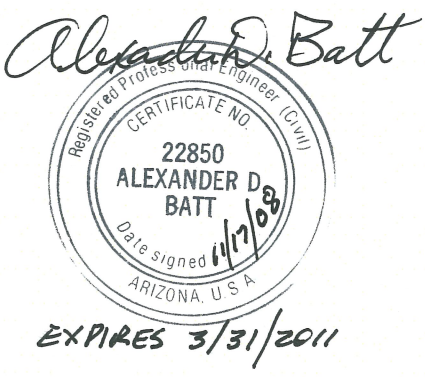
SPECIAL PROVISIONS

CITY OF TUCSON, PLAN No. I-2008-027

DOWNTOWN INFRASTRUCTURE IMPROVEMENT PROJECT
SCOTT AVENUE – BROADWAY BLVD TO 14TH STREET
STREETSCAPE PROJECT

Stantec



EXPIRES 3/31/2011

PROFESSIONAL LICENSE SEALS

I, Alexander Demming Batt, certify that the following technical documents were either reviewed by me, or prepared by me, or under my direct supervision or responsible charge. I am a duly Registered Civil Engineer under the laws of the State of Arizona, License No. 22850.

Alexander D. Batt

Registered Professional Engineer (Civil)
CERTIFICATE NO.
22850
ALEXANDER D.
BATT
Date signed 11/17/08
ARIZONA U.S.A.

EXPIRES 3/31/2011

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PROFESSIONAL LICENSE SEALS

I, Khang M. Nguyen, certify that the following technical documents were either reviewed by me, or prepared by me, or under my direct supervision or responsible charge. I am a duly Registered Civil Engineer under the laws of the State of Arizona, License No. 34595.

607 ROADSIDE SIGN SUPPORTS
608 SIGN PANELS

EXPIRES 3/31/09

PROFESSIONAL LICENSE SEALS

I, Edward J. Kessler, certify that the following technical documents were either reviewed by me, or prepared by me, or under my direct supervision or responsible charge. I am a duly Registered Civil Engineer under the laws of the State of Arizona, License No. 35894.

730 GENERAL REQUIREMENTS FOR TRAFFIC SIGNAL AND STREET LIGHTING SYSTEMS

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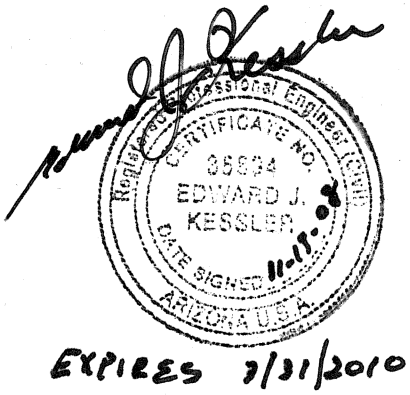
732 ELECTRICAL MATERIAL AND SERVICE

975 TELECOMMUNICATIONS INFRASTRUCTURE



EXPIRES 9/30/2010

PROFESSIONAL LICENSE SEALS

I, Lisa Jane Ribes, certify that the following technical documents were either reviewed by me, or prepared by me, or under my direct supervision or responsible charge. I am a duly Registered Landscape Architect under the laws of the State of Arizona, License No. 47930.

802	**LANDSCAPE GRADING**	
803	**LANDSCAPE BORROW AND PLATING MATERIALS**	
806	**TREES, SHRUBS AND PLANTS**	
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SPECIAL PROVISIONS NO. I-2008-027

DOWNTOWN INFRASTRUCTURE IMPROVEMENT PROJECT
SCOTT AVENUE - BROADWAY BLVD TO 14TH ST
STREETSCAPE PROJECT

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8090007 DRINKING FOUNTAIN
8090008 REMOVABLE BOLLARD

SPECIFICATIONS AND DETAILS:

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

Pima County/City of Tucson, Standard Specifications for Public Improvements, 2003 Edition.

Pima County/City of Tucson, Standard Details for Public Improvements, 2003 Edition.

Pima County/City of Tucson, Pavement Marking Design Manual, 2002 Edition and Latest Updates.

Tucson Water, Standard Waterworks Specifications, Latest Edition.

Manual on Uniform Traffic Control Devices for Streets and Highways, 2003 Edition, and ADOT Supplements, and the 2005 Edition of Additions by the City of Tucson to the Manual on Uniform Traffic Control Devices, for Temporary Traffic Control.

Arizona Department of Transportation, Standard Specifications for Road and Bridge Construction, Latest Edition.

Arizona Department of Transportation, Highway Division, Standard Drawings, Latest Edition.

Tucson Electric Power Electric Service Requirements, 2007 Edition.

These Special Provisions,

And Project Construction Drawings.

PROPOSED WORK

The proposed work is located in Sections 13, T14S, R13E of the Gila and Salt River Base and Meridian, within the City of Tucson, Pima County, Arizona. This project provides for the reconstruction of Scott Avenue, from Broadway Boulevard to 14th Street, as shown on City of Tucson Plan No. I-2008-027.

The work consists of reconfiguring the roadway to provide two through lanes, sidewalk, and landscaping. The work includes, but is not limited to, construction of new asphaltic concrete pavement, concrete curbs, sidewalk, curb access ramps, driveways, striping, street lighting, landscape and hardscape, utility relocations and modifications to the existing water system, and other related incidental work as shown on City of Tucson Plan No. I-2008-027.

GENERAL REQUIREMENTS

GENERAL REQUIREMENTS

The Contractor shall field verify all existing conditions shown on plans prior to beginning construction. Any significant deviations to the conditions that may affect the timely construction of improvements shall be brought to the attention of the engineer.

The Contractor shall not store equipment, supplies, materials, or debris on the sidewalks.

1. Maintenance and Protection of Traffic

Two–way traffic on Scott Avenue shall be maintained by the Contractor on a paved surface at all times except for short term periods when one way traffic will be allowed.

2. Saw Cutting

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

3. Permits

Before undertaking work at any location covered by this project, the Contractor shall obtain all applicable permits, including but not limited to: street closure permits and permits for excavation/construction in the public rights-of-way from the City of Tucson. The contractor is advised that review fees for Pima County Department of Environmental Quality (PDEQ) for sanitary sewer work shall be paid for using flow management plan funds.

4. Material Sources

No Agency designated materials source is identified for this project. Material sources shall be as specified in Section 1001 of the Standard Specifications.

5. Disposal of Materials

All excess, surplus, and unsuitable materials, structures, and obstructions to be removed, except as hereafter specified, shall be removed from the job site and disposed of by the Contractor at a site secured by the Contractor in a manner approved by the Engineer.

Disposal shall be the responsibility of the Contractor. However, the Contractor shall, with each and every disposal site he arranges for, other than commercial waste sites, provide the Engineer with a copy of the written approval of the property owner indicating that the property owner is fully aware of what the material consists. The Contractor also shall provide a letter to the Engineer from the City or County, whichever has jurisdiction, giving site approval for materials disposal at each site to be used. Approval letter shall be received and approved by the Engineer prior to the disposal of any materials at any site.

6. Construction Survey

Construction Survey and Layout will be performed by the Contractor.

7. Existing Vegetation

Some existing plant material in the Right-of-Way will be Preserved-in-Place as shown on the project plans. Prune existing trees to remain in place where needed.

8. Environmental Requirements

If suspected hazardous materials are encountered during construction, work shall cease at that location and the City of Tucson will arrange for proper assessment, treatment, or disposal of those materials.

If, during the course of construction, earthwork or other activities expose suspected hazardous materials, the Contractor shall halt work impacting the suspected hazardous materials and report the discovery to the Engineer. The Engineer shall report the discovery to the City of Tucson Environmental Management Department for characterization of the materials and recommendations for proper disposal. Work impacting suspected hazardous materials shall be halted until the Engineer provides written direction for proceeding.

If previously unidentified cultural resources are encountered during activity related to the construction of the project, the contractor shall stop work immediately at that location and shall take all reasonable steps to secure the preservation of those resources. The City of Tucson will immediately make arrangements for the proper treatment of those resources.

In compliance with Executive Order 13112 regarding invasive species, all earth-moving and hauling equipment shall be washed at the contractor's storage facility prior to arriving on site to prevent the introduction of invasive species seed.

In compliance with Executive Order 13112 regarding invasive species, all disturbed soils that will not be landscaped or otherwise permanently stabilized by construction shall be seeded using species native to the project vicinity.

In compliance with Executive Order 13112 regarding invasive species, all earth-moving and hauling equipment shall be washed prior to leaving the construction site to prevent invasive species seeds from leaving the site.

Construction noise will be controlled in accordance with the *Arizona Department of Transportation Standard Specifications for Road and Bridge Construction,* Section 104.08 (2000 Edition), special provisions, and the City of Tucson construction noise ordinance.

Fugitive dust generated from construction activities will be controlled in accordance with the City of Tucson dust control ordinance.

The Contractor will deliver construction start notices to property owners in the project area no later than one week before commencement of construction activities.

9. Construction Signs

Four (4) construction signs are required on this project and shall be located as directed by the Engineer. These signs shall be furnished by the Contractor as directed by the City of Tucson Sign Shop, 791-5279. The cost for furnishing, transporting, installation, and removal of the signs is incidental to the overall cost of the project.

SECTION 104 - SCOPE OF WORK

104-1 Intent of Contract: of the Standard Specifications is modified to add:

(A) Covenant of Good Faith and Fair Dealing

This contract imposes an obligation of good faith and fair dealing in its performance and enforcement.

The contractor and the City of Tucson, with a positive commitment to honesty and integrity, agree to the following mutual duties:

A. Each will function within the laws and statutes applicable to their duties and responsibilities.

B. Each will assist in the other's performance.

C. Each will avoid hindering the other's performance.

D. Each will proceed to fulfill its obligations diligently.

E. Each will cooperate in the common endeavor of the contract.

104-5 Maintenance of Traffic: is modified to add:

It shall be the Contractor's responsibility to contact adjacent property owners one week prior to installation of new driveways and paving operations. The Contractor shall maintain access to all side streets, access roads, businesses, residences, driveways, alleys and parking lots except for that period when concrete or asphalt concrete is actually being placed and finished across their frontage.

Work considered under this subsection includes, but is not limited to, sweeping, roadway and subgrade repair, safety feature repair, debris removal, repair of pedestrian features and other work necessary to provide a smooth and safe traveled way.

104-11 Miscellaneous Work: is added:

1. General:

Miscellaneous work shall be considered as a part of the total project, and there shall be no separate measurement for this work.

Miscellaneous work shall include but not be limited to remobilization, move off, equipment facilities, cleanup, minor pavement repair (existing pavement), and removal of debris and excess material. Also included in miscellaneous work are removal/replacement of raised pavement markers, load testing, potholing for utility locations, and any and all hauling of debris or excess material from the site. Dump fees required for disposal of demolished or excess material shall be incidental and included in the total cost of the project.

Restoration of right-of-way and disturbed adjoining property, clean-up, removal of debris, and similar work items shall be considered incidental. Relocation of street, traffic, bus stop, and other signs; and all other miscellaneous work whether on the plan or not is also incidental.

Miscellaneous work shall also include all coordination and notification necessary to complete the project. Such coordination shall include, but not be limited to: utility coordination, coordination with businesses and residences for pedestrian and vehicular access, coordination required by the plans and/or the specifications, resident notification, and all other coordination necessary whether mentioned on the plans or not.

SECTION 105 - CONTROL OF WORK

105-13 Load Restrictions is modified to add:

The contractor shall coordinate haul routes with the Project Inspector and Traffic Engineering Division. The contractor is responsible for all damage done by the contractor's hauling

equipment. Residential streets are not designed for use by heavy traffic loads. Hauling equipment is required to use major arterial streets.

105-17(B) Final Acceptance: the second paragraph of the Standard Specifications is modified to add:

In addition, final acceptance will not be made until all completed record drawings and working drawings, as required in Subsection 105-2, have been submitted and deemed acceptable by the Engineer.

105-21 Mediation of Claims and Disputes: is added:

Notwithstanding Section 105-18(C), if the contractor is not satisfied with the decision of the Engineer, and prior to filing for arbitration or litigation, the contractor may request a non-binding mediation by filing a request for mediation in writing with the Engineer. The Engineer will then arrange for a mutually agreeable mediator. Such request for mediation shall be made within 30 calendar days from actual receipt of the Engineer's decision as provided for in this section.

In connection with the mediation, each party shall bear its own costs, and any fees and expenses assessed by the mediator shall be borne equally by the parties.

105-22 Substantial Completion: is added:

The project is substantially complete when all of the following have occurred:

(A) All original bid items of work have been completed and accepted and pedestrian and vehicular traffic can move unimpeded through the project;

(B) The only work left for completion is incidental, causes no disruption to pedestrian and vehicular traffic, and does not affect the safety and convenience of the public;

The decision whether the project is substantially complete is within the sole discretion of the Engineer.

Once substantial completion is granted, the Contractor shall actively work to achieve Final Acceptance of the construction phase of the Contract within 15-calendar days from the Substantial Completion date of that phase. Failure to prosecute the remaining work within this time period will result in the resumption of time charges and the application of liquidated damages from the date scheduled for final acceptance.

The Contractor is responsible for maintenance and repairs of any project work until final acceptance, at which time the City will accept the improvements for operation and maintenance.

SPECIAL PROVISIONS NO. I-2008-027

SECTION 106 CONTROL OF MATERIAL:

106.04(A) **General:** the second paragraph of the ADOT Standard Specifications, Latest Edition, is revised to read:

Materials will be sampled and tested in accordance with the requirements of the Materials Testing Manual and the Materials Policy and Procedure Directives Manual and by a qualified representative of the Department unless otherwise specified in the contract documents. Materials will be sampled and tested by a laboratory which has been approved by ADOT Materials Group. Copies of all test results will be furnished to the contractor's representative at the contractor's request.

106.04(C)(3) **Quality Testing Supervisor:** Table 106-1 of the ADOT Standard Specifications, Latest Edition, is revised to read:

TABLE 106-1
QUALITY TESTING SUPERVISOR REQUIREMENTS

Soils and Aggregate	
Field	Laboratory
Arizona Technical Institute (ATTI) "Field" certification plus one of (a) through (g) below.	Arizona Technical Institute (ATTI) "Laboratory Soils/Aggregate" certification plus one of (a) through (g) below.
Asphaltic Concrete	
Field	Laboratory
Arizona Technical Institute (ATTI) "Field" certification plus one of (a) through (g) below.	Arizona Technical Institute (ATTI) "Asphalt" certification plus one of (a) through (g) below.
Concrete	
American Concrete Institute (ACI) "Concrete Field Testing Technician Grade I" certification plus one of (a) through (g) below.	
(a) Professional Engineer, registered in the State of Arizona, with one year of highway materials testing experience acceptable to the Department.	
(b) Engineer-In-Training, certified by the State of Arizona, with two years of highway materials testing experience acceptable to the Department.	
(c) Obtained a Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology, Construction, or related field acceptable to the Department; and with three years of highway materials testing experience acceptable to the Department.	
(d) Certified by the National Institute for Certification in Engineering Technologies (NICET) in the Construction Materials Testing field as an Engineering Technician (Level III) or higher in the appropriate subfield in which sampling and testing is being performed.	

TABLE 106-1 QUALITY TESTING SUPERVISOR REQUIREMENTS	
(e)	Certified by NICET in the Transportation Engineering Technology field as an Engineering Technician (Level III) or higher in the Highway Materials subfield.
(f)	Certified by NICET as an Engineering Technician, or higher, in Civil Engineering Technology with five years of highway materials testing experience acceptable to the Department.
(g)	An individual with eight years of highway materials testing and construction experience acceptable to the Department.

106.04(C)(4) Quality Testing Technician: Table 106-2 of the ADOT Standard Specifications, Latest Edition, is revised to read:

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

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

The contractor shall submit Weekly Quality Control Reports to the Engineer. The weekly reports shall state the types of work, such as earthwork, Portland cement concrete, or asphaltic concrete, which have been performed during the report period, and shall also include the process control measures taken to assure quality. The weekly report shall provide sample identification information for materials tested during the report period, including sample number, date sampled, sample location, person obtaining sample, and original source of material. The report shall also provide the results for all required tests and any retests, corrective actions, and any other information relevant to quality control. Although hand-written documentation can be included, the quality control report narrative, sample identification information, results for tests and any retests, and corrective actions shall be typed to ensure the Department can make clear reproductions of the documents.

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

SECTION 107 - LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

107-6 Archaeological Features: of the Standard Specifications is modified to add:

In the event that archaeological or historical features are encountered, cease work that could damage the features and contact Jonathan Mabry at the City of Tucson Historic Preservation Office at 791-4505 and the engineer.

107-8 Public Convenience And Safety: of the Standard Specifications is modified to add:

The contractor shall participate in a "Construction Public Meeting" prior to the start of construction. Meeting date is to be set by the City of Tucson. Contractor shall also, no later than seven (7) days prior to the meeting, distribute to all residents and businesses abutting the project rights-of-way notices informing them of said meeting and of intent by the City of Tucson to begin construction of this project. Such notices shall be furnished to the contractor by the office of City Engineer. Notices are not to be placed in mailboxes. Where there is no response or there is no answer at the door, the notice is to be left in the door/screen door.

Construction public meeting and resident notification shall be included as part of the overall project.

107-15 Prevention Of Landscape Defacement; Protection Of Streams, Lakes And Reservoirs: of the Standard Specifications is modified to add:

107-15.01(A) General

The Contractor shall implement the Arizona Department of Environmental Quality (ADEQ) requirements for protecting the quality of stormwater runoff during construction, as specified under the Arizona Pollutant Discharge Elimination System (AZPDES) General Permit for Construction Activities.

The work shall include providing, installing, maintaining, removing and disposing of erosion control measures including, but not limited to, such items as gravel filter berms, dikes, catch basin inlet protection, end-of-pipe filtering devices, silt fences, dams, sediment basins, netting, straw bale barriers, slope drains, and other erosion control devices or methods.

A Notice to Proceed will not be issued until a Stormwater Pollution Prevention Plan (SWPPP) has been reviewed and approved by the Engineer and a Notice of Intent (NOI) has been submitted to ADEQ by the Contractor and the Engineer.

107-15.01(B) Materials

The Contractor has prepared a Stormwater Pollution Prevention Plan (SWPPP) that includes a

description of the proposed measures to be implemented and a site specific diagram indicating the proposed locations where erosion control devices or measures may be required during construction. This SWPPP is included in the plans. The Agency and the contractor shall prepare and submit separate Notices of Intent (NOI) and Notices of Termination (NOT) forms for the project.

At the preconstruction conference, the contractor shall specify "good housekeeping" practices and requirements, including vehicle wash-down areas, on-site and off-site tracking control, protection of equipment storage and maintenance areas, sweeping of highways and roadways related to hauling activities, a construction sequence of major activities, and a listing of pollutants. The Contractor shall amend the SWPPP to include these items.

The Contractor shall follow the SWPPP in managing the following activities to protect stormwater quality during the course of construction:

- Spill Containment Plan;
- Stabilized Construction Entrances;
- Equipment Maintenance Procedures;
- Designated Washout Areas;
- Protected Chemical and Materials Storage Area;
- Solid Waste Management;
- Dust Control;
- Construction Road Stabilizing;
- Sediment Traps and Barriers; and
- Any Non-stormwater Discharges.

The Contractor will be required to complete a Notice of Intent (NOI) form for the project. The NOI shall be submitted to the ADEQ at the following address prior to receiving a Notice to Proceed and at least thirty-two (32) calendar days prior to the start of construction:

Arizona Department of Environmental Quality
Surface Water Section - Stormwater Program/NOI
1110 West Washington, Mail Code 5415B-3
Phoenix, AZ 85007

One copy shall be provided to the City of Tucson Transportation Department, Stormwater Management Section, 201 N. Stone, Tucson, Arizona 85701. All subcontractors shall comply with the requirements of the SWPPP under the day-to-day authority and supervision of the Contractor. The NOI shall be posted on the construction site along with the SWPPP at all times.

Upon final site stabilization and final acceptance of the project, the Contractor shall complete and mail a Notice of Termination (NOT) for the project to the Arizona Department of Environmental Quality. The Contractor shall also provide a copy of the NOT to the City of Tucson Transportation Department, Stormwater Management Section.

107-15.01(C) Construction

Prior to the start of construction, the Engineer and Contractor will jointly review the SWPPP, make any revisions needed, and approve and sign the SWPPP. Prior to the start of construction, the Contractor shall require all subcontractors to sign a certification that they understand all requirements of the AZPDES permit and the SWPPP. The Contractor shall provide, install, and maintain the measures described in the SWPPP for the duration of the project and to the satisfaction of the Engineer. The Contractor shall perform no work until the SWPPP has been implemented.

The Contractor shall maintain all related erosion control elements in proper working order. The contractor shall keep the project limits free of sediment from traffic control elements or tracking of sediment from vehicles exiting the construction area. This shall be done by sweeping on a regular basis, not to exceed 1-week intervals.

The Engineer and Contractor will perform a minimum of one inspection every two weeks. In addition, an inspection will be required within 24 hours after each rainfall of 1/2 inch or greater. After each inspection, the Contractor shall document the findings and revise the SWPPP as necessary. The Engineer and Contractor shall jointly approve and sign each revision to the SWPPP before implementation. The Contractor shall implement any changes within three calendar days following the inspection.

No condition of the Grading Ordinance or the SWPPP shall release the Contractor from any responsibilities or requirements under other environmental statutes or regulations.

Erosion control and pollution prevention work specified in the contract that is to be accomplished under any of the various contract items will be paid for as specified in the contract.

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

Except as specifically provided in the Standard Specifications, in case of suspension of work from whatever cause, the Contractor shall be responsible for the project and shall take such precautions as may be necessary to prevent damage to the project, and provide for normal drainage and shall erect any necessary temporary structures, signs or other facilities. In addition, the Contractor shall be responsible for continued implementation of the SWPPP, including conducting site inspections and maintaining SWPPP controls in effective working condition. During such period of suspension of work, the Contractor shall properly and continuously maintain in an acceptable growing condition all living material in newly established plantings,

seedings and sodding, furnished under his/her contract and shall take adequate precautions to protect new tree growth and other important vegetative growth against injury.

107-15.01(D) Method of Measurement

Work required by the SWPPP as approved prior to construction, and "good-housekeeping" practices and requirements, will be measured on a lump sum basis.

107-21 Contractor's Responsibility For Utility Property And Services: of the Standard Specifications is modified to add:

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

The Contractor shall make arrangements with utility companies for bracing, shoring, or otherwise protecting power poles, cables, conduits, water or drainage pipes, sewers, and other improvements, whether shown on the plans or not, including any rerouting of utilities required to maintain continuous utility service, at no cost to the City, unless otherwise noted.

The contractor shall carefully comply with Arizona Blue Stake law regarding safe approach distances to overhead power lines and other electrical facilities. The Blue Stake Center shall be contacted a minimum of 10 working days in advance, if overhead protection will be required, or if support of poles will be needed during trenching and other excavation operations. The contractor shall be responsible for protection of power poles and power lines, and for the cost of repairs if damage occurs due to contractor negligence.

At least 48 hours prior to commencing excavation, the Contractor shall call Blue Stake Center, 1-800-782-5348 between the hours of 7:00 a.m. and 4:30 p.m., Monday through Friday for information relative to the location of buried utilities.

The Contractor's attention is directed to the requirements of A.R.S. 40-360.21 through .29 requiring all parties excavating in public streets, alleys or utility easements to first secure the location of all underground facilities in the vicinity of the excavation. The Contractor shall "pot hole" and determine the exact depth and location of the utility in question. Potholing shall be considered incidental to the project.

Any existing sewer lines, water lines, gas lines, underground telephone lines, and any other underground utilities or structures in the right-of-way, that may be disturbed by the Contractor shall be repaired or replaced by the Contractor at his own expense immediately following the damage to the satisfaction of affected utility and the City representative.

The Contractor shall contact the representatives of the following utility companies concerning the status of their required adjustments and/or relocation of utilities in the project area:

Southwest Gas Corporation	Brad Steninger	247-0724
Pima County Wastewater Management	Field Engineering	740-2651

Cox Communications	Ike Cruse	629-8511
Tucson Electric Power Company	Cynthia Garcia	918-8246
Tucson Water Department	Lorenzo Hernandez	791-2665
Qwest Communications	Larry Lewis	292-8255

Prior to beginning any construction activities involving public sanitary sewage facilities, the Contractor shall furnish to the Engineer proof of possession of a valid Pima County Wastewater Management "Project Construction Permit". This is required for all sewer construction activities such as new manhole construction on existing sewers, adjustment of existing manhole frames and covers, connections in existing manholes, modifications to existing sewers or any other activity which impacts the public sewage system. A PCWWM Project Construction Permit can be obtained from PCWWM Mapping and Records, 201 North Stone, 5th Floor. Wastewater Inspection Fees plus three (3) sets of plans must accompany the permit application. Permit processing takes up to two days, and it is required that the permit be issued at least three days prior to commencement of any work on the sanitary sewage facilities.

Unknown utilities encountered during construction shall be altered as required on a Time and Material basis. Relocation work requires the prior approval of the City of Tucson Field Engineering Office. All Time and Material work shall be signed by a City of Tucson Inspector on a daily basis.

SECTION 108 - PROSECUTION AND PROGRESS

108-4 Prosecution and Progress: of the Standard Specifications is modified to add:

The care and control of the work and construction activity (as well as scheduling) within the limits of the project (or each phase) are the responsibility and under the control of the Contractor. The City will not be responsible for the Contractor's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto. A submitted bid from the Contractor indicates the Contractor has investigated the site conditions and is aware of soil conditions necessary to perform the work.

A pre-construction public meeting shall be held within ten days of the date when the contract is officially executed. The Contractor shall be responsible to pass out notices to the residents, in the area specified by the City, advising the residents of the public meeting information - a minimum of ten (10) days in advance of the meeting date. The Contractor shall attend the public meeting to introduce himself and key personnel to the neighborhood and to go over the proposed project work schedule. Any concerns or key issues that affect residents should be made known at that time.

This work shall be considered miscellaneous work and incidental to the project.

Part of the construction zone occurs within a highly trafficked business area. It will be necessary to provide accurate information regarding construction activities. Business owners rely upon

this information to maintain their daily business operations. Since construction activities have such a significant impact upon these operations, the following requirement is set forth:

The Contractor shall provide the Engineer with a written, detailed work schedule at each weekly construction meeting. This schedule shall document the anticipated construction activities for the upcoming, two week period. The Contractor must work diligently on this project. Lost time due to little or no work being performed shall not be considered when applying for a contract time extension.

108-8 Determination and Extension of Contract Time is modified to add:

Written requests for time extensions shall be submitted to the Engineer within 20 calendar days from the commencement of the delay or the right to an extension will be waived. Requests for time extensions shall indicate how the critical path of the overall project was impacted on the project schedule.

SECTION 109 - MEASUREMENT AND PAYMENT

109-1 Measurement of Quantities: the thirteenth paragraph of the Standard Specifications is revised to read:

Scales of acceptable size shall be furnished by the contractor and shall be sealed by an inspector of the Department of Weights and Measures Division, State of Arizona, or a Licensed Service Agency approved by the State of Arizona Department of Weights and Measures. The Licensed Service Agency certifying the scales shall not be affiliated with the contractor or company supplying the materials for payment by weight.

109-5(B)(3)(a) Rental Rates (Without Operators): of the Standard Specifications is modified to add:

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

SECTION 201 - CLEARING AND GRUBBING

201-1 Description: of the Standard Specifications is modified to add:

The contractor shall stake the Right-of-Way (ROW) and walk the entire project with the Engineer prior to beginning Clearing and Grubbing, in order to confirm the limits of areas and plants to be cleared and grubbed, and trees to remain or be removed during construction.

Item 2010001 Clearing and Grubbing:
This work shall consist of removing objectionable material from the right-of-way, easements, and other such areas as may be specified in the contract documents. Clearing and grubbing shall be performed in advance of grading operations.

All vegetation identified as to remain-in-place or to be salvaged-on-site on the project plans shall be protected from damage or destruction caused by the contractor's operations. The locations of all such material on the project plans are approximate.

All landscape areas within the project limits shall be cleared and grubbed where required to remove all vegetation; and rubbish, debris and other objectionable matter present during removal of vegetation, except as described below.

All *Parkinsonia aculeata* (Mexican Palo Verde), *Baccharis sarothroides* (desert broom), tumbleweeds and other noxious, weedy species shall be removed by chemical and/or mechanical means, from all landscape areas within the project.

The contractor shall inspect the entire project with the Engineer prior to beginning clearing and grubbing, in order to confirm which areas and plants shall be cleared and grubbed and which shall be left undisturbed. The contractor shall flag all plants designated to remain-in-place and to be transplanted-on-site during this walk with two different colors of surveyors tape.

Plants to Remain-In-Place: This work shall include pruning of limbs and roots, under the direction of a certified arborist, flagging and fencing, irrigation, and other efforts required in order to construct roadway and sidewalk improvements without damage to these plants.

The contractor shall warrant from damage caused by its operations, vegetation which is flagged as to remain-in-place. This warranty includes breakage of major limbs, destruction of major root system, excessive scarring to the trunk and death.

Minor damage to trees may be remedied by pruning and repair in conformance with Sections 806 and 807 of the Standard Specifications, with approval by a Certified Arborist.

The contractor shall replace any vegetation identified as to remain-in-place that has been damaged or destroyed. Replacement vegetation shall be of the same genus and species and shall be of a similar caliper and canopy size. The Landscape Architect shall approve all replacement plants prior to installation.

Plants to be Transplanted: The contractor shall salvage, by boxing, vegetation which is flagged as to be transplanted. Salvage operations shall employ best local practice methods, experienced personnel, and shall allow five weeks time for boxing and relocation to the holding area. Refer also to Subsections 806-2.03 of these Special Provisions and Section 807 of the Standard Specifications.

The contractor shall replace any vegetation, identified for transplanting, that has been damaged or destroyed. Replacement vegetation shall be of the same genus and species and shall be of a similar caliper and canopy size. The Engineer shall approve all replacement plants prior to installation.

From excavated areas, all stumps, roots, and other obstructions 3 inches or over in diameter shall be grubbed to a depth of not less than 18 inches below finish grade.

Cavities left below subgrade elevation by removal of stumps or roots shall be carefully backfilled and compacted.

SECTION 202 - REMOVAL OF STRUCTURES AND OBSTRUCTIONS

202-1 Description: of the Standard Specifications is modified to add:

The contractor is cautioned to avoid excess removals or damage of existing vegetation, sidewalks, curbing, driveways, fences, walls, structures, utilities, and other improvements scheduled to remain. However, the contractor is advised that there exist numerous obstructions not shown on the plans that are in the new right-of-way and is also advised to conduct a thorough field inspection prior to providing a bid for this item.

Any existing utility manhole, cleanout, pull box, or other structure not designated to be replaced, removed or adjusted, and disturbed by the contractor during the construction of the job, shall be repaired or replaced by the contractor at his own expense to the satisfaction of the Engineer.

All other items to be removed including, but not limited to, irrigation pull boxes, electrical pull boxes, electrical wiring, irrigation valves and boxes, irrigation lines, conduit, storm sewer pipe, drainage inlets/structures, bollards, rock rip/rap and signs as shown on the plans are included in the project.

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

Items to be salvaged shall include, but not be limited to: manhole frames and covers, and all other items designated by the Engineer, the plans, the specifications, or the Special Provisions.

Prior to delivery, the Contractor shall contact and coordinate his delivery of salvaged items with the appropriate agency, unless directed otherwise by the Engineer. After making an appointment to return the salvaged items to the agency, the Contractor shall compile a complete listing of each item to be returned. If this list is not ready when the equipment arrives at the agency, the Contractor will be refused until such arrangements have been properly executed. Contact person for returns of lighting and signal equipment is Marco Lopez at the COT Electric Shop, 791-3191. Signal and street lighting equipment shall be delivered to the COT Electric Shop at 4004 South Park Avenue, unless directed otherwise by the Engineer.

The contractor shall provide a minimum of 48 hours advance notice for delivery. Any missing or broken materials shall be replaced by the contractor or value deducted from the contract.

202-3.04 Removal of Miscellaneous Concrete: of the Standard Specifications, 2003 Edition, is modified to add:

Description:

The work in this Section also includes demolition, salvage and crushing of existing gray concrete sidewalk in the amount sufficient to provide the quantity, by volume, specified in Section 803. Refer to Section 803 for crushing, washing and reuse of salvaged concrete pavement as inert ground cover.

Materials:

Existing gray concrete shall be salvaged. Existing colored concrete shall not be used.

Construction Requirements:

Deliver salvaged gray concrete for crushing to the same material yard from which the screened rock shall be obtained, or other location with adequate crushing, screening and washing equipment.

Method of Measurement:

Salvaged gray concrete delivered for crushing shall be measured as sidewalk removal. Crushed concrete delivered to the project following crushing shall be measured by the cubic yard.

SECTION 203 - EARTHWORK

203-2.02 **Contractor Quality Control:** of the ADOT Standard Specifications, Latest Edition, is modified to add:

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

(a) Backfill production, including crusher methods, pit extraction, and washing.

(b) Stockpile management, including stacking methods, separation techniques, stockpile pad thickness, and segregation prevention.

(c) Transporting and placing, including transport technique, lift thickness, processing and mixing technique, and compaction methods.

(d) Excavation and transporting, including method of excavation and transporting methods.

(e) Embankment, including method of mixing, compaction methods, unsuitable material control, waste site, and lift thickness.

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

CONTRACTOR QUALITY CONTROL TESTING REQUIREMENTS			
TYPE OF TEST	TEST METHOD	SAMPLING POINT	MINIMUM TESTING FREQUENCY
Structural Backfill			
Gradation	ARIZ 201	Stockpile	1 per 500 CY per Source
PI	AASHTO T 89, T 90		
Proctor Density	ARIZ 225, ARIZ 226, ARIZ 245		1 per Source
Compaction	ARIZ 227, ARIZ 230, ARIZ 231, ARIZ 232, ARIZ 235, ARIZ 246	In-place	1 per 200 CY, minimum 1 per lift
Subgrade			
Gradation	ARIZ 201	Roadway	1 per Soil Type
PI	AASHTO T 89, T 90		
Proctor Density	ARIZ 225, ARIZ 226, ARIZ 245		
Compaction	ARIZ 227, ARIZ 230, ARIZ 231, ARIZ 232, ARIZ 235, ARIZ 246	Roadway	1 per 1,000 feet
Natural Ground for Embankment Less than Five Feet			
Proctor Density	ARIZ 225, ARIZ 226, ARIZ 245	In-place	1 per Soil Type
Compaction	ARIZ 227, ARIZ 230, ARIZ 231, ARIZ 232, ARIZ 235, ARIZ 246	In-place	1 per 1,000 feet

CONTRACTOR QUALITY CONTROL TESTING REQUIREMENTS			
TYPE OF TEST	TEST METHOD	SAMPLING POINT	MINIMUM TESTING FREQUENCY
Embankment			
Proctor Density	ARIZ 225, ARIZ 226, ARIZ 245	In-place	1 per Soil Type
Compaction	ARIZ 227, ARIZ 230, ARIZ 231, ARIZ 232, ARIZ 235, ARIZ 246	In-place	1 per 1,000 feet per lift
Borrow Within Three Feet of Finished Subgrade Elevation			
Gradation	Ariz 201	In-place	1 per 2,000 CY
PI	AASHTO T 89, T 90		

SECTION 206 - FURNISH WATER SUPPLY

206-2 Materials: of the Standard Specifications is modified to add:

The Contractor shall contact the Tucson Water Commercial Services Section to arrange for construction water in accordance with the City of Tucson Water Department Procedures. Construction water shall not be obtained from unmetered City of Tucson fire hydrants.

206-4 Method of Measurement: of the Standard Specifications is modified to add:

No measurement for construction water will be made.

206-5 Basis of Payment: of the Standard Specifications is modified to add:

No payment for construction water will be made. The cost for construction water is considered incidental to the work.

SECTION 303 - AGGREGATE SUBBASES AND AGGREGATE BASES: of the ADOT Standard Specifications, Latest Edition, is modified to add:

303-3.04 Contractor Quality Control:

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

(a) Aggregate production, including crusher methods, pit extraction, and washing.

(b) Stockpile management, including stacking methods, separation technique, stockpile pad thickness, and segregation prevention.

(c) Transporting and placing, including transport technique, lift thickness, processing and mixing technique, and compaction methods.

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

CONTRACTOR QUALITY CONTROL TESTING REQUIREMENTS			
TYPE OF TEST	TEST METHOD	SAMPLING POINT	MINIMUM TESTING FREQUENCY
Aggregate Base Class 1, 2, or 3			
Fractured Coarse Aggregate Particles	ARIZ 212	Crusher belt or Stockpile	1 per 1,200 CY
Gradation	ARIZ 201		1 per 600 CY
PI	AASHTO T89, T90		
Proctor Density	ARIZ 225, ARIZ 226, ARIZ 245		1 per Source
Compaction	ARIZ 227, ARIZ 230, ARIZ 231, ARIZ 232, ARIZ 235, ARIZ 246	Roadway	1 per 600 CY
Aggregate Subbase Class 4, 5, or 6			
Fractured Coarse Aggregate Particles (Class 4)	ARIZ 212	Crusher Belt or Stockpile	1 per 1,200 CY
Gradation	ARIZ 201		1 per 600 CY
PI	AASHTO T89, T90		
Proctor Density	ARIZ 225, ARIZ 226, ARIZ 245		1 per Source
Compaction	ARIZ 227, ARIZ 230, ARIZ 231, ARIZ 232, ARIZ 235, ARIZ 246	Roadway	1 per 600 CY

SECTION 401 - PORTLAND CEMENT CONCRETE PAVEMENT

Is hereby added to the Standard Specifications

401-1 Description:

The work under this section shall consist of furnishing all materials and constructing a pavement surface using Portland cement concrete over an aggregate base or compacted subgrade base, and shall include coring operations, furnishing and placing dowels and tie bars, furnishing and placing miscellaneous reinforcing steel and joint materials, and constructing joints in accordance with the details shown on the plans and the requirements of these specifications.

The contractor shall proportion, mix, place, finish, and cure concrete in accordance with the requirements of these specifications.

401-2 Materials:

Portland cement concrete for pavement shall consist of a mixture of hydraulic cement, fine aggregate, coarse aggregate, water, and admixtures.

Unless otherwise provided, Portland cement concrete pavement shall conform to the requirements of Section 1006. Concrete shall be Class P, Hydraulic Cement: 564 Lbs per Cubic Yard, Slump: 0-4.5 Inches, 28-Day Compressive Strength: 4000 PSI.

Materials for expansion joint filler and joint seal shall conform to the requirements of Section 1011, unless otherwise shown on the project plans or specified in the Special Provisions.

Materials for tie bars and dowel bars shall conform to the requirements of Section 1003.

Materials for dowel bars shall conform to the requirements of AASHTO M 254 with Type B coating except that the core material shall conform to the requirements of ASTM A 615,Grade 40. When epoxy-coated reinforcing steel is designated, it shall conform to the requirements of Subsection 1003-5.

Liquid membrane curing compound shall conform to the requirements of Subsection 1006-2.05.

401-3 Construction Requirements:

General:

At least 20 days prior to paving, the contractor shall furnish the following information for the Engineer's review for specification compliance:

(a) A detailed sequence and schedule of concrete placement operations including, but not necessarily limited to; width of pavement to be placed, proposed equipment, production rates, working hours, concrete hauling, placement methods, curing, sawing and sealing methods.

(b) A detailed staking plan for subgrade controls including offset requirements.

(c) A traffic control plan for pavement construction operations which includes provisions for the placement and maintenance of barriers required to protect the pavement from traffic for a minimum of seven days after concrete placement.

Mainline concrete pavement shall be constructed with slip-form paving equipment; however, areas inaccessible to slip-form paving equipment may be constructed with fixed side forms. Ramps and irregular pavement areas shall be constructed with either slip-form paving equipment of fixed side forms.

Unless otherwise shown on the plans, the main roadway, including concrete shoulders or distress lanes, shall be placed in a single monolithic pass, provided the finished surface of the pavement consistently conforms to the requirements for grade, alignment, and pavement smoothness as specified herein. Paving widths which are less than the full main roadway width shall be constructed with longitudinal construction joints that are located on the lane line or at the edge of the main roadway.

The contractor may submit an alternate paving plan for review by the Engineer. The alternate plan shall be submitted in writing at least 45 days prior to paving and the Engineer's approval shall be obtained prior to proceeding with alternate paving methods.

Pavement Base:

The surface of lean concrete base, cement treated base, or subgrade upon which the concrete pavement is to be placed shall conform to the finish and elevation requirements specified for the material involved. The surface shall be free of all loose and extraneous material and the surface shall be uniformly moistened immediately prior to placing concrete.

When Portland cement concrete pavement is constructed over lean concrete base, curing compound shall be applied to the surface of the lean concrete base at a rate of not less that one gallon per 150 square feet. The curing compound shall be Type 2 with a Class A vehicle conforming to the requirements of Subsection 1006-2.05 and the nonvolatile portion of the Class A vehicle shall contain natural or petroleum waxes. This curing compound shall be placed in addition to curing compound placed as part of lean concrete base construction and shall be applied no more than 24 hours prior to placement of Portland cement concrete pavement. The curing compound shall be allowed to set-up prior to placement of Portland cement concrete pavement.

Curing compound may be applied after placement of required load transfer dowel assemblies; however, uniform coverage compound with curing compound must be achieved under the dowel assemblies and spot-spraying or additional applications of curing compound may be required to achieve uniform coverage. If load transfer dowel assemblies are placed after application of curing compound, the curing compound shall be allowed to set up prior to dowel placement. Curing compound membrane which is damaged during placement of load transfer dowel

assemblies or during other operations shall be repaired with a reapplication of curing compound prior to placement of Portland cement concrete pavement.

Portland cement concrete pavement shall not be placed over lean concrete base or cement-treated base for at least 7 days after placement of the lean concrete base or cement-treated unless otherwise approved be the engineer.

Forming:

General:

Unless the project requires contractor surveying, the Engineer will place one stake for elevation control and alignment on each side of the roadway at 50-foot intervals and at grade breaks in accordance with the contractor's staking plan. The contractor shall make any additional projections necessary to establish line and grade.

If the project requires surveying by the contractor, the contractor shall place stakes for elevation control and alignment as specified above, or as approved by the Engineer.

Slip-Form Method:

The contractor shall set taut guide lines to control both line and grade.

Slip-form equipment shall be equipped with automatic sensing and control devices and shall operate such that the machine automatically follows the guide line.

Slip-form paving equipment shall be equipped with traveling side forms designed to laterally support the concrete for a length of time which is sufficient to produce pavement of the required cross-section.

No abrupt changes in longitudinal alignment of the pavement will be permitted. The horizontal deviation from the alignment shown on the plans shall not exceed 0.10 feet.

Fixed Form-Manual Method:

Forms shall be set to the required lines and grades well in advance of placing concrete and shall be as approved be the Engineer prior to concrete placement.

Forms shall be made of steel and have an approved section with a base width of at least four inches, and a depth equal to or greater than the thickness of the pavement. The forms shall be staked with steel stakes of appropriate lengths. Each form section shall have a stake pocket at each end and at intervals of not more than five feet. The stake pockets shall have a device for locking the form to the steel stakes. Each form section shall be straight and free of bends and warps at all times. The top of each form section shall not vary from a true plane by more than 1/8 inch in 10 feet and the inside face shall not vary more than 1/4 inch in 10 feet.

Wood or other rigid forms may be used in irregular areas as approved by the Engineer.

Forms shall be thoroughly cleaned and oiled each time they are used.

Before forms are placed, the underlying material shall be finished to the required grade and shall be firm and smooth. The forms shall be uniformly supported upon the subgrade or base and shall be placed to the required grade and alignment. Forms shall be supported so that they will not deviate more than 1/8 inch from the proper elevation during paving operations.

Forms shall remain in place until the day after placing the concrete and shall be removed in a manner that will prevent damage to the pavement. Pry bars shall not be used between the forms and the pavement under any circumstances.

Placing and Finishing

General:

When daytime ambient temperatures are expected to exceed 100 degrees F and when directed by the Engineer, concrete shall be placed only between the hours of 8:00 p.m. and 8:00 a.m.

Immediately prior to placing concrete, the contractor shall verify that the elevations of guide wires controlling slip-form pavers and the elevations of fixed form are such that the thickness and finished grade of the pavement will be in accordance with the requirements of the project plans and these specifications.

Concrete shall be placed using methods that result in a minimum of handling and segregation and in a manner that will result in the concrete being distributed uniformly across the front of the paving machine.

Concrete placement shall be continuous between expansion or construction joints. The concrete shall be struck off, consolidated and floated by mechanical methods. The contractor may, with the approval of the Engineer, use a free-floating, oscillating screed device, which is a minimum of 10 feet in length and attached to the paver, in conjunction with or in lieu of tubular floats. When pavement widths are less than 10 feet and where it is impractical to use mechanical methods, manual methods may be used to finish the concrete surface.

If surface drying or cracking should occur prior to the application of curing material, the entire surface of the concrete shall be kept damp by applying water with a nozzle that atomizes the flow so that a mist and not a spray is formed. The water from the nozzle shall not be applied directly upon the concrete and shall not be allowed to accumulate on the concrete in a quantity sufficient to cause a flow or wash the surface.

The contractor shall protect the base or subgrade when equipment is cleaned at the end if each day's production. All concrete deposited on the base or subgrade during the cleaning operation shall be removed from the base or subgrade immediately after cleaning is completed. Any

damage to the base or subgrade shall be repaired, as approved by the Engineer, prior to commencing paving operations. Water will not be permitted to pond on the roadway.

Any concrete which is spilled, splattered, or scattered on existing pavement shall be removed before the end of each day's paving operations.

It is important in the performance of the work and in the operation of equipment that no work shall lag and all operations shall be completed within the optimum or specified time; therefore, the Engineer may order the work suspended, if necessary, to maintain proper balance of operations so as to insure satisfactory results.

(b) Slip-Form Method:

The equipment shall spread, consolidate, screed and float-finish the concrete so that a minimum of hand-finishing will be necessary, and a well-consolidated and homogenous pavement is produced. Additional labor and equipment shall be supplied when paving beyond the limits of the side forms is required.

The machine shall vibrate the concrete for the full width and depth of the concrete. Such vibration shall be accomplished with vibrating tubes or arms working in the concrete, and be spaced not more than 24 inches center-to-center. Vibrators shall operate at a minimum of 8,000 impulses per minute. Concrete placement shall cease immediately if a vibrator fails to function and cannot be immediately repaired, replaced, or supplemented with additional vibrators.

The machine shall be operated with as nearly a continuous forward as possible and all mixing, delivering, and concrete-spreading operations shall be coordinated to provide uniform progress. If for any reason it is necessary to stop the forward movement of the paver, the vibratory and tamping elements shall also be stopped simultaneously.

Pavement edge slump in excess of 0.02 feet, exclusive of edge rounding, shall be corrected. If correction is not possible while the concrete is plastic, pavement with excessive edge slump shall be corrected by one of the following methods:

The pavement shall be removed by saw-cutting a distance not greater than one foot from the pavement edge between adjacent transverse joints. Tie bars shall be placed as specified in Subsection 401-3.05 and the pavement shall be replaced as part of adjacent Portland cement pavement construction.

If excessive edge slump can not be corrected by method on (1) above, then the pavement shall be removed for the full lane width between adjacent transverse joints and replaced as specified in Subsection 401.4.03(C).

When concrete is being placed adjacent to previously constructed pavement, work bridges for placing and finishing the pavement and the tracks on one side of the paver may be allowed on the
new pavement provided that:

The previously placed pavement has been placed for minimum of 72 hours.

Pressure exerted on the pavement by the paver shall not exceed 20 pounds per square inch.

Tracks on the paver shall be equipped with protective pads, or the surface of the existing pavement shall be protected so that the surface is not damaged.

No part of the track shall be operated within one foot of the edge of the existing pavement.

Any pavement which is damaged by the contractor's equipment shall be repaired as approved by the Engineer and at no additional cost to the Department.

With the exception of saws used for the construction of weakened plane joints, no other contractor's equipment will be allowed on the pavement until all the requirements specified herein have been met.

(c) Fixed-Form Method:

Three types of self-propelled mechanical equipment: the spreader, the finisher, and the float will be required; however, a single machine combining two or more of these operations may be used if it has been demonstrated that such a machine will accomplish satisfactory results. All wheels of all machines that ride on finished concrete surfaces shall be equipped with rubber tires.

The concrete shall be spread uniformly between the forms, immediately after it is placed, by means of the spreading machine. The spreader shall be followed by the finishing machine with not less than two oscillating or reciprocating creeds. The spreading machine or the finishing machine shall be equipped with vibrating equipment that will vibrate the concrete for the full paving width. Vibrators shall be used adjacent to the longitudinal edge of the pavement. These vibrators shall be attached to the rear of the spreading machine or to the finishing machine. Vibrators shall not rest on new pavements or side forms or contact any tie bars, and power to the vibrators shall be such that when the motion of the machine is stopped, vibration will cease. Vibrators shall operate at a minimum of 8000 impulses per minute.

The concrete shall be spread full-width before being struck off by the finishing machine. The concrete shall be struck off and consolidated so that the surface will conform to the finished grade and cross-section shown on the project plans and at the same time leave sufficient material for the floating operation. The spreading or finishing machine shall move over the pavement as many times and at such intervals as may be required to insure thorough consolidation.

After the pavement has been struck off and consolidated, it shall be floated with an approved longitudinal float.

The contractor may use a longitudinal float composed of one or more cutting and smoothing floats, suspended from and guided by a rigid frame. The frame shall be carried by four or more wheels riding on, and constantly in contact with, the forms.

The contractor may use a longitudinal float which is worked with a sawing motion while being held in a floating position parallel to the roadway centerline and while passing gradually from one side of the pavement to the other. Movements ahead along the centreline of the roadway shall be in successive advances of not more than one half the length of the float.

In lieu of using either type of longitudinal float, a single machine which will effect satisfactory consolidating, finishing and floating may be used. This machine may be towed by a spreading machine. This combination finishing-floating machine shall be equipped with screeds and vibrators as hereinbefore specified for finishing machines. Floating shall be accomplished with a non-oscillating float held in a suspended position from the frame.

If any spreading, finishing and floating equipment is not maintained in full working order, or if the equipment used by the contractor proves inadequate to obtain results prescribed, such equipment shall be improved or satisfactory equipment substituted or added.

(d) Fixed-Form – Manual Methods:

Manual methods may be permitted by the Engineer in areas inaccessible to mechanical equipment.

When manual methods are permitted, concrete shall be deposited, spread and struck off to such an elevation that, when properly consolidated, the surface will conform to the required lines and grades. The strike board shall be moved forward with a combined longitudinal and transverse motion so that neither end is raised form the side forms. While striking off, a slight excess of concrete shall be kept in front of the cutting edge at all times.

The concrete shall be consolidated by internal vibration. Vibrators shall operate at a minimum of 8000 impulses per minute. Use of vibrators for shifting of the concrete mass will not be permitted.

After consolidation, the concrete shall be tamped to the proper surface elevation and cross-section with an approved tamping or screeding device or with a mechanical vibrating unit spanning the full width between forms. A small surplus of concrete shall be kept in front of the tamper or vibrating unit. Tamping or vibrating shall continue until the required cross-section is obtained and the mortar is flushed slightly to the surface.

Other approved methods may be used to finish the concrete.

On grades in excess of five percent, a second strike board shall follow behind the tamper or vibrating unit and shall be used in the same manner as the tamper to remove waves caused by the flow of concrete.

(e) Joint Finishing and Edging:

The pavement edges and joints shall be edged in accordance with the details shown on the plans.

(f) Surface Texturing:

Surface texturing of the plastic concrete shall begin immediately after placement and finishing of the concrete. All excessive surface water shall be dispersed prior to commencing texturing operations. Texturing shall be performed by applying a longitudinal burlap drag followed by transverse texturing using steel tines.

Burlap and steel tines shall be supported by rolling mechanical bridges. They shall not be supported manually except in areas inaccessible to the bridges.

Rolling mechanical bridges supporting steel tines shall be equipped and shall operate with automatic sensing and control devices which follow the same control line as the slip form paver. This machine shall be used for texturing the pavement only. Burlap shall not be supported on the same rolling mechanical bridge used to support the steel tines.

Burlap shall be in accordance with AASHTO M 182, Class 3 and shall traverse the full width of the pavement to within 12 inches of the pavement edge.

The timing of the texturing operations is critical. Grooves that close following texturing will not be permitted and texturing shall be completed before the surface will be torn or unduly roughened by the texturing operation.

Hand-tine brooms shall be provided and available at the job site at all times.

Tine texturing shall be performed so that the grooves produced will be uniform. Texture shall be normal to the center line of the roadway and shall extend over the entire roadway width to within three inches of the pavement edge. Swerving groove patterns will not be permitted.

Texture grooves shall be 1/16 to 1/8 inch in width and 3/32 to 7/32 inch in depth. The textured groove depth will be measured in accordance with the requirements of Arizona Test Method 310. The center-to-center spacing of the grooves shall be 1/2 to one inch.

If necessary, hardened concrete shall be textured by any method that will produce the required grooves.

(g) Curing:

Curing compound shall be applied to the concrete within 15 minutes after surface texturing operations, and before any drying shrinkage or craze cracks begin to appear. In the even of surface drying or cracking, application of water with an atomizing nozzle shall be started immediately and shall be continued until application of curing material is begun or resumed; however, curing compound shall not be applied over any resulting free-standing water.

Liquid curing compound shall be applied in one or more applications totaling not less than one gallon per 100 square feet. The curing compound container shall be equipped with a calibrated sight glass for verification of quantities used.

When the ambient temperature is above 85 degrees F, as verified by a Department-furnished calibrated thermometer, the contactor shall fog the surface of the concrete with an atomized mist of water. The surface of the pavement shall be kept moist until initial joint sawing is completed; fogging done after curing material has been applied shall not begin until the curing compound has set sufficiently to prevent displacement.

When misting is required, the entire surface of the concrete shall be kept damp by applying water with a nozzle that atomizes the flow so that a mist and not a spray is formed. The moisture from the nozzle shall not be applied under pressure directly upon the concrete and shall not be allowed to accumulate on the concrete in a quantity sufficient to cause a flow or wash the surface.

Concrete curing shall be continued for not less than seven days and any damaged curing material shall be repaired immediately.

401-3.05 Joints

(a) General Requirements:

Joints in concrete pavement will be designated as transverse expansion joints; longitudinal or transverse construction joints; or longitudinal or transverse weakened plane joints.

The faces of all joints shall be constructed perpendicular to the surface of the concrete pavement.

Joints shall be constructed of the type, to the dimensions, and at the locations shown on the plans and as specified herein.

Concrete placed in lanes adjacent to previously placed concrete shall have transverse weakened plane joints located to align with the weakened plane joints in the previously placed concrete.

(b) Longitudinal Joints:

Longitudinal joints in the main roadway shall be weakened plane joints or construction joints. Weakened plane joints shall be constructed by sawing.

Longitudinal weakened plane joints shall be constructed between traffic lanes and also between traffic lanes and shoulders if concrete shoulders wider than five feet are specified.

Longitudinal joints in ramps and tapers shall be either weakened plane joints or construction joints. The location of longitudinal joints in ramps and tapers shall be as approved by the Engineer.

Unless otherwise shown on the plans, tie bars shall be placed in all longitudinal weakened plane joints by acceptable mechanical methods while the concrete is still plastic. When pavement is being placed adjacent to existing concrete pavement, tie bars shall be inserted into the existing concrete by drilling 7/8 inch diameter holes into the hardened concrete. Tie bars shall be placed in accordance with the details shown on the plans, and shall be anchored into the existing concrete with an approved high-viscosity epoxy. The Engineer's approval of the anchoring material shall be obtained prior to starting the work.

Tie bars shall be provided as shown on the plans and spaced 30 inches center-to-center. Tie bars placed in pavement which is constructed without load transfer dowel assemblies shall be two feet long. Tie bars placed in pavement which is constricted with load transfer dowel assemblies shall be 20 inches long. Tie bars shall be placed within one inch of mid-depth of the slab. Tie bars placed in adjacent slabs of different thickness shall be placed at mid-depth of the thinner slab.

Epoxy-coated smooth dowels shall be placed in all longitudinal construction joints by acceptable mechanical methods, either while the concrete is still plastic or after the concrete has hardened. Epoxy-coated smooth dowels shall be 5/8 inch in diameter and space 30 inches center-to-center. Dowels shall be two feet in length without load-transfer dowel assemblies and 20 inches in length with load-transfer dowel assemblies. All dowel bars shall be placed at mid-depth in the slab.

(c) Transverse Joints:

Transverse expansion joints shall be located at the junction of roadway pavement slabs and bridge approach slabs. The joints shall be formed in accordance with the details shown on the plans. Transverse expansion joints at locations other than bridge approaches shall be constructed as shown on the plans.

Transverse construction joints with tie bars shall be formed as shown on the plans and as specified herein. They shall be placed at the end of each day's production, or when placement of concrete is discontinued for more than 90 minutes. Excess concrete shall not be placed beyond a construction joint at the end of the day's production.

Transverse construction joints between transverse weakened plane joints shall have deformed No. 8 reinforcing tie bars, two feet in length, spaced at 30 inches center-to-center.

Transverse construction joints shall be formed perpendicular to the center line of the roadway.

Transverse weakened plane joints in ramps and crossroads shall be constructed perpendicular to the centerline of the ramp of crossroad.

The location of transverse weakened plane joints and transverse construction joints shall be as shown on the plans.

401-3.06 Joint Construction:

(a) Sawed Joints:

Longitudinal or transverse weakened plane joints shall be sawed to the dimension shown on the plans. Excess water from the sawing operation will not be permitted to stand on any subgrade to be paved. The contractor shall provide and maintain acceptable methods to control the water used in the sawing so the subgrade is not damaged.

Sawed joints shall be constructed before uncontrolled pavement cracking occurs; however, joints shall not be sawed until the concrete has hardened enough to prevent excessive tearing or ravelling during sawing operations. The exact time when sawing will be done shall be determined by the contractor.

The contractor shall maintain an additional concrete span saw on the project site at all times during which sawed joints are being constructed. The additional saw shall be maintained in good operating condition and shall be readily available as a substitute for the primary concrete saw.

Any procedure used to saw joints which results in premature uncontrolled cracking shall be revised immediately. The contractor shall repair damaged areas or random cracks as specified and as directed by the Engineer.

If joints are sawed in stages, the initial saw cut shall be of the minimum specified width and shall be sawed to the depth shown on the plans.

Suitable guide lines or other devices shall be used to assure that joints are constructed at the locations shown on the plans.

After sawing the joints the following procedure shall apply:

Prior to applying the sealant each joint face shall be thoroughly cleaned. The method of cleaning may be subject to regulation by state or local environmental quality enforcement agencies. When not otherwise mandated by law or regulation, the contractor shall clean the joints by sand-blasting. The joints shall then be further cleaned by use of high pressure air jets so that each face is clean, dry and dust free. The air used in cleaning shall be free of oil or water.

The sealant used shall be silicone joint sealant conforming to the requirements of Subsection 1011-8 and shall be applied in accordance with the manufacturer's recommendations. All recommended manufacturer's field testing shall be done by the Engineer. Necessary repairs resulting from field testing shall be immediately repaired by the contractor; cost to be considered incidental to the sealant pay item. Any sealant spilled on the concrete pavement shall be removed.

Immediately prior to applying joint sealant, an expanded closed-cell polyethylene foam backer rod, approved by the Engineer, shall be inserted along the joint as shown on the plans. The backer rod shall be compatible with the joint sealant to be applied.

Joints shall be sealed with in 10 working days after the concrete has been placed and prior to opening the pavement to any traffic.

(b) Construction Joints:

Longitudinal and transverse construction joints shall be formed in accordance with the details shown on the plans, or as directed by the Engineer.

When concrete is not finished, textured, and protected with curing material within one hour after placement, the Engineer may order the contractor to construct a transverse construction joint by sawing at the location established by the Engineer. All concrete placed beyond the construction joint shall be removed and disposed of the contractor, at no additional cost to the Department prior to continuing paving operations.

An "H" expansion joint, as shown in ADOT Standard Drawing C-7.01, shall be placed where piers, abutments, barrier transitions, light pole foundations, sign structure foundations, catch basins, slotted drains or any other concrete facilities are constructed against the edge of the pavement, unless otherwise shown on the plans.

(c) Transverse Expansion Joints:

Transverse expansion joints shall be formed in accordance with the details shown on the project plans or as directed by the Engineer.

401-3.07 Opening Pavement to Traffic:

Pavement shall not be opened to traffic less than seven days after placement, and until all joints are sealed and the concrete has attained a compressive strength of at least 3,000 pounds per square inch, unless otherwise approved by the Engineer.

401-4 Pavement Evaluation and Remedial Measures:

Pavement Surface Texture:

The depth of the surface texture grooves will be measured in accordance with the requirements of Arizona Test Method 310.

Pavement Smoothness:

Smoothness. As soon as the concrete has hardened sufficiently, the pavement surface shall be tested with a 16-foot (5 m) straightedge or other specified device. Surface smoothness deviations shall not exceed 1/4 inch (6 mm) from a 16-foot (5 m) straightedge placed in any direction, including any pavement along and spanning any pavement joint edge.

Areas in a slab showing high spots of more than 1/4 inch (6 mm) but not exceeding 1/2 inch (13 mm) in 16 feet (5 m) shall be marked and immediately ground down with an approved grinding machine to an elevation that will fall within the tolerance of 1/4 inch (6 mm) or less. Where the departure from correct cross-sections exceeds 1/2 inch (13 mm) the pavement shall be removed and replaced at the expense of the Contractor when so directed by the Engineer.

Pavement Cracks:

(a) General:

Cracks penetrating the full depth of the pavement shall be repaired or the cracked pavement shall be removed and replaced, as specified herein, prior to opening the pavement to public traffic.

Within 28 days after concrete placement and prior to acceptance of the Work, the Engineer will perform a pavement crack survey. The pavement shall be cleaned prior to the crack survey.

Cracks which are visible without magnification and which require repair, and pavement slabs which require replacement, will be marked by the Engineer and shall be repaired or replaced by the contractor as specified, and at no additional cost to the Department.

Cracks observed later than 28 days after concrete placement and prior to final acceptance of the work shall be repaired by the contractor as specified and the cost of such repairs will be shared equally by the contractor and the Department.

The contractor shall provide the Engineer with detailed information concerning the methods and materials to be used for crack repair, and the contractor shall obtain the Engineer's approval of the proposed methods and materials prior to beginning the required repairs.

The contractor, at its option and at no additional cost to the Department, may core cracked pavement, as approved by the Engineer, to determine the extent of cracking.

Crack Repair:

1) General:

Random cracks shall be repaired using the methods and under the conditions specified herein.

Crack repair shall begin within seven days after completion of the pavement crack survey and shall
be completed within 30 days after the start of repairs

Payment for pavement slabs which require repairs will be specified in Subsection 401-6.

Crack Repair Requirements:

Cracks in Jointed Pavement Constructed with Load-Transfer Dowel

Assemblies:

Longitudinal cracks which occur more than 54 inches from a longitudinal joint or less than 12 inches from a longitudinal joint shall be repaired by the routing-and-sealing method.

Transverse cracks shall be repaired by the epoxy-injection method after any immediately adjacent uncracked joints are deepened to ½ inch above the dowels.

Cracks in Jointed Pavement Construct Load-Transfer Dowel
Assemblies:

Longitudinal cracks which occur more than 54 inches from a longitudinal joint or less than 12 inches from a longitudinal joint shall be repaired by the routing-and-sealing method.

When a transverse crack crosses or terminates in a transverse contraction joint, the uncracked portion of the joint shall be filled with an approved gray-colored epoxy, and the crack shall be repaired by the routing-and-sealing method.

When a transverse crack approximately parallels and is within five feet of an uncracked contraction joint, the uncracked joint shall be cleaned and filled with an approved gray-colored epoxy and the crack shall be repaired by the routing-and-sealing method.

When a transverse crack is more than five feet from a transverse joint, either cracked or uncracked, the joint shall be resawed and resealed as originally specified, and the crack shall be repaired by the routing-and-sealing method.

(c) Cracks Occurring Within Wheel Path:

Cracks occurring within the wheel paths, which are exclusive of the areas defined under subsections (a) and (b) above, shall be considered irreparable and the pavement shall be removed and replaced by the accordance within the requirements of Subsection 401-4.03(C)

Crack Repair Methods:

Routing-and-Sealing Method:

When the routing-and-sealing crack repair method is specified, the top of the crack shall be routed, with an approved routing machine, to a depth of at least 3/4 inch and to a width not less than 3/8 inch or more than 5/8 inch. The routing machine shall be capable of closely following the path of he crack and of widening the top of the crack to the required section without spalling or otherwise damaging the concrete. Loose and fractured concrete shall be removed and the routed crack shall be thoroughly cleaned and then sealed with an approved gray-colored silicon sealant.

Epoxy-Injection Method

When the epoxy-injection crack repair method is specified, the crack shall be pressure-injected with an approved gray-colored epoxy.

Pressure-injection of epoxy shall be done only between the hours of 11:00 p.m. and 7:00 a.m.

Pavement Removal and Replacement:

Portland cement concrete pavement, having cracks irreparable in accordance with Subsection 401-4.03 (B), shall be removed and replaced as directed by the Engineer.

Cracked pavement shall be removed and replaced to the limits established by the Engineer and will generally require removal of the full lane width of the slab over a length of at least six feet.

Pavement slabs containing a single diagonal crack intersecting the transverse and longitudinal joints within 1/3 of the width and length of the slab from the corner shall be repaired by removing and replacing the smaller portion of the slab as directed by the Engineer.

Pavement slabs containing multiple cracks through the full depth of the slab, separating the slab into three or more parts, shall be entirely removed and replaced as directed by the Engineer.

Excessively cracked pavement shall be removed and replaced over the full pavement width, as directed by the Engineer.

Pavement to be removed shall be cut full-depth prior to removal. In order to minimize over-cutting, four-inch-diameter full-depth cores shall be drilled at the corners of the pavement to be removed as directed by the Engineer.

Base material which is damaged as a result of pavement removal shall be repaired or replaced by the contractor as approved by the Engineer.

Removed pavement and base material shall be disposed of by the contractor, as approved by the Engineer.

After removal of cracked pavement, tie bars and dowel bars shall be placed by drilling and anchoring, using an approved epoxy, at approximately mid-depth in the existing concrete pavement. Tie bars shall be placed in transverse construction joints and shall be 24-inch long, deformed, No. 8 bars placed 18 inches center-to-center. Tie bars shall be placed in longitudinal construction joints which are greater than 50 feet in length and shall be 24-inch-long, deformed, No. 5 bars placed 30 inches center-to-center. Dowel bars shall be placed in construction joints which coincide with existing transverse weakened plane joints. The dowel bars shall be 18-inch-long, smooth, 1 ¼-inch diameter bars placed at distances of 6, 24, 42, 90, 117, and 135 inches from the adjacent longitudinal joint which is nearest to the outside distress lane.

Replacement concrete shall be placed, finished and cured in accordance with the requirements specified for the original pavement.

401-4.04 Pavement Thickness

Concrete pavement shall be constructed to the specific thickness. Tolerances allowed for base and subgrade construction and other provisions of these specifications which may affect thickness shall not be construed to modify such thickness requirements.

Pavement will be evaluated for thickness by the lot. Lot limits will be identical to those specified in Subsection 1006-7.03 for acceptance for compressive strength of class P concrete. The contractor shall obtain ten cores per lot, in accordance with AASHTO T 24, under the observation of a TDOT representative, and at randomly selected locations designated by the Engineer. The TDOT representative shall take immediate custody of the cores. All cores will be measured by the Department in accordance with the provisions of AASHTO T 148, except that measurements will be to the nearest thousandth of an inch, and the average of such measurements will be to the nearest hundredth of an inch. If any core indicates a deficiency in thickness of 0.60 inches or more, that core shall not be used determining thickness properties of the lot, and additional cores shall be drilled at intervals not exceeding ten feet in each direction from the deficient core location, measured parallel to the center line, until one core is obtained in each direction which is not deficient by 0.60 inches or more. Pavement between these two cores shall be considered as rejected. The average of the measurements of the two cores will replace the measurements of the original deficient core in determining thickness properties of the remainder of the lot. Cores taken in areas requiring grinding will be re-cored for determination of lot thickness.

At all locations where cores have been drilled, the resulting holes shall be filled with concrete as approved by the Engineer and at no additional cost to the Department.

401-5 Method of Measurement:

Portland cement concrete pavement will be measured by the square yard, calculated from the dimensions show on the plans and adjusted by the amount of any change ordered by the Engineer. Any opening in excess of one square yard will not be measured for payment. No allowance will be made for pavement placed in excess of the specified dimensions.

SECTION 406 - ASPHALTIC CONCRETE

406-2.11 Acceptance of Materials

(C) Asphalt Cement Content and Effective Voids: the second sentence of the Standard Specifications is revised to read:

The asphalt cement content will be determined in accordance with the requirements of Arizona Test Method 402 or Arizona Test Method 421. When Arizona Test Method 402 is used, a retention factor determined in accordance with Arizona Test 407 will be added.

406-3.07(B) Longitudinal Joints: is modified to add:

Longitudinal joints shall be formed, hot lapped and compacted in accordance with the detail shown on Exhibit "A". A sloping metal plate attached to the inside edge of the paver screed shall bevel the edge of the first asphaltic concrete overlay mat. This wedge slopes the typical 2-inch thick overlay mat over a distance of 6 inches. When the adjoining mat is placed, an infrared heater, mounted on the side of the paver shall be used to preheat and soften the previously laid beveled edge. Joints shall be compacted while the mixture is hot. This procedure is required in all cases, including mill and inlay projects.

SECTION 501 – PIPE CULVERT AND STORM DRAINS:

501-3 **Construction Requirements:** of the ADOT Standard Specifications, Latest Edition, is modified to add:

501-3.01(A) Contractor Quality Control:

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

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

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

CONTRACTOR QUALITY CONTROL TESTING REQUIREMENTS			
TYPE OF TEST	TEST METHOD	SAMPLING POINT	MINIMUM TESTING FREQUENCY
Backfill and Bedding Material			
Gradation	ARIZ 201	Stockpile	1 per 500 CY per Source
PI	AASHTO T 89, T 90		
Proctor Density	ARIZ 225, 226, 245		1 per Source
Compaction	ARIZ 227, 230, 231, 232, 235, 246	In-place	1 per 200 CY, minimum 1 per lift

SECTION 505 – STORM DRAIN AND UTILITY MANHOLES

505-3.01 **General:** of the Standard Specifications is revised to read:

Where frames and covers for manholes are to be set in new bituminous mix or asphaltic concrete surfaces, including overlays and inlays, they shall be set to final grade after the asphaltic concrete surface course is in place. Steel plates of a size approved by the Engineer shall be placed over the manhole prior to placing asphaltic concrete. Care shall be taken that the base and surfacing materials are not disturbed beyond the edges of the plate. Where an existing intact frame and cover will be overlaid before adjusting to new pavement elevation, the Contractor may substitute a non-structural protective cover or bond breaking agent in lieu of the steel plate, said substitution to be approved in advance by the Engineer.

If the manhole cover has a build up of asphalt material, a new frame and cover shall be installed. It is the contractor's responsibility to acquire these replacement frames and covers. The Engineer or his field representative will determine if the frame and cover will need to be replaced. Replacement frames and covers shall meet requirements specified in Pima County/City of Tucson Standard Details for Public Improvements. The contractor shall salvage the frames and covers to PCWMD. The cost for salvage shall be considered incidental.

505-3.05 Reset Manhole Frame and Cover: of the Standard Specifications is modified to add:

Manholes:

The Contractor shall adjust to the new pavement surface, all manholes in accordance with the Standard Specifications, applicable utility standards and details, and these Special Provisions, except as noted on the plans or directed by the Engineer.

The contractor may pre-lower all existing utility manholes and water valve boxes prior to milling operations. The contractor shall contact each utility at least 48 hours prior to pre-lowering so that the number and location are identified. This work shall also be coordinated with the City of Tucson inspector.

The Contractor shall notify PCWMD at least 48 hours prior to any adjustment work so that the Contractor, City of Tucson Inspector, and PCWMD Inspector can verify the exact number and location of manholes to be adjusted.

Per PC/COT SD WWM 307, the Contractor is required to cover the bench during the adjustment process in order to prevent debris from entering the sewage flow. If the Contractor must enter a manhole to install or remove the bench cover, a no-cost Manhole Entry Permit must be obtained from PCWMD Mapping and Records (201 N. Stone, 5th Floor) prior to making the entry. Contact PCWMD Field Engineering (740-2651) to arrange an inspection if there are any questions concerning adjustments to existing manholes.

All concrete used in setting and adjusting manhole frames and covers shall be pre-approved Class P ready mix concrete. The concrete shall be protected during the curing period. After placement of asphalt overlay, the frames and covers shall be set in concrete flush with the new pavement surface.

A black coloring agent acceptable to the engineer shall be used for concrete forming the surface of the collar.

Method of Measurement:

Reset frame and cover for manholes will be measured as a unit for each manhole adjusted to the new pavement surface. No measurement or direct payment will be made for pre-lowering. Pre-lowering is considered incidental to the final manhole frame and cover adjustment.

SECTION 510 – POTABLE WATER SYSTEMS

5100001 GENERAL REQUIREMENTS

Description:

The work under this contract shall consist of furnishing all labor, equipment and materials required to install or modify City of Tucson, Tucson Water Department Facilities. All work shall be in accordance with the City of Tucson/Pima County Standard Specifications for Public Improvements, 2003 Edition, the requirements of these Special Provisions, and any details shown on the plans.

This work shall be done at the locations shown on the project plans. Any references to sections and details in these Special Provisions refer to City of Tucson/Pima County Standard Specifications for Public Improvements, 2003 Edition.

Materials:

All materials shall conform to the requirements of the City of Tucson/Pima County Standard Specifications for Public Improvements, 2003 Edition, except as modified by these Special Provisions or approved by the Engineer.

Construction Requirements:

Installation or modifications of water facilities shall conform to the City of Tucson/Pima County Standard Specifications for Public Improvements, 2003 Edition, except as modified by these Special Provisions or approved by the Engineer.

Method of Measurement:

The Method of Measurement will be as prescribed by these Special Provisions.

5100010 EXCAVATION, INSTALLATION OF WATER MAINS AND BACKFILL

Description:

The work under this item shall consist of furnishing all labor, equipment and materials required to provide excavation, installation of water mains and appurtenances, bedding, and backfill in accordance with the requirements of these Special Provisions.

Materials:

All materials shall conform to Subsections 510-2.04 (pg. 318) and 510-2.05 (pg. 318) with the exception that asphalt millings will not be allowed as backfill material or as an additive to any bedding or backfill material in any trenches intended for water pipes.

Construction Requirements:

All construction requirements shall conform to Subsections 510-3.01 (pg. 318) and 510-3.03 (pg. 321).

Method of Measurement:

Excavation, Installation of Water Mains and Backfill shall be considered incidental to the cost of the new water facilities. Any Excavation, Installation of Water Mains and Backfill required for a complete installation, but not called for on the plans, shall also be considered incidental to the cost of the new water facilities.

5100020 HYDROSTATIC PRESSURE TESTING OF WATER FACILITIES

Description:

The work under this item shall consist of furnishing all labor, and equipment required for Hydrostatic Pressure Testing of Water Facilities installed under this contract in accordance with the requirements of these Special Provisions.

Materials:

None.

Construction Requirements:

Hydrostatic Pressure Testing of Water Facilities shall be as per Subsection 510-3.10 (pg. 344).

Method of Measurement:

Hydrostatic Pressure Testing of Water Facilities shall be considered incidental to the cost of the new water facilities. Any Hydrostatic Pressure Testing of Water Facilities required for a complete installation, but not called for on the plans, shall also be considered incidental to the cost of the new water facilities.

5100030 WATER MAIN FLUSHING AND DISINFECTING

Description:

The work under this item shall consist of furnishing all labor, and equipment required for Water Main Flushing and Disinfecting of new water mains in accordance with the requirements of these Special Provisions.

Materials:

None.

Construction Requirements:

Water Main Flushing and Disinfecting shall conform to Subsections 510-3.10 (pg. 344) and 510-3.13 (pg. 349).

Method of Measurement:

Water Main Flushing and Disinfecting shall be considered incidental to the cost of the new water facilities.

5100260 PIPE MARKING AND DETECTING TAPE

Description:

The work under this item shall consist of furnishing all labor, equipment and materials required to install Pipe Marking and Detecting Tape in accordance with the requirements of these Special Provisions.

Materials:

All materials shall conform to the requirements of Subsection 510-3.05 (pg. 339).

Construction Requirements:

Installation of Pipe Marking and Detecting Tape shall be in accordance with Subsection 510-3.05 (pg. 339) and Standard Details W-115, W-309, W-310, W-311 and W-312.

Method of Measurement:

Pipe Marking and Detecting Tape shall be considered incidental to the cost of the new water facilities. Any Pipe Marking and Detecting Tape required for a complete installation, but not called for on the plans, shall also be considered incidental to the cost of the new water facilities.

5100530 PAVEMENT REPLACEMENT FOR NEW WATER MAINS

Description:

The work under this item shall consist of furnishing all labor, equipment and materials required to provide pavement replacement for new water mains in accordance with the requirements of these Special Provisions.

Materials:

All materials shall conform to Standard Detail 215, City of Tucson and Pima County Standard Details for Public Improvements, 2003 Edition and all requirements shall conform to Section 406-1 through 406-3.06, pages 212 through 230.

Construction Requirements:

All construction requirements shall conform to Section 923-3, construction Details, subsections 923-3.02 and 923-3.08.

Method of Measurement:

Pavement Replacement For New Water Mains shall be considered incidental to the cost of the new water facilities. However, any Pavement Replacement For New Water Mains, required for a complete installation beyond the limits of construction where the existing pavement is not scheduled for replacement or refurbishment, shall be measured by the linear foot of pavement replacement, regardless of trench width.

5101104 PIPE, DUCTILE IRON (DI), 4" (CLASS 350)
5101106 PIPE, DUCTILE IRON (DI), 6" (CLASS 350)
5101108 PIPE, DUCTILE IRON (DI), 8" (CLASS 350)

Description:

The work under this item shall consist of furnishing all labor, equipment and materials required to install Ductile Iron (DI) pipe at the locations shown on the project plans, in accordance with the details shown on the project plans, and in accordance with the requirements of these Special Provisions.

Materials:

All pipe materials shall conform to the requirements of Subsection 510-3.04(D)(1) (pg. 326).

Tracer Wire shall be installed as detailed on the plans. Furnishing and installation of Tracer Wire is incidental to pipe installation.

Joint restraint shall be included as described in the section 5101800, JOINT RESTRAINT series of these Special Provisions.

The materials and costs related to connecting to existing pipe shall be included in the project cost as described in the 5106000, CONNECTIONS, series of these Special Provisions.

Construction Requirements:

Installation of the pipe shall be in accordance with the requirements of Subsection 510-3 (pg. 318), and these Special Provisions.

All DI pipe shall be encased in polyethylene per the requirements of Subsection 510-3(D)(1) (pg. 326).

Method of Measurement:

Ductile Iron pipe shall be measured by the unit linear foot (LF) in accordance with Subsection 510-4 (pg. 349) with the following exceptions:

a. Subsection 510-4, eighth paragraph, first bullet, "All testing, except those tests specifically noted as being paid for by the Agency." and third bullet "Dewatering." shall be included in the project cost described in the 5106000, Connections, series of these Special Provisions.

5101404 PIPE, POLYVINYL CHLORIDE (PVC), 4" (DR 14, CLASS 305)
5101406 PIPE, POLYVINYL CHLORIDE (PVC), 6" (DR 14, CLASS 305)
5101408 PIPE, POLYVINYL CHLORIDE (PVC), 8" (DR 14, CLASS 305)

Description:

The work under this item shall consist of furnishing all labor, equipment and materials required to install Polyvinyl Chloride (PVC) pipe at the locations shown on the project plans, in accordance with the details shown on the project plans, and in accordance with the requirements of these Special Provisions.

Materials:

All pipe materials shall conform to the requirements of Subsection 510-3.04(D)(4) (pg. 330).
Refer to ANSI/AWWA C-900-07 for pipe classification.

Tracer Wire shall be installed as detailed on the plans. Furnishing and installation of Tracer Wire is incidental to pipe installation.

Joint restraint shall be included as described in the section 5101801, JOINT RESTRAINT series of these Special Provisions.

The materials and costs related to connecting to existing pipe shall be bid included in the project cost as described in the 5106000, CONNECTIONS, series of these Special Provisions.

Construction Requirements:

Installation of the pipe shall be in accordance with the requirements of Subsection 510-3 (pg. 318), AWWA Manual 23, and these Special Provisions.

Method of Measurement:

PVC pipe will be measured by the unit linear foot (LF) in accordance with Subsection 510-4 (pg. 349) with the following exceptions:

a. Subsection 510-4, eighth paragraph, first bullet, "All testing, except those tests specifically noted as being paid for by the Agency." and third bullet "Dewatering." shall be included in the project cost as described in the 5106000, Connections, series of these Special Provisions.

5101603 PIPE, COPPER, ¾" W/FITTINGS
5101604 PIPE, COPPER, 1" W/FITTINGS
5101606 PIPE, COPPER, 1½" W/FITTINGS
5101608 PIPE, COPPER, 2" W/FITTINGS

Description:

The work under this item shall consist of furnishing all labor, equipment and materials required to install Copper Pipe and Fittings at the locations shown on the project plans, in accordance with the details shown on the project plans, and in accordance with the requirements of these Special Provisions.

Materials:

All pipe materials shall conform to the requirements of Subsection 510-3.04(D)(6) (pg. 331).

All Copper Pipe shall be installed with tracer wire as called for in Standard Details W-330 and W-331.

Construction Requirements:

Installation of the pipe shall be in accordance with the requirements of Subsection 510-3 (pg. 318), and these Special Provisions.

Method of Measurement:

Copper Pipe w/Fittings shall be measured by the Linear Foot (LF) in accordance with Subsection 510-4 (pg. 349).

Tracer wire as called for in Standard Details W-309, W-310, W-311, W-312, W-330 and W-331 shall be considered incidental to the Copper Pipe.

5101804 JOINT RESTRAINT, 4"
5101806 JOINT RESTRAINT, 6"
5101808 JOINT RESTRAINT, 8"

Description:

The work under this item shall consist of furnishing all labor, equipment and materials required to install Joint Restraint at the locations shown on the project plans, in accordance with the details shown on the project plans, and in accordance with the requirements of these Special Provisions.

Materials:

All Joint Restraint materials shall conform to the requirements Subsection 510-3.04(F) (pg. 333).

Construction Requirements:

Installation of Joint Restraints shall be in accordance with the requirements of Subsection 510-3 (pg. 318) and these Special Provisions.

The contractor shall provide and install Joint Restraint at all points of directional change (i.e., fittings, valves, tees, and plugs), at the locations shown on the project plans, and in accordance with any details shown on the project plans.

All Joint Restraint mechanisms shall be installed in accordance with the manufacturer's recommendations.

All Joint Restraints shall be installed prior to pressure testing.

If field conditions varying significantly from the parameters defined in detail W-600 are encountered, the Contractor shall immediately notify the Engineer. The Engineer will advise the Contractor of the required length of restrained pipe necessary to meet the existing field conditions.

Method of Measurement:

Joint Restraint will be measured by the unit linear foot (LF). Any Joint Restraints required for a complete installation, but not called for on the plans, shall also be measured by the unit linear foot (LF).

5101901 FITTINGS, DUCTILE IRON AND CAST IRON

Description:

The work under this item shall consist of furnishing all labor, equipment and materials required to install Ductile Iron or Cast Iron Fittings. New Ductile Iron or Cast Iron Fittings shall be installed at the locations shown on the project plans, in accordance with the details shown on the project plans, and in accordance with the requirements of these Special Provisions.

Materials:

All Fittings shall be ductile iron or cast iron meeting the requirements of Subsection 510-3.07(C) (pg. 342) (pg. 342). The interior surface of ductile iron and cast iron fittings shall be cement-mortar lined and sealed by the manufacturer in accordance with the requirements of AWWA C104.

Polyvinyl Chloride (PVC) fittings shall not be allowed.

Construction Requirements:

Installation of Fittings shall be in accordance with the requirements of Subsection 510-3 (pg. 318) and these Special Provisions.

Method of Measurement:

Fittings will be considered incidental to the cost of the new water facilities. Any Fittings required for a complete installation, but not called for on the plans, shall also be considered incidental to the cost of the new water facilities.

5102116 TAPPING SLEEVE & VALVE, 16"x 8"

Description:

The work under this item shall consist of furnishing all labor, equipment and materials required to install Tapping Sleeves & Valves, riser piping, and valve boxes and covers. New Tapping Sleeves & Valves and appurtenances shall be installed the at the locations shown on the project plans, in accordance with any details shown on the project plans, and in accordance with the requirements of these Special Provisions.

Materials:

All materials shall conform to the requirements Subsection 510-3.04(E)(2), (pg. 331), Detail W-300, and these Special Provisions.

All PVC pipe for use as riser pipe called for in Detail W-300, Sheet 1 of 4, shall be a minimum of DR 14, Class 305.

All new valve boxes and covers shall conform to the requirement of Subsection 510-3.07(B) (pg. 341) and Standard Detail W-300, Sheet 3 of 4.

Construction Requirements:

Installation of Tapping Sleeves & Valves, shall be in accordance with the requirements of Subsection 510-3 (pg. 318), Detail W-300, and these Special Provisions.

Method of Measurement:

Tapping Sleeves and Valves shall be measured by the unit Each (EA) for the actual number of Tapping Sleeves and Valves and related appurtenances installed.

5102204 GATE VALVE, 4"
5102206 GATE VALVE, 6"
5102208 GATE VALVE, 8"

Description:

The work under this item shall consist of furnishing all labor, equipment and materials required to install new Gate Valves, riser piping, and valve boxes and covers. New Gate Valves and appurtenances shall be installed at the locations shown on the project plans, in accordance with the details shown on the project plans, and in accordance with the requirements of these Special Provisions.

Materials:

All new Gate Valves shall conform to the requirements of Subsection 510-3.04(E)(3) (pg. 332) and Standard Detail W-300.

All new Valve Box Covers shall conform to the requirement of Subsection 510-3.07(B) (pg. 341) and Standard Detail W-300, Sheet 3 of 4.

All PVC pipe for use as riser pipe called for in Detail W-300 shall be a minimum of DR 14, Class 305.

Construction Requirements:

Installation of Gate Valves shall be in accordance with the requirements of Subsection 510-3 (pg. 318), Detail W-300, AWWA Manual 23, and these Special Provisions.

Method of Measurement:

Gate Valves shall be measured by the unit Each (EA) for the actual number of Gate Valves and related appurtenances installed.

5102603 COMBINATION AIR RELEASE VALVE (ARV), ¾"

Description:

The work under this item shall consist of furnishing all labor, equipment and materials required to install Combination Air Release Valves and meter box. New Combination Air Release Valves and appurtenances shall be installed at the locations shown on the project plans, in accordance with the details shown on the project plans, and in accordance with the requirements of these Special Provisions.

Materials:

All materials shall conform to the requirements of Subsection 510-3.04(E)(5) (pg. 332) and Standard Detail W-330.

Working pressure for Combination Air Release Valve assemblies shall be 150 psi unless otherwise noted on the plans.

High Density Polyethylene (HDPE) pipe for air release piping shall not be allowed on this project.

The screen material for covering the ends of the two 90° bends called for in Standard Details W-330 shall be metal or fiberglass mesh with 1/8" maximum size openings.

Construction Requirements:

Installation of Combination Air Release Valve assemblies and meter boxes shall be in accordance with the requirements of Subsection 510-3.04(E)(5) (pg. 332) and Standard Detail W-330 and in accordance with the requirements of these Special Provisions.

Method of Measurement:

Combination Air Release Valve assemblies shall be measured by the unit Each (EA) for the actual number of Combination Air Release Valve assemblies and related appurtenances installed, including:

5101603 PIPE, COPPER, ¾" W/FITTINGS

5101604 PIPE, COPPER, 1" W/FITTINGS

5103205 FIRE HYDRANT

Description:

The work under this item shall consist of furnishing all labor, equipment and materials required to install Fire Hydrants. New Fire Hydrants shall be installed at the locations shown on the project plans, in accordance with the details shown on the project plans, and in accordance with the requirements of these Special Provisions.

Materials:

All materials shall conform to the requirements of Subsection 510-3.06 (pg. 340).

Construction Requirements:

Installation of the Fire Hydrants shall conform to standard detail W-500 and as approved by the Engineer.

Existing fire hydrants, fire hydrant barrel extensions and other appurtenances shall be salvaged in accordance with Section 5105310 REMOVE & DISPOSE EXISTING FIRE HYDRANT of these Special Provisions.

Method of Measurement:

Fire Hydrants shall be measured by the unit Each (EA) for the actual number Fire Hydrants and related appurtenances installed.

5105001 REMOVAL AND DISPOSAL
5105010 REMOVE AND DISPOSE NON CEMENT ASBESTOS (CA) WATER PIPE 10" AND SMALLER

Description:

Water pipe, fittings, fire hydrants, and appurtenances removed from the project will not be salvaged to Tucson Water. All water related items removed will become the property of the contractor, removed from the construction site, and properly disposed.

Materials:

None.

Construction Requirements:

The Contractor shall be responsible for the proper removal and disposition of water related items including CA materials from the construction site in accordance with Subsection 510-3.02 (pg. 320) and Standard Detail W-105, note 11, C.

Method of Measurement

Removal and Disposal shall be measured by the unit Linear Foot (LF) for the actual Linear Feet of pipe removed, or by the unit Each (EA) for the actual fire hydrant or air release valve assembly removed and disposed, including connections, fittings and appurtenances.

5105310 REMOVE AND DISPOSE EXISTING FIRE HYDRANT

Description:

The work under this item shall consist of furnishing all labor and equipment required to remove and dispose of existing Fire Hydrants at the locations shown in the project plans and in accordance with the requirements of these Special Provisions.

Materials:

None.

Construction Requirements:

Existing Fire Hydrants, fire hydrant barrel extensions and other appurtenances shall be removed and disposed of in accordance with Section 5105501, REMOVAL AND DISPOSAL of these Special Provisions.

Method of Measurement:

Removed and Disposed Fire Hydrants shall be measured by the unit Each (EA) for the actual number of Fire Hydrants and related appurtenances removed.

5106004 CONNECTIONS, 4"
5106006 CONNECTIONS, 6"
5106008 CONNECTIONS, 8"

Description:

The work under this item shall consist of furnishing all labor, equipment and materials required to install Connections between new water pipe and existing water pipe. Connections shall be installed at the locations shown on the project plans, in accordance with the details shown on the project plans, and in accordance with the requirements of these Special Provisions.

Materials:

All materials shall conform to the requirements of Subsection 510-3 (pg. 318).

See section 5101900 FITTINGS, CAST IRON AND DUCTILE IRON of these Special Provisions for pipe fittings.

Polyvinyl Chloride (PVC) fittings shall not be allowed.

Construction Requirements:

Existing water mains shall be located by the Contractor at the connection point. If exploratory excavation does not find the existing pipe within the accepted variances from Blue Stake markings, Potholing may be required.

Water shutoffs shall conform to the requirements Standard Detail W-110. *Subsection 510-3.04 (B) (pg. 324) shall not apply.*

Existing water mains shall be de-watered by the Contractor. All water shall be removed from the connection location to provide a reasonably dry working environment for connection to the existing water main. If large quantities of water are anticipated due to unforeseen field conditions, the Contractor shall notify the Engineer and the Tucson Water Department field representative before starting the de-watering process.

Preliminary Flushing shall conform to Subsection 510-3.10 (pg. 344).

Hydrostatic Pressure Testing shall conform to Subsection 510-3.11 (pg. 344).

Disinfection shall conform to Subsection 510-3.13 (pg. 349).

Connection to existing water mains shall be made with a minimum of water system down time. See the Water System Modifications Notes on the plans for special shutdown times and conditions.

Method of Measurement:

Connections shall be measured by the unit Each (EA) for the actual number of Connections and related appurtenances installed. The size of the new pipe being installed shall be the size of the Connection regardless of the size of the existing pipe.

5108114 METER RELOCATION, SERVICE LINE RENEWAL, 1" (M/R)
5108116 METER RELOCATION, SERVICE LINE RENEWAL, 1½" (M/R)
5108118 METER RELOCATION, SERVICE LINE RENEWAL, 2" (M/R)

Description:

The work under this item shall consist of furnishing all labor, equipment and materials required to install Meter Relocations, Service Line Renewals. The contractor shall remove all meters and install new Automatic Meter Readers supplied by Tucson Water. New Meter Relocations, Service Line Renewals and appurtenances shall be installed at the locations shown on the project plans, in accordance with the details shown on the project plans, and in accordance with the requirements of these Special Provisions.

Materials:

All materials shall conform to the requirements of Subsection 510.304 (H) (pg. 337), Subsection 510-3.04 (I) (pg. 338) and Standard Details W-309 and W-310.

Construction Requirements:

Installation of Meter Relocations, Service Line Renewals shall include, but not be limited to, the following:

a. Removal of all obstructions, all excavation, compaction and backfill.

b. Removal of the existing meter and installation of the new Automatic Meter Readers supplied by Tucson Water.

c. Tap on the existing or new water main, installation of service clamps, corporation stops, copper pipe with fittings, angle meter stop, all fittings, and ball valves as called for in detail W-310.

d. Installation and adjustment of a new # 2 meter box and lid to the finished grade per Standard Detail W-318, sheet 2 of 3.

e. If the renewal is off an existing main, the existing service line piping shall be removed and a threaded cap or plug installed on the threaded end of the existing corporation. If the corporation valve is leaking, the corporation and related saddle shall be removed and a repair clamp intended for the existing main size and material shall be installed on the main line.

f. Renew the customer's existing plumbing from the ball valve to within one foot of the property line with new copper pipe and fittings. Re-connect the new copper pipe to the customer's existing plumbing. The size of new copper pipe from the meter to the customer's existing plumbing shall be equal to the size of the meter outlet or equal to the size of the customer's existing plumbing at the re-connection, which ever is greater.

g. If the customer's plumbing is unstable the contractor shall contact the City of Tucson Water Department Construction Section Representative for instructions.

h. After all work is done on the service line and before the existing meter is reinstalled, the contractor shall flush the service line to remove all debris. After the service line is flushed the contractor shall reinstall the meter.

Method of Measurement:

Meter Relocations, Service Line Renewals shall be measured by the unit Each (EA) for the actual number of Meter Relocations, Service Line Renewals and related appurtenances installed.

Costs related to the following components shall be bid as separate items:

5101604 PIPE, COPPER, 1" W/FITTINGS
5101606 PIPE, COPPER, 1½" W/FITTINGS
5101608 PIPE, COPPER, 2" W/FITTINGS

5108154 SERVICE STUB, 1" (S)

Description:

Work under this item shall consist of furnishing all labor, equipment and materials required to install Service Stubs. Service Stubs and appurtenances shall be installed at the locations shown on the project plans, in accordance with the details shown on the project plans, and in accordance with the requirements of these Special Provisions.

Materials:

All materials shall conform to the requirements of Subsection 510.304 (H) (pg. 337), Subsection 510-3.04 (I) (pg. 338), Subsection 510-3.05 (pg. 339) and Standard Details W-309 and W-310.

A new # 2 meter box per Standard Detail W-318, sheet 2 of 4 shall be provided by the contractor for each Service Stub.

Copper pipe with fittings required for this work shall be bid as a separate item.

Construction Requirements:

Installation of service stubs shall include, but not be limited to, the following:

a. Removal of all obstructions, all excavation, compaction and backfill.

b. Tap on the existing or new water main, installation of service clamps, corporation stop, copper pipe with fittings, angle meter stop, and all fittings, as called for in detail W-312.

c. Installation and adjustment of a new # 2 meter box and lid to the finished grade per Standard Detail W-318, sheet 2 of 4, and per section 5108302 METER BOX, #2 of these Special Provisions.

d. All testing and flushing. After all work is done on the service line, the contractor shall flush the service line to remove all debris. After the service line is flushed the contractor shall close the angle meter stop.

Method of Measurement:

Service Stubs shall be measured by the unit Each (EA) for the actual number of Service Stubs and related appurtenances installed.

5108302 METER BOX, #2

Description:

The work under this item shall consist of furnishing all labor, equipment and materials required to install #2 Meter Boxes as Traffic Rated (H-20), including, but not limited to, brick supports and concrete encasement. New #2 Meter Boxes and appurtenances shall be installed at the locations shown on the project plans, in accordance with the details shown on the project plans, and in accordance with the requirements of these Special Provisions.

Materials:

All materials shall conform to the requirements of Standard Details W-309, W-310 and W-318, Sheet 2 of 4.

Product Clarification:

The term "rotocast" is a manufacturing process, not a product
The meter boxes specified are manufactured by Armorcast Products Company.
Contractors Engineers Supply is a supplier, not the manufacturer.
Meter boxes may be colored to match landscape features.

Construction Requirements:

Installation of #2 Meter Boxes shall be in accordance with the requirements of Standard Details W-309, W-310 and W-318 and in accordance with the requirements of these Special Provisions.

All meter boxes for this project shall be installed to meet the requirements for Traffic Rating (H-20) noted in Standard Detail W-318. The concrete encasement shall be the specified six inches (6") thick (measured horizontally) for the full depth and circumference of the meter box. The encasement shall be formed for the top four inches (4") to create a neat finished edge.

Where Meter boxes occur outside of finished concrete walkways, they shall be set with the top of the meter box between one half inch (½") and one inch (1") above the finished grade. The surrounding concrete encasement shall be tapered to meet the finished grade. The top exposed surface of the encasement shall be troweled smooth and finished to provide a non-slip surface.

Where the meter boxes occur within concrete sidewalks or concrete landscaped ~~areas~~ features they shall be set flush with the finished grade. The concrete encasement may be extended horizontally to correspond with the module or pattern of these features provided the formed edge is no more than eighteen inches (18") from the edge of the meter box. Any horizontal extensions beyond the minimum thickness of six inches (6") shall be a minimum of four inches (4") deep. The top exposed surface of the encasement may be finished to match the surrounding concrete landscape features. In all instances the concrete encasement shall be separated from any adjacent concrete landscape features with a bond breaker.

Method of Measurement:

#2 Meter Boxes shall be measured by the unit Each (EA) for the actual number of #2 Meter Boxes and related appurtenances installed.

No additional payment will be considered if the concrete encasement is extended to correspond to landscape features.

SECTION 607 - ROADSIDE SIGN SUPPORTS

607-1 DESCRIPTION

The work under this section shall consist of furnishing and installing roadside sign supports in accordance with the details shown on the plans and the requirements of these specifications.

Sign supports shall consist of breakaway perforated square tube sign posts. The type, size and installation location of the sign posts will be shown on the project plans.

607-2 MATERIALS

607-2.01 General. Certificates of Analysis conforming to the requirements of Subsection 106.05 shall be submitted for breakaway signpost shapes.

Certificates of Compliance conforming to the requirements of Subsection 106.05 shall be submitted for perforated signposts.

607-2.02 Breakaway Signpost Shapes. Posts shall be fabricated from structural steel conforming to the requirements of ASTM A 572, Grade 50 or ASTM A 588 at the option of the contractor. Base plates for the breakaway connections and friction fuse plates and back plates for the post hinge assembly shall be fabricated from the same type of structural steel selected for the signposts.

All plate holes shall be drilled and all plate notches shall be saw-cut, except that flame cutting will be permitted provided all edges are ground. Flange holes shall be drilled or sub-punched and reamed. The posts shall be saw-cut for the hinge and bolted as detailed on the plans.

Bolts, nuts and washers shall conform to the requirements of ASTM A 325.

Posts and plates shall be galvanized after fabrication in accordance with the requirements of ASTM A 123. Bolts, nuts and washers shall be cadmium plated in accordance with the requirements of ASTM B 766, or zinc plated in accordance with the requirements of ASTM B 633.

607-2.03 Perforated Signposts. Single and telescoping perforated posts shall be square tube fabricated from galvanized sheet steel. The sheet steel shall have a thickness of 0.105 inches (12 gauge). Sheet steel shall conform to the requirements of ASTM A 653 for either SQ Grade 40 or SQ Grade 50 Class 1, and be galvanized in accordance with the requirements of Coating Designation G-90. The posts shall have a wall thickness, including coating, of 0.097 to 0.116 inches for 12 gauge.

Posts shall be welded directly in the corner by high frequency resistance welding or equal. The outside edges of the posts shall be scarfed as necessary to produce a standard corner radii of 5/32 ± 1/32 inch.

External welded surfaces and scarfed areas shall be re-galvanized after fabrication.

Holes 7/16 ± 1/64 inch in diameter shall be provided on one-inch centers along all four sides over the entire length of the post. The holes shall be laterally centered on the longitudinal centerline of each face. Hole positioning and spacing shall be the same on all four faces, such that the hole centerlines for each group of four holes shall pass through a common point on the longitudinal centerline of the tube. For telescoping posts, holes shall be in proper alignment to allow 3/8-inch diameter bolts to pass through the entire post.

The finished posts shall be straight and have a smooth, uniform finish. All consecutive sizes of posts shall be freely telescoping for not less than 10 feet of their length without the necessity of matching any particular face to any other face.

Perforated signposts shall be manufactured by an approved manufacturer. A list of approved manufacturers of perforated signposts is shown on the Department's Approved Products List (APL). Copies of the most current version of the APL are available on the internet at http://www.dot.state.az.us/TPD/ATRC/PRIDE/apl.asp.

Bolts shall conform to the requirements of SAE Specification J 429, Grade 5, or ASTM A 449, Type 1. Nuts shall conform to the requirements of ASTM A 563, Grade A. Washers shall conform to the requirements of ASTM F 844.

Bolts, nuts and washers shall be zinc coated in accordance with the requirements of ASTM B 633 or cadmium plated in accordance with the requirements of ASTM B 766.

607-2.05 Concrete. Concrete for breakaway signpost foundations shall be Class B, except that utility concrete may be used for foundations using stub post sizes S 3 x 5.7 and S 4 x 7.7. Class B concrete shall conform to the requirements of Section 1006 and utility concrete to

requirements of Section 922. Concrete for perforated signpost foundations shall conform to the requirements of Subsections 922-2 and 922-3.

Foundation stub posts shall be fabricated from the same type of steel selected for the appropriate signposts. Breakaway stub posts shall be galvanized a minimum of 12 inches down from the top of the stub. Galvanizing shall be in accordance with the requirements of ASTM A 123.

Reinforcing steel bars for breakaway signpost foundations shall conform to the requirements of ASTM A 615, Grade 40. Reinforcing steel wire shall conform to the requirements of ASTM A 82.

607-3 CONSTRUCTION REQUIREMENTS

Fabrication of the breakaway signposts, stub posts and base plates shall conform to the requirements of Subsection 604-3.02, except that shop drawings will not be required.

Breakaway signpost lengths will be determined by the Engineer at the time of construction staking and will be furnished to the contractor prior to ordering fabrication of the signposts.

Perforated signpost lengths shall be determined by the contractor at the time of construction staking. Posts shall be cut to the proper lengths in the field. Splicing will be permitted for single perforated posts; however, splices will be limited to one per each post installation and the splicing shall be accomplished in accordance with the details shown on the standard drawing. The minimum length of any spliced piece of post shall be two feet.

Foundations for the breakaway signposts, perforated signposts shall be constructed to the details and dimensions shown on the plans. Concrete shall be placed in accordance with the requirements of Section 601 or 922, as the case may be. Excavation shall conform to the requirements of Subsection 203-5.03(A).

607-4 METHOD OF MEASUREMENT

Breakaway signposts will be measured by the linear foot for each size of post furnished and erected. The length of each size of post will be measured from the bottom of the upper base plate to the top of the post, measured to the nearest 0.1 feet. The total length of all posts of the same size will be rounded to the nearest foot.

Perforated signposts will be measured by the linear foot of each type of post furnished and installed. The length of each type of post will be measured from the top of the concrete post foundation to the top of the post, measured to the nearest 0.1 feet. The total length of all posts of the same type will be rounded to the nearest foot. Telescoping post members will be considered as one post after installation and will be measured separately.

Foundations for signposts will be measured by the unit for each type of foundation constructed.

SECTION 608 - SIGN PANELS

608-1 DESCRIPTION

The work under this section shall consist of furnishing and installing sign panels in accordance with the details shown on the plan and requirements set forth herein.

The sign panels shall be of the following types:

- Overhead Sign Panels
- Overlaid Sign Panels
- Flat Sheet Aluminum Sign Panels With Direct-Applied or Silk-Screened Characters
- Overlaid Plywood Sign Panels With Direct-Applied or Silk-Screened Characters
- Warning, Marker, and Regulatory Sign Panels
- Route Shields for Installation on Sign Panels
- EXIT ONLY for Installation on Sign Panels

608-2 MATERIALS

608-2.01 General. Certificates of Compliance, conforming to the requirements of Subsection 106.5, shall be submitted for all materials required for fabricating sign panels, including retroreflective sheeting.

Shipment, storage, and handling of sign panels shall conform to the recommendations of the manufacturers of the sign panel components. Fabricated signs and overlay sheets shall be shipped on edge. Damage to the sign panel or legend resulting from banding, crating or stacking may be cause for rejection of the signs.

Characters shall not be attached to overlay sheets during shipment.

608-2.07 Flat Sheet Aluminum Sign Panels With Direct-Applied or Silk-Screened Characters. Panels shall be fabricated from 0.080-inch thick, 5052-H38 Aluminum Alloy conforming to the requirements of ASTM B 209.

Panel facing shall be prepared and covered with retroreflective sheeting in accordance with the recommendations of the sheeting manufacturer. The color of the sheeting shall be as specified on the plans or as shown in the Manual of Approved Signs.

All surfaces shall be etched to reduce glare from reflected sunlight.

The retroreflective sheeting shall conform to the requirements of Section 1007. Splicing of retroreflective sheeting shall not be allowed on sign panels having a minimum dimension up to and including four feet.

Messages shall be reflectorized white or, if called for on the plans, opaque black and shall be produced by either silk-screening or direct-applying lettering as specified under Subsection 608-2.15.

608-2.09 Warning, Marker, and Regulatory Sign Panels. Panels shall be fabricated from flat sheet aluminum and shall be reflectorized as specified herein.

Panels shall be fabricated in one piece from 0.080-inch thick, 5052-H38 or 6061-T6 Aluminum Alloy conforming to the requirements of ASTM B 209.

All surfaces of panels to be covered with retroreflective sheeting shall be prepared in accordance with the recommendations of the sheeting manufacturer. Surfaces not covered shall be etched to reduce glare from reflected sunlight. Retroreflective sheeting shall conform to the requirements of Section 1007.

Warning signs shall be reflectorized with yellow retroreflective sheeting.

Regulatory signs shall be reflectorized with silver-white retroreflective sheeting.

Reflectorized red signs shall be reflectorized with silver-white retroreflective sheeting. The red color shall be produced by silk-screening.

Regulatory signs with reflectorized red circles and slashes shall be reflectorized with silver-white retroreflective sheeting. The red color shall be produced by silk-screening.

Splicing of retroreflective sheeting shall not be allowed on sign panels having the minimum dimension up to and including four feet.

Sign panels shall be attached to the posts with bolts as shown in the plans. A nylon washer, conforming to ANSI Standard and having a diameter two times the bolt head diameter, shall be placed between the bolt head and panel face. Fastening nuts shall be heavy hex; however, standard nuts may be used if a flat wash is placed between the nut and signposts.

608-2.13 Retroreflective Sheeting. Retroreflective sheeting shall conform to the requirements of Section 1007.

The colors specified for retroreflective sheeting shall match visually and be within the color tolerance limits shown on the appropriate Highway Color Tolerance Charts issued by the Federal Highway Administration.

608-2.15 Silk-Screened or Direct-applied Characters. Silk-screened letters, numerals, symbols, and borders, shall be applied on the retroreflective sheeting background of the sign by direct or reverse screen process. Messages and borders of a color darker than the background shall be applied to the retroreflective sheeting by direct process. Messages and borders of a color lighter than the sign background shall be produced by the reverse screen process.

Opaque or transparent colors, inks, and paint used in the screen process shall be of the type and quality recommended by the manufacturer of the retroreflective sheeting.

The screening shall be performed in manner that results in a uniform color and tone, with sharply defined edges of legends and borders and without blemishes on the sign background that will affect intended use.

Signs, after screening, shall be air-dried or baked in accordance with the manufacturer's recommendations to provide a smooth hard finish. Any signs on which blisters appear during the drying process will be rejected.

Direct-applied letters, numerals, symbols, borders, and other features of the sign message shall be cut from black opaque or retroreflective sheeting of the color specified and applied to the retroreflective sheeting of the sign background in accordance with the instructions of the manufacturer of the retroreflective sheeting and shall be applied by heat activation of the adhesive.

The retroreflective sheeting used for characters shall meet or exceed the minimum Specific Intensity Per Unit Area (SIA) of the background sheeting.

608-3 CONSTRUCTION REQUIREMENTS

608-3.01 Fabrication. Fabrication of the sign panels shall be in accordance with the details shown on the plans and the requirements of these specifications. If additional details for sign panel fabrication are required, the contractor shall submit shop drawings in accordance with the requirements of Subsection 105.03.

Panels shall be cut to size and shape and shall be free of buckles, warps, dents, cockles, burrs and defects resulting from fabrication.

Fabricated signs and overlay sheets shall be stored indoors and kept dry during storage. If packaged signs become wet, all packaging material shall be removed immediately and the signs allowed to dry. The signs may be repackaged using new dry materials. If outdoor storage is necessary, all packaging materials shall be removed. Signs shall be stored on edge, above ground, in an area where dirt and water will not contact the sign face. Materials used to support stored signs shall not contact the sign faces.

608-3.02 Installation of Sign Panels. The sign panels shall be installed on overhead sign structures and roadside sign supports in accordance with the details shown on the plans and in accordance with the recommendations of the manufacturers of the sign panel components.

Minor scratches and abrasions resulting from fabrication, shipping and installation of the panels may be patched; however, patching shall be limited to one patch per 50 square feet of sign area with the total patched area being less than five percent of the sign area. Panels requiring more patching than the specified limit will be rejected. Patches shall be edge sealed by a method approved by the retroreflective sheeting manufacturer.

Fasteners and bolts used on signs need not be painted the same color as the sign. The sign manufacturer's name and date of installation shall be placed on the back of each sign in black, one-inch block letters. Use of felt markers for this purpose will not be permitted. Bolts shall be

tightened from the back by holding the bolt head stationary on the face of the panel. Twisting the bolt head on the panel face will not be allowed.

608-3.03 Miscellaneous Work (Sign Panels). The work under this section shall also include furnishing all miscellaneous materials, tools, equipment and labor necessary to relocate exit panels to the right side of the parent sign panel; removing, cutting, and installing side trims and new or salvaged aluminum extrusions on existing sign panels; relocated large guide and exit gore signs; and cutting post tops on existing installations, as required on the plans.

608-3.04 Inspection. An inspection of the completely installed sign panels will be made by the Engineer during the daytime and at night for proper appearance, visibility, color, specular gloss and proper installation.

Each sign panel face shall be cleaned thoroughly just prior to the inspection by a method recommended by the manufacturer. The cleaning solvent and cleaning material shall in no way scratch, deface or have any adverse effect on the sign panel components. All apparent defects disclosed by the inspection shall be corrected by the contractor at no additional cost to the City. If color variations or blemishes between sign panel increments are visible from a distance of 50 feet either during the day or at night, the panels shall be removed and replaced at no additional cost to the City.

608-4 METHOD OF MEASUREMENT

Sign panels will be measured by the square foot for each type or types of sign panels furnished and installed. The area of each sign panel, except for warning, regulatory and marker sign panels, will be measured per plans dimensions.

For warning, regulatory and marker sign panels the area of each sign panel will be measured to the nearest square foot and the areas will be determined as follows:

The areas of each rectangular, square or triangular sign panel will be determined from the dimensions shown on the plans. The area of irregular shaped signs, such as stop signs and route markers, will be determined by multiplying the maximum height in feet by the maximum width in feet, using the dimensions shown on the plan.

SECTION 701 – MAINTENANCE AND PROTECTION OF TRAFFIC

701-1 Description: of the Standard Specifications is modified to add:

The majority of work shall be performed during daylight hours unless a written program from the Contractor is received and approved by the City Engineer. If night work is approved, all other specifications, such as temperature requirements, must be met. Night work shall consist only of those items specifically approved by the City Engineer or required by this contract. If additional night work is approved, the City Representative may terminate all, or any portions, of the night work at any time. The remaining portion of this section shall further restrict all work, including night work.

Traffic Control Plan

No less than 5 working days prior to commencement of any work on any site included in this project, the Contractor shall submit for approval a detailed traffic control plan and schedule of operations. The traffic control plans shall be on paper reproducible on a copier or blueprint machine (maximum paper size for copier prints is 8-1/2" x 14"). The plans shall be submitted to the Project Administrator/Manager, Field Engineering Section, located in the County/City Public Works Center, 201 North Stone Avenue, 4th floor.

No separate payment shall be made for the traffic control plans. The costs shall be included in the overall cost of the project.

Traffic Control/Lane Closures must be in accordance with the Manual on Uniform Traffic Control Devices as amended by the State of Arizona and the 2005 edition of Additions by the City of Tucson, available at the City of Tucson Traffic Engineering Division, located in the County/City Public Works Center, 201 North Stone Avenue, 5th floor, and at http://dot.tucsonaz.gov/traffic/barricading.cfm.

No Arterial or Collector Street restriction less than the minimum number of lanes specified herein shall occur between 6-9 a.m. and 4-7 p.m., Monday through Friday.

The Contractor must obtain permission a minimum of three (3) days in advance, except in an emergency, before closing or barricading any street or public right-of-way.

Barricading shall be in accordance with the approved barricading plan.

701-2 Materials: of the Standard Specifications is revised to add:

(A) Conformance:

Except as specified herein, all equipment, procedures used by workers, devices and facilities shall conform to the requirements of the MUTCD and associated Traffic Engineering Supplement.

(B) Safety:

(1) General Requirements:

All traffic control devices listed below as Category I and Category II devices shall meet the evaluation criteria for Test Level III per NCHRP (National Cooperative Highway Research Program) Report 350.

At the pre-construction conference the contractor shall submit a letter certifying that all such traffic control devices to be used on the project will meet the above-referenced criteria. The certification shall contain the following:

(a) A list of all Category I and II traffic control devices to be used on the project.

(b) The project number.

(c) A statement verifying that these devices, and their application, meet the requirements of NCHRP Report 350 Test Level III.

(d) The name, title and signature of a person having legal authority to bind the manufacturer or supplier of the Category I and II devices. The binding authority shall be in accordance with Subsection 106.05(B)(5).

If additional Category I or II devices are required at a later date, the contractor shall provide an amended certification letter to the Engineer specifying that such devices also comply with the requirements of NCHRP Report 350 Test Level III.

For all Category I and Category II devices used on the project, the contractor shall also acquire or have access to reports which verify that such devices meet the above-referenced criteria. The reports shall contain the name and model of the tested traffic control devices, detailed drawings or product literature of each, and under what conditions the devices passed. The traffic control devices detailed in the report shall be the complete warning devices, including warning lights, flags, ballast and any other auxiliary attachment allowed. Reports for Category II devices are prepared by the Federal Highway Administration (FHWA). For Category I devices, the supplier is responsible for testing the product and providing a report which verifies that the device meets the criteria of NCHRP Report 350, Test Level III. If requested by the Engineer, the contractor shall provide copies of such reports within one working day.

(2) Category I Devices:

Category I devices are low-mass traffic control devices that will not cause an appreciable change in speed of an impacting vehicle, nor is it likely that any part of the device will intrude into the passenger compartment. The following traffic control devices will be considered Category I devices: rubber or plastic traffic cones, rubber or plastic tubular markers, single-piece plastic drums, plastic or fiberglass delineators. No warning lights, signs, flags or other auxiliary devices are allowed on Category I devices. Should any of these attachments be added to a Category I device, the Category I device will be considered a Category II device. Ballast at the base, such as a rubber tire, is an acceptable attachment to Category I devices. The single-piece plastic drum refers to the construction of the body of the drum exclusive of a separate base, if any.

(3) Category II Devices:

Category II devices are low-mass traffic control devices that will not cause a significant change in speed of an impacting vehicle. The following traffic control devices will be considered

Category II devices: type I, II, and III barricades with or without warning lights; vertical panels with or without warning lights; signs and sign stand (all types) with or without warning lights and/or flags; drums, other than those listed in Category I, with or without warning lights; and any Category I devices with attached warning lights.

701-2.01 Existing Pavement Repair: of the Standard Specifications is modified to add:

The paved surface shall be inspected each week. Areas in need of repair shall be done immediately at the direction of the Engineer.

701-2.03 Temporary Concrete Barrier: of the Standard Specifications is revised to read:

Temporary concrete barrier shall conform to the requirements of Subsections 910-2 and 910-3 of the standard specifications for precast sections except that the dimensions of the connecting pin shall be 1 ¼ inch diameter by two feet five inches in length.

701-2.04 Temporary Pavement Markings: is revised to read:

Paint for temporary striping shall be white or yellow in accordance with the Manual on Uniform Traffic Control Devices. Paint shall comply with the requirements of Federal Specification TT-P-115E, Type 1. Temporary striping shall be 3½ inches ± ¼ inch in width. The finished line shall have well defined edges and be free from waviness. Lateral deviation of the temporary stripe shall not exceed 1 inch in 100 feet.

Symbols (such as arrows) and legends (such as only) shall not be applied as temporary installations.

All temporary striping shall be applied immediately after paving and used in lieu of vertical panels. Chip seal tabs shall be applied to the temporary striping for improved visibility at night.

701-3.01 General: of the Standard Specifications is modified to add:

Traffic control does not include any devices or services used solely for the convenience of the Contractor, or to protect the Contractor's work. Excluded from Traffic Control (for the convenience of the Contractor) is the use of devices and services (flagpersons and uniformed officers) which serve only to save the Contractor time and/or expense in his daily operations.

An example would be the use of flagpersons to control traffic at an equipment crossing in the construction zone in order to provide the right-of-way to construction equipment. Another example is the use of barricading devices around excavations in lieu of backfilling the excavation. Similarly, when a permanent below ground structure, which is to be surrounded or protected by a permanent device such as a wall or fence, is completed to the point where the permanent protection could be installed, the continued use of temporary protection [barricades, temporary concrete barriers (new installation), etc.] is for the Contractor's convenience.

701-3.02 Basic Maintenance and Protection of Traffic is modified to add:

The contractor shall provide and maintain, at all times, safe and adequate, emergency access lane for all affected directions at arterial and collector intersections. This lane shall be used for emergency vehicles only and will be adequately signed.

Should it become impossible to maintain an emergency access lane, a point control by a police officer will be provided to wave emergency vehicles through. The contractor shall notify the affected parties (police, fire, ambulance, hospitals, etc.) a minimum of 24 hours in advance of the disruption of the emergency access lane. The emergency access lane shall be restored as soon as possible.

701-3.02(A) Cleaning of Roadways and Sidewalks: the first paragraph is modified to add:

The paved surface shall be swept at least once per week.

701-3.06 Temporary Concrete Barriers: of the Standard Specifications is modified to add:

The Contractor shall provide temporary concrete barriers any time that traffic is adjacent to an open trench. The Contractor shall provide temporary concrete barriers to protect the site along open trenches or significant changes in grade elevation between traveled surfaces and the work area as necessary.

Measurement of temporary concrete barrier shall be per linear foot and include all transport, mobilization, and demobilization.

701-3.11 Flagging Services: of the Standard Specifications is modified to add:

The Contractor shall furnish verification to the Engineer that all civilian flaggers have completed a recognized training and certification program. Flaggers certified by the American Traffic Safety Services Association (A.T.S.S.A.) or by the National Safety Council shall be acceptable. Certification through other programs offering flagger training must be approved by the Engineer. Flagger certification must be current. Training and certification shall be required at least once every two years.

701-3.14 Traffic and Work Restrictions: is added:

It shall be the Contractor's responsibility to contact the adjacent and/or impacted property owners and tenants one week prior to construction. The City will furnish the written communication to be delivered by the Contractor (to be hand-delivered or left at doorway).

The Contractor shall provide vehicular access to property owners/tenants unless absolutely impossible to do so. Accessibility will be provided at the first opportunity.

Access to businesses and residents shall be maintained except for that period when placement of the pavement is underway across their frontage.

Resident notification and shall be included as a part of the overall project.

701-4.02 Construction Area Elements: of the Standard Specifications is modified to add:

The work under this section is included in the cost of the project.

(A) Elements of Work (Complete-in-Place): No subsequent measurements will be made.

(B) Elements of Work (In-Use) and Flagging: No subsequent measurements will be made.

701-5 Basis of Payment is modified to add:

The Contractor is responsible for the proper placement/maintenance of all traffic control elements in accordance with MUTCD requirements.

ITEM 7010050 - TEMPORARY STEEL PLATES (TRAFFIC RATED)

1. Description

It is the intent to minimize impact to commuter traffic and business access during peak hours. This item provides for the temporary covering of utility trenches through the intersection for work done at night and in need of protection during the day.

2. Materials

Steel plates, sufficient in width for the respective trench, and rated for traffic shall be used to cover utility trenches through the intersection.

3. Construction

The footprint of the steel plates to be used shall be inset into the asphalt over the utility trench alignment by routing or other approved method. The steel plates shall extend beyond the edge of the trench a minimum of 2 feet on each side. The asphalt shall be routed the thickness of the steel plate used. Plates abutting one another shall be uniform in thickness. No more than one inch shall separate adjoining plates. The Contractor may be required to use additional measures or cold mix asphalt materials to keep the plates from moving in place.

The plates shall remain in place and secured over utility trenches until such time that the underground work is inspected, approved, backfilled, compacted, and patched. The inset area pavement shall also be resurfaced or replaced to match the pavement patch thickness.

No additional plates shall be used for advanced work that is not prosecuted in a timely manner. Steel plates shall not become an inconvenience or nuisance to the general public for more than 5 working days unless approved by the Engineer.

The Contractor shall monitor the condition of each crossing and repair or replace each location as necessary should a plate become dislodged by traffic.

4. Method of Measurement

Steel plates in use shall be measured per linear foot of trench covered when measured along the trench centerline. The measurement of steel plates that are left in place with no serious activity and that become a nuisance as defined above shall be credited to the City of Tucson.

SECTION 704 - THERMOPLASTIC STRIPES AND MARKINGS

704-3.01 Control of Alignment and Layout: The first paragraph of the Standard Specifications is revised to read:

The Contractor is responsible for all layout work required for striping all streets. The City will approve all layout work prior to the placement of pavement markings.

704-3.03 Application: of the Standard Specifications is modified to add:

A minimum of 30 calendar day cure period shall be required prior to the placement of thermoplastic striping, symbols and legends on newly placed asphalt pavement surfaces.

SECTION 730 - GENERAL REQUIREMENTS FOR TRAFFIC SIGNAL AND STREET LIGHTING SYSTEMS

Additional to the Requirements of Subsection 730-1 Description:

730-1 Description

All contract work related to traffic signal, and street lighting installation, modification or removal shall be in accordance with the Pima County/City of Tucson Standard Specifications and Standard Details (2003 Edition), and these Special Provisions.

The work in this section shall be considered in addition to the requirements of Section 730 - General Requirements for Traffic Signal and Street Lighting Systems of the Pima County/City of Tucson Standard Specifications.

730-2.09 Scott Avenue Lighting Pole, Mounting Arm and Luminaire: is added:

(A) Scott Avenue Lighting Pole and Decorative Roadway Mounting Arm

Shape is to be a Princeton Style straight and smooth shaft, 16'-0" tall, 18" diameter base. The shaft diameter shall be non- tapered 5" above the base. An integral 3-1/2" X 8" tall tenon shall be provided at the top for luminaire mounting. The post top shall include a transitional donut between the fluted shaft and the tenon. There shall be a grounding screw provided inside the base accessible by a wiring access door.

Construction The cast shaft shall be circumferentially welded to the base casting at the top of the access door and externally where the shaft exits the base, shipped as one piece for maximum structural integrity. All exposed welds below 8' shall be ground smooth. All welding shall be per ANSI/AWS D1.2-90. All welders shall be certified per Section 5 of ANSI/AWS D1.2-90.

Finish / Material is to be cast aluminum alloy with #356.1 copper free aluminum for maximum corrosion resistance. The casting is to have a seven stage pretreatment process and finished with a polyester powder paint to insure maximum durability all exposed hardware is to be tamper resistant stainless steel. Color is to be determined, to match fixture specified. The base shall be heavy wall, cast aluminum produced from certified ASTM 356.1 ingot per ASTM B-179-95a or ASTM B26-95. The straight shafts shall be extruded from aluminum, ASTM 6061 alloy, heat treated to a T6 temper. All hardware shall be tamper proof stainless steel.
Anchor bolts are to be completely hot dipped galvanized.

The pole shall come equipped with a small, in-use wet location weatherproof receptacle/cover provided at the top of the post. The receptacle shall be 20 amp, 125 volt, ground circuit interrupter duplex type and shall be UL Listed according to E-48380 and UL 943 Class A and UL 498. The receptacle shall have a cast aluminum, lockable UL Listed cover that is suitable for wet locations while in use and complies with NEC Article 410-57(b). The cover shall accept most common cord sets up to 3/8" diameter (14/3). The receptacle and cover shall mount to an outlet opening, in the post shaft, with a gasket and stainless steel screws.

Pole shall be Holophane Catalog number PT16S5X/18-CA/CMH, or approved equal, and shall be a direct mechanical and paint match to the fixture specified.

Complete assembly, pole, arm and luminare shall be by same manufacture.

Mounting Arm

Luminare shall be supported by an aluminum twin crossarm. The smooth, curved and tapered, twin crossarm shall have a cast fitting for post top mounting. The crossarms shall be 6063-T6 with a cast aluminum (356.1 ingot alloy) post top fitting. All hardware shall be tamper resistant stainless steel. The crossarm shall rise 48" and measure 42 ½" from post center to arm end. Arm shall terminate in a 2 3/8" straight section for luminare mounting. Finish shall match luminare assembly. Holophane Part Number OUC90/2-CAAS or approved equal.

(B) Luminaire

GENERAL DESCRIPTION

The Euro styled luminaire shall consist of a prismatic glass optical assembly shielded by a dome shaped full cut-off reflector and top mounted cast aluminum ballast assembly with a circumferential 1 ½ inch reveal.

Luminaire shall be Holophane Glaswerks II Bern Series Catalog GB85QL243AS2AN 85watt induction 240 volt 1.5"NPT mounting style, standard fixture, or approved equal. No up light, with a borosilicate prismatic asymmetrical glass refractor. Luminaire shall have a published minimum ambient temperature rating of 35 deg C. with Philips induction system.

Luminaire shall consist of mounting, optical, support and electrical systems as well as finish cover and will provide certain performance characteristics as follows:

Shape

To be a Glaswerks II Bern series luminaire 28" wide at bottom of housing and 22" high, or approved equal.

Mounting System

The luminaire support system shall include a cast aluminum structural frame. The support system shall be capable of withstanding vibration forces to a peak acceleration level of 1 G throughout the life of the luminaire and shall be verified by full scale accelerated fatigue testing, documented and published for review.

The standard performance requirement that the tests are to verify is that the fixture is capable of withstanding oscillatory motion with a peak acceleration of at least 1 g for the life of the fixture. The standard engineering life for specified lighting fixture is 25 years.

Ballast Assembly

The cast aluminum ballast assembly has a smooth domed contour. Terminal block is provided with a quick disconnect receptacle. The ballast housing is hinged with a tool-less latch to provide easy access to the induction generator assembly. The electrical system shall consist of a Philips lighting induction generator housed in the ballast compartment designed to maximize heat dissipation and extend generator life. The unitized assembly, containing the induction generator and other electrical components, plugs into the quick disconnect receptacle. All luminaire wiring shall be rated at 150 C deg. Connections to the major electrical components shall be with a Molex connector. Luminaire shall undergo through heat testing to insure maximum life of induction system. Testing results shall be UL certified, documented and made available to owner for evaluation.

Luminaire Housing

Housing is Utility (tool less) style cast aluminum which cradles the optical assembly, and provides an enclosure for the induction generator. Optic is secured by 316 stainless steel screws. Housing shall be IP 65 rated.

Optical Assembly

The optical assembly consists of a thermal resistant annealed borosilicate glass refractor mechanically held in a formed aluminum door frame. The hinged door frame is attached to the spun cover with two, tool-less screws and hinge. Optics will be molded thermal resistance, non-yellowing borosilicate glass refractor. Prisms control the distribution of light for maximum utilization, uniformity and luminaire spacing. Plastic optics is not acceptable. The optical assembly is to be an asymmetrical distribution. Optics shall meet IES file #104382 distribution pattern.

Reflector assembly shall be segmented MIRO 4 specular aluminum with 92% reflectivity.

Performance

Integrated site roadway 3rd year levels shall be 2.2fc avg. maintained, and no point on the road lower than 0.8fc with avg/min at 2.8:1 or better for fixture locations and quantities shown on drawings. Combined roadway and sidewalk shall be 1.9fc avg. maintained with a uniformity of 4.8:1 or better.
The IES file shall be an actual test, five years or newer, performed by a third party or recognized testing facility.
Photometry shall be for the specific fixture provided. Initial lamp lumens are to be 6000 lumens. Total light loss factor used in calculations shall not be greater than .68.

Lamp

Induction generator system shall have, class B surge suppression level and be rated UL, CSA FCC. THD less than 10% and power factor greater than .9. Vessel shall be base up mounted.

Finish/Material

Material will be cast alloy, with #356 copper free aluminum for maximum corrosion resistance. The casting is to have a seven stage pretreatment process and finished with a polyester powder paint to insure maximum durability. All exposed hardware is to be stainless steel. Color to be determined.

UL Listed

UL Listed and Luminare will be suitable for wet locations at a maximum of 40 deg C ambient temperature.

Decorative Arm Fitter

Luminaire shall be equipped with a decorative self leveling arm fitter of the Glas Werks Style. Fitter will replicate the look of period cast arm mounts. Holophane Part number, GWLF200SCAAS, or approved equal.

Material Fitter body will incorporate a removable top casting for wiring access. Fitter body, top cover and threaded male connector shall be heavy wall cast aluminum. All mounting and locking hardware shall be stainless steel. Finish shall be polyester powder paint matched to luminaire and pole/arm.

1 ½" male threaded connector will allow a pivot of +/- of 4 degrees adjustment from the vertical. Photocell receptacle is mounted in a removable top casting for wiring access. Photocell shall be twist lock style.

730-2.10 Single Globe Light Pole: is added:

The three existing Single Globe Light Poles shown on the plans to be wired into the new Scott Avenue lighting circuit are to be repainted black for the bottom 5'-6" of the pole. The remainder of the pole shall be painted silver. The poles shall be sandblasted, primed and painted in accordance to ADOT Standard Specifications for Road and Bridge Construction Section 610. Payment for the work shall be as a lump sum per the bid schedule.

Additional to the Requirements of Subsection 730-6 Locations of Utilities:

730-6 Locations of Utilities

Exact location of each piece of equipment shall be field located by the Project Electrical Inspector. Contact City of Tucson Electric Shop (791-3191) 48 hours in advance. No excavations, patching, or backfill shall be done without the approval of the Engineering Division Inspector.

730-9 Construction Requirements: of the Standard Specifications is added:

730-9.01 General Intention Statement for Traffic Signal and Street Lighting Construction

The intent of the contract is to construct a lighting system along Scott Avenue complete in place and operable. The system shall consist of conduit, conductors, pull boxes, poles, luminaires, pole foundations, a transformer, a metered street lighting cabinet, and any other items required to complete the system. The new street lighting shall be powered by a new electric service pedestal at the location as shown on the plans. There will be one new metered street lighting cabinet (Type 1) at the location shown on the plans, to operate the roadway lighting system. One new electrical service will be required for the cabinet where indicated on the plans. The service for the cabinet shall be provided by Tucson Electric Power.

730-9.02 Identifying Utilities

Prior to start of construction/excavation, Contractor shall contact Blue Stake (1-800-782-5348) and all other affected utility companies to verify the exact location of all utilities, two (2) full

working days prior to commencing construction. Saturdays and Sundays are not considered working days.

730-9.03 Service Requirements and Connections

All electrical service requirements and connections shall be coordinated with Tucson Electric Power (Public Improvements Coordinator, 918-8388). The Contractor shall contact TEP and provide four weeks prior notice for new service system to the metered street lighting cabinet.

730-9.04 Excavations

To ensure public safety, no excavation shall be left open overnight during the weekend, from Friday afternoon to Monday morning, or holidays.

730-9.05 Existing Utilities

Within the project limits, caution is to be exercised in the field location of all poles, conduit, foundations, and pull boxes with respect to underground and aerial utility facilities including but not limited to the following:

1. Tucson Electric Power
2. Pima County Wastewater facilities
3. MCI fiber optic facilities
4. AT & T communication facilities
5. Southwest Gas facilities
6. Cox Communications cable facilities
7. Tucson Water facilities
8. Qwest communications facilities

SECTION 731 - STRUCTURAL SUPPORTS AND FOUNDATIONS FOR TRAFFIC SIGNAL AND STREET LIGHTING SYSTEMS

Additional to the Requirements of Subsection 731-1 Description:

731-1 Description

The work in this section shall be considered in addition to the requirements of Section 731 - Structural Supports and Foundations for Traffic Signal and Street Lighting Systems of the Pima County/City of Tucson Standard Specifications.

Additional to the Requirements of Subsection 731-3.01 Foundations:

731-3.01 Foundations

All foundations shall be poured monolithically and vibrated to eliminate voids.

All Scott Avenue Lighting Pole Foundations shall conform to the Scott Avenue Pole Foundation Detail shown on the plans. All Armory Park Modified Historic Replica Pole Foundations and the Single Globe Pole Foundation shall conform to the respective Detail shown on the plans.

The Contractor MUST notify the Inspector 24 hours prior to any foundation pours so test cylinders may be made. All foundations poured without the Inspector present will be rejected and removed by the Contractor at his expense, then replaced.

Due to the array of conduits existing in the immediate area, the Contractor shall plan on hand excavating in a careful manner. Existing conduits which are unavoidable or cannot be rerouted shall be wrapped with PVC tape and encased in the new foundation. If existing conduits are damaged by the Contractor, they shall be repaired at the Contractor's expense.

Abandoned conduits in foundations shall be cut off so they are not encased in the new foundations.

Foundation excavations shall not be prepared and left open for more than 48 hours before concrete pour. Foundation excavations left open shall be properly barricaded for safety purposes.

The foundation depth shall be measured from the point of undisturbed soil. Grading around new foundations shall be provided to divert drainage.

The backfill and grading around the pole foundation shall be incidental to the foundation.
All foundation locations shall be field verified by the Contractor with the Inspector prior to excavation. The Inspector may direct changes in pole locations due to field obstructions, utilities, or other existing conditions.

SECTION 732 - ELECTRICAL MATERIAL AND SERVICE

732-2 Materials

732-2.03 Pull Boxes: of the Standard Specifications is modified to add:

Covers on pull boxes installed as part of the street lighting system shall be marked 'Street Lighting 480V'. All Number 5 street lighting pull boxes shall be equipped with a 750 VA encapsulated waterproof step down transformer 240/480 V Primary to 120/240 Volt Secondary. Contractor to provide 3.5 A in-line waterproof fuse holder at primary connections and 5.0 A in-line waterproof fuse holder at secondary connections (see Pole Connection Detail DWG. E-EPGN01). All connections in pull boxes shall be U.L. listed waterproof splices.

732-3 Construction Details

732-3.01 Conduit: of the Standard Specifications is modified to add:

(B) Cleaning:

All unused conductors are to be removed from existing conduits.

(E) Bends:

Bends shall have a minimum radius of 12 times the nominal diameter of the conduit.

(G) Placement:

Conduit trench crossings of roadways, alleyways or paved drives shall conform to the "Utility Trench Pavement Patches" detail (PC/COT Std. Dtl. 216) and the "Underground Conduit" detail (PC/COT Std. Dtl. T 713). Patching of the displaced asphalt and concrete encasement of the conduit is considered incidental to the placement of the conduit. The Contractor may elect to bore or jack in lieu of trenching.

732-3.04 Wiring Procedures: of the Standard Specifications is modified to add:

(D) Testing. The installation shall be free from short circuits. Tests shall be made in the presence of the project inspector. The entire system shall have an insulation test with a 1000-Volt "megger" system. In no case shall the insulation test be less than five megohms.

(E) Unused Conductors. Pull all unused conductors out of circuits.

732-3.05 Bonding and Grounding: of the Standard Specifications is modified to add:

Ground bushings shall be used on all steel conduit ends. Conduits shall be bonded together and incorporated into the ground system.

Electrical service installations shall have two (2) copper-plated ground rods, installed six feet apart.

A continuous ground system shall be incorporated with wire extending to the end of each conduit run terminating with a ground rod.

732-3.06 Electrical Service: of the Standard Specifications is modified to add:

The work under this item shall consist of furnishing all labor, equipment and materials required for securing electrical service to the new metered street lighting cabinet as required. The work shall include the securing of required permits related to said electric service. The work to coordinate the service installation, the cost of the purchase and installation of related conduit, sweeps, meter enclosure (including the specific Tucson Electric Power meter requirements)

permit fee(s) documentation, and coordination time and expenses borne by the Contractor are included within this bid item.

All materials and installation shall conform to the requirements of Section 732 of the Standard Specifications, the latest Electrical Service Requirements (SR-200 and 221) published by Tucson Electric Power Company, and as approved by the Engineer.

Tucson Electric Power will service the new metered street lighting cabinet (Type 1) (PC/COT Std. Dtl. T 325) as shown on the plans. The metered street lighting cabinet will be located on the northeast corner of 12th Street and Scott Avenue. The cabinet will be serviced by a new 480 volt single phase pad mounted transformer.

732-4 Method of Measurement

732-4.01 Conduit is added:

Conduits shall be measured by the linear foot for each diameter size of conduit. Any rigid steel conduit installed will be measured and paid for at the equivalent diameter size of PVC conduit rate. No measurement or direct payment will be made for the trenching, jacking or boring, bedding, encasement, tracer wire, marking tape, backfill, pavement or concrete patching, and testing.

SECTION 802 LANDSCAPE GRADING

802-1 Description: of the Standard Specifications is modified to add:

The work under this section shall consist of grading, contouring, smoothing or otherwise shaping planting areas outside of curbs to create landscape microbasins and slopes, and to direct storm water runoff to the microbasins, as shown on the project plans.

802-3 Construction Materials: of the Standard Specifications is modified to add:

All planting areas shall be recessed and all landscape grading shall be constructed as shown on the project plans. Care shall be taken to ensure that the finished grade of soil in microbasins, and along sidewalks and curbs, will allow adequate depth for Screened Rock, Rock Rip Rap, or other materials, as shown on the plans. In all cases, the microbasins and slopes shall be constructed to direct storm water runoff away from sidewalks and adjacent properties, and to harvest storm water, in accordance with the plans.

(A) Sample. The contractor shall grade a sample area with a slope and microbasin the full curb to sidewalk width by 20 feet in length in a location acceptable to the Engineer. The sample may be portions of actual slopes and microbasins shown on the project plans. The City of Tucson (COT) Landscape Architect and Engineer will review and approve the sample prior to construction of additional microbasins and slopes. The accepted sample area shall remain intact

throughout the duration of the project and shall serve as a Landscape Grading standard for all remaining areas.

(B) Microbasins and Swales. Landscape microbasins and swales shall be excavated in accordance with the project plans. Soil placed in planting areas shall be amended as shown on the project plans and in accordance with Section 806 of these Special Provisions.

(C) Slopes. All slopes in landscape areas shall be constructed in accordance with the engineering and landscape plans, and compacted to 85 - 90 percent of maximum density, in accordance with Section 803-3.01 of the Standard Specifications.

(D) Fine Grading. Flat areas, slopes and microbasins shall be rounded at the tops and bottoms of slopes for smooth transitions between them and to existing grade without noticeable breaks and without a lumpy appearance.

(E) Compaction Adjacent to Sidewalks. A 1 foot wide area of subgrade shall be compacted on each side of all sidewalks to 95 percent of maximum density as shown on the project plans.

No planting or irrigation operations shall proceed until Substantial Completion of the landscape grading has been granted by the Landscape Architect.

802-4 **Method of Measurement:** of the Standard Specifications is modified to add:

Landscape Grading will be measured on a lump sum basis.

SECTION 803 LANDSCAPE BORROW AND PLATING MATERIALS

803-1 **Description:** of the Standard Specifications is modified to add:

The work under this section shall also include furnishing, hauling, placing and compacting all plating materials including rock rip rap, angular drainage rock, screened rock, structural soil, crushed, recycled concrete sidewalk, decorative boulders and related work including excavation and backfill. This section also includes eradicating existing grasses, including Buffelgrass, and weeds with an approved herbicide or mechanical methods.

803-2 **Materials:** of the Standard Specifications is modified to add:

803-2.04 **Rock Rip Rap.** Rock Rip Rap shall be angular in shape. The size shall range from 3 inches to 8 inches, with at least 50 percent 5 inches in size. The color and material shall beTucson Mountain Brown from Walter Davis Rock Co, or approved equal. The contractor shall deliver a sample of 1 cubic foot to the Engineer at the project site for approval by the Landscape Architect prior to delivery of the Rock Rip Rap to the site.

803-2.05 Angular Drainage Rock. Angular drainage rock shall range in size from 3/4 inch to 1-1/2 inches. The contractor shall deliver a sample of 1 cubic foot to the Engineer at the project site for approval by the Landscape Architect prior to delivery of the angular drainage rock to the site.

803-2.06 Screened Rock. Screened Rock shall range in size as follows:

Material Description	Percent of Total Volume	Size Range (inches)
Screened rock	50	½ inch - 3/4 inch
Screened rock	20	1 inch – 2 inches
Crushed and washed salvaged concrete sidewalk	30	½ inch - 3/4 inch

The screened rock shall be Tucson Mountain Brown from the material yard, Walter Davis Rock Co., or approved equal. Refer to Sections 202-3.04 and 803-2.09 of these Special Provisions for salvage operations of existing concrete sidewalk.

A 2-pound sample of both sizes of screened rock shall be delivered to the Engineer at the project site for approval, prior to delivery of the screened rock to the site. The sample must be approved by the Landscape Architect prior to delivery to the site.

803-2.07 Structural Soil.

(A) General. Structural soil shall be a combination of Clay Loam, Crushed Stone and Co-polymer as described below.

(B) Clay Loam. Clay Loam shall be a "clay loam" based on the "USDA classification system" as determined by mechanical analysis (ASTM D-422) and it shall be of uniform composition, without admixture of subsoil. It shall be free of stones greater than one-half inch, lumps, plants and their roots, debris and other extraneous matter over one inch in diameter or excess of smaller pieces of the same materials as determined by the Engineer. It shall not contain toxic substances harmful to plant growth. It shall be obtained from naturally well-drained areas, which have never been stripped of top soil before and have a history of satisfactory vegetative growth. Clay Loam shall contain not less than 2 percent nor more than 5 percent organic matter as determined by the loss on ignition of oven-dried samples. Mechanical analysis for a Loam / Clay Loam shall be as follows:

Textural Class	Percent of Total Weight
Gravel	less than 5
Sand	20 – 45
Silt	20 – 50
Clay	20 – 40

Chemical analysis: Meet or be amended to meet the following criteria:

pH	between 5.5 to 6.5
Percent organic matter	2 – 5 percent by dry weight
Soluble salt	less than 1.0 Millimho per cm
Cation Exchange Capacity (CEC)	greater than 10 meq / 100g
Carbon/Nitrogen Ratio	less than 33:1

Nutrient levels as required by the testing laboratory recommendations for the type of plants to be grown in the soil.

Toxic elements and compounds below the United States Environmental Protection Agency Standards for Exceptional Quality sludge or local standard; whichever is more stringent.

(C) Crushed Stone. Crushed Stone shall be a non-limestone aggregate:

(1) The maximum allowable aggregate able to pass the ½ inch sieve is 10 percent.

(2) The ratio of nominal maximum to nominal minimum particle size shall be 2.

(3) Acceptable aggregate dimensions shall not exceed 2.5:1.0 for any 2 dimensions chosen.

(4) Minimum 90 percent with one fractured face, minimum 75 percent with two or more fractured faces.

(5) Results of Aggregate Soundness Loss test shall not exceed 18 percent.

(6) Losses from LA Abrasion tests shall not exceed 40 percent.

(D) Co-Polymer. Co-polymer shall be a potassium propenoate-propenamide copolymer. Acceptable products include Hydrogel as manufactured by Gelscape by Amereq Corporation.

A 5-pound sample of prepared Structural Soil shall be delivered to the Engineer at the project site for approval, prior to completing all crushing operations. The sample must be approved by the Landscape Architect prior to delivery to site.

803-2.08 Decorative Boulders. Boulders shall be Tucson Mountain Brown Granite from Walter Davis Rock Co, or approved equal, and shall range in size from 2 feet x 2 feet x 2 feet to 3 feet x 3 feet x 3 feet.

The contractor shall deliver a sample of 2 boulders to the Engineer at the project site for approval prior to delivery of remaining boulders to the site. The sample must also be approved by the design Landscape Architect prior to delivery to the site.

Boulders shall be surface selected and shall be free of scratches, chipping, cracking and other defacing. The appearance of such damage will be considered grounds for rejection and replacement as directed by the Engineer.

803-2.09 Pre-emergent Herbicide. The pre-emergent herbicide shall contain the chemical compound Oryzalin, as provided in the trade names Surflan, Dirimal, Rycelan and others, and must be approved by the Engineer prior to application. Approved herbicide shall be a General Use Pesticide in EPA toxicity class IV. Provide herbicide in manufacturer's original and unopened containers.

803-2.10 Salvaged and Crushed Sidewalk Concrete. Concrete sidewalk salvaged from site as described in Section 202-3.04 shall be crushed to a size of 1/2 inch to 3/4 inch, washed and free of reinforcing material. Refer to Section 803-2.05.

A 2-pound sample of crushed and washed sidewalk concrete shall be delivered to the Engineer at the project site for approval, prior to completing all crushing operations. The sample must be approved by the Landscape Architect prior to completing all crushing operations.

803-3 Construction Materials: of the Standard Specifications is modified to add:

803-3.04 Rock Rip Rap. Prior to placing Rock Rip Rap: 1) all areas to receive Rock Rip Rap shall be cleared of all weeds, brush, trash, and other objectionable material, 2) pre-emergent herbicide shall be applied in accordance with the manufacturer's instructions, and 3) all landscape grading has been approved by the Engineer.

Place Rock Rip Rap to the depth and in locations shown on the project plans.

Care shall be taken in the placement of the Rock Rip Rap to not disturb or damage any plant or irrigation material, to not compact soils around plant material beyond that required in Section 802, and to leave microbasins and slopes intact and as shown on the project plans.

803-3.05 Angular Drainage Rock. Angular drainage rock shall be placed in the bottom of landscape containers to the depths and as shown on the project plans and details.

803-3.06 Screened Rock. Screened rock shall be thoroughly combined with crushed sidewalk concrete at the material yard prior to delivery to the site.

Place the resulting screened rock/crushed concrete mixture in all planting areas and as noted on the project plans. The finish grade of the screened rock/crushed concrete mixture shall be 1/2-inch below top of adjacent curbs and sidewalks as shown on the project plans. Screened rock/crushed concrete mixture shall be installed to a depth of 2 inches.

Care shall be taken in the placement of the screened rock/crushed concrete mixture not to disturb or damage any plant material or irrigation equipment and to leave microbasins and slopes intact and as shown on the project plans.

803-3.07 Structural Soil.

Structural Soil shall consist of a uniformly blended mixture of Crushed Stone, Clay Loam, Co-polymer and water, mixed to the following proportion, by weight:

Crushed Stone	100
Loam (dry)	40
Co-polymer	0.03
Total moisture	AASHTO T-99 optimum moisture

(A) Mixing. All Structural Soil mixing shall be performed using appropriate soil measuring, mixing and shredding equipment of sufficient capacity and capability to assure proper quality control and consistent mix ratios. Mixing of Structural Soil at the project site may be permitted only if these conditions can be met. Portable pugging may be used, as described below.

Maintain adequate moisture content during the mixing process. Soils and mix components shall easily shred and break down without clumping. Soil clods shall easily break down into a fine crumbly texture. Soils shall not be overly wet or dry. The contractor shall measure and monitor the amount of soil moisture at the mixing site periodically during the mixing process.

An acceptable mixing procedure for front-end loader is as follows:

On a flat asphalt or concrete paved surface, spread an 8 inch to 12 inch layer of crushed stone.

Spread evenly over the stone the specified amount of dry Co-polymer.

Spread over the dry Co-polymer and Crushed Stone a proportional amount of clay loam according to the mix design.

Blend the entire amount by turning, using a front-end loader or other suitable equipment until a consistent blend is produced.

Add moisture gradually and evenly during the blending and turning operation as required to achieve the required moisture content. Delay applications of moisture for 10 minutes prior to successive applications. Once established, mixing should produce a material within 1% of the optimum moisture level for compaction.

An acceptable pugging operation mixing procedure is as follows:

Feed a known weight of crushed stone into the mixing trough.

Add Co-polymer as a slurry into trough and mix slurry and stone into a uniform blend
Meter in soil in proper proportion of Clay loam Soil While stone-slurry mixture is in motion.

Add water to bring mixture to target moisture content after factoring in water from the slurry and the Clay Loam moisture.

Auger out to stock pile or transport vehicle (or into pit if using a portable pugging operation).

Add soil amendments to alter soil fertility including fertilizers and pH adjustment at the time of mixing at the rates recommended by the soil test. Soil pH shall be adjusted to fall within a value of 5.5 and 6.5 2 months after mixing if the material is stored, unless mixing with a high pH stone.

(B) Placement. Excavate and compact the proposed sub-grade to depths, slopes and widths as shown on the Drawings. Do not over excavate compacted sub-grades of adjacent pavement or structures. Confirm that the sub-grade is at the proper elevation and compacted as required. Sub-grade elevations shall slope parallel to the finished grade as shown on the drawings.

Clear the excavation of all construction debris, trash, rubble and any foreign material. In the event that fuels, oils, concrete washout silts or other material harmful to plants have been spilled into the sub-grade material, excavate the soil sufficiently to remove the harmful material. Fill any over excavation with approved fill and compact to the required sub-grade compaction.
Do not proceed with the installation of Structural Soil until all utility work in the area has been installed.

Protect adjacent walls, walks and utilities from damage or staining by the Structural Soil. Use ½-inch plywood and/or plastic sheeting or other material as directed by the Engineer to cover existing concrete, metal and masonry work and other items as directed during the progress of the work.

Clean up all trash and any Structural Soil spilled on any paved surface at the end of each working day.

Any damage to pavement, utilities or architectural work caused by Structural Soil placement activities shall be repaired by the Contractor at his or her expense.

Install Structural Soil in 6-inch lifts and compact each lift.

Compact Structural Soil peak dry density from a standard AASHTO compaction curve (AASHTO T 99). No compaction shall occur when moisture content exceeds maximum as listed herein. Delay compaction 24 hours if moisture content exceeds maximum allowable and protect Structural Soil during delays in compaction with plastic or plywood or other material as directed by the Engineer.

Bring Structural Soil to finished grades as shown on the project plans. Immediately protect the Soil material from contamination by toxic materials, trash, debris, water containing cement, clay, silt or materials that will alter the particle size distribution of the mix with plastic or plywood.

The Engineer may periodically check the material being delivered and placed at the site for color and texture consistency with the approved sample provided by the Contractor as part of the submittal for Structural Soil. In the event that the installed material varies significantly from the approved sample, the Engineer may request that the Contractor test the installed Structural Soil. Any Structural Soil that varies significantly from the approved testing results, as determined by the Engineer, shall be removed and new Structural Soil installed that meets these specifications.

Adjust finish grades of Structural Soil to meet field conditions.

Fill all dips and remove any bumps in the overall plane of the Structural Soil.

The tolerance for dips and bumps in Structural Soil areas shall be a 3-inch deviation from the plane in 10 feet.

All fine grading shall be inspected and approved by the Engineer prior to the installation of other items to be placed on the Structural Soil.

Upon completion of Structural Soil placement operations, clean all adjacent areas. Remove all excess fills, soils and mix stockpiles and legally dispose of all waste materials, trash and debris. Remove all tools and equipment and provide a clean, clear site. Sweep, do not wash, all paving and other exposed surfaces of dirt and mud until the paving has been installed over the Structural Soil material. Do no washing until finished materials covering Structural Soil material are in place.

Make no adjustment after Structural Soil has been placed.

803-3.08 Decorative Boulders. Install boulders in the locations shown on the project plans. Stake all locations for approval by the Engineer and Landscape Architect prior to excavation. Install the boulders with one-third buried below grade as shown on the project plans and with weathered surface exposed.

803-3.09 Pre-emergent Herbicide. Apply pre-emergent herbicide in accordance with the manufacturer's instructions. The pre-emergent herbicide shall be applied *before and again after* installation of the riprap and screened rock/crushed concrete mixture, and before the final water settling operation.

803-3.10 Salvaged and Crushed Sidewalk Concrete. Salvaged concrete shall be crushed to a size range of ½ to ¾ inch and thoroughly washed. The washed, crushed concrete shall be combined thoroughly with both sizes of Screened Rock at the material yard. The resulting Screened Rock/crushed concrete mixture shall be placed in all planting areas, in accordance with Section 803-3.05.

803-4 Method of Measurement: of the Standard Specifications is modified to add:

Measurement of Screened Rock and Rock Rip Rap will be by the cubic yard include providing and applying pre-emergent herbicide.

Angular drainage rock will be measured by the cubic yard, complete-in-place.

Structural Soil will be measured by the cubic yard, complete-in-place, including excavation and removal of site soil, and placement and compaction of Structural Soil.

Decorative Boulders will be measured on a per each basis including excavation and backfill.

Salvaged and crushed concrete sidewalk will be measured by the cubic yard of salvaged concrete, including crushing, washing and mixing operations, transportation and placement.

SECTION 806 TREES, SHRUBS AND PLANTS

806-2 Materials: of the Standard Specifications is modified to add:

806-2.01 Nursery Stock: of the Standard Specifications is modified to add:

All trees shall conform to size, caliper and height requirements specified in project plans. Contractor shall refer to the Arizona Nursery Association Grower's Committee Recommended Average Tree Specifications as a reference.

806-2.03 Local Stock: of the Standard Specifications is modified to add:

Existing plants to be salvaged for transplant to another site are shown approximately on the project Demolition plans. Ash trees to be boxed and salvaged to Armory Park Neighborhood. Provide Chuck Bressi, Armory Park Neighborhood Association president (520) 670-9022, 7 days notice to collect salvaged trees. It shall be the responsibility of the Neighborhood to transplant the trees once they are salvaged.

Local stock shall be salvaged by experienced personnel with a minimum of 5 years recent experience with similar work, with 90 percent success rate (min.). Submit written evidence listing project name, client name, date of project, description of work performed, and success rate to the Engineer at the project site before beginning work.

All pruning of roots and branches shall be under the direction of a certified arborist.

806-2.05 Prepared Topsoil: of the Standard Specifications is deleted.

806-2.06 Prepared Soil: of the Standard Specifications is modified as follows.

The first paragraph is replaced with the following paragraph:

Except for 1) cacti, 2) plants in landscape containers and 3) where plants will be installed in Structural Soil, prepared soil material for backfill in planting pits shall consist of thoroughly tilled or loosened, clean site soil, free of stones and lumps larger than 3/4 inch in any dimension plus 5 pounds of chemical fertilizer added per cubic yard of soil. Site soil has been sampled at two locations and tested by an approved soils testing laboratory for full horticultural analysis.

Based on written recommendations from the testing laboratory, the project area has been separated into 2, soil amendment areas: Soil Amendment Area #1 and Soil Amendment Area #2. Refer to Section 806-3.06 for soil amendments specific to each area.

The first sentence of the third paragraph is replaced with the following sentence:

Backfilling mix for agave and other cacti shall be a ratio of 2 parts clean site soil to 1 part sand. Backfilling mix for saguaro shall be clean, dry site soil.

Clean site soil means: free of stones and lumps larger than 3/4 inch in any dimension and in compliance with or amended to be in compliance with the requirements of Section 804 of the Standard Specifications.

The following paragraphs are added:

If clay soil (40 percent or greater clay content), occurence of caliche, overcompaction, lack of proper drainage, or other problems are encountered, notify the Engineer immediately. In such cases, the Engineer may require that the soil be excavated, removed and disposed of, or that the soil be amended to meet the requirements of Section 804 of the Standard Specifications. Amending the soil will be designated as extra work and paid for in accordance with the requirements of Subsection 109.04 of the Standard Specifications.

Backfill soil for landscape containers shall contain:

2-3 parts, by volume, of compost (described below)
2 parts, by volume, coarse, builder's sand
1 part, by volume, Pumice

Commercial potting soil is acceptable provided it meets the requirements stated above. Commercial soil must not contain Perlite or peat moss. If soil will be prepared as described above, components shall be thoroughly mixed prior to placement in containers.

Compost shall meet the following requirements:

Compost Requirements	
Cation Exchange Capacity (CEC)	Greater than 60 meq/100 g
Carbon: Nitrogen Ratio	Less than 22:1
PH (of extract)	5.5 – 8.0
Organic Matter Content	100 percent
Total Nitrogen (not added)	Greater than 1 percent
Humic Acid	1 percent (min.)

Maturity Index	Greater than 50% on Maturity Index at a 10:1 ratio
Stability	Less than 100 mb 02/Kg compost dry solids – hour
Conductivity	less than 4 mmhos/cm
Exchangeable Sodium	less than 15 percent
Available Nitrogen (NO3-N)	5 PPM (min.)
Available Phosphate (NaHCO3)	200 PPM (min.)
Available Potassium (K2O3)	400 PPM (min.)
Iron	50 PPM

806-2.09 **Chemical Fertilizer:** of the Standard Specifications is modified to add:

Chemical fertilizer shall be commercially produced. Chemical fertilizer shall be furnished in the original manufacturer's sealed, standard containers with the name, weight, and analysis of the contents clearly marked. Chemical fertilizer shall be State inspected and shall be:

Ammonium Phosphate (16-20-0)

Note: the first, second, and third numbers shown in parentheses following the name of the fertilizer represent the minimum percent by weight of soluble Nitrogen, available Phosphoric Acid, and water soluble Potash, respectively.

806-2.12 **Existing Plant Material:** of the Standard Specifications is modified to add:

Existing vegetation to Remain-In-Place shall be as located on the project plans. Refer also to Section 201 for protection during construction.

806-3 **Construction Details**

806-3.01 **Planting Season:** of the Standard Specifications is modified to add:

The planting of trees, shrubs and cacti shall be performed during favorable weather conditions during the season or seasons normal for such work, as determined by acceptable local practice.

806-3.02 **Excavation:** of the Standard Specifications is modified to add:

(A) Planting in Prepared Soil. Before backfilling and plant installation, planting pits shall be filled with water and allowed to drain to leach soluble salts. Repeat twice. All plant pits shall drain as described in the Standard Specifications and as approved by the Engineer. Refer to Item 8060168 DEEPEN PLANT PITS for plant pits that do not drain according to the Standard Specifications.

All extra work that is required after the drainage test to achieve proper drainage in planting pits will be designated as extra work and paid for in accordance with the requirements of Subsection 109.04 of the Standard Specifications.

The Contractor shall pay special attention to the infestation of bermuda grass, nut grass and Buffelgrass. Any of these items found in the prepared soil or plant rootball shall be grounds for immediate removal and disposal, and replacement of that item. The planting pit shall be excavated and inspected to ensure complete eradication of any roots or rhizomes which may have grown into the area. All this work and materials shall be the responsibility of the Contractor, at no additional cost to the Department.

After the planting areas have been amended and the irrigation system has been installed and accepted, the planting pits shall be dug and pre-watered by the irrigation system for a minimum duration of 12 hours. DO NOT PRE-WATER PLANTING PITS FOR SAGUARO AND OTHER CACTI. Planting shall be accomplished during a 3-day period starting 2 days following the pre-wetting as specified. Do not install plant materials if plant pit soil is saturated.

All planting areas shall be graded as specified and required to facilitate proper watering of all material and to leave a generally smooth appearance after the completion of planting.

(B) Planting in Structural Soil. Where indicated, plants will be installed directly into the Structural Soil as shown on the project plans. Compact Structural Soil around root balls to the density required in Section 803 of these Special Provisions.

(C) Planting in Landscape Containers. Where plants will be installed in landscape containers as shown on the project plans, install plants directly in the landscape container as shown on the project plans. Compact the planting soil around root balls to the density required in Section 803 of these Special Provisions.

806-3.04 (B) Nursery Stock: of the Standard Specifications is modified to add:

All plant materials, except cactus, shall receive irrigation water within 1 hour after planting with the installed irrigation system.

The contractor shall adequately water plants to maintain a healthy and vigorous growing condition during the construction period.

(1) All Cacti (saguaro, agave, etc.). Root prune all shredded or otherwise damaged roots, and seal all wounds to the root system with approved pruning paint. Apply wettable, dusting Sulfur to all surfaces to be below grade. Planting depth shall be that at which the plant was originally growing.

(2) Saguaro Cacti Only. Planting pit shall be 6 inches (min.) wider in all directions than extent of severed lateral roots. Cut tap root to provide a flat surface of a diameter sufficient to support the full weight of the plant without settling. Orient plant to match original orientation (original north facing side shall face north). Do not irrigate for 3 weeks following planting.

Backfill soil shall be clean, dry site soil, compacted in 6-inch lifts. Ensure that after planting, water cannot stand against base of plant; refer to the project plans.

806-3.05 **Pruning and Staking:** of the Standard Specifications is modified to add:

Trim and prune plants identified as to remain in place only as directed by a Certified Arborist, to enhance growth and retain natural form. Plants identified as to remain in place shall be monitored during the maintenance period, as specified in Section 807 for health and vigor.

Do not stake trees except at the direction of the Engineer or COT Landscape Architect.

806-3.07 **Prepared Soil:** is added to read:

(A) Soil Amendments. Contractor shall uniformly mix backfill soil from both Soil Amendment areas with amendments and organic matter in the quantities shown in the following chart:

Soil Amendment Area	Amendments (pounds per cubic yard), Material	Organic Matter (percent by volume)
1	50, Gypsum 10, degradable Sulfur	30
2	12, degradable Sulfur, 5, K-Mag, or equal 8, Ammonium Phosphate	30

Following incorporation of amendments in Soil Amendment Area 1, apply water to a surface depth of 5 inches to flush sodium from soil. Repeat 3-4 days afterward.

806-3.12 **Existing Plant Material:** of the Standard Specifications is added to read:

Plants to Remain in Place. Fencing of existing plants to remain in place shall be in the locations designated in the plans and as described in Section 201 of these Special Provisions. Fencing materials shall remain in place during the duration of construction operations. Fencing that is damaged or destroyed shall be repaired or replaced within 2 working days.

Plants to be Transplanted. Once the local stock has been salvaged and has been accepted by the Engineer, the contractor's responsibility for care will end.

806-4 **Method of Measurement:** of the Standard Specifications is modified to add:

Staking of trees will be measured on a per unit basis.

ITEM 8060168 DEEPEN PLANT PITS

Description:

The work under this item shall consist of the extra work required to excavate planting pits to a depth greater that that shown on the project plans in order to achieve the rate of drainage stated in Subsection 806-3.02 of the Standard Specifications.

Percolation tests were performed October 28, 2008 at two sites, #1: Scott Avenue/Jackson Street and #2: Scott Avenue/13th Street. Percolation rates at site #1 was found to be 2.2 inches per hour and at #2, 6 inches per hour.

Construction Requirements:

When planting pits, excavated according to these specifications do not drain at the specified rate, the pits shall be made deeper until the required rate of drainage is achieved, as determined by the Engineer. Due to the varying rates of percolation throughout the project, Contractor shall test percolation rates approximately every 100 feet, within the planting areas, both sides of the roadway. If percolation rates at 2 consecutive sites differ by more than 1.5 inches per hour, Contractor shall test percolation rates between the 2 sites at intervals of 50 feet and/or 25 feet until similar rates are achieved by deepening pits accordingly. Once the drainage rate is acceptable to the Engineer, they shall then be backfilled with prepared soil and compacted to 85 percent.

Method of Measurement:

This work will be measured on a per each planting pit deepened basis.

SECTION 807 LANDSCAPE ESTABLISHMENT

807-1 Description: of the Standard Specifications is modified to add:

The work shall consist of furnishing all labor, tools, motorized and non-motorized equipment, vehicles, appliances, materials, permits, insurance and taxes, and all other work incidental to proper maintenance; all as necessary to execute complete grounds maintenance of the entire site extending to the face of traffic curbs and paving edges. The work shall include but not be limited to the following:

(A) Litter removal

(B) Weed control

(C) Pest control

(D) Irrigation system maintenance and adjustment

(E) Plant replacement

(F) Pruning

(G) Temporary protection, fences or barriers where applicable

(H) Staking

(I) Hardscape Care, including Graffiti Removal

The maintenance period shall be three (3) years from the date of substantial completion.

Maintenance shall be performed a minimum of one time per week. Work which the contractor fails to do when necessary during the maintenance period may be performed by others as directed by the COT Landscape Architect, the cost to be borne by the contractor.

Maintenance shall commence the day after all landscape and irrigation work on the project has received provisional acceptance in writing by the COT Landscape Architect. All replacements and corrections shall be made before the Maintenance Period begins.

807-3 Construction Details

807-3.01 General: of the Standard Specifications is modified to add:

(A) Litter Removal. All litter and dead vegetation which is loose shall be removed from the entire site at intervals not to exceed 7 calendar days.

(B) Weed Control. Weed control shall be provided over the entire site through the use of herbicides and manual labor, which method or methods shall be at the discretion of the Contractor. All persons handling and/or applying herbicides or other horticultural chemicals shall be State of Arizona Agricultural Certified Applicators for all chemicals applied. Grasses and weeds which spread by underground roots shall be permanently eradicated by the use of translocating herbicides, such as Round-Up.

Herbicides employed during the term of the maintenance period shall not cause the extermination of any landscape plant material nor have detrimental residual effects.

No chemical shall stain or cause to stain, nor cause damage to any portion of the site or improvements, including landscape plant material. If staining or damage occurs, requisite repairs or replacements shall be made by the Contractor at his expense.

A record shall be kept of all chemical applications noting date and where applied, rate of application, whether pre-emergent or post emergent and method of application. A copy shall be submitted to the COT Landscape Architect at the end of the maintenance period.

Applications of chemicals shall be in such a manner so as to not cause injury to the personal health of anyone working on the site, observing, or passing by. Care shall be taken such that no puddles or pools of water which may contain toxic amounts of chemicals shall remain after completion of operations. Chemicals shall not be allowed to fall on or translocate to areas other than the site.

Chemicals shall be approved by the EPA for the intended use and applied in strict accordance with EPA guidelines and the manufacturer's instructions.

(C) Inert Ground Cover. Screened rock shall be raked to maintain finished appearance where disturbed. Replace eroded screened rock.

(D) Hardscape Care. The Contractor shall keep sidewalks, concrete curbs and decorative pavement free of dirt, debris and graffiti, by sweeping and/or hosing down these areas at intervals not to exceed seven (7) calendar days.

(E) Frequency. Establishment work shall be performed a minimum of one time per week. Work that the Contractor fails to do when necessary during the Establishment Period may be performed by others as directed by the COT Landscape Architect, the cost to be borne by the Contractor.

807-3.02 Planted Stock and Landscape Establishment: of the Standard Specifications is modified to add:

(A) Pest and Disease Control. All landscape plants, including transplanted-on-site, preserved-in-place and new plants, shall be provided protection which shall include, but not be limited to, eradication or control of insects, mites, fungi and non-fungus diseases through the application of appropriate insecticides, miticides and fungicides; which shall in form, be sprays or dusts, all necessary to maintain plants in a healthy and vigorous growing condition.

All insecticides, fungicides and miticides employed during the term of the Contract shall not cause the extermination of any landscape plant material, nor cause damage to the growth characteristics such that the plants will not be able to recover in a normal manner.

All precautionary provisions of Section 807-3.01(B) "Weed Control" of these Special Provisions shall apply for the application of pest and disease control chemicals.

(B) Pruning. Pruning of plants shall be done in a manner which preserves the plant's natural growth characteristics and appearance. No shearing will be required or allowed.

Trees shall be pruned to remove suckers and low branching, to maintain trees (at maturity) above 6' in the sight visibility triangles, and to promote safety. Dead or diseased branches shall be removed at their point of origin. Prune trees only at the direction of the COT Landscape Architect.

Shrubs, ground covers and accent plants generally will not require pruning. Pruning shall only be done to remove dead, diseased or damaged branches and to control branches which are substantially longer than the main portion of the plant or create a hazard.

(C) Plant Replacement. All landscape plant material determined by the COT Landscape Architect to possess health or vigor insufficient to develop a normal plant shall be replaced by the Contractor within ten (10) calendar days after receipt of notification.

Replacements shall be of the same genus, species and variety, and of the same size as that originally provided. Such replacements shall be at the expense of the contractor and be subject to the approval of the COT Landscape Architect.

Replacement at the Contractor's expense shall not be occasioned due to causes beyond the control of the Contractor such as, but not limited to, vandalism and unseasonably severe weather conditions. Contractor shall repair damaged areas due to circumstances beyond Contractor's control, after submitting request for change order and obtaining approval for same from COT Landscape Architect.

Following replacement, regardless of nature, the immediate and adjacent areas shall be left "broom clean", and in such appearance as prior to the aforementioned operations.

(D) Staking. Contractor shall maintain and adjust all tree staking (including support ties, wires and hoses and/or tree stakes) in order to maintain upward and proper support of the trees, protect the trees from wind/storm damage and encourage growth of strong tree trunks and branching. Staking shall allow for trunk movement and shall not cause damage to the trees.

ITEM 8080003 – LANDSCAPE IRRIGATION SYSTEM

Description:

The work under this item shall consist of furnishing all materials necessary to maintain the continuity of any existing main line and/or pressure main irrigation lines which extend through the project, to cap any unused lateral irrigation lines and to relocate and control valves which may be required due to median island modifications.

Materials

All materials used to perform the work under this item shall conform to the requirements of Section 808 of the Standard Specifications.

Construction Requirements:

All work under this item shall conform to the requirement of Section 808 of the Standard Specifications.

Method of Measurement:

The work described herein is measured as a lump sum, which is full compensation for all related work.

ITEM 8090001 TRASH/RECYCLING RECEPTACLE (ABOVE GROUND)

Description:

The work under this item consists of furnishing and installing trash/recycling receptacles complete, at the locations designated on the project plans and in accordance with these Special Provisions. The work includes providing, placing, attaching with vandal-resistant hardware and leveling the trash receptacles.

Materials:

Trash/Recycling receptacles shall be provided for placement as shown on the project plans. They shall be fabricated of perforated 11-gauge (minimum) steel. Wire grid, woven wire or woven straps are not acceptable. Trash/Recycling Receptacle shall be 32 gallon 'Round Midtown Litter Receptacle' with dual trash and recycling openings and separate bins/liners by Keystone Ridge, or approved equal. Submit manufacturer's literature and color samples to the Engineer at the project site.

The receptacles shall be cylindrical in shape of the height, diameter and volume stated, and with a removable metal lid and two separate plastic bins/liners.

Provide surface-mount or embedded installation options, as shown on the project plans. Mounting and installation hardware shall be heavy gauge, vandal resistant, corrosion-resistant galvanized steel, as specified by the manufacturer.

Finish shall be a multi-stage powder-coating system, including washing, corrosion resistant undercoating, and a final baked-on polyester color coat. Color shall be RAL 7013, or approved equal.

Construction Details:

Trash/Recycling receptacles shall be located as shown on the project plans. Install in accordance with the manufacturer's instructions. Installation shall be plumb, level, and firm.

Do not scratch, abrade or otherwise damage finish during installation. Any and all damage to the finish shall be repaired in accordance with the manufacturer's instructions. Extensive or irreparable damage shall be grounds for rejection and replacement.

Method of Measurement:

Trash/Recycling Receptacles will be measured per each furnished and installed, as specified herein.

ITEM 8090002 LANDSCAPE CONTAINERS (ABOVE GROUND)

Description:

The work under this item consists of furnishing and installing pre-cast concrete landscape containers (planters) complete, at the locations designated on the project plans and in accordance with these Special Provisions. The work includes providing, placing and leveling the containers. Planting soil, plants and irrigation are not included and will be provided under separate Sub-Items.

Materials:

Landscape containers shall be provided for placement in the locations shown on the project plans. Containers shall be Dune Series Model DS-23 and DS-17.5 manufactured by Kornegay Designs, or approved equal. Color shall be integral to the concrete and provided in Davis Color Adobe #61078. All landscape containers shall have a 2 inch drainage hole to allow for irrigation and drainage. Submit manufacturer's literature to the Engineer at the project site.

Construction Details:

Coordinate with irrigation supply, drain work and sidewalk pavement shown on the project plans. A 14 inch diameter cutout in the sidewalk paving shall be located directly beneath the DS-23 landscape container, and a 16 inch diameter cutout in the sidewalk paving shall be located directly beneath the DS-17.5 landscape container to allow adequate room for irrigation installer to make proper pipe connections and for future maintenance. Cutouts in sidewalk paving shall be of a size that is not visible at the base of any landscape container.

Landscape containers shall be located as shown on the project plans and installed in accordance with the manufacturer's instructions. Installation shall be plumb, level, and firm.

Do not scratch, abrade or otherwise damage finish during installation. Any and all damage to the finish shall be repaired in accordance with the manufacturer's instructions. Extensive or irreparable damage shall be grounds for rejection and replacement.

Method of Measurement:

Landscape containers will be measured per each furnished and installed, as specified herein.

ITEM 8090003 METAL BENCH

Description:

The work under this item consists of furnishing and installing benches complete, at the locations designated on the project plans and in accordance with these Special Provisions. The work includes providing and installing vandal-resistant hardware, placing and leveling the Benches, and coordinating installation of bench foundations with adjacent pavement.

Materials:

Benches shall be fabricated of 1/8-inch thick x 1 1/2-inch wide steel straps. Straps shall be welded to frame; mechanical connections are not acceptable. Benches shall be both backless and with backs from the Scarborough series by Landscapeforms, or approved equal. Benches shall be provided in 72-inch lengths with intermediate dividers. Submit manufacturer's literature and color samples to the Engineer at the project site.

Provide surface-mount or embedded installation options, as shown on the project plans. Mounting and installation hardware shall be heavy gauge, vandal resistant, corrosion-resistant galvanized steel, as specified by the manufacturer.

Finish shall be a multi-stage powder-coating system, including washing, corrosion resistant undercoating, and a final, baked-on polyester color coat. Color shall be RAL 7013, by LandscapeForms or approved equal.

Construction Details:

Benches shall be surface-mounted or embedded as shown on the project plans and as specified by the manufacturer.

Mark all locations on the site for approval by the Landscape Architect, before beginning installation.

Install in accordance with the manufacturer's instructions. Installation shall be plumb, level, firm, and aligned parallel with the nearest edge of pavement.

Do not scratch, abrade or otherwise damage powder-coated finish during installation. Any and all damage to the finish shall be repaired in accordance with the manufacturer's instructions. Extensive damage shall be grounds for rejection and replacement.

Method of Measurement:

Benches will be measured on a per each basis, installed, complete-in-place.

ITEM 8090004 TREE GRATE (CAST IRON)

Description:

The work under this section includes furnishing all labor, equipment and materials to provide and install steel tree grates and frames at the locations and in accordance with the details shown on the project plans and these Special Provisions.

Materials:

(A) Tree Grates. Grates shall be both rectangular in shape, 48 inches x 96 inches, and square in shape, 48 inches x 48 inches, with 16", 24", and 36" openings and provided in 2 pieces. Grates shall be constructed of cast iron and be Model M9628 and M4804 Olympian, manufactured by Ironsmith, or approved equal.

(B) Tree Grate Frames. 1¾ inches by 1¾ inches by ¼ inch thick mild steel angle, comfomring to ASTM A-36. Nelson studs shall be welded to bottom of frame at 8 equally spaced positions around the perimeter of the frame (2 per side) for embedding into adjacent concrete pavement, in accordance with the manufacturer's instructions. Frames shall be as manufactured by the tree grate manufacturer, or approved equal.

Construction Details:

Install tree grates and frames in accordance with the manufacturer's instructions and as shown on the project plans. Coordinate installation of tree grate frames with adjacent concrete pavement and field adjust as necessary around existing trees. Frames shall be installed flush with adjacent concrete pavement base. Coordinate installation of trees with installation of frame segments.

Method of Measurement:

Tree grates and frames will be measured as a complete assembly on a per each basis, for each completed assembly.

ITEM 8090005 BICYCLE RACK

Description:

The work under this section includes furnishing all labor, equipment and materials to provide and install bicycle racks at the locations and in accordance with the details shown on the project plans and these Special Provisions.

Materials:

Materials and finish of Bicycle Rack shall be Model SN01-3, manufactured by Keystone Ridge Designs, or approved equal. Submit manufacturer's literature and color samples to the Engineer at the project site. Bicycle racks shall be color RAL 7013.

Provide surface-mount or embedded installation options, as shown on the project plans. Mounting and installation hardware shall be heavy gauge, vandal resistant, corrosion-resistant galvanized steel, as specified by the manufacturer.

Finish shall be a multi-stage powder-coating system, including washing, corrosion resistant undercoating, and a final, baked-on polyester color coat.

Construction Details:

Bicycle Racks shall be surface-mounted or embedded as shown on the project plans.

Mark all locations on the site for approval by the Engineer, before beginning installation.

Install in accordance with the manufacturer's instructions. Installation shall be plumb, level, firm, and aligned parallel with the nearest edge of pavement.

Do not scratch, abrade or otherwise damage clear coat finish during installation. Any and all damage to the finish shall be repaired and the clear coat re-applied.

Method of Measurement:

Bicycle Racks will be measured on a per each basis installed complete-in-place.

ITEM 8090006 STEEL PLANTERS

Description:

The work under this section includes furnishing all labor, equipment and materials to construct and install steel planters at the locations and in accordance with the details shown on the project plans and these Special Provisions. The work includes providing, placing and leveling the planters. Planting soil, plants and irrigation are not included and will be provided under separate Sub-Items.

Materials:

Steel planters to be constructed of unfinished steel, welded to the dimension and shapes shown on the project plans and according to the manufacturer's recommendations. Inside of steel planters to be professionally sprayed with a high performance polyurethane-polyurea elastomer, similar to those commonly used in spraying truck beds. Elastomer shall be made of 100% solids, shall contain no volatile organic compounds or solvents and shall provide a flexible and tenacious bond to metal. The elastomer shall remain flexible from -40° to 190° F and be resistant to abrasion and chemicals.

Finish shall be a clear, polyurethane sealer to prohibit metal from rusting onto adjacent surfaces. Submit manufacturer's literature for sealants to the Engineer at the project site.

Construction Details:

Satisfactory steel fabricators and installers must have prior experience fabricating and installing similar unconventional applications equal to or exceeding this project in scope and must be able to show proof of completion of at least 3 projects of similar design complexity.

The finish of the mild steel perforated panels shall be sandblasted to produce a mottled surface appearance with differentiation in the patina color then acid washed to produce an aged and rusted appearance.

The acid washed panels shall be sealed with a 3-coat clear, satin finish, urethane paint. Refer to Standard Specifications Section 610.

The acid wash, urethane clear coat finish shall conform to the finish of a sample located at the offices of the Design Landscape Architect, Wheat Scharf Associates, 442 N. Sixth Ave., Tucson, AZ 85705 - (520) 884-7911.

Eligible Contractors shall be those who have performed similar spraying operations equal to or exceeding this project in scope. All bidders must submit evidence of work that has been provided over a period of a minimum 2 years and within the past 5 years, in order to be qualified to bid.

Once steel planters are constructed, they should be transported and sprayed off site. The spray liner shall cover the entire surface of the inside of the container, to within 2" of the top of the planter. The liner shall be dry to the touch in seconds and shall provide full, unrestricted use in 24 hours or less.

Mark all locations on the site for approval by the Engineer, before beginning installation.

Install in accordance with the project plans. Installation shall be plumb, level and firm.

Do not scratch, abrade or otherwise damage clear coat finish during installation. Any and all damage to the finish shall be repaired and the clear coat re-applied.

Coordinate with irrigation supply and drain work shown on the project plans.

(A) Samples. A one-foot by three foot steel sample shall be produced prior to the start of work, which will represent the procedure, appearance, and finish of the steel panels to be used for the planter. Additional samples may need to be produced until the accurate surface appearance is achieved. The sample is to be approved by the Landscape Architect.

Shop drawings addressing all welds and other structural elements sealed by an Arizona-registered structural engineer shall be submitted to the Engineer prior to construction.

Contractor shall use a fully constructed steel planter to provide a sample of the spray lining for approval by the design Landscape Architect and the Engineer. Contact the Engineer and Wheat Scharf Associates by calling (520) 884-7911, 7 days in advance of dates and times when samples will be constructed and sprayed.

Sample shall demonstrate typical coverage, surface finish, texture, color, and standard of work. Remove rejected samples from the project site and respray lining. Construct additional samples as necessary to obtain approval.

Samples must be approved by the design Landscape Architect and the Engineer before completing spray lining operations. Maintain approved samples during construction in an undisturbed condition as a standard for judging the completed pavement. Approved samples may become part of the completed work if undisturbed at time of Substantial Completion.

Method of Measurement:

Steel planters will be measured on a per each basis, installed complete-in-place.

ITEM 8090007 DRINKING FOUNTAIN

Description:

The work under this section includes furnishing all labor, equipment and materials to provide and install a drinking fountain at the location and in accordance with the details shown on the project plans and these Special Provisions. The work includes providing, placing, attachment with vandal-resistant hardware, and connection to water source.

Materials:

Drinking fountain shall be wheelchair accessible, comply with the Americans with Disabilities Act Accessibility Guidelines (ADAAG), Safe Drinking Water Act and Lead Contamination Control Act, have a push button activated pneumatic valve installed below grade, have heavy gauge cast aluminum pedestal with access plates and vandal resistant mounting hardware. The pedestal shall have an integral mounting plate with four (min.) bolt holes. Waste strainer shall be vandal resistant and have an anti-airlock draining feature.

Drinking Fountain shall be constructed of powder-coated cast aluminum, color RAL 7013, with Stainless Steel bowls and Chrome-plated bubbler heads. Drinking fountain shall be Model 3380, by Haws Corporation, or approved equal.

Construction Requirements:

Drinking fountain assembly includes the drinking fountain, sumps, valve box, gate valve, connection to water supply, concrete foundation, installation hardware, and necessary excavation and backfilling. Install drinking fountain in the location and in the manner shown on the project

plans and according to the manufacturer's instructions. Stake the location of the drinking fountain and obtain approval from the Engineer before beginning installation.

Ensure that drinking fountain valve is installed below frost line.

Method of Measurement:

Measurement of the drinking fountain will be made on a per each basis, complete and in place.

ITEM 8090008 REMOVABLE BOLLARD

Description:

The work under this section includes furnishing all labor, equipment and materials to provide and install Removable Bollards at the locations and in accordance with the details shown on the project plans and these Special Provisions. The work includes excavation, concrete foundation, steel sleeve, locking mechanism and lock, and providing, placing, and attaching Bollards with vandal-resistant hardware.

Materials:

Materials and finish of Removable Bollard shall be in accordance with project plans. In addition, the materials include the steel sleeve, locking mechanism and lock, and vandal-resistant hardware as shown on the project plans.

Finish shall be a multi-stage powder-coating system, including washing, corrosion resistant undercoating, and a final, baked-on polyester color coat. The color shall be RAL 7013, or approved equal.

Construction Details:

Install Removable Bollards in the locations and in the manner shown on the project plans.

Removable Bollards shall be mounted per COT Standard Detail 106 (Type B) and 107.

Mark all locations on the site for approval by the Engineer, before beginning installation.

Do not scratch, abrade or otherwise damage clear coat finish during installation. Any and all damage to the finish shall be repaired and the clear coat re-applied.

Method of Measurement:

Removable Bollards will be measured on a per each basis, including excavation, concrete foundation, steel sleeve, locking mechanism and lock, vandal-resistant hardware and the Bollard.

ITEM 8090009 TILE PEDESTAL

Description:

The work under this section consists of furnishing all labor, equipment and materials to construct cast in place concrete tile pedestals at the locations and in accordance with the details shown on the project plans.

Materials:

Concrete shall be integrally colored, Davis color 'Sandstone', or approved equal.

Concrete shall be Class S, have 28-day strength of 4000 PSI using Type II Portland Cement and conform to the requirements of Section 1006 of the Standard Specifications.

Reinforcing steel shall be ASTM A615, Grade 60 and shall conform to the requirements of Section 1003 of the Standard Specifications.

Construction Requirements:

Tile pedestal locations shall be staked according to the locations shown on the project plans for approval by the Engineer. The contractor shall request the Engineer's review and approval of the pedestal layout:

(A) Prior to beginning excavation for the footing,

(B) Following installation of reinforcing steel, but before placing concrete for foundations.

Concrete shall be placed to ensure that the final pedestal appearance conforms to the requirements of the plans, details and this Section.

Method of Measurement:

Tile pedestals will be measured by the linear foot.

ITEM 8090010 SANDBLAST STREET NAME

Description:

The work under this section consists of furnishing all labor, equipment and materials to sandblast text at the locations and in accordance with the details shown on the project plans.

Construction Requirements:

Text shall be 2-1/2" height, capitalized Gothic Medium font, sandblasted ¼" deep into concrete locations shown on plans, with text to be determined in the field by the Landscape Architect. Text shall be centered on a 6" wide concrete curb, facing the pedestrian, and shall not exceed 16 characters in length.

Contractor shall supply one sample of text sandblasted into a concrete similar to what will be on site to demonstrate technique, font, size and finish. Sample shall be approved by Engineer and Landscape Architect prior to sandblasting all text.

Method of Measurement:

Sandblasted text will be measured on a per each basis, complete in place.

ITEM 8090011 SOLAR PAVER LIGHTS

The work under this section consists of furnishing all labor, equipment and materials to install solar paver lights at the locations and in accordance with the details shown on the project plans.

Materials:

Solar, LED paver light shall be 6.05 inches x 6.05 inches x 2.1 inches, with a brushed/polished stainless steel frame, cast aluminum housing and a theft protection anchor plate, Model SH170C by Meteor, or approved equal. Color of the LED lights shall be blue.

Construction Requirements:

Contractor to stake locations of solar paver lights prior to installation, for approval by Landscape Architect.

According to the manufacturer's recommendations, install paver light cases and anti-theft anchor plates independently of lights to protect lights during construction. Paver lights to be installed flush with surrounding pavement, in accordance with project plans and details. Adjacent pavers and concrete should be installed prior to installing paver lights, to insure a proper fit.

Secure paver light and stainless steel face bracket using burglar proof screws, as directed by the manufacturer, to firmly affix it within the case.

Method of Measurement:

Solar paver lights will be measured on a per each basis, complete in place.

ITEM 8090012 GATEWAY FEATURE

Description:

The work under this item shall consist of furnishing all equipment, materials and labor necessary to construct, finish and install on-site two (2) 3-dimensional, Gateway Features as shown on the project plans. The Gateway Features shall each be approximately 10 feet 11 and 1/2 inches in height.

The work includes:

(A) Mild steel metal work, attachments and finishes;
(B) Photographically anodized aluminum panels and attachments;
(C) Stainless steel structural support, framing and attachments; stainless steel 'collar' fabrication, finish and attachments;
(D) Fully operational low voltage solar powered lighting system including: light emitting diodes; batteries; controllers; photocells; photovoltaic panels; poles, attachments and finishes;
(E) Furnishing and installing and leveling pre-cast concrete landscape containers, including planter drains and application of ceramic and glass tile mosaics to concrete planter, complete, at the locations designated on the project plans and in accordance with these Special Provisions. Planting soil, plants and irrigation are not included and will be provided under separate Sub-Items.

Satisfactory fabricators and installers must have prior experience fabricating and installing similar unconventional applications equal to or exceeding this project in scope and must be able to show proof of completion of at least 3 projects of similar design complexity.

Satisfactory steel fabricators and installers must also have the means to produce 3-dimensional, digital drawings, produce laser cut metal from shop drawings, have an in-house registered engineer and have available cranes and operators for installation if required. The Design Landscape Architect will supply panel perforation design to the Project Engineer as AutoCAD digital files.

Satisfactory anodized aluminum fabricators must have prior experience fabricating panels equal to or exceeding this project in scope and must be able to show proof of completion of at least 3 projects of similar design complexity. The Design Landscape Architect will supply graphic images and panel layout to the Project Engineer as digital files.

Satisfactory fabricators and installers must have prior experience fabricating and installing glass and ceramic tile work equal to or exceeding this project in scope and must be able to show proof of completion of at least 3 projects of similar design complexity.

Materials:

(A) Mild Steel:
Each Gateway Feature shall have a quantity of three (3) mild steel perforated panels, trapezoidal in shape. Refer to project plans for dimensions. Panels shall be constructed of laser cut, 1/8inch thick mild steel, stitch welded, drilled, tapped, and caulked.

Each Gateway Feature shall have a quantity of one (1) mild steel frame panels, trapezoidal in shape. Refer to project plans for dimensions. Panels shall be constructed of laser cut, 1/8 inch thick mild steel, stitch welded, drilled, tapped, and caulked.

The finish of the mild steel perforated panels shall be sandblasted to produce a mottled surface appearance with differentiation in the patina color then acid washed to produce an aged and rusted appearance.

The acid washed panels shall be sealed with a 3-coat clear, satin finish, urethane paint. Refer to Standard Specifications Section 610.

The acid wash, urethane clear coat finish shall conform to the finish of a sample located at the offices of the Design Landscape Architect, Wheat Scharf Associates, 442 N. Sixth Ave., Tucson, AZ 85705 - (520) 884-7911.

(B) Anodized Aluminum Panels:

Each Gateway Feature shall have a quantity of 1 anodized aluminum panel, trapezoidal in shape. The height and shape of the aluminum panels shall be as shown on the project plans. Anodized Aluminum Panels shall be fabricated of Aluminum plates, 0.5mm (min) in thickness, with pre-drilled holes.

Graphic images shall be photo-anodized into the panels in the following manner: An Aluminum Oxide layer shall be evenly distributed across the substrate. The 'opened' pores shall be filled with lacquer and dyes of a 4-color ink process, allowing an image to be printed into, not onto, the aluminum panel. The graphic image shall have an anodic depth color penetration of no less than 25 microns.

The Aluminum panels shall then be immersed in a hot acid bath, sealing the pores under a layer of transparent aluminum crystals, creating a sapphire-hard, transparent Aluminum Oxide coating. Film or other surface applications are not acceptable.

The printed imagery shall be a 133-line screen film that produces a resolution of 400 DPI and shall be printed full bleed (i.e. to the edges of the panels).

The Aluminum panels shall be scuff and abrasion resistant, heat resistant to 500 degrees F, ultra-violet resistant, graffiti-proof and impervious to gasoline, grease, acetone, salt water and solvents. The panels are to have a 20-year guarantee.

Provide finished sample of Aluminum panel including sample photo-anodized image 12 inches x 12 inches in size to the Project Engineer at the project site for approval prior to fabricating panels.

The silicon-based adhesive required to attach the panels to the wall shall be suitable for outdoor use and shall adhere to both aluminum and mild steel frame. Submit manufacturer's literature to the Engineer at the project site prior to purchasing adhesive or installing panels.

(C) Stainless Steel:

All steel required for structural support, framing, attachments shall be 304 stainless steel.

The 'collar' of the Gateway Features, as shown on Project plans, shall be constructed from 4" diameter Stainless steel tube.

(D) Solar Powered Light Emitting Diodes (LED) Lighting System:

Light emitting diodes (LED) shall be as manufactured by Lumileds-Luxeon, Star Hex, or approved equal. Each Gateway Feature shall have approximately 20 LED's. The LED's for each Gateway Feature shall be 1 watt each, an efficiency rating of 85% and be 140° degree lambertian radiation patterned and able to emit a minimum of 120 lumens from each single source. Each LED will have 70% lumen maintenance of 50,000 hours.

The lens shall be silicone encapsulated and mounted on a hexagon platform. The LED shall be made exterior grade by placing it into a plastic fixture and waterproofed with silicone. The LED's shall be connected in a parallel configuration and shall have a thermal resistance of 17 degrees Celsius/watt or lower. The colors of the LED's shall be available in cyan, red-orange, amber, royal blue, and white. The LED's will be installed in the field and the location of each LED shall be as approved by the Landscape Architect.

The LED's shall be solar powered. There will be two independent solar powered systems; one for each Gateway Feature as shown on the plans. Each solar power system shall consist of the following; steel mounting pole for photovoltaic panel, photovoltaic panel, battery, controller and battery box.

The steel pole shall be 15 feet tall, 3 inch diameter, Schedule 40, powder coated to match adjacent light pole. Refer to Hardscape Plans for locations.

The photovoltaic panel shall be a 65-watt panel, 29.6 inches long x 25.7 inches wide x 2.1 inches deep. The weight of the panel shall not exceed 13.2 pounds. The photovoltaic panels shall be KC65T manufactured by Kyocera, or approved equal.

The LED's shall be mounted on a 3" stainless steel square tube attached with stainless steel metal screws.

Batteries shall be Gel cell, 12 VDC, 90 amp/hr, Sealed.

Controller shall be SL-10.

Battery Box shall be 16 gauge iron, painted black, piano hinge, hasp closure on top.

(E) Concrete Planters:
Concrete planters shall be provided for placement on top of each Gateway feature. Containers shall be Dune Series Model DS-17.5 manufactured by Kornegay Designs, or approved equal. Color shall be integral to the concrete and provided in Davis Color.

(F) Glass & Ceramic Tiles:

All materials used in the manufacture and installation of the tile areas shall conform to the current edition of the Tile Trades American National Standards Institute. Tiles shall consist of glass tile and handmade ceramic tile.

Adhesives used to install the tiles shall be epoxy mortar and grout for maximum vibration resistance, protection from hydrostatic pressure, thermal tolerance and longevity and as recommended by the tile manufacturer.

Construction Requirements:

(A) Steel:

Fabricate the metal perforated panels according to the dimensions and patterns shown on the project plans. The steel shall be cut in the patterns provided with a laser cutter. Grind cut edges smooth. Paint panels, including surface preparation, primer and paint, as described in Section 610 of the Standard Provisions. The perforated patterns shall be provided as CADD drawings from the Landscape Architect.

The metal perforated panels shall be attached to the stainless steel framing members by means of drill and tap. Refer to Project plans for size and attachment details.

A one-foot by three foot steel sample shall be produced prior to the start of work, which will represent the procedure, appearance, and finish of the perforated steel panels to be used on the project. Additional samples may need to be produced until the accurate surface appearance is achieved. The sample is to be approved by the Landscape Architect.

Shop drawings addressing all welds and other structural elements sealed by an Arizona-registered structural engineer shall be submitted to the Engineer prior to construction.

The following three local companies have the experience and capability of fabricating, finishing and installing the metal work for the Gateway Feature:

(A) Creative Machines Inc. (520) 294-0939
(B) Skyline Steel (480) 926-0122
(C) T.A. Caid (520) 294-3126

(B) Anodized Aluminum Panels:

Installation of the Aluminum panels shall use both adhesive and stainless steel screws. Apply adhesive uniformly to the edge surfaces of the panels in accordance with the manufacturer's instructions and mount onto a clean, dust free steel frame surface. Stainless steel, button head hex security sheet metal screws with plastic plug anchor and silicone flanges shall be used to mount the panels onto the steel frame. Panels shall be provided with pre-drilled holes.

Care shall be given as to not scratch/break or otherwise damage the surface of the panels so as to not break the transparent Aluminum Oxide coating. if it is damaged, it shall be removed from the site and replaced

(C) Stainless Steel:

One stainless steel 4 inch tube 'collar' shall be fabricated prior to installation. Additional samples may need to be produced until the accurate appearance is achieved. The sample is to be approved by the Landscape Architect.

Steel framing members shall consist of stainless steel square stock and shall be attached to the stainless steel top plate and concrete base. Refer to Project plans for size and attachment details.

(D) Solar Powered Light Emitting Diodes (LED) Lighting System:

The Contractor shall secure all the materials, equipment, and incidental items required to install the solar powered LED lighting system for the Gateway Features, complete in place and fully operational.

The Contractor shall furnish any necessary holders, hangers, fasteners and other incidental items in accordance with the manufacturer's recommendations.

Layout and lighting effect of Light Emitting Diodes (LED) shall be reviewed and approved by the Landscape Architect and Project Engineer prior to installation of the steel sculpture.

The location of the photovoltaic poles shall be approved by Landscape Architect and Project Engineer prior to installation.

(E) Concrete Planters:

Concrete planters shall be located as shown on the project plans, elevated on top of each Gateway Feature. Tile shall be installed prior to the placement of the planter according to these Special Provisions.

Drainage hole shall be 1 ½ inch in size and shall be placed off center. Exact location shall be coordinated with Landscape Architect, Structural Engineer and Irrigation Consultant.

Installation shall be plumb, level, and firm. Coordinate with irrigation supply and drain work shown on the project plans.

Do not scratch, abrade or otherwise damage finish, both concrete and tile surfaces during installation. Any and all damage to the finishes shall be repaired in accordance with the manufacturer's instructions. Extensive or irreparable damage shall be grounds for rejection and replacement.

Planting soil, plants and irrigation are not included and will be provided under separate Sub-Items.

Planter Drain

(F) Glass and Ceramic Tiles:

Tiles shall be applied to the surfaces of the concrete pots and shall cover approximately 60% of the exterior to the concrete pots.

Attach tiles as recommended by the tile manufacturer.

Method of Measurement:

Steel work will be measured on a lump sum basis for the work completely assembled, installed and demonstrated as securely installed.

Photographically anodized, aluminum panels will be measured on a lump sum basis for the work completely assembled, installed and demonstrated as securely installed.

Solar Powered Light Emitting Diodes (LED) System will be measured on a lump sum basis for the work completely assembled, installed and fully operational.

Concrete planters will be measured per each furnished and installed, as specified herein.

Glass and ceramic tile work will be measured on a square foot basis for the work completely assembled, installed and demonstrated as securely installed.

SECTION 908 - CONCRETE CURBS, GUTTERS, SIDEWALKS AND DRIVEWAYS

908-1 Description: of the Standard Specifications is modified to add:

All handicap ramps shall have detectable warnings (truncated domes) complying with the Americans with Disabilities Act.

908-2 Materials: of the Standard Specifications is modified to add:

908-2.05 Truncated Domes. Use East Jordan Iron Works, or approved equivalent, cast iron, corrosion resistant, ADA compliant, natural finish 2 – 24" X 24" detectable warning plates. Install according to manufacturers recommendations.

908-3 Construction Details: of the Standard Specifications is modified to add:

Sidewalk forms must be approved by the Engineer prior to placing concrete.

The installation of the detectable warnings and concrete finishing shall follow the requirements of ADOT Standard Drawing C-05-30, and can be found at http://www.azdot.gov/Highways/Rdwyeng/RoadwayDesign/Index.asp. Installation of the detectable warnings shall supercede the installation of scored grooves as shown in Detail 207 of the Standard Details.

908-4 Method of Measurement: of the Standard Specifications is modified to add:

Detectable warnings (truncated domes) installed as part of handicap ramps shall be measured as part of each handicap ramp installed.

Vertical curb installed as part of handicap ramps shall be measured as part of each handicap ramp installed. Depressed and transitional curb for the curb access ramp wing shall be measured as part of the curb for this contract.

SECTION 909 - SURVEY MONUMENTS

909-3 Construction Details: of the Standard Specifications is modified to add:

Contractor shall replace all existing survey monuments on this project per City of Tucson Standard Detail 103, Sheet 2 of 3, if the monument is on a section line, or Sheet 1 of 3, if the monument is not on a section line, with the exception that any section corners or 1/4 corners found which are not built in accordance with Standard Detail No. 103-2/3, shall be changed to meet said standard when adjusted.

The setting of the bronze marker shall be accomplished as soon as the concrete block has been poured and shall be done only in the presence of the Engineer's survey party, who will give the location of said marker.

ITEM 9140155 CONCRETE SEAT WALL

Description:

The work under this section consists of furnishing all labor, equipment and materials to construct cast in place concrete seat walls at the locations and in accordance with the details shown on the project plans.

Materials:

Concrete shall be Class S, have 28-day strength of 4000 PSI using Type II Portland Cement and conform to the requirements of Section 1006 of the Standard Specifications.

Reinforcing steel shall be ASTM A615, Grade 60 and shall conform to the requirements of Section 1003 of the Standard Specifications.

3.5W LED recessed wall luminaire, 24V DC.

Construction Requirements:

Seat wall locations shall be staked according to the locations shown on the project plans for approval by the Engineer. Concrete wall joints shall not be visible. The contractor shall request the Engineer's review and approval of the wall layout:

(A) Prior to beginning excavation for the footing,

(B) Following installation of reinforcing steel, but before placing concrete for foundations.

Concrete shall be placed to ensure that the final wall appearance conforms to the requirements of the plans and this Section.

Method of Measurement:

Seat walls will be measured by the linear foot of wall constructed.

ITEM 9240170 CONTRACTOR QUALITY CONTROL:

1.0 Description:

The work under this section shall consist of furnishing all personnel, materials, supplies, facilities and equipment necessary to perform all certification of test equipment, sampling, testing, and other control actions. The work shall also include the preparation of linear control charts, Weekly Quality Control Reports, and other reports and records as described in Subsection 106.04(C) of the Specifications.

2.0 Method of Measurement:

Contractor quality control will be measured for payment on a lump sum basis as a single unit of work.

SECTION 931 DECORATIVE CONCRETE PAVEMENT

931-1 Description: of the Standard Specification is modified to add:

Work under this item includes concrete pavement with 2 finish types: 1) integrally colored and etched, 2) integrally colored with hand-seeded glass aggregate, and 3) integrally colored exposed aggregate. Refer to project plans for locations of each type.

931-2 Materials: of the Standard Specifications is modified to add:

931-2.06 Integral Color:

Compounds used for integrally colored concrete pavement shall be synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, nonfading, and resistant to lime and other alkalis, conforming to ASTM C 979.

All materials used in the colored concrete and all methods used from the mixing of concrete to the finishing of the concrete shall remain constant and exact throughout the work to ensure uniform color. Contractor shall provide evidence of uniform materials and mixtures as needed to satisfy the Engineer.

Concrete color shall be a single-component, pure, pigmented, water reducing, concrete admixture and a pure synthetic iron oxide pigment, permanent to sunlight and weather, lime proof and uniform as recommended by the Portland Cement Association. Color shall be factory formulated and packaged. Concrete color shall contain no reactive aggregate and no calcium chloride. Concrete shall be integrally colored by dry mixing at a ready-mix plant. Color samples shall be submitted and approved by the Engineer before beginning work, in accordance with sample requirements outlined in Subsection 908-3 of the Special Provisions.

All fine and coarse aggregates must be totally non-reactive (free from deleterious particles). A normal set or retarded set water reducing admixture may be used, but the concrete substrate must contain no other admixture, such as calcium chloride or water proofing additives containing calcium chloride.

All batching, placing, finishing, curing, and caulking shall be in accordance with the manufacturer's written recommendation, which shall be provided to the Engineer prior to construction.

The color shall be Davis Colors No. 5237, Sandstone, with 0.75 pound of color used per 94-pound sack of cement.

931-2.07 Aggregate:

Exposed aggregate concrete to contain 3/8" rounded aggregate, Carson mix.

Seeded glass aggregate as identified on the project plans shall be 3/8-inch size unwashed, tumbled bottle glass from a single source acceptable to the Engineer. Aggregate colors shall be mixed in equal proportions and as follows:

Color Name	Provider
Milk White #1	Progressive Concrete
Window Clear #1	Progressive Concrete
CR Green 2 #1	Progressive Concrete

A 1-pound sample of each glass aggregate color shall be provided to the Engineer at the project site for approval prior to purchase.

931-3 **Construction Details:** of the Standard Specifications is modified as follows:

Eligible Contractors shall be those who have performed similar concrete coloring and finishing construction equal to or exceeding this project in scope. All bidders must submit references of past clients for whom successful concrete, seeded glass aggregate and coloring pavement work has been provided, over a period of a minimum 2 years and within the past 5 years, in order to be qualified to bid.

(A) Samples. Construct sample panels of each color and finish for approval by the design Landscape Architect and the Engineer. Contact the Engineer and Wheat Scharf Associates by calling (520) 884-7911, 7 days in advance of dates and times when samples will be constructed.

Samples shall demonstrate typical joints, surface finish, texture, color, and standard of work. Construct samples 4 feet x 4 feet in size. Remove rejected samples from the project site. Construct additional samples as necessary to obtain approval.

Samples must be approved by the design Landscape Architect and the Engineer before starting construction. Maintain approved samples during construction in an undisturbed condition as a standard for judging the completed pavement. Approved samples may become part of the completed Work if undisturbed at time of Substantial Completion.

Decorative concrete paving shall be installed as indicated on the plans. Contractor shall stake layout of all decorative paving for approval by the design Landscape Architect prior to constructing forms. Forms must be approved by the Engineer prior to placing decorative concrete.

The same batch of concrete shall be used continuously in each decorative pavement area. The Contractor shall anticipate the concrete quantity so that no accent area will contain concrete from more than one batch.

(B) Etched Finish. Immediately after initial floating, trowel surface to smooth finish and spray-apply chemical surface retarder to pavement according to manufacturer's written

instructions. Cover pavement surface with plastic sheeting, sealing laps with tape, and remove sheeting when ready to continue finishing operations. Without dislodging aggregate, remove excess mortar by lightly washing surface with a fine-spray of water to expose fine sand particles.

(C) Seeded Glass Aggregate Finish. Immediately after initial floating, spread a single layer of glass aggregate on pavement surface, as shown in Project Plans. Trowel aggregate into plastic concrete, and float finish to entirely embed aggregate with mortar cover of 1/16 inch. Ensure there are no areas where sharp points of aggregate may be protruding above concrete surface. Spray-apply chemical surface retarder to pavement according to manufacturer's written instructions. Only if included in surface retarder manufacturer's instructions, cover pavement surface with plastic sheeting, sealing laps with tape, and remove sheeting when ready to continue finishing operations.

Without dislodging aggregate, remove excess mortar by lightly brushing surface with a stiff, nylon-bristle broom. Fine-spray surface with water and brush again. Repeat water flushing and brushing cycle until cement film is removed from aggregate surfaces to depth required.

The completed surfaces shall be cleaned to remove residual dust and excess retardant.

(D) Joints. Key all joints between pours to prevent vertical slipping.

Control Joints: Form weakened-plane control joints, sectioning concrete into areas according to the project plans. Construct control joints for a depth equal to at least one-fourth of the concrete thickness, and fill with wet concrete. Control joints shall be 3/8-inch wide and 1" deep and created using a tool designed for such a purpose.

Expansion joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, structures, walks, seatwalls, and other fixed objects, and where indicated in the project plans.

Cold Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints. Provide preformed keyway-section forms or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete. Finish edges with a 1/2-inch radius edging tool.

931-4 **Method of Measurement:** of the Standard Specifications is modified to add:

Decorative concrete pavement will be measured by the square yard. The sample panels will be considered as included with the decorative concrete pavement and will not be measured separately.

SECTION 932 PAVERS

932-1 **Description:**

The work under this item consists of furnishing materials and labor necessary for constructing concrete pavers on a Portland Cement setting bed at the locations and in accordance with the details shown on the project plans and these special provisions.

932-2 Materials:

932-2.04 Concrete pavers:

Pavers shall be 12 inches x 12 inches x 2 inches, Type 9 'Terra-Pavers', by Wausau Tile, or approved equal. Pavers to contain recycled glass aggregate, color shall be 'Turquoise', by Wausau Tile, or approved equal.

Pavers must meet or exceed ASTM industry standards for compressive and flexural strength, water absorption and freeze-thaw testing. Contractor to submit manufacturer's descriptive literature, installation instructions and 3 copies showing compliance with specified ASTM requirements. At the time of delivery to work site, the average compressive strength shall not be less than 8,000 psi with no individual unit less than 7,000 psi per ASTM C 140. Average absorption shall not be greater than 6% per ASTM C140 and flexural strength shall not be less than 800 psi per ASTM 293.

Portland cement mortar mix shall conform to ASTM C 150 Custom Building Products thick Bed mortar mix with Admix, or approved equal.

Grout shall be Custom Building Products Grout with Admix, color to be determined by Landscape Architect.

Elastomeric sealant to match adjoining pavement and approved by Landscape Architect.

932-3 Construction Details:

932-3.04 Concrete pavers:

Do not perform work during freezing conditions or on wet or frozen substrate.

Do not use unit pavers with chips, cracks, voids, discolorations, and other defects that might be visible or cause staining in finished work. Remove and replace any pavers that have become loose, chipped, broken, stained or otherwise damaged.

Field cut unit pavers to a size of 12 inches x 6 inches x 2 inches with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated in accordance with project plans and details and to fit adjoining work neatly. Hammer cutting is not acceptable.

Mix mortar setting bed per manufacturer's recommendation, working in sufficient water to obtain desired consistency. Avoid use of excess water. Rework mixes from time to time to

maintain proper consistency, as recommended by the manufacturer, but do not add ingredients. Discard mortar that has reached its initial set.

Install pavers in the locations and in the pattern shown on the project plans.

Grout pavers in strict accordance with grout manufacturer's directions and instructions.

Remove mortar stains and all other types of soiling from exposed paver surfaces, wash and scrub clean. Provide final protection and maintain conditions in an acceptable manner to installer

Installer shall submit evidence of skill and not less than 5 years specialized experience with installing this type of product.

Method of Measurement:

Concrete pavers shall be measured by the square foot of area shown on the plans or as directed by the Engineer, including all compaction, base preparation and finishing.

SECTION 975 - TELECOMMUNICATIONS INFRASTRUCTURE

975-1 DESCRIPTION

The work covered under this section shall consist of a Complete-in-Place installation, furnishing all material, labor and equipment, and installing conduit, pull boxes, vaults, and tracer wires for an underground fiber optic conduit system, including excavation, backfilling, compacting, jacking, and boring in accordance with the details.

975-2 MATERIALS

975-2.01 Polyvinyl Chloride (PVC) Conduit.

All conduit shall be listed by UL and conform to NEC standards. Unless otherwise specified, all conduit to be installed underground or installed in concrete structures shall be 4-inch diameter, rigid Polyvinyl Chloride (PVC) Non-Metallic Conduit. The PVC conduit shall be schedule 40, heavy wall, sunlight resistant, manufactured from high impact material and shall be rated for use at 90 degrees centigrade. The conduit shall meet the specifications of UL 651 and NEMA TC-2, and furnished with interface fit bell ends.
Fittings shall be schedule 40 PVC, meeting the specifications of NEMA TC-3 and UL 514.

975-2.02 Conduit with Integral Innerduct.

Conduit with Integral Innerduct shall be of schedule 40 PVC in modular, slip fit lengths. Shall have pre-lubricated innerducts with internal spacers and which expand and contract at the same rate as the outerduct. Shall have anti-reversing gaskets, and an o-ring gasket at bell base. Shall have inward tapering holes on coupling body for easy assignment, printed indication such as

"Install Print Side Up" to keep system straight during installation, and marked innerduct and marked hole on coupling body to insure proper
innerduct alignment and allow crews to work from opposite directions. Bends shall be flexible and engineered to be cut-through resistant. Carlon Telecom Systems Multi-Gard or equivalent. All integral innerducts shall have a continuous unspliced, detectable 1250 pound test mule tape installed

975-2.03 Solvent Cement for Polyvinyl Chloride (PVC) Conduit and Couplings.

All solvent cement shall meet the requirements of ASTM D 2564. The cement shall be of a medium or heavy bodied cement capable of making watertight joints. The cement and primer shall be of a type recommended by the manufacturer of the conduit.

975-2.04 Rigid Steel Conduit Sweeps.

Conduit sweeps shall be listed by UL and conform to NEC standards. The sweeps shall be steel, hot dipped zinc coated, meeting the requirements of UL 6 and ANSI C80.1, and shall carry the Underwriters Laboratory label. Non-thread couplings shall not be used. Sweeps shall have a minimum radius of 12 times the nominal diameter of the conduit. Steel conduit sweeps shall have a factory applied 40 mil PVC coating or be doubled (half overlap) wrapped with a 10 mil PVC plastic tape specifically manufactured for corrosion protection of metallic conduits installed below grade.

See Figure TD-01 '4" POLE RISER – TYPICAL' for installation details.

975-2.05 Flexible Conduit.

When specifically indicated on the plans and where approved by the engineer, flexible solid wall direct bury conduit may be used. The conduit shall be manufactured of Polyvinyl Chloride (PVC), or Polyethylene (PE) plastic. The conduit shall be specifically manufactured for direct buried fiber optic
raceway systems and shall be Carlon "Optic-Gard PE" conduit, or approved equal. Flexible conduit shall not be utilized for making bends in conduit system. Connection between the flexible conduit and conduits of other materials shall be made with a watertight transition coupling manufactured for the specific type of material.

975-2.06 Plastic Conduit Spacers.

Spacers shall be constructed of Polyvinyl Chloride (PVC) or other nonmetallic material. The spacers shall be vertical and horizontal interlocking and provide a minimum of 3-inch clearance between conduits. Base spacers shall be provided with a wide base plate to provide solid support on the bottom of the trench. The base spacers shall provide for a minimum clearance of 3 inches between the bottom of the trench and the conduit.

975-2.07 Aggregate Bedding Material.

Aggregate material for bedding material shall meet the gradation indicated in the specifications and on the drawings for the subject project. The plasticity index shall also conform to the specifications under which the subject project is designed and constructed.

975-2.08 Controlled Low Strength Material (CLSM).

Materials comprising the controlled strength material shall conform to the requirements of Section 1006. CLSM mix designs shall be in accordance with Table 975-2. Unless otherwise designated on the plans, in the special provisions or directed by the Engineer, the CLSM shall be Mix No. 2.

Table 975-2

Mix Proportions For Controlled Low Strength Material

	CLSM No. 1	CLSM No. 2	CLSM No. 3
Compressive Strength, 28 days PSI	50	500	1000
Portland Cement (lb)	60	190	280
Water (lb)	475	460	440
Fly Ash (lb)	290	300	300
Fine Aggregate (lb)	2,770	2,680	2,650

975-2.09 Detectable Warning Tape.

On open trenching an electronically detectable 6" Fiber Warning tape shall be installed 18" above the conduit. Tape shall be acid and alkali-resistant polyethylene film, with a minimum thickness of 0.004 inch. The tape shall have a minimum strength of 7500 PSI lengthwise and 1,500 PSI crosswise. The tape shall be manufactured with integral wires, foil backing, or other means to enable its detection by a metal
detector when the tape is buried up to a depth of 3 feet deep. The tape shall be orange in color and have the
following continuous inscription, "CAUTION - FIBER OPTIC CABLE BURIED BELOW". The inscription shall be 2 inch black letters.

975-2.10 Backfill Material.

The backfill material shall conform to that of the subject project.

975-2.11 Tracer Wire.

The cable and wire shall be listed by UL and conform to NEC standards. The wire shall
be a continuous unspliced stranded CU 10AWG, rated for 600 volts, and shall be type THW or XHHW. The color of the wire shall be green. The wire shall be of the required length to eliminate all splices within the conduit.

975-2.12 Pull Boxes.

Communications pull boxes shall be UL listed. Pull boxes shall be of a reinforced composite material of a neutral color. The pull box shall have a bolt-down cover secured by a minimum of two (2) recessed hex-head bolts. The pull box cover shall have the word "COMMUNICATIONS" in permanent raised, stamped or welded lettering. The pull box cover shall have a skid-resistant surface. Pull boxes shall be open base.
The pull box cover shall have two (2) ½" x 4" pull slots. The pull box base shall have two (2) 4 ½" x 4 1/2" mouse holes, one at each end. Pull boxes may be extended by means of an "extension". The extension shall have eight (8) 4 1/2" x 4 1/2" knockouts, two on each side. Contractor shall provide all necessary collars, extensions, hardware, sealant, and conduit caps. All conduit entrances shall be sealed. The assigned pull box number shall be painted on the box at the time of installation. Chipped, cracked, or otherwise damaged boxes and covers will not be accepted.

See attached Figures: Standard Detail FO-300 "FIBER OPTIC PULLBOX', and 'Pencell – PEM-3048-PCH-COM'.

975-2.13 Vaults.

Communications vaults shall be UL listed. Vault base shall be pre-cast concrete with a minimum thickness of 4". Vault cover shall be pre-cast concrete with a minimum 36" x 36" galvanized steel locking lid secured by a minimum of one (1) recessed hex-head bolt. The cover lid shall have "COMMUNICATIONS" written on it in permanent raised, stamped or welded lettering. The vault base and vault cover shall be gasketed and weather proof. Vaults shall have a minimum outside dimension of 48" long by 48" wide by 50" high with a minimum thickness of 4". The base shall have one (1) 8" diameter by 4" deep sump hole knockout in the floor. The base interior shall have a minimum of one (1) 2 ½" diameter ground rod knockout in the floor , at a corner; the base interior shall have four (4) 7/8" diameter pulling irons, one centered on each side. The
base exterior walls shall have four (4) 36" "C" channels precast in the sides, one on each side; the base exterior shall have four (4) 18" x 18" knockouts, one on each side; and, the base exterior shall have sixteen (16) 4 1/2" diameter knockouts for 4" conduit entrances, four on each side. Contractor shall provide all necessary collars, extensions, hardware, sealant, and conduit caps. All conduit entrances shall be sealed. The assigned box number shall be painted on the box at the time of installation. Chipped, cracked, or otherwise damaged boxes and covers will not be accepted.

975-2.14 Portland Cement Concrete.

Concrete shall be Class B meeting the requirements of Section 1006 of the Pima County/City of Tucson Standard Specifications for Public Improvements.

975-2.15 Innerduct.

Innerduct shall be 1" PVC constructed of a smooth walled exterior and a ribbed interior

with a continuous unspliced 1250 pound test muletape installed. No corrugated innerduct will be accepted.

975-2.16 Watertight Alibi.

Watertight Alibi shall consist of a Quadraplex Duct Plug designed to seal around, organize, and support innerduct where it emerges at the top of the risers, pull boxes, and vaults. Fasteners shall be stainless steel. Plug shall support a minimum of 400 lbs of cable, and shall be removable. Jackmoon or equivalent.
No chemical seals will be accepted.

975-2.17 Blank Duct Plugs.

Blank Duct Plugs shall be installed in each individual innerduct where it emerges at the top of the risers, pull boxes, and vaults. Shall be all plastic construction, corrosion proof, water and air tight to 30 psi. Jackmoon or equivalent.

975-3 CONSTRUCTION DETAILS

975-3.01 Conduit.

(A) Handling and Storage.

All conduit shall be transported in modules or bundled in a straight and level position. The straps securing the conduit to the vehicle shall be a minimum of 4 inches in width and shall not deform or damage the conduit in any manor. Conduits shall be unloaded in accordance with the manufacturer's recommendations and shall not be dropped to the ground. Conduits shall be stored in a straight and level position in stacks not exceeding 8 feet in height. Materials shall be stored in an approved manner and covered to prevent ultraviolet deterioration due to the exposure to sunlight. When stored, conduit ends shall not be capped nor shall conduit be subject to temperatures in excess of 140 degrees F.

(B) Cleaning.

The interior of the conduit shall be kept clean and free of debris. Prior to installation, all foreign materials shall be removed from the interior of the conduit with compressed air and a swab.

(C) Size.

Unless otherwise indicated on the plans or special provisions, all conduit shall be 4-inch diameter.

(D) Cuts and Connections.

The conduit shall be cut square, de-burred, and trimmed to remove all rough edges. PVC conduit connections shall be of the solvent weld type. Wipe conduit dry and clean before joining. Apply a full coat of primer to the pipe and coupling per the manufacturer's recommendations. Apply a full and even coat of
solvent cement to the entire area inserted into the fitting. Prevent excess cement from accumulating in the interior of the conduit. Allow joint to cure a minimum of 20 minutes. The complete joint shall be water tight. Where a connection is made to a steel bend, the coupling used shall be a PVC female adapter.
Expansion fittings shall not be installed in PVC conduit runs unless otherwise specified. Expansion fittings shall be installed in conduit runs where both ends are fixed in-place, such as between two foundations, and within concrete structures. Expansion fittings shall allow for a minimum linear expansion of six inches.

(E) Bends.

Bends shall be installed only when absolutely necessary. All bends shall be constructed ofrigid steel conduit. Bend shall be factory bent or field bent. Bends shall have a radius of not less than 12 times the
nominal diameter of the conduit. Conduit shall be bent without crimping or flattening, using the longest radius practicable. The sum of the deflection angles of all bends in any conduit run shall not exceed 270 degrees between termination and/or junction points. For the purpose of calculating the sum of the deflection angles, bends with a radius of 500 feet or greater may be excluded from this criteria.

(F) End Treatment.

Conduit ends shall be plugged at all times when work is not in progress. Rigid steel sweeps terminating in pull boxes shall terminate with an approved plastic bushing.

(G) Placement.

Conduit runs shown on the plans shall be changed only to avoid underground obstructions and only as directed by the Engineer and the City of Tucson Communications Engineering (CE) Representative.
Unless otherwise specified, conduits shall be placed with a minimum cover of 36 inches to the top of the conduit below the finished grade. When conduit runs, or any part thereof, cannot be installed at the minimum depth, the run, or part thereof, shall be encased in concrete.

Conduits shall be installed along the straightest horizontal and vertical alignment practicable, and with a uniform depth of cover. Variations in the alignment shall be accomplished with smooth transitions maximizing the radius of the bends. In cases where it is impossible to maintain the alignment of the conduit, the grade of the conduit shall be transitioned using the minimum number and the longest radius bends. Should discovered field conditions necessitate additional bends in the conduit run, the location and number of pull boxes shall be adjusted as directed by the Engineer and City of Tucson Communications Engineering (CE) Representative.

Conduits to be encased within Controlled Low Strength Material (CLSM) or concrete shall be installed on plastic conduit spacers. The spacers shall be placed at suitable locations to prevent sagging of the conduit between spacers or at 10 foot maximum centers. Prior to the placement of the CLSM or concrete, the conduits shall be tied down to prevent them from floating.

Conduit penetrations into pull boxes shall be made using the knockouts or shall be cored in the structure. Conduits entering through the side wall of pull boxes shall be located three inches above the floor and three inches away from the end wall of the box. Conduit entering the bottom of pull boxes shall be located in the near side corner of the box, approximately 3 inches away from the side and end walls. The conduit shall be sloped towards the top center of the box to facilitate pulling of the cables and innerduct. Conduits terminating in pull boxes shall terminate a minimum of three inches inside the box wall. The void between the conduit and the box shall be completely filled with mastic to form a watertight seal.

Conduits entering vaults shall enter through single duct knockouts. The location of the knockout shall be as indicated on the plans, or directed by the Engineer. The joint between the knockout and the conduit shall be filled to form a watertight seal.

At all locations where the conduits cross under a new curb, the letters "FO" shall be cut into the top of the curb directly over the conduit run. The letters shall be three inches tall and shall be clearly defined.

975-3.02 Trenching.

Unless otherwise specified, all conduit runs shall be installed by trenching methods. Trenching shall include the removal of all material to the design grade no matter what type of material is encountered. The alignment of the conduit shall be staked in the field per the City of Tucson's standard procedures.

When trenching in excess of five feet is required, the contractor shall submit, in writing to the Engineer, a detailed description of their proposed trenching operations, including shoring methods, prior to the commencement of construction.

All conduit shall be covered with bedding material or Controlled Low Strength Material (CLSM) at the completion of each day's work to prevent shrinkage and thermal expansion that could influence the alignment of the conduit.

Concrete encasement shall be a minimum of Class B (2,500 PSI) in accordance with Pima County/City of Tucson Standard Specifications and provide a minimum cover on all sides of the conduit of 3 inches. Otherwise, bedding and shading of the conduit shall be in accordance with the plans and specifications of the subject project. When installed adjacent to water mains, the conduit stall be encased in Controlled Low Strength Material (CLSM).

(A) Bedding and Shading.

Bedding and shading of the conduit shall be in accordance with the following:

Conduits installed in conjunction with Tucson Water projects shall be designed and installed under the plans and specifications of the subject project.

Conduits installed with traffic signal or street lighting conduits shall be designed and installed under the plans and specifications of the subject project.

Conduits with a depth of cover less than cited above, and where indicated on the plans, shall be encased in
concrete. The concrete shall be placed to provide a minimum of three inches of encasement on all sides of the conduit.

(B) Backfill.

Upon completion of the conduit and bedding installation, the trench shall be backfilled and compacted. The backfill shall be designed and constructed under the plans and specifications of the subject project. Place the detectable warning tape in the backfill, 18 inches below finished grade and directly above the conduit.

975-3.03 Boring and Jacking.

Conduit runs shall be installed by boring and jacking methods when required by the plans or directed by the engineer. The boring and jacking method shall be approved by the engineer prior to the commencement of work. Where a conduit run is required by the plans to be installed by boring or jacking, the trenching method shall not be utilized except with prior written approval of the Engineer.

When casing is used, the casing shall be schedule 40 "standard wall" steel pipe. The casing shall not deviate more than 0.20 feet from the design grade. The joints in the casing shall be fully welded in accordance with A.S.M.E. Section 9. Concrete end seals shall be provided at each end. The intervening annular space shall be filled with sand material approved by the Engineer.

Conduits installed within the casing used for water mains shall consist of either four each one (1) inch, four each one and one-half (1 1/2) inch, or two, or more, two (2) inch diameter flexible conduits. The largest practical size shall be used. The conduits shall be strapped to the glass reinforced skids installed on the water line, pulled into the casing after the water main is installed, or installed on a hanger welded to the casing. The alignment of the conduits shall be maintained as straight as possible. The placement of sand within the annular space of the casing shall be controlled to a rate that does not displace the conduit.

Boring and jacking pits shall be located a minimum of two feet outside the pavement edge. The diameter of the bore shall be as close to the outside diameter of the conduit such that it will enable the conduit to be installed. At all locations where the diameter of the bore is 2 inches, or greater, than the outside diameter of the conduit, the interstitial space between the conduit and the bore stall be filled with slurry. All boring and jacking methods used shall neither damage nor

deform the conduit. The installed conduit shall conform with the alignment and grade shown on the plans.

975-3.04 Concrete Structures.

Conduit embedded in concrete structures shall be securely attached to the reinforcing steel at locations and intervals detailed on the plans. Expansion fittings shall be installed at all locations where the conduit crosses expansion joints in the structure. Expansion joints shall also be installed at the point where the conduit enters and exits the concrete structure. Where it is not possible to install expansion joints, the
conduit shall be installed in a conduit sleeve of sufficient size to provide a minimum of 1/2-inch clearance between the outside diameter of the conduit and the inside wall of the sleeve. Sleeves shall be discontinuous across the expansion joints in the structure.

975-3.05 Pull-Boxes and Vaults.

Prior to setting the pull box or vault, verify that the excavation is to the design elevation and alignment. Pull boxes shall be placed on a minimum of five cubic feet of clean 1" (size #57) crushed stone to provide drainage. Vaults shall be placed on a minimum of 16 cubic feet of clean 1" (size #57) crushed stone with a minimum 8" sump hole knocked out to provide drainage. Pull boxes and vaults shall be placed such that the crushed stone does not wash away or into the conduit. Vaults and pull boxes shall NOT be placed in a location of water drainage or standing water. Set boxes and vaults true and plumb. The top plane of the cover shall be a minimum of one inch above finished grade and six inches above possible standing water level for the location. Backfill and compact around the structure avoiding damage to the structure. The backfill shall be compacted to a minimum of 95 percent of the maximum density as determined by ASTM D698.

Pull boxes shall be encased with a concrete collar a minimum 6" wide and a minimum of 6" deep on compacted soil. Each pull box/vault shall be provided with a 5/8" by eight foot ground rod and acorn, driven vertically in the corner with six inches of rod exposed above the top of the drainage rock. Ground rods will be supplied to the Contractor by the City of Tucson Communications Engineering (CE) Representative.

Install precast sections in accordance with ASTM C891. Joints between the precast sections shall be sealed with a flexible butyl sealant meeting the requirements of AASHTO M-198. Install precast adjustment rings and the frame and cover to finished grade. Cables passing through pull boxes require a minimum 50 feet service loop where attainable without exceeding manufacturer's minimum bend radius. Cables pulled through manholes/ vaults require not less than 150 feet before exiting.

See attached detail 'PULLBOX INSTALLATION NOTES'.

975-3.06 Innerducts.

All 4 inch conduits shall have 4 (quantity) 1 inch *smoothwall exterior, ribbed interior*

innerducts with 1250 pound test rated pull strength mule tape installed.

975-3.07 Tracer Wire, Electronic Marker, Mule Tape.

A continuous, separate #10 AWG THW/XHHW CU insulated tracer wire shall be installed in each conduit run, external to the innerducts. All lubricants used in the pulling of the tracer wire shall be water soluble. No splicing of the tracer wire shall be permitted in the conduit runs. The ends of the wire shall extend into each pull box, or vault, a minimum of 5 feet, coiled and secured. Connect the ends of all tracer wires within a pull box, or vault, together to a common lug. An electronic marker, 3M model 1255 mini-marker shall be placed by the Contractor at the location of any capped conduit not in a building or pull box/vault. All unoccupied or capped conduits shall have a continuous unspliced unknotted 2500 pound test rated 22AWG detectable mule tape installed, secured at each end and shall be labeled with location of opposite end.

975-3.08 Testing and Cleaning.

The completed conduit runs shall be cleaned and tested prior to final acceptance. Cleaning shall consist of pulling a swab through the conduit and removing all foreign material from within the conduit. If water is allowed to enter the conduit during construction, it shall be blown out or removed by other satisfactory means prior to the acceptance of the system. Vaults and pull boxes shall be cleaned of all debris. Upon completion of the cleaning operations, the ends of the conduit shall be capped. RGC sweeps terminating in pull boxes shall be plugged, as well.

All conduit runs shall be clearance tested after the completion of all backfilling and sub-grade preparation
operations. This test shall consist of pulling a mandrel through the conduit run. The mandrel be segmented with an outer diameter of 1/4 inch less than the inside diameter of the conduit, and shall be minimum 10" inches in length. The test shall be considered acceptable when the mandrel can be passed through the entire conduit run with a pulling force of 300 pounds or less.

All modifications, testing and final inspection of the system shall be scheduled with, and conducted in the presence of the Communications Engineering (CE) Division of the City of Tucson Department of Information Technology Representative. Provide 72 hour advance notice to Bobby C. Sweet, RCDD at 520-419-3459. The field inspector shall notify the Communications Engineering Representative of the construction schedule to facilitate inspection of the City fiber conduits. All portions of the system that does not pass the specified testing shall be repaired by the contractor, and retested, at no additional cost.

975-4 METHOD OF MEASUREMENT

975-4.01 Conduits.

Conduits shall be measured by the linear foot for each diameter size of conduit. The measurement shall be from center to center of pull box or vault. No measurement or direct payment will be made for the trenching, bedding, encasement, tracer wire, marking tape, mule tape, backfill and testing, the cost being

considered as included in the contract price for the conduit.

975-4.02 Pull Boxes.

Pull boxes will be measured as a unit for each pull box installed complete with cover and accessories.

975-4.03 Vaults.

Vaults will be measured as a unit for each vault complete with frame and cover and accessories.

PenCell

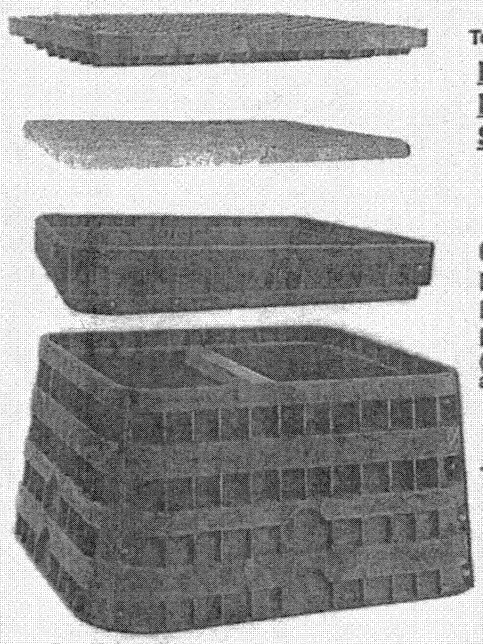
Series PEM-30 • Grade Level Buried Cable Enclosure

To order complete units (enclosure and cover):

PEM-3036
Enclosure with high density polyethylene lid.

PEM-3048
Enclosure with high density polyethylene lid.

PEM-3060
Enclosure with high density polyethylene lid.



To order various covers:

PL - Plastic lid
PCL - Polymer concrete lid
SPLIT - 2 Piece lid

6 INCH SPACER
PEM-3036-6
PEM-3048-6
PEM-3060-6
(All spacers can be stacked for additional depth)

To order various bases:

3036-GS
3048-GS
3060-GS

Available in the Following Sizes

Part No.	Description	Dimensions in Inches (centimeters)			Weight in Lbs. (kilograms)
		Width	Length	Depth	
PEM-3036	Box & Lid	30" (76.2cm)	36" (91.4cm)	24" (61cm)	115 (52.1kg)
PEM-3048	Box & Lid	30" (76.2cm)	48" (121.9cm)	24" (61cm)	140 (63.5kg)
PEM-3060	Box & Lid	30" (76.2cm)	60" (121.9cm)	24" (61cm)	160 (72.5kg)

To order specify:

Standard: (H) Hex Head Bolts
Options: (X) 3/8-16 Penta Head Bolts
(B) Button Head Bolts

Example: PEM-3036H
Enclosure with H.D. polyethylene lid and hex head bolts.

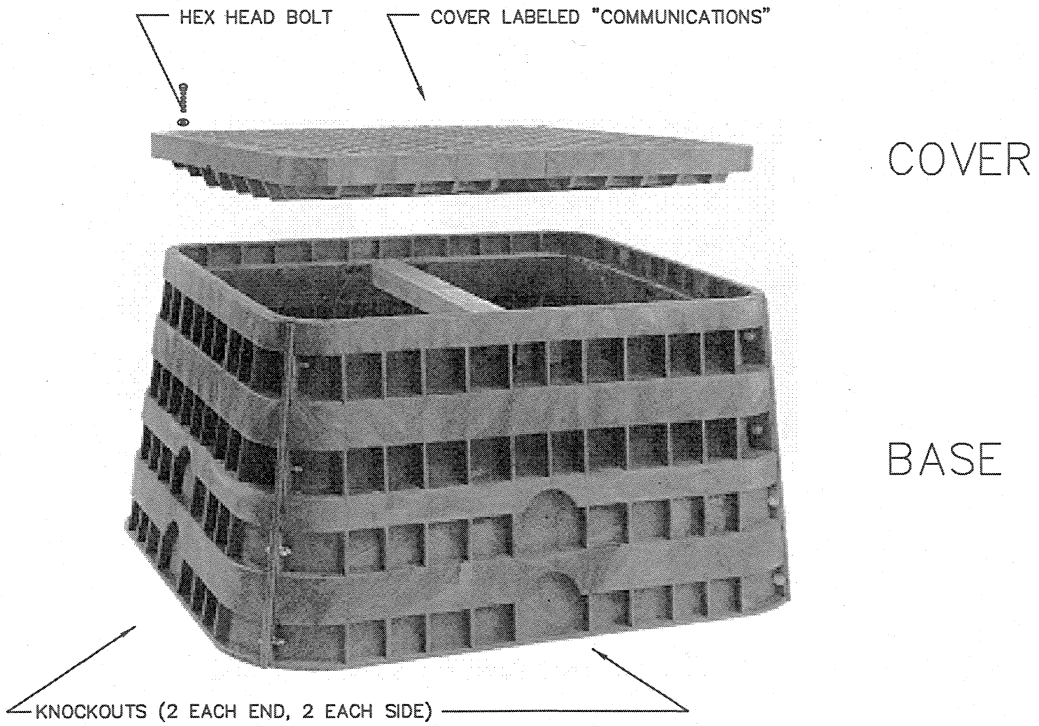
Identification: (Electric, CATV, Telephone, Water, Irrigation, Communications)
Custom logos on request. Contact factory or agent.

This unit is molded of high density polyethylene. The sidewall design prevents frost heaving. Units can be nested for a minimum amount of warehouse storage space. Units are offered in green molded-in color.

Recommendations on the application of our products are based on best available technical data and are offered as a suggestion only. Each user of the material should make his own tests to determine the material's suitability for his own particular use.

PenCell PLASTICS, INC.
P.O. Box 309
New Egypt, N.J. 08533-0309
(800) 257-9448 • (609) 758-3201 • Fax: (609) 758-7945 • www.pencell.com

PEM-3048-PCH-COM



GENERAL NOTES

1. BASE AND COVER SHALL BE GRAY IN COLOR.
2. BASE SHALL BE MOLDED HIGH DENSITY POLYETHYLENE.
3. COVER SHALL BE CAST POLYMER CONCRETE.
4. PULLBOX SHALL BE OF THE DIMENSIONS 30" WIDTH BY 48" LENGTH BY 24" DEPTH.
5. COVER SHALL BE FACTORY EMBOSSED WITH "COMMUNICATIONS".
6. COVER SHALL BE SECURED BY 3/8-16 HEX HEAD BOLTS.
7. PULLBOX MAY BE EXTENDED BY MEANS OF SPACER.
8. SPACER SHALL BE 6" IN DEPTH.

ISSUED:		STANDARD DETAIL		CITY OF TUCSON	DETAIL NO.: FO–300
NOV 2000					NOT TO SCALE
REVISED:		FIBER OPTIC PULLBOX			General Notes
April 2007					

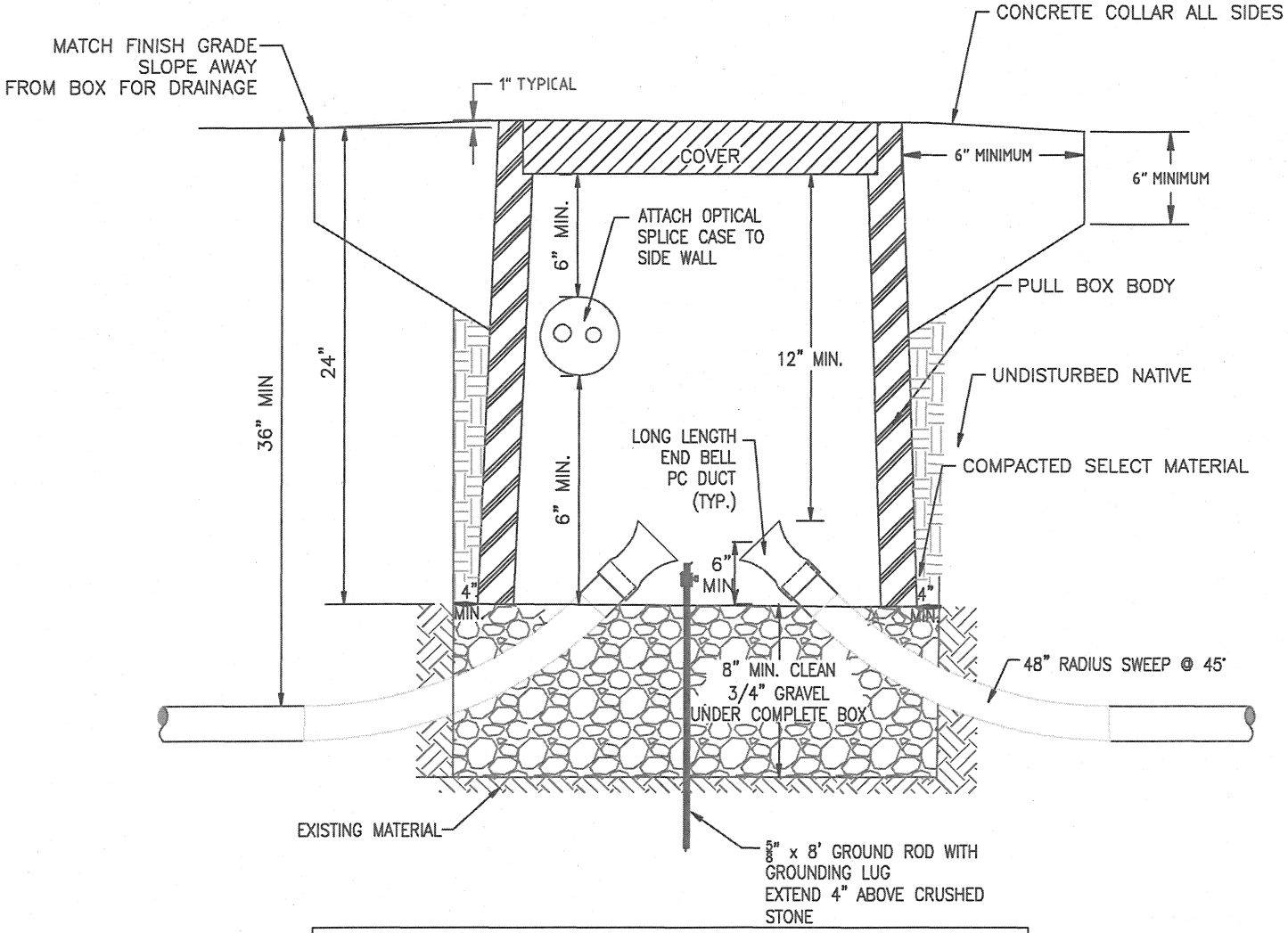
PULLBOX INSTALLATION NOTES

1. PREPARE EXCAVATION APPROXIMATELY 6 INCHES DEEPER THAN OVERALL HEIGHT OF THE ENCLOSURE. THE LENGTH AND WIDTH OF THE EXCAVATION SHALL BE BETWEEN 8 INCHES AND 10 INCHES LARGER THAN THE PULLBOX.

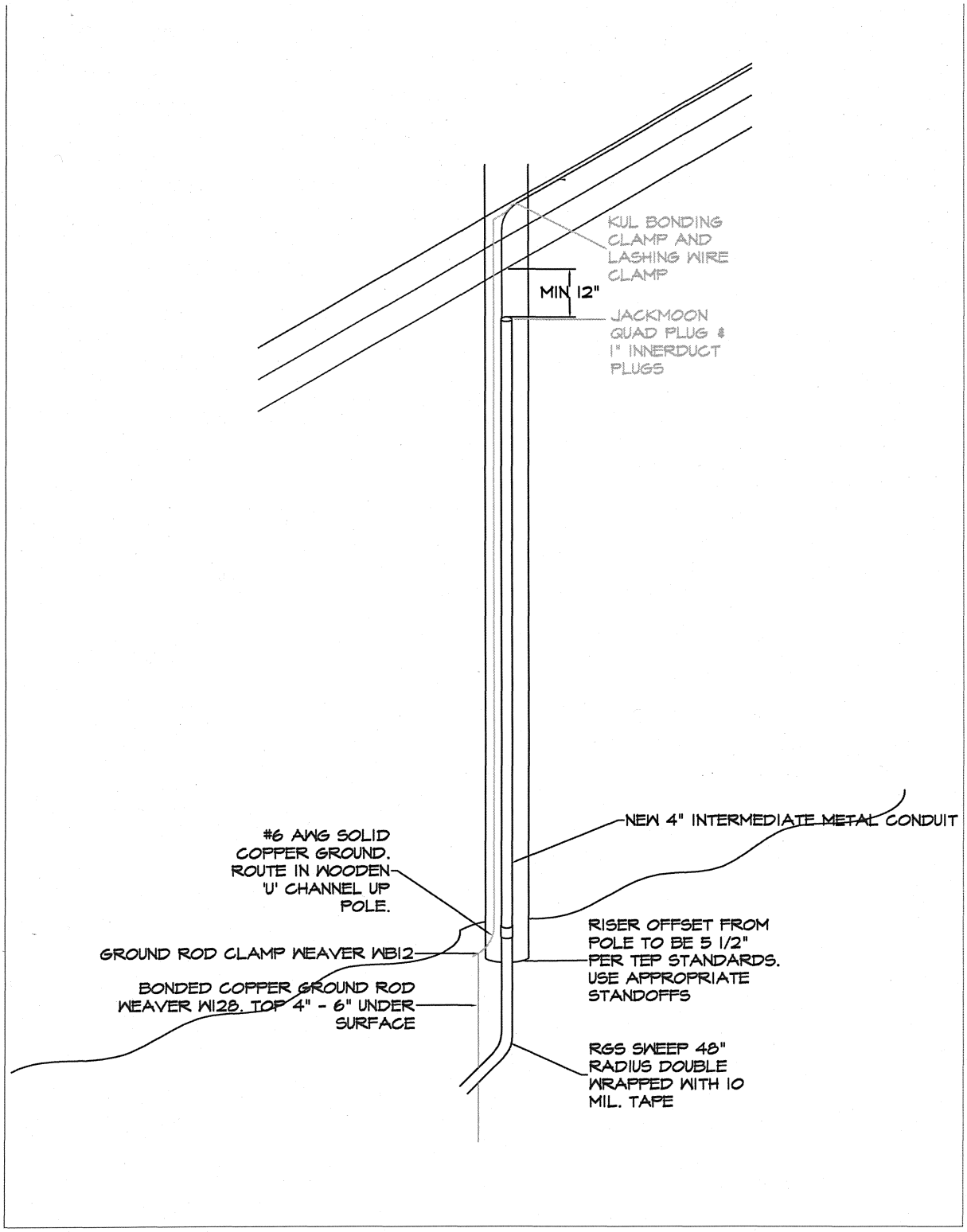
2. PLACE APPROXIMATELY 8 TO 10 INCHESS OF COMPACTED 3/4" GRAVEL IN THE EXCAVATION. LEVEL THE GRAVEL TO BRING THE PULLBOX UP TO THE APPROPRIATE GRADE.

3. PLACE THE PULLBOX IN THE EXCAVATION, CENTERING IT.

4. WITH LID INSTALLED ON THE BOX, PLACE SELECTED BACKFILL INTO THE EXCAVATION IN 8–INCH LIFTS, COMPACTING MANUALLY.



USE JACKMOONS AND INNERDUCT PLUGS IN THE BELL ENDS
TYPICAL OF ALL CONDUITS IN BOX
REFER TO MANUFACTURERS INSTALLATION RECOMMENDATIONS



Project: COT-STD-DET

Drawing: 4" POLE RISER - TYPICAL

Project No.

Cad No.

Revises Drawing No. X

Drawing No. TD-01

Drawn DBS

Checked ALS

Date 08/12/05

Sheet 1 of 1

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11740 North Joi Drive
Tucson, AZ 85737
TEL (520)544-0788
FAX (888)522-7155
www.dplacecom.com
Communications Consulting

SPECIAL PROVISIONS NO. I-2008-027

SECTION 1006 - PORTLAND CEMENT CONCRETE:

1006-4.01 **General Requirements:** of the ADOT Standard Specifications, Latest Edition, is modified to add:

1006-4.01(A) **Contractor Quality Control:**

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

(a) Aggregate Production, including crusher methods, pit extraction, and washing.

(b) Stockpile Management, including stacking methods, separation technique, plant feed technique, stockpile pad thickness, and segregation prevention.

(c) Mixing and Transport, including mixing time and revolutions, water and concrete temperature, integrity of mixing equipment, sight glass for water, slump meters, batch ticket, and travel time.

(d) Proportioning, including scale calibration, water added, water meter moisture correction, and bin loading.

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

CONTRACTOR QUALITY CONTROL TESTING REQUIREMENTS			
Type of Test	Test Method	Sampling Point	Minimum Testing Frequency
Fine Aggregate for PCC			
Gradation	ARIZ 201	Crusher Belt or Stockpile	1 per 750 Cubic Yards of Concrete
Sand Equivalent	AASHTO T176		
Coarse Aggregate for PCC			
Gradation	ARIZ 201	Crusher Belt or Stockpile	1 per 750 Cubic Yards of Concrete
Class S Portland Cement Concrete			
Entrained Air	AASHTO T 152	At Point of Discharge	1 per 40 Cubic Yards of Concrete
Slump	AASHTO T 119		

SECTION 1007 - RETROREFLECTIVE SHEETING

Of the Standard Specifications is revised to read:

1007-1 GENERAL REQUIREMENTS

Retroreflective sheeting shall consist of a retroreflective system having a smooth outer surface. The sheeting shall have a pre-coated adhesive on the back side protected by an easily removable liner. The sheeting shall conform to all criteria in the most current version of AASHTO M 268 for the applicable type and class or as modified herein. Retroreflective sheeting of the same color placed on the same sign panel or adjacent sign panels shall be color matched and be from the same manufacturing lot and run.

Only those sign sheeting products currently shown in the ADOT's Approved Products List (APL) shall be utilized in the performance of this work. Copies of the most recent version of the APL are available on the internet at:
http://www.dot.state.az.us/TPD/ATRC/PRIDE/apl.asp.

Manufacturer's identification marks shall be fabricated in, or on, the face of the various types of sheeting utilized. The markings shall be visible from a distance not greater than three feet, and the identification codes shall be furnished to the Engineer.

A Certificate of Compliance, conforming to the requirements of Subsection 106.05, shall be submitted.

1007-2 REFLECTIVE MATERIALS TYPES

Retroreflective sheeting shall meet the requirements of AASHTO M 268 for the types of sheeting called for in the project plans. The minimum criteria to be met are those established for Type II sheeting. Only those products which meet or exceed these requirements and which are listed in the ADOT's Approved Products List shall be used. The specific type of sheeting for each application shall be called for in the project plans. If no sheeting type is designated, the contractor shall furnish Type II sheeting.

1007-3 COLOR REQUIREMENTS

The color shall be as specified in the ADOT Manual of Approved Signs or on the project plans.

The Engineer may accept colors by certification or may require the contractor to furnish laboratory test results.

1007-4 SPECIFIC INTENSITY PER UNIT AREA (SIA)

The Specific Intensity per Unit Area (SIA) shall meet the minimum requirements of AASHTO M 268 for the type of sheeting called for in the Manual of Approved Signs or the project plans.

1007-5 COLOR PROCESSING

Color processing shall meet all requirements specified in AASHTO M 268. Opaque or transparent colors, inks and paints used in sign fabrication shall be of the type and quality as

recommended by the manufacturer of the reflective sheeting. Only those products listed in the approved Products List shall be used. Application will be by a screen process which results in uniform color and tone, possessing sharply defined edges of legend and border. Screen Mesh P.E. 157, using a fill pass, shall be used for applying transparent colors. After the ink is applied, the inked colors shall meet the minimum SIA requirements for the basic color and the type of sheeting being used.

1007-6 ADHESIVE

The reflective sheeting shall include either Class 1 or Class 2 adhesive backing as specified in AASHTO M 268.