

THE STATE OF TEXAS §
 §
COUNTY OF HARRIS §

4600007122
2006-1044

I. PARTIES

A. Address

THIS AGREEMENT FOR HEATING, VENTILATING, AND AIR CONDITIONING SYSTEMS AND ASSOCIATED PLUMBING, ELECTRICAL AND CONTROL SYSTEMS ("HVAC") OPERATIONS AND MAINTENANCE FOR THE HOUSTON AIRPORT SYSTEM ("Agreement") at George Bush Intercontinental Airport/Houston ("IAH"), William P. Hobby Airport ("HOU"), and Ellington Field ("EFD") is made on the date of countersignature by the City Controller ("Effective Date") between the **CITY OF HOUSTON, TEXAS ("City")**, a municipal corporation, and **TDINDUSTRIES, LTD. ("Contractor")**, a limited partnership corporation doing business in Texas.

The initial addresses of the parties, which one party may change by giving written notice to the other party, are as follows:

<u>City</u>	<u>Contractor</u>
Director, Houston Airport System or Designee City of Houston P.O. Box 60106 Houston, Texas 77205-01061	TDIndustries, Ltd. 13850 Diplomat Drive Dallas, TX 75234 Attention: Vice President, Facilities

The Parties agree as follows:

B. Table of Contents

This Agreement consists of the following sections:

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C. Parts Incorporated

The above-described sections and exhibits, the Request for Proposal for Heating/Ventilating/Air Conditioning (HVAC) Operations and Maintenance Service for the City of Houston Airport System ("RFP"), all Addenda and Letters of Clarification to the RFP, and Contractor's written responses to the RFP, Addenda and Letters of Clarification are incorporated into this Agreement.

D. Controlling Parts

If a conflict among the sections or exhibits arises, the exhibits control over the sections, and the sections and exhibits control over the RFP, Contractor's written responses to the RFP, Addenda and Letters of Clarification. If a conflict between the RFP and Contractor's written responses to the RFP and the Addenda and Letters of Clarification arises, the Addenda and Letters of Clarification control over the RFP and Contractor's written responses to the RFP. If a conflict between the RFP and Contractor's written responses to the RFP arises, the RFP controls over Contractor's written responses to the RFP.

E. Signatures

The Parties have executed this Agreement in multiple copies, each of which is an original.

ATTEST/SEAL (if a corporation):
WITNESS (if not a corporation):

TDINDUSTRIES, LTD.
"Contractor"

TDIndustries, Ltd.
By: TDIndustries Management, LLC
its general partner

By: _____
Name:
Title:
Tax Identification No: 75-0709436

By: W. Parten
Name: WILLIAM O. PARTEN
Title: VICE PRESIDENT

ATTEST/SEAL:

CITY OF HOUSTON, TEXAS
Signed by:

[Signature]
City Secretary

Bill White
Mayor
[Signature]

APPROVED:

[Signature]

Richard M. Vacar, A.A.E.
Director, Houston Airport System

APPROVED:

COUNTERSIGNED BY:

[Signature]
Purchasing Agent

[Signature]
City Controller [Signature]

APPROVED AS TO FORM:

DATE COUNTERSIGNED:

Rachel Suarez
Sr. Assistant City Attorney
L.D. File No. 0040600208004

10-18-06

II. DEFINITIONS

As used in this Agreement, the following terms have the meanings set out below:

"Acceptable" means that services, equipment, or performance, meet or exceed the requirements of this Agreement.

"Acceptance" shall be determined by the Director and occurs when the Director determines that the unit of Work specified under the Agreement is complete and acceptable.

"Acceptable Equivalent" means any equipment, part or product that complies with existing industry standards governing its manufacture or use, and that is a functional equivalent of any equipment, part, product or specification described herein, or, which functionally satisfies an approved, negotiated or specified use made a part hereof.

"Agreement" means this contract between the parties including all exhibits and any written amendments authorized by City Council and Contractor.

"Air Operations Area (AOA)" means any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operations area shall include such paved and unpaved areas that are used or intended to be used for unobstructed movement of aircraft in addition to its associated runway, taxi-way or apron.

"Airport(s)" mean George Bush Intercontinental Airport/Houston (IAH), William P. Hobby Airport (HOU), and Ellington Field (EFD).

"ASC" means the Airport Services Complex located at 4500 Will Clayton Parkway, at George Bush Intercontinental Airport/Houston.

"Basic Services" mean those services described in Exhibit "A" – Performance/Work Statement.

"Business Days" mean all days of a calendar year.

"City" is defined in Section I of this Agreement and includes its successors and assigns.

"Company or Contractor" is defined in Section I of this Agreement and includes its successors and assigns.

"Contract or Agreement" means the Agreement, RFP, Addenda, Letters of Clarification and written amendments authorized by City Council and Contractor or change orders authorized by this Agreement between the City and Contractor whereby Contractor shall provide all specified Work in connection with the Agreement, in the manner provided by the Agreement.

"Director" means the Director of the Houston Airport System or the City Purchasing Agent, or their designee in writing. The Agreement designates certain functions to be performed by the Director. For the purposes of the Agreement, those functions are assigned to the Assistant Director of Aviation, Technical Services Division. The Assistant Director of Aviation, Technical Service Division may delegate certain functions to other HAS employees, with the approval of the Director.

"EFD" means Ellington Field.

"Equipment" means all machinery, together with the necessary supplies for upkeep and maintenance, and also all tools and apparatus necessary for the proper and acceptable completion of the specified Work.

"First Class Condition" refers to the quality of systems, parts, equipment and related components and appurtenances including replacements ("elements"). It also refers to the condition of the wear and operation of the elements. When referring to the quality of the elements, First Class Condition means of a quality equal to or better than the elements as originally installed. When referring to the wear and operation of the elements, First Class Condition means a standard that is within the manufacturer's published tolerances for safe, reliable operation, or if no published tolerances, within generally accepted tolerances within the HVAC and equipment maintenance industry.

"Furnish" means to supply and deliver to the appropriate Airport site, ready for unloading, unpacking, assembly, installation, use, etc., as applicable in each instance, except as otherwise defined in greater detail.

"HOU" means William P. Hobby Airport.

"Houston Airport System (HAS)" means the property and facilities of the City of Houston Department of Aviation which include, but are not limited to, George Bush Intercontinental Airport/Houston (IAH), William P. Hobby Airport (HOU), Ellington Field (EFD), and the Houston Airport System Administration Buildings.

"HVAC SYSTEMS" means heating, ventilating, air conditioning systems and all associated plumbing, electrical, and control systems.

"Include" and "Including" and words of similar import, shall be deemed to be followed by the words "without limitation".

"IAH" means George Bush Intercontinental Airport/Houston.

"Maintenance Facilities" means the shop and office facilities the City provides to the Contractor. Such facilities are provided at each of the Airports.

"Maintenance Service" means both Preventive Maintenance and Remedial Maintenance.

"Major Equipment" means large mechanical and electrical machinery or apparatus including specifically electric and steam driven chillers, steam condensers, boilers, cooling towers, steam/hot water converters, deaerators, chilled and condenser water pumps within Central Plant systems, and related electrical switchboards and motor control centers, plus major parts of the above including, but not limited to, compressors, speed reducers and increasers, motors, heat exchangers, and related electrical switches and starters. For the purpose of providing Major Equipment Failure Insurance coverage pursuant to the terms of this Agreement, major equipment shall specifically exclude other mechanical and electrical machinery powered by motors of less than 100 horsepower, other heat exchangers and systems components, and appurtenances.

"Manufacturer" means the original manufacturer or producer of a part or component.

"Materials" means any substance specified for use in the accomplishment of the Work.

"Notice to Proceed" means a written communication from the Director to Contractor instructing Contractor to begin performance.

"OEM" means the Original Equipment Manufacturer.

"Other Service Request (OSR)" is the form used to request Other Work/Services within the scope of this Agreement.

"Other Work/Services" means those services described in Exhibit "A" – Performance/Work Statement and Exhibit "B" – Fee Schedule as Other Work/Services and other services related to operations and maintenance services, other than Basic Services. Such services are only provided upon the Director's written request.

"Overtime" is defined as being between the hours of 5:01 p.m. through 7:59 a.m.: Monday through Friday and any time Saturday, Sunday or during City holidays.

"Pavement" the combined concrete surface, base course, and sub-base course, if any, considered as a single unit.

"Preventive Maintenance (PM)" The activities focus on scheduled maintenance activities recommended by the manufacturer and by industry best practice standards. They include proper inspections, proper lubrication, belts, filter changes, proper fastening procedures, determined by regularly scheduled work, etc. Preventive maintenance activities should be so effective that at least 80 to 90% of all maintenances activities occur on a planned and scheduled basis.

"Predictive Maintenance (PdM)" – Predictive Maintenance (PdM) is a carefully planned system of machinery analysis and diagnostics. (PdM) provides machinery "health condition: information, which prompts timely, corrective action". The expected result: optimum machine productivity, extended machine life, and reduced maintenance costs.

"Provide" means furnish and install, complete, and ready for intended use, as applicable in each instance, except as otherwise defined in greater action.

"Reliability Centered Maintenance (RCM)" – The application of predictive and preventive maintenance data to the preventive maintenance tasks. The process provides statistical method (s) of optimizing the preventive maintenance and predictive maintenance programs for the HVAC SYSTEMS with the goal of maximizing the component/equipment's availability and performance at the lowest life-cycle cost.

"Remedial Maintenance (RM)" means repair of equipment and systems with parts, materials, and labor to restore performance to the designed function in the event of any breakdown or stoppage of equipment or system where the equipment or system is unable to perform its designed function. RM includes repairs and replacement of related components, parts, and appurtenances that have failed, no longer perform reliably, or have worn beyond safe tolerances.

"Repair" means to restore to good or sound working condition.

"Response Time" means the maximum elapsed time in which Contractor must respond to an Emergency Service Request. The maximum elapsed time is measured from Contractor's receipt of an Emergency Service Request to Contractor's arrival at the specified work site.

"Routine" means those services that do not require emergency condition.

"Schedule" the planned periods of time the Contractor shall be allowed to perform contract Work on the pavement as determined by the Director and local airfield requirements.

"Service" means to provide the labor, tools, equipment, and all items required to minimize maintenance requirements and ensure proper systems and equipment performance based on manufacturer's recommended procedures including, but not limited to, lubricating rotating equipment, changing filters, cleaning drains, verification of proper performance and calibration of controls and measurements devices, verifying proper operation of equipment and making adjustments in operating conditions, including operating positions and set points, pressures, and fluids.

"Straight Time" is defined as being between the hours of 8:00 a.m. through 5:00 p.m.; Monday through Friday.

"Taxiway" means the portion of the Air Operations Area of an Airport that has been designated by the HAS for movement of aircraft to and from the Airport's runways and aircraft parking areas.

"Urgent Service Request" is defined as a non-remedial maintenance request for immediate action. An urgent service request may be issued outside of Normal Business Hours, in which case additional labor charges will apply. (Exhibit "A" – Performance/Work Statement)

"Work" all services to be provided by the Contractor under this Agreement.

III. DUTIES OF CONTRACTOR

A. Scope of Services

In consideration of the payment specified in this Agreement, Contractor shall provide all labor, supervision, parts, equipment, materials, tools, instruments, expendable items, supplies, reports, transportation, insurance, subcontracts, bonds, and incidentals necessary to perform the Basic Services and, if requested, Other Work/Services described in the Performance/Work Statement set forth in Exhibit "A". Contractor shall not be paid for travel time to and from the job site.

B. Duty to Inspect

Contractor represents that it or its agent has inspected all sites affected by this Agreement and that it is not entitled to additional compensation for its failure to accurately account for all of the work required to be performed under this Agreement.

C. Invoicing

Contractor shall submit its invoices on forms approved in advance by the Director. Each invoice must be accompanied by support documents as may be requested by the Director. Each invoice Contractor

submits must be in duplicate and each copy must include required support documents. Each invoice must be identified by the Contract name and Contractor number. All invoices are to be delivered or mailed to the following location:

The City of Houston
Houston Airport System
Accounts Payable Section
P.O. Box 60106
Houston, Texas 77205-0106

D. Payment of Subcontractors

Contractor shall make timely payments to all persons and entities supplying labor, materials, services, or equipment for the performance of this Agreement. CONTRACTOR SHALL DEFEND AND INDEMNIFY THE CITY FROM ANY CLAIMS OR LIABILITY ARISING OUT OF CONTRACTOR'S FAILURE TO MAKE THESE PAYMENTS. Contractor shall submit disputes relating to payment of MWBE subcontractors to arbitration in the same manner as any other disputes under the MWBE subcontract.

E. Personnel of Contractor

Contractor shall provide sufficient, fully qualified personnel to meet the performance requirements set forth in Exhibit "A". Contractor shall replace any of its personnel or subcontractors whose work product is deemed unsatisfactory by the Director.

F. RELEASE

EXCEPT FOR THE CITY'S GROSS NEGLIGENCE OR WILFUL MISCONDUCT, CONTRACTOR AGREES TO AND SHALL RELEASE THE CITY, ITS AGENTS, EMPLOYEES, OFFICERS, AND LEGAL REPRESENTATIVES (COLLECTIVELY THE "CITY") FROM ALL LIABILITY FOR INJURY, DEATH, DAMAGE, OR LOSS TO PERSONS OR PROPERTY SUSTAINED IN CONNECTION WITH OR INCIDENTAL TO PERFORMANCE UNDER THIS AGREEMENT, EVEN IF THE INJURY, DEATH, DAMAGE, OR LOSS IS CAUSED BY THE CITY'S SOLE OR CONCURRENT NEGLIGENCE AND/OR THE CITY'S STRICT PRODUCTS LIABILITY OR STRICT STATUTORY LIABILITY.

G. INDEMNIFICATION

CONTRACTOR AGREES TO AND SHALL DEFEND, INDEMNIFY, AND HOLD THE CITY, ITS AGENTS, EMPLOYEES, OFFICERS, AND LEGAL REPRESENTATIVES (COLLECTIVELY THE "CITY") HARMLESS FOR ALL CLAIMS, CAUSES OF ACTION, LIABILITIES, FINES, AND EXPENSES (INCLUDING, WITHOUT LIMITATION, ATTORNEYS' FEES, COURT COSTS, AND ALL OTHER DEFENSE COSTS AND INTEREST) FOR INJURY, DEATH, DAMAGE, OR LOSS TO PERSONS OR PROPERTY SUSTAINED IN CONNECTION WITH OR INCIDENTAL TO PERFORMANCE UNDER THIS AGREEMENT INCLUDING, WITHOUT LIMITATION, THOSE CAUSED BY:

- (1) **CONTRACTOR'S AND/OR ITS AGENTS', EMPLOYEES', OFFICERS', DIRECTORS', CONTRACTORS', OR SUBCONTRACTORS' (COLLECTIVELY IN NUMBERED**

- PARAGRAPHS 1-3, "CONTRACTOR") ACTUAL OR ALLEGED NEGLIGENCE OR INTENTIONAL ACTS OR OMISSIONS;
- (2) THE CITY'S AND CONTRACTOR'S ACTUAL OR ALLEGED CONCURRENT NEGLIGENCE, WHETHER CONTRACTOR IS IMMUNE FROM LIABILITY OR NOT; AND
 - (3) THE CITY'S AND CONTRACTOR'S ACTUAL OR ALLEGED STRICT PRODUCTS LIABILITY OR STRICT STATUTORY LIABILITY, WHETHER CONTRACTOR IS IMMUNE FROM LIABILITY OR NOT.

CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD THE CITY HARMLESS DURING THE TERM OF THIS AGREEMENT AND FOR FOUR YEARS AFTER THE AGREEMENT TERMINATES. CONTRACTOR'S INDEMNIFICATION IS LIMITED TO \$1,000,000 PER OCCURRENCE. CONTRACTOR SHALL NOT INDEMNIFY THE CITY FOR THE CITY'S SOLE NEGLIGENCE.

CONTRACTOR SHALL REQUIRE ALL OF ITS SUBCONTRACTORS (AND THEIR SUBCONTRACTORS) TO RELEASE AND INDEMNIFY THE CITY TO THE SAME EXTENT AND IN SUBSTANTIALLY THE SAME FORM AS ITS RELEASE AND INDEMNITY TO THE CITY.

H. RELEASE AND INDEMNIFICATION - PATENT, COPYRIGHT, TRADEMARK, AND TRADE SECRET INFRINGEMENT

CONTRACTOR AGREES TO AND SHALL RELEASE AND DEFEND, INDEMNIFY, AND HOLD HARMLESS THE CITY, ITS AGENTS, EMPLOYEES, OFFICERS, AND LEGAL REPRESENTATIVES (COLLECTIVELY THE "CITY") FROM ALL CLAIMS OR CAUSES OF ACTION BROUGHT AGAINST THE CITY BY ANY PARTY, INCLUDING CONTRACTOR, ALLEGING THAT THE CITY'S USE OF ANY EQUIPMENT, SOFTWARE, PROCESS, OR DOCUMENTS CONTRACTOR FURNISHES DURING THE TERM OF THIS AGREEMENT INFRINGES ON A PATENT, COPYRIGHT, OR TRADEMARK, OR MISAPPROPRIATES A TRADE SECRET. CONTRACTOR SHALL PAY ALL COSTS (INCLUDING, WITHOUT LIMITATION, ATTORNEYS' FEES, COURT COSTS, AND ALL OTHER DEFENSE COSTS, AND INTEREST) AND DAMAGES AWARDED.

CONTRACTOR SHALL NOT SETTLE ANY CLAIM ON TERMS WHICH PREVENT THE CITY FROM USING THE EQUIPMENT, SOFTWARE, PROCESS, AND DOCUMENTS WITHOUT THE CITY'S PRIOR WRITTEN CONSENT.

WITHIN 60 DAYS AFTER BEING NOTIFIED OF THE CLAIM, CONTRACTOR SHALL, AT ITS OWN EXPENSE, EITHER (1) OBTAIN FOR THE CITY THE RIGHT TO CONTINUE USING THE EQUIPMENT, SOFTWARE, PROCESS, AND DOCUMENTS OR, (2) IF BOTH PARTIES AGREE, REPLACE OR MODIFY THEM WITH COMPATIBLE AND FUNCTIONALLY EQUIVALENT PRODUCTS. IF NONE OF THESE ALTERNATIVES IS REASONABLY AVAILABLE, THE CITY MAY RETURN THE EQUIPMENT, SOFTWARE, OR DOCUMENTS, OR DISCONTINUE THE PROCESS, AND CONTRACTOR SHALL REFUND THE PURCHASE PRICE.

I. INDEMNIFICATION PROCEDURES

- (1) Notice of Claims. If the City or Contractor receives notice of any claim or circumstances which could give rise to an indemnified loss, the receiving party shall give written notice to the other party within 10 days. The notice must include the following:
- (a) a description of the indemnification event in reasonable detail,
 - (b) the basis on which indemnification may be due, and
 - (c) the anticipated amount of the indemnified loss.

This notice does not estop or prevent the City from later asserting a different basis for indemnification or a different amount of indemnified loss than that indicated in the initial notice. If the City does not provide this notice within the 10 day period, it does not waive any right to indemnification except to the extent that Contractor is prejudiced, suffers loss, or incurs expense because of the delay.

(2) Defense of Claims

- (a) Assumption of Defense. Contractor may assume the defense of the claim at its own expense with counsel chosen by it that is reasonably satisfactory to the City. Contractor shall then control the defense and any negotiations to settle the claim. Within 10 days after receiving written notice of the indemnification request, Contractor must advise the City as to whether or not it will defend the claim. If Contractor does not assume the defense, the City shall assume and control the defense, and all defense expenses constitute an indemnification loss.
- (b) Continued Participation. If Contractor elects to defend the claim, the City may retain separate counsel to participate in (but not control) the defense and to participate in (but not control) any settlement negotiations. Contractor may settle the claim without the consent or agreement of the City, unless it (i) would result in injunctive relief or other equitable remedies or otherwise require the City to comply with restrictions or limitations that adversely affect the City, (ii) would require the City to pay amounts that Contractor does not fund in full, (iii) would not result in the City's full and complete release from all liability to the plaintiffs or claimants who are parties to or otherwise bound by the settlement.

J. Insurance

Contractor shall maintain in effect certain insurance coverage, which is described as follows:

- (1) Minimum Insurance Requirements. Contractor shall maintain the following insurance coverage in the following amounts:

_____ (Coverage)

_____ (Limit of Liability)

Workers' Compensation

Statutory for Workers' Compensation

Employer's Liability

Bodily Injury by accident \$500,000 (each accident)
Bodily Injury by Disease \$500,000 (policy limit)
Bodily Injury by Disease \$500,000 (each employee)

Commercial General Liability:
Including Broad Form Coverage,
Contractual Liability, Bodily and
Personal Injury, and Completed
Operations

Bodily Injury and Property
Damage, Combined Limits of
\$2,000,000 each Occurrence
and \$4,000,000 aggregate

Automobile Liability Insurance
(for vehicles Contractor
uses in performing under this
Agreement, including Employer's
Non-Owned and Hired Auto
Coverage)

\$1,000,000 combined single limit

Defense costs are excluded from the face amount of the policy.
Aggregate Limits are per 12-month policy period
unless otherwise indicated.

- (2) Form of Policies. The Director may approve the form of the insurance policies, but nothing the Director does or fails to do relieves Contractor from its duties to provide the required coverage under this Agreement. The Director's actions or inactions do not waive the City's rights under this Agreement.
- (3) Issuers of Policies. The issuer of any policy (1) shall have a Certificate of Authority to transact insurance business in Texas or (2) shall be an eligible non-admitted insurer in the State of Texas and have a Best's rating of at least B+ and a Best's Financial Size Category of Class VI or better, according to the most current edition Best's Key Rating Guide.
- (4) Insured Parties. Each policy, except those for Workers' Compensation, Employer's Liability, and Professional Liability, must name the City (and its officers, agents, and employees) as Additional Insured parties on the original policy and all renewals or replacements.
- (5) Deductibles. Contractor shall be responsible for and pay any claims or losses to the extent of any deductible amounts and waives any claim it may have for the same against the City, its officers, agents, or employees.
- (6) Cancellation. Each policy must state that it may not be canceled, materially modified, or nonrenewed unless the insurance company gives the Director 30 days' advance written notice. Contractor shall give written notice to the Director within five days of the date on which total claims by any party against Contractor reduce the aggregate amount of coverage below the amounts required by this Agreement. In the alternative, the policy may contain an endorsement establishing a policy aggregate for the particular project or location subject to this Agreement.
- (7) Subrogation. Each policy, except Professional Liability (if any), must contain an endorsement to the effect that the issuer waives any claim or right of subrogation to recover against the City, its officers, agents, or employees.

- (8) Endorsement of Primary Insurance. Each policy, except Workers' Compensation and Professional Liability (if any), must contain an endorsement that the policy is primary to any other insurance available to the Additional Insured with respect to claims arising under this Agreement.
- (9) Liability for Premium. Contractor shall pay all insurance premiums, and the City shall not be obligated to pay any premiums.
- (10) Subcontractors. Contractor shall require all subcontractors to carry insurance naming the City as an additional insured and meeting all of the above requirements except amount. The amount must be commensurate with the amount of the subcontract, but in no case less than \$500,000 per occurrence. Contractor shall provide copies of insurance certificates to the Director.
- (11) Proof of Insurance.

(a) Prior to execution of this Agreement, Contractor shall furnish the Director with Certificates of Insurance, along with an Affidavit from Contractor confirming that the Certificates accurately reflect the insurance coverage maintained. If requested in writing by the Director, Contractor shall furnish the City with certified copies of Contractor's actual insurance policies.

(b) Contractor shall continuously and without interruption, maintain in force the required insurance coverages specified in this Section. If Contractor does not comply with this requirement, the Director, at his or her sole discretion, may

- (1) immediately suspend Contractor from any further performance under this Agreement and begin procedures to terminate for default, or
- (2) purchase the required insurance with City funds and deduct the cost of the premiums from amounts due to Contractor under this Agreement.

The City shall never waive or be estopped to assert its right to terminate this Agreement because of its acts or omissions regarding its review of insurance documents.

(12) Other Insurance. If requested by the Director, Contractor shall furnish adequate evidence of Social Security and Unemployment Compensation Insurance, to the extent applicable to Contractor's operations under this Agreement.

K. Warranties

Contractor warrants that it shall perform all work in a good and workmanlike manner meeting the standards of quality prevailing in Harris County, Texas, for work of this kind. Contractor shall perform all work using trained and skilled persons having substantial experience performing the work required under this Agreement.

With respect to any parts, instruments, equipment, and goods it furnishes, Contractor warrants:

- (1) that all items are free of defects in title, design, material, and workmanship,
- (2) that each item meets or exceeds the manufacturer's specifications and requirements for the equipment, structure, or other improvement in which the item is installed,

- (3) that each replacement item is new, in accordance with original equipment manufacturer's specifications, and of a quality at least as good as the quality of the item which it replaces (when the replaced item was new),
- (4) that no items or their use infringe any patent, copyright, or other proprietary rights. In the event Contractor becomes aware of such an infringement, Contractor will replace the items that are the subject of the infringement with non-infringing items in a timely manner; and
- (5) that for one year from the date of any installation ("Warranty Period"), Contractor shall provide all parts, instruments, equipment, and goods required to complete all Preventive and Remedial Maintenance required under this Agreement at no cost to the City. This warranty is in addition to Contractor's obligation to provide Basic Services under this Agreement. When the manufacturer's warranty period for any parts, instruments, equipment, and goods is greater than 1 year, the longer period prevails.

Contractor shall manage and enforce on the City's behalf all manufacturer warranties issued before the Effective Date of this Agreement, during the Term of this Agreement, and any extensions. Contractor shall not be entitled to any additional compensation for the management and enforcement of these manufacturer warranties. If Contractor does not exhaust all remedies, including litigation, against a manufacturer who fails to honor all or a part of a warranty, it shall not receive additional compensation from the City for the labor and material costs it incurs to repair or replace the item that otherwise would have been under warranty.

L. Maintenance Audit

- (1) At any time during the term of this Agreement or any extensions, the Director, without notice to the Contractor and at HAS' expense, may provide for a third party maintenance audit. Contractor shall rectify any deficiencies in performance discovered by such audit for which Contractor is responsible to the Director's satisfaction at no cost to the City within 10 days of receipt of a notice of any deficiency. Further, the Contractor shall provide the Director with a written explanation for such deficiency in performance and a plan to prevent future deficiencies within 15 days of receipt of such notice. Failure of the Contractor to timely rectify the deficiency or provide the written explanation and plan to the Director shall be grounds for termination for cause as provided in Section V.
- (2) At any time during the term of this Agreement or any extensions, the Director, without notice to the Contractor, may conduct his own inspections of Contractor's work performance, equipment, inventory, logs and work sites. Contractor shall rectify any deficiencies discovered by such inspection to the Director's satisfaction within 10 days of receipt of a notice of any such deficiency at no cost to the City if caused by the Contractor or its subcontractors.

M. Confidentiality

Contractor, its agents, employees, contractors, and subcontractors shall hold all City information, data, and documents (collectively, "the Information") that they receive, prepare, or to which they have access, in strictest confidence. Contractor, its agents, employees, contractors, and subcontractors shall not disclose, disseminate, or use the Information unless the Director authorizes it in writing. Contractor shall establish procedures to ensure confidentiality of the Information and to prevent its unauthorized use and

disclosure. Contractor shall obtain written agreements from its agents, employees, contractors, and subcontractors who perform work under this Agreement, which bind them to the terms in this paragraph.

N. Use of Work Products

Contractor conveys and assigns to the City its entire interest and full ownership worldwide in and to any work, invention, and all Documents, and the copyrights, patents, trademarks, trade secrets, and any other proprietary rights therein (collectively "Proprietary Rights") that Contractor, its agents, employees, contractors, and subcontractors (collectively "Authors") develop, write, or produce under this Agreement (collectively "Works").

The Authors shall not claim or exercise any Proprietary Rights related to the Works. If requested by the Director, Contractor shall place a conspicuous notation on any Works which indicates that the City owns the Proprietary Rights.

Contractor shall execute all documents required by the Director to further evidence this assignment and ownership. Contractor shall cooperate with the City in registering, creating, and enforcing Proprietary Rights arising under this Agreement. If Contractor's assistance is requested and rendered under this Section, the City shall reimburse Contractor for all out-of-pocket expenses it incurs in rendering assistance, subject to the availability of funds. On termination of this Agreement, or if requested by the Director, Contractor shall deliver all Works to the City. Contractor shall obtain written agreements from the Authors which bind them to the terms in this Section.

All Works developed, written, or produced under this Agreement for use as a contribution to a collective work; a part of a motion picture or other audiovisual work; a translation; a supplementary work; a compilation; an instructional text; a test; answer material for a test; or an atlas, are "works made for hire."

Contractor may retain copies of the Works for its archives. Contractor shall not otherwise use, sell, license, or market the Works.

O. Licenses and Permits

Contractor shall obtain, maintain, and pay for all licenses, permits, and certificates including all professional licenses required by this Agreement, any statute, ordinance, rule, or regulation. This requirement includes, without limitation, certification of the on-site technicians. Contractor shall immediately notify the Director of any suspension, revocation, or other detrimental action against required licenses or certifications.

P. Compliance with Laws

Contractor shall comply with all applicable state and federal laws and regulations; the City Charter and Code of Ordinances; and HAS' rules and regulations.

Q. Compliance with Equal Opportunity Ordinance

Contractor shall comply with the City's Equal Employment Opportunity Ordinance as set out in Exhibit "C."

R. Minority and Women Business Enterprises

It is the City's policy to ensure that Minority and Women Business Enterprises ("MWBEs") have the full opportunity to compete for and participate in City contracts. The objectives of Chapter 15, Article V of the City of Houston Code of Ordinances, relating to City-wide Percentage Goals for contracting with MWBEs, are incorporated into this Agreement.

Contractor shall make good faith efforts to award subcontracts or supply agreements in at least 12% of the value of this Agreement to MWBEs. The City's policy does not require Contractor to in fact meet or exceed this goal, but it does require Contractor to objectively demonstrate that it has made good faith efforts to do so. To this end, Contractor shall maintain records showing:

- (1) subcontracts and supply agreements with Minority Business Enterprises,
- (2) subcontracts and supply agreements with Women's Business Enterprises, and
- (3) specific efforts to identify and award subcontracts and supply agreements to MWBEs. Contractor shall submit periodic reports of its efforts under this Section to the Affirmative Action Director in the form and at the times he or she prescribes.

Contractor shall require written subcontracts with all MWBE subcontractors and suppliers and shall submit all disputes with MWBE subcontractors to binding arbitration in Houston, Texas, if directed to do so by the Affirmative Action Director. All agreements must contain the terms set out in Exhibit "D." If Contractor is an individual person (as distinguished from a corporation, partnership, or other legal entity), and the amount of the subcontract is \$50,000 or less, then the subcontract must also be signed by the attorneys of the respective parties.

S. Performance Bond

Contractor shall furnish and maintain a performance bond for \$1,000,000 conditioned on Contractor's full and timely performance of the Agreement (and payment of subcontractors). If the City exercises any option period, Contractor shall maintain a Performance Bond in the amount of \$1,000,000 for the option period exercised. The bond must be in substantially the form attached as Exhibit "E" and issued by a corporate surety authorized and admitted to write surety bonds in Texas. If the amount of the bond exceeds \$100,000, the surety must be listed on the current list of accepted sureties on federal bonds published by the United States Treasury Department or reinsured for any liability in excess of \$100,000 by a reinsurer listed on the U.S. Treasury list.

T. Drug Abuse Detection and Deterrence

- (1) It is the policy of the City to achieve a drug-free workforce and workplace. The manufacture, distribution, dispensation, possession, sale, or use of illegal drugs or alcohol by contractors while on City Premises is prohibited. Contractor shall comply with all the requirements and procedures set forth in the Mayor's Drug Abuse Detection and Deterrence Procedures for Contractors, Executive Order No. 1-31 ("Executive Order"), which is incorporated into this Agreement and is on file in the City Secretary's Office.
- (2) Before the City signs this Agreement, Contractor shall file with the Contract Compliance Officer for Drug Testing ("CCODT"),

- (a) a copy of its drug-free workplace policy,
- (b) the Drug Policy Compliance Agreement substantially in the form set forth in Exhibit "F," together with a written designation of all safety impact positions and,
- (c) if applicable (e.g. no safety impact positions), the Certification of No Safety Impact Positions, substantially in the form set forth in Exhibit "G."

If Contractor files a written designation of safety impact positions with its Drug Policy Compliance Agreement, it also shall file every 6 months during the performance of this Agreement or on completion of this Agreement if performance is less than 6 months, a Drug Policy Compliance Declaration in a form substantially similar to Exhibit "H". Contractor shall submit the Drug Policy Compliance Declaration to the CCODT within 30 days of the expiration of each 6-month period of performance and within 30 days of completion of this Agreement. The first 6-month period begins to run on the date the City issues its Notice to Proceed or if no Notice to Proceed is issued, on the first day Contractor begins work under this Agreement.

- (3) Contractor also shall file updated designations of safety impact positions with the CCODT if additional safety impact positions are added to Contractor's employee work force.
- (4) Contractor shall require that its subcontractors comply with the Executive Order and Contractor shall secure and maintain the required documents for City inspection.

U. Environmental Laws

Contractor shall comply with all rules, regulations, statutes, or orders of the Environmental Protection Agency ("EPA"), the Texas Commission on Environmental Quality ("TCEQ"), and any other governmental agency with the authority to promulgate environmental rules and regulations ("Environmental Laws). Contractor shall promptly reimburse the City for any fines or penalties levied against the City because of Contractor's failure to comply.

Contractor shall not possess, use, generate, release, discharge, store, dispose of, or transport any Hazardous Materials on, under, in, above, to, or from the site except in strict compliance with the Environmental Regulations. "Hazardous Materials" mean any substances, materials, or wastes that are or become regulated as hazardous or toxic substances under any applicable federal, state, or local laws, regulations, ordinances, or orders. Contractor shall not deposit oil, gasoline, grease, lubricants, or any ignitable or hazardous liquids, materials, or substances in the City's storm sewer system or sanitary sewer system or elsewhere on City Property in violation of the Environmental Laws.

V. Airport Security

Contractor shall comply with all HAS, TSA, FAA and any other governmental agency security directives, rules and regulations. The FAA and/or the TSA may assess fines and/or penalties for Contractor's non-compliance with the provisions of 49 CFR 1540 and 1542, as amended from time to time, or by other agencies for noncompliance with laws or regulations applicable to Contractor's operations. Within 10 days of notification in writing, Contractor shall reimburse the City for any fine or penalty assessed against the City because of Contractor's non-compliance with 49 CFR 1540 and 1542 or other applicable laws or regulations.

W. Conflicts of Interest

If a potential or actual conflict of interests arises between the City's interests and the interests of other clients Contractor represents, Contractor shall immediately notify the City Attorney and Mayor by fax transmission or telephone and request consent. The City shall be deemed to consent to the conflict unless the Mayor or City Attorney sends a written notice that the City declines to consent within 3 business days after the City receives the notice. If the City does not consent, Contractor shall immediately take steps to resolve the conflict.

IV. DUTIES OF CITY

A. Payment Terms

- (1) Subject to all the terms and conditions of this Agreement, the City shall pay to Contractor, and Contractor accepts the fees specified in Exhibit "B," Fee Schedule, for all work provided by Contractor and its subcontractors under this Agreement. If hourly rates and fees for Other Work/Services are not stated in Exhibit "B", the rates will be based on the Parties' written agreement, which must be established in accordance with the terms of this Agreement. All such rates and fees must be ordinary and reasonable for the type of work performed.
- (2) If the City pays Contractor for work performed by any subcontractor or for parts, supplies, equipment, or materials provided by any supplier, and Contractor withholds or has withheld payment to the subcontractor or supplier because of a deficiency in the quality or quantity of that subcontractor's or supplier's work or materials, the City may withhold a corresponding amount from any pending or future payments to Contractor until the next regular payment to Contractor occurring after the City receives reasonable documentation that the deficiency has been remedied.
- (3) All invoices are subject to approval by the Director and are due and payable on or about 30 days after receipt and approval by the Director. All payments must be made by check made payable to Contractor. The City will not unreasonably delay or withhold payment or approval of any invoice. Neither payments made nor approval of invoices or services by the Director shall be construed as final acceptance or approval of that part of Contractor's services to which such payment or approval relates. Such payments do not relieve Contractor of any of its obligations under this Agreement.

B. Taxes

The City is exempt from payment of Federal Excise and Transportation Tax and Texas Limited Sales and Use Tax. Contractor's invoices to the City must not contain assessments of any of these taxes. The Director will furnish the City's exemption certificate and federal tax identification number to Contractor if requested.

C. Method of Payment - Disputed Payments

If the City disputes any items in an invoice Contractor submits for any reason, including lack of supporting documentation, the Director shall temporarily delete the disputed item and pay the remainder of the invoice. The Director shall promptly notify Contractor of the dispute and request remedial action.

After the dispute is settled, Contractor shall include the disputed amount on a subsequent regularly scheduled invoice or on a special invoice for the disputed item only.

D. Limit of Appropriation

- (1) The City's duty to pay money to Contractor for any purpose under this Agreement is limited in its entirety by the provisions of this Section.
- (2) In order to comply with Article II, Sections 19 and 19a of the City's Charter and Article XI, Section 5 of the Texas Constitution, the City has appropriated and allocated the sum of \$3,613,814.67 to pay money due under this Agreement (the "Original Allocation"). The executive and legislative officers of the City, in their discretion, may allocate supplemental funds for this Agreement, but they are not obligated to do so. Therefore, the parties have agreed to the following procedures and remedies.
- (3) The City makes a supplemental allocation by sending a notice signed by the Director and the City Controller to Contractor and, where in excess of the amount specified in Paragraph (4) below, approved by motion or ordinance of City Council in substantially the following form:

"NOTICE OF SUPPLEMENTAL ALLOCATION OF FUNDS"

TO: [Name of Contractor]

FROM: City of Houston, Texas (the "City")

DATE: [Date of notice]

SUBJECT: Supplemental allocation of funds for the purpose of the "[title of this Agreement]" between the City and (name of Contractor) countersigned by the City Controller on (Date of Countersignature) (the "Agreement").

I, (name of City Controller), City Controller of the City of Houston, certify that the supplemental sum of \$_____, upon the request of the below-signed Director, has been allocated for the purposes of the Agreement out of funds appropriated for this purpose by the City Council of the City of Houston. This supplemental allocation has been charged to such appropriation.

The aggregate of all sums allocated for the purpose of such Agreement, including the Original Allocation, and all supplemental allocations (including this one), as of the date of this notice, is \$_____.

SIGNED:

(Signature of the City Controller)
City Controller of the City

REQUESTED:

(Signature of the Director)
Director

- (4) City Council delegates to the Director the authority to approve up to \$23,842,388.83 in supplemental allocations for this Agreement without returning to Council.
- (5) The Original Allocation plus all supplemental allocations are the Allocated Funds, which include a 10% contingency in the amount of \$2,496,018.50. **For purposes of Change Orders in Section IV.E.(3)(c) below, the Original Agreement amount is \$24,960,185.** The City shall never be obligated to pay any money under this Agreement in excess of the Allocated Funds. Contractor must assure itself that sufficient allocations have been made to pay for services it provides. If Allocated Funds are exhausted, Contractor's only remedy is suspension or termination of its performance under this Agreement and it has no other remedy in law or in equity against the City and no right to damages of any kind.

E. Changes

- (1) At any time during the Agreement Term, the Director may issue a Change Order to increase or decrease the scope of services or change plans and specifications, as he or she may find necessary to accomplish the general purposes of this Agreement. Contractor shall furnish the services or deliverables in the Change Order in accordance with the requirements of this Agreement plus any special provisions, specifications, or special instructions issued to execute the extra work.
- (2) The Director will issue the Change Order in substantially the following form:

CHANGE ORDER

TO: [Name of Contractor]

FROM: City of Houston, Texas (the "City")

DATE: [Date of Notice]

SUBJECT: Change Order under the Agreement between the City and [Name of Contractor] countersigned by the City Controller on [Date of countersignature of the Agreement]

Subject to all terms and conditions of the Agreement, the City requests that Contractor provide the following:

[Here describe the additions to or changes to the equipment or services and the Change Order Charges applicable to each.]

Signed:

[Signature of Director]

- (3) The Director may issue more than one Change Order, subject to the following limitations:
 - (a) Council expressly authorizes the Director to approve a Change Order up to \$25,000. A Change Order in excess of \$25,000 must be approved by the City Council.

- (b) If a Change Order describes items that Contractor is otherwise required to provide under this Agreement, the City is not obligated to pay any additional money to Contractor.
 - (c) The Total of all Change Orders issued under this section may not increase the Original Agreement amount by more than 25%.
- (4) Whenever Contractor receives a Change Order, Contractor shall furnish all material, equipment, and personnel necessary to perform the work described in the Change Order. Contractor shall complete the work within the time prescribed. If no time for completion is prescribed, Contractor shall complete the work within a reasonable time. If the work described in any Change Order causes an unavoidable delay in any other work Contractor is required to perform under this Agreement, Contractor may request a time extension for the completion of the work. The Director's decision regarding a time extension is final.
- (5) A product or service provided under a Change Order is subject to inspection, acceptance, or rejection in the same manner as the work described in the Original Agreement, and is subject to the terms and conditions of the Original Agreement as if it had originally been a part of the Agreement.
- (6) Change Orders are subject to the Allocated Funds provisions of this Agreement.

F. Access to Site

Subject to FAA, TSA and HAS rules and regulations, Contractor may enter and leave work sites at all reasonable times without charge. Contractor and its employees may use the common areas and roadways at the Airport where the work sites are located. This excludes parking for Contractor's personnel and does not extend to any restricted area of the Airport, including without limitation, the AOA, which requires the Director's prior written approval and an HAS escort. Contractor shall repair any damage caused by it or its employees, suppliers or subcontractors as a result of their use of the common areas.

V. TERM AND TERMINATION

A. Contract Term

This Agreement is effective on the Effective Date and continues for 3 consecutive years from the date set forth in the Notice to Proceed, unless sooner terminated under this Agreement. Performance begins on the date specified in the Notice to Proceed issued by the Director. Contractor acknowledges that time is of the essence of this Agreement.

B. Renewals

If the Director, at his or her sole discretion, gives written notice of renewal to Contractor at least 30 days before expiration of the then-current term and if sufficient funds are allocated then, upon expiration of the initial term, this Agreement is renewed for up to 2 successive one-year terms under the same terms and conditions.

C. Termination for Convenience by City

The Director may terminate this Agreement at any time by giving 30 days written notice to Contractor. The City's right to terminate this Agreement for convenience is cumulative of all rights and remedies which exist now or in the future.

On receiving the notice, Contractor shall, unless the notice directs otherwise, immediately discontinue all services under this Agreement and cancel all existing orders and subcontracts that are chargeable to this Agreement. As soon as practicable after receiving the termination notice, Contractor shall submit an invoice showing in detail the services performed under this Agreement up to the termination date. The City shall then pay the fees to Contractor for services actually performed, but not already paid for, in the same manner as prescribed in Section IV(A) unless the fees exceed the allocated funds remaining under this Agreement.

TERMINATION OF THIS AGREEMENT AND PAYMENT FOR SERVICES RENDERED ARE CONTRACTOR'S ONLY REMEDIES FOR THE CITY'S TERMINATION FOR CONVENIENCE, WHICH DOES NOT CONSTITUTE A DEFAULT OR BREACH OF THIS AGREEMENT. CONTRACTOR WAIVES ANY CLAIM (OTHER THAN ITS CLAIM FOR PAYMENT AS SPECIFIED IN THIS SECTION), IT MAY HAVE NOW OR IN THE FUTURE FOR FINANCIAL LOSSES OR OTHER DAMAGES RESULTING FROM THE CITY'S TERMINATION FOR CONVENIENCE.

D. Termination for Cause by City

If Contractor defaults under this Agreement, the Director may either terminate this Agreement or allow Contractor to cure the default as provided below. The City's right to terminate this Agreement for Contractor's default is cumulative of all rights and remedies which exist now or in the future. Default by Contractor occurs if:

- (1) Contractor fails to perform any of its duties under this Agreement;
- (2) Contractor becomes insolvent;
- (3) all or a substantial part of Contractor's assets are assigned for the benefit of its creditors; or
- (4) a receiver or trustee is appointed for Contractor.

If a default occurs, the Director may, but is not obligated to, deliver a written notice to Contractor describing the default and the termination date. The Director, at his or her sole option, may extend the termination date to a later date. If the Director allows Contractor to cure the default and Contractor does so to the Director's satisfaction before the termination date, then the termination is ineffective. If Contractor does not cure the default before the termination date, then the Director may terminate this Agreement on the termination date, at no further obligation of the City.

To effect final termination, the Director must notify Contractor in writing. After receiving the notice, Contractor shall, unless the notice directs otherwise, immediately discontinue all services under this Agreement, and promptly cancel all orders or subcontracts chargeable to this Agreement.

If, after termination for failure to fulfill contract obligations, it is determined that Contractor had not so failed, the termination shall be deemed to have been effected for the convenience of the City. In such event, Contractor shall be paid in accordance with the provisions of Section V.C. of the Agreement.

E. Termination for Cause by Contractor

Contractor may terminate its performance under this Agreement only if the City defaults and fails to cure the default after receiving written notice of it. Default by the City occurs if the City fails to perform one or more of its material duties under this Agreement. If a default occurs and Contractor wishes to terminate the Agreement, then Contractor must deliver a written notice to the Director describing the default and the proposed termination date. The date must be at least 30 days after the Director receives the notice. Contractor, at its sole option, may extend the proposed termination date to a later date. If the City cures the default before the proposed termination date, then the proposed termination is ineffective. If the City does not cure the default before the proposed termination date, then Contractor may terminate its performance under this Agreement on the termination date.

VI. MISCELLANEOUS

A. Independent Contractor

Contractor is an independent contractor and shall perform the services provided for in this Agreement in that capacity. The City has no control or supervisory powers over the manner or method of Contractors' performance under this Agreement. All personnel Contractor uses or provides are its employees or subcontractors and not the City's employees, agents, or subcontractors for any purpose whatsoever. Contractor is solely responsible for the compensation of its personnel, including but not limited to: the withholding of income, social security, and other payroll taxes and all worker's compensation benefits coverage.

B. Force Majeure

1. Timely performance by both parties is essential to this Agreement. However, neither party is liable for reasonable delays in performing its obligations under this Agreement to the extent the delay is caused by Force Majeure that directly impacts the City or Contractor. The event of Force Majeure may permit a reasonable delay in performance but does not excuse a party's obligations to complete performance under this Agreement. Force Majeure means: fires, interruption of utility services, epidemics in the City, floods, hurricanes, tornadoes, ice storms and other natural disasters, explosions, war, terrorist acts against the City or Contractor, riots, strikes, court orders, and the acts of superior governmental or military authority, and which the affected party is unable to prevent by the exercise of reasonable diligence. The term does not include any changes in general economic conditions such as inflation, interest rates, economic downturn or other factors of general application; or an event that merely makes performance more difficult, expensive or impractical. Force Majeure does not entitle Contractor to extra Reimbursable Expenses or payment.

2. This relief is not applicable unless the affected party does the following:

- (a) uses due diligence to remove the effects of the Force Majeure as quickly as possible and to continue performance notwithstanding the Force Majeure; and
- (b) provides the other party with prompt written notice of the cause and its anticipated effect.

3. The Director will review claims that a Force Majeure that directly impacts the City or Contractor has occurred and render a written decision within 14 days. The decision of the Director is final.

4. The City may perform contract functions itself or contract them out during periods of Force Majeure. Such performance is not a default or breach of this Agreement by the City.

5. If the Force Majeure continues for more than 14 days from the date performance is affected, the Director may terminate this Agreement by giving 7 days' written notice to Contractor. This termination is not a default or breach of this Agreement. **CONTRACTOR WAIVES ANY CLAIM IT MAY HAVE FOR FINANCIAL LOSSES OR OTHER DAMAGES RESULTING FROM THE TERMINATION EXCEPT FOR AMOUNTS DUE UNDER THE AGREEMENT UP TO THE TIME THE WORK IS HALTED DUE TO FORCE MAJEURE.**

C. Severability

If any part of this Agreement is for any reason found to be unenforceable, all other parts remain enforceable unless the result materially prejudices either party.

D. Entire Agreement

This Agreement merges the prior negotiations and understandings of the Parties and embodies the entire agreement of the Parties. No other agreements, assurances, conditions, covenants (express or implied), or other terms of any kind, exist between the Parties regarding this Agreement.

E. Written Amendment

Unless otherwise specified elsewhere in this Agreement, this Agreement may be amended only by written instrument executed on behalf of the City (by authority of an ordinance adopted by the City Council) and Contractor. The Director is only authorized to perform the functions specifically delegated to him or her in this Agreement.

F. Applicable Laws

This Agreement is subject to the laws of the State of Texas, the City Charter and Ordinances, the laws of the federal government of the United States, and all rules and regulations of any regulatory body or officer having jurisdiction.

Venue for any litigation relating to this Agreement is Harris County, Texas.

G. Notices

All notices to either party to the Agreement must be in writing and must be delivered by hand, facsimile, United States registered or certified mail, return receipt requested, United States Express Mail, Federal Express, Airborne Express, UPS or any other national overnight express delivery service. The notice must be addressed to the party to whom the notice is given at its address set out in Section I of this Agreement or other address the receiving party has designated previously by proper notice to the sending party. Postage or delivery charges must be paid by the party giving the notice.

H. Captions

Captions contained in this Agreement are for reference only, and, therefore, have no effect in construing this Agreement. The captions are not restrictive of the subject matter of any section in this Agreement.

I. Non-Waiver

If either party fails to require the other to perform a term of this Agreement, that failure does not prevent the party from later enforcing that term and all other terms. If either party waives the other's breach of a term, that waiver does not waive a later breach of this Agreement.

An approval by the Director, or by any other employee or agent of the City, of any part of Contractor's performance does not waive compliance with this Agreement or establish a standard of performance other than that required by this Agreement and by law. The Director is not authorized to vary the terms of this Agreement.

J. Inspections and Audits

City representatives may perform, or have performed, (1) audits of Contractor's books and records, and (2) inspections of all places where work is undertaken in connection with this Agreement. Contractor shall keep its books and records available for this purpose for at least 4 years after this Agreement terminates. This provision does not affect the applicable statute of limitations.

K. Enforcement

The City Attorney or his or her designee may enforce all legal rights and obligations under this Agreement without further authorization. Contractor shall provide to the City Attorney all documents and records that the City Attorney requests to assist in determining Contractor's compliance with this Agreement, with the exception of those documents made confidential by federal or State law or regulation.

L. Ambiguities

If any term of this Agreement is ambiguous, it shall not be construed for or against any party on the basis that the party did or did not write it.

M. Survival

Contractor shall remain obligated to the City under all clauses of this Agreement that expressly or by their nature extend beyond the expiration or termination of this Agreement, including but not limited to, the indemnity provisions.

N. Publicity

Contractor shall make no announcement or release of information concerning this Agreement unless the release has been submitted to and approved, in writing, by the Director.

O. Parties In Interest

This Agreement does not bestow any rights upon any third party, but binds and benefits the City and Contractor only.

P. Successors and Assigns

This Agreement binds and benefits the Parties and their legal successors and permitted assigns; however, this provision does not alter the restrictions on assignment and disposal of assets set out in the following paragraph. This Agreement does not create any personal liability on the part of any officer or agent of the City.

Q. Business Structure and Assignments

Contractor shall not assign this Agreement at law or otherwise or dispose of all or substantially all of its assets without the Director's prior written consent. Nothing in this clause, however, prevents the assignment of accounts receivable or the creation of a security interest under §9.406 of the Texas Business & Commerce Code. In the case of such an assignment, Contractor shall immediately furnish the City with proof of the assignment and the name, telephone number, and address of the Assignee and a clear identification of the fees to be paid to the Assignee.

Contractor shall not delegate any portion of its performance under this Agreement without the Director's written consent.

R. Dispute Resolution

For purposes of this Section "Project Administrator" means the person the Director designates to monitor the progress of all Parties' performance under this Agreement.

Except as may otherwise be provided by law, a dispute that (1) does not involve a question of law; (2) arises during the performance of this Agreement; and (3) is not resolved between the Project Administrator and Contractor must be handled as described below:

- (a) The Project Administrator shall put its decision in writing and mail or otherwise furnish Contractor with a copy. Contractor may abide by the decision or may appeal the decision to the Director.
- (b) If Contractor desires to appeal a decision of the Project Administrator, Contractor must submit a written appeal to the Director. Contractor must file its written appeal within 7 working days following receipt of the Project Administrator's original decision. The Director shall provide Contractor with a written response to the appeal within 14 working days following its receipt. The decision of the Director is final.

S. Remedies Cumulative

Unless otherwise specified elsewhere in this Agreement, the rights and remedies contained in this Agreement are not exclusive, but are cumulative of all rights and remedies which exist now or in the future. Neither party may terminate its duties under this Agreement except in accordance with its provisions.

T. Contractor Debt

IF CONTRACTOR, AT ANY TIME DURING THE TERM OF THIS AGREEMENT, INCURS A DEBT, AS THE WORD IS DEFINED IN SECTION 15-122 OF THE HOUSTON CITY CODE OF

ORDINANCES, IT SHALL IMMEDIATELY NOTIFY THE CITY CONTROLLER IN WRITING. IF THE CITY CONTROLLER BECOMES AWARE THAT CONTRACTOR HAS INCURRED A DEBT, SHE SHALL IMMEDIATELY NOTIFY CONTRACTOR IN WRITING. IF CONTRACTOR DOES NOT PAY THE DEBT WITHIN 30 DAYS OF EITHER SUCH NOTIFICATION, THE CITY CONTROLLER MAY DEDUCT FUNDS IN AN AMOUNT EQUAL TO THE DEBT FOR ANY PAYMENTS OWED TO CONTRACTOR UNDER THIS AGREEMENT, AND CONTRACTOR WAIVES ANY RECOURSE THEREFOR.

EXHIBIT "A"

PERFORMANCE/WORK STATEMENT

EXHIBIT A

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EXHIBIT A

PERFORMANCE/WORK STATEMENT

1.0 BACKGROUND

The Houston Airport System (HAS) operates the City of Houston's three (3) major airports: George Bush Intercontinental Airport/Houston (IAH), William P. Hobby Airport (HOU), and Ellington Field (EFD). HAS passenger traffic is approximately 50 million passengers per year. Management of the Airports includes coordination with FAA, air carriers, and other Federal and State agencies to maintain the highest standards of service and safety to Airport patrons. HVAC SYSTEMS operations and maintenance serves a vital role in the efficient operation of the Houston Airport System.

2.0 SCOPE OF WORK

General – Operation and Maintenance Requirements

2.1 Facilities Included

Contractor shall provide all management, supervision, skilled and unskilled labor, tools, service and maintenance materials, equipment, outside services, replacement equipment and parts, components and appurtenances, instruments, expendables, supplies, training, and insurance as required for Operation and Maintenance to ensure Best-in-Practice Service of all items described in this Agreement for HVAC SYSTEMS installed in the following airport facilities:

- A. George Bush Intercontinental Airport/Houston (IAH)
- B. William P. Hobby Airport, Houston (HOU)
- C. Ellington Field (EFD)

These three airport facilities hereinafter may also be referred to jointly as Airports. These facilities are under the supervision of HAS for the City of Houston.

(IAH) includes the Central Plant, FAA Tower, Terminals A, B, C, D, FIS, and Other Remote Facilities not connected to the Central Plant's Primary Cooling and Heating water distribution systems.

(HOU) includes the Main Terminal, Concourses A, C, New Concourse, and Other Remote Facilities.

(EFD) includes the Airport Administration Building # 510, Airfield & Grounds Building, and Control Tower.

2.2 Work Included – General

The Work provided by Contractor under this Agreement includes Basic Services and Other Work/Services.

Work to proceed will be initiated by a notice to proceed for each Airport.

2.3 BASIC SERVICES

2.3.1 (IAH) Basic Services

Contractor shall provide Basic Services specified in this Agreement at (IAH) twenty-four (24) hours-per-day, seven (7) days per week, 365 days per year, including holidays. Contractor shall provide on-site staffing necessary to provide specified HVAC SYSTEMS operation and maintenance services to all specified (IAH) facilities.

Basic Services monthly payments for (IAH) will include:

A. Central Plant:

Operation, Preventive Maintenance (PM) /Predictive Maintenance (PdM), Remedial Maintenance (RM), and Reliability Centered Maintenance (RCM) for all HVAC SYSTEMS.

B. FAA Tower, Terminals A, B, C, D, FIS, and Other Remote Facilities:

- Operation, Preventive Maintenance (PM) /Predictive Maintenance (PdM), and Reliability Centered Maintenance (RCM) for all HVAC SYSTEMS.
- Remedial Maintenance (RM) for all HVAC SYSTEMS with 50 HP rating and under to include, but be not limited to, blower/fan motors, compressors, contactors, relays, etc.

Remedial maintenance (RM) for over 50 HP rated HVAC SYSTEMS will be provided under Other Works/Services (Refer to Section 5.0).

2.3.2 (HOU) Basic Services

Contractor shall provide Basic Services specified in this Agreement at (HOU) 18-hours-per-day between the hours of 5:00 a.m. to 11:00 p.m., 7 days-per-week, 365 days per year, including holidays. Contractor shall provide on-site staffing necessary to provide specified HVAC SYSTEMS operation and maintenance services to all specified (HOU) facilities.

Basic Services monthly payments for (HOU) will include:

A. Central Plant:

Operation, Preventive Maintenance (PM) /Predictive Maintenance (PdM), Remedial Maintenance (RM), and Reliability Centered Maintenance (RCM) for all HVAC SYSTEMS.

B. Main Terminal, Concourses A, C, New Concourse, and Other Remote Facilities:

- Operation, Preventive Maintenance (PM) /Predictive Maintenance (PdM), and Reliability Centered Maintenance (RCM) for all HVAC SYSTEMS.
- Remedial Maintenance (RM) for all HVAC SYSTEMS with 50 HP rating and under to include but not be limited to blower/fan motors, compressors, contactors, relays, etc.

Remedial maintenance (RM) for over 50 HP rated HVAC SYSTEMS will be provided under Other Works/Services (Refer to Section 5.0).

At (HOU) Contractor shall provide emergency after-hour service between the hours of 11:00 p.m. and 5:00 a.m. within 1 hour of notification at the labor rates specified in Exhibit B, Fee Schedule, for Other Work/Services.

2.3.3 (EFD) Basic Services

Contractor shall provide Basic Services specified in this Agreement as required at (EFD) between the hours of 6:00 a.m. to 10:00 p.m., seven (7) days-per-week, 365 days per year, including holidays. (No staffing is required, however when requested by Director, Contractor shall provide the services within 1 hour of notification.)

Basic Services monthly payments for (EFD) will include:

- A. Preventive Maintenance (PM) /Predictive Maintenance (PdM) and Reliability Centered Maintenance (RCM) for all HVAC SYSTEMS in (EFD) # 510 Building, A&G Building, and Control Tower.
- B. Remedial Maintenance (RM) for all HVAC SYSTEMS, in (EFD) # 510 Building, A&G Building, and Control Tower, with 50 HP rating and under to include, but not be limited to, blower/fan motors, compressors, contactors, relays, etc.

At (EFD) Contractor shall provide emergency after-hour service between the hours of 10:00 p.m. and 6:00 a.m. within two (2) hours of notification at the labor rates specified in Exhibit B, Fee Schedule, for Other Work/Services.

2.3.4 All Airports (IAH), (HOU)&(EFD):

- The monthly lump sum payments for Basic Services encompass all overtime, after-hours labor, additional staffing, and emergency labor required to meet the Airports HVAC SYSTEMS performance standards and Duties of Contractor detailed in this Agreement.
- Contractor shall pay 100% of the total costs for all repairs and/or replacement cost should failure occur to HVAC SYSTEMS maintained by Contractor under Basic Services.
- Repairs and/or replacement of HVAC SYSTEMS due to Contractor's failure to perform proper preventive maintenance will be the responsibility of the Contractor at no cost to HAS.

Other Work/Services to be provided by Contractor under this Agreement includes other related required work that is beyond the scope of Basic Services.

2.3.5 Air/Water Balance (Central Plants) – (IAH)

Contractor shall provide an Air/Water Balance for IAH Central Plant Serviced Areas within one year of receipt of notice to proceed. (Remote "stand alone" buildings are not included in air/water balance). Contractor shall obtain the Director's approval for recommended vendor. Vendor shall meet the following qualifications:

Air/Water Balance must be performed in compliance with The Associated Air Balance Council (AABC) Total System Balancing standards and procedures as well as Contractor's specifications including, but not limited, to the following standards and procedures:

Review of design documents and develops a methodical approach to perform total air balance services, and report all systems with verifiable test results.

- A total air balance requires an opposed blade damper (OBD) behind the face of each intake and exhaust opening in each room and of the building. Other balancing dampers are required at all branch locations of the duct system.
- The certified balance technician must change all of the filters in the system, and ensure that all dampers are fully open. Readings are taken at every opening inside, on the roof, etc. Slowly the dampers are closed in an effort to meet the cfm requirements set by the mechanical engineer. Adjusting one damper changes the cfm at all other openings. The air balance technician returns to every opening, making new adjustments and readings based on the changes from the previous one. Registers, grills, exhaust fans, and fresh air must all "balance" to meet the system performance requirements.
- After the technician tunes the system, all of the dampers and other devices are locked down, so that the settings will not change.

The Air/Water Balance vendor shall perform the following:

Air Balance Procedures

- Automated air balancing report capability
- Perform analysis of air balance results
- Analyze and report on air duct traverses, outlets and rooms
- Calculate and report on room pressurization relationships
- Record specified tolerances for outlets as a percent of design value
- Print standard and enhanced air balance reports for outlets, rooms and fans
- Show tolerance messages in real-time as measurements are compared to system design
- Combine inlet and outlet measurements together to evaluate pressure relationship for rooms without re-entering the data on different forms
- Calculate duct area and average velocities from duct traverses
- Provide real-time summarization and display of measurements by room, terminal box, branch duct, fan, and building
- Summarize outlet flows to rooms, terminal boxes, branch ducts, fan systems, and buildings
- Combine air balancing readings from multiple users

Water Balance Procedures

- Adjust heating and cooling, and steam systems to provide required quantity to and through each component.
- Water quantities/volumes and pressures will be measured with calibrated instruments compared to design and recorded.
- Using venturi tubes, orifices, or other metering fittings and pressure gages, adjust systems to provide the approved pressure drops through the heat transfer equipment (coils, converters, etc.), prior to the capacity testing. Where flow metering fittings are not installed, determine flow balance by measuring temperature differential across the heat transfer equipment. Perform measurement of

temperature differential with the air system, adjusted as described herein, in operation.

- Automatic control valves will be positioned for full flow through the heat transfer equipment of the system during tests.
- Flow through bypass circuits at three-way valves shall be adjusted to balance flow through the supply circuit.
- Adjust distribution by means of balancing devices (cocks, valves and fittings) and automatic flow control valves. Where automatic flow control valves are utilized in lieu of venturi tubes, record only pressure drop across the valve if said pressure drop is within the pressure drop rating on the valve tag.
- Special Procedures: Where pump capacity (as designed) is less than total flow requirements of individual heat transfer units of system served, full flow will be simulated by the temporary restriction of flow to positions of the system.

Air and water balance services must be planned, scheduled, documented, and reported through the Maximo CMMS. Summary and detailed water and air balance reports must be provided to HAS.

Contractor shall ensure 100% of all Contractors' supplier technicians meet Contractor's safety training standards as follows:

- Contractor Safety Training
- EHS Regulatory Training

Contractor shall emphasize the following:

- Wearing of appropriate personal protection equipment
- Compliance with Lock Out/Tag Out program
- Compliance with Safe Work Permits i.e. Hot Work.
- Proper permits and compliance during excavation or working in confined spaces
- Safe housekeeping for in progress work and in assigned areas

2.3.6 Base Line Audit (IAH),(HOU)&(EFD)

The Contractor shall conduct a Base Line Audit of the Airports major HVAC SYSTEMS, within the first thirty (30) days from the Notice to Proceed date to determine that the HVAC SYSTEMS (excluding expendables) are up to standard and within manufacturer's tolerances etc.

The Base Line Audit will be conducted at the Contractor's expense, and the Contractor will document its findings with photographs, listing with descriptions of equipment deficiencies, and suggested corrective measures.

The Director will respond in writing regarding the listed equipment deficiencies. The Director will provide a list to the Contractor itemizing equipment which Director agrees is deficient and should (or) should not be brought up to standard. The Contractor shall maintain items not to be brought up to standard at equal or better condition until the end of the Agreement.

3.0 HVAC SYSTEMS AND RELATED EQUIPMENT (IAH),(HOU),&(EFD)

3.1 The Airports HVAC Systems and Related Equipment in the Central Plants covered under Basic Services include, but are not limited to,:

- All mechanical and specified plumbing systems and all related electrical systems to include heat exchanger tubing bundles.
- Pneumatic and electronic systems associated with the generation of chilled water, steam, high temperature water, and heating water.
- Cooling and heating water distribution and pumping systems including buried pipe.
- Controls.
- Instrumentation.
- Central Plant lighting.
- Central Plant domestic cold and hot water.
- Storm and sanitary sewer systems to the main line.
- Odor masking/odor control.
- Water treatment services and water treatment chemicals.
- Full housekeeping services in the Central Plants and Contractor's office areas.

3.2 The Airports Electrical Systems in the Central Plants covered under Basic Services include, but are not limited to,:

- All electrical service systems, equipment and components serving HVAC systems and related equipment.
- All mechanical and specified plumbing systems including Zeta Rods.
- All related pneumatic and electronic systems associated with the generation of chilled water, steam, high temperature water, heating water, cooling and heating water distribution and pumping systems
- Controls.
- Instrumentation.
- Central Plant lighting.
- Central Plant domestic cold and hot water including buried pipes.
- Storm and sanitary sewer systems.
- Odor masking/odor control.
- Water treatment systems and water treatment chemicals serving the Central Plants and Contractor's office areas.

3.3 The Airports HVAC Systems and Related Equipment from the Airports Central Plants to the most remote points in the Terminals, Concourses and/or Flight Stations covered under Basic Services include but are not limited to:

- All associated HVAC systems, equipment and components including, but not limited to, all cooling and heating water distribution and pumping systems including Zeta Rods.
- All pneumatic compressors and related controls.

- All air side mechanical rooms.
- All domestic hot water generation and storage water systems to include all Backflow preventors in all mechanical rooms.
- All building storm, building ground water, and in building mechanical areas, sanitary sewer sump pump systems listed as part of Basic Services.
- All related controls and electrical service
- All air handler units and air distribution systems and components including ductwork, mixing boxes and controls actuators and VSD's.
- All exhaust and re-circulating fans and controls
- All automatic temperature controls and instrumentation.

3.4 The Airports Electrical Systems and Related Equipment from the Airports Central Plants to the most remote points in the Terminals, Concourses and/or Flight Stations covered under Basic Services include, but are not limited to,:

- All electrical service systems, equipment and components serving HVAC systems, equipment and components. (All encompassing with exception of high voltage transmission lines and sub-stations)
- All electrical service to and electrical service of motor control centers.
- Mechanical panel-boards, fused switches and circuit breakers, motor starters, disconnect switches, conduit, wiring, and related electrical controls.
- All specified stand-alone A/C units, heaters, furnaces; and other related equipment.

4.0 OTHER WORK/SERVICES (IAH),(HOU)&(EFD)

A. General

Within the general scope of the Agreement, Other Work/Services may be required to meet desired conditions and/or services not covered in Basic Services. Contractor shall perform Other Work/Services in accordance with all provisions of the Agreement plus any special provisions issued with authorization for work, so long as the specific provisions are consistent with, and related to the scope of this Agreement. With the exception of Emergency Service Requests or Urgent Service Requests, where a request may be verbal and followed immediately in writing, all requests for Other Work/Services will be in writing in the form of an Other Service Request (OSR) provided by the Director and signed by the Director or his/her designated representative. Contractor shall perform Other Work/Services to the same standards identified for Basic Services.

B. Performing Other Work/Services

Other Work/Services shall be performed in accordance with this Agreement.

1. Before issuing an OSR, the Director will first issue a written notice to Contractor detailing the specific Other Work/Services to be performed by Contractor.

2. In response to any such written notice, Contractor shall provide Director with a written Agreement within 3 business days of receipt of an OSR Request. The Agreement must include a description of the services to be performed, applicable labor rates, estimated labor hours, performance schedule, total estimated cost, and other requirements set forth in the written notice to Contractor.
3. Contractor shall furnish all materials, labor, tools, equipment, transportation, and incidentals for accomplishing the described services or as otherwise specified by Director. Director will not approve an OSR without a specified completion date. Contractor shall complete all such Other Work/Services within the time specified in the OSR. Contractor may request in writing to the Director an extension to the completion date. Director's decision is at his sole discretion and final.
4. Upon receipt of Contractor's Agreement, Director has the option to reject Contractor's Agreement, require resubmission with revised or additional information, or issue an OSR. Should Director reject Contractor's Agreement and require resubmission, Contractor shall resubmit a modified Agreement within 3 business days of the rejection.
5. Upon approval by Director of the modified Agreement, an OSR will be issued. Contractor shall commence work as stated in the OSR. Contractor shall diligently work to completion in accordance with the terms and conditions of the Agreement and the approved OSR.
6. Labor costs must not exceed the rate stated in the Bid Form. Labor is inclusive of supervision, transportation, tools, and expendables.
7. Prices for equipment, parts, supplies, and sub-contracted requirements which may be required for authorized Other/Work Services specified in 5.0 C and in Exhibit "B" shall be the Contractor's actual cost plus a 5% mark-up. Copies of invoices from Contractor's suppliers for these items must be submitted with Contractor's invoices at the time of submittal to HAS for payment. The mark-up percentages stated shall not increase during the term of this Agreement. The quantity of equipment, parts, and supplies will depend on the needs of HAS.

Contractor shall obtain (3) itemized bids/estimates within 3 business days from separate /different vendors/ suppliers, not affiliated with Contractor, for the required equipment, parts, supplies, and sub-contracted items. Contractor shall submit the bids/estimates to Director and obtain written approval from Director before proceeding with the Work. Contractor shall be compensated at cost plus 5% markup.

8. When Other Work/Services have been completed, a copy of the approved OSR must accompany the monthly invoice.
9. While performing work on any OSR, if hidden damage or additional cost is discovered, Contractor shall notify Director immediately. After determining the extent of hidden damage a supplemental OSR must be submitted.

10. Contractor shall submit to Director, copies of original purchase orders and invoices evidencing Contractor's acquisition costs.
11. In the case of emergency service, Contractor may perform Other Work/Services upon the verbal approval of Director. However, during the next business day, Director will submit a written Emergency Service Request to the Contractor.
12. If it is determined this Scope of Work should be covered under Basic Services, any amount paid to the Contractor under Other/Services Request will be reimbursed to the City by the Contractor. The City does not waive any of its rights and remedies whether by statute, at law, in equity, or under this Contract.
13. If Other Work/Services are performed by the on-site crew in conjunction with their regular duties, Contractor shall not receive additional compensation for their labor.

C. Other Work/Services may include, but are not limited to, the following categories: (IAH),(HOU)&(EFD)

- Remedial Maintenance on HVAC SYSTEMS
- Emergency After-Hours Services (HOU) & (EFD) only
- Systems and Equipment Upgrades/Modifications
- Special Energy Retrofits
- Hazard Materials Testing and Removal
- Certain O&M Service Requirements
- Visual inspection and testing of (IAH) fire dampers located in ductwork.
- Clean and apply Anti-bacteria Coat on Duct Internal Insulation.
- Air quality studies

D. Use of On-Site - Extra Work

When the Contractor's on-site crew performs extra or changed work covered by Change Orders or Other Work/Services during normal hours, Contractor shall not be relieved of any responsibilities for operation, performing preventive and remedial maintenance, or replacing equipment as defined in this Agreement unless otherwise authorized by the Director.

E. Remedial Maintenance (Other Works/Services) (IAH),(HOU)&(EFD)

When requested by Director, Contractor shall provide Remedial Maintenance (RM) services on HVAC SYSTEMS rated above 50 HP, including but not limited to, blower/ fan motors, compressors, contactors, relays, etc. at the labor and material rates specified in Exhibit B, Fee Schedule, for Other Work/Services.

Contractor shall repair/restore HVAC equipment/systems performance to designed function with parts, materials, and labor. RM includes repairs and replacement of related components, parts, and appurtenances that have failed, no longer perform reliably, or have worn beyond safe tolerances.

The Director will provide Contractor with instructions and schedules pertaining to the RM Work.

Remedial Maintenance sub-contractors and/or craftsmen used to perform Other Works/Services must be certified and/or approved by OEM equipment manufacture prior to performing any Work.

RM performed due to Contractor's negligence, including, but not limited to, failure to perform proper preventive maintenance will be the responsibility of the Contractor at no cost to HAS.

Contractor must complete required RM work to the satisfaction of the Director. Any RM items not repaired on a timely basis and/or found to be deficient after being repaired by Contractor may be repaired at the Director's discretion by parties other than Contractor. If the repairs are determined by the Director to be the responsibility of the Contractor, the Contractor will be back-charged by HAS for all associated costs.

RM equipment/materials will be obtained for this Agreement by the following methods:

1. HAS has the option to supply the equipment / materials to Contractor at no cost to the Contractor.
2. Contractor shall obtain (3) itemized bids/estimates from separate/different vendors/suppliers for the required equipment / materials.

F. Emergency After-Hour Services (Other Works/Services) (HOU) & (EFD)

1. (HOU) When requested by Director, Contractor shall provide emergency after-hour service between the hours of 11:00 p.m. and 5:00 a.m. within 1 hour of notification at the labor rates specified in Exhibit B, Fee Schedule, for Other Work/Services.
2. (EFD) - When requested by Director, Contractor shall provide emergency after-hour service between the hours of 10:00 p.m. and 6:00 a.m. within 2 hours of notification at the labor and material rates specified in Exhibit B, Fee Schedule, for Other Work/Services.

5.0 REGULATORY COMPLIANCE/CODES

5.1 Regulatory Compliance

- The Contractor shall comply with all applicable Federal, State and local laws, HAS Airport Policies, ordinances, rules, and regulations pertaining to the performance of the Work specified herein.
- Licenses, Permits and Bonding: All personnel engaged in the maintenance activities must possess certificates of training, licenses, permits, and bonding as required by the Federal, State, County, HAS, and other local authorities having jurisdiction and as specified for each activity they will be directly engaged in or supervise. All certificates of training, licenses, permits and bonds shall be current and valid and available immediately upon request by HAS.
- The Contractor shall obtain and pay for all permits, licenses, certifications and approvals required to perform services under this Agreement.

- The Contractor shall schedule recurring inspections and certifications, and pay all associated fees.
- The Contractor shall obtain any permits required to work on the Airports, including in restricted areas, as defined by Federal, State and local laws, City policies, procedures, ordinances, rules, codes and regulations. Both the contractor's business and the Contractor's employees, including subcontractor's employees, must be certified to work on the Airports property, including restricted areas.
- The Contractor shall be required to provide, as requested and on demand, all licenses, permits, certifications, and other such proof of qualifications for any personnel required to work on the Airports, including restricted areas, for proper execution of this Agreement.

5.2 Codes and Standards

Except where specified or exceeded by the requirements of the specification, the Contractor shall conform to the latest edition of the following Codes:

- Federal, state, and local building, plumbing, mechanical, electrical, safety and environmental codes.
- American Gas Association.
- National Electrical Code (NEC).
- International Plumbing Code.
- International Mechanical Code.
- International Fire Code.
- International Energy Conservation Code.
- State and Local Building Codes and Ordinances.
- State and Local Fire Codes and Regulations.
- Federal Aviation Standards and Regulations
- Occupational Safety and Health Administration Regulations.

Codes and Standards listed above and throughout these specifications are minimum standards.

6.0 **ESTIMATED RENOVATION, UPGRADE, EXPANSION AND DEMOLITION WORK:**

A. (IAH)

- Project 621- Central Plant expansion - Construction to provide up to two (2) 50,000 pounds per hour boilers and associated equipment, pumps etc. and up to two (2) 3300 ton chillers, one steam and one electric and associated equipment, pumps etc. (Estimate project will start within 2-years)
- Project 500N- T-D Renovations- Construction to remove existing Andover DDC control system and replace with a Bac-net non proprietary system. (Estimate project will start within 4-years)
- Exhaust and pumping systems may be upgraded to include existing AHU'S.
- Project 520- ASC expansion including new Fleet offices and work bays. New equipment will include heaters, dx units, AHU's etc. (Estimate project will start within 5-years)

B. (HOU)

- Project 445- A&G expansion including a new building to house Grounds personnel, offices and a new Fleet building. New equipment will include heaters, dx units, AHU's etc. (Estimate project will start within 4-years)
- Current expansion of the Central concourse on the East side is ongoing and includes new AHU's, pumps, etc.

C. (EFD)-None

7.0 CONTRACTOR RESPONSIBILITY DURING IMPLEMENTATION OF NEW FACILITIES AND/OR EQUIPMENT (IAH),(HOU)&(EFD)

As part of the Basic Services, Contractor shall cooperate with HAS and or/contractor to meet operational and capacity requirements during renovations, upgrades, expansion, and demolitions for any future projects. Contractor shall provide optimum system operations during any construction /project work to meet additional cooling and heating load requirements from on-line facilities, systems, and equipment as new systems and equipment are being readied to come on line for full cooling and heating operating service.

Upon issuance of a certificate of substantial completion and/or beneficial use and the equipment is put into revenue service the Contractor shall take full responsibility of equipment maintenance and manage any warranties in effect.

8.0 PERSONNEL REQUIREMENTS (IAH) & (HOU)

Staffing – The staffing listed in this specification is a “minimum staffing” only. Contractor shall provide the necessary number of personnel required to operate and maintain the HVAC systems and equipment at all Airports. All personnel assigned by Contractor to perform in accord with the terms of this Agreement will not be assigned to any other projects or contracts managed by Contractor unless approved in writing by the Director.

The Contractor's Project Manager, Operations Manager, and Operations Supervisor shall all have e-mail capabilities. Contractor shall answer correspondence via e-mail within a day's time.

Should HAS determine that Contractor is not meeting the Agreement responsibilities with the Contractor's on-site crew, then upon the Director's request, Contractor shall modify/increase its on-site crew in order to meet Agreement obligations. Contractor shall increase its on-site crew at no cost to HAS as required to fulfill the requirements of the Agreement. Should the Director determine that Contractor is not meeting Agreement responsibilities, the Director will notify Contractor in writing. Contractor shall address and cure performance issues relating to personnel immediately: such plan to cure must be approved in writing by the Director in his sole discretion. If Agreement responsibilities can only be met with additional permanent staff, Contractor shall pay for the cost of such additional staff.

Contractor shall provide a dedicated Project Manager for all of HAS, skilled and experienced in the operation and maintenance of the type of systems/equipment identified in this Agreement, who will be actively included in the system maintenance and who will serve as the main point of contact for Contractor. The Project Manager shall not be a working technician/mechanic. The Project Manager shall be on duty from 8:30 a.m. through 5:30 p.m., Monday through Friday at a minimum.

After execution of the Agreement the Project Manager shall attend a minimum of one meeting every month, or as requested, with the Director to report on the status of the system/equipment and the Work/Services. Contractor shall prepare a typed agenda covering the topics to be discussed, keep minutes of the meetings in a form satisfactory to the Director, and issue copies of the minutes to all attendees within four (4) business days of each meeting.

The Project Manager shall be the communications contact with the Director and shall be exclusively assigned to this project. The Project Manager shall not be reassigned from this project without prior approval of the Director. Contractor shall provide a toll free telephone number if the Project Manager resides outside of the 713 or 281 Area Codes.

The Project Manager, Operations Manager, and Operations Supervisor shall not be reassigned and or be replaced from this project without prior written approval of the Director.

Although personnel are assigned to specific airports, every employee will be cross trained and deployed as required.

8.1 Contractor's personnel shall include management professionals shared between IAH, HOU, and EFD.

A. Project Manager -(Minimum Quantity 1 ea.) – The Project Manager shall have at least 20 years of HVAC maintenance continuous project experience with verifiable HVAC management capability and experience including but not limited to:

- Centrifugal chillers 2500 tons or larger.
- Water tube high-pressure boilers in the range of 600 degrees (F) @ 225 lbs. having a minimum capacity of 50,000 lbs per hour.
- Electrical vaults 15 and 35 KV with a capacity of 30 to 50 mega watts.
- Three (3) years of this experience in administrative task, scheduling, work order control, cost analysis etc.
- Five (5) years cost forecasting and training and upgrading personnel.
- Advanced computer skills and in-depth knowledge of complex DDC control systems.
- Verifiable management capability and experience and a State of Texas HVAC License.
- 10-15 years experience in energy management in large plants 18 to 25,000 ton capacity.

The Project Manager shall communicate with the Director and shall be exclusively assigned to this project. The Project Manager shall not be reassigned from this project without prior written approval of the Director. The Project Manager will be physically located at IAH but will operate between all facilities.

- B. Administrative Assistant (Minimum Quantity 1 ea.) – The Administrative assistant will have a Bachelors degree in business/marketing or equivalent professional experience desired with 5 to 10 years as an administrative and business operations support assistant. Experience will include but not limited to:
- Excellent typing skills
 - Proficiency with MS Office applications (Word, PowerPoint, Excel, Access)
 - Experience working with complicated Excel spreadsheets and Database Software
 - Excellent communications skills; pleasant phone manner & good customer service skills
- The work schedule will be set by the Airport contract support requirements.
- C. Dispatch/Work Order Control - (Minimum Quantity 1 ea.) - generates work orders. Tracks and provides monthly, daily, weekly data on status.

8.2 (IAH) Contractor's personnel shall include professionals in the following job categories:

- A. Operations Manager (Minimum Quantity 1 ea.) – Operations Manager must have 20 consecutive years HVAC maintenance experience including but not limited to:
- 15 years supervisory capacity.
 - Class "A" air-conditioning license.
 - Completion of a journeymen level program, State of Texas HVAC License, and a Universal recovery license.
 - Knowledge of complex control systems, BACnet Native language absolutely necessary.
 - Excellent chemical treatment knowledge.
 - Maintenance at large plants 18-25,000 ton capacity.
 - Maintenance on steam turbine and electric driven chillers.
- B. Maintenance Manager – (Minimum Quantity 1 ea.) – Maintenance Manager must have 10 to 15 years continuous HVAC Maintenance experience including but not limited to:
- 1st. Grade Stationary Engineer's Licenses in conformance with the City of Houston codes.
 - Strong energy management skills and graphics capability.
 - Operating high pressure boilers 600 deg. (F), 225 lbs.
 - Operating steam driven turbines, electric driven centrifugal 1,000 – 3,000 ton capacity.
 - Operating large plants 18 to 25,000 ton capacity.
 - Excellent chemical treatment knowledge.
 - Strong DDC background.
- C. Maintenance Supervisor (Minimum Quantity 1 ea.) – Maintenance Supervisor must have 10-15 years consecutive HVAC maintenance experience including but not limited to:
- 10 years in a supervisory capacity.
 - Completed a journeymen level program and a State of Texas HVAC License and a Universal recovery license.

- D. Preventive Maintenance Technician Helpers (Minimum Quantity 5 ea. - 1st. Shift Only) – Preventive Maintenance Technician Helpers must have 2 years HVAC preventive maintenance experience including but not limited to:
- 2 years experience maintaining large campus type distribution systems.
 - Routine maintenance.

Note: Each helper must have a preventive maintenance cart loaded with items for the specific areas they are scheduled to work in. Carts must be refurbished prior to each shift.

- E. Preventive Maintenance Technician - (Minimum Quantity 5 ea. - 1st. Shift Only) – Preventive Maintenance Technician must have 5 years experience including but not limited to:
- Preventive maintenance on pumps, electric motors/starters, AHU's, mixing boxes, sheet metal repairs, bearing replacement/repairs, centrifugal blowers, etc.

Preventive Maintenance Mechanics are to be assigned full time to terminals A, B, C, D, & FIS

- F. DX Maintenance Mechanic - (See Quantities Below) – DX Maintenance Mechanic must have 5 years continuous HVAC installation/repair experience including but not limited to:
- Journeyman experience.
 - 5 year repair experience in commercial air conditioning and centrifugal chillers of 200 tons and less.
 - Universal Refrigerant recovery license.

DX Maintenance Mechanic will maintain all stand alone facilities

Quantities:

(1 ea.) – 1st. shift - 7 am to 3 pm - (Monday - Friday)

(1 ea.) – 2nd. Shift - 3 pm to 11 pm - (Monday - Friday)

- G. Stationary Engineer (Central Plant Only) (Minimum Quantity 8 ea. – 24/7 Coverage) – 1st, 2nd & 3rd Grade Stationary Engineers must have 2-10 years HVAC operations experience including but not limited to:
- Experience with high-pressure steam plant operation.
 - Operating both steam and electric equipment.
 - Operating high temperature hot water converter and pumping systems up to 300 deg.
 - Minimum 5 years experience in a large plant environment of 18-25,000 tons capacity.
- H. Electrician (Journeyman) - (Minimum Quantity 2 ea.) – Electrician Mechanic must have 5-10 years HVAC electrical experience including but not limited to:
- Maintenance electrician and a Journeyman Electrician's license in conformance with the City of Houston Building Code
 - Qualifications to perform most maintenance tasks on:
 1. Variable Speed Drives.
 2. High voltage experience.
 3. 480 V. 3 ph, Kw switch gear.

4. 12.47 KV systems.
5. Motor starters, transformers.
6. Buss distribution, buss-ties.
7. Automatic and manual transfer switches.

The following Controls personnel must be OEM certified. Candidates must be approved by the Director:

(These controls personnel will dispatch trouble tickets calls after reviewing the DDC system.)

- I. BAS Senior Technician – (Controls BACnet Native – Estimated 23,000 Points) - (Minimum Quantity 1 ea.) - 5-7 years continuous HVAC technician experience including but not limited to:
- Capable of systems management/repair/upgrades.
 - Technical degree from an accredited college in electronic, pneumatic and electrical instrumentation technology.
 - Minimum of 5 years experience in the measurement, calibration, monitoring, testing and troubleshooting of electronic, pneumatic and electrical control systems.
 - Minimum of 2 years experience must be in electronics
 - Experience with Alerton and UES systems a must.
 - Experience must include communications, high speed modems, and PC-based HVAC networking systems.

Technical degree must consist of not less than 2000 classroom hours in college algebra and physics, basic electricity covering AC and DC systems including semi-conductor and solid-state technology, as well as analog and digital electronics. Degree requirements includes electronic, pneumatic and electrical instrumentation measurement, calibration, monitoring, testing and troubleshooting, and control functions and control loop technology, as well as microprocessor hardware, DDC system architecture and computer interfacing to electronic, pneumatic and electric control devices, systems and control loops.

- J. BAS Technician - (Controls BACnet Native) (Minimum Quantity 1.5 ea. Shared Resource) – Technician shall have 3-5 years continuous experience including but not limited to:
- Capable of systems maintenance/repair/upgrades.
 - Maintaining large HVAC plants to include high pressure steam systems, must be able to work with Star-Bus, BACnet Native, etc. and other industrial languages.
- K. Painter – (Minimum Quantity 1 ea.) – Painting of mechanical rooms, central plant, duct work etc.
- L. Cleaner - (Minimum Quantity 1 ea.) (Central Plant Only) Cleaning experience includes but not limited to the following:
- Clean equipment, pads, floors, bathrooms, windows etc.
 - Wipe down piping in tunnels, equipment room
 - Plant housekeeping, buff, and wax floors

- Change filters on equipment
- Painting

8.3 (HOU) Contractor's personnel shall include professionals in the following job categories:

- A. Operations Supervisor (Minimum Quantity 1 ea.)- The Operations Supervisor shall have at least 10 year's project or similar HVACM experience with verifiable management capability and experience. The Facility Manager will report to the Project Manager and shall not be a working technician/mechanic. The Facility Manager shall be on duty from 8:30 a.m. through 5:30 p.m., Monday through Friday or as dictated by job requirements.
- B. First Grade Stationary Engineer (Minimum Quantity 1 ea.)- First Class Operating Engineers shall have First Grade Stationary Engineer's Licenses in conformance with the City of Houston Codes. Minimum 8 years HVAC operating experience as a First Grade Stationary Engineer.
- C. Operations Engineer (Minimum Quantity 3 ea.)- Operating Engineer shall have Second Grade Stationary Engineer's Licenses in conformance with the City of Houston Codes. Minimum 8 years operating experience as a Second Grade Stationary Engineer.
- D. Maintenance Mechanic (Minimum Quantity 1 ea.)- Maintenance Mechanic shall have at least 10 years experience in preventive/repair maintenance of HVAC equipment in an environment similar to Houston, Texas. Must have certification of experience on HVAC Systems from an accredited source(s) and instructor/training back-ground.
- E. BAS Technician - (Controls BACnet Native) (Minimum Quantity .5 ea. Shared Resource) – Technician shall have 3-5 years continuous experience including but not limited to:
 - Capable of systems maintenance/repair/upgrades.
 - Maintaining large HVAC plants to include high pressure steam systems, must be able to work with Star-Bus, BACnet Native, etc. and other industrial languages.

8.4 Personnel Approval (IAH)&(HOU)

The Contractor shall furnish adequate certification papers and documentation of the assigned personnel's qualifications for the on-site crew and obtain written approval of acceptance of such qualifications by the Director. Contractor may change personnel only with equally qualified personnel as approved by the Director.

8.5 EFD Personnel

HVAC requirements at Ellington Field will be handled by personnel from HOU and supported by all Contractor personnel.

9.0 PERFORMANCE STANDARDS (IAH),(HOU)&(EFD)

General

Contractor's operation and maintenance of Airports HVAC systems and equipment must be in accordance with the highest standards prevailing in the industry, recommendations of the OEM, as well as all applicable codes, rules, regulations, and laws of any regulatory or legislative body having jurisdiction over IAH and HOU, which include, but are not limited to, State of Texas agencies having jurisdiction over boiler operations, Texas Commission on Environmental Quality (TCEQ) over certain environmental matters, and Federal regulatory bodies, including, but not limited to EPA, OSHA, TSA, and FAA. Contractor shall ensure full compliance and shall bear the cost of any additional work or materials not specified that may be required. Any violation, omission, or question of compliance must be brought to the attention of the Director.

Contractor shall respond immediately to a request from the Director for emergency service to perform all steps reasonably necessary to protect persons and property from risk of harm due to a problem with the system. Priority must be given to requests for emergency service.

9.1 ENVIRONMENTAL CONDITIONS (IAH),(HOU)&(EFD)

As a part of Basic Services, Contractor shall maintain the following environmental conditions within occupied conditioned spaces, unless otherwise specified in this Agreement or requested by the Director.

(IAH), (HOU), (EFD)	Summer	Winter
Cooling Temperature	74°F + 1°F	74°F + 1°F
Design Day	97°Fdb and 80°Fwb	22°Fdb
Humidity	55% + 5%	40% max.
Heating Temperature	74°F + 1°F	74°F + 1°F
Humidity (reheat control only)	55% max. (IAH) 55% + 5% (HOU)/(EFD)	40% max.

Specific performance standards by individual systems are detailed in Sections 6.0 "System Overview for IAH" and 7.0 "System Overview for (HOU)."

9.2 (IAH) – Central Reserve Capacities

As a part of Basic Services, Contractor shall operate the (IAH) Central Plant facilities in such a manner as to maintain the following equipment in service ready for full operation with reserve capacity as specified at design temperature, pressure and flow:

- A. For the existing and the expanded Central Plant, a capacity for immediate delivery for cooling:
 - Not less than the total Central Plant installed chilled water capacity, less the capacity of one of the largest chillers.

- Not less than the total Central Plant installed cooling tower water capacity, less the capacity of one of the largest cooling tower cells.
- B. For the existing and the expanded Central Plant, a capacity for immediate delivery of steam for heating, steam turbine drive chillers and/or domestic hot water:
 - Not less than the total Central Plant installed steam boiler capacity, less one of the largest steam boilers; and
- C. For the existing and the expanded Central Plant, a capacity for immediate delivery of high temperature water for heating and domestic hot water generation:
 - Not less than the total central plant high temperature water heat exchanger, less one of the largest steam/high temperature heat exchangers.

9.3 (HOU) – Airport Reserve Capacities

- A. A capacity for immediate delivery for cooling: Not less than 2800 tons of chilled water capacity needs to be available at all times for immediate delivery for cooling. Whenever the total Central Plant installed chilled water capacity, less the capacity of one of the largest chillers systems leaves the Contractor short of 2800 tons of chilled water, Contractor shall immediately take the following action:
 1. Assess the seasonal cooling load for the Central Plant. If the seasonal load exceeds 2800 tons, with Directors approval, as a part of Basic Services, provide a 1000 Ton Air Cooled Rental Chiller System complete with chilled water pumps for 50 ft. of head and an emergency generator(s) to operate the entire system. Cost of this work will be covered under Basic Services.
- B. A capacity for immediate delivery for cooling; Not less than 3000 tons of nominal rated cooling tower water capacity; The total Central Plant installed cooling tower water capacity (4000 tons) less the capacity of one of the largest cooling tower cells (1000).
- C. For the existing and the expanded Central Plant, a capacity for immediate delivery of heating water for heating; Not less than 6,700,000 BTU per hour of hot water capacity for immediate delivery for heating; The total Central Plant heating water boiler less one of the heating water boilers.

10.0 OPERATING PHILOSOPHY (IAH),(HOU)&(EFD)

10.1 General Requirements

Best-in-Practice Service of HVAC SYSTEMS, maintaining specified environmental conditions, and cost-effective energy management are of paramount importance in operating and maintenance of the Airports HVAC SYSTEMS. Contractor shall observe OEM recommended preventive maintenance and maintenance practices and procedures. Contractor shall comply with applicable Federal, State and Local regulations of Authorities having jurisdiction including regulations of Occupational Safety and Health Act (OSHA), Environmental Protection Agency (EPA) requirements and recommended practices of National Institute for Occupational Safety and Health.

The operating procedures, used by Contractor, must be in accordance with OEM instructions contained in applicable manufacturers' manuals for individual items of equipment, including the latest OEM technical/user manuals, service bulletins, service advisories, product/service information updates, and all other such OEM published

information pertaining to the maintenance and operation of HVAC SYSTEMS. Contractor's operating procedures must address overall operation of the plant, taking into account the interrelationships of various systems to ensure that proper sequences are followed in start-up, shutdown, or in making operating adjustments. All written operating instructions and procedures must be readily available to operating personnel at all times for reference.

It is recognized that Contractor has no responsibility regarding design of the facilities, which it will operate and maintain. However, where it is evident that safety, reliability or efficiency can be improved through capital investment in equipment, analyzers, instrumentation, etc., Contractor shall bring such matters to the attention of the Director in writing for his consideration and action as the Director deems appropriate.

10.2 Operating Philosophy

The (IAH) chilled water system is a primary-secondary variable pumping system. The primary pumps, chillers and the automatic pressure bypass are located in the (IAH) Central Plant. Secondary pumps are located in the Terminals. Terminals A, B, C, D, and FIS have secondary pumps that are variable speed drives.

For the (IAH) Central Plant to deliver adequate chilled water (flow and pressure), it is imperative that the design chilled water rise (15°F) be maintained during all cooling load conditions. The (IAH) Central Plant is designed for a 40°F leaving water temperature. All existing air handling equipment is adjusted for 42°F entering water temperature and leaving air temperature and air quantity at the coils to provide for a 15°F chilled water rise. All new equipment is being designed for 42°F entering water temperature and a 15°F chilled water rise. Any cooling equipment and controls not maintaining the design chilled water rise (15°F) during all load conditions must be promptly identified, cleaned and/or repaired then, if not in balance, the Director should be notified. Contractor shall not raise design leaving Chilled Water Supply Temperatures at the Central Plant unless the design leaving air temperature can be maintained and a 15°F chilled water rise can be maintained. Contractor shall not lower Leaving Air Temperatures at AHU Coils below that established in design schedules except on a temporary basis while finding a satisfactory solution to temperature control problems.

10.3 (HOU) Operating Philosophy

The (HOU) existing chilled water system is a primary variable pumping system. The primary pumps and chillers are located in the Central Plant. Booster pumps exist at some AHUs. The new (HOU) chilled water system is a primary-secondary system with all pumps in the central plant. Secondary pumps are scheduled for variable speed drives.

For the (HOU) Central Plant to deliver adequate chilled water (flow and pressure), it is imperative that the design chilled water rise (14°F) be maintained during all cooling load conditions. The (HOU) Central Plant is designed for a 42°F leaving water temperature to provide for a 14°F chilled water rise based upon a 42°F chilled water supply. All equipment is designed for a 14°F chilled water rise. Any cooling equipment and controls not maintaining the design chilled water rise (14°F) during all load conditions must be promptly identified, cleaned and/or repaired, then if not in balance, the Director must be notified. At the Director's Option, the units will be adjusted as required to meet design load conditions and water temperature rise under Other Work/Services. Contractor shall not raise design leaving Chilled Water Supply Temperatures at the (HOU) Central Plant unless a 14°F chilled water rise can be maintained. Contractor shall not lower Leaving Air Temperatures at AHU Coils below that established in design schedules except on a temporary basis while finding a satisfactory solution to temperature control problems.

10.4 (EFD) Operating Philosophy

Contractor shall operate and maintain HVAC equipment at (EFD) to provide optimum performance, energy usage, and reliability. The HVAC systems should maintain a year-around interior ambient of 75 degrees temperature and 50% relative humidity within the building envelopes.

11.0 (IAH) SYSTEM OVERVIEW - PERFORMANCE REQUIREMENT SYNOPSIS

11.1 (IAH) Central Plant

The IAH Central Plant houses all of the major equipment providing a closed loop chilled/hot water HVAC system to Terminals A, B, C, D and FIS Building. As a part of Basic Services, Contractor shall operate and maintain all systems within the Central Plant. The major systems include, but are not limited to, the following:

- Steam Generating System
- Hot Water System
- Refrigeration Units
- Chilled Water System
- Condenser Water System
- Service Water System
- Compressed Air System
- Air Distribution, Heating, Ventilating and Exhaust Systems
- Auxiliary Systems
- High Voltage Transformers for Chillers and Motor Control Centers (transformers located adjacent to the Central Plant building) and across the street in the electrical sub-station.
- Sump Pumps
- Electrical Equipment

The primary heating and cooling mediums are conveyed from the Central Plant via tunnel to Terminal B and underground chilled water connecting west of Terminal C where distribution is accomplished to the rest of the complex.

The Central Plant also houses the Administration Offices for Contractor and the repair facilities for the Contractor's 24-hour on-site staff complete with break and restroom/shower facilities.

11.2 (IAH) Central Plant Equipment

- A. Contractor shall operate and maintain all systems in or associated with the Central Plant. A detailed listing of Central Plant Equipment is provided in Exhibit "I."
- B. Contractor shall operate and maintain all electrical power distribution from the point the power comes into the transformer complex at the plant.
- C. Contractor shall operate and maintain all HVAC-related piping systems, electrical distribution systems and appurtenances from the Central Plant to the Terminals, FAA Control Tower and Marriott Hotel.

- D. Contractor shall maintain all domestic water components from the meter that supports the Central Plant functions (i.e. cooling towers, makeup water, standpipes, fill pipes, backflow preventors, and domestic water within the plant).
- E. Contractor shall maintain all the chilled and hot water piping to all demarcation points (i.e. FAA Tower entrance valve point; Marriott Hotel entrance valve point; all other (IAH) distribution side chilled and hot water).

HAS will provide access (digging, trenching, etc.) to piping outside the building envelope, which is not accessible through the tunnel system or other accessible means in order for Contractor to perform repairs.

11.3 (IAH) Terminals "A," "B," "C," "D," and "FIS"

As a part of Basic Services, Contractor shall operate and maintain all HVAC systems and equipment in or associated with Terminals "A," "B," "C," "D," and "FIS". The environmental systems utilized in the Terminals at (IAH) employ many different types of air conditioning systems, heating and ventilating units, heat transfer systems, etc. A detailed listing of (IAH) Terminal Equipment is provided in Exhibit "I."

11.4 (IAH) Terminals "A," "B," "C," "D" and "FIS" Equipment and Systems

As a part of Basic Services, Contractor shall operate and maintain all HVAC systems in or associated with Terminals A, B, C, D, and FIS. A detailed listing of Terminals A, B, C, D, and FIS Equipment are provided in Exhibit "I." The following is a general description of the Terminals - HVAC equipment.

- A. Air Handling Units/Filters
- B. Outside Air Pretreatment Units
- C. Air Distribution Systems
- D. Air Terminal Units on Air Distribution Systems
- E. Control Air Compressors
- F. Air Dryers
- G. Exhaust/Circulating Fans (Baggage Make-up)
- H. Supply Fans
- I. Heating and Ventilating Units
- J. Special Filtration Systems
- K. Outside Air Fans
- L. Exhaust Fans for Inside of Terminal Areas
- M. Hot Water Converters & Generators/Heating Water systems
- N. Hot Water Converters & Generators/Domestic Hot Water Systems
- O. Tri-Plex Domestic Water Pumps
- P. Terminal Secondary Chilled Water Circulating Pumps
- Q. Terminal Heating Hot Water Circulating Pumps
- R. Variable Speed Drives on Fans and CHW & HT Pumps
- S. Variable Frequency Drives on Fans and Pumps
- T. Terminal Domestic Hot Water Circulating Pumps
- U. Sanitary Bilge Pumps and Sump Pumps
- V. Storm and Ground Water Pumps
- W. Computer Building Management and Control System w/Pneumatic Actuation.

- X. Sewage Pump Monitoring Station (Terminal D Gate Area 1)
- Y. Domestic water filtering Systems in T-A North and South.

11.5 Performance Requirements at (IAH) - Terminals A, B, C, D, and FIS

11.5.1 General

(IAH) Terminal Buildings A, B, C, D, and FIS are supplied primary heating and cooling mediums from the remote Central Plant facilities located at the west end of Will Clayton Parkway. The Terminal systems are designed to maintain 74°F + 1°F indoor temperature through wide variations of outdoor temperature utilizing chilled and high temperature hot water. The mediums are conveyed in tunnels and pedestrian walkways to each terminal. The Central Plant system is capable of supplying chilled water at 40°F on demand to meet peak cooling demands with no more than 42°F at the coil. The Plant is also capable of supplying high temperature hot water at a temperature of 300°F on demand to meet peak heating requirements. Hot water for domestic use and kitchen use is converted by shell and tube heat exchangers in hot water generators at each Terminal Complex. The Domestic hot water systems are designed to provide 160°F water. HAS will select Primary and Domestic Hot Water Temperature settings as required to meet requirements in individual Terminals. Contractor shall maintain all primary water, air, and secondary air systems to meet design and performance requirements set forth in the specific Contract documents under which they were installed. A detailed listing of Terminals Equipment is provided in Exhibit "I." Coil leaving air temperatures are generally designed for 52.5°F leaving air temperature for all new equipment and new coils with 42°F entering water while maintaining a 15°F water temperature rise. Lowering leaving air temperatures below 52.5°F is not acceptable as a satisfactory solution to resolving any space temperature control problem. This Practice results in lower water temperature rise reducing Central Plant and Distribution System Deliverable Capacities. AHU system balancing including Fan and Coil, maintaining clean filters, and cleaning coils are the proper ways to maintain AHU System performance in accordance with design conditions. 2-inch pleated filters need to be changed out at .8 inches on the magnehilic, 6-inch box filters need to be changed out at 1.25 inches. NO EXCEPTIONS. Any time the Director finds dirty filters on any AHU that unit will have the coils cleaned. Coil cleaning will be done on third shift, NO EXCEPTIONS.

11.5.2 (IAH) Terminal Buildings A, B, C, FIS, and APM

Air Handling Equipment or air handling units with new coils in these Terminals have been designed and selected for 52.5°F leaving air temperature. Equipment installed prior to 1990 is all designed to meet a performance requirement of 54°F with 42°F chilled water at the coil. Under these conditions all unit coils will produce a 15°F Water Temperature Rise. Air temperature leaving coils must not be set below a temperature resulting in less than a 15°F water temperature rise.

A. Below Grade – Inter-Terminal Train (ITT) Level

The ITT Level of both Terminals consists of Mechanical and Electrical rooms to the south of the ITT Track area. The Electrical Rooms serve primary electric power to the Terminals. "Pump Rooms" in each Terminal contain pumps to provide adequate pressure and flow for cooling and heating water to the Terminals. High

temperature water heat exchangers for generation of heating water are also located in the pump rooms. Domestic hot water generators/storage tanks in this same area provide domestic hot water for the Terminals.

1. Terminal A has developed areas north of the tracks at the ITT Level but Terminal B has not. This area in Terminal A contains the ITT Train service and maintenance area and other general airport service equipment and other service agencies. These areas are cooled and heated by multi-zone and single-zone units. All outside air is pretreated.
2. Below the elevator core area of the ITT Level in both Terminals are elevator machine rooms. These rooms contain sump pits and pumps and an air-handling unit to cool elevator machinery.

B. Train-Pedestrian Tunnel

This area is served by low pressure single zone units located in fan rooms adjacent to Pump Rooms in Terminals A & B and in rooms at or under Stairwells #2, #4, #5, #7 and #9 and at the ITT Train Turn-around at Terminal D Train Stop. Low-pressure single zone variable temperature units without outside air pretreatment units serve the pedestrian Tunnel. The supply is routed above the ceiling to conventional diffusers with air returned through the ceiling plenum, then to a main return duct to the AHU mechanical room. The Pedestrian Tunnel will be maintained at 74°F.

C. Ground, Second Level and East & West Side Mezzanine Level

1. The ground floor of both Terminals A & B are used as general terminal access, baggage handling and claim and private offices for Airport personnel and airline baggage services. The second floor is ticketing, food service and airline ticketing office areas. This level also provides access to arrival and departure areas in concourses and flight stations in Terminal A and flight stations only at this time in Terminal B. East & West Side Mezzanine Levels of both terminals are used primarily as office space.
2. On the 1st parking level of Terminals A & B, four major quadrant air handling mechanical rooms serve the terminal building ground, second and east and west sides of the terminal mezzanine floor areas. The mechanical rooms are positioned over the wings of the terminals and contain two recently upgraded AHU's, one double duct type and one multi-zone type, and one new outside air pretreatment unit (OAPU) to serve the primary terminal areas. The space temperature through the air distribution system is controlled with dual duct fan powered air terminal units. The new OAPUs provide outside air to the two AHUs serving general public and private office areas. Supply air is conveyed downward to the mezzanine, second and ground levels through supply/return air chases in the various quadrant wings of the Terminal below the mechanical equipment rooms. Cold supply air must be maintained at 52.5°F for humidity and temperature control on all these units.

3. The ground level baggage pick-up areas are served by the multi-zone systems and office areas by dual duct systems. Each office zone is controlled by local thermostats controlling a dual duct mixing box. Multi-zone systems are controlled by thermostats and the AHU mixing damper section at the unit.
4. The dual duct control settings for the new and existing upgraded units with new cooling coil systems are scheduled for 52.5°F cold deck settings. Hot deck settings will vary with the zone of greatest heating demand to maintain a 74°F indoor temperature.
5. Pedestrian traffic, baggage and high infiltration rates create greater filter maintenance on the ground and second level AHU's. Filters on AHUs at these levels will be scheduled for more frequent replacement.

D. Ground, Ticket & Mezzanine Levels—Terminal A - E Face & W Wings

1. Flight Stations in Terminal B - These flight stations are part of the Terminal B complex.

Flight Stations #5, 7 and #8 have dual duct fan powered air terminal units installed in 1990. Flight Station #6 has dual duct air terminal units installed in 1996 that are not fan powered. Coil leaving air temperatures should be set on these units at a minimum of 54°F to assure adequate return water temperature.

2. Terminal B Concourse Ways to Flight Stations - The four concourse ways were designed into the original complex to provide access to flight stations. These concourse ways are served by low-pressure single-zone units with outside air pretreatment units. The supply is routed above the ceiling to conventional diffusers with air returned through the ceiling plenum, then to a main return duct to the AHU mechanical room. Coil leaving air temperatures should be set on these units at a minimum of 54°F to assure adequate return water temperature. The outside air pretreatment unit serving air to concourse way units should have the cold deck temperatures at 52.5°F
3. Grade Level of Flight Stations - The grade level is conditioned by a dual duct system with one AHU. Dual-duct and single duct fan powered ATUs (mixing boxes) and variable air volume ATUs are controlled by zone thermostats.

Coil leaving air temperatures should be set on these units at a minimum of 54°F to assure adequate return water temperature.

4. Second Level of Flight Stations - This space serves as the passenger arrivals/departure area. This level is conditioned by two dual duct systems with two AHUs, one serving the east and the other serving the west half of the flight station. The controls are similar to the terminal building systems. Space temperature is controlled through Dual-duct and single duct fan powered ATUs (mixing boxes) by zone thermostats. Coil leaving air

temperatures should be set on these units at a minimum of 54°F to assure adequate return water temperature.

11.5.3 Terminal Building D

A. Terminal D is situated directly east of Terminal C and North of the West bound terminal through road. It is essentially a four-story linearly configured structure with a two-story connecting corridor to the West, which connects Terminal D with Terminal "C." The remote Central Plant supplies primary heating and cooling mediums for the Terminal. The mediums are conveyed through primary piping systems in tunnels and pedestrian walkways connecting all terminals with the Central Plant.

B. Terminal D HVAC Equipment

As a part of Basic Services, Contractor shall operate and maintain all HVAC systems in or associated with Terminal D. A detailed listing of Terminal D Equipment is provided in Exhibit "I." The following is a general description of Terminal D HVAC equipment.

1. Air Handling Units and associated Control Valves.
2. Outside Air Pretreatment Units
3. Electronic Air Cleaners and Carbon Filter Systems
4. Fan Powered Air Terminal Units w/ Heating Coils
5. Exhaust/Circulating Fans (Baggage Make-Up)
6. Fan Coil Units

Heating and Ventilating Units

7. Heating Hot Water Converter/Generators
8. Domestic Hot Water Converter/Generators with recirculation Water Pumps
9. Chilled Water Circulating Pumps
10. Heating Water Circulating Pumps
11. Domestic Hot Water Return Pumps
12. Sump Pumps
13. Exhaust Fans for Inside Terminal Areas
14. Andover/Nucleus System (Computerized Building Management System)

In summary, there are 31AHUs including outside air pretreatment units; Single zone, Multi-zone and Variable Volume units. There are 7 Fan coil units, 2 Heating ventilation units, 13 exhaust fans, 3 transfer fans, 1 DX split system, 16 relief fans, 7 electronic air cleaners, 4 Leibert unit maintaining the requirements of the telephone and airlines file server system.

C. Andover Control System

1. The existing Andover Control System is an automated environmental control and monitoring system for the HVAC system in Terminal D. The Andover Control System is operated on a Starbus Network, which uses a polled, packet-switched, statistical multiplexing method of communications.

2. The Andover Control System includes, but is not limited to, four (4) AC256 plus Andover Controllers, approximately twenty (20) Andover LCU-8 Local Control Units, and sensors located throughout the HVAC system. Two (2) Wyse Terminals are attached to the Starbus network to interface with the Andover Control System; one of these is located at the Central Plant. The Starbus network includes a poller at Terminal "B" and signal repeaters at Terminals "B" and "C" to allow access by the Facilities Administration Section at Terminal "A." Other non-HVAC systems may require connectivity to the Andover Control System – Contractor shall maintain the Andover Control System part of such additional systems.
3. The Andover Control System is an automated environmental control and monitoring system for the HVAC system in Terminal D. The Andover Control System is operated on a Starbus Network, which uses a polled, packet-switched, statistical multiplexing method of communications.

D. Performance Requirements – Terminal D

1. Water Side System

- a. The chilled water and high temperature water systems deliver water from the Central Plant through primary water piping distribution systems in tunnels and pedestrian walkways. Chilled water is designed for delivery at 40°F supply. High temperature water is designed to deliver heating water to the Terminal at 180°F.
- b. In Terminal D are two (2) chilled water pumps with variable speed control. The control points for the network is a 44-66 PSI delta to be maintained in the branch circuits pressures at the ends of the network.
- c. The hot water system has two (2) pumps. The super heated water is delivered through the tunnel and walkway. The system has two heat exchangers with a temperature reset schedule from supply water equal to 180°F at outside temperature of 20°F to 80°F.
- d. The control valves on the water-side at the air handler units in Terminal D, which throttle the water through the air handlers, should be exercised through their entire stroke on a daily basis.

2. Air Side System

- a. Level 121 lobby - is served by several AHU's. Supply is through fan powered VAV boxes of various types, some of which have reheat capabilities. Fan powered VAV boxes without heat take care of the air conditioning requirements throughout the remaining areas with some of the small exclusive areas being handled by VAV boxes.
- b. Fixed Bridges - are all conditioned with single zone air handling units with 75°F within the space, controlling the heating and cooling valves. These units are all of the Constant Volume Type.

- c. Level 106 - has the full variety of units used on this "site" from Fan Powered VAV boxes with and without heat to straight forward VAV boxes without fan assist. Temperature set point as with other levels is 75°F.
- d. Level 100 - which interfaces directly with the outside, uses relief fans, outside air fans, heating ventilation units and air handling units along with fan coil units. At the eastern edge of Level 100, where the airline operations have their offices and work areas, there are the full assortment of VAV box types used on site, all with 75°F as their objective.
- e. Level 88 - houses the majority of offices along the interior and per design should require no heating through straight VAV units serving these areas. The lobby is basically handled by two (2) AHU's each having multiple temperature sensors with the highest and the lowest of their respective AHU controlling its hot and cold deck accordingly. The western half of the level because of its diversity of loads has all types of VAV units.
- f. Level 74 and Train Tunnel areas - are serviced by VAV AHU's with 53°F set points.

E. Restricted Access Areas – Terminal D

Access to Terminal D Operations Areas is limited to Contractor's personnel, HAS employees, and certain individuals authorized by the Director, provided those persons identified by the Director do not interfere with or jeopardize the Contractor's responsibilities under this Agreement. Contractor shall conform to such identification and security procedures as the Director may deem necessary and as required by law and FAA regulations. Access must be strictly controlled and Contractor shall keep a record of all keys distributed to its personnel. Officers, employees or agents of Contractor shall never enter restricted or operational areas of Terminal D without the express permission of the Director or any other governmental bodies having jurisdiction, and Contractor hereby assumes full liability arising from any such unauthorized incursions.

11.5.4 Other Remote Facilities

- A. FAA Tower

IAH primary distribution systems (PCHW & HTW) to the FAA Tower; Service Applies up to, but not including, Secondary CHW Pump Headers; Service Applies up to, but not including, Heating Water Heat Exchanger.
- B. Airport Services Complex (ASC)
 - 1. The Airport Services Complex (ASC) is located at 4500 Will Clayton Parkway and was put into service in March, 1992. The ASC comprises the following buildings and facilities.

- Technical Services Division Offices and Supply Warehouse
- Physical Plant Maintenance (PPM) Offices and Service Bays
- Airfield & Grounds Maintenance Building
- Airfield & Grounds Maintenance/Covered Equipment Storage Sheds
- Vehicle Wash Facility
- Vehicle Fueling Station

2. ASC HVAC Equipment

Contractor shall maintain all HVAC systems in or associated with the ASC. A detailed listing of ASC Equipment is provided in Exhibit "I." The following is a general description of the ASC HVAC equipment.

- a. Packaged Chiller
- b. Air Cooled Condensing Unit
- c. Air Handling Units
- d. Air Handling Unit Filters
- e. Air Handling Unit Interlocks
- f. Ventilating Fans with thermostats, speed controls, etc.
- g. Fire Dampers
- h. Electric Duct Heaters
- i. Gas-Fired Warm-Air Heating Units
- j. Air Distribution Devices
- k. Volume Dampers
- l. Liebert unit in Main Distribution Frame (MDF) Telephone Room

3. Performance Requirements – ASC

Contractor shall operate the HVAC systems to maintain a year-around interior ambient of 74 degrees temperature and a maximum of 50% + 5% relative humidity in summer within the building envelope, except for the MDF Telephone room in which Contractor shall operate the Liebert unit to maintain a year-around ambient of 68 degrees with a non-condensing relative humidity.

4. Aviation Administration Building

Contractor shall maintain all HVAC systems in or associated with the Aviation Administration Building. A detailed listing of Administration Complex HVAC Equipment is provided in Exhibit "I." The following is a general description of the Administration Building HVAC equipment.

- a. Air Cooled Chillers
- b. Air Cooled Condensers
- c. Air Handler Units
- d. Chill Water Pumps
- e. Air Compressor with Air Dryer for instrument air.
- f. Boiler

Performance Requirements - Administration Complex

The HVAC system should maintain a year-around interior ambient of 74 + 1 degrees temperature and a maximum of 50% + 5% relative humidity in summer within the building envelope.

5. Panalpina

Contractor shall maintain all HVAC systems in or associated with the Panalpina buildings. A detailed listing of Panalpina Buildings HVAC Equipment is provided in Exhibit "I." The following is a general description of the Panalpina Buildings HVAC equipment.

- a. Chillers (1) 80 Ton & (1) 50 Ton
- b. CHW pumps
- c. Chill Water Pumps
- d. Air Handler Units
- e. Controls
- f. Duct & Grills

Performance Requirements - Panalpina Buildings

The HVAC system should maintain a year-around interior ambient of 74 + 1 degrees temperature and a maximum of 50% + 5% relative humidity in summer within the building envelope.

6. Other Remote Buildings/Facilities

A. In several remote buildings and structures at the Airport, Contractor shall maintain the HVAC equipment. It is anticipated that certain of these facilities, which are HAS-owned, will be leased to other tenants during the Agreement Term, and future lease agreements may transfer responsibility for maintaining applicable HVAC equipment to the new leaseholder; it is anticipated that certain facilities, which are non-HAS-owned, but currently leased by HAS, will be excluded from the Agreement at the termination of lease periods; it is anticipated that quantities of Security Guard/Taxi Booths may increase or decrease during the Agreement Term. Remote buildings and structures include the following.

- *18845 Col. Fischer Dr. (Fleet Maintenance Facility)
- Vault #1432
- FAA Motor Maintenance
- Vault 927
- *U.S. Customs Cargo Bldg. (Cargo Buildings "A" and "B")
- *Cargo Area (USDA APHIS 3014 McKaughan)
- Vault 826
- *5051 Wright Road
- 3060 Air Freight (Freight Forwarder Building)
- Security and Taxi Booths
- Cargo Building N Suites A & B1, 18500 Lee Road (Airport Engineers)
- Fire Stations

*(Locations marked with asterisk and italicized indicate facilities most likely to be affected by future lease agreements).

B. Remote HVAC Equipment

Contractor shall maintain all HVAC systems in or associated with the remote buildings and structures. A detailed listing of Remote Equipment is provided in Exhibit "I." A general description of the remote HVAC equipment follows:

- Air Cooled Condenser Units
- Air Handler Units
- Fan Coil Units
- Gas Flow Furnaces
- Forced Air Furnaces
- Boiler
- Air Compressor w/ air dryer

C. Performance Requirements - Remote

The HVAC system should maintain a year-around interior ambient of 75 degrees temperature and 50% relative humidity within the building envelop.

11.5.5 Miscellaneous DX Equipment

The IAH airport system includes certain buildings housing both HAS employees and airport tenants that fall outside the chilled water closed loop system including Airport Services Complex, HAS Administration Building, Panalpina buildings, and Other Remote Buildings/ Facilities. The designation (DX) in these documents identify those specific stand alone systems for which O&M HVAC services Contractor is responsible to operate and maintain. The systems in these facilities range from stand alone 3/4-ton window units to complete packaged heating and cooling units.

A. Miscellaneous (DX) HVAC Equipment

Contractor shall maintain certain DX HVAC equipment. A detailed listing of Miscellaneous (DX) HVAC Equipment is provided in Exhibit "I."

1. Window Units
2. Packaged Units
3. Roof Unit
4. Blower Unit

B. Performance Requirements Miscellaneous (DX)

The HVAC system should maintain a year-around interior ambient of 75 degrees temperature and 50% relative humidity within the building envelope.

12.0 (HOU) AIRPORT SYSTEM OVERVIEW - PERFORMANCE REQUIREMENT SYNOPSIS

12.1 (HOU) Central Plant

The Central Plant houses all of the major equipment providing a closed loop chilled/hot water HVAC system to the Terminal. Contractor shall operate and maintain all systems within the Central Plant. The major systems are as follows:

- Hot Water System
- Refrigeration Units
- Chilled Water System
- Condenser Water System
- Service Water System
- Compressed Air System
- Air Distribution, Cooling and Heating Air Systems
- Make-up Air, Ventilating and Exhaust Systems
- Control Systems
- Auxiliary Systems

12.2 Existing (HOU) Central Plant Equipment

The Central Plant houses the Administration Offices for Contractor and the repair facilities for the Contractor's on-site staff. Contractor shall operate and maintain all systems in or associated with the Central Plant. A detailed listing of Central Plant Equipment is provided in Exhibit "I." The following is a general description of the existing Central Plant HVAC equipment.

A. Hot Water Boilers

1. Two- (2) gas fired water tube boilers - capacity of 960 gal. each
2. Two (2) HVAC hot water circulating pumps - 30 HP

B. Domestic Water System

1. Water heater – 260,000 BTU
2. Domestic hot water circulation pump – ½ HP

C. Refrigeration Units – Centrifugal Water Chillers

1. Four York Chillers
2. Four chilled water pumps, 1200 gpm @ 80Ft. head

D. Chilled Water System

1. Five (5) secondary chilled water circulating pumps.
2. Chilled water expansion tanks
3. Four primary chilled water pumps, 1200 gpm @ 80Ft. head

E. Condenser Water System

1. Four Cell 1500 gpm cooling towers @ 96°F to 86°F
2. Four 50 HP each cooling tower fan motors
3. Four (4) Ceramic/cellular w/ 3' PVC tower cell fill. (500 tons Ea.)
4. Four (4) chilled water circulating pumps.
5. Four (4) chilled water circulation pumps, horizontal split case.
6. One (1) Condenser water filter system.

- F. Refrigerant Recovery Unit - One (1) ¾ HP Low pressure recovery unit
- G. Condenser Tube Cleaner - One (1) pneumatic condenser tube cleaner
- H. Compressed Air Systems
 - 1. Two (2) twin air compressor.
 - 2. Air dryer.

12.3 (HOU) MAIN TERMINAL AND CONCOURSE AREAS

The (HOU) Main Terminal Building houses the (HOU) Central Plant. The Main Terminal Building handles Ticketing and Baggage and presents access to Concourses A, and C. These concourses were built at separate times and have been expanded to and renovated within a number of times. Air handling systems currently serving the upper and lower terminal areas are principally constant volume and multi-zone types. For most multi-zone units, the Mechanical Rooms are a common return plenum. Newer air handling units use ducted returns. Units installed in recent years including the baggage claim areas, west end, and east end ramps are in good condition.

Contractor shall operate and maintain all existing HVAC systems and equipment in or associated with the Terminal and Concourses, plus other Remote Facilities. The environmental systems utilized in the Terminal at (HOU) employ many different types of air conditioning systems, heating and ventilating units, heat transfer systems, etc. Contractor shall minimize exhaust air requirements and maximize outside air intake requirements to minimize fumes and humidity. A detailed listing of Terminal and Concourse equipment is provided in Exhibit "I."

12.4 Existing (HOU) Terminal and Concourse Equipment

The following is a general description of the HVAC equipment.

- A. Air Handling Units/Filters
- B. Control Air Compressors
- C. Air Driers
- D. Exhaust/Circulating Fans
- E. Supply Fans
- F. Heating and Ventilating Units
- G. Hot Water Boilers
- H. Chilled Water Circulating Pumps
- I. Hot Water Circulating Pumps
- J. Outside Air Fans
- K. Exhaust Fans for Inside of Terminal Areas
- L. Unitary DX HVAC Equipment
- M. Fan Coil Units
- N. Air Curtains
- O. Air Distribution Devices

12.5 (HOU) Energy Management and Control.

- A. Existing Control Systems:

Existing Controls are a combination of electric/pneumatic and Metasy's DDC system. Some of these controls will all be demolished as a part of the renovation and expansion projects. Contractor shall maintain existing controls and make adjustments as required to make the construction phasing, sequencing and transitions as painless as possible. Contractor will work with the construction Contractors to assure that existing controls are left in service until new controls are ready for service.

B. **New Control Systems:**

Bac-net protocol of Local Intelligent Control Panels are in place at (HOU) for each air handling system, the chillers, and heat exchangers. The local intelligent panels have stand-alone capability, and contain all programs necessary for equipment operation. The local intelligent panels will be able to interface with the centralized control system.

The control system is an open protocol BACnet Building Automation and Control System, which includes UES and Alerton. Included in the Hardware for the system is EMI/RFI remediation in component and control panel selection and in construction procedures. HAS requires all systems not BACnet to provide Owner release of the Propriety Protocol and to have a gateway for permitting full communication capabilities. Specific controls systems include:

1. Chiller Controls

The factory installed unit mounted electronic control panel controls the chiller operation and provide for the safe operation of the chiller if the following conditions are encountered:

- Cold condenser start
- Running with hot condenser water
- Low condenser water flow
- Hot evaporator start
- Return from momentary power losses in less than 1 minute

Control panel is able to control the chiller's operation through diagnostics and diagnostic history that are time/date stamped. Diagnostics include among many others (1) sensor and switch faults, (2) excessive purge activity, (3) overload trips, (4) loss of flows, (5) high motor winding temperature.

The control panel is able to communicate with a BACnet Compatible Building Automation System.

2. Pump Control

The BACnet Compatible Energy Management and Control System for the primary variable speed pump operation will be capable of performing the following:

- Alternating pumps
- Staging pumps
- Controlling AFD speed
- Monitoring of motor performance
- PID functions and set point modifications
- Energy management through a de-coupled system

3. HVAC Air Side Systems Controls

Variable Air Volume Air Handling Units includes a factory furnished and mounted direct digital control panel for temperature control and energy management function. The system includes electronic actuators for coil control valves, dampers and duct pressure sensors for variable fan speed operation. DDC controllers are of modular construction and be able to withstand vibrations if mounted inside the AHU. The system is capable of controlling all the air handling unit operational parameters including:

- Discharge temperature reset
- Supply fan state control and status
- Supply/return air temperature monitoring and control
- Outdoor air flow monitoring control. (For 100% O.A. Units)
- Night set back, warm-up and cooling down cycles
- Space and duct humidity control
- IAQ monitoring through CO₂ sensors with O.A. control
- Variable frequency drives control from static pressure transducer
- Optimum start/stop, soft start
- Fan over pressurization safety switch
- Smoke control functions
- Chilled and hot water valves control
- Fan Operation status
- Filter status

4. Inter-operability with BACnet-Compatible Building Management Systems

Constant Volume Air Handling Units are controlled by a general type direct digital control system for temperature control and energy management functions. DDC controllers are of modular construction and be able to withstand vibrations if mounted inside the AHU.

Variable Air Volume Modules are controlled using a general type direct digital control system. Individual space temperature sensors as part of a sensor group will be used as an input for a master zone controller.

5. Compressor Air System

The existing air compressor is providing air for the existing pneumatic control systems.

12.6 Performance Requirements – (HOU) Main Terminal and Concourses

- A. General – The Terminal Building is supplied primary heating and cooling mediums from the Central Plant facility. The systems are designed to maintain 74 + 1°F

indoor temperature through wide variations of outdoor temperature utilizing chilled and hot water. The mediums are conveyed through various piping throughout the terminal. The system should be capable of supplying chilled water at 42°F on demand with no less than 42.5°F at the coil, and hot water should be delivered at a temperature of 165°F. Hot water for domestic use and kitchen use is converted by shell and tube heat exchangers. HAS will select Primary and Domestic Hot Water Temperature setting. Contractor shall maintain all primary water, air, and secondary air systems to meet design performance requirements.

B. Special Conditions

HVAC Design Conditions. Carrier E20-11 cooling load calculation program was used to calculate the building cooling/heating block load. The air conditioning system is designed to maintain the specified indoor conditions at the specified outdoor weather conditions.

Outdoor Conditions

Summer:	97° F DB	77° F WB
Winter:	28° F DB	

These temperatures are based on ASHRAE 1% design conditions.

Indoor Conditions

Area Designation	Cooling RH Control	Heating RH Control
Concourses, Baggage Claim, Gates, Ticketing	74°Fdb±1°F No RH Control	74°Fdb±1°F No RH Control
Office & Other Areas	74°Fdb±1°F 50% RH±5%	74°Fdb±1°F No RH Control
Mechanical Rooms	104°F (Max) No RH Control	60°F DB No RH Control

The Total Estimated Building Cooling Loads:

Ticketing Building Lower (Level 1) 650 tons
 Ticketing Building Upper (Level 2) 450 tons

Central Concourse	1,150 tons
Central Concourse expansion –	100 tons
Bridge	50 tons
Total	2,400 tons

1. A central dedicated ventilation unit will handle transmission and internal loads. Unit is a modular double skin construction complete with a centrifugal

or airfoil supply fan section, cooling coil section with copper coil/copper fin construction, a heating coil section with copper coil/copper fin construction, an access door section wide enough to allow for adequate maintenance, a filter section comprising a 2" thick 30% efficiency pre-filter section, an electric excitation field and a 12" thick 85% efficiency cartridge filter, and a mixing box with O.A. measuring station (VAV units only).

2. An airflow measuring probe station is mounted on the supply ducts to provide for flow balancing and measuring.
3. A dedicated outdoor air handling unit (O.A. AHU) will handle the outside air sensible and latent loads. This unit is of modular double skin construction complete with copper coil/copper fin cooling coil section, a copper coil/copper fin heating section, an 85% efficiency 12" cartridge filter section, and a centrifugal fan supply section. A 2-speed fan motor is used and controlled through return air duct mounted CO₂ sensors. The O.A. AHU is complete with unit-mounted starters and DDC control panel for its operation. Two-way modulating temperature control valves with electric actuators and automatic flow control valves are used to control chilled water flow. Three-way control valves are used on the most remote units in the loop to prevent loss of flow conditions.
4. Outbound Baggage Handling Areas. Fresh outside air from a clean source are carried and supplied to dedicated O.A. AHUs in the baggage handling areas. Air will then be treated and tempered to a minimum temperature of 65°F in summer and maximum of 75°F in winter and supplied through a duct distribution system to spot cool the work areas. Drum louvers with adjustable cylindrical drums are used to adjust for season change air pattern distribution. Air delivery will be at a speed of 1,500 FPM. Redundancy will be used as each conveyor belt is supplied by two overhead supply air ducts from two independent units.
5. Baggage Claim Conveyor Belt Area. Air curtains are installed on all baggage claim area conveyor belts to prevent air infiltration from the tug drive area. Air curtains are interlocked with the security door operation.
6. Ventilation for Toilet Rooms. Toilet room ventilation is designed to come from adjacent areas. Hence, Contractor shall maintain toilet areas at negative pressure conditions at all times. The air requirement for ventilation will be the highest of the following:
 - CFM/sq. ft. of toilet room floor areas
 - 15 ACH in the toilet room areas
 - 50 CFM/WC or 50 CFM/Urinal
7. Backwardly inclined in-line centrifugal exhausters are used to push the air outdoors. For VAV air handling systems, Contractor shall coordinate operation of the exhausters with the air handling system operation to avoid building loss of pressurization problems.

8. Concession Kitchen Ventilation. Make-up air provided for the concession areas exhaust will not be provided from adjoining spaces. Concession vendors will supply all make-up air quantity required for the kitchen exhaust equipment. Vendors will supply the heating, ventilation and air condition equipment. Chilled/heating water supply and return tapings will be only provided for concession vendor's use. To provide for tenant billing, energy or BTU meters will be used for each independent tenant. Flow meter and temperature sensors in the supply/return piping are installed and connected to the BTU meter.

12.7 (HOU) - BUILDING AT 8800 PAUL B. KOONCE BOULEVARD

12.7.1 HVAC Equipment – Building at 8800 Paul B. Koonce Boulevard

Contractor shall operate and maintain all HVAC systems in or associated with the building at 8800 Paul B. Koonce Boulevard (former FAA facility). A detailed listing of Equipment is provided in Exhibit "I." HVAC equipment includes, but is not limited to, the following:

- A. Packaged Chiller
- B. Air Cooled Condensing Unit
- C. Air Handling Units
- D. Air Handling Unit Filters
- E. Air Handling Unit Interlocks
- F. Ventilating Fans with thermostats, speed controls, etc.
- G. Fire Dampers
- H. Electric Duct Heaters
- I. Gas-Fired Hot Water Boiler Unit
- J. Air Distribution Devices
- K. Volume Dampers

12.7.2 Performance Requirements – Building at 8800 Paul B. Koonce Boulevard

Contractor shall operate the HVAC system to maintain a year-round interior ambient of 74 +10 F temperature and 50% +5% relative humidity within the building envelope.

12.8 (HOU) Remote Buildings/Facilities

Contractor shall maintain the HVAC equipment in several remote buildings and structures at the Airport. Remote buildings and structures that include, but are not limited to, the following.

- Public Safety/TSA/H.P.D. and Facilities Administration buildings
- Fire Station No. 81
- Airfield & Grounds Building
- Vehicle Maintenance Shop
- North Ramp Electrical Vault
- South Ramp Electrical Vault
- Cab Drivers' Break Room
- Parking Garage Ground Transport Building
- Electrical Hangar

- Guard Shacks (N7 & N26) and Parking Booths
- Dog Houses (27 units)
- Fuel Farm A/C Unit
- All domestic water pumps
- All circulating pumps
-

12.9 Remote HVC Equipment

Contractor shall operate and maintain all HVAC systems in or associated with the remote buildings and structures. A detailed listing of Remote Equipment is provided in Exhibit "I." Remote HVAC equipment includes, but is not limited to, the following:

- A. Air Cooled Condenser Units
- B. Air Handler Units
- C. Fan Coil Units
- D. Gas Flow Furnaces
- E. Forced Air Furnaces
- F. Boiler
- G. Air Compressor w/air dryer

12.10 Performance Requirements – Remote Facilities

The HVAC system should maintain a year-around interior ambient of 75 degrees temperature and 50% relative humidity within the building envelope.

12.11 Miscellaneous DX Equipment at (HOU)

The (HOU) airport system includes certain buildings housing both HAS employees and airport tenants that fall outside the chilled water closed loop system, the building at 8800 Paul B. Koonce Boulevard, and Remote Buildings/Facilities. The designation (DX) in these documents identify those specific stand alone systems for which O&M HVAC services for which Contractor is responsible to operate and maintain. The systems in these facilities range from stand-alone 3/4-ton window units to complete packaged heating and cooling units.

12.11.1 Miscellaneous (DX) HVAC Equipment

Contractor shall maintain certain DX HVAC equipment. A detailed listing of Miscellaneous (DX) HVAC Equipment is provided in Exhibit "I."

- A. Window Units
- B. Packaged Units
- C. Roof Unit
- D. Blower Unit

12.11.2 Performance Requirements - Miscellaneous (DX)

The HVAC system should maintain a year-around interior ambient of 74°F + 1°F temperature and in summer a 50% + 5% relative humidity within the building envelope.

12.12 (HOU) Offices under the East and West U-Ramp

The HVAC equipment comprised within vacant offices under the East U-Ramp and PPM offices under the West U-Ramp are fan coil units. A detailed list of the equipment to be maintained is provided in Exhibit "I."

13.0 DUTIES OF CONTRACTOR - BASIC SERVICES

13.1 Division of Responsibility

Normally, Contractor shall make all routine operation and maintenance decisions. Major changes in operation and maintenance philosophy, schedules, and the existing preventive maintenance program must be mutually agreed to in writing by the Director and the Contractor.

The Director reserves the right to make final decisions related to HVAC SYSTEMS operation and maintenance. If the Director chooses to override the Contractor's decisions, the Director shall inform Contractor in writing.

13.2 Direct Digital Control System (IAH) (HOU) & (EFD)

Contractor's shall operate, maintain, and repair direct digital control systems (BACnet, UES, Alerton, Andover, etc.) where applicable at all three Airports.

Contractor shall subcontract the preventive and repair maintenance of the Building Automation System (BAS) system CPU/executive controllers (hardware and software) to a certified OEM supplier to include system software upgrades within current generation software revision levels. Contractor shall self-perform preventive and repair maintenance of all ancillary components such as input-output devices, unitary controllers, and sensors.

Contractor shall maximize the use of the BAS to minimize the consumption of energy and to ensure environmental conditions are appropriate for the various space and areas within the airport facilities. Contractor shall use the BAS for building operational strategies, monitoring, and diagnostics. Contractor shall ensure all components – software and hardware – of the BAS are fully operational and the system is maintained in first class condition.

Fully qualified and certified technicians with a minimum, three years experience on the same or similar type systems shall perform all preventive and repair maintenance on the BAS systems. All maintenance on the BAS must be accomplished in accordance with the original equipment manufacturer's (OEM) specifications and recommendations as documented in the BAS Operations Manual and attendant notices and amendments. Daily operation of the system must be in accordance with the OEM operations manual and controls strategies. Routine daily operational checks and tests of the system must be performed by personnel who are trained on the operation of the system and any anomalies or malfunctions as a result of the checks/tests or experienced during normal operation must be addressed immediately. Daily operational tests and checks must be documented.

The BAS systems are included in Contractor's initial and recurring engineering audit and Contractors Reliability Centered Maintenance methodology. The BAS preventive and

repair maintenance plan must be incorporated into and administered through the Maximo CMMS.

13.3 Best in Practice Service (IAH) (HOU) & (EFD)

Contractor shall implement industry best practices service through use of documented policies, procedures, processes, and employee training programs.

Contractor's best in practice service must include, but not be limited to the following:

- A central Help Desk to provide a focal point for operations planning, scheduling, communications with Contractor's customers, and control of all contract activities; and provide an integrating function for all HVAC program activities including a priority response system and fail-safe process to ensure we respond in the allotted time.
- Efficient deployment and optimum use of all modules and capabilities of the Maximo CMMS that includes electronic documentation and reporting of all HVAC activities.
- An organizational model and work schedules that integrate all elements of strategic site leadership, field supervisory, customer service, and technical responsiveness.
- A model and management approach that considers and fosters internal departmental and external process handoffs, communications, teamwork, and process improvements.
- A reliability centered maintenance strategy that logically incorporates into a maintenance program the proper mix of reactive, preventive, predictive, and proactive maintenance practices.
- An integrated strategic sourcing strategy that combines all elements of vendor integration, supplier diversity, e-commerce, and MRO supply chain management.
- A database that allows Contractor to share best practices at accounts throughout the Nation.
- A world-class performance measurement program.
- Employee-training program that ensures Contractor's employees remain highly skilled and proficient.
- Contractor's continuous improvement that incorporates the latest advances in Quality and Customer Satisfaction programs.
- A communications and reporting program that stresses and mandates customer and internal formal and informal communications and reporting.

Contractor must deploy best practices in HVAC maintenance programs that are integral to the HAS facilities which includes mission critical environments, vendor management, energy management, phase-in processes, HR support, and account planning and reporting.

13.4 Third Party Audits (IAH) (HOU) & (EFD)

HAS may at its discretion, request a 3rd Party Inspection, no more than once a year, at anytime during the term of the agreement. The third party inspection company must be approved by the Director.

3rd Party Inspection – (IAH),(HOU), & (EFD) Propose 3rd party inspection, to verify quality of Operation and Maintenance of HVAC SYSTEMS to include but not limited to:

- Operation & maintenance of HVAC Systems
- Operation & Maintenance of DDC Systems
- Water Treatment Programs
- Proficiency/accuracy of Work performed by Contractor's employees
- House Keeping

3rd Party Inspection will be at Contractor's Cost. Independent and qualified 3rd party agency must be selected by HAS/Contractor. The 3rd Party agent/agency must be accountable to HAS. All reports must be sent directly to HAS with copies to Contractor.

13.5 Energy Management (IAH) (HOU) & (EFD)

Contractor's demand side management program (where 80 % of potential savings reside) includes optimum equipment operation, strict adherence to preventive maintenance, optimum scheduling and control of lighting and HVAC, and recurring energy audits to identify low cost/no cost consumption reduction opportunities as well as in-depth energy audits to identify and recommend capital investments with paybacks of 18 months or less.

Contractor's energy management approach shall include a combination of building tuning, upgrade and retrofits, real time monitoring, control maintenance services and deployment of the intelligent use of the BAS to monitor energy consumption on a real time basis, taking into consideration differing weather conditions, times of day and year, and competitive situations. With this information, Contractor shall develop courses of action designed to both reduce overall consumption and shift the timing of necessary consumption to lower cost periods.

Contractor shall reduce energy usage without adversely impacting tenant comfort using the following approaches:

- A comprehensive maintenance program that helps to ensure that equipment and systems are running at peak efficiency.
- High efficiency rated replacement parts.
- BAS control software must be regularly adjusted to provide maximum benefit from free cooling and outside air-reset technologies.
- Start-up and shutdown schedules must be adjusted to reduce demand charges.
- Institute projects that reduce energy usage

Building Tours

Contractor shall develop tour routes and routines that cover all major equipment. Routes must be designed ensuring operators visit all critical equipment in the most efficient manner possible. Tour routines must be designed to capture any information that is not available to the BAS system but is visible to the employee making the tour. Engineers must tour the building once per shift noting any physical signs of problems with equipment, such as sounds that indicate misalignment, leakage of liquids, or smells related to overheating.

Operating Engineers must use the tour log checklist to record data collected as they check equipment. Whenever there is a performance question concerning a piece of equipment, the touring engineer compares data with the HVAC supervisor on duty to make certain that the equipment is operating to requirements. Operating Engineers must sign the logs at the end of each tour and return them to the project office for filing. Engineers then check the conditions observed against BAS readings.

In conducting tour duties, Contractor's staff must control all pertinent system and equipment operating parameters in a manner that must assure optimum efficiency relative to load demand and seasonal variations. Equipment must be operated only as required and in the most economical manner consistent with the specific Airport's operational needs, equipment manufacturer's recommendations, availability and price of utilities, and other sound practices. All equipment must be routinely checked in accordance with a predetermined schedule. Required frequencies must be constantly updated.

All equipment tour sheets, schedules, and other records must be available at Contractor's Project Manager's office for inspection by HAS personnel. All documents generated or obtained by Contractor that pertain to the operation and maintenance of the HVAC systems and equipment must become HAS property upon contract completion.

Monitoring and Control Services

Using the BAS, Contractor's HVAC technicians can monitor and control individual points of information, equipment and systems and pre-define actions to be taken based on current conditions, predictions of future changes in operating conditions, or external changes in weather, energy, bandwidth and market price fluctuations. Tracking lifecycle costs, energy performance, maintenance needs and reliability of equipment allow for informed management decisions and actions.

13.6 Shared Energy Savings/Incentives (IAH) (HOU) & (EFD)

Contractor, at HAS discretion, shall implement a shared savings approach whereby 80% of the savings will be retained by HAS and 20% will be shared with Contractor. Dollar amounts must be calculated monthly based on the energy unit cost for the particular month, multiplied by the units saved (verified and validated with International Performance Measurement and Verification Protocol (IPMVP)).

13.7 CFC Refrigerants (IAH),(HOU)&(EFD)

Title VI of the Clean Air Act of 1990, as amended from time to time, concerns the depletion of the stratospheric ozone layer, and specifically addresses the use of CFC Refrigerants and regulations to significantly limit their production and venting.

Contractor/Contractor shall comply with Title VI, Clean Air Act of 1990, together with any amendments thereto, and together with any other applicable governmental regulations related to the use of CFC Refrigerants. The City strictly prohibits the discharge of CFC Refrigerants into the atmosphere resulting from the installation, repair, maintenance, or any condition requiring the release of CFC Refrigerants from any City-owned equipment, system, etc., new or existing.

Contractor shall ensure the necessary procedures and safeguards are in place to prevent the occurrence of a CFC Refrigerant discharge into the atmosphere.

All costs associated with removal of CFC Refrigerants for the purpose of recovery, recycling, or reclamation is at Contractor's sole expense and is included in Contractor's costs for Basic Services. No additional compensation will be allowed.

The use of new (unused), recovered, recycled or reclaimed refrigerant by Contractor will be permitted under these specifications. However, Contractor must provide a written statement indicating which it will utilize; new (unused), recovered, recycled or reclaimed and will warrant the refrigerant by any of these methods, to be within the nine (9) physical properties standards set by: ARI Standard 700-88, Table 1 - Physical Properties of Fluorocarbon Refrigerant and Maximum Contaminated Levels.

Any refrigerant that has been reclaimed must meet the then current ARI Standard 700-88 before it may be introduced into any City system. Appropriate test results must be submitted supporting the reclaimed refrigerant as being within the established maximums. Contractor shall attest to the test results as being applicable to the recycled refrigerant presented for use in the specified system in accordance with ARI Standard 700-88.)

Contractor shall be responsible and wholly liable, for any and all fines, penalties, taxes, judgments, settlements or liabilities arising out of any violation or infraction of the Clean Air Act of 1990, any amendments thereto, or any other applicable governmental regulations related to the use of CFC Refrigerants.

13.8 Operate the HVAC Systems (IAH)&(HOU)

As a part of Basic Services throughout the term of the Agreement, Contractor shall provide all supervision, labor, tools and instrumentation required to operate all heating, ventilation, exhaust, recirculating and air conditioning and related systems for (IAH) in the Central Plant, Terminals A, B, C and D, Aviation Administration Building, ASC facility, Remote Buildings/Facilities, Miscellaneous DX Equipment and all new facilities that may be built and start operation within the term of this Agreement.

Contractor shall also provide all supervision, labor, tools and instrumentation required to operate all heating, ventilation, exhaust, recirculating and air conditioning and related systems for (HOU) in the Central Plant, Terminal, Building at 8800 Paul B. Koonce Blvd.,

Building, Remote Buildings/Facilities, Miscellaneous DX Equipment and all new facilities that may be built and start operation within the term of this Agreement.

Contractor shall operate and maintain HVAC systems and equipment that include, but are not limited to, the following:

- A. All Central Plant mechanical and electrical systems, for (IAH) and (HOU), including chilled water generation system, condenser water system, steam generation system, high temperature and domestic hot water generation systems, pumping, controls, instrumentation, plumbing system, electrical system, heating system, pneumatic systems, ventilating, exhaust and re-circulating systems.
 - 1. Within the Central Plants, Contractor shall maintain all plumbing systems back to the main line. The Contractor's responsibilities for the plumbing systems within peripheral areas are those HVAC related items such as drains in the mechanical rooms (air handlers, condenser drains, sewage/sump pump and pits, heat exchanger plumbing from tanks to pumps to walls, etc.).
 - 2. Within the Central Plants, Contractor shall clean, inspect, maintain and repair the electrical distribution components as necessary from the point where the power comes into the transformer complex at the plant (refer also to the Annual Maintenance Shutdown, Exhibit "I"). In peripheral areas, Contractor shall maintain the HVAC electrical systems from the existing panels.
 - 3. Contractor shall maintain the SW to MCC and MCC to Equipment at (IAH) and (HOU).
- B. All outdoor systems and equipment related to the Central Plant including piping, pumps, cooling towers, utility services, transformers, cables and switchgear.
- C. All piping systems, electrical distribution systems and appurtenances from the Central Plants to the Terminal(s) and FAA Control Towers.
- D. All heating, ventilating, exhaust, recirculating and air conditioning systems and related systems/equipment for (IAH) in Terminals A, B, C, D, FIS, Aviation Administration Building, ASC facility, Remote Buildings/ Facilities and Miscellaneous DX Equipment, including, but not limited to, heating, ventilating and air conditioning units, exhaust and recirculating fans, automatic temperature controls, instrumentation, pumps, piping system, ductwork, mixing boxes, panel boards, motor starters, disconnect switches and wiring, VAV boxes and electronic air cleaners, etc.
- E. All heating, ventilating, exhaust, recirculating and air conditioning systems and related systems/equipment for the Airports in Terminal Concourse Areas, FAA Buildings, Remote Buildings/Facilities and Miscellaneous DX Equipment, including, but not limited to, heating, ventilating and air conditioning units, exhaust and recirculating fans, automatic temperature controls, instrumentation, pumps, piping system, ductwork – including all supply and return air components, mixing

boxes, and panel boards, motor starters, disconnect switches and wiring, VAV boxes and electronic air cleaners, etc.

- F. Clean and repair all HVAC vents, registers and intake grilles.
- G. Domestic hot water generating systems for the Terminals, and all related controls, plumbing and electrical equipment and systems within their respective equipment rooms. HAS personnel will maintain all domestic hot water and recirculating hot water piping outside the mechanical room.
- H. (IAH) - Maintain and monitor existing high/low temperature sensor alarms located in the telecommunication equipment/switch rooms located in Terminals A and Aviation Administration Building. Both are monitored from the Central Plant via Aviation provided cabling. Contractor is not responsible for the cabling of the sensors to the Central Plant. In the event of a problem associated with the cable, Facilities Administration and AMIS are to be contacted.
- I. Evaluate and troubleshoot electronic and electrical control systems to ensure appropriate repairs are made and maintained.
- J. Replace lamps, ballast, sockets, photocells, etc., in the Central Plants (interior and exterior) and all mechanical rooms with air handling units or sump pits in the terminal(s) and remote buildings.
- K. Operate, service, maintain and monitor the sump pumps and sewage pumps. Contractor shall maintain all motors, pumps, controls, piping, and fittings. Contractor shall inspect pits and submit reports to HAS Facilities Administration Section. Contractor shall clean all debris and silt from the basins and pits.
- L. (IAH) - Operate and maintain the Terminal D Andover system.

13.9 Preventive Maintenance (IAH),(HOU)&(EFD)

As a part of Basic Services throughout the term of this Agreement, Contractor shall perform preventive/predictive maintenance (MMS driven schedule of planned maintenance actions) on HVAC SYSTEMS in accordance with OEM equipment manufacturer's instructions and in accordance with the best preventive maintenance industry practices for the prevention of equipment breakdowns and failures.

The level of preventive/predictive maintenance must reduce remedial maintenance; decreased replacement cost, decreased system down time, prevent the failure of equipment before it actually occurs, preserve and improve equipment reliability by replacing worn components before they actually fail, and or immediately resolve conditions that include, but are not limited to, the following:

- Hot calls
- High humidity
- Poor calibration
- Faulty operators
- Dirty filters
- Worn belts
- Dirty coils

- Duct leaks
- Water imbalances
- Stuck valves
- Equip. shutdown
- Loose wiring
- Valve leaks
- Pipe rust
- Excess noise
- Cold calls
- Poor control
- Control air losses
- Stuck dampers
- No belts
- Loose belts
- Dirty fans/vents
- Air imbalances
- Poor heat transfer
- Plugged strainers
- Equipment failure
- False trips
- Fitting leaks
- Damaged insulation
- Excess vibration
- Degraded Painting
- Exercise valves
- Register cleaning.
- Check backflow preventors in all mechanical rooms, which need to be certified yearly. Approximately thirty (30) various sizes ranging from ¾ in. to 6 in.
- Inspect and change out Zeta Rods as needed.
Central plant – 62 ea., Terminal A – 4 ea., Terminal B – 4 ea., Terminal C – 4 ea., & Terminal D – 4 ea.
- Thoroughly clean all Mechanical Equipment Rooms (MER's) in all facilities within the first six months of this Agreement. This includes floors, walls, mechanical and electrical equipment housings, panels, ductwork, piping, etc. Approximately 141 MER rooms for various sizes.
- Replenishing all Charcoal/Potassium Permanente every 15 months regardless of HP rating. Approximately 2,725 cells of various sizes. Date will be decided by the Director. *Exclude (EFD)*.
- Operate, add, Service and maintain all VAV boxes in Flight Stations and Terminals. VAV boxes must be serviced once every 6 months.
- Install an anti-bacteria agent in the drain pans of all air handlers. (Replenish the substance as needed).
- Drain and clean cooling towers annually of silt deposits etc. - *Exclude (EFD)*.
- Inspect condensers on chillers annually and brush and clean tubes- *Exclude (EFD)*.
- All Ultra violet lighting bulbs are to be changed out once per year in March. *Exclude (EFD)*. (Approximately 279 bulbs).
- Duct cleaning/dusting of all tubular ductwork in Terminal D (Level 88) at the request of HAS officials and with a minimum scheduled cleaning of once per year. This work must be done as to not interfere with the traveling public, i.e. 11:00 p.m. to 6:00 a.m.

Contractor shall apply the same type paint system that currently exists on floors, walls, equipment, piping systems, accessories etc. in accordance with paint manufacturer's

recommendations. All unpainted mechanical room floors must be painted within the first six months of the Agreement.

The following paint systems are recommended by HAS, however; Contractor must obtain the Director's approval of the painting system to be applied prior to performing the Work.

a. Concrete Floors

- Epoxy – Benjamin Moore (M36/M39) Hi-Build Gloss Coating or City approved equal.
- Oil/Alkyd – Benjamin Moore (C112) Alkyd Porch & floor Enamel, or City approved equal.

b. Walls

- Latex – Benjamin Moore (276) Latex Semi-Gloss Enamel or City approved equal.
- Oil/Alkyd – Benjamin Moore (271) Alkyd Semi-Gloss Enamel or City approved equal.

c. Metal – Benjamin Moore (M29) Acrylic Semi-Gloss or City approved equal.

13.10 Reliability Centered Maintenance (RCM) (IAH),(HOU)&(EFD)

As a part of Basic Services throughout the term of this Agreement, the Contractor shall provide Reliability Centered Maintenance on HVAC SYSTEMS at minimum life-cycle costs.

Contractor must submit a narrative describing the Contractor's understanding of RCM requirements, processes, and/or similar type program, which is incorporated herein by reference.

The RCM process is used to determine the most effective approach to maintenance and what must be done to ensure that the HVAC SYSTEMS continues to perform as designed by the OEM within the present operating context. RCM is an ongoing process in which the Contractor gathers data from the HVAC SYSTEMS performance and uses this data to future maintenance and/or recommend design changes.

The RCM philosophy employs Preventive Maintenance (PM), Predictive Testing/Inspection, Reactive Maintenance, and Proactive Maintenance techniques in an integrated manner to increase the probability that the HVAC SYSTEMS will function in the required manner over their design life-cycle.

RCM requires that maintenance decisions be based on maintenance requirements supported by sound technical and economic justification.

RCM includes, but is not limited to,:

- Obtaining the highest level of performance and safety for the occupants and employees maintaining the Agreement.
- Providing maximum functionality, availability, safety and reliability performance of HVAC SYSTEMS at the lowest cost.
- Identifying and implementing the most cost effective actions that reduce the probability of HVAC SYSTEMS failure.

- Provide statistical method of optimizing the preventive maintenance and predictive maintenance programs for HVAC SYSTEMS.
- Establish and identify issues of personnel performance and make any required corrections.
- Restore equipment to the required levels of performance when deterioration occurs, but before failure.
- Collect the data, during the life of the Agreement and/or equipment, to change the workflow or design of the equipment in order to improve its reliability.
- Re-evaluate the workforce and identify efficiencies and changes in personnel for long-term productivity reductions.
- Report monthly progress and areas of improvement in performance, personnel, equipment, and process.

13.11 Inclusion/Exclusion

- The MMS will establish the required Preventive Maintenance / Corrective Maintenance baseline labor hours by type of equipment and approved by the Director.
- Baseline staff hours will be based on productive hours. Assuming 2080 total hours per year (less vacation, holidays and other paid time off) productive hours equal 1940 with actual tool time at 60% or 1164 hours per year.
- Additions or deletions of equipment that equal labor at or above the trigger point of 1164 hour / year indicating that a fulltime equivalent will be required or in excess of service delivery requirement.
- Contract Labor cost will be adjusted based on actual labor cost (addition/deletion) x 1.47%.
- Additions: Contractor will accurately document materials used and subcontractor cost over a 12 month period following additions and at the end of the period contractor will submit to HAS the amount expended plus 12% markup. The contract amount will be adjusted for the remainder of the contract term.
- Deletions: Contract will be decreased by an amount equal to the total cost expended by the contractor for the prior 12 months or measurable period plus 12%.
- In the case of a large addition or deletion of 250,000 square feet of conditioned space both parties agree to negotiate cost based on the above criteria. Labor run rates that will exceed the 1164 hours will be reimbursed to the contractor in the contract year they are incurred.

13.12 Service Credits

Performance	Criteria	Service Credit
Failure to maintain critical environmental conditions per contract as a direct result of contractor's failure to perform critical tasks	Durations over 2 hours periods	\$1,000.00 credit for every 12 hour period temperatures and or humidity are outside of acceptable limits

Continual failure to maintain environmental conditions as defined in the contract	Failure to maintain temperatures in a specific area for more than 3 occurrences within a 90 day period (call backs)	\$1,000.00 per occurrence
Failure to provide Agreements for other work services (OSR) in the time period promised	Upon requests made by HAS for OSR pricing Agreements, contractor and HAS define a reasonable time period in which the response will be delivered to HAS	Contractors failure to meet the time frame or receive an extension from HAS contractor will credit \$100.00 per 24 hours.
Staff positions not filled	Contractor fails to fill a position for 2 consecutive weeks	Position pay grade times 1.47 for the total shift hours the position is not staffed
Failure to complete repairs in a timely manner	Contractor fails to make repairs within 2 days when parts are available	\$500.00 per occurrence
Failure to meet response times	Contractor fails to respond to allocate manpower to calls for service within defined in the contract priority codes	\$100.00 per occurrence
Failure to perform preventative maintenance tasks on critical systems	Contractor fails to complete critical PM's for more than 60 days over schedule	\$100.00 per PM visit schedule as defined in the MMS
Failure to provide operational reports	Contractor fails to report accurate operational data to HAS within defined reporting time periods 90 days.	\$1,000 per occurrence plus \$100.00 per day until report is provided

Non-Assessment of Service Credits

Notwithstanding the foregoing, the Director shall not be entitled to assess Service Credits under any of the following circumstances:

1. Force Majeure
2. Annual shutdowns or upgrades/modifications set forth in the Agreement.
3. Third-party damage (does not apply to Contractor's subcontractors).

4. Damage to HVAC Systems or equipment that is caused solely by the acts of the City.
5. Unplanned material changes to energy requirements not caused by Contractor. However, this exception is available to Contractor only at the sole discretion of the Director.

Remedies

Assessment of Service Credits must never be construed as an exclusive remedy for any other damage incurred as the result of the breach of any other covenants, conditions, or obligations contained in the Agreement, and the City will always have the right to avail itself of other remedies available to it in law or equity.

13.13 Equipment Condition at Expiration (IAH),(HOU)&(EFD)

Contractor shall turn over all HVAC SYSTEMS in First-Class Condition. Any item not operating in accordance with its required function must be repaired or replaced. Preventive maintenance work must have been performed as required per the PM schedule.

One year prior to the expiration of the Agreement Term, Contractor shall prepare and submit to the Director a complete equipment listing of all (IAH), (HOU), and (EFD) HVAC SYSTEMS equipment. Listing must include identification number, description, location, model/serial number, area served, condition, and age of equipment.

Within sixty (60) Days of the expiration of the Agreement Term, Contractor shall inspect and test all HVAC SYSTEMS with accepted Inspection and Test Procedures, as indicated in Exhibit "K," and repair or replace any equipment or components in accordance with findings in the inspection and test.

Within sixty (60) days of the expiration of the Agreement Term, Contractor shall perform a complete inspection of all controls and instrumentation. Any HVAC SYSTEM not in First Class Condition and/or not performing as designed by OEM within its present operating condition must be corrected.

Within thirty (30) days of the expiration of the Agreement Term, Contractor shall provide the Director a complete final report on the condition of all HVAC SYSTEMS, including inspection and test reports, and certified statements signed by an agent of Contractor, testifying to the Best-in-Practice Service of all equipment and systems and that all HVAC SYSTEMS are in First Class Condition and performing as designed by OEM within present operating conditions.

HAS shall have the right of inspection during or after any of this work, and shall notify Contractor, within seven (7) calendar days of receipt of Contractor's certified statement, of any noted discrepancies. Contractor shall then proceed to correct any discrepancies within thirty (30) days and notify the Director in writing upon completion of all work. Contractor shall assist HAS with any inspections required by the Director at no additional cost to HAS.

Should Contractor fail in the performance of this portion of the Agreement, Contractor agrees that the Director may perform such Services and deduct costs from any amount that may be due Contractor. Should costs exceed amounts due Contractor, additional costs must be paid by Contractor to City or by Contractor's performance bond surety.

At the expiration or termination of the Agreement, the Contractor shall verify to HAS that all equipment is in Best-in-Practice Service and that all HVAC SYSTEMS are in First Class Condition and performing as designed by OEM within present operating conditions. Such responsibility at Agreement expiration includes all equipment, components, software, appurtenances, controls, and instrumentation in all systems identified in Exhibit "I."

13.14 Materials

13.14.1 Replacement Parts (IAH,)(HOU)&(EFD)

- A. Contractor-Furnished Parts - As a part of Basic Services, Contractor shall provide all replacement parts required for HVAC SYSTEMS preventive maintenance and remedial maintenance for HVAC SYSTEMS equipment /appurtenances etc. Contractor shall develop a spare parts inventory sufficient to maintain the highest levels of performance and Service. Contractor-furnished parts may include parts recommended by the OEM or selected on the basis of the Contractor's own past experience upon approval of the Director. If new OEM parts are available, replacement parts must be new OEM parts. Where new OEM parts are not available, Contractor may provide rebuilt OEM parts or use new parts of another manufacturer. In either case, parts must be equal or better in quality and performance than OEM parts and must be free from all defects. Contractor shall continually restock its inventory to levels that will ensure compliance with performance requirements of this Agreement.
- B. Disposal or Used Parts - As a part of Basic Services, Contractor shall dispose of all worn/defective scrap parts and waste or hazardous materials resulting from the work under this Agreement. Handling, transport, and disposal of worn/defective scrap parts and waste or hazardous materials must be done in such a manner as to ensure the highest level of safety to the environment and to public health and in compliance with all applicable laws and governmental regulations. Contractor shall assume full responsibility and liability for and act prudently in all aspects of handling, transport, and disposal of any hazardous materials, securing all licenses and permits required by law and ensuring that any disposal facilities to which any scrap, waste, or hazardous materials may be moved are in full compliance with federal, state, and local laws and regulations. Worn or defective parts must not be stored on Airport premises. Contractor shall notify the Director when these parts are to be removed from HAS property.
- C. Records - As a part of Basic Services, Contractor shall provide a monthly report of all parts utilized including inventory balances by part number. A copy of this report will be submitted to the Superintendent, Facilities Administration Sections at each Airport and to the Assistant Director at Technical Services Division.
- D. Parts Storage - The spare parts inventory is the responsibility of Contractor. Contractor will have limited area within the Central Plants to store equipment and

supplies. Any additional storage space required must be provided by Contractor off-site at its expense.

13.14.2 Tools, Instruments, and Equipment (IAH),(HOU)&(EFD)

As a part of Basic Services, the Contractor shall provide all supplies, materials, equipment, instruments, and tools required for the Work at Contractor's expense. Materials and equipment shall be of the type and quality used in large-scale airport operations and shall meet the requirements specified herein. The Contractor will provide a list of the proposed equipment, including test/calibration/diagnostic equipment, tools, and supplies etc., as part of the Agreement.

Contractor shall have available "on-site" at all times, test/calibration equipment such as CO2 calibration test equipment, electronic flow meters, hood vents etc. required to perform testing specified in the Agreement.

Contractor shall provide lifts to service and maintain VAV boxes, exhaust systems, etc.

Contractor must keep a lift on site 24/7 at (IAH) only.

Contractor equipment brought into the facilities must not exceed the engineered floor load capacities of the facilities. It is the Contractor's responsibility to provide properly sized/rated equipment to perform all services specified.

All Contractor-furnished tools, equipment and instruments must be removed by Contractor at the termination or expiration of the Agreement.

13.15 Perform Annual Shutdown (IAH)&(HOU)

As part of Basic Services and at Contractor's expense, the Contractor shall perform an annual electrical and maintenance shutdown as specified in this Agreement and detailed in Exhibit "J".

During the period between November 15 and January 15 of each year, Contractor shall schedule an annual electrical and mechanical maintenance shutdown for repair or replacement of equipment which cannot be serviced with the systems in operation and to perform certain unscheduled maintenance work within limited time. Contractor shall provide all management, planning, scheduling, logistics, and quality control. Contractor shall also schedule and pay outside utility companies that may have to be involved in the shutdown. Annual shutdown will be at Contractor's expense including, but not limited to, spot coolers, trailer mounted dx units with generators capable of handling loads in idf rooms, badged professional guards, electricity, gas, water, sewage, etc. Continental, HAS and FIS locations.

Six months prior to shutdown, Contractor shall prepare and present to HAS for the Director's approval, an Activity Planning Program identifying the time schedule/procedures for shutdown planning. Such time schedule must include start times for preparation of (1) a shutdown procedures guideline; (2) work orders for each work item to be accomplished; (3) planning sheets showing individual tasks, tools, manpower and materials required to complete a work item; (4) a maintenance priority list; (5) a shutdown

materials list and manpower schedule; (6) a job plan with a related critical path network, and; (7) shutdown, work, and startup schedules.

At least two weeks prior to shutdown, Contractor shall deliver to HAS the shutdown, work, and startup schedules. Following this activity, Contractor shall schedule a mock shutdown with the shutdown team to work out any last minute problems and ensure smooth execution of the entire shutdown program. Any preliminary work that can be done prior to shutdown must be accomplished in order to expedite the shutdown work.

At (IAH), Contractor shall provide three (3) ea. 20-ton DX rental unit (package unit) with a generator to protect the Stratus Room in Terminal A, T-D and T-E along with 17 spot coolers ranging in size from 1.5 thru 5 tons in various MDF/IFD rooms in the Airport. Contractor shall provide badged security to secure doors and verify that all persons entering have current Airport badges and security clearance. (Approximately 20 guards)

Upon completion of the shutdown, work, and startup, Contractor shall schedule a debriefing meeting with HAS to review planning, execution and startup procedures, safety, expediting, manpower utilization, and work scheduling.

The minimum annual maintenance shutdown procedures are detailed in Exhibit "J."

13.16 Perform Corrosion Tests (IAH),(HOU)&(EFD)

As a part of Basic Services, Contractor shall test and monitor corrosion rates for the chilled water, condensate and condenser water systems and report findings as specified in this Agreement and detailed in Exhibit "L."

13.17 Other Basis Services Tests - (IAH),(HOU)&(EFD)

Other test shall include, but not be limited to, the following test:

- a. Hydro Static – perform hydro static on tubes once every 3 years on each boiler.
- b. Eddy Current - perform Eddy Current Test on an alternating basis, on two (2) chillers per year.
- c. Oil/Refrigerant Analysis – perform oil/refrigerant analysis as required.
- d. Sensor Calibration Test – perform on-site calibration test once at the beginning of the Agreement and every 6-months thereafter.
- e. (IAH) Alerton – 13,000 points active (with expansion capabilities)
- f. UES – 6,1000 points
- g. (HOU) UES – 1,600 physical points
- h. Throughout the above monitoring points there are various types of temperature, CO2, etc. sensors.
- i. CFM's For Air Balance – Monitor system to stay within air balance parameters, once system has been balanced.
- j. Pump/exhaust test/reports – perform pump/exhaust test/reports every two weeks. At the start of the Agreement all exhaust systems must be labeled to coincide with DDC system and/or at airports discretion.
- k. Charcoal Filters - test charcoal filters quarterly and submit the results to the Facilities Administration Sections at the Airports.

- l. VSD's - calibrated and repaired as needed, regardless of horsepower rating yearly by a certified sub-contractor with credentials.
- m. Legionnaire's Disease - test for the presence of Legionnела and/or other potentially harmful organisms in accordance with local, state or federal agencies regulation controlling such test. The results of these tests are to be retained in accordance with the appropriate agency or current industry standards.

Contractor shall have test/calibration equipment such as CO2 calibration test equipment, electronic flow meters, hood vents etc. required to perform the above tests.

13.18 Cooling Tower Cleaning (IAH)&(HOU)

As a part of Basic Services, Contractors shall provide its approach and methodology for operating and maintaining the cooling towers at (IAH) and (HOU). Cooling towers must be cleaned once per year.

During cooling tower scheduled cleanings, Contractor shall ensure that all water and/or sediment discharged from the tower into storm or sanitary drains is in compliance with all state and federal EPA and/or TCEQ regulations controlling such discharges and any subsequent changes to these regulations that may occur during the Agreement Term. Contractor shall keep the Director informed of such changes and the effect on the effective operation of the tower(s) involved.

Contractor shall, at its expense, remove and dispose of all sediment and materials from the cooling towers and cooling tower filtration systems, whether by approved discharge into existing sanitary sewage drains or physical removal and disposal off site at approved dumping locations. Approved as specified above means approved by the EPA and, if applicable, the TCEQ. All permits associated with the removal, discharge/disposal is at Contractor's expense.

Failure of Contractor to fully comply with those regulations established by the EPA and TCEQ for disposal of specified materials that result in fines or penalties to the City, and the payment of all such fines and penalties is the Contractor's responsibility at Contractor's expense.

13.19 Filter Replacement (IAH),(HOU)&(EFD)

As part of Basic Services, Contractor shall inspect and replace HVAC SYSTEMS filters in a timely manner, as required with the frequency of inspection based upon field conditions.

Contractor shall replace any/all filters, which may become prematurely dirty due to construction.

Replacement filters must meet or exceed the performance requirements of original OEM design matching the filtration requirements of specific HVAC systems and equipment.

Correct filters must ensure filtration at optimum efficiency consistent with a minimum static pressure compensation.

Filter replacement requires the use of various types of filters properly located to ensure maximum indoor air quality at an economical cost.

A. Filter Selection Performance Factors

1. Filter type must be consistent with efficient operation at a minimum energy penalty for static pressure compensation.
2. Recirculated filtered air must provide superior indoor air quality with minimum effect of increasing the facility ventilation load, energy consumption and operating costs.
3. Filter type must be appropriate for specific mixing and distribution levels.
4. Filter selection must conform to current ASHRAE standards and existing EPA requirements.
5. Whenever possible, filters must utilize existing filter frames.
6. Filter selection must minimize any design modifications in both equipment and duct.
7. Filter selection must provide superior air quality with maximum air changes per hour.

B. Filter Types

1. Charcoal Filters - Charcoal Filters are utilized at (IAH) in Terminals A, B, C, D, and FIS and require periodic removal for regeneration or replacement. Regeneration may be accomplished by delivering the filters to the Contractor's off-site sub-contractor for such services. During the time the charcoal filters are being regenerated, Contractor shall install spare filters until the filters are cleaned, regenerated, and reinstalled. To ensure minimum equipment shutdown, Contractor shall inventory an adequate number of replacement filters for this purpose. Contractor shall be responsible, at its expense, for the maintenance, replacement, and regeneration of all such filters, both installed and in inventory for back-up. Contractor shall ensure all such filters are tested, at a minimum, every six months and changed as required by filter manufacturers. Efficiency rating of particulate filters is to be stamped on filter. Test results must be submitted to Sr. Superintendent, Facilities Administration Section.
2. Electronic Air Cleaners - The electronic air cleaners at (IAH) in Terminal D require periodic maintenance. Collection units must be washed in an appropriate solvent, returned, and installed. To ensure minimum equipment shutdown, Contractor shall inventory a number of replacement cells for this purpose.
3. Carbon and Potassium Permanganate Filter Systems – These systems must be sampled quarterly and samples sent to a laboratory to determine useful life remaining. These filters must be changed at the end of their useful life not to exceed fifteen (15) months. The replacement filter or media must be on site at replacement time. Once the projected useful life is determined for each exposure (i.e., aircraft apron level, ground terminal area, parking third level, etc.) the sampling period for laboratory can be revised, but must not exceed 75% of projected useful life.
4. Panel Filters, Media Filters, Roll Filters, Air Washers, etc -Various types and methods of filtration are utilized in the Airports' HVAC systems to meet

specific levels of air contaminants and environmental requirements. These filter media must be maintained to provide effective air filtration and efficient air movement. Efficiency rating of particulate filters is to be stamped on filter. 2-inch pleated filters need to be changed out at .8 inches on the magnehilic, 6-inch box filters need to be changed out at 1.25 inches. NO EXCEPTIONS.

C. Filter Replacement Schedule - Contractor shall identify each piece of equipment that has a filtering system in place by the following parameters:

1. Equipment & Type
2. Filter Material
3. Filter Size
4. Type of Filter
5. Location of Filter
6. Frequency of Changing
7. Effectiveness

Contractor shall collect this data and incorporate it into Contractor's filter maintenance schedule as part of its normal operations and maintenance responsibilities.

13.20 Odor Management (IAH)&(HOU)

As part of Basic Services throughout the Agreement Term, Contractors shall provide its approach and methodology for providing total airstreams Odor Management including all equipment, supplies, chemicals and maintenance at:

- (IAH) facilities including, but not limited to, Terminals A, B, C, D, FIS, ASC, HAS Administration Building, and Remote Buildings/Facilities.
- (HOU) facilities including, but not limited to, Main Terminal, Concourses A & C, and other remote facilities.

A. Odor Masking - Contractor shall continue the existing HAS Odor Masking program of evaporating odor masking materials into the airstreams, masking most odors that are present, by substituting a floral perfume. The Odor Masking Units must free all Treatment Areas from all unpleasant odors and operate at an even distribution rate for periods of at least thirty (30) days. All installed Odor Masking Units must be held in place by a holding device firmly secured to the air handler unit or adjacent fixtures: free- standing Odor Masking Units will not be allowed for safety reasons. All Odor Masking Units must be self-powered, not requiring electrical power. Contractor will not be allowed to connect to electrical outlets. Odor masking units are located in all AHU's in terminal areas.

B. Storage of Contractor's Equipment and Supplies - Contractor shall store its equipment and supplies in the Central Plant area. HAS will not provide Contractor with space in the treatment areas for storage of equipment or material for airstreams odor masking. All materials and supplies must be removed from the work site upon completion or cessation of work

- C. Cessation of Services - Contractor shall stop providing odor masking services for any Treatment Area if requested by the Director. Contractor may remove odor masking equipment and materials from Treatment Areas only after receiving written permission from the Director. After removing its equipment Contractor shall ensure that any holes/openings made by Contractor (air handlers/ducts) are securely covered with patches made from materials that are similar to the materials removed and the patched area repainted to match existing surfaces.
- D. Contractor's Response to Problems - Upon oral or written notification by the Director of any problems in a Treatment Area, Contractor shall have competent maintenance/repair personnel with appropriate equipment and parts dispatched to the problem area within one (1) hour and correct the problem within two (2) hours after receipt of such notification.

13.21 Administrative Tasks (IAH),(HOU)&(EFD)

As part of Basic Services, Contractor shall perform certain administrative tasks which include implementation, operation, and maintenance of data systems, radio communications, security and badging requirements, preparation of work orders, generating reports, attending meetings, administering a quality control program, and performing certain housekeeping duties.

13.22 Installation, Operations and Maintenance Data System (IAH),(HOU)&(EFD)

13.22.1 General Description

As part of Basic Services, immediately after receipt of Notice to Proceed, the Contractor shall provide an integrated, full function web-based Maximo 6.0 and a web-based Microsoft Dynamics SL financial system. The system must be fully accessible at all times by HAS.

Contractor shall provide and maintain all Contractor owned computer hardware, software and cabling to support the Project Management Systems (MMS & PAS) specified in this Section as part of Basic Services throughout the Agreement Term. Cabling shall be approved by HAS Information Technology.

Scope of the System

The system must support the following basic requirements:

- Assure the ongoing ability of Contractor to provide management services, help desk services, HVAC maintenance operations and repair services.
- Provide for the efficient and effective planning and scheduling of work.
- Manage the HVAC scope of services in terms of work, physical assets, parts and materials, in-house labor, and subcontractor work.
- Provide statistical data for analysis of operational performance.
- Provide detailed accounting information for internal and external use.

CMMS Operations

Maximo CMMS is conceptually segmented into three functional categories:

- 1) Work Management includes minor service and repair work, major service and repair work, minor construction, major construction, and preventive maintenance work.
- 2) Physical Asset Management includes the establishment and maintenance of service/maintenance records for structures and equipment containing descriptive information, customer information, accounting information, repair and service histories and preventive maintenance schedules and details.
- 3) Resource Management includes Contractor and contracted labor and materials, and materials management. Materials management includes parts and materials inventory, restocking requisitions, non-stock requisitions, and purchase orders.

13.22.2 Equipment Maintenance/Supplies

Contractor shall provide all integration of data etc. from the existing MMS system to the new MMS system and operate and maintain all PAS and MMS software and equipment or equivalent replacement/upgrades, at its sole expense.

All supplies, expendables etc. required for operating the complete MMS system must be provided by Contractor at its expense. Contractor shall also bear all costs for telecommunications associated with line charges, long distance, installations, etc. required for the equipment/system operations.

At the end of the Agreement Term, the PAS and MMS computer hardware, software, cabling, and incidentals remain the property of HAS. At (HOU) only however, Contractor shall provide for its use during this Agreement Term a Hewlett-Packard DeskJet 900 series printer or a comparable unit with a serial port for receiving Facility Administration trouble tickets that become the property of HAS at the termination or expiration of the Agreement. All data, files, and records generated for all Airports on the software remains the exclusive property of HAS at the expiration or termination of the Agreement.

13.23 PM Audit (IAH),(HOU)&(EFD)

PM audits may be performed yearly by an independent and qualified third party selected by the Director/Contractor and at Contractor's expense. Any deficiencies discovered by such audit which are the responsibility of Contractor, must be rectified by the Contractor at no cost to the City. Correction/Work shall commence within ten (10) working days of receipt of the notice of any such deficiency. Contractor shall provide the Director with a written explanation for such deficiency in performance and a plan to prevent future such deficiencies within fifteen (15) days of receipt of such notice.

Failure of Contractor to correct deficiencies covered under the terms of this Agreement may be used by the Director as grounds for termination of this Agreement within the meaning of the general provisions entitled "Default."

At the Director's discretion, Contractor shall submit a revised Quality Control Program for review and approval by the Director within thirty (30) working days. The Quality Control Program must detail how future occurrences as identified in the above audit will be prevented.

13.24 Records and Reports (IAH), (HOU)&(EFD)

As part of Basic Services, Contractor shall develop and maintain daily logs, weekly, monthly, and annual reports for operation and maintenance of HVAC systems and equipment. The logs shall provide a record of all pertinent operating data and maintenance performed. Contractor's record keeping system is subject to approval by the Director, and all records required may be inspected by the Director at any time during normal business hours. The Contractor shall provide all maintenance records and history on 3-1/2" diskettes to the Sr. Superintendent, Facilities Administration Section. Upon expiration or termination of the Agreement, all manual and automated records (including software data) produced and maintained on file become the property of HAS; Contractor shall submit all maintenance records to Sr. Superintendent, Facilities Administration Section, on electronic media; Contractor may retain all original employee and accounting files, but shall furnish a copy of the accounting files to Sr. Superintendent, Facilities Administration Section.

- Reports must be signed by the Project Manager. Such signature is certification that all reports and information are truthful and accurate. Falsification of any records is grounds for termination of the Agreement.
- Contractor's Logs provided to the Director must document all pertinent operating data and maintenance performed by Contractor or its sub-Contractors under the Agreement. Contractor shall describe any event or condition not readily discernible from recorded data in a "Remarks" section.
- Contractor shall develop and maintain on site records, including but not limited to, Agreement documents, inventory records, accounting and procurement records, system documents and manuals and any other documents necessary to meet reporting requirements or requests by the Director.

13.24.1 Daily Records and Reports

Contractor shall develop and maintain an automated Daily Work Log to record HVAC systems and equipment daily operation and maintenance events and to produce a Daily Work Log Summary. The Daily Work Log must record all pertinent daily operating and maintenance data, including but not limited to date, time, service performed, status or results, and person who performed service or inspection. Relevant events or conditions not readily discernible from the recorded data must be described in a "Remarks" section. The Daily Work Log and Summary must be in a format acceptable to HAS. Contractor shall provide a daily log of parts/materials used.

13.24.2 Weekly Records and Reports

Contractor shall provide weekly chemical treatment and boiler firing effectiveness/flue gas analysis reports.

13.24.3 Monthly Records and Reports

Contractor shall provide a monthly Operation and Maintenance report. The report must provide essentially the following information in a format acceptable to HAS. The Monthly Operation & Maintenance Report must include, but is not limited to,:

- A summary of daily log information
- Status of systems and equipment
- Parts utilization by unit
- An overall summary of maintenance work performed
- The results of inspections and tests conducted (including but not limited to water treatment, legionnaire's disease tests) Pictures of water treatment coupons will be inserted into monthly reports.
- Two (2) month schedule of upcoming inspections or tests, and projection of major equipment shutdowns required for maintenance.
- List of equipment breakdowns and repair time
- Statistical operating data (including, but not limited to, equipment on-line/standby report)
- Energy Report
- Warranty Report
- Other reports (including, but not limited to, filter replacement; odor management/control)

Monthly maintenance reports described in Section 14 must be submitted to the Director by the fifteenth (15th) day following the reported month. Maintenance reports are to be submitted on CD's, with one hard copy delivered to the following HAS sections; Sr. Contract Administrator, Tech Services Section, and the appropriate Airport Sr. Superintendent, Facilities Administration Section.

13.24.4 Quarterly Reports

Contractor shall provide a quarterly engineering trend analysis of systems/equipment thermodynamic and mechanical performance parameters.

The quarterly engineering trend analysis must be submitted to the Director by the fifteenth (15th) day following the reported quarter.

13.24.5 Annual Reports

Contractor shall provide an annual shutdown report. The Annual Summary Report must be submitted within 30 days after the shutdown work is completed.

13.24.6 Other Reports

- A. Daily Work Log – Contractor shall submit a daily work log depicting the work completed or performed for each day. Work log summaries must also be included in monthly reports.
- B. Parts/Materials Usage - Contractor shall submit daily reports depicting parts/materials usage each day. Contractor shall also submit a monthly Parts/Materials Usage report indicating current materials, stock levels, and required restocking over the past month.
- C. Water Treatment Records - Contractor shall maintain daily records of chemical analysis. At the end of each week, Contractor shall submit a summary of chemical treatment work performed and the effectiveness of the water treatment program. Contractor shall include any recommendations for improving the program, if any, as part of this report.
- D. Water Treatment Program - Based on Contractor's submittal of its Water Treatment Program, the Director and Contractor shall establish a mutually agreed-upon testing schedule. Schedules are required for daily, weekly and monthly testing. Each test or function must be assigned a standard or acceptable range with acceptable maximum or minimum, plus (+) or minus (-) deviation, based on accepted industry standards for equipment, chemicals, etc., utilized in the Water Treatment Program. These tests and task schedules, once established, may be changed only upon agreement by both parties and must be supported by appropriate documentation such as published bulletins from equipment manufacturers, chemical companies, etc. that have evidence to support such recommended changes in the industry standards.
- E. Central Plant On-Line/Standby Reports - Contractor shall provide as part of its monthly report the actual hours of utilization for all major equipment in the Central Plant and shall provide a full explanation and intended correction for operation of equipment exceeding the maximum or minimum allowable standards.
- F. Fuel/Air Ratio (Excess Air) in Boiler Firing Report/Flue Gas Analysis – Contractor shall maintain a weekly record of flue gas analysis for oxygen to determine "excess air," incomplete combustion, and NOX emissions. At the end of each week, Contractor shall submit a summary of boiler firing effectiveness and include any recommendations for improving the program, if any, as part of this report.
- G. Legionnaire's Disease Test Report - Contractor shall report and submit all Legionnaire's Disease test results to the Director and maintain a permanent record in the HVAC Central Plant files for future reference.
- H. Wastewater Report - Due to the loss of water that occurs through evaporation at the cooling towers, additional water must be added to the condensed water system as necessary to maintain the water volume for efficient operation of the HVAC System. It is also necessary to release

water into the City's sewage system to control the amount of total dissolved solids in the system. This results in greater amounts of water being utilized that are not in direct proportion to the amount being released into the City sewage system.

HAS pays a sewage fee based on the amount of water it utilizes unless it provides a method to show that all the water it utilizes does not end up as discharge into the sewage system. Therefore, make-up and blowdown meters have been installed to ensure the HAS does not pay a sewage fee for water that is evaporated during the heating and cooling process.

- Contractor shall read the make-up meters and blowdown meters on (IAH) and (HOU) cooling towers on the last day of each calendar month and deliver the data to the City of Houston, Water Customer Service, no later than the fifth (5th) day of the following calendar month.
 - The Director will provide Contractor with a form to be used to record the meter readings. Contractor shall be fully responsible for obtaining the required meter readings, completing the form in its entirety and delivering it to the address specified within the time periods specified. Contractor shall keep one copy in its contract files and one copy forwarded to Facilities Administration for its records. A delivery receipt for this form from the City must be obtained and attached.
- I. Employee Roster Report - Contractor shall maintain a weekly record of employee attendance records by date, title, attendance etc. and submit to HAS every two weeks to the extent allowed by law.
- J. Odor Management/Control Records - Material Safety Data Sheets (MSDS) forms are required for all chemicals utilized and must meet Federal, State and Local laws regarding the movement of chemicals through air handling systems.
- K. Hazardous Chemical Records – Contractor and its subcontractors must provide a completed Material Safety Data Sheet (MSDS) as required by applicable laws for each and every hazardous chemical as used in performance of the work or stored on City property.
- Any material declared as hazardous by the Texas Department of Health, Austin, the EPA or the TCEQ requires an MSDS. That Department also will provide standard MSDS forms upon request.
 - Contractor's Project Manager shall maintain the completed forms. All hazardous chemical records must be made available to the Director for periodic review.
- L. Annual Shutdown Report - Contractor shall prepare a formal "Annual Shutdown Report" and present it to the Director within 30 days after the shutdown work is completed. This report must summarize preplanning,

execution, startup and debriefing activities and resulting recommendations and follow-up assignments.

- Contractor shall provide a certified report from the testing lab for tests performed on PCB Transformers indicating which tests were performed, the level of PCB contamination, and recommended action required, if any.
- This report will be submitted as part of the annual shutdown report as specified elsewhere herein.

M. Energy Report

Contractor shall submit a monthly energy report with backup/supporting data for:

- Flow
- Temperature
- Energy usage (BTU, Kw, etc.)

N. Drop across CW/HW coils Reports - Contractor shall submit annually one report showing all coils on airports. All these pressure drop reports on coils must be done at the same time.

O. Hydrostatic Test Reports - provide hydrostatic reports every 3 years and when boiler tubes are replaced.

P. Sensor Calibration Test – perform on-site calibration test, as needed.

Q. GPM on hot/chilled water – check GPM on hot/chilled water, balance as needed.

R. CFM's For Air Balance – check CFM for air balance, as needed.

S. ZETA RODS REPORT – Provide annual report showing operational status and location of zeta rods.

T. Pump/exhaust reports – perform pump/exhaust reports every two weeks. (At the start of the contract all exhaust systems must be labeled to coincide with DDC system and/or at the Director's discretion.)

Contractor shall have test/calibration equipment such as CO2 calibration test equipment, electronic flow meters, hood vents etc. required to perform the above tests.

U. Warranty Report

As part of Basic Services throughout the Agreement Term, Contractor shall administer warranties on systems and equipment as may be applicable from time to time. Contractor shall maintain warranty records and submit documentation and follow-up procedures on all warranty work. Contractor shall enforce all warranties on behalf of HAS. Contractor shall provide service regardless of whether equipment is wholly or partially under

warranty. Warranty data must be maintained in a format acceptable to the Director and current data must be available for inspection by the Director at his/her discretion.

- V. (IAH),(HOU)&(EFD) Operating Procedures and Manuals – Contractor is responsible for obtaining/providing the following manuals for use in the operation and maintenance of HVAC SYSTEMS.
1. Operations Manual
 2. Equipment Manuals and Equipment Data Sheets
 3. Systems Manual

When available HAS will provide manuals etc. to Contractor.

Operations Manual, Equipment Manuals, and Equipment Data Sheets address the HVAC equipment from a component perspective. The Systems Manual details the operational procedures of the HVAC equipment from a procedural perspective. Contractor shall use these manuals in the operation and maintenance of the facilities.

Contractor shall follow the procedures in the Operations Manuals and ensure the Operations manuals and data sheets, technical/user manuals, service bulletins, service advisories, product/service information updates, and all such other OEM published information pertaining to the maintenance and operation of HVAC systems and equipment are updated and maintained.

Some equipment installed by tenants and the City may not be included in the equipment manuals. Contractor shall obtain any missing pertinent data for the equipment manuals for any equipment installed by:

- (1) Tenants which has become the property of the City or,
- (2) By Director, all being part of Contractor's responsibility.

HAS will assist in the transfer of available copies of the operations manuals and the equipment manuals to Contractor upon HAS issuance of notice to proceed document for each Airport.

Updating of the Equipment Manual shall be completed by the end of the first year of the Agreement and shall include development by Contractor of Equipment Data forms expanded to include all data pertinent to the normal operation and maintenance of each piece of mechanical and related electrical equipment. Such data shall include in addition to existing data, the sheave and belt sizes, motor data, starter and heater sizes, and the manufacturer's data identifying the equipment or component. Recommended changes in the Operations Manual, as a result of knowledge and experience with the systems, shall be submitted in writing for the Director's consideration. These suggestions will be taken under advisement by the Director. As required, the suggestions will be reviewed by the Director with Contractor. Resulting changes to the Operations Manual shall be the responsibility of Contractor. Once finalized and completed by the end of the first year of the Contract, Contractor shall maintain and update the documents.

W. Engineering Trend Analysis Report of System Performance – Contractor shall generate, on at least a quarterly basis, a comprehensive report that will graphically display data and trends. At a minimum, this report will include the following:

- 1) Track operating, thermodynamic, and performance parameters of mechanical and electrical systems, water treatment programs, performance testing, and system efficiencies.
- 2) Compare current performance to historical data.
- 3) Identify deviations from preferred operational limits.
- 4) Explain to what extent these deviations occurred and how long.
- 5) Forecast future costs for materials, labor, and equipment.
- 6) Budget and financial planning.
- 7) Operational planning.

X. Testing and Reporting Required by TCEQ and Federal agencies – Contractor shall take all steps necessary to operate and maintain boilers to ensure compliance with all current TCEQ regulations and those stipulated by Federal EPA New Source Performance Standards. Record keeping and compliance standards may be different for “new” boilers versus “grandfathered boilers,” and Contractor shall implement the correct procedures for each. Contractor shall apply standard combustion control techniques such as proper excess air firing, flue gas analysis, and properly maintaining the burner/boiler packages. Within the first 90 days under the Agreement, Contractor shall study past stack tests for existing boilers to confirm that these systems are within the limits of the operating permits and the Maximum Allowable Emission Rate Tables furnished by the TCEQ.

As new or revised regulations are placed into effect, and HAS performs any replacement, retrofit, and/or reconstruction of the boiler packages to keep them in compliance with the new standard(s), Contractor shall modify its operation and maintenance procedures and its testing and reporting procedures to ensure compliance with regulations.

13.25 Housekeeping Duties (IAH),(HOU) – Contractors shall provide their approach and methodology for the following housekeeping duties:

A. Central Plants Housekeeping Duties – As part of Basic Services,

- a. Contractor shall perform all work and provide all materials for the housekeeping of the total Central Plants to keep the Central Plants clean at all times including but not limited to break room, bath/restroom and upstairs control room.
- b. Contractor shall maintain all parts of all panel boards that have any device serving/affecting heating, ventilating and air conditioning systems.
- c. Contractor shall maintain Central Plant's surrounding grounds, exterior surface or structure at (HOU) only. (Rooms containing chillers, boilers, pumps, etc.)

- d. Equipment, parts, supplies, materials etc., must not be stored in any areas unless specifically authorized in writing by the Director.

Central Plant Housekeeping Duties Include:

- Furnishing the appropriate tools, equipment, and supplies
- Cleaning, waxing and maintenance as appropriate: all floors, walls, ceiling and glass areas on a scheduled basis, meeting or exceeding acceptable industry standards for like areas.
- Maintain the condition of all ceiling, glass and wall areas to include painting as may be required to maintain a clean and neat appearance.
- Clean and maintain ceiling tiles and floor tiles in offices
- Maintain the lighting in the Central Plant to include, but not be limited to, electrical, fixtures and lamps.
- Maintain the Central Plant floor areas, including cleaning and frequent painting. All colors for painting must be approved by the Director. No refuse, trash, etc., is to be left on the Central Plant floor areas. All trash receptacles must be properly maintained and all refuse removed from the Central Plant daily.
- All equipment, including piping, valves, etc., must be wiped down on a periodic basis to reduce the dust build-up on the equipment and to eliminate potential problems with equipment that may be sensitive to such dust particles.
- All pipe insulation must be painted on a frequent basis as needed to ensure its protection and appearance is maintained. All motors, pumps, valves and other pieces of equipment must also be kept in a painted condition as appropriate for the equipment's use. Color coding must be utilized throughout the Central Plant for ease of identification for piping, motors, valves, etc.
- Maintain all drains, grease traps, toilets, etc., in the Central Plant that become clogged. The Contractor's responsibilities extend from the Central Plant to the main sewer line.

Contractor shall provide, at its own expense:

- All office furniture and incidentals required for Contractor's operation of the Central Plant Offices, including but not limited to, IBM compatible pc's, copy machine, fax machine, beepers, office supplies, and miscellaneous office equipment. Contractor shall remove all Contractor-owned furniture and equipment upon termination or expiration of the Agreement.
- All expendable items required for the proper operation and maintenance of the facilities. Expendable items include, but are not limited to, the following: mops; floor cleaning agents; paper towels; soap; brooms; toilet tissue; paper, etc.

All telephone lines will be provided by the City, but all cost for use thereof will be at Contractor's expense.

Contractor shall, at its own expense, replace damaged or lost material, parts, equipment, etc., and repair damaged parts of the Work or facility. As part of the maintenance requirements, Contractor shall develop schedules for regular housekeeping of the central plant HVAC system equipment areas.

B. (IAH) Tunnel Area Housekeeping Duties

Contractor shall ensure the utility tunnel area from the (IAH) Central Plant to Terminal B, containing the chilled and Primary Hot Water piping for the terminal facilities, is free of all trash and debris and is properly maintained on a regularly scheduled basis. All piping insulation must be coated or painted as appropriate for maintenance and appearance. Contractor shall also maintain the lighting in the (IAH) utility tunnel to include, but not be limited to, electrical, fixtures and lamps.

C. Terminal HVAC Equipment Rooms/Air Handler Rooms Housekeeping Duties

Contractor shall maintain all HVAC Equipment Rooms/Air Handler Rooms in all terminals and keep them free of all trash and debris. Rooms must be cleaned and maintained on a regularly scheduled basis. Equipment, piping, insulation, etc. must be maintained in a painted condition at all times, consistent with appropriate protection and appearance requirements. All colors for painting must be approved by HAS.

D. (IAH) Administration Building, ASC, Panalpina, & Remote Buildings/Facilities Housekeeping Duties

Contractor shall maintain HVAC Equipment Rooms and Areas for these facilities in a trash and debris free environment. Equipment, piping, insulation, etc. must be maintained in a painted condition at all times consistent with protection and appearance requirements. All colors for painting must be approved by HAS.

E. (HOU) Building at 8800 Paul B. Koonce and Remote Buildings/Facilities Housekeeping Duties

Contractor shall maintain HVAC Equipment Rooms and Areas for these facilities in a trash and debris free environment. Rooms and equipment must be cleaned and maintained on a regularly scheduled basis. Equipment, piping, insulation, etc. must be maintained in a painted condition at all times consistent with protection and appearance requirements. All colors for painting must be approved by Sr. Superintendent, Facilities Administration Section.

F. Miscellaneous DX Equipment Housekeeping Duties

Contractor shall maintain a clean work area and shall remove all trash and debris from the area of the equipment upon completion of any O&M or remedial service.

13.26 Water Treatment Program (IAH), (HOU), & (EFD)

Contractor shall provide the water treatment program specified in the HAS HVAC Water Treatment Manual, Volumes I, II and III, which are incorporated herein by reference. Contractor shall make necessary adjustments for minor differences between the Airports water treatment programs.

13.27 Uniforms - (IAH),(HOU)&(EFD)

Contractor's personnel shall present a clean and neat appearance. Contractor's personnel shall wear a Contractor furnished uniform with Contractor's name clearly displayed on the front of the shirt and seasonal outerwear.

13.28 Training (IAH),(HOU)&(EFD)

The Contractor's training program must be directed towards developing appropriate levels of expertise for skilled trades and management/ supervisory personnel in order that they have the expertise to maintain the HVAC SYSTEMS in Best-in-Practice Service. The training program must include both comprehensive training needs analysis and subsequent training by staff professionals.

Training needs analysis and training for skilled trades must include, but not be limited to,:

- General Plant Safety
- Mathematics and Measurement
- Hand Tools & Power Tools
- Bearings & Drive Components
- Equipment Installation
- Steam Generation
- Air Conditioning & Refrigeration
- Applied Mech. Maintenance
- Pumps and Piping Systems
- Hydraulic, Pneumatic, Electric Systems
- Electric Troubleshooting
- Turbine & Boiler Operation
- Energy Conservation
- First Line Supervision

Training needs analysis and training for management/supervisory staff shall include, but not be limited to,:

- Human Resource
- Plant Maintenance
- Regulatory Compliance

All costs for training must be provided by Contractor at no additional compensation.

13.29 Facilities and Services Provided by HAS

- A. Utilities –
- HAS will provide all electricity and natural gas required for the operation of HVAC SYSTEMS. The existing service and distribution facilities for electricity and natural gas are in place and connected to the equipment.
 - HAS will also provide water necessary for use in the HVAC SYSTEMS and for Contractor's employees on site.
- B. 480V Electrical Distribution - HAS' responsibility for power distribution is limited to service to the main 480-volt disconnect switches; there is currently a switch in each Terminal.
- C. Non-Hazardous Solid Waste Pickup - HAS will provide pick-up of non-hazardous solid waste from Airport dumpsters. Disposal of hazardous, unusual (or) heavy items is the sole responsibility of Contractor. With HAS permission filters can be disposed of in HAS dumpsters.
- D. Fire Safety Equipment - HAS will maintain existing fire extinguishers.
- E. Office, Maintenance, and Storage Area – At (IAH) & (HOU), HAS will provide an office, maintenance, and storage areas. Contractor shall provide, at its expense, any additional required facilities. Contractor is responsible for all housekeeping of such facilities including, but not limited to, sweeping, washing, cleaning, waxing, painting, dusting, etc., of all areas, fixtures, and equipment.
- F. Access to Work Areas – Subject to HAS rules and regulations, Contractor may enter and leave work sites at all reasonable times. Contractor and its employees may use the common areas and roadways at the Airport where the work sites are located. This excludes parking for Contractor's personnel and does not extend to any restricted area of the Airport, including without limitation, the AOA, which requires the Director's prior written approval and an HAS escort. Contractor shall repair any damage it or its employees cause as a result of its use of the common areas.

13.30 Coordinate Performance (IAH),(HOU)&(EFD)

- A. HAS Contact – Contractor shall coordinate its performance with such person(s) as the Director designates in writing to Contractor. Contractor shall keep said person(s) currently advised of developments relating to the performance of this Agreement, and Contractor shall at all appropriate times advise and consult with the Director's designee(s) as determined by the Director.
- B. Pre-Performance Conference - Prior to commencing performance under this Agreement, Contractor shall attend a pre-performance conference with the Director and other representatives of HAS. The Director shall specify the time and place of such meeting in a written notice to Contractor. Representatives of Contractor attending the pre-performance conference include, but are not limited to, the Project Manager whom Contractor has assigned to this Agreement, together with an officer of Contractor who is authorized to bind Contractor in