INVITATION FOR BIDS
ADERO CANYON TRAILHEAD CONSTRUCTION

Town of Fountain Hills
16705 East Avenue of the Fountains
Fountain Hills, Arizona 85268

SOLICITATION INFORMATION AND SCHEDULE

Solicitation Number:	**CS2017-01**
Release Date:	**June 7, 2017**
Advertisement Dates:	**June 7 and 14, 2017 – Fountain Hills Times** **June 8 and 15, 2017 – Arizona Business Gazette**
Final Date for Inquires	**June 29, 2017**
MANDATORY Prospective Bidder's Conference:	**June 22, 2017** **10:00 a.m.** (local time, Phoenix, Arizona) Fountain Hills Town Hall – Council Chambers 16705 East Avenue of the Fountains Fountain Hills, Arizona 85268
Bid Deadline:	**July 17, 2017** **10:00 a.m.** (local time, Phoenix, Arizona)
Bid Opening:	**July 17, 2017** **10:00 a.m.** (local time, Phoenix, Arizona)
Town Representatives:	Rachael Goodwin, rgoodwin@fh.az.gov

In accordance with the Town of Fountain Hills Procurement Code, competitive sealed Bids for the services specified herein will be received by the Town Clerk at the Town Clerk's Office at the above-referenced location until the date and time referenced above (the "Bid Deadline"). Bids received by the Bid Deadline shall be publicly opened and the Bid Price read. Bids shall be in the actual possession of the Town Clerk on, or prior to, the Bid Deadline date. Late Bids shall not be considered except as provided in the Town Procurement Code. Bids shall be submitted in a sealed envelope with the Solicitation Number and the Bidder's name and address clearly indicated on the front of the envelope.

There is no charge for the Plans and Specifications.
Plans and Specifications may be obtained at the Town of Fountain Hills website:
http://www.fh.az.gov/Bids.aspx

* The Town of Fountain Hills reserves the right to amend the solicitation schedule as necessary.

OFFER

The undersigned (the "Bidder") hereby offers this Bid as an offer to contract with the Town under the terms and conditions set forth below and certifies that Bidder has read, understands and agrees to fully comply with, and be contractually bound by, all terms and conditions as set forth in this Invitation For Bids ("IFB"), the Contract formed hereby (as defined below) and any amendments thereto, together with all Exhibits, Specifications, Plans and other documents included as part of this Contract (the "Contract Documents").

Town of Fountain Hills Business License Number: 5015 Arizona Transaction (Sales) Privilege Tax License Number: 07376782 Federal Employer Identification Number: 86-0634774 Blucor Contracting Contractor Name 21738 Orion Way Address Queen Creek / AZ / 85142 City / State / Zip Code	For Clarification of this Bid contact: Name: Jose L. Castillo Telephone: (480) 595-8073 Facsimile: (480) 575-0814 Email: j.castillo@blucor.com **Authorized Signature for Contractor** Tyler Bluth Printed Name Vice President Title

ACCEPTANCE OF OFFER AND NOTICE OF AWARD
(FOR TOWN OF FOUNTAIN HILLS USE ONLY)

Effective Date: 10-3-17 Contract No. C2018-055 Official File: _____

TOWN OF FOUNTAIN HILLS,
an Arizona municipal corporation

Grady E. Miller, Town Manager

ATTEST:

Bevelyn J. Bender, Town Clerk

APPROVED AS TO FORM:

Andrew J. McGuire, Town Attorney

ARTICLE I - DEFINITIONS

For purposes of this Invitation for Bids, the following definitions shall apply:

1.1 "Bid" or "Offer" means a responsive bid or quotation submitted by a Bidder in response to this Invitation for Bids.

1.2 "Bid Deadline" means the date and time set forth on the cover of this IFB for the Town Clerk to be in actual possession of the sealed Bids.

1.3 "Bid Opening" means the date and time set forth on the cover of this Invitation for Bids for opening of sealed Bids.

1.4 "Bidder" means any person or firm submitting a competitive Bid in response to this IFB.

1.5 "Confidential Information" means that portion of a Bid, proposal, Offer, Specification or protest that contains information that the person submitting the information believes should be withheld, provided (i) such person submits a written statement advising the Town of this fact at the time of the submission and (ii) the information is so identified wherever it appears.

1.6 "Contract" means, collectively, the (i) Offer/Bid, (ii) this IFB, including all exhibits, (iii) the Notice of Award, (iv) the Notice to Proceed or Purchase Order(s), (v) any approved Addendum, Change Order or Amendment, (vi) the Contractor's Certificates of Insurance and a copy of the Declarations Page(s) of the insurance policies, (vii) the Certificate of Completion and (viii) any Plans, Specifications or other documents attached, appended or incorporated herein by reference. Alternate or optional bid items will become part of the Contract only if they are accepted by the City in writing on the Price Sheet.

1.7 "Contractor" means the individual, partnership, corporation or limited liability company who has submitted a Bid in response to this IFB and who, as a result of the competitive bidding process, is awarded a contract for Materials or Services by the Town.

1.8 "Contract Time" means the time period during which the Contractor must complete all of the Work related to the Project.

1.9 "Day(s)" means calendar day(s) unless otherwise specified.

1.10 "Engineer" means the Town Engineer or authorized designee.

1.11 "Final Completion" shall be defined as set forth in Section 3.16 and shall occur not later than 30 Days from the date of Substantial Completion unless otherwise designated by the Engineer and subject to modification by changes in the Work as provided in Section 3.14 below.

1.12 "Invitation for Bids" or "IFB" means this request by the Town for participation in the competitive bidding process according to all documents, including those attached or incorporated herein by reference, utilized for soliciting Bids for the Materials and/or Services in compliance with the Town's Procurement Code.

1.13 "MAG Specifications" means, collectively, the "Uniform Standard Specifications for Public Works Construction," current edition as of the date of Contract award and the "Uniform Standard Details for Public Works Construction," current edition as of the date of Contract award, which are sponsored and distributed by the Maricopa Association of Governments ("MAG") and any amendments or supplements adopted by the Town.

1.14 "MAG Supplement" means the most current edition of the Town of Fountain Hills Supplement to the MAG Uniform Standard Specifications and Details for Public Works Construction.

1.15 "Materials" means any personal property, including equipment, materials, replacements and supplies provided by the Contractor in conjunction with the Contract and shall include, in addition to Materials incorporated in the Project, equipment and other material used and/or consumed in the performance of the Work.

1.16 "Multiple Award" means an award of an indefinite quantity contract for one or more similar products, commodities or Services to more than one Bidder.

1.17 "Price" means the total expenditure for the defined Project, inclusive of all Materials, commodities or Services.

1.18 "Procurement Administrator" means a Town employee, as designated on the cover of this IFB, who has specifically been designated to act as a contact person to the Bidders and/or Contractor relating to their IFB.

1.19 "Procurement Agent" means the Town Manager or authorized designee.

1.20 "Procurement Code" means the Town's Procurement Code, as amended from time to time.

1.21 "Project" means the purpose and Work described as set forth in Section 2.1, in the "Purpose/Scope of Work" of the IFB.

1.22 "Punch List" means that list of items provided by Town to Contractor at the time of Substantial Completion indicating items to be completed or corrected, including the time for completion or correction by Contractor after Substantial Completion.

1.23 "Services" means the furnishing of labor, time or effort by a Contractor, not involving the delivery of a specific end product other than reports which are merely incidental to the required performance and as further defined in the Contract. This term does not include "professional and technical services" as defined in the Procurement Code.

1.24 "Specification" means any description of the physical characteristics, functional characteristics, or the nature of a commodity, product, supply or Services. The term may include a description of any requirements for inspecting, testing, or preparing a supply or service item for delivery.

1.25 "Subcontractor" means those persons or groups of persons having a direct contract with the Contractor to perform a portion of the Work and those who furnish Materials according to the plans and/or Specifications required by this Contract.

1.26 "Substantial Completion" shall be defined as set forth in Section 3.15 below and shall occur not later than the date set forth in the Schedule, subject to modification by changes in the Work as provided in Section 3.14 below.

1.27 "Town" means the Town of Fountain Hills, an Arizona municipal corporation.

1.28 "Town Representative" means the Town employee who has specifically been designated to act as a contact person to the Town's Procurement Administrator, and who is responsible for monitoring and overseeing the Contractor's performance under the Contract and for providing information regarding details pertaining to the Work.

1.29 "Vendor" means any firms, entities or individuals desiring to prepare a responsive Bid in response to this IFB.

1.30 "Work" means all labor, Materials and equipment incorporated or to be incorporated in the Project that are necessary to accomplish the construction required by this Contract.

ARTICLE II – BID PROCESS; BID AWARD

2.1 Purpose/Scope of Work. The Work included in this Project consists of the construction of the Adero Canyon trailhead, which includes, but is not limited to, the following broad categories: earthwork (cut and fill), water line, sewer line, site drainage enhancements, electrical service and distribution, lighting, installing new colored concrete driveways, asphalt parking stalls and drive aisles, concrete ADA stalls, custom restroom, custom ramada, custom steel kiosk, colored concrete plaza area, rock filled gabion basket retaining walls, rock filled gabion basket bench with concrete cap, application of desert pavement ground cover, rip rap, colored concrete sidewalks, boulder salvage and relocation and landscaping. The Town is issuing this IFB to secure a qualified General Contractor to perform the Work and provide the Materials as more particularly described in the Specifications attached hereto as Exhibit A, and incorporated herein by reference. Bidders must submit Bids encompassing the entire Project, inclusive of the related Plans and/or Construction Drawings. Failure to do so may result in a determination that the Bid is non-responsive.

2.2 Amendment of IFB. Except as set forth in Section 3.56 below, no alteration may be made to this IFB or the resultant Contract without the express, written approval of the Town in the form of an official IFB addendum or Contract amendment. Any attempt to alter this IFB/Contract without such approval is a violation of this IFB/Contract and the Town Procurement Code. Any such action is subject to the legal and contractual remedies available to the Town including, but not limited to, Contract cancellation and suspension and/or debarment of the Bidder or Contractor.

2.3 Preparation/Submission of Bid. Bidders are invited to participate in the competitive bidding process for the Project specified in this IFB. Bidders shall review their Bid submissions to ensure the following requirements are met.

A. Irregular/Non-responsive Bids. The Town will consider as "irregular" or "non-responsive" and shall reject any Bid not prepared and submitted in accordance with the IFB and Specifications, or any Bid lacking sufficient information to enable the Town to make a reasonable determination of compliance with the Specifications. Unauthorized or unreasonable exceptions, conditions, limitations, or provisions shall be cause for rejection. Bids may be deemed non-responsive at any time during the evaluation process if, in the sole opinion of the Procurement Agent, any of the following are true:

1. Bidder does not meet the minimum required skill, experience or requirements to perform the Work or provide the Materials.

2. Bidder has a past record of failing to fully perform or fulfill contractual obligations.

3. Bidder cannot demonstrate financial stability.

4. Bid submission contains false, inaccurate or misleading statements that, in the opinion of the Procurement Agent, are intended to mislead the Town in its evaluation of the Bid.

B. Specification Minimums. Bidders are reminded that the Specifications in this IFB are the minimum levels required and that Bids submitted must be for products that meet or exceed the minimum level of all features specifically listed in this IFB. Bids offering less than the minimums specified will be deemed not responsive. It shall be the Bidder's responsibility to carefully examine each item listed in the Specifications.

C. Required Submittal. Bidders shall provide **all of the following** documents to be considered a responsive Bid:

1. Complete, fully executed original of this IFB, with the Offer signed in ink by a person authorized to bind the Bidder.

2. Price Sheet.

3. Bid Bond.

4. Licenses; /DBE & MBE Status.

5. References.

6. Federal Requirements, if applicable.

7. Acknowledgment for each Addendum received, if any.

D. Bidder Responsibilities. All Bidders shall (1) examine the entire Bid package, (2) seek clarification of any item or requirement that may not be clear, (3) check all responses for accuracy before submitting a Bid and (4) submit the entire, completed Bid package by the official Bid Deadline. Late Bids shall not be considered. Bids not submitted with an **original, signed** Offer page by a person authorized to bind the Bidder shall be considered non-responsive. Negligence in preparing a Bid shall not be good cause for withdrawal after the Bid Deadline.

E. Sealed Bids. All Bids shall be sealed and clearly marked with the IFB title and number on the lower left hand corner of the mailing envelope. A return address must also appear on the outside of the sealed Bid.

F. Address. All Bids shall be directed to the following address: Town Clerk, 16705 East Avenue of the Fountains, Fountain Hills, Arizona 85268, or hand-delivered to the Town Clerk's office.

G. Bid Forms. All Bids shall be on the forms provided in this IFB. It is permissible to copy these forms if required. Telegraphic (facsimile), electronic (email) or mailgram Bids will not be considered.

H. Modifications. Erasures, interlineations, or other modifications in the Bid shall be initialed in original ink by the authorized person signing the Bid.

I. Withdrawal. At any time prior to the specified Bid Opening, a Bidder (or designated representative) may amend or withdraw its Bid. Facsimile, electronic (email) or mailgram Bid amendments or withdrawals will not be considered. No Bid shall be altered, amended or withdrawn after the specified Bid Deadline, unless otherwise permitted pursuant to the Town Procurement Code.

2.4 Inquiries: Interpretation of Plans, Specifications and Drawings.

A. Inquiries. Any question related to the IFB, including any part of the Plans, Specifications, Scope of Work or other Contract Documents, shall be directed to the Town Representative and Procurement Administrator whose names appear on the cover page of this IFB. Questions shall be submitted in writing by the date indicated on the cover page of this IFB; the Town will not respond to any inquiries submitted later than the Final Date for Inquiries. The Vendor submitting such inquiry will be responsible for its prompt delivery to the Town. Any correspondence related to the IFB shall refer to the title and number, page and paragraph. However, the Bidder shall not place the IFB number and title on the outside of any envelope containing questions, because such an envelope may be identified as a sealed Bid and may not be opened until the Bid Opening. Any interpretations or corrections of the proposed Contract Documents will be made only by addenda duly approved and issued by the Town. The Town will not be responsible for any other explanations or interpretations of the Contract Documents.

B. Addenda. It shall be the Bidder's responsibility to check for addenda issued to this IFB. Any addendum issued by the Town with respect to this IFB will be available at:

Town of Fountain Hills Town Hall,
16705 East Avenue of the Fountains, Fountain Hills, Arizona 85268
Town of Fountain Hills website at: http://www.fh.az.gov/Bids.aspx

C. Approval of Substitutions. The Materials, products, and equipment described in this IFB establish a standard or required function, dimension, appearance and quality to be met by any proposed substitution. No substitute will be considered unless written Substitution/Equal Request in the form attached hereto as Exhibit B, has been received by the Town Representative at least 10 Days prior to the Bid Deadline. Each such request shall include the name of the Material or equipment for which it is to be substituted and a complete description of the proposed substitute, including any drawings, performance and test data and any other information necessary for evaluation of the substitute. If a substitute is approved, the approval shall be by written addendum to the IFB. Bidder shall not rely upon approvals made in any other manner.

D. Use of Equals. When the Specifications for materials, articles, products and equipment include the phrase *"or equal,"* Bidder may bid upon and use materials, articles, products and equipment that will perform equally the requirements imposed by the general design. The Engineer will have the final approval of all materials, articles, products and equipment proposed to be used as an "equal." No such "equal" shall be purchased or installed without prior, written approval from the Engineer. No "equal" will be considered unless a written Substitution/Equal Request, in the form attached hereto as Exhibit B, has been received by the Town Representative at least 10 Days prior to the Bid Deadline. The request shall include the name of the material or equipment for which the item is sought to be considered an equal and a complete description of the proposed equal including any drawings, cuts, performance and test data and any other information necessary for evaluation of the equal. All approval of equals shall be issued in the form of written addendum or amendment, as applicable, to this IFB or the Contract.

E. Bid Quantities. It is expressly understood and agreed by the parties hereto that the quantities of the various classes of Services and/or Materials to be furnished under this Contract, which have been estimated as stated in the Bidders' Offer, are only approximate and are to be used solely for the purpose of comparing, on a consistent basis, the Bidders' Offers presented for the Work under this Contract. The selected Contractor agrees that the Town shall not be held responsible if any of the quantities shall be found to be incorrect and the Contractor will not make any claim for damages or for loss of profits because of a difference between the quantities of the various classes of Services and/or Materials as estimated and the Services and/or Materials actually provided. Contractor is responsible for ensuring that all Materials contained in the Plans for the project are bid on the Price Sheet. Contractor shall bring any potential discrepancy between the Plans and the Price Sheet to the Town's attention, either at the Prospective Bidders' Conference or by written inquiry, as set forth in Subsection 2.4(A) above. If any error, omission or misstatement is found to occur, the same shall not (1) invalidate the Contract or the whole or any part of the Scope of Work, (2) excuse Contractor from any of the obligations or liabilities hereunder or (3) entitle Contractor to any damage or compensation except as may be provided in this Contract.

2.5 Prospective Bidders' Conference. A Prospective Bidders' Conference may be held. If scheduled, the date and time of the Prospective Bidders' Conference will be indicated on the cover page of this IFB. The Prospective Bidders' Conference may be designated as mandatory or non-mandatory on the cover of this IFB. Bids shall not be accepted from Bidders who do not attend a mandatory Prospective Bidders' Conference. Bidders are strongly encouraged to attend those Prospective Bidder's Conferences designated as non-mandatory. The purpose of the Prospective Bidders' Conference will be to clarify the contents of the IFB in order to prevent any misunderstanding of the Town's requirements. Any doubt as to the requirements of this IFB or any apparent omission or discrepancy should be presented to the Town at the Prospective Bidders' Conference. The Town will then determine if any action is necessary and may issue a written amendment or addendum to the IFB. Oral statements or instructions will not constitute an amendment or addendum to the IFB.

2.6 New Materials. All Materials to be provided by the Contractor and included in the Bid shall be new, unless otherwise stated in the Specifications.

2.7 Prices. Work shall be performed at the unit prices as set forth in the Price Sheet attached hereto as Exhibit C and incorporated herein by reference. Bid prices shall be submitted on a per unit basis by line item, when applicable and include all applicable sales tax. In the event of a disparity between the unit price and extended price, the unit price shall prevail. **NOTE: All pricing blanks must be filled in. Empty or unfilled spaces in the Bid Price Sheet shall result in a determination that a Bid is non-responsive.**

2.8 Allowances. Allowances, if any, shall be clearly set forth on the Price Sheet. Allowances shall cover the cost to the Contractor (less any applicable trade discount) of the Materials including equipment required by the Allowance, delivered at the site, and all applicable taxes, overhead, profit handling and other general conditions costs, unless unit rates are available in the Price Sheet. Unit rates from the Price Sheet shall be used to determine the cost of a change to be paid from an Allowance, when applicable. Any remaining Allowance amount shall be returned to the Town at the end of the Project by deductive change order.

2.9 Payment; Discounts. Any Bid that requires payment in less than 30 Days shall not be considered. Payment discounts of 30 Days or less will not be deducted from the Bid Price in determining the low Bid. The Town shall be entitled to take advantage of any payment discount offered, provided payment is made within the discount period. Payment discounts shall be indicated on Price Sheet.

2.10 Taxes. The Town is exempt from Federal Excise Tax, including the Federal Transportation Tax. Transaction privilege tax, if any, shall be included in the unit price for each line item. It shall not be considered a lump sum payment item. It is the sole responsibility of the Bidder to determine any applicable State tax rates and calculate the tax accordingly. When calculating the tax on the Bid, the Bidder should not include tax on any allowances. Failure to accurately tabulate any applicable taxes may result in a determination that a Bid is non-responsive. The Bidder shall not rely on, and shall independently verify, any tax information provided by the Town.

2.11 Federal Funding. It is the responsibility of the Bidder to verify and comply with federal requirements that may apply to the Work (the "Federal Requirements"). It is also the responsibility of the Bidder to incorporate any necessary amounts in the Bid to accommodate for required federal record-keeping, necessary pay structures or other matters related to the Federal Requirements. Federal Requirements, if any, shall be attached hereto as Exhibit D. In addition to any applicable Federal Requirements, this procurement is subject to a number of state and Town regulations. In general, where these rules conflict, the more stringent law or rule applies.

2.12 Cost of Bid/Proposal Preparation. Bids submitted for consideration should be prepared simply and economically, providing adequate information in a straightforward and concise manner. The Town does not reimburse the cost of developing, presenting or providing any response to this solicitation; the Bidder is responsible for all costs incurred in responding to this IFB. All materials and documents submitted in response to this IFB become the property of the Town and will not be returned.

2.13 Public Record. All Bids shall become the property of the Town. After Contract award, Bids shall become public records and shall be available for public inspection in accordance with the Town's Procurement Code, except that any portion of a Bid that was designated as confidential pursuant to Section 2.14 below shall remain confidential from and after the time of Bid opening to the extent permitted by Arizona law.

2.14 Confidential Information. If a Vendor/Bidder believes that a Bid, Specification, or protest contains information that should be withheld from the public record, a statement advising the Procurement Agent of this fact shall accompany the submission and the information shall be clearly identified. The information identified by the Vendor or Bidder as confidential shall not be disclosed until the Procurement Agent makes a written determination. The Procurement Agent shall review the statement and information with the Town Attorney and shall determine in writing whether the information shall be withheld. If the Town Attorney

determines that it is proper to disclose the information, the Procurement Agent shall inform the Vendor or Bidder in writing of such determination.

2.15 Vendor Licensing and Registration. Prior to the award of the Contract, the successful Bidder shall be registered with the Arizona Corporation Commission and authorized to do business in Arizona. Bidders shall provide license and certification information with the Bid, attached as Exhibit E and incorporated herein by reference. Upon the Town's request, corporations, limited liability companies, partnerships or other entities shall provide Certificates of Good Standing from the Arizona Corporation Commission. A Town of Fountain Hills business license is also required.

2.16 Bidder Qualifications.

A. Experience and References. Bidder must demonstrate successful completion of at least three similar projects within the past 60 months, one of which must have a dollar value of at least 75% of the total bid for this Project as set forth in the Price Sheet, attached as Exhibit C. Total bid price does not include any Town allowances identified. For the purpose of this Solicitation, "successful completion" means completion of a project within the established schedule and budget and "similar projects" resemble this Project in size, nature and scope. References for these three projects shall be listed on the sheet attached hereto as Exhibit F and incorporated herein by reference. *These references will be checked*, and it is Bidder's responsibility to ensure that all information is accurate and current. Bidder authorizes the Town's representative to verify all information from these references and releases all those concerned from any liability in connection with the information they provide.

B. Investigation. The Town's representative may conduct any investigation deemed necessary to determine the Bidder's ability to perform the Work in accordance with the Contract Documents. The three lowest Bidders may be requested to submit additional documentation within 72 hours (or as specified) to assist the Town in its evaluation.

2.17 Certification. By submitting a Bid, the Bidder certifies:

A. No Collusion. The submission of the Bid did not involve collusion or other anti-competitive practices.

B. No Discrimination. It shall not discriminate against any employee or applicant for employment in violation of Federal Executive Order 11246.

C. No Gratuity. It has not given, offered to give, nor intends to give at any time hereafter, any economic opportunity, future employment, gift, loan, gratuity, special discount, trip favor or service to a Town employee, officer, agent or elected official in connection with the submitted Bid or a resultant Contract. In the event that the resultant Contract is canceled pursuant to this provision, the Town shall be entitled, in addition to any other rights and remedies, to recover and withhold from the Contractor an amount equal to 150% of the gratuity.

D. Financial Stability. It is financially stable, solvent and has adequate cash reserves to meet all financial obligations including any potential costs resulting from an award of the Contract.

E. No Signature/False Statement. The signature on the Bid and the Vendor Information Form is genuine. Failure to sign the Bid or the Vendor Information Form, or signing either with a false statement, shall void the submitted Bid and any resulting Contract, and the Bidder may be debarred from further bidding in the Town.

2.18 Bid Bond. All Vendors desiring to prepare a responsive Bid shall submit a non-revocable bid security payable to the Town in the amount of ten percent (10%) of the total Bid Price. This security shall be in the

form of a bid bond, certified check or cashier's check and must be in the possession of the Town Representative by the Bid Deadline. All bid security from Contractor(s) who have been issued a Notice of Award shall be held until the successful execution of all required Contract Documents and bonds. If the Contractor fails to execute the required contractual documents and bonds within the time specified, or 10 Days after Notice of Award if no period is specified, the Contractor may be found to be in default and the Contract terminated by the Town. In case of default, the Town reserves all rights inclusive of, but not limited to, the right to purchase material and/or to complete the Work and to recover any actual excess costs associated with such completion from the Contractor. All bid bonds shall be executed in the form attached hereto as Exhibit G, duly executed by the Bidder as Principal and having as Surety thereon a Surety company holding a Certificate of Authority from the Arizona Department of Insurance to transact surety business in the State of Arizona. Individual sureties are unacceptable. All insurers and sureties shall have, at the time of submission of the proposal, an A.M. Best's Key Rating Guide of "A-" or better as currently listed in the most recent Best Key Guide, published by the A.M. Best Company. As soon as is practicable after the completion of the evaluation, the Town will (A) issue a Notice of Award for those Offers accepted by the Town and (B) return all checks or bonds to those Bidders who have not been issued a Notice of Award.

2.19 Award of Contract.

A. Multiple Award. The Town may, at its sole discretion, accept Bidder's Offer as part of a Multiple Award.

B. Evaluation. The evaluation of this Bid will be based on, but not limited to, the following: (1) compliance with Specifications, (2) Price, including alternates selected by the Town, if any, and taxes, but excluding "as-needed" services requested by the Town and (3) Bidder qualifications to perform the Work.

C. Waiver, Rejection, Reissuance. Notwithstanding any other provision of this IFB, the Town expressly reserves the right to: (1) waive any immaterial defect or informality, (2) reject any or all Bids or portions thereof and (3) cancel or reissue an IFB.

D. Offer. A Bid is a binding offer to contract with the Town based upon the terms, conditions and Specifications contained in this IFB and the Bidder's responsive Bid, unless any of the terms, conditions, or Specifications are modified by a written addendum or Contract amendment. Bids become binding Contracts when the Acceptance of Offer and Notice of Award is executed in writing by the Town. Bidder Offers shall be valid and irrevocable for 90 Days after the Bid Opening.

E. Protests. Any Bidder may protest this IFB, the proposed award of a Contract, or the actual award of a Contract. All protests will be considered in accordance with the process set forth by the Town Manager or qualified designee.

ARTICLE III – GENERAL TERMS AND CONDITIONS

PART A - GENERAL

3.1 Reference Standards. The Contractor shall perform the Work required in conformance with MAG Specifications and the MAG Supplement, each of which is incorporated herein by reference. In the event of a conflict between the MAG Specifications and the MAG Supplement, the MAG Supplement shall prevail.

3.2 Plans and Specifications to Successful Contractor. The successful Contractor shall print their own Plans and Specifications for this Project from the Town's website: http://www.fh.az.gov/Bids.aspx.

3.3 Contract Time. The Contract Time for this Project shall be 254 Days from the Notice to Proceed. All Work on the Project shall be completed on or before the expiration of the Contract Time.

3.4 Pre-Construction Conference. Within 30 Days of the issuance of the Notice of Award, the Contractor shall attend a pre-construction conference. The Town will contact the Contractor to schedule a specific date, time and location for the pre-construction conference. The purpose of this conference is to outline specific items and procedures and to address items that require special attention on the part of the Contractor. The Contractor may also present proposed variations in procedures that the Contractor believes may (A) improve the Project, (B) reduce cost or (C) reduce inconvenience to the public. Any necessary coordination and procedures for construction inspection and staking will be addressed during the pre-construction conference. The Contractor will be required to provide the following items at, or prior to, the pre-construction conference, each of which is subject to review and approval by the Engineer:

A. Key Personnel; Subcontractors. A list of the names and emergency telephone numbers of all proposed Key Personnel, Subcontractors and suppliers that the Contractor intends to utilize on the Project, in the form attached hereto as Exhibit H and incorporated herein by reference. The term "Key Personnel" means individuals who will be directly assigned to this Project and includes, but is not limited to, the owner, principals, project manager, project superintendent, scheduler, construction engineer and supervisory personnel. At least two of the Bidder's Key Personnel must have a minimum of three years' experience in similar projects (defined above) and the scheduler must have experience in employing scheduling techniques appropriate for this Project. Resumes of Key Personnel shall be submitted upon request by the Town's representative. Proposed Subcontractors shall be qualified and have the requisite professional or technical licenses and be licensed to do business in the State of Arizona. The list shall include such information on the professional background of each of the assigned key individuals as may be requested by the Town Representative. Such key personnel and Subcontractors shall be satisfactory to the Engineer and shall not be changed except with the consent of the Engineer. Additionally, the Engineer shall have the right to request that the Contractor personnel and Subcontractors be removed from the Project if, in the Engineer's sole discretion, such personnel or Subcontractor(s) are detrimental to the Project delivery process. Upon receipt of such request, the Contractor shall remove such personnel or Subcontractor(s) unless the Contractor can provide the Town with sufficient documentation to prove it is commercially impractical to replace the personnel or Subcontractor(s) with substitute personnel possessing similar qualifications. The Engineer's approval of substituted personnel or Subcontractor(s) shall not be unreasonably withheld.

B. Progress Schedule. A construction progress schedule showing the estimated time for start and completion of the major items of Work in Primavera P6 scheduling software.

C. Payment Schedule. A payment schedule showing the estimated dollar volume of Work for each calendar month during the life of the Project.

D. Traffic Control. A written proposal, prepared by an individual who is IMSA or ATSSA certified, outlining the intended plans for traffic control and for maintaining continuous access to residences and businesses along the construction site.

E. Site Security. A written proposal outlining the intended plans to secure the Project site for public safety and security.

F. Drawings, Materials & Equipment. An itemized list of all required shop drawings, material and equipment submittals and a schedule indicating the dates each of these items will be transmitted to the Town for review.

3.5 Notice to Proceed. Within 45 Days of the issuance of the Notice of Award the Town may issue a written Notice to Proceed. The Notice to Proceed shall stipulate the actual Contract start date, the Contract Time and the dates of Substantial Completion and Final Completion. The time required for the Contractor to obtain permits, licenses and easements shall be included in the Contract Time and shall not be justification for a delay claim by the Contractor. The time required for the Contractor to prepare, transmit and obtain approval of

applicable submittals shall be included in the Contract Time and shall not be justification for a delay claim by the Contractor. No Work shall be started until after all required permits, licenses, and easements have been obtained. The Contractor shall notify the Engineer, in writing, at least 72 hours before the following events:

A. Commencement. The start of construction.

B. Services Shut Down. Shutdown of water, sewer, drainage, irrigation and/or traffic control facilities, including the anticipated length of time for each shut down.

C. Well or Pump Shut Down. Shutdown of existing water wells and booster pumps. Such shutdown shall not exceed 72 hours of any facility and only one facility may be shutdown at any one time. Shutdowns shall be coordinated with proper utility agency/company.

D. Water Lines. All draining and filling of water lines and irrigation laterals and all operations of existing valves or gauges, which shall also be coordinated with the proper utility agency/company.

E. Start-up and Testing. Start-up or testing of any water well or booster pump to be connected to any part of the existing water system. This includes operation of existing valves necessary to accommodate the water.

3.6 Laws and Regulations. The Contractor shall keep fully informed of all rules, regulations, ordinances, statutes or laws affecting the Work herein specified, including existing and future (A) Town and County ordinances and regulations, (B) State and Federal laws and (C) Occupational Safety and Health Administration ("OSHA") standards.

3.7 Rights-of-Way. The Contractor shall obtain a right-of-way permit for any of the Work completed in the public right-of-way. The Contractor will be responsible for any required Maricopa County permits or other agency permits. The Town will provide any necessary easements for Work specified under this Contract, and the Contractor shall not enter or occupy with workers, tools, equipment or materials any private ground outside the property of the Town without the written consent of the owner thereof. The Contractor, at its own expense, is responsible for the acquisition of any additional easements or rights-of-way.

3.8 Inspection, Safety and Compliance. Each Contractor must inform itself fully of the conditions relating to the construction of the Project and the employment of labor thereon. Failure to do so will not relieve the Contractor of its obligation to furnish all material and labor necessary to carry out the provisions of this Contract. Insofar as possible in carrying out its work, the Contractor must employ such methods or means as will not cause any interruption of or interference with the Work of any other contractor. Contractor affirms that it has inspected the jobsite and has thoroughly reviewed the Contract including, without limitation, the Specifications listed on Exhibit A, as the same may be revised by the Town, and is not relying on any opinions or representations of Town. Contractor agrees to perform and complete such Work in strict accordance with the Contract and under the general direction of the Town. Contractor agrees that any exclusions of any Work must be approved in writing by the Town prior to acceptance of this Contract or same shall not be excluded hereunder. Contractor is responsible for all safety precautions and programs and shall provide all protection and necessary supervision to implement said precautions and programs. Contractor shall take all reasonable precautions for the safety of and provide reasonable protection to prevent damage, injury or loss to: (A) Town personnel and members of the public, (B) employees or others on the Project, (C) the Work and materials and (D) other property at the Project or adjacent thereto. Contractor shall designate a responsible person on the Project whose duty shall be prevention of accidents. Contractor shall provide all competent supervision necessary to execute all Work and any Work incidental thereto in a thorough, first-class, workmanlike manner. It is Contractor's responsibility that all of the Work and any Work incidental thereto conforms to, and is performed in accordance with, all applicable Federal, State, County and Town laws, codes, ordinances, regulations (including National Pollutant Discharge Elimination System and air pollution standards) and orders of public authorities bearing on performance of the Work.

3.9 Traffic Regulations. All traffic affected by the Work under this Contract shall be regulated in accordance with the then-current version of the *City of Phoenix-Traffic Barricade Manual* (the "Barricade Manual") which is incorporated herein by reference; provided, however, that this Contract shall govern in a conflict with the terms of the Barricade Manual. At the time of the pre-construction conference, the Contractor shall designate an employee who is well qualified and experienced in construction traffic control and safety to be responsible for implementing, monitoring and altering traffic control measures, as necessary. At the same time, the Town will designate a representative who will be responsible to see that all traffic control and any alterations are implemented and monitored to the extent that traffic is carried through the Work area in an effective manner and that motorists, pedestrians, bicyclists and workers are protected from hazard and accidents.

A. Major Streets. The following shall be considered major streets: All major parkway, mile (section line), arterial and collector (mid-section line and quarter section line) streets so classified by the Town.

B. Traffic Control Devices. All traffic control devices required for the Work under this Contract shall be the responsibility of the Contractor. The Contractor shall place advance warning signs (such as REDUCE SPEED, LOOSE GRAVEL, 25 MPH SPEED LIMIT and DO NOT PASS) in accordance with the Barricade Manual. The Contractor shall provide, erect and maintain all necessary flashing arrow boards, barricades, suitable and sufficient warning lights, signals and signs and shall take all necessary precautions for the protection of the Work and safety of the public. The Contractor shall provide, erect and maintain acceptable and adequate detour signs at all closures and along detour routes. All barricades and obstructions shall be illuminated at night, and all safety lights shall be illuminated from sunset until sunrise. All barricades and signs used by the Contractor shall conform to the standard design generally accepted for such purposes and payment for all such services and materials shall be considered as included in the other pay items of the Contract.

C. Existing Signs. The Contractor shall ensure that all existing traffic signs are erect, clean and in full view of the intended traffic at all times. Street name signs at major street intersections shall be maintained erect at all times. If these signs should interfere with construction, the Contractor shall notify the Engineer, in writing, at least 48 hours in advance for Town personnel to temporarily relocate or cover said signs. The Engineer will direct the Contractor as to the correct positions to re-set all traffic and street name signs to permanent locations when notified by the Contractor that the interfering construction is complete.

D. Manual Traffic Control. Manual traffic control shall be in conformity with the Barricade Manual, except that the designated liaison officer shall be contacted at the Maricopa County Sheriff's Office, District 7. When construction activities or traffic hazards at the construction site require the use of flagmen, it shall be the Contractor's responsibility to provide trained flagmen to direct traffic safely. When traffic hazards at construction sites warrant the use of certified police personnel to direct traffic, arrangements must be made with the liaison officer at the Maricopa County Sheriff's Office, District 7.

E. Contractor Equipment. The assembly and turnarounds of the Contractor's equipment shall be accomplished using adjacent local streets when possible. Equipment used and/or directed by the Contractor shall travel with traffic at all times. Supply trucks shall travel with traffic except when being spotted. Contractor shall provide a flagman or off-duty, uniformed Sheriff's Deputy to assist with spotting.

F. Traffic Alterations. During construction, it may be necessary to alter traffic control. Any such alterations shall be in accordance with the Barricade Manual. No street within the Project area may be closed to through traffic or to local emergency traffic without prior, written approval of the Engineer. Written approval may be given if sufficient time exists to allow for notification of the public at least 72 hours in advance of such closing. Partial closure of streets within the Project shall be done in strict conformity with the Barricade Manual and the Engineer's written directions.

G. Intersections. Caution should be used when excavating near intersections with traffic signal underground cable. Contractor shall notify the Engineer, in writing, 24 hours in advance of any Work at

such intersections. The Contractor shall install and maintain temporary overhead traffic signal cable as specified by the Engineer when underground conduit is to be severed by excavations at intersections. The Contractor shall provide an off-duty, uniformed Sheriff's Deputy to direct traffic while the traffic signal is turned off and the wiring is transferred. All damaged or modified traffic signal overhead and underground items shall be repaired and restored to the Engineer's satisfaction. Magnetic detector loops shall, under no circumstances, be spliced.

H. Adjacent Property Access. The Contractor shall maintain access to all businesses, schools and residences along the Project alignment at all times in accordance with the MAG Supplement, Section 107.7.1 (Access).

I. Covered Crossings. Where crossings of existing pavement occurs, no open trenches shall be permitted overnight, but plating may be permitted if conditions allow, as determined by the Engineer in his sole discretion. If plates cannot be used, crossings shall either be back-filled or the Contractor shall provide a detour.

3.10 Indemnification. To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Town and each council member, officer, employee or agent thereof (the Town and any such person being herein called an "Indemnified Party"), for, from and against any and all losses, claims, damages, liabilities, costs and expenses (including, but not limited to, reasonable attorneys' fees, court costs and the costs of appellate proceedings) to which any such Indemnified Party may become subject, under any theory of liability whatsoever ("Claims") to the extent that such Claims (or actions in respect thereof) are caused by the negligent acts, recklessness or intentional misconduct of the Contractor, its officers, employees, agents, or any tier of subcontractor in connection with Contractor's work or services in the performance of this Agreement. The amount and type of insurance coverage requirements set forth below will in no way be construed as limiting the scope of the indemnity in this Section.

3.11 Insurance.

A. General.

1. Insurer Qualifications. Without limiting any obligations or liabilities of Contractor, Contractor shall purchase and maintain, at its own expense, hereinafter stipulated minimum insurance with insurance companies authorized to do business in the State of Arizona pursuant to ARIZ. REV. STAT. § 20-206, as amended, with an AM Best, Inc. rating of A- or above with policies and forms satisfactory to the Town. Failure to maintain insurance as specified herein may result in termination of this Contract at the Town's option.

2. No Representation of Coverage Adequacy. By requiring insurance herein, the Town does not represent that coverage and limits will be adequate to protect Contractor. The Town reserves the right to review any and all of the insurance policies and/or endorsements cited in this Contract but has no obligation to do so. Failure to demand such evidence of full compliance with the insurance requirements set forth in this Contract or failure to identify any insurance deficiency shall not relieve Contractor from, nor be construed or deemed a waiver of, its obligation to maintain the required insurance at all times during the performance of this Contract.

3. Additional Insured. All insurance coverage, except Workers' Compensation insurance and Professional Liability insurance, if applicable, shall name, to the fullest extent permitted by law for claims arising out of the performance of this Contract, the Town, its agents, representatives, officers, directors, officials and employees as Additional Insured as specified under the respective coverage sections of this Contract.

4. Coverage Term. All insurance required herein shall be maintained in full force and effect until all Work or Services required to be performed under the terms of this Contract are

satisfactorily performed, completed and formally accepted by the Town, unless specified otherwise in this Contract.

5. Primary Insurance. Contractor's insurance shall be primary insurance with respect to performance of this Contract and in the protection of the Town as an Additional Insured.

6. Claims Made. In the event any insurance policies required by this Agreement are written on a "claims made" basis, coverage shall extend, either by keeping coverage in force or purchasing an extended reporting option, for three years past completion and acceptance of the services. Such continuing coverage shall be evidenced by submission of annual Certificates of Insurance citing applicable coverage is in force and contains the provisions as required herein for the three-year period.

7. Waiver. All policies, except for Professional Liability, including Workers' Compensation insurance, shall contain a waiver of rights of recovery (subrogation) against the Town, its agents, representatives, officials, officers and employees for any claims arising out of the Work or Services of Contractor. Contractor shall arrange to have such subrogation waivers incorporated into each policy via formal written endorsement thereto.

8. Policy Deductibles and/or Self-Insured Retentions. The policies set forth in these requirements may provide coverage that contains deductibles or self-insured retention amounts. Such deductibles or self-insured retention shall not be applicable with respect to the policy limits provided to the Town. Contractor shall be solely responsible for any such deductible or self-insured retention amount.

9. Use of Subcontractors. If any Work under this Contract is subcontracted in any way, Contractor shall execute written agreement with its Subcontractors containing the indemnification provisions set forth in this Section and insurance requirements set forth herein protecting the Town and Contractor. Contractor shall be responsible for executing any agreements with its Subcontractor and obtaining certificates of insurance verifying the insurance requirements.

10. Evidence of Insurance. Prior to commencing any Work or Services under this Contract, Contractor will provide the Town with suitable evidence of insurance in the form of certificates of insurance and a copy of the declaration page(s) of the insurance policies as required by this Contract, issued by Contractor's insurance insurer(s) as evidence that policies are placed with acceptable insurers as specified herein and provide the required coverages, conditions and limits of coverage specified in this Contract and that such coverage and provisions are in full force and effect. Confidential information such as the policy premium may be redacted from the declaration page(s) of each insurance policy, provided that such redactions do not alter any of the information required by this Contract. The Town shall reasonably rely upon the certificates of insurance and declaration page(s) of the insurance policies as evidence of coverage but such acceptance and reliance shall not waive or alter in any way the insurance requirements or obligations of this Contract. If any of the policies required by this Contract expire during the life of this Contract, it shall be Contractor's responsibility to forward renewal certificates and declaration page(s) to the Town 30 Days prior to the expiration date. All certificates of insurance and declarations required by this Contract shall be identified by referencing this Contract. A $25.00 administrative fee shall be assessed for all certificates or declarations received without a reference to this Contract. Additionally, certificates of insurance and declaration page(s) of the insurance policies submitted without referencing this Contract will be subject to rejection and may be returned or discarded. Certificates of insurance and declaration page(s) shall specifically include the following provisions:

a. The Town, its agents, representatives, officers, directors, officials and employees are Additional Insureds as follows:

(i) Commercial General Liability - Under Insurance Services Office, Inc., ("ISO") Form CG 20 10 03 97 or equivalent.

(ii) Auto Liability - Under ISO Form CA 20 48 or equivalent.

(iii) Excess Liability - Follow Form to underlying insurance.

b. Contractor's insurance shall be primary insurance with respect to performance of the Contract.

c. All policies, except for Professional Liability, including Workers' Compensation, waive rights of recovery (subrogation) against Town, its agents, representatives, officers, officials and employees for any claims arising out of Work or Services performed by Contractor under this Contract.

d. ACORD certificate of insurance form 25 (2014/01) is preferred. If ACORD certificate of insurance form 25 (2001/08) is used, the phrases in the cancellation provision "endeavor to" and "but failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents or representatives" shall be deleted. Certificate forms other than ACORD form shall have similar restrictive language deleted.

B. Required Insurance Coverage.

1. Commercial General Liability. Contractor shall maintain "occurrence" form Commercial General Liability insurance with an unimpaired limit of not less than $1,000,000 for each occurrence, $2,000,000 Products and Completed Operations Annual Aggregate and a $2,000,000 General Aggregate Limit. The policy shall cover liability arising from premises, operations, independent contractors, products-completed operations, personal injury and advertising injury. Coverage under the policy will be at least as broad as ISO policy form CG 00 010 93 or equivalent thereof, including but not limited to, separation of insured's clause. To the fullest extent allowed by law, for claims arising out of the performance of this Contract, the Town, its agents, representatives, officers, officials and employees shall be cited as an Additional Insured under ISO, Commercial General Liability Additional Insured Endorsement form CG 20 10 03 97, or equivalent, which shall read "Who is an Insured (Section II) is amended to include as an insured the person or organization shown in the Schedule, but only with respect to liability arising out of "your work" for that insured by or for you." If any Excess insurance is utilized to fulfill the requirements of this subsection, such Excess insurance shall be "follow form" equal or broader in coverage scope than underlying insurance.

2. Vehicle Liability. Contractor shall maintain Business Automobile Liability insurance with a limit of $1,000,000 each occurrence on Contractor's owned, hired and non-owned vehicles assigned to or used in the performance of the Contractor's Work or Services under this Contract. Coverage will be at least as broad as ISO coverage code "1" "any auto" policy form CA 00 01 12 93 or equivalent thereof. To the fullest extent allowed by law, for claims arising out of the performance of this Contract, the Town, its agents, representatives, officers, directors, officials and employees shall be cited as an Additional Insured under ISO Business Auto policy Designated Insured Endorsement form CA 20 48 or equivalent. If any Excess insurance is utilized to fulfill the requirements of this subsection, such Excess insurance shall be "follow form" equal or broader in coverage scope than underlying insurance.

3. Professional Liability. If this Contract is the subject of any professional Services or Work, or if the Contractor engages in any professional Services or Work in any way related to performing the Work under this Contract, the Contractor shall maintain Professional Liability insurance covering negligent errors and omissions arising out of the Services performed by the Contractor, or anyone employed by the Contractor, or anyone for whose negligent acts, mistakes, errors and omissions the

Contractor is legally liable, with an unimpaired liability insurance limit of $2,000,000 each claim and $2,000,000 annual aggregate.

4. Workers' Compensation Insurance. Contractor shall maintain Workers' Compensation insurance to cover obligations imposed by Federal and State statutes having jurisdiction over Contractor's employees engaged in the performance of Work or Services under this Contract and shall also maintain Employers Liability Insurance of not less than $500,000 for each accident, $500,000 disease for each employee and $1,000,000 disease policy limit.

5. Builder's Risk Insurance. Unless expressly waived by the Town Manager in a written addendum or amendment to this Contract, the Contractor shall be responsible for purchasing and maintaining insurance to protect the Project from perils of physical loss. The insurance shall provide for the full cost of replacement for the entire Project at the time of any loss. The insurance shall include as named insureds the Town, the Contractor, the Contractor's Subcontractors and sub-subcontractors and shall insure against loss from the perils of fire and all-risk coverage for physical loss or damage due to theft, vandalism, collapse, malicious mischief, transit, flood, earthquake, testing, resulting loss arising from defective design, negligent workmanship or defective material. The Contractor shall increase the coverage limits as necessary to reflect changes in the estimated replacement cost.

C. Cancellation and Expiration Notice. Insurance required herein shall not expire, be canceled, or be materially changed without 30 Days' prior written notice to the Town.

3.12 Performance Bond. The Contractor shall be required to furnish non-revocable security binding the Contractor to provide faithful performance of this Contract in the amount of one hundred percent (100%) of the total Contract Price payable to the Town. Performance security shall be in the form of a performance bond, certified check, cashier's check or irrevocable letter of credit. This security must be in the possession of the Engineer within seven Days after execution of this Agreement by the Town. If the Contractor fails to execute and deliver the security instrument as required, the Contractor may be found in default and the Contract terminated by the Town. In case of default the Town reserves all rights. All performance bonds shall be executed in the form attached hereto as Exhibit I, duly executed by the Contractor as Principal and having as Surety thereon a Surety company approved by the Town and holding a Certificate of Authority to transact surety business in the State of Arizona by the Arizona Department of Insurance. Individual sureties are unacceptable. All Insurers and Sureties shall have, at the time of submission of the performance bond, an A.M. Best's Key Rating Guide of "A-" or better as currently listed in the most recent Best Key Guide, published by the A.M. Best Company.

3.13 Payment Bond. The Contractor shall be required to furnish non-revocable security for the protection of all persons supplying labor and material to the Contractor or any Subcontractor for the performance of any Work related to this Contract. Payment security shall be in the amount of one hundred percent (100%) of the total Contract Price and be payable to the Town. Payment security shall be in the form of a payment bond, certified check, cashier's check or irrevocable letter of credit. This security must be in the possession of the Engineer within seven Days after execution of this Agreement by the Town. If the Contractor fails to execute and deliver the security instrument as required, the Contractor may be found in default and the Contract terminated by the Town. In case of default the Town reserves all rights. All payment bonds shall be executed in the form attached hereto as Exhibit J, duly executed by the Contractor as Principal and having as Surety thereon a Surety company approved by the Town and holding a Certificate of Authority to transact surety business in the State of Arizona by the Arizona Department of Insurance. Individual sureties are unacceptable. All Insurers and Sureties shall have, at the time of submission of the payment bond, an A.M. Best's Key Rating Guide of "A-" or better as currently listed in the most recent Best Key Guide, published by the A.M. Best Company.

3.14 Changes in the Work. The Town may, without invalidating this Contract, order changes in the Work consisting of additions, deletions or other revisions to the Contract and the Contract Price and the Contract Time shall be adjusted as provided below. The Contract Price and/or the Contract Time may only be changed by

the Town's written approval authorizing said change, and said changes shall be performed under the applicable conditions of the Contract. The Contract Price shall be adjusted as a result of a change in the Work as follows:

A. Additions. When the Town increases the scope of the Work, Contractor will perform the increased work pursuant to Contractor's unit prices set forth on the Price Sheet.

B. Deletions. When the Town decreases the Work resulting in a decrease in Contractor's quantity of the Work, the Town shall be allowed a decrease in the Contract Price amounting to the quantity of the deleted Work multiplied by the Contractor's unit prices.

C. Estimating. Whenever the Town is considering a change to the Work, Contractor shall promptly, and in any event within five business days, estimate the price of the contemplated additional or deleted Work in good faith and as accurately as is then-feasible. The estimate shall show quantities of labor, material and equipment and shall be pursuant to the rates set forth in the Contractor's Bid.

3.15 Substantial Completion. When the Contractor considers that the Work is Substantially Complete, the Engineer shall prepare and submit to the Contractor a comprehensive list of Punch List items, which the Contractor may edit and supplement. The Contractor shall proceed promptly to complete and correct Punch List items. Failure to include an item on the Punch List does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. The Town shall determine when the Project and the Contractor's Work is substantially complete. "Substantial Completion" means construction has been completed in accordance with the Contract Documents to the extent that the Town can use or occupy the entire Project, or the designated portion of the Project, for the use intended without any outstanding, concurrent construction at the site, except as may be required to complete or correct Punch List items. A prerequisite for Substantial Completion, over and above the extent of construction completion required, is receipt by the Town of acceptable documentation that Contractor has successfully tested and demonstrated all systems for their intended use. The date of Substantial Completion shall be confirmed by a Certificate of Substantial Completion signed by the Town and Contractor. The Certificate of Substantial Completion signed by the Town and Contractor shall state the respective responsibilities of the Town and the Contractor for security, maintenance, utilities, damage to the Work and insurance. The Certificate of Substantial Completion shall also include the Punch List as created by the Contractor and modified by the Town and establish the time for completion and correction of all Punch List items. If the Town and the Contractor cannot agree as to the appropriate date of Substantial Completion, such issue shall be submitted for dispute resolution in accordance with the procedures set forth in Article III, Part B below. Notwithstanding such disagreement, the Contractor shall diligently proceed with completion of the Punch List items.

3.16 Final Completion. The Town shall determine when the Project and the Contractor's Work is finally completed. "Final Completion" means completion of the Project by the Contractor in accordance with the Contract Documents, certified to the Town by the Contractor. Final Completion shall be achieved only upon the Town's written acceptance of (A) the construction, (B) all testing, (C) demonstration by Contractor that the Work functions as required by the Contract Documents and meets all Contract requirements, (D) resolution of all outstanding system deficiencies and Punch List items, if any, (E) delivery of all as-built documentation, drawings, completed record documents (with revisions made after Substantial Completion), annotated submittals and design document deliverables, (F) submittal, acceptance, and delivery of the one hundred percent (100%) complete O&M manuals, (G) delivery of warranties, inspection certificates, bonds and all other required documents, (H) all pre-requisites for final payment and (I) submittal of Contractor's request for final payment and acceptance enclosing all required documentation. Upon Final Completion the Engineer shall issue a Certificate of Final Completion to the Contractor on behalf of the Town. Following receipt of payment from the Town, the Contractor shall make all payments due to the Subcontractors.

3.17 Payments to Contractor. Compensation for all Work necessary for the completion of the Project shall be included by the Bidder in the price bid for the items shown in the Bid. Only those items listed in the

Bid are pay items. Payment shall be conditioned upon Contractor's compliance with the payment terms and conditions set forth below. Contractor expressly acknowledges and agrees that (A) the Contract Price is an estimated amount based upon an engineer's estimate of the quantities of the Materials deemed necessary to perform the Work and (B) the amount of any payment to be made pursuant to this Contract shall be determined by the field-measured quantities of Materials actually installed by Contractor. Material or equipment delivered to the Project by or on behalf of Contractor shall not constitute material or equipment furnished in the performance of the Work until same has been incorporated into the improvements constituting the Project. Payment shall not constitute acceptance by the Town or evidence thereof of any Work performed.

A. Progress Payments.

1. On or before the 15th day of each month after construction has commenced, the Contractor shall submit to the Town an application for payment consisting of the cost of the Work performed up to the end of the prior month, including the cost of material stored on the site or at other locations approved by the Town. The application shall be deemed approved and certified for payment seven Days after it is submitted unless before that time the Town prepares and issues a specific written finding setting forth those items in detail that are not approved for payment under the Contract. Prior to submission of the next application for payment, the Contractor shall make available at the request of the Town a statement accounting for the disbursement of funds received under the previous application for purposes of audit. The extent of such statement shall be as agreed upon between the Town and Contractor.

2. Within 14 Days after approval of each monthly application for payment, the Town shall pay directly to the Contractor the appropriate amount for which application for payment is made, less amounts (a) previously paid by the Town, (b) sufficient to pay expenses the Town reasonably expects to incur in correcting deficiencies which are set forth in writing and provided to the Contractor and (c) any retainage as set forth in subsection 3.17(B) below.

3. The Town's progress payment, occupancy or use of the Project, whether in whole or in part, shall not be deemed as acceptance of any Work not conforming to the requirements of this Contract.

4. Upon Substantial Completion of the Work, the Town shall pay the Contractor the unpaid balance of the cost of the Work, less a sum equal to the Contractor's estimated cost of completing any unfinished items as agreed to between the Town and the Contractor as to extent and time for Final Completion. The Town thereafter shall pay the Contractor monthly the amount retained for unfinished items as each item is completed.

B. Retainage. With respect to the Work, the Town shall retain ten percent (10%) of the amount of each estimate until Final Completion and acceptance of all Material, equipment and Work covered by this Contract.

1. Any securities submitted by Contractor in lieu of retainage as may be allowed by law, shall be deposited in an escrow account by the Town. The Town shall be listed as payee or multiple payees with Contractor on all such securities.

2. When the Work is fifty percent (50%) completed, one-half of the amount retained including any securities substituted pursuant to subsection 3.17 (B)(1) shall be paid to the Contractor upon the Contractor's request, provided the Contractor is making satisfactory progress on the Work and there is no specific cause or claim requiring a greater amount to be retained. After the construction Work is fifty percent (50%) completed, no more than five percent (5%) of the amount of any subsequent progress payments made under this Contract may be retained, provided the Contractor is making satisfactory progress on the Project. If, at any time, the Town determines satisfactory progress is not being made, ten

percent (10%) retention shall be reinstated for all progress payments made under this Contract after the determination.

C. Payment for On-site and Off-site Stored Materials. Payment shall be made on account of Materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. Payment may similarly be made for Materials and equipment suitably stored off the site, conditioned upon the Contractor furnishing evidence to the Town that (1) title to the Materials and equipment will pass to the Town upon payment therefore, (2) the Materials and equipment are adequately safeguarded and insured, including during transit from the off-site location to the Project site and (3) such other matters as the Town may reasonably request in order to protect its interests. With the prior, written approval of the Town, Contractor may advance order the bulk delivery of Materials to be incorporated into the Work over the course of this Contract. Upon delivery and receipt of supplier invoice, the Town shall pay for the bulk delivery, either directly to the Contractor or to the vendor or by joint check to Contractor and vendor, and shall receive a full release for the amount paid from vendor and Contractor. Contractor agrees to assume full responsibility for the safekeeping of all such Materials and shall guarantee to the Town that such Materials shall remain safe from theft or damage from any and all causes (unless caused by the sole negligence of the Town). Contractor shall immediately replace, repair or restore said Materials to their original condition so as to not cause any delay in the Work, and Contractor shall indemnify and hold harmless the Town for, from and against any and all loss, cost, liability or expense resulting from any loss or damage to any of the Materials described herein from any cause unless due to the Town's sole negligence. Should the Town have reason to believe Contractor is not properly safeguarding any of the Materials, the Town shall have the right, but not the affirmative duty, to immediately take such steps as it deems necessary to do so, including removing Contractor from the job, replacing any Materials or expending any sums to properly carry out Contractor's responsibility hereunder, and any amounts so expended shall be billed back to Contractor or deducted from any sums then or thereafter due to Contractor. Contractor shall fully insure all Materials stored on site as required by the Town, and if such insurance is not obtained due to a lack of insurable interest, the Town shall have the right to obtain such insurance and charge the amount thereof back to Contractor or deduct said amount from any funds then or thereafter due to Contractor.

D. Title to Construction Work. The Contractor warrants that title to all Work covered by an application for payment shall pass to the Town no later than the time of payment. The Contractor further warrants that upon submittal of an application for payment, all Work for which applications for payment have been previously issued and payments received from the Town shall be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, Materials and equipment relating to the Work.

E. Final Payment.

1. Final payment, consisting of the unpaid balance of the cost of the Work shall be due and payable at Final Completion and acceptance by the Town. Before issuance of final payment, the Town may request satisfactory evidence that all payrolls, Materials bills and other indebtedness connected with the Work have been paid or otherwise satisfied.

2. Simultaneously with Contractor's request for final payment, Contractor shall submit the following items to the Town Representative:

a. Red-line construction record drawings.

b. Warranties.

c. Two sets of documentation completely covering the operation and maintenance of the mechanical and electrical installation and all other equipment. The documentation shall include charts, diagrams, performance curves, catalog information,

lubrication manuals, and details pertaining to the functioning of various items of equipment. The documentation shall be divided logically into "systems" on the basis of operation, without respect to trades, subcontractors or arbitrary specifications sections. The relationship of the "systems" shall be clearly and concisely detailed.

d. Affidavit Regarding Settlement of Claims.

e. Other items reasonably required by the Town Representative.

3. In making final payment the Town waives all claims except for:

a. Outstanding liens.

b. Improper workmanship or defective Materials.

c. Work not in conformance with this Contract or Work not completed.

d. Terms of any special warranties required by this Contract.

e. Delivery to Town of all warranties, operation and maintenance manuals, "AS-BUILT" record drawings and other documents as required by this Contract.

f. Right to audit Contractor records for a period of three years.

g. Claims previously made in writing and which remain unsettled.

4. Acceptance of final payment by the Contractor shall constitute a waiver of affirmative claims by the Contractor, except those previously made in writing and identified as unsettled at the time of final payment.

F. Warranty. Contractor or its assignee shall give to the Town a one-year warranty against deficiencies in material and workmanship for all Work on the Project or other such warranty as required by the Town Engineer, which warranty shall begin on the date that the Town accepts the Work as provided in this Section. Any material deficiencies in material or workmanship identified by Town staff during the one-year warranty period shall be brought to the attention of the Contractor or its assignee that provided the warranty, which shall promptly remedy or cause to be remedied such deficiencies to the reasonable satisfaction of the Town Engineer. Continuing material deficiencies in a particular portion of the Work shall be sufficient grounds for the Town to require (1) an extension of the warranty for an additional one-year period and (2) the proper repair of or the removal and reinstallation of, that portion of the Work that is subject to such continuing deficiencies. Regardless of whether the applicable warranty period has expired, the Contractor agrees to repair any damage to the Work caused by Contractor's construction activities on the Property. Nothing contained herein shall prevent the Town or Contractor from seeking recourse against any other third party for damage to the Work caused by such third party.

3.18 Offset.

A. Offset for Damages. In addition to all other remedies at law or equity, the Town may offset from any money due to the Contractor any amounts Contractor owes to the Town for damages resulting from breach or deficiencies in performance or breach of any obligation under this Contract.

B. Offset for Delinquent Fees or Taxes. The Town may offset from any money due to the Contractor any amounts Contractor owes to the Town for delinquent fees, transaction privilege taxes and property taxes, including any interest or penalties.

PART B - PERFORMANCE OF THE WORK

3.19 Project Videotape. The Contractor shall produce and provide a project videotape to the Engineer as required by MAG Supplement Section 105.5.3. All costs associated with the Project videotape produced in accordance with this Section shall be deemed incidental.

3.20 Soil and Subsurface Conditions. In addition to conformance to MAG Specifications, Section 102.4 (Examination of Plans, Special Provisions and Site Work), the Contractor shall make its own determinations as to the soil and subsurface conditions, including rock, caliche and ground water and shall complete the Work in whatever material and under whatever conditions may be encountered or created, without extra cost to the Town pursuant to the provisions of the MAG Supplement Section 102.4.1.

3.21 Work Scheduling. Time is of the essence for this Contract. Contractor shall provide the Engineer with any requested scheduling information and a proposed schedule for performance of the Work within the Contract Time in a form acceptable to the Engineer and approved by the Engineer, in his sole and absolute discretion, providing for commencement and completion of the Work (the "Schedule"). The Schedule shall include the date for Substantial Completion of the Work. The Engineer may revise the Schedule during the course of the Work. Contractor, to induce the Town to enter into this Contract, has and does hereby agree to fully perform and complete the Work for the Contract Price within the Schedule.

3.22 Contractor's Representative. The Contractor or his authorized representative shall be present at the Work site at all times during working hours. Instructions and information provided by the Engineer to the Contractor's representative shall be considered as having been given to the Contractor, per MAG Supplement Section 105.5.2.

3.23 Prosecution of the Work. The Contractor shall prosecute the Work so that the portion of the Work completed at any point in time shall be not less than as required by the Schedule. If the delay is an Inexcusable Delay, as defined below, the Contractor shall prepare a recovery schedule for the Engineer's review and approval, showing how the Contractor will compensate for the delays and achieve Substantial Completion by the date(s) shown on the Schedule. If the Contractor is unable to demonstrate how it will overcome Inexcusable Delays, the Engineer may order the Contractor to employ such extraordinary measures as are necessary to bring the Work into conformity with the Substantial Completion date(s) set forth therein, the costs of which shall be included as part of the Cost of the Work. If the delay is an Excusable Delay, as defined below, the Engineer shall either (A) authorize an equitable extension in the Schedule to account for such delay, and equitably adjust the contract sum on account of such delay or (B) request that the Contractor prepare a recovery schedule showing how (if possible) the Contractor can achieve Substantial Completion by the applicable date shown on the Schedule, and equitably adjust the Contract Price in accordance with the provisions of this Contract on account of any extraordinary activities required of the Contractor on account of such recovery schedule.

3.24 Extensions of Time.

A. Allowable Extensions. An extension in the scheduled date of Substantial Completion will only be granted in the event of Excusable Delays affecting the Schedule for the Work. The Contractor shall be entitled to general condition costs and extra costs related to the Excusable Delay for idle labor, equipment inefficiency and lost productivity of the performance of the Work. The Contractor must submit evidence reasonably satisfactory to the Town substantiating such costs. Such adjustment to the Price and Substantial Completion date shall be issued in a Change Order or Contract amendment, as applicable.

B. Excusable Delay. To the extent any of the following events results in an actual delay in the Work, such shall constitute an "Excusable Delay" (to the extent not set forth below, a delay will be considered an "Inexcusable Delay"):

1. Delays resulting from Force Majeure.

2. Differing, unusual or concealed site conditions that could not reasonably have been anticipated by the Contractor in preparing the Schedule, including, without limitation, archaeological finds and unusual soil conditions (including rock or other geological conditions), underground foundations, abandoned utility lines and water conditions.

3. Delays resulting from the existence or discovery of Hazardous Materials on the Site not brought to the Site by the Contractor.

4. Delays resulting from changes in Applicable Laws occurring after the date of execution of this Contract.

5. Delays occurring due to the acts or omissions of the Town and those within the control of the Town.

6. Delays occurring due to the acts or omissions of a utility, so long as Contractor has coordinated with the utility causing the delay and the delay occurs despite reasonable steps taken by Contractor to avoid the delay.

7. Delays resulting from weather conditions that make it unreasonable to perform the Work in accordance with the Schedule; provided, however, that Contractor's Schedule shall be deemed to include 14 Days for weather delays (the "Expected Delay Days"), regardless of whether such weather delays are specifically set forth in the Schedule. Contractor shall notify the Town within 24 hours in writing of a weather related delay. If Contractor fails to give the required 24-hour notice, no such weather delay will be subtracted from the Expected Delay Days. Weather delays shall not be deemed "Excusable" unless all of the Expected Delay Days have been exhausted.

8. Delays resulting from Additional Work (defined below) that cannot be performed concurrently with the Work on the Schedule.

C. Required Notice. In order to obtain an extension of time due to an Excusable Delay, the Contractor shall comply with the following requirements. The Contractor shall notify the Engineer in writing of the Excusable Delay as soon as practicable, but in no event more than seven Days after the Contractor becomes aware of the occurrence of the Excusable Delay. Such notice shall describe the Excusable Delay and shall state the approximate number of Days the Contractor expects to be delayed. After the cessation of the Excusable Delay, the Contractor shall notify the Engineer of the number of Days the Contractor believes that its activities were in fact delayed by the Excusable Delay. In the event that the delay arises as a result of a Change Order request by the Town, the request for an extension of time contained in the resulting Change Order proposal shall be deemed sufficient for purposes of this subsection.

D. Determination. Within 10 Days after cessation of an event giving rise to either an Excusable Delay or Inexcusable Delay, the parties will use good faith efforts to agree on the extent to which the Work has been delayed and whether the delay is an Excusable Delay or an Inexcusable Delay. In the absence of agreement between the parties as to the then-current status of Excusable Delays and Inexcusable Delays, the Engineer will provide the Contractor with written notice of Engineer's determination of the respective number of Days of Excusable Delay and/or Inexcusable Delay. The Engineer's determination may be issued at such time as the Engineer deems reasonable, but not later than 10 Days after receipt by the Engineer of the Contractor's written request for such determination. The Contractor shall not, however, deem an issuance by the Engineer of such a determination to be a concurrence of the matters set forth in the Contractor's request. The Contractor may invoke the dispute resolution procedures set forth in Part D below with respect to such determination.

E. Concurrent Delay. To the extent the Contractor is entitled to an extension of time due to an Excusable Delay, but the performance of the Work would have been suspended, delayed or interrupted by the

fault or neglect of the Contractor or by an Inexcusable Delay, the Contractor shall not be entitled to any additional costs for the period of such concurrency.

3.25 Liquidated Damages. It is expressly understood that should Contractor fail to complete the Work covered hereby within the Contract Time, the Contractor agrees to pay and shall pay to the Town upon request therefore for each Day of delay beyond the original or revised scheduled time of completion of Contractor's Work as liquidated damages, and not as a penalty, in the amount per Day as set forth in MAG Specifications for each Day of delay.

A. Prior to Termination. If the Contract is not terminated, the Contractor shall continue performance and be liable to the Town for the liquidated damages until the Work is complete.

B. After Termination. In the event the Town exercises its right of termination, the Contractor shall be liable to the Town for any excess costs and, in addition, for liquidated damages until such time as the Town may reasonably obtain delivery or performance of similar Services.

3.26 Suspension by the Town for Convenience.

A. Town Determination. The Town may order the Contractor in writing to suspend, delay or interrupt all or any part of the Work without cause for such period of time as the Town may determine to be appropriate for its convenience.

B. Contract Adjustments. Adjustments caused by suspension, delay or interruption shall be made for increases in the applicable contract sum and/or the date(s) of Substantial Completion. No adjustment shall be made if the Contractor is or otherwise would have been responsible for the suspension, delay or interruption of the Work, or if another provision of this Contract is applied to render an equitable adjustment.

3.27 Termination by the Town for Convenience. The Town may, upon 30 Days' written notice to the Contractor, terminate this Contract, in whole or in part, for the convenience of the Town without prejudice to any right or remedy otherwise available to the Town. Upon receipt of such notice, the Contractor shall immediately discontinue all Services affected unless such notice directs otherwise. In the event of a termination for convenience of the Town, the Contractor's sole and exclusive right and remedy shall be payment for all Work performed through the date of termination. The Contractor shall not be entitled to be paid any amount as profit for unperformed Services or consideration for the Town's termination by convenience.

3.28 Termination by the Town for Cause.

A. Default; Cure. If the Contractor refuses or fails to supply sufficient properly skilled staff or proper Materials, or disregards laws, ordinances, rules, regulations, or orders of any public authority jurisdiction, or otherwise substantially violates or materially breaches any term or provision of this Contract, and such nonperformance or violation continues without cure for 15 Days after the Contractor receives written notice of such nonperformance or violation from the Town, then the Town may, without prejudice to any right or remedy otherwise available to the Town, terminate this Contract.

B. Substitute Performance. Upon termination of this Contract by the Town, the Town shall be entitled to furnish or have furnished the Services to be performed hereunder by the Contractor by whatever method the Town may deem expedient. Also, in such case, the Contractor shall not be entitled to receive any further payment until completion of the Work, and the total compensation to the Contractor under this Contract shall be the amount that is equitable under the circumstances. If the Town and the Contractor are unable to agree on the amount to be paid under the foregoing sentence, the Town shall fix an amount, if any, that it deems appropriate in consideration of all of the circumstances surrounding such termination, and shall make payment accordingly. The Contractor may dispute the Town's assessment of the termination amount pursuant to the dispute resolution process set forth in in Part D of this Contract.

C. Contractor Insolvency. Upon the appointment of a receiver for the Contractor, or if the Contractor makes a general assignment for the benefit of creditors, the Town may terminate this Contract, without prejudice to any right or remedy otherwise available to the Town, upon giving three business days' written notice to the Contractor. If an order for relief is entered under the bankruptcy code with respect to the Contractor, the Town may terminate this Contract by giving three business days' written notice to the Contractor unless the Contractor or the trustee completes all of the following:

1. Promptly cures all breaches within such three-day period.

2. Provides adequate assurances of future performance.

3. Compensates the Town for actual pecuniary loss resulting from such breaches.

4. Assumes the obligations of the Contractor within the established time limits.

3.29 Contract Subject to Appropriation. The Town is obligated only to pay its obligations set forth in this Agreement as may lawfully be made from funds appropriated and budgeted for that purpose during the Town's then current fiscal year. The Town's obligations under this Agreement are current expenses subject to the "budget law" and the unfettered legislative discretion of the Town concerning budgeted purposes and appropriation of funds. Should the Town elect not to appropriate and budget funds to pay its Agreement obligations, this Agreement shall be deemed terminated at the end of the then-current fiscal year term for which such funds were appropriated and budgeted for such purpose and the Town shall be relieved of any subsequent obligation under this Agreement. The parties agree that the Town has no obligation or duty of good faith to budget or appropriate the payment of the Town's obligations set forth in this Agreement in any budget in any fiscal year other than the fiscal year in which this Agreement is executed and delivered. The Town shall be the sole judge and authority in determining the availability of funds for its obligations under this Agreement. The Town shall keep Contractor informed as to the availability of funds for this Agreement. The obligation of the Town to make any payment pursuant to this Agreement is not a general obligation or indebtedness of the Town. Contractor hereby waives any and all rights to bring any claim against the Town from or relating in any way to the Town's termination of this Agreement pursuant to this section.

3.30 Additional Work, Materials and/or Overtime. Contractor expressly agrees that if overtime or additional workers or materials are necessary to meet the Schedule, that such overtime will be performed or additional workers or materials will be procured by the Contractor, and the additional expense thereof shall be borne by Contractor unless the delay requiring overtime was directly caused by the Town, in which event Contractor shall be entitled to compensation for such overtime Work. If the Town requests Contractor to perform additional Work in connection with the Project ("Additional Work"), Contractor shall charge the Town a negotiated fixed amount for the Additional Work. In the event a fixed amount cannot be negotiated, Contractor shall invoice the Town on a time and materials basis for the Additional Work at the unit prices set forth in the price sheet.

3.31 No Damage for Delay or Additional Work by the Town. Contractor shall adjust its operations to conform to any progress schedule changes and hereby waives and releases the Town from any liability for damages or expenses that may be caused to or sustained by Contractor by reason of such changes or by reason of delays in the Work, whether caused in whole or in part by conduct on the part of the Town, including without limitation, any breach of this Contract or delays by other contractors or Subcontractors. Contractor's exclusive remedy in event of delay or Additional Work by the Town shall be an extension of time hereunder to complete the Work.

3.32 Risk of Loss. Contractor shall assume the risk of loss occasioned by fire, theft or other damage to Materials, machinery, apparatus, tools and equipment relating to the Work prior to actual installation in final place on the Project and acceptance by the Town. Contractor shall be responsible for damage to the Materials,

machinery, apparatus, tools, equipment and property of the Town and other contractors resulting from the acts or omissions of its Subcontractors, employees, agents, representatives Subcontractors, and for payment of the full costs of repair or replacement of any said damage.

3.33 Protection of Finished or Partially Finished Work. The Contractor shall properly guard and protect all finished or partially finished Work and shall be responsible for the same until the entire Contract is completed and accepted by the Engineer. The Contractor shall turn over the entire Work in full accordance with this Contract before final settlement shall be made.

3.34 Character and Status of Workers. Only skilled foremen and workers shall be employed on portions of the Work requiring special qualifications. When required by the Engineer, the Contractor shall discharge any person who is, in the opinion of the Engineer, disorderly, dangerous, insubordinate, incompetent or otherwise objectionable. The Contractor shall indemnify and hold harmless the Town from and against damages or claims for compensation that may occur in the enforcement of this Section. The Contractor shall be responsible for ensuring the legal working status of its employees and its Subcontractor's employees. The Contractor agrees that once assigned to Work under this Contract, key personnel shall not be removed or replaced without written notice to the Town. If key personnel are not available for Work under this Contract for a continuous period exceeding 30 Days, or are expected to devote substantially less effort to the Work than initially anticipated, the Contractor shall immediately notify the Town and shall, subject to the concurrence of the Town, replace such personnel with personnel of substantially equal ability and qualifications.

3.35 Work Methods. The methods, equipment and appliances used on the Work shall be such as will produce a satisfactory quality of Work, and shall be adequate to complete the Contract within the Contract Time. Except as is otherwise specified in this Contract, the Contractor's procedure and methods of construction may, in general, be of its own choosing, provided such methods (A) follow best general practice and (B) are calculated to secure results which will satisfy the requirements of this Contract. The Work covered by this Contract shall be carefully laid out in advance and performed in a manner to minimize interference with normal operation and utilization of the Town's right-of-way. The Contractor shall exercise caution during the course of this Work to avoid damage to all known existing or possible unknown existing underground utilities. It shall conduct its operations in such a manner as to avoid injury to its personnel and to avoid damage to all utilities. Any damage done will be repaired without delay and at the expense of the Contractor.

3.36 Safety Fencing Requirement for Trenches and Excavations. The Contractor shall provide safety construction fencing around all open trenches and excavations during all non-working hours. In addition, the Contractor shall provide safety fencing around the Project site during working hours in order to ensure public safety. The Contractor shall provide for the safety and welfare of the general public by adequately fencing all excavations and trenches that are permitted by the Engineer to remain open when construction is not in progress. Fencing shall be securely anchored to approved steel posts located not less than six feet on center, having a minimum height of six feet, and shall consist of wire mesh fabric of sufficient weight and rigidity to adequately span a maximum supporting post separation of six feet. The fencing, when installed about the periphery of excavations and trenches, shall form an effective barrier against intrusion by the general public into areas of construction. The Contractor, at all times when construction is not in progress, shall be responsible for maintaining the fencing in good repair, and upon notification by the Engineer, shall take immediate action to rectify any deficiency. Prior to the start of any excavation or trenching required for the execution of the proposed Work, the Contractor shall submit to the Engineer for approval, detailed plans showing types of materials and methods of fabrication for the protective fencing. There will be no separate measurement or payment for furnishing, installing, or maintaining protective fencing. The cost shall be considered incidental to the cost of any other structures for which trenching is necessary.

3.37 Plans and Shop Drawings, Samples and Substitution of Materials. All submittals shall conform to MAG Specifications, Section 105.2 (Plans and Drawings) as modified by the MAG Supplement. Contractor shall furnish, within three business days following request therefore by the Town, detailed drawings of the Work,

samples of Materials and other submittals required for the performance or coordination of the Work. Substitutions shall be equal or superior to Materials specified in the Contract Documents, shall be clearly identified on submittals as "proposed substitutions" and shall be approved by the Town in accordance with Section 2.4 above. Contractor shall be fully responsible for the adequacy, completeness and promptness of all such submittals. Materials shall not be furnished to the jobsite unless same is in strict compliance with the Specifications or otherwise approved in writing by the Town. Approval by the Town shall not relieve Contractor of full responsibility for compliance with scope, intent and performance in accordance with this Contract.

3.38 Utilities.

A. Cooperation. The Contractor shall comply with the requirements of MAG Specifications 105.6, as modified by the MAG Supplement.

B. Utilities Shown on the Plans.

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

2. Existing utilities are indicated on Project plans in accordance with the best information available. Contractor shall notify all owners of utilities when its Work is in progress and shall make such arrangements as are necessary to make any emergency repair to any utility, in a manner satisfactory to the Town of a damaged utility line, including individual or house service utility lines.

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

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

5. Contractor shall assume full responsibility for damages to any underground facility/utility properly shown on the Plans or properly located by the Utility owner, as a result of failing to obtain information as to its location, failing to excavate in a careful and prudent manner (as defined in MAG Specifications), or failing to take measures for protection of the facilities/utilities. The Contractor is liable to the owner of the underground facility/utility for the total cost of the repair.

C. Utilities Not Shown on the Plans.

1. If utility lines are encountered that are not shown on the plans, and not located, or incorrectly located by the utility owner, other than individual or house service utility lines, and these lines are damaged or work is required to clear same, then MAG Specifications, Section 109.8 and ARIZ. REV. STAT. § 40-360.21 et seq. shall apply.

2. The work necessary for the raising, lowering, or relocating of any such utility shall be at the utility owner's expense. The necessary Work may be done by the utility owner or by Contractor, or as a collaborative effort, at the option of the utility owner. All Work shall be in accordance with the standards of the Town and the utility owner.

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

3.39 Sampling and Testing. Sampling and testing shall conform to the requirements of the MAG Specifications, Section 106, as modified by the MAG Supplement. The Contractor shall obtain an independent laboratory or testing company and pay all costs of testing required by the Contract Documents, including testing required by MAG, the Specifications, the Town and other jurisdictional bodies. A copy of all test results shall be furnished to the Engineer in a summary report submitted at the subsequent construction progress meeting (time and date to be set upon Contract award) for tests performed. At Substantial Completion, the Contractor shall submit a final test report containing all test results which certifies the Work complies with the Specifications. This report shall be sealed by a professional engineer registered in the State of Arizona who was responsible for overseeing the testing and sampling.

3.40 Cooperation between Contractors. The Contractor shall comply with the requirements of MAG Specifications, Section 105.7, as modified by the MAG Supplement.

3.41 Outdoor Construction Time Restrictions. Unless otherwise permitted by the Engineer, construction will be restricted as listed in the following table:

May 15 – September 15	September 16 – May 14
5:30 a.m. to 6:30 p.m.	6:00 a.m. to 6:30 p.m.

Construction Work shall not begin Work prior to 7:00 a.m. and shall stop by 5:00 p.m. on Saturdays. There shall be no Construction Work on Sundays and all Town, State and Federal holidays.

3.42 Construction Survey. Construction survey and as-built record drawings shall conform to the requirements of the MAG Specifications, Section 105.8 (Construction Stakes, Lines and Grades), as modified by the MAG Supplement. Contractor shall provide and pay for all building layout staking, including elevations and all other Project staking. Replacement of construction stakes that have been knocked out due to Contractor's Work or lack of Work, weather conditions, traffic, vandalism or utility contractors will be done at Contractor's expense.

3.43 Survey Control Points. Existing survey markers (either brass caps or iron pipes) shall be protected by the Contractor or removed and replaced under direct supervision of the Engineer. Survey monuments shall be constructed to the requirements of MAG Specifications, Section 405. Lot corners shall not be disturbed without knowledge and consent of the property owner. The Contractor shall replace benchmarks, monuments or lot corners moved or destroyed during construction at no expense to the Town. Contractor and its sureties shall be liable for correct replacement of disturbed survey benchmarks except where the Town elects to replace survey benchmarks using its own forces.

3.44 Stockpile of Materials.

A. Engineer Approval. The Contractor may, if approved by the Engineer, place or stockpile Materials in the public right-of-way provided such Materials do not prevent access to adjacent properties or prevent compliance with traffic regulations. An encroachment permit shall be required. Any applicable cost shall be paid by the Contractor and shall be presumed to be part of the Contractor's bid.

B. No Traffic Interference. Traffic shall not be required to travel over stockpiled Materials and proper dust control shall be maintained.

3.45 Excess Materials. When excavations are made, resultant loose earth shall be (A) utilized for filling by compacting in place or (B) disposed of off-site. Excess or unsuitable material, broken asphaltic concrete and broken portland cement concrete excavated from the right-of-way shall be removed from the Project Site and disposed of by the Contractor. Waste material shall not be placed on private property without express permission of the property owner. The Contractor shall, at all times, keep the premises free from accumulation of waste materials or rubbish caused by its operations. At the completion of the Work, Contractor shall remove all equipment, tools and surplus materials, and shall completely clean the premises, removing and disposing of all debris and rubbish and cleaning all stains, spots, marks, dirt, smears or other blemishes. When the Work premises are turned over to the Town, they shall be thoroughly clean and ready for immediate use. Clean-up shall include removal of all excess pointing mortar materials within pipes and removal of oversized rocks and boulders left after finish grading. The Contractor shall provide for the legal disposal of all waste products and debris and shall make necessary arrangements for such disposal.

3.46 Dust Control and Water. Contractor shall implement dust control measures in accordance with MAG Specifications, Section 104.1, and the MAG Supplement. Installation and removal of fire hydrant meters should be scheduled at least three business days in advance through the Chaparral City Water Company. Watering shall conform to the provisions of MAG Specifications, Section 225. A deposit and installation fee in amounts set forth in the Chaparral City Water Company's fee schedule is required for each meter. The cost of the water is at the prevailing rate.

3.47 Storm Water. Contractor shall obtain all local, county, state and federal storm water permits.

3.48 Temporary Sanitary Facilities. The Contractor shall provide ample toilet facilities with proper enclosures for the use of workers employed on the Work site. Toilet facilities shall be installed and maintained in conformity with all applicable State and local laws, codes, regulations and ordinances and shall be properly lit and ventilated, and kept clean at all times. Adequate and satisfactory drinking water shall be provided at all times and under no circumstances and under no conditions will the use of common cups be permitted. The Contractor must supply sanitary drinking cups for the benefit of all employees.

3.49 Electric Power, Water and Telephone. Unless otherwise specified, the Contractor shall make its own arrangements for electric power, water and telephone as needed. Subject to the convenience of the utility, it may be permitted to connect to existing facilities where available, but Contractor shall meter and bear the cost of such power or water, and installation and disconnect of such power, water and telephone services.

3.50 Energized Aerial Electrical Power Lines. Utility companies may maintain energized aerial electrical power lines in the immediate vicinity of this Project. Contractor shall not presume any such lines to be insulated. Construction personnel working in proximity to these lines may be exposed to an extreme hazard from electrical shock. Contractor shall ensure that its employees and all other construction personnel working on this Project are warned of the danger and instructed to take adequate protective measures, including maintaining a minimum ten feet of clearance between the lines and all construction equipment and personnel. (see: OSHA Std. 1926.550 (a) 15, as amended). As an additional safety precaution, Contractor shall call the affected utility companies to arrange, if possible, to have these lines de-energized or relocated when the Work reaches their immediate vicinity. The cost of such temporary arrangements shall be borne by the Contractor. Contractor shall account for the time necessary to cause such utility disconnection in the preparation of its Bid. Electrical utility companies may maintain energized underground electrical power lines in the immediate vicinity of this Project. These power lines represent an extreme hazard of electrical shock to any construction personnel or equipment coming in contact with them. Arizona law requires all parties planning excavations in public rights-of-way to contact all utility firms for locations of their underground facilities. Contractor shall ensure that its employees and

all other personnel working near any underground power lines must be warned to take adequate protective measure. (see: OSHA Std. 1926-651 (A), as amended).

3.51 Site Clean Up. Contractor shall at all times, but not less than daily unless otherwise agreed by Town Representative, keep the premises on which the Work is being performed clean and free from accumulation of any waste materials, trash, debris and excess dirt, and at all times shall remove Contractor's implements, machinery, tools, apparatus and equipment from the jobsite when not needed on the jobsite. Should the Town Representative find it necessary in his/her opinion to employ help to clean up, remove or store any of the foregoing due to failure of Contractor to do so, the expense thereof shall be charged to Contractor. Verbal notice from the Town Representative on clean-up or removal is considered adequate notice hereunder, and failure to conform with his/her request within 24 hours thereof will be construed as a breach of this Contract by the Contractor and such charges will be made against Contractor's account as are necessary to accomplish the clean-up or removal. The cost of cleanup, removal or storage by the Town, if not deducted by the Town from monies due Contractor, shall be paid by Contractor within five business days of written demand by the Town.

3.52 Use of the Site. Contractor shall at all times comply fully with all laws, orders, citations, rules, regulations, standards and statutes with respect to occupational health and safety, the handling and storage of hazardous materials, accident prevention and safety equipment and practices, including any accident prevention and safety program of the Town; provided, however, that the Town shall not be required to impose any safety requirements or administer any such programs and the review or requirement of any safety plan by the Town shall not be deemed to release Contractor or in any way diminish its liability, by way of indemnity or otherwise, as assumed by it under this Contract. Contractor shall conduct inspections regularly to determine that safe working conditions and equipment exist and accepts sole responsibility for providing a safe place to Work for its employees and employees of its Subcontractors, laborers, suppliers of material and equipment and any other person visiting the Site, for adequacy of and required use of all safety equipment and for compliance herewith. When so ordered, Contractor shall stop any part of the Work that the Town deems unsafe until corrective measures satisfactory to the Town have been taken. Should Contractor neglect to adopt such corrective measures, the Town may do so and deduct the cost from payments due Contractor. Contractor shall timely submit copies of all accident or injury reports to the Town.

3.53 Public Information and Notification. The Contractor shall submit a public information and notification plan for this Project (the "Notification Plan") to the Town Representative at the first pre-construction meeting held prior to start of construction. The Notification Plan shall include, at a minimum, the items set forth in this Section 3.53; provided, however, that the Engineer may waive any portion of the requirements of this Section upon a written determination that the Project scope does not warrant such notification. Contractor shall provide Project information to affected residents and homeowners' associations prior to and throughout the Project's duration. The Contractor shall use the Notification Plan to inform the local citizens, businesses and Town officials, not less than five business days in advance, of (A) necessary operations that create high noise levels, (B) street closures, (C) detour locations, (D) haul routes and material delivery routes and (E) disruption of bus routes, mail routes and other delivery/pick-up routes.

A. Intentionally omitted.

B. Intentionally omitted.

C. Public Meetings. The Contractor shall attend such public meetings as deemed necessary by the Town Manager or authorized designee.

D. Press Releases. The Contractor shall, at the request of the Engineer, prepare press releases regarding the Project.

E. Payment for Public Notification. The Town will pay, based on time and materials invoices, an amount not to exceed the amount designated in the Price Sheet and entitled COMMUNITY

RELATIONS, for Work performed in accordance with the Notification Plan. Work that is eligible for reimbursement includes: the "Dear Neighbor" letters; bi-monthly progress reports; meetings with impacted businesses, residents, schools, churches or other groups; scheduling newsletter when necessary (at least monthly); temporary signs for local access; and maintaining the Hotline. No payment will be made under this item for any Day during which there are substantial deficiencies in compliance, as determined by the Engineer. The Contractor shall submit a final report/evaluation of its Notification Plan process performed for this Project. The report shall be submitted before the Contractor receives final payment.

PART C - MISCELLANEOUS

3.54 Applicable Law; Venue. This Contract shall be governed by the laws of the State of Arizona and suit pertaining to this Contract may be brought only in courts in Maricopa County, Arizona.

3.55 Conflict of Interest. This Contract is subject to the provisions of ARIZ. REV. STAT. § 38-511. The Town may cancel this Contract without penalty or further obligations by the Town or any of its departments or agencies if any person significantly involved in initiating, negotiating, securing, drafting or creating this Contract on behalf of the Town or any of its departments or agencies is, at any time while the Contract or any extension of the Contract is in effect, an employee of any other party to the Contract in any capacity or a consultant to any other party of the Contract with respect to the subject matter of the Contract.

3.56 Contract Amendments. This Contract may be modified only by a written amendment signed by persons duly authorized to enter into contracts on behalf of the Town and the Contractor; provided, however, that Change Orders may be issued and approved administratively by the Town when such changes do not alter the Contract Price.

3.57 Provisions Required by Law. Each and every provision of law and any clause required by law to be in the Contract will be read and enforced as though it were included herein and, if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party, the Contract will promptly be physically amended to make such insertion or correction.

3.58 Severability. The provisions of this Contract are severable to the extent that any provision or application held to be invalid by a Court of competent jurisdiction shall not affect any other provision or application of the Contract which may remain in effect without the invalid provision or application.

3.59 Independent Contractor. It is clearly understood that each party will act in its individual capacity and not as an agent, employee, partner, joint venturer, or associate of the other. An employee or agent of one party shall not be deemed or construed to be the employee or agent of the other for any purpose whatsoever. The Contractor acknowledges and agrees that the Services provided under this Agreement are being provided as an independent contractor, not as an employee or agent of the Town. Contractor, its employees and subcontractors are not entitled to workers' compensation benefits from the Town. The Town does not have the authority to supervise or control the actual work of Contractor, its employees or subcontractors. The Contractor, and not the Town, shall determine the time of its performance of the services provided under this Agreement so long as Contractor meets the requirements of its agreed scope of work and the specifications, plans/construction drawings as set forth in Section 2.1 above and Exhibit A. Contractor is neither prohibited from entering into other contracts nor prohibited from practicing its profession elsewhere. Town and Contractor do not intend to nor will they combine business operations under this Agreement.

3.60 Entire Agreement; Interpretation-Parol Evidence. This Contract represents the entire agreement of the parties with respect to its subject matter, and all previous agreements, whether oral or written, entered into prior to this Contract are hereby revoked and superseded by this Contract. No representations, warranties, inducements or oral agreements have been made by any of the parties except as expressly set forth herein, or in any other contemporaneous written agreement executed for the purposes of carrying out the provisions of this Contract. This Contract shall be construed and interpreted according to its plain meaning, and no presumption shall be

deemed to apply in favor of, or against the party drafting the Contract. The parties acknowledge and agree that each has had the opportunity to seek and utilize legal counsel in the drafting of, review of, and entry into this Contract.

3.61 Assignment; Delegation. No right or interest in this Contract shall be assigned or delegated by Contractor without prior, written permission of the Town, signed by the Town Manager. Any attempted assignment or delegation by Contractor in violation of this provision shall be a breach of this Contract by Contractor.

3.62 Subcontracts. No subcontract shall be entered into by the Contractor with any other party to furnish any of the Materials, Services or construction specified herein without the prior, written approval of the Town. The Contractor is responsible for performance under this Contract whether or not Subcontractors are used.

3.63 Rights and Remedies. No provision in this Contract shall be construed, expressly or by implication, as waiver by the Town of any existing or future right and/or remedy available by law in the event of any claim of default or breach of this Contract. The failure of the Town to insist upon the strict performance of any term or condition of this Contract or to exercise or delay the exercise of any right or remedy provided in this Contract, or by law, or the Town's acceptance of and payment for Materials or Services, shall not release the Contractor from any responsibilities or obligations imposed by this Contract or by law, and shall not be deemed a waiver of any right of the Town to insist upon the strict performance of this Contract.

3.64 Attorneys' Fees. In the event either party brings any action for any relief, declaratory or otherwise, arising out of this Contract or on account of any breach or default hereof, the prevailing party shall be entitled to receive from the other party reasonable attorneys' fees and reasonable costs and expenses, determined by the court sitting without a jury, which shall be deemed to have accrued on the commencement of such action and shall be enforced whether or not such action is prosecuted through judgment.

3.65 Notices and Requests. Any notice or other communication required or permitted to be given under this Contract shall be in writing and shall be deemed to have been duly given if (A) delivered to the party at the address set forth below, (B) deposited in the U.S. Mail, registered or certified, return receipt requested, to the address set forth below or (C) given to a recognized and reputable overnight delivery service, to the address set forth below:

If to the Town:	Town of Fountain Hills 16705 East Avenue of the Fountains Fountain Hills, Arizona 85268 Attn: Grady E. Miller, Town Manager
With copy to:	GUST ROSENFELD P.L.C. One East Washington Street, Suite 1600 Phoenix, Arizona 85004-2553 Attn: Andrew J. McGuire
If to Contractor:	_____ _____ _____ Attn: _____

or at such other address, and to the attention of such other person or officer, as any party may designate in writing by notice duly given pursuant to this Section. Notices shall be deemed received (A) when delivered to the party, (B) three business days after being placed in the U.S. Mail, properly addressed, with sufficient postage or (C) the following business day after being given to a recognized overnight delivery service, with the person giving the notice paying all required charges and instructing the delivery service to deliver on the following business day. If a

copy of a notice is also given to a party's counsel or other recipient, the provisions above governing the date on which a notice is deemed to have been received by a party shall mean and refer to the date on which the party, and not its counsel or other recipient to which a copy of the notice may be sent, is deemed to have received the notice.

3.66 Overcharges by Antitrust Violations. The Town maintains that, in practice, overcharges resulting from antitrust violations are borne by the purchaser. Therefore, to the extent permitted by law, the Contractor hereby assigns to the Town any and all claims for such overcharges as to the goods and services used to fulfill the Contract.

3.67 Force Majeure. Except for payment for sums due, neither party shall be liable to the other nor deemed in default under this Contract if and to the extent that such party's performance of this Contract is prevented by reason of force majeure. The term *"force majeure"* means an occurrence that is beyond the control of the party affected and occurs without its fault or negligence. Without limiting the foregoing, force majeure includes acts of God; acts of the public enemy; war; riots; strikes; mobilization; labor disputes; civil disorders; fire; floods; lockouts, injunctions-intervention-acts, or failures or refusals to act by government authority; and other similar occurrences beyond the control of the party declaring force majeure which such party is unable to prevent by exercising reasonable diligence. The force majeure shall be deemed to commence when the party declaring force majeure notifies the other party, in accordance with Section 3.65, of the existence of the force majeure and shall be deemed to continue as long as the results or effects of the force majeure prevent the party from resuming performance in accordance with this Contract. Force majeure shall not include the following occurrences:

A. Late Delivery. Late delivery of equipment or materials caused by congestion at a manufacturer's plant or elsewhere, an oversold condition of the market, inefficiencies or similar occurrences.

B. Late Performance. Late performance by a Subcontractor unless the delay arises out of a force majeure occurrence in accordance with this Section 3.67. Any delay or failure in performance by either party hereto shall not constitute default hereunder or give rise to any claim for damages or loss of anticipated profits if, and to the extent that such delay or failure is caused by force majeure. If either party is delayed at any time in the progress of the Work by force majeure, then the delayed party shall notify the other party in accordance with Section 3.65 and shall make a specific reference to this Section, thereby invoking its provisions. The delayed party shall cause such delay to cease as soon as practicable and shall notify the other party in writing. The time of Substantial Completion or Final Completion shall be extended by written Contract amendment for a period of time equal to the time that the results or effects of such delay prevent the delayed party from performing in accordance with this Contract.

3.68 Confidentiality of Records. The Contractor shall establish and maintain procedures and controls that are acceptable to the Town for the purpose of ensuring that information contained in its records or obtained from the Town or from others in carrying out its obligations under this Contract shall not be used or disclosed by it, its agents, officers, or employees, except as required to perform Contractor's duties under this Contract. Persons requesting such information should be referred to the Town. Contractor also agrees that any information pertaining to individual persons shall not be divulged other than to employees or officers of Contractor as needed for the performance of duties under this Contract.

3.69 Records and Audit Rights. To ensure that the Contractor and its Subcontractors are complying with the warranty under Section 3.70 below, Contractor's and its Subcontractors' books, records, correspondence, accounting procedures and practices, and any other supporting evidence relating to this Contract, including the papers of any Contractor and its Subcontractors' employees who perform any Work or Services pursuant to this Contract (all of the foregoing hereinafter referred to as "Records"), shall be open to inspection and subject to audit and/or reproduction during normal working hours by the Town, to the extent necessary to adequately permit (1) evaluation and verification of any invoices, payments or claims based on Contractor's and its Subcontractors' actual costs (including direct and indirect costs and overhead allocations) incurred, or units expended directly in the performance of Work under this Contract and (2) evaluation of the

Contractor's and its Subcontractors' compliance with the Arizona employer sanctions laws referenced in Section 3.70 below. To the extent necessary for the Town to audit Records as set forth in this Section, Contractor and its Subcontractors hereby waive any rights to keep such Records confidential. For the purpose of evaluating or verifying such actual or claimed costs or units expended, the Town shall have access to said Records, even if located at its Subcontractors' facilities, from the effective date of this Contract for the duration of the Work and until three years after the date of final payment by the Town to Contractor pursuant to this Contract. Contractor and its Subcontractors shall provide the Town with adequate and appropriate workspace so that the Town can conduct audits in compliance with the provisions of this Section. The Town shall give Contractor or its Subcontractors reasonable advance notice of intended audits. Contractor shall require its Subcontractors to comply with the provisions of this Section by insertion of the requirements hereof in any subcontract pursuant to this Contract.

3.70 E-verify Requirements. To the extent applicable under ARIZ. REV. STAT. § 41-4401, the Contractor and its Subcontractors warrant compliance with all Federal immigration laws and regulations that relate to their employees and their compliance with the E-verify requirements under ARIZ. REV. STAT.§ 23-214(A). Contractor's or its Subcontractors' failure to comply with such warranty shall be deemed a material breach of this Contract and may result in the termination of this Contract by the Town.

3.71 Israel. Contractor certifies that it is not currently engaged in, and agrees for the duration of this Agreement that it will not engage in a "boycott," as that term is defined in ARIZ. REV. STAT. § 35-393, of Israel.

3.72 Right to Inspect Plant. The Town may, at reasonable times, inspect the part of the plant or place of business of the Contractor or Subcontractor that is related to the performance of this Contract.

3.73 Warranties. Contractor warrants to the Town that all Materials and equipment furnished shall be new unless otherwise specified and agreed by the Town and that all Work shall be of first class quality, free from faults and defects and in conformance with the Contract. If at any time within one year following the date of Final Completion and acceptance of the entire Project (or such longer period as may be provided under warranties for equipment or Materials): (A) any part of the Materials furnished in connection with the Work shall be or become defective due to defects in either labor or Materials, or both, or (B) Contractor's Work or Materials, or both, are or were not in conformance with original or amended Plans and Specifications, or supplementary shop drawings, then the Contractor shall upon written notice from the Town immediately replace or repair such defective or non-conforming Material or workmanship at no cost to the Town. Contractor further agrees to execute any special guarantees as provided by the Contract or required by law. Contractor shall require similar guarantees from all vendors and from all its Subcontractors. Contractor further agrees, upon written demand of the Town and during the course of construction, to immediately re-execute, repair or replace any Work that fails to conform to the requirements of the Contract, whether caused by faulty Materials or workmanship, or both. In the event Contractor shall fail or refuse to make such change upon the Town's written demand, the Town shall have the right to have such Work re-executed, repaired or replaced, to withhold from or back charge to Contractor all costs incurred thereby.

3.74 Inspection. All Materials and/or Services are subject to final inspection and acceptance by the Town. Materials and/or Services failing to conform to the Specifications of this Contract will be held at Contractor's risk and may be returned to the Contractor. If so returned, all costs are the responsibility of the Contractor. Upon discovery of non-conforming Materials or Services, the Town may elect to do any or all of the following by written notice to the Contractor: (A) waive the non-conformance; (B) stop the Work immediately; or (C) bring material or service into compliance and withhold the cost of same from any payments due to the Contractor.

3.75 No Replacement of Defective Tender. Every tender of Materials shall fully comply with all provisions of the Contract. If a tender is made which does not fully conform, this shall constitute a breach of the Contract as a whole.

3.76 Shipment Under Reservation Prohibited. Contractor is not authorized to ship Materials under reservation and no tender of a bill of lading will operate as a tender of the Materials.

3.77 Liens. All Materials, Service or construction shall be free of all liens and, if the Town requests, a formal release of all liens shall be delivered to the Town.

3.78 Licenses. Contractor shall maintain in current status all Federal, State and Local licenses and permits required for the operation of the business conducted by the Contractor as applicable to this Contract.

3.79 Patents and Copyrights. All Services, information, computer program elements, reports and other deliverables, which may be patented or copyrighted and created under this Contract are the property of the Town and shall not be used or released by the Contractor or any other person except with the prior written permission of the Town.

3.80 Preparation of Specifications by Persons other than Town Personnel. All Specifications shall seek to promote overall economy for the purposes intended and encourage competition and not be unduly restrictive in satisfying the Town's needs. No person preparing Specifications shall receive any direct or indirect benefit from the utilization of Specifications, other than fees paid for the preparation of Specifications.

3.81 Advertising. Contractor shall not advertise or publish information concerning this Contract without prior, written consent of the Town.

3.82 Conflicting Terms. In the event of any inconsistency, conflict or ambiguity among the terms of the Contract, the IFB, the Scope of Work, any Town-approved Purchase Order, the Price Sheet, any Town-approved Work Orders, invoices and the Contractor's response to the IFB, the documents shall govern in the order listed herein.

PART D - ALTERNATIVE DISPUTE RESOLUTION

3.83 Scope. Notwithstanding anything to the contrary provided elsewhere in the Contract Documents, except for subsection 3.86(G) below, the alternative dispute resolution ("ADR") process provided for herein shall be the exclusive means for resolution of claims or disputes arising under, relating to or touching upon the Contract, the interpretation thereof or the performance or breach by any party thereto, including but not limited to original claims or disputes asserted as cross claims, counterclaims, third party claims or claims for indemnity or subrogation, in any threatened or ongoing litigation or arbitration with third parties, if such disputes involve parties to contracts containing this ADR provision.

3.84 Neutral Evaluator, Arbitrators. The Town will select a Neutral Evaluator to serve as set forth in this ADR process, subject to the Contractor's approval, which approval shall not be unreasonably withheld. In the event that the Town and the Contractor are unable to agree upon a Neutral Evaluator, the neutral evaluation process shall be eliminated and the parties shall proceed with the binding arbitration process set forth in Section 3.86 below. The Town and Contractor shall each select an arbitrator to serve as set forth in this ADR process. Each arbitrator selected shall be a member of the State Bar of the State of Arizona and shall have experience in the field of construction law. None of the arbitrators nor any of the arbitrator's firms shall have presently, or in the past, represented any party to the arbitration.

3.85 Neutral Evaluation Process. If the parties have been unable to resolve the disputes after discussions and partnering, but the parties have agreed to a Neutral Evaluator, the following neutral evaluation process shall be used to resolve any such dispute.

A. Notification of Dispute. The Town through its Engineer shall notify the Neutral Evaluator in writing of the existence of a dispute within 10 Days of the Town or the Contractor declaring need to commence the neutral evaluation process.

B. Non-Binding Informal Hearing. The Neutral Evaluator shall schedule a non-binding informal hearing of the matter to be held within seven Days from receipt of notification of the existence of a dispute. The Neutral Evaluator may conduct the hearing in such manner as he deems appropriate and shall notify each party of the hearing and of its opportunity to present evidence it believes will resolve the dispute. Each party to the dispute shall be notified by the Neutral Evaluator that it shall submit a written outline of the issues and evidence intended to be introduced at the hearing and the proposed resolution of the dispute to the Neutral Evaluator before the hearing commences. Arbitrators shall not participate in such informal hearing or proceedings process. The Neutral Evaluator is not bound by the rules of evidence when admitting evidence in the hearing and may limit the length of the hearing, the number of witnesses or any evidence introduced to the extent deemed relevant and efficient.

C. Non-Binding Decision. The Neutral Evaluator shall render a non-binding written decision as soon as possible, but not later than five Days after the hearing.

3.86 Binding Arbitration Procedure. The following binding arbitration procedure, except as provided in subsection 3.86(G) below, shall serve as the exclusive method to resolve a dispute if (A) the parties cannot agree to a Neutral Evaluator as set forth in Section 3.84 above or (B) any party chooses not to accept the decision of the Neutral Evaluator. The party requesting binding arbitration shall notify the Neutral Evaluator of a request for arbitration in writing within three business days' of receipt of the Neutral Evaluator's decision. If the Contractor requests arbitration or if Contractor rejects the Town's selection of a Neutral Evaluator, it shall post a cash bond with the Neutral Evaluator in an amount agreed upon by the parties or, in the event of no agreement, the Neutral Evaluator shall establish the amount of the cash bond to defray the cost of the arbitration as set forth in subsection 3.86(M) and the proceeds from the bond shall be allocated in accordance with subsection 3.86(M) by the Arbitration Panel.

A. Arbitration Panel. The Arbitration Panel shall consist of three arbitrators: the Town's appointed arbitrator, the Contractor's appointed arbitrator and a third arbitrator (or "Neutral Arbitrator") who shall be selected by the parties' arbitrators as set forth in subsection 3.86(B) If more than one consultant or contractor is involved in a dispute, the consultants and/or contractors shall agree on an appointee to serve as arbitrator. The Neutral Evaluator shall not participate in the proceedings.

B. Selection of Neutral Arbitrator. The parties' arbitrators shall choose the Neutral Arbitrator within five business days of receipt of notification of a dispute from the Neutral Evaluator. The Neutral Arbitrator shall have the same qualifications as those of the arbitrators set forth in subsection 3.84. In the event that the selected arbitrators cannot agree on the Neutral Arbitrator as set forth above, the Neutral Arbitrator shall be the "Default Neutral Arbitrator," a person or entity jointly selected by the Town and the Contractor. If the Town and the Contractor cannot agree on a Default Neutral Arbitrator, the Town and the Contractor shall each submit two names to an appropriate judge who shall select one person to serve as the Default Neutral Arbitrator.

C. Expedited Hearing. The parties have structured this procedure with the goal of providing for the prompt, efficient and final resolution of all disputes falling within the purview of this ADR process. To that end, any party can petition the Neutral Evaluator to set an expedited hearing. If the Neutral Evaluator determines that the circumstances justify it, the Neutral Evaluator shall contact the selected Arbitration Panel and arrange for scheduling of the arbitration at the earliest possible date. In any event, the hearing of any dispute not expedited will commence as soon as practical but in no event later than 20 Days after notification of request for arbitration having been submitted. This deadline can be extended only with the consent of all the parties to the dispute, or by decision of the Arbitration Panel upon a showing of emergency circumstances.

D. Procedure. The Arbitration Panel will select a Chairman and will conduct the hearing in such a manner that will resolve disputes in a prompt, cost efficient manner giving regard to the rights of all parties. Each party shall supply to the Arbitration Panel a written pre-hearing statement which shall contain a brief statement of the nature of the claim or defense, a list of witnesses and exhibits, a brief description of the subject

matter of the testimony of each witness who will be called to testify, and an estimate as to the length of time that will be required for the arbitration hearing. The Arbitration Panel shall review and consider the Neutral Evaluator decision, if any. The Chairman shall determine the nature and scope of discovery, if any, and the manner of presentation of relevant evidence consistent with deadlines provided herein and the parties' objective that disputes be resolved in a prompt and efficient manner. No discovery may be had of any materials or information for which a privilege is recognized by Arizona law. The Chairman upon proper application shall issue such orders as may be necessary and permissible under law to protect confidential, proprietary or sensitive materials or information from public disclosure or other misuse. Any party may make application to the Maricopa County Superior Court to have a protective order entered as may be appropriate to confirm such orders of the Chairman.

E. Hearing Days. In order to effectuate parties' goals, the hearing once commenced, will proceed from business day to business day until concluded, absent a showing of emergency circumstances.

F. Award. The Arbitration Panel shall, within 10 Days from the conclusion of any hearing, by majority vote issue its award. The award shall include an allocation of fees and costs pursuant to subsection 3.86(M) herein. The award is to be rendered in accordance with this Contract and the laws of the State of Arizona.

G. Scope of Award. The Arbitration Panel shall be without authority to award punitive damages, and any such punitive damage award shall be void. The Arbitration Panel shall be without any authority to issue an award against any individual party in excess of twenty percent (20%) of the original Contract amount, but in no event shall any award exceed $2,000,000, exclusive of interest, arbitration fees, costs and attorneys' fees. If an award is made against any individual party in excess of $100,000, exclusive of interest, arbitration fees, costs and attorneys' fees, it must be supported by written findings of fact, conclusions of law and a statement as to how damages were calculated. Any claim in excess of twenty percent (20%) of the original Contract amount or in excess $2,000,000 shall be subject to the jurisdiction of the Superior Court of Arizona, Maricopa County. Any party can contest the validity of the amount claimed if an action is filed in the Superior Court.

H. Jurisdiction. The Arbitration Panel shall not be bound for jurisdictional purposes by the amount asserted in any party's claim, but shall conduct a preliminary hearing into the question of jurisdiction upon application of any party at the earliest convenient time, but not later than the commencement of the arbitration hearing.

I. Entry of Judgment. Any party can make application to the Maricopa County Superior Court for confirmation of an award, and for entry of judgment on it.

J. Severance and Joinder. To reduce the possibility of inconsistent adjudications: (1) the Neutral Evaluator or the Arbitration Panel may, at the request of any party, join and/or sever parties, and/or claims arising under other contracts containing this ADR provision, and (2) the Neutral Evaluator, on his own authority, or the Arbitration Panel may, on its own authority, join or sever parties and/or claims subject to this ADR process as they deem necessary for a just resolution of the dispute, consistent with the parties' goal of the prompt and efficient resolution of disputes, provided, however, that the Contractor, Architect/Engineer and Project professionals shall not be joined as a party to any claim made by a Contractor. Nothing herein shall create the right by any party to assert claims against another party not germane to the Contract or not recognized under the substantive law applicable to the dispute. Neither the Neutral Evaluator nor the Arbitration Panel are authorized to join to the proceeding parties not in privity with the Town. Contractor cannot be joined to any pending arbitration proceeding, without Contractor's express written consent, unless Contractor is given the opportunity to participate in the selection of the non-Town appointed arbitrator.

K. Appeal. Any party may appeal (1) errors of law by the Arbitration Panel if, but only if, the errors arise in an award in excess of $100,000, (2) the exercise by the Chairman or Arbitration Panel of any powers contrary to or inconsistent with the Contract or (3) on the basis of any of the grounds provided in ARIZ. REV. STAT. § 12-1512, as amended. Appeals shall be to the Maricopa County Superior Court within 15 Days of

entry of the award. The standard of review in such cases shall be that applicable to the consideration of a motion for judgment notwithstanding the verdict, and the Maricopa County Superior Court shall have the authority to confirm, vacate, modify or remand an award appealed under this Section, but not to conduct a trial, entertain the introduction of new evidence or conduct a hearing de novo.

L. Uniform Arbitration Act. Except as otherwise provided herein, binding arbitration pursued under this provision shall be governed by the Uniform Arbitration Act as codified in Arizona in ARIZ. REV. STAT. § 12-1501, *et seq.*

M. Fees and Costs. Each party shall bear its own fees and costs in connection with any informal hearing before the Neutral Evaluator. All fees and costs associated with any arbitration before the Arbitration Panel, including without limitation the Arbitration Panelists' fee, and the prevailing party's reasonable attorneys' fees, expert witness fees and costs, will be paid by the non-prevailing party, except as provided for herein. In no event shall any Arbitrator's hourly fees be awarded in an amount in excess of $200 per hour and (1) costs shall not include any travel expenses in excess of mileage at the rate paid by the Town, not to exceed a one way trip of 150 miles, and (2) all travel expenses, including meals, shall be reimbursed pursuant to the travel policy of the Town in effect at the time of the hearing. The determination of prevailing and non-prevailing parties, and the appropriate allocation of fees and costs, will be included in the award by the Arbitration Panel. Fees for the Neutral Evaluator shall be divided evenly between the Town and the Contractor.

N. Confidentiality. Any proceeding initiated under ADR shall be deemed confidential to the maximum extent allowed by Arizona law and no party shall, except for disclosures to a party's attorneys or accountants, make any disclosure related to the disputed matter or to the outcome of any proceeding except to the extent required by law, or to seek interim equitable relief, or to enforce an agreement reached by the parties or an award made hereunder.

O. Equitable Litigation. Notwithstanding any other provision of ADR to the contrary, any party can petition the Maricopa County Superior Court for interim equitable relief as necessary to preserve the status quo and prevent immediate and irreparable harm to a party or to the Program pending resolution of a dispute pursuant to ADR provided herein. No court may order any permanent injunctive relief except as may be necessary to enforce an order entered by the Arbitration Panel. The fees and costs incurred in connection with any such equitable proceeding shall be determined and assessed in ADR.

P. Change Order. Any award in favor of the Contractor against the Town or in favor of the Town against the Contractor shall be reduced to a Change Order and executed by the parties in accordance with the award and the provisions of this Contract.

Q. Merger and Bar. Any claim asserted pursuant to this ADR process shall be deemed to include all claims, demands, and requests for compensation for costs and losses or other relief, including the extension of the Contract performance period which reasonably should or could have been brought against any party that was or could have been brought into this ADR process, with respect to the subject claim. The Arbitration Panel shall apply legal principles commonly known as merger and bar to deny any claim or claims against any party regarding which claim or claims recovery has been sought or should have been sought in a previously adjudicated claim for an alleged cost, loss, breach, error, or omission.

R. Inclusion in Other Contracts. The Contractor shall cooperate with the Town in efforts to include this ADR provision in all other Project contracts. Subject to Contractor's reasonable agreement, the Contractor agrees that any modification to this ADR provision that is included in the construction or other contracts shall also apply to the Contractor. It is the intent of the parties that any changes to this ADR provision in later contracts will be evolutionary and designed to incorporate the terms of this ADR provision without material changes to the substance or procedure of this ADR provision.

EXHIBIT A
TO
INVITATION FOR BIDS NO. CS 2017-01

[Specifications, Plans/Construction Drawings]

See following pages.

Fountain Hills

TECHNICAL SPECIFICATIONS
(Special Provisions)

TOWN OF FOUNTAIN HILLS

Adero Canyon Trail Head

PROJECT NO. P3025

Volume 1of 2
Site Specifications

Prepared for:

Town of Fountain Hills
Community Services Department
Fountain Hills Town Hall
16705 E. Avenue of the Fountains
Fountain Hills, AZ 85268

Prepared by:

J2 Engineering and Environmental Design
4649 E. Cotton Gin Loop, Ste. B2
Phoenix, AZ 85040
(602) 438-2221

June 5, 2017

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PROFESSIONAL SEALS:

This book of specifications and related contract documents represents the efforts of the following firms:

(1) J2 Engineering and Environmental Design, LLC. (J2) (Landscape Architecture)
(2) J2 Engineering and Environmental Design, LLC. (J2) (Civil Engineering)
(3) Wright Engineering (Electrical Engineering)

A registrant of each firm has affixed his/her professional seal below, which attests that those portions of these specifications, which relate to their respective discipline area, were prepared under his/her direction.

J2 - Landscape Architecture

Registered Landscape Architect
CERTIFICATE NO.
23430
JEFFREY M.
ENGELMANN
Date Signed 03-03-17
ARIZONA, U.S.A.
Expires: 09/30/2017

J2 - Civil Engineering

REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO.
23170
JEFFREY J.
HOLZMEISTER
Date Signed 3/3/17
ARIZONA, U.S.A.
Expires 03/31/18

Wright Engineering – Electrical Engr.

Registered Professional Engineer (Electrical)
Certificate No.
57159
CLIFFORD M.
TOLMAN
Date Signed 2-28-17
ARIZONA U.S.A.
Expires 3-31-17

See "Volume 2 Restroom Specifications" that are sealed and stand alone set of specifications for all restroom building specifications.

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION and MAG TOWN OF FOUNTAIN HILLS SUPPLEMENTS TO DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ARE HEREBY AMENDED TO INCLUDE THE FOLLOWING:

STANDARD SPECIFICATIONS

Except as otherwise required in these special provisions, construction of this project shall be in accordance with all applicable Maricopa Association of Governments (MAG) Uniform Standard Specifications, and MAG Standard Details following the 2017 edition of each and the 2017 Town of Fountain Hills supplements or the Town's most recently adopted supplements. All measurement and payment for items unless modified herein or on attached bid schedule shall also be in compliance with the above stated standards.

In the event a conflict exists on the plans or between the plans and referenced specifications or these construction special conditions, the order of precedence shall be as follows:

1. Addenda
2. Town of Fountain Hills Contract and Town Standards
3. The Technical Specifications
4. The Project Plans
5. Maricopa Association of Governments (MAG) *Uniform Standard Specifications and Details for Public Works Construction*, 2012 Edition and all supplemental revisions
6. 2009 *Manual on Uniform Traffic Control Devices* (MUTCD) with Supplements

LOCATION OF THE WORK:

Improvements are located on the property owned by the Town of Fountain Hills, Maricopa County Assessor Number 217-19-008V. A parcel of land located in Sections 6 and 7, Township 3 North, Range 6 East of the Gila and Salt River Base and Meridan, Maricopa County, Arizona

The site is remote and only accessed through the use of North Eagle Ridge Drive that is currently under development by MCO Properties. The site is approximately 2.30 miles west of the intersection of North Eagle Ridge Drive and East Palisades Blvd.

DESCRIPTION OF WORK:

Adero Canyon Trailhead Improvements consist of, but are not limited to, the following broad categories: earthwork (cut and fill), water line, sewer line, site drainage enhancements, electrical service and distribution, lighting, installing new colored concrete driveways, asphalt parking stalls and drive aisles, concrete ADA stalls, custom restroom, custom ramada, custom steel kiosk, colored concrete plaza area, rock filled gabion basket retaining walls, rock filled gabion basket bench with concrete cap, application of desert pavement ground cover, rip rap, colored

concrete sidewalks, boulder salvage and relocation, landscaping, native re-seeding, plant salvage, plant nursery and replanting of native materials.

Automatic Gate Opening and Closing System Bid Alternate: An amount proposed by bidders as identified and stated on the Bid Form for providing and installing all items associated with the Automatic Gate Opening and Closing System as defined on the plans and in these bidding requirements for this item of work complete in place. The amount included in the bid schedule may be added to the base bid amount if the Owner decides to accept the bid alternate in the amount of labor and materials required for the bid alternate to be completed and 100% operational and accepted by the Town as described on the plans and in these Contract Documents.

Interim Utility Bid Alternate Items: An amount proposed by bidders as identified and stated on the Bid Form for providing and installing all items associated with the interim utility effort for grading and excavation, erosion control, aggregate base pad for water tank, plastic water tank with locking lid and locking valve, Schedule 40 PVC waterline to restroom and to irrigation system, SDR-35 sewer line to Sewage holding tank, concrete pre-cast Sewage holding tank, solar collection and storage system complete, chain link fencing and access gates, and other items as defined on the plans and in these bidding requirements for this item of work complete in place. The Town reserves the right to award the interim utility package as a lump sum amount or item by item individually as included in the bid schedule. The Town may add the entire interim utility package as a lump sum amount or item by item added to the base bid amount. The interim utility bid items that are selected to be included with the project are to be completed and 100% operational and accepted by the Town as described on the plans and in these Contract Documents.

CONTRACT STANDARD SPECIFICATIONS AND DRAWINGS:

The following Standard Specification and Standard Drawings referenced in the project contract documents are required for construction of this project:

Maricopa Association of Government *Uniform Specifications and Details for Public Works Construction*, 2012 Edition, and any supplemental Revisions.

Manual on Uniform Traffic Control Devices (MUTCD), 2009 Edition.

The following conditions or items are not considered for separate measurement or payment and are therefore considered incidental to an item to which it is closely associated.

WORKING HOURS:

Work on this project shall not begin before 6:00 a.m. and shall conclude prior to 6:30 p.m. each weekday unless otherwise approved by the Town. No work shall occur on Saturdays, Sundays, nor Town-recognized holidays. Work located within existing roadways shall not begin before 8:00 a.m. and shall conclude prior to 3:30 p.m. each weekday unless otherwise approved by the Town. Work at times other than those specified will be considered by the Town subject to the duration and type of activity proposed and the resulting impact on adjacent residential and commercial areas.

If the Contractor is permitted to work between the hours of 6:30 p.m. and 6:00 a.m., the Town will determine what measures the Contractor will be required to make to inform and mitigate adverse conditions for the affected public.

Hours for hauling operations shall be subject to approval by, and if necessary, permits from the Town of Fountain Hills, Maricopa County and other applicable municipalities, in accordance with local ordinances.

NOISE MITIGATION:

The Contractor is responsible for any construction noise mitigation measures needed to meet the noise ordinances of Town of Fountain Hills and Maricopa County.

COORDINATION AND MAINTENANCE OF TEMPORARY TRAFFIC CONTROL:

The Contractor shall coordinate construction efforts with adjacent or adjoining projects that could be under construction at the same time in accordance with MAG Sections 105.6 and 105.7. Where work overlaps other contractor's work, coordination will be required to determine work zone traffic control setups and improvement match points that will benefit the Town.

Temporary signing and marking associated with work under this contract shall not conflict with other temporary signing and marking associated with adjacent projects. Lane closures, full roadway closures and detours shall be coordinated between projects to minimize confusion to pedestrians, bicyclists and the motoring public.

The Contractor will be responsible to furnish, erect, maintain and remove all temporary signs that, in the opinion of the Construction Manager, are necessary to warn, regulate and guide traffic adequately between projects. Compensation for this work shall be considered included in

the bid item price for **Maintenance of Traffic.**

BUSINESS, UTILITY FACILITIES AND PRIVATE PROPERTY ACCESS:

Emergency vehicle, postal delivery, school bus routes, and driveway accesses to businesses, utility facilities, and private property shall be maintained at all times. Short-term closures may be permitted subject to prior approval by the Construction Manager and property owner. Contractor shall notify property owners a minimum of ten (10) calendar days in advance of any construction on driveways or streets that result in lane restrictions or closures.

At the direction of the Construction Manager, flaggers may be required when Contractor is working at or restricting any of the driveways for businesses or private property access. Open for business directional signing that may be required, as directed by the Construction Manager, for business access shall be in conformance with the applicable Town standards.

SHORING:

Shoring may be required for certain trenches related to work shown on the project plans. The Contractor shall be responsible for determining the exact limits and locations of any required shoring. Shoring shall be installed in accordance with all applicable Federal, State and Local safety requirements.

POWER LINES:

There are no known underground and overhead power lines within the project limits at the time that these specifications have been published. All work however that may be at or in close proximity to any underground or overhead power lines shall be performed in accordance with all Federal, State, and local laws and regulations, including but not limited to:

A. Arizona law regarding "Underground Facilities" (A.R.S. 40-360.21, .22, .24, .26 and .28).
B. Arizona law regarding "High Voltage Power Lines and Safety Restrictions" (A.R.S. 40-360.41 - .45).
C. The Occupational Safety and Health Administration.
D. The National Electric Safety Code.

PERMITS:

Contractor is responsible for obtaining all necessary permits from appropriate governing agencies and paying applicable fees prior to starting such construction activities. Governing agencies could include Maricopa County, Town of Fountain Hills (TOFH), EPCOR Water, Fountain Hills Sanitary District, and Salt River Project (SRP).

Samples of permits could include:

a) dust control

b) storm water pollution control
c) traffic control
d) building permit
e) construction water
f) water meters
g) sewer
h) transporting plants
i) notice of intent
j) signing and striping improvements
k) TOFH Saguaro Cactus Permit

CONSTRUCTION WATER:

There are no Town water facilities in the near vicinity of the project. Contractor is responsible to secure a water source and providing all necessary water and storage devices for construction activities. EPCOR Water may allow construction water to be drawn from a fire hydrant with a hydrant meter (all permits and meter cost to paid for by contractor).

All cost for construction water is considered incidental to other work.

There are two good possibilities for a contractor to access construction water both along Eagle Ridge Drive, if water service to those fire hydrants is operational at that time:

The first possible construction water source is located at approximately Sta 59+63. At this location the Contractor could choose to provide and install a Town and EPCOR approved fire hydrant meter to this existing Phase 1 fire hydrant. Currently at this location is an approximately 40' wide asphalt paved roadway, and is approximately 130' from the end of the recently completed roadway pavement. This street area will be striped for parking, so signage and/or striping modifications would be needed to be provided by the Contractor to allow the tanker truck to safely access the area and refill. Within the vicinity of this area at approximately Sta. 59+82 there is a catch basin and a sump that has to remain protected in place. The Contractor shall be required to develop a truck turning, parking, and fill-up area associated with this location that is acceptable to the Town. The Contractor would be required to replace all pavement impacted by this temporary set up at the end of the construction period when project is accepted by the Town. The Contractor shall return the area of impact back to pre-construction conditions and the pavement effected and or modified for water access shall be removed and replaced with new aggregate roadway per MAG Standards and Town of Fountain Hills supplements.

A second construction water location is at approximately Sta. 75+00 where there will be a corp. stop on the end of an 8" potable water line. This location would require that the Contractor modify this connection line in compliance with all MAG Standards and Town Supplements so that this water could be safely accessed. In addition to the water line modifications the roadway's top prism is only 24' wide here, with existing side slopes and ditches, that grading and drainage modifications for truck turnaround and/or for a fill-up loading area will likely be needed. The Contractor shall be required to develop a truck turning, parking, and fill-up area associated with this location that is acceptable to the Town. The Contractor would be required to replace all pavement impacted by this temporary set up at the end of the construction period when project is accepted by the Town. The Contractor shall return the area of impact back to pre-construction conditions and the pavement effected and or modified for water access shall be removed and replaced with what exists at the time of construction either new aggregate or asphalt roadway per MAG Standards and Town of Fountain Hills supplements.

CONDITION OF MATERIALS:

All materials incorporated into the project are expected to be placed into service in new, clean and unblemished condition. Any materials stored unprotected from their original manufacture's packaging shall be cleaned of any foreign matter prior to use. All stored materials shall be protected from surface scarring and dents. All materials found to deviate from manufacture's original size, shape or condition may be subject to reorder at the discretion of the Construction Manager.

WARRANTY AND ESTABLISHMENT PERIODS:

The one-year warranty period of the General Conditions applies to all equipment and material except plant material. Plant material will be warranted in accordance with the establishment period provided in these special conditions.

PROJECT MEETINGS:

This Section describes criteria for Project meetings to be held both before and during construction. This Section is complementary to the General conditions and Special Provisions and nothing herein shall be considered to waive any requirements of the General conditions or Special Provisions.

A Preconstruction Conference to discuss the Project work will be held at a time and location established by the owner. The Contractor, together with representatives of his major Subcontractors, shall attend. Representatives of the Town, the Engineer, MCO Properties (AKA Adero LLC), and Utility Companies will be invited to attend. The purpose of this conference is to discuss the Project in detail, including scheduling of work, and to answer any questions that may arise. See the General Conditions for what the Contractor is to supply at this meeting.

Unless followed up in writing, verbal authorizations or acknowledgment by anyone present shall not be binding.

At a time designated by the Town and agreed to by the Contractor, Progress Meetings will be held at the job site or designated location. The Contractor, together with representatives of his major Subcontractors, shall attend, as will the Owner or Owner's Representative. The Contractor shall be responsible for notifying the Subcontractors of their required attendance. The contractor shall be responsible for recording all minutes of each meeting and distributing those minutes to all attendees within 5 calendar days of the meeting. The purpose of these meetings is to discuss the job progress, and to resolve any problems that may have developed since the last meeting. Unless followed up in writing, verbal authorizations or acknowledgments by anyone present shall not be binding.

CONDUCT OF OPERATIONS:

It is the intent of this contract to disturb only areas within the final trailhead template unless approved in advance and by writing by the Engineer or Town Representative. This project lies in environmentally sensitive areas of the Town of Fountain Hills. The Contractor shall conduct all activities in a manner respectful of the environment, exercising caution at all times to preserve all natural resources outside the established clearing limits throughout the project.

LIMITS OF WORK/DISTURBANCE (LOW/D):

The Contractor, Engineer and Landscape Architect shall jointly establish in the field the limits of work/disturbance (LOW/D) prior to beginning construction. The Contractor may **not** work outside the established limits without written approval of the Engineer. The contractor shall install as the limit of work/disturbance boundary a temporary nonmetallic fence. The installation of the fence shall be the first activity to occur on the site prior to any construction activity. The (LOW/D) fence shall be maintained in-place a minimum of two weeks after completion of all work, or at the direction of the Engineer. There will be no separate measurement or payment for installing or maintaining the (LOW/D) fencing, the cost being considered included in the price of contract items.

No vehicles, equipment and machinery required to perform the local and collected stock work shall trespass outside the boundaries of the LOW/D, planned access routes or established nursery site approved by the Town. The contractor shall adhere to the Standard Specifications with respect to parking of all vehicles. The contractor is advised that rugged terrain may be encountered during the salvaging and replanting of local and/or collected stock. Pioneering of access roads and the use of specialized equipment such as cranes, hydraulic lifts/cradles and

loaders may be required to gain access to locations for the removal of local and/or collected stock. No separate payment for pioneering of access roads or use of specialized equipment will be made by the Town.

PROTECTION OF EXISTING FEATURES:

The project has been designed for utilization of access only from the future cul-de-sac (cul-de-sac constructed by others) and within the limits of disturbance. Prior to beginning work, the contractor shall review in the field the existing conditions with the Engineer. Any deviations from the approved plan will require the written approval of the Engineer.

The contractor shall preserve and protect all existing vegetation (i.e., trees, shrubs and native grasses), topography, and rock on or adjacent to the site, unless other requirements have been agreed to in writing by the Engineer. The contractor shall be responsible for all unauthorized cutting, removing, or altering of existing vegetation, topography, and rock including damage due to careless operation of equipment, stockpiling of materials or tracking of terrain by equipment. Any vegetation so damaged, removed, or altered that is unauthorized shall be replaced at a minimum 1:1 ratio, or as determined by the Engineer, depending on the size of the vegetation to be replaced.

Stable rock outcrops revealed as part of excavation <u>may</u> be colored by the use of "Permeon" or "Natina" products or approved equal **but only when directed by the Engineer**. The coloring material shall be a single step application process, simulated desert varnish material that will develop natural, aged earth tones or desert varnish colors on the surface to which it is applied. The material shall contain no caustic or alkaline chemicals. Product must not have a pH of 7 or above. The rock coloring material shall be PERMEON™ , NATINA™ or an approved equal. The simulated desert varnish material shall be applied directly to clean surfaces by an applicator certified by the manufacturer. Brown to black colors that develop shall be controlled or modified by custom blending of the color concentrate, application technique or a combination of these. Test sections shall be applied at various dilutions to match desired colors. Such outcrops may be steeper than adjacent soil slopes, as shown on the project plans. The Town has in the past not always employed this staining option as the natural rock outcroppings did not require this treatment with the natural color being acceptable.

A force account for the use and application of rock staining has been established as part of this project. That force account can only be utilized for this project and that staining effort if authorized in advance by the Town of Fountain Hills.

A contact for the Permeon product is:

SOIL-TECH, CO.

6420 S. Cameron Drive, Ste. 207

Las Vegas NV, 89118

(702) 873-2023

http://www.soil-tech.com/

A contact for the Natina product is:

NATINA PRODUCTS

1555 North V I P Blvd.,

Casa Grande, AZ 85122

(877) 762-8462

http://natinaproducts.com/

ROCK STAINING:

All rock surfaces exposed during construction, as noted in these Special Provisions and only as directed by the Engineer, shall be stained using Permeon, Natina or an approved equal substance.

Desert Varnish Staining of Concrete Drainage Headwalls, Placed Native Rock Embankment, Gabion Rock Walls, Appurtenances and Pipe Culverts and End Sections:

All visible concrete and metal surfaces (down to and including surfaces at least 12 inches below the adjacent finished grade) on all concrete box culverts, headwalls, flared end sections and outlet structures shall be Desert Varnish Stained by the use of the Permeon product, Natina product or approved equal. All visible exterior and interior pipe surfaces shall be stained to match the color of the adjacent stained inlet or outlet structure. The interior surface staining shall extend into the exposed pipe opening for a distance equal to two times the largest diameter of the pipe or two times the largest dimension of the reinforced concrete box culvert, unless directed otherwise by the Engineer.

No measurement or payment will be made for staining of concrete structures and metal surfaces, the cost being considered as included in the prices paid for the various contract items of work.

BOULDER RIP RAP, PLACED NATIVE ROCK EMBANKMENT, AND GABION FILL MATERIAL

The rock for all boulders, rock mulch, riprap, placed native rock embankment, gabion fill material and bank protection shall be native material obtained from within the construction limits of the

project, and shall meet the requirements of, and the gradations shown on the plans and in these Special Provisions. The material shall be angular in shape, and the color shall match the surrounding soil material. If an outside source is used, it shall be approved by the Engineer prior to use. Desert Varnish stain may be required on the visible surfaces of the rock as described in Rock Staining of the Special Provisions. Application, measurement, and payment of stain shall be in accordance with the above referenced bid item.

MCO PROPERTIES COORDINATION:

MCO Properties is the developer for the proposed Adero Canyon Parcel 4 – Eagle Ridge North Subdivision as noted on the plans. Portions of MCO construction plans have been approved, and are under active construction, therefore, additional coordination will be necessary, in particular with MCO for all utility connections, roadway work, construction water, vehicular access, entry coordination at future cul-de-sac and other aspects. The Town of Fountain Hills shall supply MCO Contact information to the contractor at the initiation of the project.

SALVAGED SURFACE SOILS

Salvaging of the top two (2) feet of existing soil for placement back on any new fill slopes is required as a part of this project and will become part of the projects topsoil plating as described in Section 424 Parkway Grading specification. The contractor shall submit a "Salvaged Surface Soil Management Plan" for approval at the Preconstruction Conference to the Town that describes the approach that the Contractor will take to salvage the top two (2) feet of existing soil and protect that existing salvaged surface soil in place and how that soil will be redistributed on the fill slopes of the project site.

No project excavation shall commence until the Salvaged Surface Soil Management Plan is approved by the Town.

At the pre-construction conference, the Contractor shall submit a Salvage Surface Soil Management Plan for use on the project. This plan shall cover details of how the top two (2) feet of existing site soils (Salvage surface soils) will be excavated, transported, stockpiled, and when needed placed back on the project fill slopes. Proposed equipment shall also be a part of the plan. The contractor shall allow a minimum of two (2) weeks for the Town to review the plan and provide direction, if changes are deemed necessary by the Engineer.

The cost associated with salvaging the existing two (2) feet of soil, protecting that material and then placing the material back on the fill slopes is considered included in other items of work to which such grading is incidental or appurtenant.

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION AND MAG TOWN OF FOUNTAIN HILLS SUPPLEMENTS TO DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ARE HEREBY MODIFIED TO MORE ACCURATELY CONFORM TO THE NEEDS OF THIS PROJECT AS FOLLOWS:

SECTION 101
ABBREVIATIONS and DEFINITIONS

101.2 DEFINITIONS AND TERMS:

ENGINEER: is modified to add

"Construction Manager", "Town of Fountain Hills Representative", "Architect", or "Landscape Architect" as a duly authorized representative.

101.2 DEFINITIONS AND TERMS: add the following terms:

TOWN: The Town of Fountain Hills

SECTION 105
CONTROL OF WORK

105.6 COOPERATION WITH UTILITIES: is modified to add:

The location of underground and overhead utilities as shown on the plans is based on the best available information gathered from utility company provided mapping, as-builts, and field visits. The Contractor shall not assume that this represents an exact location of the indicated utility. No guarantee is made to the accuracy of the location shown on the plans or found in the as-builts. It is the responsibility of the Contractor to verify and determine the exact location of all utilities. Proposed improvements shall be installed to avoid relocating existing utilities.

Southwest Gas
www.swgas.com
(877)860-6020

Electric
SRP – Salt River Project
www.srpnet.com
(602)236-8888

Water
EPCOR Water Company
http://www.epcor.com/
(800) 383-0834

Sewer
Fountain Hills Sanitary District
www.az-fhsd.gov
(480)837.9444

Trash and Waste Management
www.wm.com
(602)257.1313

TV Cable/Phone/Internet
Cox Communications
www.cox.com
(623)594.1000

Century Link
www.centurylink.com
(866)642.0444

105.6.2 Century Link Communications:
Century Link may have existing facilities within the project that are not anticipated to be in conflict but shall be protected in-place.

105.6.3 Cox Communications:
Cox Communications may have existing facilities within the project area. Please note Cox Communications is constantly expanding its facilities and the maps used during the conflict review process may not always be current or reflect actual infrastructure placed in the field. Contractor shall contact AZ Blue Stake prior to any excavation. Should Cox facilities be identified in conflict protect those facilities in place and notify Cox Communications.

105.6.4 Southwest Gas (SWG)
SWG has no apparent conflicts. If contractor unearths steel gas lines within the project limits that are potentially coated or wrapped with unidentified materials. Southwest Gas treats all of its steel gas pipe with unidentified coating/wrapping materials as potentially containing asbestos. Accordingly, when such pipe is in direct conflict and requires removal, it must only be done so by one of Southwest Gas' NESHAP certified contractors. Care must also be taken when working near and exposing these lines. Please contact Southwest Gas in advance to coordinate any removal.

Prior to beginning construction please call Blue Stake Center at 1-800-782-5348 for field locations of all utility facilities, pursuant to the "Blue Stake Law" (Arizona Revised Statues (State Law), Chapter 2, Article 6.3, Sections 40-360.21 through 40-360.32).

105.6.5 Town of Fountain Hills:
The Town of Fountain Hills does not currently have any facilities within adjacent roadways and on the project site that are anticipated to be in conflict but if improved at time of construction all Town facilities shall be protected in-place.

105.8 CONSTRUCTION STAKES, LINES AND GRADES*:* is deleted in its entirety and replaced with the following:

Contractor shall be responsible for creating red-lines for "As-Built" record drawing preparation. All alterations from the plans must be approved by the Construction Manager prior to the work being done and subsequently documented on as-built drawings. The Contractor shall keep accurate data and field notes as construction progresses for preparation of the "As-Built" drawings. Contractor shall submit redlined drawings to the Construction Manager for preliminary review. Contractor shall make all corrections required and resubmit a new copy to the Construction Manager for review and approval. Final payment will be made upon Construction Manager's acceptance of the redlined "As-Built" drawings. These final red-lined "As-Built" drawings must be prepared by a licensed Arizona Land Surveyor.

Contractor shall furnish all materials, personnel, tools, and equipment necessary to perform all surveying, construction staking, and establishment of all excavation boundaries. Contractor shall furnish sufficient construction stakes, lines, and grades to accomplish the work as indicated on the plans. Contractor shall establish horizontal and vertical controls and establish

secondary points and/or benchmarks for construction. The control point verification process shall include locating and making ties to all section lines and roadway monuments in the vicinity of the proposed work. Included in this work shall be all calculations required for the satisfactory completion of the project in conformance with the plans and these specifications. The work shall be done under the direction of a registered professional engineer or a registered land surveyor employed by the contractor. The crew chief shall be NSPS Certified Level III, NICET Certified Level III, or a registered Land Surveyor-in-Training. A minimum of 50 percent of the survey crew shall be either NSPS Certified Level II or NICET Certified Level II.

The Contractor shall carefully preserve all construction stakes, reference points and other survey points, and in the case of their loss or destruction, shall replace them at the direction of the Construction Manager. Wooden lath or stakes used during construction shall be removed as part of the project's final clean up.

Existing cadastral corners, such as section corners, quarter corners, intersecting street centerline monuments, and property corners that are destroyed by the Contractor shall be re-established by a registered land surveyor employed by the Contractor.

Where utility adjustments are required, the Contractor shall perform all layout work and set all control points, stakes and references necessary for carrying out all such adjustments.

The Contractor shall furnish all traffic control, including flagging for survey and staking operations. Traffic control devices and procedures for construction surveying shall be in accordance with the requirements of the MUTCD.

Prior to beginning any survey operations, the Contractor shall furnish to the Construction Manager, for approval, a written outline detailing the method of staking, marking of stakes, grade control for various courses of materials, referencing, structure control, pavement markings, and any other procedures and controls necessary for survey completion. A part of this outline shall also be a schedule which will show the sequencing of the survey and layout work, throughout the course of the contract, listing a percentage of completion for each month.

105.8.1 MEASUREMENT:

Measurement for construction staking and preparation of red-lines for as-builts will be measured as a single complete unit of work on a lump sum basis under the bid item **Construction Stakes, Lines and Grades.** The work shall include all materials, equipment, tools, and labor necessary to facilitate construction, documenting existing control, and existing monuments.

105.8.2 PAYMENT:

Payment for **Construction Stakes, Lines and Grades** will be by the lump sum and will be made as follows:

The approved schedule showing the sequencing and percentage of the survey and layout work shall be the basis on which monthly progress payments shall be made. The schedule shall be subject to periodic review, at the request of either party, if the survey and layout work lags or accelerates. If necessary, the schedule shall be revised to reflect changes in survey and layout progress. When approved, the revised schedule will become the basis of payment. Final payment will not be made until the Contractor's as-built red-line drawings are received and approved by the Construction Manager.

SECTION 106
CONTROL OF MATERIALS

106.2 SAMPLES AND TESTS OF MATERIALS: is modified as follows:

In the first sentence of second paragraph, substitute The Contractor for the words ".. Contracting Agency…".

SECTION 107
LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC

107.2 PERMITS: is modified to add:

This project is subject to the Arizona Pollutant Discharge Elimination System (AZPDES) requirements under the Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) program as administered by the Arizona Department of Environmental Quality (ADEQ). Under the conditions of a permit, the Contractor shall be designated as co-permittee (with the Town of Fountain Hills), and shall be responsible for providing necessary materials; taking appropriate measures to ensure removal of additional sediment generated in storm water runoff from the project (relative to pre-project sediment levels); and completing the following documents:

- Storm Water Pollution Prevention Plan (SWPPP) for the project, including a certification-of-compliance form
- Notice of Intent (NOI) to be covered under AZPDES, including certification of signature
- Notice of Termination (NOT) of coverage under AZPDES (upon project completion)

All Subcontractors must comply with AZPDES requirements under the supervision of the Contractor, and shall submit a completed, signed subcontractor certification form, thereby designating themselves as co-permittees. The SWPPP shall be subject to approval by the Construction Manager prior to implementation. The SWPPP shall be kept at the project site at all times, and the final SWPPP shall be retained by the Contractor for three (3) years following project completion and final acceptance.

The Contractor shall submit a completed, signed NOI form (including signed subcontractor certification forms) to the Town's Engineering Section, no later than the Pre-Construction meeting. The Town will attach these forms to its own completed NOI form, and submit the package to ADEQ at least 48 hours prior to the proposed Notice to Proceed date. The Town will send copies of the final submittal for distribution to the Contractor, the Engineering Section, and the Arizona Department of Environmental Quality (ADEQ) Storm Water Coordinator.

Failure by the Contractor (or any applicable subcontractors) to submit the NOI form and certification by the time of the Pre-Construction meeting, or to promptly make revisions to those forms as requested by the Town, which leads to delays in attaining ADEQ requirements will result in postponing the start of construction. The Contractor will not be entitled to any additional compensation for costs resulting from such delay.

The NOI shall be posted at the construction site along with the SWPPP. No construction activities shall begin until all applicable storm water pollution control devices are in place. Any additional work caused by the Contractor's (or subcontractor's) failure to properly implement the SWPPP will not be compensated. In addition, the Contractor shall keep a copy of the STORM

WATER BASELINE CONSTRUCTION GENERAL PERMIT COVERAGE NOTICE received from ADEQ (after submittal of the NOI) at the job site at all times.

All SWPPP reports required under this contract shall be available to the public in accordance with requirements of the Clean Water Act—Section 308(b). The Contractor shall make plans available to the public upon a request from either the EPA or ADEQ.

No conditions of the AZPDES or the SWPPP shall release the Contractor from any responsibilities or requirements under other environmental statutes or regulations. Asphalt plant and concrete plants (including module plants) require separate AZPDES industrial permits.

Upon completion and acceptance of the work performed by a co-permittee, either the Contractor or other subcontractors shall absolve such subcontractor of any involvement in, or responsibility for, subsequent AZPDES violations on the project. Upon total project completion, acceptance, and de-mobilization, the Contractor shall submit a completed, signed NOT form to the Town. The Town will attach it's NOT form, and submit the final package to EPA, ADEQ, and other Town departments, thereby terminating all AZPDES permit coverage for the project. Necessary forms for the NOI, NOT and the draft SWPPP are available through the Town.

As a minimum, the Contractor shall inspect all storm water pollution control devices on the project on a monthly basis, and following each rainfall of 0.50" or more (as measured at the nearest Flood Control District of Maricopa County rain gauge, or approved on-site rain gauge). The Contractor is also encouraged to inspect devices following rainfalls of less than 0.50", as it is the Contractor's responsibility to ensure the proper operation of each device. The Contractor shall maintain a record of each inspection. No other separate measurements or payments will be made relative to SWPPP items.

107.2.1 BEST MANAGEMENT PRACTICES:

The contractor shall install storm water pollution prevention devices as shown on the project plans and details and shall provide implementation of "Best Management Practices" (BMP's) to reduce storm water pollution on a multi-tiered, most cost-effective approach. The Contractor shall utilize the lowest-cost acceptable BMP available to address each type of potential storm water pollution situation encountered on the project. Should this prove ineffective in resolving a storm water pollution problem, additional, higher-cost BMPS may need to be practiced, upon approval by the Town. Multi-tiered BMP approaches to construction operations might include:

SUBGRADE EXCAVATION:

1. Tier I – The excavated area may create a temporary area that retains storm water runoff. This may provide adequate control of runoff preventing sediment from leaving the site. Draining the excavation area by pumping or other methods shall utilize filter fabric or other filtering methods to remove sediment before leaving the site or entering the storm drain system.

2. Tier II – Catch basin inlet protection (utilizing filter fabric, gravel, etc.) may be necessary should Tier I controls prove inadequate. Care shall be exercised to ensure that Tier II BMPs do not result in flooding adjacent properties.

OPEN PIPELINE TRENCHES

1. Tier I – An open trench itself may act as a temporary retention area. The Contractor shall provide a low-cost, readily-installed/removable temporary device on the open end of the pipe to prevent sediment-laden storm water from entering the pipe. This may consist of a temporary "plug" incorporating filter fabric, a temporary weir, or other device capable of removing sediment before allowing storm water to enter the pipe. Care must be taken to prevent damming of runoff waters in the excavation that could result in "floating" the pipe.

2. Tier II – If Tier I protection does not prove satisfactory, the Contractor may need to install straw bales, sandbag berms, or temporary diversion dikes around the perimeter of the open evacuation to prevent sediment-laden storm water from entering the open excavation. Due to installation/removal time, such devices need only be installed during periods of likely precipitation and runoff. Earthen dikes are preferred alternates, due to ease of installation and removal. Care must be taken to ensure that runoff is not blocked causing adjacent properties to flood.

BACKFILLED PIPELINE TRENCHES:

1. Tier I – As with subgrade excavations, pipeline trenches which have been backfilled but not yet paved may be several inches lower than adjacent paved areas, and may act as temporary retention areas.

2. Tier II – If the "retention" provided by the backfilled area does not prevent sediment-laden runoff from leaving the excavated area, perimeter controls such as silt fence, straw bales, sandbag berms, or gravel filter berms may need to be installed around the downstream edges of the backfilled area. As with open trenches, the selection of the appropriate measure, extent of its application, and time period during which it is needed will be dependent upon cost, site conditions, ease of installation/removal, and likelihood of precipitation/runoff. Care must be taken to ensure that extra storm water runoff is not diverted onto adjacent properties.

An acceptable storm water control method is limiting the amount of area disrupted and therefore reducing sediment-laden storm water runoff at any one time. Should such project phasing prove necessary due to the failure of other BMP's, the Contractor shall revise his construction activities accordingly, at no additional cost to the Town.

Standards for installing and operating the above BMP's are provided in the Flood Control District of Maricopa County "Drainage Design Manual for Maricopa County, Arizona, Volume III, Erosion Control".

107.2.2 MEASUREMENT:

Measurement for all work associated with obtaining, implementing, monitoring and closing out said permit will be measured on a lump sum basis under the bid item **Storm Water Pollution Prevention Plan**. The work shall include all materials, equipment and labor necessary to install, maintain, and remove the storm water pollution prevention items.

107.2.3 PAYMENT:

Payment for **Storm Water Pollution Prevention Plan** will be by the lump sum and will be made as follows:

The approved schedule showing the sequencing and percentage of storm water pollution prevention items required shall be the basis on which monthly progress payments shall be made. The schedule shall be subject to periodic review, at the request of either party, if the need for storm water pollution prevention items lags or accelerates. If necessary, the schedule shall be revised to reflect changes in construction that impact the use of these items. When approved, the revised schedule will become the basis of payment. Final payment will not be made until the Contractor has removed all temporary pollution prevention items to the satisfaction of the Construction Manager.

SECTION 107
LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC

107.8 USE OF EXPLOSIVES: is modified to add:

107.8 Summary (Force Account Contingency)
This Section includes the following:

1. Rock Blasting
2. Description of Blasting Method
3. General Blasting Requirements
4. Roughened Natural Slopes
5. Controlled Blasting
6. Production Blasting
7. Trim Blasting
8. Contractor's Blasting Proposal
9. Blasting Test Section
10. Primary Blasting Plan
11. Detailed Blasting Plan
12. Pre-Blast Condition Surveys
13. Blasting Report
14. Scaling & Stabilization
15. Safety
16. Blasting Consultant
17. Blasting Supervisor
18. Vibration Control & Monitoring
19. Airblast & Noise Control
20. Fly-Rock Control

1. Rock Blasting
Overshooting or any method of blasting that might cause damage to the roadway section or any adjacent structures, or that might be dangerous or destructive to adjacent property or landscape features, such as natural boulder outcrops, wildlife nests and habitat, and rock spires, will not be permitted. In any event, the contractor shall provide and install suitable protection approved by the Engineer for adjacent trees cacti, shrubbery, pole lines, overhead power lines, poles or towers, or other natural or man-made objects with the purpose being to prevent damage rather than to control the amount of damage.

Controlled blasting methods shall be used to reduce damage to the rock backslope to help ensure long-term slope stability. Controlled blasting techniques in conjunction with production blasting, as specified herein, shall be used for forming highway cut slopes where rock requiring controlled blasting is encountered on slopes staked according to the project plan sheets or as directed by the Engineer.

Slope Mitigation Details shall be followed.
Cut slopes 1:1 (horizontal to vertical) or steeper as shown on the plans are for estimating purposes only. If the finished slope gradients catch points and special details are not specified by the Plans or project Special Provisions, the actual slope gradients catch points, and special details will be established in the field by the contractor and approved by the Engineer.

The Engineer may require the contractor to use controlled blasting to form the faces of slopes, even if the slopes could be formed by non-blasting methods.

Blasting shall achieve stable, intact cut faces that have the characteristics of natural formations, while reducing damage and alternation to nearby areas, and while respecting and observing public use, safety, and land status.

The work shall be consistent with these objectives. The work shall further entail assignment of personnel meeting the requirements of these Special Provisions, preparation of a technical proposal and blasting plans; test blasting; control of vibrations, air-blast, fly-rock, and noise; scaling; stabilization and protection of natural boulder outcrops; maintenance and protection of traffic; and observance of safety procedures.

2. Description of Blasting Method:
Blasting on this project may include boulder reduction, pioneering, production blasting including step drilling for the flatter roadway cut slopes (flatter than 1:1), controlled (cushion) blasting for the steeper roadway cut slopes, or controlled (smooth) blasting as may be required for structural excavation in rock. Unless approved by the Engineer, trim blasting or pre-splitting shall not be used to form the roadway cut slopes.

Boulder reduction may entail secondary blasting, mudcapping, block holing, or combinations of these techniques and non-blasting methods.

Pioneering encompasses small-scale bench blasting, and other earthmoving operations, but to only the extent necessary to provide access for full-scale production blasting, controlled, excavation, or haulage operations.

Production blasting consists of the main fragmentation blasting resulting from production holes drilled throughout the main excavation area adjacent to the intended final slopes, routine step-drilling of the final slopes, or other blasting in areas where controlled or trim blasting is not required.

Controlled blasting shall consist of the controlled use of explosives and blasting accessories in carefully located drill holes to produce specific free surface(s) or shear plane(s) in the rock along the predetermined excavation backslope. Controlled blasting techniques covered by these Special Provisions include cushion blasting, presplitting, trim blasting, line drilling, and etc.

3. General Blasting Requirements:

All blasting operations, including boulder reduction and pioneering shall be performed under a road-closed condition, which shall be coordinated through the Engineer. If approved by the Engineer, and providing a sufficient separation between alignments exists, blasting operations along portions of one alignment may be conducted under a road-open condition.

Blasting shall not occur between 0.5 hour after sunset and 0.5 hour before sunrise. Also, blasting shall not occur during the noise regulation hours specified in the Town Code, Article 7-6, regardless of the distance to existing buildings.

If explosives are handled at night, adequate lighting shall be provided so that the entire area being loaded may always be clearly seen and checked without the aid of hand-held lighting and helmet lights.

The contractor shall notify the Engineer before drilling each shot.

All blasting operations, including the storage and handling of explosives and blasting agents, shall be performed according to the applicable provisions of the Standard Specifications and all other pertinent Federal, State, and local regulations. Whenever explosives are used, they shall be of such character and not in greater amounts as are permitted by the State and local laws and ordinances, and all respective agencies having jurisdiction.

Potentially dangerous boulders or other material located beyond the excavation limits that may become detached during excavation operations shall be removed or stabilized as ordered by the Engineer. Despite this, it will be the contractor's responsibility to prevent all uncontrolled release of rock, whether within or outside the excavation limits, that may arise from the contractor's operations.

Some boulder outcrops along the alignment may have unique landscape attributes that warrant preservation. These natural outcrops may be designated by the Engineer for preservation. These natural features may require stabilization before blasting and excavation are allowed to proceed. The Engineer shall approve stabilization methods. Specific blast vibration limits are also specified for these natural outcrops within 300 feet of blasting or other construction operations.

Within rock cut sections where drainage ditches are specified at the toe of cut slopes, drilling 2 feet below ditch bottom grade will be allowed to facilitate removal of the rock along the ditch alignment. Blasting shall not be permitted to facilitate excavation of drainage ditches located upslope from the top of the cut sections.

Drilled hole conditions may vary from dry to full of water. The contractor shall use whatever type(s) of explosives and/or blasting accessories necessary to accomplish the specified results.

The Engineer may request that the contractor measure the depth and alignment of drill holes anytime before loading.

The Blasting Supervisor shall monitor and record the loading of each hole to ensure that overloading of individual holes does not occur and that the actual powder factor can be determined.

Loaded holes must be supervised and guarded at all times.

The contractor shall patch any pavement used for travel by the public that becomes damaged because of blasting or mucking operations. Repairs shall be completed as early as practicable after the activity that caused the damage, to facilitate safe and smooth passage of traffic. The Engineer may direct that further blasting be suspended until the pavement is satisfactorily patched. The contractor shall have sufficient cold patch AC material available to repair a damaged pavement. Pavement damage resulting in potentially hazardous driving conditions shall be patched immediately. Other pavement repairs shall be made within two hours of notification that a repair is needed.

4. Roughened Natural Slopes:
For all roadway cuts in rock, except otherwise specified or directed by the Engineer, the contractor shall produce roughened, natural-appearing slopes meeting the requirements of his subsection. For this project, cut slopes flatter than 1:1 may be formed by controlled (cushion) blasting or step drilling, and cut slopes 1:1 or steeper shall be formed by controlled (cushion) blasting. For step drilling and controlled (cushion) blasting, the burden, spacing, timing, and loading shall be balanced and adjusted as required to satisfy contractual conditions.

The creation of roughened, natural-appearing slopes shall be in accordance with the following:

1. The line made by the intersection of the intended cut surface with the natural ground surface, prior to slope roughing, is the "trim line". Minimize blast damage behind the trim line. Blast damage is defined to include widening or loosening of existing joints or bedding planes, displacement of blocks or intact rock, or creation of new fractures.
2. Utilize the natural rock discontinuities (bedding planes, foliation planes, fractures, joints) in a controlled manner to form the final cut.
3. Scale to the nominal slope angle as necessary to remove loose or damaged rock, machine scars, and deleterious drill hole traces (half cast barrels).
4. Preserve or create irregularities in the rock faces such as pockets and ledges, as shown on the project plans or as directed by the Engineer. The creation of ledges and a rough natural appearance shall not be accomplished by overshooting and selective removal of damaged rock. Ledges shall be more pronounced in lower cuts and at the ends of higher cuts, where they may be incorporated into major warping and rounding. In the middle of higher cuts, ledges shall be narrower and the faces more uniform. The contractor may use the following guidelines in planning ledges subject to approval by the Engineer.

Cut Height at Point of Measurement	Max. Width of Ledges
Less than 10 feet	6 feet
10 feet to 20 feet	4 feet
20 feet to 40 feet	2.5 feet
more than 40 feet	2 feet

5. Warp ends of rock cuts by widening ledges and flattening slopes.
6. No drill hole traces or half cast shall be allowed. Any drill hole traces, half casts or machine scaling equipment scars in the final cut face shall be removed to the satisfaction of the Engineer/Forest Service.
7. Provide smooth transitions to natural features such as rock outcrops, draws and slope of terrain. This includes slope warping laying back draws, forming edges following natural bedding planes, providing niches and re-entrants, and rounding the tope and/or toe of the slope.
8. Prevent damage outside the clearing limits from fly-rock, rock fall, operation of equipment, or other construction-related causes.
9. Reduce blasting-induced ground vibrations and air-blast-induced vibrations to the limits specified herein.
10. Any fly-rock allowed to remain in place, past the clearing limits, shall be stained to the satisfaction of the Engineer to match the local terrain.
11. For roughened natural slopes, the bench height for any individual lift shall not exceed 20 feel unless this would result in a subsequent lift of 10 feet or less. In no event shall individual lifts exceed 30 feet in height.
12. Subdrilling shall not be permitted where cushion blasting is used in order to reduce fracturing below grade. Based on test blasts or actual blasting results and the rock conditions as revealed in the excavations, the contractor at his option may propose and demonstrate changes pursuant to subsection 203-3.03(A)(2)(a)(4) Blasting Test Sections. However, proposed changes made by the contractor shall be approved in writing by the Engineer and shall meet the requirements of the project Plans, Standard Specifications, and Special Provisions.

5. Controlled Blasting:

Before drilling the controlled blast holes, the contractor shall completely remove all overburden soil and loose or detached rock from the top of the excavation at the trim line, for a distance of at least 30 feet beyond the end of the production hole drilling limits, or to the end of the cut. Such materials shall not be removed by blasting. Pioneering the tops of cuts shall be performed as approved by the Engineer. Clearing shall not occur further than 10 feet behind the trim line. The orientation of each controlled blast hole shall be accurately established, using mechanical devices permanently or temporarily affixed to the drilling equipment. Controlled blast hole drilling will not be permitted if these devices are either missing or inoperative.

Controlled blast holes shall be drilled within 6 inches of the hole locations shown on the approved blasting plan. Any hole drilled outside this tolerance will be rejected and a new replacement hold drilled.

Before placing charges in any controlled blast hole, the contractor shall determine that each such hole is free of obstructions for its entire depth. The cost of drilling controlled blast holes that are not loaded and shot shall be borne by the contractor. Depths of controlled blast holes shall be measured and recorded by the contractor.

When the cut height will require more than one lift, a maximum of 3 feet offset between lifts shall be permitted to allow for drill equipment clearance.

Bulk explosives shall not be used in controlled blast holes. Acceptable explosives for controlled blasting include continuous-column explosives manufactured specifically for controlled blasting, or detonating cord with or without spaced charges of fractional explosive cartridges. If spaced charges are used, their spacing shall be adjusted to a suitable and reasonably uniform charge density.

6. Production Blasting:
Production holes shall be detonated in a controlled delay sequence, designed to prevent escape materials (for example, fly-rock and other debris) beyond the construction limits, reduce the amount of rock reaching the traveled roadway, and reduce fly-rock.
Production holes shall not exceed 4 inches in diameter unless approved by the Engineer. Based on actual blasting results and rock conditions as revealed in the excavations, the contractor at his option may propose and demonstrate changes pursuant to subsequent 203-3.03(A)(2)(a)(4) Blasting Test Sections.

The contractor shall take all necessary precautions in the production blasting to minimize blast damage to the rock backslope, control fly-rock, avoid loosening of existing cuts and natural rock formations outside the cut limits, reduce damage to the road in use by the traveling public, and comply with all the provisions of these specifications relating to allowable roadway closures and maintenance and protection of traffic. Modification of the production blasting techniques will be required if these requirements are not satisfied and pattern, or other appropriate measures as approved by the Engineer.

7. Trim Blasting:
On the portions of all blasted rock slopes where otherwise a roughened, natural appearance is not required, such as structural excavations in rock for culverts, footings and piers, the contractor may employ trim blasting techniques (presplitting or trim blasting, or both). Presplitting or trim blasting shall not be allowed unless approved in writing by the Engineer and U. S. Forest Service. The choice of trim blasting techniques will be approved by the Engineer based on the results of the blasting test sections. All presplitting or trim blasting, including that

carried out in conjunction with the test sections, shall be performed according to the following requirements.

When presplitting the contractor, at his option, may either presplit the slope face before drilling for production blasting or may presplit the slope face and production blast in the same shot, provided that the presplitting drill holes are fired first, and satisfactory presplit slopes are obtained. When trim blasting, the detonation of the trim line shall be along with the adjoining production blast holes. Trim blasts are fired after the production rounds have been fired; and they are designed in a similar manner to presplit blasts.
If the rock response to blasting so warrants, the Engineer may direct the use of presplit techniques in combination with trim blasting techniques, in different lifts of the same cut.

The contractor shall control the drilling operations for trim blasting by using proper equipment and technique to insure that no hole shall deviate from the plan of the planned slope by more than 9 inches either parallel or normal to the slope. Holes exceeding these limits will not be accepted and shall be redrilled to the proper alignment. The cost of redrilling shall be borne by the contractor.

The finished smooth-blasting slope faces shall not deviate more than one foot measured perpendicular to a plane passing through adjacent drilling holes, except where the character of the rock is such that, as determined by the Engineer, irregularities are unavoidable.
No lift shall exceed 20 feet in height unless the contractor can demonstrate to the Engineer that he can stay within the above tolerances and produce a uniform slope. If greater than 5% of the controlled holes are misaligned in any one lift, the contractor shall reduce the height of the lifts until the 9-inch tolerance is met.

Only standard explosives manufactured especially for presplitting shall be used in presplit holes, unless otherwise approved by the Engineer. If rock conditions or the results of blasting so indicate, the trim or buffer holes shall be deck-loaded to reduce the charge density.

8. Contractor's Blasting Proposal:
The contractor shall submit a blasting proposal for the Engineer's review and approval. The Engineer in turn, shall forward the proposal to SRP for their review. The Blasting Proposal shall be submitted within one month following the contractor receipt of notice of award and before the commencement of any excavation that requires blasting. At a minimum, the blasting proposal shall include the following:

1. Proposed location, excavation plan, and description of the test blasting program.
2. Proposed location(s) of powder magazines.
3. Proposed sequence of excavation of the various major elements of the project.
4. Qualifications (include but not limited to: blaster's credentials, license number and issued agency, experience, etc.) of all supervisory, technical and Blasting Consultant's personnel to be involved in blasting operations.

5. Equipment list for scaling, drilling blasting, pioneering, and excavating.
6. Method of forming desired cut slope contour, including production blasting and creation of final roughened appearance.
7. Measures that will serve to reduce backwall fracturing and eliminate hole traces (half casts).
8. The blast proposal shall specifically note that it is meeting the road closure limitations specified.
9. Intended measures for limiting dust and fly-rock, and for the protection of the public using the area during excavation.

The proposal must be approved in writing by the Engineer and the Town before blasting operations, including the test blasts, may commence. The Engineer will either approve the Proposal, or return it for revisions, within 2 weeks of receipt.

Any change in, or addition to, the personnel shown in the approved Proposal must be submitted to the Engineer and the U.S. Forest Service for approval.

9. Blasting Test Section:
Before commencing production-scale blasting operations, the contractor shall demonstrate the adequacy of the proposed blasting approaches by drilling, blasting, and excavating one (or more) short test sections up to 200 feet in length, to determine which combination of method, hole spacing, and charge satisfies contractual conditions.

Test sections shall lie completely within a representative roadway cut, a minimum of one test section in representative sections of each type of rock formation. Test sections shall be designed to display the range of blasting approaches and patterns expected to be used. Test faces shall be artificially treated with the visual mitigation procedures proposed by the contractor for full-scale use on rock cut slopes.

The test blasts shall also demonstrate the contractor's ability to comply with the restrictions on road closures embodied in these Special Provisions. Requirements for blasting safety, documentation, traffic maintenance and protection, and other matters related to care in blasting covered elsewhere in these Special Provisions shall also apply to the test blasting.

The contractor will not be allowed to drill ahead of the test shot area until the test section has been excavated and the results evaluated by the Engineer. Unsatisfactory test shot results include excessive damage beyond the staked slope lines and grade, excessive fly-rock, deleterious drill hole traces, loss of planned ledges or other visual mitigation features, failure to comply with road closures limits, or nonconformance with other requirements within the Special Provisions.
All costs incurred by the contractor in adopting revised blasting methods necessary to produce an acceptable test shot shall be considered incidental to the contract unit prices for roadway excavation.

If, anytime during the work, the methods of drilling and blasting do not produce the desired results within the tolerances and requirements specified, the contractor will be required to drill, blast and excavate in short sections, not to exceed 100 feet in length, until a technique is used that produces the desired results. Extra cost resulting from his requirement shall be borne by the contractor.

10. Primary Blasting Plan:
Within two (2) weeks after approval of the contractor's blasting proposal and before commencing drilling and blasting operations, the contractor shall submit a "Primary Blasting Plan" to the Engineer for approval. The Primary Blasting Plan shall contain the following minimum information:

1. Description of explosives storage, and of storage location.
2. Manufactures data sheets for all explosives, primers, and initiators to be employed.
3. Name, address, and telephone number of the explosive supplier.
4. Other public safety precautions in the use, storage, and transportation of explosives. .
5. General blasting patterns shall be described for the various geologic conditions known to exist where blasting may be used within the project limits. These should cover the rock type, geologic structure orientation and physical conditions such as rock hardness, weathering, and boulder features expected on the project. The patterns should be illustrated with plan views and typical sections reflecting a range of slope angles, showing layouts for controlled (cushion) blasting and step drilling. Typical production patterns and loading diagrams shall also be shown.
6. Identification of vibration monitoring equipment and the organization or individual that will process and interpret the data.
7. Approval of both the Engineer and the U.S. Forest Service for explosive storage beyond the staked clearing limits.
8. Approval of the contractor's Blasting Consultant.
9. The Engineer will either approve, or return for revisions, the contractor's primary blasting plan within 2 weeks of receipt.

Amendments to the Primary Blasting Plan shall be submitted for approval should any of the following occur:

1. Any changes in explosive material used.
2. Any changes in method of storage or transportation of explosives.
3. Any change in explosives supplier.
4. Any change in the blasting patterns, timing, or loading, or change in the method of excavation.
5. Any change in the contractor's Blasting Supervisor or Blasting Consultant.

11. Detailed Blasting Plan:
Detailed blasting plans shall be submitted in the following instances:

1. All shots for controlled blasting and production blasting.
2. All test section blasting.
3. Where there is a significant risk of longer road closure that expected or where fly-rock could present a hazard to traffic.
4. Where cuts daylight onto the existing roadway in use by the traveling public.
5. When problems have been encountered on previous shots.
6. Where blasting in the immediate vicinity of any structure located within or along the right-of-way.
7. Where, in the opinion of the Engineer, circumstances require detailed blasting plans.

Detailed Blasting Plans shall be submitted to the Engineer not less than 3 working days before drilling that shot. The Engineer shall approve the detailed blasting plan before any drilling or blasting work may commence in the area covered by the plan. The Engineer will either approve, or return for revisions, the contractor's detailed blasting plan within 2 working days of receipt.

The Detailed Blasting Plans shall contain full details of rock type, geologic structure orientation, rock hardness and weathering affecting the design of the shot, drilling and blasting patterns and controls the contractor proposes to use for both the controlled and production blasting. The Blasting Consultant shall approve all Detailed Blasting Plans and their modifications in writing. The contractor shall use a standard format for the Detailed Blasting Plan that shall, at a minimum, contain the following information:

1. Station limits, widths, and elevations of the proposed blasts.

2. Location and attitude of geologic structural planes (foliation, fractures, joints faults), significant discontinuity zones, rock type changes, rock hardness, rock weathering and any special circumstances meriting consideration or affect the blast plan design. This information shall be shown on the plan and section views.

3. Clearly dimensioned drawings showing a plan view of all holes, their depths, and cross-sections views of all variations of the proposed drill pattern. These drawings shall show blast hole locations, spacing, diameters, orientations, and depths as well as clearing limits; free face; burdens to free faces and between rows (true burden); and lift height. Sufficient justification must be provided in the blasting plan for any proposed subdrilling. No subdrilling shall commence unless the proposed subdrilling is approved in advance by the Engineer.

4. Loading diagram showing powder factors, charge weights, types, amounts, and strengths of explosives, primers, and initiators; and locations and depths of stemming for all substantial variations within the pattern. Controlled blasting holes shall be shown in sufficient detail to permit thorough evaluation.

5. Initiation method, including type, sequence, and number of delays; delay patterns; size and type of hookup lines and lead lines; and type and capacity of initiation devices.

6. Fly-rock control measures.

7. Estimated quantities of cubic yards in-lace and linear feet of both production and controlled blast drill holes.

8. Identification of vibration monitoring equipment type shall be provided and locations indicated.

9. Signatures of the Blasting Supervisor and Blasting Consultant.
   Review of blast design and techniques by the Engineer shall not relieve the contractor of sole responsibility of adequacy, accuracy, safety, proper supervision, and compliance with these special provisions.

   SRP may require an onsite inspector and specific monitoring recorders for critical utility blasting areas. The Engineer shall advise the contractor of such requirements when returning said detailed blasting plan.

   When drilling blast holes, the contractor will note the depth, color, and character of the cuttings, penetration rates (hard and soft zones), hole collar location and hole attitude, and other pertinent information such as sticking steel, occurrence of water, loss of air, or sloughage. Controlled blast holes shall be logged in written form, with sufficient frequency that all voids, fractures, stratigraphic variations faults, water, and all other potential impacts to hole loading and pattern are indicated. Occurrences of these factors, whether or not logged in controlled blast holes, shall be noted on the blast plan.

   When variations in the rock formation are indicated by the drill holes that are significant enough to call into question the suitability of the blast pattern, the drilling shall be stopped and the blast plan revised and resubmitted to the Engineer for approval. After approval of the revised plan, drilling shall again commence according to the revised plan.

   It is not anticipated that any single blasting technique, or combination of techniques, once proven successful, will be acceptable throughout the project due to the variety of geologic conditions.

12. Pre-Blast Condition Surveys:

A pre-blast condition survey shall be conducted jointly by the Blasting Supervisor and Blasting Consultant on roadway section or highway structures, or roadway section or highway structures, or adjacent property or landscape features (such as natural boulder outcrops, boulder nests,

and rock spires) that might be endangered or destroyed by the blast within the following distances to proposed blasting:

Estimated Maximum Charge Weight/delay (lbs)	Distance (ft.)
<=4	100
5-16	200
17-25	300
26-36	400
37 - 50 (maximum)	500

A "Pre-blast Condition Survey Report" shall be submitted to the Engineer one (1) day prior to each blast, including boulder reduction shots. Each report shall include the following information:

1. Each blast shall be identified by a numeric-alpha designation.
2. Dimensioned diagram showing shot width, length, top and bottom elevations, station limits, and lift number.
3. Name of blasting foreman and date and time of blast.
4. Detailed pre-blast conditions on every roadway section or highway structures, or adjacent property or landscape features (such as natural boulder outcrops, boulder nests, and rock spires that might be endangered or destroyed by the blast) per "Seminar on Blasting and Overbreak Control", Federal Highway Administration, May **1985.**
5. The Blasting Supervisor and Blasting Consultant shall sign and date each report.

13. Blasting Report:

A "Blasting Report" shall be submitted to the Engineer within 1 working day following each blast, including boulder reduction shots. Each report shall include the following information:

1. Each blast shall be identified by a numeric-alpha designation.
2. The date and time when drilling and loading is started and finished, along with a log of actual explosive loading and description of pattern(s) used.
3. Dimensioned diagram showing shot width, length, top and bottom elevations, station limits, and lift number.
4. Total length of controlled blasting holes loaded and shot.
5. Name of blasting foreman and date and time of blast.
6. Notation of overbreak, fragmentation, fly-rock, muck, movement, and attainment of the specific visual mitigation objectives.
7. Quantity of blasted material.
8. The Blasting Supervisor and Blasting Consultant shall sign and date each report. After mucking operations, the contractor shall measure the excavated slopes to determine overbreak quantities. Measurement may be done after each individual blast or after a series of blasts in the cut as determined by the Engineer. These quantities shall be submitted to the Engineer and will become part of the final blasting record.

14. Scaling and Stabilization:
All rock on the cut face that is loose, hanging, or which creates a potentially dangerous situation shall be removed or stabilized, to the Engineer's satisfaction.

The slopes shall be scaled throughout the span of the contract and at such frequency as required to remove all hazardous, loose rock or overhangs. Subject to the Engineer's approval other methods such as machine scaling, hydraulic splitters, or light blasting may be used to supplement hand scaling. Scaling shall not be carried out with short crowbars, shovels, or other inappropriate equipment. Payment for scaling shall be incidental to the contract unit price for roadway excavation.

15. Safety:

The Blasting Supervisor shall observe the entire blast area for a minimum of 5 minutes following a blast to guard against rock fall before commencing work in the cut.

The Engineer shall prohibit or halt the contractor's blasting operations if the required slopes are not being obtained in a stable condition, or the safety and convenience of the traveling public are being jeopardized.

Clearing, scaling, blasting operations taking place above the traveled roadway shall incorporate berms, temporary rock net fences, or other containment measures to control rockfall and boulder rolling and protect the public and workers.

No blasting will be permitted except when the road is closed to public travel. If approved in advance and in writing by the Engineer, and depending upon the separation distance between blasting site and traveling roadway, blasting may be permitted with the traveling roadway in a road-open condition.

Before any blasting takes place, the blasting site and adjoining areas shall be cleared of construction workers and members of the public with the exception of blasting personnel required to complete the shot.

Safety of blasting and related operations is the responsibility of the contractor.

16. Blasting Consultant:
The contractor shall retain the professional services of an independent, qualified Blasting Consultant, to assist the contractor in the design of both production and controlled blasting. He shall be available to the contractor for consultation regarding creation or modification of the blasting plans. Before submittal of each test blast plan, the Blasting Consultant shall inspect the area covered by the Detailed Blasting Plan. As a minimum, the Blasting Consultant shall inspect the site when requested by the Engineer. All blasting plan submittals, reports, and modifications

shall be approved in writing by the Blasting Consultant, except that blasting plans modifications directed by the Engineer will not have to be approved by the Blasting Consultant.

Not later than the preconstruction conference, the contractor shall submit the resume of the proposed Blasting Consultant, which shall include educational background, blaster's license (if any), overall qualifications, and a list of recent highway rock projects of similar size, scope, and difficulty to the work required under these special provisions. The project descriptions shall demonstrate the consultant's successful and instrumental involvement in the projects listed. The list shall contain a description of the project's blasting methods, modifications made during the project, and the names and telephone numbers of project owners with sufficient knowledge of the projects to verify the submitted information. The Engineer must approve the Blasting Consultant before submitting the Primary Blast Plan.

17. Blasting Supervisor:
All loading and firing of blasts on this project shall be under the direct physical supervision of an approved Blasting Supervisor. Blasting Supervisors shall have a minimum of 7 years experience in supervising the loading and firing of charges for rock excavation and shall have all the necessary licenses and permits required by the state and other agencies having jurisdiction.

The contractor shall submit the resumes of the proposed Blasting Supervisors which shall include educational background related to blasting and details of their experience.

18. Vibration Control and Monitoring:
When blasting near natural objects and man-made structures or utilities that may be susceptible to damage from blast-induced ground vibrations, the ground vibrations shall be controlled by using properly designed delay sequences and allowable charge weights per delay period. The contractor shall use approved seismographs located, as approved by the Engineer, between the blast area and the closest susceptible object, structure, SRP power pole or tower, or other utility. Seismographs shall be required whenever the blast is located within 300 feet of any natural or man-made object that may be susceptible to damage by blast-inducted, or construction equipment-induced ground vibrations, or when the maximum charge weight per delay period exceeds 20 pounds. Simultaneous monitoring of multiple locations may be required by the Engineer. "Seismographs used shall be capable of recording particle velocity for three mutually perpendicular components of vibration in the range associated with controlled blasting. The seismographs shall also be capable of calculating the resultant peak particle velocity (PPV), peak frequency, and associated resultant vector.

Peak particle velocity (PPV) shall not be allowed to exceed the safe limits of any object or structure subject to vibration damage or the following maximum values, whichever is less:

Structure	Max. Peak Particle Velocity (inches per second)
Residential Building[1]	0.75 - 2.0 (Varies)
Historical Building or Artifact	0.10
Concrete-cured	4.0
Concrete-24 to 48 hours old	0.80
Concrete-less than 24 hours old	0.10
SRP Power Poles or Towers	2.8
Wells	2.0
Rock Outcrops, Nests, & Spires: Unstabilized Stabilized	0.25 0.50

1. Per "Blasting Guidance Manual", US Office of Surface Mining Reclamation and Enforcement, March 1987.
2. Per "Standard Recommended Practice for Evaluation of Transportation Related Earthborne Vibrations", AASHHTO Designation R8.

Preliminary blast monitoring results shall be provided to the Engineer, or his designated representative, within one hour following each monitored blast. Data recorded for each shot shall be provided in writing to the Engineer before the next blast made within 300 feet (or at greater distances as may be determined following review of the blasting plan) of any natural or man-made object where monitoring is specified, or where directed by the Engineer. The data recorded shall include the following:

1. Identification of instrument used;

2. Name of seismograph operator;

3. Distance and direction of recording station from blast area;

4. Type of ground at recording station and material on which the vibration sensors are placed;

5. Type or method of geophone (vibratory motion sensor) placement or anchorage;

6. Maximum particle velocity and frequency in each vector component;

7. Resultant peak particle velocity (PPV), peak frequency, and associated resultant vector; and

8. A dated and signed copy of the seismograph readings.

19. Airblast and Noise Control:
If directed by the Engineer, an airblast monitoring system shall be installed between the main blast area and the location subject to blast damage or annoyance. The overpressure limit shall be established to reduce damage or complaints and never shall the peak airblast levels be allowed to exceed an equivalent sound level of 133 decibels (db) or approximately 0.010 pounds per square inch (psi). The equipment used to make the airblast measurements shall be the type specifically manufactured for that purpose. Appropriate blast hole patterns, detonation systems, and stemming shall be used to prevent venting of blasts and to reduce airblast and noise level produced by blasting operations. A permanent record of the peak overpressure measured, signed and dated by the contractor or designated representative, shall be furnished to the Engineer within one hour following the blast.

20. Fly-Rock Control:
Before the firing of any blast in areas where flying rock may result in personal injury, damage to property or the work, or inability to conform to road closure limitations, the area to be blasted shall be covered with approved blasting mats, soil, or other equally suitable material, to prevent fly-rock.

PAYMENT
This allowance item provides an estimated funding to cover the cost associated with blasting that may be encountered and corresponding work needed to complete the contract per plan. It shall be understood that this allowance is an estimate only and is based on the history of similar projects. The amount of the allowance item is determined by the Engineer and is not subject to individual bid pricing. It is further understood that work under this item, if any, may be less than the allowance item. This item shall not be utilized or drawn on unless authorized in writing by the Town's Construction Administrator.

All bidders shall incorporate the amount pre-entered in the bid schedule and shall reflect the same in the total amount bid for this project.

Work under this section shall be accomplished only after receiving written authorization by the Town's Construction Administrator. Unforeseen extra work, if any, shall be as approved by the Engineer, for example; negotiated price, or time and material in accordance with MAG Uniform Standard Specifications section 109.4 and 109.5.

SECTION 109
MEASUREMENTS and PAYMENTS

109.1 MEASUREMENT OF QUANTITIES: *is modified to add:*
The **Town of Fountain Hills Controlled Allowance** bid item shall be utilized at the discretion of the Town for the completion of unspecified work not covered by other bid items. Authorization for Work under this bid item shall be made by the Construction Manager prior to the start of such work. All bidders shall incorporate the amount pre-entered in the bid proposal and shall include the same in the total amount bid for this project. Payment for work completed under this bid item shall be made based on the Construction Manager's approved methods of unit of measure and unit of payment.

109.10 PAYMENT FOR MOBILIZATION/DEMOBILIZATION: *is modified to add:*
Measurement and payment for **Mobilization/Demobilization** will be as a Lump Sum which includes compensation to the Contractor for expenses to set up marshalling yards, to relocate equipment to and from the various project sites, and to perform final cleanup. Payment shall be compensation in full for all related items and all incidental work not specifically covered in other pay items. The Town shall compensate the Contractor for a one time, round trip mobilization/demobilization of the contractor's personnel equipment, supplies and incidentals, establishment of a marshalling yard, and other facilities required for the performance of the work on the project, as well as preparatory work and operations prior to the commencement of the work on the project site.

Payment, measured as provided above, will be made at the contract lump sum price as a single complete unit of work. Payment shall be made in two equal portions. The first payment shall be paid with the CONTRACTOR'S initial billing and shall be made for ½ of the total line item price. The final payment shall be paid as part of the final payment due the Contractor once the project has been accepted as complete by the Town.

SECTION 201
CLEARING AND GRUBBING

201.1 DESCRIPTION:

Add the following:

The work shall also include removal of existing vegetation, trash and debris, or other in the project area.

201.2 PRESERVATION OF PROPERTY:

Add the following:

The intent of the project is to minimize disturbance and disruption to all existing site features including plant material. Trees and shrubs may be pruned by a Certified Arborist to allow for project improvements with minimal disruption to the plant material. Any plant material to be removed or pruned shall be tagged by the contractor and reviewed and approved by the Owner prior to any removal or pruning.

201.3 CONSTRUCTION METHODS:

Replace the first paragraph with the following:

The limits of disturbance shall be clearly marked by temporary fencing, rope and staking, or other Agency approved method. Contractor shall provide submittal to the Agency for review containing the following information:

- means and methods for identifying and maintaining the limits of disturbance throughout construction
- ingress and egress points to perform the work
- contractor staging area
- temporary nursery area
- access routes throughout the limits of the project area

Work shall not occur outside of the agreed upon limits of disturbance. Clearing and grubbing activities shall be extremely selective and limited as described in Section 201.2. Any clear and grubbed material can be stock-piled in a single location at an agreed upon location between the Contractor and the Town. Contractor can utilize this material as deadfall and scatter the material throughout the limits of disturbance after all landscape work has been completed and prior to any seeding operations if agreed to in advance by the Town. No separate measurement or payment will be made for the salvaging, stock piling and placing of deadfall the cost of which

is considered included in other items of work. Contractor shall remove and properly dispose of any material that the Town does not desire to utilize as deadfall.

Replace the third paragraph with the following:

No water course shall be entered into by the Contractor without prior written authorization from the Agency. No clear and grubbing activities shall occur within a water course unless specifically agreed upon by the Contractor and the Agency.

Modify the fourth paragraph to read as follows:

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.

Modify the seventh paragraph to read as follows:

No trees shall be pruned or removed without prior approval from the Agency. Any pruning shall occur by a Certified Arborist or in the presence of a Certified Arborist. Contractor shall submit name and certification number of Arborist to the Agency prior to the commencement of any work. Tree branches extending over the roadway, which hang within 12 feet of the profile grade or that restrict sight distance shall be cut off close to the trunk or stem of the tree in a neat and workmanlike manner. The Contractor's arborist shall remove additional tree branches under the direction of the Engineer, in such a manner that the tree will present a balanced appearance. Tree sealant shall not be applied to cut limbs. **Any limbs trimmed from trees if not obstructing any pedestrian pathway or trail system can remain where it falls or can as directed by the Engineer be placed around the project site as deadfall.** This only applies to limbs that are pruned from trees that are to remain protected on site any trees identified on the plans for removal shall be completely removed and disposed of offsite.

201.6 MEASUREMENT, REMOVAL AND DISPOSAL OF TREES:

Delete in its entirety and replace with the following:

No separate measurement will be made for the removal of trees of any caliper inch.

201.7 PAYMENT, REMOVAL AND DISPOSAL OF TREES:

Delete in its entirety and replace with the following:

No separate payment will be made for the removal of trees the cost of which is considered included in the bid price for the construction or installation of the items to which the tree is required to be removed.

SECTION 205
ROADWAY EXCAVATION

205.1 DESCRIPTION: *Delete in its entirety and replace with the following:*

The work in this section shall include the preparation of excavation and embankment (cut and fill) slopes, including Salvaging of the top two (2) feet of existing soil for placement back on any new fill slopes is required as a part of this project and will become part of the projects topsoil plating as described in Section 424 Parkway Grading specification, rounding, warping, ripping, re-grading and stabilization of streambeds and surface treatments all in accordance with the requirements of the project plans, Standard Specifications, and these Special Provisions.

Roadway excavation shall consist of excavation involved in the grading and construction of roadways and site improvements to the contour lines and grades as shown on the project plans, except structure excavation, trench excavation and any other excavation separately designated.

All water required for construction is considered incidental to the project, all costs associated with using water in construction shall be considered as included in contract items.

Geotechnical Reports used during design are provided as information to the Contractor. No representation or warranty is made or implied by the Engineer or Town as to the adequacy of the reports for construction. The Contractor shall visit the site, examine the soils report and obtain all information necessary to determine existing site and subsoil conditions that will affect the work prior to bid. Additional geotechnical testing after bid for the Contractors information will be no cost to the Town.

Site specific soils test have been completed by RAMM Testing, and have been attached as appendices as informational purposes only to these special provisions.

205.5 Slopes: of the Standard Specifications is modified to add:
When earth slopes are to be seeded, the surface shall be finished to a loose, evenly roughened condition.

(1) Rounding, Warping and Surface Treatments:

It is the intent of this project to construct slopes that blend in with the surrounding undisturbed landscape as seamlessly as possible. In order to construct slopes that are aesthetically acceptable, the contractor shall proceed in the following manner:

Slopes constructed early in the project will serve as samples for the remainder of the project. Therefore, the contractor shall take extra care early in the project to construct and mitigate cut and fill slopes. After portions of cut and fill slopes have been constructed in accordance with the contractual provisions (including all warping, rounding and roughening) and prior to beginning

seeding and planting operations, the contractor shall request a field review with the Engineer and the Landscape Architect. The contractor's earthmoving equipment and operator shall be present at the field review so Engineer and the Landscape Architect can directly communicate with the operator as the work progresses. In consultation with the Landscape Architect, the Engineer will provide direction to the contractor's operator with respect to the appearances of the slopes. The contractor shall continue construction on the slopes according to direction provided at this review. No additional payment will be made to the contractor for this work.

The intersections between cut slopes and existing ground surfaces shall be warped to provide smooth transitions without noticeable breaks as shown on the project plans or as directed by the Engineer. Where cut slopes intersect embankments, the slopes shall be adjusted and warped to provide smooth transitions without noticeable breaks.

Earth and rock slopes shall be left with a roughened surface as they are being constructed. The slopes shall generally conform to the staked slope ratio, but shall be steepened and flattened intermittently, as shown on the plans or as directed by the Engineer, to simulate the irregularity of existing, natural terrain. The slopes shall be left with a roughened surface to aid in water absorption.

Rock that is fractured, weathered or disintegrated to such an extent that it will work and handled as earth, and can be handled with conventional earth moving equipment, shall be considered as earth and the slopes shall be rounded the same as earth slopes. Shattered or loosened material shall be removed from rock cut slopes. When earth overlays a rock cut, the top of the slope shall be rounded above the rock in the same manner as earth slopes, unless otherwise approved by the Engineer.

Stable rock outcroppings shall be left protruding from the cut slopes when approved by the Engineer. Rock outcroppings shall be scaled as they are cut in order to remove hazards and blend them into surrounding terrain, at the direction of the Engineer. Rock cut irregularities shall generally follow natural faults, seams or cracks.

After slope rounding and warping are completed and approved by the Engineer in consultation with the Landscape Architect, salvaged surface soils shall be distributed on cut and fill slopes. To avoid sloughing, where soil will be placed on and/or against existing, undisturbed slopes, existing slopes shall be roughened, and the material placed shall be in accordance with the details shown on the project plans.

Adjustments in slopes shall be made to avoid injury of standing vegetation or marring of weathered rock, or to harmonize with existing landscape features. Transitions to such adjusted slopes shall be gradual. The toes of fill slopes shall be warped around existing significant vegetation within 5 feet of the toe of slope, as directed by the Engineer.

At locations approved by the Engineer, excess material from roadway excavation may be incorporated into fill slopes to create varying, gently undulating contours, additional rounding at toes of fills, and to construct flatter slopes in selected areas to blend with existing landform or promote revegetation.

The ends of all roadway fill slopes shall be flared and flattened to produce a smooth transition between the fill slopes and the existing ground. Fill slope end treatments shall be as detailed on the project plans.

Boulders larger than 2'x3' (size 'A' per plans) shall be stockpiled and then placed in accordance with the plans and these Special Provisions. No additional cost will be allowed for stockpiling and then placing the boulders, this cost is considered incidental to all of the other cost associated with this project.

Embankment slopes shall be left with a roughened surface as they are being constructed. The slopes shall generally conform to the staked slope ratio, but shall be steepened and flattened intermittently, as shown on the plans or as directed by the Engineer, to simulate the irregularity of existing, natural terrain.

After slope rounding and warping are completed, and are approved by the Engineer, salvaged topsoil shall be redistributed on fill slopes.

(2) Ripping Soil Cut Slopes

As they are constructed, earth and conglomerate earth/rock cut slopes with slopes of 2:1 and flatter shall be ripped horizontally (parallel to the contours) to a depth of not less than twelve inches unless otherwise approved by the Engineer. The space between ripped furrows shall be approximately two feet. Cut slopes steeper than 2:1 shall not be ripped. Vertical ripping shall not be permitted. Equipment shall not be allowed on slopes following ripping and distribution of topsoil, except as needed for discing.

Boulders, bedrock or other features exposed or brought to the surface during ripping that are stable and add visual texture to the slope shall remain, provided they do not pose a hazard. These features shall be inspected by the Engineer prior to approval. These features may need to be treated by Permeon to blend the cuts into the natural desert.

After cut slopes are ripped, salvaged topsoil shall be redistributed on cut slopes.

205.7 MEASUREMENT: *Delete the second paragraph and replace with the following:*

Excavating the roadway prism including public and private road approaches, connections to driveways; excavation unsuitable material when shown on the plans or specified in the special provisions; excavating slides and slip-outs not resulting from overshooting; excavating surplus

material; excavating selected material and topsoil from within the limits of project and removing such materials from stockpiles when stockpiling is ordered; excavating ditches and excavating borrow; and providing contouring of the site as shown on the project plans.

No measurement will be made for slope improvements (ripping, rounding, warping, and slope treatments).

No measurement will be made for Salvage, Stockpiling, and Placement of Salvage Surface Soil or boulders.

Earthwork Cut for Roadway and Parking excavation shall be measured on the basis of Cubic Yard. Such price shall include salvage surface soil stockpiling and redistribution, excavating, sloping, rounding tops and ends of excavations, loading, depositing, conditioning, spreading, and compacting the material complete in place and disposal of surplus material.

205.8 BASIS OF PAYMENT: of the Standard Specifications is modified to add:

No separate payment will be made for slope improvements (ripping, rounding, warping, ripping and slope surface treatments), the cost being considered included in the price of contract items.

No separate payment will be made for Salvage, Stockpiling, and Placement of Salvaged Surface Soils or boulders, the cost being considered included in the price of contract items.

Basis Payment for Earthwork Cut for Roadway and Parking excavation shall be measured as described above.

SECTION 206
STRUCTURE EXCAVATION AND BACKFILL

206.5 PAYMENT: *Delete the second paragraph.*

206.5.1 MEASUREMENT: *Delete the subsection.*

206.5.2 PAYMENT: *Delete the subsection. Structural excavation and backfill shall be considered incidental to the cost of the construction or installation of the items to which excavation and backfill are required as identified within this section. Structural backfill for Gabion Walls shall be considered incidental to the cost of the Gabion Walls.*

SECTION 211
FILL CONSTRUCTION

211.1 DESCRIPTION: *add the following:*

Earthwork Fill for Roadway, Parking areas and Gabion Basket Retaining Walls and has been produced by MCO properties and stockpiled near the project site for use as fill material for this project. The Contractor will be required to test this material to confirm that it is suitable for fill construction according to MAG Section 211. All tests results shall be provided to the Town for review. Contractor may be required to supplement the fill material to bring the fill into compliance with MAG Standards, move the Fill Construction Material needed for this project to the site and compact the materials to comply with MAG Section 211, and MAG Section 321 and the Geotechnical Report for this site unless directed by the Town of Fountain Hills.

In the case where the fill materials that have been stockpiled by MCO are not sufficient in quality to meet the required MAG specifications or quantity for the fill required for this project the contractor shall provide the materials needed to complete the work effort through use of the established force account item of work described herein and only when authorized in advance by the Town.

Backfill material for Gabion Basket Retaining Walls shall be placed and compacted to a minimum of Standard proctor 95% in lifts not to exceed 9 inches vertical and shall comply to MAG standard specification section 211, 206 and 321. Backfill material shall consist of Stone, Gravel and Sand with an angle of internal friction between 30-36. Contractor shall verify that MCO stockpile meets these properties; contractor shall provide backfill material in accordance to these specifications for Gabion Wall backfill.

211.2 PLACING: *Delete the first paragraph and replace with the following:*

Rocks large than 6", broken concrete, or other solid material shall not be placed in fill areas.

Delete the fourth paragraph and replace with the following:

When the fill material includes large rocky material greater than 6 inch, or hard lumps, such as hardpan or cemented gravel that exceed 6 inch which cannot be broken readily, such material shall be removed from the site by the contractor and cannot be used as fill material. Rocky material up to 6 inch shall be placed such that sufficient earth or other fine material can be placed around the larger material as it is deposited so as to fill the interstices and produce a dense, compact fill. However, material sized up to 6 inch shall not be placed within 2 feet of the finished grade of the fill, nor within 3 feet of any proposed utilities, storm drain and irrigation pipes or other underground constructed elements.

All embankments shall be constructed in accordance with ADOT Standard Specification Section 203-10 Embankment Requirements.

211.3 COMPACTING: *Delete the fourth paragraph and replace with the following:*

Areas over which fills are to be placed shall be cleared and scarified to a depth of 6 inches to proved a bond between the existing ground and the material to be deposited thereon. Unless otherwise specified, the original ground area upon with fills are to be constructed shall be compacted to a uniform density of not less than 95 percent unless the area is intended to be planted then the density shall not exceed 85 percent.

Delete the fifth paragraph and replace with the following:

The loose thickness off each layer of fill material before compaction shall not exceed 8 inches.

Delete the sixth paragraph.

Delete the seventh paragraph and replace with the following:

Broken Portland cement concrete and bituminous type pavement obtained from the project excavations will not be permitted in the fill.

211.5 MEASUREMENT: *add the following:*

Earthwork Fill for Roadway and Parking areas shall be measured on a per Cubic Yard basis. Such price shall include hauling the materials from the MCO stockpile location, loading, depositing, conditioning, spreading, sloping, rounding tops and ends of fill areas, and compacting the material complete in place per the these specifications and MAG Standards and disposal of surplus material.

Force Account for Additional Earthwork Fill for Roadway and Parking areas would be measured as a force account item of work and would only be used if the existing fill material stockpile is not sufficient to meet the MAG specification and to provide the fill materials needed for the project. This force account bid item will be measured on a per Cubic Yard basis for all fill material imported into the site based on weigh tickets provided by the Contractor to the Engineer. Such price shall include amending existing fill materials to bring the fill material into compliance with MAG Standards, hauling the materials in from an offsite source, loading, depositing, conditioning, spreading, sloping, rounding tops and ends of fill areas, and compacting the material complete in place per the these specifications and MAG Standards including the disposal of any surplus material. This force account item of work shall only be utilized if approved in advance by the Town of Fountain Hills.

211.6 PAYMENT: of the Standard Specifications is modified to add:

Basis Payment for Earthwork Fill for Roadway, Parking and Gabion Basket Retaining Wall backfill from MCO Stockpile shall be measured as described above.

Basis of Payment for Force Account Additional Earthwork for Fill for Roadway and Parking excavation from an additional source of material shall be measured as described above and paid for by the Town based upon the Town accepted weigh tickets submitted by the Contractor for the amount of Cubic Yards of materials that have been brought to the site.

SECTION 220
RIP RAP CONSTRUCTION

220.1 DESCRIPTION: *add the following:*

The work under this section shall **also** include the construction of metal gabion basket retaining walls, gabion basket seat walls with concrete piers and caps in accordance with the project plans and details.

220.2 MATERIALS: *delete the first sentence in its entirety and add the following:*

Riprap shall conform to the requirements of Section 703 and the intent is that the rip rap be developed or generated from local rock on site as part of the project and the color shall match the color of the existing and surrounding rock. The gradation of the rip rap shall be as called for on the project plans. If the rock on site is of insufficient quantity any rip rap brought into the site from an offsite source shall match existing rock color. Samples of rip rap rock shall be provided to the Town for review and approval prior to the use of the rip rap on site if using an offsite source. Sample size of rip rap rock shall be provided to the site and should cover area 20'x20 feet on site for review and approval by the Town. Rock shall be sound and durable, free from clay or shale seams, cracks or other structural defects. The Bulk Specific gravity (SSD) shall be determined in accordance with the requirements of AASHTO T 85 and shall be a minimum of 2.4. Rock used to fill the welded wire mesh baskets rock shall be site rock that is well graded varying from three inches minimum to nine inches maximum in size. Rock shall have the following gradation: D_{50} =9", D_{Max}=12", D_{Min}=6". D_{50}=18" shall be: D_{Max} shall be 24", D_{Min}=12". Control for the gradation will be by visual inspection of the Engineer. Rip rap D_{50}=9" thickness is 1.8 feet. D_{50}=18" thickness is 3 feet.

Rock for welded wire mesh baskets shall be **from on site material** sound and durable, free from clay or shale seams, cracks or other structural defects. Rock shall have a least dimension not less than one-third of its greatest dimension and a gradation in reasonable conformity with that shown herein for the welded wire mesh baskets.

The acceptability of the stone will be determined by the Town of Fountain Hills and the Engineer. If testing is required, suitable samples of stone shall be taken in the presence of the Engineer at least 25 days in advance of the time when its use is expected to begin. The approval of some rock fragments from a particular quarry site shall not be construed as constituting the approval of all rock fragments taken from that quarry.

Rock for Placed Native Rock Embankment shall be well graded varying in size per the plan details. Stone shall be from native on-site materials.

The source from which the rock will be obtained if needed to supplement the on-site rock shall be selected well in advance of the time when it will be required in the work. The acceptability of the rock including color will be determined by the Town of Fountain Hills and the Engineer. If testing is required, suitable samples of rock shall be taken in the presence of the Engineer at least 25 days in advance of the time when its use is expected to begin. The approval of some

rock fragments from a particular quarry site shall not be construed as constituting the approval of all rock fragments taken from that quarry.

Aggregate base shall be in accordance with Section 702.

Bedding Material for Gabion Basket Retaining Walls and Gabion Basket Seat Walls:

Bedding material for the baskets that will create the benches for the walls shall be placed on natural grade and shall consist of native earth scarified to a depth of one foot and compacted to 95% density. Bedding material for Gabion Basket Retaining walls shall consists of 12 inches AB over native earth compacted to a 95% density. The bedding shall be free of clay or organic material. The concrete base that the gabion benches are to be placed upon and secured too shall be swept clean so that the gabion basket is in direct contact with the concrete pad. The concrete pad shall be cured sufficiently so that the placement of the basket and the associated loads do not cause the concrete pad to crack or be deformed. Gabion Basket attachment procedures and timing of stated attachments shall be provided by the contractor prior to their use and verified by the Engineer prior to placement.

Concrete for Seat Caps and Footings:

Portland cement concrete utilized for Concrete Seat Caps, and for all Footings shall conform to the requirements of MAG Section 725 for Class "B" concrete (f'_c = 2500 psi) for both the reinforced concrete seat caps and footings. Reinforcing Welded Wire Fabric for the concrete seat caps shall comply with Section 727 Reinforcing Steel. Note the concrete seat caps shall be installed level, verify installation with Engineer

220.2.1 Gabion Baskets shall be welded wire non-galvanized mesh basket of a single unit of construction. The bottom mat, sides, dividers, back face, front face, shall be connected and spiraled into rectangular baskets of the specified sizes. The non-galvanized welded wire mesh baskets shall be Hilfiker Retaining Walls Artweld Gabion 1-800-762-8962 or approved equal. Contractor shall provide samples of welded wire mesh baskets to the Engineer at least 30 days in advance of the time when its use is expected to begin.

Mesh baskets shall be constructed of 3"x 3" opening, 9 gauge welded wire fabric, non-galvanized and conform to the requirements of ASTM A185. Pre-formed stiffeners and spiral binders shall be constructed of 9 gauge non-galvanized wire and conform to the requirements of ASTM A82.

Wire fabric shall be of the diameter, spacing, pattern, and dimensions shown of the plans. The wire fabric shall be certified for a 50 year life cycle.

Miscellaneous fittings and hardware for the gabion basket shall be of the type and size provided by the manufacturer of the major item to which they apply and shall be in accordance with the requirements of ASTM A82.

Certificates of Compliance conforming to the requirements of Sections 105 and 106 shall be submitted.

See Hilfiker product specifications for material, installation and construction of Gabion Baskets.

220.5.1 Gabion Basket Construction Requirements:

220.5.1.1 Mock ups: The Contractor is required to construct fully complete mock ups for the gabion retaining wall and the gabion basket seat wall with concrete pier and concrete cap. Wall mock-up shall be a minimum of 4 feet wide by 6 feet in height, and the mock-up of the seat wall shall be a minimum of 6 feet in length and the height of the seat wall. Mock up may be constructed in place where an actual wall or bench will be constructed but if the quality is unacceptable it shall be promptly removed from the location and the mock ups reconstructed until they are acceptable.

The mock ups shall be constructed a minimum of 30 days prior to production of the walls or seat walls for review and approval by the Engineer. No construction is to begin until the mock up(s) are accepted by the Engineer. The contractor may have to construct an additional two (2) mockups of the wall and the seat wall, for a maximum total of three (3) mockups until a final mockup of each is approved by the Engineer. Mock-ups will be reviewed for rock placement, level placement, construction methods, and over all aesthetic appearance of the basket walls and the bench finish.

No separate measurement or payment will be made for the mock-ups the cost of which is considered included in the price of the gabion wall or the seat wall.

220.5.1.2 Gabion Basket Installation: Areas on which welded wire baskets are to be constructed shall be cleared, grubbed and excavated or backfilled and compacted in accordance with the requirements of the appropriate sections of the Standard Specifications to produce a ground surface in reasonable conformance with the lines and grades shown in the project plans or established by the Engineer.

The Gabion Basket Benches that are to be secured to concrete slabs the surface shall be brushed or blown clean creating a clean surface to attach the benches per the details on the plans. Baskets shall be filled with specified rock placed so that the baskets are not allowed to deform geometrically or destroy any of the wire supports or concrete. The reinforced concrete caps for the bench tops are to be tied into the baskets as detailed on the plans.

Bedding material shall consist of 12 inch AB Base Course over native earth compacted to 95% density per MAG Standard Section 310. See Civil details for limits. The bedding shall be free of clay or organic material. Filter fabric shall be placed between the bedding and welded wire basket in accordance with the project plans.

The welded wire mesh basket base course shall in accordance with Section 310 and be excavated to the width, line and grade as shown on the plans. The welded wire basket shall be founded on this base course and laid to the lines and dimensions required.

Welded wire mesh baskets shall be fabricated in such a manner that the sides, ends, lid and diaphragms can be assembled at the construction site into geometric or semi-circular units of specified sizes. Welded wire mesh baskets are to be of single unit of construction, the base ends and sides to be welded or physically connected into a single unit or one edge of these members connected to the end section of another unit in such a manner that strength and flexibility at the point of connection is at least equal to that of the mesh. The height, length, and width of welded wire baskets shall not vary more than 1 percent from the dimensions shown on the plans.

All perimeter edges of welded wire mesh baskets are to be securely selvage or bound so that the joints formed by tying the selvages have at least the same strength as the body of the mesh.

Welded wire mesh baskets shall be placed to conform to the project plan details. Rock shall be placed in close contact in the unit so that maximum fill is obtained. The units may be filled by machine with sufficient hand work to accomplish requirements of this specification.

Flat faces of rock shall be placed against the face of the wire mesh. Larger rocks should be utilized on the outside faces of the basket and smaller rocks placed on the interior of the baskets to fill voids.

The last lift of rock in each cell shall be level with the top of the welded wire mesh basket in order to properly close the lid and provide an even surface for the top of the basket to close and be level.

All welded wire mesh baskets shall be tied together each to its neighbor along all contacting edges in order to form a continuous connecting structure.

The construction sequence for welded wire baskets shall require placement of the bottom basket and 95% compaction adjacent the basket. Once the first layer of baskets has been placed, filled, compacted, and approved by the Engineer the second layer may be constructed. This process will be repeated until the entire height of welded wire baskets has been completed.

Soil reinforcement mats- Soil reinforcement mats shall be placed behind gabions per limits stated on Civil Detail sheets. Reinforcement mats shall be placed on prepared subgrade preparation and bedding material as specified in plans and as described above for gabion basket installation bedding.

Backfill material for Gabion Walls and soil reinforcement mats shall be placed and compacted to a minimum of Standard proctor 95% in lifts not to exceed 9 inches vertical and shall comply to MAG standard specification section 211 and 321.

Concrete Caps:

Concrete Seat Caps shall be reinforced and shall be constructed from portland cement concrete and shall conform to the requirements of MAG Section 725 for Class "B" concrete ($f'_c = 2500$ psi). The welded wire fabric used for reinforcing shall comply with MAG standard 727. The pre-cast reinforced concrete seat caps shall include the steel anchor plates as detailed on the plans, and the specified welded wire fabric. Engineer shall approve of the pre-cast reinforced concrete

seat cap formwork, welded wire fabric placement and anchor plate locations prior to fabrication. Note the concrete seat caps shall be installed level, verify installation with Engineer.

220.7 MEASUREMENT: *is modified to add*

Welded wire mesh gabion basket retaining walls will be measured by the cubic yard by computing the volume of the rock filled baskets used

Welded wire mesh basket seat walls with Concrete Piers and Concrete Cap will be measured by the lineal foot including baskets, rock fill, concrete piers, and concrete cap.

Dumped Rip Rap will be measured complete, in place riprap construction within the limits of the dimensions shown on the plans shall be measured. Measurement will be in cubic yards rounded to the nearest cubic yard. No separate measurement will be made for erosion control geosynthetic fabric, bedding material, or grout.

Placed Rock Embankment will be measured complete, in place within the limits of the dimensions shown on the plans shall be measured per lineal foot rounded to the nearest foot. No separate measurement will be made for erosion control geosynthetic fabric, bedding material, or grout.

220.8 PAYMENT: *is modified to add*

The accepted quantities of Gabion basket retaining walls/welded wire mesh basket retaining walls, measured as provided above, will be paid for at the contract unit price per cubic yard, which price shall be full compensation for the work, complete in place, including excavating, bedding material, subgrade preparation (95% compaction), structural backfill (95% compaction at 9" vertical lifts), furnishing and installing the rock, filter fabric, soil reinforcement mats (limits specified on plans), and welded wire mesh baskets, and metal hardware as required. The soil reinforcement mats material, installation, compaction and structural backfill shall be considered incidental to the cost of the Gabion basket retaining walls/welded wire mesh basket retaining walls.

The accepted quantities of welded wire mesh basket seat walls with Concrete Piers and Concrete Cap, measured as provided above, will be paid for at the contract unit price per lineal foot, which price shall be full compensation for the work, complete in place, including excavating, bedding, furnishing and installing the rock, filter fabric, and welded wire mesh baskets, metal hardware, concrete piers and concrete cap as required.

Payment for dumped riprap will be made for the accepted complete in-place dumped riprap measured as provided above. Dumped Riprap construction shall include excavation, ground surface preparation, erosion control geosynthetic fabric, bedding material, riprap stone, grout and backfilling. Payment for dumped riprap shall be full compensation for furnishing all material, labor and equipment for dumped riprap construction.

Payment for Placed Rock Embankment will be made for the accepted complete in-place Placed Rock Embankment measured as provided above. Placed Rock Embankment construction shall include excavation, ground surface preparation, erosion control geosynthetic fabric, bedding

material, placed rock embankment stone, and backfilling. Payment for rock mulch shall be full compensation for furnishing all material, labor and equipment for rock mulch construction.

SECTION 301
SUBGRADE PREPERATION

301.7 MEASUREMENT:

Delete in its entirety and replace with the following:

No separate measurement will be made for Subgrade Preparation.

301.8 PAYMENT:

Delete in its entirety and replace with the following:

No separate payment will be made for Subgrade Preparation the cost of which is considered included in the bid price for the construction or installation of the items to which subgrade preparation is required.

SECTION 310
PLACEMENT AND CONSTRUCTION OF AGGREGATE BASE COURSE

310.2 PLACEMENT AND CONSTRUCTION:

Add the following:

Aggregate base course for Asphalt and Concrete Pavement has been produced by MCO properties and stockpiled near the project site for use as base material for this project. The Town has had the stockpile tested and will provide the geotechnical test report of this material is attached. When compared to MAG specifications for ABC, the stockpiled material that was sampled and tested showed a high in PI (9 tested, maximum of 5 specified) and high in percent passing the No. 200 sieve (17 tested, maximum of 12 specified). **Contractor shall be required to bring any geotechnical noted deficiencies of the stockpiled AB materials for the amount of material needed for this project into compliance with MAG standards Section 702 and move the amended Aggregate Base needed for this project to the site including compacting the materials to comply with MAG Section 310, and MAG Section 321 and the Geotechnical Report unless directed by the Town of Fountain Hills.**

Force Account for Additional Aggregate Base Course for Roadway and Parking would be measured as a force account item of work and would only be used if authorized in advance by the Town of Fountain Hills to supplement the existing material bringing that material into compliance with MAG standards as specified and only if the existing AB material stockpile is not sufficient to provide the quantity of AB materials needed for the project or to supplement the existing stockpile to bring the AB material into compliance with MAG standards. This force account bid item will be measured on a per Cubic Yard basis for all imported Aggregate Base brought into the site based on weigh tickets provided by the Contractor to the Engineer. Such price shall include hauling the materials in from an offsite source, mixing and compacting the material to comply with MAG Section 310, MAG Section 321 and MAG Section 702 and the Geotechnical Report unless directed by the Town of Fountain Hills. This force account item of work shall only be utilized if approved in advance by the Town of Fountain Hills.

310.5 PAYMENT:

Delete in its entirety and replace with the following:

Payment for Aggregate base course will be made on the basis of Cubic Yard Such price shall include amending the amount of the stockpiled material necessary to complete this project to bring the Aggregate Base Material into compliance with MAG Standards per the Town provided Geotechnical test, hauling the amended material from the identified MCO Stockpile, loading, depositing, conditioning, spreading, subgrade preparation and compacting the material complete in place.

Basis of Payment for Force Account Additional Aggregate Base Course Materials for Roadway and Parking areas from an additional source of material shall be measured as described above and paid on a per Cubic Yard basis.

SECTION 321
ASPHALT CONCRETE PAVEMENT

321.5 MIX DESIGN
Add the following:

The Mix Design shall be provided in compliance with the East Valley Asphalt Committee (EVAC) Hot Asphalt Mix Criteria and shall meet the EVAC 1/2" Mix design criteria.

321.12 MEASUREMENT:

Delete in its entirety and replace with the following:

Asphalt concrete pavement will be measured by the square yard, for the mixture actually used as allowed above, which shall include the required quantities of mineral aggregates, asphalt binder, and mineral admixture. Measurement shall include any tonnage used to construct intersections, roadways, streets, or other miscellaneous surfaces indicated on the plans or as directed by the Engineer.

321.13 PAYMENT:

Delete in its entirety and replace with the following:

The asphalt concrete measured as provided above will be paid for at the contract price per square yard, as adjusted per Section 321.10, which price shall be full compensation for the item complete in place per the pavement structural sections indicated on the plans, as herein described and specified, including all subgrade preparation, aggregate base, asphaltic concrete, and tack coats.

No payment will be made for any overrun in quantity of asphalt concrete in excess of 10 percent based on actual field measurement of area covered, design thickness, and the mix design unit weight. The calculations and payment for overrun will be by individual pay item. To compensate or adjust for a thickness deficiency in an underlying asphalt concrete course, the Engineer may authorize a quantity increase in excess of 10 percent for a subsequent asphalt concrete course. In such cases, the quantity in excess of 10 percent will be paid for at the lowest unit price.

Except as otherwise specified in the special provisions, no separate payment will be made for work necessary to construct miscellaneous items or surfaces of asphalt concrete.

SECTION 324
PORTLAND CEMENT CONCRETE STREET PAVEMENT

324 Description: of the Standard Specifications is modified to add:
The scope under this section shall consist of furnishing all labor, materials, and incidentals to install all surface finishes indicated as "Colored Concrete" at the specified thickness as shown on the plans ready for the intended use as elaborated or referenced in these specifications and on the plans. Portland Cement concrete shall conform to the applicable requirements of MAG specifications section 324 and 725. All jointing within concrete surface shall comply with MAG Section 729 and as shown on the plans. Color shall be integral color, dust on or surface applied colors will not be accepted. Colors that will be used include:

Concrete Drives and Sidewalks: Davis Color: San Diego Buff #5237 or
Solomon Color: Buckwheat

Concrete Plaza Areas: Davis Color Sunset Rode #160, and Dark Grey #8084 or
Solomon Color: Dusty Rose and Onyx

324 Quality Assurance Plan:
Schedule a pre-construction meeting for colored concrete work with all parties involved a minimum of 48 hours prior to initial concrete placement. The meeting shall include the Town Engineer, Town's consultant, contractor, finishers, admixture representatives, testing agencies, etc. to review the letter, plan of action.

324 Test Panels:
Prior to constructing the concrete plazas, sidewalks, roadway, driveway and entrance drive provide on-site sample(s) of each type of exposed flatwork concrete finish showing texture and color. Samples shall be a minimum 8 feet x 8 feet square with a medium and a heavy broom finish for the walkways and the tine finish for the driveway and roadway section and have at least one longitudinal and one transverse joint sample. Construct sample panels in ample time to allow for finishing and curing before requesting Engineer to review. The Contractor shall not remove the approved test panel from site, prior to acceptance of the entire concrete work by the Engineer. The Contractor may need to pour multiple test samples. The test panel(s) shall demonstrate mix workability, placing and finishing techniques, and curing.

324 Color:
Concrete shall contain integral color tint in liquid form. Colors shall be equivalent to the following colors;

Concrete Drives and Sidewalks: Davis Color: San Diego Buff #5237 or
Solomon Color: Buckwheat

Concrete Plaza Areas: Davis Color Sunset Rode #160, and Dark Grey #8084 or
Solomon Color: Dusty Rose and Onyx

324 Tine Texture Colored Concrete Entry Drive and Roadway:
Surface Texturing of the colored concrete at the driveway and entry drive only (not the ADA Parking Stalls) as shown on the plans 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 longitudinal 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 equipment.

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 in the drive isles. The span of the tining rake shall be capable of texturing the entire width of the pavement section placed. 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 in depth and width. Texture shall be parallel 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 1/8 inch (plus or minus 1/32 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 3/4 inch (plus or minus 1/8 inch).

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

324 Field Quality Control And Acceptance:
Concrete test cylinders will be taken by the Contractor's testing lab to verify the mix design strength.
Any plastizer used shall be added on site and no water added after this point. Slump tests shall be taken by the Contractor's testing lab prior to and after the addition of any plastizers.

Tests: The Town may direct that additional tests be performed at any time.

Aesthetics: The colored concrete installation must satisfy the appearance needs and wishes of the Town. Any narrow crack, greater than or equal 0.030 in width and longer than 3 feet is cause for total rejection of the concrete section as determined by the Engineer. Less narrow cracks and hairline cracks less than 0.030, which are excessive in the opinion of the Engineer, are cause for rejection of the concrete section.

324.6 MEASUREMENT: *Delete in its entirety and replace with the following:*

Measurement and payment of the Colored Concrete Pavement (Roadway, Walkway, Plaza Spaces) shall be by the square feet. The cost for the Colored Concrete Pavement (Roadway, Walkway, Plaza Spaces) shall include all grading, subgrade preparation, and compaction, aggregate base, specified colored concrete and tine texture in roadway.

SECTION 329
TACK COAT

329.7 PAYMENT:

Delete in its entirety and replace with the following:

No separate payment will be made for Tack Coat the cost of which is considered included in the cost of other pavement items.

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

340.1 DESCRIPTION: *Is modified to add:*

Concrete placement on this project will be held to a high standard for aesthetic quality and visual appearance of the finished product. All concrete is to be colored.

340.2 MATERIALS: *Delete the first sentence and replace with the following:*

Concrete shall be as noted on the project plans and details. If project plans do not specify a concrete strength, concrete shall be a minimum of MAG 'A'.

Add the following:

340.2.2 Steel Reinforcement: Steel Reinforcing shall be in accordance with MAG standard specification section 727. Dowel or load transfer bars shall conform to the requirements of ASTM A-615, Grade 40. An approved support system shall be used to hold bars in place.

340.2.3 Concrete Curing Materials: Materials for curing concrete shall conform to the requirements of Section 726.

340.2.4 Concrete Coloring Materials: Coloring for all of the concrete shall be from an integral color mix that is developed from a tint in liquid form mixed thoroughly and throughout the concrete. Colors shall be equivalent to the following integral colors or Town approved changes in color;

Concrete Curbs and Gutter, Sidewalks, Driveways, ADA Parking Stalls, Roadway Drives shall be:

Davis Color: San Diego Buff #5237 or
Solomon Color: Buckwheat

Concrete Plaza Areas at Ramada:

Davis Color Sunset Rose #160, and Dark Grey #8084 or
Solomon Color: Dusty Rose and Onyx

340.3 CONSTRUCTION METHODS:

340.3.2 Formwork: *Add the following:*
Wood or other rigid forms will be used to form curved or irregular edges of the concrete. Chording with steel forms will not be allowed to form curved concrete.

340.3.6 Detectable Warnings: *Add the following:*
Detectable Warning materials will be ADA Compliant Warning Paver model "*ADA – 1 Truncated Dome*" as produced by Wausau Tile or approved equal. Tiles shall be ADA compliant warning pavers that meet the technical specifications of the ADA guidelines for application, design and installation. The concrete warning pavers shall be Color U4008, or U5008 per Wausau colors.

Colors shall be selected to contrast with adjoining surface. Contractor shall submit paver samples to the Town for review and approval prior to ordering any product.

Detectable Warning Pavers shall comply with the following requirements;

Property	Value	Test Method
Compressive Strength	=>8,000 psi avg.	ASTM C140
Flexural Strength	=>800 psi avg.	ASTM C293
Water Absorption	<6%	ASTM C140
Freeze/Thaw	=<1% loss of dry weight (50 cycles)	ASTM C67
Center Load	1,850 lbs.	WTCL 99

Contact information for Wausau Pavers local supplier is as follows:
Fran Hamele/David Castanon
P.O. Box 967
Banning, CA 92220
Phone: (951) 849-5695
Toll Free: (800) 231-4836
Fax: (951) 849-4781
General E-Mail: wtca@verizon.net
Website: www.wausautile.com

Add the following new subsections:

340.3.11 Sample Panels: For each color, finish, and textured concrete paving type Contractor shall provide sample panel(s) 10 foot by 10 foot in size, or as stated in the project plans, for approval by the engineer. Samples of each type of concrete header shall be provided in a 10 foot length by width of header for each color, finish, and texture as called for on the project plans. Samples shall incorporate a minimum of one expansion joint and control joint of each type as called for on the project plans. Concrete for samples shall utilize the same approved mix design as will actually be used in the project work.

Contractor will be required to provide as many samples as required, up to five (5) sample panels for each color and textured concrete, to achieve the aesthetic intent and quality of workmanship to the satisfaction of the Engineer. The approved sample panel (s) shall remain in place on site

for the duration of the project for a standard of reference for quality. No separate measurement or payment will be made for sample panels the cost of which is considered included in the cost of other items of work.

340.3.12 Finished Concrete Products: Any concrete placed on the project that is not of the same quality as the approved sample panel will be removed and replaced by the contractor. Cracked, broken, or marred concrete will not be accepted. Misshapen, deformed or poorly finished concrete will not be accepted. Contractor will remove and replace any concrete to the nearest control or expansion joint. Saw cut control joints shall be in accordance with Section 601. Patching of concrete will not be accepted. All removal and replacement of unacceptable concrete will be at no additional cost to the Contracting Agency.

340.5 MEASUREMENT: *Delete in its entirety and replace with the following:*

Measurement and payment of Concrete Ribbon Curb shall be by the Lineal Foot. The cost for the Concrete Ribbon Curb shall include all materials, integral color, grading, subgrade preparation, and compaction, aggregate base, and specified colored concrete in conformance with the plans and details complete and in place.

Measurement and payment of Concrete Header shall be by the Lineal Foot. The cost for the Concrete Header shall include all materials, integral color, grading, subgrade preparation, and compaction, and compaction in conformance with the plans and details complete and in place.

Measurement and payment of Concrete Ribbon Curb With Wheel Stop shall be by the Lineal Foot. The cost for the Concrete Ribbon Curb With Wheel Stop shall include all materials, integral color, grading, subgrade preparation, and compaction in conformance with the plans and details complete and in place.

Measurement and payment of ADA Truncated Domes shall be by the Square Foot. The cost for the ADA Truncated Domes shall include all materials, grading, subgrade preparation, and compaction in conformance with the plans and details complete and in place.

340.6 PAYMENT: *Delete in its entirety and replace with the following:*

The accepted quantity of Concrete Ribbon Curb, Concrete Header, Concrete Ribbon Curb with Wheel Stop, ADA Truncated Domes as, measured as provided above, will be paid by the contract unit price which shall be full compensation for the work, complete, as described above and as shown on the plans and details, including all labor, equipment and materials.

SECTION 343
EXPOSED AGGREGATE PAVING

343.1 DESCRIPTION: *Delete and replace with the following:*

Exposed aggregate paving is a decorative concrete surface consisting of a uniform aggregate size throughout the concrete mix which is then exposed on the surface by use of a concrete surface retarder and/or abrasive blasting on both horizontal and vertical surfaces.

343.2.1 Concrete: *Delete and replace with the following:*
Concrete shall be a minimum of Class A per Section 725 with a maximum slump of 3 inches or shall be of a concrete class as called for on the project plans. The higher strength requirement shall prevail.

343.2.2 Exposed Aggregate: *Delete (A) and (B) and replace with the following:*

The aggregate size shall be 3/8 of an inch or as indicated on the project plans.

343.3 CONSTRUCTION PROCEDURE: *Delete the first and second paragraph and replace with the following:*

Construction methods shall be in accordance with Section 340 as modified in these special provisions.

Add the following:

343.3.1 Abrasive Blasting: Exposed aggregate shall be accomplished by abrasive blasting (sand blasting) when called for on the project plans. The abrasive blasting shall be performed in such a way as to leave the exposed area uniformly lower than the original surrounding surface elevation after abrasive blasting operations and exposing the concrete's aggregate to the extent as called for on the project plans such as light, medium, or heavy. Light abrasive blasting typically removes the top layer of cream and exposes the sand layer of the concrete. Medium abrasive blasting begins to expose the tops of aggregate and provides a mottled blend of approximately 2/3 sand exposure to 1/3 aggregate exposure. Heavy abrasive blasting removes the majority of the sand layer of the concrete and exposes the entire first layer of aggregate. The exact extent of the light, medium, and heavy finishes will be determined through sample panels per Section 340.

Edges between abrasive blasted areas and non-abrasive blasted areas shall be sharp and uniform. Contractor shall use templates in order to maintain a consistent and uniform edge. Templates shall be of a sound and durable material able to withstand the abrasive blasting and protect any areas not intending to receive abrasive blasting from being damaged. Any adjacent concrete that is damaged by abrasive blasting activities, not intended to receive abrasive

blasting, shall be immediately removed and replaced by the contractor at no expense to the owner. Contractor shall determine type of nozzle, nozzle pressure, and blasting techniques and abrasive media required to provide the desired aesthetic. Contractor shall clean up and remove all expelled media from abrasive blasting operation from all surrounding areas.

All abrasive blasting shall be in compliance with all local and federal regulations for dust and particulate matter control.

343.3.2 Test Panel: Prior to constructing the exposed aggregate concrete, provide on-site sample(s) of each type of exposed flatwork concrete finish showing texture. Samples shall be a minimum 8 feet x 8 feet square with a medium and a heavy exposed aggregate finish and have at least one longitudinal and one transverse joint sample. Construct sample panels in ample time to allow for finishing and curing before requesting Engineer to review. The Contractor shall not remove the approved test panel from site, prior to acceptance of the entire concrete work by the Engineer. The Contractor may need to pour multiple test samples. The test panel(s) shall demonstrate mix workability, placing and finishing techniques, and curing.

343.3.3 Testing: Concrete test cylinders will be taken by the Contractor's testing lab to verify the mix design strength.

Any plastizer used shall be added on site and no water added after this point. Slump tests shall be taken by the Contractor's testing lab prior to and after the addition of any plastizers. Tests: The Town may direct that additional tests be performed at any time. Aesthetics: The colored concrete installation must satisfy the appearance needs and wishes of the Town. Any narrow crack, greater than or equal 0.030 in width and longer than 3 feet is cause for total rejection of the concrete section as determined by the Engineer. Less narrow cracks and hairline cracks less than 0.030, which are excessive in the opinion of the Engineer, are cause for rejection of the concrete section.

343.4 MEASUREMENT AND PAYMENT: *Delete and replace with the following:*

No separate measurement or payment will be made for integrally colored exposed aggregate finish the cost of color which is considered included in the item of work receiving the exposed aggregate finish.

SECTION 401
TRAFFIC CONTROL

401.1 DESCRIPTION: is modified to add:

The project includes the installation of miscellaneous traffic control elements that includes signing and striping and parking stalls designated through the use of yellow and white 2-way reflectors, parking lot stall painting, accessible parking symbols, stop bars, speed table arrows, fire lane markings, including both paint and thermoplastic. All signing, striping and 2-way reflectors shall be completed in accordance with MAG Section 401, and any Town of Fountain Hill's supplements. Included in this work are all traffic related signs, no parking signs, red curb painting, ADA parking signs and other signing and striping elements required per Town of Fountain Hills requirements.

401.6 MEASUREMENT: is deleted and replaced with the following:

Measurement of Misc Signing & Striping (Includes Yellow & White 2-Way Reflectors) shall be measured as a single project and the measurement will be by the lump sum. The cost for the Misc Signing & Striping (Includes Yellow & White 2-Way Reflectors) shall include all materials, pavement paint, curb paint, ADA parking symbols, stop bars, speed table arrows, fire lane marking, signage and signage post, concrete footings and installation of the yellow and white 2-way reflectors in conformance with the plans and details complete and in place.

401.7 Payment: is modified to add the following:

Payment shall be paid for based on the measurement provided above. The cost for the Misc Signing & Striping (Includes Yellow & White 2-Way Reflectors) shall include all materials, pavement paint, curb paint, ADA parking symbols, stop bars, speed table arrows, fire lane marking, signage and signage post, concrete footings and installation of the yellow and white 2-way reflectors in conformance with the plans and details complete and in place.

SECTION 424
PARKWAY GRADING

424.1 DESCRIPTION: *Delete in its entirety and replace with the following:*

This grading shall include all work necessary to bring the surface of the site to the grade and cross-sections shown on the plans or as directed by the Engineer. This work shall occur after the initial Roadway Excavation and Fill Construction (Mass Grading) has occurred. This work shall also include the fine grading of water harvest swales around plant materials, planting areas within hardscape plazas and parking lot islands.

Included in this effort is the placement back onto the fill slopes of the salvaged surface soils that were stockpiled prior to any excavations and or grading operations as part of the Contractors Salvaged Surface Soil Management Plan approved by the Town.

424.2 ROUGH GRADING: *Delete (A)in its entirety and replace with the following:*

(A) Fill material shall not contain broken concrete, or construction debris of any nature.

424.3 FINE GRADING: *Add the following:*

(C) Water harvest swales shall be no greater than six inches in depth and shall be naturally contoured to fit within the surrounding planting area to give a natural appearance.

424.4 PAYMENT: *Delete in its entirety and replace with the following:*

No separate measurement or payment will be made for parkway grading the cost of which is considered included in other items of work to which such grading is incidental or appurtenant.

SECTION 430
LANDSCAPING AND PLANTING

430.2 GENERAL: *add or modify the following:*

Contractor shall not begin planting operations until landscape grading and irrigation system has been installed and is fully operable. (Note: Town may approve planting operation under the use of a temporary irrigation system contractor shall verify that Town approves approach for the temporary irrigation prior to initiating any planting operations).

This site has extensive native seeding and re-vegetation efforts all native seed and re-vegetation areas shall not be treated with any pre-emergent.

Landscape Contractor shall call for "blue stake" as required. Place plantings where shown on the plans. If there are obstructions or underground utilities, relocate plants clear of any interference at the direction of the Town inspector. Landscape Contractor shall repair all damages caused by him to obstructions and underground utilities at no expense to Owner.

Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate, as required, to minimize possibility of damage to underground utilities. Maintain grade stakes until removal is mutually agreed upon by all parties concerned. The Contractor shall layout all plant material using stakes or flags to indicate the location of all plant materials. Spacing of shrub and groundcover material shall be as specified in schedule on plans. Location and spacing of trees shall be determined by the plan scale and located as accurately as the scale permits. Preliminary adjustments to conform to actual site conditions shall be accomplished at this time and the approval of the Town Inspector or his authorized representative on the stakeout of all plant material.

Product certificates signed by manufacturers certifying that their products comply with specified requirements

430.4 DECOMPOSED GRANITE AREA: *delete the second paragraph and replace with the following:*

The contractor shall stake out all areas to receive Granite, Desert Pavement and Salvaged Surface Soil areas, or rip-rap areas.

The sub-grade, prior to Granite, Desert Pavement and Salvaged Surface Soil areas placement in areas to be planted or seeded, shall be compacted to 85 percent of the maximum proctor density, as determined in accordance with the requirements of Arizona Test Methods 230 or 235, depending on the test method used to determine the compaction density (Sand Cone or Nuclear Method). Subgrade compaction under interim roadway granite surface treatment and stabilized decomposed Granite areas shall be in accordance with the project plans and details.

All areas to receive native seeding shall not receive pre-emergent.

All weed control products and herbicides shall be approved for use by the Engineer prior to any applications. Contractor shall submit copies of all manufacture specifications and application rates to the Engineer for review and approval prior to application. Herbicides and weed control shall only be performed by an Arizona State Office of Pest Management licensed applicator; Contractor shall supply information on applicator to the Engineer for approval.

Contractor shall apply three (3) applications of pre-emergent **only in areas that are designated not to receive any native seeding**:

1. One application of pre-emergent herbicide prior to installing Granite
2. One application after Granite has been installed, compacted, and raked level
3. One application 30 Days prior to the end of the maintenance period

The Engineer is to be notified prior to all pre-emergent applications. Contractor shall provide all spray tickets to the engineer.

The pre-emergent herbicide shall be applied in the manner recommended by the manufacturer to prevent germination of noxious weeds (both monocot and dicot), and shall be equivalent to Dimension, or an approved equal, and shall be applied at a rate specified by the manufacture to control weeds in an ornamental setting. Pre-emergent herbicide shall be applied to the designated Granite areas, prior to the final water settling operation. Water to activate the pre-emergent herbicide shall be applied to the areas of the herbicide application as recommended by the manufacturer's label. The amount of water specified by the manufacturer may be adjusted due to rainfall, if approved by the Engineer.

After the first application of pre-emergent to the Granite that is not to receive any seeding and to the separate Desert Pavement and Salvaged Surface Soil areas shall be rolled or raked to remove any irregularities, tire marks etc. Installation shall provide a minimum of two-inch depth of decomposed Granite and three-inch of Desert Pavement or Salvaged Surface Areas after compacting. During the final spreading and final grading operations, all surfaces within the decomposed Granite areas, Desert Pavement and Salvaged Surface Soil areas shall be passed over by the spreading and grading equipment a minimum of 2-times. Equipment operations for spreading, grading, raking, chemical application, water settling, and any other operations shall be done in a manner that uniformly maximizes the vehicle(s) wheel compaction over the surface area. All vehicles used for spreading, grading and raking the decomposed Granite, Desert Pavement or Salvaged Surface Soil areas shall have one set of wheels with floatation tires having a minimum width of 18-inches to allow equal compaction of these areas. The use or application of Granite, Desert Pavement and Salvaged Surface Soil areas by any method (conveyor belt etc.) shall not relive the contractor of providing compaction to a level approved by

the Landscape Architect or Owner's Representative. Methods of compacting such as rolling, water settling, etc., shall be approved by the Landscape Architect or Owner's Representative.

After placing, spreading, compacting, and grading the decomposed Granite, Desert Pavement, or Salvaged Surface Soil areas the contractor shall water settle the total thickness of the decomposed Granite, Desert Pavement and Salvaged Surface Soil areas to remove the fine material from the surface. The water settling operation, noted above, shall be completed by applying water at minimum depth of one-half inch of water over the decomposed Granite, Desert Pavement and Salvaged Surface Soil areas or an amount of water as approved by the Landscape Architect or Owner's Representative. This water settling technique can be used to water in the second application of pre-emergent in compliance with pre-emergent Manufacturer recommendations and as approved by the Landscape Architect or Owner's Representative in the areas designated to receive this treatment.

Unless otherwise specified in the drawings, Granite, Desert Pavement and Salvaged Surface Soil areas finish grade shall be one inch (1") below top of curb or adjacent sidewalk surfaces.

430.5 TREE, SHRUB, AND GROUND COVER PLANTING: *add the following:*

430.5.7 Plant Material

1. Plants protected by federal trademark or patent must include the correct name with genus and species along with registered cultivar name and be attached to all plants delivered and planted on specific project.

2. The Contractor shall coordinate pre-approval of plant material and delivery with the Town and applicable nurseries as required.

3. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, and secure Town of Fountain Hills's Landscape Architect/Engineer representative for acceptance before the start of planting work.

4. Upon delivery to the site, all nursery stock shall be planted as soon as possible. Until planting, plants shall not be exposed to excessive sun or drying winds. Stock which is not satisfactory in the opinion of the Town Inspector, shall be immediately replaced with acceptable stock.

5. The planting of all trees shall be performed during favorable weather conditions, during the season or seasons which are normal for such work, as determined by acceptable local practice.

6. Planting pit **width only** for trees and shrubs shall be excavated to a volume 2½ times the size of the root ball of the plant to be planted. Contractor shall stockpile native soil

excavated. The native soil will be used for backfilling planting soil. Scarify the walls of the planting pit.

7. Planting pits shall be backfilled with native soil and be watered settled to a grade sufficient, that in the setting of the plant, the finish grade level after settlement will be the same as that at which the plants were grown (see details in landscape plans).

8. Container Removal: Remove container by turning plant upside down, supporting root ball with hand and tapping container gently to dislodge plant. Support root ball with both hands until planted in pit. Do not injure root ball, or hold plant by the stem.

9. Box Removal: Remove bottom of plant boxes before planting. Remove sides of box without damage to root ball after positioning plant within planting pit.

10. Set container and boxed stock on undisturbed native soil, plumb, and hold rigidly in center of pit or trench with top of ball at elevation as shown on planting details. When set, place additional soil backfill around base and sides of ball, and work each layer to settle planting soil backfill to eliminate voids and air pockets. When excavation is approximately ½ full, water thoroughly before placing remainder of planting soil backfill.

11. After removal of plant from container or sides from box superficially cut edge-roots with a sharp knife on one side and tease out feeder roots to assure positive contact and embedment into planting soil.

12. After watering, any settlement within basins shall be refilled to required grade with native soil.

13. Prune, thin out and shape trees and shrubs in accordance with standard horticultural practice. Prune trees to retain required height and spread. Unless otherwise directed by the Town Inspector, do not cut tree leaders, and remove only injured or dead branches.

14. Excessively pruned or misformed stock resulting from improper pruning shall be removed from site and replaced at no additional cost to the Owner.

15. Stake trees if necessary immediately after planting. See Part 7, Section 7.03, "Tree Staking."

16. Any rock or other underground obstructions shall be removed, if possible, to the depth necessary to permit proper planting, according to plans and specifications. If underground construction, obstructions, or rock are encountered in the excavation of planting areas, other locations of the planting may be selected by the Contractor only upon approval of the Town Inspector. Prior to any work, the Contractor must be knowledgeable of the locations of all existing underground installations, and their

protection is his responsibility. All damage will be corrected at the expense of the Contractor to the satisfaction of the Town Inspector. Coordinate all work with other trades so conflicts will not exist or delay the work in any way. Coordinate grades with earthwork and with placement of irrigation systems fixtures.

17. All 15-gallon and larger trees shall be staked in line with prevailing winds. Stakes shall be 2-inch round knot-free pine, length as required and installed as follows: Stakes shall be placed immediately adjacent to, but in no case through, the root ball, and penetrate at least 6 inches into undisturbed soil, be aligned vertically, be pointed at one end, and be aligned so as not to interfere with the existing branch structure of the tree, extending 5 to 6 feet above grade. Vinyl for fastening trees to stakes shall be stapled to the wood stakes, or otherwise attached to prevent removal of the vinyl. Provide not less than two (2) stakes spaced equally around trees (see tree staking details).

18. Measurement of All Tree Species: Measure trees and shrubs according to ANSI Z60.1 with branches and trunks or canes in their normal position. Do not prune to obtain required sizes. Take caliper measurements 6 inches above ground for trees up to 4-inch caliper size, and 12 inches above ground for larger sizes. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip-to-tip.

19. Trees and Shrubs: Do not prune before delivery, except as approved by Parks, Recreation and Facilities Representative. Protect bark, branches, and root systems from sunburn, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy natural shape. Provide protective covering during delivery. Do not drop trees and shrubs during delivery of all plant material, this includes flatbed semi-trailer.

20. Deliver trees, shrubs, ground covers, and plants after preparations for planting have been completed and install immediately. If planting is delayed more than 6 hours after delivery, set planting materials in shade, protect from weather and mechanical damage, and keep roots moist. Contractor is responsible for providing water to plant material on site.

430.5.7 TREE AND SHRUB CARE

Maintain trees and shrubs in a healthy, growing condition by performing necessary operations, including the following:

Pruning: Prune and shape only as necessary to maintain the usual form of the plant, to stimulate growth, to maintain growth within space limitations, and to maintain a natural appearance.

Staking: Stakes are to be inspected weekly and adjusted or removed as necessary.

Weed Control: In groundcover area, keep areas between plants free of weeds. Use recommended, legally approved, herbicides whenever possible. Avoid frequent soil cultivation.

Spray as required to keep trees and shrubs free of insects and disease.

Remove and replace dead planting materials immediately. All plants to be replaced in-kind size specified in the original design.

430.5.8 GROUNDCOVER CARE

Foster attractiveness at all times by following these practices:

Desert Pavement Areas: Landscape Desert Pavement areas shall be inspected weekly. Man-made debris shall be removed and weeds and grass shall be hand removed because of the native seed mix that has been applied to all areas. Any erosion that has occurred in any desert pavement areas shall be remedied, repaired desert pavement areas replaced by the contractor at the contractor's expense.

Weed Control: Keep all landscape areas free of broadleaf or grassy weeds, by the hand pulling weeds. Project shall not be accepted until all noxious weeds are eradicated.

Remove and replace dead planting materials immediately. All plants to be replaced in-kind size specified in the original design.

430.8 PLANT GUARANTEE AND MAINTENANCE: *add the following:*

Contractor shall begin maintenance immediately after planting has been initiated.

Contractor shall maintain landscape work until final acceptance, but in no case less than 90 days after the work has been accepted by the Engineer.

NOTE: Contractor shall instruct Town Maintenance personnel in the proper maintenance of landscape work.

The Contractor shall furnish all labor, materials, equipment, tools, services, skill, etc., required to maintain the landscape in an attractive condition throughout the contract period. Maintenance of plant materials shall include, but not be limited to, pruning, weeding, fertilizing, irrigation programming, pest control, and landscaped areas debris clean up, per specifications. Maintenance shall be performed a minimum of once a week throughout the maintenance period.

Replace planting materials that are in an unhealthy condition at end of warranty period.

Contractor Supervisor shall be responsible for the training and supervision of the maintenance personnel's performance of their duties during the maintenance period.

Contractor shall provide to the Owner a set of maintenance instructions specific to maintaining the landscaping that covers an entire year. Contractor shall submit before expiration of required maintenance period.

GUARANTEE

Guarantee all plant materials under this contract to be in good, healthy and flourishing condition of active growth at end of guarantee period. Replace all dead plants and all plants not in vigorous, thriving condition without cost to Owner immediately during maintenance period, and as soon as weather conditions permit during normal growing season during the guarantee period. Replace contract plantings that die back and lose form and size originally specified even though they have taken root and are growing after die back. Frost kill or damage caused by weather is not covered by this guarantee. However, Contractor shall, if requested, make replacement at reasonable cost and include replaced plants within maintenance and guarantee of project for weather related damage. Except for failures beyond control of Contractor, such as neglect, damage by others, vandalism, and floods, make replacements of comparable quality, type, and size. Continue replacements until each plant has successfully established itself for required guarantee time period. A sum sufficient to cover estimated cost of possible replacement, but not exceeding 5 percent of contract price including materials and labor may be retained by Owner until replacement obligations are complete.

GUARANTEE AND MAINTENANCE TIME SCHEDULE

	Guarantee Period	Maintenance Period
Shrubs	One year	90 days
Trees	One year	90 days
Plants in Flats	One year	90 days

LANDSCAPE GUARANTEE AND MAINTENANCE PERIOD

Upon acceptance after 90 day maintenance period, furnish a written guarantee on all plant material agreeing to guarantee the continued growth of an even, active plant material growth for the specified guarantee periods.

If at any time within the guarantee period, provide reseeding of any native seeded areas necessary to ensure a uniform coverage of native seed.

The Contractor shall maintain all landscape material during the maintenance period. The Owner will water, and maintain the landscape material during the guarantee period. The Contractor shall inspect the landscape materials periodically during the guarantee period and

shall notify the Engineer and Owner in writing, if, in the Contractor's opinion, the landscape materials are not receiving proper care.

LANDSCAPE ACCEPTANCE

Contractor shall notify Engineer in writing when Contractor believes that the landscaping is substantially complete to begin the maintenance period. Notification shall be submitted in writing, through the General Contractor, and received by the Engineer at least seven (7) days prior to the requested maintenance period observation. Upon subsequent observation and acceptance of landscaping by Engineer, the maintenance period start date shall be established. At completion of the maintenance period, the condition of work will again be observed by the Engineer to determine acceptance and the start date of the guarantee period. There shall be no relationship of landscape acceptances and general project final acceptance.

430.9 PLANT ESTABLISHMENT PERIOD: *add the following:*

When the landscape work is completed, including maintenance, the Engineer and Owner's Representative will make a pre-final and final inspection to determine acceptability. Where inspected landscape work does not comply with the requirements, replace rejected work and continue specified maintenance until re-inspected by the Engineer and found to be acceptable. Remove rejected plants and materials promptly from the project site.

430.10 MEASUREMENT AND PAYMENT: *add the following:*

Measurement and Payment for "LANDSCAPE MATERIAL" will be at the contract unit prices bid per each item and shall include all costs, materials, equipment, labor, and operations necessary for a complete installation in the per each bid item for the various tree and shrub sizes indicated on the plans.

Add the following new subsection:

430.11.1 DESERT PAVEMENT: Desert Pavement as called for on the plans is a blend of sizes from larger rock down to fines that is intended to match the surrounding undisturbed native desert floor. The intent of this specification is to assist the contractor in understanding how areas outside of the pavement and hardscape limits that are disturbed during the construction process are to be treated and restored with an application of desert pavement. Size, Color, and Texture shall be identified on the plans by the Landscape Architect or Engineer.

In areas of high or concentrated storm water flows, the use of larger angular stone has been called for on the Civil Engineering sheets and is placed in areas to assist in controlling erosion. The size of which shall be determined by the Engineer. Site salvaged stone may be used only with engineer approval. The Desert Pavement blend specified herein is for all disturbed areas outside and adjacent to those Civil Engineering drainage areas.

The contractor shall prepare a sample area on-site of no less than 20 feet by 20 feet to demonstrate the application and blend of desert pavement in accordance with the desired look and spec. This sample area shall be approved by the Engineer or Landscape Architect prior to any other applications. The intent of Desert Pavement is to create a natural appearance, matching the surrounding ground plane while not preventing the application and germination of the native seed mix.

Desert Pavement areas are not to be treated with any pre-emergent. The intent and goal of these areas is to allow the native desert seed (see seed mix) to germinate and re-establish itself in these disturbed areas.

Contractor shall provide a certificate/letter of compliance from the material supplier ensuring that the material meets the gradation requirements as specified by the Landscape Architect or Engineer, with a gradation medium density and **color Adero Canyon Blend** that complies with the following table for gradation:

3" Natural	
SIEVE SIZE	% PASSING
18in.	100
8in.	100
3in.	90 - 100
1in.	70 - 90
1/4in.	50 - 70
#40	0 - 20
#100	0 - 10
#200	0 - 10

Desert Pavement shall be placed at a minimum 3" depth. Price of bid shall include all labor, sub-grade preparation, materials and equipment necessary to provide and place Desert Pavement in accordance with the plans, details, and these Special Provisions.

430.11 MEASUREMENT AND PAYMENT: *add the following:*

Measurement and Payment for "DESERT PAVEMENT" will be at the contract unit prices bid per square foot and shall include all costs, materials, equipment, labor, and operations necessary to provide the materials for a complete installation for the areas to received desert pavement as indicated on the plans.

430.12.1 BOULDER SALVAGE AND RELOCATION: Boulders shall be salvaged from the project site, quantities per bid schedule, during excavation operations. Minimum dimensions for each boulder shall be 24" x 36" x 36". Boulders shall be of sound, durable, unfractured native rock. Boulders selected for salvaging and relocating shall be obtained from the original ground surface and shall be naturally weathered to the extent possible. Boulders from below the original

ground surface may be used for this project at the direction of the Engineer. Boulders without sufficient natural weathering shall be stained with a Town approved rock staining method and material (Permeon, Natina) at the direction of the Engineer.

Construction Requirements: of the Standard Specifications is modified to add:
Boulders shall be handled using slings or other methods which do not mar or damage the boulders. Boulders salvaged and slated for relocation shall be stockpiled on site.

Boulders shall be placed in groups in the locations shown on the project plans. Soil placed around the boulders shall be compacted to a density of not less than 90 percent density.
Final exposed surfaces of boulders that are insufficiently weathered, or scarred or damaged during the salvage and relocation operation, shall be repaired as agreed upon by the Engineer and stained to achieve the aesthetic objectives identified above. The contractor shall demonstrate the proposed techniques for repairing and staining of damaged boulders and obtain the Engineer's approval prior to utilization on the project.

430.12 MEASUREMENT AND PAYMENT: *add the following:*

Measurement and Payment for "BOULDER SALVAGE AND RELOCATION" will be at the contract unit prices bid per each boulder dependent upon size and shall include all costs, materials, equipment, labor, and operations necessary for salvaging, stockpiling and relocating the boulders to the site per the plans for a complete installation in the per each bid item for the various boulder sizes indicated on the plans.

430.13.1 DECOMPOSED GRANITE ON INTERIM ROADWAY SURFACE AND SURROUNDING WATER TANK AND SOLAR COLLECTION AREA: Decomposed Granite for the cover over the interim roadway extension up to the temporary water tank and surrounding the water tank and solar panel areas as called for on the plans shall receive a minimum of three (3) inches in depth of ¾" minus decomposed granite in a color to match the surrounding undisturbed native desert floor. The color for this interim roadway, water tank, solar collection area shall be identified on the plans by the Landscape Architect or Engineer.

The decomposed granite blend specified herein is for use on the interim roadway and the area surrounding the interim water tank and solar panel collection area as shown on the plans.

The contractor shall prepare a sample area on-site of no less than 20 feet by 20 feet to demonstrate the application this granite on the surface in accordance with the desired look and spec. This sample area shall be approved by the Engineer or Landscape Architect prior to any other applications.

Contractor shall provide a certificate/letter of compliance from the material supplier ensuring that the material meets the gradation requirements as specified herein or as authorized by the Landscape Architect or Engineer, with a gradation medium density and **color Adero Canyon Blend** that complies with the following table for gradation for 3/4" minus material:

Passing Sieve	Percent
3/4 inch	100
1/2 inch	85-93
3/8 inch	67-83
No. 4	41-61
No. 8	31-47
No. 16	24-40
No. 30	20-32
No. 50	16-24
No. 100	10-18
No. 200	7.5-10.5

Decomposed Granite for the interim roadway corridor and area surrounding the water tank and solar collection area shall be placed at a minimum 3" depth. Price of bid shall include all labor, sub-grade preparation, materials and equipment necessary to provide, place, water settle and compact the 3/4" minus materials in accordance with the plans, details, and these Specifications.

430.11 MEASUREMENT AND PAYMENT: *add the following:*

Measurement and Payment for "DECOMPOSED GRANITE ON INTERIM ROADWAY SURFACE AND SURROUNDING WATER TANK AND SOLAR COLLECTION AREA" will be at the contract unit prices bid per square foot and shall include all costs, materials, equipment, labor, and operations necessary to provide the materials for a complete installation for the areas to received desert pavement as indicated on the plans.

Add the following new Section:

SECTION 432
PLANT SALVAGE

432.1 DESCRIPTION: This section outlines the requirements for complete salvage of existing on-site plant materials as indicated on the project plans. This section outlines the requirements for the relocation, storage, and maintenance of salvaged plant materials. This section outlines the requirements for replanting and establishment of salvaged plant materials.

The work under these items consists of salvaging collected stock tagged on the site and as shown on the plans located within the Trail Head clearing limits, relocating the trees to the fenced temporary nursery constructed under this project, distributing water to the trees from the initiation of the salvaging operations and/or from the time of placement of the plants in the nursery as applicable, hauling the trees to their final location and replanting the trees, including furnishing all labor, material, equipment, and safety control devices to dig, box, lift, transport the trees to the nursery, transport the trees to their final location from the nursery site, replant the trees and water the trees as required in accordance with the requirements of MAG Section 795 of the Standard Specifications, the project plans, and these Specifications.

Adhere to the Town of Fountain Hills Native Plant Ordinance and make necessary submittals to obtain approval and Town permits prior to salvage operation. Contractor shall also comply with all County, State and Federal permits which may be applicable to the Transplanting and or Salvaging of Plant Material shall be obtained and paid for by the Contractor.

The contractor is required to submit a **Revised Salvaging Plan** for the review and approval of the Town of Fountain Hills prior to the beginning of any ground breaking work by the contractor. The plant inventory as shown on the project plans is the design inventory used to establish the quantities as shown on the bidding schedule. The contractor shall re-inventory the local stock on the project site with the Town of Fountain Hills or its representative by means of a site walk through and prepare an adjusted plant inventory. The purpose of the re-inventory and walk through will be to review specific clearing limits where adjustments can be made to prevent removal of local stock, addition of collected stock that may have been omitted during the design inventory, reevaluation of the health of local stock and to make any other adjustments as required. The contractor will be required to either salvage or protect in place, all plant material identified in the final adjusted inventory. The adjusted inventory shall become part of the Salvage Plan. No separate payment will be made for the walk through and preparation of the adjusted inventory.

432.2 REFERENCES:

432.2.1 Abbreviations and Acronyms:

AMQ: Acceptable Mortality Quantity.

432.2.2 Definitions:

Bottoming: The act of affixing the bottom material to the side boxing applied to the root ball of plant material to minimize the loss of soil from the bottom of the root ball.

Callus: The tissue that forms over the wounds of plants, protecting the inner tissues and causing healing.

Landscape Establishment Period: The time required for a species of plant to acclimate itself to its transplanted location.

Top Wood: Material affixed to the top of the side boxing applied to the root ball of plant materials to minimize movement of the plant and its root system, and to reduce loss of soil, during transportation and handling. Top wood shall be tight against trunk but not causing scarring.

Top bracing shall consist of at least 2 flat, 1 x 12's with 2 x 6's or 2 x 4's on top. All top bracing members shall be nailed into box sides and each other. The contractor shall take care not to harm trunk or roots.

432.3 ADMINISTRATIVE REQUIREMENTS:

432.3.1 Coordination: The Contractor is responsible for the safety of the public, other contractors, and his/her crew members during the relocation operations.

432.3.2 Sequencing: Coordinate the salvage and replanting of the salvaged materials with anticipated phasing and sequencing of other construction activities. Submit methods for coordinating the plant salvage operations with other construction activities to the Construction Manager for approval. If the exact areas where plants are to be relocated are not immediately available, develop a temporary nursery or nurseries in the interim for storing the plants. Submit methods for developing the temporary nursery or nurseries to the Construction Manager for approval.

432.3.3 Submittals:
Action Submittals:
Submit the following to the Construction Manager for approval in accordance with the requirements of Section 100, Submittal Procedures:

Product Data:

- List of pesticide materials proposed for use, and their application methods and documentation.
- Fertilizer/nutrients.

Shop Drawings:

- Boxes for plants.

Delegated Design Submittals:

- Location of the temporary holding yard for storing salvaged plants.
- Equipment proposed for removing and transporting salvaged plants.
- Methods for coordinating the plant salvage operations with other construction activities.
- Methods for developing the temporary nursery or nurseries.
- List of mechanical and hand equipment to be used to accomplish salvage and replanting operations.
- Location and layout of the temporary irrigation system to establish the plant material.

Qualification Statements:

- Plant Nursery Qualification Statement.
- Landscape subcontractor qualifications.

Informational Submittals:

Submit the following to the Construction Manager for information in accordance with the requirements of Section 100, Submittal Procedures:

Test and Evaluation Reports:

- Written record of plant salvageability discussion and decisions.

- The **Revised Salvaging Plan** shall contain but not be limited to the following items and shall conform to these Special Provisions.
    - Methods for coordinating the salvage and replanting of all local and collected stock with anticipated phasing and sequencing of construction per stationing limits and the development of planting lots. Planting lots shall consist of a minimum quantity of two hundred plants;
    - Site location map and layout plan of nursery(ies) showing size, access requirements, fencing, irrigation system layout, irrigation calculations and anticipated duration of use;
    - Color photographs of the in-situ location of all saguaro and ocotillos and/or substitutions to be salvaged and replanted, except as described more fully in these Special Provisions. An identifiably-scaled object shall be included in the

picture to aid in determining the overall size and height measurement of the photographed plant material;

- Linear feet (height), diameter measurements and the number of arms (plus each arm length) for all saguaros stock quantities and AMQ per species per lot;
- Existing and final location of each local and/or collected stock (if different than shown on the plans;
- Identification numbers of each local stock item (if different than shown on the plans);
- Sources of nursery stock (if required to supply the materials for the project);
- List of mechanical and hand equipment to be used to accomplish all local and collected stock work;
- Shop drawing(s) of all guying, staking, transport bracing and cradle details;
- A description (in detail) of the hardware and materials, stock removal, tree boxing procedures and replanting procedures and transporting methods plus all other methods to accomplish all local and collected stock work as per the project plans and the requirements of the Standard Specifications and these Special Provisions;
- Watering Plan The watering plan shall include applicable drawings, details and documentation to demonstrate how the plant material (lots) will be watered from the initiation of the salvaging activities through the plant establishment period. The Plan shall identify the source of water; its capability to deliver water in sufficient quantity to meet the project needs; the proposed layout of piping for delivering water from the source to the stored and replanted plants; the total quantity of water anticipated to be used on the project; daily estimates of water consumption by species type (in the nursery and replanted condition) including, at a minimum, a breakout of monthly adjustments for seasonal conditions; and protection of the watering method from damage by animals, insects and/or other detrimental conditions. The Plan must also contain a statement from an independent certified laboratory that the proposed water quality is acceptable for the intended use.

- The Salvaging Plan shall be contained in a three ring binder(s) and shall be typed on 8 ½" x 11" sheets and be at the job site during the entire salvage operation. All calibrated measurements will be completed and documented in writing by the contractor. The Town will furnish the contractor with a documentation form for their use and reproduction that is to be used for the recording of all measurements, dates, identification number, corresponding photograph(s) if required, and a remarks column. This documentation shall be kept on file by the contractor and copies presented to the Town upon completion of initial measurements and all other required measurements thereafter throughout the duration of the work.

Site Quality Control Submittals:

- Daily Plant Salvage Log.
- Current Saguaro Calibrated Measurement Logs upon completion of the initial measurements and after other required measurements thereafter.
- Salvaged Plant Watering Log.

Qualifications:

- Offsite Plant Nursery Qualifications: Provide the services of an offsite plant nursery that specializes in, and has proven success in, transplanting the type of plant materials as required by the Contract Drawings and Specifications.
- Submit a Qualification Statement for the offsite plant nursery that includes the following information:
    - Project list indicating past plant relocation projects.
    - Clients for whom the relocation was performed.
    - The types and quantities of plant materials moved.
    - The mortality rate for the project.
    - The time of year the work was performed.
    - A narrative describing the daily operations of the job
    - Include any deviations from the tree boxing method specified that may be proposed for incorporation into this Contract.

The Construction Manager reserves the right to approve or disapprove of the offsite plant nursery based on review of the qualification statement.

Landscape Subcontractor Qualifications: Employ a landscape subcontractor licensed as a landscape contractor in the State of Arizona and in good standing. The licensed landscape subcontractor must have a minimum of 10 years experience relocating native plants and cacti similar to those shown in the Contract Drawings, and must have a proven record of successful tree and saguaro transplanting and survival rate of at least 80 percent for 3 years after transplanting.

Submit the landscape subcontractor qualifications to the Construction Manager for approval prior to initiation of any salvage operations, and include the following written documentation:

- A list of a minimum of 5 native tree, shrub, and saguaro salvaging projects the landscape subcontractor has satisfactorily completed, each of which involved the relocation of a minimum of 100 native trees and 100 saguaros having sizes ranging from 3 to 25 feet in height.
- Include the dates of the project work; the type of equipment used; a description of the project and work performed; and the name and phone number of a contact

person representing the agency, company, or owner for which the work was completed.

- A written record of successful tree and saguaro transplanting demonstrating a survival rate of at least 80 percent for 3 years after transplanting.

432.4 DELIVERY, STORAGE, AND HANDLING:

432.4.1 Delivery and Acceptance Requirements: Transport the materials for the Work of this Section in compliance with all State and local requirements. Obtain all necessary permits and tags for transporting plant materials on public roadways. Make permits and tags available to the Construction Manager upon request.

432.4.2 Storage, Handling, and Irrigation Requirements:

Temporary Holding Yard: Prior to commencing plant salvage work, submit the location of a fenced temporary holding yard and the proposed equipment for removing and transporting the salvaged plants to the Construction Manager for approval. Provide a fenced and secure temporary holding yard. Prevent damage to the salvaged vegetation boxes by grading the temporary holding yard to prevent ponding, to promote positive drainage away from the salvaged plant materials, and to control offsite runoff. Grade the nursery site to be level, with a slope no greater than 1 percent in any direction, and to safely retain all water within the established boundaries of the holding area. Use hand equipment and labor to keep the holding yard weed free. Using chemicals or herbicides within a 6 foot radius of salvaged plant material to combat weeds is not allowed. The contractor shall provide as part of the nursery(ies) layout an area protected by an overhead shade fabric. These areas within the nursery(ies) shall be used to protect those plants that are salvaged from a shaded or protected area associated with this project.

Temporary Irrigation System: Provide a temporary irrigation system in the salvage plant holding yard and on the project site once plant material is replanted constructed using methods and materials that prevent rodents, insects, and pests from damaging and/or impeding the intent of the system's operation. A water truck and hose is not an acceptable means of providing irrigation water. Provide a pressurized water source for watering plant material. Provide a water source capable of delivering the necessary water to the salvaged plant materials that require irrigation. Provide the water source for the life of the holding yard and until the plant material is fully reestablished after replanting. If a storage tank is provided for the purpose, it must be capable of providing sufficient water during a 24-hour period for the required irrigation without refilling based on the salvaged plant materials. Use an automatic controller or automatic controllers to insure a regular watering schedule. The temporary irrigation system shall be in place for no less than one (1) year from final project acceptance. Contractor shall remove all components of the temporary irrigation system at the end of the one year period unless otherwise directed by the Town. Contractor and Town may negotiate a contract modification to extend the temporary irrigation system if the Town so desires. The contractor shall document

and record all watering times, dates and frequencies and submit this information to the Town. Sprinkler, overhead spray and drip irrigation systems are acceptable for use in the nursery. No emission point from any proposed drip irrigation systems shall have the capability of emitting water in flows greater than 1.5 Gallons per hour.

Emitters: Distribute emitters evenly across the surfaces of the rootballs. If a drip irrigation system is proposed, design the system so no emitter point is capable of emitting water flows greater than 2 gallons per hour. Large boxes may need additional emitters. Record the date, time, and frequency of watering for each plant in a Salvaged Plant Watering Log, and submit this log to the Construction Manager on a weekly basis for information. Store and maintain salvaged material at the approved holding yard until it can be planted in its new location. Provide optimum conditions for salvaged plants to overcome transplant shock and maintain viability throughout boxing and the storage period.

Plant Placement: In order to avoid sunburn damage, take care when plant material is placed in the holding area that the plant is placed facing the direction in which it originally grew. Properly orient the specified mark to the north side of the plant during placement. Do not allow lifting or replanting activities to damage or deform tree branches and canopies of salvaged trees.

432.5 SITE CONDITIONS:

432.5.1 Salvage Season:

Trees and Shrubs: Salvage and transport salvaged trees and shrubs to a temporary holding yard as specified between the dates of April 1 through September 30.

Cacti: Salvage and transport salvaged cacti to a temporary holding yard as specified between the dates of April 1 through September 30.

Cactus Salvage Weather Constraints: Do not excavate, transport, or remove cactus of any species during rainy weather conditions as determined by the Construction Manager. Cactus salvage operations may resume after rain with the written approval by Construction Manager.

Existing Conditions: An Existing Plant Inventory and Salvage Summary appears in the Contract Drawings.

Saguaro Cacti Photo Log: Produce and submit a photo log of each saguaro cacti in its current location, capturing its orientation and notable scarring and/or blemishes. Include a caliper measurement of each saguaro taken 4 feet above finish grade with the photo log.

432.6 MATERIALS:

432.6.1 Boxes: The following material specifications for construction of box sides are based on storage and transportation requirements.

The following guidelines are for plants that are to be lifted upright as opposed to being tipped. If plants are to be tipped, modify the materials used to withstand the additional stress of being tipped.

Box Member Standards:
One inch members: Standard 1 by 12 Number 5 pine minimum.
Two inch members: Standard 2 by 6, or 2 by 12, economy grade minimum.

Provide Horizontal box members as follows:

- Up to a 60-inch box: 1 inch members.
- Over a 60-inch box: 2 inch members.

Provide Vertical box members as follows:

- Up to a 48-inch box: 1 inch members.
- Over a 60-inch box: 2 inch members.

The contractor shall secure sides and bottoms around plant root ball with ¾-inch x .025 steel straps minimum.

Top bracing shall consist of a minimum of 2, flat 1-inch x 12-inches with 2-inch x 4-inches or 2-inch x 6-inches on top. All top bracing members shall be nailed into box sides and each other.

Submit Shop Drawings of boxes to the Construction Manager for approval.

432.6.2 Pesticide: Provide materials approved by the governing regulatory agencies that are suitable for the identified needs. Submit a list of pesticide materials proposed for use, and their application methods and documentation.

432.6.3 Soil Sulfur: Provide agricultural dusting type of soil sulfur.

432.6.4 Fertilizer/Nutrients:

Provide the following types of fertilizer/nutrients:

- Slow release fertilizer: Provide 19/3/10 slow release fertilizer.

- Nutrient replacement for salvage trees:
  Manufacturers: PHC BioPak (Artistic Arborist 602-2638889), or approved equal.

- Organic Compost:
  Manufacturers: Western Organics (602-269-5756), or approved equal.

Submit Product Data for the fertilizer/nutrients to the Construction Manager for approval.

432.6.5 Plant Identification Tags: Provide heavy duty vinyl identification tags or plastic tape, color coded as specified. Provide tags and/or tape that does not damage or deface the plant materials being tagged and identified.

432.6.6 Plant Backfill: Backfill shall be clean, native topsoil excavated from the plant pit. Soil shall be loose and in a pulverized condition. Large soil clumps shall not be used to support the stock. Clods or stones exceeding 2-inches in diameter and foreign matter deemed objectionable by the Engineer will not be allowed. Excess soil from the planting activities shall be wasted on-site at the direction of the Engineer.

If the material excavated from the plant pit results in a deficient quantity to backfill the pits as required, the contractor shall collect additional existing surface soil to fulfill the quantities necessary to complete the work. The additional soil shall be collected from within the clearing limits of the project as approved by the Engineer

432.6.7 Nursery Fencing: The fencing shall be temporary chain link fencing, minimum 6 foot high with a minimum10 foot wide lockable gate. All fence materials shall comply with MAG Section 420.

432.6.8 Shade Screens: The shade screens in physical contact with cactus shall be made of burlap, hemp or other breathable fiber material as approved by the Town.

432.7 CONSTRUCTION REQUIREMENTS:

432.7.1 Verification of Conditions: Confine Work performed to within the Contract limits as defined by the Contract Drawings and Specifications and field verified by the Construction Manager.

432.7.2 Evaluation and Assessment: Protected plants within the Contract have been identified in the Native Plant Inventory and on the Existing Plant Inventory and Salvage Summary on the Contract Drawings. Flag all inventoried plants with plastic tape or vinyl tags to correspond to the determinations made in the plant Inventory in the following manner:

- White tape or vinyl tag – Plants to remain in place.
- Red tape or vinyl tag – Plants to be moved to another location.
- Blue tape or vinyl tag – Plants to be destroyed.

Maintain the identification tags or tape for the duration of the Contract and landscape establishment period.

Investigation of Plant Salvageability: Use accepted methods and equipment to investigate conditions in the area surrounding each plant, including all utility, soil, and rock conditions. If upon this investigation a plant is found to have a decreased chance of being successfully boxed and relocated, contact the Construction Manager and any other parties the Town requires, to come out and review the field conditions. A decision will then be made as to whether the plant will be relocated. Individual decisions will be made for each plant in question. Substitution or other possible alternatives will be discussed at this time. Prepare and submit a written record of plant salvageability discussion and decisions.

Marking Orientation: Mark all plants to be salvaged on their north side to provide proper orientation during storage and planting. Apply a mark and use an installation process that does not damage or deface the salvaged plant materials. Apply a mark that is capable of withstanding poor weather and expected working conditions without the possibility of erasure or detachment for the duration of the Contract, including the plant establishment period.

Shaded Plant Material: Properly document all salvaged plant material originally growing in a shaded condition and subsequently transplanted to a nursery as "shaded plant material". Place the "shaded plant material" in a shaded area or areas in the nursery created by using screening or other methods approved by the Construction Manager and sized to adequately store these materials. Gradually expose salvaged material documented as shaded plant material to continual sunlight during its period in the nursery and prior to being transplanted to its final location as approved by the Construction Manager.

432.7.3 Preparation:

Protect-In-Place Limits: The Construction Manager may direct that areas or features on or adjacent to the Site are to be protected by fencing, flagging, or staking in accordance with the limits of disturbance shown on the project plans. Contractor and Construction Manager shall agree upon on limits of disturbance prior to any work occurring on the project site. Provide the equipment, labor, and materials to define and protect such areas and features at no increase in Contract Price. Replace plant material to be salvaged that has been damaged or destroyed during pre-construction and construction activities with like-kind and size plant material as approved in advance by the Construction Manager and at no increase in Contract Price. The acceptable mortality quantity (AMQ) for each species as indicated in Section 432.7.6 for replacements applies to all plant materials identified as salvageable.

Surface Preparation: The Contractor is responsible for safety considerations of the public, the Construction Manager's personnel, and the Contractor's crew during relocation operations. Provide barricades as necessary during salvage operations to insure the safety of the public, other trades, and the salvage crew. Follow the safety requirements of ANSI Z133.1.

432.7.4 Salvage Operations: Prior to commencement of the plant salvage Work, submit a list of mechanical and hand equipment to be used to accomplish removing, transporting, and replanting salvaged plants to the Construction Manager for approval.

Calibrated Measurements of Saguaro Cacti: Saguaro Cacti to be transplanted must have several calibrated measurements performed, the first measurement performed when the cactus is dug and moved to the temporary nursery location, the next measurement performed 1 week after the cactus is planted in the temporary nursery location, and additional measurements performed every 4 months after the cactus is moved to its final transplanted location during the remainder of the Contract Time. No additional calibration of trees will be required by the Contractor's landscape subcontractor. Perform calibrated measurements of Saguaro cacti using methods and tools approved by the Construction Manager. Use a method that allows the original points of measurement to be located easily and with pinpoint accuracy when future measurements are to be made throughout the duration of the Contract. The minimum acceptable measurable distance of displacement between the original points of measurement and all future measurements is 1/8 inch. Submit the proposed method of measuring Saguaro cacti to the Construction Manager for approval.

Saguaro Calibrated Measurement Log: Keep a record of the Saguaro calibrated measurements, dates, saguaro identification number, corresponding photograph(s), final transplanted location by station and offset, and a remarks column in a written Saguaro Calibrated Measurement Log kept on file at the Site. Submit the proposed form for recording the information in the Saguaro Calibrated Measurement Log to the Construction Manager for approval prior to beginning salvage of the Saguaro cacti. Submit copies of the current Saguaro Calibrated Measurement Log to the Construction Manager upon completion of the initial measurements, and monthly thereafter throughout the duration of the Work of this Section and the landscape establishment period to document the other required measurements.

Watering: Provide adequate water to each plant during digging operations to maintain its optimum health.

Pruning: Prune plants as needed; and hand dig, box, and relocate them to a temporary holding yard as specified. Prune plants to be relocated in a way that removes an amount of foliage proportionate to the root system that will be eliminated by the salvage operations. Prune plants so that an aesthetic framework of branches is left which preserves the size and best features of the plant so the plant will fill in for a balanced appearance. Use current standards for arboriculture. Remove dead and diseased branches at the direction of the Construction Manager. For cacti, apply a one-time application of soil sulfur to all areas where branches/arms are removed. Treat the wounds and/or cuts made to the roots and salvaged plant materials with powdered sulfur or bactericide on the same day that the cut and/or wound is made. Make cuts so damage to the cambium layer of the tree and exposed weakness are minimized. Carefully plan the excavation and root selection process for salvaged materials to ensure that the remaining roots will supply a structurally sound foundation.

Saguaro Roots: To achieve the proper Saguaro root length, do not commence excavation closer than 5 feet from the trunk of each plant. When making the final cuts to Saguaro roots less than 1 inch in diameter, ensure each attached root has a minimum length of 3 inches from the buttress of the trunk or lateral support root. When making the final cuts to Saguaro roots greater than 1 inch but less than 3 inches in diameter, ensure each attached root has a minimum length of 12 inches from the buttress of the trunk or lateral support root. When making the final cuts to Saguaro roots greater than 3 inches in diameter, ensure each attached root has a minimum length of 24 inches from the buttress of the trunk or lateral support root. Root length requirements stated herein are the minimum. After pruning, employ a Certified Pesticide Applicator to apply an approved pesticide to prevent damage by wood borers and to increase moisture retention of the foliage. Reapply the pesticide 3 weeks after the initial application.

Excavating Plant Materials: Use only non-mechanized methods for the excavation of plants to be salvaged.

Saw roots off at the edge of the root ball with a sharp pruning saw. Excavate the root ball to be rectilinear, widest at the top and tapering toward the bottom in accordance with the industry standard.

Boxing Plant Materials: Hand dig and box plants as necessary, as indicated by Contract Drawings and Specifications, and as directed by the Construction Manager. Water plants as needed depending on the season or as otherwise instructed by the Construction Manager.

Box/Root Ball Size: Choose box sizes that will maximize the chances of survival for the roots but that are within economic constraints.

Base box sizes for trees/shrubs on Table 432-1.

Table 432-1 Box Sizes for Trees/Shrubs

Trunk Caliper (Inches)	Box Size (Inches)
0 to 2-1/2	24
2 to 3-1/2	30
3 to 5	36
5 to 7	42
6-1/2 to 9-1/2	48
8-1/2 - 11	54
11 to 13	60

Table 432-1 Box Sizes for Trees/Shrubs	
Trunk Caliper (Inches)	Box Size (Inches)
12 to 15	66
14 to 17	72
16 to 20	78

Indicate the box size on flagging tape attached to the plant. Label the caliper of the tree and the identification (ID) number corresponding to the tag on the tree on the box itself.

Side Boxing: Provide side boxing consisting of 4 tapered box sides that enclose and preserve a rectilinear root ball, while exposing the top and bottom of the root ball with minimum damage to the root system. Secure the box sides with horizontal banding. Provide 3/4-inch wide steel strip banding with a minimum thickness of 0.025 inch spaced a maximum of 6" apart. Pack dirt tightly into any space between the box sides and the root ball. Water thoroughly and repack dirt as needed.

Plants shall be left side-boxed for minimum of 2-3 weeks or as approved in advance by the Town. Watering of boxed plants shall be done as determined by the contractor based on seasonal considerations or as otherwise instructed by the Engineer. The contractor shall label the caliper size and I.D. number of each tree on two sides of the box while they are in the field-boxed condition. These items shall correspond to the tag numbers on the tree.

Topwood: Place topwood so it minimizes the movement of the plant and its root system, and reduces loss of soil. Securely anchor topwood to the box.

Bottoming: Leave plants side boxed for a minimum of 2 weeks and a maximum of 3 weeks, prior to bottoming. Bottom each plant after cutting the remaining roots, minimizing the loss of soil from the bottom of the root ball. Box bottoms shall be nailed to the box sides and secured with a minimum of 4 vertical metal bands equally spaced across the box bottom.

Special Protection for Saguaros: Saguaros 7 feet in height and taller require bracing and protection capable of reasonably eliminating harmful twisting and bending of the Saguaro's trunk and/or arms during each removal and transportation. Use methods and/or materials that do not damage and/or mar the surface or internal structure of each saguaro. Use Styrofoam and/or similar materials to support saguaro arms 3 feet or longer. Submit to the Construction Manager the materials and methods required for appropriately bracing, protecting, removing, and transporting salvaged saguaros for approval.

Removing and Transporting Salvaged Plants: Before salvaged plants can be transplanted to the indicated new locations or locations designated by the Construction Manager, the condition

of the plant materials must be reviewed by the Construction Manager. In order for the condition of the salvaged plants can be reviewed, notify the Construction Manager prior to transplanting each salvaged plant to the indicated new locations. Remove and transport salvaged plants to the approved temporary holding yard without damaging the plant or box. Take care so that branches are not broken or otherwise damaged by equipment or while transporting the plant materials. The contractor is responsible for safety considerations of the public, and his crew members during the relocation operations. Each salvaged tree, including collected stock, shall be stored in the nursery at least 30 days to allow the material to stabilize from the transplanting operations.

Repair and Restoration: The excavation pits created as part of the salvage operation shall be backfilled immediately after the plant removal has occurred. Replace and/or repair, in kind, any plant material, geological, natural or manmade features disturbed or destroyed within or outside the limits of the Contract which were to be protected during transplanting operations. Repair damaged areas to their previous condition to the satisfaction of the Construction Manager. Fill-in and compact all pits left from removal of salvaged plants or as directed by the Construction Manager.

Temporary Holding Yard: At the completion of salvage and replanting efforts and activities, remove the temporary holding yard and the associated equipment as directed by the Construction Manager. Remove temporary fences, tanks, and other equipment used during the holding yard operation. Re-grade the temporary holding yard site to return it to its pre-construction conditions, including replacing ground plane treatment provided to be in compliance with Maricopa County Dust Control measures. Provide decomposed Granite, apply a soil stabilization product, or re-establishment of native seed or ground cover. Prior to restoring the temporary holding yard to its pre-construction conditions, submit the proposed methods for performing this restoration Work to the Construction Manager for approval.

432.7.5 Replanting: For replanting, follow the requirements set out in the relevant specification for each plant type in accordance with the requirements specified in Section 430 Landscaping and Planting. Replant salvaged materials approximately at their original growing depth, but not more than 2 inches deeper than their original growing depth. For salvaged materials transplanted deeper than their original growing depth, the root collars must be in a callused condition, and replanting will require advanced approval from the Construction Manager. Replant saguaro and barrel cacti in the same solar orientation, and as near as possible to their vertical growth habit, found prior to their initial removal and transport. Apply a thorough application of agricultural streptomycin bactericide or powdered sulfur to the roots of each salvaged plant. Plant salvaged plant materials treated with the streptomycin bactericide in dry site soil at its temporary and final locations. Keep the surrounding soil dry for a minimum period of 2 weeks after application of the bactericide or powdered sulfur. To increase the stability of the installed plants, the Construction Manager may allow the plants to be watered within a few days of planting to compact the backfill.

432.7.6 Site Quality Control:

Daily Plant Salvage Log: Keep a daily log of all plant salvage related activities on the Contract. The daily log must contain a record of the number of trees that are dug and side boxed per day, and when bottoming and moving takes place. Refer to the plant inventory provided by the Construction Manager listing all plants to be boxed. Pre-printed log sheets will be available to record the necessary information. Submit the Daily Plant Salvage Log to the Construction Manager for approval weekly. The Construction Manager will observe salvage, transportation, and storage operations periodically to review overall conditions including compliance with accepted maintenance standards. The Work and equipment will be observed by the Construction Manager, and must be approved by him. The recorded Saguaro Cacti calibrated measurements, photographs, and visual inspections will be used as tools by the Construction Manager to determine if the health and/or vigor of the Saguaro cacti are in reasonably close conformity to the appearance each displayed prior to its initial removal and transplant. The Construction Manager will review transplanted material every month for overall condition. The Construction Manager and the Contractor will together calculate the acceptable mortality quantity (AMQ) of each species. The acceptable mortality quantity (AMQ) for each species is determined by multiplying the assigned acceptable mortality quantity percent (AMQP) as indicated in Table 432-2 by the total species amount, and rounding the result down to the nearest whole number.

Table 432-2 Acceptable Mortality Quantity Percent (AMQP)

Species	Common Name	AMQP
Carnegiea gigantea	Saguaro cactus	10
Fouquieria splendens	Ocotillo	25
Ferocactus wislizenii	Fishhook barrel	25
Olneya tesota	Ironwood tree	10
Cercidium microphyllum	Foothills palo verde	10
Cercidium floridum	Blue palo verde	10
Prosopis velutina	Velvet mesquite	10

Non-Conforming Work: If the material inspected is deemed by the Construction Manager to be in unsatisfactory condition prior to completion of the Contract, replace the material with like kind and size at no increase in Contract Price.

If the acceptable mortality quantity (AMQ) is exceeded for any species, obtain replacement trees or saguaros of the same species and of equal size, quality, and caliper and/or height (saguaro) from other approved sources for the unacceptable plant materials. Replacement plant materials will likewise be observed by the Construction Manager, and are subject to the same

inspection and acceptance requirements as salvaged plants. Remove salvaged and replacement plant materials determined to be unacceptable by the Construction Manager from the nursery and/or temporary holding yard within 15 working days from notification.

Cleaning: Clean up the debris from salvage operations, and remove it offsite in a legal manner.

Waste Management: Gather and dispose of spoils and vegetative waste, including dead and damaged plants and the trimmings accumulated from the operations. Dispose of spoils and vegetative waste offsite in conformance with the regulations imposed by the local authorities, and in an area approved for such disposal by the local authorities.

432.7.7 Maintenance:
Watering Salvaged Plants: Watering is the responsibility of the Contractor and is considered incidental to the salvage and replanting operation.

Salvaged Plant Watering Schedule: Water the plants as needed, depending on the season, to keep the plants healthy. Water plants 3 times a week from May through October. Water plants 2 times a week from November to April.

> Cacti/Bare Root Material: Water cacti/bare root material 2 times per month from May to October. Water cacti/bare root material 1 time per month from November to April.
>
> Boxed Material: Water boxed material until water runs from the bottom of the box to insure the soil is totally saturated. The entire root ball should be saturated in 4 hours.
>
> Bare Root Material: Water fouquieria splendens (Ocotillo) using overhead spray heads to insure the branches will be wet down during watering.

Water cacti using drip irrigation line in a well around the base and insuring that water does not come in direct contact with the cactus base. Periodically check rootballs for excessive runoff caused by cavities in the soil and holes in box sides. Repack soil and repair boxes as necessary, causing minimal damage to the root ball.

Weeding and trimming: Maintain the boxed plants in a weed free condition and trim all suckers at the base of the plants.

Pest Control: Spray trees with appropriate pesticides as directed by Program/Project Manager.

Disease Control: Use soil sulfur for disease control on cacti.

Irrigation: Check the irrigation system and delivery to each plant for proper function and distribution of appropriate water quantities.

Fertilization: Fertilize trees with 19-3-10 slow release fertilizer in late February and early July per Table 432-3.

Table 432-3 Slow Release Fertilizer Application	
Box Size (Inches)	Number of Cups
24	1
30	1.5
36	2
42	2.5
48	3
54	4
60	5

Nutrient Replacement: Apply nutrient replacement to all trees and shrubs. Use one-half pound per 25 gallons of water for 2 applications at 30 Day intervals. For additional monthly applications use one-fourth pound per 25 gallons of water. Apply nutrient replacement to boxes per Table 432-4.

Table 432-4 Nutrient Replacement	
Box Size (Inches)	Number of Gallons
24 – 30	5
36 – 42	10
48 – 54	15
60 – 72	20
84 and greater	25

Mulching: Cover the top of the root ball of boxed plants with 4 inches of organic compost.

432.8 MEASUREMENT AND PAYMENT:

The basis of Measurement and Payment for salvaged plants is the price bid per each complete in place as shown on the project plans, details, and special conditions. Payment shall be full compensation for all labor, material, equipment, storage, maintenance, salvage, relocations, replanting, and incidental and appurtenant work for salvaging and relocating plant material.

The basis of Measurement and Payment for the plant nursery will be at the contract unit price per lump sum as described on the Bidding Schedule, which price shall be full compensation for the work, complete in place, as described and specified herein including the preparation of the site, chain link fencing, gates, providing and installing shade areas, providing, installing and operating the temporary irrigation system, providing water for the nursery and reclamation of the area. No separate measurement or payment will be made for the nursery irrigation system, the costs being considered as included in the price of contract items. Seeding of the nursery site(s) (and access roads) that are part of the nursery set up are considered incidental to the nursery cost of reestablishing the area once the nursery(ies) are no longer needed and shall be included in the cost of this bid item.

Requests for partial payments on these items shall be in accordance with Subsection 109 of MAG Standard Specifications.

No separate measurement or payment will be made for the preparation and necessary modifications to the Salvaging Plan as described herein. The work is considered incidental to the contracted items.

No separate measurement or payment will be made for providing and supplying water for use during the salvaging operations and the irrigation components, including labor as described herein these Special Provisions. The work is considered incidental to the these contract items.

Add the following new Section:

SECTION 433
NATIVE SEEDING

433.1 DESCRIPTION:

The work under this item shall consist of furnishing all materials, preparing the soil, applying native seed, and establishing the seeded areas.

Areas to be seeded are: those shown on the plans, including areas disturbed by project construction improvements, and as called for in the Contractor's erosion control plan, or as designated by the Agency.

Seeding shall be accomplished in two stages. The first stage shall consist of tillage, furnishing, and applying chemical fertilizer, furnishing and planting the contract specified seed mix, and furnishing, applying and affixing mulch. The second stage, beginning after the first stage has been accepted by the Agency, shall be a 90 calendar day period, during which time, the Contractor shall be responsible for maintaining and stabilizing the seeded and mulched areas, and restoring damaged or eroded areas until seed establishment is accepted by the Agency.

Seeding shall occur within the following time frames:

- February 15 to May 15
- August 1 to November 1

433.2 MATERIALS:
Appropriate documentation, as specified below, shall be submitted to the Agency a minimum of 30 calendar days before the start of a scheduled seeding activity. No materials shall be delivered to the site until the documentation has been approved by the Agency.

Unless otherwise specified, Certificates of Compliance conforming to the requirements of MAG Section 106 shall be provided for all materials.

Unless otherwise specified, the Contractor shall perform all testing, or provide test results to the Agency from accredited laboratories as specified herein.

433.2.1 Seed: The species, variety, and strain of seed shall be as shown below or as directed by the Town. The contract specified seed shall be obtained from seed suppliers through harvesting of wild land collections, or field-grown seeds grown prior to or during the contract period.

Hydroseed: Seed mixture shall consist of the following varieties at the rates shown below.

Seed mixture shall be applied with the wood fiber mulch slurry.

PLS#/ACRE	BOTANICAL NAME	COMMON NAME
1	Acacia greggii	Catclaw Acacia
2	Ambrosia deltoidea	Bursage
2	Aristida purpurea	Purple Three Awn
0.5	Baileya mutiradiata	Desert Marigold
1	Bouteloua aristidoides	Needle Grama
2	Cassia covesii	Desert Senna
1	Cercidium microphylum	Foothills Palo Verde
2	Encelia farinosa	Brittlebush
0.5	Eriogonum fasciculatum var. polifolium	Arizona Flat-topped Buckwheat
1	Guiterrezia microcephala	Snakeweed
1	Halopappus acradenius	Turpentine Bush
1	Larrea tridentata	Creosote Bush
1	Lotus rigida	Rock Pea
1	Lupinus sparsiflorus	Desert Lupine
4	Plantago insularis	Indian Wheat
0.5	Psilotrophe tagetina	Paperflower
0.5	Sphaeralcea ambigua	Desert Globemallow
1	Vigueria deltoidea	Shrubby Golden Eye
23 lbs. Total Per Acre		

ALL SEED QUOTED IN PLS POUNDS PER ACRE.
PLS = PURE LIVE SEED = PURITY X GERMINATION SEED TO BE BROADCAST ACCORDING TO RECOMMENDED RATES.

A. Application rates of seed as specified are for Pure Live Seed (PLS). PLS = (% germination + % hard or dormant) x % purity. Weed content of seed shall not exceed .05%.

B. Binder: Binder shall be a free flowing, non-corrosive powder produced from natural plant gum of Plantago Insulares (Indian Wheat) such as Muciloid Tac or approved equal. Binder shall be applied at 60 lbs. per acre on slopes less than 3:1 and 80 lbs per acre on slopes 3 to 1 and above, slope 2:1 and above 200 lbs per acre.

C. Wood Fiber Mulch: Wood fiber mulch shall consist of a specially prepared virgin wood fiber processed to contain no growth or germination inhibiting factors. Further, the mulch shall be manufactured and processed so the wood cellulose fibers will remain in uniform suspension in water under agitation and will blend with seed, fertilizer, and other additives to form a homogeneous slurry. The processed mulch material shall have characteristics to form a blotter like ground cover on application, with moisture and percolation properties and the ability to cover and hold seed in contact with the soil. Wood fiber mulch shall be applied at 2000 lbs per acre.

D. Compost: Compost shall consist of composted organic vegetative materials. Prior to furnishing on the project, compost mulch samples shall be tested by an organic testing laboratory for microbiological and nutrient conditions as specified including maturity and stability. Written test results shall be submitted to the Engineer for approval.

Within 30 calendar days after the award of contract, the Contractor shall submit the name of the seeding subcontractor to be used, along with written confirmation from seed suppliers and collectors, on their letterhead, that the source(s) for the contract specified seed has been secured. If any of the contract-specified seed is expected to not be available during the contract period prior to seeding, the Contractor shall notify the Agency at this same time and provided recommended substitutions for non-available seed. Seed substitutions shall be the same monetary value per pound as the seed being substituted.

The seed shall be delivered to the project site unmixed in standard, sealed, undamaged containers for each seed species. Each container shall be labeled in accordance with the appropriate conditions of the Arizona Revised Statues and the U.S. Department of Agriculture rules and regulations under the Federal Seed Act. Labels shall indicate the variety or strain of seed, the percentage of germination, purity and weed content, the date of analysis which shall not be more than nine months prior to the delivery date, and testing information. A Certificate of Analysis from an accredited seed-testing laboratory, and conforming to MAG Section 106, shall accompany each container of seed.

Unless otherwise approved by the Agency, weed content of the contract-specified seed mix shall not exceed 0.5 percent.

The Contractor shall provide all seed tag labels to the Agency. No payment will be made for seed unless tag labels from all seed to be used on the project have been submitted as specified.

The Contractor shall store seed under dry conditions, at temperatures of between 35 °F and 100 °F, and out of direct sunlight. Prior to using the seed, the Contractor shall provide a certification letter to the Agency that the seed was stored as specified herein.

Legume seed shall be inoculated with appropriate bacteria cultures approved by the Agency, in accordance with the culture manufacturer's instructions.

Tetrazolium staining shall be acceptable to test for germination and hard seed. Cut or fill testing will not be allowed. As directed by the Agency, seeds past the acceptable test date or not meeting the specified conditions for storage shall be retested by the Contractor. The Agency may perform random sampling of seeds throughout the project. Mixing of the specified seed at the project site shall be under the supervision of the Agency.

Application rates of seed as specified are for Pure Live Seed (PLS). PLS is determined by multiplying the sum of the percent germination of seeds, including hard or dormant seeds, by the percent purity.

Seed mix species and the Pure Live Seed (PLS) rates are shown on the project plans or as directed by the Construction Manager.

Contractor shall supply seed as indicated on the project plans for all areas within the disturbance limits, as indicated on the plan, or as directed by the Agency.

No payment will be made for areas seeded with unapproved seed, or for the removal of the seed and repair of these areas.

433.2.2 Tacking Agent: Tacking agent shall be a naturally occurring organic compound and be non toxic. It shall be a product typically used for binding soil and mulch in seeding or erosion control operations. Approved types shall consist of mucilage or gum by dry weight as active ingredient obtained from guar or plantago. The tacking agent shall be labeled indicating the type and mucilage purity.

The Contractor shall have the tacking agent swell volume tested by an approved testing laboratory using the USP method. The standard swell volume shall be considered at 30 milliliters per gram. Material shall have a swell volume of at least 24 milliliters per gram. Certified laboratory test results shall be furnished to the Agency for each shipment of homogenous consistency to be used on project areas or as directed by the Agency. Tacking agent rates shall be adjusted to compensate for swell volume variation. Material tested with lesser volume shall have the tacking agent rate increased by the same percentage of decrease in swell volume from the standard 30 milliliters per gram. Material tested with greater volume may reduce tacking agent rates by the same percentage of increase in swell volume from the standard 30 milliliters per gram. Tacking agent shall be pure material without other starches, bentonite, or other compounds that would alter the swell volume test results of mucilage, or the effectiveness of the tacking.

433.2.3 Wood Fiber Mulch: Wood cellulose fiber mulch shall be from thermo-mechanically processed wood, processed to contain no growth germination inhibiting factors. The mulch shall be from virgin wood manufactured and processed so the fibers will remain in uniform suspension in water under agitation to form homogenous slurry. Paper products will not be considered as virgin wood. The wood fiber mulch shall have the properties as shown below:

Wood Fiber Mulch	
Virgin Wood Cellulose Fiber	90% min.
Recycled Cellulose Fiber	10% max.
Ash Content	0.8% +/-0.3%
PH	4.5 +/-1.0
Water Holding Capacity	10:1 (water:fiber)

433.2.4 Chemical Fertilizer and Sulfur: Fertilizer shall be composed of a mixture of one part sulfur-coated urea 25-4-8, one part monammonium phosphate 11-52-0, and one part methalene urea 38-0-0. The sulfur-coated urea, a blended fertilizer 25-4-8, shall have 80 percent of the nitrogen defined as slow release, and contain 5 percent iron, 10 percent sulfur and trace amounts of zinc and manganese. The resulting 24-18-2 chemical blended fertilizer, as specified herein, shall be applied at the rate of 200 pounds per acre. In addition to the fertilizer mixture, agricultural sulfur compounds, comprised of between 80 percent and 96 percent sulfur, shall be applied at the rate of 200 pounds per acre.

433.2.5 Water: Water shall be free of oil, acid, salts or other substances which are harmful to plants. The source shall be as approved by the Agency prior to use.

433.2.6 Compost: Compost shall consist of composted organic vegetative materials. Prior to furnishing on the project, compost mulch samples shall be tested for the specified microbiological and nutrient conditions, including maturity and stability, by a testing laboratory approved for testing of organic materials. Written test results shall be submitted to the Agency for approval.

Compost material shall be dark brown in color with the parent material composted and no longer visible. The structure shall be a mixture of fine and medium size particles and humus crumbs. The maximum particle size shall be within the capacity of the Contractor's equipment for application to the constructed slopes. The odor shall be that of rich humus with no ammonia or anaerobic odors.

Compost shall also meet the requirements of the table below:

Compost	
Cation Exchange Capacity (CEC)	Greater than 60 meq/100 g
Carbon: Nitrogen Ratio	Less than 20:1
PH (of extract)	6 – 8.5
Organic Matter Content	Greater than 25%
Total Nitrogen (not added)	Greater than 1%
Humic Acid	Greater than 5%
Maturity Index	Greater than 50% on Maturity Index at a 10:1 ratio
Stability	Less than 100 mb 02/Kg compost dry solids – hour

Compost shall be applied to areas to be seeded at the rate of six tons per acre prior to final tillage for incorporation into the soil seed bed.

433.2.7 Soil Conditioners: Soil conditioners, when required, will be as described in these Special Conditions.

433.2.8 Straw Mulch: Straw mulch shall conform to the requirements of **ADOT Standard Specification** Subsection 805-2.03 of the Standard Specifications, except as modified herein, and shall be from the current season's crop. A letter of certification from the supplier shall be required stating that the straw was baled less than 12 months from the delivery date.

All straw, including hydraulically applied straw, shall be free from noxious weeds in compliance with the standards and procedures of the North American Weed Management Association (NAWMA) or the Arizona Crop Improvement Association (ACIA). The contractor shall provide documentation, including a transit certificate, and appropriate labels and/or marking twine, from the ACIA or NAWMA that straw materials to be used for mulch are free of noxious weeds. The straw shall be accompanied by the certification, labels and/or marking twine at the time of delivery to the project site. Straw delivered to the project without such information will be rejected, and promptly removed from the project.

Rye straw and oat straw will not be acceptable.

Straw mulch shall conform to the requirements of ADOT Standard Specification Subsection 805-2.03 of the Standard Specifications, except as modified herein, and shall be from the current season's crop. A letter of certification from the supplier shall be required stating that the straw was baled less than 12 months from the delivery date.

All straw, including hydraulically applied straw, shall be free from noxious weeds in compliance with the standards and procedures of the North American Weed Management Association (NAWMA) or the Arizona Crop Improvement Association (ACIA). The contractor shall provide documentation, including a transit certificate, and appropriate labels and/or marking twine, from the ACIA or NAWMA that straw materials to be used for mulch are free of noxious weeds. The

straw shall be accompanied by the certification, labels and/or marking twine at the time of delivery to the project site. Straw delivered to the project without such information will be rejected, and promptly removed from the project.

Straw mulch shall be anchored by tacking using a slurry consisting of a minimum of 150 pounds of tackifier, 500 pounds of wood fiber mulch and 300 gallons of water per acre. The applicator may increase the quantities of components to ensure the stability of the straw mulch to provide erosion control during the Seeding Establishment Period at no increase in cost.

433.3 CONSTRUCTION REQUIREMENTS:
The Contractor shall notify the Agency at least five days prior to commencing seeding operations and to the methods that the Contractor will employ during seeding operations.

The equipment and methods used to distribute seeding materials shall provide an even and uniform application of seed, mulch, and other materials at the specified rates.

Unless specified otherwise in the Special Conditions, seeding operations shall not be performed on undisturbed soil outside the clearing and grubbing limits of the project or on steep rock cuts. The Contractor shall coordinate the seeding operations with the grading operations to determine mobilization frequency as embankment and cut slopes are finished throughout the duration of the project. Seeding shall be done during suitable weather and soil conditions for tillage and placement of materials. Seeding operations shall not be performed when wind would prevent uniform application of materials or would carry seeding materials into areas not designated to be seeded.

Frequent mobilizations may be required to accomplish seeding as specified herein. These multiple mobilizations are considered to be included in the price bid for the seeding. No adjustments will be made to the contract for the number of seeding mobilization activities. Should the Contractor fail to provide seeding for a sub-area as specified herein, the Agency will notify the Contractor of such non-compliance. Should the Contractor fail to immediately remedy the unstabilized and unaccepted areas, the Agency may suspend work until such seeding stabilization has been completed, or proceed to provide the necessary seeding stabilization. The entire cost of such work will be deducted from the monies due or to become due to the Contractor. In addition, no adjustment to the contract time will be made for suspensions resulting from the Contractor's failure to provide seeding for a sub-area within the time periods specified herein.

The steps of work for seed completion should be as follows unless otherwise directed by the Engineer:

Complete rough and finish grade
Apply salvaged site soil (salvaged desert pavement)
Till salvaged desert pavement
Place deadfall
Place seed

433.3.1 Tillage: Where equipment can operate, the area to be seeded shall be prepared with a ripper bar, chisel plow, or with other devices, which will provide thorough soil cultivation to the depth specified below. On final slopes too steep for equipment to operate, as approved by the

Agency, tillage shall be accomplished with appropriate equipment as the slope is constructed. On slope areas, all tillage shall be directional along the contours of the areas involved. All areas which are eroded shall be restored to the specified condition, grade and slope as directed prior to seeding.

On cut and fill slopes the operations shall be conducted in such a manner as to form minor ridges thereon to assist in retarding erosion and favor germination of the seed.

Except as specified herein, slopes shall be constructed in accordance with the plans. Cut slopes flatter than 3:1 (horizontal to vertical) shall be tilled a minimum of 12 inches in depth, and fill slopes flatter than 3:1 shall be tilled to a six-inch minimum depth. All slopes steeper than 3:1, and areas which could potentially be affected by underground utilities, shall be tilled to a minimum 6 inches in depth, and left in a roughened condition as they are constructed.

Care shall be taken during the seeding operations to prevent damage to existing trees and shrubs in the seeding area.

Tillage may require passing the equipment over the area several times to provide thorough soil cultivation. Furrows from tillage shall be no more than 12 inches apart. No work shall be done when the moisture content of the soil is unfavorable to tillage.

All competitive vegetation shall be uprooted prior to seeding and the soil shall be left in a friable roughened condition free of clods. Exposed stones larger than four inches shall be removed and disposed of in an approved manner prior to grading and seeding.

All areas prepared with tilling shall have fertilizer and, when specified, compost, uniformly applied to the surface at the specified rates per acre before seeding. Fertilizer and compost shall be incorporated into the surface prior to final tilling. Slopes 3:1 and flatter shall have fertilizer and compost tilled into a minimum of the top four inches of the surface. Slopes steeper than 3:1 shall have fertilizer and compost applied as directed by the Agency.

433.3.2 Seeding Operation: Either Drill Seeding or Hydroseeding shall be acceptable methods for seed distribution.

Wood fiber mulch shall be applied on drilled or hydroseeded areas with crimping and tacking, as specified herein or directed by the Agency, within 24 hours of seed application.

Unless otherwise specified in these Special Conditions, seeding areas shall not be watered after planting.

Hydroseeding which is deposited on adjacent trees and shrubs, roadways, in drain ditches, on structures, and upon any area where seeding is not specified or which is placed in excessive depths on seeding areas shall be removed.

Seeding areas flooded or eroded as a result of irrigation shall be repaired, reseeded, and refertilized by the Contractor at his expense.

433.3.2.1 Drill Method: After the tillage and incorporation of fertilizer, and compost when required, is completed and accepted by the Agency, seed shall be planted with a drill seeder

capable of accurately metering the specific seed mix. Use of a drill seeder shall not damage the prepared seedbed, and shall provide a soil cover over the planted seed.

Seed shall be planted approximately 1/4 inch deep, with a maximum depth of 1/2 inch. The distance between the furrows produced using the drill process shall not be more than eight inches. If the furrow openers on the drill exceed eight inches, the area shall be drilled twice. Seeding shall be done with grass seeding equipment with double disc openers, depth bands, packer wheels or drag chains, rate control attachments, seed boxes with agitators and separate boxes for small seed. Seed of different sizes shall be sowed from at least two separate boxes adjusted or set to provide the planting rate as specified.

433.3.2.2 Hydroseed Method: After the tillage and incorporation of fertilizer, and compost when required, is completed and accepted by the Agency, seed shall be planted by hydroseed method with wood fiber mulch applied following application of the seed. The contract specified seed shall be applied in a slurry containing a minimum of 40 pounds tacking agent and 200 pounds of wood fiber mulch per acre. If fertilizer was not applied to the tilled surface, as specified in Subsection above, 200 pounds of fertilizer per acre shall be added to the hydroseed slurry. Seed shall not be in the slurry for more than 30 minutes. Seed planted by this method will not require covering with soil. Soil areas shall be tilled to produce loose and friable surfaces with crusted hard soils broken up prior to hydroseeding.

433.3.4 Applying Wood Fiber Mulch with Tacking Agent: Areas seeded but not practical for straw mulch, as determined by the Agency, shall have wood fiber mulch with tacking agent applied at the variable rates shown in the table below.

Wood Fiber Mulch with Tacking Agent		
Slope	Tacking agent (Pounds pure mucilage per acre)	Wood Fiber Mulch (Pounds per acre)
Flat to 4:1	50	1,000
4:1 to 3:1	100	2,000
3:1 to 2:1	150	2,500
2:1 & steeper	200	3,000
Erosive Soil Slopes*	300	3,500
*As determined by Construction Manager		

The Contractor shall submit a batch (tank) mix quantity schedule for seed application and the temporary erosion control mulch application for approval of the Agency prior to mixing seed, fertilizer, wood fiber mulch and tacking agent in slurry. Batch mixing and coverage will be monitored throughout the seeding operations. The Contractor shall coordinate the mixing and application operations with the Agency in advance of all mixing.

433.3.5 Seeding Acceptance: After application the Agency will inspect seeded areas or sub-areas for conformance to the contract requirements. The Contractor shall correct, to the satisfaction of the Agency, any areas not conforming to the specifications. The 90-day maintenance period will begin upon acceptance of the area by the Agency.

The Contractor shall maintain and stabilize each area or sub-area for a minimum period of 90 calendar days after application of the seeding and mulching materials, and acceptance by the Agency. Any areas damaged from wind or on site erosion that have less than 90 percent of

applied mulch remaining, shall be re-seeded, re-mulched, and re-tacked at no additional cost to the Agency.

Care During Construction: The Contractor shall be responsible for protecting and caring for seeded areas until final acceptance of the work and shall repair, at his expense, any damage to seeded areas caused by pedestrian or vehicular traffic or other causes.

433.4 MEASUREMENT AND PAYMENT: Hydro-Seeding will be measured to the nearest square foot for the project. Measurements shall be along the ground surface for the areas which have been seeded and mulched, as determined and approved by the Engineer.

Hydro-Seeding shall include furnishing and applying contract specified seed mix, fertilizers, soil amendments, tillage, mulch materials, tackifier, and all labor to complete the work, which may be completed in several stages as construction areas are completed. The accepted quantities for Hydro-Seeding, measured as provided above, will be paid for at the contract unit price per square foot, which price shall be compensation for the work complete including all equipment, labor and materials required for Seeding as described and specified herein.

SECTION 440
SPRINKLER IRRIGATION SYSTEM INSTALLATION

440.1 DESCRIPTION: *add or modify the following:*

Irrigation System shall conform to Section 440, 757 and 610 of the MAG Uniform Standard Specifications except as modified herein.

Note: At the time of sprinkler irrigation system installation there may not be any pressurized water system to connect the sprinkle irrigation system into due to the remote nature of the site and the delay in surrounding development. This will result in the Contractor being required to provide all materials necessary to water test and pressure test the permanent irrigation system in compliance with these specifications and to the satisfaction of the Town of Fountain Hills. The cost to provide the means and methods of pressure testing the system (wet and dry) shall be considered incidental to the overall sprinkler irrigation system installation and there will not be any separate measurement and or payment for this effort.

440.2 GENERAL: *add or modify the following:*

Examine areas and conditions under which work of this section is to be performed. Do not proceed with work until unsatisfactory conditions have been corrected. Staking: Mark new lines to be installed with powdered lime, routing of pressure supply line and stake locations of various components and emitter locations.

All permits for installation or construction of the work included under this Section, which are required by legally constituted authorities having jurisdiction, shall be obtained by the Contractor, each at the proper time. He/she shall also arrange for and pay costs in connection with any inspections and examinations required by these authorities.

Provide work and materials in accordance with latest edition of National Electric Code, Uniform Plumbing Code as published by the Western Plumbing Officials Association, and applicable laws, regulations and codes of governing authorities.

All irrigation equipment and materials shall be supplied by the manufacturers as indicated on the plans, details and specifications. If no manufacturer is specified, the contractor shall supply as part of his submittal package complete manufacturer cut sheets detailing materials, construction methods and standards. If quantities are furnished either in specifications or on drawings, quantities are furnished for information only. It is Contractor's responsibility to determine actual quantities of material, equipment, and supplies required by the project and to complete independent estimate of quantities and wastage.

The Contractor shall furnish all labor, materials, tools, equipment, and services necessary for the execution and completion of the irrigation system work as indicated on the drawings and as described in these specifications and the General Conditions.

The plans indicate a detailed layout of irrigation lines, laterals, and emitter locations, however some of the piping may be shown diagrammatically outside of the planting areas for graphic clarity. The contractor shall follow the intent of the plan layout and shall review and obtain written approval from the Owner's Authorized Representative for any requested changes. The goal is to minimize any disturbance to the site.

Due to the scale of the drawings, it is not possible to indicate all offsets, fittings and sleeves that may be required. The Contractor shall carefully investigate the structural and finished conditions affecting all of his work and plan his work accordingly, furnishing such offsets, fittings and sleeves as may be required to meet such conditions. All work called for on the drawings by notes or details shall be furnished and installed whether or not specifically mentioned in the specifications.

The irrigation system shall be constructed using the emitters, valves, piping, fittings, controllers, wiring, and other components, of sizes and types as shown on the drawings and as called for in these specifications. The system shall be constructed to grades and conform to areas and locations as shown on the drawings.

Connection to irrigation power source: The irrigation contractor shall connect the irrigation controller to the power source provided by others within the restroom. The power source shall be protected by 20 amp fuses or circuit breakers and shall include a disconnect provision.

440.3 MATERIALS: *add or modify the following:*

A. Master Valves: The master valves 3" and larger shall be manufactured by Singer or approved equal as specified on the plans and details. The valve shall be manufactured of epoxy coated ASTM A536-65/45/12 ductile iron class 150, with nylon fabric bonded synthetic rubber diaphragm. The size shall be as noted on the drawings. The valve shall include a 24 volt solenoid to enable operation from the irrigation controller. The valve shall be configured for normally closed operation. The valve shall be fully serviceable without requiring the valve from being disconnected from the irrigation mainline through a removable bonnet that shall be fastened to the body with stainless steel capscrews. Locating pins shall accurately position bonnet with main body. The inner valve stem assembly shall be guided by replaceable bearing bushings. The valve shall include opening and closing adjustable speed controls. The controls shall include a 40 mesh strainer to isolate any grit that may impede the speed control or solenoid operation.

   The master valve shall be installed below grade within a high density polyethylene plastic valve box measuring 40 ½" long x 27 ¼" wide x 18" high (outside) with purple

coloring. The box lid shall include a stainless steel bolt down lid. Depth to top of master valve shall not exceed 18". The box shall match the box being provided for the flow sensor. Install the master valve decoder and the wire connectors within a junction box inside the valve box. Enclose the wiring to the junction box and from the junction box to the valve solenoid in flex conduit to keep rodents from chewing the wire.

B. Gate Valves: The gate valves shall be manufactured by American Flow Control or approved equal as specified on the plans and details. The valves shall be resilient wedge type rated for 250 p.s.i.g. cold water working pressure. The wedge shall be ductile iron encapsulated with nitrite rubber. Valves shall be NSF Standard 61 certified and conform to AWWA C-509. The operating nut shall be 2" square ductile iron. The valve shall be completely serviceable without requiring removal from the mainline. The valve shall be ductile iron with epoxy coating on both the inside and outside. Gate valves shall be used for 3" and larger sizes.

C. Ball Valves: Ball valves for use with remote control valves shall be Spears True Union or approved equal. The valves shall be manufactured of schedule 80 PVC and feature Teflon seats capable of two-way blocking. The valve shall have threaded end connections. Valves shall be sized to match the remote control valve.

D. Remote Control Valves: The remote control valve shall be RainBird PEB series or approved equal, with 24 volt 60 cycle, normally closed, globe design. The valve body shall be manufactured of glass filled UV resistant nylon, with a pressure rating of 200 p.s.i. The valve shall have a self-cleaning stainless steel screen designed for use in dirty water applications. Furnish the valve with a purple non-potable flow control handle.

   The remote control valves shall be contained within a valve box, tan in color.

E. Drip Wye Filter: The drip wye filter shall be an Rainbird QKCHK-100M or approved equal. It shall be manufactured of high strength engineered plastic with a 150 p.s.i. rating. The filter shall be supplied with a 150 mesh stainless steel screen and a visual condition indicator. The filter shall have 1" male pipe thread inlet and outlets.

F. Drip Pressure Regulator: The pressure regulator shall be a Senninger PLR-25 or approved equal. The regulator shall have 3/4" female pipe thread inlet and outlets. It shall be capable of regulating outlet pressure at 25 p.s.i. with inlet pressures up to 150 p.s.i. Flow range for the regulator shall be from 0.1-8 gpm. The regulator outlet body shall be purple colored for use in non-potable conditions.

G. Drip Emitter: The drip multi port emitters shall be RainBird XBT-X0-6 multi-port as noted on the plans or approved equal. The emitters shall be supplied in 1 or 2 gph. Configuration as required in the emitter schedule on the plans. Supply the emitter with all

components required for installation as shown on the plan details including flex PVC piping, fittings, distribution tubing, tubing stakes, bug caps and emitter boxes with lids.

The drip single-port emitters shall be RainBird XBT-X0-PC single-port or approved equal. The emitters shall be supplied in 1 or 2 gph. Configuration as required in the emitter schedule on the plans.
Supply the emitter with all components required for installation as shown on the plan details including flex PVC piping, and fittings.

H. Drip Flush End Cap Assembly: The drip flush end cap assembly shall be as detailed on the plans. The assembly shall include the following products: a ¾" manual ball valve, ¾" male adaptor, ¾" flex PVC riser, ¾" 90 S x S, Carson #809 valve box with lid, and a 6" depth of pea gravel or crushed river rock.

I. Automatic Controllers: The irrigation controller shall be a 24 Station Weathermatic Indoor Wall Mounted Controller with wireless weather station. Controller shall be located within Restroom Building

The contractor shall provide a total of four on-site irrigation controller training sessions. Cost shall be incidental to the irrigation controller.

As-builts shall be kept noting location of all wire paths.

The contractor shall include locks and two sets of keys for the controller specified on the plans.

add the following new subsection:

440.3.1 SUBMITTALS: *add the following:*

Submittals shall include but not be limited to the following:

A. Deliver four (4) copies of submittals to Project Manager within 10 working days from date of Notice to Proceed. Furnish information in 3-ring binder with table of contents and index sheet. Index sections for different components and label with specification section number and name of component. Furnish submittals for components on material list. Indicate which items are being supplied on catalog cut sheets when multiple items are shown on one sheet. **Do not order materials until the Project Manager has approved the proposed products.** Substitutions will not be allowed without approval. At a minimum the book shall contain:

B. Materials List: Include sleeving, pipe, fittings, mainline components, drip irrigation components, control system components, shop drawings and other components shown on drawings and installation details or described herein. Include pipe sealant, wire, wire

connectors, ID tags, and other miscellaneous items. Quantities of materials need not be included.

C. Manufacturers' Data: Submit manufacturers' catalog cuts, specifications, and operating instructions for equipment shown on the materials list.

D. Shop Drawings: Submit shop drawings called for by the details. Show products required for proper installation, their relative locations, and critical dimensions.

440.5 TRENCH EXCAVATION AND BACKFILL: *add or modify the following:*

A. Excavate and install pipes at minimum cover indicated in drawings or specifications. Excavate trenches at appropriate width for connections and fittings. Trenches and other excavations shall be sized to accommodate the irrigation system components, conduit, and other required facilities. Additional space shall be provided to assure proper installation and access for inspection. Unless otherwise specified, the minimum depth of cover over pipelines and conduits shall be as specified herein.

B. The bottom of the trench shall be true to grade and free of protruding stones, roots or other matter that would prevent proper bedding of pipe or other facilities. Where ledge rock, hardpan, or boulders are encountered, the trench bottom shall undercut and filled with sand or fine-grained material approved by the Project Manager.

C. Minimum cover (distance from top of pipe or control wire to finish grade):
   1. Mainline pipe (to top of pipe): 18-inches for 21/2-inch and smaller pipe, 24-inches for 3-inch, 4-inch pipe, and 36-inches for 6-inch and larger pipe.
   2. Electrical conduit: 36-inches to top of pipe.
   3. Control wire: 8" to top of conduit housing wire.
   4. Lateral pipe to Emitters (to top of pipe): 12-inches for 3-inch and smaller pipe, 18-inches for 4-inch and larger pipe.

D. Maintain at least 15-feet clearance from centerline of trees.

E. Backfill only after lines have been reviewed and tested.

F. Excavated material is generally satisfactory for backfill. Use backfill free from rubbish, vegetable matter, frozen materials, and stones larger than 1/2inch in maximum diameter. Remove material not suitable for backfill. Use backfill free of sharp objects next to pipe.

G. Backfill buried pipe in either of the following manners:
   1. Backfill and puddle lower half of trench. Allow to dry 24 hours. Backfill remainder of trench in 6-inch layers. Compact to density of surrounding soil.

2. Backfill trench by depositing backfill material equally on both sides of pipe in 6-inch layers and compacting to density of surrounding soil.

H. Enclose pipe and wiring beneath roadways and hardscapes in separate sleeves. Minimum compaction of backfill for sleeves shall be 95 percent Standard Proctor Density, ASTM D698-78. Use of water for compaction around sleeves, "puddling", will not be permitted.

I. Dress backfilled areas to original grade. Incorporate excess backfill into existing site grades.

J. Contact Owner's Representative for trench depth adjustments where utilities conflict with irrigation trenching and pipe work.

K. Trenches may be curved to change direction or avoid obstructions within limits of the curvature of pipe. Curvature results from bending of pipe lengths. Do not exceed pipe and fitting manufacturer's allowable deflection at joints. Minimum radius of curvature and offset per 20-foot length of pipe-by-pipe size are shown in following table.

SIZE	RADIUS	OFFSET PER 20' LENGTH
1 ½"	31.7'	6.5'
2"	39.6'	5.2'
2 ½"	47.9'	4.2'
3"	58.3'	3.5'
4"	75.0'	2.7
6"	110.4'	1.8'
8"	143.8'	1.4'
10"	179.2'	1.1'
12"	212.5'	0.9'

440.6 PIPE INSTALLATION: *add or modify the following:*

A. Piping or conduit of different trades crossing each other shall be separated by a minimum of 6 inches in the vertical direction. When pipe laying is not in progress, the open ends of the pipe shall be closed by approved means.

B. All pipe shall be protected from damage during assembly. All vises shall have padded jaws and only strap wrenches will be used. Any plastic pipe that has been nicked, scarred, or otherwise damaged shall be removed and replaced. Care shall be exercised so that stress on a previously made joint is avoided.

C. When PVC to metal pipe connectors are required, these connections shall be accomplished first. A plastic adapter with external pipe threads should be used, screwing it into the metal internal pipe threads. Use a non-hardening pipe dope, such as liquid Teflon, or equal, on all plastic to metal threaded joints. The joint shall be hand-tightened. Utilize a light wrench, as necessary, to prevent leaks.

D. Pipe shall be uniformly bedded in a minimum of 4" of finely graded topsoil or sand to provide a firm uniform bearing pad against which the pipe shall be placed. After laying the pipe the pipe shall be surrounded with additional sand or graded and approved topsoil backfill to a minimum depth of 4" over the top of the pipe. Sand bedding or fine-grained material shall be provided where ledge rock, hardpan, or boulders are encountered. Compact bedding material to provide a minimum depth of bed between pipe and rock of 4 inches.

   Trench backfill, sufficient to anchor the pipes, mat be deposited before pipeline pressure testing, except that joints shall remain exposed until satisfactory completion of testing.

   Trenches and excavations shall be backfilled with clean material from excavations. Remove organic material as well as rocks larger than 1 inch in diameter. Place acceptable backfill materials in lifts, the height of which shall not exceed that which can be effectively compacted, depending on the type of equipment and methods used. Trenches and excavations shall be backfilled so that the specified thickness of topsoil is restores to the upper part of the trench. Water settling of the trenches will not be permitted unless approved by the Project Manager.

E. When wrapped pipe is specified, joints and connections shall not be wrapped until completion of the pressure test.

F. All pipe 3" and larger shall be installed with concrete thrust blocks per MAG standard details. Use thrust blocks for fittings on any diameter rubber gasketed pipe. Use 3,000 PSI concrete. Use 2 mil plastic. Use No. 4 rebar wrapped or painted with asphalt tar based mastic coating. Thrust blocking shall be formed against a solid trench wall that has been hand excavated. The size and type of the thrust blocking shall be as per the drawings. Control wire shall not be concealed within the thrust blocking.

G. Joint Restrain Harness: Use a joint restraint harness wherever joints are not positively restrained by flanged fittings, threaded fittings, and/or thrust blocks. Use a joint restraint harness with transition fittings between metal and PVC pipe, where weak trench banks do not allow the use of thrust blocks, or where extra support is required to retain a fitting or joint. Use bolts, nuts, retaining clamps, all-thread, or other joint restraint harness materials that are zinc plated or galvanized. Use on pipe greater than or equal to 3 inch diameter or any diameter rubber gasketed pipe.

H. Keep pipe free from dirt and debris. Cut pipe ends square, debur and clean as recommended by manufacturer.

I. Keep ends of assembled pipe capped. Remove caps only when necessary to continue assembly.

J. Mainline Pipe and Fittings:
Use only strap-type friction wrenches for threaded plastic pipe.

K. PVC Rubber-Gasketed Pipe:
Use pipe lubricant. Join pipe in manner recommended by manufacturer and in accordance with accepted industry practices.

Use rubber-gasketed pipe equipped with factory installed reinforced gaskets for mainline pipe with a nominal diameter greater than or equal to 3 inches. Gasketed pipe joints must conform to the "Laboratory Qualifying Tests" section of ASTM D-3139. Gasket material must conform to ASTM F-477. Use rubber-gasketed deep bell ductile iron fittings conforming to ASTM A-536 and ASTM F-477. Use lubricant approved by the pipe manufacturer.

L. PVC Solvent Weld Pipe:
Use primer and solvent cement. Join pipe in manner recommended by manufacturer and in accordance with accepted industry practices. Cure for 30 minutes before handling and 24 hours before allowing water in pipe. Snake pipe from side to side within trench.

Use solvent weld pipe for mainline pipe with a nominal diameter less than 3 inches or where a pipe connection occurs in a sleeve. Use Schedule 80, Type 1, PVC solvent weld fittings conforming to ASTM Standards D-2466 and D-1784. Use primer approved by the manufacturer. Solvent cement shall conform to ASTM Standard D-2564.

M. Fittings:
Use of cross type fittings is not permitted.

Do not strike ductile iron fittings with metallic tools. Cushion blows with wood block or similar shock absorber.

Schedule 80 pipe shall be used for threaded joints. Field threading shall be accomplished in the same manner as specified for steel pipe, except that a plug will be installed in the bore of the pipe prior to threading to prevent distortion. Solvent will not be used on threaded pipe. Threaded joints shall be hand tightened with final tightening as necessary to prevent leaks with a strap wrench.

N. Lateral Pipe and Fittings:
Use only strap-type friction wrenches for threaded plastic pipe.

O. PVC Solvent Weld Pipe:
Solvent welded joints shall be made in accordance with ASTM D-2855, and the type of solvent and primer recommended by the pipe manufacturer shall be used. Use primer and solvent cement. Join pipe in manner recommended by manufacturer and in accordance with accepted industry practices.

Primer and solvent shall be applied to the pipe ends in such a manner that no material is deposited on the interior surface or forced into the interior of the pipe during insertion. Excess solvent on the exterior of the joint shall be wiped clean immediately after assembly. The pipeline will not be exposed to water for at least 12 hours after the last solvent welded joint has been made

Cure for 30 minutes before handling and 24 hours before pressurizing or installing with vibratory plow.

Snake pipe from side to side within trench. Snake pipe in trench as much as possible to allow for expansion and contraction.

Provide a firm, uniform bearing for the entire length of each pipeline to prevent excessive bowing in accordance with ASAE Standard: ASAE 376. Pipe shall be clean prior to installation and shall be maintained in that condition during installation.

P. Specialized Pipe and Fittings:
   a. Copper Pipe:
      i. Use flux and solder. Join pipe in manner recommended by manufacturer and in accordance with local codes and accepted industry practices.
      ii. Solder so that continuous bead shows around the joint circumference.

   b. Ductile Iron Pipe:
      i. Join pipe in the manner recommended by manufacturer and in accordance with accepted industry practices.
      ii. Insert dielectric union or flange wherever copper-based metal (copper, brass, bronze) and iron-based metal (iron, galvanized steel, stainless steel) are joined.
      iii. Flanged connections: Install fittings, fasteners and gaskets in manner recommended by manufacturer and in accordance with accepted industry practices.

   c. PVC Threaded Connections:
      i. Use only factory-formed threads. Field-cut threads are not permitted.

ii. Apply thread sealant in manner recommended by component, pipe and sealant manufacturers and in accordance with accepted industry practices.
iii. Use plastic components with male threads and metal components with female threads where connection is plastic-to-metal.

Q. Thrust Blocks:
   a. Use thrust blocks for fittings on pipe greater than or equal to 3-inch diameter, or any diameter of rubber gasketed pipe.
   b. Size, orient, and place cast-in-place concrete against undisturbed soil as shown on installation details.
   c. Wrap fitting or component with plastic to protect bolts, joint, gasket and fitting from concrete. Do not bury fitting or component in concrete.
   d. Commercially delivered concrete requires a 3,000 PSI mix.
   e. If pre-mix bags are used, mix per manufacturer's recommendations (maximum 1 gallon of water to 80-pound bag of pre-mix).
   f. Contractor is responsible for performing a slump test (minimum of 2-inches to a maximum of 4-inches) if requested by Owner's Representative.

R. Joint Restraint Harness:
   a. Use on pipe greater than or equal to 3-inch diameter or any diameter of rubber gasketed pipe. Use a joint restraint harness wherever joints are not positively restrained by flanged fittings, threaded fittings, and/or thrust blocks.
   b. Use a joint restraint harness with transition fittings between metal and PVC pipe, where weak trench banks do not allow use of thrust blocks, or where extra support is required to retain fitting or joint.
   c. Use restrained casing spacers for gasketed pipe routed through sleeving. Install harness in the manner recommended by the manufacturer and in accordance with accepted industry practices. Install self-restraining casing spacers at all gasketed pipe bell joints and every 10-feet along the gasketed mainline pipe installed through sleeving. Provide correct number and type of restraints per manufacturer's requirements.

add new subsection
440.6.1 SLEEVING: *add the following:*

A. Provide sleeving at 36" depth for any vehicular crossing, and at the depth that keeps the pipe at the specified depth called out in the special provisions noted above.

B. Extend sleeve ends twelve inches beyond edge of hardscape, or sidewalks. Cap sleeve ends and mark with stakes. Provide rope or wire through sleeve and secure to stake at surface grade at each end for future sleeve location. Sleeve ends shall be covered with duct tape prior to backfill.

C. Bore for sleeves under obstructions that cannot be removed. Employ equipment and methods designed for horizontal boring.

D. Boring will be permitted only where pipe must pass under obstructions that cannot be removed or when approved by the Project Manager. Permission to cut asphalt or concrete shall be obtained from the Project Manager.

E. Each irrigation pipe or wire located beneath asphalt and concrete must be installed in a PVC Schedule 40 DWV sleeve that is a minimum of twice the aggregate diameter of the pipe or wire contained within the sleeve. Wire shall be in its own and separate sleeve. Low voltage wire can be placed in sleeves with water lines as long as the wire is contained within a separate sleeve within the main sleeve. High voltage (120 volt and greater) wiring shall always be placed in sleeves separate from water lines, and at 48" depth.

F. Pipe trenches should be straight but if obstructions necessitate a change of direction, the limits of curvature for PVC pipe must be followed.

G. Trenches may be curved to change direction or avoid obstructions within the limits of the curvature for PVC pipe. Minimum radii of curvature is 40 feet for 2-inch diameter pipe, 75 feet for 3- and 4-inch diameter pipe, and 115 feet for 6-inch pipe. All curvature results from the bending of the pipe lengths. No deflection will be allowed at a pipe joint.

   Sleeving Clearance:
   - Piping 3 inches and larger, minimum trench width of 12 inches.
   - Piping smaller than 3 inches, minimum trench width of 7 inches.
   - Provide not less than 6 inches of clearance between each line, and not less than 12 inches of clearance between lines of other trades, to permit service or replacement without disturbing the other line.

H. Asphalt cut and patch operations necessary for sleeve installation shall be considered incidental to the sleeve installation. All asphalt cutting shall be done with proper equipment to allow straight and true cuts through the entire depth of the asphalt being removed. Compact trench backfill to 95% with a minimum of a 6" ABC base and 6" asphalt top patch cover. Contractor shall replace any patch work if the patch compacts more than ½" or if any of the patch becomes dislodged within one year. All asphalt shall comply with MAG section 336.

add new subsection
440.6.2 WIRING: *add the following:*

A. All wiring for remote control valve operation shall be UF-600, 12AWG UL listed for direct burial usage.

B. All underground wire connections shall be made with Northstar Industries Suresplice SK 8-12G wire connectors.

C. Low Voltage Control Wiring issuing from the controller shall be direct burial, type UF-600, No. 12 AWG copper, unless otherwise required and installed in 3/4" schedule 40 electrical conduit at 8" below finished grade at the locations shown on the project plans. Install decoders as detailed and shown on the plans. Sufficient slack shall be left in the wiring to provide for expansion and contraction.

D. Sufficient slack shall be left at each splice and point of connection in pull boxes so that in case of repair the valve bonnet or splice may be brought to the surface without disconnecting the wire, no splices shall be permitted under pavements.

E. All wiring shall be tested for continuity, open circuits, and unintentional grounds prior to connecting the equipment. All controllers shall be grounded independent of any other controller as recommended by the controller manufacturer.

440.7 VALVES, VALVE BOXES, AND SPECIAL EQUIPMENT INSTALLATION: *add or modify the following:*

A. Valves, Valve Boxes, and Special Equipment: Valves and Related Accessories shall be installed as shown on the plans, or as specified. They shall be installed in a normal upright position unless otherwise recommended by the manufacturer, and shall be readily accessible for operation maintenance and replacement. The equipment shall be set at a sufficient depth to provide clearance between the valve box cover and the valve handle, cap, or key for operation of the system

B. All remote control valves, flow sensors, gate valves, pressure reducing valves, wye strainers, emitter flush caps, and quick coupling valves unless otherwise indicated shall be installed in suitable plastic or other type valve access box of proper size as required for easy access to the valve. All valve boxes supplied shall be Carson or approved equal.

C. Valve Boxes: Install one valve box for each type of valve installed as shown on the plans, or specified unless directed otherwise by the Project Manager. Install gravel sump after compaction of all trenches. Place final portion of gravel under valve box before valve box is backfilled and compacted.

D. Set valve boxes to the finish grade specified, or as follows:
   a. In non-irrigated areas set box ½ inch above finish grade.

E. The valve boxes shall be branded with the controller letter and station number of the contained valve. The letter and number size shall be no smaller than 1 inch and no

greater in size than 1 ½ inch. Depth of branding shall not be more than 3/8 inch into the valve box lid. All labeling shall be neat and legible.

F. Flow Sensor Assembly: Provide where indicated on drawings. Brand "MCV / FS" on valve box lid in 2-inch high letters.

G. Isolation Gate Valve Assembly: Provide where indicated on drawings. Install at least 12-inches from and align with adjacent walls or edges of paved areas. Brand "GV" on valve box lid in 2-inch high letters.

H. Quick Coupling Valve Assembly: Provide where indicated on drawings. Brand "QC" on valve box lid in 2-inch high letters.

I. Air-Vacuum Relief Valve Assembly: Install where indicated on drawings or nearest high point, not closer than 2-feet from nearest fitting. Brand "AV" on valve box lid in 2-inch high letters.

J. Gate valves and ball valves shall be installed below ground and shall be housed in a concrete or plastic pipe, with bolt down locking cover that will permit access for servicing. The pipe shall be centered on the valve stem.

K. Remote Control Valve (RCV) Assembly for Drip Irrigation System Laterals:
   a. flush mainline before installation of RCV assembly.
   b. Provide where indicated on drawings. Use wire connectors and waterproof sealant to connect control wires to remote control valve wires. Provide connectors and sealant per manufacturer's recommendations.
   c. Provide only one RCV to a valve box. Locate valve box at least 12-inches from and align with nearby walls or edges of paved areas. Group RCV assemblies together where practical. Align grouped valve boxes in uniform patterns. Allow at least 12-inches between valve boxes. Brand controller letter and station number on valve box lid in 2-inch high letters.
   d. Adjust RCV assembly to regulate downstream operating pressure.
   e. Attach ID tag with controller station number to control wiring.

440.9 AUTOMATIC CONTROL SYSTEM INSTALLATION: *add or modify the following:*

A. Controller System: The Controller and accessories shall be installed at the locations designated and per the details shown on the contract documents. Submit shop drawing showing location with equipment, and sleeving for approval by the Project Manager.

B. Upon completion of construction, Owner's Representatives will administer a System Acceptance Test of the installed controller.

C. Following construction completion and review by Town Staff, an evaluation period will begin. After 30 days of continuous automatic control system service without major

system problems, system will be accepted and guarantee/warranty period will begin. If at any time during 30-day evaluation period a major automatic control system problem occurs, the source of problem will be determined and corrected and 30-day evaluation period will start again. Equipment will not be accepted until System Acceptance Test has passed and been accepted by the Town.

D. If successful completion of System Acceptance Test is not attained within 90-days following commencement of evaluation period, Owner's Representative has the option to request replacement of equipment, terminate the order or portions thereof, or continue with System Acceptance Test. These options will remain in effect until System Acceptance Test is successfully completed.

E. Final payment will only be processed after successful completion of System Acceptance Test.

440.10 FLUSHING AND TESTING: *add or modify the following:*

A. Perform an operational test of the irrigation system in the presence of the Project Manager. Contact Project Manager three working days prior to testing.

B. After completion and prior to the installation of any terminal fittings, the entire pipeline system shall be thoroughly flushed to remove a foreign material. After flushing, the following tests shall be conducted in the sequence listed below. The Contractor shall furnish all equipment, materials, and labor necessary to perform the tests and all tests shall be conducted in the presence of the Project Manager.

a. Hydrostatic Testing:
   i. After flushing is completed, cap the risers and pressure test the system.
      1. Perform hydrostatic tests only in the presence of the Project Manager.
      2. Test the irrigation lines in place, before backfilling, and under dry conditions.
         a. Fill the line with water at least 4 hours before the pressure test, and thoroughly bleed the line of air.
         b. Center load the pipe sections and expose all couplings and connections to valves, etc.
         c. Do not backfill piping until it has been observed, hydrostatically tested, and accepted in writing by the Project Manager.
         d. Test all piping under paved areas to prove them watertight prior to paving.

b. Notify the Project Manager 3 days in advance of testing. Pipelines jointed with rubber gaskets or threaded connections may be subject to a pressure test at any time after partial completion of backfill. Subsections of mainline pipe may tested independently, subject to the review of the Project Manager. Furnish clean, clear water, pumps, labor, fittings, and equipment necessary to conduct tests or re-tests.

c. Pipeline Pressure Test: A water test shall be performed on all pressure mains and submains. Pressure mains and submains shall be tested with all control valves installed and in the closed position. The constant test pressure and duration of the test shall be for 3 hours at 150 psi. Any leaks that occur during the mains will then be re-tested until accepted by the Project Manager.

d. Drip Emitter Test: The test shall be performed after all drip emitter ports have been installed and shall demonstrate that each section or zone in the irrigation system is balanced to provide uniform and adequate coverage of the areas services. The Contractor shall supply labor for assisting a Town of Fountain Hills representative in performing a test to determine irrigation system efficiency. The Contractor shall correct any deficiencies in the system.

e. Operational Tests: the Contractor shall adjust or replace any type of irrigation drip emitter or equipment to ensure proper distribution of water through the course of the Plant Establishment Guarantee and Maintenance Period.

f. Control System Grounding: Test for proper grounding of control system per manufacture's recommendations. Test results must meet or exceed manufacturer's guidelines for acceptance. Replace defective wire, grounding rod, or appurtenances. Repeat the test until manufacturer's guidelines are met.

new subsection
440.10.1 IRRIGATION SYSTEM CLOSEOUT: *add the following:*

440.10.1 GENERAL

1. All requirements and procedures for submittal of pertinent data relating to closing out of Project upon completion of the project work. Detailed instructions elsewhere in these Specifications may require that certain items listed herein to be submitted prior to Substantial Completion of the Project. This Section is complementary to the General Conditions and Special Provisions and nothing herein shall be considered to waive any requirements of the General Conditions or Special Provisions.

2. Letter from Contractor and Irrigation Controller Manufacturer's Representative guaranteeing four total training sessions for Irrigation Controller Programming. Letter

must be signed by both Contractor and Irrigation Controller Manufacturer's Representative.

440.10.2 AS BUILTS RECORD DRAWINGS

1. Contractor shall provide Record Drawings which shall clearly show all differences between the Contract work as drawn and as installed for all work, as well as work added to the Contract which is not shown on the Contract drawings.

2. Contractor shall maintain a set of Record Drawings at the job site. These shall be kept legible and current and shall be available for inspection at all times by the Town of Fountain Hills. The record drawings shall show all changes in the Contract work, or work added, on these Record Drawings in a contrasting color, including work changed by Addendum or Bulletin.

3. Prepare Record Drawings for the irrigation control system that shows the location of and id codes for all valve decoders, sensors, and surge protectors. The decoders shall accurately show which remote control valves that they activate.

4. In showing changes in the work, or added work, use the same legends as were used on the Contract Drawings. Indicate exact locations by dimensions and exact elevations given in job datum, by depth. Give dimensions from a permanent point. Give elevations to sewer and storm drainage lines to the invert elevation.

5. Record Drawings shall indicate exact routing of all piping, irrigation, power and control wiring, etc., any irrigation lateral line modifications or adjustments shall be depicted on the plans.

6. Record Drawings shall contain the names, addresses, and phone number of the Subcontractors and shall be signed by the Contractor.

7. The Town of Fountain Hills shall review the Record Drawings and shall be the sole judge of the acceptability of these drawings.

8. Upon Substantial Completion of the Project contractor shall submit the redlined record drawings to the Town of Fountain Hills Parks Department for preliminary review. Contractor shall make all corrections required and resubmit a new copy to the Town's Park and Recreation Department for review and approval. Upon acceptance of the redlined record drawings and prior to final payment the contractor shall submit to the Town the corrected and final version of the record drawing red-lines. The contractor will be responsible for recording the redlines onto the mylars for the final record set of drawings prior to final project acceptance.

440.10.3 MAINTENANCE MANUALS AND OPERATING INSTRUCTIONS

1. Upon completion of the installation of all work furnish 4 complete bound copies of operating and maintenance instructions and parts lists for all materials and equipment, including electrical, irrigation, pump and control items, being supplied.

2. Operating instructions shall include complete operating sequence, control diagrams, description of method of operating machinery, machine serial numbers, factory order numbers, parts lists, instruction books, supplier's phone numbers and addresses and individual equipment guarantee. Parts lists shall be complete in every respect, showing all parts and part numbers for ready reference.

3. Assemble Maintenance Manual and Operating Instructions in hard back 3-ring loose-leaf binders. Suitably label and index all material contained therein for ready reference.

4. Upon Substantial Completion of the Project work, submit one copy of the Maintenance Manual and Operating Instructions to the Town of Fountain Hills for review. Upon receipt of notice of acceptance, deliver the additional copies to the Town of Fountain Hills.

440.10.4 GUARANTEES AND WARRANTIES

1. Submit all required guarantees and warranties to the Town of Fountain Hills. Provide all written guarantees, warranties or certificates required. Guarantees and warranties shall be a part of maintenance manual.

440.10.5 SPARE PARTS AND MAINTENANCE MATERIALS

The Contractor shall deliver to the Owner the spare parts, extra stock and maintenance materials listed below, and shall obtain a signed receipt for these materials. Materials shall be neatly packaged and identified, per each specification section.

Spare parts required prior to project closeout:

1. Three (3) of each size remote control valve installed
2. Three (3) of each size drip filter installed
3. Three (3) of each size pressure regulator installed
4. Two (2) keys to irrigation controller enclosure
5. Ten (10) of each emitter type and volume installed
6. Two (2) quick coupler keys with ¾" mht swivels and locking cover keys

440.10.6 SEMI-FINAL AND FINAL REVIEW

1. When Contractor is of the opinion that the Project is substantially complete, he shall send to the Project Manager a written statement that the Project is substantially complete (naming a date) and shall request a semi-final inspection by the Project Manager to determine the status of completion. Such notice shall be received at least three days before the requested inspection date.

2. If the Project Manager finds that the Project is substantially complete, he will prepare a Certificate of Substantial Completion, attaching thereto a list or "Punch List" of items to be completed or corrected.

3. If the Project Manager does not concur in the Contractor's claim of Substantial Completion, the contractor shall continue to maintain the site until the Project Manager accepts the project.

4. When all items on the "Punch List" are completed or corrected, the Contractor shall send to the Project Manager a statement that the Project is complete and request a final inspection.

5. If the project is complete and all "Punch List" items are completed or corrected, the Project Manager will issue a final acceptance letter.

6. After completion of the procedures outlined above, the Contractor shall submit his final application for payment in accordance with the Agreement, the General Conditions and Special Provisions.

440.10.7 FINAL CHECKOUT OF PROJECT AND EQUIPMENT BY OWNER

1. Before acceptance and final payment, at a time arrived at with the Project Manager a complete checkout and test shall be made of all irrigation, mechanical and electrical systems, architectural and structural devices, etc., with the Project Manager. For this purpose, each trade concerned shall provide a skilled operating engineer or technician for a period of at least one day. This person, together with selected operating personnel, shall test all systems and devices and demonstrate the complete operation and required maintenance of each.

440.10.7 MAINTENANCE

1. Maintain irrigation system for a duration of 90 calendar days from formal written acceptance by Project Manager. Make periodic examinations and adjustments to irrigation system components in order to achieve the most desirable application of water.

2. Following completion of Contractor's maintenance period, Owner will be responsible for maintaining system in working order during remainder of guarantee/warranty period, for performing necessary minor maintenance, for clearing debris from around emitters, for protecting against vandalism, and for preventing damage after landscape maintenance operation.

3. For period of one year from Final Acceptance, guarantee/warranty irrigation materials, equipment, and workmanship against defects. The Contractor shall replace any pavement damage resulting from the installation of the irrigation system and repair damage to grading, soil preparation, seeding, or planting at no additional cost to the Town of Fountain Hills. Make repairs within 3 days following notification by the Project Manager. The Town of Fountain Hills has the right to make emergency corrections and back-charge to the contract for his/her costs when determined necessary by the Project Manager.

440.10.8 CLEAN UP

1. Remove from site machinery, tools, excess materials, and rubbish upon completion of work.

2. Maintain a clean and orderly jobsite on a daily and ongoing basis. Trash, discarded material and other debris shall not be allowed to blow around on the project. Discard all materials off site at an approved sanitary landfill.

440.10.9 FINAL PAYMENT

Receipt and approval of all items specified in this Section is a prerequisite for final payment irrigation related efforts.

SECTION 505
CONCRETE STRUCTURES

505.1 DESCRIPTION: *add the following:*

The work under this item shall also include the construction of integrally colored concrete headwalls with access barrier, trash racks, concrete headwall outlets and concrete pipe culverts as detailed and called for on the plans.

The Contractor shall be responsible for reviewing all available geotechnical investigation reports. The geotechnical investigation reports are available at the following address:

Town of Fountain Hills
Community Services Department
Fountain Hills Town Hall
16705 E. Avenue of the Fountains
Fountain Hills, AZ 85268

505.3 FORMS: *delete the second sentence of the 4th paragraph and replace with following:*

All plywood shall be at a minimum APA Plyform Class I, B-B exterior type, mill oiled. All plywood shall be manufactured to U.S. Product Standard PS 1-95 and must meet all APA standards. If plywood is used to create any smooth, non-textured surface, Medium Density Overlay (MDO) plywood shall be used. MDO shall be of exterior type with one face of medium density overlay as described in voluntary product standard PS-1, and be specifically manufactured for concrete formwork, with all edges sealed.

Add the following new subsection:

505.6.6 Mock Up: The Contractor is required to construct a fully complete mockup panel(s) for color and each varying finish that occurs on concrete structures. Mock-up panel shall be a minimum of 4 feet wide by full height of wall.

A fully complete mock-up panel shall consist of an integrally colored and fully finished panel and shall be representative of how the final structure aesthetic enhancements will appear. All concrete structure aesthetic enhancements shall receive a minimum Class II finish. Sandblasting shall be in accordance with Section 343 Exposed Aggregate Paving.

The mockup panel(s) shall be constructed and erected a minimum of 30 days prior to production of the walls for review and approval by the Engineer. No construction is to begin until the mockup(s) are accepted by the Engineer. The contractor may have to construct an additional two (2) mockup panels, for a maximum total of three (3) mockup panels until a final mockup texture, finish, etc. are approved by the Engineer.

The mock up panel(s) shall be set in a vertical position, reinforced, and able to remain in place until the project improvements are accepted by the Engineer. The mock up panel(s) shall remain in place throughout the construction and shall be used as a reference standard for quality of finish and will serve as one source for comparison during construction and as a means of comparison to achieve final acceptance. The acceptable structure aesthetic enhancements should have a pleasing appearance with minimal color and texture variations and minimal surface defects when viewed at a distance of five (5) feet. Final acceptance of the mockup panel will be determined by the Engineer.

The Contractor shall remove and properly dispose of the mock up panel(s) at the completion of the project as directed by the Engineer. Contractor may utilize both sides of the mock-up panel to demonstrate different required finishes.

No separate measurement or payment will be made for the mock-ups the cost of which is considered included in the price of the concrete structure being treated.

505.11.1 Reinforcing Steel: delete in its entirety and replace with following:

No separate measurement will be made for reinforcing steel.

505.12.1 Reinforcing Steel: *delete in its entirety and replace with the following:*

No separate payment will be made for reinforcing steel the cost of which is considered included in the structure for which it is associated with.

505.12.4 MEASUREMENT AND PAYMENT: *is modified to add the following:*

The installation of the Drainage Headwalls as sized and detailed on the plans will be paid for at the unit price of each as set forth in the bid proposal. The contract unit price shall include full compensation for all labor, materials, tools and equipment necessary to provide and install the integrally colored Drainage Headwalls (sized per plan) and any accessory complete in place, including all concrete, reinforcing steel, and items embedded in the concrete, such as anchor bolts, grates and frames, metal inserts, etc. as detailed on the plans for a complete and functioning Drainage Headwall.

The installation of the Concrete Pipe Culvert as sized and detailed on the plans will be paid for at the unit price bid per lineal foot as set forth in the bid proposal. The contract unit price shall include full compensation for all labor, materials, tools and equipment necessary to provide and install the Concrete Pipe Culvert and any accessories complete in place, including all concrete, reinforcing steel, and items embedded in the concrete, such as anchor bolts, grates and frames, metal inserts, joint seals and other features as detailed on the plans for a complete and functioning Concrete Pipe Culvert.

The installation of the Trash Racks as sized and detailed on the plans will be paid for at the unit price of each as set forth in the bid proposal. The contract unit price shall include full compensation for all labor, materials, tools and equipment necessary to provide and install the Trash Rack complete in place, including all concrete attachments, hardware and frames for a complete Trash Rack.

SECTION 515
STEEL STRUCTURES

515.1 DESCRIPTION: *Add the following:*

The work under this item shall consist of furnishing all materials and labor and constructing Access Control Gates to Fire Road, Main Entry Gates, Signs, Custom Shade Ramada, Information Kiosk, Bike Racks, Pet Waste Station, complete in place as shown on the plans and as described in these specifications.

The information Kiosk on the plans was designed to allow the Town of Fountain Hills the opportunity to post in a secure format information about the trail head, safety issues and other Town related information. The metal structure was designed to protect the informational kiosk. The Informational Kiosk is to be a pre-manufactured **bronze anodized** aluminum finish structure with hinged two (2) door features, acrylic safety glass, lockable doors to both protect and control what is and can be posted vented case for moisture reduction, weatherized read panel, thick rubber door seal, tackable burlap weave vinyl surface. The kiosk was designed around a pre-manufactured bronze anodized aluminum unit produced by American Building Products and was built around the use of the Cherokee Model. Alternatives to this system will be accepted by the Town, alternatives shall be submitted per MAG Section 106.

The work under this special provision shall consist of furnishing all materials, equipment and labor necessary to construct Ramada (Steel Structure, and Roof) in conformance with the details on the Project Plans, in accordance with these specifications and as directed by the Engineer

515.1.1 Shop Drawings: *Add the following:*

The contract drawings will not be used in any way, shape or form to develop the fabrication drawings.

Shop drawings for the steel structures and walls connections design, for erection details and methods shall be developed and submitted in accordance with Standard Section 105.2 Plans and Shop Drawings. Shop Drawings shall be unique drawings and not standard forms requiring filling in blank spaces unless all extraneous information is deleted and standard forms provide an exact description of work. All relative design information such as member sizes, welding details, construction details, erection details and general notes shall be clearly shown. Drawings shall have cross-referenced details and sheet numbers. The Contractor shall clearly indicate on the working drawings all shop welds and field welds.

Add the following new subsection:

515.1.5 Materials: Materials shall conform to the requirements specified on the plans and these specifications. If a discrepancy exists between the project plans and these specifications the more stringent of the requirements shall prevail. The contractor shall furnish complete copies, in triplicate, of all mill reports on steel materials furnished.

Structural Steel Kiosk:

- Materials shall conform to the requirements specified on the plans and these special provisions.
- The contractor shall furnish complete copies, in triplicate, of all mill reports on steel materials furnished.
- Structural steel shall conform to ASTM A36.
- Carriage Bolts shall conform to the requirements of ASTM A307.

Welding of structural tubing shall conform to the requirements of the American Welding Society, Structural Welding Code, D1.1 current edition

The Kiosk Case shall be bronze anodized aluminum frame with a locking case.

Structural Steel Ramada:
Materials shall conform to the requirements specified on the plans and these special provisions.

- The contractor shall furnish complete copies, in triplicate, of all mill reports on steel materials furnished.
- Tubular structural steel shall conform to the requirements of ASTM A847 (Weathering) with a minimum yield stress (Fy) of 46 KSI.
- Other structural steel shall conform to ASTM A36.
- Anchor bolts shall conform to the requirements of ASTM A36 or A307 Grade A Galvanized.
- Metal Roofing shall be formed with a minimum of 22 gauge roofing material. Metal shall conform to the requirements of ASTM A606.

Gates and Other Structures

Rectangular Hollow Structural Steel (HSS) sections shall conform to the requirements of ASTM A500, Grade B with a minimum yield stress (F_y) of 46,000 psi.

Structural steel plate and shapes shall conform to ASTM A36.

Concrete shall conform to MAG Class 'A', with a 28-day minimum compressive strength, f'c, of 3,000 psi.

Reinforcing steel shall conform to the requirements of ASTM A615 and be furnished as Grade 60.

Signage/Reflectors shall be in accordance with all MUTCD standards and Town of Fountain Hills supplements.

Hinges shall be heavy duty weld-on barrel hinges with a round barrel body, stainless steel pin, ball bearing, grease fitting, and a minimum weight rating of 1200 lbs

Add the following:

515.3.1 Construction Requirements: The work under this item shall conform to applicable sections of the Standard Specifications as amended by these Special Provisions. Any concrete structures associated with steel structures shall be in accordance with Section 505 Concrete Structures.

Working drawings for this Item shall be developed and submitted by the Contractor in accordance with MAG Section 105.2 Plans and Shop Drawings. Working Drawings shall be unique drawings and not standard forms requiring filling in blank spaces unless all extraneous information is deleted and standard forms provide an exact description of work. All relative design information such as member sizes, welding details, construction details and general notes shall be clearly shown. Drawings shall have cross-referenced details and sheet numbers. The Contractor shall clearly indicate on the working drawings all shop welds and field welds.

Properly accredited, experienced certified welders, in accordance with the American Welding Society, shall perform all welding. Each welder shall submit to the Engineer satisfactory evidence of experience and skill in welding structural steel joints in the positions required. Welding of structural tubing shall conform to the requirements of the American Welding Society, Structural Welding Code, D1.1 current edition. Field welds shall be full penetration welds.

515.3.1.1 Foundations: The work under this item consists of furnishing all labor and materials to construct foundations within drilled excavations including excavation and placement of concrete. Each drilled shaft shall consist of a shaft section as shown on the Project Plans, and shall be constructed in reasonable close conformity with the details and dimensions shown on the Project Plans and these specifications. All work under this Section shall conform to SECTION 731 – STRUCTURAL SUPPORTS AND FOUNDATIONS FOR TRAFFIC SIGNAL AND HIGHWAY LIGHTING of the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, 2008 Edition, except as herein noted and shown on the Project Plans.

The Contractor shall be responsible for reviewing all available geotechnical investigation reports. The geotechnical investigation reports are available at the Town of Fountain Hills, 1034 East Madison, Phoenix, Arizona 85034.

515.3.1.2 Welding and Inspection: Welding of structural steel shall conform to the requirements of the American Welding Society (AWS), Structural Welding Code, D1.1 current edition.

Properly accredited, experienced certified welders, in accordance with the American Welding Society, shall perform all welding. Each welder shall submit to the Engineer satisfactory evidence of passing AWS qualification tests and maintenance of qualifications for welding structural steel joints in the positions required. Submit welding procedure specifications to the Engineer for review.

At minimum, at least one foot of weld for each size and type of weld and type of joint shall be tested using nondestructive testing (NDT). The entire weld shall be tested when rejectable discontinuities are found in any test length of the weld. All welds shall be visually inspected. Correct improper workmanship, remove and replace, or correct as instructed by the Engineer, all welds that are found unacceptable or deficient.

515.3.1.3 Fabrication: All vertical members shall be plumb and true after installation. Out of plumb tolerance shall be 1/8 inch per 10 feet.

515.5 PAINTING: *Delete in its entirety and replace with the following:*

With the exception of items which are to be galvanized, structural steel members shall not be painted. Steel shall be allowed to develop a natural rust patina. Match marks and identification marks shall be properly cleaned off.

515.6 METHOD OF MEASUREMENT: *Delete in its entirety and replace with the following:*

Items of work shall be measured as identified within the bid schedule.

515.7 PAYMENT: *Delete in its entirety and replace with the following:*

The accepted quantity of steel structures as, measured as provided above, will be paid by the contract unit price which shall be full compensation for the work, complete, as described above and as shown on the plans and details, including all labor, equipment and materials necessary to construct concrete foundations, steel structure including all; fabrication, delivery and erection of Steel Structures.

SECTION 520
STEEL AND ALUMINUM HANDRAILS

520.1 DESCRIPTION: *delete in its entirety and replace with the following:*

Metal handrail shall consist of furnish all material and constructing handrail of steel including railing, posts, fittings and anchorages. Metal handrail shall be fabricated and installed in accordance with MAG Standard Detail 145 except as modified herein and as shown on the plans and details.

520.2 FABRICATION: *delete paragraphs five, six, ten, and eleven. Delete the fourth paragraph in its entirety and replace with the following:*

Railings shall be fabricated from welded or seamless members of the size and thickness shown on the plans and details. Steel members shall conform to the requirements of ASTM F1043 Material Group IA-2 (2.72 LB/FT Minimum Yield Strength = 50 KSI.

All metal components of the metal handrail shall be non-galvanized and allowed to form a natural rust patina, with the exception of the mounting hardware (anchor bolts, nuts, washers, etc.) which shall be galvanized in accordance with Section 771.

520.4 MEASUREMENT: *modified to add the following:*

The Handrail as shown and detailed on the plans will be measured by the linear foot from end to end along the face of the railing including terminal sections.

520.5 PAYMENT: *modified to add the following:*

The price paid per linear foot for the handrail shall include full compensation for furnishing all labor, materials, tools, and equipment and doing all work involved in constructing the railing complete in place as shown on the plans and specified herein.

SECTION 610
WATER LINE CONSTRUCTION

610.1 DESCRIPTION: is modified to add:

Note: At the time of the water line construction there will not be any pressurized water system to connect the water line system into due to the remote nature of the site and the delay in surrounding development with utility infrastructure. This will result in the Contractor being required to provide all materials necessary to hydrostatically test and disinfect the line in compliance with MAG Section 611, these specifications and to the satisfaction of the Town of Fountain Hills. The cost to provide the means and methods of hydrostatically testing and disinfecting the system shall be considered incidental to the overall water line construction and there will not be any separate measurement and or payment for this effort.

610.16 MEASUREMENT AND PAYMENT: is modified to add:

B Service Line Connection is modified to add; Service Line Connection shall include all cost to provide and install the specified meter assembly (including all appurtenances other than actual water meter which shall be installed in future by Town once connection to water service is available) in compliance with MAG Standards, EPCOR Water Standards and Requirements and Town of Fountain Hills Standards including all permit, inspection and installation fees.

I. Water Main Vertical DIP per MAG Standard Detail 370: No separate payment shall be made. This work shall be included in the price bid for the water mains, installed complete in place.

J. Waterline construction shall include restrained joints in accordance to MAG Std Dtl 303-1 and 303-2. Thrust Blocks shall be in accordance with MAG Std Dtl 380. Cost for joint restraining and thrust blocks shall be considered incidental to the cost of the construction of the waterline.

SECTION 618
STORM DRAIN CONSTRUCTION

618.5 MEASUREMENT: is modified to add:

The Catch Basin Per MAG Standard Detail 537shall be installed per MAG Standard Detail and Specifications. Measurement for providing and installing the Catch Basin per MAG Standard Detail 537 and MAG Specifications will be measured by each which shall be complete in place in compliance with the plans, details and the referenced MAG Details and Specifications.

618.6 PAYMENT: is modified to add:

The Catch Basin will be paid at the contract unit cost bid per each and shall be compensation in full for furnishing and installing the type of Catch Basin as specified and as shown on the plans including removal of obstructions, excavation, bedding, backfilling, compacting, testing, joint materials, joining, collars, and testing.

SECTION 625
MANHOLE CONSTRUCTION AND DROP SEWER CONNECTIONS

625.1 DESCRIPTION: *is modified to add:*

The contractor shall contact the Fountain Hills Sanitary District for the most recent odor control specifications. The contact is as follows:

Fountain Hills Sanitary District
16941 East Pepperwood Circle
Fountain Hills, AZ 85268
Telephone: (480) 837-9444

625.4 MEASUREMENT: *is modified to add:*

The contractor shall provide and install the Storm Drain Manhole with Reinforced Box Structure as specified and detailed on the plans and the structure shall be measured as a complete unit, no distinction shall be made based on manhole depth, or box structure size.

625.5 PAYMENT: *is modified to add:*

The cost of furnishing odor control shall be incidental to the construction of the sanitary sewer manhole, frame and cover. No separate measurement and payment will be made for this work.

The payment will be made at the contract unit price for each Storm Drain Manhole With Reinforced Box Structure, and shall be compensation in full for furnishing and installing the manhole and reinforced box structure, complete in place, with formed or pre-cast inverts, concrete foundation, sanitary sewer drop connections sheeting and bracing, removal of obstructions cast iron frame and cover, excavation and backfill, reinforced box, all reinforcing steel and any incidentals thereto, in conformance with the plans, details and specifications.

SECTION 630
TAPPING SLEEVES, VALVES AND VALVE BOXES ON WATER LINES

603.8 MEASUREMENT: *is modified to add:*

Measurement will be by the unit each 8" Plug and Curb Stop with Flushing Pipe and Air Release Valve installed as specified and detailed on the plans complete unit, in place.

630.9 PAYMENT: *is modified to add:*

Payment for the 8" Plug and Curb Stop with Flushing Pipe and Air Release Valve will be made at the contract unit price identified above and shall be compensation in full for the complete installation in place including all labor, materials, equipment, and all incidentals necessary to complete the installation.

SECTION 631
WATER TAPS AND METER SERVICE CONNECTIONS

631.9 MEASUREMENT: is added:

The Connection to 8 Waterline –Install Service Saddle and Corporation Stop shall be sized per plan and installed per MAG Standard Detail and Specifications. Measurement for providing and installing the Connection of the 8" Waterline – Install Service Saddle and Corporation Stop shall be per MAG Specifications, EPCOR Water requirements and Town of Fountain Hill Standards and will be measured by each which shall be complete in place in compliance with the plans, details and the referenced MAG Details and Specifications, EPCOR Water Details and Specifications and Town of Fountain Hills Requirements.

The Connection to 8 Waterline– Install 8"x8" Cross with 8" Gate Valve and Cover shall be sized per plan and installed per MAG Standard Detail and Specifications. Measurement for providing and installing the Connection of the 8" Waterline –Install 8"x8" Cross with 8" Gate Valve and Cover shall be per MAG Specifications, EPCOR Water requirements and Town of Fountain Hill Standards and will be measured by each which shall be complete in place in compliance with the plans, details and the referenced MAG Details and Specifications, EPCOR Water Details and Specifications and Town of Fountain Hills Requirements.

631.10 PAYMENT: is added:

The Connection to 8" Waterline– Install Service Saddle and Corporation Stop will be paid at the at the unit as defined above in full for furnishing and installing the type of 8" Waterline Connection– Install Service Saddle and Corporation Stop as specified and as shown on the plans including removal of obstructions, excavation, bedding, backfilling, compacting, testing, as specified through MAG Standards, EPCOR Water Standards and Town of Fountain Hills Requirements.

The Connection to 8 Waterline– Install 8"x8" Cross with 8" Gate Valve and Cover will be paid at the unit as defined above and shall be compensation in full for furnishing and installing the type of 8 Waterline – Install 8"x8" Cross with 8" Gate Valve and Cover as specified and as shown on the plans including removal of obstructions, excavation, bedding, backfilling, compacting, testing, as specified through MAG Standards, EPCOR Water Standards and Town of Fountain Hills Requirements.

SECTION 735
REINFORCED CONCRETE PIPE

735.10 MEASUREMENT AND PAYMENT: is added:

All Drainage RGRCP pipes shall be sized per plan and installed per MAG Section 735 with Rubber Gaskets at all joints. Measurement and Payment for providing and installing the Pipe per MAG Specifications will be measured by the lineal foot which shall be complete in place in compliance with the plans, details and the referenced MAG Specifications.

SECTION 757
SPRINKLER IRRIGATION SYSTEM

757.1 GENERAL: *add or modify the following:*

Irrigation System shall conform to Section 440, 757 and 610 of the MAG Uniform Standard Specifications except as modified herein.

Note: At the time of sprinkler irrigation system installation there may not be any pressurized water system to connect the sprinkle irrigation system into due to the remote nature of the site and the delay in surrounding development. This will result in the Contractor being required to provide all materials necessary to water test and pressure test the permanent irrigation system in compliance with these specifications and to the satisfaction of the Town of Fountain Hills. The cost to provide the means and methods of pressure testing (wet and dry) the system shall be considered incidental to the overall sprinkler irrigation system installation and there will not be any separate measurement and or payment for this effort.

757.2 PIPE AND FITTINGS: is modified to add:

A. Mainline Pipe: Use rigid, unplasticized polyvinyl chloride (PVC) 1120, 1220 National Sanitation Foundation (NSF) approved pipe, extruded from material meeting the requirements of Cell Classification 12454-A or 12454-B, ASTM Standard D1784, with an integral belled end. Use Class 200, SDR-21, rated at 200 PSI, conforming to the dimensions and tolerances established by ASTM Standard D2241 rubber-gasketed pipe equipped with factory installed reinforced gaskets for mainline pipe with a nominal diameter 3 inches and larger. Gasketed pipe joints must conform to the "Laboratory Qualifying Tests" section of ASTM D3139. Gasket material must conform to ASTM F477. Use lubricant approved by the pipe manufacturer. Use Schedule 40 pipe conforming to the dimensions and tolerances established by ASTM Standard D1785 solvent-weld pipe for mainline pipe with a nominal diameter less than 3-inches or where a pipe connection occurs in a sleeve. Use primer approved by the pipe manufacturer. Solvent cement to conform to ASTM Standard D2564.

B. Lateral Pipe: Use rigid, unplasticized polyvinyl chloride (PVC) 1120, 1220 National Sanitation Foundation (NSF) approved pipe, extruded from material meeting the requirements of Cell Classification 12454-A or 12454-B, ASTM Standard D1784, with an integral belled-end suitable for solvent welding. Use Class 200 pipe conforming to the dimensions and tolerances established by ASTM Standard D1785. Use solvent weld pipe for lateral pipe. Use primer approved by the pipe manufacturer. Solvent cement to conform to ASTM Standard D2564, of a type approved by the pipe manufacturer.

Plastic Pipe Fittings and Couplings:

A. Mainline Pipe Fittings: For mainline pipe with a nominal diameter 3 inches and larger, use rubber-gasketed deep-bell ductile iron fittings conforming to ASTM A-536 and ASTM F-477. Gasketed pipe joints must conform to the "Laboratory Qualifying Tests" section of ASTM D3139. Gasket material must conform to ASTM F477. Use lubricant approved by the pipe manufacturer.

   For mainline pipe with a nominal diameter less than 3-inches or where a pipe connection occurs in a sleeve, use Schedule 80, Type 1, PVC solvent weld fittings conforming to ASTM Standards D2466 and D1784. Use primer approved by the pipe manufacturer. Solvent cement to conform to ASTM Standard D2564.

B. Lateral Pipe Fittings: Use Schedule 40, Type 1, PVC solvent weld fittings conforming to ASTM Standards D2466 and D1784. Use primer approved by the pipe manufacturer. Solvent cement to conform to ASTM Standard D2564.

757.7 MEASUREMENT: is added:

The 1" Reduced Pressure Backflow Device w/ Enclosure and Concrete Pad shall be sized per plan and installed per MAG Standard Detail and Specifications, EPCOR Water Standard Details and Specifications and Town of Fountain Hills Standard. Measurement for providing and installing the 1" Reduced Pressure Backflow Device w/ Enclosure and Concrete Pad shall be per MAG Specifications, EPCOR Water requirements and Town of Fountain Hill Standards and will be measured by each which shall be complete in place in compliance with the plans, details and the referenced MAG Details and Specifications, EPCOR Water Details and Specifications and Town of Fountain Hills Requirements.

757.8 PAYMENT: is added:

The 1" Reduced Pressure Backflow Device w/ Enclosure and Concrete Pad will be paid at the at the unit as defined above in full for furnishing and installing the type 1" Reduced Pressure Backflow Device w/ Enclosure and Concrete Pad as specified and as shown on the plans including removal of obstructions, excavation, bedding, backfilling, compacting, testing, as specified through MAG Standards, EPCOR Water Standards and Town of Fountain Hills Requirements.

new section

SECTION 791
DESERT VARNISH STAIN

791.1 Description:

This work shall only be undertaken when approved in advance by the Town of Fountain Hills. This work effort is a force account item of work and will only be authorized in advance by the Town as there may be many instances where desert varnish is not needed or warranted. The work under this section shall include furnishing all materials, equipment and labor necessary for the application of a penetrating desert varnish stain to exposed rock cut surfaces, selected rip rap, gabion rock fill, exposed headwall concrete, exposed surfaces of new drainage channels, any fly rock allowed to remain in place, or other surface's directed by the Engineer, and in accordance with the plans and these Special Provisions.

Desert Varnish Stain:

(A) General Requirements:

The Engineer, in consultation with the Landscape Architect, shall select and determine the areas and surfaces to be stained prior to application of any desert varnish stain. Surfaces will include freshly exposed rock faces, and rock rip-rap. The Town of Fountain Hills shall make final determination as to what if any rock surfaces need any treatment as in many cases the natural patina of the exposed rock surface may not require any stain.

The stain shall be applied by an Arizona licensed painting contractor or manufacturer's representative applicator, who has a minimum of one year of experience in the application of desert varnish stains under similar project conditions.

The method of application, the rate of application, and the surface temperature range of application shall be in accordance with the manufacturer's written recommendations.

The contractor shall cover or protect all adjacent existing and new surfaces which are to remain unstained, including vegetation, from the application of the stain.

The preliminary stain test panels/rock outcropping shall be within the project limits, and the samples shall measure at least 24 inches by 24 inches in size. The surfaces shall be aged and textured similar to that to be encountered on the work. The stain shall be applied using the same methods that will be used for the work. For each major rock type, the preliminary test panels shall be approved by the Engineer the before further stain application may proceed.

After the preliminary test panel/rock outcropping sample has been approved by the Engineer, full-scale test panels shall be prepared. The full-scale panels shall be between 100 square feet and 250 square feet in size, or as directed by the Engineer. The full-scale test panels shall use the same application rates, methods, and dilutions as were approved for the preliminary panels. The test panels shall be prepared as specified herein and shall be located at the project site for the duration of the project. One full-scale test panel shall be provided for each of the major rock types encountered on the project. The full-scale test panels may remain as part of the finished work as approved by the Engineer.

If, in the opinion of the Engineer, the results of any test panel are not satisfactory, the Engineer may require that additional test panels be performed in these or other rock types.

For any given major rock type, the contractor shall not begin full-scale staining until final approval of the products and test panels in that rock type is received from the Engineer.

Shade and tone adjustments shall be made in accordance with aesthetic considerations, and final approval may require such adjustments.

All surfaces to be stained shall be cleaned, prior to the stain being applied, in accordance with the manufacturer's written recommendations for the removal of all dirt, dust, blasting residue, scale or other foreign substances that could be detrimental to the stain penetration or color. All surfaces to be stained shall be clean and completely dry at the time of the application of the stain.

After all surfaces have been prepared for the application of stain, the contractor and a representative of the stain manufacturer shall inspect the surfaces to be stained and, if in agreement, shall notify the Engineer in writing that the surfaces are satisfactory for the stain to be applied. The contractor shall not commence application of the stain without specific direction from the Engineer.

791.2 Materials:

Desert Varnish Stain (Permeon or Natina Products or Approved Equal):

(A) General Requirements:

The Desert Varnish Stain (Permeon, Natina or approved equal) material shall meet the requirements specified herein. Prior to application of the stain, the contractor shall provide the Engineer with a Certificate of Analysis. Submittal of product data sheets listing the application or use requirements, and the types and proportions of stain constituents, and Materials Safety Data Sheets (MSDS) is required for the stain material supplied. Approval of the stain material will not occur until all required documentation has been received by the Engineer.

The Engineer, in consultation with the Landscape Architect, will select the desired colors and intensity of the stains. There may be several different colors required, due to variation in existing rock color and type. The contractor shall prepare sample tests of the selected stains for approval.

The desert varnish stain shall be ready-mixed at the manufacturer's plant. The contractor shall submit the name of the manufacturer of the desert varnish stain he proposes to use, along with three sets of the manufacturer's specifications for mixing and application, to the Engineer for written approval.

(B) Physical and Chemical Requirements:

The desert varnish material shall be an aqueous solution containing salts of iron and manganese, built-in oxidizers and other trace elements including copper and zinc. The desert varnish stain shall involve applying a stable one-step or two-step component solution directly to the rock cut surface. The material shall contain no caustic or alkaline chemicals. Product must not have a pH of 7 or above.

(C) Performance Requirements:

The projected life expectancy of the stain shall be 50 to 100 years. The stain shall develop Full coloration within two weeks after the application. The final color of the stain shall be controlled or modified by custom blending of the basic ingredients, application techniques, dilution rate of the color concentrate with water, or a combination of these methods. Chemical components within the stain shall have n adverse reactions or effects on soils, plants or animals. No corrosive by-products shall be present once the stain has been applied.

791.3 Method of Measurement:

Force Account Rock Staining will be measured as on a Square Foot Basis. No additional measurement or payment will be made for test panels, staining edges, ledges, crevices, or surface relief in the rock face, the cost of which shall be included. **This force account item of work shall only be utilized if approved in advance by the Town of Fountain Hills.**

791.4 Basis of Payment: of the Standard Specifications is revised to read:

No measurement or payment will be made for independent laboratory tests, surface preparation, and supplying samples, the cost being considered as included in the prices paid for the various contract items of work involving painting.

Rock Staining, measured as provided above, will be paid at the contract unit prices which prices shall be full compensation for the work, complete in place, as described and specified herein and as shown on the project plans.

Add the following new Section:

Section 800
Electrical and Lighting

800.1 GENERAL:
This section describes in general, requirements of the electrical and related items and work necessary for the complete job indicated by the contract documents. The general conditions are applicable to this section and shall form a part of the contract.

Note: At the time of the electrical system construction for the Adero Canyon Trailhead there will not be any primary power to connect the electrical system into due to the remote nature of the site and the delay in surrounding development. This will result in the Contractor being required to provide all materials necessary to test the entire electrical system in compliance with the electrical service provider requirements and the Town of Fountain Hills. The cost to provide the means and methods of testing the entire electrical system shall be considered incidental to the overall electrical system construction and there will **not be any separate measurement and or payment for this effort**.

800.2 GENERAL LIST OF WORK:
The work of this section and related work described in other sections is indicated on the Drawings and included, but not necessarily limited to:

1. Service Entrance Section and Lighting Control and Power Distribution Enclosure including all sub-panels, circuit breakers, controls and lighting contactors as shown on plans and as necessary to complete the job in a workmanlike manner.
2. All other electrical equipment and services needed to complete a usable and operable facility in accordance with all pertinent codes and regulations;
3. Electric service, complete, to point of connection with the future utility company's facilities;
4. Main distribution panel with metering equipment and feeder switches or circuit breakers;
5. Branch circuit panels for power and lighting;
6. Lighting fixtures, poles, pole bases;
7. Landscape lighting including housing and base/foundation;
8. Trenching and backfilling for underground electrical installation.

800.3 PERMITS:
Secure and pay for all necessary permits and licenses, services and all inspection fees as required by the Town.

800.4 QUALITY ASSURANCE:
For the actual fabrication, installations, and testing of the work of this Section, use only thoroughly trained and experienced personnel who are completely familiar with the

requirements of this work and with the installation recommendations of the manufacturers of the specified items.

In acceptance or rejection of installed electrical system, no allowance will be made for lack of skill on the part of the installers.

800.5 CODES AND ORDINANCES:
Install all work in accordance with the National Electrical Code and its latest revisions, with any Town of Fountain Hills requirements, and with all pertinent requirements and standard specifications.

800.6 CERTIFICATES:
All work included shall comply with all State and Local rules and regulations Furnish to the Owner all certificates of inspection and approval as required.

800.7 EXAMINATION OF PREMISES:
Prior to submitting proposal, the bidder shall examine all general construction drawings and visit construction site to become familiar with existing conditions under which he will have to operate and which will in any way affect the work under this contract. No subsequent allowance will be made in this connection in behalf of the Contractor for any error or negligence on his part.

Prior to ordering any materials or doing any work, verify dimensions at the site, correctness of dimensions will be this Contractor's responsibility. No extra charge or compensation will be allowed for differences between actual dimensions and dimensions indicated on drawings. Immediately report differences to Engineer and do not proceed with work until Engineer renders his decision.

800.8 CONCRETE, EXCAVATION, FILL AND BACKFILL:
Furnish all concrete, excavation, fill and backfill, and steel required for this work unless specifically noted otherwise.

Concrete shall be Class "A", 3000 p.s.i. and shall be mixed, placed and cured in conformance with M.A.G. Specifications.

Backfill conduit trenches in a manner to prevent disturbance to the pipes or conduits. Fill under and around pipes thoroughly to a point approximately 6" above the top of the pipe and compact.

Compaction of backfill shall be horizontal lifts not exceeding 6" in thickness. Compact to 85 percent of maximum density at optimum moisture content in accordance with local codes and standards.

All existing landscape and hardscape areas must be replaced in kind after construction of electrical trenches and installation of electrical equipment.

800.9 ELECTRICAL DRAWINGS:
The drawings are generally diagrammatic and indicate the manner, method and nature of the installation. The Specifications denote the style and quality of material and workmanship. Where a conflict exists between the Drawings and Specifications, promptly notify the Engineer. The Engineer will make the proper interpretation and his decision will be final.

Any items not mentioned in these specifications or not indicated on the plans but which are necessary for successful and efficient operation of the work shall be held to be implied and shall be furnished and installed as part of the contract.

800.10 STANDARD OF MATERIAL AND WORKMANSHIP:
All materials shall be new and shall conform to UL Standards in every case where such a standard has been established and shall bear the UL label. All work shall be performed in a workmanship manner in accordance with the best-accepted standards and shall present a neat mechanical appearance when completed.

Ratings of all electrical equipment shall be in accordance with National Electrical Manufacturers Association. (NEMA).

800.11 PAINTING:
All exposed electrical equipment, conduit, flush panel fronts, transformers, switches, switchboards, panels panel mounting boards, and similar items shall come powder coated from the manufacture or be primed and painted as specified under the Painting Section of the MAG Specifications per Owner's request. Paint color shall be a dark brown or tan color to blend in with the surrounding desert. Contractor shall submit color samples for review and approval by the Town.

800.12 TEMPORARY POWER:
Provide temporary power as required by the job. This service shall be maintained throughout the entire job as the work progresses.

800.13 CLEANING UP PROCESS:
At all times keep the premises free from accumulation of waste materials or rubbish caused by employees. Metal floor plans shall be provided for pipe threading machines and benches and shall be used at all times to prevent concrete floors from becoming oil soaked. Upon completion of the job remove all debris, clean all switchplates, fixtures, panel trims and in general leave the premises in a clean and tidy condition.

800.14 FINAL INSPECTIONS AND TESTS:
Furnish all meters, cable, connection and apparatus necessary for making tests.

Test system for shorts and grounds. Faulty wiring shall be removed and replaced. Any device, apparatus or fixture installed showing substandard performance shall be removed and replaced as directed by the Town Inspector.

800.15 UTILITIES:

800.15.1 Location Of Underground Utilities: The Contractor shall notify the interested "Utilities" prior to the start of construction, and shall ascertain the locations of the various underground utilities either shown on the plans and/or may be brought to his attention. The exact locations of these underground utilities shall be determined by excavations made by the Contractor prior to any trenching operations.

800.15.2 Damage to Existing Utilities: The Contractor shall assume full responsibility for all damage to all utilities due to his operations, and shall repair the damaged utilities as required herein, at his own expense. Damaged water and irrigation lines shall be replaced in kind.

800.16 GUARANTEE:
Fully guarantee all work under this Section for a period of one year from the date of final acceptance by the Owner, against imperfect workmanship or failure or malfunction of materials and/or equipment due to faulty or imperfect workmanship. Give this guarantee in writing to the Owner at the time of issuing final certificate. Work found to be defective within period shall be replaced without cost to the Owner.

800.17 SHOP DRAWINGS:
All data shall be submitted at one time, bound and indexed in an orderly manner. Prior to starting work, submit to the Engineer for approval, six (6) sets of shop drawings, panels, lighting fixtures, poles, and all other equipment to be fabricated.

800.18 DOCUMENTS:
The contractor shall preserve all manufacturers' paperwork that is shipped with equipment assemblies, lighting control panel components and field installed components. All literature accompanying each and every item shall be considered a part of that item such as specification sheets, installation instructions, operating and maintenance write-ups, etc.

As builts shall be provided to the Owner and shall be of the highest quality. Poor quality copies will not be accepted.

800.19 WIRE AND CABLE:

800.19.1 General: Conductors shall be soft drawn, annealed copper having conductivity of not less than 98% of that of pure copper, have a uniform in cross-section, free from flaws, scale and other imperfections. All interior branch wiring shall be Type "XHHW" 600 volt, unless otherwise

noted and a minimum of 12 AWG except for control wiring which shall be a minimum of 14 AWG. Wire 8 AWG and larger shall be stranded.

Manufacturers shall be Simplex, General Cable, Okonite, Rome Cable, Anaconda, General Electric and Kaiser or approved equal.

800.19.2 Installations: Install all wire and cable in conduit. No running splices in conduit shall be accepted. Make all above ground connections and splices for #10 wire and smaller with Buchanan "B-Cap", 3-M "Scotchlok", or Ideal "Wing Nut" preinsulated wire connector (sizes as recommended by manufacturer). Make connection and splices for #8 conductors and larger with solderless pressure or compression type connectors by O.Z., Burndy, Buchanan, T & B, or Illsco. Tape all splices with plastic so insulation is at least equivalent to insulation of conductor. Thoroughly clean ends before splicing. Where plastic tape is used and there is any danger of insulation damage from pressure of joint against non-current carrying metal parts, use friction tapes for additional protection. Vinyl plastic tape shall be Scotch #33 or Plymouth.

Make all underground cable and conductor splices in a pull box or j-box and connected and insulated with a Tyco Electronics Gelcap-sl or connected with copper compression h-tap connector or approved equal and insulated with a 3M Scotchcast splice kit 85 series or Tyco Electronics Gelcap.

All wires in panelboards, gutters, switchboards, wireways and pull boxes shall be neatly arranged with terminations located directly opposite terminals and routed in a neat and workmanlike manner through spaces where the wire passes.

Exercise due care when pulling wire and cable through raceways, to prevent conductors from kinking and injuring insulations. UL approved pulling compounds may be applied to the conductors to insure ease of pulling. Under no circumstances shall any medium containing water, acid or petroleum base be used. Leave no less than 6" or wire at each outlet for connection to lighting fixture, switch receptacle, and other pieces of equipment. Where wires feed through an outlet or junction box, neatly tuck a 6" long loop in bottom of box.

Control wiring and all other stranded wiring to screw connections shall be provided with T & B "STA-KON" terminals.

Solid conductors shall loop tightly and completely around terminal screws on all wiring devices.

800.20 CONDUIT RACEWAYS:
Conduit systems shall be rigid galvanized steel, non-metallic fiber or Polyvinylchloride (PVC) plastic as specified herein, or as indicated on the plans. All systems shall be continuous. Rigid steel conduit shall be heavy walled, hot dipped, galvanized or sheardized. Use rigid steel conduit in concrete slabs on grade, in exposed locations such as tunnels and equipment rooms, where exposed to weather, and where buried in earth. Make all joints with standard couplings

or unions; use of running threads is prohibited. Ream conduit ends after cutting use double lock nuts at terminations. Use insulated bushings throughout.

No conduit placed in a concrete slab be greater than ¾" trade size diameter and no conduit smaller than ½" shall be installed underground. No conduit shall be imbedded in a slab that is less than 3-½" thick except for local offsets. Unless otherwise noted or specified, tops of underground conduit or ducts shall not be less than 18" below grade. Assemble joints together using approved couplings to make watertight joints.

Schedule 40 PVC electrical conduits, UL listed may be used for direct burial of underground branch circuits (with bond wire). All bends shall be manufactured, not field made.

800.20.1 General: Stubs and risers above grade to panels and cabinets shall be rigid steel conduit and shall be grounded as described under "grounding". Where exposed, install conduit parallel to walls and partitions; do not cross-window openings.

All conduit bends 45 degrees and larger, and 2 inches and above shall be manufactured bends or field make with hydraulic bender.

Coat Metallic conduit below grade or encased in concrete with two coats of Koppers Bitumastic, or half lap with Scotch Wrap #50, minimum thickness to be 20 mils.
800.20.2 Conduit Fittings: Provide double lockouts and bushings at all rigid conduit terminations except at threaded hubs. Bushings shall be O.Z. type "A" molded bakelite except for 2" conduit and shall be O.Z. type "B" or type "BL" where groundings is required.

800.21 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS:

The neutral conductors and all other exposed non-current carrying metal parts as required by Code shall be grounded. Grounding bushings shall be used as required and shall be O.Z. insulated Type "BL", or approved equal. No grounding shall be made to gas piping. Where equipment or devises are served by non-metallic ducts, enclosure shall be grounded by means of a code size bare or green insulated equipment ground wire installed in the duct with the current carrying conductors and be bonded securely in each cabinet terminating the ground wire. Copper jumpers shall bridge flexible conduit and be installed with ground wire. All service grounds shall be in accordance with the "UFER" ground.

All panels containing ground or bonding wires shall be equipped with a ground bus for terminating all such wires.

See Concrete Section for description of concrete reinforcement grounding.

800.22 RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS:

800.22.1 Gutter, Pull boxes and Junction Boxes: Boxes shall be fabricated from code gauge steel without knockouts and a minimum 14 gauge front cover. Finish shall be galvanized steel or phosphate undercoating, with 2 finish coats hammer gray or bake enamel.

Junction boxes shown outside flush or surface mounted shall be watertight all welded construction with neoprene gasketed screwed covers NEMA Type 3R.

800.23 LIGHTING CONTROL DEVICES:

800.23.1 Lighting Contactors: Lighting contactors shall be sized to facilitate all the lighting circuits within the pedestal or panel, and shall be Square D, Cutler Hammer, Furnas, Allen Bradley, Siemens or approved equal.

800.24 ELECTRICAL CABINETS AND ENCLOSURES:

800.24.1 Nameplates: Provide lamicoid nameplates for all distribution switches, breakers, lighting and power panels, contactors, and any control equipment.

800.24.2 Electrical Service: The electrical service shall be as shown on the plans by the Utility Company. Provide all necessary material and labor required by the serving utility for delivery of power to the service entrance equipment.

800.24.3 Service Entrance Equipment: Service entrance shall be 12 gauge standardized, modular formed steel dead front construction, and front accessible. The enclosure shall be weatherproofed and factory painted per Owner's specifications with primer and rust inhibitor undercoat.

The service entrance shall have space and necessary provisions for metering current transformer and testing as required by the Power Company and P.U.E.S.R. Standards.
Main and branch feeder over-current devise shall be fusible or circuit breaker type and sized as noted on the drawings.

The switchgear assembly shall be braced for short circuit stress as noted on the drawings.

All distribution equipment shall be of the same manufacturer. Approved manufacturers are: Cutler Hammer, RSE-Sierra, Federal Pacific, General Electric, Square D, Sylvania, Siemens, Milbank or Myers.

All service entrance and all distribution equipment and panels shall have fully rated copper bussing.

800.25 EXTERIOR LIGHTING:

800.25.1 General: Work covered under this section includes manufacturing, equipping, wiring and assembling of all lighting fixtures. Provide lighting fixtures complete for each and every light outlet in the type, quality and size of fixture indicated on the drawings.

Check the drawings with the fixture schedules for completeness, as numbers on the schedule are for the purpose of indicating the general type, quality and size of fixtures that will be required. The use of catalog numbers for a fixture does not necessarily include all the required accessories that may be demanded for a complete installation.

Provide all light-sources, lamps and other light producing media called for and suitable for specified equipment and functions. Unless otherwise called for, all lamps operating without controlling ballasts or transformers, operate on 120 volts.

The use of a vendor's name and catalog number is for convenience in specifying the quality, style, size finish and performance required and does not intentionally exclude similar equipment available from other manufacturers. Judgment of equality shall be by the Engineer and his acceptance or rejection shall be final.

800.25.2 Installation of Lighting Fixtures: Installation of all lighting fixtures shall be done by qualified and experienced mechanics.

Protect the lighting fixtures from damage during their unloading or removal, storage or installation. Any broken fixtures, glassware, etc., must be replaced with new parts, without any additional expense to the Owner, undue delay or inconvenience.

Upon completion of the installation of the lighting fixtures and lighting equipment, they must be in first-class operating order and in perfect condition as to finish, etc. Check for proper operation and appearance, alignment of fixtures and proper placement of lenses, louvers, lamps and other light-controlling or modifying appurtenances.

Cleaning – Immediately prior to final inspection, damp clean all glassware, fixture trims, reflectors; clean lamps or install new lamps as directed, with glass and fixtures free of labels.

800.25.3 Lighting Fixtures: Certified copies of the testing laboratory's findings shall be submitted to the Engineer. No luminaire shall be ordered until approved by the Engineer.

Each luminaire shall be furnished with an instruction sheet, which clearly shows installation procedures and instructions for adjusting the lamp socket.

800.26 SOLAR POWERED ELECTRICAL SYSTEM:

800.26.1 General: Solar Powered Electrical System consists of the following components and assemblies: Photovoltaic (PV) Modules, Solar Electronics, Wiring, Batteries, Battery Enclosures, Mounting and Support Hardware.

800.26.2 Photovoltaic (PV) Module: Module shall be constructed as follows: 310 Watt Minimum Rating, 72 Cell Polycrystalline silicon solar cells, Framed in an all-aluminum structure, Sealed behind UV stabilized tempered glass, Covered by a 25 year 80% power warranty, Meet or exceed UL1703 standard, Harnessing and cabling is 12 AWG stranded wire with over molded insulated rated for exterior usage. Approved Manufacturers: Phono Solar; Conergy; Suntech; BP Solar; Kyocera; GEI; Sharp; Canadian Solar or owner approved alternate.

800.26.3 Solar Electronics: Consists of battery charge controller and inverter. Components shall be constructed as follows:

1. Conformal coated to prevent corrosion and failure due to water
2. Charge controller is designed without electrolytic capacitors. All other capacitor devices are de-rated by at least 20° C below the capacitor's maximum temperature rating under fully-loaded conditions and ambient temperature of 50° C
3. Minimum 10 year operational life when operating at minimum or maximum rated system environmental specifications (10° C to 50° C at 0 – 100% relative humidity, non condensing)
4. Designed and tested to withstand electrostatic discharges up to 15,000 V without impairment per IEC 801-2.
5. Withstand up to a 6,000 Volt surge without impairment of performance as defined by ANSI C62.41 Category A.
6. Manufactured in a facility that employ ESD reduction practices in compliance with ANSI/ESD S20.20.

Performance of the electrical components shall meet the following minimum specifications:

1. Charge Controller operates with temperature compensated limits ensuring battery charging algorithm protects battery(ies) from over and under voltage stress
   a. Charge controller adapts maximum (charged) voltage based on temperature (14V maximum at 21° C)
   b. Charge controller prevents discharge below temperature compensated battery Low Voltage Disconnect (LVD) limit (11.5V at 21° C)
2. Charge controller never discharges more than 20% depth of discharge per night
3. Charge Controller Approved Manufacturers: Schneider C40; Morningstar; SEPCO; ASC; aiSUN, or owner approved alternate.

800.26.4 Batteries: Components shall be constructed as follows:

1. Separate sealed valve regulated gel cell type 250 Ah batteries

2. Maintenance free, non-hazardous
3. Capable of over 2000 cycles
4. Deep cycle technology
5. Maintains over 80% of charge after 2 months if left disconnected
6. Operating temperature range: Discharge: -40°F (-40°C) to +160°F (71°C) Charge: -10°F (-23°C) to +140°F (60°C)
7. Warranted for a minimum of three (3) years, and an additional pro-rated warranty to cover two additional years (five total years).
8. Approved Manufacturers: MK; DEKA; NRG Life; SunXtender; OutBack or owner approved alternate.

800.26.5 Battery Enclosure: Components shall be constructed as follows:

1. All heavy gauge aluminum vented enclosure
2. Aluminum doors with police keyed notches for securing the door during service
3. NEMA 3R rated
4. Holds up to 4 large-size batteries to a maximum enclosure weight of 600 lbs.
5. All battery wire terminals and harnessing connect via quick-connect type with keyed connections to prevent miss-wires
6. Wire harness is finished to prevent accidental shorts
7. Terminal covers, ring washers, terminals, etc. are non-corrosive non-rusting

800.26 MEASUREMENT AND PAYMENT:

Measurement and payment of for all electrical components shall be as specified above, indicated on the plans and reflected in the bid tabulation form. The cost for all electrical elements of work shall include all necessary materials and labor for a complete, functioning and Town of Fountain Hills approved electrical system.

Add the following new Section:

SECTION 900
SITE FURNISHINGS

900.1 DESCRIPTION:
Work specified in this item shall include all labor, equipment, and materials to provide and install the site furnishings as shown in the project plans and details and in accordance with the manufacturer's specifications and these special provisions.

900.2 MATERIALS:
The following site furnishings shall be surface mounted:
Picnic Tables (Standard and ADA)
Litter/Trash receptacle
Pet Waste Station
Bick rack

The project picnic tables, bench and bike rack shall be provided as specified on the plans.

Picnic Tables shall be provided by the contractor as part of this effort. Picnic Tables shall be as manufactured by Webcoat Model T46WEBCLASSPSM, and Model T46WEBCLASS-3SM (ADA) with Anti Vandalism Bar. Each model shall have the manufacturer provided anchor bracket and anchor bracket cover model SMLCOVER. Contractor shall provide and install a set of four brackets for each table per manufacturer instructions.

Litter/Trash Receptacle: Litter/Trash receptacle shall consist of furnishing all materials, equipment and labor necessary to purchase and install the pre-manufactured trash receptacle as produced by WAUSAU Tile Model TF1170 with TF2091 Snuffer in conformance with the manufacturer recommendations.

Bike Rack: Bike Rack is to be constructed from a combination of metal I-beams, Rebar in a concrete footing. Bicycle Rack shall be constructed in accordance with the details shown on the project plans and MAG Section 515, 727 except as specified herein

Materials for the litter/trash receptacle The product is a pre-manufactured exposed aggregate trash receptacle as specified and shown on the plans. Contractor shall make arrangements to have product delivered to the site relative to the proposed construction schedule.

Materials for the bike rack shall conform to the requirements specified on the plans and these special provisions.

- The contractor shall furnish complete copies, in triplicate, of all mill reports on steel materials furnished.

- Other structural steel shall conform to ASTM A36.
- Anchor bolts shall conform to the requirements of ASTM A307.

Re-Bar

All re-bar called for use on the bicycle rack shall comply with MAG Section 727.

900.3 CONSTRUCTION REQUIREMENTS:

All site furnishings shall have shop drawings and submittals provided for review and approval by the Town of Fountain Hills per MAG standard section 105 Control of Work. Submittals shall include samples of the custom powder coat color on a 5 inch by 5 inch metal square. Sample should be reflective of the surface preparation, prime coat, and final top coat finish of the site furnishings. Contractor will be required to provide as many samples as required, up to five (5) sample panels for each color to achieve the aesthetic intent and quality of workmanship to the satisfaction of the Engineer. No separate measurement or payment will be made for the samples the cost of which is considered included in the price of the site furnishing.

All site furnishings shall be placed in the field and have the layout reviewed and approved by the Engineer prior to final installation.

All site furnishings shall be installed per manufacture specifications and as shown on the project plans and details.

All hardware to bolt equipment shall be stainless steel and tamper resistant. Any anchor bolt connection shall have nut tack welded to bolt.

Picnic Tables and brackets for attaching tables to the concrete pad shall be provided by the contractor and installed at the Ramada

Bike Rack will require welding of structural tubing and rebar shall conform to the requirements of the American Welding Society, Structural Welding Code, D1.1 current edition.

Bike Rack field welds shall be full penetration welds.

Working drawings for the Bicycle Rack and design calculations for erection details and methods shall be developed and submitted in accordance with MAG Section 105.02 Plans and Shop Drawings. Working Drawings shall be unique drawings and not standard forms requiring filling in blank spaces unless all extraneous information is deleted and standard forms provide an exact description of work. All relative design information such as member sizes, welding details, construction details, erection details and general notes shall be clearly shown. Drawings shall have cross-referenced details and sheet numbers. The Contractor shall clearly indicate on the working drawings all shop welds and field welds.

Bike Rack Weld Inspection:

Bike Rack weld inspections shall include at a minimum, at least one foot of weld for each size and type of weld and type of joint shall be tested using nondestructive testing (NDT). The entire weld shall be tested when rejectable discontinuities are found in any test length of the weld. All testing shall be in accordance with the American Welding Society, Structural Welding Code, D1.1 current edition. All welds shall be visually inspected.

Fabrication:

All post for bike rack shall be plumb after installation. Out of plumb tolerance shall be 1/8 inch per 10 feet.

Properly accredited, experienced certified welders, in accordance with the American Welding Society, shall perform all welding. Each welder shall submit to the Engineer satisfactory evidence of experience and skill in welding structural steel joints in the positions required.

900.4 MEASUREMENT AND PAYMENT:

Payment will be made for Picnic Tables complete in place as shown on the drawings. Payment for Picnic Tables as shown on the drawings shall be made based on the price bid per Each complete and in place and including all brackets to attach tables to concrete pad, all hardware including anti-vandalism bar, and all equipment, materials, labor and incidentals necessary for complete installation of the Picnic Tables.

Payment will be made for Litter Receptacle complete in place as shown on the drawings. Payment for Litter Receptacle as shown on the drawings shall be made based on the price bid per Each complete and in place and including all Litter Receptacle, hardware and all equipment, materials, labor and incidentals necessary for complete installation of the Litter Receptacle.

Payment will be made for Pet Waste Station complete in place as shown on the drawings. Payment for Pet Waste Station as shown on the drawings shall be made based on the price bid per Each complete and in place and including all Pet Waste Station, hardware and all equipment, materials, labor and incidentals necessary for complete installation of the Pet Waste Station.

Payment will be made for Bike Rack complete in place as shown on the drawings. Payment for Bike Racks as shown on the drawings shall be made based on the price bid per Each complete and in place and including all hardware and all equipment, materials, labor and incidentals necessary for complete installation of the Bike Rack.

Add the following new Section:

SECTION 910
ENTRY SIGNAGE

910-1 Description

The work under this section shall consist of furnishing all materials and constructing an entry sign that is developed from a curved retaining wall utilizing non-galvanized welded wire mesh gabion baskets in accordance with the details shown on the plans and the requirements of these specifications to create the curved entry signage gabion retaining wall shown on the plans, including furnishing all materials, equipment and labor necessary to construct the entry sign with the metal I-Beam.

The retaining wall shall be constructed through the use of gabion baskets which shall be filled with rock salvaged, stockpiled and used in the baskets. The baskets shall be a non-galvanized 9 gauge welded wire baskets and shall be constructed at the locations and as shown on the project plans.

910-2 Materials

Rock to Fill Gabion Basket:

Rock for the Gabion Baskets associated with the Entry Signage shall be in compliance with the Rock Specified under Section 220.

Structural Steel for I-Beam Signage:

Materials shall conform to the requirements specified on the plans and these special provisions. The contractor shall furnish complete copies, in triplicate, of all mill reports on steel materials furnished.

Structural steel shall conform to ASTM A36.

Carriage Bolts shall conform to the requirements of ASTM A307.

Welding of structural tubing shall conform to the requirements of the American Welding Society, Structural Welding Code, D1.1 current edition

Brushed aluminum lettering secured to I-Beam – Contractor shall submit sample letters of each size along with means and methods used to attach the letters to the I-Beam for Town review and approval prior to any installation.

Town Logo imprinted on the specified metal plate as detailed on the plans and as approved in advance by the Town of Fountain Hills for all fonts, colors and ultimate size of the Town Logo. Contractor shall submit shop drawings and means and methods that will be used to replicate the

Town Logo on the metal background disc for Town review and approval prior to any fabrication. Submittal shall include all colors, text fonts and materials proposed. Method and materials uses shall be proven through identification of past installations provided to the Town for review that demonstrates how the product and technique were used in Arizona in a public outdoor area with no fading or maintenance issues. Town approvals required prior to any fabrication.

Metal Items for Gabion Basket:

Metal and all items for the Gabion Baskets associated with the Entry Signage shall be in compliance with the Rock Specified under Section 220.

Pipe for Drainage:

Wall drainage shall be conveyed through a series of connected 4" Perforated Polyvinyl pipes that shall be in conformance with ADOT Section 506—2.01 (D) Corrugated polyvinyl chloride plastic pipe with a smooth interior surface. The surrounding drainage aggregate shall be in compliance with ADOT Section 506-2.03.

910-3 Construction Requirements

General:

The construction of the Gabion Baskets associated with the Entry Signage shall be in compliance with the Gabion Construction Specified under Section 220.

910-4 Method of Measurement

Entry Monument will be measured as a single, complete unit of work, per each installed including the baskets, rock, and footings, all hardware, Metal I-Beam with lettering, Footings, Hardware Connections, Town Logo, complete and in place each element secured per the details on the plans.

910-5 Basis of Payment

Entry Monument measured as provided above, will be paid for at the contract unit price per each, which price shall be full compensation for the work, complete in place including fabrication and erection, metal I-Beam with lettering, footings, and all other connections as described and specified herein and on the project plans.

Add the following new Section:

SECTION 915
AUTOMATIC GATE OPENING AND CLOSING SYSTEM
(BID ALTERNATE)

915-1 Description

The automatic gate opening and closing system (**Bid Alternate**) units (one for the entry gate and one for the exit gate) should both be designed to handle 75 cycles per hour and support gates weighing up to 610 lbs, with a length of up to 19ft-1in. and should have a traveling speed of 12 inches per second. The work shall include all electrical equipment and power supply, all equipment and materials, the gate key posts and associated equipment, and labor to install and test the system with the Town to verify that the system is 100% operational.

915-2 Materials

The following represent in a broad sense the materials and functions of the gate systems and should not be considered all inclusive. The materials that are expected to be provided with the Automatic Gate Opening System for each of the proposed gates entry and exit are as follows. This list was developed around the use of the model CSW-200-UL Swing Gate as manufactured by Elite gate openings, other gate systems can be submitted for approval to the Town for the following MAG Section 106.

Modular Board – Uses LEDs to indicate all input and output functions of the gate operator.
ERD – If the gate hits a vehicle while closing, it reopens. If it hits a vehicle while opening, it stops, reverses 4 to 6 inches and stops again.
Digital Motor Protection – Entrapment sensor shuts off the motor after it reaches the stall amp for 3 seconds, reverses direction for several inches, and stops.
Electronic Inputs – Radio receiver, key switch, safety loop, center loop, fire dept. key switch & 3-push-button station. Timer – Adjustable timer can be set from 3 to 60 seconds.
Power Input On/Off Switch – Controls power input to the board with convenient switch.
Power Management – Board includes electronic power management with over current shutdown and automatic recovery.
Magnetic Lock – With Omni Option board, magnetic lock system is incorporated, allowing the "MG1300" electromagnetic locking system to the gate to operate.
Burglar Alarm – With Omni Option board, interfaces with existing alarm output.
Three Push Button Control – On board gate operator control for close, stop, and open.
Intelligent Master/Slave – Precise, synchronized movement and communication between two gate operators using 3 wire RS-485 bi-directional technology.
Spike Suppressors – 20,000 Amps and near lightning protection with modular omni surge suppressor. Initial response time: 0.000000000001 seconds.
Alternate Outputs – With Omni Option Board 3 push button command control, burglar alarm input and output.

Gate Traveling Time – Adjusted by a precision mechanical device and electrical limit switch system.
Soft Stop – Gate travels through the cycle at normal speed and comes to a stop slowly for more accurate gate cycle. Equipped with integrated time delay for long mechanical life expectancy
Integrated Loop Detectors – Easy to install, modular, plug in loop detector inputs for exit loop, center loop, and safety loop.
120 VAC Power – Built-in 120 VAC power receptacle (NEMA 5-15).
Motor Drive – Solid-State electronic motor drive system is incorporated into board.
Safety Alarm – If the gate hits an object twice while opening or closing, the system will shut down. After five minutes the system will automatically reset itself. To reset the system during the five minutes, a manual reset button must be used.
Chassis – Constructed with 1/4" sanded, welded, and gold zinc plated sheet metal.
Worm Gear Reduction – Two 30-to-1 worm gears equal a 900-to-1 reduction. Both are lubricated in an oil bath.
Motors – (2) 1hp, instant reversing, 120VAC, 4 amp,1625 rpm, high speed ball bearings.
Cover – Stainless steel for excellent heat and corrosion resistance.
Finishing – All metal parts are gold zinc plated for rust proof protection.
Emergency Release – The gate is easily disconnected by use of the DC-1000U™.
Cycles – 75/hr. with 610 lb. gate.
Swing Arm –Non-scissor type arm action.
Output Shaft – 2 1/2" cold rolled steel.
Capabilities – Maximum gate length 18'. Maximum gate weight 600 lbs.
Gate Traveling Speed* – 90° opening in 13-15 seconds.
Dimensions – L20.5" X W15" X H28" ST model: L19" X W14" X H28"
Weight : 160 lbs.
Shipping Weight : 175 lbs.
Stainless Steel Cover : 179 lbs.
Approval – ETL and UL Listed and compliant to UL325 and UL991 standards.

The Town requires that the gate include the following: The gate system shall be equipped with a programmable timer that the Town can set based on trail head hours of operation and the season that it is being programmed to accept. The timer shall be capable of opening and closing the gate system at the predetermined times. The system is to have loop detectors for the exit gate that are programmed to open the exit gate after park hours to allow those trail users in the area to safely exit the park. The system shall have a preemptive strobe light or trigger system that is set up to accept only the signal from the Town's emergency vehicle system. This preemptive system shall be capable of opening both the entry and exit gates. Contractor shall ensure that the system that is installed for this preemptive mechanism shall be compatible with the Town's emergency vehicle system.

915.3 Construction Requirements:

Contractor shall install gate opening system in compliance with manufacturer specifications. Automatic opening sequence in case of emergency, automatic timer, magnetic lock use, preemptive strobe system, gate key posts, loop detectors, and all materials and equipment are all considered incidental to the installation of the system and are to be included in the cost of installing the automatic gate opening system.

915.4 Method of Measurement:

Automatic Gate Opening System (Bid Alternate) will be measured by the lump sum and include the same system for opening and closing both the entry and exit gates at locations shown on the plans including all electrical materials and labor.

915.5 Basis of Payment:

Automatic Gate Opening System (Bid Alternate) will be paid for by the lump sum price shall include the same system for opening and closing both the entry and exit gates at locations shown on the plans, including preemptive strobe system in accordance with Town's Fire and Parks and Recreation Departments, Magnetic Lock system, automatic timer opening/closing sequence for safety personnel, and coordinating power requirements and hookups. All of these efforts and systems shall be considered incidental to the overall gate cost.

Add the following new Section:

SECTION 920
ACCESS CONTROL GATES TO FIRE ROAD
MAIN ENTRY GATES

920-1 Description

The work under this special provision shall consist of furnishing all materials, equipment and labor necessary to construct the Access Control Gates to Fire Road for access control to the fire road and the Main Entry Gates for entering and exiting the site in conformance with the details on the Project Plans, in accordance with these specifications and as directed by the Engineer.

Access Control Gates to Fire Road and Main Entry Gates shall be constructed in accordance with the details shown on the project plans and MAG Section 515, except as specified herein.

910-2 Materials

Structural Steel:

Materials shall conform to the requirements specified on the plans and these special provisions.

The contractor shall furnish complete copies, in triplicate, of all mill reports on steel materials furnished.

Tubular structural steel shall conform to the requirements of ASTM A588 with a minimum yield stress (Fy) of 46,000 psi.

Other structural steel shall conform to ASTM A36.

Anchor bolts shall conform to the requirements of ASTM A307.

Copper Plate

The copper plate used in the main entry gates is to be welded or secured to a ¼" metal backing (non-galvanized) and then attached by welding to the re-bar frame that is part of the gate design. Contractor shall submit samples of the copper plate and method of attaching both to the plate backing and the entry/exit gates for approval.

Re-Bar

All re-bar called for use on the main entry gate shall comply with MAG Section 727. Contractor shall submit paint draw down samples of the powder coat color to be used on rebar (Ocotillo canes) tips with color to represent flowering Ocotillo canes as noted per plans.

910-3 Construction Requirements

Welding of structural tubing and rebar shall conform to the requirements of the American Welding Society, Structural Welding Code, D1.1 current edition.

Field welds shall be full penetration welds.

Working drawings for the Access Control Gates to Fire Road and Main Entry Gates and design calculations for erection details and methods shall be developed and submitted in accordance with MAG Section 105.02 Plans and Shop Drawings. Working Drawings shall be unique drawings and not standard forms requiring filling in blank spaces unless all extraneous information is deleted and standard forms provide an exact description of work. All relative design information such as member sizes, welding details, construction details, erection details and general notes shall be clearly shown.

Drawings shall have cross-referenced details and sheet numbers. All drawings and design calculations shall be signed and sealed by a Professional Structural Engineer registered in the State of Arizona. The Contractor shall clearly indicate on the working drawings all shop welds and field welds.

Weld Inspection:

At minimum, at least one foot of weld for each size and type of weld and type of joint shall be tested using nondestructive testing (NDT). The entire weld shall be tested when rejectable discontinuities are found in any test length of the weld. All testing shall be in accordance with the American Welding Society, Structural Welding Code, D1.1 current edition. All welds shall be visually inspected.

Fabrication:

All post shall be plumb after installation. Out of plumb tolerance shall be 1/8 inch per 10 feet.

Properly accredited, experienced certified welders, in accordance with the American Welding Society, shall perform all welding. Each welder shall submit to the Engineer satisfactory evidence of experience and skill in welding structural steel joints in the positions required.

910-4 Method of Measurement

Access Control Gates to Fire Road (Steel Structure, Post, Foundations,, Reflectors, Etc.) as detailed on the plans will be measured as a single, complete unit of work, at a lump sum costs.

Main Entry Gates (Steel Structure, Post, Re-Bar, Hinges, Copper Plate, Rebar Ocotillo, Gate Enhanced Art Work, Foundations, Reflectors, Etc.) as detailed on the plans will be measured as a single, complete unit of work, at a lump sum costs.

910-5 Basis of Payment

The accepted quantities of Access Control Gates to Fire Road (Steel Structure, Gate Post and Stop Post, Hinges, Foundations, Reflectors, Etc..) measured as provided above, will be paid for at the contract unit price per lump sum which price shall be full compensation for the work, complete in place including fabrication and erection, footings

Main Entry Gates (Steel Structure, Post, Re-Bar, Hinges, Copper Plate, Rebar Ocotillo, Gate Enhanced Art Work, Foundations, Reflectors, Etc.) measured as provided above, will be paid for at the contract unit price per lump sum which price shall be full compensation for the work, complete in place including fabrication and erection, footings,

Add the following new Section:

SECTION 925
INTERIM UTILITIES
(BID ALTERNATE)

925-1 Description

The work under this special provision shall consist of furnishing all materials, equipment and labor necessary to install the entire interim utility effort for water storage and delivery, restroom fixture modifications and valving, sewage collection and solar electric as shown on the plans, details and specified herein.

Drawings and general provisions of the Town Contract, including General and Supplementary Conditions, Town of Fountain Hills modifications to MAG Standard Specifications and Details and MAG Standard Specifications and Details apply to this Section.

Due to the unknown nature of the permanent utility infrastructure that may be available at the site when this construction commences the Town of Fountain Hills reserves the right to award this interim utility bid alternate as either a lump sum bid award or on a line item by line item award basis as identified on the bid tab price sheet. The individual bid items shall be bid for that effort complete and in place 100% operational and acceptable to the Town.

925-2 Materials

SUBMITTALS

Water Tank

A. Product Data: For the type of facility elevated, potable-water storage tank, include rated capacities, accessories, appurtenances, and furnished specialties.
B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details for the elevated, potable-water storage tank, including the following:
    i. Tank Shell
    ii. Plans, elevations, sections, and attachment details
    iii. Structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Engineering Responsibility: Preparation of data for elevated, potable-water storage tank, accessories, specified appurtenances, steel supports and bracing (if required), and concrete supports and foundations, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
    iv. Lightning protection.

Sewage Collection Tank

A. Product Data: For each the pre-cast concrete Sewage Collection tank as indicated on the plans
   i. Include construction details, material descriptions, dimensions of individual components, and profiles.
   ii. Include manhole openings, covers, and pipe connections.

B. Shop Drawings: Pre-Cast Concrete Vault
   i. Include manhole openings, covers, pipe connections, and accessories.
   ii. Include piping with sizes and invert elevations.
   iii. Include underground structures.
   iv. Include other utilities.

Solar Collection System

A. All Solar submittals shown on project plans contractor shall include all devices and submittals required to complete the solar collection and distribution installation to the Town for Approval.

Restroom Building Modifications

A. All restroom building submittals related to the building's plumbing and electrical modifications to adapt building to interim utilities are as shown on project plans contractor shall include all submittals required to adapt the building to these interim connections to the Town of Fountain Hills for approval.

Decomposed Granite on Interim Roadway Surface and Surrounding Water Tank and Solar Collection Area

A. Submit minimum of 5 gallon bucket sample of 3/4" decomposed granite sample to the Town of Fountain Hills for approval.

MATERIALS

Water Tank

A. Water Tank Design was based on the use of a tank that matches the following:
   i. Norwesco Manufacturing model no. 41377 Dark Green color.
   ii. 5,000 Gallon capacity ("Tuna Can"), 880 lbs dry weight, 141" (inch) diameter x 86" (inch) overall height, 22" (inch) diameter tank opening with lockable hinged lid with ring and vent, 1 ½" (inch) top fill inlet, 2" (inch) stainless steel lockable ball valve drain with Teflon seats and seals.
   iii. Minimum tank rating of 9.2 lbs per gallon.

iv. Polyethylene resin that meets FDA specifications is corrosion resistant and lightweight with no seams, welds, or joints.
v. Three (3) year limited warranty.
vi. Flex elbows at plumbing connections as required per manufacturer's specifications (not recommended to install hard-plumbed connections due to the expansive/contractive characteristics of polyethylene).
vii. One (1) Poly Welder Pro Plastic Repair Kit – Green including a heavy-duty 200W welding iron with teardrop tip, welder stand, 5" (inch) x 10" (inch) stainless steel reinforcing mesh, and 10' (feet) of green polyethylene welding strips.

Holding Tank

A. Holding Tank Design was based on the use of a tank that matches the following:
   i. Jensen Precast Concrete model no. HZ-5000.
   ii. Description: ASTM C 1227, precast, reinforced-concrete tank and covers; single chamber.
   iii. Designed for traffic loading (H-20).
   iv. Manholes: 24" (inch) minimum diameter opening with reinforced-concrete risers to grade and access lid with steel lift rings.

Solar Collection System

A. All solar materials are as shown on project plans but contractor shall provide and install all materials necessary for a complete and functioning solar collection and distribution system.

Restroom Building Modifications

A. All restroom building modifications are as shown on project plans but contractor shall provide and install all materials necessary elements and features for a complete and functioning restroom building utilizing the interim utilities including valving in the off position all potable drinking water sources and human contact water sources.

Decomposed Granite on Interim Roadway Surface and Surrounding Water Tank and Solar Collection Area

A. 3" (inch) depth layer of 3/4" (inch) minus decomposed granite material per Section 430.13.1 water settled and compacted per these specifications- see Section 430.4.

Chainlink Fence Enclosure with Gates

A. 6' (feet) height chainlink fence enclosure with dual 6' (feet) wide swinging access gates surrounding water tank and solar panels as shown in Civil Water Line Plan

and Civil Details per MAG Specification 772 and MAG Standard Detail 160 without Razor Wire.

EXECUTION

Water Tank

A. Grade pad for Water Tank as shown on plans.
B. Compact sub-base per MAG Section 301.
C. Install specified aggregate base course per MAG Section 310.
D. Erect and level water-storage tank and all associated parts according to AWWA D100 and manufacturer's instructions and specifications.
E. Install lightning protection according to manufacturer's specifications.
F. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
    i. Connect tanks to water-distribution piping as shown on plans and per tank manufacturer's specifications.
    ii. Extend piping to Restroom and Irrigation System Connections as shown on plans. Waterline installation shall comply with MAG Section 610.

Holding Tank

A. Excavating, trenching, and backfilling for all pipe connections and tank as shown on plans
    i. Stockpile topsoil for reuse in finish grading without intermixing with other excavated material. Stockpile materials away from edge of excavation and do not store within drip line of remaining trees.
    ii. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
    iii. Excavate sufficient width and length for tanks to depth determined by tank inlet elevation **(note hard dig is anticipated with this excavation and shall be included and incidental to the cost of excavation for this tank installation)**. Provide level bottom in compliance with manufacturer instructions.
    iv. Backfill with excavated soil, mounding soil above original grade without compacting.
B. Install precast concrete holding tanks according to ASTM C 891 at correct invert level as indicated on plans set level and plumb.
C. Comply with requirements for sewer pipe installation from main sewer line collection to the pre-cast concrete holding tank as specified in MAG Section 615, Town of Fountain Hills requirements and as shown on the plans.

Solar Collection System

A. Install all solar collection and distribution elements and features for a complete and functioning solar collection and distribution system.

Restroom Building Modifications

A. Install all restroom building modifications for a complete and functioning restroom building utilizing the interim utilities including valving in the off position for all potable drinking water sources and human contact water sources. Replace all toilet fixtures from those noted in plans (for use with base bid) to utilize low pressure / low flow fixtures capable of proper use with a maximum of 20 p.s.i. water pressure.

Decomposed Granite on Interim Roadway Surface and Surrounding Water Tank and Solar Collection Area

A. 3" (inch) depth layer of 3/4" (inch) minus decomposed granite per Section 430.13.1 shall be installed over width of existing dirt access road from end of pavement drive to north of water tank location and within water tank fenced enclosure as shown per Surface Materials Plan. This decomposed granite shall be water settled and compacted per these specifications- see Section 430.4.

FIELD QUALITY CONTROL

Water Tank

A. Contractor shall engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
    i. Leak Test: Comply with AWWA D100 and NFPA 22. Fill tanks with potable water and test for leaks after installation. Repair leaks and retest until no leaks exist.
        1. Water shall be provided and installed by the Contractor for the test from approved water source by Town.
C. Clean interior and exterior of elevated potable-water storage tank.
D. Disinfect elevated, potable-water storage tanks and water line to restroom and irrigation system according to MAG Section 611 and the Town of Fountain Hills requirements.
E. Following approval by the Town of that the installation is in compliance with plans, specifications and manufacturer requirements Contractor is responsible to completely fill the tank with potable water.

Holding Tank

A. Contractor shall test and have Town of Fountain Hills inspect components, assemblies, and equipment installations, including connections prior to any backfilling operations of pipe connections and tank.
B. Fill underground structures with water and let stand overnight. If water level recedes, locate and repair leaks and retest. Repeat tests and repairs until no leaks exist.

i. Water shall be provided and installed by the Contractor for the test from approved water source by Town.

C. Clear interior of piping and structures of dirt and other superfluous material as work progresses.

Solar Collection System

A. Review with Town all solar collection and distribution systems to verify that they are 100% operational.

Restroom Building Modifications

A. Review with Town all restroom building modifications that the building is complete and functioning restroom building utilizing the interim utilities including the valving in the off position for all potable drinking water sources and human contact water sources. Replace all toilet fixtures from those noted in plans (for use with base bid) to utilize low pressure / low flow fixtures capable of proper use with a maximum of 20 p.s.i. water pressure.

925-3 Method of Measurement

The instillation of all of the materials needed to complete the installation of the interim utilities will be measured as a single, complete unit of work, at a lump sum costs that would be derived from totaling the work for each item independently as broken out on the bid tab price sheet. Note: **Due to the unknown nature of the permanent utility infrastructure that may be available at the site when this construction commences the Town of Fountain Hills reserves the right to award this interim utility bid alternate as either a lump sum bid award or on a line item by line item award basis as identified on the bid tab price sheet. The individual bid items shall be bid for that effort complete and in place 100% operational and acceptable to the Town.**

925-4 Basis of Payment

The accepted quantities of the interim utilities measured as provided above, will be paid for at the contract unit price per lump sum or line item by line item which price shall be full compensation for the work, complete in place including all testing and inspections.

Site Geotechnical Appendix

- Geotechnical Report - Existing Road Fill and Subgrade
- Geotechnical Report Seismic Refraction Tests

Geotechnical Engineering Report
Evaluation of Existing Road Fill and Subgrade
Adero Canyon Trailhead
Fountain Hills, Arizona
RAMM Project No. G23225
Revised 7-13-16

Registered Professional Engineer (Civil)
CERTIFICATE NO.
10971
KENNETH L.
RICKER
Date Signed 7-13-16
ARIZONA U.S.A.

Expires 3/31/2019

For:
J2 Engineering and Environmental Design, LLC
4649 East Cotton Gin Loop, Suite B2
Phoenix, Arizona 85040

◆◆◆

By:
Ricker • Atkinson • McBee • Morman & Associates, Inc.
2105 South Hardy Drive, Suite 13
Tempe, Arizona 85282

R·A·M·M

RICKER • ATKINSON • McBEE • MORMAN & ASSOCIATES, INC.

Geotechnical Engineering • Construction Materials Testing

J2 Engineering and Environmental Design, LLC
4649 East Cotton Gin Loop, Suite B2
Phoenix, Arizona 85040

July 11, 2016

Attention: Jeff Holzmeister, P.E.

RAMM Project No. G23225
Reference RAM Project No. G11251
Revised 7-13-16

Subject: Geotechnical Engineering Report
Evaluation of Existing Road Fill and Subgrade
Adero Canyon Trailhead
Fountain Hills, Arizona

Attached to this letter is the Geotechnical Engineering Report for the Evaluation of the Existing Road Fill and Subgrade along the alignment of the proposed Adero Canyon Trailhead.

The existing dirt road through the proposed Adero Canyon Trailhead has been partly filled with material from an unknown off-site location. The materials are being evaluated for use as fill throughout the proposed trailhead facilities. Recommendations for the trailhead site development, structure and pavement are presented in our referenced Geotechnical Report RAM Project No. G11251. The results of our field explorations; laboratory testing; and engineering analysis, evaluation and recommendations are presented in this report.

If you have any questions, please do not hesitate to call.

Respectfully submitted,
RICKER • ATKINSON • McBEE • MORMAN & ASSOCIATES, INC.

Registered Professional Engineer (Civil)
CERTIFICATE NO.
10971
KENNETH L.
RICKER
Date Signed 7-13-16
ARIZONA U.S.A.

Expires – 3/31/2019

By: Kenneth L. Ricker, P.E.

/dh
Copies to: Addressee (2 + jholzmeister@j2design.us)

2105 South Hardy Drive, Suite 13, Tempe, AZ 85282-1924 • Telephone (480) 921-8100 • Facsimile (480) 921-4081
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Registered Professional Engineer (Civil)
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KENNETH L.
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Date Signed 7-13-16
ARIZONA U.S.A.

Expires 3/31/2019

REPORT

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INTRODUCTION

This report presents the results of our geotechnical engineering services for Evaluation of Existing Road Fill and Subgrade along the alignment of the proposed Adero Canyon Trailhead to be located in Fountain Hills, Arizona. The scope of our services included performing a field exploration program, laboratory analysis and geotechnical engineering evaluation, analysis and recommendations. The geotechnical recommendations presented herein consist of site development, material suitability and requirements. We would be pleased to discuss with you any additional recommendations you may require. In addition, we are available to review project specifications and plans for conformance with our recommendations at no charge to you.

This firm should be notified for additional evaluation and recommendations should the building design parameters (locations, types, sizes, structural loads), site use or conditions encountered during construction differ from those presented herein.

PROPOSED CONSTRUCTION

The existing dirt road through the proposed Adero Canyon Trailhead has been partly filled with material from an unknown off-site location. The materials are being evaluated for use as fill throughout the proposed trailhead facilities. Recommendations for the trailhead site development, structure and pavement are presented in our referenced Geotechnical Report RAM Project No. G11251.

SITE CONDITIONS

The proposed Adero Canyon Trailhead site is located at the north end of Eagle Ridge Drive, about two miles from Palisades Boulevard, in Fountain Hills, Arizona. At the time of our field exploration, the site was steeply sloping native desert land. The site surface contains various desert plants and a narrow dirt road which had been partly filled at various locations along the alignment by loose to medium dense off-site fill material.

FIELD EXPLORATIONS

Subsurface conditions at the site were explored by excavating four test pits to a depth of 2.0 to 8.0 feet in the existing fill areas, as shown on the Site Plan in Appendix A. The test pits were excavated with a rubber tired John Deere all-wheel-drive backhoe using a 24-inch wide bucket. The equipment and crew were provided by Wildcat Drilling, Inc. The test pit locations were determined in the field by a field technician from our firm who also directed the field crew. During the field

explorations, representative disturbed samples were obtained, the test pits logged and soils field classified by our field technician. The results of the field explorations are presented on the Test Pit Logs in Appendix A.

LABORATORY ANALYSIS

Representative samples obtained during the field exploration were subjected to the following tests in our laboratory.

Type of Test	Type of Sample	Number of Samples Tested
Percent Passing No. 200 Sieve & Atterberg Limits	Representative	8
Standard Proctor, ASTM D 698-Method A	Representative	4

The results of the laboratory tests are presented in Appendix B.

SUBSURFACE CONDITIONS

The subsurface conditions encountered at the test pit locations were somewhat variable. The results of the test pits are presented in Appendix A in the Test Pit Logs. In general, the surface and near surface soils encountered at the test pit locations, and extending to depths of 1.0 to 5.0 feet consisted of loose to medium dense gravelly sand with some silt fill. The fill soils contained low plasticity fines and were underlain by dense to very dense gravelly sand with a trace to some silt/clay with low plasticity fines which were underlain by granite bedrock on which refusal to backhoe penetration occurred at depths of 2.0 to 8.0 feet. Soil moisture contents were nearly dry throughout the depths explored. No groundwater was observed in the test pits during the drilling operations.

SITE DEVELOPMENT RECOMMENDATIONS

Concrete Slab-On-Grade and On-Site Pavement Support:

The near surface fill and native soils are of low plasticity and, when compacted and wetted, these soils will exhibit low potentials for expansion. These soils may be used as fill in all areas. Exterior slabs and pavements should be founded on a prepared subgrade. Any fill and/or disturbed soils should be removed from concrete slab-on-grade and pavement areas and may be reused as fill. All unreinforced slabs-on-grade and PCC pavement should be jointed in accordance with ACI (American Concrete Institute) or PCA (Portland Cement Association) guidelines.

Surface Drainage:

Most soils will undergo some degree of volume change as the result of wetting. The degree of volume change will depend on the type of soil, swell potential, natural soils structure or degree of compaction (if a fill). These volume changes could result in movements in overlying structures and non-structure elements including sidewalks, planters, retaining walls, floor slabs, etc. Therefore, good site and surface drainage away from these elements is required.

Excavatability and Slopes:

The excavatability of site materials is difficult to evaluate based only on the exploration equipment used during this design report. Therefore, we recommend that the contractor evaluate the excavatability of site materials by performing test excavations with the size and type of equipment the contractor plans on using at the site. For design purposes the following paragraph presents our best analysis as to the excavatability of site soils.

The near surface fill and native soils to depths of 2.0 to 8.0 feet can probably be removed with conventional excavating equipment. Deeper excavations in the granite bedrock will require rock removal equipment such as ramhoes. OSHA requires all excavations over five feet in depth, in which personnel are to enter, be either braced or sloped in accordance with OSHA regulations.

Temporary cut slopes in the shallow fill soils should be constructed no steeper than 2.0H:1V. The underlying native soils cut slopes should be constructed no steeper than 1.5H:1V and the granite may be cut vertically. Permanent slopes in the surface soils should be 2H:1V. Permanent cuts in the granite will be controlled by joint and fracture patterns in the bedrock.

MATERIALS SUITABILITY AND REQUIREMENTS

Site Soils:

The surface fill and native soils are low in plasticity and probably exhibit low swell potentials when compacted and wetted. These soils may be used as fill in all areas. All materials should be free of organics, debris and rubble.

Imported Soils:

Any additional fill required to raise the structure, pavement or exterior slab areas, or for use as retaining wall backfills, should be imported soils meeting the following requirements:

Maximum Particle Size ----------6 inches
Maximum Swell Potential ----------1.5%*

* Based on a sample which is remolded to 95% of the ASTM D698 maximum dry density at a moisture content of 2 percent below optimum, placed under a surcharge load of 100 psf and wetted.

Recommendations presented in the "Site Preparation and Grading Procedures" sections of the original Geotechnical Engineering Report (RAM Project No. G11251) should be used for site preparation and grading procedures. All earthwork should be accomplished with observation and testing by a qualified technician under the direction of a registered geotechnical/materials engineer.

APPENDIX A
FIELD EXPLORATIONS

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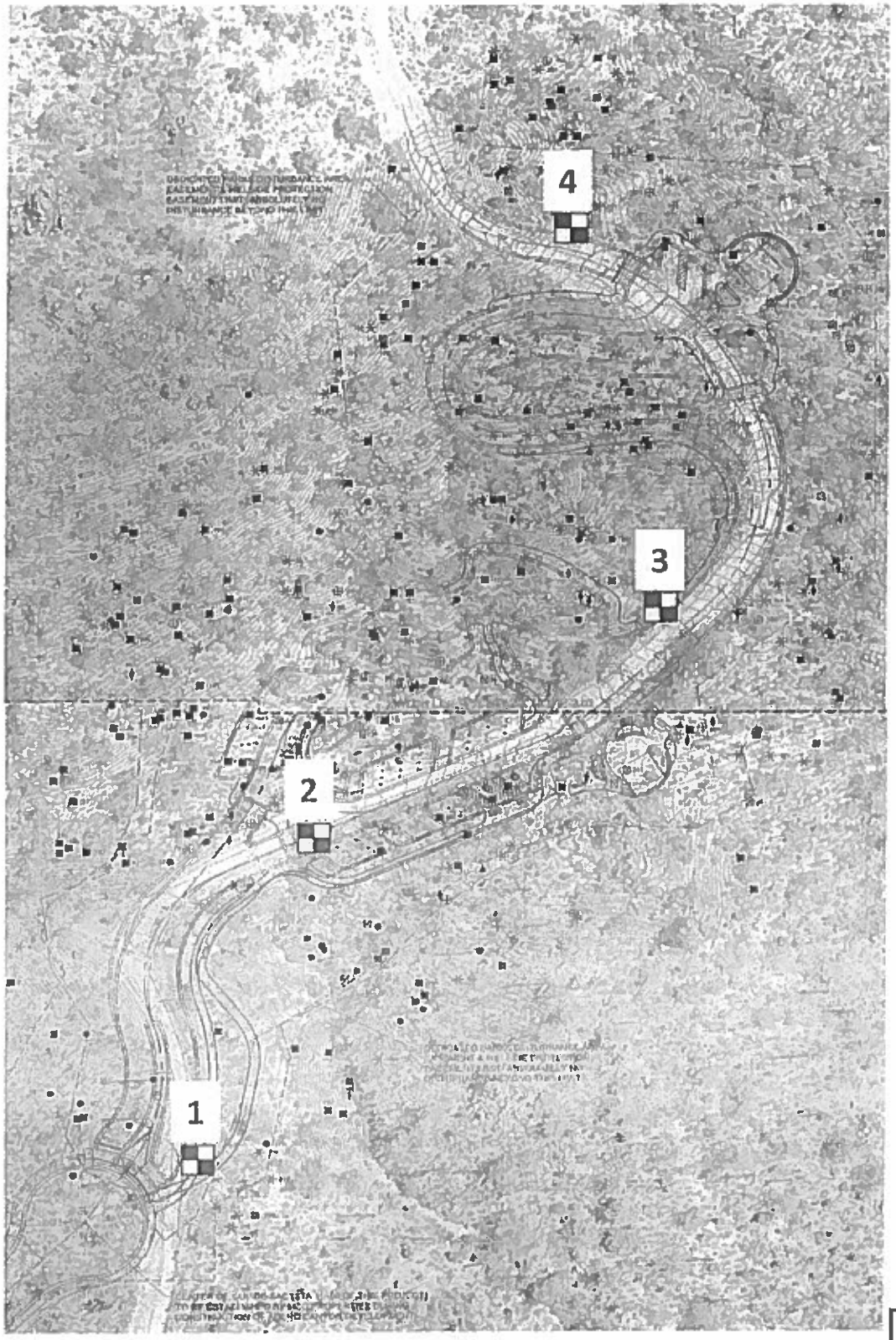


N

Test Pit Location

Not To Scale

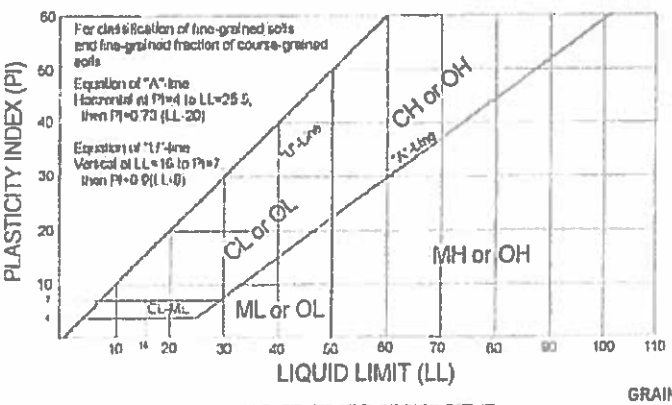
SITE PLAN

LEGEND

CLASSIFICATION OF SOILS

ASTM Designation: D2487-83
(Based on Unified Soil Classification System)

			Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests		Soil Classification: Group Symbol	Soil Classification: Name
COARSE-GRAINED SOILS More than 50% retained on No. 200 Sieve	Gravels More than 50% coarse fraction retained on No. 4 Sieve	Clean Gravels Less than 5% fines	$Cu \geq 4$ and $1 \leq Cc \leq 3$		GW	Well graded gravel
			$Cu < 4$ and/or $1 > Cc > 3$		GP	Poorly graded gravel
		Gravels with Fines More than 12% fines	Fines classify as ML or MH		GM	Silty gravel
			Fines classify as CL or CH		GC	Clayey gravel
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines	$Cu \geq 6$ and $1 \leq Cc \leq 3$		SW	Well-graded sand
			$Cu < 6$ and/or $1 > Cc > 3$		SP	Poorly graded sand
		Sands with Fines More than 12% fines	Fines classify as ML or MH		SM	Silty sand
			Fines classify as CL or CH		SC	Clayey sand
FINE-GRAINED SOILS 50% or more passes the No. 200 Sieve	Silts and Clays Liquid limit less than 50	Inorganic	PI > 7 and plots on or above "A" line		CL	Lean clay
			PI < 4 or plots below "A" line		ML	Silt
		Organic	Liquid Limit - oven dried / Liquid limit - not dried	< 0.75	OL	Organic clay / Organic silt
	Silts and Clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line		CH	Fat clay
			PI plots below "A" line		MH	Elastic silt
		Organic	Liquid limit - oven dried / Liquid limit - not dried	< 0.75	OH	Organic clay / Organic silt
HIGHLY ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor				PT	Peat



TEST PIT LOG DEFINITIONS

Blows per foot using 140 pound hammer with 30 inch free-fall.

Depth, feet	Blows/Foot: C	Blows/Foot: N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description

C = Continuous Penetration Resistance (2 inch diameter rod)
N = Standard Penetration Resistance (ASTM D1586)
R = Penetration Resistance (3 inch diameter ring line sampler)

GRAIN SIZES

U.S. STANDARD SERIES SIEVE: 200, 40, 10, 4

CLEAR SQUARE SIEVE OPENINGS: 3/4", 3", 12"

SILTS & CLAYS DISTINGUISHED ON BASIS OF PLASTICITY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

MOISTURE CONDITION (INCREASING MOISTURE ⟶)

DRY — SLIGHTLY DAMP — DAMP — MOIST (Plastic Limit) — VERY MOIST — WET (SATURATED) (Liquid Limit)

CONSISTENCY CORRELATION: CLAYS & SILTS	BLOWS/FOOT*
VERY SOFT	0-2
SOFT	2-4
FIRM	4-8
STIFF	8-16
VERY STIFF	16-32
HARD	OVER 32

RELATIVE DENSITY CORRELATION: SANDS & GRAVELS	BLOWS/FOOT*
VERY LOOSE	0-4
LOOSE	4-10
MEDIUM DENSE	10-30
DENSE	30-50
VERY DENSE	OVER 50

*Number of blows of 140 lb hammer falling 30" to drive a 2" O.D. (1-3/8" I.D.) split-spoon sampler (ASTM D1586).

TEST PIT LOG

Project: Adero Canyon Trailhead Evaluation – Fountain Hills, Arizona Test Pit: 1

Elevation: Not Determined Datum: --- Date: 6-6-16

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
						SP/ SM	FILL: Gravelly Sand, Some Silt; brown, nearly dry, loose to medium dense, low plasticity fines.
5						SP/ SM/ SC	Gravelly Sand, Trace to Some Silt/Clay; brown, nearly dry, dense to very dense, low plasticity fines.
							Refusal to backhoe excavation at 3 feet in bedrock. No groundwater observed.
10							
15							
20							
25							

This pit log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST PIT LOG

Project: Adero Canyon Trailhead Evaluation – Fountain Hills, Arizona Test Pit: 2

Elevation: Not Determined Datum: --- Date: 6-6-16

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
						SP/ SM	FILL: Gravelly Sand, Some Silt; brown, nearly dry, loose to medium dense, low plasticity fines.
5							
						SP/ SM/ SC	Gravelly Sand, Trace to Some Silt/Clay; brown, nearly dry, dense to very dense, low plasticity fines.
							Refusal to backhoe excavation at 8 feet in bedrock. No groundwater observed.
10							
15							
20							
25							

This pit log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST PIT LOG

Project: Adero Canyon Trailhead Evaluation – Fountain Hills, Arizona Test Pit: 3

Elevation: Not Determined Datum: --- Date: 6-6-16

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
						SP/SM	FILL: Gravelly Sand, Some Silt; brown, nearly dry, loose to medium dense, low plasticity fines.
5						SP/SM/SC	Gravelly Sand, Trace to Some Silt/Clay; brown, nearly dry, dense to very dense, low plasticity fines.
							Refusal to backhoe excavation at 3 feet in bedrock. No groundwater observed.
10							
15							
20							
25							

This pit log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST PIT LOG

Project: Adero Canyon Trailhead Evaluation – Fountain Hills, Arizona Test Pit: 4A

Elevation: Not Determined Datum: --- Date: 6-6-16

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
						SP/ SM	FILL: Gravelly Sand, Some Silt; brown, nearly dry, loose to medium dense, low plasticity fines.
5						SP/ SM/ SC	Gravelly Sand, Trace to Some Silt/Clay; brown, nearly dry, dense to very dense, low plasticity fines.
							Refusal to backhoe excavation at 3 feet in bedrock. No groundwater observed. Moved 10 feet southeast to excavate Test Pit 4B.
10							
15							
20							
25							

This pit log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST PIT LOG

Project: Adero Canyon Trailhead Evaluation – Fountain Hills, Arizona Test Pit: 4B

Elevation: Not Determined Datum: --- Date: 6-6-16

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
						SP/SM	FILL: Gravelly Sand, Some Silt; brown, nearly dry, loose to medium dense, low plasticity fines.
5						SP/SM/SC	Gravelly Sand, Trace to Some Silt/Clay; brown, nearly dry, dense to very dense, low plasticity fines.
							Refusal to backhoe excavation at 3 feet in bedrock. No groundwater observed.
10							
15							
20							
25							

This pit log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

APPENDIX B
LABORATORY ANALYSIS

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LABORATORY TEST RESULTS

Date: 23-Jun-16

SAMPLE SOURCE: As noted below

TESTING PERFORMED: Percent Passing No. 200 Sieve, Atterberg Limits, Percent Expansion (ASTM D1140, D4318, D4546)

SAMPLED BY: RAMM/Schirmer

RESULTS:

Sample Source	Percent Retained No. 4 Sieve	Percent Passing No. 200 Sieve	Liquid Limit	Plasticity Index
1 @ 0'-1'	25	13	27	6
1 @ 1'-3'	54	6.3	27	9
2 @ 0'-5'	21	11	24	3
2 @ 5'-8'	27	6.9	26	4
3 @ 0'-2'	20	12	26	6
3 @ 2'-3'	20	12	26	5
4A @ 0'-2'	19	11	26	4
4B @ 2'-3'	32	8	N/A	NP

* Based upon sample remolded to 95% of the estimated maximum dry density at 2% below the estimated optimum moisture content, with a surcharge pressure of 100 psf.

LABORATORY TEST RESULTS

Date: 23-Jun-16

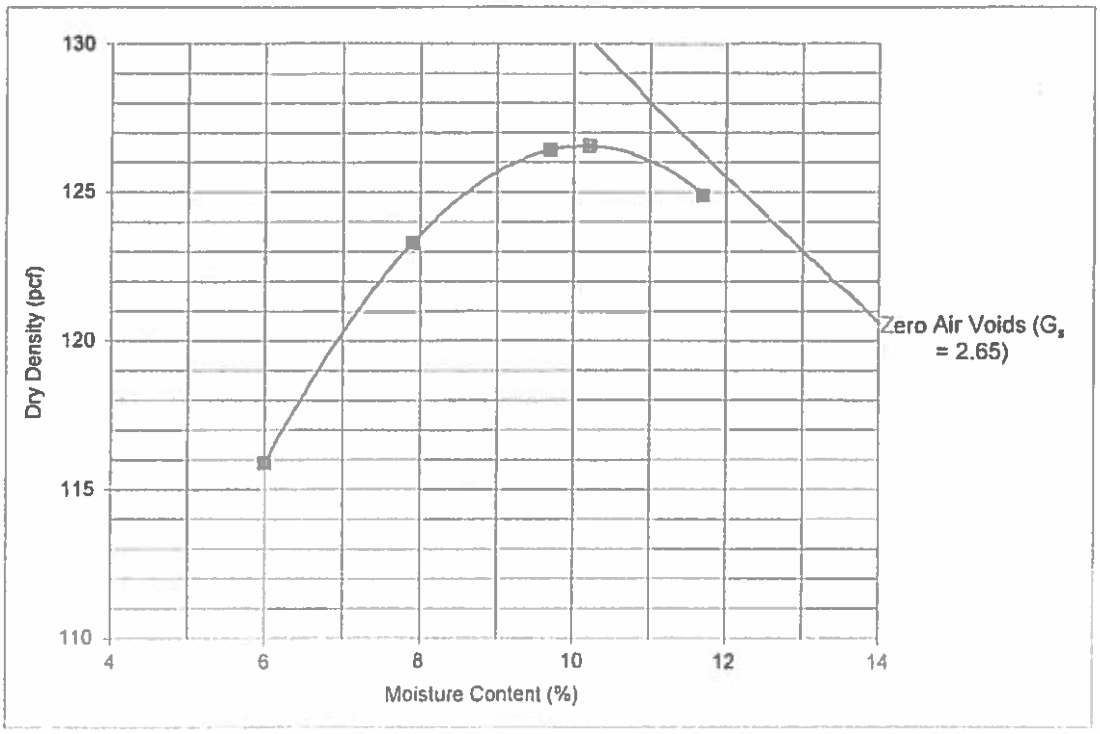
SAMPLE SOURCE: 1 @ 0'-1

TESTING PERFORMED Maximum Density-Optimum Moisture Determination (ASTM D698 Method A)

SAMPLED BY: RAMM/Schirmer

RESULTS:

Maximum Density (pcf) = 126.6 Optimum Moisture (%) = 10.2



LABORATORY TEST RESULTS

Date: 23-Jun-16

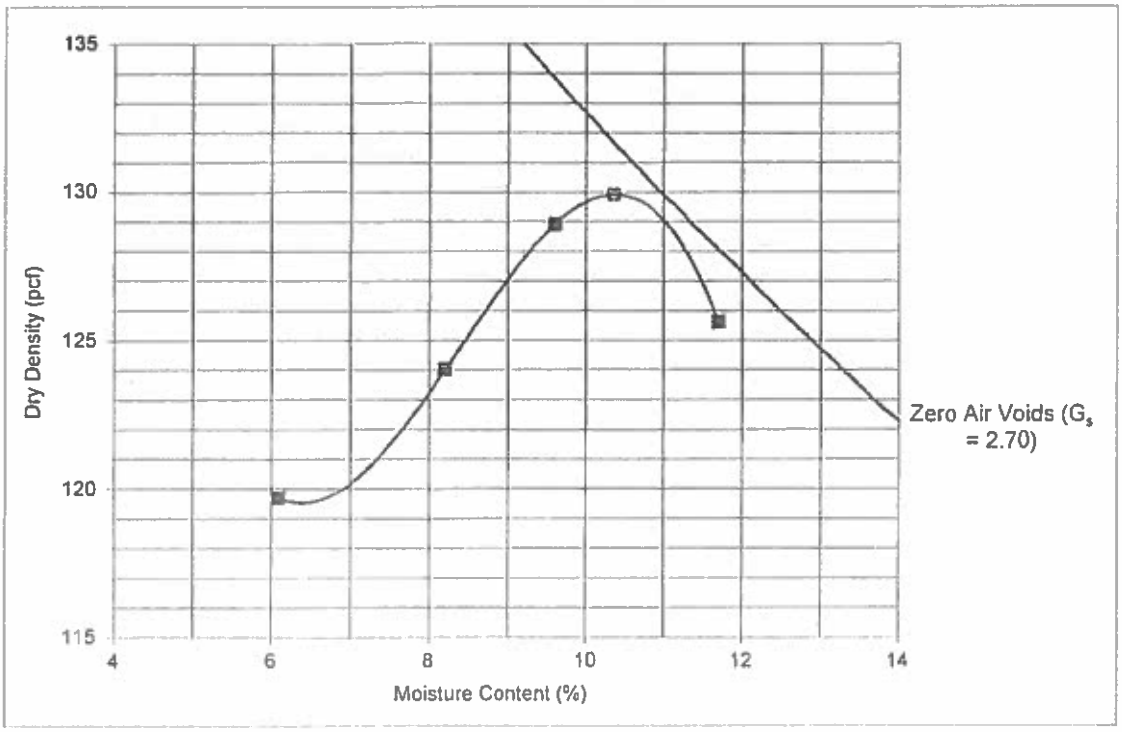
SAMPLE SOURCE: 2 @ 0'-5'

TESTING PERFORMED Maximum Density-Optimum Moisture Determination (ASTM D698 Method A)

SAMPLED BY: RAMM/Schirmer

RESULTS:

Maximum Density (pcf) = 129.9 Optimum Moisture (%) = 10.4



LABORATORY TEST RESULTS

Date: 23-Jun-16

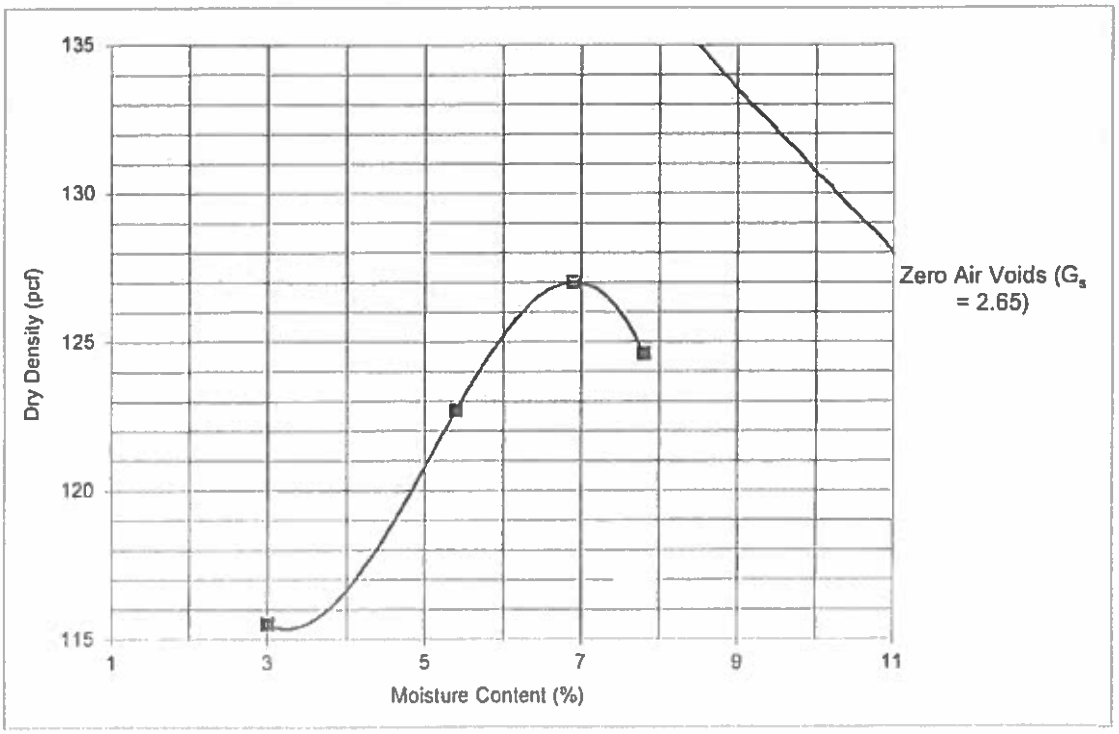
SAMPLE SOURCE: 3 @ 0'-2'

TESTING PERFORMED Maximum Density-Optimum Moisture Determination (ASTM D698 Method A)

SAMPLED BY: RAMM/Schirmer

RESULTS:

Maximum Density (pcf) = 127.0 Optimum Moisture (%) = 6.9



LABORATORY TEST RESULTS

Date: 23-Jun-16

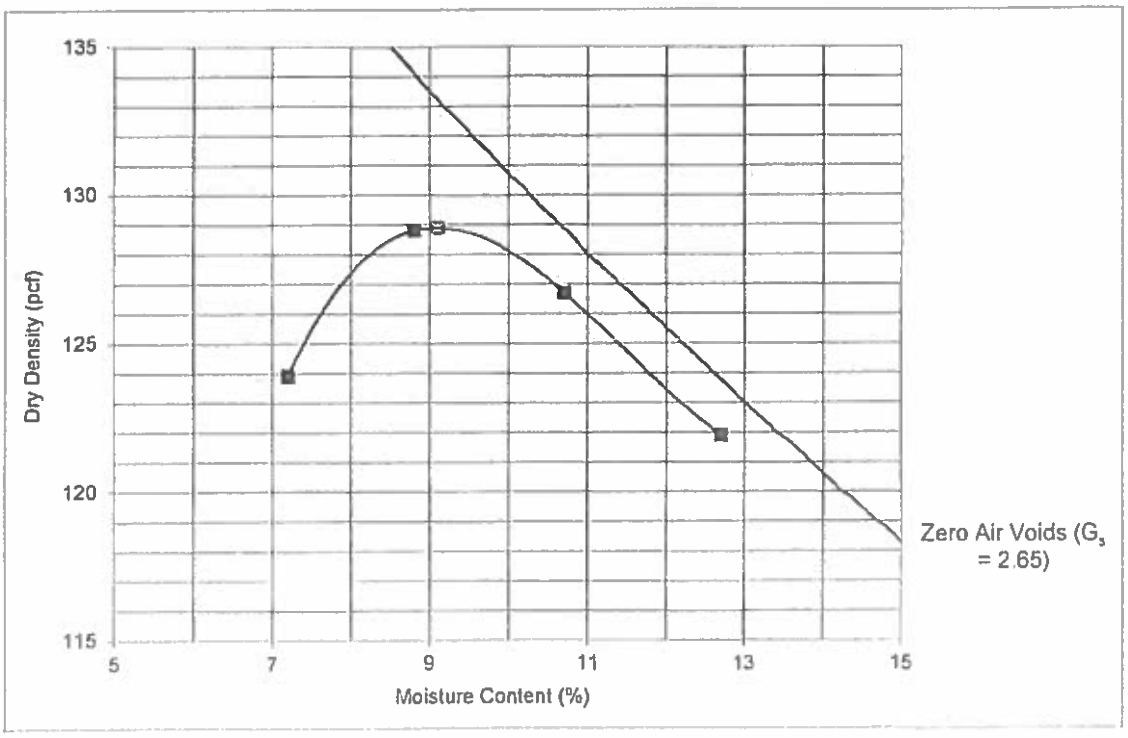
SAMPLE SOURCE: 4 @ Fill

TESTING PERFORMED Maximum Density-Optimum Moisture Determination (ASTM D698 Method A)

SAMPLED BY: RAMM/Schirmer

RESULTS:

Maximum Density (pcf) = 128.9 Optimum Moisture (%) = 9.1



R·A·M

RICKER • ATKINSON • McBEE & ASSOCIATES, INC.

Geotechnical Engineering • Construction Materials Testing

J2 Engineering and Environmental Design, LLC
4649 East Cotton Gin Loop, Suite B2
Phoenix, Arizona 85040

September 6, 2005

Attention: Jeff Engelmann, RLA, ASLA

Subject: Geotechnical Engineering Report
Central Trailhead
North End of Eagle Ridge Drive
Fountain Hills, Arizona

R.A.M. Project No. G12118
Reference R.A.M. Project No. G11251

At your request this firm retained Geological Consultants, Inc. to perform a seismic refraction survey for a proposed 20-foot high cut, parts or all of which may be replaced with a retaining wall. The results of the seismic refraction survey are attached to this letter. As stated in the Geological Consultants Inc.'s report, the upper 0 to 3 feet of material is probably residual soils or strongly weathered granite bedrock. Below the upper 0 to 3 feet and extending to an approximate depth of 22 feet was probably a moderately weathered granite bedrock which is probably underlain by unweathered granite bedrock at approximately 22 feet. The unweathered granite bedrock extends below the depth of 22 feet. The qualitative assessment of ripability of the various materials is presented in the report. However, this type of non-destructive, non-intrusive exploration does not provide data for joint/fracture pattern, spacing and types. This is generally determined from surface outcrops, core drilling and/or evaluation of other bedrock exposure at the site such as existing cuts. There are no existing cuts or well defined bedrock exposure at the site. Since the joint/fracture patterns, spacing and types which control the configuration of all cut slopes, no recommendations are made here in as to the safe bedrock cut slope configuration that can be maintained for either short or long term. The necessary data can be obtained prior to construction using oriented core drilling techniques or test excavated using a trackhoe and/or a ramhoe. Both of these methods are very costly. We understand that other than esthetics there is no restriction on cut slope configurations. We recommend that during construction of the cut (cut depths of at least 5 feet high), that a geologist from this firm review the exposed cut surface, map the joint/fracture patterns, spacing and types so that recommended stable cut slope configurations can be provided. Initial cuts, especially where the residual soils/strongly weathered granite is encountered, can be safely excavated on a short term basis at 1H:1V. However, the actual configuration below this surface zone, where present, will be very irregular with steeper areas and flatter areas, both horizontally and vertically.

Where cast-in-place concrete retaining walls bear on the undisturbed granite bedrock, the allowable bearing pressures for footings may be increased to 10,000 psf at a minimum depth of 1.5 feet. Steel dowels into the bedrock and tied into the footing may be used to resist sliding and uplift. The size, spacing and depth of the dowels will be depending on the anticipated loads.

2105 South Hardy Drive, Suite 13, Tempe, AZ 85282 • Telephone (480) 921-8100 • Facsimile (480) 921-4081

If you have any questions, please do not hesitate to call.

Respectfully submitted,

RICKER, ATKINSON, MCBEE & ASSOCIATES, INC.

By: Kenneth L. Ricker, P.E.

Reviewed by: David A. Thomas, P.E.

/ces
Copies to: Addressee (5)

GEOLOGICAL CONSULTANTS INC

KENNETH M. EUGE, R.G.
JASON C. WILLIAMS, R.G.

Report Prepared for:

Ricker, Atkinson, McBee, and Associates, Inc.
2105 S. Hardy Drive, Suite 13
Tempe, AZ 85282

Report Prepared by:

Geological Consultants Inc.
2333 West Northern Avenue, Suite 1A
Phoenix, Arizona 85021
Project No. 2005-163

August 15, 2005

REGISTERED GEOLOGIST
CERTIFICATE NO.
41794
JASON C.
WILLIAMS
Date Signed 8-15-05
ARIZONA, U.S.A.

Jason C. Williams, R.G.

REGISTERED GEOLOGIST
CERTIFICATE NO.
10338
KENNETH M.
EUGE
Date Signed 08/11/05

Reviewed by:
Kenneth M. Euge, R.G.

SEISMIC REFRACTION SURVEY

FOUNTAIN HILLS TRAIL HEAD

FOUNTAIN HILLS, ARIZONA

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SEISMIC REFRACTION SURVEY

FOUNTAIN HILLS TRAIL HEAD

PHOENIX, ARIZONA

1.0 INTRODUCTION

This report presents results of a seismic refraction geophysical field investigation and analysis performed to assess site subsurface conditions for a proposed parking lot. The parking lot will provide a staging area for access to the Fountain Hills Trail Head. The site is located in a currently undeveloped portion of northwest Fountain Hills, Arizona (Figure 1) at the north end of the proposed Eagle Ridge Drive alignment. At the time of the survey, the project area consisted of undeveloped desert, with the exception of a jeep trail that provided access to the site. A seismic refraction survey was used to characterized subsurface characteristics in areas inaccessible to a drill rig.

The project site is underlain primarily by shallow granite bedrock. Depth to bedrock in the vicinity of the seismic survey lines ranges from nil to less than three feet. A few low height granite boulder outcrops are located within the project area. Surface soils are uncemented silty sand with gravels. No fill soils were observed in the vicinity of the seismic survey lines.

Seismic survey data are used to develop reasonable interpretations of subsurface conditions of the site. The objectives of the seismic refraction geophysical surveys are to provide for, by indirect means, a higher level of confidence to:

- Indirectly characterize earth fill, natural soil, bedrock, or bedrock-like materials that may be present within representative portions of the proposed parking lot area.

- Evaluate the thicknesses of existing soil overburden that may be present, and depth to bedrock or rocklike materials.

The requirements for this study were defined in discussions with Mr. Kevin Wallin of J2 Engineering and Environmental Design, L.L.C.. Seismic survey field work was completed on August 9, 2005

The Scope of Work performed to accomplish the objectives of this study included:

- Mobilization and demobilization of personnel and equipment to and from the job site.
- Completion of (1) one shallow seismic refraction surveys and preliminary field analysis of survey results. The location of the seismic refraction survey is depicted on Figure 2.
- A rough position survey to locate the seismic line relative to site topography and cultural features depicted on the site plan.
- A brief examination of the geologic materials exposed at the site.
- Computer analysis of field data and interpretation of results was performed to complete the assessment of the materials present and their relative quality.
- Preparation of this report documenting the refraction seismic survey, its findings, interpretations, conclusions, and recommendations.

The seismic survey was designed to envelop the anticipated excavation depths. The effective penetration of the seismic survey is estimated to be 20 feet below ground surface. Velocity, thickness, and depth computations of different horizons, or zones, are provided to generally characterized site materials within the depth of interest expected at the residential home site. No direct subsurface explorations, such as test pits, were made by Geological Consultants Inc. as part of this seismic refraction survey.

2.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the cursory site reconnaissance, seismic surveys, and the data interpretations, the following conclusions and recommendations are provided:

2.1 The project site is underlain primarily by shallow granite bedrock. Depth to bedrock in the vicinity of the seismic survey lines ranges from nil to less than three feet. A few low height granite boulder outcrops are located within the parking area. Parking lot surface soils are uncemented silty sand with gravels. No fill soils were observed in the vicinity of the seismic survey lines.

2.2 Granite core stones, or localized areas of shallow, very hard, dense granite may be encountered in site excavations within both the low velocity and middle velocity zones (Figure 3). If encountered, excavateabililty constraints should be expected to range from moderate to severe (Table 2).

2.3 Interpreted stratigraphy at the site, developed from interpretation of the seismic survey data are depicted on Figure 3. Based on our interpretations of the seismic data, the conclusions presented regarding the depth to various velocity zones are believed to be reasonable at the location of the seismic survey line. The conditions characterized by indirect seismic methods along the seismic survey line probably represent subsurface conditions that could be found in adjacent areas of the site where depicted on the site plan provided by J2 Engineering and Environmental Design, L.L.C. Calculated depth/velocity ranges are summarized in Table 1.

Table 1
Seismic Survey Line Calculated Depth/Velocity Ranges

Survey Line Number	Depth* Range (feet)	Average Seismic Velocity (ft/sec)	Interpreted Geologic Description	Qualitative Rippability
S-1	0-3	915	Residual Soil/Strongly Weathered Granite Bedrock	Slight
	3-22	3,637	Moderately Weathered Granite Bedrock	Marginal
	> 22	11,438	Unweathered Granite Bedrock	Severe

*Depth range is calculated perpendicular to the ground slope and is only applicable at center of seismic survey line.

Table 2
Seismic Survey Line Calculated Depth/Velocity Ranges

Unit	Average Velocity (feet per second)	Excavateability Constraints
Residual Soils / Strongly Weathered Granite	< 3,000	**Slight-** Should be excavate able using conventional earthmoving equipment. Very Hard granite core stones could be encountered within this velocity zone
Moderately Weathered Granite	3,000 to 6,000	**Marginal-** Potentially difficult to excavate with conventional equipment. Ram hoe and ripping could be required to fragment and excavate efficiently. Could require blasting for efficient excavation. Very hard granite core stones could be encountered within this velocity zone and blasting could be required to fragment efficiently.
Slightly Weathered Granite	> 6,000	**Severe-** Blasting could be required for effective fragmentation. May be locally rippable along joint and fracture planes. Heavy backhoe or ram-hoe could be effective but slow.

2.4 The estimated qualitative excavateability summarized in Table 2 is based on the interpretations of the seismic survey data, understanding of the site geological conditions, and professional experience. There is no guarantee that the seismic refraction survey results or the qualitative excavateability can be duplicated by others. We recommend this information be used with caution and only as guidelines.

Because the seismic velocities used to determine qualitative excavateablility may vary from 10 to 20 percent, and due to the variability of the subsurface material, qualitative excavateability listed in Table 2 may overlap at the transition from one constraint category to the next.

The excavation constraints described in this report are, in our opinion, reasonable for the locations where the seismic refraction surveys were conducted. However, the ultimate excavateability is dependent on many factors (variably cemented soils, presence of core stones, bedrock and soil physical properties, excavation methods, size and age of excavation equipment, level of effort applied by the contractor, etc.) and it may not be possible to correlate these factors with the results of the seismic refraction surveys conducted for this investigation. The excavation contractor must exercise caution, and assume associated risks, when attempting to extrapolate these data to other areas where seismic surveys have not been conducted.

The results of the seismic refraction survey is depicted in Figure 3. Figure 3 depicts the average seismic velocities of the materials encountered along the seismic line, a thickness profile of the different velocity zones, the calculated velocity zone boundaries and our interpretation of the geologic materials represented by the measured seismic velocities.

2.5 If heavy vibration-producing equipment, such as a ram-hoe, or blasting is used to assist with the excavations made at this site, the contractor should be required to keep ground vibrations from any construction source within applicable safe limits for surrounding structures including buildings and utilities.

Blasting could be used for bedrock fragmentation. If blasting is proposed, it should be conducted by a contractor experienced with controlled blasting in residential areas in granitic bedrock terrain. Also the blasting should be conducted in accordance with the Uniform Fire Code, Article 77 or other rules and codes mandated by the Town of Fountain Hills and State and Federal agencies that have jurisdiction relative to blasting operations. We recommend preconstruction and pre-blast surveys be made of all structures within 300 feet of the proposed construction. We recommend adequate "safety zones" be established and maintained around the proposed excavation sites during construction. Likewise, construction equipment operations and blasting should be monitored during construction to assure the ground vibrations are within safe limits. However, we recommend the construction/blasting vibrations be limited to less than one inch per second for residential areas and for sensitive structures or components such as buried gas and water lines unless more restrictive allowable vibration limits are specified by other regulatory authorities. The purpose of the preconstruction surveys and construction vibration monitoring is to limit liability for property owners, the contractor, and other involved parties.

2.6 The proposed rock cut slope depicted on site plans provided by J2 Engineering and Design for the parking lot excavation is ½:1 (horizontal to vertical). It is not possible to render an opinion regarding long term stability of this proposed cut slope with the information presently available. We recommend that a slope stability analysis be performed by a geologist to determine the stability of the proposed cut slope. Ultimately, the stability of the cut slope will depend on the orientation of the naturally occurring planes of weakness within the granite bedrock (joints, fractures, foliations, etc.). The results of the slope stability investigation will provide the necessary information for determining if the proposed cut slope angle is reasonable.

3.0 GEOPHYSICAL SITE INVESTIGATION

A seismic refraction survey was conducted to indirectly investigate subsurface conditions and to develop reasonable interpretations of subsurface conditions.

3.1 Site Specific Seismic Surveys

Following the completion of a site reconnaissance to identify the survey location, a seismic refraction survey was made at the site depicted in Figure 2. The seismic survey was conducted to evaluate the residual soil overburden thickness, to identify fills that may be present in likely excavation areas, and to generally characterize subsurface conditions.

The seismic survey line location was determined in the field by locating the areas of the proposed cut slope. The line location is depicted on Figure 2. A rough position survey was conducted by Geological Consultants Inc. to locate the seismic survey line endpoints relative to staking by others as well as existing cultural and topographic features depicted on the site plan (Figure 2).

Three shot points are used along the seismic survey line to evaluate possible non-horizontal subsurface boundary conditions (buried sloping surfaces, cementation zones, bedrock boundaries, etc.) that could be expected in this type of geological terrain, and to improve the accuracy of the seismic wave velocity determinations. The seismic traverse was run over a length sufficient to achieve adequate depth penetration (of at least 30 feet) and to identify the subsurface zones that could influence excavations at the project site.

As with any type of geophysical investigation method, there are limitations to its usefulness and application. Refer to Appendix A for additional information regarding seismic refraction surveys and their limitations.

3.2 Equipment

Travel-time data for the seismic traverses were obtained using Geometrics Inc. Model S12 SmartSeis™ 12-Channel Exploration Seismograph. Seismic wave arrivals are detected with digital grade vertical geophones with a dual hum-bucking coil and a frequency response above 14 Hz natural frequency. The seismic shock wave is produced by repeated impacts of a 16-pound sledge hammer onto a soft steel striking plate. Hammer impacts were made at each end of the seismic line

traverse and at a shot point located at the center of the survey line spread. The distance from the impact station to the geophones and the travel time recorded for each station is stored in the seismographs on-board computer. If the field seismic data plots indicate the possible presence of anomalous subsurface conditions or spurious noise coincident with the hammer impacts, repeated impacts are used to verify the initial data reading or to correct the data. Topography, outcrops, and other natural or man-made features found along the seismic survey lines that might influence the data interpretations are annotated with the field data plots.

3.3 Results

Interpretations of the seismic survey data obtained at the project site suggest the presence of a distinctive subsurface stratigraphic profile along each of the seismic survey lines. Seismic velocities, calculated zone thicknesses, and depth to velocity zone boundaries for each interpreted bedrock or soil types are depicted in Figure 3. The elevation data depicted on the Y-axis of the Depth Cross-Sections is based on information derived from the site plan. The data depicted on the figures can be used to scale depths to different velocity layers below ground surface. The estimated accuracy of the velocity layer boundaries is approximately 20 percent.

4.0 GENERAL LIMITATIONS

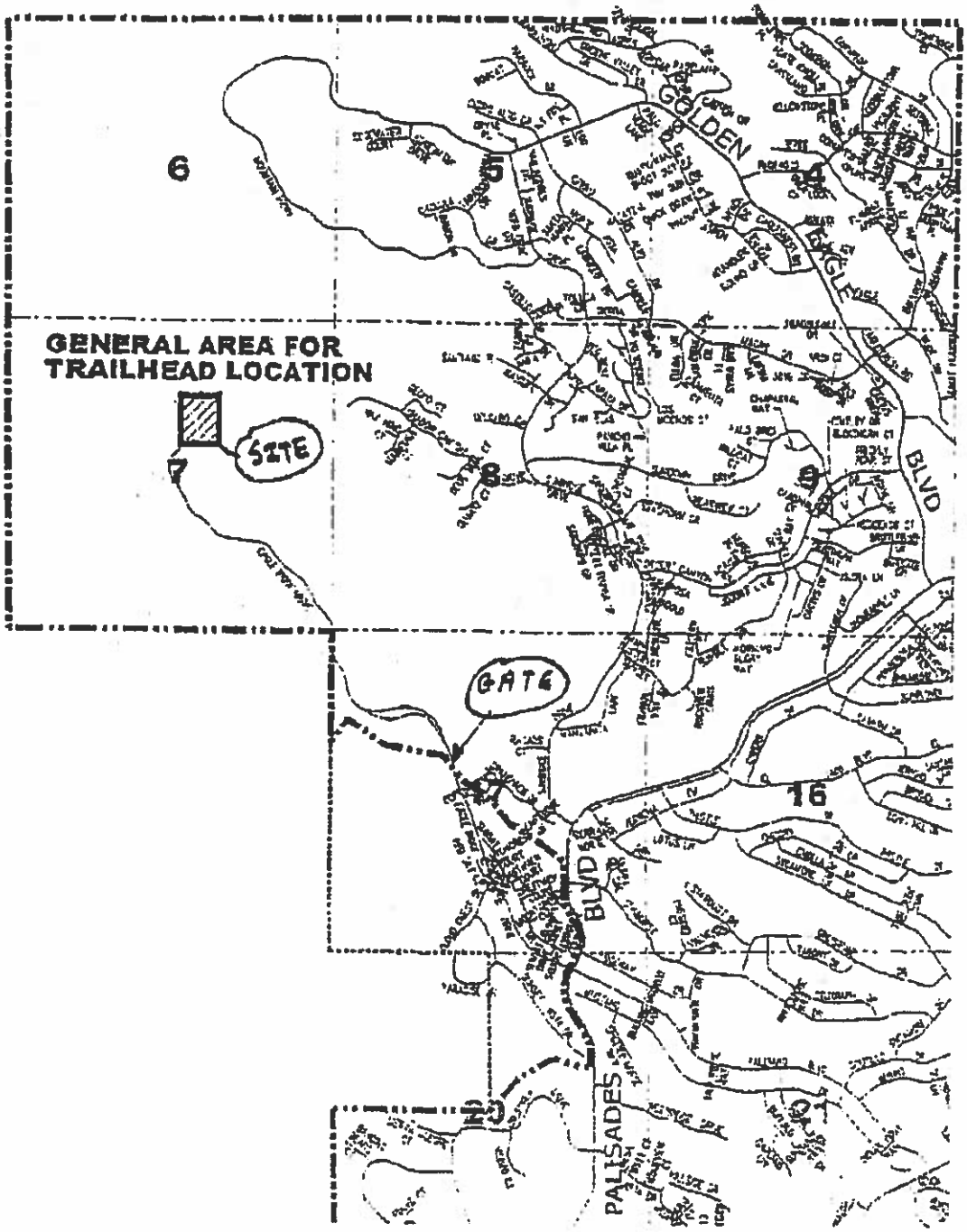
The geologic observations, findings, conclusions, and recommendations presented in this report are based on (1) cursory observations of surface conditions and geologic materials if exposed and (2) analysis of the seismic refraction data gathered at the site. The services provided by Geological Consultants Inc. were performed in accordance with generally accepted geological principals and standard practices used by members of the geological profession in this locale at the time of this study.

It must be recognized that subsurface geologic conditions may vary from place to place and from those found at locations where measurements or surveys are made by the investigator. Generalized geological and excavateability recommendations presented in this report are based on the results of this investigation and it may not be possible for others to accurately correlate the geological and excavateability results to test explorations or investigations conducted by others. No warranty or representation, either expressed or implied, is or should be construed regarding geological conditions at locations other than those evaluated as part of this study.

The professional opinions, conclusions and recommendations presented in this report relate only to the project and locations specified in this report. If any changes are made in the project, the conclusions and/or recommendations in this report shall not be considered valid unless the changes are reviewed and the conclusions and recommendations of this study are modified and approved in writing by Geological Consultants Inc.

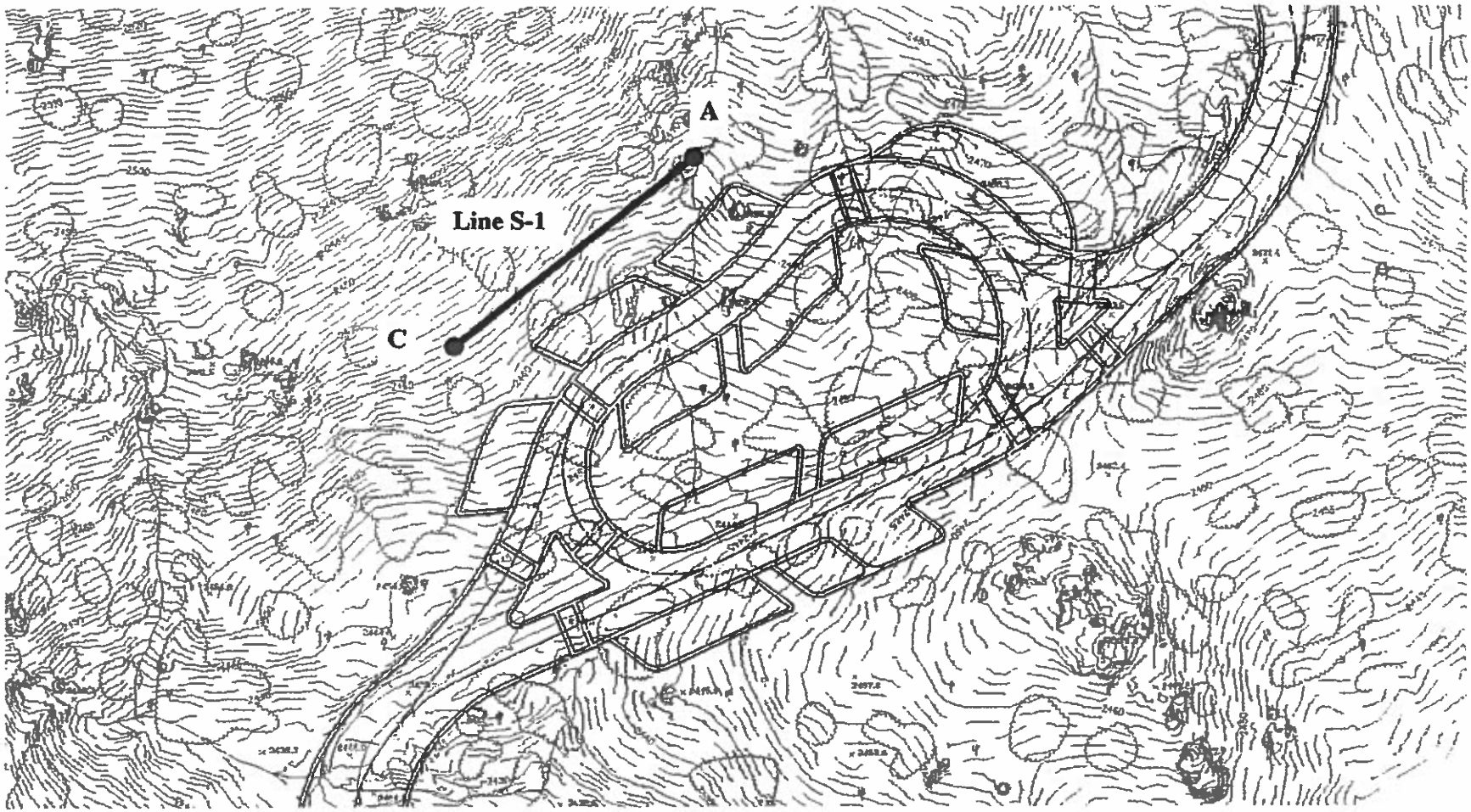
FIGURES

SITE MAP

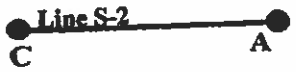


Seismic Refraction Survey
Fountain Hills Trailhead
Location Map
Figure 1

GEOLOGICAL CONSULTANTS INC.
2333 West Northern Ave. Ste 1A
Phoenix, Arizona 85021
Phone 602-864-1888
Fax 602-864-1899



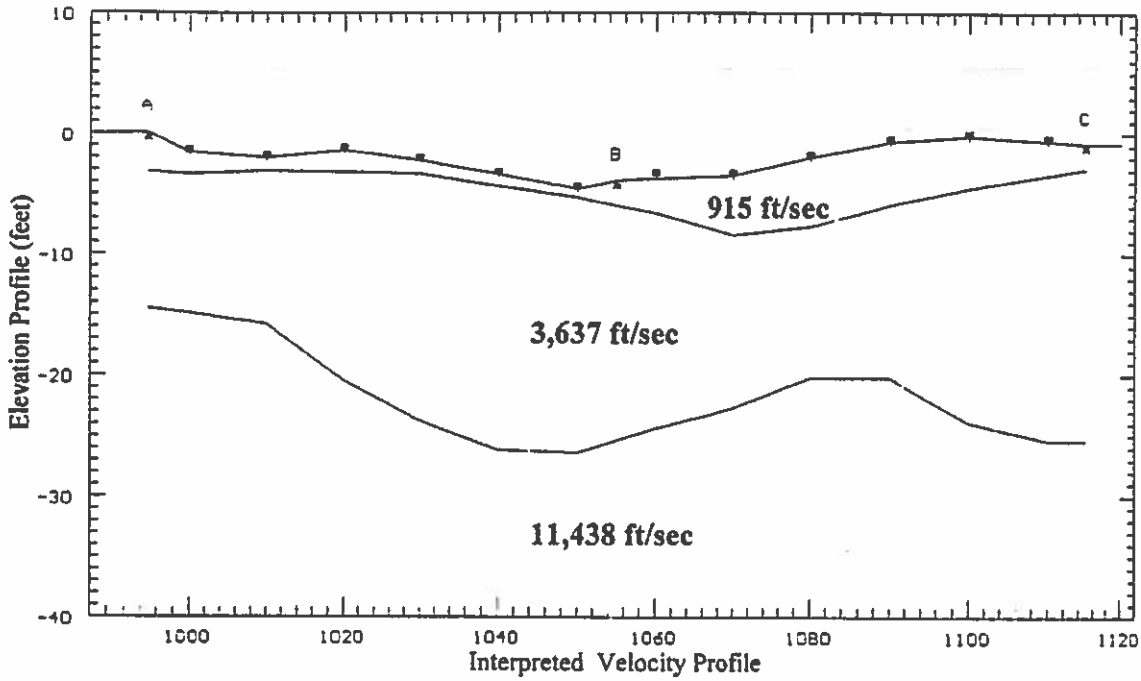
Explanation:

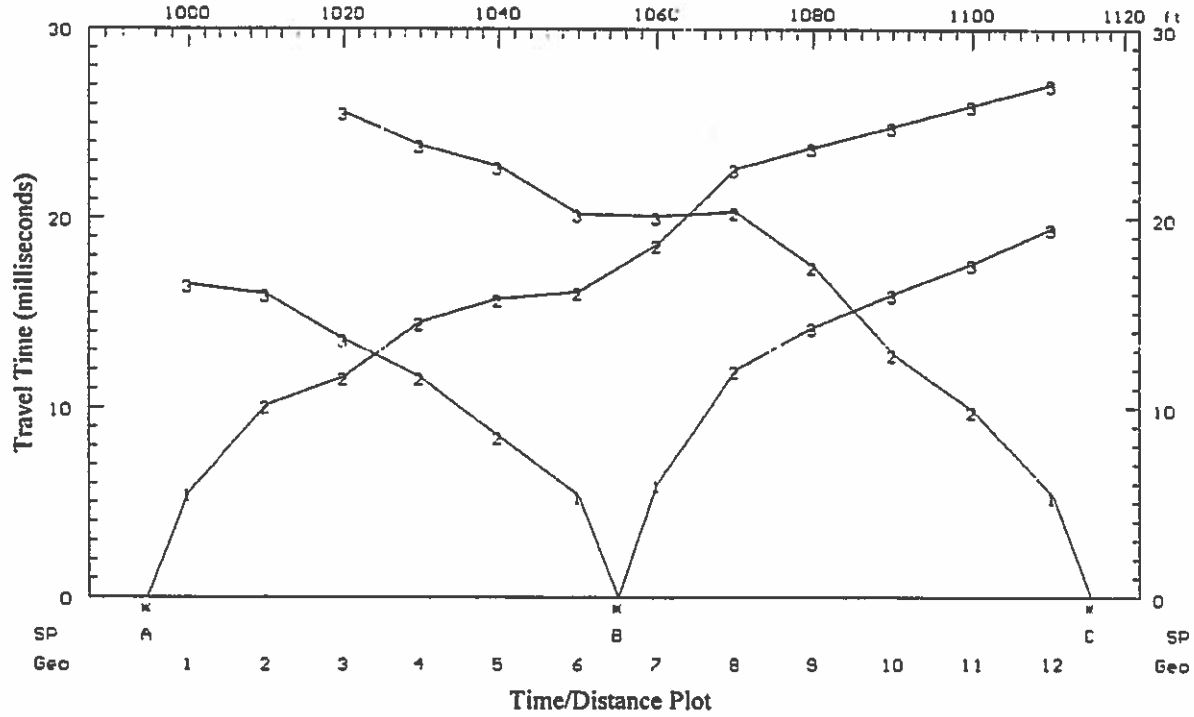


Seismic survey line location: A-shot point start; C-shot point end.
Refer to Figure 3 for interpreted seismic line profiles.

Seismic Refraction Survey
Fountain Hills Trailhead
Seismic Survey Line Location Map
Figure 2

2333 West Northern Ave. Ste 1A
Phoenix, Arizona 85021
Phone 602-864-1888
Fax 602-864-1899





Refer to Figure 2 for survey line location.

Seismic Refraction Survey
Fountain Hills Trailhead
Seismic Survey Line S-1
Figure 3

GEOLOGICAL CONSULTANTS INC.
2333 West Northern Ave. Ste 1A
Phoenix, Arizona 85021
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APPENDIX A

SEISMIC REFRACTION SURVEY

APPENDIX A

SEISMIC REFRACTION SURVEY

A.1 GENERAL

In general, seismic wave velocities are related to the hardness, consolidation, and density of the materials through which seismic (shock) waves travel. Seismic velocities of subsurface soils and bedrock can be correlated to some of the physical properties of the material with reasonable levels of confidence. As with rock rippability (ease of excavation) for example, the Caterpillar tractor Company has correlated ranges of seismic velocities in different rock and soil materials to qualitative estimates of rippability for their D-9 tractor with a mounted hydraulic No.9 ripper.

The use of seismic velocities measured in various soils and rock types are considered reasonably conservative for evaluating soil and rock characteristics by "indirect" shallow geophysical seismic methods. Some general correlations are as follows:

- Soil, loose surface material, alluvium and strongly weathered and broken bedrock has velocities ranging from 500 feet per second (fps) to 1,200 fps;

- Moderately hard, slightly to moderately cemented, dense alluvial and colluvial sediments and moderately weathered and broken bedrock range from 1,200 fps to 3,000 fps;

- Very dense, hard, well-cemented soils and moderately competent bedrock range from 3,000 fps to 6,000 fps;

- Sound, relatively homogeneous or tightly jointed bedrock and uniformly, strongly cemented soils (silica hardpan, caliche, calcrete, etc.) have seismic velocities greater than 6,000 fps.

Soils and rock with velocities of less than 3,000 fps can usually be excavated with conventional earth moving equipment. Where materials with velocities in excess of 6,000 fps are found, blasting would normally be required for efficient fragmentation. However, if the rock is thinly bedded, jointed, or fractured, it may be possible to break the rock with heavy ripping using a single shank ripper or large ram-hoe. The resulting fragments will be of a size consistent with the fracture spacing and the

progress of the excavation would be very slow. The intermediate material (velocities between 3,000 fps and 6,000 fps) would likely require heavy equipment and possibly the localized use of jack-hammers, ram-hoes, or selective blasting to provide cost-effective excavation.

A.2 DATA COLLECTION

Refraction data were collected along seismic survey lines consisting of 12 geophones spaced 10 feet apart. This geometry provided coverage of about 110 feet along each survey line. Refer to Figure 2 for the seismic survey line locations. Seismic waves were generated at shot points located at line ends and the center to measure shallow materials (near surface) seismic velocities. Data recorded from offsets (10 feet) past the line ends measured the deeper velocities. Data were recorded from both line ends so the effect of layer inclination, or dip on velocity boundaries, could be calculated. This geometry provided at least 40 feet, or more, of penetration at most line locations.

A.3 REFRACTION SEISMIC SURVEY LIMITATIONS

The seismic survey data presented in this report are derived from and interpreted from an indirect geophysical investigative technique (seismic refraction surveys) employed at the specific locations indicated and from observations made of the surface geologic conditions exposed at the site. The interpretations made at the specific seismic survey sites are believed to be reasonable based on the information available at the time of this study. The interpretations may not represent, nor are they intended to represent, subsurface conditions at other locations.

Geologic contacts between rock and soil units are approximate, may be either gradual or abrupt, and the calculated depths could vary from 10 to 20 percent or more. Geological and geotechnical information provided others and our experience on similar projects in similar geological terrain were considered in the interpretations of subsurface conditions.

A.4 REFRACTION DATA PROCESSING

Seismic Refraction Interpretation Programs (SIP) computer programs by RIMROCK GEOPHYSICS, were used to analyze seismic data obtained in the field. The programs calculate average velocities of any number of layers assuming the multilayered intervals do not include velocity inversions or "hidden" zones (i. e., high velocity zone over a low velocity zone). Thicknesses of each layer, except for the lowermost layer, are calculated along with the dip (inclination) angle of the layer boundary.

The depth below ground surface to each layer boundary is also provided.

Input data, velocity of each layer and seismic wave arrival times, obtained during the field work are checked by the computer program to assure that they satisfy reciprocity at least within 20 percent. These data are used to develop a meaningful geological model used to interpret subsurface stratigraphic conditions.

MCO Stockpiled AB Material Geotechnical Appendix

R·A·M·M

Ricker, Atkinson, McBee, Morman & Associates, Inc.
Geotechnical Engineering • Construction Materials Testing
2105 S. Hardy Dr., Ste 13 Tempe, AZ 85282-1924
Telephone: 480-921-8100 Facsimile: 480-921-4081

LABORATORY TEST RESULTS

Job Id:	23556
Lab Sample Id:	49354
Sampled By:	Golarte
Sampled Date:	10/20/16
Submitted By:	Golarte
Submitted Date:	10/20/16
Client Project No:	

Client: Town of Fountain Hills
Attn: Mark Mayer
P.O. Box 17958
Fountain Hills, AZ 85269

Job: Material Sampling & Testing
Job Location: Adero Canyon Trail Head
Sample Loc: Material Stockpiles on Parcel 5
Material: ABC

Lot/Station:
Specification: MAG ABC

ASTM D-5444			Task Id: 196129
Moisture Content			1.5%
Sieve Size		% Passing	Specification
6"	(150.0mm)	100	
4"	(100.00mm)	100	
3"	(75.00mm)	100	
2 1/2"	(63.00mm)	100	
2"	(50.00mm)	100	
1 1/2"	(37.50mm)	100	100
1 1/4"	(31.25mm)	100	
1"	(25.00mm)	100	90 - 100
3/4"	(19.00mm)	98	
1/2"	(12.50mm)	94	
3/8"	(9.50mm)	89	
1/4"	(6.25mm)	79	
#4	(4.75mm)	*69	38 - 65
#8	(2.36mm)	51	25 - 60
#10	(2.00mm)	48	
#16	(1.18mm)	38	
#30	(0.60mm)	31	10 - 40
#40	(0.425mm)	28	
#50	(0.30mm)	25	
#100	(0.15mm)	21	
#200	(0.075mm)	*17	3.0 - 12.0

Method: ASTM D-4318 B	Task Id: 196146
Liquid Limit	27
Plastic Limit	18
Plasticity Index	*9

Remarks:

*Indicates Out of Specification

Distribution: Town of Fountain Hills, Attn: Mark Mayer (mmayer@fh.az.gov)

AASHTO R18

Respectfully submitted,

David A. Thomas, P.E.
Project Engineer

Town of Fountain Hills
Saguaro Cactus Permit Appendix

DEVELOPMENT SERVICES DEPARTMENT
PLANNING & ZONING DIVISION
Application Packet

Saguaro Cactus Permit

To submit a complete application packet to The Town of Fountain Hills, the following items must be provided:

1. **A fully executed application indicating the type of approval being requested.**
2. **Permit fee, (if applicable).**
3. **All additional required items as indicated on the "application submittal requirements" (attached).**

Do not write in this space –official use only
Filing Date_____
Accepted By_____
Fee Accepted_____
Case Manager_____

The Town of Fountain Hills

PLANNING & ZONING DIVISION – SAGUARO CACTUS PERMIT APPLICATION

APPROVAL CATEGORY (A, B, C) Check all that apply

A. ____ Saguaro Cactus Removal/Relocation/Destruction ($90.00 fee)

B. ____ New Saguaro Cactus (no fee) **C.** ____ No Saguaros on Property/No Saguaros Disturbed (No fee)

NATURE OF THE PROJECT:

LEGAL DESCRIPTION: Plat Name_____ Block _____ Lot_____

PROPERTY ADDRESS: _____

PARCEL SIZE (Acres) _____ **ASSESSOR PARCEL NUMBER**_____

Applicant
____ Mrs. _____ Day Phone _____
____ Mr.
____ Ms. Address: _____ City: _____ State: _____ Zip: _____

Owner
____ Mrs. _____ Day Phone _____
____ Mr.
____ Ms. Address: _____ City: _____ State: _____ Zip: _____

Contact Person _____ **Phone:** _____ E-Mail: _____

If application is being submitted by someone other than the owner of the property under consideration, the section below must be completed.

SIGNATURE OF OWNER _____ **DATE** _____

I HEREBY AUTHORIZE _____ TO FILE THIS APPLICATION.
Please Print

Subscribed and sworn before me this _____ day of _____, 20_____.

_____ My Commission Expires_____.
Notary Public

Munis #_____

CASE FILE NUMBERS

P & Z _____

Bldg _____

Town of Fountain Hills – Required Certification

I hereby certify that there are no saguaros greater than 3 feet tall on the subject property or the existing protected saguaro cacti on the property will not be removed, relocated, mutilated or destroyed.

Applicant Signature _____ Date___ _____

CASE FILE NUMBERS
P & Z _____
Bldg _____

SAGUARO CACTUS PERMIT

APPLICATION SUBMITTAL REQUIREMENTS (Type "A" permit only)

Information requirements:

The following identifies the required information to be submitted to obtain a Saguaro Cactus Permit. A Saguaro Cactus Permit is required in order to remove, relocate or destroy any saguaro cacti over three feet in height in the Town of Fountain Hills.

- ☐ 3 copies of a site plan, at a minimum scale of 1"=100' that identifies the location of each saguaro cactus over 3 feet in height on the site along with a tag number assigned by the applicant.
  - -- Include the distance to an adjacent feature (property line, building, another saguaro cactus) to provide reference.
  - -- If the site is a construction site, identify any cacti outside of, but within 50 feet of, the construction boundaries.
  - -- For any saguaro cacti to be relocated onsite, identify planned location.
  - -- An aerial photo of the site is encouraged, but not required.

- ☐ Other information to be included on the site plan is:
  - -- Size and location of all buildings and driveways, existing and proposed.
  - -- Identify and dimension any easements, including Hillside Protection Easements.
  - -- Identify the location of any temporary nursery
  - -- Provide an inset vicinity map

- ☐ 3 copies of a saguaro cactus inventory for the site. A format such as a spreadsheet is recommended. However, the inventory could also be provided on the site plan. Each saguaro entry would have the tag number and color identified on the site plan, which corresponds to the tag on the saguaro itself. Required information for each entry is:
  - -- Tag number and color
  - -- Size of cactus in caliper inches three feet above the base
  - -- Height
  - -- General condition
  - -- Plant planned movement status (remove, relocate on site, remain in place, destroy)
  - -- If the saguaro cactus is to be destroyed, give reasons for planned destruction

- ☐ Letter of authorization from the property owner identifying the salvage contractor who has been retained to move/relocate the cacti. A list of salvage contractors is available upon request from the Planning and Zoning Department.

CASE FILE NUMBERS
P & Z _____
Bldg _____

Tagging Requirements:

Tagging using colored tape is required.

- Each saguaro cactus must be tagged using a different color tape based on its movement status:

-- **White tape**	**Remain**
-- **Red tape**	**Relocate**
-- **Blue tape**	**Destroy**
-- **Yellow tape**	**Remove from property**

- Each tag must have a site unique number or reference that ties to the inventory above.

- Tag number or reference must be recorded on the side of any cactus boxing.

- Letter from an arborist, or similarly qualified professional, stating that the cacti proposed to be destroyed are either diseased or otherwise in a condition from which they are not likely to survive or are unlikely to survive transplanting. Use tag numbers to reference cacti included.

- A copy of any forms required by the Arizona Department of Agriculture regarding your proposed movement of cacti.

List of the salvage contractors:

Name	Street Address	City	Zip	Telephone
Arizona Best Native Plant Care	13901 N 73rd St # 214	Scottsdale	85260	(480) 948-7501
Black Eagle Nursery & Mntnc	5226 S 32nd St	Phoenix	85040	(602) 323-1558
Native Resources Intl	1540 W Happy Valley Rd	Phoenix	85085	(623) 869-6757
Renaissance Exterior Dev Inc	6363 E Dixileta Dr	Cave Creek	85331	(480) 585-3492
Stafos Cactus Growers	27848 N 37th Ave	Phoenix	85085	(602) 943-7551
Sun Valley Landscape	1999 W Houston Ave	Apache Junction	85220	(480) 898-0533
Tree Relocators, Inc.	8533 E. Krail Street	Scottsdale	85250	(480) 947-6118

CASE FILE NUMBERS
P & Z _____
Bldg _____

TOWN OF **FOUNTAIN HILLS**

Development Services Department

Planning & Zoning Division

Procedure for obtaining a PERMIT for the

REMOVAL, RE-LOCATION, or DESTRUCTION Of Saguaro Cacti

1. Contact the Fountain Hills Planning & Zoning Division to obtain an application form or the Town's web site at www.fh.az.gov.

2. The applicant must complete the application form and all required information must be included. If the application form is not complete, a permit will not be issued.

3. The completed application may be presented in person or by mail along with the appropriate fee to the Planning & Zoning Division for verification of the information. However, you will need to be present to obtain the permit and tagging materials (plastic tape). Town personnel may conduct a survey of the site. The application fee includes the cost for the inspection. It may be required that the landowner determines the boundaries and clearly marks the corners of the property.

4. Any applicant's request for the **REMOVAL** or **DESTRUCTION** of a Saguaro Cactus will require the submittal of a written assessment of the condition of the cactus from a salvage company or qualified professional of their choice. An up to date list of salvage contractors is available at the Development Services Department upon request.

5. Upon verification of all information given and the method of cactus movement, the permit will be issued, along with the tagging ribbons.

6. Prior to removal, the **TOWN ORDINANCE** requires that a tag (plastic ribbon) be firmly affixed to each protected Saguaro, per the attached tagging instructions, before it is removed from its original growing site. The tag/ribbons will be made available by the town to applicants upon permit issuance at Town Hall.

7. Prior to removal, the **STATE LAW** requires that a native plant tag and seal be firmly affixed to each protected native plant before it is removed from its original growing site. The tags are to remain on the plants until they are permanently placed in a new growing site. It is the responsibility of the landowner to ensure that all state permits are in order. A copy of the Arizona Department of Agriculture Native Plant Removal application form is attached to the back of this application.

CASE FILE NUMBERS
P & Z _____
Bldg _____

PROJECT SPECIFICATIONS

For

Town of Fountain Hills Adero Canyon Trailhead

Volume 2 Restroom Specifications

MARCH 2017

Prepared by
Orcutt Winslow
3003 North Central Avenue
Sixteenth Floor
Phoenix, Arizona 85012

Technical Specifications
Volume 2 Building

REGISTERED ARCHITECT
CERTIFICATE NO
18963
H. NEIL
TERRY
Date Signed 3/3/17
ARIZONA, U.S.A.
expires 09/30/19

ADERO CANYON TRAILHEAD BID DOCUMENTS

FOR

J2 ENGINEERING AND ENVIRONMENTAL DESIGN, LLC

PROJECT MANUAL
100% CONSTRUCTION DOCUMENTS

MARCH 3, 2017

ORCUTT| WINSLOW
ARCHITECTURE PLANNING INTERIOR DESIGN
3003 NORTH CENTRAL AVENUE, 16TH FLOOR
PHOENIX, ARIZONA 85012

(602) 257-1764

O| W #2016_135

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NOT USED

REGISTERED ARCHITECT
CERTIFICATE No
18963
H. NEIL
TERRY
Date Signed 3/3/17
ARIZONA, U.S.A.
expires 09/30/19

SECTION 01 1100

SUMMARY OF WORK

PART 1 GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

A. Project: Adero Canyon Trailhead Restroom Facility.

B. Base Bid: The bid shall include labor, material, equipment, services and transportation necessary to construct the Trailhead Restroom Facility. The work shall include utility connections and other work indicated, or reasonably implied, unless specifically indicated "Not in Contract."

C. Scaffold, Staging, Protection, etc.: The Work under each Section of these Specification shall include providing, installing, and maintaining all scaffold, staging, trestles, and planking necessary for the work under each Section in strict conformity with all applicable laws and ordinances, and maintenance of same so as not to interfere with or obstruct the work of other trades. Additionally, the work under each section of these Specifications shall include providing all forms of protection necessary to preserve the work of other trades free from damage. These provisions shall be considered as though repeated under each separate Section of the Specifications.

D. Asbestos: It is the intent and requirement of these Contract Documents that no asbestos is to be used or incorporated into this Project in any form. If asbestos in any form is incorporated into the construction and is subsequently found during the construction period or after occupancy, it shall be the Contractor's responsibility to remove it immediately and replace it with materials approved by the Architect, including repair of all damage to adjacent materials caused by the asbestos removal, at the Contractor's expense. The period for discovery of materials containing asbestos shall not be limited by warranty period contained within this Contract or otherwise provided with the materials or construction. At close-out, the Contractor shall complete the affidavit in Section 01 7700, Closeout Procedures, on behalf of himself, his subcontractors and his suppliers, certifying that materials used or installed in the project are asbestos free.

E. Time for Completion: The Contractor shall complete the Work within the limits of the Contract.

F. Utilities:
   1. Utilities, services, etc., cut or damaged by the Work shall be the Contractor's responsibility for repair and/or replacement in accordance with governing authority's requirements.
   2. Contractor shall obtain written approval from the Owner a minimum of 72 hours prior to disconnection or shutting off service or utility.

G. Accessibility of Systems: No equipment which must be operated or maintained, such as valves, taps, controls, unions, motors, etc., shall be placed in an inaccessible location.
   1. Dampers, filters, controls, valves, expansion joints, electrical junction boxes, air handling units or filters, or other apparatus that must be located in walls, above ceilings, etc., shall be provided with suitable access doors (fitted in a framed opening) that will permit proper operation, servicing and access. The access door shall be fire rated where required to maintain the fire rating of the wall or ceiling.

2. Exhaust fans, fan coil units, VAV boxes or other air handling equipment shall not be located above hard ceiling areas. Piping, fan covers, etc. shall be arranged to allow easy access to filters or other parts that may need maintenance. Valves, etc., shall be grouped to minimize the number of access panels required.
3. Filters, valves, traps, controls, etc., that require periodic maintenance and whose removal would cause adverse consequences to occupants, equipment or critical operations shall be supplied with manual bypasses whenever practical.

H. Construction Staking: Unless noted otherwise, the Contractor shall be responsible for employing the services of a licensed surveyor to provide all necessary surveying and staking required for construction of the Work.

1.2 CONTRACTOR USE OF PREMISES

A. Contractor's parking, access, yards, etc., shall be limited to those areas specifically indicated at the Pre-Bid or Pre-Construction Conferences.

B. Contractor and other persons connected to this Project shall only use parking areas designated on site plan or as approved by the Owner.

C. Contractor and workmen shall not trespass into area beyond the "Limit of Work" area.

D. Contractor shall use and maintain in clean condition site access route as shown on site or site access plan. No other access shall be used for vehicles or personnel.

END OF SECTION

SECTION 01 2613

CONTRACTOR'S REQUEST FOR INTERPRETATION (RFI)

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Administrative requirements for Requests For Interpretation.

1.2 DEFINITIONS

A. Request for Interpretation:
1. A document submitted by the Contractor requesting interpretation of a portion of the Contract Documents, hereinafter referred to as RFI.
2. A properly prepared Request for Interpretation shall include a detailed written statement that indicates the specific Drawings or Specification in need of clarification and the nature of the clarification requested.
   a. Drawings shall be identified by drawing number and location on the drawing sheet.
   b. Specifications shall be identified by Section number, page and paragraph.

B. Improper or frivolous RFI's:
1. RFI's that request information that is clearly shown on the Contract Documents.
2. RFI's that are not properly prepared or are incomplete.
3. RFI's that do not reference the contract documents.
4. Improper RFI's will be processed by the Architect at the Architect's standard hourly rate. Such costs may be deducted by the Owner from monies due the Contractor. The Contractor will be notified by the Architect prior to the processing of improper RFI's.

1.3 CONTRACTOR'S REQUESTS FOR INTERPRETATION

A. When the Contractor is unable to determine from the Contract Documents, the material, process or system to be installed, the Architect shall be requested to make a clarification of the indeterminate item.
1. Wherever possible, such clarification shall be requested at the next appropriate project meeting, with the response entered into the meeting minutes. When clarification at the meeting is not possible, either because of the urgency of the need, or the complexity of the item, Contractor shall prepare and submit an RFI to the Architect.

B. RFI's shall be submitted online using a web based program acceptable to the Architect.

C. RFI's shall be originated by the Contractor.
1. RFI's from subcontractors or material suppliers shall be submitted through, reviewed by, and signed by the Contractor prior to submittal to the Architect.
2. RFI's sent directly from Subcontractors to the Architect or the Architect's consultants shall not be answered.

D. Contractor shall carefully study the Contract Documents to assure that the requested information is not available therein. RFI's that request information available in the Contract Documents will be deemed either "improper" or "frivolous" as noted above.

E. In cases where RFI's are issued to request clarification of coordination issues, for example, pipe and duct routing, clearances, specific locations of work shown diagrammatically, and similar items, the Contractor shall fully lay out a suggested solution using drawings or sketches drawn to scale, and submit same with the RFI. RFI's that fail to include a suggested solution will be returned unanswered with a requirement that the Contractor submit a complete request.

F. RFI's shall not be used for the following purposes:
   1. To request approval of submittals
   2. To request approval of substitutions,
   3. To request changes which entail additional cost or credit.
   4. To request different methods of performing work than those drawn and specified.
   5. To confirm Owner direction or decisions.

G. In the event the Contractor believes that a clarification by the Architect results in additional cost or time, Contractor shall not proceed with the work indicated by the RFI until a change order is prepared and approved.
   1. Answered RFI's shall not be construed as approval to perform extra work or incur additional expense.
   2. Unanswered RFI's will be returned with a stamp or notation: Not Reviewed.

H. Architect will respond to RFI's in one of the following manners:
   1. Properly prepared RFI's:
      a. Issue an "Architect's Supplemental Instruction" form.
      b. Issue a "Request for Proposal" form.
      c. Respond directly on the R.F.I. form.
   2. Improper or Frivolous RFI's:
      a. Unanswered RFI's will be returned with a stamp or notation: "Not Reviewed".

I. Contractor shall allow up to seven (7) days review and response time for RFI's, however, the Architect will endeavor to respond in a timely fashion to RFI's.

PART 2 PRODUCTS

Not applicable.

PART 3 EXECUTION

Not applicable.

END OF SECTION

SECTION 01 2976

PROGRESS PAYMENT PROCEDURES

PART 1 GENERAL

1.1 GENERAL

This Section outlines, in general, as a convenience to the Contractor, submittals required for, and to be used with, the first pay request and the procedure to be used for all pay requests. This Section is complementary to the General Conditions and Supplemental General Conditions and nothing within this Section shall be considered to waive any requirements of the General Conditions or Supplemental General Conditions.

1.2 EXPANDED SCHEDULE OF VALUES

A. In addition to the Schedule of Values required by the General Conditions, the Contractor shall submit, prior to the first pay request, an additional breakdown of the dollar amounts in the Schedule. Larger value amounts shall be broken down into major subcontracts and categories including, but not limited to:

Sitework:	Major earthwork, final grading
Concrete:	Paving and sitework, sidewalks, building slabs and foundations, other structural concrete
Rough Carpentry:	Structural framing, interior framing and blocking, carpentry labor used to install items or assemblies supplied by others
Finish Carpentry:	Finish work and trim
Insulation:	Batt insulation, rigid board
Doors and Frames:	Hollow metal, wood, other.
Hardware	Finish hardware for doors.
Glass and Glazing	Windows, storefront, translucent systems
Roofing	Roof membrane, insulation, flashings
Drywall:	Light gauge studs, drywall systems
Ceiling:	Suspended or other ceiling systems
Painting:	Interior and exterior paint and stain
Flooring:	Carpet, sheet vinyl, and base, other by specific type
Casework:	Cabinets and Casework
Plumbing:	Site, underslab at buildings, rain drains, top out/rough-in, trim and fixtures
HVAC:	Equipment, ductwork, piping, temperature controls, energy management system, diffusers and trim, test and balance, other non-HVAC general sheet metal
Electrical:	Site, underground, rough, fixtures, trim, switchgear, equipment, fire alarm, special A/V systems, intercom, phone
Others:	As the Architect may require, to fairly and fully judge the value of the work in place.

These figures are to be used only to evaluate construction in place for each pay request and need not appear on the monthly pay application.

B. Contractor shall submit copies of the Contractor's schedule in accordance with Section 01 3217, Construction Schedule. Updated schedules shall be submitted at the time of each Application and Certification for Payment meeting in accordance with section 01

3217, Construction Schedule. **This will be required as a condition of approving the Application and Certification for Payment.**

1.3 PAY REQUEST

A. The form of Application and Certification for Payment shall be a notarized AIA Document G702, Application and Certification for Payment, supported by AIA Document G703, Continuation Sheet, or equivalent submitted for Architect's approval prior to submitting for payment. A minimum of three (3) original copies of these forms shall be submitted for each application. Submit additional copies if requested by the Owner or Architect.

B. The Contractor shall on or before the first day of each month make an estimate of the work performed during the preceding month and submit same to the Architect for checking and approval. Per ARS 35-342, within thirty (30) days after Governing Board approval of Application and Certification for Payment, the Owner shall pay to the Contractor ninety percent (90%) of the value of said work in place, as checked and approved by the Architect. The balance of ten percent (10%) of the estimate shall be retained by the Owner, or shall be posted in the form of substitute securities in accordance with Arizona Revised Statute 41-2576 and State Board of Education Procurement Rules R7-2-1114 and R7-2-1115". Reduction in the amount retained or held in substitute securities will only be made as provided for in applicable statute or ordinance. Contractor request for reduction in retainage shall be accompanied by AIA Document G707A, "Consent of Surety to Reduction in or Partial Release of Retainage".

C. Prior to the first Application and Certification for Payment, the Architect, Owner and Contractor will establish a schedule for submission of the Application and Certification for Payments. For each Application and Certification for Payment, a meeting shall be held at the project site where the Architect and Owner, if he requests, will meet with the Contractor prior to the submittal of the Application and Certification for Payments and "pencil through" the previous Application and Certification for Payment. Proposed values will be reviewed for work in place and stored materials (if allowed) **projected not more than two days past the date of the pay request.** The values accepted at this meeting will then be typed on the AIA Application and Certification for Payment as called for elsewhere in these specifications. The Application and Certification for Payment shall be delivered, complete, to the Architect not less than three days prior to the Application being due to the Owner. Requests due to Owners or lenders located outside of the Phoenix area may need to be submitted earlier when determined by the Architect.

D. The Contractor shall submit a financial breakdown of the work, itemized by crafts or sections as designated by the Architect. Payment will be based upon the monthly percentage of completion of these items.

E. Lien Waivers: General Contractor shall submit, along with the progress payment request, notarized conditional lien waiver the sum of which shall be the amount of the progress payment issued to the General Contractor.

F. The Contractor shall continually update the Record Drawings per the requirements in Section 01 7700, Closeout Procedures. Review these updated drawings with the Architect at each pay request meeting or more often as directed. Up to date Record Drawings are required before an Application and Certification for Payment will be approved.

G. The Application and Certification for Payment shall be accompanied by substantiation for stored materials, monthly progress reports and updates, and any other pertinent items

required by the Owner or Architect and identified during the Pre-Construction Conference. SEE PARAGRAPH 1.4 A. FOR SUBSTANTIATION REQUIREMENTS.

H. AIA Documents G706, Contractor's Affidavit of Payment of Debts and Claims, G706-A, Contractor's Affidavit of Release of Liens, Documents G707, Consent of Surety Company to Final Payment shall be used. These documents shall be submitted with the final Application and Certification for Payment. If appropriate, G707-A, Consent of Surety to Reduction in or Partial Release of Retainage shall be used.

I. At any time the actual progress falls 5% or more behind the scheduled progress, the Contractor shall submit a written plan to the Architect outlining his plan for placing the project back on schedule. Failure to provide this information shall be cause to withhold payment.

1.4 STORED MATERIALS

A. When acceptable to the Owner, the Contractor may submit for payment on properly stored materials not yet incorporated into the work. Materials must be stored on the site in a secured area and be protected from damage, weather, theft or vandalism. The Contractor shall be responsible for replacing any damaged or missing materials.

B. At the time of the Application and Certification for Payment meeting, stored materials for which payment is requested will be examined, counted and verified against actual bills of sale legibly listing all items, quantities and dollar values, including freight. Mark-ups are not allowed. All invoices shall clearly indicate invoice numbers, purchase order numbers or tag numbers associated with the materials so that the materials can be quickly and clearly located in the storage areas. Copies of these invoices shall be provided to the Architect for his use and record and shall be attached to the submitted pay application and the totals shall equal or exceed amounts requested for the stored materials. Stored materials shall be listed in the appropriate column of the Application and Certification for Payment.

1.5 ALLOWANCES/CONTINGENCIES

A. Allowance/Contingency Items for which payment is requested will be verified against invoices or previously approved Contractor proposals for work completed. Copies of these invoices or proposals shall be provided to the Architect for his use and record, shall be attached to the submitted Application and Certification for Payment, and the totals shall equal the amounts requested for Allowances/Contingencies. Allowances/Contingencies will be listed individually on the Application and Certification for Payment per the Allowance Section.

END OF SECTION

SECTION 01 2980
(PUBLIC WORK)
CONDITIONAL WAIVER AND RELEASE ON PROGRESS PAYMENT
(Pursuant to A.R.S. § 33-1008)

Project: _____

Job. No.: _____

On receipt by the undersigned of a check from _____
(Maker of Check)

in the sum of $_____ payable to _____
(Amount of Check) *(Payee or Payees of Check)*

and when the check has been properly endorsed and has been paid by the bank on which it is drawn, this document becomes effective to release any Mechanic's Lien, any state or federal statutory bond right, any private bond right, any claim for payment and any rights under any similar ordinance, rule or statute related to claim or payment rights for persons in the undersigned's position that the undersigned has on the job of _____

_____
(Owner)

located at _____
(Job Description)

to the following extent. This release covers a progress payment for all labor, services, equipment or materials furnished to the jobsite or to

_____
(Person with whom undersigned contracted)

through _____ only and does not cover any retention, pending
(Date)

modifications and changes or items furnished after that date. Before any recipient of this document relies on it, that person should verify evidence of payment to the undersigned.

The undersigned warrants that he either has already paid or will use the monies he receives from this progress payment to promptly pay in full all of his laborers, subcontractors, materialmen and suppliers for all work, materials, equipment or services provided for or to the above referenced project up to the date of this waiver.

DATE: _____ _____
(Company Name)

Notary: By: _____
(Signature)

_____

_____
This _____ day of _____20_____. *(Title)*

SECTION 01 2981
(PUBLIC WORK)
UNCONDITIONAL WAIVER AND RELEASE ON PROGRESS PAYMENT
(Pursuant to A.R.S. § 33-1008)

Project: _____

Job. No.: _____

The undersigned has been paid and has received a progress payment in the sum of $_____ for all labor, services, equipment or material furnished to the jobsite or to

_____
(Person with whom undersigned contracted)

on the job of _____
(Owner)

located at _____
(Job Description)

and does hereby release any Mechanic's Lien, any state or federal statutory bond right, any private bond right, any claim for payment and any rights under any similar ordinance, rule or statute related to claim or payment rights for persons in the undersigned's position that the undersigned has on the above referenced project to the following extent. This release covers a progress payment for all labor, services, equipment or materials furnished to the jobsite or to_____

_____
(Person with whom undersigned contracted)

through _____ only and does not cover any retention, pending
(Date)

modifications and changes or items furnished after that date.

The undersigned warrants that he has already paid or will use the monies he receives from this progress payment to promptly pay in full all his laborers, subcontractors, materialmen and suppliers for all work, materials, equipment or services provided for or to the above referenced project up to the date of this waiver.

DATE: _____ _____
(Company Name)

Notary: By: _____
(Signature)

_____

This _____ day of _____20_____ _____
(Title)

NOTICE: THIS DOCUMENT WAIVES RIGHTS UNCONDITIONALLY AND STATES THAT YOU HAVE BEEN PAID FOR GIVING UP THOSE RIGHTS. THIS DOCUMENT IS ENFORCEABLE AGAINST YOU IF YOU SIGN IT, EVEN IF YOU HAVE NOT BEEN PAID. IF YOU HAVE NOT BEEN PAID, USE A CONDITIONAL RELEASE FORM.

SECTION 01 2982
(PUBLIC WORK)
CONDITIONAL WAIVER AND RELEASE ON FINAL PAYMENT

Project: _____

Job. No.: _____

On receipt by the undersigned of a check from _____
(Maker of Check)

in the sum of $_____ payable to _____
(Amount of Check) *(Payee or Payees of Check)*

and when the check has been properly endorsed and has been paid by the bank on which it is drawn, this document becomes effective to release any Mechanic's Lien, any state or federal statutory bond right, any private bond right, any claim for payment and any rights under any similar ordinance, rule or statute related to claim or payment rights for persons in the undersigned's position, the undersigned has on the job of

_____
(Owner)

located at _____
(Job Description)

This release covers the final payment to the undersigned for all labor, services, equipment or materials furnished to the jobsite or to

_____
(Person with whom undersigned contracted)

except for disputed claims in the amount of $_____. Before any recipient of this document relies on it, the person should verify evidence of payment to the undersigned.

The undersigned warrants that he either has already paid or will use the monies he receives from this final payment to promptly pay in full all his laborers, subcontractors, materialmen and suppliers for all work, materials, equipment or services provided for or to the above referenced project up to the date of this waiver. The undersigned further agrees to be responsible for any future claims or liens filed against the Owner or Architect for work in conjunction with this project for which he has been or will be paid (to indemnify the Owner and Architect).

DATE: _____ _____
(Company Name)

Notary: By: _____
(Signature)

_____ _____

This _____ day of _____20_____. *(Title)*

SECTION 01 2983
(PUBLIC WORK)
UNCONDITIONAL WAIVER AND RELEASE ON FINAL PAYMENT
(Pursuant to A.R.S. § 33-1008)

Project: _____

Job. No.: _____

The undersigned has been paid in full for all labor, services, equipment or material furnished to the jobsite or to

_____
(Person with whom undersigned contracted)

on the job of _____
(Owner)

located at _____
(Job Description)

and does hereby waive and release any right to Mechanic's Lien, any state or federal statutory bond right, any private bond right, any claim for payment and any rights under any similar ordinance, rule or statute related to claim or payment rights for persons in the undersigned's position, except for disputed claims for extra work in the amount of $_____.

The undersigned warrants that he either has already paid or will use the monies he receives from this final payment to promptly pay in full all his laborers, subcontractors, materialmen and suppliers for all work, materials, equipment or services provided for or to the above referenced project.

DATE: _____ _____
(Company Name)

Notary: By: _____
(Signature)

_____

This _____ day of _____20_____. _____
(Title)

NOTICE: THIS DOCUMENT WAIVES RIGHTS UNCONDITIONALLY AND STATES THAT YOU HAVE BEEN PAID FOR GIVING UP THOSE RIGHTS. THIS DOCUMENT IS ENFORCEABLE AGAINST YOU IF YOU SIGN IT, EVEN IF YOU HAVE NOT BEEN PAID. IF YOU HAVE NOT BEEN PAID, USE A CONDITIONAL RELEASE FORM.

SECTION 01 3113

PROJECT COORDINATION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions if the Contract, including General and Supplementary conditions and Division 1 Specification Sections, apply to this section.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 SUMMARY

A. Requirements

1. Review requirements and clearances of all building utilities and structural components above ceiling and coordinate the installation of all components to provide proper access and clearances to valves, access doors, ports, etc.
2. Provide project interface and coordination as required to properly and accurately bring together the several parts, components, systems, and assemblies and as required to complete the Work and the Project.
3. Provide interface and coordination of all trades, crafts, and subcontracts as required to provide correct and accurate connection of abutting, adjoining, overlapping, and related Work, and provide all anchors, fasteners, accessories, appurtenances, and incidental items as required to complete the Work properly, fully, and correctly in accordance with the Contract Documents.
4. Provide additional structural components, miscellaneous metal, bracing, blocking, backing, clips, anchors, fasteners, and installation accessories as required to properly anchor, fasten, or attach materials, equipment, appliances, hardware, systems, assemblies, cabinets, and architectural features to the structure required to adequately support or back building components.
5. Provide excavation and backfill, trenching and drilling for all trades as required for the installation of their Work.
6. Provide concrete foundations, pads, supports, bases, and grouting for all trades as required for the installation of their Work.
7. Provide caulking, sealing, and flashings as required to weatherproof the building complete and as required to insulate the building thermally and acoustically. Include caulking, sealing, flashings, and related work as required to prevent moisture intrusion, air infiltration, and light leakage.
8. Provide equipment, appliances, fixtures, and systems requiring plumbing and mechanical services, rough-in, and connections, or other utilities and services, with such services, rough-in, and final connections.
9. Terminations, connections, circuiting and conductors for appliances, fixtures, and indicated equipment required to complete the Work which are not provided by Subcontractors shall be provided by the Contractor.

10. Materials, equipment, component parts, accessories, incidental items, connections, and services required to complete the Work that are not provided by Subcontractors shall be provided by the Contractor.

B. Field Measurements and Templates:
   1. Obtain all field measurements required for the accurate fabrication and installation of the Work. Exact measurements are the Contractor's responsibility.
   2. Furnish or obtain templates, patterns, and setting instructions as required for the installation of all Work. Verify all dimensions in the field.

C. Responsibility
   1. The Contractor shall be in charge of this Contract and the site, as well as the directing and scheduling and coordination of all Work.
   2. Final responsibility for the performance, interface, and completion of the Work and the Project in accordance with the Contract Documents shall be with the Contractor.

END OF SECTION

SECTION 01 3119

PROJECT MEETINGS

PART 1 GENERAL

1.1 PROJECT MEETINGS

A. General: Contractor will schedule and conduct meetings and conferences at the Project site unless otherwise indicated.
   1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
   2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
   3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within two (2) days of the meeting.
   4. Preconstruction Conference: Contractor will schedule and conduct a preconstruction conference before starting construction, at a time convenient to the Owner and Architect.

B. Progress Meetings: Contractor will conduct progress meetings.
   1. Coordinate dates of meetings with preparation of payment requests.
   2. Attendees: In addition to the representatives of the Owner and Architect, each subcontractor, and other entity concerned with current progress or performance of future activities shall be represented. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
   3. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

END OF SECTION

SECTION 01 3217

CONSTRUCTION SCHEDULE

PART 1 GENERAL

1.1 SUMMARY

A. Related Documents
1. Drawings and General Provisions of the Contract, including Special Supplemental and General Conditions and other Division 01 Specification sections apply to work of this section.

1.2 CONSTRUCTION SCHEDULE

A. Progress schedule shall be submitted to Architect no later than seven (7) calendar days after date of Agreement and shall be updated bi-monthly during construction or as required to keep it current. A current schedule shall be submitted with each application for payment. Nothing in this requirement shall be deemed to be a usurpation of the Contractor's authority and responsibility to plan and schedule the work as he sees fit, subject to other requirements of the Contract Documents.

1.3 TIME OF COMPLETION

A. Contractor's time of completion shall be as indicated in the Contract for construction. Any change to the construction duration or completion date shall be formalized by a Change Order. All days or time referenced in this section are calendar days unless otherwise noted.

1.4 CONTRACT SCHEDULE

A. The Contractor shall present the construction approach and explain the schedule logic, duration and sequencing. The schedule shall cover the entire contract time.
1. The above generated schedule shall include:
a. Working activities broken down by trade or CSI Division.
b. Milestone activities identifying completion of each stage of work.
c. Owner furnished materials or equipment identified as separate activities for delivery and installation.
d. Activities for procurement of major equipment or long lead items.
2. Upon acceptance of the schedule, it will be incorporated into the Contract as the Construction Schedule. All monthly payment applications will be generated from the updated Construction Schedule. Acceptance of the Construction Schedule will be a condition precedent to the making of any progress payments under the Contract.

1.5 CONTRACTOR'S RESPONSIBILITY

A. The Contractor shall furnish sufficient forces, facilities and equipment, and shall work such hours including night shift and overtime operations, as necessary to ensure the prosecution of the Work in accordance with the current monthly Construction Schedule Update. If the Contractor falls behind in meeting the Construction Schedule as noted by negative float in the current monthly Construction Schedule, the Contractor shall take such steps as may be necessary to accelerate the Work without additional cost to the

Owner. The provision of this paragraph shall not be construed as prohibiting the Contractor from increasing the hours of work, the number of shifts, overtime operations and/or the amount of construction plant and equipment provided the Contractor gives reasonable notice to the Owner.

1.6 CONTRACT SCHEDULE REVISIONS

A. Change Proposals:

1. When a Change Proposal is issued which has the potential to impact specified completion dates, the Contractor shall notify the Owner and Architect immediately of that fact.

B. Additional Costs:

1. No additional cost beyond that provided in Article 7 of the General Conditions will be allowed for the incorporation of approved Change Orders into the Contract Schedule.

1.7 SHORT INTERVALS SCHEDULES

A. Use of Short Intervals Schedules:

1. Short Interval Scheduling shall be used throughout the construction period and shall be a two week projection to include the week submitted and the week thereafter. The schedule shall be submitted weekly for approval by the Owner.

END OF SECTION

SECTION 01 3300

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

A. Shop Drawings: The term "Shop Drawings" includes but is not limited to fabrication, erection, layout and setting drawings, manufacturer's standard drawings, descriptive literature, catalogs, brochures, performance and test data pertaining to materials and equipment systems and methods of construction as may be required to show that the materials, equipment or systems and the positions and layout of each conform to the Contract requirements. As used herein the term "manufactured" applies to standard units usually mass-produced and 'fabricated' means items specifically assembled or made out of selected materials to meet individual design requirements. Shop Drawings shall establish the actual detail of manufactured or fabricated items; indicate proper relation to adjoining Work; amplify design details of mechanical and electrical equipment in proper relation to physical spaces in the structure; and incorporate minor changes of design or construction to suit actual conditions.

B. Contractor is responsible for scheduling and organizing the submittals from the various subcontractors and suppliers and verifying compliance with the contract documents. All submittals are to be indexed and clearly labeled with the C.S.I. (2004 MasterFormat) section number and title. Following Contractor's review and approval, Contractor shall submit electronic versions (.pdf or similar) using a web based program acceptable to the Architect. If any submittals are not able to be scanned and submitted electronically, Contractor shall provide the required number of hardcopies to the Architect for review.

C. Samples: Submit to the Architect for review and/or selection all samples and appropriate information for the Architect to select all colors, textures, fabric and finishes for the entire project. Final selection of color, textures, fabrics or finishes will not be made until all applicable and related submittals have been provided to the Architect.

1.2 QUALITY CONTROL SUBMITTALS

A. Manufacturer's Instructions: Where any item or work is required by Specifications to be furnished installed or performed in accordance with a specified product manufacturer's instructions, Contractor shall procure and distribute the necessary copies of such instructions to concerned parties.

B. Certificates: When requested by the Architect, the Contractor shall deliver to the Architect, prior to final acceptance of the Work as a whole, signed certificates from suppliers of materials and manufactured items stating that such items conform to the Contract Documents.

C. Field Test Reports: Portions of the work may require special testing, inspections, certification, etc. as indicated in this Project Manual. Properly prepared written summaries, reports, etc., as required shall be forwarded to the Architect through the Contractor promptly upon completion. Compliance with this requirement will be a condition for payment.

END OF SECTION

SECTION 01 3301

SUBSTITUTION OF MATERIALS OR PRODUCTS DURING CONSTRUCTION

PART 1 GENERAL

1.1 To be considered, substitutions must be made in accordance with these instructions.

1.2 When a specific product is specified for use in the project, it is to establish a standard of quality and shall not be construed as limiting competition. It is the Architect's and Engineers' intent that "Substitutions during Construction" match the specified product, system, equipment or material criteria including, but not limited to, color, texture, size, weight, utility requirements, working clearances, capacity, volume, speeds, power, BTU's, etc.

1.3 This project is to include only the products, materials, equipment and systems that are indicated on the Drawings, and are specified or approved through the "Substitution Prior to Bid" process. In order for "Substitutions During Construction" to be considered by the Owner, Architect and Engineers, the Contractor shall demonstrate that the specified or Prior Approved product, material, equipment or system is not available after award of the Contract. Requests for "Substitution During Construction" shall contain sufficient information, descriptive brochures, drawings, samples or other data as is necessary to provide direct comparison to the specified materials.

1.4 Products proposed as "Substitutions" must be fully compared to the product, material, equipment or system specified. Contractor shall thoroughly review and compare the Specifications for both the specified item and proposed "Substitution During Construction", and clearly identify in writing to the Architect and Engineer, any differences between the items. Differences that are to be identified shall include, but not be limited to, size, weight, utility requirements, working clearances volume, capacity, speeds, power, BTU's, etc. Should the Architect and Engineer deem any differences to be unacceptable, the "Request for Substitution During Construction" shall be rejected.

1.5 All requests for "Substitution During Construction" will be accompanied by a "Substitution of Materials During Construction" Request Form, that is a part of this Specification section. Requests not accompanied by the Form will not be reviewed. Requests for "Substitution During Construction" shall be in the hands of the Architect no later than twenty-eight (28) calendar days prior to date Contractor is required to place an order for the product of material.

1.6 Each submittal shall be well marked and identified as to types and kind of the items being submitted for approval. It is the sole responsibility of the Contractor to submit complete descriptive and technical information to the Architect so the Architect can make proper appraisal. Lack of proper information will be sufficient cause for rejection. Reference to catalogs will not be acceptable unless catalog is submitted with Substitution Request Form. All pertinent information shall be clearly marked by the Contractor and shall be specific to the product in question.

1.7 It is the Contractor's responsibility to confirm and correlate quantities and dimensions and coordinate with trades whose work may be affected by the requested substitution.

1.8 In submitting a Request for Substitution During Construction, the Manufacturer and Contractor shall make the following representations:

A. The specified or prior approved product, material, equipment or system is not available, does not comply with current or local codes or is not approved by the AHJ.

B. The proposed product is equal or superior in all respects to that specified.

C. The Substitution carries the same or better Warranty as the specified product, materials, equipment or system.

D. Installation of the accepted Substitution shall be incorporated into the Work, making such changes as may be required for the Work to be completed in every respect and at no additional cost to the Owner.

E. Claims for additional costs related to the Substitution that subsequently become apparent, shall be waived by the Contractor.

F. Cost data is complete and includes related costs under the Contract but excludes costs under separate construction contracts and design consultant's redesign.

1.9 If, at any time, any differences in the performance or physical characteristics of the proposed "Substitutions During Construction" and are determined to be a liability to the performance, operation or design intent of the building, the Contractor shall be required to replace said product, material, equipment or system with the originally specified product at Contractor's expense, as well as compensate the Owner for any costs associated with the substituted product, material, equipment or system.

SUBSTITUTION OF MATERIALS DURING CONSTRUCTION REQUEST FORM

TO:_____

PROJECT:_____BID DATE:_____

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

Section	Page/Sheet No.	Paragraph/Line	Specified Item
_____	_____	_____	_____

Proposed Substitution:_____

_____

Reason for substitution:_____

_____

Attach complete product description, drawings, photographs, performance and test data, available colors/finishes, and other information necessary for evaluation. Identify specific model numbers, finishes, options, etc.

A. Will changes be required to building design or any components or assemblies in order to properly install and operate proposed substitution? Yes _____ No _____.
If yes, explain:

_____

_____

B. List description of the difference proposed for each substitution and specified item.

Specified Item	Proposed Substitution
_____	_____
_____	_____
_____	_____
_____	_____

C. Does substitution affect Drawing clearances and/or dimensions? Yes _____ No _____

If yes, explain: _____

D. What effect does substitution have on other trades? List affected trades._____

_____

E. Does manufacturer's warranty of proposed substitution differ from that specified?
Yes _____ No _____ If yes, explain:_____

_____

F. Will substitution affect progress schedule? Yes _____ No _____ If yes, explain:

_____

G. Will substitution require more license fees or royalties than specified product?
Yes _____ No _____ If yes, explain:_____

_____

H. Will maintenance and service parts be locally available for substitution?
Yes _____ No _____ If no, explain:_____

_____

I. Will substitution require additional testing, inspection, certification or approvals?
Yes _____ No _____ If yes, explain:_____

_____

In submitting this "REQUEST FOR SUBSTITUTION OF MATERIALS DURING CONSTRUCTION" Contractor represents the following:

1. The proposed product is equal or superior in all respects to that specified

2. The Substitution carries the same or better Warranty as the specified product, materials, equipment or system.

3. Installation of the accepted Substitution shall be incorporated into the Work, making such changes as may be required for the Work to be completed in every respect, at no additional cost to the Owner.

4. Claims for additional costs related to the Substitution,, that subsequently become apparent, will be waived by the Contractor.

5. Cost data is complete and includes related costs under the Contract but excludes costs under separate contracts and design consultant's redesign.

6. If, at any time, any differences in the performance or physical characteristics of the proposed "Substitutions During Construction" and are determined to be a liability to the performance, operation or design intent of the building, the Contractor shall be required to replace said product, material, equipment or system with the originally specified product at Contractor's expense, as well as compensate the Owner for any costs associated with the substituted product, material, equipment or system.

7. The Contractor understands that he will pay for changes to the building design, including engineering and drawing costs, caused by requested substitution.

Submitted by General Contractor:

_____ _____

Signature Date

For Architect's Use:

____ Accepted ____ Accepted as Noted ____ Not Accepted

By _____

Date _____

Remarks _____

For Engineer's Use:

____ Accepted ____ Accepted as Noted ____ Not Accepted

By _____

Date _____

Remarks _____

For Owner's Use:

____ Accepted ____ Accepted as Noted ____ Not Accepted

By _____

Date _____

Remarks _____

END OF SECTION

SECTION 01 4200

REFERENCES

PART 1 GENERAL

1.1 REFERENCE STANDARDS

A. Reference in the specifications to known standards, such as codes, specifications, etc., promulgated by professional or technical Associations, Institutes and Societies, are intended to mean the latest edition of each such standard adopted and published as of the date of the invitation to bid on this Project except where otherwise specifically indicated. Each such standard referred to shall be considered a part of the Specifications to the same extent as if reproduced therein in full. The following is a representative list of such Associations, Institutes and Societies, together with the abbreviation by which each is identified.

ACI	American Concrete Institute
ADOT	Arizona Department of Transportation
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
API	American Petroleum Institute
ASA	American Standards Association
ASHRAE	American Society for Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWI	Architectural Woodwork Institute
AWSC	American Welding Society Code
AWWA	American Water Works Association
CSI	Construction Specifications Institute
F.M.	Factory Mutual
GA	Gypsum Association
MAG	Maricopa Association of Governments
NEC	National Electrical Code
NFPA	National Fire Protection Association
NRCA	National Roofing Contractor's Association
UL	Underwriter's Laboratories, Inc.

B. Every reference in the Specifications text to codes, standard specifications or manufacturer's instructions shall mean the latest printed edition of each in effect under the applicable jurisdiction at the Contract date.

C. Reference to known standards shall mean and intend the latest edition or amendment published prior to date of these Specifications, unless specifically indicated otherwise, and to such portions of it that relate and apply directly to the material or installation called for on the Project.

D. Where material is specified solely by reference to standard Specifications, the Contractor shall, if requested by the Architect, submit to the Architect for his approval, data on all such material proposed to be incorporated into the Work of the Contract listing the name and address of the vendor, the manufacturer or producer, and the trade or brand names of such materials.

END OF SECTION

SECTION 01 4500

QUALITY CONTROL

PART 1 GENERAL

1.1 SUMMARY:

A. This Section describes regulatory requirements, quality control, and quality assurance procedures.

B. This Section is complimentary to the General Conditions, Supplementary Conditions, General Structural Notes, and local code requirements and nothing contained herein shall be considered to waive any such requirement.

1.2 REGULATORY REQUIREMENTS:

A. Design Criteria: Every reasonable effort has been made to design this Project in accordance with the applicable regulatory requirements. Regulatory requirements are interpretive by nature and the Architect cannot warrant compliance; only officials of the enforcing agencies can attest to compliance.

B. Construction methods: the responsibility for constructing this Project in compliance with the latest edition of all applicable building codes and regulatory requirements rests solely with the Contractor and his subcontractors. All work shall comply with codes and regulations noted herein.

C. Conflicts: If a conflict is found between regulatory requirements and information contained in the Contract Documents, the Contractor shall immediately report the conflict to the Architect. Contractor shall not proceed with any Work that he knows to be in violation of either the regulatory requirements or the Contract Documents. The fact that a regulatory official may accept a particular product and/or system does not relieve the Contractor from providing what is required by the Contract Documents.

1.3 QUALITY CONTROL

A. The Contractor shall schedule the times for Special Inspections and Materials Testing with the consultant providing the service, so as to coordinate with the construction progress. Appointments for such services shall be made twenty-four (24) hours in advance or greater. Refer to the General Structural Notes in the Drawings for Special Structural Inspection requirements.

B. Where specific instructions in these specifications require that a particular product and/or material be installed and/or applied by an "approved applicator" of the manufacturer, it is the Contractor's responsibility to ensure that the subcontractor employed for such work be an approved applicator. Such subcontractor(s) shall provide evidence of being an approved applicator when requested by the Architect.

C. Where not more specifically described in the Specifications, workmanship shall conform to the methods and operations of best standards and accepted practices of the trade or trades involved, and shall include all items of fabrication, construction or installation regularly furnished or required for completion (including any finish), and for successful operation as intended.

D. Work shall be executed by mechanics skilled in their respective lines of work.

E. If a product or material is indicated or shown for an application other than that intended by the manufacturer, the supplier, installer or manufacturer shall notify Architect prior to bidding.

F. UL Label: Where applicable, materials and equipment for which Underwriter's Laboratories, Inc. standards have been established, and their label services available, shall bear the appropriate UL label.

G. Anything in the Contract Drawings notwithstanding, the Contractor accepts the responsibility of construction of a watertight, weathertight project.

1.4 TESTING AND INSPECTION SERVICES

A. Selection of inspection and/or testing company:
   1. Special Structural Inspections: By Structural Engineer of Record's assigned personnel.

   2. Earthwork and Material Tests: By the same company that prepared the Geotechnical Engineering Report. Where no Geotechnical Engineering Report was prepared the Testing Company shall be selected by the Contractor and approved by the Architect.

B. The Owner will retain and pay the expenses of the services for special structural inspections.

C. The Contractor shall retain and pay the expenses of an Earthwork and Materials Testing Laboratory to perform the work called for in the Contract Documents. »
INCLUDE PARAGRAPH BELOW WHERE APPLICABLE TO PROJECT AND AS REQUIRED BY A.H.J. FOR INSPECTIONS OF THE E.I.F.S APPLICATION.

1.5 SUBMITTALS

A. Special Inspection Reports: Inspecting Agent will submit a copy of report to the Contractor and a copy to the Architect. Contractor to make additional copies as required and distribute to all affected subcontractors and material suppliers.

B. Distribution of test reports: The Testing Agency shall distribute copies of all reports to the offices of the parties concerned as follows:

   1 copy to the Architect
   1 copy to the Structural Engineer
   1 copy to the Owner
   1 copy to the Contractor
   1 copy to the Supplier being tested

   Requirements for additional copies will be determined upon commencement of the Contract.

PART 2 PRODUCTS

2.1 General: As determined by the Inspection/Testing Company

PART 3 EXECUTION

3.1 Testing Methods: As determined by the Inspection/Testing Company and/or as required to satisfy the A.H.J.

3.2 Required Special Inspection and Material Testing:

A. Preparation of existing soil and pad construction: Verify compliance of site preparation by Special Inspection to ensure compliance with referenced Geotechnical Engineering Report and other sections applicable.

B. Excavations: After foundations have been excavated and prior to placing any reinforcing steel or concrete, inspect excavations to verify compliance by Special Inspection to ensure:
   1. Foundation excavations are free of loose soils and compacted to specified densities.
   2. Dimensions are as indicated on the Drawings.

C. Structures: At observable stages and as indicated in the General Structural notes in the Drawings, provide Special Inspections for site and building construction to ensure conformance with contract documents.

D. Concrete: Mold four (4) cylinders for each test; one for 7 day, two for 28 day and one for hold.
   1. Structural Concrete: Test per IBC 1905.6; one test of each type strength/class of concrete for every 150 cubic yards but no less than one test each day's pour nor less than once for each 5000 square feet of surface for slabs or walls. Structural concrete includes foundations and building slabs-on-grade.

E. Mortar: Shall conform to the proportion specifications of IBC Table 2103.8(1) or the property specifications of IBC Table 2103.8(2).

F. Grout: Test per IBC 2105.2.2; minimum 1 test of every day's delivery of grout. Take 3 test specimens for each test.

END OF SECTION

SECTION 01 5000

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 GENERAL

A. The Contractor shall be responsible for and comply with codes and regulations regarding potable drinking water, sanitation, dust control, fire protection, and other temporary controls.

B. Temporary office facilities, toilets, storage sheds and other construction of temporary nature shall be removed from the site as soon as, the progress of the work will permit and as agreed to by Owner, and the portions of the site occupied by same shall be properly reconditioned and restored to a condition acceptable to the Owner.

1.2 TEMPORARY UTILITIES

A. Temporary Electricity:
   1. Temporary electric service required in the performance of the Contract shall be furnished and paid for by the Contractor.

B. Temporary Heating and Cooling:
   1. When required for proper installation or protection of any portion of the Work, the Contractor shall maintain an interior building temperature between 60° - 85° F.
   2. When the permanent heating, ventilation and air conditioning systems are installed and operable, the Contractor shall be responsible for operation and paying costs in connection with such operations. Prior to Substantial Completion, registers, diffusers and filters shall be cleaned or replaced as appropriate

C. Temporary Water:
   1. Water required in the performance of the Contract shall be provided and paid for by the Contractor. Water used for human consumption shall conform to requirements of State and local authorities for potable water.

D. Temporary Sanitary Facilities: The Contractor shall provide temporary chemical toilet structures with urinals, in numbers as required, located as approved, and maintained in a clean and sanitary condition.

E. Temporary Fire Protection: The Contractor shall provide and maintain fire extinguishers, fire hoses and other equipment as necessary for proper fire protection during construction. Such equipment is to be used for fire protection only.

1.3 ACCESS ROADS AND PARKING

A. Temporary emergency vehicle access route(s) shall be constructed where required and in accordance with the local jurisdiction. This temporary access route may be located along the same route as the designed vehicle access and may be incorporated into the final construction where acceptable to local authorities.

B. Contractor shall use, and maintain in clean condition site access route as shown on site or site access plan.

C. Contractor and other persons connected to this Project will only use parking areas designated on site plan or as approved by the Owner.

D. Contractor and workmen shall not trespass into area beyond the "Limit of Work" area.

END OF SECTION

SECTION 01 6000

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 DELIVERY AND STORAGE OF MATERIALS

A. Deliver manufactured materials in the original packages, containers or bundles (with the seals unbroken) bearing the name or identification mark of the manufacturer.

B. Deliver fabrications in as large assemblies as practicable and where specified to be shop-primed or shop-finished, they shall be packaged or crated as required to preserve such priming or finish intact and free from abrasion.

C. Store materials in such manner as necessary to properly protect same from damage, as materials or equipment damage by handling, weather, dirt or from any other cause will not be acceptable.

D. Store materials so as to cause no obstructions, stored off sidewalks, roadways, and underground services. The Contractor shall be responsible for protecting materials and equipment furnished under the Contract.

E. All ductwork delivered to the site shall be temporarily sealed at both ends as required to prevent dust from entering ducts prior to installation. All installed ductwork shall remain sealed until final connections are made.

1.2 WORKMANSHIP STANDARDS

A. Where not more specifically described in the various Sections of these Specifications, workmanship shall conform to the methods and operations of best published standards and accepted practices of the trade or trades involved, and shall include items of fabrication, construction or installation regularly furnished or required for completion (including finishes), and for successful operation as intended.

B. Work shall be executed by mechanics skilled in their respective lines of work.

C. When completed, parts shall have been durably and substantially built and shall present a neat, workmanlike appearance.

1.3 PRODUCT SUBSTITUTIONS

A. See Section 01 3301 "Substitution of Materials or Products During Construction"

1.4 MANUFACTURER'S TRADE MARKS AND NAMES

A. The Architect reserves the right to review and request and removal of manufacturer's trade marks and names on items or materials and equipment which will be in plain view of the occupants of the building when placed in their final position. Such removal shall be at no expense to the Owner. A decision on the necessity to remove may be obtained from the Architect, in writing. Failure to obtain such approval shall constitute agreement to comply with this requirement.

END OF SECTION

SECTION 01 7329

CUTTING AND PATCHING

PART 1 GENERAL

1.1 CUTTING AND PATCHING

A. Structural Work: Do not cut-and-patch structural work in a manner resulting in a reduction of load-carrying capacity of load/deflection ratio. Submit proposal and request and obtain Engineer's approval before proceeding with any cut-and-patch of structural work.

B. Visual/Quality Limitations: Do not cut-and-patch work exposed to view (exterior and interior) in a manner resulting in noticeable reduction of visual qualities and similar qualities, as judged by Architect.
   1. Engage the original installer/fabricator, or (if not available) an acceptable equivalent entity, to perform cutting and patching.
   2. Refinish entire surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection. For an assembly, refinish the entire unit.

C. Limitation on Approvals: Architect's approval to proceed with cutting and patching does not waive right to later require removal/replacement of work found to be cut-and-patched in an unsatisfactory manner, as judged by the Architect.

D. Where not more specifically described in any of the various Sections of these Specifications, workmanship shall conform to all of the methods and operations of best standards and accepted practices of the trade or trades involved, and shall include all items of fabrication, construction, or installation regularly furnished or required for completion, (including any finish), and for successful operation as intended.

E. Work shall be executed by mechanics skilled and experienced in their respective trade, and shall have proper certification or other credentials where appropriate.

F. In every case, exercise extreme care in cutting operations, and perform such operations under adequate supervision. Openings shall be neatly cut and shall be kept as small as possible to avoid unnecessary damage. Careless and/or avoidable cutting damage, etc., will not be tolerated, and the Contractor will be held responsible for such avoidable or willful damage.

G. Replacing, patching and repairing of materials and surfaces cut or damaged in the execution of the Work shall be performed by experienced mechanics of the applicable trades involved. Such replacing, repairing or patching shall be done with the applicable materials, in such manner that surfaces so replaced, etc., will, upon completion of the Work, match the surrounding similar surfaces.

H. When completed, all parts shall have been durably and substantially built and shall present a neat, workmanlike appearance.

END OF SECTION

SECTION 01 7500

STARTING AND ADJUSTING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Perform operations in following order prior to request for Substantial Completion:
   1. Starting of systems
   2. Demonstration of systems
   3. Instruction of Owner's designated personnel.

1.2 SUBMITTALS

A. General: Submit in accordance with Section 01 3300, Submittal Procedures.

B. Submit following items as required by this Section:
   1. Record of Owner's Instructions.

1.3 STARTING OF SYSTEMS

A. Coordinate schedule for startup of various equipment and systems.

B. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or for other conditions that may cause damage.

C. Verify that tests, meter readings, and specified electrical characteristics agree with those required by contract documents and equipment or system manufacturer.

D. Verify wiring and support components for equipment are complete and tested.

E. When specified in individual Specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to startup, and to supervise placing equipment or system in operation.

F. Verify that all waste piping is clear of obstructions and free flowing from top of vent to city tap.

G. Verify that all roof drainage systems are clear of debris and free flowing.

1.4 DEMONSTRATION

A. Demonstration is for verification that systems will start and operate properly.

B. Demonstrate systems operation to Owner's personnel prior to performing instruction of Owner's personnel.

C. Demonstrate Project equipment by qualified manufacturers' representative who is knowledgeable about Project requirements and operation and maintenance of equipment being demonstrated.

D. Demonstrate startup, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment.

E. Prepare and insert additional data in operations and maintenance manuals required by Section 01 7700, Closeout Procedures when need for additional data becomes apparent during instruction.

1.5 INSTRUCTION OF OWNER'S PERSONNEL

A. Prior to Substantial Completion, fully instruct Owner's designated operation and maintenance personnel in operation, adjustment, and maintenance of products, equipment and systems requiring regular maintenance. Perform instructions within continuous period of thirty (30) days. For equipment that requires seasonal operation, provide similar instruction during other seasons.

B. Use operations and maintenance manual as basis of instruction. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance. Include detailed review of following items:
   1. Maintenance manuals.
   2. Record documents.
   3. Spare parts and materials.
   4. Tools.

C. Submit complete record of instructions as part of operations and maintenance manual given to Owner. For each instructional period, supply following data:
   1. Date.
   2. System or equipment involved.
   3. Names of persons giving instructions.
   4. Other persons present.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01 7700

CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Requirements and procedures for submittal of pertinent data relating to closing out the Project, upon completion of the Project Work. Detailed instructions elsewhere in these Specifications may require that certain items listed herein be submitted prior to Substantial Completion of the Project.

B. Receipt and approval of items specified in this Section is a prerequisite for Final Payment and/or release of Retention.

1.2 FINAL CLEANING

A. Perform the following special cleaning for trades at completion of Work; employing only experienced workmen or professional cleaners for the final cleaning:
   1. Remove marks, stains, fingerprints, soil and dirt from painted areas.
   2. Remove spots, soil, paint and mastic from tile work and wash same.
   3. Clean fixtures, equipment and piping; remove stains, paint, dirt and dust.
   4. Clean concrete walks and slabs of plaster or cement droppings, paint and other objectionable materials to present a neat, clean appearance.
   5. Clean exterior and interior metal surfaces, including doors and windows and their frames.
   6. Clean items required to have a polished finish free of oil, stains, dust, dirt, paint and the like; polish and leave without fingermarks or other blemishes.
   7. Clean exterior surfaces of building to be free of dirt, dust, concrete, splatters, overspray, etc. Use low-pressure water stream to clean all exterior surfaces.

B. Existing improvements, inside or outside the property that are disturbed, damaged or destroyed by the Work under the Contract shall be restored to the condition in which they originally were, or to the satisfaction of the Architect.

1.3 PROJECT RECORD DOCUMENTS

A. Record Drawings: The Contractor will provide the Owner with a complete record set of the original Construction Documents for review Construction Change Directive and Change Order items included and clearly indicated. Seals and signatures of Registrants shall be completely removed and/or permanently obscured.
   1. Locations of underground Work shall be established by dimensions to column lines or walls, locating all turns, etc., and by properly referenced centerline or invert elevations and rates of fall.
      a. For Work concealed in the building, sufficient information shall be given so it can be located with reasonable accuracy and ease. In some cases this may be by dimension. In others it may be sufficient to illustrate the Work on the drawings in relation to the spaces in the building near which it was actually installed.
   2. Additional drawings shall be provided as necessary for clarification.

3. Drawings shall be kept up-to-date during the entire course of the Work and shall be available upon request for examination by the Architect and, when necessary, to establish clearances for other parts of the Work.

1.4 Owner's Manual:

A. Upon Substantial Completion of the Project Work, submit one (1) copy of the Owner's Manual suitably typed, indexed and labeled for ready reference to the Architect for review.

1. Subcontractors, major suppliers list with company's names, addresses and telephone numbers.
2. Guarantees/warranties, certifications as described in the General Conditions, Supplementary General conditions and/or the technical specification or each item or work product.
3. "Affidavit: Non-Use of Asbestos Containing Building Materials" from General Contractor on use of asbestos-free materials, included in this Section.
4. "Materials Receipt" signed by Owner and Contractor, included in this Section
5. Special certifications and inspections documentation.
6. Certification of building pad and finish floor elevations by a licensed surveyor.
7. Training Log or other documentation verifying system(s) training.
8. Other items required by the Specifications.

Upon acceptance of Owner's Manual document, the Contractor shall provide two (2) final hard copies, along with one (1) electronic (.pdf) file copy for transmittal to the Owner.

1.5 OPERATION AND MAINTENANCE DATA

A. Upon Substantial Completion of the Project Work, submit one (1) copy of the Operation and Maintenance Manual and Operating Instructions including parts lists for materials, equipment and systems, electrical and control items, to the Architect for review. Divisions 21 to 28 may be contained in separate binders for each division. If required, correct and resubmit two (2) copies of the Operation and Maintenance Manuals along with two (2) electronic (.pdf) file copies to the Architect who will transmit them to the Owner. NOTE: Failure to properly complete and submit Maintenance and Operation Manuals in a timely manner shall place responsibility for detrimental maintenance and operating procedures on the Contractor.

B. Operating instructions shall include complete operating sequence, control diagrams, description of method of operating machinery, machine serial numbers, factory order numbers, parts, tests, instruction books, suppliers phone numbers and addresses and individual equipment guarantees. Parts lists shall be complete in every respect, showing parts and part numbers for ready reference.

C. Maintenance instructions shall include a written list of required and suggested maintenance for mechanical, plumbing, electrical or other equipment or features in the project. Each item shall contain a brief description of the maintenance required as well as the recommended time frame or period for the maintenance. Include lists of filter sizes for air handling equipment, indicated "washable" or "disposable" and for which unit the filter is for. Shut off valves, etc., must be clearly marked on as-constructed drawings.

D. Assemble maintenance manual and operating instructions in hard back loose leaf binders. Suitably label and index material for ready reference.

1.6 CERTIFICATES AND AFFIDAVIT

A. Certificates: Submit certificates from governing authorities, manufacturers and subcontractors not previously submitted at the time of Substantial Completion.

B. Affidavit: Submit the completed "Non-Use of Asbestos Containing Building Materials"; this form is bound into these specifications as the last page of this section.

MATERIALS RECEIPT

DATE_____

PROJECT_____ O| W PROJECT #_____

GENERAL CONTRACTOR_____

I HAVE RECEIVED THE FOLLOWING EXTRA MATERIALS AS REQUIRED BY THE PROVISIONS IN THE PROJECT MANUAL FOR EACH LISTED CATEGORY: (*insert "N/A", not applicable, to those items not in contract)*

ITEM	**QUANTITY**
PAINT	_____
FUSES	_____
LAMPS	_____

OWNER REPRESENTATIVE

NAME _____

SIGNATURE _____ DATE _____

CONTRACTOR

NAME _____

SIGNATURE _____ DATE _____

AFFIDAVIT: NON-USE OF
ASBESTOS CONTAINING BUILDING MATERIALS

State of Arizona)
) ss:
County of Maricopa)

I, _____, having
(name)

been duly sworn, depose as follows:

1. **I am authorized to make this affidavit on behalf**

of_____
(name of General Contractor)

who/which is the General Contractor of the_____
(project name)

_____
.

2. **In performing the Contract for the construction of**

_____,
(project name)

I certify that no building materials containing asbestos were used or incorporated in any way in the completed project.

DATED this_____day of_____, 20____.

_____
(Name of General Contractor)

By_____

Its_____
(Title)

Subscribed and sworn to before me this

_____day of_____,20____.

_____
Notary Public
My commission expires:

_____

TRAINING LOG

	RESPONSIBLE SUBCONTRACTOR (or NA)	DATE PERFORMED	OWNER REP	OWNER SIGNATURE
Water piping and valve locations	_____	/	/	/
HVAC System	_____	/	/	/
Lighting controls	_____	/	/	/
Roof system maintenance	_____	/	/	/

END OF SECTION

SECTION 03 3300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Furnish and install Cast-In-Place Concrete Work as shown on the Drawings and as specified herein.

1.2 REFERENCES

A. American Concrete Institute:
1. ACI 301- Structural Concrete for Buildings
2. ACI 305 – Hot Weather Concreting
3. ACI 306 – Cold Weather Concreting
4. ACI 302 – Guide for Concrete Floor and Slab Construction

B. American Society for Testing and Materials:
1. ASTM C309 – Liquid Membrane – forming compounds for Curing Concrete
2. ASTM C979 – Pigments for Integrally Colored Concrete
3. ASTM E1155 – Determining Floor Flatness and Floor Levelness Numbers
4. ASTM C94 - Standard Specifications for Ready-Mixed Concrete
5. ASTM 1745 – Standard Specification for Plastic Water Vapor Retarders
6. ASTM D2240 – Standard Test Method for Rubber Property

1.3 SYSTEM DESCRIPTION

A. Mix Design: The mix designs of the concrete for each portion of the work shall be as indicated on the Structural Drawings, but not less than those indicated below. If conflicts exist between these requirements and the Structural Drawings, the higher strength requirement shall govern.
1. The mix design for interior floor slabs on grade shall have a water/cement ratio of 0.45 maximum and a minimum strength of 4500 p.s.i. in twenty eight (28) days.
2. All other portions of the Work not specifically indicated shall have a minimum strength of 3,000 p.s.i. in twenty eight (28) days.

B. In no case shall the slump exceed 5 inches, as determined by ASTM C143, unless a new design showing compliance with other provisions of the specifications is submitted to and accepted by the Architect/Engineer.

C. Design of mixes shall be as per ACI Standard 301 "Specifications for Structural Concrete for Buildings" except as otherwise shown on the Drawings and specified herein.

1.4 SUBMITTALS

A. General: Submittals requirements are specified in Section 01 3300, Submittal Procedures.

B. Mix Design: Submit proposed concrete mix design for each class of concrete to be supplied for the project for review by the Architect/Engineer.
1. The proportioning of ingredients shall be such as to produce the necessary workability, durability, strength and other required properties.

2. A mix design used successfully on a previous project under conditions as anticipated and with the same ingredients proposed for use in this project may be used when approved by the Architect or Engineer.
3. When the proposed mix designs are not established by other allowed methods, they shall be based on the results obtained from tests of trial mixes made with the same materials as will be used in the concrete supplied for the project by testing laboratory or agency approved by the Architect and Engineer, and in accordance with the procedures given in ACI 211 "Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete".

C. Contractor shall submit a drawing of proposed from tie layouts for architectural concrete to be reviewed by the Architect prior to starting work.

1.5 PROJECT CONDITIONS

A. Environmental Requirements:
1. Cold Weather: Concreting shall conform to ACI 306 Standard entitled "Recommended Practice for Cold Weather Concreting".
a) The temperature of the concrete when discharged shall be not less than 55 degrees F. when the mean air temperature is below 40 degrees F.
b) Concrete placing shall cease when the descending air temperature in the shade falls below 40 degrees F. At any other time when the air temperature may be expected to reach the freezing point during the day or night, protection material so provided shall be spread over the concrete. Concrete injured by frost action shall be removed and replaced at the Contractor's expense.
2. Hot Weather: Hot weather concreting, except as otherwise specified herein, shall conform to ACI 305, "Recommended Practice for Hot Weather Concreting".
a) The temperature of the concrete when discharged shall not exceed 90 degrees F.

PART 2 PRODUCTS

2.1 MATERIALS

A. Water shall be potable.

B. Cement shall be gray Portland cement as per ASTM C150, Type II. Provide cement from a single source.

C. Calcium Chloride compounds are not allowed.

D. Aggregates:
1. Aggregates shall be clean, free from foreign matter and shall conform to ASTM C33. Provide aggregate from a single source for exposed concrete work.
2. Fine aggregate shall be clean, sharp, natural sand, free from loam, clay, lumps or other deleterious substances.
3. Coarse aggregate shall be clean, uncoated, processed aggregate containing no clay, mud, loam or foreign matter.
4. Maximum aggregate size shall be not larger than one-fifth of the most narrow dimension between sides of forms, one-third of the depth of slabs, nor three-fourths of the minimum clear spacing between individual reinforcing bars or bundles of bars.

E. Expansion strip material: 1/2 inch thick, asphalt composite, expansion material conforming to ASTM D994.

F. Joint sealant:
   1. For slabs on grade that are to receive finish floor materials install a one or two component self-leveling, polyurethane elastomeric sealant equal to "Sikaflex-2C" with a minimum Shore Hardness of 40 durometers (+/-5).
   2. For slabs on grade that are to be exposed and sealed (or polished) install a flexible epoxy control joint resin equal to "Sikadur 51" with a minimum Shore Hardness of 50-55. Provide in color as approved by Architect.

G. Sealer: Shall be an acrylic sealer such as "W.R. Meadows Vo-Comp 25" at locations indicated on the Drawings and the Room Finish Schedule unless otherwise indicated.

H. Colored Additives (for integrally colored concrete):
   1. Materials:
      a) Colored additives shall contain pure, concentrated mineral pigments specially processed for mixing into concrete and complying with ASTM C979. Color additives containing carbon black are not acceptable. Refer to Adero Canyon Site specifications.

I. Curing Compound: "VC5" by Sinak Corporation. Curing compound shall be applied in strict accordance with manufacturer's requirements to comply with all warranty requirements against moisture vapor transmission.

2.2 BATCHING AND MIXING

A. Ready Mix:
   1. Ready mix concrete shall be batched, mixed and transported in accordance with the applicable provisions of ASTM C94.
   2. Batch plants used in the production of ready mixed concrete shall comply with the standards set forth by the Plant Manufacturers Bureau of the National Ready Mix Concrete Association.

2.3 QUALITY CONTROL

A. Testing Laboratory Services: Material testing shall be performed in accordance with the requirements of this section and Section 01 4500, Quality Control.

B. Concrete Sampling: In accordance with ASTM C172. Three (3) concrete test cylinders will be taken for every 50 (or less) cubic yards of each class of concrete placed.

C. Concrete Specimens: Laboratory specimens shall be prepared and cured in accordance with ASTM C31.

D. Compressive Strength Test Method: ASTM C39. The Testing Agency shall distribute copies of reports as specified in Section 01 4500, Quality Control.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report in writing, with a copy to Architect, any detrimental conditions. Failure to observe this requirement

constitutes a waiver to subsequent claims to the contrary and holds Contractor responsible for correction(s) Architect may require.

B. Verify all slab recesses, slopes, etc. are provided as indicated on drawings and that slopes and depths are coordinated to provide the desired intent. All areas indicated to slope to drain shall be sloped at 1/8"/ft. unless noted otherwise.

3.2 PREPARATION

A. Exposed form ties shall be placed in a uniform manner according to a reviewed submittal or as approved by the Architect.

B. Surfaces directly beneath concrete pour shall be wetted just prior to concrete placement unless a vapor barrier is included in floor slab design.

C. Build in items of miscellaneous iron and steel as indicated in proper position, properly embedded in concrete.

D. Unless noted otherwise on the Drawings, the embedment of conduits, pipes, sleeves, etc. of any material shall not be permitted within any concrete structural element (i.e., columns, beams elevated slabs, etc.) or structural concrete toppings without the approval of the Structural Engineer.

3.3 CONCRETE PLACEMENT

A. Ready mixed concrete shall be mixed and delivered in accordance with the requirements of the Standard Specifications for Ready-Mixed Concrete, ASTM C94. Not more than 90 minutes shall elapse from time water is introduced into the concrete mixture until it is discharged. When the air temperature is above 90 degrees F., reduce maximum mixing and delivery time to 60 minutes. No water shall be added to a mix in the field. At no time will concrete mix exceed a bulb thermometer reading of 90 degrees F. or over. Ice or other method, as approved by the Structural engineer, shall be used to keep concrete below 90 degrees F. temperature.

B. Concrete shall be deposited as near to its final position as possible to prevent segregation. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

C. Vibrators shall be used under experienced supervision and the forms designed to withstand their action. Vibrators shall not be used to move concrete within formwork. Vibrators are not to be used at floor slabs.

D. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete that has hardened sufficiently to cause the formation of seams or planes of weakness within the section. If a section cannot be placed continuously, provide construction joints as herein specified.

E. Cold Joints/Construction Joints: Form keyed joints at all pour terminations. Joints shall be firmly and accurately positioned so that no movement occurs during the concrete placement.

1. At Contractor's option, interior slabs on grade may be poured in a continuous manner, without cold joints, except at perimeter of pour, under the following conditions:

a) The slab shall be saw cut to a depth of ¼ the depth of the slab, along the joints as indicated on the Drawings, the same day the slab is poured.

b) Saw cuts shall be filled with a pourable, polyurethane sealant with a minimum shore hardness of 40 durometers. Saw cuts shall be filled as soon as practical and before cuts have become full of sand or dirt, etc. Clean thoroughly prior to filing.

F. Expansion joints: Full depth of the concrete section. Expansion joint material shall be placed at all exterior concrete flatwork, including all sidewalks, curbs, ramps and steps at a maximum spacing of 20 feet intervals. Expansion joints shall be placed at the edges of flatwork abutting walls, stems, columns, or existing concrete slabs in addition to locations indicated on the Drawings.

G. Where drains are located in floor slab, feather concrete as required from perimeter of affected areas to drains at a minimum of 2% slope unless otherwise indicated on drawings.

3.4 CONCRETE FINISHING

A. All interior slabs to receive floor covering or to be left exposed shall have a smooth, dense, steel trowel finish.

B. Scoring tool shall be used to mark off exterior walks and other areas as indicated on the Drawings. Tool shall provide 3/8 inch radius and depth of cut shall be 1 inch or 1/4 depth of slab, whichever is greater.

C. All exposed vertical concrete surfaces shall have a smooth, surface unless noted otherwise. Concrete that is out of alignment or flatness beyond specified tolerances or shows a defective surface that cannot be properly repaired or patched, shall be removed.

3.5 CURING

A. Protect freshly deposited concrete from premature drying and maintain without drying at a relatively constant temperature for the period of time necessary for the hydration of the cement and proper hardening of the concrete.
   1. Apply curing compound at the rate specified by manufacturer. Apply evenly to surface of concrete with no puddles or "holidays" in coverage.
   2. During the curing period, protect the concrete from damaging mechanical disturbances, particularly load stresses, heavy shock and excessive vibration. Protect finished concrete surfaces from damage caused by construction equipment, materials or methods.

B. Joint Sealant: Saw cut joints, keyed control joints, expansion joints, etc., shall receive joint sealant. Install joint sealant after concrete curing period or as recommended by sealant manufacturer. Joints shall be thoroughly cleaned prior to installation of sealant. Type of sealant shall be as specified herein or as recommended by finish flooring manufacturer.

3.6 FIELD QUALITY CONTROL

A. Tests:
   1. Slump Tests: Shall be in accordance with ASTM C143 and shall be taken whenever a strength test sample is taken and at other times as directed by the Architect or Structural Engineer.
   2. Temperature Tests: The temperature of the concrete mix shall be determined as delivered with a thermometer accurate to plus or minus 2 degrees F. The

thermometer shall be inserted into the sample immediately after it is obtained and allowed to remain until the reading becomes stable.

B. It is the responsibility of the Contractor to take all appropriate measures to avoid slab curl that affects the appearance, fitness or function of the finish floor. Slab curl deemed unacceptable shall be corrected by the Contractor.

C. All interior concrete flatwork shall comply with ASTM E1155 for flatness and level criteria.

D. Contractor shall repair cracks and up to 1/16 inch during the project's warranty period. Contractor shall replace any concrete that exhibits cracks greater than 1/16 inch or concrete that is displaced vertically or horizontally from the adjacent concrete surface by 1/16 inch or more.

3.7 CLEANING

A. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition in accordance with Section 01 5000, Temporary Facilities and Controls.

3.8 PROTECTION

A. Protective coatings shall remain until floors have completely cured or until interior partitions are to be installed.

B. Floors that are to remain exposed (with no floor coverings installed) are to be protected from staining, chipping, and other incidental damage by covering with a non-staining material that will remain in place throughout the duration of construction.

END OF SECTION

SECTION 04 2200

CONCRETE UNIT MASONRY

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Concrete Unit Masonry as shown on Drawings and as specified herein.

1.2 REFERENCES

A. ASTM International:
1. ASTM C90 Standard specification for load bearing Concrete Masonry Units.
2. ASTM C91 Standard Specification for Masonry Cement.
3. ASTM C144 Standard Specification for Aggregate for masonry Mortar.
4. ASTM C150 Standard Specification for Portland Cement.
5. ASTM C207 Standard Specification for Hydrated Lime for Masonry Purposes.
6. ASTM C270 Standard Specification for Mortar for Unit Masonry.
7. ASTM C476 Standard Specification for Grout for Masonry.
8. ASTM C780 Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
9. ASTM C979 Standard Specification for Pigments for Integrally Colored Concrete.
10. ASTM C1329 Standard Specification for Mortar Cement. ASTM C1019 Standard Test Method for Sampling and Testing Grout.
11. ASTM C1384 Standard Specification for Admixtures for Masonry Mortars.
12. ASTM E514 Standard Test Method for Water Penetration and Leakage Through Masonry.

B. International Masonry Industry All-Weather Council (IMIAC):
1. Recommended Practices and Guide Specification for Cold Weather Masonry Construction.
2. Recommended Practices and Guide Specification for Hot Weather Masonry Construction.

C. National Concrete Masonry Association (NCMA):
1. NCMA TEK Bulletin #8-2A Removal of Stains from Concrete Masonry.
2. NCMA TEK Bulletin #8-3A Control and Removal of Efflorescence.
3. NCMA TEK Bulletin #3-1C All-Weather Concrete Masonry Construction

D. Arizona Masonry Guild-Standard 107

1.3 SUBMITTALS

A. General: Submittal requirements are specified in Section 01 3300, Submittal Procedures.

B. Submit samples to Architect for review prior to constructing job-site mock-ups, delivering materials or commencing work covered in this section.
1. Concrete Masonry Unit samples: Provide two (2) samples of concrete masonry units, to be used on Project showing range of texture and/or color variations of exposed surfaces for units.
2. Mortar Color samples: Provide two (2) samples of mortar "sticks" in specified color.

C. Mortar and Grout Mix Designs:

1. Submit mix designs and samples to the Architect for review prior to delivering materials to the site or commencing the work in this section in accordance with Section 01 3300, Submittal Procedures.
   a. Mortar Mix Design: Furnish in accordance with ASTM C270.
   b. Grout Mix Design: Furnished by either the supplier of grout or an independent testing laboratory.

1.4 QUALITY ASSURANCE

A. Standards: The "Levels of Quality", Standard 107 of Arizona Masonry Guild shall apply and by reference is made a part of this specification. Reference to "Custom", "Standard" or "Economy" in this specification shall be as defined in latest edition of AMG Standard 107.

B. Regulatory Requirements: Masonry materials and workmanship shall meet requirements of building codes that are applicable to jurisdiction in which Project is located.

C. Certifications: Concrete unit masonry shall be supplied by a manufacturer participating in Certified Block Program of the Arizona Masonry Guild and shall be a member of NCMA.

1.5 PROJECT/SITE CONDITIONS

A. Field Measurements:

1. Verify measurements shown on Drawings by taking field measurements.
2. Proper fit and attachment of concrete masonry units is required.

1.6 SCHEDULING AND SEQUENCING

A. Coordination: Coordinate with other trades whose work relates to concrete masonry units installation for placing required blocking, backing, furring, conduits and other items.

PART 2 PRODUCTS

2.1 CONCRETE MASONRY UNITS

A. General Requirements for Concrete Masonry Units:

1. All concrete masonry units shall meet ASTM C90 requirements except that when CMU will be exposed in final construction, ASTM C90 "Finish and Appearance" shall be modified to read... "that not more than 3 percent of a shipment contains slight cracks or small chips not larger than 1/2 inch".
2. Units shall be machine made precast concrete units manufactured by a member of N.C.M.A.
3. Units not complying with appropriate ASTM Standards, and as required by this specification, shall not be laid in wall where exposed to view and will be rejected and shall be removed and replaced.
4. Provide special block sizes and shapes required or as shown on Drawings.
5. Interior masonry walls shall utilize a "bullnose" design at all outside corner locations subject to human impact and as otherwise indicated.

B. Standard Hollow CMU:
   1. Manufactured from volcanic scoria aggregate per ASTM C331 and have an average density of three (3) sample units selected at random of not less than 85 p.c.f. nor more than 115 p.c.f. when tested per ASTM C140.
   2. Interior and exterior masonry walls shall utilize a "bullnose" design at all outside corner locations subject to human impact and as otherwise indicated.

C. Accessory Units: Provide units as required for window sills and jambs, doors, control joints, bond beams, lintels, pilaster, caps and other locations as indicated on drawings with a minimum of block cutting.

D. Mortar:
   1. General: Comply with ASTM C270 "Standard Specification for Mortar in Unit Masonry".
   2. Type: "S" Unless noted otherwise on structural drawings.
   3. Cement: Type II Portland cement conforming to ASTM C150.
   4. Aggregate: conforming to ASTM C144, except that no less than 3 percent nor more than 10 percent shall pass a No. 100 sieve.
   5. Hydrated Lime: ASTM C207, Type S.
      a. Color to be standard gray.
   6. Water: Clean and potable.

E. Grout:
   1. Cement: Type II Portland cement conforming to ASTM C150.
   2. Aggregate: ASTM C404 and as follows:
      a. Sand: Size No. 1 for fine aggregate.
      b. Pea Gravel: Size No. 8 for coarse aggregate.
   3. Mix design: minimum compressive strength of 2000 p.s.i. in 28 days, unless higher strength is required by the structural drawings and notes.
   4. Slump: 10 to 11 inches, unless otherwise noted on Drawings.
   5. Use within 1-1/2 hours of initial mixing and use no grout after it has begun to set or after it has become harsh or non-plastic.
   6. Coarse grout may be used in cavity walls with a horizontal dimension of 2 inches or more, and in hollow cell construction 4 inches or more in both horizontal directions.

2.2 ACCESSORIES

A. Joint reinforcing: Ladder type, galvanized steel rods with width 2 inches less than wall thickness conforming to UBC Standard 24-15, Part 1.

B. Dovetail anchor: 16 gauge flat sheet steel, one inch wide, 5-1/2 inch length, designed for use with embedded slot or inserts. Zinc coating shall conform to ASTM A153.

C. Reinforcing steel: As specified under Section 03 2000, Concrete Reinforcing.

D. Masonry wall insulation: As specified under Section 04 0500, Masonry Wall Insulation.

E. Sheet metal flashings: See Section 07 6200, Sheet Metal Flashing and Trim.

F. Expansion Anchors: Structural Steel for Work except as otherwise indicated or specified shall conform to ASTM A36 for miscellaneous steel items and ASTM A992 (Fy=50KSI) for wide flange sections. Steel pipe shall conform to ASTM A500 (Fy=42KSI), Type E or S, Grade B. Tubular steel shall be ASTM A500.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces and supports to receive Work and report in writing, with a copy to Architect, detrimental conditions. Failure to observe this requirement constitutes a waiver to subsequent claims to the contrary and holds Contractor responsible for correction(s) Architect may require. Commencement of Work will be construed as acceptance of subsurfaces.

1. Verify, before proceeding with this Work, that required inspections of existing conditions have been completed.

B. Coordination with other Work: Coordinate with other work that affects, connects with, or will be concealed by this Work.

3.2 INSTALLATION

A. General Requirements for Concrete Masonry Walls:

1. Workmanship: Provide Standard Level workmanship as defined by AMG Standard 107.
2. Lay units in uniform and true courses, level and plumb to height indicated on drawings.
3. Surface of units shall be clean and free from dirt when laid in walls.
4. Lay concrete unit masonry in such a way that cracks are not formed at time unit is placed in wall.
5. Units shall not be wetted before being used and shall be laid dry.
6. Adjusting Units:
   a. Units shall be adjusted to be level, plumb and straightened into final position in wall while mortar is still soft and plastic enough to ensure a good bond.
   b. Avoid over-plumbing and pounding of corners and jambs to fit stretcher units after they are set in position.
   c. If position of unit is shifted after mortar has stiffened, or bond is broken or cracks are formed, re-lay unit in new mortar.
7. Bearings on Walls: Unless noted otherwise provide 3 courses of solid units or grouted hollow masonry units below steel bearing plates or beams bearing on walls. Extend bearings each side of contact with load as required to properly transfer loads into wall.
8. Openings: Provide openings in masonry walls where required or indicated. Steel lintels shall be provided unless otherwise noted.
9. Masonry parapets without copings/caps: Where no parapet coping or other element is to be constructed or installed to provide a positive slope at the top of the parapet, a mortar (cap) sloped towards the building interior shall be provided.
10. Anchor masonry units facing against or abutting concrete members to concrete by use of dovetailed flat bar anchors inserted in slots built into concrete.
    a. Unless noted otherwise space anchors not more than 16 inches vertically and 24 inches horizontally.
    b. Maintain a space not less than 1/2 inch width between masonry and concrete members, keeping space free of mortar or other rigid materials so as to permit differential movement.

B. Bonding:

1. Where no bond pattern is shown, the wall shall be laid up in straight uniform course with regular running bond.

2. Bond shall be plumb throughout face of wall.

C. Bearing Wall Intersections:
1. Intersecting block bearing walls shall not be tied together in a masonry bond, except at corners.
2. One wall shall terminate at face of other wall with a control joint at intersection.
3. Tie intersecting wall together with a metal tie bar, 1/4 inch x 1-1/4 inches x 2 feet 4 inches long with a 2 inch right angle bend at each end of bar, spaced vertically at 2 feet on center.
4. Bends at ends of tie bars shall be embedded in grouted cells.
5. Rake out vertical joint between intersecting walls to a depth of 3/4 inch after mortar has stiffened.
6. Provide sealing of control joint as specified.

D. Non-Bearing Wall Intersections:
1. Tie non-bearing wall together with strips of metal lath or galvanized 1/4 inch mesh hardware cloth placed across joint between 2 walls placed in alternate horizontal block courses.
2. Rake out vertical joint between intersecting walls to a depth of 3/4 inch after mortar has stiffened.
3. Provide sealing of control joint as specified.

E. Mortar Joints:
1. Joints shall be straight, clean and a uniform 3/8 inch thickness on exposed wall face, and comply with NCMA TEK 19-2.
2. Exposed vertical and horizontal joints shall be tooled to produce a dense, slightly concave surface that is well bonded to the unit at edges, or as indicated.
3. Joints shall be struck flush at surface to receive dampproofing, waterproofing, or finishes requiring flush joints that are to be concealed.
4. Where interior or exterior walls are to receive plaster or other finishes, strike joints flush.
5. Solidly fill joints from face of unit to depth of face shell, except where specified otherwise.
6. Full bedding to be provided for first course on foundation and wherever maximum strength is required.
7. Butter vertical head joints well and shove these joints tight so that mortar bonds well to both units.
8. Full coverage to be provided on bed of face shells and webs surrounding cells to be filled.
9. Bee-holes or other open joints shall be filled and tooled with mortar while mortar is still fresh.
10. Installation of mortar shall be in accordance with AMG Standard 108.
11. Consistency of appearance shall be maintained throughout the project.

F. Control Joints:
1. Provide control joints, as detailed, at vertical masonry walls where such walls exceed 40 feet in length. In long length of walls, provide joints at approximately 24 feet on center or as detailed.
2. Control joints shall be continuous full height of walls.
3. At bond beams, control joints shall separate both block and grout; however, steel reinforcing shall be continuous.
4. Horizontal wire reinforcing shall not run through control joint.
5. Control joints shall not occur at wall corners, intersections, ends, within 24 inches of concentrated points of bearing or jambs or over openings unless specifically indicated on Structural Drawings.

6. Control joint materials shall be held back from finished surface as required to allow for sealant and back-up materials.

G. Horizontal Joint Reinforcing:
1. Place horizontal joint reinforcing every 16 inches vertically throughout wall construction.
2. Continuously reinforce first bed joint immediately above and below openings. Provide reinforcing in second bed joint above and below openings that extend 2 feet beyond each side of opening.
3. Lap reinforcement a minimum of 6 inches at splices.
4. Cut and bend reinforcing at corners.

H. Vertical Reinforcing and Bond Beam Reinforcing:
1. Place in accordance with requirements of drawings.
2. Vertical Reinforcement: Provide continuous reinforcing full height of wall at wall ends, corners, intersections, jambs of openings and each side of control joints. Vertical reinforcing shall match and lap dowels which are at top of foundation walls and precast concrete beams.
3. Bond Beams: Unless noted otherwise provide horizontal reinforcing of 2 bars in minimum 8 inch deep grouted continuous bond beam at roof and elevated floor lines.
4. Parapets: Unless noted otherwise provide horizontal reinforcing of 1 bar in minimum 8 inch deep grouted continuous bond beam at top of parapets. Where no parapet coping is to be installed, provide a mortar (cap) sloped towards the building interior.
5. Bond Beam and Parapet Reinforcing at Vertical Control Joints: Place bars continuous through control joint and wrap mastic tape around bars for 18 inches each side of control joint.
6. Bond Beam and Parapet Reinforcing at Corners and Wall Intersections: Provide bent bars to match reinforcing at corners and wall intersections.
7. Lap splices in reinforcing not less than 40 bar diameters for #7 and larger bars; 30 bar diameters for #6 and smaller bars.
8. Use spacers to position reinforcing steel in center of grout at center of wall as required by code.

I. Grouting:
1. Reinforcing steel is to be in place and inspected before grouting starts.
2. Vertical cells to be filled shall have vertical alignment to maintain a continuous cell area.
3. Keep cell to be grouted free from mortar.
4. Fill cells solidly with grout in lifts not to exceed those specified or allowed by AHJ.
5. Grout may be poured by hand bucket, concrete hopper or through a grout pump.
6. Do not wet down grout space prior to pouring of grout.
7. Stop pours 1-1/2 inches below top of cell to form a key at pour points.
8. Grout shall be consolidated by mechanical vibration during placing before loss of plasticity in a manner to fill grout space. Grout pours greater than 12 inches shall be reconsolidated by mechanical vibration to minimize voids due to water loss.
9. Grout barrier below bond beams shall be continuous wire lath or other approved material.
10. Grout beams over openings and bond beams in a continuous operation.
11. Solidly grout in place bolts, anchors and other items within wall construction.
12. Fully grout jambs and head of metal door frames connected to masonry. Filling of frames shall be done as each 2 feet of masonry is laid.
13. Use extreme care to prevent grout or mortar from staining face of the masonry.
14. Immediately remove grout that is visible on face of masonry.
15. Installation shall be in accordance with AMG Standard 108.

J. Flashing and Weeps:
   1. Provide and install in accordance with NCMA TEK 19-2A, 19-4A and 19-5A.
   2. Install continuous flashing at floor lines, above window and door openings, mechanical openings, and all other openings in exterior masonry walls.
   3. Install weeps at head joints located to direct moisture from flashing to exterior. Locate as indicated on drawings but no more than 32 inches O.C. with a minimum of (2) weeps at each opening.

K. Provisions for other trades and built-in items:
   1. Built-in items required and indicated, including; but not limited to, reinforcing steel, anchors, flashings, sleeves, frames, structural steel, loose lintels, anchor bolts, nailing blocks, door and window frames and miscellaneous iron.
   2. Enclosures for pipes, stacks, ducts and conduits:
      a. Construct slots, chases, cavities, and similar spaces as required.
      b. Where masonry is to enclose conduit or piping, bring it to proper level indicated and as directed.
      c. Cover no pipe, conduit chases or enclosures until advised that Work has been inspected and approved.

3.3 ADJUSTING

A. After installation of masonry insulation, the masonry Subcontractor shall inspect all walls for evidence of voids, beeholes, and other defects and shall repair to match the adjacent surface.

B. Pointing of Mortar Joints:
   1. Point and fill holes and cracks in exposed mortar joints.
   2. Cut out defective mortar joints to a depth of at least 1/4 inch.
   3. When cutting is complete, remove dust and loose material by brushing or vacuuming.
   4. Prehydrate mortar for pointing by mixing dry ingredients with only sufficient water to produce a damp mass of such consistency that it will retain its form when it is pressed into a ball with hands, but will not flow under trowel.
   5. Allow mortar to stand for a period of not less than one hour nor more than 2 hours, after which remix with addition of sufficient water to produce satisfactory workability.
   6. Pointing mortars shall be identical to adjacent mortar in similar joints and finish results shall match and be indistinguishable from original mortar used.
   7. Premoisten joint and apply mortar tightly.
   8. Tool to match adjacent joints.
   9. Moist cure for 72 hours.

C. Patching: If approved by Architect, patching of exposed masonry walls shall be done at conclusion of general work and shall conform as closely as possible to similar surrounding or adjoining work.

3.4 FIELD QUALITY CONTROL

A. General: Architect will require tests and inspections as necessary to verify quality and strength of grout and mortar. Laboratory tests shall conform to applicable ASTM standards and tests.

B. Testing Laboratory: Material testing shall be provided in accordance with Section 01 4500, Quality Control.

C. Frequency: As determined by the Architect based upon total time for construction of masonry with not less than two (2) tests per each level of masonry construction, foundation to roof or floors.

D. Mortar:
   1. Testing per ASTM C780.
   2. For determining hardened mortar properties, prepare three (3) test specimens for each test age and property. A strength test shall be the average of the strengths of the specimens tested at the age specified.
   3. Specimens shall be tested at 7 and 28 days.
   4. In case of dispute, the mortar proportions must be tested in accordance with the property specification of ASTM C270.

E. Grout:
   1. Testing per ASTM C1019.
   2. Three test specimens shall constitute one sample. A strength test shall be the average of the strengths of the specimen tested at the age specified.
   3. Specimens shall be tested at 7 and 28 days.
   4. The compression strength will be considered satisfactory if the average of three consecutive tests of the grout is equal to or greater than the specified strength and no individual strength test falls below the specified strength by more than 500 p.s.i.

F. Test reports: The Testing Laboratory shall distribute copies of reports as specified in Section 01 4500, Quality Control.

3.5 CLEANING AND PROTECTION

A. Mortar and grout spills will be cleaned immediately from surfaces that will be exposed to view.

B. Chemical cleaner application to be in strict accordance with manufacturer's printed instructions and NCMA TEK Bulletins.

C. Furnish temporary protection for exposed masonry corners subject to damage.

D. Carefully cover tops of walls left incomplete at conclusion of day's work with tarpaulins or other approved covering.

E. In hot and dry weather, protect masonry against rapid drying in compliance with recommendations of NCMA TEK Bulletin 3-1 and IMIAC.
   1. Fog spray new masonry 3 times/day for 3 days when mean daily temperature exceeds 100 degrees F or 90 degrees F with wind velocity greater than 8 mph.

F. In cold weather, protect masonry against freezing in compliance with recommendations of NCMA TEK Bulletin 3-1 and IMIAC.
   1. Protect finished work against freezing for a period of not less than 48 hours by means of enclosures, artificial heat, or such other protective methods as may be required.

G. Clean up debris, refuse and surplus material and remove from premises, as per Section 01 5000, Temporary Facilities and Controls.

END OF SECTION

SECTION 05 1200

STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.1 SUMMARY

A. Furnish and install Structural Steel Framing and related items as shown on the Drawings and as specified herein.

1.2 REFERENCES

A. Except where provisions of these Specifications are more exacting, comply with applicable provisions of the following standards:
   1. Standard Specifications for the Design and Fabrication of Structural Steel for Buildings, of the American Institute of Steel Construction (AISC).
   2. Code of Standard Practice for Steel Buildings and Bridges, of AISC.
   3. Code for Welding in Building Construction, D1.0, of the American Welding Society (AWS).
   4. Specifications for Structural Joints by the Research Council on Riveted and Bolted Structural Joints.

1.3 SUBMITTALS

A. General: Submittals requirements are specified in Section 01 3300, Submittal Procedures.

B. Shop Drawings: Submit shop and erection Drawings clearly showing each piece required for fabrication and erection.

C. Certifications: Furnish certification that material furnished meets or exceeds the requirements of the ASTM Specifications specified herein or on the Drawings, for each type of material.

1.4 DELIVERY, STORAGE AND HANDLING

A. Exercise care during unloading, storage and erection to avoid damage. Dumping on the ground is not permitted.

B. Material stored at the site shall be supported completely free of the ground and covered to avoid damage from the elements.

PART 2 PRODUCTS

2.1 MATERIALS

A. Structural Steel: Structural Steel for Work except as otherwise indicated or specified shall conform to ASTM A36 for miscellaneous steel items and ASTM A992 (Grade 50) for wide flange sections. Structural Steel pipe shall conform to ASTM A500 or ASTM A53, Type E or S, Grade B. Tubular steel shall be ASTM A500.

B. Bolts: Bolts used in connection with structural steel shall conform to ASTM A325 and shall be regular hexagon-bolt type. Bolts and nuts other than those with self-locking screw threads, shall be the American National Coarse-Thread series, conforming to the "National Bureau of Standards" publication H-28. Where self-locking nuts are not furnished, bolt threads shall be upset to prevent the nuts from backing off. Self-locking threads shall be manufacturer's approved standard type and may be used in lieu of upsetting bolt threads. Expansion bolts to have ICBO rating applicable for material into which installation takes place.

C. Welding Electrodes: Arc-welding electrodes shall conform to ASTM A233 for Steel Arc-Welding Electrodes. Electrodes shall be as recommended by their manufacturers for the positions and other conditions of actual use.

D. Metal Primer: Prime all members with shop applied primer. Touch up all damaged primer with compatible primer.

2.2 FABRICATION

A. Workmanship and details of construction (except as otherwise indicated or specified) shall be in conformity with applicable articles of the AISC "Specifications for Design, Fabrication and Erection of Structural Steel for Buildings," AISC "Code of Standard Practice" and the applicable building codes.

1. Sections shall be of dimensions, weight and design as indicated, assembled complete at the shop, with base plates and other detailed materials attached.
2. Furnish 1/4 inch thick leveling plates at columns where base plates are shop fabricated to columns.
3. Make connections as indicated or detailed on the Drawings and the approved shop and erection drawings.
4. Exposed steel shall have smooth, clean surfaces with no identifying trade marks, names, etc. exposed to view.
5. Leave in condition for finish painting.

2.3 SHOP PAINTING

A. Thoroughly clean steel of loose mill scale, rust splatter, slag or flux deposit, oil, dirt and other foreign matter. Apply one coat of protective paint to steel surfaces, except machined surfaces, surfaces that are to be encased in concrete, and edges and surface areas adjacent to field welds. Parts inaccessible after assembly or erection shall be given two coats of different colors.

B. Structural steel that is to receive direct applied fireproofing shall not be primed or painted. Contractor is to ensure compliance with adhesion of all fireproofing materials and any steel finishes.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Verify anchor bolt locations, grouting and elevation of base and setting plates and other material set by other trades, etc., before commencing work.

2. Notify the Architect of work set by others that is out of tolerances specified, and do not erect material upon such work until it has been corrected.

3.2 ERECTION

A. Report errors in shop fabrication or deformation that prevent proper assembly immediately to Architect, and obtain approval of method of correction. Approved corrections shall be made at no additional cost to the Owner. No field cuts or modifications shall be made to members or connections without prior review and approval by the structural engineer.

B. Locate anchor bolts and anchors and build into connection Work. Pre-set by use of templates or other methods as required to locate accurately.

C. Provide temporary shoring and additional bracing of steel framing necessary to adequately and safely support all loads imposed on structure during construction.

D. Welding: Conform to requirements of the AISC specifications, and the AWS welding code. Welds left exposed shall be ground smooth and flush with adjacent surfaces.

E. Cutting Holes: Shall be cut, drilled or punched at right angles to the surface of the metal and shall not be made or enlarged by burning with a gas-cutting torch except where specific approval is given for each hole by the Architect and Structural Engineer. Holes in base or bearing plates shall be drilled.

F. Templates: The Contractor shall furnish templates and instructions for the setting of anchors, anchor bolts and bearing plates and shall ascertain that the items are properly set during the progress of the Work.

G. Framing: The framing shall be carried up true and plumb and temporary bracing shall be introduced where necessary to take care of loads to which the structure may be subjected, including erection of equipment and its operation. Such bracing shall be left in place as long as may be required for safety. It shall be finally removed by the Contractor as part of his equipment. As erection progresses, the Work shall be securely connected to take care of dead load, wind and erection stresses.

3.3 FIELD PAINTING

A. Field Painting: After erection, touch-up field connections including welds, bolts and abraded places with the same type of paint as used for shop coat. Steel surfaces, except those required to be in concrete, shall be given a field coat of protective paint. Field bolts in Work that will be left exposed to the weather shall be dipped in protective paint as noted in "materials" above, just before bolts are put in place. For work that is to be exposed, all surface finish blemishes are to be removed by sandblasting or other approved method and reprimed prior to finish coat application.

3.4 CLEANING

A. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition in accordance with Section 01 5000, Temporary Facilities and Controls.

END OF SECTION

SECTION 05 3100

STEEL DECKING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Furnish and install Steel Decking Work as shown on the Drawings and as specified herein.

1.2 SYSTEM DESCRIPTION

A. Design Requirements:
1. Increase S and I properties for simple or two span continuous to achieve equivalent load capacity. Minimum allowable diaphragm shear furnished, per ICC report, shall be 567 pounds per foot, or as stated on the Drawings.
2. Corrugated metal roof decking shall be manufactured from steel, conforming to ASTM 446 Grade E, having a minimum yield strength of 38,000 p.s.i. The galvanized coating shall conform to ASTM 525 Class G-60 Specifications.

1.3 SUBMITTALS

A. General: Submittals requirements are specified in Section 01 3300, Submittal Procedures.

B. Submit shop and erection Drawings showing layout, material and fastening methods and each piece to be erected. Note diaphragm deck welding pattern and physical properties of decking on Shop Drawings.

1.4 QUALITY ASSURANCE

A. Welder Qualifications: AWS Certified.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in manufacturer's original unopened packaging with labels intact.

B. Deliver, store and handle metal decking in such a manner that it will not be damaged or deformed.
1. Exercise special care so as not to damage or overload the decking during the entire construction period.
2. Do not use metal decking for storage or as a working platform until the sheets have been welded in position.
3. Stack decking stored at the site before erection on platforms or pallets, and suitably protect from the weather.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Steel decking shall be as manufactured by a member of the Steel Deck Institute, of such type gauge and depth of material as shown on the Drawings.

2.2 MATERIALS

A. Ribbed and Corrugated Decking:
   1. Steel: minimum yield strength of 38,000 p.s.i. Finish: Decking to remain exposed to view after installation shall be factory galvanized as per ASTM A525.G60 and shall have a shop coat of rust inhibitive primer conforming to FS-TT-P-0086f, Type III. Steel shall be thoroughly cleaned, free of oil, grease and dirt prior to application of primer.

B. Accessories:
   1. Where required or shown on Drawings, ridge and valley plates, closures, cant strips and roof sump pans shall be furnished in galvanized steel materials, and shall be attached directly to the deck to provide a suitable surface for the application of insulation and roofing.
   2. Provide accessories including closure units, covering strips, miscellaneous supporting members at openings and edges, cant strips, roof sump pans, etc. as shown on Drawings or as required.
   3. Galvanizing repair paint: High zinc-dust content paint complying with MS MIL P-21035.
   4. Provide minimum 1 inch thick formed from closed cell neoprene sponge of 25-45 p.c.f. density manufactured in accordance with ASTM D-1056 at all location between interior/exterior and conditioned/unconditioned spaces.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report in writing, with a copy to Architect, detrimental conditions. Failure to observe this requirement constitutes a waiver to subsequent claims to the contrary and holds Contractor responsible for correction(s) Architect may require. Commencement of Work will be construed as acceptance of subsurfaces.
   1. Verify, before proceeding with this Work, that required inspections of existing conditions have been completed.

B. Coordination with other Work: Coordinate with other work that affects, connects with, or will be concealed by this Work.

3.2 ERECTION

A. Deck sheets shall be placed in accordance with approved erection layout Drawings and complying with Steel Deck Institute "Basic Design Specifications", and as specified herein.

B. Deck units shall be fabricated to span three or more support spacings, with end laps of at least two inches that shall occur over supports. Male joint of side laps shall engage female joint by at least 5/8 inch.

C. Openings shown on the erection layout Drawings shall be cut by the deck erector. Openings not shown on the erection diagram, such as those required for stacks, conduits, plumbing vents, etc. shall be cut and reinforced if necessary, by the Trade requiring the openings.

D. Welding washers are not necessary for steel deck of 22 gauge or heavier, or when the bottom rib width equals or exceeds 5/8 inch.

E. Where washers are required, weld deck to steel framing through 16 gauge welding washers with 1 inch x 3/8 inch puddle welds. Maximum weld spacing shall be as follows unless noted otherwise on the structural drawings:

End and end laps	6 inches on center
Intermediate supports	6 inches on center
Edges, perimeter beams and angles parallel to deck flutes	12 inches on center
Opening edges	6 inches on center

F. After erection, touch up field connections including weld and abraded places with the same kind of paint used for prime coat. For surfaces welded after galvanizing apply specified galvanizing repair paint.

3.3 FIELD QUALITY CONTROL

A. Tests: When required by the Architect, installation of metal decking and welding shall be subject to inspection by a qualified Testing Agency acceptable to Architect, the cost of which will be paid in accordance with Section 01 4500, Quality Control.

B. The Testing Agency shall:
1. Test and inspect metal decking and workmanship to verify compliance with Contract Documents.
2. Check material, equipment, procedures, welds, ability of welders.
3. Furnish Architect with a verified report that completed Work conforms with Contract Documents.

3.4 CLEANING

A. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition in accordance with Section 01 5000, Temporary Facilities and Controls.

END OF SECTION

ROOFING AND SIDING PANELS

SECTION 07 4000

PART 1 GENERAL

1.1 SUMMARY

A. Preformed prefinished metal panels.

B. Miscellaneous trim, flashing, underlayment, and accessories.

1.2 REFERENCES

A. American Iron & Steel Institute (AISI) Specification for the Design of Cold-formed Steel Structural Members.

B. ASTM A-653 & ASTM A924 Steel Sheet, Zinc-coated (Galvanized).

C. SMACNA – Sheet Metal and Air Conditioning Contractors' National Association

D. AISC – Steel Construction manual, American Iron and Steel Institute.

E. UL: "Tests for Uplift Resistance of Roof Assemblies", Underwriters Laboratories, Inc.

F. ASTM E 1592: "Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference", American Society for Testing and Materials.

G. ASTM E 1680: "Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems", American Society for Testing and Materials.

H. ASTM E 1646: "Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference", American Society for Testing and Materials.

1.3 ASSEMBLY DESCRIPTION

A. Assembly includes rigid insulation, waterproofing underlayments, preformed sheet metal panels, miscellaneous flashing and attaching devices.

1.4 SUBMITTALS

A. Submittals requirements are specified in Section 01 3300, Submittal Procedures.

B. Submit detailed drawings showing layout of panels, anchoring details, joint details, trim, flashing, and accessories, including provisions for expansion and contraction. Show details of weatherproofing, terminations, and penetrations of metal work.

C. Submit a sample of each type of panel, complete with factory finish.

1.5 QUALITY ASSURANCE

A. Manufacturer: company specializing in architectural sheet metal products with ten (10) years minimum experience.

B. Installer of the system shall be an approved installer, certified by the manufacturer, and meet the following minimum criteria:
   1. Project foreman is the person having received specific training in the proper installation of the specified system and will be present to supervise whenever material is being installed.
   2. Provide certification letter that installer has a minimum of three (3) years of metal product installation experience immediately preceding the date upon which work is to be commence.

C. Pre-Roofing Conference: Approximately two (2) weeks prior to scheduled commencement of roofing installation and associated work. Attendees shall include the Owner, Architect, Contractor, contractor's applicator foreman, manufacturer's representative, installers of deck or substrate construction to receive roofing work, installers of roof-top equipment and other work in and around roofing that must precede or follow roofing work. Review methods and procedures related to roofing work, including, but not limited to the following:
   1. Roofing substrates (decks), roof drains, curbs, penetrations and other preparatory work performed by other trades.
   2. Structural loading limitations of steel deck and inspect deck for loss of flatness and for required mechanical fastening.
   3. Roofing system requirements (drawings, specifications and other contract documents).
   4. Finalize construction schedule related to roofing work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
   5. Required inspection, testing, certifying and material usage accounting procedures.
   6. Weather and forecasted weather conditions, and procedures for coping with unfavorable conditions, including possibility of temporary roofing.
   7. Record any modifications/deviations from Contract Documents agreed upon and distribute to all parties in attendance at least one (1) week prior to commencement of roofing activities.

1.6 WARRANTY:

A. Furnish to the Owner a full twenty (20) year manufacturer warranty on panel finish system

B. Furnish to the Owner a standard two (2) year contractor warranty for all labor and material to include.

   1. Perform as designed and installed.
   2. Remain watertight.
   3. Remain free of manufacturer or installation defects.

1.7 DELIVERY, STORAGE AND HANDLING

A. Upon receipt of panels and other materials, installer shall examine the shipment for damage and completeness.

B. Panels should be stored in a clean, dry place. One end should be elevated to allow moisture to run off.

C. Panels with strippable film must not be stored in the open, exposed to the sun.

D. Stack all materials to prevent damage and to allow for adequate ventilation.

PART 2 PRODUCT

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with these specifications metal roof and soffit panels shall be manufactured by one of the following:
   1. AARA Architectural Metals.
   2. Berridge Manufacturing Company
   3. Atas International
   4. Kovach, Inc.

2.2 MATERIALS

A. General:
   1. Prefinished metal shall be hot-dipped galvanized – ASTM A446-85 Grade C, G90 Coating A525-86 24 Gauge core steel or prefinished Galvalume – ASTM 792-86 AZ-55.

B. Roof Panels
   1. Equal to: "Ultra Seam US175LS", as manufactured by AARA Architectural Metals with 1 ¾" inch high rib by 18 inch wide panel with two intermediate striations. Equal products shall be acceptable if approved by the architect
   2. Panel Style: Narrow rib, vertical leg, concealed fastener, positive snap lock standing seam, utilizing male and female rib configuration.
   3. Gauge: 24 gauge (UL 90 rated).
   4. Finish shall be full strength "Kynar 500" or "Hylar 5000" resin fluoropolymer coating, applied by the manufacturer on a continuous coil coating line, with a top side dry film thickness of 0.70 to 0.90 mil over 0.25 to 0.35 mil prime coat, to total dry film thickness of 0.95 to 1.25 mil. Bottom side shall be coated with primer with a dry film thickness of 0.25 mil.

C. Clip: 18 gauge UL-Rated clip to structural substrate as required to meet uplift requirements.

D. Underlayment
   1. "Deck Guard™ HT" as manufactured by Polyguard Products.
   2. TW Metal and tile underlayment as manufactured by Tamko.

2.3 ACCESSORY MATERIALS

A. Fasteners: Galvanized steel with washers where required.
   1. All fasteners shall be designed to withstand specified design loads.
   2. All exposed fasteners shall be the color of the metal roof system.
   3. Locate and space any exposed fastener in a true vertical and horizontal alignment.

B. Sealant: As recommended by metal panel manufacturer and in accordance with Section 07 9200.

2.4 FABRICATION

A. All exposed adjacent flashing shall be of the same material and finish as the roof panels.

B. Hem all exposed edges of flashing on underside, ½ inch.

C. Roll form panels in continuous lengths, from eave to ridge, eave to ground, etc. Spliced panels are not acceptable.

D. Fabricate trim/flashing and accessories to detailed profiles.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine deck materials to ensure proper attachment to framing.

B. Inspect sheathing to verify deck is clean and smooth, free of depressions, waves or projections, level to =/- ¼" in 20', and properly sloped.

C. Correct any deficiencies in substrate prior to commencing installation.

3.2 INSTALLATION

A. Install underlayment in strict accordance with manufacturer's recommendations for location and exposure. Note: Install two full layers of underlayment over the entire roof deck staggering each layer horizontally.

B. Comply with manufacturers standard instructions and conform to standards set forth in the architectural sheet metal manual published by SMACNA, in order to achieve a watertight installation.

C. Install panels in such a manner that horizontal lines are true and level and vertical lines are plumb.

D. Install starter and edge trim before installing panels.

E. Remove protective strippable film prior to installation of roof panels.

F. Attach panels using manufacturer's standard slips and fasteners, spaced in accordance with approved shop drawings.

G. Do not allow panels or trim to come into contact with dissimilar materials.

H. Protect installed panels and trim from damage caused by adjacent construction until completion of installation.

I. Remove and replace any panels or components that are damaged beyond successful repair.

3.3 CLEANING

A. Clean any grease finger marks or stains from the panels per manufacturer's recommendations.

B. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition in accordance with Section 01 5000, Temporary Facilities and Controls.

END OF SECTION

SECTION 07 6200

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Furnish and install Sheet Metal Flashing and Trim Work as shown on Drawings and as specified herein.

1.2 REFERENCES

A. SMACNA (Sheet Metal and Air Conditioning Contractors National Association, Inc.). "Architectural Sheet Metal Manual" (current edition).

1.3 SUBMITTALS

A. General: Submittals requirements are specified in Section 01 3300, Submittal Procedures.

B. Provide two (2) samples of each prefinished metal for verification of color.

C. Shop Drawings: Shop Drawings are not required unless specifically called for in the item of Work specified.

1.4 QUALITY ASSURANCE

A. Pre-Installation Conference: Review materials, specifications and details, etc. at the Pre-Roofing Conference.

1.5 DELIVERY, STORAGE AND HANDLING

A. Delivery and Storage: Deliver and store materials in dry, protected areas. Keep free of corrosion or other damage. Replace any damaged materials at no cost to the Owner.

1.6 PROTECT/SITE CONDITIONS

A. Measurements: Verify dimensions shown on Drawings by taking field measurements; proper fit and attachment of parts is required.

PART 2 PRODUCTS

2.1 MATERIALS

A. Galvanized Sheet Steel:
   1. Thickness: Where sheet metal gauges are not noted, use gauges as recommended by SMACNA. In no case shall flashings be less than 24 gauge.
   2. Finish: Galvanized or pre-painted galvanized as indicated on the Drawings.
      a. G-90 (1.25 oz.) galvanized sheet steel conforming to ASTM A446, ASTM A525, or ASTM A361 as required. Paint finish shall comply with ASTM 605.2 "Voluntary Specifications for High Performance Organic Coating on Architectural Extrusions and Panels.

B. Plastic Cement: A mixture of asphalt and fibers conforming to Federal Specification SS-C-153.

C. Sealants: One part synthetic rubber sealant.

D. Reglets: Equal to Fry "Springlok" flashing system type CO, MA, ST, STX, SM as shown. If not indicated on Drawings provide type as required for specific application. Pre-painted 24 gauge galvanized in manufacturer's standard color where indicated or as required to match adjacent metal surfaces.

E. Underlayment: 30 mil self-adhering reinforced butyl rubber sheet flashing, designed for high temperature and vertical applications. Equal to Grace "Ultra".

F. Metal Fastenings: Nails, screws, rivets and clips used in connection with galvanized steel work shall be hot dipped galvanized, in sufficient length and configuration to properly anchor the material. Fastenings for dissimilar metals shall be stainless steel. Use 20 gauge minimum galvanized steel for clips, retainers, backer plates, etc.

2.2 FABRICATION

A. Fabricate sheet metal flashing to shapes and sizes detailed, or required, allowing sufficient material for up-standing leg. Make surfaces free of waves and buckles, with lines and angles sharp and true. No raw, exposed edges shall be permitted.

B. Prefabricate 18 inches x 18 inches inside and outside corners of flashing and/or counterflashing to be soldered and seamless.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine subsurfaces to receive Work and report in writing, with a copy to Architect, conditions detrimental to Work. Failure to observe this injunction constitutes a waiver to subsequent claims to the contrary and holds Contractor responsible for corrections Architect may require. Commencement of Work will be construed as acceptance of subsurfaces.

B. Coordination: Coordinate and cooperate with other trades that affect, connect with, or will be concealed by this Work.

3.2 INSTALLATION

A. Installation:
1. All sheet metal work, not otherwise detailed, shall conform to applicable details and specifications of SMACNA. Accurately form, fit snugly, have exposed edges folded under at least 1/2 inch with no sharp corners left exposed. Properly shield against galvanic action with asphalt base paint or equivalent. Securely fasten and make absolutely watertight.
2. Attach sheet metal to surfaces that are even, smooth, sound, thoroughly dry and clean, free of defects that might affect application. Materials furnished hereunder to build into Work by others shall be in condition for final installation. Do cutting, fitting, drilling or other operation in sheet metal required to accommodate Work of other Trades.

3. All flashings shall be installed over self-adhering bituminous flashing material. Apply bituminous sheet to all horizontal and vertical surfaces to be flashed lapping over minimum 1 inch at sheet edge. Metal flashing shall extend 1/2 inch below or beyond edge of underlayment.
4. All joints in running flashings and copings shall be butt joined using a cover-plate with backup plate fastened through to the substrate. Allow recommended clearances at butt joint for expansion of the flashing. Install sealant to all facing surfaces prior to final assembly and fastening to substrate.
5. Extend flashings 4 inches beyond jambs of openings. Provide expansion joints at junctions with existing flashings and at straight runs at intervals at 10 foot o.c. Select type best suited and least obtrusive for condition and make watertight with sealant.
6. Provide items essential to complete the installation, though not specifically shown or specified, of the same kind, quality and type as similar items utilized elsewhere in the building.
7. Lock seam work shall be flat and true to line and be sweated full of solder. Flat lock seams, and lap seams, where soldered, shall be at least 1/2 inch and made in direction of drainage flow. Lap seams, not soldered, according to pitch but in no case less than 3 inches. Thoroughly wash acid flux work after soldering.
8. Wherever possible, secure metal by minimum 1 inch wide cleats, 24 inches o.c. maximum, without nailing through metal. In general, space fasteners not more than 8 inches apart and where exposed to weather use lead washers.
9. Join parts with concealed rivets or sheet metal screws where necessary for strength or stiffness. Place sheets together before drilling. Where lap joints are used, lap sheets at least 4 inches. Provide for expansion of flashings to prevent buckling or warping with slotted fastener holes, slip connections, etc. as recommended by SMACNA.
10. Apply sealant and/or butyl tape to joints, intersections, etc. to provide a watertight connection/joint. Clean concealed surfaces prior to applying sealants,

3.3 CLEANING

A. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition in accordance with Section 01 5000, Temporary Facilities and Controls.

END OF SECTION

SECTION 07 9200

JOINT SEALANTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Joint sealant work as specified herein. Install caulking, sealants and secondary sealants in locations as shown on Drawings and as required for a watertight, weather-tight job.

1.2 SUBMITTALS

A. General: Submittals requirements are specified in Section 01 3300, Submittal Procedures.

1.3 DELIVERY, STORAGE AND HANDLING

A. Deliver sealant to the job site in sealed containers each of which shall bear manufacturer's name and product designation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Except as otherwise specified herein, or specifically approved by the Architect, sealants shall be products of one (or more) of the following manufacturers, subject, however, to compliance with the specification requirements.
   1. BASF
   2. Dow Corning
   3. G.E.
   4. Pecora
   5. Sika
   6. Tremco

2.2 MATERIALS

A. Sealant:
   1. Provide sealants of type as scheduled at the end of this specification. Where application for a particular substrate condition is not listed review with Architect prior to application.
   2. Sealant color shall match the color of the material sealed, unless otherwise noted.
   3. Use "non-sag" types for vertical and overhead work, "self leveling" for horizontal work.

B. Back-up materials shall be preformed, pre-compressed, self-expanding, cellular foam rod capable of movements of +/- 25% (50% total) of nominal material size and requiring no additional bond break. Materials impregnated with oil, wax, bitumen or similar materials are not acceptable.
   1. Subject to compliance with requirements, provide products by one of the following:

a) Backer Rod Manufacturing, Inc.
b) Emseal Joint Systems
c) Sonneborn

C. Solvents, cleaning agents and other accessory materials shall be as recommended by sealant manufacturer and shall be non-staining.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine subsurface to receive Work and report in writing to General Contractor any detrimental conditions. Commencement of Work will be construed as acceptance of subsurface.

3.2 PREPARATION

A. Only experienced mechanics shall be employed to apply materials under this Section. Clean and prepare surfaces to which sealant is to be applied per manufacturer's recommendations and as specified herein.

B. Joints to receive sealant shall be a minimum of ¼ inch wide and ¼ inch deep unless otherwise approved.

C. Thoroughly clean joints, removing foreign matter such as dust, oil, grease, water, surface dirt and frost. Clean porous material such as concrete where necessary by grinding, mechanical abrading, acid washing or combination of these methods as required to provide a clean, sound base surface for sealant adhesion.

D. Clean non-porous surfaces such as metal and glass either mechanically or chemically. Remove protective coatings on metallic surfaces using a solvent that leaves no residue.

3.3 INSTALLATION

A. Install back-up material or joint filler, of type and size specified, at proper depth in joint to provide a width/depth ratio of approximately 2:1 or as recommended by manufacturer. Do not apply sealant without back-up materials. Do not leave gaps between ends of foam back-up material. So not stretch, twist, puncture or tear form back-up material.

B. Prime surfaces where required with primer recommended by sealant manufacturer.

C. Follow sealant manufacturer's instructions regarding mixing, surface preparation, priming and application procedure.

D. Apply sealant with sufficient pressure to completely fill joints. Neatly point or tool joint surfaces to provide slightly concave surfaces, free of wrinkles and skips.

E. Protect adjacent surfaces from excess material. Finish work shall be left in a neat, clean condition.

F. Protect sealant from contamination by dirt or debris until sealant has fully cured.

3.4 CLEANING

A. Remove excess sealant material from adjacent surfaces immediately after application. Follow manufacturer's instructions for removal of sealant material from finished surfaces. Restore damaged surfaces to their original condition.

B. Clean sealant of dust, dirt, stains that may accumulate during the course of construction.

C. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition in accordance with Section 01 5000, Temporary Facilities and Controls.

3.5 SCHEDULES

A. Installation shall include but not be limited to the following schedule. Provide sealant at locations indicated on the drawings. Materials/manufacturers/products listed on schedule are to be considered as the "basis of design". Other products/manufacturers are acceptable provided they are deemed equal to those specified for the application.

TYPE	POLYMER	PRODUCT	USES/APPLICATION
Elastomeric	Silicone	Sikasil 290 Dow 790	Control and expansion joints in precast and cast-in-place concrete Exterior joints in vertical surfaces and non-traffic horizontal surfaces Aluminum windows and between doors and windows and other materials
Elastomeric	Two-part Urethane	Sikaflex 2C	Control, expansion, and isolation joints in cast-in-place concrete slabs Joints in exterior horizontal traffic surfaces Joints at building stem or foundation and abutting pavements Threshold bedding
Elastomeric	Silicone or Two-part Urethane	Sikasil 295 Dow 795 Sikaflex 2C	Control and expansion joints in exposed interior surfaces of exterior walls Interior moving joints in vertical surfaces and horizontal non-traffic surfaces Perimeter joints of exterior openings Joints between top of non-load bearing unit masonry walls and underside of cast-in-place concrete slabs & beams Flooring control and expansion joints Frames of interior doors, windows and elevator entrances
Elastomeric	Silicone (mildew resistant)	Sikasil N Sikasil GP	Around fixtures and tile joints at wet areas
Latex caulk	Acrylic Latex	Pecora AC-20	Interior, non-moving joints in drywall and masonry construction
Acoustical	Non-skinning butyl	Pecora BA-98	Interior acoustical construction

END OF SECTION

SECTION 08 1113

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Furnish and install Hollow Metal Doors and Frames as shown on Drawings and/or as specified herein.

1.2 REFERENCES

A. ANSI/SDI A250.8 latest edition, "Recommended Specifications for Standard Steel Doors and Frames".

1.3 SUBMITTALS

A. General: Submittals requirements are specified in Section 01 3300, Submittal Procedures.

B. Schedule: Submit a door/frame schedule reflecting the location frame type, fire rating, wall thickness, hardware set and anchor type.

C. Shop Drawings: Submit drawings showing elevations of each door type, typical and special details of construction, location and installation requirements for hardware, size and thickness of material.

1.4 QUALITY ASSURANCE

A. The hardware supplier/installer shall inspect all hollow metal door construction, accuracy of frame, and installation for compliance with the Drawings and Specifications prior to installation of hardware and shall provide written notice to the Architect of any discrepancies noted.

B. Manufacturer Qualifications: provide all products from a single manufacturer who is a member of the Steel Door Institute the National Association Architectural Metal Manufacturers.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Doors and their frames shall be furnished by the same manufacturer, and shall adhere to the standards of the Steel Door Institute (S.D.I.) or more stringent requirements as indicated herein.

B. Approved Manufacturers:
1. Amweld
2. Commercial Door & Hardware
3. Curries Company
4. Deansteel

5. Republic Builders Products
6. Security Metal Products Corporation
7. Steelcraft Manufacturing Co.
8. The Ceco Corporation

2.2 MATERIALS

A. Doors: ANSI/SDI A250.8 Level 3, 16 Ga. .

B. Frames: ANSI/SDI A250.8, 16 ga. steel.

C. Exterior frames to be hot-dip galvanized meeting ASTM A525, Grade G60, or electrolytic zinc-coated meeting ASTM A591, Class A.

D. Paint: Non-lifting, rust-inhibitive grey primer.

2.3 FABRICATION - DOORS

A. Construct hollow metal doors, seamless edge type, in accordance with ANSI/SDI-A250.8. Reinforce top and bottom of doors horizontally by 14 ga. minimum steel channels, full width, spot welded to each face at least 3 inches on center.

B. Core construction shall be resin impregnated kraft honeycomb core completely filling the inside of the door and laminated to the inside faces of the panels.

C. Accurately mortise doors for locks and hinges. Provide 8 ga. reinforcing for hinges. Provide 14 ga. reinforcement locksets and all other items of hardware.

D. All doors shall be bonderized and primed with one (1) shop coat of factory applied rust inhibitive primer.

E. Doors shall have 1/8 inch bevel on hinge and lock edges.

2.4 FABRICATION – DOOR FRAMES

A. Construct to shapes and sizes shown, meeting various wall thicknesses in accordance with ANSI/SDIA250.8.

B. Fabricate frames with mitered corners and full profile welded, filled, and ground smooth.

C. Mortise, reinforce, drill and tap for standard weight, full mortise template hinges and template strike. Provide countersunk screw hole at bottom of each jamb face for anchorage into rough opening and patented compression lug assembly to close and lock corner miters.

D. Provide not less than three (3) 16 ga. anchors per jamb up to 7 feet-6 inches in height. Add one anchor per jamb per each 30 inches of frame height or fraction thereof. Provide adjustable 12 ga. min. welded floor clips at each jamb.

E. Make cutouts for required hardware from templates furnished by hardware vendor. Reinforce hinge jambs with minimum 10 ga. steel plate drilled and tapped and welded in place. Reinforce head as recommended by closer manufacturer.

F. Provide strike stops of frames with holes for three rubber door silencers; on double door frames, provide for two silencers at head.

G. Where butt hinges are to be utilized for mounting of the door comply as follows:

1. Butt Hinge Length

Thickness of door	Width of door	Height of Butt Hinges
1 ¾ in. door	to 36 in.	4 ½ in.
1 ¾ in. door	over 36 in to 48 in.	5 in.
1 ¾ in. door	over 48 in.	Continuous

2. Number of Butt Hinges required.
   a. Doors 60 inches high and under: 2 butt hinges
   b. Doors over 60 inches high and not over 90 inches high: 3 butt hinges
   c. Door over 90 inches high and not over 120 inches high: 4 butt hinges

H. Provide plaster guards at back of hinge and strike cutouts at frames to be grouted.

I. The three toilet partition doors will receive a cladding of 22 ga. stainless steel. The outside face shall receive an artwork design etched into the stainless sheet. Artwork design (and graphic file) to be provided by others. Fabrication/installation by contactor.

PART 3 EXECUTION

3.1 INSTALLATION

A. Frames:

1. Install frames plumb, level and rigidly secure in place. Properly brace until built in.

2. Backs of frames to any masonry or concrete shall be filled solid with mortar.

3. Where frames are not available to be anchored into the surrounding masonry during construction frames shall be "punched and dimpled" to allow anchorage through the frame. Type, number, location, and installation of anchors and frame shall be in strict accordance with manufacturer's printed data sheets. After anchorage, frames are to be solid grouted through ports at frame head..

B. Doors:

1. Install doors plumb and in true alignment in a prepared opening and fasten them to achieve the maximum operational effectiveness and appearance.
2. Maintain proper door clearance in accordance with SDI-110.
3. Hinge shims, if required, shall be metallic.

3.2 CLEANING

A. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition in accordance with Section 01 5000, Temporary Facilities and Controls.

END OF SECTION

SECTION 08 3116

ACCESS PANELS AND FRAMES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Furnish and install Access Doors Work as shown on drawings and/or as specified herein. Note that required access panels shall be considered part of the contract whether shown on Drawings or not.

1.2 SUBMITTALS

A. General: Submittals requirements are specified Section 01 3300, Submittal Procedures.

B. Shop Drawings: Submit drawings showing sizes, construction and installation details.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Except as otherwise specified herein, or specifically approved by the Architect, Access Doors shall be products of one of the following manufacturers, subject to compliance with Specifications and Drawing requirements.
1. Milcor
2. J.L. Industries

2.2 MATERIALS

A. Fabrication: Units shall be in types as required by wall or ceiling construction. Units shall be stainless steel. Doors shall be provided with key operated cylinder lock.

PART 3 EXECUTION

3.1 EXAMINATION

A. Coordination with other Work: Coordinate with other work that affects, connects with, or will be concealed by this Work.
B. Provide access doors at locations as required by building codes, manufacturer's requirements for equipment access, and/or as indicated.

3.2 INSTALLATION

A. Install access doors in accordance with manufacturer's directions for each type.

B. Install plumb and level, true to line.

3.3 CLEANING

A. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition in accordance with Section 01 5000, Temporary Facilities and Controls.

END OF SECTION

SECTION 08 6300

METAL FRAMED SKYLIGHTS

PART 1 GENERAL

1.1 WORK INCLUDED:

A. Design, manufacture and installation of metal framed skylight.

B. All anchors, brackets, and hardware attachments necessary to complete the specified structural assembly and water-tightness performance requirements. All flashing up to but not penetrating adjoining work are also required as part of the system and shall be included.

1.2 QUALITY ASSURANCE:

A. System must be evaluated and listed by recognized building code authorities: International Council Evaluation Service Inc (ICC-ES).

B. Materials and Products shall be manufactured by a company continuously and regularly employed in the manufacture, designing and building of skylights using polycarbonate panel systems for a period of at least ten (10) years.

C. Erection shall be by a factory-approved installer who has been in the business of erecting similar material for at least five (5) consecutive years and can show evidence of satisfactory completion of projects of similar size, scope and type.

D. The manufacturer shall be responsible for the configuration and fabrication of the complete panel system, and will ensure that it fully meets all requirements of this specification.

1.3 DESIGN REQUIREMENTS:

A. Structural Performance: Provide metal-framed skylights, including anchorage, capable of withstanding pressures indicated without material and deflection failures and permanent deformation of structural members exceeding 0.2 percent of span when tested according to ASTM E 330.

B. Air Infiltration: Provide metal-framed skylights with maximum air leakage of 0.06 cfm/sq. ft. (0.03 L/s per sq. m) of surface when tested according to ASTM E 283 at a minimum static-air-pressure differential of 6.24lb/sq. ft. (300 Pa).

C. Water Penetration: Provide metal-framed skylights that do not evidence water penetration when tested according to ASTM E 331 at a minimum differential static pressure of 20 percent of positive design wind pressure, but not less than 15 lb/sq. ft. (718 Pa).

D. Thermal Movement: Provide metal-framed skylights that allow for thermal movements resulting from the following maximum change (range) in ambient temperatures by preventing buckling, sealant failure, and other detrimental effects.

1. Temperature Change (Range): 100 degrees F.

1.4 SUBMITTALS:

A. Submit shop drawings and color samples in accordance with Section 01 3300, Submittal Procedures.

B. Submit Installer Certificate signed by installer, certifying compliance with project qualification requirements.

1.5 WARRANTY

A. Five year warranty against defective materials and fabrication, ten years on polycarbonate materials and two years on frame finish. .

PART 2 PRODUCTS

2.1 MANUFACTURER

A. APPROVED MANUFACTURERS
1. Wasco Products, Inc.
2. Other manufacturers may be approved provided they comply with all requirements of the specification and all performance criteria of the specified product.

2.2 FRAMING MATERIALS

A. Framing Members: Extruded aluminum alloy 6063-T5 or T6, ASTM B 221 with minimum effective thickness of 0.109 inches.
1. Exterior Pressure Caps: Extruded aluminum alloy 6063-T5 or T6, ASTM B 221 with minimum effective thickness of 0.090 inches.
2. Concealed Flashing: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding flashing; compatible with adjacent materials.
3. Exposed Flashing and Closures: Aluminum sheet alloy and temper of 1100-H14, thickness as require for proper performance.
4. Minimum Thickness: 0.032 inch Apron Flashing.
5. Minimum Thickness: 0.062 inch Closures.
6. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories; compatible with adjacent materials.
7. Aluminum Retaining Cap Fasteners and Framing Members Fasteners: ASTM A 193/A 193M, Series 300 stainless-steel screws; type as recommended by manufacturer.
8. Connections to Supporting Structure: Series 300 Stainless Steel or ASTM A 307, hot dipped galvanized steel fasteners by installer.

B. Framing-System Sealants: Single-component, non-sag, high performance, non-priming, gun-grade elastomeric polyurethane sealant furnished by skylight manufacturer.
1. Sealant complies with ASTM C920, Type S, Grade NS, Class 25, Use T, NT, M, A, G, and O. Canadian Specification CAN/CGSB-19.13-M87, Classification MCG-2-25-A-N.
2. Sealant conforms to USDA approval standards.

C. Bituminous Paint: Cold-applied asphalt mastic paint complying with SSPC-Paint 12, except containing no asbestos, and formulated for 30-mil thickness per coat.

2.3 GLAZING MATERIALS

A. Multiwall Polycarbonate: 25MM multiwall polycarbonate panels
   1. Clear/Crystal (7 wall); VT=63%, SHGC=0.61, U-factor=0.26

B. Glazing Gaskets: Manufacturer's proprietary pressure-glazing gaskets of elastomer type and hardness selected by the skylight manufacturer to comply with requirements. Glazing gaskets to be extruded thermoplastic elastomer by the skylight manufacturer.

C. Spacers, Edge Blocks, and Setting Blocks: Manufacturer's standard permanent non-migrating type of elastomer type and hardness selected to comply with requirements. Spacers, Edge Blocks, and Setting Blocks to be extruded thermoplastic elastomer by the skylight manufacturer.

D. Glazing Weatherseal Sealant: Neutral-curing silicone sealant recommended by skylight and sealant manufacturers for this use and furnished by skylight manufacturer.
   1. Sealant is capable of withstanding 50 percent movement in both extension and compression (total of 100 percent movement) when tested for adhesion and cohesion under maximum cyclic movement according to ASTM C 719.
   2. Sealant complies with ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and, as applicable to substrates including other sealants with which it comes in contact, O.
   3. Color: Black.

E. Flashing Sealant: Single-component, non-sag, high performance, non-priming, gun-grade elastomeric polyurethane sealant furnished by skylight manufacturer.
   1. Sealant complies with ASTM C920, Type S, Grade NS, Class 25, Use T, NT, M, A, G, and O.

2.4 ALUMINUM FINISHES

A. General: Comply with NAAMM "Metal Finishes Manual" recommendations for application and designations of finishes.
   1. Finish designations prefixed by AA conform to the system for designations of aluminum finishes established by the Aluminum Association.
   2. Mill Finish: Manufacturer's standard mill finish.

PART 3 EXECUTION

3.1 EXAMINATION.

A. All submitted opening sizes, dimensions and tolerances are to be field verified by general contractor unless otherwise stipulated

B. Installer to examine area of installation to verify readiness of site conditions. Notify general contractor about any defects requiring correction. Do not work until conditions are satisfactory.

3.2 INSTALLATION

A. Install components in strict accordance with manufacturer's instructions and approved shop drawings. Use proper fasteners and hardware for material attachments as specified.

B. Use methods of attachment to structure allowing sufficient adjustment to accommodate tolerances.

C. Remove all protective coverings on panels immediately after installation.

3.3 CLEANING

A. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition in accordance with Section 01 5000, Temporary Facilities and Controls.

END OF SECTION

SECTION 08 9100

WALL LOUVERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Stationary wall louvers.

1.2 REFERENCES

A. AAMA 2604 – High Performance Organic Coatings on Architectural Extrusions and Panels.

B. AMCA 500 – Test Methods for Louvers, Dampers and Shutters.

C. AMCA 511 – Certified Ratings Program for Air Control Devices.

D. ASCE 7 – Minimum Design Loads for Buildings and Other Structures.

1.3 SUBMITTALS

A. Submit under provisions of Section 01 3300, Submittal Procedures.

B. Product Data:
1. Manufacturer's product data including performance data for each item.

C. Shop Drawings:
1. Submit shop drawings indicating materials, construction, dimensions, accessories, and installation details.

1.4 QUALITY ASSURANCE

A. Product Qualifications:
1. Louvers to bear AMCA Certified Ratings Seal. Ratings based on tests and procedures performed in accordance with AMCA 511 and comply with AMCA Certified Ratings Program.

1.5 WARRANTY

A. Manufacturer shall provide warranty for louver systems for a period of 2 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURER

Greenheck

2.2 STATIONARY LOUVER

A. Model:
   1. Greenheck ESU 130 (framed)
   2. Frame:
      a. Frame Depth: 1-1/2 inches (152 mm).
      b. Material: Aluminum

2.3 ACCESSORIES

A. Insect Screens:
   1. Manufacturer's standard

PART 3 EXECUTION

3.1 EXAMINATION

A. Inspect areas to receive louvers. Notify the Architect of conditions that would adversely affect the installation or subsequent utilization of the louvers. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Clean opening thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install louvers at locations indicated on the drawings and in accordance with manufacturer's instructions.

B. Install louvers plumb, level, in plane of wall, and in alignment with adjacent work.

C. Install joint sealants as specified in Section 07 9200, Joint Sealants.

3.4 CLEANING

A. Clean louver surfaces in accordance with manufacturer's instructions. Touch-up, repair or replace damaged products.

B. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition in accordance with Section 01 5000, Temporary Facilities and Controls.

END OF SECTION

SECTION 09 9100

PAINTING AND COATING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Furnish and apply Paint and Coatings as specified herein and as noted on Drawings.

1.2 DEFINITIONS

A. Gloss Level 1 (Flat): Not more than 5 units at 60 degrees and 1 to 2 units at 85 degrees.

B. Gloss Level 2 (Velvet): 5 to 9 units at 60 degrees and 10 to 15 units at 85 degrees.

C. Gloss Level 3 (Eggshell): 10 to 15 units at 60 degrees and 15 to 30 units at 85 degrees.

D. Gloss Level 4 (Satin): 20 to 35 units at 60 degrees and 35 to 50 units at 85 degrees.

E. Gloss Level 5 (Semi-Gloss): 40 to 50 units at 60 degrees.

F. Gloss Level 6 (Gloss): 70 to 80 units at 60 degrees.

G. Gloss Level 7 (High-Gloss): More than 80 units at 60 degrees.

1.3 SUBMITTALS

A. General: Submittals requirements are specified in Section 01 3300, Submittal Procedures.

B. Product Data: Before submitting samples, submit a complete schedule of manufacturers of products required throughout the Work, together with specifications recommended by each manufacturer.

C. Samples: Submit samples of each type of finish specified herein.
   1. Submit two 8 inch x 10 inch "draw down" samples of each color, indicating the correct sheen and texture.

1.4 QUALITY ASSURANCE

A. Preparation, application, and workmanship, shall be in accordance with manufacturer's recommendations and applicable provisions of MPI, by the Painting and Decorating Contractors of America (PDCA) and the "Gypsum Board for Walls and Ceilings" booklet by the Gypsum Association.

B. Materials used shall comply with applicable federal and local regulations, lead content laws, and current V.O.C. requirements.

C. Perform work using only experienced, competent painters under supervision of experienced, capable foremen, per PDCA with the best standards of practice in the trade. When completed, the painting shall represent a first-class workmanlike appearance. Apply paint materials under adequate illumination.

1.5 PROJECT/SITE CONDITIONS

A. Environmental Requirements: Do not apply exterior paint in damp or rainy weather or until after the surface has dried thoroughly from the effects of such weather. Do not apply when temperature is below 50 degrees or above F., 100 degrees 24 hours before, during and 24 hours after application. Do not paint surfaces exposed to hot sunlight. During interior application, maintain minimum temperature of 65 degrees F.

1.6 MAINTENANCE

A. Extra Materials: Furnish Owner with one fresh gallon of each type and color of paint and finish used on this Project. Mark each container with the location(s) where the paint was used, without obscuring manufacturer's label.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Except as otherwise specified herein, or specifically approved by the Architect, Paint and Coating Products shall be of the following manufacturers, subject, however, to compliance with specification requirements.
1. Benjamin Moore Paints
2. Dunn-Edwards Corporation
3. Frazee Paint Company
4. Glidden Professional (PPG)
5. Kelly-Moore
6. Olympic Paints and Stains
7. PPG Paints
8. Rustoleum
9. Sherwin Williams

B. Materials shall be "top of the line, first quality" products. Alternate materials submitted for prior approval shall have qualities and materials equal to the other listed manufacturer's top of the line, first quality products. Materials selected for coating systems for each type of surface shall be the products of a single manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Verify that site environmental conditions are appropriate and substrates are in proper condition to receive Work and report in writing with a copy to Architect, conditions detrimental to Work. Commencement of Work will be construed as acceptance of substrates.

B. Verify that shop applied primers are compatible with specified finish coats.

C. Do not begin application of coatings unless moisture content of surfaces is below the following maximum values:
1. Gypsum and plaster surfaces: 12 percent.
2. Masonry surfaces: 8 percent.
3. Vertical concrete surfaces: 12 percent.
4. Horizontal concrete surfaces: 8 percent.

3.2 PREPARATION

A. Protection: Before painting, remove hardware, accessories, plates, lighting fixtures and similar items or provide ample protection for such items.
   1. Protect adjacent surfaces as required or directed.
   2. Prepare surfaces in strict accordance with manufacturer's written instruction.

B. Surface Preparation:
   1. General: Surfaces requiring painting or finishing shall be thoroughly dry and cured, free of dirt, dust, grease, oil and other foreign matter. Repair voids, cracks, nicks, and other surface defects, with appropriate patching material. Finish flush with surrounding surfaces.
   2. Steel and Iron: Remove grease, rust and scale and touch-up chipped or abraded places on items that have been shop coated. When area will be exposed to view, sandpaper the entire treated area smooth and spot prime in a manner to eliminate evidence or repair.
   3. Galvanized metal or aluminum: Thoroughly clean by wiping surfaces with surface conditioner or solvent. Prime galvanized metal with primer as recommended by paint manufacturer.
   4. Concrete: Prepare surfaces to be painted by removing dirt, dust, oil and grease stains and efflorescence in accordance with manufacturers recommendations. Fill holes, cracks, etc. with suitable fill material.
   5. Concrete Masonry: Prepare surfaces to be painted by removing dirt, dust, oil and grease stains and efflorescence in accordance with manufacturers recommendations. Unless noted otherwise, all interior and exterior concrete masonry units (C.M.U.) to receive block filler to "level 2" fill classification. An elastomeric type coating shall then be applied to the top and inside face of all parapet walls overlapping the roof base flashing.

C. Claims concerning suitability of material specified (or its inability to satisfactorily produce the work) shall not be accepted unless such claim is made in writing to the Architect prior to beginning the work. Surfaces that cannot be prepared or painted as specified shall be immediately brought to the attention of the Architect in writing.

3.3 APPLICATION

A. Prime coats specified herein will not be required on items delivered with prime or shop coats already applied, unless otherwise specified. Touch up prime coats as required.

B. Paint all exposed Plumbing, mechanical and electrical items: Paint exposed unfinished fixtures, metal ducts, switch boxes, control panels, devices, starters, junction boxes, vents, drains, and other similar items on roof or other exterior locations unless otherwise directed by Architect. Color code and stencil identification when specified.

C. Apply coatings without reduction except as specifically required by label directions.

D. Access panels (except stainless steel) and other similar items, shall be painted to match adjacent surfaces.

E. Each coat of paint shall be well applied, worked out evenly and allowed to dry completely before the subsequent coat is applied. Comply with more stringent manufacturer's drying requirement, as applicable.

F. Each coat of paint shall be well applied, worked out evenly and allowed to dry completely before the subsequent coat is applied. Comply with more stringent manufacturer's drying requirement, as applicable.

G. Finished work shall be uniform, smooth and free from runs, sags, clogging or flooding. Make edges of paint adjoining other materials or colors sharp and clean, without overlapping.

H. Do not paint over Underwriters' Laboratory labels, fusible links, sprinkler heads, and other similar items.

3.4 CLEANING AND PROTECTION

A. During the course of the Work and on completion of Work, carefully clean glass, hardware, and other similar items, and remove misplaced paint and stain spots or spills. Leave Work in clean condition acceptable to Architect and in accordance with Section 01 5000, Temporary Facilities and Controls.

B. Protect from damage until acceptance. Repair or repaint damaged Work at no additional cost to Owner.

3.5 SCHEDULES

A. Items listed are acceptable as "basis of design" products of Glidden Professional (PPG) and Rustoleum. Other manufacturers shall furnish equal types of materials.

B. The number of coats scheduled is the minimum number of coats required. Additional coat(s) shall be applied, at no additional cost to the Owner, to completely hide base material, provide uniform color and to produce satisfactory finish results.

C. Apply products to achieve paint manufacturer's printed specifications for dry mil thickness

D. Exterior Surfaces:

1. Concrete - Flat (Acrylic):
   1st Coat: 3030 Prep & Prime Bond-Prep Masonry Primer Sealer, MPI #3
   2nd Coat: 2210 Glidden Ultra-Hide Acrylic (Gloss Level 1), MPI #10
   3rd Coat: 2210 Glidden Ultra-Hide Acrylic (Gloss Level 1), MPI #10

2. Plaster and stucco - Flat (Acrylic):
   1st Coat: 3030 Prep & Prime Bond-Prep Masonry Primer Sealer, MPI #3
   2nd Coat: 2210 Ultra-Hide Glidden Acrylic (Gloss Level 1), MPI #10
   3rd Coat: 2210 Ultra-Hide Glidden Acrylic (Gloss Level 1), MPI #10

3. Masonry - Flat (Acrylic):
   1st Coat: 3010 Prep & Prime Block Filler, MPI #17
   Provide Level 2 fill U.N.O.
   2nd Coat: 2210 Ultra-Hide Glidden Acrylic (Gloss Level 1), MPI #10
   3rd Coat: 2210 Ultra-Hide Glidden Acrylic (Gloss Level 1), MPI #10

4. Ferrous Metal – (all exposed structural members and decking)
   1st Coat: Rust-Oleum Mathys Noxyde- at 7 mils DFT.
   2nd Coat: Rust-Oleum Mathys Noxyde- at 7 mils DFT.

3rd Coat: Rust-Oleum Sierra Performance Metal Max Plus - -3 mils DFT.

5. Galvanized Metal – (hollow metal frames)– Semi-Gloss (Acrylic Enamel):
   1st Coat: 4020 Devflex Metal Primer
   2nd Coat: 4216 Devflex Waterborne Acrylic (Gloss Level 5), MPI #153
   3rd Coat: 4216 Devflex Waterborne Acrylic (Gloss Level 5), MPI #153

E. Interior Surfaces:

1. Concrete - Eggshell (Acrylic):
   1st Coat: 3210 Ultra-Hide Aquacrylic "Gripper" Primer-Sealer, MPI #17
   2nd Coat: 1402 Glidden Pro Latex (Gloss Level 3) MPI #44
   3rd Coat: 1402 Glidden Pro Latex (Gloss Level 3) MPI #44

2. Masonry - Eggshell (Acrylic):
   1st Coat: 3010 Prep & Prime Block Filler, MPI #4
   Provide Level 3 fill of exposed CMU.
   2nd Coat: 1402 Glidden Pro Latex (Gloss Level 3) MPI #44
   3rd Coat: 1402 Glidden Pro Latex (Gloss Level 3) MPI #44

3. Ferrous Metal – (all exposed structural members and decking)
   1st Coat: Rust-Oleum Mathys Noxyde- at 7 mils DFT.
   2nd Coat: Rust-Oleum Mathys Noxyde- at 7 mils DFT.
   3rd Coat: Rust-Oleum Sierra Performance Metal Max Plus - -3 mils DFT.

4. Galvanized Metal – (hollow metal frames)– Semi-Gloss (Acrylic Enamel):
   1st Coat: 4020 Devflex Metal Primer
   2nd Coat: 4216 Devflex Waterborne Acrylic (Gloss Level 5), MPI #153
   3rd Coat: 4216 Devflex Waterborne Acrylic (Gloss Level 5), MPI #153

5. Concrete slab scheduled to receive "Sealer" as a finish:
   1st Coat: PPG Paints Perma-Crete Plex Seal Concrete Sealer 4-6200
   2nd Coat: "PPG Paints Perma-Crete Plex Seal Concrete Sealer 4-6200

END OF SECTION

SECTION 10 2813

TOILET ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Furnish and install all Toilet Accessories as shown on Drawings and as specified herein.

1.2 REFERENCES

A. ANSI A117.1 "Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People."

1.3 SUBMITTALS

A. General: Submittals requirements are specified in Section 01 3300, Submittal Procedures.

B. Shop Drawings: Submit brochures and Shop Drawings of toilet accessory items showing sizes, methods of construction and mounting techniques.

1.4 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in manufacturer's original unopened packaging with labels intact.

B. Store in dry, protected areas. Keep free of corrosion or other damage. Replace damaged items at no cost to Owner.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Except as otherwise specified herein, or specifically prior approved by the Architect, Toilet Accessories shall be products of one of the following manufacturers, subject, however, to compliance with specifications requirements.
   1. Bobrick Washroom Equipment Co., Inc.
   2. Bradley Corporation

2.2 MATERIALS

A. Stainless Steel: AISI, Type 302/304, with satin No. 4 finish. Unless specified or indicated, the use of other stainless steel alloys.

B. Sheet Steel: Cold rolled, commercial quality, ASTM A366. Surface preparation and metal pretreatment as required for applied finish.

C. Chromium Plating: Nickel and chromium electro-deposited on metal, ASTM B456, Type SC 2.

D. Galvanized Steel Mounting Devices: ASTM A123, hot-dip galvanized after fabrication.

E. Locks shall be tumbler type, keyed alike for toilet accessories on this project, unless specified otherwise.

F. Fasteners: Theft-proof screws. No adhesive mountings shall be used.

G. Backing Plates: 16 gauge cold-rolled steel for mounting grab bars and/or all other wall mounted accessories in stud partitions.

2.3 TOILET ACCESSORIES

A. Separate Side and Rear Grab Bars: Equal to Bobrick B-5806 Series, stainless steel, 1-1/4 inch diameter, concealed mounting, peened non-slip finish, at locations as shown on Drawings. Grab bars shall be able to support at least 900 pounds.

B. Front Vertical Grab Bar: Equal to Bobrick B-5806 Series Stainless steel, 1-1/4 inch diameter, concealed mounting, peened non-slip finish, at locations as shown on Drawings.

C. Paper Towel Dispensers: Equal to Bobrick B262 series, stainless steel, surface mount with lock to accept "C-fold" or "multi-fold" towels. Provide paper towel dispenser at each lavatory and sink location.

D. Combination Paper Towel Dispenser and Waste Disposal Unit: Equal to Bobrick B3944; stainless steel, recessed unit to accept "C-fold" or "multi-fold" towels and locked, removable waste receptacle.

E. Stainless Steel Mirrors: Equal to Bobrick B1556 series frameless mirror. Provide mirror as shown on plans

F. Multi-roll Toilet Tissue Dispenser: Equal to Bobrick B2888 stainless steel, surface mounted.

G. Toilet Roll Holder: Equal to Bobrick B2740 heavy duty cast aluminum, double roll holder without controlled delivery.

H. Recessed Soap Dispenser: Equal to Bobrick B306 stainless steel. Chrome plated, non-corroding valve, unbreakable refill window.

I. Hand Dryer: Equal to Bobrick B-7120 Surface mounted cast aluminum with baked enamel paint finish. Mount with controls at 33 inches – 48 inches A.F.F. or as indicated on Drawings.

J. Mop Rack: Bobrick B223 x 36 stainless steel, satin finish with anti-slip mop holders B224 x 36 stainless steel, satin finish with anti-slip mop holders, shelf and rag hooks.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report in writing, with a copy to Architect, detrimental conditions. Failure to observe this requirement constitutes a waiver to subsequent claims to the contrary and holds Contractor

responsible for correction(s) Architect may require. Commencement of Work will be construed as acceptance of subsurfaces.

1. Verify, before proceeding with this Work, that required inspections of existing conditions have been completed.

B. Coordination with other Work: Coordinate with other work that affects, connects with, or will be concealed by this Work.

C. Where accessories are to be located in a fire rated assembly, provide such locations to the affected trades prior to installation so that provisions for maintaining the fire rated integrity of the assembly can be made.

3.2 INSTALLATION

A. Install all items in accordance with manufacturer's published instructions and approved installation drawings in locations as shown on Drawings, and in compliance with ANSI A117.1 as applicable.

B. Secure toilet room accessories to adjacent walls and partitions in accordance with the manufacturer's instructions for each item and each type of substrate construction and as follows:

1. Attachment to Toilet Partitions: Secure at screw attachment point with sheet metal screws furnished by manufacturer or by 3/16 inch diameter through-bolts.
2. Attachments of Recessed Accessories: Shims shall be placed between framing and cabinet at screw attachment points.
3. Attachment of Surface Mounted Accessories: At stud walls, concealed blocking or backing shall be provided at screw points to allow attachment. At solid walls, wall plugs, expansion shields or toggle bolts shall be provided. Mirrors shall be locked to wall hangers by tightening locking screws concealed in lower frame. Soap dispensers shall be mounted with 4 inch clearance from filler top to underside of any horizontal projection.

C. Seal wall penetrations with sealant as specified to prevent moisture penetration through joints around fixtures.

3.3 CLEANING

A. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition in accordance with Section 01 5000, Temporary Facilities and Controls.

END OF SECTION

Ramada
STRUCTURAL CALCULATIONS

For

Town of Fountain Hills
Adero Canyon Trailhead

Prepared by
Structural Grace
1430 E Fort Lowell Rd
Suite 200
Tucson, AZ 85719

Revision By: jm date: 06-28-16
Bck chk: CGP date: 10/6/16

STRUCTURAL CALCULATIONS

REVISED STRUCTURAL CALCULATIONS BY: J. Montoya Date: 06-28-16

Fountain Hills Ramada

July 6, 2006

NOTES:

1- Original calculations on these copies were developed following these Codes:

a. International Building Code (IBC) 2003

b. Minimum Design Loads for Building and other Structures ASCE 7-05

2- Current design Codes are:

a. International Building Code (IBC) 2012

b. Min. Design Loads for Building and other Structures ASCE 7-10

3 new loads calculated are smaller than the original design loads
∴ no changes in member sizes are needed

Revised Oct 2016

Structural Grace, Inc

Registered Professional Engineer (Structural)
CERTIFICATE NO. 36837
CLAUDIA G. PERCHINELLI
Date Signed 10/6/16
ARIZONA U.S.A.
Expires 9/30/19

1430 E. Fort Lowell Road, Suite 200 ♦ Tucson, AZ 85719 ♦ Tel (520) 320-0156 ♦ Fax (520) 320-0157

Revision By: jm date: 06-28-16
Bck Chk: CGP date: 10/6/16

CALCULATION NOTES:
1- All revisions are done in color blue
2- "(#)" indicates the Reference number. Copy of the design code allached @ the end of these Calculations

Job No. 06-011
Fountain Hills Ramada

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Registered Professional Engineer (Structural)
CERTIFICATE NO. 38537
CLAUDIA G. PERCHINELLI
Date Signed 7/6/16
ARIZONA U.S.A.

Structural Grace, Inc

Section A:
Roof

Structural
Grace, Inc

Fountian Hills
RAMADA - ROOF

Structural Grace, Inc

Job No. 06-011
Des. By: KMS Date: 3/06
9/06

Revisions by: 06-28-16
Bck chk: date 10/6/16

A. **Design Loadings** (Open Structure)

Self Weight of Roof Decking: $q_D := 1.62psf$ (see deck properties for 22 Ga) $F_y := 50ksi$

Roof Decking Section Properties: $S_{pos} := .0821in^3$ $S_{neg} := .0555in^3$ $E := 29000ksi$

$I_{pos} := .1103in^4$ $I_{neg} := .0458in^4$

(1) Table 1607.1

Live Load on Roof: $q_{Lr} := 20psf$ Span Length: $L := 68.5ft$

Wind Loading (from ASCE7 ~~-05~~ -10) Eave Height: $H := 12ft$

Basic Wind Speed (Figure 6-1): $V := 90mph$ Exposure C (open terrain) ← (3)

(2) Figure 26.5-1 → V = 115 mph

Importance Factor (Catagory II as defined in ~~Table 1-1~~): $I := 1.0$ (from Table 6-1)

(4) Category II Table 1.5-1 ← Table 1.5-2 (5)

Topographic Factor: (from Figure 6-4) $K_{zt} := 1.0$ (for flat terrain with no escarpments or ridges)

← Sect. 26.8.2 (6)

Method 2: $K_z := 0.85$ (Table 6-3 0 < H < 15')

Table 30.3-1 (7)

Directionality Factor: (from Table 6-4) $K_d := 0.85$ ← Table 26.6-1 (8)

Velocity Pressure: $q_z := 0.00256 \cdot \frac{psf}{(mph)^2} \cdot K_z \cdot K_{zt} \cdot K_d \cdot V^2 \cdot I$ $q_z = 15.0psf$ ← Formula 30.3-1 (9)

$= 0.00256(0.85)(1.00)(0.85)(115)^2 = 24.46$ psf

Gust Effect Factor Rigid Structure (6.5.8.1): $G := .85$

← Sect. 26.9.4 (11)

Net Pressure Coefficient
(Fig. 6-19C, pg 72)

For Effective Wind Area >a^2; <4a^2 on Zone 3: $C_{N.down} := 1.8$ $C_{N.up} := 1.7$ ← Fig. 30.8-3 (12)

Angle of Roof: $\theta_r := 7.2deg$

Design Pressures: $p_{down} := q_z \cdot G \cdot C_{N.down} \cdot \cos(\theta_r)$ $p_{up} := q_z \cdot G \cdot C_{N.up} \cdot \cos(\theta_r)$ ← Formula 30.3-1 (10)

$= 24.46(0.85)(1.8)\cos(7.2)$ $= 24.46(0.85)(1.7)\cos(7.2)$

$p_{down} = 22.7psf$ $p_{up} = 21.5psf$

37.13psf $= 35.07$

Loading Combinations per IBC 1605.3.1

Case 1: D + L.r Case 2: D + .75*(L.r + W) Case 3: 0.6*D + W

Case 1: $q_1 := q_D + q_{Lr}$ $q_1 = 21.6psf$ ← Load Comb. same as IBC-12

Case 2: ~~$q_2 := q_D + 0.75 \cdot (q_{Lr} + p_{down})$~~ $q_2 = \cancel{33.7}psf$

$= q_D + 0.75(q_{Lr} + 0.6\,p_{down}) = 33.32$

Case 3: ~~$q_3 := 0.6 \cdot q_D - p_{up}$~~ $q_3 = \cancel{-20.5psf}$

$0.6q_D + 0.6\,p_{up}$ $= -20.1psf$

IBC 12 < IBC-03 OK (13)

NOTE: Load combination changed on IBC-12, but final load on IBC-12 aprox. the same as IBC-05

Design Loading for positive pressure: $q_{pos} := \max(q_1, q_2, q_3)$ $q_{pos} = 33.7psf$

Design Loading for negative pressure: $q_{neg} := \min(q_1, q_2, q_3)$ $q_{neg} = -20.5psf$

Stress Check

$M_{neg1} := \frac{q_{pos} \cdot 1 \cdot ft \cdot L^2}{8}$ $\quad M_{neg1} = 137.2\ lbf \cdot ft$ over middle support

$M_{neg2} := \left| \frac{q_{neg} \cdot 1 \cdot ft \cdot L^2}{8} \right|$ $\quad M_{neg2} = 83.5\ lbf \cdot ft$

$f_{b1} := \frac{M_{neg1}}{S_{neg}}$ $\quad f_{b1} = 29.7\ ksi$ $\quad f_{b2} := \frac{M_{neg2}}{S_{neg}}$ $\quad f_{b2} = 18.1\ ksi$

$F_b := .6 \cdot F_y$ $\quad F_b = 30.0\ ksi$

Check = "OK"

Deflection Check (Live Load Only)

$\delta := \frac{5 \cdot (q_{Lr} \cdot 1\ ft) \cdot L^4}{384 \cdot E \cdot I_{pos}}$ $\quad \delta = 0.149\ in$

$\Delta_{max} := \frac{L}{240}$ $\quad \Delta_{max} = 0.285\ in$

Check = "OK"

Section B:
Beams & Diagonal Tie

Structural
Grace, Inc

Structural Grace, Inc.
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Tucson, Arizona 85719
Tel. (520) 320-0156
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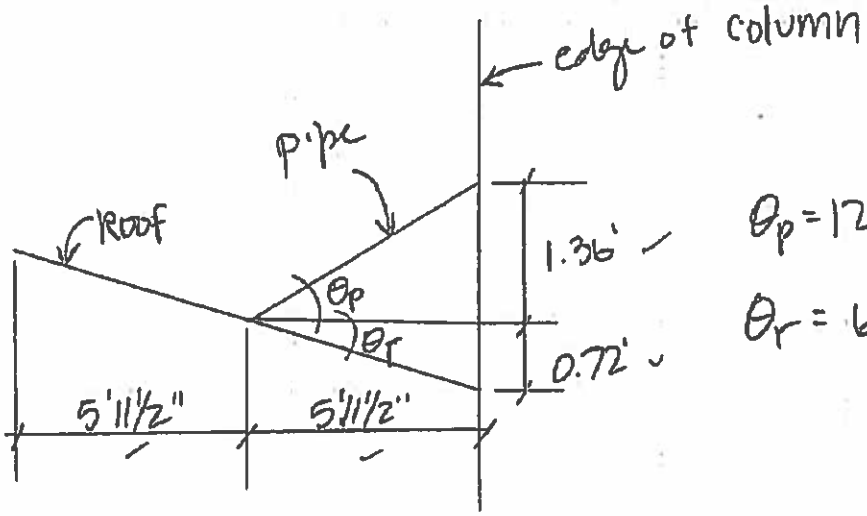
JOB: FH Ramada
SHEET NO. 3 OF 24
CALCULATED BY: IUMS DATE: 7/06
CHECKED BY: [illegible] DATE: 7/06
SCALE: Roof Geometry

B.



$\theta_p = 12.9°$

$\theta_r = 6.9°$

$L_{pipe} = \sqrt{1.36^2 + (5'11\tfrac{1}{2}")^2} = 73"$

Fountain Hills
RAMADA

Structural Grace, Inc

Job No. 08-011
Des. By: KMS Date: 3/06
7/06
Revision By: jm date: 06-28-16
Bck Chk: CGP date: 10/6/16

Mid Longitudinal Beam Roof Angle: $\theta_r := 6.9deg$

$F_y := 46ksi$ $E := 29000ksi$ $F_v := 0.4 \cdot F_y$ $F_v = 18.40ksi$ $F_b := 0.6 \cdot F_y$ $F_b = 27.60ksi$

Span = $L := 4ft + 0in$ Spacing = $Sp := 6ft + 0in$ Allow. Defl.= $\Delta_{max} := \frac{L}{240}$ $\Delta_{max} = 0.20in$

Roof Deck: $q_r := 1.62psf$

$q_D := q_r$ $q_D = 1.62psf$ $q_L := 20psf$ (11)

Effective Wind Area: $A_{wind} := Sp \cdot L$ $A_{wind} = 24.00ft^2$ Gust Factor: $G := .85$

From Figure 6-19C, Zone 2: (12) $CN_{up} := 1.7$ $CN_{down} := 1.8$ From Roof Design, $q_z := \cancel{15.0psf}$ 24.46

$p_{w.up} := G \cdot CN_{up} \cdot q_z \cdot \cos(\theta_r)$ $p_{w.up} = 21.5psf$ $p_{w.down} := G \cdot CN_{down} \cdot q_z \cdot \cos(\theta_r)$ $p_{w.down} = \cancel{22.8psf}$
$= 0.85(1.8)(24.46)\cos(6.9) = 37.15$

Try Section HSS4x4x1/8 Unit Weight = $w_u := 6.45plf$ $q_{sw} := \frac{(w_u)}{Sp}$ $q_{sw} = 1.08psf$

$Ht := 4in$ $B := 4in$ $t := \frac{1}{8}in$ $I := 4.4in^4$ $S := 2.2in^3$

Loading Combinations from 2003 IBC 1605.3.1 (page 273) $q_{DL} := q_D + q_{sw}$ $q_{DL} = 2.70psf$

Case 1: $q_1 := q_{DL} + q_L$ $q_1 = 22.70psf$ ← Same as IBC-12

Case 2: $q_2 := \cancel{q_{DL} + 0.75 \cdot (q_L + p_{w.down})}$ $q_2 = \cancel{34.78psf}$
$q_{DL} + 0.75(q_L + 0.6 P_{w.down}) = 34.42$

Case 3: $q_3 := \cancel{0.6q_{DL} + p_{w.up}}$ $q_3 = \cancel{19.90psf}$
$0.6q_{DL} + 0.6 P_{w.up} = 19.43$

IBC-12 < IBC-03 OK

$q := \max(q_1, q_2, q_3)$ $q = 34.78psf$ $w_i := q \cdot Sp$ $w_i = 208.70plf$

Check Shear $A_w := 2(Ht - 2 \cdot t) \cdot t$ $A_w = 0.94in^2$ $V_i := w_i \cdot \frac{L}{2}$ $V_i = 0.42kip$

$f_v := \frac{V_i}{A_w}$ $f_v = 0.45ksi$ $F_v = 18.40ksi$ Check = "OK"

Check Bending $M := w_i \cdot \frac{L^2}{8}$ $M = 0.42ft \cdot kip$ $f_b := \frac{M}{S}$

$f_b = 2.28ksi$ $F_b = 27.60ksi$ Check = "OK"

Check Downward Deflection with Live Load $q_{defl} := \max(q_1, q_2) - q_{DL}$ $q_{defl} = 32.09psf$

$w_{defl} := q_{defl} \cdot Sp$ $w_{defl} = 192.53plf$ $\delta := \frac{(5 \cdot w_{defl} \cdot L^4)}{384 \cdot E \cdot I}$ $\delta = 0.01in$ $\Delta_{max} = 0.20in$

Check = "OK"

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External Longitudinal Beam Spacing = $Sp_e := 0.5 \cdot Sp$ $Sp_e = 3.00\,ft$

Effective Wind Area: $A_{wind} := Sp_e \cdot L$ $A_{wind} = 12.00\,ft^2$

From Figure 6-19B, Zone 3: $\boxed{CN_{up} := 3.3}$ $\boxed{CN_{down} := 2.4}$ ← Figure 30.8-2 (14)

$p_{w.up} := G \cdot CN_{up} \cdot q_z \cdot \cos(\theta_r)$ $p_{w.up} = \cancel{41.8\,psf}$ $p_{w.down} := G \cdot CN_{down} \cdot q_z \cdot \cos(\theta_r)$ $p_{w.down} = 30.4\,psf$
$= 0.85(3.3)(24.46)\cos(6.9) = 68.11\,psf$

$\boxed{\text{Try Section HSS4x4x1/8}}$

$\boxed{Ht := 4in}$ $\boxed{B := 4in}$ $\boxed{t := \frac{1}{8}in}$ $\boxed{I := 4.4in^4}$ $\boxed{S := 2.2in^3}$

Unit Weight = $\boxed{w_u := 6.45plf}$

$q_{sw} := \frac{w_u}{Sp_e}$ $q_{sw} = 2.15\,psf$

Loading Combinations from 2003 IBC 1605.3.1 (page 273) $q_{DL} := q_D + q_{sw}$ $q_{DL} = 3.77\,psf$

Case 1: $q_1 := q_{DL} + q_L$ $q_1 = 23.77\,psf$ ← Same as IBC-12

Case 2: $q_2 := \cancel{q_{DL} + 0.75(q_L + p_{w.down})}$ $q_2 = \cancel{41.55\,psf}$
$= q_{DL} + 0.75(q_L + 0.6\,p_{w.down}) = 39.19\,psf$

Case 3: $q_3 := \cancel{-0.6q_{DL} + p_{w.up}}$ $q_3 = \cancel{39.51\,psf}$
$= -0.6q_{DL} + 0.6\,p_{w.up} = 38.60\,psf$

} IBC-12 < IBC-03 OK

$q := \max(q_1, q_2, q_3)$ $q = 41.55\,psf$ $w := q \cdot Sp_e$ $w = 124.66\,plf$

Check Shear

$A_w := 2(Ht - 2 \cdot t) \cdot t$ $A_w = 0.94\,in^2$ $V_e := w \cdot \frac{L}{2}$ $V_e = 0.25\,kip$ $f_v := \frac{V_e}{A_w}$

$f_v = 0.27\,ksi$ $F_v = 18.40\,ksi$ $\boxed{\text{Check = "OK"}}$

Check Bending

$M := w \cdot \frac{L^2}{8}$ $M = 0.25\,ft \cdot kip$ $f_b := \frac{M}{S}$

$f_b = 1.36\,ksi$ $F_b = 27.60\,ksi$ $\boxed{\text{Check = "OK"}}$

Check Downward Deflection with Live Load $q_{defl} := \max(q_1, q_2) - q_{DL}$ $q_{defl} = 37.78\,psf$

$w_{defl} := q_{defl} \cdot Sp_e$ $w_{defl} = 113.35\,plf$ $\delta := \frac{(5 \cdot w_{defl} \cdot L^4)}{384 \cdot E \cdot I}$ $\delta = 0.01\,in$ $\Delta_{max} = 0.20\,in$

$\boxed{\text{Check = "OK"}}$

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Transverse Beam Roof Angle: $\theta_r := 6.9deg$

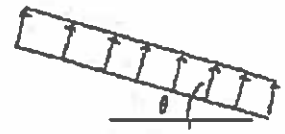
Internal Span = $L_i := 5ft + 11.5in$ External Span= $L_e := 5ft + 11.5in$ Total Length= $L := L_i + L_e$

Maximum Allowable Deflection = $\Delta := \frac{L_i}{240}$ $\Delta = 0.298in$ $L = 11.92ft$

Try Section HSS4x4x1/8 Unit Weight = $w_u := 6.45plf$

$Ht := 4in$ $B := 4in$ $t := \frac{1}{8}in$ $I := 4.4in^4$ $S := 2.2in^3$

Spacing: $Sp := 4ft + 2in$ $Sp = 4.17ft$



$w_{DL} := w_u + q_D \cdot Sp + 2w_u \cdot \frac{Sp}{L}$ $w_{DL} = 17.71plf$

$w_L := q_L \cdot Sp$ $w_L = 83.33plf$

From Figure 6-19C, Zone 1 $CN_{up} := 1.1$ $CN_{down} := 1.2$ wind forces are normal to the roof surface. Fig 30.8-3 (16)

$p_{w.up} := G \cdot CN_{up} \cdot q_z$ $p_{w.up} = \cancel{14.03psf}$ $= 0.85(1.1)(24.46) = 22.87psf$

$w_{w.up} := p_{w.up} \cdot Sp$ $w_{w.up} = \cancel{58.44}plf$ $= 95.37plf$

$p_{w.down} := G \cdot CN_{down} \cdot q_z$ $p_{w.down} = \cancel{15.30psf}$ $= 0.85(1.2)(24.46) = 24.95psf$

$w_{w.down} := p_{w.down} \cdot Sp$ $w_{w.down} = \cancel{63.75}plf$ $= 104.04plf$

Loading Combinations from 2003 IBC 1605.3.1 (page 273)

Case 1: $w_1 := w_{DL} + w_L$ $w_1 = 101.04plf$ ← Load comb same as IBC-12

Case 2: $w_2 := w_{DL} + .75 \cdot (w_L + w_{w.down} \cdot \cos(\theta_r))$
$= w_{DL} + 0.75(w_L + 0.6 w_{w.down} \cdot \cos(\theta_r))$

Case 3: $w_3 := -.6w_{DL} + w_{w.up} \cdot \cos(\theta_r)$
$= -0.6 w_{DL} + 0.6 w_{w.up} \cdot \cos(\theta_r)$

$w := \max(w_1, w_2, w_3)$ $w = 127.68plf$

$w_2 = \cancel{127.68}plf$ $= 126.7plf$
$w_3 = \cancel{47.39}plf$ $= 46.18plf$
} IBC-12 < IBC-03 OK

Check Shear $V := w \cdot L_i$ $V = 0.76kip$ $A_w := 2(Ht - 2 \cdot t) \cdot t$

$A_w = 0.94in^2$ $f_v := \frac{V}{A_w}$ $f_v = 0.81ksi$ $F_v = 18.40ksi$ Check = "OK"

Check Bending

$M := \frac{w \cdot (L_i)^2}{2}$ $M = 2.27ft \cdot kip$ $f_b := \frac{M}{S}$ $f_b = 12.36ksi$

Check = "OK"

Check Deflection $w_{defl} := w - w_{DL}$

$\Delta_{cant} := \frac{L_e}{120}$

$\delta_{ext} := \frac{6 \cdot w_{defl} \cdot \left(\frac{L}{2}\right)^4}{24 \cdot E \cdot I}$ $\delta_{ext} = 0.47in$ $\Delta_{cant} = 0.596in$

Check = "OK"

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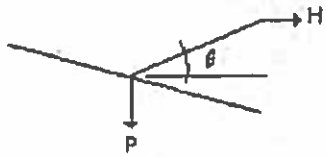
Diagonal Tie Design

Tie Angle: $\theta_p := 12.9deg$ ✓ Length of Tie: $L_p := 73in$ ✓



Compression Check:

Vertical Force at bottom of tie: $P := \left(w_3 + w_{w.up} \cdot \cos(\theta_p)\right) \cdot \frac{L^2}{2 \cdot L_i}$ $P = 1.24\,kip$

Axial Force in tie: $A_{tie} := \frac{P}{\sin(\theta_p)}$ $A_{tie} = 5.57\,kip$

Try:1.25" std pipe $A := .669in^2$ $r := .54in$ $K := 1$

$K \cdot \frac{L_p}{r} = 135$ From AISC ASD table C-36: $F_a := 8.19ksi$

$f_a := \frac{A_{tie}}{A}$ $f_a = 8.33\,ksi$ Check = "NG" ← 2% over stress, Say OK ✓

Tension Check:

Vertical Force at bottom of pipe: $P := \left(w + w_{w.down} \cdot \cos(\theta_r)\right) \cdot \frac{L^2}{2L_i}$ $P = 2.28\,kip$

Axial Force in tie: $A_{tie} := \frac{P}{\sin(\theta_p)}$ $A_{tie} = 10.19\,kip$

$F_y := 36ksi$ $F_a := .6F_y$ $F_a = 21.60\,ksi$

$f_a := \frac{A_{tie}}{A}$ $f_a = 15.24\,ksi$ Check = "OK" ✓

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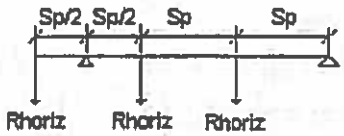
Top Longitudinal Beam



$R_{horiz} := A_{tie} \cdot \cos(\theta_p)$ $\quad R_{horiz} = 9.94\,kip$

$R_{vert} := A_{tie} \cdot \sin(\theta_p) \cdot 2$ $\quad R_{vert} = 4.55\,kip$

$V_{max} := 1.4 \cdot R_{horiz}$ $\quad V_{max} = 13.91\,kip$

$M_{weak} := .6 \cdot R_{horiz} \cdot Sp$ $\quad M_{weak} = 24.84\,kip \cdot ft$

$M_{strong} := .6 R_{vert} \cdot Sp$ $\quad M_{strong} = 11.38\,kip \cdot ft$

Try W14x90 $\quad F_{ycol} := 50ksi$

$I_{weak} := 362in^4$ $\quad S_{weak} := 49.9in^3$ $\quad A := 26.5in^2$ $\quad t_f := .71in$ $\quad t_w := .44in$ $\quad D := 14.in$ $\quad b_f := 14.5in$

$I_{strong} := 999in^4$ $\quad S_{strong} := 143 \cdot in^3$

Shear Check

$A_f := 2 \cdot b_f \cdot t_f$ $\quad A_f = 20.59\,in^2$ $\quad f_v := \frac{V_{max}}{A_f}$ $\quad f_v = 0.68\,ksi$ $\quad F_v = 18.40\,ksi$

Check = "OK"

Bending Check

$F_{b.strong} := .6F_{ycol}$ $\quad F_{b.strong} = 30.00\,ksi$ $\quad F_{b.weak} := .75 \cdot F_{yco}$ $\quad F_{b.weak} = 37.50ksi$

Strong Direction: $f_{b.strong} := \frac{M_{strong}}{S_{strong}}$ $\quad f_{b.strong} = 0.95\,ksi$

Weak Direction: $f_{b.weak} := \frac{M_{weak}}{S_{weak}}$ $\quad f_{b.weak} = 5.97\,ksi$

$f_{comb} := \frac{f_{b.strong}}{F_{b.strong}} + \frac{f_{b.weak}}{F_{b.weak}}$ $\quad f_{comb} = 0.19$

Check = "OK"

Bottom Longitudinal Tube

Try HSS6x6x5/16 $\quad D := 6in$ $\quad t := \frac{5}{16}in$ $\quad I := 34.3in^4$ $\quad S := 11.4in^3$ $\quad F_{ytube} := 46ksi$

Shear Check

$A_w := 2 \cdot (D - 2 \cdot t) \cdot t$ $\quad A_w = 3.36\,in^2$ $\quad f_v := \frac{V_{max}}{A_w}$ $\quad f_v = 4.14\,ksi$

$F_v := .4F_{ytube}$ $\quad F_v = 18.40\,ksi$

Check = "OK"

Bending Check

Note: The bottom longitudinal tube will resist the same horiz./weak axis force as top longitudinal, the vert/strong axis is determined from roof angle. ✓

2 Members

$f_b := \frac{(.5 \cdot M_{weak} \cdot \tan(\theta_r) + M_{weak})}{S}$ $\quad f_b = 27.73\,ksi$ $\quad F_b := .6F_{ytube}$ $\quad F_b = 27.60\,ksi$

Check = "NG"

0.5% overstress, Say OK

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Drain Pipe Design

cantilever length: $L_{cant} := 6ft$

Weight of person: $W_p := 250lbf$

Try MC6x16.3 weak axis bending

$w_u := 16.3plf$ $S := 1.82in^3$ $A := 4.79in^2$

$t_f := .475in$ $b_f := 3in$ $F_{ydrain} := 50ksi$

$V_{max} := W_p + w_u \cdot L_{cant}$ $V_{max} = 0.35\,kip$

$M_{max} := W_p \cdot L_{cant} + w_u \cdot \frac{L_{cant}^2}{2}$ $M_{max} = 1.79\,kip\cdot$

Shear Check

$A_f := 2 \cdot t_f \cdot b_f$ $A_f = 2.85\,in^2$ $f_v := \frac{V_{max}}{A_f}$ $f_v = 0.12\,ksi$

$F_v := .4 \cdot F_{ydrain}$ $F_v = 20.00\,ksi$

Check = "OK"

Bending Check

$f_b := \frac{M_{max}}{S}$ $f_b = 11.82\,ksi$ $F_b := .6F_{ydrain}$ $F_b = 30.00\,ksi$

Check = "OK"

Section C:
Columns

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C. **Column**

Depth of Roof = $D_r := 4in$ Height of Column = $L_c := 13.5ft$ Column Spacing: $Sp_{col} := 10ft + 5in$

Gust Factor, from Para. 6.5.8.1 (for Rigid Structures): $G := 0.85$

Strong Axis Bending

(15) From Figure 6-18C, Net Pressure Coefficient

For main wind force resist. system use Chapter # 27 of the ASCE-10

from Fig 27.4-6

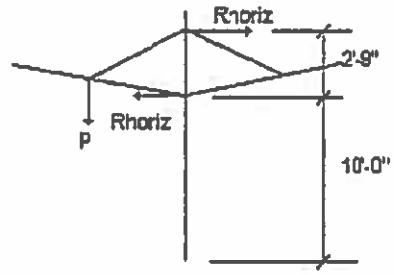
$Cnw_A := -1.1$ $Cnl_A := .3$

$Cnw_B := -.2$ $Cnl_B := 1.2$

$Cn_A := Cnw_A - Cnl_A$ $Cn_A = -1.40$

$Cn_B := Cnw_B - Cnl_B$ $Cn_B = -1.40$

$Cn := |\max(Cn_A, Cn_B)|$ $Cn = 1.40$



$q_w := G \cdot Cn \cdot q_z$ $q_w = \cancel{17.85\,psf}$
$= 0.85(1.4)(24.46) = 29.11\,psf$

$w_w := q_w \cdot Sp$ $w_w = \cancel{74.38\,plf}$
$= 29.11(4.17) = 121.4\,plf$

Loading Combinations from 2003 IBC 1605.3.1 (page 273)

Case 1: $w_1 := 2w_{DL} + w_L$ $w_1 = 118.75\,plf$ ← Load Comb same as IBC-12

Case 2: $w_2 := 2w_{DL} + .75 \cdot (w_L + w_w \cdot \cos(\theta_r))$ $\cos(6.9) = 152.2\,plf$
$= 2(17.71) + 0.75(83.33) + 0.6(121.4)$ $w_2 = \cancel{153.30}\,plf$

Case 3: $w_3 := 2 \times -.6w_{DL} + w_w \cdot \cos(\theta_r)$
$= 2(0.6)(17.71) + 0.6(121.4)\cos(6.9)$ $w_3 = \cancel{52.58}\,plf$ 51.06 plf

IBC-12 < IBC-03 OK

$w := \max(w_1, w_2, w_3)$ $w = 153.30\,plf$

$P := w \cdot L + w_w \cdot L$ $P = 2.71\,kip$ $P_{col} := P \cdot \frac{Sp_{col}}{Sp}$ $P_{col} = 5.69\,kip$

$M_{col} := .75 \cdot (w_L + w_w) \cdot \frac{L^2}{2} \cdot \frac{Sp_{col}}{Sp}$ $M_{col} = 21.00\,kip \cdot ft$

Try W14 x 90 Effective Length Factor = $K_x := 2.1$ $K_y := 1.2$

$F_{ycol} := 50ksi$ $A := 26.5in^2$ $I_x := 999in^4$ $S_x := 143in^3$ $r_x := 6.14in$

$I_y := 362 \cdot in^4$ $S_y := 49.9in^3$ $r_y := 3.7in$

$D := 14 \cdot in$ $t_f := .71in$ $t_w := .44in$

$w_{col} := A \cdot 490 \frac{lbf}{ft^3}$ $w_{col} = 90.17\,plf$

$V := w_w \cdot L \cdot \tan(\theta_r) \cdot \frac{Sp_{col}}{Sp}$ $V = 0.27\,kip$

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Check Combined Stress Ratio for Axial and Bending (CSR) at base of Column

$C_c := \sqrt{2\cdot\pi^2\cdot\frac{E}{F_{ycol}}}$ $C_c = 107.00$ $KL_{rx} := K_x\cdot\frac{L_c}{r_x}$ $KL_{rx} = 55.41$ $KL_{ry} := K_y\cdot\frac{L_c}{r_y}$ $KL_{ry} = 52.54$

$KL_r := \max(KL_{rx}, KL_{ry})$ $KL_r = 55.41$ $\alpha := \frac{KL_r}{C_c}$ $\alpha = 0.52$

$FS := \left(\frac{5}{3}\right) + \left(3\cdot\frac{\alpha}{8}\right) - \left(\frac{\alpha^3}{8}\right)$ $FS = 1.84$ $F_a := \left(1 - 0.5\cdot\alpha^2\right)\cdot\frac{F_{ycol}}{FS}$ $F_a = 23.486\,ksi$

$F_e := 12\cdot\pi^2\frac{E}{\left(23\cdot KL_r^2\right)}$ $F_e = 48.64\,ksi$ $F_a := if(\alpha < 1, F_a, F_e)$ $F_a = 23.49\,ksi$

$f_a := \frac{P_{col}}{A}$ $f_a = 0.21\,ksi$ Ratio = $R_a := \frac{f_a}{F_a}$ $R_a = 0.009$

$F_b := .6\cdot F_{ycol}$ $F_b = 30.00\,ksi$ $f_b := \frac{M_{col}}{S_x}$ $f_b = 1.76\,ksi$ $R_b := \frac{f_b}{\left[\left(1 - \frac{f_a}{F_e}\right)\cdot F_b\right]}$ $R_b = 0.059$

$CSR := R_a + R_b$ $CSR = 0.068$

$\boxed{\text{Check = "OK"}}$

Determine if Structure meets Requirements to be considered Rigid

(17)

7-16 Section 26.2

(If Natural Frequency is Greater than or Equal to 1.0, Structure is Rigid per ASCE 7-05 Section 6.2)

from Dynamics of Structures by Clough (Eq. 12-6, pg 177): [K-ωωm]=0

K = Stiffness ω = Natural Frequency m = mass

Rearranging the terms: ω = sqrt(K/m)

Stiffness of Cantilever Column = 3*E*I/(LLL) $K_{col} := 3\cdot\frac{(E\cdot I)}{L_c^3}$ $K_{col} = 0.70\,\frac{kip}{in}$

Mass at Top of Column = P/g: $m_{col} := \frac{2\cdot w_{DL}\cdot L\cdot\frac{Sp_{col}}{Sp}}{g}$ $m_{col} = 32.80\,slug$

Natural Frequency: $\omega := \sqrt{\left(\frac{K_{col}}{m_{col}}\right)}$ $\omega = 16.03\,Hz$

$\boxed{\text{Check = "Structure IS Rigid"}}$

$(\omega > 1.0)$

Section D:
Base Plate

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D. **Base Plate and Anchor Bolts**

Concrete Strength = $f := 2500psi$ $F_{brg} := 0.3 \cdot f$ $F_{brg} = 750\ psi$

$E_c := 57000 \cdot \sqrt{(f \cdot psi)}$ $E_c = 2850\ ksi$ $n := round\left[\left(\frac{E}{E_c}\right), 0\right]$ $n = 10.00$

Size of Square Plate = $B_{pl} := 20in$ Diameter of Anchor Bolt = $Dia_{bolt} := 0.625in$
(A307 bolts)

Width of column: $D := 14in$

Check Bearing Pressure under Plate and Tension in Anchor Bolts

Number of Anchor Bolts per Edge of Plate = $n_{bolts} := 3$

$A_{bolt} := 0.25 \cdot \pi \cdot Dia_{bolt}^2$ $A_{bolt} = 0.31\ in^2$ $A_s := n_{bolts} \cdot A_{bolt}$ $A_s = 0.92\ in^2$

Distance from Edge of Plate to Anchor Bolt = $D_{bolt} := 1.5in$ $d := B_{pl} - D_{bolt}$ $d = 18.50in$

Allowable Tension in Bolt = $F_{bolt} := 20ksi$ per AISC Table I-A, pg 4-3 $\rho := \frac{A_s}{B_{pl} \cdot d}$

$k := \sqrt{(\rho \cdot n)^2 + 2 \cdot \rho \cdot n} - \rho \cdot n$ $k = 0.200$ $j := 1 - \frac{k}{3}$ $j = 0.933$

$f_{brg} := \left(\frac{P}{B_{pl} \cdot d}\right) + \frac{2 \cdot M}{\left(B_{pl} \cdot d^2 \cdot k \cdot j\right)}$ $f_{brg} = 50\ psi$ Check = "OK"

$f_{bolt} := \frac{M}{\left(A_s \cdot j \cdot d\right)}$ $f_{bolt} = 1.71\ ksi$ Check = "OK"

Note: Force per Bolt = $P_{bolt} := F_{bolt} \cdot A_{bolt}$ $P_{bolt} = 6.14\ kip$

Anchor Bolt Embed Depth

Embed Depth = $D_e := 8in$ Bolt Spacing = $S_b := 8.5in$

$A_{sh} := \left(2 \cdot D_e\right) \cdot \left[2 \cdot D_e + \left(n_{bolts} - 1\right) \cdot S_b\right]$ $A_{sh} = 528.00\ in^2$

Allowable pullout capacity = $P_c := 0.95 \cdot \sqrt{f \cdot psi} \cdot A_{sh}$ $P_c = 25.08\ kip$

Maximum force in bolts = $P_{bolt\_tot} := n_{bolts} \cdot P_{bolt}$ $P_{bolt\_tot} = 18.41\ kip$

Check = "OK"

Determine Required Thickness of Base Plate

Bending of Plate at Face of Column: $M_{pl} := f_{brg} \cdot \frac{[0.5 \cdot (B_{pl} - D)]^2}{2}$ $M_{pl} = 0.22\,in \cdot \frac{kip}{in}$

$F_y := 50ksi$

$F_b := 0.75 \cdot F_y$ $F_b = 37.50\,ksi$ $t_{reqd} := \sqrt{\left(6 \cdot \frac{M_{pl}}{F_b}\right)}$ $\boxed{t_{reqd} = 0.190\,in}$

Square Pier

Pier Edge. = $\boxed{D_{pier} := 36in}$ Depth of Fill over Footing = Height of Pier: $\boxed{D_f := 4in}$

$A_{pier} := D_{pier}^2$ $W_{pier} := 150pcf \cdot A_{pier} \cdot D_f$ $W_{pier} = 0.45\,kip$

$I_{pier} := \frac{D_{pier}^4}{12}$ $I_{pier} = 139968.00\,in^4$ $S_{pier} := \frac{D_{pier}^3}{6}$ $S_{pier} = 7776.00\,in^3$

Check Shear

Alowable Shear Factor per ACI-99 A.3.1: $\boxed{\alpha_V := 1.1}$

$F_v := \alpha_V \sqrt{(f' \cdot psi)}$ $F_v = 55\,psi$

$\boxed{\beta_V := 1.5}$

Maximum Shear Stress in Pier: $f_v := \frac{\beta_V \cdot V}{(A_{pier})}$ $f_v = 0.31\,psi$

$\boxed{\text{Check = "OK"}}$

Check Bending in Un-Reinforced Section

Modulus of Rupture per ACI-99 9.5.2.3: $f_r := 7.5 \cdot \sqrt{f' \cdot psi}$ $f_r = 375\,psi$

Alowable Bending Factor per ACI-99 A.3.1: $\boxed{\alpha_M := 0.45}$

Allowable Flexural Tension in Concrete: $F_t := \alpha_M \cdot f_r$ $F_t = 169\,psi$

$M_{pier} := M_{col} + V \cdot D_f$ $M_{pier} = 21.09\,ft \cdot kip$

$f_t := \frac{M_{pier}}{S_{pier}}$ $f_t = 33\,psi$

$\boxed{\text{Check = "OK"}}$

Section E:
Footing

Structural
Grace, Inc

Fountain Hills
RAMADA

Structural Grace, Inc

Job No. 05-011
Des. By: KMS Date: 3/06
MMT 7/06

Revision By: [illegible] date: 06 28-16
Chk By: CGP date: 10/6/16

E. **Footing - Stability and Pressure**

Center Footing analyzed since it has the largest tributary area from the roof.

Size of Square Footing = $B := 6.5ft$

Thickness of Footing = $t_f := 16in$

Unit Weight of Soil = $\gamma_{soil} := 150pcf$ (The footing has 4" concrete slab over footing and no soil)

$W_f := 150pcf \cdot t_f \cdot B^2$ $W_f = 8.45\,kip$ $W_s := \gamma_{soil} \cdot D_f \cdot \left(B^2 - A_{pier}\right)$ $W_s = 1.66\,kip$

$P := 2 \cdot w_{DL} \cdot L \cdot \frac{Sp_{col}}{Sp} + W_f + W_{pier} + W_s + 3w_{col} \cdot L_c$ $M := M_{col} + V \cdot (D_f + t_f)$

$P = 15.27\,kip$ $M = 21.44\,ft \cdot kip$

There is no wind on Load comb. therefore IBC-12 same as IBC 03
OK

Check Sliding

Coefficient of Base Friction = $\mu := .4$ $V_{cap} := \mu \cdot P$ $V_{cap} = 6.11\,kip$

$V = 0.27\,kip$

Factor of Safety = $FS := \frac{V_{cap}}{V}$ $FS = 22.78$

Check = "OK"

Check Overturning

$M_{st} := P \cdot \frac{B}{2}$ $M_{st} = 49.63\,ft \cdot kip$ Factor of Safety = $FS := \frac{M_{st}}{M}$ $FS = 2.31$

Check = "OK"

Check Bearing Pressure

Allowable Bearing Pressure = $Q_{brg} := 2000psf$ $Kern := \frac{B}{3}$ $Kern = 2.17\,ft$

Distance to Resultant = $Dist := \frac{(M_{st} - M)}{P}$ $Dist = 1.85\,ft$

Eccentricity = $e := 0.5 \cdot B - Dist$ $e = 1.40\,ft$

If Resultant within Kern (Dist > Kern), max. pressure = P * (1 + 6e/B)/(BB)

If Resultant outside of Kern (Dist < Kern), max. pressure = 2 * P/(3 * B * Dist)

$q_{in} := \frac{P}{B^2} \cdot \left(1 + 6 \cdot \frac{e}{B}\right)$ $q_{out} := 2 \cdot \frac{P}{(3 \cdot B \cdot Dist)}$ $q_{max} := if\left(Dist < Kern, q_{out}, q_{in}\right)$

$q_{max} = 849\,psf$

Check = "OK"

Footing - Shear and Bending

Rebar Diameter = $D_{bar} := \left(\frac{5}{8}in\right)$ $\quad$ $Spacing := 12in$ $\quad$ $F_y := 60ksi$ $\quad$ $F_s := 24ksi$

$A_{bar} := 0.25 \cdot \pi \cdot D_{bar}^2$ $\quad$ $A_{bar} = 0.31\,in^2$ $\quad$ $A_s := \frac{A_{bar}}{Spacing}$ $\quad$ $A_s = 0.31\,\frac{in^2}{ft}$

$Cover := 3in$ $\quad$ $d := t_f - Cover - 1.5 \cdot D_{bar}$ $\quad$ Bars in Both Directions $\quad$ $d = 12.06\,in$

Net Pressure under Footing = $q_{net} := q_{max} - 150pcf \cdot t_f - \gamma_{soil} \cdot D_f$ $\quad$ $q_{net} = 599\,psf$

Check Shear at "d" away from Pier $\quad$ width of Pier $\quad$ $D_{pier} = 3.00\,ft$

$X := 0.5 \cdot (B - D_{pier}) - d$ $\quad$ $X = 8.94\,in$ $\quad$ $V := q_{net} \cdot X \cdot B$ $\quad$ $V = 2.897\,kip$

$f_v := \frac{V}{B \cdot d}$ $\quad$ $f_v = 3\,psi$ $\quad$ $F_v := \alpha_V \cdot \sqrt{(f \cdot psi)}$ $\quad$ $F_v = 55\,psi$

Check = "OK"

Check Bending at Face of Pier

$X := 0.5 \cdot (B - D_{pier})$ $\quad$ $X = 21.00\,in$ $\quad$ $M := 0.5 \cdot q_{net} \cdot X^2$ $\quad$ $M = 0.92\,ft \cdot \frac{kip}{ft}$

$\rho := \frac{A_s}{d}$ $\quad$ $\rho = 0.002119$ $\quad$ $\rho_{min} := 200\,\frac{psi}{F_y}$ $\quad$ $\rho_{min} = 0.003333$

Check = "Check Cracking Moment"

$k := \sqrt{(\rho \cdot n)^2 + 2 \cdot \rho \cdot n} - \rho \cdot n$ $\quad$ $k = 0.0623$ $\quad$ $j := 1 - \frac{k}{3}$ $\quad$ $j = 0.938$

$f_c := \frac{2 \cdot M}{(d^2 \cdot k \cdot j)}$ $\quad$ $f_c = 72\,psi$ $\quad$ $F_c := \alpha_M \cdot f$ $\quad$ $F_c = 1125\,psi$

Check = "OK"

Check Cracking Moment (if required above)

$\phi := 0.9$ $\quad$ $P := A_s \cdot B \cdot F_y$ $\quad$ $P = 119.65\,kip$ $\quad$ $a := \frac{P}{0.85 \cdot f \cdot B}$ $\quad$ $a = 0.72\,in$

$\phi Mn := \phi \cdot P \cdot (d - 0.5 \cdot a)$ $\quad$ $\phi Mn = 105.01\,ft \cdot kip$

$f_r := 7.5 \cdot \sqrt{(f \cdot psi)}$ $\quad$ $f_r = 375\,psi$ $\quad$ $S := B \cdot \frac{t_f^2}{6}$ $\quad$ $M_{cr} := f_r \cdot S$

$M_{cr} = 104.00\,ft \cdot kip$ $\quad$ $ratio := \frac{\phi Mn}{1.2 \cdot M_{cr}}$ $\quad$ $ratio = 0.84$

$f_s := \frac{M}{A_s \cdot j \cdot d}$ $\quad$ $f_s = 3.17\,ksi$

$F_s := if(ratio > 1.0, F_s, 0.75 \cdot F_s)$

Maximum Allowable Steel Stress = $F_s = 18.00\,ksi$

Check = "OK"

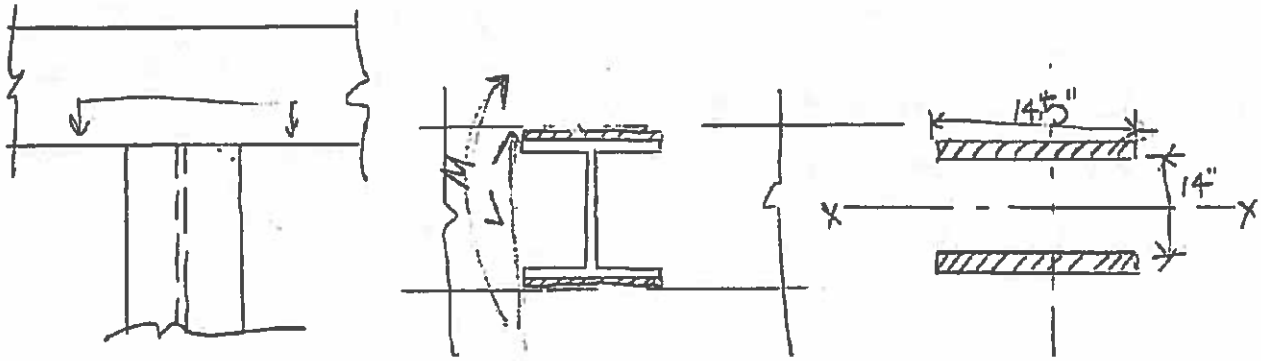
Section F: Connections

Structural Grace, Inc

Structural Grace, Inc.
1430 E. Fort Lowell Road, Suite 200
Tucson, Arizona 85719
Tel. (520) 320-0156
Fax (520) 320-0157

F.

Column to Top Longitudinal Beam

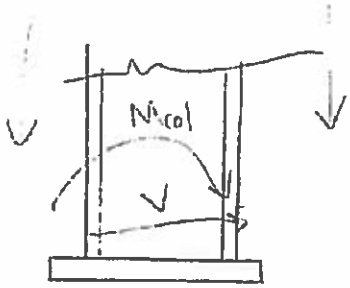


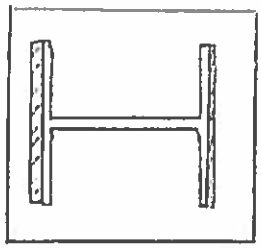
No Moment connection - M=0

$$V = \frac{6.68^k \times 4'2'' \times (3+2+1)}{42'' \times 2.5} = 16.03^k$$

(Rhoriz (pg 7))

Column to Base Plate





$M_{col} = 21^{k\cdot ft}$

$V = 2200^{\#}$

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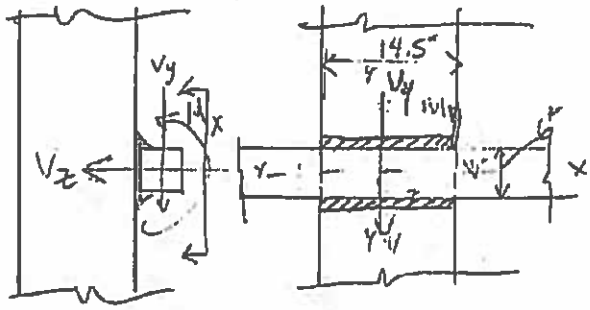
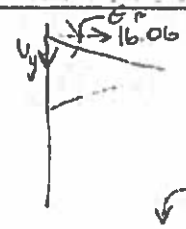
Lower Longitudinal Tube to column





$V_x = 0$

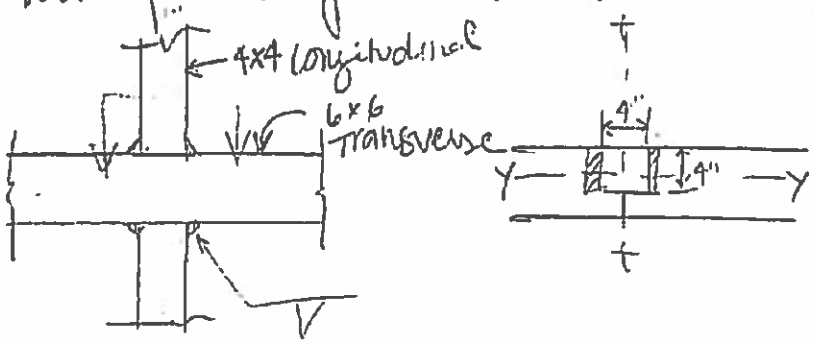
$M_y = 0$

$V_y = 16.03^k \tan 18.8^\circ = 5.46^k$ (θ_p)

$M_x = 5.46^k \cdot 6''/2 = 1.36^{k\cdot ft}$

$F_{all} = 0.3 \times 70ksi = 21ksi$

Midspan Longitudinal Tube to Transverse Tube



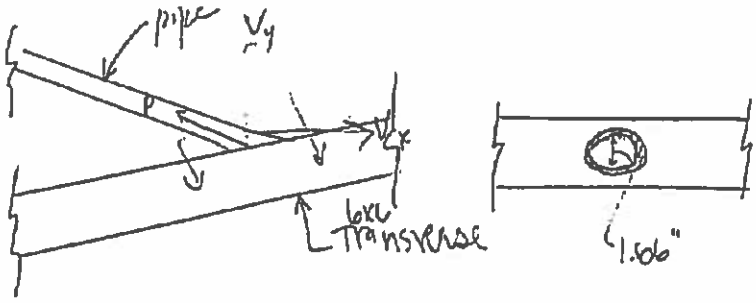
"pinned"

$M_y = 0$ k-ft

$V_y = 0.42$ kip

(see pg 3)

Pipe to Transverse Tube



Axial Force
$P = 3.58^k$ (pg 6)

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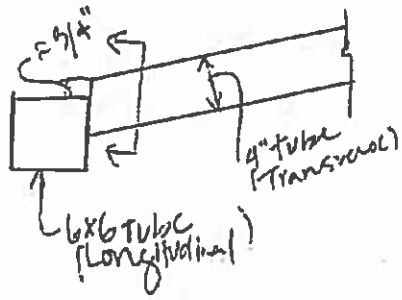
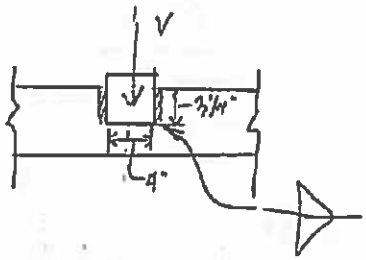
JOB FH Ramada
SHEET NO. 18 OF 24
CALCULATED BY KMS DATE 4/06
CHECKED BY [illegible] DATE 4/06
SCALE Welds

Transverse Tube to bottom longitudinal Tube



(pinned connection)



$$V_x = \overset{P}{3.58^k} \cos \overset{\theta_p}{18.8^\circ} = 3.39^k$$

$$V_y = 3.58 \sin 18.8^\circ = 1.15^k$$

FOUNTAIN HILLS RAMADA
WELD DESIGN
COLUMN TO TOP LONGITUDINAL BEAM

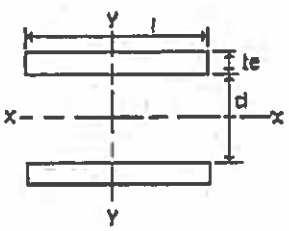
Design: KMS Date: 4/06
Check: MH Date: 4/06

$M_y := 0kip \cdot ft$ $V_y := 16.03kip$ $M_x := 0kip \cdot ft$ $V_x := 0kip$

weld size: $t := .25in$ effective weld size: $t_e := \frac{t}{\sqrt{2}}$ $t_e = 0.177\ in$

length ~~of weld~~ of each weld: $l := 14.5in$ distance between welds: $d := 14in$

weld tensile strength: $F_t := 70ksi$ allowable weld stress: $F_{all} := 0.3 \cdot F_t$ $F_{all} = 21\ ksi$



$I_y := \frac{2 \cdot t_e \cdot l^3}{12}$ $I_y = 89.821\ in^4$

$A := 2 \cdot t_e \cdot l$ $A = 5.127\ in^2$

$I_x := \frac{2 \cdot l \cdot t_e^3}{12} + A \cdot \left(\frac{d}{2}\right)^2$ $I_x = 251.213\ in^4$

$c_y := \frac{d}{2}$ $c_y = 7\ in$ $c_x := \frac{l}{2}$ $c_x = 7.25\ in$

$f_{by} := \frac{M_y \cdot c_x}{I_y}$ $f_{by} = 0\ ksi$ $f_{vy} := \frac{V_y}{A}$ $f_{vy} = 3.127\ ksi$

$f_y := f_{by} + f_{vy}$ $f_y = 3.127\ ksi$

$f_{bx} := \frac{M_x \cdot c_y}{I_x}$ $f_{bx} = 0\ ksi$ $f_{vx} := \frac{V_x}{A}$ $f_{vx} = 0\ ksi$

$f_x := f_{bx} + f_{vx}$ $f_x = 0\ ksi$

$f_{eff} := \sqrt{f_y^2 + f_x^2}$ $f_{eff} = 3.127\ ksi$

Check = "OK"

FOUNTAIN HILLS RAMADA
WELD DESIGN
COLUMN TO BASE PLATE

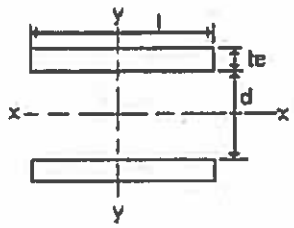
Design: KMS Date: 4/06
Check: MT Date: 4/06

$M_y := 21 kip \cdot ft$ $V_y := .28 kip$ $M_x := 0 kip \cdot ft$ $V_x := 0 kip$

weld size: $t := .25 in$ effective weld size: $t_e := \frac{t}{\sqrt{2}}$ $t_e = 0.177\ in$

length ~~of weld~~ of each weld: $l := 14.5 in$ distance between welds: $d := 14 in$

weld tensile strength: $F_t := 70 ksi$ allowable weld stress: $F_{all} := 0.3 \cdot F_t$ $F_{all} = 21\ ksi$



$I_y := \frac{2 \cdot t_e \cdot l^3}{12}$ $I_y = 89.821\ in^4$

$A := 2 \cdot t_e \cdot l$ $A = 5.127\ in^2$

$I_x := \frac{2 \cdot l \cdot t_e^3}{12} + A \cdot \left(\frac{d}{2}\right)^2$ $I_x = 251.213\ in^4$

$c_y := \frac{d}{2}$ $c_y = 7\ in$ $c_x := \frac{l}{2}$ $c_x = 7.25\ in$

$f_{by} := \frac{M_y \cdot c_x}{I_y}$ $f_{by} = 20.34\ ksi$ $f_{vy} := \frac{V_y}{A}$ $f_{vy} = 0.055\ ksi$

$f_y := f_{by} + f_{vy}$ $f_y = 20.395\ ksi$

$f_{bx} := \frac{M_x \cdot c_y}{I_x}$ $f_{bx} = 0\ ksi$ $f_{vx} := \frac{V_x}{A}$ $f_{vx} = 0\ ksi$

$f_x := f_{bx} + f_{vx}$ $f_x = 0\ ksi$

$f_{eff} := \sqrt{f_y^2 + f_x^2}$ $f_{eff} = 20.395\ ksi$

Check = "OK"

FOUNTAIN HILLS RAMADA

WELD DESIGN

TRANSVERSE BEAM TO BOTTOM LONGITUDINAL BEAM

Design: KMS Date: 4/06

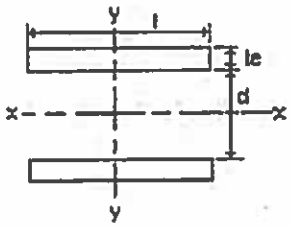
Check: Date:

$M_y := 0kip \cdot ft$ $V_y := 1.15kip$ $M_x := 0kip \cdot ft$ $V_x := 3.39kip$

weld size: $t := \frac{3}{16}in$ effective weld size: $t_e := \frac{t}{\sqrt{2}}$ $t_e = 0.133\,in$

length of each weld: $l := 3in$ distance between welds: $d := 4in$

weld tensile strength: $F_t := 70ksi$ allowable weld stress: $F_{all} := 0.3 \cdot F_t$ $F_{all} = 21\,ksi$



$I_y := \frac{2 \cdot t_e \cdot l^3}{12}$ $I_y = 0.597\,in^4$

$A := 2 \cdot t_e \cdot l$ $A = 0.795\,in^2$

$I_x := \frac{2 \cdot l \cdot t_e^3}{12} + A \cdot \left(\frac{d}{2}\right)^2$ $I_x = 3.183\,in^4$

$c_y := \frac{d}{2}$ $c_y = 2\,in$ $c_x := \frac{l}{2}$ $c_x = 1.5\,in$

$f_{by} := \frac{M_y \cdot c_x}{I_y}$ $f_{by} = 0\,ksi$ $f_{vy} := \frac{V_y}{A}$ $f_{vy} = 1.446\,ksi$

$f_y := f_{by} + f_{vy}$ $f_y = 1.446\,ksi$

$f_{bx} := \frac{M_x \cdot c_y}{I_x}$ $f_{bx} = 0\,ksi$ $f_{vx} := \frac{V_x}{A}$ $f_{vx} = 4.261\,ksi$

$f_x := f_{bx} + f_{vx}$ $f_x = 4.261\,ksi$

$f_{eff} := \sqrt{f_y^2 + f_x^2}$ $f_{eff} = 4.5\,ksi$

Check = "OK"

FOUNTAIN HILLS RAMADA

WELD DESIGN

MID-LONGITUDINAL BEAM TO TRANSVERSE BEAM

Design: KMS Date: 4/06

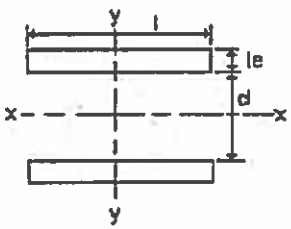
Check: MH Date: 4/06

$M_y := 0kip \cdot ft$ $V_y := .42kip$ $M_x := 0kip \cdot ft$ $V_x := 0kip$

weld size: $t := \frac{1}{8}in$ effective weld size: $t_e := \frac{t}{\sqrt{2}}$ $t_e = 0.088\ in$

length of each weld: $l := 4in$ distance between welds: $d := 4in$

weld tensile strength: $F_t := 70ksi$ allowable weld stress: $F_{all} := 0.3 \cdot F_t$ $F_{all} = 21\ ksi$



$I_y := \frac{2 \cdot t_e \cdot l^3}{12}$ $I_y = 0.943\ in^4$

$A := 2 \cdot t_e \cdot l$ $A = 0.707\ in^2$

$I_x := \frac{2 \cdot l \cdot t_e^3}{12} + A \cdot \left(\frac{d}{2}\right)^2$ $I_x = 2.829\ in^4$

$c_y := \frac{d}{2}$ $c_y = 2\ in$ $c_x := \frac{l}{2}$ $c_x = 2\ in$

$f_{by} := \frac{M_y \cdot c_x}{I_y}$ $f_{by} = 0\ ksi$ $f_{vy} := \frac{V_y}{A}$ $f_{vy} = 0.594\ ksi$

$f_y := f_{by} + f_{vy}$ $f_y = 0.594\ ksi$

$f_{bx} := \frac{M_x \cdot c_y}{I_x}$ $f_{bx} = 0\ ksi$ $f_{vx} := \frac{V_x}{A}$ $f_{vx} = 0\ ksi$

$f_x := f_{bx} + f_{vx}$ $f_x = 0\ ksi$

$f_{eff} := \sqrt{f_y^2 + f_x^2}$ $f_{eff} = 0.594\ ksi$

Check = "OK"

FOUNTAIN HILLS RAMADA
WELD DESIGN
PIPE CONNECTION

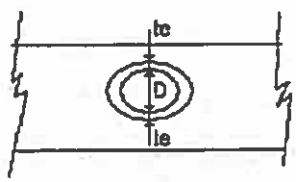
Design: KMS Date: 4/06
Check: JMG Date: 4/06

Axial Force in pipe: $P := 3.58kip$

weld size: $t := \frac{1}{8}in$ effective weld size: $t_e := \frac{t}{\sqrt{2}}$ $t_e = 0.088\ in$

outer diameter of pipe: $D := 1.66in$

weld yield strength: $F_y := 70ksi$ allowable weld stress: $F_{all} := 0.3 \cdot F_y$ $F_{all} = 21\ ksi$



$A := \pi \cdot D \cdot t_e$ $A = 0.461\ in^2$

$f := \frac{P}{A}$ $f = 7.767\ ksi$

Check = "OK"

FOUNTAIN HILLS RAMADA
WELD DESIGN
COLUMN TO BOTTOM LONGITUDINAL BEAM

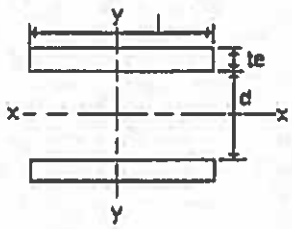
Design: KMS Date: 4/06
Check: MT Date: 4/06

$M_y := 1.36 kip \cdot ft$ $V_y := 5.46 lbf$ $M_x := 0 kip \cdot ft$ $V_x := 0 kip$

weld size: $t := \frac{1}{4} in$ effective weld size: $t_e := \frac{t}{\sqrt{2}}$ $t_e = 0.177 in$

length of each weld: $l := 14.5 in$ distance between welds: $d := 6 in$

weld tensile strength: $F_t := 70 ksi$ allowable weld stress: $F_{all} := 0.3 \cdot F_t$ $F_{all} = 21 ksi$



$I_y := \frac{2 \cdot t_e \cdot l^3}{12}$ $I_y = 89.821 in^4$

$A := 2 \cdot t_e \cdot l$ $A = 5.127 in^2$

$I_x := \frac{2 \cdot l \cdot t_e^3}{12} + A \cdot \left(\frac{d}{2}\right)^2$ $I_x = 46.152 in^4$

$c_y := \frac{d}{2}$ $c_y = 3 in$ $c_x := \frac{l}{2}$ $c_x = 7.25 in$

$f_{by} := \frac{M_y \cdot c_x}{I_y}$ $f_{by} = 1.317 ksi$ $f_{vy} := \frac{V_y}{A}$ $f_{vy} = 1.065 \times 10^{-3} ksi$

$f_y := f_{by} + f_{vy}$ $f_y = 1.318 ksi$

$f_{bx} := \frac{M_x \cdot c_y}{I_x}$ $f_{bx} = 0 ksi$ $f_{vx} := \frac{V_x}{A}$ $f_{vx} = 0 ksi$

$f_x := f_{bx} + f_{vx}$ $f_x = 0 ksi$

$f_{eff} := \sqrt{f_y^2 + f_x^2}$ $f_{eff} = 1.318 ksi$

Check = "OK"

ICC

INTERNATIONAL CODE COUNCIL®

2012

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IRC

ASCE STANDARD

ASCE/SEI 7-10

This document uses both the International System of Units (SI) and customary units

ASCE

SEI

ASCE

STRUCTURAL ENGINEERING INSTITUTE

TABLE 1607.1—continued
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_o, AND MINIMUM CONCENTRATED LIVE LOADS[g]

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
23. Penal institutions		
Cell blocks	40	—
Corridors	100	
24. Recreational uses:		
Bowling alleys, poolrooms and similar uses	75[m]	
Dance halls and ballrooms	100[m]	
Gymnasiums	100[m]	—
Reviewing stands, grandstands and bleachers	100[n, r]	
Stadiums and arenas with fixed seats (fastened to floor)	60[n, m]	
25. Residential		
One- and two-family dwellings		
Uninhabitable attics without storage[i]	10	
Uninhabitable attics with storage[i, k]	20	
Habitable attics and sleeping areas[k]	30	
All other areas	40	—
Hotels and multifamily dwellings		
Private rooms and corridors serving them	40	
Public rooms[m] and corridors serving them	100	
26. Roofs		
All roof surfaces subject to maintenance workers		300
Awnings and canopies:		
Fabric construction supported by a skeleton structure	5 nonreducible	
All other construction	20	
Ordinary flat, pitched, and curved roofs (that are not occupiable)	20	
Where primary roof members are exposed to a work floor, at single panel point of lower chord of roof trusses or any point along primary structural members supporting roofs:		
Over manufacturing, storage warehouses, and repair garages		2,000
All other primary roof members		300
Occupiable roofs:		
Roof gardens	100	
Assembly areas	100[m]	
All other similar areas	Note f	Note f
27. Schools		
Classrooms	40	1,000
Corridors above first floor	80	1,000
First-floor corridors	100	1,000
28. Scuttles, skylight ribs and accessible ceilings	—	200
29. Sidewalks, vehicular drive ways and yards, subject to trucking	250[d, m]	8,000[e]

(continued)

TABLE 1607.1—continued
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_o, AND MINIMUM CONCENTRATED LIVE LOADS[g]

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
30. Stairs and exits		
One- and two-family dwellings	40	300[f]
All other	100	300[f]
31. Storage warehouses (shall be designed for heavier loads if required for anticipated storage)		—
Heavy	250[m]	
Light	125[m]	
32. Stores		
Retail		
First floor	100	1,000
Upper floors	75	1,000
Wholesale, all floors	125[m]	1,000
33. Vehicle barriers	See Section 1607.8.3	
34. Walkways and elevated platforms (other than exitways)	60	—
35. Yards and terraces, pedestrians	100[m]	—

For SI: 1 inch = 25.4 mm, 1 square inch = 645.16 mm^2,
1 square foot = 0.0929 m^2,
1 pound per square foot = 0.0479 kN/m^2, 1 pound = 0.004448 kN,
1 pound per cubic foot = 16 kg/m^3.

a. Floors in garages or portions of buildings used for the storage of motor vehicles shall be designed for the uniformly distributed live loads of Table 1607.1 or the following concentrated loads: (1) for garages restricted to passenger vehicles accommodating not more than nine passengers, 3,000 pounds acting on an area of 4.5 inches by 4.5 inches; (2) for mechanical parking structures without slab or deck that are used for storing passenger vehicles only, 2,250 pounds per wheel.

b. The loading applies to stack room floors that support nonmobile, double-faced library book stacks, subject to the following limitations:

1. The nominal bookstack unit height shall not exceed 90 inches;
2. The nominal shelf depth shall not exceed 12 inches for each face; and
3. Parallel rows of double-faced book stacks shall be separated by aisles not less than 36 inches wide.

c. Design in accordance with ICC 300.

d. Other uniform loads in accordance with an approved method containing provisions for truck loadings shall also be considered where appropriate.

e. The concentrated wheel load shall be applied on an area of 4.5 inches by 4.5 inches.

f. The minimum concentrated load on stair treads shall be applied on an area of 2 inches by 2 inches. This load need not be assumed to act concurrently with the uniform load.

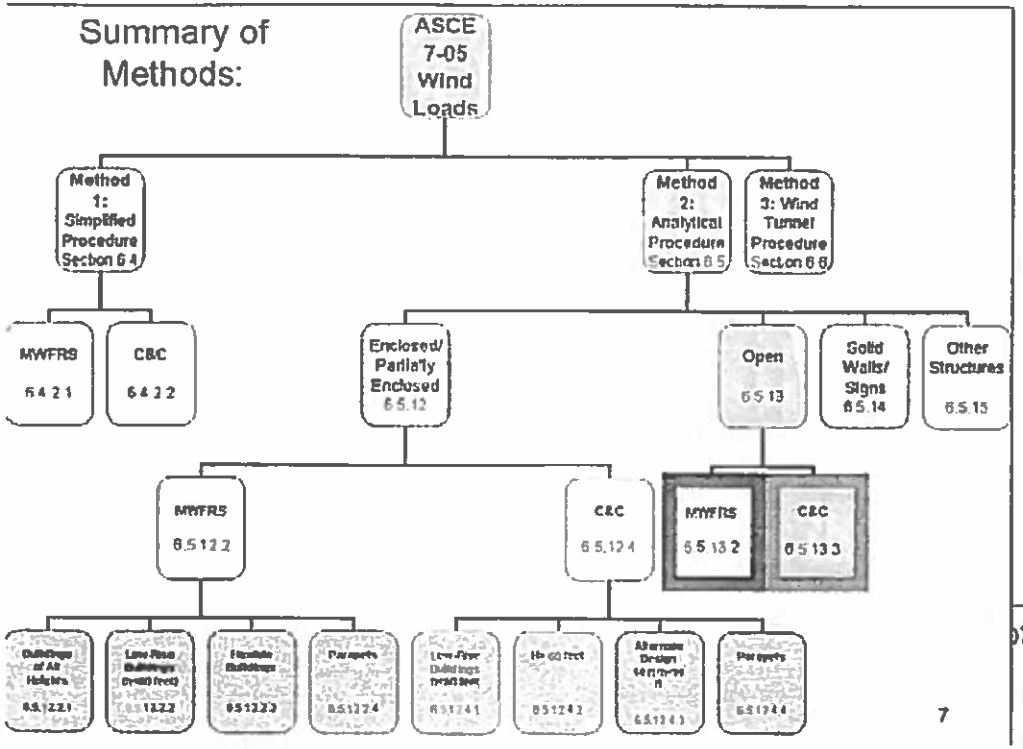
g. Where snow loads occur that are in excess of the design conditions, the structure shall be designed to support the loads due to the increased loads caused by drift buildup or a greater snow design determined by the building official (see Section 1608).

h. See Section 1604.8.3 for decks attached to exterior walls.

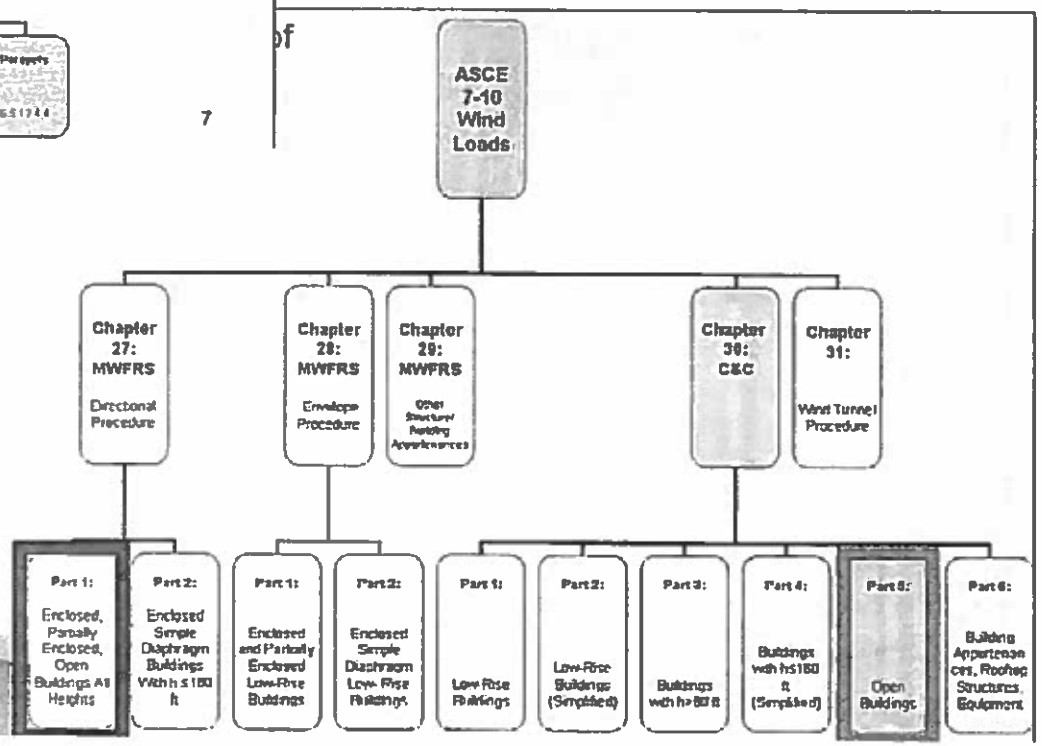
i. Uninhabitable attics without storage are those where the maximum clear height between the joists and rafters is less than 42 inches, or where there are not two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses. This live load need not be assumed to act concurrently with any other live load requirements.

(continued)

Summary of Methods:



NCSEA
National Council of Structural Engineers Associations



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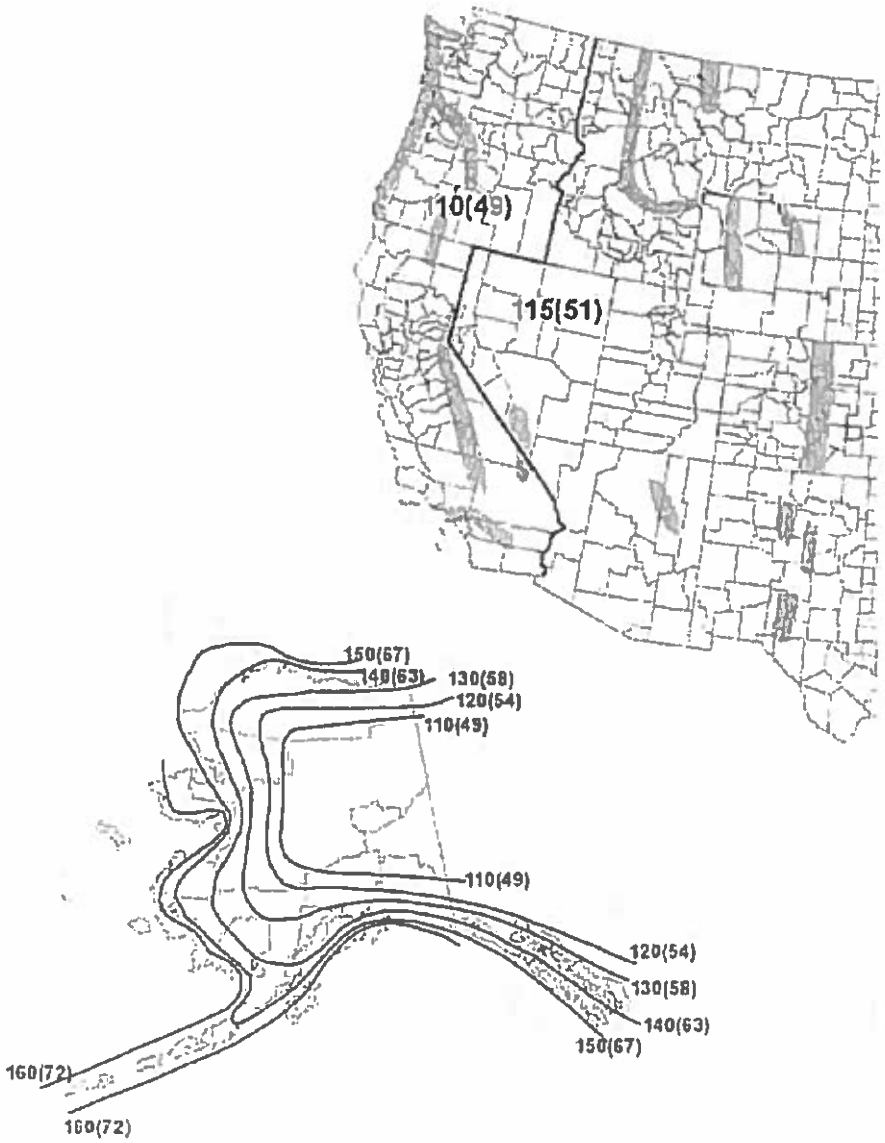


Figure 26.5-1A Basic Wind Speeds for Occupancy Category II Buildings and Other Structures.

Notes:

1. Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 ft (10m) above ground for Exposure C category.
2. Linear interpolation between contours is permitted.
3. Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.
4. Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.
5. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).

Surface Roughness B: Urban and suburban areas, wooded areas, or other terrain with numerous closely spaced obstructions having the size of single-family dwellings or larger.

Surface Roughness C: Open terrain with scattered obstructions having heights generally less than 30 ft (9.1 m). This category includes flat open country and grasslands.

Surface Roughness D: Flat, unobstructed areas and water surfaces. This category includes smooth mud flats, salt flats, and unbroken ice.

26.7.3 Exposure Categories

Exposure B: For buildings with a mean roof height of less than or equal to 30 ft (9.1 m), Exposure B shall apply where the ground surface roughness, as defined by Surface Roughness B, prevails in the upwind direction for a distance greater than 1,500 ft (457 m). For buildings with a mean roof height greater than 30 ft (9.1 m), Exposure B shall apply where Surface Roughness B prevails in the upwind direction for a distance greater than 2,600 ft (792 m) or 20 times the height of the building, whichever is greater.

→ Exposure C: Exposure C shall apply for all cases where Exposures B or D do not apply.

Exposure D: Exposure D shall apply where the ground surface roughness, as defined by Surface Roughness D, prevails in the upwind direction for a distance greater than 5,000 ft (1,524 m) or 20 times the building height, whichever is greater. Exposure D shall also apply where the ground surface roughness immediately upwind of the site is B or C, and the site is within a distance of 600 ft (183 m) or 20 times the building height, whichever is greater, from an Exposure D condition as defined in the previous sentence.

For a site located in the transition zone between exposure categories, the category resulting in the largest wind forces shall be used.

EXCEPTION: An intermediate exposure between the preceding categories is permitted in a transition zone provided that it is determined by a rational analysis method defined in the recognized literature.

26.7.4 Exposure Requirements.

26.7.4.1 Directional Procedure (Chapter 27)

For each wind direction considered, wind loads for the design of the MWFRS of enclosed and partially enclosed buildings using the Directional Procedure of Chapter 27 shall be based on the exposures as defined in Section 26.7.3. Wind loads for the design of open buildings with monoslope, pitched, or troughed free roofs shall be based on the exposures, as defined in Section 26.7.3, resulting in the highest wind loads for any wind direction at the site.

26.7.4.2 Envelope Procedure (Chapter 28)

Wind loads for the design of the MWFRS for all low-rise buildings designed using the Envelope Procedure of Chapter 28 shall be based on the exposure category resulting in the highest wind loads for any wind direction at the site.

26.7.4.3 Directional Procedure for Building Appurtenances and Other Structures (Chapter 29)

Wind loads for the design of building appurtenances (such as rooftop structures and equipment) and other structures (such as solid freestanding walls and freestanding signs, chimneys, tanks, open signs, lattice frameworks, and trussed towers) as specified in Chapter 29 shall be based on the appropriate exposure for each wind direction considered.

26.7.4.4 Components and Cladding (Chapter 30)

Design wind pressures for components and cladding shall be based on the exposure category resulting in the highest wind loads for any wind direction at the site.

26.8 TOPOGRAPHIC EFFECTS

26.8.1 Wind Speed-Up over Hills, Ridges, and Escarpments

Wind speed-up effects at isolated hills, ridges, and escarpments constituting abrupt changes in the general topography, located in any exposure category, shall be included in the design when buildings and other site conditions and locations of structures meet all of the following conditions:

1. The hill, ridge, or escarpment is isolated and unobstructed upwind by other similar topographic features of comparable height for 100 times the height of the topographic feature ($100H$) or 2 mi (3.22 km), whichever is less. This distance shall be measured horizontally from the point at which the height H of the hill, ridge, or escarpment is determined.
2. The hill, ridge, or escarpment protrudes above the height of upwind terrain features within a 2-mi (3.22-km) radius in any quadrant by a factor of two or more.
3. The structure is located as shown in Fig. 26.8-1 in the upper one-half of a hill or ridge or near the crest of an escarpment.

Table 1.5-1 Risk Category of Buildings and Other Structures for Flood, Wind, Snow, Earthquake, and Ice Loads

Use or Occupancy of Buildings and Structures	Risk Category
Buildings and other structures that represent a low risk to human life in the event of failure	I
All buildings and other structures except those listed in Risk Categories I, III, and IV	II
Buildings and other structures, the failure of which could pose a substantial risk to human life.	III
Buildings and other structures, not included in Risk Category IV, with potential to cause a substantial economic impact and/or mass disruption of day-to-day civilian life in the event of failure.	
Buildings and other structures not included in Risk Category IV (including, but not limited to, facilities that manufacture, process, handle, store, use, or dispose of such substances as hazardous fuels, hazardous chemicals, hazardous waste, or explosives) containing toxic or explosive substances where their quantity exceeds a threshold quantity established by the authority having jurisdiction and is sufficient to pose a threat to the public if released.	
Buildings and other structures designated as essential facilities.	IV
Buildings and other structures, the failure of which could pose a substantial hazard to the community.	
Buildings and other structures (including, but not limited to, facilities that manufacture, process, handle, store, use, or dispose of such substances as hazardous fuels, hazardous chemicals, or hazardous waste) containing sufficient quantities of highly toxic substances where the quantity exceeds a threshold quantity established by the authority having jurisdiction to be dangerous to the public if released and is sufficient to pose a threat to the public if released.*	
Buildings and other structures required to maintain the functionality of other Risk Category IV structures.	

*Buildings and other structures containing toxic, highly toxic, or explosive substances shall be eligible for classification to a lower Risk Category if it can be demonstrated to the satisfaction of the authority having jurisdiction by a hazard assessment as described in Section 1.5.2 that a release of the substances is commensurate with the risk associated with that Risk Category.

exceed the member design strength (also called "load and resistance factor design").

TEMPORARY FACILITIES: Buildings or other structures that are to be in service for a limited time and have a limited exposure period for environmental loadings.

TOXIC SUBSTANCE: As defined in 29 CFR 1910.1200 Appendix A with Amendments as of February 1, 2000.

1.1.2 Symbols and Notations

F_x A minimum design lateral force applied to level x of the structure and used for purposes of evaluating structural integrity in accordance with Section 1.4.2.

W_x The portion of the total dead load of the structure, D, located or assigned to Level x.

D Dead load.

L Live load.

L_r Roof live load.

N Notional load used to evaluate conformance with minimum structural integrity criteria.

R Rain load.

S Snow load.

1.3 BASIC REQUIREMENTS

1.3.1 Strength and Stiffness

Buildings and other structures, and all parts thereof, shall be designed and constructed with adequate strength and stiffness to provide structural stability, protect nonstructural components and systems from unacceptable damage, and meet the serviceability requirements of Section 1.3.2.

Acceptable strength shall be demonstrated using one or more of the following procedures:

a. the Strength Procedures of Section 1.3.1.1,
b. the Allowable Stress Procedures of Section 1.3.1.2, or
c. subject to the approval of the authority having jurisdiction for individual projects, the Performance-Based Procedures of Section 1.3.1.3.

for each beam, girder, or truss either directly to its supporting elements or to slabs designed to act as diaphragms. Where the connection is through a diaphragm, the member's supporting element shall also be connected to the diaphragm. The connection shall have the strength to resist a force of 5 percent of the unfactored dead load plus live load reaction imposed by the supported member on the supporting member.

1.4.5 Anchorage of Structural Walls

Walls that provide vertical load bearing or lateral shear resistance for a portion of the structure shall be anchored to the roof and all floors and members that provide lateral support for the wall or that are supported by the wall. The anchorage shall provide a direct connection between the walls and the roof or floor construction. The connections shall be capable of resisting a strength level horizontal force perpendicular to the plane of the wall equal to 0.2 times the weight of the wall tributary to the connection, but not less than 5 psf (0.24 kN/m^2).

1.4.6 Extraordinary Loads and Events

When considered, design for resistance to extraordinary loads and events shall be in accordance with the procedures of Section 2.5.

1.5 CLASSIFICATION OF BUILDINGS AND OTHER STRUCTURES

1.5.1 Risk Categorization

Buildings and other structures shall be classified, based on the risk to human life, health, and welfare associated with their damage or failure by nature of their occupancy or use, according to Table 1.5-1 for the purposes of applying flood, wind, snow, earthquake, and ice provisions. Each building or other structure shall be assigned to the highest applicable risk category or categories. Minimum design loads for structures shall incorporate the applicable importance factors given in Table 1.5-2, as required by other sections of this Standard. Assignment of a building or other structure to multiple risk categories based on the type of load condition being evaluated (e.g., snow or seismic) shall be permitted.

When the building code or other referenced standard specifies an Occupancy Category, the Risk Category shall not be taken as lower than the Occupancy Category specified therein.

1.5.2 Multiple Risk Categories

Where buildings or other structures are divided into portions with independent structural systems, the classification for each portion shall be permitted to be determined independently. Where building systems, such as required egress, HVAC, or electrical power, for a portion with a higher risk category pass through or depend on other portions of the building or other structure having a lower risk category, those portions shall be assigned to the higher risk category.

1.5.3 Toxic, Highly Toxic, and Explosive Substances

Buildings and other structures containing toxic, highly toxic, or explosive substances are permitted to be classified as Risk Category II structures if it can be demonstrated to the satisfaction of the authority having jurisdiction by a hazard assessment as part of an overall risk management plan (RMP) that a release of the toxic, highly toxic, or explosive substances is not sufficient to pose a threat to the public.

To qualify for this reduced classification, the owner or operator of the buildings or other structures

Table 1.5-2 Importance Factors by Risk Category of Buildings and Other Structures for Snow, Ice, and Earthquake Loads[a]

Risk Category from Table 1.5-1	Snow Importance Factor, I_s	Ice Importance Factor—Thickness, I_i	Ice Importance Factor—Wind, I_w	Seismic Importance Factor, I_e
I	0.80	0.80	1.00	1.00
→ II	1.00	1.00	1.00	1.00
III	1.10	1.25	1.00	1.25
IV	1.20	1.25	1.00	1.50

[a]The component importance factor, I_p, applicable to earthquake loads, is not included in this table because it is dependent on the importance of the individual component rather than that of the building as a whole, or its occupancy. Refer to Section 13.1.3.

4. $H/L_h \geq 0.2$.
5. H is greater than or equal to 15 ft (4.5 m) for Exposure C and D and 60 ft (18 m) for Exposure B.

26.8.2 Topographic Factor

The wind speed-up effect shall be included in the calculation of design wind loads by using the factor K_{zt}:

$$K_{zt} = (1 + K_1K_2K_3)^2 \qquad (26.8\text{-}1)$$

where K_1, K_2, and K_3 are given in Fig. 26.8-1.

If site conditions and locations of structures do not meet all the conditions specified in Section 26.8.1 then $K_{zt} = 1.0$.

26.9 GUST-EFFECTS

26.9.1 Gust-Effect Factor: The gust-effect factor for a rigid building or other structure is permitted to be taken as 0.85.

26.9.2 Frequency Determination

To determine whether a building or structure is rigid or flexible as defined in Section 26.2, the fundamental natural frequency, n_1, shall be established using the structural properties and deformational characteristics of the resisting elements in a properly substantiated analysis. Low-Rise Buildings, as defined in 26.2, are permitted to be considered rigid.

26.9.2.1 Limitations for Approximate Natural Frequency

As an alternative to performing an analysis to determine n_1, the approximate building natural frequency, n_a, shall be permitted to be calculated in accordance with Section 26.9.3 for structural steel, concrete, or masonry buildings meeting the following requirements:

1. The building height is less than or equal to 300 ft (91 m), and
2. The building height is less than 4 times its effective length, L_{eff}.

The effective length, L_{eff}, in the direction under consideration shall be determined from the following equation:

$$L_{eff} = \frac{\sum_{i=1}^{n} h_i L_i}{\sum_{i=1}^{n} h_i} \qquad (26.9\text{-}1)$$

The summations are over the height of the building where

h_i is the height above grade of level i
L_i is the building length at level i parallel to the wind direction

26.9.3 Approximate Natural Frequency

The approximate lower-bound natural frequency (n_a), in Hertz, of concrete or structural steel buildings meeting the conditions of Section 26.9.2.1, is permitted to be determined from one of the following equations:

For structural steel moment-resisting-frame buildings:

$$n_a = 22.2/h^{0.8} \qquad (26.9\text{-}2)$$

For concrete moment-resisting frame buildings:

$$n_a = 43.5/h^{0.9} \qquad (26.9\text{-}3)$$

For structural steel and concrete buildings with other lateral-force-resisting systems:

$$n_a = 75/h \qquad (26.9\text{-}4)$$

For concrete or masonry shear wall buildings, it is also permitted to use

$$n_a = 385(C_w)^{0.5}/h \qquad (26.9\text{-}5)$$

where

$$C_w = \frac{100}{A_B}\sum_{i=1}^{n}\left(\frac{h}{h_i}\right)^2 \frac{A_i}{\left[1+0.83\left(\frac{h_i}{D_i}\right)^2\right]}$$

where

h = mean roof height (ft)
n = number of shear walls in the building effective in resisting lateral forces in the direction under consideration
A_B = base area of the structure (ft^2)
A_i = horizontal cross-section area of shear wall "i" (ft^2)
D_i = length of shear wall "i" (ft)
h_i = height of shear wall "i" (ft)

26.9.4 Rigid Buildings or Other Structures

For rigid buildings or other structures as defined in Section 26.2, the gust-effect factor shall be taken as 0.85 or calculated by the formula:

$$G = 0.925\left(\frac{1+1.7g_v I_{\bar{z}} Q}{1+1.7g_v I_{\bar{z}}}\right) \qquad (26.9\text{-}6)$$

$$I_{\bar{z}} = c\left(\frac{33}{\bar{z}}\right)^{1/6} \qquad (26.9\text{-}7)$$

Velocity Pressure Exposure Coefficients, K_h and K_z

Table 30.3-1

Height above ground level, z		Exposure		
ft	(m)	B	C	D
0-15	(0-4.6)	0.70	0.85 ←	1.03
20	(6.1)	0.70	0.90	1.08
25	(7.6)	0.70	0.94	1.12
30	(9.1)	0.70	0.98	1.16
40	(12.2)	0.76	1.04	1.22
50	(15.2)	0.81	1.09	1.27
60	(18)	0.85	1.13	1.31
70	(21.3)	0.89	1.17	1.34
80	(24.4)	0.93	1.21	1.38
90	(27.4)	0.96	1.24	1.40
100	(30.5)	0.99	1.26	1.43
120	(36.6)	1.04	1.31	1.48
140	(42.7)	1.09	1.36	1.52
160	(48.8)	1.13	1.39	1.55
180	(54.9)	1.17	1.43	1.58
200	(61.0)	1.20	1.46	1.61
250	(76.2)	1.28	1.53	1.68
300	(91.4)	1.35	1.59	1.73
350	(106.7)	1.41	1.64	1.78
400	(121.9)	1.47	1.69	1.82
450	(137.2)	1.52	1.73	1.86
500	(152.4)	1.56	1.77	1.89

Notes:

1. The velocity pressure exposure coefficient K_z may be determined from the following formula:

   For 15 ft. $\le z \le z_g$ $\qquad$ For $z < 15$ ft.

   $K_z = 2.01\,(z/z_g)^{2/\alpha}$ $\qquad$ $K_z = 2.01\,(15/z_g)^{2/\alpha}$

   Note: z shall not be taken less than 30 feet in exposure B.

2. α and z_g are tabulated in Table 26.9.1.
3. Linear interpolation for intermediate values of height z is acceptable.
4. Exposure categories are defined in Section 26.7.

8

Wind Directionality Factor, K_d

Table 26.6-1

Structure Type	Directionality Factor K_d*
Buildings	
Main Wind Force Resisting System	0.85
Components and Cladding	0.85
Arched Roofs	0.85
Chimneys, Tanks, and Similar Structures	
Square	0.90
Hexagonal	0.95
Round	0.95
Solid Freestanding Walls and Solid Freestanding and Attached Signs	0.85
Open Signs and Lattice Framework	0.85
Trussed Towers	
Triangular, square, rectangular	0.85
All other cross sections	0.95

*Directionality Factor K_d has been calibrated with combinations of loads specified in Chapter 2. This factor shall only be applied when used in conjunction with load combinations specified in Sections 2.3 and 2.4.

– Gust Effect Factor (Section 26.9)
– Enclosure classification (Section 26.10)
– Internal pressure coefficient (GC_{pi}) (Section 26.11).

30.2.2 Minimum Design Wind Pressures

The design wind pressure for components and cladding of buildings shall not be less than a net pressure of 16 lb/ft^2 (0.77 kN/m^2) acting in either direction normal to the surface.

30.2.3 Tributary Areas Greater than 700 ft^2 (65 m^2)

Component and cladding elements with tributary areas greater than 700 ft^2 (65 m^2) shall be permitted to be designed using the provisions for MWFRS.

30.2.4 External Pressure Coefficients

Combined gust effect factor and external pressure coefficients for components and cladding, (GC_p), are given in the figures associated with this chapter. The pressure coefficient values and gust effect factor shall not be separated.

30.3 VELOCITY PRESSURE

30.3.1 Velocity Pressure Exposure Coefficient

Based on the exposure category determined in Section 26.7.3, a velocity pressure exposure coefficient K_z or K_h, as applicable, shall be determined from Table 30.3-1. For a site located in a transition zone between exposure categories, that is, near to a change in ground surface roughness, intermediate values of K_z or K_h, between those shown in Table 30.3-1, are permitted, provided that they are determined by a rational analysis method defined in the recognized literature.

30.3.2 Velocity Pressure

Velocity pressure, q_z, evaluated at height z shall be calculated by the following equation:

$$q_z = 0.00256\ K_z K_{zt} K_d V^2\ (\text{lb/ft}^2) \qquad (30.3\text{-}1)$$

[In SI: $q_z = 0.613\ K_z K_{zt} K_d V^2$ (N/m^2); V in m/s]

where

K_d = wind directionality factor defined in Section 26.6
K_z = velocity pressure exposure coefficient defined in Section 30.3.1
K_{zt} = topographic factor defined in Section 26.8
V = basic wind speed from Section 26.5
q_h = velocity pressure calculated using Eq. 30.3-1 at height h

The numerical coefficient 0.00256 (0.613 in SI) shall be used except where sufficient climatic data are available to justify the selection of a different value of this factor for a design application.

PART 5: OPEN BUILDINGS

30.8 BUILDING TYPES

The provisions of Section 30.8 are applicable to an open building of all heights having a pitched free roof, monosloped free roof, or troughed free roof. The steps required for the determination of wind loads on components and cladding for these building types is shown in Table 30.8-1.

30.8.1 Conditions

For the determination of the design wind pressures on components and claddings using the provisions of Section 30.8.2, the conditions indicated on the selected figure(s) shall be applicable to the building under consideration.

30.8.2 Design Wind Pressures

The net design wind pressure for component and cladding elements of open buildings of all heights with monoslope, pitched, and troughed roofs shall be determined by the following equation:

$$p = q_h G C_N \qquad (30.8\text{-}1)$$

where

q_h = velocity pressure evaluated at mean roof height h using the exposure as defined in Section 26.7.3 that results in the highest wind loads for any wind direction at the site

G = gust-effect factor from Section 26.9

C_N = net pressure coefficient given in:
- Fig. 30.8-1 for monosloped roof
- Fig. 30.8-2 for pitched roof
- Fig. 30.8-3 for troughed roof

Net pressure coefficients C_N include contributions from top and bottom surfaces. All load cases shown for each roof angle shall be investigated. Plus and minus signs signify pressure acting toward and away from the top surface of the roof, respectively.

User Note: Use Part 5 of Chapter 30 for determining wind pressures for C&C of *open buildings* having pitched, monoslope or troughed roofs. These provisions are based on the Directional Procedure with *wind pressures calculated from the specified equation* applicable to each roof surface.

Table 30.8-1 Steps to Determine C&C Wind Loads Open Buildings

Step 1: Determine risk category, see Table 1.5-1

Step 2: Determine the basic wind speed, V, for applicable risk category, see Figure 26.5-1A, B or C

Step 3: Determine wind load parameters:
- Wind directionality factor, K_d, see Section 26.6 and Table 26.6-1
- Exposure category B, C or D, see Section 26.7
- Topographic factor, K_{zt}, see Section 26.8 and Figure 26.8-1
- Gust effect factor, G, see Section 26.9

Step 4: Determine velocity pressure exposure coefficient, K_z or K_h, see Table 30.3-1

Step 5: Determine velocity pressure, q_h, Eq. 30.3-1

Step 6: Determine net pressure coefficients, C_N
- Monosloped roof, see Fig. 30.8-1
- Pitched roof, see Fig. 30.8-2
- Troughed roof, see Fig. 30.8-3

Step 7: Calculate wind pressure, p, Eq. 30.8-1

4. $H/L_h \geq 0.2$.
5. H is greater than or equal to 15 ft (4.5 m) for Exposure C and D and 60 ft (18 m) for Exposure B.

26.8.2 Topographic Factor

The wind speed-up effect shall be included in the calculation of design wind loads by using the factor K_{zt}:

$$K_{zt} = (1 + K_1K_2K_3)^2 \qquad (26.8\text{-}1)$$

where K_1, K_2, and K_3 are given in Fig. 26.8-1.

If site conditions and locations of structures do not meet all the conditions specified in Section 26.8.1 then $K_{zt} = 1.0$.

26.9 GUST-EFFECTS

26.9.1 Gust-Effect Factor: The gust-effect factor for a rigid building or other structure is permitted to be taken as 0.85.

26.9.2 Frequency Determination

To determine whether a building or structure is rigid or flexible as defined in Section 26.2, the fundamental natural frequency, n_1, shall be established using the structural properties and deformational characteristics of the resisting elements in a properly substantiated analysis. Low-Rise Buildings, as defined in 26.2, are permitted to be considered rigid.

26.9.2.1 Limitations for Approximate Natural Frequency

As an alternative to performing an analysis to determine n_1, the approximate building natural frequency, n_a, shall be permitted to be calculated in accordance with Section 26.9.3 for structural steel, concrete, or masonry buildings meeting the following requirements:

1. The building height is less than or equal to 300 ft (91 m), and
2. The building height is less than 4 times its effective length, L_{eff}.

The effective length, L_{eff}, in the direction under consideration shall be determined from the following equation:

$$L_{eff} = \frac{\sum_{i=1}^{r} h_i L_i}{\sum_{i=1}^{n} h_i} \qquad (26.9\text{-}1)$$

The summations are over the height of the building where

h_i is the height above grade of level i
L_i is the building length at level i parallel to the wind direction

26.9.3 Approximate Natural Frequency

The approximate lower-bound natural frequency (n_a), in Hertz, of concrete or structural steel buildings meeting the conditions of Section 26.9.2.1, is permitted to be determined from one of the following equations:

For structural steel moment-resisting-frame buildings:

$$n_a = 22.2/h^{0.8} \qquad (26.9\text{-}2)$$

For concrete moment-resisting frame buildings:

$$n_a = 43.5/h^{0.9} \qquad (26.9\text{-}3)$$

For structural steel and concrete buildings with other lateral-force-resisting systems:

$$n_a = 75/h \qquad (26.9\text{-}4)$$

For concrete or masonry shear wall buildings, it is also permitted to use

$$n_a = 385(C_w)^{0.5}/h \qquad (26.9\text{-}5)$$

where

$$C_w = \frac{100}{A_B}\sum_{i=1}^{n}\left(\frac{h}{h_i}\right)^2 \frac{A_i}{\left[1 + 0.83\left(\frac{h_i}{D_i}\right)^2\right]}$$

where

h = mean roof height (ft)
n = number of shear walls in the building effective in resisting lateral forces in the direction under consideration
A_B = base area of the structure (ft^2)
A_i = horizontal cross-section area of shear wall "i" (ft^2)
D_i = length of shear wall "i" (ft)
h_i = height of shear wall "i" (ft)

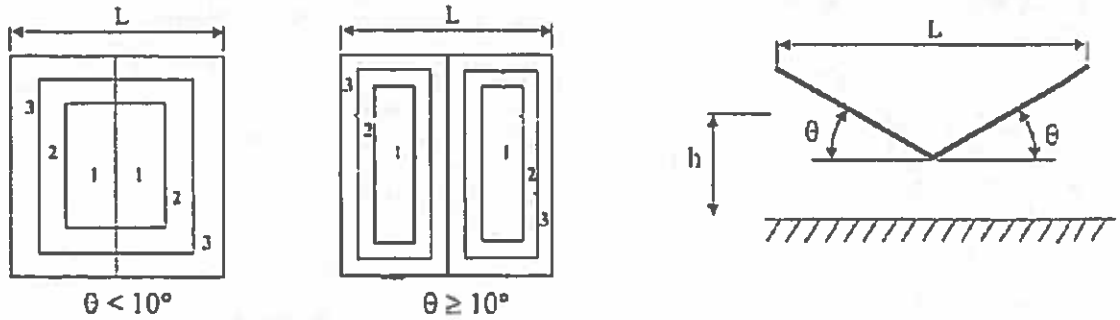
26.9.4 Rigid Buildings or Other Structures

For rigid buildings or other structures as defined in Section 26.2, the gust-effect factor shall be taken as 0.85 or calculated by the formula:

$$G = 0.925\left(\frac{1 + 1.7g_Q I_{\bar{z}} Q}{1 - 1.7g_v I_{\bar{z}}}\right) \qquad (26.9\text{-}6)$$

$$I_{\bar{z}} = c\left(\frac{33}{\bar{z}}\right)^{1/6} \qquad (26.9\text{-}7)$$

Components and Cladding		$0.25 \le h/L \le 1.0$
Figure 30.8-3	Net Pressure Coefficient, C_N	**Troughed Free Roofs**
Open Buildings		$\theta \le 45°$



Roof Angle θ	Effective Wind Area	C_N											
		Clear Wind Flow						Obstructed Wind Flow					
		Zone 3		Zone 2		Zone 1		Zone 3		Zone 2		Zone 1	
0°	$\le a^2$	2.4	-3.3	1.8	-1.7	1.2	-1.1	1	-3.6	0.8	-1.8	0.5	-1.2
	$> a^2, \le 4.0a^2$	1.8	-1.7	1.8	-1.7	1.2	-1.1	0.8	-1.8	0.8	-1.8	0.5	-1.2
	$> 4.0a^2$	1.2	-1.1	1.2	-1.1	1.2	-1.1	0.5	-1.2	0.5	-1.2	0.5	-1.2
7.5°	$\le a^2$	2.4	-3.3	1.8	-1.7	1.2	-1.1	1	-4.6	0.8	-2.4	0.5	-1.6
	$> a^2, \le 4.0a^2$	1.8	-1.7	1.8	-1.7	1.2	-1.1	0.8	-2.4	0.8	-2.4	0.5	-1.6
	$> 4.0a^2$	1.2	-1.1	1.2	-1.1	1.2	-1.1	0.5	-1.6	0.5	-1.6	0.5	-1.6
15°	$\le a^2$	2.2	-2.2	1.7	-1.7	1.1	-1.1	1	-2.4	0.8	-1.8	0.5	-1.2
	$> a^2, \le 4.0a^2$	1.7	-1.7	1.7	-1.7	1.1	-1.1	0.8	-1.8	0.8	-1.8	0.5	-1.2
	$> 4.0a^2$	1.1	-1.1	1.1	-1.1	1.1	-1.1	0.5	-1.2	0.5	-1.2	0.5	-1.2
30°	$\le a^2$	1.8	-2.6	1.4	-2	0.9	-1.3	1	-2.8	0.8	-2.1	0.5	-1.4
	$> a^2, \le 4.0a^2$	1.4	-2	1.4	-2	0.9	-1.3	0.8	-2.1	0.8	-2.1	0.5	-1.4
	$> 4.0a^2$	0.9	-1.3	0.9	-1.3	0.9	-1.3	0.5	-1.4	0.5	-1.4	0.5	-1.4
45°	$\le a^2$	1.6	-2.2	1.2	-1.7	0.8	-1.1	1	-2.4	0.8	-1.8	0.5	-1.2
	$> a^2, \le 4.0a^2$	1.2	-1.7	1.2	-1.7	0.8	-1.1	0.8	-1.8	0.8	-1.8	0.5	-1.2
	$> 4.0a^2$	0.8	-1.1	0.8	-1.1	0.8	-1.1	0.5	-1.2	0.5	-1.2	0.5	-1.2

Notes:

1. C_N denotes net pressures (contributions from top and bottom surfaces).
2. Clear wind flow denotes relatively unobstructed wind flow with blockage less than or equal to 50%. Obstructed wind flow denotes objects below roof inhibiting wind flow (>50% blockage).
3. For values of θ other than those shown, linear interpolation is permitted.
4. Plus and minus signs signify pressures acting towards and away from the top roof surface, respectively.
5. Components and cladding elements shall be designed for positive and negative pressure coefficients shown.
6. Notation:
   - a : 10% of least horizontal dimension or 0.4h, whichever is smaller but not less than 4% of least horizontal dimension or 3 ft. (0.9 m). Dimension "a" is as shown in Fig. 30.8-1
   - h : mean roof height, ft. (m)
   - L : horizontal dimension of building, measured in along wind direction, ft. (m)
   - θ : angle of plane of roof from horizontal, degrees

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1605.2 Load combinations using strength design or load and resistance factor design. Where strength design or load and resistance factor design is used, buildings and other structures, and portions thereof, shall be designed to resist the most critical effects resulting from the following combinations of factored loads:

$1.4(D+F)$ **(Equation 16-1)**

$1.2(D+F)+1.6(L+H)+0.5(L_r \text{ or } S \text{ or } R)$ **(Equation 16-2)**

$1.2(D+F)+1.6(L_r \text{ or } S \text{ or } R)+1.6H+(f_1L \text{ or } 0.5W)$ **(Equation 16-3)**

$1.2(D+F)+1.0W+f_1L+1.6H+0.5(L_r \text{ or } S \text{ or } R)$ **(Equation 16-4)**

$1.2(D+F)+1.0E+f_1L+1.6H+f_2S$ **(Equation 16-5)**

$0.9D+1.0W+1.6H$ **(Equation 16-6)**

$0.9(D+F)+1.0E+1.6H$ **(Equation 16-7)**

where:

f_1 = 1 for places of public assembly live loads in excess of 100 pounds per square foot (4.79 kN/m²), and parking garages; and 0.5 for other live loads.

f_2 = 0.7 for roof configurations (such as saw tooth) that do not shed snow off the structure, and 0.2 for other roof configurations.

Exceptions:

1. Where other factored load combinations are specifically required by other provisions of this code, such combinations shall take precedence.
2. Where the effect of H resists the primary variable load effect, a load factor of 0.9 shall be included with H where H is permanent and H shall be set to zero for all other conditions.

1605.2.1 Other loads. Where flood loads, F_a, are to be considered in the design, the load combinations of Section 2.3.3 of ASCE 7 shall be used. Where self-straining loads, T, are considered in design, their structural effects in combination with other loads shall be determined in accordance with Section 2.3.5 of ASCE 7. Where an ice-sensitive structure is subjected to loads due to atmospheric icing, the load combinations of Section 2.3.4 of ASCE 7 shall be considered.

1605.3 Load combinations using allowable stress design.

1605.3.1 Basic load combinations. Where *allowable stress design* (working stress design), as permitted by this code, is used, structures and portions thereof shall resist the most critical effects resulting from the following combinations of loads:

$D+F$ **(Equation 16-8)**

$D+H+F+L$ **(Equation 16-9)**

1- $D+H+F+(L_r \text{ or } S \text{ or } R)$ **(Equation 16-10)**

$D+H+F+0.75(L)+0.75(L_r \text{ or } S \text{ or } R)$ **(Equation 16-11)**

$D+H+F+(0.6W \text{ or } 0.7E)$ **(Equation 16-12)**

2- $D+H+F+0.75(0.6W)+0.75L+0.75(L_r \text{ or } S \text{ or } R)$ **(Equation 16-13)**

$D+H+F+0.75(0.7E)+0.75L+0.75S$ **(Equation 16-14)**

3- $0.6D+0.6W+H$ **(Equation 16-15)**

$0.6(D+F)+0.7E+H$ **(Equation 16-16)**

Exceptions:

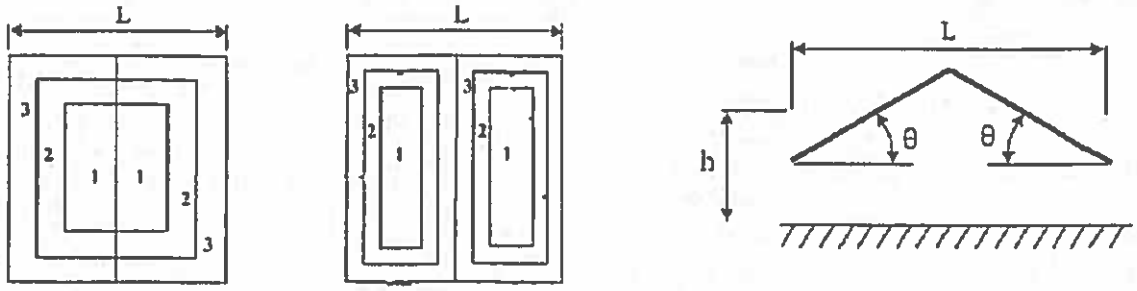
1. Crane hook loads need not be combined with roof live load or with more than three-fourths of the snow load or one-half of the wind load.
2. Flat roof snow loads of 30 psf (1.44 kN/m²) or less and roof live loads of 30 psf (1.44 kN/m²) or less need not be combined with seismic loads. Where flat roof snow loads exceed 30 psf (1.44 kN/m²), 20 percent shall be combined with seismic loads.
3. Where the effect of H resists the primary variable load effect, a load factor of 0.6 shall be included with H where H is permanent and H shall be set to zero for all other conditions.
4. In Equation 16-15, the wind load, W, is permitted to be reduced in accordance with Exception 2 of Section 2.4.1 of ASCE 7.
5. In Equation 16-16, 0.6 D is permitted to be increased to 0.9 D for the design of special reinforced masonry shear walls complying with Chapter 21.

1605.3.1.1 Stress increases. Increases in allowable stresses specified in the appropriate material chapter or the referenced standards shall not be used with the load combinations of Section 1605.3.1, except that increases shall be permitted in accordance with Chapter 23.

1605.3.1.2 Other loads. Where flood loads, F_a, are to be considered in design, the load combinations of Section 2.4.2 of ASCE 7 shall be used. Where self-straining loads, T, are considered in design, their structural effects in combination with other loads shall be determined in accordance with Section 2.4.4 of ASCE 7. Where an ice-sensitive structure is subjected to loads due to atmospheric icing, the load combinations of Section 2.4.3 of ASCE 7 shall be considered.

1605.3.2 Alternative basic load combinations. In lieu of the basic load combinations specified in Section 1605.3.1, structures and portions thereof shall be permitted to be designed for the most critical effects resulting from the following combinations. When using these alternative basic load combinations that include wind or seismic loads, allowable stresses are permitted to be increased or load combinations reduced where permitted by the material chapter of this code or the referenced standards. For load combinations that include the counteracting effects of dead and wind loads, only two-thirds of the minimum dead load likely to be in place during a design wind event shall be used. When using allowable stresses which have been increased or load combinations which have been reduced as permitted by the material chapter of this code

Components and Cladding		$0.25 \le h/L \le 1.0$
Figure 30.8-2	Net Pressure Coefficient, C_N	**Pitched Free Roofs**
Open Buildings		$\theta \le 45°$



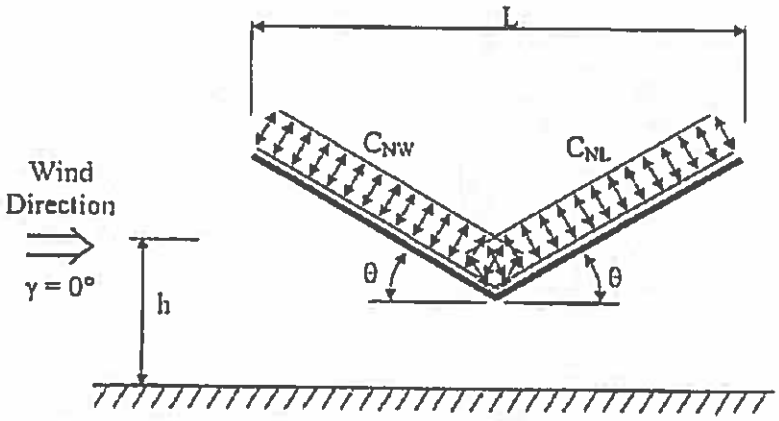
$\theta < 10°$ $\theta \ge 10°$

Roof Angle θ	Effective Wind Area	C_N											
		Clear Wind Flow						Obstructed Wind Flow					
		Zone 3		Zone 2		Zone 1		Zone 3		Zone 2		Zone 1	
0°	$\le a^2$	2.4	-3.3	1.8	-1.7	1.2	-1.1	1	-3.6	0.8	-1.8	0.5	-1.2
	$> a^2, \le 4.0a^2$	1.8	-1.7	1.8	-1.7	1.2	-1.1	0.8	-1.8	0.8	-1.8	0.5	-1.2
	$> 4.0a^2$	1.2	-1.1	1.2	-1.1	1.2	-1.1	0.5	-1.2	0.5	-1.2	0.5	-1.2
7.5°	$\le a^2$	2.2	-3.6	1.7	-1.8	1.1	-1.2	1	-5.1	0.8	-2.6	0.5	-1.7
	$> a^2, \le 4.0a^2$	1.7	-1.8	1.7	-1.8	1.1	-1.2	0.8	-2.6	0.8	-2.6	0.5	-1.7
	$> 4.0a^2$	1.1	-1.2	1.1	-1.2	1.1	-1.2	0.5	-1.7	0.5	-1.7	0.5	-1.7
15°	$\le a^2$	2.2	-2.2	1.7	-1.7	1.1	-1.1	1	-3.2	0.8	-2.4	0.5	-1.6
	$> a^2, \le 4.0a^2$	1.7	-1.7	1.7	-1.7	1.1	-1.1	0.8	-2.4	0.8	-2.4	0.5	-1.6
	$> 4.0a^2$	1.1	-1.1	1.1	-1.1	1.1	-1.1	0.5	-1.6	0.5	-1.6	0.5	-1.6
30°	$\le a^2$	2.4	-1.8	2	-1.4	1.3	-0.9	1	-2.4	0.8	-1.8	0.5	-1.2
	$> a^2, \le 4.0a^2$	2	-1.4	2	-1.4	1.3	-0.9	0.8	-1.8	0.8	-1.8	0.5	-1.2
	$> 4.0a^2$	1.3	-0.9	1.3	-0.9	1.3	-0.9	0.5	-1.2	0.5	-1.2	0.5	-1.2
45°	$\le a^2$	2.2	-1.6	1.7	-1.2	1.1	-0.8	1	-2.4	0.8	-1.8	0.5	-1.2
	$> a^2, \le 4.0a^2$	1.7	-1.2	1.7	-1.2	1.1	-0.8	0.8	-1.8	0.8	-1.8	0.5	-1.2
	$> 4.0a^2$	1.1	-0.8	1.1	-0.8	1.1	-0.8	0.5	-1.2	0.5	-1.2	0.5	-1.2

Notes:

1. C_N denotes net pressures (contributions from top and bottom surfaces).
2. Clear wind flow denotes relatively unobstructed wind flow with blockage less than or equal to 50%. Obstructed wind flow denotes objects below roof inhibiting wind flow (>50% blockage).
3. For values of θ other than those shown, linear interpolation is permitted.
4. Plus and minus signs signify pressures acting towards and away from the top roof surface, respectively.
5. Components and cladding elements shall be designed for positive and negative pressure coefficients shown.
6. Notation:
   - a : 10% of least horizontal dimension or 0.4h, whichever is smaller but not less than 4% of least horizontal dimension or 3 ft. (0.9 m). Dimension "a" is as shown in Fig. 30.8-1.
   - h : mean roof height, ft. (m)
   - L : horizontal dimension of building, measured in along wind direction, ft. (m)
   - θ : angle of plane of roof from horizontal, degrees

Main Wind Force Resisting System		0.25 ≤ h/L ≤ 1.0
Figure 27.4-6	Net Pressure Coefficient, C_N	**Troughed Free Roofs**
Open Buildings		**θ ≤ 45°, γ = 0°, 180°**

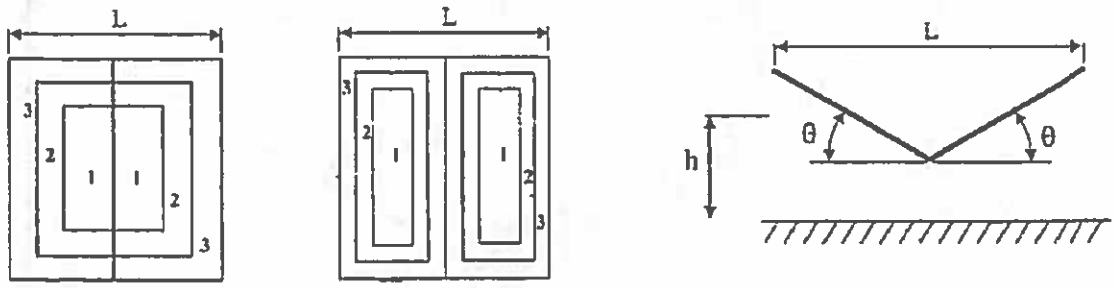


Roof Angle θ	Load Case	Wind Direction, γ = 0°, 180°			
		Clear Wind Flow		Obstructed Wind Flow	
		C_{NW}	C_{NL}	C_{NW}	C_{NL}
7.5°	A	-1.1	0.3	-1.6	-0.5
	B	-0.2	1.2	-0.9	-0.8
15°	A	-1.1	0.4	-1.2	-0.5
	B	0.1	1.1	-0.6	-0.8
22.5°	A	-1.1	-0.1	-1.2	-0.6
	B	-0.1	0.8	-0.8	-0.8
30°	A	-1.3	-0.3	-1.4	-0.4
	B	-0.1	0.9	-0.2	-0.5
37.5°	A	-1.3	-0.6	-1.4	-0.3
	B	0.2	0.6	-0.3	-0.4
45°	A	-1.1	-0.9	-1.2	-0.3
	B	0.3	0.5	-0.3	-0.4

Notes:

1. C_{NW} and C_{NL} denote net pressures (contributions from top and bottom surfaces) for windward and leeward half of roof surfaces, respectively.
2. Clear wind flow denotes relatively unobstructed wind flow with blockage less than or equal to 50%. Obstructed wind flow denotes objects below roof inhibiting wind flow (>50% blockage).
3. For values of θ between 7.5° and 45°, linear interpolation is permitted. For values of θ less than 7.5°, use monoslope roof load coefficients.
4. Plus and minus signs signify pressures acting towards and away from the top roof surface, respectively.
5. All load cases shown for each roof angle shall be investigated.
6. Notation:
   - L : horizontal dimension of roof, measured in the along wind direction, ft. (m)
   - h : mean roof height, ft. (m)
   - γ : direction of wind, degrees
   - θ : angle of plane of roof from horizontal, degrees

Components and Cladding		0.25 ≤ h/L ≤ 1.0
Figure 30.8-3	Net Pressure Coefficient, C_N	**Troughed Free Roofs**
Open Buildings		**θ ≤ 45°**



θ < 10° θ ≥ 10°

Roof Angle θ	Effective Wind Area	C_N											
		Clear Wind Flow						Obstructed Wind Flow					
		Zone 3		Zone 2		Zone 1		Zone 3		Zone 2		Zone 1	
0°	$\le a^2$	2.3	-3.3	1.8	-1.7	1.2	-1.1	1	-3.6	0.8	-1.8	0.5	-1.2
	$> a^2, \le 4.0a^2$	1.8	-1.7	1.8	-1.7	1.2	-1.1	0.8	-1.8	0.8	-1.8	0.5	-1.2
	$> 4.0a^2$	1.2	-1.1	1.2	-1.1	1.2	-1.1	0.5	-1.2	0.5	-1.2	0.5	-1.2
7.5°	$\le a^2$	2.3	-3.3	1.8	-1.7	1.2	-1.1	1	-4.8	0.8	-2.4	0.5	-1.6
	$> a^2, \le 4.0a^2$	1.8	-1.7	1.8	-1.7	1.2	-1.1	0.8	-2.4	0.8	-2.4	0.5	-1.6
	$> 4.0a^2$	1.2	-1.1	1.2	-1.1	1.2	-1.1	0.5	-1.6	0.5	-1.6	0.5	-1.6
15°	$\le a^2$	2.2	-2.2	1.7	-1.7	1.1	-1.1	1	-2.4	0.8	-1.8	0.5	-1.2
	$> a^2, \le 4.0a^2$	1.7	-1.7	1.7	-1.7	1.1	-1.1	0.8	-1.8	0.8	-1.8	0.5	-1.2
	$> 4.0a^2$	1.1	-1.1	1.1	-1.1	1.1	-1.1	0.5	-1.2	0.5	-1.2	0.5	-1.2
30°	$\le a^2$	1.9	-2.0	1.4	-2	0.9	-1.3	1	-2.8	0.8	-2.1	0.5	-1.4
	$> a^2, \le 4.0a^2$	1.4	-2	1.4	-2	0.9	-1.3	0.8	-2.1	0.8	-2.1	0.5	-1.4
	$> 4.0a^2$	0.9	-1.3	0.9	-1.3	0.9	-1.3	0.5	-1.4	0.5	-1.4	0.5	-1.4
45°	$\le a^2$	1.6	-2.2	1.2	-1.7	0.8	-1.1	1	-2.4	0.8	-1.8	0.5	-1.2
	$> a^2, \le 4.0a^2$	1.2	-1.7	1.2	-1.7	0.8	-1.1	0.8	-1.8	0.8	-1.8	0.5	-1.2
	$> 4.0a^2$	0.8	-1.1	0.8	-1.1	0.8	-1.1	0.5	-1.2	0.5	-1.2	0.5	-1.2

Notes.

1. C_N denotes net pressures (contributions from top and bottom surfaces)
2. Clear wind flow denotes relatively unobstructed wind flow with blockage less than or equal to 50%. Obstructed wind flow denotes objects below roof inhibiting wind flow (>50% blockage).
3. For values of θ other than those shown, linear interpolation is permitted.
4. Plus and minus signs signify pressures acting towards and away from the top roof surface, respectively.
5. Components and cladding elements shall be designed for positive and negative pressure coefficients shown.
6. Notation:
   - a : 10% of least horizontal dimension or 0.4h, whichever is smaller but not less than 4% of least horizontal dimension or 3 ft. (0.9 m). Dimension "a" is as shown in Fig. 30.8-1.
   - h : mean roof height, ft. (m)
   - L : horizontal dimension of building, measured in along wind direction, ft. (m)
   - θ : angle of plane of roof from horizontal, degrees

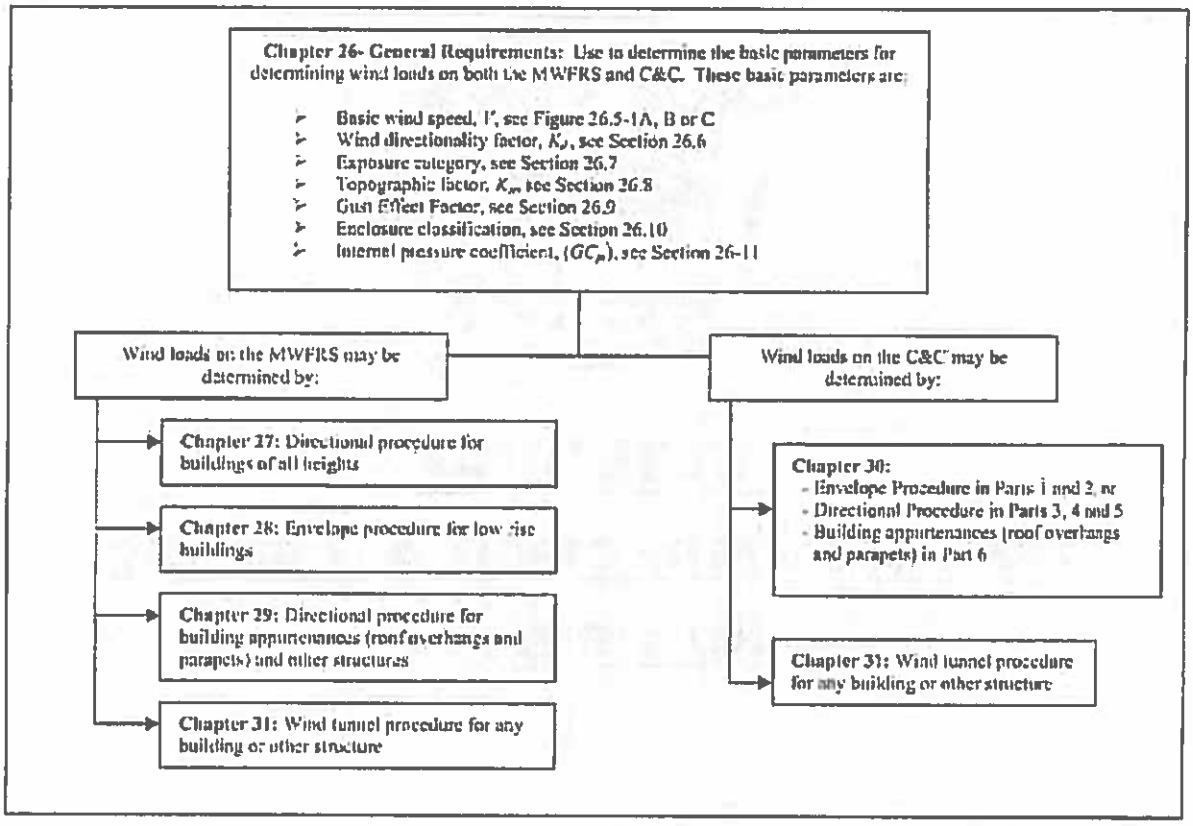


FIGURE 26.1-1 Outline of Process for Determining Wind Loads. Additional outlines and User Notes are provided at the beginning of each chapter for more detailed step-by-step procedures for determining the wind loads.

or 1 percent of the area of that wall, whichever is smaller, and the percentage of openings in the balance of the building envelope does not exceed 20 percent.

These conditions are expressed by the following equations:

1. $A_o > 1.10A_g$
2. $A_o > 4$ ft^2 (0.37 m^2) or $> 0.01A_g$, whichever is smaller, and $A_o/A_g \leq 0.20$

where

A_o, A_g are as defined for Open Building

A_{oi} = the sum of the areas of openings in the building envelope (walls and roof) not including A_o, in ft^2 (m^2)

A_{gi} = the sum of the gross surface areas of the building envelope (walls and roof) not including A_g, in ft^2 (m^2)

BUILDING OR OTHER STRUCTURE, REGULAR-SHAPED: A building or other structure having no unusual geometrical irregularity in spatial form.

BUILDING OR OTHER STRUCTURES, RIGID: A building or other structure whose fundamental frequency is greater than or equal to 1 Hz.

BUILDING, SIMPLE DIAPHRAGM: A building in which both windward and leeward wind loads are transmitted by roof and vertically spanning wall assemblies, through continuous floor and roof diaphragms, to the MWFRS.

BUILDING, TORSIONALLY REGULAR UNDER WIND LOAD: A building with the MWFRS about each principal axis proportioned so that the maximum displacement at each story under Case 2, the torsional wind load case, of Fig. 27.4-8, does not exceed the maximum displacement at the same location under Case 1 of Fig. 27.4-8, the basic wind load case.

BUILDING
Special Inspection & Testing Agreement

For

Town of Fountain Hills

Adero Canyon Trailhead Restroom Building

Prepared by
Orcutt Winslow
3003 North Central Avenue
Sixteenth Floor
Phoenix, Arizona 85012

Town of Fountain Hills
Building Safety Department
Special Inspection and Testing Agreement

Project name: Mc Dowell Mountain Preserve
Address: Adero Canyon Trailhead Bathrooms

Date:
Bldg. Permit #

SPECIAL INSPECTION REQUIREMENTS UNDER IBC CH. 17

Before a building permit may be issued, the owner, or owner's agent must submit two completed copies of this agreement, a resume' or other documentation of the special inspector(s) qualifications and certifications, and the attached special inspection and testing schedule for review and approval by the building official. The building official may require a personal interview with proposed special inspection personnel prior to their approval. A pre-construction conference may also be required to review the special inspection requirements and procedures.

DUTIES AND RESPONSIBILITIES OF THE SPECIAL INSPECTOR

In addition to the requirements prescribed under IBC Ch. 17, the following constitute the duties and responsibilities of the special inspector.

1. **Observe On-site Work** – The special inspector must observe the work for conformance with the design drawings and specifications approved and stamped by the building department. Unless specifically approved by the building official, the special inspector must provide continuous observation of all work under their charge. Periodic special inspections may be allowed by the building official upon receipt of a separate written plan submitted by the design professional in responsible charge.
2. **Report Nonconforming Items** – The special inspector must bring nonconforming items to the immediate attention of the contractor and note all such items in the daily report. If any item is not resolved in a timely manner or is about to be incorporated in the work, the special inspector shall immediately notify the building official, the design professional in responsible charge, and must post a discrepancy notice on site.
3. **Furnish Daily Reports** – Special inspectors must complete and sign both the special inspection record and the daily report form for each day's inspections. Daily reports and records must be retained at the job site for review by the building official.
4. **Furnish Weekly Reports** – The special inspector or inspection agency must furnish weekly reports of tests and inspections directly to the building official, design professional in responsible charge, and others as designated. These reports must include:
   a. Descriptions of daily inspections and tests made with applicable locations;
   b. A listing of all nonconforming items;
   c. Reports on how nonconforming items were resolved or unresolved as applicable; and
   d. Itemized changes authorized by the design professional in responsible charge and building department if not included in nonconformance items. *All changes must have the prior approval of the building official.*
5. **Furnish Final Report** – The special inspector or inspection agency must submit a final signed report to the building official stating that all items requiring special inspection and testing were inspected and to the best of his/her knowledge, are in conformance with the approved design drawings, specifications, approved change orders, and applicable workmanship standards of the Fountain Hills building code. Items not in conformance, unresolved items or any discrepancies in inspection coverage (i.e. missed inspections, unauthorized periodic inspections, etc.) shall be specifically itemized on this report.

CONTRACTOR RESPONSIBILITIES

In addition to the requirements prescribed under IBC Ch. 17, the following constitute the duties and responsibilities of the contractor.

1. **Special Inspector Notification** – The contractor is responsible for notifying the special inspector or agency regarding individual inspections for items listed on the attached schedule *and* as noted on the building department approved plan. Adequate notice must be provided so that special inspections can be scheduled and so that the special inspector has time to become familiar with the project.
2. **Provide Access to Approved Plans** – The contractor is responsible for providing the special inspector access to building department approved plans at the job site.
3. **Retain Special Inspection Records** – The contractor is responsible for retaining at the job site, all special inspection records submitted by the special inspector, and providing these records for review by the building official upon request.
4. **Correct Nonconformities** – The contractor is responsible for correcting all nonconformities to the satisfaction of the design professional in responsible charge and the building official.

BUILDING DEPARTMENT RESPONSIBILITIES

1. **Approve Special Inspections** – The building official must approve all special inspectors and special inspection requirements.
2. **Monitor Special Inspections** – Work requiring special inspection and the performance of special inspectors will be monitored by the building official. Building official approval, in addition to that of the special inspector, must be obtained prior to placement of concrete or the concealment of other work
3. **Issuance of Certificate of Occupancy** – The building official may issue a Certificate of Occupancy after all special inspection reports and the final report have been submitted and approved. *Occupancy prior to issuance of a Certificate of Occupancy is prohibited.*

OWNER RESPONSIBILITIES

The project owner or owner's agent must fully fund all special inspection services as required by the building official.

DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE RESPONSIBILITIES

The design professional in responsible charge shall include all special inspection requirements, including special inspections required under a products third party testing and/or listing, on the plans and specifications.

Registered Professional Engineer (Structural)
CERTIFICATE NO. 13964
RICHARD TURLEY
Date Signed 10-25-16
ARIZONA, U.S.A.
EXPIRES 09-30-19

ACKNOWLEDGEMENTS

I have read and agree to the terms and conditions of this agreement.

Owner:_____ By:_____ Date:_____

Contractor:_____ By:_____ Date:_____

Special Inspector/ Agency: Caruso Turley Scott By: Richard Turley Date: 10-25-16

APPROVED BY THE TOWN OF FOUNTAIN HILLS, DEVELOPMENT SERVICES

By:_____ Date:_____

Final Drainage Report
McDowell Mountain Preserve Adero Canyon Trailhead

Fountain Hills

Prepared for:

TOWN OF FOUNTAIN HILLS

Parks & Recreation Dept.
Fountain Hills Town Hall
16705 E. Avenue of the Fountains
Fountain Hills, AZ 85268
(480) 816-5252

REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO. 23170
JEFFREY J. HOLZMEISTER
Date Signed 3/13/17
ARIZONA, U.S.A.
Expires 03/31/18

Prepared by:

J2 Engineering and Environmental Design
4649 E. Cotton Gin Loop, Ste. B2
Phoenix, AZ 85040
(602) 438-2221

March, 2017
J2 Project No. 04.0039

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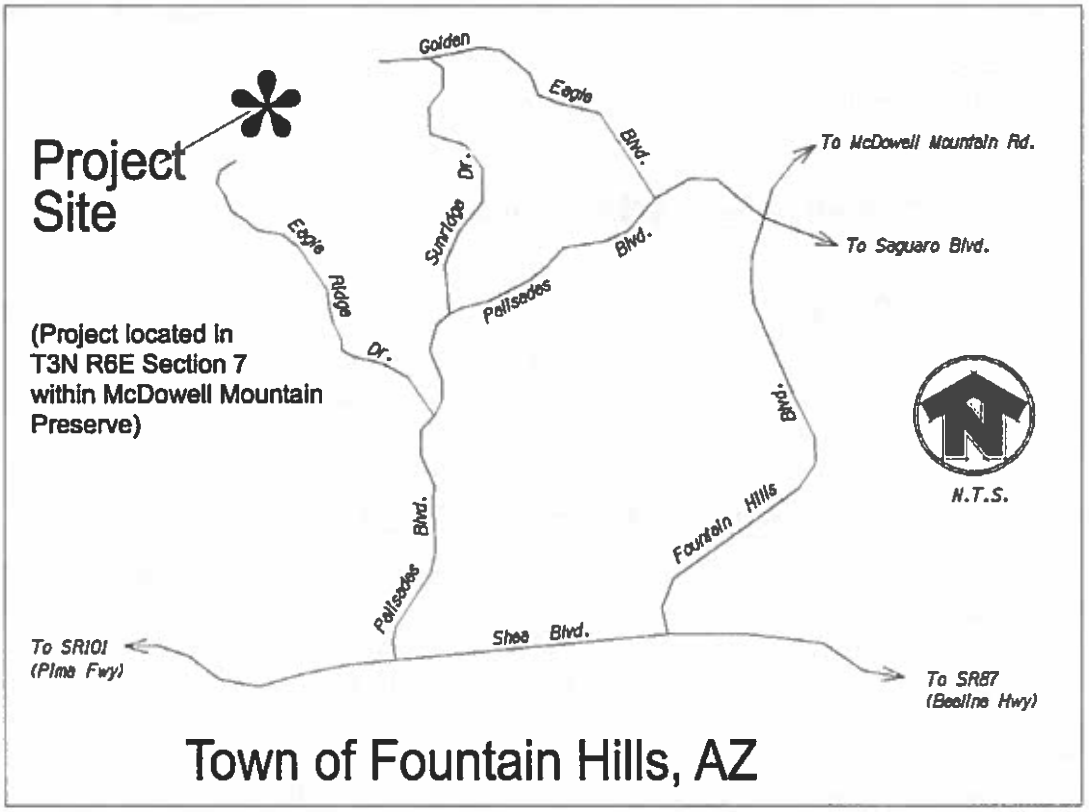
1 INTRODUCTION

This report summarizes the hydrology and hydraulics for the McDowell Mountain Preserve Adero Canyon Trailhead in the Town of Fountain Hills (Figure 1), as part of the 100 percent submittal package. The project is located in T3N, R6E, Section 7 within the McDowell Mountain Preserve.

The project includes the development of a trailhead that will provide sidewalks, landscaping, stabilized parking areas and drives. As part of these improvements, culverts will be installed to pass water through the proposed improvements along the historical flow paths.

The purpose of this study was to evaluate the hydrology and size the culverts at the trailhead. The analysis used the criteria in the *Maricopa County District Hydrology Manual.*

Figure 1: Project Location



2 PROJECT SITE DESCRIPTION

2.1 Existing Conditions

The project area consists of steeply sloping, undeveloped desert landscape with saguaros and other desert plants. The topography generally directs water from north to south. A geotechnical investigation by Ricker, Atkinson, and McBee and Associates (2005) indicates that the surface soil is mainly clayey to silty sand and gravel – decomposed granite. The surface soil is underlain by granite bedrock at depths of 2.5 to 7.5 feet.

2.2 Proposed Conditions

The proposed conditions consist of paved parking spaces, sidewalks, and driveways. In order to accommodate the trailhead, retaining walls will be added. The trailhead will be graded to allow sheet flow off of the parking and driveway areas.

Water from two washes will be conveyed under the trailhead through culverts.

3 DRAINAGE ANALYSIS

3.1 Design Event

The culverts were sized to convey the 50-year storm event with no flow crossing over the roadway. The 100-year storm event was also checked to insure no adverse flooding conditions would be generated.

3.2 Hydrology – Rational Method

All of the drainage areas contributing to each culvert are less than 160 acres; therefore, the Rational Method was used to determine the peak flows for each culvert. The Rational Method is expressed as Q = C*i*A; where Q is the peak discharge from a given area in cfs, *C* is the runoff coefficient, *A* is the drainage area in acres, and *i* is the rainfall intensity in inches per hour.

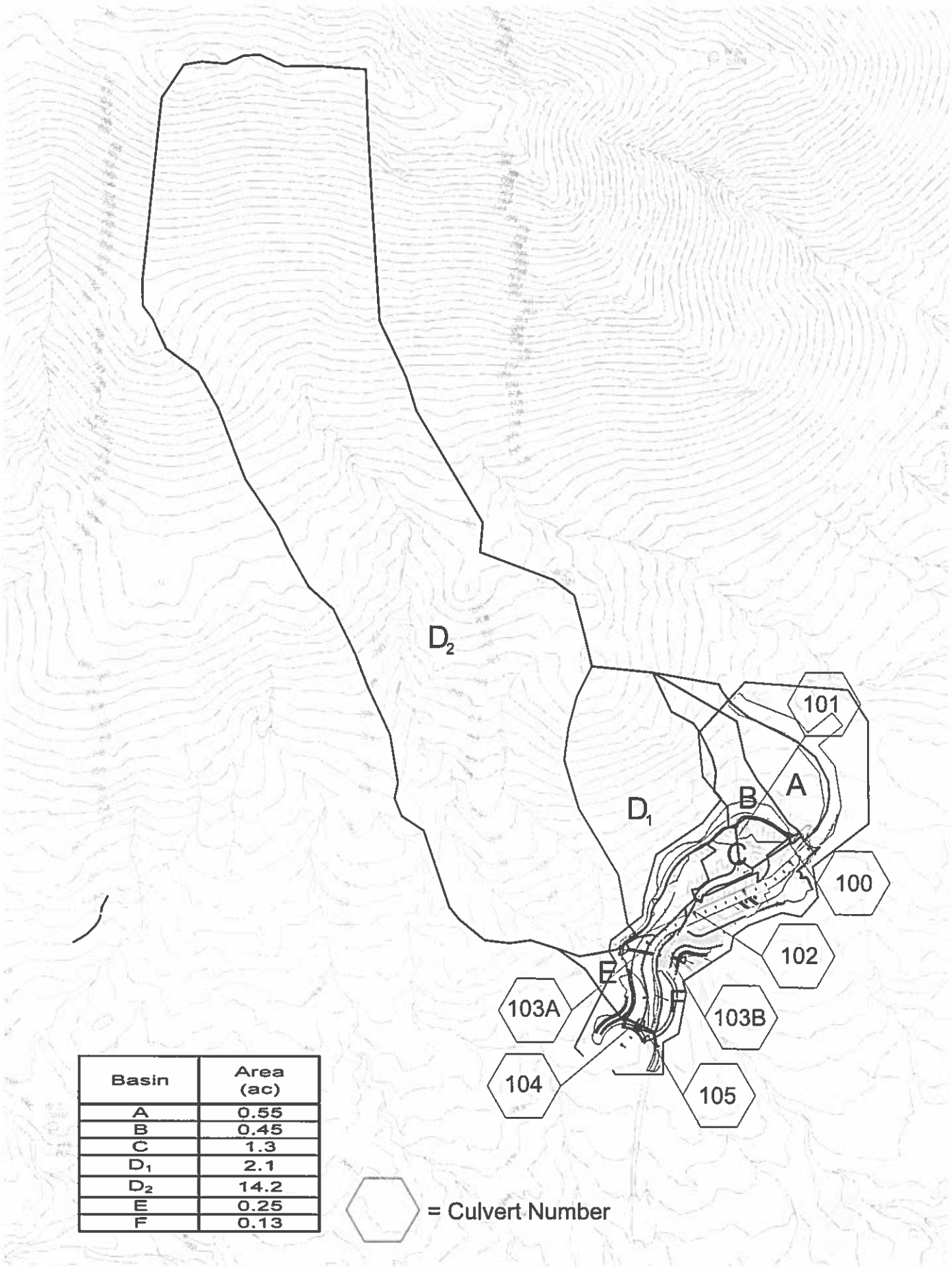
3.2.1 Drainage Areas

Four culverts (100, 101, 102, and 103) and two grated inlets (104, 105) will be constructed to divert the flows around the trailhead. Culvert 103 will be split into two sections – 103A and 103B. The drainage areas are delineated on Figure 2.

Culvert 100 collects water from drainage area A. It drains the northeastern offsite area that would naturally cross the proposed parking lot area. It is the most easterly culvert on the project site. Culvert 100 shall be an 18-inch reinforced concrete pipe that drains into the parking lot infield area.

Culvert 101 collects water from drainage area B. The area is adjacent to drainage area B. Offsite flow intersects a portion of the northern edge of the parking lot. Culvert 101 will be an 18-inch reinforced concrete pipe that will direct the offsite flow to the parking lot infield area.

Culvert 102 collects water from drainage areas A, B, and C. It is located at the outlet of the parking lot infield area. It collects onsite drainage from the parking lot and offsite drainage from Culverts 100 and 101. Culvert 102 is a 24-inch reinforced concrete pipe that drains into Culvert 103.



Basin	Area (ac)
A	0.55
B	0.45
C	1.3
D_1	2.1
D_2	14.2
E	0.25
F	0.13

J2 engineering and environmental design
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phoenix, arizona 85040
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PROJECT NO. 040039	DRAWN BY MRT
DATE	DESIGNED BY ALU

DRAINAGE AREA MAP

FIGURE 2

Culvert 103 is split into two parts - the upper portion is 103A, the lower portion is 103B to help avoid a costly dissipation structure at the outlet. Culvert 103A collects water from drainage areas D1 and D2. It drains the largest offsite drainage areas along the northern edge of the proposed parking lot area. This flow is directed under the entrance drive through a 42-inch reinforced concrete pipe culvert. The lower part of the culvert, Culvert 103B, conveys the combined flow from Culvert 103A and Culvert 102. The combined flow is carried in a 42 inch concrete pipe culvert and is released on the east side of the entrance drive.

Grated inlets 104 and 105 collect flow on the west and east sides of the entrance drive from drainage areas E and F. The inlets are located near the entrance to the trailhead. Flow collected by the grated inlets will drain into a double 12-inch reinforced concrete pipe and be outlet on the east side of the entrance drive.

The total area contributing to each culvert or inlet is shown in Table 1.

Table 1 Drainage Areas Contributing to Each Culvert

Culvert/ Inlet	Contributing Drainage Areas	Total Drainage Area (acres)
100	A	0.55
101	B	0.45
102	A,B,C	2.30
103A	D_1, D_2	16.3
103B	A,B,C, D_1, D_2	18.60
104	E	0.25
105	F	0.13

3.2.2 Runoff Coefficients

The runoff coefficients were determined from Table 3.2 in the *Maricopa County Flood Control District Hydrology Manual*. Since the slopes adjacent to the trailhead are greater than 10 percent, an average runoff coefficient for Mountain Terrain was selected for each return period. For the parking and drive areas, an average runoff coefficient for paved roads was selected. Based on the areas and land use, a weighted runoff coefficient was calculated for each culvert based on the following equation:

$$\overline{C} = \frac{\sum_{i=1}^{n} C_i A_i}{\sum_{i=1}^{n} A_i}$$

3.2.3 Rainfall Intensity

The rainfall depths and intensities for a range of durations and return periods were determined from the PREFRE program. Please refer to Appendix A for rainfall calculations. The intensity used in the Rational Method depends on the time of concentration, as discussed in the next section.

3.2.4 Time of Concentration

The time of concentration was calculated using the following equation by Papadakis and Kazan (1987):

$$T_c = 11.4 L^{0.5} K_b^{0.52} S^{-0.31} i^{-0.38}$$

where T_c is the time of concentration in hours, L is the length of the longest flow path in miles, K_b is the watershed resistance coefficient, S is the watercourse slope in feet per mile, and i is the rainfall intensity in inches per hour. K_b, the watershed resistance coefficient, was derived from Table 3.1 in the *Maricopa County Flood Control District Hydrology Manual* by assuming a Type C condition.

Since the time of concentration depends on the rainfall intensity, an iterative procedure was used to determine the time of concentration and rainfall intensity. The minimum time of concentration for any inlet was 10 minutes, even if the actual time of concentration was calculated to be less than 10 minutes.

There is a worksheet showing the calculation of the weighted runoff coefficients, time of concentration, and rainfall intensity for each inlet in Appendix B. The results are summarized in Table 2.

Table 2 Parameters used in the Rational Method

Culvert/ Inlet	Runoff Coefficient			Time of Concentration (min)	Rainfall Intensity (in/hr)		
	25-yr	50-yr	100-yr		25-yr	50-yr	100-yr
100	0.7	0.8	0.85	10	4.94	5.69	6.44
101	0.7	0.8	0.85	10	4.94	5.69	6.44
102	0.75	0.83	0.87	10	4.94	5.69	6.44
103	0.7	0.8	0.85	10	4.94	5.69	6.44
104	0.75	0.83	0.87	10	4.94	5.69	6.44
105	0.70	0.80	0.85	10	4.94	5.69	6.44

3.2.5 Peak Discharges

Table 3 shows the peak flow for each culvert or inlet for the 25-, 50-, and 100-year storm events calculated by using the Rational Method:

Table 3 Peak discharge to each culvert or inlet

Culvert/ Inlet	Peak Discharge (cfs)		
	25-yr	50-yr	100-yr
100	1.9	2.3	3.0
101	1.6	2.0	2.5
102	4.8	6.1	7.3
103A	56.6	74.3	89.4
103B	61.4	80.4	96.7
104	0.9	1.2	1.4
105	0.4	0.6	0.7

[1] For simplification, the peak flows for culverts 103A and 102 were directly added to determine the peak flow within culvert 103B.

3.3 Culvert and Inlet Design

The hydraulic operation of the culverts was analyzed using Haested Methods *CulvertMaster*. The culverts were sized to pass the 50-year storm without overtopping of the roadway or creating an HW/D ratio greater than 1.5. The 100-year storm was also analyzed to insure that no objectionable backwater will be produced. All culverts will be made of reinforced concrete. The hydraulic operation of the grated inlets will be discussed in Section 3.3.2.

3.3.1 Culvert Configuration

Inlets for culverts 100, 101, and 102 shall be MAG 501-4 headwalls with trash racks, as shown on the plans. For culvert 103, the inlet shall have a MAG 501-3 headwall with trash rack. The inverts for these culverts shall be at grade.

Due to the large difference in elevation between the inlet and outlet inverts of culvert 103, high velocities would be generated by keeping the culvert as a continuous pipe. The large outlet velocity would have required a costly energy dissipation structure. To avoid the need for such a structure, a special drop structure will be constructed. This allows a reduction in slope within the culvert and keeps the exit velocities down to more manageable conditions.

3.3.2 Grated Inlets

There will be two grated inlets in the roadside ditch on each side of entrance driveway. Flow will be conveyed under the entrance drive through a double 12-inch reinforced concrete pipe and outlet to the east. A single MAG 537 grated inlet (Catch Basin Type G) has been specified for each location. The headwater that must be developed on each grate to pass the 100-year storm is 2 inches and 1.2 inches for the west and east inlets, respectively assuming a 50 percent clogging factor. The full flow capacity of the 12-inch RCP is 2.5 cfs, so the pipe capacity is sufficient to pass the 100-year flow. With such low headwaters required, freeboard in the ditches is sufficient. Calculations are attached in Appendix F.

3.3.3 Summary of Results

Since each culvert will have a trash rack, the approach velocities were calculated for each culvert. Approach velocities for culverts 100, 101, and 102 were all below 3 fps. So, it was not necessary to include a loss for the trash rack. For culvert 103, the approach velocity is greater than 3 fps. The calculations for the culvert approach velocity and headloss are attached in Appendix C. Calculations for the 50-year analysis of the trash rack show there will be virtually no headloss through the culvert because the trash rack is sufficiently large to allow for clogging.

The results of the analysis for the 50- and 100-year return periods are presented in Appendix D and E, respectively. The results of the culvert analysis are summarized in Table 4.

The analysis of the grated inlets 104 and 105 indicate that there will be sufficient freeboard in the roadside ditches, as well as the storm drain under all return periods.

Table 4 Summary of Culvert Analyses

Culvert	Diameter (D) (ft)	Length (ft)	Upstream Invert (ft)	Downstream Invert (ft)	Slope (ft/ft)	50-yr HW/D	100-yr HW/D
100	1.5	83	2461.35	2459.45	0.0228	0.62	0.69
101	1.5	59	2461.40	2459.00	0.041	0.55	0.62
102	2	117.4	2453.00	2440.50	0.108	0.69	0.76
103A/103B	3.5	93.2	2436.00	2425.50	0.0946/ 0.006	1.36	1.60
104	2-12"	56	2426.50	2426.22	.0050	0.76	0.77
105	2-12"	26	2426.22	2426.09	.0050	1.01	0.88

[a]Culvert 103 is split into two segments (103A and 103B) with a drop structure connecting the two segments.

3.4 Erosion Protection

Culverts 100 and 101 are discharged onto a riprap surface. Discharge through these culverts is relatively small, so the riprap protection should be sufficient.

The highest discharge is the combined discharge of culverts 102 and 103A that will exit culvert 103B. A riprap apron can be used for erosion protection downstream of culvert 103B. The exit velocity leaving this culvert will be lower than the natural velocity in the channel downstream of the culvert, large rip rap will be provided downstream of culvert 103B to prevent erosion and long-term maintenance issues. Calculations for velocity in the natural channel downstream of culvert 103B are included in Appendix G.

The storm drain that collects water from inlets 104 and 105 will only need a moderate amount of erosion protection by placement of a small riprap apron. The discharge is small and the natural terrain is relatively rocky and erosion resistant.

Due to the steep slopes in the project area, there is some potential for nuisance rilling adjacent to the paved driveway and parking lot area. In order to mitigate rilling that may occur, decomposed granite will be placed in these areas.

3.5 Open Channel Flow

On the north side of the trailhead, a ditch will be constructed to allow water between Culvert 101 and 103A to be conveyed to Culvert 103B. Looking at Figure 2, the area D1 must be conveyed by this ditch Channel B-B. Areas A+B+C are conveyed via Channel C-C through the

middle of the parking lot pipe 102. Rational Method was used to determine that a peak flow of 9.6 cfs during the 50-year storm event. Based on calculations in *FlowMaster*, this ditch can convey 9.6 cfs (50-year flow to Culvert 103) at a depth of 0.6-ft. This will provide at least 2-feet of freeboard for the channel. Flows contributing to pipe 102 were calculated to be 10.8 cfs (50-yr flow to Culvert 102) . Based on *FlowMaster* calculations this channel section can convey the 10.8 cfs at a depth of 0.5-ft and will provide 2 feet of freeboard. Calculations are included in Appendix G.

4 RESULTS

The McDowell Mountain Preserve Adero CanyonTrailhead will be constructed in the Town of Fountain Hills. The project will include sidewalks, landscaping, stabilized parking areas and drives. In order to divert water from two washes through the trailhead, culverts will be constructed. Riprap will be provided at the outlet of two of the culverts, and a riprap lined channel will be constructed around the north side of the trailhead fill slope.

5 REFERENCES

Haested Methods, Inc. *CulvertMaster*, Waterbury, CT.

Papadakis, C.N. and Kazan, M.N. (1987). "Time of Concentration in Small, Rural Watersheds," *Proceedings of the Engineering Hydrology Symposium*, ASCE, Williamsburg, Viginia, pp. 633-638.

Ricker, Atkinson, McBee and Associates. (2005). "Geotechnical Engineering Report Central Trailhead North End of Eagle Ridge Drive, Fountain Hills, Arizona, R.A.M. Project No. G11251."

Sabol, G.V., Rumann, J.M., Khalili, D. et al. (1995). "Drainage Design Manual for Maricopa County, Arizona, Volume I, Hydrology."

APPENDIX A

Precipitation Data and Calculations

Project:	Fountain Hills Trailhead	By:	ALU
Location :		Date:	May-05
Subject :	IDF Curves	Project #:	40039

RAINFALL DEPTH-DURATION-FREQUENCY (D-D-F) WORKSHEET
AND INTENSITY-DURATION-FREQUENCY (I-D-F)CURVES

Determine rainfall depths from the isopluvial maps

2-year, 6-hour	P2,6' =	1.2
2-year, 24-hour	P2,24' =	1.9
100-year, 6-hour	P100,6' =	3.2
100-year, 24-hour	P100,24' =	4.2
Short Duration Frequency Zone	Zone =	8

PART B

Compute the following:

2-year, 1-hour	P2,1' =	0.70
100-year, 1-hour	P100,1' =	2.33
2-year, 2-hour	P2,2' =	0.87
2-year, 3-hour	P2,3' =	0.99
2-year, 12-hour	P2,12' =	1.55
100-year, 2-hour	P100,2' =	2.63
100-year, 3-hour	P100,3' =	2.83
100-year, 12-hour	P100,12' =	3.70

Note: 5" denotes 5 minutes, etc.; 1'denotes 1 hour, etc.

PART C

Determine the short-duration rainfall ratios (Table 1-1):

Duration (Minutes)		Ratio 2-year		Ratio 100-year
5	A=	0.34	E=	0.30
10	B=	0.51	F=	0.46
15	C=	0.62	G=	0.59
30	D=	0.82	H=	0.80

Compute the following:

2-year, 5-min	P2,5" =	0.24
2-year, 10-min	P2,10" =	0.36
2-year, 15-min	P2,15" =	0.44
2-year, 30-min	P2,30" =	0.58
100-year, 5-min	P100,5" =	0.70
100-year, 10-min	P100,10"=	1.07
100-year, 15-min	P100, 15"=	1.38
100-year, 30-min	P100, 30"=	1.87

Note: 5" denotes 5 minutes, etc.; 1' denotes 1hour, etc.

PART D

For any flood frequency (T-yr) other than 2-year or 100-year calculate the rainfall depth for each rainfall duration (t) by the following equation:

(not printed, see manual)

Project:	Fountain Hills Trailhead	By:	ALU
Location :		Date:	May-05
Subject :	IDF Curves	Project #:	40039

Where X and Y for a selected frequency (T-yr) are:

Frequency (T-yr)	X	Y
5-year	0.674	0.278
10-year	0.496	0.449
25-year	0.293	0.669
50-year	0.146	0.835
500-year	-0.337	1.381

	Frequency, T-yr				
	5	10	25	50	500
5-min	0.36	0.43	0.54	0.62	0.89
10-min	0.54	0.66	0.82	0.95	1.36
15-min	0.68	0.83	1.05	1.21	1.76
30-min	0.91	1.12	1.42	1.64	2.39
1-hour	1.12	1.40	1.77	2.05	2.99
2-hour	1.32	1.61	2.01	2.32	3.34
3-hour	1.45	1.76	2.18	2.50	3.57
6-hour	1.70	2.03	2.49	2.85	4.01
12-hour	2.07	2.43	2.93	3.32	4.59
24-hour	2.45	2.83	3.37	3.78	5.16

PART E

Depth - Duration - Frequency (DDF)

Project:	Fountain Hills Trailhead	By:	ALU
Location :		Date:	May-05
Subject :	IDF Curves	Project #:	40039

Rainfall Depth, in inches							
	Frequency, in years						
Duration	2	5	10	25	50	100	500
5-min	0.24	0.36	0.43	0.54	0.62	0.70	0.89
10-min	0.36	0.54	0.66	0.82	0.95	1.07	1.36
15-min	0.44	0.68	0.83	1.05	1.21	1.38	1.76
30-min	0.58	0.91	1.12	1.42	1.64	1.87	2.39
1-hour	0.70	1.12	1.40	1.77	2.05	2.33	2.99
2-hour	0.87	1.32	1.61	2.01	2.32	2.63	3.34
3-hour	0.99	1.45	1.76	2.18	2.50	2.83	3.57
6-hour	1.20	1.70	2.03	2.49	2.85	3.20	4.01
12-hour	1.55	2.07	2.43	2.93	3.32	3.70	4.59
24-hour	1.90	2.45	2.83	3.37	3.78	4.20	5.16

Project:	Fountain Hills Trailhead	By:	ALU
Location :		Date:	May-05
Subject :	IDF Curves	Project #:	40039

Intensity - Duration - Frequency (IDF)

Rainfall Intensity, in inches per hour								
		Frequency, in years						
Duration	minutes	2	5	10	25	50	100	500
5-min	5	2.87	4.27	5.20	6.46	7.44	8.41	10.64
10-min	10	2.15	3.24	3.96	4.94	5.69	6.44	8.17
15-min	15	1.74	2.71	3.34	4.20	4.86	5.51	7.02
30-min	30	1.15	1.82	2.25	2.84	3.29	3.74	4.77
1-hour	60	0.70	1.12	1.40	1.77	2.05	2.33	2.99
2-hour	120	0.44	0.66	0.81	1.01	1.16	1.31	1.67
3-hour	180	0.33	0.48	0.59	0.73	0.83	0.94	1.19
6-hour	360	0.20	0.28	0.34	0.42	0.47	0.53	0.67
12-hour	720	0.13	0.17	0.20	0.24	0.28	0.31	0.38
24-hour	1440	0.08	0.10	0.12	0.14	0.16	0.18	0.21

APPENDIX B

Rational Method Calculations

Engineering and Environmental Design

Rational Runoff Method
FCD Hydrology Manual

Project: Fountain Hills Trailhead
Basin: Culvert 100 (Drainage Area A)

By: ALU
Date: Apr-06
Checked:
Project No.: 40039

Storm	25-Year	50-Year	100-Year	
Q =	1.9	2.6	3.0	cfs

Runoff Coefficient, C and Basin Area, A

Subarea	Area (acres)	Watershed Classification:	25-Year C	50-Year C	100-Year C
1	0.550	Mountain Terrain	0.70	0.80	0.85
Total	0.550				

	25-Year	50-Year	100-Year
Weighted C =	0.70	0.80	0.85

Time of Concentration, Tc / Rainfall Intensity, i

1) Longest flowpath length, L, and slope, S

Segment	Length (feet)	Elevation, ft High Pt	Low Pt	Change, H	Slope (ft/ft)	(d^3/H)^1/2
1	476	2580.00	2462.50	117.5	0.247	958
2						
3				0.0		0
4				0.0		0
5				0.0		0
d_i =	476		Sum =	118		j = 958

L (miles) = 0.090
S, ft/mi = 1303.4 — 0.24685 ft/ft

2) Roughness Coefficient, Kb (Table 3.1, pg 3-3)

Landform description: Moderately High Roughness

m= -0.025 b= 0.15
Kb = 0.16

3) Tc / i iteration:

	25-Year	50-Year	100-Year	
Assume Tc:	6.89	6.48	6.14	minutes
Try i:	5.89	6.92	7.96	in/hr
Calc Tc:	0.07	0.07	0.06	hours
Calc Tc:	4.32	4.06	3.85	min
Warning				
Tc Check*	Use Tc=10	Use Tc=10	Use Tc=10	
Final i =	4.94	5.69	6.44	in/hr

Note: ** If Calculated Tc is less than 10 minutes use 10-minute rainfall intensity

Engineering and Environmental Design

Rational Runoff Method
FCD Hydrology Manual

Project: Fountain Hills Trailhead
Basin: Culvert 101 (Drainage Area B)

By: ALU
Date: Apr-06
Checked: JH
Project No.: 40039

Storm	25-Year	50-Year	100-Year	
Q =	1.6	2.0	2.5	cfs

Runoff Coefficient, C and Basin Area, A

Subarea	Area (acres)	Watershed Classification:	25-Year C	50-Year C	100-Year C
1	0.450	Mountain Terrain	0.70	0.80	0.85
Total:	0.450				

	25-Year	50-Year	100-Year
Weighted C =	0.70	0.80	0.85

Time of Concentration, Tc / Rainfall intensity, i

1) Longest flowpath length L, and slope, S

Segment	Length (feet)	Elevation, ft High Pt.	Low Pt.	Change, H	Slope (ft/ft)	(d^3/H)^1/2
1	355	2590.00	2470.00	120.0	0.338	611
2						
3				0.0		0
4				0.0		0
5				0.0		0
d_T =	355		Sum =	120		j = 611

L (miles) = 0.067
S, ft/mi = 1784.8 — 0.33803 ft/ft

2) Roughness Coefficient, Kb (Table 3.1, pg. 3-3)

Landform description: Moderately High Roughness

m= -0.025 b= 0.15
Kb = 0.16

3) Tc / i iteration:

	25-Year	50-Year	100-Year	
Assume Tc:	6.89	6.48	6.14	minutes
Try i:	5.89	6.92	7.96	in/hr
Calc Tc:	0.06	0.05	0.05	hours
Calc Tc:	3.41	3.21	3.04	min
Warning:				
Tc Check**	Use Tc=10	Use Tc=10	Use Tc=10	
Final i =	4.94	5.69	6.44	in/hr

Note: ** If Calculated Tc is less than 10 minutes use 10-minute rainfall intensity

Engineering and Environmental Design

Rational Runoff Method
FCD Hydrology Manual

Project: Fountain Hills Trailhead
Basin: Culvert 102 (Drainage Area A,B, and C)

By: ALU
Date: Apr-06
Checked: JA
Project No: 40039

Storm	25-Year	50-Year	100-Year	
Q =	4.8	6.1	7.3	cfs

Runoff Coefficient, C and Basin Area, A

Subarea	Area (acres)	Watershed Classification:	25-Year C	50-Year C	100-Year C
1	1.000	Mountain Terrain	0.70	0.80	0.85
2	0.300	Paved Roads	0.90	0.92	0.95
Total	1.300				

	25-Year	50-Year	100-Year
Weighted C =	0.75	0.83	0.87

Time of Concentration, Tc / Rainfall intensity, i

1) Longest flowpath length: L, and slope, S

Segment	Length (feet)	Elevation, ft High Pt	Low Pt	Change, H	Slope (ft/ft)	(d^3/H)^1/2
1	476	2580.00	2462.50	117.5	0.247	958
2	59	2465.50	2459.50	6.0	0.102	185
3	116	2459.50	2453.00	6.5	0.056	490
4				0.0		0
5				0.0		0
d_T =	651		Sum =	130		i = 1633

L (miles) = 0.123
S, ft/mi = 839.0 — 0.15890 ft/ft

2) Roughness Coefficient, Kb (Table 3.1, pg 3-3)

Landform description: Moderately High Roughness

m= -0.025 b= 0.15
Kb = 0.15

3) Tc / Iteration

	25-Year	50-Year	100-Year	
Assume Tc	6.89	6.48	6.14	minutes
Try i	5.89	6.92	7.96	in/hr
Calc Tc	0.09	0.09	0.08	hours
Calc Tc	5.66	5.33	5.05	min
Warning				
Tc Check*	Use Tc=10	Use Tc=10	Use Tc=10	
Final i =	4.94	5.69	6.44	in/hr

Note: ** If Calculated Tc is less than 10 minutes use 10-minute rainfall intensity

Engineering and Environmental Design

Rational Runoff Method
FCD Hydrology Manual

Project: Fountain Hills Trailhead
Basin: Culvert 103A (Drainage Areas D_1 and D_2)

By: ALU
Date: Apr-06
Checked: GH
Project No.: 40039

Storm	25-Year	50-Year	100-Year	
Q =	56.6	74.3	89.4	cfs

Runoff Coefficient, C and Basin Area, A

Subarea	Area (acres)	Watershed Classification:	25-Year C	50-Year C	100-Year C
1	16.127	Mountain Terrain	0.70	0.80	0.85
2	0.179	Paved Roads	0.90	0.92	0.95
Total	16.306				

	25-Year	50-Year	100-Year
Weighted C =	0.70	0.80	0.85

Time of Concentration, Tc / Rainfall intensity, i

1) Longest flowpath length, L, and slope, S

Segment	Length (feet)	Elevation, ft High Pt.	Low Pt.	Change, H	Slope (ft/ft)	(d^3/H)^1/2
1	1998	3090.00	2436.00	654.0	0.327	3492
2						
3				0.0		0
4				0.0		0
5				0.0		0
d_T =	1998		Sum =	654		j = 3492

L (miles) = 0.378
S ft/mi = 1728.3 0.32733 ft/ft

2) Roughness Coefficient, Kb (Table 3.1, pg 3-3)

Landform description: Moderately High Roughness

m= -0.025 b= 0.15
Kb = 0.12

3) Tc / i iteration

	25-Year	50-Year	100-Year	
Assume Tc:	4.17	10.00	10.00	minutes
Try i:	5.89	6.92	7.96	in/hr
Calc Tc:	0.12	0.11	0.10	hours
Calc Tc:	7.06	6.64	6.29	min
Warning				
Tc Check*	Use Tc=10	Use Tc=10	Use Tc=10	
Final i =	4.94	5.69	6.44	in/hr

Note: * If Calculated Tc is less than 10 minutes use 10-minute rainfall intensity

Engineering and Environmental Design

Rational Runoff Method
FCD Hydrology Manual

Project: Fountain Hills Trailhead
Basin: Inlet 104 (Drainage Area E)

By: ALU
Date: Apr-06
Checked:
Project No.: 40039

Storm	25-Year	50-Year	100-Year	
Q =	0.9	1.2	1.4	cfs

Runoff Coefficient, C and Basin Area, A

Subarea	Area (acres)	Watershed Classification:	25-Year C	50-Year C	100-Year C
1	0.190	Mountain Terrain	0.70	0.80	0.85
2	0.060	Paved Roads	0.90	0.92	0.95
Total	0.250				

	25-Year	50-Year	100-Year
Weighted C =	0.75	0.83	0.87

Time of Concentration, Tc / Rainfall Intensity, i

1) Longest flowpath length L, and slope, S

Segment	Length (feet)	Elevation, ft High Pt	Low Pt	Change, H	Slope (ft/ft)	(d^3/H)^1/2
1	175	2465.00	2428.00	37.0	0.211	381
2				0.0		0
3				0.0		0
4				0.0		0
5				0.0		0
d_T =	175		Sum =	37		j = 381

L (miles) = 0.033
S, ft/mi = 1116.3 — 0.21143 ft/ft

2) Roughness Coefficient, Kb (Table 3.1, pg. 3-3)

Landform description: Moderately High Roughness

m= -0.025 b= 0.15
Kb = 0.17

3) Tc / i iteration

	25-Year	50-Year	100-Year	
Assume Tc:	6.89	6.48	6.14	minutes
Try i	5.89	6.92	7.96	in/hr
Calc Tc	0.05	0.04	0.04	hours
Calc Tc	2.85	2.68	2.54	min
Warning				
Tc Check*	Use Tc=10	Use Tc=10	Use Tc=10	
Final i =	4.94	5.69	6.44	in/hr

Note: * If Calculated Tc is less than 10 minutes use 10-minute rainfall intensity

Engineering and Environmental Design

Rational Runoff Method
FCD Hydrology Manual

Project: Fountain Hills Trailhead
Basin: Inlet 105 (Drainage Area F)

By: ALU
Date: Apr-06
Checked: [illegible]
Project No: 40039

Storm	25-Year	50-Year	100-Year	
Q =	0.4	0.6	0.7	cfs

Runoff Coefficient, C and Basin Area, A

Subarea	Area (acres)	Watershed Classification:	25-Year C	50-Year C	100-Year C
1	0 130	Paved Roads	0 70	0 80	0 85
Total	0 130				

	25-Year	50-Year	100-Year
Weighted C =	0.70	0.80	0.85

Time of Concentration, Tc / Rainfall Intensity, i

1) Longest flowpath length L, and slope, S

Segment	Length (feet)	Elevation, ft High Pt	Low Pt	Change, H	Slope (ft/ft)	(d^3/H)^1/2
1	244	2455 00	2428 00	27.0	0 111	734
2				0 0		0
3				0 0		0
4				0.0		0
5				0.0		0
d_T =	244		Sum =	27		I = 734

L (miles) = 0 046
S, ft/mi = 584 3 — 0 11066 ft/ft

2) Roughness Coefficient, Kb (Table 3 1, pg 3-3)

Landform description Moderately High Roughness

m= -0 025 b= 0 15
Kb = 0 17

3) Tc / i iteration

	25-Year	50-Year	100-Year	
Assume Tc	6 89	6 48	6 14	minutes
Try i	5 89	6 92	7.96	in/hr
Calc Tc	0 07	0 07	0 06	hours
Calc Tc	4 17	3 92	3 72	min
Warning				
Tc Check*	Use Tc=10	Use Tc=10	Use Tc=10	
Final i =	4.94	5.69	6.44	in/hr

Note: ** If Calculated Tc is less than 10 minutes use 10-minute rainfall intensity

APPENDIX C

Trash Rack Headloss
Approach Velocity Calculations

SHEET NO 1 OF 1

JOB NUMBER 04.0039

TITLE Fountain Hills Trailhead

SUBJECT

MADE BY ALLL DATE 4/14/06 CHECKED BY JA DATE 4/24/06

Calculate trash rack headloss for culvert 103A:

Trash rack headloss:

Eqn 5.5: $H_g = \frac{1.5\,[V_g^2 - V_A^2]}{2g}$

V_g = velocity between bars of trashrack (ft/s)

V_A = approach velocity (ft/s)

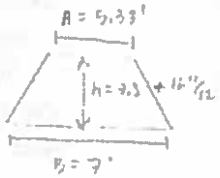
g = acceleration due to gravity (ft/s²)

velocity between bars:

$V_g = \frac{Q}{A_{open}} = \frac{74\,cfs}{12.3} = \underline{6.0\ ft/s}$

$A_{open} = \%\text{unclogged}\,(A - A_{bars})$

$A = \frac{1}{2}\,h\,(A + B) = \frac{1}{2}\left(3.5' + \frac{16''}{12''/ft}\right)(5.33' + 7')$



$A = 29.8\ ft^2$

$A_{bars} = (\#\text{ of bars})(\text{thickness} \times \text{length})$

$A_{bars} = (13)\left(\frac{1''}{12''/ft}\right)\left(3.5' + \frac{16''}{12''/ft}\right)$

$A_{bars} = 5.24\ ft^2$

$A_{open} = 0.5\,(29.8 - 5.2)$

$A_{open} = 12.3\ ft^2$

Trash rack headloss:

Assume Ponding V=3.0+/-

Hg=1.5(6^2-3^2)/(2*32.2)=0.2.

Add

$H_{g\,headwall}$ =total loss = 0.7 feet total headloss.

Worksheet for Channel U/S Culvert 100_50yr

Project Description		
Flow Element:	Triangular Channel	
Friction Method:	Manning Formula	
Solve For:	Normal Depth	
Input Data		
Roughness Coefficient:	0.040	
Channel Slope:	0.01430	ft/ft
Left Side Slope:	6.00	ft/ft (H:V)
Right Side Slope:	7.00	ft/ft (H:V)
Discharge:	2.50	ft^3/s
Results		
Normal Depth:	0.48	ft
Flow Area:	1.48	ft^2
Wetted Perimeter:	6.27	ft
Top Width:	6.19	ft
Critical Depth:	0.39	ft
Critical Slope:	0.04079	ft/ft
Velocity:	1.69	ft/s
Velocity Head:	0.04	ft
Specific Energy:	0.52	ft
Froude Number:	0.61	
Flow Type:	Subcritical	
GVF Input Data		
Downstream Depth:	0.00	ft
Length:	0.00	ft
Number Of Steps:	0	
GVF Output Data		
Upstream Depth:	0.00	ft
Profile Description:		
Profile Headloss:	0.00	ft
Downstream Velocity:	Infinity	ft/s
Upstream Velocity:	Infinity	ft/s
Normal Depth:	0.48	ft
Critical Depth:	0.39	ft
Channel Slope:	0.01430	ft/ft
Critical Slope:	0.04079	ft/ft

Worksheet for Channel U/S Culvert 101_50yr

Project Description		
Flow Element:	Rectangular Channel	
Friction Method:	Manning Formula	
Solve For:	Normal Depth	
Input Data		
Roughness Coefficient:	0.078	
Channel Slope:	0.02300	ft/ft
Bottom Width:	10.00	ft
Discharge:	2.00	ft^3/s
Results		
Normal Depth:	0.20	ft
Flow Area:	2.05	ft^2
Wetted Perimeter:	10.41	ft
Top Width:	10.00	ft
Critical Depth:	0.11	ft
Critical Slope:	0.19176	ft/ft
Velocity:	0.98	ft/s
Velocity Head:	0.01	ft
Specific Energy:	0.22	ft
Froude Number:	0.38	
Flow Type:	Subcritical	
GVF Input Data		
Downstream Depth:	0.00	ft
Length:	0.00	ft
Number Of Steps:	0	
GVF Output Data		
Upstream Depth:	0.00	ft
Profile Description:		
Profile Headloss:	0.00	ft
Downstream Velocity:	Infinity	ft/s
Upstream Velocity:	Infinity	ft/s
Normal Depth:	0.20	ft
Critical Depth:	0.11	ft
Channel Slope:	0.02300	ft/ft
Critical Slope:	0.19176	ft/ft

Worksheet for Channel U/S Culvert 102_50yr

Project Description		
Flow Element:	Rectangular Channel	
Friction Method:	Manning Formula	
Solve For:	Normal Depth	
Input Data		
Roughness Coefficient:	0.078	
Channel Slope:	0.04000	ft/ft
Bottom Width:	12.00	ft
Discharge:	6.10	ft^3/s
Results		
Normal Depth:	0.30	ft
Flow Area:	3.65	ft^2
Wetted Perimeter:	12.61	ft
Top Width:	12.00	ft
Critical Depth:	0.20	ft
Critical Slope:	0.15837	ft/ft
Velocity:	1.67	ft/s
Velocity Head:	0.04	ft
Specific Energy:	0.35	ft
Froude Number:	0.53	
Flow Type:	Subcritical	
GVF Input Data		
Downstream Depth:	0.00	ft
Length:	0.00	ft
Number Of Steps:	0	
GVF Output Data		
Upstream Depth:	0.00	ft
Profile Description:		
Profile Headloss:	0.00	ft
Downstream Velocity:	Infinity	ft/s
Upstream Velocity:	Infinity	ft/s
Normal Depth:	0.30	ft
Critical Depth:	0.20	ft
Channel Slope:	0.04000	ft/ft
Critical Slope:	0.15837	ft/ft

Worksheet for Channel U/S Culvert 102_100yr

Project Description		
Flow Element:	Rectangular Channel	
Friction Method:	Manning Formula	
Solve For:	Normal Depth	
Input Data		
Roughness Coefficient:	0.078	
Channel Slope:	0.04000	ft/ft
Bottom Width:	12.00	ft
Discharge:	7.30	ft^3/s
Results		
Normal Depth:	0.34	ft
Flow Area:	4.08	ft^2
Wetted Perimeter:	12.68	ft
Top Width:	12.00	ft
Critical Depth:	0.23	ft
Critical Slope:	0.15296	ft/ft
Velocity:	1.79	ft/s
Velocity Head:	0.05	ft
Specific Energy:	0.39	ft
Froude Number:	0.54	
Flow Type:	Subcritical	
GVF Input Data		
Downstream Depth:	0.00	ft
Length:	0.00	ft
Number Of Steps:	0	
GVF Output Data		
Upstream Depth:	0.00	ft
Profile Description:		
Profile Headloss:	0.00	ft
Downstream Velocity:	Infinity	ft/s
Upstream Velocity:	Infinity	ft/s
Normal Depth:	0.34	ft
Critical Depth:	0.23	ft
Channel Slope:	0.04000	ft/ft
Critical Slope:	0.15296	ft/ft

Worksheet for Channel U/S Culvert 103A_50yr

Project Description		
Flow Element:	Triangular Channel	
Friction Method:	Manning Formula	
Solve For:	Normal Depth	
Input Data		
Roughness Coefficient:	0.040	
Channel Slope:	0.14000	ft/ft
Left Side Slope:	3.40	ft/ft (H:V)
Right Side Slope:	2.10	ft/ft (H:V)
Discharge:	74.00	ft^3/s
Results		
Normal Depth:	1.55	ft
Flow Area:	6.59	ft^2
Wetted Perimeter:	9.09	ft
Top Width:	8.52	ft
Critical Depth:	2.14	ft
Critical Slope:	0.02486	ft/ft
Velocity:	11.22	ft/s
Velocity Head:	1.96	ft
Specific Energy:	3.51	ft
Froude Number:	2.25	
Flow Type:	Supercritical	
GVF Input Data		
Downstream Depth:	0.00	ft
Length:	0.00	ft
Number Of Steps:	0	
GVF Output Data		
Upstream Depth:	0.00	ft
Profile Description:		
Profile Headloss:	0.00	ft
Downstream Velocity:	Infinity	ft/s
Upstream Velocity:	Infinity	ft/s
Normal Depth:	1.55	ft
Critical Depth:	2.14	ft
Channel Slope:	0.14000	ft/ft
Critical Slope:	0.02486	ft/ft

APPENDIX D

50-year Culvert Analysis

Culvert Calculator Report
Culvert 100_50yr

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	2,465.00	ft	Headwater Depth/Height	0.62	
Computed Headwater Elev:	2,463.38	ft	Discharge	2.50	cfs
Inlet Control HW Elev.	2,463.27	ft	Tailwater Elevation	2,454.37	ft
Outlet Control HW Elev.	2,463.38	ft	Control Type	Entrance Control	

Grades					
Upstream Invert	2,462.45	ft	Downstream Invert	2,459.45	ft
Length	83.00	ft	Constructed Slope	0.036145	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	0.36	ft
Slope Type	Steep		Normal Depth	0.36	ft
Flow Regime	Supercritical		Critical Depth	0.60	ft
Velocity Downstream	7.71	ft/s	Critical Slope	0.005024	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	1.50	ft
Section Size	18 inch		Rise	1.50	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	2,463.38	ft	Upstream Velocity Head	0.22	ft
Ke	0.50		Entrance Loss	0.11	ft

Inlet Control Properties					
Inlet Control HW Elev.	2,463.27	ft	Flow Control	N/A	
Inlet Type	Square edge w/headwall		Area Full	1.8	ft^2
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
Culvert 101_50-yr

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	2,464.50	ft	Headwater Depth/Height	0.55	
Computed Headwater Elev	2,462.23	ft	Discharge	2.00	cfs
Inlet Control HW Elev.	2,462.11	ft	Tailwater Elevation	2,454.37	ft
Outlet Control HW Elev.	2,462.23	ft	Control Type	Entrance Control	

Grades					
Upstream Invert	2,461.40	ft	Downstream Invert	2,459.00	ft
Length	59.00	ft	Constructed Slope	0.040678	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	0.31	ft
Slope Type	Steep		Normal Depth	0.31	ft
Flow Regime	Supercritical		Critical Depth	0.53	ft
Velocity Downstream	7.54	ft/s	Critical Slope	0.004944	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	1.50	ft
Section Size	18 inch		Rise	1.50	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	2,462.23	ft	Upstream Velocity Head	0.20	ft
Ke	0.50		Entrance Loss	0.10	ft

Inlet Control Properties					
Inlet Control HW Elev.	2,462.11	ft	Flow Control	N/A	
Inlet Type	Square edge w/headwall		Area Full	1.8	ft^2
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
Culvert 102_50yr

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	2,456.50	ft	Headwater Depth/Height	0.69	
Computed Headwater Elev:	2,454.37	ft	Discharge	6.10	cfs
Inlet Control HW Elev.	2,454.13	ft	Tailwater Elevation	2,440.50	ft
Outlet Control HW Elev.	2,454.37	ft	Control Type	Entrance Control	

Grades					
Upstream Invert	2,453.00	ft	Downstream Invert	2,440.50	ft
Length	115.50	ft	Constructed Slope	0.108225	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	0.39	ft
Slope Type	Steep		Normal Depth	0.39	ft
Flow Regime	Supercritical		Critical Depth	0.87	ft
Velocity Downstream	14.29	ft/s	Critical Slope	0.004659	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	2.00	ft
Section Size	24 inch		Rise	2.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	2,454.37	ft	Upstream Velocity Head	0.33	ft
Ke	0.50		Entrance Loss	0.17	ft

Inlet Control Properties					
Inlet Control HW Elev.	2,454.13	ft	Flow Control	N/A	
Inlet Type	Square edge w/headwall		Area Full	3.1	ft^2
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
Pipe Culvert 103A 50yr

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	2,443.00	ft	Headwater Depth/Height	1.42	
Computed Headwater Elev:	2,440.99	ft	Discharge	74.00	cfs
Inlet Control HW Elev.	2,440.48	ft	Tailwater Elevation	2,426.64	ft
Outlet Control HW Elev.	2,440.99	ft	Control Type	Entrance Control	

Grades					
Upstream Invert	2,436.00	ft	Downstream Invert	2,427.72	ft
Length	66.30	ft	Constructed Slope	0.124887	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	1.28	ft
Slope Type	Steep		Normal Depth	1.08	ft
Flow Regime	Supercritical		Critical Depth	2.69	ft
Velocity Downstream	23.28	ft/s	Critical Slope	0.006137	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.50	ft
Section Size	42 inch		Rise	3.50	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	2,440.99	ft	Upstream Velocity Head	1.35	ft
Ke	0.70		Entrance Loss	0.94	ft

Inlet Control Properties					
Inlet Control HW Elev.	2,440.48	ft	Flow Control	Submerged	
Inlet Type	Square edge w/headwall		Area Full	9.6	ft^2
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
Pipe Culvert 103B 50yr

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	2,443.00	ft	Headwater Depth/Height	1.51	
Computed Headwater Elev	2,441.29	ft	Discharge	80.00	cfs
Inlet Control HW Elev.	2,440.88	ft	Tailwater Elevation	2,426.64	ft
Outlet Control HW Elev.	2,441.29	ft	Control Type	Entrance Control	

Grades					
Upstream Invert	2,436.00	ft	Downstream Invert	2,427.72	ft
Length	66.30	ft	Constructed Slope	0.124887	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	1.34	ft
Slope Type	Steep		Normal Depth	1.13	ft
Flow Regime	Supercritical		Critical Depth	2.79	ft
Velocity Downstream	23.57	ft/s	Critical Slope	0.006644	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.50	ft
Section Size	42 inch		Rise	3.50	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	2,441.29	ft	Upstream Velocity Head	1.47	ft
Ke	0.70		Entrance Loss	1.03	ft

Inlet Control Properties					
Inlet Control HW Elev.	2,440.88	ft	Flow Control	Submerged	
Inlet Type	Square edge w/headwall		Area Full	9.6	ft^2
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
Pipe Culvert 104 50 yr

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	2,428.63	ft	Headwater Depth/Height	0.76	
Computed Headwater Elev	2,427.26	ft	Discharge	1.20	cfs
Inlet Control HW Elev.	2,427.22	ft	Tailwater Elevation	2,427.22	ft
Outlet Control HW Elev.	2,427.26	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	2,426.50	ft	Downstream Invert	2,426.22	ft
Length	56.00	ft	Constructed Slope	0.005000	ft/ft

Hydraulic Profile					
Profile	M1		Depth, Downstream	1.00	ft
Slope Type	Mild		Normal Depth	0.33	ft
Flow Regime	Subcritical		Critical Depth	0.32	ft
Velocity Downstream	0.76	ft/s	Critical Slope	0.005619	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	1.00	ft
Section Size	12 inch		Rise	1.00	ft
Number Sections	2				

Outlet Control Properties					
Outlet Control HW Elev.	2,427.26	ft	Upstream Velocity Head	0.01	ft
Ke	0.90		Entrance Loss	0.01	ft

Inlet Control Properties					
Inlet Control HW Elev.	2,427.22	ft	Flow Control	Unsubmerged	
Inlet Type	Square edge w/headwall		Area Full	1.6	ft^2
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
Pipe Culvert 105 50 yr

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	2,428.55	ft	Headwater Depth/Height	1.01	
Computed Headwater Elev	2,427.23	ft	Discharge	0.60	cfs
Inlet Control HW Elev.	2,427.22	ft	Tailwater Elevation	2,427.22	ft
Outlet Control HW Elev.	2,427.23	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	2,426.22	ft	Downstream Invert	2,426.09	ft
Length	25.00	ft	Constructed Slope	0.005200	ft/ft

Hydraulic Profile					
Profile	PressureProfile		Depth, Downstream	1.13	ft
Slope Type	N/A		Normal Depth	0.23	ft
Flow Regime	N/A		Critical Depth	0.23	ft
Velocity Downstream	0.38	ft/s	Critical Slope	0.005694	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	1.00	ft
Section Size	12 inch		Rise	1.00	ft
Number Sections	2				

Outlet Control Properties					
Outlet Control HW Elev.	2,427.23	ft	Upstream Velocity Head	0.00	ft
Ke	0.90		Entrance Loss	0.00	ft

Inlet Control Properties					
Inlet Control HW Elev.	2,427.22	ft	Flow Control	Unsubmerged	
Inlet Type	Square edge w/headwall		Area Full	1.6	ft^2
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

APPENDIX E

100-year Culvert Analysis

Culvert Calculator Report
Culvert 100_100-yr

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	2,465.00	ft	Headwater Depth/Height	0.69	
Computed Headwater Elev:	2,463.48	ft	Discharge	3.00	cfs
Inlet Control HW Elev.	2,463.36	ft	Tailwater Elevation	2,454.52	ft
Outlet Control HW Elev.	2,463.48	ft	Control Type	Entrance Control	

Grades					
Upstream Invert	2,462.45	ft	Downstream Invert	2,459.45	ft
Length	83.00	ft	Constructed Slope	0.036145	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	0.39	ft
Slope Type	Steep		Normal Depth	0.39	ft
Flow Regime	Supercritical		Critical Depth	0.66	ft
Velocity Downstream	8.13	ft/s	Critical Slope	0.005125	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	1.50	ft
Section Size	18 inch		Rise	1.50	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	2,463.48	ft	Upstream Velocity Head	0.25	ft
Ke	0.50		Entrance Loss	0.13	ft

Inlet Control Properties					
Inlet Control HW Elev.	2,463.36	ft	Flow Control	N/A	
Inlet Type	Square edge w/headwall		Area Full	1.8	ft^2
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
Culvert 101_100-yr

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	2,464.50	ft	Headwater Depth/Height	0.62	
Computed Headwater Elev	2,462.33	ft	Discharge	2.50	cfs
Inlet Control HW Elev.	2,462.21	ft	Tailwater Elevation	2,454.52	ft
Outlet Control HW Elev.	2,462.33	ft	Control Type	Entrance Control	

Grades					
Upstream Invert	2,461.40	ft	Downstream Invert	2,459.00	ft
Length	59.00	ft	Constructed Slope	0.040678	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	0.35	ft
Slope Type	Steep		Normal Depth	0.35	ft
Flow Regime	Supercritical		Critical Depth	0.60	ft
Velocity Downstream	8.04	ft/s	Critical Slope	0.005024	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	1.50	ft
Section Size	18 inch		Rise	1.50	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	2,462.33	ft	Upstream Velocity Head	0.22	ft
Ke	0.50		Entrance Loss	0.11	ft

Inlet Control Properties					
Inlet Control HW Elev.	2,462.21	ft	Flow Control	N/A	
Inlet Type	Square edge w/headwall		Area Full	1.8	ft^2
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
Culvert 102_100-yr

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	2,456.50	ft	Headwater Depth/Height	0.76	
Computed Headwater Elev	2,454.52	ft	Discharge	7.30	cfs
Inlet Control HW Elev.	2,454.28	ft	Tailwater Elevation	2,440.50	ft
Outlet Control HW Elev.	2,454.52	ft	Control Type	Entrance Control	

Grades					
Upstream Invert	2,453.00	ft	Downstream Invert	2,440.50	ft
Length	115.50	ft	Constructed Slope	0.108225	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	0.42	ft
Slope Type	Steep		Normal Depth	0.42	ft
Flow Regime	Supercritical		Critical Depth	0.96	ft
Velocity Downstream	15.06	ft/s	Critical Slope	0.004795	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	2.00	ft
Section Size	24 inch		Rise	2.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	2,454.52	ft	Upstream Velocity Head	0.37	ft
Ke	0.50		Entrance Loss	0.19	ft

Inlet Control Properties					
Inlet Control HW Elev.	2,454.28	ft	Flow Control	N/A	
Inlet Type	Square edge w/headwall		Area Full	3.1	ft^2
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
Pipe Culvert 103A 100yr

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	2,443.00	ft	Headwater Depth/Height	1.65	
Computed Headwater Elev	2,441.78	ft	Discharge	89.40	cfs
Inlet Control HW Elev.	2,441.57	ft	Tailwater Elevation	2,428.00	ft
Outlet Control HW Elev.	2,441.78	ft	Control Type	Entrance Control	

Grades					
Upstream Invert	2,436.00	ft	Downstream Invert	2,427.72	ft
Length	68.00	ft	Constructed Slope	0.121765	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	1.44	ft
Slope Type	Steep		Normal Depth	1.20	ft
Flow Regime	Supercritical		Critical Depth	2.94	ft
Velocity Downstream	23.91	ft/s	Critical Slope	0.007593	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.50	ft
Section Size	42 inch		Rise	3.50	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	2,441.78	ft	Upstream Velocity Head	1.67	ft
Ke	0.70		Entrance Loss	1.17	ft

Inlet Control Properties					
Inlet Control HW Elev.	2,441.57	ft	Flow Control	Submerged	
Inlet Type	Square edge w/headwall		Area Full	9.6	ft^2
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
Pipe Culvert 103B 100yr

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	2,443.00	ft	Headwater Depth/Height	1.64	
Computed Headwater Elev	2,431.38	ft	Discharge	89.00	cfs
Inlet Control HW Elev.	2,431.38	ft	Tailwater Elevation	2,426.64	ft
Outlet Control HW Elev.	2,431.30	ft	Control Type	Inlet Control	

Grades					
Upstream Invert	2,425.64	ft	Downstream Invert	2,425.50	ft
Length	27.00	ft	Constructed Slope	0.005185	ft/ft

Hydraulic Profile					
Profile	M2		Depth, Downstream	2.93	ft
Slope Type	Mild		Normal Depth	N/A	ft
Flow Regime	Subcritical		Critical Depth	2.93	ft
Velocity Downstream	10.35	ft/s	Critical Slope	0.007548	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.50	ft
Section Size	42 inch		Rise	3.50	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	2,431.30	ft	Upstream Velocity Head	1.45	ft
Ke	0.70		Entrance Loss	1.02	ft

Inlet Control Properties					
Inlet Control HW Elev.	2,431.38	ft	Flow Control	Submerged	
Inlet Type	Square edge w/headwall		Area Full	9.6	ft^2
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
Pipe Culvert 104 100 yr

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	2,428.63	ft	Headwater Depth/Height	0.77	
Computed Headwater Elev	2,427.27	ft	Discharge	1.40	cfs
Inlet Control HW Elev.	2,427.22	ft	Tailwater Elevation	2,427.22	ft
Outlet Control HW Elev.	2,427.27	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	2,426.50	ft	Downstream Invert	2,426.22	ft
Length	53.00	ft	Constructed Slope	0.005283	ft/ft

Hydraulic Profile					
Profile	M1		Depth, Downstream	1.00	ft
Slope Type	Mild		Normal Depth	0.36	ft
Flow Regime	Subcritical		Critical Depth	0.35	ft
Velocity Downstream	0.89	ft/s	Critical Slope	0.005648	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	1.00	ft
Section Size	12 inch		Rise	1.00	ft
Number Sections	2				

Outlet Control Properties					
Outlet Control HW Elev.	2,427.27	ft	Upstream Velocity Head	0.02	ft
Ke	0.90		Entrance Loss	0.02	ft

Inlet Control Properties					
Inlet Control HW Elev.	2,427.22	ft	Flow Control	Unsubmerged	
Inlet Type	Square edge w/headwall		Area Full	1.6	ft^2
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
Pipe Culvert 105 100yr

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	2,428.55	ft	Headwater Depth/Height	0.88	
Computed Headwater Elev	2,427.10	ft	Discharge	0.70	cfs
Inlet Control HW Elev.	2,427.09	ft	Tailwater Elevation	2,427.09	ft
Outlet Control HW Elev.	2,427.10	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	2,426.22	ft	Downstream Invert	2,426.09	ft
Length	26.00	ft	Constructed Slope	0.005000	ft/ft

Hydraulic Profile					
Profile	M1		Depth, Downstream	1.00	ft
Slope Type	Mild		Normal Depth	0.25	ft
Flow Regime	Subcritical		Critical Depth	0.24	ft
Velocity Downstream	0.45	ft/s	Critical Slope	0.005675	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	1.00	ft
Section Size	12 inch		Rise	1.00	ft
Number Sections	2				

Outlet Control Properties					
Outlet Control HW Elev.	2,427.10	ft	Upstream Velocity Head	0.00	ft
Ke	0.50		Entrance Loss	0.00	ft

Inlet Control Properties					
Inlet Control HW Elev.	2,427.09	ft	Flow Control	Unsubmerged	
Inlet Type	Square edge w/headwall		Area Full	1.6	ft^2
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

APPENDIX F

Grated Inlet Analysis

SHEET NO 1 OF 2

JOB NUMBER 04.0039

TITLE Fountain Hills Trailhead

SUBJECT

MADE BY ALU DATE 4/14/06 CHECKED BY JLT DATE 4/17/06

To pass required flow, grated inlet will operate under weir or orifice flow:

weir flow: $Q = CLH^{3/2}$

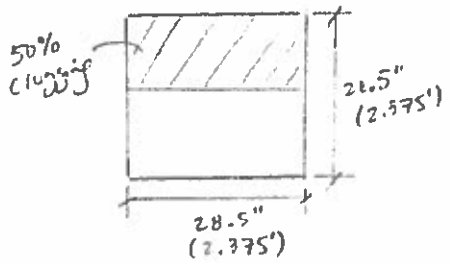
$C = 3.0$
L = perimeter adjusted for clogging
H = headwater, ft

orifice flow: $Q = C_b \cdot A\sqrt{2gH}$

$C_b = 0.67$
A = area, adjusted for open area + clogging
g = acceleration due to gravity.

For a given headwater, the minimum flow of these two operating conditions will control.

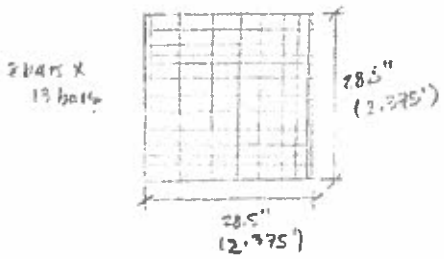
Perimeter for a MAG 537 under 50% clogging:



$P_{adj} = 2(2.375) + 2\left(\frac{1}{2}(2.375)\right)$

$\boxed{P_{adj} = 7.1 \text{ ft}}$

Area for a MAG 537 under 50% clogging:



Area = (2.375') x (2.375') = 5.64 ft²

Area open = Area - A_{bars}.

A_{bars} = (# of bars)(width of bars)(Length of bar) − (t_{bar})(t_{bar})(# of crossover pts)

$A_{bars} = (21 \text{ bars})(0.25 \text{ in} \cdot \frac{1 \text{ ft}}{12 \text{ in}})(28.5 \text{ in} \cdot \frac{1 \text{ ft}}{12 \text{ in}}) - 0.0$

$A_{bars} = 1.00 \text{ ft}^2$

Area crossover = (1/4")(1/4")
= 0.0625 in² (1 ft / 12 in)²
= (0.000434 ft²)(104)
= 0.05 ft²

Area open = 5.64 ft² − 1.00 ft²

Area open = 4.64 ft²

Area open, unclogged = 0.5 (4.64 ft²)

$\boxed{\text{Area open, unclogged} = 2.32 \text{ ft}^2}$

TITLE Fountain Hills Trailhead

SUBJECT

MADE BY ALU DATE 4/14/06 CHECKED BY QH DATE 4/17/06

For grate E, $Q_{100} = 1.4$ cfs, the headwater required to pass this flow is:

weir flow: $H = \left(\frac{Q}{C \cdot L}\right)^{2/3}$

$H = \left(\frac{1.4 \text{ cfs}}{(3.0)(7.1 \text{ ft})}\right)^{2/3}$ $H = 0.16 \text{ ft} = 1.95 \text{ in.}$

orifice flow: $H = \left(\frac{Q}{C_b \cdot A}\right)^2 \left(\frac{1}{2g}\right)$

$H = \left(\frac{1}{2(32.2 \text{ ft/s}^2)}\right)\left(\frac{1.4 \text{ cfs}}{(0.67)(2.32 \text{ ft}^2)}\right)^2$

$H = 0.01 \text{ ft} = 0.15 \text{ in.}$

weir flow controls → it takes a head of 1.95" to pass $Q_{100} = 1.4$ cfs

For grate F, $Q_{100} = 0.7$ cfs, the headwater required to pass this flow:

weir flow $H = \left(\frac{Q}{C \cdot L}\right)^{2/3}$

$H = \left(\frac{0.7 \text{ cfs}}{(3.0)(7.1 \text{ ft})}\right)^{2/3}$ $H = 0.10 \text{ ft} = 1.2 \text{ in.}$

orifice flow: $H = \left(\frac{Q}{C_b \cdot A}\right)^2 \left(\frac{1}{2g}\right)$

$H = \left(\frac{1}{2(32.2)}\right)\left(\frac{0.7 \text{ cfs}}{(0.67)(2.32 \text{ ft}^2)}\right)^2$

$H = 0.003 \text{ ft} = 0.04 \text{ in.}$

weir flow controls → it takes 1.2 in of head to pass $Q_{100} = 0.7$ cfs.

Worksheet for Storm Drain for Inlets 104 and 105

Project Description		
Flow Element:	Circular Pipe	
Friction Method:	Manning Formula	
Solve For:	Full Flow Capacity	
Input Data		
Roughness Coefficient:	0.013	
Channel Slope:	0.00500	ft/ft
Diameter:	1.00	ft
Results		
Discharge:	2.52	ft^3/s
Normal Depth:	1.00	ft
Flow Area:	0.79	ft^2
Wetted Perimeter:	3.14	ft
Top Width:	0.00	ft
Critical Depth:	0.68	ft
Percent Full:	100.0	%
Critical Slope:	0.00770	ft/ft
Velocity:	3.21	ft/s
Velocity Head:	0.16	ft
Specific Energy:	1.16	ft
Froude Number:	0.00	
Maximum Discharge:	2.71	ft^3/s
Discharge Full:	2.52	ft^3/s
Slope Full:	0.00500	ft/ft
Flow Type:	SubCritical	
GVF Input Data		
Downstream Depth:	0.00	ft
Length:	0.00	ft
Number Of Steps:	0	
GVF Output Data		
Upstream Depth:	0.00	ft
Profile Description:		
Profile Headloss:	0.00	ft
Average End Depth Over Rise:	0.00	%
Normal Depth Over Rise:	1.00	%
Downstream Velocity:	Infinity	ft/s

Worksheet for Storm Drain for Inlets 104 and 105

Upstream Velocity:	Infinity	ft/s
Normal Depth:	1.00	ft
Critical Depth:	0.68	ft
Channel Slope:	0.00500	ft/ft
Critical Slope:	0.00770	ft/ft

APPENDIX G

Natural Channel Downstream of Culvert 103

Channel between Culvert 102 and 103A

Worksheet for Channel between Culverts 101 and 103A

Project Description		
Flow Element:	Trapezoidal Channel	
Friction Method:	Manning Formula	
Solve For:	Normal Depth	
Input Data		
Roughness Coefficient:	0.078	
Channel Slope:	0.03000	ft/ft
Left Side Slope:	1.00	ft/ft (H:V)
Right Side Slope:	0.01	ft/ft (H:V)
Bottom Width:	8.00	ft
Discharge:	9.60	ft^3/s
Results		
Normal Depth:	0.56	ft
Flow Area:	4.64	ft^2
Wetted Perimeter:	9.35	ft
Top Width:	8.57	ft
Critical Depth:	0.35	ft
Critical Slope:	0.13650	ft/ft
Velocity:	2.07	ft/s
Velocity Head:	0.07	ft
Specific Energy:	0.63	ft
Froude Number:	0.50	
Flow Type:	Subcritical	
GVF Input Data		
Downstream Depth:	0.00	ft
Length:	0.00	ft
Number Of Steps:	0	
GVF Output Data		
Upstream Depth:	0.00	ft
Profile Description:		
Headloss:	0.00	ft
Downstream Velocity:	Infinity	ft/s
Upstream Velocity:	Infinity	ft/s
Normal Depth:	0.56	ft
Critical Depth:	0.35	ft
Channel Slope:	0.03000	ft/ft

Worksheet for Channel between Culverts 101 and 103A

Critical Slope:	0.13650	ft/ft

Worksheet for Natural Channel D/S Culvert 103B

Project Description		
Flow Element:	Triangular Channel	
Friction Method:	Manning Formula	
Solve For:	Normal Depth	
Input Data		
Roughness Coefficient:	0.040	
Channel Slope:	0.09400	ft/ft
Left Side Slope:	2.75	ft/ft (H:V)
Right Side Slope:	2.70	ft/ft (H:V)
Discharge:	80.00	ft^3/s
Results		
Normal Depth:	1.72	ft
Flow Area:	8.09	ft^2
Wetted Perimeter:	10.00	ft
Top Width:	9.39	ft
Critical Depth:	2.22	ft
Critical Slope:	0.02451	ft/ft
Velocity:	9.89	ft/s
Velocity Head:	1.52	ft
Specific Energy:	3.24	ft
Froude Number:	1.88	
Flow Type:	Supercritical	
GVF Input Data		
Downstream Depth:	0.00	ft
Length:	0.00	ft
Number Of Steps:	0	
GVF Output Data		
Upstream Depth:	0.00	ft
Profile Description:		
Profile Headloss:	0.00	ft
Downstream Velocity:	Infinity	ft/s
Upstream Velocity:	Infinity	ft/s
Normal Depth:	1.72	ft
Critical Depth:	2.22	ft
Channel Slope:	0.09400	ft/ft
Critical Slope:	0.02451	ft/ft

BUILDING
STRUCTURAL CALCULATIONS

For

Town of Fountain Hills

Adero Canyon Trailhead Restroom Building

Prepared by
Orcutt Winslow
3003 North Central Avenue
Sixteenth Floor
Phoenix, Arizona 85012

Job No.	16-124	Sheet No.	Cover
By	TH	Date	10/16

CARUSO
TURLEY
SCOTT
structural
engineers

CLIENT:

Orcutt Winslow Partnership
3003 N Central, 16th Floor
Phoenix, AZ 850112

Registered Professional Engineer (Structural)
CERTIFICATE NO. 13964
RICHARD D. TURLEY
Date Signed 12-9-16
ARIZONA, U.S.A.
EXPIRES 09-30-19

PROJECT:

McDowell Mountain Preserve
Trailhead Restrooms
Fountain Hills, AZ

STRUCTURAL
ENGINEERING
EXCELLENCE

PARTNERS
Richard Turley, PE
Paul Scott, PE, SE
Sandra Herd, PE, SE, LEED AP
Chris Atkinson, PE, SE, LEED AP
Thomas Morris, PE, LEED AP
Richard Dahlmann, PE

GENERAL INFORMATION:

BUILDING CODE: **2012 IBC**

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130 South Priest Drive
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Job Name MMP TRAILHEAD
Job No. _____ Sheet No. C
By _____ Date _____

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13 FOOTING REVIEW
14 LATERAL ANALYSIS

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Job Name McDowell Mtn Preserve Trailhead Plans

Job No 16124 Sheet No. 1

By TH Date 10/16

BASIS FOR DESIGN

BUILDING CODE:	2012 EDITION OF THE INTERNATIONAL BUILDING CODE
LOADS:	ROOF LIVE LOAD = 20 PSF (REDUCIBLE). ROOF DEAD LOAD = 15 PSF. WIND LOAD = 90 MPH WIND SPEED, EXPOSURE C.
FOUNDATIONS:	SOIL REPORT BY RICKER, ATKINSON, MCBEE, JOB NO. G11251. SPREAD FOOTINGS SHALL BEAR ON FIRM, UNDISTURBED SOIL 1'– 6" MINIMUM BELOW FINISHED GRADE. ALLOWABLE BEARING VALUE = 2000 PSF.
CONCRETE:	MINIMUM 28 DAY STRENGTH 3,000 PSI EXCEPT AS FOLLOWS: SLABS ON GRADE ---------- 3,000 PSI FOUNDATIONS AND CAISSONS ---------- 2,500 PSI (DESIGN FOR FOUNDATIONS BASED ON 2,500 PSI)
MASONRY:	HOLLOW CONCRETE MASONRY UNITS: F'm = 1,500 PSI (DESIGN BASED ON INSPECTED VALUES)
REINFORCING:	BARS #5 AND SMALLER: Fy = 40,000 PSI.
STRUCTURAL STEEL:	STRUCTURAL STEEL: Fy = 36,000 PSI. BOLTS: A307

$TA = H^2/3 = 14^2/3 = 65\,sf$

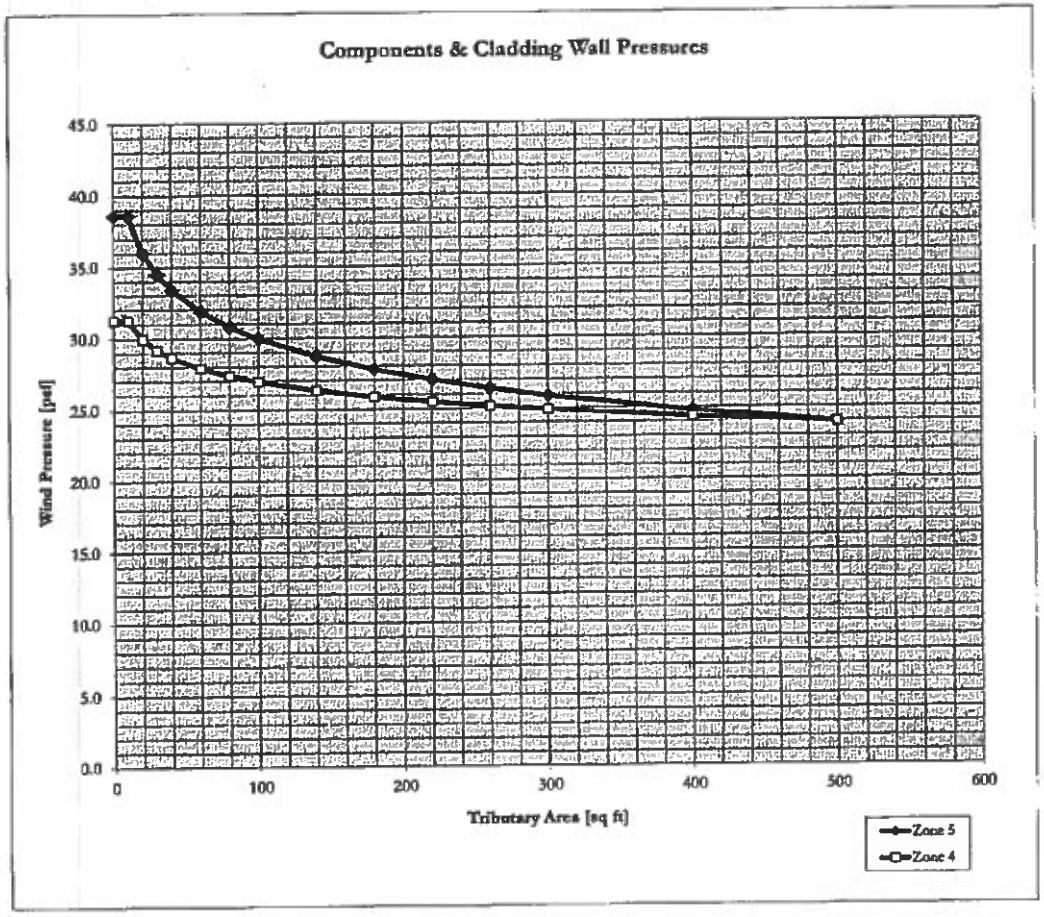
Components & Cladding Wall Loading [eave / mean roof height = 14 ft - 115 mph - Exposure C]

ASCE 7-10 Sections 30.4 (h <60) & 30.6 (h >60)

V_{3s} =	115	[mph - wind speed - 3 sec gust]	z_g =	900	[Table 26.9-1 ASCE 7-10, page 256]
Exposure =	C	[B, C, D - Section 26.7.3 ASCE 7-10]	α =	9.5	[Table 26.9-1 ASCE 7-10, page 256]
K_{zt} =	1.00	[Figure 26.8-1 ASCE 7-10, page 252 & 253]	h =	14	[ft - eave / mean roof height]
K_d =	0.85	[Table 26.6-1 ASCE 7-10, page 250 (for all buildings, K_d = 0.85)]	K_h =	0.85	[Table 30.3-1 ASCE 7-10, page 317]

$PW4 = 27.8\,psf$

		Tributary Area [sq ft]														
		0	10	20	30	40	60	80	100	110	150	220	260	300	400	500
Zone 5	$GC_p \pm GC_{pi}$	1.58	1.58	1.47	1.41	1.37	1.31	1.26	1.23	1.18	1.14	1.11	1.08	1.06	1.01	0.98
	Pressure [psf]	38.6	38.6	36.0	34.5	33.4	31.9	30.8	30.0	28.7	27.8	27.0	26.4	25.9	24.8	23.9
Zone 4	$GC_p \pm GC_{pi}$	1.28	1.28	1.23	1.20	1.17	1.14	1.12	1.10	1.08	1.06	1.04	1.03	1.02	1.00	0.98
	Pressure [psf]	31.3	31.3	30.0	29.2	28.7	27.9	27.4	27.0	26.3	25.9	25.5	25.2	24.9	24.4	23.9



Design Equations

$p_{C\&C\ h<60} = q_h(GC_p \pm GC_{pi})$ [eq 30.4-1]

$p_{C\&C\ h>60} = q(GC_p) \pm q_i(GC_{pi})$ [eq 30.6-1]

(note: it is conservatively assumed q and q_i equal q_h therefore the two equations above can be combined into one equation.)

$p_{C\&C} = q_h(GC_p \pm GC_{pi})$

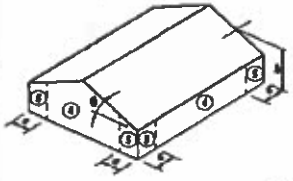
$q_h = 0.00256 * K_h * K_{zt} * K_d * V^2$ [eq 30.3-1]

$\pm GC_{pi} = 0.18$ [enclosed building] [table 26.11-1]

$p_{C\&C} = 24.429 * (GC_p \pm GC_{pi})$

External Pressure Coefficients for h ≤ 60 (fig. 30.4-1)		
Zone	Tributary Area	(GC_p)
5 wall corner	$A \le 10\ ft^2$	-1.4
	$10 < A \le 500\ ft^2$	-1.7532+0.3532 log A
	$A > 500\ ft^2$	-0.8
4 wall interior	$A \le 10\ ft^2$	-1.1
	$10 < A \le 500\ ft^2$	-1.2766+0.1766 log A
	$A > 500\ ft^2$	-0.8

External Pressure Coefficients for h > 60 (fig. 30.6-1)		
Zone	Tributary Area	(GC_p)
5 wall corner	$A \le 20\ ft^2$	-1.8
	$20 < A \le 500\ ft^2$	-2.5445+0.5723 log A
	$A > 500\ ft^2$	-1.0
4 wall interior	$A \le 20\ ft^2$	-0.9
	$20 < A \le 500\ ft^2$	-1.0861+0.1431 log A
	$A > 500\ ft^2$	-0.7



$a = max[a_1; a_2]$

$a_1 = min[(0.1)(LHD); (0.4)(h)]$

$a_2 = max[(0.04)(LHD); 3\ ft]$

LHD = least horizontal dimension

Chart Printed: 10/17/2016

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Job Name: McDowell Mountain

Job No.: 16124 Sheet No.: 2

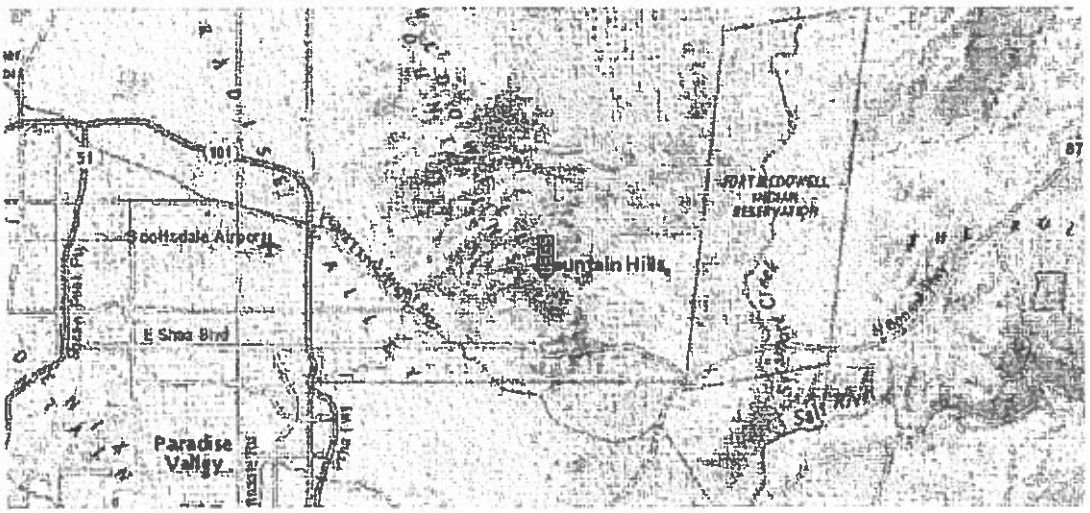
By: Date: 10-16

3

USGS Design Maps Summary Report

User-Specified Input

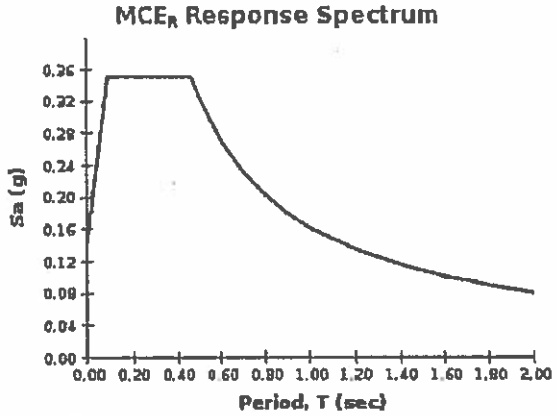
Report Title	McDowell Mtn Prsrve Trailhead Restrooms Thu February 18, 2016 16:32:21 UTC
Building Code Reference Document	2012 International Building Code (which utilizes USGS hazard data available in 2008)
Site Coordinates	33.618°N, 111.77732°W
Site Soil Classification	Site Class D - "Stiff Soil"
Risk Category	I/II/III

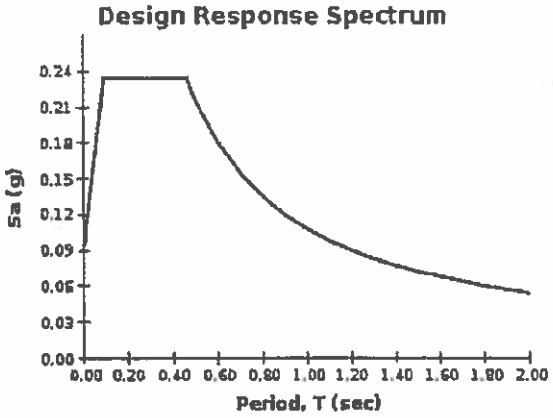


USGS-Provided Output

S_S =	0.219 g	S_{MS} =	0.351 g	S_{DS} =	0.234 g
S_1 =	0.068 g	S_{M1} =	0.162 g	S_{D1} =	0.108 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.

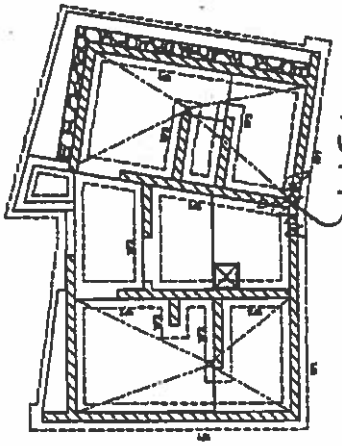




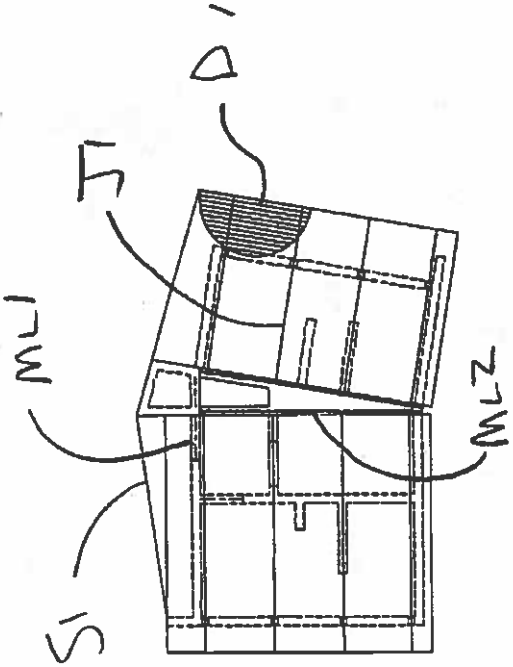
SHEET 4 NOT USED

5 + 6

FRAMING
KEY PLANS



FOUNDATION



ROOF FRAMING

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Job Name MMP TRAIL PLAN
Job No 16124 Sheet No. 7
By TH Date 10/16

ROOF DESIGN

DECK

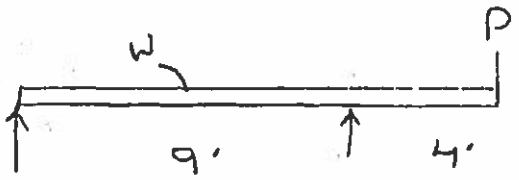
JOIST SPAN = 6' OC MAX

D1 USE 3" DEEP 16GA STEEL DECK

JOIST

J1 L = 9' CANT = 4'

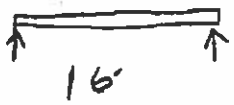
$P = \frac{14'}{2} \times \frac{4'}{2}(15_D + 20_L) = 210_D + 280_L = 490_{TL}$



$w = 6'(15_D + 20_L) = 90_D + 120_L$

USE WT 8 x 13 @ 6' OC
(OR GREATER)

S1 ONE WAY SLAB DESIGN



L = 16'

d =

$R_L = R_R = .9^{KLF}$

$w = 1' \times \left(\frac{6''}{12''/'}\right)(150PCF_{DL} + 20PCF_{LL}) = 75_D + 20_L$

USE 6 1/2" DEEP CONC SLAB W/ #5@12" OC, E.W.

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Tempe, AZ 85301
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Project Title: McDowell Mountain Park
Engineer: TH
Project Descr: Adera Trail Restroom
Project ID: 16124

8

Steel Beam

File = g:\ENG_PR~1_CTSEN~2\16124M~1\CALCUL~1\calcs.ec6
ENERCALC, INC. 1983-2016, Build:6.16.7.21, Ver:6.16.7.21
Lic. # : KW-06000624 Licensee : caruso turley scott

Description : J1 Steel Beam - joist

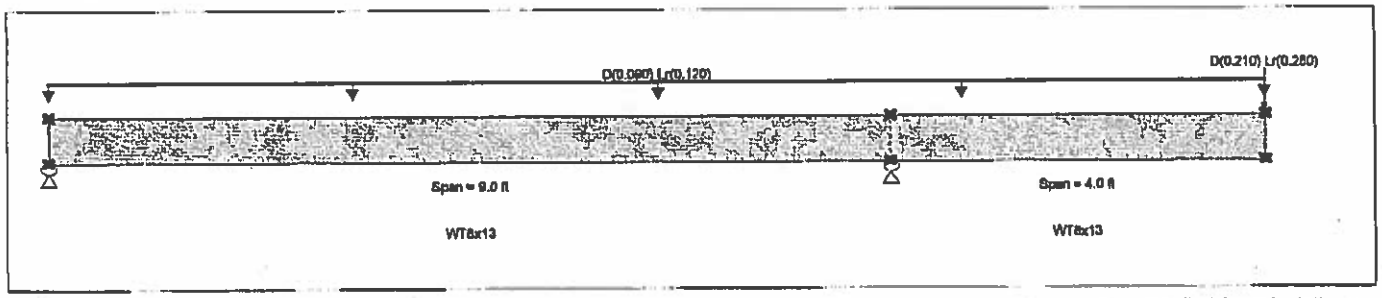
CODE REFERENCES

Calculations per AISC 360-10, IBC 2012, ASCE 7-10
Load Combination Set : ASCE 7-10

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Completely Unbraced
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.090, Lr = 0.120 k/ft
Point Load : D = 0.210, Lr = 0.280 k, Starting at : 13.0 ft and placed every 0.0 ft thereafter

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.904 : 1	Maximum Shear Stress Ratio =	0.040 : 1
Section used for this span	WT6x13	Section used for this span	WT6x13
Ma : Applied	3.744 k-ft	Va : Applied	1.420 k
Mn / Omega : Allowable	4.142 k-ft	Vn/Omega : Allowable	35.254 k
Load Combination	+D+Lr, LL Comb Run (LL)	Load Combination	+D+Lr, LL Comb Run (LL)
Location of maximum on span	9.000ft	Location of maximum on span	9.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.088 in	Ratio =	1,089 >=360
Max Upward Transient Deflection	-0.037 in	Ratio =	2,596 >=360
Max Downward Total Deflection	0.127 in	Ratio =	758 >=240
Max Upward Total Deflection	-0.028 in	Ratio =	3816 >=240

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 9.00 ft	1	0.402	0.018	0.38	-1.66	1.66	6.92	4.14	2.77	1.00	0.65	58.88	35.25
Dsgn. L = 4.00 ft	2	0.402	0.018		-1.66	1.66	6.92	4.14	1.00	1.00	0.62	58.88	35.25
+D+Lr, LL Comb Run (*L)													
Dsgn. L = 9.00 ft	1	0.904	0.039	0.01	-3.74	3.74	6.92	4.14	2.43	1.00	1.38	58.88	35.25
Dsgn. L = 4.00 ft	2	0.904	0.039		-3.74	3.74	6.92	4.14	1.00	1.00	1.38	58.88	35.25
+D+Lr, LL Comb Run (L*)													
Dsgn. L = 9.00 ft	1	0.402	0.034	1.50	-1.66	1.66	6.92	4.14	1.39	1.00	1.19	58.88	35.25
Dsgn. L = 4.00 ft	2	0.402	0.018		-1.66	1.66	6.92	4.14	1.00	1.00	0.62	58.88	35.25
+D+Lr, LL Comb Run (LL)													
Dsgn. L = 9.00 ft	1	0.904	0.040	0.77	-3.74	3.74	6.92	4.14	2.83	1.00	1.42	58.88	35.25
Dsgn. L = 4.00 ft	2	0.904	0.039		-3.74	3.74	6.92	4.14	1.00	1.00	1.38	58.88	35.25
+D+0.750Lr, LL Comb Run (*L)													
Dsgn. L = 9.00 ft	1	0.778	0.034	0.05	-3.22	3.22	6.92	4.14	2.63	1.00	1.19	58.88	35.25
Dsgn. L = 4.00 ft	2	0.778	0.034		-3.22	3.22	6.92	4.14	1.00	1.00	1.19	58.88	35.25
+D+0.750Lr, LL Comb Run (L*)													
Dsgn. L = 9.00 ft	1	0.402	0.030	1.21	-1.66	1.66	6.92	4.14	1.68	1.00	1.05	58.88	35.25
Dsgn. L = 4.00 ft	2	0.402	0.018		-1.66	1.66	6.92	4.14	1.00	1.00	0.62	58.88	35.25
+D+0.750Lr, LL Comb Run (LL)													
Dsgn. L = 9.00 ft	1	0.778	0.035	0.67	-3.22	3.22	6.92	4.14	2.82	1.00	1.23	58.88	35.25
Dsgn. L = 4.00 ft	2	0.778	0.034		-3.22	3.22	6.92	4.14	1.00	1.00	1.19	58.88	35.25
+0.60D													
Dsgn. L = 9.00 ft	1	0.241	0.011	0.23	-1.00	1.00	6.92	4.14	2.77	1.00	0.39	58.88	35.25

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Project Title: McDowell Mountain Park
Engineer: TH
Project Descr: Adera Trail Restroom

Project ID: 16124

9

Steel Beam

File = g:\ENG_PR-1_CTSEN-2\16124M-1\CALCUL-1\calcs.ec6.
ENERCALC, INC. 1983-2016, Build:6.16.7.21, Ver:6.16.7.21

Lic. # : KW-06000624 Licensee : caruso turley scott

Description : J1 Steel Beam - joist

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
Dsgn. L = 4.00 ft	2	0.241	0.011		-1.00	1.00	5.92	4.14	1.00	1.00	0.37	58.88	35.25

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	0.0275	4.104	+D+Lr	-0.0283	5.760
+D+Lr	2	0.1267	4.000		0.0000	5.760

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	0.819	2.802	
Overall MINimum	0.048	0.540	
D Only	0.279	1.270	
+D+Lr, LL Comb Run (*L)	0.048	2.262	
+D+Lr, LL Comb Run (L*)	0.819	1.810	
+D+Lr, LL Comb Run (LL)	0.588	2.802	
+D+0.750Lr, LL Comb Run (*L)	0.105	2.014	
+D+0.750Lr, LL Comb Run (L*)	0.684	1.675	
+D+0.750Lr, LL Comb Run (LL)	0.510	2.419	
+0.60D	0.167	0.762	
Lr Only, LL Comb Run (*L)	-0.231	0.991	
Lr Only, LL Comb Run (L*)	0.540	0.540	
Lr Only, LL Comb Run (LL)	0.309	1.531	

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Project Title: McDowell Mountain Park
Engineer: TH
Project Descr: Adera Trail Restroom
Project ID: 16124

10

Concrete Beam

File = g:\ENG_PR~1_CTSEN~2\16124M~1\CALCUL~1\calcs.ec6
ENERCALC, INC. 1983-2016, Build:6.16.7.21, Ver:6.16.7.21
Lic. # : KW-06000624 Licensee : caruso turley scott

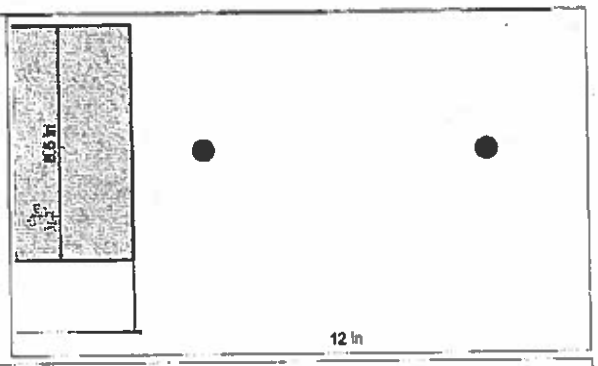
Description : S1

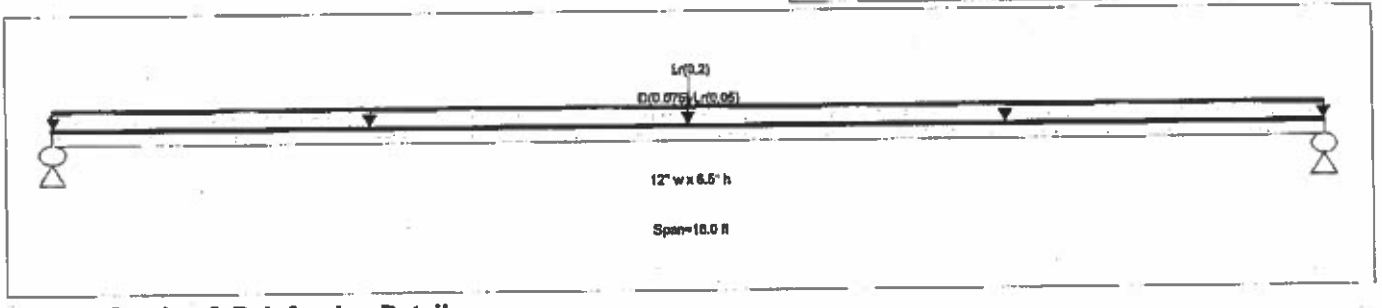
CODE REFERENCES

Calculations per ACI 318-11, IBC 2012, ASCE 7-10
Load Combination Set : ASCE 7-10

Material Properties

f'c	= 3.0 ksi	ϕ Phi Values	Flexure :	0.90
fr = f'c^1/2 * 7.50	= 410.792 psi		Shear :	0.750
ψ Density	= 145.0 pcf	β 1	=	0.850
λ LtWt Factor	= 1.0			
Elastic Modulus	= 3,122.0 ksi	Fy - Stirrups		40.0 ksi
		E - Stirrups	=	29,000.0 ksi
fy - Main Rebar	= 60.0 ksi	Stirrup Bar Size #		5
E - Main Rebar	= 29,000.0 ksi			
		Number of Resisting Legs Per Stirrup =		2





Cross Section & Reinforcing Details

Rectangular Section, Width = 12.0 in, Height = 6.50 in
Span #1 Reinforcing....
2-#5 at 3.0 in from Bottom, from 0.0 to 16.0 ft in this span

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Load for Span Number 1
Uniform Load : D = 0.0750, Lr = 0.050 k/ft, Tributary Width = 1.0 ft
Point Load : Lr = 0.20 k @ 8.0 ft, (Service Loads)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.833 : 1	Maximum Deflection	
Section used for this span	Typical Section	Max Downward Transient Deflection	0.120 in Ratio = 1595 >=36
Mu : Applied	6.718 k-ft	Max Upward Transient Deflection	0.000 in Ratio = 0 <360
Mn * Phi : Allowable	8.069 k-ft	Max Downward Total Deflection	0.749 in Ratio = 256 >=18
Location of maximum on span	8.015 ft	Max Upward Total Deflection	0.000 in Ratio = 999 <180
Span # where maximum occurs	Span # 1		

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
Overall MAXimum	1.100	1.100
Overall MINimum	0.360	0.360
D Only	0.600	0.600
+D+Lr	1.100	1.100
+D+0.750Lr	0.975	0.975
+0.60D	0.360	0.360
Lr Only	0.500	0.500

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.20D+1.60Lr	1	0.00	3.50	1.52	1.52	0.00	1.00	4.44	Vu < PhiVc/2	Not Reqd 1	4.4	0.0	0.0
+1.20D+1.60Lr	1	0.03	3.50	1.52	1.52	0.04	1.00	4.44	Vu < PhiVc/2	Not Reqd 1	4.4	0.0	0.0

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structural
engineers

Rio Salado Executive Center
130 South Priest Drive
Tempe, Arizona 85281
480-774-1700 FAX 480-774-1701

Job Name MMP TRAILHEAD
Job No. 16124 Sheet No. 11
By TH Date 2/16

MASONRY LINTEL DESIGN

ML1

SPAN < 4'

$W = \left(\frac{18}{2} + \frac{12'}{2}\right)(15_D + 20_L) + 2'(78PSF) = 381 + 300 = 681 PLF$

ROOF Wall WT

< 1510 PLF

USE 16" DEEP ML W/ 2#5 BOTTOM OK

ML2

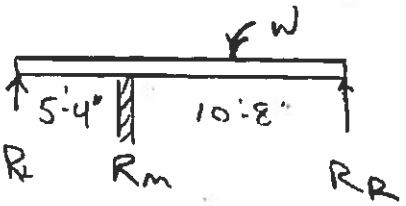
SPAN = 10'-8" AND 5'-4"

$W = \frac{18'}{2}(15_D + 20_L) + 5'(65PSF)$

$= 135_D + 180_L \quad 325$

$= 460_D + 180_L$

$W = 640 PLF$



$R_M = \frac{16}{2}(952) = 7.62^K$

INCLUDE MASONRY SOFFET AND CAP

$W_{TL} = 640PLF + 2(2')(78PSF) = 952 PLF < 1231 PLF @ 12'$

USE 32" DEEP ML W/ 2#5 TOP + BOTTOM

CARUSO TURLEY SCOTT, INC.
Consulting Structural Engineers
2702 N. 44th Street, Suite 200
Phoenix, Arizona 85008
(602) 912-9120 fax (602) 912-9390

Job Name: MMP TRAILHEAD PLANS
Job No.: 16-124 Sheet: 12
By: TH Date: 10/16

8" MASONRY LINTEL ALLOWABLE LOADS **

Special Inspection Required

DESIGN DATA:

fm =	1,500	psi	Specified masonry compressive strength
t =	7.62	in.	Actual masonry thickness or width
clear =	4	in.	Cover at reinforcing - bottom face to steel centroid
fs =	19,200	psi	Allowable steel stress - reduced 20% for standard lap lengths
Special Inspection =	yes	("yes" or "no")	Special Inspection - full allowable stress design

ALLOWABLE UNIFORM LOAD (plf)

Lintel Height		Reinforcing	LINTEL SPAN (ft) 2	2.67	3.33	4	4.67	5.33	6	6.67	7.33
1'-4"	16	2 #4	3,098	2,321	1,861	1,549	1,327	1,163	1,033	929	845
	16	2 #5	3,020	2,262	1,814	ML) 1,510	1,293	1,133	1,007	906	824
	16	2 #6	2,953	2,212	1,773	1,475	1,263	1,106	984	885	806
2'-0"	24	2 #4	5,300	3,970	3,183	2,650	2,270	1,989	1,767	1,589	1,446
	24	2 #5	5,184	3,883	3,114	2,592	2,220	1,945	1,728	1,555	1,415
	24	2 #6	5,083	3,807	3,053	2,541	2,177	1,907	1,694	1,524	1,387
2'-8"	32	2 #4	7,530	5,640	4,522	3,765	3,225	2,825	2,510	2,258	2,055
	32	2 #5	7,384	5,531	4,435	3,692	3,162	2,771	2,461	2,214	2,015
	32	2 #6	7,253	5,433	4,356	3,628	3,106	2,721	2,418	2,175	1,979
3'-4"	40	2 #4	9,777	7,324	5,872	4,889	4,187	3,669	3,259	2,932	2,668
	40	2 #5	9,604	7,194	5,768	4,802	4,113	3,604	3,201	2,880	2,621
	40	2 #6	9,448	7,077	5,674	4,724	4,046	3,545	3,149	2,833	2,578
4'-0"	48	2 #4	12,037	9,016	7,229	6,018	5,156	4,517	4,012	3,609	3,284
	48	2 #5	11,839	8,868	7,111	5,920	5,070	4,443	3,946	3,550	3,230
	48	2 #6	11,659	5,734	7,003	5,830	4,993	4,375	3,886	3,496	3,181
4'-8"	56	2 #4	14,305	10,715	8,592	7,152	6,126	5,368	4,768	4,289	3,903
	56	2 #5	14,085	10,551	8,460	7,043	6,032	5,285	4,695	4,223	3,843
	56	2 #6	13,884	10,400	8,339	6,942	5,946	5,210	4,628	4,163	3,788
5'-4"	64	2 #4	16,580	12,419	9,958	8,290	7,101	6,221	5,527	4,971	4,524
	64	2 #5	16,339	12,239	9,813	8,170	6,998	6,131	5,446	4,899	4,458
	64	2 #6	16,116	12,073	9,680	8,059	6,903	6,048	5,373	4,833	4,399
6'-0"	72	2 #4	18,880	14,128	11,327	9,430	8,077	7,077	6,287	5,655	5,146
	72	2 #5	18,600	13,933	11,171	9,300	7,966	6,979	6,200	5,577	5,078
	72	2 #6	18,350	13,753	11,027	9,180	7,863	6,889	6,120	5,506	5,010

ALLOWABLE UNIFORM LOAD (plf)

Lintel Height		Reinforcing	LINTEL SPAN (ft) 6	6.67	8.33	10	12	14	16	18	20
1'-4"	16	2 #4	775	715	616	538	378	274	210	166	134
	16	2 #5	755	697	647	604	474	348	266	211	171
	16	2 #6	738	681	533	591	492	384	294	232	188
2'-0"	24	2 #4	1,325	1,223	1,056	919	658	489	359	284	230
	24	2 #5	1,296	1,196	1,111	1,037	864	711	545	430	349
	24	2 #6	1,271	1,172	1,090	1,017	847	726	635	567	451
2'-8"	32	2 #4	1,882	1,737	1,501	1,306	937	667	510	403	327
	32	2 #5	1,846	1,703	1,583	1,477	ML2 1,231	1,013	776	613	498
	32	2 #6	1,813	1,673	1,555	1,451	1,209	1,036	907	806	652
3'-4"	40	2 #4	2,444	2,255	1,949	1,695	1,176	865	663	524	424
	40	2 #5	2,401	2,216	2,059	1,921	1,601	1,319	1,009	797	646
	40	2 #6	2,362	2,179	2,025	1,890	1,575	1,350	1,181	1,050	901
4'-0"	48	2 #4	3,009	2,777	2,399	2,088	1,450	1,066	818	645	522
	48	2 #5	2,960	2,731	2,538	2,368	1,973	1,624	1,244	983	796
	48	2 #6	2,915	2,690	2,499	2,332	1,943	1,596	1,457	1,295	1,113
4'-8"	56	2 #4	3,578	3,300	2,851	2,482	1,723	1,266	969	766	620
	56	2 #5	3,521	3,249	3,019	2,817	2,348	1,932	1,480	1,169	947
	56	2 #6	3,471	3,203	2,976	2,777	2,314	1,983	1,735	1,543	1,325
5'-4"	64	2 #4	4,145	3,825	3,304	2,876	1,997	1,468	1,124	888	719
	64	2 #5	4,085	3,769	3,503	3,268	2,723	2,242	1,716	1,356	1,098
	64	2 #6	4,029	3,719	3,455	3,224	2,686	2,303	2,015	1,791	1,539
6'-0"	72	2 #4	4,715	4,351	3,759	3,272	2,272	1,669	1,278	1,010	818
	72	2 #5	4,650	4,291	3,987	3,720	3,100	2,552	1,954	1,544	1,250
	72	2 #6	4,590	4,235	3,936	3,672	3,060	2,523	2,295	2,040	1,752

** Lintel self-weight is not included in the allowable loads - self-weight must be included in the total load to the lintel

Mm = 1/2*fb*k*j*b*d^2	where:	fb = 0.33*f'm	(allowable masonry compressive stress)
Ms = fs*rho*j*b*d^2	where:	fs = 0.8*Fs	(allowable steel stress - 24,000 psi max.)
fv = V / b*j*d	where:	Fv = f'm^0.5	(allowable shear stress - no shear reinforcement required)

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Job Name MMC TRAILHEAD
Job No. 16124 Sheet No. 13
By TH Date 10/16

FOOTING DESIGN

WF1 @ MLZ $P = 7.62^k < 8^k$

$$\text{Ftg Reqd} = \frac{8^k}{\frac{2\ KSF}{\text{width}}} = \frac{4\ SF}{1.33'} = 3' \text{ of cont. SPREAD FOOTING}$$

SUFFICIENT SPREAD FOOTING IS PROVIDED TO BEAR POINTLOADS.

USE 16" X 10" DEEP CONT Ftg W / #5 CONT

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Job Name MMP TRAILHEAD
Job No. 15-124 Sheet No. 14
By TH Date 10/16

LATERAL ANALYSIS

LATERAL FORCES ARE GOVERNED BY WIND DESIGN AS PROVIDED. SEE SHEET 2. CONNECTIONS ARE BASED ON 200 PLF DESIGN LATERAL LOADS AND ARE ADEQUATE BY INSPECTION.

THIS STRUCTURE IS ADEQUATE TO RESIST LATERAL FORCES AS PROVIDED AND IS ADEQUATE BY INSPECTION

TOWN OF FOUNTAIN HILLS, ARIZONA

McDOWELL MOUNTAIN PRESERVE
ADERO CANYON TRAILHEAD
SITE DESIGN

May 31st, 2017

MAYOR:

LINDA M KAVANAGH

TOWN COUNCIL:

DENNIS BROWN
NICK DEPORTER
HENRY LEGER
ALAN MAGAZINE
ART TOLIS
CECIL YATES

PROJECT CONTACT:

RACHAEL GOODWIN
INTERIM COMMUNITY SERVICES DIRECTOR
TOWN OF FOUNTAIN HILLS
16705 EAST AVENUE OF THE FOUNTAINS
FOUNTAIN HILLS, AZ 85268
(480) 816-5135

DESIGN CONSULTANTS:

PRIMARY DESIGN CONSULTANT:
LANDSCAPE ARCHITECTURE & CIVIL ENGINEERING
J2 ENGINEERING & ENVIRONMENTAL DESIGN LLC
4646 EAST COTTON GIN LOOP SUITE B2
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DESIGN CONSULTANTS:
ELECTRICAL ENGINEERING
WRIGHT ENGINEERING CORPORATION
165 EAST CHILTON
CHANDLER, ARIZONA 85225
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www.WrightEngineering.us

RAMADA STRUCTURAL ENGINEERING
STRUCTURAL GRACE, INC
809 NORTH FIRST STREET
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SURVEYING & LEGAL EXHIBITS
AZTEC ENGINEERING GROUP, INC
4801 EAST McDOWELL ROAD
PHOENIX, AZ 85008
(602) 454-0402
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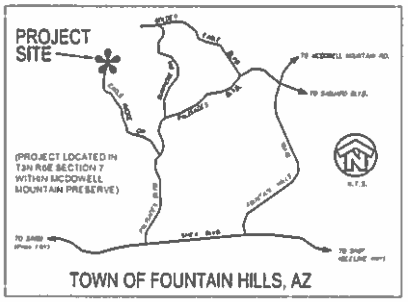
VICINITY MAP:



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NOTE
IT IS INTENDED FOR THIS DESIGN PLAN SET TO BE BID AND CONSTRUCTED IN CONJUNCTION WITH THE ARCHITECTURE DESIGN SET. CONTRACTOR SHALL OBTAIN AND BE FAMILIAR WITH ALL DESIGN PLAN SETS PRIOR TO CONSTRUCTION

UTILITY CONFLICTS:

THESE PLANS HAVE BEEN SUBMITTED TO THE FOLLOWING UTILITY COMPANIES WHERE THE WORK TO BE DONE CONFLICTS WITH ANY OF THESE UTILITIES. THE CONFLICTS SHALL BE RESOLVED AS SPECIFIED IN THE SPECIAL NOTES AND/OR AS OTHERWISE NOTED ON THESE PLANS. CONFLICTS ARISING DURING THE COURSE OF CONSTRUCTION FROM UNFORESEEN CIRCUMSTANCES SHALL BE REPORTED TO THE INTERESTED UTILITY COMPANY AND BE RESOLVED BY THEM AND THE DESIGN ENGINEER

ALSO NOTE THE PROPOSED NEIGHBORING ADERO CANYON DEVELOPMENT - EAGLE RIDGE NORTH SUBDIVISION PLANS HAVE NOT BEEN APPROVED THEREFORE, EXISTING UTILITY CONNECTION POINTS ARE NOT YET ESTABLISHED

UTILITY	COMPANY REP	DATE SUBMITTED
CENTURYLINK (TELEPHONE)	CONFLICT REVIEW	01-11-17
SALT RIVER PROJECT (SRP) (ELECTRIC)	CONFLICT REVIEW	12-09-16
SOUTHWEST GAS (GAS)	WILL FIELDER	12-09-16
FOUNTAIN HILLS SANITARY DISTRICT (SEWER)	-	-
EPCOR WATER COMPANY (WATER)	JOSH VIO	12-09-16

SURVEY CONTROL:

THE SURVEY BASIS OF BEARING IS THE TOWN OF FOUNTAIN HILLS DATUM HOLDING THE BEARING BETWEEN TOWN BENCHMARKS BM69 TO BM118 WHICH BEARS S11°07'03"E.

POINT NO	NORTHING	EASTING	ELEV.	DESCRIPTION / LOCATION
100	34904.7303	12660.6296	2445.53	1/2" REBAR IN AERIAL PANEL
101	35006.4569	12660.3661	2479.10	1/2" REBAR IN AERIAL PANEL
102	35110.1089	12437.8302	2627.08	1/2" REBAR IN AERIAL PANEL
103	34122.0426	12460.9997	2407.86	1/2" REBAR IN AERIAL PANEL
104	34122.2606	12676.7668	2360.22	1/2" REBAR IN AERIAL PANEL
BM69	36730.6510	16061.3630	2078.29	BC FLUSH GOLDEN EAGLE & EDGEWATER
BM106	31966.7320	24985.4120	1731.44	BC FLUSH GOLDEN EAGLE & PALISADES
BM112	34712.6200	16123.9000	2035.66	BC FLUSH SHADOW & MARIPOSA
BM118	34947.2480	19143.2840	1910.32	BC FLUSH PALISADES 400'N OF WESTRIDGE

"AS-BUILT" CERTIFICATION:

I HEREBY CERTIFY THAT THE "AS-BUILT" INFORMATION AS SHOWN HEREON WAS MADE UNDER MY SUPERVISION OR AS NOTED AND IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF

REGISTERED CIVIL ENGINEER DATE

REGISTERED LAND SURVEYOR DATE

APPROVALS:

TOWN OF FOUNTAIN HILLS TOWN ENGINEER DATE

MARICOPA COUNTY ENVIRONMENTAL SERVICES DEPT DATE

△ = BID ALTERNATE INTERIM UTILITIES

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TOWN OF FOUNTAIN HILLS
PARKS & RECREATION DEPT.
FOUNTAIN HILLS TOWN HALL
16705 E. AVENUE OF THE FOUNTAINS
FOUNTAIN HILLS, AZ 85268
(480) 816-5100

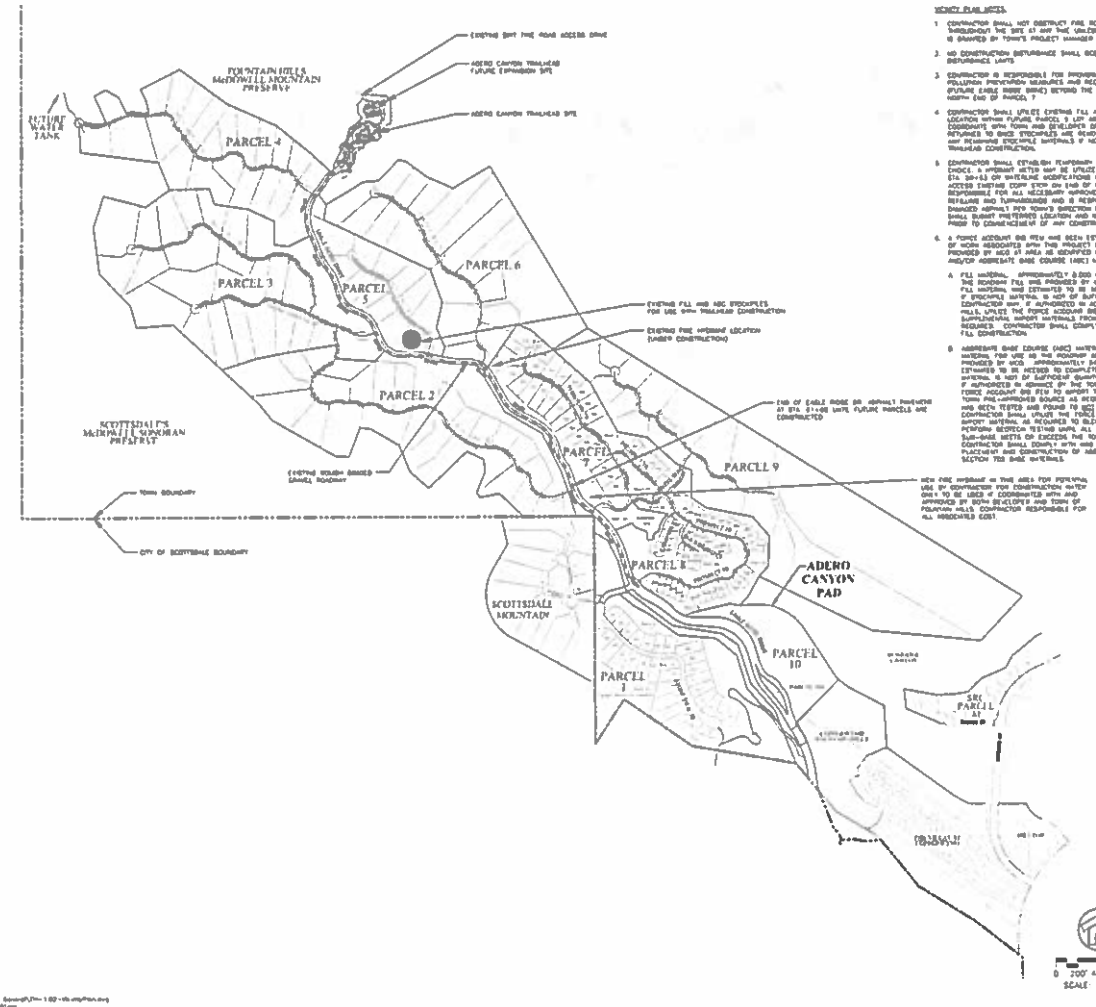
PROJECT: Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead
SITE DESIGN TITLE SHEET

No.	Date	Description
1	10/31/16	90% REVIEW
2	01/17/17	100% REVIEW
3	03/03/17	REVISED SUBMITTAL
4	04/24/17	90% AS BUILT UTILS
5	05/31/17	90% AS

Drawn by: R. BALLIN
Designed by: R. BALLIN
Approved by: J. ENGELMANN
Scale: N/A
Date: 05/31/2017

J2 Project No.: 16 089 7 003

Original Date: Sheet No.: FH-1.01 1 of 58



VICINITY PLAN NOTES:

1. CONTRACTOR SHALL NOT OBSTRUCT FIRE ROAD EMERGENCY VEHICLE ACCESS THROUGHOUT THE SITE AT ANY TIME UNLESS PRIOR COORDINATED AND APPROVAL IS GRANTED BY TOWN'S PROJECT MANAGER AND/OR FIRE DEPARTMENT
2. NO CONSTRUCTION DISTURBANCE SHALL OCCUR BEYOND THE SHOWN ESTIMATED DISTURBANCE LIMITS
3. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL APPLICABLE STORM WATER POLLUTION PREVENTION MEASURES AND REQUIRED DUST CONTROL OF HAUL ROAD (FUTURE EABLE PAVED DRIVE) BEYOND THE IMPROVED ASPHALT ROADWAY AT NORTH END OF PARCEL 7
4. CONTRACTOR SHALL UTILIZE EXISTING FILL AND ABC MATERIALS STOCKPILED AT LOCATION WITHIN FUTURE PARCEL 5 LOT AS SHOWN. CONTRACTOR SHALL COORDINATE WITH TOWN AND DEVELOPER OF THAT CONDITION LOT SHALL BE RETURNED TO GRADE STOCKPILES ARE REMOVED OR THAT SHALL BE DONE WITH ANY REMAINING STOCKPILE MATERIALS IF NOT COMPLETELY UTILIZED WITH TRAILHEAD CONSTRUCTION.
5. CONTRACTOR SHALL ESTABLISH TEMPORARY WATER SERVICE AT LOCATION OF CHOICE. A HYDRANT METER MAY BE UTILIZED AT EXISTING FIRE HYDRANT NEAR STA. 30+63 ON WATERLINE MODIFICATIONS MAY BE MADE NEAR STA. 75+00 TO ACCESS EXISTING DOPP STOP ON END OF 6" WATER LINE. CONTRACTOR IS RESPONSIBLE FOR ALL NECESSARY IMPROVEMENTS TO FACILITATE WATER REFILLING AND TURNAROUNDS AND IS RESPONSIBLE TO REPAIR/REPLACE ANY DAMAGED ASPHALT PER TOWN'S DIRECTION DUE TO SUCH ACTIVITIES. CONTRACTOR SHALL SUBMIT PREFERRED LOCATION AND METHOD TO TOWN FOR APPROVAL PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION
6. A FORCE ACCOUNT ONE FEW HAS BEEN ESTABLISHED FOR THE FOLLOWING ITEMS OF WORK ASSOCIATED WITH THIS PROJECT FOR USE OF STOCKPILED MATERIAL AS PROVIDED BY MCO AT AREA AS DEPICTED ON PLAN FOR ROADWAY FILL MATERIAL AND/OR AGGREGATE BASE COURSE (ABC) MATERIAL.
   A. FILL MATERIAL. APPROXIMATELY 8,000 CY OF FILL MATERIAL FOR USE AS THE ROADWAY FILL HAS PROVIDED BY MCO. APPROXIMATELY 7,213 CY OF FILL MATERIAL HAS ESTIMATED TO BE NEEDED TO COMPLETE THIS PROJECT. IF STOCKPILE MATERIAL IS NOT OF SUFFICIENT QUANTITY OR QUALITY THE CONTRACTOR MAY, IF AUTHORIZED IN ADVANCE BY THE TOWN OF FOUNTAIN HILLS, UTILIZE THE FORCE ACCOUNT ONE FEW TO PROVIDE THE SUPPLEMENTAL IMPORT MATERIALS FROM A TOWN PRE-APPROVED SOURCE AS REQUIRED. CONTRACTOR SHALL COMPLY WITH SPECIFICATION SECTION 311 FILL CONSTRUCTION
   B. AGGREGATE BASE COURSE (ABC) MATERIAL. APPROXIMATELY 4000 CY OF ABC MATERIAL FOR USE AS THE ROADWAY BAD PAVING LOT SUB-BASE HAS PROVIDED BY MCO. APPROXIMATELY 940 CY OF ABC MATERIAL HAS ESTIMATED TO BE NEEDED TO COMPLETE THIS PROJECT. IF STOCKPILE MATERIAL IS NOT OF SUFFICIENT QUANTITY OR QUALITY THE CONTRACTOR MAY, IF AUTHORIZED IN ADVANCE BY THE TOWN OF FOUNTAIN HILLS, UTILIZE THE FORCE ACCOUNT ONE FEW TO IMPORT THE ADDITIONAL MATERIALS FROM A TOWN PRE-APPROVED SOURCE AS REQUIRED. THE PROVIDED ABC MATERIAL HAS BEEN TESTED AND FOUND TO MEET TOWN'S ABC SPECIFICATIONS. CONTRACTOR SHALL UTILIZE THE FORCE ACCOUNT TO PROVIDE SUPPLEMENTAL IMPORT MATERIAL AS REQUIRED TO BLEND WITH PROVIDED MATERIAL AND PERFORM GEOTECH TESTING UNDER ALL MATERIAL REFUSED FOR USE AS ABC SUB-BASE MEETS OR EXCEEDS THE TOWN'S MINIMUM ABC SPECIFICATION. CONTRACTOR SHALL COMPLY WITH ABC SPECIFICATION SECTION 310 PLACEMENT AND CONSTRUCTION OF AGGREGATE BASE COURSE AND ABC SECTION 700 BASE MATERIALS

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OWNER:
TOWN OF FOUNTAIN HILLS
PARKS & RECREATION DEPT.
FOUNTAIN HILLS TOWN HALL
STOP 6 (MIDDLE OF THE FOUNTAIN)
FOUNTAIN HILLS, AZ 85268
(480) 816-5190

PROJECT: Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

SHEET: VICINITY PLAN

No.	Date	Desc
1	10/26/16	90% REVIEW
2	01/17/17	100% REVIEW
3	03/03/17	APPROVED SUBMITTAL
A	05/25/17	SUB-01 WITHDRAWN
A	06/07/17	AS BUILT

DRAWN BY: M. GALLIN
DESIGNED BY: M. GALLIN
APPROVED BY: J. ENGELMANN
SCALE: 1"=400'
DATE: 05/31/2017

J2 PROJECT NO: 16 0897 003

DRAWING NO: FH-1.02
SHEET NO: 2 of 58

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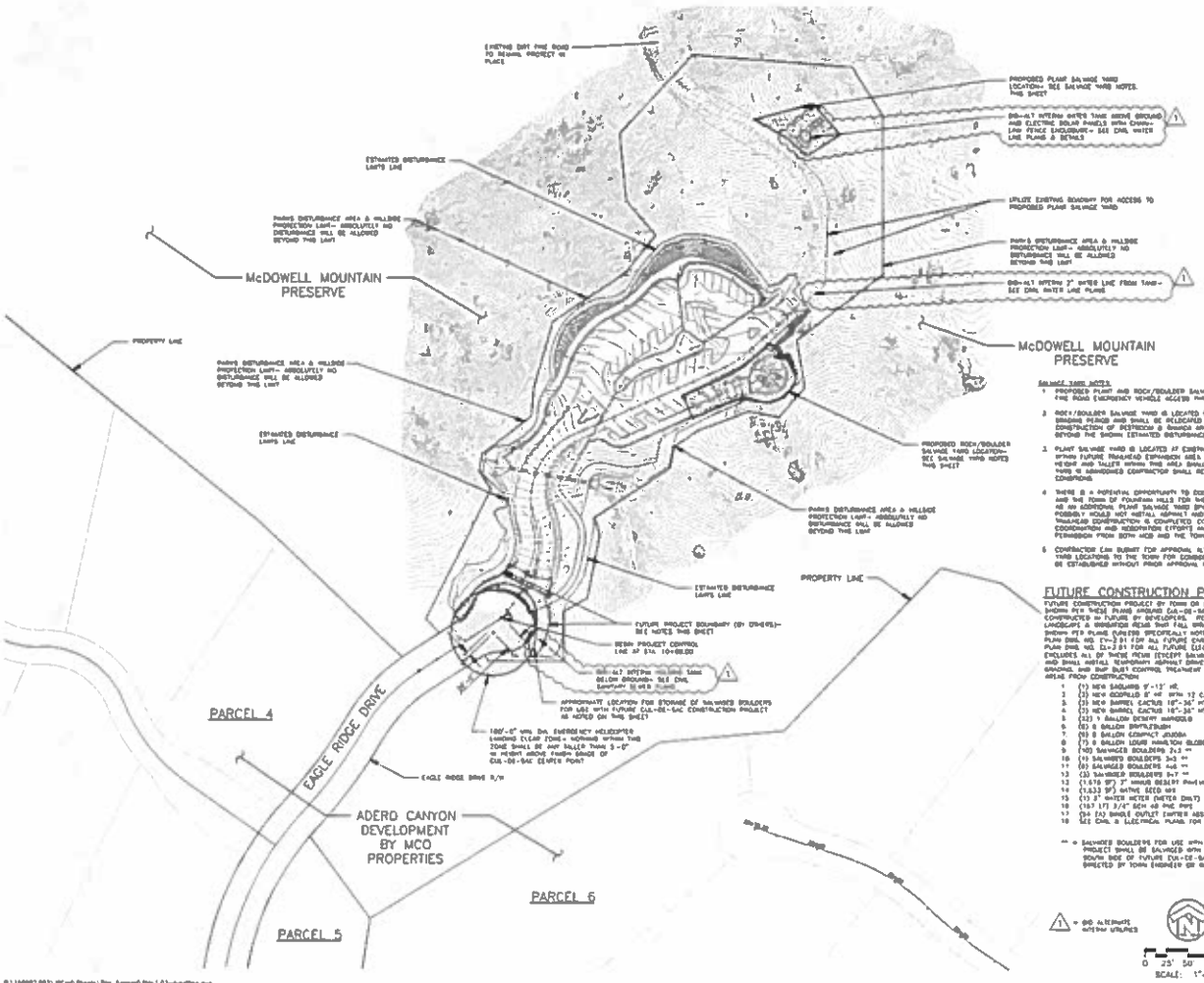

SALVAGE YARD NOTES:

1. PROPOSED PLANT AND ROCK/BOULDER SALVAGE YARDS SHALL NOT OBSTRUCT THE ROAD (SECONDARY VEHICLE ACCESS THROUGHOUT THE SITE AT ANY TIME
2. ROCK/BOULDER SALVAGE YARD IS LOCATED FOR USE DURING PRELIMINARY GRADING PLANS AND SHALL BE RELOCATED AS NECESSARY TO COMPLETE CONSTRUCTION OF DETENTION & DRAINAGE AREA. NO DISTURBANCE SHALL OCCUR BEYOND THE SHOWN ESTIMATED DISTURBANCE LIMITS.
3. PLANT SALVAGE YARD IS LOCATED AT EXISTING RELATIVELY OPEN & FLAT AREA WITHIN FUTURE PROJECTED EXPANSION AREA. ANY EXISTING VEGETATION 2'-0" IN HEIGHT AND TALLER WITHIN THIS AREA SHALL BE PROTECTED IN PLACE. SALVAGE YARD IS ABANDONED CONTRACTOR SHALL RETURN AREA BACK TO ORIGINAL CONDITIONS
4. THERE IS A POTENTIAL OPPORTUNITY TO COORDINATE WITH MCO PROPERTIES AND THE TOWN OF FOUNTAIN HILLS FOR THE USE OF THE EVA-DE-SAC AREA AS AN ADDITIONAL PLANT SALVAGE YARD SPACE. SHOULD MCO PROPERTIES POSSIBLY WOULD NOT INSTALL ASPHALT AND CONCRETE BEYOND LOTS. AFTER TRANSFER CONSTRUCTION IS COMPLETED CONTRACTOR IS RESPONSIBLE FOR COORDINATION AND RESTORATION EFFORTS AND MUST OBTAIN WRITTEN PERMISSION FROM BOTH MCO AND THE TOWN PRIOR TO UTILIZING THIS AREA
5. CONTRACTOR CAN SUBMIT FOR APPROVAL ALTERNATIVE OR STAGED SALVAGE YARD LOCATIONS TO THE TOWN FOR CONSIDERATION. NO YARD LOCATION SHALL BE ESTABLISHED WITHOUT PRIOR APPROVAL FROM TOWN OFFICIALS

FUTURE CONSTRUCTION PROJECT QUANTITIES:

FUTURE CONSTRUCTION PROJECT BY TOWN OR OTHERS TO COMPLETE DESIGN AS SHOWN PER THESE PLANS INCLUDE EVA-DE-SAC PERIMETER SINCE EVA-DE-SAC IS CONSTRUCTED IN FUTURE BY DEVELOPERS. ITEMS LISTED BELOW ARE ALL LANDSCAPE & IRRIGATION ITEMS THAT FALL WITHIN THE FUTURE BOUNDARY AREA AS SHOWN PER PLANS (UNLESS SPECIFICALLY NOTED OTHERWISE IN PLANS). SEE CIVIL PLAN DWG. NO. C1-3 & 01 FOR ALL FUTURE CIVIL QUANTITIES AND SEE ELECTRICAL PLAN DWG. NO. E1-3 & 01 FOR ALL FUTURE ELECTRICAL QUANTITIES. THIS PROJECT EXCLUDES ALL OF THESE ITEMS (EXCEPT SALVAGING BOULDERS)- SEE NOTE BELOW AND SHALL INSTALL TEMPORARY ASPHALT DRIVE & DRAINAGE ALONG HOUGH GRADING AND SWP BEST CONTROL TREATMENT AS REQUIRED TO TREAT DISTURBED AREAS FROM CONSTRUCTION

1	(1) NEW SAGUARO 8'-12' HT.
2	(3) NEW OCOTILLO 8' HT WITH 12 CANES MIN
3	(3) NEW BARREL CACTUS 18"-36" HT.
4	(3) NEW BARREL CACTUS 18"-36" HT.
5	(22) 1 GALLON DESERT MARIGOLD
6	(8) 5 GALLON BRITTLEBUSH
7	(9) 5 GALLON CREOSOTE JOJOBA
8	(7) 5 GALLON LOUIS HAMILTON GLOBE MALLOW
9	(40) SALVAGED BOULDERS 2x3 **
10	(4) SALVAGED BOULDERS 3x3 **
11	(8) SALVAGED BOULDERS 4x6 **
12	(3) SALVAGED BOULDERS 5x7 **
13	(1,676 SF) 2" HYDRO SEED MIX
14	(1,633 SF) NATIVE SEED MIX
15	(1) 3" WATER METER (METER ONLY)
16	(167 LF) 3/4" SCH 40 PVC PIPE
17	(34 EA) SINGLE OUTLET EMITTER ASSEMBLIES
18	SEE CIVIL & ELECTRICAL PLANS FOR FUTURE ITEMS AS NOTE ABOVE

** = SALVAGED BOULDERS FOR USE WITH FUTURE EVA-DE-SAC COMPLETION PROJECT SHALL BE SALVAGED WITH THIS PROJECT AND STORED NEAR SOUTH SIDE OF FUTURE EVA-DE-SAC WITHIN TOWN'S LIMITS AND AS DIRECTED BY TOWN ENGINEER OR REPRESENTATIVE.

1 = (#) ALTERNATE METHOD VARIES

SCALE: 1"=50'

J2 Engineering and Environmental Design

Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

AREA PLAN

Drawn by	K. WALLIN
Designed by	K. WALLIN
Approved by	J. ENGELMANN
Scale	1"=50'
Date	05/31/2017
J2 Project No.	16 0897 001
Drawing No.	FH-1.03
Sheet No.	3 of 58

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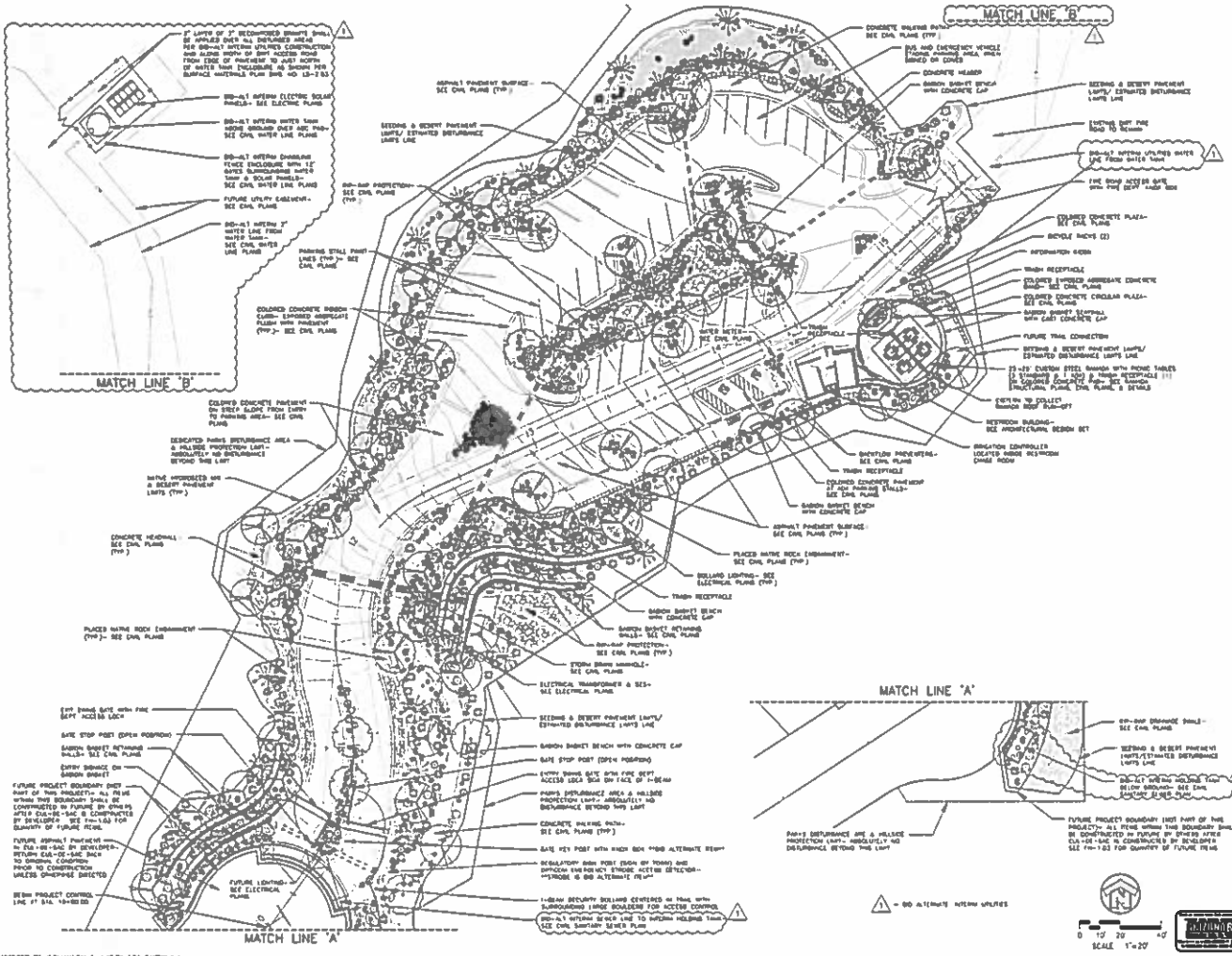

MATCH LINE 'B'
MATCH LINE 'A'
SITE PLAN
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead
J2 Engineering and Environmental Design
FH-1.04
4 of 58
SCALE 1"=20'
05/31/2017

PART 1 - To be completed by the Landscape Architect or Design Engineer

I. PROJECT DESCRIPTION

A. Owner Name and Address
Town of Fountain Hills
Parks & Recreation Department
16705 E. Avenue of the Fountains
Fountain Hills, Arizona 85268

B. Project Location Address
Adero Canyon Trailhead
Town of Fountain Hills, Arizona 85268

C. Project Description
New Trail head to be constructed. Hardscape, landscape, restroom, remodel, and parking stalls will be installed

II. HYDROLOGIC INFORMATION

A. Project Site
Length (Mi.) 0.11
Area (Ac.) 1.77

B. Area to be disturbed (Ac.) 1.77

C. Runoff Coefficient
Existing 0.85
Developed 0.85

D. Receiving Water(s) Verde River

III. SOIL STABILIZATION MEASURES

All disturbed areas, which will not be paved, will be revegetated and/or landscaped in accordance with the approved plans and specifications

IV. EROSION / SEDIMENT CONTROL MEASURES

A. Temporary Control Measures implemented During Construction Activities

- ___ Silt Fence
- X Organic Filter Barriers
- ___ Sediment Control Berms
- X Rock Inlet/Outlet Protection
- ___ Sand Bag Barrier
- ___ Sediment Traps
- X Existing Vegetation
- X Dust Control
- X Stabilized Construction Ingress/Egress
- X Storm Drainage Protection
- ___ Other (describe) ___

B. Permanent Control Measures implemented Post Construction Activities

- ___ Sediment Basin
- X Rock / Riprap Lined Channel
- X Sedgeard / Spillways / Catch Basins
- ___ Drywells
- X Rock Inlet / Outlet Protection
- X Landscape / Ground Cover
- X Other (Describe) Crown Drain

V. MAINTENANCE AND INSPECTIONS

A. Inspection Frequency
At least once every 7 calendar days

X Every 14 calendar days and within 24 hours after a rainfall of 0.5 inches or more

B. Inspection Report:
An inspection report will be completed by the contractor or authorized representative for each site inspection and shall be retained for at least 3 years following permit expiration or termination

C. Maintenance of SWPPP:
The site SWPPP must be amended within 15 days when a change in design, construction, operation, or maintenance that may have a significant effect on the discharge of pollutants to the Waters of the United States

VI. CERTIFICATION OF COMPLIANCE WITH FEDERAL STATE AND LOCAL REGULATIONS

A. This Erosion and Sediment Control Plan has been prepared in accordance with the most current version of the Arizona Pollutant Discharge Elimination System General Permit for Construction Activities, administered by the Arizona Department of Environmental Quality (ADEQ).

Signature ___

Date ___

Name ___

Title ___

PART 2 - To be completed by Owner / Operator or Contractor

I. SCHEDULE OF MAJOR ACTIVITIES

A. Project Schedule

Start Date ___

End Date ___

B. Sequence of Construction Activities

II. INVENTORY OF POLLUTANTS

A. The following materials and/or substances are expected to be onsite during construction:

- ___ Paints
- ___ Concrete
- ___ Asphalt
- ___ Oil
- ___ Fuel
- ___ Herbicides / Fertilizers
- ___ Other (List) ___

III. POLLUTION CONTROL MEASURES

A. Best Management Practices

- ___ Wind Erosion / Dust Control
- ___ Designated Washout Area
- ___ Solid Waste Management
- ___ Chemical / Material Storage Area
- ___ Stabilized Construction Ingress / Egress
- ___ Equipment Maintenance Procedures
- ___ Other (Describe) ___

IV. SPILL PREVENTION, RESPONSE AND CLEANUP

A. Spill Prevention
The best management practices outlined under pollution control measures are designed to prevent and contain spills of hazardous substances

B. Spill Response and Cleanup
In the event of any accidental spill or release of hazardous substances or chemicals, the owner / operator shall report such discharges as follows

1. If an imminent and substantial danger to public health and welfare and/or to the environment exists, immediately contact emergency assistance (911). No assistance is needed for the removal of hazardous waste contact Town of Fountain Hills Environmental Management office
2. For discharges not involving an imminent and substantial danger to public health and welfare or to the environment, contact the Town of Fountain Hills Streets Division of the Public Works Department by telephone within 24 hours
3. Provide written report to the Town of Fountain Hills Environmental Management office and to the Town of Fountain Hills Streets Division of the Public Works Department within 3 business days of the discharge. The written report may be submitted via mail, fax or in person
4. Such reporting shall identify the location, source of discharge and pollutant(s) discharged and all measures taken to mitigate the discharge. Additionally, if the discharge involves hazardous waste, the report shall detail the method of disposal and disposal facility receiving the waste material. The report shall also identify best management practices implemented to prevent similar discharges in the future

V. EROSION AND SEDIMENT CONTROL PLAN PLAN CERTIFICATION

A. I certify under penalty of law that this document and all attachments were prepared under direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations

B. The owner/operator and/or contractor as defined in the Arizona Pollutant Discharge Elimination System General Permit for Construction Activities administered by the Arizona Department of Environmental Quality (ADEQ) should sign the Stormwater Pollution Prevention Plan (SWPPP) and maintain the SWPPP onsite at the construction site or other reasonably accessible location during normal business hours

Signature ___

Date ___

Name ___

Title ___

J2 Engineering and Environmental Design
4640 E. COTTON GIN LOOP, STE. 8[illegible]
PHOENIX, AZ PHN (602)438-[illegible]
USA 85040 FAX (602)438-[illegible]

OWNER
TOWN OF FOUNTAIN HILLS
PARKS & RECREATION DEPT.
FOUNTAIN HILLS TOWN HALL
16705 E. AVENUE OF THE FOUNTAINS
FOUNTAIN HILLS, AZ 85268
(480) 816-5180

PROJECT
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

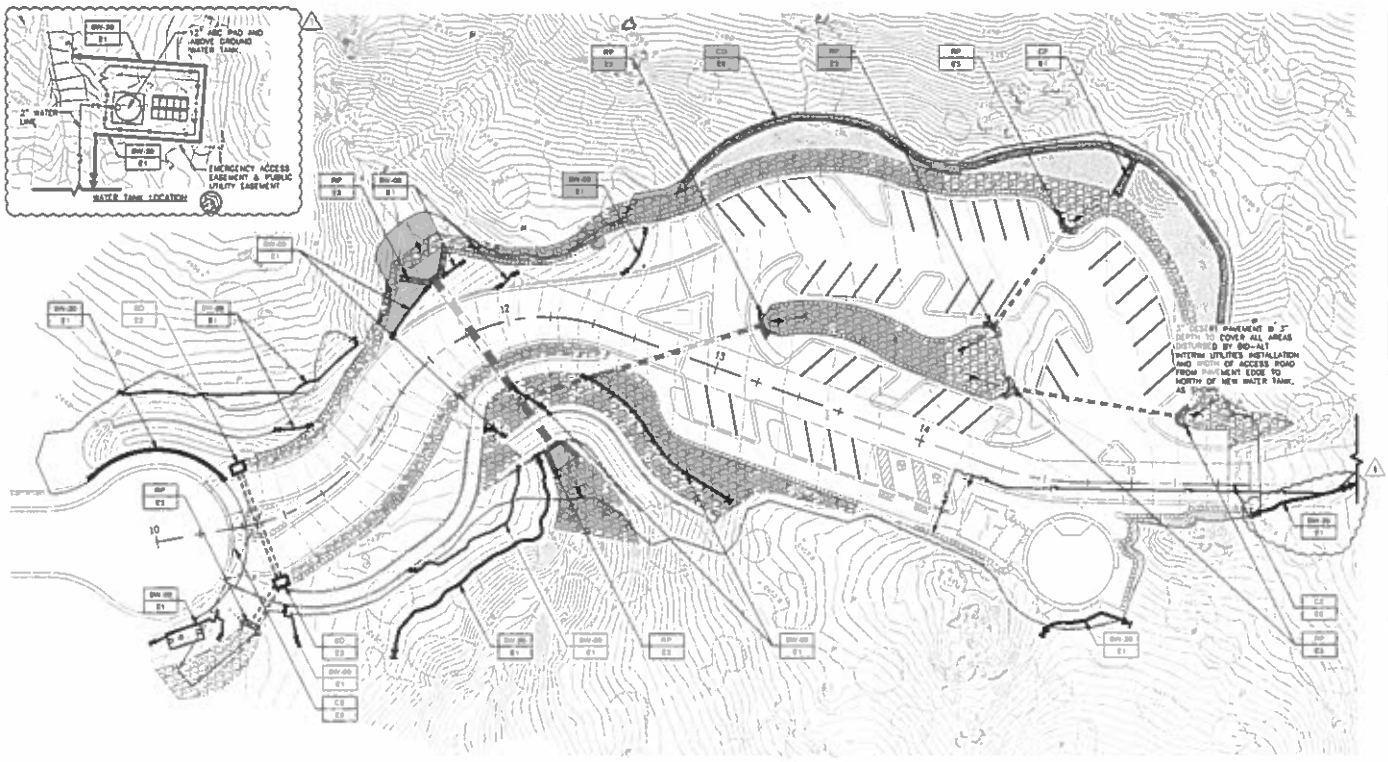
SHEET
EROSION CONTROL INDEX

No.	Date	Revision
1	10/20/16	Bid Review
2	06/15/17	[illegible]
3	03/05/17	[illegible]
4	04/20/17	[illegible]
5	05/31/17	[illegible]

DRAWN BY E. NICHOLS
REVIEWED BY E. NICHOLS
APPROVED BY J. ENGELMANN
SCALE N/A
DATE 05/31/2017

J2 PROJECT NO 16 0897 003

Drawing No. EC-1.01 Sheet No. 5 of 58



NOTES:

1. THE PLACEMENT OF ALL EROSION CONTROL DEVICES LISTED MAY BE SUBJECT TO CHANGE AND MAY BE ADJUSTED BY THE FIELD ENGINEER
2. FIELD ENGINEER IS RESPONSIBLE TO VERIFY THE CONTRACTOR HAS SUFFICIENT PROTECTIVE MEASURES IN PLACE TO CONTAIN ALL STORM WATER RUNOFF SEDIMENT WITHIN PROJECT LIMITS AND PROTECT ALL DISTURBED SLOPES FROM EROSION
3. THE CONTRACTOR IS REQUIRED TO MONITOR/MAINTAIN ALL BMP'S DURING ANY SHUTDOWN PERIOD
4. FIELD DETERMINE LIMITS OF CONSTRUCTION ENTRANCE WITH TOWN REPRESENTATIVE

RP — TYPE OF EROSION PROTECTION
E3 — DETAIL NUMBER

SWPPP LEGEND AND QUANTITIES

LEGEND	REF	DET	TYPE	QUANTITY
SEDIMENT WATTLE	SW-09	E1	9" SEDIMENT WATTLE	312 LF
SEDIMENT WATTLE	SW-20	E1	20" SEDIMENT WATTLE	BASE: 281 LF ALT: 267 LF
STORM DRAIN PROTECTION	SD	E2	12" SEDIMENT WATTLE	50 LF
ROCK PROTECTION	RP	E3	1" TO 3" ANGULAR, CRUSHED ROCK	20 CY
CUT/FILL TRANSITION	CF	E4	3" TO 6" ANGULAR, CRUSHED ROCK	2.2 CY
CROWN DITCH	CD	E5	N/A	370 LF
CONSTRUCTION ENTRANCE	CE	E6	1" TO 3" ANGULAR, CRUSHED ROCK	500 SY

1 = BID ALTERNATE BURIED UTILITIES

SCALE: 1"=20'

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J2 Engineering and Environmental Design
6649 E. COTTON GIN LOOP, STE. B2
PHOENIX, AZ Phone (602)330-2221
MCO 88040 Fax (602)330-2235
www.j2designpro.com

OWNER:
TOWN OF FOUNTAIN HILLS
PARKS & RECREATION DEPT.
FOUNTAIN HILLS TOWN HALL
16705 E. AVENUE OF THE FOUNTAINS
FOUNTAIN HILLS, AZ 85268
(480) 816-5180

PROJECT: Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

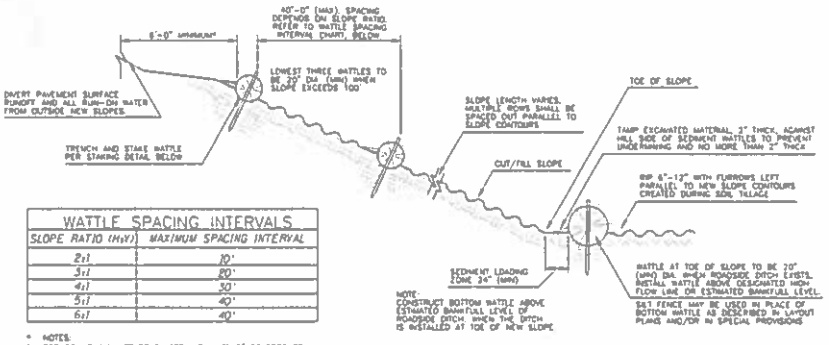
SHEET: EROSION CONTROL PLAN

NO	DATE	REVISION
1	10/20/17	[illegible]
2	01/19/18	[illegible]
3	03/28/18	[illegible]
4	05/25/18	BID-ALT [illegible]
5	06/21/18	[illegible]

DRAWN BY: E. NICHOLS
DESIGNED BY: E. NICHOLS
APPROVED BY: J. ENGEL
DATE: 8/4
DATE: 05/31/2017

J2 PROJECT NO. 16.0007.003

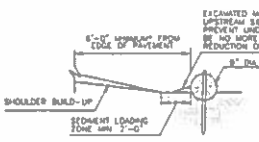
DRAWING NO. EC-2.01 SHEET NO. 6 of 58



SECTION (NTS)

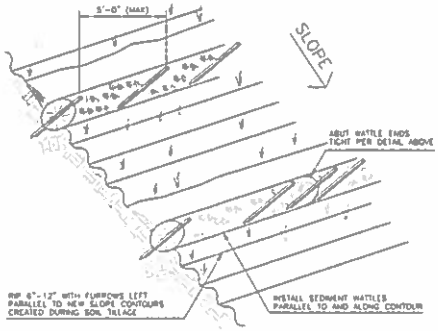
WATTLE SPACING INTERVALS	
SLOPE RATIO (H:V)	MAXIMUM SPACING INTERVAL
2:1	10'
3:1	20'
4:1	30'
5:1	40'
6:1	40'

* NOTES:
1. TOP ROW SHALL NOT BE PLACED WITHIN 6'-0" OF EDGE OF PAVEMENT AND 9'-0" FROM OUTSIDE SURFACE OF BARRIER
2. FOR ERODIBLE SOILS, PLACE ROWS OF WATTLES CLOSER TOGETHER.
3. FOR SOILS WITH LOW ERODIBLE POTENTIAL, PLACE ROWS OF WATTLES FURTHER APART.

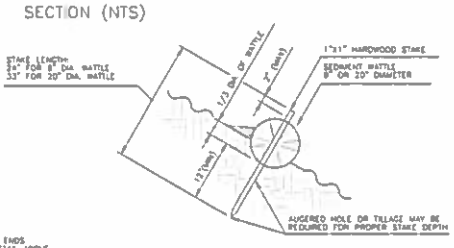


** NOTE:
APPLICABLE ONLY IN THE AREAS OF CONCENTRATED FLOW -- TO INCLUDE BUT NOT BE LIMITED TO ROADWAY SAG SPOTS AND DROP-OFF REPAIR LOCATIONS AS PER THE DIRECTION OF THE ENGINEER.

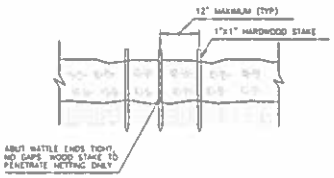
NEW SHOULDER BUILDUP **
PROTECTION SECTION (NTS)



SEDIMENT WATTLE
LAYOUT (NTS)



SEDIMENT WATTLE STAKING
DETAIL (NTS)



SEDIMENT WATTLE
OVERLAP (NTS)

NOTES:
1. INSTALL SEDIMENT WATTLES AS SLOPES ARE CONSTRUCTED TO GRADE OR AS DIRECTED BY THE ENGINEER. SELECT, INSTALL AND MAINTAIN IN CONFORMANCE WITH MANUFACTURERS SPECIFICATIONS TO MEET SITE CONDITIONS FOR SLOPE PROTECTION AND IN ACCORDANCE WITH GOOD ENGINEERING PRACTICES.
2. SEDIMENT WATTLES SHALL BE IN CONTINUOUS CONTACT WITH TRENCH BOTTOM AND DO NOT OVERLAP WATTLE ENDS ON TOP OF EACH OTHER. A 20" DIA WATTLE MAY BE MADE FROM 2-3 ROLLED EXCELSIOR OR STRAW BLANKETS
3. BUTT ADJOINING WATTLES TIGHTLY AGAINST EACH OTHER. DRIVE THE FIRST END STAKE OF THE SECOND WATTLE AT AN ANGLE TOWARD THE FIRST WATTLE TO HELP ABUT THEM TIGHTLY.
4. REPAIR ANY RILLS OR GULLIES PROMPTLY. MAKE FIELD ADJUSTMENTS AND CORRECTIONS OF WATTLE BMP IMMEDIATELY IF IT IS CAUSING FLOODING, EROSION, AND/OR AFFECTING ROADWAY SAFETY.
5. CONSTRUCTION OF CUT SLOPES 2:1 AND STEEPER IN SOIL AND ROCK MATERIALS THAT CAN BE RIPPED SHALL BE CONSTRUCTED, WHENEVER POSSIBLE, BY MINIBENCHING. REFER TO SLOPE MINIBENCHING BMP DETAIL.
6. LOOSENING SURFACE SOIL IS NOT REQUIRED WHERE MINIBENCHES ARE USED FOR SEEDED AREAS. TILLAGE SHALL BE PERFORMED TO FORM MINOR RIDGES AND FURROWS PARALLEL TO NEW SLOPE CONTOURS AND AS SPECIFIED IN THE STANDARD SPECIFICATIONS.
7. DIVERT AND DIRECT RUN-ON WATER FROM OUTSIDE OF THE SLOPES TO THE SPILLWAYS AND/OR ROCK RIPRAP/ROCK MULCH. DIVERSION DIKES AND/OR DITCHES ARE NECESSARY ON NATURAL UNDISTURBED SLOPES BEYOND THE TOP LIMITS OF NEW SLOPES TO DIVERT RUN-ON WATER
8. INSTALLATION AND MAINTENANCE OF SEDIMENT WATTLE BMPS SHALL NOT NEGATIVELY IMPACT LOCAL SAFETY, NOR THE DESIGNED FUNCTION OF THE SITE.
9. INSTALL AND MAINTAIN SEDIMENT WATTLE BMPS TO CARRY THE STORMWATER OF AT LEAST 2-YEAR, 24-HOUR EVENTS.
10. THE SEDIMENT WATTLE BMP'S PAY/NO ITEM SHALL INCLUDE ALL MATERIALS USED FOR THIS BMP: ALL GROUND PREPARATION, FURNISHING, INSTALLING, MAINTENANCE, FINAL REMOVAL, AND DISPOSAL OF THIS TEMPORARY BMP, AS WELL AS RETURNING THE AREA TO AN ACCEPTABLE CONDITION AS APPROVED BY THE ENGINEER
11. REFER TO STANDARD SPECIFICATION FOR SEDIMENT WATTLE MATERIAL SPECIFICATIONS.
12. MAKE FIELD ADJUSTMENTS AND CORRECTIONS TO ENSURE NO SENSITIVE BIOLOGICAL RESOURCES (NATIVE SPECIES / HABITATS) WILL BE ADVERSELY IMPACTED.

SW-X
E1
SEDIMENT WATTLE SLOPE PROTECTION
NTS

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4640 E. COTTON GIN LOOP, STE. 110
PHOENIX, AZ PHN (602)438-2222
MA# 68000 FAX (602)438-2220
www.j2engineering.com

TOWN OF FOUNTAIN HILLS
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16705 E. AVENUE OF THE FOUNTAINS
FOUNTAIN HILLS, AZ 85268
(480) 816-5100

Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead
EROSION CONTROL DETAILS

REV	DATE	DESCRIPTION
0	05/30/16	60% REVIEW
1	06/30/16	90% REVIEW
2	07/17/16	100% REVIEW
3	04/03/17	REVISED SUBMITTAL
4	04/20/17	90% CLT REVIEW SET
5	05/31/17	90 SET

DRAWN BY: E. NICHOLS
DESIGNED BY: E. NICHOLS
APPROVED BY: J. ENGELMANN
SCALE: N/A
DATE: 05/31/2017

J2 PROJECT NO: 16 0897 003

DRAWING NO: EC-3.01
SHEET NO: 7 of 58

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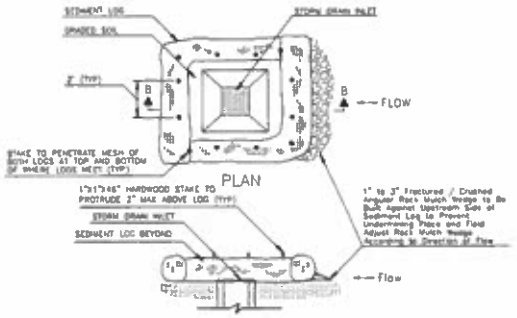
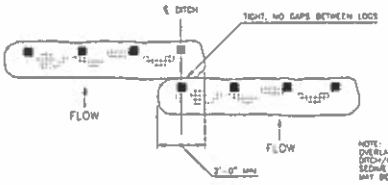


SEDIMENT LOG AT STORM DRAIN
SECTION B-B (NTS)

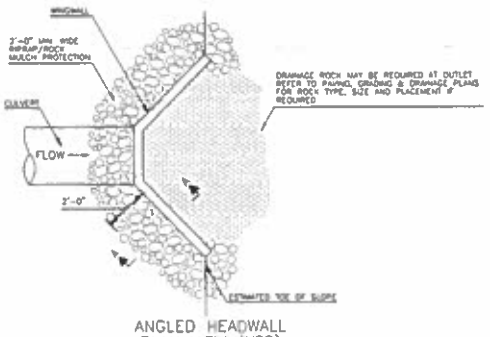


TYPICAL OVERLAP
PLAN (NTS)

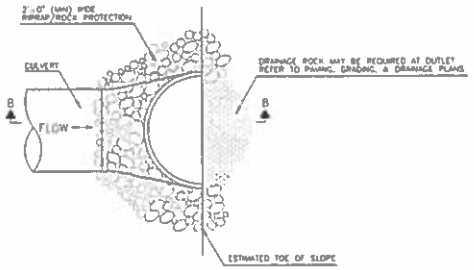
NOTES:

1. LOCATE SEDIMENT LOGS AS INDICATED IN PLANS, SWPPP OR AS DIRECTED BY THE ENGINEER
2. SELECT, INSTALL AND MAINTAIN LOGS PER MANUFACTURERS' SPECIFICATIONS AND GOOD ENGINEERING PRACTICES.
3. LAY SEDIMENT LOG ACROSS PREPARED DITCH OR CHANNEL. TRENCHING OR BURIAL OF SEDIMENT LOGS IS NOT REQUIRED. THE CLOSE, CONTINUOUS CONTACT BETWEEN THE BOTTOM OF THE LOG AND THE GROUND IS MANDATORY. THE LOGS SHALL BE INSTALLED IN THE DITCH, SWALE OR CHANNEL BOTTOM PERPENDICULAR TO THE FLOW OF WATER AS SHOWN ON DETAIL THIS SHEET
4. STAKE LOG AS SHOWN. STAKES SHALL BE PLACED THROUGH DOWNSTREAM SIDE ONLY AS SHOWN
5. DO NOT DRIVE STAKES THROUGH CENTER OF THE LOG. STAKES MUST BE DRIVEN INTO THE GROUND AS SHOWN.
6. ENSURE THAT NO GAPS EXIST BETWEEN SOIL AND BOTTOM OF SEDIMENT LOG. REPAIR ANY RILLS OR UNDERCUTS PROMPTLY.
7. PLACEMENT OF SEDIMENT LOGS SHALL BE EVALUATED BY THE ENGINEER IN ROCKY SOIL CONDITIONS. REMOVE SEDIMENT LOG BMPS WITHIN THE DITCHES/CHANNELS AND AROUND THE STORM DRAIN INLETS AS PER THE DIRECTION OF THE ENGINEER OR AS SOON AS PRACTICABLE UPON STABILIZATION OF THE CONSTRUCTION DISTURBED AREA.
8. DISPOSE OF SEDIMENT LOGS AND TRAPPED SEDIMENT MATERIAL AND FILL TRENCH CREATED BY SEDIMENT LOG.
9. THE INSTALLATION AND MAINTENANCE OF SEDIMENT LOG BMPS SHALL NOT NEGATIVELY IMPACT LOCAL SAFETY NOR THE DESIGNED FUNCTION OF THE SITE. SEDIMENT LOGS SHALL BE INSTALLED AND MAINTAINED TO CARRY THE STORMWATER OF AT LEAST 2-YEAR, 24-HOUR EVENTS.
10. MAKE FIELD ADJUSTMENTS AND CORRECTIONS OF SEDIMENT LOG BMP IMMEDIATELY IF IT IS CAUSING FLOODING, EROSION, AND/OR AFFECTING ROADWAY SAFETY
11. ROCK MULCH/RIPRAP MAY BE REQUIRED FOR CHANNEL/DITCH LINING OR ROCK CHECK DAMS FOR LONGITUDINAL DITCH SLOPES THAT EXCEED 5% AND/OR FOR SOIL CONDITIONS NOT SUITABLE FOR LOG INSTALLATION.
12. THE SEDIMENT LOG BMP'S PAY/BID ITEM SHALL INCLUDE ALL MATERIALS USED FOR THIS BMP, ALL GROUND PREPARATION, FURNISHING, INSTALLING, MAINTENANCE, FINAL REMOVAL, AND DISPOSAL, AS WELL AS RETURNING THE AREA TO AN ACCEPTABLE CONDITION AS APPROVED BY THE ENGINEER
13. REFER TO STANDARD SPECIFICATION FOR SEDIMENT LOG MATERIAL SPECIFICATIONS
14. MAKE FIELD ADJUSTMENTS AND CORRECTIONS TO ENSURE NO SENSITIVE BIOLOGICAL RESOURCES (NATIVE SPECIES/HABITATS) WILL BE ADVERSELY IMPACTED.
15. CONSTRUCT ROCK WEDGE WITH ANGULAR-SHAPED 1" TO 3" ROCK MULCH AS SHOWN IN THIS DETAIL. NATURAL RIVER-RUN MATERIALS SUCH AS ROUNDED RIVER ROCKS/COBBLESTONES AND PEBBLES ARE NOT ACCEPTABLE.

SD	STORM DRAIN PROTECTION
E2	N.T.S.



ANGLED HEADWALL
PLAN VIEW (NTS)



FLARED END
PLAN VIEW (NTS)

NOTES

1. ROCK RIPRAP/ROCK MULCH SHALL BE ANGULAR SHAPED. CRUSHED ROCK MATERIALS. NATURAL RIVER-RUN MATERIALS SUCH AS ROUNDED RIVER ROCKS/COBBLESTONES AND PEBBLES ARE NOT ACCEPTABLE.
2. EMBED ROCK WITHIN TRAFFIC RECOVERY AREA/CLEAR ZONE INTO THE FINISHED GRADE SO THAT ANY PORTION OF THE ROCK ABOVE THE GRADE WILL BE LESS THAN 4" IN HEIGHT.
3. THE INSTALLATION AND MAINTENANCE OF ROCK PROTECTION BMPS SHALL NOT NEGATIVELY IMPACT LOCAL SAFETY, NOR THE DESIGNED FUNCTION OF THE SITE. ROCK PROTECTION BMPS SHALL BE INSTALLED AND MAINTAINED TO CARRY THE STORMWATER OF AT LEAST 2-YEAR, 24-HOUR EVENTS.
4. MAKE FIELD ADJUSTMENTS AND CORRECTIONS OF ROCK PROTECTION BMP IMMEDIATELY IF IT IS CAUSING FLOODING, EROSION, AND/OR AFFECTING ROADWAY SAFETY.
5. THE ROCK PROTECTION BMP'S PAY/BID ITEM SHALL INCLUDE ALL MATERIALS USED FOR THIS BMP, ALL GROUND PREPARATION, FURNISHING, INSTALLING, MAINTAINING AS WELL AS RETURNING THE AREA TO AN ACCEPTABLE CONDITION AS APPROVED BY THE ENGINEER.
6. MAKE FIELD ADJUSTMENTS AND CORRECTIONS TO ENSURE NO SENSITIVE BIOLOGICAL RESOURCES (NATIVE SPECIES / HABITATS) WILL BE ADVERSELY IMPACTED.
7. COLOR OF RIP-RAP TO MATCH COLOR OF OTHER PERMANENT RIP-RAP USED ON SITE PER PLAN SURFACE MATERIALS ON LS-2.03

RP	ROCK PROTECTION FOR HEADWALL TRANSITION
E3	N.T.S.

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PROJECT
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

TITLE
EROSION CONTROL DETAILS

No.	Date	Revision
1	10/26/16	90% SUBMITTAL
2	01/17/17	100% SUBMITTAL
3	03/06/17	REVISED SUBMITTAL
4	06/26/17	90% A.T. REVISIONS
5	06/27/17	100% A.T.

DRAWN BY: E. NICHOLS
DESIGNED BY: E. NICHOLS
APPROVED BY: J. INGELMANS
SCALE: N/A
DATE: 03/31/2017

J2 PROJECT NO. 16.0097.002

PROJECT NO. EC-3.02 SHEET NO. 8 of 58

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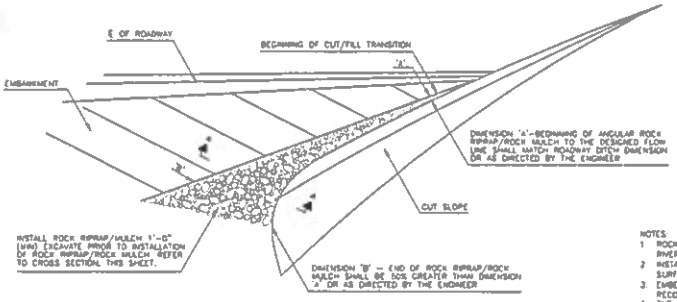
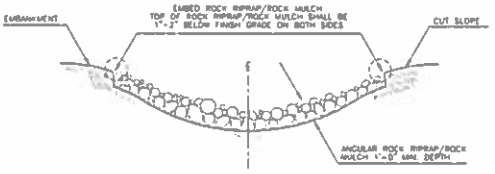
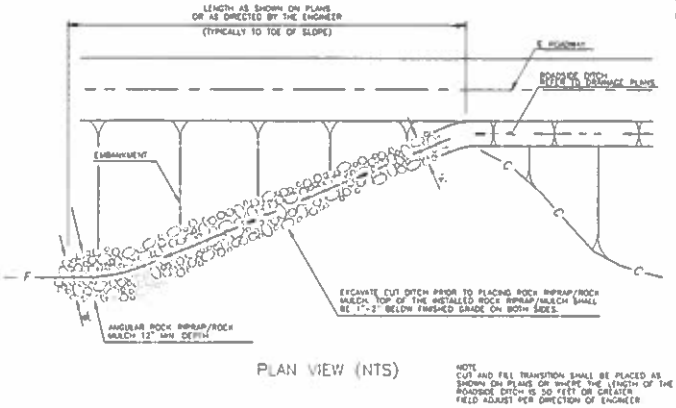


PERSPECTIVE (NTS)



ROCK RIPRAP/ROCK MULCH EMBEDMENT
SECTION A–A (NTS)

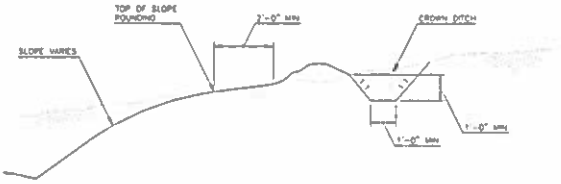
NOTES:
1. ROCK RIPRAP/ROCK MULCH SHALL BE ANGULAR SHAPED, CRUSHED ROCK MATERIALS. NATURAL RIVER-RUN MATERIALS SUCH AS ROUNDED RIVER ROCKS/COBBLESTONES AND PEBBLES ARE NOT ACCEPTABLE.
2. INSTALL ROCK RIPRAP/ROCK MULCH TO A MINIMUM DEPTH OF 12" FOR CHANNEL LINING AND CUT/FILL TRANSITION. EXCAVATE GROUND SURFACE TO A DEPTH THAT THE TOP OF ROCK IS 1"-2" BELOW THE GRADE OF THE DITCH.
3. EMBED ANY ROCK INTO THE FINISHED GRADE SO THAT ANY PORTION OF THE ROCK IS LESS THAN 4" ABOVE GRADE, WITHIN TRAFFIC RECOVERY AREA/CLEAR ZONE.
4. THE INSTALLATION AND MAINTENANCE OF ROCK PROTECTION BMPS SHALL NOT NEGATIVELY IMPACT LOCAL SAFETY, NOR THE DESIGNED FUNCTION OF THE SITE. ROCK PROTECTION BMPS SHALL BE INSTALLED AND MAINTAINED TO CARRY THE STORMWATER OF AT LEAST 2-YEAR, 24-HOUR EVENTS.
5. MAKE FIELD ADJUSTMENTS AND CORRECTIONS OF ROCK PROTECTION BMP IMMEDIATELY IF IT IS CAUSING FLOODING, EROSION, AND/OR AFFECTING ROADWAY SAFETY.
6. MAKE FIELD ADJUSTMENTS TO ENSURE THE TOP SURFACE OF ROCK RIPRAP/ROCK MULCH IS GRADED LOWER THAN THE SURROUNDING FINISHED GRADE TO COLLECT SURFACE STORMWATER RUNOFF AND CONCENTRATED FLOW.
7. THE ROCK PROTECTION BMP'S PAY/BID ITEM SHALL INCLUDE ALL MATERIALS USED FOR THIS BMP, ALL GROUND PREPARATION, FURNISHING, INSTALLING, MAINTAINING, AS WELL AS RETURNING THE AREA TO AN ACCEPTABLE CONDITION AS APPROVED BY THE ENGINEER.
8. MAKE FIELD ADJUSTMENTS AND CORRECTIONS TO ENSURE NO SENSITIVE BIOLOGICAL RESOURCES (NATIVE SPECIES / HABITATS) WILL BE ADVERSELY IMPACTED.
9. COLOR OF RIP-RAP TO MATCH COLOR OF OTHER PERMANENT RIP-RAP USED ON SITE PER PLAN SURFACE MATERIALS ON LS-2.01



PLAN VIEW (NTS)

NOTE
CUT AND FILL TRANSITION SHALL BE PLACED AS SHOWN ON PLANS OR WHERE THE LENGTH OF THE ROADSIDE DITCH IS 50 FEET OR GREATER. FIELD ADJUST PER DIRECTION OF ENGINEER

CF
E4
CUT & FILL TRANSITION AND CHANNEL LINING
NTS



NOTES:
1. DIMENSIONS OF DITCHES AND CHANNELS SHALL BE SHOWN ON THE PLANS AS BOTTOM WIDTH, DEPTH AND LENGTH.
2. DITCHES AND CHANNELS SHALL BE CONSTRUCTED WITH A MINIMUM GRADE TO PREVENT EROSION. DITCH OUTLET TREATMENT SHALL BE AS PROVIDED ON PLANS.

CD
E5
CROWN DITCH
NTS.

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Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

EROSION CONTROL DETAILS

No.	Date	Description
1	10/20/16	[illegible]
2	01/13/17	[illegible]
3	03/31/17	[illegible]
4	05/08/17	[illegible]
5	06/30/17	[illegible]
6	07/17	[illegible]

DRAWN BY: E. NICHOLS
DESIGNED BY: E. NICHOLS
APPROVED BY: ENGINEMANN
SCALE: N/A
DATE: 05/31/2017
J2 PROJECT NO.: 16 0897 003
DRAWING NO.: EC-3.03
SHEET NO.: 9 of 58

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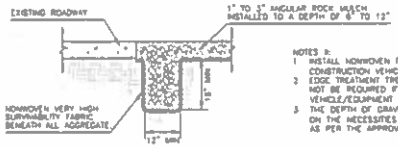
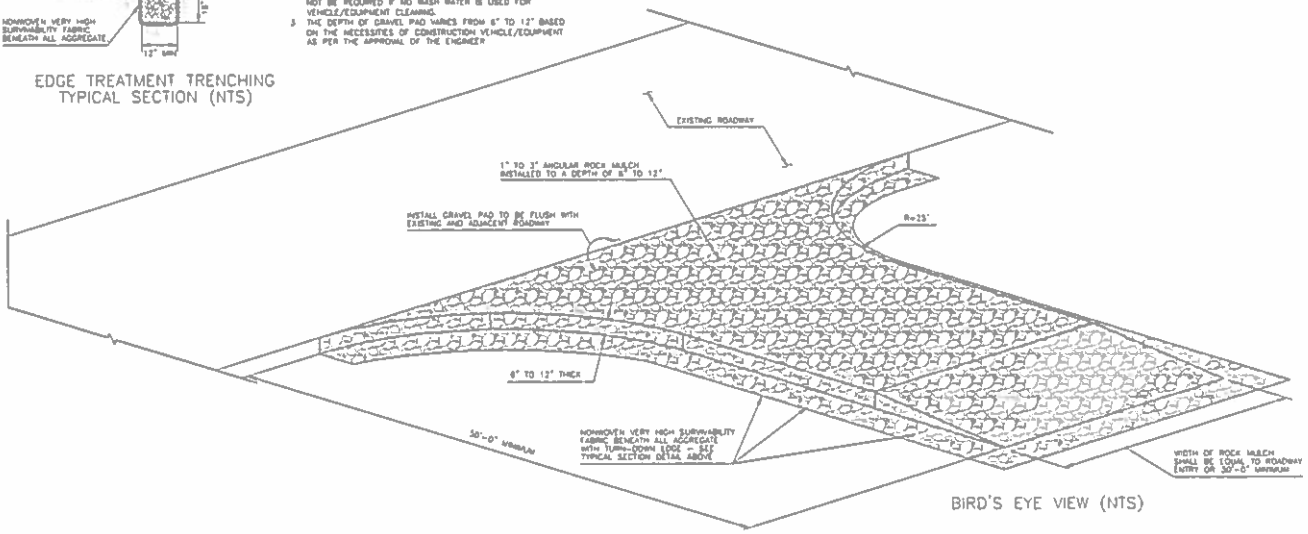


NOTES :
1. INSTALL NONWOVEN FABRIC WHEN WATER IS APPLIED FOR CONSTRUCTION VEHICLE/EQUIPMENT CLEANING ON GRAVEL PAD.
2. EDGE TREATMENT TRENCHING AND NONWOVEN FABRIC SHALL NOT BE REQUIRED IF NO WASH WATER IS USED FOR VEHICLE/EQUIPMENT CLEANING.
3. THE DEPTH OF GRAVEL PAD VARIES FROM 6" TO 12" BASED ON THE NECESSITIES OF CONSTRUCTION VEHICLE/EQUIPMENT AS PER THE APPROVAL OF THE ENGINEER

EDGE TREATMENT TRENCHING
TYPICAL SECTION (NTS)



BIRD'S EYE VIEW (NTS)

NOTES :
1. INSTALL STABILIZED CONSTRUCTION ENTRANCE/EXIT GRAVEL PAD BMP FOR TRAFFIC ENTERING OR EXITING A CONSTRUCTION SITE WHERE SEDIMENTATION, CLAY, SALT OR OTHER POLLUTANTS CAN BE TRACKED ONTO PUBLIC ROADS AND/OR ADJACENT WATER BODIES, AS APPROVED BY THE ENGINEER. IT MAY ALSO BE APPLIED FOR CONSTRUCTION ENTRANCE/EXIT WHEN EROSION/DUST CONTROL, AS APPROVED BY THE ENGINEER.
2. LOCATE NEW CONSTRUCTION ENTRANCE(S)/(EXITS) AT APPROPRIATE PROJECT ENTRANCE/EXIT POINTS AS DETERMINED IN FIELD WITH THE APPROVAL OF THE ENGINEER. RELOCATE STABILIZED CONSTRUCTION ENTRANCE/EXIT GRAVEL PAD BMP AS NEEDED AS PROJECT PROGRESSES. REPLACE ROCK MULCH MATERIALS IN DRIVE PATHS WHEN DIRT OR MUD ACCUMULATES.
3. NONWOVEN VERY HIGH SURVIVABILITY FABRIC SHALL CONFORM TO THE STANDARD SPECIFICATIONS.
4. ROCK MULCH MATERIALS SHALL BE FRACTURED/CRUSHED ROCKS W/ ANGULAR SHAPE. NATURAL RIVER-RUN MATERIALS, ESPECIALLY ROUNDED NATURAL RIVER ROCKS ARE NOT ACCEPTABLE.
5. MAKE FIELD ADJUSTMENTS AND CORRECTIONS OF CONSTRUCTION ENTRANCE/EXIT GRAVEL PAD BMP IMMEDIATELY IF IT IS CAUSING FLOODING AND/OR AFFECTING ROADWAY SAFETY.
6. WHEN PAID SEPARATELY, THE STABILIZED CONSTRUCTION ENTRANCE/EXIT GRAVEL PAD BMP'S PAY/BID ITEM SHALL INCLUDE ALL MATERIALS USED FOR THIS BMP, ALL GROUND PREPARATION, FURNISHING, INSTALLING, FINAL REMOVAL, AND DISPOSAL OF THIS TEMPORARY BMP, AS WELL AS RETURNING THE AREA TO AN ACCEPTABLE CONDITION AS APPROVED BY THE ENGINEER
7. MAKE FIELD ADJUSTMENTS AND CORRECTIONS TO ENSURE NO SENSITIVE BIOLOGICAL RESOURCES (NATIVE SPECIES / HABITATS) WILL BE ADVERSELY IMPACTED

CE
EG

STABILIZED CONSTRUCTION ENTRANCE/EXIT GRAVEL PAD
NTS

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PROJECT
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

TITLE
EROSION CONTROL DETAILS

No.	Date	Revision
1	06/26/17	[illegible]
2	07/17/17	[illegible]
3	08/08/17	[illegible]
4	10/26/17	[illegible]
5	05/31/21	[illegible]

DRAWN BY E. NICHOLS
DESIGNED BY E. NICHOLS
APPROVED BY J. ENGELMANN
SCALE N/A
DATE 05/31/2017

J2 PROJECT NO. 16 0897 003

DRAWING NO. EC-3.04 SHEET NO. 10 of 58

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PLANT INVENTORY & SALVAGE GUIDELINES:

I. DETERMINATION OF FEASIBILITY

OBJECTIVE:
TO MAKE THE MOST EFFECTIVE USE OF THE FINANCIAL RESOURCES AND TIME AVAILABLE THEREBY MAXIMIZING THE NATIVE PLANT MATERIAL SUCCESSFULLY SALVAGED.

PROCEDURES:

A. ESTIMATE RESOURCES REQUIRED.

1. WALK THE SITE TO BE CLEARED, IDENTIFYING POTENTIALLY SALVAGEABLE PLANTS.

2. FOR EACH PLANT, CONSIDER ACCESSIBILITY FOR MAN AND MACHINES BASED ON SURROUNDING GRADE, GEOLOGICAL FEATURES AND OTHER OBSTACLES.

3. MAKE PRELIMINARY ESTIMATE OF BOX SIZES TO DETERMINE SIZE AND TYPE OF MACHINES WHICH WOULD BE REQUIRED TO REMOVE AND TRANSPORT BOXED PLANTS.

4. IF POSSIBLE, DO SEVERAL TEST DIGS TO DETERMINE SOIL CONDITIONS ON VARIOUS SITE LOCATIONS.

5. BASED ON DATA GATHERED, ESTIMATE MAN-HOURS AND MACHINE TIME NECESSARY

B. BASED ON RESOURCES AVAILABLE, MAKE FINAL DETERMINATION OF PLANTS TO BE ATTEMPTED.

C. FLAG SELECTED PLANTS TO IDENTIFY FOR PRUNING. (AT THIS POINT IT MAY BE CONVENIENT TO WRITE THE ANTICIPATED BOX SIZE ON THE FLAG. HOWEVER, A FINAL DETERMINATION OF BOX SIZE SHOULD BE MADE AFTER PRUNING.)

CONSIDERATIONS:

1. COULD ANY GIVEN PLANT BE TRIMMED RATHER THAN REMOVED BECAUSE OF ITS LOCATION ON THE PROJECT?

2. DOES PLANT HAVE PARTICULAR AESTHETIC VALUE OR HISTORICAL SIGNIFICANCE THAT WARRANT DEDICATION OF EXTRA RESOURCES?

MORE PLANTS HAVE BEEN TAGGED THAN ACTUALLY NEEDED.

II. PRUNING

OBJECTIVE:

TO REMOVE FOLIAGE PROPORTIONATE TO ROOT SYSTEM ELIMINATED BY BOXING AND PROVIDE AN AESTHETIC FRAMEWORK OF BRANCHES THAT PRESERVES THE SIZE AND BEST FEATURES OF THE TREE FOR LATER FILLING IN.

PROCEDURES:

A. IDENTIFY THE MAJOR LIMBS TO BE RETAINED AND REMOVE THE OTHERS

B. REMOVE MEDIUM AND SMALLER BRANCHES SUCH THAT A TOTAL OF ABOUT 60 TO 80% OF THE ORIGINAL FOLIAGE IS REMOVED.

CONSIDERATIONS:

1. CARE SHOULD BE TAKEN TO MAKE CUTS AS SMOOTH AS POSSIBLE AND FLUSH WITH TRUNKS. STUBS ARE UNSIGHTLY AND PROVIDE ENTRY POINTS FOR INSECTS.

2. USUALLY, THE PRUNING SHOULD ELIMINATE APPROXIMATELY EQUAL AMOUNTS OF FOLIAGE FROM ALL SIDES OF THE TREE TO GIVE A BALANCED LOOK. HOWEVER, IN SOME CASES IT IS EFFECTIVE TO ACCENTUATE UNUSUAL SHAPES AND STRUCTURES.

III. DETERMINATION OF BOX SIZE

OBJECTIVE:

TO DETERMINE THE BOX SIZE THAT WILL MAXIMIZE THE CHANCES OF SURVIVAL OF THE TREE BUT STILL BE WITHIN ECONOMIC CONSTRAINTS.

PROCEDURES:

A. AFTER PRUNING ASSESS THE REMAINING PLANT AND DETERMINE SIZE OF THE BOX TO BE USED.

B. WRITE THE BOX SIZE ON FLAGGING TAPE TO ALERT BOXING CREW.

CONSIDERATION.

1. BOX SIZE IS A MATTER OF PROFESSIONAL JUDGMENT BUT THE FOLLOWING SIZE RANGES GENERALLY APPLY:

TRUNK DIAMETER:	BOX SIZE:
0 - 6"	24" - 42"
6" - 12"	48" - 60"
12" - 18"	66" - 84"
18" +	90" +

2. BOX SIZES ARE STATED IN 6" INCREMENTS CONSISTENT WITH NURSERY INDUSTRY PRACTICE AND REFER TO THE LENGTH OF THE TOP OF AN INDIVIDUAL BOX SIZE

IV. SIDE BOXING

OBJECTIVE:

TO EXPOSE AND PRESERVE A RECTILINEAR ROOT BALL TO BE ENCLOSED BY FOUR TAPERED BOX SIDES WITH MINIMUM DAMAGE TO THE ROOT SYSTEM

PROCEDURES:

A. MEASURE THE TOP OF THE ROOT BALL TO BE EXPOSED AND MARK THE OUTLINE TO FACILITATE DIGGING

B. BEGIN DIGGING A TRENCH AROUND THE PLANT USING THE OUTLINE IN STEP A AS THE INSIDE DIMENSIONS.

C. CAREFULLY CUT ROOTS FLUSH WITH THE SIDE OF THE ROOT BALL AS THEY ARE ENCOUNTERED.

D. AS TRENCH PROGRESSES, GRADUALLY CUT THE ROOT BALL INWARD TO ACCOMMODATE THE TAPER OF THE BOX

E. WHEN TRENCH REACHES THE DEPTH OF THE BOX, PLACE BOX SIDES IN TRENCH AND CHECK FIT AROUND ROOT BALL TRIM ROOT BALL AS NECESSARY

F. ATTACH BOX SIDES AROUND ROOT BALL WITH NAILS.

G. SECURE BOX SIDES WITH BANDING.

H. PACK DIRT TIGHTLY INTO ANY SPACE BETWEEN BOX SIDES AND ROOT BALL.

I. WATER THOROUGHLY AND REPACK DIRT AS NEEDED.

CONSIDERATIONS:

1. MATERIAL SPECIFICATIONS FOR CONSTRUCTION OF BOX SIDES SHOULD BE BASED ON STORAGE AND TRANSPORTATION REQUIREMENTS. FOR EXAMPLE, A TREE BOX THAT MUST BE TIPPED AND TRANSPORTED OFF-SITE MUST WITHSTAND CONSIDERABLY MORE STRESS THAN ONE WHICH IS ONLY LIFTED UPRIGHT.

FOLLOWING ARE ROUGH GUIDELINES WHICH SHOULD BE MODIFIED TO FIT THE CIRCUMSTANCES:

HORIZONTAL MEMBERS:
1" MATERIAL UP TO 60" BOX
2" MATERIAL OVER 60" BOX

VERTICAL MEMBERS:
1" MATERIAL UP TO 48" BOX
2" MATERIAL OVER 48" BOX

1" MATERIAL IS USUALLY 1X12 #5 PINE
2" MATERIAL IS USUALLY 2X8 OR 2X12 ECONOMY GRADE

2. 1" x .025 STEEL STRAPPING IS GENERALLY USED FOR BANDING MATERIAL. 1/2" x .025 IS USUALLY ADEQUATE FOR SMALLER BOXES WHICH WILL NOT BE STORED FOR LONG PERIODS

3. BEFORE DIGGING THE TRENCH, SOME THOUGHT SHOULD BE GIVEN TO THE DIRECTION THE BOX IS TO BE TIPPED DURING BOTTOMING AND THE ORIENTATION OF THE BOX SHOULD BE ADJUSTED ACCORDINGLY.

4. GENERALLY, PLANTS SHOULD BE LEFT SIDEBOXED AND WATERED EXTENSIVELY FOR AT LEAST 3 WEEKS BEFORE BOTTOMING.

V. PLACING SUPPORTING TOP WOOD

OBJECTIVES:

TO MINIMIZE MOVEMENT OF THE PLANT AND ITS ROOT SYSTEM BY ANCHORING SECURELY TO BOX AND TO REDUCE LOSS OF SOIL DURING TRANSPORTATION AND HANDLING.

PROCEDURES

A. MEASURE 2x4 OR 2x6 WOOD TO FIT THE WIDTH OF BOX AND CUT.

B. PLACE WOOD ON EACH SIDE OF TRUNK. NAIL WOOD TO SUPPORTS ON BOX SIDES.

C. PLACE CROSS MEMBERS AND ADDITIONAL SUPPORTING WOOD AS NECESSARY BASED ON SIZE AND ORIENTATION OF TREE.

D. NAIL 1" MATERIAL ACROSS TOP OF ROOT BALL (AT LEAST 2 BOARDS IN EACH DIRECTION).

E. DO NOT NAIL BOARDS TO TREE TRUNKS

VI. BOTTOMING

OBJECTIVE:

TO CUT THE REMAINING ROOTS WHILE MINIMIZING LOSS OF SOIL FROM THE BOTTOM OF ROOT BALL.

PROCEDURES

A. PLACE STAKE A SAFE DISTANCE FROM TRENCH IN THE DIRECTION PLANT IS TO BE TIPPED. ATTACH "COME ALONG" TO ONE END OF CHAIN. WRAP OTHER END OF CHAIN AROUND BOX AND SECURE CINCH CHAIN UNTIL TAUT

B. GRADUALLY UNDERCUT BENEATH THE ROOT BALL. CUT TAP ROOTS CLEANLY AS ENCOUNTERED.

C. FREQUENTLY TEST TAUTNESS OF CHAIN. WHEN POSSIBLE BEGIN TO TIP BOX OVER IN DIRECTION OF STAKE. WHEN BOX BEGINS TO TIP, PLACE SAFETY BRACE AGAINST BOTTOM OF BOX TO PREVENT BOX FROM FALLING IN CASE OF STAKE OR CHAIN FAILURE.

D. AS BOX IS TIPPED BACK, NAIL BOTTOM STRIPS TO BOX SIDES. WHEN TREE IS FULLY TIPPED AND BOTTOM COMPLETELY COVERED, NAIL BOARDS ACROSS OTHERS.

E. PLACE BANDING UNDERNEATH CROSS MEMBERS.

F. LOWER BOX DOWN TO ITS ORIGINAL ORIENTATION.

G. BRING BANDING UP ALONG SIDES AND OVER TOP OF BOX. TIGHTEN BANDING AND SECURE WITH CRIMPER.

CONSIDERATIONS:

1. DEPENDING ON SOIL CONDITIONS, PRE-ASSEMBLED BOTTOMS MAY BE FEASIBLE.

2. ONCE THE TRENCH IS DUG, THE BOX MAY BE TIPPED IN ANY ONE OF FOUR DIRECTIONS CORRESPONDING WITH THE BOX SIDES. IN CHOOSING THE DIRECTION, CONSIDERATION SHOULD BE GIVEN TO LOW BRANCHES ON THE SUBJECT PLANT OTHER NEARBY PLANTS OR ANY OTHER OBSTACLES WHICH WOULD IMPEDE TIPPING TO THE EXTENT NECESSARY TO ATTACH BOTTOM.

VII. REMOVAL AND TRANSPORTATION

OBJECTIVE:

TO MOVE BOXED PLANT TO HOLDING AREA WITHOUT DAMAGING BOX OR PLANT.

PROCEDURES:

A. DETERMINE EQUIPMENT NEEDED BASED ON ACCESSIBILITY, ESTIMATED WEIGHT OF PLANT AND DISTANCE TO HOLDING AREA

B. IF USING BACKHOE OR FRONT LOADER, PLACE CHAIN AROUND BOX AND SECURE TO BUCKET OF MACHINE. TILT BUCKET BACK AND LIFT OUT OF HOLE

C. IF USING CRANE, PLACE TWO CABLES CROSS-WISE AROUND BOX AND ATTACH TO HOOK. LIFT OUT OF HOLE

CONSIDERATIONS:

1. IT IS BEYOND THE SCOPE OF THIS DOCUMENT TO ADDRESS ALL THE PRECAUTIONARY AND SAFETY CONSIDERATIONS FOR OPERATING HEAVY EQUIPMENT. OBVIOUSLY, THIS STAGE OF THE OPERATION MUST BE PREFORMED BY PERSONS HAVING APPROPRIATE EXPERTISE, EXPERIENCE, AND THE PROPER LICENSES AND INSURANCES.

2. THE PERSON PLACING CABLES AROUND THE BOX WHEN A CRANE IS INVOLVED SHOULD BE CAREFUL TO ROUTE THE CABLES SUCH THAT BRANCHES ARE NOT BROKEN WHEN THE SLACK IS TAKEN UP BY LIFTING.

VIII. MAINTENANCE

OBJECTIVE

TO PROVIDE OPTIMUM CONDITIONS FOR THE PLANTS TO OVERCOME TRANSPLANT SHOCK AND MAINTAIN VIABILITY THROUGHOUT THE STORAGE PERIOD

PROCEDURES:

A. ATTACH PLANTS TO DRIP WATERING SYSTEM. SOAK THOROUGHLY ACCORDING TO REGULAR SCHEDULE BASED ON WEATHER CONDITIONS.

B. AFTER FIRST FEW SOAKINGS, CHECK ROOT BALL FOR EXCESSIVE RUN-OFF CAUSED BY CAVITIES IN SOIL AND HOLES IN BOX SIDES. CONTRACTOR SHALL REPACK SOIL AND REPAIR BOX AS NECESSARY

C. CONTRACTOR SHALL APPLY SLOW-RELEASE FERTILIZER THREE TIMES EACH YEAR MARCH, JUNE, AND SEPTEMBER OR AS DIRECTED BY TOWN.

D. CHECK FOR INSECT ACTIVITY EVERY OTHER DAY. USE FOLIAR SYSTEMIC SPRAY FOR SUCKING INSECTS SUCH AS THRIPS AND MITES. USE TRUNK SPRAY FOR WOOD BORES.

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PROJECT: Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

SHT. TITLE: PLANT INVENTORY NOTES

NO.	DATE	DESCRIPTION
1	05/05/11	90% REVIEW
2	07/07/11	100% REVIEW
3	03/30/17	REVISED SUBMITTAL
4	04/06/17	REV-01 SUBMITTAL
5	05/31/17	REV-02 SUBMITTAL

DRAWN BY: D. HE
REVIEWED BY: K. BALLA
APPROVED BY: J. EHRLLMAN
SCALE: N/A
DATE: 05/31/201

J2 PROJECT NO. 16 0897 003
DRAWING NO. PI-1.01
SHEET NO. 11 OF 58

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Plant #	Common Name	Caliper (in)/ Height (ft)	Status	Comments
1	Foothills Palo Verde	7	RIP	Roots
2	Saguaro	6	S	
3	Barrel	6	RIP	
4	Barrel	8	RIP	
5	Foothills Palo Verde	13	RIP	Roots
6	Foothills Palo Verde	8	NS	Branch Dieback
7	Foothills Palo Verde	8	NS	Roots
8	Saguaro	14	S	
9	Foothills Palo Verde	8	NS	Trunk Form / Leaning
10	Foothills Palo Verde	6	NS	Trunk Form / Leaning
11	Foothills Palo Verde	6	NS	Branch Dieback
12	Barrel	4	S	
13	Foothills Palo Verde	4	NS	Roots
14	Barrel	6	S	
15	Barrel	6	S	
16	Saguaro	22	NS	1 arm / Damaged
17	Foothills Palo Verde	6	NS	Branch Dieback / Cambium Damage
18	Foothills Palo Verde	7	NS	Branch Dieback / Cambium Damage
19	Saguaro	42	NS	2 arms / Declining
20	Foothills Palo Verde	6	NS	Branch Dieback / Cambium Damage
21	Saguaro	5	S	
22	Saguaro	14	RIP	1 arm
23	Foothills Palo Verde	7	NS	In Roots / Cambium Damage
24	Foothills Palo Verde	7	NS	In Roots / Cambium Damage
25	Foothills Palo Verde	7	NS	In Roots / Cambium Damage
26	Foothills Palo Verde	4	NS	In Roots / Cambium Damage
27	Foothills Palo Verde	6	NS	In Roots / Cambium Damage
28	Foothills Palo Verde	7	RIP	In Roots / Cambium Damage
29	Foothills Palo Verde	5	RIP	In Roots / Cambium Damage
30	Foothills Palo Verde	6	RIP	In Roots / Cambium Damage
31	Foothills Palo Verde	4	RIP	Branch Dieback / Cambium Damage
32	Barrel	9	RIP	Declining
33	Foothills Palo Verde	9	RIP	Branch Dieback / Cambium Damage
34	Foothills Palo Verde	16	RIP	In Roots / Cambium Damage
35	Barrel	4	RIP	
36	Foothills Palo Verde	10	RIP	In Roots / Cambium Damage
37	Foothills Palo Verde	5	RIP	In Roots / Cambium Damage
38	Ocotillo	10	RIP	
39	Foothills Palo Verde	12	RIP	In Roots / Cambium Damage
40	Foothills Palo Verde	10	RIP	In Roots / Cambium Damage
41	Foothills Palo Verde	5	RIP	In Roots / Cambium Damage
42	Saguaro	10	RIP	Poor Form
43	Foothills Palo Verde	8	RIP	In Roots / Cambium Damage
44	Foothills Palo Verde	8	RIP	In Roots / Cambium Damage
45	Foothills Palo Verde	8	RIP	In Roots / Cambium Damage
46	Foothills Palo Verde	8	RIP	In Roots / Cambium Damage
47	Foothills Palo Verde	5	RIP	In Roots / Cambium Damage
48	Foothills Palo Verde	7	RIP	In Roots / Cambium Damage
49	Saguaro	8	RIP	
50	Foothills Palo Verde	7	RIP	In Roots / Cambium Damage
51	Foothills Palo Verde	7	RIP	In Roots / Cambium Damage
52	Foothills Palo Verde	16	RIP	In Roots / Cambium Damage
53	Foothills Palo Verde	17	NS	In Roots / Cambium Damage
54	Foothills Palo Verde	8	NS	In Roots / Cambium Damage
55	Foothills Palo Verde	13	NS	In Roots / Cambium Damage
56	Foothills Palo Verde	6	NS	In Roots / Cambium Damage
57	Foothills Palo Verde	6	NS	In Roots / Cambium Damage
58	Ocotillo	13	S	
59	Foothills Palo Verde	16	RIP	In Roots / Cambium Damage
60	Barrel	6	RIP	
61	Barrel	4	RIP	
62	Barrel	4	RIP	
63	Saguaro	21	S	1 arm
64	Ocotillo	13	S	
65	Barrel	5	NS	Declining
66	Ocotillo	6	S	
67	Ocotillo	6	S	
68	Foothills Palo Verde	5	NS	In Roots / Cambium Damage
69	Foothills Palo Verde	18	RIP	In Roots / Cambium Damage
70	Foothills Palo Verde	8	RIP	In Roots / Cambium Damage
71	Foothills Palo Verde	8	RIP	In Roots / Cambium Damage

Plant #	Common Name	Caliper (in)/ Height (ft)	Status	Comments
72	Foothills Palo Verde	6	RIP	In Roots / Cambium Damage
73	Foothills Palo Verde	6	RIP	In Roots / Cambium Damage
74	Foothills Palo Verde	8	RIP	In Roots / Cambium Damage
75	Foothills Palo Verde	7	RIP	In Roots / Cambium Damage
76	Foothills Palo Verde	6	RIP	In Roots / Cambium Damage
77	Foothills Palo Verde	6	NS	In Roots / Cambium Damage
78	Foothills Palo Verde	4	NS	In Roots / Cambium Damage
79	Foothills Palo Verde	8	NS	In Roots / Cambium Damage
80	Foothills Palo Verde	8	NS	In Roots / Cambium Damage
81	Foothills Palo Verde	18	NS	In Roots / Cambium Damage
82	Foothills Palo Verde	8	NS	In Roots / Cambium Damage
83	Foothills Palo Verde	18	NS	In Roots / Cambium Damage
84	Foothills Palo Verde	7	RIP	In Roots / Cambium Damage
85	Foothills Palo Verde	10	RIP	In Roots / Cambium Damage
86	Foothills Palo Verde	13	NS	In Roots / Cambium Damage
87	Saguaro	20	NS	Declining
88	Foothills Palo Verde	7	NS	In Roots / Cambium Damage
89	Foothills Palo Verde	7	NS	In Roots / Cambium Damage
90	Foothills Palo Verde	13	NS	In Roots / Cambium Damage
91	Foothills Palo Verde	7	NS	In Roots / Cambium Damage
92	Foothills Palo Verde	7	NS	In Roots / Cambium Damage
93	Foothills Palo Verde	7	NS	In Roots / Cambium Damage
94	Foothills Palo Verde	5	NS	In Roots / Cambium Damage
95	Foothills Palo Verde	10	NS	In Roots / Cambium Damage
96	Saguaro	4	S	
97	Foothills Palo Verde	13	NS	Branch Dieback / Cambium Damage
98	Ocotillo	6	S	
99	Ocotillo	8	S	
100	Ocotillo	11	S	
101	Saguaro	4	S	
102	Foothills Palo Verde	6	NS	In Roots / Cambium Damage
103	Saguaro	25	S	
104	Foothills Palo Verde	7	NS	Branch Dieback / Cambium Damage
105	Foothills Palo Verde	12	NS	Branch Dieback / Cambium Damage
106	Foothills Palo Verde	12	NS	Trunk Form / Leaning
107	Foothills Palo Verde	7	NS	Branch Dieback / Cambium Damage
108	Ocotillo	6	S	
109	Foothills Palo Verde	8	NS	In Roots / Cambium Damage
110	Saguaro	7	S	
111	Ocotillo	10	S	
112	Foothills Palo Verde	6	NS	In Roots / Cambium Damage
113	Foothills Palo Verde	7	NS	In Roots / Cambium Damage
114	Foothills Palo Verde	[illegible]	NS	In Roots / Cambium Damage
115	Foothills Palo Verde	7	NS	In Roots / Cambium Damage
116	Barrel	3	RIP	
117	Ocotillo	8	RIP	
118	Barrel	3	RIP	In Roots
119	Foothills Palo Verde	7	RIP	In Roots / Cambium Damage
120	Foothills Palo Verde	8	RIP	In Roots / Cambium Damage
121	Saguaro	4	RIP	
122	Foothills Palo Verde	8	RIP	In Roots / Cambium Damage
123	Foothills Palo Verde	8	NS	In Roots / Cambium Damage
124	Foothills Palo Verde	8	NS	In Roots / Cambium Damage
125	Foothills Palo Verde	8	NS	In Roots / Cambium Damage
126	Foothills Palo Verde	6	NS	In Roots / Cambium Damage
127	Foothills Palo Verde	6	NS	In Roots / Cambium Damage
128	Foothills Palo Verde	7	NS	Exposed Roots / Cambium Damage
129	Foothills Palo Verde	7	NS	Branch Dieback / Cambium Damage
130	Foothills Palo Verde	10	NS	Branch Dieback / Cambium Damage
131	Foothills Palo Verde	4	NS	Branch Dieback / Cambium Damage
132	Saguaro	13	S	
133	Barrel	5	S	
134	Foothills Palo Verde	5	NS	In Roots / Cambium Damage
135	Foothills Palo Verde	6	NS	In Roots / Cambium Damage
136	Foothills Palo Verde	12	NS	Branch Dieback / Cambium Damage
137	Foothills Palo Verde	12	NS	Branch Dieback / Cambium Damage
138	Foothills Palo Verde	30	NS	Clutter / Cambium Damage
139	Foothills Palo Verde	6	NS	Trunk Form / Leaning
140	Foothills Palo Verde	6	NS	Branch Dieback / Cambium Damage
141	Foothills Palo Verde	8	NS	Branch Dieback / Cambium Damage
142	Foothills Palo Verde	5	NS	Branch Dieback / Cambium Damage

Plant #	Common Name	Caliper (in)/ Height (ft)	Status	Comments
143	Foothills Palo Verde	8	NS	Exposed Roots / Cambium Damage
144	Foothills Palo Verde	8	NS	Exposed Roots / Cambium Damage
145	Foothills Palo Verde	8	NS	Branch Dieback / Cambium Damage
146	Foothills Palo Verde	7	NS	Branch Dieback / Cambium Damage
147	Saguaro	10	S	
148	Foothills Palo Verde	7	NS	In Roots / Cambium Damage
149	Foothills Palo Verde	8	NS	In Roots / Cambium Damage
150	Ocotillo	6	S	
151	Foothills Palo Verde	10	NS	In Roots / Cambium Damage
152	Foothills Palo Verde	4	NS	In Roots / Cambium Damage
153	Foothills Palo Verde	8	NS	In Roots / Cambium Damage
154	Foothills Palo Verde	8	NS	In Roots / Cambium Damage
155	Ocotillo	14	NS	In Roots
156	Foothills Palo Verde	8	NS	In Roots / Cambium Damage
157	Foothills Palo Verde	8	NS	In Roots / Cambium Damage
158	Ocotillo	12	S	
159	Barrel	7	S	
160	Ocotillo	11	S	
161	Foothills Palo Verde	12	NS	Branch Dieback / Cambium Damage
162	Foothills Palo Verde	12	NS	Branch Dieback / Cambium Damage
163	Ocotillo	15	S	
164	Ocotillo	14	S	
165	Barrel	5	S	
166	Ocotillo	8	RIP	
167	Saguaro	7	RIP	In Roots
168	Ocotillo	15	RIP	In Roots
169	Barrel	5	RIP	In Roots
170	Ocotillo	15	RIP	In Roots
171	Foothills Palo Verde	6	RIP	In Roots / Cambium Damage
172	Foothills Palo Verde	6	RIP	In Roots / Cambium Damage
173	Foothills Palo Verde	6	RIP	In Roots / Cambium Damage
174	Foothills Palo Verde	6	RIP	In Roots / Cambium Damage
175	Foothills Palo Verde	8	RIP	In Roots / Cambium Damage
176	Foothills Palo Verde	6	RIP	In Roots / Cambium Damage
177	Ocotillo	15	RIP	In Roots
178	Foothills Palo Verde	7	RIP	In Roots / Cambium Damage
179	Foothills Palo Verde	6	RIP	In Roots / Cambium Damage
180	Foothills Palo Verde	6	RIP	In Roots / Cambium Damage
181	Foothills Palo Verde	[illegible]	RIP	In Roots / Cambium Damage
182	Foothills Palo Verde	5	RIP	In Roots / Cambium Damage
183	Ocotillo	10	RIP	In Roots
184	Ocotillo	8	RIP	In Roots
185	Foothills Palo Verde	13	RIP	In Roots / Cambium Damage
186	Foothills Palo Verde	6	RIP	In Roots / Cambium Damage
187	Ocotillo	6	RIP	
188	Foothills Palo Verde	8	RIP	In Roots / Cambium Damage
189	Foothills Palo Verde	8	RIP	In Roots / Cambium Damage
190	Barrel	4	RIP	
191	Ocotillo	8	RIP	
192	Ocotillo	11	RIP	
193	Foothills Palo Verde	8	RIP	Branch Dieback / Cambium Damage
194	Saguaro	30	RIP	2 arms / Declining
195	Ocotillo	8	RIP	
196	Ocotillo	8	RIP	
197	Ocotillo	8	S	
198	Ocotillo	8	RIP	
199	Barrel	4	NS	Declining
200	Saguaro	13	S	
201	Saguaro	16	RIP	3 arms
202	Foothills Palo Verde	6	NS	Branch Dieback / Cambium Damage
203	Foothills Palo Verde	6	RIP	Branch Dieback / Cambium Damage
204	Foothills Palo Verde	6	NS	Branch Dieback / Cambium Damage
205	Barrel	4	NS	Declining
206	Foothills Palo Verde	6	NS	Branch Dieback / Cambium Damage
207	Saguaro	27	S	
208	Foothills Palo Verde	6	NS	Exposed Roots / Cambium Damage
209	Foothills Palo Verde	4	RIP	Exposed Roots / Cambium Damage
210	Foothills Palo Verde	6	RIP	Trunk Form / Cambium Damage
211	Foothills Palo Verde	5	RIP	Trunk Form / Cambium Damage
212	Foothills Palo Verde	5	RIP	Trunk Form / Cambium Damage
213	Foothills Palo Verde	8	RIP	Exposed Roots / Cambium Damage

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Project:
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

PLANT INVENTORY DATA

Drawn by	D. HEINZ
Checked by	K. BALLO
Approved by	J. ENGELMANN
Scale	N/A
Date	05/31/2017
J2 Project No.	16.0897.003
Drawing No.	PI-1.02
Sheet No.	12 of 58

Plant #	Common Name	Caliper (in)/ Height (ft)	Status	Comments
214	Foothills Palo Verde	8	RIP	Branch Dieback / Cambium Damage
215	Barrel	4	RIP	In Rocks
216	Foothills Palo Verde	9	RIP	Branch Dieback / Cambium Damage
217	Foothills Palo Verde	6	RIP	In Rocks / Cambium Damage
218	Foothills Palo Verde	8	RIP	In Rocks / Cambium Damage
219	Ocotillo	8	RIP	
220	Foothills Palo Verde	5	RIP	In Rocks / Cambium Damage
221	Foothills Palo Verde	6	RIP	In Rocks / Cambium Damage
222	Foothills Palo Verde	10	RIP	In Rocks / Cambium Damage
223	Barrel	4	RIP	In Rocks
224	Barrel	6	RIP	
225	Saguaro	11	RIP	In Rocks
226	Barrel	4	RIP	
227	Foothills Palo Verde	5	RIP	In Rocks / Cambium Damage
228	Ocotillo	11	RIP	
229	Foothills Palo Verde	8	RIP	In Rocks / Cambium Damage
230	Foothills Palo Verde	6	RIP	In Rocks / Cambium Damage
231	Foothills Palo Verde	4	RIP	In Rocks / Cambium Damage
232	Foothills Palo Verde	6	RIP	In Rocks / Cambium Damage
233	Foothills Palo Verde	6	RIP	In Rocks / Cambium Damage
234	Barrel	4	RIP	Poor Form / In Rocks
235	Barrel	4	RIP	Poor Form / In Rocks
236	Ocotillo	12	RIP	
237	Ocotillo	8	RIP	
238	Ocotillo	5	RIP	
239	Ocotillo	8	RIP	
240	Ocotillo	7	RIP	
241	Barrel	6	RIP	3 heads
242	Ocotillo	10	RIP	
243	Ocotillo	12	RIP	
244	Foothills Palo Verde	5	RIP	Branch Dieback / Cambium Damage
245	Barrel	3	RIP	Poor Form
246	Foothills Palo Verde	9	RIP	Branch Dieback / Cambium Damage
247	Barrel	5	RIP	
248	Foothills Palo Verde	9	RIP	Branch Dieback / Cambium Damage
249	Foothills Palo Verde	7	RIP	Branch Dieback / Cambium Damage
250	Foothills Palo Verde	8	RIP	Branch Dieback / Cambium Damage
251	Saguaro	17	RIP	Declining / In Rocks
252	Ocotillo	18	RIP	In Rocks
253	Foothills Palo Verde	8	RIP	In Rocks / Cambium Damage
254	Foothills Palo Verde	8	RIP	In Rocks / Cambium Damage
255	Foothills Palo Verde	9	RIP	In Rocks / Cambium Damage
256	Foothills Palo Verde	4	RIP	In Rocks / Cambium Damage
257	Foothills Palo Verde	4	RIP	In Rocks / Cambium Damage
258	Foothills Palo Verde	8	RIP	In Rocks / Cambium Damage
259	Foothills Palo Verde	8	RIP	In Rocks / Cambium Damage
260	Foothills Palo Verde	6	RIP	In Rocks / Cambium Damage
261	Foothills Palo Verde	16	RIP	In Rocks / Cambium Damage
262	Foothills Palo Verde	5	RIP	Branch Dieback / Cambium Damage
263	Foothills Palo Verde	6	RIP	Branch Dieback / Cambium Damage
264	Foothills Palo Verde	8	RIP	Branch Dieback / Cambium Damage
265	Foothills Palo Verde	6	RIP	Branch Dieback / Cambium Damage
266	Foothills Palo Verde	6	RIP	Branch Dieback / Cambium Damage
267	Ocotillo	13	RIP	
268	Foothills Palo Verde	4	RIP	Branch Dieback / Cambium Damage
269	Ocotillo	12	RIP	
270	Ocotillo	6	RIP	
271	Ocotillo	6	RIP	
272	Foothills Palo Verde	6	RIP	In Wash / Cambium Damage
273	Foothills Palo Verde	5	RIP	In Wash / Cambium Damage
274	Foothills Palo Verde	7	RIP	Branch Dieback / Cambium Damage
275	Foothills Palo Verde	6	RIP	Branch Dieback / Cambium Damage
276	Foothills Palo Verde	11	RIP	Branch Dieback / Cambium Damage
277	Foothills Palo Verde	4	RIP	Branch Dieback / Cambium Damage
278	Foothills Palo Verde	5	RIP	Branch Dieback / Cambium Damage
279	Foothills Palo Verde	4	RIP	Branch Dieback / Cambium Damage
280	Foothills Palo Verde	7	RIP	Branch Dieback / Cambium Damage
281	Barrel	5	RIP	
282	Foothills Palo Verde	5	RIP	In Rocks / Cambium Damage
283	Foothills Palo Verde	8	RIP	Branch Dieback / Cambium Damage
284	Foothills Palo Verde	7	RIP	Branch Dieback / Cambium Damage

Plant #	Common Name	Caliper (in)/ Height (ft)	Status	Comments
285	Foothills Palo Verde	8	RIP	Mistletoe / Cambium Damage
286	Foothills Palo Verde	4	RIP	Branch Dieback / Cambium Damage
287	Ocotillo	6	RIP	
288	Foothills Palo Verde	6	RIP	Branch Dieback / Cambium Damage
289	Ocotillo	13	RIP	In Rocks
290	Foothills Palo Verde	7	RIP	In Rocks
291	Foothills Palo Verde	6	RIP	Branch Dieback / Rocky Soil
292	Saguaro	26	RIP	4 arms / Declining
293	Barrel	4	RIP	In Rocks
294	Ocotillo	13	RIP	
295	Ocotillo	6	RIP	
296	Ocotillo	6	RIP	
297	Foothills Palo Verde	6	RIP	Trunk Form / Cambium Damage
298	Foothills Palo Verde	6	RIP	In Rocks / Cambium Damage
299	Ocotillo	10	RIP	
300	Foothills Palo Verde	6	△1 (see Remark)	Branch Dieback / Cambium Damage
301	Foothills Palo Verde	13	(see Remark)	Branch Dieback / Cambium Damage
302	Ocotillo	10	(see Remark)	
303	Ocotillo	10	RIP	
304	Ocotillo	13	RIP	
305	Saguaro	14	RIP	Declining
306	Foothills Palo Verde	7	RIP	In Rocks / Cambium Damage
307	Ocotillo	13	RIP	
308	Foothills Palo Verde	6	RIP	In Rocks / Cambium Damage
309	Barrel	6	RIP	
310	Barrel	4	RIP	In Rocks
311	Foothills Palo Verde	6	RIP	In Rocks / Cambium Damage
312	Foothills Palo Verde	7	RIP	In Rocks / Cambium Damage
313	Foothills Palo Verde	7	RIP	In Rocks / Cambium Damage
314	Foothills Palo Verde	10	RIP	In Rocks / Cambium Damage
315	Foothills Palo Verde	6	RIP	In Rocks / Cambium Damage
316	Foothills Palo Verde	4	RIP	In Rocks / Cambium Damage
317	Ocotillo	11	RIP	
318	Foothills Palo Verde	6	RIP	Branch Dieback / Cambium Damage
319	Foothills Palo Verde	6	RIP	In Rocks / Cambium Damage
320	Foothills Palo Verde	6	RIP	In Rocks / Cambium Damage
321	Foothills Palo Verde	6	RIP	Exposed Roots / Cambium Damage
322	Foothills Palo Verde	6	RIP	Exposed Roots / Cambium Damage
323	Foothills Palo Verde	8	RIP	Branch Dieback / Cambium Damage
324	Foothills Palo Verde	7	RIP	Branch Dieback / Cambium Damage
325	Foothills Palo Verde	6	RIP	Branch Dieback / Cambium Damage
326	Foothills Palo Verde	5	RIP	Trunk Form / Leaning
327	Foothills Palo Verde	14	RIP	In Rocks / Leaning
328	Foothills Palo Verde	6	RIP	Branch Dieback / Leaning
329	Foothills Palo Verde	7	RIP	In Rocks / Leaning
330	Ocotillo	11	RIP	
331	Barrel	4	RIP	
332	Ocotillo	13	RIP	In Rocks
333	Foothills Palo Verde	8	RIP	In Rocks / Leaning
334	Foothills Palo Verde	6	RIP	In Rocks / Leaning
335	Foothills Palo Verde	7	RIP	In Rocks / Leaning
336	Foothills Palo Verde	5	RIP	In Rocks / Leaning
337	Foothills Palo Verde	12	RIP	Branch Dieback / Leaning
338	Ocotillo	5	RIP	
339	Saguaro	16	RIP	Declining
340	Saguaro	8	RIP	
341	Saguaro	8	RIP	
342	Foothills Palo Verde	12	RIP	In Rocks / Leaning
343	Foothills Palo Verde	10	NS	In Rocks / Cambium Damage
344	Barrel	2	NS	In Rocks
345	Ocotillo	7	NS	In Rocks
346	Foothills Palo Verde	7	NS	In Rocks / Cambium Damage
347	Ocotillo	8	NS	In Rocks
348	Barrel	3	RIP	
349	Foothills Palo Verde	7	RIP	In Rocks / Cambium Damage
350	Ocotillo	12	RIP	
351	Foothills Palo Verde	6	RIP	Branch Dieback / Cambium Damage
352	Foothills Palo Verde	6	RIP	In Rocks / Cambium Damage
353	Foothills Palo Verde	8	RIP	In Rocks / Cambium Damage
354	Foothills Palo Verde	7	RIP	In Rocks / Cambium Damage
355	Foothills Palo Verde	10	NS	In Rocks / Cambium Damage

Plant #	Common Name	Caliper (in)/ Height (ft)	Status	Comments
356	Foothills Palo Verde	6	NS	In Rocks / Cambium Damage
357	Foothills Palo Verde	7	NS	In Rocks / Cambium Damage
358	Foothills Palo Verde	6	NS	In Rocks / Cambium Damage
359	Foothills Palo Verde	4	NS	Trunk Form / Cambium Damage
360	Ocotillo	4	S	
361	Barrel	4	S	
362	Foothills Palo Verde	7	NS	In Rocks / Cambium Damage
363	Barrel	4	NS	In Rocks
364	Ocotillo	15	NS	In Rocks
365	Ocotillo	10	RIP	
366	Ocotillo	7	RIP	
367	Barrel	3	S	
368	Ocotillo	13	NS	Poor Structure / Form
369	Foothills Palo Verde	8	NS	Trunk Form / Leaning
370	Foothills Palo Verde	14	NS	Trunk Form / Leaning
371	Foothills Palo Verde	13	NS	Branch Dieback / Cambium Damage
372	Barrel	4	NS	Declining
373	Ocotillo	10	S	
374	Foothills Palo Verde	8	RIP	Rocky Soil
375	Barrel	3	RIP	
376	Foothills Palo Verde	8	RIP	Rocky Soil
377	Ocotillo	8	RIP	
378	Foothills Palo Verde	8	NS	Branch Dieback / Rocky Soil
379	Foothills Palo Verde	7	NS	Exposed Roots / Rocky Soil
380	Saguaro	8	NS	Poor Form
381	Foothills Palo Verde	8	NS	Branch Dieback / Rocky Soil
382	Barrel	3	RIP	In Rocks
383	Foothills Palo Verde	8	RIP	Branch Dieback / Rocky Soil
384	Saguaro	14	NS	Poor Form
385	Saguaro	4	NS	Poor Form
386	Saguaro	5	NS	In Rocks
387	Saguaro	4	NS	In Rocks
388	Foothills Palo Verde	15	NS	Branch Dieback / Rocky Soil
389	Saguaro	31	NS	3 arms / In Rocks
390	Ocotillo	13	NS	In Rocks
391	Ocotillo	16	NS	In Rocks
392	Foothills Palo Verde	8	NS	Rocky Soil
393	Foothills Palo Verde	10	NS	In Rocks
394	Foothills Palo Verde	8	NS	Branch Dieback / In Rocks
395	Foothills Palo Verde	7	NS	Branch Dieback / In Rocks
396	Foothills Palo Verde	8	NS	Branch Dieback / In Rocks
397	Barrel	3	RIP	In Rocks
398	Foothills Palo Verde	8	RIP	Branch Dieback / In Rocks
399	Foothills Palo Verde	7	RIP	Branch Dieback / In Rocks
400	Foothills Palo Verde	8	RIP	Branch Dieback / In Rocks
401	Foothills Palo Verde	8	NS	Roots
402	Foothills Palo Verde	13	NS	Branch Dieback
403	Foothills Palo Verde	14	NS	Branch Dieback / In Rocks
404	Ocotillo	10	S	
405	Foothills Palo Verde	14	NS	Trunk Form / Leaning
406	Saguaro	13	RIP	
407	Ocotillo	11	RIP	
408	Ocotillo	8	RIP	
409	Ocotillo	7	RIP	
410	Barrel	3	RIP	
411	Saguaro	22	RIP	2 heads / 1 arm
412	Foothills Palo Verde	6	NS	Branch Dieback / Rocky Soil
413	Foothills Palo Verde	6	NS	Branch Dieback / Rocky Soil
414	Barrel	1	RIP	
415	Foothills Palo Verde	6	RIP	In Rocks / Cambium Damage
416	Foothills Palo Verde	10	RIP	Branch Dieback / Cambium Damage
417	Ocotillo	13	S	

PLANT	S	NS	RIP	TOTAL
Barrel	8	6	31	46
Ocotillo	18	7	44	79
Saguaro	13	6	17	37
Foothills Palo Verde	N/A	108	192	300
TOTAL	39	120 **	248 **	417

△1

S = Salvage
NS = Non-Salvage / Remove
RIP = Remain in Place

** = Plants #300-302 shall Remain in Place with Base Bid or shall be Removed if the Bid Alternate to install temporary water line and solar panels is awarded. Total quantities above indicate Base Bid quantities with these plants in RIP.

△1 = BID ALTERNATE, INTERIM UTILITIES

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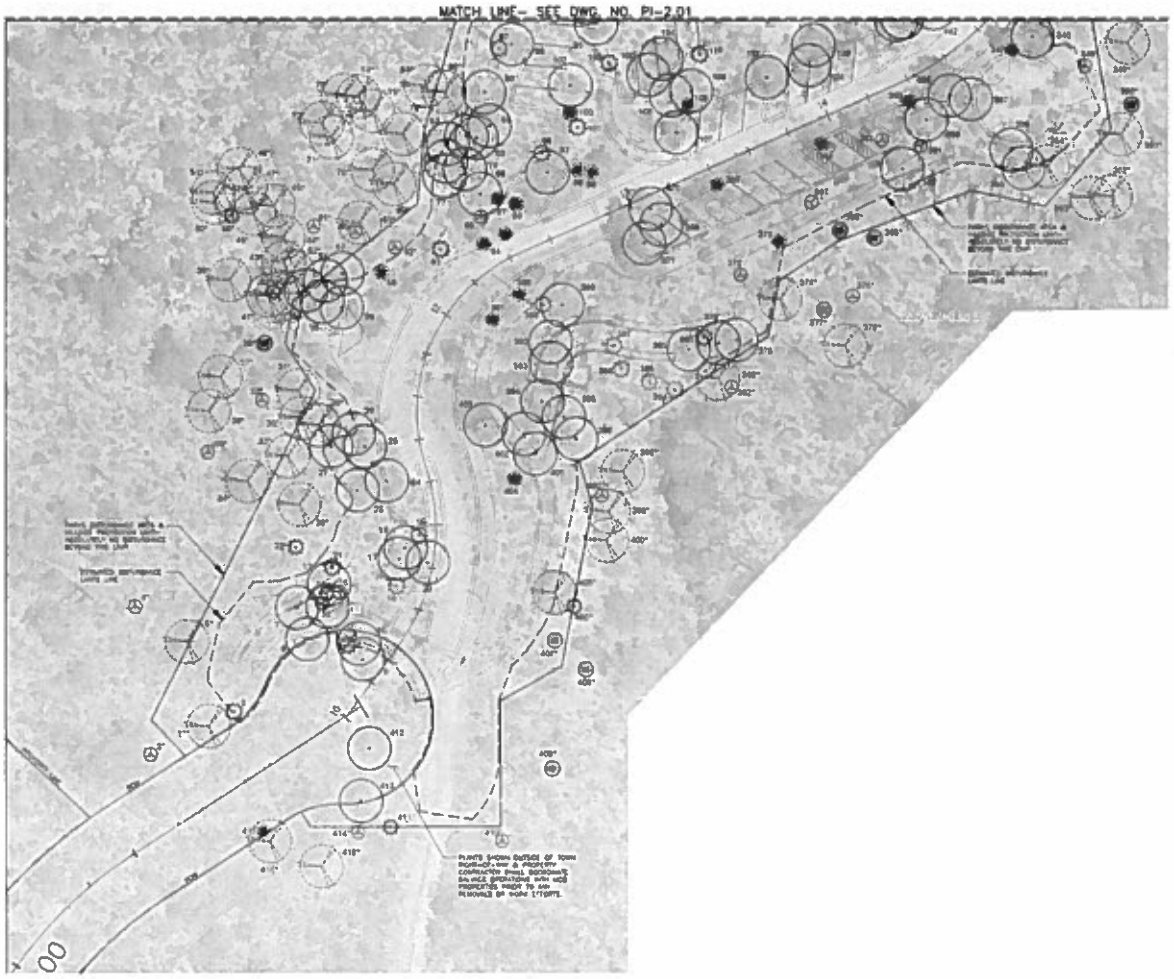
FOUNTAIN HILLS TOWN HALL
16705 E. AVENUE OF THE FOUNTAINS
FOUNTAIN HILLS, AZ 85268
(480) 816-5100

PROJECT:
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

PLANT INVENTORY DATA

DRAWN BY	D. HEWITT
DESIGNED BY	N. BALLIF
APPROVED BY	J. ENGELMANN
SCALE	N/A
DATE	05/31/2017
J2 PROJECT NO.	16.0837.003

DRAWING NO. PI-1.03 SHEET NO. 13 of 58



PLANT INVENTORY LEGEND

TREES	DESCRIPTION
CERCIDIUM MICROPHYLLUM FOOTHILLS PALO VERDE	NON-SALVAGE, REMOVE
CERCIDIUM MICROPHYLLUM FOOTHILLS PALO VERDE	REMAIN IN PLACE
CARNEGIEA GIGANTEA SAGUARO	REMAIN IN PLACE
CARNEGIEA GIGANTEA SAGUARO	SALVAGE or NON-SALVAGE
FEROCACTUS WISLIZENI FISHHOOK BARREL	REMAIN IN PLACE
FEROCACTUS WISLIZENI FISHHOOK BARREL	SALVAGE or NON-SALVAGE
FOUQUIERIA SPLENDENS OCOTILLO	REMAIN IN PLACE
FOUQUIERIA SPLENDENS OCOTILLO	SALVAGE or NON-SALVAGE

● NEXT TO ANY NON-PLANT TO REMAIN IN PLACE
●● NEXT TO ANY NON-PLANT TO REMAIN IN PLACE WITH BASE-BID OR PLANT TO BE REMOVED IF INTERIM UTILITIES BID-ALTERNATE IS AWARDED

NOTES:

1. SEE PLANT INVENTORY DATA ON DWG. NO. PI-1.02 AND PI-1.03.
2. ALL TREES IDENTIFIED ON THIS PLAN WERE DETERMINED AS NON-SALVAGEABLE. ALL TREES SHALL REMAIN IN PLACE REGARDLESS OF DESIGNATION ON PLAN UNLESS DEEMED AS NECESSARY TO REMOVE FOR SAKE OF NEW CONSTRUCTION.
3. PROTECT IN PLACE ALL EXISTING PLANTS EXCEPT ONLY THOSE DEEMED AS NECESSARY TO REMOVE FOR SAKE OF NEW CONSTRUCTION. ABSOLUTELY NO PLANTS LOCATED BEYOND THE DEFINED DISTURBANCE LIMITS SHALL BE REMOVED OR DESTROYED INCLUDING ANY IDENTIFIED SALVAGEABLE PLANTS PER THESE PLANS.
4. ALL DESTROYED PLANT MATERIALS SHALL BE UTILIZED FOR USE WITH THE NEW HYDROSEED MIX AS DIRECTED PER SEED MIX SPECS- SEE PROJECT SPECIFICATIONS.
5. ALL SALVAGED PLANTS SHALL BE PALMED, REMOVED, BORED, AND TRANSPORTED TO PLANT SALVAGE YARD WHERE THEY SHALL BE MAINTAINED AND WATERED BY NEW TEMPORARY IRRIGATION SYSTEM PER 'PLANT INVENTORY NOTES' ON DWG. NO. PI-1.01 AND PER PROJECT SPECIFICATIONS.
6. ALL DISTURBED BOULDERS, ROCKS, & SOIL SHALL BE SALVAGED AND STOCK PILED IN ROCK SALVAGE YARD.
7. SEE 'AREA PLAN' ON DWG. NO. PI-1.03 FOR PROPOSED LOCATIONS OF PLANT SALVAGE AND ROCK SALVAGE YARDS. PLANT SALVAGE YARD SHALL BE FENCED PER TOWN OF FOUNTAIN HILLS REGULATIONS.
8. COORDINATE WITH MCD PROPERTIES REGARDING SALVAGE OR REMOVAL OF VEGETATION OUTSIDE OF TOWN OWNED PROPERTY OR RIGHT-OF-WAY.

0 10' 20' 40'
SCALE: 1"=20'

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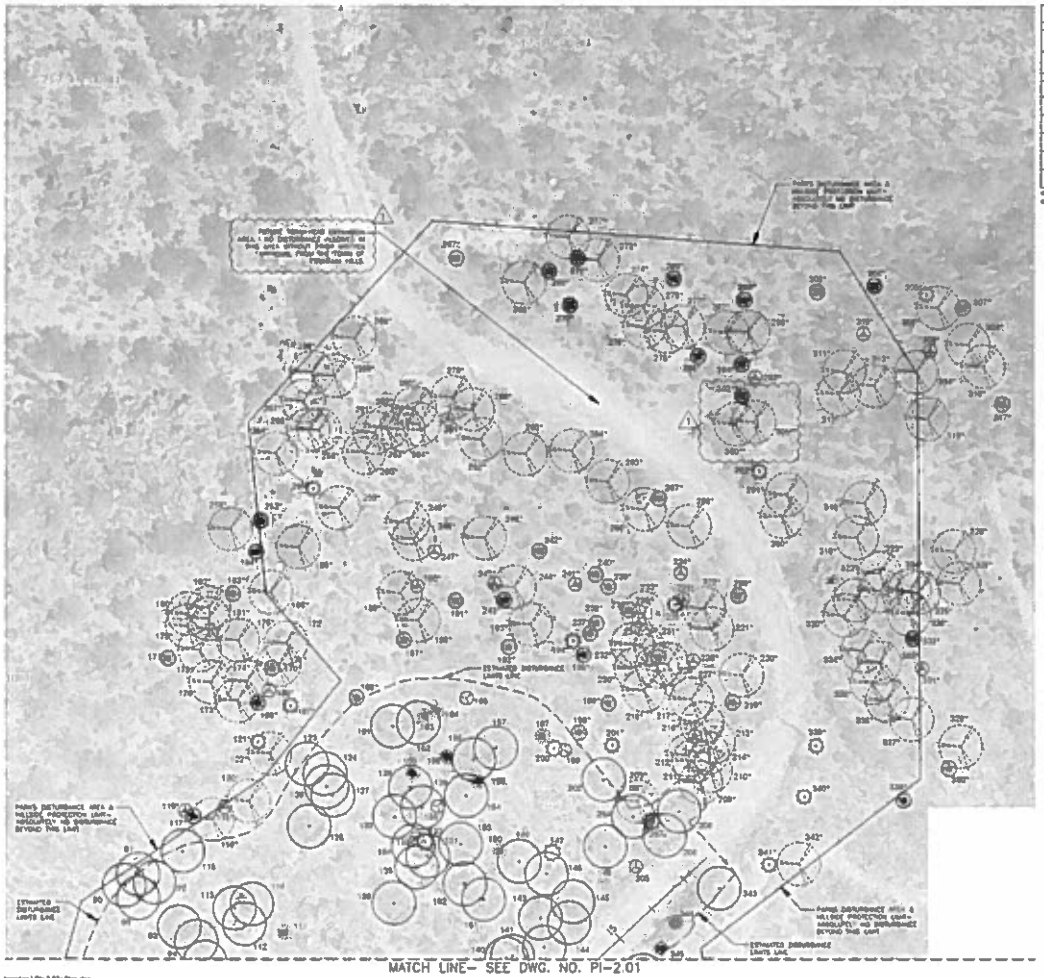
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

PLANT INVENTORY PLAN

1	10/26/16	[illegible]
2	04/17/17	[illegible]
3	03/08/17	[illegible]
4	04/24/17	[illegible]
5	05/31/17	[illegible]

DRAWN BY D. HEWITT
DESIGNED BY K. GALLIN
APPROVED BY J. ENGELMANN
SCALE 1"=20'
DATE 05/31/2017
JE PROJECT NO. 16.0887.003

PI- 2.01 14 of 58



MATCH LINE– SEE DWG. NO. PI–2.01

PLANT INVENTORY LEGEND

TREES	RECOMMENDED
CERCIDIUM MICROPHYLLUM FOOTHILLS PALO VERDE	NON-SALVAGE, REMOVE
CERCIDIUM MICROPHYLLUM FOOTHILLS PALO VERDE	REMAIN IN PLACE
LARGE SHRUBS	**RECOMMENDED**
CARNEGIEA GIGANTEA SAGUARO	REMAIN IN PLACE
CARNEGIEA GIGANTEA SAGUARO	SALVAGE or NON-SALVAGE
FEROCACTUS WISLIZENI FISHHOOK BARREL	REMAIN IN PLACE
FEROCACTUS WISLIZENI FISHHOOK BARREL	SALVAGE or NON-SALVAGE
FOUQUIERIA SPLENDENS OCOTILLO	REMAIN IN PLACE
FOUQUIERIA SPLENDENS OCOTILLO	SALVAGE or NON-SALVAGE

* NEXT TO DWG. NO.= PLANT TO REMAIN IN PLACE
** NEXT TO DWG NO.= PLANT TO REMAIN IN PLACE WITH BASE-BID OR PLANT TO BE REMOVED IF UNDER UTILITIES BID-ALTERNATE IS AWARDED

NOTES:

1. SEE PLANT INVENTORY DATA ON DWG. NO. PI–1.03 AND PI–1.03
2. ALL TREES IDENTIFIED ON THIS PLAN WERE DETERMINED AS NON-SALVAGEABLE. ALL TREES SHALL REMAIN IN PLACE REGARDLESS OF DESIGNATION ON PLAN UNLESS DEEMED AS NECESSARY TO REMOVE FOR SAKE OF NEW CONSTRUCTION
3. PROTECT IN PLACE ALL EXISTING PLANTS EXCEPT ONLY THOSE DEEMED AS NECESSARY TO REMOVE FOR SAKE OF NEW CONSTRUCTION. ABSOLUTELY NO PLANTS LOCATED BEYOND THE DEFINED DISTURBANCE LIMITS SHALL BE REMOVED OR DESTROYED REGARDING ANY DEFINED SALVAGEABLE PLANTS PER THESE PLANS
4. ALL DESTROYED PLANT MATERIALS SHALL BE UTILIZED FOR USE WITH THE NEW PROJECTS OR AS DIRECTED PER SEED MIX SPECS– SEE PROJECT SPECIFICATIONS
5. ALL SALVAGED PLANTS SHALL BE PRUNED, REMOVED, BOXED, AND TRANSPORTED TO PLANT SALVAGE YARD WHERE THEY SHALL BE QUARANTINED AND OVERSEED BY NEW TEMPORARY IRRIGATION SYSTEM PER "PLANT INVENTORY NOTES" ON DWG. NO. PI–1.01 AND PER PROJECT SPECIFICATIONS
6. ALL DISTURBED BOULDERS, ROCKS, & SOIL SHALL BE SALVAGED AND STOCK PILED IN ROCK SALVAGE YARD
7. SEE AREA PLAN ON DWG. NO. PI–1.03 FOR PROPOSED LOCATIONS OF PLANT SALVAGE AND ROCK SALVAGE YARDS. PLANT SALVAGE YARD SHALL BE FENCED PER TOWN OF FOUNTAIN HILLS REGULATIONS
8. COORDINATE WITH ACD PROPERTIES REGARDING SALVAGE OR REMOVAL OF VEGETATION OUTSIDE OF TOWN OWNED PROPERTY ON PARK-OF-WAY

△ = BID ALTERNATE WHEN UTILITIES

SCALE 1"=20'

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(480) 816-5100

Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

PLANT INVENTORY PLAN

NO.	DATE	DESC.
1	10/26/16	DES REVIEW
2	01/13/17	TOWN REVIEW
3	03/03/17	REVISED SUBMITTAL
4	04/26/17	BID-ALT INFO ADDED
5	05/31/17	BID SET

DRAWN BY: D. MEWES
DESIGNED BY: K. WALLIN
APPROVED BY: J. ENGELMANN
SCALE: 1"=20'
DATE: 05/31/2017
J2 PROJECT NO: 16 0807 003
DRAWING NO.: PI- 2.02
SHEET NO.: 15 of 58

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GENERAL CONSTRUCTION NOTES:

1. ALL CONSTRUCTION IN PUBLIC RIGHT-OF-WAY OR IN EASEMENTS GRANTED FOR PUBLIC USE MUST CONFORM TO THE LATEST MARICOPA ASSOCIATION OF GOVERNMENTS (MAG) UNIFORM STANDARD SPECIFICATIONS AND UNIFORM STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION, OR AS OTHERWISE NOTED.
2. THE ENGINEERING DESIGNS ON THESE PLANS ARE ONLY APPROVED BY THE TOWN IN SCOPE AND NOT IN DETAIL. IF CONSTRUCTION QUANTITIES ARE SHOWN ON THESE PLANS, THEY ARE NOT VERIFIED BY THE OWNER, DESIGN ENGINEER OR TOWN.
3. APPROVAL OF PLANS IS VALID FOR SIX (6) MONTHS. IF AN ENCROACHMENT PERMIT FOR CONSTRUCTION HAS NOT BEEN ISSUED WITHIN SIX MONTHS, THE PLANS SHALL BE RESUBMITTED TO THE TOWN FOR RE-APPROVAL.
4. A PUBLIC WORKS INSPECTOR WILL INSPECT ALL WORK WITHIN THE TOWN OF FOUNTAIN HILLS RIGHTS-OF-WAY AND IN EASEMENTS. NOTIFY INSPECTION SERVICES 24 HOURS PRIOR TO STARTING CONSTRUCTION (TELEPHONE 837-[illegible] [illegible]) TOWN OF FOUNTAIN HILLS.
5. CALL "BLUE STAKE CENTER", 263-1100, TWO WORKING DAYS BEFORE EXCAVATION IS TO BEGIN. THE CENTER WILL SEE THAT THE LOCATION OF THE UNDERGROUND UTILITY LINES IS IDENTIFIED FOR THE PROJECT. CALL COLLECT IF NECESSARY.
6. ENCROACHMENT PERMITS ARE REQUIRED FOR ALL WORK IN PUBLIC RIGHTS-OF-WAY AND EASEMENTS GRANTED FOR PUBLIC PURPOSES. AN ENCROACHMENT PERMIT WILL BE ISSUED BY THE TOWN UPON RECEIPT OF PAYMENT OF A BASE FEE PLUS A FEE FOR INSPECTION SERVICES TO BE PROVIDED BY THE TOWN. COPIES OF ALL PERMITS SHALL BE RETAINED ON-SITE AND SHALL BE AVAILABLE FOR INSPECTION AT ALL TIMES. FAILURE TO PRODUCE THE REQUIRED PERMITS WILL RESULT IN IMMEDIATE WORK STOPPAGE UNTIL THE PROPER PERMIT DOCUMENTATION IS OBTAINED.
7. ALL EXCAVATION AND GRADING WHICH IS NOT IN THE PUBLIC RIGHTS-OF-WAY OR NOT IN EASEMENTS GRANTED FOR PUBLIC USE MUST CONFORM TO CHAPTER 70, EXCAVATION AND GRADING, OF THE LATEST EDITION OF THE UNIFORM BUILDING CODE PREPARED BY THE INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS. A PERMIT FOR THIS GRADING MUST BE SECURED FROM THE TOWN FOR A FEE ESTABLISHED BY THE UNIFORM BUILDING CODE.

ENGINEERING NOTES:

1. THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION SERVICES ENGINEER AT LEAST 48 HOURS IN ADVANCE FOR ANY STARTING OR RESTARTING REQUIRED.
2. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN ALL PERMITS REQUIRED, AT HIS OWN EXPENSE.
3. THE CONTRACTOR WILL MAKE EXPLORATORY EXCAVATIONS AND LOCATE EXISTING UNDERGROUND FACILITIES SUFFICIENTLY IN ADVANCE OF CONSTRUCTION TO PERMIT THE REVISION OF THESE PLANS IF NECESSARY DUE TO CONFLICT BETWEEN A FACILITY PROPOSED HEREIN AND AN EXISTING FACILITY. THE CONTRACTOR WILL IMMEDIATELY NOTIFY THE DESIGN ENGINEER OF ANY CONFLICTS ENCOUNTERED IN THE FIELD.
4. IT IS THE CONTRACTORS SOLE RESPONSIBILITY TO VERIFY THE PRESENCE AND LOCATION OF ANY AND ALL EXISTING OVERHEAD AND/OR UNDERGROUND UTILITIES THAT MAY INTERFERE WITH THE CONSTRUCTION, WHETHER OR NOT SAID UTILITIES ARE SHOWN ON THE CONSTRUCTION PLANS FOR THIS PROJECT. CONTRACTOR SHALL ADEQUATELY PROTECT AND MAINTAIN SUCH UTILITIES.
5. THE CONSTRUCTION SERVICES ENGINEER DOES NOT ASSUME ANY LIABILITY FOR ERRORS OF LINE AND/OR GRADE ON ANY STAKING WHICH HAS BEEN DISTURBED IN ANY WAY, NOR DOES THE CONSTRUCTION SERVICES ENGINEER ASSUME ANY LIABILITY FOR ERRORS OF LINE AND/OR GRADE ON ANY STAKING THAT HAS BEEN IN PLACE FOR A PERIOD OF 12 HOURS OR MORE WITHOUT THE COMMENCEMENT OF CONSTRUCTION FOR WHICH IT WAS SET.
6. THE CONTRACTOR SHALL NOTIFY THE DEVELOPERS SURVEYOR BEFORE BACKFILLING WATER AND/OR SEWER SERVICES IN ORDER THAT THE CONSTRUCTION SERVICES ENGINEER MAY VERIFY THE AS-BUILT LOCATION OF THE SERVICE.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PRESERVING ALL STAKES AND CONTROL, AND SHALL TAKE STEPS NECESSARY TO INSURE THAT THE STAKES AND CONTROL ARE NOT DISTURBED OR TAMPERED WITH. IF STAKES ARE DISTURBED, THE CONTRACTOR ALONE SHALL BE RESPONSIBLE FOR THE COST INCURRED TO RESTAKE.
8. ANY QUESTIONS RELATING TO THE ACCURACY OF IMPROVEMENT INSTALLATION SHALL NOT BE RAISED SUBSEQUENT TO COMPLETION OF THE WORK UNLESS ALL SURVEY STAKES ARE MAINTAINED INTACT. SHOULD SUCH STAKES NOT BE PRESENT AND VERIFIED AS TO THEIR ORIGIN, NO CLAIM FOR ADDITIONAL COMPENSATION FOR CORRECTION SHALL BE PRESENTED TO ANY PARTY AND SUCH WORK SHALL BE CORRECTED BY THE CONTRACTOR AT HIS OWN EXPENSE.
9. THESE PLANS ARE SUBJECT TO THE INTERPRETATION OF INTENT BY THE DESIGN ENGINEER. ALL QUESTIONS REGARDING THESE PLANS SHALL BE PRESENTED TO THE DESIGN ENGINEER IN WRITING. ANYONE WHO TAKES UPON HIMSELF/HERSELF THE INTERPRETATION OF THE DRAWINGS OR MAKES REVISIONS TO SAME WITHOUT CONFERRING WITH THE DESIGN ENGINEER SHALL BE RESPONSIBLE FOR THE CONSEQUENCES THEREOF.
10. CONSTRUCTION LIMITS-ADEQUATELY STAKE AND ROPE THE CONSTRUCTION LIMITS. THE CONSTRUCTION LIMITS SHALL REMAIN MARKED THROUGHOUT THE CONSTRUCTION PERIOD.
11. PAINT ANY EXISTING UTILITY BOXES PER AGENCY GUIDELINES.
12. THE ESTIMATED QUANTITIES SHOWN HEREON ARE FOR INFORMATION PURPOSES ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPLETENESS AND ACCURACY OF A DETAILED ESTIMATE.
13. A REASONABLE ATTEMPT HAS BEEN MADE TO SHOW THE LOCATIONS OF UNDERGROUND OBSTRUCTIONS AND UTILITY LINES IN THE WORK AREA. HOWEVER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO OBSTRUCTIONS AND UTILITY LINES ENCOUNTERED DURING CONSTRUCTION AND SHALL DETERMINE THE EXACT LOCATION OF UTILITIES IN ADVANCE OF CONSTRUCTION.
14. NOTHING CONTAINED IN THE CONTRACT DOCUMENTS SHALL CREATE, NOR SHALL BE CONSTRUED TO CREATE, ANY CONTRACTUAL RELATIONSHIP BETWEEN THE DESIGN ENGINEER AND THE CONTRACTOR OR ANY SUBCONTRACTOR.
15. THE DESIGN ENGINEER WILL NOT BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES OR FOR SAFETY PRECAUTIONS OR PROGRAMS UTILIZED IN CONNECTION WITH THE WORK, AND HE WILL NOT BE RESPONSIBLE FOR THE CONTRACTORS FAILURE TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
16. THE ENGINEER MAKES NO REPRESENTATION OR GUARANTEE REGARDING EARTHWORK QUANTITIES OR THAT THE EARTHWORK FOR THIS PROJECT WILL BALANCE DUE TO THE VARYING FIELD CONDITIONS, CHANGING SOIL TYPES, ALLOWABLE CONSTRUCTION TOLERANCES AND CONSTRUCTION METHODS THAT ARE BEYOND THE CONTROL OF THE ENGINEER.
17. ALL CONDUITS (BOX CULVERT, REINFORCED CONCRETE PIPE, AND/OR CORRUGATED METAL PIPE) SHOWN ON THESE PLANS ARE DESIGNED FOR STANDARD HIGHWAY LOADING. THE STANDARD SATISFACTORY MINIMUM COVER REQUIREMENTS AS ESTABLISHED BY THE CONDUIT MANUFACTURER MAY NOT ALWAYS BE ADEQUATE DURING CONSTRUCTION. WHEN CONSTRUCTION EQUIPMENT, FREQUENTLY HEAVIER THAN TRAFFIC LOADS FOR WHICH THE CONDUIT HAS BEEN DESIGNED, IS TO BE DRIVEN OVER OR CLOSE TO THE BURIED CONDUIT, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE ADEQUATE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE CONDUIT. THE ADEQUACY OF THE COVER REQUIREMENTS FOR CONDUITS SHALL BE ANALYZED AND CHECKED BY THE CONTRACTOR TO ADDRESS LOADING CONDITIONS IMPOSED BY CONSTRUCTION ACTIVITY. ANY CONDUIT DAMAGED BY CONSTRUCTION ACTIVITY SHALL BE REPLACED AT THE CONTRACTORS EXPENSE.
18. J2 ENGINEERING AND ENVIRONMENTAL DESIGN LLC, HAS PROVIDED NO ENVIRONMENTAL INVESTIGATIONS ON THIS SITE/PROJECT, HAS NO KNOWLEDGE OF ANY ADVERSE ENVIRONMENTAL CONDITIONS ON THIS SITE AND IS NOT RESPONSIBLE FOR AND HAS NO LIABILITY FOR ANY SUCH ENVIRONMENTAL CONDITION SHOULD ONE BE FOUND.
19. PRIOR TO BIDDING THE WORK, THE CONTRACTOR SHALL BE SATISFIED AS TO THE ACTUAL CONDITIONS, AND EARTHWORK QUANTITIES. NO CLAIM SHALL BE MADE AGAINST THE OWNER/DEVELOPER OR DESIGN ENGINEER FOR ANY EXCESS OR DEFICIENCY THEREIN, ACTUAL OR RELATIVE.

FOUNTAIN HILLS SANITARY DISTRICT NOTES:

1. ALL CONSTRUCTION SHALL CONFORM TO THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, MARICOPA ASSOCIATION OF GOVERNMENTS AND THE UNIFORM STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION, MARICOPA ASSOCIATION OF GOVERNMENTS MOST RECENT ADDITION M.A.G. SPEC. & M.A.G. DETAILS, THE ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY ENGINEERING BULLETIN NO. 11 AND REQUIREMENTS OF THE FOUNTAIN HILLS SANITARY DISTRICT, WHICHEVER IS MOST STRINGENT.
2. BEDDING MATERIAL SHALL NOT BE LARGER THAN ¾" IN SIZE.
3. ALL FACILITIES, MATERIALS, AND WORKMANSHIP ARE SUBJECT TO THE APPROVAL AND ACCEPTANCE OF THE SANITARY DISTRICT MANAGER IN ORDER TO ASSURE THE INTEGRITY OF THE SANITARY DISTRICTS COLLECTION SYSTEM.
4. ANY WORK PERFORMED WITHOUT THE APPROVAL OF THE SANITARY DISTRICT MANAGER AND/OR ALL WORK AND MATERIALS NOT IN CONFORMANCE WITH THE SPECIFICATIONS IS SUBJECT TO REMOVAL AND REPLACEMENT AT THE CONTRACTORS EXPENSE.
5. ANY DEVIATION FROM THE PLANS AND SPECIFICATIONS MUST BE APPROVED IN WRITING BY THE ENGINEER AND SANITARY DISTRICT MANAGER PRIOR TO ACCEPTANCE.
6. THE CONTRACTOR MUST OBTAIN ALL NECESSARY PERMITS FROM THE TOWN OF FOUNTAIN HILLS AND MARICOPA COUNTY ENVIRONMENTAL SERVICES DEPARTMENT PRIOR TO CONSTRUCTION. THE SANITARY DISTRICT MANAGER SHALL BE NOTIFIED 24 HOURS PRIOR TO THE DIFFERENT PHASES OF CONSTRUCTION FOR SCHEDULING INSPECTIONS.
7. THE CONTRACTOR WILL UNCOVER ALL EXISTING LINES BEING TIED INTO TO VERIFY THEIR LOCATION PRIOR TO TRENCHING. THE CONTRACTOR WILL LOCATE OR HAVE LOCATED ALL EXISTING UNDERGROUND PIPELINES, TELEPHONE AND ELECTRIC CONDUITS, AND STRUCTURES IN ADVANCE OF CONSTRUCTION AND WILL OBSERVE ALL POSSIBLE PRECAUTIONS TO AVOID DAMAGE TO THE SAME.
8. TRAFFIC CONTROL SHALL BE MAINTAINED IN ACCORDANCE WITH M.A.G. SPECIFICATION 401, MANUAL OF TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS (LATEST EDITION) AND THE CITY OF PHOENIX TRAFFIC BARRICADE MANUAL.
9. BACKFILLING SHALL NOT BE STARTED UNTIL ALL LINES ARE APPROVED BY THE SANITARY DISTRICT MANAGER.
10. A MINIMUM OF FOUR COMPACTION TESTS ARE REQUIRED MANHOLE TO MANHOLE. LOCATIONS FOR TESTING WILL BE DETERMINED BY THE DISTRICT. THE CONTRACTOR WILL NOTIFY THE TESTING LAB, COORDINATE WITH THE INSPECTOR AND TESTING LAB, AND PAY THE COSTS TO PERFORM THE TESTS. COPIES OF THE TEST RESULTS SHALL BE SENT TO BOTH THE SANITARY DISTRICT MANAGER AND TOWN ENGINEER. IF ANY TEST FAILURES ARE EXPERIENCED, THE DISTRICT RESERVES THE RIGHT TO REQUIRE ADDITIONAL TESTING AT NO EXPENSE TO THE DISTRICT.
11. WHEN A SEWER CROSSES A WATER PIPE AT A POINT AT WHICH THE SEWER IS LESS THAN 2 FEET BELOW THE WATER PIPE, THE SEWER SHALL BE ENCASED IN CONCRETE FOR A DISTANCE OF AT LEAST 6 FEET IN EACH DIRECTION FROM THE CROSSING, EXCEPT IN THE CASE OF A FORCE MAIN WHERE THE DISTANCE IS 10 FEET. WHEN THE SEWER IS A 4 OR 6 INCH HOUSE CONNECTION, NO PROTECTION IS REQUIRED IF THE VERTICAL SEPARATION IS 12 INCHES OR GREATER.
12. ALL SEWER LATERALS SHALL BE CONSTRUCTED TO THE LOT LINE OR INTERIOR EDGE OF THE PUE WHICHEVER IS FURTHER ONTO PROPERTY. A PLUG OR CAP MUST BE INSTALLED AT THE END OF EACH LATERAL WITH A GREEN 1-RAIL MARKING POST (FIBERGLASS/PLASTIC BLEND) INSTALLED VERTICALLY FROM THE PLUG OR CAP UP TO 2 FEET ABOVE GRADE.
13. ALL SEWER STUBS SHALL END WITH A PLUG OR CAP AND MUST HAVE A GREEN 1-RAIL MARKING POST (FIBERGLASS/PLASTIC BLEND) INSTALLED FROM THE END OF THE PLUG OR CAP UP TO 2 FEET ABOVE GRADE.
14. ALL SEWER LINES WILL BE AIR TESTED IN ACCORDANCE WITH ADEQ ENGINEERING BULLETIN NO. 11. ALL MANHOLES WILL BE WATER TESTED IN ACCORDANCE WITH ADEQ ENGINEERING BULLETIN NO. 11 OR TESTED WITH NEGATIVE AIR PRESSURE IN ACCORDANCE WITH ASTM C 1244-[illegible]. A LETTER CERTIFYING THE PASSING RESULTS MUST BE RECEIVED BY THE DISTRICT PRIOR TO ACCEPTANCE.
15. ANY PREVIOUSLY TESTED SEWER LINES BROKEN DURING THE INSTALLATION OF OTHER ADJACENT UTILITIES WILL BE REPAIRED AND RETESTED TO THE SATISFACTION OF THE SANITARY DISTRICT MANAGER.
16. ACCEPTANCE OF THE COMPLETED IMPROVEMENTS WILL NOT BE GIVEN UNTIL FULL SIZE PHOTO MYLAR REPRODUCIBLE "AS-BUILTS", ALONG WITH ELECTRONIC FILES IN PDF FORMAT OF ALL AS-BUILT SHEETS, HAVE BEEN SUBMITTED TO AND APPROVED BY THE SANITARY DISTRICT MANAGER.
17. NON-SHRINK GROUT SHALL BE USED IN THE CONSTRUCTION OF ALL MANHOLES.
18. ALL SANITARY SEWER PIPE SHALL BE POLYVINYL CHLORIDE (P.V.C.) UNLESS OTHERWISE NOTED, IN ACCORDANCE WITH M.A.G. SPECIFICATION & CERTIFICATE SHALL BE FURNISHED FROM THE MANUFACTURER ATTESTING THAT THE PIPE MEETS THE REQUIRED ASTM REQUIREMENTS, PVC PIPE SDR 35, ASTM D 3034.
19. ALL CLEANOUTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE DISTRICTS STANDARD DESIGN.
20. COMPLIANCE WITH ALL TOWN, COUNTY, STATE AND FEDERAL RULES AND REGULATIONS PERTAINING TO JOB SAFETY SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
21. THE INSIDE OF ALL NEW MANHOLES SHALL BE COATED WITH INSECTICIDE PAINT IN ACCORDANCE WITH DISTRICT REQUIREMENTS. USE EITHER [illegible] OR SUPER 10. APPLICATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. A LETTER CERTIFYING THAT THE APPLICATION IS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS ALONG WITH A TWO YEAR WARRANTY SHALL BE PROVIDED TO THE DISTRICT.

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[illegible] 3/31/17 12:[illegible]

EPCOR WATER GENERAL NOTES:

1. ANY CHANGES FROM APPROVED PLANS MUST BE SUBMITTED TO EPCOR WATER FOR WRITTEN APPROVAL PRIOR TO INSTALLATION.
2. CONTRACTOR SHALL NOTIFY EPCOR WATER CONSTRUCTION INSPECTIONS DEPARTMENT 48 HOURS IN ADVANCE OF ANY CONSTRUCTION. USE THE CONTACT LIST IN EPCOR WATER'S DEVELOPMENT GUIDE TO SCHEDULE INSPECTION. EPCOR WATER GENERAL PHONE NUMBER IS 623-[illegible]. WHEN APPOINTMENTS FOR INSPECTION ARE ARRANGED AT LEAST 48 HOURS IN ADVANCE, THE INSPECTION/TEST WILL BE CONDUCTED AS SCHEDULED. OTHERWISE THE REQUEST WILL BE BASED ON AVAILABILITY.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING REQUIRED PERMITS AND INSPECTIONS FROM APPROPRIATE GOVERNMENTAL AGENCIES FOR ALL WORK IN PUBLIC RIGHTS-OF-WAY (MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION, CITY ENGINEERING DEPARTMENT, ETC.). INSPECTIONS BY EPCOR WATER DO NOT RELIEVE CONTRACTOR OF RESPONSIBILITY TO OBTAIN REQUIRED INSPECTIONS FROM OTHER INTERESTED GOVERNMENTAL AGENCIES (BUILDING SAFETY, FIRE DISTRICT, ETC.).
4. ALL WORK AND TESTING SHALL BE IN ACCORDANCE WITH MARICOPA ASSOCIATION OF GOVERNMENTS (MAG) STANDARD SPECIFICATIONS AND DETAILS UNLESS OTHERWISE STATE ON PLANS.
5. ALL POTABLE WATERLINES AND FITTINGS SHALL HAVE NSF-PW SEAL. ALL MATERIALS AND PRODUCTS USED IN THE POTABLE WATER SYSTEM SHALL CONFORM TO NSF STANDARDS 60 AND 61 IN ACCORDANCE WITH AAC R18-4-119. ALL MATERIALS SHALL BE LEAD-FREE AS DEFINED IN AAC R18-4-[illegible] AND R18-4-[illegible].
6. PIPE SEPARATION: SEPARATION BETWEEN WATER AND SEWER LINES WILL BE A MINIMUM OF 6 FEET FROM OUTSIDE EDGE TO OUTSIDE EDGE OF PIPE. TWO FEET SEPARATION IS REQUIRED BETWEEN WATER LINES, STORM DRAINS, AND DRY UTILITIES.
7. DIP SECTIONS: ALL DIP SECTIONS SHALL BE CONSTRUCTED OF RESTRAINED DUCTILE IRON PIPE (DIP) PER EPCOR WATER'S STD. DET. [illegible]. ALL DIP SECTIONS SHALL BE JOINT RESTRAINED DIP WITH POLYETHYLENE WRAP FOR THE ENTIRE LENGTH PER MAG SECTION 610.[illegible]. JOINT RESTRAINED LENGTHS WILL FOLLOW MAG STD. DET. 303-1 AND 303-2. ANCHOR BLOCKS/THRUST BLOCKS MUST BE INSTALLED FOR VERTICAL BENDS PER MAG STD. DET. 380.
8. CONCRETE ENCASEMENT: ALL WATER AND SEWER ENCASEMENTS SHALL FOLLOW MAG STD. DET. 404-1. WHEN A WATER LINE MUST BE CONSTRUCTED UNDER A SEWER OR RECLAIMED WATER LINE, THE WATER LINE MUST BE A MINIMUM OF 2' BELOW THE SEWER OR RECLAIMED WATER LINE AND EXTRA PROTECTION IS REQUIRED. PROTECTION FOR THE SEWER MAIN SHOULD BE CONSTRUCTED WITH MECHANICAL JOINT OR RESTRAINED JOINT DUCTILE IRON PIPE FOR A DISTANCE OF TEN FEET ON BOTH SIDES OF THE WATER MAIN. A FULL LENGTH OF DIP WILL BE CENTERED OVER/UNDER THE WATER MAIN. WHEN DIP IS NOT USED FOR THE SEWER MAIN, BOTH THE WATER AND SEWER LINES WILL BE ENCASED IN CONCRETE FOR A LENGTH OF 10' ON BOTH SIDES OF THE CROSSING, PER MAG STD. DET. 404-2. REFER TO MAG STD. DET. 404-1 REGARDING FORCE MAINS. ALL ENCASEMENTS REQUIRE REBAR AND CLASS "C" CONCRETE.
9. GATE VALVES SHALL BE RESILIENT SEATED IN ACCORDANCE WITH EPCOR WATER'S WATER MATERIAL SPECS AND MAG SECT. 630.[illegible].
10. VALVE SUPPORTS SHALL BE IN ACCORDANCE WITH MAG STD. DET. 301.
11. VALVE BOXES SHALL BE IN ACCORDANCE WITH MAG STD. DET. 391-1, TYPE C.
12. WATER VALVE DEBRIS CAP: DEBRIS CAPS ARE REQUIRED WHEN WATER VALVES ARE CONSTRUCTED WITHIN 2 FEET OF THE EDGE OF GUTTER, IN AREAS THAT ARE UNPAVED, AND AREAS PRONE TO FLOODING. VALVES SHOULD BE SET 2-TENTHS ABOVE FINISH GRADE IN ALL UNPAVED AREAS. CONCRETE COLLAR WITH CARSONITE MARKER IS REQUIRED ON ALL VALVE LOCATIONS OUTSIDE OF RIGHT-OF-WAY.
13. CONCRETE THRUST BLOCKS SHALL BE IN ACCORDANCE WITH MAG STD. DET. 380. THRUST BLOCKS ARE NOT ALLOWED IN ROWS. RESTRAINED JOINTS PER MAG STD. DET. 303-1 & 2 SHALL BE USED IN ROWS IN PLACE OF CONCRETE THRUST BLOCKS. 90-DEGREE FITTINGS ARE NOT ALLOWED IN ROWS, BUT MAY BE USED OTHER AREAS AS APPROVED BY EPCOR.
14. FIELD LOCK GASKETS ARE NOT ALLOWED.
15. WATER SERVICES 2 INCHES AND SMALLER SHALL BE IN ACCORDANCE WITH EPCOR WATER STD. DET. 342-2.
16. FIRE HYDRANTS LOCATED ON "DEAD END" WATER MAINS SHALL HAVE A BLOW-OFF, IN ACCORDANCE WITH EPCOR WATER STD. DET. 390-1, INSTALLED AT THE END OF THE WATER MAIN.
17. HYDRANT COATING: FRAZEE AND PLATE 2 [illegible] "BRIGHT YELLOW" OR SHERWIN WILLIAMS [illegible] "SAFETY YELLOW". COMPLETE HYDRANT PREPARATION PRIOR TO INSPECTION FOR PAINTING. INSPECTION IS ALSO REQUIRED AFTER PAINTING FOR CONTRACTOR TO RECEIVE FINAL ACCEPTANCE. DOES NOT APPLY TO PROJECTS IN MOHAVE COUNTY.
18. PUMPER NOZZLE TO BE ORIENTED TO PROVIDE BEST ACCESSIBILITY FOR FIRE TRUCK. ALL HYDRANT PORTS MUST BE LUBRICATED WITH A FOOD-GRADE LUBRICANT.
19. EXCEPT IN MOHAVE COUNTY, FIRE HYDRANTS SHALL BE IN ACCORDANCE WITH EPCOR STD. DET. 360-1 OR 360-2 AS INDICATED ON THE PLAN. IN MOHAVE COUNTY, FIRE HYDRANTS SHALL COMPLY WITH LOCAL FIRE MARSHAL REQUIREMENTS.
20. RECLAIMED WATERLINES SHALL BE INSTALLED IN ACCORDANCE WITH MAG SECTIONS 601, 610 AND 616. TESTING SHALL BE IN ACCORDANCE WITH MAG SECTIONS 610 AND 611 INCLUDING DISINFECTION/CHLORINATION. FINAL FLUSHING AND BACTERIOLOGICAL TESTING AS SPECIFIED IN MAG SECTION 611.[illegible] SHALL NOT BE REQUIRED.
21. WATER TIGHT MANHOLE COVERS: WATER TIGHT MANHOLE COVERS ARE REQUIRED WHEN THE EDGE OF THE MANHOLE COVERS ARE CONSTRUCTED WITHIN 2 FEET OF THE EDGE OF GUTTER, IN AREAS THAT ARE UNPAVED, AND AREAS PRONE TO FLOODING. MANHOLES SHOULD BE SET 2-TENTHS ABOVE FINISH GRADE IN ALL UNPAVED AREAS. CONCRETE COLLAR WITH CARSONITE MARKER IS REQUIRED ON ALL VALVE LOCATIONS OUTSIDE OF RIGHT-OF-WAY. WATER TIGHT MANHOLE COVERS ARE REQUIRED FOR ALL MANHOLES IN MOHAVE COUNTY.
22. WATER PRESSURE TESTING: ALL WATER LINES WILL BE TESTED PER MAG SECTION 610.[illegible]. MODIFICATIONS TO THESE SPECIFICATIONS INCLUDE: THE TESTING TO BE AT A MINIMUM OF 200 PSI. HIGHER TEST PRESSURES MAY BE REQUIRED IN CERTAIN CIRCUMSTANCES, AND LOSS/LEAKAGE CALCULATIONS WILL BE BASED UPON A MAXIMUM OF 1500-FEET, STARTING WITH THE SMALLEST DIAMETER PIPE.
23. THE CONTRACTOR IS REQUIRED TO UNIFORM SLOPE TEST ALL SEWER LINES BY VIDEO AND VACUUM TEST ALL MANHOLES IN ACCORDANCE WITH A.A.C. R18-9-E301. DEFLECTION TESTING SHALL BE PERFORMED PER MAG SECTION 615.[illegible]. TESTING DOCUMENTATION AND DVDS SHALL BE SUBMITTED TO EPCOR WATER DEVELOPMENT SERVICES PROJECT MANAGER FOR APPROVAL PRIOR TO ACCEPTANCE. ALL REQUIRED REPAIRS ARE THE RESPONSIBILITY OF THE CONTRACTOR AND MUST BE COORDINATED WITH EPCOR WATER INSPECTORS.
24. SEWER TESTING: ALL SEWER MAINS AND LATERALS SHALL BE PRESSURE TESTED AND VIDEO TESTED. ALL SEWER MAINS SHALL ALSO BE MANDRELL TESTED. THE MAXIMUM ALLOWABLE SAG IS 0.5 INCHES.
25. IN MOHAVE COUNTY, SOLID SLEEVES ARE NOT ALLOWED AS A REMEDY TO A FAILED PRESSURE TEST ON A NEW LINE.

EPCOR WATER BACKFLOW PREVENTION GENERAL NOTES:

1. BACKFLOW PREVENTION DEVICES: ALL LANDSCAPE AND COMMERCIAL WATER SERVICES REQUIRE BACKFLOW PREVENTION DEVICES, MEETING THE REQUIREMENTS OF EPCOR WATER. BACKFLOW DEVICES SHALL BE IN PLACE PRIOR TO METERS BEING SET. TESTING OF THE BACKFLOW DEVICES MAY BE COMPLETED AFTER THE INSTALLATION OF THE METER.
2. CONTACT UTILITY CROSS-CONNECTION SPECIALIST (BACKFLOW PREVENTION) AT [illegible] FOR APPROVED ASSEMBLY LIST, INSPECTIONS AND TESTING.
3. USE ONLY A UNIVERSITY OF SOUTHERN CALIFORNIA FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH (USC) APPROVED ASSEMBLY.
4. BACKFLOW PREVENTION ASSEMBLIES SHALL HAVE A CERTIFICATE OF APPROVAL ISSUED BY USC-FCCCHR, OR OTHER APPROVED THIRD-PARTY CERTIFYING ENTITY UNRELATED TO THE PRODUCT MANUFACTURER OR VENDOR, IN ACCORDANCE WITH AAC R18-4-215. ALL ASSEMBLIES SHALL BE INSTALLED IN ACCORDANCE WITH EPCOR WATER STANDARD DETAILS. NO ASSEMBLY SHALL BE PLACED IN SERVICE UNLESS IT HAS BEEN TESTED AND IS FUNCTIONING AS DESIGNED. A CERTIFIED TEST MUST BE SUBMITTED TO EPCOR WATER CROSS CONNECTION SPECIALIST (BACKFLOW PREVENTION) FOR APPROVAL. APPROVAL OF WATER FACILITIES WILL NOT BE GRANTED PRIOR TO BACKFLOW PREVENTION APPROVAL.
5. LOCATE ASSEMBLY PER PLANS UNLESS OTHERWISE DIRECTED BY UTILITY'S CROSS-CONNECTION SPECIALIST.
6. ALL PRESSURE VACUUM BREAKER ASSEMBLIES SHALL BE INSTALLED A MINIMUM OF 12 INCHES ABOVE ALL DOWNSTREAM PIPING AND OUTLETS.
7. USE LEAD FREE SOLDER ONLY.
8. OPTIONAL (WITH APPROVAL FROM EPCOR WATER) PLANT SCREENING, POSTS AND/OR PROTECTIVE ENCLOSURES FOR VANDALISM AND/OR FREEZE PROTECTION.
9. CLEARANCES:
   A. WALL OR STRUCTURE: MINIMUM 24"
   B. ABOVE FINISH GRADE: MINIMUM 12" - MAXIMUM 36"
10. FIRE LINES: PROVIDE LEAK-TAMPER SWITCHES & WIRING TO ALARM SYSTEM WHERE REQUIRED BY FIRE DEPARTMENT. NOTE: FIRE LINES LONGER THAN [illegible] REQUIRE BACKFLOW ASSEMBLY AT PROPERTY LINE OR EPCOR APPROVED LOCATION. SUCH FIRE LINES MUST HAVE BACKFLOW PREVENTION ASSEMBLIES WITH A METERED BYPASS.

ROADWAY QUANTITIES-(ROADWAY & PARKING LOT)

NEW ASPHALT PAVEMENT	2320	SY
COLORED CONCRETE PAVEMENT	[illegible]	SF
COLORED CONCRETE WALKWAY	[illegible]	SF
TEMPORARY ASPHALT ENTRY PAVEMENT (2"AC OVER 95% COMPACTED SUBGRADE)	14	SY
COLORED RIBBON CURB	2195	LF
COLORED RIBBON CURB WITH WHEEL STOP	[illegible]	LF
ADA TRUNCATED DOMES	[illegible]	SF
DRAINAGE CONCRETE PIPE, CLASS IV (2[illegible]" PIPE)	[illegible]	LF
DRAINAGE HEADWALL (DOUBLE 3[illegible]" PIPE MAG 501 [illegible] U TYPE)	[illegible]	EA
DRAINAGE CONCRETE PIPE, CLASS IV (3[illegible]" PIPE)	142	LF
DRAINAGE HEADWALL (3[illegible]" PIPE)	[illegible]	EA
DRAINAGE CONCRETE PIPE CULVERT, CLASS IV (24" PIPE)	[illegible]	LF
DRAINAGE HEADWALL (24" PIPE)	[illegible]	EA
DRAINAGE CONCRETE PIPE, CLASS IV (42")	[illegible]	LF
DRAINAGE HEADWALL INLET (42" PIPE)	[illegible]	EA
DRAINAGE HEADWALL OUTLET (42" PIPE)	[illegible]	EA
CATCH BASIN MAG STD DTL 537 - DOUBLE	[illegible]	EA
HEADWALL HANDRAIL	[illegible]	LF
HEADWALL TRASH RACK	[illegible]	EA
STORM DRAIN MANHOLE WITH REINFORCED BOX STRUCTURE	[illegible]	EA
PLACED ROCK (ARMAMENT)	[illegible]	SF
GABION BASKET RETAINING WALLS	[illegible]	CY
GABION BASKET SEATING WALLS WITH CONCRETE PIERS AND CAPS	[illegible]	LF
DUMPED RIPRAP D[illegible]	[illegible]	SY
DUMPED RIPRAP D[illegible]	[illegible]	SY
ROCK CUT (ENHANCEMENT) / SCULPTURING	[illegible]	SF
MISC SIGNING & STRIPING (INCLUDES YELLOW & WHITE 2-WAY REFLECTORS)	1	LS

UTILITIES QUANTITIES-(WATER & SEWER)

CONNECT TO 8" WATERLINE-INSTALL SERVICE SADDLE & CORPORATION STOP	1	EA
CONNECT TO 8" WATERLINE-INSTALL 8"X8" CROSS W/8" GATE VALVE & COVER	1	EA
2" WATER METER BOX & CURB STOP (NO METER AT THIS TIME)	1	EA
1" REDUCED PRESSURE BACKFLOW DEVICE W/ENCLOSURE & CONCRETE PAD	1	EA
2" WATERLINE	[illegible]	LF
6" DI WATERLINE	[illegible]	LF
8" DI WATERLINE	[illegible]	LF
2" BACKFLOW DEVICE W/ENCLOSURE & CONCRETE PAD	1	EA
FIRE HYDRANT WITH 6" GATE VALVE & COVER	1	EA
2" PLUG & CURB STOP WITH FLUSHING PIPE & AIR RELEASE VALVE	1	EA
8" DI SEWER PIPE	[illegible]	LF
8" PVC SDR 35	[illegible]	LF
SEWER MANHOLES	[illegible]	EA

BID-ALT INTERIM UTILITIES QUANTITIES

QUANTITIES FOR THE BID-ALT ARE LOCATED ON SHEETS CV-2.03, CV-2.04, CV-2.04A & LS-2.03

EARTHWORK QUANTITIES

CUT	4,3[illegible] C.Y.
FILL	11,[illegible] C.Y.
NET	7,[illegible] C.Y. BORROW

(1) = BID ALTERNATE INTERIM UTILITIES

NOTES:

1. ENGINEERS ESTIMATED EARTHWORK QUANTITIES ARE NOT FOR BIDDING PURPOSES. CONTRACTORS SHALL BASE THEIR BID ON THEIR OWN QUANTITY TAKEOFFS.
2. ALL GRADING AND EARTHWORK SHALL BE CONSTRUCTED IN STRICT CONFORMANCE WITH THE GEOTECHNICAL REPORT FOR THE SITE PREPARED BY [illegible] & ASSOCIATES, INC. THE CONTRACTOR SHALL CONTACT OWNER AND GEOTECHNICAL ENGINEER PRIOR TO CONSTRUCTION TO VERIFY RECEIPT OF ANY UPDATES THAT MAY HAVE BEEN MADE TO THE REPORT.
3. GRADING & EARTHWORK MAY REQUIRE ROCK BLASTING. THE CONTRACTOR MUST OBTAIN ALL NECESSARY PERMITS, INCLUDING THE TOWN OF FOUNTAIN HILLS FIRE DEPARTMENT PERMIT, PRIOR TO CONSTRUCTION.
4. THE ABOVE ARE NOT A COMPLETE LISTING OF ALL WORK ITEMS.

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Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

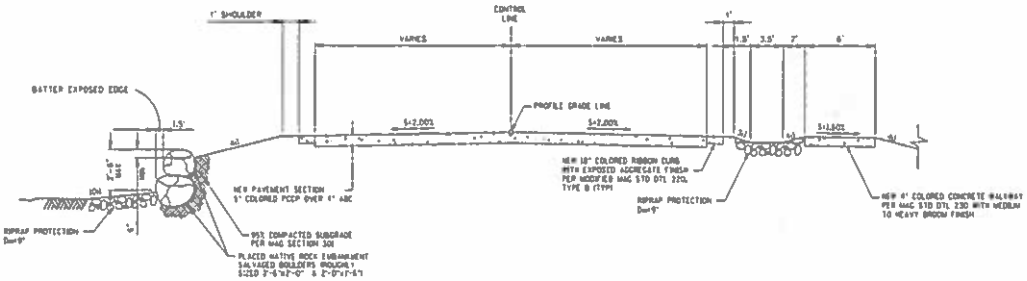
CIVIL NOTES

NO.	DATE	REVISIONS
1	[illegible]	[illegible]
2	[illegible]	[illegible]
3	[illegible]	REVISED [illegible]
4	[illegible]	[illegible]
5	[illegible]	[illegible]

DRAWN BY: J. WITTING
DESIGNED BY: C. GRIFFITH
APPROVED BY: J. HOLZMEISTER
SCALE: N/A
DATE: 05/31/2017

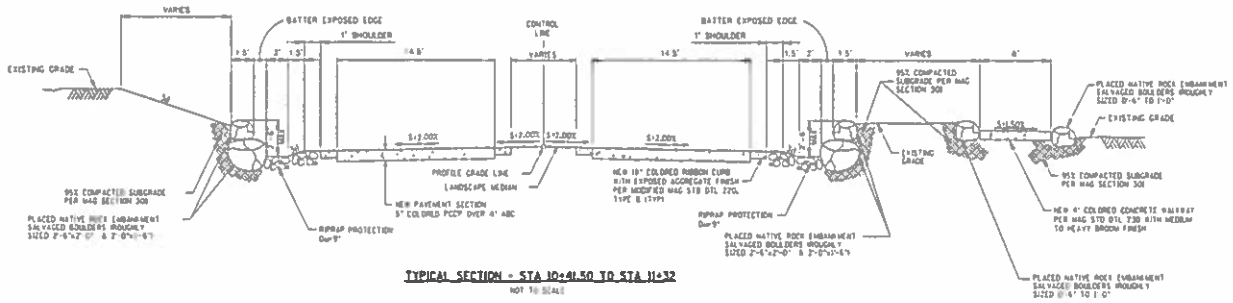
J2 PROJECT NO. 16.0897.003

DRAWING NO. CV-1.01
SHEET NO. 16 of 58



TYPICAL SECTION - STA 11+32 TO STA 12+45

NOT TO SCALE



TYPICAL SECTION - STA 10+41.50 TO STA 11+32

NOT TO SCALE

NOTES:

1. PLACED ROCKS SHALL BE ON-SITE NATIVE STONE. ANY SUPPLEMENTAL STONE SHALL BE APPROVED BY THE TOWN OF FOUNTAIN HILLS AND THE ENGINEER AT LEAST 25 DAYS PRIOR TO INSTALLATION. STONE COLOR AND TEXTURE SHALL MATCH SURROUNDING NATIVE STONE / NATURAL SETTING.
2. PREPARE SUBGRADE PER MAG SECTION 301 AT 95% COMPACTION.
3. ALL ROCK EXPOSED DURING CONSTRUCTION MAY BE STAINED WITH PERMEON, EDMIE OR TOWN APPROVED MATERIAL INCLUDING ALL VISIBLE CONCRETE, HEADWALLS, RIPRAP, GABION BASKET STONES, AND PLACED ROCK ONLY WHERE DIRECTED AND APPROVED BY TOWN REPRESENTATIVE.
4. RIBBON CURB PER MAG STD DTL 220 TYPE B, MODIFY CURB WIDTH TO 30-INCHES.
5. CROSS SLOPE OF RIBBON CURB TO MATCH CROSS SLOPE OF ADJACENT PAVEMENT.

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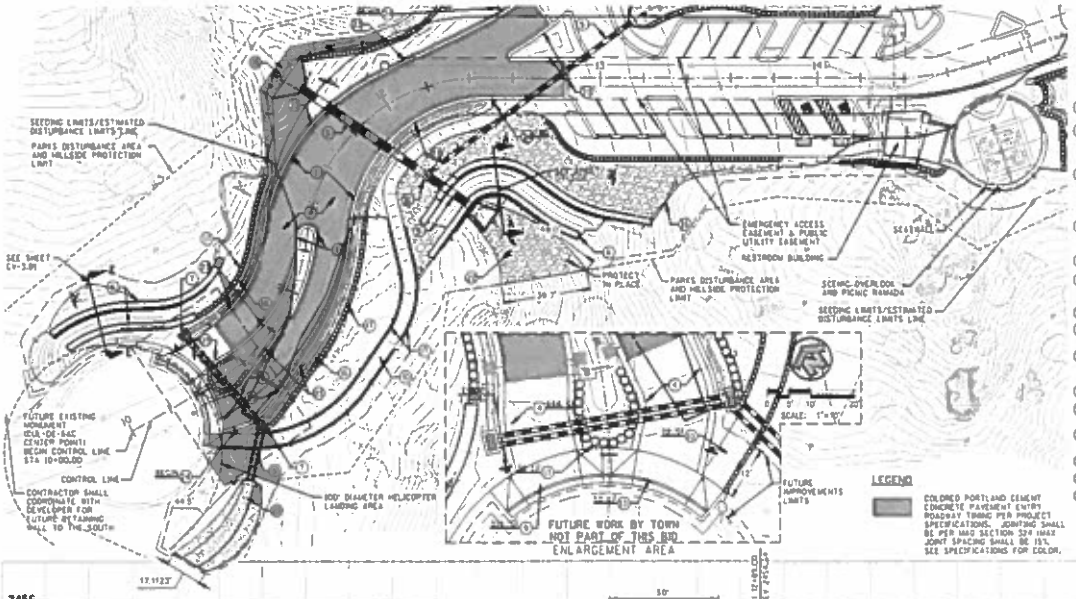
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

TYPICAL SECTIONS

1	10/20/16	[illegible]
2	01/17/17	[illegible]
3	03/02/17	[illegible]
4	04/28/17	[illegible]
5	05/31/17	[illegible]

DRAWN BY J. ROTHING
DESIGNED BY C. DRIFTIN
APPROVED BY J. HOLZMEISTER
SCALE N/A
DATE 05/31/2017
J2 PROJECT NO. 16 0807 003
DRAWING NO. CV-1.02
SHEET NO. 17 of 58



GENERAL CONSTRUCTION NOTES

1. THE CONTRACTOR SHALL FIELD VERIFY ALL INFORMATION BEFORE ANY CONSTRUCTION WORK COMMENCES. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL UTILITIES PRIOR TO BECOMING CONSTRUCTION. UTILITIES DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED OR REPLACED AT CONTRACTOR'S EXPENSE. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN.

PAVING, GRADING & DRAINAGE NOTES

1. COLORED RIBBON CURB PER MAG STD DTL 270. TYPE B. MODIFY CURB WIDTH TO 18-INCHES COLOR PER SPEC.
4. 5-INCH COLORED PORTLAND CEMENT CONCRETE PAVEMENT PER MAG SECTION 775, OVER 6-INCH AGGREGATE BASE COURSE PER MAG SECTION 702. PREPARE SUBGRADE PER MAG SECTION 301, 90% COMPACTION. COLOR PER SPEC.
5. STORM DRAIN CONCRETE PIPE PER MAG, SECTION 618. SIZE, LENGTH, HEADWALL, AND INVERT PER STORM DRAIN PLANS, DWG NO CV-2.05, CV-2.06, & CV-2.07. TRASH RACK ON UP-STREAM HEADWALL PER DETAIL 5, DWG NO CV-3.04. HANDRAIL PER DETAIL 6, DWG NO CV-3.03.
6. GABION BASKET RETAINING WALLS PER DETAIL 16 AND 18, DWG NO CV-3.05. SEE L3-2.06 & L3-3.05 FOR ENTRY SIGNAGE LOCATION & DETAIL.
7. CATCH BASIN PER MAG STD DTL 537.
9. CONCRETE DRIVEWAY ENTRANCE PER MAG STD DTL 250. MODIFY WIDTH TO 16-FEET AND CROSS SLOPE TO 2% TO BE CONSTRUCTED BY OTHERS.
10. NEW 4" COLORED CONCRETE WALKWAY PER MAG STD DTL 230
11. DEPRESSED CURB AND GUTTER PER MAG STD DTL 220 TO BE CONSTRUCTED BY OTHERS.
15. STORM DRAIN MANHOLE PER MAG STD DTL 520 & 522, 24-INCH FRAME AND COVER. DRAINAGE STRUCTURE PER DETAIL 17, DWG NO CV-3.06.
16. RIPRAP PROTECTION PER NOTE 4 ON DWG NO CV-3.02.
17. PLACED NATIVE ROCK ENBANKMENT. PER TYPICAL SECTIONS ON DWG NO CV-1.02 AND DETAILS ON DWG NO CV-3.02.
18. RIPRAP PROTECTION PER NOTE 4 ON DWG NO CV-3.02 MOD Dm=24"
23. FIRE LANE STRIPING PER DETAIL 16, DWG NO CV-3.06
24. NO PARKING SIGN PER DETAIL 15 AND 16, DWG NO CV-3.05.
25. TEMPORARY ASPHALT PAVING 2" ASPHALT OVER COMPACTED NATURAL GRADE WITH SAFETY EDGE PER MAG STD DTL 201

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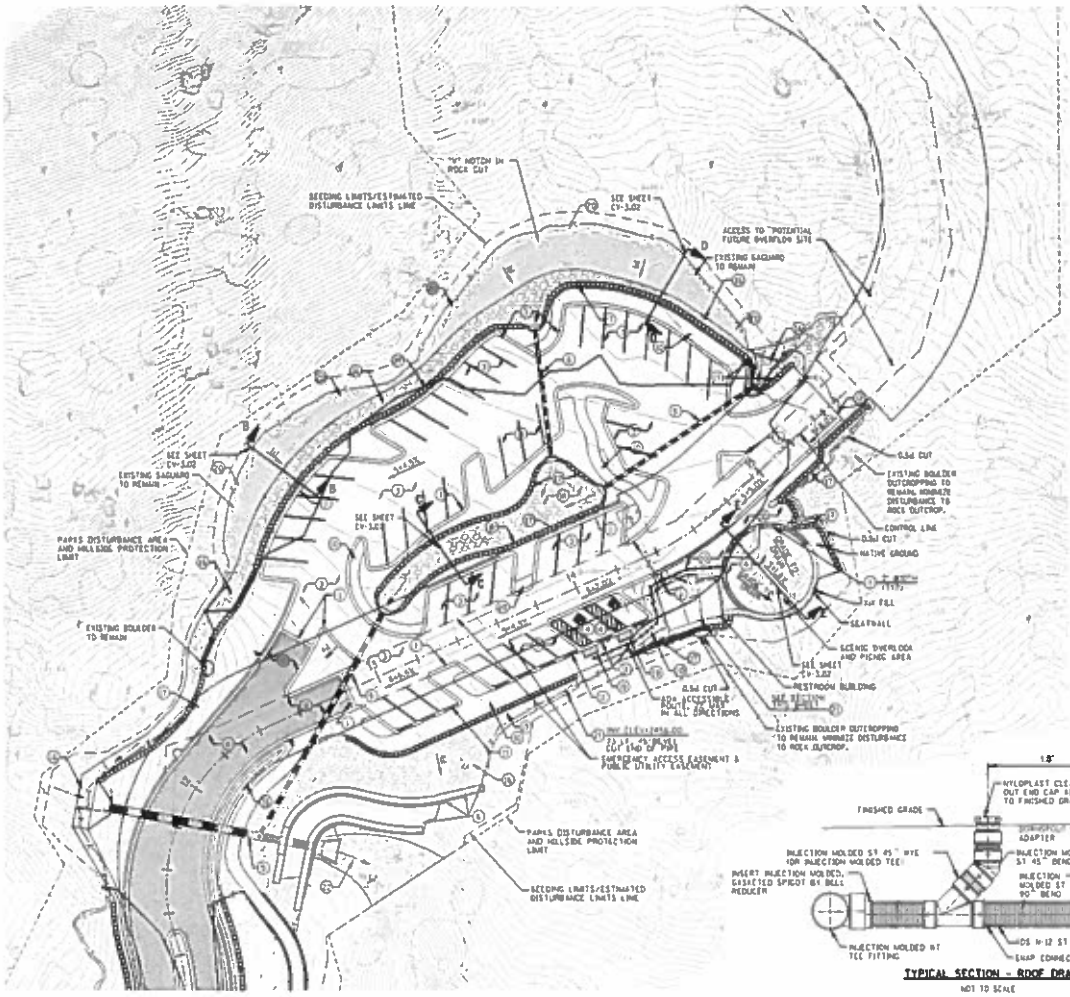
Project
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

PAVING, GRADING & DRAINAGE

No	Date	Revision
1	10/20/17	60% Review
2	01/17/17	Town Review
3	03/02/17	Permit Submittal
4	04/26/17	90% Permit Set
5	05/31/17	100 Set

Drawn by J. ROTHING
Designed by C. GRIFFITH
Approved by J. HOLZWEISTER
Scale 1"=20'
Date 05/31/2017
J2 Project No. 16.0887.003
Drawing No. CV-2.01
Sheet No. 18 of 58



GENERAL CONSTRUCTION NOTES

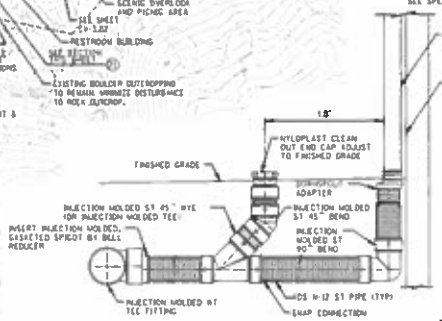
1. THE CONTRACTOR SHALL FIELD VERIFY ALL INFORMATION BEFORE ANY CONSTRUCTION WORK COMMENCES. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL UTILITIES PRIOR TO BEGINNING CONSTRUCTION. UTILITIES DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED OR REPLACED AT CONTRACTOR'S EXPENSE. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN.

PAVING, GRADING & DRAINAGE NOTES

1. COLORED RIBBON CURB PER MAG STD DTL 220, TYPE B. MODIFY CURB WIDTH TO 18-INCHES COLOR PER SPEC.
3. NEW PAVEMENT 2" ASPHALT OVER 4" ABC PER PARKING LOT PAVEMENT DETAIL DWG NO CV-3.02.
4. 5-INCH COLORED PORTLAND CEMENT CONCRETE PAVEMENT PER MAG SECTION 726, OVER 4-INCH AGGREGATE BASE COURSE PER MAG SECTION 702. PREPARE SUBGRADE PER MAG SECTION 301, 90% COMPACTION. COLOR PER SPEC.
5. STORM DRAIN CONCRETE PIPE PER MAG, SECTION 618. SIZE, LENGTH, HEADWALL, AND INVERT PER STORM DRAIN PLANS, DWG NO CV-2.05, CV-2.06 AND CV-2.07. TRASH RACK ON UP-STREAM HEADWALL PER DETAIL B, DWG NO CV-3.04. HANDRAIL PER DETAIL B, DWG NO CV-3.03.
6. GABION BASKET RETAINING WALLS PER DETAIL 1A AND 1B, DWG NO CV-3.06.
9. DRAINAGE DITCH WITHIN PARKING AREA PER DETAIL 4, DWG NO CV-3.02.
10. NEW 4" COLORED CONCRETE WALKWAY PER MAG STD DTL 230
11. COLORED RIBBON WHEEL STOP CURB PER DETAIL 6, DWG NO CV-3.03.
12. PAVEMENT SECTION TERMINATION PER MAG STD DTL 201, TYPE A.
14. ADA ACCESSIBLE PARKING STALLS PER DETAIL 1L, DWG NO CV-3.05.
16. RIPRAP PROTECTION PER NOTE 4 ON DWG NO CV-3.02.
17. PLACED NATIVE ROCK EMBANKMENT, PER TYPICAL SECTIONS ON SHEET CV-3.02 AND DETAILS ON DWG NO CV-3.02.
18. INSTALL ADA TRUNCATED DOME PAVERS PER DETAIL 1G, DWG NO CV-3.04.
19. TOP DITCH PER DETAIL 3 & 5, DWG NO CV-3.02.
21. INSTALL 4" DIA. ADVANCED DRAINAGE SYSTEM N-12 PIPE, OR AN APPROVED EQUAL. MAINTAIN 0.52 MINIMUM SLOPE AND 1.5' OF COVER ABOVE PIPE.
22. RIPRAP PROTECTION PER NOTE 4 ON DWG NO CV-3.02 MOD Dm=24"

LEGEND

COLORED PORTLAND CEMENT CONCRETE PAVEMENT ENTRY ROADWAY TINING PER PROJECT SPECIFICATIONS. JOINTING SHALL BE PER MAG SECTION 374 MAX JOINT SPACING SHALL BE 15'. SEE SPECIFICATIONS FOR COLOR.



TYPICAL SECTION - ROOF DRAIN

NOT TO SCALE

SCALE 1"=20'

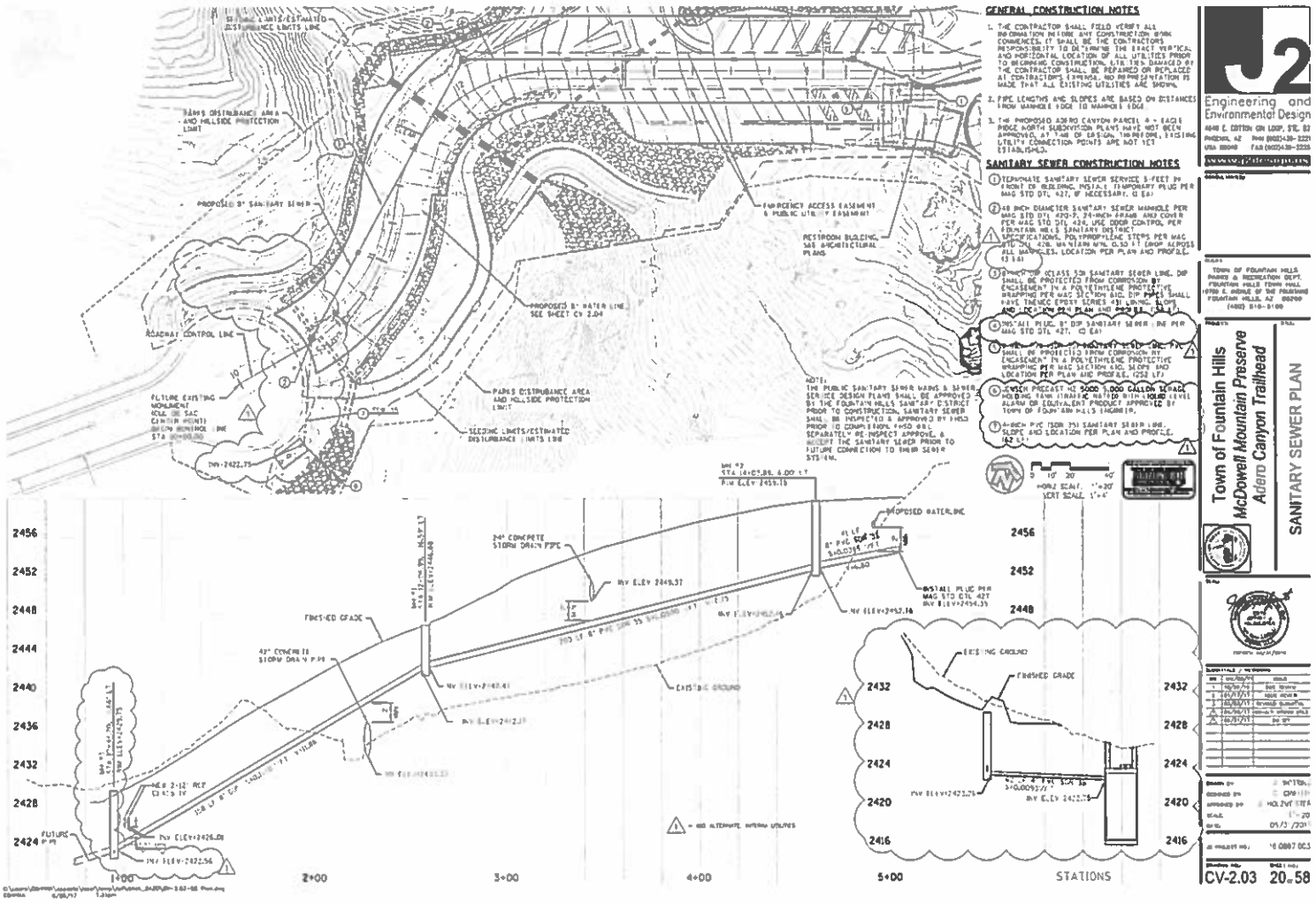
Engineering and Environmental Design

Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

PAVING, GRADING & DRAINAGE

1	02/20/19	PER REVIEW
2	01/07/19	PER REVIEW
3	03/05/19	REVISED SUBMITTAL
4	04/26/19	PER 4/1 REVIEW COMMENTS
5	06/31/19	90 DP

DRAWN BY J. BOTTING
DESIGNED BY C. GRIFFITH
APPROVED BY J. MOLZWEISTER
SCALE 1"=20
DATE 05/31/2019
JOB PROJECT NO. 16 0807 001
DRAWING NO. CV-2.02
SHEET NO. 19 of 58


GENERAL CONSTRUCTION NOTES
SANITARY SEWER CONSTRUCTION NOTES
Engineering and Environmental Design
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead
SANITARY SEWER PLAN
CV-2.03
20-58
STATIONS
1+00
2+00
3+00
4+00
5+00
2456
2452
2448
2444
2440
2436
2432
2428
2424
2420
2416
FINISHED GRADE
EXISTING GROUND
PROPOSED WATERLINE
24" CONCRETE STORM DRAIN PIPE
42" CONCRETE STORM DRAIN PIPE
ROADWAY CONTROL LINE
PROPOSED 8" SANITARY SEWER
PROPOSED 8" WATER LINE SEE SHEET CV 2.04
PARKS DISTRUBANCE AREA AND HILLSIDE PROTECTION LIMIT
SEEDING LIMITS/ESTIMATED DISTURBANCE LIMITS LINE
FUTURE EXISTING MONUMENT
RESTROOM BUILDING, SAE ARCHITECTURAL PLANS
EMERGENCY ACCESS EASEMENT & PUBLIC UTILITY EASEMENT
FUTURE PIPE
INV ELEV 2422.75
INV ELEV 2426.08
INV ELEV 2422.56
INV ELEV 2449.37
INV ELEV 2452.16
INV ELEV 2423.75
INV ELEV 2422.75
NEW 2-12" RCP
NOTE: THE PUBLIC SANITARY SEWER MAINS & SEWER SERVICE DESIGN PLANS SHALL BE APPROVED BY THE FOUNTAIN HILLS SANITARY DISTRICT PRIOR TO CONSTRUCTION. SANITARY SEWER SHALL BE INSPECTED & APPROVED BY FHSD PRIOR TO COMPLETION. FHSD WILL SEPARATELY RE-INSPECT APPROVE, & ACCEPT THE SANITARY SEWER PRIOR TO FUTURE CONNECTION TO THEIR SEWER SYSTEM.
HORIZ SCALE: 1"=20'
VERT SCALE: 1"=4'

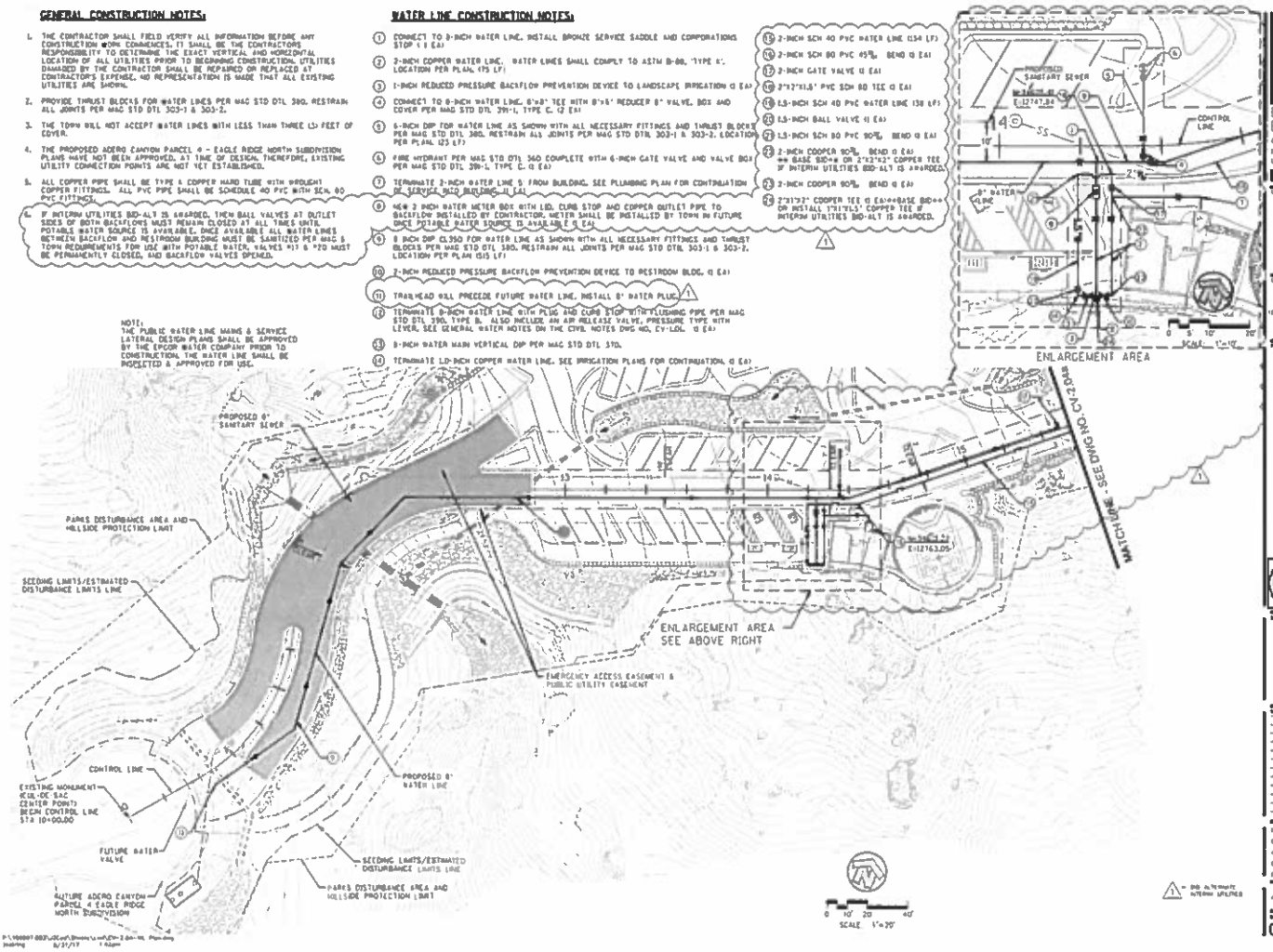
GENERAL CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL FIELD VERIFY ALL INFORMATION BEFORE ANY CONSTRUCTION WORK COMMENCES. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL UTILITIES PRIOR TO BEGINNING CONSTRUCTION. UTILITIES DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED OR REPLACED AT CONTRACTOR'S EXPENSE. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN.
2. PROVIDE THRUST BLOCKS FOR WATER LINES PER MAG STD DTL 380. RESTRAIN ALL JOINTS PER MAG STD DTL 303-1 & 303-2.
3. THE TOWN WILL NOT ACCEPT WATER LINES WITH LESS THAN THREE (3) FEET OF COVER.
4. THE PROPOSED ADERO CANYON PARCEL 4 - EAGLE RIDGE NORTH SUBDIVISION PLANS HAVE NOT BEEN APPROVED, AT TIME OF DESIGN, THEREFORE, EXISTING UTILITY CONNECTION POINTS ARE NOT YET ESTABLISHED.
5. ALL COPPER PIPE SHALL BE TYPE A COPPER HARD TUBE WITH WROUGHT COPPER FITTINGS. ALL PVC PIPE SHALL BE SCHEDULE 40 PVC WITH SCH. 80 PVC FITTINGS.
6. IF INTERIM UTILITIES BID-ALT IS AWARDED, THEN BALL VALVES AT OUTLET SIDES OF BOTH BACKFLOWS MUST REMAIN CLOSED AT ALL TIMES UNTIL POTABLE WATER SOURCE IS AVAILABLE. ONCE AVAILABLE ALL WATER LINES BETWEEN BACKFLOW AND RESTROOM BUILDING MUST BE SANITIZED PER MAG & TOWN REQUIREMENTS FOR USE WITH POTABLE WATER, VALVES #13 & #20 MUST BE PERMANENTLY CLOSED, AND BACKFLOW VALVES OPENED.

WATER LINE CONSTRUCTION NOTES:

1. CONNECT TO 8-INCH WATER LINE. INSTALL BRONZE SERVICE SADDLE AND CORPORATION STOP (1 EA)
2. 2-INCH COPPER WATER LINE. WATER LINES SHALL COMPLY TO ASTM B-88, TYPE K. LOCATION PER PLAN. (75 LF)
3. 1-INCH REDUCED PRESSURE BACKFLOW PREVENTION DEVICE TO LANDSCAPE IRRIGATION (1 EA)
4. CONNECT TO 8-INCH WATER LINE. 6"x8" TEE WITH 8"x6" REDUCER 8" VALVE, BOX AND COVER PER MAG STD DTL 391-1, TYPE C. (2 EA)
5. 6-INCH DIP FOR WATER LINE AS SHOWN WITH ALL NECESSARY FITTINGS AND THRUST BLOCKS PER MAG STD DTL 380. RESTRAIN ALL JOINTS PER MAG STD DTL 303-1 & 303-2. LOCATION PER PLAN. (25 LF)
6. FIRE HYDRANT PER MAG STD DTL 360 COMPLETE WITH 6-INCH GATE VALVE AND VALVE BOX PER MAG STD DTL 391-1, TYPE C. (1 EA)
7. TERMINATE 2-INCH WATER LINE 5' FROM BUILDING. SEE PLUMBING PLAN FOR CONTINUATION OF SERVICE INTO BUILDING. (1 EA)
8. NEW 2 INCH WATER METER BOX WITH LID, CURB STOP AND COPPER OUTLET PIPE TO BACKFLOW INSTALLED BY CONTRACTOR. METER SHALL BE INSTALLED BY TOWN IN FUTURE ONCE POTABLE WATER SOURCE IS AVAILABLE (1 EA)
9. 8 INCH DIP CL.350 FOR WATER LINE AS SHOWN WITH ALL NECESSARY FITTINGS AND THRUST BLOCKS PER MAG STD DTL 380. RESTRAIN ALL JOINTS PER MAG STD DTL 303-1 & 303-2. LOCATION PER PLAN (315 LF)
10. 2-INCH REDUCED PRESSURE BACKFLOW PREVENTION DEVICE TO RESTROOM BLDG. (1 EA)
11. TRAILHEAD WILL PRECEDE FUTURE WATER LINE. INSTALL 8" WATER PLUG. △1
12. TERMINATE 8-INCH WATER LINE WITH PLUG AND CURB STOP WITH FLUSHING PIPE PER MAG STD DTL 390, TYPE B. ALSO INCLUDE AN AIR RELEASE VALVE, PRESSURE TYPE WITH LEVER. SEE GENERAL WATER NOTES ON THE CIVIL NOTES DWG 40, CV-1.01. (1 EA)
13. 8-INCH WATER MAIN VERTICAL DIP PER MAG STD DTL 370.
14. TERMINATE 1.0-INCH COPPER WATER LINE. SEE IRRIGATION PLANS FOR CONTINUATION. (1 EA)
15. 2-INCH SCH 40 PVC WATER LINE (154 LF)
16. 2-INCH SCH 80 PVC 45°∡ BEND (1 EA)
17. 2-INCH GATE VALVE (1 EA)
18. 2"x2"x1.5" PVC SCH 80 TEE (1 EA)
19. 1.5-INCH SCH 40 PVC WATER LINE (38 LF)
20. 1.5-INCH BALL VALVE (1 EA)
21. 1.5-INCH SCH 80 PVC 90°∡ BEND (1 EA)
22. 2-INCH COPPER 90°∡ BEND (1 EA) ** BASE BID** OR 2"x2"x2" COPPER TEE IF INTERIM UTILITIES BID-ALT IS AWARDED.
23. 2-INCH COPPER 90°∡ BEND (1 EA)
24. 2"x1"x2" COPPER TEE (1 EA)**BASE BID** OR INSTALL 1"x1"x1.5" COPPER TEE IF INTERIM UTILITIES BID-ALT IS AWARDED.

NOTE:
THE PUBLIC WATER LINE MAINS & SERVICE LATERAL DESIGN PLANS SHALL BE APPROVED BY THE EPCOR WATER COMPANY PRIOR TO CONSTRUCTION. THE WATER LINE SHALL BE INSPECTED & APPROVED FOR USE.



△1 = BID ALTERNATE INTERIM UTILITIES

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FOUNTAIN HILLS, AZ 85268
(480) 816-5100

PROJECT
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

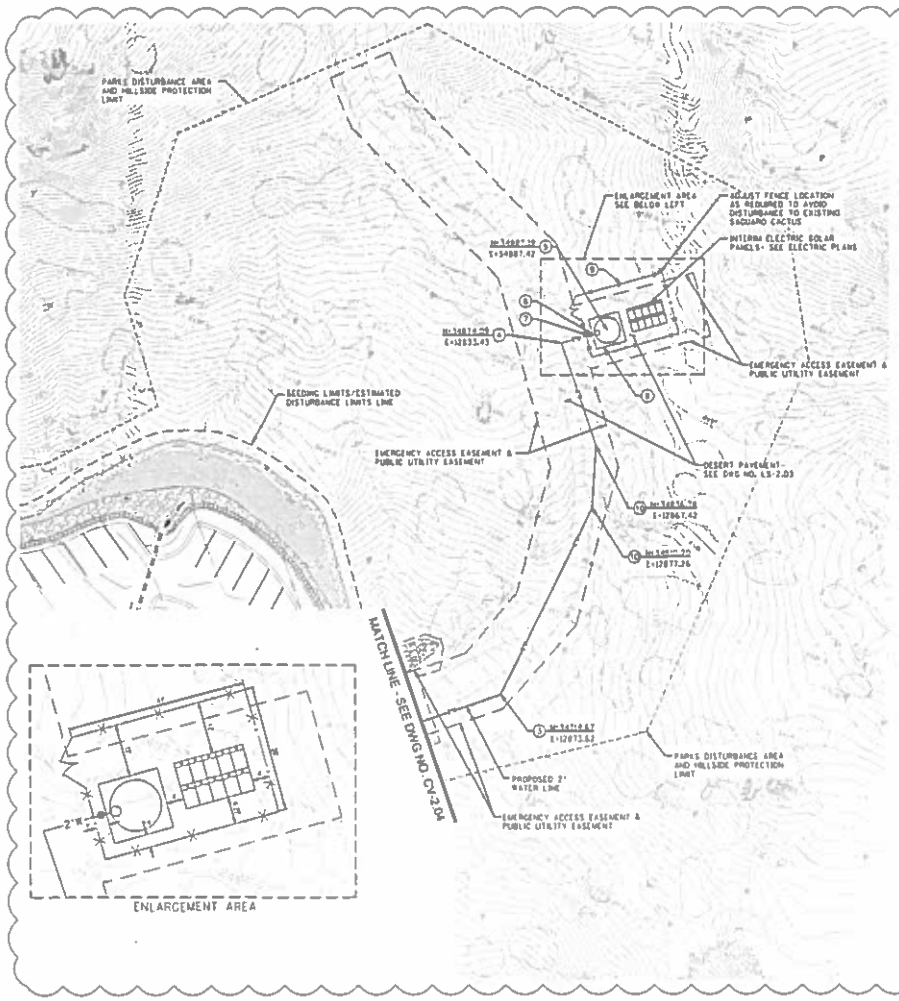
WATER LINE PLAN

SEAL

NO	DATE	DESCRIPTION
1	10/26/16	90% REVIEW
2	01/17/17	100% REVIEW
3	03/06/17	REVISED SUBMITTAL
△1	04/20/17	BID-ALT INTERIM UTILS
△2	06/07/17	BID SET

DRAWN BY J. MOTTINE
DESIGNED BY C. [illegible]
APPROVED BY J. MOLZHUBER
SCALE 1"=20'
DATE 05/31/2017

J2 PROJECT NO 16-088
DRAWING NO CV-2.04
SHEET NO 21-58



GENERAL CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL FIELD VERIFY ALL INFORMATION BEFORE ANY CONSTRUCTION WORK COMMENCES. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL UTILITIES PRIOR TO BEGINNING CONSTRUCTION. UTILITIES DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED OR REPLACED AT CONTRACTORS EXPENSE. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN.
2. PROVIDE THRUST BLOCKS FOR WATER LINES PER MAG STD DTL 380. RESTRAIN ALL JOINTS PER MAG STD DTL 303-1 & 303-2.
3. THE TOWN WILL NOT ACCEPT WATER LINES WITH LESS THAN THREE (3) FEET OF COVER.
4. THE PROPOSED ADERO CANYON PARCEL 4 - EAGLE RIDGE NORTH SUBDIVISION PLANS HAVE NOT BEEN APPROVED, AT TIME OF DESIGN. THEREFORE, EXISTING UTILITY CONNECTION POINTS ARE NOT YET ESTABLISHED.

WATER LINE CONSTRUCTION NOTES:

1. CONNECT TO 2-INCH COPPER WATER LINE. (1 EA)
2. 2-INCH SCH 40 PVC WATER LINE. (230 LF)
3. 2-INCH SCH 80 PVC 45° BEND (3 EA)
4. 2-INCH SCH 80 PVC 90° BEND (1 EA)
5. NORWESCO 5,000 GALLON ABOVE GROUND WATER TANK MODEL NO. 41377 - 141" DIA X 86" H, GREEN, W/LOCKABLE HINGED LID & STAINLESS STEEL LOCKABLE 2" DRAIN BALL VALVE OR EQUIVALENT PRODUCT APPROVED BY TOWN OF FOUNTAIN HILLS ENGINEER. (1 EA)
6. CONNECT TO WATER TANK PER MANUFACTURER'S SPECIFICATIONS (1 EA)
7. 2-INCH GATE VALVE (1 EA)
8. 14'X14'X7" ABC WATER TANK PAD COMPACTED TO 95% WITH TOP OF PAD FLUSH WITH TOP OF SURROUNDING FINISH GRADE. PAD ELEV=2491.80 (1.25 CY)
9. INTERIM 6' CHAIN LINK FENCE WITH 6' DUAL SWINGING ACCESS GATES. SEE DWG. NO. CV-3.06a. (140 LF)
10. 2-INCH SCH 80 PVC 22.5° BEND (2 EA)

NOTE:
THE PUBLIC WATER LINE MAINS & SERVICE LATERAL DESIGN PLANS SHALL BE APPROVED BY THE EPCOR WATER COMPANY PRIOR TO CONSTRUCTION. THE WATER LINE SHALL BE INSPECTED & APPROVED FOR USE.

0 10' 20' 40'
SCALE: 1"=20'

1 = DO NOT REMOVE INTERIM UTILITIES

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Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

WATER LINE PLAN

DATE: 05/31/2018

No.	DATE	DESCRIPTION
1	06/06/18	CITY REVIEW
2	05/17/18	TOWN REVIEW
3	03/05/18	REVISED SUBMITTAL
4	01/26/18	90% CITY REVIEW SET
5	06/31/17	60% SET

DRAWN BY: J. BOTRAK
DESIGNED BY: C. DRITTS
APPROVED BY: J. HOLZWEISTER
SCALE: 1"=20'
DATE: 05/31/2017
J2 PROJECT NO: 16 0897 003
DRAWING NO. CV-2.04a
SHEET NO. 21a of 58

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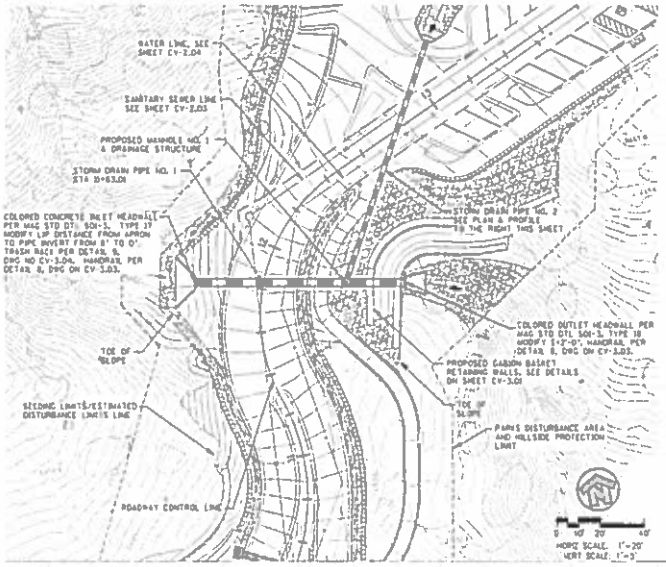
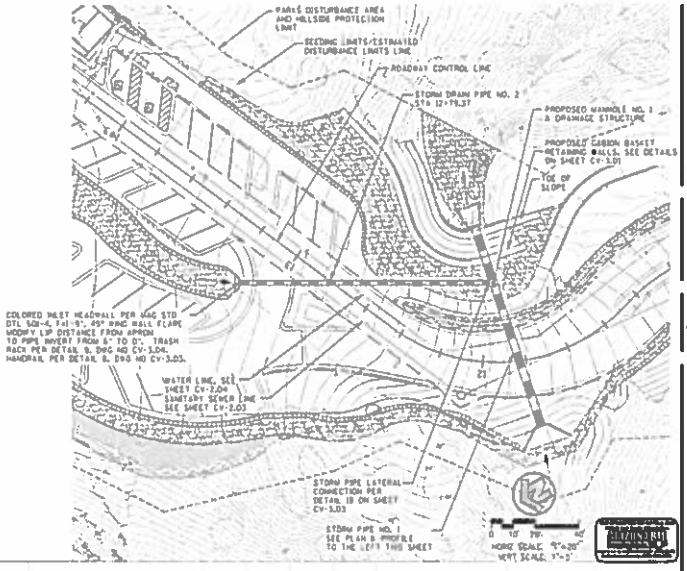
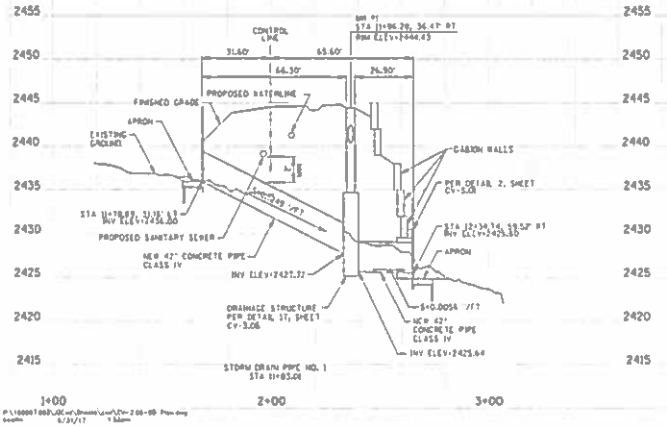
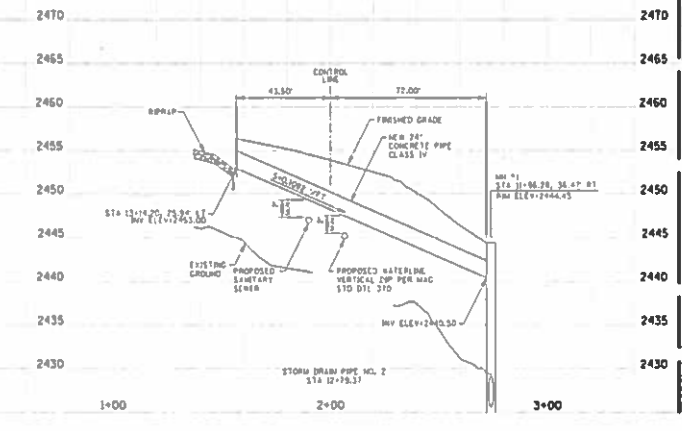






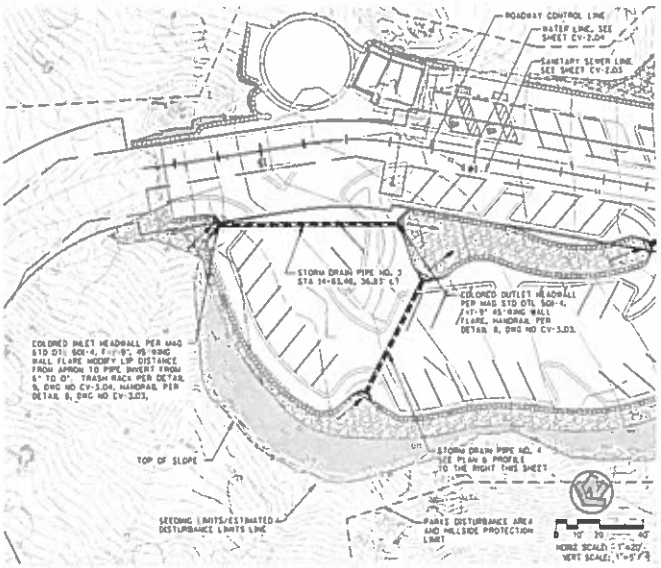


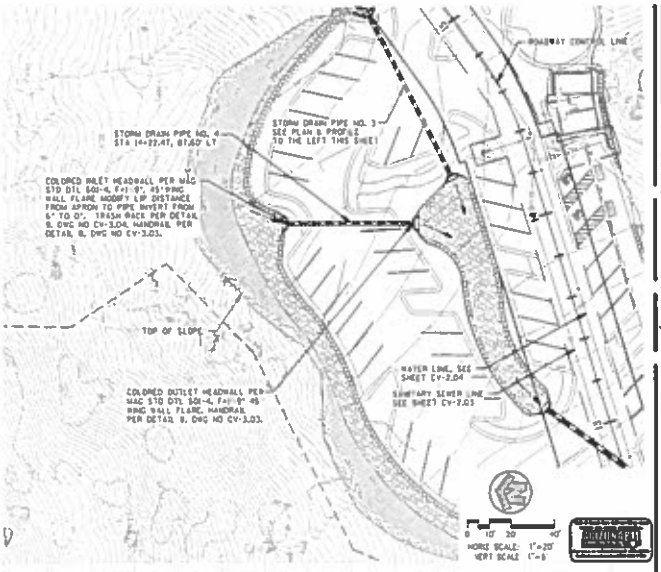
Engineering and Environmental Design

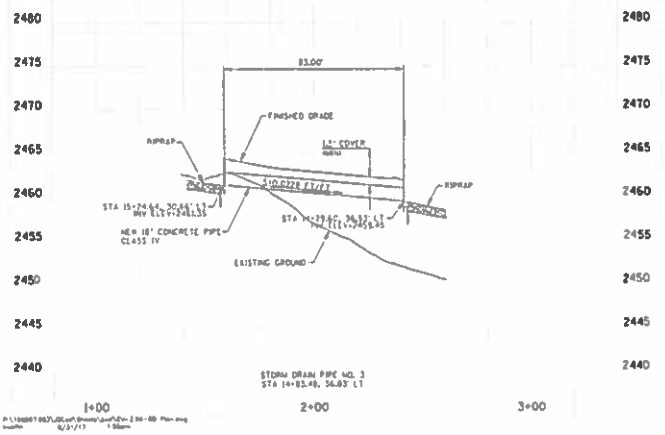
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

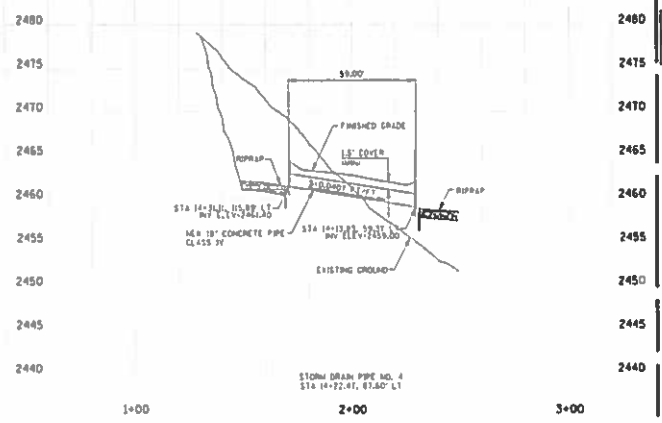
STORM DRAIN PLAN & PROFILE

CV-2.05 22 of 58









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Fountain Hills, AZ 85268
(480) 816-5100

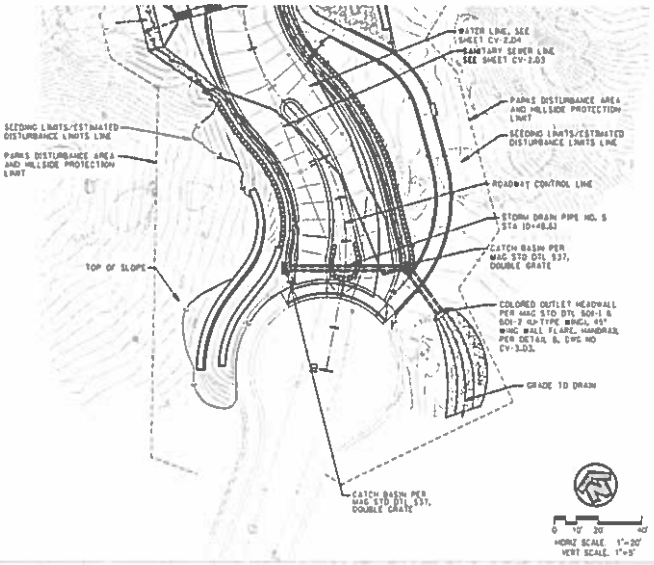
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

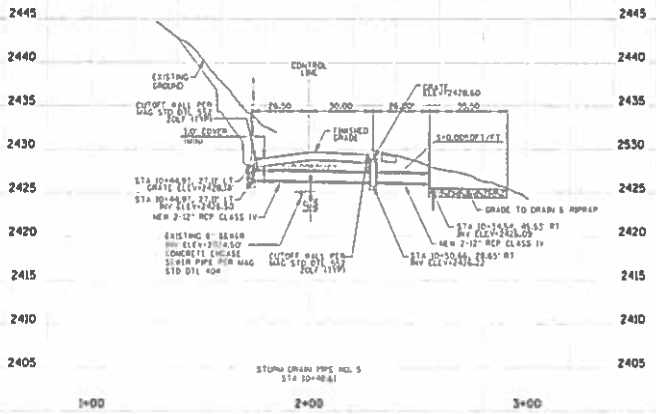
STORM DRAIN PLAN & PROFILE

No.	Date	Note
1	05/05/16	60% REVIEW
2	06/07/17	90% REVIEW
3	03/30/17	90%REV SUBMITTAL
4	04/28/17	90% REV SUBMITTAL
5	06/21/17	90 SET

Drawn by J. HOFFMAN
Designed by C. CRAFTS
Approved by J. HOLZWEISTER
Scale 1"=20
Date 06/21/2017
J2 Project No. 16 0897 003

CV-2.06 23 of 58





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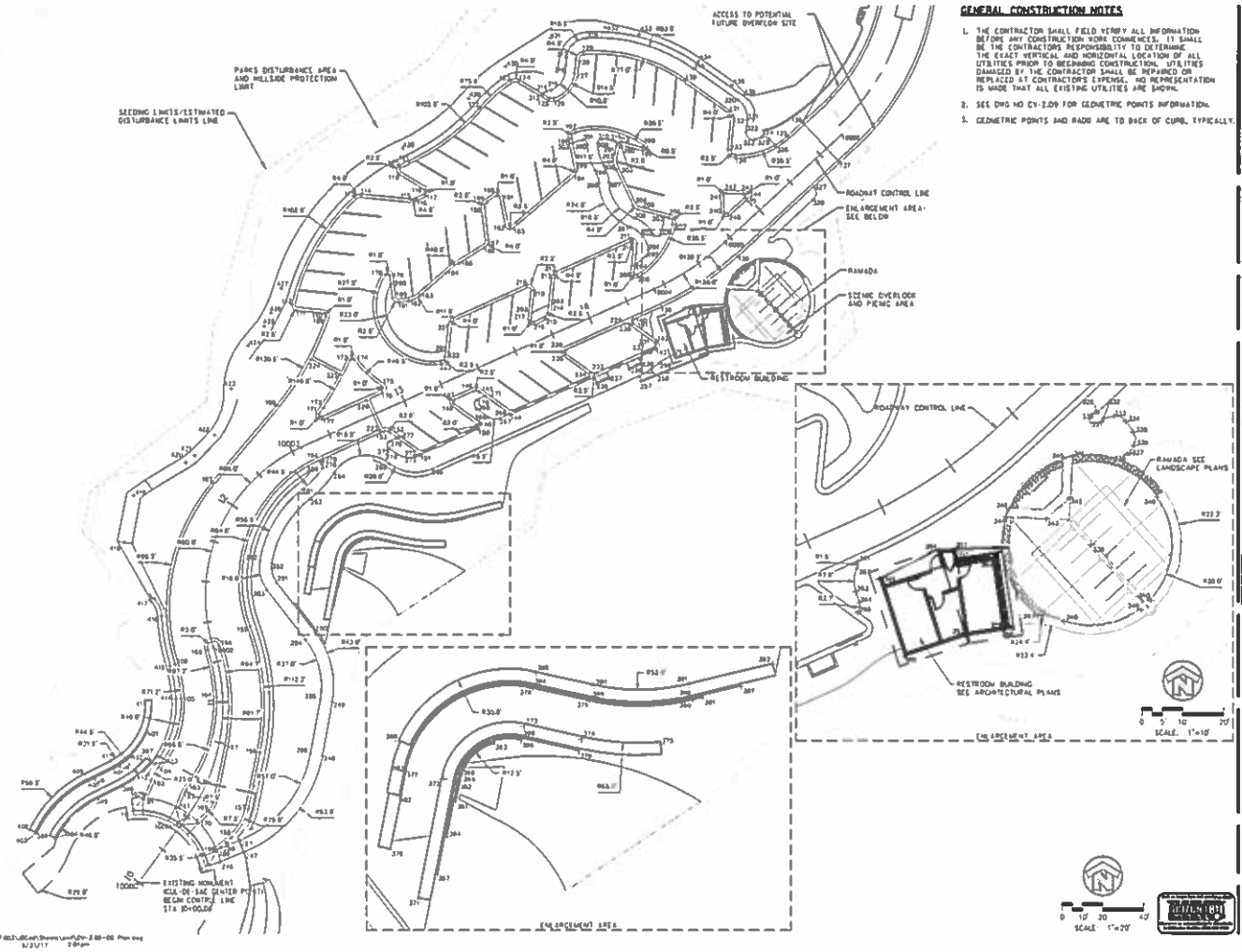
FOUNTAIN HILLS, AZ 85268
(480) 816-5180

Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead
STORM DRAIN PLAN & PROFILE

NO.	DATE	ISSUE
1	10/20/16	[illegible]
2	10/27/17	[illegible]
3	03/08/17	REVISED SUBMITTAL
4	04/05/17	[illegible]
5	05/31/17	[illegible]

DRAWN BY J. MCTIGHE
DESIGNED BY C. GRIFFITH
APPROVED BY J. HOLZMEISTER
SCALE 1"=20'
DATE 05/31/2017
J2 PROJECT NO. 16 0897 003
DRAWING NO. CV-2.07
SHEET NO. 24-58



GENERAL CONSTRUCTION NOTES

1. THE CONTRACTOR SHALL FIELD VERIFY ALL INFORMATION BEFORE ANY CONSTRUCTION WORK COMMENCES. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL UTILITIES PRIOR TO BEGINNING CONSTRUCTION. UTILITIES DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED OR REPLACED AT CONTRACTORS EXPENSE. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN.
2. SEE DWG NO CV-2.09 FOR GEOMETRIC POINTS INFORMATION.
3. GEOMETRIC POINTS AND GRADE ARE TO BACK OF CURB, TYPICALLY.

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PROJECT: Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

SHEET: COORDINATE GEOMETRY

SEAL

No.	Date	Description
1	09/30/16	90% REVIEW
2	04/17/17	100% REVIEW
3	05/02/17	REVISED BUILDING
4	05/26/17	100% AS BUILT REVISIONS
5	06/01/17	90 AS

DRAWN BY: J. ROTHING
DESIGNED BY: C. GRIFFITH
APPROVED BY: J. HOLZWEISTER
SCALE: VARIES
DATE: 05/31/2017

J2 PROJECT NO: 16 0007 00.3

DRAWING NO: CV-2.08
SHEET NO: 25 of 58

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COORDINATE DATA TABLE				
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COORDINATE DATA TABLE				
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COORDINATE DATA TABLE				
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COORDINATE DATA TABLE				
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GENERAL CONSTRUCTION NOTES

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2. ALL ELEVATIONS SHOWN ARE FINISHED GRADE.
3. SEE DWG NO CV-2.08 FOR GEOMETRIC POINT LOCATIONS.

LEGEND

- BC BACK OF CURB
- LT LEFT
- PC POINT OF CURVATURE
- PI POINT OF INTERSECTION
- POB POINT OF BEGINNING
- POE POINT OF ENDING
- PRC POINT OF REVERSE CURVATURE
- PT POINT OF TANGENCY
- RT RIGHT
- RW RETAINING WALL
- SW SIDEWALK

ROADWAY CONTROL LINE									
		LINE		CURVE					
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J2 Engineering and Environmental Design

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PHOENIX, AZ 85040

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FOUNTAIN HILLS TOWN HALL
16705 E. AVENUE OF THE FOUNTAINS
FOUNTAIN HILLS, AZ 85268

Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

COORDINATE GEOMETRY

DRAWN BY: J. NOTTING
DESIGNED BY: C. GRIFFITH
APPROVED BY: J. HOLZMEISTER
SCALE: N/A
DATE: 05/31/2017

J2 PROJECT NO. 16.0097.003

CV-2.09 26 of 58

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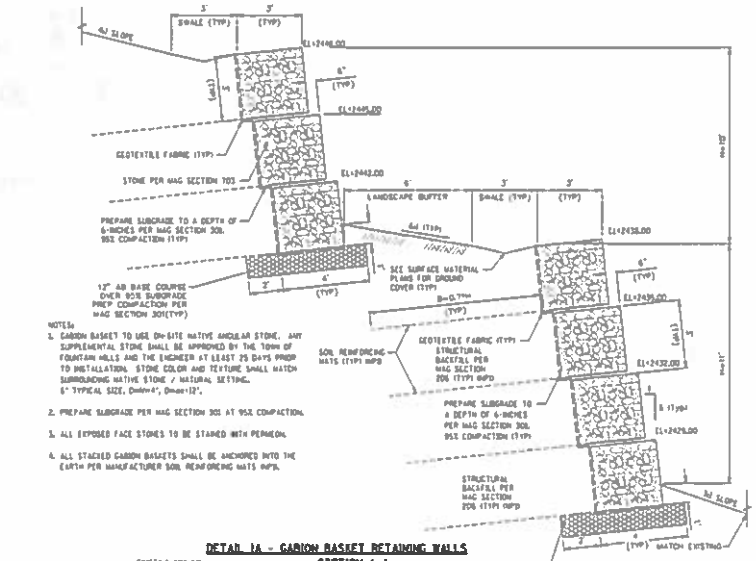
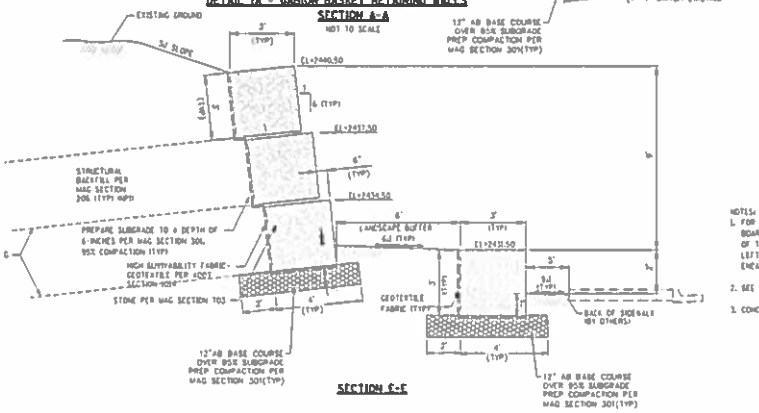
5/31/17



NOTES:

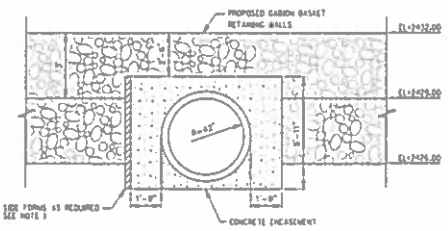
1. GABION BASKET TO USE ON-SITE NATIVE ANGULAR STONE. ANY SUPPLEMENTAL STONE SHALL BE APPROVED BY THE TOWN OF FOUNTAIN HILLS AND THE ENGINEER AT LEAST 25 DAYS PRIOR TO INSTALLATION. STONE COLOR AND TEXTURE SHALL MATCH SURROUNDING NATIVE STONE / NATURAL SETTING. 6" TYPICAL SIZE, D=6"-4", D=6"-12".
2. PREPARE SUBGRADE PER MAG SECTION 301 AT 95% COMPACTION.
3. ALL EXPOSED FACE STONES TO BE STAINED WITH PERMEON.
4. ALL STACKED GABION BASKETS SHALL BE ANCHORED INTO THE EARTH PER MANUFACTURER SOIL REINFORCING MATS MPD.

DETAIL 1A - GABION BASKET RETAINING WALLS
SECTION A-A
NOT TO SCALE

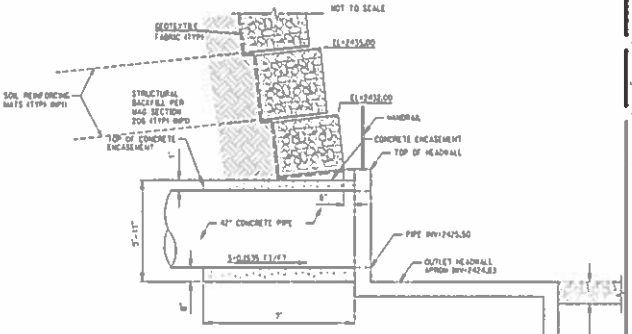


SECTION C-C

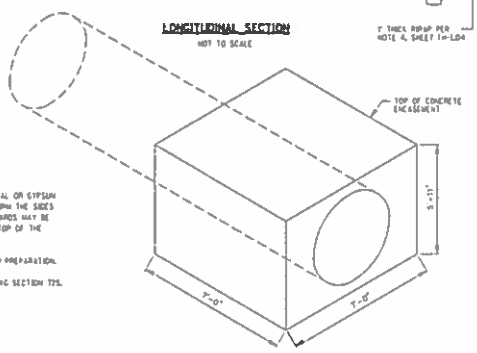
DETAIL 1B - GABION BASKET RETAINING WALLS
NOT TO SCALE



END SECTION
NOT TO SCALE



LONGITUDINAL SECTION
NOT TO SCALE



PERSPECTIVE
NOT TO SCALE

NOTES:

1. FOR PIPE OVER 18" I.D. WOOD, METAL OR GYPSUM BOARD FORM MUST BE USED TO FORM THE SIDES OF THE ENCASEMENT. GYPSUM BOARDS MAY BE LEFT IN THE GROUND BELOW THE TOP OF THE ENCASEMENT.
2. SEE MAG SECTION 601 FOR TRENCH PREPARATION.
3. CONCRETE TO BE CLASS 'A' PER MAG SECTION 725.

DETAIL 2 - GABION BASKET & PIPE OUTLET INTERFACE
NOT TO SCALE

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Owner:
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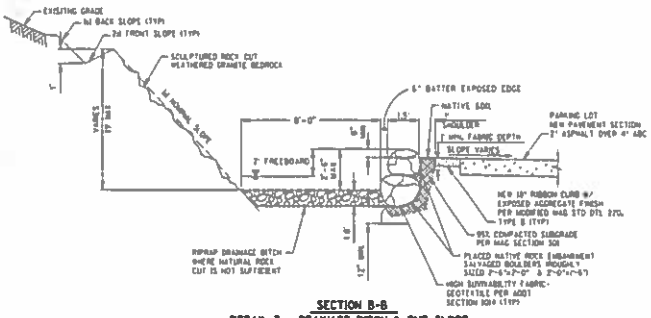
16705 E AVENUE OF THE FOUNTAINS
FOUNTAIN HILLS, AZ 85268
(480) 816-5180

Project: Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

Title: CIVIL DETAILS

No.	Date/Revision	Added
1	06/05/17	MAG REVIEW
2	06/19/17	TOWN REVIEW
3	07/05/17	PERMIT SUBMITTAL
4	09/26/17	100-% SPLITS UPDATE
5	05/31/17	AS-BUILT

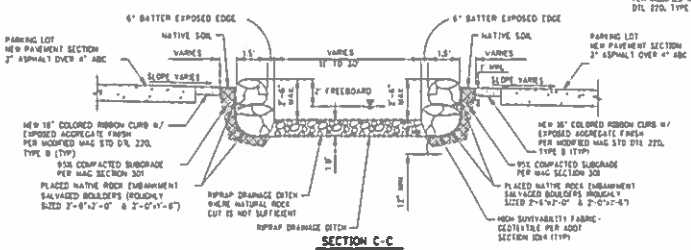
Drawn by: J. MOSTRONG
Designed by: C. GRIFFITH
Approved by: J. HOLZWEISTER
Scale: N/A
Date: 05/31/2017
J2 Project No.: 16 0897 003
Drawing No.: CV-3.01
Sheet No.: 27 of 58



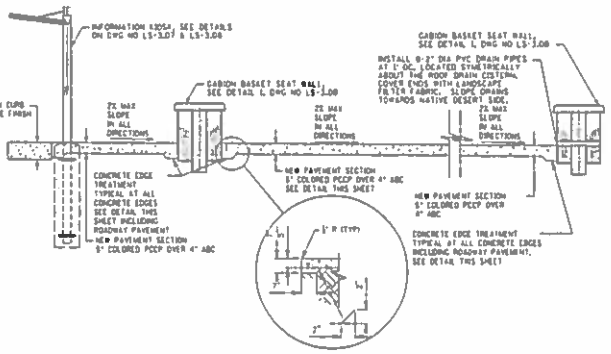
SECTION B-B
DETAIL 3 - DRAINAGE DITCH & CUT SLOPE
NOT TO SCALE

NOTES:

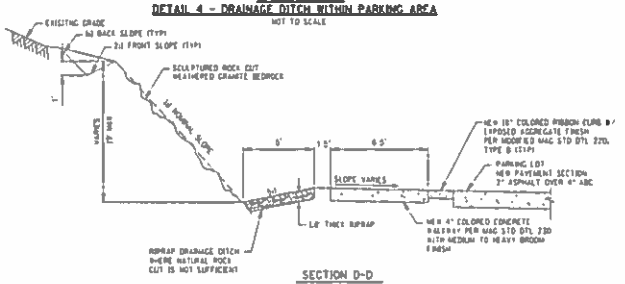
1. THE SCULPTURED ROCK CUT THE NORMAL SLOPES SHALL UTILIZE NATURAL ROCK PATTERNS, FRACTURES, CLEAVAGES, AND FORMATIONS TO CREATE NATURALLY APPEARING SLOPE FACES WITH IRREGULAR BROKEN SURFACES. SMOOTH EXCAVATION IS NOT REQUIRED.
2. IF APPLICABLE, A LESS STEEP CUT SLOPE OTHER THAN THE 1d NORMAL SLOPE SHOULD BE USED IF DECOMPOSED, RIPPABLE, OR STRONGLY WEATHERED SOIL IS ENCOUNTERED.
3. THE CONTRACTOR SHALL PROTECT EXISTING VEGETATION AND STABLE BOULDERS TO REMAIN AT LIMITS OF CUT & FILL SLOPES. STABLE ROCK OUTCROPPING ARE ALSO TO REMAIN IN PLACE.
4. RIPRAP TO USE ON-SITE NATIVE ANGULAR STONE. ANY SUPPLEMENTAL STONE SHALL BE APPROVED BY THE TOWN OF FOUNTAIN HILLS AND THE ENGINEER AT LEAST 25 DAYS PRIOR TO INSTALLATION. STONE COLOR AND TEXTURE SHALL MATCH SURROUNDING NATIVE STONE / NATURAL SETTING. Dm=9". ALL RIPRAP MAY BE STAINED WITH PERMEON OR EQUAL TO COLOR THE ROCK TO MATCH THE SURROUNDING AND EXISTING ROCK. No THE USE OF A STAINING PRODUCT AS SPECIFIED WOULD ONLY BE ALLOWED IF APPROVED BY TOWN IN ADVANCE.
5. PLACED ROCKS SHALL BE ON-SITE NATIVE STONE. ANY SUPPLEMENTAL STONE SHALL BE APPROVED BY THE TOWN OF FOUNTAIN HILLS AND THE ENGINEER AT LEAST 25 DAYS PRIOR TO INSTALLATION. STONE COLOR AND TEXTURE SHALL MATCH SURROUNDING NATIVE STONE / NATURAL SETTING.
6. RIBBON CURB PER MAG STD DTL 220, TYPE B, MODIFY CURB HEIGHT TO 18-INCHES.



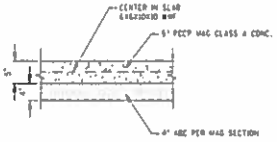
SECTION C-C
DETAIL 4 - DRAINAGE DITCH WITHIN PARKING AREA
NOT TO SCALE



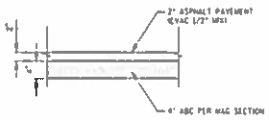
SECTION E-E
DETAIL 5A - PLAZA AREA
NOT TO SCALE



SECTION D-D
DETAIL 5 - DRAINAGE DITCH & ROCK FALL AREA
NOT TO SCALE



PLAZA PCCP PAVEMENT SECTION DETAIL
NOT TO SCALE



PARKING LOT PAVEMENT SECTION DETAIL
NOT TO SCALE

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Jennifer 5/31/17 2:19pm

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Town of Fountain Hills
PARKS & RECREATION DEPT.
FOUNTAIN HILLS TOWN HALL
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FOUNTAIN HILLS, AZ 85268
(480) 816-5190

PROJECT: Town of Fountain Hills McDowell Mountain Preserve Adero Canyon Trailhead
TITLE: CIVIL DETAILS

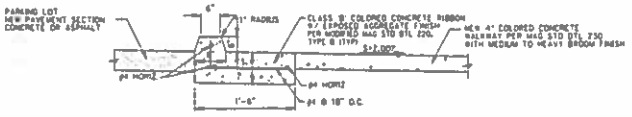
EXPIRES 06/30/2019

NO.	DATE	DESCRIPTION
1	10/26/16	[illegible]
2	01/17/17	[illegible]
3	03/28/17	[illegible]
4	04/26/17	[illegible]
5	05/31/17	[illegible]

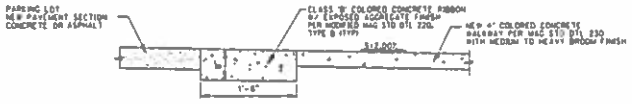
DRAWN BY: J. BOTTING
REVIEWED BY: E. CRAFTON
APPROVED BY: J. HOLZMEISTER
SCALE: AS/B
DATE: 05/31/2017

J2 PROJECT NO.: 16 0007 003

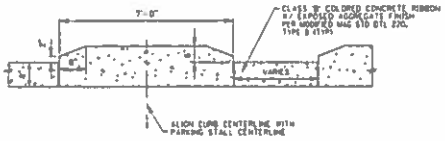
DRAWING NO.: CV-3.02 SHEET NO.: 28 of 58



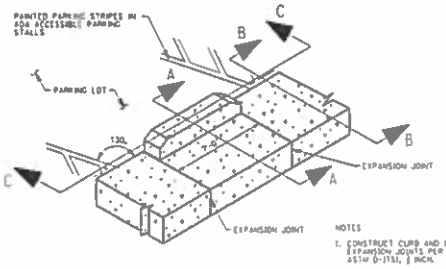
SECTION A-A



SECTION B-B



SECTION C-C

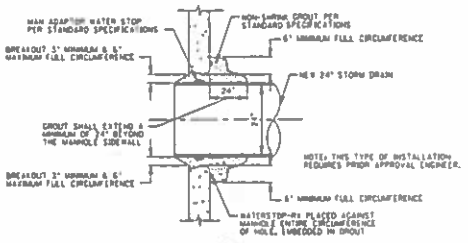


NOTES

1. CONSTRUCT CURB AND INSTALL MASTIC EXPANSION JOINTS PER MAG SECTION 340.3 ASTM D-1751, 1 INCH.
2. PROVIDE EXPOSED AGGREGATE FINISH PER MAG SECTION 341.
3. CROSS SLOPE OF RIBBON CURB TO MATCH CROSS SLOPE OF ADJACENT PAVEMENT.
4. RIBBON WHEEL STOP CURB SHALL BE CONSTRUCTED ONLY ALONG PARKING STALLS LOCATED SOUTH OF THE MAIN ENTRY DRIVE, INCLUDING ADA ACCESSIBLE PARKING STALLS.

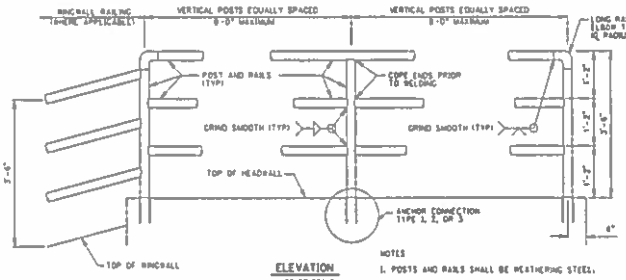
DETAIL 6 - RIBBON WHEEL STOP CURB

NOT TO SCALE



DETAIL 1B - STORM DRAIN CONNECTION

NOT TO SCALE

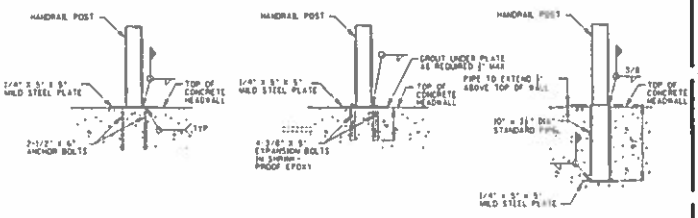


ELEVATION

NOT TO SCALE

NOTES

1. POSTS AND RAILS SHALL BE WEATHERING STEEL.
2. VERTICAL POSTS TO BE EVENLY SPACED.
3. REMOVE ALL SHARP EDGES.
4. INSTALL SAFETY RAIL AS REQUIRED BY PLANS OR SPECIFICATIONS.



TYPE 1 - ANCHOR PLATE

NOT TO SCALE

TYPE 2 - EXPANSION BOLT

NOT TO SCALE

TYPE 3 - PIPE SLEEVE

NOT TO SCALE

DETAIL 8 - HEADWALL HANDRAIL

NOT TO SCALE

J2 Engineering and Environmental Design

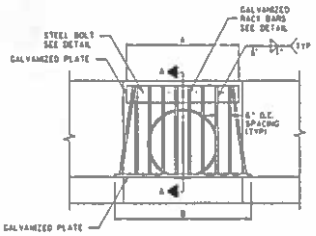
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

CIVIL DETAILS

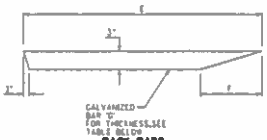
Drawn by J. WOTRING
Designed by C. GRIFFITH
Approved by J. HOLZMEISTER
Scale n/a
Date 05/31/2017

J2 Project No. 16 0887 003

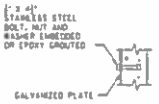
CV-3.03 29.58



ELEVATION



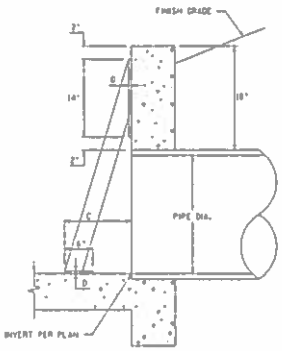
RACK BARS



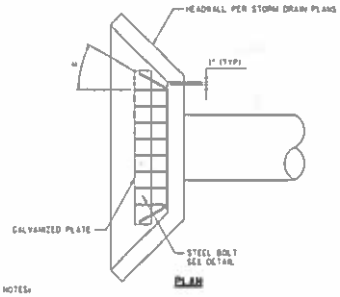
NOTE:

BOLT LOCATION CENTERED BETWEEN RACK BARS (ALTERNATE EVERY OTHER BAR). 3" CLEAR FROM EDGE OF GALVANIZED PLATE. APPLIES TO BOTH TOP AND BOTTOM PLATE.

STEEL BOLT



SECTION A-A



PLAN

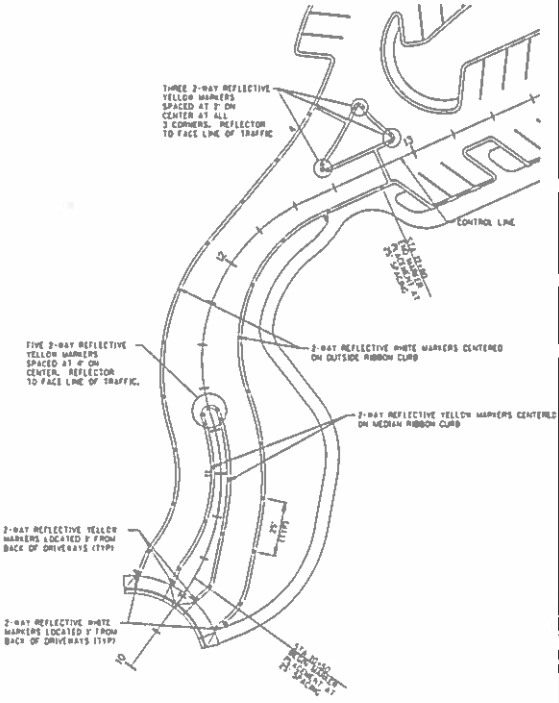
NOTES:

1. THIS DETAIL IS APPLICABLE AT ALL PIPE INLETS 12" OR MORE IN DIAMETER.
2. COAT ALL WELD AREAS WITH ZINC RICH PAINT.
3. STEEL WORK SHALL CONFORM TO MAG SECTIONS 515 AND 770.
4. REMOVE ALL SCALE FROM RACK BARS. ALL METAL TO BE STAINED WITH PERMEON, KONTE OR TOWN APPROVED METHOD TO BLEND STEEL WITH NATURAL DESERT COLORS.

DIMENSIONS										
PIPE DIA.	NO. OF BARS	A	B	C	D	E	F	G	H
18" & 18"	6	3'-4"	4'-7"	1'-0"	14"	3'-0"	8"	3'-1/2"	30"
24"	10	3'-10"	4'-8"	1'-0"	14"	3'-0"	10"	3'-1/2"	30"
42"	13	5'-4"	7'-0"	1'-6"	14"	3'-0"	10"	3'-1"	36"

DETAIL 9 - HEADWALL TRASH RACK

NOT TO SCALE



2-WAY REFLECTIVE WHITE MARKER (ADOT TYPE G)
2-WAY REFLECTIVE YELLOW MARKER (ADOT TYPE D)
ADOT TRAFFIC STD M-19

NOTES:

1. PAVEMENT REFLECTORS SHALL BE INSTALLED WITH ERASCO PAVEMENT MARKER ADHESIVE, OR EQUAL.
2. MARKERS SHALL BE SPACED 25', UNLESS OTHERWISE NOTED. CENTERED ON RIBBON CURB.

DETAIL 10 - PAVEMENT REFLECTORS

NOT TO SCALE

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Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

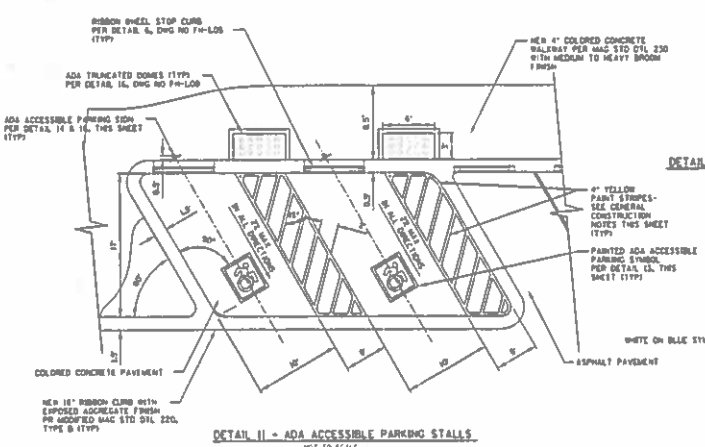
CIVIL DETAILS

NO.	DATE	ISSUE
1	10/26/16	DRB REVIEW
2	01/17/17	100% REVIEW
3	03/30/17	REVISED DRAWING
4	04/26/17	REV-01 REVISE BRIDGE
5	05/31/17	60 REV

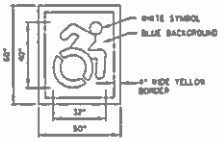
DRAWN BY J. MCTIGHE
DESIGNED BY C. DRIFFITH
APPROVED BY J. MOLZWEISTER
SCALE N/A
DATE 05/31/2017

PROJECT NO. 16 0887 002

DRAWING NO. CV-3.04
SHEET NO. 30 of 58



DETAIL 11 - ADA ACCESSIBLE PARKING STALLS
NOT TO SCALE



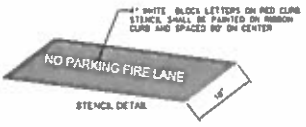
DETAIL 13 - ADA ACCESSIBLE PARKING SYMBOL
NOT TO SCALE

#7-B WOOD.
1.0" RADIUS. 0.4" BORDER, 0.4" INDENT. GREEN ON WHITE.
[RESERVED] C 50% SPACING.
[PARKING] C 75% SPACING.
ROUNDED RECTANGLE 0.5" RADIUS BLUE.
[HANDICAPPED] C. [PLATE] C.
[OR] C. [PERMIT] C. [ONLY] C.
[ARS] C. [VAC] C. [78 866] C.
#7-B.
1.5" RADIUS. 0.4" BORDER. 0.4" INDENT. GREEN ON WHITE.
[VAN] C. [ACCESSIBLE] C.

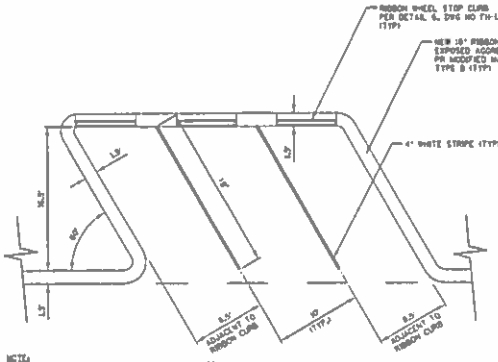
DETAIL 14 - ADA ACCESSIBLE PARKING SIGN
NOT TO SCALE

GENERAL CONSTRUCTION NOTES

1. SIGNS AND THE INSTALLATION OF ALL SIGNS SHALL CONFORM TO THE MCDOT SUPPLEMENT TO THE MARICOPA ASSOCIATION OF GOVERNMENTS' (MAG) UNIFORM STANDARD SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION, SECTIONS 460 AND 462, AND THESE PLANS AND THE SPECIAL PROVISIONS.
2. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL TRAFFIC CONTROL SIGNING, TUBULAR STEEL WITH PUSTED FINISH, ANTI-FOUNDATIONS FOR THE SIGN POSTS, AT LOCATIONS SHOWN ON THE PLANS. FOR ANY QUESTIONS CONCERNING SIGNING, CONTACT THE TOWN OF FOUNTAIN HILLS.
3. ALL FACE OF BOLTS AND NYLON WASHERS USED FOR MOUNTING SIGNS SHALL MATCH THE COLOR OF THE PART OF THE SIGN PANEL IN WHICH THEY ARE PLACED.
4. ALL POSTS, FOUNDATIONS, AND SIGN PANELS SHALL BE NEW UNLESS OTHERWISE DIRECTED.
5. ALL FOUNDATIONS FOR POSTS SHALL BE IN CONFORMANCE WITH DETAIL 16.
6. STANDARD MOUNTING HEIGHT FOR THE LOWEST PORTION OF THE SIGN PANEL SHALL BE IN CONFORMANCE WITH MCDOT STANDARD DETAILS P060-1 AND 2060-2.
7. ALL SIGNS SHALL BE MADE OF FLAT SHEET ALUMINUM PANELS UNLESS OTHERWISE DIRECTED, WITH THE RETROREFLECTIVE SHEETING AND DIRECT APPLIED OR SLIP SCREENED CHARACTERS PER SECTIONS 463.2.03 AND 463.2.05 OF THE MCDOT SUPPLEMENT TO THE MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.
8. THESE PLANS SHALL BE STRIPED IN ACCORDANCE WITH THE CURRENT EDITION OF THE MARICOPA COUNTY SIGNING AND MARKING STANDARDS, THE NOTED AND THE PAVEMENT MARKING PLANS.
9. THE FINAL STRIPING SHALL BE 15 MIL (0.015 INCH) THICK PERMANENT NON-REFLECTORIZED TRAFFIC PAINT WATERBORNE.

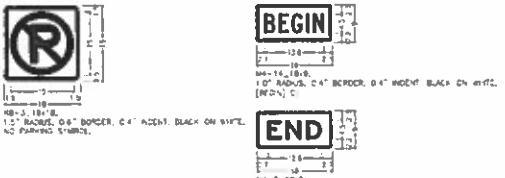


STENCIL DETAIL



NOTE:
RIBBON WHEEL STOP CURB SHALL BE CONSTRUCTED ONLY ALONG PARKING SPACES LOCATED SOUTH OF THE MAIN ENTRY DRIVE, INCLUDING ADA ACCESSIBLE PARKING STALLS.

DETAIL 12 - STANDARD PARKING STALLS
NOT TO SCALE

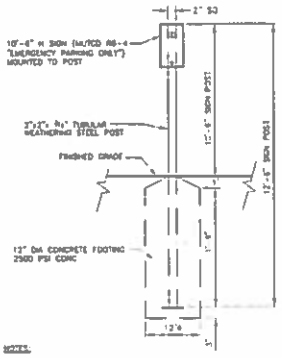


#8-3, 18x18.
1.5" RADIUS. 0.6" BORDER. 0.4" INDENT. BLACK ON WHITE.
NO PARKING SYMBOL.

#8-C, 18x9;
1.0" RADIUS. 0.4" BORDER. 0.4" INDENT. BLACK ON WHITE.
[BEGIN] C.

#8-C, 18x9;
1.0" RADIUS. 0.4" BORDER. 0.4" INDENT. BLACK ON WHITE.
[END] C.

DETAIL 15 - NO PARKING SIGN/FIRE LANE STRIPING
NOT TO SCALE



NOTES:
1. ALL STEEL SHALL BE UNIFORMLY SANDBLASTED AFTER FABRICATION TO ALLOW FOR UNIFORM NATURAL RUSTING OF STEEL.
2. SIGN POST SHALL HAVE FIRE LANE REGULATION SIGN MOUNTED (BY TOWN) AT DESIRED HEIGHT FACING APPROACHING TRAFFIC.

DETAIL 16 - TUBULAR SIGN POST
NOT TO SCALE

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CIVIL DETAILS

1	10/26/16	[illegible]
2	01/31/17	[illegible]
3	06/30/17	[illegible]
4	08/31/17	[illegible]
5	09/29/17	[illegible]
6	05/29/17	[illegible]

DRAWN BY J. SCHIRN
DESIGNED BY C. CRAIG
APPROVED BY J. HOLZWARTH
DATE 05/31/2017

PROJECT NO. 16.0007.03

CV-3.05 SHEET NO. 31 of 58

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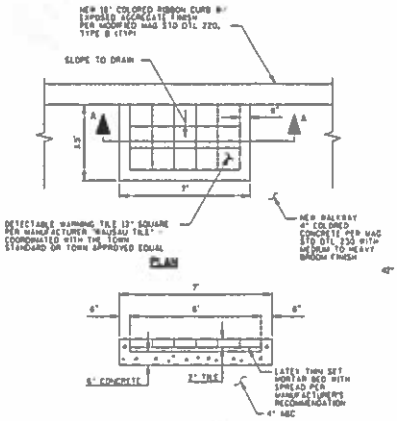
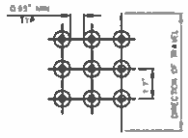


HEIGHT & DIAMETER OF TRUNCATED DOMES



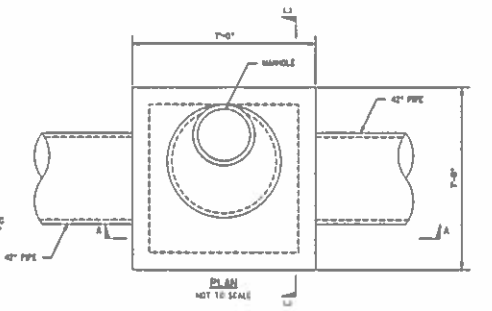
TRUNCATED DOMES SQUARE PATTERN

NOTES:

1. ALL TRUNCATED DOMES SHALL EXTEND THE FULL WIDTH AND LENGTH OF ALL CURB RAMPS AND LANDINGS (36" MINIMUM).
2. DOME COLOR SHALL BE TERRA COTTA.

DETAIL 16 - ADA TRUNCATED DOMES

NOT TO SCALE



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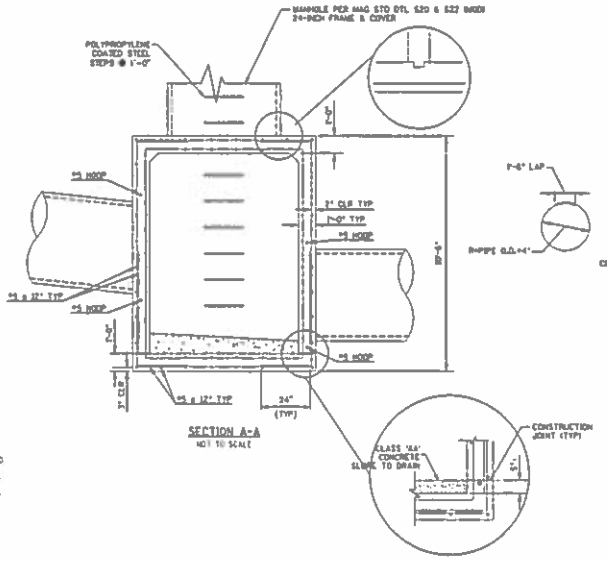
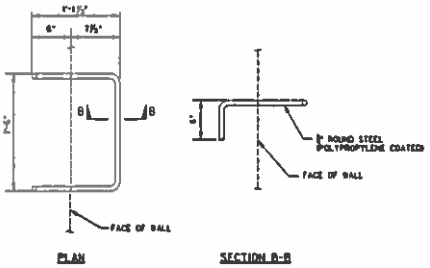


SECTION A-A

NOT TO SCALE

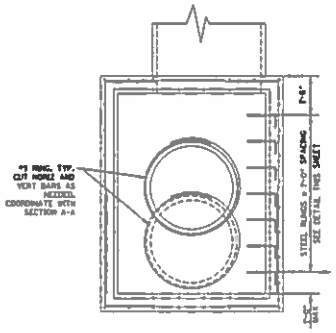
DETAIL 17 - DRAINAGE STRUCTURE

NOT TO SCALE



STEEL RUNG DETAILS

NOT TO SCALE



SECTION C-C

NOT TO SCALE

NOTES:

1. STEEL FOR RUNGS SHALL BE PER ASTM A36.
2. GALVANIZE AFTER FABRICATION PER ASTM A153.
3. CONCRETE TO BE CLASS 'AA' PER MAG SECTION 725.

Engineering and Environmental Design

Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

CIVIL DETAILS

No.	Date	Description
1	10/20/17	90% Review
2	01/11/17	100% review
3	01/26/17	Permit Submittal
4	04/20/17	Addendum Items
5	06/12/17	Bid Set

Drawn by: J. BOTTING
Designed by: E. GRIFFITH
Approved by: J. HOLZHEISTER
Scale: N/A
Date: 03/31/2017

Project No.: 16 0697 003

Drawing No.: CV-3.06
Sheet No.: 32 of 58

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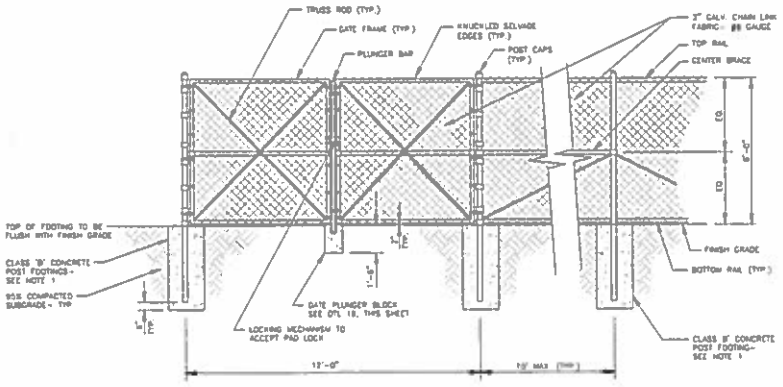
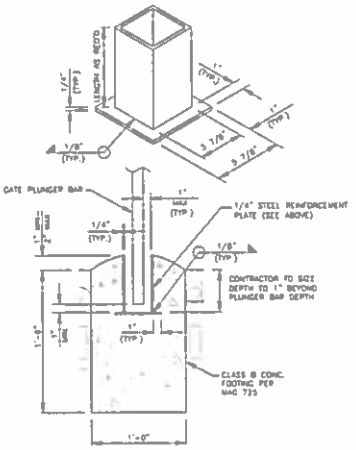


NOTES
1. FENCE AND GATES SHALL BE PER MAG STANDARD DETAIL 180 WITHOUT RAZOR WIRE AND PER MAG SPEC 777. REFER TO MAG DETAIL FOR REQUIRED POSTS, RAILINGS, & FOOTING SIZES.
2. ALL METAL SHALL BE GALVANIZED STEEL UNLESS SPECIFIED OTHERWISE PER MAG.

DETAIL 18 - 12' WIDE CHAINLINK DOUBLE SWING GATES
NOT TO SCALE



DETAIL 19 - GATE PLUNGER BLOCK
NOT TO SCALE

1 = SEE ALTERNATE INTERNAL VALVES

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Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

CIVIL DETAILS

REV	DATE	DESCRIPTION
1	10/26/11	DRC REVIEW
2	01/09/12	DRC REVIEW
3	03/30/12	REVISED & SUBMITTED
4	04/26/12	DRC-1.1 ADDITIONAL COMMENTS
5	05/31/12	DRC SET

DRAWN BY J. ROTHING
DESIGNED BY C. GRIFFIN
APPROVED BY J. HOLZWEISTE
P.E. NO. N/A
DATE 05/31/201

J2 PROJECT NO. 16 0887 00

DRAWING NO. CV-3.06a SHEET NO. 32a OF 58

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GENERAL ELECTRICAL NOTES

1. ELECTRICAL WORK SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE (LATEST EDITION), FEDERAL, STATE AND LOCAL JURISDICTION CODES.

2. ALL WORK SHALL BE DONE IN A NEAT WORKMANLIKE, FINISHED AND SAFE MANNER, ACCORDING TO THE LATEST PUBLISHED NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION STANDARDS OF INSTALLATION, UNDER COMPETENT SUPERVISION.

3. VISIT THE SITE PRIOR TO BIDDING TO BECOME FAMILIAR WITH EXISTING CONDITIONS AND ALL OTHER FACTORS WHICH MAY AFFECT THE EXECUTION OF THE WORK. INCLUDE ALL RELATED COSTS IN THE TOTAL BID PROPOSAL.

4. CONTRACTOR IS RESPONSIBLE FOR VERIFYING LOCATIONS OF ALL EXISTING UTILITIES AND PREVENTING DAMAGE TO SAME. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO UTILITIES CAUSED AS A RESULT OF HIS WORK. CALL (602) 263-1100 FOR BLUE STAKES ORGANIZATION. LINES LESS THAN 2" WILL NOT BE MARKED AND SHALL BE REPAIRED ON BIND BY THE CONTRACTOR.

5. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO EXISTING WALKS, WALLS, CURBS, ETC. DAMAGES SHALL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE OWNER AT NO ADDITIONAL COST TO THE OWNER.

6. PROPER PROTECTION OF THE CONSTRUCTION AREA FOR SAFETY SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. COVER ALL TRENCHES AT THE END OF EACH WORK DAY. BARRICADES SHALL BE INSTALLED AS DIRECTED BY THE OWNER OR THE PROJECT INSPECTOR. THE SITE AND ALL WORK SHALL CONFORM TO OSHA REQUIREMENTS.

7. ALL EXISTING LANDSCAPE, HARDSCAPE AND SPRINKLER SYSTEMS DAMAGED OR DISTURBED DURING THE CONSTRUCTION OF THIS PROJECT BY THE CONTRACTOR SHALL BE REPLACED IN KIND.

8. CONTRACTOR SHALL PAY FOR PERMITS AND INSPECTIONS AS MAY BE REQUIRED AND PROVIDE A CERTIFICATE OF INSPECTION TO THE OWNER.

9. PROTECT ALL MATERIAL AND EQUIPMENT INSTALLED AGAINST DAMAGE BY OTHER TRADES, WEATHER CONDITIONS OR ANY OTHER CAUSE. EQUIPMENT FOUND DAMAGED OR IN OTHER THAN NEW CONDITION WILL BE REJECTED AS DEFECTIVE. ALL COMPONENTS SHALL BE FREE OF DUST, DIRT AND FOREIGN MATERIALS, AND LEFT AS NEW BEFORE FINAL ACCEPTANCE OF WORK.

10. LEAVE THE SITE CLEAN. REMOVE ALL DEBRIS, EMPTY CARTONS, TOOLS, CONDUIT, WIRE SCRAPS AND ALL MISCELLANEOUS SPARE EQUIPMENT AND MATERIALS USED IN THE WORK DURING CONSTRUCTION.

11. IF AT THE DISCRETION OF THE CONTRACTOR TO DEMONSTRATE HIS WORK SO THAT A COMPLETE ELECTRICAL, METERING NETWORK AND/OR CONTROL SYSTEM FOR THE FACILITY ALL BE PROVIDED AND SUPPORTED BY ACCURATE SHOP AND RECORD DRAWINGS, AND ALL O & M MANUALS.

12. ALL UNDERGROUND CONDUIT SHALL BE SCHEDULE 40 PVC, BURIED 24" MINIMUM BELOW FINISHED GRADE, UNLESS SPECIFICALLY NOTED OTHERWISE ON PLANS OR IN DETAILS.

13. PROVIDE EMT INDOOR AND RMC OUTDOOR FOR ABOVE GROUND CONDUIT WHERE METALLIC CONDUITS COME IN CONTACT WITH SOIL. THEY SHALL BE HOT DIP GALVANIZED WITH SCORCH AND TAPE TO 12" AFG. FITTINGS SHALL BE STEEL, THREADED TYPE WITH MALLEABLE THROATS. SECURELY ATTACH ALL SURFACE MOUNTED CONDUIT EVERY 10 FEET AND WITHIN 3 FEET OF EACH JUNCTION BOX, PER NEC ARTICLE 344.30.

14. MINIMUM CONDUIT SIZE SHALL BE 3/4" UNLESS SPECIFICALLY NOTED OTHERWISE ON PLANS OR IN DETAILS.

15. ALL FEEDERS AND BRANCH CIRCUIT WIRE SHALL BE COPPER TYPE THWN (75 DEGREE C) FOR BELOW GRADE INSTALLATIONS (AND CONDUIT WHERE) AND THHN/THWN (75 DEGREE C) FOR ABOVE GRADE INSTALLATIONS. MINIMUM SIZE SHALL BE #12 AWG, UNLESS SPECIFICALLY NOTED OTHERWISE ON PLANS OR IN DETAILS. ALL WIRING SHALL BE IN CONDUIT PER APPROVING COUNTY AND/OR NEC ARTICLE 334.10 AND 334.12. APPROVING COUNTY DOES NOT PERMIT TYPE NM, NMC, NMS (ROMEX) CABLES IN COMMERCIAL APPLICATIONS.

16. A SEPARATE GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR (EGCS) SHALL BE INSTALLED WITHIN EACH RACEWAY PER NEC CODE.

17. ONCE A PANEL IS SUPPLIED BY A FEEDER OR BRANCH CIRCUIT, ANY INSTALLED GROUNDED CONDUCTOR SHALL NOT BE CONNECTED TO THE EQUIPMENT GROUNDING CONDUCTOR (EGC) OR TO THE GROUNDING ELECTRODE(S) PER NEC ARTICLE 250.32(B).

18. BOND ALL ENCLOSURES PER NEC ARTICLE 250.96.

19. CONTRACTOR SHALL PLAN AND INSTALL WORK IN SUCH A MANNER AS TO CONFORM TO THE STRUCTURE, AVOID OBSTRUCTIONS, PRESERVE headroom AND KEEP OPENINGS AND PASSAGEWAYS CLEAR.

20. CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIAL, ETC NECESSARY FOR A COMPLETE AND WORKABLE ELECTRICAL SYSTEM WHETHER OR NOT THESE PLANS ARE SPECIFICALLY NOTED ON THESE DRAWINGS. INCIDENTAL ITEMS NOT INDICATED ON THE DRAWINGS, NOR MENTIONED IN SPECIFICATIONS THAT CAN BE LEGITIMATELY AND REASONABLY INFERRED TO BELONG TO THE WORK DESCRIBED OR BE NECESSARY IN GOOD PRACTICE TO PROVIDE A COMPLETE SYSTEM, SHALL BE FURNISHED AND INSTALLED AS THOUGH PRESENT HERE IN EVERY DETAIL.

21. CONTRACTOR IS RESPONSIBLE FOR AND SHALL PROVIDE ALL LABOR, MATERIAL, TRENCHING, CONDUIT, TRANSFORMER PAD AND OTHER REQUIRED EQUIPMENT PER UTILITY COMPANY PLANS AND SPECIFICATIONS NECESSARY FOR A COMPLETE UNDERGROUND CONDUIT SYSTEM FROM THE UTILITY POINT OF SERVICE TO THE UTILITY CO. TRANSFORMER AND FROM THE UTILITY CO TRANSFORMER TO THE ELECTRICAL SERVICE ENTRANCE SECTION.

22. ALL TRENCHING, CONDUITS, ETC SHALL BE ROUTED AND INSTALLED IN SUCH A MANNER THAT WILL NOT DAMAGE EXISTING FACILITIES. SHOULD DAMAGE OCCUR, IT WILL BE THE CONTRACTORS RESPONSIBILITY TO REPAIR DAMAGE TO THE SATISFACTION OF THE OWNER OR INSPECTOR.

23. ALL CONDUIT RUNS SHOWN ON THIS PLAN ARE SCHEMATIC IN NATURE. THE CONTRACTOR SHALL MAKE SURE THAT ALL CONDUIT, ETC. RUNS WITHIN THE CONSTRUCTION AREA/RIGHT OF WAY (THIS INCLUDES UNDERGROUND ALL REQUIRED CLEARANCES.)

24. WHEN CROSSING PATHWAYS OR DRIVEWAYS, CONTRACTOR SHALL BORE UNDER EXISTING CONCRETE WALKS AND SMOOTH ASPHALT WALKS. ASPHALT WALKS SHALL BE REPLACED IN KIND.

25. CONTRACTOR SHALL GUARANTEE WORK INSTALLED UNDER THE CONTRACT TO BE FREE FROM DEFECTIVE WORKMANSHIP AND MATERIALS, WHICH MEAN EXPECTED, AND SHOULD ANY SUCH DEFECTS DEVELOP WITHIN A PERIOD OF ONE YEAR ACCEPTANCE OF THE PROJECT BY THE OWNER, THE CONTRACTOR SHALL REPAIR AND/OR REPLACE ANY DEFECTIVE ITEMS AND DAMAGE RESULTING FROM FAILURE OF THESE ITEMS, AT NO EXPENSE SHAREWITH TO THE OWNER.

26. CONTRACTOR SHALL IDENTIFY SERVICE ENTRANCE SECTION MAIN SERVICE DISCONNECT(S) WITH 3/32-INCH THICK LAMINATED PHENOLIC TYPE NAMEPLATES WITH 1/2-INCH MINIMUM HEIGHT LETTERS. NAMEPLATE TO BE BLACK WITH FRONT SURFACE WITH WHITE LETTERS. NAMEPLATE TO BE SURFACE PANEL FACE WITH TWO STAINLESS STEEL SELF-TAPPING SCREWS. NAMEPLATE SHALL READ "SERVICE DISCONNECT" PER NEC ARTICLE 230.70(B)

27. ALL CIRCUITS SHALL BE LEGIBLY IDENTIFIED AT THE PANEL, JUNCTION BOXES AND AT ALL EQUIPMENT BY A PERMANENT MARKER OR ENGRAVED PLATES. CONDUCTOR TAG, PERMANENT MARKER, ETC.) THE LABELING SHALL INCLUDE PANEL CIRCUIT NUMBER, "TO" AND "FROM" IDENTIFICATION, AND WHERE "SPARE" WHERE APPLICABLE.

28. CONTRACTOR SHALL TEST ELECTRICAL SYSTEM FOR SHORT CIRCUITS AND MEGGER TEST FEEDERS AND BRANCH CIRCUIT WIRING. CONTRACTOR SHALL PERFORM LOW RESISTANCE GROUND PATH SYSTEM PROVIDE DIAGRAM TEST RESULTS FOR REVIEW TEST TO OWNER UPON COMPLETION OF PROJECT.

29. CONTRACTOR SHALL PERFORM HIGH POTENTIAL (HIPOT) TESTING WHEN REQUIRED BY LOCAL JURISDICTION OR OWNER.

30. CONTRACTOR SHALL PROVIDE A GROUND-FAULT COORDINATION STUDY AND PROVIDE RECOMMENDED SETTINGS ON NEW (AND EXISTING) OVERCURRENT PROTECTION DEVICES, AS NEEDED OR WHEN REQUIRED BY LOCAL JURISDICTION OR OWNER. PROVIDE LABELS ON EQUIPMENT INDICATING SETTINGS.

31. CONTRACTOR SHALL PROVIDE AN ARC-FLASH STUDY WHEN REQUIRED BY LOCAL JURISDICTION OR OWNER. PROVIDE ALL APPLICABLE LABELS ON NEW (AND EXISTING) EQUIPMENT AFTER STUDY IS COMPLETED.

32. ALL CONDUIT AND J-BOXES SHOWN SHALL BE CONCEALED WHEN POSSIBLE. WHEN NOT POSSIBLE, CONDUIT AND J-BOXES MAY BE SURFACE MOUNTED WITH PERMISSION OF THE OWNER OR OWNER'S REPRESENTATIVE.

33. CONTRACTOR SHALL COORDINATE ALL EQUIPMENT CONNECTIONS WITH EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN. PROVIDE ADDITIONAL FUSED DISCONNECT SWITCHES AND CONTROLS IF OVERCURRENT PROTECTION OR CONTROLS IS NOT INTEGRAL WITH UNITS.

34. ALL EQUIPMENT SHALL BE FUSE SIZED PER MANUFACTURES RECOMMENDATIONS AND U.L. APPROVAL.

35. ELECTRICAL DEVICES, DISCONNECT SWITCHES, ETC., SHALL BE SUPPORTED INDEPENDENT OF AND ISOLATED FROM EQUIPMENT VIBRATIONS.

36. FULL LOAD AMPS (FLA) RATES, AS NOTED IN THESE DRAWINGS, ARE BASED ON SPECIFIED EQUIPMENT DATA. CONTRACTOR SHALL VERIFY NAMEPLATE FLA OF EQUIPMENT SUPPLIED AND COORDINATE ACCORDINGLY PER EQUIPMENT SUPPLIERS RECOMMENDATIONS.

37. ALL OUTDOOR ELECTRICAL EQUIPMENT SHALL BE NEMA-3R OR NEMA-4 ENCLOSURES.

38. CONDUITS OR RACEWAYS ROUTED FROM INDOORS TO OUTDOORS OR AS DETERMINED AS NEC POTENTIAL SHALL BE SEALED WITH A FLUIDIZ SEALING COMPOUND AT A CONDUIT BODY OR AT A JUNCTION BOX BEFORE THE CONDUIT ENTERS THE COLDER ENVIRONMENT.

39. CONDUITS OR RACEWAYS INSTALLED ON AREAS WHERE ELEVATION CHANGES MAY CAUSE WATER OR MOISTURE TO ENTER THE ELECTRICAL EQUIPMENT THROUGH THE CONDUIT SHALL BE SEALED WITH A MEGNETIC CONDUIT SEAL AT BOTH ENDS OF THE CONDUIT OR RACEWAY.

40. INSTALL FIRE SEALS ON ALL CONDUITS PENETRATING THE FIRE WALL TO MAINTAIN THE FIRE RESISTANCE RATING OF THE WALL, AS REQUIRED BY NEC 300.21.

41. ALL POLE LIGHTS SHALL BE PROVIDED WITH A TWO POLE FUSE HOLDER BUSSMANN PHD OR A SINGLE POLE FUSE HOLDER BUSSMANN PHD OR EQUAL FOR INLINE FUSING. PROVIDE 3A FUSES AS FUSEVALUES.

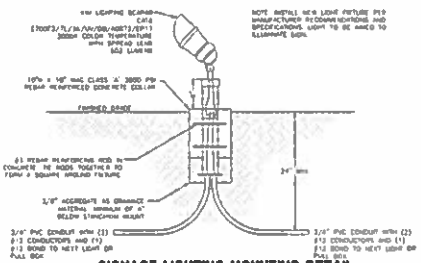
42. PRIOR TO POURING THE POLE BASES OR CONTACTING ANY ELECTRICAL CONDUITS, CONTACT THE INSPECTION DEPARTMENT 24 HOURS IN ADVANCE FOR APPROVAL.

43. MATERIALS SHALL BE NEW AND OF THE BEST QUALITY WITH MANUFACTURER'S NAME PRINTED THEREON. MATERIALS SHALL BE MANUFACTURED IN ACCORDANCE WITH NEMA AND UNDERWRITER'S LABORATORY OR OTHER APPLICABLE STANDARDS AND RATED FOR HEAVY DUTY SERVICE.

44. ALL WIRING DEVICES SHALL BE SPECIFICATION GRADE. ALL 15 AND 20 AMP, 125 AND 250 VOLT RECEPTACLES RECEPTACLES INSTALLED OUTDOORS SHALL BE LISTED WEATHER-RESISTANT TYPE. ALL WEATHERPROOF WHILE IN-USE RECEPTACLE COVERS SHALL BE METAL.

45. SELECTION OF MATERIALS SHALL BE IN STRICT ACCORDANCE WITH THE DRAWINGS AND/OR SPECIFICATIONS. THE USE OF MANUFACTURER'S NAME, MODEL AND NUMBER IS INTENDED TO ESTABLISH STYLE, QUALITY, APPEARANCE, DIMENSIONS AND ON PRICE. CONTRACTOR SHALL SUBMIT TO THE OWNER OR OWNER'S REPRESENTATIVE FOR REVIEW AND APPROVAL (PRIOR TO ORDERING MATERIALS) COPIES OF EQUIPMENT SHOP DRAWINGS AS FOLLOWS: 1) LIGHT FIXTURES, 2) POLES, 3) POLE BASES, 4) SERVICE ENTRANCE SECTION, 5) ELECTRICAL EQUIPMENT, 6) DISCONNECT SWITCHES, 7) TIME CLOCKS AND OTHER CONTROLS, 8) LIGHTING CONTACTORS AND 9) PULL BOXES. AT THE TIME OF EACH SUBMITTAL, THE CONTRACTOR SHALL DATING AND DELINEATE IN WRITING ANY DEVIATIONS FROM THE CONTRACT DOCUMENTS. THE REVIEW WILL BE ONLY FOR CONFORMANCE WITH THE DESIGN CONCEPT OF THE WORK AND FOR COMPLIANCE WITH THE INFORMATION CONTAINED IN THE CONTRACT DOCUMENTS. THE REVIEW OF A SPECIFIED ITEM AS SUCH WILL NOT INDICATE REVIEW OF THE ASSEMBLY IN WHICH THE ITEM FUNCTIONS. REVIEW BY THE OWNER OR OWNER'S REPRESENTATIVE WILL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR ANY ERRORS OR OMISSIONS IN THE SUBMITTALS NOR FROM HIS RESPONSIBILITY FOR COMPLYING WITH THE CONTRACT DOCUMENTS.

46. THE SUBMITTALS SHALL BE NEATLY GROUPED AND ORGANIZED. PERTINENT INFORMATION SHALL BE HIGHLIGHTED AND THE SPECIFIC PRODUCT SHALL BE IDENTIFIED. ALL SUBMITTALS SHALL BE COMPLETE AND PRESENTED IN ONE PACKAGE. THE SUBMITTAL SHALL INCLUDE A COMPLETE LIST OF THE EQUIPMENT AND MATERIALS, INCLUDING THE MANUFACTURER'S NAME, PRODUCT SPECIFICATION, DESCRIPTIVE DATA, TECHNICAL LITERATURE, PERFORMANCE CHARTS, CATALOG CUTS, INSTALLATION INSTRUCTIONS, AND SHOP PART RECOMMENDATIONS FOR EACH DIFFERENT ITEM OF THE EQUIPMENT SPECIFIED.



SIGNAGE LIGHTING MOUNTING DETAIL

NO SCALE

TEMPORARY POWER NOTE:

AT THE TIME OF THE ELECTRICAL SYSTEM CONSTRUCTION FOR THE ADERO CANYON TRAILHEAD THERE WILL NOT BE ANY PRIMARY EARMARKED POWER TO CONNECT THE ELECTRICAL SYSTEM INTO DUE TO THE DYNAMIC NATURE OF THE SITE AND THE DELAY IN SURROUNDING DEVELOPMENT. THE WILL RESULT IN THE CONTRACTOR BEING REQUIRED TO PROVIDE ALL MATERIALS NECESSARY TO TEST THE ENTIRE ELECTRICAL SYSTEM IN COMPLIANCE WITH THE ELECTRICAL SERVICE PROVIDER'S REQUIREMENTS AND THE TOWN OF FOUNTAIN HILLS. THE COST TO PROVIDE THE GEAR AND METHODS OF TESTING THE ENTIRE ELECTRICAL SYSTEM SHALL BE CONSIDERED INCIDENTAL TO THE OVERALL ELECTRICAL SYSTEM CONSTRUCTION AND THERE WILL NOT BE ANY SEPARATE MEASUREMENT AND OR PAYMENT FOR THIS EFFORT.

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PROJECT
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

SHEET
ELECTRICAL NOTES

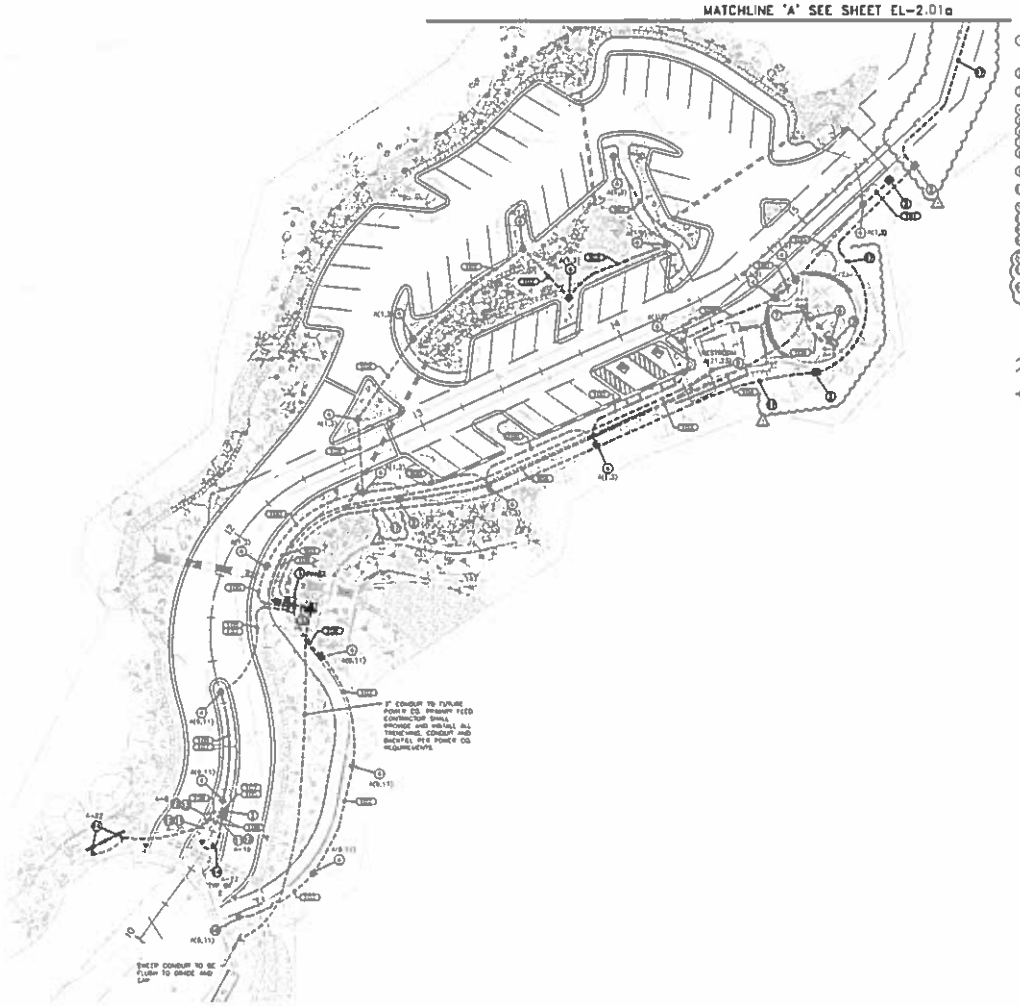
SEAL

REV	DATE	DESCRIPTION
1	06/29/14	BID SET
2	04/07/15	90% REVIEW
3	05/05/15	100% SUBMITTAL
A	09/28/15	ADDENDUM 1
B	10/05/15	BID SET

DRAWN BY D. EAGAR
REVIEWED BY C. TOLMAN
APPROVED BY C. TOLMAN
SCALE N.T.S.
DATE 08/31/2015

J2 PROJECT NO. 15.0897.003

DRAWING NO. EL-1.01 SHEET NO. 33 of 58



CONSTRUCTION NOTES:

1. INSTALL 200 AMP 120/240V 1Ø, 3W METERED PANEL (SEE PEDESTAL MOUNTED SERVICE DETAIL, SINGLE LINE DIAGRAM AND PANEL SCHEDULE SHEET EL-3.01). CONTRACTOR TO PROVIDE TEMPORARY POWER TO ALLOW FOR TESTING BY INSPECTOR AND ALSO BY OWNER'S REPRESENTATIVE. SEE TEMPORARY POWER NOTE ON COVER SHEET.
2. INSTALL #1 1/2 PULL BOX (SEE PULL BOX INSTALLATION DETAIL SHEET EL-3.02) INSTALL WHERE SHOWN ON PLANS.
3. INSTALL NEW 3 1/2" SCHEDULE 40 PVC CONDUIT TO LOCATION OF POWER CO TRANSFORMER COORDINATE INSTALLATION OF CONDUCTORS WITH POWER CO.
4. INSTALL LED BOLLARD (SEE BOLLARD DETAIL SHEET EL-3.02) INSTALL WHERE SHOWN ON PLANS.
5. EXTEND CONDUIT TO LOCATION SHOWN ON PLAN AND CAP FOR FUTURE USE.
6. INSTALL LED FAIRMAN LIGHT (SEE FAIRMAN LIGHT DETAIL SHEET EL-3.02)
7. INSTALL NEW GFCI OUTLET ON FAIRMAN POST (PER FAIRMAN LIGHT DETAIL SHEET EL-3.02).
8. PROPOSED RESTROOM BUILDING. EXTEND CONDUIT TO PANEL AS SHOWN ON BUILDING ELECTRICAL PLANS.
9. EXTEND SPARE CABLE FROM GATE OPENER TO MAGNETIC LOCK TO BE INSTALLED AT THIS LOCATION.
10. FUTURE LED BOLLARD. NOT TO BE INCLUDED IN BASE BUILD. SHOWN FOR REFERENCE ONLY. SEE BOLLARD DETAIL SHEET EL-3.02
11. CONTRACTOR RESPONSIBLE FOR ALL ELECTRICAL CONNECTIONS TO METER COMPANIES
12. THIS IS NOT TO BE INCLUDED IN BASE BUILD. TO BE BID AS ALTERNATE #1
13. DUPLEX RECEPTACLE PER DETAIL ON SHEET EL-3.03.
14. FUTURE SIGN/LANDSCAPE LIGHT NOT TO BE INCLUDED IN BASE BUILD. SHOWN FOR REFERENCE ONLY. SEE DETAIL ON SHEET SHEET EL-3.01.
15. INSTALL PHOTOVOLTAIC PANEL GROUND MOUNT SYSTEM PER DETAILS ON SHEET EL-3.02a
16. INSTALL PHOTOVOLTAIC INVERTER, SWITCHER AND CHARGE CONTROLLER IN NEMA 3R ENCLOSURE MOUNTED TO PV GROUND RACK PER DETAILS ON SHEET EL-3.02a.
17. INSTALL 1.5" SCHEDULE 40 PVC CONDUIT WITH (3)-#1 CU TYPE THHN CONDUCTORS AND (1)-#4 CU GROUND

LEGEND:

- NEW CONDUIT RUN
- NEW DIRECT CABLE RUN
- POWER COMPANY PAD MOUNTED TRANSFORMER
- CONDUIT WITH SCHEDULE 40 PVC CONDUIT, WIRE TYPE THHN COPPER SIZED ACCORDING TO WIRE AND CONDUIT TABLE WITH BARE BOND GROUND SIZED ACCORDING TO WIRE AND CONDUIT TABLE INSTALLED A MINIMUM OF 24" BELOW FINISHED GRADE.
- 200 AMP 120/240V 1Ø, 3W METERED PANEL (SEE PEDESTAL MOUNTED SERVICE DETAIL, SINGLE LINE DIAGRAM AND PANEL SCHEDULE SHEET EL-3.01)
- PULL BOX (SEE PULL BOX INSTALLATION DETAIL SHEET EL-3.01)
- PARTIALLY SHIELDED LED BOLLARD (SEE BOLLARD DETAIL SHEET EL-3.02)
- PARTIALLY SHIELDED LED FAIRMAN LIGHT (SEE FAIRMAN LIGHT DETAIL SHEET EL-3.02)
- GFCI RECEPTACLE, MOUNTED 30" AFG (SEE FAIRMAN LIGHT OR WALL MOUNTED DUPLEX RECEPTACLE DETAIL SHEET EL-3.02)

WIRE AND CONDUIT TABLE

CONDUIT NO.	SIZE	WIRE SIZE	QUANTITY	REMARKS
100	1"	#12/#8	1/1	2/1
		#12/#8	1/1/8	2/1/3
	1/2"		1/1/2	EACH GROUND
101	1/2"		1/1/2	EACH GROUND
102	1"	1/#12	1/#12	TYPICAL
103	1"	3/3	1/#6	RESTROOM SUB-PANEL
104	1"	3/#10	1/#10	A-3
		3/#10		A-5
105	1"	3/#10	1/#10	A/B-11
	1/0 "		1/#6	GROUND
106	1"	3/#12	1/#12	A-1
		3/#12		A-6
107 B	1" *	3/#6	1/#6	A-8
		3/#6		A-10
		3/#6		A-20
	1" *	3/#12		A-12
		3/#12		A-1
	1/2 "	PULL ROPE		SPARE
108 B	1" *	1/#6	1/#6	TYPICAL
109 B	1" *	3/#12	1/#12	TYPICAL

*CONDUIT TO BYPASS BOLLARD LIGHTS. DO NOT ROUTE THROUGH BOLLARD FOUNDATION
**NOTE: INSTALLATION OF CONDUCTORS TO BE COORDINATED WITH RESTROOM BUILDING CONSTRUCTION
B CONDUIT INSTALLED PER BASE BID, WIRES INSTALLED PER BUILD ALTERNATE #1.

SCALE 1"=20'

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WRIGHT ELECTRICAL engineering and DESIGN

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PARKS & RECREATION DEPT
FOUNTAIN HILLS TOWN HALL
16705 E. AVENUE OF THE FOUNTAINS
FOUNTAIN HILLS, AZ 85268
(480) 816-5100

PROJECT: Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

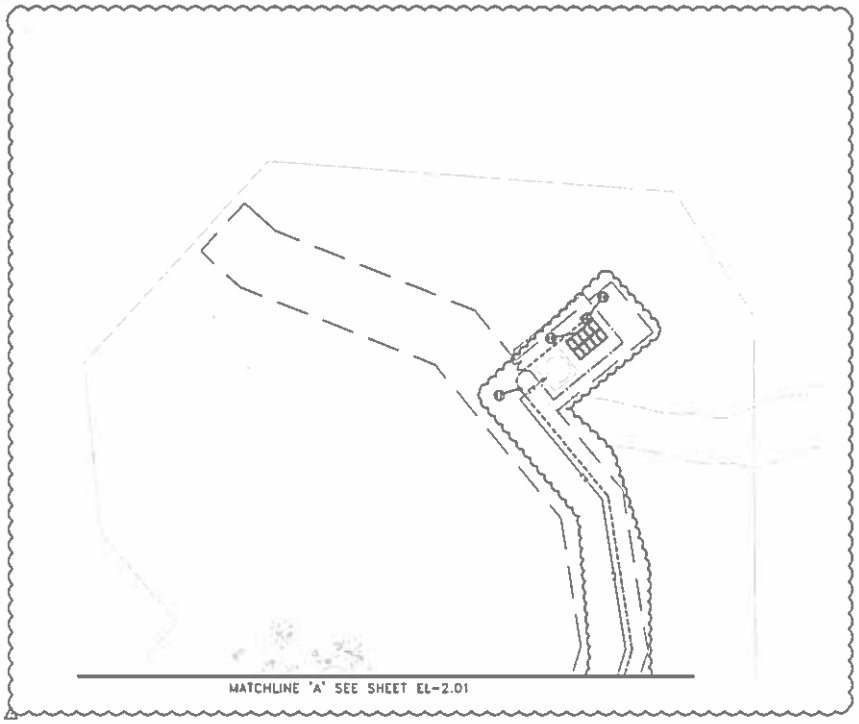
SHT. ELECTRICAL PLAN

No.	Date	Detail
1	10/29/13	90% REVIEW
2	04/07/14	100% REVIEW
3	05/05/14	[illegible]
4	06/26/14	[illegible]
5	06/26/14	[illegible]

Drawn By: D. [illegible]
Designed By: C. [illegible]
Approved By: C. [illegible]
Scale: [illegible]
Date: 06/30/2014

J2 Project No. 16 0097 [illegible]

Drawing No. EL- 2.01
Sheet No. 34 of 58



CONSTRUCTION NOTES:

1. INSTALL 200 AMP 120/240V 1Ø, 3W METERED PANEL (SEE PEDESTAL MOUNTED SERVICE DETAIL, ENABLE LINE DIAGRAM AND PANEL SCHEDULE SHEET EL-3.01). CONTRACTOR TO PROVIDE TEMPORARY POWER TO ALLOW FOR TESTING BY INSPECTOR AND ALSO BY OWNERS REPRESENTATIVE. SEE TEMPORARY POWER NOTE ON COVER SHEET.
2. INSTALL #3 1/2 PULL BOX. (SEE PULL BOX INSTALLATION DETAIL SHEET EL-3.02) INSTALL WHERE SHOWN ON PLANS
3. INSTALL NEW 3 1/2" SCHEDULE 40 PVC CONDUIT TO LOCATION OF POWER CO. TRANSFORMER, COORDINATE INSTALLATION OF CONDUCTORS WITH POWER CO.
4. INSTALL LED BOLLARD (SEE BOLLARD DETAIL SHEET EL-3.02) INSTALL WHERE SHOWN ON PLANS
5. EXTEND CONDUIT TO LOCATION SHOWN ON PLAN AND CAP FOR FUTURE USE
6. INSTALL LED PARADIGM LIGHT (SEE PARADIGM LIGHT DETAIL SHEET EL-3.03)
7. INSTALL NEW GFCI OUTLET ON PARADIGM POST (PER PARADIGM LIGHT DETAIL SHEET EL-3.03)
8. PROPOSED RESTROOM BUILDING EXTEND CONDUIT TO PANEL AS SHOWN ON BUILDING ELECTRICAL PLANS
9. EXTEND DIRECT BURIAL CABLE FROM GATE OPENER TO MAGNETIC LOCK TO BE INSTALLED AT THIS LOCATION
10. FUTURE LED BOLLARD NOT TO BE INCLUDED IN BASE BUILD. SHOWN FOR REFERENCE ONLY SEE BOLLARD DETAIL SHEET EL-3.02
11. CONTRACTOR RESPONSIBLE FOR ALL ELECTRICAL CONNECTIONS TO MOTOR CONTROLLER
12. THIS IS NOT TO BE INCLUDED IN BASE BUILD. TO BE ADD AS ALTERNATE #1
13. DUPLEX RECEPTACLE PER DETAIL ON SHEET EL-3.03
14. FUTURE SIGN/LANDSCAPE LIGHT NOT TO BE INCLUDED IN BASE BUILD SHOWN FOR REFERENCE ONLY SEE DETAIL ON SHEET EL-3.03
15. INSTALL PHOTOVOLTAIC PANEL GROUND MOUNT ARRAY PER DETAILS ON SHEET EL-3.02a
16. INSTALL PHOTOVOLTAIC INVERTER, INVERTER AND CHARGE CONTROLLER IN NEMA 3R ENCLOSURE MOUNTED TO PV GROUND MOUNT PER DETAILS ON SHEET EL-3.02a
17. INSTALL 1 1/2" SCHEDULE 40 PVC CONDUIT WITH (2)-#1 CU TWIN CONDUCTORS AND (1)-#4 CU GROUND.

LEGEND:

- NEW CONDUIT RUN
- NEW DIRECT CABLE RUN
- POWER COMPANY PAD MOUNTED TRANSFORMER
- CONDUIT NOTE SCHEDULE 40 PVC CONDUIT, WIRE TYPE THWN COPPER SIZED ACCORDING TO WIRE AND CONDUIT TABLE WITH WIRE BEND GROUND SIZED ACCORDING TO WIRE AND CONDUIT TABLE INSTALLED A MINIMUM OF 24" BELOW FINISHED GRADE.
- 200 AMP 120/240V 1Ø, 3W METERED PANEL (SEE PEDESTAL MOUNTED SERVICE DETAIL, ENABLE LINE DIAGRAM AND PANEL SCHEDULE SHEET EL-3.01)
- PULL BOX (SEE PULL BOX INSTALLATION DETAIL SHEET EL-3.01)
- PARTIALLY SHIELDED LED BOLLARD (SEE BOLLARD DETAIL SHEET EL-3.02)
- PARTIALLY SHIELDED LED PARADIGM LIGHT (SEE PARADIGM LIGHT DETAIL SHEET EL-3.03)
- GFCI RECEPTACLE, MOUNTED 24" AFG (SEE PARADIGM LIGHT OR WALL MOUNTED DUPLEX RECEPTACLE DETAIL SHEET EL-3.03)

WIRE AND CONDUIT TABLE

CONDUIT NO.	SIZE (IN)	WIRE POWER	WIRE GROUND	REMARKS (C-1 #)
1C0	1"	2/#10	1/#10	24(1)
	(2)1" *		1/#12 EACH	GROUND
1C1	(2)1"		1/#12 EACH	GROUND
1C2	1"	1/#12	1/#12	TYPICAL
1C3	3"	3/#2	1/#6	RESTROOM SUB-PANEL(3)
1C4	1"	2/#10	1/#10	2-4
		2/#10		2-5
1C5	1"	2/#10	1/#10	2-6(11)
	1 1/2" *		1/#10	GROUND
1C6	1"	2/#12	1/#12	2-1
		2/#12		2-2
1C7 B	1" *	2/#6	1/#6	2-15
		2/#6		2-16
	1" *	2/#12		2-17
		2/#12		2-18
	1 1/2" *	PULL ROPE		GROUND
1C8 B	1" *	2/#6	1/#6	TYPICAL
1C9 B	1" *	2/#12	1/#12	TYPICAL

*CONDUIT TO BYPASS BOLLARD LENGTH. DO NOT ROUTE THROUGH BOLLARD FOUNDATION.
**NOTE: INSTALLATION OF CONDUITS TO BE COORDINATED WITH RESTROOM BUILDING CONSTRUCTION
B CONDUIT INSTALLED PER BASE BID. WIRES INSTALLED PER BUILD ALTERNATE #1.

D 10' 20' 40'
SCALE 1"=20'

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PROJECT: Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

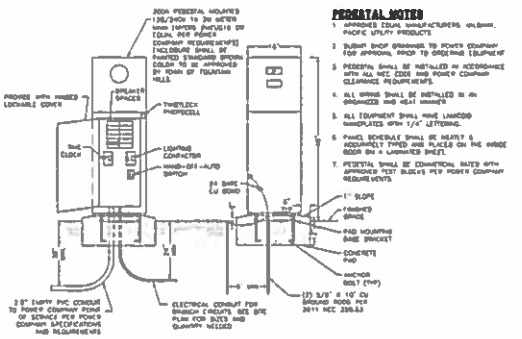
SHT. ELECTRICAL PLAN

REVISIONS / ADDENDA		
No.	MM/DD/YR	REMARKS
1	10/26/16	BID REVIEW
2	01/17/17	PERM SERVICE
3	03/02/17	REVISED BASED ON
4	04/24/17	ADD-A.1 METER SPLI
5	06/01/17	BID SET

DRAWN BY: D. TAGA
DESIGNED BY: C. YOUNG
APPROVED BY: C. YOUNG
SCALE: NTS
DATE: 06/31/2017

J2 PROJECT NO. 16-0897-003

DRAWING NO. EL-2.01a SHEET NO. 34a of 58



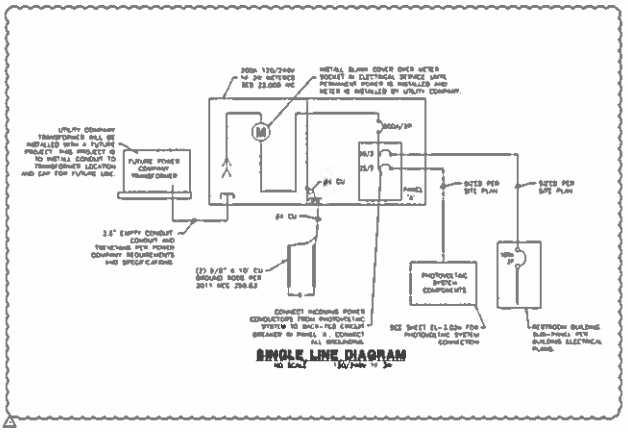
200A PEDESTAL MOUNTED SERVICE

NO SCALE

120/240V 1Ø 3W

PEDESTAL NOTES

1. APPROVED EQUAL MANUFACTURERS INCLUDE: PACIFIC UTILITY PRODUCTS
2. SUBMIT SHOP DRAWINGS TO POWER COMPANY FOR APPROVAL PRIOR TO ORDERING EQUIPMENT
3. PEDESTAL SHALL BE INSTALLED IN ACCORDANCE WITH ALL NEC CODE AND POWER COMPANY CLEARANCE REQUIREMENTS.
4. ALL WIRING SHALL BE INSTALLED IN AN ORGANIZED AND NEAT MANNER
5. ALL EQUIPMENT SHALL HAVE LAMICOID NAMEPLATES WITH 1/4" LETTERING.
6. PANEL SCHEDULE SHALL BE NEATLY & ACCURATELY TYPED AND PLACED ON THE INSIDE DOOR ON A LAMINATED SHEET.
7. PEDESTAL SHALL BE CONNECTICAL RATED WITH APPROVED TEST BLOCKS PER POWER COMPANY REQUIREMENTS



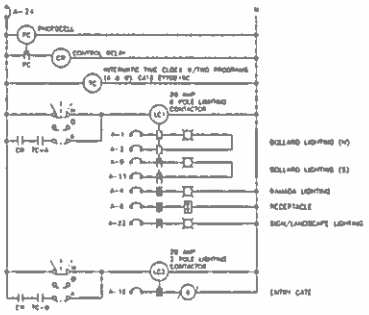
SINGLE LINE DIAGRAM

NO SCALE

PANEL	'A'	200 AMPS	120/240 VOLTS , 1Ø , 3W	MAINS	200 AMP
LOCATION	ENTRY ROAD, STA 11+70	TYPE	PLUG-IN	MOUNTING	PEDESTAL

CKT NO	BKR SIZE	DESCRIPTION	VA	AP	BP	VA	DESCRIPTION	BKR SIZE	CKT NO
1	20/	* BOLLARD LIGHTING (N)	1360	1360		500	SPARE	20/1	2
3	/2	" "	1360		1036	686	* BANNER LIGHTING	20/1	4
5	20/1	SPARE	0	500		500	RECEPTACLE	20/1	6
7	20/1	SPARE	0		375	375	SPARE	20/1	8
9	20/	*BOLLARD LIGHTING (S)	540	540		0	SPARE	20/1	10
11	/2	" "	540		540	0	ENTRY LANDSCAPE LIGHTING	20/1	12
13	20/	*BOLLARD LIGHTING (FUTURE) **	753	1360		846	* BANNER LIGHTING (FUTURE) **	20/1	14
15	/2	" "	753		1360	600	BANNER RECEPTACLE (FUTURE) **	20/1	16
17	20/	PHOTOVOLTAIC CONNECTION	0	1200		1200	ENTRY GATE @	20/1	18
19	/2	" "	0		1200	1200	ELK GATE @	20/1	20
21	60/	RESTROOM SUB-PANEL	8000	8100		98	*SIGN/LANDSCAPE LIGHTING	20/1	22
23	/2	" "	8000		6100	100	CONTROL	20/1	24
		LOAD TOTAL VA / Ø		11100	11715		* INDICATES LOAD @ 1215		
		LOAD TOTAL AMPS / Ø		878	975		22,000 VA OR 183 AMPS		

**ESTIMATED FUTURE BOLLARD LOAD
BACKUP PER BUILD ALTERNATE #1
AT TIME OF TRANSFER OPERATE TO THE PUBLIC. ALL BRANCHES TO BE TURNED OFF EXCEPT BRANCHES 17, 18, 19, 20, 21, 22 AND 24



CONTROL SCHEMATIC

NTS

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PROJECT
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

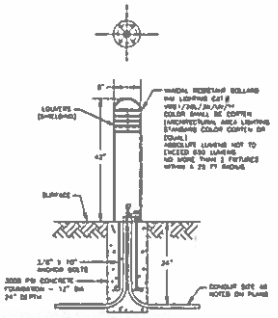
TITLE
ELECTRICAL DETAILS

NO	DATE	ISSUE
1	08/26/10	90% REVIEW
2	01/12/11	100% REVIEW
3	03/02/11	BIDDING SUBMITTAL
4	04/28/11	ADDENDUM NO. 1
5	06/01/11	BID SET

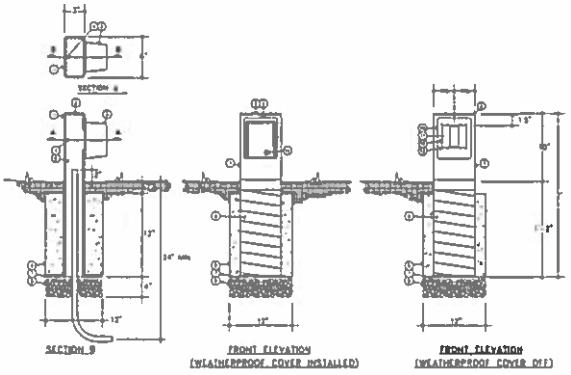
DRAWN BY D. EAGAR
DESIGNED BY E. TOLMAN
APPROVED BY E. TOLMAN
SCALE NTS
DATE 06/01/2011

J2 PROJECT NO. 10.0807.003

DRAWING NO. EL- 3.01 SHEET NO. 35 of 58



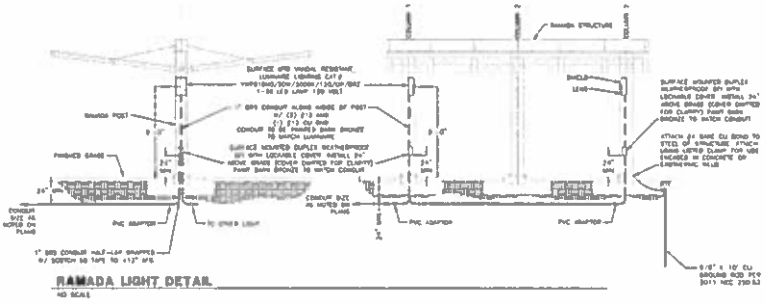
BOLLARD LIGHT DETAIL
NO SCALE



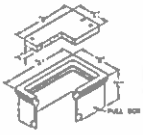
DUPLEX RECEPTACLE DETAIL
NO SCALE

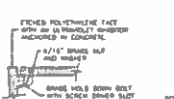
KEYED NOTES

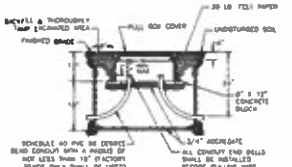
1. [illegible]
2. [illegible]
3. [illegible]
4. [illegible]
5. [illegible]
6. [illegible]
7. [illegible]
8. [illegible]
9. [illegible]
10. [illegible]
11. [illegible]
12. [illegible]
13. [illegible]
14. [illegible]
15. [illegible]
16. [illegible]



RAMADA LIGHT DETAIL
NO SCALE







LB "A" REINFORCED CONCRETE W/HOLD DOWN BOLTS

LB-A

PULL BOX TYPE	PULLBOX LENGTH	PULLBOX WIDTH	PULLBOX HEIGHT	LID LENGTH	LID WIDTH	LID HEIGHT
	"L"	"W"	"H"	"L"	"W"	"H"
#1 1/2	19-3/4"	13-1/2"	13"	19-1/4"	10"	1-3/4"
#4	29-1/2"	15-3/8"	13"	28-3/8"	14-1/2"	2"
#7	34-3/4"	21-3/4"	13"	33-1/2"	21-3/4"	2"

GENERAL NOTES:

1. THE PULL BOX SHALL BE MADE OF A NON DESCRIPT REINFORCED CONCRETE MATERIAL WITH END & SIDE WALLS/FLOOR, & MONOLITHIC WITH SMOOTH FIN TO MAINTAIN GRADE, MANUFACTURED WITH APPROXIMATE DIMENSIONS AS SHOWN
2. STEEL REINFORCEMENT SHALL BE AS REGULARLY USED IN STANDARD PRODUCTS OF THE RESPECTIVE MANUFACTURER.
3. COVER LETTERING SHALL BE 1" LETTERS CAST ON STANDARD MARKINGS "ELECTRIC" OR "HIGH VOLTAGE" AS REQUIRED.
4. THE PULL BOX SHALL HAVE AN ETCHED POLYETHYLENE FACE WITH 4x ULTRAVIOLET RESISTOR ANCHORED IN CONCRETE
5. ALL CABLE & CONDUCTOR SPLICES SHALL BE CONNECTED WITH [illegible] ELECTROMED GELCAP-SL, NPD INDUSTRIES ISSN-1/0, OR COPPER COMPRESSION H-TAP CONNECTOR OR APPROVED EQUAL & INSULATED WITH 3M SCOTCHCAST SPLICE #4 OR SERIES TYCO ELECTRONICS GELCAP SL, NPD INDUSTRIES SSS SERIES OR APPROVED EQUAL.

PULL BOX INSTALLATION
NO SCALE

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[illegible]

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Project: Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

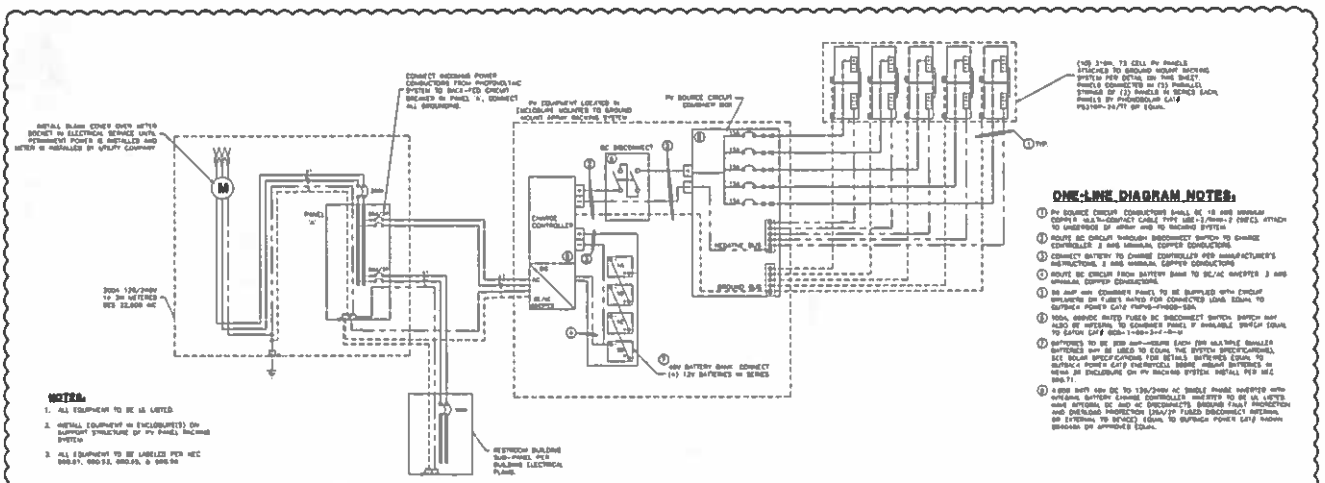
Sheet: ELECTRICAL DETAILS

No.	Date	Revision
1	10/29/12	[illegible]
2	01/17/13	[illegible]
3	03/05/13	[illegible]
A	01/29/13	[illegible]
B	06/21/13	[illegible]

Drawn By: D. EAGAR
Designed By: C. TOLMAN
Approved By: C. TOLMAN
Scale: N.T.S.
Date: 06/21/2013

J2 Project No. 18 0897.003

Drawing No. EL- 3.02 Sheet No. 36 of 58



NOTES:

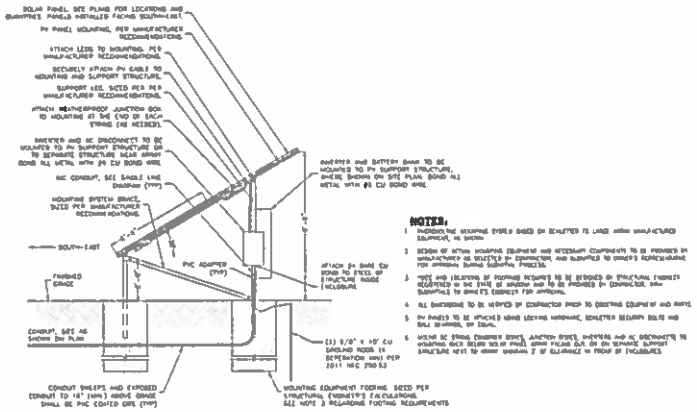
1. ALL EQUIPMENT TO BE UL LISTED.
2. INSTALL EQUIPMENT IN ENCLOSURE(S) ON SUPPORT STRUCTURE OF PV PANEL RACKING SYSTEM.
3. ALL EQUIPMENT TO BE LABELED PER NEC 690.57, 690.53, 690.56, & 690.56

PHOTOVOLTAIC SYSTEM THREE LINE DIAGRAM

NO SCALE

ONE-LINE DIAGRAM NOTES:

1. PV SOURCE CIRCUIT CONDUCTORS SHALL BE #10 AWG MINIMUM COPPER UL/ULTA-COMPACT CABLE TYPE USE-2/RHH-2 (NEC). ATTACH TO UNDERSIDE OF ARRAY AND TO RACKING SYSTEM
2. ROUTE DC CIRCUIT THROUGH DISCONNECT SWITCH TO CHARGE CONTROLLER. 2 AWG MINIMUM COPPER CONDUCTORS.
3. CONNECT BATTERY TO CHARGE CONTROLLER PER MANUFACTURER'S INSTRUCTIONS. 2 AWG MINIMUM COPPER CONDUCTORS
4. ROUTE DC CIRCUIT FROM BATTERY BANK TO DC/AC INVERTER 2 AWG MINIMUM COPPER CONDUCTORS.
5. DC SHUT OFF COMBINER PANEL TO BE SUPPLIED WITH CIRCUIT BREAKERS ON FUSES RATED FOR CONNECTED LOAD EQUAL TO OUTBACK POWER CAT# FNDPS-FNADD-50A
6. 100A, 600VDC RATED FUSED DC DISCONNECT SWITCH. SWITCH MAY ALSO BE INTERNAL TO COMBINER PANEL IF AVAILABLE SWITCH EQUAL TO EATON CAT# DC3-1-00-2-1-0-U
7. BATTERIES TO BE 2000 AMP-HOURS EACH (ON SUITABLE SMALLER BATTERIES MAY BE USED TO EQUAL THE SYSTEM SPECIFICATIONS). SEE SOLAR SPECIFICATIONS FOR DETAILS. BATTERIES EQUAL TO OUTBACK POWER CAT# CHEMTECH. BANK MOUNT BATTERIES IN NEMA 3R ENCLOSURE ON PV RACKING SYSTEM. INSTALL PER NFC 690.71
8. 4000 WATT 48V DC TO 120/240V AC SINGLE PHASE INVERTER WITH INTERNAL BATTERY CHARGE CONTROLLER. INVERTER TO BE UL LISTED. MAKE INTERNAL DC AND AC DISCONNECTS. GROUND FAULT PROTECTION AND OVERLOAD PROTECTION 120A/2P FUSED DISCONNECT INTERNAL OR EXTERNAL TO INVERTER EQUAL TO OUTBACK POWER CAT# FXXXX SERIES OR APPROVED EQUAL



NOTES:

1. PROPRIETARY MOUNTING SYSTEM SHOWN ON SCHEMATIC IS LARGE MANUFACTURED EQUIPMENT, AS SHOWN
2. DESIGN OF ATTACH MOUNTING EQUIPMENT AND ATTACHMENT COMPONENTS TO BE PROVIDED BY MANUFACTURER AS SELECTED BY CONTRACTOR AND SUBMITTED TO OWNER'S REPRESENTATIVE FOR APPROVAL DURING SUBMITTAL PROCESS.
3. SIZE AND LOCATION OF FOOTING REQUIRED TO BE DESIGNED BY STRUCTURAL ENGINEER REGISTERED IN THE STATE OF ARIZONA AND TO BE PROVIDED BY CONTRACTOR. SEE SUBMITTALS TO OWNER'S REPRESENTATIVE FOR APPROVAL.
4. ALL EQUIPMENT TO BE VERIFIED BY CONTRACTOR PRIOR TO ORDERING EQUIPMENT AND PARTS
5. PV PANELS TO BE ATTACHED USING LOCKING HARDWARE. SCHEDULE SECURITY BOLTS AND NUTS BY MANUFACTURER OR EQUAL.
6. METAL DC STRING COMBINER BOXES, JUNCTION BOXES, INVERTERS AND AC DISCONNECTS TO MOUNTED ONTO BELOW SOLAR PANEL ARRAY PLANE OUT ON PV RACKING SUPPORT STRUCTURE NEXT TO ARRAY WHERE IT IS ELIGIBLE TO PROVIDE FOR INCLEMENTS

PV PANEL GROUND MOUNT RACKING SYSTEM DETAIL

NO SCALE

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PROJECT: Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

SHEET: ELECTRICAL DETAILS

NO.	DATE	DESCRIPTION
1	06/26/14	PVE REVIEW
2	07/17/14	REVISE PER PVE
3	07/30/14	REVISED SUBMITTAL
4	08/30/14	REVISED SUBMITTAL
5	09/09/14	PVE SET

DRAWN BY: D. LAGAN
DESIGNED BY: C. TOLMAN
APPROVED BY: C. TOLMAN
SEAL: N13
DATE: 08/31/201

J2 PROJECT NO: 16-0887.002

DRAWING NO.: EL- 3.02a SHEET NO.: 36a of 58

LANDSCAPE GENERAL NOTES:

1. NO PLANT SUBSTITUTIONS, TYPE, OR QUANTITY DEVIATIONS FROM THE APPROVED LANDSCAPE OR IRRIGATION PLANS WITHOUT PRIOR APPROVAL FROM THE TOWN OF FOUNTAIN HILLS OR THE TOWN'S REPRESENTATIVE.

2. ALL PLANT MATERIAL SPECIFICATIONS SHALL COMPLY WITH PUBLISHED AND REFERENCED TOWN OF FOUNTAIN HILLS LANDSCAPE STANDARDS.

3. ALL LANDSCAPE CONSTRUCTION REQUIRED TO COMPLETE THESE PLANS SHALL BE IN ACCORDANCE WITH TOWN OF FOUNTAIN HILLS SPECIFICATIONS. THE CONTRACTOR SHALL BE FAMILIAR WITH ALL REQUIRED STANDARD SPECIFICATIONS, DETAILS, AND SUPPLEMENTS PRIOR TO BIDDING THE CONSTRUCTION COVERED BY THESE PLANS AND SPECIFICATIONS. PERMIT COST ARE CONSIDERED INCIDENTAL TO ALL WORK AND WILL NOT BE PAID SEPARATELY AND SHOULD BE INCLUDED IN THE COST OF OTHER ITEMS.

4. THE CONTRACTOR SHALL COMPLY WITH ALL LOCAL, STATE AND FEDERAL LAWS, CODES AND REGULATIONS APPLICABLE TO THE ITEMS AND AREAS TO THESE PLANS AND SPECIFICATIONS.

5. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND COMPLYING WITH ALL PERMITS REQUIRED TO COMPLETE THE LANDSCAPE CONSTRUCTION WORK COVERED BY THESE PLANS AND SPECIFICATIONS.

6. THE QUANTITIES AND SITE CONDITIONS SHOWN ON THESE PLANS ARE FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR SHALL VERIFY THE ACTUAL QUANTITIES AND SITE CONDITIONS PRIOR TO BIDDING THE WORK COVERED BY THESE PLANS AND SPECIFICATIONS. SEE NOTE #42 REGARDING ACCESSING SITE.

7. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO UTILITIES AND/OR FACILITIES CAUSED DURING ANY CONSTRUCTION OPERATIONS. THE CONTRACTOR SHALL CALL FOR BLUE STAKE AT 602-263-1100 TWO WORKING DAYS PRIOR TO ANY EXCAVATION.

8. ALL GENERAL SITE GRADING (TO WITHIN 0.10 FOOT, INCLUDING ALL BERMS, SWALES AND RETENTION AREAS) WILL BE CONSTRUCTED AS PER THE GRADING AND DRAINAGE PLANS. THE LANDSCAPE AND IRRIGATION CONTRACTOR SHALL VERIFY AND ACCEPT THESE ROUGH GRADES PRIOR TO STARTING ANY LANDSCAPE AND IRRIGATION WORK. ALL DRAINAGE FLOWS SHALL BE PROTECTED AND MAINTAINED THROUGHOUT LANDSCAPE AND IRRIGATION CONSTRUCTION.

9. ANY DISCREPANCIES FOUND BETWEEN THESE PLANS AND SPECIFICATIONS AND THE SITE SHALL BE REPORTED TO THE TOWN OF FOUNTAIN HILLS REPRESENTATIVE PRIOR TO STARTING ANY LANDSCAPE AND IRRIGATION WORK.

10. SHOULD THE LANDSCAPE CONTRACTOR HAVE ANY QUESTIONS REGARDING THESE PLANS AND SPECIFICATIONS, OR SHOULD THERE BE ANY DISCREPANCIES, THE CONTRACTOR SHALL CONTACT THE TOWN OF FOUNTAIN HILLS REPRESENTATIVE FOR CLARIFICATION BEFORE PROCEEDING FURTHER WITH ANY OTHER WORK.

11. ANY AND ALL SUBSTITUTIONS SHALL BE APPROVED BY THE TOWN OF FOUNTAIN HILLS REPRESENTATIVE. CONTRACTOR SHALL PROVIDE INFORMATION AS TO THE AVAILABILITY OF PLANT MATERIAL AS A SUBMITTAL PER THE SPECIFICATIONS.

12. IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSPECT THE JOB SITE TO BECOME FAMILIAR WITH ALL EXISTING CONDITIONS THAT COULD AFFECT THE INSTALLATION OF ANY WORK SET FORTH IN THESE PLANS OR CITY SPECIFICATIONS PRIOR TO SUBMITTING A BID. SEE NOTE #42 REGARDING ACCESSING SITE.

13. CONTRACTOR SHALL VERIFY ROCK AND SOIL CONDITIONS WITHIN THE PROJECT SITE PRIOR TO BIDDING. NO EXTRA PAYMENT OR TIME EXTENSION WILL BE GIVEN DUE TO ROCKY SOIL CONDITIONS. CONTRACTOR IS RESPONSIBLE FOR CONDUCTING SITE INSPECTIONS AND CHECKING SOIL BORING LOGS (OBTAIN FROM TOWN) TO DETERMINE SUBSURFACE CONDITIONS PRIOR TO BIDDING. SEE NOTE #42 REGARDING ACCESSING SITE.

14. CONTRACTOR TO VERIFY LIMITS OF DISTURBANCE THROUGHOUT THE PROJECT AND BRING ANY DISCREPANCIES IMMEDIATELY TO THE ATTENTION OF THE TOWN OF FOUNTAIN HILLS REPRESENTATIVE.

15. ALL WORK TO BE CONFINED WITHIN THE DEFINED LIMITS OF DISTURBANCE.

16. THE INFORMATION SHOWN ON THIS SET OF DRAWINGS CONCERNING TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT REPRESENTED TO BE ACCURATE OR ALL INCLUSIVE. THE INFORMATION IS MADE AVAILABLE TO PROVIDE THE CONTRACTOR WITH READY ACCESS TO THE SAME INFORMATION USED BY THE CONSULTANT IN PREPARATION OF THESE DOCUMENTS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY TYPE AND LOCATION OF UTILITIES AS NECESSARY TO AVOID DAMAGE THERETO. ALL UTILITIES SHALL BE LOCATED AND VERIFIED PRIOR TO ANY EXCAVATION.

17. THE CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND LEGAL DISPOSAL OF ANY DEBRIS RESULTING FROM THE CONSTRUCTION. AT NO TIME SHALL ANY OF THIS MATERIAL OBSTRUCT THE NORMAL OPERATION OF ANY ADJOINING STREET ASSOCIATED WITH THIS PROJECT.

18. THE JOB SITE AT THE COMPLETION OF THE CONSTRUCTION SHALL BE CLEANED OF ANY DEBRIS RESULTING FROM CONSTRUCTION. NO JOB WILL BE CONSIDERED COMPLETE UNTIL ALL CURBS, GUTTERS AND PAVEMENT HAVE BEEN SWEPT CLEAN OF ALL DIRT AND DEBRIS AND ARE IN COMPLIANCE WITH THE TOWN OF FOUNTAIN HILLS SPECIFICATIONS.

19. SUBSTANTIAL INSPECTION – AN INSPECTION AT COMPLETION OF THE LANDSCAPE AND IRRIGATION INSTALLATION SHALL BE MADE BY THE TOWN OF FOUNTAIN HILLS REPRESENTATIVE. ANY DEFICIENCIES IN THE INSTALLATION SHALL BE NOTED AND CORRECTED BY THE CONTRACTOR PRIOR TO THE START OF THE LANDSCAPE MAINTENANCE PERIOD AS SPECIFIED.

20. LANDSCAPE MAINTENANCE PERIOD PER MAG STANDARDS – THE CONTRACTOR SHALL NOTIFY THE TOWN OF FOUNTAIN HILLS WHEN ALL LANDSCAPING IS COMPLETED AND READY FOR A LANDSCAPE AND IRRIGATION INSPECTION PER THE TOWN'S SPECIFICATIONS.

21. FINAL ACCEPTANCE – A FINAL INSPECTION IS REQUIRED AT THE END OF THE LANDSCAPE MAINTENANCE PERIOD TO DETERMINE FINAL ACCEPTANCE PER THE TOWN'S SPECIFICATIONS.

22. TOWN OF FOUNTAIN HILLS BUILDING SAFETY INSPECTIONS ARE REQUIRED FOR THE BACKFLOW PREVENTER AND RELATED ELECTRICAL CONNECTIONS.

23. THE ABOVE INSPECTIONS REQUIRE A MINIMUM OF 48 HOURS PRIOR NOTIFICATION TO THE TOWN.

24. THE CONTRACTOR IS ADVISED THAT DAMAGE TO ANY PORTION OF ANY EXISTING CURBS, GUTTERS, PAVEMENTS, FENCING, WALLS AND SURROUNDING AREAS THAT ARE NOT NOTED ON THE PLANS TO BE DISTURBED ARE TO BE REPAIRED AT THE CONTRACTOR'S EXPENSE.

25. ALL PLANT MATERIAL TO RECEIVE 20-10-5 SLOW RELEASE FERTILIZER TABLETS AT THE FOLLOWING RATE: 1 GALLON- ONE (1) TABLET, 5 GALLON- TWO (2) TABLETS, 15 GALLON- FOUR (4) TABLETS, 24" BOX- SIX (6) TABLETS, 36" BOX- EIGHT (8) TABLETS, & 48" BOX OR LARGER- TEN (10) TABLETS.

26. ALL EQUIPMENT AND MATERIALS NOT SHOWN OR SPECIFIED ON THE PLANS OR SPECIFICATIONS BUT WHICH ARE REQUIRED TO COMPLETE THIS INSTALLATION SHALL BE SUPPLIED BY THE CONTRACTOR AS PART OF THIS CONTRACT WORK AND SHALL BE CONSIDERED INCIDENTAL TO THE WORK INVOLVED.

27. THE PLANT PITS ARE TO BE INSPECTED BY THE TOWN OF FOUNTAIN HILLS REPRESENTATIVE PRIOR TO PLANTING BY THE CONTRACTOR. THE CONTRACTOR SHALL REQUEST AN INSPECTION 48 HOURS IN ADVANCE. CONTACT THE TOWN OF FOUNTAIN HILLS TO SCHEDULE INSPECTION.

28. PLANT PIT DEPTH SHALL BE MEASURED ON THE LOW SIDE OF PLANT PIT WHEN ON A SLOPE.

29. ALL PLANTS SHALL BE CENTERED IN PLANT PITS.

30. FINAL PLANT MATERIAL PLACEMENT IN THE FIELD MAY BE REQUIRED TO BE ADJUSTED WHERE TREES OCCUR DIRECTLY UNDER OR OVER EXISTING UTILITIES.

31. THE PLANT PIT SOIL MIXTURE SHALL COMPLY WITH THE PROJECT SPECIFICATIONS AND SHALL BE PLACED IN SIX INCH (6") LIFTS. EACH LIFT SHALL BE WATER SETTLED WITHOUT PUDDLING.

32. WHERE CALICHE IS ENCOUNTERED IN PLANT PITS, THE WIDTH OF THE PIT SHALL BE INCREASED BY ONE-THIRD (1/3) OVER SPECIFICATIONS. A LIQUID PENETRATION SHALL BE INCORPORATED FOR EACH PIT PER MANUFACTURER'S RECOMMENDATIONS. NO OVER EXCAVATION SHALL OCCUR WITHOUT PRIOR APPROVAL OF THE TOWN OF FOUNTAIN HILLS. IF CALICHE IS DISCOVERED TO BE PREVALENT IN THE AREA, CONTRACTOR SHALL IMMEDIATELY NOTIFY THE TOWN TO DETERMINE ACTION AND ASSOCIATED COST. CONTRACTOR SHALL NOT PROCEED WITH ADDITIONAL WORK UNTIL DIRECTED BY THE TOWN OF FOUNTAIN HILLS.

33. PLANT AND BOULDER LOCATIONS ARE DIAGRAMMATIC. THE CONTRACTOR SHALL STAKE ALL PROPOSED TREE, SAGUARO, OCOTILLO, BARREL CACTI, AND BOULDERS LARGER THAN 3'x3'x3' LOCATIONS. LOCATIONS SHALL BE APPROVED BY TOWN OF FOUNTAIN HILLS PRIOR TO INSTALLATION.

34. CONTRACTOR SHALL TREAT ALL CUT OR FRACTURED ROCKS & BOULDERS WITH PERMEON DESERT VARNISH ROCK STAIN OR APPROVED EQUAL AFTER FINAL INSTALLATION. COLOR RANGE OF STAIN IS DEPENDENT ON STRENGTH OF SOLUTION AND APPLICATION TECHNIQUE. CONTRACTOR SHALL TREAT A TEST AREA AND ALLOW A MIN. OF SEVEN (7) DAYS FOR SOLUTION TO CURE BEFORE SCHEDULING AN INSPECTION BY THE TOWN OR TOWN'S REPRESENTATIVE FOR APPROVAL OF COLOR PRIOR TO ANY ADDITIONAL APPLICATIONS. INSTALL PER SPECIFICATIONS.

35. ALL LANDSCAPE SHALL MEET OR EXCEED THE TOWN OF FOUNTAIN HILLS MINIMUM LANDSCAPE REQUIREMENTS.

36. ALL LANDSCAPE AREAS SHALL BE IRRIGATED WITH AN AUTOMATICALLY CONTROLLED IRRIGATION SYSTEM FOR A MINIMUM OF FOUR YEARS AFTER PROJECT COMPLETION. AFTER THOSE FOUR YEARS, THE IRRIGATION SYSTEM MAY BE ABANDONED OR PROGRAMMED TO REDUCE OPERATION TIMES AT THE TOWN'S DISCRETION TO ALLOW FOR NATURALIZATION OF PLANT MATERIALS.

37. ALL LANDSCAPE AREAS SHALL BE COORDINATED WITH PLANT INVENTORY, ARCHITECTURAL, ELECTRICAL, STRUCTURAL, AND CIVIL ENGINEERING PLANS. CONTRACTOR SHALL REVIEW THOSE PLANS AND BRING ANY FOUND DISCREPANCIES TO THE IMMEDIATE ATTENTION OF THE TOWN OF FOUNTAIN HILLS REPRESENTATIVE.

38. NO RIVER ROCK IS PERMITTED AT THIS SITE. NATIVE STONE SALVAGED FROM THE SITE IS THE ONLY STONE ALLOWED TO BE USED UNLESS SPECIFICALLY STATED OTHERWISE IN PLANS OR OTHERWISE APPROVED BY TOWN'S REPRESENTATIVE.

39. NO PRE-EMERGENT HERBICIDE IS PERMITTED TO BE APPLIED AT THIS SITE DUE TO INSTALLATION OF NATIVE SEED MIX.

40. CONTRACTOR SHALL REVIEW AND COMPLY WITH SALVAGING AND NURSERY REQUIREMENTS AS WRITTEN IN SPECIFICATIONS.

41. DESIGN INTENT IS TO SALVAGE AND RE-USE ALL ROCKS AND BOULDERS THAT ARE PREVALENT ON SITE AND WILL BE DISPLACED DURING CONSTRUCTION. CONTRACTOR SHALL COORDINATE WITH TOWN ON ALL BOULDER AND ROCK SALVAGING AND STOCK PILING AND RE-USE IN LANDSCAPE.

42. PROJECT SITE IS LOCATED WITHIN THE McDOWELL MOUNTAIN PRESERVE LIMITS AND THEREFORE CONTRACTOR SHALL ADHERE TO ALL SPECIAL PRESERVE REQUIREMENTS & RESTRICTIONS AS ESTABLISHED BY THE TOWN. CONTRACTOR SHALL VERIFY WITH TOWN REGARDING CURRENT ACCESSIBILITY REQUIREMENTS PRIOR TO INITIAL SITE VISIT. AT TIME OF DESIGN, VEHICULAR ACCESSIBILITY TO SITE WAS OBSTRUCTED TO THE PUBLIC WITH A LOCKED GATE (BY TOWN) APPROX. ONE MILE FROM SITE AT CURRENT END OF EAGLE RIDGE DR. THE ONLY ACCESS TO SITE WAS VIA AN EXISTING UNIMPROVED DIRT FIRE ROAD REQUIRING THE USE OF A HIGH CLEARANCE VEHICLE (THIS MAY OR MAY NOT STILL BE THE CONDITIONS AT TIME OF BID). AT NO TIME PRIOR TO CONSTRUCTION MAY ANY VEHICLE TRAVERSE BEYOND THE EXISTING FIRE ROAD LIMITS NOR CAUSE DETRIMENTAL DISTURBANCE OF ANY KIND WITHIN THE PRESERVE BOUNDARIES.

FIRE DEPARTMENT REQUIREMENTS:

1. THE CONTRACTOR SHALL HAVE THE REQUIRED (OR EXISTING) FIRE HYDRANTS INSTALLED AND OPERABLE PRIOR TO THE FOOTING INSPECTION. PROVIDE A CURRENT APPROVED COPY OF THE CIVIL WATER PLANS TO THE FIRE SPRINKLER SUB-CONTRACTOR('S) FOR LOCATING NEW AND/OR EXISTING HYDRANTS, WATER MAIN SUPPLY, BUILDING SITE ORIENTATION, ETC.

2. PROVIDE AN ALL WEATHER ACCESS ROAD (MINIMUM 20 FEET WIDE) TO ALL BUILDINGS AND HYDRANTS DURING CONSTRUCTION.

3. A FIRE SPRINKLER SYSTEM SHALL BE DESIGNED AND INSTALLED TO N.F.P.A. AND FOUNTAIN HILLS TOWN ORDINANCE 03-12 STANDARDS.

4. THE FIRE SPRINKLER SUBCONTRACTOR SHALL SUBMIT THREE (3) SETS OF DRAWINGS, TWO (2) SETS OF HYDRAULIC CALCULATIONS, AND ONE (1) COPY OF THE APPROVED CIVIL SITE PLAN FOR REVIEW AND APPROVAL.

5. THE FIRE SPRINKLER SYSTEM SHALL BE PRESSURE TESTED AND APPROVED PRIOR TO CALLING FOR ROUGH FRAMING INSPECTION BY THE TOWN AND A FINAL FIRE SPRINKLER INSPECTION SHALL BE APPROVED PRIOR TO CALLING THE TOWN FOR A CERTIFICATE OF OCCUPANCY INSPECTION.

6. PREMISES IDENTIFICATION TO BE LEGIBLE FROM THE STREET OR DRIVE IN CONTRASTING COLORS AND MUST BE ON ALL PLANS.

7. CONTRACTOR TO PROVIDE LEGIBLE TEMPORARY STREET SIGNS IF PERMANENT STREET SIGNS ARE NOT IN PLACE BY ROUGH-IN INSPECTION.

8. GATED COMMUNITIES WILL HAVE A PRE-EMPTION SENSING DEVICE AND KNOX ACCESS SYSTEM IN PLACE AND OPERABLE PRIOR TO SECURING GATES.

9. ALL HOUSES WILL BE TIED INTO THE DOMESTIC SUPPLY AT THE TIME OF THE ROUGH-IN INSPECTION.

10. PERMIT REQUIRED FOR HOT TAR AND/OR TORCH APPLICATION ROOFING.

11. ENTRANCE GATES SHALL HAVE OPTICOM FOR FIRE DEPARTMENT ACCESS WITH KNOX SWITCH.

12. FIRE LANE IDENTIFICATION IN PARKING AREA AT TRAIL LOCATIONS NEAR PARKING LOT FOR RESCUE OPERATIONS.

J2 Engineering and Environmental Design

TOWN OF FOUNTAIN HILLS PARKS & RECREATION DEPT. FOUNTAIN HILLS TOWN HALL 16705 E. AVENUE OF THE FOUNTAINS FOUNTAIN HILLS, AZ 85268 (480) 816-5100

Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

LANDSCAPE NOTES

LS-1.01

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SITE AMENITIES SCHEDULE – BASE BID

DESCRIPTION	SUPPLIER	MANUFACTURER	MODEL	SIZE	FINISH	COLOR	QUANTITY	DETAIL REFERENCE
PICNIC TABLE– 46" SQ. w/ ¾" #9 EXPANDED METAL TOPS, ROLLED EDGES, & 4 ATTACHED RIBBED STEEL SEATS SURFACE MOUNTED TO CONCRETE PAD	MIRACLE PLAYGROUND SALES (800) 803-1411	WEBCOAT	146WEBCLASSPSM	46" SQ	POWDER COATED	TABLE & BENCHES BROWN, FRAME ALMOND	3 EA	DETAIL 1, LS-3.06
PICNIC TABLE SURFACE MOUNT COVERS FOR 2 ⅜" TUBING	MIRACLE PLAYGROUND SALES (800) 803-1411	WEBCOAT	SMLCOVER	2 ⅜"ø	POWDER COATED	ALMOND	10 EA (2 PER PAD)	DETAIL 1, LS-3.06
ACCESSIBLE PICNIC TABLE– 46" SQ. w/ ¾" #9 EXPANDED METAL TOPS, ROLLED EDGES, & 3 ATTACHED RIBBED STEEL SEATS w/ ANTI-VANDALISM BAR SURFACE MOUNTED TO CONCRETE PAD	MIRACLE PLAYGROUND SALES (800) 803-1411	WEBCOAT	146WEBCLASS-3SM AND AVBAR	46" SQ	POWDER COATED	TABLE & BENCHES BROWN, FRAME ALMOND	1 EA	DETAIL 1, LS-3.06
TRASH RECEPTACLE– 41 GALLON EXPOSED AGGREGATE CONCRETE w/ SELF-CLOSING LID & LINER– INSTALL OVER FLAT COMPACTED & STABLE SURFACE	WAUSAU TILE (715) 359-3121	WAUSAU TILE	TF1170 (RECEPTACLE) w/ TF1623 (LINER)	25"ø×44"H	EXPOSED AGGREGATE CONCRETE	CONCRETE: A1 (TAN) ACCESSORIES: P1 (BROWN)	5 EA	DETAIL 1, LS-3.06
GABION BASKET BENCH OR SEAT WALL w/ CAST IN PLACE CONCRETE CAPS & PIERS	–	BASKETS BY HILFIKER RETAINING WALLS & CONCRETE CAPS CAST BY CONTRACTOR		PER DTLS.	WEATHERED STEEL WITH SMOOTH FINISH INTEGRAL COLOR CONC. CAP: SOLOMON– 'ONYX' OR DAVIS– 'DARK GRAY #8084'		4 BENCHES, 86 LF OF SEAT WALLS	DETAIL 1, LS-3.08
BICYCLE RACKS	–	FABRICATED BY CONTRACTOR	–	PER DTLS.	NATURAL WEATHERED FINISH	RUSTED STEEL	2 EA (4 BIKE CAPACITY)	DETAIL 3, LS-3.08
BOLLARD	–	FABRICATED BY CONTRACTOR	–	PER DTLS.	NATURAL WEATHERED FINISH	RUSTED STEEL	1 EA	DETAIL 4, LS-3.08
CISTERN	–	FABRICATED BY CONTRACTOR	–	PER DTLS.	CAST IN PLACE INTEGRAL COLOR EXPOSED AGGREGATE CONCRETE TO MATCH EXPOSED AGG. RIBBON CURB AT RAMADA PLAZA		1 EA	DETAIL 1, LS-3.08 & DETAIL 2, LS-3.08
ENTRY SIGNAGE	–	FABRICATED BY CONTRACTOR	–	24"×17'-0"	NATURAL WEATHERED STEEL I-BEAM WITH RAISED BRUSHED ALUMINUM LETTERS & SILKSCREEN TOWN LOGO		1 EA	DETAIL 1, LS-3.05
GABION BASKETS	HILFIKER RETAINING WALLS (800) 763-8863	HILFIKER RETAIN WALLS	ARTWELD GABIONS– 9 GAUGE WIRE FABRIC w/ 3" SQ. MESH	BASKET SIZES PER DETAILS	NATURAL WEATHERED FINISH	RUSTED STEEL	AS REQ'D	SEE CIVIL PLANS FOR DETAILS
RAMADA	–	FABRICATED BY CONTRACTOR	–	25'×25'	NATURAL WEATHERED FINISH	RUSTED STEEL	1 EA	DETAIL 1, LS-3.06 & ALL RAMADA STRUCTURAL DTLS
KIOSK STRUCTURE	–	FABRICATED BY CONTRACTOR	–	PER DTLS.	NATURAL WEATHERED FINISH	RUSTED STEEL	1 EA	ALL DETAILS ON LS-3.07
KIOSK SIGN CASE	DAVE BANG ASSOCIATES (800) 458-7903	AMERICANA BUILDING PRODUCTS	EXTERIOR, SINGLE SIDE, LOCKING, NON-ILLUM., w/ CORK BOARD	48"×60"×3"	ALUMINUM	BRONZE ANODIZE PER MANUF	1 EA	DETAIL 1, LS-3.07
FIRE ROAD ACCESS MANUAL SWING GATES (ONE PAIR)	–	FABRICATED BY CONTRACTOR	–	PER DTLS.	NATURAL WEATHERED FINISH	RUSTED STEEL	1 EA (PAIR)	DETAIL 2, LS-3.05
FIRE ROAD ACCESS MANUAL SWING GATES HARDWARE: – FIRE DEPARTMENT KNOX BOX w/ KS-2 KEY SWITCH – HEAVY DUTY STEEL GATE HINGES	PARK PRO (602) 254-0770	DOORKING ELITE	DKS 1401 POWER HINGE (STEEL)	6⅜"×3⅝"×3" 1½"×2⅜"×6⅜"	POWDER COATED STEEL	RED (BY MANUF.) RUSTED STEEL	1 EA 4 EA	DETAIL 2, LS-3.05 DETAIL 2, LS-3.05
ENTRY/EXIT MANUAL SWING GATES	–	FABRICATED BY CONTRACTOR	–	PER DTLS.	NATURAL WEATHERED FINISH	RUSTED STEEL	2 EA (1 ENTRY & 1 EXIT)	ALL DETAILS ON LS-3.03
ENTRY MANUAL SWING GATES HARDWARE: – FIRE DEPARTMENT KNOX BOX w/ KS-2 KEY SWITCH – HEAVY DUTY STEEL GATE HINGES	PARK PRO (602) 254-0770	DOORKING ELITE	DKS 1401 POWER HINGE (STEEL)	6⅜"×3⅝"×3" 1½"×2⅜"×6⅜"	POWDER COATED STEEL	RED (BY MANUF.) RUSTED STEEL	1 EA 4 EA	DETAIL 2, LS-3.04 DETAIL 3, LS-3.04
PERMEON OR EONITE SIMULATED DESERT VARNISH & ROCK STAIN	SOIL-TECH, CO (702) 873-2023	SOIL-TECH	APPLY TO ALL EXPOSED FRACTURED BOULDER & ROCK SURFACES LARGER THAN 12" AFTER ROCK INSTALLATION IS COMPLETED AND PER TOWN'S PRIOR APPROVAL			COLOR RANGE PER STRENGTH OF SOLUTION AND PER APPLICATION	AS REQ'D	APPLY PER SPECIFICATIONS
EVERBRITE COPPER PROTECTIVE COVERING (PREVENTS COPPER TARNISH, PATINA, & OXIDATION)	EVERBRITE, INC. (800) 304-0066	EVERBRITE	–	16 OZ. CAN (COVERS ± ±150 SF)	–	CLEAR	1 EA	DETAIL 2, LS-3.03 & APPLY PER MFG SPECIFICATIONS
3M ORANGE REFLECTIVE SAFETY TAPE	EVERBRITE, INC. (800) 304-0066	3M SCOTCHLITE STRIPING TAPE	78937	3" WIDE × 50' ROLLS	REFLECTIVE	ORANGE	AS REQ'D	APPLY PER MFG. SPECIFICATIONS

NOTE: ALL SPECIFIED MANUFACTURED ITEMS WERE USED AS BASIS OF DESIGN. ALL ITEMS SHALL BE BID AS NOTED OR AS AN APPROVED EQUAL PRODUCT PER THE APPROVAL OF THE TOWN OR TOWN'S REPRESENTATIVE PRIOR TO SUBSTITUTION. SUPPLIERS LISTED ARE ONLY SUGGESTED SUPPLIERS AND MAY BE SUBSTITUTED BY CONTRACTOR. ALL MANUFACTURED ITEMS SHALL BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS, PROJECT SPECIFICATIONS, AND PROJECT DETAILS.

SITE AMENITIES SCHEDULE – **BID ALTERNATE** (ALL ELECTRONIC GATE OPTIONS)

DESCRIPTION	SUPPLIER	MANUFACTURER	MODEL	SIZE	FINISH	COLOR	QUANTITY	DETAIL REFERENCE
ENTRY/EXIT AUTOMATIC SWING GATES HARDWARE:								
– AUTOMATIC DUAL 1HP SYNCHRONIZED MOTORS	PARK PRO (602) 254-0770	ELITE	CSW200101U		–	–	2 EA	DETAIL 1, LS-3.04
– MAGNETIC LOCK		ELITE	EMLD 1300F	8"L×2½"W	–	–	4 EA	DETAIL 2, LS-3.04
– MAG. LOCK RELAY ADAPTOR MODULE		ELITE	Q400MAU	–	–	–	2 EA	
– DPDT RELAY (CONTACTS FOR EXTRA RELAY ADAPTORS)		ELITE	DPDT	–	–	–	2 EA	
– LOOP SENSORS (SAFETY, CENTER, & EXIT LOOPS)		ELITE	A ELD	–	–	–	7 EA	
– MANUAL ALARM RESET SWITCH		ELITE	–	–	–	–	1 EA	
– PRE-EMPTIVE STROBE EMERGENCY VEHICLE GATE ACCESS OPTICAL DETECTOR w/ DISCRIMINATOR MODULE		3M OPTICOM	MODEL 311– PART #500632	–	–	–	1 EA	DETAIL 3, LS-3.08
GATE KEY POST & HARDWARE:								
– PROXIMITY SWITCH (SECURITY ALARM SENSOR)	–	ELITE	A PRS	–	–	–	2 EA	
– SINGLE KEY SWITCH STATION w/ MORTISE KEY	–	DOORKING	DKS 1207	8½"×4½"×3"	POWDER COATED	–	1 EA	DETAIL 5, LS-3.08
– FIRE DEPARTMENT KNOX BOX w/ KS-2 KEY SWITCH	–	DOORKING	DKS 1401	6⅜"×3⅝"×3"	POWDER COATED	RED (BY MANUF.)	1 EA	DETAIL 5, LS-3.08

NOTE: FIRE KNOX BOX MOUNTED TO ENTRY SIGN POST PER DETAILS ON LS-3.04 SHALL BE OMITTED IF BID ALTERNATE IS CONSTRUCTED WITH KNOX BOX LOCATED ON GATE KEY POST

SITE AMENITIES SCHEDULE – **BID ALTERNATE** (INTERIM UTILITIES)

DESCRIPTION	SUPPLIER	MANUFACTURER	MODEL	SIZE	FINISH	COLOR	QUANTITY	DETAIL REFERENCE
INTERIM UTILITIES HARDWARE								
– WATER TANK	RAIN HARVEST SYSTEMS (800) 654-9283	NORWESCO	41377 (5,000 GAL.)	141"DIA.×86"H	POLYETHYLENE	GREEN	1 EA	–
– WATER TANK REPAIR KIT		POLY WELDER	PRO PLASTIC REPAIR #3	–	–	GREEN WELDING STRIPS	1 EA	–
– HOLDING TANK	–	JENSON PRECAST	HZ-5000 w/ ALARM	5,000 GALLONS	CONCRETE	–	1 EA	–
– SOLAR PANELS **SEE ELECTRIC PLANS**	–	–	–	–	–	–	–	–
CHAINLINK FENCE ENCLOSURE								
– FENCE MATERIALS (FABRIC, POSTS, RAILS, BRACES, ETC.)	–	–	–	6'-0"H	GALVANIZED	GALVANIZED	1 EA	DETAILS 18 & 19, CV-3.06

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PLANT LEGEND

CACTI– SALVAGED & NEW	SALVAGED	NEW	FUTURE (NEW)
CARNEGIEA GIGANTEA SAGUARO	12	30	1
FEROCACTUS WISLIZENII FISHHOOK BARREL	8	50	8
FOUQUIERIA SPLENDENS OCOTILLO	19	28	2

TREES– NEW	SIZE	QTY.
CERCIDIUM MICROPHYLLUM FOOTHILLS PALO VERDE	15 GAL	17
CERCIDIUM MICROPHYLLUM FOOTHILLS PALO VERDE	36"BOX	38
OLNEYA TESOTA IRONWOOD	36"BOX	11

SHRUBS/GROUNDCOVERS– NEW	SIZE	QTY.	FUT.
BAILEYA MULTIRADIATA DESERT MARIGOLD	1 GAL	125	23
ENCELIA FARINOSA BRITTLEBUSH	5 GAL	133	8
SIMMONDSIA CHINENSIS 'VISTA' COMPACT JOJOBA	5 GAL	101	8
SPHAERALCEA AMBIGUA 'LOUIS HAMILTON'	5 GAL	50	7

BOULDERS– SALVAGED	SIZE	QTY.
SALVAGED BOULDER–SIZE A	±2'×3'	●●●
SALVAGED BOULDER–SIZE B	±3'×3'	●●●
SALVAGED BOULDER–SIZE C	±4'×6'	●●●
SALVAGED BOULDER–SIZE D	±5'×7'>	●●●
NATIVE ROCK EMBANKMENT	SEE CIVIL PLANS	

–SEE DWG NO LS-1.02 FOR ALL PLANT QUANTITIES
–SEE DWG NO LS-1.03 FOR FUTURE PLANTING AREA ONCE CUL-DE-SAC IS CONSTRUCTED
●●● = SEE DWG NO LS-2.03 FOR ALL HYDROSEEDING & ROCK QUANTITIES.

NOTES:
1. ALL SALVAGEABLE PLANT MATERIALS ARE IDENTIFIED IN PLANT INVENTORY PLANS IN THIS SET. SPECIFIC PLANTS TO BE SALVAGED SHALL BE IDENTIFIED BY TOWN'S REPRESENTATIVE DURING CONSTRUCTION PRIOR TO CLEARING SITE.
2. ALL SALVAGED PLANT MATERIALS AND BOULDERS SHALL BE PLACED PER THE DIRECTION OF TOWN'S ON-SITE REPRESENTATIVE DURING CONSTRUCTION.
3. NEW OCOTILLOS SHALL BE: MIN. 8' TALL AND HAVE MIN. 12 CANES.
4. NEW SAGUAROS SHALL BE: 30% 3'-6', 30% 6'-8', AND 40% 8'-12'.
5. NEW BARREL CACTI SHALL BE: 50% 12"-18" TALL, 50% 18"-36" TALL.
6. ALL DISTURBED BOULDERS/ROCKS INCLUDING ANY UNEARTHED DURING GRADING PROCESS SHALL BE SALVAGED AND STOCK PILED FOR REUSE PER PROJECT SPECIFICATIONS.
7. BOULDER QUANTITIES ARE ESTIMATED AND NOT NECESSARILY ALL INCLUSIVE OF ACTUAL TOTALS.
8. ALL NON-PAVED DISTURBED AREAS SHALL BE HYDROSEEDED. SEE DWG NO. LS-2.03 FOR OVERALL HYDROSEED QUANTITIES AND PROJECT SPECS FOR SEED MIX VARIETY AND REQUIREMENTS.
9. ALL CUT OR FRACTURED ROCK SURFACES (INCLUDING SALVAGED ROCKS & BOULDERS) SHALL BE STAINED TO MATCH SURROUNDING EXISTING ROCK WITH PERMEON OR EONITE DESERT VARNISH STAIN AFTER INSTALLATION PER PROJECT SPECIFICATIONS AND TOWN'S PRIOR APPROVAL.
10. ALL 'FUTURE' (FUT.) PLANT QUANTITIES SHOWN ABOVE ARE NOT A PART OF THIS PROJECT AND SHALL BE FOR FUTURE PROJECT ONCE CUL-DE-SAC IS CONSTRUCTED AS NOTED ON DWG. NO. FH-1.03.

* – LEAVE EXCESS EVERBRITE COPPER COATING IN RESTROOM BUILDING CHASE ROOM FOR FUTURE MAINTENANCE APPLICATIONS BY TOWN.

NOTE REGARDING FUTURE PROJECT TO COMPLETE CONSTRUCTION AROUND CUL-DE-SAC AREA:
SEE DWG. NO. FH-1.03 FOR QUANTITIES OF ITEMS FOR FUTURE CONSTRUCTION PROJECT BY OTHERS (NOT PART OF THIS BID). THESE ITEMS SHALL BE CONSTRUCTED ONCE CUL-DE-SAC IS INSTALLED BY DEVELOPER AND ARE INCLUDED IN THIS PLAN SET FOR PURPOSE OF PROVIDING TOWN THE DESIGN AND QUANTITIES NEEDED TO COMPLETE IN FUTURE.

△1 = BID ALTERNATE, INTERIM UTILITIES

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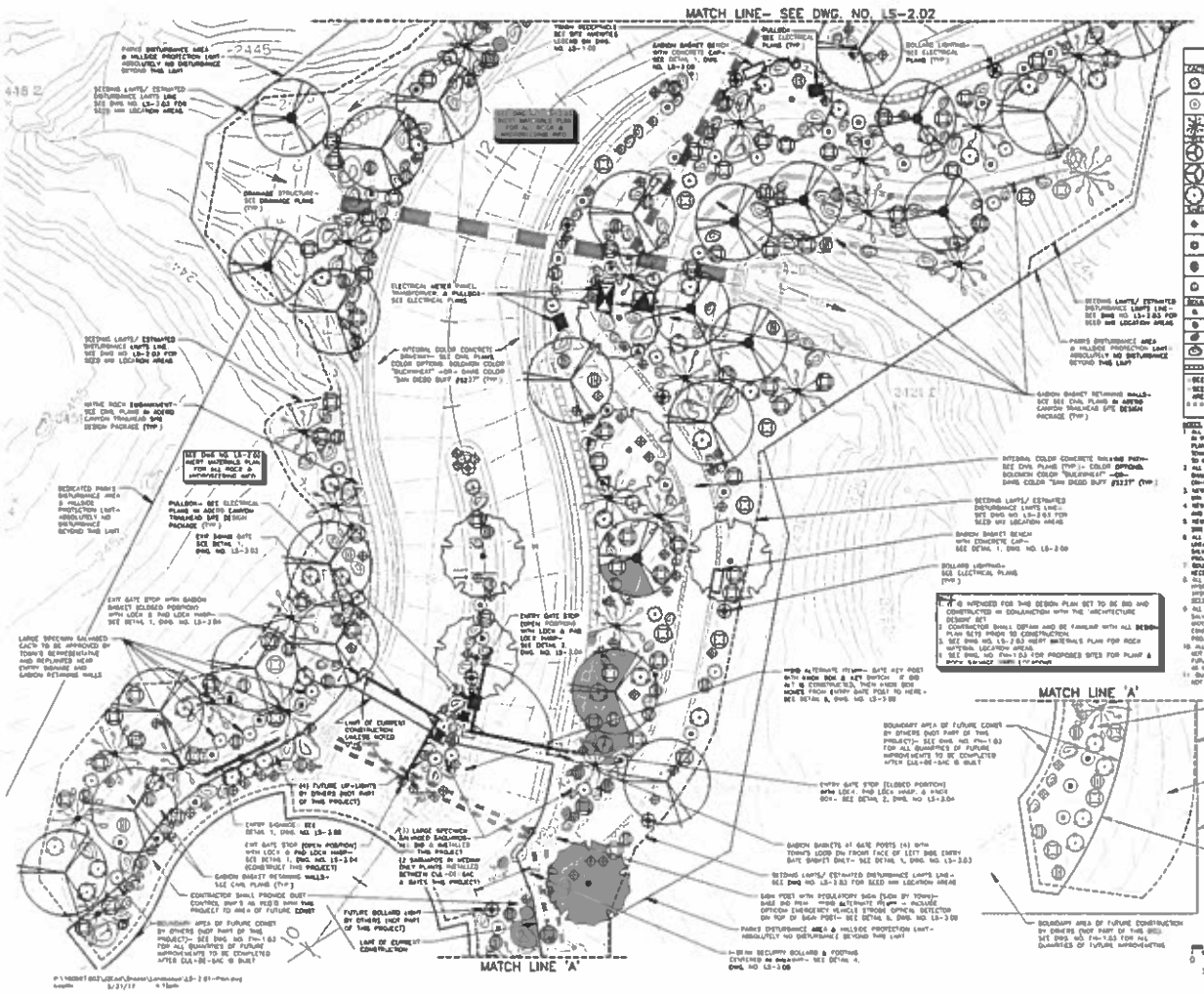
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

LANDSCAPE SUMMARY

DRAWN BY: K. BALLE
DESIGNED BY: K. BALLE
APPROVED BY: J. ENGELMAN
SCALE: N/A
DATE: 03/31/201

J2 PROJECT NO: 16.0897.00

DRAWING NO.: LS-1.02
SHEET NO.: 38 of 58


MATCH LINE- SEE DWG. NO. LS-2.02
MATCH LINE 'A'
MATCH LINE 'A'
PLANT LEGEND
CARNEGIEA GIGANTEA SAGUARO
FERROCACTUS WISLIZENII FISHHOOK BARREL
FOUQUIERIA SPLENDENS OCOTILLO
CEREUS MACROPHYLLUS FOOTHILLS PALO VERDE
CEREUS MACROPHYLLUS FOOTHILLS PALO VERDE
OLNEYA TESOTA IRONWOOD
DALEYA MULTIFLORA DESERT MARIGOLD
ENCELIA FARINOSA BRITTLEBUSH
SANCHEZIA CHINENSIS "MEXICO COMPACT JUSTICIA"
SPHAERALCEA AMBIGUA "LOUIS HAMILTON"
SALVAGED BOULDER
NATIVE ROCK ENHANCEMENT
SEE DWG NO LS-1.03 FOR ALL PLANT QUANTITIES
SEE DWG NO LS-1.03 FOR FUTURE PLANTING AREA ONCE DA1-DE-SAC IS CONSTRUCTED.
SEE DWG NO LS-1.03 FOR ALL HYDROSEEDING & ROCK QUANTITIES.
NOTES
1. ALL SALVAGEABLE PLANT MATERIALS ARE DEFINED IN PLANT INVENTORY PLANS IN THE EIT. SPECIFIC PLANTS TO BE SALVAGED SHALL BE VERIFIED BY TOWN'S REPRESENTATIVE DURING CONSTRUCTION PRIOR TO CLEARING AND
2. ALL SALVAGED PLANT MATERIALS AND BOULDERS SHALL BE PLACED PER THE DIRECTION OF TOWN'S SITE REPRESENTATIVE DURING CONSTRUCTION
3. NEW BOULDERS SHALL BE MIN 3 FEET AND NOT MORE THAN 12 FEET
4. NEW BOULDERS SHALL BE: MIN 2 -0", MAX 6 -0", AND MIN 6 -12"
5. NEW BARREL CACTUS SHALL BE MIN 12"-18" TALL, MAX 18"-30" TALL
6. ALL DEFINED BOULDERS/ROCKS INCLUDING ANY SALVAGED BURRO BOULDER PROVIDED SHALL BE SALVAGED AND STOCK PILED FOR REUSE PER PROJECT SPECIFICATIONS.
7. BOULDER QUANTITIES ARE ESTIMATES AND NOT NECESSARILY ALL INCLUDED OR REQUIRED
8. ALL NON-PAVED DISTURBED AREAS SHALL BE HYDROSEEDED. SEE DWG NO. LS-1.03 FOR OVERALL HYDROSEED QUANTITIES AND PROJECT SPECS FOR SEED MIX MIXES AND REQUIREMENTS.
9. ALL CUT OR FRACTURED ROCK SURFACES (INCLUDING SALVAGED ROCKS & BOULDERS) SHALL BE STAINED TO MATCH SURROUNDING ENTIRE ROCK MIX PRESENT IN ENTIRE DESERT VARIOUS SHADE AFTER INSTALLATION PER PROJECT SPECIFICATIONS AND TOWN & FMDD APPROVAL
10. ALL "FUTURE" PVR & PLANT QUANTITIES SHOWN ARE NOT A PART OF THIS PROJECT AND SHALL BE FOR FUTURE PROJECT ONCE DA1-DE-SAC IS CONSTRUCTED AS NOTED ON DWG. NO PM-1.03
11. QUANTITIES SHOWN ARE PARKS PROJECT QUANTITIES- NOT PER SHEET QUANTITIES.
Engineering and Environmental Design
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead
LANDSCAPE PLAN
LS-2.01
39 of 58

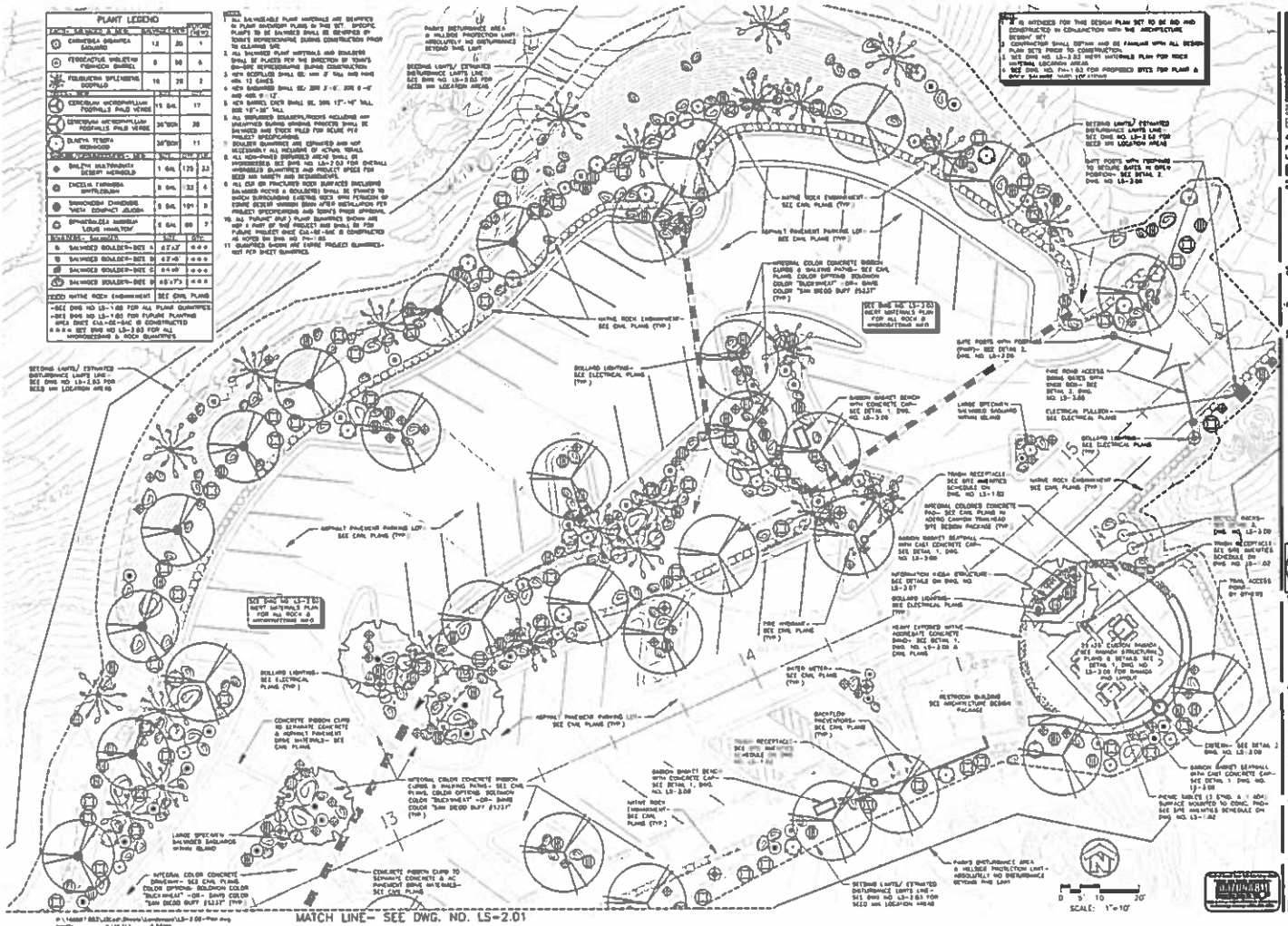
PLANT LEGEND

CODE	BOTANICAL & COMMON NAME	SIZE	QUANTITY
	CARNEGIEA GIGANTEA SAGUARO	12	20
	FERROCACTUS WISLIZENII FISHHOOK BARREL	8	50
	FOUQUIERIA SPLENDENS OCOTILLO	10	20
TREES		**SIZE**	**QTY**
	CERCIDIUM MICROPHYLLUM FOOTHILLS PALO VERDE	15 GAL	17
	CERCIDIUM MICROPHYLLUM FOOTHILLS PALO VERDE	36"BOX	20
	PARKINSONIA PRECOCE "MARICOPA"	36"BOX	11
SHRUBS		**SIZE**	**QTY**
	DALEA NATAROUNA BLUE MESQUITE	1 GAL	175
	ENCELIA FARINOSA BRITTLEBUSH	5 GAL	32
	SIMMONDSIA CHINENSIS "NANA" COMPACT JOJOBA	5 GAL	101
	SPHAERALCEA AMBIGUA "GOLDE HAMILTON"	5 GAL	68
BOULDERS		**SIZE**	**QTY**
	SALVAGED BOULDER-SIZE A	6'x3'	○○○
	SALVAGED BOULDER-SIZE B	4'x2'	○○○
	SALVAGED BOULDER-SIZE C	3'x2'	○○○
	SALVAGED BOULDER-SIZE D	2'x1'±	○○○
	NATIVE ROCK ENHANCEMENT	SEE CIVIL PLANS	

- SEE DWG NO LS-1.00 FOR ALL PLANT QUANTITIES
- SEE DWG NO LS-1.00 FOR FUTURE PLANTING AREA SINCE CULVERT IS CONSTRUCTED
○○○ SEE DWG NO LS-3.03 FOR ALL HARDSCAPE & ROCK QUANTITIES

NOTES:

1. ALL SALVAGEABLE PLANT MATERIALS ARE SHOWN ON PLANT SALVAGE PLANS IN THIS SET. SPECIFIC PLANTS TO BE SALVAGED SHALL BE IDENTIFIED BY TOWN'S REPRESENTATIVE DURING CONSTRUCTION PRIOR TO CLEARING SITE.
2. ALL SALVAGED PLANT MATERIALS AND BOULDERS SHALL BE PLACED PER THE DIRECTION OF TOWN'S ON-SITE REPRESENTATIVE DURING CONSTRUCTION.
3. NEW SCUPPLES SHALL BE MIN 3' WIDE AND HAVE MIN. 12 EMBES.
4. NEW SALVAGED SHALL BE MIN 3'-0", MIN 6'-0" AND MAX 9'-12".
5. NEW BARREL CACTI SHALL BE MIN 12"-14" TALL MIN 12"-30" WIDE.
6. ALL SALVAGED SAGUARO/ROCKS INCLUDING ANY UNEXPECTED DURING GRADING PROCESS SHALL BE SALVAGED AND STOCK PILED FOR REUSE PER PROJECT SPECIFICATIONS.
7. BOULDER QUANTITIES ARE ESTIMATED AND NOT NECESSARILY ALL REQUIRED OF ACTUAL RESULTS.
8. ALL NON-PAVED DISTURBED AREAS SHALL BE HYDROSEEDED. SEE DWG NO. LS-2.03 FOR OVERALL HYDROSEED QUANTITIES AND PROJECT SPECS FOR SEED MIX MIXES AND REQUIREMENTS.
9. ALL CUT OR FRACTURED ROCK SURFACES INCLUDING SALVAGED ROCKS & BOULDERS SHALL BE STAINED TO MATCH SURROUNDING EXISTING ROCK WITH PERMEON OR EQUAL DESIGN APPROVED BY TOWN AFTER INSTALLATION PER PROJECT SPECIFICATIONS AND TOWN'S PRIOR APPROVAL.
10. ALL "FUTURE" ONLY PLANT QUANTITIES SHOWN ARE NOT A PART OF THE PROJECT AND SHALL BE FOR FUTURE PROJECT ONCE CULVERT IS CONSTRUCTED AS NOTED ON DWG NO. LS-1.00.
11. QUANTITIES SHOWN ARE FOR THE PROJECT QUANTITIES NOT PER SHEET QUANTITIES.



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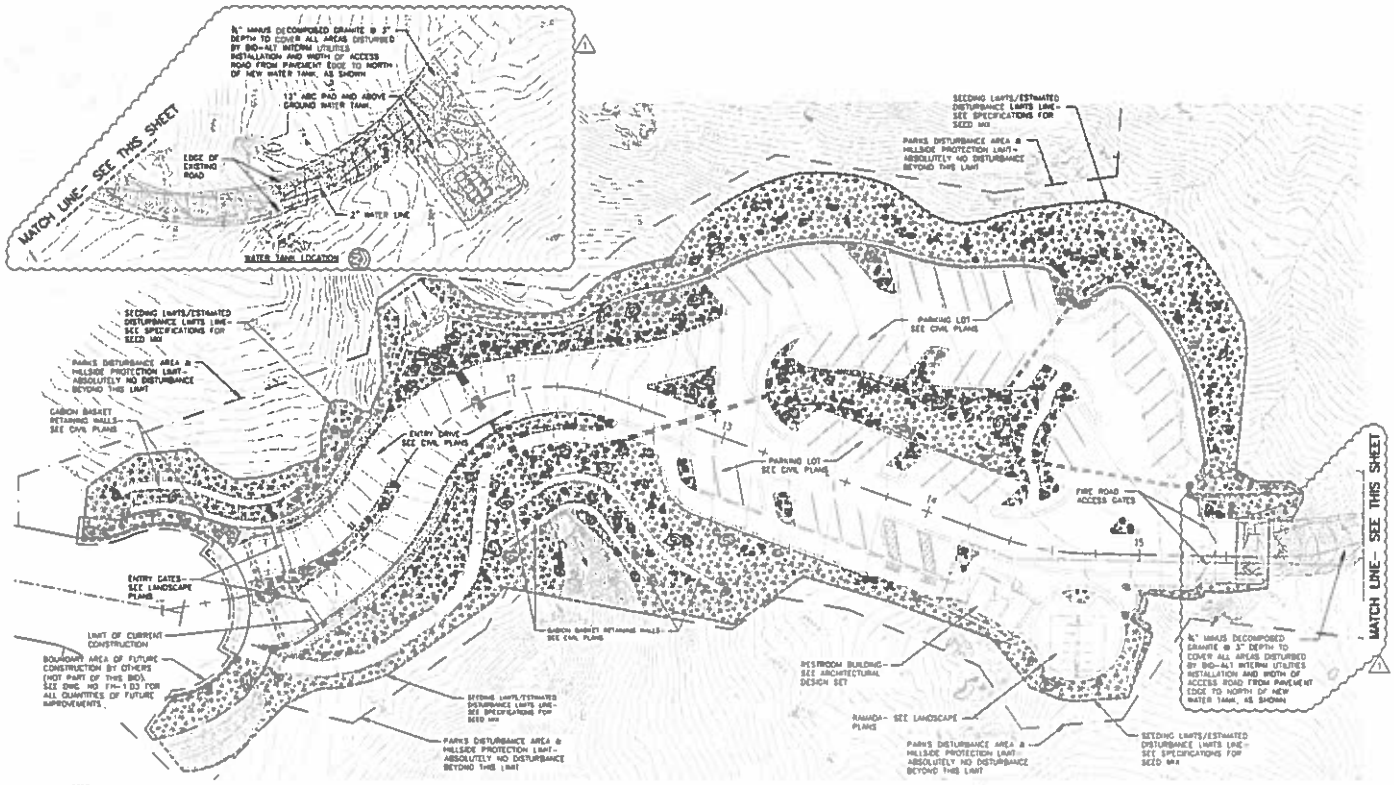
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead
LANDSCAPE PLAN

NO.	DATE	DESCRIPTION
1	09/29/16	DWG REVIEW
2	03/29/17	TOWN REVIEW
3	03/30/17	TOWN & 3rd PARTY
4	06/06/17	90% CIVIL REVIEW
5	08/31/17	90% SET

DRAWN BY K. BOLLER
DESIGNED BY K. BOLLER
APPROVED BY J. DIEGLMAN
SCALE 1"=10'
DATE 09/31/2017

J2 PROJECT NO. 15-0887-003

DRAWING NO. LS- 2.02 SHEET NO. 40 of 58



NOTES:

1. SEE PROJECT SPECIFICATIONS FOR INSTRUCTIONS OF SALVAGING AND REUSE OF EXISTING DESERT PAVEMENT ROCK AND BOULDERS ALONG WITH APPROVED ROCK INSTALLATION METHODS.
2. SEE CIVIL PLANS FOR ALL RIP-RAP & NATIVE ROCK EMBANKMENT MATERIAL QUANTITIES.
3. SEE DWG. NO. FM-1.03 FOR POTENTIAL LOCATIONS OF PLANT & ROCK SALVAGE YARD LOCATIONS
4. ALL BOULDERS, DESERT PAVEMENT, RIP-RAP, PLACED NATIVE ROCK EMBANKMENT, GABION BASKET FILL MATERIAL, AND BANK PROTECTION SHALL BE NATIVE MATERIAL OBTAINED FROM WITHIN THE CONSTRUCTION LIMITS OF THE PROJECT AND SHALL MEET THE REQUIREMENTS OF THE GRADATIONS SHOWN ON THE PLANS AND IN THESE SPECIAL PROVISIONS (TYP.); SEE SPECIFICATIONS FOR INSTRUCTIONS OF APPROVED METHOD FOR BLENDING SUPPLEMENTAL IMPORT MATERIALS IF NOT ENOUGH SALVAGED MATERIALS ARE AVAILABLE.
5. THE GENERAL ROCK MATERIAL SHALL BE ANGULAR IN SHAPE WITH COLOR MATCHING THE SURROUNDING SURFACE SOIL MATERIAL. IF AN OUTSIDE SOURCE IS USED, IT SHALL BE APPROVED BY THE TOWN ENGINEER PRIOR TO USE.
6. BOULDERS SHALL BE SALVAGED FROM THE PROJECT SITE DURING EXCAVATION OPERATIONS WITH QUANTITIES PER PLANS AND BID SCHEDULE. MINIMUM DIMENSIONS FOR EACH BOULDER SHALL BE 24"x18"x36"
7. DESERT VARNISH STAIN MAY BE REQUIRED ON THE VISIBLE SURFACES OF ANY EXPOSED ROCK MATERIAL AS DESCRIBED IN ROCK STAINING SECTION OF THE SPECIAL PROVISIONS AND PER PRIOR TOWN APPROVAL. APPLICATION, MEASUREMENT, AND PAYMENT OF STAIN SHALL BE IN ACCORDANCE WITH THE ABOVE REFERENCED BID ITEM.
8. ** SEE DWG. NO. FM-1.03 FOR NOTES AND LOCATION OF SALVAGE AND STOCKPILED BOULDERS FOR FUTURE CUL-DE-SAC CONSTRUCTION

SURFACE MATERIALS LEGEND

SYMBOL:	DESCRIPTION	QTY:
	3" MINUS DESERT PAVEMENT (3" DEPTH) SALVAGED NATIVE MATERIAL -OR- SUPPLEMENTAL PER SPECIFICATIONS COLOR: "ADERO CANYON BLEND"	18,822 SF
	3/4" MINUS DECOMPOSED GRANITE (3" DEPTH) SALVAGED NATIVE MATERIAL -OR- SUPPLEMENTAL PER SPECIFICATIONS COLOR: "ADERO CANYON BLEND"	BID ALT 8,380 SF
	NATIVE HYDROSEED-- SEE SPECIFICATIONS FOR MIX	35,533 SF
	RIP-RAP D50=8" SALVAGED NATIVE MATERIAL -OR- SUPPLEMENTAL PER SPECIFICATIONS	SEE CIVIL PLANS FOR QUANTITIES
	NATIVE ROCK EMBANKMENT MATERIAL PER SPECIFICATIONS & CIVIL PLANS	SEE CIVIL PLANS FOR QUANTITIES

SURFACE MATERIALS- BOULDERS

SYMBOL	DESCRIPTION:	SIZE:	QTY:	FUTURE QTY: **
	SALVAGED BOULDER- SIZE A	6'x3'	163	10
	SALVAGED BOULDER- SIZE B	4'x2'	101	4
	SALVAGED BOULDER- SIZE C	4'x4'	54	6
	SALVAGED BOULDER- SIZE D	3'x7'	20	3

0 10' 20' 40'
SCALE 1"=20'

1 = BID ALTERNATE INTERIM UTILITIES

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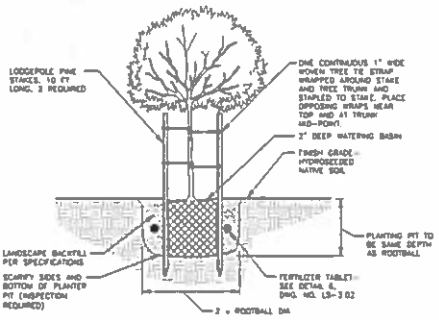
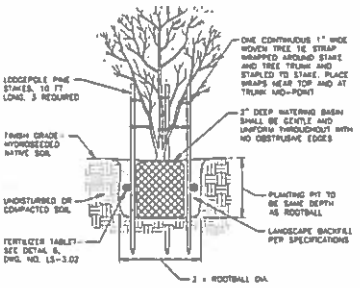
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead
SURFACE MATERIALS PLAN

No.	Date	Description
1	10/26/16	SUBD REVIEW
2	07/27/17	TOWN REVIEW
3	12/05/17	INTERIM SUBMITTAL
4	04/26/17	BID-ALT INTERIM UTILS
5	05/31/17	BID SET

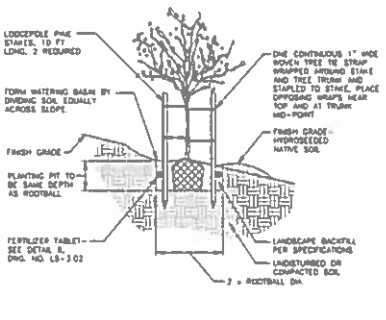
Drawn by: E. NICHOLS
Designed by: E. NICHOLS
Approved by: J. FINZEL/MANN
Scale: N/A
Date: 05/31/2017
J2 Project No: 16 088 7 003
Drawing No.: LS-2.03
Sheet No.: 41 of 58



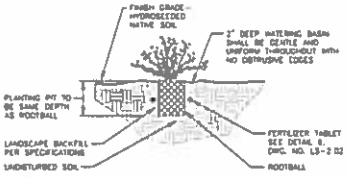
SINGLE TRUNK TREE PLANTING & STAKING (1)
SCALE: N.T.S.



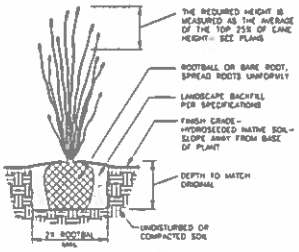
MULTI-TRUNK TREE PLANTING & STAKING (2)
SCALE: N.T.S.

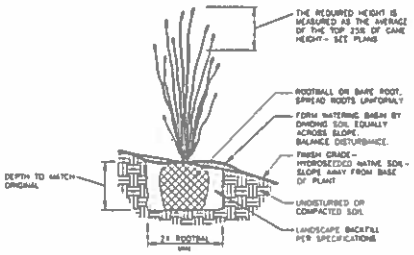


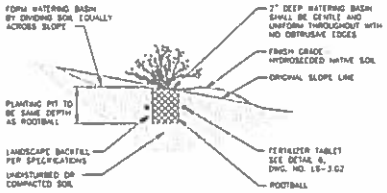
TREE PLANTING & STAKING ON SLOPE (3)
SCALE: N.T.S.



SHRUB PLANTING (4)
SCALE: N.T.S.







SHRUB PLANTING ON SLOPE (5)
SCALE: N.T.S.

NOTES (APPLICABLE TO BOTH DETAILS #6 & #7):

1. DUST ENTIRE ROOTBALL/ROOTS WITH SULFUR POWDER.
2. PRUNE ALL SHREDDED OR DAMAGED ROOTS. CLEANLY CUT ALL BROKEN ROOTS & STEMS. ENSURE ALL WOUNDS TO THE ROOT SYSTEM ARE SEALED BEFORE PLANTING BY ALLOWING TIME FOR SELF-SEALING OR APPLICATION OF WETTABLE DUSTING SULFUR. (1.5 LBS.).
3. BARE ROOTS SHALL BE OUT OF THE GROUND FOR 5 DAYS BEFORE PLANTING.
4. APPLY NAPHYL ACETIC ACID OR SUPERTHRIVE, @-1 OR OTHER APPROVED HORMONE, AS PER MANUFACTURER'S INSTRUCTIONS.
5. ROUGHEN BOTTOM AND SIDES OF PLANT PIT PRIOR TO SETTING. BACKFILL WITH MOIST CLEAN NATIVE SOIL, AND WATER SETTLE IN PLANT PIT
6. AFTER PLANTING, DO NOT WATER FOR A WEEK TO TEN DAYS TO ALLOW ANY ROOTS THAT MAY HAVE BEEN DAMAGED DURING PLANTING TO CALLUS OFF.
7. WATER WEEKLY THROUGH SUMMER, UNLESS INSTRUCTED OTHERWISE

OCOTILLO TRANSPLANT (6)
SCALE: N.T.S.

OCOTILLO TRANSPLANT ON SLOPE (7)
SCALE: N.T.S.

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Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

LANDSCAPE DETAILS

REV.	DATE	DESCRIPTION
1	10/20/16	90% REVIEW
2	10/27/17	100% REVIEW
3	03/06/17	REVISED SUBMITTAL
4	04/20/17	REVISED PER CITY
5	06/31/17	60 GA

DRAWN BY: R. WALLIN
DESIGNED BY: R. WALLIN
APPROVED BY: J. ENGELMANN
SCALE: N.T.S.
DATE: 05/31/2017

J2 PROJECT NO. 16 0897 003

DRAWING NO. LS-3.01
SHEET NO. 42 of 58

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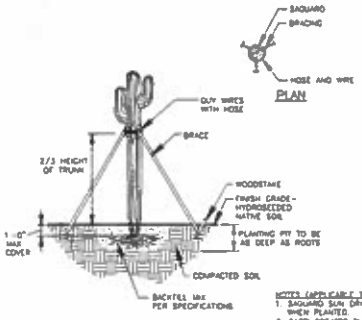
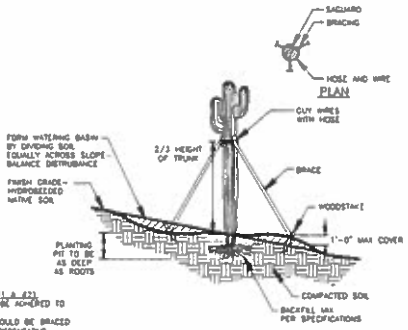
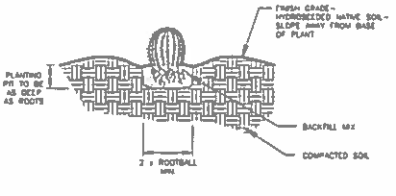


NOTES (APPLICABLE TO BOTH DETAILS #1 & #2):
1. SAGUARO SUN ORIENTATION SHOULD BE ADHERED TO WHEN PLANTED.
2. CACTI GREATER THAN 20' HEIGHT SHOULD BE BRACED OR PER DISCRETION OF TOWN'S REPRESENTATIVE.
3. PLANT SAGUARO PLUMB TO FINISH GRADE.

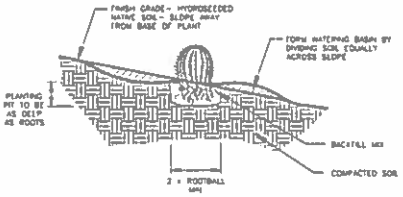
SAGUARO PLANTING
SCALE: N.T.S. (1)



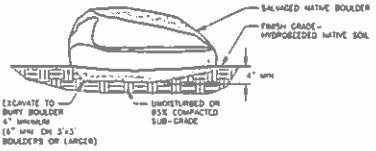
SAGUARO PLANTING ON SLOPE
SCALE: N.T.S. (2)



BARREL CACTUS AND SMALL SAGUARO PLANTING
SCALE: N.T.S. (3)



BARREL CACTUS AND SHRUB PLANTING ON SLOPE
SCALE: N.T.S. (4)



NOTES:
1. EXISTING BOULDERS SHALL BE SALVAGED AND STOCK PILED PER PROJECT SPECIFICATIONS FOR REUSE IN PROPOSED BOULDER LOCATIONS AS DESIGNATED IN LANDSCAPE PLANS.
2. EXACT LOCATION OF BOULDERS LARGER THAN 2' DIA. SHALL BE DETERMINED ON SITE AT TIME OF CONSTRUCTION BY TOWN'S REPRESENTATIVE.
3. PERMEON POEK STAIN OR APPROVED EQUAL SHALL BE APPLIED TO ALL EXPOSED BOULDER/ROCK SURFACES THAT WERE SCARRED DURING SALVAGE PROCESS, HAVE BRIGHTER COLOR SURFACES THAT WERE NOT PREVIOUSLY EXPOSED TO WEATHER ELEMENTS, OR BOULDERS CREATED BY THE FRACTURING OF LARGER ROCK DURING THE EXCAVATION PROCESS. STAIN SHALL BE APPLIED TO EXPOSED SURFACES AFTER BOULDERS HAVE BEEN PLACED IN FINAL LOCATIONS. APPLY PER PROJECT SPECIFICATIONS.

BOULDER PLACEMENT
SCALE: N.T.S. (5)

PLANT SIZE	NUMBER OF TABLETS
1 GALLON	1 TABLET
5 GALLONS	2 TABLETS
15 GALLONS	4 TABLETS
24" BOX	6 TABLETS
36" BOX	8 TABLETS
48" BOX OR LARGER	10 TABLETS

FERTILIZER TABLET SCHEDULE
SCALE: N.T.S. (6)

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Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

LANDSCAPE DETAILS

REV	DATE	DESCRIPTION
1	10/31/17	90% REVIEW
2	12/11/17	100% REVIEW
3	02/22/18	REVISED SUBMITTAL
4	04/24/18	REVISED SUBMITTAL
5	05/31/18	60% CD'S

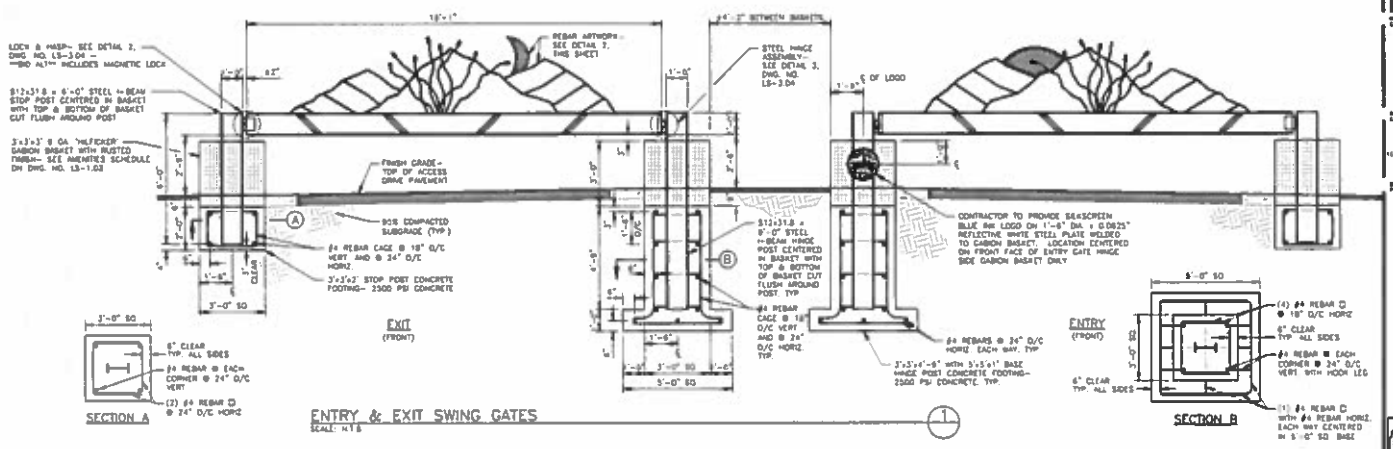
DRAWN BY: K. GALLIN
DESIGNED BY: K. GALLIN
APPROVED BY: J. ENGELMANN
SCALE: N.T.S.
DATE: 05/31/2017

J2 PROJECT NO: 16 0897 003

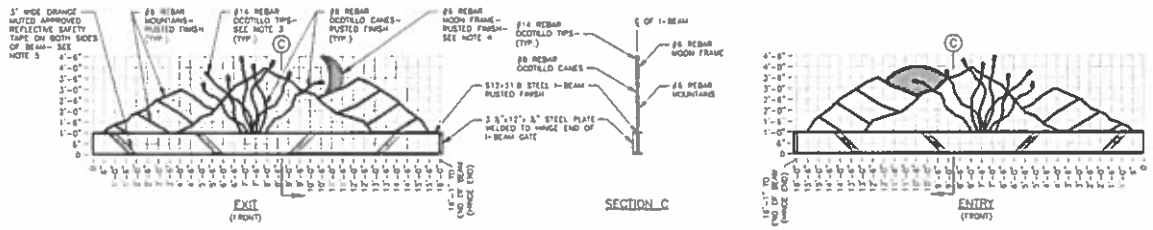
DRAWING NO.: LS-3.02
SHEET NO.: 43 of 58

GENERAL ENTRY & EXIT GATE NOTES:

1. "BID ALTERNATE" DESIGN OF ENTRY/EXIT GATES IS NOT LIMITED TO ONLY ITEMS SHOWN IN DETAILS AND SHALL ALSO INCLUDE ALL NECESSARY ITEMS TO PROVIDE A COMPLETE INSTALLATION OF AN OPERATING AUTOMATIC GATE SYSTEM PROVIDING THE FOLLOWING AMENITIES- SEE SITE AMENITIES SCHEDULE ON DWG. NO. LS-1.02 FOR ADDITIONAL MANUFACTURER & MODEL INFORMATION:
   - AUTOMATIC SWING GATE CONTROLLERS CAPABLE OF OPERATING GATES WITH A MIN. WEIGHT CAPACITY OF 850 LBS. AT A MIN. LENGTH OF 19'-1"
   - MASTER/SLAVE SYSTEM ALLOWING SYNCHRONIZED MOVEMENT AND COMMUNICATION BETWEEN THE TWO CONTROLLERS.
   - EXTERNAL SAFETY & CENTER LOOP DETECTORS ON BOTH ENTRY & EXIT GATES AND EXTERNAL EXIT LOOP DETECTOR ON EXIT GATE ONLY
   - ELECTROMAGNETIC LOCKING SYSTEMS AT ALL FOUR GATE STOP POSTS AND AT GATE ENDS CAPABLE OF 1,300 LB MIN. HOLDING FORCE
   - OPTICOM EMERGENCY VEHICLE STROBE DETECTOR SYSTEM MOUNTED ON TOP OF 8'-0" SIGN POST LOCATED AT EDGE OF WALKING PATH ENTRY
   - SINGLE KEY BUTTON STATION OPERATOR BOX WITH FIRE DEPT. KNOX BOX (W/ KEY TO PAD LOCKS INSIDE) LOCATED ON POST AT ENTRY DRIVE.
   - HEAVY DUTY STEEL HINGE ASSEMBLIES CAPABLE OF SUPPORTING GATES WITH A MIN. WEIGHT CAPACITY OF 1,000 LBS.
   - GATE CONTROLLER CONCRETE PADS PER MANUFACTURER'S SPECIFICATIONS WITH HEIGHT MODIFIED AS NECESSARY SO CONTROLLER ARMS ARE AT SAME HEIGHT AS CENTER OF I-BEAM GATES.
2. CONTRACTOR SHALL PROVIDE COMPLETE SHOP DRAWINGS OF ENTRY/EXIT GATE INSTALLATION DETAILS TO THE TOWN FOR APPROVAL PRIOR TO CONSTRUCTION.
3. CONTRACTOR SHALL FIELD STAKE PROPOSED LOCATIONS FOR APPROVAL BY TOWN PRIOR TO CONSTRUCTION.
4. ALL CUT STEEL AND WELDS SHALL BE GROUND FREE OF ANY SHARP EDGES/BURS.
5. ALL STEEL EXCEPT OCOTILLO TIPS & LOGO SIGN SHALL HAVE A RUSTED FINISH. ALL STEEL SHALL BE SANDBLASTED TO A UNIFORM FINISH AFTER COMPLETION OF FABRICATION. ORANGE SAFETY TAPE SHALL BE APPLIED AFTER SANDBLASTING.
6. ALL WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT EDITION OF THE AMERICAN WELDING SOCIETY, AWS D1.1 WELDING CODE.
7. GABION BASKETS SHALL BE FILLED WITH SALVAGED NATIVE ROCK AND ROCKS SHALL BE TREATED WITH "PERMEON" ROCK STAIN AFTER COMPLETION OF FABRICATION PER PROJECT SPECIFICATIONS.
8. CONTRACTOR SHALL COORDINATE REQUEST WITH TOWN'S REPRESENTATIVE TO OBTAIN ACCEPTABLE IMAGE FILE OF TOWN'S LOGO FOR CONSTRUCTION OF 1'-6" DIA SILKSCREEN LOGO SIGN AS SHOWN BELOW



ENTRY & EXIT SWING GATES
SCALE: NTS



NOTES:
1. ENTRY & EXIT GATES ARE MIRRORED IMAGES WITH SUN AT ENTRY AND MOON AT EXIT.
2. WELD ALL REBAR TOGETHER AT ALL CROSSINGS/CONNECTIONS FOR STRENGTH
3. 4" LONG #14 REBAR OCOTILLO TIPS (FLOWERS) SHALL BE SANDBLASTED & POWDER COATED ALL SIDES (EXCEPT BASE OF TIPS WHERE THEY SHALL BE WELDED TO #8 REBAR OCOTILLO CANES CENTERED ON CANE ENDS (TYP. 8x EACH GATE)
   COLOR: RED/ORANGE- RAL #2002- PRODUCT #49/24550
4. SUN & MOON FRAMES SHALL BE #6 REBAR WITH 3/8" STEEL PLATE WELDED INSIDE OF FRAMES CENTERED ON REBAR. TWO COPPER SHEETS CUT TO MATCH STEEL PLATE SHAPES SHALL BE SECURELY MOUNTED TO STEEL PLATES WITH ONE SHEET EACH SIDE. POLISH AND TREAT ONLY THE SUN COPPER SHEETS WITH "EVERBRITE" PROTECTIVE COATING (SEE AMENITIES SCHEDULE ON DWG. NO. LS-1.02) TO PREVENT TARNISH AND PATINA. DO NOT TREAT MOON COPPER SHEETS AS THEY ARE INTENDED TO PATINA
5. SEE AMENITIES SCHEDULE ON DWG NO. LS-1.02 FOR 3" WIDE ORANGE REFLECTIVE SAFETY TAPE INFORMATION. INSTALL TAPE ON BOTH SIDES OF GATES.

ENTRY & EXIT SWING GATES DESIGN LAYOUT
SCALE: NTS

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Aug/01 5/31/17 4:30pm

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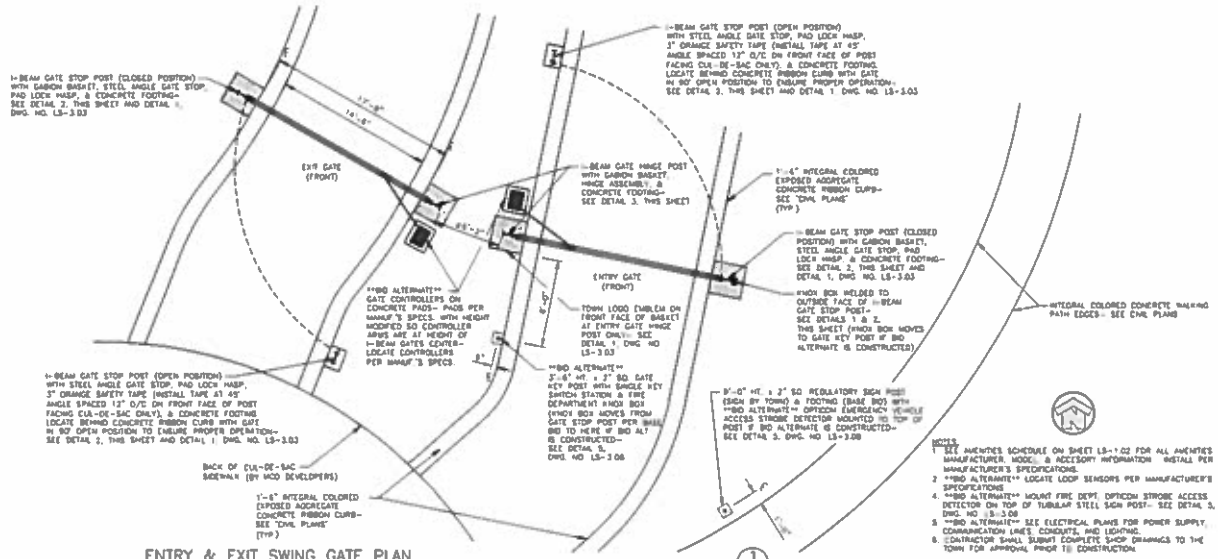
(480) 816-5100

PROJECT: Town of Fountain Hills McDowell Mountain Preserve Adero Canyon Trailhead
TITLE: LANDSCAPE DETAILS

No.	Date	Description
1	10/26/16	BID ISSUED
2	5/17/17	100% REVIEW
3	05/30/17	REVISED SUBMITTAL
4	06/26/17	BID-ALT WELDING ONLY
5	06/27/17	BID SET

DRAWN BY: B. WALLS
DESIGNED BY: B. WALLS
APPROVED BY: J. ENGELMANN
SCALE: NTS
DATE: 05/31/2017
J2 PROJECT NO: 16 0097 00
DRAWING NO.: LS-3.03
SHEET NO.: 44 of 58



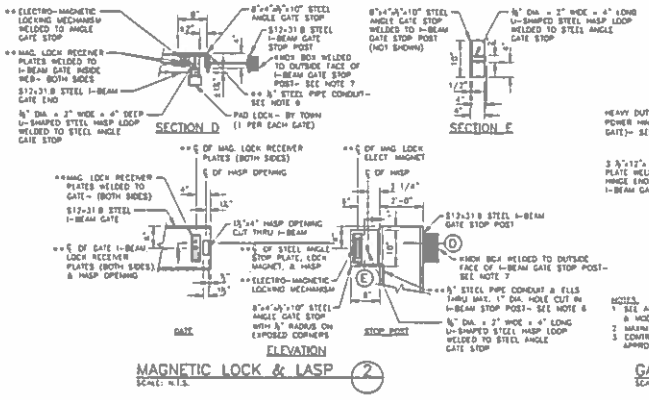
ENTRY & EXIT SWING GATE PLAN

SCALE: N.T.S.

1

NOTES:

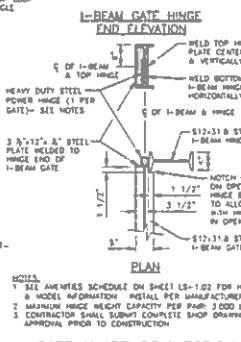
1. SEE AMENITIES SCHEDULE ON SHEET LS-1.02 FOR ALL AMENITIES MANUFACTURER, MODEL, & ACCESSORY INFORMATION. INSTALL PER MANUFACTURER'S SPECIFICATIONS.
2. **BID ALTERNATE** LOCATE LOOP SENSORS PER MANUFACTURER'S SPECIFICATIONS.
4. **BID ALTERNATE** MOUNT FIRE DEPT. OPTICOM STROBE ACCESS DETECTOR ON TOP OF TUBULAR STEEL SIGN POST- SEE DETAIL 5, DWG. NO. LS-3.08
5. **BID ALTERNATE** SEE ELECTRICAL PLANS FOR POWER SUPPLY, COMMUNICATION LINES, CONDUITS, AND LIGHTING.
6. CONTRACTOR SHALL SUBMIT COMPLETE SHOP DRAWINGS TO THE TOWN FOR APPROVAL PRIOR TO CONSTRUCTION.



MAGNETIC LOCK & HASP

SCALE: N.T.S.

2



NOTES:

1. SEE AMENITIES SCHEDULE ON SHEET LS-1.02 FOR HINGE MANUFACTURER & MODEL INFORMATION. INSTALL PER MANUFACTURER'S SPECIFICATIONS.
2. MAXIMUM HINGE WEIGHT CAPACITY PER PAIR: 3,000 LBS. GATE LENGTH= 19'-1"
3. CONTRACTOR SHALL SUBMIT COMPLETE SHOP DRAWINGS TO THE TOWN FOR APPROVAL PRIOR TO CONSTRUCTION.

BID ALTERNATE ELECTRONIC GATE FEATURES NOTES:

1. ** SHOWN IN DETAILS = BID ALTERNATE ITEM. ALL OTHER ITEMS NOT NOTED WITH ASTERISKS ARE BASE BID ITEMS.
2. SEE AMENITIES SCHEDULE ON DWG. NO. LS-1.02 FOR MAGNETIC LOCK MANUFACTURER, MODEL, & ACCESSORY INFORMATION. INSTALL PER MANUFACTURER'S SPECIFICATIONS.
3. ONE MAGNETIC LOCKING MECHANISM SHALL BE MOUNTED ON EACH OF THE FOUR GATE STOP POSTS WITH LOCK RECEIVER PLATES (4 TOTAL- 2 PER GATE) MOUNTED ON BOTH FRONT & REAR FACES OF I-BEAM GATE OUTER ENDS AS SHOWN IN SECTION D.
4. MAG. LOCKS SHALL BE CONNECTED IN SERIES WHERE ONLY THE TWO LOCKS ON CLOSED POSITION STOP POSTS ACTIVATE SIMULTANEOUSLY -OR- ONLY THE TWO LOCKS ON OPEN POSITION STOP POSTS ACTIVATE SIMULTANEOUSLY DEPENDING ON POSITION OF GATES. ALL FOUR LOCKS SHOULD NEVER BE ACTIVATED SIMULTANEOUSLY.
5. ℄ OF MAGNET & RECEIVER PLATE AND HASP & OPENING SHALL ALIGN WHEN IN SECURED POSITION LEAVING APPROX. 3" CLEARANCE BETWEEN END OF I-BEAM GATE & GATE STOP POST AS SHOWN IN SECTION D. ELEVATION DOES NOT SHOW THESE ALIGNED FOR CLARITY PURPOSE ONLY.
6. MAGNETIC LOCK WIRE CONDUIT SHALL BE STANDARD WEIGHT 3/4" DIA. (OR SMALLER) STEEL PIPE ROUTED HORIZONTALLY ALONG BOTTOM OF STEEL ANGLE STOP PLATE, THRU CUT HOLE (SIZE PER CONDUIT O.D.) IN I-BEAM GATE STOP POST, THEN VERTICALLY ALONG INSIDE WEB OF I-BEAM STOP POST, AND SHALL EXTEND A MIN. OF 8" BELOW FINISH GRADE BEFORE TRANSITIONING INTO STANDARD ELECTRICAL CONDUIT. WELD CONDUIT SECURELY IN PLACE. ALL WIRE SHALL BE FULLY ENCASED WITHIN STEEL CONDUITS. IT IS INTENDED FOR THE CONDUIT TO RUST, THUS STANDARD GALVANIZED RIGID METAL CONDUIT (RMC) OR ELECTRICAL METALLIC TUBING (EMT) ARE NOT PERMITTED ABOVE GRADE.
7. FIRE DEPT. ACCESS KNOX BOX TO BE LOCATED ON GATE STOP POST WITH BASE BID. KNOX BOX TO MOVE TO GATE KEY POST IF BID ALTERNATE FOR ELECTRONIC GATE FEATURES IS CONSTRUCTED.

GATE HINGE CONNECTION

SCALE: N.T.S.

3

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(480) 816-5150

PROJECT: Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

TITLE: LANDSCAPE DETAILS

No.	Date	Description
1	10/26/16	DRB REVIEW
2	07/17/17	TOWN REVIEW
3	08/08/17	REVISED SUBMITTAL
4	04/20/17	DRB/ZLT REVIEW SET
5	05/31/17	60% SET

DRAWN BY: K. BALLOW
DESIGNED BY: K. BALLOW
APPROVED BY: J. ENGELMANN
SCALE: N.T.S.
DATE: 05/31/2017

J2 PROJECT NO. 16.0897.003

DRAWING NO. LS-3.04 SHEET NO. 45 of 58

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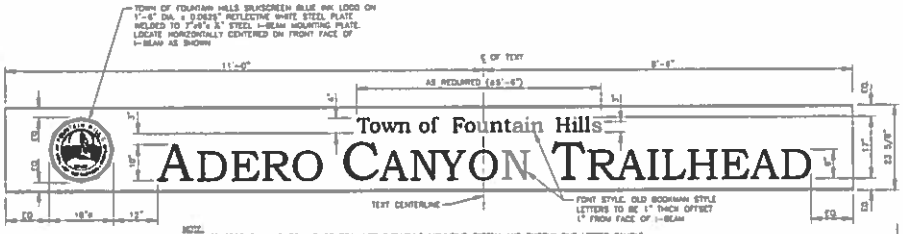
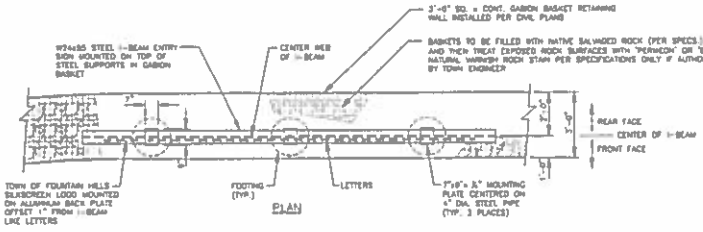
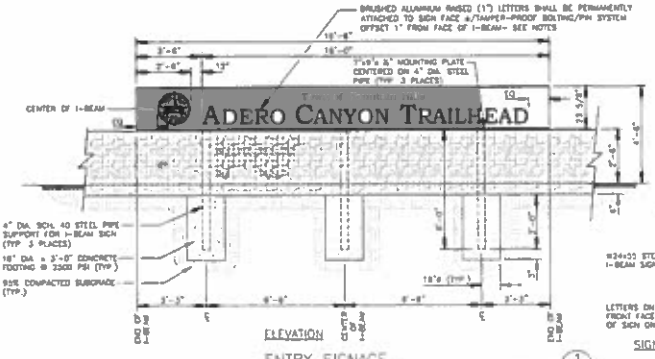


NOTE:
1. CONTRACTOR SHALL SUPPLY SHOP DRAWINGS INCLUDING MOUNTING SYSTEM AND SUPPLY ONE LETTER SAMPLE OF EACH SIZE AND CASE LETTERS FOR APPROVAL BY TOWN REPRESENTATIVE PRIOR TO INSTALLATION.
2. STEEL I-BEAM SHALL BE UNIFORMLY SANDBLASTED TO ALLOW FOR UNIFORM NATURAL RUSTING OF STEEL. LETTERS SHOULD BE APPLIED AFTER SANDBLASTING.
3. LETTERS SHALL BE MOUNTED ON FRONT FACE OF I-BEAM ONLY CENTERED ON TEXT CENTERLINE AS SHOWN.
4. CONTRACTOR SHALL COORDINATE WITH TOWN FOR APPROVED LOGO DESIGN & MATERIAL.

ENLARGEMENT

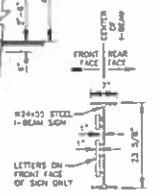


PLAN

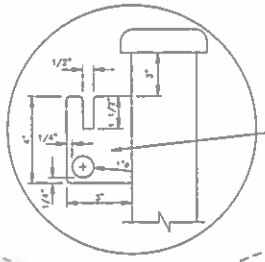


ELEVATION

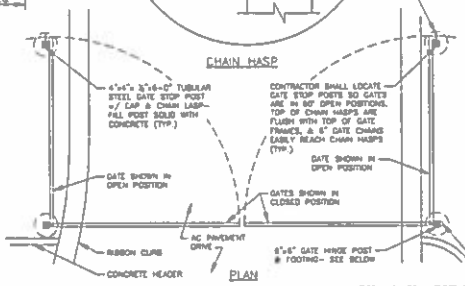
ENTRY SIGNAGE
SCALE: NTS



SIGN END ELEVATION



CHAIN HASP



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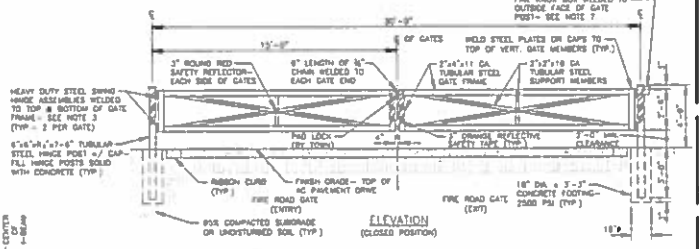

ELEVATION
(CLOSED POSITION)

CONTRACTOR NOTES:
1. CONTRACTOR SHALL SUBMIT COMPLETE SHOP DRAWINGS TO THE TOWN FOR APPROVAL PRIOR TO CONSTRUCTION.
2. CONTRACTOR SHALL ADD TWO GATE STOP POSTS WITH CHAIN HASPS & FOOTINGS AS SHOWN PER LANDSCAPE PLANS AND ABOVE TO SECURE GATES IN OPEN POSITIONS. LOCATE THE TWO OPEN POSITION POSTS BEHIND RIBBON CURBS WHERE THEY WILL ALLOW GATES TO BE SECURED OPEN USING THE 6" LONG CHAINS WELDED TO THE GATE ENDS AND THE CHAIN HASPS AS DETAILED ABOVE. LOCATION OF ALL FOUR GATE POSTS SHALL BE FIELD STAKED AND APPROVED BY THE TOWN PRIOR TO CONSTRUCTION.
3. GATE HINGES SHALL BE INSTALLED SO THAT GATES ONLY SWING OPEN 90 DEGREES IN THE DIRECTION AS SHOWN ON THE LANDSCAPE PLANS (UP-HILL) AND NOT SWING IN OPPOSITE DIRECTION BEYOND CLOSED POSITION.
4. INSTALL 3" ORANGE REFLECTIVE SAFETY TAPE TO BOTH SIDES OF ALL FOUR GATE POSTS AND GATE ENDS AS SHOWN. TAPE SHALL BE INSTALLED PER MUTCD STANDARDS.
5. ALL STEEL SHALL BE UNIFORMLY SANDBLASTED AFTER FABRICATION TO ALLOW FOR UNIFORM NATURAL RUSTING OF STEEL. SAFETY TAPE SHOULD BE APPLIED AFTER SANDBLASTING. GRIND ALL SHARP EDGES & BURS SMOOTH.
6. SEE AMENITIES SCHEDULE ON LS-1.02 FOR HINGE, KNOX BOX, & SAFETY TAPE MANUFACTURER & MODEL INFO.
7. KNOX BOX TO MOVE FROM GATE STOP TO GATE KEY POST (DETAIL 2, DWG. NO. LS-3.08) IF BID ALTERNATE FOR GATE ELECTRICAL SYSTEM IS CONSTRUCTED.

FIRE ROAD ACCESS SWING GATES
SCALE: NTS

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Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

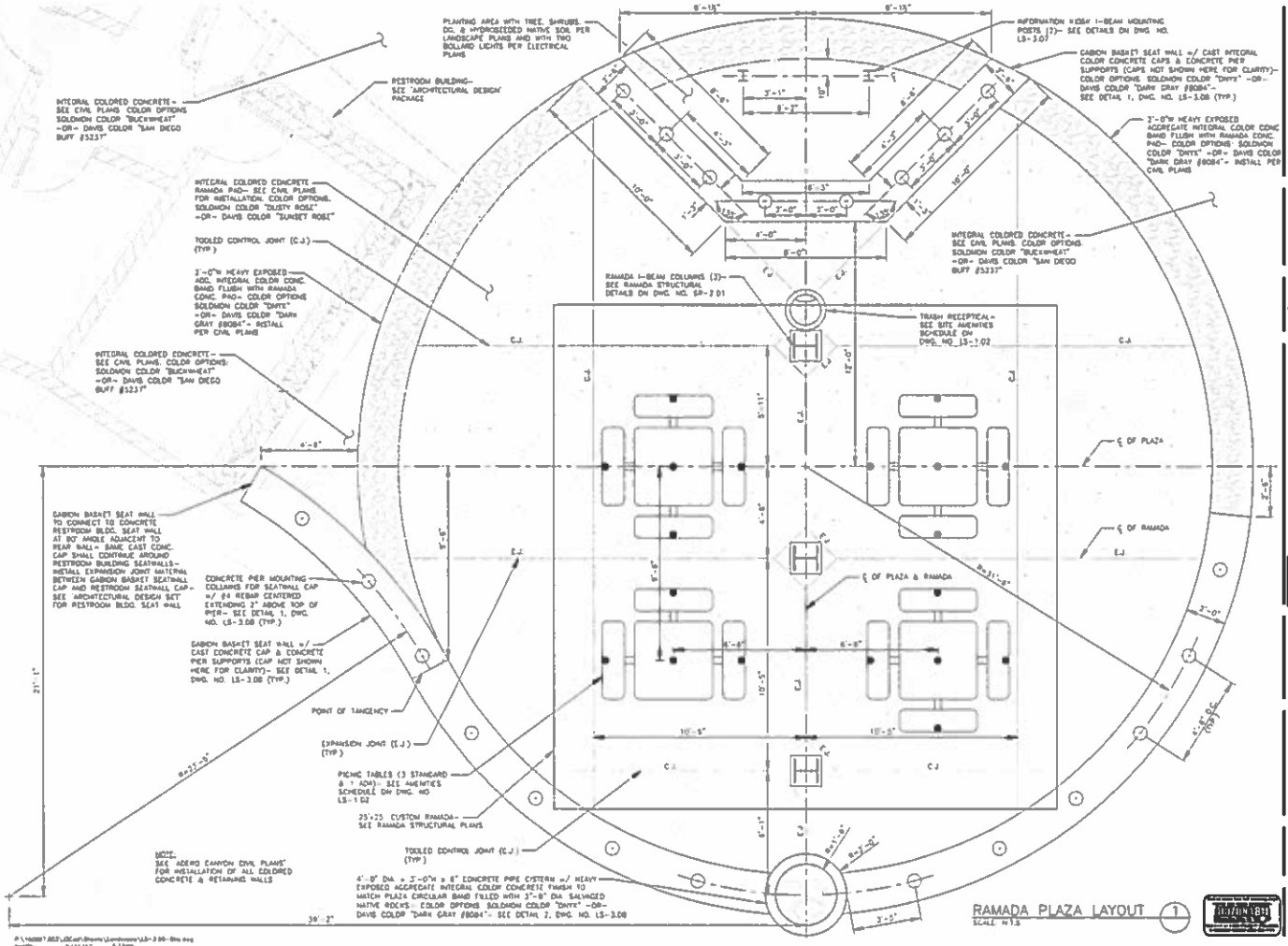
LANDSCAPE DETAILS

No.	Date	Revision
1	10/26/17	60% SUBMIT
2	11/17/17	100% REVIEW
3	12/15/17	PERMIT SUBMITTAL
4	01/31/17	100% AS-BUILT UPDATE
5	05/31/17	90% SET

Drawn by: K. SHALLP
Designed by: K. SHALLP
Approved by: J. ENGELMANN
Scale: N.T.S
Date: 05/31/201

J2 Project No.: 16 0887 00

Drawing No.: LS-3.05
Sheet No.: 46 of 58



RAMADA PLAZA LAYOUT (1)
SCALE: N.T.S.

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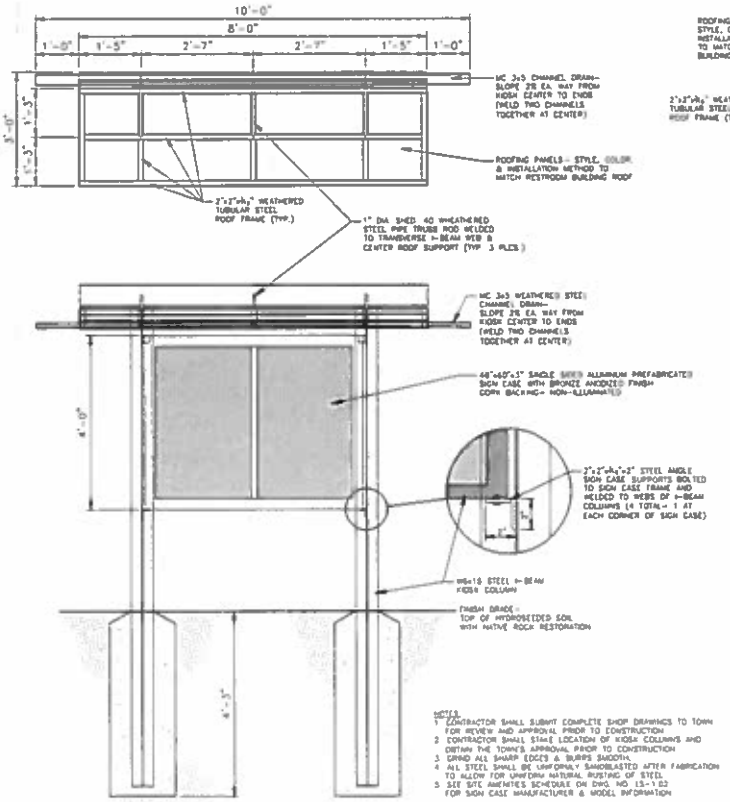
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

LANDSCAPE DETAILS

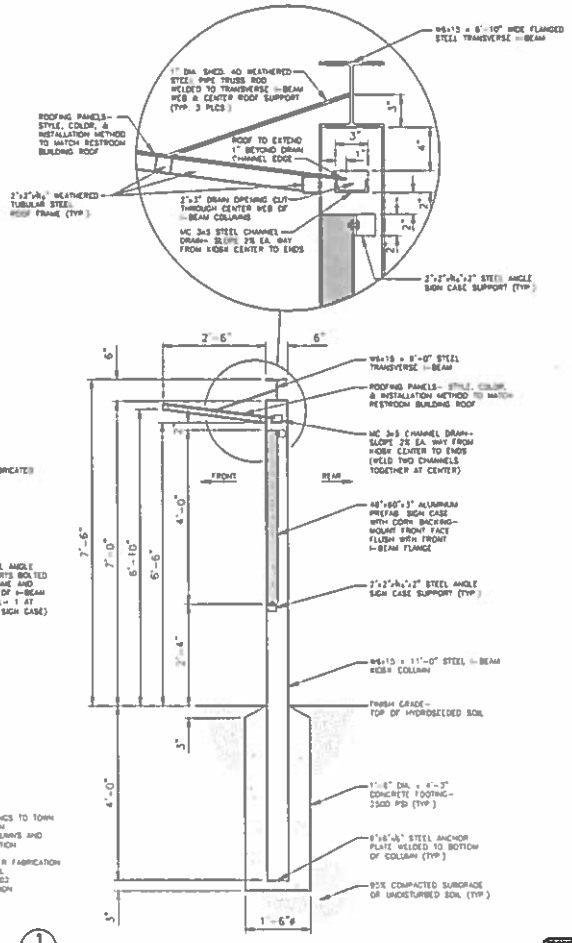
No.	Date	Description
1	10/20/17	[illegible]
2	01/17/17	[illegible]
3	03/30/17	[illegible]
4	04/20/17	[illegible]
5	05/31/17	[illegible]

Drawn By: K. BALLIN
Designed By: K. BALLIN
Approved By: J. [illegible]
Scale: N.T.S.
Date: 05/31/2017
J2 Project No: 16.089.003
Drawing No: LS-3.06
Sheet No: 47 of 58



NOTES:
1. CONTRACTOR SHALL SUBMIT COMPLETE SHOP DRAWINGS TO TOWN FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION
2. CONTRACTOR SHALL STAKE LOCATION OF KIOSK COLUMNS AND OBTAIN THE TOWN'S APPROVAL PRIOR TO CONSTRUCTION
3. GRIND ALL SHARP EDGES & BURRS SMOOTH.
4. ALL STEEL SHALL BE UNIFORMLY SANDBLASTED AFTER FABRICATION TO ALLOW FOR UNIFORM NATURAL RUSTING OF STEEL
5. SEE SITE AMENITIES SCHEDULE ON DWG NO. LS-1.02 FOR SIGN CASE MANUFACTURER & MODEL INFORMATION

INFORMATION KIOSK (1)
SCALE: N.T.S.



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DATE:
TOWN OF FOUNTAIN HILLS PARKS & RECREATION DEPT. FOUNTAIN HILLS TOWN HALL 16705 E. AVENUE OF THE FOUNTAINS FOUNTAIN HILLS, AZ 85268 (480) 816-5190

PROJECT: Town of Fountain Hills McDowell Mountain Preserve Adero Canyon Trailhead

SHEET: LANDSCAPE DETAILS

SEAL: SCOTTSDALE ARIZONA JOHN ENGELMANN 29910 EXPIRES 06/30/2017

SUBMITTALS / RE-SUBMITTALS		
NO.	MM/DD/YR	DESC
1	10/26/16	60% SUBMITTAL
2	01/17/17	100% SUBMITTAL
3	03/06/17	REVISED SUBMITTAL
4	05/26/17	90% REVISED SUBMITTAL
5	06/21/17	90 DPT

DRAWN BY: N. BALLB
DESIGNED BY: N. BALLB
APPROVED BY: J. ENGELMANN
SCALE: N.T.S.
DATE: 05/31/2017

J2 PROJECT NO: 15 0897 003

DRAWING NO: LS-3.07 SHEET NO: 48 of 58

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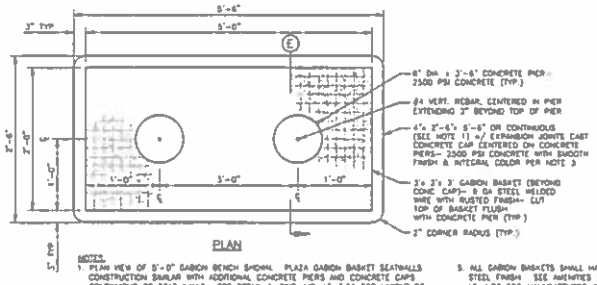
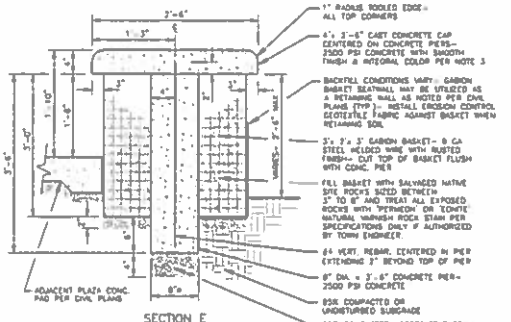


PLAN

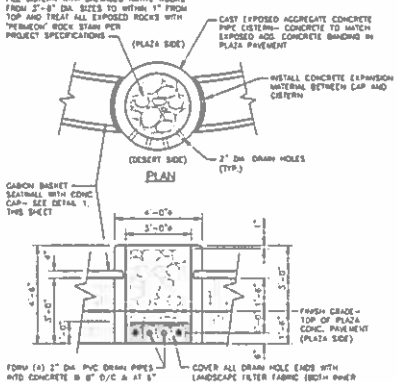


SECTION E

NOTES:
1. PLAN VIEW OF 5'-0" GABION BENCH SHOWN. PLAZA GABION BASKET SEATWALLS CONSTRUCTION SIMILAR WITH ADDITIONAL CONCRETE PIERS AND CONCRETE CAPS CONTINUOUS OF SEAT WALLS- SEE DETAIL 1, DWG. NO. LS-3.06 FOR LAYOUT OF SEATWALLS & CONCRETE PIERS.
2. CURVED GABION SEATWALL BASKETS SHALL BE TRIMMED AS REQUIRED TO ACHIEVE A SMOOTH RADIUS.
3. CONCRETE CAPS SHALL HAVE 3" OVERHANG ON ALL SIDES OF GABION BASKET AND SHALL BE INTEGRAL COLORED CONCRETE WITH A SMOOTH FINISH- COLOR OPTIONS: SOLOMON COLOR "DNYX" -OR- DAVIS COLOR "DARK GRAY #6084".
4. GABION BASKETS & STEEL TIES SHALL BE INSTALLED PER MANUFACTURER'S SPECS.
5. ALL GABION BASKETS SHALL HAVE A NATURAL RUSTED STEEL FINISH. SEE AMENITIES SCHEDULE ON DWG. NO LS-1.02 FOR MANUFACTURER & MODEL INFORMATION.
6. CONCRETE CAPS SHALL HAVE EXPANSION JOINTS @ 25' O/C ALONG A RADIAL PATTERN.
7. GABION BASKETS SHALL BE FILLED WITH SALVAGED NATIVE ROCKS PER SPECIFICATIONS AND TREATED WITH "PERMEON" OR "ZONITE" NATURAL VARNISH ROCK STAIN PER SPECIFICATIONS ONLY IF AUTHORIZED BY TOWN ENGINEER.

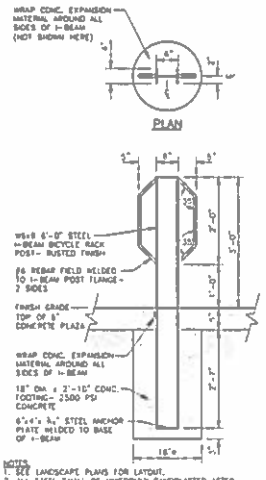
GABION BENCH/SEAT WALL (1)

SCALE: N.T.S.



CISTERN (2)

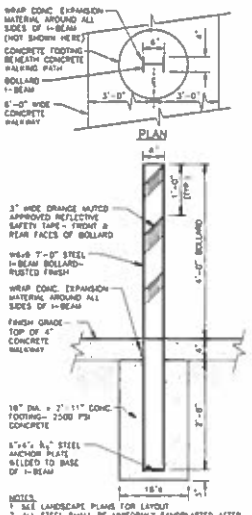
SCALE: N.T.S.



NOTES:
1. SEE LANDSCAPE PLANS FOR LAYOUT.
2. ALL STEEL SHALL BE UNIFORMLY SANDBLASTED AFTER FABRICATION TO ALLOW FOR UNIFORM NATURAL RUSTING OF STEEL.
3. BICYCLE RACKS SHALL HAVE MIN. 3'-0" CLEAR AREA IN FRONT & BEHIND AND 2'-0" CLEAR AREA TO EACH SIDE.

BICYCLE RACK (3)

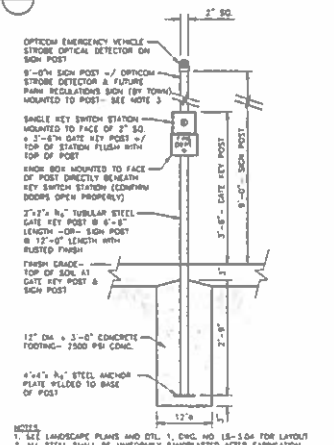
SCALE: N.T.S.



NOTES:
1. SEE LANDSCAPE PLANS FOR LAYOUT.
2. ALL STEEL SHALL BE UNIFORMLY SANDBLASTED AFTER FABRICATION TO ALLOW FOR UNIFORM NATURAL RUSTING OF STEEL. SAFETY TAPE SHOULD BE APPLIED AFTERWARDS.
3. SEE SITE AMENITIES SCHEDULE ON DWG. NO. LS-1.02 FOR ORANGE SAFETY TAPE MANUFACTURER INFORMATION.

SECURITY BOLLARD (4)

SCALE: N.T.S.



NOTES:
1. SEE LANDSCAPE PLANS AND DTL. 1, DWG. NO. LS-3.04 FOR LAYOUT.
2. ALL STEEL SHALL BE UNIFORMLY SANDBLASTED AFTER FABRICATION TO ALLOW FOR UNIFORM NATURAL RUSTING OF STEEL.
3. 9'-0"H SIGN POST SHALL HAVE FUTURE PARK REGULATIONS SIGN MOUNTED (BY TOWN) AT DESIRED HEIGHT FACING PEDESTRIAN WALKWAY. CONTRACTOR SHALL MOUNT EMERGENCY VEHICLE STROBE OPTICAL DETECTOR ON TOP OF POST ANGLED PER MANUFACTURER'S SPECIFICATIONS AND ROUTE WIRES THRU CENTER OF POST.
4. GATE KEY POST IS A SEPERATE POST LOCATED NEAR ENTRY GATE FOR MOUNTING OF GATE SINGLE KEY ENTRY SWITCH AND FIRE DEPARTMENT KNOX BOX CONTAINING GATE PAD LOCK KEY INSIDE KNOX BOX TO HAVE STANDARD FIRE DEPT. KS-2 KEY SWITCH ACCESS.
5. SEE SITE AMENITIES SCHEDULE ON DWG. NO. LS-1.02 FOR AMENITIES MANUFACTURER & MODEL INFORMATION.

SIGN POST/GATE KEY POST (5)

SCALE: N.T.S.

BID ALT (GATE KEY POST)

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Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead
LANDSCAPE DETAILS

NO.	DATE	REVISION
1	10/30/10	DWG REVIEW
2	05/27/11	PERMIT REVIEW
3	03/08/12	REVISED SUBMITTAL
4	07/05/12	REVISED PER TOWN COMMENTS
5	09/27/12	PER BID

DRAWN BY K. WALLIN
DESIGNED BY K. WALLIN
APPROVED BY J. ENGELMANN
SCALE N.T.S.
DATE 05/31/2012
J2 PROJECT NO. 10.0887.003
DRAWING NO. LS-3.08
SHEET NO. 49 of 58

STRUCTURAL NOTES

1. ALL CONSTRUCTION SHALL CONFORM TO THE INTERNATIONAL BUILDING CODE, 2012 EDITION, AND BE IN ACCORDANCE WITH MAG "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION", LATEST EDITION.

2. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE BEFORE COMMENCING WORK AND SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER.

3. OMISSIONS OR CONFLICTS BETWEEN THE VARIOUS ELEMENTS OF THE DRAWINGS, NOTES AND DETAILS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER AND RESOLVED BEFORE PROCEEDING WITH THE WORK.

4. DO NOT USE SCALED DIMENSIONS. USE WRITTEN DIMENSIONS OR WHERE NO DIMENSION IS PROVIDED, CONSULT WITH THE ENGINEER FOR CLARIFICATION BEFORE PROCEEDING WITH THE WORK.

5. THE CONTRACT STRUCTURAL DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE DURING CONSTRUCTION FOR LOADS DUE TO CONSTRUCTION EQUIPMENT, ETC. OBSERVATION VISITS TO THE SITE BY THE STRUCTURAL ENGINEER SHALL NOT INCLUDE INSPECTION OF THE ABOVE ITEMS.

6. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO ENGINEER FOR REVIEW PRIOR TO FABRICATION.

7. CONSTRUCTION MATERIALS SHALL BE SPREAD OUT IF PLACED ON ROOF. LOAD SHALL NOT EXCEED THE DESIGN LIVE LOAD PER SQUARE FOOT.

8. DESIGN LOADS:

   ROOF LIVE LOAD: 20 PSF
   SUPPORTS (STAGE):
   SEISMIC: SITE CLASS "D", CATEGORY "B"
   $S1 = .071$
   $Ss = .245$
   $I = 1.0$
   WIND: 115 MPH PARTIALLY ENCLOSED STRUCTURE
   EXPOSURE "C", $I=1.0$, $Q=0.85$,
   $Cn = -1.1, -0.2$ (WINDWARD MWFRS)
   $Cn = 0.3, 1.2$ (LEEWARD MWFRS)

REINFORCING STEEL:

1. ALL REINFORCING STEEL SHALL BE DETAILED AND PLACED IN CONFORMANCE WITH THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318 LATEST APPROVED EDITION) AND THE "MANUAL OF STANDARD PRACTICE FOR REINFORCED CONCRETE CONSTRUCTION" (LATEST APPROVED EDITION) BY THE C.R.S.I., AND AS MODIFIED BY THE DRAWINGS.

2. REINFORCING BARS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A-615, GRADE 60 FOR ALL BARS.

3. DOWELS BETWEEN FOOTINGS AND WALLS OR COLUMNS SHALL BE THE SAME GRADE, SIZE, SPACING AND NUMBER AS THE VERTICAL REINFORCING ABOVE.

4. ALL REINFORCING BARS BENDS AND HOOKS SHALL BE STANDARD CRSI BENDS AND HOOKS UNLESS SPECIFICALLY NOTED OTHERWISE ON STRUCTURAL DRAWINGS.

5. ALL REINFORCING SHALL HAVE 2" CLEAR COVER UNLESS NOTED OTHERWISE.

CONCRETE:

1. STRUCTURAL CONCRETE 28-DAY DESIGN STRENGTH = 2,500 PSI

2. ALL REINFORCING BARS AND DOWELS, ANCHOR BOLTS AND OTHER CONCRETE INSERTS SHALL BE WELL SECURED IN POSITION PRIOR TO PLACING CONCRETE.

3. PROJECTING EXPOSED CORNERS SHALL BE FORMED WITH A 3/4" CHAMFER U.N.O.

STRUCTURAL STEEL:

1. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE AISC SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS (LATEST EDITION AND SUPPLEMENTS).

2. ALL WELDING SHALL BE PERFORMED IN ACCORDANCE WITH AWS STANDARDS. (LATEST EDITION AND SUPPLEMENTS). WELDS SHALL BE PERFORMED USING SHIELDED METAL ARC WELDING WITH E70XX ELECTRODES. ALL WELDS NOT OTHERWISE DETAILED SHALL BE FILLET WELDED, ALL EDGES, CONTINUOUSLY WITH MINIMUM WELD SIZE PER AWS STANDARDS.

3. STRUCTURAL STEEL SHAPES AND PLATES SHALL BE ASTM A709, Grade 50W. $Fy = 50$ KSI.

4. STRUCTURAL TUBING: ASTM A847 (WEATHERING), $Fy = 46$ KSI

5. STRUCTURAL PIPE: ASTM A53 GRADE B, $Fy = 35$ KSI

6. UNFINISHED THREADED BOLTS (MACHINE BOLTS): ASTM A307, GRADE A, PAINTED

7. ANCHOR BOLTS: ASTM A36 OR A307, GRADE A, GALVANIZED.

8. DRYPACK UNDER STEEL BASE PLATES SHALL BE ASTM C1107, NON-SHRINK, NON-METALLIC GROUT AS MANUFACTURED BY US GROUT CORP., "FIVE STAR GROUT" OR APPROVED EQUAL.

9. BEAMS TO BE PLACED WITH MILL CAMBER UPWARD.

STEEL DECKING:

1. STEEL DECKING SHALL BE TYPE AND GAGE AS CALLED FOR ON STRUCTURAL DRAWINGS. DECKING AND ALL ACCESSORIES SHALL BE FORMED FROM STEEL SHEETS HAVING A MINIMUM YEILD STRENGTH OF 50,000 PSI, CONFORMING TO ASTM A792.

2. ROOF DECK SHALL BE GALVANIZED (G90) AND FACTORY PAINTED.

SPECIAL INSPECTIONS:

1. SPECIAL INSPECTIONS, SHALL BE PERFORMED BY A QUALIFIED INSPECTOR, AS REQUIRED BY 2003 INTERNATIONAL BUILDING CODE.

2. THE FOLLOWING TYPES OF WORK REQUIRE SPECIAL INSPECTION.

   A. FOUNDATION EXCAVATIONS PRIOR TO CONCRETE PLACEMENT
   B. STRUCTURAL CONCRETE WORK
   C. BOLTS INSTALLED IN CONCRETE
   D. REINFORCING STEEL
   *E. STRUCTURAL WELDING, (FIELD & SHOP)

*NOTE: ITEMS NOTED (*) SHALL BE PERFORMED BY A QUALIFIED INSPECTOR, UNDER THE DIRECT SUPERVISION OF AN ARIZONA REGISTERED STRUCTURAL ENGINEER WHO IS FAMILIAR WITH THE STRUCTURAL DESIGN OF THIS PROJECT. THE SPECIAL INSPECTION CERTIFICATE SHALL BE SEALED BY THE SUPERVISING STRUCTURAL ENGINEER.

DESIGN SOIL PARAMETERS:
(FROM GEOTECHNICAL EXPLORATION REPORT BY RICKER, McBEE & ASSOCIATES, INC.)

ALLOWABLE BEARING PRESSURE ..... 2000 PSF
BASE FRICTION RESISTANCE 0.40
LATERAL ACTIVE EARTH PRESSURE .....30 PSF/FT
LATERAL PASSIVE EARTH PRESSURE .....350 PSF/FT

STRUCTURES SHALL BEAR 1'-0" MINIMUM BELOW FINISHED GRADE ON FIRM, UNDISTURBED SOIL.

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Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

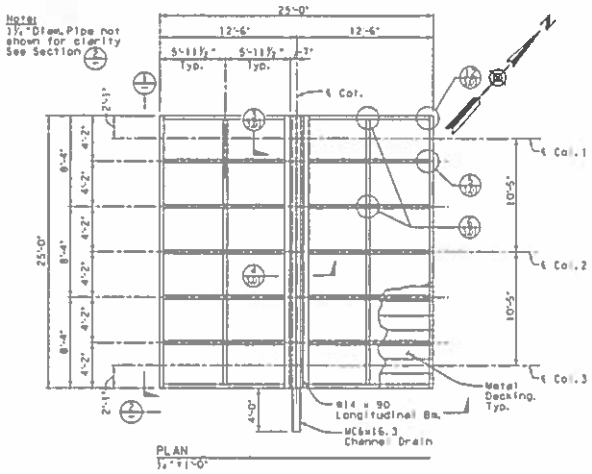
RAMADA STRUCTURAL NOTES

No.	Date	Description
1	1/1/00	CITY REVIEW
2	1/1/00	CITY REVIEW
3	1/1/00	FINAL PLAN
4	10/9/15	CITY REVIEW
5	2/1/17	CITY REVIEW
6	3/2/17	FINAL PLAN

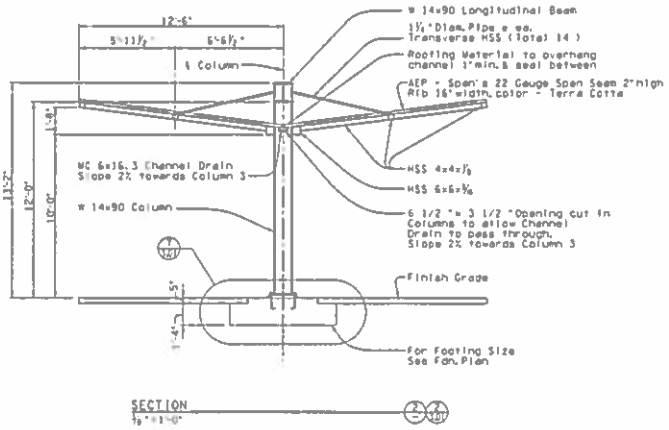
DRAWN BY: J. SAMPLE
DESIGNED BY: J. SAMPLE
APPROVED BY: J. PERSONS
SCALE: AS NOTED
DATE: 03/02/2017

J2 PROJECT NO. 18.0067.003
FILE NAME: 1819_Ramada_Str1.dgn

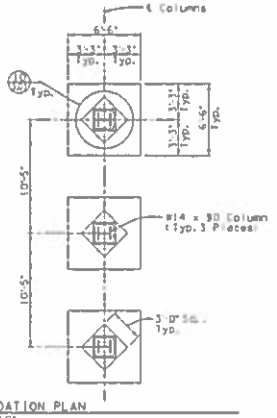
SR-1.01 50 of 58



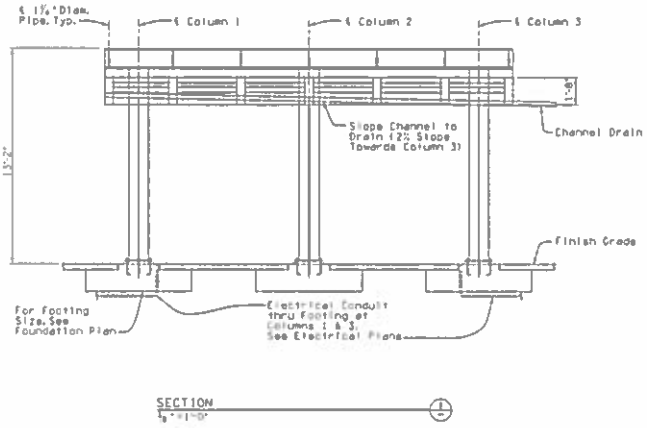
PLAN
¼" = 1'-0"



SECTION
⅛" = 1'-0"



FOUNDATION PLAN
¼" = 1'-0"



SECTION
⅛" = 1'-0"

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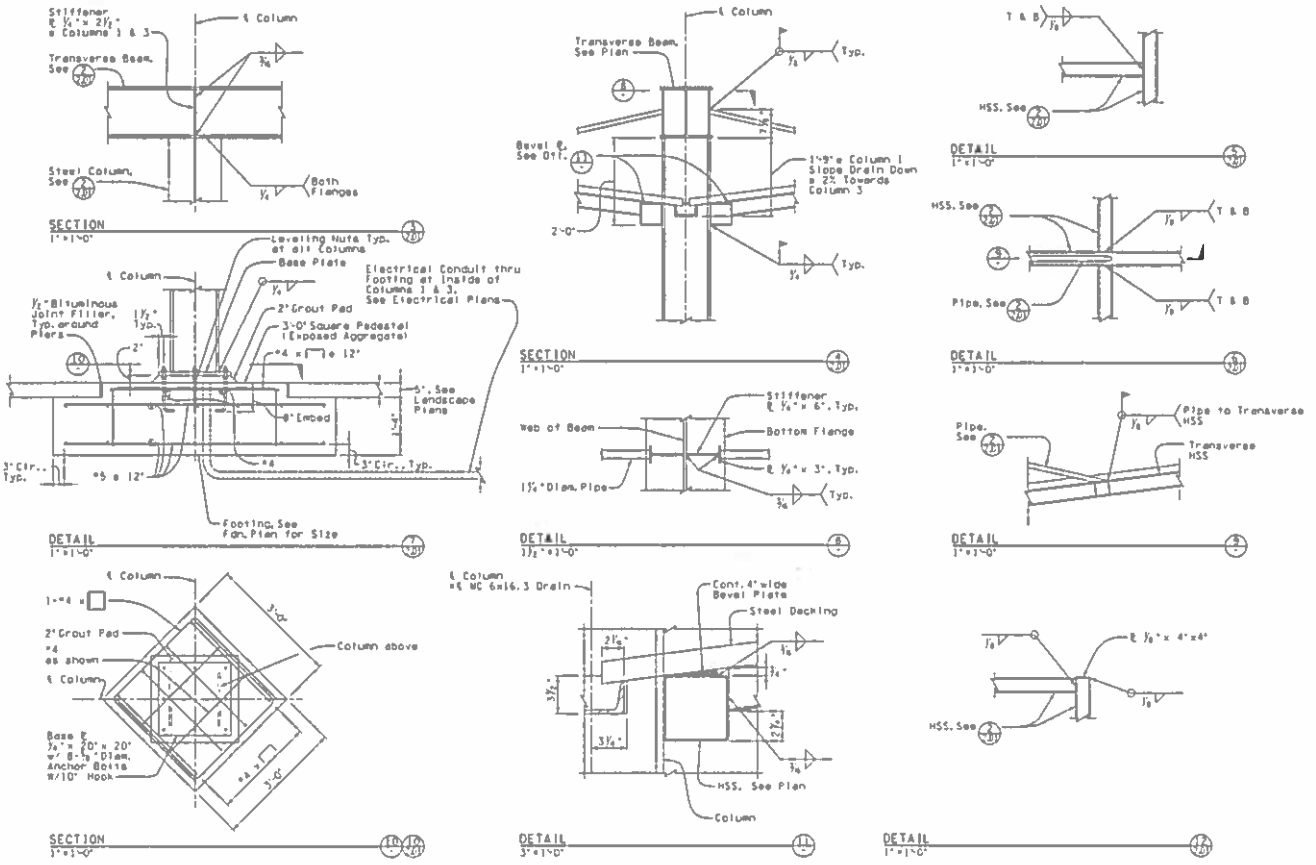
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

RAMADA PLANS AND SECTIONS

NO	DATE	ISSUE
1	7/11/06	DESIGN REVIEW
2	7/13/06	100% REVIEW
3	10/17/06	PERM. PERM.
		BOOK UPDATE
4	10/10/16	DESIGN REVIEW
5	11/17/17	100% REVIEW
6	03/02/17	PERM. PERM.

DRAWN BY J. SANTLEY
DESIGNED BY J. SKINNER
APPROVED BY C. PERCHINELLI
SCALE AS NOTED
DATE 03/02/2017
J2 PROJECT NO. 18.0897.003
FILE NAME 1819_Ramada_PL1.dgn

SR-2.01 51 of 58



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Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

RAMADA STRUCTURAL DETAILS

DRAWN BY	J. SAWLEY	
DESIGNED BY	J. SKINNER	
APPROVED BY	C. PERCHINELLI	
SCALE	AS NOTED	
DATE	03/02/2017	
JOB NO.	16 0887.003	
FILE NAME	1619_Ramada_DTL.dgn	

SR-3.01 52 of 58

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Plotted on 3/2/2017 10:32:05 AM

IRRIGATION GENERAL NOTES:

1. PRIOR TO SUBMITTING A BID FOR THE IRRIGATION WORK THE CONTRACTOR SHALL VISIT THE SITE TO VERIFY ALL INSTALLATION CONDITIONS.

2. THE CONTRACTOR SHALL READ THOROUGHLY AND BECOME FAMILIAR WITH THE PLANS, SPECIFICATIONS AND INSTALLATION DETAILS FOR THIS AND RELATED WORK PRIOR TO CONSTRUCTION

3. QUANTITIES OF IRRIGATION COMPONENTS NOTED ON THE PLANS, DETAILS OR SPECIFICATIONS ARE FOR CONVENIENCE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR ALL ITEMS REQUIRED TO PROVIDE A COMPLETE WORKING IRRIGATION SYSTEM AS DESIGNED, AND SHALL PROVIDE HIS OWN MATERIAL TAKE OFF QUANTITIES.

4. IRRIGATION COMPONENTS CALLED OUT BY MANUFACTURER AND MODEL NUMBER DESIGNATE A TYPE OF MATERIAL, SIZE AND LEVEL OF PERFORMANCE. THE CONTRACTOR MAY SUBSTITUTE ALTERNATE COMPONENTS AS EQUAL. THE TOWN OF FOUNTAIN HILLS' REPRESENTATIVE MUST APPROVE ANY REQUESTS FOR SUBSTITUTION PRIOR TO BID SUBMITTAL.

5. BEFORE STARTING ANY WORK THE CONTRACTOR SHALL CONTACT BLUE STAKE TO VERIFY LOCATIONS AND DEPTHS OF UNDERGROUND UTILITIES THAT MAY BE AFFECTED BY HIS WORK, AND HE SHALL BE RESPONSIBLE FOR DAMAGES TO SUCH UTILITIES CAUSED AS A RESULT OF HIS IRRIGATION INSTALLATION

6. THE CONTRACTOR SHALL NOT PROCEED WITH THE INSTALLATION OF THE IRRIGATION SYSTEM WHEN IT IS OBVIOUS IN THE FIELD THAT OBSTRUCTIONS OR GRADE DIFFERENCES EXIST THAT MIGHT NOT HAVE BEEN CONSIDERED IN THE ENGINEERING, OR IF DISCREPANCIES IN CONSTRUCTION DETAILS, LEGENDS, NOTES, OR SPECIFICATIONS ARE DISCOVERED. BRING ALL SUCH OBSTRUCTIONS OR DISCREPANCIES TO THE ATTENTION OF THE TOWN OF FOUNTAIN HILLS' REPRESENTATIVE IN WRITING PRIOR TO CONSTRUCTION.

7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPENSATING THE OWNER AND/OR THE OWNER'S REPRESENTATIVE FOR ANY DESIGN CHANGES MADE AS A RESULT OF DEVIATION BY THE CONTRACTOR FROM PLANS, DETAILS AND SPECIFICATIONS OR DUE TO ERRORS, FAULTY MATERIALS OR FAULTY WORKMANSHIP

8. THE MAINLINE PIPE, SUB-MAIN, LATERAL PIPE, VALVES AND OTHER COMPONENTS ARE SHOWN SCHEMATICALLY AND MAY BE DRAWN OUTSIDE OF PLANTING AREAS FOR GRAPHIC CLARITY. INSTALL ALL COMPONENTS IN LANDSCAPE AREAS WHENEVER POSSIBLE. AVOID CONFLICTS BETWEEN THE IRRIGATION SYSTEM, UTILITIES, PLANT MATERIAL, AND ARCHITECTURAL FEATURES

9. THE IRRIGATION CONTRACTOR IS RESPONSIBLE FOR 100% COVERAGE TO ALL PLANT MATERIAL. COORDINATE IRRIGATION INSTALLATION WITH LANDSCAPE PLANS AND LANDSCAPE CONTRACTOR.

10. THE CONTRACTOR SHALL COMPLY WITH ALL LOCAL, STATE AND FEDERAL LAWS, CODES, AND REGULATIONS APPLICABLE TO THE IRRIGATION SYSTEM COVERED BY THESE PLANS.

11. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND COMPLYING WITH ALL PERMITS REQUIRED TO COMPLETE THE IRRIGATION WORK COVERED BY THESE PLANS AND SPECIFICATIONS. PERMIT COST IS CONSIDERED INCIDENTAL TO IRRIGATION INSTALLATION EFFORT— NO SEPERATE PAYMENT FOR PERMITS WILL BE MADE.

12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY TRAFFIC CONTROL REQUIRED AS A RESULT OF THE IRRIGATION SYSTEM INSTALLATION. THE COST OF THE TRAFFIC CONTROL IS TO BE CONSIDERED INCIDENTAL, AND THE COST INCLUDED IN THE ASSOCIATED IRRIGATION SYSTEM WORK. THE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS AND COMPLY WITH ALL LOCAL MUNICIPAL CODES, REGULATIONS AND PROCEDURES.

13. INSTALL ALL ELECTRICAL POWER TO THE IRRIGATION CONTROL SYSTEM IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE AND ALL APPLICABLE LOCAL CODES. THE IRRIGATION CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ALL CONDUIT AND CONDUCTORS AS SHOWN PER ELECTRICAL PLANS THIS SET. 120VAC POWER SOURCE WILL NOT BE AVAILABLE FOR CONNECTION AT TIME OF CONSTRUCTION. CONTRACTOR SHALL SUPPLY GENERATED POWER AS SPECIFIED IN PROJECT SPECIFICATIONS TO TEST ALL ELECTRICAL CONNECTIONS AND EQUIPMENT PRIOR TO APPROVAL TO BEGIN WARRANTY PERIOD. (NOTE: IF BID-ALTERNATE TO SUPPLY INTERIM UTILITY SOLAR ELECTRIC POWER IS AWARDED, THEN ALL EQUIPMENT SHALL STILL BE SET UP FOR 120VAC SERVICE AS SOLAR DC POWER SHALL BE CONVERTED TO AC POWER. ALL CONNECTIONS AND EQUIPMENT WILL STILL REQUIRE TESTING FOR APPROVAL TO BEGIN WARRANTY PERIOD.)

14. THE IRRIGATION CONTRACTOR IS RESPONSIBLE FOR ALL IRRIGATION SLEEVING. SLEEVES SHALL BE PROVIDED FOR ALL IRRIGATION PIPING, LOW VOLTAGE (24 VOLT) WIRING, COMMUNICATION CABLE, AND HIGH VOLTAGE (120 VOLT AND GREATER) WIRING REQUIRED FOR THE IRRIGATION SYSTEM. SLEEVING FOR THE HIGH VOLTAGE WIRE SHALL BE SEPARATE FROM THE PIPE, LOW VOLTAGE AND COMMUNICATION SLEEVES. SEPARATE SLEEVES SHALL BE PROVIDED WITHIN THE PRIMARY SLEEVE FOR LOW VOLTAGE AND COMMUNICATION WIRING WHEN THEY SHARE A SLEEVE WITH THE IRRIGATION PIPING. SLEEVES SHALL BE PROVIDED UNDER ALL PAVING, SIDEWALKS, PATHS, AND THROUGH ANY WALLS OR PERMANENT HARDSCAPE FEATURES. ANY PIPE OR WIRE WHICH PASSES BENEATH EXISTING HARDSCAPE WHERE SLEEVING WAS NOT INSTALLED PRIOR REQUIRES HORIZONTAL BORING BY THE IRRIGATION CONTRACTOR. SLEEVE SIZES SHALL BE TWICE THE AGGREGATE DIAMETER OF ALL PIPE AND WIRE CONTAINED WITHIN THE SLEEVE.

15. PRESSURIZED POTABLE WATER FROM UTILITY COMPANY WILL NOT BE AVAILABLE FOR CONNECTION AT TIME OF CONSTRUCTION. CONTRACTOR SHALL INSTALL WATER METER BOX, BACKFLOW PREVENTER, COPPER LINES, BALL VALVES, AND ALL OTHER APPURTENANCES AS SHOWN PER PLANS WITH BASE-BID, HOWEVER THE WATER METER SHALL NOT BE INSTALLED UNTIL FUTURE DATE WHEN PERMANENT WATER SUPPLY BECOMES AVAILABLE. CONTRACTOR SHALL SUPPLY POTABLE WATER AS REQUIRED PER SPECIFICATIONS TO TEST ALL CONNECTIONS AND EQUIPMENT IN RESTROOM BUILDING AND IRRIGATION SYSTEM PRIOR TO APPROVAL TO BEGIN WARRANTY PERIOD. NO WATER SHALL REMAIN IN ANY RESTROOM BUILDING PIPES OR EQUIPMENT AFTER TESTING IS COMPLETED. (NOTE: IF BID-ALTERNATE TO SUPPLY INTERIM UTILITY NON-POTABLE WATER TANK IS AWARDED, THEN TANK, WATER SUPPLY PIPES, RESTROOM EQUIPMENT, AND IRRIGATION SYSTEM SHALL ALL BE TESTED PER PROJECT SPECIFICATIONS PRIOR TO APPROVAL TO BEGIN WARRANTY PERIOD.)

16. THE IRRIGATION POINT OF CONNECTION CAN SAFELY PROVIDE 60 GALLONS PER MINUTE (GPM) TO THE IRRIGATION SYSTEM. VALVE CIRCUITS AND CONTROLLER PROGRAMMING SHALL NOT CREATE A SYSTEM FLOW DEMAND GREATER THAN 60 GPM.

17. CROSS ALL SIDEWALKS, CONCRETE, AND HARDSCAPE AT RIGHT ANGLES WHEREVER POSSIBLE. NO LONG LATERAL RUNS WILL BE ALLOWED UNDER COMPACTED AREAS DESIGNATED FOR PAVEMENT.

18. THE CONTRACTOR SHALL ARRANGE FOR THE FOLLOWING INSPECTIONS AND MEETINGS DURING THE IRRIGATION SYSTEM INSTALLATION:
    1. PRE-CONSTRUCTION CONFERENCE
    2. LAYOUT OF MAJOR COMPONENTS: BACKFLOW, CONTROLLER, CONTROL VALVES, GATE VALVES, MAINLINE AND WIRE ROUTING.
    3. PRESSURE TESTING OF MAINLINE
    4. LAYOUT OF EMITTER HEADS
    5. COVERAGE TEST OF EMITTER HEADS
    6. FINAL WALK THROUGH/BEGINNING OF MAINTENANCE-WARRANTY PERIOD
    7. FINAL ACCEPTANCE/END OF MAINTENANCE-WARRANTY PERIOD.

    NOTIFY THE TOWN OF FOUNTAIN HILLS A MINIMUM OF 3 WORKING DAYS PRIOR TO REQUIRED INSPECTIONS AND MEETINGS.

19. THE IRRIGATION MAINLINE SHALL BE TESTED AT 120 PSI FOR NOT LESS THAN FOUR (4) HOURS WITH NO LOSS OF PRESSURE. DO NOT BACKFILL MAINLINE UNTIL AFTER SUCCESSFUL COMPLETION OF MAINLINE TEST. MAINLINE SHALL BE TESTED WITH BALL VALVES AND QUICK COUPLERS INSTALLED, AND ALL CONTROL VALVE LOCATIONS SHALL BE CAPPED.

20. INSTALL ALL MAINLINE PIPES WITH 18" MINIMUM COVER

21. INSTALL ALL SUB-MAIN PIPES WITH 12" MINIMUM COVER

22. INSTALL ALL DRIP LATERAL PIPES WITH 12" MINIMUM COVER

23. INSTALL ALL SLEEVING AT LOWEST PIPE DEPTH OR WITH 36" MINIMUM COVER UNDER ALL DRIVING SURFACES.

24. ALL PIPE TO BE INSTALLED PER THE MANUFACTURER'S SPECIFICATIONS AND ASTM STANDARD D-2774

25. PIPE BEDDING SHALL CONSIST OF CLEAN NATIVE SOIL WITH NO STONE LARGER THAN 1/4" DIAMETER. 3" OF MORTAR SAND PLACED COMPLETELY AROUND THE PIPE IS AN ACCEPTABLE SUBSTITUTE FOR NATIVE SOIL.

26. TRENCHES THAT CONTAIN MULTIPLE PIPES SHALL MAINTAIN A MINIMUM OF 2" OF SEPARATION BETWEEN PIPES

27. MAINLINE FITTINGS TO BE SCHEDULE 80. USE TOE NIPPLES. NO MALE ADAPTORS WILL BE ACCEPTED.

28. SUB-MAIN AND LATERAL PIPE (NON-PRESSURE) FITTINGS TO BE SCHEDULE 40.

29. ALL PVC SCHEDULE 40 AND SCHEDULE 80 FITTINGS TO BE LASCO OR APPROVED EQUAL.

30. ALL THREADED JOINTS SHALL BE WRAPPED WITH TEFLON TAPE UNLESS OTHERWISE SPECIFIED BY THE MANUFACTURER. USE LIQUID TEFLON ON METAL PIPE THREADS ONLY.

31. TREES SHALL BE ON SEPARATE VALVES FROM SHRUBS/CACTI/& GROUND COVERS. CONTAINER PLANTS SHALL BE ON SEPARATE VALVES. ANNUAL (FLOWER) BEDS SHALL BE ON SEPARATE VALVES.

32. FLUSH ALL LINES PRIOR TO THE INSTALLATION OF EMITTERS

33. INSTALL EMITTERS ON THE UPHILL SIDE OF PLANT MATERIAL.

34. INSTALL EMITTERS 6" FROM THE CENTERLINE OF SHRUBS AND 24" FROM TREE CENTERLINES

35. INSTALL EMITTERS PER THE IRRIGATION SYSTEM DETAILS AND SPECIFICATIONS.

36. ALL LOW VOLTAGE CONTROL WIRE TO BE #14-1 AWG UF 600 DIRECT BURIAL. COMMON WIRE TO BE #12-1 AWG UF 600 DIRECT BURIAL. CONTROL TO BE RED, COMMON TO BE WHITE. PROVIDE TWO SPARE GREEN #14-1 AWG DIRECT BURIAL WIRES FROM THE CONTROLLER ALONG THE ENTIRE LENGTH OF THE MAINLINE LOOPED INTO EACH VALVE BOX

37. WIRE CONNECTIONS SHALL BE MADE AT REMOTE CONTROL VALVE BOXES AND IRRIGATION CONTROLLERS. NO SPLICING OF WIRE IS PERMITTED UNLESS THE RUN LENGTH EXCEEDS 2,500 FEET. ANY REQUIRED WIRE SPLICES SHALL BE PLACED IN ROUND 10" DIA. TAN COLOR VALVE BOXES WITH BOLT DOWN T-COVERS. COVERS SHALL BE EMBOSSED WITH LETTERS "WS" USING 1" HEIGHT STENCILED LETTERS VIA STYLUS TIP TORCH OR SIMILAR.

38. ALL LOW VOLTAGE WIRE CONNECTIONS SHALL BE MADE WITH #DBY-6 DIRECT BURY SPLICE KITS AS MANUFACTURED BY 3M ELECTRICAL PRODUCTS OR APPROVED EQUAL.

39. PLACE GATE VALVES IN ROUND VALVE BOXES AS SHOWN IN THE PROJECT DETAILS.

40. ALL VALVE BOXES SHALL HAVE BOLT DOWN LOCKING T-COVERS AND BE TAN COLOR

41. MAINTAIN AS-BUILT PLANS OF IRRIGATION ON A DAILY BASIS, NOTING ALL CHANGES REGARDING INSTALLATION OF SYSTEM THAT DIFFER FROM PLANS. UPON FINAL ACCEPTANCE OF PROJECT BY TOWN OF FOUNTAIN HILLS, CONTRACTOR SHALL TURN IN ALL AS-BUILTS ON PLANS ON A REPRODUCIBLE SET OF MYLAR OR APPROVED MEDIUM PER TOWN

42. SUPPLY THE FOLLOWING MATERIALS TO THE OWNER AT FINAL WALK THROUGH/BEGINNING OF WARRANTY-MAINTENANCE:
    1. TWO KEYS FOR EACH IRRIGATION CONTROLLER
    2. TWO QUICK COUPLER VALVE KEYS WITH HOSE SWIVELS AND TWO LOCKING COVER KEYS
    3. TEN OF EACH BUBBLER/EMITTER TYPE AND FLOW RATE USED
    4. OPERATING/OWNERS/PARTS MANUALS FOR CONTROLLERS, MASTER VALVE, CONTROL VALVES, BALL VALVES, BUBBLERS AND EMITTERS
    5. APPROVED BACKFLOW TEST CERTIFICATION

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5/31/17

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Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

IRRIGATION NOTES

DRAWN BY	K. BALLIN
REVIEWED BY	K. BALLIN
APPROVED BY	J. ENGELMANN
SCALE	N/A
DATE	05/31/2017
J2 PROJECT NO.	16.0087.003
DRAWING NO.	IR-1.01
SHEET NO.	53 of 58

IRRIGATION LEGEND

SYMBOL	DESCRIPTION	REMARKS
M	WATER METER	NEW 3" WATER METER BOX & LID, CURB STOP, & COPPER OUTLET PIPE TO BACKFLOW INSTALLED BY CONTRACTOR. METER SHALL BE INSTALLED BY TOWN IN FUTURE ONCE POTABLE WATER SOURCE IS AVAILABLE - SEE WATER LINE PLAN
	REDUCED PRESSURE BACK FLOW ASSEMBLY	NEW 1" R.P. BACKFLOW WITH ENCLOSURE - SEE WATER LINE PLAN
	ISOLATION VALVE	WILKINS BRASS BALL VALVE WITH UNION & SS STEEL HANDLE. #350LUSH - SIZE PER MAINLINE
C	CONTROLLER	WEATHERMATIC 24 STA. CONTROLLER #1624 SMARTLINE WITH #SLW3 WIRELESS WEATHER STATION- INDOOR WALL MOUNTED IN RESTROOM BLDG. CHASE ROOM
MV	MASTER VALVE	RAINBIRD 1" MASTER VALVE: 1"-100-PEB
	AIR/VACUUM RELIEF VALVE	JAIN 1" RELIEF VALVE WITH 1" MPT #APV-1
	EMITTER CONTROL VALVE- DRIP	RAINBIRD 1" CONTROL VALVE: 1"-100-PEB WITH APV Y-FILTER: #XFM-1BM-200
	PRESSURE REGULATOR	SENNINGER 35 PSI PRE-SET PRESSURE REGULATOR @ 0.1-8 GPM #PRL-25, 3/4"
	QUICK-COUPLING VALVE	RAINBIRD 1" QUICK COUPLER #44LRC W/ LOCKING COVER; WITH 1" VALVE KEY 44K & 1" HOSE SWIVEL SH-1
NOT SHOWN	MULTI-PORT EMITTER	RAINBIRD MULTI-PORT EMITTER SEE EMITTER SCHEDULE FOR SIZE & QUANTITIES.
NOT SHOWN	SINGLE-PORT EMITTER	RAINBIRD SINGLE-PORT EMITTER. SEE EMITTER SCHEDULE FOR SIZE & QUANTITIES.
	END LINE FLUSH VALVE	3/4" PVC FLUSH BALL VALVE WITH 3/4" MALE HOSE THREAD OUTPUT
	MAINLINE PIPE	1 1/2" OR 1" SCHEDULE 40 PVC (SIZE AS NOTED)
	SUBMAIN PIPE- TREE	1" SCHEDULE 40 PVC (UNLESS OTHERWISE NOTED)
	SUBMAIN PIPE- SHRUB/CACTI	1" SCHEDULE 40 PVC (UNLESS OTHERWISE NOTED)
	LATERAL PIPE- TREE	3/4" SCHEDULE 40 PVC (UNLESS OTHERWISE NOTED)
	LATERAL PIPE- SHRUB/CACTI	3/4" SCHEDULE 40 PVC (UNLESS OTHERWISE NOTED)
	SLEEVES- PS= PIPE SLEEVES WS= WIRE SLEEVES	SCHEDULE 40 PVC PIPES- SIZE AS NOTED PER PLANS & INSTALL AT PIPE DEPTH OR 36" MIN DEPTH UNDER ALL DRIVE SURFACES

VALVE KEY

TREE — INDICATES APPLICATION

4-1 — INDICATES CONTROLLER/STATION NO

1" 6 — INDICATES LATERAL DISCHARGE IN GPM

INDICATES VALVE SIZE IN INCHES

NOTES:

1. ALL IRRIGATION EQUIPMENT TO BE INSTALLED PER STANDARD IRRIGATION DETAILS AND PER MANUFACTURER'S SPECIFICATIONS
2. ALL SPECIFIED MANUFACTURED ITEMS ARE FOR PURPOSE OF IMPLYING DESIGN INTENT ONLY. ALL ITEMS TO BE BID AS NOTED OR AS AN APPROVED EQUAL PRODUCT PER THE APPROVAL OF THE TOWN OF FOUNTAIN HILLS OR TOWN'S REPRESENTATIVE.
3. SEE RESTROOM ELECTRICAL PLANS FOR 120VAC POWER SUPPLY TO NEW IRRIGATION CONTROLLER MOUNTED ON EXTERIOR WALL INSIDE OF RESTROOM BUILDING CHASE ROOM
4. ALL CONTROL WIRES TO BE SLEEVED SEPARATELY IN 1" SCH. 40 PVC CONDUIT IN SAME TRENCH AND PARALLEL TO ALL PIPE SLEEVES AS NECESSARY.
5. ALL VALVE BOXES SHALL BE TAN COLOR WITH LOCKING T-STYLE COVERS AND VALVE TYPE/STATION # EMBEDDED INTO COVER WITH 1" STENCILED LETTERS/NUMBERS.

EMITTER SCHEDULE

SALVAGED TREES & CACTI-	QTY. / TYPE	PORTS / VOLUME
CARNEGIEA GIGANTEA SAGUARO	1 / SINGLE	1 / 1 GPH
FEROCACTUS WISLIZENII FISHHOOK BARREL	1 / SINGLE	1 / 1 GPH
FOUQUIERIA SPLENDENS OCOTILLO	1 / SINGLE	1 / 1 GPH
NEW TREES-	**QTY. / TYPE**	**PORTS / VOLUME**
CERCIDIUM MICROPHYLLUM FOOTHILLS PALO VERDE	1 / MULTI	6 / 1 GPH
CERCIDIUM MICROPHYLLUM FOOTHILLS PALO VERDE	1 / MULTI	6 / 1 GPH
DALBERGIA SISSOO ROSEWOOD	1 / MULTI	6 / 1 GPH
NEW SHRUBS/GROUNDCOVERS-	**QTY. / TYPE**	**PORTS / VOLUME**
BAILEYA MULTIRADIATA DESERT MARIGOLD	1 / SINGLE	1 / 1 GPH
ENCELIA FARINOSA BRITTLEBUSH	1 / SINGLE	1 / 1 GPH
SIMMONDSIA CHINENSIS 'VESTA' COMPACT JOJOBA	1 / SINGLE	1 / 1 GPH
SPHAERALCEA AMBIGUA 'LOUIS HAMILTON'	1 / SINGLE	1 / 1 GPH

NOTES:

1. SEE EMITTER DETAILS (IRRIGATION DETAILS) FOR EMITTER SPECIFICATIONS AND LAYOUTS.
2. ADJUST IRRIGATION OPERATING TIMES TO ACCOMMODATE PLANT MATURITY, SOIL TYPE, PLANT EXPOSURE, SLOPE CONDITIONS, AND SEASONAL REQUIREMENTS
3. ALL EMITTERS SHALL BE PRESSURE-COMPENSATING EMITTERS

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PROJECT: Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

TITLE: IRRIGATION SUMMARY

SEAL

NO	DATE	DESCRIPTION
1	10/26/16	60% REVIEW
2	12/15/17	100% REVIEW
3	03/06/18	REVISED SUBMITTAL
4	04/06/18	90% REVIEW
5	05/31/18	90% SET

DRAWN BY: K. WALLS
DESIGNED BY: K. WALLS
APPROVED BY: J. ENGELMANN
SCALE: N/A
DATE: 05/31/2018

J2 PROJECT NO.: 16 0897 002

DRAWING NO.: IR-1.02
SHEET NO.: 54 of 58

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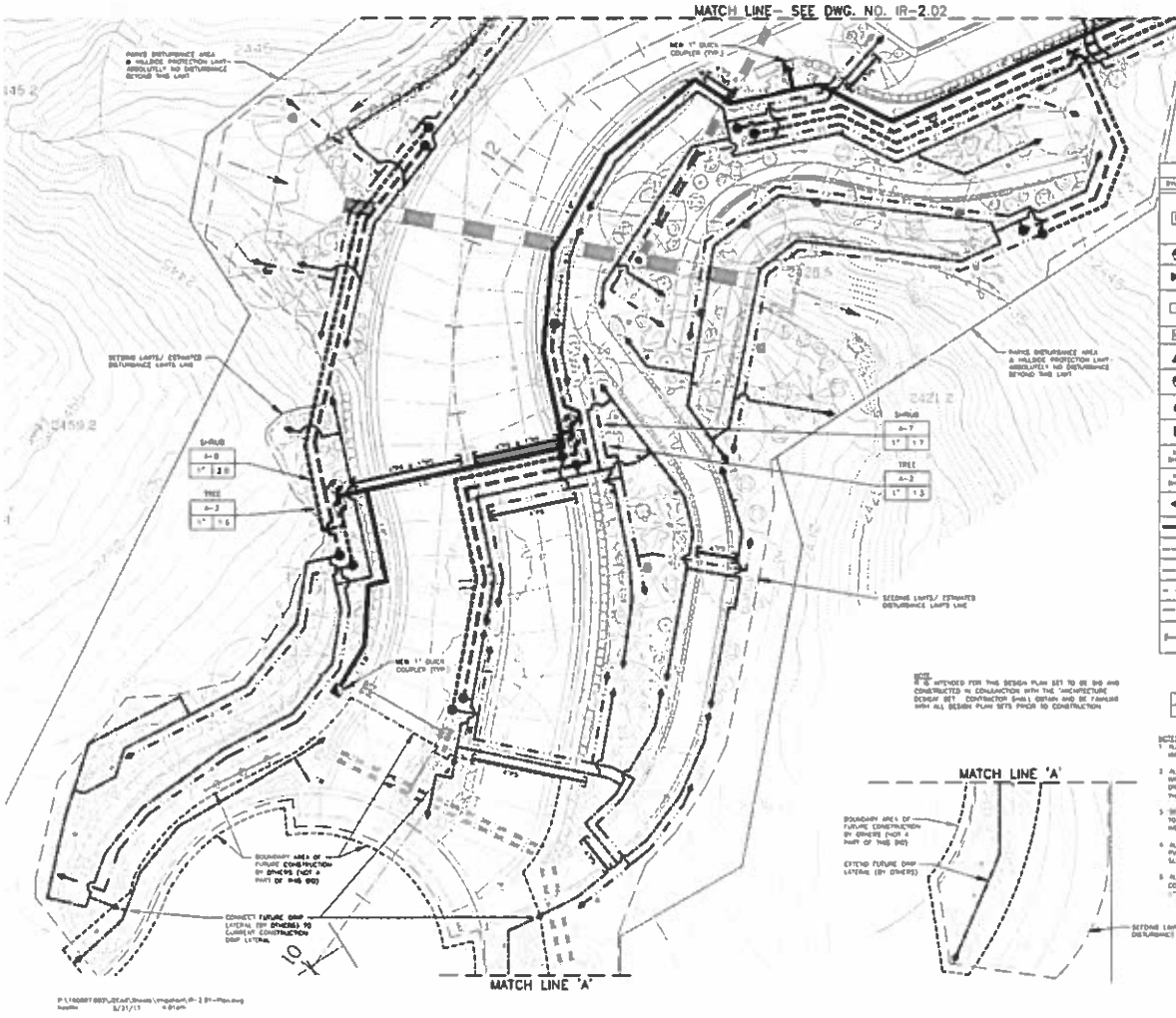
Jeremy 5/31/18 4:00pm



IRRIGATION LEGEND

SYMBOL	DESCRIPTION	REMARKS
M	METER METER	METER 2" WATER METER PER A.W.S. STD. DWG. [illegible] & SCHEDULE 40 PVC PIPE 18" BELOW GRADE. METER INSTALLED BY TOWN OF FOUNTAIN HILLS CONTRACTOR. METER SHALL BE INSTALLED BY TOWN OF FOUNTAIN HILLS PRIOR TO WATER SOURCE BEING AVAILABLE.– SEE WATER LINE PLAN
	REDUCED PRESSURE BACK FLOW PREVENTER	NEW 1" R.P. BACKFLOW WITH ENCLOSURE– SEE WATER LINE PLAN
	ISOLATION VALVE	ORLIGHT BRASS BALL VALVE WITH WRENCH & AS STYLE HANDLE. PROVIDE – SIZE PER MAINLINE
C	CONTROLLER	WEATHER MATIC 24 STA. CONTROLLER # [illegible] SMARTLINE WITH FIELD UNITS FOR WEATHER & SENSORS. PROVIDE WALL MOUNTED IN RESTROOM BLDG. EQUAL BOOM
	WATER VALVE	GRANBERG 1" WATER VALVE. 1"– 100-PYB
	VACUUM RELIEF VALVE	[illegible] 1" RELIEF VALVE WITH 1" [illegible]
	INFTER CONTROL VALVE – GRAY	GRANBERG 1" CONTROL VALVE. 1"–100-PYB WITH [illegible]
	PRESSURE REGULATOR	[illegible] 25 PSI PRE-SET PRESSURE REGULATOR @ 0.1–0 GPM [illegible] 3/4"
	QUICK–COUPLING VALVE	GRANBERG 1" BRASS COUPLER EQUAL W/ LOCKING COVER WITH 1" VALVE KEY CAN 0 1" HOSE SWIVEL [illegible]
NOT SHOWN	BULB–PORT SNITTER	GRANBERG BULB–PORT SNITTER PER DETAIL & SCHEDULE [illegible]
NOT SHOWN	SINGLE–PORT SNITTER	GRANBERG SINGLE–PORT SNITTER PER DETAIL & SCHEDULE [illegible]
	END LINE FLUSH VALVE	3/4" PVC FLUSH BALL VALVE WITH 3/4" MALE HOSE THREAD OUTPUT
	MAINLINE PIPE	1.6" OR 1" SCHEDULE 40 PVC (NOT AS NOTED)
	SUBMAIN PIPE – TREE	1" SCHEDULE 40 PVC (UNLESS OTHERWISE NOTED)
	SUBMAIN PIPE – SHRUB/EACH	1" SCHEDULE 40 PVC (UNLESS OTHERWISE NOTED)
	LATERAL PIPE – TREE	3/4" SCHEDULE 40 PVC (UNLESS OTHERWISE NOTED)
	LATERAL PIPE – SHRUB/EACH	3/4" SCHEDULE 40 PVC (UNLESS OTHERWISE NOTED)
	SLEEVES– PVC PIPE SLEEVES PVC WIRE SLEEVES	SCHEDULE 40 PVC PIPE– SIZE AS NOTED PER PLANS & INSTALL 24 INCH DEPTH OR 36" AND DEPTH UNDER ALL DRIVE SURFACES

VALVE KEY

TYPE — INDICATES APPLICATION
A–1 — INDICATES CONTROLLER/STATION NO.
1" 8.0 — INDICATES LATERAL DISCHARGE IN GPM
— INDICATES VALVE SIZE IN INCHES

NOTES:

1. ALL IRRIGATION EQUIPMENT TO BE INSTALLED PER STANDARD IRRIGATION DETAILS AND PER MANUFACTURER'S SPECIFICATIONS
2. ALL SPRINKLER MANUFACTURED ITEMS ARE FOR PURPOSE OF IMPLYING DESIGN INTENT ONLY. ALL ITEMS TO BE BID AS NOTED OR AS AN APPROVED EQUAL PRODUCT PER THE APPROVAL OF THE TOWN OF FOUNTAIN HILLS OR TOWN'S REPRESENTATIVE
3. SEE RESTROOM ELECTRICAL PLANS FOR 120VAC POWER SUPPLY TO NEW IRRIGATION CONTROLLER MOUNTED ON EXTERIOR WALL INSIDE OF RESTROOM BUILDING EMPLOYEE ROOM
4. ALL CONTROL WIRES TO BE BUNDLED SEPARATELY IN 1" SCH. 40 PVC CONDUIT IN SAME TRENCH AND PARALLEL TO ALL PIPE SLEEVES AS NECESSARY
5. ALL VALVE BOXES SHALL BE TAN COLOR WITH LOCKING 1-STYLE COVERS AND VALVE TYPE/STATION # IMBEDDED INTO COVER WITH 1" STENCILED LETTERS/NUMBERS

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PROJECT
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

TITLE
IRRIGATION PLAN

SEAL
LICENSED LANDSCAPE ARCHITECT
EXPIRES 06/30/2017

NO.	MM/DD/YR	DESC
1	05/20/14	DES REVIEW
2	05/27/14	[illegible] REVIEW
3	06/06/17	[illegible] SUBMITTAL
4	06/30/17	[illegible] WITH [illegible]
5	08/31/17	[illegible]

DRAWN BY K. BALL
DESIGNED BY K. BALL
APPROVED BY J. ENGELMAN
SCALE 1"=10'
DATE 05/31/201[illegible]
J2 PROJECT NO. 16 0097 [illegible]
DRAWING NO. IR-2.01
SHEET NO. 55 of 58

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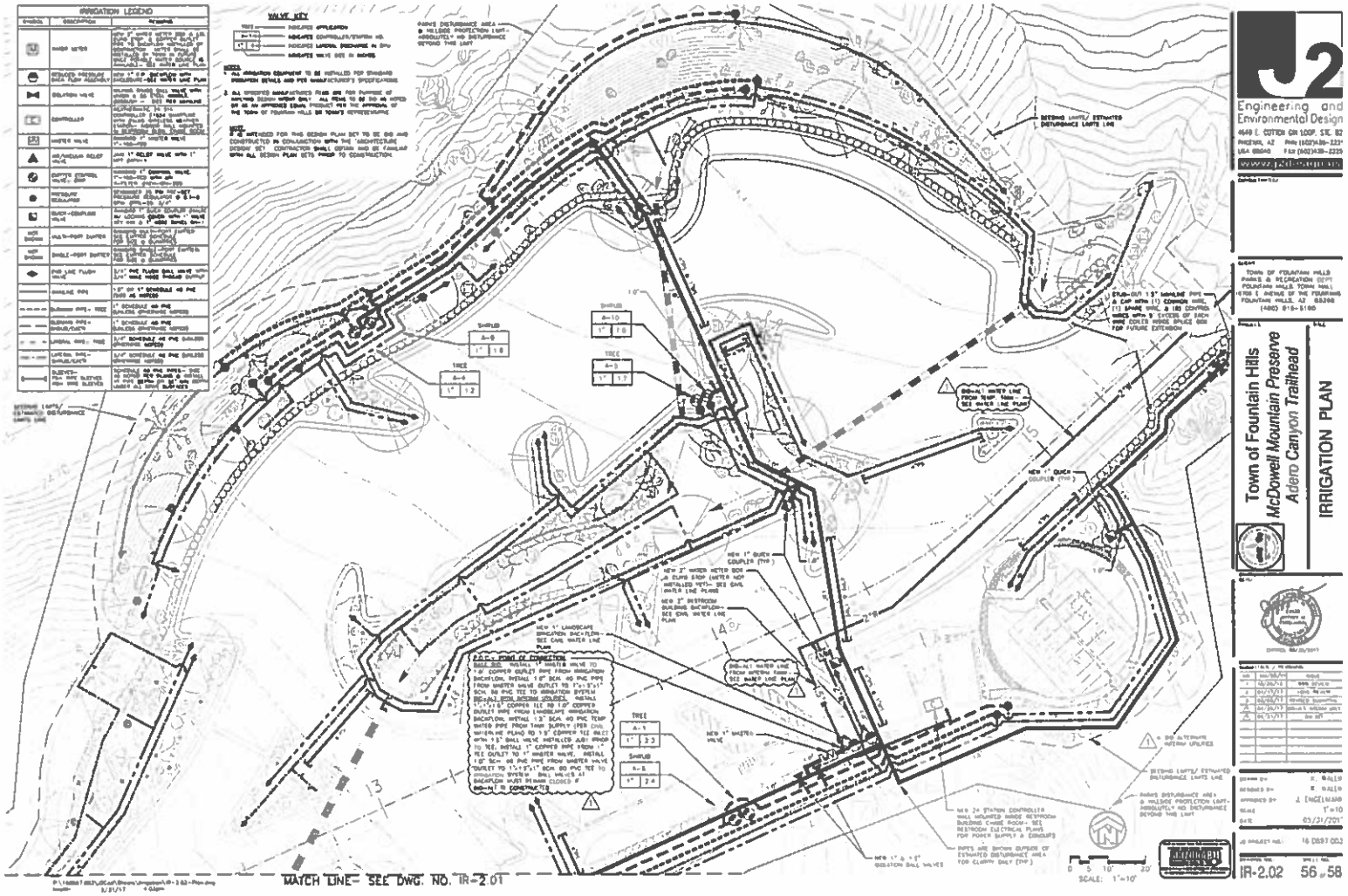
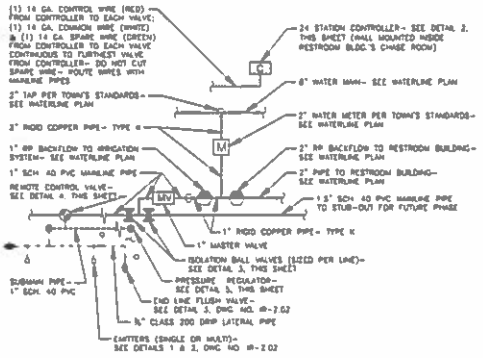
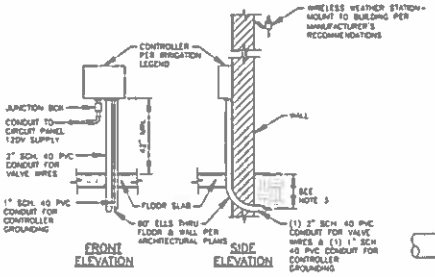
[illegible] 8/31/17 [illegible]


IRRIGATION LEGEND
VALVE KEY
MATCH LINE- SEE DWG. NO. IR-2.01
SCALE: 1"=10'
Engineering and Environmental Design
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead
IRRIGATION PLAN
IR-2.02
56 of 58

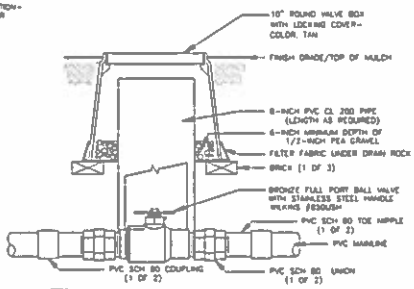


SCHEMATIC LAYOUT (1)
SCALE: N.T.S.



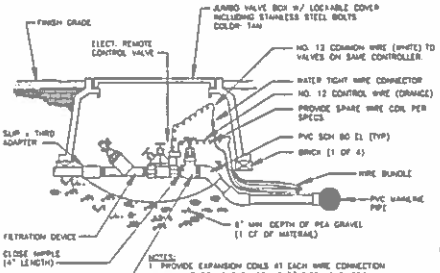
NOTE:
1. MOUNT AND INSTALL CONTROLLER INSIDE RESTROOM BUILDING CHASE ROOM AND INSTALL PER MANUFACTURER'S SPECIFICATIONS.
2. ALL WIRING TO BE INSTALLED PER CODE.
3. CONDUIT SLEEVE THROUGH WALL/SLAB PER ARCHITECTURAL PLANS. MINIMUM DIMENSION FOR CONDUIT BELOW GRADE SHALL MEET LOCAL CODE REQUIREMENTS
4. CONTROLLER SHALL INCLUDE LIGHTING PROTECTION
5. SEE IRRIGATION LEGEND ON DWG. NO. IR-1.02 FOR SUGGESTED MANUFACTURER AND MODEL INFORMATION.

CONTROLLER ASSEMBLY WALL MOUNT (2)
SCALE: N.T.S.



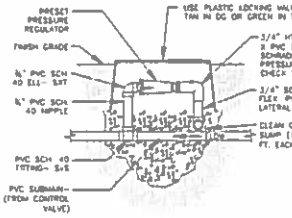
NOTES:
1. NOMINAL SIZE OF BALL VALVE TO MATCH NOMINAL MAINLINE SIZE.
2. VALVE BOX TO INCLUDE STAINLESS STEEL BOLT AND WASHER
3. SET VALVE BOX FLUSH WITH FINISH GRADE IN NATIVE AREAS.
4. COMPACT SOIL AROUND BOX TO SAME DENSITY AS UNDISTURBED ADJACENT SOIL.
5. EMBOSS COVER WITH "BV" IN 1-INCH HIGH STENCIL LETTERS USING STYLUS TIP TORCH.
6. SEE IRRIGATION LEGEND ON DWG. NO. IR-1.02 FOR SUGGESTED MANUFACTURER AND MODEL INFORMATION
7. INSTALL PER MANUFACTURER'S SPECIFICATIONS.

ISOLATION BALL VALVE (3)
SCALE: N.T.S.



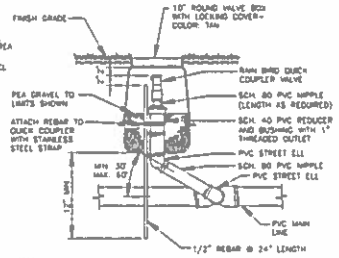
NOTES:
1. PROVIDE EXPANSION COILS AT EACH WIRE CONNECTION IN VALVE BOX (WRAP AROUND 3/4" PIPE 13 TIMES)
2. STEP-UP VALVE WITH 45° FITTINGS TO MAINTAIN 6" BETWEEN VALVE AND TOP OF BOX
3. VALVE BOX TO INCLUDE STAINLESS STEEL BOLT AND WASHER.
4. SET VALVE BOX FLUSH WITH FINISH GRADE IN NATIVE AREAS
5. EMBOSS COVER WITH 1-INCH HIGH STENCIL NUMBERS USING STYLUS TIP TORCH. NUMBERS TO CORRESPOND WITH VALVE NUMBERS ON IRRIGATION PLANS AND CONTROLLER STATION NUMBER
6. SEE IRRIGATION LEGEND ON DWG. NO. IR-1.02 FOR SUGGESTED MANUFACTURER AND MODEL INFORMATION
7. INSTALL PER MANUFACTURER'S SPECIFICATIONS

EMITTER CONTROL VALVE ASSEMBLY (4)
SCALE: N.T.S.



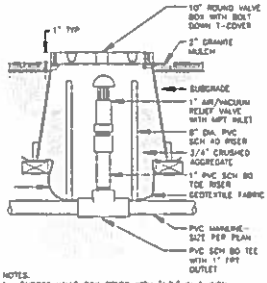
NOTES:
1. CONTRACTOR SHALL PROVIDE OWNER WITH AN ASSEMBLED UNIT MADE UP OF ONE LIQUID FILL 0-100 P.S.I. PRESSURE GAUGE, A 3' PRESSURE AIR HOSE AND A SCHRADER AUTOMOTIVE TIRE VALVE CONNECTOR.
2. SEE IRRIGATION LEGEND ON DWG. NO. IR-1.02 FOR SUGGESTED MANUFACTURER AND MODEL INFORMATION.

PRESSURE REGULATOR (5)
SCALE: N.T.S.



NOTES:
1. NOMINAL SIZE OF QUICK COUPLER TO MATCH NOMINAL MAINLINE SIZE.
2. VALVE BOX TO INCLUDE STAINLESS STEEL BOLT AND WASHER
3. SET VALVE BOX FLUSH WITH FINISH GRADE IN NATIVE AREAS.
4. COMPACT SOIL AROUND BOX TO SAME DENSITY AS UNDISTURBED ADJACENT SOIL.
5. EMBOSS COVER WITH "Q.C." IN 1-INCH HIGH STENCIL LETTERS USING STYLUS TIP TORCH.
6. SEE IRRIGATION LEGEND ON DWG. NO. IR-1.02 FOR SUGGESTED MANUFACTURER AND MODEL INFORMATION
7. INSTALL PER MANUFACTURER'S SPECIFICATIONS.

QUICK COUPLER (6)
SCALE: N.T.S.



NOTES:
1. EMBOSS VALVE BOX COVER WITH "A.R." IN 1-INCH HIGH STENCIL LETTERS USING STYLUS TIP TORCH

AIR/VACUUM RELIEF VALVE (7)
SCALE: N.T.S.

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PROJECT: Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

TITLE: IRRIGATION DETAILS

1	10/20/14	ADD REVISED
2	05/17/17	100% REVIEW
3	05/26/17	90% REVIS. SUBMITTAL
4	06/26/17	100% REVIS. SUBMITTAL
5	08/31/17	AS BUILT

DRAWN BY: K. HALLIN
DESIGNED BY: K. HALLIN
APPROVED BY: J. ENGELMANN
SCALE: N.T.S.
DATE: 05/31/2017

J2 PROJECT NO: 16 0897 003
DRAWING NO.: IR-3.01
SHEET NO.: 57 of 58

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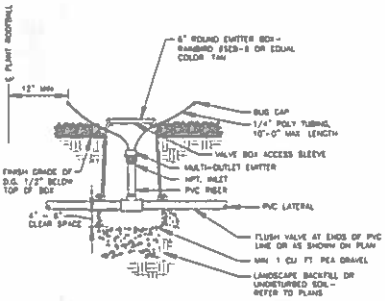
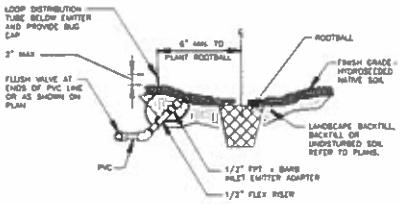
Sep 06, 2017 - 8:32am

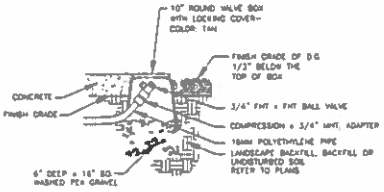


NOTES:
1. PLACE EMITTER OUTSIDE OF ROOTBALL ON UPHILL SIDE OF PLANT.
2. REFER TO PLANTING PLAN, SPECIFICATIONS, AND PLANT EMITTER SCHEDULE FOR SPECIFIC PLANT EMITTER REQUIREMENTS
3. FLEX PVC CEMENT REQUIRED
4. COMPACT SOIL AROUND VALVE BOX TO SAME DENSITY AS UNDISTURBED ADJACENT SOIL.
5. VALVE BOX SHALL BE SET FLUSH WITH FINISHED GRADE.

MULTI-PORT EMITTER (1)
SCALE: N.T.S.

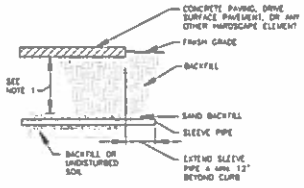


SINGLE-PORT EMITTER (2)
SCALE: N.T.S.



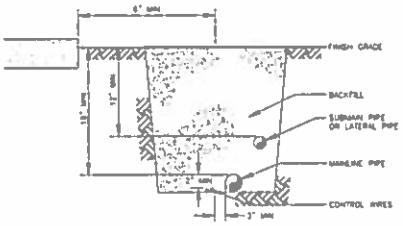
NOTES:
1. COMPACT SOIL AROUND VALVE BOX TO SAME DENSITY AS UNDISTURBED ADJACENT SOIL.
2. VALVE BOX SHALL BE SET FLUSH WITH FINISHED GRADE

END LINE FLUSH VALVE (3)
SCALE: N.T.S.



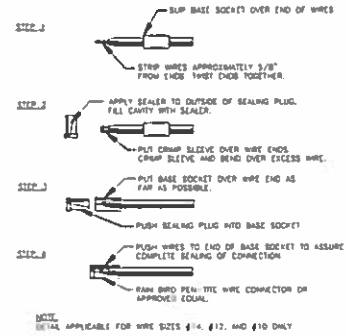
NOTES:
1. ALL SLEEVES UNDER DRIVING SURFACES SHALL BE AT A MINIMUM DEPTH OF 36" BELOW FINISH GRADE AND ALL OTHER SLEEVES SHALL BE AT THE DEPTH OF LOWEST PIPE IN TRENCH.
2. ALL PIPE SLEEVES SHALL BE 4" DIA SCH 40 PVC.
3. SLEEVE ALL ELECTRIC CONTROL WIRE SEPARATELY IN 1" DIA SCH 40 PVC

IRRIGATION SLEEVE (4)
SCALE: N.T.S.



NOTES:
1. ALL PIPE INSTALLATION, TRENCHING, EXCAVATION, BACKFILL AND COMPACTION SHALL CONFORM WITH MAG. SEC. 401.3 AND 601
2. TAPE OPEN WIRE BUNDLES TOGETHER AT 10-FOOT INTERVALS. DO NOT TAPE WIRE BUNDLES WHERE CONTAINED WITHIN SLEEVING.
3. HORIZONTAL SEPARATION BETWEEN ALL PIPE WITHIN COMMON TRENCH SHALL BE 3" MINIMUM
4. SLEEVING (NOT SHOWN) SHALL BE AT DEPTH OF LOWEST PIPE IN TRENCH OR AT 36" MINIMUM DEPTH UNDER ALL DRIVING SURFACES
5. ALL 120 VOLT WIRING SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE LOCAL CODES
6. BACKFILL TOP 6" WITH CLEAN TOPSOIL.
7. BACKFILL PIPE BEDDING AND COVER SHALL NOT CONTAIN ANY ROCKS 1" OR LARGER IN SIZE.

TRENCHING DETAIL (5)
SCALE: N.T.S.



NOTE:
DETAIL APPLICABLE FOR WIRE SIZES #14, #12, AND #10 ONLY

TYPICAL WIRE CONNECTION DETAIL (6)
SCALE: N.T.S.

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USA 85040 FAX (602)438-2226
www.j2engineering.com

OWNER/ARCHITECT
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PARKS & RECREATION DEPT.
FOUNTAIN HILLS TOWN HALL
16705 E. AVENUE OF THE FOUNTAINS
FOUNTAIN HILLS, AZ 85268
(480) 816-5180

PROJECT: Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

TITLE: IRRIGATION DETAILS

No.	DATE	DESCRIPTION
1	02/26/18	90% REVIEW
2	04/27/18	100% REVIEW
3	05/08/18	APPROVED SUBMITTAL
4	07/30/18	100% AS BUILT
5	08/27/18	AS BUILT

DRAWN BY: K. WALLIN
DESIGNED BY: K. WALLIN
APPROVED BY: J. ENGELMANN
SCALE: N.T.S.
DATE: 05/31/2017

J2 PROJECT NO: 16 0097 003
DRAWING NO.: IR-3.02
SHEET NO.: 58 - 58

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Jennifer 5/31/17 4:06pm

TOWN OF FOUNTAIN HILLS, ARIZONA

McDOWELL MOUNTAIN PRESERVE
ADERO CANYON TRAILHEAD
ARCHITECTURAL DESIGN

May 31st, 2017

MAYOR:

LINDA M. KAVANAGH

CITY COUNCIL:

NICK DEPORTER
DENNIS BROWN
ART TOLIS
HENRY LEGER
ALAN MAGAZINE
CECIL YATES

PROJECT CONTACT:

RACHAEL GOODWIN
INTERIM COMMUNITY SERVICES DIRECTOR
TOWN OF FOUNTAIN HILLS
16705 EAST AVENUE OF THE FOUNTAINS
FOUNTAIN HILLS, AZ 85268
(480) 816-5135

DESIGN CONSULTANTS:

PRIMARY DESIGN CONSULTANT:
LANDSCAPE ARCHITECTURE & CIVIL ENGINEERING:
J2 ENGINEERING & ENVIRONMENTAL DESIGN, LLC
4649 EAST COTTON GIN LOOP, SUITE B2
PHOENIX, ARIZONA 85040
(602) 436-2221
www.J2Design.us

DESIGN CONSULTANTS:
ARCHITECT:
CIRCUIT I WINSLOW
3003 N. CENTRAL AVENUE
SIXTEENTH FLOOR
PHOENIX, AZ 85012
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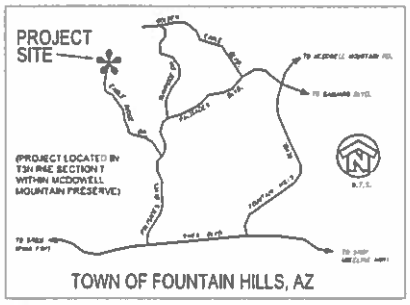
STRUCTURAL ENGINEERING:
CARLISO TURLEY SCOTT INC.
1215 W. RIO SALADO PARKWAY, SUITE 300
TEMPE, AZ 85281
(480) 774-1700
www.cts-2.com

VICINITY MAP:



NOTE:
IT IS INTENDED FOR THIS DESIGN PLAN SET TO BE BID AND CONSTRUCTED IN CONJUNCTION WITH THE 'SITE DESIGN' SET. CONTRACTOR SHALL OBTAIN AND BE FAMILIAR WITH ALL DESIGN PLAN SETS PRIOR TO CONSTRUCTION.

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Phoenix Arizona 85012
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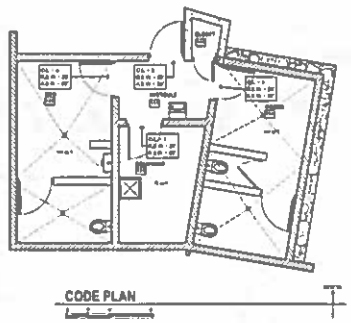
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead
ARCHITECTURAL DESIGN
TITLE SHEET

NO.	DATE	REVISION
1	10/20/16	90% SITE PLAN
2	1/11/17	100% SITE PLAN
3	3/3/17	90% SUBMITTAL
4	4/28/17	90% SUBMITTAL JT'S &

DRAWN BY: Bw
DESIGNED BY: JR
APPROVED BY: RW
SCALE: AS SHOWN
DATE: 3/3/17
J2 PROJECT NO: 16 0887 003

AR-0.00 1 of 23



CODE PLAN

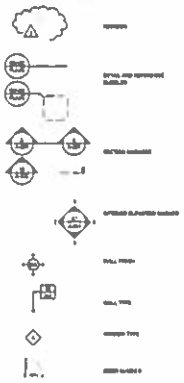
CODE GENERAL NOTES

PROJECT GENERAL NOTES

UDS DISCIPLINE DESIGNATORS

UDS SHEET DESIGNATOR GUIDELINES

TYPICAL SYMBOLS LEGEND



PROJECT DATA

BUILDING CODE DATA

engineering and environmental design
4646 E. COTTON GIN LOOP, STE. 82
PHOENIX, AZ Phone (602)438-2221
USA 85040 FAX (602)438-2225
www.gatesmark

Orcutt I Winslow
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FOUNTAIN HILLS, AZ 85268
(480) 816-5252

Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

project info, code plan, code analysis

1	[illegible]	[illegible]
2	[illegible]	[illegible]
3	[illegible]	[illegible]
4		

DESIGNED BY: [illegible]
DRAWN BY: [illegible]
APPROVED BY: [illegible]
SCALE: AS SHOWN
DATE: 3/3/17
PROJECT NO.: 16 0887 003

AR-0.01 2 of 23

GENERAL STRUCTURAL NOTES

ABBREVIATIONS

BUILDING CODE

LOADS

FOUNDATIONS

CONCRETE

STRUCTURAL STEEL

MASONRY

WOOD

SPECIAL INSPECTIONS – STRUCTURAL ONLY

GENERAL NOTES

LOCATION OF DETAILS

		GENERAL STRUCTURAL NOTES
		FOUNDATION PLAN
		FOUNDATION DETAILS
		ROOF FRAMING DETAILS

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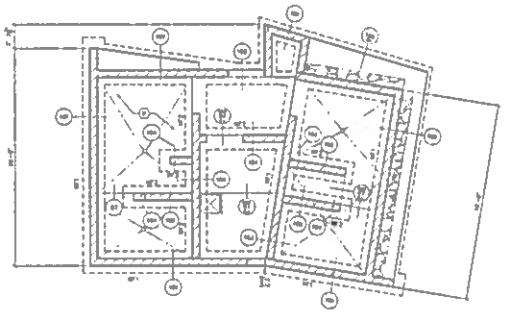
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

RESTROOM GENERAL STRUCTURAL NOTES

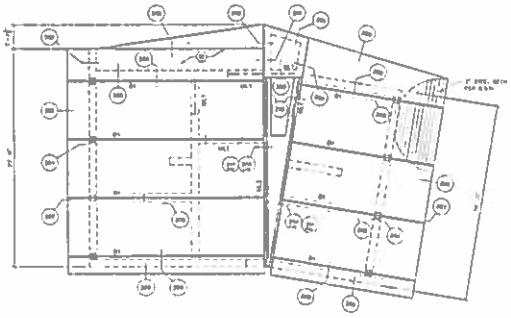
ST-1.01 3 of 23



FOUNDATION PLAN

SCALE: 1/4" = 1'-0"

FOUNDATION AND ROOF FRAMING PLAN KEYNOTES



ROOF FRAMING PLAN

SCALE: 1/4" = 1'-0"

FOUNDATION NOTES & TYP. U.N.O.

CONTINUOUS FOOTING (WF) SCHEDULE

MARK	WIDTH	DEPTH	REINFORCEMENT	REMARKS
WF1	18"	12"	(2) #5 CONTINUOUS	—
WF2	18"	18"	(2) #5 CONTINUOUS	SEE T PER Footing and Pier

GRADE (G) SCHEDULE

MARK	SIZE	LENGTH	REMARKS
G1	4" WIDE FLAT	4 ft	—

HANGER LINTEL (HL) SCHEDULE

MARK	HEIGHT	REINFORCEMENT	REMARKS
HL1	12"	2 #5 CONTINUOUS	—
HL2	24"	4 #5 TOP AND BOTTOM	—

ROOF FRAMING NOTES & TYP. U.N.O.

LOCATION OF DETAILS

		REFERENCE
—	3/T-1.01	GENERAL STRUCTURAL NOTES
—	1/S-2.01	FOUNDATION AND ROOF FRAMING PLANS
1/S-2.01	1/S-2.01	TYPICAL DETAILS
2/S-2.01	2/T-2.01	FOUNDATION DETAILS
3/S-2.01	1/T-2.01	ROOF FRAMING DETAILS

PROJECT NUMBER 16-0197 PROJECT MANAGER RDT
PROJECT ENGINEER DS PROJECT DRAFTER SAE

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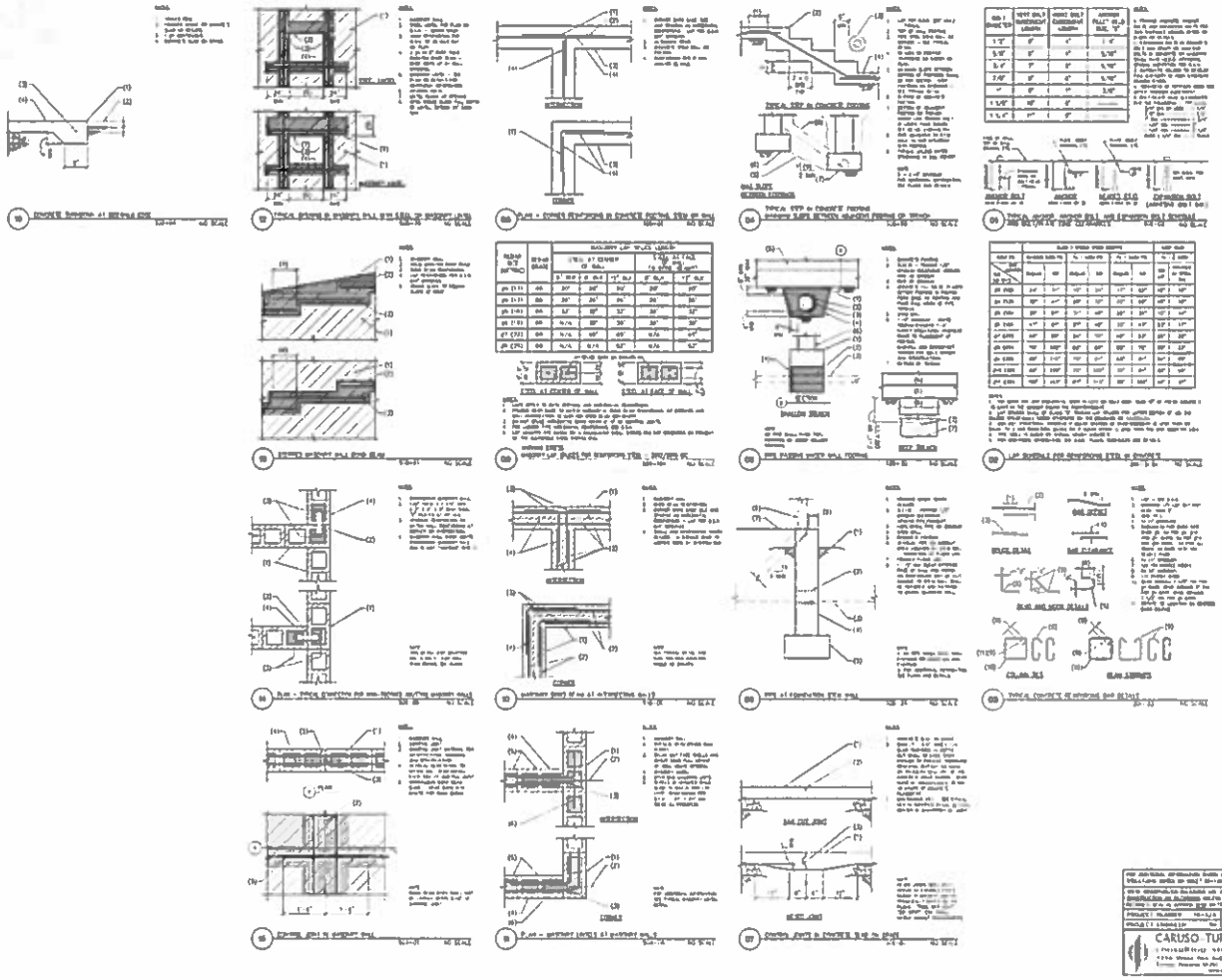
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

RESTROOM FOUNDATION AND FRAMING PLANS

DRAWN BY	SAE
DESIGNED BY	
APPROVED BY	RDT
SCALE	AS SHOWN
DATE	12/7/
JOB NUMBER	16 0197 002
FILE NAME	16124 ST201.dwg
Drawing No.	ST-2.01



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RESTROOM STRUCTURAL TYPICAL DETAILS

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RESTROOM STRUCTURAL FOUNDATION DETAILS

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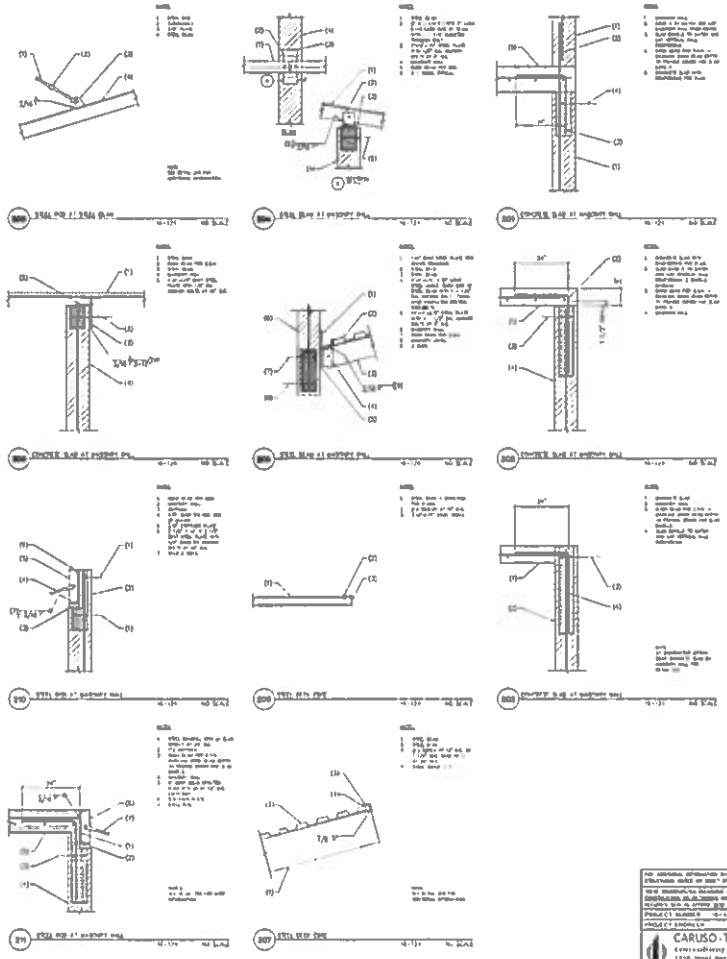
ST-3.02 6 of 23



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RESTROOM STRUCTURAL FRAMING DETAILS

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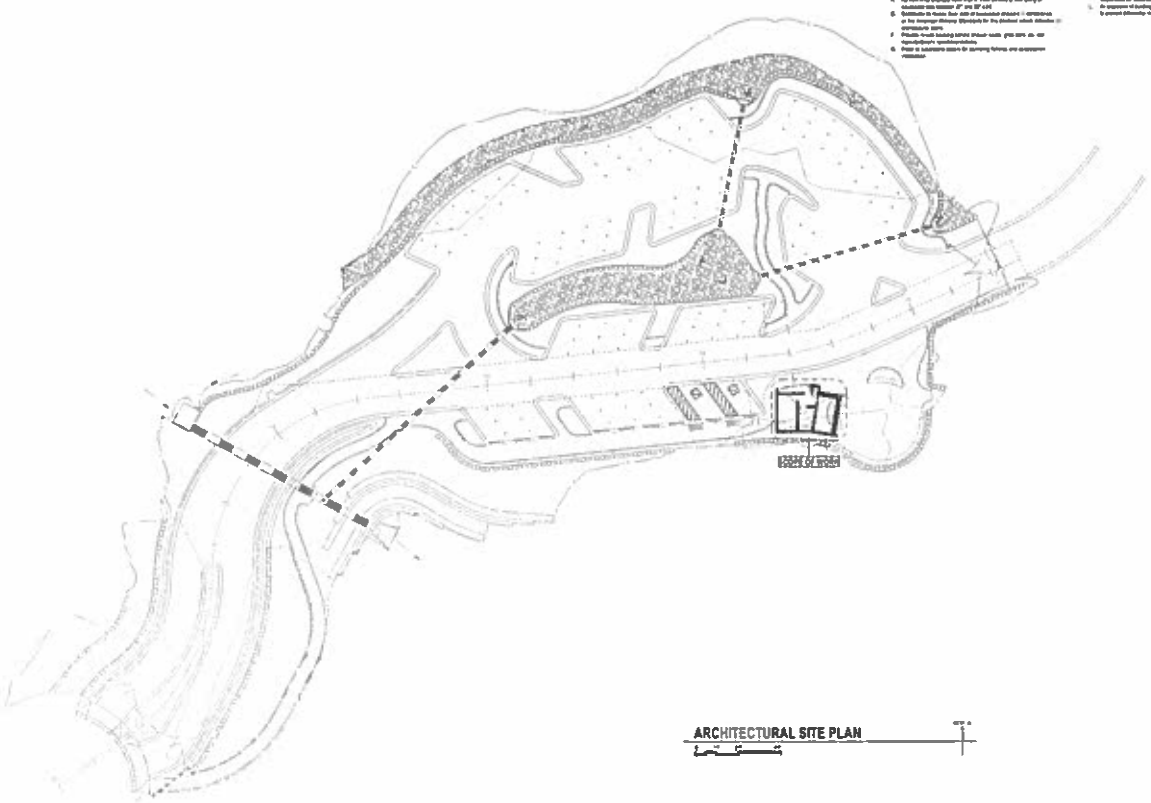
ST-3.03 7 OF 23

ACCESSIBILITY GENERAL NOTES

SITE PLAN GENERAL NOTES



ARCHITECTURAL SITE PLAN

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Town of Fountain Hills
McDowell Mountain Preserve
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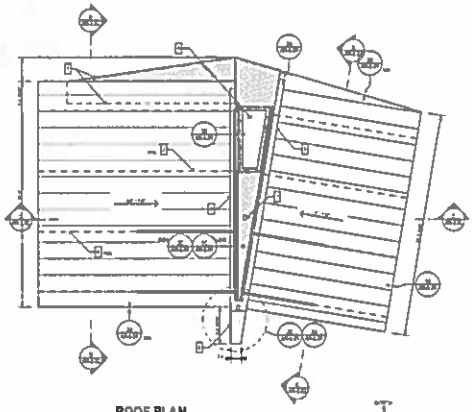
architectural site plan

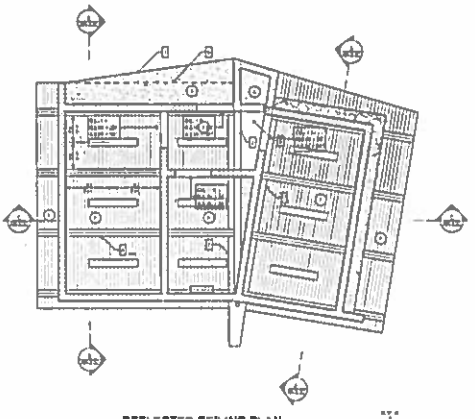
1	5/08/16	90% REVIEW
2	1/10/17	100% REVIEW
3	3/3/17	100% BUILDING PERMIT

DRAWN BY: [illegible]
DESIGNED BY: [illegible]
APPROVED BY: [illegible]
SCALE: AS SHOWN
DATE: 3/3/17
PROJECT NO. 16 0897 003

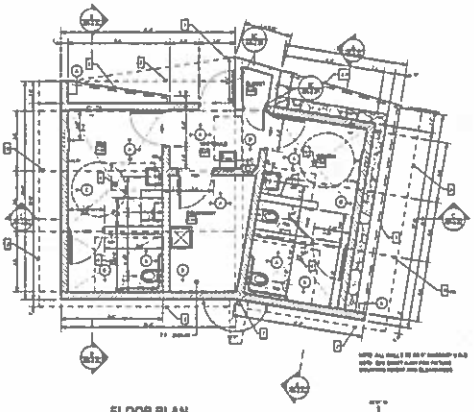
AR-1.01 8 of 23



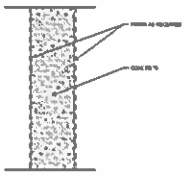
ROOF PLAN



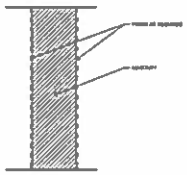
REFLECTED CEILING PLAN



FLOOR PLAN



3C 8" CONCRETE WALL



2C 8" MASONRY WALL

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Phoenix Arizona 85012
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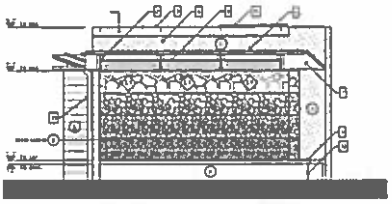
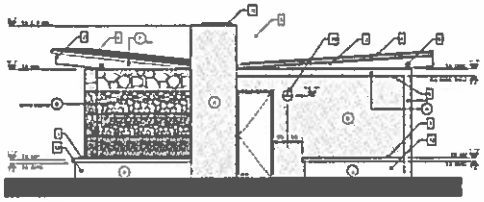
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

restroom floor plan, rcp & roof plan

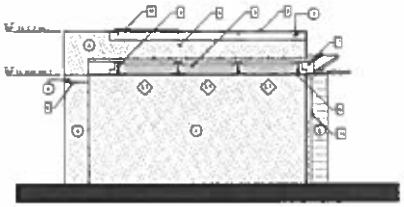
AR-2.01 9 of 23



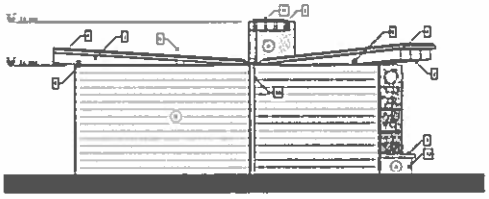
EAST ELEVATION



NORTH ELEVATION



WEST ELEVATION



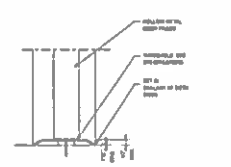
SOUTH ELEVATION

ELEVATION GENERAL NOTES:

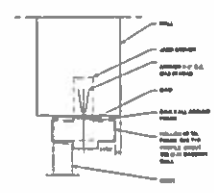
ELEVATION KEYNOTES:

SECTION / ELEVATION LEGEND

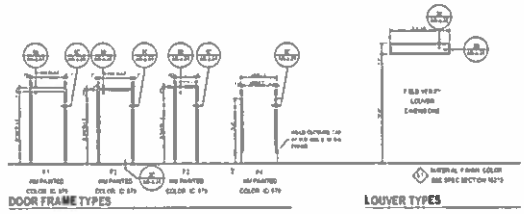
WALL FINISH LEGEND



2C SILL @ EXTERIOR DOOR

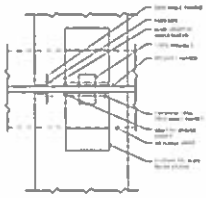


1C 2" DOOR JAMB - HEAD SIM.

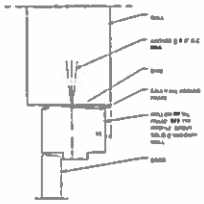


DOOR FRAME TYPES

LOUVER TYPES



2D ALUMINUM LOUVER JAMB



1D 4" DOOR HEAD

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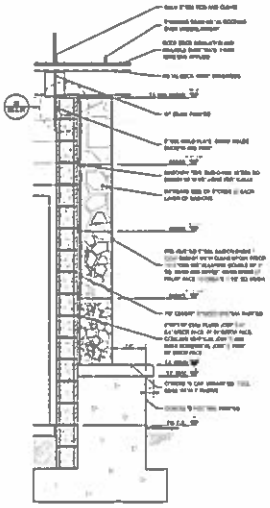
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

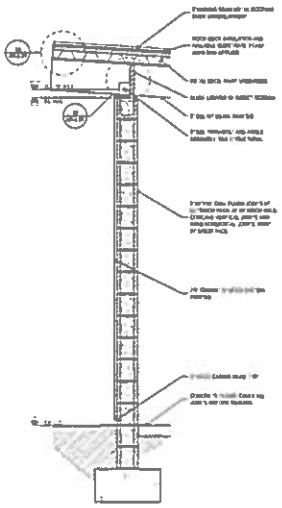
building elevations & door info

AS SHOWN
3/3/17
16 0897 003

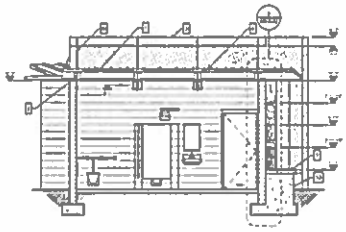
AR-3.01 10 of 23



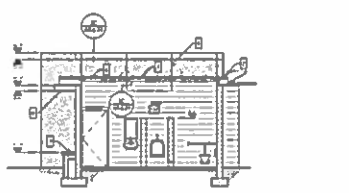
2 WALL SECTION



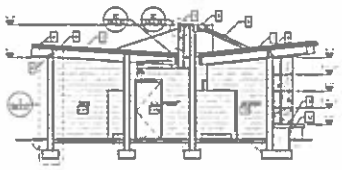
1 WALL SECTION



A SECTION



B SECTION



C SECTION

SECTION GENERAL NOTES:

SECTION KEYNOTES:

SECTION / ELEVATION LEGEND

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FOUNTAIN HILLS, AZ 85268
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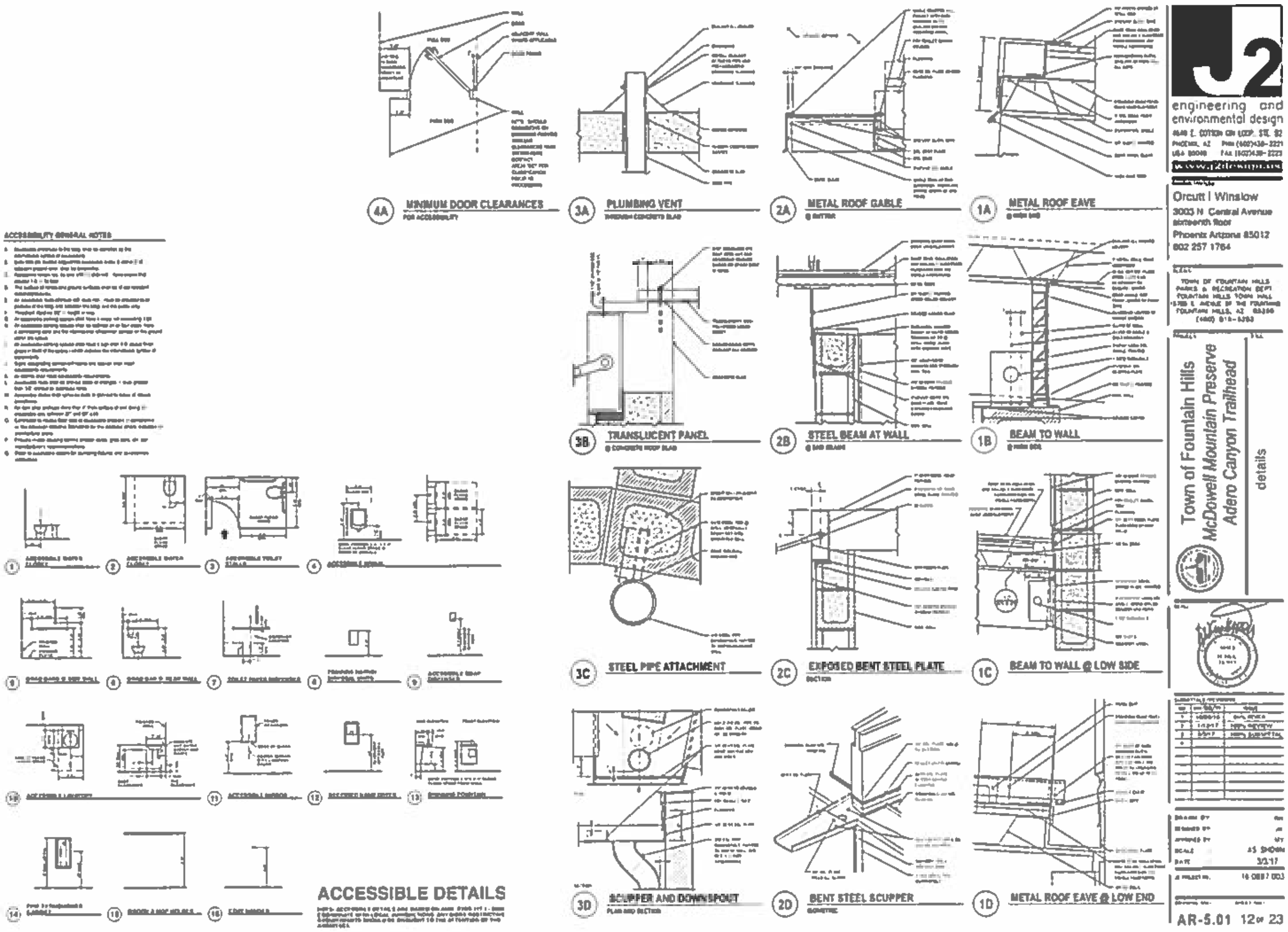
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

building sections & wall sections

NO	DATE	DESCRIPTION
1	[illegible]	[illegible]
2	[illegible]	[illegible]
3	[illegible]	[illegible]

DRAWN BY [illegible]
DESIGNED BY [illegible]
APPROVED BY [illegible]
SCALE AS SHOWN
DATE 3/3/17
J PROJECT NO. 16 0897 003

AR-3.02 11 of 23


4A MINIMUM DOOR CLEARANCES
3A PLUMBING VENT
2A METAL ROOF GABLE
1A METAL ROOF EAVE
3B TRANSLUCENT PANEL
2B STEEL BEAM AT WALL
1B BEAM TO WALL
3C STEEL PIPE ATTACHMENT
2C EXPOSED BENT STEEL PLATE
1C BEAM TO WALL @ LOW SIDE
3D SCUPPER AND DOWNSPOUT
2D BENT STEEL SCUPPER
1D METAL ROOF EAVE @ LOW END
ACCESSIBLE DETAILS
J2
engineering and environmental design
Orcutt | Winslow
3003 N Central Avenue
Phoenix Arizona 85012
602 257 1764
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead
details
AS SHOWN
AR-5.01 12 of 23

MECHANICAL SYMBOL LIST

NOTE: THIS IS A PARTIAL SCHEDULE. NOT ALL SYMBOLS CONTAINED HEREIN MAY APPEAR ON THE DRAWINGS

FOR TO BE REMOVED	CHILLED WATER RETURN PIPING
POINT OF CONNECTION/DISCONNECTION	CHILLED WATER SUPPLY PIPING
SHEET NOTE	CONDENSER WATER RETURN PIPING
REVISION NUMBER	CONDENSER WATER SUPPLY PIPING
EQUIPMENT TAG	HEATING WATER RETURN PIPING
DIFFUSER TAG	HEATING WATER SUPPLY PIPING
ACCESS PANEL	REFRIGERANT LIQUID PIPING
SUPPLY AIR DUCT UP/DOWN	REFRIGERANT SUCTION PIPING
RETURN AIR DUCT UP/DOWN	CONDENSATE DRAIN PIPING
EXHAUST AIR DUCT UP/DOWN	PLASTIC CONDENSATE DRAIN PIPING
RETURN GRILLE	CHECK VALVE
EXHAUST GRILLE	2-WAY ELECTRONIC CONTROL VALVE
4-WAY SLOT SUPPLY DIFFUSER	3-WAY ELECTRONIC CONTROL VALVE
3-WAY SLOT SUPPLY DIFFUSER	2-WAY PNEUMATIC CONTROL VALVE
2-WAY SLOT SUPPLY DIFFUSER	3-WAY PNEUMATIC CONTROL VALVE
1-WAY SLOT SUPPLY DIFFUSER	BALANCING VALVE
AIRFLOW DIRECTION	BUTTERFLY VALVE
ROUND DIFFUSER (NECK SIZE)	PLUG VALVE
RECTANGULAR DIFFUSER (NECK SIZE)	BALL VALVE
ROUND FLEXIBLE DUCT	GLOBE VALVE
ROUND TO SQUARE TRANSITION	GATE VALVE
SINGLE LINE ROUND DUCT	HOSE END DRAIN VALVE
DOUBLE LINE ROUND DUCT (ACOUSTICALLY LINED)	PRESSURE REDUCING VALVE
DOUBLE LINE ROUND DUCT	RELIEF VALVE
DOUBLE LINE ROUND DUCT (ACOUSTICALLY LINED)	TEMPERATURE PRESSURE RELIEF VALVE
STRAIGHT DIRECTION	THERMOMETER
FIRE DAMPER	PRESSURE GAUGE WITH GAUGE COCK
SMOKE DAMPER	MANUAL AIR VENT
FIRE SMOKE DAMPER	PRESSURE TEMPERATURE PORT
MOTORIZED DAMPER (OPPOSED BLADE TYPE)	Y-STRAINER WITH BLOWDOWN
MOTORIZED DAMPER (PARALLEL BLADE TYPE)	PIPE CAPS
BACKDRAFT DAMPER	UNION
MANUAL VOLUME DAMPER	PIPE ANCHOR
REMOTE VOLUME DAMPER	FLEXIBLE CONNECTION
SMOKE DETECTOR	PIPE EXPANSION JOINT
THERMOSTAT	DIRECTION OF FLOW
HUMIDISTAT	PIPE DROP
SENSOR	PIPE UP
CARBON DIOXIDE SENSOR	PIPE TEE UP
CARBON MONOXIDE SENSOR	PIPE TEE DOWN
DOOR CONTACT	
FLOW SWITCH	

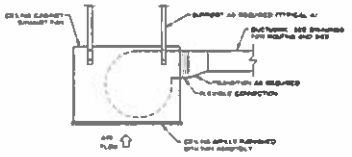
MECHANICAL ABBREVIATIONS

NOTE: THIS IS A PARTIAL SCHEDULE. NOT ALL ABBREVIATIONS CONTAINED HEREIN MAY APPEAR ON THE DRAWINGS.

AABC	AMERICAN AIR BALANCE COUNCIL	IBC	INTERNATIONAL BUILDING CODE	TAB	STATE PROGRAM TRADES BY		
ACD	ACCEPTANCE CONTROL DAMPER	IMC	INTERNATIONAL MECHANICAL CODE	SPECS	SPECIFICATIONS		
AF	AIRFLOW PROVED FLOOR	IPC	INTERNATIONAL PLUMBING CODE	SD	SENSOR		
AP	ACCESS PANEL	INS	INSULATION	SDDT	SENSOR DUCT		
ASHRAE	AMERICAN SOCIETY OF HEATING REFRIGERATING AND AIR CONDITIONING ENGINEERS	LAT	LEAVING AIR TEMPERATURE	SS	STAINLESS STEEL		
		LBS	POUNDS	T	TEMPERATURE		
ASPE	AMERICAN SOCIETY OF PLUMBING ENGINEERS	LIF	LEAVING WATER TEMPERATURE	TAB	TEST AND BALANCE SEAL AND REPORT		
		MAX	MAXIMUM				
BFD	BACKFLOW PREVENTION DEVICE	MBH	000 THOUSAND BTUH	TAP	TOTAL STATIC PRESSURE		
BHP	BRAKE HORSE POWER	MCA	MINIMUM CIRCUIT AMPS	TYP	TYPICAL		
BTUH	BRITISH THERMAL UNIT PER HOUR	MIN	MINIMUM	UBC	UNIFORM BUILDING CODE		
CFM	CUBIC FEET PER MINUTE	MSDS	MANUFACTURER SAFETY DATA SHEET	UFC	UNIFORM FIRE CODE		
CHWR	CHILLED WATER RETURN	MVD	MANUAL VOLUME DAMPER	UMC	UNIFORM MECHANICAL CODE		
CHWS	CHILLED WATER SUPPLY	N.A.	NOT APPLICABLE	UPC	UNIFORM PLUMBING CODE		
CO	CARBON MONOXIDE	NC	NORMALLY CLOSED	VFD	VARIABLE FREQUENCY DRIVE		
CR	CONDENSER WATER RETURN	NEMA	NATIONAL ELECTRICAL MANUFACTURERS BUREAU	WB	WET BULB TEMPERATURE		
CS	CONDENSER WATER SUPPLY			WG	WATER GAUGE		
D	DRAIN	NEC	NATIONAL ELECTRIC CODE	WPD	WATER PRESSURE DROP		
DDC	DIRECT DIGITAL CONTROL	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION	TBD	0 NOTING TO BE DETERMINED		
DWG	DRAWING	NIC	NOT IN CONTRACT				
EW	EDGE	NO	NORMALLY OPEN				
EW	EDGE	NTS	NOT TO SCALE				
FEC	0 NOTING TO REMAIN	OA	OUTSIDE AIR				
EA	EXHAUST AIR	OAT	OUTSIDE AIR TEMPERATURE				
EAT	ENTERING AIR TEMPERATURE	OSD	OPPOSED BLADE DAMPER				
EDDT	EXHAUST DIRECT DATE	PSI	PSIG PSIG DUCT				
EF	EXHAUST	PVC	PLASTIC PLUMBING CONTRACTOR ASSOCIATION				
ELEC	ELECTRICAL	RD	RAINWATER DRAIN				
ESP	EXTERNAL STATIC PRESSURE	PRV	PRESSURE REDUCING VALVE				
EWT	ENTERING WATER TEMPERATURE	RD	RAINWATER				
F	FAHRENHEIT	FDC	FIRE DEPARTMENT CONNECTION				
FD	FIRE DAMPER	FDC	FIRE DEPARTMENT CONNECTION				
FPM	FEET PER MINUTE	FCD	FIRE DAMPER DAMPER				
FSD	FIRE SMOKE DAMPER	FDC	FIRE DEPARTMENT CONNECTION				
GA	GAGE OR GAUGE	FDC	FIRE DEPARTMENT CONNECTION				
GAL	GALLONS	RU	0 NOTING TO BE DETERMINED				
GPM	GALLONS PER MINUTE	RA	RETURN AIR				
GR	GLOBE RETURN	RH	RELATIVE HUMIDITY				
GS	GLOBE SUPPLY	R-12	REFRIGERANT LIQUID-SUCTION				
HP	HEAD	RPM	REVOLUTIONS PER MINUTE				
HP	HORSEPOWER	RPMA	REDUCED PRESSURE PRINCIPAL ASSEMBLY				
HP	HEAD						
HSPF	HEATING SEASONAL PERFORMANCE FACTOR	SHD	SEPARATE VOLUME DAMPER				
		SA	SUPPLY AIR				
HWR	HEATING HOT WATER RETURN	SD	SPACE SENSOR				
HWS	HEATING HOT WATER SUPPLY	SDDT	SEASONAL DIRECT DIGITAL DATE				

DRAWING INDEX

SHEET NUMBER	SHEET TITLE	SHEET ISSUE DATE
ME-0.00	MECHANICAL ABBREVIATIONS AND SHEET LISTS	
ME-0.01	MECHANICAL SPECIFICATIONS	
ME-1.01	MECHANICAL PLANS	
	TOTAL	



ME-0.00 CEILING EXHAUST FAN

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Contractor Info

Seal

Owner

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FOUNTAINS HILLS, AZ 85268
(480) 816-5382

Project

Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

Title

MECHANICAL ABBREVIATIONS AND SHEET LISTS

Seal

No.	Date	Description
1	4/26/16	DHE REVIEW
2	5/3/17	IBWC

DRAWN BY	MSA
DESIGNED BY	MSA
CHECKED BY	PM
SCALE	AS SHOWN
DATE	03/13/2017
J2 PROJECT NO.	16 0897 003
FILE NAME	

ME-0.00 13 of 23

MECHANICAL SPECIFICATIONS

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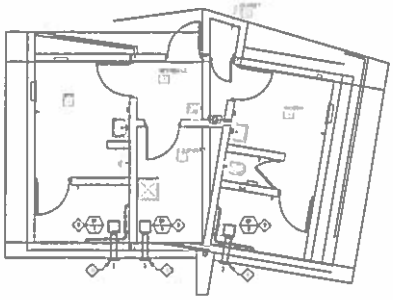
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

MECHANICAL SPECIFICATIONS

DRAWN BY:	MSA
DESIGNED BY:	MSA
APPROVED BY:	PM
SCALE:	AS SHOWN
DATE:	03/3/2017
J2 PROJECT NO.	16 0097 003
FILE NAME:	
DRAWING NO.	SHEET NO.
ME-0.0114	23



FLOOR PLAN

EXHAUST FAN SCHEDULE

MARK	GENERAL DATA: MANUFACTURER TYPE	GENERAL DATA: LOCATION	GENERAL DATA: REMARKS	FAN: TYPE	FAN: CFM	FAN: SP IN (IN)	FAN: RPM	FAN: SP	ELECTRICAL: HP	ELECTRICAL: FLA	ELECTRICAL: VOLTAGE	OPERATING WEIGHT (LBS)	REMARKS
1	GREENHECK SP-B60	CEILING (EXPOSED)	RESTROOM	CABINET	50	0.50"	1040	-	0.10	-	120-1-01	17	1 2 4
2	GREENHECK SP-A50	CEILING (EXPOSED)	JANITOR	CABINET	75	0.50"	1050	-	0.10	-	120-1-01	17	1 2 3 5

1. PROVIDE 6TH SE-4 BALL CHEK
2. PROVIDE PRIME 6TH THERMAL OVERLOADS
3. PROVIDE BACKDRAFT DAMPER
4. SWITCH 6TH LIGHTING
5. FAN TO OPERATE CONTINUOUSLY

GENERAL NOTES:

1. VERIFY LOCATION OF ALL THERMOSTATS WITH ARCHITECT PRIOR TO INSTALLATION PRIOR ALL THERMOSTATS MUST BE IN ACCORDANCE WITH ADA STANDARDS PROVIDE LOCKING COVERS FOR T STATS.
2. SHEET MEDS SHOWN ARE THE CLOSE MORE DIMENSIONS
3. THE MECHANICAL CONTRACTOR SHALL COORDINATE LOCATION AND ROUTING OF HVAC EQUIPMENT AND DUCTWORK WITH OTHER TRADES PRIOR TO COMMENCING WORK.
4. ALL TOILET OUTLETS SHALL BE LOCATED 7IN. OF 6" 6" MIN. ON SUPPLY AIR STRIPS
5. THE DUTIES, METHODS AND DESIGN OF HVAC IN PLENUM SPACE AND WALL SPACE SHALL BE IN ACCORDANCE WITH THE LATEST APPROVED EDITION OF THE INTERNATIONAL BUILDING CODE
6. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING AS REQUIRED TO ACCOMPLISH THE WORK.
7. REFER TO THE MECHANICAL CHARGERS THAT APPLY TO THE WORK ON THIS DRAWING THESE DRAWING PROVIDE GUIDANCE AS TO INSTALLATION INTENT AND DO NOT NECESSARILY SHOW ALL SUPPORTING REQUIRED

SHEET NOTES:

1. 6" EXHAUST THRU WALL TO EXTERIOR CAP
2. EXTERIOR LOW PROFILE EXHAUST EXHAUST FAN MOUNTED TRAY TO EXTERIOR EQUIPMENTS SHEET LOCATION AND MOUNTING DETAILS WITH ARCHITECT PRIOR TO ROUGH-IN

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Town of Fountain Hills
McDowell Mountain Preserve
Adam Canyon Trailhead

MECHANICAL PLANS

Rev	Date	Description
1	10/26/16	90% REVIEW
2	3/3/17	ISSUE

DRAWN BY MSA
DESIGNED BY MSA
APPROVED BY PM
SCALE AS SHOWN
DATE 03/13/2017
J2 PROJECT NO. 16-0897.003
FILE NAME
DRAWING NO. ME-1.0115 SHEET NO. 23

PLUMBING SYMBOL LIST

PLUMBING ABBREVIATIONS

DRAWING INDEX

SHEET NUMBER	SHEET TITLE
[illegible]	[illegible]

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Adero Canyon Trailhead

PLUMBING ABBREVIATIONS AND SHEET LIST

DRAWN BY	MSA
DESIGNED BY	MSA
APPROVED BY	PM
SCALE	AS SHOWN
DATE	03/3/2017
J2 PROJECT No.	16.0987.003

PL-0.00 16 of 23

PLUMBING SPECIFICATIONS

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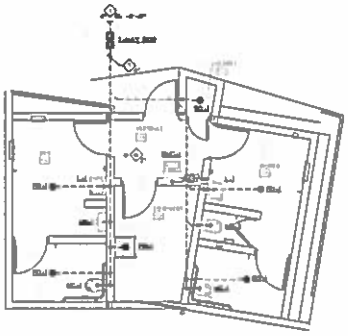
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

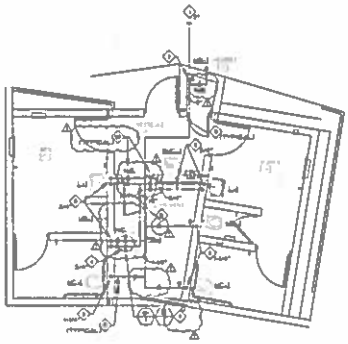
PLUMBING SPECIFICATIONS

DRAWN BY	VSA
DESIGNED BY	VSA
APPROVED BY	PM
SCALE	AS SHOWN
DATE	03/3/2011
J PROJECT NO.	16.0887.003
FILE NAME	

PL-0.01 17 of 23



A PL-1.01 PLUMBING PLAN - WASTE AND VENT



B PL-1.01 PLUMBING PLAN - DOMESTIC WATER

GENERAL NOTES:

1. ALL WATER PIPING SHALL BE INSTALLED ON THE INTERIOR SIDE OF THE BUILDING.
2. THE SUPPLY MATERIALS AND SIZING OF VALVES IN PLACE HERE AND ALL STUDS SHALL BE IN ACCORDANCE WITH THE LATEST APPROVED EDITION OF THE INTERNATIONAL BUILDING CODE.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION OF ALL PLUMBING ROUGH-IN LOCATIONS PRIOR TO CONSTRUCTION. DRAWINGS FOR FIXTURES AND EQUIPMENT LOCATIONS.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SUPPLY AND FIXTURES AS REQUIRED TO ACCOMPLISH THE WORK.
5. ALL SANITARY DRAINAGE PIPING 3" AND SMALLER SHALL BE SLOPED AT 1/4" PER FOOT. PIPING 4" AND LARGER SHALL BE SLOPED AT 1/8" PER FOOT.
6. PLUMBING CONTRACTOR SHALL COORDINATE ROUTING OF PIPING WITH ALL OTHER TRADES PRIOR TO CONTRACTING WORK.
7. ALL PLUMBING FIXTURES SHALL BE WATER CONSERVATION TYPE AS MANDATED BY LOCAL BUILDING DEPARTMENT.
8. ALL WATER CLOSETS DESIGNATED AS ACCESSIBLE SHALL BE INSTALLED SUCH THAT THE ACTUATOR IS OPERABLE FROM THE WIDE SIDE OF THE WATER CLOSET.
9. PRIOR TO INSTALLATION OF DRAIN AND WATER PIPING BELOW GROUND COORDINATE SHORT LOCATIONS AND DEPTHS OF DRAIN WITH CIVIL AND FOUNDATION DRAWINGS AND REPRESENTATIVE OWNERS.
10. REFER TO THE PLUMBING CHARGING PLAN (SHT. 7.10) FOR MORE ON THE DRAWING THESE DRAWINGS PROVIDE GUIDANCE AS TO INSTALLATION OPTIONS AND DO NOT NECESSARILY SHOW ALL COMPONENTS REQUIRED.

SHEET NOTES:

1. SEE CIVIL DRAWINGS FOR CONTINUATION.
2. INCOMING DOMESTIC COLD WATER SUPPLY PIPE AND SHUT-OFF VALVE.
3. DOMESTIC WATER DRAIN TO BALL / CHAIR TO DRAIN FOUNTAIN.
4. CO AND NO DRAIN TO WATER HEATER FOR SHELF ABOVE HEAT.
5. DOMESTIC WATER PIPING ROUTED AT ABOVE CEILING TRUNK TO OPERATORS.
6. VENT THROUGH ROOF.
7. WASTE PIPING ROUTED BELOW FLOOR.
8. WATER HEATER ADDRESS PER NOTE 4.
9. BALLAST DRAIN AND GREEN INSULATION.
10. WATER LINES TO ALL PLUMBING FIXTURES (INCLUDE WATER CLOSETS) TO BE SHUTOFF.
11. WATER SERVING WATER HEATER TO BE FULLY CONNECTED OUT SHUT-OFF COORDINATE WITH ELECTRICAL CONTRACTOR TO ENSURE WATER HEATER IS NOT POWERED.

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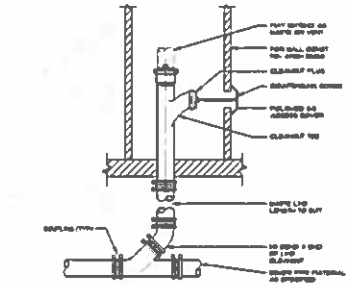
PROJECT TITLE
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

PLUMBING PLANS

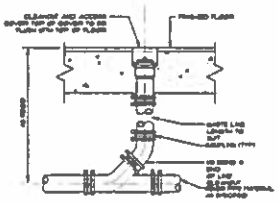
No.	Date	Description
1	12/20/16	DW SUBMIT
2	3/3/17	IFC
3	4/28/17	ADDT'L WORK ITEMS

DRAWN BY MSA
DESIGNED BY MSA
APPROVED BY PM
SCALE AS SHOWN
DATE 03/3/2017
J2 PROJECT NO. 16.0007.003
FILE NAME
DRAWING NO. PL-1.01 SHEET NO. 18 OF 23

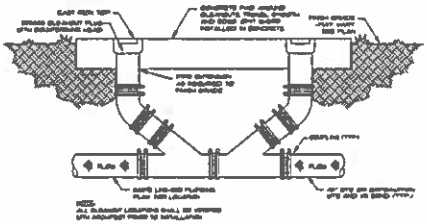
3 04/28/2017 ADDT'L WORK ITEMS



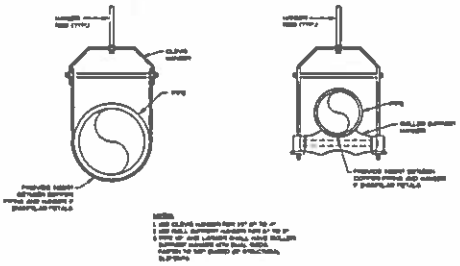
A PL-5.00 WALL CLEANOUT



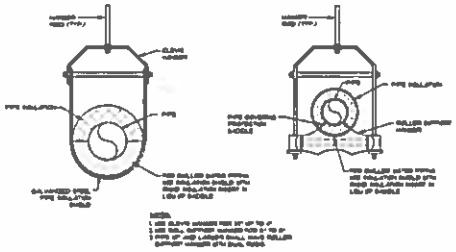
B PL-5.00 FLOOR CLEAN OUT



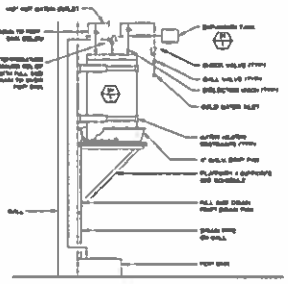
C PL-5.00 TYPICAL TWO WAY CLEANOUT



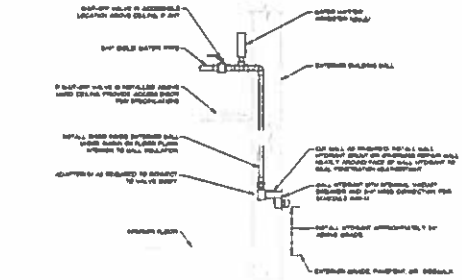
D PL-5.00 PIPE HANGER FOR UNINSULATED PIPING



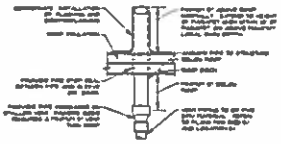
E PL-5.00 PIPE HANGER



F PL-5.00 ELECTRIC WATER HEATER



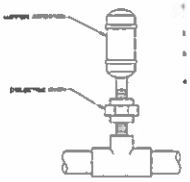
G PL-5.00 WALL HYDRANT



H PL-5.00 VENT THROUGH ROOF

WATER HAMMER ARRESTOR SCHEDULE

PSI: DYNAMIC	A	B	C	D	E	F
FIXTURE UNIT RATING	1-11	12-32	33-60	61-113	114-154	155-300



1. CONTRACTOR SHALL PROVIDE AND INSTALL WATER ARRESTOR ON ALL FLUSH VALVE OPERATED FIXTURES OR FIXTURES WITH QUICK CLOSING VALVES AND AS INDICATED ON DRAWINGS.
2. EACH WATER PRESSURE IS GIVEN AS PSI INSTALL THE UNIT LARGER UNIT.
3. SIZE OF WATER ARRESTOR REQUIRED ON BASIS OF FIXTURES SHALL BE BASED ON FIXTURE UNIT VALUES OF FLUSH VALVE OPERATED FIXTURES ONLY.
4. WATER HAMMER ARRESTORS ARE INSTALLED IN NON-ACCESSIBLE PIPE SPACES ON A MAINTENANCE CONTRACTOR O-RING INSTALL 3/4" STAINLESS STEEL, HARDS BODY WITH LINER.

J PL-5.00 WATER HAMMER ARRESTOR

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Town of Fountain Hills
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Adero Canyon Trailhead

PLUMBING DIAGRAMS

No.	Date	Description
1	10/26/16	90% SUBMITTAL
2	1/3/17	100%

DRAWN BY: MSA
DESIGNED BY: MSA
APPROVED BY: PM
SCALE: AS SHOWN
DATE: 03/3/2017

J2 PROJECT No: 15 0897.003
FILE NAME:
DRAWING No: PL-5.00
SHEET No: 19 of 23

WATER PIPE SIZING CHART

COLD WATER @ 6 PSI / 100'					HOT WATER @ 6 PSI / 100'		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

PIPING MATERIAL SCHEDULE

[illegible]	[illegible]	[illegible]

ELECTRIC WATER HEATER SCHEDULE

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

EXPANSION TANK SCHEDULE

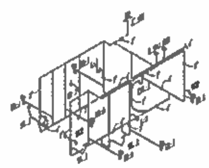
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

PLUMBING FIXTURE SCHEDULE

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

FIXTURE UNIT CALCULATIONS

MARK	DESCRIPTION	QTY	WASTE EACH	WASTE TOTAL	WATER EACH	WATER TOTAL
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]



A WASTE AND VENT ISOMETRIC

PLUMBING FIXTURE SPECIFICATIONS

[illegible]

CODE INFORMATION

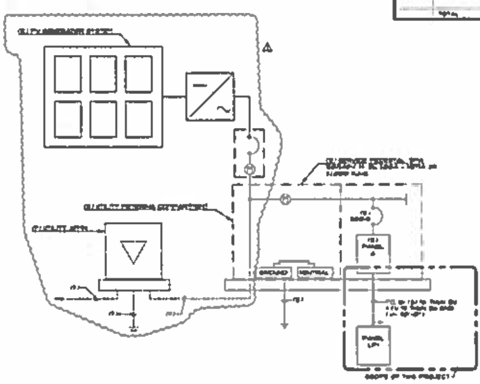
[illegible]

J2 engineering and environmental design

Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

PLUMBING SCHEDULES

GENERAL NOTES:



SINGLE LINE DIAGRAM

ELECTRICAL FAULT CALCULATION

DRAWING INDEX

SHEET NUMBER	SHEET TITLE
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

LIGHTING FIXTURE SCHEDULE

ELECTRICAL SYMBOL LIST

J2 engineering and environmental design
www.j2design.us

Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

ELECTRICAL COVER SHEET

SCALE AS SHOWN
DATE 03/3/2017

16 0897 003

EL-0.00 21 of 23

ELECTRICAL SPECIFICATIONS - NEW WORK

J2 engineering and environmental design

4640 E. COTTON GIN LOOP, STE. 82
PHOENIX, AZ PHN (602)438-2221
USA 85040 FAX (602)438-2225
www.j2engineering.com

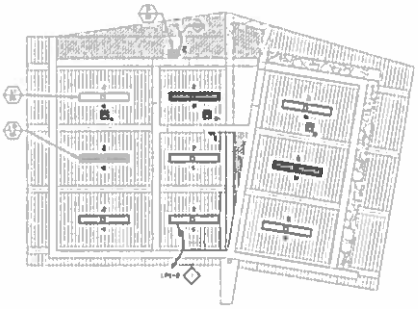
Town of Fountain Hills
Parks & Recreation Dept
Fountain Hills Town Hall
Tom I. Ashley Dr. Fountain
Fountain Hills, AZ 85268
(480) 816-5233

Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

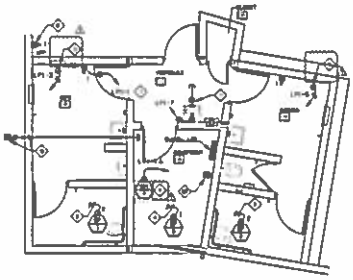
ELECTRICAL SPECIFICATIONS

DRAWN BY:	WSA
DESIGNED BY:	WSA
APPROVED BY:	PM
SCALE:	AS SHOWN
DATE:	03/3/2017
PROJECT NO:	16.0897.003
FILE NAME:	

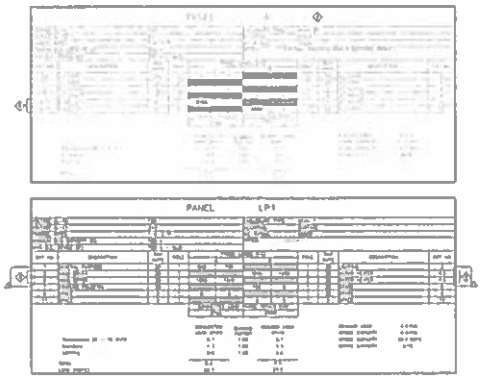
EL-0.01 22 of 23



REFLECTED CEILING PLAN



FLOOR PLAN



GENERAL NOTES:

SHEET NOTES:

J2 engineering and environmental design

Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

ENLARGED ELECTRICAL PLANS

MSA
MSA
PM
AS SHOWN
03/3/2011
15 0897 003

EL-2.01 23 of 23

EXHIBIT B
TO
INVITATION FOR BIDS NO. CS2017-01

[Substitution/Equal Request Form]

See following pages.

SUBSTITUTION/EQUAL REQUEST FORM

Adero Canyon Trailhead Construction
CS2017-01

Bidder _____ hereby submits for Town's consideration the following product, instead of the specified item, for the above Project.

Section	Page	Paragraph/Line	Specified Item
_____	_____	_____	_____

Proposed Substitution: _____

_____

(NOTE: See Article II – Bid Process; Bid Award, Section 2.4(C), Approval of Substitutions, or Section 2.4(D), Use of Equals, as applicable, for additional criteria concerning prior approval for substitutions or use equals of material and equipment.)

Attach complete product description, drawings, photographs, performance and test data, and other information necessary for evaluation, indicating by highlighting all comparable data between specified item and proposed substitution or equal. Identify specific model numbers, finishes, options, etc.

A. Will changes be required to Project design (architecturally, structurally, mechanically or electrically) in order to properly install proposed substitution? Yes _____ No _____ If Yes, explain:

_____

_____

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

C. List differences between proposed substitution and specified item.

Specified Item	Proposed Substitution
_____	_____
_____	_____

D. Does substitution affect Drawing dimensions? Yes _____ No _____ If Yes, explain:

_____

_____

E. What effect does substitution have on other trades? _____

_____

F. Does manufacturer's warranty of proposed substitution differ from that specified?
Yes _____ No _____ If Yes, explain: _____

_____

G. Will substitution affect progress schedule? Yes _____ No _____ If Yes, explain:

_____

_____

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

_____

I. Will maintenance and service parts be locally available for substitution?
Yes _____ No _____ If Yes, explain: _____

_____

J. Will substitution be compatible with all adjacent material and/or applications to or on the proposed substitution? Yes _____ No _____ If no, explain what material substitutions will be required to make your proposed substitution compatible: _____

_____

List materials that will be required to provide compatibility: _____

_____

The undersigned hereby assumes all responsibility for all provisions indicated herein and agrees that, if adequate comparable information is not provided as required by Section 2.4(C), Approval of Substitutions, or Section 2.4(D), Use of Equals, as applicable, and this Form, the proposed substitution or equal shall be subject to rejection.

The undersigned understands and agrees that the substitution requested, including all supporting data, must be submitted to and be in the possession of the Town 10 full Days prior to the Bid Deadline, to be considered, including all supporting data for the substitution. Telegraphic (facsimile) or electronic (email) copies will not be considered.

Submitted by:

_____
Signature

_____
Print Name

_____
Title

_____
Company Name

_____
Address

_____
City, State, Zip Code

_____
Date Telephone No.

For Town's Use Only:

☐ Accepted

☐ Rejected

Remarks: _____

_____

_____

_____

_____
Signature

_____
Print Name

_____
Date

2979192.2

EXHIBIT C
TO
INVITATION FOR BIDS NO. CS2017-01

[Price Sheet]

See following pages.

PRICE SHEET

Adero Canyon Trailhead Construction
CS2017-01

BID ITEM NUMBER	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL
1.	Mobilization/Demobilization	LS	1	$ 117,053.81	$ 117053.81
2.	Earthwork Cut	CY	4,248	$ 24.20	$ 102801.60
3.	Earthwork Fill (less required for gabion retaining walls, pavement sections and riprap)	CY	11,563	$ 14.50	$ 167663.50
4.	Aggregate Base Course (from MCO Stockpile to Site)	CY	540	$ 9.50	$ 5130.00
5.	Asphalt Parking Pavement	SY	2,320	$ 24.00	$ 55680.00
6.	Temporary Asphalt Entry Pavement (2" AC over Compacted Subgrade)	SY	74	$ 25.00	$ 1850.00
7.	Colored Concrete Pavement (Road, ADA Parking, Plaza Spaces, Walkway)	SF	8,415	$ 4.30	$ 36184.50
8.	Colored Concrete Pavement (Walkway)	SF	5,680	$ 3.00	$ 17040.00
9.	Concrete Ribbon Curb	LF	2,185	$ 17.50	$ 38237.50
10.	Concrete Ribbon Curb With Wheel Stop	LF	101	$ 63.50	$ 6413.50
11.	ADA Truncated Domes	SF	36	$ 167.00	$ 6012.00
12.	Drainage RGRCP, Class IV (12" Pipe)	LF	166	$ 77.00	$ 12782.00
13.	Drainage Headwall (Double 12" Pipe MAG 501-1 and 2: U Type)	EA	1	$ 5250.00	$ 5250.00
14.	Drainage RGRCP, Class IV (18" Pipe)	LF	142	$ 85.00	$ 12070.00
15.	Drainage Headwall (18" Pipe)	EA	4	$ 4555.71	$ 18222.84
16.	Drainage Concrete Pipe Culvert, Class IV (24" Pipe)	LF	116	$ 94.00	$ 10904.00
17.	Drainage Headwall (24" Pipe)	EA	1	$ 5060.00	$ 5060.00
18.	Drainage RGRCP, Class IV (42")	LF	96	$ 176.00	$ 16896.00
19.	Drainage Headwall Inlet (42" Pipe)	EA	1	$ 9320.00	$ 9320.00
20.	Drainage Headwall Outlet (42" Pipe)	EA	1	$ 7000.00	$ 7000.00
21.	Catch Basin MAG Standard Detail 537 – Double	EA	2	$ 2830.00	$ 5660.00
22.	Headwall Handrail	LF	107	$ 62.00	$ 6634.00
23.	Headwall Trash Rack	EA	4	$ 750.00	$ 3000.00
24.	Storm Drain Manhole With Reinforced Box Structure	EA	1	$ 4550.00	$ 4550.00
25.	Placed Rock Embankment	LF	1,368	$ 30.90	$ 42271.20

BID ITEM NUMBER	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL
26.	Gabion Basket Retaining Walls	CY	302	$ 247.00	$ 74594.00
27.	Gabion Basket Seating Walls at Ramada With Concrete Piers and Caps	LF	88	$ 264.00	$ 23232.00
28.	Dumped Riprap D50=9"	CY	642	$ 39.00	$ 25038.00
29.	Dumped Riprap D50=18"	CY	194	$ 90.00	$ 17460.00
30.	Rock Cut Enhancements Sculpturing	SF	3,362	$ 2.30	$ 7732.60
31.	Miscellaneous Signing and Striping (Includes Yellow and White 2-Way Reflectors)	LS	1	$ 10800.00	$ 10800.00
32.	SWPPP / Erosion Control	LS	1	$ 24000.00	$ 24000.00
33.	Connection to 8" Waterline – Install Service Saddle and Corporation Stop	EA	1	$ 8700.00	$ 8700.00
34.	Connection to 8" Waterline – Install 8" x 8" Cross (Add reduction as specified on plans) with 8" Gate Valve and Cover	EA	3	$ 3920.00	$ 11760.00
35.	2" Water Meter Assembly (All Appurtenances Without Meter)	EA	1	$ 2620.00	$ 2620.00
36.	1" Reduced Pressure Backflow Device with Enclosure and Concrete Pad	EA	1	$ 2160.00	$ 2160.00
37.	2" Reduced Pressure Backflow Device with Enclosure and Concrete Pad	EA	1	$ 2940.00	$ 2940.00
38.	2" Copper Waterline	LF	75	$ 93.00	$ 6975.00
39.	6" DI Waterline	LF	23	$ 182.00	$ 4186.00
40.	8" DI Waterline	LF	515	$ 74.00	$ 38110.00
41.	Fire Hydrant with 6" Gate Valve and Cover	EA	1	$ 5610.00	$ 5610.00
42.	8" Plug and Curb Stop With Flushing Pipe and Air Release Valve	EA	1	$ 1140.00	$ 1140.00
43.	8" DI Sewer Pipe	LF	158	$ 118.00	$ 18644.00
44.	8" PVC SDR 35 Sewer Pipe	LF	252	$ 74.00	$ 18648.00
45.	Sewer Manholes	EA	3	$ 4300.00	$ 12900.00
46.	Adjust Sewer Manhole Frame and Cover in Cul-de-sac	EA	1	$ 1780.00	$ 1780.00
47.	Restroom Building Complete	LS	1	$ 278000.00	$ 278000.00
48.	SRP Primary Power Feed including all Materials and Labor per Power Company Requirements	LS	1	$ 27200.00	$ 27200.00
49.	200 AMP Service Entrance Section including all Circuit Breakers and all Control Devices as shown on Plans	EA	1	$ 6400.00	$ 6400.00
50.	Bollard Light	EA	19	$ 1280.00	$ 24320.00
51.	Ramada/Shade Structure Electrical and Lighting	LS	1	$ 7830.00	$ 7830.00
52.	Furnish and Install Conduit Complete and In Place including Trenching and Backfill	LS	1	$ 17100.00	$ 17100.00

BID ITEM NUMBER	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL
53.	Furnish and Install all Conductors and Bond Wires complete and in place including all Splices and Terminations	LS	1	$ 11400.00	$ 11400.00
54.	Furnish and Install #3 1/2 Pull Box Complete and In Place	EA	3	$ 1200.00	$ 3600.00
55.	Salvaged Saguaro - Bare Root	EA	12	$ 355.93	$ 4271.16
56.	Salvaged Barrel Cactus - Bare Root	EA	8	$ 71.19	$ 569.52
57.	Salvaged Ocotillo - Bare Root	EA	19	$ 106.78	$ 2028.82
58.	New Tree - 15" Gallon	EA	17	$ 240.00	$ 4080.00
59.	New Tree - 36" Box	EA	49	$ 790.00	$ 38710.00
60.	New Saguaro - 3'- 6'	EA	9	$ 1210.00	$ 10890.00
61.	New Saguaro - 6'- 9'	EA	9	$ 1779.67	$ 16017.03
62.	New Saguaro - 9'- 12'	EA	12	$ 2080.00	$ 24960.00
63.	New Barrel Cactus -12" - 18"	EA	29	$ 177.97	$ 5161.13
64.	New Barrel Cactus -18"- 36"	EA	29	$ 249.15	$ 7225.35
65.	New Ocotillo - 8' with 12 Canes	EA	28	$ 320.34	$ 8969.52
66.	New Shrubs - 1 Gallon	EA	125	$ 11.39	$ 1423.75
67.	New Shrubs - 5 Gallon	EA	284	$ 17.06	$ 4850.72
68.	Native Seeding	SF	35,533	$ 0.10	$ 3553.30
69.	Salvaged Plant Nursery	LS	1	$ 28000.00	$ 28000.00
70.	Desert Pavement	SF	18,822	$ 4.30	$ 80934.60
71.	Boulder Salvage and Relocation (Size A - 2' x 3')	EA	163	$ 39.00	$ 6357.00
72.	Boulder Salvage and Relocation (Size B - 3' x 5')	EA	101	$ 68.00	$ 6868.00
73.	Boulder Salvage and Relocation (Size C - 4' x 6')	EA	64	$ 99.00	$ 6336.00
74.	Boulder Salvage and Relocation (Size D - 5' x 7' or >)	EA	20	$ 160.00	$ 3200.00
75.	Ramada (625 SF)	LS	1	$ 35000.00	$ 35000.00
76.	Exposed Aggregate Paving	SF	140	$ 22.70	$ 3178.00
77.	Picnic Table (3 Standard and 1 ADA Accessible)	EA	4	$ 3200.00	$ 12800.00
78.	Individual Gabion Basket Bench with Concrete Cap	EA	4	$ 3300.00	$ 13200.00
79.	Entry Signage	LS	1	$ 28600.00	$ 28600.00
80.	Access Control Gates to Fire Road	LS	1	$ 4700.00	$ 4700.00

BID ITEM NUMBER	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL
81.	Main Entry Gates	LS	1	$ 14300.00	$ 14300.00
82.	Information Kiosk	EA	1	$ 13600.00	$ 13600.00
83.	Bicycle Rack	EA	2	$ 1230.00	$ 2460.00
84.	Trash Receptacles	EA	5	$ 1700.00	$ 8500.00
85.	Bollard (Security)	EA	1	$ 780.00	$ 780.00
86.	Irrigation Controller	EA	1	$ 19400.00	$ 19400.00
87.	Master Valve - 1"	EA	1	$ 350.00	$ 350.00
88.	Ball Valve - 1"	EA	1	$ 215.00	$ 215.00
89.	Ball Valve - 1 1/2"	EA	2	$ 320.00	$ 640.00
90.	Emitter - Single-Outlet Assembly	EA	562	$ 10.00	$ 5620.00
91.	Emitter - Multi-Outlet Assembly	EA	66	$ 17.00	$ 1122.00
92.	Drip Filter and Pressure Regulator Assembly - 1"	EA	23	$ 650.00	$ 14950.00
93.	Drip Remote Control Valve - 1"	EA	10	$ 500.00	$ 5000.00
94.	Quick Coupler Assembly - 1"	EA	5	$ 360.00	$ 1800.00
95.	Air/Vacuum Relief Valve Assembly - 1"	EA	3	$ 2000	$ 6000.00
96.	Pipe - Drip Lateral 3/4" Schedule 40 PVC	LF	6,200	$ 1.00	$ 6200.00
97.	Pipe – Mainline and Submain 1" Schedule 40 PVC	LF	2,097	$ 1.10	$ 2306.70
98.	Pipe - Mainline 1 1/2" Schedule 40 PVC	LF	231	$ 1.80	$ 415.80
99.	Pipe Sleeve - 4" Schedule 40 PVC	LF	314	$ 5.70	$ 1789.80
100.	Wire Sleeve - 1" Schedule 40 PVC	LF	136	$ 2.80	$ 380.00
	SUBTOTAL BASE BID				$ 1,927,000.05
101.	Owners Allowance	LS	1	$178,000.00	$178,000.00
	TOTAL BASE BID AND OWNERS ALLOWANCE				$ 2,105,000.05
102.	BID ALTERNATE A: Interim Utility (Total of Items 102-A – 102-M Below)	LS	1	154151.05	$ 154151.05
102-A.	Add: Earthwork for Water Tank Pad and Sewage Collection Tank	CY	13.0	$ 156.00	2028.00
102-B.	Add: Aggregate Base for Tank Pad (From MCO Stockpile)	CY	7.25	$ 145.00	1051.25
102-C.	Add: 3/4" Minus Decomposed Granite on Interim Roadway Surface and Surrounding Water Tank and Solar Collection Area	SF	6,380	$ 1.58	10080.40
102-D.	Add: SWPPP / Erosion Control Around Tank Pad	LS	1	$ 3400.00	3400.00

BID ITEM NUMBER	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL
102-E.	Add: Desert Pavement	SF	5,738	$ 4.30	24673.40
102-F.	Add: 5,000 Gallon Water Tank with Locking Lid and Locking Drain Valve	EA	1	$ 30000.00	30000.00
102-G.	Add: 2" SCH 40 PVC Waterline with All Valves	LF	364	$ 16.00	5824.00
102-H.	Add: 1 1/2" SCH 40 PVC Waterline with All Valves	LF	38	$ 36.00	1368.00
102-I.	Add: 4" SDR-35 Sewer Pipe with Valves to Holding Tank	LF	62	$ 38.00	2356.00
102-J.	Add: 5,000 Gallon Pre-Cast Concrete Sewage Holding Tank with Alarm	EA	1	$ 14500.00	14500.00
102-K.	Add: Solar Collection and Storage System Complete	LS	1	$ 19150.00	19150.00
102-L.	Add: 6'- 0" High Chain Link Fencing with Access Gate	LF	140	$ 28.00	3920.00
102-M.	Add: Restroom Building Modifications	LS	1	$ 50000.00	50000.00
103.	BID ALTERNATE B: Automatic Gate Opening and Closing System	LS	1	$ 13500.00	$ 13500.00
	TOTAL BASE BID, OWNERS ALLOWANCE, BID ALTERNATES A AND B 2,259,151.10				$ ~~[illegible]~~
104.	Force Account Rock Blasting Allowance	LS	1	$ 70,000.00	$ 70,000.00
105.	Force Account Rock Staining	SF	3,000	$ 1.78	$ 5340.00
106.	Force Account Earthwork Fill Material	CY	2,125	$ 15.00	$ 31875.00
107.	Force Account Aggregate Base Course Material	CY	250	$ 55.00	$ 13750.00
	SUBTOTAL FORCE ACCOUNT ITEMS				$ 120965.00
	TOTAL COST: BASE BID, OWNERS ALLOWANCE, BID ALTERNATES, FORCE ACCOUNT*				$ 2,393,616.10

*** ALL BIDS ARE PRESUMED TO INCLUDE ALL APPLICABLE TAXES. CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ALL MATERIALS CONTAINED IN THE PLANS FOR THE PROJECT ARE BID ON THE PRICE SHEET.**

ACCEPTANCE OF ALTERNATE ITEMS

ALTERNATE A: Yes _____ No _____ Authorized By: _____

ALTERNATE B: Yes _____ No _____ Authorized By: _____

EXHIBIT D
TO
INVITATION FOR BIDS NO. CS2017-01

[Federal Requirements]

See following page.

Not applicable to this Project.

EXHIBIT E
TO
INVITATION FOR BIDS NO. CS2017-001

[Licenses; DBE/WBE Status]

See following page.

LICENSES; DBE/WBE STATUS

Adero Canyon Trailhead Construction
CS2017-01

[X] **Attach a copy of your Contractor's License to your bid submittal.**

[X] **Attach a copy of your Town of Fountain Hills Business License to your bid submittal.**

[X] **Attach a copy of your Arizona Transaction Privilege Tax License**

Has your firm been certified by any jurisdiction in Arizona as a minority or woman owned business enterprise? Yes_____, No_____X_____.

If yes, please provide details and documentation of the certification.

IMPORTANT NOTICE
YOU MUST:

1.) REPORT DISASSOCIATION OF QUALIFYING PARTY **IN WRITING** WITHIN 15 DAYS. [SEE A.R.S. § 32-1154(A)(18)]
2.) REPORT A CHANGE OF ADDRESS **IN WRITING** WITHIN 30 DAYS. [SEE A.R.S. § 32-1122(B)(1)]
3.) REPORT ANY TRANSFER OF OWNERSHIP OF 50% OR MORE IMMEDIATELY [SEE A.R.S. § 32-1151.01]
4.) REPORT ANY CHANGE IN LEGAL ENTITY, SUCH AS ANY CHANGE OF THE OWNERSHIP IN A SOLE PROPRIETORSHIP OR CHANGE OF A PARTNER IN A PARTNERSHIP OR THE CREATION OF A NEW CORPORATE ENTITY. [SEE A.R.S. § 32-1124(B)(F) § RULE R-4-9-110]

Blucor Contracting Inc

C/O Robinson And Allen PLC
48 N MacDonald
Mesa, AZ 85201-7329

THIS IS YOUR IDENTIFICATION
DO NOT DESTROY

LICENSE EFFECTIVE THROUGH: 08/31/2017
STATE OF ARIZONA
Registrar of Contractors CERTIFIES THAT

Blucor Contracting Inc

CONTRACTORS LICENSE NO. 84121 CLASS

General Engineering

THIS CARD MUST BE PRESENTED UPON DEMAND

JEFF FLEETHAM, DIRE

POST IN A CONSPICUOUS PLACE

Town of Fountain Hills
16705 East Avenue of the Fountains
Fountain Hills, AZ 85268
(480) 816-5100

License Number
5015

BUSINESS LICENSE
THIS LICENSE EXPIRES 10/31/2017

Account Number: 2825

Business Name: BLUCOR CONTRACTING, INC
Mailing Address: 21738 E. ORION WY
QUEEN CREEK AZ 85142

Physical Address: 6939E PARKWAY NORTE
MESA AZ 85212

Nature of Business: CONSTRUCTION

Date Issued: October 25, 2016

Beverly J Bender
Town Clerk

Total Paid: 50.00

In accordance with Town of Fountain Hills, Arizona Town Code, Chapter 8 as added or amended, the person or firm is hereby authorized to conduct business in the Town of Fountain Hill. **This License is NON-Transferable**

The portion below is for your records. Detach and file.

COPY ONLY

RECEIPT Please retain for your records	**Town of Fountain Hills** 16705 East Avenue of the Fountains Fountain Hills, AZ 85268 (480) 816-5100 **BUSINESS LICENSE** **THIS LICENSE EXPIRES 10/31/2017**	License Number 5015

Account Number: 2825

Business Name: BLUCOR CONTRACTING, INC
Mailing Address: 21738 E. ORION WY
QUEEN CREEK AZ 85142

Physical Address: 6939E PARKWAY NORTE
MESA AZ 85212

Nature of Business: CONSTRUCTION

Date Issued: October 25, 2016

Beverly J Bender
Town Clerk

Total Paid: 50.00

In accordance with Town of Fountain Hills, Arizona Town Code, Chapter 8 as added or amended, the person or firm is hereby authorized to conduct business in the Town of Fountain Hill. **This License is NON-Transferable**

ARIZONA DEPARTMENT OF REVENUE
ATTN: Customer Care and Outreach
PO BOX 29032
Phoenix, AZ 85038-9032

ARIZONA DEPARTMENT OF REVENUE

TRANSACTION PRIVILEGE TAX LICENSE

NOT TRANSFERABLE

The licensee listed below is licensed to conduct business upon the condition that taxes are paid to Arizona Department of Revenue as required under provisions of A.R.S. Title 42, Chapter 5, Article 1.

2017

ISSUED TO: BLUCOR CONTRACTING INC
21738 E ORION WAY
QUEEN CREEK AZ 85142-6448

ALL communications and reports MUST REFER to this LICENSE NO.

LICENSE: 07376782
START DATE: 06/01/1989
ISSUED: 12/08/2016
EXPIRES: 12/31/2017

LOCATION: CODE 001
BLUCOR CONTRACTOR
6939 E PARKWAY NORTE
MESA AZ 85212
1600048148353

BUSINESS CODE	REGION	JURISDICTION
015 - CONTRACTING - PRIME	GLA - GILA	COUNTY
015 - CONTRACTING - PRIME	LAP - LA PAZ	COUNTY
015 - CONTRACTING - PRIME	MAR - MARICOPA	COUNTY
215 - PRE-6/2010 CONTRACTING	MAR - MARICOPA	COUNTY
015 - CONTRACTING - PRIME	PNL - PINAL	COUNTY
215 - PRE-6/2010 CONTRACTING	PNL - PINAL	COUNTY
015 - CONTRACTING - PRIME	YAV - YAVAPAI	COUNTY
015 - CONTRACTING - PRIME	YMA - YUMA	COUNTY
215 - PRE-6/2010 CONTRACTING	YMA - YUMA	COUNTY
015 - CONTRACTING - PRIME	AJ - APACHE JUNCTION	CITY
213 - COMMERCIAL RENTAL, LEASING AND LICENSING FOR USE	AJ - APACHE JUNCTION	CITY
015 - CONTRACTING - PRIME	BE - BUCKEYE	CITY
015 - CONTRACTING - PRIME	CG - CASA GRANDE	CITY
015 - CONTRACTING - PRIME	CH - CHANDLER	CITY
015 - CONTRACTING - PRIME	CW - COTTONWOOD	CITY
015 - CONTRACTING - PRIME	EL - ELOY	CITY
015 - CONTRACTING - PRIME	FH - FOUNTAIN HILLS	CITY
015 - CONTRACTING - PRIME	FL - FLORENCE	CITY
029 - USE TAX	FL - FLORENCE	CITY
015 - CONTRACTING - PRIME	GB - GILBERT	CITY
016 - CONSTRUCTION CONTRACTING - SPECULATIVE BUILDERS	GE - GLENDALE	CITY

This License is issued to the business named above for the address shown. Licenses, by law, cannot be transferred from one person to another, nor can they be transferred from one location to another. Arizona law requires licensees to notify the Department of Revenue if there is a change in business name, trade name, location, mailing address, or ownership. In addition, when the business ceases to operate or the business location changes and a new license is issued, this license must be returned to the Arizona Department of Revenue. According to R15-5-2201, license must be displayed in a conspicuous place.

EXHIBIT F
TO
INVITATION FOR BIDS NO. CS2017-01

[References]

See following page.

REFERENCES

Adero Canyon Trailhead Construction
CS2017-01

Provide the following information for three clients for whom Bidder has successfully completed similar projects as set forth in Section 2.16 within the past 60 months. Failure to provide three accurate and suitable references will result in disqualification. Bidder may also attach another sheet with additional references.

1. Company: MCO Properties
   Address: 16930 Palisades Blvd
   City/State/Zip Code: Fountain Hills, AZ 85269
   Contact: Francisco Lopez
   Telephone Number: (480) 837-9660
   Date of Contract Initiation: 5-9-16
   Date of Contract Expiration: 4-30-17
   Final Project Cost: $6,688,921
   Project Description: Grading, Excavation, Water, Sewer, Pump Station

2. Company: See Attached
   Address:
   City/State/Zip Code:
   Contact:
   Telephone Number:
   Date of Contract Initiation:
   Date of Contract Expiration:
   Final Project Cost:
   Project Description:

3. Company:
   Address: See Attached
   City/State/Zip Code:
   Contact:
   Telephone Number:
   Date of Contract Initiation:
   Date of Contract Expiration:
   Final Project Cost:
   Project Description:

CURRENT PROJECTS

Prepared 5/9/16

PROJECT NAME	OWNER	ENGINEER	CONTRACT AMOUNT	% Completed	Scheduled Completion	Contact Name	Contact Telephone #
		Blucor Performing as General Contractor					
Adero Canyon	MCO Properties	Land Development Team	$725,000.00	0.00%	9/30/2016	Francisco Lopez	480-837-9660
(Booster Pump Station)	16930 Palisades Blvd.					16930 Palisades Blvd.	
	Fountain Hills, AZ 85269					Fountain Hills, AZ 85269	
		Blucor Performing as Subcontractor					
Rdo Lone Butte	Kennedy Design Build	O'neill Engineering, LLC.	$186,552.00	95.00%	5/30/2016	Chris Hagan	480-607-6441
(grading)	2908 N. Omaha Street						
	Mesa, AZ 85215						
Rdo Lone Butte	Kennedy Design Build	O'neill Engineering, LLC.	$405,403.00	20.00%	5/30/2016	Chris Hagan	480-607-6441
(Utilities)	2908 N. Omaha Street						
	Mesa, AZ 85215						
Laveen Meadows	TC Construction	Keogh Engineering	$1,545,216.32	0.00%	12/31/2016	Ed Smith	480-205-8906
	5025 N. Central Ave. #521						
	Phoenix, AZ 85201						
Sierra Prieta Demo	TC Construction	Grading & Drainage & Wets	$935,116.00	0.00%	7/30/2016	Ed Smith	480-205-8906
	5025 N. Central Ave. #521						
	Phoenix, AZ 85201						
Generations	CW Builders, LLC.	Terrascape Consulting	$1,047,185.00	0.00%	6/30/2016	Jim Sweet	(602) 840-1010
	6380 E. Thomas Rd., Suite 232						
	Scottsdale, Arizona 85251						
School House dev./Odyssey Prep. Academy	McGrath Construction, LLC.	Hess Roundtree	$503,059.00	50.00%	5/30/2016	Matt Capone	602-653-0208
New Junior High School Building - Verrado Way	28313 N. 112th Way						
	Scottsdale, AZ 85262						
School House dev./Odyssey Middle School	McGrath Construction, LLC.	Hess Roundtree	$871,000.00	5.00%	7/30/2016	Matt Capone	602-653-0208
	28313 N. 112th Way						
	Scottsdale, AZ 85262						

CURRENT PROJECTS

PROJECT NAME	OWNER	ENGINEER	CONTRACT AMOUNT	% Completed	Scheduled Completion	Contact Name	Contact Telephone #
Sonoqui Wash IIIB	Flood Control District of Maricopa	JE Fuller Engineering	$5,200,000.00	98.00%	12/30/2015	Fritz Huber	602-506-4138
	2801 West Durango St.					2801 West Durango St.	
	Phoenix, AZ 85009					Phoenix, AZ 85009	
American Leadership Academy - Vista Heights	School House Development	Hess Rountree	$6,248,957.00	98.00%	12/15/2015	Glen Way	480-420-2125
	2350 E. Germann, Suite26					2350 E. Germann, Suite26	
	Chandler, AZ 85263					Chandler, AZ 85263	
Adero Canyon	MCO Properties	Land Development Team	$2,732,334.00	25.00%	3/30/2016	Francisco Lopez	480-837-9660
	16930 Palisades Blvd.					16930 Palisades Blvd.	
	Fountain Hills, AZ 85269					Fountain Hills, AZ 85269	
Sienna Hills	SLV SIENNA HILLS	Hoskin/Ryan	$984,201.72	85.00%	1/30/2016	Shane Grasier	480-305-7223
	6720 N. Scottsdale rd. #195					6720 N. Scottsdale rd. #195	
	Scottsdale, Arizona 85253					Scottsdale, Arizona 85253	
Homestead North	SLV SIENNA HILLS	Atwell	$380,000.00	0.00%	2/15/2016	Shane Grasier	480-305-7223
	6720 N. Scottsdale rd. #195					6720 N. Scottsdale rd. #195	
	Scottsdale, Arizona 85253					Scottsdale, Arizona 85253	
Lone Butte Development Access Rd.	Gila River Indian Community	Dibble	$408,480.00	85.00%	1/30/2016	Carlos Munez (Pimmex)	480-969-2635
	PO Box 97						
	Sacaton, AZ 85147						

EXHIBIT G
TO
INVITATION FOR BIDS NO. CS2017-01

[Bid Bond]

See following page.

BID BOND

Adero Canyon Trailhead Construction
CS2017-01

KNOW ALL PERSONS BY THESE PRESENTS:

THAT, Blucor Contracting, Inc. (hereinafter called Principal), as Principal, and Merchants Bonding Company (mutual), a corporation organized and existing under the laws of the State of Iowa with its principal office in the City of West Des Moines, Iowa, (hereinafter called the Surety), as Surety, are held and firmly bound unto the Town of Fountain Hills, (hereinafter called the Obligee) in the penal sum of Ten Percent (10%) of Bid Amount, TEN PERCENT AMOUNT BID (Dollars) ($ 10% AMT BID) lawful money of the United States of America, to be paid to the order of the Town of Fountain Hills, for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents and in conformance with A.R.S. Section 34-201.

WHEREAS, the Principal has submitted a bid/proposal for: Adero Canyon Trail Head Project # P3025 .

NOW, THEREFORE, if the Obligee accepts the proposal of the Principal and the Principal enters into a Contract with the Obligee in accordance with the terms of the proposal and gives the Bonds and Certificates of Insurance as specified in the Standard Specifications with good and sufficient surety for the faithful performance of the Contract and for the prompt payment of labor and materials furnished in the prosecution of the Contract, or in the event of the failure of the Principal to enter into the Contract and give the Bonds and Certificates of Insurance, if the Principal pays to the Obligee the difference not to exceed the penalty of the Bond between the amount specified in the proposal and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by the proposal then this obligation is void. Otherwise it remains in full force and effect provided, however, that this Bond is executed pursuant to the provisions of Section 34-201, Arizona Revised Statutes, and all liabilities on this Bond shall be determined in accordance with the provisions of the section to the extent as if it were copied at length herein.

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

Witness our hands this 17th day of July 20 17 .

Blucor Contracting, Inc.
Principal Seal

By: _____

Merchants Bonding Company (mutual)
Surety Seal

By: _____
Jessika Gulliver, Attorney-In-Fact

USI Insurance Services, LLC
Agency of Record

2979192 2

MERCHANTS
BONDING COMPANY

POWER OF ATTORNEY

Know All Persons By These Presents, that MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC., both being corporations of the State of Iowa (herein collectively called the "Companies") do hereby make, constitute and appoint, individually,

Andrea Krahn; Benjamin A Greer; Carl N Carter; Chris Johnston; Craig L Webb; Doris R Van Leeuwen; Jessika Gulliver; Jorge Luis Mendez; Kischa Rushing, Linda M Hurst; Sherrie Cox

their true and lawful Attorney(s)-in-Fact, to sign its name as surety(ies) and to execute, seal and acknowledge any and all bonds, undertakings, contracts and other written instruments in the nature thereof, on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

This Power-of-Attorney is granted and is signed and sealed by facsimile under and by authority of the following By-Laws adopted by the Board of Directors of Merchants Bonding Company (Mutual) on April 23, 2011 and amended August 14, 2015 and adopted by the Board of Directors of Merchants National Bonding, Inc., on October 16, 2015.

"The President, Secretary, Treasurer, or any Assistant Treasurer or any Assistant Secretary or any Vice President shall have power and authority to appoint Attorneys-in-Fact, and to authorize them to execute on behalf of the Company, and attach the seal of the Company thereto, bonds and undertakings, recognizances, contracts of indemnity and other writings obligatory in the nature thereof."

"The signature of any authorized officer and the seal of the Company may be affixed by facsimile or electronic transmission to any Power of Attorney or Certification thereof authorizing the execution and delivery of any bond, undertaking, recognizance, or other suretyship obligations of the Company, and such signature and seal when so used shall have the same force and effect as though manually fixed."

In connection with obligations in favor of the Florida Department of Transportation only, it is agreed that the power and aut hority hereby given to the Attorney-in-Fact includes any and all consents for the release of retained percentages and/or final estimates on engineering and construction contracts required by the State of Florida Department of Transportation. It is fully understood that consenting to the State of Florida Department of Transportation making payment of the final estimate to the Contractor and/or its assignee, shall not relieve this surety company of any of its obligations under its bond.

In connection with obligations in favor of the Kentucky Department of Highways only, it is agreed that the power and authority hereby given to the Attorney-in-Fact cannot be modified or revoked unless prior written personal notice of such intent has been given to the Commissioner-Department of Highways of the Commonwealth of Kentucky at least thirty (30) days prior to the modification or revocation.

In Witness Whereof, the Companies have caused this instrument to be signed and sealed this 6th day of April, 2017.

MERCHANTS NATIONAL BONDING, INC. INCORPORATED -o- 2003

MERCHANTS BONDING COMPANY (MUTUAL) INCORPORATED -o- 1933

MERCHANTS BONDING COMPANY (MUTUAL)
MERCHANTS NATIONAL BONDING, INC.

By Larry Taylor
President

STATE OF IOWA
COUNTY OF DALLAS ss.
On this this 6th day of April 2017, before me appeared Larry Taylor, to me personally known, who being by me duly sworn did say that he is President of MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC.; and that the seals affixed to the foregoing instrument are the Corporate Seals of the Companies; and that the said instrument was signed and sealed in behalf of the Companies by authority of their respective Boards of Directors.

NOTARIAL SEAL IOWA
ALICIA K. GRAM
Commission Number 767430
My Commission Expires
April 1, 2020

Alicia K. Gram
Notary Public

(Expiration of notary's commission does not invalidate this instrument)

I, William Warner, Jr., Secretary of MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC., do hereby certify that the above and foregoing is a true and correct copy of the POWER-OF-ATTORNEY executed by said Companies, which is still in full force and effect and has not been amended or revoked.

In Witness Whereof, I have hereunto set my hand and affixed the seal of the Companies on this 17th day of July, 2017.

MERCHANTS NATIONAL BONDING, INC. INCORPORATED -o- 2003

MERCHANTS BONDING COMPANY (MUTUAL) INCORPORATED -o- 1933

William Warner Jr.
Secretary

POA 0018 (3/17)

EXHIBIT H
TO
INVITATION FOR BIDS NO.CS2017-01

[Key Personnel/Subcontractor Listing]

See following page.

KEY PERSONNEL/SUBCONTRACTOR LISTING

Adero Canyon Trailhead Construction
CS2017-01

Key Personnel and Subcontractors listed herein shall be utilized on this Project.

Category:	Personnel/ Subcontractor Name, Contact Information:
~~Dustin Bluth~~ QFC	
Project Mgr	Dustin Bluth dustin@blucor.com (602) 695-4756
Manholes	Old Castle
Misc Metals	Specialty Contracting · (623) 582-2385
Adjustments	Specialty Contracting (623) 582-2385
Seeding	Desert Seeders (520) 705-1277

EXHIBIT I
TO
INVITATION FOR BIDS NO. CS2017-01

[Performance Bond]

See following page.

PERFORMANCE BOND

Adero Canyon Trailhead Construction
CS2017-01

KNOW ALL PERSONS BY THESE PRESENTS:

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

WHEREAS, the Principal has entered into a certain written Contract with the Obligee, dated the _____ day of _____ 20___, for the material, service or construction described as _____ is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal faithfully performs and fulfills all of the undertakings, covenants, terms, conditions and agreements of the Contract during the original term of the Contract and any extension of the Contract, with or without notice to the Surety, and during the life of any guaranty required under the Contract, and also performs and fulfills all of the undertakings, covenants, terms, conditions and agreements of all duly authorized modifications of the Contract that may hereafter be made, notice of which modifications to the surety being hereby waived, the above obligation is void. Otherwise it remains in full force and effect.

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

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

Witness our hands this _____ day of _____ 20___.

_____
Principal Seal

By: _____

_____
Surety Seal

By: _____

_____
Agency of Record

EXHIBIT J
TO
INVITATION FOR BIDS NO. CS2017-01

[Payment Bond]

See following page.

PAYMENT BOND

Adero Canyon Trailhead Construction
CS2017-01

KNOW ALL PERSONS BY THESE PRESENTS:

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

WHEREAS, the Principal has entered into a certain written Contract with the Obligee, dated the _____ day of _____ 20___, for the material, service or construction described as _____ which Contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal promptly pays all monies due to all persons supplying labor or materials to the Principal or the Principal's Subcontractors in the prosecution of the Work provided for in the Contract, this obligation is void. Otherwise it remains in full force and effect.

PROVIDED, however, that this bond is executed pursuant to the provisions of Title 34, Chapter 2, Article 2, Arizona Revised Statutes, and all liabilities on this bond shall be determined in accordance with the provisions, conditions and limitations of Title 34, Chapter 2, Article 2, Arizona Revised Statutes, to the same extent as if they were copied at length in this agreement.

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

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

_____
Principal Seal

By: _____

_____
Surety Seal

By:_____

_____
Agency of Record

EXHIBIT K
TO
INVITATION FOR BIDS NO. CS2017-01

[Acknowledgments of Addenda received]

See following page(s).

Blucor Contracting Acknowledges Addenda #1

INVITATION FOR BIDS

ADERO CANYON TRAILHEAD CONSTRUCTION
CS2017-01

Addendum No. 1

Date: June 28, 2017

From: Rachael Goodwin, Town Representative

Subject: Addendum No. 1 to Solicitation No. CS2017-01

Bid Deadline: July 17, 2017, 3:00 p.m. (local time, Phoenix, Arizona)

SCOPE

This Addendum forms a part of the Contract and clarifies, corrects, or modifies the original Invitation for Bids document prepared by the Town of Fountain Hills. Acknowledge receipt of this addendum in the space provided on the attached "Acknowledgment of Addenda Received" form. This acknowledgement must accompany the submitted bid; failure to do so may subject the bidder to disqualification.

This Addendum No. 1 consists of modifications to the Contract Documents in response to bidder questions and revisions to Exhibit A (Specifications, Plans/Construction Drawings) for the Invitation for Bids No. CS2017-01, released on June 7, 2017.

ADDENDUM

1. The Contract Documents are modified pursuant to the answers to bidder questions, attached hereto as Exhibit 1 and incorporated herein by reference.

2. Exhibit A (Specifications, Plans/Construction Drawings) – the following sections of the Specifications are deleted in their entirety and replaced with the Specifications attached hereto as Exhibit 2 and incorporated herein by reference:

   Project Conditions (Salvaged Surface Soils on page 12)
   Section 321 (Asphalt Concrete Pavement)
   Section 915 (Automatic Gate Opening and Closing System)

3. Exhibit A (Specifications, Plans/Construction Drawings) – the following Plans are deleted in their entirety and replaced with the Plans attached hereto as Exhibit 3 and incorporated herein by reference:

Sheet CV-2.01 Sheet 18 of 58

Sheet CV-2.03 Sheet 20 of 58

Sheet CV-2.06 Sheet 23 of 58

Sheet EL-1.01 Sheet 33 of 58

Sheet EL-2.01 Sheet 34 of 58

Sheet EL-2.01a Sheet 34a of 58

Sheet EL-3.01 Sheet 35 of 58

Sheet EL-3.02 Sheet 36 of 58

Sheet EL-3.02a Sheet 36a of 58

Sheet LS-1.02 Sheet 38 of 58

EXHIBIT 1
TO
ADDENDUM NO. 1
TO
INVITATION FOR BIDS NO. CS 2017-01

[Answers to Bidder Questions]

See following pages.

ANSWERS TO BIDDER QUESTIONS

1. Q) Is there any preference or percentage that has to be met for the MBE or DBE certifications?

   A) There is not a specific percentage or preference for this contract – the Town wants to know whether or not the company has been certified by any jurisdiction or authorized authority in Arizona as a minority or woman owned business. If a member of the team is a certified MBE or DBE, they need to provide documentation of the certification or registration with their sealed proposal packet in response to "EXHIBIT E" of the Invitation for Bids.

2. Q) Do you have the engineer's estimate?

   A) There is an Engineers Estimate however this estimate will not be released.

3. Q) Please clarify the depth requirements for salvaging existing soil material from the site?

   A) The specification page 12 was in error and has been corrected to reflect the salvaging of only one foot (12") of Salvaged Surface Soils. All other items related to this effort remain unchanged. See revised specification attached to this addendum.

4. Q) On the stockpile material on the MCO site, there is a bid item for aggregate base. Are you considering that the base under all the paving as well as under the gabion basket wall?

   A) The aggregate base that has been stockpiled is for use on the project for any areas where aggregate base is specified.

5. Q) There is an item for rock sculpturing. Can you define that a little closer?

   A) The use of rock sculpting as shown on the price sheet bid item No. 30 have been clarified as follows: Rock sculpting includes adjustments in slopes made as directed by the Town of Fountain Hills Representative to avoid damage to existing trees and stands of vegetation, marring weathered rock or to harmonize with the existing landscape features of the site. The transition of such adjusted slopes shall be gradual and not abrupt. At the intersections of cut and fill the slopes shall be adjusted and warped to flow into each other or into the natural ground surfaces without noticeable break.

6. Q) Force account line items, only one of them has a dollar amount in it. Typically I would see dollar amounts in each one when it is a force account. Why are these left blank?

   A) The Town of Fountain Hills wants to understand the unit cost for the force account items that remain blank and the Contractor is required to fill in the unit cost and cost extension on the Price Sheet for these items of work. The force account bid item will be used to determine payment for extra work under these categories for work that is authorized in advance by the Town of Fountain Hills.

7. Q) On sheet CV-2.01 there is a blocked area that is noted as Future Work by the Town. Within this area there is 161 lf of 12" RGRCP and 2 Catch Basins. These items appear to be on the bid

schedule items 12 & 21. See sheet CV-2.07. Are bid line items 12 & 21 those shown on sheet CV-2.01/CV-2.07 and included in contract?

A) The reissued sheet CV-2.01 attached has been updated to clarify what is to be included in the base bid and what is considered future work.

8. Q) Item 107 - Aggregate Base Course Material- is this strictly to purchase material delivered to site? Or this in –place (installed)?

   A) This item is clarified on page 57 of the Specifications "Force Account for Additional Aggregate Base Course for Roadway and Parking" "*...Such price shall include hauling the materials in from an offsite source, mixing and compacting the material to comply with MAG Section 310, MAG Section 321 and MAG Section 702 and the Geotechnical Report unless directed by the Town of Fountain Hills....*"

9. Q) Salvaged Surface Soils page 12 of the Site Specifications notes 2 feet of existing soil to be salvaged versus the 1 foot mentioned at the Pre-bid meeting.

   A) See Answer to Question 3 this addendum.

10. Q) The Gate Opener CSW-200-UL was replaced in 2016. The new CSW-200- U does not have all the functions listed in the specification?

    A) See revised specification and the re-issued sheet LS-1.02 attached to this addendum.

11. Q) The description for asphalt paving per 321.12 and .13 discusses the pay calculation in both SY and Tons. The bid item is in SY, but it goes on to say that additional tons for roads etc. are included. The pay item units need to be consistent, and SY works as long as the asphalt section does not change.

    A) See revised specification attached to this addendum.

REGISTERED LANDSCAPE ARCHITECT
CERTIFICATE NO. 23430
JEFFREY M. ENGELMANN
Date Signed 09.28.17
ARIZONA, U.S.A.

EXPIRES 9.30.17

EXHIBIT 2
TO
ADDENDUM NO. 1
TO
INVITATION FOR BIDS NO. CS 2017-01

[Revised Specifications]

See following pages.

ADDITIONS AND REVISIONS TO THE TECHNICAL SPECIFICATIONS

On Page 12: The four (4) paragraphs describing "Salvaged Surface Soils" is deleted in its entirety and replaced with the following:

Salvaging of the top one (1) foot of existing soil for placement back on any new fill slopes is required as a part of this project and will become part of the projects topsoil plating as described in Section 424 Parkway Grading specification. The contractor shall submit a "Salvaged Surface Soil Management Plan" for approval at the Preconstruction Conference to the Town that describes the approach that the Contractor will take to salvage the top one (1) foot of existing soil and protect that existing salvaged surface soil in place and how that soil will be redistributed on the fill slopes of the project site.

No project excavation shall commence until the Salvaged Surface Soil Management Plan is approved by the Town.

At the pre-construction conference, the Contractor shall submit a Salvage Surface Soil Management Plan for use on the project. This plan shall cover details of how the top one (1) foot of existing site soils (Salvage surface soils) will be excavated, transported, stockpiled, and when needed placed back on the project fill slopes. Proposed equipment shall also be a part of the plan. The contractor shall allow a minimum of two (2) weeks for the Town to review the plan and provide direction, if changes are deemed necessary by the Engineer.

The cost associated with salvaging the existing one (1) foot of soil, protecting that material and then placing the material back on the fill slopes is considered included in other items of work to which such grading is incidental or appurtenant.

On Page 59 Section 321 Asphalt Concrete Pavement the paragraph under 321.12 Measurement is deleted and replaced with the following:

Asphalt concrete pavement will be measured by the square yard, for the mixture actually used as allowed above, which shall include the required quantities of mineral aggregates, asphalt binder, and mineral admixture. Measurement shall include any square yardage used to construct intersections, roadways, streets, or other miscellaneous surfaces indicated on the plans or as directed by the Engineer.

On Page 163 Section 915 Automatic Gate Opening and Closing System (Bid Alternate) is deleted in its entirety and replaced with the following:

SECTION 915
AUTOMATIC GATE OPENING AND CLOSING SYSTEM
(BID ALTERNATE)

915-1 Description

The automatic gate opening and closing system (**Bid Alternate)** units (one for the entry gate and one for the exit gate) should both be designed to handle 60 cycles per hour and support gates weighing up to 1,000 lbs with a length of up to 22 feet and should have a traveling speed of opening 90 degrees within 15 seconds. The work shall include all electrical equipment and power supply, all equipment and materials, the gate key post with preemptive strobe light for emergency vehicles, and associated equipment, and labor to install and test the system with the Town to verify that the system is 100% operational.

915-2 Materials

The following represent in a broad sense the materials and functions of the gate systems and should not be considered all inclusive. The materials that are expected to be provided with the Automatic Gate Opening System for each of the proposed gates entry and exit are as follows. This list was developed around the use of the model CSW200101U Swing Gate as manufactured by Liftmaster Elite gate openings, other gate systems can be submitted for approval to the Town for the following MAG Section 106.

Internet Gateway (828LM) – Connects the MyQ-Enabled Gate Operator to the Internet with this device and the free MyQ app.
Plug-In Loop Detector (LOOPDETLM) – Ensures vehicles are easily identified to exit properly or interrupt gate travel if a vehicle is in its path. Power-efficient design uses less power to maximize cycles when operating on Battery Backup.
Monitored Retro-Reflective Photo Eye (LMRRU) – Sensing distance up to 50 ft., NEMA 4X. Installed at each entrapment point.
LED Dianostic Display – Simplifies installation and troubleshooting.
Programmable Auxiliary Relays – Easily add additional features, such as warning lights/alarms.
Bi-Part Delay – Monitors and adjusts speed and position of each wing to ensure primary gate closes last.
Synchronized Close – Simultaneously closes gates.
Mechanical Limit System – Maintains accurate gate position throughout gate travel, even after using manual disconnect.
Pre-Motion Warning Alarm – Activates on-board alarm three seconds prior to gate motion.

External Alarm Reset Button – Instantly resets the built-in safety alarm siren.
Anti-Tailgate – Prevents unauthorized access. Gate will pause when closing as vehicle pulls onto interrupt loop or breaks photo beam. Once vehicle backs up, gate will continue to close.
Quick Close – Closes the gate immediately after a vehicle pulls off the interrupt loop.
HOMELINK Compatible – Version 4 and higher.
Security +2.0 On-Board Radio Receiver – Up to 50 remote controls (unlimited with 811LM/813LM).
P3 Motor – High-temperature continuous duty motor with class H (high-temp) insulation is rated for high-cycle, high-temperature applications.
Operator Duty Rating – Continuous duty.
Chassis – Same bolt patter/footprint, constructed with 1/4 in. gold zinc-plated steel for rust prevention.
Worm Gear Reduction – Two commercial oil bath gearboxes providing 900:1 worm gear reduction.
Cover – High-density, 2-piece UV-resistant polyethylene cover.
Operator Weight – 175 lbs.
Recommended Capacities – 1 HP is rated for gates up to 22 ft. in length at 1,000 lbs.
Power – 110V Single phase.
Accessory Power – 24VAC, 500mA max.
Monitored Safety Inputs – 3 Main Board, 3 Expansion Board
Temperature Specifications – Without heater: -4°F (-20°C) to 140°F (60°C).
UL Usage Classification – I, II, III, and IV.
Gate Travel Speed – 90 Degree opening in 13-15 seconds.
Approval – ETL and UL Listed and compliant to 2016 UL325 and UL991 Standards.
Dimensions – 24.5"L x 15"W x 28"H
Warranty – 5-Years with commercial application

The Town requires that the gate include the following: The gate system shall be equipped with a programmable timer that the Town can set based on trail head hours of operation and the season that it is being programmed to accept. The timer shall be capable of opening and closing the gate system at the predetermined times. The system is to have loop detectors for the exit gate that are programmed to open the exit gate after park hours to allow those trail users in the area to safely exit the park. The system shall have a preemptive strobe light or trigger system that is set up to accept only the signal from the Town's emergency vehicle system. This preemptive system shall be capable of opening both the entry and exit gates. Contractor shall ensure that the system that is installed for this preemptive mechanism shall be compatible with the Town's emergency vehicle system.

915.3 Construction Requirements:

Contractor shall install gate opening system in compliance with manufacturer specifications. Automatic opening sequence in case of emergency, automatic timer, magnetic lock use, preemptive strobe system, gate key posts, loop detectors, and all materials and equipment are all considered incidental to the installation of the system and are to be included in the cost of installing the automatic gate opening system.

915.4 Method of Measurement:

Automatic Gate Opening System (Bid Alternate) will be measured by the lump sum and include the same system for opening and closing both the entry and exit gates at locations shown on the plans including all electrical materials and labor.

915.5 Basis of Payment:

Automatic Gate Opening System (Bid Alternate) will be paid for by the lump sum price shall include the same system for opening and closing both the entry and exit gates at locations shown on the plans, including preemptive strobe system in accordance with Town's Fire and Parks and Recreation Departments, Magnetic Lock system, automatic timer opening/closing sequence for safety personnel, and coordinating power requirements and hookups. All of these efforts and systems shall be considered incidental to the overall gate cost.

REGISTERED LANDSCAPE ARCHITECT
CERTIFICATE NO.
23430
JEFFREY M.
ENGELMANN
Date Signed 06.28.17
ARIZONA U.S.A.

Expires
9.30.17

EXHIBIT 3
TO
ADDENDUM NO. 1
TO
INVITATION FOR BIDS NO. CS 2017-01

[Revised Plans/Construction Drawings]

See following pages.

ADDITIONS AND REVISIONS TO THE PLANS AND CONSTRUCTION DRAWINGS

Re-Issued Sheets Attached:

Sheet CV-2.01 Sheet 18 of 58 – Revised to clarify Town received comment and contractor comment regarding what items are to be included with base bid and what items are future work in the cul-de-sac area.

Sheet CV-2.03 Sheet 20 of 58 – Revised to clarify Town received comment note that added cleanout and connections shown into tank is considered incidental to the pipe connection and should be included with the cost of the 4" SDR35 pipe

Sheet CV-2.06 Sheet 23 of 58 – Revised to clarify Town received comment regarding grading around inlet

Sheet EL-1.01 Sheet 33 of 58 – Revised to clarify Town received comment

Sheet EL-2.01 Sheet 34 of 58 – Revised to clarify Town received comment

Sheet EL-2.01a Sheet 34a of 58 – Revised to clarify Town received comment

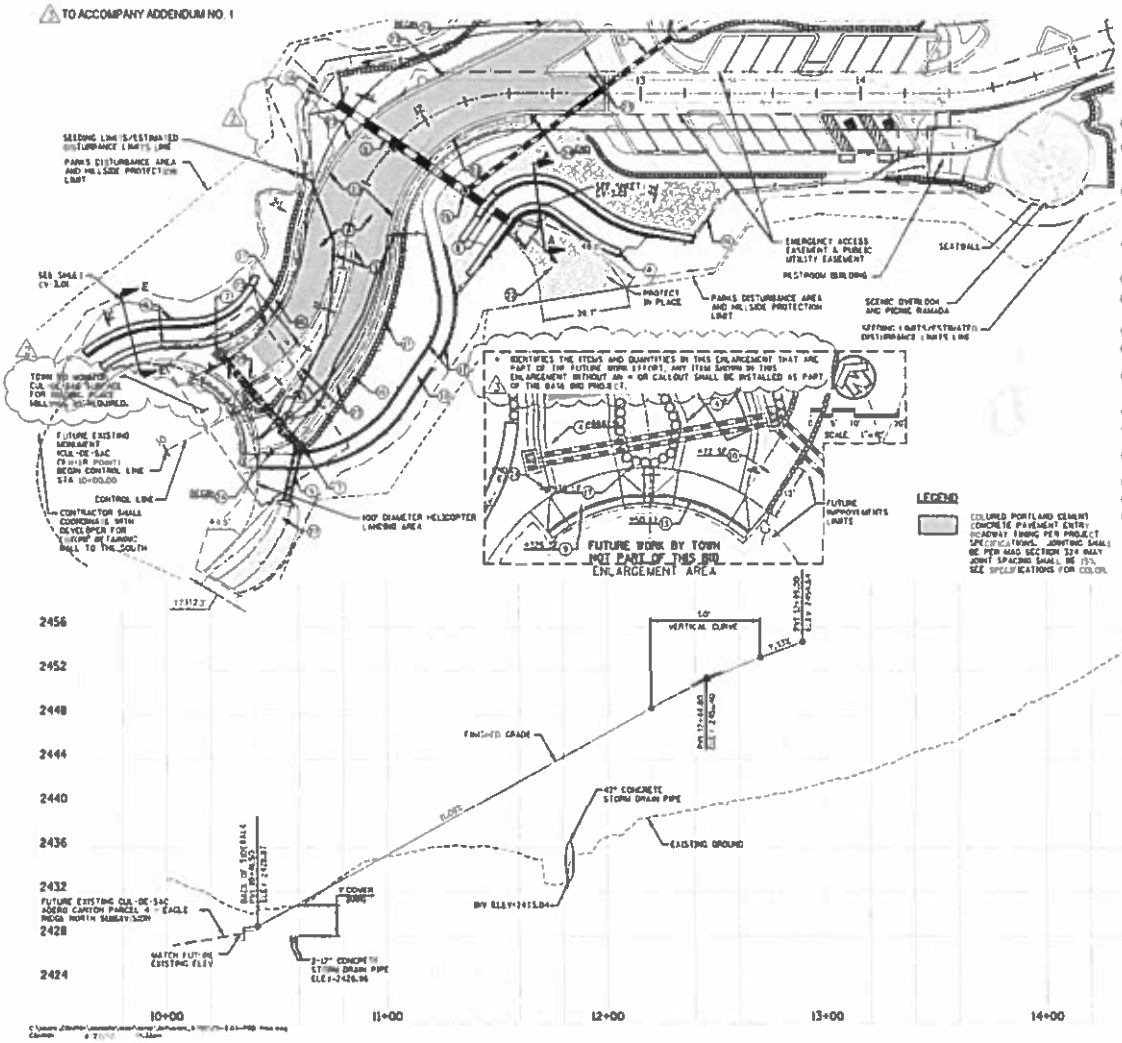
Sheet EL-3.01 Sheet 35 of 58 – Revised to clarify Town received comment

Sheet EL-3.02 Sheet 36 of 58 – Revised to clarify Town received comment

Sheet EL-3.02a Sheet 36a of 58 – Revised to clarify Town received comment

Sheet LS-1.02 Sheet 38 of 58 – Revised to clarify bid alternate gate closure model and associated gate features.

TO ACCOMPANY ADDENDUM NO. 1



GENERAL CONSTRUCTION NOTES

1. THE CONTRACTOR SHALL FIELD VERIFY ALL INFORMATION BEFORE ANY CONSTRUCTION WORK COMMENCES. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL UTILITIES PRIOR TO BEGINNING CONSTRUCTION. UTILITIES DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED OR REPLACED AT CONTRACTOR'S EXPENSE. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN.

PAVING, GRADING & DRAINAGE NOTES

1. COLORED RIBBON CURB PER MAG STD DTL 220, TYPE B, MODIFY CURB WIDTH TO 18-INCHES COLOR PER SPEC.
4. 5-INCH COLORED PORTLAND CEMENT CONCRETE PAVEMENT PER MAG SECTION 725, OVER 4-INCH AGGREGATE BASE COURSE PER MAG SECTION 702. PREPARE SUBGRADE PER MAG SECTION 301, 90% COMPACTION, COLOR PER SPEC.
5. STORM DRAIN CONCRETE PIPE PER MAG, SECTION 618, SIZE, LENGTH, HEADWALL, AND INVERT PER STORM DRAIN PLANS, DWG NO CV-3.04, CV-3.06, & CV-3.07. TRASH RACK ON UP-STREAM HEADWALL PER DETAIL 4, DWG NO CV-3.04. HANDRAIL PER DETAIL 8, DWG NO CV-3.03.
6. GABION BASKET RETAINING WALLS PER DETAIL 1A AND 1B, DWG NO CV-3.01. SEE LS-2.01 & LS-3.05 FOR ENTRY SIGNAGE LOCATION & DETAIL.
7. CATCH BASIN PER MAG STD DTL 537.
9. CONCRETE DRIVEWAY ENTRANCE PER MAG STD DTL 260, MODIFY WIDTH TO 14-FEET AND CROSS SLOPE TO 2% TO BE CONSTRUCTED BY OTHERS.
10. NEW 4" COLORED CONCRETE SIDEWALK PER MAG STD DTL 230.
11. DEPRESSED CURB AND GUTTER PER MAG STD DTL 220 TO BE CONSTRUCTED BY OTHERS.
13. STORM DRAIN MANHOLE PER MAG STD DTL 520 & 522, 24-INCH FRAME AND COVER. DRAINAGE STRUCTURE PER DETAIL 12, DWG NO CV-3.06.
16. RIPRAP PROTECTION PER NOTE 4 ON DWG NO CV-3.02.
17. PLACED NATIVE ROCK EMBANKMENT, PER TYPICAL SECTIONS ON DWG NO CV-3.02 AND DETAIL 8 ON DWG NO CV-3.03.
18. RIPRAP PROTECTION PER NOTE 4 ON DWG NO CV-3.02 MOD D=24"
21. FIRE LANE STRIPING PER DETAIL 15, DWG NO CV-3.05
22. NO PARKING SIGN PER DETAIL 18 AND 16, DWG NO CV-3.05.
23. TEMPORARY ASPHALT PAVING 2" ASPHALT OVER COMPACTED NATURAL GRADE WITH SAFETY EDGE PER MAG STD DTL 201

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PARKS & RECREATION DEPT
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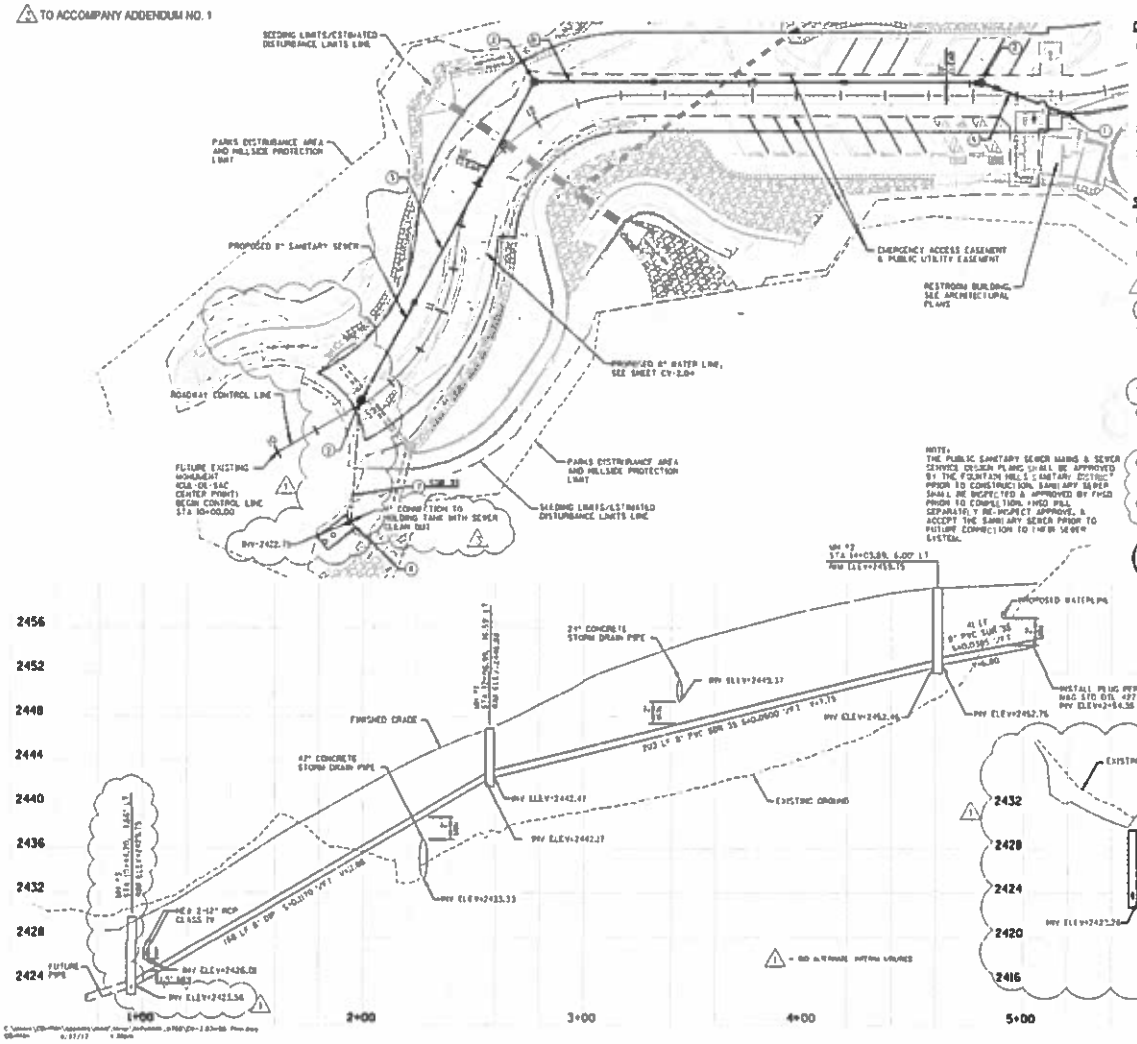
FOUNTAIN HILLS, AZ 85268
(480) 816-5100

Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead
PAVING, GRADING & DRAINAGE

No.	Date	Description
1	03/21/2013	ADDED SHEET CV-2.01
2	04/26/2013	ADDED SHEET CV-2.01
3	05/13/2013	REVISED & ADDED SHEETS
4	06/26/2013	REVISED & ADDED SHEETS
5	08/07/2013	REVISED & ADDED SHEETS
6	08/21/2013	REVISED & ADDED SHEETS
7	09/11/2013	REVISED & ADDED SHEETS
8	09/18/2013	REVISED & ADDED SHEETS
9	10/11/2013	REVISED & ADDED SHEETS
10	10/25/2013	REVISED & ADDED SHEETS
11	11/15/2013	REVISED & ADDED SHEETS
12	12/13/2013	REVISED & ADDED SHEETS
13	01/17/2014	REVISED & ADDED SHEETS
14	02/21/2014	REVISED & ADDED SHEETS
15	03/21/2014	REVISED & ADDED SHEETS
16	04/11/2014	REVISED & ADDED SHEETS
17	05/16/2014	REVISED & ADDED SHEETS
18	06/11/2014	REVISED & ADDED SHEETS

DESIGNED BY: J. BOWRING
DRAWN BY: C. GRIFFITH
APPROVED BY: J. MCELDADSTON
SCALE: 1"=20'
DATE: 05/31/2017
PROJECT NO. 16-0887.003
DRAWING NO. CV-2.01
SHEET NO. 18-58

TO ACCOMPANY ADDENDUM NO. 1



GENERAL CONSTRUCTION NOTES

1. THE CONTRACTOR SHALL PERFORM ALL INFORMATION BEFORE ANY CONSTRUCTION BEGINS COMMENCES. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL UTILITIES PRIOR TO BEGINNING CONSTRUCTION. UTILITIES DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED OR REPLACED AT CONTRACTOR'S EXPENSE. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN.
2. PIPE LENGTHS AND SLOPES ARE BASED ON DISTANCES FROM MANHOLE EDGE TO MANHOLE EDGE.
3. THE PROPOSED ADERO CANYON PARCEL 4 - EAGLE RIDGE NORTH SUBDIVISION PLANS HAVE NOT BEEN APPROVED, AT TIME OF DESIGN, THEREFORE, EXISTING UTILITY CONNECTION POINTS ARE NOT YET ESTABLISHED.

SANITARY SEWER CONSTRUCTION NOTES

1. TERMINATE SANITARY SEWER SERVICE 6-FEET IN FRONT OF BUILDING. INSTALL TEMPORARY PLUG PER MAG STD DTL 427, IF NECESSARY. (1 EA)
2. 48-INCH DIAMETER SANITARY SEWER MANHOLE PER MAG STD DTL 420-2, 24-INCH FRAME AND COVER PER MAG STD DTL 424. USE DEBRIS CONTROL PER FOUNTAIN HILLS SANITARY DISTRICT SPECIFICATIONS. POLYPROPYLENE STEPS PER MAG STD DTL 426. MAINTAIN MIN. 0.30 FT DROP ACROSS ALL MANHOLES. LOCATION PER PLAN AND PROFILE. (13 EA)
3. 8-INCH DIP SCH 350 SANITARY SEWER LINE. DIP SHALL BE PROTECTED FROM CORROSION BY ENCASEMENT IN A POLYETHYLENE PROTECTIVE WRAPPING PER MAG SECTION 610. DIP PIPES SHALL HAVE INSIDE CEMENT MORTAR LINING. SLOPE AND LOCATION PER PLAN AND PROFILE. (1254 LF)
4. INSTALL PLUG, 8" DIP SANITARY SEWER LINE PER MAG STD DTL 427. (0 EA)
5. 6-INCH PVC SCH 40 SANITARY SEWER SERVICE LINE. PVC SHALL BE PROTECTED FROM CORROSION BY ENCASEMENT IN A POLYETHYLENE PROTECTIVE WRAPPING PER MAG SECTION 610. SLOPE AND LOCATION PER PLAN AND PROFILE. (252 LF)
6. INSTALL PRECAST NO. 5000 5,000 GALLON SEWAGE HOLDING TANK (TRAFFIC RATED WITH LOAD LEVEL ALARM OR EQUIVALENT PRODUCT APPROVED BY TOWN OF FOUNTAIN HILLS ENGINEER.
7. 4-INCH PVC (SDR 35) SANITARY SEWER LINE. SLOPE AND LOCATION PER PLAN AND PROFILE. (42 LF)

HORIZ SCALE: 1"=20'
VERT SCALE: 1"=4'

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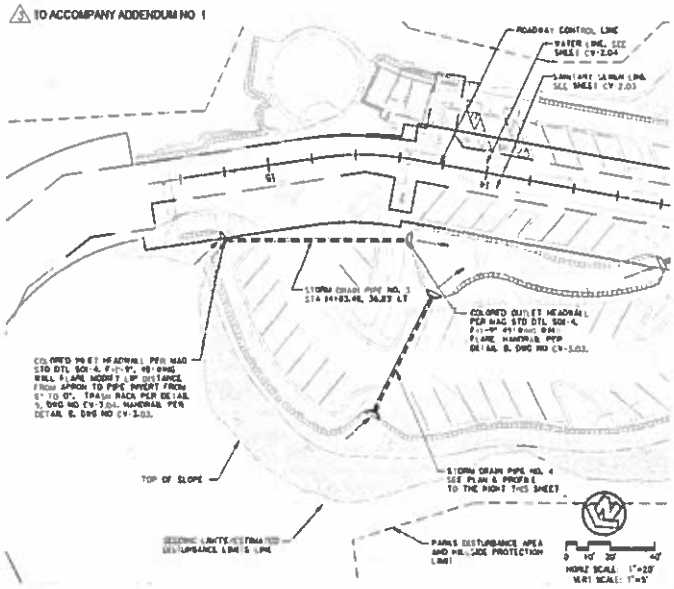
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead
SANITARY SEWER PLAN

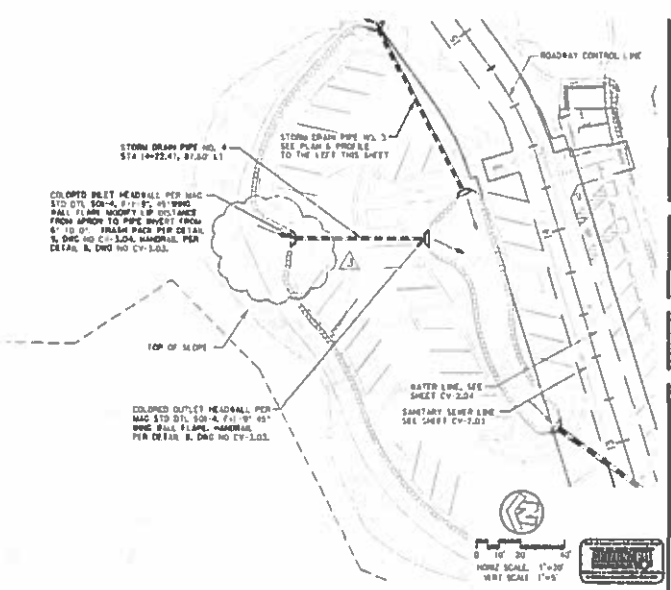
No.	Date	Revision
1	06/20/16	[illegible]
2	09/12/16	[illegible]
3	04/21/17	[illegible]
4	05/01/17	[illegible]
5	05/25/17	[illegible]
6	06/30/17	[illegible]

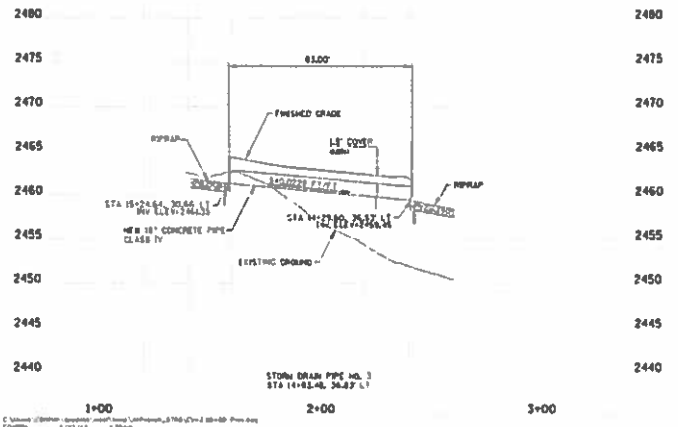
Drawn by: J. BUTRINO
Designed by: C. CRISWELL
Approved by: J. HOLLINGSWORTH
Scale: 1"=20'
Date: 06/31/2017
Project No.: 16 0007 00.1

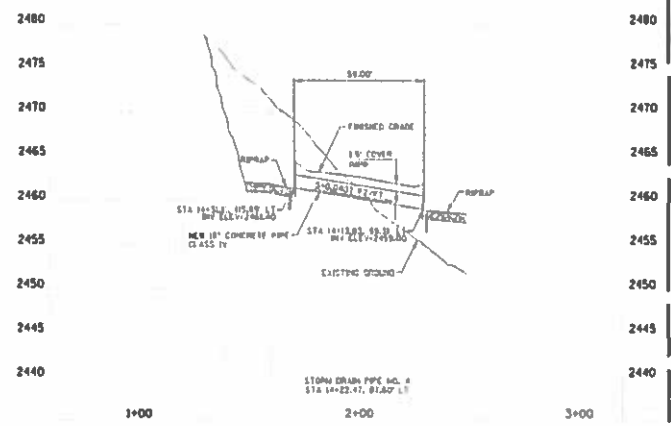
CV-2.03 20 of 58

3 TO ACCOMPANY ADDENDUM NO 1









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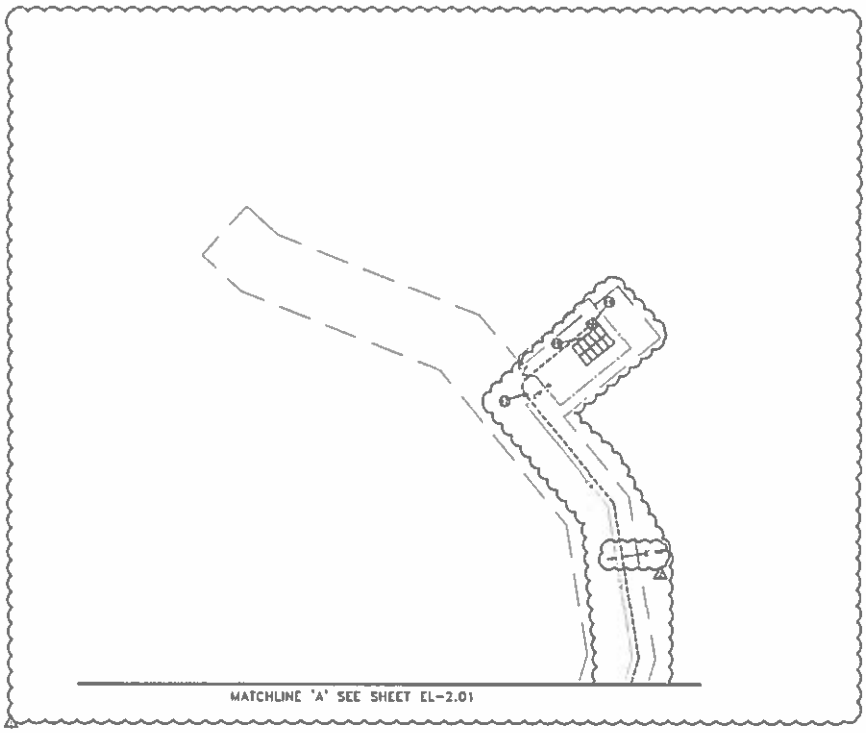
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

STORM DRAIN PLAN & PROFILE

No	Date	Revisions
1	06/06/06	[illegible]
2	01/17/07	[illegible]
3	05/02/07	[illegible]
4	06/13/07	[illegible]
5	06/15/07	[illegible]
6	Feb 14/07	[illegible]
7	Jul 26/07	[illegible]

Drawn by: J. BO HSIEH
Designed by: C. CRAFTON
Approved by: J. HOLDHEISTER
Scale: 1"=20'
Date: 05/31/2007
J2 Project No: 16 088 7.003
Drawing No: CV-2.06
Sheet No: 23 of 58



CONSTRUCTION NOTES:

1. INSTALL 200 AMP 120/240V 1Ø 3W METERED PANEL (SEE MATERIAL MOUNTED SERVICE DETAIL, SINGLE LINE DIAGRAM AND PANEL SCHEDULE SHEET EL-2.01). CONTRACTOR TO PROVIDE TEMPORARY POWER TO ALLOW FOR REVIEW BY INSPECTOR AND ALSO BY CONEDISON WHEN REQUIRED. USE A APPROVED TYPE A HUBS ON LARGE BOXES.
2. INSTALL (1 1/2 PULL BOX (NO PULL BOX INSTALLATION DETAIL SHEET EL-2.02) UNLESS WHERE SHOWN ON PLANS.
3. INSTALL NEW 3 1/2" SCHEDULE 40 PVC CONDUIT TO LOCATION OF POWER CO. TRANSFORMER, COORDINATE INSTALLATION OF CONDUCTORS WITH POWER CO.
4. INSTALL LED BOLLARD (SEE BOLLARD DETAIL SHEET EL-2.02) UNLESS OTHERWISE SHOWN ON PLANS.
5. EXTEND CONDUIT TO LOCATION SHOWN ON PLAN AND CAP FOR FUTURE USE
6. INSTALL LED FLOOD LIGHT (SEE FLOOD LIGHT DETAIL SHEET EL-2.02).
7. INSTALL NEW 20 AMP GFCI OUTLET ON FLOOD POST (FOR FLOOD LIGHT DETAIL SHEET EL-2.02).
8. PROVIDED RESTROOM BUILDING WITH CONDUIT TO PANEL AS SHOWN ON BUILDING ELECTRICAL PLANS
9. EXTEND DIRECT BURIAL CABLE FROM NEW GROUND TO MAGNETIC LOCK TO BE INSTALLED AT THIS LOCATION
10. FUTURE LED BOLLARD NOT TO BE INCLUDED IN BASE BUILD SHOWN FOR REFERENCE ONLY. SEE BOLLARD DETAIL SHEET EL-2.02
11. CONTRACTOR RESPONSIBLE FOR ALL ELECTRICAL CONNECTIONS TO ADMIN CONTROLLER
12. THIS IS NOT TO BE INCLUDED IN BASE BUILD, TO BE USE AS A REFERENCE ONLY
13. DUPLEX RECEPTACLE PER DETAIL ON SHEET EL-2.02
14. FUTURE SIGNAGE/WAYFINDING LIGHT NOT TO BE INCLUDED IN BASE BUILD SHOWN FOR REFERENCE ONLY. SEE DETAIL ON SHEET EL-2.02
15. INSTALL PROTECTIVE PANEL BELOW WOOD BARRIER PER DETAILS ON SHEET EL-2.02A
16. INSTALL PROTECTIVE GUTTERS, MATERIALS AND FRAME CONTROLLER AS SHOWN IN EXTERIOR MOUNTED TO THE GROUND PER DETAILS ON SHEET EL-2.02A
17. INSTALL 1.5" SCHEDULE 40 PVC CONDUIT WITH (3)-#10 CU THHN CONDUCTORS AND (1)-#8 CU GROUND.

LEGEND:

- HLP CONDUIT RUN
- NEW DIRECT CABLE RUN
- POWER COMPANY PAD MOUNTED TRANSFORMER
- CONDUIT NOTE: SCHEDULE 40 PVC CONDUIT UNLESS OTHERWISE NOTED ACCORDING TO WIRE AND CONDUIT TABLE WITH SOME BURIED UNDERGROUND ALSO ACCORDING TO WIRE AND CONDUIT TABLE BURIED A MINIMUM OF 24" BELOW FINISHED GRADE
- 200 AMP 120/240V 1Ø 3W METERED PANEL (SEE MATERIAL MOUNTED SERVICE DETAIL, SINGLE LINE DIAGRAM AND PANEL SCHEDULE SHEET EL-2.01)
- PULL BOX (SEE PULL BOX INSTALLATION DETAIL SHEET EL-2.01)
- PARTIALLY SHIELDED LED BOLLARD (SEE BOLLARD DETAIL SHEET EL-2.02)
- PARTIALLY SHIELDED LED FLOOD LIGHT (SEE FLOOD LIGHT DETAIL SHEET EL-2.02)
- GFCI RECEPTACLE, MOUNTED 24" AFG (SEE FLOOD LIGHT OR WALL MOUNTED DUPLEX RECEPTACLE DETAIL SHEET EL-2.02)

WIRE AND CONDUIT TABLE

Circuit		Conduit		Notes
NO.	WIRE SIZE	FROM / TO	CONDUIT SIZE	FOR ...
100	3/0	200-0 / 201-0	1-1/2	200 / 201
	(2)1/0		1-1/2 EACH	FROM
101	(2)1/0		1-1/2 EACH	TO
102	1/0	201-0 / 202-0	1-1/2	TYPE A
103		201	1.50	BETWEEN SUB POINT
104	1/0	202-0 / 203-0	1-1/2	2-1
		202-0 / 203-0		2-8
105	1/0	203-0 / 204-0	1-1/2	203 TO
	1/0		1-1/2	FROM
106	1/0	204-0 / 205-0	1-1/2	2-4
		204-0 / 205-0		2-4
107 & 8	1/0	204	1.50	2-13
		204		2-20
	1/0	207-0 / 208-0		2-12
		207-0 / 208-0		2-4
	1/0	208-0 / 209		TO/FROM
109 & 10	1/0	209	1.50	TYPE A
110 & 11	1/0	209-0 / 210-0	1-1/2	TYPE A

*CONDUIT TO OPTIMAL BOLLARD LIGHTS, DO NOT ROUTE THROUGH BOLLARD FOUNDATION
*PRIOR INSTALLATION OF CONDUCTORS TO BE COORDINATED WITH ARCHITECT BUILDING CONSTRUCTION
@ CONDUIT INSTALLED PER BASE BID, ONLY INSTALLED PER BASE BID WITH ALTERNATE #1.

SCALE 1"=20'

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ROBERT A. WRIGHT, PE
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FOUNTAIN HILLS TOWN HALL
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PROJECT
Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

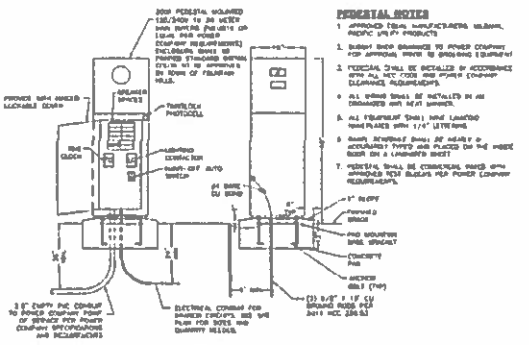
SHEET
ELECTRICAL PLAN

No.	Date	Description
1	05/16/17	90% REVIEW
2	06/01/17	100% REVIEW
3	06/06/17	95% REVIEW
4	06/13/17	95% REVIEW
5	06/20/17	95% REVIEW
6	07/10/17	100% REVIEW
7	08/14/17	100% REVIEW

DRAWN BY: B. LAGAR
DESIGNED BY: C. ROLMAN
APPROVED BY: C. ROLMAN
SCALE: NTS
DATE: 06/15/2017

J2 PROJECT NO.: 16.0837.003

DRAWING NO.: EL-2.01a
SHEET NO.: 34 of 58

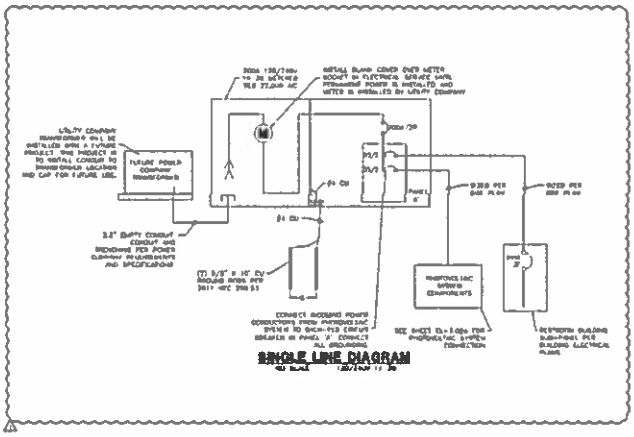


PEDESTAL NOTES

1. APPROVED EQUAL MANUFACTURERS WILBURN, PACIFIC WIRE & PRODUCTS
2. SUBMIT SHOP DRAWINGS TO POWER COMPANY FOR APPROVAL PRIOR TO ORDERING EQUIPMENT
3. PEDESTAL SHALL BE INSTALLED IN ACCORDANCE WITH ALL NEC CODE AND POWER COMPANY CLEARANCE REQUIREMENTS.
4. ALL GROUND SHALL BE INSTALLED IN ALL DRAWINGS AND NEAT WIRING.
5. ALL FIXTURES SHALL HAVE LAMPING HAVE PLACES WITH 1/4" LETTERING
6. SHOP DRAWINGS SHALL BE NEATLY & ACCURATELY TYPED AND PLACED ON THE INDEX SHEET ON A LAMINATED SHEET
7. PEDESTAL SHALL BE COMMERCIAL GRADE WITH APPROVED NEW BUILDING PER POWER COMPANY REQUIREMENTS.

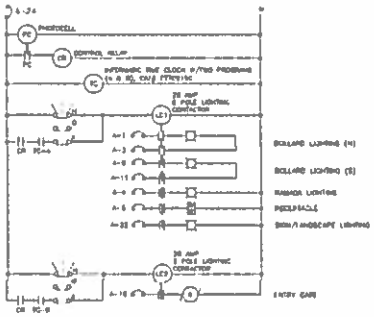
200A PEDESTAL MOUNTED SERVICE

NO SCALE



SINGLE LINE DIAGRAM

NO SCALE



CONTROL SCHEMATIC

NTS

PANEL "A"	200 AMPS	120/240 VOLTS 1Ø 3W	MAINS 200 AMP
LOCATION ENTRY ROAD, STA 11+70	TYPE PLUG-IN	MOUNTING PEDESTAL	

CKT NO.	BKR	DESCRIPTION	VA	VA	DESCRIPTION	BKR	CKT NO.
1	20/1	* BOLLARD LIGHTING (N)	1750	1050	SPARE	20/1	2
3	/1	- -	1750	1050	* FLAGPOLE LIGHTING	20/1	4
5	20/1	SPARE	0	600	RECEPTACLE	20/1	6
7	20/1	SPARE	0	270	SPARE	20/1	8
9	20/1	*BOLLARD LIGHTING (S)	540	540	SPARE	20/1	10
11	/1	- -	540	540	ENTRY LANDSCAPE LIGHTING	20/1	12
13	20/1	*BOLLARD LIGHTING (FUTURE) **	750	1200	* FLAGPOLE LIGHTING (FUTURE) **	20/1	14
15	/1	- -	750	1200	FLAGPOLE PEDESTAL OUTLETS**	20/1	16
17	20/1	PHOTOVOLTAIC CONNECTION	0	1200	ENTRY GATE ⊕	20/1	18
19	/1	- -	0	1200	ENTRY GATE ⊕	20/1	20
21	20/1	RECEPTACLE SUB-PANEL	4000	0170	SIGN/LANDSCAPE LIGHTING	20/1	22
23	/1	- -	0700	0300	SPARE	20/1	24
		CODE TOTAL = / A		11750	11750		
		CODE DEMAND AMPS / P		97.9	97.9		

* INDICATES LOAD @ 1.25%

33.0 AMP AT 240 VOLTS

**INTERMITTENT PANEL DEMAND LOAD
DEMAND PER BUILD ALTERNATE #1
ONE OF TWO FLAG OPTIONS TO BE PLACED ON BREAKER TO BE PLACED OFF EXCEPT BREAKERS 17, 18, 19, 20, 21, 22 AND 24**

J2 Engineering and Environmental Design

WRIGHT

Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

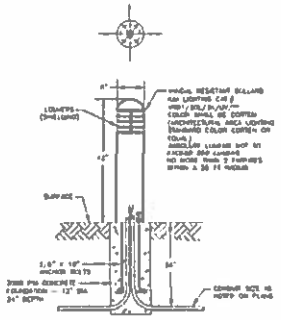
ELECTRICAL DETAILS

1	05/30/13	[illegible]
2	05/31/13	[illegible]
3	06/06/13	[illegible]
4	06/06/13	[illegible]
5	06/07/13	[illegible]

DRAWN BY D. LAGAR
DESIGNED BY C. TOLMAN
APPROVED BY C. TOLMAN
SCALE NTS
DATE 06/15/2012

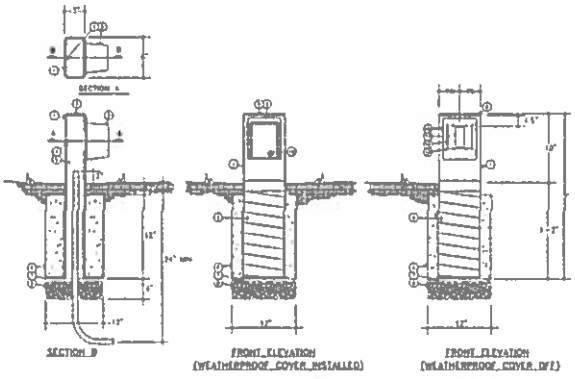
J2 PROJECT NO. 16 0097.003

EL-3.01 35 of 58



BOLLARD LIGHT DETAIL

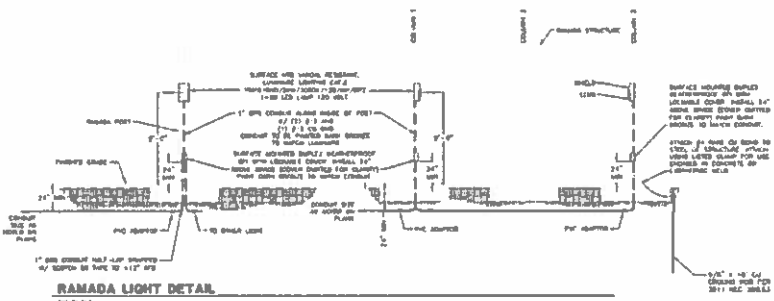
NO SCALE



KEYED NOTES

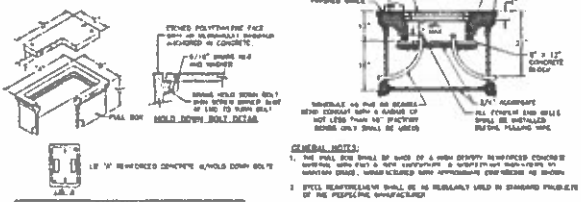
DUPLEX RECEPTACLE DETAIL

NO SCALE



RAMADA LIGHT DETAIL

NO SCALE



GENERAL NOTES:

1. THE PULL BOX SHALL BE MADE OF A HIGH DENSITY REINFORCED CONCRETE MATERIAL WITH FLAT & NON SLIP SURFACE & SUITABLE FOR HIGH-VOLTAGE WITH MINIMUM GRADE, WHICH INCLUDES NOW APPROXIMATE DIMENSIONS AS SHOWN
2. SPECIAL REINFORCEMENT SHALL BE AS REASONABLY NEED IN STANDARD PRACTICE OF THE PROPOSED MANUFACTURER
3. POWER LETTERING SHALL BE 1" LETTERS CAST IN STANDARD MARKING "ELECTRIC" OR "HIGH VOLTAGE" AS REQUIRED.
4. THE PULL BOX SHALL HAVE AN ETCHED POLYETHYLENE FACE WITH AN REASONABLY POWERED ANCHORED IN CONCRETE
5. ALL CABLE & CONDUCTOR SPLICES SHALL BE CONNECTED WITH TYCO ELECTRONICS COLOR-B, NON INSULATED CODE- 3/8, 1/0 COPPER COMPRESSION W-1/0 CONNECTOR OR APPROVED EQUAL & INSULATED WITH 3M SCOTCHCAST SPLICE KIT NO SEAL, TYCO ELECTRONICS COLOR-B, NOT INSULATED WITH SEALS OR APPROVED EQUAL.

BATE TABLE

PULLBOX TYPE	PULLBOX LENGTH	PULLBOX DEPTH	PULLBOX WIDTH	A	B	C
	"	"	"	"	"	"
13 1/2	13-1/2"	11-1/2"	13"	13-1/2"	10"	1/2"
15	15-1/2"	13-1/2"	13"	15-1/2"	12-1/2"	1"
17	17-1/2"	15-1/2"	13"	17-1/2"	14-1/2"	1"

PULL BOX INSTALLATION

NO SCALE

J2 Engineering and Environmental Design

WRIGHT

TOWN OF FOUNTAIN HILLS
PARKS & RECREATION DEPT
16705 E. AVENUE OF THE FOUNTAINS
FOUNTAIN HILLS, AZ 85268
(480) 816-5100

Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

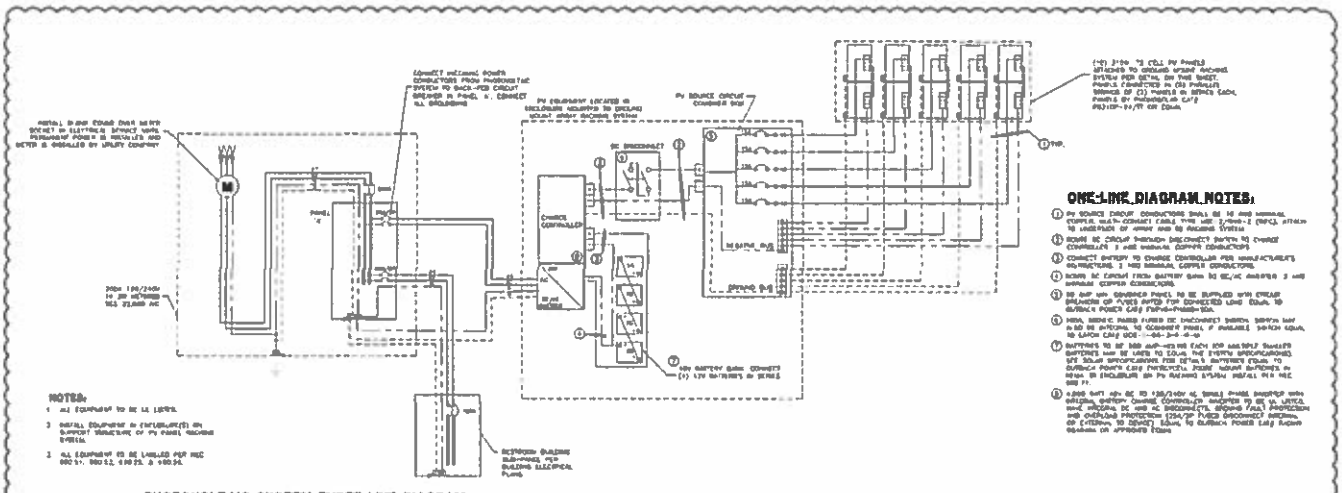
ELECTRICAL DETAILS

No.	Date	Revision
1	10/26/16	ADD DETAILS
2	04/17/17	ADD DETAILS
3	05/08/17	TC COMMENTS
4	06/06/17	TC COMMENTS
5	06/29/17	ADD ELECTRICAL DETAILS
6	08/21/17	ADD ELECTRICAL DETAILS
7	09/01/17	ADD ELECTRICAL DETAILS

Drawn by: D. EAGAN
Reviewed by: C. TOLMAN
Approved by: C. TOLMAN
Scale: N.T.S.
Date: 06/15/2017

J2 Project No. 16.0097.001

Sheet No. EL-3.02 Sheet No. 36 of 58



ONE-LINE DIAGRAM NOTES:

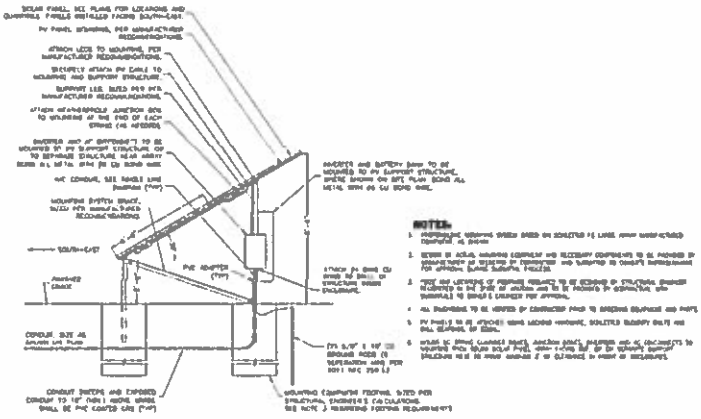
1. PV SOURCE CIRCUIT CONDUCTORS SHALL BE #12 AWG MINIMUM COPPER MULTI-CONDUCT CABLE TYPE USE 2/MC-LC (MPC), ATTACH TO UNDERSIDE OF ARRAY AND TO RACKING SYSTEM
2. BOND DC CIRCUIT PROTECTION DISCONNECT PARTS TO CHARGE CONTROLLER 1 #8 AWG MINIMUM COPPER CONDUCTORS
3. CONNECT BATTERY TO CHARGE CONTROLLER PER MANUFACTURER'S INSTRUCTIONS. 1 #8 AWG MINIMUM COPPER CONDUCTORS.
4. BOND DC CIRCUIT FROM BATTERY BANK TO DC/AC INVERTER 1 #8 AWG MINIMUM COPPER CONDUCTORS.
5. 30 AMP MPL CONTROL PANEL TO BE SUPPLIED WITH CIRCUIT BREAKERS OR FUSES RATED FOR CONNECTED LOAD EQUAL TO SURGE POWER CAPACITY+PANEL+BOX.
6. MINI, MEDIC, PADDLE FUSES OR DISCONNECT SWITCH WITH NOT TO BE OPTIONAL TO CONNECT PANEL IF AVAILABLE SWITCH EQUAL TO LARGE CAPACITY OCP ---66-3-4-6-6
7. BATTERIES TO BE 100 AMP-HRS PER EACH FOR MULTIPLE SUNLITE BATTERIES WILL BE USED TO EQUAL THE SYSTEM SPECIFICATIONS. SEE SOLAR SPECIFICATIONS FOR DETAIL. BATTERIES EQUAL TO SURGE POWER CAPACITY. PLACE MOUNT BATTERIES IN NEMA 3R ENCLOSURE ON PV RACKING SYSTEM. INSTALL PER NEC 690.71.
8. 4.000 WATT 48V DC TO 120/240V AC SINGLE PHASE INVERTER WITH BATTERY CHARGE CONTROLLER. INVERTER TO BE UL LISTED, HAVE INTERNAL DC AND AC DISCONNECTS, GROUND FAULT PROTECTION AND OVERLOAD PROTECTION 125A/2P FUSED DISCONNECT BREAKER, OR (VERIFIED TO DEVICE) EQUAL TO SURGE POWER LAB EQUIVALENT OR APPROVED EQUAL

NOTES:

1. ALL EQUIPMENT TO BE UL LISTED.
2. INSTALL EQUIPMENT IN ENCLOSURE(S) ON SUPPORT STRUCTURE OF PV PANEL RACKING SYSTEM.
3. ALL EQUIPMENT TO BE LABELED PER NEC 690.54, 690.53, 690.35 & 690.56.

PHOTOVOLTAIC SYSTEM THREE LINE DIAGRAM

NO SCALE



NOTES:

1. PROPRIETARY MOUNTING SYSTEM BASED ON SOLUTIONS FOR LARGE ARRAY MANUFACTURED COMPANY AS SHOWN
2. REFER TO ACTUAL MOUNTING EQUIPMENT AND NECESSARY COMPONENTS TO BE PROVIDED BY MANUFACTURER AS REQUIRED BY CONTRACTOR AND SUBMITTED TO OWNER'S REPRESENTATIVE FOR APPROVAL BEFORE ORDERING PROCESS.
3. TYPE AND LOCATION OF PROPOSED FOUNDATION TO BE DESIGNED BY STRUCTURAL ENGINEER REGARDING TO THE TYPE OF SOLUTION AND TO BE PROVIDED BY CONTRACTOR FOR APPROVAL.
4. ALL DRAWINGS TO BE VERIFIED BY CONTRACTOR PRIOR TO ORDERING EQUIPMENT AND PARTS.
5. PV PANELS TO BE ATTACHED USING MOUNTING HARDWARE, SUPPLIED BY MANUFACTURER AS PER ELEVATION OF SITE.
6. WHEN DC WIRING CONNECT PANEL, JUNCTION BOXES, INVERTER AND AC DISCONNECTS TO MOUNTING PADS MUST BE PVC, CONDUIT MUST BE UV RESISTANT SUPPORT SPACING NOT TO EXCEED 3' TO ALTERNATE SUPPORT SPACING NOT TO EXCEED 2' TO ALTERNATE IN FRONT OF ENCLOSURE.

PV PANEL GROUND MOUNT RACKING SYSTEM DETAIL

NO SCALE

J2 Engineering and Environmental Design

WRIGHT

Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

ELECTRICAL DETAILS

1	06/22/17	ADD REVIEW
2	06/27/17	ADD REVIEW
3	07/17/17	PV DRAWING
4	08/08/17	PV DRAWING
5	08/28/17	ADD ELEC. DETAILS
6	09/25/17	ADD ELEC. DETAILS
7	09/26/17	ADD ELEC. DETAILS
8	10/25/17	ADD ELEC. DETAILS

DRAWN BY: D. LAGAR
DESIGNED BY: C. TOLMAN
APPROVED BY: C. TOLMAN
SCALE: N.T.S.
DATE: 06/15/2017

JOB PROJECT NO. 16.0897.003

DRAWING NO. EL-3.02a SHEET NO. 36a of 58

SITE AMENITIES SCHEDULE - BASE BID

DESCRIPTION	SUPPLIER	MANUFACTURER	MODEL	SIZE	FINISH	COLOR	QUANTITY	DETAIL REFERENCE
PICNIC TABLE - 46" SQ. w/ ¾" #9 EXPANDED METAL TOPS, ROLLED EDGES, & 4 ATTACHED RIBBED STEEL SEATS SURFACE MOUNTED TO CONCRETE PAD	MIRACLE PLAYGROUND SALES (800) 909-1414	WEBCOAT	T46WFBCLASSPSM	46" SQ.	POWDER COATED	TABLE & BENCHES: BROWN, FRAME: ALMOND	3 EA.	DETAIL 1, LS-3.08
PICNIC TABLE SURFACE MOUNT COVERS FOR 2 ⅜" TUBING	MIRACLE PLAYGROUND SALES (800) 909-1414	WEBCOAT	BALCOVER	2 ⅜"ø	POWDER COATED	ALMOND	10 EA. (2 PER PAD)	DETAIL 1, LS-3.08
ACCESSIBLE PICNIC TABLE - 46" SQ. w/ ¾" #9 EXPANDED METAL TOPS, ROLLED EDGES, & 3 ATTACHED RIBBED STEEL SEATS w/ ANTI-VANDALISM BAR SURFACE MOUNTED TO CONCRETE PAD	MIRACLE PLAYGROUND SALES (800) 909-1414	WEBCOAT	T46WEBCLASS-3SM AND A/BAR	46" SQ.	POWDER COATED	TABLE & BENCHES: BROWN, FRAME: ALMOND	1 EA.	DETAIL 1, LS-3.08
TRASH RECEPTACLE - 41 GALLON EXPOSED AGGREGATE CONCRETE w/ SELF-CLOSING LID & LINER - INSTALL OVER FLAT COMPACTED & STABLE SURFACE	WAUSAU TILE (715) 359-3121	WAUSAU TILE	TF1170 (RECEPTACLE) w/ TF1825 (LINER)	28"ø x 44"H	EXPOSED AGGREGATE CONCRETE	CONCRETE: A1 (TAN) ACCESSORIES: P1 (BROWN)	5 EA.	DETAIL 1, LS-3.06
GABION BASKET BENCH OR SEAT WALL w/ CAST IN PLACE CONCRETE CAPS & PIERS	-	BASKETS BY HILFIKER RETAINING WALLS & CONCRETE CAPS CAST BY CONTRACTOR		PER DTLS	WEATHERED STEEL WITH SMOOTH FINISH INTEGRAL COLOR CONC. CAP: SOLOMON- 'ONYX' OR DAVIS- 'DARK GRAY #8084'		4 BENCHES, 88 LF OF SEAT WALLS	DETAIL 1, LS-3.08
BICYCLE RACKS	-	FABRICATED BY CONTRACTOR	-	PER DTLS.	NATURAL WEATHERED FINISH	RUSTED STEEL	1 EA. (4 BIKE CAPACITY)	DETAIL 3, LS-3.08
BOLLARD	-	FABRICATED BY CONTRACTOR	-	PER DTLS.	NATURAL WEATHERED FINISH	RUSTED STEEL	1 EA.	DETAIL 4, LS-3.08
CISTERN	-	FABRICATED BY CONTRACTOR	-	PER DTLS.	CAST IN PLACE INTEGRAL COLOR EXPOSED AGGREGATE CONCRETE TO MATCH EXPOSED [illegible] CURB AT RAMADA PLAZA		1 EA.	DETAIL 7, LS-3.08 & DETAIL 2, LS-3.08
ENTRY SIGNAGE	-	FABRICATED BY CONTRACTOR	-	24"x17'-0"	NATURAL WEATHERED STEEL I-BEAM WITH RAISED BRUSHED ALUMINUM LETTERS & [illegible] TOWN LOGO		1 EA.	DETAIL 1, LS-3.06
GABION BASKETS	HILFIKER RETAINING WALLS (800) 762-8962	HILFIKER RETAINING WALLS	WELDED GABIONS - 9 GAUGE WIRE FABRIC w/ 3" SQ MESH	BASKET SIZES PER DETAILS	NATURAL WEATHERED FINISH	RUSTED STEEL	AS REQ'D	SEE CIVIL PLANS FOR DETAILS
RAMADA	-	FABRICATED BY CONTRACTOR	-	25'x25'	NATURAL WEATHERED FINISH	RUSTED STEEL	1 EA.	DETAIL 1, LS-3.08 & ALL RAMADA STRUCTURAL DTLS
KIOSK STRUCTURE	-	FABRICATED BY CONTRACTOR	-	PER DTLS.	NATURAL WEATHERED FINISH	RUSTED STEEL	1 EA.	ALL DETAILS ON LS-3.07
MOUNTED SIGN CASE	DAVE BANG ASSOCIATES (800) 434-7803	AMERICANA BUILDING PRODUCTS	EXTERIOR, SINGLE DOOR, LOCKING, NON-GLARE, w/ CORK BOARD	46"x40"x3"	ALUMINUM	BRONZE ANODIZE PER MANUF.	1 EA.	DETAIL 1, LS-3.07
FIRE ROAD ACCESS MANUAL SWING GATES (ONE PAIR)	-	FABRICATED BY CONTRACTOR	-	PER DTLS.	NATURAL WEATHERED FINISH	RUSTED STEEL	1 EA. (PAIR)	DETAIL 2, LS-3.08
FIRE ROAD ACCESS MANUAL SWING GATES HARDWARE: - FIRE DEPARTMENT KNOX BOX w/ KS-2 KEY SWITCH - HEAVY DUTY STEEL GATE HINGES	PARK PRO (602) 254-0770	DOORKING ELITE	DKS 1401 POWER HINGE (STEEL)	6⅝"x4⅝"x3" [illegible]	POWDER COATED STEEL	RED (BY MANUF.) RUSTED STEEL	1 EA. 4 EA.	DETAIL 2, LS-3.05 DETAIL 2, LS-3.08
ENTRY/EXIT MANUAL SWING GATES	-	FABRICATED BY CONTRACTOR	-	PER DTLS.	NATURAL WEATHERED FINISH	RUSTED STEEL	2 EA. (1 ENTRY & 1 EXIT)	ALL DETAILS ON LS-3.03
ENTRY MANUAL SWING GATES HARDWARE: - FIRE DEPARTMENT KNOX BOX w/ KS-2 KEY SWITCH - HEAVY DUTY STEEL GATE HINGES	PARK PRO (602) 254-0770	DOORKING ELITE	DKS 1401 POWER HINGE (STEEL)	6⅝"x4⅝"x3" [illegible]	POWDER COATED STEEL	RED (BY MANUF.) RUSTED STEEL	1 EA. 4 EA.	DETAIL 2, LS-3.04 DETAIL 3, LS-3.08
PERMEON OR EONITE SIMULATED DESERT VARNISH & ROCK STAIN	SOIL-TECH, CO (702) 873-2023	SOIL-TECH	APPLY TO ALL EXPOSED FRACTURED BOULDER & ROCK SURFACES LARGER THAN 12" AFTER ROCK INSTALLATION IS COMPLETED AND PER TOWN'S PRIOR APPROVAL			COLOR RANGE PER STRENGTH OF SOLUTION AND PER APPLICATION	AS REQ'D	APPLY PER SPECIFICATIONS
EVERBRITE COPPER PROTECTIVE COATING (PREVENTS COPPER TARNISH, PATINA, & OXIDATION)	EVERBRITE, INC. (800) 304-0844	EVERBRITE	-	16 OZ. CAN (COVERS 4150 SF) **	-	CLEAR	1 EA.	DETAIL 3, LS-3.03 & APPLY PER MFG SPECIFICATIONS
3M ORANGE REFLECTIVE SAFETY TAPE	EVERBRITE, INC. (800) 304-0844	3M SCOTCHLITE STRIPING TAPE	79937	3" WIDE x 50' ROLLS	REFLECTIVE	ORANGE	AS REQ'D	APPLY PER MFG. SPECIFICATIONS

NOTE: ALL SPECIFIED MANUFACTURED ITEMS WERE USED AS BASIS OF DESIGN. ALL ITEMS SHALL BE BID AS NOTED OR AS AN APPROVED EQUAL PRODUCT PER THE TOWN'S APPROVAL PRIOR TO SUBSTITUTION. SUPPLIERS LISTED ARE ONLY SUGGESTED SUPPLIERS AND MAY BE SUBSTITUTED BY CONTRACTOR. ALL MANUFACTURED ITEMS SHALL BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS, PROJECT SPECIFICATIONS, AND PROJECT DETAILS.

SITE AMENITIES SCHEDULE - **BID ALTERNATE** (ALL ELECTRONIC GATE OPTIONS)

DESCRIPTION	SUPPLIER	MANUFACTURER	MODEL	SIZE	FINISH	COLOR	QUANTITY	DETAIL REFERENCE
ENTRY/EXIT AUTOMATIC SWING GATES HARDWARE: - 1HP (DUAL 1/2HP TANDEM MOTORS) - INTERNET GATEWAY - PLUG-IN LOOP DETECTOR - MAGNETIC LOCK - MAG LOCK RELAY ADAPTOR MODULE - DPDT RELAY (CONTACTS FOR EXTRA RELAY ADAPTORS) - LOOP SENSORS (SAFETY, CENTER, & EXIT LOOPS) - PRE-EMPTIVE STROBE EMERGENCY VEHICLE GATE ACCESS OPTICAL DETECTOR w/ DISCRIMINATOR MODULE	PARK PRO (602) 254-0770	ELITE ELITE ELITE ELITE ELITE ELITE ELITE 3M OPTICOM	CSW200101U 828LM LMPLS1LM EMLD 1200F 0400MLM DPDT 4 ELD MODEL 211- PART [illegible]	24"x3"Lx15"Wx28"H - - [illegible] - - - -	HD POLYETHYLENE - - - - - - -	- - - - - - - -	2 EA. 2 EA. 4 EA. 4 EA. 2 EA. 2 EA. 7 EA. 1 EA.	DETAIL 1, LS-3.04 DETAIL 2, LS-3.04 DETAIL 5, LS-3.08
GATE KEY POST & HARDWARE: - PROXIMITY SWITCH (SECURITY ALARM SENSOR) - SINGLE KEY SWITCH STATION w/ MORTISE KEY - FIRE DEPARTMENT KNOX BOX w/ KS-2 KEY SWITCH	- - -	ELITE DOORKING DOORKING	4 PRS DKS 1201 DKS 1401	- 3⅞"x4⅞"x3" 6⅝"x4⅝"x3"	- PWDR COATED PWDR COATED	- - RED (BY MANUF.)	2 EA. 1 EA. 1 EA.	 DETAIL 5, LS-3.08 DETAIL 5, LS-3.08

NOTE: FIRE KNOX BOX MOUNTED TO ENTRY SIGN POST PER DETAILS ON LS-3.04 SHALL BE OMITTED IF BID ALTERNATE IS CONSTRUCTED WITH KNOX BOX LOCATED ON GATE KEY POST.

SITE AMENITIES SCHEDULE - **BID ALTERNATE** (INTERIM UTILITIES)

DESCRIPTION	SUPPLIER	MANUFACTURER	MODEL	SIZE	FINISH	COLOR	QUANTITY	DETAIL REFERENCE
INTERIM UTILITIES HARDWARE: - WATER TANK - WATER TANK REPAIR KIT - HOLDING TANK - SOLAR PANELS **SEE ELECTRIC PLANS**	RAIN HARVEST SYSTEMS (800) 664-8281 - -	NORWESCO POLY WELDER JENSEN PRECAST -	41377 (3,000 GAL.) PRO PLASTIC REPAIR KIT HT-5000 W/ ALARM -	141"DIA x 86"H - 5,000 GALLONS -	POLYETHYLENE - CONCRETE -	GREEN GREEN WELDING STRIPS - -	1 EA. 1 EA. 1 EA. -	- - - -
CHAINLINK FENCE ENCLOSURE: - FENCE MATERIALS (FABRIC, POSTS, RAILS, BRACES, ETC.)	-	-	-	8'-0"H	GALVANIZED	GALVANIZED	1 EA.	DETAILS 18 & 19, C[illegible]

PLANT LEGEND

CACTI - SALVAGED & NEW	SALVAGE	NEW	FUTURE (NEW)
CARNEGIEA GIGANTEA SAGUARO	12	30	1
FEROCACTUS WISLIZENII FISHHOOK BARREL	8	58	6
FOUQUIERIA SPLENDENS OCOTILLO	19	29	2

TREES - NEW	SIZE	QTY.
CERCIDIUM MICROPHYLLUM FOOTHILLS PALO VERDE	15 GAL.	17
CERCIDIUM MICROPHYLLUM FOOTHILLS PALO VERDE	36"BOX	30
OLNEYA TESOTA IRONWOOD	36"BOX	11

SHRUBS/ACCENTS/GROUNDCOVERS - NEW	SIZE	NEW QTY.	FUT. QTY.
BAILEYA MULTIRADIATA DESERT MARIGOLD	1 GAL.	125	23
ENCELIA FARINOSA BRITTLEBUSH	5 GAL.	133	6
SIMMONDSIA CHINENSIS 'VISTA' COMPACT JOJOBA	5 GAL.	101	8
SPHAERALCEA AMBIGUA 'LOUIS HAMILTON'	5 GAL.	20	7

BOULDERS - SALVAGED	SIZE	QTY.
SALVAGED BOULDER-SIZE A	2'x3'	***
SALVAGED BOULDER-SIZE B	3'x5'	***
SALVAGED BOULDER-SIZE C	4'x6'	***
SALVAGED BOULDER-SIZE D	5'x7'	***
NATIVE ROCK EMBANKMENT	SEE CIVIL PLANS	

- SEE DWG NO LS-1.03 FOR ALL PLANT QUANTITIES.
- SEE DWG NO LS-1.03 FOR FUTURE PLANTING AREA ONCE CUL-DE-SAC IS CONSTRUCTED.
- *** SEE DWG NO LS-2.03 FOR ALL HYDROSEEDING & ROCK QUANTITIES.

NOTES:

1. ALL SALVAGEABLE PLANT MATERIALS ARE IDENTIFIED IN PLANT INVENTORY PLANS IN THIS SET. SPECIFIC PLANTS TO BE SALVAGED SHALL BE CONFIRMED BY TOWN'S REPRESENTATIVE DURING CONSTRUCTION PRIOR TO CLEARING SITE.
2. ALL SALVAGED PLANT MATERIALS AND BOULDERS SHALL BE PLACED PER THE DIRECTION OF TOWN'S ON-SITE REPRESENTATIVE DURING CONSTRUCTION.
3. NEW OCOTILLOS SHALL BE MIN. 8' TALL AND HAVE MIN. 12 CANES.
4. NEW SAGUAROS SHALL BE: 30% 3'-6', 30% 6'-9', AND 40% 9'-12'.
5. NEW BARREL CACTI SHALL BE: 50% 12"-18" TALL, 50% 18"-30" TALL.
6. ALL DISTURBED BOULDERS/ROCKS INCLUDING ANY UNEARTHED DURING GRADING PROCESS SHALL BE SALVAGED AND STOCK PILED FOR REUSE PER PROJECT SPECIFICATIONS.
7. BOULDER QUANTITIES ARE ESTIMATED AND NOT NECESSARILY ALL INCLUSIVE OF ACTUAL TOTALS.
8. ALL NON-PAVED DISTURBED AREAS SHALL BE HYDROSEEDED. SEE DWG NO. LS-2.03 FOR OVERALL HYDROSEED QUANTITIES AND PROJECT SPECS FOR SEED MIX VARIETY AND REQUIREMENTS.
9. ALL CUT OR FRACTURED ROCK SURFACES (INCLUDING SALVAGED ROCKS & BOULDERS) SHALL BE STAINED TO MATCH SURROUNDING EXISTING ROCK WITH PERMEON OR EONITE DESERT VARNISH STAIN AFTER INSTALLATION PER PROJECT SPECIFICATIONS AND TOWN'S PRIOR APPROVAL.
10. ALL 'FUTURE' (FUT.) PLANT QUANTITIES SHOWN ABOVE ARE NOT A PART OF THIS PROJECT AND SHALL BE FOR FUTURE PROJECT ONCE CUL-DE-SAC IS CONSTRUCTED AS NOTED ON DWG. NO. FH-1.03.

** = LEAVE EXCESS EVERBRITE COPPER COATING IN RESTROOM BUILDING CHASE ROOM FOR FUTURE MAINTENANCE APPLICATIONS BY TOWN

NOTE REGARDING FUTURE PROJECT TO COMPLETE CONSTRUCTION AROUND CUL-DE-SAC AREA:
SEE DWG. NO. FH-1.03 FOR QUANTITIES OF ITEMS FOR FUTURE CONSTRUCTION PROJECT BY OTHERS (NOT PART OF THIS BID). THESE ITEMS SHALL BE CONSTRUCTED ONCE CUL-DE-SAC IS INSTALLED BY DEVELOPER AND ARE INCLUDED IN THIS PLAN SET FOR PURPOSE OF PROVIDING TOWN THE DESIGN AND QUANTITIES NEEDED TO COMPLETE IN FUTURE.

△1 = BID ALTERNATE, INTERIM UTILITIES

△3 = ADDENDUM #1

J2 Engineering and Environmental Design
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PHOENIX, AZ 85040 PHN (602)438-2221 FAX (602)438-2225
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CLIENT: TOWN OF FOUNTAIN HILLS PARKS & RECREATION DEPT. FOUNTAIN HILLS TOWN HALL 16705 E. AVENUE OF THE FOUNTAINS, FOUNTAIN HILLS, AZ 85268 (480) 816-5100

Town of Fountain Hills
McDowell Mountain Preserve
Adero Canyon Trailhead

LANDSCAPE SUMMARY

DRAWN BY: K. WALLIN
DESIGNED BY: K. WALLIN
APPROVED BY: J. ENGELMANN
SCALE: N/A
DATE: 05/31/2017
J2 PROJECT NO.: 16.0907.003

LS-1.02 38 of 58

TOWN OF FOUNTAIN HILLS
ACKNOWLEDGMENT OF ADDENDA RECEIVED
INVITATION FOR BIDS

ADERO CANYON TRAILHEAD CONSTRUCTION
CS2017-01

Addendum No. 1

Blucor Contracting - Tyler Bluth, affirms that ADDENDUM No. 1 has been
(Name of Vendor/Designee)
received and that the information contained in ADDENDUM No. 1 has been incorporated in formulating the Vendor's Offer.

Tyler Bluth, 7-14 2017
Signed Date

Tyler Bluth
Print Name

Vice President
Title

Blucor Contracting
Company Name

6939 E Parkway Norte
Address

Mesa Az 85142
City, State, Zip Code

END OF ADDENDUM No. 1