



**PURCHASING ITEM
FOR
COUNCIL AGENDA
Memo No. CA09-084**

1. Agenda Item Number:
31
2. Council Meeting Date:
September 25, 2008

TO: MAYOR & COUNCIL

3. Date Prepared: September 12, 2008

THROUGH: CITY MANAGER

4. Requesting Department: City Manager

5. SUBJECT: Award a consultant services contract to TMCx Arizona, LLC for City Hall LEED Commissioning Services, Project No. GG0502-110, in an amount not to exceed \$145,000.

6. RECOMMENDATION: Staff recommends that Council award a consultant services contract to TMCx Arizona, LLC for City Hall LEED Commissioning Services, Project No. GG0502-110, in an amount not to exceed \$145,000.

7. BACKGROUND/DISCUSSION: The City moved into the Chandler Office Center in the fall of 1998. The City is leasing approximately 38,000 square feet in the building for twelve years, and in 2010, the City's current lease will expire. The City Hall will total approximately 120,000 square feet and is planned to be available by the time the City moves out of the Chandler Office Center.

The City has determined the City Hall should be an environmentally friendly building design, with design standards to achieve a gold certification level within the Leadership in Energy and Environmental Design (LEED)-NC Version 2.2 Green Building Rating System. Some of the elements that could be included in the new City Hall are sustainability issues such as construction activity pollution prevention, bicycle storage and changing rooms for employees, parking preferences for fuel efficient vehicles, shading, stormwater design, water efficiency plans, energy efficient HVAC systems, and use of materials that reduce indoor air contaminants.

Under this contract, TMCx Arizona, LLC will systematically verify and document the functionality of the building systems to confirm the performance meets the documented design intent and the City's operational needs, as required by the United States Green Building Council (USGBC) LEED rating system.

It is anticipated that construction will start in Spring of 2009. This should allow for the construction to be complete prior to the end of the City's lease at the Chandler Office Center in December 2010.

8. EVALUATION: The consultant selection process was conducted in accordance with established City policies and procedures. Staff solicited proposals and statements of qualifications from three (3) interested commissioning services firms on State Contract. City Staff and Abacus Project Management, Inc. reviewed the proposals and TMCx Arizona, LLC was selected for recommendation of contract award.

The selection committee included the following members:

Marian Norris, Assistant to the City Manager
Joshua Plumb, PE, Engineering Project Manager
Jeff Turner, Abacus Project Management
Rick Griffin, Abacus Project Management

9. FINANCIAL IMPLICATIONS:

Cost: \$145,000
Savings: N/A
Long Term Costs: N/A

Fund Source:

<u>Acct. No.:</u>	<u>Fund Name:</u>	<u>Program Name:</u>	<u>CIP Funded:</u>	<u>Amount:</u>
101.1290.0000.6210.8GG075	General fund	City Hall	FY07/08	\$145,000

10. PROPOSED MOTION: Move that Council award a consultant services contract to TMCx Arizona, LLC for City Hall LEED Commissioning Services, Project No. GG0502-110, in an amount not to exceed \$145,000, and authorize the Mayor to sign the contract documents.

ATTACHMENTS: Location Map, Contract

APPROVALS

11. Requesting Department

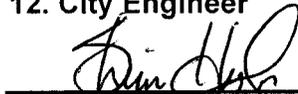


Marian Norris, Assistant to the City Manager

13. Department Head

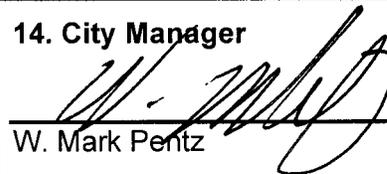
Rich Dlugas, Assistant City Manager

12. City Engineer



Sheina Hughes, Assistant Public Works
Director/City Engineer

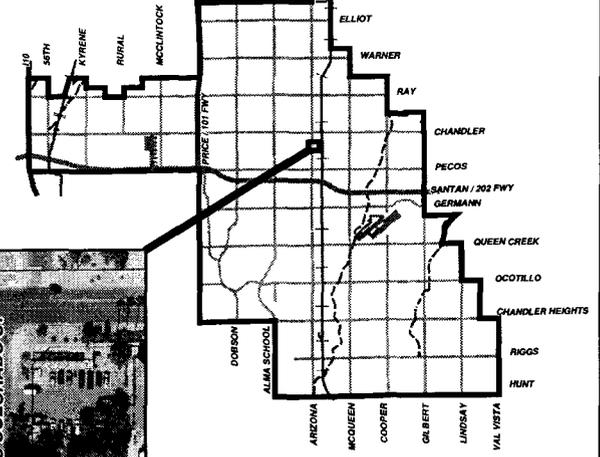
14. City Manager



W. Mark Pentz



CITY HALL LEED COMMISSIONING SERVICES PROJECT NO. GG0502-110



MEMO NO. CA09-084

 CITY HALL SITE



ENGINEERING SERVICES CONTRACT

PROJECT TITLE: **Chandler City Hall Building Commissioning**
PROJECT NO: **GG0502-110**

This contract is made and entered into by and between the City of Chandler, Arizona, a municipal Corporation, hereinafter called the CITY, and **TMCx Arizona, LLC**, a limited liability corporation licensed to do business in Arizona, hereinafter called **COMMISSIONING CONSULTANT**.

WHEREAS, **COMMISSIONING CONSULTANT** represents **COMMISSIONING CONSULTANT** has the expertise and is qualified to perform the services described in this agreement; and

WHEREAS, the Mayor and City Council/City Manager of the City of Chandler are authorized and empowered by the provisions of the City Charter to execute contracts for Professional Services;

NOW THEREFORE, for and in consideration of the mutual covenants and conditions hereinafter contained, it is agreed by and between the CITY and **COMMISSIONING CONSULTANT**, as follows:

1. DESCRIPTION OF PROJECT

COMMISSIONING CONSULTANT shall systematically verify and document the functionality of the building systems in the new City Hall to confirm the performance meets the documented design intent and the CITY's operational needs, as required by the United States Green Building Council (USGBC) LEED rating system.

2. SCOPE OF WORK

COMMISSIONING CONSULTANT shall provide those services described in Exhibit A attached hereto and made a part hereof by reference.

3. PAYMENT SCHEDULE

For services described in paragraph 2 of this Agreement, the CITY shall pay **COMMISSIONING CONSULTANT** a fee based on the fee schedule attached hereto and made a part hereof by reference Exhibit B not to exceed the sum **One Hundred Forty Five Thousand dollars (\$145,000)**. Payment will be made monthly on the basis of progress reports. An Application and Certification for Payment Sheet must be provided. In addition, the following must also be included: a clear, detailed invoice reflecting items being billed for, a summary sheet showing percentage of work completed to date, amount/percent billed to date and current status of all tasks within a project; any/all backup documentation supporting the above items. Work schedule updates will be included in the monthly progress payment requests.

4. PERIOD OF SERVICE

COMMISSIONING CONSULTANT shall complete all services described in paragraph 2 within **Eight Hundred Thirty (830)** calendar days after "Notice to Proceed" is issued by the CITY. In the event delays are experienced beyond the control of **COMMISSIONING CONSULTANT**, the completion date may be extended as mutually agreed upon by CITY and ENGINEER.

5. OPINIONS OF PROBABLE COSTS (ESTIMATES)

Any opinions of probable project cost or probable construction cost provided by **COMMISSIONING CONSULTANT** are made on the basis of information available to **COMMISSIONING CONSULTANT** and on the basis of **COMMISSIONING CONSULTANT**'s experience and qualifications, and represents its judgment as an experienced and qualified professional engineer. However, since **COMMISSIONING**

CONSULTANT has no control over the cost of labor, materials, equipment or services furnished by others, or over the contractor(s) methods of determining prices, or over competitive bidding or market conditions, COMMISSIONING CONSULTANT does not guarantee that proposals, bids or actual project or construction cost will not vary from opinions of probable cost COMMISSIONING CONSULTANT prepares.

6. APPROVALS

All work shall be subject to the approval by the City Engineer.

COMMISSIONING CONSULTANT agrees to exercise the skill and care which would be exercised by comparable professional engineers performing similar services at the time and in the locality such services are performed. If the failure to meet these standards results in faulty work, COMMISSIONING CONSULTANT shall undertake at its own expense, the corrective adjustments or modifications.

7. REPORTING

Written monthly reports, along with updated work schedules, will be made by COMMISSIONING CONSULTANT in the format prescribed by the CITY. These reports will be delivered to the CITY per schedule. When requested by the CITY, COMMISSIONING CONSULTANT will attend Council meetings and provide finished documents including correspondence for Council action, supporting charts, graphs, drawings and colored slides of same.

8. STANDARDS OF PERFORMANCE:

A. COMMISSIONING CONSULTANT shall be familiar with CITY's Standard Details and Specifications and other relevant CITY regulations. COMMISSIONING CONSULTANT shall ensure there are no conflicts among the Contract Documents including, but not limited to, the CITY's General and Supplementary Conditions for Construction Contracts, the plans and specifications prepared by COMMISSIONING CONSULTANT, any standard details or specifications incorporated therein by reference, and the Construction Contract.

B. Correction of Mistakes: COMMISSIONING CONSULTANT shall be responsible for the completeness and accuracy of the work prepared or compiled under COMMISSIONING CONSULTANT's obligation for this project and shall correct, at COMMISSIONING CONSULTANT's expense, all errors or omissions therein which may be disclosed. Correction of errors disclosed and determined to exist during any construction of the project on architectural or engineering drawings and specifications shall be accomplished by COMMISSIONING CONSULTANT. The cost of the design necessary to correct those errors attributable to COMMISSIONING CONSULTANT and any damage incurred by CITY as a result of additional construction costs caused by such engineering or architectural errors shall be chargeable to COMMISSIONING CONSULTANT and shall not be considered a cost of the Work. The fact that CITY has reviewed or approved COMMISSIONING CONSULTANT 's work shall in no way relieve COMMISSIONING CONSULTANT of any of its responsibilities.

9. INDEMNIFICATION

(a) For Professional Liability:

To the fullest extent permitted by law, COMMISSIONING CONSULTANT shall defend, indemnify and hold harmless the City of Chandler, its agents, representatives, officers, directors, officials and employees, individually and collectively, (hereinafter CoC) from and against all losses, claims, damages, suits, actions, payments, judgments, demands, expenses, and costs, including but not limited to, attorney's fees, defense costs, court costs, and the cost of appellate proceedings, or actions of any kind and nature related to, arising out of, or alleged to have resulted from the errors, mistakes or omissions relating to professional services by COMMISSIONING CONSULTANT, its employees, agents, or any tier of subcontractors in the performance

of this Contract or of any other person for whose errors, mistakes or omissions COMMISSIONING CONSULTANT may be legally liable. This indemnity shall not be construed to include losses, claims, damages, suits, or actions of any kind and nature, to the extent arising from or alleged to have resulted from the errors, mistakes or omissions of CoC (other than COMMISSIONING CONSULTANT, its employees, agents, or any tier of subcontractors). The provisions of this paragraph shall survive termination of this Contract.

(b) For all Other Liabilities, Hazards and Exposures:

To the fullest extent permitted by law, COMMISSIONING CONSULTANT shall defend, indemnify and hold harmless the City of Chandler, its agents, representatives, officers, directors, officials and employees, individually and collectively, (hereinafter CoC) from and against all losses, claims, damages, suits, actions, payments, judgments, demands, expenses, and costs, including but not limited to, attorney's fees, defense costs, court costs, and the cost of appellate proceedings, or actions of any kind and nature, wages or overtime compensation due employees in rendering service under this Contract and whether to any person or property, including natural resources and any claim made under the Fair Labor Standards Act or any other federal or state laws, related to, arising out of, or alleged to have resulted from the actions of COMMISSIONING CONSULTANT and alleged to have been caused in whole or in part by any act or omission of COMMISSIONING CONSULTANT, anyone directly or indirectly employed by them or anyone for whose acts COMMISSIONING CONSULTANT may be legally liable, and from any claims or amounts arising or recovered under Workers' Compensation laws or any other law, bylaw, or ordinance, order or decree or any failure on the part of COMMISSIONING CONSULTANT, its agents, employees or representatives to fulfill COMMISSIONING CONSULTANT's obligations under this Contract. This indemnity shall not be construed to include losses, claims, damages, suits, or actions of any kind and nature, to the extent arising from or alleged to have resulted from the errors, mistakes or omissions of CoC, (other than COMMISSIONING CONSULTANT, its employees, agents, or any tier of subcontractors). The provisions of this paragraph shall survive termination of this Contract.

(c) Consequential Damages:

The parties intend that damages and/or costs and all other terms implying an amount tied to liability shall include consequential damages and loss of productivity limited to the total value of this contract in dollars as payable by the City of Chandler or twice the amount of aggregate insurance required by this Contract, whichever is greater.

(d) Insurance does not limit liability:

The amount and type of insurance coverage requirements set forth herein will in no way be construed as limiting the scope of the indemnity in this paragraph.

10. INSURANCE REQUIREMENTS:

A COMMISSIONING CONSULTANT, at its own expense, shall purchase and maintain insurance of the types and amounts required in this section, with companies possessing a current A.M. Best, Inc. rating of B++6, or better and legally authorized to do business in the State of Arizona with policies and forms satisfactory to CITY.

B With the exception of professional liability policies, policies written on a "Claims made" basis are not acceptable without written permission from the City's Risk Manager.

C 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 Agreement is satisfactorily completed and formally accepted. Failure to do so may, at the sole discretion of CITY, constitute a material breach of this Agreement and may result in termination of this contract.

- D If any of the insurance policies are not renewed prior to expiration, payments to the COMMISSIONING CONSULTANT may be withheld until these requirements have been met, or at the option of the City, the City may pay the Renewal Premium and withhold such payments from any monies due the COMMISSIONING CONSULTANT.
- E All insurance policies, except Workers' Compensation and Professional Liability required by this Agreement, and self-insured retention or deductible portions, shall name, to the fullest extent permitted by law for claims arising out of the performance of this contract, the City of Chandler, its agents, representatives, officers, directors, officials and employees as Additional Insureds.
- F COMMISSIONING CONSULTANT's insurance shall be primary insurance over any insurance available to the CITY and as to any claims resulting from this contract, it being the intention of the parties that the insurance policies so effected shall protect both parties and be primary coverage for any and all losses covered by the described insurance.
- G The insurance policies, except Workers' Compensation, shall contain a waiver of transfer rights of recovery (subrogation) against CITY, its agents, representatives, officers, directors, officials and employees for any claims arising out of COMMISSIONING CONSULTANT 's acts, errors, mistakes, omissions, work or service.
- H The insurance policies may provide coverage which contain deductibles or self-insured retentions. Such deductible and/or self-insured retentions shall be assumed by and be for the account of, and at the sole risk of COMMISSIONING CONSULTANT. COMMISSIONING CONSULTANT shall be solely responsible for the deductible and/or self-insured retention. The amounts of any self-insured retentions shall be noted on the Certificate of Insurance. CITY, at its option, may require COMMISSIONING CONSULTANT to secure payment of such deductibles or self-insured retentions by a Surety Bond or an irrevocable and unconditional letter of credit. Self-insured retentions (SIR) in excess of \$25,000 will only be accepted with the permission of the Management Services Director/designee.
- I All policies and certificates shall contain an endorsement providing that the coverage afforded under such policies shall not be reduced, canceled or allowed to expire until at least thirty (30) days prior written notice has been given to CITY.
- J Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the COMMISSIONING CONSULTANT with reasonable promptness in accordance with the COMMISSIONING CONSULTANT 's information and belief.
- K In the event that claims in excess of the insured amounts provided herein, are filed by reason of any operations under this contract, the amount of excess of such claims, or any portion thereof, may be withheld from payment due or to become due the COMMISSIONING CONSULTANT until such time as the COMMISSIONING CONSULTANT shall furnish such additional security covering such claims as may be determined by the CITY.

10.2 Proof of Insurance - Certificates of Insurance

- A Prior to commencing work or services under this Agreement, COMMISSIONING CONSULTANT shall furnish to CITY Certificates of Insurance, issued by COMMISSIONING CONSULTANT 's insurer(s), as evidence that policies providing the required coverages, conditions and limits required by this Agreement are in full force and effect and obtain from the City's Risk Management Division approval of such Certificates.

- B If a policy does expire during the life of this Agreement, a renewal certificate must be sent to the City of Chandler five (5) days prior to the expiration date.
- C All Certificates of Insurance shall identify the policies in effect on behalf of COMMISSIONING CONSULTANT, their policy period(s), and limits of liability. Each Certificate shall include the job site and project number and title. Coverage shown on the Certificate of Insurance must coincide with the requirements in the text of the contract documents. Information required to be on the certificate of Insurance may be typed on the reverse of the Certificate and countersigned by an authorized representative of the insurance company.
- D CITY reserves the right to request and to receive, within 10 working days, certified copies of any or all of the herein required insurance policies and/or endorsements. CITY shall not be obligated, however, to review same or to advise COMMISSIONING CONSULTANT of any deficiencies in such policies and endorsements, and such receipt shall not relieve COMMISSIONING CONSULTANT from, or be deemed a waiver of CITY's right to insist on, strict fulfillment of COMMISSIONING CONSULTANT's obligations under this Agreement.

10.3 Required Coverage

Such insurance shall protect COMMISSIONING CONSULTANT from claims set forth below which may arise out of or result from the operations of COMMISSIONING CONSULTANT under this Contract and for which COMMISSIONING CONSULTANT may be legally liable, whether such operations be by the COMMISSIONING CONSULTANT or by a Sub-consultant or subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. Coverage under the policy will be at least as broad as Insurance Services Office, Inc., policy form CG00011093 or equivalent thereof, including but not limited to severability of interest and waiver of subrogation clauses.

- A Claims under workers' compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;
- B Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- C Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- D Claims for damages insured by usual personal injury liability coverage;
- E Claims for damages, other than to Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- F Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle; Coverage will be at least as broad as Insurance Service Office, Inc., coverage Code "I" "any auto" policy form CA00011293 or equivalent thereof.
- G Claims for bodily injury or property damage arising out of completed operations;
- H Claims involving contractual liability insurance applicable to the Contractor's obligations under the Indemnification Agreement;
- I Claims for injury or damages in connection with one's professional services;
- J Claims involving construction projects while they are in progress. Such insurance shall include coverage for loading and off loading hazards. If any hazardous material, as defined by any local, state or federal authorities are to be transported, MCS 90 endorsement shall be included.

10.3.1 Commercial General Liability - Minimum Coverage Limits:

The Commercial General Liability insurance required herein shall be written for not less than \$1,000,000 limits of liability or ten percent (10%) of the Contract Price, whichever coverage is greater. Any combination between general liability and excess general liability alone amounting to a minimum of \$1,000,000 per occurrence (or 10% per occurrence) and an aggregate of \$2,000,000 (or 20% whichever is greater) in coverage will be acceptable. The Commercial General Liability additional insured endorsement shall be as broad as the Insurance Services, Inc's (ISO) Additional Insured, Form B, CG 20101001, and shall include coverage for COMMISSIONING CONSULTANT's operations and products, and completed operations.

10.3.2 General Liability - Minimum Coverage Limits

The General Liability insurance required herein, including, Comprehensive Form, Premises-Operations, Explosion and Collapse, Underground Hazard, Products/Completed Operations, Contractual Insurance, Broad Form Property Damage, Independent Contractors, and Personal Injury shall be written for Bodily Injury and Property Damage Combined shall be written for not less than \$1,000,000 or 10% of the contract cost and with a \$2,000,000 aggregate.

10.3.3 Automobile Liability

COMMISSIONING CONSULTANT shall maintain Commercial/Business Automobile Liability insurance with a combined single limit for bodily injury and property damage of not less than \$1,000,000 each occurrence with respect to any owned, hired, and non-owned vehicles assigned to or used in performance of the COMMISSIONING CONSULTANT 's work. Coverage shall be at least as broad as coverage code 1, "any auto", (Insurance Service Office, Inc. Policy Form CA 00011293, or any replacements thereof). Such insurance shall include coverage for loading and off loading hazards if hazardous substances, materials or wastes are to be transported and a MCS 90 endorsement shall be included with coverage limits of \$5,000,000 per accident for bodily injury and property damage.

10.3.4 Worker's Compensation and Employer's Liability

ENGINEER shall maintain Workers' Compensation insurance to cover obligations imposed by federal and state statutes having jurisdiction over COMMISSIONING CONSULTANT 's employees engaged in the performance of the work or services; and, Employer's Liability insurance of not less than \$1,000,000 for each accident, \$1,000,000 disease coverage for each employee, and \$1,000,000 disease policy limit.

In case any work is subcontracted, COMMISSIONING CONSULTANT will require the Subcontractor to provide Workers' Compensation and Employer's Liability to at least the same extent as required of COMMISSIONING CONSULTANT.

10.3.5 Professional Liability

COMMISSIONING CONSULTANT shall maintain Professional Liability insurance covering acts, errors, mistakes and omissions arising out of the work or services performed by COMMISSIONING CONSULTANT, or any person employed by COMMISSIONING CONSULTANT, with a claims made policy limit of not less than \$1,000,000.

11. AMENDMENTS

Whenever a change in the scope of work contemplated in this Contract is determined to be necessary, the work will be performed in accordance with the Contract provided, however, that BEFORE such work is started, a Contract Amendment shall be executed by the CITY and COMMISSIONING CONSULTANT. Additions to, modifications of, or deletions from the project provided herein may be made and the

compensation to be paid to COMMISSIONING CONSULTANT may be adjusted accordingly by mutual agreement of the contracting parties. It is agreed that no claim for extra work by COMMISSIONING CONSULTANT will be allowed by the CITY except as provided herein, nor shall COMMISSIONING CONSULTANT do any work not covered by this Contract unless such work is authorized through an executed amendment.

12. TERMINATION WITHOUT CAUSE

CITY may at any time and for any or no reason, at its convenience, terminate this contract or any part of the services to be rendered pursuant thereto by written notice to COMMISSIONING CONSULTANT specifying the termination date. Immediately after receiving such notice, COMMISSIONING CONSULTANT shall discontinue advancing the work under this Contract and shall deliver to the CITY all drawings, notes, calculations, sketches and other materials entirely or partially completed, together with all unused materials supplied by the CITY.

COMMISSIONING CONSULTANT shall receive as compensation in full for services performed to date of such termination, a fee for the percentage of work actually completed. This fee shall be a percentage of COMMISSIONING CONSULTANT (S) fee described in this Contract under paragraph 3 and shall be in the amount to be agreed mutually by COMMISSIONING CONSULTANT and the CITY. The CITY shall make this final payment within sixty (60) days after COMMISSIONING CONSULTANT has delivered the last of the partially completed items.

13. TERMINATION WITH CAUSE

This Agreement may be terminated by CITY for cause should the COMMISSIONING CONSULTANT fail to perform any provision of this Agreement, including without limitation, for any of the following reasons:

- (a) COMMISSIONING CONSULTANT abandons Work;
- (b) COMMISSIONING CONSULTANT assigns or attempts to assign its rights or obligations under this Agreement or any part thereof to any third-party (without the prior written consent of CITY;
- (c) COMMISSIONING CONSULTANT is adjudged bankrupt or insolvent, makes a general assignment for the benefit of creditors, has a trustee or receiver appointed for its property, or files a petition to take advantage of any debtor's act;
- (d) COMMISSIONING CONSULTANT fails or refuses to perform any obligation under the Agreement, or fails to remedy such nonperformance within seven (7) days after its occurrence;
- (e) COMMISSIONING CONSULTANT fails to comply with any applicable Laws and fails to remedy such nonperformance within seven (7) days after its occurrence;
- (f) COMMISSIONING CONSULTANT fails to achieve the required dates for performance required pursuant to the Agreement.

The CITY'S right of termination for cause as set forth herein shall be in addition to, and not a limitation of, any and all other remedies available to CITY at law, in equity, or under the terms and provisions of this Agreement.

14. DISPUTE RESOLUTION:

Notwithstanding anything to the contrary provided elsewhere in the Agreement, the alternative dispute resolution (ADR) process provided herein shall be the exclusive means for resolution of claims or disputes arising under, relating to or touching upon this Agreement, 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.

14.1. Internal Process; Review by City of Chandler Public Works Director

- A. COMMISSIONING CONSULTANT or CITY shall submit written Notice of any claim or dispute to the Public Works Director, or his Designee, within 14 (fourteen) days of the disagreement, occurrence, event or dispute for immediate resolution pursuant to these provisions. Each claim or dispute shall be submitted and resolved as it occurs and not postponed until the Project has been completed nor lumped together with other pending claims.
- B. COMMISSIONING CONSULTANT or CITY as applicable shall respond within seven (7) to the other party's Notice.
- C. Public Works Director, or his Designee, will provide to COMMISSIONING CONSULTANT and CITY a written response to any claim, request or proposal for a Change Order on or before fifteen (15) days from receipt of COMMISSIONING CONSULTANT'S or CITY'S written response.

14.2. Mediation

In the event COMMISSIONING CONSULTANT or CITY disagrees with written response of Public Works Director, either party or both parties agree to submit the dispute to mediation as set forth in this Section of the Agreement

- 1) The parties may agree upon a local lawyer or retired judge who is experienced in alternative dispute resolution in construction disputes to serve as mediator.
 - (a) The mediation will consist of a mediation conference at which each party will provide evidence and documentation necessary to discuss their respective positions. Counsel may represent the parties.
 - (b) The mediation conference will be conducted by the mediator who may meet with parties jointly or separately to assist parties in constructing a settlement range within which the parties can assess the consequences of continuing or resolving the dispute.
 - (c) The mediator will act as a facilitator and attempt to assist the parties in reaching a settlement that can be reduced to writing.
 - (d) The mediator shall choose the location of the Mediation conference.
- 2) In the event that COMMISSIONING CONSULTANT and CITY cannot agree upon a local lawyer or retired judge to mediate the parties' claims or disputes, within 10 days of the written response of the Public Works Director the parties agree to submit the dispute to mediation administered by the American Mediation Association under its Commercial mediation Procedures before resorting to arbitration.
- 3) Parties agree to share equally costs of mediation.

14.3. Binding Arbitration Procedure

In the event Mediation as set forth in Section 11.2 is unsuccessful, the parties agree to submit their disagreement to arbitration as set forth in this Section of the Agreement. The party requesting arbitration shall post a cash bond with the Maricopa County Superior Court in the amount of \$10,000, within 10 days of the Mediation Conference that will defray the cost of the arbitration as set forth in paragraph M, Fees and Costs, and proceeds from said bond shall be allocated in accordance with said paragraph by the Arbitration Panel.

- A. **Arbitration Panel:** The Arbitration Panel shall consist of the arbitrators selected by the parties involved in the dispute, (i.e., CITY'S arbitrator, COMMISSIONING CONSULTANT'S arbitrator, and the foregoing arbitrators shall select a neutral arbitrator as set forth herein). The Neutral Evaluator shall participate in the proceedings and in the deliberations and shall be entitled to vote.
- B. **Selection of Neutral Arbitrator:** The selected arbitrators shall choose additional arbitrator within five (5) days of receipt of notification of a dispute from the Mediator. The Neutral Arbitrator(s) shall have the same qualifications as those of the arbitrators set forth in the Neutral Evaluator, Arbitrators paragraph. In the event that the selected arbitrators cannot agree on additional Neutral Arbitrators as set forth above, the parties agree to follow the procedure set forth in Paragraph R of this Section of the Agreement.
- C. **Expedited Hearing:** The parties have structured this procedure with the goal of providing for the prompt and efficient 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 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 twenty (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 Neutral Evaluator shall act as Chairman of the Arbitration Panel and will conduct the hearing that will resolve disputes in a prompt, cost efficient manner giving due 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 may review and consider the Neutral Evaluator's decision. The Chairman shall determine the nature and scope of discovery, if any, and the manner of presentation of relevant evidence consistent with the deadlines provided herein, and the parties' objective that disputes be resolved in a prompt and efficient manner. No discovery may be had of privileged materials or information. 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 conform to such orders of the Chairman.
- E. **Hearing Days:** To effectuate the 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 Arbitrator Panel shall within ten (10) days from the conclusion of any hearing issue its award. The award shall include an allocation of fees and costs pursuant to the Binding Arbitration Procedure paragraph herein. Any award providing for deferred payment shall include interest at the rate of ten (10%) percent per annum. The award is to be rendered in accordance with the 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 also be without authority to issue an award against any individual party in excess of \$500,000, exclusive of interest, arbitration fees, costs, and attorney's fees. If an award is made against any individual party in excess of \$50,000, exclusive of interest, arbitration fees, costs and attorneys' fees, it must be supported by written findings of fact, conclusions of law and statement as to how damages were calculated.

- 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 any award and for entry of judgment on it.
- J. **Severance and Joinder:** To reduce the possibility of inconsistent adjudications, 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 the Neutral Evaluator, (Chairman) may, on his 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. Nothing herein shall create the right by any party to assert claims against another party not recognized under the substantive law applicable to the dispute. Neither the Neutral Evaluator nor the Arbitration Panel is authorized to join to the proceeding parties not in privity with the CITY.
- K. **Appeal:** Any party may appeal errors of law by the Arbitration Panel if, but only if, the errors arise in an award in excess of \$100,000; the exercise by the Chairman or Arbitration Panel of any powers contrary to or inconsistent with the Contract; or any of the grounds provided in A.R.S. 12-1512. Appeals shall be to the Maricopa County Superior Court within fifteen (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.
- L. **Uniform Arbitration Act.** Except as otherwise provided herein, binding arbitration pursued under this provision shall be governed by the Uniform Arbitration Act as enacted in Arizona in A.R.S. 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' fees, the prevailing party's attorneys' fees, expert witness fees and costs, will be paid by the non-prevailing party, except as provided for herein. 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 a project cost.
- N. **Equitable Litigation:** Notwithstanding any other provision of the ADR provisions 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 Project pending resolution of a dispute pursuant to ADR provided for herein. No court may order any permanent injunctive relief except as may be necessary to enforce an order or award entered by the Arbitration Panel. The fees and costs incurred in connection with any such equitable proceeding shall be determined and assessed in ADR.
- O. **Change Order:** Any award in favor of the COMMISSIONING CONSULTANT against CITY or in favor of CITY against COMMISSIONING CONSULTANT shall be reduced to a Change Order and executed by the parties in accordance with the award and the provisions of General and Supplementary Conditions to this Agreement or if the Agreement has been terminated or is complete, the award shall be made by warrant or check.
- P. **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 Contract Time which reasonably should or could have been brought against any party

that was or could have been brought into this ADR process. 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.

- Q. Disputes of amounts greater than \$500,000: Disputes for which the Arbitration Panel has determined have the potential to warrant an award in an amount greater than Five Hundred Thousand Dollars (\$500,000) to any one party, may be brought in the appropriate Court. A party must obtain such a determination from the Arbitration Panel prior to filing any legal action.
- R. In the event that the parties cannot agree on a neutral arbitrator, the dispute shall be settled by arbitration administered by the American Arbitration Association under its Commercial Arbitration Rules, and judgment on the award rendered by the arbitrator(s) may be entered in any court having jurisdiction thereof and A through Q above shall will not apply to the alternative dispute process.

15. OWNERSHIP OF DOCUMENTS

All documents, including, but not limited to, tracings, drawings, original mylars, estimates, field notes, investigations, design analysis and studies which are prepared in the performance of this Contract are to be, and remain the property of, the CITY. COMMISSIONING CONSULTANT shall furnish the CITY, upon its request, originals or reproducible of technical specifications and copies of all other documents listed above. COMMISSIONING CONSULTANT shall endorse, by his professional seal, all plans and engineering data furnished by him.

16. RE-USE OF DOCUMENTS

The parties agree the documents, drawings, specifications and designs, although the property of CITY, are prepared for this specific project and are not intended nor represented by COMMISSIONING CONSULTANT to be suitable for re-use for any other project. Any reuse without written verification or adaptation by COMMISSIONING CONSULTANT for the specific purpose intended will be at CITY's sole risk and without liability or legal exposure to COMMISSIONING CONSULTANT.

17. NO KICK-BACK CERTIFICATION

COMMISSIONING CONSULTANT warrants that no person has been employed or retained to solicit or secure this Contract upon an agreement or understanding for a commission, percentage, brokerage or contingent fee; and that no member of the City Council or any employee of the CITY has any interest, financially or otherwise, in the COMMISSIONING CONSULTANT firm.

For breach or violation of this warranty, the CITY shall have the right to annul this Contract without liability, or at its discretion to deduct from the Contract Price or consideration, the full amount of such commission, percentage, brokerage or contingent fee.

18. CONFLICT OF INTEREST

COMMISSIONING CONSULTANT stipulates that its officers and employees do not now have a conflict of interest and it further agrees for itself, its officers and its employees that it will not contract for or accept employment for the performance of any work or services with any individual business, corporation or government unit that would create a conflict of interest in the performance of its obligations pursuant to this Contract.

Pursuant to A.R.S. Section 38-511, the City may cancel this contract within three (3) years after its execution, without penalty or further obligation by the City if any person significantly involved in initiating, negotiating, securing, drafting or creating the contract on behalf of the City of Chandler is, at any time while

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.

19. CONTROLLING LAW

The law of the state of Arizona shall govern this Contract.

20. NO ASSIGNMENT

COMMISSIONING CONSULTANT shall not assign, transfer, convey or subcontract this contract or the services to be rendered pursuant thereto without the prior written consent of CITY.

21. NOTICES

Any notice required under this Contract shall be in writing, addressed to the appropriate party at its address on the signature page and given personally or by registered or certified mail postage prepaid, or by a commercial courier service. All notices shall be effective upon the date of receipt.

IN WITNESS WHEREOF, the parties have hereunto subscribed their names to this 18th day of September 2008

CITY OF CHANDLER

COMMISSIONING CONSULTANT:

MAYOR Date

By: [Signature]
Title: Principal

ADDRESS FOR NOTICE
City of Chandler
P.O. Box 4008, Mail Stop 407
Chandler, AZ 85244-4008
Phone: 480-782-3307
Fax: 480-782-3355

ADDRESS FOR NOTICE
325 E. Southern Ave.
Suite 107
Tempe AZ 85282
Phone: (480) 446-7777
Fax: (480) 446-9999

ATTEST:

City Clerk

ATTEST: If Corporation

Secretary

APPROVED AS TO FORM:

City Attorney by: [Signature]

SEAL

**EXHIBIT A
SCOPE OF WORK**

SECTION 1 - PROJECT DESCRIPTION

The new Chandler City Hall will be a multi-building, multi-level complex. The City Hall will consist of a 5-6 story building, a single story building, and a separate Council Chambers building. The combined square footage will be 120,000. There will also be a 400-stall parking garage. The City Hall site is located along the east side of Arizona Avenue at Chicago Street. Schematic Design is currently underway with the Design Development phase to commence in September 2008. Construction is slated to commence approximately June 2009 with overall completion in September 2010. The project will be designed to achieve LEED Gold certification.

SCOPE OF WORK

I. SUMMARY

- A. COMMISSIONING CONSULTANT shall be contracted directly to the CITY. The process of commissioning as defined herein goes well beyond typical system start-up, both in detail of testing and in detail of documentation.
- B. Commissioning is a systematic process of ensuring that all building systems perform interactively according to the design intent, basis of design, construction documents and CITY's system operational needs. This is achieved by beginning in the design phase, reviewing design intent/basis of design documentation and continuing through construction, building acceptance and the warranty period with actual verification of performance. The commissioning process shall coordinate separate functions of system documentation, equipment startup, control system calibration, testing and balancing, performance testing and CITY training.
- C. Due to the nature of this project, COMMISSIONING CONSULTANT shall perform all commissioning concurrently with construction such that commissioning is approximately 85% complete prior to substantial completion acceptance, and 100% complete prior to final acceptance.
- D. The City Hall project will be designed to achieve a rating of LEED Gold, per the USGBC guidelines. The COMMISSIONING CONSULTANT shall provide Enhanced Commissioning to comply with USGBC guidelines.

LEED EA Prerequisite 1- Fundamental Commissioning of the Bldg Energy System:

- 1. Lead, review and oversee the completion of the commissioning process activities. As required by the USGBC:
 - a. COMMISSIONING CONSULTANT has documented commissioning authority experience in at least two building projects.
 - b. COMMISSIONING CONSULTANT is independent of the project's design and construction management.
 - c. COMMISSIONING CONSULTANT will report results, findings and recommendations directly to the CITY.
- 2. Review the CITY developed Project Requirements (OPR) and design team developed Basis of Design (BOD) for clarity and completeness. The CITY and design team shall be responsible for updates to their respective documents.
- 3. Develop and incorporate commissioning requirements into the construction documents.
- 4. Develop and implement a commissioning plan.
- 5. Verify the installation and performance of the systems to be commissioned.
- 6. Complete a summary commissioning report.

LEED EA Credit 3 – Enhanced Commissioning:

- 1. Conduct, at a minimum, one commissioning design review of the CITY's Project Requirements (OPR), Basis of Design (BOD), and design documents prior to mid-construction documents phase and back-check the review comments in the subsequent design submission.
- 2. Review contractor submittals applicable to systems being commissioned for compliance with the OPR and BOD. This review shall be concurrent with DESIGN CONSULTANT reviews and submitted to the design team and the CITY.
- 3. Develop a systems manual that provides future operating staff the information needed to understand and optimally operate the commissioned systems.
- 4. Verify that the requirements for training operating personnel and building occupants are completed.

5. Review building operation within 10 months after substantial completion with O&M staff and occupants. Include a plan for resolution of outstanding commissioning-related issues.

II. **SYSTEMS TO BE COMMISSIONED**

- A. General: The systems to be commissioned shall generally include:
1. Division 15 Systems
 2. Division 16 Systems
- B. Provide functional performance testing for all modes of operation only for the mechanical, electrical, plumbing, and/or process equipment included in the design. With all listed systems, there is an assumed "as applicable" caveat that is intended to exclude any generically listed pieces of equipment that are not included in the design.
- C. Mechanical Systems: Provide functional performance testing for all modes of operation
1. Chilled Water Systems including (100%):
 - a. Chillers
 - b. Cooling Towers
 - c. Pumps
 - d. Heat exchangers
 - e. VFD's
 - f. Makeup systems & expansion tanks
 - g. Miscellaneous piping components
 2. Heating Hot Water Systems including (100%):
 - a. Boilers,
 - b. Pumps,
 - c. Heat exchangers
 - d. VFD's
 - e. Makeup systems & expansion tanks
 - f. Miscellaneous piping components
 3. Hydronic Flushing (100%):
 - a. Provide on-site attendance and witnessing of all flushing procedures by the mechanical contractor.
 - b. Provide sufficient time for witnessing up to three (3) complete catastrophic dumps, pre-flushing, cleaning, and final flushing.
 - c. Provide digital photo documentation of each phase of flushing.
 - d. Assist and advise the contractor in completion of the flushing according to the specified and the CITY required flushing procedures
 4. Air Handling Systems including (100%):
 - a. Fans
 - b. VFD's
 - c. Mixing dampers
 - d. Heating coils
 - e. Cooling coils
 - f. Ventilation
 - g. Humidification
 - h. Air Quality
 5. Terminal Units (10% statically based)
 - a. Variable Air Volume Boxes
 - b. Constant Volume Boxes
 - c. Fan coil units
 - d. Unit heaters, radiation, heating coils and evaporative cooling units.
 - e. Packaged DX and split system A/C units
 - f. Heat pump units
 - g. Computer room air conditioning units (CRAC)
 6. Exhaust and Supply Systems including: (100%)
 - a. General
 - b. Critical Area Pressurization
 - c. Toilet

- d. Process
- e. Smoke and Pressurization
- 7. Facility Control System (Building Automation) including
 - a. Point to point verification and calibration verification (10% statistical)
 - b. Sequence of operation testing for all modes of operation for all seasons including review of software. (100%)
 - c. Verification of graphics, point display, point command, and alarming. (100%)
 - d. Testing of the FCS shall occur in a timely manner to meet the construction schedule.
- D. Plumbing Systems: (100%)
 - 1. Domestic H/C Water (Primary equipment only)
 - 2. Booster System (Primary equipment only)
 - 3. Vacuum System (Primary equipment only)
 - 4. Compressed Air System (Primary equipment only)
- E. Electrical Systems:
 - 1. Lighting:
 - a. Automatic Lighting – Interior & Exterior
 - b. Occupancy control
 - c. Emergency Lighting
 - 2. Emergency power system
 - a. Emergency generator
 - b. Transfer
- F. Life Safety Systems:
 - 1. Fire Alarm System: (10% statistical)
 - a. Review test documentation; verify installation and operation of all required devices.
 - b. Coordinate the verification walkthrough of the local Authority Having Jurisdiction.
 - c. Observe initiation of each typical initiation device.
 - 2. Fire Protection System: (100% of flow switches)
 - 3. Smoke Control System: Verify that all scenarios and components for the smoke control including:
 - a. Duct Detectors:
 - ◆ Test and certify the duct smoke detectors are installed and performing within the manufacturers requirements.
 - ◆ Provide testing sheets for each detector.
 - ◆ Provide all detector manufacturers performance data and verification that the location provides sufficient air velocities under all modes of operation to meet this data. In addition, verify the detector operation to verify appropriate shut down sequences.
 - ◆ Submit the testing certification to the CITY's Inspection Services Department (and AHJ if required).
 - b. Fire Smoke Dampers:
 - ◆ Test and certify the fire/smoke dampers are installed and performing according to the design intent.
 - ◆ Each damper shall be individually testing for proper close and open operation when the fire alarm system command requires this action.
 - ◆ Submit the testing certification to the CITY Inspection Services Department (and AHJ if required).
 - c. Zone Boundary:
 - ◆ Sprinkler Flow Switches
 - ◆ Zone Boundary Doors
 - ◆ Fully sealed Zone Boundaries
 - ◆ Zone pressure testing
 - ◆ Stairwell and vestibule pressure testing
 - d. Smoke Control Initiation and Control Devices including
 - ◆ Area detectors (10%)
 - ◆ Fans (100%)
 - ◆ Control Dampers (100%)

- ◆ Magnetic door release (10%)

- G. COMMISSIONING CONSULTANT shall provide the services of a qualified technician with commissioning expertise as described in this section with the following general requirements:
1. Furnish labor and material to accomplish building commissioning as specified herein.
 2. A qualified COMMISSIONING CONSULTANT, as specified in this document, shall accomplish requirements of this specification and associated specific commissioning procedures.
 3. Unless noted otherwise, functional performance tests (FPT's) apply to all equipment and systems identified under "Systems to Be Commissioned".
 4. Develop and perform functional performance testing and troubleshooting of equipment and systems.
 5. Manage the quality, coordination, scheduling, and execution of commissioning activities.

III. DEFINITIONS:

A. Definition of Terms:

1. Adjustment: To change the speed, flow, position, signal, or level of any piece of mechanical equipment.
2. Calibration: To check or adjust the graduations of a quantitative measuring instrument against a known standard.
3. CITY: The City of Chandler, OWNER of the project
4. COMMISSIONING CONSULTANT: The person, firm or corporation, including their representatives, retained by CITY to perform LEED Commissioning Services for the project.
5. CONTRACTOR: The person, firm or corporation with whom CITY has entered into the construction contract.
6. Datalogging - monitoring flows, currents, status, pressures, etc. of equipment using stand-alone dataloggers separate from the control system.
7. Deficiency - a condition in the installation or function of a component, piece of equipment or system that is not in compliance with the Contract Documents (that is, does not comply with the design intent).
8. DESIGN CONSULTANT: The person, firm or corporation, including their representatives, retained by CITY to design and engineer the project, to draft specifications, plans and perform other project design functions.
9. Design Intent - a dynamic document that provides the explanation of the ideas, concepts and criteria that are considered to be very important to the CITY. It is initially the outcome of the programming and conceptual design phases.
10. Facility Control System (FCS): Other common acronyms are DDC (Direct Digital Controls), BAS (Building Automation System), BMS (Building Management System) or FMS (Facility Management System). This is the system providing automation functions for control of the HVAC and mechanical systems as well as alarming, monitoring, trending and interface/integration to related building systems such as fire alarm, security, card access, electrical switchgear, and stand-alone controls for major equipment such as chillers.
11. Functional Performance Testing (FPT): This portion of the Commissioning Process involves dynamic tests that ensure that all mechanical systems function in accordance with design intent. The tests are dynamic and on-line and test the systems through all possible modes of operation.
12. Installation Verification: This initial portion of the Commissioning Process includes observations and punch-lists recorded and performed by the Engineer to ensure that all equipment is installed in accordance with the Specifications and Drawings. The Commissioning Provider shall overview this process.
13. LS: Life Safety Systems including Fire Alarm, Fire Protection and Smoke Control.
14. MEP: Mechanical, Electrical and Plumbing systems
15. Minor Adjustment: To add, subtract, or change various parameters included in the operation logic of a mechanical system or systems in order to improve or optimize operational performance. This refers only to the specified performance logic. Difficulties encountered in accomplishing a minor adjustment shall not be used to define a minor versus a major adjustment.
16. Major Adjustment: To fully change the specified operation logic of a mechanical system or systems. This refers only to the specified performance logic. Difficulties encountered in accomplishing a minor adjustment shall not be used to define a minor versus a major adjustment.

17. Pre-functional checklists (PFC): This portion of the Commissioning Process involves primarily the test and balance and startup personnel to ensure that individual pieces of equipment are capable of performing in accordance with the Specifications, Drawings, and manufacturers' requirements. This is documented with a pre-functional checklist provided and completed by the contractor. The Commissioning Provider shall overview this testing.
18. Statistical Sampling. - Functionally testing a statistically representative quantity (i.e. 15%) of identical or near identical pieces of equipment. Subject to 3% failure threshold whereby if there are greater than 3% testing failures of randomly chosen equipment, the testing shall be noted as failed and the Contractor shall re-verify the startup of 100% of the equipment. An additional identical statistically representative quantity of equipment shall again be tested which shall include a retest of 25% of the failed equipment and 75% randomly chosen untested equipment. This shall be repeated until the testing is noted as passing. Any proposed statistical sampling shall be identified in the construction phase commissioning plan and approved by the COMMISSIONING CONSULTANT.
19. System Component or System Element: A single piece of mechanical equipment such as a pump, fan, chiller, boiler, coil, etc. that when combined together through piping or ductwork will comprise a "System".
20. System: A combination of system components that allow the manufacture or distribution of conditioned air or water from one location to another.
21. Tuning: To adjust for maximum performance.

IV. **COMMISSIONING TEAM**

- A. Coordination and management: COMMISSIONING CONSULTANT shall provide overall coordination and management of the commissioning program as specified herein.
- B. The commissioning process will require cooperation of the Contractor, subcontractors, vendors, Architectural Engineering firm, COMMISSIONING CONSULTANT and CITY.
- C. The commissioning team shall be comprised of the following:
 1. Contractor: Project Manager and MEP coordinator
 2. Subcontractors: As required by the prime contractor
 3. Manufacturers' factory engineers: As specified elsewhere
 4. Commissioning Provider
 5. Construction Management Engineer
 6. CITY Construction Observers
 7. Architectural/Engineering Representatives

V. **DESIGN PHASE COMMISSIONING RESPONSIBILITIES**

- A. **COMMISSIONING CONSULTANT**: The COMMISSIONING CONSULTANT Responsibilities include, but are not limited to:
 1. Coordinate, schedule and manage the commissioning activities
 2. Finalize design phase commissioning plan
 3. Perform a review of Design Development Documents
 4. Assist in the development of the design intent documentation
 5. Develop the draft commissioning plan for the construction phase
 6. Develop commissioning specifications for the construction bid documents
 7. Perform a final review of the drawings and specifications
 8. Review sequences of operation.
- B. **CITY will**:
 1. Review and comment on design phase & construction phase draft Commissioning plan.
 2. Review and approve design intent document.
- C. **DESIGN CONSULTANT will**:
 1. Attend the commissioning scope meeting and selected commissioning team meetings.
 2. Plan & schedule meetings.
 3. Write design intent for systems included for commissioning.
 4. Adapt commissioning guide specifications and include in Division 1.

VI. **DESIGN PHASE COMMISSIONING TASKS:**

- A. Review Design – Design Development Phase:
1. Commissioning facilitation: Input regarding making the building easier to commission.
 2. Operation and Maintenance (O&M): Review how building O&M can be made easier (accessibility and system control, etc.)
 3. Review Basis of Design
 4. Review Design Intent Document: Identify flaws, oversights, or insufficient detail in the design, relevant to being able to reasonably meet the design intent.
- B. Review Design – Construction Document Phase (90%)
1. General Review:
 - a. Determine if the design documents are sufficiently complete to warrant a full design review, A quick review to confirm that the Design Intent is met via the Basis of Design requirements, Review Continuation of Items; Labeling; legibility; general level of completion
 2. Plan Review:
 - a. Look for accessibility, consistent terminology, physical space continuity and placement of multiple pieces of equipment.
 - b. Clear and rigorous design documentation, including detailed and complete sequences of operation.
 - c. Access for reading gages, entering doors and panels, observing and replacing filters, coils, etc.
 - d. Required isolation valves, dampers, interlocks, piping, etc. to allow for manual overrides, simulating failures, seasons and other testing conditions.
 - e. Pressure and temperature (P/T) plugs close to controlling sensors for verifying their calibration.
 - f. Pressure gages, thermometers and flow meters in strategic areas for verifying system performance and ongoing O&M. Pressure and temperature (P/T) plugs at less critical areas or on smaller equipment where gages and thermometers would be over-kill.
 - g. Specification for the location and criteria for the location of critical sensors (i.e. VAV duct static pressure sensor and chilled water differential pressure sensor).
 - h. Adequate balancing valves, flow metering and control stations and control system functions to facilitate and verify reliable test and balance.
 - i. Uniform inlet connection requirements to VAV terminal boxes.
 - j. Review entire document and building information management plan from design through construction and turnover to ensure adequacy and compliance with the CITY's program.
 3. Specification Review:
 - a. General Review: Identify unnecessary sections; manufacturer basis of design verified; no use of "or equal"; specification directions are clear and concise
 - b. Control Systems and Strategies Documentation:
 - ◆ Clear and concise sequences of operations, Sufficient monitoring points in the building automation system (BAS), even beyond that necessary to control the systems, to facilitate performance verification and O&M, Adequate trending and reporting features in the BAS.
 - c. Operation & Maintenance:
 - ◆ Review maintenance requirements for effects of specified systems and layout toward facilitating O&M (equipment accessibility, system control, etc.).
 - ◆ Review operation and maintenance documentation to verify that building O&M plan and documentation requirements specified are adequate.
 - d. Training Documentation:
 - ◆ Review training requirements to verify that operator training requirements specified are adequate.
 - e. Commissioning Facilitation:
 - ◆ Verify that bid documents adequately specify building commissioning and that there are adequate monitoring and control points specified to facilitate commissioning and O&M (trending capabilities, test ports, control points, gages and thermometers).

◆ Input regarding making the building easier to commission

VII. **CONSTRUCTION PHASE COMMISSIONING RESPONSIBILITIES**

- A. **COMMISSIONING CONSULTANT:** The COMMISSIONING CONSULTANT responsibilities include, but are not limited to:
1. General Tasks:
 - a. Coordinate, schedule and manage the commissioning activities.
 - b. Assist the Contractor to coordinate all Sub Contractor commissioning activities.
 - c. Obtain, assemble and submit commissioning documentation.
 - d. Attend periodic on-site commissioning activities
 2. Commissioning Documentation Development Tasks:
 - a. Develop the commissioning plan and schedule.
 - b. Develop detailed pre-functional check lists
 - c. Develop detailed functional performance test procedures.
 - d. Coordinate locations of test ports required for Commissioning on P&ID's, shop drawings and during installation.
 - e. Conduct and coordinate the installation verification inspections with the Engineer, DESIGN CONSULTANT, CME and CITY Construction Observers.
 - f. Prepare and submit the Commissioning Reports.
 3. Pre-Functional Testing Tasks:
 - a. Assist and witness portions of the start-up activities and pre-functional testing.
 - b. Monitor the performance of a statistically representative portion of the Test, Adjust and Balance contractor activities.
 4. Functional Performance Testing Tasks:
 - a. Direct the functional performance testing. Provide testing of all systems to provide complete confidence in the systems. The tests will include the interaction between individual components, sub-systems and complete building systems under both normal and emergency power conditions.
 - b. Ensure that necessary test instrumentation is available during functional performance testing and instruments meet quality and calibration requirements and are in good working order.
 - c. Enforce system compliance and recommend modifications to the system design that will correct or enhance the system performance.
 - d. Coordinate witnessing of the tests.
 - e. Track commissioning deficiencies until correction and retesting are successfully completed. Assist the Commissioning Team in determining the cause of failure.
- B. COMMISSIONING CONSULTANT shall coordinate with CITY to ensure:
1. Commissioning procedures and results are observed by the CITY's designated witnesses.
 2. The Contractor verifies the functional readiness of systems to be tested prior to performing the tests in the presence of the witnesses.
- C. COMMISSIONING CONSULTANT shall coordinate with DESIGN CONSULTANT to:
1. Facilitate DESIGN CONSULTANT's attendance of the commissioning scope meeting and selected commissioning team meetings.
 2. Coordinate resolution of system deficiencies (which are related to possible design deficiencies) identified during commissioning, according to the contract documents.
 3. Provide any design narrative and sequences documentation requested by the COMMISSIONING CONSULTANT. The DESIGN CONSULTANT will assist (along with the contractors) in clarifying the operation and control of commissioned equipment in areas where the specifications control drawings or equipment documentation is not sufficient for writing detailed testing procedures.
 4. Facilitate the observations and checklists for the Installation Verification.
 5. Facilitate additional calculation and investigation of design adjustments needs as defined by the COMMISSIONING CONSULTANT.
 6. Participate in the resolution of potential design concerns as discovered during the commissioning process.
- D. COMMISSIONING CONSULTANT shall coordinate with CONTRACTOR to:
1. Facilitate the coordination of the commissioning work by the COMMISSIONING CONSULTANT, and ensure that commissioning activities are being scheduled into the project's master CPM schedule.

2. Include the cost of commissioning in the total contract price.
 3. In each purchase order or subcontract written, include requirements for submittal data, O&M data, commissioning tasks and training.
 4. Ensure that all Subcontractors execute their commissioning responsibilities according to the Contract Documents and commissioning plan and schedule.
 5. Attend a commissioning scope meeting scheduled by the COMMISSIONING CONSULTANT and other necessary meetings scheduled by the COMMISSIONING CONSULTANT to facilitate the Commissioning process.
 6. Coordinate the activities of all contractor, subcontractor and vendor personnel, required to complete training of CITY personnel in accordance with the requirements of the Specifications and the Training Agenda.
 7. Prepare and submit the O&M manuals, according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built conditions.
- E. Division 15 and Division 16 Contractors
1. COMMISSIONING CONSULTANT shall coordinate with CONTRACTOR to ensure the Division 15 and Division 16 Contractors provide the services outlined in this paragraph.
 - a. Cooperate with the COMMISSIONING CONSULTANT to complete commissioning activities.
 - b. Include the cost of commissioning by the CM/GC in the total subcontract price.
 - c. Perform the Pre-functional Testing, a start-up procedure prior to balancing as defined in Part 2 of this specification.
 - d. Provide any technical personnel required for physical operation, testing, and simulation of control sequences for each piece of controlled equipment as required by the Commissioning Provider during the Functional Performance Testing. This will include chiller service personnel, boiler service personnel, the temperature control engineering and technical startup crew, mechanical contracting service personnel for miscellaneous mechanical equipment, and balancing contractor personnel.
 - e. Additional calibration and adjustment of the mechanical equipment included in each mechanical system for proper operation under actual operation as defined by the COMMISSIONING CONSULTANT.
 - f. Additional testing, calibration, adjustment, tuning, and minor adjustments to the temperature controls system sequences for proper operation under actual operation as defined by the COMMISSIONING CONSULTANT.
 - g. Additional testing, calibration and adjustment of the mechanical water and airflows of each mechanical system for proper operation under actual operation as defined by the COMMISSIONING CONSULTANT.
 - h. Review final construction phase commissioning plan procedures for equipment installed, training and functional testing required under the particular subcontract.
 - i. Provide training services as required

VIII. CONSTRUCTION PHASE COMMISSIONING SUBMITTALS

- A. Commissioning Plan – Construction Phase: Within 60 calendar days of notice to proceed, COMMISSIONING CONSULTANT shall submit a preliminary construction phase commissioning plan to identify how commissioning activities will be integrated into general construction and trade activities. The plan is the key means for the COMMISSIONING CONSULTANT to inform all parties as to how each system functions, independently and with respect to other systems. COMMISSIONING CONSULTANT shall update the plan regularly and redistributed to the commissioning team for review and comment. The intent of this plan is to evoke questions, expose issues, and resolve them with input from the entire commissioning team early in construction. The commissioning plan will identify how commissioning responsibilities are distributed. Include the following sections:
1. Executive Summary: Provide a description of the Commissioning Manual
 2. Commissioning Team: Provide a listing of all commissioning team members including the names, addresses, and office/fax/cell phones number or the CITY, Commissioning Provider, architect, mechanical engineer, electrical engineer, general contractor, mechanical contractor, electrical contractor, controls contractor, fire alarm system contractor and test & balance contractor.
 3. System Overview: Provide a listing of design weather data, design parameters and all mechanical and electrical systems equipment data for the commissioned systems.
 4. Overview of Testing Program Procedures: Provide a detailed description of the testing plan and procedures that will be implemented during the commissioning process.

5. Record Document - Sequences of Operation: Provide a detailed sequence of operation that is utilized for testing purposes. The final commissioning report shall describe any modifications to the engineer specified sequences of operation.
6. Pre-Functional Testing Checklists: Provide prefunctional testing checklist forms to the contracting team for each individual piece of mechanical equipment. The forms shall describe all events required to fully start-up a piece of equipment.
7. Functional Testing Procedures & Data Forms: Provide complete and detailed functional performance testing procedures required to fully test the entire system including the following:
 - a. Operational description: This shall include, for example, the design criteria, design intent/basis of design, code requirements, specifics of the equipment to be provided, sequences of operation, operating priorities, protocols, etc. Some of these items will be provided to the COMMISSIONING CONSULTANT with the construction package and may be copied or referenced.
 - b. Each procedure shall have a unique alphanumeric designator consisting of the applicable functional performance test procedure designator followed by a dash digit suffix to distinguish multiple repetitions of the same procedure.
 - c. The same procedure may be applied to multiple identical pieces of equipment or systems.
 - d. Identify the value for all setpoints and inputs, positions of adjustable devices, valves, dampers, and switches.
 - e. PFT procedures shall be a series of detailed test events, written with sufficient step-by-step information to allow a test to be repeated under identical conditions with repeatable results.
 - f. For each event, identify the range of acceptable results.
 - g. Include space to record: Description of the procedure; whether the form is for a retest of a failed procedure; identification and location of the equipment being tested; identification of instrumentation used by serial number; observed conditions at each step of the procedure; acceptable results as specified elsewhere; date of the test; names of technicians performing the procedure; name and signature of the COMMISSIONING CONSULTANT
8. Provide samples of commissioning forms including:
 - a. Deficiencies and Issues Log: Provide a sample functional performance test deficiency report form. Include space to record: Associated functional performance test data form number; date of test; name of person reporting the deficiency; description of the observations associated with the failure of the test; cause of the failure, if apparent at the time of the test; date and description of corrective action taken; name and signature of person taking corrective action; and schedule for retest.
 - b. Daily Log: Provide a blank log as an example.
 - c. Meeting Minutes: Provide a blank log as an example.
9. Commissioning schedule: Submit within 90 calendar days of notice to proceed.

IX. SCHEDULE

- A. Commissioning schedule: COMMISSIONING CONSULTANT shall work with CONTRACTOR to integrate functional performance testing and commissioning requirements into the Critical Path Method (CPM) master construction schedule.
 1. Prior to the beginning of start-up or functional performance testing activities, COMMISSIONING CONSULTANT shall update the schedule of commissioning activities monthly.
 2. Two weeks prior to the beginning of start-up or functional performance testing activities, provide a detailed two-week look-ahead schedule. Thereafter, COMMISSIONING CONSULTANT shall update the two-week look-ahead schedule weekly for the duration of commissioning for that construction phase. The two-week look-ahead schedule will identify the date, time, beginning location, contractor personnel required, and anticipated duration for each startup or test activity.
- B. Commissioning of systems shall proceed per the criteria established in the specific sections that follow, with activities to be performed on a timely basis. Commissioning of systems may proceed prior to final completion of systems. The COMMISSIONING CONSULTANT shall be available to respond promptly to avoid delay to the CPM schedule.
- C. COMMISSIONING CONSULTANT shall address problems observed immediately, in terms of notification to responsible parties and actions to correct deficiencies.

X. **COMMISSIONING MEETINGS**

- A. **Scope Meeting:** Early in the construction process, COMMISSIONING CONSULTANT shall facilitate a commissioning scoping meeting involving all members of the commissioning team, at a time and place designated by the CITY. The purpose of the meeting will be to familiarize all parties with the requirements of the commissioning process, and to ensure that the responsibilities of each party are clearly understood.
- B. **Progress Meetings:**
1. Prior to the beginning of start-up or functional performance testing activities, the COMMISSIONING CONSULTANT shall hold commissioning meetings at least monthly. These meetings may be held concurrently with the general construction meetings.
 2. Beginning two weeks prior to the commencement of start-up or functional performance testing activities, whichever is earlier, the COMMISSIONING CONSULTANT shall hold commissioning meetings at least weekly. Thereafter, and for the duration of commissioning for that construction phase, COMMISSIONING CONSULTANT shall continue to hold commissioning meetings at least weekly. These meetings may be held concurrently with the general construction meetings.
- C. The COMMISSIONING CONSULTANT may require additional meetings if the commissioning process appears to be behind schedule or if there are coordination problems. If so, the COMMISSIONING CONSULTANT shall advise the CITY.

XI. **TEST EQUIPMENT**

- A. The Division contractor for the equipment tested provides all standard or proprietary testing equipment required to perform startup and initial checkout and required functional performance testing. For example, the mechanical contractor of Division 15 is ultimately responsible for all standard or proprietary testing equipment for the Facility Controls System (FCS) in Division 15, except for equipment specific to and used by TAB in their commissioning responsibilities. The Division contractor provides two-way radios.
- B. The Division contractor's responsibilities include special or proprietary equipment, tools, software and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment, according to these Contract Documents in the base bid price to the Contractor and left on site, except for stand-alone data logging equipment used by the COMMISSIONING CONSULTANT.
- C. The COMMISSIONING CONSULTANT shall provide data logging equipment, sensors, and software required to test equipment that is not monitored or controlled by the FCS.
- D. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Contract Documents. If not otherwise noted, the following minimum requirements apply:
1. Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5°F and a resolution of + or - 0.1°F.
 2. Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year.
- E. The Division contractor will also be responsible for calibration of all equipment according to the manufacturer's recommended intervals and when dropped or damaged. Affix calibration tags or have certificates readily available.

XII. **COMMISSIONING REPORTS**

- A. **Documentation - General:**
COMMISSIONING CONSULTANT shall:
1. Record and maintain detailed testing data. The data record shall be comprehensive and concise.
 2. Record all data as soon as possible during the course of the testing.
 3. All documentation shall have the date, time, and names of persons participating in the inspection and testing.
 4. Document all test instruments for valid calibration.
 5. The recording work sheets, inspection check lists, and performance testing plans must all be approved by the Engineer and Commissioning Provider prior to the start of Functional Performance Testing.
- B. **Daily Commissioning Report Logs:**
1. COMMISSIONING CONSULTANT shall provide daily report logs to be included in the final report.
 2. The daily logs will record the COMMISSIONING CONSULTANT personnel and event summaries of meetings, conversations, tests, failures, solutions, procedures and successes.

- C. Installation verification audit: Prior to start-up, the COMMISSIONING CONSULTANT shall maintain a report of installation verification audit activities. COMMISSIONING CONSULTANT shall identify equipment and components verified, deficiencies noted, corrective action taken, and the dates and initials of the persons making the entries.
- D. Start-up deficiency report: Within five days following start-up of each system or equipment, the COMMISSIONING CONSULTANT shall maintain start-up deficiency report forms. COMMISSIONING CONSULTANT shall identify systems and/or equipment started up, deficiencies noted, corrective action taken, and the dates and initials of the persons making the entries.
- E. Test, adjust and balance (TAB) progress reports: After TAB activities have begun, the COMMISSIONING CONSULTANT shall obtain weekly TAB progress reports. Reports will identify:
 - 1. Systems or subsystems for which preliminary balancing is complete.
 - 2. Systems or subsystems for which final balancing is complete.
 - 3. Status of deficiencies and balancing problems encountered, including corrective actions taken.
 - 4. Updated schedule of remaining TAB activities.
- F. Deficiencies and Issues Report: At the end of each day, in which functional performance tests are conducted, the COMMISSIONING CONSULTANT shall maintain a deficiencies and Issues (D&I) log for tests for which acceptable results were not achieved during the day.
 - 1. The log will identify tests for which acceptable results were not obtained by test number and description, and equipment identification and location; briefly describe observations about the performance that was associated with failure to achieve acceptable results; and identify the cause of failure if such is apparent.
 - 2. When corrections have been completed, the COMMISSIONING CONSULTANT shall update the functional performance test deficiency report forms to identify corrective action taken and the dates and initials of the persons making the entries.
 - 3. The report will identify the schedule for re-testing.
- G. Final Commissioning Report: The COMMISSIONING CONSULTANT shall prepare and submit a final report with the closeout package. The binding format shall be 8 ½ x 11 bound documents with 11 x 17 fold out. This report shall:
 - 1. Verify performance of HVAC equipment and systems.
 - 2. Document any field modifications to the testing process and why these modifications were made.
 - 3. The organization of the final commissioning report shall be as follows:
 - a. Executive Summary of each mechanical system and problems encountered and resolved.
 - b. System Overview summarizing the system design.
 - c. Commissioning Plan
 - d. Post Commissioned Controls Sequences and Points Lists.
 - e. Prefunctional Testing Checklists
 - f. Functional Testing Procedures and Results
 - g. Deficiencies and Issues Logs
 - h. Daily report logs.
 - i. Appendix of letters, meeting minutes, memos, photos, and notes occurring during the commissioning process.
- H. Hardcopy and Electronic Versions:
 - 1. COMMISSIONING CONSULTANT shall provide the Commissioning Plan provided prior to the on-site commissioning and the Final Commissioning Report provided at the conclusion in hard copy (2 copies) and electronic on CD (2 copies).
 - 2. The Commissioning Plan CD will include files developed in the most current MS Word format.
 - 3. The Final Commissioning Report CD will contain scanned copies of all documentation developed and gathered during the Commissioning Process in Acrobat PDF format.

XIII. **COMMISSIONING PROCEDURE**

- A. Sequence of testing: Commissioning will proceed from lower to higher levels of complexity. For each discrete subsystem or system, COMMISSIONING CONSULTANT shall complete testing at the lower level prior to starting the next higher level of tests. In general, the order of testing from lowest to highest is:
 - 1. Static tests (such as duct leakage tests).

2. Component functional performance tests (of motors, actuators, sensors, etc.) and start-up.
 3. Balancing.
 4. System functional performance tests.
 5. Intersystem functional performance tests.
- B. Re-testing: The COMMISSIONING CONSULTANT shall repeat, at no additional cost to CITY, the complete functional test procedure for each test for which acceptable results are not achieved, and shall repeat tests until acceptable results are achieved. The COMMISSIONING CONSULTANT shall track commissioning deficiencies until correction. Within each system, the COMMISSIONING CONSULTANT shall provide one re-commissioning for any deficiencies. For systems with large quantities of identical equipment, COMMISSIONING CONSULTANT shall apply a statistical re-commissioning strategy to retest 30% of the deficiencies. The tested systems will not be witnessed by the CITY until COMMISSIONING CONSULTANT achieves, documents, reviews and accepts test results. Additional testing beyond a single failure may be subject to back-charges by the COMMISSIONING CONSULTANT.
- C. Correction of deficiencies:
1. COMMISSIONING CONSULTANT shall correct functional performance test deficiencies promptly and schedule retest.
 2. Corrections during functional performance tests are generally prohibited to avoid consuming the time of personnel waiting for the test, but not involved in making the correction. Exceptions will be allowed if the cause of the failure is obvious and corrective action can be completed in less than five minutes. If corrections are made under this exception, COMMISSIONING CONSULTANT shall note the failure on the functional performance test data form. COMMISSIONING CONSULTANT shall initiate a new functional performance test data form, marked "retest", after the correction has been made. COMMISSIONING CONSULTANT shall repeat the entire functional performance test procedure.
- D. Delegated witnesses: Witnesses may be designated by the CITY or DESIGN CONSULTANT to observe the commissioning process. Witnesses shall provide no labor or materials in the commissioning process. The only function of the witnesses shall be to observe and comment on the progress and results of commissioning.
- XIV. **OPERATIONS AND MAINTENANCE (O&M) MANUALS**
- A. COMMISSIONING CONSULTANT shall assist the CONTRACTOR in reviewing the O&M manuals prepared by other divisions of the work related to commissioning for compliance with the requirements of Division 1.
1. Incorporate the standard technical literature into a systems-specific document: concise, to the point, and above all, tailored specifically to this facility.
 2. Obtain the equipment manufacturer's standard technical literature relevant to the operation and maintenance of the provided equipment. The literature shall be specifically oriented to the equipment provided, indicating all operation and maintenance procedures, parts lists, assembly/disassembly diagrams, and related information. Wiring diagrams must be complete and specific to the equipment provided.
- B. COMMISSIONING CONSULTANT shall have all of these materials available for the training sessions.
- XV. **INSTALLATION VERIFICATION**
- COMMISSIONING CONSULTANT shall:
- A. During construction, assist the CONTRACTOR and coordinate the DESIGN CONSULTANT's observation the work of the CONTRACTOR and subcontractors to ensure that all installations are being made in accordance with the intent of the contract documents.
- B. Before system start-up begins, coordinate and attend a final installation verification audit with the DESIGN CONSULTANT. The audit shall include, but not be limited to, a check of:
1. Piping specialties including balance, control, and isolation valves.
 2. Ductwork specialty items including turning devices; balance, fire, smoke, and control dampers; and access doors.
 3. Control sensor types and locations.
 4. Identification of piping, valves, starters, gauges, thermometers, etc.
 5. Documentation of pre-start-up tests performed, including manufacturers' factory tests.
 6. Accessibility to equipment in 1-3 above.

- C. If any work is found to be incomplete, inaccessible, incorrect, or non-functional, make note of deficiencies and correct the deficiencies before system start-up work proceeds.

XVI. **SYSTEM START-UP**

COMMISSIONING CONSULTANT shall:

- A. Assist the CONTRACTOR in the development a start-up plan and deficiency list. Commence with system start-up after approval has been given to the start-up plan and the CONTRACTOR and subcontractors have signed off the pre-functional checklists. The COMMISSIONING CONSULTANT and/or delegated representative shall witness system start-up and list all system and equipment deficiencies noted during start-up. COMMISSIONING CONSULTANT shall coordinate with CONTRACTOR to ensure CONTRACTOR takes corrective action on all system deficiencies noted and demonstrates suitable system operation to the COMMISSIONING CONSULTANT.
- B. Prepare start-up deficiency list forms to report deficiencies discovered in conjunction with system start-up. Start-up deficiency forms will indicate the system being started up; the location and identification of the deficient equipment/material; date of observation; initials of the observer; observed deficiency; date of correction; initials of person making the correction; and corrective action taken.
- C. Issue start-up deficiency report forms to the Contractor for corrective action. The Contractor shall advise the COMMISSIONING CONSULTANT when all start-up deficiency list items have been corrected.

XVII. **TEST, ADJUST AND BALANCE**

COMMISSIONING CONSULTANT shall:

- A. Assist the Contractor in the coordination the air and hydronic balancing. Advise the Test, Adjust and Balance (TAB) firm when systems are complete and ready for balancing. Start TAB as early as possible following systems start-ups and component functional performance tests, in order to be essentially complete prior to system functional performance tests. Coordinate TAB activities with other construction schedule activities.
- B. Verify the accuracy of the TAB work prior to commencing any FPT activities that may be adversely affected by improper balancing.
- C. Spot check 10% (or as specified in the scope of work) of the TAB measured flows for all air and water flows. This may be accomplished by physically measuring those flows independently of the TAB or witnessing the TAB contractors measurement of the required quantity.

XVIII. **FUNCTIONAL PERFORMANCE TEST PROCEDURES**

- A. The COMMISSIONING CONSULTANT shall develop as a part of the construction phase commissioning plan submittal, the functional performance test (FPT) commissioning procedures and documentation to be used. COMMISSIONING CONSULTANT shall enlarge personnel experienced in the technical aspects of each system to be commissioned if necessary to augment the expertise of the COMMISSIONING CONSULTANT. Include functional performance test procedures and functional performance test data sheets for each system based upon actual system configuration. Emphasis shall be placed on testing procedures that will conclusively determine actual system performance and compliance with the design.
 - 1. The test procedures shall fully describe system configuration and steps required for each test, appropriately documented so that another party can repeat the tests with virtually identical results.
- B. The FPT procedures will confirm the performance of systems to the extent of the design intent/basis of design and applicable code under which the project was permitted. When a system is accepted, the CITY and DESIGN CONSULTANT must be assured that the system is complete, works as intended, is correctly documented, and that the designated CITY staff is trained in the operation and maintenance of the system.
- C. The majority of mechanical equipment requires integral safety devices to stop/prevent equipment operation unless minimum safety standards or conditions are met. This could include adequate oil pressure, proof-of-flow, non-freezing conditions, maximum head pressure, etc. Functional performance test procedures shall demonstrate the actual performance of safety shutoffs in real or closely simulated conditions of failure.
- D. Systems may include safety devices and components that control a variety of equipment operating as a system. Interlocks may be hard-wired or installed via software. Functional performance test procedures shall demonstrate these interlocks.

- E. The COMMISSIONING CONSULTANT shall inform appropriate subcontractors and vendors before commissioning is started as to what the test and expected results will be. Whereas some test results and interpretations may not become evident until the actual tests are performed, COMMISSIONING CONSULTANT shall ensure all participants have a reasonable understanding of the requirements. The commissioning plan will address the requirements and be distributed to all participants involved with that particular system.

XIX. **REVIEW SOFTWARE DOCUMENTATION**

- A. The COMMISSIONING CONSULTANT shall review vendor/contractor/CITY-provided detailed FCS software documentation. This includes obtaining FCS program documentation, a review of the programming approach, interface with other systems (such as lighting, fire alarm, security, clock, emergency generator monitoring, sump pumps, and utility metering), and a review of the specific software routines as applied to this project. Discrepancies in programming approaches shall be resolved to provide CITY with the most appropriate, simple, and straightforward approach to software routines.

XX. **TRAINING**

COMMISSIONING CONSULTANT shall

- A. Assist the CONTRACTOR in the preparation and submission a training plan for approval. The training plan shall include for each training session:
 - 1. Dates, start and finish times, and locations.
 - 2. Outline of the information to be presented.
 - 3. Names and qualifications of presenters.
 - 4. List of texts and other materials required to support training.
- B. Obtain assistance from appropriate subcontractors and vendors to provide training for the delegated CITY operations staff as specified in Divisions 15, 16, and 17.
- C. Provide edited videotaped documentation of training of the CITY staff for each system on a DVD format. Training will be in a classroom setting with the appropriate schematics, handouts, and audio/visual training aids.
- D. Catalog training DVD's and deliver to the CITY with the O&M manuals as part of the closeout package.
- E. Host each training session:
 - 1. Provide program overview and curriculum guidance.
 - 2. Obtain signatures of attendees on a sign-in list.
- F. Equipment vendors provide training on the specifics of each system and philosophy, troubleshooting, maintenance recommendations and repair techniques as specified in the relevant sections of this specification.
- G. Installation subcontractors provide training on peculiarities specific to this project and job-specific experience as specified in the relevant sections of this specification.

XXI. **SYSTEMS CONCEPTS MANUAL:**

COMMISSIONING CONSULTANT shall

- A. Organize and deliver a Systems Manual that includes O&M information that is organized by system rather than specification section.
- B. Systems included:
 - 1. Chilled Water System
 - 2. Heating Water System
 - 3. Air Handling Systems (broken out by area)
 - 4. Exhaust Systems
 - 5. Terminal Unit Systems
 - 6. Plumbing Systems
 - 7. Life Safety Systems
 - 8. Emergency Power Systems
 - 9. Lighting Control Systems
- C. COMMISSIONING CONSULTANT shall include the following information for each system:
 - 1. Include only information and data that is pertinent to the installed and commissioned systems.
 - 2. O&M performance and submittal data.
 - 3. Final version of the CITY's project requirements and basis of design.

4. As-built sequences of operations for all equipment as provided by the design professionals and contractors including, point to point control diagrams, schematic diagrams, software code & flow diagrams, time-of-day schedules and schedule frequency, and detailed point listings with ranges, PID parameters, and initial setpoints.
5. Ongoing operating instructions for all energy- and water-saving features and strategies.
6. Functional performance tests results (benchmarks), blank test forms, and recommended schedule for ongoing benchmarking. Seasonal operational guidelines.
7. Recommendations for recalibration frequency of sensors and actuators by type and use. Single line diagrams of each commissioned system.
8. Troubleshooting table for ongoing achievement of the CITY's project requirements.
9. Guidelines for continuous maintenance of the CITY's project requirements (operational requirements) and basis of design (basis of operation).

XXII. EXCLUSIONS

- A. The COMMISSIONING CONSULTANT shall not be responsible for construction means, methods, job safety, or any management function related to commissioning on the job site.
- B. The Contractor shall provide all technician services requiring tools or the use of tools to test, adjust, or otherwise bring equipment into a full operational state.
- C. The COMMISSIONING CONSULTANT shall not be responsible for any Civil or Structural testing required.
- D. The Commissioning Provider shall not be responsible for Division 15 Test and Balance contractor tasks or Division 16 Electrical Acceptance Testing contractor tasks.

CLARIFICATIONS TO SCOPE:

The following items are clarifications to the scope of work:

1. General:
 - a. COMMISSIONING CONSULTANT will be provided with a full set of half-sized construction drawings, specifications, addendums, information requests, submittals and any other pertinent construction documentation required to develop the commissioning documentation and execute the commissioning process.
 - b. This proposal includes two paper (2) copies of all Commissioning reports and submittals and two (2) electronic CD's with scanned and indexed copies of the paper report in Adobe Acrobat PDF format.
2. Contractor Cooperation:
 - a. Most portions of the commissioning process will require sub-contractor cooperation to avoid warranty issues. In order for COMMISSIONING CONSULTANT to diligently direct the functional testing, any associated sub-contractors will be made available on an as-needed basis to demonstrate complete system operation according to the functional testing plans.
 - b. Excessive delays in the testing of the included systems due to construction issues or non-cooperation in the resolution of deficiencies will result in a request for additional fees plus expenses at the hourly rates subsequent to one allowable deficiency re-commissioning.
 - c. *Video and DVD production fees assume that training will be performed by the CONTRACTOR according to a pre-defined, sequential schedule. COMMISSIONING CONSULTANT must be provided notice of postponement 48 hours prior to the scheduled training. Subsequent postponements will result in a re-mobilization fee of \$1,200 per occurrence.*
 - d. The CONTRACTOR will provide all technician services requiring tools or the use of tools to test, adjust, or otherwise bring equipment into a full operational state.

**EXHIBIT B
FEE SCHEDULE**

FEE BASIS: The commissioning consulting fees for the project:

1.	Mechanical Systems	\$ 35,000
2.	Central Plant Systems	\$ 28,500
3.	Electrical Systems	\$ 14,000
4.	Plumbing Systems	\$ 4,500
5.	Life Safety Systems	\$ 26,500
6.	Miscellaneous Commissioning Tasks (All Systems Combined):	
a.	Design Review:	\$ 16,000
b.	Training Coordination:	\$ 6,000
c.	Video & DVD Production:	\$ 9,000
d.	O&M Manual/System Manual Coordination:	\$ 2,000
e.	Development of Systems Manuals:	\$ 3,500
TOTAL:		\$ 145,000

The fees outlined above are broken down by phase as previously defined as follows:

Fee Structure:	Man-hours	Blended Hrly Rate	Cost
<u>Design Commissioning (DC) Phase:</u> Including construction document review for commissionability and maintainability, assist in the development of design intent documentation, develop draft outline of commissioning plan, review sequences of operation, meetings, project administration, and generation of the Commissioning reports	107	150	\$16,000
<u>Document Development (DD) Phase:</u> Including development of the Commissioning Plan, preparation of the Pre-Functional Testing Checklists, preparation of Functional Performance Testing procedures, secondary review of submittals, meetings, project administration, and generation of the preliminary Commissioning reports	131	130	\$17,000
<u>Pre-Functional Testing Phase:</u> Includes witnessing of equipment startup, installation verification, test & balance execution, meetings, documentation and project administration required for this phase.	271	120	\$32,500
<u>Functional Testing Phase:</u> Execution of the functional testing procedures, documentation, meetings and project administration required for this phase.	352	115	\$40,500
<u>Commissioning Closeout Phase:</u> Includes generation and submission of final commissioning documentation, any specified O&M review, coordination of CITY training, video and editing of CITY training, development of Systems Manuals, 10 month pre-warranty expiration site visit, meetings and project administration required for this phase.	277	130	\$36,000
Reimbursable Expenses (travel, duplication, etc.)			3,000
Total:	1,138	127	145,000

HOURLY RATE SCHEDULE:

- 1. Principal \$170 / hr
- 2. Engineer/Project Manager:..... \$130 / hr
- 3. Technical Specialist:..... \$120 / hr
- 4. Commissioning Specialist: \$110 / hr
- 5. Expenses:..... At Cost

(Allowable expenses include: Vehicle mileage, airfare, lodging, auto rental, meals, equipment rental, courier, parking, telephone, copies, and shipping)

**EXHIBIT C
PROGRAM NARRATIVE**

Mechanical Engineering Program Narrative

Development of the mechanical systems focuses on five primary objectives. The systems must be environmentally friendly, satisfy the functional requirements of the building goals, comply with the required codes and standards, be energy efficient, and be easily maintainable. DESIGN CONSULTANT concentrated on mechanical systems that would meet these goals using the Leadership in Energy and Environmental Design (LEED) standards to create an energy efficient building.

Environmental Design Conditions

Site:	Chandler, Arizona
Latitude:	33 degrees
Longitude:	112 degrees
Elevation:	1117 feet above sea level

Outdoor Design Conditions

Summer Design Dry Bulb:	109 degrees
Summer Design Wet Bulb:	78 degrees
Winter Design Dry Bulb:	31 degrees

Indoor Design Conditions

Offices and General Spaces - Cooling: 75 degrees, no humidity control
- Heating: 70 degrees, no humidity control

The estimated HVAC load for the City Hall is 450 tons. This is based on the building being approximately 130,000 square feet total. The team will explore two mechanical systems to condition the building with the intent on providing the most energy efficient system. A water-cooled chilled water system will be the system of choice.

The chilled water central plant will consist of chiller(s) with an environmentally friendly refrigerant, cooling tower(s) and pump(s) with variable frequency drives for energy efficiency. The central plant will operate in a variable primary arrangement. The location of the central plant and redundancy options for equipment will be determined at a later time. The air-cooled chilled water system will require pump(s) and chiller(s) that will be located next to the building. In either system, chilled water piping will be routed to the variable air volume (VAV) central air handling unit(s) located on each floor. The air distribution from the air handling units will be underfloor.

In an underfloor system, depending on the size of the building and location of the mechanical rooms, ductwork may have to be extended from each central air handler to distribute the air properly across the floor plate. Individual floor grilles will be provided to supply the air to the space with terminal devices to serve the perimeter spaces. An overhead plenum will be used to return the air back to the core mechanical rooms. The building will be heated by electric heating coils located in the terminal devices at the perimeter. Separate fan coil units will be located in the areas where there will not be a raised floor, such as lobbies, bathrooms and electrical rooms.

As an alternate to the underfloor system, a traditional overhead system can be provided. This system will have medium pressure ductwork from the central air handling unit(s) to serve individual variable air volume terminal devices. These devices will serve the building through low pressure ductwork and diffusers. An overhead plenum will be used to return the air back to the core mechanical rooms. The building will be heated by electric heating coils located in the variable air volume terminal devices. Each variable air volume terminal device will constitute a separate thermostatically controlled zone. Separation of interior and exterior zones will be provided for optimum zone control.

The building's outside air system and exhaust air system will be designed to meet the code requirements and will be balanced to achieve an overall building pressure to minimize infiltration. Variable frequency drives will control the central air handling units, outside air systems, exhaust and relief air fans to reduce energy consumption. The elevator machine rooms will be served by a supplemental split system air conditioning system. A LON-works direct digital control (DDC) building management system will be provided for the buildings to control building HVAC systems. This system will tie into the City's existing central control system.

In an effort to obtain the maximum energy efficient LEED points, the team will explore the options of providing natural gas boilers or solar panels for building heat in lieu of electric heating coils and exhaust air energy recovery systems.

Plumbing Systems

A new 4" domestic water service will be provided. This will include a backflow preventer extended from the street to provide domestic hot and cold water to all restrooms, hand sinks, showers and other fixtures or connections. Water closets, urinals and drinking fountains will be wall mounted for ease of maintenance. Sinks will be counter or wall

mounted depending on application. The baseline option will be to provide storage type electric water heaters to provide domestic hot water for all sinks. To maximize the energy efficiency of the building, a central storage type gas-fired water heater(s) and solar technologies will be explored to provide domestic hot water. Fixtures, connections and layouts shall comply with the American with Disabilities Act (A.D.A.). A domestic water pump may be required for the building depending on the height of the building. Low flow fixtures will be selected where appropriate to reduce the water use of the building. This will include dual-flush valves for water closets, waterless or low flow urinals and low flow faucets and shower heads.

The sanitary sewer will be extended for a new 6" connection to service all domestic plumbing fixtures. A grey-water storage system will be researched reusing the waste water from the faucets and showers. Roof drains and overflow systems will collect rainwater from the roof areas and be extended to the civil and site storm drainage system. Rain water harvesting system will be investigated during the design.

Fire Protection

The wet fire suppression system will be served by an extension of the fire water mains to one fire riser with standpipe(s) located within the stairwell(s). System components will include reduced pressure backflow preventer, wet fire riser tied to the building fire alarm system, piping and sprinkler heads for adequate coverage and respective temperature ratings. A fire pump may be required for the building depending on the height of the building.

Electrical Engineering Program Narrative

The electrical systems design will concentrate on the following objectives: energy efficiency, sustainability, comply with all applicable codes and standards, fulfill the electrical functional requirements of the project, allow for future expansion and provide systems that will be easily maintainable.

Codes and Standards

The following codes and standards will be used as references for the basis of design for electrical systems:

- National Electrical Code (NEC).
- International Energy Code (IECC)
- Life Safety NFPA-101.
- Uniform Building Code (UBC).
- Building Officials & Code Administrator International, Inc. (BOCA).
- State and Local Codes.
- Salt River Project (SRP) Standards.

Electrical Site Utility Systems

The serving electrical utility company will be Salt River Project. Service to the site will be underground. The routing of the utility primary and pad mounted transformer(s) will be determined during the design phase of the project. Primary conduit, secondary conduit, trenching and concrete transformer pads will be provided under this contract. Meter, totalizing equipment, primary feeder conductors, secondary feeder conductors and pad mounted transformers will be provided by Salt River Project.

Exact routes and requirements to serve the buildings will be determined and indicated of the final construction documents.

The estimated electrical load for this facility will be determined during the design phase of the project.

Normal Power Distribution

Power will be distributed throughout the facility from a 277/480V -3Ph-4W service entrance. In general lighting, HVAC equipment, miscellaneous motors and heating loads will be served at 277/480V. General purpose receptacles and lab equipment will be served from 120/208V-3Ph-4W panelboards via dry type transformers. Transformers will be NEMA TP1 compliant.

Distribution panels and power panels will be circuit breaker-type and will be sized to accommodate the actual load as well as a projected additional 10% spare capacity, unless noted otherwise. Lighting and power panels will be

commercial-type with bolt-on circuit breakers. In general, Molded-case breakers will be used. Each panel will have a hinged door with a master-keyed flush tumbler latch. Selected panels will also have hinged trim to allow entire front cover to swing open for easy maintenance. In general, overcurrent protection devices will be selectively coordinated with supply side overcurrent protective devices. Circuit breakers will be fully rated except that series rated devices may be considered/limited to branch breakers and an upstream main within the same panel or switchboard. Bussing will be aluminum or copper.

Transformers will be provided to convert 480-volt power to 208Y/120 volts for receptacle, and equipment needs. Transformers will be standard high efficiency, NEMA STP TP1 dry-type rated for 115° C rise. Windings will be copper or aluminum. K-rated transformers will be utilized in areas where loads predominately consist of "non-linear" loads. Transformers rated 75 kVA or smaller may be wall or floor-mounted. Transformers rated 112.5 kVA or greater will be floor-mounted. Transformers will be located to keep maximum feeder length from the transformer to the 120-volt panels from exceeding 200 feet in order to keep the neutral to ground voltage differential at workstations and equipment within acceptable limits.

Each office shall have at a minimum a single duplex receptacle on each wall, coordinated with office furniture locations. Corridor receptacles shall be placed every forty feet on center. Restrooms shall each have a single GFCI receptacle. Storage rooms shall have at a minimum a single duplex receptacle placed near the door.

Disconnect switches will be heavy-duty type. Exterior switches will be rain-tight. Disconnect switches for packaged HVAC equipment will be fusible.

HVAC equipment will be controlled by VFD's, individual motor starters and motor starters mounted in motor control centers as determined by Div 15. Each magnetic motor starter will include a hand-off-auto (H-O-A) switch, auxiliary contacts, a control power transformer, and a motor running pilot light. Each starter will have a minimum inrush rating of 140% of that for a standard motor to meet the NEC requirement for use with energy efficient motors. Loose starter will be combination-type with an MCP.

Motor control centers may be provided for each major mechanical space. Motor control centers will be Class 1, Type B with motor circuit protectors. Bussing will be copper. Components will be rated for AIC. Starters will incorporate the features described above.

Transient voltage surge suppression will be provided at the main service entrance and at selected panels serving computers or sensitive equipment.

Emergency Power Distribution

An outdoor diesel-driven generator will be provided to accommodate emergency power for egress and exit lighting. It will also include standby power for selected areas and equipment as directed by the CITY to include but not limited to: computer systems, telephone equipment and any other items directed by CITY. An automatic transfer switch shall be provided for Life Safety and Optional Standby loads.

The alternate source for the emergency system will consist of one diesel engine genset, rating to be determined during the design phase of the project. The generator will be located outside in a WP enclosure with a residential silencer. An underground fuel tank will be provided in accordance with EPA guidelines sized for a capacity of 24 hours of fuel consumption at 100% load.

In general, emergency loads will be served from the emergency branches indicated in the following paragraphs:

The Life Safety Branch will consist of loads including egress lighting and exit signs, Fire Alarm, Security, IT, and automatic doors required for egress.

The Legally Required Standby Branch will serve the loads that when power is interrupted could create hazards or hamper rescue or fire-fighting operations.

The Optional Standby Branch will serve additional CITY requested systems and equipment desired to be on generator back up.

An Uninterruptible Power Supply will be provided for IT equipment. Individual smaller units will be provided in IDF's.

Lighting

Energy efficient luminaires will be provided throughout the facility. Closed and open office and like areas will be provided with high efficient, low glare indirect/direct pendant hung fluorescent fixtures.

Storage and unfinished areas will be provided with standard lensed troffers or industrial type fixtures.

Specialty luminaires will be provided as necessary in areas such as lobbies, entries and conference rooms.

Display lighting will be provided for special artifact areas.

Lighting will be controlled via a digitally controlled lighting control system. In general, occupancy sensors will be used throughout. Perimeter lighting in day lit areas will be controlled by photo sensors.

All required egress and exit lighting will be connected to the emergency generator. LED exit signs will be used for exit signage.

The lighting system design will consider occupant needs, visual tasks to be performed, the desired appearance of the respective space, infection control and energy/economic constraints. The lighting design will consider the Recommended Practices of the IES North America and energy codes.

Lighting fixture selection will consider visual comfort, appearance and energy efficient lamp and ballast sources. In general, T8 and T5 fluorescent lamp sources with electronic low THD ballasts will be used.

Adjustable dimmed downlights will be used in rooms where additional light function is required.

Lighting in non-occupied spaces will be controlled via occupancy sensors where applicable. Separate controls will be provided for day-lit areas. Photocell control with dimming ballasts will be considered for perimeter areas where substantial day lighting is available. As a minimum, bi-level switching will be utilized for local control. All other lighting will be controlled via local switching.

High Pressure Sodium Pole Mounted site lighting fixtures (maximum of 30') and building mounted luminaires at entrances and other appropriate locations along the building will be selected with attention given to dark sky sensitivity. Bollards may be added along the circulation path if required. Any areas/features that require high lighting will utilize metal halide directional fixtures. Exterior lighting will be photocell/time clock controlled.

Basic Electrical Materials

Raceway systems will generally consist of metal boxes interconnected with electrical metallic tubing (EMT). Poly-vinyl chloride (PVC) 40 will be used for underground installations. Rigid galvanized steel (RGS) conduit or intermediate metal conduit (IMC) will be used for exposed exterior work where subject to damage. The minimum conduit size for power wiring will be 3/4-inch. The minimum conduit size for communication raceways will be 1 in.

Conductors will be copper. Conductors for power circuits will be a minimum size of # 12. Insulation will be THWN or XHHW rated for 90° C; however, design will be based on 75° C ratings. Four-wire feeders, where neutral is considered a current-carrying conductor, will have an additional 80% derating. All conductors, including neutrals and grounding conductors, will be color-coded.

Wiring devices will be specification-grade, 20-ampere minimum, and color as selected. In general, device plates will be hi-impact nylon. Stainless-steel plates will be used in selected areas.

Wiring devices on emergency circuits will be red in color. Coverplates will be engraved with the with ¼" white letters to read, "EMERGENCY".

Grounding

The electrical power distribution system will be provided with a "single-point ground system." The ground bus at the main service equipment will be connected to the water service, a concrete-encased electrode, building perimeter ground ring, and building steel. The grounding system will be installed in strict accordance with NEC article 250. A grounding system as described in the SFO will be provided for the Telecommunications system.

All transformers will have the neutral of the derived system bonded to building steel, the nearest metal water pipe, and the transformer case. An insulated ground conductor will run back to the supply equipment in same raceway as the phase conductors.

An insulated equipment grounding conductor will be installed with feeders and branch circuits. Metal raceways, boxes, equipment, receptacles, and light fixtures will be bonded to the equipment grounding system.

Lightning Protection

A complete concealed lightning protection system will be provided. The system will have master label approval. Down conductors will be run in raceways concealed in the building structure. Detailed installation drawings will be provided by the system supplier.

Fire Alarm System

The facility will be provided with an intelligent microprocessor-based, addressable fire alarm system complete with addressable control relays. The system will have sensitivity monitoring and adjustment of all smoke detectors.

Addressable manual stations will be provided at each exit from the building and no more than 200 feet from any part of the building. Smoke detectors will be provided for elevator capture, HVAC system control, paths of egress, and other areas required by code.

Audible/visual evacuation signals will be visible in the evacuation path. Signals will be located no more than 10 feet from exit doors and no more than 100 feet on center in corridors. Signals will also be installed in toilets and common use areas. An additional signal will be located on the exterior of the building.

Where required, audible evacuation signals will be speakers with a pre-recorded voice evacuation message provided by the fire alarm system amplifier. Separate tones will be provided for fire evacuation and for weather-related evacuation. Visual signals will be strobes meeting ADA requirements. Small rooms will be equipped with mini strobes. Signals will be combined audible/visual assemblies, unless otherwise indicated.

HVAC systems will be provided with duct detectors as required by code. Relays will be provided to shut down each air handling unit in response to an alarm generated by its associated detector. Smoke dampers will be wired to dedicated 120-volt circuits from emergency panels. Circuits will be controlled by the fire alarm panel so damper close upon smoke detection at the serving air handling unit or in the space served.

Fire sprinkler system will be monitored for flow and valve position. The fire pump controller will be monitored for power availability, pump run status, and trouble conditions. All fire alarm wiring will be installed in raceways.

A stand alone digital fire alarm system with early warning capabilities will be provided to include the following: Fire alarm control panel, annunciator, booster panels, heat detectors in elevator machine room, pit, and top of shafts, Complete corridor smoke detector coverage, Smoke detectors at top of stair wells, Smoke detectors in high risk areas such as electrical rooms, IT rooms and computer rooms, Smoke detectors for elevator recall, Duct smoke detectors in air handling equipment over 2000CFM, Manual pull station at all exits and where required by code. Connection to fire protection sprinkler water flow alarm and tamper switches, Complete audio/visual coverage per NFPA-72 via ceiling mounted devices, Connection to central monitoring agency.

Security System

An Intrusion Detection System with a central monitoring station will be installed as directed by CITY. Card readers, door control, door monitoring, motion detection, cameras and other required security equipment will be provided at the following locations: selected exterior doors, Telecommunications MDF and IDF's, Main Staff Entrance and Computer Rooms as well as locations directed by the CITY. A Closed Circuit TV System will be provided for monitoring of selected areas and doors.

Teledata and Communications System

A structured cabling system shall be provided in compliance with EIA/TIA standards. Horizontal cabling systems will consist of Category 6A cabling and connectors or as directed by CITY's IT personnel. Backbone cabling will consist of multimode and single mode fiber optic cabling as directed by the CITY. Copper backbone cabling will be provided where required. Wire management systems, cable tray, equipment racks will be provided where required. The telephone system will be provided outside of this contract.

Telecom outlets consisting of a minimum of two Cat 6 connectors per outlet shall be installed for tele/data combination outlets in offices, workstations, lab spaces, and other areas as directed by the CITY. Each office shall have at a minimum two telecom receptacles installed in opposite walls, coordinated with office furniture locations.