Project Specifications and Contract Documents

For

Wilkinson Drive Pavement Improvements Project

CIP No. 19-015

MAYOR AND COUNCIL:

Greg Mengarelli, Mayor
Billie Orr, Mayor Pro Tem
Steve Blair, Council Member
Phil Goode, Council Member
Cathey Rusing, Council Member
Alexa Scholl, Council Member
Steve Sischka, Council Member

CITY CLERK:

Sarah Siep

PUBLIC WORKS DIRECTOR:

Craig Dotseth

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Attachments:

- City of Prescott Supplement to the Maricopa Association of Governments (MAG) Uniform Standard Specifications and Details for Public Works Construction (Technical Specifications)
- Special Provisions
- Pavement Engineering Report
- Plan Set

Notice Inviting Bids

Wilkinson Drive Pavement Improvements Project

DESCRIPTION: This project generally consists of pulverizing and blending the existing asphalt pavement along with the base material and imported asphalt concrete millings to create a recycled based material. The recycled base material shall be moisture conditioned and compacted, and new asphalt concrete placed. The project location is on Larry Caldwell Drive and Wilkinson Drive as shown on the plans. The work includes pavement matches, drainage improvements, adjustment of utility covers to finish grade, shoulder material placement, ditch grading, as well as new traffic signage and striping.

MANDATORY PRE-BID CONFERENCE: In light of the current COVID-19 situation the City of Prescott is not going to conduct a Pre-Bid meeting. Therefore all questions shall be submitted to george.henderson@prescott-az.gov; the dead line for questions shall be 5:00pm on 4/9/2020. The questions and responses will be published on or before 4/13/2020 at noon.

BID OPENING: Thursday, April 16, 2020 at 2:00pm City Council Chambers 201 S. Cortez Street, Prescott, Arizona 86303

In accordance with local and State law, sealed bids will be received by the Office of the City Clerk at 201 S. Cortez Street, Prescott, Arizona 86303, until 2:00pm on the date specified above, for the services specified herein. Bids will be opened and read aloud at the above noted date, time and location. Any bid received at or after 2:00pm on the referenced date will be returned unopened.

The City of Prescott reserves the right to accept or reject any or all bids, and/or some or all of the alternates bid, and waive any informality deemed in the best interest of the City and to reject the bids of any persons who have been delinquent or unfaithful in any contract with the City.

Copies of the Plans, Project Specifications and Contract Documents are available for inspection at the Public Works Department, or may be obtained free of charge on the City's website at http://www.prescott-az.gov/business-development/purchasing/bid-listings/.

PUBLISH: March 29, 2020 and April 5, 2020

SPECIAL INSTRUCTIONS

Bids will be returned unopened if not submitted properly sealed and prior to the time set forth in the Notice Inviting Bids.

Bids shall be enclosed in a sealed envelope, addressed to the Office of the City Clerk, and marked on the outside, lower right-hand corner indicating:

1. Bidder's Name
2. Project Title
3. Bid Opening Date and Time
4. Acknowledgement of Addenda Received, if applicable

BID SUBMITTAL

All bids must contain the following completed forms, provided herein:

1. Bidding Schedule (page 6 - 7)
2. Subcontractors List (page 8)
3. Proposal (pages 9-11)
4. Proposed Staging Locations (page 12)
5. Bidder's Affidavit (page 13)
6. Proposal Guarantee (certified check, cashier's check or surety bond)
7. Addendum Acknowledgement, if applicable

Failure to complete and sign (where required), and return the above documents with your bid may render it irregular. It is not necessary to return a complete copy of the Notice Inviting Bids, Project Specifications and Contract Documents, other than the documents noted above.

REQUESTS FOR INFORMATION

Questions pertaining to this project prior to award of the contract shall be directed to:

City of Prescott, Public Works Department

433 N. Virginia Street, Prescott, Arizona 86301

Phone (928) 777-1130; TDD (928) 777-1100; Fax (928) 771-5929

SCOPE OF WORK

The intent of the Plans and Specifications is to prescribe a complete work for the described project which the Contractor shall perform in a manner acceptable to the City Public Works Director and in full compliance with the terms of the Contract.

Unless otherwise specified in the Special Provisions, the Contractor shall furnish all materials, labor, tools, equipment, water, light, power, transportation, superintendence, temporary construction of every nature, and incidentals, but not limited to, dust and traffic control measures, and to perform all work involved in executing the Contract in a satisfactory and workmanlike manner within the specified time.

All standard specifications and details referenced, unless otherwise noted, shall conform to all the City of Prescott Standard Specifications and Detail Drawings, most current revisions, and to the most current editions of the Uniform Standard Specifications and Details for Public Works Construction by the Maricopa Association of Governments (MAG Specifications and Details), including revisions thereto.

PROJECT SCHEDULE

The Contractor shall fully complete all work under this Contract within thirty five (35) calendar days beginning with the calendar day as noted in the Notice to Proceed. The Contractor shall at all times during the continuance of the Contract prosecute the work with such work force and equipment as is sufficient to complete the project within the time specified.

The following milestones are estimates of the earliest dates possible for planning purposes only, and shall not represent any contractual commitment whatsoever on the part of the City. The City reserves the right to amend the project schedule as necessary.

Award of Contract	May 12, 2020
Pre-Construction Meeting	Week of May 25, 2020
Notice to Proceed	Week of June 1, 2020
Expected Completion Date	Week of July 6, 2020

Bidding Schedule

Wilkinson Drive Pavement Improvements Project						
CIP #19-015						
Line No.	**Item**	**Description**	**Qty**	**Unit**	**Unit Cost**	**Amount**
General Construction Items						
1	105.8	Construction Stakes, Lines and Grades	1	LS		
2	107.15	Public Relations	1	ALL	$15,000.00	
3	107.16	SWPPP, Erosion and Sediment Control	1	LS		
4	109.10	Mobilization/Demobilization	1	LS		
5	109.11	Contract Allowance	1	ALL	$70,000.00	
6	401	Traffic Control Plan	1	LS		
7	401.2a	Barricades and Storage	1	LS		
8	401.2b	Message Boards (each per day)	80	DY		
9	401.2c	Incidental Traffic Related Items	1	LS		
10	401.3a	Flaggers	600	HR		
11	401.3b	Uniformed Off-Duty Law Enforcement Officers	1	ALL	$4,000.00	
12	401.3c	Pilot Car and Driver	200	HR		
		General Construction Items Subtotal				
Roadway Improvements						
13	201	General Clearing and Grubbing	1	LS		
14	310.a SP	Pulverize and Blend of Existing Pavement	8,400	SY		
15	310.b SP	Haul, Pulverize and Blending, and Placement of Asphalt Concrete Millings	4,400	TN		
16	321.a SP	Asphalt Concrete Pavement, 3/4" Mix, w/ Fiber (Top Lift)	1,200	TN		
17	321.b SP	Asphalt Concrete Pavement, 3/4" Mix (Bottom Lift)	1,250	TN		
18	329.6	Tack Coat	3	TN		
19	402.1a SP	Themoplastic Stop Bar, White, 4" Equiv.	360	LF		
20	402.1b SP	Themoplastic, Left Turn Arrow, White	2	EA		
21	402.1c SP	Themoplastic, Through Arrow, White	2	EA		
22	402.3a SP	Permanent Pavement Markings, White, 4" Equiv.	8,800	LF		
23	402.3b SP	Permanent Pavement Markings, Yellow, 4" Equiv.	8,800	LF		
24	405	Monumentation, QCSD	4	EA		
25	403.2a SP	Traffic Signage, Existing, Remove and Relocate	1	EA		

Bidding Schedule

Wilkinson Drive Pavement Improvements Project						
CIP #19-015						
Line No.	**Item**	**Description**	**Qty**	**Unit**	**Unit Cost**	**Amount**
26	403.2b SP	Traffic Signage, New, Post and Base (W4-4BP)	2	EA		
27	345	Adjusting Manhole Frame & Cover	1	EA		
		Roadway Improvements Subtotal				
Drainage Improvements						
28	220 SP	Rip-Rap Construction, D(50) = 6", 12" Deep	25	CY		
29	505.1.1b	Concrete Headwall, 18" Inlet	1	EA		
30	618.a	Storm Drain, 18" CMP	194	LF		
31	618.b	Storm Drain, 24" CMP	10	LF		
32	430.3.2	Seeding, Hydraulic	2	AC		
33	215.5	Finished Grading, Drainage Ditch	780	LF		
		Drainage Improvements Subtotal				
Water Improvements						
34	345	Adjusting Valve Box	1	EA		
35	611.13	Meter Service Connection, 1"	1	EA		
		Water Improvements Subtotal				
Total Bid Amount			**$**			

TOTAL BID AMOUNT:

_____ Dollars

(In Written Words)

_____

Company Name

_____ _____

Signature of Company Official Date Signed

_____ _____

Title Email Address

Subcontractors List Wilkinson Drive Pavement Improvements Project			
Subcontractor Information	**Bid Item(s)**	**Subcontract Amount**	**% of Total Bid**
Name: Address: Phone #: License #:			
Name: Address: Phone #: License #:			
Name: Address: Phone #: License #:			
Name: Address: Phone #: License #:			
Name: Address: Phone #: License #:			
Total Subcontract Amount and Percentage of Bid	**$**		**%**

**Use additional forms if needed*

Proposal

Date: _____

Proposal of _____
(Name)

Corporation organized and existing under the laws of the State of Arizona; a partnership consisting of _____ or an individual trading as _____.

TO THE HONORABLE MAYOR AND COUNCIL
CITY OF PRESCOTT
PRESCOTT, ARIZONA

Ladies and Gentlemen:

The Undersigned hereby proposes and agrees to furnish any and all required labor, material, construction equipment, transportation, and services for completion of the Wilkinson Drive Pavement Improvements Project, in strict conformity with the plans and specifications, at the total bid price of:

_____ Dollars

($_____).

The Undersigned hereby declares that he has visited the site and has carefully examined the Contract Documents relating to the work covered by the above bid or bids.

The Proposal Guarantee (Certified Check, Cashier's Check, or Bid Bond) attached, payable to the City of Prescott in the sum of not less than ten percent (10%) of the total bid price submitted for the complete project, to insure that the Undersigned, if his bid is accepted, shall enter into contract and give the bonds and certificates of insurance required. In the event that the contract and bonds and certificates of insurance required are not furnished to the City within the time required, then and in that event the City may retain from the proposal guarantee an amount, not to exceed the amount of the proposal guarantee, representing the difference between the amount specified in the proposal or bid, and such larger amount that the City in good faith contracts with another party to perform the work covered by the proposal or bid.

The project shall be completed within thirty five (35) calendar days after the starting date set forth in the NOTICE TO PROCEED.

The Undersigned hereby declares, as bidder, that the only persons or parties interested in this PROPOSAL as principals are those named herein; that no elected official or employee of the City is

in any manner interested directly or indirectly in this PROPOSAL or in the profits to be derived from the contract proposed to be taken, other than as permitted by law; that this bid is made without any connection with any other person or persons making a separate bid for the same purpose; that the bid is in all respects fair and without collusion or fraud; that he has read the NOTICE INVITING BIDS, CONTRACT DOCUMENTS AND PROJECT SPECIFICATIONS, and agrees to furnish the items and perform the work called for in accordance with the provisions of said form of Contract and the Specifications and to deliver the same within the time stipulated herein, and that he will accept in full payment therefore the total bid price named in this Proposal.

The bidder shall be an A-General Engineering contractor properly licensed in the State of Arizona at the time of bidding to perform construction in connection with fixed works, including streets, roads, power and utilities plants, dams, hydroelectric plants, sewage and waste disposal plants, bridges, tunnels, and overpasses and shall also be licensed to perform work within residential and commercial property lines, or shall be properly licensed to sub-contract residential or commercial work, as may be required in the Scope of Work.

Any bid submitted without the proper contracting license to perform the required work shall be considered non-responsive and rejected.

The bidder further agrees that, upon receipt of written notice of the acceptance of this PROPOSAL, he will execute the Contract in accordance with the PROPOSAL as accepted and furnish the required bonds TEN (10) days from the date of mailing of said Notice of Award to him at his address as given below, or within such additional time as may be allowed by the City; and that upon his failure or refusal to do so within said time, then the certified or cashier's check or bid bond accompanying this bid shall be cashed or enforced and the money payable pursuant thereto shall be forfeited to and become the property of the City as liquidated damages for such failure or refusal; provided that if said bidder shall execute the Contract and furnish the required bonds within the aforesaid time, his certified or cashier's check, if furnished, shall be returned to him within three (3) days thereafter, and the bid bond, if furnished, shall become void.

Bidder understands and agrees that the City reserves the right to reject any or all bids and to waive any informality in the bidding.

The bidder agrees that this bid shall be good and may not be withdrawn for a period of sixty (60) calendar days after the scheduled closing time for receiving bids.

Bidder acknowledges receipt of the following Addenda: _____

The undersigned is the holder of Arizona State Contractor's License No(s). and Classification(s):

_____

Respectfully submitted,

_____

Bidder (Authorized Signature)

Corporate Seal

By: _____

Title: _____

Bidder's Contact Information:

Physical Address: _____

Mailing Address: _____

Telephone No: _____

Fax No: _____

Email Address: _____

Names and addresses of all members of the firm or names and titles of all officers of the corporation:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Proposed Staging Locations

Project Name: Wilkinson Drive Pavement Improvements

Bid Date: April 16, 2020

Contractor Name: _____

Proposed Location No. 1	
General Description:	Parcel No:
	Physical Address:
Legal Owner:	Zoning District:

Proposed Location No. 2	
General Description:	Parcel No:
	Physical Address:
Legal Owner:	Zoning District:

**A map of each location may be attached to this form*

If <u>no</u> staging areas are proposed, please check here and sign below: ☐ **No Areas Proposed**

By signing below, I ("Contractor") certify that no staging areas are required for the above named project. If necessary staging area(s) are later determined, I understand that any associated costs shall be furnished by the Contractor and will be considered incidental without additional compensation from the City.

_____ _____

Signature of Company Official Date Signed

Bidder's Affidavit

Wilkinson Drive Pavement Improvements Project

State of _____)
) ss.
County of _____)

_____, being first duly sworn, deposes and says:

That he/she is _____ of _____
(Title) (Bidder)

who submits herewith to the City of Prescott, Arizona, a Proposal:

That all statements of fact in such Proposal are true;

That said Proposal was not made in the interest of or on behalf of any undisclosed person, partnership, company, association, organization or corporation;

That said bidder has not, directly or indirectly by agreement, communication or conference with anyone attempted to induce action prejudicial to the interest of the City of Prescott, Arizona, or of any bidder or anyone else interested in the proposed contract; and further,

That prior to the public opening and reading of proposal, said bidder:

1. Did not directly or indirectly, induce or solicit anyone else to submit a false or sham proposal;
2. Did not directly or indirectly collude, conspire, connive or agree with anyone else that said bidder or anyone else would submit a false or sham proposal, or that anyone should refrain from bidding or withdraw his proposals;
3. Did not in any manner, directly or indirectly, seek by agreement, communication or conference with anyone to raise or fix the proposal price of said bidder or of anyone else, or to raise or fix any overhead, profit or cost element of his proposal price, or of that of anyone else;
4. Did not, directly or indirectly, submit his proposed price or any breakdown thereof, or the contents thereof, or divulge information or data relative thereto, to any corporation, partnership, company, association organization, bid depository or to any member or agent thereof, or to any individual or group of individuals, except the City of Prescott, Arizona, or to any person or persons who have a partnership or other financial interests with said bidder in his business.

By: _____

SUBSCRIBED AND SWORN to before me by _____

this _____ day of _____, 20___.

_____ _____
Notary Public Commission Expires

CONSTRUCTION CONTRACT

Wilkinson Drive Pavement Improvements Project
Contract No. 2020-XXX

THIS AGREEMENT, made and entered into this ** day of **, 20**, and between ** of the city of **, county of **, state of **, hereinafter designated "Contractor", and the City of Prescott, a municipal corporation, organized and existing under and by virtue of the laws of the State of Arizona, hereinafter designated "City".

WITNESSETH: That the said Contractor, for and in consideration of the sum to be paid him by the said City, and of the other covenants and agreements herein contained, and under the penalties expressed in the bonds provided, hereby agrees, for himself, his heir, executors, administrators, successors and assigns as follows:

ARTICLE I - SCOPE OF WORK: The Contractor shall furnish any and all labor, materials, equipment, transportation, utilities, services and facilities, required to perform all work for the construction of the project described as City of Prescott: Wilkinson Drive Pavement Improvements Project and install the material therein for the City, in a good and workmanlike and substantial manner and to the satisfaction of the City through its Engineers and under the direction and supervision of the Public Works Director, or his properly authorized agents and strictly pursuant to and in conformity with the Plans and Specifications prepared by the engineers for the City, and with such written modifications of the same and other documents that may be made by the City through the Public Works Director or his properly authorized agents, as provided herein.

ARTICLE II - CONTRACT DOCUMENTS: The Notice Inviting Bids, Project Plans and Specifications, MAG Specifications and Details, City Supplement to MAG, Special Provisions, Addenda, Contractor Bid Proposal as accepted by the Mayor and Council per Council Minutes of **, 20**, Proposal Guarantee, Performance Bond, Payment Bond, Certificates of Insurance and required Endorsements, Contract Allowance Authorizations and Contract Amendments, are by this reference made a part of this Contract to the same extent as if set forth herein in full.

ARTICLE III - TIME OF COMPLETION: The Contractor hereby agrees to commence work on or before the tenth (10th) day after written notice to do so, and to fully complete the same within thirty five (35) calendar days after the date of the written notice to commence work, subject to such extensions of time as are provided by the City Supplement to MAG.

ARTICLE IV - COMPENSATION: Contractor shall be paid, pursuant to the provisions as set forth in the Contract Documents, the total sum of ** dollars and ** cents ($**), plus any approved contract amendments, for the full and satisfactory completion of all work as set forth in the Project Plans, Specifications and Contract Documents. Retention shall be in accordance with A.R.S. § 34-221.

ARTICLE V - CONFLICT OF INTEREST: Pursuant to A.R.S. § 38-511, the City may cancel this contract, without penalty or further obligation, if any person significantly involved in initiating, negotiation, securing, drafting or creating the contract on behalf of the City is, at any time while the contract or any extension of the contract is in effect, an employee or agent of any other party to the contract in any capacity or a consultant to any other party of the contract with respect to the subject matter of the contract. In the event of the foregoing, the City further elects to recoup any fee or commission paid or due to any person significantly involved in initiating, negotiation, securing, drafting or creating this contract on behalf of the City from any other party to the contract, arising as a result of this contract.

ARTICLE VI - AMBIGUITY: This Agreement is the result of negotiations by and between the parties. Although it has been drafted by the Prescott City Attorney, it is the result of the negotiations between the parties. Therefore, any ambiguity in this Agreement is not to be construed against either party.

ARTICLE VII - NONDISCRIMINATION: The Contractor, with regard to the work performed by it after award and during its performance of this contract, will not discriminate on the grounds of race, color, national origin, religion, sex, disability or familial status in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The Contractor will not participate either directly or indirectly in the discrimination prohibited by or pursuant to Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Section 109 of the Housing and Community Development Act of 1974, the Age Discrimination Act of 1975, the Americans With Disability Act (Public Law 101-336, 42 U.S.C. 12101-12213) and all applicable federal regulations under the Act, and Arizona Governor Executive Orders 99-4, 2000-4 and 2009-09 as amended.

ARTICLE VIII - INDEPENDENT CONTRACTOR STATUS: It is expressly agreed and understood by and between the parties that the Contractor is being retained by the City as an independent contractor, and as such the Contractor shall not become a City employee, and is not entitled to payment or compensation from the City or to any fringe benefits to which other City employees are entitled other than that compensation as set forth in Article IV - Compensation above. As an independent contractor, the Contractor further acknowledges that he is solely responsible for payment of any and all income taxes, FICA, withholding, unemployment insurance, or other taxes due and owing any governmental entity whatsoever as a result of this Agreement. As an independent contractor, the Contractor further agrees that he will conduct himself in a manner consistent with such status, and that he will neither hold himself out nor claim to be an officer or employee of the City by reason thereof, and that he will not make any claim, demand or application to or for any right or privilege applicable to any officer or employee of the City, including but not limited to

workmen's compensation coverage, unemployment insurance benefits, social security coverage, or retirement membership or credit.

ARTICLE IX - CITY FEES: Prior to final payment to the Contractor, the City shall deduct therefrom any and all unpaid privilege, license and other taxes, fees and any and all other unpaid moneys due the City from the Contractor, and shall apply to those moneys to the appropriate account. Contractor shall provide to the City any information necessary to determine the total amount(s) due.

ARTICLE X - LIQUIDATED DAMAGES: All time limits stated in the Contract Documents are of the essence and should the Contractor fail to complete the work required to be done on or before the time of completion as set forth in these Contract Documents, including any authorized extension of time, it is mutually agreed and understood by and between the parties that the public will suffer great damages; that such damages, from the nature of the project, will be extremely difficult and impractical to fix; that the parties hereto wish to fix the amount of said damages in advance; and that the sum of $**.00 per day for each and every day's delay in completion and acceptance of the work required to be done by the Contractor subsequent to the time of completion, including any authorized extensions of time, is the nearest and most exact measure of damages for such breach that can be fixed now or could be fixed at or after such breach and that, therefore, the Owner and Contractor agree to fix said sum of $**.00 per day for each and every said day's delay as liquidated damages, and not as a penalty or forfeiture for the breach of the agreement to complete the work required to be done by the Contractor on or before the time of completion and acceptance and, in the case of such breach, the Owner shall deduct said amount from the amount due the Contractor under the contract. In the event the remaining balance due the Contractor is insufficient to cover the full amount of assessed liquidated damages, then the Contractor or the surety on the bonds shall pay the difference due the Owner.

ARTICLE XI - OTHER WORK IN PROJECT AREA: The City, any other contractors, whether under contract with the City, a third party, and/or utilities, may be working within the project area while this Contract is in progress. The Contractor herein acknowledges that delays and disruptions may, and in all likelihood, will occur due to other work. The Contractor’s bid shall be deemed to have recognized and included costs arising from and associated with other work in the project area disclosed by the Contract Documents or which would be apparent to an experienced contractor exercising due diligence during inspection of the project documents, the question and answer session in the pre-bid process or during site inspection. No payment will be made for any delays or disruptions in the work schedule that are wholly the fault of the Contractor, its agents, employees or any of the Contractor’s subcontractors. In the event that the Contractor encounters delay or disruption in the project schedule due to factors not wholly the fault of the Contractor or within the Contractor’s control then the Contract may be adjusted pursuant to the Delay’s and Extension of Time provisions of this Contract and a timely request submitted for Contract Amendment. Failure to submit a timely request for Contract Amendment shall be deemed a waiver of any entitlement to additional compensation.

ARTICLE XII - BONDS:

A. On or before the execution of the contract, the Contractor shall obtain in an amount equal to the full contract price a performance bond pursuant to A.R.S. § 34-222, conditioned upon the faithful performance of this contract in accordance with the plans, specifications and conditions herein. Such bond shall be solely for the protection of the City. A copy of this bond shall be filed with the Prescott City Clerk.

B. Contractor shall also obtain a payment bond, pursuant to the provisions of A.R.S. § 34-222, in an amount equal to this full contract price herein, said bond to be solely for the protection of claimants supplying labor or materials to the Contractor or his subcontractors in the prosecution of the work provided for in this contract. A copy of this bond shall be filed with the Prescott City Clerk.

C. All bonds must be written by an insurance company authorized to do business in the State of Arizona, to be evidenced by a Certificate of Authority as defined in A.R.S. § 20-217, a copy of which certificate is to be attached to the applicable bid bond, payment bond and performance bond. In addition, depending upon the nature of the contract and amount thereof, the City Manager may also require insurance companies and/or bonding companies to have an "A" rating or better with Moody's or A.M. Best Company, and/or to be included on the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended) by the audit staff, Bureau of Accounts, US Treasury Department.

ARTICLE XIII - MISCELLANEOUS:

A. The parties hereto expressly covenant and agree that in the event of a dispute arising from this Agreement, each of the parties hereto waives any right to a trial by jury. In the event of litigation, the parties hereby agree to submit to a trial before the Court. The Contractor further agrees that this provision shall be contained in all subcontracts related to the project, which is the subject of this Agreement.

B. The parties hereto expressly covenant and agree that in the event of litigation arising from this Agreement, neither party shall be entitled to an award of attorney fees, either pursuant to the Contract, pursuant to A.R.S. § 12-341.01 (A) and (B), or pursuant to any other state or federal statute, court rule, case law or common law. The Contractor further agrees that this provision shall be contained in all subcontracts related to the project that is the subject of this Agreement.

C. Any notices to be given by either party to the other must be in writing, and personally delivered or mailed by prepaid postage, at the following addresses:

Public Works Director	**
City of Prescott	**
433 N. Virginia Street	**
Prescott, Arizona 86301	**

D. This Agreement shall be construed under the laws of the State of Arizona.

E. This Agreement represents the entire and integrated Agreement between the City and the Contractor and supersedes all prior negotiations, representations or agreements, either written or oral. This Agreement may be amended only by written instrument signed by both the City and the Contractor. Written and signed amendments shall automatically become part of the Agreement, and shall supersede any inconsistent provision therein; provided, however, that any apparent inconsistency shall be resolved, if possible, by construing the provisions as mutually complementary and supplementary.

F. In the event any provision of this Agreement shall be held to be invalid and unenforceable, the remaining provisions shall be valid and binding upon the parties. One or more waivers by either party of any provision, term, condition or covenant shall not be construed by the other party as a waiver of a subsequent breach of the same by the other party.

G. No oral order, objection, claim or notice by any party to the other shall affect or modify any of the terms or obligations contained in this Agreement, and none of the provisions of this Agreement shall be held to be waived or modified by reason of any act whatsoever, other than by a definitely agreed waiver or modification thereof in writing. No evidence of modification or waiver other than evidence of any such written notice, waiver or modification shall be introduced in any proceeding.

H. In the event of a discrepancy between this Agreement and other documents incorporated into this Agreement, this Agreement shall control over Exhibit "A".

I. Non-Availability of Funds: Fulfillment of the obligation of the City under this Agreement is conditioned upon the availability of funds appropriated or allocated for the performance of such obligations. If funds are not allocated and available for the continuance of this Agreement, this Agreement may be terminated by the City at the end of the period for which the funds are available. No liability shall accrue to the City in the event this provision is exercised, and the City shall not be obligated or liable for any future payments as a result of termination under this paragraph.

J. Israel: Contractor certifies that it is not currently engaged in, and agrees for the duration of this Agreement that it will not engage in a "boycott", as that term is defined in A.R.S. § 35-393, of Israel.

IN WITNESS WHEREOF, two (2) identical counterparts of this Contract, each of which shall for all purposes be deemed an original thereof, have been duly executed by the parties herein above named, on the date and year first above written.

ATTEST:

_____ By: _____

** (Authorized Signature) (Printed Name)

Title: _____ Email: _____

City of Prescott, a municipal corporation:

_____

Greg L. Mengarelli, Mayor

ATTEST: APPROVED AS TO FORM:

_____ _____

Sarah Siep, City Clerk Matthew Podracky, Deputy City Attorney

CONTRACTOR'S AFFIDAVIT REGARDING SETTLEMENT OF CLAIMS AND CERTIFICATION OF COMPLETION OF WARRANTIES

Project: Wilkinson Drive Pavement Improvements

To the City of Prescott, Arizona:

1. This is to certify that all lawful claims for materials, rental of equipment and labor used in connection with the construction of the above project, whether by subcontractor or claimant in person, have been duly discharged.
2. The Undersigned, for the consideration of $ _____
   (total project price)
   as set out in the final pay estimate, as full and complete payment under the terms of the Contract, hereby waives and relinquishes any and all further claims or right of lien under, in connection with, or as a result of the above-described project. The Undersigned further agrees to indemnify and save harmless the City of Prescott against any and all liens, claims of liens, suits, actions, damages, charges and expenses whatsoever, which said City may suffer arising out of the failure of the undersigned to pay for all labor performance and materials furnished for the performance of said project.
3. This is to further certify that the project is completed to acceptable standards as defined in the plans and specifications for said Project Contract Agreement. Any changes to the plans have been noted on the Construction As-built Mylar Drawings certified by the Engineer of Record, which As-built Drawings have been delivered to the Public Works Director. All materials used and workmanship performed are expressly warranted to be free of defects for a period of twenty four (24) months from the date of final acceptance by the City of Prescott.

Signed and dated this _____ day of _____, 20___.

_____
(Authorized Signature)

By: _____

Title: _____

State of _____)
) ss.
County of _____)

SUBSCRIBED AND SWORN to before me by _____

this _____ day of _____, 20___.

_____ _____
Notary Public Commission Expires

SUPPLEMENT TO THE MARICOPA ASSOCIATION OF GOVERNMENTS (MAG) UNIFORM STANDARD SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION

Technical Specifications

February 14, 2019

City of Prescott Public Works
433 N. Virginia Street, Prescott, Arizona 86301
Ph: 928.777.1130 | TDD: 928.777.1100 | Fax: 928.771.5929

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NEW 2/14/19 REVISIONS

New Specifications:

- Section 102 Bidding Requirements and Conditions
- Section 103 Award and Execution of Contract
- Section 110 Notification of Changed Conditions and Dispute Resolution
- Section 703 Riprap

Specifications Rewritten, or With Major Updates:

- Section 100 General Conditions
- Section 101 Abbreviations and Definitions
- Section 104 Scope of Work
- Section 105 Control of Work
- Section 106 Control of Materials
- Section 107 Legal Regulations and Responsibility to Public
- Section 108 Commencement, Prosecution and Progress
- Section 109 Measurements and Payments
- Section 205 Roadway Excavation
- Section 321 Placement and Construction of Asphalt Concrete Pavement
- Section 340 Concrete Curb, Gutter, Sidewalk, Curb Ramps, Driveway and Alley Entrance
- Section 405 Survey Monuments
- Section 611 Water, Sewer and Storm Drain Testing
- Section 630 Tapping Sleeves, Valves and Valve Boxes on Water Lines

Specifications With Minor Updates:

- Section 206 Structure Excavation and Backfill
- Section 211 Fill Construction
- Section 301 Subgrade Preparation
- Section 306 Mechanically Stabilized Subgrade – Geogrid Reinforcement
- Section 310 Placement and Construction of Aggregate Base Course
- Section 317 Asphalt Milling
- Section 329 Tack Coat
- Section 336 Pavement Matching and Surfacing Replacement
- Section 345 Adjusting Frames, Covers and Valve Boxes
- Section 350 Removal of Existing Improvements
- Section 401 Traffic Control
- Section 402 Pavement Markings and Striping
- Section 403 Permanent Signing, Sign Posts and Delineators
- Section 404 Loop Detectors
- Section 430 Landscaping and Planting
- Section 431 Landscape Rock

- Section 505 Concrete Structures
- Section 601 Trench Excavation, Backfilling and Compaction
- Section 610 Water Line Construction
- Section 612 Temporary Water Mains (Fly Lines)
- Section 615 Sanitary Sewer Line Construction
- Section 618 Storm Drain Construction
- Section 625 Manhole Construction and Drop Sewer Connections
- Section 626 Manhole Coatings
- Section 650 Abandonment and Removal of Water Main
- Section 651 Abandonment and Removal of Sanitary Sewer
- Section 701 Aggregate
- Section 710 Asphalt Concrete
- Section 725 Portland Cement Concrete

Details That Have Been Updated:

- All references to COP Standard Details to correspond with updated City of Prescott General Engineering Standards

PART 100 – GENERAL CONDITIONS

ADD the following section to Part 100- General Conditions:

SECTION 100: GENERAL CONDITIONS

100.2 STANDARD SPECIFICATIONS AND DRAWINGS

(A) Standard details and specifications for the project shall be the most recent versions of the Maricopa Association of Governments Uniform Standard Specifications and Details for Public Works Construction (MAG Details/MAG Specifications), City of Prescott Supplement to MAG Standards (COP Supplement), City of Prescott General Engineering Standards (COP GES), Prescott City Code (City Code) and Arizona Revised Statutes (A.R.S.), except as modified in the project plans and specifications.

(B) Other standard specifications and details will be incorporated within the plans, project documents and specifications by reference, as necessary. These may include references to the Arizona Department of Transportation Standard Specifications for Roadway and Bridge Construction (ADOT Specifications), Arizona Department of Environmental Quality (ADEQ), Manual on Uniform Traffic Control Devices (MUTCD) (with Arizona Supplement), American Association of State Highway and Transportation Officials (AASHTO), American Society for Testing and Materials (ASTM), and others.

100.3 GENERAL NOTES

(A) All construction shall conform to the most recent versions of the MAG Standards, COP Supplement to MAG, and the COP GES, unless specifically modified on the plans.

(B) It shall be the Contractor's responsibility to obtain copies of all standards, details and specifications necessary to completely and accurately interpret the plans.

(C) All plans are null and void 1 year from date of signature if construction has not started.

(D) All quantities shown on plans are approximate, are not verified by the Engineer, and are furnished solely for the Contractor's convenience. They do not necessarily correspond to bid schedule items. Payment shall be based on bid schedule items for actual quantities provided and installed. The Contractor shall not be relieved of their responsibility for independently estimating work quantities prior to bidding. If any discrepancy in quantities is found, Contractor shall notify the Engineer of such no later than 24 hours prior to bid opening.

(E) A City right-of-way permit will be required for all off-site construction and construction within the public right-of-way.

(F) It is the sole responsibility of the Contractor to obtain, at the Contractor's own expense, such permits as are required from the appropriate agencies.

(G) The Public Works Department shall be notified a minimum of 24 hours prior to beginning any construction in the public right-of-way at (928) 777-1176.

(H) Inspection is to be done by the City Public Works Department.

(I) Any work performed without the knowledge of the City Inspector or the Inspector's authorized representative is subject to removal and replacement of same, to be done at the Contractor's expense.

(J) All work and materials, which do not conform to the specifications, are subject to removal and replacement at the Contractor's expense.

(K) Approval of a portion of the work in progress does not guarantee its final acceptance. Testing and evaluation may continue until the written final acceptance of a complete and workable unit.

(L) The City may suspend the work by written notice when, in its judgment, progress is unsatisfactory, work being done is unauthorized or defective, weather conditions are unsuitable, or there is a danger to the public health and safety.

(M) The Contractor shall provide sufficient men and equipment on the job at all times during construction to comply with specifications and to complete work.

(N) The Contractor shall be responsible for construction surveying and layout.

(O) The Contractor shall notify Arizona 811 (formerly Arizona Blue Stake) at 1-800-STAKE-IT (1-800-782-5348) between 6 a.m. and 5 p.m. Arizona time, Monday-Friday (excluding State holidays), at least 48 hours prior to construction.

(P) It is the Contractor's responsibility to locate all underground pipelines, telephone, communication and electric conduits and structures in advance of any construction and will observe all possible precautions to avoid any damage to such. The Engineer and/or City will not guarantee any locations as shown on these plans, or those omitted from it.

(Q) The Contractor is to uncover all existing lines being tied into and verify grades, pipe material, and pipe diameter before material submittals and planned construction activities.

(R) The Contractor shall comply with all ADEQ requirements.

(S) All water lines shall be provided with 12 AWG HS-CCS wire. Trace wire shall be subject to traceability test. Testing is to be by the Contractor and witnessed by the City Representative and at no extra cost to the City.

(T) Water and sewer separation shall be pursuant to Arizona Administrative Code (AAC) R18-5-502.C. and City specifications.

(U) Water mains shall be subject to a pressure and leakage test in accordance with the American Water Works Association (AWWA) C600 Standard.

(V) Water mains shall be disinfected in accordance with ADEQ Engineering Bulletin No. 8 “Disinfection of Water Systems”.

(W) Operation of valves to be done by City personnel only.

(X) All pipeline materials shall be installed per manufacturer's requirements unless superseded by City specifications.

(Y) All materials for water line construction shall meet AAC R18-4-119.

(Z) ADEQ requirements will apply when more stringent than MAG Specifications; more specifically where they pertain to maximum allowable sewer line/pressure sewer line exfiltration-infiltration rates.

(AA) Sewer line low-pressure air tests shall be done on 100 percent of all sanitary sewer lines.

(BB) Sewer manholes exfiltration tests shall be done on 100 percent of all manholes. Vacuum testing in accordance with City standards may be used in lieu of exfiltration test.

(CC) Sewer line deflection tests shall be done on 100 percent of all pipes.

(DD) Prior to project acceptance, the Contractor shall be responsible for providing the City with a video (DVD format) of the entire sewer main installed including service laterals. A City Representative shall attend the video data collection. If the City is not present during the video data collection, the City may require that the video data be redone, at the Contractor’s expense, with the City Representative present. The video will be reviewed and deemed acceptable by the City prior to project acceptance.

(EE) Acceptance of the completed work will not be given until 3 ml Mylar as-built reproducible plans and all required digital files have been submitted by the Engineer of Record and approved by the Engineer.

(FF) The Contractor shall warrant all work for a minimum of 2 years after formal acceptance of the work.

SECTION 101: ABBREVIATIONS AND DEFINITIONS

101.2 DEFINITIONS AND TERMS

REVISE and ADD the following:

Agency/City/Contracting Agency/Owner: Interchangeable to mean, the City of Prescott, a municipal corporation, organized and existing under and by virtue of the laws of the State of Arizona, unless otherwise noted; and meant as the governmental agency/legal entity for which the work is being done, either by permit or contract.

City's Representative: The authorized representative of the City, which may be an individual or a firm, or their assistants assigned to the project work, the project site, or any part thereof during the performance of the work by the Contractor and until final acceptance.

County: Yavapai County, organized and existing under and by virtue of the laws of the State of Arizona.

Director: The City of Prescott Public Works Director, or their designee, representative or assistants, unless otherwise noted.

Engineer: The duly authorized person, or their designees, employed by or contracted with the City of Prescott who is responsible for all aspects of the project and with the authority to make revisions to and approve the changes to the plans or specifications.

Engineer of Record: The Engineer of Record is a Civil Engineer registered in the State of Arizona by the Board of Technical Registration and is responsible for design, calculations and preparation of contract documents. The Engineer of Record shall provide field observation, compile, review and comment on project documentation, material testing reports and prepare as-built drawings.

Materially Unbalanced Bid: A bid that generates a reasonable doubt that award to the bidder submitting a mathematically unbalanced bid will result in the lowest ultimate cost to the City.

Mathematically Unbalanced Bid: A bid containing lump sum or unit bid prices that do not reflect reasonably anticipated actual costs plus a reasonable proportionate share of the bidder's anticipated profit, overhead costs, and other indirect costs.

Notice Inviting Bids: Refers to the standard forms inviting proposals or bids.

SECTION 102: BIDDING REQUIREMENTS AND CONDITIONS

102.2 CONTENTS OF PROPOSAL PAMPHLET

ADD the following:

All standard specifications and details referenced, unless otherwise noted, shall conform to the most current editions, including revisions thereto.

102.4 EXAMINATION OF PLANS, SPECIAL PROVISIONS AND SITE OF WORK

ADD the following:

If any person contemplating submitting a bid for the proposed contract is in doubt as to the true meaning of any part of the plans, specifications, or other proposed contract documents, or finds discrepancies in or omissions from the plans or specifications, they shall submit to the Director a written request for an interpretation or correction thereof no later than 5 working days before bid or proposal opening. The person submitting the request will be responsible for its prompt delivery. Interested bidders may call, email or visit the office of the Director with any questions up to 5:00 PM on the fifth working day prior to the bid opening date. The City will no longer address or interpret any general questions or comments after that time. Should any issue be determined significant to the project by the Director, appropriate action will be taken. Any interpretation or correction of the proposed documents will be made available to prospective bidders a minimum of 3 working days prior to the bid opening date. Any correction of the contract documents will be made only by an addendum duly issued by the City and a copy of such addendum will be available on the City's website. The City will not be responsible for any other explanations or interpretations of the documents.

102.5 PREPARATION OF PROPOSAL

ADD the following:

(D) If the proposal is made by an individual, it shall be signed and the individual's full name and address shall be given. If it is made by a partnership, it shall be signed with the partnership name and by a general partner of the firm who shall also sign their own name, and the name and address of each partner shall be given; and, if it is made by a corporation, the name of the corporation shall be signed by its duly authorized officer or officers.

All submittal forms are contained in the Notice Inviting Bid and must be submitted as part of the bid.

ADD the following subsection to 102.5 Preparation of Proposal:

102.5.1 Instructions for Preparing Proposal

Payment for all work performed under this contract shall be based on the units as shown in the bidding schedule. Payment of the bid items as stated in the Contractor's proposal for the completed work, shall be compensation in full for the furnishing of all overhead, labor, materials, devices, equipment and appurtenances included in the work as are necessary to complete the total work under this contract in a good, neat, and satisfactory manner as indicated on the plans, as described in the specifications, and as otherwise implied or required to fulfill the objective of the work.

All construction elements, as identified in the bid schedule, shown on the plans or details or described in the special provisions, are required for the construction and are to include all costs associated with earthwork, trenching, subgrade construction, valves, fittings, tapping sleeves, appurtenances, utility boxes, bedding, pavement replacements, hauling, placing, disposing of, start up, testing, certifying, or any other associated work and materials required for a complete in place and operable item of construction. All work items and materials not specifically itemized in the bid schedule and that are required for construction are to be considered incidental to the total project bid amount.

It is the intent of the contract that maximum payment shall not exceed the agreed unit price without duly authorized contract amendments. Each item, fixture, piece of equipment, work, etc., as indicated on the plans, or specified anywhere in these documents shall be completed with all necessary connections and appurtenances for the satisfactory use and operation of said item, and the total system or systems.

Any and all patents, license fees, insurance premiums, etc., for the right to use equipment or processes included in this contract shall be included in the total bid price.

Cost of testing, and other incidental operations, profit and overhead cost, including the cost of supervision, temporary field offices, move-in, move-out, insurance, taxes, equipment not a permanent part of the job, and other incidental items, shall be included in the total bid price.

The "Total Amount of Bid" must be filled out by the bidder. In case of any discrepancy between the price in figures and price in written words, as written or corrected, the price in written words shall be presumed to be correct unless obviously in error, and shall be considered as the Contractor's correct and intended bid.

Bids shall not contain any recapitulations of the work to be done. Alternative proposals will not be considered unless called for.

102.6 SUBCONTRACTORS LIST

REMOVE the first paragraph in its entirety and REPLACE with the following:

The Subcontractors List must be completed, attached and submitted along with the bidding schedule. Only 1 name shall be listed for each category.

102.7 IRREGULAR PROPOSALS

ADD the following:

(F) If the bid is mathematically unbalanced.

(G) If the bid is materially unbalanced.

102.9 SUBMISSION OF PROPOSAL

ADD the following:

Bids shall be delivered to the office of the City Clerk, City of Prescott, Arizona, before the day and hour set for the submittal of bids in the Notice Inviting Bids as published. Bids shall be enclosed in a sealed envelope bearing the title of the work and the name of the bidder. It is the sole responsibility of the bidder to ensure the bid is received in proper time.

102.13 SUCCESSFUL BIDDERS

REMOVE in its entirety and REPLACE with the following:

The successful bidder may obtain 1 set of plans and specifications for the project at no extra cost.

ADD the following subsection to Section 102- Bidding Requirements and Conditions:

102.14 ADDENDA

Any addenda issued during the time of bidding, forming a part of the documents issued to the bidder for the preparation of a bid, shall be covered in the bid and shall be made a part of the contract. Addenda may be issued until noon on the third working day prior to the bid opening date. It is the prospective bidder's responsibility to check for addenda related to this procurement. Addenda will be posted on the City's website.

SECTION 103: AWARD AND EXECUTION OF CONTRACT

ADD the following subsection to 103.1 Consideration of Proposals:

103.1.1 Confirmation of Bid

At any time after the opening of the bids, the Director may require any bidder on the project to confirm such bid in writing prior to contract award. An acknowledgement will be sent to the bidder to certify the prices bid have been reviewed and to confirm work can be completed in accordance with the requirements of the contract documents, plans and specifications in the total bid amount stated in the bidding schedule.

ADD the following subsection to 103.1 Consideration of Proposals:

103.1.2 Experience and Qualifications

When requested by the City, the bidder shall supply a list of all public projects begun within the previous 3 years prior to contract award. The project list shall contain all public projects entered into by the bidder and shall include the project name and location, original and final contract amounts, project status and a contact name and information for each project. The bidder shall provide a description and explanation for any projects that were not completed successfully. Failure to provide complete and factual information may be grounds for rejection of the bid in accordance with City Procurement Code 1-27-18(K).

ADD the following subsection to 103.1 Consideration of Proposals:

103.1.3 Pre-Award Conference

The City may require the apparent low bidder to attend a pre-award conference in order to establish that the bidder fully understands the scope, complexity and expectations of the project as described in the contract documents; to discuss issues, concerns, risk areas and how to minimize them within the bounds of the contract; and to determine that the apparent low bidder is the most responsible and/or most qualified bidder in accordance with City Procurement Code 1-27-18(K).

The purpose of the pre-award conference is to ensure that all participants are apprised of their responsibilities and obligations regarding all applicable laws, rules, regulations and ordinances contained in the contract documents prior to entering into a contract.

103.3 AWARD OF CONTRACT

REMOVE the first paragraph in its entirety and REPLACE with the following:

The contract will be awarded to the lowest qualified bidder complying with these instructions and with the Notice Inviting Bid. The City, however, reserves the right to accept or reject any or all bids if it deems it best for the public good, and to waive any informality in the bids received. The award, if made, will be within 60 calendar days after the opening of bids.

ADD the following subsection to 103.3 Award of Contract:

103.3.1 Assignment of Contract

No partial or full assignment by the Contractor of any contract to be entered into hereunder, or any part thereof, or of funds to be received there under by the Contractor, will be recognized by the City unless such assignment has had prior written approval of the City and the surety has been given due notice of such assignment in writing and has consented thereto in writing.

103.6 CONTRACTOR'S INSURANCE

ADD the following:

The Contractor and subcontractors shall procure and maintain until all of their obligations have been discharged, including any warranty periods under the contract are satisfied, insurance against claims for injury to persons or damage to property which may arise from or in connection with the performance of the work hereunder by the Contractor, the Contractor's agents, representatives, employees or subcontractors.

The insurance requirements herein are minimum requirements for a contract and in no way limit the indemnity covenants contained in the contract.

The City in no way warrants that the minimum limits contained herein are sufficient to protect the Contractor from liabilities that might arise out of the performance of the work under a contract by the Contractor, the Contractor's agents, representatives, employees, or subcontractors. The Contractor is free to purchase such additional insurance as may be determined necessary.

(A) Additional Insurance Requirements: The policies shall include, or be endorsed to include, the following provisions:

(1) On insurance policies where the City is named as an additional insured, the City shall be an additional insured to the full limits of liability purchased by the Contractor even if those limits of liability are in excess of those required by this contract.

(2) The Contractor's insurance coverage shall be primary insurance and non-contributory with respect to all other available sources.

(B) Notice of Cancellation: With the exception of a 10 day notice of cancellation for non-payment of premium, any changes material to compliance with this contract in the insurance policies above shall require a 30 day written notice.

(C) Acceptability of Insurers: Insurance is to be placed with insurers with a current A.M. Best's rating of no less than A-VII, unless otherwise approved by the City. General liability, automobile liability, and worker's compensation insurance is to be placed with an insurer admitted in the state in which operations are taking place.

(D) Verification of Coverage: The Contractor shall furnish the City with certificates of insurance (ACORD form or equivalent approved by the City) as required by this contract. The certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf.

All certificates and any required endorsements are to be received and approved by the City before work commences. Each insurance policy required by this contract must be in effect at or prior to commencement of

work under this contract and remain in effect for the duration of the project and warranty period as set forth in Paragraph 3 of the "Contractor's Affidavit Regarding Settlement of Claims and Certification of Completion of Warranties". Failure to maintain the insurance policies as required by this contract or to provide evidence of renewal is a material breach of contract.

All certificates required by this contract shall be sent directly to the Public Works Department, 433 N. Virginia Street, Prescott, AZ 86301. The City project/contract number and project description shall be noted on the certificate of insurance. The City reserves the right to require complete, certified copies of all insurance policies required by this contract at any time.

(E) Such policy shall not exclude coverage for the following:

(1) Injury to or destruction of any property arising out of the collapse of/or structural injury to any building or structure due to grading of land, excavation, borrowing, filling, backfilling, tunneling, pile driving, cofferdam work or caisson work.

(2) Injury to or destruction of wires, conduits, pipes, mains, sewers, or other similar property or any apparatus in connection therewith, below the surface of the ground, if such injury or destruction is caused by and occurs during the use of mechanical equipment for the purpose of grading of land, paving, excavating, drilling; or injury to or destruction of any property at any time resulting there from.

(3) Injury to or destruction of any property arising out of blasting or explosion.

(4) Motor vehicle public liability and property damage insurance to cover each automobile, truck, and other vehicle used in the performance of the contract in an amount of not less than $1,000,000.00 for one person, and $1,000,000.00 for more than one person, and property damage in the sum of $1,000,000.00 resulting from any one accident which may arise from the operations of the Contractor in performing the work provided for herein.

(F) The Contractor shall carry and maintain fire and extended coverage with an endorsement for vandalism and malicious mischief in the Contractor's name and also in the name of the City in an amount of at least 100 percent of the contract amount (if applicable).

(G) The Contractor shall secure "all risk"-type builder's risk insurance for work to be performed. Unless specifically authorized by the City, the amount of such insurance shall not be less than 100 percent of the contract price. Such policy shall include coverage for earthquake, landslide, flood, collapse, or loss due to the results of faulty workmanship, during the contract time and until final acceptance of work by the City (if applicable).

103.6.1 General

REMOVE item (A) in its entirety and REPLACE with the following:

(A) The Contractor shall provide and maintain, during the life of the contract, General Liability, Automobile Liability, and Worker's Compensation Insurance as provided herein.

Unless otherwise specifically required by the special provisions, the minimum limits of public liability and property damage liability shall be as provided herein.

The Contractor shall provide coverage with limits of liability not less than those stated below. An excess liability policy or umbrella liability policy may be used to meet the minimum liability requirements provided that the coverage is written on a following form basis.

(1) Commercial General Liability: Occurrence Form

Policy shall include bodily injury, property damage, broad form contractual liability and XCU coverage.

- General Aggregate $3,000,000
- Products – Completed Operations Aggregate $3,000,000
- Personal and Advertising Injury $1,000,000
- Each Occurrence $1,000,000
- Fire Legal Liability (Damage to Rented Premises) (if applicable) $100,000

The policy shall be endorsed to include the following additional insured language:

"The Contractor agrees to endorse the City of Prescott as an Additional Insured on the Commercial General Liability with the following Additional Insured endorsement, or similar endorsement providing equal or broader Additional Insured coverage, the CG 2010 10 01 Additional Insured - Owners, Lessees, or Contractors, or CG2010 07 04 Additional Insured – Owners, Lessees, or Contractors – Scheduled Person or Organization endorsement in combination with the additional endorsement of GC2037 10 01 Additional Insured – Owners, Lessees, or Contractors – Completed Operations shall be required to provide back coverage for the Contractor's "your work" as defined in the policy and liability arising out of the products-completed operations hazard."

(2) Business Automobile Liability: Bodily Injury and Property Damage for any owned, hired, and/or non-owned vehicles used in the performance of this Contract

- Combined Single Limit (CSL) $1,000,000

The policy shall be endorsed to include the following additional insured language:

"The City of Prescott shall be named as additional insured with respect to liability arising out of the activities performed by or on behalf of the Contractor, involving automobiles, owned, leased, hired, or borrowed by the Contractor."

(3) Worker's Compensation and Employer's Liability:

Worker's Compensation Statutory

Employer's Liability

- Each Accident $1,000,000
- Disease- each employee $1,000,000
- Disease- policy limit $1,000,000

The policy shall contain a waiver of subrogation against the City for losses arising from work performed by or on behalf of the Contractor.

(4) Professional Liability (Errors and Omissions Liability) (if applicable)

- Each Claim $1,000,000
- Annual Aggregate $2,000,000

(a) In the event that the professional liability insurance required by this contract is written on a claims-made basis, the Contractor warrants that any retroactive date under the policy shall precede the effective date of this contract and that either continuous coverage will be maintained or an extended discovery period will be exercised for a period of two (2) years at the time work under this contract is completed.

(b) The policy shall cover professional misconduct or lack of ordinary skill for those positions defined in the Scope of Work of this contract.

(c) Notice of Cancellation: With the exception of a 10 day notice of cancellation for non-payment of premium, any changes material to compliance with this contract in the insurance policies above shall require a 30 day written notice.

103.6.2 Indemnification of the Contracting Agency Against Liability

REMOVE in its entirety and REPLACE with the following:

The Contractor shall defend, indemnify and hold harmless the City, its departments, officers, officials, agents, and employees (hereinafter referred to as "Indemnitee") from and against any and all claims, actions, liabilities, damages, losses, or expenses (including court costs, attorneys fees and costs of claim processing, investigation and litigation) (hereinafter referred to as "Claims") for bodily injury or personal injury (including death), or loss or damage to tangible or intangible property caused, or alleged to be caused, in whole or in part, by the negligent or willful acts or omissions of the Contractor or any of the Contractor's owners, officers, directors, agents, employees or subcontractors. This indemnity includes any claim or amount arising out of or recovered under Worker's Compensation Law or arising out of failure of such Contractor to conform to any Federal, State or local law, statute, ordinance, rule, regulation or court decree. It is the specific intentions of the parties that the Indemnitee shall, in all instances, except for Claims arising solely from the negligent or willful acts of Indemnitee, be indemnified by the Contractor from and against any and all claims. In consideration of the award of this contract, the Contractor agrees to waive all rights of subrogation against the City, its departments, officers, officials, agents, and employees for losses arising from the work performed by the Contractor for the City.

ADD the following subsection to Section 103- Award and Execution of Contract:

103.9 PRECONSTRUCTION CONFERENCE

Within 15 days of the date of the Notice of Award, the Contractor is required to attend a preconstruction conference. The City will contact the Contractor to schedule a specific date, time and location for the preconstruction conference. The purpose of the meeting is to outline specific construction items and procedures and to address items, which require special attention on the part of the Contractor. The Contractor may also present proposed variations in procedures, which the Contractor believes may be of benefit to the project, reduce cost, or will reduce inconvenience to the public. Communication and coordination issues will be also addressed during the preconstruction conference. The Contractor will be required to provide 5 sets of the following information at the preconstruction conference:

- Key personnel names and emergency phone numbers involved in the project.
- Public information plan
- Project signage plan
- Stormwater Pollution Prevention Plan (SWPPP) (NOI if applicable)
- Contractor quality control plan
- Subcontractor contracts and purchase orders for each and every item of work under subcontract on the project
- Payment schedule showing the estimated dollar volume of work for each calendar month during the life of the project
- Overall construction schedule and two-week look ahead schedule (provided weekly)

- Dust abatement/street sweeping plan and construction water meter application
- Traffic control plan and access management plan providing for continuous access to residents and businesses affected by the project
- Contractor's company safety plan
- An itemized list of shop drawings, materials, mix designs, equipment submittals and a schedule indicating the dates each of these items will be transmitted to the Director for review

Each of the above items is subject to review and approval by the Director.

ADD the following subsection to Section 103- Award and Execution of Contract:

103.10 COMMENCEMENT

The Contractor shall commence work on or before the tenth calendar day after receiving the Notice to Proceed, and shall complete all work under the contract within the period of time specified in the special provisions. The City reserves the right to issue Notice to Proceed at any time between 0 and 60 days after contract award. Notice to Proceed will be issued not later than 60 calendar days after the contract has been awarded unless otherwise agreed upon in writing, or as may be specified in the special provisions. In addition, the Contractor shall not commence work until all required documents, bonds, plans and schedules have been received and approved by the City. These submittals will not affect the issuance of Notice to Proceed by the City.

ADD the following subsection to Section 103- Award and Execution of Contract:

103.11 CONTRACTOR AND SUBCONTRACTOR RECORDS

(A) The Notice Inviting Bids, Information for Bidders, special provisions, specifications, plans, and all supplementary documents are intended to be complete and complementary and to prescribe a complete work. If any omissions are made of information necessary to carry out the full intent and meaning of the contract documents, the Contractor shall immediately call the matter to the attention of the Director for furnishing of detailed instructions. In case of discrepancies, the specifications shall govern over the plans. Figured dimensions shall govern over scaled dimensions.

(B) Any drawings or plans listed anywhere in the specifications or addenda thereto shall be regarded as a part thereof and of the contract. Anything mentioned in these specifications and not indicated on the plans, or anything indicated on the plans and not mentioned in these specifications, shall be in the same force and effect as if indicated or mentioned in both.

(C) The Contractor, subcontractors and all suppliers shall keep and maintain all books, papers, records, files, accounts, reports, bid documents with back-up data, including electronic data, and all other material relating to the contract and project for 3 years following completion and acceptance of the work. All records shall be accurately maintained in accordance with generally accepted accounting principles and practices uniformly and consistently applied in a format that will permit audit. The Director or the Director's authorized representative(s) shall have access at all reasonable times to all applicable records of the Contractor and the records of the Contractor's subcontractors.

The Contractor and subcontractors shall preserve all such materials for a period of 3 years after all payments to the Contractor or subcontractors, or until the final resolution of all claims made by the Contractor or subcontractor on this contract, whichever is later. The Contractor and subcontractors shall make all of the above materials available to the Director for auditing, inspection and copying and shall produce such materials upon written request at the office of the Public Works Director located at 433 N. Virginia Street, Prescott, Arizona 86303.

The Contractor shall insert the above requirement in each subcontract, purchase order, lease agreement, or other document under which goods or services are provided for the performance of this contract and shall also include in all subcontracts a clause requiring subcontractors to include the above requirement in any lower-tier subcontract, purchase order, lease agreement or document under which goods or services are provided for the performance of this contract.

ADD the following subsection to Section 103- Award and Execution of Contract:

103.12 ERROR AND OMISSIONS

The written dimensions, calculations and quantities on the plans are presumed to be correct, but the Contractor shall be required to check carefully all dimensions, calculations and quantities before beginning work. If any errors or omissions are discovered, the Director shall be so advised in writing and will make the proper corrections. If the Contractor claims that any such errors or omissions should change the cost of any pay item or the construction as identified in the plans, the Contractor shall also submit to the Director a written proposed contract amendment. Any such adjustments made by the Contractor that are claimed to change the cost of any pay item or the construction as identified in the plans, without prior review and acceptance of a proposed contract amendment, shall be at the Contractor's own risk. The settlement of any complications or disputed expenses arising from the Contractor's adjustment shall be borne by the Contractor at the Contractor's own expense.

ADD the following subsection to Section 103- Award and Execution of Contract:

103.13 CONTINGENCIES

All loss or damage arising from obstruction or difficulties which may be encountered in the prosecution of the work, from the action of the elements, or from any act or omission on the part of the Contractor or any person or agent employed by him shall be borne by the Contractor.

ADD the following subsection to Section 103- Award and Execution of Contract:

103.14 NOTICE AND SERVICE THEREOF

Any notice to the Contractor from the City relative to any part of this contract shall be in writing and considered delivered and the service thereof completed when said Notice is posted, by first class mail to the Contractor at the Contractor's last given address, electronically delivered, or delivered in person to the Contractor or the Contractor's authorized representative on the work.

ADD the following subsection to Section 103- Award and Execution of Contract:

103.15 PROJECT CLOSEOUT

It is the intent of these specifications and contract documents that the Contractor shall deliver a complete and operable facility capable of performing its intended functions and ready for use. The City shall withhold Final Payment and release of retention until ALL of the following items have been completed:

(A) Completion of all work, including punch-list items and final acceptance of the work by the City.

(B) Submittal by the Contractor of final pay estimate, which shall show the amount of work performed according to the contract and approved by the City.

(C) Submittal by the Contractor of all project record documents, including as-built drawings, operation and maintenance manuals, and other records as referenced herein.

(D) Submittal by the Contractor of the Contractor's Affidavit Regarding Settlement of Claims and Certification of Completion and Warranties.

(E) Closeout of any and all permits issued to the Contractor by the City or any other agency for the work included in the project.

(F) Submittal by the Contractor of an Environmental Protection Agency (EPA) Stormwater Pollution Prevention Plan (SWPPP) Notice of Termination (if applicable).

SECTION 104: SCOPE OF WORK

104.1.1 General

REMOVE the last paragraph in its entirety and REPLACE with the following:

Unless otherwise specified in the special provisions, the Contractor shall furnish all materials, labor, tools, equipment, water, light, power, transportation, superintendence, temporary construction of every nature, and incidentals, including, but not limited to, dust and traffic control measures, and to perform all work involved in executing the contract in a satisfactory and workmanlike manner within the specified time.

The Contractor shall at all times during the continuance of the contract prosecute the work with such work force and equipment as is sufficient to complete the project within the time specified.

ADD the following:

The work shall conform to such other drawings relating thereto as may be furnished by the City prior to the opening of proposals, and to such drawings in the explanation of details or minor modifications as may be furnished from time to time during construction, including such minor modifications as the Director may consider necessary during the prosecution of the work.

Scaled dimensions shall not be used in the construction of the work.

All work, as identified in the contract documents, not specifically itemized in the bid schedule that are required for the construction, are to be considered incidental to the project bid amount.

104.1.3 Water Supply

ADD the following:

(A) The Contractor shall supply adequate, pure, cool drinking water with individual drinking cups for the use of employees on the project. The quality of drinking water shall meet the requirements specified by the Arizona State Department of Health.

(B) It shall be the responsibility of the Contractor to provide and maintain, at the Contractor's own expense, a supply of water sufficient for the needs of the project and to install and maintain necessary supply connections and piping for the same. Before final acceptance of the completed project, all temporary connections and piping installed by the Contractor shall be removed.

(C) The Contractor shall apply for a fire hydrant meter for all construction water used if the Contractor desires to obtain water from the City distribution system at any point. All contractors requesting construction water from the City must submit an application for a construction water meter to the Water Distribution

Department. A $1,000 deposit will be required for hydrant meters. If construction water use occurs during the months of May through September the Contractor shall also include a dust abatement program. Potable water may not be allowed for dust abatement during these months. Potable water can be used to process embankment fill and base materials year round. However, contractors are encouraged to use treated effluent for construction activities. The City has two outlets for effluent, the Sundog Wastewater Treatment Plant and the Airport Wastewater Treatment Plant. The City will provide metered standpipes for effluent at both plants. The Contractor will be required to estimate daily and total potable/effluent water usage for the project as identified on the application for a construction water meter. The Contractor will be responsible for all costs associated with obtaining and delivering construction water.

104.1.4 Cleanup and Dust Control

ADD the following:

(A) Street Sweeping: The Contractor shall be responsible for sweeping the project no less than 4 times a week, or more as deemed necessary by the Engineer, to suppress dust, pick up dirt, soil, and construction debris so it does not travel to a water body or the City's storm drain system. A street sweeping plan documenting the frequency of sweeping, time and dates, route and type of sweeper that will be utilized shall be submitted to the City at the first preconstruction conference. The street sweeper shall be a mechanical sweeper with water applying equipment. No brooms, mechanical brooms mounted on drivable construction equipment or regenerative air sweepers will be accepted without prior approval from the City.

No measurement or payment will be made for street sweeping, unless otherwise provided for in the special provisions or proposal. The cost of street sweeping will be deemed incidental and the cost included in the proposal price for the construction operation to which dust control is incidental or appurtenant.

(B) Waste Disposal, Grading and Material Storage

(1) The Contractor shall provide for the disposal of all surplus materials, waste products, debris, etc., and shall make necessary arrangements for such disposal. The Contractor shall obtain written permission from property owners(s) prior to disposing of any surplus materials, waste products, debris, etc., on private property, and shall also obtain the approval of the Director prior to such disposal.

(2) The Director will not approve the filling of ditches, washes, drainage ways, etc., which may in the Director's opinion create water control problems.

(3) The Director will not approve disposal operations, which will, in the Director's opinion, create unsightly and/or unsanitary nuisances.

(4) The Contractor shall maintain the disposal site(s) in a reasonable condition of appearance and safety during the construction period as required by the Director. Prior to final acceptance of the project, the Contractor shall have completed the leveling and cleanup of the disposal site(s) to the satisfaction of the Director.

(5) The Contractor shall obtain a grading permit or any other permit required by the City, Yavapai County or any other county, or State or Federal rules, regulations, laws, ordinances, or any other regulatory authority for all construction operations of the project, including but not limited to the following:

(a) Areas disturbed by the Contractor, including staging areas, borrow areas, waste areas, or material storage areas, located within the City limits that are subject to any requirements of the City Code, COP Land Development Code or COP General Engineering Standards, including but not limited to Section 6.7 – Site Disturbance, Grading and Restoration Standards; and Section 9.6 – Site Disturbance and Grading Permit, of the COP Land Development Code; Chapter 16-2: Drainage Regulations of the City Code; and Articles 2 and 3 of the COP General Engineering Standards;

(b) Areas outside of the City limits that are subject to the requirements of Yavapai County, Arizona Department of Transportation (ADOT), and/or Yavapai-Prescott Indian Tribe (YPIT) for any activities described herein;

(c) The disposal of waste material on private property dependent upon site specific conditions at the waste area(s) and characteristics of the fill in accordance with this section. The fees for a permit for this activity shall not be waived; said fees are incidental to the appropriate bid item(s);

(d) The staging or material storage area(s) that:

(i) Are not City owned property on the project, or

(ii) Require clearing or grubbing in excess of 10,000 square feet

Fees for a permit(s) for this activity shall not be waived; said costs are incidental to the appropriate bid item(s).

(e) Site disturbances for infrastructure improvements on City owned property not within the right-of-way for which the disturbance is greater than 50 cubic yards of material or in excess of 10,000 square feet. The associated fees for grading permits for this activity on City owned property shall be waived.

104.1.5 Final Cleaning Up

ADD the following:

Upon completion of construction and before final acceptance can be made by the Engineer, the Contractor shall clean up each individual construction area to the satisfaction of the Engineer. Small trees, weeds, and brush, which were removed as part of construction work, shall be removed from the project site and properly disposed of. All debris including but not limited to broken pipe, concrete and other construction debris shall be removed from the project site and properly disposed.

Existing landscape improvements, drainage ditches, etc., shall be restored in "like kind" so that the improvement is put back in as close to its prior state as possible. Restoration of incidental items impacted by construction activity shall be in any and all areas utilized by the Contractor in relation to the project. The Contractor shall restore each individual work site to grades existing before construction work. No separate payment will be made for restoration of items impacted by the Contractor's construction operation and the cost of these items shall be included in the unit prices in the bid schedule.

104.2 ALTERATION OF WORK

ADD the following:

(A) Changes in the Work: The City, without invalidating the Contract, may order extra work, make changes by altering, or delete any portion of the work as specified herein, or as deemed necessary or desirable by the Director. All such work shall be executed under the conditions of the original contract except that any claim for extension of time and additional cost caused thereby shall be adjusted at the time of ordering such change or extra work.

Extra work shall be that work not indicated or detailed on the plans and not specified. Such work shall be governed by all applicable provisions on the contract document.

In giving instructions, the Director shall have authority to make minor changes in the work, not involving extra cost, and not inconsistent with the purposes of the work, but otherwise, except in an emergency endangering life or property, no extra work or change shall be made unless in pursuance of a written order by the Director, and no claim for an addition to the total amount of the contract shall be valid unless so ordered.

It is mutually understood that it is inherent in the nature of municipal construction that some changes in the plans and specifications may be necessary during the course of construction to adjust them to field conditions, and that it is of the essence of the contract to recognize a normal and expected margin of change. The Director shall have the right to make such changes, from time to time, in the plans, in the character of the work, and in the termination of the completion of the work in the most satisfactory manner without invalidating the contract.

Any change ordered by the Director which involves installation of work essential to complete the Contract, but for which no basis of payment is provided for herein, said payment therefore shall be subject to agreement prior to said work being performed.

The prices agreed upon and any agreed upon adjustment in contract time shall be incorporated in the written order issued by the Director, which shall be written so as to indicate acceptance on the part of the Contractor as evidenced by the Contractor's signature. In the event prices cannot be agreed upon, the City reserves the right to terminate the contract as it applies to the items in questions and make such arrangements as it may deem necessary to complete the work, or it may direct the Contractor to proceed with the items in question to be reimbursed pursuant to the unit prices in the Contractor's bid or on a force account basis as provided hereinafter, at the City's option.

(B) Claims for Extra Work: If the Contractor claims that any instructions involve extra cost under this contract, he shall give the Director written notice thereof within 48 hours after the receipt of such instructions, and in any event before proceeding to execute the work, except in emergency endangering life or property, and the procedure shall then be as provided for herein. No such claim shall be valid unless so made.

SECTION 105: CONTROL OF WORK

105.1 AUTHORITY OF THE ENGINEER

ADD the following:

All references to "the Engineer" shall mean the City Public Works Director.

105.2 PLANS AND SHOP DRAWINGS

ADD the following:

Drawings of minor or incidental fabricated materials and/or equipment may not be required by the Director. The Contractor shall furnish the Director tabulated lists of such fabrications, showing the names of the manufacturers and catalog numbers, together with samples of general data as may be required to permit determination by the Director as to their acceptability for incorporation in the work.

ADD the following subsection to 105.2 Plans and Shop Drawings:

105.2.1 Submittals

In ample time for each to serve its proper purpose and function, the Contractor shall submit to the Director such schedules, reports, drawings, lists, literature samples, instructions, directions, and guarantees as are specified or reasonably required for construction, operation, and maintenance of the facilities to be built and/or furnished under this contract.

Shop drawings and data shall be submitted to the Director in such number of copies as will allow him to retain 4 copies of each submittal. The submittal shall clearly indicate the specific area of the specifications or plans for which the submittal is made. The additional copies received by him will be returned to the Contractor's representative at the job site. The Director's notations of the action, which he has taken, will be noted on 1 of these returned copies.

The above drawings, lists, prints, samples, and other data shall become a part of the contract and a copy of the same shall be kept with the job site plans and the fabrications furnished shall be in conformance with the same.

ADD the following subsection to 105.3 Conformity with Plans and Specifications:

105.3.1 Order of Work

When required by the contract documents, the Contractor shall follow the sequence of operations as set forth therein. Full compensation for conforming to such requirements will be considered as included in the prices paid for contract items of work and no additional compensation will be allowed therefore.

105.4 COORDINATION OF PLANS AND SPECIFICATIONS

ADD the following:

In the event of any doubt or question arising regarding the true meaning of these specifications, special provisions, or the plans, reference shall be made to the Engineer, whose decision thereon shall be final. In the event of any discrepancy between any drawing and the figures written thereon, the figures shall be taken as correct.

The contract plans consist of general drawings. These indicate such details as are necessary to give a comprehensive idea of the construction contemplated. All authorized alterations affecting the requirements and information given on the contract plans shall be in writing. The contract plans shall be supplemented by such working or shop drawings prepared by the Contractor as are necessary to adequately control the work. No change shall be made by the Contractor in any working or shop drawing after it has been accepted by the Engineer.

The Contractor shall keep a copy of the contract documents, plans and specifications at the job site, and shall at all times give the Engineer access thereto. Any drawings or plans listed in the detailed specifications shall be regarded as a part thereof and the Engineer will furnish from time to time such additional drawings, plans, profiles and information as he may consider necessary for the Contractor's guidance.

All authorized alterations affecting the requirements and information given on the accepted plans shall be in writing. No changes shall be made of any plan or drawing after the same has been accepted by the Engineer except by consent of the Engineer in writing.

105.5 COOPERATION OF CONTRACTOR

REMOVE the first paragraph in its entirety and REPLACE with the following:

1 set of approved plans and specifications shall be kept available on the work site at all times by the Contractor.

105.6 COOPERATION WITH UTILITIES

ADD the following:

Location of Underground Utilities

(A) The Contractor shall contact Arizona 811 (formerly Arizona Blue Stake) within the time frame specified under Arizona law and request field location of underground utilities on public and private property. The Contractor shall employ private locating companies for private utilities not found by Arizona 811. At the time these locations have been marked and prior to the commencement of excavation within the affected area, the Contractor shall at the Contractor's expense manually determine the exact location of all buried facilities.

(B) The Contractor shall notify all affected utilities prior to the start of construction and shall ascertain the location of the various underground utilities either shown on the plans and/or as may be brought to the Contractor's attention.

(C) The Contractor shall perform all operations in accordance with Arizona 811.

(D) Utility locations shown on the plans are approximate and based on drawings furnished by the respective utility. It shall be the Contractor's responsibility to protect all existing utilities. Should a utility conflict occur, the Contractor shall cooperate with the said utility to resolve the conflict. No claim for extra costs shall be made against the City for delays due to any utility conflict.

(E) If performance of the Contractor's work is delayed because the utility owners fail to relocate or adjust their facilities in a timely manner, the Contractor may file for an extension of time. To receive consideration, this request shall contain specific information as to the nature of the delay and the actual loss of time involved.

(F) The Contractor shall assume full responsibility for damage to all marked utilities due to the Contractor's operations and shall repair the damaged utilities in accordance with regulatory authority requirements at the Contractor's own expense.

(G) Measurement and Payment: No separate measurement and payment shall be made for the location of underground utilities. This work shall be considered incidental and included in the unit price bid for construction or installation of the appropriate contract pay items.

105.8 CONSTRUCTION STAKES, LINES AND GRADES

ADD the following:

(A) Construction staking shall be the responsibility of the Contractor. The control for the project is provided in the contract documents. The Contractor shall be held responsible for preservation of control monumentation. If any of the control monumentation have been carelessly or willfully destroyed or disturbed by the Contractor, the cost of replacing them will be charged against him and will be deducted from the payment of work.

(B) The Contractor shall not retain the Engineer of Record for construction staking due to conflict of interest.

(C) Staking shall be performed and certified by a Registered Land Surveyor in good standing with the Arizona State Board of Technical Registration.

(D) The staking shall be performed in such a manner and frequency that the Contractor is able to construct the project in accordance with the plans and specifications. At a minimum, staking shall include:

(1) Slope or limit stakes

(2) Limits of Temporary Construction Easements (TCE)

(3) Horizontal and vertical alignment of pipeline

(4) Valves, tees, horizontal and vertical bends, blow offs, air release valves, tracer wire stations, water meters and hydrant locations

(5) Tank and appurtenances

(6) Electrical, instrumentation and control facilities, including, but not limited to, antennae pole

(7) Site improvements including, but not limited to, retaining walls, curbs, fencing, drainage, chain link fence enclosures, protection posts, gates, etc. The original grade of all retaining walls shall be surveyed and established prior to beginning any earthwork.

(8) Cross-sections will be required, at no additional expense to the City, should quantity disputes arise pertaining to the following: earthwork, subgrade, ABC or asphaltic concrete.

(9) Curb stakes at all PC's, PT's, vertical PI's (grade breaks), transitions to and from super elevated sections and at 50 foot intervals

(10) Blue tops for subgrade and ABC at intervals specified for curb. Quarter crown blue tops shall be required when the typical section is 4 lanes or more without median curb.

(11) Other staking as needed to complete the work in conformance with the plans and specifications.

(E) The Engineer and the Contractor’s superintendent shall meet monthly or as necessary to jointly measure all work items under the contract to determine pay quantities for each pay period. Quantities of work items shall be documented on the respective plan sheets and separately in tabular fashion with Station to Station measurements noted to assure there is no duplication of payment for work performed. Measurements will be for work actually completed. No projections for expected completion of work will be allowed.

(F) All survey data will be referenced to the City Coordinate System in accordance with the City Survey Datum Requirements as noted below.

CITY OF PRESCOTT SURVEY DATUM REQUIREMENTS		
Coordinate Units	International Feet	
Distance Units	International Feet	
Height Units	International Feet	
Datum		
Geodetic (Horizontal) Datum	North American Datum of 1983 (1992), (NAD83 (1992)	
Coordinate System	Arizona Coordinate System (State Plane)	
Zone	Central (0202)	
Vertical Datum	North American Vertical Datum of 1988, (NAVD88)	
Geoid Model	GEOID99 (Conus)	
City of Prescott Coordinate System (COPCS) – Conversion from State Plane		
COPCS Northing	(State Plane Northing x 1.000329975) – 701,456.0090	
COPCS Easting	(State Plane Easting x 1.000329975) + 69,457.2499	
Note: Distances computed between COPCS coordinates approximate "ground" distances		
State Plane – Conversion from City of Prescott Coordinate System		
State Plane Northing	(COPCS Northing + 701,456.0090) x 0.999670134	
State Plane Easting	(COPCS Easting – 69,457.2499) x 0.999670134	
Example – City of Prescott Mingo Base		
Latitude	34°34'29.27969" N	
Longitude	112°28'48.72638" W	
Height	5587.018'	
	State Plane Coordinates	**City of Prescott Coordinates**
Northing	1,301,026.703	600,000.0000
Easting	530,367.742	600,000.0000
Elevation	5,673.561'	5,673.955'

(G) Measurement and Payment: The quantity of construction staking measured for payment shall be the lump sum bid by the Contractor. The contract unit price per lump sum paid for construction staking shall be full compensation for all labor, materials, and equipment to perform the construction staking as described in this section.

105.9 DUTIES OF INSPECTOR

ADD the following:

An inspector is to be assigned to the project by the City to monitor the project and to keep the Engineer informed as to the progress of the work and the manner in which it is being done. Additionally, the Inspector will call the Contractor's attention to any nonconformance with the plans and specifications. Inspection will be done on an as needed or on-call basis. The Inspector will not be authorized to approve or accept any portion of the work. The Inspector will exercise such additional authority only as may from time to time be delegated to him by the Engineer.

105.10 INSPECTION OF WORK

ADD the following:

Inspection is to be done by the City Public Works Department. The Contractor shall furnish the Engineer with every reasonable facility for ascertaining whether or not the work as performed is in accordance with the requirements and intent of the specifications and contract. If the Engineer requests it, the Contractor at any time before acceptance of the work shall remove or uncover such portions of the finished work as may be directed. After examination, the Contractor shall restore said portions of the work to the standards required by the specifications. Should the work thus exposed or examined prove acceptable, the uncovering or removing and the replacing of the covering or making good of the part removed will be paid for as provided in Sections 104 and 105 of these specifications, but should the work so exposed or examined prove unacceptable, the uncovering or removing and the replacing of the covering or making good of the parts removed shall be at the Contractor's expense.

105.15 ACCEPTANCE

REMOVE item (A) in its entirety and REPLACE with the following:

(A) Partial Acceptance: Partial acceptance may be given upon substantial completion of the work at the sole discretion of the Engineer as provided herein. After completion of certain units of work under this contract, such as a structure, utility service, or a section of road or pavement, including all testing and other preparation necessary for operation of the unit by the City as herein specified, but prior to final project completion, the Contractor may request the Engineer to make final inspection of that work for partial acceptance. If the Engineer finds, upon inspection, that the work has been satisfactorily completed in compliance with the contract, the Engineer may accept the work, in writing, as being completed and the Contractor may be relieved of further responsibility for that work. Such partial acceptance shall in no way void or alter any terms of the contract.

(1) For the purpose of this section, substantial completion shall mean that stage in the progress of the work where the work or designated portion is sufficiently complete in accordance with the contract documents so that the City can occupy or utilize the work for its intended use with only minor work items or cleanup items remaining to be accomplished. Partial acceptance shall not be given for incomplete major work items nor minor work items affecting public health and safety.

(2) The units to be included for partial acceptance prior to final project completion will be noted at the time of the preconstruction conference in accordance with Contractor's schedule, or by written notice to the Contractor at the earliest possible time.

(3) The guarantee period for these units shall commence with the date of final acceptance of the entire project by the City. Full payment for these units will not be made until final acceptance of the total work is made.

(4) Acceptance of any portion of the project prior to acceptance of the whole shall not be construed as absolving the Contractor of responsibility for any item of construction or incidental work included in the original contract.

(5) Contract time accounting and/or assessment of liquidated damages shall be suspended on the date of partial acceptance and the Contractor shall complete all remaining work items necessary for final acceptance within 30 calendar days of the date of partial acceptance. The City shall withhold release of retention until all items under the contract have been completed and final acceptance has been issued.

ADD the following subsection to Section 105- Control of Work:

105.16 RECORD DRAWING PREPARATION AND COORDINATION

(A) As-built field data collection and preparation of record drawings will be performed by the Engineer. The Contractor shall notify the Engineer as required in this section, provide access to the work, and cooperate with the Engineer to gather information to accurately depict the as-built conditions. During the construction phase and prior to any backfilling or covering and subsurface improvements, the Contractor shall notify the Engineer of Record and the Engineer of Record will survey the work for the purpose of record drawing preparation. As-built measurements and surveying shall be performed and certified by a Registered Land Surveyor in good standing with the Arizona State Board of Technical Registration. The Engineer shall supply all horizontal and vertical as-built data in ASCII format, including a northing, easting, elevation and description of all work completed under this contract. The Contractor shall aid the Engineer in determining and providing this information. As-built data shall include, but not be limited to all items noted below.

(1) Grading and Drainage Plans

(a) Finished pad grades: An Average pad grade may be used if the pad is not flat. Pad elevations shall not exceed plus 0.5 feet tolerance (plus 0.2 feet if located adjacent to an existing development). Pad elevations shall not exceed minus 0.2 feet tolerance (0.1 feet if located in a floodplain or adjacent to a wash or channel).

(b) Flow line elevations of channels

(c) Hinge point elevations on all slopes and grade breaks

(d) Percentage of all slopes, flow lines and channels

(e) Catch basin grates elevation at top of grate

(f) Inverts of storm drain lines and headwalls

(g) As-built elevations shall be provided at all drainage control point (i.e. detention overflow point, tops and bottoms of detention basins, drain rims, valley gutters, curbs, curb openings, flow line elevations in swales, etc). As-built enough spot elevations to verify the design intentions are met (i.e. grade breaks, high/low points, scuppers, extreme outfall, etc). Show the direction of drainage flow to illustrate that design intent has been met.

(h) Provide calculations to verify that actual as-built volume of all detention facilities included on the as-builts, as well as a table which compares the as-built volumes with the approved, required volumes indicated on the design drawings or in the approved drainage report

(i) Detention calculations shall be revised to as-built condition by the Engineer of Record

(j) Flow line elevations and/or pipe inverts, grate elevations for catch basins, underground detention storage tanks, and all other drainage structures

(k) Top of flood walls, retaining walls, and cutoff walls

(l) Stations, offsets, and invert elevations for spillways and box culverts

(m) When storm drain lines and appurtenances are included in the grading and drainage drawings, the Contractor shall refer to the storm drain plan record drawing requirements for additional required items

(2) Water/Fire/Reclaimed Water Plans

(a) All fittings and appurtenances shall be surveyed, including but not limited to the following: valves, bends, tees, reducers blow offs, air release valves, tracer wire stations, water meters, and hydrant locations.

(i) Valves shall be measured on the nut and center of the cover. If extensions are used, the length of the extension shall be noted.

(ii) All fittings shall be measured at the middle of the fitting.

(iii) Air release valves shall be measured at the main connection, the air release box, and any major alignment changes between the two.

(b) Pipe sizes, lengths and materials

(c) Horizontal and vertical separation from existing and new utilities and drainage culverts/storm drain

(d) Street centerline station and offset dimension to:

(i) All fire hydrants and fittings (e.g. valves)

(ii) Main at all changes in alignment

(iii) All horizontal control points (e.g. centerline intersects, PC, PT)

(e) Centerline station and offset to each service tap; size of tap and meter

(f) Note centerline station, offset and elevations to all changes in vertical alignment (e.g. dips, bends, etc. required to avoid conflicts with other utilities). If the water main continues in a straight horizontal and vertical alignment for more than 100 feet, the water main will be surveyed every 100 feet. Sufficient survey measurements shall be taken on horizontal and vertical curves to establish an accurate alignment.

(g) The drawings must clearly indicate the specific points of reference. No dimensioning from points of curvature or tangency is acceptable for record drawing purposes. In all cases where the pipeline is constructed within, or parallel in close proximity with the right-of-way, all stationing and dimensioning must be from the nearest appropriate monument line and monument line intersection.

(h) When water services are not installed perpendicular to the water main, both the location of the tap at the main and the distance of the meter set from the nearest side property line of the lot must be shown.

(i) On phased projects, the phase lines must be clearly shown on the key map and on the plan and profile sheets, and their locations clearly identifiable. Actual pipe end locations relative to phasing lines must be shown by dimensioning or stationing.

(j) A complete list of all materials installed and abandoned must be shown. The specific size and material type of each pipeline installed must be shown at every construction reference to that pipe. Any changes to the record drawing must be reflected on the materials list.

(k) Water tank and appurtenances

(i) Required information for water tanks include, but are not limited to finished floor elevations, footing elevations, inlets, outlets, drains and overflow locations.

(ii) Required information for site piping and appurtenances shall follow the requirements of this section.

(iii) Manufacturer detail drawings for tanks shall be supplied and sealed by a Registered Engineer.

(3) Sewer Plans

(a) The alignments of the main(s) including all horizontal and vertical curves. If the sewer main continues in a straight horizontal and vertical alignment for more than 100 feet, the sewer main shall be surveyed every 100 feet. Sufficient survey measurements shall be taken on horizontal and vertical curves to establish an accurate alignment.

(b) All manholes, cleanouts, backwater valves, individual services, lift stations, and force main valves shall be surveyed. Structures shall have rim and invert elevations included.

(c) Pipe sizes and lengths

(d) Recalculated pipe slopes

(e) All valves at lift stations and line or isolation valves on force mains shall be measured on the nut and the center of the cover or vault lid.

(f) Separation from existing/newly installed water main and culverts

(g) Street centerline station and offset dimension from street centerline to main at manholes

(h) Sewer line stationing at centerline of each service tap at 90 degrees to main; if not installed at 90 degrees to main, station and offset to end of each service tap.

(i) New manholes built on existing lines require showing its station from the nearest existing downstream manhole and its distance to the nearest existing upstream manhole.

(j) Where construction begins with removal of an existing pipe plug or cleanout, 0+00 stationing always begins at the nearest existing downstream manhole. Pipe length measurement and stationing is always from the centerline of the downstream manhole to the centerline of the upstream manhole or cleanout. Do not give partial pipe lengths in plan or profile at match lines. Always indicate the distance between manholes or to cleanouts or pipe ends.

(k) All as-built adjustments to manhole, cleanout and pipe information shall be shown on both plan and profile, and repeated on every sheet that refers to the same information.

(l) A complete list of all materials installed and abandoned must be shown. The specific size and material type of each pipeline installed must be shown at every construction reference to that pipe. Any changes to the record drawing must be reflected on the materials list.

(m) On phased projects, the phase lines must be clearly shown on the key map and on the plan and profile sheets- and their locations clearly identifiable. Actual pipe end locations relative to phasing lines must be shown by dimensioning or stationing.

(4) Paving/Roadway Construction Plans

(a) Top of curb, flow line, and pavement centerline elevations at all grade breaks, Points of Tangency (PT), Points of Curvature (PC), Beginning Curb Return (BCR), and Ending Curb Return (ECR), valley gutters, spandrels at intersections, plus any other location necessary to adequately show drainage

(b) Percentage of slope

(c) ADA ramps including ramp slopes

(d) Edge of pavement on rural road sections

(e) Location of traffic signage, signals, poles and cabinets

(f) Station for all grade breaks

(g) Back of curb offset dimension at all changes in alignment

(h) Survey monuments - as-built installation and provide the City Northing/Easting to the hundredth of 1 foot. For street monuments, provide top of monument as-built elevation in addition.

(i) Distances from monument line to back/face of curb, edge of pavement, and sidewalk; show on plan view or typical detail for street section

(j) Beginning and ending stations and elevations for all traffic calming devices

(k) Stations, offsets, and invert elevations for spillways and box culverts

(l) Flow line elevations and/or pipe inverts, grate elevations for catch basins, underground detention storage tanks, and all other drainage structures

(5) Traffic Signal Plans

(a) Street centerline station and offset dimension to all fixture poles, cabinets, boxes, or other signal related furniture

(b) Horizontal location of conduit along with elevations to top of conduit

(6) Signing and Striping Plans

(a) Street centerline station and offset dimension to all signage, painted arrows, wording, and symbols

(b) Face of curb dimensions to all striping

(7) Storm Drain Plans

(a) Street centerline station and offset dimension to the main at all changes in alignment and/or changes in grade

(b) Street centerline station and offset dimension to all structures and changes in alignment

(c) Top and invert elevations for all structures

(d) Drainage pipe inverts

(e) Finish elevation for catch basins

(f) Invert elevations of box culverts

(g) Headwall data shall include top of wall/wingwall, footing elevations, inverts, and apron boundaries whether concrete or rip-rap

(h) Length of catch basin wings

(i) Drainage ditches, swales, and channels; the flow line and sufficient cross sections (minimum of 50 foot intervals) including grade changes, shall be provided

(8) Landscaping

(a) Revise as needed to reflect the addition, removal, relocation or change of irrigation main lines, plant materials or hardscape

(9) Street Light Plans

(a) Record drawings for street lights are required to have the Arizona Public Service (APS) ID number of each street light noted on the plan

(b) Street centerline stationing and offsets for street lights

(B) Prior to backfilling or covering any work, the Contractor shall notify the Engineer 48 hours in advance in writing for the item of work. The minimum 48 hours notice time shall not include weekends or holidays. The notification shall be via e-mail to both the City and the Engineer.

(C) The Contractor must provide access for the Engineer to verify all as-built information prior to backfilling or covering. The Contractor shall not backfill or cover an item of work until verification has been completed by the Engineer. If the Contractor backfills or covers an item of work prior to being measured or recorded by the Engineer, the Contractor at the direction of the Engineer shall uncover the item of work at no additional cost to the City.

(D) The Contractor shall maintain on site, available to the City and Engineer at all times, 1 redlined copy of all project plans and documents including drawings, specifications, addenda, approved shop drawings, and change orders which reflect all changes and modifications made during construction of the project. The redline copy shall be updated on a weekly basis in preparation for the weekly as-built field meeting. The Contractor shall maintain the plans and documents in good order and shall provide the Engineer with a redlined copy of all plans and documents upon completion of the project or upon termination of the contract.

(E) Weekly field meetings with the Contractor, Engineer and City shall occur to review as-built information for conformance with the specifications. The Contractor shall provide the Engineer with a schedule of work items to be constructed in the upcoming 30 day period, including approximate dates of installation prior to backfilling or covering. The Contractor field redlines will be reviewed for notation of changes in the work. Missing, erroneous or deficient data must be corrected by the Contractor at no additional cost to the City.

(F) Measurement and Payment: No separate measurement and payment shall be made for record drawing preparation and coordination. This work shall be considered incidental and included in the unit price bid for construction or installation of the appropriate contract pay items.

SECTION 106: CONTROL OF MATERIALS

106.1 SOURCE OF MATERIALS AND QUALITY

ADD the following:

The Contractor shall submit in writing all materials to be used in the project in accordance with ADOT Specifications 106 and 730-4.

Where equipment, materials, or articles are referred to in the specifications as “or equal”, or “equal to” any particular standard, the Director shall decide the question of equality.

Wherever any standard published specification is referred to, the latest edition or revision, including all contract amendments, shall be used unless otherwise specified. Materials of a general description shall be the best of their several kinds, free from defects, and adapted to the use for which provided. The physical characteristics of all materials not particularly specified shall conform to the latest standards published by the American Society for Testing and Materials (ASTM), where applicable. All material shall be new and of the specified quality and equal to the accepted samples, if samples have been submitted.

All work shall be done and completed in a thorough, workmanlike manner notwithstanding any omission from these specifications or from the plans; and it shall be the duty of the Contractor to call the Director's attention to apparent errors or omissions and request instructions before proceeding with the work. The

Director may, by appropriate instructions, correct errors and supply omissions, which instructions shall be binding upon the Contractor as though contained in the original specifications or plans.

Materials which will require testing and inspection at the place of origin shall not be shipped prior to such testing and inspection.

Nothing in the contract shall be construed as vesting in the Contractor any right of property in materials used after they have been attached or affixed to the work or the soil and accepted. All such materials shall become the property of the City upon being so attached or affixed and accepted.

106.2 SAMPLES AND TESTS OF MATERIALS

REMOVE the second paragraph in its entirety and REPLACE with the following:

The City will pay for the initial or normal test required by the Engineer as provided by Section 106.9 of these specifications. All Quality Control initial or normal testing will be performed by the Contractor's Quality Control subcontractor, at no cost to the City. Additional tests, required due to failure of the initial or normal test(s), shall be paid for by the Contractor for both Quality Control and Quality Assurance testing. The Engineer will designate the laboratory which will accomplish the additional test(s).

106.4 TRADE NAMES AND SUBSTITUTIONS

ADD the following:

Requests relative to substitutions for materials or equipment specifically designated on the plans or in the specifications shall be accompanied by complete data on which the Director can make determination on the merits of the proposed substitution. The written request shall state how the product proposed for a substitution compares with or differs from the designated product in composition, size, arrangement, performance, etc., and in addition, the request shall be accompanied by documentary evidence of equality in price and delivery or evidence of difference in price and delivery. Data on price shall be in the form of certified quotations from suppliers of both the designated and proposed items. All items accepted for substitution shall be subject to all applicable provisions of the specifications.

Should substitution be allowed under the foregoing provisions, and should the item subsequently prove to be defective or otherwise unsatisfactory for the service for which it was intended, the Contractor, shall without cost to the City, and without obligation on the part of the Director, replace the item with the material originally specified.

106.5 STORAGE OF MATERIALS

ADD the following:

Protection of materials and equipment stored on the site shall be the responsibility of the Contractor. The City reserves the right to direct the Contractor to provide proper means of protection for materials if such is deemed advisable by the Director; however, the exercise of or failure to exercise this right shall not be deemed to relieve the Contractor of the Contractor's primary responsibility for protecting the material and equipment. The Contractor shall provide suitable warehouses or other adequate means of protection for such if the materials and equipment require storage and protection. The Contractor shall store and care for the materials and equipment in the most suitable manner to protect them from distortion, rain, dust, or other damage. The cost of replacing any material or equipment damaged in storage shall be borne by the Contractor, and the fact that material or equipment has been damaged after partial payment has been made shall not relieve the Contractor of the Contractor's primary responsibility.

No motor shall be left uncovered or unprotected.

ADD the following subsection to Section 106- Control of Materials:

106.9 QUALITY ACCEPTANCE TESTING

(A) The Engineer may provide quality acceptance sampling and testing. The number of tests and location of each shall be determined by the Engineer.

(B) The Contractor and the Engineer's representative shall coordinate on a daily basis the following day's work schedule and any testing that may be necessary.

(C) Construction quality acceptance testing performed by the City does not relieve the Contractor or the manufacturer of materials produced for the Contractor, of the obligation to perform and document quality control testing of materials and workmanship.

(D) Measurement and Payment: No separate payment shall be made for Contractor Quality Control. This work shall be considered incidental and included in the unit price bid for construction or installation of the appropriate contract pay items. An independent geotechnical firm shall perform all quality control testing. The Contractor shall furnish copies of all test results to the City on a weekly basis.

The expense of the initial quality acceptance sampling and testing shall be paid for by the City. Additional tests, required due to failure of the initial or normal test(s), shall be paid for by the Contractor for both Quality Control and Quality Assurance testing at no expense to the City. The Engineer will designate the laboratory which will accomplish the additional test(s).

SECTION 107: LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC

ADD the following subsection to 107.1 Compliance with Laws:

107.1.1 Compliance with Federal and State Laws

The Contractor understands and acknowledges the applicability to it of the Americans with Disabilities Act, the Immigration Reform and Control Act of 1986 and the Drug Free Workplace Act of 1989. The following is only applicable to construction contracts: The Contractor must also comply with A.R.S. § 34-301, "Employment of Aliens on Public Works Prohibited", and A.R.S. § 34-302, as amended, "Residence Requirements for Employees".

Under the provisions of A.R.S. § 41-4401, the Contractor hereby warrants to the City that the Contractor and each of its subcontractors will comply with, and are contractually obligated to comply with, all Federal Immigration Laws and regulations that relate to their employees and A.R.S. § 23-214 (A) (hereinafter "Contractor Immigration Warranty").

A breach of the Contractor Immigration Warranty Shall constitute a material breach of this contract and shall subject the Contractor to penalties up to and including termination of this contract at the sole discretion of the City.

The City retains the legal right to inspect the papers of any Contractor or subcontractor's employee who works on this contract to ensure that the Contractor or subcontractor is complying with the Contractor Immigration Warranty. The Contractor agrees to assist the City in regard to any such inspections.

The City may, at its sole discretion, conduct random verification of the employment records of the Contractor and any of the subcontractors to ensure compliance with the Contractor Immigration Warranty. The Contractor agrees to assist the City in regard to any random verification performed.

Neither the Contractor nor any of the subcontractors shall be deemed to have materially breached the Contractor Immigration Warranty if the Contractor or subcontractor establishes that it has complied with the employment verification provisions prescribed by Sections 274A and 274B of the Federal Immigration and Nationality Act and the E-Verify requirements prescribed by A.R.S. § 23-214 (A).

The provisions of this Article must be included in any contract the Contractor enters into with any and all of its subcontractors who provide services under this contract or any subcontract. "Services" are defined as furnishing labor, time or effort in the State of Arizona by building or transportation facility or improvement to real property.

ADD the following subsection to 107.1 Compliance with Laws:

107.1.2 Employment Provisions

Subject to existing law, and regulations, illegal or undocumented aliens will not be employed by the Contractor for any work or services to be performed pursuant to this contract. The Contractor will ensure that this provision is expressly incorporated into any and all Subcontracts or subordinate agreements issued in support of this contract. The Contractor agrees to comply with the provisions of Sections 274A(a)(1)(A) and 274A(a)(2) of the Immigration and Nationality Act (8 U.S.C. 1324a(a)(1)(A) and 1324a(a)(2)) (the "INA employment provisions"), and any amendments thereto, prohibiting the unlawful employment of illegal or undocumented aliens. Under the terms of this agreement, the Contractor shall not knowingly hire or employ for any work performed pursuant to this contract any workers or employees not lawfully authorized to work under the provisions of the Immigration and Nationality Act or any other applicable Federal or State laws. Violation of the provisions of this section shall be deemed a material breach of this contract.

ADD the following subsection to 107.1 Compliance with Laws:

107.1.3 Independent Contractor Status

It is expressly agreed and understood by and between the parties that the Contractor is being retained by the City as an independent contractor, and as such the Contractor shall not become a City employee, and is not entitled to payment or compensation from the City or to any fringe benefits to which other City employees are entitled. As an independent contractor, the Contractor further acknowledges that he is solely responsible for payment of any and all income taxes, FICA, withholding, unemployment insurance, or other taxes due and owing any governmental entity whatsoever as a result of this Agreement. As an independent contractor, the Contractor further agrees that he will conduct himself in a manner consistent with such status, and that he will neither hold himself out nor claim to be an officer or employee of the City by reason thereof, and that he will not make any claim, demand or application to or for any right or privilege applicable to any officer or employee of the City, including but not limited to workmen's compensation coverage, unemployment insurance benefits, social security coverage, or retirement membership or credit.

ADD the following subsection to 107.1 Compliance with Laws:

107.1.4 Nondiscrimination

The Contractor, with regard to the work performed by it after award and during its performance of this contract, will not discriminate on the grounds of race, color, national origin, religion, sex, disability or familial status in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The Contractor will not participate either directly or indirectly in the discrimination prohibited

by or pursuant to Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Section 109 of the Housing and Community Development Act of 1974, the Age Discrimination Act of 1975, the Americans with Disabilities Act (Public Law 101-336, 42 U.S.C. 12101-12213) and all applicable Federal regulations under the Act, and Arizona Governor Executive Orders 99-4, 2000-4 and 2009-09 as amended.

ADD the following subsection to 107.1 Compliance with Laws:

107.1.5 Americans with Disabilities Act

The Contractor shall comply with all Federal, State and local nondiscrimination statutes in the operation, implementation and delivery of, including State and Federal civil rights and disabilities laws. In particular the Contractor shall ensure that the City 's obligations for program, facility and service accessibility in Title II of the Americans with Disabilities Act are complied with in all activities arising under this contract, and shall hold harmless the City for any and all loss, including but not limited to damages, costs or expenses, incurred or arising from any alleged violations of the Americans with Disabilities Act under the auspices of this contract unless resulting from an intentional or actual negligent act of the City and its employees. Failure to comply with the nondiscrimination or accessibility requirements herein shall be construed as nonperformance and may result in termination of funding, civil action or both.

ADD the following subsection to 107.2 Permits:

107.2.1 Permits, Taxes and Licenses

Except as otherwise provided in the specifications, it is the duty of the Contractor to procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the work. All applicable permits, licenses and taxes are the responsibility of the Contractor.

City permit fees are waived for contractors performing work on City capital improvement projects.

107.5 SAFETY, HEALTH AND SANITATION PROVISIONS

REMOVE the first paragraph in its entirety and REPLACE with the following;

The Contractor shall provide and maintain, in a neat and sanitary condition, suitable and adequate sanitary conveniences for the use of all persons employed on the project. All sanitary conveniences shall conform to the regulations of the public authority having jurisdiction over such matters. At the completion of the project, all such sanitary conveniences shall be removed and the premises left in a sanitary condition.

On all projects, with respect to sanitation facilities, for which Federal funds are allocated, the Contractor shall cooperate with and follow directions of representatives of the Public Health Service and the Arizona State Department of Health. Federal, State and County public health service representatives shall have access to the work wherever it is in preparation or progress, and the Contractor shall provide proper facilities for such access and inspection.

ADD the following:

The Contractor shall make adequate provision, subject to the approval of the Director, to protect the project and Contractor's facilities from fire, theft, and vandalism, and the public from unnecessary exposure to injury.

At least 1 fire extinguisher, rated at least 2A, shall be provided on the job site.

All construction hoists, elevators, scaffolds, stages, shoring, and similar temporary facilities shall be of ample size and capacity to adequately support and/or move the loads to which they will be subjected. All railings,

enclosures, safety devices, and controls required by law or for adequate protection of life and property shall be provided.

Machinery, equipment and other hazards shall be guarded or eliminated in accordance with the safety provisions of the Manual of Accident Prevention in Construction published by the Associated General Contractors of America, and the requirements of the Occupational Safety and Health Administration.

First aid facilities and information posters conforming at least to the minimum requirements of the Occupational Safety and Health Administration shall be provided in a readily accessible location or locations.

The Contractor shall provide all temporary facilities and utilities required for prosecution of the work; protection of employees and the public; protection of the work from damage by fire, weather or vandalism; and such other facilities as may be specified or required by any legally applicable law, ordinance, rule, or regulation.

The Contractor shall make all reports as are, or may be, required by the Engineer or any authority having jurisdiction, and permit all safety inspections of the work being performed under this contract. Before proceeding with any construction work, the Contractor shall take all the necessary action to comply with all provisions for safety and accident prevention. In the event the Contractor fails to comply with said safety provisions or directions of the Engineer, the Engineer without prejudice to any other rights of the City, may issue an order stopping all or any part of the work.

Thereafter, a start order for resumption of the work may be issued at the discretion of the Engineer when in the Engineer's opinion the defection from safety requirements has been corrected. The Contractor shall make no claim for an extension of time or for compensation or damages by reason of or in connection with such work stoppage.

107.6 PUBLIC CONVENIENCE AND SAFETY

ADD the following:

(A) Maintenance of Traffic

(1) Unless otherwise provided, streets and roads subjected to interference by the prosecution of work shall be kept open to all traffic and maintained by the Contractor until the work is complete. When so requested by the Contractor and approved by the Engineer, the Contractor may by-pass traffic over an approved detour route. Regardless of whether it is through or local traffic, the Contractor shall keep the portion of the project being used by traffic in such condition that traffic will be adequately accommodated. A City approved traffic control plan and right-of-way permit is required prior to the detour.

(2) The Contractor shall also provide and maintain in a safe condition temporary approaches or crossings, intersections with trails, roads, streets, businesses, parking lots, driveways residences, garages and farms. The Contractor shall also be required to remove snow as directed by the Engineer.

(3) Before any detour is opened to traffic, the Engineer shall have been satisfied that traffic is able to proceed in a safe manner.

(4) The Contractor shall bear all expense of maintaining traffic over the road being improved as well as constructing, maintaining and subsequently removing the Contractor requested detours, approaches, crossings, intersections and other features as may be necessary without any direct compensation.

(5) Except as otherwise shown or specified, off-site access roads shall be adequately maintained, graded-earth roads. Such roads shall be built only in the public right-of-way or easements obtained by the City. If the Contractor elects to build along some other alignment, he shall obtain, without additional cost to the City, the necessary right-of-ways or easements.

(6) The Contractor shall remove all unnecessary signage from the project area daily. If unnecessary signage is left, the City will contact the Contractor to remove it immediately. If the Contractor fails to remove the signage in a timely manner, the City will remove the signage at the Contractor's expense.

(7) Sidewalks shall be maintained to allow pedestrian foot traffic without obstruction. If a sidewalk must be closed, the Contractor shall maintain adequate prior warning for pedestrians to safely cross the street with as much advance notice as possible. Where sidewalk is not present, a City approved pedestrian detour shall be provided.

(B) Access to Businesses/Residences

(1) The Contractor shall provide to all residents and businesses affected by the project, access to 1 of their driveways at all times except as modified by the following: If the Contractor finds it unavoidable to temporarily close off access for any time, the residents/businesses affected shall be contacted a minimum of 48 hours in advance and an alternate procedure for access mutually agreed to. The Contractor shall provide the Engineer with signed evidence of a mutually accepted agreement between the property owner/business manager/residential manager and the Contractor prior to said closure.

(2) Direct access shall be provided at all times to fire engine houses, fire hydrants, hospitals, police stations and at all other agencies or services where emergencies may require immediate access to same.

(C) Safety

(1) The safety and convenience of the general public and the residents along the project and the protection of persons and property shall be provided for by the Contractor in accordance with the requirements of this contract.

(2) The Contractor shall submit a safety plan to the Engineer at the preconstruction conference. The plan shall detail the procedures the Contractor will implement to satisfy the Occupational Safety and Health Administration (OSHA) and the Arizona Division of Occupational Safety and Health (ADOSH) Guidelines related to the worker as well as public safety in construction of excavations, structures and confined air spaces as identified by the Engineer. The Contractor's safety plan shall include the requirement that all workers and visitors must wear hard hats while within the project limits.

(3) The safety plan submitted by the Contractor shall include proposed methods to prevent unauthorized persons from gaining access to the work areas.

(4) In conjunction with the safety plan, the Contractor shall furnish and install 72 inch temporary chain link fencing, or approved equal satisfactory to the Engineer, around any unattended excavation deeper than 4 feet with slopes steeper than 2:1. Temporary fencing shall completely enclose the referenced construction activity and shall be secured after normal working hours to prevent unauthorized access.

(5) Unless otherwise approved in writing by the Engineer, open utility trenches shall be limited to 50 feet in length except for cast-in-place pipe installations and during non-working hours shall be covered with steel plate in a manner satisfactory to the Engineer. Appropriate warning signs shall be installed when steel plates are left during non-work hours. Any traffic control signing shall be included in the traffic control line item(s) for the project.

107.6.1.1 Contractor's Marshaling Yard when the Agency is the Contracting Party:

ADD the following to item (F):

The Contractor will be fully and solely responsible for any and all adverse impacts and damages caused by the Contractor's operations on the property and the settlement of all claims pertaining thereto. The failure of the Contractor to comply with these provisions will result in the retention of some portion of the Contractor funds, payable under the contract, until such claims are resolved.

107.6.2

ADD the following:

In inhabited areas, particularly residential, operations shall be performed in a manner to minimize unnecessary noise generation. Particular consideration shall be given to noise generated by construction, repair and/or service activities during the night hours in residential areas. No construction, repair or service activities shall be conducted between the hours of 6:00 PM and 7:00 AM, without prior approval of the City.

107.7 BARRICADES AND WARNING SIGNS

ADD the following:

Excavations on project sites from which the public is to be excluded shall be marked or guarded in a manner appropriate for the hazard.

The Contractor shall protect all existing structures, trees, shrubs, and other items on the project site that are to be preserved, by substantial barricades or other devices commensurate with the hazard, from injury or destruction by vehicles, equipment, workmen, or other agents.

107.9 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE

ADD the following to the first paragraph:

Any land monuments and property marks displaced by the Contractor shall be replaced at the Contractor's expense in accordance with Section 405 of these specifications and to the City Surveyor's satisfaction, including filing of new record of survey if monuments could not be reestablished to pre-project conditions.

ADD the following:

The Contractor shall replace or repair any damage done to driveways and walks to not less than the condition existing prior to the Contractor's work.

Streets and roads subjected to interference by the prosecution of this work shall be kept open and maintained by the Contractor until the work is completed.

All trees and shrubbery within the right-of-way or easements shall be protected by the Contractor insofar as practicable. In the event shrubbery or trees must be trimmed, or removed, the Contractor shall notify the property owner to do so within a reasonable time prior to construction. All shrubbery or trees not removed by the property owner shall be trimmed or removed by the Contractor and hauled from the job at the Contractor's expense. All trees, shrubs, hedges, brush, etc. designated on the plans, or by the Director for removal, shall be completely removed and disposed of as indicated on the plans or as specified by the Director.

The Contractor shall contact the owners of any drainage ditches, irrigation lines, and appurtenances, which interfere with the work and shall make arrangements for dry-up or scheduling of water deliveries as necessary. The Contractor shall be liable for any damage due to irrigation facilities damaged by the Contractor's operations and shall repair such damaged facilities to an "equal or better than" original condition.

In excavation, fill, and grading operations, care shall be taken to disturb the pre-existing drainage pattern as little as possible. Particular care shall be taken not to direct drainage water onto private property or into streets or drainage ways inadequate for the increased flow.

Mailboxes and traffic signs removed during construction shall be installed in "like kind" and shall be considered incidental to the unit prices for work included in the bid schedule, provided they are not in the bid schedule.

The Contractor shall restore each individual work site to grades existing before construction work, including wheel ruts and other scarring.

Measurement and Payment: No separate payment will be made for restoration of items impacted by the Contractor's construction operation and the cost of these items shall be included in the unit bid prices in the bid schedule, unless specifically called out in the bid schedule as protection and restoration of property and landscape.

107.10 CONTRACTOR'S RESPONSIBILITY FOR WORK

ADD the following:

(A) The Director shall have the authority to suspend the work wholly or in part, for such period as he may deem necessary, due to unsuitable weather, or to such other conditions as are considered unfavorable for the suitable prosecution of the work, or for such time as he may deem necessary due to the failure on the part of the Contractor to carry out orders given, or to perform any provisions of the contract. The Contractor shall immediately comply with the written order of the Director to suspend work wholly or in part. The suspended work shall be resumed when conditions are favorable and methods are corrected, as reviewed and accepted in writing by the Director.

(B) In case of suspension of work for any cause whatsoever, the Contractor shall be responsible for all materials and shall properly store them if necessary and shall provide suitable drainage and erect temporary structures where necessary.

(C) If the performance of all or any portion of the work is suspended or delayed by the Director in writing for an unreasonable period of time (not originally anticipated, customary, or inherent to the construction industry) and the Contractor believes that additional compensation and/or contract time is due as a result of such suspension or delay, the Contractor shall submit to the Director, in writing, a request for an adjustment within 7 calendar days of receipt of the notice to resume work. The request shall set forth the reasons and support for such adjustment.

(D) Upon receipt, the Director will evaluate the Contractor's request. If the Director agrees that the cost and/or time required for the performance of the contract has increased as a result of such suspension and the suspension was caused by conditions beyond the control of and not the fault of the Contractor, its suppliers, or subcontractors at any approved tier, and not caused by weather, the Director will make an adjustment (excluding profit) and modify the contract in writing accordingly. The Contractor will be notified of the Director's determination whether or not an adjustment of the contract is warranted. In the event an adjustment of the contract is warranted a contract amendment shall be executed by both parties evidencing mutual agreement to same.

(E) No contract adjustment will be allowed unless the Contractor has submitted the request for adjustment within the time limits prescribed.

(F) No contract adjustment will be allowed under this clause to the extent that performance would have been suspended or delayed by any other cause, or for which an adjustment is provided or excluded under any other term or condition of this contract.

Add the following subsection to 107.13 Personal Liability of Public Officials:

107.13.1 Non-Responsibility of the City

Indebtedness incurred for any cause in connection with this work must be paid by the Contractor, and the City is hereby relieved at all times from any indebtedness or claim other than payments under terms of the contract.

ADD the following subsection to Section 107- Legal Regulations and Responsibility to Public:

107.15 PUBLIC RELATIONS

107.15.1 Public Notice

Unless otherwise directed, the Contractor shall issue written notification to those residents affected by the project. The notification shall contain, at a minimum: (1) Type of Work (2) Contractor Name, Phone Number and Point of Contact (3) Duration of Project (4) Date Project Commences (5) Description of the Project Site (6) Contractor's After-hours Point of Contact and Phone Number.

The Contractor is required to post public notification signs at all entrances to the project specifying the following information: (1) Project Name and Description (2) Construction Calendar (3) Contractor Name and Phone Number for both Day and Night (4) City Public Works (928) 777-1130.

The sign size and legend shall be appropriate for the intended purpose and be easily read. Sign background shall be blue with white letters. The sign size and legend content shall be approved by the Director prior to sign manufacture. All signs shall be posted prior to commencement of any work on the project. Signs will be removed by the Contractor upon final acceptance of the project. No direct payment shall be made for said signs. The cost of such signs shall be considered incidental to the project, unless otherwise noted.

107.15.2 Community Relations Organization

The Contractor shall be required to furnish a private telephone line to be used solely for receiving incoming calls from local citizens with questions or complaints concerning construction operations or procedures. The Contractor shall be required to publish this telephone number and maintain a 24 hour answering service. The answering service shall be manned by the Contractor's personnel during all hours during the course of construction that there is work being performed on the project. The Contractor shall maintain a log of incoming calls, responses, and action taken, which shall be submitted to the Engineer weekly and upon request.

The Contractor shall retain the services of a community relations organization for the project. The Contractor shall submit for approval, to the Engineer, the resume of the proposed community relations organization. Included in the resume shall be the names and credentials of the staff. The community relations organization shall be proactive and knowledgeable in the means and effectiveness of various notification techniques. The Engineer will rely on the organization's experience and suggestions in the presentation of information to the public. The Engineer will review the resume and possibly interview the organization. The Engineer will notify the Contractor within 10 calendar days of the acceptability of the community relations organization. Upon notification by the Engineer of an acceptable community relations organization, the Contractor shall hire the organization.

The community relations organization's activities shall include, but not necessarily be limited to:

- Printing and distribution of public notices
- Providing media news releases after review by the Engineer
- Planning and attending other public meetings as required by the Engineer
- Planning or otherwise participating in the dedication ceremonies as requested by the Engineer

- Possess the means for the development and fabrication of newsletters, notices, posters and demonstration boards
- Providing telephone "Hot Line" 24 hour service

The Contractor shall have a community relations organization on board prior to the preconstruction conference, a meeting in which the community relations organization will have an important participatory role.

The community relations organization shall develop a community relations program. The program shall include but not necessarily be limited to:

(A) Distributing a preconstruction information letter to all residents, businesses, schools and churches affected by the project or use of staging areas, and within an area determined by the Engineer, which shall contain, as a minimum, the following information:

- Name of contractor
- A 24 hour informational telephone number
- Brief description of project
- Names of project manager and superintendent (Contractor)
- Name of project engineer (Public Works Department)
- Construction schedule including anticipated work hours
- Traffic regulations including lane restrictions
- Time and place for the preconstruction conference. This notification shall be delivered a minimum of 5 working days prior to the meeting date.

(B) Holding a preconstruction community meeting with affected neighbors, businesses, schools, churches, etc., as directed by the Engineer.

(C) Scheduling and conducting progress meetings, as required, with the affected business tenants and property owners, as directed by the Engineer.

(D) Printing and mailing of public notices and/or newsletters, including a list of the names, addresses and receipt of postage or delivery for recipients of these newsletters and/or notifications.

(E) Holding other public meetings, as required by the Engineer.

(F) The community relations organization shall use the means (Items A through E) or others to inform the local citizens of operations which may create changes to the norm such as high noise levels, road closures, limited access, haul routes, changes to material delivery routes, unusual hours of construction, disruption of bus routes or changes to other passenger delivery/pick-up routes.

(G) Newsletters shall be distributed each month. A final draft shall be submitted to the Engineer for review and approval at least 2 days before the planned distribution. Each distribution area shall be approved by the Engineer. Each distribution shall include 1 electronic copy and 12 hard copies for the Engineer.

(H) The community relations organization shall keep daily personnel time logs which shall include the name of the employee, date of work, amount of time worked, description of work performed and project number.

Measurement and Payment: The bid schedule includes an allowance for public relations for the purpose of encumbering funds to cover the cost of public relation services. The amount of the allowance is determined

by the Engineer and is not subject to individual bid pricing. All bidders shall incorporate the amount pre-entered in the bid proposal and shall reflect the same in the total bid for the project.

It shall be understood that this allowance item is an estimate only. The allowance shall not be used without approval of the Engineer, and in no case shall exceed the allowance.

Reimbursement for public relations shall be based on the community relations organization invoice cost, plus an allowable markup to the prime Contractor of 15 percent, for those services approved by the Engineer.

107.15.3 Publicity Releases

The Contractor and the Contractor's subcontractors and suppliers, if any, shall not reveal to others through literature, brochures, or other types of publicity releases any information regarding the work or the Contractor's activities or participation on the project without prior written approval from the Director. Any and all jobsite photographs taken by the Contractor, subcontractor or others must be processed in duplicate form with copies provided to the Director. No project photographs shall be released to others without prior written approval of the Director.

ADD the following subsection to Section 107- Legal Regulations and Responsibility to Public:

107.16 STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

The project is subject to the Arizona Pollutant Discharge Elimination System (AZPDES) stormwater requirements for construction sites under the Environmental Protection Agency (EPA) delegation to ADEQ for the Construction General Permit for Arizona. The following specifications shall apply:

(A) General Requirements

The Contractor shall comply with AZPDES stormwater requirements for construction sites under the ADEQ Construction General Permit for Arizona. Under provisions of that permit, the Contractor shall be designated as permittee and shall be responsible for providing the necessary labor and materials, and for taking the appropriate measures to assure compliance with the AZPDES Construction General Permit for Arizona as well as other Federal, State and local requirements pertaining to stormwater discharges. As the permittee, the Contractor is responsible for completing, in a manner acceptable to ADEQ, all documents required by this regulation including the following:

(1) The SWPPP shall be sealed by a professional engineer licensed in the State of Arizona.

(2) The SWPPP for the project including certification form. The Contractor will be required to update and revise the SWPPP as necessary throughout the construction of the project in order to assure compliance with ADEQ permit requirements. The completed SWPPP shall be kept on the project site at all times during construction of the project.

(3) Notice of Intent (NOI) to be covered by AZPDES Construction General Permit for Arizona including certification of signature.

(4) Notice of Termination (NOT) of coverage under AZPDES Construction General Permit for Arizona (upon project completion).

ADEQ's website http://www.azdeq.gov/node/524 provides guidance for NOI submittal and SWPPP templates.

(B) Submittals

(1) Preliminary copies of the NOI and SWPPP shall be submitted to the Engineer at the time of the preconstruction conference. Any necessary revisions to the SWPPP shall be subject to review by the Engineer, before submitting to ADEQ.

(2) The Contractor shall submit completed, signed NOI forms to ADEQ at least 48 hours prior to the initial start of construction on the project. The completed, signed NOI form shall be submitted to ADEQ.

(3) Failure by the Contractor (or any of its appropriate subcontractors) to submit the NOI forms within the required time frame shall result in delay of the start of construction. Any delay resulting from the Contractor failing to fulfill these requirements shall not extend the completion date of the contract unless authorized by the City. The Contractor shall submit a completed copy of the NOI prior to Notice to Proceed. A copy of the completed NOI shall be posted on the construction site and a copy of the SWPPP shall be kept on the construction site.

(C) Contractor Responsibilities

(1) It is the Contractor's responsibility to perform inspection of all stormwater pollution control devices on the project as required under the AZPDES Construction General Permit for Arizona.

The Contractor shall prepare reports on these inspections and retain these reports for a period of 3 years following project completion as required under the AZPDES Construction General Permit for Arizona. Inspection reports shall be submitted monthly to the contracting agency along with payment requests. The Contractor shall maintain all stormwater pollution control devices on the project in proper working order, including cleaning and/or repair during the duration of the project.

(2) No condition of either the AZPDES Construction General Permit for Arizona or the SWPPP shall release the Contractor from any responsibilities or requirements under other environmental statutes and regulations.

(D) Upon total project completion, acceptance, and de-mobilization, the Contractor shall submit a completed, signed NOT form to ADEQ with copies to the same agencies who received copies of the NOI, thereby terminating all AZPDES permit coverage for the project.

Measurement and Payment: Payment shall be at the lump sum unit price bid in the contract documents for all material, labor, and other incidental costs relating to the provision, installation, and maintenance of items relating to this permit during project construction. Such incidental costs shall include the Contractor's costs in order to assure proper operation of the pollution-control devices installed including all maintenance, cleaning, and disposal costs associated with clean-up and repair following storm events or other runoff or releases on the project.

SECTION 108: COMMENCEMENT, PROSECUTION AND PROGRESS

108.1 NOTICE TO PROCEED

ADD the following to item (A):

(1) The Contractor shall not work on any part of the project or incur any expenses or obligations until a Notice to Proceed has been issued by the City.

(2) The Notice to Proceed will be delivered to the Contractor by first class mail, electronically and/or delivered in person.

108.2 SUBLETTING OF CONTRACT

REMOVE item (E) in its entirety and REPLACE with the following:

(E) The Contractor shall perform more than 40 percent of the dollar value of the work (by total contract amount) involved in the project with the Contractor's own forces. Total subcontracted amounts shall be limited to less than 60 percent of the dollar value of the work (by the total contract amount). For purposes of this requirement, materials purchased directly from suppliers and installed by the Contractor's own forces shall be included in the Contractor's total and materials installed by subcontractors, regardless of who originally purchased them, will be included in the subcontractor's totals.

ADD the following:

(F) All subcontractors and purchase orders for equipment shall state and establish guaranteed delivery dates, at such times as determined by the Contractor, which will allow the Contractor to complete the project within the contract time.

(G) The Contractor shall furnish the Subcontractors List form with the Contractor's bid including the estimated amount of each subcontract. Additionally, a duplicate copy of each subcontract, including lower tier subcontracts, shall be delivered to the Director upon award of the project and prior to the issuance of the Notice to Proceed.

108.4 CONTRACTOR'S CONSTRUCTION SCHEDULE

ADD the following:

At the preconstruction conference the Contractor shall submit for review by the Engineer a complete construction schedule. The Engineer reserves the right to reject construction schedule submittals when in the Engineer's opinion the schedule lacks the proper detail. It shall be the responsibility of the Contractor to maintain overall coordination of the project. Based on the general contract construction schedule prepared in accordance with these specifications, the Contractor shall obtain from each of the Contractor's subcontractors a similar schedule and shall be responsible for all parties maintaining these schedules or for coordinating changes necessitated by unforeseen difficulties.

(A) The construction schedule shall indicate the time of starting and completing each major phase of the project and such intermediate phases as will serve for well-defined control points. The schedule shall be of sufficient detail to define the critical path for project completion. It shall also indicate the scheduled receipt of major items of equipment and the items of equipment installation dates of which is critical to the scheduled progress of the project. Two week look-ahead schedules will be provided by the Contractor at each weekly construction meeting. The comprehensive project schedule shall be updated and submitted monthly. Such updates shall include and accurately reflect additional work, changes in the work, delays to individual items of work and reasons therefore along with the extent of delay and any other items affecting the progress of the project.

(B) Failure by the Contractor to provide the weekly and monthly updates will result in the City withholding an amount equal to 5 percent of the monthly pay estimate relative to the billing period in which the schedule updates are to be provided. Said 5 percent withholding will be retained by the City until the required schedule updates are submitted by the Contractor, reviewed by the City and found to be current. When the schedule updates are determined to be in conformance with the provisions herein the 5 percent retainer will be released with the next monthly payment.

(C) The construction schedule shall serve as an index of progress prosecution as contemplated by the Contractor. In the event the actual construction progress varies substantially from the scheduled progress, the

Engineer will require and the Contractor shall be required, within 10 calendar days written notice, to provide a revised construction schedule, giving in detail the particular changes in production as estimated by the Contractor to complete the work within the specified contract time. Time is of the essence in this regard.

ADD the following subsection to 108.4 Contractor's Construction Schedule:

108.4.1 Project Meetings

(A) It shall be the responsibility of the Contractor to conduct weekly meetings to be attended by representatives of subcontractors, utilities, the City and other interested parties for the purpose of keeping the project on schedule and to provide for necessary coordination of the work of the various parties. The Contractor shall take minutes at each meeting for distribution to all attendees the following week. The minutes shall be of sufficient detail to accurately recount the meeting discussion, including but not limited to progress, work schedule, submittals and certifications, utilities, construction issues, contract changes, safety and traffic control, action items, and resolved and unresolved issues.

(B) Additionally the Contractor shall furnish the Director with written weekly project status reports at the beginning of each weekly project meeting. The report shall cover the work of the preceding work week and shall include the following for each week:

(1) A comprehensive daily list of the Contractor's men and equipment performing the work on the jobsite.

(2) A comprehensive daily list of the Contractor's subcontractor's men and equipment, if any, performing the work on the jobsite.

(3) A brief description of the work performed by the Contractor and Contractor's subcontractors, if any.

(4) The estimated percentage of each portion of the work performed for the period together with the total percentage of each portion of the work performed to the date of the report.

(5) A detailed summary of each work stoppage, if any, occasioned by the City, other contractors, or other designated reasons, which were beyond the Contractor's control.

(6) Comments or exceptions to prior weekly meeting minutes shall be addressed at each subsequent construction meeting.

108.7 DETERMINATION AND EXTENSION OF CONTRACT TIME

ADD the following:

It is the Contractor's responsibility to establish construction methods and a construction schedule, which will facilitate the completion of work required by this contract within the contract period and with full consideration for the season during which the work is scheduled. Judgment as to hazardous conditions shall be made by the Director.

To receive consideration for an extension of time, a request must be made in writing to the Director stating the reason for said request, and such request must be received by the Director as soon as reasonably practicable when the Contractor has knowledge or should have known of the delay causing event, condition or circumstances, but in no event later than immediately following the end of the delay-causing condition. The extension of time allowed shall be as determined by the Director and approved by the City. In setting the contract time, it has been assumed that up to 5 working days may be lost as a result of weather conditions which will slow down the normal progress of work; therefore no extensions in contract time will be allowed for the first 5 working days lost due to bad weather conditions. An extension of time may be granted by the City after the expiration of the time originally fixed in the contract or as previously extended, and the extension so granted shall be deemed to commence and be effective from the date of such expiration.

Any extension of time shall not release the sureties upon any bond required under the contract. Extensions of time in and of themselves will not be a basis for a request of additional compensation by the Contractor.

Any delays in the project, or extensions of time which may be granted, shall not entitle the Contractor to any additional compensation or monies whatsoever, including but not limited to compensation for loss of anticipated profits, extended overhead, unabsorbed home office overhead, or any other payments, unless expressly agreed to by the City in a duly executed and approved contract amendment.

108.8 GUARANTEE AND WARRANTY PROVISIONS

REMOVE the first paragraph in its entirety and REPLACE with the following:

The Contractor shall guarantee the work against defective workmanship and materials for a period of 2 years from the date of its final acceptance under the contract, ordinary wear and tear and unusual abuse or neglect excepted.

During the 2 year guarantee period, should the Contractor fail to remedy defective material and/or workmanship, or to make replacements within 5 calendar days after written notice by the City, it is agreed that the City may make such repairs and replacements and the actual cost of the required labor and materials shall be chargeable to and payable by the Contractor.

108.10 FORFEITURE AND DEFAULT ON CONTRACT

ADD the following:

In accordance with Section 109 of these specifications, if the Contractor fails, neglects, or refuses to perform work tasks necessary for the completion of the total job; replace defective work; to repair or resurface, in a manner that is acceptable to the City and Engineer, public right-of-ways disturbed by the Contractor's work which are a nuisance, hazard, impedes or endangers vehicular traffic and the public; the City may serve written notice upon the Contractor of its intention to have the work performed by others. Unless, within 3 calendar days after the service of such notice, the Contractor has made such arrangement and scheduled the accomplishment of said work tasks to the satisfaction of the City and Engineer, the City will proceed to have the work accomplished by others or by itself and deduct the costs thereof from amounts due to the Contractor.

The foregoing provisions are in addition to and not in limitation of any other rights or remedies available to the City.

108.11 TERMINATION OF CONTRACT

ADD the following:

The foregoing provisions are in addition to and not in limitation of any other rights or remedies available to the City.

SECTION 109: MEASUREMENTS AND PAYMENTS

109.2 SCOPE OF PAYMENT

ADD the following:

The Contractor shall maintain any and all documentation to substantiate all costs on the project, including but not limited to those items included in force account computations, computations reflecting the actual cost of work on the project and computations substantiating any claimed increases or additional costs incurred in the project by the Contractor, and shall make those records available to the City (or provide copies thereof to the City) within 24 hours of request by the City. The failure of the Contractor to maintain and produce the foregoing documentation will preclude the Contractor from being entitled to any additional payments for any additional work in question.

109.4 COMPENSATION FOR ALTERATION OF WORK

ADD the following:

New or additional work will be classed as extra work when determined by the Director that such work is not covered by the contract.

The value of such work or change shall be determined and paid for with a contract amendment in one of the following ways according to the contract amendment procedure set down by the Public Works Department, and at the option of the City:

(A) As may be mutually agreed upon by the City and the Contractor.

(B) By unit prices in accordance with the Contractor's bid.

(C) By lump sum based upon the Contractor's estimate and the Director's review and acceptance of the estimate.

(D) By force account in accordance with the requirements of that section.

(E) The Contractor shall do such extra work and furnish material and equipment therefore upon receipt of an accepted contract amendment or other written order of the Director. In no case shall work be undertaken without written notice from the Director to proceed with the work. In absence of such contract amendment or other written order of the Director, the Contractor shall not be entitled to payment for any extra work. All contract amendments must be approved by the Director. Contract amendments over $25,000.00 must be approved by City Council.

(F) In the event that the Contractor and the City cannot agree on the compensation to be paid to the Contractor prior to the issuance of a contract amendment, then and in that event the City has the option of terminating the contract with the Contractor or directing the Contractor to proceed and to receive compensation pursuant to the force account provisions herein. In the event that this contract is terminated by the City pursuant to this subsection, the Contractor shall only be paid for those services performed to date of the City's Notice of Termination, said payment to be based upon the unit prices as set forth in the Contractor's bid. In no event shall the Contractor be entitled to additional compensation for lost profits, mobilization or de-mobilization costs, loss of anticipated profits, extended overhead, unabsorbed home office overhead, or any other payments other than for work actually performed as based upon unit prices. In the event that there are no unit prices pertaining to work in question, then and in that event the Contractor's compensation for early termination pursuant to this subsection shall be based upon force account as here-in-before described.

(G) It is expressly agreed that in the event of a contract amendment, any compensation due the Contractor shall be set forth in the contract amendment, and shall be considered full and complete payment (if any) for any and all work related costs, including but not limited to labor, materials, equipment, supervision, field office overhead, extended home office overhead, unabsorbed home office overhead, taxes, bonds, insurance and profits. Additionally, the Contractor shall not be entitled to any additional compensation based upon a contract amendment (or the accumulation of contract amendments) unless specifically set forth in that contract amendment.

(H) In the event that the Contractor submits a proposed contract amendment, the Director shall have 10 days after receipt of the Contractor's written proposed contract amendment to either accept or agree to the contract amendment under the above provisions or deny such proposed contract amendment. If necessary to assess the proper purpose and function of a Contractor's proposed contract amendment, because of the proposed contract amendment's complexity or scope, the Director may either accept and agree to the contract amendment of deny such proposed contract amendment under the above provisions beyond such 10 day period and for an additional reasonable period commensurate with the nature of the proposed contract amendment. The failure of any party to take any action within the time periods or in the manner specified in the subparagraph shall be deemed a waiver of that party's right to recover for such delay in acting.

109.5 ACTUAL COST WORK

ADD the following:

The basis of payment for construction of the project shall be unit prices for all work actually performed in accordance with the specifications and scope of work, and shall include all labor and materials incorporated in the completed work.

Upon final inspection and acceptance of the work, the City will pay the Contractor the amount earned under the Contract, as provided herein.

ADD the following subsection to 109.5 Actual Cost Work:

109.5.8 Force Account

The compensation for force account work performed by the Contractor shall be approved by the Director in the following manner:

(A) Labor: The Contractor shall provide monthly certified payroll reports for all labor and for foremen in direct charge of the specific operations. The Contractor will be compensated as follows:

(1) The actual cost of wages paid by him but at rates not to exceed those for comparable labor currently employed on the project as determined by the Director.

(2) The actual cost of social security taxes and unemployment compensation insurance. There will be no payment for fringe benefits unless mandated by Federal law on federally funded projects.

(3) An amount equal to 15 percent of the actual cost of wages and other costs listed above to cover the Contractor's profit and overhead.

(4) In case work is performed by a subcontractor, the said 15 percent will be added only once to the actual cost of the work, however, the Contractor may add 5 percent to the subcontractor's price to cover the Contractor's own overhead and supervision.

(B) Tools and Equipment: For any special or heavy equipment, the use of which has been authorized by the Director, except for small tools and manual equipment, the Contractor shall be reimbursed the actual cost of rental, not to exceed the latest Rental Rate Blue Book for Construction Equipment. In the event that any of the equipment to be used is not shown in said schedule, the rental rate for such equipment shall be as agreed upon in writing before the work is started. No percentage shall be added to equipment rental rates. In the event said special or heavy equipment is owned by the Contractor, he shall be compensated only for the actual hours said equipment is required for the work under force account on the job site, at a rate not to exceed the latest Rental Rate Blue Book for Construction Equipment.

(C) Materials: For all materials accepted by the Director and used in the work the Contractor shall be paid the actual cost of such material, including transportation charges, to which cost shall be added a sum equal to 15 percent thereof.

(D) Supervision Overhead and Home Office Overhead: No allowance shall be made for general superintendence. The cost of supervision and all overhead is presumed to be included in the 15 percent added in accordance with the above.

(E) Records: The Contractor's representative and the Director shall compare the records of the work performed as ordered on a force account basis at the end of each day on which such work is performed. Copies of these records shall be made on suitable forms provide for this purpose and signed by both the Director and the Contractor's representative. All claims for work done on a force account basis shall be certified and submitted to the Director by the Contractor, and such statements shall be filed with the Director not later than the fifth day of the month following that in which the work was actually performed.

(F) Bonds and Insurance: The Contractor shall be paid the actual cost for additional bonding and insurance pertaining to force account work when the Contractor can provide evidence of additional payment for premiums on required payment and performance bonds. No duplication of payment for Contractor's costs associated with labor costs above will be allowed.

(G) The Director authorized representative is in charge of force account work and has the authority to direct which labor and equipment will be used, to suspend operations, and to refuse to pay for any labor or equipment, which he feels is not doing productive work.

109.7 PAYMENT FOR BOND ISSUE AND BUDGET PROJECTS

ADD the following:

For and in consideration of the faithful performance of the work, the City will pay to the Contractor the amount earned less retention as computed from the actual quantities of work performed under the contract and to make such payment in the manner and at the time(s) specified herein.

ADD the following to the third paragraph of item (A):

The Contractor shall obtain approval from the City prior to reducing the percentage of funds retained and prior to requesting the release of one-half the previous retained amount.

ADD the following to item (A) (1):

(a) Once each month, the Inspector and the Contractor's Superintendent shall meet, or as necessary, to jointly measure all work items under the contract to determine pay quantities for each pay period. Quantities of work items shall be documented on the respective plan sheets and separately in tabular fashion with station to station measurements noted to assure there is no duplication of payment for work performed. Measurements will be for work actually completed. No projections for expected completion of work will be allowed.

(b) The Contractor shall submit partial payment requests in a format approved by Public Works together with the City's Pay Request Application and Certification for Payment (form provided by Public Works) or equal, subject to approval by the Director.

(c) The Contractor shall furnish a detailed breakdown showing unit prices and quantities for use in preparing the monthly estimate. No partial payment will be made until this breakdown is presented by the Contractor and has been reviewed and accepted by the Director. Green-lined plan sheets shall be submitted with each monthly pay request illustrating the line item quantities constructed for the period. The green-lined plan sheets and pay estimate spreadsheets must reconcile with one another.

(d) Partial payments for stored materials may be considered by the Director, if it is determined to be in the best interest of the City. The Contractor shall not rely on payment for stored materials being approved in the preparation of the project bid.

REMOVE the first paragraph of item (B) in its entirety and REPLACE with the following:

(B) Final Payment: When the project has been accepted as provided in Section 105 of these specifications, and within 30 calendar days after final inspection of the work completed under the contract, the Contractor shall render to the City a final estimate, which shall show the amount of work performed and accepted under the contract. All prior estimates and partial payments will be subject to correction in the final estimate for payment.

ADD the following to the second paragraph of item (B):

(See the Contractor's Affidavit Regarding Settlement of Claims and Certification of Completion of Warranties within the contract documents.) Additionally, the Contractor shall furnish lien waivers for all completed labor and materials consumed during the project.

Prior to the final payment to the Contractor, the City shall deduct therefrom any and all unpaid privilege, license and other taxes, fees and any and all other unpaid moneys due the City from the Contractor, and shall apply to those moneys to the appropriate account. The Contractor shall provide to the City any information necessary to determine the total amount(s) due. The quantities appearing in the bidding schedule are approximate only, and are prepared for the comparison of bids. Payment to the Contractor will be made only by actual quantities of work performed and accepted in accordance with the requirements of the contract. Only the items listed in the bidding schedule are pay items. The scheduled quantities of work to be done and materials to be furnished may each be increased, decreased or omitted.

Final project as-built plans shall verify line item quantities constructed for the project by individual plan sheet. The Contractor shall submit final payment request in a format approved by the City.

109.10 PAYMENT FOR MOBILIZATION/DEMOBILIZATION

REMOVE in its entirety and REPLACE with the following:

The Agency will compensate the Contractor for a single round trip mobilization/demobilization of the Contractor's personnel, equipment, supplies and incidentals, including establishment of offices, buildings and other facilities required for the performance of the work on the project, as well as preparatory work and operations prior to the commencement of the work on the project site.

Measurement and Payment: Mobilization will be measured for payment by the lump sum bid as a single complete unit of work. Payment for mobilization will be made as provided herein which shall be full compensation for supplying and furnishing all materials, facilities, and services and performing all the work involved as specified above. The total amount allowed for mobilization during the life of the contract shall not exceed 9 percent of the original contract amount. If the bid price exceeds this percentage the excess amount will be paid to the Contractor upon completion of the contract and 9 percent of the contract amount shall be used to determine partial payments. Partial payments under this item will be made in accordance with the following provisions:

(1) The first payment of 1/3 of the lump sum price for mobilization may be made provided that all submissions required under this section and as otherwise noted in the contract documents are submitted by the Contractor at the preconstruction conference to the satisfaction of the Engineer and when the Engineer has determined that a significant amount of equipment has been mobilized to the project site which will be used to perform portions of the project work.

(2) The second payment of 1/3 of the lump sum price for mobilization shall be made on the first estimate following completion of 13 percent of the contract.

(3) The third payment of 1/3 of the lump sum price for mobilization will be made on the first estimate following completion of 26 percent of the contract.

ADD the following subsection to Section 109- Measurements and Payments:

109.11 CONTRACT ALLOWANCE

(A) Contract allowance items are provided for the purpose of encumbering funds to cover the costs of possible contract amendment work. The amount of the allowance item is determined by the Engineer and is not subject to individual bid pricing. All bidders shall incorporate the amount pre-entered in the bid proposal and shall reflect the same in the total amount bid for the project.

(B) This allowance item provides an estimated funding to cover unforeseen changes that may be encountered and corresponding extra work needed to complete the contract per plan. Unforeseen extra work, if any, shall be in accordance with MAG Specification and COP Supplement 109.4.

(C) It shall be understood that this allowance item is an estimate only and is based on contract amendment history of similar projects. It shall not be utilized without an approved contract amendment. It is further understood that authorized extra work, if any, may be less than the allowance item. The Contractor, by submittal of a bid, acknowledges that the total bid and individual bid items were prepared without anticipation of use of the contract allowance.

SECTION 110: NOTIFICATION OF CHANGED CONDITIONS AND DISPUTE RESOLUTION

110.2.2 Dispute Resolution

REMOVE the first paragraph of item (A) and REPLACE with the following:

(A) The Contractor shall provide in writing the following information to the Engineer. In providing the information required by this section, the Contractor shall provide specific factual detail as to each item and show the methods of calculating each item.

110.3.1 General

ADD the following:

Level I shall mean the Public Works Project Manager as appointed by the Public Works Director

Level II shall mean the Public Works City Engineer as appointed by the Public Works Director

Level III shall mean the Public Works Director

In the event of litigation, the parties hereby agree to submit to a trial before the court. The Contractor further agrees that this provision shall be contained in all subcontracts related to the project, which is the subject of this agreement.

The parties hereto expressly covenant and agree that in the event of litigation arising from this agreement, neither party shall be entitled to an award of attorney fees, either pursuant to the contract, pursuant to A.R.S. §

12-341.01 (A) and (B), or pursuant to any other State or Federal statute. The Contractor further agrees that this provision shall be contained in all subcontracts related to the project that is the subject of this agreement.

110.4 ARBITRATION

REMOVE the last sentence of the first paragraph in its entirety and REPLACE with the following:

The arbitration of claims shall be conducted either in Prescott or Phoenix, Arizona as agreed to by the parties, or if the parties cannot agree, to be determined by the arbitrator, taking into consideration the convenience and costs to the parties and their witnesses.

REMOVE the last paragraph in its entirety and REPLACE with the following:

The decision or award of the arbitrator shall be supported by substantial evidence and, in writing, contain the basis for the decision or award and findings of fact. The decision or award of the arbitrator shall be nonbinding.

Any resolution of a dispute in accordance with MAG Specification and COP Supplement 110 and the contract which causes the contract amount to be exceeded by $25,000.00 or more shall not be final until approved by the City Council.

PART 200 – EARTHWORK

ADD the following section to Part 200- Earthwork:

SECTION 200: DEWATERING AND BYPASS PUMPING

200.1 DEWATERING

(A) All water encountered during the work shall be disposed of by the Contractor in a manner such that it will not damage public or private property or create a public nuisance or health problem. The Contractor shall submit drawings and complete design data showing methods and equipment he proposes to utilize in dewatering prior to completing any dewatering work. This work shall consist of obtaining permits, furnishing equipment, materials, and labor necessary for the control and removal of water, the construction or installation of all facilities necessary to accomplish the work, and the subsequent removal of such facilities except when designated on the project plans or in the special provisions to remain in place.

(B) The Contractor shall keep, where appropriate, the rehabilitated pipe section free from water during rehabilitation. If groundwater is present in any excavation, the static groundwater level shall be drawn down a minimum of 1 foot below the bottom of excavations to maintain the undisturbed state of natural soils and allow the placement of any fill to the specified density. Disposal of water shall not damage property or create a public nuisance. The Contractor shall have on hand pumping equipment and machinery in good working condition for emergencies and shall have workmen available for its operation. Dewatering systems shall operate continuously until backfill has been completed to 1 foot above the normal static groundwater level.

Groundwater shall be controlled to prevent softening of the bottom of excavations, or formation of “quick” conditions. Dewatering systems shall not remove natural soils. The Contractor shall control surface runoff to prevent entry or collection of water in excavations.

Release of groundwater to its static level shall be controlled to prevent disturbance of the natural foundation soils or compacted fill and to prevent flotation or movement of structures or pipelines.

Measurement and Payment: No separate measurement or payment shall be made for dewatering. This work shall be considered incidental and included in the unit price bid for construction or installation of the appropriate contract pay items.

200.2 BYPASS PUMPING

(A) Description

(1) Scope: This section specifies the requirements for temporary bypass pumping of sewers

(2) Requirements

(a) The Contractor shall provide labor, materials, and supervision to temporarily bypass flow around the Contractor's work.

(b) The Contractor shall have the entire bypassing system in place and tested before bypassing any sewage.

(3) At the preconstruction conference, the Contractor shall submit drawings and complete design data showing methods and equipment he proposes to utilize in sewer bypassing for approval by the Engineer. The submittal shall include the following information:

(a) Drawings indicating the location of temporary sewer plugs and bypass discharge lines

(b) Capacities of pumps, prime movers, and standby equipment

(c) Design calculations providing adequacy of the system and selected equipment

(d) Standby power source

(e) Staffing plan

(f) Traffic control plan

(4) Flow Data: It is the responsibility of the Contractor for design, construction, and operation of an adequate and properly functioning bypass. It is also the responsibility of the Contractor to coordinate with the City to gather flow data.

(5) Protection: In areas where flows are bypassed, all bypass flow shall be discharged as approved by the Engineer. No bypassing to the ground surface, receiving waters, storm drains or bypassing which results in groundwater contamination or potential health hazards shall be permitted.

(6) Scheduling: The bypass system shall not be shut down between shifts, on holidays or weekends, or during work stoppages without written permission from the Engineer. Public advisory services will be required to notify all parties whose service laterals will be out of service and to advise against water usage until the main line is back in service.

(B) Materials

(1) The Contractor shall provide temporary pumps, conduits and other equipment to bypass the sewer flow. The Contractor shall furnish the necessary labor and supervision to set up and operate the pumping and bypass system. Engines shall be equipped with mufflers and/or enclosed to keep the noise level less than 50dB or 10dB above ambient noise levels when measured at the property line closest to the noise source. Pumps and bypass lines shall be of adequate capacity and size to handle the flows.

(2) The Contractor shall maintain on site sufficient equipment and materials to ensure continuous and successful operation of the bypass systems. Standby pumps shall be fueled and operational at all times. The Contractor shall maintain on site a sufficient number of valves, tees, elbows, connections, tools, sewer plugs, piping and other parts or system hardware to ensure immediate repair or modification to any part of the system as necessary.

(3) All piping, joints and accessories shall be designed to withstand at least twice the maximum system pressure, or 50 psi, whichever is greater. All hoses/pipes used for bypass pumping shall be ramped to allow for the ease of vehicular and pedestrian traffic. All hoses/pipes shall be color-coded for identification to prevent cross contamination of water and wastewater lines. Hose/pipes used for wastewater conveyance shall not be used for water conveyance.

(C) General

(1) During bypass pumping, sewage shall not be leaked, dumped or spilled outside the sewer system. When bypass pumping operations are complete, all piping shall be drained into the sanitary sewer prior to disassembly. In the event that sewage accidentally drains into the storm drainage system or the street, the Contractor shall immediately stop the overflow, notify the City and take the necessary action to clean up and disinfect the spillage to the satisfaction of the City. The Contractor shall submit an emergency spillage and cleanup action plan for all sewage spills to the Engineer for approval prior to beginning construction. It shall include but not be limited to a remediation plan that indicates what labor, equipment and resources will be used to restore the site to the condition prior to the spillage.

(2) The Contractor shall repair without cost to the City any damage that may result from this negligence, inadequate or improper installation, maintenance and operation of bypassing system including mechanical or electrical failures, regulatory infractions and penalties resulting from sewer spillage.

(D) Flow Control

(1) Complete stoppage or bypassing of flow is required during sewer line and manhole rehabilitation work.

(2) When the depth of flow at the upstream manhole of the sewer line section being worked is above the maximum allowable for television inspection, the flow shall be reduced to the level shown below by plugging or blocking of the flow, or by pumping and bypassing of the flow as specified.

(3) Plugging or Blocking: A sewer line plug shall be inserted into the line upstream of the section being worked. The plug shall be so designed that all or any portion of the sewage can be released. During TV inspection, flow shall be reduced to within the limits specified above. After the work has been completed, flow shall be restored to normal. Precautions shall be taken to prevent flooding damage. See flow precautions below.

(4) Pumping and Bypassing: When pumping and bypassing is required the Contractor shall supply the pumps, conduits and other equipment to divert the flow of sewage around the manhole section in which work is to be performed. The bypass system shall be of sufficient capacity to handle existing flow plus additional flow that may occur during peak flow periods or from precipitation and shall be constructed of such material that will prevent leakage during the pumping operation. The Contractor will be responsible for furnishing the necessary labor and supervision to set up and operate the pumping and bypassing systems. All pump drivers shall have noise suppressor exhaust systems to reduce noise levels to less than 50dB, or 10dB above ambient noise levels, when measured at the closest property line.

(5) Flow Control Precautions: When flow in a sewer line is plugged, blocked or bypassed; sufficient precautions must be taken to protect the sewer lines from damage that might result from sewer surcharging. Further, precautions must be taken to ensure that sewer flow control operations

do not cause flooding or damage to public or private property being served by the sewer involved. All piping(s), joints and accessories shall be designed to withstand at least twice the maximum system pressure or a minimum of 50 psi whichever is greater. During by-pass pumping sewage shall not be leaked, dumped or spilled onto any area outside the sewer system. When bypass pumping operations are complete all piping shall be drained into the sanitary sewer prior to disassembly. In the event sewage accidentally drains into the drainage system or street, the Contractor shall immediately stop the overflow, notify the Engineer and take the necessary action to clean up and disinfect the spillage to the satisfaction of the Engineer. If sewage is spilled onto public or private property, the Contractor shall wash down, clean up and disinfect the spillage to the satisfaction of the City. The Contractor shall report any and all overflows to the City.

(E) Measurement and Payment: Payment for bypass pumping shall be made at the lump sum bid by the Contractor.

SECTION 201: CLEARING AND GRUBBING

201.1 DESCRIPTION

REMOVE in its entirety and REPLACE with the following:

This work shall consist of removing objectionable material from the right-of-way, easements, all areas to be graded, and such other areas as may be specified in the special provisions. Clearing and grubbing shall be performed in advance of grading operations.

201.3 CONSTRUCTION METHODS

REMOVE the second paragraph in its entirety and REPLACE with the following:

All trees and shrubs found suitable for improvement and beautification, which will not interfere with excavation or embankment or cause disintegration of the improvements shall not be disturbed. In any event, the Contractor shall avoid injury to shrubbery, vines, plants, grasses and other vegetation growing outside of the clearing limits. The dragging and the piling of materials of various kinds and the performing of other work which may be injurious to vegetation shall be confined to areas which have no vegetation or which will be covered by embankment or disturbed by excavation during grading operations.

REMOVE the fourth paragraph in its entirety and REPLACE with the following:

From excavated areas, all stumps, roots and other obstructions 3 inches or over in diameter shall be grubbed to a depth of not less than 24 inches below finish grade.

REMOVE Table 201-1 in its entirety and REPLACE with the following:

TABLE 201-1	
EMBANKMENT CLEARING AND GRUBBING	
Height of Embankment Over Stump	**Height of Clearing and Grubbing**
0 Feet to 2 Feet	All stumps or roots 6 inches or over in diameter shall be grubbed to 24 inches below original grade. All others shall be cut flush with the ground.
2 Feet to 3 Feet	All stumps 1 foot and over in diameter shall be grubbed to 24 inches below original grade. All others shall be cut flush with the ground.
Over 3 Feet	All stumps shall be cut flush with the ground.

REMOVE the last paragraph in its entirety and REPLACE with the following:

All tree trunks, stumps, brush, limbs, roots, vegetation and other debris removed in clearing and grubbing shall be completely removed from the project and properly disposed of.

SECTION 205: ROADWAY EXCAVATION

ADD the following subsection to 205.1 Description:

205.1.1 General

The bidding schedule quantities for this item of work will be considered to be the final quantities for payment. Adjustments in the bidding schedule quantities for roadway excavation as contained in these specifications may be initiated by the Contractor or the Engineer if evidence indicates that the required quantity varies by an amount greater than 5 percent of the bidding schedule quantity. The Contractor shall advise the Engineer, in writing, submitting evidence in the form of a construction survey or photogrammetric survey with measurement for the proposed adjustment and requesting an adjustment in quantities. The Engineer will determine the amount of adjustment, if any. The quantity upon which payment will be based will be the bidding schedule quantity plus or minus only that portion of the adjustment that exceeds 5 percent of the bidding schedule quantity.

Variations caused by shrink/swell of materials shall not be considered for quantity adjustments.

Adjustments in roadway excavation quantities due to revisions ordered by the Engineer will be isolated by measurement or calculations. The bidding schedule quantities will be adjusted by the amount either measured or calculated, regardless of the 5 percent variation requirement above.

205.2 UNSUITABLE MATERIAL

REMOVE the third paragraph in its entirety and REPLACE with the following:

If material is encountered during excavation that the Engineer determines to be unsuitable, the following shall apply:

(1) Any unsuitable material which is located in a cut section at an elevation above finished subgrade shall not be utilized in construction but shall be removed and disposed of at a site secured by the Contractor. The cost of excavation, hauling and disposal are incidental to roadway excavation. No additional compensation will be allowed for any unsuitable materials found in a cut section at an elevation above finished subgrade.

(2) Material which is located below the finished subgrade elevation in excavation areas shall be removed to the limits as determined by the Engineer and the resultant cavity backfilled with aggregate base course (ABC) in accordance with Section 310 of these specifications. The costs of the removal, hauling, disposal, backfill material, placement and any related process, shall be included in the payment for this bid item.

205.6 SURPLUS MATERIAL

REMOVE the first paragraph in its entirety and REPLACE with the following:

Unless otherwise shown on the plans, addressed in the special provisions, or approved by the Engineer, no surplus excavated material shall be disposed of within the right-of-way. The Contractor shall make all arrangements for disposal of the material at off-site locations as may be approved by the Engineer. The Contractor shall provide to the Engineer copies of the written consent of the owner of the property upon which he intends to dispose of such material, and any permits that may be required by a governing agency for said disposal.

205.7 MEASUREMENT

REMOVE the first two paragraphs in their entirety and REPLACE with the following:

The following earthwork operations will be measured as roadway excavation for the quantities of material involved.

Excavating the roadway prism including public and private roadway approaches; excavating slides and slip-outs not resulting from overshooting; excavating excess material; excavating selected material and topsoil from within the limits of the project and removing such materials from stockpiles when stockpiling is ordered; and excavating ditches.

ADD the following:

Measurement for unsuitable material shall be to the nearest cubic yard as calculated in the field.

205.8 PAYMENT

ADD the following:

Payment for unsuitable material shall be at the contract unit price and shall include any and all processes associated with the removal and backfill of the unsuitable materials, all excavation, hauling and disposal at a site secured by the Contractor, and backfilling with aggregate base course (ABC).

SECTION 206: STRUCTURE EXCAVATION AND BACKFILL

206.4.2 Structure Backfill for Earth Retaining Structures

REMOVE item (A) in its entirety and REPLACE with the following:

(A) Shall conform to the material and the graduation requirements for Select Material, Type B in Table 702-1, unless otherwise approved by the Engineer.

206.4.4 Structure Backfill for Structures within Paved Areas

REMOVE in its entirety and REPLACE with the following:

Where a structure is located within an existing street, proposed street, or paved area:

All backfill material with the exception of controlled low strength material (CLSM) shall be compacted to 95 percent maximum dry density per ASTM D698. Controlled low strength material shall be 1 sack material as specified in MAG Specifications 604 and 728.

SECTION 211: FILL CONSTRUCTION

211.1 DESCRIPTION

REMOVE in its entirety and REPLACE with the following:

Fill construction shall consist of constructing embankments except as may otherwise be specified, including the preparation of the areas upon which they are to be placed; including the construction of dikes.

The bidding schedule quantities for this item of work will be considered to be the final quantities for payment. Adjustments in the bidding schedule quantities for Fill Construction as contained in these specifications may be initiated by the Contractor or the Engineer if evidence indicates that the required quantity varies by an amount greater than 5 percent of the bidding schedule quantity. The Contractor shall advise the Engineer, in writing, submitting evidence in the form of a construction survey or photogrammetric survey with measurement for the proposed adjustment and requesting an adjustment in quantities. The Engineer will determine the amount of adjustment, if any. The quantity upon which payment will be based will be the bidding schedule quantity plus or minus only that portion of the adjustment that exceeds 5 percent of the bidding schedule quantity.

Variations caused by shrink/swell of materials shall not be considered for quantity adjustments.

Adjustments in Fill Construction quantities due to revisions ordered by the Engineer will be isolated by measurement or calculations. The bidding schedule quantities will be adjusted by the amount either measured or calculated, regardless of the 5 percent variation requirement above.

211.2 PLACING

REMOVE the first paragraph in its entirety and REPLACE with the following:

Rocks or other solid material which are larger than 4 inches in greatest dimension shall not be placed in fill areas. Broken concrete or asphalt shall not be placed in the fill.

211.3 COMPACTING

REMOVE the seventh paragraph in its entirety and REPLACE with the following:

The interstices around the rock in each layer shall be filled with earth or other fine material and compacted. Broken Portland cement concrete and bituminous pavement shall not be permitted in the fill.

211.4 TESTS

ADD the following:

Quality Control testing frequency shall be 1 per soil type for proctor density testing and 1 per 500 feet per 8 inch lift for compaction testing.

211.5 MEASUREMENT

REMOVE the first paragraph in its entirety and REPLACE with the following:

The quantities of fill construction used to construct embankments or dikes will be those of the complete bid item within the limits of dimensions shown on the plans.

PART 300 – STREETS AND RELATED WORK

ADD the following section to Part 300- Streets and Related Work:

SECTION 300: SAW CUT

300.1 DESCRIPTION

(A) The work under this item shall consist of saw cutting the existing pavement where new asphalt concrete is to match existing bituminous surfaces with no provisions for overlaying the entire section. This item shall also include saw cutting of existing Portland cement concrete pavement, sidewalks, driveways and parking lots where new construction shall match the grade of existing surfaces that are to remain where called for on the project plans or where designated by the Engineer.

(B) Saw cuts shall be made to a full depth of the material to ensure a neat vertical joint. Portland cement concrete designated to remain that is damaged by the saw cutting shall be replaced in kind at the Contractor's expense.

(C) No separate measurement or payment will be made for saw cutting, being considered incidental to the cost for work for which saw cutting is required.

SECTION 301: SUBGRADE PREPARATION

301.1 DESCRIPTION

ADD the following:

The work under this item shall consist of furnishing all materials, equipment, and labor necessary for preparation of natural or excavated areas prior to the placement of any sub-base material, pavement, curbs and gutters, driveways, sidewalks or other structures. Unless provided for in another bid item, this work shall include the removal and disposal of all unsuitable material including existing pavement and other obstructions in accordance with Section 301 of these specifications. The Contractor shall be required to provide and pay for all Quality Control geotechnical testing in accordance with the MAG Specifications and the COP Supplement.

301.2.1

REMOVE in its entirety and REPLACE with the following:

The Contractor shall not use asphalt concrete or other bituminous roadway surfacing materials as embankment fill.

Project earthwork quantities, when included as separate contract pay items, will include removed asphalt/bituminous material volumes, unless there is a pay item for asphalt removal or asphalt milling in the bid schedule or otherwise specified in the special provisions.

All unsuitable material and all excess material shall be disposed of in accordance with the requirements of Sections 205.2 and 205.6 of these specifications, respectively. When additional material is required for fill, it shall conform to MAG Specification 210.

301.3 RELATIVE COMPACTION

REMOVE item (B) in its entirety and REPLACE with the following:

The subgrade shall be scarified and loosened to a depth of 8 inches.

(B)	Below detached sidewalk not subject to vehicular traffic	95 percent

Subgrade Quality Control testing shall be 1 per 500 linear feet per lane for compaction testing.

301.7 MEASUREMENT

REMOVE in its entirety and REPLACE with the following:

Measurement for subgrade preparation will be by the square yard, measured by the total accepted area of new pavements, including paved shoulders, tapers, turnouts and driveways that are paved or surfaced with an aggregate base material. The areas under concrete curb and gutter, sidewalk and concrete driveway entrances will not be included. Unless provided for in other separate bid items or unless otherwise specified; Clearing and Grubbing, Roadway Excavation, Rock Excavation, Borrow Excavation, and Fill Construction shall not be measured, in which case payment for these earthwork items, if required, shall be included in the unit price for subgrade preparation.

SECTION 306: MECHANICALLY STABILIZED SUBGRADE – GEOGRID REINFORCEMENT

306.2 MATERIALS

ADD the following

Reinforcement Geogrid shall be Tensar BX1200 or approved equal.

306.8 PAYMENT

REMOVE in its entirety and REPLACE with the following:

Measurement of geogrid reinforcement shall be the surface area of accepted geogrid to the nearest square yard. No additional measurement or payment shall be made for geogrid overlap as required by the manufacturer.

Payment for geogrid reinforcement shall be per square yard installed complete and in place.

SECTION 310: PLACEMENT AND CONSTRUCTION OF AGGREGATE BASE COURSE

310.1 DESCRIPTION

REMOVE in its entirety and REPLACE with the following:

The work under this item shall consist of furnishing all materials, equipment, and labor necessary for the placement of an approved, imported aggregate base course material on top of a prepared subgrade per the required design thickness, grade, cross-section and compaction as specified on the project plan documents and in accordance with Sections 310 and 701 of these specifications, and MAG Specification 702. Aggregate base course shall not be placed on a prepared subgrade until the Engineer or the Engineer's authorized representative has inspected and accepted the underlying subgrade. The Contractor shall be required to provide and pay for all Quality Control geotechnical testing in accordance with MAG Specifications and COP Supplement. Use of Reclaimed Concrete Material (RCM) is not allowed per COP Supplement 701.4.

ADD the following subsection to 310.1 Description:

310.1.1 Reclaimed Asphalt Pavement (RAP)

Use of reclaimed asphalt pavement (RAP) aggregates or "millings" produced on-site, imported or stockpiled for the intended use in the underlying base or subgrade material must be approved by the Engineer or the Engineer's authorized representative; and shall be screened and meet MAG Sections 310, 701 and 702, and here within. RAP millings must be uniformly mixed with an imported virgin aggregate base course material.

310.2 PLACEMENT AND CONSTRUCTION

ADD the following:

Aggregate base course shall not be placed on excessively wet or frozen subgrade materials as determined by the Engineer.

ADD the following subsection to 310.2 Placement and Construction:

310.2.1 Quality Control Testing

Aggregate base course Quality Control testing frequency shall be as follows:

(A) Resistance to Degradation and Abrasion: 1 at the start of production and again if source changes.

(B) Fractured Faces, One Face, PI, and Gradation: 1 per shift.

310.3 COMPACTION

REMOVE the fifth paragraph in its entirety and REPLACE with the following:

For roadway construction, a minimum of 1 field density test shall be performed per 6 inch lift per 500 feet per lane. For other aggregate base course applications, a minimum of 1 field density test shall be performed for each 800 square yards.

REMOVE items (A), (B) and (C) in their entirety and REPLACE with the following:

Aggregate base course shall be compacted to 98 percent in all instances.

310.5 PAYMENT

REMOVE in its entirety and REPLACE with the following:

Measurement for aggregate base course material will be per cubic yard furnished and placed. Copies of material delivery tickets will be required for quantity verification purposes. Payment shall be made at the unit price bid and shall be considered full compensation for this work item.

SECTION 317: ASPHALT MILLING

317.2 CONSTRUCTION REQUIREMENTS

REMOVE in its entirety and REPLACE with the following:

When milling is specified, the existing asphaltic concrete shall be removed in accordance with the details shown on the project plans with equipment specifically designed to remove such material by means of grinding or chipping to a controlled line and grade. The equipment used shall be capable of removing the existing asphaltic concrete within 0.01 feet of the specified removal depth. The removal shall be accomplished in a manner which does not destroy the integrity of any asphaltic concrete pavement that remains and which does not result in a contamination of the milled asphaltic concrete with the underlying base material.

Pavement to be removed by milling, adjacent to manholes, valve boxes, small radius curbs and other fixed objects that produce confined areas shall be removed with milling equipment specifically designed to operate in restricted areas and capable of removing asphaltic concrete of the specified thickness without damage or displacement of the adjacent object. The removal of asphalt concrete pavement at the approaches to structures shall be accomplished in a manner approved by the City.

On projects with existing curb and gutter, any asphaltic concrete buildup in the gutter designated to be removed, shall be removed prior to the pavement removal operation by equipment and methods approved by the Engineer. The equipment and methods used shall be capable of removing the asphaltic concrete buildup without causing damage to the curb and gutter

Upon removal, all milled materials shall become the property of the Contractor. The City will not accept millings. The Contractor shall properly dispose of the millings away from the site. No additional compensation will be made for the disposal of millings.

Prior to milling and roadway excavation, all existing manholes, valve boxes, etc. shall be lowered and protected. All City facilities shall be protected from debris that may result from any adjustments and the Contractor shall be responsible for any maintenance activity resulting from debris related to the construction. No separate payment shall be made for lowering and protecting existing manholes, valve boxes, etc.

Under no circumstance shall the removal of existing asphaltic concrete begin until the mix design for replacement asphaltic concrete has been approved by the Engineer.

The extent of removal of existing asphaltic concrete must be in keeping with the Contractor's ability to produce, haul, place and compact replacement asphaltic concrete so that at all times the length of open "trench" is at a minimum. If the Contractor's production of replacement asphaltic concrete is stopped for any reason, the removal of asphaltic concrete shall either cease or shall be reduced. The Engineer will be the sole judge as to whether the removal shall cease or be reduced. The Engineer's decision will be based on the reason for the stoppage in asphaltic concrete production, the expected length of the stoppage, the type and depth of the material being removed, and the time of day.

ADD the following subsection to 317.2 Construction Requirements:

317.2.1 Quality Control

All milling shall be inspected and approved prior to paving. High spots in excess of the tolerances noted shall be milled until in conformance.

Low spots in excess of ½ inch shall have a leveling course placed prior to paving at no additional cost to the City.

ADD the following subsection to 317.2 Construction Requirements:

317.2.2 Paving

For mill and overlay areas, replacement asphaltic concrete shall be placed as soon as possible after milling has occurred and been approved. The surface on which the material is to be placed shall be uniform and free of loose material. Any exposed base material shall be compacted to the extent required by the Engineer.

The "trench" in which asphaltic concrete is being placed shall be filled before the end of each day's work and the lane shall be opened to traffic. The length of open "trench" at any one time shall not exceed 2 miles or ½ the length of the work, whichever is the lesser.

In the event of circumstances beyond the control of the Contractor, such as equipment breakdown, or if the production of the replacement asphaltic concrete has been stopped by the Engineer and the Contractor is unable to comply with the requirements in the preceding paragraph, the Contractor shall provide and maintain such traffic control devices that the Engineer deems necessary under the circumstances in order to provide safe and efficient passage through the work zone.

If the Engineer deems it to be warranted, the Contractor shall provide for the surface drainage of areas where the pavement surface has temporarily been removed.

ADD the following subsection to 317.2 Construction Requirements:

317.2.3 Macrotexture Milling

Macrotexture asphalt milling when included as a separate contract pay item shall be performed in accordance with the following:

Existing asphaltic concrete shall be removed by milling in accordance with the details shown on the project plans and as specified herein. The milling equipment shall be specifically designed to remove material to a controlled line and grade by means of grinding or chipping. The equipment used shall be capable of removing the existing asphaltic concrete uniformly throughout the milled area at the required cross-slope and within 1/8 inch of the specified removal depth. The specified removal depth of the existing bituminous pavement shall be as noted on the plans. The removal shall be accomplished in a manner which does not destroy the integrity of any pavement that remains. During production milling, the Contractor shall verify the actual depth of milling required to remove the desired underlying pavement surface. If it is determined by the Engineer that the required milling depth is greater than the specified milling depth, the additional material shall be completely removed to the desired underlying pavement surface, as approved, in accordance with COP Supplement 109.4. The milled material shall be removed and disposed of as specified by the City.

The milled surface shall have a maximum mean macrotexture depth of 4.50 millimeters, as determined in accordance with Arizona Test Method 742- Mean Macrotexture Depth of Milled Pavement.

At the start of the milling operation, the Contractor shall mill a 500 foot test section. The milled surface of the test section shall be evaluated by the Engineer for compliance with the maximum mean macrotexture depth requirement. If the milled surface is in compliance with the macrotexture requirement, the Contractor may begin production milling. If the milled surface is not in compliance with the macrotexture requirement, the Contractor shall make adjustments to the milling operation and then mill another test section.

During production milling, the mean macrotexture depth shall be determined at a minimum frequency of 1 test per ½ mile per lane. If, at any time, during the milling operation the Engineer determines that the macrotexture requirement is not being achieved, the Contractor shall stop milling. Milling shall not resume until the Engineer is satisfied that the macrotexture requirement can be met or until successful completion of another test section. The forward speed of the milling machine during production milling shall not exceed the speed used for the test section. The forward speed of the milling machine shall be checked throughout each production day, or at the discretion of the Engineer.

The profile of the milled surface, in both the longitudinal and transverse directions, shall not vary by more than 1/8 inch over a distance of 10 feet.

Under no circumstance shall the removal of existing asphaltic concrete begin until the mix design for replacement asphaltic concrete has been approved by the Engineer.

The extent of removal of existing asphaltic concrete must be in keeping with the Contractor's ability to produce, haul, place and compact replacement asphaltic concrete so that at all times the length of milled surface is at a minimum. If the Contractor's production of replacement asphaltic concrete is stopped for any reason, the removal of asphaltic concrete shall either cease of shall be reduced. The Engineer will be the sole judge as to whether the removal shall cease or be reduced. The Engineer's decision will be based on the reason for the stoppage in asphaltic concrete production, the expected length of the stoppage, the type and depth of the material being removed, and the time of day.

Asphaltic concrete shall be placed as soon as possible after the milling. The surface on which the material is to be placed shall be uniform and free of loose material.

The length of milled surface at any one time shall not exceed 2 miles, or ½ the length of the work, whichever is less. Asphaltic concrete shall be placed on the milled surface before the end of each day's work. The lane shall be opened to traffic at the end of each day's work.

In the event of circumstances beyond the control of the Contractor, such as equipment breakdown, or if the production of the replacement asphaltic concrete has been stopped by the Engineer and the Contractor is unable to comply with the requirements in the preceding paragraph, the Contractor shall provide and maintain

such traffic control devices that the Engineer deems necessary under the circumstances in order to provide safe and efficient passage through the work zone.

If the Engineer deems it to be warranted, the Engineer will require that the Contractor provide for the surface drainage of areas where the pavement surface has temporarily been removed.

Pavement, to be removed by milling, adjacent to manholes, valve boxes, small radius curbs and other fixed objects that produce confined areas shall be removed with milling equipment specifically designed to operate in restricted areas and capable of removing asphaltic concrete of the specified thickness without damage or displacement of the adjacent object. Such areas may be excluded from macrotexture testing at the discretion of the Engineer.

On projects with existing curb and gutter, any asphaltic concrete buildup in the gutter designated to be removed, shall be removed prior to the pavement removal operation by equipment and methods approved by the Engineer. The equipment and methods used shall be capable of removing the asphaltic concrete buildup without causing damage to the curb and gutter.

317.3 MEASUREMENT AND PAYMENT

REMOVE in its entirety and REPLACE with the following:

Payment for milling shall be based on plan quantities at the unit bid price in the bid schedule to include milling and proper disposal of the millings away from the site.

SECTION 321: PLACEMENT AND CONSTRUCTION OF ASPHALT CONCRETE PAVEMENT

321.2 MATERIALS AND MANUFACTURE

REMOVE in its entirety and REPLACE with the following:

The materials shall conform to Section 710 of these specifications for the type specified. Warm Mix Asphalt (WMA) technologies shall not be used. 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

REMOVE in its entirety and REPLACE with the following:

Asphalt concrete shall be placed only when the surface on which the material is to be placed is dry, unfrozen, the atmospheric temperature in the shade is at 40 degrees F and rising, and the temperature of the road surface or subsurface is at 50 degrees F and rising as measured in the shade. No asphalt concrete shall be placed when the weather is foggy or rainy, when precipitation is eminent, 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 or the Engineer's authorized representative determines that weather conditions are suitable and sub base conditions on which the material is to be placed are acceptable.

321.4 APPLICATION OF TACK COAT

REMOVE the first and second paragraphs in their entirety and REPLACE with the following:

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.

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

321.6 MIX PRODUCTION

ADD the following:

(A) Stockpiling

(1) Sufficient virgin mineral aggregate material shall be stockpiled at the site of the hot plant to produce the quantity of asphalt concrete required for a minimum of two successive 8 hour shifts; however, this requirement will be modified during the last 2 days production, or under special conditions with the Engineer's approval.

(2) Mineral aggregate shall be stockpiled so that segregation is minimized. An approved divider of sufficient size to prevent intermingling of stockpiles shall be provided.

(B) Proportioning

(1) No fine material which has been collected in the dust collection system shall be returned to the mixture unless the Engineer, on the basis of tests, determines that all or a portion of the collected fines can be utilized. If the Engineer so determines, he will authorize in writing the utilization of a specific proportion of the fines; however, authorization will not be granted unless the collected fines are accurately and uniformly metered into the mixture.

(2) Mineral aggregate and bituminous material shall be proportioned by volume, by weight, or by a combination of volume and weight.

(3) When mineral aggregate and bituminous material are proportioned by weight, all boxes, hopper buckets or similar receptacles used for weighing materials, together with scales of any kind used in batching materials, shall be insulated against the vibration or movement of the rest of the plant due to the operation of any equipment so that the error in weighting with the entire plant operating shall not exceed 2 percent for any setting nor 1½ percent for any batch. Bituminous material shall be weighed in a heated, insulated bucket suspended from a springless dial scale system.

(4) When mineral aggregate and bituminous material are proportioned by volume, the correct portion of each mineral aggregate size introduced into the mixture shall be drawn from the storage bins by an approved type of continuous feeder which will supply bituminous material and so arranged that the proportion of each mineral aggregate size can be separately adjusted. The continuous feeder for the mineral aggregate shall be mechanically or electrically actuated.

(C) Drying and Heating

(1) A recording pyrometer or other approved recording thermometric instrument sensitive to a rate of temperature change of not less than 10 degrees F per minute shall be so placed at the discharge chute of the drier in order to record mineral aggregate and to facilitate reading the recorded temperature. A copy of the recording shall be given to the Engineer. The moisture content of the asphalt concrete immediately behind the paver shall not exceed 1 percent.

(D) Mixing

(1) The production of the plant shall be governed by the rate required to obtain a thorough and uniform mixture of the materials. Mixing shall continue until the uniformity of coating, when tested

in accordance with the requirements of the American Association of State Highway and Transportation Officials (AASHTO) T 195, is at least 95 percent.

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

(3) The temperature of asphalt concrete upon discharge from the mixer shall not exceed 325 degrees F. If the asphalt concrete is discharged from the mixer into a hopper, the hopper shall be constructed so that segregation of asphalt concrete will be minimized.

321.8 PLACEMENT

ADD the following:

(A) The Contractor shall stringline finish ABC grade in the presence of the Engineer or the Engineer's authorized representative to verify compliance to specified tolerances prior to the placement of asphalt concrete. Placement of asphalt concrete shall not begin until adjacent Portland cement concrete items have obtained 75 percent of design strength.

(B) The handling of asphalt concrete shall at all times be such as to minimize segregation. Any asphalt concrete which displays segregation shall be removed and replaced.

(C) All wheels and tires of compactors and other equipment shall be wiped when necessary with an approved product in order to prevent the picking up of the asphalt concrete.

(D) Before asphalt concrete is placed, the surface to be paved shall be cleaned of objectionable material.

(E) The base or subgrade upon which the asphalt concrete is to be placed shall be prepared in accordance with the applicable requirements for the material involved and maintained in a smooth and firm condition until placement.

(F) At any time, the Engineer or the Engineer's authorized representative may require that the work cease or that the work day be reduced in the event of weather conditions either existing or expected which would have an adverse effect upon the asphalt concrete.

(G) The temperature of asphalt concrete just prior to compaction shall be at least 250 degrees F but shall not exceed 300 degrees F, unless permitted by the Engineer.

(H) The asphalt concrete shall be placed as a surfacing course. Surfacing courses are defined as courses placed to serve either as a traffic surface or as a surface upon which a finishing course or seal coat is to be placed. The thickness of surfacing courses will be shown on the project plans.

(I) In order to achieve, as far as practicable, a continuous operation, the speed of the paving machine shall be coordinated with the production of the plant.

(J) Tapered sections exceeding 8 feet in width or widened sections not exceeding 4 feet in width may be placed and finished by other means approved by the Engineer.

321.8.5 Smoothness

REMOVE the second sentence in its entirety and REPLACE with the following:

Surfacing course surfaces shall not vary more than 1/8 inch from the lower edge of a 10 foot long straightedge when the straightedge is placed parallel to the center of the roadway.

321.9 QUALITY CONTROL

ADD the following:

Contractor Quality Control

(A) General Requirements

(1) It shall be the responsibility of the Contractor to administer a Quality Control Plan (hereinafter, within this section, referred to as "Plan") sufficient to assure a product meeting the requirements of these specifications. The Plan may be operated wholly or in part by a subcontractor or an independent organization; however, the Plan's administration, including compliance with the Plan and its modification, shall remain the responsibility of the Contractor.

(2) The Contractor is required to provide and maintain a Quality Control Plan, along with all the personnel, equipment, supplies and facilities necessary to obtain samples, perform tests, and otherwise assure the quality of the project.

(3) The Contractor shall submit the Plan to the Engineer or the Engineer's authorized representative at the preconstruction conference.

(4) The Contractor shall perform process control sampling, testing and inspection during all phases of the work and shall perform the process control sampling, testing, and inspection at a rate sufficient to assure that the work conforms to the contract requirements. The Contractor shall provide the Engineer a certification stating that all of the testing equipment to be used is properly calibrated and will meet the specifications applicable for the specified test procedures.

(B) Elements of the Plan

(1) The Plan shall address all elements which affect the quality of the asphalt concrete including, but not limited to the following: Mix Design, Aggregate Production, Quality of Components, Stockpile Management, Proportioning, Mixing (including addition of Mineral Admixture, if required), Placing and Finishing, Joints, and Compaction.

321.12 MEASUREMENT

ADD the following:

(A) Measurement under this item shall be to the nearest square yard.

(B) No separate measurement shall be given for the thickened edge, COP GES Detail 201Q and as detailed on project drawings. This work shall be considered incidental and included in the unit price bid in the contract documents. Payment shall be made at the unit price bid in the contract documents for the items complete in place, adjusted for compaction and thickness deficiencies as herein provided.

SECTION 329: TACK COAT

329.3 APPLICATION

REMOVE in its entirety and REPLACE with the following:

(A) The application rate shall be between 0.04 to 0.06 gallons per square yard of diluted material, 50 percent water and 50 percent emulsion, using SS-1h.

(B) The tack coat shall be applied only as far in advance of placing the asphalt concrete as ordered by the Engineer; however, in no event shall the tack coat be applied and not covered by the asphalt concrete in the same day.

329.6 MEASUREMENT

REMOVE in its entirety and REPLACE with the following:

Measurement shall be per ton diluted as placed, based on weight tickets.

SECTION 336: PAVEMENT MATCHING AND SURFACING REPLACEMENT

336.1 DESCRIPTION

REMOVE the second paragraph in its entirety and REPLACE with the following:

Asphalt concrete roadway pavement replacement shall be constructed in accordance with COP GES Detail 200Q-1 and as indicated on the plans.

REMOVE the fourth paragraph in its entirety and REPLACE with the following:

All other surface replacement in the right-of-way but not in paved roadways shall be constructed in accordance with COP GES Detail 200Q-1 and as indicated on the plans.

336.2.1 Pavement Widening or Extensions

REMOVE the second paragraph in its entirety and REPLACE with the following:

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 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.

336.2.3 Temporary Pavement Replacement

REMOVE the first and second paragraphs in their entirety and REPLACE with the following:

Temporary pavement replacement with UPM in accordance with COP GES Detail 200Q-1 shall be required in right-of-way until permanent hot mix trench pavement replacement can be performed. The Contractor shall install temporary asphalt pavement or the first course of permanent pavement replacement in accordance with Section 336 of these specifications immediately following backfilling and compaction of trenches that have been cut through existing pavement. Except as otherwise provided in Section 336, this preliminary pavement shall be maintained in a safe and reasonably smooth condition until required backfill compaction is

obtained and final pavement replacement is completed. Temporary paving removed shall be hauled from the job site and disposed of by the Contractor at no additional cost to the Agency.

Permanent pavement replacement shall replace temporary repairs within 5 working days after completion of temporary work.

336.2.4.1 Permanent Asphalt Pavement Replacement

ADD the following:

(H) Asphalt concrete trench pavement replacement shall be a minimum 4 inch thickness compacted to 95 percent of laboratory density in accordance with COP GES Details 200P-2, 200Q-1 and MAG Specification 601.6.

(I) Permanent hot mix asphalt concrete pavement replacement shall be required for all trench cuts. Installation of UPM or other high performance cold mix shall not be permitted for permanent installation. The Contractor shall be required to maintain pavement trench cuts to the satisfaction of the Engineer.

(J) The Contractor shall coordinate with the Engineer a minimum of 2 working days in advance of trench paving.

REMOVE the last paragraph in its entirety.

336.3 TYPES AND LOCATIONS OF TRENCH SURFACE REPLACEMENT

REMOVE the first five paragraphs in their entirety and REPLACE with the following:

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 shall be in accordance with COP GES Detail 200Q-1. If a type is not noted on the plans or specified in the special provisions, the following criteria will govern:

T-Top trench repair will be utilized on all streets per COP GES Detail 200Q-1.

COP GES Detail 200Q-1 trench repair shall be utilized to repair surfaces other than asphalt concrete or Portland cement concrete pavement. It may also be used when the condition of the existing pavement does not justify construction of T-Top trench repair. Prior written approval of the Engineer is required for this condition.

336.4 MEASUREMENT

REMOVE items (A) and (B) in their entirety and REPLACE with the following:

(A) In computing pay quantities for replacement using COP GES Detail 200Q-1, pay widths shall not exceed the maximum widths as depicted on Table 601-1, plus 24-inches for the T-Top.

(B) In computing pay quantities for replacement using COP GES Detail 200Q-1, pay widths shall not exceed the maximum widths as depicted on Table 601-1.

336.5 PAYMENT

ADD the following:

Pavement matching and surfacing replacement shall include all saw cutting, removal and disposal of existing pavement, plus all labor and material for complete installation of permanent pavement replacement. No extra payment will be made for temporary pavement required for maintenance of utility trench cuts or for trench widths in excess of Section 336.4 of these specifications.

SECTION 340: CONCRETE CURB, GUTTER, SIDEWALK, CURB RAMPS, DRIVEWAY AND ALLEY ENTRANCE

340.2 MATERIALS

REMOVE the first sentence in its entirety and REPLACE with the following:

Concrete shall be Class AA unless otherwise noted.

340.2.1 Detectable Warnings

ADD the following:

Detectable warnings shall be Masco Detectable Warning Panels, or approved equal, and in the color Salem Red.

340.3.1 Subgrade Preparation

REMOVE the second paragraph in its entirety and REPLACE with the following:

The subgrade shall be constructed and compacted true to grades and lines shown on the plans and as specified in Section 301 of these specifications. All soft or unsuitable material shall be removed to a depth of not less than 6 inches below subgrade elevation and replaced as directed by the Engineer. Unsuitable material shall be measured and paid in accordance with Section 205.2 of these specifications. The subgrade shall be compacted to not less than 95 percent of the maximum dry density.

All concrete items in this section shall be constructed on a minimum of 4-inches of aggregate base course unless noted otherwise, whether shown on the standard details or not. Aggregate base course shall be compacted to not less than 98 percent of maximum dry density.

ADD the following subsection to 340.3.3 Concrete Placement:

340.3.3.1 Concrete Curb, Gutter, and Curb Terminations

The pavement section (base and sub-base) shall extend to the back of curb.

ADD the following subsection to 340.3.3 Concrete Placement:

340.3.3.1a Single Curb

All single curb shall be constructed to MAG Detail 222.

ADD the following subsection to 340.3.3 Concrete Placement:

340.3.3.2 Concrete Sidewalk, Sidewalk Landing, and Ramp

Concrete sidewalk, sidewalk landings, and ramps shall be in accordance with COP GES Details or as otherwise modified on the plans.

ADD the following subsection to 340.3.3 Concrete Placement:

340.3.3.3 Concrete Driveway Entrances and 6 Inch Concrete Slabs

Portland cement concrete pavement shall contain 6 percent ±1 percent entrained air. Slump shall be a maximum of 3½ inches.

Construction Joints shall be a maximum of 15 feet apart. The Contractor shall submit a jointing pattern for review and approval prior to construction.

Driveways shall include the curb returns to the existing grades as shown on MAG Detail 251 and modified by the driveway details in the plans. All concrete used in the driveways and adjacent sidewalk crossings shall be 6 inches thick.

Match up construction shall include 10 feet of replacement driveway surfacing from the new top of sidewalk to the existing driveway elevations behind the sidewalk unless otherwise shown on the plans.

ADD the following subsection to 340.3.3 Concrete Placement:

340.3.3.4 Concrete Valley Gutter

All concrete valley gutter shall be constructed on a minimum 8 inch thick aggregate base course, whether shown on the standard details or not.

340.3.10 Deficiencies

REMOVE in its entirety and REPLACE with the following:

Any section of the work deficient in depth or not conforming to the plans or specifications shall be removed and replaced by the Contractor at no additional cost to the City. Replacement or reconstruction shall be from joint to joint.

Concrete work that does not comply with tolerance requirements of MAG Specification 340.3.9 shall be removed and replaced. Remove and replace gutters that exceed the ponding tolerance. Grinding shall only be allowed if approved by the Engineer.

No placement of asphalt shall occur unless the Contractor receives acceptance from the Engineer for all concrete work, such as, but not limited to: curb and gutter, gutter, raised median, concrete sidewalks and ramps, and valley gutter.

It shall be the Contractor's responsibility to submit for approval in advance of any paving operations such that concrete work can be inspected, and deficient work can be removed and replaced by the Contractor. The Contractor shall make necessary removals, replacements and corrections at no additional cost to the City. The Contractor shall not receive any time extension for removal, replacements and corrections of deficient work unless approved by the Engineer. The Contractor shall not receive any time extension for failure to notify the City in a timely manner for inspection before paving operations.

Approval shall be a written document from the Engineer. Verbal approval shall not be accepted.

340.5.2 Concrete Flat Work

REMOVE in its entirety and REPLACE with the following:

Sidewalks, driveways, alley intersections, valley gutters, curb ramps and aprons, to include spandrels, will be measured to the nearest square foot complete in place. When concrete sidewalks, sidewalk ramps, driveways, alley intersections, valley gutters, curb ramps, aprons and/or spandrels are cut during trenching operations, the square foot measurement for payment will be in accordance with Section 336 of these specifications.

340.5.3 Curb Ramp Installation

REMOVE in its entirety and REPLACE with the following:

Curb ramp installation shall be measured in accordance with Section 340.5.2 of these specifications. Detectable warnings are an integral part of curb ramp installations and shall not be measured or paid separately.

Perpendicular curb ramps shall include the area from the back of curb between the outer edges of the ramp wings to the top of the curb ramp, ending prior to and excluding the top landing. The top landing area shall be measured as sidewalk in accordance with Section 340.5.2. Ramp curbs area an integral part of the perpendicular curb ramp installation and shall not be measured or paid separately.

Parallel and combination curb ramps shall include the ramp area between the ramp curb and the back edge of the roadway curbing. Ramp curbs are an integral part of parallel curb ramp and combination curb ramp installations and shall not be measured or paid separately.

ADD the following subsection to 340.5 Measurement:

340.5.4 Aggregate Base Course

Aggregate base course shall be considered incidental to all items in this section.

340.6 PAYMENT

ADD the following:

Aggregate base course shall be considered incidental to all items in the section.

No separate measurement or payment for the curb returns and transition curbs for driveways shall be made.

SECTION 345: ADJUSTING FRAMES, COVERS AND VALVE BOXES

345.1 DESCRIPTION

REMOVE the second paragraph in its entirety and REPLACE with the following:

All frames, covers, valve boxes, manholes, etc., shall be adjusted to finished grade after placement of asphalt concrete surface course by the Contractor in accordance with the standard details. Adjustments shall be completed within 15 working days of completion of paving.

The Contractor shall remove old frames and covers and install new frames and covers in accordance with the contract documents.

345.3 ADJUSTING FRAMES

REMOVE the second paragraph in its entirety and REPLACE with the following:

Frames shall be set to the elevations and slopes established by the Engineer and shall be firmly blocked in place in accordance with COP GES Detail 422Q. 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.

A single No. 4 rebar hoop will be placed in each concrete collar in accordance with the respective detail. The hoop diameter shall be such that its placement is centered between the edge of the manhole frame or valve box, and the outer edge of the concrete collar, the depth of the hoop shall be centered in the thickness of the collar. Each concrete ring shall be scored radially at quarter-circle points. Score lines shall be ¼ -inch wide by ½ - inch deep. The concrete collar surface shall be rough broom finished. (See COP GES Details 270Q and 422Q)

Existing frames and covers shall be salvaged to the City. All salvaged items shall be delivered to the City Wastewater Collections facility, located at 1505 Sundog Ranch Road, and placed as directed by the Engineer.

REMOVE the fourth paragraph in its entirety and REPLACE with the following:

After removal of the temporary asphalt pavement in the area of adjustment, and prior to placement of the final concrete collar ring (as shown on COP GES Details 270Q and 422Q) the asphalt pavement in proximity of the adjustment shall be rolled with a self-propelled steel wheel roller if requested by the Engineer.

Traffic shall not be allowed on the concrete collars until the concrete has reached a minimum compressive strength of 2,500 psi on residential and 3,000 psi on collector and major streets. On major streets the Contractor shall use “high-early” in the concrete mix, approved by the Engineer, to minimize delay in reopening the street(s) to traffic.

345.4 ADJUSTING VALVE BOXES

REMOVE in its entirety and REPLACE with the following:

Valve boxes shall be adjusted to the new elevations indicated on the plans, or as established by the Engineer.

New valve box top risers and caps shall be furnished by the Contractor at existing water valve locations and placed as directed by the Engineer. New valve box top risers and caps shall be considered incidental to the cost of adjustment.

Existing valve box risers and caps shall be salvaged to the City. All salvaged items shall be delivered to the City Water Operations facility, located at 1481 Sundog Ranch Road, and placed as directed by the Engineer.

A single No. 4 rebar hoop will be placed in each concrete collar in accordance with the respective detail. The hoop diameter shall be such that its placement is centered between the edge of the manhole frame or valve box, and the outer edge of the concrete collar, the depth of the hoop shall be centered in the thickness of the collar. Each concrete ring shall be scored radially at quarter-circle points. Score lines shall be ¼ inch wide by ½ inch deep. The concrete collar surface shall be rough broom finished. (See COP GES Detail 391Q)

Traffic shall not be allowed on the concrete collars until the concrete had reached a minimum compressive strength of 2,500 psi on residential and 3,000 psi on collector and major streets. On major streets the Contractor shall use "high-early" in the concrete mix, approved by the Engineer, to minimize delay in reopening the street(s) to traffic.

Add the following subsection to 345.4 Adjusting Valve Boxes:

345.4.1 Adjusting Meter Boxes

Meter boxes shall be adjusted to the new elevations indicated on the plans, or as established by the Engineer.

Additional meter box sections, concrete, and miscellaneous items required to protect the utility in accordance with the respective standard detail shall be considered incidental to adjusting the meter box.

345.5 ADJUSTING MANHOLE AND VALVE COVERS WITH ADJUSTMENT RINGS

REMOVE in its entirety and REPLACE with the following:

Existing sanitary sewer manhole and covers shall be salvaged to the City. All salvaged items shall be delivered to the City Wastewater Collections facility, located at 1505 Sundog Ranch Road, and placed as directed by the Engineer.

Adjusting rings may be used to raise manhole covers in conformance to the dimensions noted on COP GES Detail 420Q-1. 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 concrete and installed per the manufacturer's specifications. The rings shall be approved by the Engineer.

The concrete collar ring around the frame or valve box shall be circular, shall be a minimum of 8 inches thick, struck off and finished ¼ inch below with the adjacent new pavement surface. Concrete shall be a minimum of Class AA. All concrete shall be obtained from plants approved by the Engineer.

A single No. 4 rebar hoop will be placed in each concrete collar in accordance with the respective detail. The hoop diameter shall be such that its placement is centered between the edge of the manhole frame or valve box, and the outer edge of the concrete collar, the depth of the hoop shall be centered in the thickness of the collar. Each concrete ring shall be scored radially at quarter-circle points. Score lines shall be ¼ inch wide by ½ inch deep. The concrete collar surface shall be rough broom finished. (See COP GES Detail 270Q)

Traffic shall not be allowed on the concrete collars until the concrete has reached a minimum compressive strength of 2,500 psi on residential and 3,000 psi on collector and major streets. On major streets the Contractor shall use "high-early" in the concrete mix, approved by the Engineer, to minimize delay in reopening the street(s) to traffic.

All machined surfaces on the frame and cover shall be such that the cover will lie flat in any position in the frame and have a uniform bearing through its entire circumference. Any frame and cover which creates any noise when passed over by automobiles shall be replaced by the Contractor at the Contractor's expense.

345.6 MEASUREMENT

ADD the following:

Measurement for adjusting existing frames, covers, valve boxes, and water meter boxes to finished grade shall be the actual number of each type adjusted and accepted.

Measurement for adjusting new frames, covers, valve boxes, and water meter boxes shall not be measured as adjustment to finished grade is considered incidental to installation of the respective item.

SECTION 350: REMOVAL OF EXISTING IMPROVEMENTS

REMOVE the section in its entirety and REPLACE with the following:

350.1 DESCRIPTION

The work under this section shall consist of the removal, wholly or in part, and satisfactory disposal of all structures and obstructions within the right-of-way which have not been designated on the project plans or specified in the special provisions to remain, except for those structures and obstructions which are to be removed and disposed of under other items of work in the contract. The work shall also include salvaging of designated materials and backfilling the resulting cavities.

Existing structures, pavement, sidewalks, curbs, gutters and other existing improvements which are to become an integral part of the planned improvements shall remain even though not specifically noted.

Materials removed and not designated to be salvaged or incorporated into the work shall become the property of the Contractor.

All existing utilities not designated for removal shall remain in place and be protected against damage.

The removal of existing improvements shall be conducted in such a manner as not to damage active utilities or any portion of the improvement that is to remain in place.

350.2 CONSTRUCTION REQUIREMENTS

Bridges, culverts and other structures in use by traffic shall not be removed until l satisfactory arrangements have been made to accommodate the traffic. Blasting or other operations necessary for the removal of an existing structure or obstruction, which may damage new construction, shall be completed prior to commencing the new work.

Items designated to be salvaged shall be carefully stockpiled or stored by the Contractor at locations designated in the special provisions or as directed by the Engineer.

Items which are to be salvaged or reused in the new construction and are damaged or destroyed as a result of the Contractor's operations shall be repaired or replaced by the Contractor at no additional cost to the City.

Holes, cavities, trenches and depressions resulting from the removal of structures or obstructions, except in areas to be excavated, shall be backfilled with suitable material which shall be compacted to a density of not less than 95 percent of the maximum density as determined in accordance with the requirements of Section 601 or Section 211 of these specifications. Backfill of all excavated areas below structures shall be in accordance with MAG Specification and COP Supplement 206.4.

350.3 REMOVAL OF PAVEMENT

(A) Portland Cement Concrete Pavement: Unless otherwise specified in the special provisions, concrete pavement designated on the project plans to be removed shall be removed from the job site and disposed of at a site secured by the Contractor.

Where new construction is to join the existing concrete pavement, the pavement shall be saw cut to a true line perpendicular to the centerline of the pavement with straight vertical edges free from irregularities.

(B) Bituminous Pavement: Unless milling is noted on the plans or is a bid item, all bituminous pavement designated on the project plans to be removed, shall be completely removed down to the underlying base course or subgrade. The pavement material shall be removed and disposed of at a site secured by the Contractor.

Where new construction is to join existing bituminous pavement, the existing pavement shall be cut to a true line perpendicular to the centerline of the pavement with straight vertical edges free from irregularities. The removal of asphaltic concrete at the approaches to structures shall be accomplished in a manner approved by the Engineer.

350.4 REMOVAL OF STORM PIPE AND CULVERTS

All removed pipe which is to be salvaged or re-laid shall be cleaned of all earth and other material inside and outside prior to being stockpiled or reused. Pipe to be reused shall be stored when necessary to avoid damage or loss before relaying.

Existing pipe to be partially removed shall be cut with straight and smooth edges on a plane perpendicular to the center line of the pipe.

Pipe that is not salvaged shall become property of the Contractor, removed from the project, and disposed of properly.

350.5 REMOVAL OF MISCELLANEOUS CONCRETE

Miscellaneous concrete shall be defined as all or portions of mortared rubble masonry, curbs, gutters, sidewalks, driveways, aprons, slope paving, island paving, retaining walls, spillways, drainage structures, concrete box culverts, foundations, footings and all other Portland cement concrete or masonry construction, except bridges and pavement. All existing miscellaneous concrete shall be removed to a depth of at least 5 feet below finished subgrade elevation unless otherwise noted on the project plans or special provisions. Other specification sections that discuss removal of concrete items shall supersede the provisions in this section.

Where new concrete is to join existing concrete, the existing concrete shall be saw cut to a true line with straight vertical edges free from irregularities.

Concrete removal operations shall be performed without damage to any portion that is to remain in place. All damage to the existing concrete, which is to remain in place, shall be repaired to a condition equal to that existing prior to the beginning of removal operations. The repairing of existing concrete damaged by the Contractor's operations shall be at no additional cost to the City.

Existing reinforcement that is to be incorporated in new work shall be protected from damage and shall be thoroughly cleaned of all adhering material before being embedded in new concrete.

Concrete shall be disposed of as provided in 350.3(A).

The floors of concrete basements, pits and structures that are located within the right-of-way shall be completely removed.

350.6 REMOVAL OF UTILITIES

Removal of water mains, sewer mains, and related appurtenances shall be in accordance with COP Supplement 650 and 651, respectively.

All existing utilities not designated for removal shall remain in place and be protected against damage.

A utility may be abandoned in place below a new major structure that is part of the work only if approved by the Agency and solidly filled with grout using methods approved by the Agency. All abandoned utilities to remain and the approved abandonment method shall be noted on the installation record drawings.

Utilities to be removed by the Contractor shall be disconnected and taken out in accordance with the requirements of the utility owner to the limits shown on the plans. Utility removal shall not be performed until a release has been obtained from the utility stating that their respective service connection and appurtenant equipment have been disconnected, removed or sealed and plugged in a safe manner.

The Engineer shall be notified when utilities are encountered that are not shown on the plans.

350.6.1 Removal and Disposal of Asbestos Cement Pipe

(A) Background

Asbestos Cement Pipe (ACP) is a mixture of Portland cement and asbestos fibers. It was introduced into North America in 1931 and by 1953 the American Water Works Association (AWWA) had established standards for ACP. Along with many other cities, ACP water mains were installed in the city of Prescott and as a consequence, we have a considerable quantity of this material in service. Some of these mains are old and need to be replaced; some are undersized and need to be upsized; and others are in conflict with new utility installations and need to be relocated. These actions require all or part of the existing ACP system to be removed and disposed. Subsequent to ACP's introduction into the United States, the EPA determined that asbestos, in an airborne condition, is a hazardous material and established laws/guidelines for the handling and disposal of the material. The Asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP) establishes requirements for the removal and disposal of regulated asbestos containing materials. This policy statement establishes procedures and identifies responsibilities for the proper handling of asbestos-cement pipe in conformance with the Asbestos NESHAP requirements in effect as of November 1990.

NOTE: As used herein, the term “Excavator” shall refer to that entity (individual or contractor) which actually excavates and exposes the pipe. The term “Generator” means any owner or operator of a source (covered by the regulation) whose act or process produces asbestos containing waste material. The term “extra cost” shall refer to the cost over and above the removal and disposal of the pipe in a non-friable state.

(B) Policy

(1) It is the intent of the City to comply with the requirements of the Asbestos NESHAPS found at 40 CFR Part 61, Subpart M. This Policy Statement will establish procedures to be used by all Excavators in the removal and disposal of ACP in compliance with NESHAPS. Nothing in this Policy Statement shall be construed to void any provision of a contract or other law, ordinance, regulation or policy whose requirements are more stringent.

(2) ACP is defined under NESHAPS as a Category II, non-friable, non-regulated material in its intact state but which may become friable upon removal, demolition, and/or disposal. Consequently, if the removal/disposal process renders the ACP friable, it is regulated under the disposal requirements of 40 CFR 61.150. If more than 260 linear feet of ACP is removed which on removal will become friable, a NESHAPS notification must be filed with the Yavapai County Environmental Services Department. The notification must be filed at least 10 days prior to removal of the material. If it remains in its non-friable state, as defined by the NESHAPS, it can be disposed as a conventional

construction waste. EPA defines friable as material, when dry, which may be crumbled, pulverized or reduced to powder by hand pressures.

(3) The Generator of the hazardous material is responsible for the identification and proper handling, transportation, and disposal of the material. Therefore, it is the policy of the City that if the actions of the Excavator cause the material to become friable, and therefore subject to the regulations, that the Excavator becomes the Generator.

(4) The requirements of A.R.S. § 40-360.21 through 40-360.32 (Blue Stake Law) are important with respect to implementation of this policy statement. The Blue Stake Law mandates the owner of the facility (in this case the City) to maintain installation records and, upon request, to properly locate the underground facility. The law also places requirements on the Excavator to:

(a) Call Arizona 811 at least 2 working days prior to the start of excavation.

(b) Mark the boundaries of the location to be excavated.

(c) Excavate in a careful and prudent manner, including hand digging within 24 inches of the underground facility.

(d) Notify the City if the Excavator encounters an underground facility that has not been located and marked or has been marked in the wrong location.

If the Excavator does not comply in full with Arizona 811 requirements and therefore causes non-friable ACP to become friable, any and all extra costs incurred to handle, containerize, transport, and dispose of the asbestos containing waste shall not be paid or reimbursable by the City. If Arizona 811 requirements are met and ACP is accidentally or unknowingly disturbed thereby causing it to become friable, the Excavator may seek reimbursement from the City for additional costs to handle, containerize, transport and dispose of the material following the procedures described herein.

(5) The Contractor shall retain the services of an independent, qualified, licensed asbestos abatement Consultant. All removal and disposal of ACP shall be under the cognizance of the Consultant. The Excavator is responsible to contact the Consultant a minimum of 2 working days prior to the initiation of removal/disposal operations.

The Consultant will monitor the Excavator's work. If the ACP was not planned for removal and the Excavator accidentally disturbs the pipe, the Excavator will cease all work and notify the Engineer immediately for further instructions.

(6) It is the intent of the City that all ACP shall be removed in such careful and prudent manner that it remains intact and non-friable. The Excavator is responsible to deploy the means, methods, techniques, and sequences to ensure this result. When it is a practical impossibility, as determined by the Engineer, to remove the ACP without creating a friable material, the City will pay the Excavator for the removal of friable material in accordance with the measurement and payment section. The Excavator shall take steps to minimize the amount of the friable waste and abide with all asbestos regulatory requirements. The Consultant shall be available to provide recommendations or suggestions, which the Excavator may or may not choose to deploy. The Consultant shall measure or otherwise assess and recommend to the Engineer the amount or percentage of friable waste for which the City should pay for removal and disposal with the remainder being the responsibility of the Excavator. If the ACP is caused to become friable, the Consultant shall conduct perimeter air monitoring upon request by the City. If the Excavator fails to notify the Consultant, fails to excavate and remove the ACP in a careful and prudent manner creating friable material or fails to abide with all asbestos regulatory requirement, the Excavator shall be deemed to be the Generator responsible to handle, transport and dispose of the ACP in accordance with the NESHAPS requirements and will not be reimbursed for any cost incurred. This will include all penalties and associated legal fees of the Generator as well as any penalties assessed against the City, and any associated legal fees incurred by the City for violation of any of the asbestos regulatory requirements that are caused by the Excavator.

(7) ACP shall NOT be crushed and left in place.

(8) Compliance with all aspects of worker safety and health regulations including but not limited to the OSHA Asbestos Standard is the responsibility of the Excavator. The City assumes no responsibility for compliance programs which are the responsibility of the Excavator.

(9) Payment for removal of non-friable existing asbestos cement pipe shall be at the unit bid price shown in the bidding schedule for complete removal, proper disposal and trench backfill in accordance with the specifications.

(10) Payment for removal of friable existing asbestos cement pipe shall be a contingent item at the unit bid price shown in the bidding schedule for complete removal, proper disposal and trench backfill as determined by the Engineer in accordance with this section and other provisions of the specifications.

350.7 REMOVAL OF SIGNS AND DELINEATORS

Street signs, traffic control signs, traffic signal material and control devices shall be removed as designated on project drawings, salvaged and delivered to the City at the site designated by the Engineer. The Contractor shall dismantle the sign panels and delineators and remove the sign posts from the ground in such a manner as to prevent damage to the posts. The Contractor shall not remove the existing signs prior to the completion of the new sign installation, but shall remove them within 5 working days after the installation of the new signs or as directed by the Engineer.

350.8 REMOVAL OF FENCE

All fence to be removed, shall become the property of the Contractor unless designated for salvage on the project plans. If fence is designated to be removed and salvaged, all fence, including gates shall be salvaged in accordance with the requirements of 202-3.01.

When designated for salvage, fence and gates shall be carefully dismantled and neatly rolled or coiled. Posts shall be cleaned of all concrete and dirt.

In areas where new fence or relocated fence is to be installed, the Contractor shall perform the removals in such a manner as to prevent the escape of any livestock and/or domestic pets, including the placement and removal of temporary fence when necessary.

350.9 REMOVAL OF GUARDRAIL

All guardrail to be removed shall become the property of the Contractor unless otherwise specified on the project plans.

If guardrail is designated to be removed and salvaged, the Contractor shall carefully dismantle the guardrail and remove the blocks and posts in such a manner as to prevent any damage to the removed items. The guardrail, including panels, end sections, posts and all hardware shall be salvaged in accordance with the requirements of 350.2.

350.10 MEASUREMENT AND PAYMENT

No separate measurement or payment shall be made for removal of existing improvements unless otherwise noted on the plans or there being removal bid items. This work shall be considered incidental and included in the unit price bid for construction of the appropriate contract pay items.

Measurement for non-friable and friable asbestos cement pipe shall be by the linear foot of pipe removed.

Payment for removal of non-friable existing asbestos cement pipe shall be at the unit bid price shown in the bidding schedule for complete removal, proper disposal and trench backfill in accordance with the specifications.

Payment for removal of friable existing asbestos cement pipe shall be a contingent item at the unit bid price shown in the bidding schedule for complete removal, proper disposal and trench backfill as determined by the Engineer in accordance with paragraphs E and F and other provisions of the specifications.

PART 400 – RIGHT-OF-WAY AND TRAFFIC CONTROL

SECTION 401: TRAFFIC CONTROL

401.1 DESCRIPTION

REMOVE in its entirety and REPLACE with the following:

Traffic control is the responsibility of the Contractor and shall be performed in accordance with this section and the US Department of Transportation Federal Highway Administration's Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), latest edition with the latest revisions, Prescott Traffic Barricade Manual, and the project plans.

(A) Prior to beginning the project, the Contractor shall submit to the City, for approval, a traffic control plan for all activities connected with the proposed work. He must obtain approval from the Engineer for the traffic control plan and schedule prior to any construction. The Contractor shall submit the traffic control plan to the Engineer at or before the project preconstruction conference.

(B) Written notice shall be given to the Engineer or the Engineer's authorized representative on the job 48 hours prior to any changes in detours or routes of access. The notice shall give specific details with maps showing the access to all residences and businesses affected by the project.

(C) The City Police and Fire Departments shall be continually updated on access routes along and through the site during construction.

401.2 TRAFFIC CONTROL DEVICES

ADD the following:

(C) All traffic control devices required for the project shall be the responsibility of the Contractor.

(D) When required to cross, obstruct, or close a street, traffic way, or sidewalk for a short duration that is approved by the Director, the Contractor shall provide and maintain suitable bridges, detours or other approved temporary means for the accommodation of vehicular and pedestrian traffic.

(E) When traffic conditions at the construction site warrant the use of certified police personnel to direct traffic, arrangements shall be made with the City Police Department, Yavapai County Sheriff's Office, or Department of Public Safety for off-duty officers.

401.3 FLAGMEN OR PILOT CARS

REMOVE in its entirety and REPLACE with the following:

The Contractor shall provide sufficient certified flagmen, uniformed off-duty law enforcement officers and pilot cars to expedite the safe passage of traffic through the work zone as determined by the Engineer.

Any individual who is stationed in a work zone to provide temporary traffic control (flagmen) or to drive a pilot car shall have completed training and be certified in flagging through a program that meets the training and certification standards of the National Safety Council flagger training program, the American Traffic Safety Services Association (ATSSA) flagger program or an equivalent program that meets the same objectives. An equivalent program must be approved by the Director and meet the US Department of Transportation Federal Highway Administration's Standards for the control of traffic through highway work zones as defined in the manual on uniform traffic control devices for streets and highways. This training and certification shall be renewed at least once every 4 years. It is the Contractor's responsibility to provide the certifications to the Engineer before flagmen engage in the traffic control and/or temporary traffic control. This section does not apply to law enforcement personnel who are employed by governmental entities. Should appropriately trained flaggers not be present, the City, at its discretion may cease operations until appropriately trained flaggers can be provided on-site.

401.6 MEASUREMENT

REMOVE in its entirety.

401.7 PAYMENT

REMOVE in its entirety.

ADD the following subsection to Section 401- Traffic Control:

401.8 MEASUREMENT AND PAYMENT

Payment for traffic control shall be at the applicable unit price bid in the contract documents.

(A) Preparation of traffic control plan shall be inclusive of all submittals, reviews and if needed, re-submittals.

(B) Flaggers shall be per hour for actual time directing traffic. It does not include travel time or time spent setting up or taking down devices.

(C) In the event off-duty police personnel are required to direct traffic, the bid schedule includes an allowance for certified police personnel for the purpose of encumbering funds to cover the cost of certified police personnel. The amount of the allowance is determined by the Engineer and is not subject to individual bid pricing. All bidders shall incorporate the amount in the bid proposal and shall reflect the same in the total bid for the project.

It shall be understood that this allowance is an estimate only. The allowance shall be not used without approval of the Engineer.

Reimbursement for certified police personnel shall be based on actual cost, plus an allowable markup to the prime Contractor of 15 percent, for use of certified police personnel approved by the Engineer.

Flagmen, uniformed off-duty law enforcement officers or pilot cars, with driver, will be measured by the hour for each individual, including vehicle and equipment, required to perform traffic control. When an officer is

used less than 3 hours, a minimum of 3 hours will be charged. Anything over 3 hours will be measured by the hour.

Payment will be made at the contract bid price in the proposal for uniformed, off-duty law enforcement officer. If the officer is utilized in excess of 8 hours in any calendar day or in excess of 40 hours in any calendar work week, payment shall be at the rate of 1½ times the contract bid price for all hours worked in excess in either of the above time periods.

(D) Barricades and storage shall be at the lump sum bid and shall be inclusive of all temporary signs and devices in the traffic control plan and as required by the MUTCD, COP Traffic Barricade Manual and the Engineer.

(E) Message boards shall be measured by each per day as determined necessary by the approved traffic control plan and the Engineer.

(F) Pilot car and driver shall be per hour for actual time used as required by the approved traffic control plan and the Engineer. It does not include travel time or time spent setting up or taking down devices.

(G) Incidental traffic related items shall include all other pertinent tools, equipment, devices and or work required to provide safe and effective traffic control in accordance with the approved traffic control plan, the MUTCD and the Engineer.

ADD the following section to Part 400- Right-of-Way and Traffic Control:

SECTION 402: PAVEMENT MARKINGS AND STRIPING

402.1 THERMOPLASTIC PAVEMENT MARKINGS

Work under this item shall be performed per ADOT Specification 704.

(A) Stop Bars and Crosswalks: Work under this item shall consist of the application of thermoplastic striping material at the locations noted on the project plans. All stop bars shall be 18 inches in width unless otherwise specified. Crosswalks shall be 12 inches in width.

(B) Measurement shall be in accordance with ADOT Specification 704-5 (width times length divided by 4 inches equals LF as shown in bid schedule).

(C) Pavement Markings: Pavement markings shall be in accordance with ADOT Specifications 704-4, ADOT 4-M 1.12 through 4-M 1.17, and as modified herein. Work under this item shall consist of the application of thermoplastic striping material at the locations noted on the project plans.

402.2 TEMPORARY STRIPING

Work under this item, temporary striping (paint) where required, shall be performed per ADOT Specification 701-3.05.

402.3 PERMANENT PAVEMENT MARKINGS

Work under this item shall be performed per ADOT Specification 708.

402.4 MEASUREMENT AND PAYMENT

Measurement and payment for pavement markings shall be at the per each basis for each legend or marking installed in accordance with ADOT Specification 704-5.

Measurement and payment for temporary striping shall be per ADOT Specifications 708-4 and 708-5.

Measurement for permanent pavement markings shall be in accordance with ADOT Specification 708-4 (width times length divided by 4 inches equals LF as shown in bid schedule). Payment for permanent pavement markings shall be in accordance with ADOT Specification 708-5.

ADD the following section to Part 400- Right-of-Way and Traffic Control:

SECTION 403: PERMANENT SIGNING, SIGN POSTS AND DELINEATORS

403.1 DESCRIPTION

Work under this item shall be done in accordance with the project drawings and requirements of the Manual MUTCD, MAG Detail 131, and ADOT Signing and Marking Standards.

403.2 GENERAL SIGNING GUIDELINES

(A) All signing shall conform to the most recent editions of the publications shown above with regard to size, color, shape and placement.

(B) All signs shall be new (other than those shown to be relocated). All new and relocated signs shall be mounted on new posts with new hardware. Signs designed for installation on existing street light poles shall be mounted with new hardware.

(C) Traffic sign dimensions, colors and lettering shall conform to the latest MUTCD Specifications. Traffic sign size shall be standard unless otherwise specified here or on the plans.

(D) All non mountable curb section signs shall be located at least 2 feet from the curb face to the nearest edge of the sign. All other roadways signs shall be mounted from 6 feet to 12 feet from the edge of the pavement to the nearest edge of the sign, unless otherwise noted in the sign summary table or on the plans.

(E) Roadways with guardrail signs shall be located at least 6 feet from the face of the guard rail to the nearest edge of the sign, unless otherwise noted in the sign summary table or on the plans.

(F) Sign location shall be coordinated with landscaping plans to ensure sign visibility per AASHTO Standards.

(G) Signs shall be mounted on street light poles whenever feasible.

(H) All signs installed in areas where parking or pedestrian movements occur shall typically be erected at a height of 7 feet above the normal edge of pavement or sidewalk to the bottom of the sign or to the lowest sign in a multiple sign installation assembly with the following exceptions:

(1) The height to the bottom of a secondary sign mounted below another sign may be up to 2 feet less than the height specified above.

(2) If the bottom of a secondary sign that is mounted below another sign is mounted lower than 7 feet above a pedestrian sidewalk or pathway, the secondary sign shall not project more than 4 inches into the pedestrian facility.

(3) Object markers shall be installed at least 4 feet above the normal edge of pavement.

(I) All R1-1 "STOP" signs and pedestrian warning signs shall be reflective with all reflective sheeting material to be diamond grade.

(J) All other signs are to be reflective with all reflective sheeting material to be high intensity prismatic meeting or exceeding ASTM D4956-04.

(K) Sign blanks shall be 5052-H38 alloy treated aluminum with Alodine 1200 conversion coating, 0.080 inch thick with rounded corners.

(L) Stop signs are to be shown at all local street intersections within a subdivision unless an engineering study shows that no control or yield control is warranted. Stop signs shall be designed and shown at all collector and non signalized arterial street intersections.

(M) Stop signs and Yield signs shall be a minimum of 30 inches in width. When specified by the City Traffic Engineer 36 inch and/or 48 inch signs may be required on major collectors and arterial streets.

403.3 SIGN POSTS

(A) Sign posts shall conform to the COP GES Detail 131Q.

(B) For new construction the Telspar, Uni-strut or approved equal 12 gauge, galvanized steel, 4 sided perforated square tubing is required. Two inch tubing shall be used for smaller signs while 2½ inch tubing shall be used for the larger signs.

(C) The post shall be tall enough to provide the minimum clearances specified in COP GES Detail 131Q.

(D) The base and sleeve system for the sign shall be anchored in a minimum of a 24 inch deep, 12 inch diameter foundation of concrete. The base shall have a breakaway slip base system. The exposed post from the base shall be 4 inches to 6 inches high.

(E) Signs over 48 inches wide shall be mounted on two, 2½ inch posts with a horizontal support frame.

(F) All station locations are approximate. The Contractor shall verify actual sign locations with the Engineer prior to the installation of all signs.

(G) The Contractor shall verify post lengths and elevations prior to installation.

403.4 MEASUREMENT AND PAYMENT

Measurement and payment shall be the unit price per each for posts and delineators and per square foot for sign panels, complete and in place.

ADD the following section to Part 400- Right-of-Way and Traffic Control:

SECTION 404: LOOP DETECTORS

404.1 QUADRUPOLE LOOP DETECTORS

(A) Loop detectors shall be installed in base course of asphalt concrete pavement and conform to ADOT Specifications 735 and 732-2.01, ADOT Traffic Signals and Lighting Standard Drawings (2010) 7-1. All

loop detectors shall be installed per ADOT Signals and Lighting Standard Drawing T.S. 7-1, Sheet 2. Installation shall include the home runs and installation of loop wiring into the existing signal cabinet. The hardwiring in the cabinet will be accomplished by City forces unless otherwise specified.

(B) Prior to bidding, the Contractor shall verify the location and layout of the existing detector loops and appurtenant home runs to ensure that home runs are re-established in their original configuration. Loop detectors shall be centered in lanes. The Contractor shall verify loop layout with the Inspector prior to installation.

404.2 MEASUREMENT AND PAYMENT

Measurement shall be a complete quadrupole loop installation. Payment shall be made on a per each installed basis.

SECTION 405: SURVEY MONUMENTS

405.1 DESCRIPTION

ADD the following:

All efforts shall be made to protect survey monuments from being disturbed or damaged. Monuments shall be: 1) re-established by a Registered Land Surveyor at the Contractor's expense if disturbed, damaged or covered, and 2) located by a Registered Land Surveyor where noted on plans.

All survey monuments, including but not limited to street centerline monuments, benchmarks, control points, and property corner monuments shall not be moved or otherwise disturbed by the Contractor until an authorized agent of the agency having jurisdiction over the survey monuments has witnessed or otherwise referenced their location, and only then in accordance with the requirements of the agency having jurisdiction. Any survey monuments uncovered, found, damaged, defaced, disturbed, removed, or displaced by the Contractor shall be replaced at the Contractor's expense.

405.2 MATERIALS

REMOVE the first paragraph in its entirety and REPLACE with the following:

The concrete portion of monuments shall be constructed in accordance with the provisions in Sections 725 and 505 of these specifications. Concrete shall be Class AA.

405.3 CONSTRUCTION

REMOVE the fourth paragraph in its entirety.

ADD the following:

Frames, covers and concrete shall be installed per COP GES Detail 120Q.

405.5 PAYMENT

ADD the following:

No separate payment shall be made for resetting property monuments. This work shall be considered incidental and included in the unit price bid for construction or installation of the appropriate contract pay items.

Payment for survey monuments shall be based on a per each unit complete in place.

SECTION 430: LANDSCAPING AND PLANTING

430.3.2 Seeding

REMOVE in its entirety and REPLACE with the following:

430.3.2 Seeding (Hydraulic)

(A) Seeding consists of furnishing and applying chemical fertilizer; furnishing and planting seed and furnishing, applying and affixing mulch. The areas to be seeded are disturbed or un-vegetated areas. Slopes are required to be seeded immediately upon completion; coordination with grading operations will be required.

Application rates of seed as specified are for Pure Live Seed (PLS). PLS is determined by multiplying the sum of the germination and hard or dormant seed by purity. Weed content of seed shall not exceed 0.5 percent. No substitution of species, strain or origin of seed will be allowed unless evidence is submitted in writing by the Contractor to the Engineer showing that the specified materials are not reasonably available during the contract period. The substitution of species, strains or origins shall be made only with the written approval of the Engineer, prior to making said substitution.

The seed shall be delivered to the project site in standard, sealed, undamaged containers. Each container shall be labeled in accordance with A.R.S. § 3-231 through 3-243 and the US Department of Agriculture rules and regulations under the Federal Seed Act. Labels shall indicate the variety or strain of seed, the percentage of germination, purity and weed content, and the date of analysis, which shall not be more than 9 months prior to the delivery date.

(B) Seed Mix

Botanical Name	Common Name	Seed/lb	Rate/Acre- PLS (Pure Live Seed)
Agropyron dasystachym	Thickspike Wheatgrass	154,000	3.0
Bouteloua gracilis	Blue Gramma	825,000	2.0
Koeleria crisata	Prairie Junegrass	825,000	1.0
Mulenbergia wrightii	Spike Muhly	1,000,000	1.5
Festuca arizonica	Arizona Fescue	500,000	2.0
Elymus elymoides	Squirrel Tail	192,000	4.0
Sporobolus cryptandrus	Sand Dropseed	5,298,000	0.75

(C) Seed Supply Agreement: The required species may be in short supply during the project. Therefore, the Contractor shall enter a contractual agreement with a seed collector/supplier that verifies that sufficient supply of specified plant materials will be available on or immediately prior to the seeding dates. This requirement shall be fulfilled within 45 days following the preconstruction conference in order to allow sufficient time for seed collection. The Contractor shall provide written notification to the Engineer verifying that the required species are available and secured for the project. The collection contractor shall test the seed for purity and viability and hold the seed in a manner which maintains its viability. The Contractor shall submit purity and viability test results to the Engineer for approval prior to the initiation of seeding operations. If it is required to be held for more than a year from initial testing the seed shall be tested again for viability. The Contractor shall compensate the seed supplier a percentage of the seed cost to hold seed material and for the seed tests as identified in Basis for Payment.

(D) General

The slurry for the hydroseed process shall be as follows:

Slurry Mix	Rate
Hydrofiber: Silva, Conwed or Spray mulch x-100 wood fiber or equivalent	800 lbs/acre
Tackifier	80 lbs active ingredient/acre
Starter fertilizer: Ammonium Phosphate	16-20-0 200 lbs/acre
Seed mix	As specified
Soil conditioner	1000 lbs/acre

The seed shall be applied within 30 minutes after being combined with the slurry mix.

Ingredients for Slurry Application	Percentages (Minimum)
Nitrogen	5
Phosphoric Acid	3
Water Soluble Potash	1
Humas	50
Humic Acids	15
Soluble Metallic Iron	1

(E) Wood Cellulose Fibers: Wood fiber mulch shall consist of a specially prepared wood fiber processed to contain no growth germination inhibiting factors. The mulch shall be virgin wood and be manufactured and processed so the fibers will remain in uniform suspension in water under agitation to form a homogenous slurry. The mulch shall have a pH range between 4.5 to 6.5.

When hydraulically sprayed on the ground, the material will form a blotter-like cover impregnated uniformly with seed. The cover will allow the absorption of moisture and allow rainfall to percolate to the underlying area.

(F) Tacking Agent: Binder shall be free flowing, non-corrosive powder produced from natural plant gum marketed under M-Binder, M145 Binder, AZ-TAC or approved equal. It shall have gelling properties to inhibit the tendency of water and fiber to move downhill as they are sprayed on steep slopes.

(G) Construction Requirements

(1) General: The Engineer will regularly observe the weighing of seed, mixing of slurry mix and application of seed.

(2) Seeding: Seeding shall be done immediately following the final grading or disking of each cut slope and each fill slope. The soil surface shall be loose. The Contractor will be required to mobilize frequently to accomplish this goal. No seeding shall be carried out under wind conditions exceeding 5 mph Scheduling of seeding mobilization will be coordinated with the Engineer at the weekly construction meetings. In no case shall a decision by the Engineer relieve the Contractor from the requirement of seeding prior to measurable rainfall. If measurable rain falls prior to seeding, or if the surface of the graded area has formed a crust or slightly hardened surface, the Contractor shall be responsible for ripping, blading or loosening the ground surface, or otherwise repairing and/or preparing the affected areas for seed, after they adequately dry out and prior to seeding, at no cost to the City. The use of specialized equipment or manual methods may be required to prepare the surface for seeding, if seeding is not accomplished immediately after grading or disking.

Seed is to be accomplished during the window of June 1 to July 15 and November 1 to January 30. These windows are to allow expected seasonal rains to start germination process.

All areas disturbed by construction are to be seeded. This may be more area than shown on the plans. All areas are to be approved by the Engineer. The Contractor shall coordinate seeding operations with slope construction so that the tops of cuts and toes of fills can be reached with hydroseed equipment.

Hoses may be used where heavy equipment cannot access.

(3) Tillage: All slopes steeper than 3:1 shall either have a loose, friable soil depth of 2 inches or more or be tilled a minimum of 4 inches in depth as they are constructed.

Tillage shall be accomplished with a ripper bar, chisel plow or harrow tool or with other equipment which will provide thorough soil cultivation.

Tillage shall be performed along the contour. The slopes behind guardrail and in the ditch line in cut shall be left with roughened surface to aid in water absorption. Seeded areas which are not behind guardrail or between the ditch line and the roadway on a cut shall be left in a firm surface free of foreign material that would interfere in the seeding operation.

No work shall be done when the moisture content of the soil is unfavorable or the ground is otherwise in a condition not conducive to tillage.

(4) Planting: The Contractor shall submit a batch (tank) mix for the Engineer's approval prior to mixing any seed/mulch slurry. Batch mixing and coverage will be monitored throughout seeding operations. The Contractor is to coordinate monitoring with the Engineer in advance of mixing.

After the tillage is complete and accepted by the Engineer, seed shall be planted by slurry mix (cut slopes steeper than 3:1).

All areas to be seeded shall have a starter fertilizer of ammonium phosphate 16-20-0 applied at a rate of 200 pounds per acre and soil condition at the rate of 1,000 pounds per acre.

Any material sprayed on non-designated areas shall be immediately removed by the Contractor at the Contractor's expense. Non-designated areas include pavement, guardrails, signs, plants and existing vegetation.

(5) Anchorage by Tacking: Mulch shall be anchored by tacking using a slurry consisting of a minimum of 150 pounds of binder, 400 pounds of wood fiber mulch and 700 gallons of water per acre.

(6) Preservation of Seeded Areas: Any material sprayed on non-designated areas shall be immediately removed by the Contractor at the Contractor's expense. Non-designated areas include pavement, guard rails, signs, plants, and existing vegetation.

(7) Warranty: The Contractor shall guarantee that 75 percent of the applied tackifier remains in place for a period of 30 days after acceptance of the seeding application. Any areas that have less than 75 percent of the tackifier remaining shall be reseeded, re-mulched and re-tacked at the Contractor's expense.

Areas that require reseeding and re-mulching under the warranty shall be done at no additional cost to the City. The 30 day period(s) shall be within the allotted contract time.

Measurement and Payment: Seeding will be measured by the acre, to the nearest tenth acre, measured along the ground surface for the areas which have been planted and mulched, as determined by the Engineer. The Contractor may be reimbursed a partial payment based on the invoice amount for the cost to hold and test the seed in conformance with the Seed Supply Agreement.

The accepted quantities of seeding, measured as provided above, will be paid for at the contract price per acre for the full performance of the work herein described, which price shall be full compensation for the work completed including all equipment, labor and materials required.

ADD the following section to Part 400- Right-of-Way and Traffic Control:

SECTION 431: LANDSCAPE ROCK

431.1 REMOVE AND REPLACE LANDSCAPE ROCK

Landscaping shall be protected and restored in accordance with Section 107.9 of these specifications. Existing landscaping rock shall be removed, stockpiled, and replaced in its original position as closely as possible.

Measurement and Payment: Payment shall be per lump sum amount.

PART 500 – STRUCTURES

SECTION 505: CONCRETE STRUCTURES

505.1.1 Minor Structures

REMOVE in its entirety and REPLACE with the following:

Concrete structures such as manholes, catch basins, median barriers, headwalls, cattle guards, and other miscellaneous structures as defined by the Engineer are hereby defined as minor structures. Minor structures

shall be precast units. MAG Type D Catch Basins shall be cast-in-place. Cattle guards, median barriers, and headwalls, at the option of the Engineer, may be either constructed of cast-in-place concrete, or furnished as precast units. Precast units shall be fabricated in accordance with shop drawings submitted by the Contractor and approved by the Engineer, in accordance with the requirements of MAG Specification and COP Supplement 105.2. All structures not defined as minor structures shall be classified as major structures.

(A) Concrete Drainage Outlet/Structure: The work consists of constructing a concrete drainage outlet(s) and structure(s) as designated on the project drawings in accordance with Sections 505 and 725 of these specifications, and as modified herein. All cast-in-place concrete shall be Class AA, 4,000 psi. Subgrade and base materials under the structure shall be compacted to not less than 95 percent of the maximum dry density as determined by AASHTO T 99. No additional payment will be made for aggregate base materials required under concrete structures. The base material shall be considered incidental to the construction of this item and provided for in the unit price for the work. Measurement and payment under this item shall be to the nearest square foot complete in place in accordance with the respective detail for flat work, and per each unit installed for structures.

(B) Concrete Headwall: Work under this item shall be in accordance with COP Supplement 505 and 725, MAG Specifications 726 and 727; MAG Details 501-1 and 501-2; and the project drawings. Concrete shall be Class AA, 4,000 psi. Payment shall be made per each headwall installed complete in accordance with the respective detail.

(C) Concrete Catch Basin: Work under this item shall be in accordance with MAG Details 530 through 540-2; COP Supplement 505 and 725; and above mentioned specifications for Portland Cement Concrete. All grates shall be bicycle safe type. Measurement and payment under this item shall be per each catch basin complete in place in accordance with the respective detail, to include grates.

(D) Scupper: Work under this item shall be in accordance with MAG Details 203 and 206. Concrete shall be Class AA, 4,000 psi. Measurement and payment under this item shall be per each scupper installed complete in place in accordance with the respective detail.

(E) Concrete Retaining Wall: Work under this item shall be in accordance with the project drawings. Measurement and payment under this item shall be to the nearest square foot of the retaining wall measured from the top of the footing to the top of the wall complete in place in accordance with the respective detail.

505.6.2 Adverse Weather Concreting

REMOVE in its entirety and REPLACE with the following:

Adverse weather concreting shall be in accordance with COP Supplement 725.

PART 600 – WATER, SEWER, STORM DRAIN AND IRRIGATION

SECTION 601: TRENCH EXCAVATION, BACKFILLING AND COMPACTION

601.1 DESCRIPTION

ADD the following:

(A) Unless specifically identified, no investigation of subsurface soil conditions for water or sewer main installation has been made for project limits.

(B) Excavation, backfilling and compaction shall be in accordance with this section and standard details as noted.

(C) All water encountered during the work shall be disposed of by the Contractor in a manner such that it will not damage public or private property or create a public nuisance or health problem. The costs of furnishing pumps, pipes, special bedding, and over excavation as required to provide a stable foundation, and other equipment and materials shall be incidental to the work in accordance with COP Supplement 200.1.

601.2.3 Trench Grade

REMOVE in its entirety and REPLACE with the following:

All construction staking shall be in accordance with Section 105.8 of these specifications.

For all pipe, the Contractor shall excavate for and provide an initial granular bedding at least 6 inches thick. This bedding material shall be placed at a uniform density with minimum compaction and fine graded as specified below.

601.2.5 Over-excavation

REMOVE the second paragraph in its entirety and REPLACE with the following:

Unauthorized excavation below the specified grade line shall be refilled at the Contractor's expense with bedding material compacted to a uniform density of not less than 95 percent of the maximum density as determined by AASHTO T 99 and T 191 or ASTM D6938. When AASHTO T 99, method A or B, and T 191 are used for density determination, ADOT Procedure ARIZ 227c will be used for rock correction.

ADD the following subsection to 601.2 Excavation:

601.2.11 Rock Excavation for Utility and/or Drainage Construction

(A) Definition of Rock: When rock is encountered, it shall be stripped of earth and shale, and the Engineer notified in order that he may measure or cross-section the same. In lieu of stripping the earth overburden prior to excavation/blasting, the Engineer and the Contractor may mutually agree on a method to define the vertical limits of rock. Any rock excavated before such measurement or agreement is made, will not be estimated, allowed, or paid for. Rock excavation shall be defined to include: all hard, solid rock in ledges; bedded deposits and unstratified masses; all natural conglomerate deposits so firmly cemented as to present all the characteristics of solid rock; and masonry or concrete structures not shown on the plans. Shales, hard pan, masonry and concrete rubble boulders less than 1 cubic yard which are not a part of or attached to substrata of rock, shall not be considered rock excavation. Additionally, material to be considered "rock" shall be of such hardness that it cannot be excavated using hydraulic backhoe with combined breakout force, for bucket and stick cylinders, of at least 100,000 pounds.

(B) Blasting

(1) It is the Contractor's responsibility to determine the type of material he will encounter and whether blasting will be necessary.

(2) Blasting shall be done only by experienced, qualified blasters. Blasting shall be done in accordance with the recommendations for best practice in Section 9 of the Associated General Contractors of America (AGC) Manual of Accident Prevention in Construction and in accordance with the recommendations for best practices of the Institute of Makers of Explosives. Also, all blasting must comply with the requirements of the Division of Industrial Safety and OSHA and all other Federal, State and local ordinances.

(3) When work requires blasting or explosive conditions, precautions shall be taken to protect life and property, and give proper warning to persons who may be in vicinity of work before blast is set off.

(4) Blasting shall be performed in such a manner that no damage will result to any building, structure, pipeline, or facility on or off the site of work, above or below ground. Any damage suffered as a result of blasting shall be immediately settled, including repair or replacement.

(5) Blasting shall be done in such a manner that the earth is not loosened or disturbed below the footing or foundation of any proposed structure. Loosened material below footings or foundations shall be replaced with Class C concrete.

(6) The stemming of each hole or cover over explosive shall be sufficient to prevent surface blast wave, but in no case less than 3 feet, 6 inches. Multiple holes shall be shot using millisecond delays.

(7) The Contractor shall enlist the services of an experienced explosives engineer for advice on blasting methods and for the protection of existing structures or facilities.

(8) Blasting procedures shall comply with all rules and regulations as specified and determined by the City Fire Marshall or the Director.

601.4.2 Bedding

REMOVE in its entirety and REPLACE with the following:

Bedding shall be a minimum of 6 inches and shall be in accordance with COP GES Detail 200Q-1 for paved and unpaved areas. Bedding/shade material shall be of granular consistency such as sand or crushed aggregates conforming to the following gradation and plasticity requirements:

Sieve Size	Percentage Passing By Weight
1 in	100
No. 200	< 25
PI	10 Max.

Volcanic cinders or glass materials are not acceptable.

Use of open graded rock (i.e. 3/8 inch pea gravel or ¾ inch rock) must be approved by the Engineer prior to placement and will be considered only in special circumstances.

Water consolidation by any means shall not be permitted.

Bedding and shading material shall not be considered “corrosive” or “aggressive” soil per the definitions in AWWA (including C105), Ductile Iron Pipe Research Association (DIPRA) and other similar standards and industry accepted documents. The Contractor shall submit material certification documents from the bedding and shading material supplier indicating that the bedding and shading material to be provided is not considered “corrosive” or “aggressive” soil to ferrous metals, and shall include the pH, resistivity, oxidation/reduction, and sulfide values of the material within the certification package. Upon delivery of the material, the Contractor’s geotechnical engineer shall provide Quality Control testing by testing samples of the bedding/shading material for corrosivity. The Contractor’s geotechnical engineer shall provide a letter

sealed by a registered professional engineer, licensed in the State of Arizona, that the bedding/shading material is not corrosive to ferrous metals as defined by AWWA C105. If the material is found to be corrosive, the Contractor must install polyethylene encasement per MAG Specification 610.6 at no additional cost to the City. Testing shall occur a minimum of every 1,000 linear feet of pipe installed.

601.4.4 Initial Backfill

REMOVE in its entirety.

601.4.5 Final Backfill

REMOVE in its entirety and REPLACE with the following:

601.4.5 Backfill

Backfill material shall be in accordance with COP GES Detail 200Q-1 for paved areas and COP GES Detail 200Q-1 for unpaved areas. In paved areas, backfill from 1 foot above the pipe to the bottom of the base course shall be non-shrink CLSM backfill. In unpaved areas, backfill from 12 inches above the pipe to 6 inches below existing grade shall be minus 3 inch native material similar in nature to material existing prior to excavation.

Trench backfill Quality Control testing frequency shall be 1 per soil type for Proctor Density testing and 1 per 1 foot vertical lift per 200 linear feet of trench.

601.4.6 Compaction Densities

REMOVE in its entirety and REPLACE with the following:

All backfill material with the exception of non-shrink slurry backfill shall be compacted to 95 percent maximum dry density per ASTM D698.

601.4.7 Water Consolidation

REMOVE in its entirety and REPLACE with the following:

Water consolidation by any means shall not be permitted.

601.7 PAYMENT

REMOVE in its entirety.

ADD the following subsection to Section 601- Trench Excavation, Backfilling and Compaction:

601.8 MEASUREMENT AND PAYMENT

No separate measurement or payment shall be made for trench excavation, backfilling, compaction, or placement of temporary pavement. This work shall be included in the respective unit bid price for water, sewer, or storm main and lateral construction.

Rock excavation within the roadway excavation limits shall not be measured separately. It will be included in roadway excavation. No separate payment will be made for roadway rock excavation. It shall be combined as one item under roadway excavation.

Rock excavation within structural excavation limits shall not be measured separately. It will be considered incidental and shall be included in the appropriate bid item.

Rock excavation within trenches shall be measured in accordance with the following:

(1) Width of trench for rock excavation shall be based on pipe outside diameter plus 24 inches.

(2) Depth for rock excavation shall be actual depth from top of rock to bottom of rock, or to bottom of normal bedding section, whichever depth occurs first.

Payment for rock trenching shall be at the unit price bid per cubic yard which shall include the cost of blasting, excavation, removal, hauling and disposal.

SECTION 610: WATER LINE CONSTRUCTION

610.1 DESCRIPTION

REMOVE in its entirety and REPLACE with the following:

Water main construction shall be in accordance with all applicable standard specifications and standard details.

610.3 MATERIALS

REMOVE item (A) in its entirety and REPLACE with the following:

(A) Water Main piping shall be bell and spigot Class 350 ductile iron unless otherwise noted on the project plans, in accordance with COP Supplement 610 and MAG Specification 750. Trace wire per COP GES Detail 319Q-1 shall be required for all water main installations. Water main piping shall be furnished new in full lengths with manufacturer, class rating, and all other applicable information clearly marked on the barrel. Water main piping for 2 inch shall be copper in accordance with MAG Specification 754 and encased in polyethylene protective wrapping in accordance with Section 610.6 of these specifications.

REMOVE the fourth paragraph in its entirety and REPLACE with the following:

Ductile iron water pipe and fittings per: MAG Specification 750. Concrete pressure pipe-steel/cylinder type per: MAG Specification 758.

ADD the following:

(C) All ductile iron water main and fittings shall be encased in polyethylene protective wrapping in accordance with Section 610.6 of these specifications where called for on the plans or after the Contractor's testing of bedding and shading material is found to be corrosive in accordance with AWWA C105.

All copper and brass water main and fittings shall be encased in polyethylene protective wrapping in accordance with Section 610.6.

(D) All water mains shall have "NSF-PW" seal clearly marked on each barrel and installed with trace wire in accordance with COP GES Detail 319Q-1.

(E) Thrust restraint shall generally be accomplished through the use of restrained joints in lieu of thrust blocking. The preferred joint restraint system shall be "Field-Lok" gasket or approved equal except that vertical deflections, tees, valves and bends shall be restrained utilizing Mega-Lug, as manufactured by Ebba Iron, or equal.

(F) Joint restraint shall be required at piping configurations as show on COP GES Detail 303Q-1. Required minimum lengths of joint restraint shall be per COP GES Detail 303Q-2, or as noted on the plans. In "Tee" locations where perpendicular branch mains are shown as restrained, the main line run (LRN) shall be restrained for a minimum of 10 feet or 1 joint, whichever is greater, each side of the "Tee".

Concrete thrust blocking will be required at connections to existing lines at the locations noted on the plans. Thrust blocks placed at these connections shall be in conformance with MAG Specification 610.14 and MAG Detail 380, and shall be adequately braced to allow system operation during curing of the concrete thrust blocks. Fittings to be restrained with thrust blocks shall be wrapped and taped with heavy polyethylene sheeting per Section 610.6 to prevent covering with concrete on nuts and threading on fittings.

(G) All lateral water main connecting piping, valves and fittings shall be constructed using restrained joints from the main line "Tee" to the connection point at the existing water main at the locations shown on the plans.

(H) Prior to ordering of materials and scheduling connections to existing water mains and services, the Contractor shall complete investigations to verify the size, type and location of the existing water mains and services.

(I) The technical specification for "Air Release Valves" is expanded to include Combination Air Release-Vacuum Breaker valves at the locations shown on the plans constructed as shown in COP GES Detail 317Q-1.

(J) Payment for water main shall be at the unit price in the bidding schedule and shall include all connections, fittings, joints, flanges, thrust restraint and incidentals unless specifically itemized in the bidding schedule.

610.4.1 Trenching/Cover

REMOVE in its entirety and REPLACE with the following:

All water mains shall have a minimum cover of 48 inches over the top of the pipe.

Cover for water mains will be measured from existing or proposed finished grade of pavement or from natural ground, whichever is deeper.

No water main shall be deflected, either vertically or horizontally, in excess of 50 percent of the manufacturer's recommendation for the pipe or coupling, without the appropriate use of bends or offsets.

Except as otherwise required in this specification, the special provisions, or by the Engineer, trench excavation, backfilling and compaction shall be in accordance with the requirements of Section 601 of these specifications. Backfilling may be accomplished as soon as the pipe line has been installed to the satisfaction of the Engineer, subject to the requirements for testing per Section 611 of these specifications.

610.4.3 Blocking and Restraints

REMOVE the first four paragraphs in their entirety and REPLACE with the following:

All pipe lines, valves and fittings shall be restrained using mechanical joints, mechanical joint restraints, or gasket joint restraints in accordance with COP GES Details 303Q-1 through 303Q-4.

If irregular soil or pressure conditions are encountered, a thrust block design revision or an alternate joint restraint system may be required. Thrust block installation or alternate joint restraint will require approval from the City.

610.4.5 Testing

REMOVE the last sentence of this section and REPLACE with the following:

All corporation stops used for testing and chlorination shall be removed and a stainless steel full circle repair clamp shall be installed.

610.5 SEPARATION

REMOVE all references to the Maricopa County Environmental Services Department.

610.5.1 General

ADD the following:

Concrete encased water mains that cross storm drains and/or other dry utilities which clear the crossed line by less than 12 inches shall incorporate a 6 inch sand pad to break the frictional contact.

610.9 FIRE HYDRANTS

ADD the following:

(A) Hydrant installation shall be in accordance with COP GES Details 360Q, 362Q, 363Q and 364Q, and as specified on the project plans. Hydrants shall be Waterous, Mueller, East Jordan, or as approved by the Engineer.

(B) All ductile iron water pipe used in fire hydrant installation shall be Class 350.

(C) All new fire hydrants and connecting piping shall be constructed using restrained joints from the main line “Tee” to the hydrant.

(D) Payment for hydrant installation shall be at the unit price in the bidding schedule and shall include the hydrant, piping, valve, box and cover, and all appurtenant fittings, as noted for a complete assembly.

610.11 CONNECTION TO EXISTING MAINS

ADD the following:

The existing water main shall not be taken out of service prior to completion and ADEQ Approval to Operate the replacement water main and connection of all water services and fire hydrants to the replacement system.

The existing water system shall not be taken out of service at any time without the approval of the Engineer. With the approval of the Engineer, the existing water main may be taken out of service for limited periods to facilitate project construction. City Water Operations shall be contacted a minimum of 48 hours prior to a planned water service disruption.

The Contractor shall prepare and submit to the Engineer a plan for each connection to the existing system which demonstrates the ability to complete all work within the allowed period.

All temporary connections and/or elements which must be placed in service prior to full system disinfection, testing and approval shall be disinfected in accordance with Section 4.7 of AWWA C651 after approval of the Engineer.

All existing water service connections shall be replaced in accordance with the provisions of the COP General Engineering Standards.

610.13 METER SERVICE CONNECTIONS

REMOVE items (A) and (B) in their entirety and REPLACE with the following:

(A) Type K soft copper pipe or tubing shall be used except as otherwise called for on the plans.

(B) When the existing main is not abandoned and the existing meter is to be connected to the new line, the corporation stop and saddle shall be removed and a stainless steel full circle repair clamp shall be installed.

ADD the following:

(E) Water Service Connection

(1) New Water Service shall be in accordance with COP GES Detail 316P. All service piping and fittings from main tap to meter box shall be encased in polyethylene protective wrapping in accordance with Section 610.6 of these specifications. Existing water service shall be abandoned in place and existing meter box and cover shall be salvaged and delivered to the City's Maintenance Yard and placed as directed by the Engineer. The Contractor shall supply all necessary materials for new water service including service saddle, corporation stops, piping, meter yoke, boxes and covers, plus all appurtenant fittings to connect to customers existing service line. The Contractor shall maintain a minimum 4 feet of cover material over water service and set new box and yoke as indicated on plans.

(2) The Contractor shall take all necessary steps to maintain water service. Customers affected by water disruption due to water service installation/connection shall be notified by written flyer delivered by the Contractor a minimum of 24 hours in advance of scheduled water service disruption. The Contractor shall not disconnect or disrupt water service until new water main and services pass hydrostatic and disinfection tests and is accepted by the Engineer. Customers shall not be without water service for a total time period greater than 4 hours. The Contractor shall supply bottled potable water and temporary water service meeting all State health requirements for periods of water service disruption exceeding 4 hours. No separate payment will be made for water service maintenance or Contractor written notification of water service disruption.

(3) No separate measurement or payment will be made for adjustment of new water meter boxes to finished grade. This work is considered as incidental to the construction of the water service replacement.

(4) The Contractor shall install water service line from the main to the new water meter location and continue to a point after the existing water meter location. This point of connection shall be a maximum of 10 feet from the existing meter location. The Contractor shall remove existing valves, pressure regulators, nipples, connectors, etc. and replace per specifications. All private service lines shall be Type "K" copper in accordance with MAG Specification 754 and encased in polyethylene protective wrapping in accordance with Section 610.6. The Contractor shall maintain a minimum of 4 feet of cover material, including ditch inverts, over new private water service line and utilize

existing in-situ material for backfill. The Contractor shall supply all necessary material for new private water service installation including a curb stop, plus an approved type pressure regulator, in an accessible box per COP GES Detail 316P at the new meter box location and all appurtenant fittings to connect to existing service line.

(5) The Contractor shall remove the existing water meter and reinstall in the new yoke at the new meter box location with all appurtenant fittings and adapters. The City shall supply the Contractor with new meters for use in new locations that were not previously served or there is no existing meter to remove.

(6) The Customer Box called out in COP GES Detail 316P for the curb stop and pressure regulator on the customer side of the meter box shall be minimum #1 box, and the curb stop, regulator, box and lid shall be provided and installed by the Contractor.

(7) The Contractor shall be required to distribute written notices approved by the Engineer to all customers 24 hours in advance of proposed private service line reconnection work.

(8) Existing improvements disturbed by the Contractor shall be restored in "like kind" to the satisfaction of the Engineer. No extra payment will be made for restoring existing improvements in "like kind" to include concrete walkways, retaining walls, landscape improvements, etc.

(9) It shall be the Contractor's responsibility to review existing water meter location and points of private service line reconnection locations and ascertain all work including existing improvement restoration costs to perform the private service line reconnection work as specified. Costs associated for private service line reconnection work shall be at the appropriate unit bid price in the bidding schedule and shall include private service line piping, curb stop and pressure regulator, plus all appurtenant fittings and existing improvement restoration work as specified.

(10) The pressure regulators shall be set at 65 psi. The Contractor shall bench-test or otherwise provide written verification from the supplier prior to installation that the pressure regulators have been set at the required psi.

(11) Payment for new water service and reconnection shall be at the appropriate unit bid price shown in the bidding schedule and shall include service saddle, corporation stops, curb stops, piping, meter yoke, adapters, boxes, pressure regulator, plus all appurtenant fittings for complete assembly for connection to existing service line. The Contractor shall supply and install all fittings necessary to install meter into new yoke.

(F) Commercial Water Service (Greater than 2 inches)

(1) The Contractor shall install water service line from the main to the new water meter location and continue to a point after the existing water meter location. This point of connection shall be a maximum of 10 feet from the existing meter location. The Contractor is to furnish and install gate valve and Pressure Regulating Valve (PRV) after meter vault. PRV shall be installed in accordance with the International Building Code as adopted by the City. All commercial service lines shall be a minimum of 4 inch Class 350 Ductile Iron Pipe in accordance with Section 610 of these specifications. The Contractor shall maintain a minimum of 4 feet of cover material over new water service line and may utilize existing in-situ material for backfill provided it meets the project specification. The Contractor shall supply all necessary material for commercial water service installation including a customer shutoff valve and PRV, in an accessible vault per COP GES Detail 321Q at the new meter vault location and include all appurtenant fittings to connect to existing service line.

(2) The Contractor shall be required to distribute written notices approved by the Engineer to all customers 24 hours in advance of proposed private service line reconnection work.

(3) Existing improvements disturbed by the Contractor shall be restored in "like kind" to the satisfaction of the Engineer. No extra payment will be made for restoring existing improvements in

"like kind" to include concrete walkways, retaining walls, landscape improvements, etc. It shall be the Contractor's responsibility to review existing water meter location and points of service line connection locations and ascertain all work including existing improvement restoration costs to perform the service line connection work as specified.

(4) Measurement and Payment for commercial water service shall be at the applicable unit bid price in the bidding schedule and shall include piping, customer shutoff valve, PRV and vault, including all appurtenant fittings and existing improvement restoration work as required.

(G) Traffic Rated Concrete Meter Box

(1) Meter boxes located within traffic areas shall be Christy model B1324 by Christy Concrete Products or approved equal.

(2) Pre-cast concrete meter boxes shall have H-20 loading and be constructed of high density reinforced concrete with a minimum compressive strength of 4,000 psi. Covers to be furnished with the boxes shall be a steel checker plate, H-20 loading, and lid.

610.16 MEASUREMENT AND PAYMENT

REMOVE item (E) in its entirety.

SECTION 611: WATER, SEWER AND STORM DRAIN TESTING

611.2 FLUSHING AND HYDROSTATIC TESTING

REMOVE the first and second paragraphs and REPLACE with the following:

Water lines, fire lines and force mains, including all fittings and connections to the water mains shall be tested for water tightness by subjecting each section to hydrostatic testing in accordance with applicable provisions of AWWA C600, except as modified below, and the City Water Line Testing and Acceptance Procedures, and shall consist of pressure testing and allowance testing.

Testing shall be performed by the Contractor and shall be witnessed by the Engineer for approval.

Payment for testing of water mains shall be included in the unit bid price for water main construction.

611.3 DISINFECTING WATER MAINS

ADD the following:

Water main and services shall be disinfected in accordance with Section 611 of these specifications and the City Water Line Testing and Acceptance Procedures. The City shall perform the sampling for bacteriological and residual chlorine testing. The Contractor shall notify the City 24 hours in advance to coordinate disinfection testing.

All valves in the lines being disinfected shall be opened and closed several times during the 24 hour period of disinfection.

Payment for disinfection of water mains shall be included in the unit bid price for water main construction.

611.4 SEWER LINE TESTING

ADD the following to the first paragraph:

Force mains shall be pressure tested at a minimum of 50 psi above the maximum design working pressure for 2 hours in accordance with AAC R18-9-E301, 4.01.

ADD the following to (A) Low Pressure Air Test:

Sanitary sewers shall be low pressure air tested in accordance with ADEQ Engineering Bulletin 11, Chapter IV and in accordance with the Arizona Administrative Code, Title 18, Chapter 9, Part E301(D)(2)(j)(i). 100 percent of the total length of pipe shall be tested.

ADD the following to (C) Deflection Test for HDPE and PVC Pipe:

100 percent of new sewer main construction, regardless of pipe material shall be deflection tested in accordance with the following:

(1) The pipe section to be tested shall be cleaned free of dirt, sand, water, or other foreign materials.

(2) Backfill and compaction will have been completed prior to testing. Initial tests may be done immediately upon completion of the first reach of pipe for each diameter to ascertain if the Contractor's means, materials and methods are producing the desired quality within permissible tolerances.

(3) Final acceptance mandrel pull shall be no sooner than 30 days after backfill and compaction unless authorized by the City.

(4) Test mandrels shall be solid sleeve or cage type with outside diameter and type of pipe permanently and clearly identified on the mandrel body. Worn, damaged or deformed mandrels will not be allowed. The mandrel shall have a cable attached at each end to enable removal if it becomes stuck.

(5) For acceptance, the mandrel must pass through the entire section between manholes or other structures in one pass when pulled by hand, without the use of excessive force. All testing shall be witnessed by the Engineer or the Engineer's authorized representative and the Engineer reserves the right to order additional tests in excess of 20 percent of new main installed.

(6) Any section of the installation which fails to pass the deflection test will be repaired and retested.

REMOVE item (D) in its entirety and REPLACE with the following:

(D) Closed Circuit Television Inspection

(1) Description

This section defines the requirements for internal television inspection of the sewer main and service laterals after they have been installed for all new construction and shall include the connection point to the existing system. The Contractor shall inspect the sewer interior using a color Closed Circuit Television (CCTV) camera and document the inspection on video with audio location and date information, video title information and hard copy inspection logs.

Upon completion of sewer main rehabilitation, the Contractor shall perform CCTV inspection for 100 percent of the newly rehabilitated sewer main to provide a video record and associated written report to become the property of the Engineer. The Engineer shall be notified a minimum of 48 hours in advance of proposed scheduled sewer camera inspection, so the Engineer may witness the video recording. Any inspection completed without the Engineer witnessing will not be accepted.

(2) Submittals

(a) The Contractor shall submit samples of main and lateral (if separate) inspection logs and reports for approval in accordance with MAG Specification and COP Supplement 105.2.

(i) The Contractor shall be responsible for modifications to the Contractor's equipment and/or inspection procedures to achieve report material of acceptable quality. No work shall commence prior to approval of the material by the Engineer. Once accepted, the report material shall serve as a standard for the remaining work.

(ii) The Contractor shall maintain a copy of all inspection documentation (reports, DVD, etc) for the duration of the work and warranty period.

(iii) Mainline inspection reports shall be provided by the Contractor and shall show all observations, at a minimum: project title, name of owner, time of day, manhole-to-manhole pipe section, pipe segment length, pipe material, line size, compass direction of viewing, lateral identification and clock position, direction of camera's travel, pipe depth, name of operator and footage counter reading at the beginning and end of each manhole-to-manhole pipe segment. Report shall identify any deficiencies observed.

(iv) Video of sewer mainlines shall at a minimum include the following information: project title, time of day, pipe material, line size, compass direction of viewing, direction of camera's travel, and footage counter reading continuously through-out each manhole-to-manhole pipe section. The video shall pause at and identify all observations.

(v) Service lateral inspection reports shall be provided by the Contractor and shall show all observations, at a minimum: project title, time and date, property address of service, manhole-to-manhole pipe section, pipe segment length, pipe material, line size, direction of camera's travel, name of operator and footage counter reading at the beginning and end of each service. Report shall identify any deficiencies observed.

(vi) Video of sewer lateral shall show, at a minimum: project title, street address, time and date, pipe material, line size, direction of camera's travel, and counter reading at the beginning and end of each service. The video shall pause at and identify all observations including the connection point to the existing service line.

(b) The Contractor shall supply finished video recordings upon completion of sewer construction. 4 sets of the videos (DVD) and reports shall be submitted to the City.

(3) Equipment

(a) Cameras: For inspection of sewer, the camera shall be equipped with a rotating head, capable of 90 degree rotation from the horizontal and 360 degree rotation about its centerline. Minimum camera resolution shall be 400 vertical lines and 460 horizontal lines. The camera lens shall not have less than 140 degree viewing angle and shall have automatic or remote focus and iris controls. The focal distance shall be adjustable through a range of from 2 inches to infinity. Camera(s) shall be intrinsically safe and shall be operative in 100 percent humidity conditions. Lighting intensity shall be remote controlled and shall be adjusted to

minimize reflective glare. Lighting and camera quality shall provide a clear, in-focus picture of the entire inside periphery of the sewer.

(b) Recording Media: Video recordings of all sewer line inspections shall be made on DVD. The audio portion of the composite video shall be sufficiently free from electrical interference and background noise to provide complete intelligibility of the oral report. Each video shall be identified with labels showing the Owner's name, Contractor's name, Engineer's name and each manhole-to-manhole pipe segment of sewer line represented on the video. Each video shall be submitted at the completion of the project for records.

(c) Footage Counter: A footage counter device which measures the distance traveled by the camera in the sewer device shall be accurate to plus or minus 2 feet in 1,000 feet.

(d) Depth Gauge: The camera shall be fitted with a depth gauge to identify sags present in the main lines. The gauge shall have ¼ inch increment markings to measure the depth of the pipe sag. The depth of the sag and location shall be noted as an observation and recorded on the report.

(e) Video Titling: Video recording equipment shall include genlocking capabilities to the extent that computer generated data, (i.e. footage, date, size, etc) as determined by the City can be overlaid onto video, and both indicated on the television monitor and permanently recorded on the inspection video recording.

(4) Flow Control

(a) Flow control is required for TV inspection and for sewer line rehabilitation. Limited sewage flow, as defined below, is acceptable for TV inspection.

(b) Depth of flow shall not exceed 40 percent of pipe diameter as measured in the manhole when performing television inspection.

(c) Bypass pumping, if required, shall conform to the requirements of COP Supplement 200.2 and shall be incidental to CCTV Inspection.

(5) Inspection Methods

(a) The Engineer and the City's Wastewater Collection Representative shall have access to observe the video monitor and all other operations at all times. The system of cabling employed to transport the camera and transmit its signal shall not obstruct the camera's view.

(b) The Contractor shall physically measure and record on the inspection log, the length of each sewer reach from the centerline of its terminal manholes.

(c) The camera may travel through the sewer in either direction. Maximum rate of travel shall be 30 feet per minute when recording.

(d) The camera image shall be down the center axis of the pipe when the camera is in motion. The Contractor is required to provide a 360 degree sweep of the pipe interior, at points of interest, in order to more fully document the existing condition of the sewer. Points of interest may include, but are not limited to, defects, encrustations, mineral deposits, debris, sediment and any location determined not to be clean or part of a proper line installation and defects in the liner including, but not limited to, bumps, folds, tears, dimples, etc.

(e) The video and all inspection documentation should include the sewer line and manhole identifiers shown on the plans. After the rehabilitation of the sewer main is complete, the Contractor shall use the upstream manhole as the identifier in conjunction with the distance meter.

(f) The City will review videos and logs to ensure compliance with the requirements listed in this specification and contract documents. If the sewer line, in the sole opinion of the City, is not adequately clean, it shall be cleaned and re-inspected by the Contractor at no additional cost to the City. If the construction work, in the sole opinion of the City, has not been properly installed, it shall be reinstalled and re-inspected by the Contractor at no additional cost to the City.

Final acceptance of the project will not be granted until sewer line video results, including any re-inspection of deficient sewer main, meet the satisfaction of the Engineer and are in accordance with this section.

611.5 POST INSTALLATION INSPECTION OF NEW MAINLINE STORM DRAINS

REMOVE the first sentence of item (A) in its entirety and REPLACE with the following:

The Contractor shall provide the Engineer with an annotated video inspection record (DVD format only) of the new mainline storm drain pipeline.

REMOVE the last sentence of item (A) in its entirety and REPLACE with the following:

This video shall be provided to the Engineer for review and approval prior to the Contractor being allowed to place the first lift of pavement over the storm drain line.

611.6 PAYMENT

REMOVE the second paragraph in its entirety and REPLACE with the following:

All low pressure air, hydrostatic, and deflection testing shall be considered incidental to the unit price bid for sewer main installation and no additional payment shall be made for these items.

Measurement and payment shall be for the complete work of Sewer CCTV inspection at the unit price in the bid schedule. All cleaning and bypass pumping required for a clear and complete CCTV inspection shall be incidental to the cost of video inspection.

ADD the following section to Part 600- Water, Sewer, Storm Drain and Irrigation:

SECTION 612: TEMPORARY WATER MAINS (FLY LINES)

612.1 DESCRIPTION

This section describes the requirements and procedures for the installation, testing and maintenance of temporary water main systems where required to maintain service to customers during the shutdown or removal of existing City water mains for new construction. *All* existing water services shall be moved to the temporary main so that customer service interruptions are avoided.

(A) Materials: All pipe valves, fittings, hose and connections furnished by the Contractor shall be of good quality, clean, meet National Sanitation Foundation (NSF) Standard 61 requirements for potable water. The City shall be the final arbiter if any questions arise regarding the suitability of any materials to meet these criteria. Previously used pipe that has been used in sanitary sewer, force main or effluent applications is specifically NOT allowed, regardless of any disinfection procedures or results submitted.

Temporary mains 6 inches or greater shall be constructed of HDPE solid wall pipe conforming to AWWA C906 with a minimum DR ration based on 150 psi. Higher rated pipe may be required based on analysis of the City water system for the construction area.

Temporary mains less than 4 inches may be constructed of either HDPE or PVC with the appropriate pressure rating for system and testing pressures.

(B) Installation and Protection: The temporary line may be installed above grade as necessary to facilitate the construction of new waterline. The temporary pipe shall be installed in such a manner that it will not present a hazard to vehicle traffic or pedestrians and will not interfere with access to homes, businesses and driveways along its route. Cover plates shall be installed as necessary. Where installed at driveway or street crossings the line shall be protected from traffic loads and displacement. During seasons with potential for freezing the lines shall be insulated to the degree necessary to prevent damage to the line or fittings and to maintain service.

Valves shall be installed at the beginning and end of the temporary line and at 300 foot intervals, or as directed by the City. The use of pressure reducing valves for individual service connections may be required as directed by the City.

All temporary piping, fittings and service connections shall be furnished, installed and maintained by the Contractor for the duration of the construction. The Contractor shall make connections to a water source designated by the City or as shown on the plans. Alternative connection points may be considered by the City.

(C) Testing

(1) Disinfection and Testing: The Contractor shall be responsible to disinfect all pipe, connections and fittings in accordance with MAG Specification 611.3. Disinfection of the line, if not connected to the City's existing system at either end, may be treated as a closed vessel for purposes of the disinfection period and combined with the pressure test. If the temporary line is connected to the City's existing system the line shall be disinfected, flushed and then pressure tested after a bacteriological sample is obtained and tested.

(2) Pressure Testing: All temporary water mains shall be pressure tested to ensure integrity of the system supplying water to the City's customers. Test pressure shall be a minimum of 50 psi over normal system operating pressure for the area served by the temporary line and shall be maintained for 2 hours. Pressure test results should be provided to the Inspector responsible for the project. A single length of HDPE line with no joints will not require a pressure test.

(3) Bacteriological Testing: Following disinfection, pressure testing and flushing of the temporary line, the Contractor shall obtain water samples from the line and submit to a certified laboratory for bacteriological testing. Results shall be provided to the Inspector responsible for the project. The City's Utility Engineer will review test results prior to connection of existing customers to the temporary line.

(D) Maintenance and Repairs

(1) Maintenance: Following acceptance of the temporary system as a potable system by the City, the Contractor shall maintain continuous service through the temporary piping to all customers normally served both directly and indirectly by the pipe line. Once the temporary pipe has been accepted, the Contractor shall request the City to shut down the existing system piping and the Contractor shall remove the existing system piping in conflict with the new mains or as shown on the project plans.

Upon completion of the work, the Contractor shall remove the temporary piping and appurtenances and shall restore all ground surfaces and water service connections to the satisfaction of the City.

(2) Repairs: If repairs to temporary piping are necessary the Contractor shall make such repairs in a timely manner as directed by the City. If progress in making repairs is inadequate, as determined

by the City, or in the event of an emergency, the City may take immediate corrective measures, which may include the performance of repair work by City forces or another contractor. All costs for corrective measures shall be borne by the Contractor.

(3) Fire Hydrants: Fire hydrants not on the temporary main that are taken out of service shall be covered with a bag to be easily recognized as being out of service until they are removed or until they are brought back into service. The Contractor shall notify the City Fire Marshal and the Water Operations Division of any fire hydrants that will be taken out of service.

(E) Measurement and Payment: Measurement for the installation, testing and maintenance of temporary water mains shall be for each separate main installation.

Payment shall be made at the unit price contained in the bid schedule. Such payment shall be full compensation for furnishing and installing the pipe, fittings valves, adaptors, service connections, and all miscellaneous fittings, complete in place, standard details, and/or Temporary Water Main Plan submittal and approval, and shall include all costs of excavation, removal of obstructions, shoring, bracing, bedding, backfilling, compaction, maintenance of traffic, testing, disinfection, connections to existing mains and services, disposal of existing pipes and materials. Disposal of asbestos cement pipe, lead joints and other potential hazardous materials shall be disposed of in accordance with applicable Federal, State and local regulations and shall be considered incidental to the payment for Temporary Mains unless specifically identified in other bid items.

SECTION 615: SANITARY SEWER LINE CONSTRUCTION

615.2 MATERIALS

REMOVE in its entirety and REPLACE with the following:

Pipe used for sewer line construction, including specials, joints, and gaskets, shall be according to the following sections, or as modified by the special provisions.

HDPE pipe shall conform to MAG Specification 738. Vitrified clay pipe shall conform to MAG Specification 743. Polyvinylchloride (PVC) pipe and fittings shall conform to MAG Specification 745. Ductile iron pipe shall conform to MAG Specification 750.

(A) Sanitary sewer main construction shall be in accordance with all applicable standard details and MAG Specification 750. All sanitary sewer piping and fittings shall be ASTM D3034 SDR 35 PVC or AWWA C151 Ductile Iron, Class 350, with an epoxy coating (Protecto Coat 401, Series 431 Perma-Shield, or approved equal). Sewer pipe shall be furnished new in full lengths with manufacturer, class, rating and other pertinent information clearly marked on the barrel. All ductile iron sewer main shall be encased in polyethylene protective wrapping in accordance with MAG Specification 610.6 where called for on the plans or after the Contractor's testing of bedding and shading material is found to be corrosive in accordance with AWWA C105.

(B) Field cuts and taps of ductile iron pipe shall be re-coated with Protecto Coat 401, Series 431 Perma-Shield, (or approved equal) field kit in accordance with the manufacturer's recommendations.

(C) Where noted on project plans, mechanical joint or restrained joint, Class 350, ductile iron sewer main shall be installed 10 feet (minimum) each direction from water/sewer interface where vertical separation is less than 2 feet or until 6 feet of horizontal separation is attained per MAG Detail 404.

(D) The method of construction of manhole and sewer main replacements is of prime importance to the City. Maintenance of sewage flows is critical and shall be the responsibility of the Contractor. The

Contractor's construction schedule shall be phased as to allow for minimal pumping of sewage flows for manholes and sewer main under construction.

(E) Payment for sanitary sewer main will be at the applicable unit bid prices for sewer main, as shown in the bidding schedule and shall include all excavation, backfill and compaction in accordance with trench details and all materials necessary for installation of the new sewer main.

615.8 SANITARY SEWER SERVICE TAPS

REMOVE the last sentence of the fourth paragraph in its entirety.

ADD the following:

All new or replacement sewer services, and any existing sewer services disturbed during construction, shall be replaced to the location indicated on project plans with a new minimum 4 inch ASTM D3034 SDR 35 PVC or AWWA C151 Ductile Iron, Class 350, with an epoxy coating (Protecto Coat 401, Series 431 Perma-Shield, or approved equal) sewer pipe, backwater valve, manufactured wye, and appurtenances in accordance with COP GES Details 405Q, 414P, 440P-1, 440P-2 and 440P-3, except as modified herein.

If individual sewer service disruption is anticipated, the Contractor shall notify the property owner 24 hours in advance. Sewer service must be restored within 4 hours or some alternate means of sewage disposal provided to allow for the resumption of individual sewer service.

Payment for sanitary sewer service shall be at the unit price indicated on the bidding schedule for the sewer service installation, and shall include connecting each existing sewer service including all labor, material, equipment, removal of existing pipe, new pipe, coupling concrete reinforcement, new concrete encasement, fittings, by-pass pumping and other work required to connect the existing yard line service to the new sewer main.

615.10 MANHOLES

ADD the following:

(A) The Contractor is to provide to the Engineer a detailed written description of the method of construction for manhole and sewer replacement for each individual area of work. This should include, but is not limited to the following:

(1) Maintenance of sewage flows during construction and curing of concrete.

(2) Type of concrete for manhole bases (i.e. pre-cast, "high-early", etc.)

(3) Method of curing concrete (i.e. protection against freezing, development strength before barrels and cones are set, etc.)

(4) What steps will be taken to ensure the grade around the manholes will not sink when complete (i.e. compaction testing, special base preparation, etc.)

Sanitary sewer manholes shall be constructed per COP Supplement 625.

SECTION 618: STORM DRAIN CONSTRUCTION

618.1 DESCRIPTION

ADD the following:

Work under this item shall be in accordance with COP Supplement 601 and as modified herein.

REMOVE the second paragraph in its entirety.

618.2 MATERIALS

REMOVE the first paragraph in its entirety and REPLACE with the following:

Pipe used for storm drain construction, including specials, joints, and gaskets, shall be according to the following sections, or as modified by special provisions.

The concrete pipe, HDPE pipe, corrugated metal pipe (CMP), specials, joints, gaskets, and testing shall be according with MAG Specifications 621, 735, 736 and 738, except as specified below or as modified by special provisions.

ADD the following:

All CMP shall have $2^2/_3$ inch x ½ inch corrugations with a minimum gauge of 14. Steel lined or paved CMP will not be allowed.

(1) Rubber Gasket Joints

All joints for CMP shall conform to MAG Specification 621.3.1 and shall be watertight.

618.3 CONSTRUCTION METHODS

REMOVE the first paragraph in its entirety and REPLACE with the following:

Excavation, bedding, backfilling, and compaction of backfill and bedding of trenches shall be accomplished in accordance with COP Supplement 601 and MAG Specification 603 for HDPE pipe, or as modified by special provisions.

SECTION 625: MANHOLE CONSTRUCTION AND DROP SEWER CONNECTIONS

625.1.1 Manholes

ADD the following:

Sanitary sewer manhole construction shall be in accordance with COP GES Details 420Q-1, 420Q-2, 421Q, 422Q, 423P-1, 423P-2, 426Q-1, 426Q-2 and 427Q.

625.1.2 Sanitary Drop Sewer Connections

ADD the following:

Sanitary sewer drop connections shall be constructed per COP GES Detail 426Q-1.

625.2 MATERIALS

REMOVE the second paragraph in its entirety and REPLACE with the following:

Brick shall not be used for maintenance and adjustment of the existing sanitary sewer manhole or ring and cover.

REMOVE the seventh paragraph in its entirety and REPLACE with the following:

Manhole steps, where approved by the City shall be in accordance with COP GES Detail 412Q. Plastic manhole steps shall conform to OSHA and ASTM C487 requirements. The manufacturer shall furnish a written certification indicating conformance.

625.3 CONSTRUCTION METHODS

REMOVE in its entirety and REPLACE with the following:

625.3.1 Manholes

Manholes shall be constructed of precast concrete sections, frames and covers, in accordance with the standard details. The invert channels shall be smooth and semi-circular in shape, conforming to the inside of the adjacent sewer sections. Changes in direction of flow shall be made with a smooth curve, having a radius as large as the manhole will permit. Changes in size and grade of the channels shall be made gradually and evenly.

Invert channels may be formed of concrete having a smooth mortared surface, or may be constructed by laying a full section of sewer pipe through the manhole and cutting out the portion of pipe above the floor after the surrounding concrete has hardened. The floor of the manhole outside the channels shall be smoothed and shall slope towards the channels.

Existing manholes shall be totally removed, including the bases, and disposed of by the Contractor. Existing rings and covers shall be salvaged and delivered to the City Wastewater Collection Yard located at 1505 Sundog Ranch Road. No separate payment will be made for removing manholes or salvaging manhole rings and covers. The cost of this item of work shall be included in the cost of manhole construction.

The excavation shall be made cylindrical to a diameter sufficient in size to permit sheeting if necessary and leave room that the precast concrete sections may be properly assembled.

Concrete foundations shall be Class A concrete and in accordance with the standard details and COP Supplement 505 for both poured-in-place and pre-cast bases. Cast-in-place concrete bases and inverts shall cure for a minimum of 72 hours, depending on concrete development strength before barrels and cones can be placed and before sewage flows across the inverts.

Frame and Cover: All machined surfaces on the frame and cover shall be such that the cover will lie flat in any position in the frame and have a uniform bearing through its entire circumference. Any frame and cover which creates any noise when passed over by automobiles shall be replaced. Frames shall be set in accordance with COP GES Detail 420Q-1.

Watertight Ring and Cover: Installation of watertight ring and cover shall be in accordance with COP GES Detail 420Q-1 as indicated on the plans. Watertight rings and covers shall be approved by the City prior to installation and cost shall be incidental to the manhole construction.

All water encountered during the work shall be disposed of by the Contractor in a manner such that it will not damage public or private property or create a public nuisance or health problem in accordance with MAG Specification 220.1. The costs of special bedding and over excavation as required to provide a stable foundation, and other equipment and materials shall be incidental to the work.

Backfilling shall be done in accordance with the requirements for trench backfilling as stated in COP Supplement 601. Quality Control density testing shall be 1 test per 16 inches of fill, beginning at 2 feet above the crown of the pipe. A minimum of 2 density tests are required for each manhole. Each density test taken shall be in a different quadrant of the manhole as the previous test. If 4 tests are required, each quadrant shall have a density test.

625.3.2 Sanitary Sewer Drop Connections

Drop manholes that intercept existing mains (upper invert) shall not have a block-out for the pipe during the casting process. Said manholes shall be core drilled in place once the appropriate invert elevation has been verified in the field.

Core drilling shall not commence without approval from the Engineer.

The pipe shall be sealed at the penetration using a Link-Seal Modular Seal or approved equal.

(A) Internal Drop

(1) Internal drop systems shall be installed in drop manholes where indicated on the plan sheets and accordance with COP GES Detail 426Q-1.

(2) Internal drop systems shall be constructed using Reliner Inside Drop System as manufactured by Reliner/Duran Inc., or approved equal.

(3) Manholes with internal drop systems require Internal Manhole Coating, and shall have the protective coating installed and tested prior to the installation of the drop system. Manhole coating shall be in accordance with COP Supplement 626.1.

625.3.3 Sanitary Sewer Manhole Testing

All manholes installed shall be tested by exfiltration or by vacuum testing as determined by the City. Testing shall be per ASTM C1244-3 and in accordance with Arizona Administrative Code, Title 18, Chapter 9, Part E301(D)(3)(e).

Testing of sanitary sewer manholes is considered incidental to the price bid for manhole installation and no additional payment shall be made.

625.4 MEASUREMENT

REMOVE in its entirety and REPLACE with the following:

Measurement of manholes shall be per manhole installed, complete in place regardless of depth.

Measurement of drop manholes shall be per manhole installed, complete in place regardless of depth.

Measurement for internal drops shall be per drop installed, complete in place regardless of depth.

625.5 PAYMENT

REMOVE in its entirety and REPLACE with the following:

Payment for each accepted manhole installation shall be at the contract unit bid price in the bidding schedule and shall include all excavation, backfill, installation, grade ring adjustment, all necessary materials and testing for a complete manhole installation.

Payment for each accepted drop manhole installation shall be at the contract unit bid price and shall include all excavation, backfill, installation, internal coating, internal drop assembly, core drilling, grade ring adjustment, all necessary materials, and testing for a complete manhole installation

Payment for internal drop systems installed in existing manholes shall be at the bid unit price and shall include complete installation of the internal drop assembly, and internal coating in accordance with COP GES Detail 426Q-1 and all materials necessary for installation of the new drop sewer connections.

ADD the following section to Part 600- Water, Sewer, Storm Drain and Irrigation:

SECTION 626: MANHOLE COATINGS

626.1 DESCRIPTION

This section specifies the coating system used for the lining of the manholes as indicated on the drawings. The Contractor shall furnish all labor, materials and equipment required to clean, modify and coat the manholes. The Contractor shall comply with the local authority and all OSHA requirements for confined space entry. The coating shall yield a hard, durable chemical resistant coating and shall be specifically designed to be applied on a dry surface. The finish coating shall provide a watertight seal and shall adhere to all components of pipeline liner systems.

(A) Specific coating terminology used in this section is in accordance with definitions contained in ASTM D16, ASTM D3960 and the following definitions:

(1) Dry Film Thickness (DFT): The thickness of one fully cured continuous application of coating.

(2) Field Coat: The application or the completion of application of the coating system after installation of the surface at the site of the work.

(3) Shop Coat: One or more coats applied in a shop or plant prior to shipment to the site of erection or fabrication, where the field or finishing coat is applied.

(4) Tie Coat: An intermediate coat used to bond different types of paint coats. Coatings used to improve the adhesion of a succeeding coat.

(5) Photochemically Reactive Organic Material: Any organic material that will react with oxygen, excited oxygen, ozone or other free radicals generated by the action of sunlight on components in the atmosphere giving rise to secondary contaminants and reaction intermediates in the atmosphere which can have detrimental effects.

(6) Volatile Organic Compound (VOC) Content: The portion of the coating that is a compound of carbon is photochemically reactive and evaporates during drying or curing, expressed in grams per liter or pounds per gallon.

(7) Touch-Up Painting: The application of a paint on areas of painted surfaces to repair marks, scratches and areas where the coating has deteriorated to restore the coating film to an unbroken condition.

(B) Quality Assurance

(1) References: This section contains references to the following documents. They are a part of this section as specified and modified. In case of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

- ASTM D16-93 Standard Terminology Relating to Paint, Varnish, Lacquer and Related Products
- ASTM D3359 A-92 Standard Test Methods for Rating Adhesion by Tape Test
- ASTM D3960-92 Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings

(2) Standardization: Materials and supplies provided shall be the standard products of manufacturers. Materials in each coating system shall be the products of a single manufacturer.

(C) Delivery and Storage

(1) Materials shall be delivered to the job site in their original, unopened containers. Each container shall bear the manufacturer's name, coating type, batch number, date of manufacture, storage life and special directions.

(2) Materials shall be stored in enclosed structures and shall be protected from weather and excessive heat or cold. Flammable materials shall be stored in accordance with State and local codes. Materials exceeding storage life recommended by the manufacturer shall be removed from the site.

626.2 MATERIALS

(A) The pre-approved coatings for the lining of manholes include: Sewer Shield Liner 150 as manufactured by Environmental Coatings, Mesa, Arizona; Sauereisen No. 210 as manufactured by Sauereisen, Inc., Pittsburgh, Pennsylvania; or Raven 405 as manufactured by Raven Lining Systems, Broken Arrow, Oklahoma. The coating color shall be approved by the owner.

(B) Primer shall be as recommended by the manufacturer for each application.

(C) Defect filler shall be as recommended by the manufacturer for each application. The coating shall contain no more than 20 percent filler, sand; no fiberglass fillers.

(D) Applicator Experience and Qualifications: The coating applicator must have a minimum of 2 years experience in applying either the specified coating or an equivalent coating and shall be certified as an applicator by the manufacturer. They shall submit a successful performance history for the application of either the specified coating or a similar coating in the wastewater industry:

(1) The coating applicator shall submit 3 references relating to the quality of workmanship performed on other projects using the same coating being proposed or an equivalent coating.

(2) The coating applicator shall be an Arizona licensed contractor with an AE License or equivalent.

(3) The coating contractor shall submit a manufacturer's certification to apply the coating specified herein for each applicator involved in the coating process.

(E) Product Data: Before materials are delivered to the job site, the Contractor shall provide the following information in accordance with these specifications.

(1) For the filler, primer and finish coating, the Contractor shall furnish a Material Safety Data Sheet (MSDS).

(2) For the filler and finish coating, the Contractor shall provide the manufacturer's application instructions, which shall include the following:

(a) Surface preparation recommendations

(b) Primer type, where required

(c) Maximum dry and wet mil thickness per coat

(d) Minimum and maximum curing time between coats, including atmospheric conditions for each

(e) Curing time before submergence in liquid

(f) Thinner to be used with coating material

(g) Ventilation requirements

(h) Minimum atmospheric conditions during which the coating shall be applied

(i) Allowable application methods

(j) Maximum allowable moisture content

(k) Maximum storage life

(3) List of materials proposed to be used under this section and manufacturer's data for each material.

626.3 COATING

(A) Coating products shall not be used until the City has inspected the materials and the coating manufacturer's technical representative has instructed the Contractor and the City in the surface preparation, mixing and application of the coating. The coating manufacturer's technical representative must be a factory representative, not a local representative or an affiliate of the Contractor.

(B) Field coats shall consist of 1 or more finish coats to build up the coating to the specified dry film thickness. Unless otherwise specified, finish coats shall not be applied until other work in the area is complete and until all previous coats have been inspected.

(C) All items of equipment, or parts and surfaces of equipment, which are immersed when in service, with the exception of pumps and valves shall have all surface preparation and coating work, performed in the field.

(D) Preparations

(1) Surfaces to be coated shall be clean and dry. Before applying coating or surface treatments, oil, grease, dirt, rust, loose mill scale, old weathered coatings and other foreign substances shall be removed except as specified. Oil and grease shall be removed before mechanical cleaning is started. Where mechanical cleaning is accomplished by blast cleaning, the abrasive used shall be washed, graded and free of contaminants, which might interfere with the adhesion of the coatings. The air used for blast cleaning shall be sufficiently free of oil and moisture to not cause detrimental

contamination of the surfaces to be coated. The Contractor shall examine all surfaces to be coated and shall correct all surface defects as required by manufacture before application of any coating.

(2) The Contractor shall protect the sewer from debris, overspray or any detrimental activity due to restoration of the manholes.

(3) Holes shall be filled using a grout as recommended by the coating manufacturer, and approved by the Engineer. The grout filler shall be used to bring all areas of holes and pitting up to the nominal surface of the manhole so that there is an even interior surface in the manhole without waves, pits or holes. Any exposed rebar shall be cleaned, and all areas of corrosion removed, prior to application of the grout as recommended by the coating manufacturer and approved by the Engineer.

(4) After surface preparation is complete, all loose material shall be removed from the sewer and manholes.

(5) The Contractor shall repair all defects in the coating system where directed by the Engineer.

(6) Surface preparations for each type of surface shall be in accordance with the specific requirements of the coating system specification sheet (COATSPEC). The COATSPEC shall be supplied by the manufacturer.

(E) Application

(1) The surface of the installed coating will be cleaned and prepared to permit visual inspection by the Engineer. Any areas of the coating showing poor adhesion, excessive air inclusion or edge or seam defects shall be properly repaired and re-inspected.

(2) Coated surfaces shall be free from runs, drops, ridges, waves, laps and brush marks. Coats shall be applied so as to produce an even film of uniform thickness completely coating corners and crevices. Painting shall be done in accordance with the requirements of SSPC: The Society for Protective Coatings, Paint Application Specification No. 1. The SSPC Paint Application Specification shall be supplied by the manufacturer.

(3) The Contractor's equipment shall be designed for application of the materials specified. The coating shall be obtained with the proper thickness and surface characteristics as recommended by the coating manufacturer.

(4) Each coat shall be applied evenly and sharply cut to line. Care shall be exercised to avoid over-coating or spattering on surfaces not to be coated.

(5) Film Thickness and Continuity: Coating system thickness is the total thickness of the finished coats. The surface area covered for various types of surfaces shall not exceed those recommended by the manufacturer. Coatings shall be applied to the thickness specified, and in accordance with these specifications. In testing for continuity of coating about welds, projections (such as bolts and nuts), and crevices, the City will determine the minimum conductivity for smooth areas of like coating where the dry mil thickness has been accepted. This conductivity shall then be taken as the minimum required for these rough or irregular areas. Pinholes and holidays shall be repainted to the required coverage.

(6) Safety and Ventilation: Requirements for safety and ventilation shall be in accordance with SSPC Paint Application Guide No. 3. The SSPC Paint Application Guide shall be supplied by the manufacturer.

(7) Cleanup: Upon completion of coating, the Contractor shall remove surplus materials, protective coverings and accumulated rubbish and thoroughly clean all surfaces and repair any over spray or other paint-related damage.

(F) Testing

(1) Spark Testing: All coated surfaces shall be spark tested for holes. The spark tester used shall provide 14,000 volts. If pinholes are found, the Contractor shall repair the coating as recommended by the manufacturer and retest. All testing and repair work shall be at the Contractor's expense.

(2) Adhesion Testing: The Contractor shall perform an adhesion test after proper cure in accordance with ASTM D3359 to demonstrate that the specified field coatings adhere to the substrate. Test results showing an adhesion rating of 5A on immersed surfaces and 4A or better on all other surfaces shall be considered acceptable.

626.4 DEFECT REPAIR

The Contractor shall repair all defects in the coating system where directed by the Engineer.

Where unacceptable adhesion test results are obtained, the Contractor shall be responsible for removing and reapplying the specified coatings at no expense to the City.

626.5 WARRANTY

The coating applicator shall supply a minimum 5 year warranty, for the coating that has been approved through the submittal process. The coating applicator shall also supply a warranty from the coating manufacturer addressed to the City. The warranty shall state, at a minimum, that the coating is applied in accordance with the manufacturer's instruction and that the coating will not fail for a period of 5 years. The definition of coating failure is that blistering, cracking, embrittlement or softening of the coating is starting to occur.

All structural rehabilitation work performed by the Contractor shall be guaranteed against faulty workmanship and/or materials for a period of 2 years after final acceptance of work.

626.6 MEASUREMENT AND PAYMENT

Payment for manhole coating shall be per square foot as measured from the invert to the ring and cover. The unit price shall include by-pass pumping and all materials necessary for internal coating of manholes specified on the plan sheets.

SECTION 630: TAPPING SLEEVES, VALVES AND VALVE BOXES ON WATER LINES

630.3.1 General

ADD the following:

Valves shall be resilient wedge gate valves, Waterous 2500 series, Clow, Mueller, or equal, suitable for use in line and in wet tapping water mains in conjunction with tapping sleeves. Gate valves shall be mechanical joint except where flange joints are specifically detailed in project plans or where required for tapping sleeves and hydrant installation.

Valve blocking shall be provided on all valves in accordance with Quad City Detail 301Q. No separate payment will be made for valve blocking and the cost shall be included in the water main unit price.

Valve boxes shall be in accordance with COP GES Detail 391Q.

Debris caps shall be installed on all valves within project limits according to MAG Detail 392 and shall be color-coded according to COP GES Detail 391Q. Debris caps shall be SW Services DC600 or approved equal.

The Contractor shall notify customers of scheduled water service disruption a minimum of 24 hours in advance of construction. Customers shall coordinate water shut-down with City Water Operations in accordance with Quad City Detail 103P.

630.3.2 Specific Valve Size Requirements

REPLACE item (A) with the following:

(A) Valves 2 inches through 12 inches:

REMOVE item (B) in its entirety and REPLACE with the following:

(B) Valves 14 inches and larger:

Valves shall be iron body resilient-seated gate valves in accordance with the latest revision of AWWA C515.

Valves shall be for operation in a horizontal position. The valve shall have bevel gears. The gears and stuffing box shall be enclosed in a watertight iron case, for operation in a buried location. The case shall be filled with grease at the factory.

By-pass valves shall be furnished and installed on each valve unless otherwise indicated on the approved plans. See Table 630-1 for by-pass valve sizes.

630.4 TAPPING SLEEVES AND VALVES

ADD the following:

The City Utility Operations shall be notified 48 hours in advance to schedule water main tap. If the Contractor is not ready for the tap at the scheduled time, the tap will be rescheduled. City crews will not remain on standby until the Contractor is ready for the tap. The rescheduled tap shall include a new 48 hour notification.

630.4.1 Tapping Valves

REMOVE the third paragraph in its entirety and REPLACE with the following:

Once the tap has been installed, the Contractor shall not operate the valve.

ADD the following:

Debris caps shall be installed on tapping sleeve valve according to MAG Detail 392 and shall be color-coded according to COP GES Detail 391Q. Debris caps shall be SW Services DC600 or approved equal.

630.5 BUTTERFLY VALVES

REMOVE item (A) and REPLACE with the following:

(A) 18 inches and larger:

REMOVE item (A) (1) in its entirety and REPLACE with the following:

(1) Valve body shall be of cast iron or ductile iron with connecting ends one of or a combination of flanged (short body) or mechanical joint.

REMOVE item (B) in its entirety and REPLACE with the following:

(B) 3 inches through 16 inches:

Butterfly valves shall not be used.

630.6 AIR RELEASE AND VACUUM VALVES

ADD the following:

(C) Air/vacuum release valves shall be in accordance with COP GES Detail 317Q-1 or 317Q-2.

(D) Combination Air Valves

(1) Air valves shall be standard combination style. Cast iron air valves shall comply with AWWA C512 except as modified herein. Valves shall be of the size shown and shall have threaded or flanged ends to match piping. Bodies shall be of high-strength cast iron, conforming to ASTM A126, Class B, or NSF 61 certified reinforced nylon. Floats of cast iron air valves shall be heavy stainless steel, suitable to withstand 1,000 psi external pressure. Seats of cast iron air valves shall be Buna-N. Other internal components of cast iron air valves shall be constructed of stainless steel, bronze, delrin, or cast iron as appropriate. Internal components for reinforced nylon valves shall be NSF 61 certified nylon, polypropylene, EPDM or NBR 70. Inlet and outlet ports for large orifice valves shall be baffled to prevent the action of high volume airflows from interfering with valve operations. Interior and exterior carbon steel surfaces shall be epoxy coated. Valves shall be designed for a minimum of 300 psi water working pressure, unless otherwise shown.

(2) Internal protective coatings shall be provided in accordance with AWWA C550.

(a) Liquid epoxy lining and coating materials shall be listed in the NSF Listing for Drinking Water Additives, Standard 61, certified for use in contact with potable water.

(b) The minimum dry film thickness for epoxy linings shall be 0.203 mm (0.008-inch or 8 mils). Liquid epoxy lining shall be applied in 2 coats in accordance with AWWA C210.

(3) Combination air valves shall be in accordance with COP GES Detail 317Q-1 or 317Q-2, unless shown otherwise. They shall have both large and small orifices in a single body. The large orifice shall serve to vent large quantities of air during filling operations and shall automatically open to relieve vacuum conditions. The small orifice shall vent small quantities of air under full line pressure that may become entrained in the system and collect at high points. Valves shall be APCO Series 140, Val-Matic Corp. Series 200, or equivalent

ADD the following subsection to 630.6 Air Release and Vacuum Valves:

630.6.1 Blow Off Installation

Blow off installation shall be in accordance with Quad City Detail 318P. The Contractor shall be required to provide Mega-Lug restraint for all joints for a distance specified per Quad City Detail 303Q-1 and 303Q-2.

630.8 MEASUREMENT

REMOVE in its entirety and REPLACE with the following:

Measurement will be by the unit each of the various kinds and sizes of valves, manholes, vaults, or tapping sleeves and valves, including valve boxes and covers, retrofit debris covers, air release valve assemblies, combination valve assemblies, and blow off assemblies.

630.9 PAYMENT

ADD the following:

Payment for valves, box and cover shall be per each at the unit bid price shown in the bidding schedule. Valves on tapping sleeves and hydrant installations shall be included in the appropriate bid item in the bidding schedule.

Debris cap specified on existing valves shall be incidental to the project work.

Payment for tapping sleeves shall be at the unit price bid in the bidding schedule and include the tapping sleeve, valve, box and cover, and all appurtenant fittings for complete assembly.

Payment for air release and vacuum valve installation shall be at the unit price bid in the bidding schedule and shall include all materials and appurtenant fittings as noted for a complete installation.

Payment for combination air valve assembly shall be at the unit price bid in the bidding schedule and shall include all materials and appurtenant fittings as noted for a complete installation.

Payment for blow off installation shall be at the unit price bid in the bidding schedule and shall include all materials and appurtenant fittings as noted for complete installation. No extra payment shall be made for Mega-Lug restraint.

ADD the following section to Part 600- Water, Sewer, Storm Drain and Irrigation:

SECTION 650: ABANDONMENT AND REMOVAL OF WATER MAIN

650.1 WATER MAIN ABANDONMENT

(A) Abandonment of existing water main shall not commence until hydrostatic and disinfection test results for the new main have been accepted by the Engineer. The Contractor shall contact the Engineer a minimum of 48 hours in advance of abandonment activities to schedule City water crews to coordinate valve operation. Water customers affected by water service disruption due to water main abandonment shall be notified by written flyer delivered by the Contractor a minimum of 24 hours in advance of scheduled water service disruption. Scheduled water service disruptions are limited to a maximum of 4 hours.

(B) Abandonment of existing main shall include the removal of all valves, hydrants, and appurtenances within the reach to be abandoned. All valves and hydrants to be abandoned shall be salvaged to the City unless otherwise noted on the plans or special provisions. All salvaged items shall be delivered to the City

Water Operations facility, located at 1481 Sundog Ranch Road, and placed as directed by the Engineer. Removed materials not identified to be salvaged shall become the property of the Contractor and properly disposed of. Removed or salvaged materials shall not be used in new main installation.

At all locations indicated on the plans, a minimum of 4 feet of water main shall be removed capped and the appropriate thrust restraint installed.

Existing valves to be abandoned shall include removing the valve, valve box, and cover in its entirety. Abandonment of appurtenances located in any structure (manhole, vault, etc.) shall include the complete removal and proper disposal of the appurtenance and the structure.

Abandonment of valves, hydrants, and appurtenances shall include the installation of the requisite number of mechanical joint caps as necessary to seal all pipe remaining in place.

(C) Restoration for water main abandonment shall include excavation, backfilling, compaction and re-surfacing in accordance with COP Supplement 601.

(D) Pavement matching and surface replacement shall be incidental to water main abandonment.

650.2 WATER MAIN REMOVAL

(A) Removal of water main shall not commence prior to authorization from the Engineer.

(B) Water main removal shall include the complete removal of all existing water main, valves, hydrants, structures, and appurtenances within the reach as indicated on the plans. All valves and hydrants to be removed shall be salvaged to the City unless otherwise noted on the plans or special provisions. All salvaged items shall be delivered to the City Water Operations facility, located at 1481 Sundog Ranch Road, and placed as directed by the Engineer. Materials not otherwise identified to be salvaged shall become the property of the Contractor and properly disposed of. Removed or salvaged materials shall not be used in new main installation.

(C) Removal of water main shall include excavation, backfilling, compaction, disposal and salvage in accordance with COP Supplement 601.

(D) Pavement matching and surface replacement shall be measured and paid accordance with COP Supplement 336. Any other restoration shall be considered incidental.

650.3 MEASUREMENT

Measurement for abandonment of water main and laterals shall be by the linear foot of pipe abandoned, measured horizontally through valves and fittings. Hydrants, valves, fittings, vaults, services, and other appurtenances shall be considered incidental to water main abandonment.

Measurement for removal of water mains and laterals shall be by the linear foot of pipe removed, measured horizontally through valves and fittings. Hydrants, valves, fittings, vaults, services, and other appurtenances shall be considered incidental to water main abandonment.

650.4 PAYMENT

Payment for water main abandonment shall be at the applicable unit bid price and shall include all work and appurtenant fittings necessary for complete abandonment. Pavement matching and surface replacement shall be incidental to water main abandonment.

Payment for water main removal shall be at the applicable unit bid price and shall include all work and appurtenant fittings necessary for complete removal. Pavement matching and surface replacement shall be

measured and paid accordance with COP Supplement 336. Any other restoration shall be considered incidental.

ADD the following section to Part 600- Water, Sewer, Storm Drain and Irrigation:

SECTION 651: ABANDONMENT AND REMOVAL OF SANITARY SEWER

651.1 SANITARY SEWER ABANDONMENT

(A) Abandonment of sanitary sewer shall not occur until all existing sanitary sewer services have been transferred to another main or lateral, and abandonment is approved by the Engineer.

(B) Abandonment of sanitary sewer shall include gravity and/or force mains, manholes, vaults, wet wells, and other appurtenances within the reach noted on the plans to be abandoned.

(C) Manhole frames, covers, vault access hatches, and clean-out frame and covers shall be salvaged to the City unless otherwise noted on the plans or special provisions. All salvaged items shall be delivered to the City Wastewater Collections facility, located at 1505 Sundog Ranch Road, and placed as directed by the Engineer. Materials not otherwise identified to be salvaged shall become the property of the Contractor and properly disposed of. Removed or salvaged materials shall not be used in new sewer installation.

(D) Restoration for sanitary sewer abandonment shall include all excavation, backfilling, compaction, and resurfacing in accordance with COP Supplement 601.

651.1.1 Sanitary Sewer Mains

(A) Abandonment of sanitary sewer mains shall include all gravity mains, laterals, and force mains, and shall be accomplished by pipe bursting or grout filling as indicated on the plans.

(1) Pipe bursting shall be performed using industry standard methods and equipment.

A pipe bursting plan including equipment used, means and methods shall be submitted and approved in accordance with Section 105.2 of these specifications prior to beginning bursting operations.

Valves shall be removed and disposed of prior to pipe bursting, and shall become property of the Contractor. All valves shall be properly disposed of in accordance with these specifications.

(2) Grouting shall be accomplished following industry standard methods, using a cement based grout to fill the void of the existing sanitary sewer main. The grouting material must have a minimum compressive strength of 100 psi and shall have flow characteristics appropriate for filling a sanitary sewer.

Injection of the grout material shall be done with sufficient pressure and injection locations to fill the existing sanitary sewer line. The method shall adequately provide for the removal and legal disposal of existing sewage in the lines and any pipe materials removed, and release of air from the system to facilitate proper abandonment.

A grouting plan including equipment used injection locations, grout mix design, and means and methods shall be submitted and approved in accordance with Section 105.2 prior to beginning grouting operations.

651.1.2 Manholes, Vaults and Wet Wells

(A) Abandonment of manholes, vaults, wet wells and other structural appurtenances shall include the complete removal of each structure within the reach to be abandoned as indicated on the plans.

(B) All items removed and not salvaged shall become property of the Contractor and properly disposed of in accordance with these specifications.

(C) Backfilling after removal shall be in accordance with COP Supplement 601.

(D) Pavement matching and surface replacement shall be incidental to sewer abandonment.

651.2 SANITARY SEWER REMOVAL

(A) Removal of sanitary sewer shall not commence prior to authorization from the Engineer.

(B) Removal of sanitary sewer shall include the complete removal of gravity and/or force mains, manholes, vaults, wet wells, and other appurtenances within the reach noted on the plans to be removed.

Existing sanitary sewer that is removed coincident with the installation of new sanitary sewer shall be considered incidental to the installation and shall not be measured or paid for under this section.

(C) Manhole frames, covers, vault access hatches, and clean-out frame and covers shall be salvaged to the City unless otherwise noted on the plans or special provisions. All salvaged items shall be delivered to the City Wastewater Collections facility, located at 1505 Sundog Ranch Road, and placed as directed by the Engineer. Materials not otherwise identified to be salvaged shall become the property of the Contractor and properly disposed of. Removed or salvaged materials shall not be used in new sewer installation.

(D) Removal of sewer main, laterals, or force main that tie into an existing manhole that is to remain in service shall include complete removal of the penetrating pipe and grouting the hole with lean, non-shrink grout. A water stop shall be used to ensure the integrity of the manhole.

The water stop proposed shall be submitted for review and approval prior to removal activities in accordance with Section 105.2 of these specifications.

(E) Removal of sanitary sewer shall include excavation, backfilling and compaction in accordance with COP Supplement 601. Disposal, salvage, and bypass pumping shall be considered incidental to sewer removal.

(F) Pavement matching and surface replacement shall be measured and paid in accordance with Section 336 of these specifications. Any other restoration shall be considered incidental.

651.3 MEASUREMENT

Measurement for abandonment of sewer main, laterals, and force main shall be by the linear foot of pipe abandoned, measured horizontally through manholes, vaults, valves, and fittings. Valves, fittings, services, cleanouts, and other appurtenances shall be considered incidental to sewer abandonment.

Abandonment of manholes and wet wells shall be the number of each abandoned. Vaults shall be considered incidental to sewer abandonment unless otherwise noted in the special provisions.

Measurement for removal of sewer main, laterals, and force main shall be by the linear foot of pipe abandoned, measured horizontally through manholes, vaults, valves, and fittings. Valves, fittings, services, cleanouts, and other appurtenances shall be considered incidental to sewer removal.

Measurement for manholes and wet wells shall be the number of each removed. Vaults shall be considered incidental to sewer abandonment unless otherwise noted in the special provisions.

651.4 PAYMENT

Payment for abandoning sewer mains, laterals, and force main shall be made at the contract unit price. Said price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work. Pavement matching and surface replacement shall be incidental to sewer abandonment.

Payment for abandoning manholes and wet wells shall be made at the contract unit price. Said price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work. Pavement matching and surface replacement shall be incidental to sewer abandonment.

Payment for removing sanitary sewer shall be made at the contract unit price. Said price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work. Pavement matching and surface replacement shall be measured and paid in accordance with Section 336 of these specifications. Any other restoration shall be considered incidental.

Payment for removing manholes and wet wells shall be made at the contract unit price. Said price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work. Pavement matching and surface replacement shall be measured and paid in accordance with Section 336. Any other restoration shall be considered incidental.

PART 700 – MATERIALS

SECTION 701: AGGREGATE

701.4 RECLAIMED CONCRETE MATERIAL (RCM)

REMOVE in its entirety and REPLACE with the following:

Use of Reclaimed Concrete Material (RCM) is not allowed.

701.5 RECLAIMED ASPHALT PAVEMENT (RAP)

REMOVE in its entirety and REPLACE with the following:

Reclaimed asphalt pavement (RAP) shall not be allowed.

SECTION 703: RIPRAP

703.1 GENERAL

REMOVE the second paragraph in its entirety and REPLACE with the following:

Aggregate shall be color-matched with adjacent landscape aggregate or as specified on the plans or in the special provisions, and approved by the Engineer. Payment for riprap shall include all work associated with providing color samples.

SECTION 710: ASPHALT CONCRETE

710.2.1 Asphalt Binder

REMOVE in its entirety and REPLACE with the following:

(A) The approved asphalt binder shall be either Performance Grade (PG) 64-22, PG 70-22, PG 70-22TR, or PG70-22TR+ asphalt conforming to the requirements of AASHTO M 320-09 Performance-Graded Asphalt Binder. The binder grade shall be as specified in the contract documents or as directed by the Engineer.

(B) The Engineer may review a request by the Contractor to change from the approved binder grade.

710.2.3 Reclaimed Asphalt Pavement (RAP):

REMOVE in its entirety and REPLACE with the following:

Reclaimed asphalt pavement (RAP) shall not be allowed.

710.3.1 General

REMOVE item (11) in its entirety.

710.3.2 Mix Design Criteria

ADD the following:

(A) The intent of this supplement is to use only ½ inch or ¾ inch Marshall or Gyratory Mix Designs within the specification unless specifically called out in the project specifications.

(B) The asphalt mix design shall be for high traffic volume, unless otherwise specified.

710.3.2.1 Marshall Mix Design

REMOVE item (5) in Table 710-3 Marshall Mix Design Criteria and REPLACE with the following:

(5) Tensile Strength Ratio: % Min.

Minimum percent requirement is changed to 75. A tensile strength ratio of 75 percent may require more than 1 percent mineral admixture.

REMOVE item (7) in Table 710-3 Marshall Mix Design Criteria and REPLACE with the following:

(7) Stability: pounds, Minimum

Minimum requirement is changed to 3500 for ½ inch mix and ¾ inch mix.

SECTION 725: PORTLAND CEMENT CONCRETE

725.1 GENERAL

ADD the following:

All Portland cement concrete placed under this contract shall be Class AA with a maximum water/cement ratio of 0.45.

ADD the following subsection to 725.1 General:

725.1.1 Adverse Weather Concreting

(A) Hot Weather Concreting: Hot weather is defined as any combination of high ambient temperature, low relative humidity, and wind velocity which would tend to impair the quality of fresh concrete. These effects become more pronounced as wind velocity increases. Since last minute improvisations are rarely successful, preplanning and coordination of all phases of the work are required to minimize these adverse effects.

(1) Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:

(a) Cool ingredients before mixing to maintain concrete temperature below 90 degrees F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is the Contractor's option.

(b) Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.

(c) Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

(2) As an absolute minimum, the Contractor shall ensure that the following measures are taken:

(a) An ample supply of water, hoses, and fog nozzles are available at the site.

(b) Spare vibrators are on hand in the ratio of 1 spare vibrator for each 3 in use.

(c) Pre-planning has been accomplished to ensure prompt placement, consolidation, finishing, and curing of the concrete.

(d) Concrete temperature on arrival should be approximately 60 degrees F and in any event shall not exceed 90 degrees F. The use of cold water and ice is recommended.

(e) The subgrade is moist, but free of standing water.

(f) Fog spray is utilized to cool the forms and steel. Under extreme conditions of high ambient temperature, exposure to the direct rays of the sun, low relative humidity, and wind, even strict adherence to these measures may not produce the quality desired and it may be necessary to restrict concrete placement to early morning only. If this decision is made, then particular attention must be directed to the curing process since the concrete will be exposed

to severe thermal stresses due to temperature variation; heat of hydration plus midday sun radiation versus nighttime cooling.

(B) Cold Weather Concreting: Comply with ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

(1) When air temperature has fallen to or is expected to fall below 40 degrees F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F and not more than 80 degrees F at point of placement.

(2) Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

(3) Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.

(C) Wet Weather Concreting: Placing of concrete shall be discontinued when the quantity of rainfall is such as to cause a flow or wash to the surface. Any concrete already placed and partially cured shall be covered to prevent dimpling. A construction joint will be installed prior to shut down.

(D) Replacement of Damaged or Defective Concrete: Upon written notice from the Engineer, all concrete which has been damaged or is defective, shall be replaced by the Contractor at no cost to the Contracting Agency.

(E) References

(1) ACI-305 Hot Weather Concreting

(2) ACI-306 Cold Weather Concreting

(3) ACI-308 Recommended Practices for Curing Concrete

(F) No separate payment shall be made for adverse weather concreting. The work shall be considered incidental and included in the unit price bid for construction or installation of the appropriate contract pay item.

725.5 ADMIXTURES AND ADDITIVES

REMOVE the third paragraph in its entirety and REPLACE with the following:

Air entraining admixtures incorporated into the approved concrete mix design shall meet the requirements of ASTM C260. All Portland cement concrete shall contain 6 percent, plus or minus 1 percent, entrained air of evenly dispersed air bubbles at the time of placement. The air-entraining agent shall contain no chlorides. The air-entraining agent shall be added to the batch in a portion of the mixing water. The solution shall be batched by means of a mechanical batcher capable of accurate measurement. Air entrainment in the concrete shall be tested in accordance with AASHTO T 152. Air entrainment shall be tested at time of sampling in accordance with ASTM C143 and C231 respectively. The cost of this testing shall be the responsibility of the Contractor.

725.8.1 Field Sampling and Tests

REMOVE the fourth paragraph in its entirety and REPLACE with the following:

The slump of Portland cement concrete shall be tested in accordance with the requirements of AASHTO T 119, ASTM C143 and ASTM C231 respectively. Concrete that does not meet the specification requirements as to slump shall not be used, but shall be removed from the job at no cost to the City. Slump tests shall be

taken in the field by a representative of the Contractor's Quality Control firm. The cost of this testing shall be the responsibility of the Contractor.

725.8.2 Concrete Cylinder Test:

ADD the following:

Concrete cylindrical specimens for compression tests shall be taken in the field by a representative of the Contractor's Quality Control firm in accordance with AASHTO T 141 and T 23. These samples will be tested for compressive strength in accordance to AASHTO T 22. Concrete samples will be taken in accordance with this section and MAG Specification 725.8.3, except as noted hereinafter. 1 set of not less than 4 cylinders per 50 cubic yards or ½ days pour shall be prepared and retained to verify compressive strength of the mixture. 1 cylinder shall be tested at 7 days and 2 at 28 days. The fourth cylinder shall be retained for up to 60 days. If the 28 day test does not meet the minimum strength requirement, cores shall be taken as provided herein and the cost of such will be the responsibility of the Contractor. Acceptance shall be based on minimum 28 day strength requirements. The cost of testing shall be the responsibility of the Contractor.

CIP 19-015
Wilkinson Drive Pavement Reconstruction Project

Project Special Provisions

SPONSOR:

CITY OF PRESCOTT, ARIZONA

DEPARTMENT OF PUBLIC WORKS

ENGINEER:

CITY OF PRESCOTT

THE SPECIAL PROVISIONS SHALL MODIFY AND SUPERSEDE THE VARIOUS SECTIONS OF THE CITY OF PRESCOTT (COP) SUPPLEMENT TO THE MARICOPA ASSOCIATION OF GOVERNMENTS (MAG) UNIFORM STANDARD SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION, TECHNICAL SPECIFICATIONS, DATED 2/14/2019.

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104 SP SCOPE OF WORK

104.1.1 General

ADD the following to Section 104.1.1 of the MAG Technical Specifications:

1. Project Description

   A. The project generally consists of pulverizing and blending the existing asphalt pavement along with the base material and imported asphalt concrete millings to create a recycled based material. The recycled base material shall be moisture conditioned and compacted, and new asphalt concrete shall be placed on Larry Caldwell Drive and Wilkinson Drive as shown on the plans. The work includes pavement matches, drainage structure extensions, adjustment of utility covers to finish grade, shoulder material placement, ditch grading, as well as new traffic signage and striping.

   B. All construction elements, as identified in the Bid Schedule, shown on the plans or details or described in the Special Provisions, are required for construction and are to include all costs associated with pulverizing and blending, base preparation, shouldering, trenching, appurtenances, bedding, pavement replacement, hauling, placing, disposing of, mobilization, materials quality control testing and certification, or any other associated work and materials required for a complete in place and operable item of construction. All work items and materials not specifically itemized in the bid schedule and that are required for the construction are to be considered incidental to the total project bid amount.

104.3 Sequencing

ADD the following to Section 104 of the MAG Technical Specifications:

Sequencing and timing on this project shall be as follows:

Wilkinson Drive is classified as a major collector and is the only road leading to the Airport Business Park. To minimize the impact to through traffic to and from the business park, the Contractor shall limit construction activities during the established peak hours. For the peak hours on both the northbound and southbound lanes, 6:30AM to 8:30AM for the morning peak and 4:00PM to 6:00PM, both lanes shall remain fully open. Night work shall be permitted pending City Council approval, however the night work schedule shall be represented on the project schedule. All sequencing and timing for work on this project shall be submitted to the City in the form of a Project Submittal and be approved by the City a minimum of two (2) weeks prior to the scheduled work.

It is further noted that the City will be receptive to proposals that accomplish the same intended result to minimize the impact to through traffic in and out of the Airport Business Park.

The Contractor shall be required to coordinate with the Contractor on the City project immediately adjacent to this project—Corsair Avenue Extension.

201SP CLEARING AND GRUBBING

201.6 Measurement, Removal and Disposal of Trees

REMOVE in its entirety and REPLACE with the following:

No separate measurement is included for the removal of each tree regardless of size.

201.7 Payment, Removal and Disposal of Trees

REMOVE in its entirety and REPLACE with the following:

No payment will be made for the removal of each tree, the cost thereof shall be included in the bid price for General Clearing and Grubbing.

220 SP RIP-RAP CONSTRUCTION

220.7 Measurement

REMOVE in its entirety and REPLACE with the following:

Riprap, Grouted Riprap and rock mulch with filter fabric shall be measured per cubic yard.

220.8 Payment

REMOVE in its entirety and REPLACE with the following:

The accepted quantities of riprap and rock mulch with filter fabric, measured as provided above, will be paid for at the contract unit price per cubic yard, which price shall be full compensation for the item, complete in place, including excavation of existing ground for riprap and rock mulch placement. The cost of labor, equipment and material to install the filter fabric shall be included in the cost.

Pay Item: 220 SP Grouted Riprap w/ Filter Fabric (D50=6", 12” Deep) Cubic Yard (CY)

310 SP FULL DEPTH RECLAMATION, PLACEMENT AND CONSTRUCTION OF RECYCLED AGGREGATE BASE COURSE

310.1 Description

Remove MAG 310.1in its entirety and replace with the following:

This special provision covers the furnishing of all labor, tools, and equipment necessary to reclaim bituminous roadways, as specified below, to form a recycled asphalt aggregate base course. Work under this item shall consist of pulverizing the in-place asphalt pavement, placement of additional recycled asphalt pavement as an aggregate base material, and the compaction of the reclaimed blended material.

310.2 Placement and Construction

MAG Section 310.2 Placement and Construction. Remove in its entirety and replace with the following:

310.2.1 Construction Equipment:

The recycled aggregate base material shall be manufactured onsite by the use of a pulverizing Full Depth Reclamation (FDR) shall consist of a self-propelled machine specifically designed to pulverize and blend the existing bituminous pavement and base materials in-place to a specific depth. Approved equipment that may be used for pulverizing and blending includes a CMI/Terex RS-500 or larger size machine (or equivalent reclaimer/stabilizer). The City shall approve the equipment to be used for the pulverizing and blending activities. The machine shall have automatic depth controls to maintain the cutting depth to within +/- 1/4 inch of the depth specified. Equipment such as road planers or cold milling machines, which are designed to mill or shred the existing bituminous pavement surface rather than crush/fracture and blend it, are not considered capable of achieving the specified gradation and effective mixing, and therefore are *not* acceptable equipment for performing the pulverizing and blending reclamation activities of this project.

The equipment used for blending the pulverized material with additional recycled asphalt pavement shall be capable of producing a homogeneous and uniformly blended reclaimed mixture. The equipment used for placement of the reclaimed material shall be capable of placement to the proposed lines and grades.

The mixer/reclaimer shall be fitted with an integrated water injection system capable of introducing water into the cutting drum during the mixing process. The metering device shall be capable of automatically adjusting the flow of water to compensate for any variation in the amount of reclaimed material introduced in to the mixing chamber. Water added shall be applied from a calibrated meter capable of accurately measuring the amount of water calculated volumetrically based on width, depth and unit weight of processed material with automatic adjustment for working speed. The injection system shall have an automatic digital reading displayed for both the flow rate of water and total amount of reclaimed material in appropriate units of weight and time.

Compaction of the recycled asphalt aggregate base course shall be completed using self-propelled rollers, complete with properly operating scrapers and water spray systems as necessary. The number, weight and types of rollers shall be as necessary to obtain the required compaction throughout the entire reclaimed thickness. Segmented padfoot, vibratory padfoot, pneumatic-tired, vibratory single or double drum rollers can be used for compaction. Any combination of rollers shall be allowed provided the compaction requirements are met.

310.2.2 Construction Methods:

Before any work begins, coordination, identification and location of all utilities within the pulverization operations should occur. Excess dirt, vegetation, standing water, raised roadway markings and other objectionable materials shall be removed by sweeping, blading, or other approved method. All affected utilities shall be identified and protected from damage prior to processing. The profile and cross-slope as shown on the plans shall be referenced for the finished surface. The pulverization sequence shall be constructed in a series of parallel lanes such that longitudinal and transverse joints are minimized.

The subgrade shall be firm and able to support, without yielding or subsequent settlement, the construction equipment and compaction of the recycled asphalt aggregate base course. Soft or yielding subgrade shall be made stable before pulverization construction proceeds.

The pulverization processing shall not be conducted when the asphalt pavement, base, subbase or subgrade is frozen, or when freezing temperatures are anticipated within 7 days of the end of pulverization and subsequent asphalt paving.

310.2.3 In-Place Pulverization:

During the first day of production, a control strip of the recycled asphalt aggregate base course shall be constructed in order for the owner agency to evaluate and approve the equipment, construction methodology and workmanship, and to verify that the construction process meets specification requirements. The control strip shall be of adequate size to demonstrate that the equipment, materials and processes proposed can produce a recycled asphalt aggregate base course that conforms to specification requirements. The optimal rates for water and additional imported recycled asphalt pavement shall be established to determine procedures that result in optimum compaction. Passes with various combinations of rollers under static and/or vibratory mode shall be evaluated.

The pulverization operations shall continue through the first day unless the equipment and process fails to meet the requirements for successful completion of pulverization operations. Pulverization operations shall not continue beyond the first day unless a control strip has been approved by the owner agency. Control strips that do not meet specification requirements shall be reworked, recompacted, or removed and replaced. On acceptance of the control strip the same equipment, materials and construction methods shall be used for the remainder of the pulverization operations, unless adjustments made by the contractor are approved by the owner agency. If adjustments are made, a new control strip shall be constructed.

In lieu of a control strip, the owner agency may allow the contractor to provide proof, based on previous experience with the same equipment, personnel and materials, that the work will conform to specification requirements.

The full depth of asphalt material shall be pulverized. The pulverized in-place asphalt material shall be thoroughly blended with additional passes of the reclaimer to produce a homogenous mixture.

Longitudinal joints between successive pulverization passes should overlap a minimum of 6 inches and transverse joints shall overlap a minimum of 2 feet.

Rubberized crack filler, pavement markers, loop wires, thermoplastic markers and other similar materials shall be removed from the roadway as observed during the pulverization process. Residual materials that cannot be completely removed from the processed materials may be incorporated into the reclaimed materials if it can be demonstrated that those added materials will not adversely affect the performance of the reclaimed layer. Any such materials retained in the mixture shall be appropriately sized and blended so as not to adversely affect the appearance or strength of the reclaimed layer.

310.2.4 Placement of Imported Recycled Asphalt Pavement:

Additional recycled asphalt pavement shall be placed above the pulverized in-place asphalt. The additional recycled asphalt pavement shall be obtained from the COP stockpiles located at the City of Prescott Solid Waste Division, 2800 Sundog Range Road, Prescott, Arizona 86301. The Contractor shall coordinate with the transportation of the recycled asphalt pavement with the City prior to construction.

The Contractor shall transport and place the additional recycled asphalt pavement immediately above the pulverized in-place asphalt. The additional recycled asphalt shall be blended with a minimum of the top two inches of the original pulverized asphalt This blending shall be completed with additional passes of the reclaimer such that the reclaimer penetrates into the original in-place pulverized asphalt layer to produce a final homogenous mixture meeting the following gradation requirements:

Sieve Analysis Test Methods AASHTO T-27, T-11	
Sieve Size	**Accumulative Percentage Passing Sieve, by Weight Reclaimed Recycled Asphalt Pavement Base Material**
2 in.	100
1-1/2 in.	90 – 100
3/4 in.	55 – 90
No. 4	40 – 75
No. 40	10 – 30
No. 200	3 – 10

The gradation of the material shall be tested at a frequency of one test per 25,000 square feet per lift to verify gradation and to ensure that the recycled asphalt aggregate base course layers are being pulverized to the required gradation. The sample shall be taken from the full treatment depth.

Variation from this specification requires approval from the City Engineer. The recycled asphalt aggregate base course shall be brought to the desired moisture content by means of the mixer/reclaimer's integrated water injection system. The recycled asphalt aggregate base course shall then be graded to a uniform layer that will net, after compacting, the required thickness. The grading operation shall be continued to such extent as may be necessary to minimize segregation. The quantity of water applied shall be that amount which will assure proper compaction resulting in the density required by Section 310.3.

After placement, the recycled asphalt aggregate base course shall be true, even and uniform conforming to the grade and cross-section specified. In no case shall the recycled asphalt aggregate base course vary by more than ½ inch above or below required grade.

The recycled aggregate base material shall be used for the pavement shoulder, however all requirements of MAG Section 702 shall be met with the shoulder material utilized.

310.5 Payment

REMOVE Section 310.5 of the COP Technical Specifications in its entirety and REPLACE with the following:

Measurement of the pulverizing and blending, moisture conditioning and compaction of the existing asphaltic concrete shall be shall be per square yard (SY) of the plan quantities, which is reflected in the bid schedule. Payment shall be made at the unit price bid and shall be considered full compensation for this work item.

Measurement of the hauling, pulverizing and blending, moisture conditioning and compaction of the asphalt concrete millings from the Sundog Transfer Station shall be done so by the ton (TN). Payment shall be made at the unit price bid and shall be considered full compensation for this work item.

Pay Item: 310.a SP Pulverize and Blend Existing Pavement, Square Yard (SY)

Pay Item: 310.b SP Haul, Pulverize and Blending, and Placement of Asphalt Concrete Millings, Ton (TN)

321 SP PLACEMENT AND CONSTRUCTION OF ASPHALT CONCRETE PAVEMENT

321.2 Materials and Manufacture

ADD the following to Section 321.2 of the COP Technical Specifications:

A reinforcing aramid fiber shall be added to the mix design and production for the ***top lift*** of asphalt concrete. The aramid fiber shall be FORTA-FI brand, or a City Engineer approved equal.

321.6 Mix Production

ADD the following to Section 321.6 of the COP Technical Specifications:

Asphaltic Concrete Hot Plant Reports shall be provided to the Owner.

Add aramid and polyolefin reinforcing fiber blends at a dosage rate of one (1) pound fiber per one (1) ton of asphalt.

Have the fiber manufacturer's representative on site during mixing and production. This requirement can be waived if fiber manufacturer and asphalt producer can supply evidence of manufacturer's brand of fiber being successfully produced a minimum of three times at the asphalt plant to be used for the project.

Batch Plant Production: When a batch plant is used, add fiber to the aggregate in the weigh hopper and increase both dry and wet mixing times. Ensure that the fiber is uniformly distributed before the injection of asphalt cement into the mixture.

Drum Plant Production: Inject fibers through the RAP collar manually or by feeding them with a metered air blown system to promote rapid and complete fiber dispersion. Rate the feeding of fibers with the rate the plant is producing asphalt mix. If there is any evidence of fiber bundles at the discharge chute, increase the mixing time and/or temperature or change the angle of the fiber feeder line to increase dry mixing time.

Add fibers continuously and in a steady uniform manner. Provide automated proportioning devices and control delivery within ±10% of the mass of the fibers required. Perform an equipment calibration to the satisfaction of the fiber manufacturer's representative to show that the fiber is being accurately metered and uniformly distributed into the mix.

Include the following with the air blown system:

- Low level indicators
- No-flow indicators
- A printout of feed rate status in pounds/minute
- A section of transparent pipe in the fiber supply line for observing consistency of flow or feed.

- Manufacturer's representative's approval of fiber addition system

Plant Quality Control:

Aramid Dispersion Visual Test: Collect a 10kg sample of mix from the discharge chute during first 50 tons of production. Visually assess the state of aramid fibers in the sample according to Reference 4 (Section B of this specification) and rate the sample as "Pass" or "Fail".

"Pass" = All fibers exist in an Individual State and no Undistributed Clips or Agitated Bundles of fiber are detected.

"Fail" = One or more Undistributed Clips or Agitated Bundles are detected.

If a sample is rated as "Fail", adjust mixing operations to improve fiber dispersion and repeat Step 1 above. If Visual Test results in three consecutive "Fail" ratings, plant mix samples should be sent to a third party laboratory for complete ADSR testing before production is allowed to commence. In addition to Visual Test, use a shovel to inspect mix in the back of first three trucks and every tenth truck thereafter to confirm adequate blending of the fiber. Remove any observed fiber bundles from placed mixture and adjust operations per the manufacturer's recommendation to eliminate future fiber bundle development, and repeat Steps 1 through 3 above to confirm adequate aramid fiber dispersion.

321.8.2 Joints

ADD the following to MAG Section 321.8.2:

The longitudinal joints shall coincide with the lane striping or shall run parallel to all lane striping no more than 6" from the ultimate stripe location.

321.10 Acceptance

ADD the following to MAG Section 321.10:

All ACCEPTANCE requirements, as per this section, shall be applicable for this project.

321.12 Measurement

REMOVE Section 321.12(A) of the COP Technical Specifications in its entirety and REPLACE with the following:

Asphalt concrete pavement will be measured by the TON, 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.

321.13 Payment

Revise and replace with the following to MAG Section 321.13:

The asphalt concrete measured as provided above will be paid for at the contract price per ton, as adjusted per Section 321.10, which price shall be full compensation for the item complete, as herein described and specified.

The asphalt concrete measured as provided above will be paid for at the contract price per ton, as adjusted per Section 321.10, which price shall be full compensation for the item complete, as herein described and specified.

No payment will be made for any overrun in quantity of asphaltic concrete ***in excess of 5 percent of the bid schedule quantity***, based on actual field measurement of area covered, design thickness, and the mix design unit weight. The accepted quantities of asphalt concrete pavement, measured as provided above, will be paid for at the contract unit price per the pay unit shown below, which price shall be full compensation for the item complete in place and as adjusted per Section 321.10, and as herein described and specified.

Pay Item: 321.13.a SP Asphaltic Concrete Pavement, ¾" Mix, with Fiber (Top Lift) (TN)

Pay Item: 321.13.b SP Asphaltic Concrete Pavement, ¾" Mix (Bottom Lift) (TN)

336 PAVEMENT MATCHING AND SURFACE REPLACEMENT

336.4 Measurement

REMOVE Section 336.4 of the COP Technical Specifications in its entirety and REPLACE with the following:

There shall be no measurement for the pavement matching at the ends of this project, or the adjacent driveway matches in the public right of way. This work is incidental to the 310 SP & 321 SP pay items.

336.5 Payment

REMOVE Section 336.5 of the COP Technical Specifications in its entirety and REPLACE with the following:

There shall be no payment for the pavement matching at the ends of this project, or the adjacent driveway matches in the public right of way. This work is incidental to the 310 SP & 321 SP pay items.

401 SP TRAFFIC CONTROL DEVICES

ADD the following to Section 401.2:

Ten (10) days prior to commencement of the construction work an electronic message board shall be placed on both ends of the work zone(s) and provide a message to the traveling public regarding the times and dates they can anticipate delays. These electronic message boards shall remain throughout the length of the project and be changed to reflect the current/upcoming anticipated delays. All messages shall be approved by the Owner in the form of a submittal.

402 SP Pavement Markings and Striping

402.4 Payment

ADD the following to Section 402.4:

Pay Item: 402.1a SP Thermoplastic Stop Bar, White (4" Equiv.), Linear Feet (LF)

Pay Item: 402.1b SP Thermoplastic Left Turn Arrow, White, Each (EA)

Pay Item: 402.1c SP Thermoplastic Through Arrow, White, Each (EA)

Pay Item: 402.3a SP Permanent Pavement Markings, White (4" Equiv), Linear Feet (LF)

Pay Item: 402.3b SP Permanent Pavement Markings, Yellow (4" Equiv), Linear Feet (LF)

403 SP Permanent Signing Post, Signs and Delineators

403.4 Payment

ADD the following to Section 403.4:

Pay Item: 403.2a SP Traffic Signing, Existing, Remove and Replace, Each (EA)

Pay Item: 403.2b SP Traffic Signing, New, Post and Base (W4-4BP), Each (EA)

710 SP Asphalt Concrete

710.2.1 Asphalt Binder

REMOVE Section 710.2.1 of the COP Technical Specifications in its entirety and REPLACE with the following:

(A) The bottom lift of asphalt concrete shall have a PG64-22 asphalt binder. The top lift of asphaltic concrete shall have a PG70-22TR+ asphalt binder, otherwise known as a polymer modified asphalt tire rubber binder, which shall conform to the requirements of Table 711- 2 for Type 1 – TR products, with the exception of AASHTO T-315 test shall be for 70 degrees Celsius.

(B) The Engineer may review a request by the Contractor to change from the approved binder

grade.

710.2.2 Aggregate

REPLACE the following items in Table 710-2 of the MAG Technical Specifications:

Fractured Faces, % (Coarse Aggregate Only):

95% of the coarse aggregate shall have a minimum of one fractured face, and a minimum of 90% shall have 2 or more fractured faces.

ADD the following to Section 710.2.2 of the MAG Technical Specifications:

Historical L.A. Abrasion test results shall not be permitted.

710.3.2.1 Marshall Mix Design

REPLACE the following items in Table 710-3 of the MAG Technical Specifications:

Tensile Strength Ratio (TSR); minimum shall be 75%
Dry Tensile Strength: minimum shall be 125 psi.

Pavement Engineering Report, Rev. 1

Wilkinson Pavement Rehabilitation
North Wilkinson Drive
Prescott, Arizona

February 28, 2020
Terracon Project No. 65195185

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64550
KIRK D.
JACKSON
Date Signed 2/28/2020
ARIZONA, U.S.A.
EXPIRES 9/30/2020

Prepared for:
City of Prescott
Prescott, Arizona

Prepared by:
Terracon Consultants, Inc.
4685 South Ash Avenue, Suite H-4
Tempe, Arizona

February 28, 2020

City of Prescott
433 North Virginia Street
Prescott, Arizona 86301

Attn: Mr. Aric M. Stewart, P.E., CFM
Phone: (928) 777-1130
Email: Aric.Stewart@Prescott-AZ.gov

Re: Pavement Engineering Report, Rev. 1
Wilkinson Pavement Rehabilitation
North Wilkinson Drive
Prescott, Arizona
Terracon Project No. 65195185

Dear Mr. Stewart:

Terracon Consultants, Inc. (Terracon) has completed the Pavement Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. P65195185 dated August 2, 2019 and Task Order Number 2 of Contract Number 2019-030 with the City of Prescott. This report presents the findings of the subsurface exploration and provides pavement engineering recommendations for the rehabilitation of North Wilkinson Drive.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

Kirk D. Jackson, P.E.
Project Engineer

Donald R. Clark, P.E.
Sr. Consultant/Sr. Principal

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Pavement Engineering Report

Wilkinson Pavement Rehabilitation
North Wilkinson Drive
Prescott, Arizona

Terracon Project No. 65195185
February 28, 2020

INTRODUCTION

This report presents the results of our subsurface exploration and pavement engineering services performed for the proposed North Wilkinson Drive pavement rehabilitation project in Prescott, Arizona. The purpose of these services is to provide information and pavement engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Site preparation and earthwork
- Demolition considerations
- Excavation considerations
- Pavement design and construction

The geotechnical engineering Scope of Services for this project included the advancement of three (3) test borings and one (1) test pit to depths ranging from approximately five (5) to six (6) feet below existing site grades. Our field exploration work also included Dynamic Cone Penetrometer (DCP) testing in the borings.

Maps showing the site and boring locations are shown in the **Site Location** and **Exploration Plan** sections, respectively. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included on the boring logs and/or as separate graphs in the **Exploration Results** section.

PROJECT DESCRIPTION

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Information Provided	The information provided Terracon included the following: ▪ Email from Aric Stewart dated July 3, 2019 ▪ Wilkinson Pavement Rehab Map from the COP

Item	Description
Project Description	We understand the proposed project will consist of pulverizing the existing asphalt, placing additional recycled asphalt pavement (RAP) material and placing additional new asphalt concrete pavement above the reclaimed layers. We understand the COP has existing asphalt millings which may be considered for use as stabilization or additional aggregate base material. Terracon conducted a limited condition survey of the existing pavement, although pulverization and mechanically stabilized reclamation has already been determined for the project by the COP. In the event that some form of rehabilitation other than described above may be considered in the future, a full condition survey may be appropriate at that time.
Existing Site Features	The existing roadway is paved with asphalt concrete surfacing. The shoulders are generally gravel surfaced with trees and other typical high desert vegetation extending beyond the shoulders. The western shoulder of the roadway slopes downward from 1 to 10 feet. A gravel lot turnout exists on the shoulder of the southbound lane.
Pavement Traffic	The ADOT Transportation Data Management Tool was used to estimate the current traffic loading on Wilkinson Drive from the traffic data counts at the intersection of SR 89A and Larry Caldwell Drive. Based on the traffic counts shown around this interchange, we estimate the traffic on Wilkinson Drive to consist of the following: ■ Autos/Light Truck 1,858 AADT ■ Trucks 1,238 AADT ■ Directional Distribution Factor of 57 percent The actual design traffic should be verified by COP prior to final implementation of the design recommendations outlined in this report. We have assumed a pavement design life of 20 years. We request the COP review this information to confirm and/or modify the traffic information that formed the basis of the design.
Estimated Start of Construction	2020

SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The project is located in Prescott, Arizona north of Arizona State Route 89A, Pioneer Parkway Exit 318 onto Larry Caldwell Drive. Based on the provided site plan, the project extents encompass North Wilkinson Drive as it turns north from Larry Caldwell Drive. The extents of the proposed rehabilitation are approximately 2,050 feet long. See **Site Location** and **Exploration Plan** for additional site location information.
Existing Topography (from Google Earth Pro)	Relatively flat, sloping gently to the southeast
Prior Maintenance & Rehabilitation Efforts	The pavement has received some amount of maintenance over its life as evidenced by crack sealing and the presence of some roadway patching. One area of patching near the entrance to the Hanson Aggregate plant site appears to have been recently placed. Other maintenance and rehabilitation efforts appear to be older in age.

Existing pavement and other site conditions were photo documented at the time of our field exploration program. Photographs depicting selected site conditions photos are contained in the attached **Photography Log**.

EXPLORATION AND TESTING PROCEDURES

Field Exploration

The field exploration for this project included the following boring/test pit program:

Number of Borings/Test Pits	Boring Depth (feet)	Planned Location
3 Borings	5	Pavement rehabilitation area
1 Test Pit	6	Pavement rehabilitation area

Boring/Test Pit Layout and Elevations: Unless otherwise noted, Terracon personnel provided the boring layout. Coordinates were obtained with a handheld GPS unit (estimated horizontal accuracy of about ±10 feet). If elevations and a more precise boring layout are desired, we recommend borings be surveyed following completion of fieldwork.

Subsurface Exploration Procedures: We advanced the borings with a truck-mounted rotary drill rig using continuous flight augers. We observed and recorded groundwater levels during drilling and sampling. For safety purposes, all borings were backfilled with auger cuttings after their completion. The existing pavements were patched with cold-mix asphalt.

The asphalt at the test pit location was saw-cut to the appropriate dimensions. The asphalt was removed and hauled from the site. The subsurface layers beneath the asphalt were excavated in one-foot intervals. The density and moisture content of the in-place material was measured at

each one-foot interval using a nuclear moisture-density gauge. Bulk samples of the subsurface materials were collected from the sidewalls of the excavation and from the test pit spoils. The test pit was backfilled with the cuttings in one-foot lifts. Each lift was compacted using a sheep's foot roller extension on the backhoe. The density and moisture content of the backfill was measured at each one-foot interval using the nuclear density gauge to ensure adequate compaction of the backfill material was achieved. The edges of the saw-cut asphalt were primed with a tack coat. The surface of the test pit was capped with hot-mix asphalt concrete and roller compacted using a smooth drum roller. The temperature of the asphalt was continuously measured after compaction and the roadway was opened to traffic once the temperature of the asphalt cooled sufficiently.

The sampling depths and other sampling information was recorded on the field boring and test pit logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Dynamic Cone Penetrometer: Dynamic Cone Penetrometer (DCP) testing was conducted at each boring location to supplement the understanding of the pavement subgrade strength characteristics with depth. The DCP testing was conducted in general accordance with ASTM D 6951 "Standard Test Method for Use of the Dynamic Cone Penetrometer in Shallow Pavement Applications". A Kessler K-100 Model DCP was used for testing. The penetration rate of the DCP, measured in mm/blow, is correlated to in-situ strength such as an estimated in-situ California Bearing Ratio (CBR) or R-value. The strength parameters can be plotted with depth providing a strength profile of the pavement subgrade.

Sampling of Milled Asphalt: We understand the COP is considering using recycled asphalt pavement (RAP) to stabilize the pavement subgrade for this project. Alternatively, the RAP is also being considered as an aggregate base course material. A Terracon representative sampled milled asphalt from a stockpile of previously milled asphalt located in the stock yard near the COP waste transfer facility. The samples were transported to the Terracon Tempe Laboratory to determine the suitability and feasibility of using the milled asphalt for stabilization of the subgrade or as an aggregate base course material.

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests to understand the engineering properties of the various soil strata, as necessary, for this project. Procedural standards noted below are for reference to methodology in general. In some cases, variations to

methods were applied because of local practice or professional judgment. Standards noted below include reference to other, related standards. Such references are not necessarily applicable to describe the specific test performed.

- ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- ASTM D422 Standard Test Method for Particle-Size Analysis of Soils
- ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort
- ASTM D2844 Standard Test Method for Resistance R-Value and Expansion Pressure of Compacted Soils

The laboratory testing program included examination of soil samples by an engineer. Based on the material's texture and plasticity, we described and classified the soil samples in accordance with the Unified Soil Classification System.

Testing of Milled Asphalt: The milled asphalt RAP was tested for gradation to determine the feasibility of using the material to stabilize the pavement subgrade. These results are presented in **Exploration Results** as sample "AS-1". The RAP was also incorporated into the FDR stabilization mix design discussed below.

Full-Depth Reclamation Stabilization Mix Design: Terracon performed a full-depth reclamation (FDR) stabilization mix design to determine the required cement content for the stabilized subgrade. The mix design was performed generally following the guidelines for full-depth reclamation in the following documents:

- Basic Asphalt Recycling Manual published by the Asphalt Recycling & Reclaiming Association and the U.S. Department of Transportation Federal Highway Administration (FHWA), 2015; and,
- Guide to Full-Depth Reclamation (FDR) with Cement published by the National Concrete Pavement Technology Center and the Portland Cement Association, March 2017.

The subgrade materials beneath Boring B-1 and B-2 were combined with a proportion of asphalt millings in an approximate 52 percent asphalt and 48 percent subgrade blend. These proportions were based on the expected ratio of materials to be blended during a reclamation process of the pavement rehabilitation, if this alternative is utilized for the project.

The maximum dry density and optimum moisture content of the composite material was determined at a cement content of 7 percent in accordance with ASTM D698. The gradation of

the composite material was also determined. These results are presented in **Exploration Results** as sample "Composite".

Specimens of the material were prepared in 4-inch diameter molds at 5, 7 and 9 percent cement contents in accordance with ASTM D1633. Based on the limited availability of subgrade material collected during the field exploration, a limited number of specimens were prepared. Three specimens at 5 percent cement content and two specimens at 7 and 9 percent cement content were prepared. The specimens were compacted to 95 percent of maximum dry density determined in accordance with Standard Proctor criteria (ASTM D698). The specimens were cured for 7-days in a fog room. The compressive strength of each specimen was determined at 7 days in accordance with the procedures outlined in ASTM D1633. The compressive strength test results are presented in the Material Design Parameters subsection of the **Pavement Thickness Design** section of this report.

The pH and minimum resistivity of the composite sample was determined in accordance with ARIZ 236e and the soluble sulfate and chloride contents were determined in accordance with ARIZ 733b and ARIZ 736b, respectively. These results are presented in the **Corrosivity** section of this report.

SUBSURFACE CONDITIONS

A total of three (3) test borings were drilled and one (1) test pit was excavated on the alignment of the project at the locations indicated on the **Site Location** and **Exploration Plan**. Specific conditions encountered at each boring location and at the location of the test pit are indicated on the individual boring/test pit logs. Stratification boundaries on the boring/test pit logs represent the approximate location of changes in soil types; in-situ, the transition between materials may be gradual. Details for each of the borings can be found on in the **Exploration Results** section.

The existing asphalt concrete (AC) at the location of the test borings/pit varied in thickness from approximately 5.0 to 6.5 inches with an average of 6.1 inches thick. The thickness of the existing aggregate base course (ABC) varied from nonexistent to approximately 3 feet in thickness with an average of 1.5 feet in thickness at the locations of the borings/test pit. Based on conditions encountered in the borings/test pit, subsurface subgrade conditions for most of the alignment can be generalized as consisting of sandy lean clay (Unified Soil Classification CL), clayey sand (SC), and silty clayey sand (SC-SM) all with variable amounts of sand and fine sized gravel. Portions of the subgrade were likely fill soils placed as subbase during the original construction of the project.

The subgrade soils along the alignment mainly exhibited non- to low plasticity characteristics. The near surface subgrade soils were estimated to be medium dense in relative density.

The Association of State Highway and Transportation Officials (AASHTO) soil classification method provides for the calculation of a Group Index, which is used as a scale for rating soil quality. The AASHTO Group Index (GI) values, based on the results of the laboratory testing, and the general subgrade support characteristics at each boring/test pit location are summarized in the following table:

SUBGRADE SOIL CLASSIFICATION							
Boring No.	**Depth**	**% Passing US No. 200 Sieve**	**Liquid Limit (LL)**	**Plasticity Index (PI)**	**USCS Classification**	**AASHTO Group Index**	**AASHTO Classification**
B-1	0.5-2.5	--	--	--	SC	--	A-2-6[1]
B-1	2.5-4	61.0	28	15	CL	6	A-6
B-2	0.5-3	--	--	--	SM	--	A-1-b[1,2]
B-2	3.5-5	27.5	34	19	SC	1	A-2-6
B-3	3.5-5	24.8	30	14	SC	0	A-2-6
TP-1	1-2	19.1	21	3	SM	0	A-1-b[2]
TP-1	2-4	15.8	25	7	SC-SM	0	A-2-4[2]

1. Based on visual classification only
2. Likely fill soils placed as part of the subbase for the elevated portion of this section of the roadway alignment.

Note: The AASHTO Classifications indicate the following general subgrade support characteristics:	
	Indicates Excellent to Good Subgrade Support Characteristics
	Indicates Fair Subgrade Support Characteristics
	Indicates Fair to Poor Subgrade Support Characteristics

The roadway subgrade support characteristics varied considerably across the alignment and with depth. In the northern portion of the alignment, the subgrade soils exhibit fair to poor subgrade support characteristics. These soils are overlain by fill material with fair to good subgrade support characteristics. The southern portion of the alignment appears to have deeper thicknesses of fill material with excellent to good subgrade support characteristics.

Groundwater was not observed in the borings or the test pit during the subsurface exploration. Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

CORROSIVITY

The following table lists the results of laboratory soluble sulfate, soluble chloride, electrical resistivity, and pH testing. The values may be used to estimate potential corrosive characteristics

of the on-site soils with respect to contact with the various underground materials which will be used for project construction.

Corrosivity Test Results Summary					
Boring	**Soil Description**	**Soluble Sulfate, ppm**	**Soluble Chloride, ppm**	**Electrical Resistivity (Ω-cm)**	**pH**
Composite: B-1@1-2.5, B-1@1-3.5, Asphalt Millings	Composite asphalt millings and pavement subgrade	31	16	2,307	8.2

Results of soluble sulfate testing indicate samples of the on-site soils tested possess negligible sulfate concentrations when classified in accordance with Table 4.3.1 of the ACI Design Manual.

PAVEMENT CONDITION

Distress generally observed in the existing pavements for this project can be grouped into three broad categories, which include:

Category I Structural Distress	Category II Climate/Durability Distress	Category III Other Distress Types
■ Alligator Cracking ■ Rutting	■ Longitudinal and Transverse Cracking ■ Weathering and Raveling	■ Patching and Utility Cut Patching

Structural distress is considered the most detrimental to pavement condition and when present, will shorten pavement life when preventative maintenance or rehabilitation measures are not undertaken on a timely basis. Climate/durability related distress usually contributes to deterioration in pavement serviceability. While less detrimental than structural distress, maintenance measures are usually employed for climate/durability distress to maintain safe pavement conditions.

The distresses observed in the asphalt pavements occur in varying degrees and locations in the pavement along the alignment. Descriptions of the distresses that have occurred in the pavement are as follows:

- **Alligator Cracking**: Alligator cracking, a structural distress, is usually the result of loss of support for the pavement through a reduction in the strength of the subgrade soils. However, alligator cracking can also be caused as a result of load related failure from traffic due to inadequate pavement thickness. Without proper maintenance or rehabilitation, alligator cracking usually increases in severity and propagates over larger areas of the pavement with infiltration of water to subgrade soils beneath the surface. High

severity alligator cracking was observed extensively in the northern portion of the alignment from approximately the entrance to the aggregate pit to the end of the project alignment. Medium severity alligator cracking was observed extensively in the southern portion of the alignment, most notably in the southbound lane.

- **Rutting**: Rutting, a structural distress, stems from a permanent deformation in any of the pavement layers or subgrade materials, and is usually caused by consolidation or lateral movement of the materials due to traffic load. Significant rutting can lead to major structural failure of the pavement. Low severity rutting was observed in the northern portion of the alignment and is associated with high severity alligator cracking where it was observed.

- **Longitudinal and Transverse Cracking**: Longitudinal and transverse cracking was observed extensively along the entirety of the project alignment. These types of cracks are not load-related and are usually the result of climate, pavement durability or construction related factors including poorly constructed paving lane joints or shrinkage of the asphalt surface due to low temperatures, hardening of the asphalt and/or daily temperature cycling. All of the longitudinal and transverse cracking observed was of low to medium severity. Without proper maintenance or rehabilitation, this type of cracking can progress to more severe forms of pavement distress including block or alligator cracking.

- **Weathering & Raveling**: Weathering and raveling are caused by the loss of asphalt binder and dislodged aggregate particles in the pavement surface from climate and pavement durability related factors. Left untreated, weathering will eventually result in the dislodging (raveling) of aggregate particles in the pavement surface. The weathering and raveling was of low severity to medium severity along the majority of the alignment with isolated areas of high severity weathering. Raveling was common at locations of high severity alligator cracking in the northern portion of the alignment.

- **Patching & Utility Cut Patching**: A patch is an area of pavement which has been replaced with new materials to repair the existing pavement. A patch is considered a defect no matter how well it is performing (a patched area or adjacent area does not usually perform as well as an original pavement section). Generally, some roughness is always associated with this distress. Patching was observed throughout the alignment, but most notably in the northern portion. The high severity alligator cracking appears to have been repaired at isolated locations with hot-mix asphalt. One such location, near the entrance to the aggregate pit and Boring B-2, is exhibiting high severity rutting and shoving. One large low-severity utility patch appears to have been placed recently north of the entrance to the aggregate pit. Other locations of isolated patch repairs were identified throughout the alignment.

PAVEMENT THICKNESS DESIGN

General Pavement Comments

We understand the COP has determined that rehabilitation methods for the project will consist of pulverization of the existing asphalt, the addition of recycled asphalt pavement to mechanically stabilize the reclaimed layer and surfacing the reclaimed layers with a new layer of asphalt concrete. Alternatively, the existing pavement will be recycled as an aggregate base course and RAP will be imported as an additional aggregate base course material for the project. We understand the COP has determined this rehabilitation method of North Wilkinson Drive is warranted based on the existing pavement condition. Pavement reclamation techniques utilizing a reclaimer to blend materials with recycled asphalt pavement (RAP) are not effective if the blended materials contain large gravel or cobbles. Based on the laboratory test results of the existing pavement base and subbase collected at the discrete boring locations along the alignment of North Wilkinson Drive, the base and subbase appear to be good candidates for FDR. Although unlikely, the presence of large gravel and/or cobbles may be present between our boring locations. If such conditions are encountered during construction, Terracon should be notified immediately to determine if additional recommendations will be necessary.

The pavement design for this project has been based on the guidelines outlined in the following documents:

- 1993 Guideline for Design of Pavement Structures by the American Association of State Highway and Transportation Officials (AASHTO-1993);
- Arizona Department of Transportation Pavement Design Manual dated September 29, 2017;
- Basic Asphalt Recycling Manual published by the Asphalt Recycling & Reclaiming Association and the U.S. Department of Transportation Federal Highway Administration (FHWA), 2015; and,
- Guide to Full-Depth Reclamation (FDR) with Cement published by the National Concrete Pavement Technology Center and the Portland Cement Association, March 2017.

Alternative pavement thickness designs are provided for the traffic conditions and pavement life conditions as noted in **Project Description** and in the following sections of this report. A critical aspect of pavement performance is site preparation. Pavement designs noted in this section must be applied to the site which has been prepared as recommended in the **Earthwork** section.

The following subsections detail the subgrade, traffic and material design parameters for pavement design of this project as well as our recommended and alternative pavement thicknesses.

Subgrade Design Parameters

Correlations to subgrade resilient modulus were determined from the results of the laboratory R-value tests as well as the results of the laboratory gradation and plasticity index test results. The results of the subgrade dynamic cone penetrometer (DCP) testing were correlated to California Bearing Ratio (CBR) values, which were also subsequently correlated to subgrade resilient modulus. The results of the correlations are presented in the following table:

Design Subgrade Values			
Parameter	**Correlated Design R-Value**	**Correlated Design CBR**	**Correlated Resilient Modulus (psi)**
Laboratory R-value	27.7	--	8,202[1]
Laboratory Gradation and Plasticity Index	24[2]	--	7,131[1]
DCP Test Results	--	6	8,043[3]

1. Based on the following ADOT published correlation and a seasonal variation coefficient of 3.2 for Prescott

$$M_r\ (psi) = \frac{1815 + 225 \times Rvalue + 2.40 \times Rvalue^2}{0.6 \times SVF^{0.6}}$$

2. Based on the following ADOT published correlation

$$\log(Rvalue) = 2.0 - 0.006 \times Percent\ Fines - 0.017 \times PI$$

3. Based on the following correlation published by the National Cooperative Highway Research Program (NCHRP) Publication 1-37A, 2004:

$$M_r(psi) = 2555 \times CBR^{0.64}$$

Based on the results of the correlated resilient modulus values from the laboratory and field test data, a value of 8,000 psi was selected as the design subgrade resilient modulus.

Traffic Design Parameters

The following traffic design parameters were utilized for the calculation of the design Equivalent Single Axle Loads for this project:

Design Criteria	Value
Roadway Classification	Major Collector
Pavement Design Life	20 years
Design Average One-way ADT	■ Autos/Light Truck 1,858 AADT ■ Trucks 1,238 AADT
Directional Distribution Factor	57 percent
Estimated Growth Factor Percentage	1.5 percent

Design Criteria	Value
Approximate Truck Percentage	40 percent
Calculated Flexible ESALs	15,339,478

A more detailed calculation of the design ESALs is provided in **Supporting Information**.

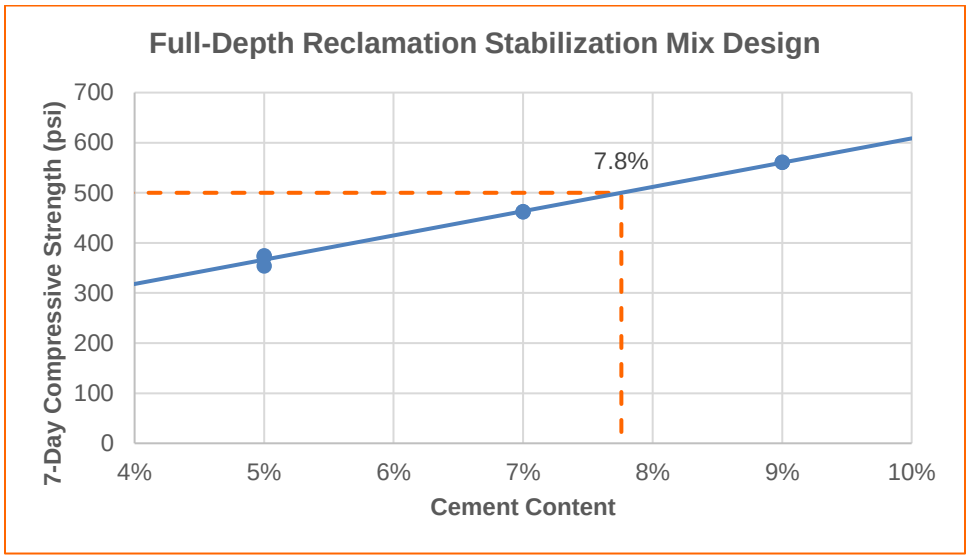
Material Design Parameters

In the AASHTO 1993 pavement design guide, the relative ability of a unit thickness of a given material to function as a structural component of the pavement is quantified by the structural layer coefficient. Recommended structural layer coefficients for various material types are provided in the ADOT Pavement Design Manual. This section discusses the selection of the layer coefficients for a full-depth reclamation layer stabilized with cement, a full-depth reclamation layer not stabilized with cement, and the asphalt surface and base course layers.

A mix design for the FDR section was performed, as described in **Exploration and Testing Procedures**, to determine the cement content required to achieve a compressive strength of 500 psi. The material used for the mix design was a composite of an approximate 48 percent subgrade materials sampled from Boring B-1 and B-2 combined with an approximate 52 asphalt millings. These proportions were based on the expected ratio of materials to be blended during the reclamation process of the pavement rehabilitation.

The structural layer coefficient for cement treated subgrades and bases, such as the cement treated full-depth reclamation layer, is correlated to the 7-day unconfined compressive strength of the layer. The results of the mix design are shown in the following table and figure:

Specimen	Cement Content	Maximum Compressive Load (lb)	7-Day Compressive Strength (psi)	Average 7-Day Compressive Strength (psi)
5a	5%	4446	354	367
5b		4680	372	
5c		4705	374	
7a	7%	5808	462	462
7b		5800	462	
9a	9%	7048	561	561
9b		7047	561	



Based on the results of the FDR stabilization mix design, we recommend a cement content of 8 percent by dry weight of soil be used in the FDR stabilized layer.

An alternative stabilization method would be to forgo the use of cement stabilization in the FDR layer. In this case, we have assumed the FDR layer to have a minimum R-value of 73.

Based on the FDR stabilization mix design, and the guidance provided in the referenced documents, the following table lists the structural layer coefficients assigned to each pavement layer.

Material Layer	Structural Layer Coefficient
Asphalt Surface Course	0.44
Asphalt Base Course	0.40
Import Recycled Aggregate Base Course	0.11
Pulverized In-Place Recycled Aggregate Base Course	0.11
Full-Depth Reclamation Stabilized with Cement	0.25

Pavement Section Thicknesses

Based on the guidance in the above referenced documents, the following pavement design parameters were utilized in the thickness design of the pavement rehabilitation for this project:

Pavement Thickness Design Parameters	
Input Parameter	**Value**
Reliability	90%
Serviceability Loss	1.5
Standard Deviation	0.45

As a minimum, we suggest the following pavement sections be considered for this project:

Full-Depth Reclamation Pavement Design Layer Thicknesses[1]			
LAYER	**Material Specification**	**Alternative A**	**Alternative B**
		Thickness (in) [1]	
Asphalt Surface	MAG 321, ½" Marshall, PG 70-22 TR+	2.5	4.0
Asphalt Base	MAG 321, ¾" Marshall PG 64-22	3.5	--
Stress Absorbing Membrane Interlayer (SAMI)	ADOT Section 410	No	Yes
Recycled Asphalt Aggregate Base	Imported RAP	6.0	--
	Pulverized In-Place RAP	6.0	--
	Cement Stabilized RAP (8 Percent Cement)	--	8.0
Existing Subbase	N/A	24.0	24.0
Total Structural Pavement Section (in.) [1]		**42.0**	**36.0**

1. The individual and total material thickness values presented herein represent minimum thickness values, not averages.
2. Recommendations regarding the material specifications for each layer are provided in the **Material Specifications** section of this report.

Detailed calculations for each of the alternative pavement thickness designs are provided in **Supporting Information**.

Pavement Drainage

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature

pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the granular base section. Appropriate sub-drainage or connection to a suitable daylight outlet should be provided to remove water from the granular subbase.

Pavement Maintenance

The pavement sections represent minimum recommended thicknesses and, as such, periodic maintenance should be anticipated. Therefore, preventive maintenance should be planned and provided for through an on-going pavement management program. Maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Maintenance consists of both localized maintenance (e.g., crack and joint sealing and patching) and global maintenance (e.g., surface sealing). Preventive maintenance is usually the priority when implementing a pavement maintenance program. Additional engineering observation is recommended to determine the type and extent of a cost-effective program. Even with periodic maintenance, some movements and related cracking may still occur and repairs may be required.

Pavement performance is affected by its surroundings. In addition to providing preventive maintenance, the civil engineer should consider the following recommendations in the design and layout of pavements:

- Final grade adjacent to paved areas should slope down from the edges at a minimum 2%.
- Subgrade and pavement surfaces should have a minimum 2% slope to promote proper surface drainage.
- Install below pavement drainage systems surrounding areas anticipated for frequent wetting.

MATERIAL SPECIFICATIONS

The use of the most current Maricopa Association of Governments (MAG) Uniform Standard Specifications and Details for Public Works Construction is recommended for all work on the project. We recommend using the Arizona Department of Transportation (ADOT) Standard Specifications for Road and bridge Construction for the SAMI and tack coat. We recommend the use of FDR102 and FDR302 specifications referenced below for the construction and quality control testing of the FDR layer. The FDR102 and FDR302 example specifications are included as attachments to this report in the **Supporting Information** section. Terracon has developed a special provision for the pulverization construction process and the material requirements of the reclaimed layer and imported RAP material (for Pavement Alternative B). The Reclaimed Asphalt Layer Special Provision is included as an attachment to this report in the **Supporting Information** section. Recommended changes to these specifications as outlined in the following table should be included in the specific specifications or special provisions for the project.

MAG Spec.	ADOT Spec.	Specification Title	Comments/Recommendations
--	404 - 3.06	Application of Cover Material	Class 1 cover material applied at a rate of approximately 0.014 cubic yards per square yard
--	404 - 3.12	Tack Coat	The Tack Coat should meet the requirements for Emulsified Asphalt Anionic Slow Set (SS-1) in ADOT Specification 1005.
--	410	Asphalt Rubber Stress-Absorbing Membrane Interlayer	CRA Type 2 PG 58-22 in accordance with ADOT Section 1009.
321	--	Placement and Construction of Asphalt Concrete Pavement	The gradations should be ½ inch for the asphalt surface course and ¾ inch for the asphalt base course.
710	--	Asphalt Concrete	The PG Binder grade should be PG 70-22 TR+ for the surface course. The PG Binder grade for the base course should be PG 64-22.
--	1005	Asphalt Cement	The Tack Coat should meet the requirements for Emulsified Asphalt Anionic Slow Set (SS-1).
--	1009	Asphalt Rubber Material	Meeting the requirements of gradation Type A and CRA Type 2.
--	--	FDR102[1,3]	The addition of corrective aggregate may be required to bring the pulverized material into conformance with the gradation specifications. The need for the addition of corrective aggregate in the FDR layer should be assessed at the time of construction where the variations in the subsurface materials will be more apparent.
--	--	FDR302[2,3]	The dry density of the FDR layer should be tested using ASTM D6938 with moisture content periodically corrected in accordance with AASHTO T-217. The FDR layer should be compacted to a density of at least 95 percent of ASTM D698. Additionally, compressive strength of the FDR layer should be tested a minimum of twice per day using Arizona ARIZ-241. Strength specimens should be compacted onsite and protected

MAG Spec.	ADOT Spec.	Specification Title	Comments/Recommendations
			from moisture loss or disturbance by any practical means. Specimens should be kept in this manner on site for 18-24 hours inside a hard-outer shelled container that will protect the specimens from external environmental elements. The specimens should be carefully transported to the laboratory for moist curing after this initial 18-24 hour cure.
--	--	Reclaimed Asphalt Special Provision	Included as an attachment to this report in the **Supporting Information** section.

1. "Recommended Construction Guidelines for Full Depth Reclamation (FDR) Using Cementitious Stabilization FDR102", published by the Asphalt Recycling & Reclaiming Association, revised September 12, 2017.
2. "Recommended Quality Control Sampling and Testing Guidelines for Full Depth Reclamation Using Cementitious Stabilizing Agents FDR302", published by the Asphalt Recycling & Reclaiming Association, revised September 12, 2017.
3. FDR102 and FDR302 are included in the **Supporting Information** section.

The construction should be monitored under the direction of the Geotechnical Engineer. Monitoring should include documentation of the pulverization, moisture conditioning, placement of cement, compaction of the reclaimed asphalt layer, application of the SAMI, and placement and compaction of the asphalt concrete.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical/Pavement Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical/Pavement Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

GENERAL COMMENTS

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical/Pavement Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client, and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

ATTACHMENTS

PHOTOGRAPHY LOG

Photo 1 Poorly performing asphalt patch near high severity alligator cracking looking north from southbound lane near entrance to aggregate pit

Photo 2 Medium severity alligator cracking looking south from southbound lane

Photo 3 High severity alligator cracking in northern portion of alignment with isolated patching

Photo 4 Medium to high severity alligator cracking in northbound lane near the church

Photo 5 Recent utility patch

Photo 6 Test Pit 1

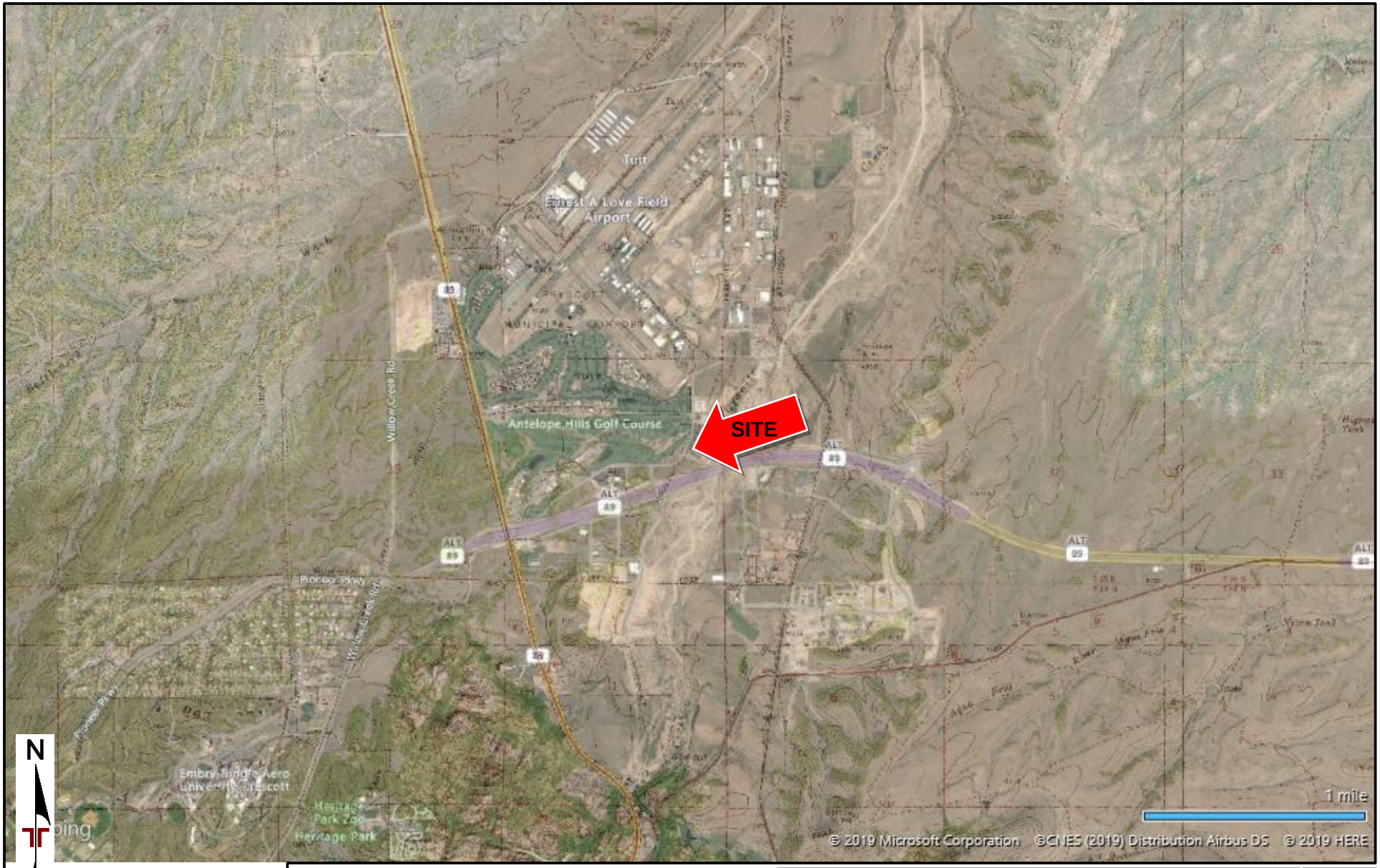
SITE LOCATION AND EXPLORATION PLANS

Contents:

Site Location Plan

Exploration Plan

Note: All attachments are one page unless noted above.



N

TOPOGRAPHIC MAP IMAGE COURTESY OF THE U.S. GEOLOGICAL SURVEY QUADRANGLES INCLUDE: CHINO VALLEY SOUTH, AZ (1/1/1973) and PRESCOTT, AZ (1/1/1973).

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Manager:	KDJ
Drawn by:	KDJ
Checked by:	DRC
Approved by:	DRC

Project No.	65195185
Scale:	1"=2,000'
File Name:	NA
Date:	10/24/2019

Terracon

4685 S Ash Ave, Ste H-4

Tempe, AZ 85282-6767

SITE LOCATION

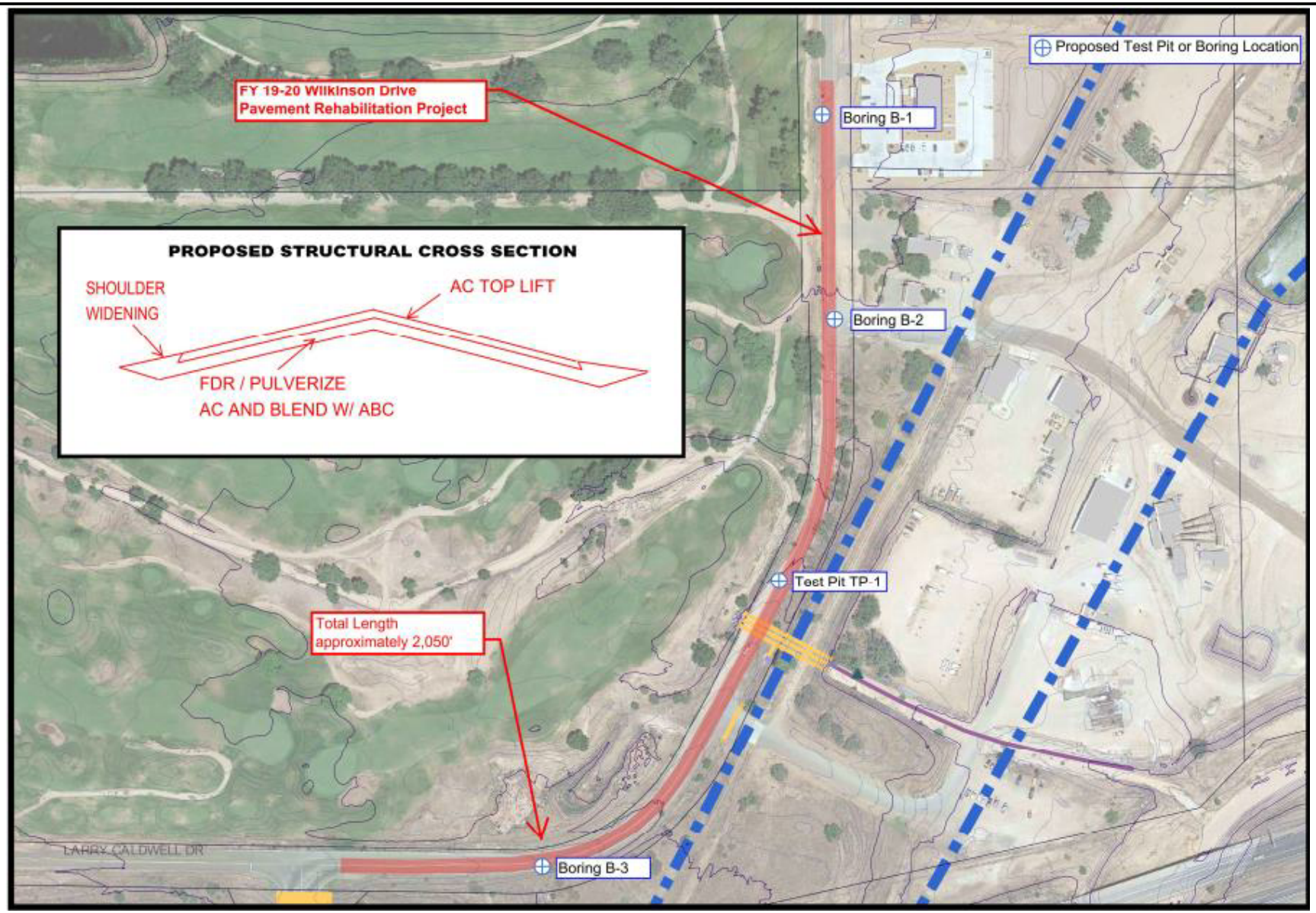
Wilkinson Pavement Rehabilitation

N Wilkinson Dr

Prescott, AZ

Exhibit

A-1



AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Manager: KDJ	Project No. 65195185
Drawn by: KDJ	Scale: AS SHOWN
Checked by: DRC	File Name: NA
Approved by: DRC	Date: 10/24/2019

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ 85282-6767

EXPLORATION PLAN

Wilkinson Pavement Rehabilitation
N Wilkinson Dr
Prescott, AZ

Exhibit
A-2

EXPLORATION RESULTS

Contents:

Boring Logs (B-1 through B-3)

Test Pit Log (TP-1)

Atterberg Limits

Grain Size Distribution (3 pages)

Moisture Density Relationship (2 pages)

R-Value

Summary of Laboratory Results

Dynamic Cone Penetrometer Results (3 pages)

Note: All attachments are one page unless noted above.

BORING LOG NO. B-1

PROJECT: Wilkinson Pavement Rehabilitation

CLIENT: City of Prescott AZ
Prescott, AZ

SITE: N Wilkinson Dr
Prescott, AZ

LOCATION See Exploration Plan

Latitude: 34.6405° Longitude: -112.4146°

GRAPHIC LOG	DEPTH		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	DRY DENSITY (ASTM D6938)	WATER CONTENT (ASTM D6938)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		ASPHALT, 6 1/2" Asphalt Concrete									
	0.5	**FILL - CLAYEY SAND WITH GRAVEL (SC)**, fine grained gravel, subrounded gravel, brown, medium dense									
	2.5	**SANDY LEAN CLAY (CL)**, fine grained sand, brown, stiff								28-13-15	61
	4.0	**CLAYEY SAND (SC)**, fine grained sand, brown, medium dense									
	5.0	***Boring Terminated at 5 Feet***	5								

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:

Abandonment Method:

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Boring Started:

Boring Completed:

Drill Rig:

Driller:

Project No.: 65195185

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 65195185 WILKINSON PAVEMEN.GPJ TERRACON_DATATEMPLATE.GDT 10/30/19

BORING LOG NO. B-2

PROJECT: Wilkinson Pavement Rehabilitation

CLIENT: City of Prescott AZ
Prescott, AZ

SITE: N Wilkinson Dr
Prescott, AZ

LOCATION See Exploration Plan

Latitude: 34.6394° Longitude: -112.4145°

GRAPHIC LOG	DEPTH		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	DRY DENSITY (ASTM D6938)	WATER CONTENT (ASTM D6938)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		ASPHALT, 6 1/2" Asphalt Concrete									
	0.5	**FILL - AGGREGATE SUBBASE COURSE**, tan, medium dense, Aggregate Subbase Course and/or Subbase Course									
	3.0	**CLAYEY SAND (SC)**, subrounded gravel, medium dense, trace fine gravel								34-15-19	28
	5.0	***Boring Terminated at 5 Feet***	5								

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:

Abandonment Method:

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Boring Started:

Boring Completed:

Drill Rig:

Driller:

Project No.: 65195185

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 65195185 WILKINSON PAVEMEN.GPJ TERRACON_DATATEMPLATE.GDT 10/30/19

BORING LOG NO. B-3

PROJECT: Wilkinson Pavement Rehabilitation

CLIENT: City of Prescott AZ
Prescott, AZ

SITE: N Wilkinson Dr
Prescott, AZ

LOCATION See Exploration Plan

Latitude: 34.6367° Longitude: -112.4163°

DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	DRY DENSITY (ASTM D6938)	WATER CONTENT (ASTM D6938)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
ASPHALT, 5" Asphalt Concrete									
0.4 **AGGREGATE SUBBASE COURSE**, tan, medium dense, Aggregate Subbase Course and/or Subbase Course									
1.0 **FILL - SILTY CLAYEY SAND WITH GRAVEL (SC-SM)**, medium to coarse sand, fine gravel, tan, medium dense, Subbase Course									
3.5 **CLAYEY SAND (SC)**, subrounded gravel, brown, medium dense, trace fine gravel								30-16-14	25
5.0 ***Boring Terminated at 5 Feet***	5								

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:

Abandonment Method:

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Boring Started:

Boring Completed:

Drill Rig:

Driller:

Project No.: 65195185

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 65195185 WILKINSON PAVEMEN.GPJ TERRACON_DATATEMPLATE.GDT 10/30/19

TEST PIT LOG NO. TP-1

PROJECT: Wilkinson Pavement Rehabilitation

CLIENT: City of Prescott AZ
Prescott, AZ

SITE: N Wilkinson Dr
Prescott, AZ

LOCATION See Exploration Plan

Latitude: 34.6381° Longitude: -112.4148°

GRAPHIC LOG	DEPTH		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	DRY DENSITY (ASTM D6938)	WATER CONTENT (ASTM D6938)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		ASPHALT, 6 1/2" Asphalt Concrete									
	0.5	**FILL - AGGREGATE SUBBASE COURSE**, tan, medium dense, Aggregate Subbase Course and/or Subbase Course					131.4	4.0		21-18-3	19
	2.0	**FILL - SILTY CLAYEY SAND WITH GRAVEL (SC-SM)**, medium to coarse sand, fine gravel, tan, medium dense, Possible Subbase Course					129.5	5.1		25-18-7	16
							128.3	11.1			
							109.3	16.4			
			5								
	6.0	***Test Pit Terminated at 6 Feet***									

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:

Abandonment Method:

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Test Pit Started:

Test Pit Completed:

Excavator:

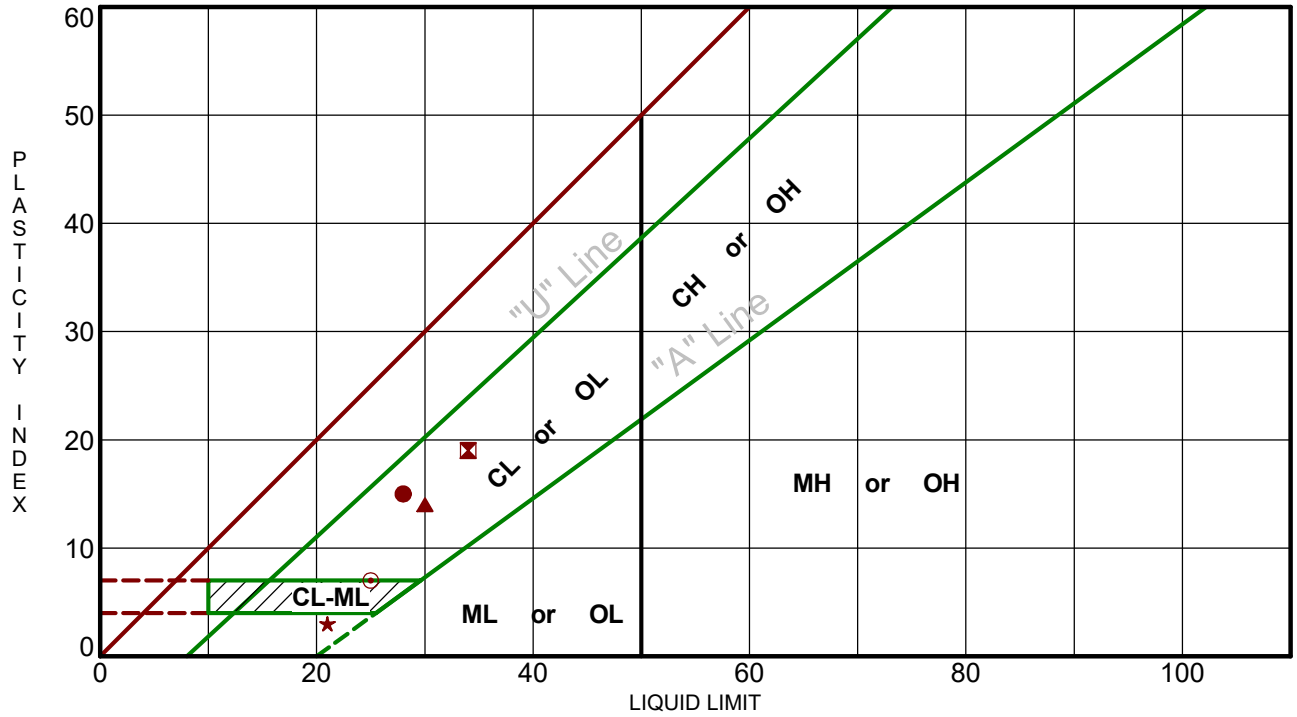
Operator:

Project No.: 65195185

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 65195185 WILKINSON PAVEMEN.GPJ TERRACON_DATATEMPLATE.GDT 10/30/19

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID		Depth	LL	PL	PI	Fines	USCS	Description
●	B-1	2.5 - 4	28	13	15	61	CL	SANDY LEAN CLAY
⊠	B-2	3.5 - 5	34	15	19	28	SC	CLAYEY SAND
▲	B-3	3.5 - 5	30	16	14	25	SC	CLAYEY SAND
★	TP-1	1 - 2	21	18	3	19	SM	SILTY SAND with GRAVEL
⊙	TP-1	2 - 4	25	18	7	16	SC-SM	SILTY, CLAYEY SAND with GRAVEL

PROJECT: Wilkinson Pavement Rehabilitation

SITE: N Wilkinson Dr
Prescott, AZ

Terracon
4685 S Ash Ave Ste H-4
Tempe, AZ

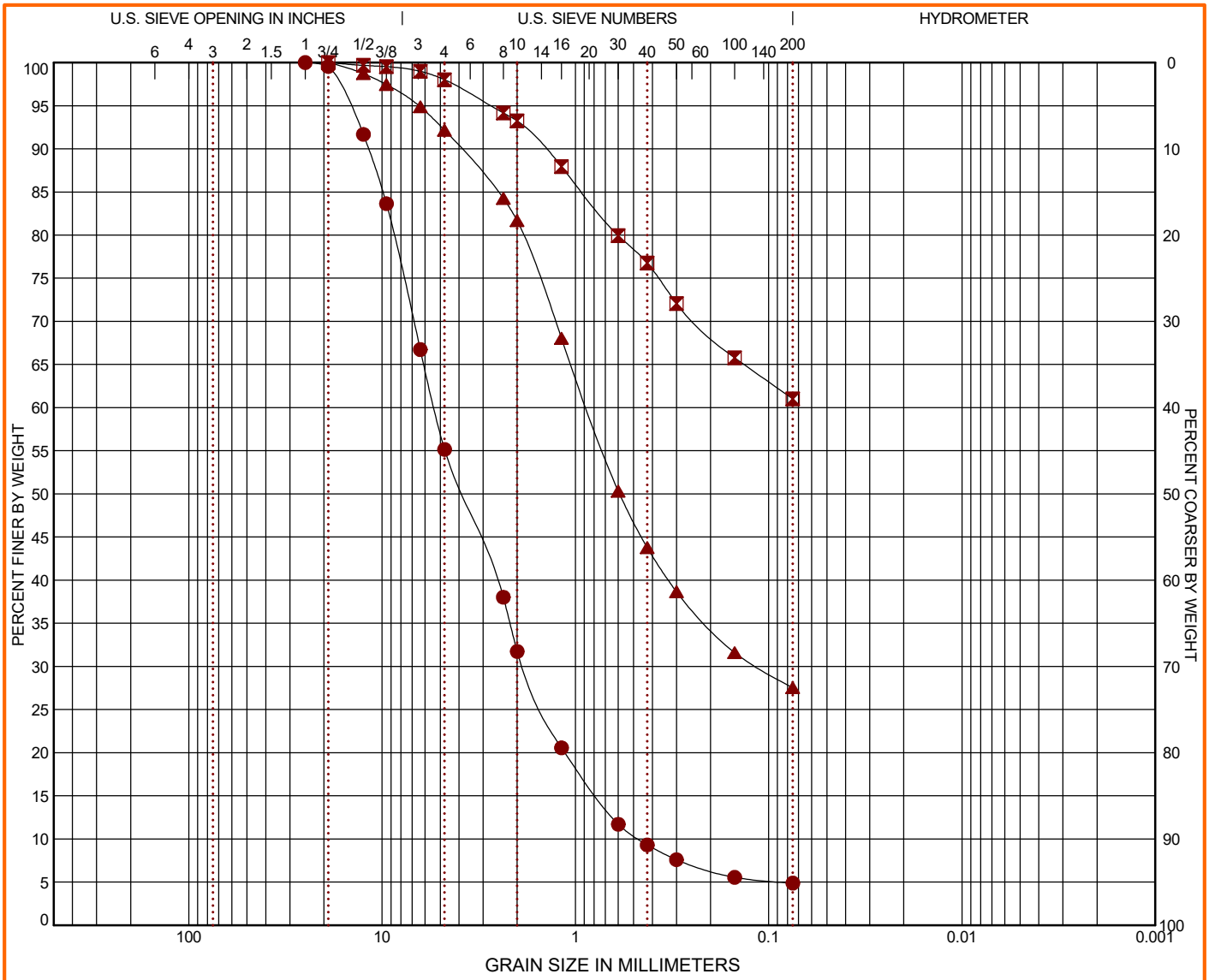
PROJECT NUMBER: 65195185

CLIENT: City of Prescott AZ
Prescott, AZ

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ATTERBERG LIMITS 65195185 WILKINSON PAVEMEN.GPJ TERRACON_DATATEMPLATE.GDT 10/23/19

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
●	AS-1	1 - 2	0.0	44.8	50.3		4.9		SW
⊠	B-1	2.5 - 4	0.0	2.0	37.0		61.0		CL
▲	B-2	3.5 - 5	0.0	7.8	64.6		27.5		SC

GRAIN SIZE

	●	⊠	▲
D_{60}	5.364		0.868
D_{30}	1.842		0.114
D_{10}	0.469		

COEFFICIENTS

	●	⊠	▲
C_C	1.35		
C_U	11.43		

●		⊠		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
1"	100.0	3/4"	100.0	3/4"	100.0
3/4"	99.53	1/2"	99.67	1/2"	98.72
1/2"	91.67	3/8"	99.52	3/8"	97.45
3/8"	83.64	1/4"	98.98	1/4"	94.88
1/4"	66.73	#4	98.01	#4	92.16
#4	55.15	#8	94.16	#8	84.26
#8	38.02	#10	93.24	#10	81.66
#10	31.74	#16	87.94	#16	68.03
#16	20.57	#30	79.92	#30	50.32
#30	11.71	#40	76.77	#40	43.78
#40	9.31	#50	72.07	#50	38.66
#50	7.6	#100	65.78	#100	31.61
#100	5.56	#200	61.01	#200	27.54
#200	4.89				

SOIL DESCRIPTION

●	Recycled Asphalt Pavement Millings
⊠	A-6 (6)
▲	A-2-6 (1)

REMARKS

●	
⊠	
▲	

PROJECT: Wilkinson Pavement Rehabilitation

SITE: N Wilkinson Dr
Prescott, AZ

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

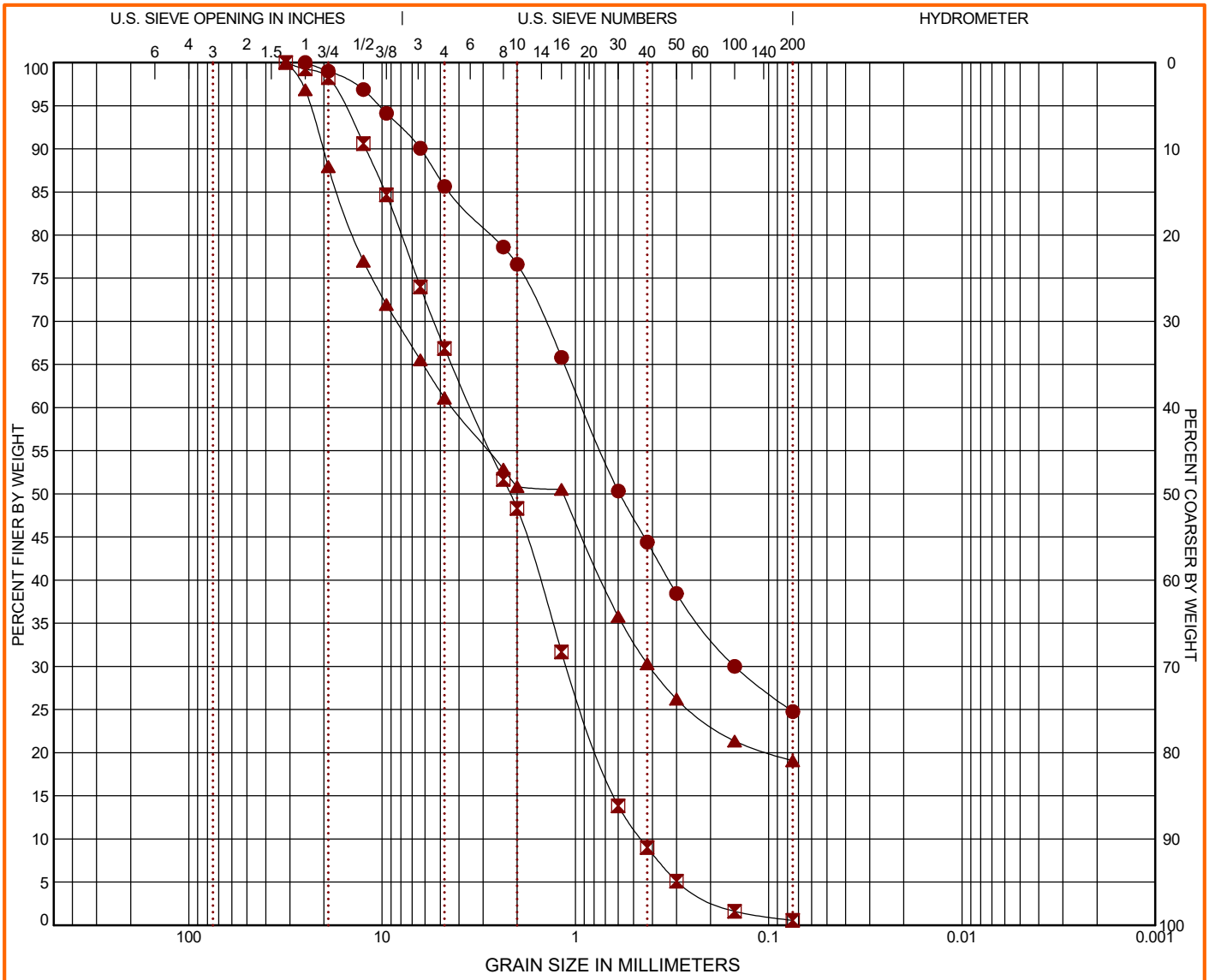
PROJECT NUMBER: 65195185

CLIENT: City of Prescott AZ
Prescott, AZ

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 65195185 WILKINSON PAVEMEN.GPJ TERRACON_DATATEMPLATE.GDT 10/31/19

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

							% FINES	% CLAY	USCS
●	B-3	3.5 - 5	0.0	14.4	60.9		24.8		SC
⊠	Composite	1 - 3	0.0	33.1	66.3		0.6		SP
▲	TP-1	1 - 2	0.0	38.9	42.1		19.1		SM

GRAIN SIZE

	●	⊠	▲
D_{60}	0.915	3.461	4.32
D_{30}	0.15	1.108	0.414
D_{10}		0.456	

COEFFICIENTS

	●	⊠	▲
C_C		0.78	
C_U		7.59	

● % Finer		⊠		▲	
1"	100.0	1 1/4"	100.0	1 1/4"	100.0
3/4"	99.0	1"	99.26	1"	96.84
1/2"	96.87	3/4"	98.24	3/4"	87.94
3/8"	94.12	1/2"	90.61	1/2"	76.99
1/4"	90.06	3/8"	84.68	3/8"	71.95
#4	85.65	1/4"	74.0	1/4"	65.54
#8	78.61	#4	66.87	#4	61.12
#10	76.61	#8	51.7	#8	52.87
#16	65.82	#10	48.32	#10	50.84
#30	50.33	#16	31.67	#16	50.52
#40	44.41	#30	13.84	#30	35.79
#50	38.46	#40	9.01	#40	30.31
#100	30.01	#50	5.12	#50	26.22
#200	24.77	#100	1.61	#100	21.35
		#200	0.57	#200	19.06

SOIL DESCRIPTION

●	A-2-6 (0)
⊠	
▲	A-1-b (0)

REMARKS

●	
⊠	
▲	

PROJECT: Wilkinson Pavement Rehabilitation

SITE: N Wilkinson Dr
Prescott, AZ

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

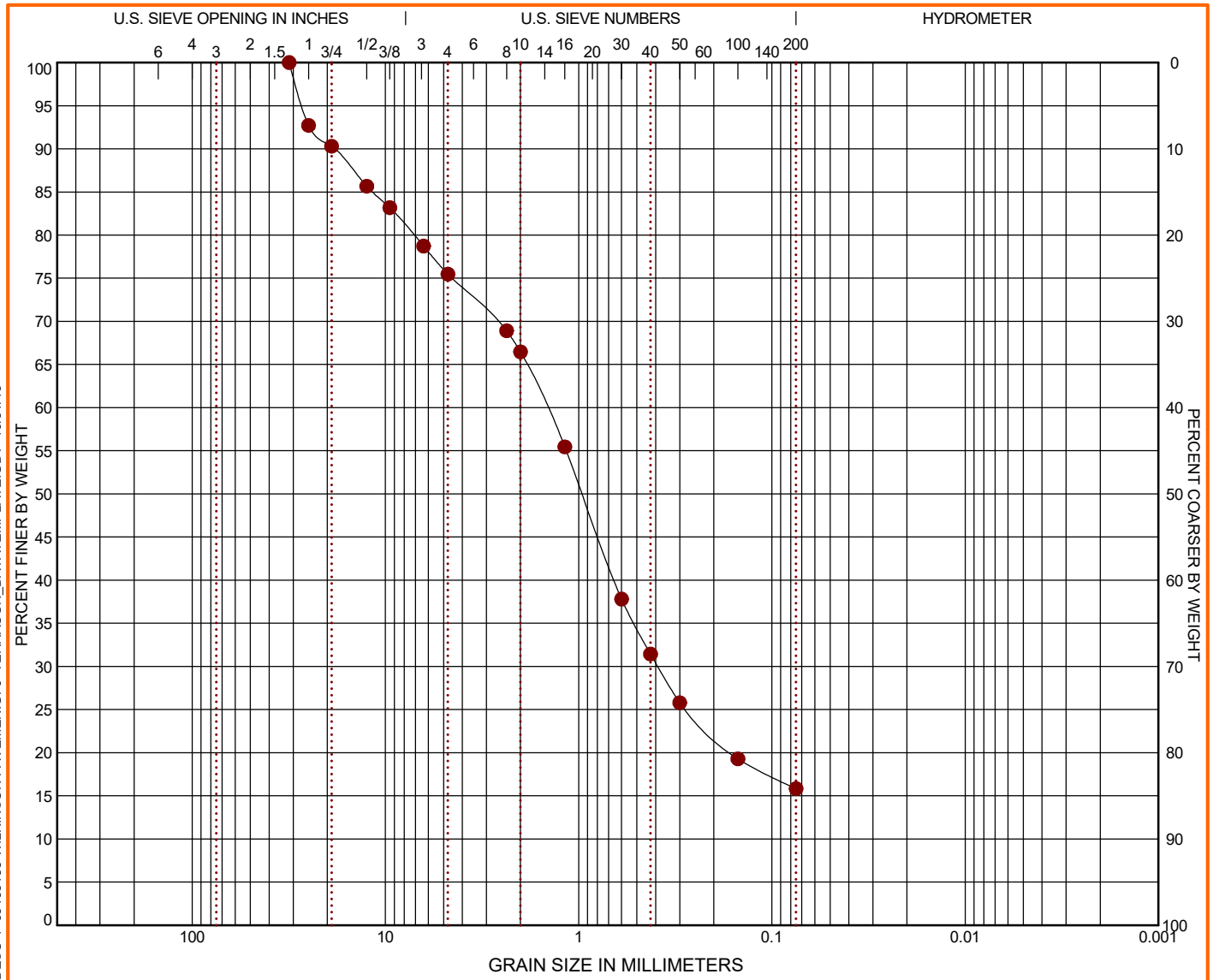
PROJECT NUMBER: 65195185

CLIENT: City of Prescott AZ
Prescott, AZ

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 65195185 WILKINSON PAVEMEN.GPJ TERRACON_DATATEMPLATE.GDT 10/31/19

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
●	TP-1	2 - 4	0.0	24.5	59.6		15.8		SC-SM

GRAIN SIZE			
	●		
D_{60}	1.467		
D_{30}	0.389		
D_{10}			

COEFFICIENTS			
	●		
C_C			
C_U			

●					
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
1 1/4"	100.0				
1"	92.71				
3/4"	90.3				
1/2"	85.66				
3/8"	83.18				
1/4"	78.73				
#4	75.47				
#8	68.91				
#10	66.47				
#16	55.45				
#30	37.81				
#40	31.44				
#50	25.79				
#100	19.29				
#200	15.84				

SOIL DESCRIPTION
● A-2-4 (0)

REMARKS
●

PROJECT: Wilkinson Pavement Rehabilitation

SITE: N Wilkinson Dr
Prescott, AZ

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

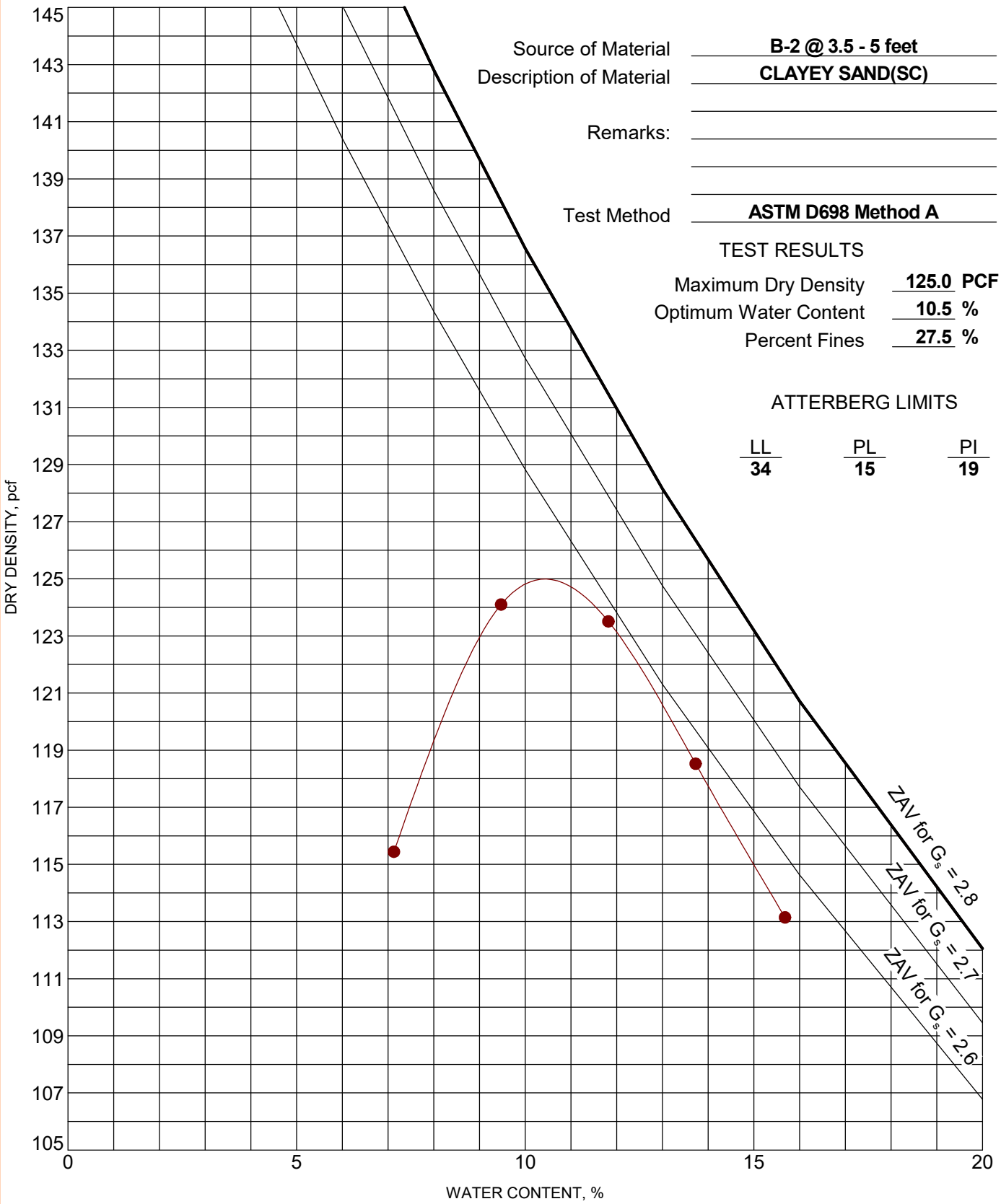
PROJECT NUMBER: 65195185

CLIENT: City of Prescott AZ
Prescott, AZ

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 65195185 WILKINSON PAVEMEN.GPJ TERRACON_DATATEMPLATE.GDT 10/31/19

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**B-2 @ 3.5 - 5 feet**
Description of Material	**CLAYEY SAND(SC)**
Remarks:	
Test Method	**ASTM D698 Method A**

TEST RESULTS

Maximum Dry Density	**125.0**	**PCF**
Optimum Water Content	**10.5**	**%**
Percent Fines	**27.5**	**%**

ATTERBERG LIMITS

LL	PL	PI
34	**15**	**19**

PROJECT: Wilkinson Pavement Rehabilitation

PROJECT NUMBER: 65195185

SITE: N Wilkinson Dr
Prescott, AZ

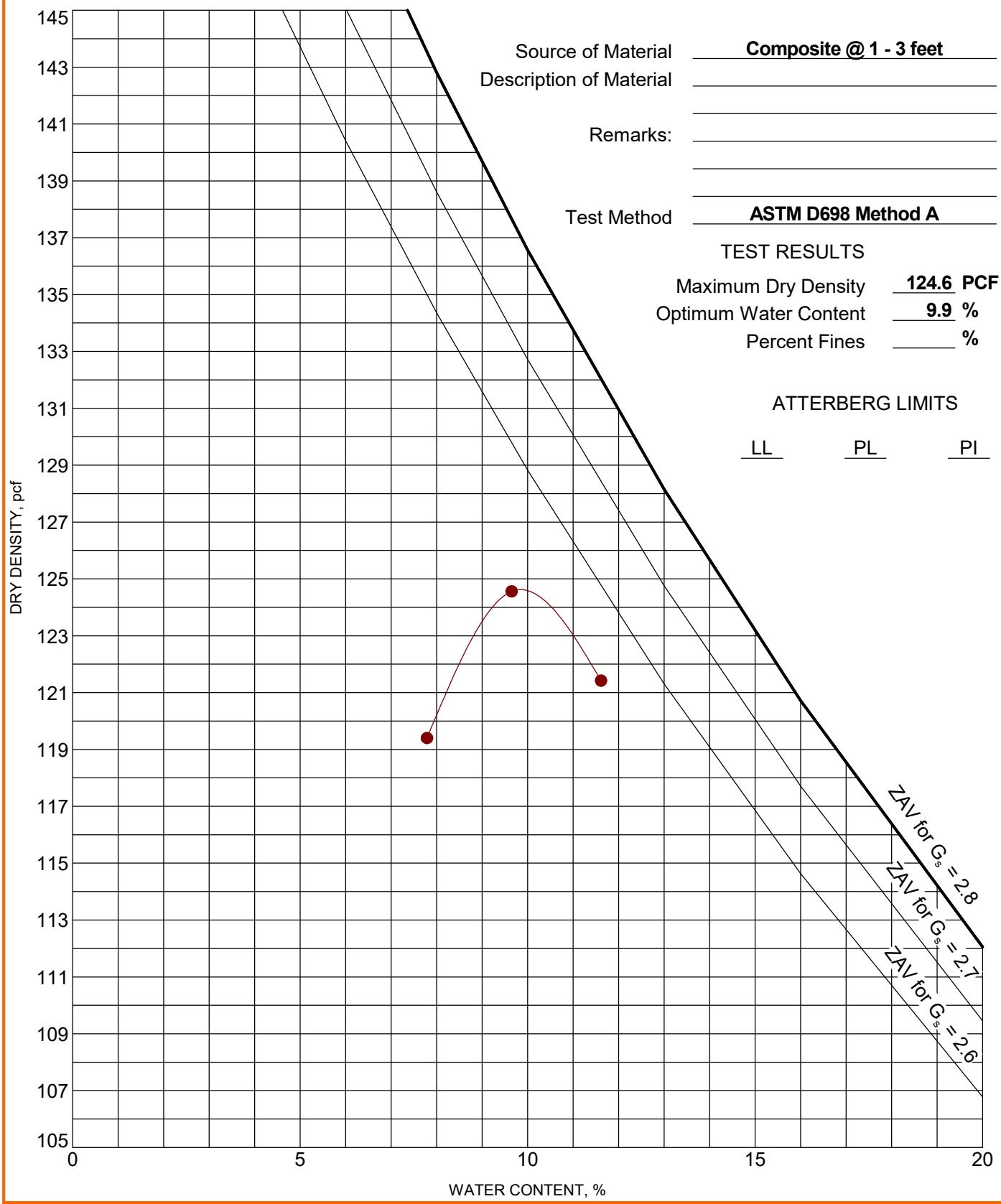
Terracon
4685 S Ash Ave Ste H-4
Tempe, AZ

CLIENT: City of Prescott AZ
Prescott, AZ

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTION - V1 65195185 WILKINSON PAVEMEN.GPJ TERRACON_DATATEMPLATE.GDT 10/23/19

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material: **Composite @ 1 - 3 feet**

Description of Material:

Remarks:

Test Method: **ASTM D698 Method A**

TEST RESULTS

Maximum Dry Density	**124.6**	**PCF**
Optimum Water Content	**9.9**	**%**
Percent Fines		**%**

ATTERBERG LIMITS

LL	PL	PI

PROJECT: Wilkinson Pavement Rehabilitation

SITE: N Wilkinson Dr
Prescott, AZ

Terracon
4685 S Ash Ave Ste H-4
Tempe, AZ

PROJECT NUMBER: 65195185

CLIENT: City of Prescott AZ
Prescott, AZ

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTION - V1 65195185 WILKINSON PAVEMEN.GPJ TERRACON_DATATEMPLATE.GDT 10/23/19

SUMMARY OF LABORATORY RESULTS

Borehole No.	Depth (ft.)	USCS Soil Class.	In-Situ Properties		Classification				Expansion Testing					Corrosivity				Remarks
			Dry Density (pcf)	Water Content (%)	Passing #200 Sieve (%)	Atterberg Limits			Dry Density (pcf)	Water Content (%)	Surcharge (psf)	Expansion (%)	Expansion Index EI_{50}	pH	Resistivity (ohm-cm)	Sulfates (ppm)	Chlorides (ppm)	
						LL	PL	PI										
AS-1	1.0 - 2.0	SW			5													
B-1	2.5 - 4.0	CL			61	28	13	15										
B-2	3.5 - 5.0	SC			28	34	15	19	119	8.5	100	0.6						
B-3	3.5 - 5.0	SC			25	30	16	14										
TP-1	1.0 - 2.0	SM			19	21	18	3										
TP-1	2.0 - 4.0	SC-SM			16	25	18	7										

REMARKS

1. Dry Density and/or moisture determined from one or more rings of a multi-ring sample.
2. Visual Classification.
3. Submerged to approximate saturation.
4. Expansion Index in accordance with ASTM D4829-95.
5. Air-Dried Sample

PROJECT: Wilkinson Pavement Rehabilitation

SITE: N Wilkinson Dr
Prescott, AZ

Terracon
4685 S Ash Ave Ste H-4
Tempe, AZ
PH. 480-897-8200 FAX. 480-897-1133

PROJECT NUMBER: 65195185

CLIENT: City of Prescott AZ
Prescott, AZ

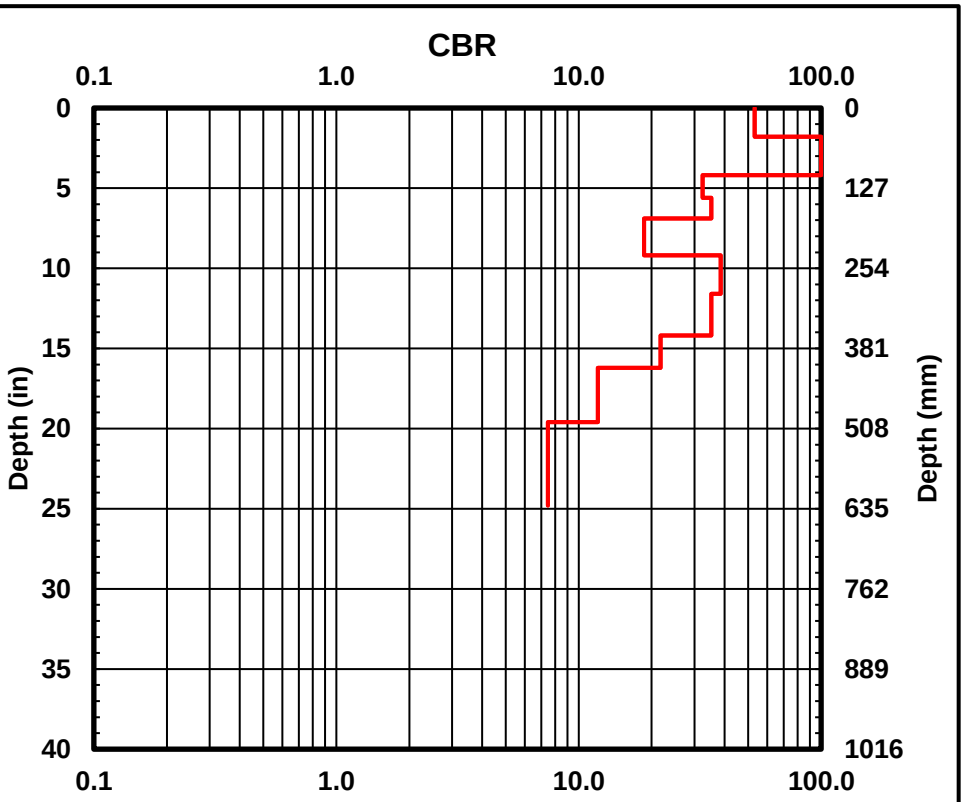
THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. SOIL PROPERTIES 2 65195185 WILKINSON PAVEMEN.GPJ TERRACON_DATATEMPLATE.GDT 10/23/19

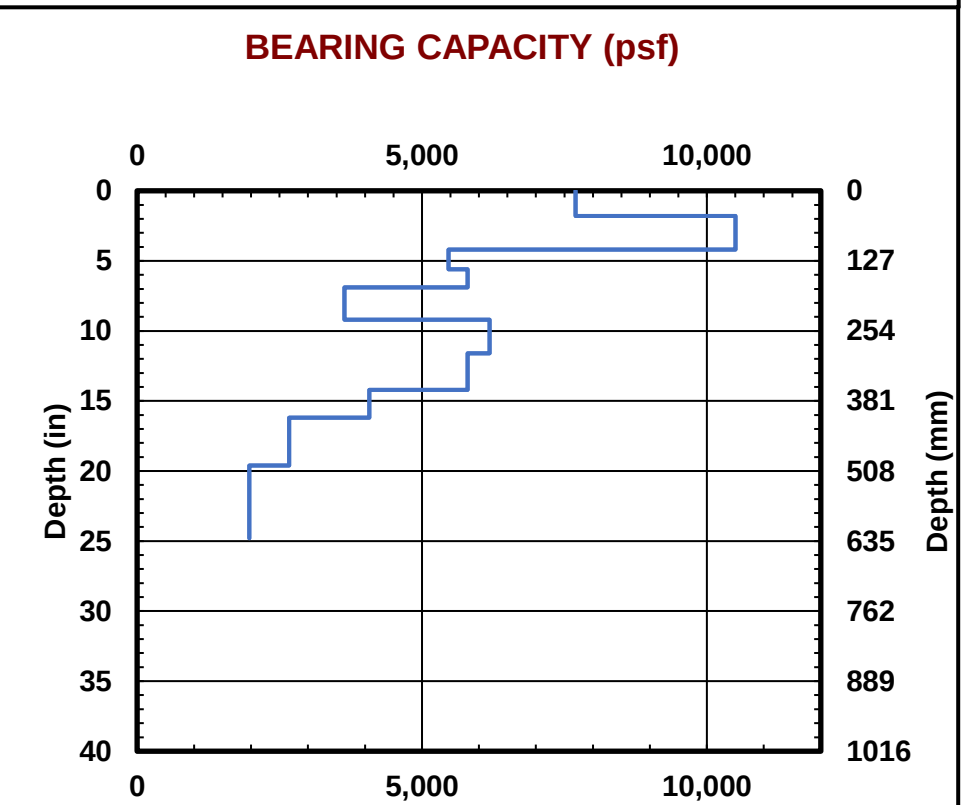
DYNAMIC CONE PENETROMETER RESULTS

Project:	65195185
Location:	B-1
Date:	8/30/2019

Hammer Type:	Dual Mass (17.6 lbs)
Subgrade Soil Type:	Other (Not CL or CH)

No. of Blows	Reading (mm)	Cum. Pen. (mm)
0	302	0
10	348	46
10	368	66
10	386	84
10	409	107
5	445	142
5	478	175
5	536	234
5	566	264
5	597	295
5	630	328
5	663	361
5	714	411
5	800	498
5	932	630



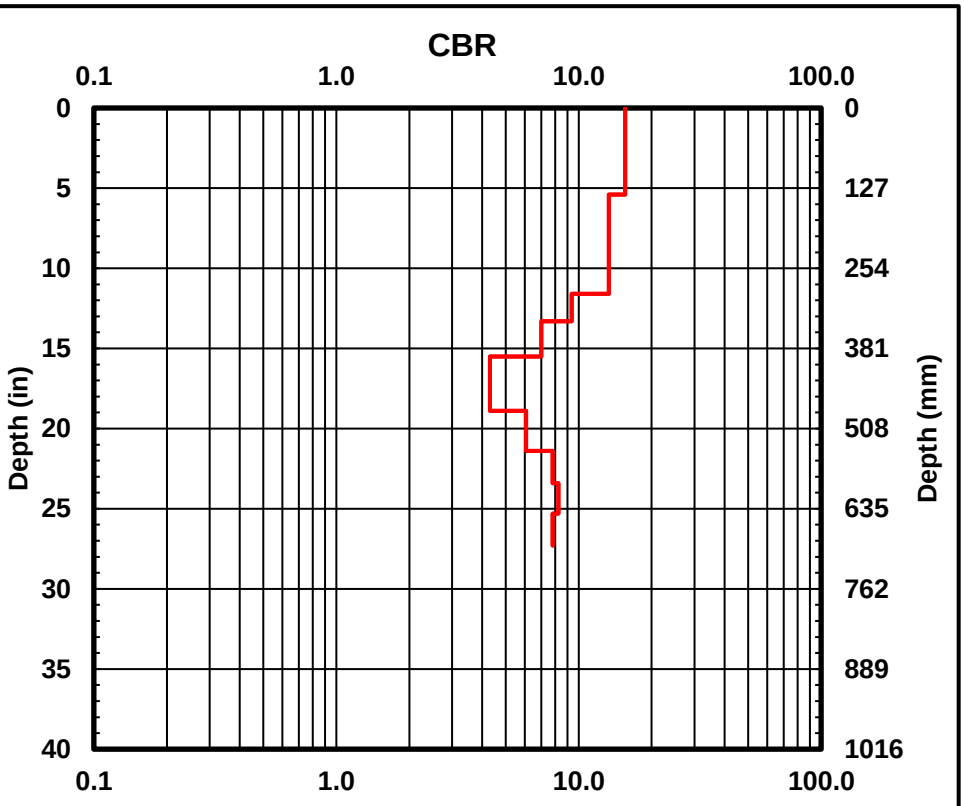


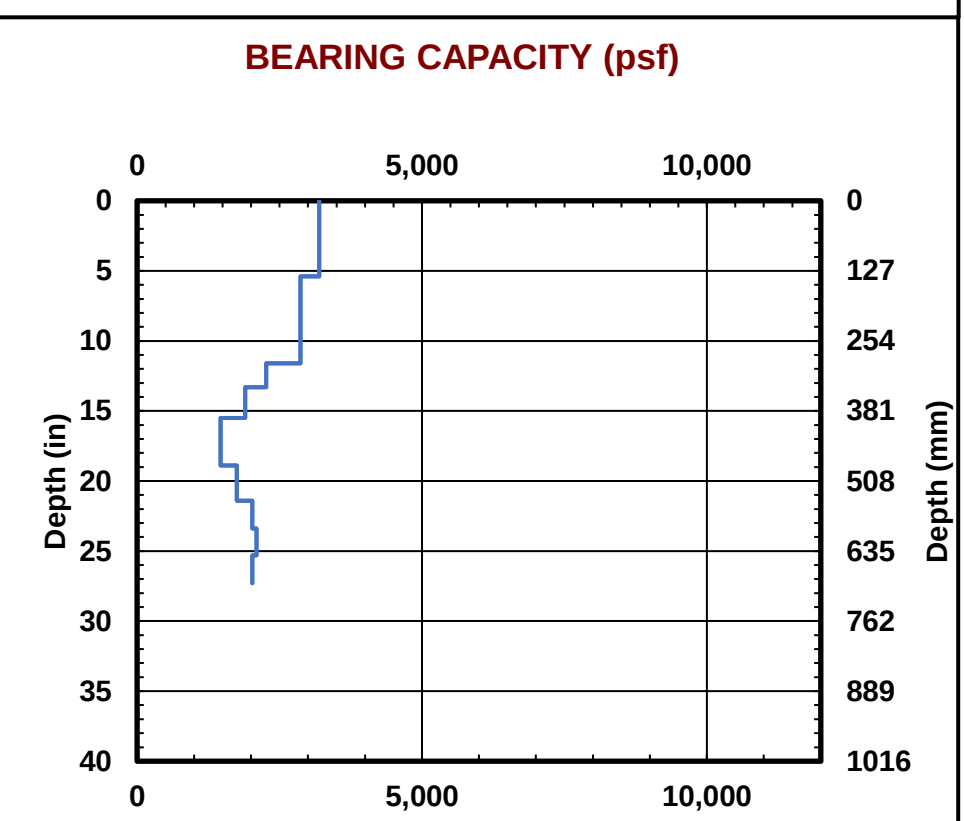
DYNAMIC CONE PENETROMETER RESULTS

Project:	65195185
Location:	B-2
Date:	8/30/2019

Hammer Type:	Dual Mass (17.6 lbs)
Subgrade Soil Type:	Other (Not CL or CH)

No. of Blows	Reading (mm)	Cum. Pen. (mm)
0	231	0
10	368	137
10	526	295
2	569	338
2	625	394
2	711	480
2	775	544
2	826	594
2	874	643
2	925	693



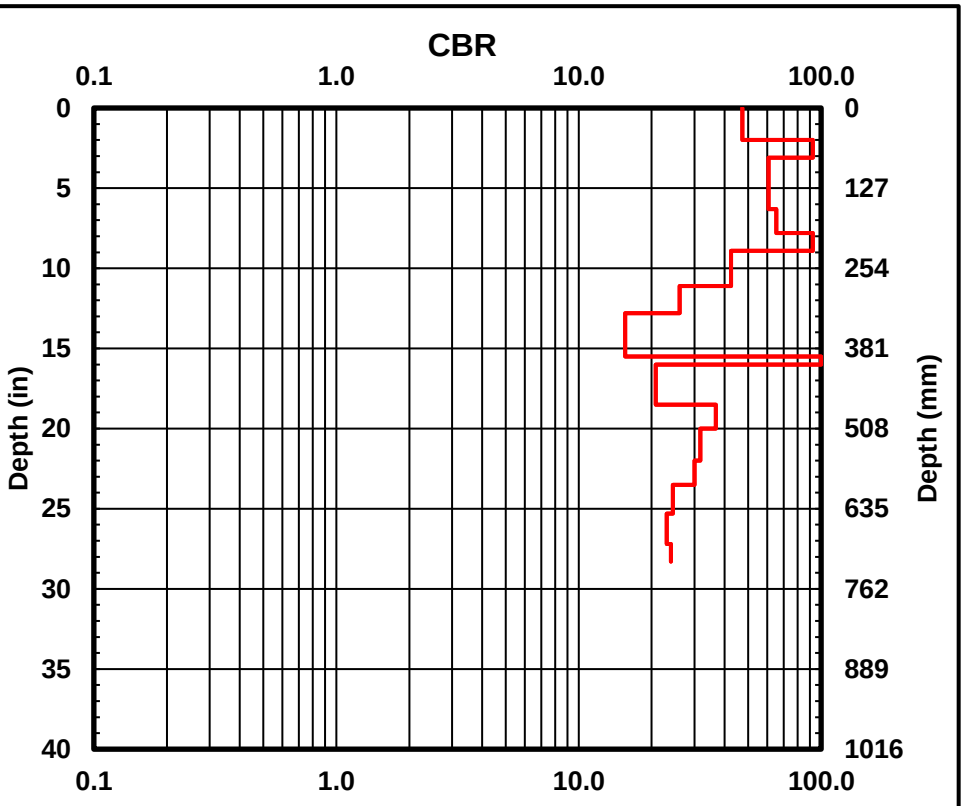


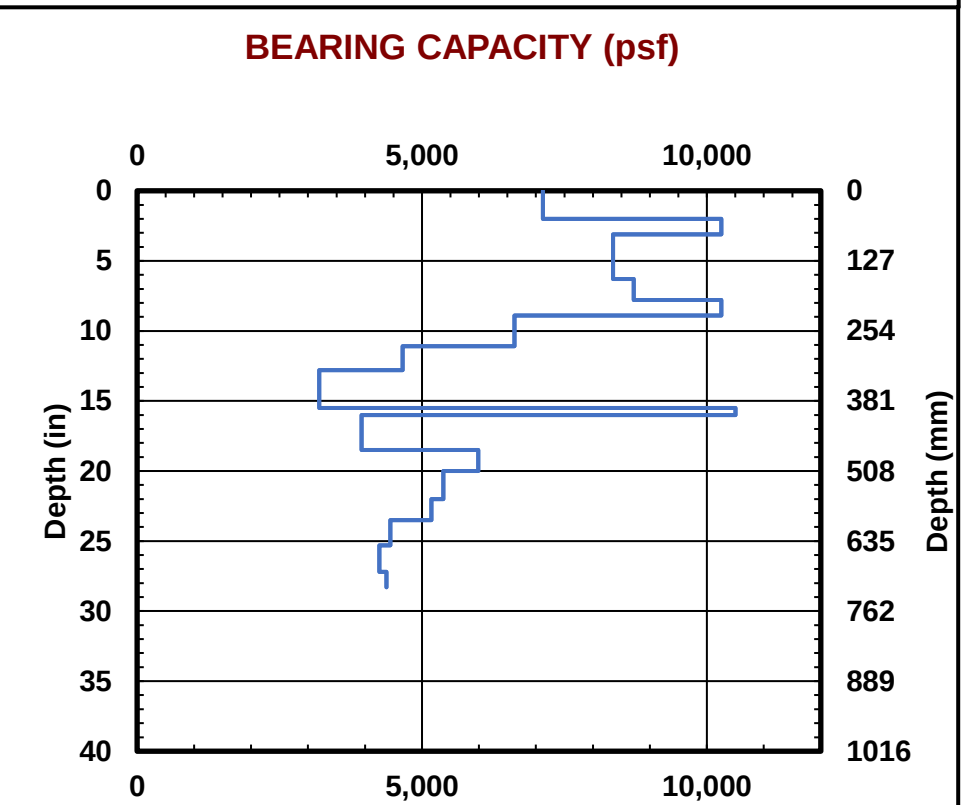
DYNAMIC CONE PENETROMETER RESULTS

Project:	65191070 Bagdad Airport
Location:	B-3
Date:	8/20/2019

Hammer Type:	Dual Mass (17.6 lbs)
Subgrade Soil Type:	Other (Not CL or CH)

No. of Blows	Reading (mm)	Cum. Pen. (mm)
0	229	0
10	279	51
10	307	79
10	348	119
10	389	160
10	427	198
10	455	226
10	511	282
5	554	325
5	622	394
5	635	406
6	699	470
6	737	508
7	787	559
5	826	597
5	871	643
5	919	691
3	947	719





SUPPORTING INFORMATION

Contents:

General Notes

Unified Soil Classification System

AASTHO 1993 ESAL Calculations for Flexible Pavements

Pavement Design Alternative A

Pavement Design Alternative B

Recommended Construction Guidelines for Full Depth Reclamation (FDR) Using Cementitious Stabilization FDR102 (11 pages)

Recommended Quality Control Sampling and Testing Guidelines for Full Depth Reclamation Using Cementitious Stabilizing Agents FDR302 (11 pages)

Special Provision: Recycled Asphalt Pavement Aggregate Base Course (4 pages)

Note: All attachments are one page unless noted above.

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

Wilkinson Pavement Rehabilitation ■ Prescott, AZ

10/23/2019 ■ Terracon Project No. 65195185

SAMPLING	WATER LEVEL	FIELD TESTS
Auger Cuttings	**Water Initially Encountered** **Water Level After a Specified Period of Time** **Water Level After a Specified Period of Time** Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	**N** Standard Penetration Test Resistance (Blows/Ft.) **(HP)** Hand Penetrometer **(T)** Torvane **(DCP)** Dynamic Cone Penetrometer **UC** Unconfined Compressive Strength **(PID)** Photo-Ionization Detector **(OVA)** Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength Qu, (psf)**	**Standard Penetration or N-Value Blows/Ft.**
Very Loose	0 - 3	Very Soft	less than 500	0 - 1
Loose	4 - 9	Soft	500 to 1,000	2 - 4
Medium Dense	10 - 29	Medium Stiff	1,000 to 2,000	4 - 8
Dense	30 - 50	Stiff	2,000 to 4,000	8 - 15
Very Dense	> 50	Very Stiff	4,000 to 8,000	15 - 30
		Hard	> 8,000	> 30

RELATIVE PROPORTIONS OF SAND AND GRAVEL		RELATIVE PROPORTIONS OF FINES	
Descriptive Term(s) of other constituents	Percent of Dry Weight	**Descriptive Term(s) of other constituents**	**Percent of Dry Weight**
Trace	<15	Trace	<5
With	15-29	With	5-12
Modifier	>30	Modifier	>12

GRAIN SIZE TERMINOLOGY		PLASTICITY DESCRIPTION	
Major Component of Sample	**Particle Size**	**Term**	**Plasticity Index**
Boulders	Over 12 in. (300 mm)	Non-plastic	0
Cobbles	12 in. to 3 in. (300mm to 75mm)	Low	1 - 10
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)	Medium	11 - 30
Sand	#4 to #200 sieve (4.75mm to 0.075mm	High	> 30
Silt or Clay	Passing #200 sieve (0.075mm)		

UNIFIED SOIL CLASSIFICATION SYSTEM

Terracon

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	Group Name [B]
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	Cu ≥ 4 and 1 ≤ Cc ≤ 3 [E]		GW	Well-graded gravel [F]
			Cu < 4 and/or [Cc<1 or Cc>3.0] [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F, G, H]
			Fines classify as CL or CH		GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	Cu ≥ 6 and 1 ≤ Cc ≤ 3 [E]		SW	Well-graded sand [I]
			Cu < 6 and/or [Cc<1 or Cc>3.0] [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G, H, I]
			Fines classify as CL or CH		SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above "A"		CL	Lean clay [K, L, M]
			PI < 4 or plots below "A" line [J]		ML	Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay [K, L, M, N]
			Liquid limit - not dried			Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line		CH	Fat clay [K, L, M]
			PI plots below "A" line		MH	Elastic Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay [K, L, M, P]
			Liquid limit - not dried			Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

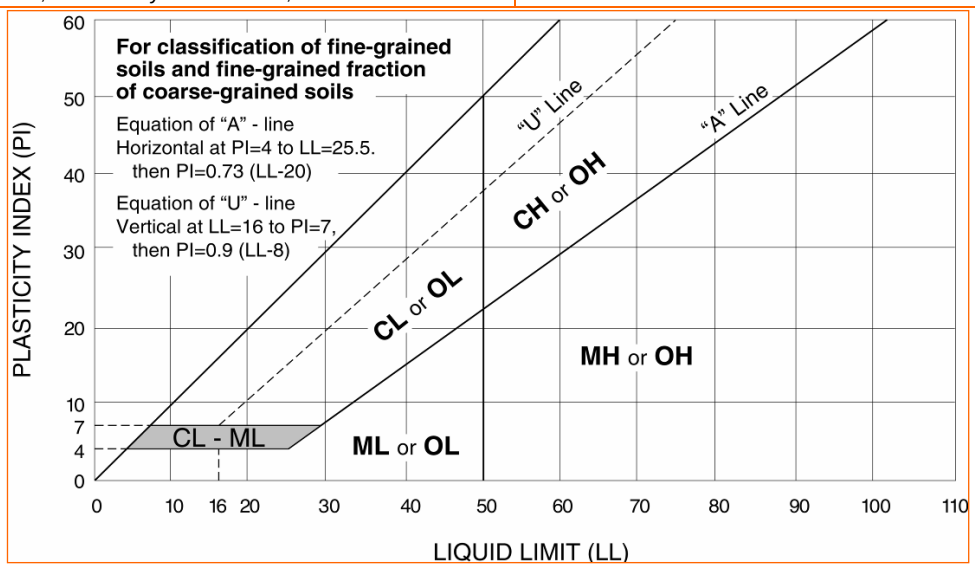
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



AASHTO 1993 ESAL Calculator for Flexible Pavements

Vehicle Description	Traffic Volume			Analysis	Axle Load and Type						Gross	Equivalency			ESAL's
	Quantity in the Design Lane	Days per Week	Weeks per Year	Period (years)	Axle 1 (kips)		Axle 2 (kips)		Axle 3 (kips)		Weight (pounds)	Factors Axle 1	Axle 2	Axle 3	
Passenger car	**1,059**	**7**	**52**	**20**	2	S	2	S			4,000	0.0002	0.0002	0	3,561
Pick-up truck or van					2	S	4	S			6,000	0.0002	0.003	0	0
Recreational vehicle					4	S	4	S			8,000	0.003	0.003	0	0
School bus					6	S	14	S			20,000	0.012	0.338	0	0
TARC bus					8	S	14	S			22,000	0.035	0.338	0	0
Greyhound MC-12 bus					13.4	S	18.4	S	6	S	37,800	0.2897	1.118	0.012	0
Package delivery truck					4	S	14	S			18,000	0.003	0.338	0	0
Beverage delivery truck					6	S	12	S	12	S	30,000	0.012	0.177	0.177	0
Garbage/dumpster truck					20	S	35	T			55,000	1.59	1.225	0	0
Concrete truck (full)					20	S	48	R			68,000	1.59	0.992	0	0
Dump truck (full)	**706**	**7**	**52**	**20**	20	S	48	R			68,000	1.59	0.992	0	15,335,917
Semi-tractor (no trailer)					8	S	2	T			10,000	0.035	0	0	0
Semi-tractor trailer (empty)					8	S	8	T	6	T	22,000	0.035	0.003	0.001	0
Semi-tractor trailer					12	S	34	T	34	T	80,000	0.177	1.07	1.07	0
					6	S	29	s	20	T	55,000	0.012	8.655	0.117	0
					8	S	8	T		T	16,000	0.035	0.003	0	0
Vehicle type H10					4	S	16	S			20,000	0.003	0.598	0	0
Vehicle type H15					6	S	24	S			30,000	0.012	3.62	0	0
Vehicle type H20					8	S	32	S			40,000	0.035	13.5	0	0
Vehicle type 3					16	S	34	T			50,000	0.598	1.07	0	0
Vehicle type HS15					6	S	24	S	24	S	54,000	0.012	3.62	3.62	0
Vehicle type HS20					8	S	32	S	32	S	72,000	0.035	13.5	13.5	0
Vehicle type 3S2					10	S	31	T	31	T	72,000	0.085	0.723	0.723	0

Terminal Serviceability, r_t	**2.0**
Assumed Structural Number, SN	**2**
Traffic Growth Rate, %/yr	**1.5**

Summary:		
	Total AASHTO ESAL's	**15,339,478**
	Superpave	**ESAL Class 3**
	Traffic Category	

Project: lkinson Pavement Rehabilitat Location: Prescott, Arizona

Job No.: 65195185 Date: 10/3/2019

Terracon

Pavement Design Alternative A

(AASHTO 1993 Method)

Design Inputs		**Asphalt**	
Sugrade Support	CBR =	6	
	Mr =	8000	psi
Reliability		90	%
Standard Deviation	So =	0.45	
Initial Serviceability	Po =	4.1	
Terminal Serviceability	Pt =	2.6	
Design Serviceability Loss,	ΔPSI =	1.5	

Layer Coefficients:

AC Surface Course	a_1 =	0.44
AC Base Course	a2 =	0.44
Reclaimed Asphalt Base Layer	a3 =	0.11
Existing Subbase Course	a4 =	0.07

	Design ESALs
Asphalt Section Traffic (18 kip ESAL) =	15,339,478

Asphalt Pavement Section	Drainage, m		
AC Surface Course		**2.5**	in.
AC Base Course		**3.5**	in.
Reclaimed Asphalt Base Layer	1.0	**12.0**	in.
Existing Subbase Course	1.0	**24.0**	in.
	Structural Number:	**5.64**	
	Structural Number - Required	***5.35***	

Project: Wilkinson Pavement Rehabilitatior Location: Prescott, Arizona

Project No. 65195185 Date: 02/24/20

Terracon

Pavement Design Alternative B

(AASHTO 1993 Method)

Design Inputs		**Asphalt**	
Sugrade Support	CBR =	6	
	Mr =	500000	psi
Reliability		90	%
Standard Deviation	So =	0.45	
Initial Serviceability	Po =	4.1	
Terminal Serviceability	Pt =	2.6	
Design Serviceability Loss,	ΔPSI =	1.5	

Layer Coefficients:

AC Surface Course	a_1 =	0.44
FDR Layer with 8% Cement	a_2 =	0.25
Existing Subbase Course	a3 =	0.07

	Design ESALs
Asphalt Section Traffic (18 kip ESAL) =	15,339,478

Asphalt Pavement Section	Drainage, m		
AC Surface Course		**4.0**	in.
FDR Layer with 8% Cement		**8.0**	in.
Existing Subbase Course	1.0	**24.0**	in.

Structural Number: **5.44**

Structural Number - Required ***5.35***

Project: Wilkinson Pavement Rehabilitatior Location: Prescott, Arizona

Project No. 65195185 Date: 02/27/20

Terracon

Recommended Construction Guidelines
For
Full Depth Reclamation (FDR)
Using Cementitious Stabilization
FDR102

Revised: 09/12/2017

Responsible Renewal. Reliable Results.

NOTICE

It is not intended or recommended that these guidelines be used verbatim within a specification. Owner Agencies should use them to help establish their particular project specification. Owner Agencies should understand that all geographical areas and pavement rehabilitation/preservation projects are unique and the availability of materials and equipment may vary as well. ARRA assumes no liability for utilization of these guidelines by any individual or entity. Contact ARRA for answers to questions and for a list of ARRA member Contractors and Suppliers.

Asphalt Recycling & Reclaiming Association
800 Roosevelt Road, Building C-312
Glen Ellyn, IL 60137
(630) 942-6578
www.ARRA.org

1. General

Full Depth Reclamation (FDR) shall consist of pulverizing (reclaiming) the existing flexible pavement and underlying materials (base and/or subgrade materials) to the length, depth and width as specified or as shown on the plans, blending with a cementitious stabilizing agent (either cement, portland or blended hydraulic, or Class C fly ash), water, other additives or corrective aggregate as required by the mix design, to produce a cementitious stabilized base. This material shall then be shaped, compacted, cured and protected in accordance with the plans and specifications.

2. Treatment Thickness

The existing flexible pavement, base and/or subgrade material shall be pulverized to a total depth of ____ inches (mm). The pulverized section shall then be re-graded, with excess material removed and hauled away as necessary, so as to allow for the net placement of ____ inches of new pavement material. A cementitious stabilizing agent, water, additives, and/or corrective aggregate shall be added and blended to a total depth of ____ inches (mm) in accordance with the plans and specifications.

User Note: FDR treatment thicknesses may vary between 4 and 14 inches (100 - 350 mm) per lift and should be dependent on structural capacity requirements and project-specific criteria such as original asphalt thickness and design life. Selecting the right FDR application for a particular project should be based on the judgment of those involved in the design process of the project after consideration of several key factors including: project location, existing roadway conditions, depth of current pavement layers, failure depths, reason for current failure (i.e. lack of maintenance, age, insufficient depth, lack of adequate drainage, etc.), traffic volume, available materials and project budget.

3. Preconstruction Personnel Training

Personnel involved with the construction of FDR from both the Contractor and Owner Agency shall have successfully completed Preconstruction Personnel Training (PPT) to ensure that proper quality procedures are followed to construct high quality FDR stabilized base. The PPT shall be conducted at a location convenient for both the Contractor and the Owner Agency. The PPT shall be completed not more than ___ days, not including Saturdays, Sundays or holidays, prior to the start of FDR operations. The training shall be held during normal working hours. In lieu of this training, proof may be provided showing successful experience has been obtained by the individuals performing the work for the materials and construction techniques to be used in the FDR construction.

The PPT trainer shall be provided by the _____ *(Contractor or Owner Agency).* The PPT trainer shall be experienced in construction methods, materials, and test methods associated with construction of FDR projects. The Contractor and Owner Agency shall mutually agree to the course instructor, course content and training site.

User Note: PPT is optional to the agency. PPT should be conducted for agencies and Contractors new to FDR. It is recommended that the PPT takes place within 5 days from the start of the FDR so that it is current and allows some time to address any issues that may be raised during the training.

4. Materials

FDR shall consist of a homogeneous blend of reclaimed asphalt pavement (RAP), base material and/or subgrade materials, cementitious stabilizing agent (cement or Class C fly ash), water and other chemical additives and corrective aggregate as necessary. The actual materials utilized and their respective usage rates are dependent on the mix design and project requirements.

4.1 Reclaimed Asphalt Pavement and Underlying Material

RAP and underlying material shall consist of the existing asphalt material, existing base course material and/or subgrade material. The underlying materials shall be free of roots, sod, topsoil, weeds, wood or any material deleterious to its reaction with the cementitious stabilizing agent. The gradation of the processed (pulverized) material shall meet the requirements of Table 1.

Table 1 – GRADATION OF PROCESSED (PULVERIZED) MATERIALS	
Sieve Size	**Minimum Percent Passing**
3 in. (75 mm)	100
2 in. (50 mm)	95
No. 4 (4.75 mm)	55
No. 200 (0.075 mm)	5

Rubberized crack filler, pavement markers, loop wires, thermoplastic markers, paving fabric and other similar materials shall be removed as observed from the roadway during the reclaiming process. Residual materials that cannot be completely removed from the reclaimed material may be incorporated into the FDR mixture if the Contractor can demonstrate that those added materials will not adversely affect performance. Any such materials retained in the mixture shall be appropriately sized and blended so as to not adversely affect the appearance or strength of the FDR stabilized base.

4.2 Cement

Cement (portland or blended hydraulic), in either dry or slurry form, shall be added to the reclaimed mixture as determined by the mix design. Slurry made from cement shall contain a minimum of 30% dry solids content. Cement used for full depth reclamation shall comply with the latest specifications for hydraulic cement (AASHTO M 85, AASHTO M 240 or ASTM C150, ASTM C595). The Contractor shall inform the Owner Agency of the process to be used for incorporating cement into the reclaiming process.

4.3 Class C Fly Ash

Self-cementing Class C fly ash shall be added to the reclaimed mixture as determined by the mix design. Fly ash used for full depth reclamation shall comply with the latest specifications for Class C Fly Ash (AASHTO M 295 or ASTM C618). The Contractor shall inform the Owner Agency of the process to be used for incorporating fly ash into the reclaiming process.

4.4 Corrective Aggregate

Corrective aggregate may be required to supplement the existing material gradation and to meet performance requirements of the mix design. Corrective aggregate may consist of crushed rock, RAP, crushed concrete or other types of aggregate approved by the Owner Agency. The corrective aggregate gradation may vary according to its size and distribution, depending on the desired effect to the FDR stabilized base. When required by the mix design, corrective aggregate shall meet the requirements of Table 2.

TABLE 2 – CORRECTIVE AGGREGATE		
Tests	**Method**	**Limit**
Los Angeles Abrasion Value, % loss	AASHTO T 96 ASTM C131	40 max
Sand Equivalent,%	AASHTO T 176 ASTM D2419	60 minimum
Washed Gradation	AASHTO T 11 & T 27 ASTM C117 & C136	As required

4.5 Water

Water shall be added to achieve the desired moisture content. Water added shall be free from deleterious concentrations of oils, acids, alkalis, salts, sugars, vegetation, as well as other organic, chemical or deleterious substances. The water shall not cause an adverse effect on either the cementitious stabilizing agent or the reclaimed mixture. If the water is of questionable quality, it shall be tested in accordance with ASTM C1602 or according to local standards and procedures.

5. Preconstruction Sampling and Mix Design

If not provided by the Owner Agency, a mix design shall be submitted by the Contractor for approval by the Owner Agency. The mix design shall be performed with representative materials to be encountered during construction of the FDR. When the in-place materials change significantly, additional mix designs shall be performed to establish representative mixtures for the entire job. Representative samples of the in-place materials shall be obtained directly from the project site by sampling in accordance with ARRA *FDR202 - Preconstruction Sampling and Mix Design Guidelines for Full Depth Reclamation using Cementitious Stabilizing Agents* and delivered to an AASHTO or Owner Agency approved laboratory experienced in full depth reclamation. The asphalt materials shall then be crushed and mixed with the underlying base and/or subgrade materials at the percentages to be encountered in the field. This blended material, which may also contain corrective aggregate or RAP, shall then be treated with a cementitious stabilizing agent at various rates and compacted and tested according to the project requirements to obtain the optimum addition rates as outlined in the mix design procedures of ARRA *FDR202*.

The mix design shall be the baseline measure for the rate of cementitious stabilizing agent, water, additives and corrective aggregate blended with the existing materials to construct the reclaimed mixture. The mix design shall indicate the allowable tolerance for application of stabilizing agent, water, additives and corrective aggregate so as to not jeopardize the performance of the mixture but allow the Contractor to adjust the mixture so that it may be placed successfully.

6. Equipment

The FDR equipment shall be capable of pulverizing the existing asphalt and underlying materials. The equipment used for blending/mixing the pulverized materials with stabilizing agent, water, additives and corrective aggregate, if used, shall be capable of producing a homogeneous and uniformly blended reclaimed mixture. The equipment used for placement of the FDR stabilized base shall be capable of placement to the lines, grades, and guidelines provided herein and shown on the plans and specifications. The equipment shall consist of the following major components:

6.1 Spreaders/Distributors

Spreaders or distributors used to apply dry powder stabilizing agents and/or additives shall be non-pressurized mechanical vane-feed, cyclone or screw type capable of providing a consistent, accurate and uniform distribution of material while minimizing dust during construction. Imported corrective aggregate may be placed by a mechanical spreader, a conventional paver, or by tailgating with end dump trucks and spread to a uniform thickness with a motor grader.

6.2 Additive Slurry Storage and Supply Equipment

Slurry shall be produced using onsite portable batching equipment or inline processed and fed directly to the reclaiming equipment. Additive slurry storage and supply equipment shall have agitators or similar equipment to keep the slurry in suspension when held in the slurry batch or storage tanks. Slurry shall be kept in suspension during transport using agitator equipment. The meter system controlling application of slurry shall apply the additive within a tolerance of ± 10% of the specified rate.

6.3 Mixing/Reclaiming Equipment

Only self-propelled, high powered, minimum _____ HP, rotary mixers/reclaimers capable of mixing in-place to a minimum depth of _____ inches (mm) shall be used. The cutting drum shall be a minimum _____ feet (meters) in width and fitted with cutting teeth capable of trimming earth, aggregate and asphalt materials and be so designed that they may be accurately adjusted vertically and held in-place. The machine shall not weigh less than 25,000 lbs. (11,300 kg) and shall have the strength and rigidity so that it shall not develop a center deflection of more than 1/8 in (3 mm). Disc harrows, bucket teeth and other equipment that does not meet the above requirements shall not be used for FDR.

The mixer/reclaimer shall be fitted with an integrated water injection system capable of introducing water into the cutting drum during the mixing process. The metering device shall be capable of automatically adjusting the flow of water to compensate for any variation in the amount of reclaimed material introduced into the mixing chamber. Water shall be calculated on a volumetric basis tied to a foot per minute gauge using a calibrated meter that is capable of accurately measuring the amount of water to within a tolerance of ± 10% of the rate required. Automatic digital readings shall be displayed for both the flow rate and total amount of reclaimed material and water in appropriate units of weight and time.

User Note: If 5.0% water is required, based upon the allowable tolerance the water must be introduced between 4.5% and 5.5%.

6.4 Motor Grader

A motor grader for pre-shaping, aerating, spreading and final shaping of the material shall be provided. The motor grader shall have a cross slope indicator.

6.5 Rollers

Compacting of the reclaimed mixture shall be completed using self-propelled rollers, complete with properly operating scrapers and water spray systems. The number, weight and types of rollers shall be as necessary to obtain the required compaction throughout the entire FDR thickness. A pneumatic roller of adequate size, a vibratory padfoot roller with an 84-inch (2.13-m) wide drum equipped with knockdown blade, and a single or double drum vibratory steel roller may be used in any combination to achieve density.

User Note: For some applications the vibratory padfoot roller may not be necessary. Any combination of rollers should be allowed provided the compaction requirements are met.

6.6 Water Truck

Water truck(s) for supplying water to the reclaimer or roadway for addition of moisture and for curing during the FDR operation shall be provided. Water truck(s) shall be capable of providing a controlled and consistent spray without eroding or otherwise damaging the compacted FDR stabilized base surface.

7. Construction

Prior to the start of construction, employees representing both the Contractor and Owner Agency shall submit certification of PPT to ensure the FDR is constructed properly.

Throughout the pulverization, mixing, placement and compaction of the reclaimed materials, adjustments may be made to the cementitious stabilizing agent, water, and additives so as to produce a reclaimed mixture with optimal performance that meets specification requirements. All adjustments shall be recorded and submitted to the Owner Agency.

7.1 Roadway Preparation

Before the stabilization process begins, the area to be stabilized shall be pre-pulverized, graded, and/or shaped to the lines and grades as shown on the plans and specifications. During this process any unsuitable soil or material shall be removed and replaced with materials meeting project plan and specification requirements. The subgrade shall be firm and able to support, without yielding or subsequent settlement, the construction equipment and compaction of the FDR stabilized base. Soft or yielding subgrade shall be made stable before construction proceeds. Any manholes, valve covers, or other buried structures/utilities shall be protected from damage prior to processing. FDR shall be constructed in a series of parallel lanes such that longitudinal and transverse joints are minimized.

7.2 Weather Limitations

FDR processing shall not be conducted when the soil, aggregate or subgrade is frozen, or when the ambient temperature is below 35 °F (2 °C) or when freezing temperatures are anticipated within 7 days of the end of FDR placement.

7.3 Control Strip

During the first day of production the first load of cementitious stabilizing agent shall be used by the Contractor to construct a control strip to verify that the construction process meets specification requirements. The control strip shall be of adequate size for the Contractor to:

A. Demonstrate that the equipment, materials, and processes proposed can produce a reclaimed material layer that conforms to specification requirements.
B. Determine the optimal rates for cementitious stabilizing agent, water, and any additives recommended for the reclaimed material.
C. Determine the sequence and manner of rolling necessary to obtain specified density requirements.

FDR operations <u>may continue</u> through the first day unless the Contractor's equipment and process fails to meet the requirements for successful completion of FDR operations. FDR operations shall not continue beyond the first day unless a control strip has been approved by the Owner Agency. Cease production after the first load of cementitious stabilizing agent if any of the requirements of the specifications are outside specification tolerances. Change procedures to contingency plans approved in the QC plan to continue work. The first load of cementitious stabilizing agent applied with the contingency plans will be used as a control strip to evaluate the corrective action plan. If the requirements of the specifications are still not being met cease production and submit a revised corrective action plan to the Engineer for acceptance prior to continuing work. Continue with

this process until all specification requirements are met. Upon acceptance of the control strip by the Owner Agency, the Contractor shall use the same equipment, materials, and construction methods for the remainder of FDR operations, unless adjustments made by the Contractor are approved by the Owner Agency. If adjustments are made, the Contractor shall produce a new control strip.

In lieu of a control strip, the Owner Agency may allow the Contractor to provide proof, based on previous experience with the same equipment, personnel, and materials that the work will conform to specification requirements.

7.4 Pulverization

The pre-determined full depth of asphalt material and underlying materials (base and/or subgrade) shall be pulverized to a homogenous mixture and specified gradation using a mixer/reclaimer meeting the requirements of Section 6.3. The mixture shall be brought to the desired moisture content during this process by means of surface application or through the mixer/reclaimer's integrated fluid injection system.

User Note: Desired moisture content of a pulverized mixture will vary on every project, based on the material to be stabilized as well as the type of stabilizing agent used. Desired moisture content should be determined prior to construction.

Longitudinal joints between successive cuts shall overlap a minimum of 6 inches (150 mm) and transverse joints shall overlap a minimum of 2 feet (0.60 m).

When a paving fabric is encountered during the pulverizing operation, the Contractor shall make the necessary changes in equipment or operations so that incorporation of shredded fabric into the reclaimed material does not affect the performance parameters or inhibit placing or compaction of the FDR stabilized base. The Contractor shall be required to remove and properly dispose of oversized pieces of paving fabric as indicated by the plans and specifications.

Rubberized crack filler, pavement markers, loop wires, thermoplastic markers and other similar materials shall be removed from the roadway as observed during the reclaiming process. Residual materials that cannot be completely removed from the processed materials may be incorporated into the reclaimed materials if the Contractor can demonstrate that those added materials will not adversely affect the performance of the FDR stabilized base. Any such materials retained in the mixture shall be appropriately sized and blended so as not to adversely affect the appearance or strength of the FDR stabilized base.

7.5 Corrective Aggregate

Corrective aggregate, if stipulated in the design, shall be spread uniformly on the roadbed using equipment as specified in Section 6.1. Aggregate may be placed either prior to pulverization or following pulverization, but prior to the addition of the stabilizing agent. If applied following pulverization, the corrective aggregate shall be blended with the reclaimed material by means of additional full depth mixing to form a homogeneous mixture prior to application of the stabilizing agent. No traffic, other than the reclaiming equipment, shall be allowed to pass over corrective aggregate until the reclaiming operation is complete.

7.6 Cementitious Application and Mixing

Removal and disposal of excess material, if required, shall be performed on the pulverized asphalt, base and subgrade material prior to cementitious treatment. Following pulverization and any trimming, if necessary, the cementitious material shall be spread on or applied to the pulverized material in accordance with the mix design using an approved spreader/distributor or slurry equipment at the applied rate [of _____ lbs/yd^2 (kg/m^2) for dry stabilizing agent and _____ gal/yd^2 (L/m^2) for slurry; of not less than_____ percent based

upon dry unit weight of the pulverized material; or in accordance with the mix design] based on a dry unit weight [of _____ pcf (kg/m^3) assumed for bidding purposes; or the in-place dry unit weight determined in the mix design] of pulverized material and for the depth of treatment specified or as shown on the plans. The actual final dry unit weight of pulverized material shall be determined during construction. The cementitious stabilizing agent shall be applied to within a tolerance of ± 5% of the rate required. The compressive strength at 7 days for the FDR stabilized base shall be a minimum of _____ psi (kPa) (ASTM D1633, Method A), but shall not exceed _____ psi (kPa) (ASTM D1633 Method A).

User Note: If 6.0% cementitious stabilizing agent is required, based upon the allowable tolerance the stabilizing agent must be applied between 5.7% and 6.3%.

Dust control measures shall be employed to minimize fugitive dust. With a dry stabilizing agent the distance between the spreader and the reclaiming operation shall be reduced appropriately during windy days. Slurry may be spread on the pulverized reclaimed material in front of the reclaiming operation or may be added directly to the reclaimer's mixing chamber through the reclaimer's integrated fluid injection system. If the stabilizing agent is supplied in slurry form in front of the reclaiming operation, the reclaimed material shall be scarified prior to spreading of slurry to prevent excessive runoff or ponding. Slurry shall be produced at the jobsite. The Contractor shall provide the Owner Agency with batch or inline production logs daily. In no case shall dry stabilizing agent or slurry be allowed to remain exposed at the end of the workday. No traffic, other than the reclaiming equipment, shall be allowed to pass over the spread stabilizing agent until the reclaiming operation is complete.

The first contact of cementitious stabilizing agent with water prior to application on the reclaimed material shall not exceed 60 minutes. The time from cementitious stabilizing agent placement to start of mixing shall not exceed 30 minutes. If using dry stabilizing agent, water application shall only be added through the mixer/reclaimer's integrated fluid injection system during mixing. Mixing shall be performed while introducing water into the pulverized material through the metering device on the mixer. After completion of the first pass, the road shall be shaped with a motor grader and compacted with a steel wheel roller to provide improved depth control. A second pass of the reclaimer shall be completed with the required amount of stabilizing agent added. If necessary, water shall be added to the pulverized material during mixing to bring the moisture content to within minus 1 to plus 2 percent of the optimum moisture content determined in accordance with ASTM D558 to ensure chemical reaction of the cementitious stabilizing agent and processed materials. Mixing shall continue until the entire mixture, RAP, base and/or subgrade material is pulverized and gradation requirements are met. The final check for gradation shall not be made until the conclusion of mixing operations. The entire operation of cementitious stabilizing agent spreading, water application and mixing shall result in a uniform pulverized base, stabilizing agent, and water mixture for the full design depth and width.

Longitudinal joints between successive passes shall overlap a minimum of 6 inches (150 mm) and transverse joints shall overlap a minimum of 2 feet (0.60 meters).

To ensure a uniformly treated section, any material/soil around manholes, utility risers, valves and adjacent to curbs/gutters or in corners, shall have that material/soil pulled out to the depth of treatment and placed where it is accessible for mixing. After mixing, that material shall be replaced and compacted.

7.7 Compaction

The Contractor shall sequence operations such that compaction shall begin no more than 20 minutes after mixing or immediately upon achieving gradation and moisture requirements. All compaction operations shall be completed within 2 hours from start of mixing operations. No section shall be left undisturbed for more

than 30 minutes during compaction operations. At the start of compaction, the moisture content shall be within -1% to +2% of the specified optimum moisture content determined in accordance with ASTM D558. The mixed material shall be uniformly compacted in one layer to a minimum of 98% of the maximum dry density determined in accordance with ASTM D558, based on a moving average of five consecutive tests, with no test below 96%. Field density of compacted material may be determined by nuclear method in the direct transmission mode (AASHTO T 310, ASTM D6938) or sand cone method (AASHTO T 191, ASTM D1556).

7.8 Finishing and Surface Tolerance

As compaction nears completion, the surface of the FDR stabilized base shall be shaped to the specified lines, grades and cross sections. Compaction shall then be continued until uniform and adequate density is achieved. During the finishing process the surface shall be kept moist by means of water spray devices that shall not erode the surface. Compaction and finishing shall be performed in such a manner so as to produce a surface free of compaction planes, cracks, ridges or loose material. The surface tolerance shall not vary more than 1/2 inch (12 mm) from a 10-foot (3.0-m) straight edge placed on the surface. The Contractor shall correct humps exceeding this tolerance by trimming, milling or abrasive grinding. Feathering shall not be permitted for repair of low areas. Depressions exceeding the specified depth tolerance shall have a tack coat applied and filled with an asphalt mixture just prior to placement of the final surfacing. All finishing operations shall be completed within 4 hours from start of mixing. However, trimming (cuts only) can be completed within 24 hours of mixing.

7.9 Curing

After completion of final finishing, the cementitious stabilized surface shall be cured by application of a bituminous or other approved sealing membrane, or by being kept continuously moist for a period of 3 to 5 days with a water spray that shall not erode the surface of the FDR stabilized base. If curing material is used, it shall be applied as soon as possible, but no later than 24 hours after completing finishing operations. The surface shall be kept continuously moist prior to application of the curing membrane.

For bituminous curing membranes the FDR stabilized base shall be free of all loose, extraneous materials and shall be applied in the form of a fog seal composed of either CSS-1h or SS-1h emulsified asphalt, or another emulsion approved by the Owner Agency, diluted up to 60 percent by volume with water. The fog seal shall be applied at a rate of 0.10 to 0.20 gal/yd^2, (0.4 to 0.8 L/m^2). When a sand blotter is required, it shall be applied to the surface at 2 to 3 lbs/yd^2, (1 to 5 kg/m^2). Sand shall be free from clay or organic material. Application rates of fog seal and sand blotter shall be determined by the Contractor and shall be such that a stable and safe roadway surface can be maintained until the surface course is placed.

7.10 Microcracking (Optional)

User Note: Microcracking is not commonly conducted in some areas. However, if a cement stabilizing agent is utilized, the surface sealing is thin, and the compressive strength of the FDR stabilized base is not limited, microcracking is a technique that can help prevent shrinkage cracking and therefore reduce reflective cracking in the final surface course. If microcracking is specified include the following:

After the initial 24 hour curing period, the FDR stabilized base shall be tested to determine the stiffness using an approved device, such as a Humboldt Stiffness Gauge (HSG), or equivalent. Stiffness testing shall be at the rate of one test per 100 lineal feet (30 m) of section. Test locations shall be marked with paint for later retesting. If the initial HSG readings are in the range of 50 to 60 (MN/m), then microcracking of the FDR section shall begin. If the readings are below the stated range, the FDR section shall be allowed to cure for an additional 24 hours and stiffness readings obtained at the end of the 24 hour period and prior to the commencement of microcracking operations.

Microcracking of the FDR stabilized base shall be accomplished by a 12 ton (11 metric ton) steel-wheel vibratory roller, traveling at a speed of approximately 2 mph (3 kph) and vibrating at maximum amplitude and lowest frequency, or as directed by the Owner Agency. The section shall have 100% coverage, exclusive of the outside 1-foot (0.3 m), so as to induce minute cracks in the FDR section. After one pass of the vibratory roller the stiffness of the FDR section shall be determined. Microcracking operations may be terminated when a minimum 40% reduction in stiffness of the FDR section is achieved as compared to the initial (pre-cracked) readings or, in the absence of measurement by a stiffness gauge, until the desired crack pattern is achieved. Additional passes of the steel-wheel roller may be required to achieve the desired crack pattern or section modulus as determined by the Owner Agency. The FDR stabilized base shall be tested for stiffness after each additional rolling pass. It is anticipated that the roller will have to make 1 to 4 passes to achieve the required reduction in stiffness.

After cessation of microcracking the section the stabilized surface, if previously moist cured, shall be moist cured for an additional 2 to 4 days with a water spray that shall not erode the surface of the FDR stabilized base. As an alternative, the stabilized surface shall be moist cured for an additional 4 hours and then a bituminous or other approved sealing membrane applied in accordance with Section 7.9.

If the stabilized surface was previously cured prior to microcracking with a bituminous or other approved sealing membrane, then the stabilized surface shall be moist cured by being kept continuously moist for a period of 2 hours and then a bituminous or other approved sealing membrane reapplied in accordance with Section 7.9.

8. Traffic

Completed portions of FDR stabilized base can be opened immediately to low speed local car traffic and to construction equipment, provided the curing material is not impaired. Finished portions of the FDR stabilized base traveled on by construction equipment used in constructing an adjoining section shall be protected in such a manner so as to prevent equipment from marring or damaging the completed work. If damage occurs, it may be necessary to keep heavy truck traffic off the stabilized base until the final surfacing is placed, and/or the stabilized base has passed proof roll testing. Proof rolling shall represent the type of traffic expected on the pavement. If deformation does not occur, moving truck traffic can be allowed at speeds less than _____ mph (kph) until the final surfacing is placed. If deformation does occur, truck traffic shall be kept off the stabilized base until it is firm enough to support the loads.

9. Maintenance

After opening to traffic and prior to placing the surface course, the surface of the FDR stabilized base shall be maintained in a condition suitable for the safe movement of traffic. The Contractor shall protect and maintain the surface from nuisance water, other deleterious substances, and/or any other damage. Any damage to the completed FDR stabilized base shall be repaired by the Contractor prior to placement of the final surfacing. If it is necessary to replace any processed material, the replacement shall be for full depth, with vertical cuts, using an approved material. Skin patches shall not be permitted. No direct payment shall be made and costs shall be included elsewhere for protection and maintenance of the stabilized base.

10. Surfacing

Final surfacing (hot or warm mix asphalt, seal coat, or concrete) can be placed any time after curing, as long as the FDR stabilized base is sufficiently stable (proof roll) to support the required construction equipment without marring or permanent distortion of the surface.

11. Quality Assurance Testing

The Contractor shall perform process and quality control (QC) sampling and testing, and exercise management control to ensure that FDR base conforms to the project plans and specifications. Sampling and testing shall be performed as outlined in ARRA *FDR302-Recommended Quality Assurance Guidelines for Full Depth Reclamation using Cementitious Stabilizing Agents*. The Contractor or Owner Agency shall provide a qualified technician, testing laboratory and personnel to perform process and quality control sampling and testing during the FDR. The proficiency of testing laboratories and sampling and testing personnel shall be reviewed and approved by the Owner Agency prior to providing services to the project. The Owner Agency shall have unrestricted access to the laboratory, sampling, testing sites, and all information resulting from mix design and quality control activities. All quality control testing results shall be submitted to the Owner Agency.

12. Measurement and Payment

Quantities of the FDR stabilized base shall be measured by the square yard (square meter) completed and accepted by the Owner Agency to the depths specified or shown on the plans. Cementitious stabilizing agent and additive weight shall be based upon certified delivery weight tickets, less any unused portion. Water used in this operation shall not be paid for directly and shall be considered subsidiary to the bid item.

Payment for FDR shall be made at the contract unit price per square yard (square meter). The price shall be full compensation for all labor, materials, tools, equipment, and incidentals; for doing all the work involved in full depth reclaiming, complete in-place; for pulverizing, mixing, blending, placing, compacting and curing of the FDR stabilized base; for protection and maintenance of the FDR stabilized base; for performing all QA testing including mix design, if required to be provided by the Contractor, PPT training and instructor, if provided by Contractor, and for obtaining measurements and recording results of all tests as shown on the plans and specifications.

Cementitious stabilizing agents shall be paid for at the contract price per ton (metric ton).

Additives shall be paid for at the contract price per ton (metric ton).

Recommended
Quality Control Sampling and Testing Guidelines
For
Full Depth Reclamation Using Cementitious Stabilizing Agents
FDR302

9/12/2017

Responsible Renewal. Reliable Results.

NOTICE

It is not intended or recommended that these guidelines be used verbatim within a specification. Owner Agencies should use them to help establish their particular project specification. Owner Agencies should understand that all geographical areas and pavement rehabilitation/preservation projects are unique and the availability of materials and equipment may vary as well. ARRA assumes no liability for utilization of these guidelines by any Individual or Entity. Contact ARRA for answers to questions and for a list of ARRA member Contractors and Suppliers.

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1. General

Quality Control (QC) sampling, testing and inspection shall be conducted by the Contractor to ensure optimum performance of the full depth reclamation (FDR) material. QC shall be conducted in accordance with the procedures outlined in Table 1 and below. Additional sampling and testing shall be conducted if significant changes in reclaimed material characteristics are observed, such as a change in the percentages of Reclaimed Asphalt Pavement (RAP) and underlying materials, a much coarser or finer gradation, or when considerable variability is occurring in field test results.

The Contractor's testing personnel and laboratory shall be certified in the applicable test methods and/or approved by the Owner Agency prior to beginning FDR. All testing performed by the Contractor shall be provided to the Owner Agency, when requested, within two business days of obtaining results.

If test results conducted during the placement of the FDR do not meet requirements presented in Table 1 the Owner Agency shall be immediately notified. The roadway shall then be inspected and monitored prior to the application of the surface course and any resultant deficiencies shall be rectified in accordance with the requirements of the plans and specifications.

User Note: These QC guidelines identify suggested material sampling and testing methods that are related to FDR process control to maximize final product performance. To adjust for varying field conditions during FDR pavement production, changes in rolling patterns, moisture content, stabilizing agent content and additive content may be necessary to obtain optimum performance. When taking material samples the time between sampling and testing may affect the results obtained. The Contractor should consult with the Material Supplier to ensure proper timelines are followed so as to ensure accurate test results.

2. Stabilizing Agent and Additive Spreader/Distributor

Spreaders or distributors used to apply dry powder stabilizing agents and/or additives shall be non-pressurized mechanical vane-feed, cyclone or screw type capable of providing a consistent, accurate and uniform distribution of material, while minimizing dust during construction. Corrective aggregate may be placed by a mechanical spreader, a conventional paver, or by tailgating with end dump trucks and spread to a uniform thickness with a motor grader.

3. Cementitious Stabilizing Agent Compliance

The cementitious stabilizing agent shall be established by a mix design prior to the start of full depth reclamation in accordance with guidelines presented in *ARRA FDR202 - Recommended Mix Design Guidelines for Full Depth Reclamation (FDR) Using Cementitious Stabilizing Agents*. If actual test results conducted during FDR do not meet the requirements of Section 3 of Table 1, the Owner Agency shall be immediately notified. The roadway shall then be inspected and monitored prior to the application of any surface course. Resultant deficiencies shall be rectified in accordance with the requirements of the plans and specifications.

User Note: Cementitious stabilizing agents used for the FDR process should be selected to obtain optimum performance and mix workability. They should be established by a mix design prior to the start of the process. The stabilizing agent selected for a particular project will depend on environmental conditions and material availability, and should follow guidelines presented in *ARRA FDR202*.

3.1 Cement

When required by the mix design, cement (portland or blended hydraulic), in either dry or slurry form, shall comply with the QC procedures outlined in Section 3.1 of Table 1. Slurry made from cement shall contain a minimum of 30% dry solids content. A COA shall be provided by the Material Supplier with each delivery of cement or a sample from the delivery tanker may be tested for verification in lieu of the COA.

3.2 Class C Fly Ash

When required by the mix design, self-cementing class C fly ash shall comply with the QC procedures outlined in Section 3.2 of Table 1. A COA shall be provided by the Material Supplier with each delivery of class C fly ash or a sample from the delivery tanker may be tested for verification in lieu of the COA.

3.3 Cementitious Stabilizing Agent Application Rate

At the start of production the optimum cementitious stabilizing agent rates established by the mix design shall be followed and, when necessary, modified to within the tolerances established in the mix design to adjust for changing field conditions. Cementitious stabilizing agents shall be transported to the site in bulk tankers.

When dry cement is spread using a spreader, it shall be applied to the road after initial pulveriation and the application rate verified according to Section 3.3.1 of Table 1. Dry cement shall be spread to the full width of the reclaiming drum to ensure uniform cement distribution throughout the mix. When spreading cement to the full width of the drum a standard “canvas patch” test, or similar procedure, shall be used to check the application rate as prescribed in Section 3.3.1 of Table 1. A canvas of known area shall be placed on the existing pavement prior to application of cement. After the cement is spread on the existing pavement, the canvas shall be weighed to verify the application rate.

When cement is applied by means of slurry injection, the consumption of cement (and water) shall be obtained from the computer that controls the slurry mixing unit. A volumetric distribution shall also be performed using the weight of dry cement used in the slurry mixer per load as prescribed in Section 3.3.2 of Table 1.

If field conditions or performance indicate the need for an adjustment to the application rate, adjustments shall be made. If the actual applied rate does not fall within the mix design tolerance, the performance of the roadway shall be monitored prior to application of the surface course. Resultant deficiencies shall be rectified in accordance with the requirements of the plans and specifications.

4. Stabilizing Additive Compliance

Stabilizing additives shall be lime, lime slurry, corrective aggregate or a combination thereof. The need for a stabilizing additive shall be established by a mix design prior to the start of reclaiming in accordance with guidelines presented in *ARRA FDR202*.

User Note: Stabilizing additives are used when the gradation can be improved, as is the case for corrective aggregate, or for a reduction in plasticity, as is the case for lime. The stabilizing agent selected for a particular project will depend on environmental conditions and material availability, and should follow the guidelines presented in *ARRA FDR202*. It is important that stabilizing additives be added at the rate specified in the mix design to ensure that optimal performance of the FDR material is achieved.

4.1 Lime

When required by the mix design, lime shall comply with the QC procedures outlined in Section 4.1.1 of Table 1. Lime shall be applied by means of slurry injection or dry. Lime slurry shall contain a minimum of 30% dry solids content. The consumption of lime (and water) shall be obtained from the computer that controls the slurry mixing unit. A volumetric distribution shall also be performed using the weight of dry lime used in the slurry mixer per load, as prescribed in Section 4.1.2 of Table 1.

When dry lime is spread using a spreader, it shall be applied to the road prior to reclaiming and the application rate verified according to Section 4.1.3 of Table 1. Dry lime shall be spread to the full width of the reclaiming drum to ensure uniform lime distribution throughout the mix. When spreading lime to the full width of the drum a standard "canvas patch" test, or similar procedure, shall be used to check the application rate as prescribed in Section 4.1.3 of Table 1. A canvas of known area shall be placed on the existing pavement prior to application of lime. After the lime is spread on the existing pavement, the canvas shall be weighed to verify the application rate.

4.2 Corrective Aggregate Compliance

When required by the mix design, corrective aggregate shall meet the gradation dictated by the mix design and the physical properties presented in Table 2 of *FDR102* and shall comply with the QC procedures outlined in Section 4.2.1 and Section 4.2.2 of Table 1. A COA from an Owner Agency certified Aggregate Supplier may be used in lieu of QC testing.

Corrective aggregate addition rate shall be determined by volumetric distribution utilizing weigh tickets from the haul trucks and the applied area, and shall comply with QC procedures outlined in Section 4.2.3 of Table 1.

User Note: Corrective aggregates may be incorporated into the mix to obtain the desired mix characteristics or desired gradation. The gradation of the material will depend on the desired effect but are typically unwashed screenings, chips, continuously graded aggregate or RAP. There should be a quantifiable improvement in measured mix properties to justify the added expense of corrective aggregates.

5. Reclaimed Pavement Material

Reclaimed pavement material shall consist of reclaimed asphalt pavement (RAP) and underlying materials. RAP shall consist of asphalt coated material. Underlying materials can consist of aggregate base, subbase or subgrade materials. The reclaimed pavement materials shall be sampled and tested in accordance with Section 5.1 of Table 1 for maximum particle size, and with Section 5.2 for air dried or wet field gradation. Samples may be obtained prior to or after the addition of stabilizing agent.

User Note: Maximum particle size is important to ensure that the texture and consistency in the final FDR mat is optimized. It is not possible to reduce the maximum size of the FDR material to less than the maximum size of the in-situ materials. A wet sieve analysis in the field provides an indication of the consistency of the FDR material and can be used for comparison with the mix design gradation to adjust the cementitious stabilizing agent rate.

6. Water

Moisture content shall be controlled to ensure adequate chemical reaction of the stabilizing agent and any additives, and to ensure optimum compaction of the FDR mixture. Moisture content monitoring shall comply with the QC procedures outlined in Section 6.0 of Table 1.

7. Construction

User Note: Performance testing (unconfined compressive strength, indirect tensile strength) of field produced and either field or laboratory compacted samples as a QC testing requirement for FDR materials is not recommended. Variations in environmental conditions (ambient temperatures, curing rates, moisture levels, solar influence, wind, etc.) produce inconsistent test results which make it difficult to establish and control testing results.

Immediate coring of FDR materials is not recommended for obtaining performance test samples as a significant amount of time, weeks to months, can be required for the material to fully cure and develop sufficient strength to withstand coring forces.

ARRA is investigating ways to implement performance testing; however, additional research is required to determine reliable field performance testing methods and procedures. At this time, if field testing is mandated by the Owner Agency, specimens must be compacted within the same timeframe and ambient conditions as field compaction, and should be used for information purposes only. Onsite compacted specimens are the only way to simulate actual construction conditions.

7.1 Pulverization

Before the stabilization process begins, the area to be stabilized shall be pre-pulverized, graded, and/or shaped to the lines and grades as shown on the plans and specifications. Pulverization depth measurements of reclaiming shall be obtained at available longitudinal joints according to Section 7.1 of Table 1.

7.2 Cementitious Application and Mixing

Removal and disposal of excess material, if required, shall be performed on the pulverized asphalt, base and subgrade material prior to cementitious treatment. Following pulverization and any trimming, if necessary, the cementitious material shall be spread on or applied to the pulverized material in accordance with the requirements of the mix design and the requirements of section 3.3.1 or 3.3.2 of Table 1.

Apply no more cementitious stabilizing agent to an area than can be adequately mixed within the time constraints of section 7.2.1 of Table 1. Apply cementitious stabilizing agent only when the anticipated weather meets the requirements of section 7.2.2 of Table 1.

If using dry stabilizing agent, water application shall only be added through the mixer/reclaimer's integrated fluid injection system during mixing. Mixing shall continue until the entire mixture, RAP, base and/or subgrade material is pulverized and gradation requirements are met.

Mixing depth measurements of reclaiming shall be obtained at available longitudinal joints according to Section 7.2.3 of Table 1.

7.3 Control Strip

A control strip shall be constructed to determine the optimum rolling pattern required to achieve the specified percent compaction. The control strip shall be established in accordance with the procedures outlined in *ARRA FDR102* and the QC procedures outlined in Section 7.3 of Table 1.

7.4 Compaction

Apply no more cementitious stabilizing agent to an area, and the Contractor shall sequence operations, such that the time constraints of section 7.4.1 of Table 1 are met. At the start of compaction the

moisture content shall meet the requirements of Section 6.0 of Table 1. The mixed material shall be uniformly compacted in one layer. Testing for compaction shall be in accordance with Section 7.4.2 of Table 1.

7.5 Mat Width and Cross-Slope

FDR mat cross-slope shall be measured across the mat width before and after compaction to ensure that the desired cross-slope is achieved, according to Section 7.5.1 of Table 1.

User Note: Depth and cross-slope requirements for a roadway will vary depending on condition of the existing roadway and operations prescribed in the plans and specifications. For roadways that exhibit a loss of profile outside of a 0.5% tolerance from the desired FDR profile, the plans and specifications should stipulate either a constant milling depth, placement depth, or desired cross-slope i.e. the existing cross-slope is 3.0% and the maximum specified is 2.5%. In this scenario a premilling line item should be included where the profile of the existing roadway prohibits obtaining both a depth and cross-slope. In the event that the existing roadway profile is consistent with the desired FDR profile, both a thickness and cross-slope may be specified.

Mat width shall comply with the QC procedures outlined in Section 7.5.2 of Table 1.

User Note: Measurement of FDR mat width is important where the desired mat width is wider than the existing asphalt pavement.

8. Surface Tolerance and Smoothness

Surface tolerance shall be measured as a pavement deviation within a 10 foot (3 m) straight edge utilizing a wedge ruler that can slide between the pavement/straight edge interface to accurately measure the gap. Surface tolerance shall comply with QC procedures outlined in Section 8.0 of Table 1.

User Note: Surface tolerance is important to ensure that end user comfort is maximized and expected long-term performance of the FDR pavement is realized. Use of the International Roughness Index (IRI), Mean Roughness Index (MRI), Profile Index (PI), or Ride Number (RN) for FDR pavements has grown as a measurement of smoothness due to acceptance of these methods for both asphalt and concrete pavements. ARRA believes that these techniques can be used successfully for FDR pavements; however, substantial evidence does not currently exist to determine specification guidelines for the results obtained. ARRA plans to compile results to establish suggested guidelines in the future.

Table 1. Quality Control Requirements by Contractor

Section	Type of Testing	Method	Frequency	Sample Location & Size	Target	Means of Rectification
3.1	Cement (portland or blended hydraulic)	Supplier generated COA[1]	Before use of every delivery load	N/A	According to *ARRA FDR102* and mix design	Do not use and remove material on site
3.2	Self-Cementing Class C Fly Ash	Supplier generated COA[1]	Before use of every delivery load	N/A	According to *ARRA FDR102* and mix design	Do not use and remove material on site
3.3.1	Cement Dry Spread Rate	Volumetric distribution	Every half mile (0.8 km)	From pavement. One 3X3 foot canvas patch test	± 5% of mix design application rate	Adjust application rate and complete non-conformance report if outside tolerance
3.3.2	Cement Slurry Application Rate	Volumetric distribution % solids by drying or hydrometer	Once for every delivery load	Application rate: one delivery load over area applied % solids from batch tank, 1 qt (1 L)	± 5% of mix design application rate	Adjust application rate and complete non-conformance report if outside tolerance
4.1.1	Lime	Supplier generated COA[1]	Before use of every delivery load	N/A	According to *ARRA FDR102* and mix design	Do not use and remove material on site
4.1.2	Lime Slurry Application Rate	Volumetric distribution % solids by drying or hydrometer	Once for every delivery load	Application rate: one delivery load over area applied % solids from batch tank, 1 qt (1 L)	According to *ARRA FDR102* and mix design	Adjust application rate and complete non-conformance report if outside tolerance
4.13	Lime Dry Spread Rate	Volumetric distribution	Every half mile (0.8 km)	From pavement. One 3X3 foot canvas patch test	± 5% of mix design application rate	Adjust application rate and complete non-conformance report if outside tolerance

Section	Type of Testing	Method	Frequency	Sample Location & Size	Target	Means of Rectification
4.2.1	Corrective Aggregate Gradation	Supplier generated COA[1] or laboratory analysis (AASHTO T 11 and T 27 or ASTM C117 and C136)	Before the start of placement and once every 1,000 tons (metric tons) thereafter	From stockpile, in accordance with AASHTO T 2 or ASTM D75 requirements	According to mix design tolerance in *ARRA FDR202*	Alternate source
4.2.2	Corrective Aggregate Physical Properties	Supplier generated COA[1] or laboratory analysis (AASHTO T 96, T 176 and T 85 or ASTM C131, D2419 and C127)	Once before placement	From stockpile, in accordance with AASHTO T 2 or ASTM D75 requirements	According to Table 2 of *ARRA FDR102* and mix design	Alternate source
4.2.3	Corrective Aggregate Addition Rate	Volumetric distribution	Every 1/2 mile (0.8 km)	Application rate: one delivery load over area applied	± 10% of mix design application rate	Adjust aggregate placement
5.1	FDR Maximum Particle Size	AASHTO T 27 ASTM C136 Air dried or wet gradation	Start of day and every 1/2 mile (0.8 km) thereafter	Sample in accordance with AASHTO T 168 or ASTM D979 from mat, minimum weight of 5 lbs. (2.5 kg)	100% passing specified maximum size	Reduce speed of reclaimer and/or adjust mixing chamber door openings
5.2	FDR Gradation	Air dried or wet gradation	Twice/day for first two days and once/day thereafter or if visual change in gradations occurs	Sample in accordance with AASHTO T 168 or ASTM D979 from mat, minimum weight of 22 lbs. (10 kg)	According to mix design tolerance in *ARRA FDR202*	Reduce speed of reclaimer and/or adjust mixing chamber door openings
6.0	Moisture Content of Reclaimed Mixture	AASHTO T 329 AASHTO T 265, ASTM D2216 or ASTM D4643	In control strip and as required	Sample in accordance with AASHTO T 168 or ASTM D979 after all additives have been added to mixture, minimum weight of 20 lbs. (9 kg)	Adjust to achieve desired fluids content for proper mixing and compaction, -1 to +2% of optimum moisture content determined in accordance with ASTM D588	Adjust water
7.1	Depth of Pulverization[2]	Depth probe measurement	Every 500 ft. (150 m)	Across mat width	Minimum plan or specified depth	Adjust pulverization depth

Section	Type of Testing	Method	Frequency	Sample Location & Size	Target	Means of Rectification
7.2.1	Stabilization Application and Mixing Time Constraints	Timepiece	Each construction section	N/A	The first contact of cementitious stabilizing agent with water prior to application on the reclaimed material shall not exceed 60 minutes. The time from cementitious stabilizing agent placement to start of mixing shall not exceed 30 minutes.	Reduce stabilization area or add more equipment to meet time constraints
7.2.2	Ambient Temperature	Any Owner Agency approved method	At the start of each day and every two hours thereafter	N/A	> 35 °F (2 °C) and no freezing temperatures within 7 days of completion of FDR	Suspend reclaiming until temperature requirements can be met
7.2.3	Depth of Stabilized Material	Depth probe measurement	Every 1,000 ft (300 m), recording every 10th measurement	Vertical measurement adjacent to longitudinal joints	Minimum plan and specified depth	Adjust mixing depth
7.3	Control Strip	Nuclear gauge per AASHTO T 355 (ASTM D2950) or Owner Agency approved method[2]	During the first day and if significant changes in reclaimed mix properties occur	One spreader or distributor load	Rolling pattern necessary to meet specified percent compaction	N/A

Section	Type of Testing	Method	Frequency	Sample Location & Size	Target	Means of Rectification
7.4.1	Compaction Time Constraints	Timepiece	Each construction section	N/A	Compaction shall begin no more than 20 minutes after mixing or immediately upon achieving gradation and moisture requirements. All compaction operations shall be completed within 2 hours from start of mixing operations. No section shall be left undisturbed for more than 30 minutes during compaction operations.	Reduce stabilization area or add more equipment to meet time constraints
7.4.2	Reclaimed Material Compacted Density	Nuclear gauge AASHTO T 310 (ASTM D6938) or Sand Cone AASHTO T 191 (ASTM D1556)[2]	Initial control strip and every 1,000 ft. (300 m) as required	Random sampling as per ASTM D3665	≥ 98% of ASTM D588, based on a moving average of five consecutive tests, with no test below 96%	Establish new rolling pattern
7.5.1	Cross-slope[2]	10 ft.(3 m) Straight edge	Every 1000 ft. (300 m)	Across mat width after grading and finish rolling	± 0.1% of desired cross fall	Regrade as necessary
7.5.2	Mat Width	Tape measurement	Ongoing, recording every 1,000 ft. (300 m)	Across mat width	± 2 inches (50 mm)	Adjust reclaimer passes/overlaps
8.0	Surface Tolerance	10 ft. (3 m) Straight edge	Ongoing, recording every 1,000 ft. (300 m)	At joints and ongoing	< 1/2 in. (12 mm) longitudinal and < 3/8 in. (10 mm) transverse	Trimming, milling or abrasive grinding

Notes for Table 1

1. A Certificate of Analysis (COA) provided by the Material Supplier that includes test results that verify that the product supplied meets the minimum specified quality standards.

2. Both pulverization depth and cross-slope requirements for a roadway may not be achievable as described in Sections 7.1 and 7.5.1. FDR material will not compact to the pulverized thicknesses as the RAP will fluff after pulverization and cementitious stabilizing agent application, depending

on material, methods and environmental factors. Because of this material expansion, the elevation of the final FDR pavement may increase compared to the existing pavement. Depending on the road geometry this additional material may be removed and placed in areas where minor cross fall corrections are required. Premilling may also be performed if the final FDR elevation is to match the existing pavement elevation.

3. It has not been determined at this time if electromagnetic gauges are suitable for use on full depth reclamation mixtures; therefore, they are not recommended for use.

SPECIAL PROVISION: RECYCLED ASPHALT PAVEMENT AGGREGATE BASE COURSE

310 PLACEMENT AND CONSTRUCTION OF AGGREGATE BASE COURSE

This work shall be completed in accordance with Section 310 of the latest Uniform Standard Specifications and Details for Public Works Construction sponsored and distributed by the Maricopa Association of Governments (MAG) except as modified herein.

310.1 DESCRIPTION. Remove in its entirety and replace with the following:

This special provision covers the furnishing of all labor, tools, and equipment necessary to reclaim bituminous roadways, as specified below, to form a recycled asphalt aggregate base course. Work under this item shall consist of pulverizing the in-place asphalt pavement, placement of additional recycled asphalt pavement as an aggregate base material, and the compaction of the reclaimed blended material.

310.2 PLACEMENT AND CONSTRUCTION. Remove in its entirety and replace with the following:

310.2.1 Construction Equipment: The pulverization equipment shall be capable of pulverizing the existing asphalt to the required depth. The equipment used for blending the pulverized material with additional recycled asphalt pavement shall be capable of producing a homogeneous and uniformly blended reclaimed mixture. The equipment used for placement of the reclaimed material shall be capable of placement to the proposed lines and grades.

Only self-propelled, high powered, rotary mixers/reclaimers capable of mixing in-place to the required depth shall be used. The cutting drum shall have a minimum required width of 6 feet and be fitted with cutting teeth capable of trimming aggregate and asphalt materials and be so designed that they can be accurately adjusted vertically and held in-place. The machine shall have the strength and rigidity so that it will not develop excessive center deflection. The reclaimer shall have a mechanism for controlling the reclaimed material gradation via a breaker bar and/or door opening on the reclaimer. Disc harrows, bucket teeth and other equipment that does not meet the above requirement shall not be used for pulverization.

The mixer/reclaimer shall be fitted with an integrated water injection system capable of introducing water into the cutting drum during the mixing process. The metering device shall be capable of automatically adjusting the flow of water to compensate for any variation in the amount of reclaimed material introduced in to the mixing chamber. Water added shall be applied from a calibrated meter capable of accurately measuring the amount of water calculated volumetrically based on width, depth and unit weight of processed material with automatic adjustment for working speed. The injection system shall have an automatic digital reading displayed for both

the flow rate of water and total amount of reclaimed material in appropriate units of weight and time.

Compaction of the recycled asphalt aggregate base course shall be completed using self-propelled rollers, complete with properly operating scrapers and water spray systems as necessary. The number, weight and types of rollers shall be as necessary to obtain the required compaction throughout the entire reclaimed thickness. Segmented padfoot, vibratory padfoot, pneumatic-tired, vibratory single or double drum rollers can be used for compaction. Any combination of rollers shall be allowed provided the compaction requirements are met.

310.2.2 Construction Methods: Before any work begins, coordination, identification and location of all utilities within the pulverization operations should occur. Excess dirt, vegetation, standing water, raised roadway markings and other objectionable materials shall be removed by sweeping, blading, or other approved method. All affected utilities shall be identified and protected from damage prior to processing. The profile and cross-slope as shown on the plans shall be referenced for the finished surface. The pulverization sequence shall be constructed in a series of parallel lanes such that longitudinal and transverse joints are minimized.

The subgrade shall be firm and able to support, without yielding or subsequent settlement, the construction equipment and compaction of the recycled asphalt aggregate base course. Soft or yielding subgrade shall be made stable before pulverization construction proceeds.

The pulverization processing shall not be conducted when the asphalt pavement, base, subbase or subgrade is frozen, or when freezing temperatures are anticipated within 7 days of the end of pulverization and subsequent asphalt paving.

310.2.3 In-Place Pulverization: During the first day of production, a control strip of the recycled asphalt aggregate base course shall be constructed in order for the owner agency to evaluate and approve the equipment, construction methodology and workmanship, and to verify that the construction process meets specification requirements. The control strip shall be of adequate size to demonstrate that the equipment, materials and processes proposed can produce a recycled asphalt aggregate base course that conforms to specification requirements. The optimal rates for water and additional imported recycled asphalt pavement shall be established to determine procedures that result in optimum compaction. Passes with various combinations of rollers under static and/or vibratory mode shall be evaluated.

The pulverization operations shall continue through the first day unless the equipment and process fails to meet the requirements for successful completion of pulverization operations. Pulverization operations shall not continue beyond the first day unless a control strip has been approved by the owner agency. Control strips that do not meet specification requirements shall be reworked, recompacted, or removed and replaced. On acceptance of the control strip the same equipment, materials and construction methods shall be used for the remainder of the

pulverization operations, unless adjustments made by the contractor are approved by the owner agency. If adjustments are made, a new control strip shall be constructed.

In lieu of a control strip, the owner agency may allow the contractor to provide proof, based on previous experience with the same equipment, personnel and materials, that the work will conform to specification requirements.

The full depth of asphalt material shall be pulverized. The pulverized in-place asphalt material shall be thoroughly blended with additional passes of the reclaimer to produce a homogenous mixture.

Longitudinal joints between successive pulverization passes should overlap a minimum of 6 inches and transverse joints shall overlap a minimum of 2 feet.

Rubberized crack filler, pavement markers, loop wires, thermoplastic markers and other similar materials shall be removed from the roadway as observed during the pulverization process. Residual materials that cannot be completely removed from the processed materials may be incorporated into the reclaimed materials if it can be demonstrated that those added materials will not adversely affect the performance of the reclaimed layer. Any such materials retained in the mixture shall be appropriately sized and blended so as not to adversely affect the appearance or strength of the reclaimed layer.

310.2.4 Placement of Imported Recycled Asphalt Pavement: Additional recycled asphalt pavement shall be placed above the pulverized in-place asphalt. The additional recycled asphalt pavement shall be obtained from the COP stockpiles located at the City of Prescott Solid Waste Division, 2800 Sundog Range Road, Prescott, Arizona 86301. The Contractor shall coordinate the transportation of the recycled asphalt pavement with the COP prior to construction.

The Contractor shall transport and place the additional recycled asphalt pavement immediately above the pulverized in-place asphalt. The additional recycled asphalt shall be blended with a minimum of the top two inches of the original pulverized asphalt This blending shall be completed with additional passes of the reclaimer such that the reclaimer penetrates into the original in-place pulverized asphalt layer to produce a final homogenous mixture meeting the following gradation requirements:

Sieve Analysis Test Methods AASHTO T-27, T-11	
Sieve Size	**Accumulative Percentage Passing Sieve, by Weight**
	Reclaimed Recycled Asphalt Pavement Base Material
2 in.	100
1-1/2 in.	90 – 100

Sieve Analysis Test Methods AASHTO T-27, T-11	
Sieve Size	**Accumulative Percentage Passing Sieve, by Weight**
	Reclaimed Recycled Asphalt Pavement Base Material
3/4 in.	55 – 90
No. 4	40 – 75
No. 40	10 – 30
No. 200	3 – 10

The gradation of the material shall be tested at a frequency of one test per 25,000 square feet per lift to verify gradation and to ensure that the recycled asphalt aggregate base course layers are being pulverized to the required gradation. The sample shall be taken from the full treatment depth.

Variation from this specification requires approval from the COP Engineer. The recycled asphalt aggregate base course shall be brought to the desired moisture content by means of the mixer/reclaimer's integrated water injection system. The recycled asphalt aggregate base course shall then be graded to a uniform layer that will net, after compacting, the required thickness. The grading operation shall be continued to such extent as may be necessary to minimize segregation. The quantity of water applied shall be that amount which will assure proper compaction resulting in the density required by Section 310.3.

After placement, the recycled asphalt aggregate base course shall be true, even and uniform conforming to the grade and cross-section specified. In no case shall the recycled asphalt aggregate base course vary by more than ½ inch above or below required grade.