

CONTRACT DOCUMENTS

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WATER TRANSMISSION MAIN RELOCATION  
51ST AVENUE AND CACTUS

PROJECT NO. W-823044

CITY OF GLENDALE  
GLENDALE, ARIZONA

1984

MAYOR

GEORGE R. RENNER

COUNCILMEN

RICHARD BELLAH  
JOE A. FALBO  
BRUCE E. HEATWOLE

ROBERT L. HUFFMAN  
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DILLIS WARD

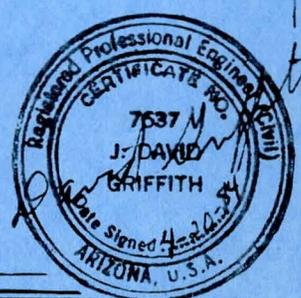
CITY MANAGER

JOHN MALTBIE

CITY CLERK

LAVERGNE BEHM

**JOHN CAROLLO ENGINEERS**  
PHOENIX, AZ • WALNUT CREEK, CA  
FOUNTAIN VALLEY, CA • VISALIA, CA  
TUCSON, AZ



A023.504

ADDENDUM NO. 1  
TO  
WATER TRANSMISSION MAIN RELOCATION  
51ST AVENUE AND CACTUS  
PROJECT NO. W-823044  
CITY OF GLENDALE, ARIZONA

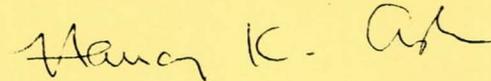
May 2, 1984

In accordance with Section 102, Bidding Requirements and Conditions of the Uniform Standard Specifications for Public Works Construction sponsored and distributed by the Maricopa Association of Governments, and in accordance with the INFORMATION FOR BIDDERS, Page IB-2, Paragraph 5., ADDENDA, of the Contract Documents, the following revisions to the Plans and Specifications shall become a part of the Contract Documents and the Bidder shall acknowledge receipt thereof on Page P-4 of the PROPOSAL.

SPECIFICATIONS

Page NC-1, first paragraph, change time of bid opening from 2:00 P.M. to 3:00 P.M.

JOHN CAROLLO ENGINEERS



Nancy K. Ash

CONTRACT DOCUMENTS

WATER TRANSMISSION MAIN RELOCATION

51ST AVENUE AND CACTUS

Project No. W-823044E

CITY OF GLENDALE

GLENDALE, ARIZONA

1984



JOHN A. CAROLLO, P.E. (1906 - 1971)  
H. HARVEY HUNT, P.E.  
HOWARD M. WAY, P.E.  
DONALD R. PREISLER, P.E.  
GAIL P. LYNCH, P.E.  
WALTER R. HOWARD, P.E.  
J. DAVID GRIFFITH, P.E.  
G. WILLIAM KNOPF, P.E.

S P E C I A L N O T I C E

BIDDER'S ATTENTION IS CALLED TO THE FACT THAT NO BID IS COMPLETE WITHOUT THE RETURN OF THIS BOOK OF PROJECT SPECIFICATIONS AND CONTRACT DOCUMENTS. ADDENDA SHALL BE ATTACHED INSIDE THE FRONT COVER OF THIS BOOKLET.

BIDS WILL BE RETURNED UNOPENED IF NOT SUBMITTED PROPERLY SEALED.

BIDS SHALL BE ENCLOSED IN SEALED ENVELOPES MARKED ON THE OUTSIDE COVER, RIGHT-HAND CORNER WITH:

1. BIDDER'S NAME,
2. PROJECT NUMBER,
3. TITLE OF THE PROJECT,
4. TIME AND DATE BIDS ARE TO BE RECEIVED.

WATER TRANSMISSION MAIN RELOCATION  
51ST AVENUE AND CACTUS

Project No. W-823044E

CITY OF GLENDALE  
GLENDALE, ARIZONA

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NOTICE TO CONTRACTORS

Sealed bids will be received by either mailing to the City Engineer of Glendale, Arizona, 7022 North 58th Drive, Glendale, Arizona, or hand delivered to the City Engineering Office, 6402 West Glendale Avenue until 2:00 P.M., May 22, 1984, for furnishing all necessary labor, plant, equipment, materials, and performing all work for Water Transmission Main Relocation, 51st Avenue and Cactus, Project No. W-823044E, 300 linear feet of 30-inch pipe crossing the Arizona Canal Diversion Channel, Glendale, Arizona, at which time the Proposals will be publicly opened and read aloud in the City Engineering Office Conference Room, 6402 West Glendale Avenue. Any bid received after the hour of closing time will be returned unopened.

Copies of the Plans and Contract Documents are on file at the office of JOHN CAROLLO ENGINEERS, 1314 North Third Street, Suite 300, Phoenix, Arizona 85004 and are open for public inspection and use.

Those interested in having individual sets of Plans and Contract Documents may obtain the Plans and Contract Documents from JOHN CAROLLO ENGINEERS upon payment of Fifteen Dollars (\$15.00) per set, which cost is not refundable whether the Plans and Contract Documents are returned or not.

Each bid shall be in accordance with the Plans, Specifications and Contract Documents, made out on the Bid Form(s) included in the project specifications book and shall be accompanied by a certified or cashier's check or bid bond for five percent (5%) of the amount of the bid, made payable to the order of the City of Glendale, Arizona. All proposal guarantees, except those of the three lowest qualified bidders, will be returned immediately following the opening and checking of proposals. The proposal guarantee of the three lowest qualified bidders will be returned immediately after the Contract Documents have been executed.

Bids will be opened in the City Engineer's office Conference Room at 6402 West Glendale Avenue and publicly read aloud immediately after the hour of closing. Certified or cashier's checks, or bid bond, shall be given as a guarantee that the successful bidder will enter into the contract if awarded him and shall be declared forfeited as liquidated damages if said bidder refuses to enter into said contract after being requested so to do by the City of Glendale, Arizona.

The City of Glendale reserves the right to reject any or all bids or waive any informality in a bid. The City of Glendale is an equal opportunity employer, and minority and women's business enterprises are encouraged to submit bids on this project.

CITY OF GLENDALE, ARIZONA

Dated:

Published:  
The Glendale Star

By: John Maltbie  
City Manager

INFORMATION FOR BIDDERS

PROPOSAL

Bids, to receive consideration, shall be made in accordance with the following instructions:

Before submitting a bid, bidders shall carefully examine the Plans, read the Specifications and the forms of other Contract Documents, visit the site of the work, fully inform themselves as to all existing conditions and limitations, and shall include sums in the bid covering the cost of each item included in the Contract.

Bids shall be properly executed upon the Proposal attached to and made part of these Contract Documents. Numbers shall be stated both in writing and in figures where so required, and the signatures of all persons signing shall be in longhand. The completed forms shall be without interlineations, alterations, or erasures. In case of a difference in written words and figures in a Proposal, the amount stated in written words shall govern unless obviously in error. No book of Contract Documents shall be disassembled.

Bids shall not contain any recapitulations of the work to be done. Alternative proposals will not be considered unless called for. No oral, telegraphic, telephonic, or modified proposals will be considered.

Bids shall be delivered to the office of the City Engineering Department, City of Glendale on or before the day and hour set for the opening 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 see that his bid is received in proper time. Any bids received after the scheduled closing time for receipt of bids will be returned to the bidder unopened.

BID SECURITY

Each Proposal shall be accompanied by a certified check, cashier's check, or bid bond acceptable to the Owner in an amount equal to at least five percent (5%) of the Proposal, payable without condition to the Owner as a guarantee that the bidder, if awarded the Contract, will promptly execute such Contract in accordance with the Proposal and in manner and form required by these Contract Documents and will furnish good and sufficient bond for the faithful performance of the same. The bid securities of the three (3) lowest bidders will be retained until the Contract is signed and satisfactory bonds furnished, or other disposition made thereof. The bid securities of all bidders except the three (3) lowest will be returned promptly after the canvass of bids.

WITHDRAWAL OF BID

Any bidder may withdraw his bid, either personally or by telegraphic or written request, at any time prior to the scheduled closing time for receipt of bids.

CONTRACT AND BONDS

The successful bidder, simultaneously with the execution of the Contract, will be required to furnish a Payment Bond in an amount equal to one hundred percent (100%) of the Contract price and a faithful Performance Bond in an amount equal to one hundred percent (100%) of the Contract price. Said Bonds shall be secured from a surety company satisfactory to the Owner.

The form of Contract, which the successful bidder as Contractor will be required to execute, and the forms of Bonds which he will be required to furnish are included in the Contract Documents and should be carefully examined by the bidder. The Contract and the Bonds will be executed in Four (4) original counterparts.

INTERPRETATION OF PLANS AND DOCUMENTS

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, he may submit to the Engineer a written request for an interpretation or correction thereof. The person submitting the request will be responsible for its prompt delivery. Any interpretation or correction of the proposed documents will be made only by Addendum duly issued and a copy of such Addendum will be mailed or delivered to each person receiving a set of such documents. The Owner will not be responsible for any other explanations or interpretations of the proposed documents.

ADDENDA

Any Addenda issued during the time of bidding, forming a part of the documents loaned to the bidder for the preparation of his bid, shall be covered in the bid and shall be made a part of the Contract.

AWARD OR REJECTION OF BIDS

The Contract will be awarded to the lowest responsible bidder complying with these instructions and with the Notice Inviting Bids. The Owner however, reserves the right to accept or reject any or all bids if it may deem it best for the public good, and to waive any informality in the bids received. The award, if made, will be within 30 days after the opening of bids.

BIDDERS INTERESTED IN MORE THAN ONE BID

No person, firm, or corporation shall be allowed to make, file, or to be interested in more than one (1) bid for the same work unless alternate bids are called for. A person, firm, or corporation who has submitted a subproposal to a bidder, or who has quoted prices on materials to a bidder, is not thereby disqualified from submitting a subproposal or quoting prices to other bidders.

ASSIGNMENT OF CONTRACT

No assignment by the Contractor of any contract to be entered into hereunder, or any part thereof, or of funds to be received thereunder by the Contractor, will be recognized by the Owner unless such assignment has had prior approval of the Owner and the Surety has been given due notice of such assignment in writing and has consented thereto in writing.

SPECIAL NOTICE

Bidders are required to inform themselves fully of the conditions relating to construction and labor under which the work will be or is now being performed, and the Contractor must employ, as far as possible, such methods and means in carrying out his work as will not cause any interruption or interference to any other contractor.

CITY OF GLENDALE TRANSACTION PRIVILEGE TAX

The City of Glendale transaction privilege tax shall be waived under the conditions of this Contract; however, the Contractor shall be responsible for reporting and payment of all other county, state, and/or federal taxes.

PLANS AND SPECIFICATIONS TO SUCCESSFUL BIDDER

The successful bidder may obtain ten (10) sets of Plans and Specifications for this project at no extra cost.

If he desires more than the ten (10) sets, he may purchase additional sets of Plans at the cost of reproduction and Specifications at Ten Dollars (\$10.00) per set from JOHN CAROLLO ENGINEERS.

TIME OF COMPLETION

The Contractor shall commence work under this Contract on or before the tenth day after receiving written Notice to Proceed from the Engineer on behalf of the Owner and shall fully complete all work under this Contract within the overall one hundred and twenty consecutive calendar days beginning with the day following the date of such Notice. However, actual construction time at the site shall be limited to 28 consecutive calendar days during the annual Salt River Project dry-up period that the water treatment plant will be shut down. The dry-up period will be

scheduled by the SRP for the period of approximately November 15, 1984 to December 15 1984. Sequencing of work shall be per paragraphs 010600 and 011100. The Contractor shall at all times during the continuance of the Contract prosecute the work with such force and equipment as are sufficient to complete it within the time specified.

PRE-BID CONFERENCE

A pre-bid conference will be held on May 15, 1984 at 10:00 A.M. in the Engineering Conference Room, 6402 W. Glendale Avenue, Glendale, Arizona. Bidders, contractors, and other interested parties are invited to attend this conference which will be conducted by the Owner and Engineer to answer any questions.

NONPERFORMANCE OF WORK TASKS BY THE CONTRACTOR

If the Contractor fails, neglects, or refuses to perform work tasks necessary for the completion of the total job; to replace defective work; or to repair or resurface, in a manner that is acceptable to the Owner and Engineer, public rights-of-way disturbed by his work which are a nuisance, a hazard, or which impedes or endangers vehicular traffic and the public, the Owner may serve written notice upon the Contractor of his intention to have the work performed by others. Unless within three (3) 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 Owner and Engineer, the Owner will proceed to have the work accomplished by others and deduct the costs thereof from amounts due the Contractor.

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## GENERAL CONDITIONS - PART 1

DEFINITIONS

Wherever in these Specifications, or in other Contract Documents, the following terms are used, the intent and meaning shall be interpreted as shown below. Additional definitions and abbreviations pertaining to this project will be found in Special Conditions, Section 010090.

1-1 DEFINITIONS

**ADDENDUM:** A supplement to any of the Contract Documents issued, in writing, after advertisement of but prior to the opening of bids for a Contract.

**ADVERTISEMENT:** The public announcement, as required by law, inviting bids for work to be performed or materials to be furnished.

**AWARD:** The formal action of the governing body in accepting a proposal.

**BID SECURITY:** Refers to the certified check, cashier's check, or surety bond, which is required to be submitted with the Proposal to insure execution of the Contract and the furnishing of the required bonds.

**BIDDER:** Any individual, firm, copartnership, or corporation submitting a Proposal for the work contemplated, acting directly or through a duly authorized agent.

**CHANGE ORDER:** A written order issued by the Owner ordering the Contractor to make changes in the work or to perform extra work, and setting forth conditions for payment and adjustment in time of completion.

**CITY:** A municipal corporation, organized and existing under and by virtue of the laws of the State.

**CLERK:** The word "Clerk" refers to the duly authorized person who performs the duties of Clerk of the Contracting Agency.

**CONTRACT:** The written instrument executed by the Contractor and the Owner by which the Contractor is bound to furnish all labor, equipment, and materials and to perform the work specified, and by which the Owner is obligated to compensate the Contractor therefore at the prices set forth therein. The Contract Documents are herewith by reference made a part of the Contract as if fully set forth therein.

**CONTRACT DOCUMENTS:** The words "Contract Documents" include the Notice Inviting Bids, Information for Bidders, General Conditions, Special Conditions, Specifications, Measurement and Payment or Instructions for Preparing Proposal, Proposal, Contract, Payment Bond, Performance Bond, Plans, and Addenda thereto.

**CONTRACTING AGENCY:** The legal entity that has contracted for the performance of the work or for whom the work is being performed.

**CONTRACTOR:** The person or persons, copartnership, or corporation who has or have entered into a contract with the Owner as a party or parties of the first part or his or their legal representatives.

**DAYS:** Unless otherwise designated, days will be understood to mean calendar days.

**DESIGN ENGINEER:** The firm or person and his properly authorized assistants, designated by the Owner to prepare Plans and Specifications for the work.

**ENGINEER:** The firm or person and his properly authorized assistants, designated by the Owner to inspect construction of the work for compliance with the Plans and Specifications.

**MATERIALS:** The word "materials" includes, in addition to material incorporated in the project, equipment and other material consumed in the performance of the work.

**NOTICE TO CONTRACTORS:** Refers to the standard forms inviting Proposals or bids.

**NOTICE TO PROCEED:** A directive issued by the Owner, authorizing the Contractor to start the work or improvements required in the Contract.

**OWNER:** The word "Owner" refers to the individual, company, municipality or other legal entity that has contracted for the work or for whom the work is being performed.

**OWNER'S REPRESENTATIVE OR OWNER'S AGENT:** The authorized representative of the Owner, which may be an individual or a firm, the Engineer, or his 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.

**PAYMENT BOND:** A bond furnished by the Contractor and an acceptable surety, conditioned upon the Contractor promptly paying all monies due persons supplying labor or material to be used in prosecution of the Contract.

**PERFORMANCE BOND:** A bond furnished by the Contractor and an acceptable surety, conditioned on the faithful performance and completion of the work covered by the Contract.

**PLANS:** All drawings or reproductions thereof pertaining to details of the work and which are made a part of the Contract Documents.

**SPECIAL CONDITIONS:** The special conditions and requirements, applicable to the work, that are not covered in detail under other sections of these Contract Documents.

**SPECIFICATIONS:** The directions, provisions, and requirements for performing the work, as contained in the Contract Documents.

**SUBCONTRACTOR:** The word "subcontractor" includes those having a direct contract with the Contractor and those who furnish material worked into a special design according to the Plans and Specifications for this work, but does not include those who merely furnish material not so worked.

**SURETY:** Refers to the person or firm with whom the Contractor joins in assuming the liability for the performance of the Contract by issuing the bonds required by law.

**TOWNSHIP, CITY, TOWN, OR DISTRICT:** A subdivision of the County used to designate or identify the location of the proposed work.

**WORK:** The word "work" or "improvement" includes any or all of the improvements mentioned and authorized to be made, and the construction, reconstruction, and repair of all, or any portion of such improvements, and all labor, services, incidental expenses, and material necessary or incidental thereto.

## GENERAL CONDITIONS - PART 2

BIDDING REQUIREMENTS AND CONDITIONS2-1. SUBMITTING BIDS

No bid will be considered unless it is made upon the Proposal forms contained in and submitted with the book of Contract Documents. No book of Contract Documents shall be disassembled.

No bid shall be considered which is deemed as an irregular Proposal. Proposals may be considered irregular and may be rejected by the Owner if they show any alterations of form, unauthorized additions, unauthorized conditional or alternate bids, incomplete bids, obviously unbalanced prices, erasures, or irregularities of any kind.

No bid will be considered unless accompanied by the Bid Security in the type and amount set forth in Information for Bidders.

Bids shall be submitted in a sealed envelope.

Proposals will be received until the hour and date set for the opening thereof, and must be, by that time, in the hands of officials so designated in Notice Inviting Bids. Proposals received after the time set for opening of bids will be returned to the bidders unopened.

The bids will be publicly opened and read at the time and place designated in the Notice Inviting Bids.

The Owner reserves the right to reject any or all bids when deemed advisable for the public good.

2-2 EXAMINATION OF PLANS AND SITE OF WORK

The bidder is required to examine carefully the site of the proposed work, the Plans, Specifications, Special Conditions, Proposal, Contract Agreement, and Bond forms before submitting a Proposal. Submission of a Proposal shall be considered prima facie evidence that the bidder has made such examination and is satisfied as to the conditions to be encountered in performing the work and as to the requirements of the Plans, Specifications, and other Contract papers.

2-3 DISQUALIFICATION OF BIDDERS

More than one Proposal for the same work from an individual, a firm or partnership, a corporation, or an association under the same or different names, will not be accepted. Reasonable ground for believing that any bidder is interested in more than one Proposal for the same work, will cause the rejection of all Proposals for the work in which such a bidder is interested. Any or all Proposals will be rejected if there is reason for believing that collusion exists among any of the bidders.

GC 2-2.

2-4 ADDENDA

Any Addenda issued during the time of bidding, forming a part of the Documents issued to the bidder for the preparation of his bid, shall be covered in the bid and shall be made a part of the Contract.

## GENERAL CONDITIONS - PART 3

AWARD AND EXECUTION OF CONTRACT3-1. AWARD

The Owner, through its duly authorized body or agent, will award the Contract to the lowest responsible bidder, or all bids will be rejected, as soon as practicable after the date of opening of bids.

A Notice of Award will be sent to the successful bidder by mail.

The low bid will be determined by the lowest net total arrived at by combining the bidder's lump sum and unit price totals or lump sum base bid price and the bid prices of the alternates that are selected and accepted by the Owner. The Owner may accept or reject any or all alternates.

3-2 EXECUTION OF CONTRACT

The successful bidder shall, within the time specified in Information for Bidders, execute the Contract and simultaneously therewith furnish the required Payment Bond and Performance Bond, in the amounts indicated in the Information for Bidders, and shall file insurance policies and/or certificates of insurance as required herein.

3-3 CONTRACTOR'S INSURANCE

GENERAL: On all projects, the Contractor shall carry all insurance required by Federal, State, County, and local laws. The Contractor shall procure and maintain, during the life of the Contract, adequate fire, workmen's compensation, public liability, and property damage insurance. The specific requirements for insurance as set forth in these General Conditions, shall be considered as minimum requirements.

The Contractor shall furnish satisfactory proof of carriage of insurance, or satisfactory proof of an approved self-insured program, and shall submit to the Owner, before work on the Contract starts, certificates of all insurance policies, bonds, or self-insured programs. Neither the Contractor, nor any subcontractor, shall commence work under this Contract until the Owner has approved all required insurance policies. The certificates of insurance shall be attached to the Contract by the Owner and filed in the Owner's office.

Certificates of said policies shall provide that if the said policy or policies be cancelled by the insurance company during the term of the Contract, that thirty (30) days written notice prior to cancellation will be given the Owner. Insurance certificates will be retained by the Owner. Insurance certificates shall set forth the following information and shall be signed by an authorized representative of the insurance company:

Name and address of the insured

The location of the operations to which the insurance applies

The number of the policy and the type or types of insurance in force thereunder on the date borne by the certificate

The expiration date of the policy and the limit or limits of liability thereunder on the date borne by the certificate

A statement that the insurance covered by the certificate applies to all of the operations on and at the site of the project which are undertaken by the insured during the life of the Contract

Public liability and Comprehensive General Liability, completed operations broad form property damage insurance shall include elevator liability, water damage liability, and automobile liability including nonowned and rented cars

A statement that all coverage is on an occurrence basis rather than an accident basis

A statement that "explosion, collapse, and underground" coverage is included

A provision that the policy or policies may not be cancelled or reduced in coverage until at least thirty (30) days after written notice has been sent to the Owner

A statement that a cross liability or severability of interests clause is included (unless a separate policy covering the Owner is provided)

In lieu of an insurance certificate setting forth all the required information concerning the coverages, a copy of the complete policy or policies may be furnished to the Owner.

**COMPENSATION INSURANCE:** The Contractor shall take out and maintain Workmen's Compensation Insurance for all his employees employed at the site of the project during the life of his Contract. In case any work is sublet, the Contractor shall require each subcontractor to provide Workmen's Compensation Insurance for his employees unless such employees are covered by the Contractor. The above coverage is required unless such employees are covered by the protection afforded by the Contractor under a self-insurance plan or with a private carrier approved by the State Industrial Commission.

In the event any class of employees engaged in hazardous work under this Contract is not protected by the Workmen's Compensation Statute, the Contractor shall provide, and shall cause the subcontractor to provide special insurance for the protection of such employees not otherwise protected.

COMPREHENSIVE GENERAL LIABILITY AND PROPERTY DAMAGE INSURANCE: The Contractor shall procure, and maintain during the life of his Contract, such comprehensive general liability and property damage insurance necessary to protect him, the Owner, John Carollo Engineers, or any subcontractor performing work under his Contract, from all claims for bodily injury, including accidental death and property damage claims arising from operations under this Contract, whether such operations are the Contractor's or the subcontractors'. The Owner and John Carollo Engineers shall be named as additional primary insureds without offset against their existing insurance, and the certificate of insurance shall include reference to such provisions.

Unless otherwise specifically required by the Special Conditions, the minimum limits of comprehensive general liability and property damage liability shall be as follows:

Comprehensive general liability insurance for injuries, including accidental death, to any one person in an amount not less than	\$1,000,000
Subject to the same limits on account of one occurrence, in a total amount not less than	\$1,000,000
Broad form property damage insurance in an amount not less than	\$1,000,000

Such policy shall not exclude coverage for the following:

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; or

To moving, shoring, underpinning, raising, or demolition of any building or structure, or removal or rebuilding of any structural support thereof.

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 therefrom.

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

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 One Million Dollars (\$1,000,000) for one person, and One Million Dollars (\$1,000,000) for more than one person, and property damage in the sum of One Million Dollars (\$1,000,000) resulting from any one occurrence which may arise from the operations of the Contractor in performing the work provided for herein.

The Contractor shall carry and maintain fire and extended coverage with an endorsement for vandalism and malicious mischief in his name and also in the name of the Owner in an amount of at least fifty percent (50%) of the value of the Contract. Except that on pipeline and similar projects where fire hazard is negligible or nonexistent the Owner may waive the requirement for fire insurance.

The Contractor shall secure "All Risk" type Builder's Risk Insurance for Work to be performed. Unless specifically authorized by the Owner, the amount of such insurance shall not be less than fifty percent (50%) 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 Owner.

If the Owner is added as an additional insured, the policy or policies shall contain a cross liability or severability of interest clause. As an alternative, the Contractor may secure, in the name of the Owner, and pay for an Owner's Protective Policy for the minimum limits required. In this event, the original policy shall be filed with the Owner in lieu of a certificate of insurance.

#### 3-4. NOTICE TO PROCEED

The Contractor or subcontractor shall not start work on any part of the project until a Notice to Proceed has been issued by the Owner. The Notice to Proceed will be sent to the Contractor by mail or delivered to him in person.

#### 3-5 ASSIGNMENT OF PAYMENTS

Claims for monies due or to become due the Contractor may be assigned to a bank, trust company, or other financing institution, and may thereafter be further assigned and reassigned to any such institution. Any such assignment or reassignment may be made to one (1) party as agent or trustee for two (2) or more parties participating in such financing.

No assignment by the Contractor of any Contract to be entered into hereunder, or of any part thereof, or of funds to be received thereunder by the Contractor will be recognized by the Owner unless such assignment has had prior consent of the Owner and the Surety has been given due notice of such assignment in writing and has consented thereto in writing.

## GENERAL CONDITIONS - PART 4

COMMENCEMENT, PROSECUTION, AND PROGRESS4-1 COMMENCEMENT

The Contractor or subcontractor shall commence work on or before the tenth (10th) day after receiving the Notice to Proceed, and shall complete all work under the Contract within the period of time specified in the Special Conditions. Notice to Proceed will be issued not later than thirty (30) days after the Contract has been awarded unless otherwise agreed upon in writing, or as may be specified in the Special Conditions.

4-2 SUBCONTRACTORS

Subcontracts shall be in accordance with, and the Contractor shall be bound by, the following provisions:

All subcontracts shall be subject to review and acceptance by the Owner.

All subcontracts shall be in writing and shall provide that all work to be performed thereunder shall be performed in accordance with the terms of the Contract.

True copies of any and all subcontracts shall be furnished to the Owner; however, prices may be omitted.

Subcontractors shall conform to the regulations governing employment of labor.

The subcontracting of any part of the work will in no way relieve the Contractor of his responsibility or liability or obligation under the Contract.

All subcontracts and purchase orders for equipment shall state and establish guaranteed delivery dates, at such times as determined by the Contractor, that will allow the Contractor to complete the project within the Contract time.

4-3 CONTRACTOR'S REPRESENTATIVE AND EMERGENCIES

The Contractor shall at all times be present at the work in person or represented by a competent superintendent who shall supervise and direct the work and shall be authorized by the Contractor to receive and fulfill instruction from the Owner's Representative.

The Contractor shall, at all times during working hours, be represented in all matters pertaining to this project by one, and only one, fully competent and experienced general superintendent. Instructions and information given by the Engineer to the Contractor's superintendent on the work shall be considered as having been given to the Contractor. Before any work is done at the jobsite, the Contractor shall give written notice to the Engineer stating who the Contractor's superintendent will be, giving his home address and telephone number. The Engineer shall be informed in writing prior to any change of general superintendent. A statement naming more than one representative at a time to be in charge and depending upon which is present at the time will not be acceptable.

Emergencies may arise during the progress of the work which may require special effort or require extra shifts of men to continue the work beyond normal working hours. The Contractor shall be prepared in case of such emergencies from whatever cause, to do all necessary work promptly.

#### 4-4 CONTRACT DOCUMENTS

The Contractor shall keep on the work a copy of the Contract Documents and shall at all times give the Engineer access thereto.

The Notice Inviting Bids, Information for Bidders, Special Conditions, 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 Engineer for furnishing of detail instructions. In case of discrepancies, the Specifications shall govern over the Plans. Figured dimensions shall govern over scaled dimensions.

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.

#### 4-5 ADDENDA, REVISIONS AND SUPPLEMENTARY DRAWINGS

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

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

#### 4-6 ERRORS AND OMISSIONS

The written dimensions on the Plans are presumed to be correct, but the Contractor shall be required to check carefully all dimensions before beginning the work. If any errors or omissions are discovered, the Engineer shall be so advised in writing and will make the proper corrections. Any such adjustments made by the Contractor without prior review and acceptance shall be at his own risk, and the settlement of any complications or disputed expenses arising from such adjustment shall be made by the Contractor, at his own expense.

#### 4-7 QUALIFICATIONS FOR EMPLOYMENT

No person under the age of sixteen (16) years for normal occupations, no person under the age of eighteen (18) years in hazardous occupations, and no person currently serving a sentence in a penal or correctional institution shall be employed to perform any work under this Contract.

No person whose age or physical condition is such as to make his employment dangerous to his health or safety, or to the health and safety of others, shall be employed to perform any work under this Contract provided, however, this condition shall not operate against the employment of physically handicapped persons who, otherwise employable, may safely be assigned to work which they can ably perform.

#### 4-8 CHARACTER OF WORKMEN

Whenever, in the opinion of the Engineer, any superintendent, foreman, or workman employed by the Contractor or his subcontractors is disrespectful, intemperate, disorderly, or otherwise objectionable, he shall, at the written request of the Engineer, be removed and not again employed on the work without the written consent of the Engineer.

#### 4-9 SUSPENSION OF WORK

The Contractor shall 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.

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

#### 4-10 DELAYS AND EXTENSION OF TIME

The Contractor may be entitled to an extension of Contract time if the work has been suspended pursuant to the preceding article, in whole or in part, or where other conditions occur which delayed progress and

which are clearly beyond the control of the Contractor, provided that in either case the Contractor is not at fault and is not negligent under the terms of the Contract. Extension of time shall be as determined by the Owner.

In setting the Contract time, it has been assumed that up to 20 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 twenty (20) working days lost due to bad weather conditions.

To receive consideration, a request for extension of time must be made in writing to the Engineer stating the reason for said request, and such request must be received by the Engineer within ten (10) days following the end of the delay-causing condition.

The Owner shall ascertain the facts and the extent of the delay, and its findings of the facts thereon shall be final and conclusive. Attention is directed to the nearest weather bureau station in the vicinity of the Work for determining the extremes of temperature, wind velocities, and the amount and intensity of precipitation that can be expected. Weather conditions that have occurred within the three years prior to contract award will not be classified as severe weather conditions for granting extensions of time.

An extension of time may be granted by the Owner 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.

#### 4-11 TERMINATION FOR BREACH OF CONTRACT

If the Contractor refuses or fails to prosecute the work or any separable part thereof with such diligence as will ensure its completion within the time specified herein, or any extension thereof, or fails to complete such work within time, or if he or any of his subcontractors should violate any of the provisions of the Contract, the Owner may serve written notice upon the Contractor and his surety of their intention to terminate the Contract, said notice to contain the reasons for such intention to terminate the Contract, and unless within ten (10) days after the service of such notice such violations shall cease and satisfactory arrangements for the corrections thereof be made, the Contract shall, upon the expiration of said ten (10) days cease and terminate.

In the event of any such termination, the Owner shall immediately serve written notice thereof upon the Surety and the Contractor, and the Surety shall have the right to take over and perform the contract; provided, however, that if the Surety within fifteen (15) days after the serving upon it of a notice of termination does not give the Owner written notice of his intention to take over and perform the Contract,

or does not commence performance thereof within thirty (30) days from the date of serving said notice, the Owner may take over the work and prosecute the same to completion by contract or by any other method the Owner may deem advisable for the account and at the expense of the Contractor, and his surety shall be liable to the Owner for any excess cost or other damage occasioned the Owner thereby, and in such event the Owner may, without liability for so doing, take possession of and utilize in completing the work such materials, appliances, plants and other property belonging to the Contractor that may be on the site of the work and be necessary therefor. For any portion of such work that the Owner elects to complete by furnishing employees, materials, tools and equipment, the Owner shall be compensated for such in accordance with the schedule of compensation for force account work in the section on payment for changes in the work.

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

#### 4-12 METHODS AND APPLIANCES

The methods and equipment adopted by the Contractor shall be such as will secure a satisfactory quality of work and will enable the Contractor to complete the work in the time agreed upon. The selection and use of these methods and appliances is the responsibility of the Contractor.

#### 4-13 DATE OF ACTUAL COMPLETION

The date upon which the project will be considered as complete shall be that date upon which the work is accepted by the Owner.

#### 4-14 FINAL ACCEPTANCE

After the Contractor has completed to the best of his knowledge all the work under this Contract, including all of the Contractor's testing and cleanup, the Contractor shall then inform the Engineer by written memorandum that the work has been completed. The Contractor shall then request a final inspection by the Engineer. The Engineer will then make an inspection. If items are found by the Engineer to be incomplete or not in compliance with the Contract requirements, the Engineer will inform the Contractor of such items. After the Contractor has completed these items, the procedure shall then be the same as specified above for the Contractor's statement of completion and request for final inspection.

After all work under the Contract has been completed, as determined by the Engineer, and after the Owner's final seven-day (7-day) test operation if such is required, the Engineer will recommend in writing to the Owner that final acceptance of the entire work under this Contract be made as of the date of the Engineer's final inspection. The Owner will make final acceptance promptly after receiving the Engineer's recommendation.

Unless otherwise specified under Special Conditions, no partial acceptance of any portion of the work will be made and no acceptance other than the final acceptance of the overall completed project will be made. No inspection or acceptance pertaining to specific parts of the project shall be construed as final acceptance of any part until the overall final acceptance by the Owner is made.

4-15 CONSTRUCTION SAFETY PROGRAM AND REGULATIONS

The Arizona Occupational Safety and Health Act and the conditions set forth in the Occupational Safety & Health Standards (OSHA) shall constitute the outline for the Safety program to be adhered to during the course of the project. A copy of these publications shall be available at the jobsite for reference.

4-16 TRAFFIC CONTROL

Traffic control shall be as specified under Special Conditions.

4-17 SANITATION

The Contractor shall provide 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 State. 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.

4-18 WATER

The Contractor shall supply adequate pure cool drinking water with individual drinking cups for the use of employees on this construction. The quality of drinking water shall meet the "Standards for Public Water Supplies" specified in the State Health Department Code.

It shall be the responsibility of the Contractor to provide and maintain at his own expense an adequate supply of water for his use for construction and to install and maintain necessary supply connections and piping for same. Before final acceptance of the completed project, all temporary connections and piping installed by the Contractor shall be removed.

The Contractor shall apply for a fire hydrant meter and pay for all construction water used at the current rates charged by the Owner or public utility, if the Contractor desires to obtain water from the distribution system at any point.

#### 4-19 PROTECTION OF WORK AND CLEANING UP

The Contractor shall be responsible for the protection of all work until its completion and final acceptance, and he shall at his own expense, replace damaged or lost material, or repair damaged parts of the work, and the Contractor and his Sureties shall be liable therefor.

The Contractor shall remove from the vicinity of the completed work all plant, surplus material, or equipment belonging to him or used under his direction during construction. All surplus excavated material, concrete, plaster, and debris of all kinds shall be removed from the Owner's premises, streets, or portions of building or property at or adjacent to the site of the work excepting that select material which may be required for refilling or grading the surface. Salvage material shall be stored at areas designated by the Engineer. Where an area is indicated to be "cleared", all weeds, vegetation, shrubs, and trees shall be removed unless they are specifically noted as not to be removed.

#### 4-20 GUARANTEE OF WORK

The Contractor shall guarantee the work against defective materials or workmanship for a period of one (1) year from the date of its final acceptance under this Contract except where longer guarantee periods are specifically stated. It shall be the Contractor's responsibility to insure himself that manufacturer and supplier warranties are in compliance with the terms of these Contract Documents.

All work which has been rejected shall be remedied, or removed and replaced, by the Contractor at his own expense, with work conforming to the Plans and Specifications. Any defective material or workmanship which may be discovered before final acceptance or within one (1) year thereafter shall be corrected immediately by the Contractor at his own expense, notwithstanding that it may have been overlooked in previous inspections and estimates. Failure to inspect work at any stage shall not relieve the Contractor from any obligation to perform sound and reliable work as herein described. It is the Contractor's ultimate responsibility to deliver at the time of final acceptance a complete project that complies in all details with these Contract Documents. All items shall be ready to operate.

Any omission or failure on the part of the Engineer to discover or notify the Contractor of or to condemn defective work or material at the time of construction shall not be deemed an acceptance, and the Contractor will be required to correct defective work or material prior to final acceptance.

The Engineer will endeavor to locate any errors or defective materials or workmanship and call them to the attention of the Contractor prior to subsequent work being performed. However, the Engineer is under no obligation to do so and neither the Owner nor the Engineer shall be held liable because errors or defective material or workmanship by the Contractor are not discovered by the Engineer prior to subsequent work.

During the one (1) year guarantee period, should the Contractor fail to remedy defective material and/or workmanship, or to make replacements within five (5) days after written notice by the Owner, it is agreed that the Owner 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.

In the event it is necessary for the Owner to file suit to enforce any liability of the Contractor pursuant to this section GUARANTEE OF WORK, the Owner shall be entitled to recover from the Contractor, in addition to all other amounts found due and owing, a reasonable sum as and for attorney fees.

#### 4-21 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.

#### 4-22 LIQUIDATED DAMAGES

It is agreed by the parties to the Contract that in case all the work called for under the Contract is not completed before or upon the expiration of the time limits set forth in the Contract Documents, damage will be sustained by the Owner, and that it is and will be impracticable to determine the actual damage which the Owner will sustain in the event of and by reason of such delay, and it is therefore agreed that the Contractor will pay to the Owner an amount specified in the Special Conditions for each calendar day between the completion date required by the Contract, and the date of final acceptance by the Owner, as liquidated damages and not as penalty. It is further agreed that the amounts stipulated are reasonable estimates of the damages that would be sustained by the Owner and the Contractor agrees to pay such liquidated damages as herein provided. In case the liquidated damages are not paid, the Contractor agrees that the Owner may deduct the amount thereof from any money due to or that may become due the Contractor by progress payments or otherwise under the Contract, or if said amount is not sufficient, recover the total amount.

The Contractor shall not be assessed with liquidated damages during any delay in the completion of the work caused by acts of God, acts of criminals, acts of the Owner, acts of the public utilities, fire, floods, epidemics, quarantine restrictions, labor strikes that delay the

critical sequence of the work, and unusually severe weather or delays of subcontractors due to such causes, provided that the Contractor shall notify the Owner in writing the causes of such delay as stated hereinbefore.

4-23 NOTICE AND SERVICE THEREOF

Any Notice to the Contractor from the Owner 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 Registered mail, to the said Contractor at his last given address, or delivered in person to said Contractor or his authorized representative on the work.

## GENERAL CONDITIONS - PART 5

SCOPE OF WORK5-1 INTENT OF PLANS AND SPECIFICATIONS

The intent of the Plans and Specifications is to prescribe a complete work or improvement which the Contractor shall perform in a manner acceptable to the Engineer and in full compliance with the terms of the Contract. The Contractor shall provide the Owner with a complete and operable work or improvement, even though the Plans and Specifications may not specifically call out all items or items of work required of the Contractor to complete his tasks, incidental appurtenances, materials, and the like.

The Contractor shall perform the work in accordance with the lines, grades, cross sections, and dimensions indicated on the Plans and detailed drawings.

Unless otherwise specified in the Special Conditions, 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 time specified.

5-2 CHANGES IN THE WORK

The Owner, without invalidating the Contract and without notification of Sureties, 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 Owner. All such work shall be executed under the conditions of the original Contract except that any claim for extension of time and additional costs caused thereby shall be adjusted at the time of ordering such change or extra work.

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

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 Owner shall have the right to make such changes, from time to time, in the Plans, in the character of the work, and in the termini of the project as may be necessary or desirable to insure the completion of the work in the most satisfactory manner without invalidating the Contract.

Any change ordered by the Owner which involves installation of work essential to complete the Contract, but for which no basis of payment is provided for herein, said payment therefor shall be subject to negotiation.

Upon demand of either the Contractor or the Owner an equitable adjustment satisfactory to both parties shall be made in the basis of payment for extra work. The prices agreed upon and any agreed upon adjustment in Contract time shall be incorporated in the written order issued by the Owner, which shall be written so as to indicate acceptance on the part of the Contractor as evidenced by his signature. In the event prices cannot be agreed upon, the Owner reserves the right to terminate the Contract as it applies to the items in question 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 on a force account basis as provided hereinafter.

5-3 FORCE ACCOUNT

LABOR: For all labor and for foremen in direct charge of the specific operations the Contractor shall be paid:

The actual cost of wages paid by him but at rates not to exceed those for comparable labor currently employed on the project

The actual cost of industrial accident or Workmen's Compensation Insurance

The actual cost of social security taxes and unemployment compensation insurance

The actual amounts paid by the Contractor by reason of an employment Contract generally applicable to his employees

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

In case work is performed by a subcontractor, the said fifteen percent (15%) will be added only once to the actual cost of the work, however, the Contractor may add ten percent (10%) to the Subcontractor's price to cover his own overhead.

TOOLS AND EQUIPMENT: For any machine power tools and special or heavy equipment used, the Contractor shall be paid in accordance with the latest approved Schedule of Equipment Rental Rates. 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 and no allowance shall be made for the use of small tools and minor items of equipment which shall be considered as part of the overhead. As used herein, such tools and equipment are defined as individual tools or pieces of equipment having a replacement value of Fifty Dollars (\$50.00) each or less.

**MATERIALS:** For all materials accepted by the Engineer 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 fifteen percent (15%) thereof.

**SUPERVISION AND OVERHEAD:** No allowance shall be made for general superintendence. The cost of supervision and overhead is presumed to be included in the fifteen percent (15%) added in accordance with the above.

**RECORDS:** The Contractor's representative and the Engineer shall compare the records of the work performed as ordered on a force account basis as the end of each day on which such work is performed. Copies of these records shall be made on suitable forms provided for this purpose and signed by both the Engineer and the Contractor's representative. All claims for work done on a force account basis shall be certified and submitted to the Engineer by the Contractor, and such statements shall be filed with the Engineer not later than the fifth (5th) day of the month following that in which the work was actually performed.

#### 5-4 EXTRA WORK

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

#### 5-5 CHANGE ORDER

The value of such work or change shall be determined and paid for with a Change Order in one of the following ways unless paid by force account:

By unit prices mutually agreed upon by the Owner and Contractor.

By a lump sum based upon the Contractor's estimate and the Engineer's review and acceptance of the estimate. The Contractor shall do such extra work and furnish material and equipment therefor upon receipt of an accepted Contract Change Order or other written order of the Owner, and in the absence of such Contract Change Order or other written order of the Owner, the Contractor shall not be entitled to payment for such extra work. Payment for extra work required to be performed pursuant to the provisions of this section, in the absence of an executed Contract Change Order, will be made by force account as provided herein, or as agreed to by the Contractor and the Owner. However, in no case shall work be undertaken without written notice from the Owner to proceed with the work.

#### 5-6 CLAIMS FOR EXTRA WORK

If the Contractor claims that any instructions involve extra cost under this Contract, he shall give the Owner written notice thereof within forty-eight (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 under CHANGES IN THE WORK. No such claim shall be valid unless so made.

## GENERAL CONDITIONS - PART 6

CONTROL OF WORK6-1 WORK SCHEDULE

Prior to the commencement of the work the Contractor shall prepare and submit to the Engineer for review, a written schedule covering the general sequence of the work to be performed. The work schedule, after review and acceptance by the Engineer, shall not be changed without written consent of the Engineer. The Contractor shall assume the full responsibility for performing the work in an orderly procedure under the Contract.

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 ten (10) 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.

6-2 AUTHORITY OF THE ENGINEER

The Engineer will decide all questions which may arise as to the quality and acceptability of materials furnished and work performed; all questions which may arise as to the interpretation of the Plans and Specifications; and all questions as to the satisfactory and acceptable fulfillment of the Contract on the part of the Contractor.

Written permission must be obtained from the Engineer to perform any work after regular hours, on Sundays, or on legal holidays. Work performed at these times shall be done at no additional expense to the Owner.

6-3 FORMAL PROTEST

If the Contractor considers any work demanded of him to be outside the requirements of the Contract, or if he considers any instructions, ruling, or decision of the Engineer to be unfair, he shall, within ten (10) days after any such demand is made, or instruction, ruling or decision is given, file a written protest with the Engineer, stating clearly and in detail his objections and the reasons therefor. Except for such protests as are made of record in the manner and within the time above stated, the Contractor shall be deemed to have waived and does hereby waive all claims for Extra Work, damages and extensions of time resulting from demands, instructions, rulings and decisions of the Engineer.

Upon receipt of any such protest from the Contractor, the Engineer shall review the demand, instructions, rulings, or decisions objected to and shall promptly advise the Contractor in writing of his final decision, which shall be binding, unless within ten (10) days thereafter the Contractor shall file with the Owner a formal protest against said final decision of the Engineer. The Owner shall consider and render a final decision of any such protest within thirty (30) days of receipt of same.

#### 6-4 PLANS

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 Plans and Specifications at the jobsite, 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.

#### 6-5 CONFORMITY WITH PLANS AND ALLOWABLE DEVIATIONS

Finished surfaces in all cases shall conform with lines, grades, cross sections, and dimensions shown on the accepted Plans. Allowable deviations, other than specified tolerances, from the accepted Plans and working drawings will in all cases be determined by the Engineer.

#### 6-6 COORDINATION AND INTERPRETATION OF PLANS AND SPECIFICATIONS

The Plans, Specifications, General Conditions, Special Conditions, Contract Change Orders, and all supplementary documents are essential parts of the Contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be coordinated and to describe and provide for a complete work.

Should it appear that the work to be done or any of the matters relative thereto are not sufficiently detailed or explained in these Specifications, General Conditions, Special Conditions, or the Plans, the Contractor shall apply to the Engineer for such further explanations as may be necessary and shall conform to them as part of the Contract. In the event of any doubt or question arising regarding the true meaning of

these Specifications, the Special Conditions, 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.

In the event of there being a conflict between one Contract Document and any of the other Contract Documents, the Document highest in precedence shall control and supersede the Document which is contrary to it. The order of precedence of the Contract Documents is as follows:

- First: Supplemental Agreements, the last in time being the first in precedence.
- Second: The formal Contract.
- Third: Notice Inviting Bids.
- Fourth: Information for Bidders.
- Fifth: Special Conditions (Division 1).
- Sixth: Specifications (Division 2 through 18).
- Seventh: Plans.
- Eighth: Supplemental General Conditions (when included)
- Ninth: General Conditions.
- Tenth: Contractor Proposal.

#### 6-7 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 with such requirements will be considered as included in the prices paid for Contract items of work and no additional compensation will be allowed therefor.

#### 6-8 INSPECTION

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 parts removed, will be paid for as provided under CHANGES IN THE

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WORK, 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. Inspection or supervision by the Engineer shall not be considered as direct control of the individual workman and his work. The direct control shall be solely the responsibility of the Contractor's foremen and superintendent.

When the United States Government is to pay a portion of the cost of the work covered by the Contract, the work shall be subject to the inspection of the representatives of the U. S. Government. Such inspection shall in no sense make the U. S. Government a party to this Contract and will in no way interfere with the rights of either party under this Contract.

The inspection of the work shall not relieve the Contractor of any of his obligations to fulfill his Contract as herein provided, and unsuitable materials may be rejected notwithstanding that such work and materials may have been previously overlooked and accepted or estimated for payment.

Should any work be covered up before acceptance or consent of the Engineer, it must, if required by the Engineer, be uncovered for examination at the Contractor's expense.

#### 6-9 LINES AND GRADES

Profiles and elevations are indicated on the Plans. Elevations are referred to a datum as indicated on the Plans. All work under this Contract shall be built in accordance with the lines and grades indicated on the Plans. These lines and grades may be modified as provided in the Contract. The establishment of the lines and grades shall be as set forth under Special Conditions.

## GENERAL CONDITIONS - PART 7

MATERIALS AND WORKMANSHIP7-1 GENERAL

All equipment, materials, and articles incorporated in the work covered by this Contract shall be new and subject to review and acceptance by the Engineer unless otherwise specifically provided for in the Contract Documents.

Where equipment, materials, or articles are referred to in the Specifications as "or equal", or "equal to" any particular standard, the Engineer shall decide the question of equality.

Wherever any standard published specification is referred to, the latest edition or revision, including all 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, 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 Engineer's attention to apparent errors or omissions and request instructions before proceeding with the work. The Engineer may, by appropriate instructions, correct errors and supply omissions, which instructions shall be as binding upon the Contractor as though contained in the original Specifications or Plans.

7-2 SUBSTITUTION OF MATERIAL OR EQUIPMENT

Where material or equipment is designated on the Plans or in the Specifications by a trade or manufacturer's name, it is so designated primarily to establish standards of quality, finish, appearance, and performance. It is not the intent to limit the choice of materials and equipment to the specific product designated. However, requests relative to substitutions for materials or equipment specifically designated on the Plans and in the Specifications will not be considered until after award of the Contract. Requests relative to substitutions for materials or equipment specifically designated on the Plans or in the Specifications shall be made in writing, and such requests shall be accompanied by complete data on which the Engineer 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. All specific requirements of the Specifications must be adhered to, and all necessary modifications shall be made in the articles specified by trade name, type, or model of manufacturer's equipment to make it conform to the specific requirements of the Specifications and the actual conditions under which the product is required to be used. Should a 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 Owner, and without obligation on the part of the Engineer, replace the item with the material originally specified.

#### 7-3 SAMPLE AND TESTING

All materials to be incorporated in the work shall be subject to sampling, testing, and acceptance. Samples furnished by the Contractor shall be representative of the materials to be used. The Engineer may select samples or may require that samples be delivered to and tested at a laboratory designated by the Engineer at no additional cost to the Owner.

All sampling and testing of materials shall be done in accordance with the latest designated standard methods of AASHTO or ASTM, or in accordance with special methods designated in the Specifications.

Sieves used in determining the grading of samples of aggregates, select material, and other graded materials, shall conform to ASTM Designation E 11. Sieves 1/4 inch and larger shall have square openings and are designated by the size of opening in inches. Sieves smaller than 1/4 inch shall have square openings and are designated by number.

#### 7-4 FABRICATED MATERIALS AND SHOP DRAWINGS

Fabricated materials and shop drawings shall be handled as set forth in the Special Conditions.

#### 7-5 MATERIALS FURNISHED BY THE OWNER

All materials and/or services furnished by the Owner shall be obtained by the Contractor as indicated in the Special Conditions. The cost of handling and placing Owner furnished materials shall be included in the price paid for the Contract item involving such material.

#### 7-6 STORAGE OF MATERIALS

The Contractor shall provide proper storage facilities and exercise such measures as will insure the preservation of the specified quality and fitness of all materials and equipment to be used in the work. Stored

materials shall be located so as to provide reasonable access for inspection. That portion of the right-of-way not required for public travel may be used for storage purposes unless prohibited by other provisions of the project Specifications. Any additional space required shall be provided by the Contractor at no cost to the Owner. Protection of materials and equipment stored on the site shall be the responsibility of the Contractor. The Owner reserves the right to direct the Contractor to provide proper means of protection for materials if such is deemed advisable by the Engineer; however, the exercise of or failure to exercise this right shall not be deemed to relieve the Contractor of his primary responsibility for protecting the material and equipment. The Contractor shall provide suitable warehouses or other adequate means of protection for such of the materials and equipment as require storage or 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 his primary responsibility. No motor shall be left uncovered or unprotected.

#### 7-7 REJECTED MATERIALS

Materials not conforming to the requirements of the Specifications, whether in place or not, may be rejected. Rejected materials shall be removed immediately from the site of the work unless otherwise permitted by the Engineer. No rejected material, the defects of which have been subsequently corrected, shall be used unless accepted by the Engineer. If the Contractor fails to remove and replace rejected material, the Owner has authority to do so and to deduct the cost thereof from any monies due or to become due the Contractor.

## GENERAL CONDITIONS - PART 8

LEGAL RELATIONS AND RESPONSIBILITY8-1 LAWS TO BE OBSERVED

The Contractor is presumed to know, and at all times shall observe and comply with, all Federal and State laws and local ordinances, workmen's compensation, occupational disease, and unemployment compensation laws together with the payment of all premiums and taxes therefor; also all laws, ordinances, and regulations in any manner affecting the conduct of the work, and shall indemnify and save harmless the Owner and its representatives against any claim arising from the violation of such laws, bylaws, ordinances, or regulations, whether by the Contractor himself or by the Contractor's employees. The Contractor's particular attention is drawn to the cognizance of, but not limited to, the laws in the four (4) following paragraphs.

8-2 HOURS OF LABOR

All contracts made by or on behalf of the State of Arizona, or any of its political subdivisions, with any person for the performance of any work, or the furnishing of any material manufactured within the State, shall be deemed and considered as made upon the basis of eight (8) hours constituting a day's work; and it shall be unlawful for any person to require or permit any person doing manual or mechanical labor to work more than eight (8) hours per calendar day in doing such work or in furnishing or manufacturing such material, except as provided in Section 23-391, Arizona Revised Statutes, 1956.

8-3 ALIEN LABOR

No person not a citizen or ward of the United States shall be employed upon or in connection with any State, County, or municipal works or employment provided that nothing herein shall be construed to prevent the working of prisoners by the State or by any County or municipality thereof on street or roadwork or other public work.

8-4 LABOR DISCRIMINATION

Attention is directed to Arizona Revised Statutes, Title 41, Chapter 9, Article 4, entitled "Discrimination in Employment."

When Federal funds are to pay a portion of the cost of this project, then the bidders shall also comply with the applicable paragraph in the Special Conditions.

8-5 PERMITS 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.

8-6 PATENTED DEVICES, MATERIALS, AND PROCESSES

The Contractor shall indemnify and save harmless the Owner and its duly authorized representatives from all liabilities, judgments, costs, damages, and expenses which may result from the infringement of any patents, trademarks, and copyrights by reason of the use of any proprietary materials, devices, equipment, or processes incorporated in or used in the performance of the work under this Contract.

8-7 SURVEY LAND MONUMENTS

Survey land monuments and property marks shall not be moved or otherwise disturbed by the Contractor until an authorized agent, of the agency having jurisdiction over the land monuments or property marks setting, has witnessed or otherwise referenced their location, and only then in accordance with the requirements of the agency having jurisdiction.

8-8 PROTECTION OF PERSON AND PROPERTY

The Contractor shall adopt every practical means and comply with all laws, ordinances, and regulations in order to minimize interferences to traffic, and inconveniences, discomfort and damage to the public, including the provision of adequate dust control measures. All obstructions to traffic shall be guarded.

If an unsafe condition arises or exists during the progress of the work, or if the Owner has reason to believe that an unsafe condition exists, the Contractor shall suspend the work wholly or in part for such period as may be necessary to correct the unsafe condition.

The Contractor shall not trespass upon private property and shall be responsible for all injury or damage to persons or property, directly or indirectly, resulting from his operations in completing this work. He shall comply with the laws and regulations of the Owner, County, and State, relating to the safety of persons and property, and will be held responsible and required to make good any injury or damage to persons or property caused by carelessness or neglect on the part of the Contractor or subcontractor(s), or any agent or employee of either during the progress of the work and until its final acceptance.

The Contractor shall protect against injury any pipes, sewer conduits, electrical conduits, lawns, gardens, shrubbery, trees, fences, or other structures or property, public and/or private, encountered in this work except as stipulated elsewhere herein. The Contractor shall be responsible and liable for any injury to such pipe, structures, and property.

8-9 UTILITIES SHOWN ON THE PLANS

Regardless of what utilities are shown on the Plans, it shall be the Contractor's responsibility to verify these locations and any additional lines which may exist through consulting with the Owner, utility companies, and/or "Blue Stake."

Existing utilities are indicated on project Plans in accordance with the best information available. The Contractor shall notify all Owners of utilities when his work is in progress and shall make such arrangements as are necessary to make any emergency repair to any utility, in a manner satisfactory to the owner of a damaged utility line, including individual or house service utility lines.

No extra compensation will be made for the repair of any individual or house service utility or utility lines damaged by the Contractor's labor forces or equipment, nor for any damage incurred through neglect or failure to provide protective barriers, lights and other devices or means required to protect such existing utilities.

The Contractor shall expose all sanitary and storm sewers, water, gas, electric, telephone utility lines, and other underground structures which might interfere with the construction of the project, in order to permit survey location prior to construction.

The work necessary to the raising, lowering or relocating of a utility, which work is not so indicated on the Plans shall be at the owner's expense. The necessary work may be done by the owner of the utility or by the Contractor, at the option of the owner of the utility. All work shall be in accordance with the standards of the owner of the utility.

The Contractor shall resolve crossing and clearance problems concerning all utility structures with the utility company concerned.

8-10 UTILITIES NOT SHOWN ON THE PLANS

If utility lines are encountered which are not indicated on the Plans, other than individual or house service utility lines, and which the Owner, utility companies, and/or "Blue Stake" are unaware of their existence, and these lines are damaged or work is required to clear same, then the Contractor will be paid for any extra work involved on his part on a cost plus basis, as set forth elsewhere herein.

In most cases, individual or house service utility lines are not shown on the Plans. It shall be the Contractor's responsibility to locate and protect these individual or house services. If, due to the Contractor's operations, any of these lines are damaged, he shall repair or replace these lines in a manner satisfactory to the owner of the utility at no extra cost to the owner. In addition, the cost of location, protection, and working around these individual or house service utility lines shall be included in the Contractor's bid for the work under this Contract.

8-11 DRIVEWAYS AND WALKS

Inconvenience caused by digging across driveways and sidewalks shall be kept to a minimum by restoring the serviceability of the drive or sidewalk as soon as possible. Before blocking driveways, the Contractor shall notify the property owner. 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. If it is necessary to leave an excavation open across driveways or sidewalks, the Contractor shall provide temporary relief in the form of steel plates over the excavation.

Temporary paving replacement in front of business establishments shall be placed immediately following backfill and shall remain in place until the condition of the backfill is suitable for permanent pavement replacement.

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.

8-12 TREES AND SHRUBBERY

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 Engineer for removal, shall be completely removed and disposed of as indicated on the Plans or specified.

8-13 IRRIGATION DITCHES AND STRUCTURES

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

8-14 ROADS AND FENCES

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 fences located in easements, when damaged or temporarily removed, shall be restored to a condition equal to or better than the original condition. Such fences shall be restored at the Contractor's expense.

#### 8-15 PROTECTION OF ANTIQUITIES

Attention is called to State and Federal laws pertaining to the protection and preservation of sites or objects of archaeological, paleontological or historic interest.

It shall be a provision of every contract that when features of archaeological, paleontological or historic interest are encountered or unearthed in material pits, the roadway prism, or other excavation the Contractor shall stop work in the immediate vicinity of such feature, protect it from damage or disturbance, and report promptly to the State and local officials having jurisdiction.

Work shall not be resumed in the immediate area until the Contractor is advised by the authorities having jurisdiction that study or removal of the feature or features has been completed. The Contractor will be allowed an appropriate contract time extension as provided in these GENERAL CONDITIONS for construction time lost.

#### 8-16 RESPONSIBILITY FOR DAMAGE CLAIMS

The Contractor and his Surety shall indemnify and save harmless the Owner and its officers, agents, and representatives from all suits, actions, loss, damage, expense, costs, or claims of any character or nature brought on account of any injuries or damages sustained by any person or property arising out of the work done in fulfillment of the construction of the improvement under the terms of this agreement, or on account of any act of omission by the Contractor or his agents, or from any claims or amounts arising or recovered under workmen's compensation laws or any other law, bylaw, or ordinance, order, or decree.

#### 8-17 NONRESPONSIBILITY OF THE OWNER

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

#### 8-18 PROPERTY RIGHTS IN MATERIAL

Nothing in the Contract shall be construed as vesting in the Contractor any right of property in the material 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 Owner upon being so attached or affixed and accepted.

## GENERAL CONDITIONS - PART 9

PAYMENT TO CONTRACTORS9-1 GENERAL

The basis of payment for construction of a project shall be in full for all work actually performed in accordance with the Plans and Specifications, and shall include all labor and materials incorporated in the completed work.

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

9-2 PAYMENT

For and in consideration of the faithful performance of the work, the Owner will pay to the Contractor the amount earned 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, as follows:

Within thirty (30) days after final acceptance of the work completed under the Contract, the Engineer shall render to the Owner and to the Contractor, a final estimate which shall show the amount of work performed according to the Contract. Within forty (40) days after the final completion and final acceptance of the work under the Contract, the Owner will pay to the Contractor all amounts due him under the provisions of the Contract, except that before the final payment will be made, the Contractor shall satisfy the Owner by affidavit that all bills for labor and materials incorporated in the work have been paid, and shall complete and submit to the Engineer a Certification relinquishing any and all claims or right of lien under, in connection with, or as a result of the work under the Contract.

The basis of payment shall be in full for all work actually performed in accordance with these Specifications, and shall include all labor and materials incorporated in the completed work.

9-3 PARTIAL PAYMENT

Once each month the Owner will make a partial payment to the Contractor on the basis of an estimate prepared by the Contractor and accepted by the Engineer for work completed through the last day of the preceding calendar month. The estimate will cover the work performed by the Contractor during the preceding calendar month plus the invoice cost of material suitably stored at the site of the project if the Contractor desires payment for material stored. The Owner will retain 10 percent (10%) of the amount of each such estimate and material cost until final completion and acceptance of all work covered by this Contract.

GC 9-2.

Cost of material stored will be based on vendors' invoices which shall be listed by the Contractor. A copy of each such invoice shall accompany the first estimate in which payment is requested for material covered by the invoice. This list shall be revised and brought up-to-date by the Contractor for each estimate. The revised list shall show the total amount of each invoice, the invoice amount that has been incorporated in the work, and the remaining invoice amount that is stored for which payment is requested that month. Only those materials that will become an integral part of the final completed project may be included for partial payment as material stored.

If required by the Proposal or Special Conditions, the Contractor shall furnish a detailed breakdown of the lump sum Contract Price, 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 Engineer.

Partial payments for jobsite delivered material or equipment will in no way reduce the Contractor's responsibility for such material or equipment until it has been installed.

9-4 PAYMENT OF ITEMS IN PROPOSAL

Only those items listed in the Proposal are Pay Items.

Compensation for all work necessary for the completion of the project or improvement shall be included by the bidder in the price bid for the items shown in the Proposal.

9-5 PAYMENT FOR "EXTRA WORK" AND FOR "CHANGES IN THE WORK"

Payment for "Changes in the Work" and for "Claims for Extra Work" will be made as stated in Part 5 of these GENERAL CONDITIONS.

DIVISION 1

SPECIAL CONDITIONS

010011 WORK UNDER THIS CONTRACT

The work to be done under this Contract shall include the furnishing of all labor, material, and equipment necessary for or incidental to the construction and completion of all work indicated in the Contract Documents. This consists of, but is not necessarily limited to, furnishing and installing approximately 300 linear feet of 30-inch diameter water distribution main, and removing existing pipe as required to install new pipe, with all incidental, accessory, and/or supplemental work necessary for a complete and usable facility.

010012 LOCATION OF PROJECT

The new water distribution main will be parallel to 51st Avenue at Cactus, crossing under the new Arizona Canal Diversion Channel, as detailed on the Plans.

010015 WORK BY OTHERS

The Owner, other Contractors, and/or utilities may be working within the project area while this Contract is in progress. If so, this Contractor shall schedule his work in conjunction with these other organizations to minimize mutual interference.

010016 MUTUAL RESPONSIBILITY OF CONTRACTORS

If any part of the work of any Contractor or subcontractor depends for proper execution or results upon the work of any other Contractor or subcontractor, he shall inspect and promptly report to the Engineer any apparent discrepancies or defects in such work that render it unsuitable for such proper execution and results. Failure of the Contractor to so inspect and report shall constitute an acceptance of the other Contractor's work as fit and proper to receive his work except as to defects which may develop in the other work after execution of his work.

010017. WORK INVOLVED WITH EXISTING PIPELINE

Some of the work under this Contract must be accomplished while the existing 30-inch water main pipe is in operation. The work that is involved with the existing pipe must be done so that operation of the existing pipe will not be jeopardized or materially reduced in efficiency as a result of the work under this Contract.

Work on this Contract must be coordinated with the Owner. The Contractor shall notify the Engineer of the Contractor's planned procedure

for each specific alteration of existing facilities before the alteration begins. The Contractor shall not begin an alteration until specific permission has been granted by the Owner in each case. The Engineer will coordinate the Contractor's planned procedure with the Owner. The making of connections to existing pipe shall be completed as quickly as possible and with as little delay as possible.

Existing materials and equipment removed in the performance of this Contract remain the property of the Owner. All reasonable effort shall be made to remove and preserve such material and equipment in an undamaged condition and it shall be stored at the work site at locations selected by the Engineer.

#### 010018 COORDINATION OF WORK

It shall be the responsibility of this Contractor to maintain overall coordination of the project. Based on the general contract Construction Schedule prepared in accordance with these Specifications, he shall obtain from each of his subcontractors a similar schedule and shall be responsible for all parties maintaining these schedules or for coordinating changes necessitated by unforeseen difficulties.

#### 010021 LINES AND GRADES

All work under this Contract shall be built in accordance with the lines and grades as indicated in the Contract Documents. Distances and measurements except elevations and structural dimensions are given and made on horizontal planes.

#### 010021.3 UNDERGROUND FACILITIES

On underground facilities, the Engineer will furnish one set of line and grade stakes at the offset mutually agreed to with the Contractor. After a stake has been set, it shall be the Contractor's responsibility to protect the stake from damage, any stakes lost or destroyed will be replaced only at the Contractor's expense.

#### 010030 TIME OF COMPLETION

Subject to adjustment provided herein, all work under this Contract shall be completed in not more than 120 calendar days, beginning with the day following the date of the Notice to Proceed.

#### 010031 LIQUIDATED DAMAGES

As provided herein, it is mutually agreed that Liquidated Damages for late completion of this project shall be One Hundred Dollars (\$100.00) per calendar day.

010090 DEFINITIONS AND ABBREVIATIONS

Whenever in these Contract Documents, the following abbreviations or terms are used, the intent and meaning shall be interpreted as follows:

010091 DEFINITIONS AND TERMS

Addendum: A supplement to any of the Contract Documents issued, in writing, after advertisement of but prior to the opening of bids for a Contract.

Advertisement: The public announcement, as required by law, inviting bids for work to be performed or materials to be furnished.

Agency: The legal entity that has contracted for the performance of the work or for whom the work is being performed.

Architect: The individual or firm who has accomplished the architectural services for the project, including his representatives.

Award: The formal action of the governing body in accepting a proposal.

Backfill: Material placed in an excavated space to fill such space.

Base Course: The upper course of the granular base of a pavement structure, immediately below the pavement or the lower course of an asphalt concrete pavement structure.

Building Code: A regulation adopted by the governing body establishing minimum standards of construction for the protection of the public health, safety, and welfare in terms of measured performance rather than in terms of rigid specifications of materials and methods.

Calendar Day: Every day shown on the calendar.

City: A municipal corporation, organized and existing under and by virtue of the laws of the State.

Completion Time: The number of calendar days for completion of an act, including authorized time extensions. In case a calendar date of completion is shown in the proposal in lieu of the number of calendar days, the Contract shall be completed by that date. The time within which an act is to be done shall be computed by excluding the first and including the last day; and if the last day be Sunday or a legal holiday, that shall be excluded.

Construction Project: The erection, installation, remodeling, alteration, of durable facilities upon, under, or over the ground. This shall include, but is not limited to buildings, roadways and utility pipes, lines, poles, or other structures.

Contract Documents: The words "Contract Documents" include the Notice Inviting Bids, Information for Bidders, General Conditions, Supplemental General Conditions, Special Conditions, Specifications, Measurement and Payment or Instructions for Preparing Proposal, Proposal, Contract, Payment Bond, Performance Bond, Plans, and Addenda thereto.

Council: The City Council, or other governing body, organized and existing under and by virtue of the laws of the State.

Culvert: Any structure not classified as a bridge, which provides an opening under or adjacent to the roadway.

Days: Unless otherwise designated, days will be understood to mean calendar days.

Design Engineer: The firm or person and his properly authorized assistants, designated by the Owner to prepare Plans and Specifications for the work.

Emergency: Unforeseen occurrences and combinations of circumstances involving the public welfare or the protection of work already done under the Contract Documents, or which endanger life or property and call for immediate action or remedy.

Engineer: The firm or person and his properly authorized assistants designated by the Owner to prepare Plans and Specifications for the work, and/or to make detailed inspections of Contract performance.

Equipment: (Construction) - All machinery and equipment, together with the necessary supplies for upkeep and maintenance, and also tools and apparatus necessary for the proper construction and acceptable completion of work. (Installed) All material or articles used in equipping a facility as furnishings or apparatus to fulfill a functional design.

Extra Work: An item of work not provided for in the Contract as awarded but found essential to the satisfactory completion of the Contract within its intended scope.

Laboratory: The established materials testing laboratory of the Contracting Agency's Engineering Department, or other laboratories acceptable to and/or authorized by the Engineer to test materials and work involved in the Contract.

Major Item: Any item of work and/or materials having an original contract value which exceeds ten percent of the amount of the original Contract.

Non Pay Item: An item of work for which no separate payment will be made under the proposal, but which must be included as an incidental cost for payment on an associated item included in the Proposal.

Notice of Award: A letter from the Owner advising the Contractor that he is the successful bidder and that his Proposal has been accepted.

Or Equal: The equality of material and/or equipment offered by the Contractor, supplier, or manufacturer in lieu of the material and/or equipment specified by name herein shall be determined by the Engineer.

Owner: The word "Owner" refers to the individual, company, municipality or other legal entity that has contracted for the work or for whom the work is being performed.

Owner's Representative or Owner's Agent: The authorized representative of the Owner, which may be an individual or a firm, the Engineer, or his 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.

Pavement: Any surfacing of streets, alleys, sidewalks, courts, driveways, etc., consisting of mineral aggregate bound into a rigid or semi-rigid mass by a suitable binder such as, but not limited to, portland cement or asphalt cement.

Pavement Structure: The combination of subbase, base course, and surface course placed on a subgrade to support the traffic load and distribute it to the roadbed.

Pay Item: A detail of work for which separate payments are to be made under the Contract, as specified in the Proposal.

Plant: The Contractor's and/or subcontractor's facilities, including but not limited to small tools and mobile equipment, located on and/or offsite, necessary for preparation of materials and prosecution of work for the project.

Principal: The individual, firm, or corporation primarily liable on an obligation, as distinguished from a surety.

Profile Grade: The trace of a vertical plane intersecting the top surface of the proposed wearing surface, usually along the longitudinal center line of the roadbed; invert or flow line of a pipe; or similar trace. Profile grade means either elevation or gradient of such trace according to the context.

Project: A specific coordinated construction or similar undertaking identified by a single project number and bid and awarded as one contract. On occasion two or more projects may be bid and awarded as a single contract.

Project Representative: The Engineer's authorized representative assigned to make detailed inspections of Contract performance.

Proposal: The offer of a bidder, on the prescribed form, to perform the work and to furnish the labor and materials at the prices quoted.

Proposal Form: The approved form on which the Contracting Agency requires bids to be prepared and submitted for the work.

Proposal Guarantee: The security furnished with a bid to guarantee that the bidder will enter into the Contract if his bid is accepted.

Referenced Documents: On all work authorized by the Contracting Agency, any referenced documents in the Specification, (i.e.; Bulletins, Standards, Rules, Methods of Analysis or Test, Codes and Specifications of other Agencies, Engineering Societies or Industrial Associations) refer to the latest edition thereof, including Amendments, which are in effect and published at the time of Advertising for Bids or the issuing of a permit for the work.

Right-of-way: A general term denoting land, property, or interest therein, usually in a strip, acquired for or devoted to a street, highway, or other public improvement.

Road: A general term denoting a public way for purposes of vehicular travel, including the entire area within the right-of-way.

Sewers: Conduits and related appurtenances employed to collect and carry off water and waste matter to a suitable point of final discharge.

Shop Drawings: Drawings or reproduction of drawings, detailing, fabrication and erection of structural elements, falsework and forming for structures, fabrication of reinforcing steel, installed equipment and installation of systems, or any other supplementary plans or similar data, which the Contractor is required to submit for review and acceptance.

Sewage: Water borne wastes.

Storm Drain: Any conduit and appurtenance intended for the reception and transfer of storm water.

Street: Streets, avenues, alleys, highways, crossings, lanes, intersections, courts, places, and grounds now open or dedicated or hereafter opened or dedicated to public use and public ways.

Structures: Bridges, culverts, catch basins, drop inlets, retaining walls, cribbing, manholes, endwalls, buildings, sewers, service pipes, underdrains, foundation drains, fences, swimming pools, and other features which may be encountered in the work and not otherwise classed herein.

Subbase: The lower course of the base of a roadway, immediately above the subgrade.

Subgrade: The supporting structures on which the pavement and its special undercourses rest.

Superintendent: The Contractor's authorized representative in responsible charge of the work.

Surface Course: The finish or wearing course of an asphalt concrete pavement structure.

Title and Headings: The titles or headings of the sections and subsections herein are intended for convenience of reference and shall not be considered as having any bearing on their interpretation.

Township, City, Town, or District: A subdivision of the County used to designate or identify the location of the proposed work.

Traveled Way: The portion of the roadway for the movement of vehicles, exclusive of shoulders and auxiliary lanes.

Treatment Plant Works: The collection system treatment facilities, ponds and effluent pipe or channels, and all related incidental and appurtenant facilities and equipment for the collection, purification, and disposal of sanitary sewage.

Utility: Pipelines, conduits, ducts, transmission lines, overhead or underground wires, railroads, storm drains, sanitary sewers, irrigation facilities, street lighting, traffic signals, fire alarm systems, and appurtenances of public utilities and those of private industry, businesses, or individuals solely for their own use or use of their customers which are operated or maintained in, on, under, over or across public right-of-way or public or private easement.

Water Works (Water Supply System): The reservoirs, pipelines, wells, pumping equipment, purification works, mains, service pipes, and all related appliances and appurtenances utilized in the procurement, transportation and delivery of an adequate, safe, and palatable water supply for the Contracting Agency.

Working Day: A calendar day, exclusive of Saturdays, Sundays, and Contracting Agency recognized legal holidays, on which weather and other conditions not under the control of the Contractor will permit construction operations to proceed for the major part of the day with the normal working force engaged in performing the controlling item or items of work which would be in progress at that time.

#### 010092 ABBREVIATIONS

Abbreviations shall be as indicated in the Contract Documents.

010100 OPTIONS, ALTERNATES AND SUBSTITUTIONS

When accepted by the Engineer, substitution may be made for certain equipment specified by brand name or manufacturer. In other instances limited options are provided.

010200 PROJECT MEETINGS

It shall be the responsibility of the Contractor to conduct periodic meetings to be attended by representatives of subcontractors, utilities, the Engineer 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.

010210. PRECONSTRUCTION CONFERENCE

Upon receipt of the Notice to Proceed, or at an earlier time if mutually agreeable, the Engineer shall arrange for a preconstruction conference to be attended by the Contractor's superintendent, the Owner, the Engineer or his representative, and representatives of utilities, major subcontractors, and others whose input may be desired.

010300 SUBMITTALS

In ample time for each to serve its proper purpose and function, the Contractor shall submit to the Engineer 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.

010301 CONTRACTOR'S RESPONSIBILITY AND LIABILITY FOR SUBMITTALS

It shall be the Contractor's responsibility to assure himself that equipment, systems, or materials submitted for use in the work under this Contract are in accord with the intent of these Contract Documents.

The intent of these Contract Documents is that manufacturers or suppliers of equipment, systems, or material that are named in the text for the item specified and as altered, adjusted, or revised by the manufacturer or supplier to conform to the specific requirements of the Contract Documents will require a certain amount of review to determine compliance and acceptability. The foregoing shall not be interpreted to exclude the equipment, systems, or materials of manufacturers or suppliers who are not named but have a product that is equal to the item as specified. It shall be the responsibility of the Contractor to ascertain that the unnamed product is equal to the item specified. The Contractor shall include with his submittal all information as required by these Contract Documents for the Substitution of Material or Equipment.

The above type of submittal and the subsequent review to determine compliance and acceptability will be taken as normal, and the Contractor shall not be liable for the costs involved for this type of engineering review.

Should the Contractor submit equipment, systems, or material from any manufacturer or supplier, named or unnamed in the Contract Documents, that deviates from the intent or is nonresponsive to the specific requirements of these Contract Documents, then he shall have deducted from periodic payments by Owner the costs of evaluating the equipment, system, or material as to its acceptability, and the Contractor shall be liable for said cost whether the items submitted are acceptable or not. Any delay, cost to the Contractor, or rescheduling caused by the evaluation of this equipment, system or material shall be at the Contractor's expense and will not be a reason for an extension of time for Contract completion.

Deviations from the intent or nonresponsiveness to the specific requirements of the Contract Documents shall include, but not be limited to; equipment, systems, or material that are new on the market, or that have little or no operational experience; equipment, systems, or materials that are untried in the application for which they are intended to be used; equipment, systems, or materials that will require a process change, or that would cause a process to change; equipment, systems, or materials that will require changes or alterations to operational, structural, architectural, mechanical, electrical, or instrumental features.

#### 010320 SHOP DRAWINGS, SCHEDULES, AND SAMPLES

Shop drawings, layout diagrams, catalog data, test reports, and information in sufficient detail to show complete compliance with all specified requirements shall be furnished to the Engineer covering but not limited to the items under MATERIAL LIST.

The Contractor at his own expense shall make such changes in the required drawings as may be necessary to conform to the Contract Documents. After completion of such checking, verification, and revising, the Contractor shall stamp and sign the drawings indicating his approval and submit the shop drawings and pertinent data to the Engineer for review. Prior to the Engineer's review of such drawings, any work which the Contractor may do on the fabrications covered by the same shall be at his own risk, as the Owner will not be responsible for any expense or delays incurred by the Contractor for changes to make the same conform to the Contract Documents.

#### 010321 MATERIAL LIST

Pipe, fittings and specials  
Valve and valve box

010322 SUBMITTAL

Shop drawings and data shall be submitted to the Engineer in such number of copies as will allow him to retain four (4) copies of each submittal. The submittal shall clearly indicate the specific area of the Contract Documents for which the submittal is made. The additional copies received by him will be returned to the Contractor's representative at the jobsite. The Engineer's notations of the action which he has taken will be noted on one (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 jobsite Contract Documents, and the fabrications furnished shall be in conformance with the same. However, the Engineer's review of the above drawings, lists, prints, specifications, samples, or other data shall in no way release the Contractor from his responsibility for the proper fulfillment of the requirements of this Contract nor for fulfilling the purpose of the installation nor from his liability to replace the same, should it prove defective or fail to meet the specified requirements.

010323 MATERIAL AND EQUIPMENT SCHEDULES

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

010325 MILL TESTS

The Contractor, at his own expense, shall furnish the Engineer in triplicate, certified copies of all required factory and mill test reports to verify material quality and composition. Any materials shipped by the Contractor from a factory or mill prior to having satisfactorily passed such testing and inspection by the Engineer shall not be incorporated in the work, unless the Engineer shall have notified the Contractor in writing that such testing and inspection will not be required. The cost of performing all mill and factory tests shall be paid by the Contractor unless otherwise required by these Contract Documents.

010326 REINFORCING STEEL

Review and acceptance of shop drawings will not be required on reinforcing steel that is detailed by the Contractor in accordance with the Contract Documents. The Contractor shall supply the Engineer with a copy of all reinforcing steel detail drawings. Any change from the Contract Documents that is made by the Contractor in reinforcing steel shop drawings, as well as in any other shop drawings, shall be specifically called to the Engineer's attention and specific acceptance shall be secured on each such change.

010400 QUALITY CONTROL

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 Contract Documents; and it shall be the duty of the Contractor to call the Engineer's attention to apparent errors or omissions and request instructions before proceeding with the work. The Engineer may, by appropriate instructions, correct errors and supply omissions, which instructions shall be as binding upon the Contractor as though contained in the original Contract Documents.

At the option of the Engineer, materials to be supplied under this Contract will be tested and/or inspected either at their place of origin or at the site of the work. The Contractor shall give the Engineer written notification well in advance of actual readiness of materials to be tested and/or inspected at point of origin. Satisfactory tests and inspections at the point of origin shall not be construed as a final acceptance of the material nor shall it preclude retesting or reinspection at the site of the work.

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

010410 AUTHORITY AND DUTIES OF PROJECT REPRESENTATIVE

The Project Representative employed by the Owner or Engineer shall be authorized to inspect all work done and materials furnished. Such inspection may extend to all or any part of the work, and to the preparation, fabrication, or manufacture of the materials to be used. The Project Representative is not authorized to alter or waive the provisions of these Contract Documents.

A Project Representative is placed on the work to keep the Engineer informed as to the progress of the work and the manner in which it is being done; also to call the Contractor's attention to any nonconformance with the Contract Documents. He will not be authorized to approve or accept any portion of the work, to issue instructions contrary to the Contract Documents, or to act as foreman for the Contractor. The Project Representative will have authority to reject defective material, subject to the final decision of the Engineer.

The Project Representative will exercise such additional authority only as may from time to time be delegated to him by the Engineer.

010411 INSPECTION

All material and workmanship of whatever description shall be subject to the inspection of, and rejection by, the Engineer, if not in conformance with the Contract Documents. All defective work or materials shall be removed from the premises by the Contractor, whether in place or not, and shall be replaced or renewed with work or material in conformance with the Contract Documents.

On all questions concerning the acceptability of materials, classification of materials, execution of the work, and the determination of costs, the decision of the Engineer shall be final and binding upon all parties.

The Contractor shall at all times maintain proper facilities and provide safe access to all parts of the work, to the shops wherein the work is in preparation and to all warehouses and storage yards wherein equipment and material are stored for purposes of inspection by the Engineer. Should any work be covered up before acceptance or consent of the Engineer, it must, if required by the Engineer, be uncovered for examination at the Contractor's expense.

#### 010420 SAMPLES AND TESTS

At the option of the Engineer the source of supply of each of the materials shall be accepted by him before the delivery is started and before such material is used in the work. Representative preliminary samples of the character and quality prescribed shall be submitted by the Contractor or producer of all materials to be used in the work for testing or examination as desired by the Engineer.

All tests of materials furnished by the Contractor shall be made in accordance with the commonly recognized standards of national technical organizations, and such special methods and tests as are prescribed in these Contract Documents.

#### 010500. TEMPORARY FACILITIES

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.

#### 010522 WATER

The Contractor shall pay for and shall construct all facilities necessary to furnish water for his use during construction. Water used for human consumption shall be kept free from contamination and shall conform to the requirements of the State and local authorities for potable water. The Contractor shall pay for all water used for the Contractor's operations prior to final acceptance except that the Owner will provide water for the seven-day final test operation if such is required.

#### 010527 SANITARY FACILITIES

The Contractor shall provide suitable chemical toilets or water closets at points acceptable to the Engineer for use of employees on this work. At the end of the job such toilets shall be removed completely.

010528 ACCIDENT PREVENTION

Precaution shall be exercised by the Contractor at all times for the protection of persons (including employees) and property. The safety provisions of applicable laws, and of building and construction codes shall be observed. Machinery, equipment and other hazards shall be guarded or eliminated.

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 make all reports as are, or may be, required by the Owner 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 the necessary action to comply with all provisions for safety and accident prevention.

010530 CONSTRUCTION FACILITIES

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.

010533 STAGING AND SHORING

All temporary supports shall be designed with an adequate safety factor to assure adequate load bearing capability.

010541 HAZARDS IN PUBLIC RIGHT-OF-WAY

Trenches and other essentially continuous excavations in the public right-of-way, running parallel to the general flow of traffic, shall be marked at reasonable intervals by traffic cones, barricades, or other suitable visual markers during daylight hours. During hours of darkness these markers shall be provided with torches, flashers, or other adequate lights.

At intersections or for pits and similar excavations, where traffic may reasonably be expected to approach head on, such excavations shall be protected by essentially continuous barricades lighted at close intervals during hours of darkness.

010544 PROTECTION OF EXISTING ITEMS

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.

010550 PROJECT SECURITY

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

010560 ACCESS ROADS

The Contractor shall build and maintain adequate access roads to and on the project site to provide for delivery of material and for access to any existing and operating plant facilities on the site. A road to be considered adequately maintained shall be reasonably dust free, and suitable for automobile traffic traveling at 25 miles per hour.

010570 SPECIAL CONTROLS

The Contractor shall take all reasonable means to minimize inconvenience and injury to the public by dust, noise, diversion of storm water, or other agencies under his control.

010571 DUST CONTROL

The Contractor shall take whatever steps, procedures, or means as are required to prevent abnormal dust conditions being caused by his operations in connection with this Contract; and on any unpaved road which the Contractor or any of his subcontractors are using, excavation or fill areas, demolition operations, or other activities. Control shall be by sprinkling, use of dust palliatives, modification of operations, or any other means acceptable to the Health or Environmental Control Agency having jurisdiction.

010573 NOISE ABATEMENT

In inhabited areas, particularly residential, operations shall be performed in a manner to minimize unnecessary noise generation. In residential areas particular consideration shall be given to noise generated by repair and service activities during the night hours.

010575 DRAINAGE CONTROL

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 drainageways inadequate for the increased flow.

010600 EXISTING FACILITIES AND SEQUENCING

All work under this contract involving the existing 30-inch water main shall be performed during the 1984 Salt River Valley Water User's Association canal dry-up. Although the exact dates are not known at this

time, a 28-day period beginning approximately November 1, 1984 is anticipated. The Contractor shall schedule his work so that he can complete all connections to the existing line, testing and disinfection during this period.

#### 010700 PROJECT CLOSEOUT

It is the intent of these Contract Documents that the Contractor shall deliver a complete and operable facility capable of performing its intended functions and ready for use.

#### 010710 CLEANUP

Throughout the period of construction the Contractor shall keep the work site free and clean of all rubbish and debris, and shall promptly remove from any portion of the site, or from property adjacent to the site of the work, all unused materials, surplus earth and debris, excepting select material which may be required for refilling or grading.

Upon completion of the work and prior to final acceptance of the project the Contractor shall remove from the vicinity of the completed work all plant, surplus material, and equipment belonging to him or used under his direction during construction.

#### 010820 POTABLE WATER MAINS

The interior of all pipe and fittings shall be kept as clean as possible at all times. If the pipe contains dirt that will not be removed by flushing, the interior of the pipe shall be cleared and swabbed as necessary with a solution containing not less than 500 ppm of chlorine.

Prior to chlorination, all pipes 12 inch and smaller shall be flushed as thoroughly as available water sources will permit.

After cleaning as thoroughly as possible, the pipe shall be filled with a chlorine solution of sufficient strength to provide a 10 ppm chlorine residual at the end of 24 hours.

Following chlorination, the pipe shall be flushed with potable water until the chlorine residual is less than 0.6 ppm before it is put into service.

#### 010830. CONSTRUCTION WATER

The Contractor shall make all necessary arrangements and pay for all applicable fees for water used during construction. Fire hydrant meters may be obtained from the City of Glendale. Installation and removal of meter should be scheduled at least 24 hours in advance through the Public Works/Field Operations Department at 931-5561. Contractor may arrange to obtain water from other available sources if desired.

D 1-16.

010900. TRAFFIC REGULATIONS

All traffic affected by this construction shall be regulated in accordance with MAG Specification Section 401, Traffic Control, and the City of Phoenix "Traffic Barricade Manual."

011100. SCHEDULING OF WORK

Certain limitations are hereby placed on the Contractor and shall be considered when bidding, scheduling, and performing the work.

The Contractor shall place orders for any and all material, process any shop drawings required and have all material and equipment ready at the site to begin construction the first day of the dry-up period, so as to complete the project before the end of the dry-up period, approximately November 15, 1984 to December 15, 1984.

## DIVISION 2

SITE WORK020000 GENERAL

The provisions herein shall apply to all demolition, clearing, grading, excavation, filling, and backfilling, and the construction of all utility lines, fences, roadways and other construction outside the lines of structures and plant facilities.

Existing improvements, adjacent property, utilities and other facilities, shall be protected from injury or damage resulting from the Contractor's operations.

020002 COMPACTION CONTROL AND TESTING

Maximum density, as used in these Specifications, shall be defined as the maximum density obtained in the laboratory by ASTM D 1557, Method C, Modified Proctor using a 10-pound rammer and 18-inch drop. In-place density of compacted backfill will be determined by ASTM D 1556.

It shall be the responsibility of the Contractor to accomplish the specified compaction for backfill, fill, etc. It shall be the responsibility of the Contractor to control his operations by tests to verify and confirm that he has complied and is complying at all times with the requirements of these Specifications concerning compaction. The Contractor's confirmation tests shall be performed by a soils testing laboratory acceptable to the Engineer.

The frequency of the Contractor's confirmation tests shall be as follows, and each test location shall include tests for each layer, type, or class of backfill from bedding to finished grade.

Open fields	1 per 1,000 linear feet
Trenches along dirt or gravel roads or off traveled right-of-way	1 per 500 linear feet
Trenches crossing paved roads	2 per crossing
Trenches under pavement cuts or within 2 feet of pavement edges	1 per 400 linear feet

Confirmation tests for correction of substandard work might be up to double these frequencies.

Periodic compliance tests will be made by the Engineer to confirm that compaction is meeting the requirements set forth above at no cost to the Contractor. For tests in backfill that has been water settled the

Contractor shall remove the overburden above the level at which the Engineer wishes to test and shall backfill and recompact the excavation after the test is complete.

If compaction fails to meet the requirements set forth above, the Contractor shall remove and replace the backfill at proper density or shall bring the density up to specified level by other means acceptable to the Engineer. Subsequent tests required to confirm that the reconstructed backfill has been brought up to specified density shall be paid for by the Contractor.

#### 020300 EARTHWORK

The work covered by this Section of the Specifications consists in furnishing all labor, equipment, supplies, and materials and in performing all operations in connection with the following: loosening, excavating, filling, grading, borrow, hauling, subgrade preparation, compacting in final location, wet and dry, and all operations pertaining thereto for site grading for buildings, basins, reservoirs, boxes, pipelines, roads, and other structures of whatever nature and other purposes; furnishing, placing, and removing of all sheeting and bracing; pumping and draining of excavation; the supporting of structures above and below ground; the handling of all water encountered in the excavations; the backfilling, compacted and loose, around structures and backfilling of all trenches and pits; and all other incidental earthwork as shown on the Plans, as specified and as required to complete the work ready for final use.

Where mud or other soft or unstable material is encountered, it shall be removed and the space refilled with good clean earth or gravel which can be compacted with no perceptible movement under the roller.

#### 020300.10. EARTHWORK WITHIN ROADWAYS

Earthwork within the rights-of-way of the State Division of Highways, the County Road Department and the respective cities, the Flood Control District of Maricopa County, and Salt River Project shall be done in accordance with requirements and provisions of the permits issued by those agencies for the construction within their respective rights-of-way. Such requirements and provisions, where applicable, shall take precedence and supersede the provisions of these Specifications.

#### 020301 WORK SEQUENCE

The Contractor shall schedule the earthwork operations to meet the requirements as provided in these Specifications for excavation and uses of excavated material. If necessary, the Contractor shall stockpile excavated material in order to use it in the specified locations.

020302 CHARACTER AND AMOUNT OF MATERIAL

The Contractor shall satisfy himself regarding the character and amount of rock, gravel, sand, silt, water, and other inorganic or organic material as well as gradation and shrinkage of excavation and fill material, and the suitability of the material for the use intended, and all other material to be encountered in the work to be performed. The quantity of material, and the cost thereof, required for the construction of all excavation and fill, whether from site excavation, borrow or imported material; and/or the wasting of excess material, if required, shall be included in the Contractor's quoted price for construction of the work to be performed under this project.

020303 PROTECTION OF EXISTING STRUCTURES

The Contractor, especially in blasting or in the use of heavy equipment, shall protect existing power lines, roofs, buildings, other structures, and utilities.

020304 FINISH GRADE OF EXCAVATION, BACKFILL, AND FILL

Fine grading under the concrete structures shall be such that the finished surfaces are never above the established grade or accepted cross section and are never more than 0.10 foot below. All areas which are not under concrete shall be graded uniformly. The finished surface shall be reasonably smooth, compacted, and free from irregular surface changes. The degree of finish shall be that ordinarily obtainable from blade grader operations, except as otherwise specified. All gutters and ditches shall be finished so as to drain readily. The finished surface areas outside of structures shall be not more than 0.10 foot above or below the established grade or accepted cross section.

The finished graded surfaces of all areas which will not be under structures, concrete, asphalt, roads, pavements, walks, dikes, etc. shall either consist of undisturbed natural soil, or at least the top 6 inches shall be cohesive materials. The intent of the above is to avoid sandy or gravelly areas.

Newly graded areas shall be protected from the action of the elements, and any settlement or washing that may occur from that or any other cause prior to acceptance of the work shall be repaired and grades reestablished to the required elevations and slopes.

020305 REMOVAL OF WATER

The Contractor shall provide and maintain at all times during construction, ample means and devices with which to promptly remove and properly dispose of all water entering the excavation or other parts of the work, whether the water be surface water or underground water. No concrete or masonry footings, foundations, or floors shall be laid in water, nor shall water be allowed to rise over them until the concrete or mortar has set at least 24 hours. Water shall not be allowed to rise unequally against walls for a period of 14 days following concrete placement.

The Contractor shall dispose of the water from the work in a suitable manner without damage to adjacent property. The Contractor shall be responsible for obtaining all water discharge permits that are required. No water shall be drained into work built or under construction.

Water shall be disposed of in such a manner as not to be a menace to the public health.

Written permission shall be secured from the Engineer before locating any wells, well points, or drain lines for purposes of dewatering within the limits of a structure foundation. The Engineer shall have the right to require that any dewatering well, line, or French drain left in place within the structure foundation limits be filled with Class C concrete or grout as herein specified.

#### 020320 EXCAVATION

Excavation shall comprise and include the satisfactory loosening, removing, loading, transporting, depositing, and compacting in the final location all materials, wet and dry, necessary to be removed for purposes of construction, or as required for ditches, grading, roads, and such other purposes as are indicated on the Plans; the furnishing, placing, and removing of all sheeting and bracing; all pumping, draining, and handling of water encountered in the excavations; the supporting of structures above and below ground. All excavated materials which are not required for fill and backfill, or which are unsuitable for fill or backfill, shall be disposed of by the Contractor, at his expense and responsibility, and in a manner acceptable to the Engineer.

No surplus material shall be dumped on private property unless written permission is furnished by the owner of the property.

During construction, excavation and filling shall be performed in a manner and sequence that will provide drainage at all times. Material required for fills in excess of that produced by excavation shall be obtained from borrow areas as specified herein.

Topsoil, and suitable excavated material required for fill under slabs, shall be separately stockpiled as directed by the Engineer.

Rocks, broken concrete, or other solid materials, which are larger than 4 inches in greatest dimension shall not be placed in fill areas and shall be removed from the site by the Contractor at no additional cost to the Owner.

#### 020322 SHORING

Where necessary, trenches and other excavations shall be properly sheeted and braced to furnish safe and acceptable working conditions. The bracing shall be so arranged as not to place any stress on portions of the completed work until the general construction thereof has proceeded far enough to provide ample strength. Any damage to structures

occurring through settlements, water or earth pressures, slides, caves, or other causes due to failure or lack of sheeting or bracing, or improper bracing, or through negligence or fault of the Contractor in any other manner shall be repaired by the Contractor at his own expense.

The Contractor shall submit for the acceptance by the Engineer, in advance of all excavations of depth in excess of 5 feet, a detail plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation. If such plan varies from the shoring system standards established by the Industrial or Construction Safety Orders of the authority having jurisdiction, the plan shall be prepared by a registered civil or structural engineer.

Nothing in this section shall be deemed to allow the use of shoring, sloping, or protective system less effective than that required by the Occupational Safety and Health Act. All excavations shall be performed, protected, and supported as required for safety and in the manner set forth in the operation rules, orders, and regulations prescribed by the Division of Industrial Safety.

#### 020323 BARRICADES

Barriers shall be placed at each end of all excavations and at such places as may be necessary along excavations to warn all pedestrian and vehicular traffic of such excavations. Lights shall also be placed along excavations from one hour before sunset each day to one hour after sunrise of the next day until such excavation is entirely refilled, compacted, and paved. All excavations shall be barricaded in such a manner as to prevent persons from falling, walking, or otherwise entering any excavation in any street, roadway, parking lot, treatment plant or any other area, public or private.

#### 020330 COMPACTED FILLS

Fills, embankments, or backfills (except trench backfills specified elsewhere), herein designated as fills, shall be constructed at the locations and to the lines and grades indicated on the Plans. The completed fill shall correspond to the shape of the typical sections shown on the Plans or shall meet the requirements for the particular case. Material for fills shall be obtained from cut sections or borrow from a source as selected by the Contractor and accepted by the Engineer. Maximum particle size shall not exceed 4 inches. The fill material shall be free of leaves, grass, roots, stumps, and other vegetable matter.

Fills and backfills and the upper 6 inches in cuts shall be compacted to the percentage of maximum density as indicated in the following tabulation:

<u>Location</u>	<u>Percent</u>
Backfill adjacent to structures	95%
Under structures (present and future)	95%
Under roadways, parking, and storage areas, curbs, and sidewalks	90%
Other areas	85%

All compacted fills shall be placed in successive layers of loose material not exceeding 6 inches in depth after compaction. Each layer shall be brought to optimum moisture content for maximum density before compaction by rolling. If any material is placed that does not have the correct moisture content, it shall be removed and replaced. Soft, spongy, or springy material causing areas that "pump" when heavy loads pass over them shall be removed and replaced with suitable material. Dry material that will not "ball" shall be removed and replaced. These two conditions shall be considered as sufficient evidence without further testing that the moisture content is not correct and the material shall be removed.

Each layer shall be spread uniformly by the use of a road machine or other accepted device and rolled with an acceptable tamping roller, heavy pneumatic roller, or 3-wheeled power roller until thoroughly compacted to not less than the specified density.

Fill that is to be compacted and is inaccessible to rollers shall be compacted with pneumatic, vibrating, or other tamping equipment.

It shall be the responsibility of the Contractor to accomplish the specified compaction for backfill, fill, etc. It shall be the responsibility of the Contractor to control his operations by tests to verify and confirm that he has complied, and is complying at all times, with the requirements of these Specifications concerning compaction, control and testing.

The use of trucks, carryalls, scrapers, tractors, or other heavy hauling equipment shall not be considered as rolling in lieu of rollers, but the traffic of such hauling equipment shall be distributed over the fill in such a manner as to make use of the compaction afforded thereby as an addition to compaction by the use of rollers.

Where fill will not be under or adjacent to a wall or slab, under a paved area, under or in an area of compacted fill or embankment or is not otherwise specified to have compaction to 95 percent of maximum density, the Contractor may backfill the first 2 feet above the bottom of the excavation by the method described above and proceed to the top of the fill in not less than 3 lifts placed as follows: Each lift shall be consolidated by first filling to the lift height with water and subsequently depositing sufficient granular material as defined herein under SELECT MATERIAL to absorb the water deposited to such extent that

water is still evident on the entire surface before proceeding with the next lift. The filling of the soil to absorb the water shall be done gradually, to insure that the soil is uniformly wetted and to preclude the possibility of a large amount of soil displacing the water to the top. The Engineer reserves the right to require that the filling be done by hand, if use of mechanical equipment results in incomplete wetting of the material and improper compaction. Each lift shall be leveled by poling or tamping prior to the application of water for the following lift. Each lift shall be examined to determine if all the earth is saturated.

#### 020331 BACKFILL AND BASE MATERIALS

Sand, aggregate base material, gravel fill, and select material, where required for fill, backfill, bedding, and/or backfill around pipe and trench backfill shall conform to the following specifications.

#### 020331.10 SAND

The sand used for bedding under and around the bottom of the pipe shall be clean, coarse sand which shall be nonplastic when tested in accordance with AASHTO T 90 and 100 percent shall pass a 1/2-inch screen and no more than 20 percent shall pass a No. 200 screen.

#### 020331.20 BASE MATERIAL

The material shall consist of hard, durable particles or fragments of stone or gravel, screened or crushed to the required size and grading. The material shall be free from vegetable matter, lumps or balls of clay, alkali, adobe, or other deleterious matter, and shall conform to the following gradations when tested in accordance with ASTM C-136 and C-117.

<u>Sieve Sizes</u> <u>(Square Openings)</u>	<u>Percentage by Weight Passing Sieve</u>		
	<u>Gravel Fill</u>		<u>(ABC)</u>
	<u>Type A</u>	<u>Type B</u>	<u>Aggregate</u> <u>Base</u>
3"	100		
1-1/2"		100	
1-1/8"			100
No. 4	30-75	30-70	38-65
No. 8	20-60	20-60	25-60
No. 30	10-40	10-40	10-40
No. 200	0-12	0-12	3-12
P.I. Max.	5	5	5

In addition to the above requirements, all material, when sampled and tested in accordance with standard test methods, the aggregate shall meet the following requirements:

PERCENTAGE OF WEAR: When tested in accordance with ASTM C-131, the percentage of wear shall not exceed 40 percent after 500 revolutions.

PLASTICITY INDEX: When tested in accordance with AASHTO T-90, the plasticity index shall not be more than 5.

LIQUID LIMIT: When tested in accordance with AASHTO T-89, the liquid limit shall not be more than 25 percent.

Crushed material is not required, but may be incorporated in the finished product. The aggregate shall conform to the sieve analysis in this specification except that the least dimension of the maximum particle size shall not exceed  $\frac{2}{3}$  of the compacted thickness of the specified lift being placed.

#### 020331.30 SELECT MATERIAL

Select material as specified herein shall mean sound earthen material for which the sum of the plasticity index as determined by the methods of AASHTO Specification T 90 and the percent of material passing the No. 200 sieve shall not exceed 23.

#### 020340 TRENCH EXCAVATION

Pipe and electrical conduits shall be laid in an open trench. If the bottom of the excavation for pipe is found to consist of rock or any material that by reason of its hardness cannot be excavated to give a uniform bearing surface, said rock or other material shall be removed to a depth of at least 3 inches below the bottom of the pipe and refilled to grade with ABC material or sand placed at a uniform density, with minimum possible compaction, all at the Contractor's expense.

If the bottom of the excavation for pipe is found to consist of soft or unstable material which is incapable of properly supporting the pipe, such material shall be removed to a depth required and for the lengths required and the trench refilled to grade with ABC material or sand, compacted to 90 percent of maximum density, all at the Contractor's expense. Where indicated on the Plans, pipe shall be cradled in concrete.

The minimum clear width of the trench for pipe 4 inches in diameter and over, measured at the top of the pipe, shall be not less than the outside diameter of the pipe plus 18 inches. The maximum clear width of the trench for pipe, measured at the top of the pipe, shall not exceed the outside diameter of the pipe plus 24 inches for pipe sizes up to and including 24 inches and shall not exceed the outside diameter of the pipe plus 36 inches for pipe sizes over 24 inches.

Excavation for manholes, valves, or other accessories shall be sufficient to leave at least 12 inches in the clear between their outer surfaces and the embankment or timber which may be used to hold the banks and protect them. Backfill with earth under manholes, vaults,

tanks, or valves will not be permitted. Any unauthorized excess excavation below the elevation indicated for foundation of any structure shall be filled with sand, base material, or concrete, at the expense of the Contractor. Backfilling of manhole excavation shall conform to the backfilling required for trenches.

If, because of soil conditions, safety requirements or other reasons, the trench width at top of pipe is increased beyond the width shown in the preceding paragraphs, laying conditions shall be upgraded or stronger pipe installed designed in conformance with the Specifications for the increased trench width, without additional cost to the Owner.

Before laying pipes or electrical conduits that are to be in fill, the fill shall first be placed and compacted to not less than 2 feet above the top of pipe or conduit. After the placing and compacting of the fill, the trench for the pipe or conduit shall be excavated through the fill and fine graded as required hereinafter.

Potable water pipe and appurtenances shall be laid in trenches separate from those used for sewers. Unless otherwise specified or indicated on the Plans, potable water pipe shall be laid in trenches having a cover of not less than 3 feet below the surface of the ground and located at a distance of not less than 6 feet from any parallel sewer trench.

At road crossings or where existing driveways occur on a road, the Contractor shall make provision for ditch crossings at these points, either by means of backfills, tunnels, or temporary bridges.

#### 020342 FINE GRADING

Unless otherwise specified in the Contract Documents, the bottom of the trench for pipes 16 inches in nominal diameter and under shall be accurately graded to provide uniform bearing and support for each section of the pipe, on undisturbed soil at every point along its entire length, except for portions of the pipe where it is necessary to excavate for bells and for the proper sealing of pipe joints.

For all pipe over 16 inches in diameter, the Contractor shall over-excavate the bottom of the trench by at least 4 inches, or 1/12 the outside diameter of the pipe, whichever is greater. This overcut shall be filled with select material as specified herein, and fine graded as specified above. This bedding material shall be placed at a uniform density, with minimum possible compaction.

Fine grading of undisturbed soil or of compacted bedding material shall be controlled by the Contractor by string-lining, laser beam, or other method acceptable to the Engineer.

Where the trench excavation is made below the grade required to accommodate the bedding material, the trench bottom shall be restored to the proper grade by backfilling and compacting the backfill to 90 percent of maximum density. Backfill material shall be select material as specified herein.

Bell or coupling holes shall be dug after the trench bottom has been graded. Such holes shall be of sufficient width to provide ample room for caulking or banding.

Bell and coupling holes shall be excavated only as necessary to permit accurate work in the making of the joints and to insure that the pipe will rest upon the prepared bottom of the trench, and not be supported by any portion of the joint.

Depressions for joints, other than bell-and-spigot, shall be made in accordance with the recommendations of the joint manufacturer for the particular joint used.

#### 020344 PIPE BEDDING

After the pipe is laid, bedding material shall be placed under and around the pipe to a level even with the spring line of the pipe, compacted to 90 percent of its maximum density. The section of trench from the spring line to 12 inches above the top of the pipe shall then be filled with bedding material and water settled or compacted to 90 percent of its maximum density. The Contractor shall take all necessary precautions in the placement and compaction of the bedding material to prevent displacement of the pipe. In the event there is movement or floating, the Contractor shall at his own expense, reexcavate, relay, and backfill all pipe so affected. Water settling shall be performed by flooding and poling, or jetting so as to obtain a relative compaction of the fill material at least equal to that specified. When flooding and poling, or jetting methods are used, material for use as backfill shall be placed and consolidated in layers not exceeding 4 feet in thickness. Flooding and poling, or jetting methods shall be supplemented by the use of vibratory or other compaction equipment when necessary to obtain the required relative compaction. Water settling methods shall not be used when the backfill material is not sufficiently granular in nature to be self-draining during and after consolidation and when foundation materials may be softened or otherwise damaged by applied water.

Except as otherwise specified, bedding material for pipe less than 16-inch nominal size shall be sand, ABC, or select material passing a 1-inch screen. Bedding material for pipe from 16-inch to 48-inch nominal size shall be as above or B gravel. Bedding material for pipe over 48-inch shall be as above or A gravel.

After filling the trench to a level 12 inches above the top of the pipe, the Contractor has the option to water test the pipe or to backfill to the surface, at his own risk, before testing. If the pipe does not pass the hydrostatic test, he shall uncover the pipe, locate the leaks, repair and retest, repeating until the pipe section under test passes the hydrostatic test, all at the Contractor's expense.

020345 TRENCH BACKFILL

The trench backfill from 12 inches above the top of the pipe to the natural surface level or the finished grade indicated on the Plans shall be placed and compacted as follows:

Backfill for trench cuts across roadways and paved streets shall consist of backfilling the trench from 12 inches above the top of the pipe to the surface or to the underside of the specified pavement replacement with aggregate base course material compacted to 90 percent of maximum density.

Trench backfill for longitudinal trench cuts in roadways, paved areas, and storage areas shall consist of backfilling the trench from 12 inches above the top of the pipe up to within 2 feet of finished grade with native material compacted to 85 percent of maximum density. Backfill from 2 feet below finished grade to finished grade, to the underside of specified aggregate base course material as indicated on the Plans, or to the underside of specified pavement replacement shall consist of native material compacted to 90 percent of maximum density.

Trench backfill for trench cuts in areas outside the traveled right-of-way and in open country shall consist of backfilling the trench from 12 inches above the top of the pipe to finished grade with native material compacted to 80 percent of maximum density.

It shall be the responsibility of the Contractor to be assured that the native material, when used as specified above, is capable of being compacted to the degree specified. If the native material cannot be compacted to the density as specified above, it shall be the Contractor's responsibility to remove and dispose of this material whether it has been placed in the ditch as backfill or not, and to utilize other backfill material from another source acceptable to the Engineer, at no extra cost to the Owner.

Where existing underground pipes or conduits larger than 3 inches in diameter cross the trench above the new work, the backfill from the bottom of the trench to the spring line of the intersecting pipe or conduit shall be aggregate base course material compacted to 90 percent of maximum density. The aggregate base course material shall extend 2 feet on either side of the intersecting pipe or conduit which will insure that the material will remain in place while other backfill is placed.

Excess material shall be rounded up in a neat mound over the trench or removed as directed by the Engineer.

020347 PAVEMENT REMOVAL AND REPLACEMENT

Replacement of street, driveway, alley entrance, and other type pavements shall be of the same material as the existing pavement, constructed in accordance with the applicable Plans and Specifications.

The Contractor shall install temporary asphalt pavement or the first course of permanent pavement replacement immediately following back-filling and compaction of trenches that have been cut through existing pavement. Except as otherwise provided, this preliminary pavement shall be maintained in a safe and reasonably smooth condition until required permanent pavement is installed. Temporary paving removed shall be hauled from the jobsite and disposed of at the Contractor's expense.

Where a longitudinal trench is partly in pavement, the pavement shall be replaced to the original pavement edge, on a straight line, parallel to the center line of the roadway.

Where no part of a longitudinal trench is in the pavement, surfacing replacement will only be required where existing surfacing materials have been removed.

When the trench cut is in aggregate surfaced areas, the replacement shall be of aggregate base course material compacted to 95 percent of its maximum density.

#### 020347.10 ASPHALT PAVEMENT REPLACEMENT

Asphalt pavement replacement shall be of the same thickness as the adjacent pavement for a minimum of 2 inches and a maximum of 3-1/2 inches, and shall match as nearly as possible the adjacent pavement in texture, unless otherwise shown on the Plans.

Existing asphalt pavements to be removed for trenches or other underground construction or repair shall be cut by a wheel cutter, clay spade, or other device capable of making a neat, reasonably straight and smooth cut without damaging adjacent pavement that is not to be removed. The Engineer's decision as to the acceptability of the cutting device and its manner of operation shall be final.

The existing pavement shall be cut and trimmed after placement of required ABC and just prior to placement of asphalt concrete for pavement replacement, and the trimmed edges shall be painted with a light coating of asphalt cement or emulsified asphalt immediately prior to constructing the new abutting asphalt pavements. No extra payment shall be provided for these items, and all costs incurred in performing this work shall be incidental to pipe laying or pavement replacement.

Asphalt pavement replacement shall conform to the contour of the original pavement. A 10-foot straightedge shall be laid parallel to the center line of the trench when the trench is running parallel to the street, and across the pavement replacement when the trench crosses the street at an angle. Any deviation in the cut pavement replacement and the old pavement greater than 1/4 inch in 10 feet (10-foot straightedge) shall be removed and corrected.

020347.30 CURB, GUTTER, AND SIDEWALK REPLACEMENT

Where any concrete curb, gutter, or sidewalk has been removed or displaced, the same shall be replaced to the nearest construction joints with new concrete Class A curb, gutter or sidewalk to the same dimensions and finish as the original construction that was removed.

Expansion joints shall be the same spacing and thickness as on the original construction.

020602 WEATHER LIMITATIONS

Asphalt concrete shall be constructed only when the surface is dry, when the atmospheric temperature in the shade is 40 degrees F and rising, or above 50 degrees F if falling. No asphalt concrete shall be placed when the weather is foggy or rainy or when the base on which the material is to be placed is in a wet or frozen condition.

020603 RESTORING SURFACES

All roads and paved surfaces in which the surface is broken into or damaged by the installation of new work shall be resurfaced in kind, in accordance with the details on the Plans and as specified herein.

020604 GRADING UNDER PAVEMENT

All trees, stumps, brush, roots, sod, vegetation, rubbish, debris, and other objectionable matter shall be removed as previously specified from all areas to be paved.

All areas cleared and grubbed must be acceptable to the Engineer before the start of grading operations.

The Contractor shall not pass equipment over any pipe, drain, utility line, duct, or structure before it is protected by ample fill material, properly compacted. Any damage to such facilities shall be promptly repaired by the Contractor at his own expense.

The subgrade shall be brought to the required grades and cross sections by excavating, filling, blading, and compacting as hereinbefore specified.

The finished surface of the subgrade, after compaction, shall be smooth and not vary more than 3/4 inch when tested with a 10-foot straightedge, nor vary more than 3/4 inch from true grade as established by grade stakes or forms.

The subgrade shall be kept well drained at all times. Whenever ruts or low spots are formed, the subgrade shall be brought to grade and, if necessary, shall be reshaped and recompacted. Storage or stockpiling of materials on the subgrade will not be permitted.

020605 AGGREGATE BASE COURSE MATERIAL - ABC

The material shall consist of hard, durable particles or fragments of stone or gravel, screened or crushed to the required size and grading. The material shall be free from vegetable matter, lumps or balls of clay, alkali, adobe, or other deleterious matter, and shall conform to the following gradations when tested in accordance with ASTM C-136 and C-117.

<u>Sieve Sizes</u> (Square Openings)	<u>Percentage by Weight Passing Sieve</u> (ABC)
3"	
1-1/2"	
1-1/8"	100
No. 4	38-65
No. 8	25-60
No. 30	10-40
No. 200	3-12
P.I. Max.	5

In addition to the above requirements, all material, when sampled and tested in accordance with standard test methods, the aggregate shall meet the following requirements:

**PERCENTAGE OF WEAR:** When tested in accordance with ASTM C-131, the percentage of wear shall not exceed 40 percent after 500 revolutions.

**PLASTICITY INDEX:** When tested in accordance with AASHTO T-90, the plasticity index shall not be more than 5.

**LIQUID LIMIT:** When tested in accordance with AASHTO T-89, the liquid limit shall not be more than 25 percent.

Crushed material is not required, but may be incorporated in the finished product. The aggregate shall conform to the sieve analysis in this specification except that the least dimension of the maximum particle size shall not exceed 2/3 of the compacted thickness of the specified lift being placed.

020610 CONSTRUCTION METHODS

No aggregate base course material shall be placed on the subgrade until it has been checked and accepted by the Engineer.

Aggregate base material shall be placed on the subgrade in uniform layers not to exceed 6 inches in compacted depth. In no instance shall the minimum depth of a layer be less than 2 inches. Each layer shall be bladed to a smooth surface and shall be consolidated to the densities hereinafter specified.

The material shall be so handled as to avoid segregation of size and shall be mixed, after the addition of water on the roadway, before spreading. When spread, the material shall be free of pockets of coarse or fine materials.

Prior to final compaction, the surface of the aggregate base course shall be shaped to grade and cross section, as indicated on the Plans.

Aggregate base course material under roads and pavements shall be compacted to a maximum density of at least 95 percent, and under walks shall be compacted to a maximum density of at least 85 percent.

#### 020620 BITUMINOUS PRIME COAT

The bituminous prime coat shall consist of an application of hot bituminous material on a previously prepared base course or other surfaces to be paved. Prior to the application of the prime coat, an inspection of the area to be coated will be made by the Engineer to determine its fitness to receive the bituminous priming material. That portion of the base course prepared for immediate treatment, if considered excessively dry, shall be lightly sprinkled with water immediately in advance of the application to assure a uniform spread of the bituminous material.

Bituminous material used for the prime coat shall conform to the requirements for MC-250. MC-250 shall be applied at a temperature of 175 degrees F to 225 degrees F at a rate of 0.3 to 0.4 gallon per square yard by use of a bituminous distributor.

Immediately following the preparation of the base course, the bituminous material shall be applied by means of a bituminous distributor at the temperature specified above. The priming material shall be so applied that uniform distribution is obtained at all points of the surface to be primed.

Following the application of prime material, the surface shall be allowed to dry for a period of not less than 48 hours without being disturbed, or for such additional period of time as may be necessary to attain penetration into the base course and drying out or evaporation of the volatiles from prime material. The Contractor shall furnish and spread sufficient acceptable sand on all areas which show an excess of bituminous material to effectively blot up and cure the excess.

The primed surface shall be maintained by the Contractor until the succeeding layer of pavement has been placed. During this interval, the Contractor shall protect the primed surface against damage and shall repair all broken spots.

The bituminous distributor shall be so designed and equipped as to distribute the bituminous material uniformly at even heat on variable widths of surface at readily determined and controlled rate with pressure range of 25 to 75 pounds per square inch.

The prime coat shall be applied only when the base course is dry or contains moisture not in excess of that which will permit uniform distribution and the desired penetration. It shall not be applied when atmospheric temperature is below 60 degrees F.

020630 ASPHALT CONCRETE

Asphalt cement shall conform to the requirements for asphalt cement, AR4000, AASHTO 226 (AR-40). Mixing temperature shall be not lower than 275 degrees F, nor higher than 325 degrees F.

Mineral aggregate shall consist of coarse aggregate of crushed stone or gravel composed of hard, durable particles, sand, and a filler as specified below. The portion of the material retained on the No. 8 sieve shall be known as coarse aggregate and that portion passing a No. 8 sieve shall be known as fine aggregate. The composite material shall be uniformly graded from coarse to fine and shall meet the requirements of one of the following gradings when tested in accordance with AASHTO T 27. Asphalt concrete shall be as shown on the Plans, but if not shown shall be two course plant mix. Unless otherwise indicated on the Plans, asphalt concrete having an overall thickness of 2-1/2 inches or more shall be the two course plant mix.

<u>Plant Mix, Two Course</u>				<u>Plant Mix, Single Course</u>			
<u>Seal</u>		<u>Base</u>		<u>1-1/2" Thick Minimum</u>			
<u>3/4" Thick Min.</u>		<u>1-3/4" Thick Min.</u>		<u>Sieve</u>	<u>Percent</u>		
<u>Sieve</u>	<u>Percent</u>	<u>Sieve</u>	<u>Percent</u>	<u>Size</u>	<u>Passing</u>		
<u>Size</u>	<u>Passing</u>	<u>Size</u>	<u>Passing</u>	<u>Size</u>	<u>Passing</u>		
	100	1-1/4"	100	3/4"	100		
	95-100	1"	87-100	1/2"	75- 95		
No. 4	50- 70	3/4"	75- 90	3/8"	65- 85		
No. 8	35- 55	3/8"	55- 72	No. 4	50- 65		
No. 30	15- 30	No. 4	40- 60	No. 8	35- 50		
No. 100	5- 15	No. 8	30- 50	No. 30	15- 30		
No. 200	3- 8	No. 30	15- 30	No. 100	5- 15		
		No. 100	5- 15	No. 200	3- 8		
		No. 200	3- 8				

At least 70 percent by weight of each size of aggregate included in the coarse aggregate shall consist of particles which have at least one rough, angular surface produced by crushing.

Coarse aggregate shall have a percentage of wear of not more than 50 at 500 revolutions, as determined by AASHTO T 96.

Plasticity index of the aggregate shall be not more than 2 as determined by AASHTO T 90.

Sand may be added to the crusher or pit run product to supply any deficiency in the 8-mesh size, and filler may be added to supply any deficiency in 200-mesh material. If the aggregate contains an excess of sand, wasting will be required.

Finely powdered limestones, portland cement, or other artificially or naturally powdered mineral dust, acceptable to the Engineer, shall be used for filler. Filler shall be weighed and added separately to each batch at the time of proportioning. It shall be free from deleterious matter of any kind. It shall be of such fineness that it will meet the following requirements:

Passing 50-mesh sieve	100%
Passing 200-mesh sieve, at least	75%
The amount of material passing the No. 200 sieve shall be determined as provided under AASHTO T 11.	

The composite aggregate shall be free from vegetable matter, lumps or balls of clay, adherent films of clay, or other matter which will prevent thorough coating with asphalt cement.

The amount of asphalt cement, by weight, to be added to the aggregate will be 5.2 to 5.8 percent of the weight of the mixture.

Asphalt concrete conforming to the current requirements in Section 710 of the Uniform Standard Specifications for Public Works Construction published by Maricopa Association of Governments (MAG), may be substituted for the asphalt concrete specified herein as follows:

Plant Mix, Two Course

Seal: MAG Type E-3/8

Base: MAG Type A-1-1/2

Plant Mix, Single Course

MAG Type C-3/4

020650 DELIVERY AND PLACING

Placing and compacting of the asphalt mixture shall progress in sections generally not more than 750 linear feet in length. The mixture shall be spread, shaped, and finished by equipment as specified. The mixture shall be placed in uniform strips for the full width to be paved. Each successive strip shall be spread adjacent to the previously spread strip. A 6-inch width of each strip adjacent to which a new strip is to be placed shall not be rolled until after the new strip has been placed.

020653 PLACING AND COMPACTING

The surface of the aggregate base course shall be cleaned and then shall receive a prime coat as previously specified, before placing asphalt concrete.

An existing base, surfacing, or pavement shall be thoroughly cleaned immediately prior to receiving the plant-mixed surfacing. Where existing pavement is being widened or extended, it shall be cut to a straight vertical face prior to the paving operations and treated with asphalt paint binder.

When asphalt concrete is to be applied over existing pavement and local irregularities in the existing surface would result in a course of more than specified thickness, the surface of the existing pavement shall be brought to uniform contour by patching with asphalt concrete thoroughly tamped or rolled until it conforms with the surrounding surface, and a tack coat applied.

Spreading shall be as nearly continuous as possible. When asphalt concrete is laid against vertical surfaces such as gutters, the face of the vertical surface shall be roughened for proper bonding, cleaned, and then painted with a light coating of asphalt cement or emulsified asphalt.

At terminations of new surface course, the asphalt concrete shall be feathered into the existing surface over such a distance as may be required to produce a smooth riding transition. Base course and single course construction shall be joined by vertical butt joints finished and rolled to a smooth surface.

Initial or "breakdown" rolling shall be performed with a tandem power roller and shall follow the spreading operation when the mixture has reached a temperature where it does not "pick up" on the rolls. Rolls shall be kept properly moistened but a surplus of water will not be permitted. Rolling with pneumatic roller shall follow initial rolling when the mixture is in proper condition and when the rolling does not cause undue displacement, cracking, or shoving. Rolling shall begin at the sides and progress gradually to the center, lapping each preceding track until the entire surface has been rolled. Alternate trips of the roller shall be terminated in stops at least 3 feet distant from any preceding stop.

At any place not accessible to the roller, the mixture shall be thoroughly compacted with tampers and finished, if necessary, with a hot iron to provide a uniform layer over the entire width being paved.

The finished surface shall be of uniform texture. When tested with a 10-foot straightedge laid on the surface parallel with the centerline of the road, the variation of the surface from the testing edge of the straightedge shall not be more than 1/4 inch.

The specific gravity of the compacted mixture shall not be less than 95 percent of the specific gravity of specimens composed of the same materials in similar proportions or composed of the same mixture, compacted in the laboratory by the 75 blow method of ASTM D 1559.

## DIVISION 3

CONCRETE030000 GENERAL

Except as otherwise specified, concrete shall be composed of portland cement, fine aggregate, coarse aggregate, and water so proportioned and mixed as to produce a plastic, workable mixture in accordance with all requirements of this section and suitable to the specific conditions of placement. The proportions of materials shall be such as to secure the lowest water-cement ratio which is consistent with good workability, a plastic, cohesive mixture, and one which is within the specified slump range. The proportion of fine and coarse aggregate shall be such that the ratio of the coarse to the fine shall be not less than 1.0 nor more than 2.0, nor shall the amount of coarse aggregate be such as to produce harshness in placing nor honeycombing in the structures.

030100 WORKMANSHIP AND METHODS

Concrete work, including detailing of reinforcing, shall be in accordance with the best standard practices and as set forth in the ACI Building Code, Manuals, and Recommended Practices.

All concrete materials shall be so delivered, stored, and handled as to prevent damage to the materials and the inclusion of foreign substances. Packaged materials shall be delivered and stored in original containers until ready for use. Material containers or materials showing evidence of water or other damage shall be rejected.

030105 ENFORCEMENT OF STRENGTH REQUIREMENT

Concrete is expected to reach a higher compressive strength than that which is indicated in Table A as compressive strength. The strength level of the concrete will be considered satisfactory if the averages of all sets of three consecutive strength test results equal or exceed the required strength and no individual strength test falls below the required strength by more than 500 psi. Where an individual strength test falls below the required strength by more than 500 psi, the Engineer shall have the right to ask for additional curing of the affected portion followed by cores taken in accordance with ASTM C 42 and ACI 318, all at the Contractor's expense. If the additional curing does not bring the average of three cores taken in the affected area to at least the strength specified, the Engineer may require strengthening of the affected portions of the structures by means of additional concrete or steel or he may require replacement of these affected portions, all at the Contractor's expense.

030110 CLASSES OF CONCRETE

Concrete shall be of four classes, herein referred to as Classes A, B, C, and D, which shall be as specified herein and which shall be used in the respective places called for in these Specifications. Class C concrete may be used for fill for unauthorized excavation, for thrust blocks and ground anchor for piping, for bedding of pipe, and when noted on the Plans. Class B concrete may be used where Class A concrete is required, if high-early-strength is desired, at the Contractor's option. Class D concrete shall be used for precast concrete items. All other concrete, unless specified or noted otherwise, shall be Class A concrete.

TABLE A

<u>Class</u>	<u>Compressive Strength @ 28-Days (psi)</u>	<u>Max. Net Water to Cement Ratio by weight</u>	<u>Min. Cement Per Yard of Concrete (pounds)</u>	<u>Consistency Range in Slump (inches)</u>
A	3,500	0.58	564	2-1/2 to 4**
B (Type III cement)	3,500	0.58	564	2-1/2 to 4**
C	2,500	0.71	423	3 to 6
D	4,500	0.49	658	3 to 4

\*\*NOTE: Slump for slabs, decks, walks, and beams shall be not more than 3-1/2 inches. For gap graded aggregate, the slump may be less than 2-1/2 inches.

Any concrete that is pumped shall meet all the requirements of these Specifications. In no case shall concrete be placed which shows a slump outside the limits indicated in the table.

Classes A, C, and D concrete shall be made with Type II low alkali or Type IP(MS) cement. Classes A, C, and D concrete made with Type II cement may also contain fly ash pozzolan as an admixture. Class B concrete shall be made with Type III low alkali cement.

030121 FINE AGGREGATE

Fine aggregate for concrete or mortar shall consist of clean, natural sand or of sand prepared from stone or gravel. Deleterious substances shall not be present in excess of the following percentages by weight of contaminating substances. In no case shall the total exceed three percent.

Removed by decantation (dirt, silt, etc.)	3%
Shale	1%
Clay lumps	1%

Fine aggregate shall not contain strong alkali nor organic matter which gives a color darker than the standard color when tested in accordance with ASTM C 40. Fine aggregate shall have a fineness modulus not less than 2.50 nor greater than 3.00. Except as otherwise specified, fine aggregate shall be graded from coarse to fine in accordance with the requirements of ASTM C 33.

#### 030122 COARSE AGGREGATE

Coarse aggregate shall consist of gravel or crushed stone made up of clean, hard, durable particles free from calcarious coatings, organic matter, or other foreign substances. Thin or elongated pieces having a length greater than five times the average thickness shall not exceed 15 percent by weight. Deleterious substances shall not be present in excess of the following percentages by weight, and in no case shall the total of all deleterious substances exceed 2 percent.

Soft fragments	2%
Shale	1%
Coal and lignite	1/4%
Clay lumps	1/4%
Materials finer than No. 200 sieve	1/2%*

\* Except that when material finer than No. 200 sieve consists of crusher dust, the maximum amount shall be 1 percent.

Except as otherwise specified or authorized in writing by the Engineer, coarse aggregate shall be graded as specified in ASTM C 33, Size No. 57. Coarse aggregate for encasement of conduit shall be graded as specified in ASTM C 33, Size No. 8; concrete utilizing this aggregate will be equal to Class C concrete in all other respects, and will be designated as Class CE.

#### 030150 WATER

Water for concrete shall be clean-free from oil, alkali, acid, organic matter, or other deleterious substances.

#### 030160 PORTLAND CEMENT

Except as otherwise specified all portland cement shall conform to the specifications and test for portland cement ASTM C 150, Type II or III, Low Alkali. Low alkali portland cement shall contain not more than 0.6 percent total alkali. The word "alkali" shall be taken to mean the sum of sodium oxide ( $\text{Na}_2\text{O}$ ) and potassium oxide ( $\text{K}_2\text{O}$ ) calculated as sodium oxide. The determination for total alkali shall be made by the method set forth in ASTM C 114. Only one brand of cement shall be used for exposed concrete in any individual structure.

030200 FORMS AND ACCESSORIES

Forms shall be so constructed that the finished concrete will conform to the shapes, lines, grades, and dimensions indicated on the Plans. It is intended that the surface of the concrete after stripping shall present a smooth, hard, and dense finish that will require a minimum amount of finishing. Sufficient number of forms shall be provided so that the work may be prosecuted rapidly and present a uniform appearance in form patterns and finish. Forms shall be clean and free from all dirt, debris, concrete, etc. and shall be coated with an acceptable form oil if required, prior to use or reuse.

The design of all concrete forms, falsework and shoring shall be the responsibility of the Contractor and the design and installation of these items shall comply with all Local, State and Federal regulations and as specified in the General Conditions of these Specifications.

Information on the Contractor's proposed forming system shall be submitted in such detail as the Engineer may require to assure himself that the intent of the Specifications can be complied with by the use of the proposed system. Except as otherwise specified, or accepted in writing by the Engineer, only forming systems by manufacturers with a minimum of five years experience shall be considered.

Vertical forms shall remain in place a minimum of 24 hours after the concrete is placed. If, after 24 hours, the concrete is sufficiently hardened to resist surface damage, the vertical forms may be removed. Horizontal forms, or forms supporting concrete, shall remain in place as follows:

Sides of footings	24 hours
Vertical sides of beams, girders, and similar members	48 hours
Slabs, beams, and girders	10 days
Shoring for slabs, beams, and girders	Until concrete strength reaches 3,000 psi
Wall bracing	Until top or roof slab concrete is cured to 2,500 psi

Forms shall not be removed from concrete which has been placed with outside air temperature below 50 degrees F without first determining by cylinder tests if the concrete has properly set without regard for time. No heavy loading on green concrete will be permitted. Immediately after forms are removed, the surface of the concrete shall be carefully examined, and any irregularities in the surface shall be repaired and finished as specified hereinafter.

030201 FORM TIES

Form ties for the forming system selected shall be the cone-snap tie or flat bar type as manufactured by a recognized manufacturer of concrete

forming equipment. Forms shall be tied together at not less than two-foot centers vertically and horizontally. Wire ties or wood spreaders of any form shall not be used. Ties shall be of a type that will accurately tie, lock, and spread the forms. Forms and ties shall be designed to withstand concrete pressures without bulging, spreading, or lifting of the forms. The form tie shall be of such design that when the forms are removed no metals shall be within 3/4 inch of any surface. Holes in the forms for ties shall not allow leakage during placement of concrete.

#### 030300 REINFORCEMENT

All reinforcing steel shall be new material, of the quality specified, free from excessive rust or scale or any defects affecting its usefulness.

#### 030310 REINFORCING BARS

Reinforcing bars to be embedded in concrete or masonry shall be deformed bars conforming to ASTM A 615 and shall include the supplementary requirements. Bar Sizes No. 7 and larger shall be Grade 60. Smaller sizes shall be Grade 40. No field bending of bars will be allowed. All reinforcement bars lacking grade identification marks shall on delivery be accompanied by a manufacturer's guarantee of grade which will identify variations.

All bars shall be new stock free from rust scale, mill scale, or excessive rust when placed in the work. A thin coating of red rust resulting from short exposure will not be considered objectionable, but any bars having rust scale, mill scale, or a thick rust coat shall be thoroughly cleaned, or shall be rejected and removed from the premises upon order of the Engineer.

Bars shall be delivered bundled and tagged with identifying tags.

Bars shall be cut and bent in accordance with the provisions of ACI 315 and ACI 318. All bars shall be bent cold. Bars shall be free from defects and kinks and from bends not indicated on the Plans.

The Contractor shall review, sign and submit bending lists and placing diagrams for review by the Engineer. Review of shop drawings by the Engineer will be limited to general compliance with the Contract Drawings. The Contractor shall be fully responsible for accuracy of dimensions and details.

#### 030311 PLACING BAR REINFORCEMENT

Reinforcing bars shall be accurately placed and adequately secured in position. Bars at splices shall overlap as specified on the Plans in reinforced concrete, and if not specified then lap shall be 36 diameters; and 40 diameters in reinforced masonry construction. Bar supports shall be steel, shall conform to ACI 315, and shall be furnished in sufficient number to prevent sagging and to support loads during

construction, but in no case shall the quantities and locations of the supports be less than indicated in ACI 315. Bar supports, where used in slabs which will be exposed to view, shall be equipped with plastic tips. Reinforcing for concrete placed on the ground shall be supported by standard manufactured chairs, with steel plates for resting on the ground. No use shall be made of brick, broken concrete masonry units, spalls, rocks, or similar material for supporting reinforcing steel.

Unless otherwise indicated on the Plans, reinforcement shall be placed so as to provide the thickness of protective concrete covering as indicated on the Drawings.

The Contractor shall submit to the Engineer for review and acceptance samples of all chairs he proposes to use along with a letter stating where each type chair will be used. No concrete shall be placed until this prior acceptance has been obtained.

030312 TYING BAR REINFORCEMENT

Bars shall be fastened securely in place with wire ties. Bars shall be tied sufficiently often to prevent shifting. There shall be at least 3 ties in each bar length (does not apply to dowel laps or to bars shorter than 4 feet, unless necessary for rigidity). Slab bars shall be tied at every intersection around the periphery of the slab. Wall bars and slab bar intersections other than around the periphery shall be tied at every fourth intersection, but at not greater than the following maximum spacings:

	<u>Slab Bars</u>	<u>Wall Bars</u>
Bar Nos. 5 and smaller	60"	48"
Bar Nos. 6 through No. 9	96"	60"
Bar Nos. 10 and 11	120"	96"

The above tying requirements do not apply to reinforcement for masonry. For masonry, vertical bars shall be held in position at top and bottom and at intervals not exceeding 192-bar diameters.

Where bars are to be lapped at joints in the concrete, all bars shall project a minimum as specified on the Plans, and if not so specified then a minimum length as specified for lapped bars from the concrete first placed. All concrete or other deleterious coating shall be removed from dowels and other projecting bars by wire brushing or sand-blasting before the bars are embedded in a subsequent concrete placement.

The Plans contain general notes concerning amount of reinforcement and placing, details of reinforcement at wall corners and intersections, and details of extra reinforcement around openings in concrete.

030320 MESH REINFORCEMENT

Reinforcing mesh shall be welded steel wire fabric in accordance with ASTM A 185. It shall be of new stock, free from excessive rust when placed in the work. All necessary wiring, spacing chairs, or supports shall be installed to keep the mesh in place while concrete is being placed. The mesh shall be bent as shown or required to fit the work. Mesh shall be rolled or otherwise straightened to make a perfectly flat sheet before placing in the work. Laps shall be one complete mesh. Every other wire shall be tied at laps.

Welded wire fabric may be used in place of reinforcing steel bars if accepted by the Engineer. The welded wire fabric shall be furnished in flat sheet form. The cross-sectional area per linear foot of wire fabric shall be not less than the cross-sectional area per linear foot of reinforcing bars indicated on the Plans. Splices in the direction of principal reinforcement shall be lapped not less than the cross wire spacing plus 4 inches. Splices in the direction of cross wire reinforcement shall be lapped not less than one complete mesh.

030400 MIXING CONCRETE

Mixing equipment shall be subject to review and acceptance by the Engineer. Mixers may be of the stationary plant, paver, or truck mixer type. Adequate equipment and facilities shall be provided for accurate measurement and control of all materials and for readily changing the proportions of the material.

The mixing equipment shall be capable of combining the aggregates, cement, and water within the specified time into a thoroughly mixed and uniform mass and of discharging the mixture without segregation.

Concrete mixing plant and equipment shall be maintained in good working order and shall be operated at the loads, speeds, and timing recommended by the manufacturer or as specified.

The cement and aggregate shall be proportioned by weight.

030420 HAND MIXED CONCRETE

Hand mixing of concrete shall be done only when requested by the Contractor in writing and accepted by the Engineer.

Hand mixed concrete shall be prepared on a watertight level platform in batches of not to exceed 1/3 cubic yard each. The required amount of coarse aggregate shall first be spread on the platform in an even and uniform layer, over which the proper proportion of fine aggregate shall then be likewise spread. The combined depth of both such layers shall not be greater than 1 foot. The required quantity of cement shall then be evenly distributed over the fine aggregate; following which the entire batch shall be turned with shovels at least twice before the water is added. The proper amount of water shall then be uniformly

sprinkled or sprayed over the batch which shall thereafter be turned with shovels not less than 3 times before being removed from the platform.

030500 CONVEYING AND PLACING CONCRETE

Concrete shall be conveyed from the mixer to the place of final deposit by methods which will prevent the separation or loss of the materials.

030520 PLACING AND CONSOLIDATION

No concrete shall be placed without the prior authorization of the Engineer.

Concrete shall not be placed until all reinforcement is securely and properly fastened in its correct position and loose form ties at construction joints have been retightened, nor until all dowels, bucks, sleeves, hangers, pipes, conduits, bolts, and any other fixtures required to be embedded therein have been placed and adequately anchored, nor until the forms have been cleaned and oiled as specified.

Placement of concrete in which initial set has occurred or of retempered concrete will not be permitted.

No concrete shall be placed during rainstorms or high winds. Concrete placed immediately before rain shall be protected to prevent the water from coming in contact with it or winds causing excessive drying. Sufficient protective covering shall be kept on hand at all times for protection purposes.

030522 CONSOLIDATING CONCRETE

Concrete shall be placed with the aid of acceptable mechanical vibrators. Vibration shall be supplemented by manual forking or spading adjacent to the forms on exposed faces in order to secure smooth dense surfaces. The concrete shall be thoroughly consolidated around reinforcement, pipes, or other shapes built into the work. The vibration shall be sufficiently intense to cause the concrete to flow and settle readily into place and to visibly affect the concrete over a radius of at least 18 inches.

Sufficient vibrators shall be on hand at all times to vibrate the concrete as placed. In addition to the vibrators in actual use while concrete is being placed, the Contractor shall have on hand one spare vibrator in serviceable condition. No concrete shall be placed until it has been ascertained that all vibrating equipment, including spares, is in serviceable condition.

Special care shall be taken to place the concrete solidly against the forms so as to leave no voids. Every precaution shall be taken to make all concrete solid, compact, and smooth, and if for any reason the surfaces or interiors have voids or are in any way defective, such concrete shall be repaired in a manner acceptable to the Engineer.

030524 FOOTINGS AND SLABS ON GRADE

Concrete to be placed on ground or compacted fill shall not be placed until the subgrade is in a moist condition acceptable to the Engineer. If necessary, the subgrade shall be well sprinkled with water not less than 6 nor more than 20 hours in advance of placing concrete. If it becomes dry prior to the actual placing of concrete, it shall be sprinkled again, without forming pools of water. No concrete shall be placed if the subgrade is muddy or soft.

030525 REPAIR OF DEFECTIVE CONCRETE

All defective work shall be removed and replaced or repaired. Any work which has not been constructed in accordance with the Plans and Specifications shall be considered defective.

Correction of defective work shall be as specified herein. No defective work shall be patched, repaired, or covered without inspection by the Engineer. All imperfections in the work shall be chipped out and keyed ready for repair. The dry pack method shall be used for holes having a depth nearly equal to or greater than the least surface dimension of the hole, for cone-bolt, and narrow slots cut for repair. The mortar method of replacement shall be used for holes too wide to dry pack and too shallow for concrete replacement and shall be used for comparatively shallow depressions, large or small, which extend no deeper than the reinforcement nearest the surface. Concrete replacement shall be used when holes extend entirely through the concrete section or when holes are more than one square foot in area and extend halfway through the section. All surfaces of the set concrete to be repaired shall first be coated with epoxy Adhesive Engineering Concessive No. 1 LPL, Hunts Process HB 100 or 151, or equal. No repair shall be made until the Engineer has accepted the method of preparing the surface and proposed method of repair.

Curing of all repaired concrete shall be the same as specified for concrete.

030600 CURING CONCRETE

All concrete shall be cured by the methods specified herein.

All concrete that is to be painted shall be water or plastic membrane cured. No curing compound shall be used on any concrete surface that is to receive paint or upon which any material is to be bonded. All other concrete shall be cured by water curing or sprayed curing membrane at the Contractor's option, except floors and slabs which are specified to be sealed with a concrete sealer.

All surfaces of concrete being water cured shall be kept constantly and visibly moist day and night for a period of not less than 7 days and nights. Each day the forms remain in place may count as one day of water curing. No further curing credit will be allowed for forms in

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place after contact has once been broken between the concrete surface and the forms. Ties shall not be loosened during the period when concrete is being cured by leaving the forms in place. The top of walls shall be flooded with water at least 3 times per day, and the concrete surface shall be kept moist at all times during the 7-day curing period.

030700 CEMENT MORTAR AND GROUT

Cement mortar or grout for the repair of imperfect concrete work, filling of holes left by form bolts or ties, and the filling of voids around items through the concrete, etc. shall consist of cement and sand mixed in the same proportions used for the concrete being repaired, with only sufficient water to give the required consistency. In no case shall the water-cement ratio be more than that specified for the concrete being repaired. In the case of mortar being used for patching or repairing exposed concrete surfaces which are not to be painted or which will not be submerged in water, sufficient white cement shall be used to make the color of the finished patch match that of the surrounding concrete. Bolt and tie holes shall be filled with dry-pack mortar, well tamped into the holes. For dry-pack mortar, only enough water shall be used so that the resulting mortar will crumble to the touch after being "balled."

Concrete surfaces shall be roughened, cleaned, and thoroughly wet before grout or mortar is placed, or, where indicated on the Plans or specified, a bonding agent, such as Epoxy Adhesive Engineering Concessive No. 1 LPL, Hunts Process HB 100 or 151, or equal, shall be applied to the clean, roughened surface before placing the mortar or grout.

Grout for spreading over the surfaces of construction joints or cold joints shall consist of sand and cement with no more water used than allowed by the water-cement ratio specified for the concrete.

Particular care shall be exercised in placing cement mortar or grout since it will be expected to furnish structural strength or an impermeable water seal or both. Cement mortar or grout that has not been placed within 30 minutes after mixing shall not be used.

Grout for which the mix is not otherwise specified shall be mixed in the proportions of one part cement to four parts of concrete sand.

## DIVISION 15

PIPING, VALVES, GATES, AND SPECIALTIES150000 GENERAL

Piping shall be installed as indicated on the Plans. The Contractor shall submit to the Engineer, for review and acceptance, his detailed proposed piping layouts.

Any pipe which does not meet specifications or has been rejected, shall be removed from the jobsite and disposed of by the Contractor at no extra cost to the Owner.

Where new fittings are to be cut into or attached to existing piping or where connections are to be made to existing piping, the Contractor shall furnish and install the necessary sleeves, flanges, nipples, couplings, fittings, or other devices needed to accomplish the cutting-in or connections, whether indicated on the Plans or not.

In no case shall copper or copper alloy pipe or fittings carrying water or water based solutions or slurries be attached to cast-iron or steel pipe except by means of a dielectric coupling expressly made for this purpose and service.

All pipe which will operate under pressure shall be properly blocked at all fittings where the pipeline changes direction, changes size, or ends, using concrete thrust blocks in trenches and suitable anchors in structures. Concrete thrust blocks shall be sized so as to give bearing against undisturbed vertical earth banks sufficient to absorb the thrust from line pressure, allowing an earth bearing of 200 pounds per square foot per foot of depth below natural grade. (Earth bearing value may be increased, if substantiated by soils analysis.) The line pressure shall be the product of the nominal cross sectional area of the pipe and the test pressures as specified for each type of pipe. The concrete shall be placed, unless indicated otherwise on the Plans, so that the pipe joints and fittings will be accessible.

Flowmeters and other similar in-line devices, as described in DIVISION 17 of these Specifications, shall be installed per the manufacturer's recommendations under the general requirements of this Division of these Specifications.

150020. BURIED PIPING

All pipelines laid in open trenches shall conform to applicable parts of DIVISION 2.

Before excavation is started for any run of underground piping, the Contractor shall locate and expose all existing structures, piping, conduit, etc., which intersect the line of the piping, to avoid possible

damage to these during excavation operations and so that it may be determined if there will be any conflicts in location. In the event of conflicts in location or grade or both, between new piping and existing piping, the Contractor shall make adjustments in location or grade of new piping acceptable to the Engineer.

Where buried ductile iron, reinforced concrete, asbestos cement, vitrified clay, or similar rigid pipe enters a structure, it shall be by means of a coupling or wall piece cast into the wall, having a mechanical push-on, or similar flexible joint as specified or indicated on the Plans at the outside face of the wall. An additional similar joint shall be installed in the line at the edge of the structure excavation where the pipe trench leaves undisturbed ground. For steel pipe a single joint may be used located not more than 2 feet from the outside face of the wall.

At the close of the day's work, and at such other times when the pipe is not being laid, all openings in the end of the pipeline shall be closed with an accepted plug.

#### 150021 LAYING OF PIPE AND FITTINGS

In laying pressure pipelines, the deflection in a standard joint shall not exceed the manufacturer's recommendation. Horizontal and vertical deflections of not more than the recommended combined angle, including curves as indicated on the Plans, shall be made by deflections in standard pipe joints within 10 feet of the indicated stations. Five degree beveled joints may be used. Deflections of more than 5 degrees shall require special bends or fittings. Departure from and return to established alignment and grade shall not exceed 1/16 inch per linear foot of pipe and at no point shall the maximum departure from established line and grade be greater than 1 inch.

The laying of all pipe shall be in finished trenches free from water or debris. The joining of pipe sections shall be such as to produce watertight lines. Pipe shall be laid on an unyielding foundation with uniform bearing under the full length of the barrel. If the pipe bears top or bottom markings, it shall be placed with the markings in the proper position. All adjustments to line and grade shall be made by scraping away or filling in under the pipe. Pipe shall not be dropped or pounded to fit grade. If the joints are the type which require external grouting, banding, or pointing, space shall be provided under and immediately in front of the bell end of each section laid of such shape and size as to permit sufficient room for the grouting, banding, or pointing of the joints.

Each section of pipe shall be lowered into the trench, utilizing a sling or other device, in a manner that shall prevent injury to the pipe, coating, lining, or joints. Under ordinary conditions of laying, the work shall be so scheduled that the bell end of the pipe faces in the direction of laying. In placing pipe in the trench, the pipe shall be held by the lowering device at the balancing point of the section. It

shall not be dragged on the bottom of the trench but shall be supported while being fitted into the adjacent section. Supporting the pipe on blocks, or blocking of any nature, either temporary or otherwise, will not be allowed.

It is the responsibility of the Contractor, when the pipeline and appurtenances are finally laid, to see that all joints are protected and that any damage to the coating or lining of the pipe and fittings has been adequately repaired or replaced in order to preserve their integrity for corrosion protection.

#### 150022 JOINTING OF RUBBER GASKETED PIPE

Unless specified otherwise under a particular type of pipe, the jointing of pipe with rubber gaskets shall be in accordance with the manufacturer's published instructions and this section.

The ends of the pipe shall be thoroughly cleaned with wire brushes or the equivalent to remove all foreign materials, including sealing compound, if any, from surfaces which are to be incorporated in the joint. The spigot recess, the rubber gasket, and the bell shall be lubricated with a soft, vegetable compound. After lubrication, the gasket shall be thoroughly stretched when placing in the spigot groove so that there is a uniform volume of rubber distributed around the circumference. The gasket shall not be twisted, rolled, cut, crimped or otherwise injured or forced out of position during closure of the joint. Prior to assembling the joint in position, metal or wooden spacers shall be placed against the inside shoulder of the bell to provide the proper space for mortar between abutting ends of the pipe. After the joint is assembled, a "feeler" gauge shall be inserted between the bell and the spigot and the position of the rubber gasket checked around the complete circumference of the pipe. If the gasket is not in the proper position, the pipe shall be withdrawn, the gasket checked to see that it is not cut or damaged, the pipe relaid, and the gasket again checked.

Where indicated on the Plans and at locations where make-up field joints are required, the pipe shall be joined by lap welded field joints. Welded field joints at locations where a bell end is not provided shall be made by means of a bell end formed by a 4-inch butt strap welded to one side of the joint prior to assembly. All welding of field joints shall be in accordance with the requirement of AWWA Specification C 206.

Where welding is required in the field for pipe restraints in accordance with the Plans or Specifications, the welded surface shall be given an SP-3 power tool cleaning in accordance with the Specifications of the Structural Steel Painting Council. Following power cleaning, the Contractor shall recoat the power cleaned areas with an acceptable coating furnished by the pipe manufacturer and equal to the material and thickness supplied on the pipe by the pipe manufacturer. Following application of the coating, the pipe joint shall be grouted as specified hereinafter.

After the pipe has been laid, and before trench backfill may commence, the outside annular space between pipe sections shall be completely filled with grout. The grout shall be poured in such a manner that all exposed portions of the joint shall be completely protected with cement grout. Grout used for filling the outside joints by the pouring method shall be mixed in proportions of one part cement by weight, to not more than one part, by weight, of sand passing a No. 16 mesh screen and thoroughly mixed with water to the consistency of rich cream. A band of canvas or polyethylene shall be placed around the outside of the pipe and centered over the joint. The joint band shall be bound to the pipe by use of steel box strapping. The band shall completely and snugly encase the joint except for an opening at the top through which to pour the grout. The outside grout space, prior to filling with grout, shall be flushed with water so that the surfaces of the joint to be in contact with the grout filling will be thoroughly moistened when the grout is poured. Fluid grout shall be poured in only one opening in this joint and pouring shall be continuous until grout appears at the other side. The grout shall be rodded on both sides of the pipe to settle the grout and more grout added, as necessary, to fill the joint completely. Exposed portions of the joint, after filling, shall be covered with wet burlap. Joint bands shall not be removed.

Backfilling shall not be started until the exterior joint protection grout has set (2 hours) and the Inspector has checked and accepted each joint as completed.

After trench backfill is complete, the interior joint recesses shall be filled with mortar, tamped into the joint with a thin block of wood or other suitable tool, and pointed. The finished joint shall be smooth and flush with the adjacent pipe surfaces. Mortar for the inside of pipe joints shall be mixed in the proportion of one part, by weight, of cement, to two parts, by weight, of clean well-graded sand, and just sufficient water shall be used so that the resulting mortar will crumble to the touch after being "balled".

All mortar or grout shall be newly mixed. No mortar or grout that has begun to set shall be used, and no retempering will be allowed.

#### 150022.10 CURING AND PROTECTION OF JOINTS

Joints requiring mortar or grout shall be cured and protected as follows: Immediately after each exterior joint is completed, if not already by canvas or polyethylene band, it shall be protected from the sun by means of a covering of wet burlap and an initial covering of fine, moist earth or sand approximately 6 inches above the top of the pipe. Extreme care shall be taken in placing such earth around the pipe to avoid injury to freshly applied mortar or grout. At the close of the day's work and at such other times when the pipe is not being laid, if the inside joints are pointed, all openings in ends of the pipeline shall be covered by sacks and moist earth or sand to prevent drying out of the joint mortar by the circulation of air within the pipe.

150023 STEEL SURFACES EXPOSED TO WATER OR EARTH

All steel surfaces exposed to water or earth, including but not limited to blind flanges used in access manholes, construction manholes, bell rings at structures, all cast-iron or steel nuts and bolts, and dead ends shall be painted with an epoxy polyamide system of 10 mils dry film thickness conforming to the requirements of the FDA, Section 175.300 for potable water. The epoxy polyamide system used shall be as manufactured by Glidden, Tnemec, or equal, applied in accordance with the paint manufacturer's recommendations, to a clean surface, free of dust, dirt, mill scale, rust, oil, or grease, commercial blasted cleaned in accordance with SP-6, Steel Structures Painting Council Specifications.

150030. CLEANING AND TESTING

The interior of all pipelines, above or below grade, shall be thoroughly cleaned of all adhering matter and other debris. No testing of any pipeline shall be started until the cleaning is complete and accepted by the Engineer.

Special precautions required in the cleaning of a particular pipeline shall be as stated in the various parts of this Division of these Specifications.

All pipelines, above or below grade, shall be tested to the pressures indicated in the various parts of this Division of these Specifications.

Pipe underground may be tested before backfilling unless otherwise specified, and pipes to be encased in concrete or under concrete slabs shall be tested before the encasement or slabs are placed.

The Contractor shall furnish all necessary personnel, supplies, equipment, bulkheads, and whatever additional equipment is required to make any and all tests specified and shall make any and all repairs, including relaying, if necessary, to any and all pipelines failing to pass the testing requirements of these Specifications.

The Contractor shall give the Engineer a list of the scheduled pipeline tests by noon of the day preceding the scheduled test or tests. The Contractor shall notify the Engineer by written memorandum of his readiness (not just his intention) to test a line or portion of line. All bulkheads, thrust blocks, anchors, temporary connections, pumps, etc., shall be in place before the Contractor's notification of readiness is given to the Engineer. After testing, all pipes shall be flushed or blown out and left clean.

In testing with water, the test pressure specified shall be the pressure at the lowest point in the piping concerned. In testing with water, the lines shall be examined and any visible leaks repaired. In testing with air, the lines shall be examined and tested with soap suds and any leaks repaired. Testing shall be repeated until the lines are in satisfactory condition.

Despite any previous testing, any leaks developing before the end of the one year guarantee period shall be repaired by the Contractor at no additional expense to the Owner.

150036 POTABLE WATER LINES

Potable water pipelines shall be disinfected, prior to being placed in service, by filling the pipeline with a chlorine solution, expelling all air from the pipeline, and retaining the solution in the pipeline for 24 hours. The strength of the chlorine solution shall be such that at the end of the 24 hour period, the solution shall contain a chlorine residual of not less than 10 ppm at all points in the pipeline. Disinfection of the pipelines shall conform to AWWA C 601 except as modified herein. All details of the procedure shall be subject to the review and acceptance of the Engineer.

The effectiveness of the disinfection of the water lines shall be demonstrated by laboratory examination of samples in accordance with AWWA C 601. Should the initial treatment fail to result in a disinfected system, the Contractor shall repeat chlorination of the system until satisfactory results are obtained, all at no additional cost to the Owner. The Owner will furnish the water required for the initial disinfection; if additional disinfection is required, then the Contractor shall pay for such additional water.

150050 PIPING TEST SCHEDULE

<u>Type and/or Service</u>	<u>Test pressure</u>
All pipe	125 psi

150070 CONNECTION TO IN-SERVICE LINES

Existing pipe to which connections are to be made shall be exposed by the Contractor to permit field changes in line, grade, or fittings, if necessary.

All connections to existing lines shall be constructed according to the Plans.

When shutdown of an in-service line is necessary in order to connect to the new lines, a conference between the Contractor's representative, the Engineer, and operating supervisory personnel shall establish the time and procedures to insure that the shutdown will be for the shortest possible time. If necessary, shutdowns may be scheduled during other than normal working hours, at no additional cost to the Owner.

150071. CONNECTION TO WATER DISTRIBUTION SYSTEMS

The Owner will close existing valves, but will not guarantee a "bone-dry" shutdown. Valves connecting new work to the existing system shall be kept closed at all times. If it is necessary to obtain water from

the existing system, CLEARANCE MUST BE OBTAINED FROM THE OWNER. Valves shall not be operated until such clearance is obtained.

After disinfection samples have been taken and the new work passes the bacteriological tests, the new line shall then be turned over to the Owner with all branch lines and tie-in valves closed. Owner's crews will put the line into service.

#### 150320 STEEL CYLINDER PIPE - PRETENSIONED

GENERAL: This Specification covers reinforced concrete water pipe, steel cylinder type, pretensioned, designed and manufactured in accordance with AWWA C 303, latest revision. Except as otherwise specified or indicated on the Plans, field joints shall be bell and spigot with a rubber gasket.

The Owner reserves the right to inspect the pipe, fittings, and materials at the manufacturer's plant during all or any portion of the project. The pipe diameter, specified or called for on the Plans, shall be the inside diameter of the concrete section. An affidavit of compliance as specified in Section 1.10 of AWWA C 303 is required. A tabulated layout schedule in accordance with Section 1.5.2 of AWWA C 303 shall be submitted to the Engineer for review and acceptance.

Identification marks as specified in Section 1.6 of AWWA C 303 are required. The manufacturer shall clearly stencil or mark at the top of the pipe on the outside surface of each pipe the following:

1. Name or trademark of manufacturer.
2. Date of manufacture.
3. Internal diameter in inches.
4. Number consecutively according to design schedule from initial station to end station.

The manufacturer shall submit design calculations to the Engineer for review and acceptance. The design calculations shall indicate the pipe wall thickness, steel cylinder thickness, and pretension steel area and type that will be satisfactory for all conditions of external pressure and earth loadings, special physical loadings, and internal pressure.

DESIGN: Pipe design procedure shall be in accordance with AWWA C 303, Appendix A, except as modified herein. Pipe deflection shall be calculated from "Spangler's formula" using a deflection lag factor of 1.00, a bedding constant, K, of 0.100, and a modulus of soil reaction, E', of 700. Design pressure shall be as specified on the Plans and elsewhere in these Specifications.

Earth loads shall be calculated using the formula  $W = 192 H B_c$ . H is the height of fill over the pipe in feet and  $B_c$  is the outside diameter of the pipe in feet.

H-20 truck loading shall be added to all earth loads.

The lining thickness shall be a minimum of 3/4-inch and a maximum of 1 inch. The concrete coating over the rod reinforcing shall not exceed 1-1/2 inches.

Fittings and special pipe shall be designed for all the loadings as required for the pipe. The steel plate shall be thickened or stiffeners shall be added to the plate so as to resist the above loadings while limiting the deflection to  $D^2/4000$ . Deflection of steel plate pipe specials, and fittings shall be calculated from "Spangler's formula" using a bedding constant, K, of 0.100, a constant, E', of 700 and a deflection lag factor of 1.00. Reinforcement of fittings shall be designed in accordance with supplementary data contained in the AWWA Steel Pipe Design Manual M11.

MATERIALS: Cement used in the manufacture of pipe shall conform to ASTM C 150, Type II, low alkali. Mill certificates shall be furnished in triplicate for each load of cement delivered.

Steel for manufacture of pipe shall conform to Sections 2.4, 2.5, 2.6 and 2.7 of AWWA C 303. Mill test reports and certificates for steel as specified in Section 1.9.3 of AWWA C 303 shall be submitted in triplicate.

Rubber gaskets shall conform to the following requirements:

Minimum tensile strength - ASTM D 412	2,000/2,700 psi
Minimum elongation - ASTM D 412	400/350%
Hardness Shore A - ASTM D 2240	50-65
Specific gravity - ASTM D 297	0.95 to 1.45 ±0.05
Compression set - ASTM D 395, Method B	20% maximum
Tensile strength loss - ASTM D 573, 96 hours, 70 degrees C air	20% maximum
Elongation loss - ASTM D 573, 96 hours, 70 degrees C air	20% maximum

Test reports shall be furnished in triplicate showing the physical properties of rubber used in gaskets.

FABRICATION OF PIPE: Joint rings for spigot ends for rubber gasket joints shall be Carnegie shape M-3516.

Where the design pressure is 175 psi or less, flanges shall conform either to AWWA C 207 Class D or E, or ANSI B 16.5, 150 psi class. Where the design pressure is greater than 175 psi, flanges shall conform to ANSI V16.5, 300 psi class. Flanges shall have flat faces. Flanges shall be attached to bolt holes straddling the vertical axis of the pipe. Where flanged valves are to be installed, the pipe flange shall match the valve flange.

Flanges and portions of joint rings which are exposed on the completed pipe shall be given a shop coat of primer. All flange bolts installed underground shall be stainless steel Type 304 or 316. Anti-Seize Compound, Permatex, or equal, shall be applied to all threads.

Specials and fittings shall be fabricated in accordance with Section 4 of AWWA C 303 and in conformance with AWWA C 208, except bend radius may be 2.5 times the nominal diameter. Specials and fittings shall be furnished as required to provide a complete pipeline as indicated on the Plans. Specials and fittings not detailed on the Plans shall conform to the details furnished by the manufacturer and accepted by the Engineer.

#### 153000. VALVES

The Contractor shall furnish all valves where indicated on the Plans, as called for in these Specifications, or as required for proper operation of the equipment in general. Unless otherwise indicated on the Plans or specified in other sections of these Specifications, valves shall conform to the requirements as specified herein.

All valves installed in a given line shall be designed to withstand the test pressure for that particular line and shall be fabricated with ends to fit the piping.

Valves shall be manufactured by a manufacturer whose valves have had successful operational experience in comparable service.

The valve manufacturer shall furnish detailed technical information as required by the Engineer for evaluating the quality of the valves and as required by the Contractor for proper valve installation. The technical information shall include complete dimensions, weights, and material lists. No valve will be accepted for installation until the required information has been received and reviewed.

The Contractor shall furnish four sets of complete installation operation and maintenance instructions for each type of valve furnished. Instructions shall be bound in a cover.

Wherever stainless steel is specified in this section, it shall be AISI Type 316, or 304 unless otherwise specified.

Bolts shall conform to ANSI B 16.1 except that underground, in concrete valve boxes, or in water may be cast-iron bolts and nuts, and all bolts and nuts under these conditions shall be painted with an asphaltic coating as specified in AWWA C 104, of at least 10 mils thickness. Cast-iron bolts and nuts shall be made of material having at least 50,000 psi tensile strength. The cast-iron bolts used with mechanical joints will be acceptable.

The zinc content of bronze or brass used in any valve parts shall not exceed 6 percent. The aluminum content of bronze shall not exceed 2 percent.

The method of connection of valves to each piping system shall be as detailed on the Plans. In general, unless otherwise indicated on the Plans or specified, all valves 3-inch size and larger shall have flanged ends or shall be designed for bolting to flanged pipe, and all valves less than 3-inch size shall have screwed ends.

The Contractor shall furnish to the pipe supplier, after flanged valves and flanged check valves are selected, the face-to-face dimensions of all flanged valves and check valves to be installed in flanged pipelines so that the pipe may be fabricated to the proper length.

All buried valves shall have cast-iron valve boxes. The boxes shall be asphalt varnished, or enameled cast iron, adjustable to grade, and installed perpendicularly, centered around and covering the upper portions of the valve or valve operator. The box shall not be supported in any manner by the valve, valve operator, or the pipe. The top of each valve box shall be placed flush with finish grade unless otherwise indicated on the Plans. Valve boxes shall be 2-piece Mueller Company, Tyler Pipe Industries Inc., or equal.

All buried valves and other valves located below the operating deck or level, specified or noted to be key operated, shall have an operator shaft extension from the valve or valve operator to finish grade or deck level, a 2-inch square AWWA operating nut, and cover or box and cover, as may be required.

Except as otherwise specified, all buried valves shall be painted with 2 coats of asphalt varnish in accordance with the requirements of AWWA Standard C 500. This protective coating shall be protected from damage until valve is backfilled.

#### 153010. INSTALLATION OF VALVES

The Contractor shall furnish all labor, materials, and equipment necessary to install the valves complete in place at the locations indicated on the Plans in accordance with the details and these Specifications.

The Contractor shall furnish all incidental materials necessary for installation of the valves such as flange gaskets, flange bolts and nuts, valve boxes and covers, and all other materials required for the complete installation.

The Contractor shall provide the necessary concrete bases or supports and blocking to support the valves installed underground and above-ground.

#### 153100. BUTTERFLY VALVES

Butterfly valves and operators shall conform to AWWA Standard for Rubber-Seated Butterfly Valves, AWWA C 504, except as modified or supplemented herein.

Valves and operators shall be designed for maximum operating torque, with safety factors as required in AWWA C 504 standards and the Appendix thereto. Maximum operating torque shall be calculated in accord with the procedures set forth in the Appendix of AWWA C 504 and based on the following characteristics:

Maximum pipeline velocity (valve wide open): 16 feet per second

Maximum pressure drop across valve (valve closed): per class rating of valve

System headloss characteristic (exclusive of valve): proportional to velocity squared

System head source characteristic: constant head source equal to class rating of valve

Records of tests shall be furnished as specified in AWWA C 504.

The valve shaft, keys, dowel pins, or taper pins used for attaching the valve shaft to the valve disc shall be Type 304 or 316 stainless steel or equivalent corrosion resistant material. All portions of the shaft bearings shall be stainless steel, bronze, nylon, or fiberglass and Teflon in accordance with AWWA C 504.

All nuts and screws used with clamps and discs for rubber seats shall be 304 or 316 stainless steel and securely held from loosening from vibration or cavitation effects.

Valve disc shall seat in a position of 90 degrees to the pipe axis and shall rotate 90 degrees between full open and tight closed position.

Butterfly valves shall be AWWA Class 150 B unless otherwise indicated on the Plans.

Valves larger than 6 inches that are buried in the ground shall be provided with a totally enclosed worm gear or traveling nut operator mounted on the valve. The valve shaft shall extend from the valve to the operator and shall be as specified for valve shafts. The operator shall be gasketed for watertightness. Operators shall be suitable for buried service and shall have an operator shaft extension to finished grade, a 2-inch square AWWA nut, valve box, and cover.

Protective coatings shall be as specified in Section 4.2 of AWWA C 504.

An affidavit of compliance as specified in Section 1.5 of AWWA C 504 shall be furnished.

Certified drawings and material specifications shall be furnished by the manufacturer through the Contractor covering all items included in Sections 1.2 and 2 of AWWA C 504. Manufacture of valves to be furnished shall commence only after the certified drawings have been accepted by the Engineer.

D 15-12.

Butterfly valves shall be as manufactured by Henry Pratt Company, Allis-Chalmers Manufacturing Company, Kennedy Valve, or equal.

MEASUREMENT AND PAYMENTGENERAL

The method of measurement and payment for the various items comprising the completed work follows: Payment for the items shall be compensation in full for the furnishing of all overhead, labor, material, tools, equipment, and appurtenances necessary to complete the work in a good, neat, and satisfactory manner as indicated on the Plans or as specified, with all connections, testing, painting, cleanup, and related work completed. Each item, fixture, piece of equipment, etc., shall be complete with all necessary connections and appurtenances for the satisfactory use and/or operation of said item. No additional payment will be made for work related to each item unless specifically noted or specified. Measurement will be in place in the completed work with no allowance for waste.

ITEM NO. 1 - WATER PIPE

Measurement for payment for water pipe will be for the linear feet of pipe installed, measured along the center line of pipe from center of fitting to fitting or to appurtenant structures, with no deduction for valves or fittings. Payment will be made at the unit price bid per linear foot of pipe called for in the Proposal. Such payment will be compensation in full for furnishing and installing water pipe and fittings complete in place including all cost of clearing and grubbing, excavation, removal of obstructions, paving removal and disposal, shoring and bracing, bedding, concrete blocking, ABC street crossing backfill, backfilling and compaction, maintenance of traffic, flushing, testing, and chlorination.

ITEM NO. 2 - BUTTERFLY VALVE

Measurement for payment for butterfly valve, will be for the number of valves installed. Payment will be made at the unit price bid per valve as called for in the Proposal. Such payment will be compensation in full for furnishing and installing the butterfly valve with operator, box and cover.

ITEM NO. 3 - PUMP MANHOLE

Measurement for payment for pump manhole will be for the number of manholes installed. Payment will be made at the unit price bid as called for in the Proposal. Such payment will be compensation in full for furnishing and installing the manhole, complete in place, including excavation and backfill.

ITEM NO. 4 - PAVEMENT REPLACEMENT

Measurement for payment for pavement replacement will be by the square yard, measured in place, for the type of pavement involved, with the following restrictions and provisions.

In computing pay quantities by the square yard for pavement replacement, the length of the pavement replacement will be measured along the center line of the trench and the maximum pay width shall be as defined in MAG Specifications, Section 336.4. Should the actual width of the pavement replacement be less than the maximum pay width then the actual width shall be used in computing pay quantities.

The unit price bid per square yard for pavement replacement will be compensation in full for furnishing all materials, equipment, and labor to saw-cut the existing pavement and construct the pavement replacement in accordance with the Plans and Specifications.

ITEM NO. 5 - CHIP SEAL COAT

Measurement for payment for Chip Seal Coat will be by the square yard, measured in place, for the type of chip seal coat involved, with the following restrictions and provisions.

In computing pay quantities by the square yard for chip seal coat, the chip seal coat will be measured along the center line of the trench from monument line Station 9+15 to monument line Station 9+90. The pay width shall be 25 feet.

The unit price bid per square yard for chip seal coat will be compensation in full for furnishing and installing all materials, equipment and labor in accordance with the Plans and Specifications.

ITEM NO. 6 - MISCELLANEOUS

The lump sum to be paid for miscellaneous will be compensation in full for work on any item shown on the Plans or specified but not specifically included for payment under any other item. Miscellaneous items shall include, but not be limited to: bond expense; permits; mobilization; drainage restoration and replacement; relocation or repair of any items unavoidably damaged, destroyed or moved as a result of construction; repairs of sidewalks, curbs and gutters; cutting plugged and abandoning existing waterlines, removing existing pipe as required to install new pipe, and project cleanup.

PROPOSAL

Place \_\_\_\_\_

Date \_\_\_\_\_

Proposal of \_\_\_\_\_,

a Corporation organized and existing under the laws of the State of \_\_\_\_\_

\_\_\_\_\_ ; a partnership consisting of \_\_\_\_\_

\_\_\_\_\_ ; or an individual trading as \_\_\_\_\_

\_\_\_\_\_ .

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

Gentlemen:

The undersigned hereby proposes and agrees to furnish any and all required labor, materials, construction equipment, transportation and services for the construction of:

Project No. W-823044E  
Water Transmission Main Relocation  
51st Avenue and Cactus

in strict conformity with the Plans and Specifications for the following unit prices:

(Extension of these unit prices on the basis of estimated quantities and the totaling of these extensions are for the purpose of comparing bids only. The mathematics of such extensions and totaling will be checked and corrected by the Engineering Division, Public Works Department, before evaluating the bids, and the lowest of such corrected and checked totals will determine the lowest bid.)

Item No.	Quantity	Item (Prices to be written in words)	Unit Price	Total
			\$	\$
1	300 LF	For 30-inch diameter concrete steel cylinder water pipe, AWWA Class C-303, complete in place, the sum of  _____ Dollars and _____ Cents per linear foot		
2	1 Ea	For 30-inch butterfly valve, AWWA C-504 with valve box and cover, Type A, complete in place, the sum of  _____ Dollars and _____ Cents lump sum		
3	1 Ea	For pump manhole, complete in place, the sum of  _____ Dollars and _____ Cents lump sum		
4	16 SY	For AC pavement replacement, saw cut, removed and replaced over pipe trench, complete in place, the sum of  _____ Dollars and _____ Cents per square yard		

Item No.	Quantity	Item (Prices to be written in words)	Unit Price	Total
			\$	\$
5	208 SY	For chip seal coat, complete in place, the sum of		
		_____		
		Dollars		
		and _____ per square yard	_____	_____
6	1 LS	For miscellaneous items complete, the lump sum of		
		_____		
		Dollars		
		and _____ lump sum	_____	_____
		TOTAL, Items No. 1 through 6 - inclusive		
		_____		
		Dollars		
		and _____	\$	_____

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.

Upon receipt of notice of the acceptance of this bid, we will execute the formal Contract attached within ten (10) days, and will deliver a one hundred percent (100%) Surety Bond for the faithful performance of this Contract, together with a one hundred percent (100%) Payment Bond.

The Bid Security, attached, without endorsement, in the sum of five percent (5%) of the total bid is to become the property of the City of Glendale, Glendale, Arizona, in the event the Contract and Bonds are not executed within the time set forth as liquidated damages for the delay and additional work caused thereby.

The undersigned has checked carefully all the above figures and understands that the City of Glendale, Arizona will not be responsible for any errors or omissions on the part of the undersigned in making up this bid.

The undersigned understands that the Mayor and Council of the City of Glendale, Arizona reserve the right to reject any or all bids or to waive any informalities in the bid.

SEAL - If bidder  
a Corporation

Respectfully submitted,

\_\_\_\_\_  
Contractor  
By \_\_\_\_\_

\_\_\_\_\_  
Complete Business Address

Bidder shall signify receipt of all Addenda here (if any).

Addenda No. \_\_\_\_\_

LICENSE TO USE PROJECT RIGHT OF WAY

C.S.R. A9921-21

LICENSE NO. 23679

Phoenix, Arizona December 27, 19 83

The Salt River Project hereby gives and the undersigned hereby accepts, pursuant to the terms and conditions appearing below and upon the reverse side hereof, a revocable license to enter upon and use right of way of the Salt River Project at the following location:  
Approximately 265 feet South of Northeast Corner, Section 20, T-3N, R-2E. 51st Avenue North Side of Arizona Canal. (8E-14.9N)

Said use to be for the sole and express purpose of:

Water transmission line partially crossing Association's canal right-of-way.

In the use of said right of way, the following specifications and conditions must be followed:

- (a) Water line to be installed in accordance with City of Glendale plans for Project #W823044E in canal right-of-way to have minimum of 36 inches cover.
- (b) Backfill to be native material compacted in lifts to minimum of 90% of Proctor density.
- (c) No valves, risers, or any other above ground installations to be placed in Association's canal right-of-way.
- (d) Canal roadway surfaces and right-of-way to be restored to original condition or better.
- (e) Licensee will move at own expense if installation conflicts with maintenance of, or future installations in, Association's facilities.
- (f) All damage to Association's facilities to be repaired by Licensee to the Association's satisfaction.
- (g) Subject pipeline will not transport water beyond the exterior boundaries of the Salt River Project Reservoir District and cannot serve non-member land unless provided for by contract.
- (h) Work to be done only after securing clearance from Transmission Watermaster, phone 273-5461, a minimum of 72 hours in advance.



The Licensee, whose signature or that of any authorized representative, appears below, having read and understood the terms and conditions of this license appearing below and upon the reverse side hereof, agrees to all of the terms and conditions set forth:

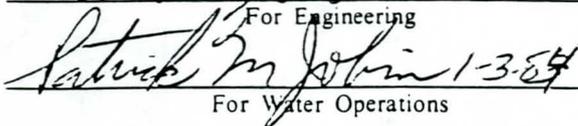
1. The Licensee warrants and represents that he is qualified to perform or will contract with qualified parties to perform the undertaking which is the subject of this license, to enter upon and use the right of way of the Salt River Project and agrees to obtain such other license, permits and agreements as may be required by other governing bodies having jurisdiction over the location which is the subject hereof.
2. The Licensee further agrees that any changes in the existing Project right of way or construction and improvements thereon, or both, shall be completed and maintained in conformity with all applicable safety standards, regulations and the like and specifically in a manner so as to avoid the creation of potentially dangerous conditions and harm to others.
3. The Licensee shall be liable for any and all damages to the property of the United States of America, the Salt River Valley Water Users' Association and the Salt River Project Agricultural Improvement and Power District, or to the property of any other party or parties by reason of the exercise of the privilege herein given to the Licensee. The Licensee further agrees to and by these presents does indemnify and hold harmless the United States of America, the Salt River Valley Water Users' Association and the Salt River Project Agricultural Improvement and Power District, against any claims, actions, costs, expenses, and causes of actions for property damages or personal injuries in any way caused by or related to the rights herein granted, save and except those caused solely and exclusively by the negligence of the Salt River Project. The Licensee specifically agrees to indemnify and save harmless the Salt River Project, its agents, successors and assigns from any and all liability arising out of the presence, maintenance or use of the Licensee's undertaking which is the subject of this license, or any changes thereon or improvements thereto. The Licensee understands and agrees that he enters upon the property of the Salt River Project at his own risk.
4. It is understood and agreed by Licensee that this license shall not become finally effective until said use has been inspected by agents of the Salt River Project and finally approved as complying with the specifications and conditions listed on both sides of this form. Said inspection, however, is not intended nor understood to be or constitute more than a determination that the specifications set forth herein have been complied with by Licensee and is not to be considered as an approval or ratification by Licensor of the quality or fitness of Licensee's improvements.
5. Failure to obtain a specific construction clearance from the designated office will automatically void this license and subject the Licensee to all liability for damage, as a result of this failure, to his works and the works and property of others, including those of the Association.
6. In the event that said use does not comply with the above specifications and conditions stated herein or upon revocation of this license, the Licensee shall remove at his own cost, within ten (10) days after written notice, any improvements or installations placed on said right of way by virtue of this license. In case of the failure of the Licensee to remove the aforesaid installations within the time specified above, the authorized agents of the Salt River Project, or its successors or assigns, may thereupon remove the installations from the said right of way and the cost and expense so incurred (as conclusively determined by the Project) shall be chargeable to and payable by the said Licensee within ten (10) days after a statement of such expense and cost has been mailed to Licensee at the address designated beneath his signature hereunder. The Licensee hereby releases the said United States of America, the Salt River Valley Water Users' Association, and the Salt River Project Agricultural Improvement and Power District from all claims for damages that might result to the Licensee by reason of such removal.
7. The Licensee further agrees to keep in proper maintenance and repair any improvements, structures or other installations erected within said right of way.
8. This license shall continue so long as it is considered to be expedient as conclusively determined by a proper officer of the Salt River Project and shall be revocable by said officer upon ten (10) days written notice to the Licensee.

APPROVED

CITY OF GLENDALE W823044E

SALT RIVER PROJECT

  
 \_\_\_\_\_  
 For Engineering

  
 \_\_\_\_\_  
 For Water Operations

  
 \_\_\_\_\_  
 Licensee

7022 N. 58th Drive  
 \_\_\_\_\_  
 Address

Glendale, AZ 85311  
 \_\_\_\_\_

CALL FOR ASSISTANCE

City

Telephone

273-5412

Inspection Division

273-5461

Irrigation Division

BID BOND  
(Surety Bond)

KNOW ALL MEN BY THESE PRESENTS:

That we, \_\_\_\_\_,

as Principal, (hereinafter called the Principal), and the \_\_\_\_\_

\_\_\_\_\_, a corporation duly organized under

the laws of the State of \_\_\_\_\_, as Surety, (hereinafter called the Surety), are held and firmly bound unto the City of Glendale, a municipal corporation as Obligee, in the sum of five percent (5%) of the total amount of the bid of Principal, submitted by him to the Mayor and Council of the City of Glendale, for the work described below, for the payment of which sum, well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, and administrators, successors and assigns, jointly and severally, firmly by these presents, and in conformance with A.R.S.

WHEREAS, the said Principal is herewith submitting its proposal for

\_\_\_\_\_  
\_\_\_\_\_

NOW, THEREFORE, if the City of Glendale shall accept the proposal of the Principal and the Principal shall enter into a contract with the City of Glendale, in accordance with the terms of such proposal and give such Bonds and Certificates of Insurance as specified in the Standard Specifications with good and sufficient Surety for the faithful performance of such contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter into such contract and give such Bond and Certificates of Insurance, if the Principal shall pay to the City of Glendale the sum of money set forth above as liquidated damages for failure of the Principal to enter into the contract, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_, A.D., 19\_\_

\_\_\_\_\_  
Principal

Witness:

\_\_\_\_\_  
Title

\_\_\_\_\_

\_\_\_\_\_  
Surety

Witness:

\_\_\_\_\_  
Title

\_\_\_\_\_

C O N T R A C T

THIS AGREEMENT, made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_, by and between the City of Glendale, Arizona, a municipal corporation, organized and existing under and by virtue of the laws of the State of Arizona, party of the first part, hereinafter designated the Owner, and

\_\_\_\_\_ of the City of \_\_\_\_\_, County of \_\_\_\_\_, and State of \_\_\_\_\_, party of the second part, hereinafter designated the Contractor.

WITNESSETH: That the said Contractor has covenanted, and agreed, for and in consideration of the payments made as provided for in the proposal and specifications, to the Contractor by the said Owner, and under the penalty expressed in the bond hereto attached, at his proper cost and expense to do all the work and furnish all materials, tools, labor, and all appliances and appurtenances called for by the Agreement, free from all claims, liens and charges whatsoever, in the manner, and under the conditions hereinafter specified, that are necessary for the construction of:

PROJECT Water Transmission Main Relocation, Project No. W-823044E  
51st Avenue and Cactus

The work done and materials and equipment furnished shall be strictly pursuant to and in conformity with the specifications and plans. The specifications and drawings furnished by the Contractor with his proposal and the additional drawings or prints and other information to be furnished by the Contractor in accordance with the specifications are made a part of this Agreement when and as approved by the City of Glendale, Arizona are intended to be complementary and all specifications, plans, drawings, or prints furnished by the Contractor and approved by the City of Glendale shall be complementary therewith. Any work appearing in or upon the one and not mentioned in the others shall be executed according to the true intent and meaning of the said specifications and plans, drawings, or prints the same as though the said work were contained and described in all.

The Notice to Contractors, Information for Bidders, Special and Technical Provisions, Proposal, Bid Bond, Payment Bond, Performance Bond, Appendix, Plans and Addenda thereto, are hereby understood to be a part of this Contract.

It is further covenanted and agreed that the work shall be executed under the direction and supervision of the City of Glendale, Arizona, or its properly authorized agents, on whose inspection all work shall be accepted or rejected.

The City shall have full power to reject or condemn all materials furnished or work performed under this contract which do not conform to the terms and conditions herein expressed.

To prevent all disputes and litigation, it is further agreed by and between the said City of Glendale, Arizona, and said Contractor, that the Engineering Division, Public Works Department, City of Glendale, shall determine all questions in relation to the work and the construction thereof, and it shall in all cases decide all questions which may arise relative to the execution of the work under this contract on the part of the said Contractor and its estimates and decisions shall be final and conclusive; and such estimates and decisions, in case any question may arise, shall be a condition precedent to the right of said Contractor to receive any money or compensation for anything done or furnished under this contract.

IN WITNESS WHEREOF, four (4) identical counterparts of this contract, each of which shall for all purposes be deemed an original thereof, have been duly executed by the parties hereinabove named, on the date and year first herein written.

(SEAL)

ATTEST:

CITY OF GLENDALE, ARIZONA  
PARTY OF THE FIRST PART (OWNER)

\_\_\_\_\_  
City Clerk

\_\_\_\_\_  
Title

APPROVED: (AS TO FORM)

\_\_\_\_\_  
City Attorney

WITNESSES:

\_\_\_\_\_  
PARTY OF THE SECOND PART (CONTRACTOR)

\_\_\_\_\_  
Title

STATUTORY PERFORMANCE BOND PURSUANT TO TITLE 34,  
CHAPTER 2, ARTICLE 2, OF THE ARIZONA REVISED STATUTES  
(Penalty of this bond must be 100% of the Contract Amount)

KNOW ALL MEN BY THESE PRESENTS:

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

WHEREAS, The Principal has entered into a certain written contract  
with the Obligee, dated the \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_,  
to construct Water Transmission Main Relocation, Project No. W-823044E  
51st Avenue and Cactus

which contract is hereby referred to and made a part hereof as fully and to  
the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if  
said Principal shall faithfully perform and fulfill all the undertakings,  
covenants, terms, conditions and agreements of said contract during the  
original term of said contract and any extension thereof, with or without  
notice to the Surety, and during the life of any guaranty required under the  
contract and shall also perform and fulfill all the undertakings, covenants,  
terms, conditions, and agreements of any and all duly authorized modifications  
of said contract that may hereafter be made, notice of which modifications to

the Surety being hereby waived; then the above obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Title 34, Chapter 2, Article 2, of the Arizona Revised Statutes, and all liabilities on this bond shall be determined in accordance with the provisions of said Title, Chapter, and Article, to the extent as if it were copied at length herein.

The prevailing party or any party which recovers judgment on this bond shall be entitled to such reasonable attorney's fees as may be fixed by the Court or a judge thereof.

Witness our hands this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_

\_\_\_\_\_  
Principal Seal

By: \_\_\_\_\_

\_\_\_\_\_  
Surety Seal

By: \_\_\_\_\_

\_\_\_\_\_  
Agency of Record

\_\_\_\_\_  
Agency Address

STATUTORY PAYMENT BOND PURSUANT TO TITLE 34,  
CHAPTER 2, ARTICLE 2, OF THE ARIZONA REVISED STATUTES  
(Penalty of this bond must be 100% of the Contract Amount)

KNOW ALL MEN BY THESE PRESENTS:

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

WHEREAS, The Principal has entered into a certain written contract  
with the Obligee, dated the \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_,  
to construct Water Transmission Main Relocation, Project No. W-823044E  
51st Avenue and Cactus

which contract is hereby referred to and made a part hereof as fully and to  
the same extent as if copied at length herein.

NOW, THERETOFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if  
the said Principal shall promptly pay all monies due to all persons supplying  
labor or materials to him or his sub-contractors in the prosecution of the  
work provided for in said Contract, then this obligation shall be void, other-  
wise to remain in full force and effect.

PROVIDED, HOWEVER, that this bond having been required of the said  
Principal in order to comply with the provisions of Title 34, Chapter 2,  
Article 2, of the Arizona Revised Statutes, all rights and remedies on this

bond shall inure solely to such persons and shall be determined in accordance with the provisions, conditions, and limitations of said Title, Chapter and Article, to the same extent as if they were copied at length herein.

The prevailing party or any party which recovers judgment on this bond shall be entitled to such reasonable attorney's fees as may be fixed by the court or a judge thereof.

Witness our hands this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_

\_\_\_\_\_  
Principal Seal

By: \_\_\_\_\_

\_\_\_\_\_  
Surety Seal

By: \_\_\_\_\_

\_\_\_\_\_  
Agency of Record

\_\_\_\_\_  
Agency Address

CITY OF GLENDALE, ARIZONA  
ENGINEERING AND DEVELOPMENT DEPARTMENT  
CERTIFICATE OF INSURANCE

The \_\_\_\_\_  
certifies that the following insurance policies have been issued on behalf of

Name of Insured \_\_\_\_\_

Address of Insured \_\_\_\_\_

Name and Address of Additional Named Insured: City of Glendale, Arizona  
P. O. Box 1556  
Glendale, Arizona 85311

Type of Insurance	Policy No.	Eff. Date	Exp. Date	Limits of Liability
(1) Workmen's Compensation				Statutory
(2) Contractors Protective Bodily Injury				\$1,000,000 each occurrence
(2) Contractor(s) Protective Property Damage				\$1,000,000 each accident \$1,000,000 aggregate
(3) Contractual Bodily Injury				\$1,000,000 each occurrence
(3) Contractual Property Damage				\$1,000,000 each accident \$1,000,000 aggregate
(4) Automobile Bodily Injury & Property Damage				\$1,000,000 each occurrence

When the project includes construction of a new, or modification of an existing building (in addition to the above types):

(5) Fire and Extended Coverage plus Vandalism and Malicious Mischief - for the Full Amount of the Contract.

Policy No. Eff. Date Exp. Date

Policy Includes Coverage For:

- (1) a. Damage caused by blasting.  
b. Damage caused by collapse or structural injury.  
c. Damage to underground utilities.
- (2) Liability assumed in construction agreements and other types of contracts or agreements in effect in connection with insured operations.
- (3) All owned, hired or non-owned automotive equipment used in connection with the insured operation.

It is agreed that none of these policies will be cancelled or changed so as to affect this certificate until ten (10) days written notice of such cancellation or change has been delivered to the City of Glendale.

It is further agreed that:

These policies shall not expire until all work has been completed and the project has been accepted by the City of Glendale. (If a policy does expire during the life of the Contract, a renewal Certificate of the required coverage must be sent to the City of Glendale not less than five (5) days prior to expiration date.) The Contractor hereby agrees to indemnify and save harmless the City of Glendale and any jurisdiction or agency issuing permits for any work included in the project, their officers, agents and representatives from all suits, actions, loss, damage, expense, cost, or claims of any character or any nature brought on account of any injuries sustained by any person or property arising out of the work done in fulfillment of the construction of the improvement under the terms of this agreement, or on account of any act or omission by the Contractor or his agents,

or from any claims or amounts arising or recovered under Workmen's Compensation laws or any other law, by-law, ordinance, or order or decree.

This Certificate is not valid unless countersigned by an authorized representative of the Insurance Company.

Date:

\_\_\_\_\_

Countersigned by

\_\_\_\_\_

\_\_\_\_\_

Signature

CITY OF GLENDALE, ARIZONA  
PUBLIC WORKS/ENGINEERING DEPARTMENT

CONTRACTOR'S AFFIDAVIT  
REGARDING  
SETTLEMENT OF CLAIMS

PROJECT W-823044E - Water Transmission Main Relocation,  
51st Avenue and Cactus

To the City of Glendale, Arizona

Gentlemen:

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.

The undersigned, for the consideration of \$ \_\_\_\_\_, 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 Glendale 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 installation.

Signed and dated at \_\_\_\_\_, this \_\_\_\_\_  
day of \_\_\_\_\_, 19\_\_\_\_\_.

\_\_\_\_\_  
Contractor

By \_\_\_\_\_

STATE OF ARIZONA )  
                          ) ss.  
COUNTY OF MARICOPA )

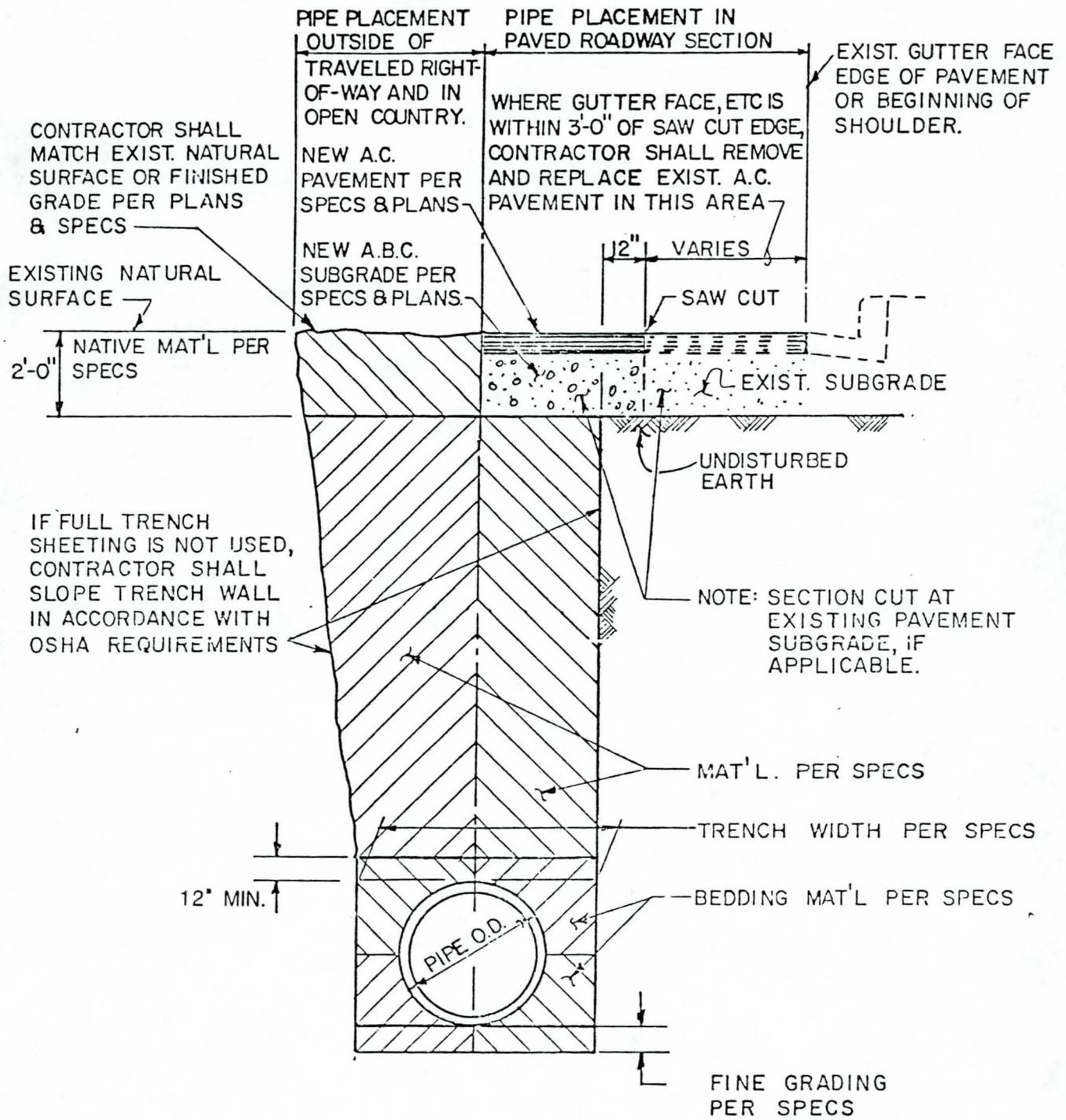
The foregoing instrument was subscribed and sworn to before me this \_\_\_\_\_  
day of \_\_\_\_\_, 19\_\_\_\_\_.

\_\_\_\_\_  
Notary Public

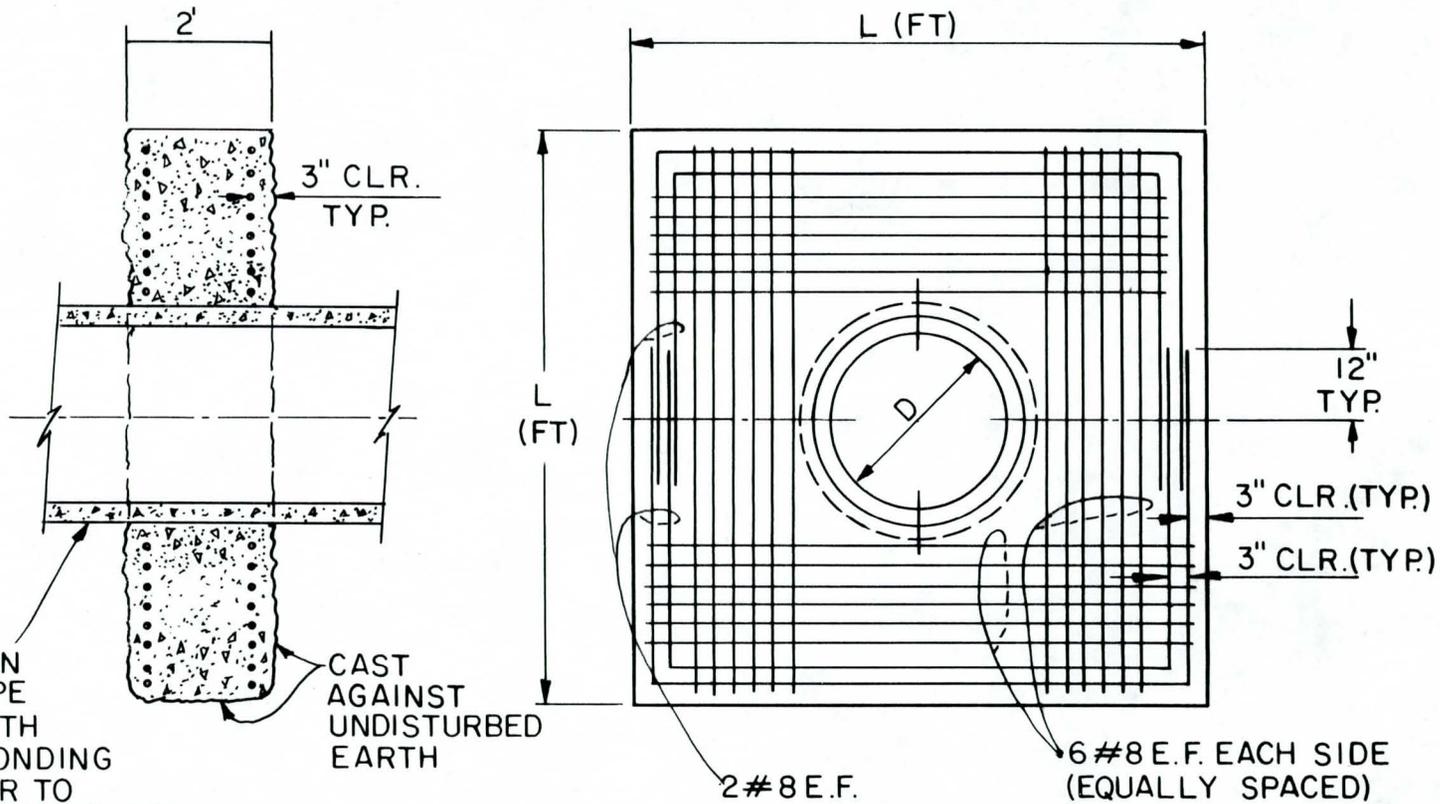
My Commission Expires \_\_\_\_\_

STANDARD DETAILSINDEX

<u>Typical No.</u>	<u>Title</u>	<u>Page No.</u>
205	Pipe Installation and Pavement Replacement	SD-1
233	Anchor Block	SD-2
272	Installation of Buried Butterfly Valve	SD-3
304	Pump Manhole	SD-4



205 PIPE INSTALLATION  
TYP AND PAVEMENT REPLACEMENT



SANDBLAST AND ROUGHEN EXISTING PIPE AND COAT WITH CONCRETE BONDING AGENT PRIOR TO PLACING ANCHOR BLOCK

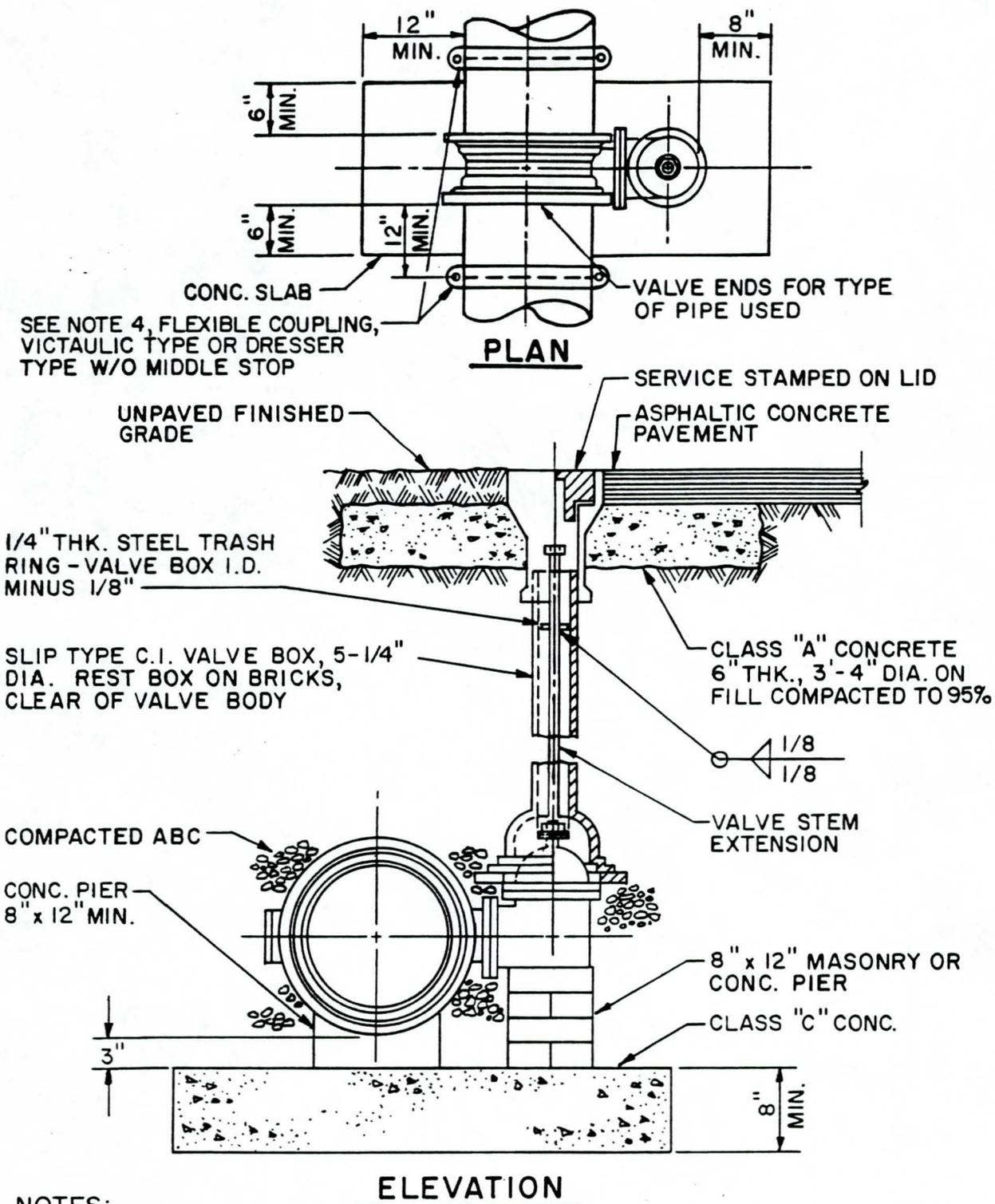
CAST AGAINST UNDISTURBED EARTH

$$\text{AREA} = \frac{\text{TEST PRESS. (PSI)} \times 0.79 D^2 (\text{INS.})}{200 (\text{PSF}) \times \text{PIPE DEPTH}}$$

$$L = \sqrt{A} \quad D = \text{I.D. PIPE}$$

233  
TYP.

## ANCHOR BLOCK



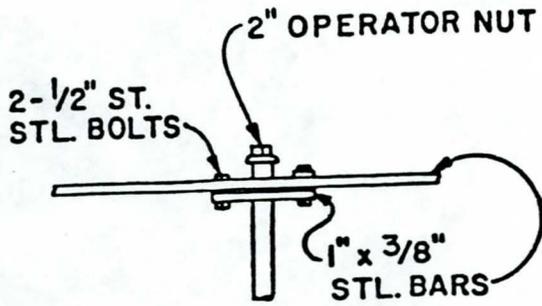
**NOTES:**

1. ALL BURIED VALVES TO BE PROVIDED WITH EXTENSION STEM OPERATOR WITH 2" SQUARE A.W.W.A. NUT WITHIN 12" OF VALVE BOX COVER. NUT IS TO INDICATE DIRECTION OF ROTATION TO OPEN VALVE.
2. COAT BURIED PIPE AND VALVE BOX PER SPECIFICATIONS.
3. CLEAN VALVE BOX OF ALL DEBRIS AND SOIL.
4. ONLY ONE FLEXIBLE COUPLING REQUIRED WITH FLANGED VALVE.

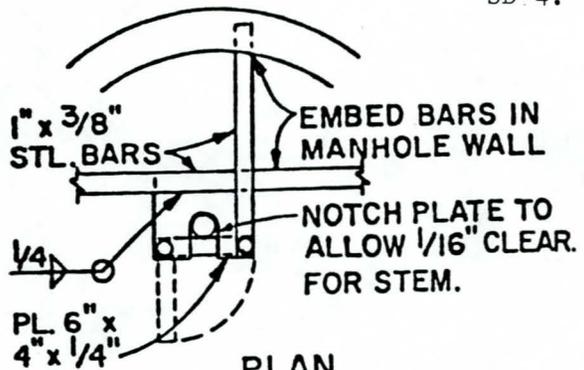
272  
TYP

S483

**INSTALLATION OF BURIED BUTTERFLY VALVE**



ELEV.



PLAN

DETAIL-STABILIZER UNIT

PROVIDE @ 8' O.C.

6" x 12" CLASS "B" CONC. COLLAR

MANHOLE FRAME & COVER PER TYP. DET. 290.

PRECAST CONCRETE MANHOLE PER TYP. DET. 281

EXTENSION STEM

"RAM NEK" PLASTIC GASKET OR EQUAL

WATER MAIN O.D.

8" BOTTOM OUTLET

#5 @ 12" E.W. TOP

1" SPONGE RUBBER

NON-SHRINK GROUT

24" DIA., 24" DEEP GRAVEL SUMP

4" x 4" GROUT ALL AROUND

3" DIA. HOLE FILL WITH GRAVEL