PROJECT MANUAL

MARICOPA COUNTY COMMUNITY COLLEGE DISTRICT
General Obligation Bond Major Maintenance Program

2021 District-Wide
Pavement Maintenance
VOLUME I

Bid Number: 3477-2

Chandler Gilbert Community College ..... **CGCC**
Chandler Gilbert Community College @ Williams ..... **CGCC@ W**
District Support Services Center ..... **DSSC**
District Support Services Center @ Wood St ..... **DSSC @ Wood St**
District Support Services Center @ Emerald Point ..... **DSSC @EP**
Estrella Mountain Community College ..... **EMCC**
Gateway Community College ..... **GWCC**
Glendale Community College ..... **GCC**
Glendale Community College North ..... **GCCN**
Maricopa Skills Center ..... **MSC**
Mesa Community College ..... **MCC**
Mesa Community College at Red Mountain ..... **MCC @ RM**
Paradise Valley Community College ..... **PVCC**
Paradise Valley Community College at Black Mountain ..... **PVCC @ BM**
Phoenix College ..... **PC**
Phoenix College @ Downtown ..... **PC@ DT**
Rio Salado College @ Avondale ..... **RSC@ Avondale**
Rio Salado College @ Downtown ..... **RSC@ 7th**
Rio Salado College @ Tempe/Hohokam Building ..... **RSC @T**
Rio Salado College @ Northern ..... **RSC@ Northern**
Rio Salado College @ Park ..... **RSC@ Park**
Rio Salado College @ Queen Creek ..... **RSC@ Queen Creek**
Rio Salado College @ Southern ..... **RSC@ Southern**
Rio Salado College @ Sun City ..... **RSC@ SC**
Rio Salado College @ Thomas ..... **RSC @ Thomas**
Scottsdale Community College ..... **SCC**
South Mountain Community College ..... **SMCC**

FPD Project No. 21.1641

CONSULTANT:
Terracon Consultants, Inc.
4685 South Ash Avenue, Suite H-4
Tempe, Arizona 85282
(480) 897-8200
Fax: (480) 897-1133

PROJECT MANAGER:
Facilities Planning and Development
District Support Services Center (DSSC)
2411 West 14th Street
Tempe, Arizona 85281-6941
Manager: Mr. Randy Rossow, Architect

MCCCD Purchasing Buyer
Mr. Ren Carlson
Purchasing Department
District Support Services Center (DSSC)
2411 West 14th Street
Tempe, Arizona 85281-6941
Phone: (480) 731-8519
Fax: (480) 731-8190
Email: Ren.Carlson@domail.maricopa.edu

MARICOPA COMMUNITY COLLEGES

BID SET NO.

PROJECT MANUAL

CONSULTANT

Terracon Consultants, Inc.
4685 South Ash Avenue, Suite H-4
Tempe, Arizona 85282

1. *Jennifer K. Tran, P.E., Sr. Project Manager*
2. *Donald R. Clark, P.E., Senior Principal*

Office: 480.897.8200
Fax: 480.897.1133
Mobile: 619-252-0664

PROJECT MANAGER

Maricopa County Community College District
Facilities Planning and Development
District Support Services Center (DSSC)
2411 West 14th Street
Tempe, Arizona 85281-6941

Randy Rossow, Architect
Office: 480.731.8237

This document is Volume I of the Contract Documents.

The Plan Pages comprise Volume II of the Contract Documents.

JOB SITE CONTACTS

Chandler Gilbert Community College (CGCC)
2626 East Pecos Road
Chandler, Arizona 85225

Joshua Doddroe, Coll. Facilities Dir
office: (480) 726-4140

Chandler Gilbert Community College @ Williams (CGCC@ W)
7360 East Tahoe Avenue
Mesa, Arizona 85212

Joshua Doddroe, Coll. Facilities Dir
office: (480) 726-4140

District Support Services Center (DSSC)
2411 West 14th Street
Tempe, Arizona 85281

Brian Barry, Coll. Facilities Dir
office: (480) 731-8840

District Support Services Center – Emerald Point (DSSC- EP)
2419 West 14th Street
Tempe, Arizona 85281

Brian Barry, Coll. Facilities Dir
office: (480) 731-8840

District Support Services Center – Wood Street (DSSC- Wood St)
4110 East Wood Street
Phoenix, Arizona 85040

Brian Barry, Coll. Facilities Dir
office: (480) 731-8840

Estrella Mountain Community College (EMCC)
3000 North Dysart Road
Avondale, Arizona 85323

Randy Naughton, Facilities Manager
Office: (623) 935-8295

Gateway Community College (GWCC)
108 North 40th Street
Phoenix, Arizona 85034

Jamie Aldama, Mgr. Facility Op's.
office: (602) 286-8242

Glendale Community College (GCC)
6000 West Olive Avenue
Glendale, Arizona 85302

Al Gonzales, Coll. Facilities Dir
office: (623) 845-3035

Glendale Community College North (GCCN)
5727 W. Happy Valley Road
Phoenix, Arizona 85310

Scott Vogland*, Maintenance and Operations Manager*
office: (623) 845-4051

Hohokam Building (Hohokam)
1480 South Hohokam Drive
Tempe, Arizona 85281

Richard Oros, Coll. Facilities Dir
office: (623) 243-2790

Maricopa Skill Center (MSC)
1245 East Buckeye Road
Phoenix, Arizona 85034

Steve Bowersock, Maintenance and Operations Supervisor
Office: (602) 238-4319

Mesa Community College (MCC)
1833 West Southern Avenue
Mesa, Arizona 85202

Steve Acevedo, Facilities Dir
office: (480) 461-7095

Mesa Community College @ Red Mountain (MCC@RM)
7110 East McKellips Road
Mesa, Arizona 85207

David Mesbergen, Bldg Operations Manager office: (480) 654-7213

Paradise Valley Community College (PVCC)
18401 North 32nd Street
Phoenix, Arizona 85032

Bob Garcia, *Facilities Dir.*
office: (602) 787-6688

Paradise Valley Community College @ Black Mountain (PVCC @ BM)
34250 North 60th Street
Scottsdale, Arizona 85265

Bob Garcia, *Facilities Dir.*
office: (602) 787-6688

Phoenix College (PC)
1202 West Thomas Road
Phoenix, Arizona 85013

Doug McCarthy, Coll. Facilities Dir
office: (602) 285-7245

Phoenix College- Nursing (PC- Nursing)
3700 North 3rd Ave
Phoenix, Arizona 85013

Doug McCarthy, Coll. Facilities Dir
office: (602) 285-7245

Phoenix College- Downtown (PC@DT)
640 North 1St Avenue
Phoenix, Arizona 85003

Doug McCarthy, Coll. Facilities Dir
office: (602) 285-7245

Rio Salado College- Downtown
(RSC-DT)
619 N. 7th Avenue
Phoenix, Arizona 85007

Richard Oros, Coll. Facilities Dir
office: (623) 243-2790

Rio Salado College - Northern (RSC- Northern)
1715 West Northern Avenue
Phoenix, Arizona 85021

Richard Oros, Coll. Facilities Dir
office: (623) 243-2790

Rio Salado College- Park (RSC- Park)
2250 West 14th Street
Tempe, Arizona 85281

Richard Oros, Coll. Facilities Dir
office: (623) 243-2790

Rio Salado College- Southern (RSC- Southern)
3320 S. Price Road
Tempe, Arizona 85282

Richard Oros, Coll. Facilities Dir
office: (623) 243-2790

Rio Salado College @ Sun City
(RSC@ SC)
12535 West Smokey Drive
Surprise, Arizona 85374

Richard Oros, Coll. Facilities Dir
office: (623) 243-2790

Rio Salado College @ Tempe
(RSC@ T)
2323 West 14th Street
Tempe, Arizona 85281

Richard Oros, Coll. Facilities Dir
office: (623) 243-2790

Rio Salado College @ Thomas
(RSC@ Thomas)
3631 West Thomas Road
Phoenix, Arizona 85005

Richard Oros, Coll. Facilities Dir
office: (623) 243-2790

South Mountain Community College (SMCC)
7050 South 24th Street
Phoenix, Arizona 85040

David Bannenberg, Interim Facility Director, (602) 243-8062

Rio Salado College - Avondale
(RSC- Avondale)
420 N. Central Avenue
Avondale, Arizona 85323

Richard Oros, Coll. Facilities Dir
office: (623) 243-2790

Rio Salado College- Queen Creek
(RSC- Queen Creek)
Ellsworth & Ocotillo Road
Queen Creek, Arizona 85142

Richard Oros, Coll. Facilities Dir
office: (623) 243-2790

Scottsdale Community College
(SCC)
9000 East Chaparral Road
Scottsdale, Arizona 85256

Anthony Miele, Coll. Facilities Dir.
office: (480) 423-6003

PROJECT MANUAL

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PART 1
INFORMATION FOR BIDDERS

MARICOPA COUNTY COMMUNITY COLLEGE DISTRICT
2021 District-Wide Pavement Maintenance
FPD PROJECT NO. 21.1641
INVITATION FOR BID #3477-2

Consultant Contacts:

Ms. Jennifer K. Tran, P.E., Project Manager
Mr. Donald R. Clark, P.E., Senior Principal
Terracon Consultants, Inc.
4685 South Ash Avenue, Suite H-4
Tempe, Arizona 85282
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MCCCD Project Manager

Mr. Randy Rossow, Architect
Maricopa County Community College District
Facilities Planning and Development
Phone: (480) 731-8237
Fax: (480) 731-8235

MCCCD Purchasing Buyer

Mr. Ren Carlson
Maricopa County Community College District
Purchasing Department
Phone: (480) 731-8519
Fax: (480) 731-8190

PROJECT DESCRIPTION: Asphalt pavement reconstruction, patching, microsurfacing, crack sealing, and pavement marking, stenciling and fire lane painting at various parking lots & roadways at various campuses.

DATE OF FINAL COMPLETION: Sunday, August 1, 2021

SCHEDULE OF EVENTS

ACTIVITY DATE

1. Release Bid Documents.....……**Tuesday, February 23, 2021**
   The Bid Documents include a Project Manual (Volume I) and Plans (Volume II). The Bid Documents are available only as an on-line download.

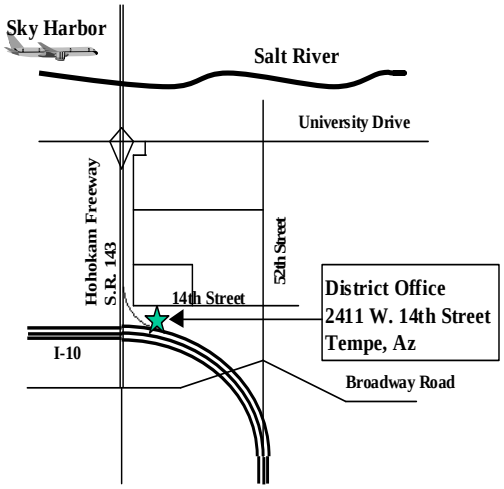
   Documents are available via the MCCCD Purchasing Department website at:
   https://procurement.maricopa.edu/

2. Pre-bid Conference.……**9:00 am, Wednesday, March 3, 2021**

   A non-mandatory pre-bid meeting will be held on Tuesday, March 3, 2021, at 9:00am, in Room 134 (Employee Lounge) at:
   District Support Services Center
   2411 West 14th St.
   Tempe, Arizona.

3. Cut-off date for Prior Approvals and RFI's……**3:00 pm, Friday, March 19, 2021**

   Not later than 3:00pm Friday, March 19, 2021.
   All requests must be submitted **to the Consultant directly**, not to the Owner.



4. Bids Due: **Prior to 2:00:00 pm, Tuesday, March 30, 2021**
   at the Lobby Reception Desk of the District Support Services Center, 2411 West 14th St. Tempe, Arizona. This is located between Broadway and University, west of 52nd Street, in Tempe.
   When delivering your Bid/Proposal please allow for sufficient time to check in through the Security.

   The public bid opening will follow shortly after 2:00pm.

5. Notice of Contract Award (estimated) ..... ……..**O/A Thursday, April 29, 2021**

6. The Notice to Proceed and Purchase Order will be issued as soon as the contract is signed and returned, along with Bonds and Certificates of Insurance. **Time is of the essence**

7. Schedule for Work……**Start: On or about Monday, May 17, 2021.**
   Final Completion not later than Sunday, August 1, 2021.
   The work in this Contract must be done in a specific order to maintain, as much as possible, operation of the facilities at all times. Work at the campuses **must** be scheduled in coordination with the Campus Facilities Managers. There may be blackout dates, when special events or activities will take precedence over the work.

INSTRUCTIONS TO BIDDERS

PURPOSE OF BID. The Maricopa County Community Colleges District (MCCCD) is accepting sealed bids to select a Contractor to provide all materials, labor, taxes, bonds, and insurance for the following:

Project: 2021 District-Wide Summer Pavement Maintenance

At: Multiple Campuses

CONTRACTS WITH MINORITY VENDORS Subcontracts or partnerships with minority or women owned firms and businesses are encouraged, but are not otherwise required.

BID SUBMISSION. It shall be the **responsibility of the Bidders** to assure that Bids are received as follows:

The Bid packet must contain one (1) original, one (1) copy of the Bid and one (1) thumb drive with the bid in pdf format. The original must be clearly marked **"Original".**

The Bid must be delivered Sealed.

The Bids must be received at the Main Reception Desk of MCCCD, 2411 West 14th St., Tempe, Arizona, 85281, no later than the time and date noted on the Calendar of Events.

☛ **When delivering your Bid/Proposal, please allow for sufficient time to check in through the Security Desk.**

Bids received after this time and date shall not be considered and will be returned unopened.
The following information must be clearly visible **on the Bid Packaging:**

Invitation for Bid # 3477-2 Project #: 21.1641

Project: 2021 District-Wide Pavement Maintenance

Located at: Multiple Campuses

Bid Closing Date: Tuesday, March 30, 2021 prior to 2:00:00 pm (Local Time)

Bid time shall be determined as the time stated, zero seconds (e.g., 2:00:00 p.m.). Bids received after that time (e.g., 2:00:01 or later) are considered late and will not be accepted. Bids must be in the Purchasing representative's hands by the submittal time stated to be considered as being "received". Bidders shall confirm the time and location of the official bid clock and coordinate their own clock or watch to assure themselves of timely delivery of the bid. Timely delivery of the bid into the representative's hand prior to bid submittal time is the obligation of the Bidder. Bids not delivered per these requirements will be rejected and will not be considered, even if inadvertently accepted, time stamped or read aloud at the Bid opening.

BID EVALUATION: This Invitation for Bids does not constitute a commitment by the District to award a contract. The District reserves the right to waive any formalities and to reject any or all bids and/or to cancel the Invitation for Bids. The award shall be made on the bid(s) that best serve the interests of the District and may not be evaluated solely on a monetary basis. **No contract award shall exist until executed in writing.**

QUALIFICATION OF BIDDER:

Each Bidder shall submit along with his bid a completed statement of qualifications on the form provided herein. When requested by the District, each Bidder shall also submit a completed statement of qualifications for each of his proposed subcontractors within twenty-four (24) hours from the time the final list

is submitted. Prior to Contract award or within seven (7) days of the Owner's request to do so, the successful Bidder shall be prepared to demonstrate that his present organization, direct labor force and prior work experience is of adequate size and development to maintain responsible control of the project and to schedule, coordinate and perform the work in an expeditious manner and in accordance with the Contract Documents.

The contract will be awarded to the lowest responsive and responsible Bidder, and whose bid is considered to be in the best interest of the Owner. The Lowest Bidder is determined by the aggregate amount of the unit prices set forth in the Form of Bid or the aggregate amount of the Base Bid, plus any alternates selected by the Owner, including sales tax for each priced item.

A Responsive Bidder shall mean a Bidder who has submitted a bid that conforms, in all material respects, to the Bidding Documents.

A Responsible Bidder shall mean a Bidder who has the capability, in all respects, to perform fully the contract requirements and the moral and business integrity and reliability that will assure good faith performance. In determining responsibility, the following criteria will be considered:

1. The ability, capacity and skill of the Bidder to perform the contract or provide the service required;

2. Whether the Bidder can perform the contract or provide the service promptly, or within the time specified, without delay or interference;

3. The character, integrity, reputation, judgment, experience and efficiency of the Bidder;

4. The quality of performance of previous contracts or services. For example the following information will be considered:

    a. The administrative and consultant cost overruns incurred by Owners on previous contract with Bidder,

    b. The Bidder's compliance record with contract general conditions on other projects,

    c. The submittal by the Bidder of excessive and/or unsubstantiated extra cost proposals and claims on other projects,

    d. The Bidders record for completion of the work within the Contract Time or within Contract Milestones and Bidders compliance with scheduling and coordinating requirements on other projects, including Contractor’s propensity to run significantly behind schedule for most of a project,

    e. The Bidder's demonstrated cooperation with the Owner or Design Consultant and other contractors on previous contracts,

    f. Whether the work performed and materials furnished on previous contracts was in accordance with the Contract Documents;

    g. Whether the Contractor has received a written Notice of potential Default for cause or Termination for cause, whether or not termination or default actually occurred, on any prior District projects or projects for any other owner within the previous five years.

    h. Whether the Contractor has defaulted, been terminated, or had projects taken over by the owner or surety, on any prior District projects or projects for any other owner within the previous five years.

5. The previous and existing compliance by the Bidder with laws and ordinances relating to contracts or services;

6. The proposed prices bid are materially unbalanced between line items. A bid is materially unbalanced when, despite an acceptable total evaluated price, the price of one or more contract line items is significantly overstated or understated and there is a reasonable doubt that the bid will result in the lowest overall cost to Owner, even though it may be the low evaluated bid.

7. The sufficiency of the financial resources and ability of the Bidder to perform the contract or provide the service;

8. The quality, availability and adaptability of the goods or services to the particular use required;

9. The ability of the Bidder to provide future maintenance and service for the warranty period of the contract;

10. Whether the Bidder is in arrears to the Owner on debt or contract or is a defaulter on surety to the Owner;

11. Such other information as may be secured by the Owner having a bearing on the decision to award the contract, to include, but not limited to:

    a. The ability, experience and commitment of the Bidder to properly and reasonably plan, schedule, coordinate and execute the work,

    b. Whether the Bidder has ever been debarred from bidding or found ineligible for bidding on any other projects, for this or other Owners.

Conditional bids will not be accepted.

REFERENCES:

To meet minimum requirements, the Bidder shall furnish a minimum of five (5) references for which the bidder has provided services on a contract similar in scope (dollar amount, complexity and type of construction) to those described in this IFB. Prior to award, the references will be checked and verified. At the sole discretion of the District, a poor or bad reference(s) (whether from listed references or other owners or designers from recent work) may cause the bidder to be rejected as non-responsive. References shall be listed in ATTACHMENT "B", STATEMENT OF BIDDER'S QUALIFICATIONS, in the Form of Proposal.

PROPRIETARY INFORMATION: In the event any Bidder shall include in their bid any information deemed proprietary or protected, such information shall be separately packaged from the balance of the Bid Forms and clearly marked as to any proprietary claim. The District discourages the submission of such information and undertakes to provide no more than reasonable efforts to protect the proprietary nature of such information. The District, as a public entity, cannot and does not warrant that proprietary information will not be disclosed. The District shall have the right to use any or all information included in the bids submitted unless the information is expressly restricted by the Bidder. Pricing is not considered proprietary information.

BID FORMS: **All bids must be submitted on the Bid Forms provided.** No oral, telephone, or telegraphic bids or modifications will be considered. Facsimile (fax machine) or computer data transfer submittals will not be accepted.

WITHDRAWAL OF BIDS: Any Bidder may withdraw their bid by written notification at any time prior to the deadline set for receipt of bids. No bid may be withdrawn or modified after that deadline and shall be binding upon the Bidder for a period of sixty (60) days after the bid closing date. Withdrawn bids may be resubmitted

up to the time designated for the receipt of bids provided that they are then fully in conformance with the general terms and conditions of the Project Documents.

COST OF PREPARING BIDS: Any and all costs associated with the preparation of responses to this Invitation for Bids including site visits, oral presentations, and any other costs shall be entirely the responsibility of the Bidder and shall not be reimbursable in any manner by the District.

AWARD WITHOUT DISCUSSION: The District reserves the right to make an award without further discussion of the bids received. It is therefore critical that all bids be submitted initially in the most favorable terms possible, both economically and technically.

CONTRACT ASSIGNMENT: Any resultant Contract, in part or in whole, **shall not** be subcontracted or assigned to another Contractor **without prior written permission of the appropriate District authority.**

MCCCD MODIFICATION TO BIDS: Any interpretation, correction, or change of this Invitation for Bids will be made by written Addendum. Interpretations, corrections, or changes made in any other manner will not be binding, and Bidders shall not rely upon such interpretations, corrections, and changes. Any changes or corrections will be issued by MCCCD or their consultant. Addenda will be distributed to all who are known to have received a copy of the Bid Documents. All addenda must be acknowledged on the bid form.

BIDDER MODIFICATION: Prior to the time and date designated for receipt of bids, bids submitted early may be modified or withdrawn only by notice to MCCCD. Such notice must be received by MCCCD prior to the time designated for receipt of bids by MCCCD at the address provided herein.

ALTERNATES/SUBSTITUTIONS: Except as mentioned below, any manufacturer's name, trade name or model number shown are for the purpose of establishing minimum levels regarding capability, quality, and function. Whenever such a brand name is shown, it is understood to mean OR ACCEPTABLE ALTERNATE. Bids will be considered for brand names meeting the minimum levels with the following stipulations: Alternate materials accompanied by full descriptive literature must be submitted for prior approval at least eight (8) calendar days prior to bid. Only materials which are specified or receive prior approval may be used in this work. Please use the Substitution Request Form "Attachment C" when submitting for prior approvals.

The Owner will make the sole determination as to the suitability of the alternate item bid with regard to compliance with minimum performance levels, characteristics, or features which may affect minimum levels, and budgetary considerations.

BID SECURITY: Bid security shall be made payable to: Maricopa County Community College District, in the amount of ten percent (10%) of the total amount of the Contract. Security shall be either certified check or bid bond issued by a surety company licensed to conduct business in the State of Arizona. The successful Bidder's security shall be retained until the Contract is signed and the required Performance and Payment Bonds have been furnished. If any Bidder refuses to enter into a Contract, the District will retain the Bid Security as liquidated damages but not as a penalty.

PERFORMANCE AND PAYMENT BONDS: The successful Bidder shall furnish a Performance Bond in an amount equal to one hundred percent (100%) of the Contract Sum as security for the faithful performance of this Contract and also a Labor and Material Payment Bond in an amount not less than one hundred percent (100%) of the Contract Sum, as a security for the payment of all persons performing labor and furnishing materials for this Contract. The cost of these Bonds shall be borne by the Contractor and the amount shall be included in the bid proposal price. Bonds shall be made payable to Maricopa County Community College District.

GENERAL TERMS AND CONDITIONS

The following General Conditions constitute the provisions of the agreement to be executed between the District and the successful Bidder. The District reserves the right to negotiate with the successful Bidder and modify any of the provisions of the agreement prior to execution.

PARTIES TO AGREEMENT: The Contract shall be between the Maricopa County Community College District, hereafter referred to as District, and the successful Bidder, hereafter referred to as Contractor.

LIABILITY FOR TAXES: The Contractor assumes complete liability for all taxes applicable to the operations, income, and transactions of the Contractor. The District/Institution shall not be liable for, and will not make reimbursement to the Contractor, any tax imposed either directly or indirectly upon the Contractor by any authority by reason of the Contract or otherwise.

FEDERAL EXCISE TAX: The Maricopa County Community College District is exempt from Federal Excise Tax.

USE TAX: The Maricopa County Community College District pays out-of-state Use Tax directly to the State of Arizona.

CATASTROPHES: If, because of riots, war, public emergency or calamity, fire, earthquake, act of God, government restriction, labor disturbance or strike, business operations at the Institution are interrupted or stopped, performance of this Contract, with the exception of moneys already due and owing, shall be suspended and excused to the extent commensurate with such interfering occurrence; and the expiration date of this Contract may by mutual agreement of `both parties be extended for a period of time equal to the time that such default in performance is excused.

PERMITS, LICENSES AND BONDING: The Contractor shall be financially responsible for obtaining all required permits, licenses, and bonding to comply with all pertinent municipal, county, state and federal laws, and assume liability for all applicable taxes including, but not restricted to, sales and personal property taxes.

Each bidder shall be an Arizona licensed Contractor and be appropriately licensed for the intended work at the time of bid submission. It is the contractor's responsibility to assure that the State of Arizona Registrar of Contractor's license proposed for this project allow the contractor to perform the full scope of work if it is not a B-01 or B-02 General Commercial Contractor license. In general interpretation, a Specialty Commercial Contracting license will allow a minor amount of subcontracted work to trades outside the specialty license if that work is both directly related to the main work of the project, does not represent a significant percentage of the total contract value (usually 15% or less) and is, in itself, not significant. Examples of what has been allowed is subcontracting of concrete work for concrete patching or concrete pole bases for an exterior electrical lighting contract, or extension of or new electrical circuits from existing circuit breakers needed in an HVAC renovation project. Examples of what has not been allowed to be subcontracted under a Specialty Commercial Contractor license would be providing new electrical panels in the same HVAC renovation project, installing new lay-in ceiling tile throughout a large area when only a small portion was needed in the immediate area of a small replacement air handler, etc.)

Other than for Scottsdale Community College, no municipal building permit is required for construction work on District Property.

Scottsdale Community College. **Scottsdale Community College falls under the jurisdiction of the Salt River Pima Maricopa Indian Community (SRPMIC). The SRPMIC also has specific tax, business license and other requirements of contractors. Please contact SRPMIC to ascertain all of the costs and requirements for work in the Community.** See the separate specification section listing these requirements.

PROVISION OF SUPPLIES, MATERIALS AND LABOR: The Contractor shall furnish all supplies, transportation, equipment, and all management and labor necessary for the efficient and sound provision of the products and installation services included in this Contract, subsequent extensions, and amendments.

NON-DISCRIMINATION: In connection with the performance of work under this Contract, the Contractor agrees not to discriminate against any employee or applicant for employment because of age, race, religion, color, sex, physical condition, developmental disability, or national origin. This provision shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rate of pay or other forms of compensation, and selection for training,

including apprenticeship. The Contractor further agrees to take affirmative action to insure equal employment opportunities for persons with disabilities.

COMPLIANCE WITH LAWS: The Contractor shall at all times comply with the Federal Immigration Reform and Control Act of 1986 (and by any subsequent amendments thereto) and shall indemnify and hold harmless the District from any and all costs or expenses whatsoever arising out of the Contractor's compliance or noncompliance therewith.

LEGAL WORKER REQUIREMENTS: Contractors are reminded that as mandated by Arizona Revised Statutes § 41-4401, Maricopa is prohibited from awarding a contract to any contractor who fails, or whose subcontractors fail, to comply with the requirements to verify the employment eligibility of their employees through the Federal E-verify system. Note that this also applies to all subcontractors and sub-consultants that you may use for this work. See Maricopa agreements for this proposed work for additional detail.

NON-COLLUSION: MCCCD encourages free and open competition. Whenever possible, specifications, bid invitations and conditions are designed to accomplish this objective, consistent with the necessity to satisfy MCCCD's needs and the accomplishment of a sound economical operation.

The Bidder's signature on this Bid, **including Attachment "A",** guarantees that the prices offered have been established without collusion with other eligible Bidders and without effort to preclude MCCCD from obtaining the lowest possible competitive price. The award will be made to the responsible offeror whose bid is determined to be the most advantageous to MCCCD based on the evaluation factors in this Invitation for Bid. Attachment “A” must be included with the bid package.

CONTRACT TERMINATION: In addition to the termination considerations shown the in Contract Conditions, The following conditions describe the possible options which may predicate a termination of the Contract:

Termination by the District: The District may terminate this Contract for neglect as determined by the District which shall consider such items as: insufficient insurance coverage, failure to provide required periodical statements or payments due on or before the fifteenth day of each month, failure to enforce required standards of sanitation, failure to keep wage payments to employees current, or quality of service deemed unsatisfactory to the District. This may include any cessation or diminution of service included, but not limited to, failure to maintain adequate personnel, whether arising form labor disputes, or otherwise or any substantial change in ownership or proprietorship of the Contractor who in the opinion of the District is not in its best interest or failure to comply with the terms of this Contract. The District shall provide ten (10) calendar days written notice of contract neglect, and unless within ten (10) calendar days such neglect has ceased, and arrangements made to correct, the District may terminate the Contract by giving ten(10) days notice in writing by registered or certified mail of its intention to cancel this Contract.

Termination by Contractor: Should the Institution breach any terms or provisions of this Contract, the Contractor shall serve written notice on the Institution setting forth the alleged breach and demanding compliance with the Contract. Unless within ten (10) calendar days after receiving such notice, the allegation shall be contested or such breach shall cease and arrangements made for corrections, the Contractor may terminate the Contract by giving ten (10) days notice in writing by registered or certified mail of its intention to cancel this Contract.

LIQUIDATED DAMAGES: Should the Contractor fail to substantially complete the Work on or before the date stipulated for Substantial Completion (or such later date as may result from extension of time granted by Owner), he shall pay the Owner, as liquidated damages, the sum as shown on the Owner-Contractor Agreement for each consecutive calendar day that terms of the Contract remain unfulfilled beyond the date allowed by the Contract, which sum is agreed upon as a reasonable and proper measure of damages which the Owner will sustain per day by failure of the Contractor to complete the work within the stipulated time period; it being recognized by the Owner and the Contractor that the injury to the Owner which could result from a failure of the Contractor to complete on schedule is uncertain and cannot be computed exactly. In no way shall costs for liquidated damages be construed as a penalty on the Contractor.

INSURANCE REQUIREMENTS: Without limiting any of their obligations or liabilities, the Contractor, at Contractor’s own expense, shall purchase and maintain for the duration of this Contract the hereafter

stipulated minimum insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the Work hereunder by the Contractor, its agents, representatives, employees, or subcontractors. Such insurance shall be with companies duly licensed or approved unlicensed to do business in the State of Arizona with policies and forms satisfactory to the Maricopa County Community College District (MCCCD). Each insurer shall have a current Best rating of not less than A: VII. Use of alternative insurers requires prior approval of MCCCD. Contractor shall include all subcontractors as insured's under its policies or shall furnish separate certificates of insurance and endorsements for each subcontractor. All coverage's for subcontractors shall be subject to all of the insurance requirements stated herein.

To the fullest extent permitted by law, the Contractor shall defend, indemnify and hold harmless the Maricopa County Community College District, its agents, representatives, officers, directors, officials and employees relating to, arising out of, resulting from or alleged to have resulted from the performance of the Work. Contractor's duty to defend, indemnify and hold harmless the Maricopa County Community College District, its agents, representatives, officers, directors, officials and employees shall arise in connection with any claim, damage, loss or expense (including but not limited to attorney's fees, court costs and the cost of appellate proceedings) that is attributable to personal or bodily injury, sickness, disease, death, injury to, impairment or destruction of property including loss of use resulting there from, caused by any act or omission caused by the sole or partial negligence of the Contractor, subcontractor, or anyone directly or indirectly employed by them or anyone for whose acts they may be liable.

The insurance policies, except Workers' Compensation, required by this Contract, shall name MCCCD, its agents, representatives, officers, directors, officials, employees, volunteers, and consultants as Additional Insured, and shall specify that insurance afforded the Contractor shall be primary insurance, and that any insurance coverage carried by the entity or its employees shall be excess coverage, and not contributory coverage to that provided by the Contractor. The Commercial General Liability additional insured endorsement will be at least as broad as the Insurance Service Office, Inc.'s Additional Insured, Form B, CG 20101185, or any replacements thereof.

The MCCCD and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other, and (2) the Consultant, Consultant's sub-consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other perils to the extent covered by **Builder's Risk insurance** applicable to the Work, except such rights as they have to proceeds of such insurance held by the MCCCD or Contractor as fiduciary. The MCCCD or Contractor, as appropriate, shall require of the Consultant, Consultant's sub-consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged. The coverage's shall contain no special limitations on the scope of protection afforded to MCCCD, its agents, representatives, officers, directors, officials, employees, and volunteers.

All insurance policies required herein shall be maintained in full force and effect until all Work required to be performed under the terms of the Contract is satisfactorily completed and formally accepted; failure to do so may constitute a material breach of this Contract upon which MCCCD may immediately terminate the Contract or, at its discretion, procure or renew such insurance and pay any and all premiums in connection therewith, and all monies so paid by MCCCD shall be repaid by Contractor to the MCCCD upon demand, or MCCCD may offset the cost of the premiums against any monies due to the Contractor from MCCCD. Costs for coverage's maintained by Contractor in excess of those required shall not be charged to the MCCCD without prior written approval of MCCCD.

The Contractor's insurance shall be primary insurance as respect MCCCD, and any insurance or self insurance maintained by MCCCD shall be excess of the Contractor's and shall not contribute to it. Any failure

to comply with the claim reporting provisions of the policies or any breach of a policy warranty shall not affect coverage afforded under the policy to protect MCCCD.

The policies may provide coverage that contains deductible or self-insured retentions. Such deductible and/or self insured retentions shall not be applicable with respect to the coverage provided to MCCCD under such policies. The Contractor shall be solely responsible for deductibles and/or self-insured retentions and MCCCD, at its option, may require the Contractor to secure the payment of such deductibles or self-insured retentions by a surety bond or an irrevocable and unconditional letter of credit. (However, evidence of qualified self-insured status will satisfy this agreement.) The insurance policies that contain deductibles or self-insured retentions in excess of $100,000 per occurrence shall not be acceptable without the prior approval of MCCCD.

MCCCD reserves the right to request and to receive, within 10 working days, complete certified copies of any or all of the policies and/or endorsements. MCCCD shall not be obligated, however, to review same or to advise Contractor of any deficiencies in such policies and endorsements, and such receipt shall not relieve Contractor from, or be deemed waiver of, MCCCD's right to insist on, and strict fulfillment of Contractor's obligations under this Contract.

At the execution of this Contract, Contractor shall furnish the MCCCD Risk Manager with Certificates of Insurance, or formal endorsements as required by the Contract, issued by Contractor's insurer(s), as evidence that policies providing the required coverage's, conditions, and limits required by this Contract are in full force and effect. Such Certificates and endorsements shall identify the Contract or Project. Each insurance policy required by this Contract shall be endorsed to state the coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days prior written notice by certified mail, return receipt requested, has been given to the MCCCD Risk Manager.

Such notice shall be sent directly to:

Ren Carlson, Buyer
MCCCD Purchasing Department
2411 W. 14th Street
Tempe, AZ 85281

The certificates and endorsements for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. All certificates and endorsements are to be received and approved by the MCCCD before work commences. In the event any insurance policy(ies) required by this Contract is(are) written on a "claims made" basis, coverage shall extend for two years past completion and acceptance of the Contractor's work or services and as evidenced by annual certificates of insurance. If a policy expires during the life of the Contract, a renewal certificate must be sent to MCCCD thirty (30) days prior to the expiration date.

If the MCCCD finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion, such occupancy shall not commence prior to a time mutually determined by the Contractor and MCCCD. The Project insurance shall not be cancelled or lapsed on account of such partial occupancy. If the insurance company or insurance companies require notification of such occupancy, it is the responsibility of the Contractor to fulfill the terms and conditions of the insurance contract(s). If MCCCD supplied materials, furniture, or equipment are placed in the Project prior to Substantial Completion, the Contractor shall obtain permission of his insurer and provide additional coverage for these items until Substantial Completion is achieved. Consent to such early occupancy shall not be unreasonable withheld by the Contractor.

REQUIRED COVERAGES

Commercial General Liability

Contractor shall maintain Commercial General Liability insurance with an unimpaired limit of liability of not less than $5,000,000 for each occurrence with a $5,000,000 Products and Completed Operations Aggregate and a $5,000,000 General Aggregate Limit. The general aggregate limit shall apply separately to the Work under

this Contract or the general aggregate shall be twice the required per occurrence limit. The policy shall include coverage for bodily injury, broad form property damage, personal injury, products/completed operations, and blanket contractual coverage including, but not limited to, the liability assumed under the indemnification provisions of this Contract, which coverage will be at least as broad as Insurance Service Office, Inc. Policy Form CG 000211093 or any replacement thereof. The coverage shall not exclude XCU.

Such policy shall contain a severability of interest provision, and shall not contain a sunset provision or commutation clause, or any provision that would serve to limit third party over claims.

The Commercial General Liability additional insured endorsement shall be at least as broad as the Insurance Service Office, Inc.'s Additional Insured, Form B, CG20101185, and shall include coverage for Contractor's operations and products and completed operations.

The Sub-Contractor subletting any part of the work, services, or operations awarded to the Contractor shall purchase and maintain all coverages required of the General Contractor.

Builders' Risk *(NOT REQUIRED IF PROJECT IS 100% SITEWORK and NO WORK OCCURS WITHIN ANY BUILDING)*

Contractor shall purchase and maintain Builders' Risk Insurance in the amount of the initial Contract Amount as well as subsequent modifications thereto for the entire Work at the site on a replacement cost basis. Such Builders' Risk insurance shall be maintained until final payment has been made or until no person or entity other than the MCCCD has an insurable interest in the property required to be covered, whichever is earlier. This insurance shall include interests of the MCCCD, the Contractor, Subcontractors and Sub-subcontractors in the Work during the life of the Contract and course of construction, and shall continue until the Work is completed and accepted by the MCCCD. For new construction projects, the Contractor agrees to assume full responsibility for loss or damage to the Work being performed and the buildings under construction. For renovation construction projects, the Contractor agrees to assume responsibility for loss or damage to the Work being performed at least up to the full Contract Amount, unless otherwise required by the Contract Documents or amendments thereto.

Builders' Risk Insurance shall be on an all-risk policy form and shall also cover false work and temporary buildings and shall insure against risks of direct physical loss or damages from external causes including flood and earthquake debris removal, demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's service and expenses required as a result of such insured loss and other "soft costs" as required by the Contract.

Builders' Risk Insurance must provide coverage from the time any covered property becomes Contractor's responsibility, and continuing without interruption during construction, renovation, or installation, including any time during which the covered property is being transported to the construction installation site, and while on the construction site awaiting installation. The policy will provide coverage while the covered premises or any part thereof are occupied. Builders' Risk Insurance shall be primary and not contributory.

If the Contract requires testing of equipment or other similar operations, at the option of MCCCD, the Contractor will be responsible for providing proper insurance for these exposures under a Boiler & Machinery policy.

Automobile Liability

Contractor shall maintain Commercial/Business Automobile Liability insurance with a combined single limit for bodily injury and property damage of not less than $1,000,000 each occurrence with respect to any of the Contractor's owned, hired, and non-owned vehicles assigned to or used in performance of the Contractor's Work. Coverage will be at least as broad as coverage code 1, "any auto", (Insurance Service Office, Inc. Policy Form CA 0011293, or any replacements thereof). Such insurance shall include coverage for loading and off loading hazards. If hazardous substances, materials, or wastes are to be transported, MCS 90

endorsement shall be included and $5,000,000 per accident combined single limits for bodily injury and property damage shall apply.

Workers' Compensation

The Contractor shall carry Workers' Compensation insurance to cover obligations imposed by Federal and State statutes having jurisdiction of Contractor's employees engaged in the performance of the Work, and Employer's Liability insurance of not less than $1,000,000 for each accident, $1,000,000 disease for each employee, and $1,000,000 disease policy limit. In case any work is subcontracted, the Contractor will require the Subcontractor to provide Workers' Compensation and Employer's Liability insurance to at least the same extent as required of the Contractor.

Required coverage's may be modified by an amendment to the Contract Documents.

(Insurance requirements revised 8/26/03)

SAFETY PROGRAM

Contractor shall be responsible for initiating, maintaining, and supervising all safety programs in connection with this Work. Contractor shall take all necessary precautions for the safety of, and shall provide all necessary protection to prevent damage, injury, or loss to:

1. All employees on the Worksite and all other persons who may be affected thereby.
2. All the Work, materials, and equipment to be incorporated therein, whether in storage on or off the site.
3. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

Contractor shall comply will all applicable laws, ordinances, rules, and regulations of any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury, or loss. Contractor shall erect and maintain, as required by existing conditions and progress on the Work, all necessary safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying owners and users of adjacent utilities.

No existing main switches, circuit breakers or valves should be operated by the contractor. The College will provide personnel to operate, shut down or start up existing systems. When working within or adjacent to existing facilities, or when tying into existing utilities, the Contractor shall use and comply with College red tag permit systems, tag out procedures and hot work permit systems for cutting, welding, soldering, grinding, etc.

Safety Warranty

Contractor warrants that Contractor is aware of, and understands the hazards which are presented to, persons, property, and the environment relating to, and arising out of, the Contractor's work or service, as described in this Contract's scope of work or service. In the event the Contractor of Contractor's Subcontractor is working or operating in an unsafe manner, the Contractor will immediately take full and appropriate steps to assure the safety of those working in the construction area or jobsite.

PERFORMANCE BOND AND PAYMENT BOND

At the execution of this Contract, the Contractor shall file with the MCCCD, a performance bond and a payment bond on MCCCD approved forms in the full amount of the Contract pursuant to A.R.S. 41-2574. The cost of the bonds shall be included in the Contract Sum, and the bonds shall be payable to the Maricopa County Community College District. The Contractor shall require the attorney-in-fact that executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the Power of Attorney. The bonds required by this section shall be provided solely by one or more surety companies holding a Certificate of Authority to transact surety business in this State issued by the Director of the Department of

Insurance pursuant to A.R.S. 20, Chapter 2, Article 1. Individual surety or sureties shall not execute the surety bond or bonds, even if the requirements of A.R.S. 7-101 are satisfied.

Upon request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall permit copies to be made.

PART 2
FORM OF PROPOSAL

MARICOPA COUNTY COMMUNITY COLLEGE DISTRICT
2021 District-Wide Pavement Maintenance
FPD PROJECT NO. 21.1641
INVITATION FOR BID #3477-2

FORM OF PROPOSAL

Date _____ Time _____

TO: Maricopa County Community College District Governing Board OWNER

2411 West 14th Street ADDRESS

Tempe, Arizona 85281 CITY/STATE

FROM: _____ BIDDER

_____ ADDRESS

_____ CITY/STATE

Operating as (strike out conditions that do not apply) an individual, a Company, A Corporation organized and existing under the law of the State of Arizona, or a Proprietorship, a Partnership, or Joint Venture consisting of _____

_____

BASE BID PROPOSAL:

When delivering your Bid/Proposal please allow for sufficient time to check in through the Security Desk.

1. Having become completely familiar with the local conditions affecting the cost of work at the place where work is to be executed, and having carefully examined the site conditions as they currently exist, and having carefully examined the bidding document for the following project:

2021 District-Wide Pavement Maintenance

(Bid Package Designation 3477-2) together with any addenda to such Bidding Documents as listed hereinafter,

Total Allowance amount to be **included** in Base Bid below (see Contract Conditions) $ 25,000.00

(note: The Contractor is to include in his base bid all overhead and profit markups, and all markups related to bonds, insurance, taxes, etc., to be applied to direct contractor labor and materials or subcontractor work, including markups, for performing allowance account work as directed by the Owner.)

The undersigned hereby proposes and agrees to provide all labor, materials, plant, equipment, transportation taxes, allowances, and other facilities as necessary and/or required to execute all of the work described by the aforesaid Bidding Documents for the lump sum consideration of:

_____ Dollars ($_____)*

*(***Including all applicable sales tax***.)

said amount being hereinafter referred to as the Base Bid or Bid Proposal.

2. If notified of acceptance of this proposal and contract award within sixty (60) calendar days after receipt of bids, the undersigned agrees to execute a contract for the above-named project work and the above-stated consideration on the form required, within ten (10) calendar days of such notification. The undersigned hereby designates the office address stated on the first page of this proposal as the address to which a Notice to Award of this construction contract may be delivered and to which all office correspondence and notices be mailed, faxed or delivered and to which all office correspondence and notices may be mailed, faxed or delivered, unless the Owner is otherwise notified in writing.

3. The undersigned proposes to perform alternatives for stated resulting additions to or deductions from the Base Bid. Additions and deductions shall include any modifications of work or additional work that undersigned may be required to perform by reason for the acceptance of any alternative, and represent actual, not assigned, costs for the work described. (Note: Include all alternatives as required by Bidding Documents.)

Alternative Proposals: **NONE**

Unit Cost proposals:

Unit Costs (including sales tax) [1]				
No.	**Description[1]**	**Units**	**Unit Cost**	**Unit Cost (written)**
1	Traffic Signs (stop, wrong way, do not enter, etc.)	Each		
2	Parking Lot Signs & Placards (carpool only, no parking – fire lane, reserved parking, van accessible, etc.)	Each		
3	Standard steel channel post[2]	Each		
4	Square section steel post with telescope insert style mount[3] (Tele-post)	Each		
5	Core hole for installing signposts in concrete	Each		
6	Remove damaged wheel stops	Each		
7	New Wheel Stops[4]	Each		
8	Paint Wheel Stops	Each		
9	Reuse Undamaged Wheel Stops	Each		
10	Speed Humps[5]	Each		
11	Speed Bumps[5]	Each		
12	Paint existing Speed Humps (white chevron pattern)	Each		
13	Paint existing Speed Bumps (solid yellow)	Each		
14	Initial Stripe Accessible Stalls[6]	Each		
15	Paint Existing Accessible Stalls[23]	Each		
16	Initial Stripe Restricted Stalls[7]	Each		
17	Paint Existing Restricted Stalls[23]	Each		
18	Initial Stripe Unrestricted Stalls[19]	Each		
19	Paint Existing Unrestricted Stalls[23]	Each		
20	Initial Miscellaneous Striping[8]	Lineal feet		
21	Paint Existing Miscellaneous Striping[23]	Lineal feet		
22	Initial Miscellaneous Stenciling[9]	Each		
23	Paint Existing Miscellaneous Stenciling[23]	Each		

No.	Description[1]	Units	Unit Cost	Unit Cost (written)
24	Initial Stop Bars with Stop Stencil[10]	Each		
25	Paint Existing Stop Bars with Stop Stencil[23]	Each		
26	Initial Traffic Arrows	Each		
27	Paint Existing Traffic Arrows[23]	Each		
28	Blackout[11]	Ft^2		
29	Fire Lane Red/ Yellow Curb Painting	Lineal feet		
30	Adjustment –Small Item (diameter is ≤ 18 inches)[12]	Each		
31	Adjustment- Medium, Man holes, Drywells, Storm Drains, Vault Lids (18 inches < Diameter < 3 Feet)	Each		
32	Adjustment- Large Items, Pull Boxes, Vault Lid, Etc… (Side Length ≥ 3 Feet)[13]	Each		
33	Crack Sealing[15]	Lineal feet		
34	Shallow Patching (2 inches)	Ft^2		
35	Deep Patching (5 inches)	Ft^2		
36	Pressure Wash Curb	Lineal feet		
37	Replace Single Curb[14]	Lineal feet		
38	Miscellaneous Flatwork (5 inches)[16]	Square feet		
39	Microsurfacing (Type II)[17]	Square yard		
40	5% Soil Cement Subgrade Treatment (10 inches)[18]	Square feet		
41	Pavement Sweeping[24]	Square feet		
42	Geogrid[20]	Square feet		
43	Aggregate Base Course (ABC)[21]	Ton		
44	New Pavement Construction (3" AC over 6" ABC)[22]	Square yard		
45	Asphaltic Concrete Overlay MAG ½-inch Mix, 1 ½ Inches[25]	Square yard		
46	Mill 1 ½ Inches Of Existing Asphalt Pavement	Square yard		
47	Crack Mastic (Crack> 1 ½")[26]	Lineal feet		
48	Scrub Seal	Square feet		
49	ADA Curb Ramp & Landing [27]	Each		
50	Haul Off[28]	Ton		
51	Over-excavate of AB/Subgrade	Ton		

Unit Cost Notes

Note 1: All items complete and placed/assembled/installed/painted, including striping, stencils, safety areas, etc… as applicable.

Note 2: Use channel posts in landscape areas per Plans. Signs include mounting hardware installed per manufacturer's recommendations. Per Details, bolts shall not extend beyond nuts where exposed threads could be a hazard to pedestrians.

Note 3: Use square section steel posts in pavement areas and in concrete slab areas per Plans. Square posts shall be constructed with a telescope socket concreted flush with the surface. Socket tube may include a sleeve/bushing to ensure tight fit. Per Details, bolts shall not extend beyond nuts where exposed threads could be a hazard to pedestrians.

Note 4: New wheel stops include rebar stakes.
Note 5: These items are for new speed humps and speed bumps. Unit price includes construction and striping/painting.
Note 6: Initial striping includes striping without the presence of an existing layout where surveying will be required such as after microsufacing, after reconstruction, after asphalt overlay, new parking lot, etc. Includes yellow stall and safety area striping as well as white on blue accessible symbol (sign and wheel stop separate)
Note 7: Initial striping includes striping without the presence of an existing layout where surveying will be required such as after microsufacing, after reconstruction, after asphalt overlay, new parking lot, etc. Includes colored striping and stencil per Details (sign and wheel stop separate)
Note 8: Initial miscellaneous striping includes striping without the presence of an existing layout where surveying will be required such as after microsufacing, after reconstruction, after asphalt overlay, new parking lot, etc. Miscellaneous striping includes safety areas or pedestrian crosswalks, which are yellow. On Plans, centerline stripes approaching stop bars and miscellaneous stenciling, which are white, are also indicated as miscellaneous striping.
Note 9: Initial miscellaneous stenciling includes stenciling without the presence of an existing layout where surveying will be required such as after microsufacing, after reconstruction, after asphalt overlay, new parking lot, etc. May include “No Parking,” “Loading Zone,” “Motorcycle Parking Only” drive lane number stencils, or other pavement stencils, etc…. Each stenciled word is considered one count item.
Note 10: Stop bars 12 inches wide, length varies per Plans. Stop stencil 2 foot block lettering (typical)
Note 11: Apply suitable opaque paint or bituminous product to facilitate restriping. (usually at accessible stall rows in lots that will not be microsurfaced.)
Note 12: Includes removal of asphalt, excavation to free and then adjust item (e.g. valve access sleeve, gas valve cover) to flush and concrete in place.
Note 13: Includes removal of asphalt, excavation to free and then adjust item (e.g. junction boxes, utility vault lids) to flush and concrete in place. **NOTE: a Licensed Electrician may be needed to complete work on electrical utilities.**
Note 14: Replace single curb at locations shown on the plans and installed per MAG Single Curb Type B, Detail 222.
Note 15: Unit costs for crack sealing will only apply for additional work authorized for any pavements not included in the plan set. All crack sealing included on the plans sheets will be paid for on a lump sum basis per parking lot.
Note 16: This line item is for new 5” concrete slab in the pavement. Unit price to include saw cutting pavement, placing concrete, and finishing.
Note 17: The Contractor shall remove all wheel stops in parking lots scheduled for microsurfacing prior to work. Removing and resetting of the wheel stops is incidental to the work. Resetting of wheel stops shall be in a manner consistent with the original layout unless directed otherwise by the representative of the campus.
Note 18: This line item is for treatment of 10” of subgrade below the proposed new pavement section. If soft /wet subgrade soils are encountered, Terracon should be contacted to make the determination if soil cement will be required.
Note 19: Initial striping includes striping without the presence of an existing layout where surveying will be required such as after microsufacing, after reconstruction, after asphalt overlay, new parking lot, etc.
Note 20: Geogrid shall be polyethylene. Includes delivery and installation.
Note 21: Aggregate base course per MAG specification, include delivery and installation.
Note 22: Includes removal of existing pavements and subgrade required for new sections, subgrade preparation per MAG specifications, aggregate base course per MAG specifications, asphalt concrete per MAG specifications and tack coat (where specified). Refer to the plans for the required base course and asphalt concrete types.
Note 23: Existing striping/ stenciling includes striping/ stenciling with the presence of an existing layout where surveying will not be required such as restriping over faded striping/ stenciling
Note 24: Pavement sweeping shall in be accordance with Section 900 of the project manual.
Note 25: Asphalt concrete overlay shall include the specified paving fabric. The overlay shall be MAG ½-inch mix and a minimum of 1 ½-inch in thickness. Paving fabric shall be an approved paving fabric that retards reflective cracking. The Contractor shall submit data sheet for review and approval prior to construction. The unit price shall include all required tack coat and surface preparation prior to the placement of the fabric and asphalt concrete overlay.
Note 26: Crack Mastic use on the project shall be in accordance with the specifications, Volume I and approved by the engineer. Crack Mastic shall be completed for cracks wider than 1 ½ inches. Approximate quantities (in lineal foot) are shown on the plans. Unit cost for crack mastic will only apply for additional work authorized for any pavements not included in the plans. All cracks wider than 1 ½" included on the plans sheets will be paid for on a lump sum basis per parking lot.
Note 27: ADA Curb Ramp and Landing shall be constructed in accordance with ADA Standard for Accessible Design (latest version). This work includes labor, materials, and finishing.
Note 28: Haul off includes construction materials at the site resulting from additional requested work outside of the base bid.

ADDENDA ACKNOWLEDGEMENT:

4. The undersigned acknowledges receipt of the following addenda: (List by number and date appearing on addenda.) **ALL ADDENDA MUST BE ACKNOWLEDGED, REGARDLESS OF IMPACT ON WORK.**

Addendum No.	Date	Addendum No.	Date
_____	_____	_____	_____
_____	_____	_____	_____

TIME OF COMPLETION:

5. The undersigned agrees to substantially complete all work under this Contract within the dates specified in the milestone or specific date schedule, as set forth in the Owner-Contractor Agreement and the General Conditions.

CHANGES IN WORK:

6. The undersigned agrees that should changes in the work be ordered the cost, if any, shall be determined in accordance with appropriate sections of the Contract General Conditions.

BID SECURITY:

7. Bid security in the amount of ten percent (10%) of the sum of the Base Bid without endorsement, in the sum of:

   _____ Dollars ($_____)

   that is to become the property of the Owner in the event the Contract and Performance and Payment Bonds are not executed within the time set forth, as liquidated damages for the delay and additional work caused the Owner.

8. The undersigned agrees that upon receipt of the Notice of Acceptance of his bid, he will execute the formal Contract, and will deliver all bonds and proof of insurance coverage as may be required by the Specifications.

9. The undersigned further agrees to execute the formal Contract within ten (10) days from the date of Notice of Acceptance of this Proposal, and in case the undersigned fails or neglects to appear within the specified time to execute the Contract, and the Cashier's Check or Bid Bond accompanying this Proposal will be forfeited to the Owner by reason of such failure on the part of the undersigned.

10. The undersigned further agrees that the bid security may be retained by the Owner and that said proposal guaranty shall remain with the Owner until the Contract has been signed and Performance Bond has been made and delivered to the Owner.

GENERAL STATEMENTS:

11. The undersigned has checked all of the above figures, and understands that the Owner will not be responsible for any errors or omissions on part of undersigned in preparing this Proposal.

12. In submitting this Proposal, it is understood that the right is reserved by Owner to reject any or all bids and waive all informalities in connection therewith. It is agreed that this Proposal may not be withdrawn for a period from time of bid opening as noted in paragraph two above. Award of this bid is defined as approval by the District Capital Development Executive Council or District Governing Board, as appropriate.

13. The undersigned hereby acknowledges that he has read and understands the Drawings, Specifications, Addenda and all other Contract Documents pertaining to this project. The undersigned certifies that the Contract Documents are, in his opinion, adequate, feasible and complete for performing the Work and constructing the Work in a sound and suitable manner for the use specified

and intended by the Contract Documents. The undersigned further certifies that he has, or has available, the equipment, personnel, materials, facilities and technical and financial ability necessary to complete the Work in accordance with the Contract Documents and within the time specified therein. The Bidder certifies that he has made allowances for normal inclement weather indigenous to the project site.

14. The following information is provided pursuant to the Contract Documents:

A. Legal Name of Firm: _____

1) If Firm is a corporation, state that corporation is organized under the laws of the

State of _____ Date Incorporated _____

Have your Articles of Incorporation ever been suspended or revoked?

( ) Yes ( ) No

If Yes, when, for what reason and when they were reinstated:

_____

_____

_____

_____

_____

2) If Firm is an LC or LLC, state that firm is organized under the laws of the

State of _____ Date Organized _____

Have your Articles of Organization ever been suspended or revoked?
( ) Yes ( ) No

If Yes, when, for what reason and when they were reinstated:

_____

_____

_____

_____

3) If Firm is a partnership, state names of partners:

_____

_____

4) If Firm is an individual using a trade name, state name of individual:

5) If Firm is a joint venture, state name of joint ventures:

B. Has your firm, its parent or subsidies ever debarred or suspended from providing any goods or services to any public institution or governmental agency at the Federal, State or local level?

( ) Yes ( ) No

If Yes, when, for what reason and when they were reinstated:

C. Signature of Person or Persons legally authorized to bind Bidder to a Contract. A bid submitted by an agent shall have a current Power of Attorney attached certifying the agent's authority to bind the Bidder.

1) Signature: Date:

2) Name: (Type)

3) Title: (Corporate Seal)

4) Address:

D. Licenses:

1) State of Arizona Contractor's License number(s):

2) License Classifications:

3) Business or Taxpayer I.D. number:

15. The undersigned declares that the person or persons signing this Proposal is/are fully authorized to sign on behalf of the firm listed and to fully bind the firm listed to all the Proposal's conditions and provisions thereof.

16. It is agreed that no person or persons or company other than the firm listed below or as otherwise indicated has any interest whatsoever in this Proposal or the contract that may be entered into as a result of the Proposal and that in all respects the proposal is legal and firm, submitted in good faith without collusion or fraud.

17. It is agreed that the undersigned has complied or will comply with all requirements of local, state, and national laws, and that no legal requirement has been or will be violated in making or accepting this Proposal, in awarding the contract to him and/or in the prosecution of the work required.

18. The following are names, titles and addresses of the Proprietor, all Partners, LC or LLC officers or three corporate officers:

(LIST)

_____

_____

_____

_____

_____

_____

19. The following bank reference is given:

Name of Bank: _____

Address: _____

_____

Officer of Bank: _____

Respectfully submitted this _____ day of _____, 20 _____.

(Firm Name) _____

(Address) _____

_____

(E-mail address) _____

(Telephone) _____ (FAX)_____

(Tax ID Number) _____

(Signature) _____

(Name Typed) _____

(Title) _____

(SEAL IF BIDDER IS A CORPORATION)

Enclosures:

1. Bid Bond
2. Statement of Bidder's Qualifications
3. Executive Order 2009-09
4. Non-Collusion Affidavit

*** Executive Order 2009-09 ***
PROHIBITION OF DISCRIMINATION IN STATE CONTRACTS NONDISCRIMINATION IN EMPLOYMENT BY GOVERNMENT CONTRACTORS AND SUBCONTRACTORS
(Superseding Executive Order 99-4 and Amending Executive Order 75-5)

WHEREAS, Executive Order 99-4 was effectuated to assure that persons or entities contracting with the State of Arizona or its political subdivisions comply with the provisions of Title VII of the Civil Rights Act of 1964 (42 U.S.C, § 2000e, et. seq.) and with Arizona's Civil Rights Act (Title 41, Chapter 9, Article 4);

WHEREAS, Executive Order 99-4 correctly states that various religious organizations are exempted from Arizona's Civil Rights Act;

WHEREAS, Executive Order 99-4 does not expressly state the federal and state exemptions for Indian tribes under both the federal and State Civil Rights Acts;

WHEREAS, 42 U.S.C, § 200e(b)(1) exempts tribes from the definition of employer;

WHEREAS, A.R.S. § 41-1461 4 (b)(i) also exempts Indian tribes from the definition of employers to whom the Arizona Civil Rights Act applies;

WHEREAS, Indian tribes across the State have recently begun to experience difficulty contracting with the State, often for money or services to which they are lawfully entitled, as a result of their exclusion from specified exemptions within Executive Order 99-4;

WHEREAS, the Attorney General's Office has in some cases interpreted the existing provisions as requiring tribes to waive rights guaranteed by both federal and State law;

WHEREAS, a modification is necessary to expressly provide that the exemptions found in federal and State law continue in full force and effect;

NOW, THEREFORE, I, Janice K. Brewer, Governor of the State of Arizona, by virtue of the authority vested in me by the Constitution and laws of this State, hereby order and direct as follows:

1. Executive Order 75-5 is hereby amended as follows:

PART I - Non-discrimination in employment by government contractors and subcontractors.

Unless otherwise exempted by federal or state civil rights laws, all government contracting agencies shall include in every government contract hereinafter entered into the following provisions:

During the performance of this contract, the contractor agrees as follows:

A. The Contractor will not discriminate against any employee or applicant for employment because of race, age, color, religion, sex, or national origin. The contractor will take affirmative action to insure that applicants are employed and that employees are treated during employment without regard to their race, age, color, religion, sex or national origin. Such action shall include, but is not limited to the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of payor other forms of compensation and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places available to employees and applicants for employment notices to be provided by the contracting officer setting forth the provisions of this non-discrimination clause.

A continued Executive Order No. 75-5 is hereby amended to permit government contractors and subcontractors that are exempted from compliance under Title 41, chapter 9, article 4, Arizona Revised

Statutes or 42 U.S.C. § 200e(b)(1), to provide employment preferences consistently with federal and state statutes;

Therefore, Executive Order 75-5 does not apply to Indian tribes. It likewise does not apply to religious organizations with respect to the employment of individuals of a particular religion to perform work connected with the activities of the employer. It also provides that religious organizations may provide employment preferences based upon religion when dealing with a bona fide occupational qualification reasonably necessary to the operation of the religious organization. This is consistent with the provisions of the Civil Rights Act of 1964 (42 U.S.C. 2000e, et seq.). In addition, in the Personal Responsibility and Work Opportunity Reconciliation Act, P.L. 104-193, Congress provided that religious organizations are eligible for the receipt of federal funds on the same basis as other private organizations.

Executive Order No. 75-5 prohibits all other government contractors and subcontractors from discriminating against any employee or applicant for employment because of race, age, color, religion, sex or national origin. Executive Order No. 75-5 further requires all government contractors and subcontractors to take action to insure that applicants are employed and employees are treated during employment without regard to their race, age, color, religion, sex or national origin.

B. The contractor will in all solicitations or advertisement for employees placed by or on behalf of the contractor state that all qualified applicants will receive consideration for employment without regard of race, age, color, religion, sex or national origin.

C. The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding a notice to be provided by the agency contracting officer advising the labor union or workers' representative of the contractor's commitments under the Executive Order and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

D. The contractor will furnish all information and reports required by the contracting agency and will permit access to his books, records. and accounts by the contracting agency and the Civil Rights Division for purposes of investigation to ascertain compliance with such rules, regulations and orders.

E. In the event of the contractor's noncompliance with the nondiscrimination clauses of the contract or with any such rules, regulations or orders of the Arizona Civil Rights Division said noncompliance will be considered a material breach of the contract and this contract may be cancelled, terminated or suspended, in whole or in part, and the contractor may be declared ineligible for future government contracts until said contractor has been found to be in compliance with the provisions of this order and the rules and regulations of the Arizona Civil Rights Division, and such sanctions may be imposed and remedies invoked as provided in Part II of this order, and the rules and regulations of the Arizona Civil Rights Division.

F. The contractor will include the provisions of paragraphs A through E in every subcontractor purchase order so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to the subcontract or purchase orders the contracting agency may direct as a means of enforcing such provisions, including sanctions for noncompliance, provided, however, that in the event the contractor becomes involved in or is threatened with litigation with a subcontractor or vender as a result of such direction by the contracting agency, the contractor may request the State of Arizona to enter into such litigation to protect the interest of the State of Arizona.

G. Each contractor having a contract containing the provisions prescribed in this section shall file and shall cause each of his subcontractors to file compliance reports with the contracting agency or the Civil Rights Division, as may be directed. Compliance reports shall be filed within such times and shall contain such information as the practices, policies, programs and employment policies, programs and

employment statistics of the contractor and each subcontract and shall be in form as the Arizona Civil Rights Division may prescribe.

H. Bidders or prospective contractors of subcontractors shall be required to state whether they have participated in any previous contract subject to the provisions of this order or any preceding similar Executive Order and in such event to submit on behalf of themselves and the proposed subcontractors compliance reports prior to, or as an initial part of negotiation of a contract.

I. Whenever the contractor or subcontractor has a collective bargaining agreement or other contract or understanding with a labor union or an agency referring workers of providing or supervising apprenticeship or training for such workers, the compliance report shall include such information from such labor unions or agency practices an policies affecting compliance as the contracting agency or Civil Rights Division may prescribe: provided that, to the extent such information is within the exclusive possession of a labor union or an agency referring workers or providing or supervising apprenticeship or training and such labor union or agency shall refuse to furnish such information to the contractor, the contractor shall so certify the contracting agency as part of its compliance report and shall set forth what efforts he has made to obtain such information.

J. The contracting agency or the Civil Rights Division shall require that the bidder or prospector contractor or subcontractor shall submit as part of his compliance report a statement in writing signed by an authorized officer or agent on behalf of any labor union or any agency referring workers or providing or supervising apprenticeship or other training with which the bidder or prospective contractor deals with supporting information to the effect that the signer's practices and policies do not discriminate on the grounds of race, color, religion, sex or national origin, and that the signer either will affirmatively cooperate in the implementation of the policy and provisions of this order or that it consents and agrees that recruitment, employment, and the terms and conditions of employment under the proposed contract shall be in accordance with the purpose and provisions of this order. In the event that the union or the agency shall refuse to execute such a statement, the compliance shall so certify and set forth what efforts have been made to secure such a statement and such additional factual material as the contracting agency or the Civil Rights Division may require.

PART II - Enforcement

A. Each contracting agency shall be primarily responsible for obtaining compliance with this Executive Order with respect to contracts entered into by such agency or its contractors. All contracting agencies shall comply with the rules of the Civil Rights Division in discharging their primary responsibility for securing compliance with the provisions of contracts and otherwise with the terms of this order and the rules and regulations and orders of the Civil Rights Division issued pursuant to this order. They are directed to cooperate with the Civil Rights Division and to furnish the Division such information and assistance as it may require in the performance of the Division's functions under this order. They are further directed to appoint or designate from among the agency personnel compliance officers. It shall be the duty of such officers to first seek compliance with the objective of this order by conference, conciliation, mediation or persuasion.

B. The Civil Rights Division may investigate the employment practices of any government contractor if subcontractor of initiate such investigation by the appropriate contracting agency or determine whether or not the contractual provisions specified in this order have been violated. Such investigations shall be conducted in accordance with the procedures established by the Civil Rights Division and the investigating agencies shall report to the Civil Rights Division any action taken or recommended. The Civil Rights Division may receive and investigate or cause to be investigated complaints by employees or prospective employees of a government contractor or subcontractor which alleges discrimination contrary to the contractual provisions specified in Part I of this order. If the investigation is conducted for the Civil Rights Division by a contracting agency, that agency shall report to the Civil Rights Division what action has been taken or it's recommendation with regard to such complaint.

C. The Civil Rights Division shall use its best efforts directly and through contracting agencies, other interested state and local agencies, contractors and all other available instrumentalities to cause any labor union engaged in work under government contracts or any agency referring workers or providing or supervising apprenticeship or training for it in the course of such work or cooperate in the implementation of the purposes of this order.

D. The Civil Rights Division or any agency, officer or employee in the executive branch of the government designated by rule, regulation or order of the Civil Rights Division may hold such hearings, public or private, as the Division may deem advisable for compliance, enforcement of educational purposes. The Civil Rights Division may hold or cause to be held hearings in accordance with rules and regulations issued by the Civil Rights Division prior to imposing, ordering or recommending the imposition of penalties and sanctions under this order.

E. No order for debarment of any contractor from further government contracts under this order shall be made without affording the contractor an opportunity for a hearing.

F. Sanctions and Penalties. In accordance with such rules, regulations or orders as the Civil Rights Division may issue or adopt, the Civil Rights Division or the appropriate contracting agency may publish or cause to be published the names of contractors or unions which it has concluded have complied or have failed to comply with the provisions of this order and with the rules, regulations and orders of the Civil Rights Division.

1. Contracts may be cancelled, in whole or in part, terminated, or suspended absolutely, or continuation of contracts may be conditioned upon a program for future compliance approved by the contracting agency or the Civil Rights Division: provided that any contracting agency shall refrain from entering into further contracts, extensions or other modifications of existing contracts with any noncomplying contractor until such contractor has established and will carry out personnel and employment policies in compliance with the provisions of this order.

2. Under rules and regulations prescribed by the Civil Rights Division, each contracting agency shall make reasonable efforts within a reasonable time limitation to secure compliance with the contract provisions of this order by methods of conference, conciliation, mediation and persuasion before proceedings shall be instituted under this order of before a contract shall be cancelled or terminated in whole or in part under this order for failure of a contractor or subcontractor to comply with the contract provisions of this order.

G. This Executive Order shall become effective immediately of its issuance.

IN WITNESS WHEREOF, I have hereunto set my hand and caused to be affixed the Great Seal of the State of Arizona.

Janice K. Brewer
GOVERNOR

DONE at the Capital in Phoenix, Arizona this 20th day of October In the Year Two Thousand and Nine and of the Independence of the United States of America the Two Hundred and Thirty-Third.

ATTEST:
Ken Bennett
Secretary of State

ACKNOWLEDGED as having read the above:

By: _____

Firm: _____

Address: _____

_____

ATTACHMENT "A"
NON-COLLUSION AFFIDAVIT FORM

COMPANY NAME: _____

ADDRESS: _____

_____

The persons, corporation or company making the accompanying bid, having been duly sworn, deposes and says that such bid is genuine and not sham or collusive, nor made in the interest or behalf of any person not herein named, and that Bidder has not directly or indirectly induced or solicited any other Bidder to put in a sham bid or another person, firm, or corporation to refrain from proposing, and that the Bidder has not in any manner sought by collusion to secure for itself an advantage over any other Bidder.

Signed: _____

Name: _____

Title: _____

Subscribed and sworn to before me
the _____ day of_____20____

_____
Signature of Notary Public in and for the

County of _____

State of _____

My Commission Expires:

ATTACHMENT "B"
STATEMENT OF BIDDER'S QUALIFICATIONS

To accompany bids submitted for Bid No. _____, for the Construction of:

_____

_____

Name of Bidder: _____

Address: _____

_____

Phone Number: _____ Fax Number: _____

When Organized: _____

Where Incorporated: _____

State of Arizona Contractors License number(s): _____

No. of years engaged in the contracting business under the present firm name? _____

Gross Amount of Contract value in hand on the date of this bid: $_____

Have you ever defaulted on a contract? If yes, amount and date: $_____ Date: _____

Please list one (1) current local trade and one (1) financial local reference with contract name and current phone number:

1. Contact Name: _____ Firm Name: _____

Address: _____

_____

Phone Number: _____ Fax Number: _____

2. Contact Name: _____ Firm Name: _____

Address: _____

_____

Phone Number: _____ Fax Number: _____

Please list five (5) current local **client** or **architect** (no more than three of either type) references and their current phone numbers for in-progress or recently completed projects. **Please reconfirm that phone numbers are current**. Contacts listed should not have a financial or legal interest in your construction firm or be related firms. Partners in any form (corporate, joint venture, financial, investment, etc. for this firm, related companies, or other investments) shall not be used as references.

The listed projects should be like scope and/or value to this proposed project:

1. Contact Name: _____ Firm Name: _____

Project Name: _____

Contract Value: $_____ Actual/Projected Completion Date: _____

Address: _____

_____

Phone Number: _____ Fax Number: _____

2. Contact Name: _____ Firm Name: _____

Project Name: _____

Contract Value: $_____ Actual/Projected Completion Date: _____

Address: _____

_____

Phone Number: _____ Fax Number: _____

3. Contact Name: _____ Firm Name: _____

Project Name: _____

Contract Value: $_____ Actual/Projected Completion Date: _____

Address: _____

_____

Phone Number: _____ Fax Number: _____

4. Contact Name: _____ Firm Name: _____

Project Name: _____

Contract Value: $_____ Actual/Projected Completion Date: _____

Address: _____

_____

Phone Number: _____ Fax Number: _____

5. Contact Name: _____ Firm Name: _____

Project Name: _____

Contract Value: $_____ Actual/Projected Completion Date: _____

Address: _____

_____

Phone Number: _____ Fax Number: _____

Remarks: _____

_____

(The above statements must be subscribed and sworn to before a Notary Public.)

Date: _____

Firm Name: _____

By: _____

Title: _____

Subscribed and sworn to before me

the _____ day of_____20____

_____

Signature of Notary Public in and for the

County of _____

State of _____

My Commission Expires:

ATTACHMENT "C"
SUBSTITUTION REQUEST FORM

NOTE: THIS FORM MUST BE RECEIVED BY THE APPROPRIATE CONSULTANT AT LEAST 8 (EIGHT) CALENDAR DAYS PRIOR TO BID. DO NOT SEND IT TO THE OWNER UNLESS THE OWNER IS THE CONSULTANT OF RECORD.

TO: _____ Bid No. _____ Project No. _____

For the Construction of:

_____

_____

We hereby submit for your consideration the following product instead of the specified item for above project:

SPEC SECTION: _____PAGE: _____PARAGRAPH/LINE: _____SPECIFIED ITEM: _____

_____

PROPOSED SUBSTITUTION: _____

_____

_____

Attach complete product descriptions, drawings, photographs, performance and test data, and other information necessary for evaluation.

A. Will changes be needed to building design in order to properly install proposed substitution? Yes ____ No ___

If Yes, explain: _____

_____

B. Will the undersigned pay for changes to the building design, including engineering and drawing cost, caused by requested substitution? Yes _ No _____

C. What differences exist between proposed substitution and specified item:

_____

_____

_____

D. Does proposed substitution affect drawing dimensions: Yes _____ No _____

If Yes, explain: _____

_____

E. Does proposed substitution affect other trades: Yes _____ No _____

If Yes, explain: _____

_____

F. Does Manufacturer's warranty of proposed substitution differ from that specified? :
Yes _____ No _____

If Yes, explain: _____

_____

G. Will substitution affect progress schedule: Yes _____ No _____

If Yes, explain: _____

_____

H. Will substitution require more license fees or royalties than specified product?
Yes _____ No _____

If Yes, explain: _____

_____

I. Will substitution cost more than specified product? Yes _____ No _____

If Yes, explain: _____

_____

J. Will maintenance and service parts be locally available for substitution?
Yes _____ No _____

If No, explain: _____

_____

By making this request for substitution, the Contractor:

1. represents that the Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified

2. represents that the Contractor will provide the same or longer warranty for the substitution that would have been for the originally specified product

3. certifies that the cost data presented is complete and includes all related costs, and waives all claims for additional costs related to the substitution which subsequently become apparent; and

4. shall coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be completed in all respects.

Submitted by:

Signature Date

Firm

Address

Remarks

For Consultant's/Owner's Use Only:

Signature Date

Firm

Accepted Accepted As Noted

Not Accepted Received Too Late

Remarks

ATTACHMENT "D"
BID BOND
(Sample)

KNOW ALL MEN BY THESE PRESENTS, that we, _____
(Bidder's Name)
_____ of _____
(Street Address) (City, State, Zip)
hereinafter called the Principal, and _____
(Surety's Name)
a corporation organized and existing under the Laws of the State of, _____ and authorized to transact business in the State of _____, as Surety, hereinafter called Surety, are held and firmly bound unto the _____ hereinafter called Obligee, in the Penal sum of ten percent (10%) of the amount (Owner) bid, good and lawful money of the United States of America, for the payment of which the Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

The Condition of this Obligation is such, that, WHEREAS the Principal had submitted a proposal to the Obligee on a contract for the construction of:

_____
(Contract, Name and Number)

NOW THEREFORE, If the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the Bidding or Contract Documents with good and sufficient surety for the faithful performance of such construction for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void; otherwise to remain in full force and effect.

IN WITNESS WHEREOF, we have hereunto set our signatures and seal this _____ day of _____, 2009, all pursuant to due authorization.

Principal:_____Seal

By:_____

Surety:_____Seal

Bond No._____ By:_____

By _____
Attorney-in-fact in accordance with
the attached Power of Attorney

STATE OF _____

COUNTY OF _____

I, _____, a Notary Public in and for the State and County aforesaid, do hereby certify that _____ and _____, whose names are signed to the foregoing bond, this day personally appeared before me in my State and County aforesaid and acknowledged the same.

Given under my hand seal this _____ day of _____, 20___.

_____
Notary Public (Seal)

My commission expires: _____

ATTACHMENT "E"
PAYMENT BOND
(Sample)

STATUTORY PAYMENT BOND PURSUANT TO A.R.S. 41-2574
(Penalty of this bond must be 100% of the Contract Amount.)

KNOWN ALL MEN BY THESE PRESENTS:

That, _____ (hereinafter called Principal), as Principal, and , a corporation organized and existing under the laws of the State of _____, with its principal office in the City of, (hereinafter called the Surety), as Surety, are held and firmly bound unto (hereinafter called the Obligee, in the amount of _____ Dollars ($_____) for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, dated the day of _, 20___, to _____ which contract is hereby referred to and made a part hereof as fully and to the same extent as if copies at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if said Principal shall promptly pay all monies due to all persons, supply labor or materials to him or his subcontractors in the prosecution of the work provided for in and said contract, then this obligation shall be void, otherwise to remain in full force and effect;

PROVIDE, HOWEVER, that this bond having been required of the said Principal in order to comply with the provisions of A.R.S. 41-2574, all rights and remedies on this bond shall insure solely to such persons and shall be determined in accordance with the provisions, conditions, and limitations of said Title, Chapter, and Article, to the same extent as if they were copied at length herein.

The prevailing party in a suit on this bond shall recover as a part of his judgment such reasonable attorneys' fees as may be fixed by a judge of the Court.

Witness our hands this _____ day of _____, 20____.

Principal Seal
By:
Surety Seal
By:
Agency of Record
Agency Address

ATTACHMENT "F"
PERFORMANCE BOND
(Sample)

STATUTORY PERFORMANCE BOND PURSUANT A.R.S. 41-2574
(Penalty of this bond must be 100% of the Contract Amount.)

KNOWN ALL MEN BY THESE PRESENTS:

That, _____(hereinafter called Principal), as Principal, and _____, a corporation organized and existing under the laws of the State of _____, with its principal office in the City of_____ _____ (hereinafter called the Surety), as Surety, are held and firmly bound unto _____ _____ (hereinafter called the Obligee) in the amount of _____ _____ Dollars (_____), for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, dated the ___ day of _____, 20____, to_____ which contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that is said Principal shall faithfully perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term of said contract and any extension thereof, with or without notice of the Surety, and during the life of any guaranty required under the contract, and shall also perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said contract that may hereby be made notice, of which modifications to the Surety being hereby waived; than the above obligation shall be void, otherwise to remain in full force and effect.

PROVIDE, HOWEVER, that this bond is executed pursuant to the provisions of A.R.S. 41-2574, and all liabilities on this bond shall be determined in accordance with the provisions of said Title, Chapter, and Article, to the extent as if it were copied at length herein.

The prevailing party in suit on this bond shall recover as a part of his judgment such reasonable attorneys' fees as may be fixed by a judge of the Court. Witness our hands this_____ day of _____, 20____.

	Principal	Seal
	By:	
	Surety:	Seal
Bond No.	By:	
	Agency of Record	
	Agency Address	

OWNER-CONTRACTOR AGREEMENT

PROJECT: 2021 District-Wide Pavement Maintenance

PROJECT ADDRESS: Multiple MCCCD Campuses

COLLEGE: District Wide

BID NUMBER: 3477-2 PROJECT NO.: 21.1641

THIS AGREEMENT is dated as of the _____ day of _____, in the year 20 __, by and between Maricopa County Community College District, ("Owner"), whose mailing address is:

MARICOPA COUNTY COMMUNITY COLLEGE DISTRICT
2411 West 14th Street
Tempe, Arizona 85281

and

_____

("Contractor"), whose mailing address is:

_____

_____

_____

All correspondence, submittals and notices relating to or required under this Contract shall be sent in writing to the above addresses, unless either party is notified in writing by the other of a change in address.

WITNESSETH:

WHEREAS, it is the intention of the Owner to obtain the services of the Contractor to complete all Work as specified in the Contract documents in connection with the construction of:

_____

hereinafter referred to as the "Project" or the "Work" and

WHEREAS, the Contractor desires to perform such construction in accordance with the terms and conditions of this Agreement,

NOW, THEREFORE, in consideration of the promises made herein and other good and valuable consideration, the following terms, covenants and conditions are hereby mutually agreed to, by and between the Owner and Contractor:

Article 1
DEFINITIONS

1.1 All terms in this Agreement which are defined in the Information for Bidders and the General Conditions shall have the meanings designated therein.

1.2 The Contract Documents are as defined in the General and Supplemental Conditions. Such documents form the Contract, and all are as fully a part thereof as if attached to this Agreement or repeated herein.

Article 2
STATEMENT OF WORK

2.1 The Contractor shall provide and pay for all materials, tools, transportation, equipment, temporary facilities and labor; and associated required management, supervision, coordination, professional and non-professional services; and shall perform all other acts and supply all other things necessary, to fully and properly perform and complete the Work, as required by the Contract Documents.

2.2 The Contractor shall further provide and pay for all related facilities described in any of the Contract Documents, including all work expressly specified therein and such additional work as may be reasonably inferred there from, saving and exception only such items of work as are specifically stated in the Contract Documents not to be the obligation of the Contractor. The totality of the obligations imposed upon the Contractor by this Article and by all other provisions of the Contract Documents, as well as the structures to be built and the labor to be performed, is herein referred to as the "Work."

Article 3
DESIGN CONSULTANT

3.1 The Owner had retained the following professional services engineering firm who is to act on behalf of the Owner, assume all duties and responsibilities of and have the rights and authority assigned to the Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents. The Engineer (as defined in the General Conditions) shall be:

Terracon Consultants, Inc.

4685 South Ash Avenue, Suite H-4

Tempe, Arizona 85282

(480) 897-8200

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provided, however, that the Owner may, without liability to the Contractor, unilaterally amend this Article from time to time by designating a different person or organization to act as its Consultant and so advising the Contractor in writing, at which time the person or organization so designated shall be the Consultant for purposes of this Contract.

3.2 For the purposes of this Agreement, if no Architect is retained, all requirements and responsibilities of the Architect will be provided by the Owner.

Article 4
COMMENCEMENT, CONTRACT TIME AND COMPLETION

4.1 The Contractor shall commence the Work promptly upon the date established in the Notice to Proceed. If there is no Notice to Proceed, the date of commencement of the Work shall be the date of this Agreement or such other date as may be established herein.

4.2 **Time is of the essence**
The Contractor shall achieve Final Completion as defined in the General Conditions, within the time periods stated hereunder taken from the date of Notice to Proceed or the date otherwise established for the commencement of Work.

4.2.1 The entire Work shall attain Final Completion on or before the following date in accordance with the requirements of the Contract Documents or Contract Conditions:

Date of Final Completion: Sunday, August 1, 2021

The Contractor also shall consider that the Owner needs the complete use of these facilities as quickly as possible. If the Contractor proposes completion of the Work on an accelerated schedule, the requirements within the General Conditions shall be met with regard to early completion and any resulting adjustment to the Date of Final Completion.

4.3 **Liquidated Damages**

4.3.1. Owner and Contractor further recognize that time is of the essence to this Agreement and that Owner will suffer additional financial loss and adverse impact if the Work does not reach Final Completion within the times specified in paragraph 4.2.2 above, plus any extensions thereof allowed in accordance with the General Conditions. They also recognize the delays, expense and difficulties involved in proving the actual loss or adverse impacts suffered by Owner if the Work does not reach Final Completion on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty) Contractor shall pay Owner, at the Owner's sole option,

Final Completion $500

for each consecutive calendar Day (Sundays and holidays included) that expires after the time specified in paragraph 4.2.1 for Final Completion of the Work, until the Work reaches Final Completion.

4.4 Because the District is further damaged or adversely impacted in their ability to properly operate and maintain the Work due to late or incomplete Owner training, and failure to receive complete close out documents including O&M Manuals, as-constructed drawings and specifications. They also recognize the delays, expense and difficulties involved in proving the actual loss or adverse impacts suffered by Owner if the training and full close out of the Work per the Contract Documents is not completed on a timely basis. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as additional liquidated damages for delay (but not as a penalty) Contractor shall pay Owner the following for each calendar day past 30 calendar days following the date of Substantial Completion that these items remain incomplete or absent:

Close-out Completion $ 50.00

4.5 Items in Paragraph 4.4 that remains incomplete after providing a reasonable amount of time to complete past final close out of this Agreement shall result in a deduction of up to ONE PERCENT (1%) of the subcontract Schedule of Values amount for the particular trade or subcontractor. The Owner has sole discretion regarding a reasonable time limit to complete the close out requirements or the application of some or all of the allowed one percent reduction in Contract Price. Only the District Director of Facilities Planning and Development may waive collection of these damages.

4.6 The amount of liquidated damages set forth above shall be assessed cumulatively and independently of each other. Liquidated damages are agreed to because actual damages or adverse impacts in many areas will be difficult or impossible to ascertain. The Agreement also makes provision for recovery of certain known costs in addition to the liquidated damages. This provision for liquidated damages does not bar Owner's right to collect actual costs as stated in the General Conditions, or enforce other rights and remedies against Contractor, including but not limited to, specific performance or injunctive relief.

Article 5
CONTRACT PRICE

5.1 Provided that the Contractor shall strictly and completely perform all of its obligations under the Contract Documents, and subject only to additions and deductions by Change Order or as otherwise provided in the Contract Documents, the Owner shall pay to the Contractor, in current funds and at the times and in the installments hereinafter specified, the sum of

_____ Dollars $_____

("Contract Sum") which includes all specific cash allowances which have been computed in accordance with the General Conditions, as well as all applicable sales tax.

Article 6
PROGRESS PAYMENTS and INTEREST

6.1 The Contractor hereby agrees that on or about the twenty-fifth day of the month for every month during the performance of the Work, he will deliver to the Architect an Application for Payment in accordance with the provisions of the General Conditions. This date may be changed upon mutual agreement, stated in writing, between the Owner and Contractor. Payment under this Contract shall be made as provided in the General Conditions.

6.2 All moneys not paid when due as provided in the General Conditions shall bear interest in accordance with Arizona Revised Statutes §41-2577.

Article 7
CONTRACTOR'S REPRESENTATIONS

In order to induce Owner to enter into this Agreement, Contractor makes the following representations:

7.1. Contractor has examined and carefully studied the Contract Documents, including any Addenda, and all other related data identified in the Construction Documents including "technical data" and geo-technical reports.

7.2. Contractor has visited the site and become familiar with and is satisfied as to the general, local and site conditions that may affect cost, progress, performance or furnishing of the Work.

7.3. Contractor is familiar with and is satisfied as to all Federal, State, and local Laws and Regulations which may affect cost, progress, performance and furnishing of the Work.

7.4. Contractor is aware of the general nature of work to be performed by Owner and others at the site that relates to the Work as indicated in the Contract Documents.

7.5. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the site, reports and drawings identified in the Contract Documents and all additional examinations, investigations, explorations, tests, studies and data with the Contract Documents.

7.6 Contractor has carefully studied all reports of explorations and tests of subsurface conditions at or contiguous to the site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the site which have been identified in the Contract Documents or been provided to the Contractor as supplemental information to the Contract Documents. Contractor accepts the extent of the data contained in such reports and drawings upon which Contractor is entitled to rely as provided in the General Conditions. Contractor acknowledges that, unless specifically included within or by reference into the Contract Documents, such reports and drawings are not Contract Documents and may not be complete for Contractor's purposes. Contractor has obtained and carefully studied (or assumes responsibility for having done so) all such additional supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and underground features or utilities) at or contiguous to the site or otherwise which may affect cost, progress, performance or furnishing all the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions an programs incident thereto. Contractor does not consider that any additional examinations, investigations, explorations, tests, studies or data are necessary for the performance and furnishing of the Work at the Contract Price, within the Contract Times and in accordance with the other terms and conditions of the Contract Documents.

7.6.1 Contractor has given Architect written notice of all conflicts, errors, ambiguities or discrepancies that Contractor has discovered in the Contract Documents and the written resolution thereof by Architect is acceptable to Contractor, and the Contract Documents are sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

Article 8
CONTRACT DOCUMENTS

The Contract Documents, which comprise the entire agreement for construction services between Owner and Contractor concerning the Work, consist of the following:

8.1 Agreement

8.2 Any Addenda issued

8.3 Performance Bond and Payment Bond

8.4 Notice to Proceed

8.5 Contract Conditions

8.6 Project Manual

8.7 Drawings consisting of a cover sheet and sheets listed in the Index of Drawings

8.8 Contractor's Bid Proposal

The Contract Documents may only be amended, modified or supplemented as provided in the General Conditions. The Contractor shall submit the Performance Bond, Labor and Material Payment Bond and Certification of Insurance as required by the Contract Documents.

Article 9
MISCELLANEOUS AND OTHER REQUIREMENTS

9.1. No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without

such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

9.2. Owner and Contractor each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

9.3. Any provision or part of the Contract Documents held to be void or unenforceable under any Law of Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

9.4 **Affirmative Action Requirements**

9.4.1. Any Contractor in performing under this contract shall not discriminate against any worker, employee or applicant, or any member of the public, because of race, color, religion, gender, national origin, age or disability nor otherwise commit an unfair employment practice.

9.4.2. The Contractor will take affirmative action to ensure that applicants are employed, and employees are dealt with during employment without regard to their race, color, religion, gender or national origin, age or disability. Such action shall include but not be limited to the following: Employment, promotion, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rate of pay or other forms of compensation; and selection for training; including apprenticeship as well as all labor organizations furnishing skilled, unskilled and union labor, or who may perform any such labor or services in connection with this contract.

9.5 **Sudan or Iran Scrutinized Business**

9.5.1 Pursuant to Arizona Revised Statutes §35-391.06(A) and §35-393.06(B), Contractor certifies that it does not have a “scrutinized” business operation in either Sudan or Iran, as that term is defined in Arizona Revised Statutes §35-391(15) and §35-393(12) respectively.

9.6 Legal Worker Requirements

9.6.1 As required by Arizona Revised Statutes §41-4401, Owner is prohibited from awarding a contract to any contractor who fails, or whose subcontractors fail, to comply with the requirements to verify the employment eligibility of their employees through the Federal E-verify system. The undersigned entity warrants that it complies fully with all Federal immigration laws and regulations that relate to its employees, that it shall verify, through employment verification pilot programs as jointly administered by the U.S. Department of Homeland Security and the Social Security Administration or any of its successor programs, that the eligibility of each employee hired after December 31, 2007, and that it shall require its subcontractors to provide the same warranties to the Owner. Note that this also applies to all subcontractors and sub-consultants that Contractor may use for this work.

9.6.2 The undersigned acknowledges that a breach of this warranty by the Contract or any subcontractor under any contract resulting from this Agreement shall be deemed a material breach of the Agreement, and is grounds for penalties, including termination, by the Owner. The Owner reserves the right to inspect records of the Contractor, subcontractors, and employees who perform work under the Contract, to conduct random verification of the employment records of the Contractor and any subcontractor who is part of the Work, to ensure that the Contractor and each subcontractor is complying with the warranties set forth above. Contractor shall be responsible for all costs associated with the compliance of such programs.

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IN WITNESS WHEREOF, the parties, acting through their authorized signatories have set their hands as of the date first above.

OWNER: **MARICOPA COUNTY COMMUNITY COLLEGE DISTRICT**

By: _____
David Martin

Title: Director of Purchasing and Auxiliary Services

Date: _____

CONTRACTOR: _____

By: _____

Title: _____

Date: _____

[CORPORATE SEAL]

Attest: _____

License No.: _____

Agent for service of process: _____

(If CONTRACTOR is a corporation, attach evidence of authority to sign.)

PART 3
CONTRACT CONDITIONS

MARICOPA COUNTY COMMUNITY COLLEGE DISTRICT
2021 District-Wide Pavement Maintenance
FPD PROJECT NO. 21.1641
INVITATION FOR BID #3477-2

CONTRACT CONDITIONS

Upon the Award of a Contract and Purchase Order to the successful Bidder, the following Conditions will also be in force. All work shall be in compliance with applicable laws, ordinances, regulations and building codes. All work and material shall be the best of the respective kinds specified or indicated. Should any workmanship or materials be required which are not directly or indirectly called for in the Specifications and/or shown on the Drawings but are consistent with the Contract Documents and reasonably inferable by them or industry standard practice, the workmanship or materials shall be the same as similar parts that are detailed, indicated or specified, or shall match or exceed the quality of existing for remodeling and restoration work, and the Contractor shall understand the same to be implied and provide for it in his bid as fully as if it were particularly described or delineated.

When no consultant is used on the project, any reference to the Consultant within these conditions shall refer to the Owner, acting as his own consultant.

TIME OF COMPLETION AND LIQUIDATED DAMAGES: The Contractor and the Owner understand and mutually agree that the date of beginning, rate of progress, and the time for completion of the work to be done are ESSENTIAL CONDITIONS of this Contract; and it is further mutually understood and agreed that time for completion of this Contract shall be commenced on the date of 'Notice to Proceed.' The Contractor also shall consider that the Owner needs the complete use of these facilities as quickly as possible.

The work of this contract is critical to the day to day operations of all Community Colleges. All work must be accomplished with minimum interruption of operations. Lot closures and access restriction must be minimized. This will include scheduling shut downs and associated work in evenings or weekends. All overtime premiums necessary to accomplish this must be contained within the contractor's bid.

Should the Contractor fail to fully complete the Work on or before the date stipulated for Final Completion (or such later date as may result from extension of time granted by Owner), he shall pay the Owner, as liquidated damages, as referenced in the Owner-Contractor agreement, for each consecutive calendar day that terms of the contract remain unfulfilled beyond the date allowed by the Contract, which sum is agreed upon as a reasonable and proper measure of damages which the Owner will sustain per day by failure of the Contractor to complete work within time as stipulated; it being recognized by the Owner and the Contractor that the injury to the Owner which could result from a failure of the Contractor to complete on schedule is uncertain and cannot be computed exactly. In no way shall costs for liquidated damages be construed as a penalty on the Contractor.

Should it become necessary for the Consultant to incur additional costs during the course of construction, or subsequent to the final inspection, due to the Contractor's failure to maintain required quality control or schedule, or the Contractor's acts, omissions or negligence, the Consultant will provide all necessary additional services at his standard hourly rate and will charge the Owner as part of an Additional Service Request, and such costs will be reimbursed by the Contractor or deducted from monies still due the Contractor. These costs are in addition to any liquidated damages.

The Contractor shall furnish such manpower, materials, facilities, and equipment and shall work such hours, including night shifts, overtime operations and Sunday and holidays, as may be necessary to insure the prosecution and completion of the Work in accordance with the approved and currently updated progress schedule. If Work in place falls behind the currently updated and approved schedule by seven (7) days or more and it becomes apparent from the current schedule that the Work will not be completed within the Contract Time or that the performance of the Work is not satisfying the requirements of the accepted schedule, the Contractor agrees that he will, as necessary, take some or all of the following actions at no additional cost to the Owner to improve his progress and expedite the progress of

the Work:

1. Increase manpower, equipment or facilities in such quantities and crafts as will substantially eliminate the backlog of work;

2. Increase the number of working hours per shift, shifts per working day, working days per week, the amount of equipment, or any combination of the foregoing, sufficient to substantially eliminate the backlog of Work; and,

3. Reschedule activities to achieve maximum practical concurrence of accomplishment of activities.

ALTERNATE BIDS

See the general bid requirements, which apply to all work. All related work not specifically affected by the bid alternate shall be accomplished according to the basic specifications. See drawings and schedules for all items and construction covered by this section. Each bidder shall submit on the form(s) provided alternate proposals stating the difference in price (additions or deletions) from the base bid for adding, deleting or substituting the materials and/or systems described hereunder. The difference in the alternate price shall include the related work of all trades.

ALTERNATES LISTED: **NONE**

ALLOWANCES: Furnish and install the following listed portions of the Work for the cash allowance amounts stated. Include the total of the cash allowance amounts in the Contract Sum. Furnish materials by suppliers and/or contractors as directed by the Owner. The Contract Sum includes all costs related to the work to be provided on the basis of cash allowance. Where cash allowances are for materials only, allowances will include all costs of delivery to the job site and taxes. The Contractor is to include in his base bid all overhead and profit markups, and all markups related to bonds, insurance, taxes, etc., to be applied to direct contractor labor and materials or subcontractor work, including markups,, for performing allowance account work as directed by the Owner. Unused allowance account moneys will be deducted from the contract amount by Change Order at project close-out.

ALLOWANCES LISTED:

The allowance item(s) described under the related specification section and allowance amounts are as follows:

1.	Miscellaneous Improvements directed by Owner	$25,000
	Subtotal	$25,000

UNIT PRICES:

Each Unit Price represents the aggregate lump-sum cost to the Owner, per unit of measure stated, including, but not limited to, materials, delivery, handling, on-site labor and installation, adjustments to related Work overhead, profit and similar fees for administration/supervision, and proportionate shares of such general expenses as bond and insurance premiums, temporary construction facilities, and temporary controls.

If unit priced quantities are used with an allowance amount provided above, all mark- ups including overhead, profit, etc., shall be applied against the Allowance value. The unit price shall then be the total cost, before mark-ups, including, but not limited to labor, material, delivery, handling and adjustments to related work.

Unit Costs (including sales tax) [1]				
No.	**Description[1]**	**Units**	**Unit Cost**	**Unit Cost (written)**
1	Traffic Signs (stop, wrong way, do not enter, etc.)	Each		
2	Parking Lot Signs & Placards (carpool only, no parking – fire lane, reserved parking, van accessible, etc.)	Each		
3	Standard steel channel post[2]	Each		
4	Square section steel post with telescope insert style mount[3] (Tele-post)	Each		
5	Core hole for installing signposts in concrete	Each		
6	Remove damaged wheel stops	Each		
7	New Wheel Stops[4]	Each		
8	Paint Wheel Stops	Each		
9	Reuse Undamaged Wheel Stops	Each		
10	Speed Humps[5]	Each		
11	Speed Bumps[5]	Each		
12	Paint existing Speed Humps (white chevron pattern)	Each		
13	Paint existing Speed Bumps (solid yellow)	Each		
14	Initial Stripe Accessible Stalls[6]	Each		
15	Paint Existing Accessible Stalls[23]	Each		
16	Initial Stripe Restricted Stalls[7]	Each		
17	Paint Existing Restricted Stalls[23]	Each		
18	Initial Stripe Unrestricted Stalls[19]	Each		
19	Paint Existing Unrestricted Stalls[23]	Each		
20	Initial Miscellaneous Striping[8]	Lineal feet		
21	Paint Existing Miscellaneous Striping[23]	Lineal feet		
22	Initial Miscellaneous Stenciling[9]	Each		
23	Paint Existing Miscellaneous Stenciling[23]	Each		
24	Initial Stop Bars with Stop Stencil[10]	Each		
25	Paint Existing Stop Bars with Stop Stencil[23]	Each		
26	Initial Traffic Arrows	Each		
27	Paint Existing Traffic Arrows[23]	Each		
28	Blackout[11]	Ft^2		
29	Fire Lane Red/ Yellow Curb Painting	Lineal feet		
30	Adjustment –Small Item (diameter is ≤ 18 inches)[12]	Each		
31	Adjustment- Medium, Man holes, Drywells, Storm Drains, Vault Lids (18 inches < Diameter < 3 Feet)	Each		
32	Adjustment- Large Items, Pull Boxes, Vault Lid, Etc… (Side Length ≥ 3 Feet)[13]	Each		

33	Crack Sealing[15]	Lineal feet		
34	Shallow Patching (2 inches)	Square feet		
35	Deep Patching (5 inches)	Square feet		
36	Pressure Wash Curb	Lineal feet		
37	Replace Single Curb[14]	Lineal feet		
38	Miscellaneous Flatwork (5 inches)[16]	Square feet		
39	Microsurfacing (Type II)[17]	Square yard		
40	5% Soil Cement Subgrade Treatment (10 inches)[18]	Square feet		
41	Pavement Sweeping[24]	Square feet		
42	Geogrid[20]	Square feet		
43	Aggregate Base Course (ABC)[21]	Ton		
44	New Pavement Construction (4" AC over 4" ABC)[22]	Square yard		
45	Asphaltic Concrete Overlay MAG ½-inch Mix, 1 ½ Inches[25]	Square yard		
46	Mill 1 ½ Inches Of Existing Asphalt Pavement	Square yard		
47	Crack Mastic (Crack> 1 ½")[26]	Lineal feet		
48	Scrub Seal	Square feet		
49	ADA Curb Ramp & Landing[27]	Each		
50	Haul Off[28]	Ton		
51	Over-excavate of AB/Subgrade	Square yard		

Unit Cost Notes
Note 1: All items complete and placed/assembled/installed/painted, including striping, stencils, safety areas, etc… as applicable.
Note 2: Use channel posts in landscape areas per Plans. Signs include mounting hardware installed per manufacturer's recommendations. Per Details, bolts shall not extend beyond nuts where exposed threads could be a hazard to pedestrians.
Note 3: Use square section steel posts in pavement areas and in concrete slab areas per Plans. Square posts shall be constructed with a telescope socket concreted flush with the surface. Socket tube may include a sleeve/bushing to ensure tight fit. Per Details, bolts shall not extend beyond nuts where exposed threads could be a hazard to pedestrians.
Note 4: New wheel stops include rebar stakes.
Note 5: These items are for new speed humps and speed bumps. Unit price includes construction and striping/painting.
Note 6: Initial striping includes striping without the presence of an existing layout where surveying will be required such as after microsufacing, after reconstruction, after asphalt overlay, new parking lot, etc. Includes yellow stall and safety area striping as well as white on blue accessible symbol (sign and wheel stop separate)
Note 7: Initial striping includes striping without the presence of an existing layout where surveying will be required such as after microsufacing, after reconstruction, after asphalt overlay, new parking lot, etc. Includes colored striping and stencil per Details (sign and wheel stop separate)
Note 8: Initial miscellaneous striping includes striping without the presence of an existing layout where surveying will be required such as after microsufacing, after reconstruction, after asphalt overlay, new parking lot, etc. Miscellaneous striping includes safety areas or pedestrian crosswalks, which are yellow. On Plans, centerline stripes approaching stop bars and miscellaneous stenciling, which are white, are also indicated as miscellaneous striping.
Note 9: Initial miscellaneous stenciling includes stenciling without the presence of an existing layout where surveying will be required

such as after microsufacing, after reconstruction, after asphalt overlay, new parking lot, etc. May include “No Parking,” “Loading Zone,” “Motorcycle Parking Only” drive lane number stencils, or other pavement stencils, etc.… Each stenciled word is considered one count item.
Note 10: Stop bars 12 inches wide, length varies per Plans. Stop stencil 2 foot block lettering (typical)
Note 11: Apply suitable opaque paint or bituminous product to facilitate restriping. (usually at accessible stall rows in lots that will not be microsurfaced.)
Note 12: Includes removal of asphalt, excavation to free and then adjust item (e.g. valve access sleeve, gas valve cover) to flush and concrete in place.
Note 13: Includes removal of asphalt, excavation to free and then adjust item (e.g. junction boxes, utility vault lids) to flush and concrete in place. **NOTE: a Licensed Electrician may be needed to complete work on electrical utilities.**
Note 14: Replace single curb at locations shown on the plans and installed per MAG Single Curb Type B, Detail 222.
Note 15: Unit costs for crack sealing will only apply for additional work authorized for any pavements not included in the plan set. All crack sealing included on the plans sheets will be paid for on a lump sum basis per parking lot.
Note 16: This line item is for new 5” concrete slab in the pavement. Unit price to include saw cutting pavement, placing concrete, finishing, and haul off.
Note 17: The Contractor shall remove all wheel stops in parking lots scheduled for microsurfacing prior to work. Removing and resetting of the wheel stops is incidental to the work. Resetting of wheel stops shall be in a manner consistent with the original layout unless directed otherwise by the representative of the campus.
Note 18: This line item is for treatment of 10” of subgrade below the proposed new pavement section. If soft /wet subgrade soils are encountered, Terracon should be contacted to make the determination if soil cement will be required.
Note 19: Initial striping includes striping without the presence of an existing layout where surveying will be required such as after microsufacing, after reconstruction, after asphalt overlay, new parking lot, etc.
Note 20: Geogrid shall be polyethylene. Includes delivery and installation.
Note 21: Aggregate base course per MAG specification, include delivery and installation.
Note 22: Includes removal of existing pavements and subgrade required for new sections, subgrade preparation per MAG specifications, aggregate base course per MAG specifications, asphalt concrete per MAG specifications and tack coat (where specified). Refer to the plans for the required base course and asphalt concrete types.
Note 23: Existing striping/ stenciling includes striping/ stenciling with the presence of an existing layout where surveying will not be required such as restriping over faded striping/ stenciling
Note 24: Pavement sweeping shall in be accordance with Section 900 of the project manual.
Note 25: Asphalt concrete overlay shall include the specified paving fabric. The overlay shall be MAG ½-inch mix and a minimum of 1 ½-inch in thickness. Paving fabric shall be an approved paving fabric that retard reflective cracking. The Contractor shall submit data sheet for review and approval prior to construction. The unit price shall include all required tack coat and surface preparation prior to the placement of the fabric and asphalt concrete overlay.
Note 26: Crack Mastic use on the project shall be in accordance with the specifications, Volume I and approve by the engineer. Crack Mastic shall be completed for cracks wider than 1 ½ inches. Approximate quantities (in lineal foot) are shown on the plans. Unit cost for crack mastic will only apply for additional work authorized for any pavements not included in the plans. All cracks wider than 1 ½" included on the plans sheets will be paid for on a lump sum basis per parking lot.
Note 27: ADA Curb Ramp and Landing shall be constructed in accordance with ADA Standard for Accessible Design (latest version). This work includes labor, materials, and finishing.
Note 28: Haul off includes construction materials at the site resulting from additional requested work outside of the base bid.

PERMITS, FEES AND NOTICES: Work within the Maricopa campuses is under the jurisdiction of the State Fire Marshall or some local municipalities for Fire Code review only. Any new construction or remodeling work shall be reviewed and receive permits from the Fire Marshall’s office or that local authority, including final inspection at their option. Any work in public or off-campus rights-of-way, attaching to the rights-of-way or within public utility easements within the campus, needs proper notification, permits and coordination with the appropriate City agencies. This will include fire, water and sewer lines. The City has no other jurisdiction on the site. The County Health Department retains review and jurisdiction for food service. Maricopa County dust control ordinances and procedures are required for this work, as applicable, including filing required plans and obtaining required permits. State of Arizona, Department of Environmental Quality, storm water planning and AZPDES permitting also is required as appropriate.

For SCC- The Salt River Pima-Maricopa Indian Community (SRPMIC) has building code, inspection, business license and tax, and preferred employment and materials purchase jurisdiction for this project. Please review the requirements in the specifications for these items.

Contact Arizona 811 ahead of any excavation to mark all public utility positions, such as gas, sewer, fire and water line, etc. Buildings and Grounds will assist in locating any College utilities in the area

with five days advance notice. Contractor is to provide a private utility locating service to identify and mark all college utilities within the Work area.

The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss. If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a two day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may without prejudice to other remedies the Owner may have, correct such deficiencies. If the Contractor performs Work contrary to laws, statutes, ordinances, building codes, and rules and regulations without such notice to the Consultant and Owner, the Contractor shall assume full responsibility for such Work and shall bear the attributable costs including all penalties and fines.

Written notice shall be deemed to have been duly served if delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified mail to the last business address known to the party giving notice. Notices sent to the District shall be received by the Facilities Department at the District Office, in care of the project manager for the contract. Failure of the Owner to act or provide written notice to the Contractor regarding the Contractor's failure to comply with any specific requirement of the Contract or Contract Documents shall not constitute Owner's waiver of the requirement. The Owner's waiver of any requirement will occur only in writing which expressly states that it is a waiver of the specific requirement described in that writing.

Dust and Storm Water Run-off Control: The Contractor is responsible for complying with all federal, State and local requirements and laws for temporary construction related issues related to dust control and erosion control for the site related to his Work. This includes all necessary permits, notices, plans (including Storm Water Pollution Prevention Plans), and termination of coverage, along with enforcement of all of these requirements with sub-contractors and suppliers. Provide dust control for all outdoor work, including demolition, earthwork, landscaping, etc.

WARRANTY: The Contractor guarantees that the Work will conform to the Contract Documents. Buildings shall be weathertight, watertight, and leak-proof at every point in every area, except where leaks can be attributed to damage to the building by external forces beyond the Contractor's control. The Contractor also shall repair or replace any damaged material, finishes or fixtures damaged as a result of this water penetration. The Work shall be mold free at the time of Final Completion.

If, within **two years** after the Date of Substantial Completion of the Work, or a longer period if such time is part of the manufacturer's standard warranty, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. This period of two years shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work. The Owner shall give such notice promptly after discovery of the condition. During this guarantee period, if any faulty or defective materials or workmanship is discovered, the Owner will provide notice to the Contractor requesting the Contractor repair or remedy the defect at the sole expense of the Contractor.

The Contractor agrees that he shall respond to the warranty request within forty-eight (48) hours, and then commence and diligently pursue remedy or repair within five work days. Warranty requests which adversely effect the operation of critical building systems or life safety issues shall be responded to immediately and corrected as quickly as possible. Neither final payment nor any other provision in this Contract shall relieve the Contractor of the sole responsibility to such corrective work.

If the Contractor fails to timely commence the corrective work, the Owner, at his option, may perform the corrective work or have the same performed at the expense of the Contractor, with payment due to the Owner by the Contractor, or his surety, upon receipt for the expenses. Corrective Work shall be warranted to be free of defects for a period equal to the longer of six months after completion of the corrective Work or for the remainder of the warranty period otherwise applicable.

ALLOWANCES: The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities against which the Contractor makes reasonable objection. Unless otherwise noted, allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts and Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum and not in the allowances. whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order.

MODIFICATIONS TO THE CONTRACT: No modifications of the issued Contract or Purchase Order shall be made unless the Owner authorizes the modifications by a properly signed and executed Change Order.

COSTS OF EXTRA WORK: When authorized in writing by the Owner and the Consultant if one is used, extra work may be ordered. Claims for additional compensation, on account of extra work done, will not be recognized unless such extra work has been authorized in advance and in writing by the Owner and the Consultant. Any change in the project that results in a change of the cost or time will be

agreed to in a written change order. The Contractor shall perform such extra work and charge the Owner at the actual cost of labor and materials plus mark-ups as specified hereinafter.

All pricing submitted by the Contractor for change orders exceeding $1000 shall have back-up information attached that provides a break down of materials, labor hours and rates, equipment rental, etc. Sub-contractors shall provide this same break down to the general contractor to substantiate their cost proposals. The Owner will not accept Contractor requests for extensions, extra compensation for delays, overtime or extra costs associated with the lack of, or incomplete, submittal of this back up material on a timely basis. At the Owner's sole discretion, he may direct the contractor to proceed with the Work immediately through a Construction Change Directive (CCD) if the Contractor fails to provide sufficient detail or agreement cannot be reached as to price or terms of the requested change.

Prime Contractor's Mark-up: The total cost for mark-ups to the actual cost of labor and materials for extra work authorized to be done by the Contractor's own forces shall not exceed the following:

Overhead: Ten percent (10%) of the actual cost of labor and materials. Overhead shall include the following: bond premiums, all job site general conditions and costs including superintendence, additional supervision time related to the change, wages of time-keepers, watchmen and clerks, small tools, incidentals, field; and home office general and administrative expenses.

Profit: Ten percent (10%) of the actual cost of labor and materials.

Sales Tax: Statutory amount of the actual cost of labor and materials, plus overhead, plus profit.

Bond: Bond cost based upon the actual cost of labor and materials, plus overhead, plus profit, plus sales tax.

Subcontractor's Markup: The total cost for mark-ups to the actual cost of labor and materials for extra work authorized to be done by the Subcontractor's forces shall be as follows:

Overhead: Ten percent (10%) of the actual cost of labor and materials.

Profit: Ten percent (10%) of the actual cost of labor and materials.

Prime Contractor's Mark-up of Subcontractor's Work: The total cost for mark-ups made by the General Contractor to the actual cost of labor and materials for extra work authorized which is done by a Subcontractor shall be as follows:

Overhead and Profit: Five percent (5%) of the actual cost of labor and materials.

Sales Tax: Statutory amount of the actual cost of labor and materials, plus overhead and profit.

Bond: Bond cost based upon the actual cost of labor and materials, plus overhead and profit, plus sales tax.

Where extra work involves both added and omitted work, the overhead, profit, taxes and bond figures specified above shall be added to only the net increased amount over the original Contract Amount.

Work omitted from Contract: If Contract Amount has been previously increased by Change Order for additional work, then overhead, bond and taxes will be deducted for omitted work. Profit will not be deducted as part of a deductive Change Order unless the credit amount is due to the final reconciliation of contract allowance or contingency amounts, in which case, all mark-ups shall be applied. Taxes and bonds shall always be based upon the current Contract Amount, whether more or less than the original Contract Amount. The unit costs for labor and materials used in change orders shall be the same in added work as they are for deleted work, modified only to include quantity discounts or similar adjustments for materials, and added charges for premium time for labor costs.

Change Orders - Ordinary: The Contractor will be issued a proposed change order request describing the intended change upon which, and within fifteen (15) calendar days, he shall indicate his proposed price to be added or deducted from the contract sum due to the change, supported by full and completely detailed estimates of cost by the Contractor, Subcontractor, vendor, or supplier, and any adjustment in time of final completion of the entire work which is directly attributable to changed work.

Upon request by Owner, Contractor shall permit inspection of his original contract estimate, subcontract agreements or purchase orders relating to the change. If agreement is reached as to the adjustment in compensation for performance of changed work, but agreement is not reached as to the time adjustment for such work, the Contractor shall proceed with the work at the agreed price reserving to Contractor the right to further pursue his claim for time adjustment.

While the Owner retains the right to order the Contractor to proceed with changes in the Work at any time through a Construction Change Directive; if the Contractor fails to submit his cost estimate within a seven (7) calendar day period, or there is a failure to agree to such costs, the Owner has the right to order the Contractor, in writing, to commence work immediately and the contract price shall be adjusted in accordance with the Owner's estimated cost, unless, within seven (7) calendar days following completion of added work or with written notice to delete work, Contractor presents proof that the Owner's estimate was in error. Final cost will be based upon actual documented materials, labor and equipment costs, marked up as previously defined.

CLAIMS FOR ADDITIONAL COST AND/OR TIME EXTENSION: If the Contractor wishes to make a claim for an increase in the Contract Sum and/or Time Extension, he shall give the Owner written notice thereof within three (3) days after the occurrence of the event giving rise to such claim. The Contractor shall give notice before executing the Work, except in an emergency endangering life or property, in which case the Contractor shall proceed. No claim shall be valid unless so made. Contractor hereby waives all claims not so made. Any change in the Contract Sum resulting from such claim shall be authorized by a Change Order.

If the Contractor incurs damages related to expenses caused by a delay for which the Owner is responsible, which is unreasonable under the circumstances, and which was not reasonable contemplated by the parties at time of formation of this Contract, then the parties shall resolve the Contractor's claim pursuant to A.R.S. §41-2617. The Contractor shall notify the Owner in writing within five working days of such delay, specifying why the Owner is believed by the Contractor to be responsible for the delay and the percentage extent to which the Contractor believes the Owner is responsible. Failure to provide such timely notice constitutes a waiver of all rights under A.R.S. §41-2617.

Contract time shall not be adjusted unless a change affects the critical path of the Work, per the most recent approved schedule. An analysis of the changes in the critical path of the Work schedule, using contemporaneous time frame analysis such as a "fragnet" or similar analysis, must be submitted as part of the change request in order to consider a Contract time adjustment. If the Owner and Contractor do not agree with an adjustment in Contract Time or the method for determining it, the adjustment or the method shall be recommended by the Architect to the Owner for final resolution in accordance with the Contract Documents.

In every such written claim, the Contractor shall provide the following information:

a. Nature of the delay;
b. Date (or anticipated date) of commencement of delay;
c. Activities on the progress schedule affected by the delay and/or new activities created by the delay and their relationship with existing activities;
d. Identification of person(s) or organization(s) or events(s) responsible for the delay including weather reports;
e. Anticipated extent of the delay;
f. Recommended action to avoid or minimize the delay, including the contractor's efforts

to resolve the issue or minimize the delays undertaken to the date of the extension request.

g. Recommended solution or action required by the Contractor.

Any claims for extensions of time for delays in transportation or for failures of suppliers or subcontractors shall be supported by facts demonstrating that the delays are beyond the contractor's control, including his efforts to overcome such delays. All costs related to delay claims by the Contractor must be supported by records and documentation demonstrating the actual cost directly related to the delay or time extension.

If adverse and unusually severe weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, and had an adverse effect on the critical path of the scheduled construction. Unusual or inclement weather as used herein means weather that results in a minimum of a five hour delay or loss of work for at least 75% of the labor force working on critical path work that day. The contract project completion time includes the following number of rain days for the applicable months within the project's duration: January- 2 days; February- 2 days; March- 2 days; April- 1 day; May- 1 day; June-1 day; July- 2 days; August- 2 days; September- 1 day; October- 1 day; November- 2 days; December- 2 days. Claims for rain days must be received by the Owner by 10:00 a.m. of the day that the rain or muddy condition occurs. The appropriate number of rain days shall be shown as single critical path activity with proper duration immediately preceding the Substantial Completion milestone on the critical path project schedule. The duration of this activity will be reduced by the approved rain days encountered. Unused rain days for a particularly month will roll forward as part of the unused total for the entire project.

If an extension claim is made due to mud or other job site conditions related to the unusual weather, the Architect or other Owner's representative shall be notified on the day for which the site condition is being claimed to substantiate the condition(s). Claims for time extensions due to weather related mud or other site conditions will be granted only where the required notification is given and unusual weather conditions prevented execution of items within the critical path of the work or otherwise significantly hindered the accomplishment of work. Partial day extensions may be granted when some portion of the daily work could be accomplished, though not at full efficiency or capacity.

CLAIMS FOR CONCEALED OR UNKNOWN CONDITIONS: If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or in the Geo-technical report or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the Contractor shall be given to the Owner promptly before conditions are disturbed and in no event later than three (3) days after first observance of the conditions, and in any case, prior to altering or removing the differing condition. The Architect or Owner will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect or Owner determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Owner shall notify the Contractor in writing stating the reasons. Claims by either party in opposition to such determination must be made within 21 days after the Architect has given notice of the decision.

DESIGN CLARIFICATION, ERRORS AND OMISSIONS: Should the Contractor require clarification or interpretation of the Contract, or become aware of any claimed error or omission, he shall immediately inform the Consultant in writing. The Owner or Consultant shall promptly review the circumstances and determine the appropriate corrective action, if any, and so advise the Contractor.

MEASUREMENT AND PAYMENT:

Schedule of Values: Before the first Application for Payment, the Contractor shall submit to the Owner a Schedule of Values allocated to the various portions of the Work, as detailed as the Owner may require. This schedule shall be used as the basis for the Contractor's Applications for Payment. At a minimum, the Schedule of Values shall be broken down by trade, with a separate breakdown and summary required for each separate building or college location. For the purposes of the Schedule of Values, the Contractor certifies that the cost or value listed for the line item represents the true and accurate cost of the proposed Work. The value shown can be used for any future change order or bond valuation adjustment based upon the scope of the work proposed within the line item.

Applications for Payment: The Contractor's Application for Payment shall be submitted on the AIA document G702 form and shall include the Owner's Project number and Purchase Order number. Invoices for payment should be sent to: MCCCD, Facilities Planning & Development, 2411 West 14th St., Tempe, AZ 85281.

The Contractor's Application for Payment shall show the percentage of work completed for each application, total percentage or work completed for each application, total percentage complete-to-date and the balance of work remaining for each cost code identified in the schedule of values. Ten (10) percent retention shall be required on all payments. Retention shall be released following completion of the work, submittals of all close-out materials, required owner training, and submittals of final releases and affidavits.

Payment will be made to the Contractor in compliance with Arizona Revised Statute unless specifically noted on the documents. The Contractor shall promptly pay each sub-contractor (including suppliers, laborers and material men) performing labor or furnishing material for the Work upon receipt of payment from the Owner out of the amount paid to the Contractor on account of the Work of such Subcontractor, supplier, laborer, or material man, the amount which said sub-contractor is entitled, reflecting the percentage actually retained, if any, from payments to the Contractor on account of such Work. The Contractor shall, by an appropriate agreement with each Subcontractor, also require each Subcontractor to make payment to his sub-subcontractors in a similar manner.

The Owner may, on request and his discretion, furnish to any subcontractor, if practicable, information regarding the percentages of completion or the amounts applied for by the Contractor and the action taken thereon by the Owner on account of Work done by such Subcontractors.

Neither the Owner nor the Consultant shall have any obligation to pay, nor to see to the payment, of any moneys to any sub-contractor, except as may otherwise be required by law.

No Certificate for a progress payment, not any partial or entire use of occupancy of the Project by the Owner, shall constitute an acceptance of any Work which is not in accordance with the Contract Documents. Use or occupancy shall not, in and of itself, constitute Substantial Completion.

The Owner or Consultant may decline to certify payment and may withhold the Certificate in whole or in part, to the extent necessary to protect the Owner, if in their opinion they are unable to make correct and accurate representations to the Owner as to the completeness or acceptability of the work in place.

Approval of Allowance and Contingency Uses: At least monthly, and more often if requested, an "Allowance and Contingency Use Authorization" form shall be filled out and signed by the Owner, Architect and Contractor that describes every use of allowances and contingencies made that month. Use of any and all allowance or contingency funds, including those included in the Contractor's contract, require this three party approval. This form should be attached to the monthly payment application.

Stored Materials: The Contractor shall submit a listing of those items proposed as stored equipment and materials for which payment will be requested. Payment of stored materials will not be considered

for items that are incorporated into the work on a continuing basis or for materials which are available as shelf or warehouse items. Materials must be properly stored on site and protected from the elements. Receipts must be provided substantiating that payment has been made for the materials and/or equipment.

Lien Waivers: For each progress payment application, the Contractor shall include lien waivers signed and notarized by each subcontractor or direct materials supplier paid for the previous month.

SUPERVISION AND COORDINATION OF WORK:
The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention, including all required coordination between suppliers, trades and subcontractors. This coordination shall include as necessary, meetings with suppliers or subcontractors, additional coordination drawings or details, etc., as may be required to assure that all of the work fits within the spaces provided, allowing adequate service and maintenance clearances and access, etc. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the safety of such means, methods, techniques, sequences or procedures.

The Contractor's Superintendent shall be in attendance at the Project site at all times work is taking place. The Superintendent shall be acceptable to the Owner, and shall be continued in that capacity for the duration of the Work, unless they cease to be on the Contractor's payroll or the Owner otherwise agrees. Except on small projects and ONLY with the Owner's prior written consent, the Superintendent shall not be employed on any other project for or by Contractor, or any other entity during the course of the Work. On small projects or projects with intermittent work, the Superintendent or a responsible individual, such as a foreman representing the Contractor shall be present on site at all times that work is in progress if expressly approved by the Owner in writing.

PROJECT MEETINGS: If project meetings are necessary, the following applies:

Attendees: Unless otherwise specified or required by the Owner, he will chair the meeting. The Consultant, Contractor and the Contractor's Superintendent shall attend. Subcontractors may attend meetings when involved in matters to be discussed or resolved, but only when requested by the Owner, Consultant, or Contractor.

Meeting Records: The Consultant will record minutes of each meeting and furnish copies within a reasonable time thereafter to the Owner, Contractor, and other attendees. Unless written objection to contents of the meeting minutes is received by the Owner within ten (10) days after presentation, it shall be understood and agreed that the minutes are a true and complete record of the meeting.

Meeting Schedule: Dates, times, and locations for various meetings shall be agreed upon and recorded at the pre-construction meeting. Thereafter, changes to the meeting schedule shall be agreed between the Owner and the Contractor, with appropriate written notice to all parties involved.

SUBMITTALS: The following submittals are required before commencing construction and during the course of construction of the Project.

Project Identification on Correspondence and Submittals: Correspondence and submittals to the Consultant shall bear the Project name and the Project number, as shown on the Contract Documents. Lack of proper identification may cause delays in processing. Submittals which have not been reviewed before submittal by the Contractor will not be accepted. The Contractor is to review, approve and initial shop drawings. The Contractor shall use his standard submittal form to transmit drawings. Drawings are to be delivered to the Consultant's office, unless otherwise directed.

Work Progress Schedule: Immediately after Award of Contract, the Contractor shall prepare and submit for the Owner's and Consultant's review an estimated progress schedule for the work. This schedule shall indicate the dates for the starting and completion of the various stages of construction and shall provide for expeditious and practicable execution of the work.

The Construction Schedule shall consist of a bar chart format consisting of horizontal lines, or bars, plotted along a daily time scale. Each pay item designated in the Contractor's Schedule of Values shall be denominated as a separate activity and represented by a horizontal bar or bars on the chart. The time-scale shall indicate all required Milestone and Completion Dates for each activity up to and including the date of Substantial Completion. The horizontal bar shall indicate the start and finish dates of each activity, well as the total time period of performance for each activity. All work activities, including those within a single activity, shall be broken down into distinctly described activities of no greater than two weeks.

As soon as possible following award, the Contractor shall notify the Owner of any order or delivery lead time of materials which may impact the required completion date for the work. Project completion deadline may be adjusted if material orders are promptly placed and normal manufacturer/supplier lead delivery times will still impact the completion date.

Shop Drawings, Product Data and Samples: Shop drawings are drawings, diagrams, schedules and other data specially prepared for the work by the Contractor or any subcontractor, manufacturer, supplier or distributor to illustrate some portion of the work.

Product data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate a material, product or system for some portion of the work.

Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the work will be judged.

The Contractor shall review, approve and submit, with reasonable promptness and in such sequence as to cause no delay in the work or in the work of the Owner or any separate contractor, all shop drawings, product data and samples required by the Contract Documents. If a submittal is not made in time, any resultant delay will be weighed against any claims for delays.

By approving and submitting shop drawings, product data and samples, the Contractor represents that he has determined and verified all materials, field measurements, and field construction criteria related and that he has checked and coordinated the information contained within such submittals with the requirements of the work and of the Contract Documents. Only those products that were originally specified, or approved by Prior Approval, shall be included in the project.

The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Consultant's review of shop drawings, product data or samples unless the Contractor has specifically informed the Consultant in writing of such deviation at the time of submission and the Consultant has given written authorization to the specific deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the shop drawings, product data or samples by the Consultant's review.

The Contractor shall direct specific attention, in writing or on resubmitted shop drawings, product data or samples, to revisions other than those requested by the Consultant on previous submittals.

No portion of the work requiring submission of a shop drawing, product data or sample shall be commenced until the submittal has been reviewed by the Consultant. Portions of the work shall be in accordance with reviewed submittals.

Submittal Procedure: Shop drawings, product data, and samples shall be dated and marked to show the names of the project, Consultant, Contractor, originating Subcontractor, manufacturer or supplier, and separate detailer if pertinent. All submittals shall be accompanied by a transmittal letter containing the Project name, Contractor's name, number of drawings, data and samples, titles, specification section and page number. All submittals are to be delivered to and may be picked up at the office of the Consultant. The Consultant will require a minimum of ten (10) working days for shop drawing review.

Samples: Submit three (3) samples of sufficient size to indicate general visual effect. Where a selection of color, texture, finish, graining, or other similar property will be made, submit six (6) sets of manufacturer's color or finish charts illustrating the full scope of this range. One (1) set of samples will be retained by the Consultant.

Samples and color or finish charts of all materials requiring color or finish selections shall be submitted, within twenty (20) days after receipt of "Notice to Proceed," in one submittal to facilitate preparation of the color schedule by the Consultant. No color or finish selection will be made until all samples or color or finish charts, as required, are received.

Shop Drawings: Shop drawings shall completely identify Specification Section and locations at which materials or equipment are to be installed. Submit one reproducible sepia transparency and two (2) prints of each shop drawing, including fabrication, erection, layout and setting drawings and such other drawings as required under various sections of the Specifications, until "No Exception Taken" or "Furnish as Corrected" is obtained.

The Consultant will check the drawings and affix his stamp to the sepia, indicating the action taken, and will return same to the Contractor, retaining the prints for his records. Comments, if any, will be noted directly on the sepia. If a drawing is marked "No Exception Taken" or "Furnish as Corrected," no resubmittal is necessary. When marked "Rejected," "Submit Specified Item," "Make Corrections Noted,' or "Revise and Resubmit," correct and resubmit as specified.

Contractor is responsible for obtaining and distributing required prints of shop drawings to his subcontractors and material suppliers after, as well as before, "No Exception Taken" or "Furnished as Corrected" marking is obtained. Prints of reviewed shop drawings shall be made from transparencies which carry the Consultant's appropriate stamp. Mechanical and electrical equipment lay out drawings are to be submitted for review by the Consultant.

Unapproved shop drawings are not to be used. All drawings must have both the Contractor's and Consultant's approval stamp.

Product Data: Submit five (5) copies of manufacturer's descriptive data including catalog sheets for materials, equipment and fixtures, showing dimensions, performance characteristics and capacities, wiring diagrams and controls, schedules, and other pertinent information as required. Where printed materials describe more than one product or model, clearly identify which is to be furnished.

If data is stamped: "No Exception Taken," or "Furnish as Corrected," two (2) copies will be returned. If stamped "Revise and Resubmit," "Rejected," "Submit Specified Item," or "Make Corrections Noted," one (1) marked copy will be returned. Corrected copies are to be resubmitted for review as per original submittal. If Contractor requires additional copies for his distribution, he shall correct and mark those copies to match the Consultants marked copies at his own expense.

Submittals for all major items of mechanical, plumbing and electrical equipment and materials shall be made within thirty (30) days after receipt of "Notice to Proceed." Submit all items at one time in a neat and orderly manner. Partial submittals will not be accepted. Refer to specific submittal requirements in related technical sections.

Equipment submittals shall be complete including space requirements, weight, electrical and mechanical requirements, performance data and supplemental information requested by the Consultant.

Where equipment submitted requires space other than that indicated, submit large scale drawings showing floor space and service clearances.

PROJECT CONDITIONS AND STANDARDS: The Contractor shall inspect the substrate to receive the work and the conditions under which the work is to be performed. The Contractor shall report all unsatisfactory conditions in writing to the Owner. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer. Proceeding with the work indicates acceptance of the substrate conditions and waives any future claim to the contrary.

Manufacturer's Instructions: Where installations include manufactured products, Contractor shall comply with the manufacturer's applicable instructions and recommendations for installation, to the extent that these instructions and recommendations are more explicit or more stringent than requirements indicated in the contract documents.

Cutting and Patching: The Contractor shall be responsible for all cutting, fitting or patching that may be required to complete the work or to make its several parts fit together properly. The Contractor shall not damage or endanger any portion of the work or the work of the Owner or any separate contractors by cutting, patching or otherwise altering any work, or by excavation. Hold any cutting, fitting, or patching of new work to the absolute minimum. Should cutting, fitting or patching become necessary, it shall be performed to the minimum requirements as hereinafter stated and as stipulated elsewhere in the Contract Documents. Structural elements shall not be cut without the written consent of a Structural Engineer.

In all cases, exercise extreme care in cutting operations, and perform such operations under adequate supervision by competent mechanics skilled in the applicable trade. Openings shall be neatly cut and shall be kept as small as possible to avoid unnecessary damage. Careless and/or avoidable cutting, damage, etc., will not be tolerated, and the Contractor will be held responsible for such avoidable or willful damage. All replacing, patching and repairing of all materials and surfaces cut or damaged in the execution of the work shall be performed by experienced mechanics of the several trades involved. Such replacing, repairing and/or patching shall be done with the applicable materials, in such a manner that all surfaces so replaced, etc., will, upon completion of the work, match the surrounding similar surfaces.

Where sidewalk or concrete slabs are removed, they shall be cleanly saw cut and removed to the nearest joint at all sides, and completely replaced with matching thickness and finish. At the contractor's option, conduit may be bored or jacked under existing slabs. Asphalt paving also shall be cleanly saw cut, removed and patched back to the same thickness and base where it needs to be removed for conduit installation. New concrete slabs shall be pinned to existing slabs by drilling in rebar to the face of the existing slabs before pouring back the new concrete work.

Approved Applicators: Where specific instructions in the Specifications require that a particular product and/or material be applied and/or installed by an "approved applicator," it shall be the Contractor's responsibility to insure that any subcontractor or sub subcontractor used for such work is in fact currently certified by the particular manufacturer for this type of installation or application.

Reference Standards: Reference Standards are incorporated into this work by reference to number, title, or other designation in the Specification Sections. Provisions of Standards so referenced apply to the work as though included in their entirety. The date of the Standard shall be that which is in effect as of the bid or proposal date.

The requirements of the Contract take precedence over requirements of Reference Standards, "manufacturer's standards", or local "industry practice," when the Contract Documents call for more stringent or greater requirements. No provision of Reference Standard specifications, manuals or codes, or manufacturer acceptance of work not meeting contract documents or his own standards,

shall be effective to change the duties and responsibilities of the Contractor or Consultant, or any of their agents, consultants, or employees from those set forth in the Contract Documents.

Clarification is to be received from the Consultant prior to material purchase, fabrication or installation when Referenced Standards conflict with information specified or indicated on Drawings.

INSPECTIONS AND TESTING: All inspection and testing required to establish compliance with Contract Document requirements, except as may be otherwise specified, shall be made by an independent professional testing agency or firm selected and paid for by the Owner.

The Owner will pay the cost of the initial services for testing and inspection. If initial tests or consultant inspections indicate non-compliance with Contract Document requirements, or the Work is not ready for testing or inspection when called by the Contractor, any subsequent testing or inspection shall be performed by the same inspection service or consultant and be paid for by the Contractor. Schedule portions of the Work requiring testing and inspection services so that the time of the testing agency is as continuous and brief as possible.

DEMOLITION, EXCAVATION AND BACKFILL/COMPACTION: Visit the site and examine the existing conditions. Note all conditions as to character and extent of work required. Execute all demolition work in an orderly manner with due consideration for existing structures and site features, including any parts of the surrounding areas which re to remain. Barricade and cover as necessary to protect pedestrians, workman and adjacent property. Periodically sprinkle to allay dust. Protect active service and utilities lines shown or uncovered as part of this work. Repair any damage to adjacent structures or features caused by demolition operations. Conduct operations so as not to interfere with adjacent roads, streets, drives, walks and service areas. Disconnect any utilities serving the structure or site features. Backfill and compact trenches and excavations caused by the demolition work.

Carefully excavate or trench for buried conduit. Hand dig where needed to identify and protect existing utilities and landscape irrigation systems. The College will work with the contractor to identify locations of these items, however, not all locations may be identified. Backfill and compact trenches and excavation under lawns and unpaved areas to 90% optimum density, and under walkways, paving, or building slabs to 95% of optimum density. All trenches shall be raked fine to existing adjacent finished grade to allow replanting by the College. All waste or extra construction materials shall be disposed of and not mixed with backfill.

Certain materials shall be carefully removed, protected and turned over to the District as shown. All items considered for salvage and not indicated to be reused shall be placed in a holding area designated by the District for a minimum of 30 days following removal, during which time the District may select items to be retained. Items not salvaged by the District will become property of the Contractor and shall be removed from the site and legally disposed of. Use movable debris containers the material through the building. Do not store or permit debris to accumulate on the site. No sale of salvage materials will be allowed from the site. Extreme care shall be exercised to prevent chipping, breakage, bending and mishandling of materials indicated to be salvaged for the District. On completion of the demolition work, leave the property and adjacent areas clean and satisfactory to the District.

TRAFFIC CONTROL: Where road or parking closures will be required by this work, provide traffic control signage necessary to safely reroute traffic to open circulation or parking areas. Include lighted barricades, temporary directional and information signs, etc. Traffic control signage shall be coordinated with the College and be in place for the duration of the work causing the closure or unsafe conditions. Where campus entry access or driveways will be closed, or normal access is otherwise impeded, or where work is occurring within and along the public right of way, provide traffic control within the public street and right of way, including proper filing of traffic control plans with, and obtaining any required permits from, the local municipal authority.

TEMPORARY FACILITIES AND CONTROLS: Furnish, erect and maintain temporary facilities and controls and perform temporary work required in the performance of the Contract. All utility and services described here and used by the Owner shall remain in service until Final Completion is obtained by the Contractor. Items indicate as "If Needed" shall be furnished as determined by the Contractor. The Owner is not obligated to provide these or similar facilities if the Contractor declines to provide them.

The Owner will identify construction staging and storage areas allocated to the Contractor for the work.

Temporary Enclosures and Storage, if needed: Contractor shall provide all storage enclosures required for his operations. Limit storage of materials to areas indicated or agreed to by the Owner. All temporary storage areas shall be enclosed by a temporary fence at least six feet tall.

Storage Sheds, If Needed: The general contractor and/or subcontractors shall make available throughout the duration of the project, either in temporary facilities or in designated lockable space in the building itself, adequate storage space for his and his subcontractors' materials. Such storage facilities shall be secure, lockable and weather tight. In accordance with the General Conditions, the Owner may make partial payments to the Contractor for materials so stored to his satisfaction.

Contractor's Field Office Trailer, If Needed: Furnish and install a field office building adequate in size for all the Contractor's offices, files, and his job sites meetings.

Toilet Facilities: Provide adequate toilet facilities, as required by applicable ordinance, for the use of all workmen employed on the Project, located where directed, and enforce their use by all personnel on the Project. Existing toilets shall not be used, unless specifically approved by the Owner prior to bid.

Temporary Telephone Service: Telephones may be furnished by the Contractor for the use of the Contractor, Subcontractors, and trades employed on the work. Toll and long distance calls shall be made only under arrangements with the Contractor who shall be responsible for the collection and payment of all charges in connection therewith.

Temporary Water: Water required in the performance of the Contract shall be provided and paid for by the Owner. Provide and regularly test an approved backflow device at all connections to main water supplies. The Contractor shall provide temporary taps, valves or lines necessary for the work.

Temporary Electrical Service: The Owner will provide power required in the performance of the Contract. The Contractor shall provide temporary panels, circuit protection, wiring, devices and fixtures necessary for the work.

Provide adequate temporary lighting and convenience outlets as may be necessary for proper performance and inspection of the work. If operations are carried on during hours of darkness, adequate floodlights, clusters and spot illumination shall be furnished and maintained during all hours that natural illumination is deemed by the Contractor as being insufficient for the work being performed.

Temporary Heat and Cooling: When required for proper installation or protection of any portion of the work, the Contractor shall furnish and install approved temporary heating and cooling units; operate and maintain same, and remove them or relocate them as directed. Unless the project occupies an entire air handler zone, the building HVAC systems will not be used for conditioning if odors, fumes or dust may be spread from the work area to other areas of the building.

Drinking Water: Supply adequate cool, pure drinking water with individual drinking cups for the use of employees on the Project. The quality of the drinking water shall meet the standards for public water supplies specified in the County Health Department Sanitary Code.

Temporary Construction Equipment and Protection: Provide and maintain all fences, barricades, lights, shoring and other protective structures or devices necessary for the safety of workmen, equipment, the

public and property as required by State or Municipal laws and regulations, and local ordinances. These shall conform to all regulations, ordinances, laws and other requirements of the City, State, Federal and other authorities having jurisdiction with regard to safety precautions, operation and fire hazards.

Temporary Fence and Barriers: Where required by the Owner, install a minimum six foot (6') high chain link fence and access gates around the construction sites. Provide opaque wind screen material at all fencing and gates. Furnish, install, maintain for the duration of construction all required scaffolds, tarpaulins, barricades, canopies, warning signs and safety barriers, steps, bridges, platforms, and other temporary construction necessary for proper completion of the Work shall be compliance with all pertinent safety and other regulations. All open excavations shall be completely protected by lighted barriers, 48" high safety/snow type fencing and safety warning tape.

Protect existing structures, paving/paving surface, landscape, underground utilities, etc., as noted on the drawings and as may be otherwise located by the Contractor. Prior to substantial completion return any damaged conditions to the original conditions. Provide and maintain provisions for closing and locking the Project at such time as possible to do so.

Protect the interior of the building by closing all openings with suitable materials when weather or job conditions require.

Protection for Work in Place: Work in place that is subject to injury because of operations being carried on adjacent thereto shall be covered, boarded up or substantially enclosed with adequate protection. Permanent openings used as thoroughfares for the introduction of work and materials to the structure shall have heads, jambs, and sills well blocked and boarded. All forms of protection shall be constructed in a manner such that, upon completion, the entire work will be delivered to the Owner in proper, whole and unblemished condition.

Fire Protection: Provide adequate fire extinguishers on the premises during the course of construction, of the type and sizes recommended by the American Insurance Association to control fires resulting from the particular work being performed. Instruct employees in their use. Place extinguishers in the immediate vicinity of the work being performed, ready for instant use.

Temporary Dust Protection and Barriers: The Contractor shall erect and maintain temporary dust barriers in areas of new construction or remodeling adjacent to or open to non-project areas. Barriers shall be sealed to walls and ceilings to prevent passage of dust. Ceilings tiles shall be in place or other provisions made to prevent the spread of dust into the building air conditioning system when demolition, drywall finishing or other dust producing operations are taking place. At the completion of construction/remodeling, the entire project area shall be cleaned. If dust has spread into adjacent non-project areas, those areas shall be thoroughly cleaned by a professional cleaning service as part of this project. All air filters in air handling equipment located within project areas shall have new filters installed at the close of the project.

Special Controls: Contractor shall take necessary precautions to minimize the dust, dirt, noise or odors arising from his operations by wetting the area or by other suitable methods as approved.

The Owner's on-going operations and use of adjacent areas outside of the project area shall not be disturbed by noise, vibration, odor, material staging, etc. All movement of new materials or waste/demolition materials through non-project areas shall occur prior to 7:30 A.M. or after 2:30 P.M. Dust, dirt or debris in areas outside of the project area shall be cleaned and vacuumed at the end of each work day. All material storage, etc. shall be limited to within the project area.

Contractor shall take reasonable precautions to minimize debris that could be carried by wind on the site or to adjoining property.

Contractor shall exercise maximum noise control efforts to minimize the nuisance of construction noise. Dependent on Owner operating requirement use of noisy equipment may be restricted.

Safety: The contractor will notify the College Buildings and Grounds director in writing of any desired changes to, or interruption of, existing utilities at least five (5) days prior to the time changes are to be made. No existing main switches or valves should be operated by the contractor. Buildings and Grounds will provide personnel to operate, shut down or start up existing systems. Shut down of utilities or equipment that will affect more than the project area needs to be planned and scheduled at least 14 days in advance.

When working within or adjacent to existing facilities, or when tying into existing utilities, the Contractor shall use and comply with College red tag permit systems, tag out procedures and Hot Work Permit systems for cutting, welding, soldering, grinding, etc.

Access and Traffic Regulation: The Contractor shall have access to the work area seven (7) days per week from 5:00 A.M. to 10:00 P.M. Access shall be limited to the work, staging, delivery, and parking areas which have been approved by Owner and indicated on the drawings.

Whenever the Contractor's activity affects college/public vehicular or pedestrian traffic, the Contractor shall install and maintain any and all traffic barriers, signals, separators, etc., necessary for the safety of the public. Maintain access for fire protection of buildings at all times. Do not block or restrict access to fire hydrants.

CLEANING AND REPAIRS: The Contractor shall keep the premises free from accumulation of waste materials or rubbish caused by construction operations at all times. At the completion of the work, remove all waste materials and rubbish from the about the Project, as well as tools, construction equipment, machinery and surplus materials.

All areas open to the public which are affected by the work shall have all debris and material picked up and broomed or vacuumed clean at the end of each work shift. If the Contractor fails to clean up the work, the Owner may do so, and the cost thereof shall be charged to the Contractor. At the end of the project, remove all surplus material, false work, temporary structures, and debris of every nature resulting from operations, and put site in a neat orderly condition. Clean surfaces of the construction and site including sidewalks, curbs and gutters, paved areas, and all like surfaces, and adjoining private and public property to the extent soiled by the Contractor's operations. Remove all debris from staging and construction areas and return the area to the original conditions. In conjunction with final cleaning of all surfaces and areas, the Contractor shall check operational pieces of equipment for proper functional operation and alignment. Final adjustments by qualified mechanics shall be made as required.

All damage to areas or materials due to the work of this project shall be repaired or replaced to match adjacent undamaged areas. Work shall be performed by craft persons skilled in the particular area of work requiring repair or replacement.

SUBSTANTIAL COMPLETION: is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work. For the purposes of this Contract, the term "beneficial occupancy" is not recognized as having any meaning or impact on defining the meaning or Date of Substantial Completion. Full or partial occupancy or use of the facility by the Owner shall not constitute or be sufficient for determining Substantial Completion. All of the following are conditions precedent for Substantial Completion:

1. Inspection, approval, occupancy, and other permits issued by regulatory agencies having jurisdiction and without conditions. Conditional permits do not satisfy Substantial Completion requirements.

2. Work in paved areas is complete, functional, and accepted by the Consultants.

3. Odor and fume generating activities are complete. This includes work such as painting, staining, floor installation, etc. This also includes odor generating activity that originates in non-occupied spaces, but could enter and impact occupied areas.

4. All dust generating activity has been completed. This includes street sweeping. This also includes any dust generating activity that originates in non-occupied spaces, but could enter and impact occupied areas.

5. Final cleaning is complete.

6. Remaining punch-list items do not represent a hazard or create an adverse impact to the Owner and occupants in order for the contractor and his subcontractors to complete. Completion of punch-list items should not cause interruption or disruption to the Owner's functions due to noise, dust, odor, fumes, etc., or they must be undertaken and completed during off-hours convenient to the Owner's operations and at no added cost to the Owner.

7. The Owner is able to fully occupy and use all portions of the Work.

INDEMNIFICATION

To the fullest extent permitted by law, the Contractor shall defend, indemnify and hold harmless the Owner, Architect, Architect's Consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, court costs and the cost of appellate proceedings, arising out of the negligent acts or omissions of the Contractor, ~~a~~ it's Subcontractors, anyone directly or indirectly employed by them or anyone for whose acts they may be liable. ~~.~~ Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to any party or person described in this Paragraph 3.18.

The obligations of the Contractor shall not extend to the liability of the Architect, the Architect's consultants, and agents and employees of any of them arising out of (I) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications, or (2) the giving of or the failure to give directions or instructions by the Architect, the Architect's Consultants, and agents and employees of any of them provided such giving or failure to give is the primary, cause of the injury or damage. These Paragraphs shall not limit the obligations of the Contractor to the State of Arizona or any Department, board, agency or other political subdivision of the State of Arizona, when any one or more of the foregoing serves as the Architect or a sub-consultant to the prime Architect.

ADMINISTRATIVE RESOLUTION OF CLAIMS AND DISPUTES

Any claim or dispute between the Contractor and the Owner arising out of or relating to this Contract, which has not been resolved by the Architect in a manner acceptable to both the Contractor and the Owner shall be resolved pursuant to the Maricopa County Community College District Purchasing Procedures Manual, Section 902, "Contract Claims and Dispute Resolution", with the addition that if there is any cost incurred in providing an outside hearing officer, the District and the Contractor will split the cost in proportion of the actual award made versus the value of the claim being made . A copy of this section can be found at http://www.maricopa.edu/purchasing/pmanual/902.htm. The parties agree that the Claims Procedures and Legal Remedies set forth or identified in this Paragraph shall be the exclusive means for resolving disputes arising under the Contract. Contractor acknowledges and understands that it must follow this process before instituting any judicial proceeding and that all decisions reached, along with their reasoning, shall become part of the legal record of any proceeding. In agreeing to this Contract Claims Process, all parties to the hearings and decisions agree that this process must be followed prior to any formal litigation and that all decisions reached, along with their reasoning, become part of the legal record of that litigation filing.

No suit or action shall be commenced hereunder by any claimant other than in the Arizona Superior Court for Maricopa County. The procedures described in this Paragraph for resolving claims shall be exhausted before any lawsuit may be filed.

Nothing in this Contract shall be construed to waive the requirements of Arizona Revised Statutes Sections 12-820 et seq. The Contractor shall file any notice of claim under this Contract within the time limits and in the manner specified in Arizona Revised Statutes Section 12-821.01. Unless otherwise agreed in writing, the shall carry on the Work and maintain its progress during the resolution of any claim or controversy and the Owner shall continue to make payments that are due and owing to the Contractor in accordance with this Contract

LEGAL WORKER REQUIREMENTS

As mandated by Arizona Revised Statutes § 41-4401, MCCCD is prohibited from awarding a contract to any contractor who fails, or whose subcontractors fail, to comply with Arizona Revised Statutes §23-214-A, which requires that employers verify the employment eligibility of their employees through the Federal E-verify system. An "employer" is an independent contractor, a self-employed person, the State of Arizona or any of its political subdivisions, or any individual or type of organization that transacts business in the State of Arizona, that has a licensed issued by an agency in the State and that employs one or more employees in the State. (See A.R.S. §23-211-4.) Therefore, in signing or performing any contract for MCCCD, the Contractor fully understands that:

A. It warrants that both it and any subcontractors it may use comply with all federal immigration laws and regulations that relate to their employees and with A.R.S. § 23-214-A;
B. Any breach of that warranty is material and is subject to penalties up to and including immediate termination of the contract; and
C. MCCCD or its designee is authorized by law to randomly inspect the records relating to an employee of the Contractor or any of its subcontractors who works on the contract to ensure compliance with the warranty made in Paragraph A above.

SUSPENSION, TERMINATION and DEFAULT

All requirements of the termination, suspension or default paragraphs shall be included as flow-down requirements in all sub-contracts and supplier purchase orders.

TERMINATION BY THE OWNER FOR CAUSE

The Owner may terminate or default the Contractor upon actual or anticipated, persistent or repeated occurrence of, or failure to, correct any one or more of the following: (1) If the Contractor fails to supply, or fails to cause to supply, sufficient skilled workman or suitable materials or equipment required for the timely and proper progress and/or completion of the Work; (2) If the Contractor, upon payment by the Owner, fails to make prompt payment to Subcontractors or suppliers at any tier, for materials, labor or equipment due, or approved in the Application for Payment, in accordance with the respective agreements between the Contractor and the Subcontractors; (3) If the Contractor fails to comply with laws, ordinances, rules, codes, regulations, orders or similar requirements of any public entity having jurisdiction or specified by this Contract; (4) If the Contractor refuses or fails to prosecute the work, or any separable part, with such diligence as will ensure its completion within the agreed upon time; or if the Contractor fails to produce and pursue the required recovery schedules; or if the Contractor fails to complete the Work within contract dates of Substantial or Final Completion; (5) If the Contractor fails to follow any reasonable instruction by the Architect or Owner; (6) If the Contractor performs Work that deviates from the Contract Documents, or fails to remove, replace or repair improper or inadequate Work when directed by the Architect; (7) If the Contractor fails to obtain or maintain required bonds, insurance, licenses or permits; (8) If the Contractor has repeated or excessive safety violations, whether officially reported or not, or fails to remedy serious safety violations; (9) If the Contractor otherwise breeches or violates in any material way any provision or requirements of these Contact Documents or of any other contract between the Owner and Contractor.

Once the Owner determines that sufficient cause exists, the Owner may terminate or default the Contract without prejudice to any other right or remedy the Owner may have in the Contract Documents or in law.

Once the Owner determines that sufficient cause exists, the Owner may terminate or default the Contract after giving the Contractor and its surety notice by issuing a written Declaration of Default. If Contractor fails to cure, or demonstrate reasonable effort to cure, such problem within three Days, and completely cure such problem within seven Days, then Owner may give a second written notice to Contractor and surety of its intent to terminate the Agreement within seven Days. If Contractor, within such second seven Day period, fails to cure such problem, then Owner may declare the Agreement immediately terminated for default by providing written notice to Contractor and surety of such declaration. After expiration of this seven day period, the Owner shall have the sole discretion to permit the Contractor to remedy the cause for the contemplated termination without waiving the Owner's right to terminate the Contract.

In the event that the Contract is terminated or defaulted, the Owner may take over the Work and prosecute to completion, by contract or otherwise, and may exclude the Contractor from the site. The Owner may take possession of the Work and all tools, construction equipment, machinery and plant which may be on site of the Work, and the use of same to the full extent that they can be used by the Contractor, and without liability to the Contractor except to return them undamaged, reasonable wear and tear excepted, at such time as any such item no longer has utility for completion of the Work. The Owner may also take possession of all material and appliances stored at the site and finish the Work as the Owner deems expedient. In such case, the Contractor shall not be entitled to receive any further payment until the Work is completed.

Immediately upon Termination for Cause or Default, title to all completed work, work in progress and stored materials passes to the Owner. If the unpaid balance of the Contract Sum exceeds the Owner's direct and indirect cost and expenses of completing the Work, including compensation for the additional professional, consultant, internal or additional procurement costs, lost revenue, interest, legal or other required services and damages incurred by the Owner and not expressly waived, such excess shall be used to pay the Contractor for the Work it performed. If such costs exceed the unpaid balance, the Contractor or its surety shall pay the difference to the Owner, or at the sole discretion of the Owner, the difference due may be deducted from balances due on other contracts between the Owner and Contractor. In exercising the Owner's right to prosecute the completion of the Work, the Owner shall have the right to exercise its sole discretion as to the manner and methods of completing the Work. In the event that the Owner accepts bids for corrective Work or completion of the Project, or the Surety assumes responsibility for corrections or completion of the Work, the Contractor shall not be eligible for the award of such contracts or work at the Owner's sole option.

The Owner shall have the option of requiring any, all or none of the Subcontractors or suppliers to perform according to their subcontracts and purchase orders, and may assign any or all of the subcontracts to a general contractor selected to complete the Work.

If the Owner takes over the Work, unexecuted orders entered into by the Contractor for performance of any part of the Work will be effective upon acceptance by the Owner in writing, and only as to those subcontracts and purchase orders which the Owner designates in writing. The Owner may accept assignment at any time during the course of construction prior to Final Completion. All subcontracts and purchase orders shall provide that they are freely assignable by the Contractor to the Owner and its assigns. The assignment is part of the consideration to the Owner for entering into this Contract and may not be withdrawn prior to Final Completion of the Work.

In the event the Contract is terminated and it is determined for any reason that the Contractor was not in default, the termination shall be deemed a suspension for Convenience of the Owner. This Contract may be terminated by the Owner under the conditions stated in A.R.S. § 38-511.

SUSPENSION BY THE OWNER FOR CONVENIENCE

The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine. The Contract Sum and the Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or

interruption. Adjustment of the Contract Sum shall include pro-rated profit for the Work completed at the time of the Suspension. No adjustment shall be made to the extent:

1. that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

2. that an equitable adjustment is made or denied under another provision of the Contract.

If funds approved by the Legislature, by public vote, or by the District Governing Board to perform this Work become unavailable for payment under this Contract, the Owner may delay the Work for a period up to six months, after which date if no approved or apportioned funds are made available, this Contract shall terminate at the option of the Owner. In the event of such delay or termination, the Owner shall pay the Contractor under the Contract through the date of Work stoppage, but only direct job site costs may be recovered by the Contractor for damages reasonably incurred after the date of Work stoppage.

TERMINATION BY THE OWNER FOR CONVENIENCE

For its own convenience upon seven days' written notice, the Owner may, at any time, terminate the Contract in whole or in part for the Owner's convenience and without cause. Such Termination shall be effective at the time and manner specified in the Notice. In such case, the Contractor shall be paid in accordance with provisions of this section. Such termination shall be without prejudice to any claims which the Owner may have against the Contractor. In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, which shall be the unpaid progress payments from the Schedule of Values for completed work or work in progress plus the proportional overhead and profit from the Schedule of Values due on that Work only, materials and equipment stored on the site but not yet installed in the Work, plus the retention held to date along with reasonable, direct job site costs incurred by reason of such termination. Unless shown as a defined payment line on the Schedule of Values, non-recurring costs, such as project mobilization, or other indirect project start-up costs will not be paid or reimbursed. No payment will be made for items such as home office overhead and profit, anticipated profit, or profit on work not yet performed.

TERMINATION INFORMATION REQUIRED FROM THE CONTRACTOR

In the event of termination, for any reason, or default by the Contractor, the following shall be supplied to the Owner and bond company, or their representative, as requested, within seven calendar days of the request: (1) subcontract information, including copies of all subcontracts, and both successful and unsuccessful subcontract proposals, including all accounting information related to the subcontracts; (2) purchase order information, including full copies of all purchase orders with all attachments, and all related correspondence, take-off sheets, change notice proposals, accounting and payment information, etc. (3) complete payroll information, including computations of labor burden chargeable to the project, for all personnel employed directly by the Contractor (4) complete information on all Contractor owned equipment or equipment rentals associated with this Work (5) other job cost or progress support information related to general conditions costs, insurance or bond coverage, daily job superintendent reports, etc. (6) summaries of costs billed during the period and final/to-date detailed job cost history (7) all drawings, manuals, submittals, narratives, tests, etc., associated with the Work.

DEFAULT OR TERMINATION OF OTHER ON-GOING PROJECTS

In the event of termination or default of the Contractor, the Owner may terminate or default other on-going Contracts held with the same Contractor. Where termination or default occurs, the Contractor shall take action as described in the following paragraph and be entitled to payment for termination as described above, for other On-Going projects in good standing, only when the termination is for Owner's convenience.

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PROTECTION AND SECURITY FOR WORK IN THE EVENT OF SUSPENSION, TERMINATION OR DEFAULT

Upon receipt of written notice from the Owner of suspension, termination or default, whether for the Owner's convenience or for cause, the Contractor shall: (1) cease operations as directed by the Owner in the notice; (2) take actions necessary, or that the Owner may direct, for the protection and preservation of the completed Work and Work in progress, and property related to the Agreement that is in the possession of the Contractor and which the Owner has or may acquire an interest including stored materials; (3) shall maintain site security until directed by the Owner or other arrangements are made by the Owner or Surety and the Contractor is notified in writing to discontinue such services; (4) except for Work directed to be performed prior to the effective date of termination stated in the notice, and upon direction from the Owner, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders. (5) The Contractor will be reimbursed for the reasonable and direct costs to maintain on-going security and protection as required above upon presentation and approval of supporting documentation. Estimated costs for these requirements shall be reviewed and approved in writing by the Owner in advance.

PROJECT CLOSE-OUT: The following are requirements and procedures for submittal of data relating to closing out the Project upon completion of the Project Work. Receipt and approval of all items specified in this Section is a prerequisite for Final Payment. Detailed instructions elsewhere in these Specifications may require that certain items listed herein be submitted prior to Substantial Completion of the Project.

Evidence of Payment and Release of Liens: The Contractor shall submit the following to the Owner:

1. Contractor's Affidavit of Payment of Debt and Claims (AIA Document G706 or similar form approved by the Owner).

2. Contractor's Affidavit of Release of Liens (AIA Document G706A or similar form approved by the Owner including the following:

   a. Consent of Contractor's Surety to Final Payment (AIA Documents G707 or similar form approved by the Owner).

   b. Contractor's Final/Conditional Release of Waiver of Liens.

   c. Separate releases or Waivers of Lien for each Subcontractor, supplier, and others with lien rights against Owner's property, together with list of those parties.

Duly sign and execute all submittals, before delivery to the Owner.

Contractor's Close-out Submittals to Owner: Both the Project Record Documents and the Owner's Operation and Maintenance Manuals should be submitted as specified herein and as per the various Sections of the specifications.

Provide THREE COPIES of all maintenance and operations data, as well as THREE COPIES of all manuals, warranties, etc.

Operations and Maintenance Data, If Needed: Where manuals are required to be submitted covering items included in this Work, prepare all such manuals in durable binders approximately 8 1/2 by 11 inches in size. The general nature of the manual should easily identifiable through the front cover. A neatly

typewritten index should be located near the front of the manual, in order to furnish immediate information as to location of data. In addition, a copy of all guarantees and warranties issued should be included.

Maintenance and operation instructions:

Procure or prepare and include in manuals, operating and/or maintenance instructions for all equipment and/or materials that will require any adjustment, servicing, or attention for its proper operation or use. These instructions shall set forth all of the information necessary for the Owner to operate, maintain and make full and efficient use and perform such maintenance and servicing as would ordinarily be done by the Owner or his personnel. The Contractor will retain liability for the Owner's improper maintenance or operation of the system until proper training is completed.

Write instructions in simple, non-technical language when possible, with sufficient diagrams and explanation where necessary to be readily understandable by average layman. Possible hazards shall be particularly pointed out with instructions cautioning against mistakes that might result in damage or danger to equipment, building, or personnel. Where contents of manuals include manufacturer's catalog pages, clearly indicate the precise items included in this installation and delete or otherwise clearly indicate all manufacturer's data with which this installation is not concerned.

Instruction of Owner's Personnel:

Prior to final acceptance and payment, instruct Owner's personnel in necessary operation, adjustment, and maintenance of products, equipment and systems. Operating and maintenance manual shall constitute basis of instruction. Review manual contents with Owner's personnel in detail to explain all aspects of operations and maintenance. A listing of all personnel receiving instructions, complete with signature verifying same, dates of instruction, and other pertinent data shall be delivered to the Project Manager upon completion of instruction session(s).

Recording As-Built Drawings:

The Owner will furnish the Contractor one (1) complete set of new prints of the drawings. The Contractor and/or sub-contractor under his direction shall record each and every change from the Contract Documents at the time it is made. This includes any changes that are made in partitions, doors, or otherwise in arrangement of construction of buildings as well as a complete record of exact manner in which electrical and mechanical work, piping, etc., are installed. Dimensions shall be included where necessary to accurately locate piping and other items that will be concealed in the finished building and on the site that may later be necessary to service. Maintain documents in clean, dry, legible condition and do not use record documents for construction purposes. Maintain Shop Drawings as record documents; legibly annotate appropriate drawings to record changes made after review.

Markings on reproducible materials shall be in dark ink or pencil. No "white out" or similar material should be used. Markings on paper drawings should be in red pencil, made dark and clear enough to reproduce via photocopy process.

Keep As-Built Drawings current. Legibly mark to record the following:

a. Horizontal and vertical location of underground utilities, including electrical, and appurtenance referenced to permanent surface improvements.
b. Field changes of dimensions and detail.
c. Change made by Change Order.
d. Details not on original Contract Drawings.

All RFI's, ASI's or change orders referenced on the face of the drawings as part of the As-Built information either shall be taped to the drawing sheet with the reference (without covering or obscuring other information on the sheet) or taped to a separate blank drawing sheet that is the same size as the

rest of the sheets and then bound into the drawing set. References to files or a separate binder are not acceptable.

Provide one set of mylar reproducible drawings and one set of prints of the completed as-builts.

SECTION 01015

SALT RIVER PIMA-MARICOPA INDIAN COMMUNITY REQUIREMENTS

NOTE: EACH GENERAL CONTRACTOR SHALL MAKE EACH SUBCONTRACTOR AND SUPPLIER AWARE OF THE CONDITIONS OF THIS SECTION DURING THE BID PERIOD.

PART 1 GENERAL

1.02 Related sections

1.03 Definitions

1.04. SRPMIC and EPA Region 9 Permits

1.05 Inspections and monitoring

1.06 Certificate of Occupancy

1.07 Business License

1.08 Taxes

1.09 Material Preference

1.10 Commercial Waste and Trash Collection

1.11 Dust Control

1.12 Employment Preference

1.13 Disadvantage Business Enterprises

1.14 Mandatory Cultural Sensitivity Training

1.15 Miscellaneous Requirements

1.02 RELATED SECTIONS

A. Section 01010 – Summary of Work

B. Section 01600 – Material and Equipment and Substitutions

1.03 DEFINITIONS

A. “CofO” – means Certificate of Occupancy

B. “Prime Contractor” – means the Contractor (General Contractor)

C. “P&ED” – means the Planning and Engineering Department, of the SRPMIC

D. “SRPMIC” – means the Salt River Pima-Maricopa Indian Community

E. “SRMG” – means Salt River Materials Group

1.04 PERMITS

A. Salt River Pima-Maricopa Indian Community Building Permit

a. Grading, foundation, building, electrical, mechanical, plumbing, signage permits are issued by SRPMIC Planning and Engineering Department (P&ED). Permit fees will be paid upon permit issuance and are payable to the SRPMIC.

b. Before the permit is released, the Prime Contractor shall show evidence that the Business License, Tax License, Material Preference, Employment Preference and cultural training have been met.

c. **THE CONTRACTOR MUST CONTACT SRPMIC TO VERIFY FEES AND PROCEDURES REQUIRED FOR EACH PROJECT**.

d. Contact Information:

Engineering Construction Services
480-362-7900

B. U.S. Environmental Protection Agency (EPA) Region 9 Construction General Permit

a. A Construction General Permit from Region 9 EPA is required for each project. There is no cost for the permit; to apply, submit a notice of intent (NOI) requesting permit coverage. SWPPPs are not sent to EPA unless specifically requested.

b. Contractor who meet the definition of an “operator” in the permit need to submit NOIs and obtain permit coverage.

c. There is a 7 day waiting period (e.g., for endangered species review) after an electronic NOI submittal before permit coverage is active. The status of the NOI can be checked on on EPA's eNOI website at:
http://cfpub.epa.gov/npdes/stormwater/enoi.cfm

EPA may delay permit coverage for more than 7 days if issues arise during the review such as endangered species concerns. Paper NOIs sent by mail (they go to EPA HQ in Washington, DC) take longer for mailing and processing, but also can have the status checked on the eNOI website.

Proposed new permits for 2012 would require a 30 day waiting period; see:
http://cfpub.epa.gov/npdes/stormwater/cgp.cfm

d. Once the NOI is listed as "active" on the eNOI website, the contractor has his permit and discharge authorization.

e. Contact Information:

Eugene Bromley
NPDES Permits Office (WTR-5)
EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105
bromley.eugene@epa.gov
(415) 972-3510
(415 947-3549 (fax)

1.05 INSPECTIONS AND MONITORING

A. All inspections, including foundation, structural, electrical, mechanical, plumbing, on-site improvements, off-site improvements are required, and must be scheduled with the P&ED with at least one day's notice. The Salt River Indian Community Fire Department provides fire prevention and safety, and final inspection. Approved building permit and inspection record shall be posted at jobsite. Approved building plans must be available for SRPMIC Building Inspector.

B. In addition, the Contractor is responsible to notify Cultural & Environmental, who will monitor grading, trenching, foundation work. Any and all finds of actual or suspected archeological significance shall be reported immediately to Cultural and Environmental. Work in the immediate area of the suspected materials shall be stopped and the materials protected until clearance to resume work or other instructions are provided by Cultural and Environmental.

C. Contacts: Inspections, Engineering Construction Services
480-362-7910

Environmental Protection and Natural Resources Division (EPNR)
480-362-7500

Cultural Resource Dept (CRD)
480-850-2940.

1.06 CERTIFICATE OF OCCUPANCY

A. Temporary and Final CofO inspections are mandatory. Upon satisfactory final CofO inspections, the Prime Contractor is responsible to return all inspection records to P&ED for issuance of CofO. Occupancy of building shall not be authorized until Prime Contractor has processed required documents. The definition of temporary and Final CofO is as follows.

B. Final CofO: Class I Certificate – Every tenant of every building or structure must first obtain a Class 1 Certificate prior to opening for business or for public use. This certificate shall not be transferable from one building to another nor from one tenant to another, and shall be posted on the premises in a conspicuous location with the required business license. A business license shall be issued only after Class 1 Certificate of Occupancy has been issued by the Building Official.

C. Temporary CofO: Class II Certificate – a Class II Certificate shall permit the limited occupancy of a building for the purpose of facilitating fixturing, stocking, equipment installation, staff training, temporary storage or tenant improvement construction. This certificate shall not permit the conduct of business on the premises, nor allow service to the public, and shall be valid for a period of not more than 30 days unless extended in writing by the Building Official. This certificate shall be posted on the premises and is nontransferable.

D. Contact: Engineering Construction Services Department
480-850-8160

1.07 BUSINESS LICENSE

A. Pursuant to SRPMIC Ordinance No. SRO-49-78, the Prime Contractor **and all Subcontractors** are required to obtain a Business License to perform work within the SRPMIC. License fees are paid per calendar year and are not subject to be prorated.

B. Contact: Economic Development
480-362-7649

1.08 TAXES

A. The Prime Contractor must obtain a Tax License from the SRPMIC Finance Department. The Tax License fee is a one time fee.

B. Pursuant to SRPMIC Ordinance No. SRO-88-84, a tax upon the gross income of Contractors earned within the SRPMIC is assessed.

C. Confirm the applicable tax rate and calculation with the Community.

D. Contact: Finance Department
480-850-8065

E. Arizona State and Maricopa County Sales Taxes are required to be reported to the Arizona Department of Revenue, on a monthly basis. For questions regarding these tax procedures, contact the State of Arizona Department of Revenue. City of Scottsdale taxes are not applicable to work performed at Scottsdale Community College.

1.09 MATERIAL PREFERENCE

A. In keeping with the interests and requirements of the Salt River Pima-Maricopa Indian Community, Contractors for all projects are required to use aggregates, cement, mortar products and pozzolan (fly ash) obtained through SRPMIC resources.

B. In addition to being purchased directly through Salt River Materials Group (SRMG), these materials are also incorporated into a number of other construction products.

C. The following is a list of all contractors and suppliers that currently meet the requirements of the Community's purchasing policy with SRMG. Contractors shall notify all suppliers about the requirement to use SRPMIC resources on projects at the Community prior to receiving quotes and submitting bids for projects. The intent of this notice is to ensure the use of contractors and product suppliers that utilize SRPMIC products for their cement, fly ash, and aggregate needs. The companies on this list must be competitive with other similarly qualified companies that may not purchase materials from Community entities.

Contact: Salt River Materials Group
480-850-5757

D. If a claim is made that a supplier or contractor from this list is not competitively priced, please contact SRMG and arrangements will be made to ensure a competitive bid to the Community.

E. **The Contractor is responsible for obtaining updates from SRMG to this list during pricing periods and before placing any orders to assure that this vendor list is current and materials preference purchases are made**.

F. Materials List: See Part 2, Products, within this Specifications Section.

G. In the event that SRPMIC and its affiliates are unable to supply materials that meet specifications in a timely manner at the quoted process, the Prime Contractor or Subcontractor may utilize an alternate source upon written approval of the Owner and SRMG.

1.10 COMMERCIAL WASTE AND TRASH COLLECTION

A. Construction waste reduction and recycling efforts shall be addressed and used by the Contractor. Certain construction and demolition waste materials may need to be disposed of in specialized landfills. Call Environmental Protection and Natural Resources for specific information and instructions.

B. All commercial waste and trash hauling within the Salt River Pima Maricopa Community, including construction debris, and all waste materials during and after construction are required to be taken to Salt River landfill utilizing SRPMIC Public Works Department's approved waste contractor. The currently approved sole contractor for disposing of all commercial waste and recycling, including construction and demolition materials, is **Allied/Republic Waste Service.** Use Allied's blue containers to help identify their pick up materials.

C. Materials that the Salt River landfill will not take may be disposed of according to Environmental Protection and Natural Resources Division requirements. The approved waste contractor will advise the contractor of any restrictions imposed by the landfill operations. Contact SRPMIC Public Works with any questions.

D. Hazardous waste spills shall be reported immediately to Environmental Protection and Natural Resources and the wastes shall be disposed of properly.

E. Use of any unauthorized firm will result in impounding of trash containers and shut down of the project.

F. No open burning of any kind is allowed.

G. Contacts:

SRPMIC Sanitation Manager- Russell Phillips
480-362-5603

Public Works
480-850-8260

Environmental Protection and Natural Resources
480-362-7500

1.11 DUST CONTROL

A. Submit one electronic copy and one bound copy of the Notice of Intent (NOI) and Stormwater Pollution Prevention Plan (SWPPP) to Environmental Protection and Natural Resources.

B. For construction activities that disturb more than one acre, an approved Dust Control Plan (DCP) for all ground disturbing activities shall be in place prior to construction. Apply to and submit one electronic copy and one bound copy to Community Development Department/ Environmental Protection and Natural Resources.

C. Materials that the Salt River landfill will not take may be disposed of according to Environmental Protection and Natural Resources Division requirements. The approved waste contractor will advise the contractor of any restrictions imposed by the landfill operations. Contact SRPMIC Public Works with any questions.

D. Track-out, carry-out, spillage and/or erosion

a. Install, maintain and use a suitable track-out control device that prevents and controls track out and removes particulate matter from tires and exterior surfaces of haul trucks and motor vehicles that transverse the site. Install these devices at all site exits onto paved areas accessible to the public from both of the following:

i. All work sites where 100 cubic yards or more of bulk materials are hauled on- or off-site per day; and

ii. All work sites with a disturbed surface or one acre or larger

b. Control Measures for all sites

i. At all exits onto paved areas accessible to the public, install a wheel wash system.

ii. Install a gravel pad at all exits onto paved areas accessible to the public.

iii. At all exits onto paved areas accessible to the public, install a Grizzly or rumble grate that consists of raised dividers (rails, pipes or grates) a minimum of three inches tall, six inches apart, and 20 feet long, to allow vibration to be produced such that the dust is shaken off the wheels of a vehicle as the entire circumference of each wheel of the vehicle passes of the Grizzly or rumble grate.

iv. Pave starting from the point of intersection with a paved area accessible to the public and extending for a center line distance of at least 100 feet and a width of at least 20 feet.

v. Clean up, track out, carry out, spillage and erosion from paved areas accessible to the public including curbs, gutters, and sidewalks shall be cleaned up on the following schedule:

1. No personal shall allow track-out to extend 75 linear feet or more in cumulative length from the point of origin from an active operation. Notwithstanding this, all track-out from an active operation shall be removed at the conclusion of each workday or evening shift

2. Operate a street sweeper as necessary or wet broom with sufficient water, including but not limited to, kick broom, steel bristle broom, Teflon broom, or vacuum, at the speed recommended by the manufacturer.

E. Contact:

Environmental Protection and Natural Resources
480-362-7500

1.12 EMPLOYMENT PREFERENCE

A. In order to provide employment, promotion, and training opportunities for members of SRPMIC, the Prime and Subcontractors shall comply with the following guidelines:

1. Section 1: Pre-job Conference Procedure

A. The Prime shall attend a pre-job conference initiated by the SRPMIC Human Resources Department (HRD) prior to starting work.
The Prime shall provide a list of Subcontractors to be used on the job, along with the contact person, and telephone number for each firm.

B. The Prime and all Subcontractors shall provide a Manpower Utilization Pan identifying the crafts and trades expected to be utilized including the key supervisory positions or any position required special qualifications, ranges of pay scales for each craft and trade, and the approximate date the workers will be required on the job.

2. Section 2: Employment Preference and Hiring Procedure

A. HRD may make job referrals to appropriate Contractors. This procedure will enable HRD to monitor employment preference. IN all cases, only those Community resident applicants who register with HRD received job referral will be considered for employment. The wage rates established at the pre-job conference shall not be altered unless agreed upon by both parties the Contractors and HRD.

B. The Prime and Subcontractors shall submit weekly Manpower Reports to HRD. Forms will be provided to Prime and Subcontractors. The Prime shall be responsible for ensuring that all Subcontractors adhere to SRPMIC Employment and Preference requirements.

C. In the event SRPMIC is unable to fill employment positions with qualified applicants, the Prime and Subcontractor may utilize other hiring methods.

3. Section 3: Employment and Training Plans

Prime and Subcontractors are encourage to utilize the “On-the-job Training” (OJT) program available through HRD. HRD will make available up to one-half of the training costs for each training slot. Prime and subcontractors should make allowances for the utilization of semi-skilled and untrained Community members. The OJT program requirements, including the number of man-hours, by craft, and skill level will be discussed at the pre-job employment conference.

B. In addition, the prime shall be responsible to ensure that all Subcontractors adhere to SRPMIC Employment Preference guideline. See attached Contractor/Developer Record of Application and Notification form.

C. Contact: Human Resources Dept.
(480) 850-8096

1.13 DISADVANTAGE BUSINESS ENTERPRISES

A. Socially and economically disadvantage business enterprises, including native American owned enterprises shall have maximum opportunity to participate as Contractors, Subcontractors, suppliers or vendors in the performance of construction contracts within SRPMIC.

1.14 MANDATORY CULTURAL SENSITIVITY TRAINING

A. Any contractor who is doing ground disturbance within the Community must attend a mandatory two-hour class in cultural sensitivity training. English and Spanish speaking classes are available.

B. Attending parties shall be the contractor’s project manager and superintendent.

C. Material and information shall be provided to all subcontractors and any of their personnel who may be doing ground disturbance as part of their work.

D. Registration and Contact:

Esther Moyah
480-362-7656

1.15 MISCELLANEOUS REQUIREMENTS

A. Prior to moving or destroying protected native plant species, the Contractor shall file a formal Notice of Intent with the Arizona Department of Agriculture Native Plants (602) 542-6408.

B. Prior to excavating, the Contractor shall obtain from the Arizona State Historical Preservation Officer (SHPO) at (602) 542-4009, recommendations regarding the need for cultural resources (archeological) clearance. The College site has NOT been surveyed according to SHPO. All discoveries of human remains, cultural artifacts, or paleontological remains shall be reported to the Arizona State Museum, Maricopa County Department of Transportation (if found in the Chaparral Road right of way), and appropriate SRPMIC Community department. Upon discovery, Contractor shall cease operations in the vicinity of the find and protect the discovery area from further disturbance until the find can be investigated by the above notified departments.

Part 2: PRODUCTS

These products change somewhat regularly. The Contractor shall contact SRMG prior to pricing or bidding the project to confirm the most current list of approved firms. (The list below is current as of 1/14/10)

Contact: (480) 850-5757

1. **Aggregates** (all types including sand, rock, and ABC)
   - ❖ Salt River Materials Group

2. **Sack Products** (may be purchased from several building material suppliers throughout metropolitan Phoenix, including Board Construction Specialties, Marvel Building and Masonry, Preach Building Supply, Grand Sprinkler and a number of others. SRMG can provide contact numbers for these and other firms)
   - ❖ Phoenix Cement Type I/III/V (LA)
   - ❖ Phoenix Cement Type IP (Portland Pozzolan)
   - ❖ Phoenix Cement Type III (Rapid Power)
   - ❖ Phoenix Cement SUPERMORTAR (Type S masonry cement)
   - ❖ Phoenix Cement SUPERMORTAR PLUS SANDED (Type S mortar mix)
   - ❖ Phoenix Cement DYNAMORTAR (Type S masonry cement)
   - ❖ Phoenix Cement DYNAMORTAR PLUS SANDED (Type S mortar mix)
   - ❖ Phoenix Plastic Cement
   - ❖ Phoenix Fly Ash (Class F pozzolan)

3. **Concrete Block/Brick/Pavers** (as manufactured with Phoenix Cement products)
   - ❖ Block-Lite
   - ❖ Metro Block
   - ❖ Quality Block
   - ❖ Show Low Block
   - ❖ Yavapai Block

4. **Precast Concrete Products**
   - ❖ Olson Precast of Arizona
   - ❖ US Concrete
   - ❖ Southwest Architectural Castings

- ❖ Aristone Concrete Designs
- ❖ Mesa Precast

5. **Ready Mix Concrete and Grout**
   - ❖ Vulcan Materials
   - ❖ Hanson Aggregates
   - ❖ Fort McDowell Yavapai Materials
   - ❖ Arizona Materials
   - ❖ Maricopa Ready Mix

6. **Hot Mix Asphalt**
   - ❖ Vulcan Materials
   - ❖ Hanson Aggregates

7. **Stucco** (Sack products or site mix application)
   - ❖ Great Western Building Materials
   - ❖ Atko Building Materials
   - ❖ In-Cide Technologies
   - ❖ Ultrakote Products

Part 3. EXECUTION

Not Used.

END OF SECTION

SALT RIVER
PIMA-MARICOPA INDIAN COMMUNITY
Environmental Protection & Natural Resources

10005 EAST OSBORN ROAD, SCOTTSDALE, AZ 85256 (480) 362-7500 EPNR@srpmic-nsn.gov

MEMORANDUM

To: Anthony Miele, Scottsdale Community College
Thru: Ondrea Barber, Manager
From: Dan Daggett, Environmental Program Supervisor
Date: 11 May 2009
Subject: Scottsdale Community College

A Request for Environmental Review (RER) was received by EPNR on 21 April 2009 from Mr. Jack Van Cleave, Director of Facilities requesting environmental & archaeological clearance for the Scottsdale Community College Campus. The project area contains 162.25 acres more or less.

This memo is to inform you that the Environmental Protection and Natural Resources Department has completed a review of the referenced site located on tribal land which is north of Chaparral Road and east of the Loop 101 Freeway, Section 18, Township 2 North, Range 5 East, Gila & Salt River Baseline and Meridian, Maricopa County, Arizona.

The Environmental Protection and Natural Resources Department has determined that there are no significant archaeological resources, biological species, or environmental concerns known to this specific area. The Environmental Protection and Natural Resources Department recommends environmental & archaeological clearance for the Scottsdale Community College Campus.

This clearance applies only to federal and tribal environmental law and policy and should not be construed as clearance for issues of right-of-way, lease or other such legalities.

As a condition of this clearance, please observe the following:

Should previously undocumented archaeological materials, cultural or biological resources or hazardous materials be encountered during the course of construction or project activity, work must cease at that location and our office must be notified immediately at (480) 362-7500.

When engaged in a fugitive dust generating operation, the owner and/or operator shall install, maintain, and use dust control measures, as applicable. The owner and/or operator of the fugitive dust generating operation shall implement control measures before, after, and while conducting fugitive dust operations, including weekends, after work hours, and on holidays. In the future any fugitive dust operations which exceed one (1) acre in size shall apply for and receive Dust Control Plan (DCP) approval from the EPNR prior to beginning operations.

All ground disturbance in excess of one (1) acre in size requires the development of a Storm Water Pollution Prevention Plan (SWPPP). Please contact EPNR if this is the case.

A Construction General Permit must be obtained from the U.S. Environmental Protection Agency Region IX for any projects disturbing one (1) acre or more. The Notice of Intent (NOI) that begins this process can be submitted electronically (http://cfpub.epa.gov/npdes/stormwater/enoi.cfm) and the SWPPP associated with the project must be submitted at the same time.

The owner and/or operation shall maintain the area(s) in a sanitary condition at all times; waste materials shall be properly disposed of promptly. No owner and/or operator shall dispose of recyclable material through solid waste disposal. The owner/operator assumes all responsibility for the removal of hazardous wastes, either found, generated or disposed of.

Should you have any questions, please contact EPNR at 480.362.7500.

Cc: Ondrea Barber, Manager
Cruz Lopez, ECS Compliance
Gerard Johnson, Public Works
file

PART 4
TECHNICAL SPECIFICATIONS

MARICOPA COUNTY COMMUNITY COLLEGE DISTRICT
2021 District-Wide Pavement Maintenance
FPD PROJECT NO. 21.1641
INVITATION FOR BID #3477-2

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Section 322 ..... Asphalt Concrete Overlay
Section 324 ..... Portland Cement Concrete Pavement (PCCP)
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Section 331 ..... Microsurfacing Specifications
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LOCATION OF WORK:

The work will be conducted at selected sections at multiple campuses within the Maricopa County Community College District. Addresses and contact names for all the campuses are presented in the Front Matter of this Project Manual. Sections are specific areas of pavement that may include entire lots and adjacent roadways or portions of either as shown in Volume II, Project Plans.

GENERAL SCOPE OF WORK:

The scope of work for this bid package will include all of the necessary work to complete identified reconstruction, maintenance and striping/ stenciling work at the various campuses and facilities of the Maricopa County Community College District (MCCCD). The scope of work for this project will also include microsurfacing of asphalt concrete pavements at various campuses. The general scope of work for this bid package will include:

a. Visiting sites, where maintenance is indicated on the plans, to determine the appropriate scope of work prior to providing unit costs for the repair.

b. Reconstruction of the existing asphalt concrete pavements at RSC @ Southern.

c. Cleaning and sealing of block cracking and longitudinal and transverse cracks in asphalt concrete pavements. The cracks that will be sealed shall be at least ¼ inch or larger in width. The sealing product shall be a "parking lot" grade rubberized crack sealant. For cracks greater than 1-1/2 inches in width, as identified on the plans, placement of the asphalt concrete crack mastic shall be completed. Materials used as crack mastic shall be in accordance with Section 901 of the project manual;

d. Removing wheel stops from the area to be worked and storing wheel stops at a location on campus as designated by the Facilities Manager. After all pavement work is completed, including the striping, painting, and stenciling, the Contractor shall reset the wheel stops as shown on the project plans. The cost for this work at campuses that will receive a surface treatment and/or reconstruction is incidental and no direct payment will be made. It is expected that there will be some wheel stops that are damaged through no fault of the Contractor. The Contractor shall replace these wheel stops and shall be reimbursed on a unit cost basis;

e. At sections where there will be no surface treatment, the Contractor shall determine whether the accessible stall layouts have been revised. Where revisions require relocation or replacement of signs, the Contractor shall remove the existing signs and patch the surface prior to blacking out the areas for restriping;

f. Patching existing asphalt concrete surfaces at the locations designated by the Consultant. This requires removing existing asphalt concrete pavement, reworking and recompacting existing aggregate base course or subgrade, and placing new asphalt concrete to original site grades at designated locations;

g. Providing microsurfacing surface treatment at designated sections after completion of patching and crack sealing. Sweeping of the microsurfaced lots a minimum of three weeks after application and no later than final completion date;

h. Striping and restriping designated parking lots, including stalls, drive lane stripes, painted islands, safety areas, crosswalks, miscellaneous hatched areas, etc.;

i. Painting of traffic symbols, drive lane numbers, stop bars with stencils, and direction arrows;

j. Assembling and installing signs;

k. Removal of existing asphalt concrete pavement and any other existing physical features incidental to the work at the locations shown on the project plans;

l. Removal and replacement of existing aggregate base materials, if necessary;

m. Placing new asphalt concrete to original site grades;

n. Installing miscellaneous concrete flatwork where indicated on the plans;

o. Placement of soil cement to a depth of 10" below the proposed new pavement section for subgrade stabilization in areas determined by the Consultant, if applicable;

p. Disposal of removed asphalt, concrete, and other construction derived waste materials (which will be the responsibility of the Contractor); and,

q. Pavement sweeping in parking lots where indicated on the plans.

The Contractor will be required to schedule the work to avoid conflicts with the blackout dates and in accordance with directions from the Facilities Manager for each campus. The Contractor will also need to coordinate with each Facilities Manager for scheduling work, routing traffic, staging equipment, stockpiling materials, etc. It is the Contractor's responsibility to obtain necessary traffic permits from the local municipal authority to safely reroute traffic to open circulation or parking areas.

The new asphalt concrete will be placed at the required thicknesses at the locations shown on the project plans. All joints between new and existing pavements will be made by saw cutting straight lines in the existing asphalt at the approximate locations shown on the project plans.

The Contractor will be required to provide the survey work necessary to place the new pavement to the grades shown on the plans and to the proper thicknesses. All asphalt concrete and other materials incidental to the removal of existing pavements will become the property of the Contractor and will be properly disposed of off of the site. All pavement work will be as cited in these specifications or as modified herein.

Prior to initiating the work, the Contractor will be required to provide a construction schedule, including the anticipated start and ending dates of construction at the campus locations. The Contractor will be required to schedule the work to avoid conflicts with certain dates in accordance with directions from the Facilities Manager at each campus location. Traffic control will be provided by the Contractor during the construction period to route traffic on the campus around and away from the work.

Approximate quantities required for the programmed maintenance and rehabilitation are presented in the Plans and in Table 1, Estimated Quantities, of these specifications. The limits of work are indicated on the Plan pages for each section. The work programmed at each section is also generally indicated. Additionally, some work may be completed outside delineated areas at the direction of the Consultant.

The Plan Pages are Volume II of the Contract Documents and are alphabetized by section name. The section names are presented at the bottom of each page. The section names and abbreviations for each campus are presented on the cover of this Manual. Sections can comprise parking lots, roadways, or combinations thereof.

The Contractor shall provide all survey work necessary to lay out or locate all striping, marking, painting, and signage per the Plans. It will be necessary to fit stalls of equal – but not predetermined – width along a row. Routinely, the available length must be measured, the width of prescriptive stall widths subtracted (e.g. accessible stalls), and then the required width of the remaining stalls can be calculated. Several layout guidelines should be considered:

- Do not lay out stalls narrower than 8½ feet wide.
- Van accessible stalls should be 11 feet wide with the safety area on its passenger side.
- Stalls should probably be added if the stall width along a row is more than 9½ feet.
- Depending on the campus and lot, stall widths of 8½ or 9 feet are desirable.

The Contractor shall provide a preliminary construction schedule during the preconstruction meeting. An updated tentative schedule shall be provided to the District and the Consultant every two weeks when work will be done. The schedules must include the anticipated start and ending dates of crack sealing, patching, installing post and sign, striping, stenciling, and reconstruction at each campus location, by section.

As shown on the Plans, drive lane numbers have been added to selected lots. These numbers are included in the count of painted traffic symbols. The numbers should be painted in 2-foot block lettering at indicated locations.

Crack Sealing

Cracks will not be marked in the field to establish the lengths of crack sealing to be completed. Crack seal crews will be expected to clean and seal all of the cracks in the indicated pavement areas that are at least ¼ inch or wider after being blown clean and vegetation removed. Asphalt concrete crack mastic will be required for any cracks greater than 1-1/2 inches in width. The crack seal crew is expected to crack seal around perimeter of new patched areas. Quantities of crack sealing (linear feet) indicated in the project documents are estimates based on data from visual surveys. Actual quantities should be expected to vary from section to section. The Contractor shall report crack seal quantities to the Consultant on a weekly basis by campus. Crack sealing will be paid for on a lump sum basis.

Patching

Depending on the type of pavement distress, patches will be either 2 inches deep for shallow patches, or 5 inches deep for deep patches. Areas to be patched will be marked in the field with white paint along proposed sawcut lines. Locations shown on the Plans are schematic, intended only for locating the area of the required maintenance. Field markings should delineate maintenance and the Plans indicate approximate quantities. Shallow patching will be clearly indicated in the field and on the Plans. Routinely, patching should be assumed to be deep patching.

All joints between new and existing pavements shall be made by saw cutting straight lines in the existing asphalt. The Contractor shall coordinate with the Consultant to provide notice at least one full workday day in advance of patching at any particular lot. All new patched areas shall be crack sealed at the saw cut lines delineating between the old and new asphalt.

The Contractor shall report patching quantities to the Consultant on a weekly basis by campus. The Consultant will verify quantities for payment.

Signs and Sign Posts

Per the notes with Details I and J of the Plans, the following general guidelines apply:

- Bolts for attaching signs to channel posts shall not protrude beyond their nuts where exposed threads could be a hazard to pedestrians.
- Posts located in landscape areas shall be standard galvanized channel stakes – unless indicated otherwise on the Plans.
- Posts located in pavement areas shall be 2 inch square section steel.
- Where signs are installed in concrete slabs, the slab shall be cored, not saw cut.

The following general requirements also apply:

- Signposts shall be supported in a minimum 26-inch deep, 12-inch diameter concrete foundation. (When located in sidewalk or other concrete slab areas, the foundation depth may be reduced to 14 inches.)
- The concrete may be MAG Class A, Class B, or Class C.
- Steel posts/anchor tubes shall extend into the concrete to within two to three inches of the bottom of the foundation.
- Signposts shall be 12 gage galvanized steel.

Square section signposts are identified in these bid documents as “teleposts” for convenience only. No particular brand name is associated with this term. The following requirements apply to these types of sign/signposts:

- Bolts for mounting the post to the anchor and sleeve assembly and for mounting the sign to the signpost shall be 1 1/32” x 3 1/32” thread x 5/16” corner bolt with a 5/16” self locking nut. (See City of Mesa Standard Detail M-39, Detail A.)
- Anchors shall be 2 ¼” x 2 ¼” These shall extend from within 2 to 3 inches of the bottom of the concrete and above grade a distance adequate to expose two to six bolt holes.
- Sleeves shall be 1 ½” x 2 ½” These shall be at least 18 inches long and shall be installed so their top end is flush with the top of the anchor tube.
- Posts shall be 2” x 2” These shall be installed to at least 6 inches below grade.

Blackout Dates and Access Restrictions

Facilities Managers can provide a list of blackout dates, which are days when no work will be allowed at a campus. For example, at campuses that have 4th of July activities or fireworks, there will be several blackout days due to expected traffic. Usually, however, restrictions do not apply for more than one day, do not apply to the entire campus, or do not apply to all of the planned maintenance activities. Given the amounts of work programmed for this year, the Contractor should anticipate significant communication and management requirements to coordinate with Facilities Managers. Additional blackout dates may be presented during the Preconstruction Meeting.

Table 1. Estimated Quantities of Work[1]

			WHEEL STOPS - CURBS								
			Reuse Wheel Stops	Place New Wheel Stops	Single Curb	Speed Humps/ Bumps (Asphalt)	Speed Humps/ Bumps (Concrete)	Presure Wash Curb	Concrete Grinding	ADA Curb Ramp	Miscellaneous Concrete Flatwork
Campus	Section	Plan Page	count	count	linear feet	count	count	linear feet	square feet	count	square feet[10]
Chandler Gilbert CC at Williams	CGCC @ W BLUF HALL	PM-3									
	CGCC @ W FACILITY	PM-4									
	CGCC @ W TAHOE	PM-5									
	CGCC @ W 91	PM-6									
Estrella Mountain CC	EMCC C	PM-7									
	EMCC D	PM-8									
Glendale CC	GCC LS NORTH	PM-9									
Gendale CC North	GCCN A	PM-10									
	GCCN D	PM-11									
Gateway CC	GWCC C	PM-12									
Mesa CC	MCC B	PM-13									
	MCC HD	PM-14									
	MCC LM	PM-15									
Mesa CC @ Red Mountain	MCC @ RM C	PM-16									
Phoenix College	PC CCC	PM-17									
Rio Salado College Avondale	RSC AVONDALE A	PM-18									
Rio Salado College @ Southern	RSC SOUTHERN A RECON.	PM-19			301						
	RSC SOUTHERN A STRIPING	PM-20									
Scottsdale CC	SCC D	PM-21									
	SCC FIRELANE	PM-22									
	SCC I	PM-23				1					
South Mountain CC	SMCC B	PM-24									
	SMCC F	PM-25									
		Total									

	PAVEMENT MAINTENANCE/ REHABILITATION					
	Crack Sealing (<1.5")	Crack Sealing (>1.5") AC Crack Mastic	Shallow Patching	Deep Patching	Microsurfacing Type II	Reconstruction 3" AC/ 5" AB
Campus	linear feet[9]	linear feet	square feet[7]	square feet[7]	square yard	square yard
Chandler Gilbert CC at Williams	1,000				2,296	
	1,050			1,262	7,550	
	1,000				796	
	2,810				853	
Estrella Mountain CC	5,000	1,830		1,833	8,570	
	5,770	1,000			4,027	
Glendale CC	5,000				6,120	
Gendale CC North	1,500	500			16,928	
	1,000	200			13,168	
Gateway CC	2,850			8,715	9,012	
Mesa CC	1,500	300			6,536	
	7,145			542	5,152	
	6,820				9,502	
Mesa CC @ Red Mountain	2,300	3,610		538	6,058	
Phoenix College	22,800	500			9,012	
Rio Salado College Avondale	1,000				2,772	
Rio Salado College @ Southern						5,115
Scottsdale CC	3,300	9,800		3,846	19,586	
	1,000	1,100			2,756	
	9,400	6,210		8,124	19,353	
South Mountain CC	1,700			432	3,787	
	4,540	5,868		365	2,360	
	72,845	**17,740**		**16,736**	**130,694**	**5,115**

	STRIPING - MARKING - PAINTING										
	Unrestricted Parking Stalls	Restricted Parking Stalls	Accessible Stalls	Van Accessible Stalls	Painted Traffic Symbols	Misc. Striping & Crosswalks	Misc- Stenciling	Blackout	Painted Speed Hump	Painted Wheel Stops	Fire Lane Red, Yellow or Green
Campus	count	count[3]	count[2]	count	count[5]	linear feet[4]	count	square feet	count	count	linear feet[6]
Chandler Gilbert CC at Williams											
	84										
	20										
	22		3								
Estrella Mountain CC	239		12		22	1,500	2		4		
	34		1								
Glendale CC	196		10		2						
Gendale CC North	325	15	11		27	3,000	4				
	210	9	5		14	3,500	12		1		
Gateway CC	87		4		5	200			1		
Mesa CC		122	9		15	2,000					
	1		9		1	500					
					6	3,000			3		
Mesa CC @ Red Mountain	160				3						
Phoenix College	68	3	4								
Rio Salado College Avondale	70		4								
Rio Salado College @ Southern											
	85										
Scottsdale CC	299	33	9		26	300			3		
	279	44	8		48	1,000			4		
South Mountain CC					9	500	11		1		
	45		2		2						
	2,224	**226**	**91**		**121**	**14,000**	**18**		**12**		

	ADJUSTMENTS			SIGNS AND SIGNPOSTS[8]				SWEEPING
	Adjustment - Small	Adjustment - Med	Adjustment - Large	Traffic Signs (stop, wrong way, do not enter, etc.)	Parking Lot Signs & Placards (carpool only, reserved parking, etc.)	Standard steel channel post (per detail)	Square section steel post with telescope insert style mount (per detail)	Sweep Entire Parking Lot Clean of Loose Aggregate
Campus	count	count	count	count	count	count	count	square yard
Chandler Gilbert CC at Williams								
Estrella Mountain CC								
Glendale CC								
Gendale CC North								
Gateway CC								
Mesa CC								
Mesa CC @ Red Mountain								
Phoenix College								
Rio Salado College Avondale								
Rio Salado College @ Southern								
Scottsdale CC								
South Mountain CC								

Table 1 Notes

Note 1 All maintenance to be completed per Specifications as outlined in the Project Manual.

Note 2. Striping for accessible stalls includes stall stripes, handicap accessible symbol, and hatched safety area.

Note 3. Striping for restricted stalls includes stall stripes and restriction stencil. The color of the stripes and stencil shall be the same, in accordance with Table 2 shown in the Plans. Stencil using 10" block letters typical.

Note 4. Typically, miscellaneous striping includes safety areas and crosswalks, which are yellow. Miscellaneous striping also includes centerline stripes approaching stop bars and miscellaneous stenciling, which are white.

- Quantities of linear striping for hatched areas are estimated based on the area with hatch lines at 2-foot spacing. Stripes are 4 inches wide.

Note 5. Painted traffic symbols include arrows, drive lane numbers, Stop bars, STOP stencil, lettering which are counted separately. Number stencils should be 2-foot block lettering typical.

- Stop bars are 12 inches wide and 10 feet long (typ). Width varies as shown on the Plans.
- STOP stencil shall be 2-foot block lettering typical.

Note 6. Fire lane red quantity is estimated. Refresh existing striping. Add only after consulting with the Campus Facilities Manager.

Note 7. The locations of patches are indicated on the Plans. Approximate areas in square feet are included. Indicated locations are schematic and do not necessarily show exact shape or size. Approximate limits were painted on the pavement with white marking paint. Locations are generally accurate to within an approximate 2,500 square foot area. Patching is not intended where there is no visual pavement distress or trip hazards. The Contractor should contact the Consultant regarding indicated locations that do not appear to correspond with distress or trip hazards.

Note 8. Replacement of signs that already meet the requirements of these Contract Documents is not intended. Where existing signs are correctly located, are in good condition, and are constructed per requirements, they should not be replaced.

Where paved areas will be microsurfaced, the Contractor shall determine which existing signs require removal and patching prior to the surface treatment. New signs may be installed after surface treatments, but patching in paved surfaces should be completed before any surface treatments.

Note 9. All crack sealing and patching shall be completed before any surface treatment.

Note 10: Miscellaneous flatwork requires the removal of existing pavement materials and processing of existing subgrade soils.

SPECIFICATIONS:

Applicable Specifications are from three sources: those included herein; the Maricopa Association of Governments Uniform Standard Specifications[1], and the City of Phoenix Supplements to the Maricopa Association of Governments Uniform Standard Specifications[2]. Unless otherwise noted, the latest revision to the listed specifications will govern the work.

Most of the materials and work included in these Contract Documents are included in the Maricopa Association of Governments Uniform Standard Specifications (MAG Specifications). There are a few specification sections included herein that are not available in the MAG Specifications. Not all specifications are verbatim according to MAG. The revisions made to the applicable specifications as outlined in this Project Manual will govern the work.

Measurement and Payment for work shall be in accordance with these Contract Documents. Contract prices, the base bid, and unit cost adjustments shall include all materials and labor, completed, in place, and accepted. In the event there are variations between the referenced specifications and those included herein, the provisions of these Contract Documents shall take precedence.

[1]Maricopa Association of Governments, 1998, revised through 2020, ***Uniform Standard Specifications for Public Works Construction***, Arizona.

[2] City of Phoenix, January 1, 2009, ***City of Phoenix Supplements to the Maricopa Association of Governments Uniform Standard Specifications,*** Arizona

SECTION 225
WATERING

225.1 DESCRIPTION:

Water for compacting embankments, constructing subgrade, placement of screened gravel and crushed surfacing, and for laying dust caused from grading operations or public travel, shall be applied in the amounts and places as directed by the Consultant.

225.2 WATER SUPPLY:

Water shall consist of providing a water supply sufficient for the needs of the project and the hauling and applying of all water required.

The Contractor shall make arrangements for and provide all necessary water for his construction operations and domestic use at his own expense.

If the Contractor purchases water from a water utility at a fire hydrant on or near the project, all arrangements shall be made by him at his own expense and payment made direct to the water utility as agreed upon.

The Contractor shall use only those hydrants designated by the water utility in charge of water distribution and in strict accordance with its requirements for hydrant use.

225.3 CONSTRUCTION EQUIPMENT:

The tank truck and/or trailer shall meet all safety and licensing regulations and the water shall be applied by sprinkling with tank trucks equipped with spray bars and suitable apparatus.

225.4 MEASUREMENT:

No measurement will be made of water, unless otherwise provided for in the special provisions or proposal.

225.5 PAYMENT:

The cost of watering will be included in the price bid for the construction operation to which such watering is incidental to the work.

SECTION 301
SUBGRADE PREPARATION

301.1 DESCRIPTION:

This section shall govern the preparation of natural, or excavated areas prior to the placement of sub-base material, pavement, curbs and gutters, driveways, sidewalks or other structures. It shall include stripping and disposal of all unsuitable material including existing pavement and obstructions such as stumps, roots, rocks, etc., from the area to be paved.

301.2 PREPARATION OF SUBGRADE:

In the areas where new construction is required the moisture content shall be brought to that required for compaction by the addition of water; by the addition and blending of dry, suitable material; or by the drying of existing material. The material shall then be compacted to the specified relative density. Proof rolling shall be observed by the Consultant prior to paving. Approved equipment (e.g. a loaded dump truck or pneumatic-tire roller) shall be observed during proof rolling of the entire surface. The Consultant may require additional or follow-up proof rolling to identify the limits of areas that pump or rut or to verify repairs were effective.

The proof rolling will be performed at no additional cost to the Contracting Agency. The Contractor shall provide at least 24 hours advance notice for scheduling proof rolling.

301.3 RELATIVE COMPACTION:

The subgrade shall be scarified and loosened to a depth of 10 inches. Rock 6-inches or greater in size that becomes exposed due to scarification shall be removed from the scarified subgrade. When fill material is required, a layer of approximately 3 inches may be spread and compacted with the subgrade material to provide a better bond. The subgrade cut and fill areas shall be constructed to achieve a uniform soil structure having the following minimum compaction, measured as a percentage of maximum dry density when tested in accordance with AASHTO T-99, Method A, and T191 or ASTM D6938 with the percent of density adjusted in accordance with the rock correction procedures for maximum density determination, ARIZ-227c1 to compensate for the rock content larger than that which will pass a No. 4 sieve. Unless otherwise noted in the project plans or project specifications, compaction shall be performed within +3 to -1 percentage of the optimum moisture content.

All Subgrade ..... 95 percent

301.6 PROTECTION OF EXISTING FACILITIES:

The Contractor shall exercise extreme caution to prevent debris from falling into manholes or other structures. In the event that debris should fall into a structure it shall immediately be removed.

301.7 MEASUREMENT:

No measurement will be made for grading under pavement, flatwork, curb and gutter or other areas where subgrade preparation is necessary for the work.

301.8 PAYMENT: The cost of grading work will be included in the bid price for asphalt concrete pavement, flatwork, curb and gutter or other improvements where subgrade preparation is necessary.

SECTION 310
UNTREATED BASE

310.1 DESCRIPTION:

Untreated base, i.e., select or aggregate base course, shall comply with Subsection unless the use of a different type of material is specifically authorized in the special provisions.

310.2 PLACING:

Untreated base 6 inches or less in compacted thickness may be placed in a single layer and those more than 6 inches in thickness shall be built up in successive layers of approximately equal compacted thickness not to exceed a maximum thickness of 6 inches. The requirements which follow are applicable to all types of material.

After distributing, the base material shall first be watered and then immediately bladed to a uniform layer that will net, after rolling, the required thickness. If the materials deposited are not uniformly blended together, the blading operation shall be continued to such extent as may be necessary to eliminate segregation. The quantity of water applied shall be that amount which will assure proper compaction resulting in a relative density of not less than 100 percent as determined under Section 301. Care shall be exercised in connection with watering operations to avoid wetting the subgrade or any lower base course to detrimental extent.

Upon completion, the base surface shall be true, even and uniform conforming to the grade and cross-section specified.

Untreated base may vary not more than 1/2 inch above or below required grade and cross-section.

310.3 DEFICIENCY:

When in the opinion of the Consultant there is reason to believe that a deficiency in thickness, or an excess of plasticity exists, measurements or samples will be taken in the same pattern as that defined in Section 321. If the base has been covered or it is otherwise impractical to correct the deficiency, the corrective measures in Table 310-1 shall be taken by the Contractor at no additional cost to the Contracting Agency.

TABLE 310-1
THICKNESS AND PLASTICITY DEFICIENCY

Type	Deficiency	Corrective Measure
I	1/2 inch or more but less than 1inch thickness	Place asphalt chip seal using precoated chips in accordance with Section 330 for the full roadway width over the area involved but for not less than 660 feet or one City block in length.
II	1 inch or more in thickness	Place an additional asphalt concrete overlay, a 9.5 mm mix, of ½ the thickness of the deficiency in thickness for the full roadway width over the area involved, not less than 660 feet or one City block in length.
III	A plasticity index of 6 to 7 inclusive*	Place an asphalt concrete overlay 1/2 inch in thickness over the same total area as required for Type I and II.

* The plasticity index shall be in accordance with AASHTO T-146 Method A (wet preparation), T-89 and T-90.

310.4 PAYMENT:

Payment for untreated base will be included in the square yard costs of asphalt concrete.

SECTION 311
PLACEMENT AND CONSTRUCTON OF CEMENT TREATED SUBGRADE

311.1 DESCRIPTION:
This item shall consist of a cement treated subgrade composed of a mixture of local soil, portland cement, and water compacted at optimum moisture content.

311.2 MATERIALS:
Portland cement and water shall comply with Sections 725. The soil for the mixture shall consist of the material in the area to be paved. The material shall not contain more than 5 percent gravel or stone retained on a 3 inches sieve. It shall be demonstrated by laboratory tests that the plasticity and strength characteristics as defined in Section 311.4.5 of the soil will be adequately modified by the specified cement content.

311.3 EQUIPMENT:
An ample number of machines, combination of machines and equipment shall be provided and used to produce the complete soil cement treated layer meeting the requirements for soil pulverization, cement distribution, water application, incorporation of materials, compaction, finishing, and for application of the curing material as provided in these specifications.

Mixing shall be accomplished by means of multiple-pass soil-cement mixer, single-pass soil-cement mixer or central plant mixer.

Water may be applied through the mixer or with the water trucks equipped with pressure sprays. Water trucks providing fine fog-type sprays shall be furnished for finishing and curing. Properly adjusted garden type nozzles on a pressure bar may be used to produce fog spray if approved by the Consultant.

Cement spreader shall be a specially constructed device to distribute bulk cement at the specified rate. The spreader shall have the ability to maintain a consistent spread rate over variable travel speeds.

311.4 CONSTRUCTION METHODS:
Prior to construction, the Contractor shall remove all deleterious material, organic material, and particles retained on the 3 inch sieve from the area to be treated. The soil shall be brought to a compacted condition, true to line and grade as directed by the Consultant or as shown on the plans. The compacted soil and surface shall be approved by the Consultant prior to proceeding with mixing.

The material shall be scarified, pulverized, mixed with water and cement, compacted, finished and cured in lengths permitting the full roadway width to be complete in not more than 4 hours from the time that cement is exposed to water. Such lengths will generally be not less than 600 feet or the length of one City block and preferably more. Where a gutter section exists the material shall be pulled back from the gutter face for the full depth of the course before processing.

311.4.1 Pulverizing: Prior to application of cement, soil to be processed shall be scarified to depth of base. The material shall be damp at time of scarifying to reduce the dust generation and to aid in pulverization. Soil shall be pulverized until not less than 80 percent, exclusive of gravel or stone, will pass a No. 4 sieve.

311.4.2 Application of Cement: The quantity of cement shall be by weight as a percentage of the dry weight of the soil as determined by the laboratory and/or as directed by the Consultant and shall be applied uniformly on the soil in a manner satisfactory to the Consultant. The allowable deviation in uniformity shall not exceed 10 percent. The entire operation of spreading and mixing shall be conducted in such a manner as will result in a uniform soil cement and water mixture for the full design width and depth.

The percentage of moisture in the soil, at the time of cement application, shall not exceed the quantity that will permit a uniform and intimate mixture of the soil and cement during mixing operations, and it shall not exceed the specified optimum moisture content for the soil cement mixture.

311.4.3 Mixing: Mixing with addition of water as required shall be continued until the product is uniform in color and at optimum moisture content to +4% of optimum moisture content as determined in

accordance with ASTM D558. Any mixture of soil and cement which has not been compacted and finished shall not remain undisturbed for more than 30 minutes but shall be agitated by remixing.

311.4.4 Optimum Moisture: Optimum moisture requirements and field tests of moisture density shall be determined in accordance with ASTM D558, and D6938, with moisture content periodically corrected in accordance with AASHTO T-217 on representative samples of soil cement mixture obtained from the area being processed. At the time of compaction, the moisture content shall not be below optimum moisture, and shall be less than that quantity which will cause the base course to become unstable during the compaction and finishing process. Any area which becomes so unstable shall be removed and replaced with new cement stabilized material.

311.4.5 Compressive Strength: Laboratory compressive strength testing of the cement treated subgrade is required to evaluate the proposed amount of cement and/or verify the compressive strength achieved during construction. Laboratory compressive strength testing shall be done in accordance with ARIZ-241.

311.4.6 Compaction: After mixing is complete, the mixture shall be carefully placed in a uniform loose depth which will provide a surface true to grade and section when compacted. Unless otherwise directed by the Consultant, initial compaction shall be by means of a tamping, grid, or pneumatic roller. After the tamping roller has partially walked out, pneumatic rollers shall be used. Density of final product shall be not less than 95 percent as determined by ASTM D6938 as specified above.

311.4.7 Finishing: As compaction nears completion, the surface of the base course shall be shaped to required lines, grades and cross-section. When required, the surface shall be lightly scarified with spike tooth harrows or other approved equipment to remove imprints left by equipment or to prevent slippage planes. During the finishing process the surface shall be kept moist by means of fog-type sprays. Surface finish and final compaction shall be completed in not more than 2 hours from the time the cement is exposed to water. The completed base course shall be true to line, grade, cross-section and shall not vary more than ½ inch in thickness and not more than 1 inch in surface tolerance when tested with a 10 foot straight edge. It shall be free of surface cleavage planes, cracks, or loose material. As a final operation, the surface shall be very lightly scalped with a motor grader, wet with a fog spray and rolled with a pneumatic roller as directed by the Consultant.

311.4.8 Thickness Deficiency: The Consultant may choose to have cores obtained to evaluate the thickness of the treated cement stabilized subgrade layer. Should the thickness of the treated layer not meet the project specifications, the Consultant may require the Contractor to submit an Engineering Analysis (EA) to address the pavement section. The EA will provide an opinion as to the anticipated performance of the pavement section as a result of the reduced cement treated layer thickness and make recommendations on possible corrective actions. The Consultant shall determine what corrective actions, if any, are required.

311.4.9 Curing: Each layer of cement treated subgrade shall be maintained in a moist condition until the next layer of pavement structure is placed. If required, a fog seal for curing in compliance with MAG Section 333, shall be furnished and applied to the surface of the final layer of the cement stabilized material as soon as possible after completion of final rolling and before the ambient temperature falls below 40º F. Curing seal shall be applied at a rate between 0.10 and 0.20 gallons per square yard of surface. The exact rate shall be determined by the Consultant.

After curing begins, all traffic, except necessary construction equipment shall be kept off the cement stabilized subgrade for a minimum of 7 days or until the final pavement structure layer(s) are placed. As an alternative, the Contractor may place a loose lift of aggregate base course over the curing subgrade. The aggregate base course shall be kept moist during the curing process.

311.4.10 Construction Joints: At the end of each day's work, a construction joint shall be made transverse to the centerline of the road by cutting back into the work to provide a full depth vertical joint. Except where specifically authorized by the Consultant, no other construction joints will be permitted. Where authorized, such joints shall be full depth vertical joints.

311.4.11 Maintenance: The Contractor shall maintain the surface until it has been covered with the designated bituminous wearing course. In case it is necessary to replace any soil cement, it shall be for the full depth. No skin patches or soil cement will be permitted. Minor surface pits may be filled with

compacted bituminous surfacing, if authorized by the Consultant. Immediately prior to the placing of the bituminous wearing course, the surface shall be broomed to remove all loosened material from the surface.

311.5 MEASUREMENT:

Measurement of soil cement will be the number of square yards constructed to the required depth, completed and accepted. The unit price shall include the cost of portland cement at a rate of 5% by dry unit weight of soil. No separate measurement will be made for portland cement

311.6 PAYMENT:

Payment will be made for the applicable items at the contract unit prices bid in the proposal, and shall constitute full payment for furnishing all material, equipment, tools, labor and incidentals necessary to complete the work and for carrying out the maintenance provisions.

No measurement or payment will be made for any imported earth materials.

SECTION 321
PLACEMENT AND CONSTRUCTION OF ASPHALT CONCRETE PAVEMENT

321.1 DESCRIPTION:

This section is to provide specifications for furnishing all materials, mixing at a plant, hauling and placing a mixture of aggregate materials, mineral admixture and asphalt binder to form a pavement course for placement upon a previously prepared base or sub base.

321.2 MATERIALS AND MANUFACTURE:

The materials shall conform to Section 710 for the type specified. Warm Mix Asphalt (WMA) technologies may be used within the mixture provided all requirements of the specifications are met, and the technology is on the ADOT approved product list. The specific required mix type shall be called out in the contract documents or as directed by the Engineer.

321.3 WEATHER AND MOISTURE CONDITIONS:

Asphalt concrete shall be placed only when the surface is dry, and when the atmospheric temperature in the shade is 40 degrees F. (50 degrees F for Asphalt Concrete lift less than 2 inch thick) or greater. No asphalt concrete shall be placed when the weather is foggy or rainy, or when the base or sub base on which the material is to be placed is unstable. Asphalt concrete shall be placed only when the Engineer determines that weather conditions are suitable.

321.4 APPLICATION OF TACK COAT:

A tack coat shall be applied to all existing and to each new course of asphalt concrete prior to the placing of a succeeding lift of asphalt concrete. If approved by the Engineer, the tack coat may be deleted when a succeeding layer of asphalt concrete is being applied over a freshly laid course that has been subjected to very little traffic.

The application of the tack coat shall comply with Section 329. The grade of emulsified asphalt shall be SS-1h or CSS-1h as specified in Section 713.

The same material that is specified above for the tack coat shall be applied to the vertical surfaces of existing pavements, curbs, and gutters, against which asphalt concrete is to be placed.

The surface to be covered may require repair or patching as directed by the Engineer. This shall be addressed in the project specifications prior to the bidding of the project.

321.5 MIX DESIGN:

The mix design shall be submitted to the Engineer at least five working days prior to the start of asphalt concrete production. Mix designs provided by the agency may be utilized on projects at the Engineer's discretion. The Engineer will review and approve the mix design to assure it contains all of the required information as outlined in Section 710.3.1. If WMA technologies are used within the mix design, the type of WMA technology used shall be indicated on the mix design. The target values for gradations, binder contents, and air voids will be established as the accepted Job Mix Formula (JMF) based upon the mix design. Mix designs not containing all of the information will be returned within five working days of receipt of all mix design information, for action and resubmission by the contractor.

Once the mix design has been approved by the agency and the mixing plant selected, the Contractor and/or his supplier shall not change plants nor utilize additional mixing plants without prior approval of the Engineer.

If the contractor elects to change its source of material, the contractor shall furnish the Engineer with a new mix design, which meets the requirements of Section 710, as amended by the Project Specifications.

The contractor may make self-directed target changes to the approved mix design within the limits shown below. Requests for self-directed target changes shall be made in writing and acknowledged by the Engineer prior to the start of production of a lot and will remain in effect until such time as any additional changes are implemented. The self-directed target changes must meet the contract requirements for mix design criteria and gradation limits.

TABLE 321-1
ALLOWABLE SELF-DIRECTED TARGET CHANGES

MEASURED CHARACTERISTICS	ALLOWABLE SELF-DIRECTED TARGET CHANGES
Gradation (Sieve Size)	
3/8 inch	± 4% from mix design target value
No 8	± 4% from mix design target value
No 40	± 2% from mix design target value
No 200	+0.5% from mix design target value
Binder Content	± 0.2% from mix design target value
Effective Air Voids	None

The contractor may propose target changes, other than self-directed changes, to the approved mix design for the approval of the Engineer. The Engineer will determine if the proposed target change will result in mix production that meets the contract requirements for mix design criteria and gradation limits. The target changes will not be retroactive for the purpose of acceptance.

321.6 MIX PRODUCTION:

All materials shall be proportioned by weight in a hot mix asphalt plant in the proportions required by the mix design to provide a homogeneous and workable mass. Each hot mix asphalt plant shall be inspected in accordance with the provisions contained in the 'Hot Mix Asphalt Production Facilities' by the Arizona Rock Products Association and shall have a current inspection certificate. All measuring devices shall be calibrated at least annually by a technician licensed by the Arizona Bureau of Weights & Measures. Mixing plants shall conform to the requirements of AASHTO M-156, except as modified herein. If WMA technology is being used, any equipment associated with the production of hot mix asphalt shall be calibrated and in proper working order according to the WMA equipment specifications. If there are any deviations in the production or compacting temperatures of the hot mix asphalt with WMA technology, the mix design shall state the differences.

In drum mix plants 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.

For drum-mix plants, the mineral admixture shall be weighed across a weight belt, or other approved alternative weighing system, with a weight totalizer prior to entry into the mechanical mixing device. The mechanical mixing device shall be a pugmill type mixer that is in good working condition. The rate of the aggregate feed shall not exceed the mixing device's capacity in ton per hour. The mixer shall be constructed to minimize the loss of mineral admixture and shall be located in the aggregate delivery system at a location where the mixed material can be readily inspected. The mixing device shall be capable of effective mixing in the full range of the asphalt concrete production rates.

The hot plant and equipment shall be constructed and operated to prevent loss of mineral admixture through the dust collection system of the plant.

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

The introduction of bituminous material shall be controlled by an automated system fully integrated with the controls or the mineral aggregate and mineral admixture. The production of the plant shall be controlled by the rate required to obtain a uniform mixture of all components. Drying and heating shall be accomplished in such a manner as to preclude the mineral admixture from becoming coated with un-spent fuel. The completed asphalt concrete may be held in storage for up to 12 hours in insulated or heated silos, providing the minimum temperature noted herein for placement and compaction is met behind the placement device. If the Engineer determines that there is an excessive amount of heat, heat loss, drain down, segregation and/or oxidation of the mixture due to temporary storage, use of surge bins or storage bins will be discontinued.

The temperature of the asphalt concrete, with unmodified binders, upon discharge from the mixer shall not exceed 335 degrees F. The discharge temperature may be increased on the recommendation of the binder supplier, when approved by the Engineer. If the asphalt concrete is discharged from the mixer into a hopper, the hopper shall be constructed so that segregation of the asphalt concrete will be minimized.

321.7 TRANSPORTATION:

Petroleum distillates or other substances that will have a detrimental effect on the asphalt concrete shall not be used as a release agent.

The beds of all transportation units shall be clean and smooth to allow the free flow of material into the paving machine's hopper.

Tarpaulins shall be furnished on all trucks and used when weather condition warrant, or if directed by the Engineer.

321.8 PLACEMENT:

Placement of asphalt concrete pavement shall not commence until authorized by the Engineer. The Engineer's authorization to allow commencement of asphalt concrete paving will generally require all newly constructed valley gutters, curbing, and curb and gutters which new pavement is to be placed against to be in-place and in an acceptable condition. While it is preferred to have all newly constructed concrete items against which new pavement is to be placed be in an acceptable condition, the Engineer may allow paving to commence based on weather, the amount of defective concrete, or other considerations.

321.8.1 Placing: All courses of asphalt concrete shall be placed and finished by means of a self-propelled paving machine equipped with an automatically actuated control system, except under certain conditions or at locations where the Engineer deems the use of a self-propelled paving machine impracticable.

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 alternatively when directed, by controlling the elevation of each end independently.

The control system shall be capable of working with one of the following devices:

(a) Ski or non-contact device of not less than 30 feet in length, supported throughout its entire length
(b) Taut stringline or wire set to grade
(c) Short ski or sonar sensing units from curb control
(d) Joint matching shoe

Failure of the control system to function properly shall be cause for the suspension of asphalt concrete production. In order to achieve a continuous operation, the speed of the paving machine shall be coordinated with the hot mix plant and transport units.

If the asphalt concrete is dumped from the hauling vehicles directly into the paving machine, 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 truck.

If asphalt concrete is dumped upon the surface being paved and subsequently loaded in 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 asphalt concrete shall be picked up and loaded into the paving machine.

Self-propelled paving machines shall spread the mixture without segregation or tearing, true to line, grade and crown indicated on the project plans. Pavers shall be equipped with hoppers and augers that will distribute the mixture uniformly in front of an adjustable floating screed. The raising of the hopper wings must be minimized and the paving machine will not be operated when in an empty condition.

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. In the case of the screed, auger extensions and vibrators shall be installed wherever the screed is extended more than one (1) foot beyond the end of the base auger or auger extension. However, when placing material against an extremely uneven curb or edge over a short distance, the Engineer may waive the auger extensions and vibrators.

At any place not accessible to the roller, the mixture shall be thoroughly compacted with tampers to provide a uniform and smooth layer over the entire area compacted in this manner.

321.8.2 Joints: Transverse joints, before a surface course is placed in contact with a cold transverse construction joint, the cold existing asphalt concrete shall be trimmed to a vertical face for its full depth exposing a fresh face. The fresh face shall be tack coated prior to placement of the new asphalt concrete. After placement and finishing the new asphalt concrete, both sides of the joint shall be dense and the joint shall be smooth and tight. The surface in the area of the joint shall not deviate more than 1/4 inch from a 12-foot straightedge, when tested with the straightedge placed across the joint, parallel to the centerline.

Longitudinal joints of each asphalt course shall be staggered a minimum of 6 inches with relation to the longitudinal joint of the immediate underlying course's cold longitudinal construction joint.

Longitudinal joints with existing or cold (more than 32 hours old) asphalt concrete shall require the existing pavement to be trimmed to a vertical face for its full depth exposing a fresh face. The fresh face shall be tacked prior to placement of the adjacent course. Longitudinal joints with an existing asphalt pavement that is less than 32 hours old that has had its edge protected from damage may have adjacent new asphalt concrete placed after applying the required tack coat. After placement and finishing of longitudinal joints, both sides of the joint shall be dense and the joint shall be smooth and tight. The surface in the area of the joint shall not deviate more than 1/4 inch from a 12-foot straightedge, when tested with the straightedge placed across the joint, in any direction.

321.8.3 Asphalt Leveling Course: A leveling course shall be used when specified, or as directed in writing by the Engineer, to bring existing pavement to a uniform grade prior to placing an overlay or other course. If a leveling course is being applied on an asphalt surface, a tack coat shall be applied. The compaction requirements contained in Section 321.10 do not apply to leveling courses.

321.8.4 Compaction; Asphalt Base Course and Surface Course: It is the contractor's responsibility to perform Quality Control monitoring and/or testing during compaction operations to achieve the required compaction. The temperature of the asphalt concrete immediately behind the laydown machine shall be at least 265 degrees F, unless WMA technology is being used. If WMA technology is being used then the minimum requirements will be stated within the mix design recommended by the WMA manufacturer. A

probe type electronic thermometer with a current calibration sticker attached will be used to measure the temperature of the asphalt concrete mixture. When measuring the temperature of the mat, the probe shall be inserted at mid-depth and as horizontal as possible to the mat. The contractor is responsible to achieve the required compaction.

Asphalt compaction equipment shall be of sufficient size and weight to accomplish the required compaction. All compaction equipment shall be operated and maintained in accordance with the manufacturer's recommendations and the project requirements. During the rolling operation, the speed of the roller shall not exceed three miles per hour, unless otherwise approved by the Engineer.

Pneumatic tired compactors shall be equipped with skirt-type devices mounted around the tires so that the temperature of the tires will be maintained during the compaction process.

The Engineer will determine the acceptability of the pavement compaction in accordance with Section 321.10.

321.8.5 Smoothness: The completed surfacing shall be thoroughly compacted, smooth and true to grade and cross-section and free from ruts, humps, depressions or irregularities. An acceptable surface shall not vary more than 1/4 inch from the lower edge of a 12-foot straightedge when the straightedge is placed parallel to the centerline of the roadway.

321.8.6 Asphalt Concrete Overlay: Asphalt concrete overlay consists of the placing and compacting plant mix asphalt concrete over existing pavement. The mix design and thickness of the overlay shall be as shown on the plans or as specified in the special provisions.

Except when the existing asphalt surface is to be preheated and remixed, pavement surfaces shall be prepared as follows:

(a) Areas designated for pavement repair by the contract documents (which may include severely raveled areas, severely cracked areas, over-asphalted areas, and other defects) shall be cut out and replaced. Pavement repairs shall be completed and approved before placing asphalt concrete overlay.

(b) Before placing asphalt concrete overlay, raised pavement markers shall be removed, and milling shall be completed. Milling shall be as shown on the plans or specified in the special provisions and shall be in accordance with Section 317.

(c) After pavement repairs and milling have been completed the entire surface shall be cleaned with a power broom.

(d) After surfaces have been prepared to the satisfaction of the Engineer, they shall receive a tack coat per Section 321.4. Traffic will not be permitted to travel over surfaces which have received a tack coat, except when tack coat is applied to milled surfaces in compliance with Section 317.2 for dust control purposes. When the overlay is to extend onto a concrete surface, the concrete surface shall be thoroughly cleaned of loose dust and cement particles and shall be tack coated.

Asphalt concrete overlay shall be placed as specified in Section 321.8.1 and compacted as specified in Section 321.8.4. The surface smoothness shall meet the tolerances specified in Section 321.8.5.

Frames and covers of manholes, survey monuments, valve boxes, clean-outs and other existing structures shall be adjusted in accordance with Section 345 to set flush with the finished surface of the new pavement. During adjustment, if pavement or base materials are removed or disturbed, they shall be replaced with approved materials installed in a manner acceptable to the Engineer.

On roads without curb and gutter, the existing unpaved shoulder elevation shall be adjusted by the Contractor to match the elevation at the edge of the new overlay and slope away from the new pavement

surface at a rate that the existing quantity of shoulder material will allow. Shoulder material shall be compacted to a minimum of 95% of maximum density, determined in accordance with Section 301.3. Shoulder adjustment to match the new pavement surface elevation shall not be measured. The cost of shoulder adjustment shall be included in the price paid for the asphalt concrete overlay or other related pay items. When the Engineer determines an insufficient amount of material is available for shoulder adjustment, the Engineer may require the Contractor to provide additional material. Acceptable material for shoulders includes the existing shoulder material, millings, untreated base materials, or a granular material approved by the Engineer. Engineer requested imported material for shoulder adjustment is not included in the price paid for the asphalt concrete overlay.

321.8.7 Pavement Fabric Interlayer: Pavement fabric interlayer shall be used only when specified on the plans or in the specifications.

Pavement fabric interlayer shall be in accordance with Table 796-1 and be the class designated on the plans or in the specifications.

Asphalt binder coat used to bond the fabric to the pavement shall be paving asphalt PG 70-10 asphalt cement conforming to the requirements of Section 711. The application and distributing equipment for the asphalt binder shall conform to the requirements of Section 330. The asphalt binder coat shall be uniformly spray applied to the prepared pavement surface at the rate of 0.20 gallons per square yard for Class B fabric or at the rate of 0.25 gallons per square yard for Class A fabric. Some underlying surfaces may require a higher or lower application rate. A test strip may be necessary to determine the proper application rate. The width of liquid asphalt cement application shall be the fabric width, plus six inches.

Neither the asphalt binder coat or fabric interlayer shall be placed when weather conditions, in the opinion of the Engineer, are not suitable. The asphalt binder and fabric interlayer shall only be placed when the pavement is dry, the ambient air temperature is 50 degrees F and rising, and pavement temperature is 40 degrees F and rising.

Equipment for placing the fabric shall be mechanized and capable of handling full rolls of fabric. The equipment shall be able to lay the fabric smoothly to maximize pavement contact and remove air bubbles. Stiff bristle brooms shall be used to smooth the fabric. The equipment used to place the fabric shall be in good working order and is subject to approval by the Engineer.

Pavement fabric interlayer shall not be placed if the in-place binder is hotter than 325 degrees F or has cooled to 180 degrees F or below (as determined by non-contact thermometer).

Pavement fabric interlayer shall be placed onto the asphaltic binder with the heat bonded side up with a minimum amount of wrinkling or folding. Remaining wrinkles or folds 1-inch and larger shall be removed or slit and shingle-lapped in the direction of paving. Burning or torching of wrinkles is not allowed. Fabric shall overlap three to six inches to insure full closure of the joint. Transverse joints shall be shingle-lapped in the direction of paving to prevent edge pickup by the paver. A second application of hand-placed asphalt binder may be required at laps and repairs as determined by the Engineer to ensure proper binding of the narrow double fabric layer.

All areas where fabric has been placed shall be paved with asphaltic concrete during the same workshift. Placement of the asphaltic concrete shall closely follow fabric lay down. The temperature of the asphaltic concrete immediately behind the laydown machine shall not exceed 325 degrees F, unless modified by the WMA technology being used. If WMA technology is being used then the minimum requirements will be stated within the mix design recommended by the WMA manufacturer. In the event that the asphalt binder coat bleeds through the fabric causing construction problems before the overlay is placed, the affected areas shall be sanded with a sand blotter in compliance with Section 333. Excess sand shall be removed before beginning the paving operation. In the event of rainfall prior to the placement of the asphaltic concrete, the fabric shall be allowed to dry before the asphalt concrete is placed.

Turning of the paving machine or of other vehicles on the fabric shall be gradual and kept to a minimum to avoid damage to the fabric. Should equipment tires stick to the fabric during pavement operations, small

quantities of paving asphalt concrete shall be broadcast on the fabric to prevent pick-up. Decrease of binder rate in order to minimize pick-up on tires is not allowed.

321.8.8 Thickened Edge: When the depth of the thickened edge extends four inches or more below the bottom of the asphalt pavement, the portion of the thickened edge extending below the asphalt pavement shall be placed and compacted prior to placement of the asphalt pavement. Placement of tack coat on the surface of the compacted thickened edge asphalt may be omitted when additional asphalt pavement is placed on the same day and the Engineer agrees that the surface of the thickened edge asphalt has remained clean.

When the depth of the thickened edge extends less than four inches below the bottom of the asphalt pavement, the portion below the asphalt pavement may be placed and compacted with the asphalt pavement in a single operation.

321.8.9 Safety Edge: The finished safety edge slope shall be planar forming a 30° ± 5° angle with the adjacent roadway surface and extend a minimum of five inches (5") below the roadway pavement's finished surface.

The safety edge shall be constructed with the top or final paving lift of a new pavement or overlay using a device that is mounted to or is a part of the screed portion of the laydown machine. The safety edge device shall be capable of constraining the asphalt concrete material to increase density of the extruded profile by reducing the volume. A conventional single strike-off plate is not acceptable. Compaction obtained from the extruded safety edge shall be acceptable when the extruded shape conforms to the specified shape.

During laydown operations if the extruded safety edge does not conform to the specified shape, the Contractor shall take immediate actions to correct the deficiency and to repair all non-compliant sections of safety edge. The Contractor shall stop paving operations until corrections to the laydown operation have been made and resumption of paving is approved by the Engineer or his designated representative.

321.8.10 Protection for Asphalt Base Course: Arterial roadway traffic shall not be allowed on a new asphalt base course that is less than five inches (5") in thickness without the written consent of the Engineer.

321.9 QUALITY CONTROL:

It is the contractor's responsibility to perform Quality Control monitoring and/or testing during asphalt concrete production to achieve the required compaction and to perform Quality Control monitoring and/or testing during asphalt concrete production to achieve the required mix properties. The Engineer may obtain samples of any portion of any material at any point of the operations for his own use. Also, the Engineer may order the use of any drying, proportioning and mixing equipment or the handling of any material discontinued which, in his/her opinion, fails to produce a satisfactory mixture.

The asphalt concrete produced shall conform to the requirements of the production tolerances established in Section 321.10. When the asphalt concrete does not conform to the production tolerances, it shall be reported to the Engineer, and corrective quality control measures shall be implemented, or production shall cease immediately at no additional cost to the contracting Agency.

Requests for referee testing as described in Section 321.11 will only be considered based on quality control test results performed by a laboratory accredited by the AASHTO Accreditation Program (AAP) for the tests being performed or a laboratory listed in the current ADOT Directory of Approved Materials Testing Laboratories for the set of tests in question. The laboratory shall use properly certified technicians in accordance with ASTM D3666, Section 7 (Personnel Qualifications).

321.10 ACCEPTANCE:

321.10.1 Acceptance Criteria: Asphalt concrete will be divided into lots for the purpose of acceptance. A lot shall be one day's production. Each lot shall be divided into sublots of 500 ton or fraction thereof. Tests used to determine acceptance will be performed by a laboratory accredited by the AASHTO Accreditation Program (AAP) for the tests being performed. The contracting agency shall provide an appropriately accredited laboratory or laboratories to perform the acceptance testing. laboratories shall use properly certified technicians in accordance with ASTM D3666, Section 7 (Personnel Qualifications). The acceptance laboratory will take representative samples of the asphalt concrete from each sublot to allow for testing of gradation, binder content, air voids, pavement thickness, and compaction of base and surface courses. Acceptance of each sublot will be based on the test data from the sample(s) from that sublot. All acceptance samples shall be taken using random locations or times designated by the Engineer in accordance with ASTM D3665.

For permit work, testing that does not strictly adhere to the sampling and testing methodology and requirements outlined in this section shall be disregarded and not considered in any acceptance determination. All required retesting shall be at the expense of the permittee.

321.10.2 Gradation, Binder Content and Air Voids: The acceptance laboratory will take a sample of the asphalt concrete in accordance with the requirements of Section 2 or 4 of Arizona Test Methods 104 or AASHTO T-168 from each sublot. The minimum weight of the sample shall be 45 pounds. Asphalt binder content and gradation shall be determined in accordance with AASHTO T-308 using the ignition furnace for each sublot. The acceptance laboratory is responsible for obtaining the necessary materials and performing an ignition furnace calibration as outlined in AASHTO T-308 for each asphalt concrete mixture utilized on the project. The correction factor used for each test shall be clearly indicated on the report. The bulk density for Marshall Mix designs shall be tested in accordance with AASHTO T-245. The bulk density for Gyratory mix designs shall be determined in accordance with AASHTO T-312. The maximum theoretical density shall be determined in accordance with the requirements of AASHTO T-209 including fan drying per AASHTO T-209 Section 15. Effective voids of the laboratory compacted specimens will be determined at a minimum of once per lot in accordance with the requirements of AASHTO T-269. Should the testing for effective air voids not meet the "Full Payment" or "No Corrective Action" requirements of Table 321-5, additional testing for laboratory air voids on the remaining sublots will be performed as necessary to determine the extent of the deficiency. Acceptance testing results will be furnished to the contractor and the supplier within five working days of receipt of samples by the acceptance laboratory.

During production, the allowable deviations from the mix design gradation targets are listed in the tables below. The allowable production tolerances may fall outside of the mix design gradation bands.

TABLE 321-3A				
GRADATION ACCEPTANCE LIMITS FOR MARSHALL MIXES				
Sieve Size	3/8 inch Mix	1/2 inch Mix	3/4 inch Mix	Base Mix
1 inch	---	---	---	±7%
3/4 inch	---	---	±7%	±6%
1/2 inch	---	±7%	---	---
3/8 inch	±7%	±6%	±6%	±6%
No. 8	±6%	±6%	±6%	±6%
No. 40	±4%	±4%	±4%	±4%
No. 200	±2%	±2%	±2%	±2%

TABLE 321-3B			
GRADATION ACCEPTANCE LIMITS FOR GYRATORY MIXES			
Sieve Size	3/8 inch Mix	1/2 inch Mix	3/4 inch Mix
3/4 inch	---	---	±7%
1/2 inch	---	±7%	±6%
3/8 inch	±7%	±6%	---
No. 8	±6%	±6%	±6%
No. 40	±4%	±4%	±4%
No. 200	±2%	±2%	±2%

If the results from a single acceptance sample fall outside of the acceptance limits in Table 321-3A or 321-3B as applicable, a second sample shall be taken and if the second acceptance sample is also outside of the acceptance limits the Contractor shall cease production of asphalt concrete. Production shall not begin again until calibration test results verify that adjustments made to materials or proportions yield a gradation that falls within acceptance limits in Table 321-3A or 321-3B as applicable.

If the asphalt binder content is within ± 0.40% of the mix design target value, the asphalt concrete will be paid for at the contract unit price. If the asphalt binder content deviates by more than ± 0.40% from the mix design target value, the deficient area will be evaluated within the sublot by coring one additional location at a maximum interval of 100 feet on each side of the deficient sample. The asphalt content of the original deficient sample will be averaged with the asphalt binder content of the two additional cores to determine compliance with the acceptance requirements. If the resulting average of the asphalt binder content deviates by more than ± 0.40% from the mix design target value, then Table 321-4 shall apply to the sublot. If approved by the Engineer, the Contractor may obtain additional cores to assist in formulation of an Engineering Analysis, but the additional cores shall not be used for re-evaluating acceptance.

TABLE 321-4		
ASPHALT BINDER CONTENT ACCEPTANCE AND PENALTIES		
Deviation from that permitted	When the contracting agency is the owner: Payment Reduction ($ per ton of asphalt concrete)	When the contracting agency is not the owner (i.e. permits): Corrective Action
Over 0.2% above that permitted	Removal* or EA	Removal* or EA
Over 0.1% to 0.2% above that permitted	$6.00	EA
Over 0.0% to0.1% above that permitted	$2.00	EA
Within permitted range	Full Payment	No Corrective Action
Over 0.0% to0.1% below that permitted	$2.00	EA
Over 0.1% to 0.2% below that permitted	$6.00	EA
Over 0.2% below that permitted	Removal* or EA	Removal* or EA

NOTES: *The Contractor shall remove and replace the entire sublot that is deficient. EA = Engineering Analysis per Section 321.10.6

If the laboratory air voids fall within a range of 2.8% to 6.2%, the asphalt concrete will be paid for at the contract unit price. If the laboratory air voids are outside of this range, the deficient area will be evaluated within the sublot by coring one additional location at a maximum interval of 100 feet on each side of the deficient sample. The laboratory air voids of the original deficient sample will be averaged with the laboratory air voids obtained from each of the two additional cores to determine compliance with the acceptance requirements. If the resulting average of the laboratory air voids is outside the indicated range, then Table 321-5 shall apply to the sublot. If approved by the Engineer, the Contractor may obtain additional cores to assist in formulation of an Engineering Analysis, but the additional cores shall not be used for re-evaluating acceptance.

TABLE 321-5		
LABORATORY VOIDS ACCEPTANCE AND PENALTIES		
Laboratory Air Voids (Measured at N_{des} or 75 blows as applicable)	When the contracting agency is the owner: Payment Reduction ($ per ton of asphalt concrete)	When the contracting agency is not the owner (i.e. permits): Corrective Action
Less than 1.5%	Removal* or EA	Removal* or EA
1.5-2.0%	$5.00	EA
2.1-2.7%	$2.00	EA
2.8-6.2%	Full Payment	No Corrective Action
6.3-6.9%	$2.00	EA

7.0-8.0%	$5.00	EA
Greater than 8.0%	Removal* or EA	Removal* or EA

NOTES: *The Contractor shall remove and replace the entire sublot that is deficient. EA = Engineering Analysis per Section 321.10.6

If an agency or Engineer is purchasing asphalt concrete directly from a commercial material supplier, the agency or Engineer will use Section 321.10, and specifically Tables 321-3A or 321-3B as applicable, 321-4 and 321-5 from Section 321.10, when determining the acceptance of the asphalt concrete with the material supplier.

321.10.3 Surface Testing: If directed by the Engineer surface drainage test shall be performed. The completed surfacing shall be thoroughly compacted, smooth and true to grade and cross-section and free from ruts, humps, depressions or irregularities. An acceptable surface shall not vary more than 1/4 inch from the lower edge of a 12-foot straightedge when the straightedge is placed parallel to the centerline of the roadway. The straightedge shall be furnished by the contractor and shall be acceptable to the Engineer.

All streets shall be water tested for drainage in the presence of the Engineer or designated representative before final acceptance. Any areas not draining properly shall be corrected to the Engineer's satisfaction at the Contractor's expense. Water for this testing shall be provided and paid for by the Contractor.

When deviations in excess of the above tolerance are found, humps or depressions shall be corrected to meet the specified tolerance. The defective pavement shall be cut out along neat straight lines or for multiple course pavements the surface course may be milled out, and the removed pavement replaced with fresh hot mixture and thoroughly compacted to conform with and bond to the surrounding area. Materials and work necessary to correct such deviations shall be at no additional cost to the Contracting Agency.

When pavement is cut out along neat straight lines, full depth longitudinal joints shall not be located within a lane wheel path or within forty-eight inches (48") of an asphalt pavement edge. Longitudinal joints shall comply with the restrictions for Type A Trench Repairs in Section 336.3.

321.10.4 Asphalt Pavement Thickness: Asphalt pavement thickness will be determined from cores secured from each lift of each sublot. Such cores will be taken and measured by the Asphalt Concrete Coring Method. This method can be found in Section 321.14. Each core location will be patched by the party responsible for the testing.

Acceptance or assessment of penalties for asphalt pavement thickness will be based on the combined total thickness of all asphalt concrete layers omitting all layers of asphalt-rubber asphalt concrete. If the final total pavement thickness exclusive of all ARAC layers is deficient from the target thickness by 0.25 inches or less, it will be paid for at the contract unit price.

If the thickness deficiency of the pavement core exceeds 0.25 inch, the thickness deficiency shall be evaluated by coring at a maximum interval of 100 feet on each side of the deficient core. The thickness of the original deficient core will be averaged with the thicknesses of the cores taken from each side of it to determine compliance with the acceptance requirements.

If the pavement thickness deficiency is greater than 0.25 inches and the contracting agency is not the owner (i.e. permits) the following will apply:

(1) If the pavement thickness deviates from the target thickness by more than 0.25 inch but not more than 0.50 inch, corrective action will be required. This corrective action shall consist of application of a Type II slurry seal coat in accordance to Section 715. The Contractor may present an Engineering Analysis outlining other proposed remedial measures for the consideration by the Engineer. The Engineer will review the engineering analysis and decide within 30 working days whether to accept the proposed remedial measures.

(2) If the pavement thickness deviates from the target thickness by more than 0.50 inch, corrective action will be required. The deficient area shall be overlaid with no less than a 1 inch thick lift, for the full width of the pavement to meet or exceed the designed thickness, with appropriate end and edge milling, with a mixture approved by the Engineer. The Contractor may present an engineering analysis outlining other proposed remedial measures for the Engineer's consideration. The Engineer will review the engineering analysis and decide within ten working days whether to accept the proposed remedial measures. If the Engineer chooses to reject the Engineering Analysis, the indicated overlay shall be constructed by the Contractor at no additional cost to the Owner.

If the contracting agency is the owner and the pavement thickness deficiency is greater than 0.25 inches but less than 0.50 inches, Table 321-6 will apply. If the pavement thickness deficiency is greater than 0.5 inches, the deficient area shall be overlaid with no less than a 1-inch thick lift for the full width of the pavement to meet or exceed the designed thickness using an asphalt mixture approved by the Engineer. The Contractor shall provide appropriate end and edge milling. The overlay and milling shall be accomplished by the Contractor at no additional cost to the contracting agency.

TABLE 321-6

ASPHALT PAVEMENT THICKNESS PAYMENT REDUCTION
For Thickness Deficiency of More Than 0.25 inches and less than 0.50 inches

Total Specified Asphalt Pavement Thickness exclusive of ARAC (if any)	**Reduction in Payment Applied to asphalt concrete Except ARAC layers (if any)**
Less than 1.5 inches	50%
1.50 inches to 1.99 inches	33%
2.00 inches to 2.49 inches	25%
2.50 inches to 2.99 inches	20%
3.00 inches and greater	17%

321.10.5 Density:

321.10.5.1 Pavement 1-1/2 Inches or Less in Nominal Thickness:

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

The rolling sequence, the type of compactor to be used, and the number of coverages required shall be as shown in Table 321-7.

TABLE 321-7

ROLLING SEQUENCE FOR LIFT THICKNESS 1½" OR LESS

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

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

The Contractor shall select the option for compaction and, when pneumatic-tired compactors are used will designate the tire pressure. Steel wheel compactors shall not be used in the vibratory mode for courses of

one inch or less in thickness nor when the temperature of the asphaltic concrete falls below 180 degrees F. Initial and intermediate compaction shall be accomplished before the temperature of the asphaltic concrete falls below 200 degrees F.

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

321.10.5.2 Pavement Greater than 1-1/2 Inches in Nominal Thickness:

Achieving the required compaction is the responsibility of the contractor. The number and types of rollers is the contractor's responsibility and shall be sufficient to meet these requirements.

In-place air voids shall be determined in accordance with AASHTO T-269 utilizing cores taken from the finished pavement. The maximum theoretical density used in the determination of in-place air voids will be the average value from the acceptance samples determined for the lot as outlined in 321.10.1.

The Engineer will designate one random test location for each sublot and the acceptance laboratory will obtain one core from that location. Regardless of sublot quantities or boundaries, a minimum of one core will be obtained per residential street and a minimum of one core per travel lane for collector and arterial streets. The outside one foot of each pass of the pavement course or any unconfined edge will be excluded from testing. The Engineer may exclude areas from the compaction lot that are not accessible by normal compaction equipment.

The Contractor shall provide the traffic control to facilitate any coring operations necessary for compaction acceptance.

Cores will be taken per the Asphalt Concrete Coring Method. This method can be found in Section 321.14. Acceptance testing results will be furnished to the contractor within five working days of receipt of samples by the acceptance laboratory.

If the pavement density has in-place voids of between 4.0% and 8.0%, the asphalt concrete will be paid for at the contract unit price. If the acceptance core for a sublot indicates that the pavement density has in-place voids of less than 4.0% or greater than 8.0%, the deficient area will be evaluated by coring two additional locations at maximum intervals of 100 feet from the deficient core. The in-place voids of the original deficient core will be averaged with the in-place voids of the cores taken from 100 feet on each side of it to determine compliance with the acceptance requirements. If the resulting average of the in-place voids is outside the indicated range, then Table 321-8 shall apply to the sublot. If approved by the Engineer, the Contractor may obtain additional cores to assist in formulation of an Engineering Analysis, but the additional cores shall not be used for re-evaluating acceptance.

TABLE 321-8		
PAVEMENT DENSITY PENALTIES		
Limits of In-place Air Voids for design lift thicknesses 1.5 inches and greater	When the contracting agency is the owner Payment Reduction ($ per ton of asphalt concrete)	When the contracting agency is not the owner i.e. permits Corrective Action
Below 3.0%	Removal* or EA	Removal* or EA
3.0% to below 4.0%	$10.00	EA and Type II Surry Seal
4.0% to 8.0%	Full Payment	No Corrective Action
Greater than 8.0% to less than 9.0%	$6.00	EA
9.0% to 10.0%	$10.00	EA and Type II Surry Seal
Greater than 10.0%	Removal* or EA	Removal* or EA

NOTES: *The Contractor shall remove and replace the entire sublot that is deficient.
EA = Engineering Analysis per Section 321.10.6

321.10.6 Engineering Analysis (EA): Within 10 working days after receiving notice that a lot or sublot of asphalt concrete is deficient and is found to fall within the "Removal or EA" band per Table(s) 321-4, 321-5, and/or 321-8 the contractor may submit a written proposal (Engineering Analysis) to accept the material in place at the applicable penalties along with possible remediation(s) listed in the "Removal or EA" category. Engineering Analysis can also be proposed for non-removal categories of "Corrective Actions" when the contracting agency is not the owner (i.e. permits).

The Engineering Analysis shall contain an analysis of the anticipated performance of the asphalt concrete if left in place. The Engineering Analysis shall also detail the effect of any proposed corrective action to the material(s) in place as it relates to the in-place material's performance. The Engineering Analysis shall be performed by a professional engineer experienced in asphalt concrete testing and mix designs.

If a lot or sublot is accepted for referee testing and the referee test results still show a deficiency, the contractor shall have ten working days to submit an Engineering Analysis beginning upon notification of referee test results.

When an Engineering Analysis recommends that a specific lot or sublot should not be removed, the Engineering Analysis will recommend that the following penalties (Table 321-9) be paid when the contracting agency is the owner, for the specific criteria being reviewed by the EA.

TABLE 321-9		
ENGINEERING ANALYSIS PENALTIES for REMOVAL* LOTS/SUBLOTS LEFT IN-PLACE		
Acceptance Criteria	**Acceptance Limits**	**Penalty When Contracting Agency is the Owner ($/Ton)**
Asphalt Binder Content	Over 0.2% points from that Permitted	$9.00
Laboratory Air Voids (Measured at N_{des} or 75 blows as applicable)	Less than 1.5% or Greater Than 8.0%	$7.50
Limits of In-place Air Voids	Less than 3% or Greater than 10.0%	$15.00

Within 15 working days, the Engineer will determine whether or not to accept the contractor's proposed Engineering Analysis.

321.11 REFEREE:

If the Contractor has reason to question the validity of any of the acceptance test results, the Contractor may request that the Engineer consider referee test for final acceptance. Any request for referee testing must describe the contractor's reasons for questioning the validity of the original acceptance test results and must clearly describe which set of acceptance tests are in question. The engineer may either accept or reject the request for referee testing. When referee testing is accepted the Contractor (at the Contractors own expense) will engage an independent laboratory accredited by the AAP or a laboratory listed in the current ADOT Directory of Approved Materials Testing Laboratories as appropriate the acceptance tests that are being questioned. The independent referee laboratory shall use properly certified technicians in accordance with ASTM D3666, Section 7 (Personnel Qualifications). For the set of test results in question the referee laboratory shall perform a new set of acceptance tests (as required by Section 321.10 representing the area for the set of tests in question). The referee tests will replace the original acceptance tests that were in question.

For permit work, the permittee, whose results necessitate referee testing, shall bear all expenses in the additional testing (i.e., secondary and the referee testing) if the original results are not substantiated by the referee testing procedure outlined in this section. Additionally, any testing performed that does not strictly adhere to the sampling and testing methodology and requirements in Section 321.10 shall be disregarded and not allowed in any acceptance determination. Disregarded tests will be re-performed at the expense of the permittee.

These tests may include asphalt binder content, aggregate gradation, Marshall or Gyratory unit weight, maximum theoretical unit weight, laboratory air voids and in-place air voids (compaction). Samples for referee testing shall come from representative samples obtained from the completed pavement, as directed by the Engineer.

The number of samples taken will be the same as specified in Section 321.10. The independent laboratory shall compile the test results and transmit them to both the Engineer and the contractor. The independent laboratory shall include a report sealed and signed by an Engineer registered in the State of Arizona, who is experienced in asphalt concrete testing and mix design development. The signed report shall give an opinion that the material evaluated does or does not comply with project specifications, shall clearly describe any deficiencies, and the results will be binding between all parties.

321.12 MEASUREMENT:

Asphalt concrete pavement will be measured by the ton, or by the square yard, for the mixture actually used as allowed above, which shall include the required quantities of mineral aggregates, asphalt binder, and mineral admixture. Measurement shall include any tonnage used to construct intersections, roadways, streets, or other miscellaneous surfaces indicated on the plans or as directed by the Engineer.

Measurement for safety edge preparation only applies to overlays of existing pavements that require the construction of a safety edge when none exists. Safety edge preparation will be measured by the linear foot. Safety edge preparation will not be measured when a safety edge is part of new pavement construction, pavement widening, or when overlaying an existing pavement that contains a safety edge. The asphalt concrete pavement measurement shall include the tonnage used to construct safety edges or the square yard measurement for asphalt concrete pavement will be increased by the horizontal extension of the safety edge beyond the roadway pavement edge.

321.13 PAYMENT:

The asphalt concrete measured as provided above will be paid for at the contract price per ton or square yard, as adjusted per Section 321.10, which price shall be full compensation for the item complete, as herein described and specified.

Payment for tack coat will be by the ton diluted, based on the rate of application, as directed by the Engineer.

No payment will be made for any overrun in quantity of asphalt concrete in excess of 10 percent for newly constructed pavement having a total thickness equal to or greater than 2.5 inches. The overrun quantity is excess tonnage above the tonnage calculated based on actual field measurement of area covered, design thickness, and the mix design unit weight. The calculations for overrun will be by individual pay item. To compensate or adjust for a thickness deficiency in an underlying asphalt concrete course, the Engineer may authorize a quantity increase in excess of 10 percent for a subsequent asphalt concrete course. In such cases, the quantity in excess of 10 percent will be paid for at the lowest unit price.

Removal of raised pavement markers, pavement repairs, and surface pavement replacements required prior to roadway overlay operations will be paid for by other pay items unless otherwise specified.

Except as otherwise specified, no separate payment will be made for work necessary to construct thickened edges, safety edges, or other miscellaneous items or surfaces of asphalt concrete.

Payment for safety edge preparation will be at the contract unit price for the quantities measured as described above.

321.14 ASPHALT CORE METHOD: Core Drilling of Hot Mix Asphalt (HMA) for Specimens of 4" or 6" diameter

321.14.1 Scope: This method is to establish a consistent method of the use of a diamond bit core to recover specimens of 4 or 6 inch diameter for laboratory analysis and testing. The method will require the use of: water, ice (bagged or other suitable type), dry ice, and a water-soap solution to be utilized when coring asphalt rubber concrete. Individuals doing the specimen recovery should be observing all safety regulations from the equipment manufacturer as well as the required job site safety requirements for actions, and required personal protective equipment.

For permit work, testing of cores obtained in a manner that does not strictly adhere to the methodology outlined in this section shall be disregarded and not considered in any acceptance determination. Retesting shall be at the expense of the permittee.

321.14.2 Core Drilling Device: The core drilling device will be powered by an electrical motor, or by an acceptable gasoline engine. Either device used shall be capable of applying enough effective rotational velocity to secure a drilled specimen. The specimen shall be cored perpendicularly to the surface of pavement, and that the sides of the core are cut in a manner to minimize sample distortion or damage. The machinery utilized for the procedure shall be on a mounted base, have a geared column and carriage that will permit the application of variable pressure to the core head and carriage throughout the entire drilling operation. The carriage and column apparatus shall be securely attached to the base of the apparatus; and the base will be secured with a mechanical fastener or held in place by the body weight of the operator. The core drilling apparatus shall be equipped with a water spindle to allow water to be introduced inside of the drill stem while operating. The cutting edge of the core drill bit shall be of hardened steel or other suitable material with embedded diamond chips in the cutting surface. The core barrel shall be of sufficient diameter to secure a specimen that is a minimum of four or six inches or whichever is prescribed for necessary testing. The core barrel shall not be missing more than one of the teeth used for cutting; if so it shall be discarded and another barrel shall be used. The core barrel shall also be a minimum of two inches longer than the anticipated depth of pavement in accordance with project paving plans.

321.14.3 Accessory Equipment: A sufficient supply of ice and dry ice shall be provided to sufficiently cool the pavement prior to securing the samples from the designated areas in the pavement. The ice should also be used to adjust the temperature of the water used to cool the core bit. A water supply (usually a plastic 35 – 55 gal drum) with sufficient hose to introduce the water into and through the spindle of the coring device by gravity feed. The drum should be white or light in color to minimize excessive thermal heating of the water (*for coring of asphalt rubber cores see Note 1*). At no time shall the water utilized in the coring operation exceed 65 degrees F during the coring operation. Ice shall be utilized to ensure the temperature control of the water being introduced during the cutting operation. An ice chest or other suitably insulated container that can maintain a temperature of less than 70 degrees F shall be used to secure the specimens during transport. The container will be equipped with flat shelving that will support the drilled cores throughout the entire specimen dimension during transport back to the testing facility.

Miscellaneous hand tools to remove the drilled specimen from the drill hole or the core barrel taking great care in not disturbing the specimen more than necessary (refer to fig. 1 in ASTM D5361).

321.14.4 Process: The pavement surface at the time of coring shall not exceed a temperature of 90 degrees F; the pavement shall be conditioned with ice or dry ice to ensure that this requirement is met. Immediately after it has been ensured that the pavement has dropped to the required temperature, core drilling shall begin. The operator will then apply an even and continuous pressure (Note 2) to penetrate through the full depth of the pavement. The operator will concurrently ensure that enough water is moving over the core surface as to adequately remove any and all cuttings that could damage the drilled core. After the pavement thickness has been penetrated the core shall be carefully removed from either the drill hole or the core barrel and be immediately transferred to an ice chest or other suitable container. Each individual core shall be placed on a shelf in the cooler with the exposed side of the specimen facing down, or the "top side" down. If the specimen is a two lift core, the only acceptable means of separating lifts is with a power or other acceptable wet saw type of equipment (conforming to ASTM D5361); however, at no time shall cores be split using a mallet and screwdriver or metal straight edge when being tested for bulk density. Perpendicularity of the specimen shall be checked in the field after the specimen has been extracted from the

surface. The core operator shall hold the core up to eye level and place the core top side down in a "speed square" or small carpenters square. The specimen placed in the square shall not depart from perpendicular to the axis more than 0.5^{o} (approximately equivalent to 1/16 of an inch in 6 inches). If the specimen is outside of this distance from square it shall be discarded in the field and another sample cored that falls within tolerance. The cores upon arriving at the laboratory for testing shall be carefully cleaned and measured for thickness in accordance with ASTM D3549. A speed square shall be utilized to measure perpendicularity as compared to a 90 degrees angle and shall not depart from perpendicular to the axis more than 0.5 degrees (approximately equivalent to 1/16 of an inch in 6 inches). All remaining testing shall be done within the parameters of the current project and/or agency required specification.

SECTION 322
ASPHALT CONCRETE PAVEMENT OVERLAY

322.1 DESCRIPTION:

This section is to provide specifications for furnishing all materials, and placing asphalt concrete overlays at locations shown on the plans. All specifications for the asphalt overlay construction as previously outlined in these specifications will apply with the following exceptions, modifications and additions:

322.2 OVERLAY REQUIREMENTS:

The asphalt concrete overlay thickness will be as shown on the plans and will be a minimum of 1-1/2 inches of MAG Type 1/2" Mix in accordance with MAG Section 710.

The Contractor will mill the existing pavement where required for proper grade transitions next to structures, pavements and other appurtenant structures not subject to truck or forklift traffic. All milling will be undertaken in general accordance with Section 317.

Paving fabric will be placed over all areas that will receive the asphalt concrete overlays. Paving fabric will be placed as close as practical to the bullnose extension of landscape islands and to all existing curbs.

The surface of the existing pavement will be thoroughly cleaned after all patching, crack sealing and grade adjustments prior to the placement of the paving fabric.

322.3 Paving Mat (Fabric):

The paving mat (fabric) to be used on the project will be a paving fabric that retards reflective cracking. The Contrator shall submit data sheet for review and approval prior to construction. The paving mat shall have the following minimum properties:

Property	Specification	Test Method
Mass per Unit Area	4.0 oz./yd^2	ASTM D5261
Tensile Strength	140 lb/in.	ASTM D5035
Asphalt Retention	0.10 gal/ yd^2	ASTM D6140
Elongation at Break	<5%	ASTM D5035
Melting Point	>400 °F	ASTM D276

Prior to placing the paving mat, all cleaning of the pavement surface crack filling, water testing and patching will be completed.

A hot asphalt tack coat will be applied to the surface of the pavement prior to installing the paving mat. In no case will a solvent based bitumen or a cut back asphalt be used. The tack coat shall be applied by a motorized distributor that has the capability of adjusting the spray rates by 1/10 gal/yd^2. The recommended application for the paving mat is 0.15 gal/yd^2. Where necessary to install the paving mat adjacent to curbs or other concrete appurtenances, the tack coat will be placed by hand sprayer or by means of a squeegee. The tack coat shall be AC-20 or PG64-22. If the ambient temperatures are above 90 degrees F, the tack coat shall be AC-30 or PG70-10. Emulsified asphalts will not be acceptable as tack coat for use with the specified paving fabric.

The paving mat shall be placed by a tractor or distributer truck with a fabric applicator. If the fabric is placed by hand, it should be broomed into the hot tack coat. Any wrinkling of the material shall be repaired by slitting and lapping in the direction of the paving train.

Transverse overlaps in the paving mat shall be a minimum of 3 inches and shall be "shingled" in the direction of the paving train. Longitudinal overlaps shall be a minimum of 2 inches in width.

322.4 MEASUREMENT:

Asphalt concrete pavement overlays will be measured by the square yard, for the mixture actually used as allowed above, which shall include the required quantities of mineral aggregates, asphalt binder, and mineral admixture. Measurement shall include any tonnage used to construct the surfaces indicated on the plans or as directed by the Consultant.

322.4 PAYMENT:

The asphalt concrete overlays measured as provided above will be paid for at the contract price per square yard, as adjusted per Section 321.10, which price shall be full compensation for the item complete, as herein described and specified. No additional payment will be made for tack coat, paving fabric, milling, cleaning or any other item required for new overlay pavement construction.

SECTION 324

PORTLAND CEMENT CONCRETE PAVEMENT (PCCP)

324.1 DESCRIPTION:

This item shall consist of construction of a pavement composed of plain jointed portland cement concrete on a prepared subgrade. The Contractor shall furnish all labor, materials and equipment necessary for the construction of the pavement in accordance with these specifications and in reasonably close conformity to the lines, grades, thicknesses and details indicated by the plans or as established by the Engineer. All tests shall be performed by a laboratory approved by the Engineer.

324.2 MATERIALS:

324.2.1 Portland Cement Concrete: Portland cement concrete shall conform to the applicable requirements of Section 725 and the additional requirements of this section.

Concrete shall comply with Table 725-1 for Class AA, 4000 psi unless otherwise specified by the Engineer.

The maximum concrete slump shall be as determined by the approved mix design in accordance with Section 725.9(A)(1).

324.2.2 Reinforcement: Tie bars shall be deformed billet steel reinforcing bars conforming to the requirements of ASTM A615, Grade 40.

Dowel or load transfer bars shall conform to the requirements of ASTM A615, Grade 40. An approved support system shall be used to hold bars in position.

324.2.3 Curing Materials: Materials for curing concrete shall conform to the requirements of Section 726.

324.2.4 Joint Materials: Joint sealant shall be poured type, conforming to the requirements of Section 729.2 or as approved by the Engineer. Preformed expansion joint filler shall conform to the requirements Section 729.1 or as approved by the Engineer.

324.3 CONSTRUCTION METHODS:

324.3.1 General: Pavement shall be constructed with mechanical equipment utilizing stationary side forms or by the use of slipform paving equipment without stationary side forms. Manual methods of placing and finishing concrete with stationary side forms may be permitted by the Engineer for areas inaccessible for mechanical equipment.

All curb and gutter shall have the same class of concrete as the adjacent PCCP. Gutter sections shall have the same thickness as the PCCP section. All curbs or combined curb and gutter joints shall align with roadway joints.

324.3.2 Equipment: Design, capacity, and mechanical condition of equipment and tools necessary for handling materials and performing all parts of the work shall be approved by the Engineer. Equipment shall be at the jobsite sufficiently ahead of the start of concrete paving operations to permit thorough examination and approval by the Engineer prior to start of concrete paving.

Equipment used to place concrete may consist of one or more machines, shall be capable of uniformly distributing and consolidating the concrete as it is placed without segregation and shall be capable of producing concrete pavement which will conform to the required cross-section with a minimum of hand work. The number and capacity of machines furnished shall be adequate to perform the work required at a rate equal to the concrete delivery rate.

Vibrators shall be used to consolidate concrete; the rate of vibration shall be not less than 3,500 cycles per minute for surface vibrators and not less than 8,000 cycles per minute for internal vibrators. Power to vibrators mounted on mechanical equipment shall be so connected that vibration ceases when forward or backward motion of the machine is stopped. Contractor shall furnish a tachometer or other suitable device for measuring and indicating the frequency of vibration.

Slipform pavers shall be equipped with high frequency internal vibrators mounted with axes either parallel or normal to pavement alignment for the full paving width. Vibrators mounted with axes parallel with pavement alignment shall be spaced at intervals not to exceed 24 inches, measured center-to-center. Vibrators mounted with axes normal to pavement alignment shall be spaced so that lateral clearance between individual vibrating units does not exceed 6 inches.

Slipform paving equipment which will be wholly or partially supported on subgrade shall be equipped with traveling side forms of sufficient dimensions, shape and strength to support the concrete at free edges laterally for a sufficient length of time during placement to produce pavement of the required cross-section, and shall be equipped and operate with automatic sensing and control devices such that the machine automatically senses deviations from the established guideline and performs the necessary corrective maneuvers to overcome variations from correct grade and alignment.

When concrete will be placed adjacent to existing pavement or curb and gutter, that part of the equipment supported on the existing pavement or curb and gutter shall be equipped with protective pads on crawler tracks or rubber-tired wheels with bearing surfaces offset a sufficient distance from the edge of the pavement or curb and gutter to avoid edge damage, or the surface of the existing pavement or curb and gutter shall be otherwise protected against such damage in a manner approved by the Engineer.

324.3.3 Subgrade and Base Preparation: Subgrade and base shall conform to the applicable compaction requirements of Section 601 and elevation tolerances specified for the material involved, shall be kept smooth and compacted, and shall be free of all loose and extraneous material when concrete is placed.

The surface of the subgrade shall be uniformly moist when concrete is placed. The surface of the subgrade shall be moistened immediately prior to placement of concrete, if necessary to produce a uniformly moist condition. Any excess water standing in pools or flowing on the surface shall be removed prior to placing concrete.

324.3.4 Stationary Side Forms and Setting of Forms: Side form sections shall be straight, free from warps, bends, indentations or other defects. Side forms shall be of metal, have a base width of at least four inches and a minimum depth equal to the thickness of the pavement. No section shall show a variation from a true plane greater than 1/8 inch in ten feet on the top of the form or more than 1/4 inch in ten feet on the inside face. Flexible or curved forms of proper radius shall be used for curves of 100 feet radius or less. Suitable materials other than metal may be used to form end closures or at other locations where use of metal forms is not practical. Forms shall be thoroughly cleaned and oiled each time they are used.

Forms shall be of such cross section and strength and so secured and supported on the subgrade as to resist the pressure of the concrete when placed and the impact and vibration of any equipment they are to support without springing or settlement. The method of connection between sections shall be such that the joints shall not move in any direction.

Subgrade under forms shall be compacted and cut to grade so that the form when set will be uniformly supported for its entire length at the specified elevation. Forms shall be so supported and secured during the entire operation of placing and finishing that they will not deviate vertically at any point more than 1/8 inch from the proper elevation. Forms shall be set to the required lines and grades well in advance and for a distance sufficient to prevent delay in placing concrete, and shall be approved by the Engineer prior to placing concrete. When any form has been disturbed or any grade has become unstable, the form shall be reset and rechecked.

Side forms shall remain in place until the day after placing concrete, and in all cases until the edge of the pavement no longer requires the protection of the forms. Forms shall be carefully removed in such a manner as to avoid damage to the pavement. Use of pry bars between the pavement and the forms will not be permitted.

324.3.5 Placing, Spreading and Compacting: Construction equipment shall not operate on the subgrade in the paving lane when conditions of the job will permit operation from outside the lane. When job conditions make it necessary to operate equipment on the subgrade in the paving lane, suitable runways or other precautions shall be taken to prevent rutting or displacement of subgrade material. The grade shall be checked and corrected immediately ahead of concrete placement and all disturbed grade shall be properly recompacted. Except when otherwise approved by the Engineer, concrete shall be deposited on the subgrade and spread full width using mechanical methods that result in minimal handling and segregation. Necessary hand spreading shall be done with shovels, not rakes. Placement shall be continuous between transverse joints without the use of intermediate bulkheads.

The Contractor shall make adequate advance arrangements for preventing delay in delivery and placing of concrete. An interval of more than 15 minutes between placing of any two consecutive batches shall constitute cause for stopping operations, and Contractor shall remove all concrete placed beyond the last scheduled joint or install a joint of the type and at the location as directed by the Engineer.

Concrete shall be deposited as near to expansion and construction joints as possible without disturbing them but shall not be dumped onto a joint assembly. Concrete shall be thoroughly consolidated against and along the faces of all forms, adjacent pavement or curb and gutter, and on both sides of all joint assemblies. Vibrators shall not be permitted to come in contact with joint assemblies, the grade, or side forms, and shall not be operated longer than 15 seconds in any one location.

Manual methods of placing, spreading, and compacting may be used in the construction of pavement lanes of irregular width or widths less than 10 feet, and sections of intersections or other locations with complex variable surface configurations when permitted by the Engineer. Workmen shall not be allowed to walk in the freshly placed concrete.

324.3.6 Shaping and Initial Finishing: Concrete shall be struck off, consolidated, and float-finished with a slipform paver, mechanical finishing machine, vibrating screed, or by hand finishing methods when approved by the Engineer so that the complete pavement will conform to the thickness and cross section requirements of the plans and specifications. When the pavement being constructed is contiguous to existing parallel concrete pavement or curb and gutter, the elevation of the new pavement surface shall conform as closely as possible to the elevation of the existing pavement or gutter surface in a manner which will prevent ponding. The difference in elevation shall not exceed 1/4 inch.

Water shall not be applied to the pavement surface during screeding and finishing operations in excess of the amount lost by evaporation. Adding water to the surface of the concrete to assist in finishing operations shall not be permitted. When applications of water to the surface are required to prevent rapid evaporation of water from the surface during finishing operations, it shall be applied as a fog spray and with approved spray equipment.

(A) Slipform Supported on Subgrade Method: When concrete pavement will be placed with slipform paving equipment which will be supported and operate on the subgrade, the subgrade and slipform paver track area shall be brought to proper grade and cross section by means of a properly designed and operated machine. The equipment shall spread, consolidate, screed and float-finish the concrete in one complete pass of the machine. The machine shall be operated with as nearly a continuous forward movement as possible and all paving operations shall be so coordinated as to provide uniform progress with stopping and starting of the paver held to a minimum. Sliding side forms shall be rigidly held together to prevent spreading. Any edge slump of the pavement, exclusive of edge rounding, in excess of 1/4 inch shall be corrected.

No abrupt changes in longitudinal alignment of the pavement will be permitted. The horizontal deviation shall not exceed one inch from the alignment established by the Engineer.

While concrete is being spread, compacted and shaped, vibrating units shall be operated within fresh concrete so that the longitudinal axis, at the center of each unit, is not more than 6 inches above the top of the subgrade. Amplitude of vibration shall be sufficient to be perceptible on the surface of concrete along the entire length of vibrating units and for a distance of at least one foot.

(B) Mechanical Equipment Supported on Fixed Form Method: When concrete is spread without the use of internal vibration, the finishing machine shall be equipped with vibrating equipment that will internally vibrate the concrete for the full paving width and with not less than two oscillating or reciprocating screeds. Concrete shall be struck off and consolidated so that the surface will conform to the finished grade and cross section shown on the project plans and with sufficient material on the surface for floating operations.

After the concrete has been struck off and consolidated, it shall be floated with a longitudinal float of a type approved by the Engineer.

A slipform paver or a single machine which will effectively spread, consolidate, screed, and float in one operation may be used in lieu of separate finishing and floating equipment.

(C) Manual Methods with Fixed Forms: Concrete shall be deposited, spread and struck off to such an elevation that, when properly consolidated, the surface will conform to the required lines and grades. Concrete shall be consolidated by internal vibration as it is struck off with a screed. A slight excess of concrete shall be kept in front of the screed at all times during the strike-off operation.

After consolidation and screeding, concrete shall be tamped to the proper surface elevation and cross section using either a heavy plank with a length in excess of the width of pavement being placed by one foot or more, or with a mechanical vibrating unit spanning the full width between forms. The tamping plank, if used, shall be stiffened as necessary to prevent sag and shall have the lower tamping edge shod with metal. The tamping plank shall be moved forward with a combined vertical tamping and longitudinal screeding motion so that the concrete will be thoroughly consolidated and the surface screeded to the required elevation. A small surplus of concrete shall be kept in front of the tamper or vibrating unit.

Tamping or vibrating shall continue until the specified cross section is obtained and the mortar flushed slightly to the surface. On grades in excess of 5 percent a second strike board shall follow from 25 to 50 feet behind the tamper or vibrating unit and shall be used in the same manner to remove waves caused by the flow of concrete behind the first strike board.

Methods other than the tamping plank may be utilized for screeding when approved by the Engineer.

Pavement shall be finished smooth and true to grade with suitable manually operated floats or powered finishing equipment.

324.3.7 Final Finishing: After the pavement has been float-finished, it shall be scraped with a 10-foot long straightedge equipped with a handle to permit operations from the edge of the pavement, and excess water and laitance shall be removed from the surface. The straightedge shall be operated parallel to the centerline of the pavement and shall be moved forward one-half length after each pass. Irregularities shall be corrected by adding or removing concrete, and disturbed places shall be again straight-edged.

Long-handled floats shall be used only in areas not accessible to finishing equipment and in emergencies, and use of such floats shall be confined to a minimum.

The addition of water to the surface of the concrete to assist in finishing operations shall not be permitted unless approved by the Engineer. When the evaporation rate on the concrete surface exceeds the rate of bleeding of the concrete, measures shall be taken to prevent the rapid evaporation of water from the surface during finishing operations. When allowed by the Engineer, the addition of water to the surface may be permitted when applied as a fog spray with approved spray equipment immediately after screeding and/or between finishing operations. A commercial evaporation reducer that forms a monomolecular film may also be sprayed onto the concrete surface in accordance with the Manufacturer's recommendations. When either of these methods is approved and used it does not take the place of proper curing methods per Section 324.3.8.

Pavement edges and joints shall be edged in accordance with details shown on the project plans or as directed by the Engineer.

In advance of curing operations, pavement shall be textured. Texturing shall be performed with an artificial turf drag with a board added to assure the weight needed to obtain an approved surface. Artificial turf shall be a molded composite structure with polyethylene face, nylon and polyester backing, a pile height of 0.85 inches, and total weight of 75 oz./sq. yd. The surface obtained during initial surface texturing shall be subject to approval by the Engineer. The texturing approved on the initial construction shall not be changed without the Engineer's approval. Each time the construction is stopped or causes the texturing to stop, the artificial turf must be shaken clean before continuing.

324.3.8 Curing: Curing shall begin immediately following surface texturing and edging. Before concrete placement begins, Contractor shall have at hand and ready to install the materials and equipment needed for adequate curing.

After finishing operations have been completed, the newly placed concrete shall be cured by moist curing methods, by application of a white pigmented liquid membrane compound conforming to the requirements of Section 726, or by a combination of these methods. All surfaces not covered by reasonably waterproof forms shall be kept damp by applying water with a nozzle that so atomizes the flow of water that a fog mist and not a spray is formed until the surface is covered with liquid membrane compound, the surface has hardened sufficiently to permit sprinkling of the surface, or moist curing by covering with wet burlap or other approved materials can be initiated. 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 and erode the surface. Moist curing shall be continued until liquid membrane curing compound or other type of curing membrane is applied.

Membrane curing compound shall be applied to all pavement by automatic mechanical method from a construction bridge.

The edges of concrete slabs exposed by the removal of forms shall be protected immediately to provide these exposed surfaces with continuous curing treatment equal to the method selected for curing the pavement surface.

The membrane method of curing may be applied behind the final finishing operation after all free water has disappeared from the surface. Complete and uniform coverage at the rate of one gallon per 100 square feet, or as otherwise recommended by the manufacturer, shall be required. Compound shall be kept agitated to prevent pigment from settling.

324.3.9 Joints: Joints shall be provided in the pavement of the type, dimensions and at the locations as indicated in the plans or as specified herein.

Joints in concrete pavement will be designated as transverse expansion joints, longitudinal or transverse construction joints, longitudinal or transverse weakened plane joints, or isolation joints. The faces of all joints shall be perpendicular to the pavement surface. Joints shall be constructed in accordance with the details shown or referenced in the plans and in accordance with the following provisions.

At all times prior to acceptance of the construction, joints shall be maintained clean and free of soil, gravel, and other foreign material except approved types of joint filler materials.

(A) Longitudinal Joints: Longitudinal joints shall be weakened plane or construction joints. Longitudinal weakened plane joints shall be constructed by sawing or by insertion of a parting strip in the plastic concrete to be left in place. Longitudinal construction joints shall be constructed with tie bars or keyways as indicated in the plans.

(B) Transverse Joints: Transverse joints shall be weakened plane, construction or expansion joints. All transverse weakened plane joints will be constructed by sawing and in accordance with the details shown in the project plans. Transverse construction joints shall be constructed in

accordance with the details shown or referenced in the project plans. Transverse expansion joints shall be constructed in accordance with the details shown or referenced in the project plans.

Dowel bars when required shall be supported with an approved support system.

(C) Joint Location: Longitudinal and transverse joints shall be constructed at locations as indicated in the project plans.

Isolation joints shall be provided around manholes, catch basins, or other elements which extend into or project through the pavement and act as point of restraint to horizontal or vertical movement of the pavement. Isolation joints shall be located in accordance with Detail 224 or as directed by the Engineer.

324.3.9.1 Construction of Joints:

(A) Sawed Joints: Sawed joints shall be constructed by cutting a groove in the pavement using a single or multiple-blade power saw. The groove shall be cut to the dimensions shown on the project plans. Suitable guidelines or devices shall be used to ensure joints are cut true to the lines as shown on the project plans.

If joints are sawed in stages, the initial saw cut shall be of the minimum width specified and sawed to the required depth. The depth of the initial saw cut in the construction of weakened plane joints shall be a minimum of 1/4 of slab thickness.

Sawing of weakened plane joints shall be done before uncontrolled cracking takes place, and after the concrete has hardened to the extent that tearing or raveling of the edges of the saw cut is not excessive. The exact time for all sawing shall be determined by the Contractor when not otherwise specified.

Any procedure for sawing joints that result in premature, uncontrolled cracking shall be revised immediately. The Contractor shall be responsible for replacing or repairing areas containing uncontrolled cracking and for repairing spalled or chipped concrete along the edges of sawed joints to the satisfaction of the Engineer.

After saw cutting of the joint and just prior to sealing the joint, the internal joint surfaces shall be cleaned of all dirt, curing compound residue, laitance and other foreign materials. The internal joint surface shall be defined as the sawed portion of the joint and the resultant crack for the full depth of the pavement. Sealing of sawed joints where required shall be completed prior to the opening of the pavement to traffic unless otherwise approved by the Engineer. When delayed sealing of sawed joints is permitted, saw cuts and formed recess to be filled with sealant shall be protected to ensure thorough curing of the concrete along the edges of the joint recesses and to prevent entry of foreign materials into the joint. At the Contractor's option, inert compressible joint filler material such as plastic backer rod or upholstery cord may be inserted into joints immediately after sawing or forming of the joint recess to provide curing protection and prevent entry of foreign material. If absorptive filler material is used, it shall be thoroughly moistened either before or immediately after installation in the sawed groove. When filler material is rope, or similar material which does not fill the entire depth of sawed groove, it shall be depressed not less than 1/2 inch below the pavement surface before the pavement is opened to traffic.

(B) Expansion and Construction Joints: Longitudinal and transverse expansion and construction joints shall be as required by the project plans.

(C) Isolation Joints: Isolation joints unless otherwise detailed in construction documents shall be 1/2 inch wide expansion joints in accordance with Detail 224 or as directed by the Engineer.

(D) Sealing of Joints: Sealant shall be applied in accordance with the sealant manufacturer's recommendations. A primer shall be furnished and applied after the joint has been cleaned and prepared to receive sealant when indicated in the manufacturer's recommendations.

Prior to the application of the sealant, an approved type of inert, compressible joint filler material such as plastic backer rod or upholstery cord, or an approved type of bond breaker, shall be inserted along the joint in accordance with the details shown on the project plans. The joint shall then be filled with sealant to a level not less than 1/8 inch or more than 1/4 inch below the elevation of the pavement surface adjacent to the joint edge.

The equipment used to apply sealant shall be as recommended by the sealant manufacturer. Sealant shall not be spilled on the surface of the concrete pavement, and Contractor shall remove any sealant inadvertently spilled on the pavement surface.

(E) Repair of Cracks, Spalls, Raveling and Tearing: Contractor shall be responsible for replacing or repairing all areas of pavement containing uncontrolled cracking, surface spalls, or other types of surface. Repairs when authorized shall be made and completed by methods acceptable to the Engineer.

324.4 TESTS OF FINISHED PAVEMENT:

324.4.1 Smoothness: The pavement surface including pavement in intersections will be tested with a ten-foot straight-edge placed parallel to the centerline of the pavement in each lane. Ordinates measured from the face of the straight-edge to pavement surface shall at no place exceed one-quarter inch. Areas that do not meet the required surface accuracy as determined by straight-edge testing shall be marked, and Contractor shall at his own expense and as required by the Engineer either:

(1) Grind down areas higher than 1/4 inch but not more than 1/2 inch above the correct surface.

(2) Correct areas lower than 1/4 inch but not lower than 1/2 inch below the correct surface by grinding down the adjacent areas.

(3) Remove and replace pavement when the deviation exceeds 1/2 inch from the correct surface. Area replaced shall be of a length, width and depth as required to allow formation of a new slab of the required quality. The area replaced shall be compatible with the joint layout shown on the project plans as determined by the Engineer.

After grinding, the finished surface of the ground area shall be provided with a uniform texture acceptable to the Engineer. The method of texturing shall be approved by the Engineer.

324.4.2 Pavement Thickness: Concrete pavement shall be constructed in accordance with the thickness requirements of the plans and specifications. Tolerances for base and subgrade construction and other provisions of these specifications which may affect thickness shall not be construed to modify such thickness requirements.

Pavement thickness testing shall begin after achieving pavement smoothness compliance. For the purpose of determining acceptability for thickness, cores shall be drilled by the Contractor at the locations specified by the Engineer. Cores shall have a minimum diameter of four inches. Length of cores will be determined in accordance with the requirements of AASHTO T-148.

In calculating average length, cores which have a length in excess of the thickness specified by more than 0.25 of an inch will be deemed to have a length of the specified thickness plus 0.25 of an inch. Field length measurements will be acceptable in lieu of average length measurement in accordance with the requirements of AASHTO T-148, provided the original core in any secondary unit meets or exceeds the specified thickness. Measurements in accordance with the requirements of AASHTO T-148 will be required on any questionable thickness measurements and on the three cores used to determine the average length for payment, regardless of length.

A primary unit of pavement shall be the area of pavement placed in each day's paving operation. Each intersection or special section shall be considered as a primary unit.

A secondary unit of pavement shall consist of 1,000 linear feet, or fraction thereof, of each traffic lane. Each 1,300 square yards of pavement in intersections, etc., shall be considered a secondary unit regardless of when the concrete was placed.

One core shall be drilled in each secondary unit. If the length of that core is not deficient by more than 0.25 of an inch, that secondary unit will be measured for payment at 100 percent. If the length of that core is deficient by more than 0.25 of an inch but less than 1.0 inch, two additional cores shall be drilled within that secondary unit and the length of the three cores averaged. If the average length is not deficient by more than 0.25 of an inch, that secondary unit will be measured for payment at 100 percent. If the average length of the three cores is deficient by more than 0.25 of an inch, that secondary unit will be measured for payment in accordance with the requirements of Table 324-1.

If the core in the secondary unit is deficient by more than 1.00 inch, that core will not be used in determining the average thickness of that secondary unit. Additional cores shall be drilled at intervals not to exceed ten feet in each direction from the deficient core, parallel to the main-line centerline, until one core is obtained in each direction which is not deficient by more than 1.00 inch. The pavement between these two cores will be evaluated separately from the balance of the pavement in that secondary unit. The limits for evaluation shall be between the longitudinal weakened plane or construction joint on each side of the core and between the next transverse weakened plane, construction, or expansion joint beyond each of the last two cores. Unless the Engineer allows the pavement to remain, it shall be removed and replaced with pavement of the specified thickness and no payment will be made for the removed pavement.

If the pavement in the deficient area is removed, either by the order of the Engineer or at the option of the Contractor, it shall be removed between the limits of the evaluation. After the pavement has been replaced, one core shall be drilled at random in that secondary unit after deducting the area of the replaced pavement and one core shall be drilled in the new pavement. Pavement represented by the core drilled in the secondary unit, less the replaced pavement, will be measured for payment as hereinbefore specified. The core drilled in the replaced pavement shall be not less than the specified thickness; otherwise that pavement will not be measured or paid for.

At all locations where cores have been drilled, the resulting holes shall be filled with concrete in a manner satisfactory to the Engineer.

324.5 PROTECTION OF PAVEMENT:

The Contractor shall be responsible for taking adequate steps to protect concrete placed during rain, or hot or cold weather as defined in ACI Standards. Any concrete damaged by rain or extreme temperatures shall be removed and replaced at the Contractor's expense.

When ordered by the Engineer, pavement crossings shall be constructed for the convenience of public traffic. Where motor vehicles are encountered, a temporary bridge to span the newly placed concrete will be provided.

No traffic or Contractor's equipment, except as hereinafter provided, will be permitted on the pavement until the concrete has developed a compressive strength of 3500 psi.

Equipment for sawing joints will be permitted on the pavement when, in the Contractor's judgment, the concrete has developed sufficient strength to support the equipment without damage to the concrete. In case of visible cracking or other damage to the pavement, operation of the equipment on the pavement shall be immediately discontinued.

Any damage to the pavement resulting from early use of pavement by the Contractor's equipment shall be repaired by the Contractor at his expense.

324.6 METHOD OF MEASUREMENT:

Portland Cement Concrete Pavement will be measured by the square yard. Any opening in excess of one square yard will not be measured for payment.

324.7 BASIS OF PAYMENT:

The accepted quantities of Portland Cement Concrete Pavement, measured as provided for herein, will be paid for at the contract unit price complete in place, except that where the average length of cores indicates pavement deficient in thickness by more than 0.25 of an inch but not more than 1.00 inch, payment will be made as specified in Table 324-1. Payment will be made to the nearest cent.

No additional payment will be allowed for pavement constructed in excess of the thickness specified on the project plans.

TABLE 324-1	
PAVEMENT THICKNESS PAYMENT REDUCTION (PCCP)	
Core Thickness, Less Than Specified Thickness, Inches	Percent of Contract Unit Price Allowed
0.00 to 0.25	100
0.26 to 0.35	93
0.36 to 0.45	85
0.46 to 0.55	75
0.56 to 0.75	63
0.76 to 1.00	50

SECTION 329
TACK COAT

329.1 DESCRIPTION:

Tack coat for bituminous paved surfaces shall consist of the application of emulsified asphalt as specified in Section 713.

329.2 PREPARATION OF SURFACE:

Surfaces to be treated shall be cleaned of all loose material as specified in Section 330.

329.3 APPLICATION:

Tack coat shall be diluted in the proportion of 50 percent water and 50 percent emulsion and applied at the rate of 0.05 to 0.10 gallons per square yard. Application shall be made in advance of subsequent construction as ordered by the Consultant.

329.4 EQUIPMENT:

Tack coat shall be applied by distributor trucks designed, equipped, maintained and operated in accordance with Section 330. Hand spray by means of hose or bar through a gear pump or air tank shall be acceptable for resurface work, corners or tacking of vertical edges. Care shall be taken to provide uniform coverage. Equipment that performs unsatisfactory shall be removed from the job.

329.5 PROTECTION FOR ADJACENT PROPERTY:

Care shall be taken to prevent the spraying of asphalt emulsion on adjacent pavements, including that portion of the pavement being used for traffic, on structures, guard rails, guide posts, markers, trees, shrubs, and property of all kinds.

329.6 MEASUREMENT:

Bituminous emulsion that is diluted prior to application will be measured by the ton of diluted material. Any conversion from volumetric quantities shall be in accordance with Section 713.

329.7 PAYMENT:

No additional payment will be made for tack coat. Tack coat will be considered incidental to the new pavement construction where specified on the plans.

SECTION 331
MICROSURFACING SPECIFICATIONS

331.1 GENERAL:

The work covered by this specification consists of furnishing all labor, equipment, and materials for the application of a "quick traffic solid/polymer microsurface."

This specification covers the equipment and construction procedures for rut filling and/or resurfacing of existing paved surfaces. The microsurface shall be a mixture of cationic polymer modified asphalt emulsion, mineral aggregates, mineral filler, water and other additives properly proportioned, mixed and spread on the pavement surface.

331.2 MATERIALS:

The Contractor shall supply all materials necessary for the performance of the work in accordance with the specifications. The asphalt emulsion, aggregate, and mineral filler shall be as specified in Section 714. Materials shall be approved by the Consultant prior to the start of construction. Certificates of Compliance shall accompany each delivery of emulsion.

The Contractor shall be responsible for the safety of all materials of which he has taken delivery until they are in place on the pavement, and shall take all necessary precautions to avoid loss by fire or theft, or damage by water, and shall bear the cost of replacing any such material that is lost, spilt, destroyed or damaged after delivery.

331.3 PROPORTIONING:
The microsurface shall be proportioned in accordance with the mix design. Calibrated sign flowmeters shall be provided to measure both the addition of water and additives to the pugmill. Emulsion and cement flow shall be tied directly to aggregate flow. All additive flows shall be calibrated.

331.3.1 Performance: The microsurface mixture shall be proportioned per the mix design to ensure:

(A) Trafficability - the material will permit controlled traffic without damage to the surface within thirty (30) minutes and uncontrolled traffic without damage within sixty (60) minutes, per Section 331.4.2.2.

(B) Prevent development of bleeding, raveling, separation or other distress for seven (7) days after placing the microsurface.

331.4 MIX DESIGN:

331.4.1 General:

331.4.1.1: The Contractor shall provide a job mix formula from an approved laboratory and present certified test results for the Consultant's approval. Compatibility of the aggregate and polymer modified emulsion shall be certified by the emulsion manufacturer. All the materials used in the job mix formula shall be representative of the materials proposed by the Contractor for use in the project.

331.4.1.2: All the products used in the construction shall have certifications from the suppliers and they shall be given to the Consultant upon delivery to the project.

331.4.1.3: Mix design and proportioning will be approved by the Consultant prior to the start of the project.

331.4.2: Specifications:

331.4.2.1: The Consultant shall approve the mix design prior to use. The specification limits are as follows:

Residual Asphalt	(ASTM D244)	6% - 11.5% by dry weight of aggregate

Mineral Filler	(ASTM C136)	0.1% - 1% by dry weight of aggregate
Polymer Content/Type		4% min. (see Section 714.4)
Additive		As required for mix properties
Water		As required for mix properties
Aggregate Grading		Meets Section 331.4.2.4
Consistency (ISSA T-106)		2.5 to 3.0 cm
Traffic Time		See Section 331.4.2.2
Abrasion Loss (ISSA TB-100)		75 g/ft2 maximum
Adhesion (ISSA TB-114)		90% minimum
Loaded Wheel Sand Adhesion		See Section 331.4.2.3

331.4.2.2 Modified Cohesion Test (ISSA TB-139): Furnish laboratory test data showing the mix design to be trafficable thirty (30) minutes after application at 77 F conforming to the following criteria in accordance with test methods described in the applicable specifications.

Set Time Test: 30 minutes	12 kg-cm minimum.
Early Rolling Traffic Time:	60 minutes 20 kg-cm minimum.

331.4.2.3 Loaded Wheel Sand Adhesion Test (ISSA TB-109): Furnish laboratory test data showing the mix design conforming to the following criteria in accordance with test methods described in the appropriate specifications.

Vehicles/day	Minimum Sand Adhesion
0-30	70 g/ft2
250-1500	60 g/ft2
1500-3000	55 g/ft2
greater than 3000	50 g/ft2

331.4.2.4 The laboratory shall further report the quantitative effects of moisture content in the unit weight of the aggregate (bulking effect). The report must clearly show the theoretical recommended proportion of aggregate, mineral filler (Min. & Max.), water (Min. & Max.), additive(s), and asphalt, and how the proportions are based (dry aggregate weight, total mix, etc.).

331.5 TESTING: Samples for quality assurance will be taken throughout the project per ISSA TB101 for testing by an approved laboratory as required by the Consultant. Materials with test results not meeting these specifications shall be corrected immediately. Testing shall be at the expense of the Agency for the following:

(A) Asphalt content
(B) Aggregate gradation
(C) Percent polymer content and type—certified by supplier

331.6 EQUIPMENT:

331.6.1 General: All equipment, tools and machines used in the performance of this work shall be maintained in satisfactory working condition at all times to ensure a high quality product.

331.6.2 Mixing Equipment: The mixing machine shall be a self-propelled or truck mounted mixing machine which shall be able to accurately deliver and proportion the aggregate, mineral filler, water, additive, and polymer-modified asphalt emulsion to a revolving multi-blade mixer capable of minimum speeds of 200 RPM and discharge the product on a continual flow basis. The machine shall have sufficient storage capacity for aggregate, polymer modified asphalt emulsion, mineral filler, water, and additive to maintain an adequate supply to the proportioning controls.

331.6.3 Material Control:

331.6.3.1 Calibration: Each mixing unit to be used in the performance of the work shall be calibrated prior to construction. Calibration data, if done within the calendar year, using the same material, may be used, providing a verification of the aggregate feed agrees.

Individual volume or weight controls for proportioning each material to be added to the mix shall be provided, and shall be accessible to the Consultant. Each material control device shall be calibrated prior to work and documented for inspection by the Consultant.

331.6.3.2 Aggregate Feed: The aggregate feed to the mixer shall be equipped with a revolution counter or similar device so the amount of aggregate used may be determined at any time.

331.6.3.3 Emulsion Pump: The emulsion pump shall be the positive displacement type with a jacketed housing for uniform heating. A revolution counter or similar device shall be fitted so that the amount of emulsion used may be determined at any time.

331.6.3.4 Fines Feeder: An approved fines feeder is required that will provide a uniform, positive, accurately metered range of 0 to 1 percent by dry aggregate weight. The fines feeder shall have a counter so the amount of mineral filler can be determined at any time.

331.6.3.5 Liquid Additive: The mixing machine shall be equipped with a liquid additive system that provides a pre-determined amount of additive to the mixing chamber. This additive system must be equipped with a counter that can determine the amount used at any time.

331.6.3.6 Water System: The mixing machine shall be equipped with a water system that provides a pre-determined amount of water to the mixing chamber. This water system must be equipped with a counter that can determine the amount used at any time.

331.6.4 Operator Controls: Controls will allow the operator to sequence and proportion the material per the mix design.

331.6.5 Spray Bars: The mixing machine shall be equipped with a water pressure system that provides a water spray immediately ahead of and outside the spreader box.

331.6.6 Spreading Equipment:

331.6.6.1: The paving mixture shall be spread uniformly by means of mechanical type laydown box attached to the mixer, equipped with agitation, to spread the materials throughout the box without any dead zones. The paddles shall be designed and operated so all the fresh mix will be agitated. Flexible seals, front and rear, shall be in contact with the road surface to prevent loss of mixture from the box. The spreader box shall be equipped with hydraulic cylinders for controlling the thickness of the spread mixture.

331.6.6.2: The rut filling spreader box shall have 6 to 8 skids to provide for leveling and filling uneven depressed areas. Two adjustable steel strike-off plates are required. The rear flexible seal shall act a final strike-off and shall be adjustable. The steel strike-offs shall be controlled by hydraulic cylinders placed at the rear of the spreader box.

331.6.6.3 The spreading equipment shall be maintained free from build-up of the mixture on the paddles or side walls. Skips, lumps, or tears will not be allowed in the finished product.

331.7 APPLICATION:

331.7.1 General: The microsurface shall be of the desired consistency when deposited in the spreader box and nothing more shall be added to it. The mixing time shall be sufficient to produce a complete and uniform coating of the aggregate and the mixture shall be chuted into the moving spreader box at a sufficient rate to maintain an ample supply across the full width of the strike-off squeegee at all times.

331.7.2 Weather: Microsurfacing shall not be placed if either the pavement or air temperature is below 50 degrees F and falling, but may be applied if both the air and pavement temperature are at least 45 degrees F and rising, and it is not raining.

331.7.3 Protection of Existing Surfaces: The Contractor shall take all necessary precautions to prevent microsurface or other material used from entering or adhering to gratings, hydrants, valve boxes, manhole covers, bridge or culvert decks, and other road fixtures. Immediately after resurfacing, the Contractor shall clean off any such material and leave any grating, manholes, etc. in a satisfactory condition.

331.7.4 Fogging Pavement: The surface shall be pre-wetted by fogging ahead of the spreader box. The rate should be adjusted as dictated by the pavement temperature, surface texture, humidity, and dryness of existing pavement.

331.7.5 Mix Stability: The mix shall possess sufficient stability so that premature breaking of material in the spreader box does not occur. The mixture shall be homogeneous during mixing and spreading; it shall be free of excess water or emulsion, and free of segregation of the emulsion and aggregate fines from the coarser aggregate.

331.7.6 Application Rate: The application rates, pounds per square yard of mix specified, are average rates; the surface texture variation throughout the work will dictate the actual spreading rates. The strike-off squeegee shall be adjusted to provide a microsurface thickness which will completely fill the surface voids and provide an additional thickness not exceeding one and one-half times the largest top-size stone. The requirement of 1-1/2 stone depth does not apply to rut filling operations as these depths vary greatly according to the surface irregularities.

331.7.7 Joints: No excessive build-up or unsightly appearance shall be permitted on longitudinal or transverse joints. A maximum of 4.0" overlap will be permitted on longitudinal joints. The Contractor shall provide suitable width spreading equipment to produce a minimum number of longitudinal joints throughout the work. Half passes and odd width passes will be used in minimal amounts. If half passes are used, they cannot be the last pass on any area. Care shall be taken to ensure straight lines along curbs and shoulders. No runoff will be permitted on these areas. Construction joints shall be neat in appearance and shall be tapered or feathered to conform to the existing surface. All excess material shall be removed from the surface upon completion of each run.

331.7.8 Handwork: Approved squeegees and lutes shall be used to spread the mixture in areas inaccessible to the spreader box and in other areas where hand spreading may be required.

331.7.9 Protection of the Microsurface: Adequate means shall be provided by the Contractor to protect the uncured product. Any damage done to the product shall be repaired at the Contractor's expense.

331.7.10 Damage to the Microsurface: The Contractor's responsibility to replace microsurface damaged by unexpected rain after spreading shall be limited to the period within four (4) hours of placement of the microsurface.

331.7.11 Sweeping: The Contractor is responsible for sweeping the microsurfaced lots clean of loose aggregate after three (3) weeks of application and no later than one month after application. Pavement sweeping shall be in accordance with Section 900 of the project specifications. Schedule for sweeping of the lots shall be arranged with the Facilities Manager of each campus.

331.8 PAYMENT:
The microsurfacing shall be paid for by the square yard. The price shall be full compensation for furnishing, mixing and applying all materials; and for all labor including sweeping, equipment, tools, design tests, and incidentals necessary to complete the job as specified herein.

SECTION 336
PAVEMENT MATCHING AND SURFACING REPLACEMENT

336.1 DESCRIPTION:

Pavement and surfacing removed by construction activities or to be patched shall be placed as shown on the plans and applicable standard details, in accordance with this specification and/or the special provisions.

Asphalt concrete pavement replacement shall be constructed in accordance with Type A, B, D or E of standard details, as indicated on the plans, and as required by MAG Sections 321 and 710.

Portland cement concrete pavement replacement shall be in accordance with Type C of the Standard Details, and as required by MAG Sections 505 and 725.

ABC or decomposed granite surface replacement shall be constructed in accordance with Type F of standard details as indicated on the plans and in MAG Section 702.

Temporary pavement replacement shall be constructed as required below.

Pavements to be matched by construction of new pavements adjacent to or at the ends of a project shall be saw cut in accordance with these specifications and where shown on the plans.

336.2 MATERIALS AND CONSTRUCTION METHODS:

Materials and construction methods used in the replacement of pavement and surfacing shall conform to the requirements of all applicable standard details and specifications, latest revisions.

336.2.1 Pavement Widening or Extensions: 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. The minimum depth of cut shall be 1 1/2 inches or D/4, whichever is greater.

The existing pavement shall be cut and trimmed after placement of 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 coating of asphalt cement or emulsified asphalt immediately prior to constructing the new abutting asphalt concrete pavements. No extra payment shall be provided for these items and all costs incurred in performing this work shall be incidental to the widening or pavement extension.

The exact point of matching, termination, and overlay may be adjusted in the field, if necessary, by the Consultant or designated representative.

336.2.2 Pavement to be Removed: Existing asphalt pavement to be removed for trenches or for other underground construction or repairs shall be cut by a device capable of making a neat, straight and smooth cut without damaging adjacent pavement that is not to be removed. The Consultant's decision as to the acceptability of the cutting device and manner of operation shall be final. If saw cutting, only, is to be utilized, it will be so specified in the plans or special provisions.

In lieu of cutting trenches across driveways, curbs and gutters, sidewalks, alley entrances, and other types of pavements, the Contractor may, when approved by the Consultant, elect to tunnel or bore under such structures and pavements.

When installations are within the street pavement and essentially parallel to the center line of the street, the Contractor, with approval of the Consultant, may elect to bore or tunnel all or a portion of the installation. In such installations, the seal coat requirements, as discussed in Section 336.2.4, will be modified as follows:

(A) If the pavement cuts (bore pits, recovery pits, etc.) are 300 feet or more apart, the bore or tunneled distance will not be considered as part of the open trench and the seal coat may not be required.

(B) If the pavement cuts (bore pits, recovery pits, etc.) are less than 300 feet apart, the distance between the cuts will be considered the same as a trench cut and the distance will be added to any trench cut distances.

336.2.3 Temporary Pavement Replacement: Temporary pavement replacement, as required in MAG Section 601, may be with cold-mix asphalt concrete, with a minimum thickness of 2 inches, using aggregate grading in accordance with MAG Section 710.

Temporary pavement replacement shall be used in lieu of immediate placement of single course permanent replacement or the first course of two course pavement replacement only on transverse lines such as spur connections to inlets, driveways, road crossings, etc., when required by the Consultant, by utilities or others who subcontract their permanent pavement replacement, under special prior arrangement; or for emergency conditions where it may be required by the Consultant. Temporary pavement replacement shall be placed during the same shift in which the backfill to be covered is completed.

Rolling of the temporary pavement replacement shall conform to the following:

(A) Initial or breakdown rolling shall be followed by rolling with a pneumatic-tired roller. Final compaction and finish rolling shall be done by means of a tandem power roller.

(B) On small areas or where equipment specified above is not available or is impractical, the Consultant will approve the use of small vibrating rollers or vibrating plate type compactors provided comparable compaction is obtained.

The surface of the temporary pavement shall be finished off flush with the adjacent pavement.

336.2.4 Permanent Pavement Replacement and Adjustments:

336.2.4.1 Permanent Pavement Replacement: Pavement replacement for cuts essentially parallel to the street centerline and greater than 50 feet in length shall be two course pavement replacement as hereinafter specified. For cuts greater than 600 feet in length the entire area shall then be seal coated in accordance with MAG Section 330 (coated chips) or as otherwise specified. This seal coat shall extend from the edge of pavement or lip of gutter to the street centerline except that on residential streets less than 36 feet face to face of curb or where the pavement patch straddles the centerline, the entire width of street shall be seal coated.

Pavement replacement for cuts parallel to the street centerline less than 50 feet in length, transverse cuts, bell holes and similar small areas shall match gradation and thickness of the existing pavement. These one course pavement patches shall be compacted with a vibratory roller to the same density specified for asphalt concrete pavements.

Laying of single course or the base course of the asphalt concrete pavement replacement where a two course replacement is applicable shall never be more than 600 feet behind the ABC placed for the pavement replacement.

The trench must be compacted to its required density, and required ABC must be in place prior to the placement of the asphalt concrete.

Single course replacement shall consist of a 12.5 mm or 19 mm mix placed and finished as directed by the Consultant.

The base course of two course pavement replacement shall consist of a 19 mm mix in accordance with MAG Section 710.

Where the base course is to be placed with non-compactive equipment, it shall be not less than 2 inches in thickness and the aterial shall be immediately rolled with a pneumatic-tired roller. The surface course shall

be of sufficient depth to provide the total required compacted thickness of the two courses, but not more than 1 inch.

Where the trench is 6 feet or more in width, all courses, single or both courses of the two course pavement replacement, shall be laid with a self-propelled compacting, spreading equipment. When the trench is from 6 to 8 feet in width, the self-propelled compacting, spreading equipment shall not be wider than 8 feet. All courses, except the surface course, shall be of a compacted thickness of not less than 1 1/2 inches.

The surface course shall consist of a 9.5 mm mix in accordance with MAG Section 710 as specified by the Consultant to match the existing surface. The surface course shall not be placed sooner than 2 weeks after the base course, except where the trench crosses a signalized intersection. In this case the surface course shall be placed within 48 hours, or the crossing pavement replacement shall be single course as specified above.

Placement of the surface course is to be by means which will result in a surface texture satisfactory to the Consultant, and flush with the existing pavement.

Where deep lift asphalt concrete (asphalt concrete base and asphalt concrete wearing course) exists, the base course replacement shall be made in lifts not exceeding 6 inches in compacted thickness to within 1/2 inch of the finish grade.

336.2.4.2 Adjustments: When new or existing manholes, values, survey monuments, clean outs, etc. fall within the limits of the permanent pavement replacement as discussed in this Section, the Contractor shall be responsible for adjusting the various items to the new pavement surface or as directed by the Consultant. This will include but not be limited to slurry and chip seals.

The Contractor will coordinate with the Consultant and with representatives of the various utilities regarding the adjustment and inspection of the work. The Contractor shall be responsible for obtaining and complying with all specifications, special requirements, details, etc. of the Utility Company regarding the adjustments. When adjusting the Agency's utilities, survey monuments, etc., the adjustment will comply with these Specifications and Details.

The work will be done in compliance with OSHA standards and regulations regarding confined space entry.

The Contractor shall remove all material attached to the lids and/or covers including that of prior work. The method of removal shall be approved by the Consultant and/or the Utility Representative.

336.3 TYPES AND LOCATIONS OF PAVEMENT AND SURFACING REPLACEMENT:

Normally, the type of pavement replacement and backfill required will be noted on the plans or specified in other portions of the contract documents and construction will be in accordance with Detail 200. This detail requires that a 12 inches "T" Top be utilized when normal traffic flow is perpendicular to any one of the four sides of the trench excavation. Therefore, Type A pavement replacement will require a "T" Top whenever the trench crosses a street or goes through an intersection and at the end(s) if they terminate in the street. Type B pavement replacement will require the "T" Top on the sides that are perpendicular to normal traffic flow.

If a type is not noted on the plans or specified in the special provisions, the following criteria will govern:

Type A pavement replacement, including the "T" Top, will be utilized on all streets where the excavation is parallel to the centerline of the street.

Type B pavement replacement, including the "T" Top, will be utilized on all streets where the excavation is transverse to the centerline of the street.

Type C pavement replacement will be used to match existing portland cement concrete pavement.

Type D pavement replacement may be used when the condition of the existing pavement does not justify construction of Type A or B. Prior written approval of the Consultant is required.

Type F pavement replacement will be utilized to match existing ABC or decomposed granite roadways.

Where a longitudinal trench is partly in pavement, the pavement shall be replaced to the outside edge of the existing pavement, on a straight line, as indicated on the plans. Measurements for payment shall be from the inner limit of pay width allowed below, to the outside edge of the existing pavement as defined herein.

Where no part of a trench is in pavement, surfacing replacement will only be specified where existing surfacing materials have been removed.

When a trench cut is in aggregate surfaced area, the surfacing replacement shall be of a like type and depth as the existing material, compacted to the densities required in MAG Section 601.

336.4 MEASUREMENT:

Measurement for payment and surfacing replacement shall be by the square yard, based upon actual field measurement of the area covered except as noted below.

(A) In computing pay quantities for replacement Types A, B, and F, pay widths will be based on the actual field measured width, however the boundaries of the measurement will not extend further than 1/2 the distance, either side, from the centerline of the pipe as depicted on Table 601-1, Maximum Width At Top Of Pipe Greater Than O.D. Of Barrel.

(B) In computing pay quantities for replacement Types C, D, E, and T, pay widths will be based on the actual field measured width, however the boundaries of the measurement will not extend further than 1/2 the distance plus 12 inches, either side, from the centerline of the pipe as depicted on Table 601-1, Maximum Width At Top Of Pipe Greater Than O.D. Of Barrel.

(C) Where a longitudinal trench is partly in pavement, computations of pay quantities shall be based on the limitations specified above.

(D) The length of pavement and surfacing replacement shall be measured through any manhole, valve box, or other structure constructed in the pipe line, and any pavement or surface replacement and/or seal treatment in excess of the above pay widths shall be considered and included in the bid item for such structure.

(E) Any pavement replacement in excess of the specified pay widths necessitated by the installation of valves, tapping sleeves and valves, valve by-passes, and concrete thrust blocks shall be included in the bid price for these items.

(F) When special provisions allow deviations from the trench widths specified in MAG Section 601, the above allowed pay widths for pavement replacement may be altered where so specified.

(G) Measurement of pavement and surfacing replacement shall be made along the finished surface of the ground to the nearest foot, and shall be computed to the nearest square yard.

336.5 PAYMENT:

Direct payment for pavement or surfacing replacement will be made for replacement over all pipe trench cuts except as otherwise allowed in the special provisions. Payment for replacements over other work shall be included in the cost of constructing that work, in accordance with the applicable standard details and specifications.

Payment for temporary pavement replacement shall be included in the cost of the pipe.

When a Contractor has the option of either jacking and/or boring or opencut construction, and elects to construct a pipeline by the jacking and/or boring method, he will be paid for the replacement of such items of work as pavement, curb and gutter, sidewalk, driveway, and alley entrances, as allowed for opencut construction.

SECTION 345
ADJUSTING FRAMES, COVERS, VALVE BOXES AND WATER METER BOXES

345.1 DESCRIPTION:

The Contractor shall furnish all labor, materials, and equipment necessary to adjust all frames, covers and valve boxes as indicated on the plans or as designated by the Consultant. The frames shall be set to grades established by the Consultant, in a manner hereinafter specified.

The Contractor may elect to remove old frames, covers and valve boxes and to install new frames and/or boxes without any additional cost to the District, in accordance with standard detail drawings.

345.2 ADJUSTING FRAMES:

The Contractor shall loosen frames in such a manner that existing monuments, clean outs or valve boxes will not be disturbed or manholes damaged. Debris shall not be permitted to enter sanitary or storm sewer conduits. All loose material and debris shall be removed from the excavation and the interiors of structures prior to resetting frames.

Frames shall be set to the elevations and slopes established by the Consultant and shall be firmly blocked in place with masonry or metal supports. Spaces between the frame and the old seat shall be sealed on the inside to prevent any concrete from entering the hand hole or manhole. Class AA concrete shall be placed around and under the frames to provide a seal and properly seat the frame at the required elevation and slope. Concrete shall be struck off flush with the top of the existing pavement.

345.2 ADJUSTING VALVE BOXES:

Valve shall be adjusted to the new elevation indicated on the plans or as established by the Consultant.

Adjustable cast iron boxes shall, if possible be brought to grade by adjustment of the upper movable section. Any excavated area shall be filled with Class AA concrete to the level of the existing pavement, or as directed by the Consultant.

In areas subject to vehicular traffic and where the existing valve box is a Type B, the adjustment to the new elevation shall be made using the old cover and installing a new 8 inch frame in accordance with the standard detail for installation of valve boxes in vehicular traffic areas. This adjustment shall be known as Type BA.

345.4 ADJUSTING MANHOLE AND VALVE COVERS:

Adjusting rings may be used to raise manhole covers in asphalt pavements when deemed acceptable by the Consultant. The amount of adjustment, thickness of seal or overlay, and cross slope will be considered when using adjusting rings. Each location where an adjusting ring is used must have a sufficient depth of asphalt to assure the proper installation and operation of the ring. The rings shall be made of a non-metallic, polypropylene or fiberglass material and installed per the manufacturer's specifications. The rings shall be approved by the Consultant.

345.5 MEASUREMENT:

The quantities measured will be the actual number of frames, covers and value boxes of each type, adjusted and accepted.

345.6 PAYMENT:

The quantities, as determined above will be paid for at the contract price per unit of measurement respectively, for each of the particular items listed in the proposal. The payment shall be compensation in full for all materials, labor, equipment and incidentals necessary to complete the work.

SECTION 350
REMOVAL OF EXISTING IMPROVEMENTS

350.1 DESCRIPTION:

This work shall consist of removal and disposal of various existing improvements, such as pavements, structures, pipes, curbs and gutters, and other items necessary for the accomplishment of the improvement.

350.2 CONSTRUCTION METHODS:

The removal of existing improvements shall be conducted in such a manner as not to injure utilities or any portion of the improvement that is to remain in place. See MAG Section 107.

Sidewalks shall be removed to a distance required to maintain a maximum slope for the replaced portion of sidewalk, for one inch per foot and all driveways shall be removed to a distance as required by standard details.

Existing concrete driveway curbs and gutters shall be removed to the right-of-way line and the new end of curb faced.

Portland cement concrete pavements, curbs and gutters and sidewalks designated on the plans for removal shall be saw-cut at match lines, in accordance with MAG Section 601 and removed.

Asphalt concrete pavements designated on the plans for removal shall be cut in accordance with MAG Section 336.

Removal of trees, stumps, irrigation structures, storm water inlets, headwalls, and other items in the right-of-way shall be done in accordance with MAG Section 201.

Backfill and compaction of all excavated areas shall be compacted to the densities as prescribed in MAG Section 601.

All surplus materials shall be immediately hauled from the jobsite and disposed of in accordance with MAG Section 205.

350.3 MISCELLANEOUS REMOVAL AND OTHER WORK:

This work shall include, but not be limited to the following, where called for on the plans.

a. Install plugs for pipes and remove existing plugs as necessary for new construction.
b. Remove median island slabs.
c. Remove pavements and aggregate base where called for outside the roadway prism.

350.4 PAYMENT:

Removal and disposal of existing improvements shall be considered incidental to the work and shall be included in the cost of pavement construction.

SECTION 362
CRACK SEALING

362.1 DESCRIPTION

Crack sealing shall consist of cleaning out existing cracks in the asphalt concrete and/ or portland cement concrete pavement and filling cracks with a rubberized asphalt for cracks greater than 1/4-inch but less than 1-1/2-inches in width. For cracks greater than 1-1/2-inches in width, the cracks will be sealed in accordance with Section 901.

362.2 MATERIALS

Rubberized crack filler used on the project shall consist of a mixture of asphalt and 100% vulcanized rubber. Crack filler and shall conform to the following minimum specifications:

Rubber Gradation	Percent Finer by Weight
No. 8 Sieve	100
No. 10 Sieve	95 - 100
No. 30 Sieve	0 - 10
Specific Gravity (rubber)	1.15 ± 0.02
Rubber Content (by weight of mixture)	25 ± 2%
Asphalt Cement	AC - 10
Asphalt Content (by weight of mixture)	75 ± 2%

362.3 CONSTRUCTION METHODS

All cracks greater than 1/4-inch in width shall be cleaned with high velocity compressed air to a depth of at least two times the width of the crack. Once cleaned, the cracks greater than ¼-inch but less than 1-1/2-inches in width shall be filled with the asphalt-rubber mixture placed at temperatures where consistency is that of a semi-fluid material. For cracks greater than 1-1/2-inches in width, the cracks will be cleaned and filled with 3/8" rock mixed with liquid SS1H crack seal to within 1/2-inch of the pavement surface and shall then be finished with the rubberized asphalt as outlined in this specification.

Cracks are to be filled flush with top of pavement.

362.4 MEASUREMENT

No measurements will be made for crack sealing in designated lots as shown on the plans.

362.5 PAYMENT

Payment for crack sealing will be paid for on a lump sum basis for the pavements included on the project plans. For any additional crack sealing for pavements outside of these shown on the plans, crack sealing will be paid for by the lineal foot.

SECTION 440
SPRINKLER IRRIGATION SYSTEM INSTALLATION

440.1 DESCRIPTION:

The Contractor shall furnish all the necessary labor, materials, and equipment required to complete the installation of the automatic sprinkler irrigation system providing full coverage to all plants and shrubs.

440.2 GENERAL:

Unless otherwise specified, the automatic sprinkler irrigation system layout as shown on the plans shall be considered schematic. The Contractor shall lay out the entire system using stakes to indicate the location of the various components. Preliminary adjustments to conform to actual site condition shall be accomplished at this time and the approval of the Engineer obtained prior to any actual work being performed. Utility connections, both water and electrical, shall be as shown on the plans or as designated by the utility concerned. Unless specifically exempted in the plans or specifications, the Contractor shall pay all costs concerned in providing these services.

Prior to the acceptance of the project, the Contractor shall furnish the Engineer 4 copies of the manufacturer's instruction and maintenance manual for each component or group of components to include parts listings and source of supply.

Prior to final inspection, the Contractor shall submit one set of corrected, as-built drawings showing the location of all pipe, valves, wiring, and utility services.

All permits for installation or construction of any of the work included under this section, which are required by legally constituted authorities having jurisdiction, shall be obtained and paid for by the Contractor, each at the proper time. He shall also arrange for and pay all costs in connection with any inspections and examinations required by these authorities.

440.3 MATERIALS:

Prior to the start of construction, the Contractor shall submit shop drawings per Section 105 on all material for approval of the Engineer. All materials shall conform to Section 757.

440.4 LANDSCAPE IRRIGATION SYSTEM REMOVAL AND RESTORATION

When construction encroaches into an existing landscaped irrigation system, the Contractor shall remove the conflicting portion of the system within the right-of-way and/or easements and any portion which may remain under the proposed improvements, whether shown or not shown on the plans. If the removals affect other areas of the system not in conflict with the construction, the Contractor shall permanently or temporarily restore or modify the existing system to provide water to the unaffected areas. The restoration or modifications shall be completed within 24 hours after the disruption occurs or notification by the Engineer.

The Contractor shall restore the affected landscape irrigation system to an operational condition equal to or better than the existing system. When necessary, bubbler and/or sprinkler heads shall be reinstalled at the edge of the new improvements. The reconstructed or modified system shall provide completed irrigation coverage without overspray onto walks, pavement, walls, buildings, etc.

The Contractor shall have the option to salvage and reuse existing materials. In the event that it is not feasible to reinstall the salvaged materials, new materials shall be installed.

To provide ample notification for owners who desire to remove and restore their own system, the Contractor shall notify the affected property owners at least fourteen (14) days prior to the scheduled removal of the irrigation system.

When determined by the Engineer that the existing sprinkler system cannot be practically restored, the existing system shall be plugged and removed as directed.

Unless specified by the agency and called out in the bid documents, this work shall be considered incidental to the contract and no separate payment shall be made to comply with these provisions.

440.5 TRENCH EXCAVATION AND BACKFILL:

Trenches and other excavations shall be sized to accommodate the irrigation system components, conduit, and other required facilities. Additional space shall be provided to assure proper installation and access for inspection. Unless otherwise specified, the minimum depth of cover over pipelines and conduits shall be as follows:

(A) Electrical conduit - 18 inches

(B) Waterlines continuously pressurized - 18 inches

(C) Lateral sprinkler lines - 12 inches

(D) Plastic lines under pavement - 24 inches

The bottom of trenches shall be true to grade and free of protruding stones, roots or other matter which would prevent proper bedding of pipe or other facilities.

Trenches and excavations shall be backfilled so that the specified thickness of topsoil is restored to the upper part of the trench. Compaction shall be in accordance with Section 301.

Water settling of trench backfill will not be permitted unless approved by the Engineer.

440.6 PIPE INSTALLATION:

(A) General**:** Pipe fittings shall be installed in accordance with the manufacturer's recommendations and these specifications. When requested by the Engineer, the Contractor shall furnish the manufacturer's printed installation instructions before pipe installation.

Pipe shall be bedded in at least 2 inches of finely graded native soil or sand to provide a firm, uniform bearing. After laying, the pipe shall be surrounded with additional finely graded native soil or sand to at least 2 inches over the top of the pipe. Trench backfill, sufficient to anchor the pipes, may be deposited before the pipeline pressure testing, except that joints shall remain exposed until satisfactory completion of testing.

When two or more pipelines are installed in the same trench, they shall be separated by a minimum horizontal clear distance of 6 inches and they shall be installed so that each pipeline, valve, or other pipeline component may be serviced or replaced without disturbing the other.

Piping under concrete or asphalt shall normally be installed by jacking, boring, or hydraulic driving. When any cutting or removal of asphalt and/or concrete work is necessary, it shall be saw cut in accordance with Section 601. Permission to cut asphalt and/or concrete shall be obtained from the Engineer. Where piping on the drawings is shown under paved areas, but running parallel and adjacent to planted areas, the intent of the drawings is to install the piping in the planted area.

When plastic to steel pipe connectors are required, these connections shall be accomplished first. A non-hardening, non-oil base pipe compound or liquid teflon shall be used on the male threads only. The joint shall be hand-tightened with final tightening as necessary to prevent leaks accomplished with a strap wrench.

Threads shall be cut with clean sharp dies and shall conform to American Standards Association Specification B2.

Joints shall be made with a non-toxic non-hardening joint compound applied to the male threads only.

(B) When wrapped pipe is specified, joints and connectors shall not be wrapped until completion of the pressure test.

(C) Plastic Pipe: Plastic pipe shall be cut square, externally chamfered approximately 10-15 degrees, and all burrs and fins removed. It shall be joined utilizing threaded fittings or socket type, solvent welded fittings. Schedule 80 pipe only will be used for threaded joints. Field threading will be accomplished in the same manner as specified for steel pipe, except that a plug will be installed in the bore of the pipe prior to threading to prevent distortion. Threaded pipe joints shall be made using teflon tape on the male threads. Solvent will not be used for threaded joints. Threaded joints shall be hand tightened with final tightening as necessary to prevent leaks with a strap wrench. Solvent welded joints shall be made in accordance with ASTM D2855, and the type of solvent recommended by the pipe manufacturer shall be used. Solvent shall be applied to the pipe ends in such a manner that no material is deposited on the interior surface or forced into the interior of the pipe during insertion. Excess solvent on the exterior of the joint shall be wiped clean immediately after assembly.

The pipe shall be protected from damage during assembly. All vises shall have padded jaws and only strap wrenches shall be used. Any plastic pipe which has been nicked, scarred, or otherwise damaged shall be removed and replaced. Care shall be exercised so that stresses on the previously made joints are avoided. Movement of the pipe following assembly, such as lowering the pipe into the trench, shall not occur prior to the set time recommended by the manufacturer of the solvent cement used.

The plastic pipe will be snaked from side to side within the trench so as to provide approximately 1 foot of slack per each 100 feet of pipe.

The pipeline will not be exposed to water for at least 12 hours after the last solvent welded joint has been made.

440.7 VALVES, VALVE BOXES, AND SPECIAL EQUIPMENT INSTALLATION:

Valves, backflow preventers, pressure regulators and related accessories shall be furnished and installed as specified.

All valves and other equipment shall be installed in a normal upright position unless otherwise recommended by the manufacturer, and shall be readily accessible for operation, maintenance and replacement. Sectional control valves shall not be located within range of sprinklers they control.

Gate valves and sectional control valves shall be installed below ground. Gate valves shall be housed in a covered concrete or plastic box that will permit access for servicing. Sectional control valves shall be equipped with a sleeve and cap centered on the valve stem.

Quick-coupler valves and garden valves projecting above grade shall be installed a minimum of 3 feet from curbs, pavement and walks. In non-irrigated areas, quick-coupler valves shall be set flush with finish grade, and in irrigated areas at or just above water level. They shall be installed on a double swing joint riser assembly. Garden valves shall be set 12 inches above finish grade, and shall be installed on a galvanized riser. In non-irrigated areas all valve boxes, valve access sleeves, and caps shall be set to finish grade, and in irrigated areas set adjacent to curbs, sidewalks or pavement at or just above water level. Valves shall be set at sufficient depth to provide clearance between the cover and the cap, valve handle, or key when the valve is in the fully open position. Backflow preventers shall be provided with pipe supports and the accessories necessary to properly secure the assembly. All backflow preventers shall be assembled with pipe, fittings, and risers of an approved material by the contracting agency.

440.8 SPRINKLER HEAD INSTALLATION AND ADJUSTMENT:

In accordance with the requirements of Subsection 440.7 all mains and laterals, including risers, shall be flushed and pressure tested before installing sprinkler heads. A water coverage test shall be performed after the sprinkler heads are installed.

(A) Location, Elevation and Spacing: Sprinkler head spacing shall not exceed the maximum shown on the drawings or recommended by the manufacturer. They shall be installed with at least 4 inches clearance from adjacent vertical elements projecting above grade such as walls, planter boxes, curbs and fences. Bubbler heads shall be installed a minimum of 2 inches above finish grade. The Engineer will notify the Contractor in writing when the planted beds are sufficiently planted and settled to make the necessary adjustments to the bubbler heads. Any adjustments are to be made within sixty (60) calendar days after this notification is received and at no additional cost to the Contracting Agency.

(B) Riser Assembly: A top outlet riser assembly shall consist of a pipe riser threaded into a top outlet ell or tee installed in the lateral supply line. Double-swing joint and single-swing joint riser assemblies shall utilize a horizontal 6 inches pipe nipple threaded into a side outlet ell or tee installed in the lateral supply line. For a double-swing joint, 3 ells shall be used in the remaining assembly ahead of the vertical riser pipe. For a single-swing joint, one ell shall be used.

(C) Sprinkler Head Adjustment: After all sprinkler heads are installed and the irrigation system is operating, each section or unit shall be adjusted and balanced, with all section control valves fully open to obtain uniform and adequate coverage.
Sprinkler heads having adjustable pin nozzles or orifices shall have the pins adjusted to provide adequate distribution of
water over the coverage pattern. The Contractor shall substitute larger or smaller nozzle cores in non-adjustable sprinkler heads as necessary.

440.9 AUTOMATIC CONTROL SYSTEM INSTALLATION:

The Contractor shall install a complete automatic irrigation control system including the automatic controller, remote control valves and wiring, and all necessary accessories and utility service connection including the junction box and any work required from the stubout provided by the power company.

The automatic controller shall be installed outside of the coverage pattern of the irrigation system at the location designated in the contract documents. The foundation for the controller shall be Class C concrete of the size shown on the plan or recommended by the manufacturer. The control components in the controller shall be fused and the chassis shall be grounded. The controller shall be installed in a steel security cabinet with metal hasp and padlocks unless the controller is to be placed with a building or walled enclosure.

Remote control valves shall be compatible with the automatic controller. The valve is to be housed in a plastic box with locking cover, and it shall be installed with at least a 6 inches clearance below the plastic cover. The box shall be set to finish grade in non-irrigated areas and adjacent to curbs, sidewalks or pavement at or just above high water elevation in irrigated areas.

All service wiring shall be installed in rigid conduit from the service point to the controller at the minimum depth specified in Subsection 440.2. A separate disconnect switch or combination meter socket, as required, shall be installed between the source of power and the controller. The minimum service wire shall be No. 12 AWG copper 600 volt type, TWH or larger as required by the contract documents or controller manufacturer. Wire splices shall be located only in specified pull boxes and shall be made with a packaged kit approved for underground use. Pull boxes shall be plastic with locking covers set to proper elevations on a 12 inches layer of crushed rock or washed gravel.

All wiring issuing from the controller shall be direct burial installed in main or lateral waterline trenches wherever practicable. The wiring shall be bundled and secured to the lower quadrant of the irrigation pipeline at 10 foot intervals with plastic electrical tape. Sufficient slack shall be left in the wiring or tubing

to provide for expansion and contraction. When the control wiring or tubing cannot be installed in a pipe trench, it shall be installed a minimum of 18 inches below finish grade. All pilot or "hot" wires are to be of one color and all common wires are to be of another color.

Unless otherwise required, all control wiring shall be direct burial Type UF, No. 14 AWG copper. Splices in control wire shall be made in accordance with the requirements for service wire. Sufficient slack shall be left at each splice and point of connection in pull boxes and valve boxes so that in case of repair the valve bonnet or splice may be brought to the surface without disconnecting the wire. No splices shall be permitted under pavement.

All wiring shall be tested for continuity, open circuits, and unintentional grounds prior to connecting the equipment.

Upon completion of the work the control system shall be in operating condition with an operational chart mounted within the controller cabinet.

440.10 FLUSHING AND TESTING:

After completion and prior to the installation of any terminal fittings, the entire pipeline system shall be thoroughly flushed to remove all foreign material. After flushing, the following tests shall be conducted in the sequence listed below. All equipment, materials, and labor necessary to perform the tests shall be furnished by the Contractor and all tests shall be conducted in the presence of the Engineer.

(A) Pipeline Pressure Test: A water pressure test shall be performed on all pressure mains and laterals before any couplings, fittings, valves, and the like are concealed. All open ends shall be capped after the water is turned into the lines in such a manner that all air will be expelled. Pressure mains shall be tested with all control valves to lateral lines closed. After the pressure main test, all valves shall be opened to test lateral lines. The constant test pressure and the duration of the test are as follows:

Mains	6 hours at 125 psi
Laterals	2 hours at 100 psi

(B) Sprinkler Coverage Test: The coverage test shall be performed after sprinkler heads have been installed and shall demonstrate that each section or unit in the irrigation system is balanced to provide uniform and adequate coverage of the areas serviced. The Contractor shall correct any deficiencies in the system.

(C) Operational Test: The performance of all components of the automatic control system shall be elevated for manual and automatic operation.

During the maintenance period specified and at least 9 days prior to final acceptance, the Contractor shall set the controller on automatic operation and the system shall operate satisfactorily during this period. All necessary repairs, replacement and adjustment shall be made until all equipment, electrical work, controls and instrumentation are functioning in accordance with the contract documents.

440.11 MEASUREMENT AND PAYMENT:

Measurement and payment shall be in accordance with Section 109. The lump sum or unit prices established in the proposal sheets shall be full compensation for furnishing all labor, materials, tools and equipment, and performing all work necessary to complete the sprinkler irrigation system described or specified in the contract documents.

SECTION 701
ROCK, GRAVEL, AND SAND

701.1 GENERAL:

The following specifications set forth the requirements for crushed rock, gravel, sand, and quarry stone. Samplings and sieve analysis shall be performed in accordance with ASTM D-75 and ASTM C-136. Sand equivalents shall be determined in accordance with AASHTO T-176. The liquid limit and plasticity index shall be determined in accordance with AASHTO T-89 and T-90.

701.2 CRUSHED ROCK AND GRAVEL:

Rock and gravel shall be clean, hard, sound, durable, uniform in quality, and free of any detrimental quantity of soft, friable, thin elongated, or laminated pieces, disintegrated material, organic matter, oil, alkali, or other deleterious substance.

The loss by abrasion in the Los Angeles abrasion machine, determined as prescribed in ASTM C-131, Grading A, shall not exceed 10 percent, by weight, after 100 revolutions nor 40 percent after 500 revolutions.

701.2.1 Crushed Rock: Crushed rock shall consist of the product obtained by crushing rock, stone, or gravel so that at least 50 percent by weight of aggregate retained on the No. 4 sieve for 3/4 inch or larger maximum sizes, and 50 percent retained on the No. 8 sieve for maximum sizes less than 3/4 inch shall consist of particles which have at least one rough, angular surface produced by crushing. All material that will pass a grizzly with bars spaced 15 inches apart, clear opening, shall be crushed when producing from the Contracting Agency's source.

The gradation of crushed rock shall comply with ASTM D-448.

701.2.2 Gravel: Material designated herein as gravel shall be composed entirely of particles that are either fully or partially rounded and water-worn. Crushed rock obtained by crushing rock which exceeds ASTM D-448 maximum gradation sizes may be combined provided it is uniformly distributed throughout and blended with the gravel. The quality and gradation requirements shall be as stated in this specification.

701.3 SAND:

Sand shall be fine granular material produced by the crushing of rock or gravel or naturally produced by disintegration of rock and shall be sufficiently free of organic material, mica, loam, clay, and other deleterious substances to be thoroughly suitable for the purpose for which it is intended.

701.3.1 Sand for Asphalt Concrete Pavement: Sand for asphalt concrete pavement shall comply with AASHTO M-29 except that grading requirements shall be deleted and have a minimum sand equivalent of not less than 50 and shall be non-plastic when tested in accordance with AASHTO T-89 and T-90.

701.3.2 Sand for Portland Cement Concrete, Mortar and Plaster: It shall be thoroughly and uniformly washed and shall be entirely free from oil and deleterious substances.

The average value of sand equivalent determined on 3 successive samples shall not be less than 70. No individual sample shall have a sand equivalent less than 65.

The size and grading of sand to be used in cement concrete, mortar, and plaster shall be such as to conform with the requirements specified as follows:

Concrete:	ASTM C-33
Mortar:	ASTM C-144
Plaster:	ASTM C-35

701.3.3 Coarse Aggregate for Portland Cement Concrete: Coarse aggregate shall conform to ASTM C-33 grading size No. 467, 57, 67, and 7.

701.3.4 Aggregate for Masonry Grout: The size and grading of the fine or coarse aggregate to be used in masonry grout shall conform with ASTM C-404.

701.3.5 Aggregate for Controlled Low Strength Material: Coarse aggregate shall conform to ASTM C-33 grading size No.57. The size and gradation of fine aggregates (sand) shall conform to ASTM C-33.

701.4 QUARRY STONE:

701.4.1 General: Quarry stone shall be angular, sound, durable, hard, resistant to abrasion; free from laminations, weak cleavages, and undesirable weathering, leaching, exfoliation tendencies, and slaking; and of such character that it will not disintegrate from the action of air, water, or the conditions to be met in handling and placing. Stone shall be clean and free from deleterious impurities, including alkali, earth, clay, refuse, and adherent coatings. Suitable tests and/or service records will be used to determine the acceptability of the stone. Tests to which the material may be subjected include petrographic analysis, X-ray diffraction, specific gravity, absorption, abrasion, rock drop, soundness, wetting and drying, and such other tests as may be considered necessary to demonstrate to the Consultant that the materials are acceptable for use in the work. In connection therewith, the Contractor shall notify the Consultant in writing at least 60 days prior to use of the intended sources of quarry stone.

701.4.2 Test Requirements: Quarry stone shall meet the following requirements except as may be otherwise provided on the plans and in the special provisions:

(A) Apparent specific gravity:	2.65 minimum.
(B) Breakdown:	
Rock drop breakdown:	5 percent maximum
Abrasion breakdown at 1000 revolutions:	40 percent maximum
Breakdown after 10 cycles of wetting and drying:	5 percent maximum
Solubility in water, breakdown, or softening:	None

701.4.3 Test Methods: Unless otherwise specified in the special provisions or indicated on the plans, test methods for quarry stone shall be as follows:

A) Apparent specific gravity per ASTM C-127.

(B) Abrasion characteristics to be determined by either Rock Drop Test or Los Angeles Rattler, ASTM C-131, as required on the plans or the special provisions.

(1) Standard Rock Drop Test. Tests shall be made on groups of 5 accurately weighed sizes of rocks: No. 1, ranging from 75 to 100 lbs.; No. 2, 100 to 125 lbs.; No. 3, 125 to 150 lbs.; No. 4, 150 to 175 lbs.; No. 5, 175 to 225 lbs.

Each rock of the 5 sizes shall be dropped 3 times on the group of the other 4, in an enclosure, from successive heights of 10, 15, and 18 feet. The enclosure shall have a flexible medium weight galvanized iron floor or equivalent, set on a solid foundation. Order of dropping shall be Nos. 3, 2, 4, 1, 5. All rock passing a 3 inch square mesh screen after test shall be weighed and recorded as a percentage of the total initial weight of the 5 rocks.

(2) Los Angeles abrasion machine, per ASTM C-131, Grading B.

(C) Wetting and drying. The stone shall be crushed, screened, and 1000 or 1500 grams of the 3/4 inch to 3/8 inch fraction taken for the test.

The crushed and graded stone shall be submerged in water for 18 hours at room temperature, after which the sample shall be drained and oven-dried at 140!F. When dry, the sample shall be cooled to room temperature. This would complete one cycle.

The percent loss shall be determined by screening the tested sample on a No. 4 sieve and shall be computed as follows:

$$\frac{\textit{100 x Weight of Material Passing No. 4 Sieve}}{\textit{Total Weight of Sample}} = \%\ \textit{Loss}$$

(D) Accelerated water breakdown and solubility test. Air-dry samples of representative stone weighing approximately 1 lb. each shall be immersed for 8 hours at 140°F., in distilled water, local tap water, or 3.5 percent sodium chloride solution.

SECTION 702
BASE MATERIALS

702.1 GENERAL

Materials for use as aggregate base shall be classified in the order of preference as follows:

a. Crushed Aggregate.
b. Processed Natural Material.
c. Processed Steel Slag.
d. Decomposed Granite.

When base material without further qualification is specified, the Contractor shall supply crushed aggregate. When a particular classification of base material is specified, the Contractor may substitute any higher classification of base material for the specified classification.

Except where materials are being obtained from a previously approved source, the Contractor shall give the Consultant 10 days advance notice, in writing, of the source of the base material he intends to use in order to allow sufficient time to perform the necessary tests.

702.2 CRUSHED AGGREGATE:

Crushed aggregate shall consist of crushed rock or crushed gravel or a combination thereof as defined in Section 701.

702.2.1 Soundness: The percentage of wear of crushed aggregate to be used as base will be determined as in Section 701, except that Grading B of ASTM C-131 shall be used. The percentage of wear of the material shall not exceed 40 after 500 revolutions.

702.2.2. Grading: The aggregate shall be well graded when tested in accordance with ASTM C-136 and C-117. The percentage composition by weight shall be within Table 702-1.

Table 702-1

Sieve Sizes (square openings)	Percentage by Weight Passing Sieve		
	Select Material		Aggregate Base
	Type A	Type B	
3”	100		
1½”		100	
1¼”			100
No. 4	30-75	30-70	38-65
No. 8	20-60	20-60	25-60
No. 30	10-40	10-40	10-40
No. 200	0-12	0-12	3-12

702.2.3 Plasticity Index: Unless otherwise noted, the Plasticity Index as tested in accordance with AASHTO T-146 Method A (Wet Preparation), T-89 and T-90 shall not be more than 5.

702.3 PROCESSED NATURAL MATERIAL:

702.3.1 General: Processed natural material shall consist of hard, durable fragments of stone or gravel and a filler of sand or other finely divided mineral matter. It shall be free from an excess of soft or disintegrated pieces, alkali, adobe, vegetable matter, loam, or other deleterious substances.

702.3.2 Physical Requirements: When sampled and tested in accordance with standard test methods, the aggregate shall meet the following requirements:

e. Percentage of Wear: When tested in accordance with ASTM C-131, the percentage of wear shall not exceed 40 percent after 500 revolutions.

f. Plasticity Index: When tested in accordance with AASHTO T-146 Method A (Wet Preparation), T-89 and T-90, the plasticity index shall not be more than 5.

g. Liquid Limit: When tested in accordance with AASHTO T-89, the liquid limit shall not be more than 25 percent.

702.3.3 Crushed Material: Crushed material is not required, but may be incorporated in the finished product.

702.3.4 Grading: The aggregate shall conform to the sieve analysis in this specification except that the least dimension of the maximum particle size shall not exceed 2/3 of the compacted thickness of the specified lift being placed.

702.4 DECOMPOSED GRANITE:

702.4.1 Preparation of Test Specimens: A quantity of sufficient size to have a dry weight of 15 pounds shall be selected and dried to constant weight at a temperature between 215°F. and 230°F. Fifteen pounds of this material shall then be subjected to 500 revolutions in a Los Angeles abrasion machine, as described in Section 701, except that nothing shall be placed in the drum other than the material to be tested.

The material that has been subjected to the breakdown shall be tested in accordance with ASTM C-117 to determine the percentage of material finer than a No. 200 mesh sieve by washing.

SECTION 708
PAVEMENT MARKINGS

708.1 DESCRIPTION:

The work under this section shall consist of cleaning and preparing the pavement surface, furnishing all materials and applying white or yellow water-borne, lead-free, rapid-dry traffic paint at the locations and in accordance with the details shown on the plans, Manual on Uniform Traffic Control Devices (MUTCD), and Arizona Department of Transportation supplements, the requirements of these specifications, or as directed by the Consultant.

708.2 MATERIALS

708.2.1 Pavement Marking Paint

General

All material used in the formulation of the pavement marking paint shall meet the requirements herein specified. Any materials not specifically covered shall be approved by the Consultant prior to use.

Certificates of Compliance conforming to the requirements of MAG Subsection 106.05 shall be submitted for each lot or batch of paint prior to its use.

Composition Requirements

The pavement marking paint shall be a ready-mixed, one component, water-borne lead-free traffic line paint, of the correct color, to the applied to either asphalt or portland cement concrete pavement. The composition of the paint shall be determined by the manufacturer. It will be the manufacturer's responsibility to produce a pigmented water-borne paint containing all the necessary co-solvents, dispersant, wetting agents, preservatives and all other additives, so that the paint shall retain its viscosity, stability and all of the properties as specified herein. The manufacturer shall certify that the product does not contain mercury, lead, hexavalent chromium, toluene, chlorinated solvents, hydrolyzable chlorine derivatives, ethylene-based glycol ethers and their acetates, and not any carcinogen, as defined in 29 CFR 1910.1200. Lead content shall not exceed 0.06 percent of weight of the dry film, and the test for chromium content shall be negative.

708.3 CONSTRUCTION REQUIREMENTS

708.3.1 Equipment

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

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

708.3.2 Application

Pavement markings shall be applied when the pavement surface is dry and the weather is not foggy, rainy, or otherwise adverse to the application of markings. The surface shall be free from excess asphalt or other deleterious substances before traffic paint is applied. The Contractor shall remove dirt, debris, grease, oil, rocks or chips from the pavement surface before applying markings. The method of cleaning the pavement surface and removal of detrimental material is subject to approval by the Consultant and shall include sweeping and the use of high-pressure air spray. The placing of traffic markings shall be done only by personnel who are experienced in this work.

Painting shall not be performed when the atmospheric temperature is below 10°C when using water-borne paint, nor when it can be anticipated that the atmospheric temperature will drop below said 10°C temperature during the drying period. Water-borne paints shall not be applied if rain is expected within one hour of its application, unless otherwise approved by the Consultant. Water-borne paint shall not be heated to a temperature greater than 66°C to accelerate drying.

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

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

708.3.3 Tolerances for Placing Paint:

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

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

Painted lines shall be 4 or 8 inches wide as shown on the plans with a tolerance of plus or minus ¼-inch and shall be placed at a minimum rate of 10 gallons per mile for a solid 4-inch line and 2.5 gallons for a broken 4-inch line, based on a 10 foot stripe and a 30 foot gap (40 foot cycle).

Wet thickness shall not be less than 380 micrometers.

708.4 METHOD OF MEASUREMENT

Pavement marking paint used for parking stalls will be measured by the stall.

Pavement marking paint used for handicap parking stalls will be measured by the stall.

Miscellaneous pavement marking paint will be measured by the linear foot along the centerline of the pavement stripe. Skips in dashed lines will not be included in the measurement. Length of pavement markings will be based on 4-inch wide strip. Measurement for striping with a plan width greater or less than the basic 4 inches as shown on the plans or directed by the Consultant will be made by the following method:

Plan Width of Striping (inches) x Linear Foot / 4 inches

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

708.5 BASIS OF PAYMENT:

Pavement striping for parking stalls and handicap parking stalls will be paid for at the contract price per stall, which price shall be full compensation for the work complete including layout, as described and specified herein and on the project plans.

Pavement striping of the type specified, measured as provided above will be paid for at the contract price per linear foot for the total length of painted line applied to the nearest foot, which price shall be full compensation for the work complete as described and specified herein and on the project plans.

Pavement symbols and legends measured as provided above, will be paid for at the contract price for each painted symbol or legend, which price shall be full compensation for the work complete as described and specified herein and on the project plans.

SECTION 710
ASPHALT CONCRETE

710.1 GENERAL:
Asphalt concrete shall be a mixture of asphalt cement and mineral aggregates. Mineral admixture shall be included in the mixture when required by the mix design or by the Consultant. Asphalt concrete shall be produced in accordance with Section 321.

The designation for asphalt concrete mixes shall be based on the nominal maximum aggregate size of the mix. The applicable mix designations are 3/8 inch, ½ inch, ¾ inch and Base (1") mix.

Each mix shall be designed using Marshall or Gyratory compaction methods. Either Gyratory or Marshall Mixes may be used for low or high traffic conditions, as determined by the agency. Low traffic conditions are conditions where the asphalt mix will be subject to low volume and low weight vehicle usage. Examples of this condition are residential streets, most parking lots and residential minor collector streets. High traffic conditions are conditions where the asphalt mix will be subject to high volume and/or heavy weight vehicle usage as found on major collector, arterial and commercial streets. Street classifications (i.e. minor collector and major collector) shall be determined by the specifying agency.

The following table (Table 710-1) displays the recommended lift thickness for various asphalt concrete mix designations found within Section 710. Please note that these recommended lift thicknesses are minimums based on each mix designation's "Nominal Aggregate Size" and the relative coarseness of its gradation. The compacted thickness of layers placed shall not exceed 150% of the Minimum Lift Thickness of Table 710-1 except as otherwise provided in the plans and specifications, or if approved in writing by the Consultant.

TABLE 710-1
RECOMMENDED MINIMUM LIFT THICKNESS'S for ASPHALT CONCRETE MIXES

Asphalt Concrete Mix Designation (inches)	Minimum Lift Thickness Marshall Mixes	Minimum Lift Thickness Gyratory Mixes
3/8"	1.0 inches	1.5 inches
1/2"	1.5 inches	2.0 inches
3/4"	2.5 inches	3.0 inches
Base	3.0 inches	n/a

710.2 MATERIAL:

710.2.1 Asphalt Binder: The asphalt binder specified in this section has been developed for use in desert climate conditions. Should it be utilized in other climates, consideration should be given to adjustments in the asphalt binder selection. The asphalt binder shall be Performance Grade Asphalt conforming to the requirements of Section 711 for PG 70-10, unless otherwise approved by the Consultant or specified differently in the plans or special provisions.

710.2.2 Aggregate: Coarse and Fine aggregates shall conform to the applicable requirements of this section. Coarse mineral aggregate shall consist of crushed gravel, crushed rock, or other approved inert material with similar characteristics, or a combination thereof, conforming to the requirements of these specifications.

Coarse aggregate for hot mix asphalt is material retained on or above the No. 4 sieve and Fine aggregate is material passing the No. 4 sieve. Aggregates shall be relatively free of deleterious materials, clay balls, and adhering films or other material that prevent coating with the asphalt binder. Coarse and Fine aggregates shall conform to the following requirements when tested in accordance with the applicable test methods:

TABLE 710-2 COARSE/ FINE AGGREGATE REQUIREMENTS			
Characteristics	Test Method	Low Traffic	High Traffic
Fractured Faces, % (Coarse Aggregate Only)	Arizona 212	75, 1 or more	85, 1 or more 80, 2 or more
Uncompacted Voids, % Min.	AASHTO T-304	42	45
Flat & Elongated Pieces, % 5:1 Ratio	ASTM D-4791	10.0 Max.	10.0 Max.
Sand Equivalent, %	AASHTO T-176	50 Min.	50 Min.
Plasticity Index	AASHTO T-90	Non-plastic	Non-plastic
L.A. Abrasion, %Loss	AASHTO T-96	9 max. @ 100 Rev 40 max. @ 500 Rev.	9 max. @ 100 Rev. 40 max. @ 500 Rev.
Combined Bulk Specific Gravity	AI MS-2/SP-2	2.35 – 2.85	2.35 – 2.85
Combined Water Absorption	AI MS-2/SP-2	0 – 2.5%	0 – 2.5%

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

Blend sand (naturally occurring or crushed fines) shall be clean, hard and sound material which will readily accept asphalt binder coating. The blend sand grading shall be such that, when it is mixed with the other mineral aggregates, the combined product shall meet the requirements of Table 710-2.

The natural sand shall not exceed 20 percent for the Marshall mixes and 15 percent for the Gyratory mixes by weight of the total aggregate for a mix.

710.2.3 Mineral Admixture: Mineral admixture when used as an anti-stripping agent in asphalt concrete shall conform to the requirements of AASHTO M-17. Mineral admixture used in asphalt concrete shall be dry hydrated lime, conforming to the requirements of ASTM C-1097 or portland cement conforming to ASTM C 150Type II or ASTM C 595 Type IP. The amount of hydrated lime or Portland cement used shall be determined by the mix design. The minimum Mineral admixture content within a mix will be 1.00 percent, by weight of total aggregate.

710.3 MIX DESIGN REQUIREMENTS:

710.3.1 General: The mix design for asphalt concrete shall be prepared by a laboratory that is accredited through the AASHTO Accreditation Program (AAP) in Hot Mix Asphalt Aggregates and Hot Mix Asphalt. The laboratory shall be under the direct supervision of a Civil Engineer, registered by the State of Arizona, and who is listed by ADOT as a "Qualified Asphaltic Concrete Mix Design Engineer" within ADOT's latest list of approved laboratories. The latest list of approved laboratories is available on ADOT's web page www.azdot.gov. The date of the design shall not be older than 1 year from the date of submittal, unless supportive documentation is provided and approved by the Consultant.

The mix design report shall include the following elements as a minimum.

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

(2) The mix plant identification and/or location, as well as the supplier or producer name.

(3) A description of all products that are incorporated in the asphalt concrete along with the sources of all products, including admixtures and asphalt binder, and their method of introduction.

(4) The supplier and grade of asphalt binder, the source and type of mineral aggregate, and the percentage of asphalt binder and mineral admixture used.

(5) The mix design report shall state the traffic condition (low or high traffic) and size designation. In all cases Gyratory based mix designs shall be designated as high traffic mixes. Marshall based mix design shall be designated either low or high traffic mixes.

(6) The results of all testing, determinations, etc., such as: specific gravity and gradation of each component, water absorption, sand equivalent, loss on abrasion, fractured coarse aggregate particles, Tensile Strength Ratio (AASHTO T 283), Marshall stability and flow, asphalt absorption, percent air voids, voids in mineral aggregate, and bulk density. Historical abrasion values may be supplied on existing sources. The submittal should include a plot of the gradation on the Federal Highway Administration's 0.45 Power Gradation Chart, plots of the compaction curves and the results of moisture sensitivity testing.

(7) The laboratory mixing and compaction temperature ranges for the supplier and grade of asphalt binder used within the mix design.

(8) A specific recommendation for design asphalt binder content and any limiting conditions that may be associated with the use of the design, such as minimum percentages of crushed or washed fine aggregate.

(9) The supplier's product code, the laboratory Engineer's seal (signed and dated), and the date the design was performed.

The mix design shall be submitted to the Agency or Consultant by the Contractor/Supplier for which it was developed as part of his project submittals. Once the mix design has been approved by the agency or Consultant, the Contractor and/or his supplier shall not change plants nor utilize additional mixing plants without prior approval of the Consultant. Any changes in the plant operation, the producer's pit, the asphalt binder, including modifiers in the asphalt binder, or any other item that will cause an adjustment in the mix, shall be justification for a new mix design to be submitted.

710.3.2 Mix Design Criteria: The mix design shall be performed by one of two methods, Marshall Mix Design or Gyratory Mix Design. The method shall be specified on the plans, special provisions, or by the Consultant. A minimum of 4 points will be used to establish the mix design results. The oven aging period for both Marshall and Gyratory mix design samples shall be 2 hours.

710.3.2.1 Marshall Mix Design: The Marshall Mix Design shall be performed in accordance with the requirements of the latest edition of the Asphalt Institute's Manual, MS-2 "Mix Design Methods for Asphalt Concrete." The mix shall utilize the compactive effort of 75 blows per side of specimen. The mix shall comply with the criteria in Table 710-3.

TABLE 710-3 MARSHALL MIX DESIGN CRITERIA					
Criteria	**Requirements**				**Designated Test Method**
	3/8" Mix	**1/2" Mix**	**3/4" Mix**	**Base Mix**	
1. Voids in Mineral Aggregate: %, min	15.0	14.0	13.0	12.0	AI MS-2
2. Effective Voids: %, Range	4.0 ± 0.2	4.0 ± 0.2	4.0 ± 0.2	4.0 ± 0.2	AI MS-2
3. Absorbed Asphalt: %, Range*	0-1.0	0-1.0	0-1.0	0-1.0	AI MS-2
4. Dust to Eff. Asphalt Ratio, Range**	0.6 – 1.4	0.6 – 1.4	0.6 – 1.4	0.6 – 1.4	AI MS-2
5. Tensile Strength Ratio: %, Min.	65	65	65	65	AASHTO T-283
6. Dry Tensile Strength: psi, Min.	100	100	100	100	AASHTO T-283
7. Stability: pounds, Minimum	2,000	2,500	2,500	3,000	AASHTO T-245
8. Flow: 0.01-inch, Range	8 -16	8 -16	8 -16	8 -16	AASHTO T-245
9. Mineral Aggregate Grading Limits				AASHTO T-27	
	Percent Passing with Admix				
Sieve Size	**3/8 inch Mix**	**1/2 inch Mix**	**3/4 inch Mix**	**Base Mix**	
1-1/4 inch				100	
1 inch			100	90-100	
3/4 inch		100	90-100	85-95	
1/2 inch	100	85-100	--	--	
3/8 inch	90-100	62-85	62-77	57-72	
No. 8	45-60	40-50	35-47	33-43	
No. 40	10-22	10-20	10-20	9-18	
No. 200	2.0-10.0	2.0-10.0	2.0-8.0	1.0-7.0	

* Unless otherwise approved by the Consultant.

** The ratio of the mix design composite gradation target for the No. 200 sieve, including admixture, to the effective asphalt content shall be within the indicated range.

710.3.2.2 Gyratory Mix Design: Gyratory Mix Designs shall be performed in accordance with the requirements of latest edition of the Asphalt Institute's SP-2 manual. Mix design laboratory compacted specimens shall be prepared using a gyratory compactor in accordance with AASHTO T-312.

The mix design shall be formulated in a manner described for volumetric mix designs in the current edition of the Asphalt Institute Manual SP-2, except the number of trial blend gradations necessary will be determined by the mix design laboratory. Duplicate gyratory samples shall be prepared at a minimum of four (4) binder contents to select the recommended binder content. The completed mix design shall meet all the mineral aggregate and mix design criteria specified herein.

For purposes of design, the number of gyrations shall be 8 for Nini, 100 for Ndes, and 160 for Nmax. The corrected density of the specimens shall be less than 89.0 percent of maximum theoretical density at 8 gyrations. The corrected density of the specimens shall be less than 98.0 percent of maximum theoretical density at 160 gyrations.

The Gyratory mix shall comply with the criteria in Table 710-4.

TABLE 710-4 GYRATORY MIX DESIGN CRITERIA				
Criteria	**Requirements**			**Designed Test**
	3/8" Mix	**1/2" Mix**	**3/4" Mix**	
1. Voids in Mineral Aggregate: %, min	15.0	114.0	13.0	AI SP-2
2. Effective Voids: %, Range	4.0 ± 0.2	4.0 ± 0.2	4.0 ± 0.2	AI SP-2
3. Absorbed Asphalt: %, Range*	0-1.0	0-1.0	0-1.0	AI SP-2
4. Dust to Eff. Asphalt Ratio, Range**	0.6 – 1.4	0.6 – 1.4	0.6 – 1.4	AI SP-2
5. Tensile Strength Ratio: %, Min.	75	75	75	AASHTO T-283
6. Dry Tensile Strength: psi, Min.	75	75	75	AASHTO T-283
7. Mineral Aggregate Grading Limits				AASHSTO T-27
	Percent Passing with Admix			
Sieve Size	**3/8" Mix**	**1/2" Mix**	**3/4" Mix**	
1 inch			100	
3/4 inch		100	90-100	
1/2 inch	100	90-100	43-89	
3/8 inch	90-100	53-89	--	
No. 8	32-47	29-40	24-36	
No. 40	2-24	3-20	3-18	
No. 200	2.0-8.0	2.0-7.5	2.0-6.5	

* Unless otherwise approved by the Consultant.

** The ratio of the mix design composite gradation target for the No. 200 sieve, including admixture, to the effective asphalt content shall be within the indicated range.

710.3.2.3 Moisture Sensitivity Testing: Moisture sensitivity testing will be performed in accordance with AASHTO Test Method T-283 for both Marshall and Gyratory mix designs, without the freeze/thaw cycle(s). The minimum required Tensile Strength Ratio is indicated in the tables above.

SECTION 711
PAVING ASPHALT

711.1 GENERAL:

The asphalt shall be produced from crude asphalt petroleum or a mixture of refined liquid asphalt and refined solid asphalt. It shall be free from ad-mixture with any residues obtained by the artificial distillation of coal, coal tar, or paraffin oil and shall be homogeneous and free from water.

Asphalt shall not be heated during the process of its manufacture, storage, or during construction so as to cause injury as evidence by the formation of carbonized particles.

Asphalt shall meet the requirements for grade PG 70-10.

711.2 TESTING REQUIREMENTS:

Paving asphalt shall be classified by the Performance Grading System and shall conform to the requirements set forth in Table 711-1.

TABLE 711-1

PERFORMANCE GRADING SYSTEM

	PG 64-10	PG 70-10	PG 76-10	PG 82-10
Original Asphalt				
Viscosity, ASTM D 4402 (Note 1) Max. 3 Pa-s, Test Temp, °C	135	135	135	135
Dynamic Shear TP5 (Note 2) G*/Sin *,Min., 1.0kPa Test Temp. @ 10 rad/s, °C	64	70	76	82
Rolling Thin Film Oven Residue (T240)				
Mass Loss, Maximum % Dynamic Shear TP5	1.0	1.0	1.0	1.0
G*/sin *, Min., 2.20 kPa Test Temp. @ 10 rad/s, °C	64	70	76	82
Pressure Aging Vessel Residue (PP1)				
PAV Aging Temperature, °C	110	110	110	110
Dynamic Shear TP5 G*/sin *, Max., 5000 kPa Test Temp. @ 10 rad/s, °C	31	34	37	40
Creep Stiffness, TP1 (Note 3) S, Maximum, 300.0 Mpa *m*-value, Minimum, 0.300 Test Temp. @60s, °C	0	0	0	0
Direct Tension, TP3 (Note 3) Failure Strain, Minimum 1.0% Test Temp. @ 1.0 mm/min. °C	0	0	0	0

On all Grades Flash Point Temperature T48: Minimum 230 °C and Mass Loss, Maximum 1.00 percent.

NOTES:

(1) This requirement may be waved at the discretion of the specifying agency if the supplier warrants that the asphalt binder can be adequately pumped and mixed at temperatures that meet all applicable safety standards.

(2) For quality control of unmodified asphalt cement production, measurement of the viscosity of the original asphalt cement may be substituted for dynamic shear measurements of G*/sin(*) at test temperatures when the asphalt is a Newtonian fluid. Any suitable standard means of viscosity measurement may be used, including capillary or rotational viscometry (T210 or T202).

(3) If the Creep Stiffness is below 300 Mpa, the direct tension test is not required. If the Creep Stiffness is between 300 and 600 Mpa, the direct tension failure strain requirement can be used in lieu of the Creep Stiffness requirement. The *m*-value requirement must be satisfied in all cases.

Design Note: Performance Grade Asphalts are selected for certain reliabilities with respect to high and low pavement temperatures. The specified characteristics are based upon a loading frequency that approximates vehicle speeds of approximately 90 km/hr. Since all binders are frequency dependent, the designer may consider increasing the high temperature requirement for slow transient and standing loads, such as intersection loading. The high temperature requirement may also be increased for excessive numbers of equivalent single axle loads.

711.3 TEST REPORT AND CERTIFICATION:

At the time of delivery of each shipment of asphalt, the supplier supplying the material shall deliver to the purchaser 3 certified copies of the test report which shall indicate the name of the refinery and supplier, type and grade of asphalt delivered, date and point of delivery, quantity delivered, delivery ticket number, purchase order number, and results of the above specified tests. The test report shall be signed by an authorized representative of the supplier certifying that the product delivered conforms to the specifications for the type and grade indicated.

Until the certified test reports and samples of the material have been checked by the Consultant, that material will be only tentatively accepted by the Contracting Agency. Fiinal acceptance will be dependent on the determination of the Consultant that the material involved fulfills the requirements prescribed. The certified test reports and the testing required in connection with the reports shall be at no additional cost to the Contracting Agency.

711.4 TEMPERATURES:

Unless otherwise specified in these specifications or in the special provisions, the various grades of paving asphalt shall be applied within the temperature range indicated in Table 711-2. The exact temperature shall be determined by the Consultant.

At no time, after loading into a tank car or truck for transportation from the refinery to the purchaser, shall the temperature of the paving asphalt be raised above 400 degrees F.

TABLE 711-2				
APPLICATION TEMPERATURE OF PAVING ASPHALTS				
Grade of Material	Pug Mill Mixing Asphalt Temperature degrees F		Distributor Application Temperature degrees F	
	Minimum	Maximum	Minimum	Maximum
PG 64-10	275	325	300	390
PG 70-10	275	325	300	390
PG 76-10	290	340	310	390
PG 82-10	290	340	315	390

Paving asphalt shall be heated in such a manner that steam or hot oils will not be introduced directly into the paving asphalt during heating.

711.5 DISTRIBUTING EQUIPMENT:

Distributing Equipment shall meet the requirements of Section 330.

711.6 CONVERSION OF QUANTITIES:

When pay quantities of paving asphalt are determined from volumetric measurements, the volumetric measurement at any temperature shall be reduced to the volume the material would occupy at 60 degrees F. in accordance with ASTM D-1250. In converting volume to weight, the computations shall be based on Table 711-3.

TABLE 711-3		
PAVING ASPHALT QUANTITY CONVERSION		
Grade of Materials	**Gals. Per Ton at 60 Degrees F.**	**Lbs. Per Gals. at 60 Degrees F.**
PG 64-10	235	8.5
PG 70-10	325	8.5
PG 76-10	230	8.7
PG 82-10	230	8.7

SECTION 712
LIQUID ASPHALT

712.1 GENERAL:

Liquid asphalt shall consist essentially of either natural crude or refined asphalt petroleum, or a residual product thereof.

The liquid asphalt shall be medium curing product designed by the letters MC, and shall consist of a paving asphalt conforming to the provisions in Section 711, fluxed or blended with a kerosene type solvent.

The asphalt shall not be heated during the process of its manufacture or during construction so as to cause injury as evidence by the formation of carbonized particles.

712.2 TEST REQUIREMENTS:

The liquid asphalt shall consist of materials specified above and shall conform to the requirements set forth in Table 712-1.

712.3 TEST REPORTS AND CERTIFICATIONS:

Test reports and certifications will be furnished in accordance with Section 711.

712.4 CONVERSION OF QUANTITIES:

When pay quantities of liquid asphalt are determined from volumetric measurements, the volumetric measurement at any temperature shall be reduced to the volume the material would occupy at 60 degrees F in accordance with ASTM D-1250. In converting volume to weight, the computations shall be based on the data contained in Table 712.2.

TABLE 712-1 AASHTO M-82 TABLE 1										
	MC-30		**MC-70**		**MC-250**		**MC-800**		**MC-3000**	
	Min.	**Max.**	**Min.**	**Max.**	**Min.**	**Max.**	**Min.**	**Max.**	**Min.**	**Max.**
Kinematic Viscosity at 60°C (140°F) centistokes	30	60	70	140	250	500	800	1600	3000	6000
Flash point (Tab. open-cup), degrees C (°F)	38 (100)	---	38 (100)	---	66 (150)	---	66 (150)	---	66 (150)	---
Water Percent	---	0.2	---	0.2	---	0.2	----	0.2	---	0.2
Distillation test: Distillate percentage by volume of total of distillate to 360°C (680°F) to 225°C (437°F) to 260°C (500°F) to 315°C (600°F)	--- 40 75	25 70 93	0 20 65	20 60 90	0 15 60	10 55 87	--- 0 45	--- 35 80	--- 0 15	--- 15 75
Residue from distillation to 360°C (680°F) Volume percentage of sample by difference	50	---	55	---	67	---	75	---	80	---
Tests on residue from distillation: Absolute viscosity at 60°C (140°F) poises	300	1200	300	1200	300	1200	300	1200	300	1200
Ductility, 5 cm/cm, cm.	100	---	100	---	100	---	100	---	100	---
Solubility in Trichloroethylene, percent	99.0	----	99.0	----	99.0	---	99.0	---	99.0	---

TABLE 712-1A
ASTM D-2026
Requirements for Cutback Asphalt (Slow-Curing Type)

Designation	SC-70		SC-250		SC-800		SC-3000	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Kinematic viscosity at 140°F (60°C), Cst	70	140	250	500	800	1600	3000	6000
Flash point (Cleveland open cup), °F (°C)	150 (66)	---	175 (79)	---	200 (93)	---	225 (107)	---
Distillation lost: Total distillate to 680°F (360°C), volume %	10	30	4	20	2	12	---	5
Solubility in trichloroethylene, %	99.0	---	99.0	---	99.0	---	99.0	---
Kinematic viscosity on distillation residue at 140°F (60°C), St	4	70	8	100	20	160	40	350
Asphalt Residue: Residue of 100 penetration, % Ductility of 100 penetration residue at 77°F (25°C), cm	50 100	--- ---	60 100	--- ---	70 100	--- ---	80 100	--- ---
Water, %	---	0.5	---	0.5	---	0.5	---	0.5

NOTE: If the ductility at 77°F (25°C) is less than 100, the material will be acceptable if its ductility at 60°F (15.5°C) is more than 100.

TABLE 712-2		
Grade of Materials	**Gals. Per Ton at 60°F**	**Lbs. Per Gals. at 60°F**
70	253	7.90
250	249	8.03
800	245	8.16
2000	241	8.30

SECTION 713
EMULSIFIED ASPHALT

713.1 GENERAL:

Emulsified asphalts shall be composed of a paving asphalt base uniformly emulsified with water and an emulsifying or stabilizing agent. It shall be homogeneous throughout and if stored, shall show no separation of ingredients within 30 days after delivery. Emulsified asphalt shall be classified as quick setting, rapid setting, medium setting or slow setting type in either anionic or cationic emulsions.

Emulsified asphalt shall be specified as follows:

a) Penetration type and high viscosity type emulsion shall be designated by the letters RS-Rapid Setting.

b) Mixing type emulsion shall be designated by the letters SS-Slow Setting, MS-Medium Setting and QS-Quick Setting.

713.2 TESTING REQUIREMENTS:

The emulsified asphalt shall conform to the requirements set forth in Table 713-1.

713.3 TESTS REPORT AND CERTIFICATION:

REQUIREMENTS FOR ANIONIC/CATIONIC EMULSIFIED ASPHALT (Specification Designation)

TABLE 713-1	*Quick Setting*				*Rapid Setting*				*Medium Setting*				*Slow Setting*			
Grade	*QSH*		*CQSH*		*CRS-1*		*CRS-2h*		*CMS-2*		*CMS-2h*		*CSS-1*		*CSS-1h*	
	Min	*Max*	*Min*	*Ma*	*Min*	*Max*	*Min*	*Max*	*Min*	*Max*	*Min*	*Max*	*Min*	*Max*	*Min*	*Max*
Tests on																
Visc., Saybolt	*20*	*100*											*20*	*100*	*20*	*100*
Visc., Saybolt					*20*	*100*	*100*	*400*	*50*	*450*	*50*	*450*				
Settlement, 24						*1*		*1*		*1*		*1*		*1*		*1*
Demulsibility,					*40*		*40*									
dioctyl																
Coating ability																
resistance:																
Dry aggregate									*Good*		*Good*					
after spraying									*Fair*		*Fair*					
wet aggregate									*Fair*		*Fair*					
after spraying									*Fair*		*Fair*					
Particle charge	*Negative*		*Positive*		*Positive*		*Positive*		*Positive*		*Positive*		*Positive*		*Positive*	
Sieve Test, %	*0.10*		*0.10*		*0.10*		*0.10*		*0.10*		*0.10*		*0.10*		*0.10*	
Cement Mixing														*2.0*		*2.0*
Distillation:																
Oil distillate, by						*3*		*3*		*12*		*12*				
emulsion, %																
Residue, %	*57*		*57*		*60*		*65*		*65*		*65*		*57*		*57*	

TABLE 713-1	*Quick Setting*				*Rapid Setting*				*Medium Setting*				*Slow Setting*			
Grade	*QSH*		*CQSH*		*CRS-1*		*CRS-2h*		*CMS-2*		*CMS-2h*		*CSS-1*		*CSS-1h*	
	Min	*Max*	*Min*	*Ma*	*Min*	*Max*	*Min*	*Max*	*Min*	*Max*	*Min*	*Max*	*Min*	*Max*	*Min*	*Max*
Test on Residue																
Penetration,	*40*	*110*	*40*	*110*	*100*	*250*	*40*	*90*	*100*	*250*	*40*	*90*	*100*	*250*	*40*	*90*
sec.																
Ductility, 25°C	*40*		*40*		*40*		*40*		*40*		*40*		*40*		*40*	
min, cm.																
Solubility in	*97.5*		*97.5*		*97.5*		*97.5*		*97.5*		*97.5*		*97.5*		*97.5*	
Storage Stability	*1*		*1*													

*If the Particle Charge Test result is inconclusive for CSS-1 and CSS-1h, material having a maximum pil value of 6.7 will be accepted.

713.4 CONVERSION OF QUANTITIES:

Unless otherwise specified, the various grades of emulsified asphalt shall be applied at temperatures within the limits specified in Table 713-2 the exact temperature to be determined by the Consultant. Emulsified asphalt shall be reheated if necessary. But at no time, after loading into a tank car or truck for transportation to the work site, shall the temperature of the emulsion be raised above the maximum temperature shown in Table 713-2. During all reheating operations, the emulsified asphalt shall be agitated to prevent localized overheating. Emulsified asphalt shall not be permitted to cool to a temperature of less than 40 degrees F.

TABLE 713-2

APPLICATION TEMPERATURE OF EMULSIFIED ASPHALT

Grade of Emulsified Asphalt	**Minimum °F.**	**Maximum °F.**
RS-1, MS-1, SS-1, SS-1h, CSS-1, CSS-1h	70 F.	140 F.
RS-2, MS-2, MS-2h, CRS-1, CRS-1h, CRS-2h, CMS-2, CMS-2h, QSH, CQSH	125 F.	185 F.

Emulsified asphalt shall be heated in such a manner that steam or hot oils will not be introduced directly into the emulsified asphalt during heating.

713.5 CONVERSION OF QUANTITIES:

When pay quantities of emulsified asphalt are determined from volumetric measurements, the volumetric measurement at any temperature shall be reduced to the volume the material would occupy at 60 degrees F. in accordance with ASTM D-1250. In converting volume to weight, the computations shall be based on Table 713-3.

TABLE 713-3		
EMULSIFIED ASPHALTS QUANTITY CONVERSION		
Grade of Material	**Gals. Per Ton at 60°F.**	**Lbs. Per Gal. at 60°F.**
All grades	240	8.33

SECTION 714
MICROSURFACING MATERIALS

714.1 GENERAL:

Microsurfacing materials shall consist of a properly proportioned mixture of cationic polymer modified asphalt emulsion, mineral aggregates, mineral filler, water, and other additives.

714.2 AGGREGATE:

714.2.1 Mineral Filler: Mineral filler, as required by the mix design, shall be any recognized brand of non-air-entrained Type I/II normal portland cement that is free of lumps and clods, with a minimum of 85% passing the #200 sieve, added by weight of aggregate as specified by the mix design.

714.2.2 Mineral Aggregate: Mineral aggregate shall consist of sound, durable crushed stone or crushed gravel, per Section 701, and approved mineral filler. The material shall be free from vegetable matter and other deleterious substances. Aggregates shall be 100% crushed with no rounded particles. No natural sand will be allowed. The mineral aggregate shall conform to Table 715-1 for gradation only. Type II Aggregate is specified for this project. Application rates shall be 18-24 pounds of aggregate/square yard for Type II, and 24-35 pounds/square yard for Type III.

The mineral aggregate and mineral filler shall have a sand equivalency value not less than 50 (ASTM D 2419) and be non-plastic.

If more than one kind of aggregate is used, the correct amount of each kind of aggregate needed to produce the required gradation shall be proportioned separately in a manner that will result in a uniform and homogeneous blend. The final blended aggregate shall meet the above requirements for grading, sand equivalency, and plasticity.

714.3 BITUMINOUS MATERIAL:

The Polymerized Emulsion is a slow-setting, cationic type emulsion for mixing applications and seal coats. A minimum of 4% saturated polymer shall be high sheared into the asphalt prior to the emulsification process. The Agency may choose to sample the polymerized asphalt for testing. The amount of polymer will be based on weight of polymer and asphalt (total weight) and be certified by the supplier. The polymerized emulsion will meet the following specifications listed in Table 714-1.

Table 714-1

Polymerized Emulsion

Test	AASHTO Method	Specification Limits
Tests on Emulsion		
Viscosity, SSF, @ 77"F. sec.	T-59	15-100
Sieve Test, %	T-59	0.30 Maximum
Particle Charge	T-59	Positive
Storage Stability, 24 hr. %	T-59	1.0 Maximum
Evaporation Residue, %	Arizona 512	60 Minimum
Tests on Evaporation Residue Arizona 504		
Kinematic Viscosity 275"F.cst	T-201	650 Minimum
Penetration, 77"F 100g	T-49	40-90
Softening Point, degrees F.	T-53	140 Minimum
Ductility, 77%, 5 cm/min.	T-51	60 Minimum

Table 714-1		
Polymerized Emulsion		
Test	**AASHTO Method**	**Specification Limits**
Tests on Evaporation Residue after RTFO		
Kinematic Viscosity, 275"F. aging	T-201	2.5 Maximum
Softening Point, degrees F.	T-53	140 Minimum
The emulsion, upon standing undisturbed for a period of twenty-four (24) hours, shall		

714.4 MODIFIER TYPE AND CONTENT:

The modifier shall be saturated. The use of latex type modifier will be allowed only if both the test results and field performance are accepted by the Consultant. The asphalt cement shall contain a minimum of 4% solid polymer by weight of asphalt residue, sheared into the asphalt prior to emulsification. Plant verification by the Agency, and certification of the polymer content and type by the supplier, will be required throughout the duration of the contract. Each tank of emulsion produced shall be certified
as to its compliance with these specifications; this certification shall be provided to the Agency.

714.5 WATER:

Water shall be potable water, free of any injurious impurities. The Contractor shall identify the water source to the Agency.

714.6 ADDITIVES:

Additives may be used to accelerate or retard the breaking point and set times of the mix, or to improve the resulting finished surface.

The use of additives in the mix shall be supplied in quantities predetermined by the laboratory mix design.

714.7 TEST CERTIFICATES AND REPORTS:

Test certificates and reports for the bituminous material shall be furnished in accordance with Section 711.3.

SECTION 715
SLURRY SEAL MATERIALS

715.1 GENERAL:

Slurry seal shall consist of a properly proportioned mixture of emulsified asphalt, mineral aggregate, mineral fillers, and water.

All material source must be approved prior to their use. The Contractor will submit material samples at least seven days prior to start of construction. When requested, additional samples will be furnished during the construction period at no cost to the Contracting Agency. This is a non-pay item.

715.2 AGGREGATE:

715.2.1 Mineral Filler: Mineral filler shall consist of finely divided matter, such as hydrated lime, portland cement, limestone dust or fly ash, conforming to the requirements of ASTM D-4318. Mineral filler shall be used only when needed to reduce the setting time, to improve the workability or to reduce the stripping characteristics of the aggregate emulsion mixture. The minimum amount of the required filler will be used and it will be considered as part of the blended aggregate. The expected range shall be between .25% and 2.0% by weight of aggregate.

715.2.2 Mineral Aggregate: Mineral aggregate shall consist of sound and durable sand and/or crushed stone as per MAG Section 701 combined with an approved mineral filler where it is required. The mineral filler will be considered as part of the blended aggregate. The material shall be non-plastic (ASTM D-4318) with a sand equivalent (ASTM D-2419) of at least 50. The abrasion loss (ASTM C-131) shall not exceed 35 percent. Ninety percent of the aggregate retained on the No. 50 sieve shall have at least one fractured face. The gradation of material aggregate shall conform to Table 715-1.

715.3 BITUMINOUS MATERIAL:

The emulsified asphalt used for seal coating shall be quick setting or slow setting as per Section 713.

The quick setting emulsified asphalt shall be of the anionic or cationic quick set type such as QSH or CQSH that will react to chemically active mineral fillers such as portland cement in such a way that the applied slurry mixture can support controlled traffic in 45-60 minutes after application. The amount of chemically active filler shall be determined by mix design and field performance.

Quick Set Emulsion Mix Properties	
Slurry Seal Mixing, 70-85 degree F., Sec.	120 Sec. Min.
Slurry Seal Setting text, 70-85 degree F., 1 hour cure	No Brown Stain
Slurry Seal Water Resistance Test, 70-85 degree F., 30 minute cure	No More Than Slight Discoloration

Slow setting emulsion may be used when traffic control is not a critical item.
Placement of slurry seal is temperature dependent and should be tested under field conditions.

715.4 WATER:

Water shall be potable and be compatible with the slurry ingredients used.

715.5 TEST CERTIFICATES & REPORTS:
Test certificates and reports for the bituminous material shall be furnished in accordance with Section 711.

715.6 CONVERSION OF QUANTITIES:
Volumetric conversions shall be accomplished in accordance with Section 713.

TABLE 715-1			
SLURRY SEAL AGGREGATE			
SIEVE SIZE	**Type I %**	**Type II % PASSING**	**Type III % PASSING**
3/8	100	100	100
No.4	100	85/100	70/90
No. 8	90/100	65/90	45/70
No. 16	65/90	45/70	28/50
No. 30	40/60	30/50	19/34
No. 50	25/42	18/30	12/25
No. 100	15/30	10/21	7/18
No. 200	10/20	5/15	5/15
Emulsified Asphalt content as a % of Dry Wt. Of Aggregate (approx.) ASTM D-3910 (W.T.A.T. TEST)	18	16	14
Residual Asphalt Range requirements % of Dry Wt. of Aggregate ASTM D-3910 (W.T.A.T. TEST)	10-16	73.5-13	6.5-12
Pounds of Aggregate per Square Yard (approx.)	8-10	12-18	18-25

SECTION 725
PORTLAND CEMENT CONCRETE

725.1 GENERAL:
Portland cement concrete shall be composed of cementitious materials, fine and coarse aggregates, water, and, if specified or allowed, certain chemical admixtures and additives.

TABLE 725-1
CONCRETE CLASSES - MINIMUM REQUIREMENTS

Class of Concrete	Minimum Cementitious Materials Content (lbs. per cubic yard)	Minimum Compressive Strength (1) at 28 Days (psi)
AA	600	4000
A	520	3000
B	470	2500
C	420	2000

(1) In accordance with section 725.8.

725.2 CEMENTITIOUS MATERIALS:
Cementitious materials to be used or furnished under this specification shall be:

Portland cement, meeting the requirements of ASTM C150
Type II, low alkali, when no other specific type is specified
Type III, low alkali, for high early strength, when applicable or specified
Type V, low alkali, when specified in the special provisions for applications requiring high sulfate resistance

Portland Pozzolan Cement ASTM C595
Type IP (MS), when no other specific type is specified

Supplementary Cementitious Materials (SCM) shall not be used as an additional cementitious materials replacement in concrete in combination with Portland Pozzolan Cement.

Cementitious materials shall be sampled and tested as prescribed in the applicable ASTM specifications. The Contractor shall obtain and deliver to the Consultant a certification of compliance signed by the material manufacturer, identifying the cementitious material and stating that the cementitious material delivered to the batching site complies with the appropriate specifications. When requested by the Consultant, the Contractor shall furnish three copies of the cementitious materials certification. The cost of furnishing tested cementitious materials shall be considered as included in the contract bid price and no additional allowance will be made therefore.

When suitable facilities, as recommended by the Concrete Plant Manufacturer's Bureau, and approved by the Consultant, are available for handling and weighing bulk cementitious materials, such facilities shall be used. Otherwise the cementitious material shall be delivered in original unopened sacks that bear the name or brand of the manufacturer. The type of cementitious material, and the weight contained in each sack shall be plainly marked thereon.

Cementitious materials shall be stored in such manner as to permit ready access for the purpose of inspection and identification, and so as to be suitably protected against damage by contamination or moisture. Should any lot of bulk cementitious material be delivered to the site show evidence of contamination, the Consultant may require that such lot be removed from the site.

725.2.1 Supplementary Cementitious Materials (Pozzolans): Supplementary Cementitious Materials to be used in concrete or furnished under this specification shall conform to the appropriate ASTM requirements as follows:

Fly ash or natural pozzolan	ASTM C618 and C311
Silica Fume	ASTM C1240

Up to 25 percent by weight of the Table 725-1 minimum cementitious materials requirements may be an approved fly ash or natural pozzolan. Additional pozzolanic material in excess of the minimum Table 725-1 requirements may be incorporated into a concrete mix design to achieve enhanced performance, upon approval of the Consultant.

The Contractor shall obtain and deliver to the Consultant a certification of compliance signed by the pozzolan supplier identifying the pozzolanic material and stating the pozzolan delivered to the batching site complies with the appropriate specifications. The cost of furnishing tested pozzolan shall be considered as included in the contract bid price and no additional allowance will be made therefore.

Pozzolanic materials shall be handled and stored in the same manner as other cementitious materials. When facilities for handling a bulk pozzolan are not available, the pozzolan shall be delivered in original unopened sacks bearing the name and brand of the supplier, the type and source of the pozzolan, and the weight contained in each sack plainly marked thereon.

725.3 AGGREGATES:

Coarse and fine aggregate shall conform to the applicable requirements of ASTM C33. Coarse aggregate grading requirements shall conform to the appropriate rock size designation in the Grading Requirements for Coarse Aggregate, Table 2. Fine aggregate grading requirements shall conform to the Fine Aggregate Grading section.

The average value of 3 successive sand equivalent samples shall not be less than 70 when tested in accordance with ASTM D2419. No individual sample shall have a sand equivalent less than 65.

The loss by abrasion in the Los Angeles Abrasion Machine, determined as prescribed in ASTM C131, shall not exceed 10 percent, by weight, after 100 revolutions nor 40 percent after 500 revolutions.

Prior to the delivery of the aggregates and whenever required during concrete production, the Contractor shall make stockpiles available to the Consultant for testing. All required samples shall be furnished at the expense of the Contractor, and the cost of sampling and testing shall be at the expense of the Contracting Agency.

Reclaimed Concrete Materials (RCM) and Reclaimed Asphalt Pavement (RAP) as defined in Section 701 shall not be used in Portland Cement Concrete without the prior approval of the Consultant.

725.4 WATER:

The water used for mixing concrete shall be potable or shall meet the requirements of ASTM C1602, when tested by a qualified independent testing laboratory.

725.5 ADMIXTURES AND ADDITIVES:

Admixtures or additives of any type, except as otherwise specified, shall not be used unless identified in the approved mix design or authorized by the Consultant.

Water reducing admixtures incorporated into the approved concrete mix design shall meet the requirements of ASTM C494 for the appropriate type.

Air entraining admixtures incorporated into the approved concrete mix design shall meet the requirements of ASTM C260.

Pigments incorporated into the approved concrete mix design for integrally colored concrete shall meet the requirements of ASTM C979.

Fibers incorporated into the approved concrete mix shall meet the requirements of ASTM C1116.

Any admixtures used shall be included in the price for that item.

725.6 MIX DESIGN PROPORTIONING:

A concrete mix design carrying the producer's designated mix number for each type of concrete being furnished under these specifications shall be submitted to the Consultant at least once each year for approval. Each design shall utilize the proper proportioning of ingredients to produce a concrete mix that is homogeneous and sufficiently workable to provide a consistent and durable concrete product that meets the specified compressive strength and other properties as required by the application.

In the event there is a modification to the mix design proportions:

(A) Modifications that do not require a new mix design submittal/approval:

(1) Modifications which do not result in batch target weights for the fine aggregate or combined coarse aggregates changing by more than 5 percent from the original approved mix design.
(2) Modifications to the percentage of coarse aggregate fractions that do not change the total coarse aggregate volume.
(3) Modifications to dosages of chemical or air-entraining admixtures, within the manufacturer's recommendations.
(4) The incorporation or elimination of chemical admixtures which are listed on the mix design to effect a change in the time-of-set (retarders or accelerators).

(B) Modifications that require a new mix design submittal/approval and may require performance verification:

(1) Modification to the class of concrete per Table 725-1.
(2) Modification to the type/class/source of cement, fly ash, natural pozzolan, or silica fume.
(3) Modification to the percentage of fly ash, natural pozzolan, or silica fume.
(4) Modification to a coarse aggregate size designation.
(5) Modification of the type of chemical admixture, or the incorporation or elimination, of an air-entraining admixture.
(6) Modification of coarse or fine aggregate source.

725.7 MIXING:

All proportioning/batching/mixing equipment shall comply with the standards of the Concrete Plant Manufacturer's Bureau and the certification requirements of the Arizona Rock Products Association or National Ready Mixed Concrete Association. The proportioning shall consist of combining the specified sizes of aggregates with cementitious materials, admixtures/additives, and water as herein provided. No method which may cause the segregation or degradation of materials shall be used.

Weighing and metering devices used for the purpose of proportioning materials shall fulfill requirements as to accuracy and tolerance prescribed by the Weights and Measures Division of the State of Arizona and shall be sealed and certified in accordance with the procedures established by this agency. This certification shall not be over 12 months old and shall be renewed whenever required by the Consultant. When portable plants are set up at a new or temporary location, the scales and scale assembly shall be inspected and certificate issued regardless of the date when the scales were last tested. The Consultant may require the Contractor to run a quick scale check at any time with certified weights furnished by the Contractor and order the scale recertified if necessary.

Any admixture/additive shall be measured accurately by mechanical means into each batch by equipment or in a method pre-approved by the Consultant.

The equipment for measuring and supplying the water in the mixer shall be so constructed and arranged that the amount of water to be added to the mixture can be measured, in gallons or by weight. The amount of water shall be varied in accordance with the percentage of free moisture in the material and the requirements of the workability of the aggregate.

Machine mixing will be required in all cases unless pre-approved by the Consultant. Regardless of the method employed, mixing shall be commenced as soon as possible after the cementitious material is placed in contact with the aggregates or water. All concrete mixers shall be of such design and construction, and so operated, as to provide a thoroughly and properly mixed concrete in which the ingredients are uniformly distributed.

725.7.1 Paving and Stationary Mixers: Paving and stationary mixers shall comply with the standards of the Concrete Plant Manufacturer's Bureau and the certification requirements of the Arizona Rock Products Association or the National Ready Mixed Concrete Association.

Mixers shall be maintained in proper and serviceable working condition, and any part or portion thereof that is out of order, or becomes worn to such extent as to detrimentally affect the quality of mixing, shall be promptly repaired or replaced.

The proper proportions of aggregate, cementitious materials, admixtures/additives and water for each batch of concrete shall be placed in the mixer, and shall be mixed for a period of not less than 50 seconds after all such materials are in the drum.

The rotating speed at which the mixer shall be operated shall conform to that recommended by the manufacturer.

The total volume of materials mixed in any one batch shall neither exceed the water level capacity of the mixer nor the manufacturer's catalog rated capacity of the mixer.

725.7.2 Transit Mixers: Transit mixers shall meet the requirements of the Truck Mixer Manufacturer's Bureau and the certification requirements of the Arizona Rock Products Association or the National Ready Mixed Concrete Association. Ready mix concrete and shall comply with ASTM C94 except as herein specified.

Each mixer and agitator shall have attached thereto in a prominent place a metal plate or plates, installed by the manufacturer, on which is plainly marked the capacity of the drum in terms of the volume of mixed concrete and the speed of rotation for the agitating and mixing speeds of the mixing drum or blades.

Each mixer shall have an identification number painted on the truck in such a location that it can be easily read from the batching platform.

The total volume of materials introduced into the mixer for mixing purposes shall not exceed the manufacturer's guaranteed mixing capacity. If the concrete so mixed does not meet the uniformity requirements of this section, the amount of materials charged into the mixer shall be reduced.

The rotation speed at which the mixer shall be operated shall conform to that recommended by the manufacturer.

Each batch of concrete placed in the mixer shall be mixed for not less than 70 nor more than 100 revolutions of the drum or blades, at the speed designated by the manufacturer of the equipment as mixing speed. Additional mixing shall be at the agitating speed designated by the manufacturer of the equipment. The revolving of the drum shall be continuous until the concrete is completely emptied from the drum. Before any

portion of the materials for any batch of concrete is placed therein, the drum of the mixer shall be completely emptied of the previously mixed batch.

At the time of delivery to the job site, the Consultant shall be provided with a legible delivery ticket which shall contain the following information:

Date and Truck Number.

Name of the Supplier.

Name of the Contractor.

Specific designation of job (name and location).

Number of cubic yards in the batch.

Time the transit mixer is loaded.

Amount of water added at the job site at request of receiver, and his signature or initials.
Suppliers' mix design code number.

Type and amount of admixture or additive that is not already included in the approved mix design, if any.

Serial number of the ticket.

Additional water may be added on the jobsite in accordance with ASTM C94 Tolerances in Slump section to adjust slump providing the slump after such water addition does not exceed the maximum allowed by these specifications in Section 725.9 (A) (1) and that water so added is mixed into the batch for a minimum of 30 additional revolutions at mixing speed. Loss of cement mortar during discharge which in the opinion of the Consultant would be of sufficient amount to affect the homogeneity of the concrete shall be cause for rejection of the load. The Contractor shall be responsible for all concrete to which water is added at the job site.

725.7.3 Job Mixed Concrete: All job mixed materials and procedures shall be pre-approved by the Consultant. A prepackaged commercial product shall be used for job mixed concrete placement in accordance with the manufacturer's recommended procedure.

In lieu of the use of a prepackaged commercial product, individual ingredients for concrete placement shall be prepared in a watertight container of suitable volume in batches not to exceed 1/3 cubic yard each. Proportioning of batches shall be in accordance with the applicable required mix design in Table 725-1 and Section 725.6. All mixing shall be done prior to placement in the forms and in accordance with the following procedure:

(A) Mixing shall be done in a mechanical batch mixer of approved type.
(B) The mixer shall be rotated at a speed recommended by the manufacturer.
(C) Mixing shall continue for at least 1-1/2 minutes after all materials are in the mixer, unless a shorter time is shown to be satisfactory by the mixing uniformity tests of ASTM C94.
(D) Materials handling, batching, and mixing shall conform to the applicable provisions of ASTM C94.
(E) Suitable records shall be kept to indentify the number of batches, proportions of materials used, and time and date of mixing and placement along with the approximate location in the structure.

725.7.4 Dry Batched Unmixed Concrete: All dry batched unmixed concrete materials and procedures shall be pre-approved by the Consultant. An accurate batch weight shall be provided to record the quantities of cementitious materials, aggregate, admixtures/additives, and water batched into the containers. The date of batching, the container number and the batching certificate number shall be recorded at the time of batching. Copies of the batch weight records shall be submitted to the Consultant upon request.

All dry batched unmixed concrete delivered to the job site shall be stored in containers so constructed that the cement cannot comingle with the water and aggregate within the container. Any admixture/additive added in powder form shall be added to the cement; if added in liquid form, it shall be added to the water.

The contents of the container shall be discharged into a mixer at the job site. Following discharge of the first container into the mixer, the mixer shall be operated at mixing speeds during the discharge of the remaining containers. After the contents of the last container have been discharged into the mixer, the concrete shall be mixed as specified in this specification for transit mixers, and drum or turbine type mixers.

Any spillage of cementitious materials, aggregate, water or admixtures/additives during the filling, transporting, or the discharging of the container, shall be cause for rejection of the container or the contents of the mixer if any portion of the rejected container is discharged into the mixer.

725.7.5 Volumetric Batching and Continuous Mixing Concrete and Equipment: Volumetric-batching and continuous-mixing concrete and equipment may be utilized upon approval of the Consultant for job site concreting applications. Material handling, procedures, and operations shall be in accordance with ACI 304.6R, Guide for the use of Volumetric-Measuring and Continuous-Mixing Concrete Equipment and all concrete produced and all test performed shall be in accordance with ASTM C685, Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing. All equipment shall meet the requirements of the Volumetric Mixer Standards of the Volumetric Mixer Manufacturers Bureau and shall have a suitable copyrighted rating plate furnished by the Bureau and attached to the volumetric mixing equipment.

725.8 TESTS AND TEST METHODS:

725.8.1 Field Sampling and Tests: Concrete shall be sampled in accordance with ASTM C172 for determination of temperature, slump, unit weight and yield (when required) and air content (when required) as well as for fabrication of test cylinders for compressive strength determination at 28 days. Samples shall be of sufficient size to perform all the required tests and fabricate the necessary test cylinders but in no case less than 1 cubic foot. Concrete shall be sampled during discharge of the middle portion of the batch. At the discretion of the Consultant, a sample may be obtained at the beginning of the discharge if the properties of the concrete do not appear to be within the specification limits for slump or temperature.

All sampling and testing shall be done by a certified technician meeting the requirements of the ACI Concrete Field Testing Technician, Grade I or equivalent.

Temperature of the concrete mixture shall be determined in accordance with ASTM C1064.

Slump of the concrete mixture shall be determined in accordance with ASTM C143.

Air content of the concrete mixture (when required) shall be determined in accordance with ASTM C231 or C173, whichever is applicable.

Unit weight and yield of the concrete mixture (when required) shall be determined in accordance with ASTM C138.

All compressive strength test specimens shall be made, cured, handled, protected, and transported in accordance with the requirements of ASTM C31. The contractor shall provide and maintain for the sole use of the testing laboratory/technician adequate facilities for safe storage and proper curing of concrete test cylinders on the project site including sufficient access on weekends and holidays to allow the timely pick-up of cylinders specimens. Any and all deviations from the standard procedure of any test method shall be promptly identified and corrected. Any deviations shall be clearly noted by the testing laboratory on all written reports. Testing results obtained from non-standard testing procedures shall be considered invalid and discarded by Consultant.

Sampling and testing performed for concrete acceptance will be at the expense of the Contracting Agency. Sampling and testing for the Contractor's purposes of quality control or other needs shall be at the Contractor's expense.

725.8.2 Concrete Cylinder Test: A cylinder strength test shall be the average of the strengths of at least two 6 inch by 12 inch cylinders or at least two 4 inch by 8 inch cylinders made from the same sample of concrete and tested at 28 days. An adequate number of cylinder specimens shall be made for each 50 cubic yards or not less than each half-day's placement of each class of concrete. All specimens will be tested in a laboratory approved by the Consultant in accordance with ASTM C39 for concrete acceptance. Should an individual cylinder show evidence of improper sampling, molding, curing, or testing, the results shall be discarded and the compressive strength shall be the result of the average of the remaining cylinder(s). Additional cylinder specimens may be made and tested at other ages to obtain additional compressive strength information and shall not be considered as acceptance tests. Cylinder testing performed for concrete acceptance will be at the expense of the Contracting Agency. Cylinder testing for the Contractor's purposes of quality control or other needs shall be at the Contractor's expense.

725.8.3 Additional Concrete Testing: If the 28-day strength test does not meet the compressive strength requirements, additional concrete testing may be performed to further evaluate the concrete in question for purposes of acceptability or payment. This may involve testing of additional cylinders at later ages, (for example - hold cylinders at 56 days or more), or core testing to determine in-place concrete strengths. This additional testing and all coring repairs shall be pre-approved by the Consultant and at the expense of the Contractor. If core testing is performed, at least three representative cores shall be obtained, conditioned and tested in accordance with ASTM C42 from each concrete member or area of concrete to be tested at locations designated by the Consultant. Cores damaged subsequent to or during removal shall be rejected and additional core samples taken. Cores shall be obtained and delivered to a laboratory acceptable to the Consultant in time to allow complete strength testing within 48 days of original concrete placement. The Contractor may elect to have a representative present during sampling and testing. A core strength test shall be the average of the results of the three cores. Should an individual core show evidence of improper sampling, curing, or testing, the results shall be discarded and the compressive strength shall be the result of the average of the remaining core(s). Results of the core strength testing shall replace the results of the cylinder strength test for that sample.

725.9 ACCEPTANCE:

(A) Plastic Concrete Properties

(1) The slump of the concrete shall meet the requirements of ASTM C94 Tolerances in Slump section. When the approved mix design or project specification requirements for slump are a "maximum" or "not to exceed", the following tolerances apply:

Specified slump:	If 3" or less	If more than 3"
Plus tolerance	0 inch	0 inch
Minus tolerance	1 -1/2 inch	2-1/2 inch

When the approved mix design or project specification requirements for slump are not written as a "maximum" or "not to exceed", the following tolerances apply:

For design slump of:	Tolerance
2 inch and less	+/- 1/2 inch
More than 2 through 4 inch	+/- 1 inch
More than 4 inch	+/- 1 1/2 inch

(2) Limit the maximum allowable temperature of the concrete mixture immediately before placement to 90 degrees F unless otherwise specified or unless a higher allowable temperature is pre-approved by the Consultant. At the discretion of the Consultant, recommended practices in ACI 305, Specification for Hot Weather Concreting, can provide good reference information and may be used to modify maximum allowable concrete temperature and acceptance.

Per ACI 306, Specification for Cold Weather Concreting, when the atmospheric temperature at the time of placing concrete is above 30°F the temperature of the concrete, as placed, shall not be less than 60°F. When the atmospheric temperature at the time of placing concrete is between 0°F and 30°F the temperature of the concrete, as placed, shall not be less than 65°F.

(3) Air entrained concrete shall meet the requirements of ASTM C94 Air-Entrained Concrete section. The air content of air-entrained concrete when sampled from the transportation unit at the point of discharge shall be within the approved mix design tolerance or +/- 1.5 % of the specified value. When a representative sample taken prior to discharge shows an air content below the specified level by more than the allowable tolerance, additional air entraining admixture shall be added to the concrete mix to achieve the desired air content level, followed by a minimum of 30 revolutions at mixing speed.

(4) Per ASTM C94 Mixing and Delivery section, discharge of the concrete shall be completed within 1 1/2 hour after the introduction of the mixing water to the cementitious materials or the introduction of the cementitious materials to the aggregates. The Consultant may allow the continuation of concrete placement after the 1 1/2 hour time limit has been reached if the concrete is of such slump or workability that it can be placed without the addition of water to the batch.

Any concrete failing to meet the tolerances for plastic concrete properties in 725.9 (A) (1) through (4) shall be reviewed by the Consultant and is subject to rejection.

(B) Hardened Concrete Properties – Compressive Strength

Compressive strength of concrete shall be determined on the basis of cylinder strength tests obtained in accordance with section 725.8.2 and shall be acceptable if the tests meet or exceed the minimum specified strength. When the validity of cylinder strength tests are suspect, the strength of concrete in question shall be determined in accordance with Section 725.8.3.

When compressive strength test results are less than the specified minimum, an Engineering Analysis to determine the impact of the strength reduction may be required by the Consultant prior to the decision to accept or reject the concrete. The Engineering Analysis will be at the Contractor's expense. Any concrete that is rejected by the Consultant shall be removed and replaced by the Contractor at the Contractor's expense.

When concrete is accepted by the Consultant on the basis of test results of less than 100% of the required minimum compressive strength, an adjustment in the concrete unit price may be made for the quantity of concrete represented by such strength tests in accordance with Table 725-2.

TABLE 725-2

Adjustment in Concrete Unit Price Based on Strength Deficiency

Class AA and Class A		Class B and Class C	
Percent of Specified Minimum 28-day Compressive Strength Attained (Nearest 1%)	Percent of Concrete Unit Price Allowed	Percent of Specified Minimum 28-day Compressive Strength Attained (Nearest 1%)	Percent of Concrete Unit Price Allowed
100 % or greater	100	100 % or greater	100
98-99	90	95-99	95
96-97	85	90-94	90
95	80	85-89	85

SECTION 796
GEOSYNTHETICS

796.1 GENERAL:

This section defines the requirements for geosynthetic fabrics, grids and membranes typically used as pavement fabric beneath asphalt concrete overlays, filtration/drainage separation between soil/aggregate layers, erosion ontrol filter/separators for riprap protection, and soil or base reinforcement to improve the stability of weak soils or reinforce aggregate bases.

796.2 MATERIALS AND REQUIREMENTS:

Identification, packaging, delivery, storage and handling of geosynthetic materials shall be in accordance with manufacturer's recommendations and ASTM D4873. Each roll shall be labeled or tagged to provide product identification sufficient to determine the product type, manufacturer, quantity, lot number, roll number date of manufacture, and shipping date.

Geosynthetic materials shall be inert to commonly encountered chemicals, resistant to rot and mildew, and shall have no tears or defects which adversely affect or a
lter its physical properties.

Geosynthetic materials shall be packaged with material that will protect the geosythetic (including ends of rolls) from damage due to shipment, water, sunlight and contaminates. During storage, geosynthetic materials shall be elevated off the ground and protected from the following: site construction damage, precipitation, extended ultraviolet radiation, strong acid or strong base chemicals, flames (including welding sparks), temperatures in excess of 160°F, and any other environmental condition that may damage geosynthetic material property values. Protection shall be in accordance with manufacturer’s specifications and shall be maintained during periods of shipment and storage.

Materials required for complete and proper installation of geosynthetic materials that are not specifically described herein (such as pins, nails, washers, etc.) shall conform to the manufacturer's recommendations and be as selected and supplied by Contractor subject to final approval by the Engineer.

Requirements represent minimum average roll values in the weaker principal direction. Average of test results from any sampled roll in a lot shall meet or exceed the minimum values noted herein. Lot sampling shall be in accordance with ASTM D4354.

796.2.1 Pavement: Pavement fabric geosynthetics are non-woven polyester or polypropylene fabrics that are field saturated with an asphalt binder and placed as an interlayer beneath a pavement overlay or between pavement layers. When placed, the fabric becomes an integral part of the roadway section, forming a barrier to water infiltration and absorbing stresses to reduce reflective and fatigue cracking of the new pavement surface layer.

Pavement fabric shall be constructed of at least 95 percent (by weight) nonwoven synthetic fibers of polyester or polypropylene, thermally bonded on one side. The fabric material shall additionally conform to the physical properties shown in Table 796-1.

TABLE 796-1
PAVEMENT GEOSYNTHETIC PROPERTIES

Property	Class A	Class B	Test Method
Weight: oz/yd^2	4.1 min.	4.0 min.	ASTM D3776
Grab tensile strength: lbs	100 min.	90 min.	ASTM D4632
Elongation at break: %	50 min.	50 min.	ASTM D4632
Melting point: degree F	300 min.	300 min.	ASTM D276
Asphalt retention: gal/yd^2	0.25 min (1)	0.20 min	ASTM D6140

(1) May be reduced within street intersections, on steep grades or in other zones where vehicle braking is common, but not less than 0.20 gal/yd^2, when approved by the Engineer.

796.2.2 Filtration (Drainage) and Separation: Filtration and separation fabrics are nonwoven or woven polypropylene or polyester fabrics with specified strength characteristics used as permeable separators to restrain soil or other particles subjected to hydrodynamic forces while allowing the passage of fluids into or across a geotextile and to prevent inter-migration of adjacent soil layers of vastly different particle sizes and particle distributions.

Filtration and separation fabrics shall be nonwoven or woven fabric consisting only of long chain polymeric filaments such as polypropylene or polyester formed or woven into a stable network such that the filaments retain their relative position to each other. The fabric material shall additionally conform to the physical properties shown in Table 796-2.

TABLE 796-2
FILTRATION & DRAINAGE GEOSYNTHETIC PROPERTIES

Property	Class A (1)	Class B (2)	Test Method
Grab tensile strength: lbs.	180 min.	80 min.	ASTM D4632
Seam strength: lbs.	160 min.	70 min.	ASTM D4632
Puncture strength: lbs.	80 min.	25 min.	ASTM D4833
Trapezoidal tear: lbs	50 min.	25 min.	ASTM D4533
Apparent opening size: US Standard sieve size	>50	>50	ASTM D4751
Ultraviolet Stability:	% 50 min.	50 min.	ASTM D4355

(1) Class A - Use where installation stresses are more severe than for Class B application (i.e. very coarse sharp angular aggregate or high compaction requirements).
(2) Class B – Use with smooth graded surface having no sharp angular projections and sharp angular aggregate.

796.2.3 Erosion Control: Erosion control fabrics are used below areas to receive aggregate or riprap slope protection and act as filter/separators to provide sustained permeability while maintaining structural stability.

Erosion control fabrics shall be a woven monofilament fabric or a nonwoven fabric consisting only of long chain polymeric filaments such as polypropylene or polyester formed into a stable network that the filaments retain their relative position to each other. The fabric material shall additionally conform to the physical properties shown in Table 796-3.

TABLE 796-3			
EROSION CONTROL GEOSYNTHETIC PROPERTIES			
Property	**Class A [(1)]**	**Class B [(2)]**	**Test Method**
Grab tensile strength: lbs.	270 min.	200 min.	ASTM D4632
Elongation at break: %	45min., 115 max.	15 min., 115 max.	ASTM D4632
Puncture strength: lbs.	110 min	75 min.	ASTM D4833
Burst strength: psi	430 min.	320 min.	ASTM D3786
Trapezoidal tear: lbs	75 min.	50 min.	ASTM D4533
Permittivity: $second^{-1}$	0.07 min.	0.07 min.	ARIZ-730 (1)
Apparent opening size: US Standard sieve size	30 – 140	30 - 140	ASTM D4751
Ultraviolet Stability: %	70 min.	70 min.	ASTM D4355

(1) Arizona Department of Transportation test method.

796.2.4 Soil or Base Reinforcement: Geogrid geosynthetic materials are used for improving the stability of weak soils or reinforcing aggregate bases. Geogrids are defined as biaxial or triaxial polymeric grids formed by a regular network of integrally connected polymer tensile elements with apertures of sufficient size to permit significant mechanical interlock with the surrounding soil, aggregate, or other fill materials to function primarily as reinforcement.

The geogrid structure shall be dimensionally stable and able to retain its geometry under manufacture, transport and installation. Geogrids shall be integrally formed and deployed as a single layer; comprised of 100 percent polypropylene or high-density polyethylene. Geogrids shall additionally conform to the physical properties shown in Table 796-4.

TABLE 796-4			
REINFORCEMENT GEOGRID PROPERTIES			
Property	**Type 1**	**Type 2**	**Test Method**
Aperture size: inches	1 min.	1-3/8 min	ID callipered
Ultimate Tensile Strength: lb/ft	850 min.	1300 min.	ASTM D4945
Flexural Rigidity: Mg-cm	250,000 min.	750,000 min.	ASTM D1388
Tensile Strength @ 2% Strain: lb/ft MD [(1)]	270 min.	410 min.	ASTM D6637
Tensile Strength @ 2% Strain: lb/ft CMD [(2)]	380 min.	620 min.	ASTM D6637
Tensile Strength @ 5% Strain: lb/ft CMD [(1)]	550 min.	810 min.	ASTM D6637
Tensile Strength @ 5% Strain: lb/ft CMD [(1)]	720 min.	1340 min.	ASTM D6637
Junction Efficiency: % Ultimate Tensile Strength	75 min.		GRI-GG2 [(3)]
Ultraviolet Stability: % Retained Strength	70 min.		ASTM D4355

(1) MD = Test in the machine direction along roll length
(2) CMD = Test in the cross-machine (transverse) direction across roll width
(3) Geosynthetic Research Institute test method

796.3 TEST AND CERTIFICATION REQUIREMENTS:

Upon request, a Certificate of Compliance shall be submitted to the Engineer for material to be used. Samples of materials shall be submitted for testing. Each geosynthetic material lot or shipment is to be approved by the Engineer before the material is incorporated into the work.

Testing methods and results shown in the Certificate of Compliance shall conform to the listed specifications for the proposed geosynthetic. Manufacturer's supporting documentation including, but not limited to, product information sheets, installation procedures and recommendations, recommended use, and project references shall be submitted to the Engineer for product evaluation and approval.

SECTION 900
PAVEMENT SWEEPING

900.1 GENERAL:

The Contractor shall furnish all labor, supervision, equipment, tools, supplies, and all effort necessary to perform power sweeping of the pavement surfaces as specified herein. This specification covers the equipment and construction procedures for sweeping of pavement.

900.2 EQUIPMENT:

Sweeping equipment used must have a power brush for sweeping and have vacuum capabilities. All sweeping equipment shall be capable of meeting Maricopa County air pollution requirements.

All work performed and all equipment used shall comply with Maricopa Air Quality Department Rules and Regulations.

(http://www.maricopa.gov/aq/divisions/planning_analysis/Default.aspx.

900.3 SERVICES TO PARKING LOTS:

The Contactor shall power sweep and vacuum designated parking lots and all parking lots where microsurfacing is planned. The parking lots scheduled for either power sweeping or microsurfacing are indicated on Table 1 on Sheet PM-2. Bidders are encouraged to visit each site listed so as to have a complete understanding of areas of responsibility. Submission of a bid price will be prima facia evidence that the Contractor did, in fact, make a site inspection and is aware of all conditions affecting performance and bid prices.

900.4 PERFORMANCE:

In the event the cleaning of the lot is not performed to the satisfaction of the Facilities Director of the designated campus, the lot shall be re-cleaned at no additional cost to the District. The Campus authorized representative shall decide if the entire site is to be re-cleaned, or any portions thereof.

The Contractor's vacuum/sweeping fleet shall be sufficient enough to carry out the requirements listed herein. As part of the District's due diligence, these requirements shall be verified by the Consultant via a formal inspection after the work is completed.

The Contractor shall perform the work in a way to minimize as much disruption to the campus as possible. Upon completion of work the Contractor is responsible for cleaning and removing from the job site all debris, materials, and equipment associated with the work performed.

The Contractor shall perform lot cleaning duties in such a manner that does not damage Campus property. In the event damage occurs to Maricopa County Community College District property, or any adjacent property by reason of any cleaning services performed under this Contract, the Contractor shall replace or repair the same at no cost to the District. If damage caused by the Contractor has to be repaired or replaced by the District, the cost of such work shall be deducted from the monies due the Contractor.

900.5 PAYMENT:

The pavement sweeping where completed on lots other than where microsurface has been specified, shall be paid for by the square foot. The price shall be full compensation for all labor including equipments, tools, and incidentals necessary to complete the job as specified herein. Where sweeping has been specified for lots with microsurfacing, the cost of sweeping will be considered incidental to the microsurface cost and no additional compensation will be made.

SECTION 901
ASPHALT CONCRETE CRACK MASTIC

901.1 GENERAL:

This work consists of repairing cracks or joints over 1½ inches wide in asphalt concrete pavement with a specified sealant material without milling or routing.

901.2 MATERIALS:

901.2.1 Binder: Asphalt repair mastic shall be composed of quality-selected asphalt and/or resin select aggregates with structural integrity, synthetic rubber polymers antioxidants, naturally occuring and man-made reinforcing material, and other modifiers.

Asphalt repair mastic shall have the following properties:

PROPERTIES OF MASTIC BINDER	TEST METHOD	SPECIFICATION
Penetration @ 77°F (25°C), 150 g, 5 sec	ASTM D5329	100 dmm Max
Penetration @ 122°F (50°C), 150 g, 5 sec	ASTM D5329	150 dmm Max
Ductility @ 77°F (25°C), 5cm Min	ASTM D 113	20 cm Min
Softening Point (R&B)	ASTM D36	190°F (88°C) Min
Pliability @ 0°F (-18°C), 1" mandrel, 90° bend, 2 sec	ASTM D3111 Modified*	Bend With No Cracks
Resilience @ 77°F (25°C)	ASTM D5329	45% Min
Recommended Application Temp		380-400°F(193-204°C)***
Safe Heating Temp		400°F(204°C) Max****
PROPERTIES OF BLENDED MASTIC PRODUCT		
Low Temperature Flexibility @ 32°F(0°C) 1" mandrel, 90° bend, 10 sec	ASTM D3111 Modified*	Bend Without Breaking
Weight per Cubic Foot (Cubic Meter)		108-112 pounds (49-51 kilograms)

* 1" (25mm) wide x 7" (175mm) long x 0.5" (12mm) thick sample
** 2" (50mm) wide x 6"(150mm) long x 0.25" (8mm) thick sample conditioned for 24 hours
*** Temperature of the product measured at the pavement surface. Use maximum application temperature in cool weather
**** Prolonged heating at or above Maximum Safe Heating Temperature may severely damage product

901.2.2 Aggregate: The aggregate in the surfacing material shall have a LA abrasion loss of no more than 35 percent per AASHTO T96, Grading D.

901.2 PREPARATION:

The cracks to be repaired shall be clean, dry and intact. The pavement surface condition for application shall be the same level of cleanliness as typically used for hot-applied pavement crack and joint sealants. Air blowing, heat lancing, wire brushing etc. cleaning procedures can be used. Backpack blowers will not be allowed.

If a crack is exposed to precipitation, it shall be cleaned and dried before surfacing material is applied.

901.4 APPLICATION:

Ambient temperature during application shall be a minimum of 40°F and rising. The work area may be lightly heated with a hand torch or heat lance prior to installation to enhance adhesion.

The heated repair mastic shall be dispensed onto the properly prepared repair area, in layers if needed, leveled and smoothed with the surrounding pavement surface to form a durable repair.

Improperly installed surfacing material shall be removed and reinstalled at no additional cost to the Owner.

901.5 EQUIPMENT:

The repair mastic shall be heated in a thermostatically controlled mastic mixer that utilizes oil as a heat transfer medium and has a full sweep horizontal agitator capable of gently lifting the material from the bottom of the reservoir and turning the material over and over. The agitation shall be capable of mixing and suspending materials, filled with aggregates having a specific gravity as high as 3.0.

901.6 MAINTENANCE OF TRAFFIC:

The Contractor is responsible for coordinating with the facilities manager at the site to properly control traffic and to prevent traffic from traveling in the freshly applied materials. The repaired areas shall be kept barricaded until the sealant has cooled enough to support traffic per manufacturer's recommendation or a minimum of 2 hours whichever is more stringent.

901.7 TRAINING:

A representative of the material manufacturer must be on site the first day of material application for training of the repair crews.

901.8 LIABILITY FOR DAMAGE:

Damage to vehicles or private property from the mastic shall be the Contractor's responsibility.

901.9 MEASUREMENT:

No measurement will be made for cracks repair in designated lots as shown on the plans.

901.10 PAYMENT:

Payment for crack mastic will be paid for on a lump sum basis for the pavements included on the project plans. For any additional crack mastic required and approved outside of these shown on the plans will be paid for by the lineal foot.