

STATE OF TEXAS §
 §
 COUNTY OF FORT BEND §

ADDENDUM TO PERFORMANCE CONTRACT

THIS ADDENDUM is entered into by and between Fort Bend County, (hereinafter "Customer"), a body corporate and politic under the laws of the State of Texas, and Johnson Controls, Inc., (hereinafter "JCI"), a company authorized to conduct business in the State of Texas.

THAT, WHEREAS, the parties have executed and accepted that certain Performance Contract for the implementation of Facility Improvement Measures for the Customer, (hereinafter the "Contract"), attached hereto as Exhibit "A" and incorporated by reference; and

WHEREAS, the following changes are incorporated as if a part of the Contract:

1. Compensation and Limit of Appropriation.

- A. The Maximum Compensation for the performance of the Work to be performed by JCI under the Contract is twelve million nine hundred nineteen thousand seven hundred ninety-nine dollars and no/100 (\$12,919,799.00). In no case shall the amount paid by Customer under the Contract exceed the Maximum Compensation without a written agreement executed by the parties.
- B. All performance of the Work by JCI including any changes in the Scope of Services and revision of work satisfactorily performed will be performed only when approved in advance and authorized by Customer.
- C. JCI clearly understands and agrees, such understanding and agreement being of the absolute essence of the Contract, that Customer shall have available the total maximum sum of twelve million nine hundred nineteen thousand seven hundred ninety-nine dollars and no/100 (\$12,919,799.00) specifically allocated to fully discharge any and all liabilities Customer may incur.
- D. JCI does further understand and agree, said understanding and agreement also being of the absolute essence of the Contract, that the total maximum compensation that JCI may become entitled to and the total maximum sum that Customer may become liable to pay to JCI shall not under any conditions, circumstances, or interpretations thereof exceed twelve million nine hundred nineteen thousand seven hundred ninety-nine dollars and no/100 (\$12,919,799.00).

2. **Insurance.** Customer and the members of Fort Bend County Commissioners Court (“Commissioners Court”) shall be named as additional insured to all required coverage except for Workers’ Compensation and Professional Liability. All Liability policies including Workers’ Compensation written on behalf of JCI shall contain a waiver of subrogation in favor of Customer and members of Commissioners Court. If required coverage is written on a claims-made basis, JCI warrants that any retroactive date applicable to coverage under the policy precedes the effective date of the contract; and that continuous coverage will be maintained or an extended discovery period will be exercised for a period of 2 years beginning from the time that work under the Contract is completed.
3. **Arbitration.** Customer does not agree to submit disputes arising out of the Contract to binding arbitration. Therefore, any references to binding arbitration or the waiver of a right to litigate a dispute are hereby deleted.
4. **Applicable Law.** The laws of the State of Texas govern all disputes arising out of or relating to the Contract. The parties hereto acknowledge that venue is proper in Fort Bend County, Texas, for all legal actions or proceedings arising out of or relating to the Contract and waive the right to sue or be sued elsewhere. Nothing in the Contract shall be construed to waive the Customer’s sovereign immunity.
5. **Notices.**
 - A. Each party giving any notice or making any request, demand, or other communication (each, a “Notice”) pursuant to the Contract shall do so in writing and shall use one of the following methods of delivery, each of which, for purposes of the Contract, is a writing: personal delivery, registered or certified mail (in each case, return receipt requested and postage prepaid), or nationally recognized overnight courier (with all fees prepaid).
 - B. Each party giving a Notice shall address the Notice to the receiving party at the address listed below or to another address designated by a party in a Notice pursuant to this Section:

Customer:	Fort Bend County Attn: Director, Facilities Management and Planning 301 Jackson Street, Suite 301 Richmond, Texas 77469
Copy to:	Fort Bend County Attn: County Judge 401 Jackson Street, 1st Floor Richmond, Texas 77469

JCI: Johnson Controls, Inc.
8323 N. Eldridge Parkway
Houston, Texas 77041

Copy to: Johnson Controls, Inc.
Attn: General Counsel - Building Efficiency Americas
507 East Michigan Street
Milwaukee, Wisconsin 53202

- C. A Notice is effective only if the party giving or making the Notice has complied with subsections 4.A. and 4.B. and if the addressee has received the Notice. A Notice is deemed received as follows:
- i) If the Notice is delivered in person, or sent by registered or certified mail or a nationally recognized overnight courier, upon receipt as indicated by the date on the signed receipt.
 - ii) If the addressee rejects or otherwise refuses to accept the Notice, or if the Notice cannot be delivered because of a change in address for which no Notice was given, then upon the rejection, refusal, or inability to deliver.

IN WITNESS WHEREOF, the parties hereto have signed or have caused their respective names to be signed to multiple counterparts to be effective on the date signed by the last party hereto.

FORT BEND COUNTY


County Judge KP George

KP George, County Judge

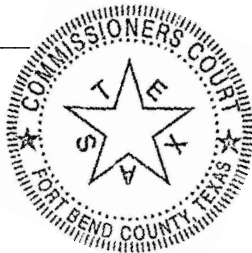
10/27/2020

Date

ATTEST:



Laura Richard, County Clerk



JOHNSON CONTROLS, INC.



Authorized Agent- Signature

Justin Reid Surratt

Authorized Agent- Printed Name

Area General Manager, South

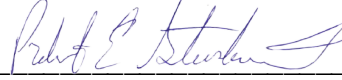
Title

October 23, 2020

Date

AUDITOR'S CERTIFICATE

I hereby certify that funds in the amount of \$ 12,919,799.00 are available to pay the obligation of Fort Bend County within the Contract.



Robert Ed Sturdivant, County Auditor

EXHIBIT A

PERFORMANCE CONTRACT

This Performance Contract (this "Agreement") is made this 27th day of October 2020 between:

PARTIES

JOHNSON CONTROLS, INC. ("JCI")
8323 N. Eldridge Pkwy. Houston, TX 77041

and

Fort Bend County ("Customer")
301 Jackson Street, Suite 301, Richmond, TX 77469.

RECITALS

WHEREAS, Customer desires to retain JCI to perform the work specified in Schedule 1 (Scope of Work) hereto (the "Work") relating to the installation of the improvement measures (the "Improvement Measures") described therein; and,

WHEREAS, Customer is authorized and empowered under applicable Laws (as defined below) to enter into this Agreement, and has taken all necessary action under applicable Laws to enter into this Agreement; and

WHEREAS, Customer has selected JCI to perform the Work after it determined JCI's proposal was the most advantageous to Customer in accordance with all applicable procurement and other Laws.

NOW, THEREFORE, in consideration of the mutual promises set forth herein, the parties agree as follows:

AGREEMENT

- SCOPE OF THE AGREEMENT.** JCI shall perform the Work set forth in Schedule 1. After the Work is Substantially Complete (as defined below) and the Certificate of Substantial Completion is executed by Customer and JCI, JCI shall provide the assured performance guarantee (the "Assured Performance Guarantee") and the measurement and verification services (the "M&V Services") set forth in Schedule 2 (Assured Performance Guarantee), as applicable. Customer shall make payments to JCI for the Work and the M&V Services in accordance with Schedule 4 (Price and Payment Terms).
- AGREEMENT DOCUMENTS:** In addition to the terms and conditions of this Agreement, the following Schedules are incorporated into and shall be deemed an integral part of this Agreement:
 - Schedule 1 – Scope of Work
 - Schedule 2 – Assured Performance Guarantee
 - Schedule 3 – Customer Responsibilities
 - Schedule 4 – Price and Payment Terms
 - Attachment 1 – Notice to Proceed
 - Attachment 2 – Change Order
 - Attachment 3 – Certificate of Substantial Completion
 - Attachment 4 – Certificate of Final Completion
 - Attachment 5 – Detailed Scope and Savings Supporting Documents (Electronic Files Only)
 - Attachment 6 – Drawings (Electronic Files Only)
- NOTICE TO PROCEED; SUBSTANTIAL COMPLETION; M&V SERVICES.** This Agreement shall become effective on the date of the last signature on the signature page below. JCI shall commence performance of the Work within ten (10) business days of receipt of Customer's Notice to Proceed, a form of which is attached

hereto as Attachment 1, and shall achieve Substantial Completion of the Work by the Substantial Completion date, which shall be the earlier of:

- (a) the date on which Customer executes a Certificate of Substantial Completion substantially in the form attached hereto as Attachment 3;
- or
- (b) 14 months after JCI's receipt of Notice to Proceed, subject to adjustments set forth in Section 4 and Section 5 below.

For purposes of this Agreement, "Substantial Completion" means that JCI has provided sufficient materials and services to permit Customer to operate the Improvement Measures. The M&V Services shall commence on the first day of the month following the month in which Customer executes a Certificate of Substantial Completion and shall continue throughout the Guarantee Term, subject to earlier termination of the Assured Performance Guarantee as provided herein. Customer acknowledges and agrees that if, for any reason, it (i) cancels or terminates receipt of M&V Services, (ii) fails to pay for M&V Services in accordance with Schedule 4, (iii) fails to fulfill any of Customer's responsibilities necessary to enable JCI to complete the Work and provide the M&V Services, or (iv) otherwise cancels, terminates or materially breaches this Agreement, the Assured Performance Guarantee shall automatically terminate and JCI shall have no liability thereunder.

- 4. **DELAYS AND IMPACTS.** If JCI is delayed in the commencement, performance, or completion of the Work and/or M&V Services by causes beyond its control and without its fault, including but not limited to inability to access property; concealed or unknown conditions encountered at the project, differing from the conditions represented by Customer in the bid documents or otherwise disclosed by Customer to JCI prior to the commencement of the Work; a Force Majeure (as defined below) condition; failure by Customer to perform its obligations under this Agreement; or failure by Customer to cooperate with JCI in the timely completion of the Work, JCI shall provide written notice to Customer of the existence, extent of, and reason for such delays and impacts. Under such circumstances, an equitable adjustment in the time for performance, price and payment terms, and the Assured Performance Guarantee shall be made.
- 5. **ACCESS.** Customer shall provide JCI, its subcontractors, and its agents reasonable and safe access to all facilities and properties in Customer's control that are subject to the Work and M&V Services. Customer further agrees to assist JCI, its subcontractors, and its agents to gain access to facilities and properties that are not controlled by Customer but are necessary for JCI to complete the Work and provide the M&V Services. An equitable adjustment in the time for performance, price and payment terms, and Assured Performance Guarantee shall be made as a result of any failure to grant such access.
- 6. **PERMITS, TAXES, AND FEES.** Unless otherwise specified in Schedule 3 (Customer Responsibilities), JCI shall be responsible for obtaining all building permits required for it to perform the Work. Unless otherwise specified in Schedule 1 (Scope of Work), Customer shall be responsible for obtaining all other permits, licenses, approvals, permissions and certifications, including but not limited to, all zoning and land use changes or exceptions required for the provision of the Work or the ownership and use of the Improvement Measures. JCI shall not be obligated to provide any changes to or improvement of the facilities or any portion thereof required under any applicable building, fire, safety, sprinkler or other applicable code, standard, law, regulation, ordinance or other requirement unless the same expressly regulates the installation of the Improvement Measures. Without limiting the foregoing, JCI's obligations with respect to the Work is not intended to encompass any changes or improvements that relate to any compliance matters (whether known or unknown) that are not directly related to the installation of the Improvement Measures or which have been imposed or enforced because of the occasion or opportunity of review by any governmental authority. Customer shall be responsible for and shall pay when due all assessments, charges and sales, use, property, excise, or other taxes now or hereafter imposed by any governmental body or agency upon the provision of the Work or the M&V Services, implementation or presence of the Improvement Measures, the use of the Improvement Measures or payments due to JCI under this Agreement, other than taxes upon the net income of JCI. Customer shall also be responsible for real or personal property taxes relating to equipment or material included in the Improvement Measures. Any fees, taxes, or other lawful charges paid by JCI on account of Customer shall become immediately due from Customer to JCI.
- 7. **WARRANTY.** JCI will perform the Work in a professional, workman-like manner. JCI will promptly re-perform any non-conforming Work for no charge, as long as Customer provides written notice to JCI within one (1) year following Substantial Completion or such other period identified in Schedule 1. If JCI installs or furnishes goods

or equipment under this Agreement, and such goods or equipment are covered by an end-user warranty from their manufacturer, JCI will transfer the benefits of such warranty to Customer. The foregoing remedy with respect to the Work, together with any remedy provided by goods or equipment manufacturers, shall be Customer's sole and exclusive remedies for warranty claims. Customer agrees that the one (1) year period following Substantial Completion, or such other period identified in Schedule 1, shall be a reasonable time for purposes of submitting valid warranty claims with respect to the Work. These exclusive remedies shall not have failed of their essential purpose so long as JCI transfers the benefits of any goods or equipment end-user warranty to Customer and remains willing to re-perform any non-conforming Work for no charge within the one (1) year period described above or such other period identified in Schedule 1. NO OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE PROVIDED BY JCI. This warranty does not extend to any Work that has been abused, altered, or misused, or repaired by Customer or third parties without the supervision or prior written approval of JCI. Except with respect to goods or equipment manufactured by JCI and furnished to Customer hereunder, for which JCI shall provide its express written manufacturer's warranty, JCI shall not be considered a merchant or vendor of goods or equipment.

8. **CLEANUP.** JCI shall keep the premises and the surrounding area free from accumulation of waste materials or rubbish caused by the Work and, upon completion of the Work, JCI shall remove all waste materials, rubbish, tools, construction equipment, machinery, and surplus materials.
9. **SAFETY; COMPLIANCE WITH LAWS.** JCI shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Work and M&V Services. Each of JCI and Customer shall comply with all applicable laws, ordinances, rules, regulations, and lawful orders of public authorities (collectively, "Laws") in connection with its performance hereunder.
10. **ASBESTOS-CONTAINING MATERIALS AND OTHER HAZARDOUS MATERIALS.**

Asbestos-Containing Materials: Neither party desires to or is licensed to undertake direct obligations relating to the identification, abatement, cleanup, control, removal or disposal of asbestos-containing materials ("ACM"). Consistent with applicable Laws, Customer shall supply JCI with any information in its possession relating to the presence of ACM in areas where JCI undertakes any Work or M&V Services that may result in the disturbance of ACM. It is JCI's policy to seek certification for facilities constructed prior to 1982 that no ACM is present, and Customer shall provide such certification for buildings it owns, or aid JCI in obtaining such certification from facility owners in the case of buildings that Customer does not own, if JCI will undertake Work or M&V Services in the facility that could disturb ACM. If either Customer or JCI becomes aware of or suspects the presence of ACM that may be disturbed by JCI's Work or M&V Services, it shall promptly stop the Work or M&V Services in the affected area and notify the other. As between Customer and JCI, Customer shall be responsible at its sole expense for addressing the potential for or the presence of ACM in conformance with all applicable Laws and addressing the impact of its disturbance before JCI continues with its Work or M&V Services, unless JCI had actual knowledge that ACM was present and acted with intentional disregard of that knowledge, in which case (i) JCI shall be responsible at its sole expense for remediating areas impacted by the disturbance of the ACM, and (ii) Customer shall resume its responsibilities for the ACM after JCI's remediation has been completed.

Other Hazardous Materials: JCI shall be responsible for removing or disposing of any Hazardous Materials (as defined below) that it uses in providing Work or M&V Services ("JCI Hazardous Materials") and for the remediation of any areas impacted by the release of JCI Hazardous Materials. For other Hazardous Materials that may be otherwise present at Customer's facilities ("Non-JCI Hazardous Materials"), Customer shall supply JCI with any information in its possession relating to the presence of such materials if their presence may affect JCI's performance of the Work or M&V Services. If either Customer or JCI becomes aware of or suspects the presence of Non-JCI Hazardous Materials that may interfere with JCI's Work or M&V Services, it shall promptly stop the Work or M&V Services in the affected area and notify the other. As between Customer and JCI, Customer shall be responsible at its sole expense for removing and disposing of Non-JCI Hazardous Materials from its facilities and the remediation of any areas impacted by the release of Non-JCI Hazardous Materials, unless JCI had actual knowledge that Non-JCI Hazardous Materials were present and acted with intentional disregard of that knowledge, in which case (i) JCI shall be responsible at its sole expense for the remediation of any areas impacted by its release of such Non-JCI Hazardous Materials, and (ii) Customer shall remain responsible at its sole expense for the removal of Non-JCI Hazardous Materials that have not been released and for releases not resulting from JCI's performance of the Work or M&V Services. For purposes of this Agreement, "Hazardous Materials" means any material or substance that, whether by its nature or use, is now

or hereafter defined or regulated as a hazardous waste, hazardous substance, pollutant or contaminant under applicable Law relating to or addressing public or employee health and safety and protection of the environment, or which is toxic, explosive, corrosive, flammable, radioactive, carcinogenic, mutagenic or otherwise hazardous or which is or contains petroleum, gasoline, diesel, fuel, another petroleum hydrocarbon product, or polychlorinated biphenyls. "Hazardous Materials" specifically includes mold and lead-based paint and specifically excludes ACM. JCI shall have no obligations relating to the identification, abatement, cleanup, control, removal, or disposal of mold, regardless of the cause of the mold.

11. CHANGE ORDERS. The parties, without invalidating this Agreement, may request changes in the Work to be performed under this Agreement, consisting of additions, deletions, or other revisions to the Work ("Change Orders"). The price and payment terms, time for performance and, if necessary, the Assured Performance Guarantee, shall be equitably adjusted in accordance with the Change Order. Such adjustments shall be determined by mutual agreement of the parties. JCI may delay performance until adjustments arising out of the Change Order are clarified and agreed upon. Any Change Order must be signed by an authorized representative of each party. If concealed or unknown conditions are encountered at the project, differing from the conditions represented by Customer in the bid documents or otherwise disclosed by Customer to JCI prior to the commencement of the Work, price and payment terms, time for performance and, if necessary, the Assured Performance Guarantee, shall be equitably adjusted. Claims for equitable adjustment may be asserted in writing within a reasonable time from the date a party becomes aware of a change to the Work by written notification. Failure to promptly assert a request for equitable adjustment, however, shall not constitute a waiver of any rights to seek any equitable adjustment with respect to such change.

12. CUSTOMER FINANCING; TREATMENT; TAXES. The parties acknowledge and agree that JCI is not making any representation or warranty to Customer with respect to matters not expressly addressed in this Agreement, including, but not limited to:

- (a) Customer's ability to obtain or make payments on any financing associated with paying for the Improvement Measures, related services, or otherwise;
- (b) Customer's proper legal, tax, accounting, or credit rating agency treatment relating to this Agreement; and
- (c) the necessity of Customer to raise taxes or seek additional funding for any purpose.

Customer is solely responsible for its obligations and determinations with respect to the foregoing matters. In addition, the parties acknowledge and agree that Customer shall be responsible to comply, at its cost and expense, with all Laws that may be applicable to it relating to performance contracting, including, without limitation, any requirements relating to the procurement of goods and/or services and any legal, accounting, or engineering opinions or reviews required or obtained in connection with this Agreement. Customer is a body corporate and politic under the laws of the State of Texas and claims exemption from sales and use taxes. A copy of a tax-exempt certificate will be furnished to JCI upon request.

13. INSURANCE. JCI shall maintain insurance in amounts no less than those set forth below in full force and effect at all times until the Work has been completed and shall provide a certificate evidencing such coverage promptly following Customer's request therefor.

COVERAGES	LIMITS OF LIABILITY
Workmen's Compensation Insurance or self-insurance, including Employer's Liability	Statutory
Commercial General Liability Insurance	\$5,000,000 Per Occurrence \$5,000,000 Aggregate
Comprehensive Automobile Liability Insurance	\$5,000,000 Combined Single Limit

The above limits may be obtained through primary and excess policies and may be subject to self-insured retentions.

Customer shall be responsible for obtaining builder's risk insurance coverage for the Improvement Measures and shall at all times be responsible for any loss or casualty to the Improvement Measures. Customer shall also maintain insurance coverage, of the types and in the amounts customary for the conduct of its business, throughout the term of this Agreement.

- 14. INDEMNIFICATION.** To the fullest extent permitted by applicable Law, JCI shall indemnify Customer with respect to any third-party claim alleging bodily injury, including death, or property damage, but only to the proportionate extent such injury or damage is caused by the negligence or willful misconduct of JCI or a party for which JCI is responsible. A condition precedent to any obligation of JCI to indemnify Customer pursuant to this Section 14 shall be for Customer to promptly advise JCI of the claim pursuant to the notice provision of this Agreement.
- 15. LIMITATION OF LIABILITY.** NEITHER JCI NOR CUSTOMER WILL BE RESPONSIBLE TO THE OTHER FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL, REMOTE, PUNITIVE, EXEMPLARY, LOSS OF PROFITS OR REVENUE, LOSS OF USE, OR SIMILAR DAMAGES, REGARDLESS OF HOW CHARACTERIZED AND REGARDLESS OF A PARTY HAVING BEEN ADVISED OF THE POSSIBILITY OF SUCH POTENTIAL LOSSES OR RELIEF, ARISING IN ANY MANNER FROM THIS AGREEMENT, THE WORK, THE IMPROVEMENT MEASURES, THE PREMISES, THE M&V SERVICES, OR OTHERWISE. WITHOUT LIMITING JCI'S EXPRESS OBLIGATIONS UNDER THE ASSURED PERFORMANCE GUARANTEE, JCI'S LIABILITY UNDER THIS AGREEMENT, REGARDLESS OF THE FORM OF ACTION, SHALL IN NO EVENT EXCEED THE AMOUNT OF THE PAYMENTS ACTUALLY RECEIVED BY JCI UNDER SCHEDULE 4. If this Agreement covers fire safety or security equipment, Customer understands that JCI is not an insurer regarding those services, and that JCI shall not be responsible for any damage or loss that may result from fire safety or security equipment that fails to prevent a casualty loss. The foregoing waivers and limitations are fundamental elements of the basis for this Agreement between JCI and Customer, and each party acknowledges that JCI would not be able to provide the work and services contemplated by this Agreement on an economic basis in the absence of such waivers and limitations, and would not have entered into this Agreement without such waivers and limitations.
- 16. FORCE MAJEURE.** Neither party will be responsible to the other for damages, loss, injury, or delay caused by conditions that are beyond the reasonable control, and without the intentional misconduct or negligence of that party. Such conditions (each, a "Force Majeure") include, but are not limited to: acts of God; acts of government agencies; strikes; labor disputes; fires; explosions or other casualties; thefts; vandalism; riots or war; acts of terrorism; electrical power outages; interruptions or degradations in telecommunications, computer, or electronic communications systems; changes in Laws; or unavailability of parts, materials or supplies.
- 17. JCI'S PROPERTY.** All materials furnished or used by JCI personnel and/or JCI subcontractors or agents at the installation site, including documentation, schematics, test equipment, software and associated media remain the exclusive property of JCI or such other third-party. Customer agrees not to use such materials for any purpose at any time without the express authorization of JCI. Customer agrees to allow JCI personnel and/or JCI subcontractors or agents to retrieve and to remove all such materials remaining after installation or maintenance operations have been completed. Customer acknowledges that any software furnished in connection with the Work and/or M&V Services is proprietary and subject to the provisions of any software license agreement associated with such software.
- 18. DISPUTES.** JCI and Customer will attempt to settle any controversy, dispute, difference, or claim between them concerning the performance, enforcement, or interpretation of this Agreement (collectively, "Dispute") through direct discussion in good faith, but if unsuccessful, will submit any Dispute to non-binding mediation in the nearest major metropolitan area of the state where the project is performed. If the parties are unable to agree on a mediator or a date for mediation, either party may request JAMS, Inc. to appoint a mediator and designate the time and procedure for mediation. Such mediator shall be knowledgeable, to each party's reasonable satisfaction, with respect to matters concerning construction law. Neither JCI nor Customer will file a lawsuit against the other until not less than sixty (60) days after the mediation referred to herein has occurred, unless one or both parties is genuinely and reasonably concerned that any applicable statute of limitations is on the verge of expiring. The laws of the State of Texas govern all disputes arising out of or relating to this Agreement. The parties hereto acknowledge that venue is proper in either Fort Bend County, Texas or the U.S. District Court closest to Fort Bend County, Texas, for all legal actions or proceedings arising out of or relating to this Agreement and waive the right to sue or be sued elsewhere. Nothing in the Agreement shall be construed to waive the County's sovereign immunity. JCI AND CUSTOMER HEREBY WAIVE THEIR RESPECTIVE RIGHTS TO A JURY TRIAL AS TO ANY CLAIM OR CAUSE OF ACTION BASED UPON, ARISING OUT OF OR DIRECTLY OR INDIRECTLY RELATED TO THIS AGREEMENT, INCLUDING CONTRACT, TORT AND STATUTORY CLAIMS, AND EACH OF THE PARTIES HERETO ACKNOWLEDGES THAT THIS WAIVER IS A MATERIAL INDUCEMENT TO ENTER INTO A BUSINESS RELATIONSHIP, THAT EACH HAS RELIED ON THIS WAIVER IN ENTERING INTO THIS AGREEMENT, AND THAT EACH WILL CONTINUE TO RELY ON THIS WAIVER IN THEIR RELATED FUTURE DEALINGS UNDER THIS

AGREEMENT. Customer does not agree to submit disputes arising out of the Agreement to binding arbitration. Neither party agrees to pay any and/or all attorney fees incurred by the other party in any way associated with the Agreement.

19. **GOVERNING LAW.** This Agreement and the construction and enforceability thereof shall be interpreted in accordance with the laws of the state where the Work is conducted.
20. **CONSENTS; APPROVALS; COOPERATION.** Whenever Customer's consent, approval, satisfaction or determination shall be required or permitted under this Agreement, and this Agreement does not expressly state that Customer may act in its sole discretion, such consent, approval, satisfaction or determination shall not be unreasonably withheld, qualified, conditioned or delayed, whether or not such a "reasonableness" standard is expressly stated in this Agreement. Whenever Customer's cooperation is required by JCI in order to carry out JCI's obligations hereunder, Customer agrees that it shall act in good faith and reasonably in so cooperating with JCI and/or JCI's designated representatives or assignees or subcontractors. Customer shall furnish decisions, information, and approvals required by this Agreement in a timely manner so as not to delay the performance of the Work or M&V Services.
21. **FURTHER ASSURANCES.** The parties shall execute and deliver all documents and perform all further acts that may be reasonably necessary to effectuate the provisions of this Agreement.
22. **INDEPENDENT CONTRACTOR.** The relationship of the parties hereunder shall be that of independent contractors. Nothing in this Agreement shall be deemed to create a partnership, joint venture, fiduciary, or similar relationship between the parties.
23. **POWER AND AUTHORITY.** Each party represents and warrants to the other that (i) it has all requisite power and authority to execute and deliver this Agreement and perform its obligations hereunder, (ii) all corporate, board, body politic, or other approvals necessary for its execution, delivery, and performance of this Agreement have been or will be obtained, and (iii) this Agreement constitutes its legal, valid, and binding obligation.
24. **SEVERABILITY.** In the event that any clause, provision, or portion of this Agreement or any part thereof shall be declared invalid, void, or unenforceable by any court having jurisdiction, such invalidity shall not affect the validity or enforceability of the remaining portions of this Agreement unless the result would be manifestly inequitable or materially impair the benefits intended to inure to either party under this Agreement.
25. **COMPLETE AGREEMENT.** It is understood and agreed that this Agreement contains the entire agreement between the parties relating to all issues involving the subject matter of this Agreement. No binding understandings, statements, promises or inducements contrary to this Agreement exist. This Agreement supersedes and cancels all previous agreements, negotiations, communications, commitments and understandings with respect to the subject matter hereof, whether made orally or in writing. Each of the parties to this Agreement expressly warrants and represents to the other that no promise or agreement which is not herein expressed has been made to the other, and that neither party is relying upon any statement or representation of the other that is not expressly set forth in this Agreement. Each party hereto is relying exclusively on the terms of this Agreement, its own judgment, and the advice of its own legal counsel and/or other advisors in entering into this Agreement. Customer acknowledges and agrees that any purchase order issued by Customer associated with this Agreement is intended only to establish payment authority for Customer's internal accounting purposes. No purchase order shall be considered a counteroffer, amendment, modification, or other revision to the terms of this Agreement.
26. **HEADINGS.** The captions and titles in this Agreement are for convenience only and shall not affect the interpretation or meaning of this Agreement.
27. **COUNTERPARTS.** This Agreement may be executed in any number of counterparts, all of which when taken together shall constitute one single agreement between the parties.
28. **NOTICES.** All notices or communications related to this Agreement shall be in writing and shall be deemed served if and when sent by facsimile or mailed by certified or registered mail: to Johnson Controls, Inc. at the address listed on the first page of this Agreement, ATTN: Regional Solutions Manager, with a copy to Johnson Controls, Inc., ATTN: General Counsel – Building Efficiency Americas, 507 East Michigan Street, Milwaukee, Wisconsin, 53202: and to Customer at the address listed on the first page of this Agreement.

29. NON-APPROPRIATION. It is specifically understood and agreed that in the event no funds or insufficient funds are appropriated by Customer under this Agreement, Customer shall notify all necessary parties that this Agreement shall thereafter terminate and be null and void on the last day of the fiscal period for which appropriations were made without penalty, liability or expense to Customer.

30. CONFIDENTIAL INFORMATION. JCI expressly acknowledges that Customer is subject to the Texas Public Information Act, TEX. GOV'T CODE ANN. §§ 552.001 *et seq.*, as amended, and notwithstanding any provision in the Agreement to the contrary, Customer will make any information related to the Agreement, or otherwise, available to third parties in accordance with the Texas Public Information Act. Any proprietary or confidential information marked as such provided to Customer by JCI shall not be disclosed to any third party, except as directed by the Texas Attorney General in response to a request for such under the Texas Public Information Act, which provides for notice to the owner of such marked information and the opportunity for the owner of such information to notify the Attorney General of the reasons why such information should not be disclosed. The terms and conditions of the Agreement are not proprietary or confidential information.

31. TEXAS-SPECIFIC PROVISIONS.

- A. Agreement to Not Boycott Israel Chapter 2271 Texas Government Code: By signature below, JCI verifies that if JCI employs ten (10) or more full-time employees and this Agreement has a value of \$100,000 or more, JCI does not boycott Israel and will not boycott Israel during the term of this Agreement.
- B. Texas Government Code Section 2251.152 Acknowledgment: By signature below, JCI represents pursuant to Section 2252.152 of the Texas Government Code, that JCI is not listed on the website of the Comptroller of the State of Texas concerning the listing of companies that are identified under Section 806.051, Section 807.051 or Section 2253.153.
- C. Human Trafficking. **BY ACCEPTANCE OF AGREEMENT, JCI ACKNOWLEDGES THAT THE CUSTOMER IS OPPOSED TO HUMAN TRAFFICKING AND THAT NO CUSTOMER FUNDS WILL BE USED IN SUPPORT OF SERVICES OR ACTIVITIES THAT VIOLATE HUMAN TRAFFICKING LAWS.**

FORT BEND COUNTY

JOHNSON CONTROLS, INC.

Signature: _____

Signature: Justin R Surratt

Printed Name: _____

Printed Name: Justin Reid Surratt

Title: _____

Title: Area General Manager, South

Date: _____

Date: October 23, 2020

SCOPE OF WORK

I. SUMMARY OF THE SCOPE OF WORK

The following information lists and summarizes the Facility Improvement Measures (FIM) to be implemented for this project.

FIM Number	FIM Name
FIM 1	LED Lighting Upgrades
FIM 2	DX Unit Replacement
FIM 3	RTU Replacement
FIM 4	Air Cooled Chiller
FIM 5	Water Cooled Chiller
FIM 6	AHU Upgrades
FIM 7	BAS Upgrades
FIM 8	Not Included
FIM 9	Building Envelope
FIM 10	Emergency Generator
FIM 11	Fire Alarm System

Schedule 1

Building	FIM 1	FIM 2	FIM 3	FIM 4	FIM 5	FIM 6	FIM 7	FIM 9	FIM 10	FIM 11
Admin Bldg - Drainage District	X	X					X			
Albert George Library	X									
Cinco Ranch Library	X									
East End Annex	X					X	X	X		
Extension Office Bldg	X	X					X	X		
First Colony Library	X									
Fort Bend County North Annex Bldg	X	X					X			
Precinct 4 Bldg	X						X			
Sienna Branch Library	X									
Sugar Land Annex	X		X				X	X		
Sugar Land Branch Library	X									
911 Call Center		X					X			
County Jail / West Tower									X	X
Courthouse	X									
Parking Garage (Justice Center)	X									
Bob Lutts Fulshear Library	X			X			X			
George Memorial Library	X	X	X		X		X	X		
Jane Long Building	X		X	X		X	X			
Rosenberg Annex	X			X			X			
Travis Building	X			X			X	X		
Gus George Academy	X		X				X	X		
Missouri City Annex	X									
Precinct 1 Building	X	X					X	X		
Richmond Tax Office	X	X					X	X		
Justice Center (Parking Lot)	X									
Sienna Annex	X									

II. DESCRIPTION OF THE SCOPE OF WORK

The following information provides a description of the scope of work. For more detail on the Improvement Measures noted immediately below, please refer to the corresponding attachments:

GENERAL SCOPE OF WORK:

JCI will provide the Customer with the scope of work (Work) identified in this Section. JCI shall supervise and direct the Work and shall be solely responsible for construction means, methods, techniques, sequences, and procedures and for coordinating the Work. JCI shall be responsible to pay for labor, materials, equipment, tools, construction equipment and machinery, transportation, and other facilities and services necessary for the execution and completion of the Work, whether temporary or permanent. Completed work will be functional and installed and inspected as in compliance with local governing codes in effect at the time of contract signing.

General Work:

- The Johnson Controls Safety Specifications will be followed at all times. Any safety violations will be addressed immediately. Work will not continue until any unsafe conditions are corrected.
- Customer agrees to sign off, take ownership of and accept JCI's warranty start date for each FIM by building separately as they are completed.
- Final engineering work for each FIM shall be provided as described within this scope of work. Once final engineering work is complete, some minor modifications to outlined scope of work may be required. No modifications shall be made to the Work without prior approval of Customer.
- Customer agrees to review and approve all equipment and product submittals within five (5) working days after receipt from JCI.
- One (1) each electronic copy of the Operation and Maintenance ("O&M") manuals of equipment shall be submitted to Customer at completion of the construction phase of the project.
- One (1) each electronic copy of as-built construction drawings for applicable FIMs will be submitted to the Customer at completion of the construction phase.
- JCI shall provide an as-built lighting table with updated fixture counts to reflect actual lamps/ballasts/fixtures installed.
- Work will be coordinated with Customer personnel to minimize interruptions and delays.
- Materials being installed shall be new unless otherwise specified in this scope of work.
- Necessary protection will be provided to avoid damage to adjacent services in the surrounding work areas.
- Johnson Controls shall be given ample notice for security clearance procedures required for access to any facility included in this scope of work.
- County to provide adequate personnel for escort(s) in and access to correctional facilities and county buildings for multiple installation trades so not to impede the construction work and schedule at no cost to JCI.
- Customer retains the right to keep any removed equipment or material, unless specified differently in other areas of this Agreement. Customer shall notify JCI within thirty (30) calendar days of contract signing of any equipment and materials the Customer shall retain.
- Work will be coordinated with Customer personnel to minimize interruptions, delays, or safety issues.
- Materials being installed shall be new unless otherwise specified in this scope of work.
- All work performed during standard 40 hour work week, Monday through Friday; weekends or overtime not included.
- All existing equipment, infrastructure, materials, circuit breakers, contactors, switches/controls, existing lighting fixtures, and the electrical system not being replaced or repaired under this contract are assumed to be operational, in working order and compliant with current code requirements and standards.

General Exclusions:

- HAZARDOUS MATERIALS. Unless specifically noted in this scope of work, JCI's obligations expressly exclude any Work or Services of any nature associated or connected with the identification, abatement, cleanup, control, removal, or disposal of hazardous materials or substances, including, but not limited to, asbestos or PCBs, in or on the premises.
- Any structural modifications to existing equipment and infrastructure.
- Code upgrades for existing infrastructure and equipment scheduled to remain.
- Repair, upgrades, or replacement of defective mechanical equipment, electrical or controls equipment, or the electrical distribution system, except the equipment described in the FIM description (JCI will identify the location of defective equipment and notify Customer personnel).
- TAB of existing systems, unless specified in the scope of work.
- Existing building ventilation conditions, indoor air quality issues are excluded from the scope of work and cost of this project.
- Engineering services, studies, and analysis associated with any exclusions or work clearly outside of the scope definition.
- Repairs to existing pneumatic and electronic controls unless specified to be replaced in this scope of work.
- Repairs to existing fire & smoke controls and associated wiring. During construction, if JCI identifies non-functional fire & smoke controls, JCI will provide a deficiency report to Customer.
- Temporary space conditioning unless otherwise identified in a FIM scope of work.
- Resolution of existing design, service, and or distribution conditions known or unknown.
- Correction of any existing applicable building code violations and Federal Americans with Disabilities Act (ADA) violations identified by JCI during the execution of the Work. Such violations will be brought to the attention of the Customer for remedy.

FIM 1: LED Lighting Upgrades

General

This FIM shall include retrofits to the existing lighting system with energy-efficient LED lighting technology per Attachment 5. The overall lighting project is designed to meet or exceed current Illuminating Engineering Society (IES) recommendations while addressing specific illumination requirements for task/area functions. The following is a summary scope of work per area (refer to the line by line for details of fixtures included in scope):

Interior LED Lighting Retrofit Scope of Work

The majority of the light fixtures are T8 linear fluorescent running at 32 W per lamp, powered by a lower power ballast; There are also a variety of fixtures with incandescent and compact fluorescent lamps. For fixtures identified in Attachment 5:

- Linear fluorescent fixtures will be retrofitted with Type B TLED tubes that will be “direct-wired”. The existing electronic ballasts will be removed.
- Round recessed can lights will be replaced with LED can kits.
- Screw-in incandescent and compact fluorescent lamps will be re-lamped with LED replacement lamps.

Exterior LED Lighting Retrofit Scope of Work

- The exterior lighting systems in the county include a mixture of incandescent, compact fluorescent, LED, and high intensity discharge (HID) technology fixtures.
- For fixtures identified in Attachment 5: HID fixtures will be replaced with either new high efficiency LED fixtures or HID replacement retrofits. Screw-in fixtures will receive new high efficiency LED lamps. The recessed cans will be retrofitted with a LED kit. Existing LED fixtures will not be replaced.

Final Engineering

- Development of material and equipment submittals.

Demolition and Removal Work

- Existing lamps and ballasts associated with the referenced scope of work will be removed and properly disposed according to local codes regulations in force at the time of contract signing.

Installation

- JCI will furnish all materials, labor, and necessary equipment to complete the detailed scope of work shown in Attachment 5, room by room description.

Warranty

- Maintenance stock of 1.5% shall be provided for interior scope (LED troffer kits, tubes, and LED screw-in lamps only).
- Customer shall be responsible for installation of warranted lamps beginning at the date of Substantial Completion.
- Workmanship is warranted for one year from date of installation.
- Material Warranties - Manufacturer warranties of retrofit kits, and fixtures installed as part of the project are covered by the individual manufacturer’s published documentation. Johnson Controls will furnish contact information for each manufacturer. Alleged defective product may be required for return to factory for analysis and shall be the customer’s responsibility.

Training

- No training for this FIM shall be provided.

Closeout

JCI shall provide the following closeout documents:

- Product data for new materials and equipment installed.
- Warranty information for new materials and equipment installed.
- Updated line by line document for all work included in this FIM.

Inclusions

- Pricing is turnkey which includes material, labor, engineering, design and recycling/disposal costs.
- All work shall be performed in accordance with industry standards and approved safety practices. Professional performance by licensed, ensured and certified personnel skilled in lighting retrofit services.
- Lamps and ballasts removed as part of the work shall be recycled and/or disposed of in compliance with applicable regulations in effect at the time of contract signing.
- If specified materials become either temporarily or permanently unavailable for reasons beyond the control of JCI, then the expected time for performance of the work will be extended. JCI reserves the right to provide equivalent substitutions at no price increase.
- Where ULB listed tubular LED lamp (TLED) retrofits are proposed, the tubes will be direct-wired and the existing ballast will be removed.
- Where retrofits of existing fixtures are proposed, the scope includes wiping down prismatic lenses with dry cloth.
- Design illumination levels: In the absence of code-mandated lighting requirements, industry standards have been used as a guide, primarily the most recent edition of the Illuminating Engineering Society of North America (IESNA), IESNA Recommended Practice documents and IESNA Design Guides.
- Existing lighting systems were presumed to be designed based on IESNA recommended practices. In the event current light levels are above IESNA recommendations for the space type (i.e., over-lit), light levels will be reduced. In the event light levels are below IESNA recommendations for the space type, JCI will meet or exceed current light levels. If the space is under-lit due to an inadequate spacing or quantity of fixtures from initial design, which requires adding fixtures, adding circuits, reconfiguration or new construction, this will be brought to the attention of the customer. LED fixtures or components specified for the project are based on comparable original lumen outputs of existing equipment rather than depreciated light output values.
- Existing and post-retrofit illumination levels have been/will be measured in a sample of fixtures accordance with procedures recommended by IESNA using a light meter.
- Any existing dimming and step-dim switching to remain in place.

Exclusions

- Electrical permits and fees.
- Replacement or repair of concrete pole footings or rusted bolts on footings.
- Existing light poles will be reused. Repair of wiring to poles, if required, is not included.
- Pole mounted lighting is reusing existing poles. Customer is responsible for pole maintenance, repair, and replacement throughout the term of the guarantee.

Schedule 1

- Lighting poles will be checked for contact voltage. If any hazardous voltage is noted, work on that pole will be stopped and the customer and/or the utility company be notified immediately to correct the fault before any work will be performed.
- Existing task lighting and table type light fixtures unless specified in Attachment 5- Schedule 1 FIM #1, room by room description of work.
- Removal or replacement of ceiling tiles unless specified in Attachment 5- Schedule 1 FIM #1, room by room description of work.
- Existing decorative and stage light fixtures unless noted in Attachment 5- Schedule 1 FIM#1, room by room description of work.
- The addition of lighting fixtures in areas with existing illumination deficiencies is not covered under this scope of work unless otherwise noted in Attachment 5- Schedule 1 FIM #1, room by room description of work. If pre-install foot-candle levels do not meet minimum standards, the customer will be notified.
- Existing fluorescent dimming systems or step-dim fixtures will remain “as is” unless otherwise noted in Attachment 5- FIM 1, room by room description of work.
- Reconfiguration of existing fixture layout unless otherwise noted in Attachment 5- Schedule 1 FIM #1, room by room description of work.
- Replacement of existing wiring and/or electrical issues in exterior fixtures.
- Existing fixtures that are not in a well-maintained condition including, but not limited to, rusted or embrittled in a manner which would impede retrofit.
- Any electrical wiring other than that required for the retrofit or replacement within the existing lighting fixtures, the installation of new fixtures as scheduled, the installation of occupancy sensors and other controls.
- Double or bi-level switching of in-board and out-board sockets is not included unless specified in Attachment 5- Schedule 1 FIM #1, room by room description of work.
- Repair, replacement and adjustments of existing sensors, time clocks, switches, or energy management systems unless otherwise noted in Attachment 5- Schedule 1 FIM #1, room by room description of work.
- Calibration or adjustment of the lighting control devices post-retrofit. JCI will set controls to the agreed upon settings at time of installation only.
- Repair or replacement of louvers or other components unless denoted in Attachment 5- Schedule 1 FIM #1, room by room description of work.
- Repair or replacement of yellowed, cracked, damaged or missing fixture lenses, louvers or other components unless denoted on the Attachment 5- Schedule 1 FIM #1 room by room description scope of work.
- Repair, replacement or upgrades to the existing Emergency and Egress Lighting Systems unless otherwise noted in Attachment 5- Schedule 1 FIM #1, room by room description of work.
- Replacement of defective emergency battery backup ballast unless otherwise noted in Attachment 5- Schedule 1 FIM #1, room by room description of work.
- Unless specified in the scope of work, no provisions are made to ensure that the light levels will comply with existing surveillance camera requirements. Proposed light levels will meet or exceed the current light levels of the interior and exterior fixtures.
- Replacement of existing lighting sockets and ballast unless otherwise noted.
- Correction or repair of electrical system deficiencies or any NFPA, NEC, or Local Code deficiencies unless provided for in the scope.
- Painting, plastering or any other type of repair to existing mounting surfaces after the removal or replacement of fixtures, unless otherwise noted.

Schedule 1

- Situations that could not be reasonably documented during the audit (i.e. concealed locations or hidden conditions).
- Work in buildings or areas not specifically indicated on the Attachment 5- Schedule 1 FIM #1 room by room description scope of work is excluded. Should additional areas, buildings, or campuses require addition into the program, JCI will provide a written estimate for change order.
- Replacement of existing Exit Signs other than what is noted in Scope.
- Replacement of existing LED Technologies.

FIM 2: DX Units Replacement

General

This FIM addresses older & inefficient HVAC equipment by replacing existing decentralized unitary DX HVAC equipment (split systems (SS)) with new higher-efficiency equipment, as listed in Table 2.1. The new HVAC equipment will be approximately the same cooling capacity as the existing units. Refer to Attachment 5 – Schedule 1 FIMs for EER for of new equipment as well as savings calculations associated with this FIM.

Table 2.1

Building	JCI Tag	Make	Electrical	Model	Ref	Tons
911 Call Center		Liebert	460/3/60	PFH096A-LN	R410	10
911 Call Center		Liebert	460/3/60	PFH096A-LN	R410	10
Admin Drainage District	83.	Carrier	460/3/60	38AKS024-621	R-22	20
Admin Drainage District	85.	Carrier	460/3/60	38ARD12-601	R-22	10
Admin Drainage District	84.	Carrier	460/3/60	38ARZ007-601	R-22	5
Extension Office	86	Trane	460/3/60	TTA120A400DA	R-22	10
Extension Office	87	Trane	460/3/60	TTA060D400A1	R-22	5
Extension Office	88	Trane	460/3/60	TTA180B400CC	R-22	15
Extension Office	89	Trane	460/3/60	TTA090A400DA	R-22	7.5
Extension Office	90	Trane	460/3/60	TTA120A400DA	R-22	10
Extension Office	91	Trane	460/3/60	TTA120A400DA	R-22	10
Extension Office Annex	132	Coleman	208/1/60	CLK 36-1D	R-22	3
Extension Office Annex	133	Coleman	208/1/60	CLK 36-1D	R-22	3
Extension Office Annex	134	Coleman	208/1/60	CLK 36-1D	R-22	3
Extension Office Annex	135	Coleman	208/1/60	CLK 36-1D	R-22	3
Extension Office Annex	136	Coleman	208/1/60	CLK 36-1D	R-22	3
Fort Bend Co. N. Annex	94*	York	460/3/60	YC180C00AAA1A	R-410	15
Fort Bend Co. N. Annex	96*	York	460/3/60	YC120C00A4AAA2A	R-410	10
George Memorial Library	59	Ruud	208/3/60	RHGE-100 ZL949	R-22	8
Precinct-1	65	Trane	460/3/60	TTA240B400FB	R-22	20
Precinct-1	66	Carrier	460/3/60	RAUCC304BZ130BD0000	R-22	30
Precinct-1	67	Carrier	460/3/60	TTA240B400FB	R-22	20
Precinct-1	68	Carrier	460/3/60	TTA240B400FB	R-22	20
Richmond Tax Office	69	Trane	460/3/60	TTA240B400FB	R-22	20
Richmond Tax Office	70	Trane	460/3/60	RAUCC304BZ0300D0000	R-22	30
Richmond Tax Office	71	Trane	460/3/60	RAUCC304BZ0300D0000	R-22	30

Notes: *Only replace outdoor condensing unit

Final Engineering

- Provide equipment submittals for and split systems. All quantities, values, and details indicated are approximate and subject to change as a result of final engineering to be completed post contract signing. JCI will provide the final 100% Construction Drawings and Specifications prior to commencement of the Work of this FIM.
- The following drawings and specifications are included in Attachment 6– Drawings:
 - ◆ Schedule 1 - FIM 2 DX Units Replacement – Admin Drainage District
 - ◆ Schedule 1 - FIM 2 DX Units Replacement – Extension Office Mechanical Site
 - ◆ Schedule 1 - FIM 2 DX Units Replacement – Extension Office Mechanical Plan
 - ◆ Schedule 1 - FIM 2 DX Units Replacement – North Annex Mechanical
 - ◆ Schedule 1 - FIM 2 DX Units Replacement – Precinct 1 Mechanical
 - ◆ Schedule 1 - FIM 2 DX Units Replacement – Richmond Tax Office
 - ◆ Schedule 1 - FIM 2 DX Units Replacement – 911 Call Center Mechanical Plan
 - ◆ Schedule 1 - FIM 2 DX Units Replacement – 911 Call Center Mechanical Details

Demolition and Removal Work

JCI will remove and properly dispose of specified existing HVAC systems (both indoor and outdoor units, as applicable). Demolition of existing equipment will include the following:

- Refrigerant in existing equipment shall be removed and properly disposed of per codes in effect at the time of contract signing.
- Disconnection of existing refrigerant lines.
- Remove each existing equipment electrical disconnect, and safely disconnect electrical supply.
- Disconnect equipment from existing ducting, condensate drain piping and natural gas piping as applicable.
- Customer shall indicate and mark any equipment or parts to be retained within thirty (30) calendar days of contract signing of any equipment and materials the Customer shall retain. It shall be the Customers responsibility to remove parts from existing equipment prior to demolition. Additionally, any equipment to be retained by Customer shall be placed by JCI in a designated location on each site for Customer removal.
- Removal and proper disposal of existing units in accordance with local, state, and Federal laws in effect at the time of contract execution unless the Customer choses to keep the equipment.
- Visually inspecting existing housekeeping pads for defects and repair and replace as necessary.
- Disconnect existing controls from the unit being replaced.
- Disconnect, remove, and properly dispose of the existing unit to be replaced.
- Remove existing units roof-mounted units and dispose of properly.
- Temporarily seal or cap disconnected utilities and exposed ducting.

Installation

- JCI will provide and install new HVAC systems (both indoor and outdoor units). Equipment to have the following features:
 - ◆ New electrical disconnects
 - ◆ Existing electrical power wiring will be reused
 - ◆ Charging the new systems with refrigerant
 - ◆ Reconnecting the existing refrigerant lines and existing ductwork reusing existing roof penetrations

- ◆ Re-insulation of refrigerant lines, as necessary, to replace insulation removed during the demolition of each unit
- ◆ Reconnect new equipment to existing condensate drain and natural gas piping
- ◆ Connect new equipment to new BAS and thermostats as detailed in FIM 7 scope of work

Training

- No training for this FIM shall be provided.

Warranties

- 1-Year workmanship guarantee beginning upon final acceptance of this FIM.
- Manufacturer's stated warranties on equipment installed as part of this FIM.

Closeout

JCI shall provide the following closeout documents:

- Start-up and testing reports.
- Warranty information for new equipment installed and Operation & Maintenance manuals.

Exclusions

- Air balancing will be limited only to the equipment being replaced.
- Temporary space conditioning.
- Duct cleaning and coil cleaning.
- Resolution of existing design, service, and or distribution conditions known or unknown.
- Roof repairs other than those directly associated with this scope of work.
- Roof structural upgrades.
- The warranty on materials installed as part of this FIM does not include labor beyond the 1-year workmanship guarantee.
- Repairs/replacement of insulation, piping, electrical or ductwork found to be corroded or rusted or otherwise unacceptable for installation of components or fittings required for installation other than what is specified in the scope of work.

FIM 3: RTUs Replacement

General

This FIM addresses older & inefficient existing packaged rooftop air cooled air-conditioning equipment with new higher-efficiency equipment, as listed in Table 3.1. The new HVAC equipment will be approximately the same heating and cooling capacity as the existing units. Refer to Attachment 5 – Schedule 1 FIMs for EER of new equipment as well as savings calculations associated with this FIM.

Table 3.1

Building	JCI Tag	Make	Electrical	Model	Ref	Tons
George Memorial Library	58	Raypack	460/3/60	RLKA-A060	R-22	5
Gus George Academy	45	Trane	460/3/60	TED360A4A11A5CC5A00D000HJK	407C	30
Gus George Academy	46	Trane	460/3/60	TFD181E40Naa	R410	40
Gus George Academy	47	Trane	460/3/60	TED480A4B11	407C	40
Gus George Academy	48	Trane	460/3/60	TED360A4A11A5CC5A00D000HJK	407C	30
Jane Long	41	Trane	460/3/60	DH240E36A4Aaa1C	R-22	20
Jane Long	42	Trane	460/3/60	DH240C00A4AAA1A	R-22	20
Sugar Land Annex	101.	Trane	208/3/60	TC Series	R-22	7.5
Sugar Land Annex	102.	Trane	208/3/60	TC Series	R-22	7.5
Sugar Land Annex	103.	Trane	208/3/60	TC Series	R-22	5
Sugar Land Annex	104.	Trane	208/3/60	TC Series	R-22	5
Sugar Land Annex	105.	Trane	208/3/60	TC Series	R-22	7.5
Sugar Land Annex	106.	Trane	208/3/60	TC Series	R-22	7.5
Sugar Land Annex	108.	Weathermaster	208/3/60	TC Series	R-22	5
Sugar Land Annex	109.	Trane	208/3/60	TC Series	R-22	6
Sugar Land Annex	110.	Trane	208/3/60	TC Series	R-22	5
Sugar Land Annex	111.	Weathermaster	208/3/60	TC Series	R-22	5

Final Engineering

- Provide equipment submittals for RTUs. The drawings and specifications outlined below are the scope of work of this FIM. All quantities, values, and details indicated are approximate and subject to change as a result of final engineering to be completed post contract signing. JCI will provide the final 100% Construction Drawings and Specifications prior to commencement of the Work of this FIM.
- The following drawings and specifications are included in Attachment 6– Drawings:
 - ◆ Schedule 1 - FIM 5 RTU Replacements – Gus George Academy Mechanical Plan
 - ◆ Schedule 1 - FIM 5 RTU Replacements – Gus George Academy Mechanical Details
 - ◆ Schedule 1 - FIM 5 RTU Replacements – Sugarland Annex Mechanical Plan
 - ◆ Schedule 1 - FIM 5 RTU Replacements – Sugarland Annex Mechanical Details

Demolition and Removal Work

JCI will remove and properly dispose of specified existing HVAC systems. Demolition of existing equipment will include the following:

- Refrigerant in existing equipment shall be removed and properly disposed of per state and local requirements in effect at the time of contract signing.
- Disconnection of existing refrigerant lines.
- Remove each existing equipment electrical disconnect, and safely disconnect electrical supply.
- Disconnect equipment from existing ducting, condensate drain piping and natural gas piping as applicable.
- Customer shall indicate and mark any equipment or parts to be retained within thirty (30) calendar days of contract signing of any equipment and materials the Customer shall retain. It shall be the Customers responsibility to remove parts from existing equipment prior to demolition. Additionally, any equipment to be retained by Customer shall be placed by JCI in a designated location on each site for Customer removal.
- Removal and proper disposal of existing units in accordance with local, state, and Federal laws in effect at the time of contract execution unless the Customer choses to keep the equipment.
- Visually inspecting existing housekeeping pads for defects and repair as necessary.
- Disconnect existing controls from the unit being replaced.
- Disconnect, remove, and properly dispose of the existing unit to be replaced.
- Remove existing units for roof-mounted units and dispose of properly.
- Temporarily seal or cap disconnected utilities and exposed ducting.

Installation

- JCI will provide and install new HVAC systems. Equipment to have the following features:
 - ◆ Meets or exceeds ASHRAE Standard 90.1-2016 (S)EER
- New curb adapters.
- New electrical disconnects.
- Existing electrical power wiring will be reused.
- Charging the new systems with refrigerant.
- Reconnecting the existing refrigerant lines and existing ductwork reusing existing roof penetrations.
- Re-insulation of refrigerant lines, as necessary, to replace insulation removed during the demolition of each unit.
- Reconnect new equipment to existing condensate drain and natural gas piping.
- Connect new equipment to new BAS and thermostats as detailed in FIM 7 scope of work.

Training

- No training for this FIM shall be provided

Warranties

- 1-Year workmanship guarantee beginning upon final acceptance of this FIM.
- Manufacturer's stated warranties on equipment installed as part of this FIM.

Closeout

JCI shall provide the following closeout documents:

- Start-up and testing reports.
- Warranty information for new equipment installed and Operation & Maintenance manuals.

Exclusions

- Air balancing will be limited only to the equipment being replaced.
- Temporary space conditioning.
- Duct cleaning and coil cleaning.
- Resolution of existing design, service, and or distribution conditions known or unknown.
- Roof repairs other than those directly associated with this scope of work.
- Roof structural upgrades.
- The warranty on materials installed as part of this FIM does not include labor beyond the 1-year workmanship guarantee.
- Repairs/replacement of insulation, piping, electrical or ductwork found to be corroded or rusted or otherwise unacceptable for installation of components or fittings required for installation other than what is specified in the scope of work.

FIM 4: Air Cooled Chiller

General

This FIM replaces existing air cooled chillers as listed in Table 4.1. The new HVAC equipment will be the same cooling capacity as the existing units. This FIM also replaces specified pumps with new pumps with premium efficiency motors listed in Table 4.2. Refer to Attachment 5 – Schedule 1 FIMs for EER for new equipment as well as savings calculations associated with this FIM.

Table 4.1 Existing Chillers

Building	JCI Tag	Make	Electrical	Model	Refrigerant	Tons
Bob Lutts Fulsher Library	128	Carrier	460/3/60	30RAN040	R-22	40
Jane Long Building	43	Carrier	460/3/60	30RAN045	R-22	40
Jane Long Building	43	Carrier	460/3/60	30RAN045	R-22	40
Rosenberg Annex	72	Carrier	460/3/60	30RBA120	R410	120
Travis Building	1	Carrier	460/3/60	30RBA170	R410	170
Travis Building	2	Carrier	460/3/60	30RBA170	R410	170

Table 4.2 Existing Pumps

Building	JCI Tag	Equipment	Speed	HP	GPM	Head
Bob Lutts Fulsher Library	130	Chilled Water Pump	1,750 RPM	2	85	40'
Jane Long	137	Chilled Water Pump	,1750	7.5	225	50'
Jane Long	138	Chilled Water Pump	1,750	7.5	225	50'
Rosenberg Annex	78	Chilled Water Pump	1,800	15	587	85'
Travis	3	Chilled Water Pump	1,800	7.5	342	40'
Travis	4	Chilled Water Pump	1,800	7.5	342	40'

Final Engineering

- Provide product data sheets for submittals. All quantities, values, and details indicated are approximate and subject to change as a result of final engineering to be completed post contract signing. JCI will provide the final 100% Construction Drawings and Specifications prior to commencement of the Work of this FIM.
- The following drawings and specifications are included in Attachment 6– Drawings:
 - ◆ Schedule 1 - FIM 4 Air Cooled Chiller – Fulshear Mechanical Site Plan
 - ◆ Schedule 1 - FIM 4 Air Cooled Chiller – Fulshear Mechanical Plans
 - ◆ Schedule 1 - FIM 4 Air Cooled Chiller – Fulshear Flow Diagram
 - ◆ Schedule 1 - FIM 4 Air Cooled Chiller – Jane Long Mechanical Site Plan
 - ◆ Schedule 1 - FIM 4 Air Cooled Chiller – Jane Long Mechanical Plan
 - ◆ Schedule 1 - FIM 4 Air Cooled Chiller – Jane Long Mechanical Flow Diagram
 - ◆ Schedule 1 - FIM 4 Air Cooled Chiller – Rosenberg Annex Site
 - ◆ Schedule 1 - FIM 4 Air Cooled Chiller – Rosenberg Annex Demo Plan

- ◆ Schedule 1 - FIM 4 Air Cooled Chiller – Rosenberg Mechanical Plan
- ◆ Schedule 1 - FIM 4 Air Cooled Chiller – Rosenberg Flow Diagram
- ◆ Schedule 1 - FIM 4 Air Cooled Chiller – Travis Mechanical Site Plan
- ◆ Schedule 1 - FIM 4 Air Cooled Chiller – Travis Mechanical Plan
- ◆ Schedule 1 - FIM 4 Air Cooled Chiller – Travis Flow Diagram

Demolition and Removal Work

- Refrigerant in existing equipment shall be removed and properly disposed of per state and local requirements in effect at the time of contract signing.
- Disconnect, remove, and properly dispose of existing chillers as show in Table 4.1.
- Disconnect, remove, and properly dispose of existing pumps as shown in Table 4.2.
- Disconnect, remove, and properly dispose of chilled water piping to nearest isolation valves or as required for new installation.
- Disconnect, remove, and properly dispose of other materials or debris related to this project as necessary for installation.
- Disconnect and secure electrical connections to the chillers.
- Disconnect and secure electrical connections to chilled water pumps.
- Disconnect and secure the BAS connection.

Installation

- Install each new chiller in the existing location with chilled water piping and other piping extended as required for connection.
- Reconnect chilled water lines to each new chiller with flexible connections. Match the existing pipe size.
- Provide and install the new chilled water pumps on the existing pads. Pumps will be mounted with new spring isolation dampers.
- Insulate new piping, valves and fittings. Reinsulate any piping whose insulation was damaged during installation.
- Provide and install new heat tape as required on exterior small pipe modification connecting to the new chillers.
- Connect power to new chiller.
- Connect power to new primary chilled water pumps.
- Furnish and Install variable speed drives on the chilled water pumps (shown in the pump table above) with hand bypass for pumps. Replace the existing electrical wiring back to the main electrical panel and connect power.
- Provide and install new chiller feeds conduit from point of roof penetration including new code compliant racks.
- Test and balance of the water system at the new chillers only.

Training

- Two (2) hours of on-site training shall be performed during start-up of the chiller units.
- No other training shall be provided.

Warranties

- 1-Year workmanship guarantee beginning upon final acceptance of this FIM.

- Manufacturer's stated warranties on equipment installed as part of this FIM.

Closeout

JCI shall provide the following closeout documents:

- Start-up and testing reports.
- Warranty information for new equipment installed and Operation & Maintenance manuals.

Exclusions

- Temporary space conditioning during transition.
- Repair or replacement of defective mechanical, electrical or controls equipment, or the electrical distribution system, except the equipment described in the FIM description. JCI will identify the location of defective equipment and notify Fort Bend County.
- Repair or upgrades required due to bring adjacent electrical and mechanical systems up to code.
- Engineering services, studies and analysis associated with any exclusions or work clearly outside of the scope definition.
- Unknown permits, fees or processes required by local or oversight jurisdiction and/or utilities.
- Resolution of existing design, service, and or distribution conditions known or unknown.
- Repairs/replacement of insulation, piping, electrical or ductwork found to be corroded or rusted or otherwise unacceptable for installation of components or fittings required for installation other than what is specified in the scope of work.

FIM 5: Water Cooled Chiller

General

This FIM will replace the existing old lower-efficiency water-cooled chillers at George Memorial Library, with new high efficiency water cooled chillers equipped with variable speed drives. The new chillers have improved part-load performance and can operate at lower condenser water temperatures. The new chillers use R-134a refrigerant. Replacement of the old chillers will avoid future chiller repair and replacement expenditures. This FIM includes replacement of associated cooling tower and pumps as listed in Table 5.2 and 5.3. The new pumps and cooling tower capacity will be the same as that of the current equipment. Refer to Attachment 5 – Schedule 1 FIMs for EER of new chiller as well as savings calculation associated with this FIM.

Table 5.1 Existing Chillers

JCI Tag	Make	Electrical	Serial	Capacity (Tons)
49	Carrier	460/3/60	30HX146	146
50	Carrier	460/3/60	30HX146	146

Table 5.2 Existing Cooling Tower

JCI Tag	Make	Electrical	Model	No. of Cells
55	BAC	460/3/60	PT-2-0709A-2H2	2

Table 5.3 Existing Pumps

JCI Tag	Equipment	Electrical	Speed	HP	GPM	Head
51	Chilled Water Pump	460/3/60	1,800 RPM	10	250	70'
52	Chilled Water Pump	460/3/60	1,800 RPM	10	250	70'
53	Condenser Water Pump	460/3/60	1,800 RPM	7.5	360	40'
54	Condenser water Pump	460/3/60	1,800 RPM	7.5	360	40'

Final Engineering

- Provide equipment submittals, including drawings, product data, warranty information, installation instructions, operating instruction and maintenance instructions. The drawings and specifications outlined below are the scope of work of this FIM. All quantities, values, and details indicated are approximate and subject to change as a result of final engineering to be completed post contract signing. JCI will provide the final 100% Construction Drawings and Specifications prior to commencement of the Work of this FIM.
- The following drawings and specifications are included in Attachment 6– Drawings:
 - ◆ Schedule 1 - FIM 5 Water Cooled Chiller – George Memorial Library Demo Plan
 - ◆ Schedule 1 - FIM 5 Water Cooled Chiller – George Memorial New Work Plan
 - ◆ Schedule 1 - FIM 5 Water Cooled Chiller – George Memorial Library Cooling Tower Plan
 - ◆ Schedule 1 - FIM 5 Water Cooled Chiller – George Memorial Library Schedules

Demolition and Removal Work

- Remove existing Chillers, Cooling Tower, and Pumps according to Table 5.1, 5.2, and 5.3:
 - ◆ Properly dispose of all old equipment, material, refrigerant, oil and other fluids removed for chiller demolition.
 - ◆ Provide break-down, cutting and rigging as required to remove chillers and cooling tower.

Installation

The following is the scope of work associated with this recommendation. Johnson Controls will furnish and install all material and labor necessary to implement the upgrades (unless noted otherwise).

- Furnish and install two new 146-ton York chiller(s), new cooling tower, and associated chilled and condenser water pumps:
 - ◆ Provide rigging, loading, and setting
- Insulate new chilled water piping and any existing piping where the insulation was damaged during the installation of the chillers.
- Furnish and install chilled water and condenser water piping required to connect new chillers, cooling tower, chilled water and condenser water pumps into the existing system.
- Provide new automatic chilled water and condenser water isolation valves, connected to the BAS.
- Provide drain and vent connections at lowest points in system and traps.
- Provide vibration isolation and structural supports required by local codes in effect at the time of contract signing.
- Install new refrigerant monitoring and ventilation systems as required to meet local codes in effect at the time of contract signing.
- Rework and extend existing housekeeping pad as required for new chiller base.
- Remove existing chiller starters.
- Remove existing electrical power wiring connections, starters, fuses, panel boards, and above-grade conduit on existing chiller.
- Provide new electrical power wiring from the main electrical panel to new unit-mounted VSDs.
- Electrical power wiring distribution panel modifications as necessary for installation.
- Provide flushing, cleaning, filling, start-up and testing of new chiller.
- Extend communication bus to/from new chiller controller to/from existing BAS. Update front-end graphics and modify control system to tie new chiller into existing BAS.

Training

- No training for this FIM shall be provided.

Warranties

- 1-Year workmanship guarantee beginning upon final acceptance of this FIM.
- Manufacturer's stated warranties on equipment installed as part of this FIM.

Closeout

JCI shall provide the following closeout documents:

- Start-up and testing reports.
- Warranty information for new equipment installed and Operation & Maintenance manuals.

Exclusions

- Temporary cooling during transition.
- Repair or replacement of defective mechanical, electrical and controls equipment, and the electrical distribution system, except the equipment described in the FIM description.

Schedule 1

- Repair or upgrades required to bring adjacent electrical and mechanical systems up to code.
- Overtime work caused by unforeseen circumstances beyond the control of Johnson Controls, such as scheduling changes by customer. The cost difference between the overtime work wages and normal time work wages will be the responsibility of customer calculated as $[(\text{overtime rate} - \text{normal rate}) \times \text{hours}]$.
- Asbestos abatement and removal for this project is entirely the responsibility of customer. If hazardous materials are encountered during the implementation phase, Johnson Controls will immediately stop work, take measures to reduce any contamination, and notify the customer facility manager of the possible hazardous material condition and location. Johnson Controls will then request that customer remove and dispose of the hazardous materials prior to any continuation of work. Hazardous materials encountered during the on-going service phase of the project will remain the property and disposal responsibility of customer. Johnson Controls will work with customer and our subcontractors to sufficiently identify the scope, costs and project scheduling implications of any required abatement such that customer can adequately plan for this requirement.
- The cost of hazardous material abatement or removal, such as asbestos, mold and lead paint that is not currently specified in the engineering scope of work. In the event hazardous materials are uncovered and abatement is beyond the ability of Johnson Controls to abate under this contract, the FIM will be evaluated for possible removal from the scope of work or the transfer of this responsibility to customer.
- Water balance of additional equipment (air handlers, condensers, etc.), unless specified in the scope of work.
- Engineering services, studies and analysis associated with any exclusions or work clearly outside of the scope definition.
- Unknown permits, fees or processes required by local or oversight jurisdiction and/or utilities.
- Repairs/replacement of insulation, piping, electrical or ductwork found to be corroded or rusted or otherwise unacceptable for installation of components or fittings required for installation other than what is specified in the scope of work.

FIM 6: AHU Upgrades

General

This FIM addresses older & inefficient AHU equipment, as listed in Table 6.1. The new HVAC equipment will be approximately the same heating and cooling capacity as the existing units.

Table 6.1

Building	JCI Tag	Make	Model	Serial	Capacity (Tons)
East End Annex	118	Trane	MCAA 006	K97C31107	15
East End Annex	119	Trane	MCAA 006	K97C31107	15
Jane Long	31.	Carrier	791589392	39E008HVFVCSFCS	10
Jane Long	32.	Carrier	7915389390	39E008HVFVCSFCS	10
Jane Long	33.	Carrier	791589396	39ED12H	10
Jane Long	34.	Carrier	791589389	39ED08HVFVCSFCS	8
Jane Long	35.	Carrier	7915-89394	39ED08HVFVCSFCS	8
Jane Long	36.	Carrier	791589395	39ED12hufvcsfcs	12
Jane Long	37.	Carrier	791589391	39ED08HVFVCSFCS	8
Jane Long	38.	Carrier	791589397	39ED12HUFVCSFCS	12
Jane Long	39.	Carrier	791589393	39De08HVFVCSFCS	10

Final Engineering

- Provide product data sheets and equipment submittals. The drawings and specifications outlined below are the scope of work of this FIM. All quantities, values, and details indicated are approximate and subject to change as a result of final engineering to be completed post contract signing. JCI will provide the final 100% Construction Drawings and Specifications prior to commencement of the Work of this FIM.
- The following drawings and specifications are included in Attachment 6– Drawings:
 - ◆ Schedule 1 - FIM 6 AHU Upgrades – East End Annex Mechanical
 - ◆ Schedule 1 - FIM 6 AHU Upgrades – East End Annex Mechanical Plan
 - ◆ Schedule 1 - FIM 6 AHU Upgrades – East End Annex Mechanical
 - ◆ Schedule 1 - FIM 6 AHU Upgrades – East End Annex Mechanical
 - ◆ Schedule 1 - FIM 6 AHU Upgrades – Jane Long Basement
 - ◆ Schedule 1 - FIM 6 AHU Upgrades – Jane Long First Floor
 - ◆ Schedule 1 - FIM 6 AHU Upgrades – Jane Long Second Floor
 - ◆ Schedule 1 - FIM 6 AHU Upgrades – Jane Long Basement

Demolition and Removal Work

- Remove existing AHUs according to Table 6.1 and dispose of properly (Customer has right of first refusal).
- Customer shall indicate and mark any equipment or parts to be retained at least thirty (30) business days before scheduled removal. It shall be the Customer's responsibility to remove parts from existing equipment prior to demolition. Additionally, any equipment to be retained by Customer shall be placed by JCI in a designated location on each site for Customer removal.
- Safely disconnect equipment from existing ducting, condensate drain piping, hot water, and chilled water piping.
- Temporarily seal or cap disconnected utilities.

Installation

- JCI will provide and install new AHUs according to Table 6.1. The new HVAC equipment will be the same air flow, heating, and cooling capacity as the existing units.
- Connect AHU equipment to existing ducting, installing transition ductwork as required.
- Connect equipment to existing condensate drain piping.
- Connect equipment to existing chilled water and hot water distribution.
- Provide insulation and labeling for new ductwork transitions and new piping in accordance with existing building standards.
- Connect equipment to existing electrical power wiring, reusing equipment starter.
- Provide new insulation within AHU's mechanical room.
- Reconnect equipment to existing BAS.
- Provide and install new access door to mechanical room from outside the building.
- Test and balance for air and water at the new AHU only. Does not include test and balance of air distribution system beyond the mechanical room.

Training

- No training for this FIM shall be provided.
- Controls training shall be provided under a separate FIM.

Warranties

- 1-Year workmanship guarantee beginning upon final acceptance of this FIM.
- Manufacturer's stated warranties on equipment installed as part of this FIM.

Closeout

JCI shall provide the following closeout documents:

- Product data for new equipment installed.
- As-built drawings.
- Warranty information for new equipment installed including any extended warranties.

Exclusions

- Temporary space conditioning.
- Repair or replacement of defective equipment, other than the equipment specifically described above. JCI will identify the location of defective equipment and notify Fort Bend County.
- Repairs or upgrades required due to bring adjacent controls, electrical, and mechanical systems up to code.
- Repairs to existing damaged areas, such as retiling and painting of floors, ceilings, and walls, unless specifically identified above.
- Repairs/replacement of insulation, piping or ductwork found to be corroded or rusted and unacceptable for installation of components or fittings required for installation other than what is specified in the scope of work.
- Air balancing will be limited only to the equipment being replaced.
- Existing building ventilation conditions and indoor air quality issues are excluded from the scope and cost of this project.

Schedule 1

- Engineering services, studies or analysis associated with any exclusions or work clearly outside of the scope definition.
- Duct cleaning and coil cleaning.
- Resolution of existing design, service, and or distribution conditions known or unknown.

FIM 7: BAS Upgrades

General

The intent of this **scope of work** is to upgrade and/or replace (like for like unless otherwise noted) the HVAC Controls at selected locations. In addition to the buildings with existing systems, more County buildings will be added to the system. Some existing standalone controls will remain unchanged (i.e. Standalone Unit Heaters). Refer to Attachment -5 for savings associated with the FIM. Work to be performed during normal business hours unless otherwise specified.

The scope of work will include the following buildings:

Table 7.1

Building
Admin Bldg - Drainage District
Bob Lutts Fulshear Library
East End Annex
Extension Office Bldg
Extension Office Annex
Fort Bend County North Annex Bldg
George Memorial Library
Gus George Academy
Jane Lone Building
Precinct 1 Bldg
Precinct 4 Bldg
Richmond Tax Office
Rosenberg Annex
Sugar Land Annex
Travis Building
911 Call Center (Fort Bend City Jail)

Final Engineering

- Development of equipment submittals.

Demolition and Removal Work

JCI will remove and properly dispose of existing control equipment as shown below. Demolition of existing equipment will include the following (for details refer to each FIM section below):

- Remove existing controllers impacted by this scope of work.
- Remove existing supervisory controllers impacted by this scope of work.
- Remove existing sensors, transmitters, control valves, and dampers impacted by this scope of work.
- Remove existing control panels impacted by this scope of work.
- Remove existing visible pneumatic tubing back to the nearest main and cap impacted by this scope of work. Unexposed pneumatic tubing within walls will remain. Demolish pneumatic sensors and caulk holes that may be left in sheet metal due to demolition of pneumatic sensors.

- Removal and proper disposal of existing equipment in accordance with all local, state, and Federal laws in effect at the time of contract execution, unless the Customer chooses to keep the equipment.
- Customer shall indicate and mark any equipment or parts before scheduled removal. It shall be the Customer's responsibility to remove parts from existing equipment prior to demolition. Additionally, any equipment to be retained by Customer shall be placed by JCI in a designated location on each site for Customer removal.

Installation

Overall installation requirements:

- All work to be performed and installed in strict accordance with building codes in effect at the time of contract signing.
- Dismantle and remove applicable non-functioning controls and return or discard as directed by maintenance staff.
- Demolish existing controls, as required, to install new controls.
- Dismantle and remove existing control panels unless there is a compelling reason to leave in service.
- Existing conduit and/or wiring to be reused if compatible and in acceptable condition.
- As applicable, disconnect, seal and leak test pneumatic piping as close to the pneumatic main air line, as is possible and/or applicable.

Exclusions

- Automated Logic Sites – Existing controls at these sites will remain in service. Any additions or modifications will be performed by Automated Logic including programming/graphics and remain independent of the JCI Metasys System. JCI will provide various control devices as noted.
- Repair or replacement of defective mechanical, electrical and/or controls equipment, and the electrical distribution system, other than the equipment specifically described in the FIM description. JCI will identify the location of defective equipment and notify the owner.
- Engineering services, studies and analysis associated with any exclusions or work clearly outside of the scope definition. Resolution of existing HVAC design, service and or distribution conditions known or unknown.
- Engineered drawings.
- Test and balance of any air or water system.
- Repairs or upgrades required due to bring adjacent controls, electrical, and mechanical systems up to code.
- Repairs to existing damaged areas, such as retiling and painting of floors, ceilings, and walls, unless specifically identified above.
- Existing building ventilation conditions and indoor air quality issues are excluded from the scope and cost of this project.
- Temporary space conditioning.
- Resolution of existing design, service, and or distribution conditions known or unknown.
- Exclude taxes
- Exclude all fire alarm work
- Exclude furnishing, installing, wiring or monitoring fire/smoke/fire smoke dampers
- Fire alarm system, integration and/or UUKL smoke control

- Chemical water treatment system work
- Emergency generator control and/or monitoring
- Smoke isolation dampers, smoke, fire, combination fire/smoke dampers (understood to be operating properly)
- ATS transfer switch monitoring
- Exclude Buy American FARs.
- Installation of valves, dampers or other in-line devices.
- Access doors and/or panels
- Cleaning (i.e. mopping, vacuuming, dusting and etc.)
- Exclude patching and painting.
- Thermometers or pressure gage
- Anything not specifically included in this Work

Training

- Four (4) each two (2) hour training sessions shall be provided during construction.

Warranties

- 1-Year workmanship guarantee beginning upon final acceptance of this FIM.
- Manufacturer's stated warranties on equipment installed as part of this FIM.

Closeout

JCI shall provide the following closeout documents:

- Product data for new equipment installed.
- Warranty information for new equipment installed and Operation & Maintenance manuals.

HVAC BAS SCOPE OF WORK

BAS Infrastructure

- Metasys (ADX) Extended Application Data Server (Qty-1)
 - ◆ Rack mounted server to be installed in the Fort Bend County Server Farm located in the Jane Long Building in concert with Fort Bend County IT department. Includes SQL server software with core license.

Use Existing Operator Workstation – Common to impacted Metasys sites

- BAS Workstations Existing – Metasys data server to be accessed via internet browser using existing notebook and desktop computers.
- Lot System Graphics.
 - ◆ Includes floor plan graphics with HVAC equipment locations
 - ◆ Includes dynamic system graphics for connected equipment

Admin Building Drainage District

- Supervisory Network Engine and/or Router (Qty-1)
 - ◆ Includes BACnet MS/TP signal repeaters, as required

- ◆ Includes Ethernet connection to customer's LAN
- DX split systems DDC network controls (Qty-3) with flush mounted wall sensors. Mount new TEC BACnet thermostat near indoor unit (or protected area) or in drop ceiling directly above flush mounted wall plate sensors.
- Zone Electric Duct Heaters DDC Network Controls (Qty-5) with flush mounted wall sensors.

Bob Lutts Fulshear Library

- Supervisory Network Engine and/or Router (Qty-1)
 - ◆ Includes BACnet MS/TP signal repeaters, as required
 - ◆ Includes Ethernet connection to customer's LAN
- Chilled Water Plant DDC Control Retrofit
 - ◆ Includes DDC controller field installed in new panel
 - ◆ Re-terminate existing Input/Output control cabling
- Install the following new Inputs/Outputs
 - ◆ Replace outdoor air temp
 - ◆ Replace chilled water supply/return temp (reuse well) (Qty-2)
 - ◆ Chiller status – reuse contact (Qty-2)
 - ◆ New chiller enable relay (Qty-2)
 - ◆ New chilled water pumps current sensor relay (Qty-2)
- New Chiller installation - Chilled Water Plant DDC Control Upgrades
 - ◆ BACnet MS/TP chiller integration
- New Chilled Water Plant Control Valves
 - ◆ Non-spring return, 2-way control valve (on-off)
 - ▶ Chilled water system differential bypass = 1.5" threaded, ball (Qty-1)
 - ◆ New chilled water differential pressure sensor
- New Chilled Water Plant Btu Meter (Temperature/Flow Meter-TFM-1)
 - ◆ Electromagnetic flow meter (Insertion Type) – (Qty-1)
 - ◆ Chilled water supply and return temperature (Qty-2)
 - ◆ Btu meter (Qty-1)
- New Chilled Water Plant Flow Meters (TFM-2)
 - ◆ Electromagnetic flow meter (Insertion Type) – (Qty-1)
- New Pump Variable Frequency Drive (Provided and installed in FIM above) (Qty-2)
 - ◆ Includes BACnet MS/TP integration to variable frequency drives)
- Multizone retrofit (AHU-1) (Qty-1) with 7 zones with electric reheat DDC controls
 - ◆ Includes DDC controller in factory assembled panel to replace existing controller & enclosure
 - ◆ Re-terminate existing Input/Output control cabling
 - ◆ Replace chilled water control valve
 - Installation of DDC control wiring to new non-spring return, 3-way mixing valve (0-10vdc)
 - AHU-1 = 3" flanged, ball

- ◆ Replace existing temperature low limits
- ◆ Replace existing electric zone damper actuators with new electronic rotary actuators (0-10vdc) (Qty-7)
- ◆ Replace existing electric outside air damper actuator with new electronic rotary actuator
- ◆ Replace cold deck and hot deck temperature sensor with new
- ◆ New discharge air temperature sensor (Qty-7)
- ◆ New mixed air temperature sensor
- ◆ New network sensor – CAT5/6 RJ45 SA Bus connections
 - Combination Temp, Humidity and CO₂ in Mech Room
- ◆ Replace existing CSI zone sensors with new flush mounted wall plate sensors (Qty-7)
- ◆ New supply fan start/stop relay, status contact

East End Annex

- Supervisory Network Engine and/or Router (Qty-1)
 - ◆ Includes BACnet MS/TP signal repeaters, as required
 - ◆ Includes Ethernet connection to customer's LAN
- AHU VAV Zone Bypass Control Retrofit (AHU-1 & 2) (Qty-2)
 - ◆ Includes DDC controller in factory assembled panel to replace existing controller & enclosure
 - ◆ Re-terminate existing Input/Output control cabling
 - ◆ New supply fan variable frequency drive (Provided and installed in FIM Scope above)
 - ◆ Includes BACnet MS/TP integration to variable frequency drives
 - ◆ Install and/or replace duct pressure high limit for variable frequency drive
 - ◆ New duct stat pressure transmitter
 - ◆ Replace electric bypass, and outside air damper actuator with new electronic rotary damper actuator. Existing control dampers to remain in service
 - ◆ New supply air temperature sensor
 - ◆ New network sensor – CAT5/6 RJ45 SA Bus connections
 - ◆ Combination temp, humidity and CO₂ in Mech Room
- Zone Control damper retrofit (existing zone dampers are to remain in service Qty-30)
 - ◆ Includes DDC controller with integral actuator
 - ◆ New control transformers
 - ◆ Replace existing sensors with flat wall plate sensors
 - ◆ New discharge air duct temperature
- DX Split Systems (Qty-3)
 - ◆ Includes TEC network thermostat (hard wired), mounted near indoor unit or in drop ceiling above remote flush mounted wall plate sensor
 - ◆ Replace existing thermostats with flush mounted wall plate sensor
 - ◆ Discharge air temperature sensor

Extension Office Annex

- BACnet MS/TP network from Extension Office Main Building via covered walkway conduit run
- DX Split Systems (Qty-5)
 - ◆ Includes TEC network thermostat (hard wired), mounted near indoor unit or in drop ceiling above remote flush mounted wall plate sensor
 - ◆ Replace existing thermostats with flush mounted wall plate sensor
 - ◆ Discharge air temperature sensor

Extension Office Building

- Supervisory Network Engine and/or Router (Qty-1)
 - ◆ Includes BACnet MS/TP signal repeaters, as required
 - ◆ Includes Ethernet connection to customer's LAN
- DX Split Systems (Qty-6)
 - ◆ Includes TEC network thermostat (hard wired), mounted near indoor unit or in drop ceiling above remote flush mounted wall plate sensor
 - ◆ Replace existing thermostats with flush mounted wall plate sensor
 - Discharge air temperature sensor
- Zone Electric Duct Heaters (Qty-14)
 - ◆ Existing duct heaters and duct heater control circuits including contactors to be reused and remain in service unchanged
 - ◆ Includes TEC network thermostat (hard wired), mounted near indoor unit or in drop ceiling above remote flush mounted wall plate sensor. TEC will be interlocked to respective indoor unit to energize the fan when there is a call for heat
 - ◆ Replace existing thermostats with flush mounted wall plate sensor
 - ◆ Discharge air temperature sensor

Fort Bend North Annex

- Supervisory Network Engine and/or Router (Qty-1)
 - ◆ Includes BACnet MS/TP signal repeaters, as required
 - ◆ Includes Ethernet connection to customer's LAN
- AHU VAV Control Retrofit (AHU-1,2,3, & 4) (Qty-4)
 - ◆ Includes DDC controller in factory assembled panel to replace existing controller & enclosure
 - ◆ Re-terminate existing input/output control cabling
 - ◆ Reuse supply fan variable frequency drive
 - ◆ New cooling/heating stage relays
 - ◆ Install and/or replace duct pressure high limit for variable frequency drive
 - ◆ New duct stat pressure transmitter
 - ◆ Replace electric outside air damper actuator with new electronic rotary damper actuator
 - ◆ New supply air temperature sensor
 - ◆ New supply fan start/stop relay, status contact

- AHU VAV OSA Control Retrofit (AHU-5) (Qty-1)
 - ◆ Includes DDC controller in factory assembled panel to replace existing controller & enclosure
 - ◆ Re-terminate existing Input/Output control cabling
 - ◆ Reuse fresh air supply fan variable frequency drive
 - ◆ New cooling/heating stage relays
 - ◆ Install and/or replace duct pressure high limit for variable frequency drive
 - ◆ New duct stat pressure transmitter
 - ◆ Replace electric outside air damper actuator with new electronic rotary damper actuator. Existing damper to remain in service
 - ◆ New supply air temperature sensor
 - ◆ New network sensor – CAT5/6 RJ45 SA Bus connections
 - ▶ Combination temp, humidity and CO₂ in Mech Room
 - ◆ New supply fan start/stop relay, status contact
 - ◆ New outdoor air temperature and humidity sensor
- Outside VAV Terminal Boxes (Qty-4)
 - ◆ Includes DDC controller with integral actuator. Re-terminate existing airflow sample tubing to controller
 - ◆ Reuse 24vac transformer
 - ◆ Replace existing zone sensor with flush mounted wall plate sensors
 - ◆ New discharge air duct temperature
- Fan Power VAV Terminal Boxes (Qty-26)
 - ◆ Includes DDC controller with integral actuator. Re-terminate existing airflow sample tubing to controller
 - ◆ Re-terminate input/outputs, fan relay and electric reheat coil
 - ◆ Reuse 24vac transformer
 - ◆ Replace existing zone sensor with flush mounted wall plate sensors
 - ◆ New discharge air duct temperature
- Exhaust Fans (EF-6 & 8) (Qty-2)
 - ◆ Install new combination relay and current sensing status and connect to nearest controller

George Memorial Library (Standalone RTU & Split System)

- DX Split System (Computer Lab)
 - ◆ Replace existing DDC standalone thermostats with new TEC 7-day programmable thermostat
 - ◆ Install flush mounted wall plate sensors and connect to TEC remote sensor input
 - ◆ Mount new TEC BACnet thermostat controller in closet (or protected area) or in drop ceiling directly above flush mounted wall plate sensors
 - ◆ Preserve existing safety circuits and safety devices
- Rooftop Unit (Middle Grades Area)
 - ◆ Replace existing DDC standalone thermostats with new TEC 7-day programmable thermostat
 - ◆ Install flush mounted wall plate sensors and connect to TEC remote sensor input
 - ◆ Mount new TEC BACnet thermostat controller in closet (or protected area) or in drop ceiling directly above flush mounted wall plate sensors
 - ◆ Preserve existing safety circuits and safety devices

George Memorial Library (Automated Logic)

Automated Logic System to remain in service upgrades, as follows:

- Scope Clarifications:
 - ◆ Work is based on after hours and weekends
 - ◆ Prevailing wage rates as it applies to their specific trades
 - ◆ Existing wires and end devices assumed to be operational
 - ◆ All cabling not in conduit will be plenum rated wire. Mechanical room wiring and cables will be installed in conduit
 - ◆ Reuse existing 120 VAC power to all BAS control panels and any motorized butterfly valve
 - ◆ ALC will furnish installation labor, wiring, programming/graphics, and check out for the building control and automation system
 - ◆ ALC is providing all DDC control modules, enclosures, software, engineering, and field devices as indicated above
 - ◆ Providing 1-year warranty on materials and labor
- Exclusions:
 - ◆ Lighting commissioning
 - ◆ Provisions or monitoring of any electric meters, gas meters, or water meters
 - ◆ Control of any ac mini-mate units
 - ◆ Leak or gas detection systems
 - ◆ Occupancy sensors or motion sensors
 - ◆ Space CO₂ sensors
 - ◆ Space humidity sensors
 - ◆ Lighting control system, lighting contactors, and/photocells are existing
 - ◆ Project price excludes all scope of work associated with fire dampers, fire/smoke/automatic dampers, smoke detectors, fire alarm system, or any other Life Safety Equipment
 - ◆ Any work not listed
- Perform a sequence of operation checkout of the following systems.
 - ◆ Hot water system
 - ◆ (5) multizone units
 - ◆ (29) multizone zones
- Central Plant Upgrades based on Wheaton Engineering plans and specifications (for interim review) dated (08/24/20)
 - ◆ Automated Logic will provide necessary engineering, software, hardware, installation, project management, commissioning, programming, and warranty. The system database for this project, including programs, software, and graphics, will be installed on the existing WebCTRL server.
- (2) Chiller BACnet Interface
 - ◆ BACnet cards
 - ◆ BACnet/MSTP wiring by ALC
- (6) Variable Frequency Drive BACnet Interface
 - ◆ BACnet cards assumed to be MSTP and included with variable frequency drive
 - ◆ BACnet/MSTP wiring by ALC
- (1) Refrigerant Monitor Alarm

- ◆ Alarm to be dry contact closure from refrigerant monitor
- ◆ Refrigerant monitor and ancillary devices by Mechanical
- ◆ Interlocks to chillers, exhaust fans and horn/strobes provide by ALC subcontractor
- (1) Plant Manager Controller
 - ◆ New DDC controller and expanders to accommodate new flow meters, variable frequency drive outputs and isolation valve outputs
 - ◆ New wiring, conduit and connections to variable frequency drive for BAS control
 - ◆ Modified programming added to accommodate new sequence of operations
 - ◆ New graphic to depict new layout and new equipment.
 - ◆ Disconnect/reconnect 43 physical points
- (1) Single Zone Cooling Only AHU
 - ◆ New DDC controller and enclosure
 - ◆ Programming and graphics
- (18) Chilled Water Valve Replacements
 - ◆ New valves
 - ◆ Wiring disconnect/reconnect

George Memorial Library

Control Device:

- New Non-Spring Return, 3-way Mixing Valve (0-10vdc)
 - ◆ Cooling tower bypass flanged, butterfly (Qty-1)
- New Non-Spring Return, 2-way Control Valve (0-10vdc)
 - ◆ Chilled water system differential bypass" flanged, Ball (Qty-1)
- New Chill Water Plant Btu Meter (TFM-1)
 - ◆ Electromagnetic flow meter (Insertion Type) – (Qty-1)
 - ◆ Chilled water supply and return temperature (Qty-2)
 - ◆ Btu meter (Qty-1)
- New Chill Water Plant Flow Meters (TFM-2)
 - ◆ Electromagnetic flow meter (Insertion Type) – (Qty-1)
- New Chiller Isolation Valves
 - ◆ Non-spring return, 2-way control valve (0-10vdc)
 - ▶ AHU cooling flanged butterfly (Qty-4)
- New Boiler Isolation Valves
 - ◆ Non-spring return, 2-way control valve (0-10vdc)
 - ▶ AHU cooling flanged butterfly (Qty-2)
- Replaced AHU Coil Control Valves
 - ◆ Non-spring return, 3-way mixing valve (0-10vdc)
 - ▶ AHU heating flanged, ball (Qty-1)
 - ▶ AHU heating threaded, ball (Qt-4)
 - ◆ Non-spring return, 2-way control valve (0-10vdc)

- ▶ AHU cooling flanged, ball (Qty-3)
- ▶ AHU cooling threaded, ball (Qty-2)

Gus George Academy

- Supervisory Network Engine and/or Router (Qty-1)
 - ◆ Includes BACnet MS/TP signal repeaters, as required
 - ◆ Includes Ethernet connection to customer's LAN
- RTU VAV Control Retrofit (RTU-1,2 & 3) (Qty-3)
 - ◆ Includes DDC controller in factory assembled panel to replace existing controller & enclosure
 - ◆ Re-terminate existing Input/Output control cabling
 - ◆ Reuse supply fan variable frequency drive
 - ◆ Install and/or replace duct pressure high limit for variable frequency drive
 - ◆ Replace electric outside air and return air damper actuator with new electronic rotary damper actuator
 - ◆ New supply air temperature sensor
 - ◆ New return air temperature sensor
 - ◆ New return air CO₂ sensor
 - ◆ New return air humidity sensor
 - ◆ New supply fan start/stop relay, status contact
- RTU CV Control Retrofit (RTU-4) (Qty-1)
 - ◆ Includes BACnet MS/TP Integration to Smart Factory Controller
 - ◆ Economizer with damper actuators, discharge air, return air and outdoor air temperature sensors are supplied by the RTU manufacturer
 - ◆ Flush mounted wall plate space sensors wired to RTU terminal strip
- Fan Power VAV Terminal Boxes (Qty-33)
 - ◆ Includes DDC controller with integral actuator. Re-terminate existing airflow sample tubing to controller
 - ◆ Re-terminate input/outputs, fan relay and electric reheat coil
 - ◆ Reuse 24vac transformer
 - ◆ Replace existing zone sensor with flush mounted wall plate sensors
 - ◆ New discharge air duct temperature
 - ◆ Install fan status current sensor
- VAV Terminal Boxes (Qty-5)
 - ◆ Includes DDC controller with integral actuator. Re-terminate existing airflow sample tubing to controller
 - ◆ Reuse 24vac transformer
 - ◆ Replace existing zone sensor with flush mounted wall plate sensors
 - ◆ New discharge air duct temperature
- Exhaust Fans (Qty-3)
 - ◆ Install new combination relay and current sensing status and connect to nearest controller

Jane Long Building

- Supervisory Network Engine and/or Router (Qty-1)
 - ◆ Includes BACnet MS/TP signal repeaters, as required
 - ◆ Includes Ethernet connection to customer's LAN
- Chilled Water Plant
 - ◆ Includes DDC controller field installed in new panel
 - ◆ Re-terminate existing Input/Output control cabling
 - ◆ BACnet MS/TP chiller integration
 - ◆ Install the following new Inputs/Outputs:
 - ◆ Replace outdoor air temp
 - ▶ Replace chilled water supply/return temp (reuse well) (Qty-2)
 - ▶ Chiller status – reuse contact (Qty-2)
 - ▶ New chiller enable relay (Qty-2)
 - ▶ New chilled water pumps current sensor relay (Qty-2)
 - ▶ New chilled water differential pressure sensor
 - ◆ New Chilled Water Plant Control Valves:
 - ▶ Non-spring return, 2-way control valve (on-off)
 - Chiller Isolation Butterfly Valves (Qty-2)
 - Chilled Water System Differential Bypass = 2" Threaded, Ball (Qty-1)
 - ◆ New Chilled Water Plant Btu meter (TFM-1):
 - ▶ Electromagnetic flow meter (Insertion Type) – (Qty-1)
 - ▶ Chilled water supply and return temperature (Qty-2)
 - ▶ Btu meter (Qty-1)
 - ◆ New Chilled Water Plant Flow Meters (TFM-2):
 - ▶ Electromagnetic Flow Meter (Insertion Type) – (Qty-1)
 - ◆ New Pump Variable Frequency Drive (Provided and installed in FIM Scope Above) (Qty-2)
 - ▶ Includes BACnet MS/TP integration to Variable Frequency Drives)
- AHU CV Control Unit Replacement (Qty-9)
 - ◆ Includes replacement of existing controllers with new DDC controller
 - ◆ Re-terminate existing Input/Output control cabling
 - ◆ New Supply Fan Variable Frequency Drive (Provided and installed in FIM Scope Above) replaces existing starters
 - ▶ Includes BACnet MS/TP integration to Variable Frequency Drives)
 - ◆ Install and/or replace duct pressure high limit for variable frequency drive
 - ◆ New duct stat pressure transmitter
 - ◆ Replace chilled water control valve
 - ▶ Installation of DDC control wiring to new Non-Spring Return, 3-way Mixing Valve (0-10vdc) (Valves installed by Mechanical)
 - AHU = 2.5" flanged, ball (Qty-4)
 - ▶ Installation of DDC control wiring to new Non-Spring Return, 2-way Valve (0-10vdc)
 - AHU = 2.5" flanged, ball (Qty-5)

- ◆ Electric duct heaters control
- ◆ Replace existing electric outside air damper actuator with new electronic rotary actuator
- ◆ New discharge air temperature sensor
- ◆ New zone sensor with flush mounted wall plate sensors
- Rooftop Unit (Qty-2)
 - ◆ Includes BACnet MS/TP Integration to Smart Factory Controller
 - ◆ Economizer with damper actuators, discharge air, return air and outdoor air temperature Sensors are supplied by the RTU manufacturer
 - ◆ Flush mounted wall plate space sensors wired to RTU terminal strip
- Data Aire CRAC Unit Monitoring
 - ◆ Includes TEC network thermostat (hard wired), mounted near indoor unit to monitor:
 - ▶ Space temperature
 - ▶ Space humidity
 - ▶ Alarm dry contacts (Qty-2)
- Lift Containment Fan Control in Basement
 - ◆ Fan command and status
 - ◆ Differential pressure monitoring

Precinct 1

- Supervisory Network Engine and/or Router (Qty-1)
 - ◆ Includes BACnet MS/TP signal repeaters, as required
 - ◆ Includes Ethernet connection to customer's LAN
- AHU VAV Control Retrofit (AHU-1,RF-1) (Qty-1)
 - ◆ Includes DDC controller in factory assembled panel to replace existing controller & enclosure
 - ◆ Re-terminate existing input/output control cabling
 - ◆ Variable frequency drive controls
 - ◆ New cooling/heating stage relays
 - ◆ Install and/or replace duct pressure high limit for variable frequency drive
 - ◆ New duct stat pressure transmitter
 - ◆ Replace electric outside air, return air and relief damper actuator with new electronic rotary damper actuator
 - ◆ New supply air temperature sensor
 - ◆ New supply fan start/stop relay, status contact
 - ◆ New return fan start/stop relay, status contact
 - ◆ New outdoor air temperature sensor
 - ◆ Replace existing zone sensor
- AHU VAV Control Retrofit (AHU-2,3 & 4) (Qty-3)
 - ◆ Includes DDC controller in factory assembled panel to replace existing controller & enclosure
 - ◆ Re-terminate existing Input/Output control cabling
 - ◆ Variable frequency drive controls
 - ◆ New cooling/heating stage relays
 - ◆ Install and/or replace duct pressure high limit for variable frequency drive

- ◆ New duct stat pressure transmitter
- ◆ New supply air temperature sensor
- ◆ New supply fan start/stop relay, status contact
- Fan Power VAV Terminal Boxes (Qty-25)
 - ◆ Includes DDC controller with integral actuator. Re-terminate existing airflow sample tubing to controller
 - ◆ Re-terminate input/outputs, fan relay and electric reheat coil
 - ◆ Reuse 24vac transformer
 - ◆ Replace existing zone sensor with flush mounted wall plate sensors
 - ◆ New discharge air duct temperature
 - ◆ Install fan status current sensor

Precinct 4

- Supervisory Network Engine and/or Router (Qty-1)
 - ◆ Includes BACnet MS/TP signal repeaters, as required
 - ◆ Includes Ethernet connection to customer's LAN
- Rooftop DX Units (Qty-6)
 - ◆ Includes TEC network thermostat (hard wired), mounted near indoor unit or in drop ceiling above remote flush mounted wall plate sensor
 - ◆ Remote flush mounted wall plate sensor replaces existing sensor
 - ◆ Discharge air temperature sensor
 - ◆ Replace electric mixed air damper actuators with new electronic rotary damper actuator

Richmond Tax Office

- Supervisory Network Engine and/or Router (Qty-1)
 - ◆ Includes BACnet MS/TP signal repeaters, as required
 - ◆ Includes Ethernet connection to customer's LAN
- AHU VAV Control Retrofit (AHU-1 & 3) (Qty-2)
 - ◆ Includes DDC controller in factory assembled panel to replace existing controller & enclosure
 - ◆ Re-terminate existing Input/Output control cabling
 - ◆ Variable frequency drive controls
 - ◆ New cooling/heating stage relays
 - ◆ New duct stat pressure transmitter
 - ◆ Replace electric outside air and return air damper actuator with new electronic rotary damper actuator
 - ◆ New supply air temperature sensor
 - ◆ New supply fan start/stop relay, status contact
 - ◆ Reuse existing outside air and return air airflow stations
- AHU VAV Control Retrofit (AHU-2) (Qty-1)
 - ◆ Includes DDC controller in factory assembled panel to replace existing controller & enclosure
 - ◆ Re-terminate existing Input/Output control cabling
 - ◆ Variable frequency drive controls
 - ◆ New cooling/heating stage relays
 - ◆ Install and/or replace duct pressure high limit for variable frequency drive

- ◆ New duct stat pressure transmitter
- ◆ Replace electric outside air and return air damper actuator with new electronic rotary damper actuator
- ◆ New supply air temperature sensor
- ◆ New supply fan start/stop relay, status contact
- ◆ Reuse existing outside air and return air airflow stations
- Fan Power VAV Terminal Boxes (Qty-17)
 - ◆ Includes DDC controller with integral actuator. Re-terminate existing airflow sample tubing to controller
 - ◆ Re-terminate input/outputs, fan relay and electric reheat coil
 - ◆ Reuse 24vac transformer
 - ◆ Replace existing zone sensor with flush mounted wall plate sensors
 - ◆ New discharge air duct temperature sensors
 - ◆ Install fan status current sensor

Rosenberg Annex

- Supervisory Network Engine and/or Router (Qty-1)
 - ◆ Includes BACnet MS/TP signal repeaters, as required
 - ◆ Includes Ethernet connection to customer's LAN
- Chilled Water Plant
 - ◆ Includes DDC controller to replace existing controllers
 - ◆ Re-terminate existing Input/Output control cabling
 - ◆ BACnet MS/TP chiller Integration
 - ◆ BACnet MS/TP chiller variable frequency drives Integration
 - ◆ Variable frequency drive controls (Qty-2)
 - ◆ Replaced chilled water plant control valves:
 - ▶ Non-spring return, 2-way control valve (on-off)
 - Chiller isolation = 6" flanged, butterfly (Qty-2)
 - ◆ New chilled water plant control valves:
 - ▶ Non-spring return, 2-way control valve (on-off)
 - Chilled water system differential bypass = 3" threaded, ball (Qty-1)
 - ◆ Install the following new Inputs/Outputs:
 - ▶ Replace outdoor air temp and outdoor air humidity sensors
 - ▶ Replace chilled water supply/return temp (reuse well) (Qty-6)
 - ▶ New chilled water differential pressure sensor
 - ◆ New chilled water plant Btu meter (TFM-1):
 - ▶ Electromagnetic Flow Meter (Insertion Type) – (Qty-1)
 - ▶ Chilled water supply and return temperature (Qty-2)
 - ▶ Btu meter (Qty-1)
 - ◆ New chilled water plant flow meters (TFM-2):
 - Electromagnetic flow meter (Insertion Type) – (Qty-1)

- AHU VAV Control Retrofit (AHU-1,2,3,4,5 & 6) (Qty-6)
 - ◆ Includes DDC controller in factory assembled panel to replace existing controller & enclosure
 - ◆ Re-terminate existing Input/Output control cabling
 - ◆ Variable frequency drive controls
 - ◆ Install and/or replace duct pressure high limit for variable frequency drive
 - ◆ New duct stat pressure transmitter
 - ◆ New low temperature limit switch
 - ◆ Replace electric outside air and return air damper actuator with new electronic rotary damper actuator
 - ◆ Replace filter status switch
 - ◆ New supply air temperature sensor
 - ◆ New supply fan start/stop relay, status contact
 - ◆ Replace chilled water control valves
 - ▶ AHU-5 & 6: Installation of DDC control wiring to new non-spring return, 3-way mixing valve (0-10vdc) to replace existing 3-way valve
 - AHU = 2.5" flanged, ball (Qty-2)
 - ▶ AHU-1, 2, 3 & 4: Installation of DDC control wiring to new non-spring return, 2-way valve (0-10vdc) to replace existing 3-way valve
 - AHU = 2.5" flanged, ball (Qty-3)
 - AHU = 3" flanged, ball (Qty-1)
- OSA Supply Fan Control Retrofit (SAF-1,2 & 3) (Qty-3)
 - ◆ Replace electric outside air damper actuator with new electronic rotary damper actuator
 - ◆ New supply fan start/stop relay, status contact
- VAV Terminal Boxes (Qty-5)
 - ◆ Includes DDC controller with integral actuator. Re-terminate existing airflow sample tubing to controller
 - ◆ Reuse 24vac transformer
 - ◆ Replace existing zone sensor with flush mounted wall plate sensors
 - ◆ New discharge air duct temperature
- Fan Power VAV Terminal Boxes (Qty-59)
 - ◆ Includes DDC controller with integral actuator. Re-terminate existing airflow sample tubing to controller
 - ◆ Re-terminate input/outputs, fan relay and electric reheat coil
 - ◆ Reuse 24vac transformer
 - ◆ Replace existing zone sensor with flush mounted wall plate sensors
 - ◆ New discharge air duct temperature
 - ◆ Install fan status current sensor

Sugar Land Annex

- Supervisory Network Engine and/or Router (Qty-1)
 - ◆ Includes BACnet MS/TP signal repeaters, as required
 - ◆ Includes Ethernet connection to customer's LAN

- Existing Rooftop DX Units (Qty-1)
 - ◆ BACnet MS/TP trunk to RTU controls
 - ◆ Includes TEC network thermostat (hard wired), mounted near indoor unit or in drop ceiling above remote flush mounted wall plate sensor
 - ◆ Remote flush mounted wall plate sensor replaces existing thermostats
 - ◆ Discharge air temperature sensor
- Rooftop DX Units Replacement (Qty-10)
 - ◆ Includes BACnet MS/TP Integration to Smart Factory Controller
 - ◆ Economizer with damper actuators, discharge air, return air, and outdoor air temperature sensors are supplied by the RTU manufacturer
 - ◆ Flush mounted wall plate space sensors wired to RTU terminal strip

Travis Building (Automated Logic)

Automated Logic System to remain in service

- Scope Clarifications:
 - ◆ Work is based on after hours and weekends
 - ◆ Prevailing wage rates as it applies to their specific trades
 - ◆ Existing wires and end devices assumed to be operational
 - ◆ All cabling not in conduit will be plenum rated wire. Mechanical room wiring and cables will be installed in conduit
 - ◆ Reuse existing 120 VAC power to all BAS control panels and any motorized butterfly valve
 - ◆ ALC will furnish installation labor, wiring, programming/graphics, and check out for the building control and automation system
 - ◆ ALC is providing all DDC control modules, enclosures, software, engineering, and field devices as indicated
 - ◆ Providing 1-year warranty on materials and labor
- Exclusions:
 - ◆ Lighting commissioning
 - ◆ Provisions or monitoring of any electric meters, gas meters, or water meters
 - ◆ Control of any AC mini-mate units
 - ◆ Leak or gas detection systems
 - ◆ Occupancy sensors or motion sensors
 - ◆ Space CO₂ sensors
 - ◆ Space humidity sensors
 - ◆ Lighting control system, lighting contactors, and/photocells are existing
 - ◆ Project price excludes all scope of work associated with fire dampers, fire/smoke/automatic dampers, smoke detectors, fire alarm system, or any other Life Safety Equipment
 - ◆ Any work not listed
- Central Plant upgrades based on Wheaton Engineering plans and specifications (for interim review) dated (08/24/20)
 - ◆ Automated Logic will provide all necessary engineering, software, hardware, installation, project management, commissioning, programming, and warranty. The system database for this project, including programs, software, and graphics, will be installed on the existing WebCTRL server.

- ▶ Existing DDC controller to accommodate isolation valve outputs and feedback position
- ▶ New wiring, conduit and connections to valves
- ▶ Modified programming added to accommodate new sequence of operations and points
- ▶ New graphic to depict new layout and new equipment
- ▶ Disconnect/reconnect 21 physical points

Travis Building

Control Devices Parts Only:

- New Chilled Water Plant Control Valves
 - ◆ Non-Spring Return, 2-way Control Valve (on-off)
 - ▶ Chiller Isolation = 6" Flanged, Butterfly (Qty-2)
- New Chilled Water Plant Btu meter (TFM-1)
 - ◆ Electromagnetic Flow Meter (Insertion Type) – (Qty-1)
 - ◆ Chilled water supply and return temperature (Qty-2)
 - ◆ Btu meter (Qty-1)
- New Chilled Water Plant Flow Meters (TFM-2)
 - ◆ Electromagnetic flow meter (Insertion Type) – (Qty-1)
- New Chilled Water Plant Control Valves
 - ◆ Non-spring return, 2-way control valve (0-10vdc)
 - ▶ Chilled water system differential bypass = 3" flanged, ball (Qty-1)

911 Call Center

- Supervisory Network Engine and/or Router (Qty-1)
 - ◆ Includes BACnet MS/TP signal repeaters, as required
 - ◆ Includes Ethernet connection to customer's LAN
- Existing Computer Room AHU Retrofit (Qty-1)
 - ◆ Includes TEC network thermostat (hard wired), mounted near indoor unit or in drop ceiling above remote flush mounted wall plate sensor
 - ◆ Remote flush mounted wall plate sensor replaces existing sensor
- New Computer Room AC (Qty-2)
 - ◆ BACnet IP tie-in to CRAC units
 - ◆ Space temperature and humidity sensor, and condensate probe is provided by the CRAC unit manufacturer

FIM 9: Building Envelope

General

Energy is lost from various leakages throughout the buildings due to infiltration or exfiltration. The heat losses and heat gains occur due to gaps and openings that allow the building's conditioned (heated or cooled) air to mix with the outside ambient air. This measure will seal these leaks. This FIM also adds insulation. Refer to Attachment 5 for detailed scope of work and energy savings associated with this FIM.

East End Annex: Exterior – Wet seal the perimeter of each window frame and the perimeter of each window pane at all windows on 1st and 2nd floors. Wet sealing will not be performed at any entrance doors, sidelights, or windows at any entrance doors. **Interior** – Interior elastomeric caulking of the perimeter of the window frame will be performed **only** at identified in scope windows.

Extension Office Annex/Ag Building: Wet sealing will not be performed at any of the windows or entry doors. Exterior elastomeric caulking of the perimeter of each window pane only.

Extension Office: Exterior – Wet seal the perimeter of each window frame and the perimeter of each window pane at all windows. **Interior** – Wet seal the perimeter of each window pane on the interior at all windows. Wet sealing will not be performed at any entrance doors, sidelights, or windows at entrance doors.

George Memorial Library: Exterior – Wet seal the entire curtain wall system at the main front entrance including perimeter of each window frame and the perimeter of each window pane. Wet seal both sidelights at Lobby 2 entrance. Wet sealing will not be performed at any entrance doors or windows at entrance doors, skylights, any other curtain wall system or window system. **Interior** – Interior elastomeric caulking of various specified window details will be performed **only** at identified in scope windows.

Gus George Training Academy: Exterior – Wet seal the perimeter of each window frame and the perimeter of each window pane at all windows on 1st and 2nd floors. Wet seal the entire curtain wall system at the main front entrance including perimeter of each window frame and the perimeter of each window pane. Wet seal all sidelights at the three other entrance doors. **Interior** – Interior elastomeric caulking of various specified window details will be performed **only** at identified in scope windows.

Precinct One Facility: Exterior – Wet seal the perimeter of each window frame and the perimeter of each window pane at all windows on 1st and 2nd floors. Wet seal the entire curtain wall system at the main front entrance including perimeter of each window frame and the perimeter of each window pane. Wet seal all sidelights at two other entrance doors. Wet sealing will not be performed at any entrance doors or windows at entrance doors. **Interior** – Interior elastomeric caulking of various specified window details will be performed **only** at identified in scope windows.

Sugar Land Annex: Exterior – Wet seal the perimeter of each window pane **only** at all windows. **INTERIOR** -Wet seal the perimeter of each window pane **only** on the interior at all windows. Wet sealing will not be performed at any entrance doors, sidelights, or windows at entrance doors. **Interior** – Interior elastomeric caulking of the perimeter of the window frame will be performed at all windows. Interior elastomeric caulking will not be performed at any entrance doors, sidelights, or windows at entrance doors.

Tax Office: Exterior – Wet seal the perimeter of each window frame and the perimeter of each window pane at all windows on 1st and 2nd floors. Wet seal the entire curtain wall system at the main front entrance including perimeter of each window frame and the perimeter of each window pane. Wet seal all sidelights at two other entrance doors. **Interior** – Interior elastomeric caulking of various specified window details will be performed **only** at identified in scope windows.

Travis Building: Exterior – Wet seal the perimeter of each window pane **only** at all windows. Wet seal all curtain wall systems including perimeter of each window frame and the perimeter of each window pane. Wet sealing will not be performed at any entrance doors, sidelights, or windows at entrance doors other than the entrances at the curtain wall systems. Not including any windows of the smaller office/addition area where there is glass block windows or sidelights at this area. (Entrance 6 area). **Interior** – Interior elastomeric caulking of the perimeter of the window frame will be performed **only** at identified in scope windows

Jail: No wet sealing of windows.

The following summarizes the recommendations:

- **Door Sealing:** repair or replace the Weatherstripping, door sweeps, and/or vertical sweeps in the locations identified in Attachment 5.
- **Seal Windows/Penetration/Penetration Wall:** seal window perimeter, penetrations, penetration walls in the locations identified in Attachment 5 – Schedule 1 FIMs with premium wet seal urethanized elastomeric sealants (DOWSIL™ 795 Silicone Building Sealant) per the manufacturers’ recommendation.

Final Engineering

- Development of submittals (product datasheets only).

Demolition and Removal Work

- None.

Installation

This scope is based upon the following sites:

Table 9.1

Building	Quantity	Length (ft)
East End Annex		
Door Sealing	10	66.00
Seal Penetration	6	72.40
Seal Penetration Wall	6	402.33
Seal Windows	78	337.04
Extension Office		
Door Sealing	6	21.00
Seal Penetration Wall	1	782.00
Seal Windows	341	1,019.33
Extension Office Agricultural Building		
Door Sealing	4	18.00
Seal Windows	18	67.54
George Memorial Library		
Door Sealing	23	112.02
Seal Penetration	5	6.58
Seal Penetration Wall	2	85.00
Seal Windows	70	265.35
Gus George Training Academy		
Door Sealing	7	74.33
Seal Penetration Wall	2	690.50
Seal Windows	4,035	1,618.90
Precinct One Facility		
Door Sealing	5	18.00
Seal Windows	1,494	637.88

Building	Quantity	Length (ft)
Sugar Land Annex		
Door Sealing	4	15.00
Seal Penetration Wall	25	380.50
Seal Windows	285	1,129.40
Tax Office		
Door Sealing	5	21.00
Seal Penetration	2	52.67
Seal Windows	1,353	590.54
Travis Building		
Door Sealing	8	39.67
Seal Penetration Wall	4	116.53
Seal Windows	540	1,135.71

Training

- None.

Warranties

- 1-Year workmanship guarantee beginning upon final acceptance of this FIM.
- Manufacturer's stated warranties on materials installed as part of this FIM.

Closeout

JCI shall provide the following closeout documents:

- Product data for new equipment installed.
- Warranty information for new material installed.

Exclusions

- Work not specifically described in Attachment 5.
- Repair or replacement of existing exterior doors and windows is excluded in this scope of work other than as described in scope. If any doors are found to be inoperable, or windows are found to be broken, JCI will report the deficiency to the customer for repair or replacement prior to JCI retrofitting the seals.
- Repair or replacement of existing brick, masonry block or split face block is excluded in this scope of work.
- Repair or replacement of existing attic space including rafters, ceiling or roof areas.
- Modifications required to due to existing code violations, including but not limited to the Americans with Disabilities Act (ADA) and egress, are the responsibility of the customer.
- Cutting, patching, sealing and painting is excluded.
- The scope of work does not include the repair or installation of windows or doors except as described above.
- The scope of work does not include the repair or installation of any structural systems.
- The scope of work does not include the repair or installation of roof decking.

FIM 10: Emergency Generator

General

This FIM will replace the existing Onan-Cummins diesel engine generator with a new 1.5 MW standby rated Caterpillar diesel generator set.

Final Engineering

- Provide product data sheets and equipment submittals. . The drawings and specifications outlined below are the scope of work of this FIM. All quantities, values, and details indicated are approximate and subject to change as a result of final engineering to be completed post contract signing. JCI will provide the final 100% Construction Drawings and Specifications prior to commencement of the Work of this FIM.
- The following drawings and specifications are included in Attachment 6– Drawings:
 - ◆ Schedule 1 - FIM 10 Emergency Generator – East Tower Jail Generator Site
 - ◆ Schedule 1 - FIM 10 Emergency Generator – East Tower Jail Generator Plan
 - ◆ Schedule 1 - FIM 10 Emergency Generator – East Tower Jail Generator Online

Demolition and Removal Work

- Demolition and removal of the existing Onan-Cummins diesel engine generator, along with associated temporary fuel tank and annunciator systems. Demolition will also include the existing 1200 amp automatic transfer switch. There are total of four current transfer switches. Only one of them will be demolished.

Installation

- The generator will be replaced with a new 1.5 MW standby rated Caterpillar diesel generator set. The system will provide approximately 20% additional power capacity. Generator skid will include a 2,500 gallon 24 hour day tank system, along with return pumps for an auxiliary tank connection. Generator will be connected and wired into the existing circuit systems and include a new annunciator system with an extension of up to 250 feet of wire for placement within the facility.
- The installation will also include an above ground concrete full isolated 4,000 gallon diesel tank, typical Convault or other brand. The new tank will include a pump transfer station to deliver fuel to the new generator day tank to maintain generator operation for a minimum of 50 hours without refueling being necessary. The installation will also include a return auxiliary line to allow the return pumps on the new generator to pump fuel back to the tank to avoid overflows and circulate fuel.
- The existing 1,200 amp automatic transfer switch will be replaced with a new Caterpillar-Eaton 1,200 amp transfer switch to provide the same functions with new equipment.

Training

- One hour of customer training.

Warranties

- 1-year workmanship guarantee beginning upon final acceptance of this FIM.
- Manufacturer’s stated warranties on equipment installed as part of this FIM.

Closeout

JCI shall provide the following closeout documents:

- Product data for new equipment installed.

- Warranty information for new equipment installed and Operation & Maintenance manuals.

Exclusions

- Resolution of existing design, service, and or distribution conditions known or unknown.
- Correction of any existing applicable building code violations and Federal Americans with Disabilities Act (ADA) violations identified by JCI during the execution of the Work. Such violations will be brought to the attention of the Customer for remedy.
- Repair or replacement of defective mechanical, controls, and electrical equipment and electrical distribution system, except the equipment described in the Scope of Work (Defective equipment identified by JCI during implementation of the Scope of Work will be brought to the attention of the Customer).
- Rewiring of emergency circuits.

ASSURED PERFORMANCE GUARANTEE

I. PROJECT BENEFITS

A. Certain Definitions. For purposes of this Agreement, the following terms have the meanings set forth below:

Annual Project Benefits are the portion of the projected Total Project Benefits to be achieved in any one year of the Guarantee Term.

Annual Project Benefits Realized are the Project Benefits actually realized for any one year of the Guarantee Term.

Annual Project Benefits Shortfall is the amount by which the Annual Project Benefits exceed the Annual Project Benefits Realized in any one year of the Guarantee Term.

Annual Project Benefits Surplus is the amount by which the Annual Project Benefits Realized exceed the Annual Project Benefits in any one year of the Guarantee Term.

Baseline is the mutually agreed upon data and/or usage amounts that reflect conditions prior to the installation of the Improvement Measures as set forth in Section IV below.

Guarantee Term will commence on the first day of the month next following the Substantial Completion date and will continue through the duration of the M&V Services, subject to earlier termination as provided in this Agreement.

Installation Period is the period beginning on JCI's receipt of Customer's Notice to Proceed and ending on the commencement of the Guarantee Term.

Measured Project Benefits are the utility savings and cost avoidance calculated in accordance with the methodologies set forth in Section III below.

Non-Measured Project Benefits are identified in Section II below. The Non-Measured Project Benefits have been agreed to by Customer and will be deemed achieved in accordance with the schedule set forth in the Total Project Benefits table below. Customer and JCI agree that: (i) the Non-Measured Project Benefits may include, but are not limited to, future capital and operational costs avoided as a result of the Work and implementation of the Improvement Measures, (ii) achievement of the Non-Measured Project Benefits is outside of JCI's control, and (iii) Customer has evaluated sufficient information to conclude that the Non-Measured Project Benefits will occur and bears sole responsibility for ensuring that the Non-Measured Project Benefits will be realized. Accordingly, the Non-Measured Project Benefits shall not be measured or monitored by JCI at any time during the Guarantee Term, but rather shall be deemed achieved in accordance with the schedule set forth in the Total Project Benefits table below.

Project Benefits are the Measured Project Benefits plus the Non-Measured Project Benefits to be achieved for a particular period during the term of this Agreement.

Total Project Benefits are the projected Project Benefits to be achieved during the entire term of this Agreement.

B. Project Benefits Summary. Subject to the terms and conditions of this Agreement, JCI and Customer agree that Customer will be deemed to achieve a total of \$11,593,720 in Non-Measured Project Benefits and \$161,000 in non-guaranteed Utility Rebates, and JCI guarantees that Customer will achieve a total of \$5,271,800 in Measured Project Benefits during the term of this Agreement, for Total Project Benefits of \$17,026,520, as set forth in the Total Project Benefits table below.

Total Project Benefits*****

Year	Measured Benefits	Non-Measured Benefits		Utility Rebates****	Annual Project Benefits
	Utility Cost Avoidance*	Operational Cost Avoidance**	Capital Cost Avoidance***		
Construction	\$70,899	\$0	\$466,173	\$161,000	\$698,072
1	\$201,716	\$67,141	\$466,173	\$0	\$735,029
2	\$202,869	\$69,155	\$466,173	\$0	\$738,196
3	\$204,056	\$71,229	\$466,173	\$0	\$741,458
4	\$205,278	\$73,366	\$466,173	\$0	\$744,817
5	\$206,538	\$75,567	\$466,173	\$0	\$748,278
6	\$207,835	\$77,834	\$466,173	\$0	\$751,842
7	\$209,171	\$80,169	\$466,173	\$0	\$755,513
8	\$210,547	\$82,574	\$466,173	\$0	\$759,294
9	\$211,965	\$85,052	\$466,173	\$0	\$763,189
10	\$213,425	\$87,603	\$466,173	\$0	\$767,201
11	\$214,928	\$90,231	\$466,173	\$0	\$771,332
12	\$286,696	\$92,938	\$466,173	\$0	\$845,807
13	\$295,297	\$95,726	\$466,173	\$0	\$857,196
14	\$304,156	\$98,598	\$466,173	\$0	\$868,927
15	\$313,280	\$101,556	\$466,173	\$0	\$881,009
16	\$322,679	\$104,603	\$466,173	\$0	\$893,454
17	\$332,359	\$107,741	\$466,173	\$0	\$906,273
18	\$342,330	\$110,973	\$466,173	\$0	\$919,476
19	\$352,600	\$114,302	\$466,173	\$0	\$933,075
20	\$363,178	\$117,731	\$466,173	\$0	\$947,082
Total	\$5,271,800	\$1,804,092	\$9,789,628	\$161,000	\$17,026,520

* The electrical consumption rate structure (\$/kWh) for Fort Bend County is fixed for through Performance Year 11 and will not escalate during that period. A detailed annual kWh rate for each building for each Performance Year can be found in Section IV below. Electrical Demand (\$/kW) and natural gas (\$/therm) rates shall be escalated annually by the actual cost escalation, but such escalation shall be no less than the mutually agreed "floor" escalation rate of 3.0%.

** Non-Measured Operational Cost Avoidance Benefits figures in the table escalate by the annual rate of 3.0% during the duration of the Project Term.

*** Non-Measured Capital Cost Avoidance Benefits figures in the table do not escalate during the duration of the Project Term.

**** Utility Rebates shown in the table above are not guaranteed. Fort Bend County must apply for these rebates. Johnson Controls shall assist Fort Bend County in the rebate application process.

***** Values are rounded to the nearest dollar.

Within sixty (60) days of the commencement of the Guarantee Term, JCI will calculate the Measured Project Benefits achieved during the installation period plus any Non-Measured Project Benefits applicable to such period and advise Customer of same. Any Project Benefits achieved during the installation period may, at JCI's discretion, be allocated to the Annual Project Benefits for the first year of the Guarantee Term. Within sixty (60) days of each anniversary of the commencement of the Guarantee Term, JCI will calculate the Measured Project Benefits achieved for the applicable year plus any Non-Measured Project Benefits applicable to such period and advise Customer of same.

Customer acknowledges and agrees that if, for any reason, it (i) cancels or terminates receipt of M&V Services, (ii) fails to pay for M&V Services in accordance with Schedule 4, (iii) fails to fulfill any of its responsibilities necessary to enable JCI to complete the Work and provide the M&V Services, or (iv) otherwise cancels, terminates or materially breaches this Agreement, the Assured Performance Guarantee shall automatically terminate and JCI shall have no liability hereunder.

C. Project Benefits Shortfalls or Surpluses.

- (i) *Project Benefits Shortfalls.* If an Annual Project Benefits Shortfall occurs for any one year of the Guarantee Term, JCI shall, at its discretion and in any combination, (a) set off the amount of such shortfall against any unpaid balance Customer then owes to JCI, (b) where permitted by applicable law, increase the next year's amount of Annual Project Benefits by the amount of such shortfall, (c) pay to Customer the amount of such shortfall, or (d) subject to Customer's agreement, provide to Customer additional products or services, in the value of such shortfall, at no additional cost to Customer.
- (ii) *Project Benefits Surpluses.* If an Annual Project Benefits Surplus occurs for any one year of the Guarantee Term, JCI may, at its discretion and in any combination, (a) apply the amount of such surplus to set off any subsequent Annual Project Benefit Shortfall during the Guarantee Term, or (b) bill Customer for the amount of payments made pursuant to Section C(i)(c) above and/or the value of the products or services provided pursuant to clause C(i)(d) above, in an amount not to exceed the amount of such surplus.*
- (iii) *Additional Improvements.* Where an Annual Project Benefits Shortfall has occurred, JCI may, subject to Customer's approval (which approval shall not be unreasonably withheld, conditioned, or delayed), implement additional Improvement Measures, at no cost to Customer, which may generate additional Project Benefits in future years of the Guarantee Term.

II. NON-MEASURED PROJECT BENEFITS

The size of this project is dependent upon the financial criteria established by the customer. Savings can be obtained not only through a reduction in utility and water service consumption, but also through reduced (avoided) amounts of purchased materials and service contracts due to the implementation of this project. By allowing stipulated savings for operations and maintenance savings to benefit this project, the customer will be able to achieve even more significant improvements and upgrades to their municipality.

Non-Measured Project Benefits from the following Improvement Measures are detailed below:

FIM No.	Description	Material Savings	Repair Savings
1	LED Lighting Upgrades	X	
4	Air Cooled Chiller		X
5	Water Cooled Chiller		X

Customer agrees that the Non-Measured Project Benefits are reasonable and that the installation of the Improvement Measures will enable Customer to take actions that will result in the achievement of such Non-Measured Project Benefits.

FIM 1: LED Lighting Upgrades (Material Savings)

Non-measured savings associated with LED Lighting Upgrades include material savings for replacement bulbs and ballasts. The new lamps and ballasts will fail at a lesser rate than the existing lamps and ballasts, as the rated life of the new lamps and ballast (in most cases) is greater than the rated life of the existing equipment. Material warranties of the proposed equipment are also factored into the savings calculations.

Below are the equations used to calculate the annual material savings for each type of fixture.

- **Lamp Unit Cost per Hour** = Average Lamp Cost ÷ Average Lamp Life.
- **Ballast Unit Cost per Hour** = Average Ballast Cost ÷ Average Ballast Life.
- **Existing Annual Lamp Material Cost** = Existing Burn Hours × Quantity of Lamps × Lamp Unit Cost per Hour.
- **Existing Annual Ballast Material Cost** = Existing Burn Hours × Quantity of Ballasts × Ballast Unit Cost per Hour.
- **Proposed Annual Lamp Material Cost** = Existing Burn Hours × Quantity of Lamps × Lamp Unit Cost per Hour.
- **Proposed Annual Ballast Material Cost** = Existing Burn Hours × Quantity of Ballasts × Ballast Unit Cost per Hour.
- **Proposed Annual Material Cost** = Proposed Burn Hours × ((Quantity of Lamps × Lamp Unit Cost per Hour) + (Quantity of Ballasts × Ballast Unit Cost per Hour)).
- **Annualized Project Term Material Savings** = ((Project Term × (Existing Annual Lamp Material Cost + Existing Annual Ballast Material Cost)) - ((Project Term - Proposed Lamp Warranty Period) × Proposed Annual Lamp Material Cost) + ((Project Term - Proposed Ballast Warranty Period) × Proposed Annual Ballast Material Cost)) ÷ Project Term.

The non-measured project benefits as associated with Lighting Materials are based on lighting component expenditures as calculated and shown in the table below. These savings escalate annually by three percent (3%).

LED Lighting Upgrades Material Savings	Performance Years							Total
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	
	\$0	\$25,937	\$26,716	\$27,517	\$28,343	\$29,193	\$30,069	
	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	
	\$30,971	\$31,900	\$32,857	\$33,843	\$34,858	\$35,904	\$36,981	
	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	
	\$38,090	\$39,233	\$40,410	\$41,622	\$42,871	\$44,157	\$45,481	

FIM 4: Air Cooled Chiller (Repair Savings)

Non-measured savings associated with air cooled chillers include cost savings for repairs to existing air cooled chillers that should no longer be necessary due to the improvements included in this FIM. Based on data provided by Fort Bend County during development, the County spent \$26,090 last year for repairs to the existing air cooled chillers. It is expected that the life cycle costs of maintaining the new equipment versus the existing equipment, combined with manufacturer’s warranties of the new equipment, should result in the repair savings included in this project.

Air Cooled Chiller repair savings are shown in the table below and were based on the repair invoices provided by the County, as described above. These savings escalate annually by three percent (3%)

Air Cooled Chiller Repair Savings	Performance Years							Total
	Year 0	Year 1	Year 2	Year 3	Year 4	Year5	Year 6	
	\$0	\$26,873	\$27,679	\$28,509	\$29,365	\$30,245	\$31,153	
	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	
	\$32,087	\$33,050	\$34,042	\$35,063	\$36,115	\$37,198	\$38,314	
	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	
	\$39,463	\$40,647	\$41,867	\$43,123	\$44,416	\$45,749	\$47,121	\$722,080

FIM 5: Water Cooled Chiller (Repair Savings)

Non-measured savings associated with water cooled chiller include cost savings for repairs to existing water cooled chillers that should no longer be necessary due to the improvements included in this FIM. Based on data provided by Fort Bend County during development, the County spent \$13,913 last year for repairs to the existing water cooled chillers. It is expected that the life cycle costs of maintaining the new equipment versus the existing equipment, combined with manufacturer’s warranties of the new equipment, should result in the repair savings included in this project.

Water Cooled Chiller repair savings are shown in the table below and were based on the repair invoices provided by the County, as described above. These savings escalate annually by three percent (3%).

Water Cooled Chiller Repair Savings	Performance Years							Total
	Year 0	Year 1	Year 2	Year 3	Year 4	Year5	Year 6	
	\$0	\$14,330	\$14,760	\$15,203	\$15,659	\$16,129	\$16,613	
	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	
	\$17,111	\$17,625	\$18,153	\$18,698	\$19,259	\$19,837	\$20,432	
	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	
	\$21,045	\$21,676	\$22,326	\$22,996	\$23,686	\$24,397	\$25,128	\$385,063

Non-measured Capital Cost Avoidance

Description	Year 0 Benefit	Escalation
Fort Bend County has agreed to allocate funds annually, to this Project.	\$466,173	0%

Fort Bend County agrees to contribute \$466,173 each year for this project in addition to the measured and non-measured savings included within the project to avoid future capital purchases of HVAC and mechanical equipment.

Customer agrees that the Non-Measured Project Benefits are reasonable and that the installation of the Improvement Measures will enable Customer to take actions that will result in the achievement of such Non-Measured Project Benefits.

III. MEASUREMENT AND VERIFICATION METHODOLOGIES

The following is a brief overview of the measurement and verification methodologies applicable to the Improvement Measures set forth below. JCI shall apply these methodologies, as more fully detailed in the guidelines and standards of the International Measurement and Verification Protocol (IPMVP), in connection with the provision of M&V Services hereunder.

Guaranteed Measured Savings Summary

FIM	Description	Annual Savings	Electrical Consumption Savings	Electrical Demand Savings	Natural Gas Consumption Savings
		\$	kWh	kW	therms
1	LED Lighting Upgrades	\$141,479	2,394,035	366	0
2	DX Unit Replacement	\$11,353	266,316	129	0
3	RTU Replacement	\$6,138	144,451	65	0
4	Air Cooled Chiller	\$11,307	266,935	113	0
5	Water Cooled Chiller	\$1,727	41,044	16	0
7	BAS Upgrades	\$24,616	613,330	0	1,267
9	Building Envelope	\$3,978	96,257	0	0
Total Annual Guarantee (Baseline)					\$200,597
Year 1 (with applicable escalation)					\$201,716

**Option A
Retrofit Isolation: Key Parameter Measurement**

Measured Project Benefits are determined by partial field measurement of the energy use of the system(s) to which an Improvement Measure was applied separate from the energy use of the rest of the facility.

Partial measurement means that some but not all parameters will be measured. Careful review of the design and installation of Improvement Measures is intended to demonstrate that the stipulated values fairly represent the probable actual values. Agreed upon values will be shown in the measurement and verification plan. Engineering calculations using measurements and stipulations are used to calculate Measured Project Benefits for the duration of the Guarantee Term.

Measured Project Benefits from the following Improvement Measures will be calculated using Option A:

FIM No.	Description	M&V Protocol	Frequency
1	LED Lighting Upgrades	Option A	One-time
2	DX Unit Replacement	Option A	One-time
3	RTU Replacement	Option A	One-time
4	Air Cooled Chiller	Option A	Annual
5	Water Cooled Chiller	Option A	Annual
7	BAS Upgrades	Option A	Annual
9	Building Envelope	Option A	One-time

Installation Period Savings (All FIMs)

Installation period savings will be verified using a Microsoft Excel® spreadsheet based on substantial completion and/or percent complete for each FIM and building on a monthly basis. The monthly FIM savings will be calculated using the estimated Year 1 annual savings divided by 12 months with respect to the installation progress and the applicable rates defined Section IV. The installation period savings will be updated to reflect actual FIM savings including energy, O&M, and material savings. The installation period savings will be documented in the post-installation report.

FIM-1: LED Lighting Upgrades

The savings for this FIM will be verified using IPMVP Option A, Retrofit Isolation with Key Parameter Measurement. The savings for this FIM are generated through a reduction in energy used by the lighting system; therefore, the measurement boundary is the lighting system itself.

Key Parameter	Measurement Frequency	Measurement Description
Pre- and Post-Retrofit Fixture Power Draw (kW)	One-time Pre-; One-time Post-Retrofit	<p>The pre-retrofit power measurements will be taken with a true Root Mean Square (RMS) meter prior to the start of construction. The sample of measurements will be based on an 80/20 sampling plan. The savings will be updated to reflect actual pre-retrofit measurements. These values will not be measured again.</p> <p>In some situations, such as when a certain type of lighting fixture is not available by itself on a switch, typical wattages as published by the manufacturer or ANSI (American National Standards Institute) will be used.</p> <p>The post-retrofit power measurements will be taken with a true Root Mean Square (RMS) meter during construction after the installation of the new fixtures. The sample of measurements will be based on an 80/20 sampling plan. The post-installation wattage of the impacted fixtures will be measured one-time, and the savings will be updated.</p>

Estimated Parameters	Assumed Value	Justification, Source and Description
Burn Hours	See Table Below	<p>The lighting system annual burn hours by space type are agreed to be as shown in the table below. These burn hours are based on historical data light logger data for Local Government Buildings, on-site surveys, and interviews during development. These values will not be measured.</p> <p>Post-installation burn hours are the same as the pre-installation burn hours, except where sensors are added. The burn hours shown in the table below are inclusive of the reduced hours due to the installation of occupancy sensors.</p> <p>Where pre and post burn hours are the same, not sensors are being added. Where they are different, the difference is due to the installation of occupancy sensors.</p>
Coincidence Factor	See Table Below	<p>The coincidence factor is estimated based on the number of fixtures in a space type expected to be operating at the same time during the on-peak period and is agreed to remain at the same value after the retrofit. The factor is based on its respective usage group type and hours of operation. This factor is agreed upon and will be the same in both the pre and post-retrofit conditions. This estimate is based on overall operation and studies from similar area types. These values will not be measured.</p>

Lighting Usage Groups, Burn Hours, and Coincidence Factors for First Colony Library, Missouri City Annex, Rosenberg Annex, and Travis Building

Usage Group Code	Description	Pre-Installation Burn Hours*	Coincidence Factor
24/7	24/7	8,760	1
AU	Auditorium/Stage	4,340	0.9
BR	Break Room**	4,779	0.9
BRAS	Break room Already Sensored	3,345	0.9
CL	Classroom**	3,290	0.9
CR	Conference Room**	3,203	0.9
CRAS	Conference Room Already Sensored	2,242	0.9
CT	Court Room/Trial Areas	4,095	0.9
E	Elevator	4,380	0.9
EL	Exterior	8,760	1
GA	Garage/Parking Decks	4,380	0.9
GYM	Gymnasium**	4,760	0.9
HW	Hallway	6,356	1
HWAS	Hallway Already Sensored	4,449	0.9
KT	Kitchen	3,150	0.9
LAB	Laboratory	5,234	0.9
LI	Library	8,437	1
LIAS	Library Already Sensored	5,906	0.9
LO	Lobby/Entry Vestibule	5,952	0.9
LR	Locker Room	5,600	0.9
ME	Mechanical/Electrical Rooms	700	0.5
MEAS	Mechanical/Electrical Rooms Already Sensored	490	0.5
MP	Multipurpose**	3,701	0.9
NL	Night Light	8,760	1
OO	Open Office**	5,234	0.9
OOAS	Open Office Already Sensored	3,664	0.9
OS	Office Support**	3,570	0.9
OSAS	Office Support Already Sensored	2,499	0.9
PO	Private Office**	4,499	0.9
POAS	Private Office Already Sensored	3,149	0.9
PR	Patient Room	4,499	0.9

Schedule 2

Usage Group Code	Description	Pre-Installation Burn Hours*	Coincidence Factor
PRAS	Patient Room Already Sensored	3,149	0.9
RR	Restroom**	6,633	1
RRAS	Restroom Already Sensored	4,643	0.9
ST	Storage**	2,100	0.9
STAS	Storage Already Sensored	1,470	0.9
SW	Stairwell	8,760	1
UT	Utility/Janitor Closets	700	0.5
UTAS	Utility/Janitor Closets - Already Sensored	490	0.5
WS	Workshop	2,277	0.9
X	Exit Signs	8,760	1

Lighting Usage Groups, Burn Hours, and Coincidence Factors for all other Buildings

Usage Group Code	Description	Pre-Installation Burn Hours*	Coincidence Factor
24/7	24/7	8,760	1
AU	Auditorium/Stage	2,480	0.9
BR	Break Room**	2,731	0.9
BRAS	Break room Already Sensored	1,912	0.9
CL	Classroom**	1,880	0.9
CR	Conference Room**	1,830	0.9
CRAS	Conference Room Already Sensored	1,281	0.9
CT	Court Room/Trial Areas	2,340	0.9
E	Elevator	4,380	0.9
EL	Exterior	8,760	1
GA	Garage/Parking Decks	4,380	0.9
GYM	Gymnasium**	2,720	0.9
HW	Hallway	3,632	0.9
HWAS	Hallway Already Sensored	2,542	0.9
KT	Kitchen	1,800	0.9
LAB	Laboratory	2,991	0.9
LI	Library	4,821	0.9
LIAS	Library Already Sensored	3,375	0.9
LO	Lobby/Entry Vestibule	3,401	0.9
LR	Locker Room	3,200	0.9
ME	Mechanical/Electrical Rooms	400	0.5

Usage Group Code	Description	Pre-Installation Burn Hours*	Coincidence Factor
MEAS	Mechanical/Electrical Rooms Already Sensored	280	0.5
MP	Multipurpose**	2,115	0.9
NL	Night Light	8,760	1
OO	Open Office**	2,991	0.9
OOAS	Open Office Already Sensored	2,094	0.9
OS	Office Support**	2,040	0.9
OSAS	Office Support Already Sensored	1,428	0.9
PO	Private Office**	2,571	0.9
POAS	Private Office Already Sensored	1,800	0.9
PR	Patient Room	2,571	0.9
PRAS	Patient Room Already Sensored	1,800	0.9
RR	Restroom**	3,790	0.9
RRAS	Restroom Already Sensored	2,653	0.9
ST	Storage**	1,200	0.9
STAS	Storage Already Sensored	3,000	0.9
SW	Stairwell	8,760	0.9
UT	Utility/Janitor Closets	400	0.5
UTAS	Utility/Janitor Closets Already Sensored	280	0.5
VEND	Vending Machines	8,760	1
WS	Workshop	1,301	0.9
X	Exit Signs	8,760	1

Note:

* Post Burn hour are the same as pre-burn hours, except were occupancy sensors are being installed, as noted by **.

** Denotes Usage Groups that contain fixtures where new occupancy sensors will be installed as part of the scope of work. Within these specific usage groups, some, but not all, new fixtures will be installed with occupancy sensors. For those specific fixtures with new occupancy sensors, the post burn hours will be 30% less than the pre-burn hours shown in the table above. Please refer to the detailed lighting line by line in Attachment 5 for specific locations of new occupancy sensors.

Equations for Calculating Lighting Retrofit Savings

Demand (kW)

$$kW \text{ Savings} = \sum_u [(kW/Fixture_{pre} \times Quantity_{pre} \times Coincidence \text{ Factor}_{pre} - kW/Fixture_{post} \times Quantity_{post} \times Coincidence \text{ Factor}_{post})]$$

Where:

$kW/fixture_{pre}$ = lighting baseline demand per fixture for usage group u

$kW/fixture_{post}$ = lighting demand per fixture during post-retrofit period for usage group

$Quantity_{pre}$ = quantity of affected fixtures before the lighting retrofit for usage group u

$Quantity_{post}$ = quantity of affected fixtures after the lighting retrofit for usage group u

$Coincidence \text{ Factor}_u$ = Coincidence Factor is a multiplier to account for peak demand of each specific usage group u

Energy (kWh)

$$kWh_{pre} = \sum [(kW/Fixture_{pre} \times Quantity_{pre} \times Coincidence\ Factor_{pre} \times Burn\ Hours_{pre})]_u$$

$$kWh_{post} = \sum [(kW/Fixture_{post} \times Quantity_{post} \times Coincidence\ Factor_{post} \times Burn\ Hours_{post})]_u$$

$$kWh_{Savings_{Lighting}} = kWh_{pre} - kWh_{post}$$

Where:

Burn Hours_{pre} = number of baseline operating hours during the time period *t* for the usage group *u*

Burn Hours_{post} = number of proposed operating hours during the time period *t* for the usage group *u*

Refer to **Attachment 5** for the detailed calculations.

JCI Responsibilities:

Measurements for this FIM consist of pre-retrofit and post-retrofit fixture wattages of a sample of fixtures, based on an 80% level of confidence with a 20% level of precision (80/20) and an assumed coefficient of variation of 0.5. Sample populations will be chosen by the fixture type. The pre-retrofit power measurements will be taken with a true Root Mean Square (RMS) meter prior to the start of construction. Post-installation measurements will be conducted after the installation of the fixtures is complete. Once the pre-retrofit and post-retrofit measurements have been conducted, JCI will update the savings tables with the actual measured data to calculate the actual energy savings for this FIM. No annual measurements will be conducted for this FIM. The pre-retrofit burn hours for this FIM have been determined based on building occupancy, interviews with staff, and observations made during the lighting audits. It is agreed upon that the post-retrofit burn hours are to be the same as the pre-retrofit burn hours, except where occupancy sensors are installed, as defined in Schedule 1. It is also agreed upon that these burn hours are reasonable and accurately reflect each facility's operations. The coincident factor is estimated based on the number of fixtures in a given space type assumed to be operating at the same time during the on-peak period and is agreed to remain at the same value after the retrofit.

There will be no annual M&V activities conducted for this FIM. The verified post-retrofit savings will serve as annual verified savings for this FIM and will be subjected to the applicable year's utility rates.

Customer's Responsibilities:

Customer's all operational and maintenance requirements for this FIM. They will maintain the new fixtures as per manufacturer's guidelines. They will also ensure that all replacement ballasts and bulbs are like for like replacements.

FIM-2: DX Unit Replacement

The savings for this FIM will be verified using IPMVP Option A, Retrofit Isolation with Key Parameter Measurement, The savings for this FIM are generated through an increase in efficiencies of the new DX equipment as compared to the existing equipment; therefore, the measurement boundary is surrounding the DX equipment itself.

Key Parameter	Measurement Frequency	Measurement Description
Pre and Post Cooling Efficiency (EER)	Pre-retrofit One-time; Post-Retrofit One-time	<p>The baseline cooling efficiencies of each unit are based on product data, observed conditions, and engineering judgment. This value was not measured due to the measurement cost associated with taking accurate field measurements, and its cost would not be feasible for the savings related to this FIM. Therefore, the pre-retrofit cooling efficiency was based on the EER efficiency ratings of the existing equipment, de-rated based on the age of the existing equipment. The values are detailed in this calculation in Attachment 5 and are agreed to by the Customer and JCI for the term of the contract.</p> <p>The post-retrofit cooling efficiencies for each unit will be verified by utilizing the manufacturer’s EER rating for each new unit. The calculations will be updated based on post-retrofit cooling efficiency, which has been determined through manufacturer’s factory testing of the new equipment, prior to the new equipment being installed.</p> <p>JCI is not responsible for the loss of savings resulting from customer-directed changes in schedules, system overrides, or lack of maintenance.</p>

Estimated Parameters	Assumed Value	Justification, Source and Description
Design Capacity	See Attachment 5	Total cooling capacity, in tons, of each unit is based on product data. The values are detailed in this calculation in Attachment 5 and are agreed to by the Customer and JCI for the term of the contract. These values will not be measured during the term of the contract.
Demand Diversity Factor	See Attachment 5	The demand diversity factor accounts for instantaneous loads being less than the peak capacity of the equipment. The diversity factor is based on engineering judgment and is used to ensure baseline demand is not greater than utility bills. These values are agreed to by the Customer and JCI, and will not be measured.
Cooling Diversity Factor	See Attachment 5	The cooling diversity factor accounts for loads being less than the installed capacity on an annual basis. The diversity factor is based on engineering judgment and is used to ensure baseline energy is not greater than utility bills. These values vary by equipment type. These values are agreed to by the Customer and JCI and will not be measured.
Degradation Factor	See Attachment 5	<p>The degradation factor for each unit is calculated using the methodology described in National Renewable Energy Laboratory (NREL) publication entitled <i>Building America Performance Analysis Procedures for Existing Homes</i> (BAPA). The methodology accounts for the age and general condition (maintenance factor) of the existing equipment and is calculated by the following equation:</p> $(1 - M)^{Age}$ <p>Where M is the maintenance factor and Age is the equipment age in years. The maintenance factor is defined as:</p> <ul style="list-style-type: none"> • 0.01 for “good” condition • 0.02 for “fair” condition • 0.03 for “poor” condition

Equations for Calculating DX Unit Replacement Savings

DX unit replacement savings were calculated using a spreadsheet model of the baseline and post-installation conditions. Savings were calculated based on the DX unit system size (cooling capacity in tons), system efficiency, and equipment run hours.

The run hours used for this FIM are the same as the pre-retrofit run hours used in FIM 7. The pre and post-run hours for this FIM are the same to ensure that the savings for this FIM are inclusive of only the efficiency improvements of the equipment.

Demand (kW)

$$\text{Pre-retrofit kW} = \text{Design Capacity} \times \text{Diversity Factor} \times 12 / (\text{Exist. EER} \times \text{Degradation Factor})$$

$$\text{Post-retrofit kW} = \text{Design Capacity} \times \text{Diversity Factor} \times 12 / \text{Future EER}$$

$$\text{Total kW Saved} = \text{Pre-retrofit kW} - \text{Post-retrofit kW}$$

where:

Design Capacity = Cooling Design Capacity, described in table above

Diversity Factor = Demand Diversity Factor, described in table above

Degradation Factor = Degradation Factor, as described above

Exist. EER = Pre-Retrofit Cooling Efficiency base on existing product data shown in Attachment 5

Future EER = Post-Retrofit Cooling Efficiency base on verified product data

Energy (kWh)

$$\text{Pre-retrofit kWh} = \text{Design Capacity} \times \text{Diversity Factor} \times 12 / (\text{Exist. EER} \times \text{Degradation Factor}) \times \text{Exiting Cooling FLH}$$

$$\text{Post-retrofit kWh} = \text{Design Capacity} \times \text{Diversity Factor} \times 12 / \text{Future EER} \times \text{Exiting Cooling FLH}$$

$$\text{Total kWh Saved} = \text{Pre-retrofit kWh} - \text{Post-retrofit kWh}$$

where:

Design Capacity = Cooling Design Capacity, described in table above

Diversity Factor = Cooling Diversity Factor, described in table above

Degradation Factor = Degradation Factor, as described above

Exist. EER = Pre-Retrofit Cooling Efficiency base on existing product data shown in Attachment 5

Future EER = Post-Retrofit Cooling Efficiency base on verified product data

Cooling FLH = Cooling equivalent full load hours as described above

Refer to Attachment 5 for the detailed calculations.

JCI Responsibilities:

JCI will visually inspect and verify performance data of the installed equipment one-time during construction. The post-retrofit efficiencies for each unit will be verified by utilizing the manufacturer's nameplate data. The calculations will be updated based on post-retrofit efficiencies. Detailed calculations can be found in Attachment 5. JCI shall not be responsible for changes to installed equipment as they are turned over to the Customer, nor shall JCI be responsible for any loss of savings that occur due to customer-driven changes or customer's failure to maintain the new equipment.

There will be no annual M&V activities conducted for this FIM. The verified post-retrofit savings will serve as annual verified savings for this FIM and will be subjected to the applicable year's utility rates.

Customer Responsibilities:

Customer is responsible for all operational and maintenance responsibilities for this FIM. Customer is responsible for performing preventative maintenance on the equipment as per the manufacturer's guidelines. In the event that the equipment fails or needs repairs; Customer is responsible for repairing/replacing the equipment, either by use of its own maintenance staff, through a separate contract with either JCI or a third-party mechanical repair contractor.

FIM-3: RTU Replacement

The savings for this FIM will be verified using IPMVP Option A, Retrofit Isolation with Key Parameter Measurement, The savings for this FIM are generated through an increase in efficiencies of the new RTU equipment as compared to the existing equipment; therefore, the measurement boundary is surrounding the RTU equipment itself.

Key Parameter	Measurement Frequency	Measurement Description
Pre and Post Cooling Efficiency (EER)	Pre-retrofit One-time; Post-Retrofit One-time	<p>The baseline cooling efficiencies of each unit are based on product data, observed conditions, and engineering judgment. This value was not measured due to the measurement cost associated with taking accurate field measurements, and its cost would not be feasible for the savings related to this FIM. Therefore, the pre-retrofit cooling efficiency was based on the EER efficiency ratings of the existing equipment, de-rated based on the age of the existing equipment. The values are detailed in this calculation in Attachment 5 and are agreed to by the Customer and JCI for the term of the contract.</p> <p>The post-retrofit cooling efficiencies for each unit will be verified by utilizing the manufacturer’s EER rating for each new unit. The calculations will be updated based on post-retrofit cooling efficiency, which has been determined through manufacturer’s factory testing of the new equipment, prior to the new equipment being installed.</p> <p>JCI is not responsible for the loss of savings resulting from customer-directed changes in schedules, system overrides, or lack of maintenance.</p>

Estimated Parameters	Assumed Value	Justification, Source and Description
Design Capacity	See Attachment 5	Total cooling capacity, in tons, of each unit is based on product data. The values are detailed in this calculation in Attachment 5 and are agreed to by the Customer and JCI for the term of the contract. These values will not be measured during the term of the contract.
Demand Diversity Factor	See Attachment 5	The demand diversity factor accounts for instantaneous loads being less than the peak capacity of the equipment. The diversity factor is based on engineering judgment and is used to ensure baseline demand is not greater than utility bills. These values are agreed to by the Customer and JCI, and will not be measured.
Cooling Diversity Factor	See Attachment 5	The cooling diversity factor accounts for loads being less than the installed capacity on an annual basis. The diversity factor is based on engineering judgment and is used to ensure baseline energy is not greater than utility bills. These values vary by equipment type. These values are agreed to by the Customer and JCI and will not be measured.
Degradation Factor	See Attachment 5	<p>The degradation factor for each unit is calculated using the methodology described in National Renewable Energy Laboratory (NREL) publication entitled <i>Building America Performance Analysis Procedures for Existing Homes</i> (BAPA). The methodology accounts for the age and general condition (maintenance factor) of the existing equipment and is calculated by the following equation:</p> $(1 - M)^{Age}$ <p>Where M is the maintenance factor and Age is the equipment age in years. The maintenance factor is defined as:</p> <ul style="list-style-type: none"> • 0.01 for “good” condition • 0.02 for “fair” condition • 0.03 for “poor” condition

Equations for Calculating RTU Replacement Savings

RTU replacement savings were calculated using a spreadsheet model of the baseline and post-installation conditions. Savings were calculated based on the DX unit system size (cooling capacity in tons), system efficiency, and equipment run hours.

The run hours used for this FIM are the same as the pre-retrofit run hours used in FIM 7. The pre and post-run hours for this FIM are the same to ensure that the savings for this FIM are inclusive of only the efficiency improvements of the equipment.

Demand (kW)

$$\text{Pre-retrofit kW} = \text{Design Capacity} \times \text{Diversity Factor} \times 12 / (\text{Exist. EER} \times \text{Degradation Factor})$$

$$\text{Post-retrofit kW} = \text{Design Capacity} \times \text{Diversity Factor} \times 12 / \text{Future EER}$$

$$\text{Total kW Saved} = \text{Pre-retrofit kW} - \text{Post-retrofit kW}$$

Where:

Design Capacity = Cooling Design Capacity, described in table above

Diversity Factor = Demand Diversity Factor, described in table above

Degradation Factor = Degradation Factor, as described above

Exist. EER = Pre-Retrofit Cooling Efficiency base on existing product data shown in Attachment 5

Future EER = Post-Retrofit Cooling Efficiency base on verified product data

Energy (kWh)

$$\text{Pre-retrofit kWh} = \text{Design Capacity} \times \text{Diversity Factor} \times 12 / (\text{Exist. EER} \times \text{Degradation Factor}) \times \text{Existing Cooling FLH}$$

$$\text{Post-retrofit kWh} = \text{Design Capacity} \times \text{Diversity Factor} \times 12 / \text{Future EER} \times \text{Existing Cooling FLH}$$

$$\text{Total kWh Saved} = \text{Pre-retrofit kWh} - \text{Post-retrofit kWh}$$

Where:

Design Capacity = Cooling Design Capacity, described in table above

Diversity Factor = Cooling Diversity Factor, described in table above

Degradation Factor = Degradation Factor, as described above

Exist. EER = Pre-Retrofit Cooling Efficiency base on existing product data shown in Attachment 5

Future EER = Post-Retrofit Cooling Efficiency base on verified product data

Cooling FLH = Cooling equivalent full load hours as described above

Refer to Attachment 5 for the detailed calculations.

JCI Responsibilities:

JCI will visually inspect and verify performance data of the installed equipment one-time during construction. The post-retrofit efficiencies for each unit will be verified by utilizing the manufacturer's nameplate data. The calculations will be updated based on post-retrofit efficiencies. Detailed calculations can be found in Attachment 5. JCI shall not be responsible for changes to installed equipment as they are turned over to the Customer, nor shall JCI be responsible for any loss of savings that occur due to customer-driven changes or customer's failure to maintain the new equipment.

There will be no annual M&V activities conducted for this FIM. The verified post-retrofit savings will serve as annual verified savings for this FIM and will be subjected to the applicable year's utility rates.

Customer Responsibilities:

Customer is responsible for all operational and maintenance responsibilities for this FIM. Customer is responsible for performing preventative maintenance on the equipment as per the manufacturer's guidelines. In the event that the equipment fails or needs repairs; Customer is responsible for repairing/replacing the equipment, either by use of its own maintenance staff, through a separate contract with either JCI or a third-party mechanical repair contractor.

FIM-4: Air Cooled Chiller

The savings for this FIM will be verified using IPMVP Option A, Retrofit Isolation with Key Parameter Measurement, The savings for this FIM are generated through an increase in efficiencies of the new air cooled chillers as compared to the existing ones; therefore, the measurement boundary is surrounding the chillers themselves.

Key Parameter	Measurement Frequency	Measurement Description
Pre and Post Chiller Efficiency (EER)	Pre-retrofit One-time; Post-Retrofit One-time	<p>The baseline efficiencies of each chiller are based on product data, observed conditions, and engineering judgment. This value was not measured due to the measurement cost associated with taking accurate field measurements, and its cost would not be feasible for the savings related to this FIM. Therefore, the pre-retrofit chiller efficiency was based on the EER efficiency ratings of the existing equipment, de-rated based on the age of the existing equipment. The values are detailed in this calculation in Attachment 5 and are agreed to by the Customer and JCI for the term of the contract.</p> <p>The post-retrofit efficiencies for each unit will be verified by utilizing the manufacturer’s EER rating for each new chiller. The calculations will be updated based on post-retrofit chiller efficiency, which has been determined through manufacturer’s factory testing of the new equipment, prior to the new equipment being installed.</p> <p>JCI is not responsible for the loss of savings resulting from customer-directed changes in schedules, system overrides, or lack of maintenance.</p>

Estimated Parameters	Assumed Value	Justification, Source and Description
Design Capacity	See Attachment 5	Total cooling capacity, in tons, of each chiller is based on product data. The values are detailed in this calculation in Attachment 5 and are agreed to by the Customer and JCI for the term of the contract. These values will not be measured during the term of the contract.
Demand Diversity Factor	See Attachment 5	The demand diversity factor accounts for instantaneous loads being less than the peak capacity of the equipment. The diversity factor is based on engineering judgment and is used to ensure baseline demand is not greater than utility bills. These values are agreed to by the Customer and JCI and will not be measured.
Cooling Diversity Factor	See Attachment 5	The cooling diversity factor accounts for loads being less than the installed capacity on an annual basis. The diversity factor is based on engineering judgment and is used to ensure baseline energy is not greater than utility bills. These values vary by equipment type and facility. These values are agreed to by the Customer and JCI and will not be measured.
Degradation Factor	See Attachment 5	<p>The degradation factor for each unit is calculated using the methodology described in National Renewable Energy Laboratory (NREL) publication entitled <i>Building America Performance Analysis Procedures for Existing Homes</i> (BAPA). The methodology accounts for the age and general condition (maintenance factor) of the existing equipment and is calculated by the following equation:</p> $(1 - M)^{Age}$ <p>Where M is the maintenance factor and Age is the equipment age in years. The maintenance factor is defined as:</p> <ul style="list-style-type: none"> • 0.01 for “good” condition • 0.02 for “fair” condition • 0.03 for “poor” condition

Equations for Calculating Air Cooled Chiller Savings

Air cooled chiller savings were calculated using a spreadsheet model of the baseline and post-installation conditions. Savings were calculated based on the chiller size (cooling capacity in tons), chiller efficiency, and equipment run hours.

The run hours used for this FIM are the same as the pre-retrofit run hours used in FIM 7. The pre and post-run hours for this FIM are the same to ensure that the savings for this FIM are inclusive of only the efficiency improvements of the equipment.

Demand (kW)

$$\text{Pre-retrofit kW} = \text{Design Capacity} \times \text{Diversity Factor} \times 12 / (\text{Exist. EER} \times \text{Degradation Factor})$$

$$\text{Post-retrofit kW} = \text{Design Capacity} \times \text{Diversity Factor} \times 12 / \text{Future EER}$$

$$\text{Total kW Saved} = \text{Pre-retrofit kW} - \text{Post-retrofit kW}$$

Where:

Design Capacity = Cooling Design Capacity, described in table above

Diversity Factor = Demand Diversity Factor, described in table above

Degradation Factor = Degradation Factor, as described above

Exist. EER = Pre-Retrofit Cooling Efficiency base on existing product data shown in Attachment 5

Future EER = Post-Retrofit Cooling Efficiency base on verified product data

Energy (kWh)

$$\text{Pre-retrofit kWh} = \text{Design Capacity} \times \text{Diversity Factor} \times 12 / (\text{Exist. EER} \times \text{Degradation Factor}) \times \text{Exiting Cooling FLH}$$

$$\text{Post-retrofit kWh} = \text{Design Capacity} \times \text{Diversity Factor} \times 12 / \text{Future EER} \times \text{Exiting Cooling FLH}$$

$$\text{Total kWh Saved} = \text{Pre-retrofit kWh} - \text{Post-retrofit kWh}$$

Where:

Design Capacity = Cooling Design Capacity, described in table above

Diversity Factor = Cooling Diversity Factor, described in table above

Degradation Factor = Degradation Factor, as described above

Exist. EER = Pre-Retrofit Cooling Efficiency base on existing product data shown in Attachment 5

Future EER = Post-Retrofit Cooling Efficiency base on verified product data

Cooling FLH = Cooling equivalent full load hours as described above

Refer to Attachment 5 for the detailed calculations.

JCI Responsibilities:

JCI will visually inspect and verify performance data of the installed equipment one-time during construction. The post-retrofit efficiencies for each unit will be verified by utilizing the manufacturer's nameplate data. The calculations will be updated based on post-retrofit efficiencies. Detailed calculations can be found in Attachment 5. JCI shall not be responsible for changes to installed equipment as they are turned over to the Customer, nor shall JCI be responsible for any loss of savings that occur due to customer-driven changes or customer's failure to maintain the new equipment.

Schedule 2

Annual M&V activities for this FIM will include checking and verifying proper operation of the chillers and their associated chilled water systems using instantaneous readings of component setpoints, commands, and values as well as short-term trending of the same and report these findings to the Customer.

Customer Responsibilities:

Customer assumes all operational and maintenance responsibilities for this FIM and is responsible for performing preventative maintenance on the equipment as per manufacturer's guidelines. In the event that the equipment fails or needs repairs, Customer is responsible for repairing/ replacing the equipment, either by use of its own maintenance staff or through a separate contract with either JCI or a third-party mechanical repair contractor. Customer is also responsible for ensuring all strategies and sequences established during the installation of this FIM remain in place. JCI is not responsible for the loss of savings resulting from customer-directed changes in schedules, system overrides, or lack of maintenance that adversely affect the performance of this FIM.

FIM-5: Water Cooled Chiller

The savings for this FIM will be verified using IPMVP Option A, Retrofit Isolation with Key Parameter Measurement, The savings for this FIM are generated through an increase in efficiencies of the new water cooled chillers as compared to the existing ones; therefore, the measurement boundary is surrounding the chillers themselves.

Key Parameter	Measurement Frequency	Measurement Description
Pre and Post Chiller Efficiency (kW/ton)	Pre-retrofit One-time; Post-Retrofit One-time	<p>The baseline efficiencies of each chiller are based on product data, observed conditions, and engineering judgment. This value was not measured due to the measurement cost associated with taking accurate field measurements, and its cost would not be feasible for the savings related to this FIM. Therefore, the pre-retrofit chiller efficiency was based on the kW/ton efficiency ratings of the existing equipment, de-rated based on the age of the existing equipment. The values are detailed in this calculation in Attachment 5 and are agreed to by the Customer and JCI for the term of the contract.</p> <p>The post-retrofit efficiencies for each chiller will be verified by utilizing the manufacturer’s kW/ton rating for each new chiller. The calculations will be updated based on post-retrofit chiller efficiency, which has been determined through manufacturer’s factory testing of the new equipment, prior to the new equipment being installed.</p> <p>JCI is not responsible for the loss of savings resulting from customer-directed changes in schedules, system overrides, or lack of maintenance.</p>

Estimated Parameters	Assumed Value	Justification, Source and Description
Design Capacity	See Attachment 5	Total cooling capacity, in tons, of each chiller is based on product data. The values are detailed in this calculation in Attachment 5 and are agreed to by the Customer and JCI for the term of the contract. These values will not be measured during the term of the contract.
Demand Diversity Factor	See Attachment 5	The demand diversity factor accounts for instantaneous loads being less than the peak capacity of the equipment. The diversity factor is based on engineering judgment and is used to ensure baseline demand is not greater than utility bills. These values are agreed to by the Customer and JCI and will not be measured.
Cooling Diversity Factor	See Attachment 5	The cooling diversity factor accounts for loads being less than the installed capacity on an annual basis. The diversity factor is based on engineering judgment and is used to ensure baseline energy is not greater than utility bills. These values vary by equipment type and facility. These values are agreed to by the Customer and JCI and will not be measured.
Degradation Factor	See Attachment 5	<p>The degradation factor for each unit is calculated using the methodology described in National Renewable Energy Laboratory (NREL) publication entitled <i>Building America Performance Analysis Procedures for Existing Homes</i> (BAPA). The methodology accounts for the age and general condition (maintenance factor) of the existing equipment and is calculated by the following equation:</p> $(1 - M)^{Age}$ <p>Where M is the maintenance factor and Age is the equipment age in years. The maintenance factor is defined as:</p> <ul style="list-style-type: none"> • 0.01 for “good” condition • 0.02 for “fair” condition • 0.03 for “poor” condition

Equations for Calculating Water Cooled Chiller Savings

Water cooled chiller savings were calculated using a spreadsheet model of the baseline and post-installation conditions. Savings were calculated based on the chiller size (cooling capacity in tons), chiller efficiency, and equipment run hours.

The run hours used for this FIM are the same as the pre-retrofit run hours used in FIM 7. The pre and post-run hours for this FIM are the same to ensure that the savings for this FIM are inclusive of only the efficiency improvements of the equipment.

Demand (kW)

$$\text{Pre-retrofit kW} = \text{Design Capacity} \times \text{Diversity Factor} \times \text{Exist. kW/ton} \times \text{Degradation Factor}$$

$$\text{Post-retrofit kW} = \text{Design Capacity} \times \text{Diversity Factor} \times \text{Future kW/ton}$$

$$\text{Total kW Saved} = \text{Pre-retrofit kW} - \text{Post-retrofit kW}$$

where:

$$\text{Design Capacity} = \text{Cooling Design Capacity, described in table above}$$

$$\text{Diversity Factor} = \text{Demand Diversity Factor, described in table above}$$

$$\text{Degradation Factor} = \text{Degradation Factor, as described above}$$

$$\text{Exist. kW/ton} = \text{Pre-Retrofit Cooling Efficiency base on existing product data shown in Attachment 5}$$

$$\text{Future kW/ton} = \text{Post-Retrofit Cooling Efficiency base on verified product data}$$

Energy (kWh)

$$\text{Pre-retrofit kWh} = \text{Design Capacity} \times \text{Diversity Factor} \times \text{Exist. kW/ton} \times \text{Degradation Factor} \times \text{Exiting Cooling FLH}$$

$$\text{Post-retrofit kWh} = \text{Design Capacity} \times \text{Diversity Factor} \times \text{Future kW/ton} \times \text{Exiting Cooling FLH}$$

$$\text{Total kWh Saved} = \text{Pre-retrofit kWh} - \text{Post-retrofit kWh}$$

where:

$$\text{Design Capacity} = \text{Cooling Design Capacity, described in table above}$$

$$\text{Diversity Factor} = \text{Cooling Diversity Factor, described in table above}$$

$$\text{Degradation Factor} = \text{Degradation Factor, as described above}$$

$$\text{Exist. kW/ton} = \text{Pre-Retrofit Cooling Efficiency base on existing product data shown in Attachment 5}$$

$$\text{Future kW/ton} = \text{Post-Retrofit Cooling Efficiency base on verified product data}$$

$$\text{Cooling FLH} = \text{Cooling equivalent full load hours as described above}$$

Refer to Attachment 5 for the detailed calculations.

JCI Responsibilities:

JCI will visually inspect and verify performance data of the installed equipment one-time during construction. The post-retrofit efficiencies for each unit will be verified by utilizing the manufacturer's nameplate data. The calculations will be updated based on post-retrofit efficiencies. Detailed calculations can be found in Attachment 5. JCI shall not be responsible for changes to installed equipment as they are turned over to the Customer, nor shall JCI be responsible for any loss of savings that occur due to customer-driven changes or customer's failure to maintain the new equipment.

Annual M&V activities for this FIM will include checking and verifying proper operation of the chillers and their associated chilled water systems using instantaneous readings of component setpoints, commands, and values as well as short-term trending of the same and report these findings to the Customer.

Customer Responsibilities:

Customer assumes all operational and maintenance responsibilities for this FIM and is responsible for performing preventative maintenance on the equipment as per manufacturer's guidelines. In the event that the equipment fails or needs repairs, Customer is responsible for repairing/ replacing the equipment, either by use of its own maintenance staff or through a separate contract with either JCI or a third-party mechanical repair contractor. Customer is also responsible for ensuring all strategies and sequences established during the installation of this FIM remain in place. JCI is not responsible for the loss of savings resulting from customer-directed changes in schedules, system overrides, or lack of maintenance that adversely affect the performance of this FIM.

FIM-7: BAS Upgrades

The electricity and natural gas savings for this FIM will be verified using IPMVP Option A, Retrofit Isolation with Key Parameter Measurement. The savings for this FIM are generated through a reduction in energy consumption at the HVAC system; therefore, the measurement boundary is the system itself.

Key Parameter	Measurement Frequency	Measurement Description
Pre and Post Unit Run Hours (as scheduled)	Pre-retrofit One-time; Post-Retrofit One-time Annual On-going	<p>The pre-retrofit run hours are based on staff interviews, site observations of existing thermostats' control, and an energy balance with the utility bills. The values are detailed in this calculation in Attachment 5 and are agreed to by the Customer and JCI for the term of the contract.</p> <p>The post-retrofit run hours are determined by conformance to the building occupancy schedules as shown in Schedule 2 - Section V. Individual total run hours for each building are shown in the calculation Attachment 5.</p> <p>Annually, JCI will verify the contractual schedules are still implemented and operating properly through instantaneous reviews and short-term trending of key parameters within the energy management system and instantaneous reviews of schedules and set points within stand alone thermostats. JCI will review and identify variances in the schedule in comparison with contractual agreements. The schedules are shown in Section V.</p> <p>As JCI works with the Customer's maintenance staff to reduce equipment run hours even further than the contract required limits, JCI will update the savings calculations for equipment scheduling based on actual schedules. JCI reserves the right to include additional savings as a result of any additional improvements implemented during the construction related to the control system; and the additional savings will be included as part of the final measured savings. However, JCI is not responsible for the loss of savings resulting from customer-directed changes in schedules, system overrides, or lack of maintenance that results in schedules run hours beyond contract-agreed upon values.</p>

Estimated Parameters	Assumed Value	Justification, Source and Description
Cooling Efficiency (EER)	See Attachment 5	The cooling efficiency will be set equal for the pre and post-retrofit conditions for this FIM and are equal to the Post-Retrofit EERs of FIMs 2, 3, and 4 for any units replaced under those FIMs. Efficiencies are based on manufacturer's data. These values are agreed to by the Customer and JCI and will not be measured.
Cooling Efficiency (kW/ton)	See Attachment 5	The cooling efficiency will be set equal for the pre and post-retrofit conditions for this FIM and are equal to the post-retrofit kW/ton of FIM 5 for the chillers replaced under that FIM. Efficiencies are based on manufacturer's data. These values are agreed to by the Customer and JCI and will not be measured.
Heating Efficiency	See Attachment 5	The heating efficiency will be set equal for the pre and post-retrofit conditions for this FIM and are based on manufacturer's data of existing equipment. These values are agreed to by the Customer and JCI and will not be measured.
Cooling Diversity Factor	See Attachment 5	The cooling diversity factor accounts for loads being less than the installed capacity on an annual basis. The diversity factor is based on engineering judgment and is used to ensure baseline energy is not greater than utility bills. These values vary by equipment type. These values are agreed to by the Customer and JCI and will not be measured.
Heat Diversity Factor	See Attachment 5	The heating diversity factor accounts for loads being less than the installed capacity on an annual basis. The diversity factor is based on engineering

Estimated Parameters	Assumed Value	Justification, Source and Description
		judgment and is used to ensure baseline energy is not greater than utility bills. These values vary by equipment type. These values are agreed to by the Customer and JCI and will not be measured.
Design Capacity	See Attachment 5	Total cooling capacity, in tons, or heating capacity, in kBtu/hr, of each unit is based on product data. The values are detailed in this calculation in Attachment 5 and are agreed to by the Customer and JCI for the term of the contract. These values will not be measured during the term of the contract.

Equations for Calculating Energy Savings:

BAS Upgrades savings were calculated using a spreadsheet model of the baseline and post-installation conditions. Savings were calculated based on the HVAC system size (cooling capacity in tons and heating capacity in kBtu/hr), system efficiency, and pre-/post-run hours.

The pre-retrofit run hours were determined through staff interviews, existing schedules, and existing thermostats. Using NREL TMY3 weather data for Fort Bend County, the existing operating hours were converted to equivalent FLH. A spreadsheet model (included in Attachment 5) was used to determine the post-retrofit loading, with the control strategies implemented as part of this FIM, based on-site surveys, calculated FLH, and engineering judgment. The table below shows the cooling and heating FLH used to determine savings for this FIM.

Location	Pre-Retrofit Cooling FLH	Post-Retrofit Cooling FLH	Pre-Retrofit Heating FLH	Post-Retrofit Heating FLH
911 Call Center	no setback	no setback	no setback	no setback
Admin Bldg - Drainage District	1,371	1,302	99	89
Bob Lutts Fulshear Library	2,910	1,281	389	67
East End Annex	1,964	1,302	149	89
Extension Office Bldg	2,176	1,510	240	117
Fort Bend County North Annex Bldg	2,176	1,510	240	117
George Memorial Library	2,075	1,847	163	120
Gus George Academy	2,176	1,510	240	117
Jane Long Building	2,533	1,769	241	123
Precinct 1 Building	1,371	1,302	99	89
Precinct 4 Building	2,176	1,510	240	117
Richmond Tax Office	2,176	1,510	240	117
Rosenberg Annex	2,176	1,510	240	117
Sugar Land Annex	2,176	1,510	240	117
Travis Building	2,176	1,510	240	117

Equations for Calculating BAS Upgrade Savings

Energy (kWh) where efficiency is defined as EER

Total kWh Saved = (12 / EER) x Design Capacity x Diversity Factor x (Pre-Retrofit Cooling FLH – Post-retrofit Cooling FLH)

Energy (kWh) where efficiency is defined as kW/ton

Total kWh Saved = kW/ton x Design Capacity x Diversity Factor x (Pre-Retrofit Cooling FLH – Post-retrofit Cooling FLH)

where:

Cooling Efficiency (EER) = Described in table above

Cooling Efficiency (kW/ton) = Described in table above

Diversity Factor = Cooling Diversity Factor described in table above

Design Capacity = Total cooling capacity in tons

Pre-Retrofit Cooling FLH = Pre-retrofit cooling equivalent full load hours calculated based on existing conditions (shown in the table above)

Post-Retrofit Cooling FLH = Post-retrofit cooling equivalent full load hours calculated based on verified conditions (shown in the table above)

Energy (Therms)

Total Therms Saved = Design Capacity x 0.01 x Diversity Factor x (Pre-Retrofit Heating FLH - post-retrofit Heating FLH) / (Heating Efficiency)

where:

Heating Efficiency = Described in table above

Diversity Factor = Heating Diversity Factor described in table above

Design Capacity = Total heating capacity in kBtu/hr

Pre-Retrofit Heating FLH = Pre-retrofit heating equivalent full load hours calculated based on existing conditions (shown in the table above)

Post-Retrofit Heating FLH = Post-retrofit heating equivalent full load hours calculated based on verified conditions (shown in the table above)

Refer to **Attachment 5** for the detailed calculations.

JCI Responsibilities:

Post-Installation M&V activities for this FIM will include a one-time verification of the contractual set points and schedules within the new control system through instantaneous observations of the control parameters. Contractual set points and schedules are detailed in Section V.

Once the schedules and setpoints are proven operational within the control system, the Customer will assume full responsibility for maintaining the systems and keeping schedules and set points within agreed upon contract parameters. JCI will update the savings calculations one-time, post-retrofit based on actual schedules. JCI reserves the right to include additional savings as a result of any additional improvements implemented during the construction related to the control system; and the additional savings will be included as part of the final measured savings. JCI will not be responsible for changes to set points or schedules that are customer-driven or are outside of the scope of work for this FIM.

Annual M&V activities for this FIM will include checking and verifying proper operation of control system using instantaneous readings of component setpoints, commands, and values as well as short-term trending of the same and report these findings to the Customer.

Customer Responsibilities:

The Customer assumes all operational and maintenance responsibilities for this FIM. They are responsible for ensuring all schedules and set points (per Schedule 2 Section V) established during the installation of this FIM remain in place. Customer understands it is their responsibility to operate under these parameters and maintain the system. JCI is not responsible for the loss of savings resulting from customer-directed changes in schedules, system overrides, or lack of maintenance that results in operation beyond the contract-agreed upon amounts.

FIM-9: Building Envelope

The savings for this FIM will be verified using IPMVP Option A, Retrofit Isolation with Key Parameter Measurement. The savings for this FIM are generated through a reduction in air leakage through the building envelope. Therefore, the measurement boundary is the building itself.

Key Parameter	Measurement Frequency	Measurement Description
Pre and Post Air Leakage Area	See Attachment 5	<p>The baseline area of air leakage was surveyed during the development of this FIM through the use of a thermal camera to detect air leakages through the perimeter of each facility.</p> <p>The post-retrofit area of air leakage will be verified by ensuring that each point of leakage, as described in Schedule 1, is addressed. The calculations will be updated based on post-retrofit area of air leakage.</p> <p>JCI is not responsible for the loss of savings resulting from customer-directed changes in building operations or lack of maintenance.</p>

Estimated Parameters	Assumed Value	Justification, Source and Description
Wind Speed	See Attachment 5	The wind speed is based on TMY3 weather data sourced from Fort Bend County, TX. It is agreed by both the Customer and JCI that this represents a typical hourly weather profile and will not be measured.
Outdoor Temperature	See Attachment 5	The hourly outdoor temperature is based on TMY3 weather data sourced from Fort Bend County, TX. It is agreed by both the Customer and JCI that this represents a typical hourly weather profile and will not be measured.
Indoor Temperature – Cooling Season	72°	The indoor temperature during the cooling season has been agreed to by the customer to be 72° degrees F. It is agreed by both the Customer and JCI that this temperature will be used by the building and will not be measured.
Indoor Temperature – Heating Season	68°	The indoor temperature during the heating season has been agreed to by the customer to be 68° degrees F. It is agreed by both the Customer and JCI that this temperature will be used by the building and will not be measured.
Heating System Efficiency	80%	The heating system efficiency is based on manufacturer’s data. It is agreed by both the Customer and JCI that the efficiency is 80% and will not be measured.
Cooling System Efficiency	See Attachment 5	The cooling system efficiencies are based on manufacturer’s data. The cooling efficiency is based on the post-installation conditions of FIMs 2 and 3. It is agreed by both the Customer and JCI that these are the efficiencies that will be used and will not be measured.

Equations for Calculating Energy Savings:

$$\text{Pre-retrofit Airflow Leakage} = Q_{pre} = A_{pre} \times \sqrt{(C_s \times \Delta T + C_w \times U^2)}$$

$$\text{Post-retrofit Airflow Leakage} = Q_{post} = A_{post} \times \sqrt{(C_s \times \Delta T + C_w \times U^2)}$$

$$\text{Energy change per hour} = q = 1.08 \times (Q_{pre} - Q_{post}) \times \Delta T$$

$$\text{Hourly cooling energy reduction} = kW = q \times \text{Cooling Efficiency} / 12,000$$

$$\text{Hourly heating energy reduction} = Btu = q / \text{Heating Efficiency}$$

Energy (kWh)

Total kWh Saved = \sum Hourly kW reductions

Energy (Therms)

Total Therms Saved = \sum Hourly btu reductions / 100,000

where:

A = Square feet of area

Cs = Stack Coefficient, as defined by ASHRAE below

Cw = Wind Coefficient, as defined by ASHRAE below

U = Wind Speed

ΔT = Temperature difference in degree F between indoor and outdoor air temperatures

ASHRAE Fundamentals 16.23, Table 4 Basic Model Stack Coefficient Cs:

Story	Stack Coefficient Cs
1	0.01500
2	0.02990
3	0.04490
4	0.06283
5	0.07858
6	0.09433
7	0.11008
8	0.12583
9	0.14158
10	0.15733

ASHRAE Fundamentals 16.23, Table 5 Local Shelter Class:

Shelter Class	Description
1	No Obstructions or local shielding
2	Typical shelter for an isolated rural house
3	Typical shelter used by other buildings across the street from building under study
4	Typical shelter for urban buildings on larger lots where sheltering obstacles are more than one building height away
5	Typical shelter produced by building or other structures immediately adjacent

ASHRAE Fundamentals 16.23, Table 6 Basic Model Wind Coefficient C_w :

Number of Stories	Shelter Class 1	Shelter Class 2	Shelter Class 3	Shelter Class 4	Shelter Class 5
1	0.0119	0.0092	0.0065	0.0039	0.0012
2	0.0157	0.0121	0.0086	0.0051	0.0016
3	0.0184	0.0143	0.0101	0.0060	0.0018
4	0.0218	0.0170	0.0120	0.0071	0.0021
5	0.0251	0.0195	0.0138	0.0082	0.0024
6	0.0283	0.0221	0.0156	0.0092	0.0027
7	0.0316	0.0246	0.0174	0.0103	0.0030
8	0.0348	0.0272	0.0192	0.0113	0.0033
9	0.0381	0.0297	0.0210	0.0124	0.0036
10	0.0413	0.0323	0.0228	0.0134	0.0039

Refer to **Attachment 5** for the detailed calculations.

JCI Responsibilities:

JCI will visually inspect and verify installed improvements one-time during construction. The post-retrofit area of air leakage will be determined based on the survey of installed improvements. The calculations will be updated based on post-retrofit area of air leakage. Detailed calculations can be found in **Attachment 5**. JCI shall not be responsible for changes to installed improvements as they are turned over to the Customer, nor shall JCI be responsible for any loss of savings that occur due to customer-driven changes or customer's failure to maintain the new improvements.

There will be no annual M&V activates conducted for this FIM. The verified post-retrofit savings will serve as annual verified savings for this FIM and will be subjected to the applicable year's utility rates.

Customer Responsibilities:

The Customer s all operational and maintenance responsibilities for this FIM. They are responsible for ensuring all schedules and set points (per Schedule 2 Section V) established during the installation of this FIM remain in place. Customer understands it is their responsibility to operate under these parameters and maintain the system. JCI is not responsible for the loss of savings resulting from customer-directed changes in schedules, system overrides, or lack of maintenance that results in operation beyond the contract-agreed upon amounts.

**CHANGES IN USE OR CONDITION; ADJUSTMENT TO BASELINE
AND/OR ANNUAL PROJECT BENEFITS**

Customer agrees to notify JCI, within fourteen (14) days, of (i) any actual or intended change, whether before or during the Guarantee Term, in the use of any facility, equipment, or Improvement Measure to which this Schedule applies; (ii) any proposed or actual expansions or additions to the premises or any building or facility at the premises; (iii) a change to utility services to all or any portion of the premises; or (iv) any other change or condition arising before or during the Guarantee Term that reasonably could be expected to change the amount of Project Benefits realized under this Agreement.

Such a change, expansion, addition, or condition would include, but is not limited to: (a) changes in the primary use of any facility, Improvement Measure, or portion of the premises; (b) changes to the hours of operation of any facility, Improvement Measure, or portion of the premises; (c) changes or modifications to the Improvement Measures or any related equipment; (d) changes to the M&V Services provided under this Agreement; (e) failure of any portion of the premises to meet building codes; (f) changes in utility suppliers, utility rates, method of utility billing, or method of utility purchasing; (g) insufficient or improper maintenance or unsound usage of the Improvement Measures or any related equipment at any facility or portion of the premises (other than by JCI); (h) changes to the Improvement Measures or any related equipment or to any facility or portion of the premises required by building codes or any governmental or quasi-governmental entity; or (i) additions or deletions of Improvement Measures or any related equipment at any facility or portion of the premises.

Such a change or condition need not be identified in the baseline in order to permit JCI to make an adjustment to the baseline and/or the Annual Project Benefits. If JCI does not receive the notice within the time period specified above or travels to either Customer's location or the project site to determine the nature and scope of such changes, Customer agrees to pay JCI, in addition to any other amounts due under this Agreement, the applicable hourly consulting rate for the time it took to determine the changes and to make any adjustments and/or corrections to the project as a result of the changes, plus all reasonable and documented out of pocket expenses, including travel costs. Upon receipt of such notice, or if JCI independently learns of any such change or condition, JCI shall calculate and send to Customer a notice of adjustment to the baseline and/or Annual Project Benefits to reflect the impact of such change or condition, and the adjustment shall become effective as of the date the change or condition first arose. Should Customer fail to promptly provide JCI with notice of any such change or condition, JCI may make reasonable estimates as to the impact of such change or condition and as to the date on which such change or condition first arose in calculating the impact of such change or condition, and such estimates shall be conclusive.

IV. BASELINE CALCULATIONS AND UTILITY RATES

The unit utility costs for the baseline period are set forth below as “baseline” rate for each type of utility and shall be used for all calculations made under this Schedule. The Base Utility Cost for each type of utility represents the 16 month average utility costs from February 2019 through July 2020.

Fort Bend County has a fixed electrical consumption rate (\$/ kWh) rate through Performance Year 11 of this Contract. During this period, the cost per kWh will remain constant every year. Starting in Performance Year 12, when the current kWh rate contract expires, the kWh rate is expected to increase to the “market rate”, which is the current rate following the historical 3.0% annual escalation each year. The Year 12 kWh rate represents what the current rate would be in Year 12 if it were escalated 3% each Performance Year.

The demand rates (\$/ kW) and natural gas rates (\$/ therm) will escalate annually by 3.0%, based on historical escalations.

The tables below lay out the annual rates for each utility type by facility that will be used for each year’s annual savings calculations. Given that the kWh rate is not linear, it is easier to show each year’s rates to ensure that the proper rates are being applied each Performance Year. The kWh rate shown below applies to each facility included in this project. Additionally, natural gas rates are only depicted for facilities with gas heating.

Electrical Consumption Rates (\$/kWh)

Facility	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
All Facilities	\$0.03900	\$0.03900	\$0.03900	\$0.03900	\$0.03900	\$0.03900	\$0.03900

Facility	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
All Facilities	\$0.03900	\$0.03900	\$0.03900	\$0.03900	\$0.03900	\$0.05577	\$0.05744

Facility	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
All Facilities	\$0.05917	\$0.06094	\$0.06277	\$0.06465	\$0.06659	\$0.06859	\$0.07065

Electrical Demand Rates (\$/kW)

Facility	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
911 Call Center	\$8.0300	\$8.2709	\$8.5190	\$8.7746	\$9.0378	\$9.3090	\$9.5882
Admin Bldg - Drainage District	\$7.2600	\$7.4778	\$7.7021	\$7.9332	\$8.1712	\$8.4163	\$8.6688
Bob Lutts Fulshear Library	\$7.4700	\$7.6941	\$7.9249	\$8.1627	\$8.4076	\$8.6598	\$8.9196
East End Annex	\$7.6300	\$7.8589	\$8.0947	\$8.3375	\$8.5876	\$8.8453	\$9.1106
Extension Office Bldg	\$7.4000	\$7.6220	\$7.8507	\$8.0862	\$8.3288	\$8.5786	\$8.8360
Fort Bend County North Annex Bldg	\$7.8000	\$8.0340	\$8.2750	\$8.5233	\$8.7790	\$9.0423	\$9.3136
George Memorial Library	\$7.8500	\$8.0855	\$8.3281	\$8.5779	\$8.8352	\$9.1003	\$9.3733
Gus George Academy	\$7.4200	\$7.6426	\$7.8719	\$8.1080	\$8.3513	\$8.6018	\$8.8599
Jane Long Building	\$7.7800	\$8.0134	\$8.2538	\$8.5014	\$8.7565	\$9.0192	\$9.2897
Precinct 1 Building	\$7.5000	\$7.7250	\$7.9568	\$8.1955	\$8.4413	\$8.6946	\$8.9554
Precinct 4 Building	\$7.7700	\$8.0031	\$8.2432	\$8.4905	\$8.7452	\$9.0076	\$9.2778

Schedule 2

Facility	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Richmond Tax Office	\$7.5500	\$7.7765	\$8.0098	\$8.2501	\$8.4976	\$8.7525	\$9.0151
Rosenberg Annex	\$7.9600	\$8.1988	\$8.4448	\$8.6981	\$8.9591	\$9.2278	\$9.5047
Sugar Land Annex	\$7.7500	\$7.9825	\$8.2220	\$8.4686	\$8.7227	\$8.9844	\$9.2539
Travis Building	\$8.0300	\$8.2709	\$8.5190	\$8.7746	\$9.0378	\$9.3090	\$9.5882

Facility	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
911 Call Center	\$9.8759	\$10.1722	\$10.4773	\$10.7916	\$11.1154	\$11.4489	\$11.7923
Admin Bldg - Drainage District	\$8.9289	\$9.1968	\$9.4727	\$9.7568	\$10.0495	\$10.3510	\$10.6616
Bob Lutts Fulshear Library	\$9.1872	\$9.4628	\$9.7467	\$10.0391	\$10.3402	\$10.6504	\$10.9699
East End Annex	\$9.3839	\$9.6655	\$9.9554	\$10.2541	\$10.5617	\$10.8786	\$11.2049
Extension Office Bldg	\$9.1011	\$9.3741	\$9.6553	\$9.9450	\$10.2433	\$10.5506	\$10.8671
Fort Bend County North Annex Bldg	\$9.5930	\$9.8808	\$10.1772	\$10.4825	\$10.7970	\$11.1209	\$11.4546
George Memorial Library	\$9.6545	\$9.9441	\$10.2425	\$10.5497	\$10.8662	\$11.1922	\$11.5280
Gus George Academy	\$9.1257	\$9.3994	\$9.6814	\$9.9719	\$10.2710	\$10.5791	\$10.8965
Jane Long Building	\$9.5684	\$9.8555	\$10.1511	\$10.4557	\$10.7693	\$11.0924	\$11.4252
Precinct 1 Building	\$9.2241	\$9.5008	\$9.7858	\$10.0794	\$10.3818	\$10.6932	\$11.0140
Precinct 4 Building	\$9.5561	\$9.8428	\$10.1381	\$10.4422	\$10.7555	\$11.0782	\$11.4105
Richmond Tax Office	\$9.2855	\$9.5641	\$9.8510	\$10.1466	\$10.4510	\$10.7645	\$11.0874
Rosenberg Annex	\$9.7898	\$10.0835	\$10.3860	\$10.6976	\$11.0185	\$11.3491	\$11.6895
Sugar Land Annex	\$9.5315	\$9.8175	\$10.1120	\$10.4154	\$10.7278	\$11.0496	\$11.3811
Travis Building	\$9.8759	\$10.1722	\$10.4773	\$10.7916	\$11.1154	\$11.4489	\$11.7923

Facility	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
911 Call Center	\$12.1461	\$12.5105	\$12.8858	\$13.2724	\$13.6705	\$14.0807	\$14.5031
Admin Bldg - Drainage District	\$10.9814	\$11.3108	\$11.6502	\$11.9997	\$12.3597	\$12.7305	\$13.1124
Bob Lutts Fulshear Library	\$11.2990	\$11.6380	\$11.9872	\$12.3468	\$12.7172	\$13.0987	\$13.4917
East End Annex	\$11.5411	\$11.8873	\$12.2439	\$12.6112	\$12.9896	\$13.3793	\$13.7806
Extension Office Bldg	\$11.1932	\$11.5290	\$11.8748	\$12.2311	\$12.5980	\$12.9759	\$13.3652
Fort Bend County North Annex Bldg	\$11.7982	\$12.1521	\$12.5167	\$12.8922	\$13.2790	\$13.6773	\$14.0877
George Memorial Library	\$11.8738	\$12.2300	\$12.5969	\$12.9749	\$13.3641	\$13.7650	\$14.1780
Gus George Academy	\$11.2234	\$11.5601	\$11.9069	\$12.2641	\$12.6321	\$13.0110	\$13.4013
Jane Long Building	\$11.7679	\$12.1210	\$12.4846	\$12.8592	\$13.2449	\$13.6423	\$14.0515
Precinct 1 Building	\$11.3444	\$11.6848	\$12.0353	\$12.3964	\$12.7682	\$13.1513	\$13.5458
Precinct 4 Building	\$11.7528	\$12.1054	\$12.4686	\$12.8426	\$13.2279	\$13.6247	\$14.0335
Richmond Tax Office	\$11.4201	\$11.7627	\$12.1155	\$12.4790	\$12.8534	\$13.2390	\$13.6361

Schedule 2

Facility	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Rosenberg Annex	\$12.0402	\$12.4014	\$12.7735	\$13.1567	\$13.5514	\$13.9579	\$14.3766
Sugar Land Annex	\$11.7226	\$12.0742	\$12.4365	\$12.8096	\$13.1939	\$13.5897	\$13.9974
Travis Building	\$12.1461	\$12.5105	\$12.8858	\$13.2724	\$13.6705	\$14.0807	\$14.5031

Natural Gas Rates (\$/therm)

Facility	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
George Memorial Library	\$0.5500	\$0.5665	\$0.5835	\$0.6010	\$0.6190	\$0.6376	\$0.6567
Precinct 4 Building	\$0.5500	\$0.5665	\$0.5835	\$0.6010	\$0.6190	\$0.6376	\$0.6567

Facility	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
George Memorial Library	\$0.6764	\$0.6967	\$0.7176	\$0.7392	\$0.7613	\$0.7842	\$0.8077
Precinct 4 Building	\$0.6764	\$0.6967	\$0.7176	\$0.7392	\$0.7613	\$0.7842	\$0.8077

Facility	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
George Memorial Library	\$0.8319	\$0.8569	\$0.8826	\$0.9091	\$0.9363	\$0.9644	\$0.9934
Precinct 4 Building	\$0.8319	\$0.8569	\$0.8826	\$0.9091	\$0.9363	\$0.9644	\$0.9934

V. PRIMARY OPERATIONS SCHEDULE PRE & POST-RETROFIT

Pre-Retrofit HVAC Occupied Hours

Building	Mon	Tue	Wed	Thu	Fri	Sat	Sun
911 Call Center	24 hrs	24 hrs	24 hrs	24 hrs	24 hrs	24 hrs	24 hrs
Admin Bldg - Drainage District	7 AM – 6 PM	7 AM – 6 PM	7 AM – 6 PM	7 AM – 6 PM	7 AM – 6 PM	Off	Off
Bob Lutts Fulshear Library	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
East End Annex	7 AM – 7 PM	7 AM – 7 PM	7 AM – 7 PM	7 AM – 7 PM	7 AM – 7 PM	7 AM – 7 PM	7 AM – 7 PM
Extension Office Bldg	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM
Fort Bend County North Annex Bldg	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM
George Memorial Library	7 AM – 9 PM	7 AM – 9 PM	7 AM – 9 PM	7 AM – 9 PM	7 AM – 9 PM	7 AM – 6 PM	7 AM – 6 PM
Gus George Academy	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM
Jane Long Building	6 AM - Midnight	6 AM - Midnight	6 AM - Midnight	6 AM - Midnight	6 AM - Midnight	6 AM - Midnight	6 AM - Midnight
Precinct 1 Building	7 AM – 6 PM	7 AM – 6 PM	7 AM – 6 PM	7 AM – 6 PM	7 AM – 6 PM	Off	Off
Precinct 4 Building	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM
Richmond Tax Office	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM
Rosenberg Annex	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM
Sugar Land Annex	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM
Travis Building	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM	4 AM – 8 PM

Schedule 2

Post-Retrofit HVAC Occupied Hours*

Building	Mon	Tue	Wed	Thu	Fri	Sat	Sun
911 Call Center	24 hrs	24 hrs	24 hrs	24 hrs	24 hrs	24 hrs	24 hrs
Admin Bldg - Drainage District	7 AM – 5 PM	7 AM – 5 PM	7 AM – 5 PM	7 AM – 5 PM	7 AM – 5 PM	Setback	Setback
Bob Lutts Fulshear Library	11 AM – 8 PM	9 AM – 6 PM	9 AM – 6 PM	9 AM – 8 PM	12 AM – 5 PM	8 AM – 1 PM	Setback
East End Annex	7 AM – 5 PM	7 AM – 5 PM	7 AM – 5 PM	7 AM – 5 PM	7 AM – 5 PM	Setback	Setback
Extension Office Bldg	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	Setback	Setback
Fort Bend County North Annex Bldg	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	Setback	Setback
George Memorial Library	8 AM – 9 PM	8 AM – 9 PM	8 AM – 9 PM	8 AM – 9 PM	8 AM – 7 PM	8 AM – 5 PM	Noon – 5 pm
Gus George Academy	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	Setback	Setback
Jane Long Building	7 AM – 5 PM	7 AM – 5 PM	7 AM – 5 PM	7 AM – 5 PM	7 AM – 5 PM	7 AM – 5 PM	7 AM – 5 PM
Precinct 1 Building	7 AM – 5 PM	7 AM – 5 PM	7 AM – 5 PM	7 AM – 5 PM	7 AM – 5 PM	Setback	Setback
Precinct 4 Building	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	Setback	Setback
Richmond Tax Office	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	Setback	Setback
Rosenberg Annex	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	Setback	Setback
Sugar Land Annex	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	Setback	Setback
Travis Building	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	7 AM – 8 PM	Setback	Setback

Note *: “Setback” refers to the “unoccupied mode” for each building whereby the units will cycle on, if necessary, to maintain the unoccupied temperature limits listed below, but will not otherwise provide conditioned air, unless overridden by the end-user.

HVAC Operations Temperatures

Heating Season

Occupied Room Temperature: 68 degrees F or less

Unoccupied Room Low Temperature Limit: 60 degrees F or less

Cooling Season

Occupied Room Temperature: 72 degrees F or greater

Unoccupied Room High Temperature Limit: 80 degrees F or greater

VI. MEASUREMENT & VERIFICATION SERVICES

JCI will provide the M&V Services set forth below in connection with the Assured Performance Guarantee.

1. During the installation period, a JCI Performance Assurance Specialist will track Measured Project Benefits. JCI will report the Measured Project Benefits achieved during the installation period, as well as any Non-Measured Project Benefits applicable to the installation period, to Customer within 60 days of the commencement of the Guarantee Term.
2. Within 60 days of each anniversary of the commencement of the Guarantee Term, JCI will provide Customer with an annual report containing:
 - A. an executive overview of the project's performance and Project Benefits achieved to date;
 - B. a summary analysis of the Measured Project Benefits accounting; and
 - C. depending on the M&V Option, a detailed analysis of the Measured Project Benefits calculations.
3. During the Guarantee Term, a JCI Performance Assurance Specialist will monitor the on-going performance of the Improvement Measures, as specified in this Agreement, to determine whether anticipated Measured Project Benefits are being achieved. In this regard, the Performance Assurance Specialist will periodically assist Customer, on-site or remotely, with respect to the following activities:
 - A. review of information furnished by Customer from the facility management system to confirm that control strategies are in place and functioning;
 - B. advise Customer's designated personnel of any performance deficiencies based on such information;
 - C. coordinate with Customer's designated personnel to address any performance deficiencies that affect the realization of Measured Project Benefits; and
 - D. inform Customer of opportunities to further enhance project performance and of opportunities for the implementation of additional Improvement Measures.
4. For specified Improvement Measures utilizing an "Option A" M&V protocol, JCI will:
 - A. conduct pre and post-installation measurements required under this Agreement;
 - B. confirm the building management system employs the control strategies and set points specified in this Agreement; and
 - C. analyze actual as-built information and adjust the baseline and/or Measured Project Benefits to conform to actual installation conditions (e.g., final lighting and water benefits calculations will be determined from the as-built information to reflect the actual mix of retrofits encountered during installation).
 - D. confirm that the appropriate metering and data points required to track the variables associated with the applicable Improvement Measures' benefits calculation formulas are established; and
 - E. set up appropriate data capture systems (e.g., trend and totalization data on the facility management system) necessary to track and report Measured Project Benefits for the applicable Improvement Measure.
 - F. Trend data records maintained in the ordinary course of system operation shall be used and relied upon by Johnson Controls in connection with Project Benefit calculations. Johnson Controls will use commercially reasonable efforts to ensure the integrity of the data collected to calculate the required metrics. In the event data are lost due to equipment failure, power failure or other interruption in data collection, transmission or storage, Johnson Controls will use reasonable engineering methods to estimate the impact of or replace the lost data.

CUSTOMER RESPONSIBILITIES

In order for JCI to perform its obligations under this Agreement with respect to the Work, the Assured Performance Guarantee, and the M&V Services, Customer shall be responsible for:

1. Providing JCI, its subcontractors, and its agents reasonable and safe access to all facilities and properties that are subject to the Work and/or M&V Services;
2. Providing for shut down and scheduling of affected locations during installation, including timely shutdowns of chilled water and hot water systems as needed to accomplish the Work and/or M&V Services;
3. Providing timely reviews and approvals of design submissions, proposed change orders, and other project documents;
4. Providing the following information with respect to the project and project site as soon as practicable following JCI's request:
 - a) surveys describing the property, boundaries, topography and reference points for use during construction, including existing service and utility lines;
 - b) geotechnical studies describing subsurface conditions, and other surveys describing other latent or concealed physical conditions at the project site;
 - c) temporary and permanent easements, zoning and other requirements and encumbrances affecting land use, or necessary to permit the proper design and construction of the project and enable JCI to perform the Work;
 - d) a legal description of the project site;
 - e) as-built and record drawings of any existing structures at the project site; and
 - f) environmental studies, reports and impact statement describing the environmental conditions, including hazardous conditions or materials, in existence at the project site.
5. Securing and executing all necessary agreements with adjacent land or property owners that are necessary to enable JCI to perform the Work;
6. Providing assistance to JCI in obtaining any permits, approvals, and licenses that are JCI's responsibility to obtain as set forth in Schedule 1;
7. Obtaining any permits, approvals, and licenses that are necessary for the performance of the Work and are not JCI's responsibility to obtain as set forth in Schedule 1;
8. Properly maintaining, and performing appropriate preventative maintenance on, all equipment and building systems affecting the Assured Performance Guarantee in accordance with manufacturers' standards and specifications;
9. Providing the utility bills, reports, and similar information reasonably necessary for administering JCI's obligations under the Assured Performance Guarantee within five (5) days of Customer receipt and/or generation or JCI's request therefor;
10. Providing all records relating to energy and/or water usage and related maintenance of the premises and relevant equipment requested by JCI;
11. Providing and installing utility sub-meters on all new construction and/or additions built during the Guarantee Term as recommended by JCI or, alternatively, paying JCI's applicable fees for calculating necessary adjustments to the Assured Performance Guarantee as a result of the new construction;
12. Providing and maintaining a dedicated telephone line and/or TCP/IP remote connection to facilitate remote monitoring of relevant equipment;

Schedule 3

13. Promptly notifying JCI of any change in use or condition described in Section III of Schedule 2 or any other matter that may impact the Assured Performance Guarantee;
14. Taking all actions reasonably necessary to achieve the Non-Measured Project Benefits;
15. If any equipment under control is changed out, it is the customer's responsibility to move the controls and the control programming to the new equipment.
16. Coordinate required laydown areas, trailer locations, and other required project management spaces with JCI.
17. Approve annual M&V report within 60 days of report delivery.
18. Customer shall provide escorts where required for secured areas at no additional cost.

PRICE AND PAYMENT TERMS

Customer shall make payments to JCI pursuant to this Schedule 4.

1. Work. The price to be paid by Customer for the Work shall be twelve million, nine hundred nineteen, seven hundred ninety-nine dollars (**\$12,919,799**)

Payment from Customer to JCI shall include a thirty percent (30%) mobilization down payment billed and due upon Customers Notice to Proceed and Project Funding. Additional payments shall be made by Customer through the Construction Period as billed by JCI. JCI shall bill Customer for the purchase of equipment as equipment arrives, as well as monthly for percentage of work completed. Customer agrees to pay JCI within thirty (30) days from receipt of JCI invoice.

2. Allowance. The [**\$12,919,799**] includes an allocation of funds for the renovation of the Fire Alarm System as provided below (the "Allowance"). JCI and Customer have worked together to review the Fire Alarm scope and Allowance values based on design information then available to determine that the amount of the Allowance constitutes a reasonable estimate for the Allowance items. Nothing herein is intended in any way to constitute a guarantee by JCI that the Fire Alarm work in question can be designed and performed for the amount of the Allowance.

After contract execution, but prior to commencement of any Fire Alarm work, the Parties will cooperate in finalizing the scope and pricing of the Fire Alarm work. If the final price for the Fire Alarm work is more than or less than the stated Allowance value, the [**\$12,919,799**] shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect the difference between the final agreed upon pricing for the Fire Alarm work and the value of the Allowance.

Fort Bend County Jail

Fire Alarm System (FIM 11) [Total Allowance] **\$2,000,000**

3. M&V Services. The total price for JCI's M&V Services, as detailed on Schedule 2 of this Agreement, is \$316,143. This amount will be paid to JCI in Quarterly installments as shown in the table below. These payments will be due and payable when Customer receives JCI's invoice and in advance of the services JCI is to provide, and shall be made throughout the Guarantee Term.

Performance Year	Annual Payment	Quarterly Payment
Year 1	\$39,355	\$9,838.75
Year 2	\$11,020	\$2,755.00
Year 3	\$11,351	\$2,837.75
Year 4	\$11,691	\$2,922.75
Year 5	\$12,042	\$3,010.50
Year 6	\$12,403	\$3,100.75
Year 7	\$12,775	\$3,193.75
Year 8	\$13,158	\$3,289.50
Year 9	\$13,553	\$3,388.25
Year 10	\$13,960	\$3,490.00
Year 11	\$14,379	\$3,594.75

Schedule 4

Performance Year	Annual Payment	Quarterly Payment
Year 12	\$14,810	\$3,702.50
Year 13	\$15,254	\$3,813.50
Year 14	\$15,712	\$3,928.00
Year 15	\$16,183	\$4,045.75
Year 16	\$16,669	\$4,167.25
Year 17	\$17,169	\$4,292.25
Year 18	\$17,684	\$4,421.00
Year 19	\$18,214	\$4,553.50
Year 20	\$18,761	\$4,690.25
Total	\$316,145	

4. Sourcewell Contract # 030817-JHN

NOTICE TO PROCEED

Johnson Controls, Inc.
8323 N. Eldridge Pkwy. Houston, TX 77041
ATTN: Justin Surratt

Re: Notice to Proceed for County of Fort Bend TX – PI

Dear Justin Surratt:

This Notice to Proceed is being issued by _____ (“Customer”) to Johnson Controls, Inc. (“JCI”) pursuant to that certain Performance Contract entered into between Customer and JCI for the purpose of notifying JCI to commence work under such contract.

In the event that this Notice to Proceed is delivered by Customer prior to the execution of the Performance Contract by Customer and JCI, Customer understands and expects JCI will incur significant costs and expenses in complying with this Notice to Proceed. In the event the Performance Contract is not executed by the parties, for any reason, Customer agrees to pay JCI for its costs and fees incurred in complying with this Notice to Proceed on a time and material basis. Customer also agrees JCI shall be entitled to a reasonable mark-up thereon for profit and overhead. Customer agrees to pay amounts billed by JCI no later than five (5) days after Customer receives JCI’s payment application. JCI will continue to submit payment applications to Customer until the Performance Contract is executed. Once the Performance Contract is executed, JCI will begin submitting its payment applications to Customer in accordance with the terms and conditions set forth therein. Any amounts already paid by Customer will be credited towards the Performance Contract price.

By signing and dating this Notice to Proceed, the parties hereto agree to these terms and represent and warrant they have the authority to execute this Notice to Proceed on behalf of their respective organizations.

County of Fort Bend

Signature: _____

Printed Name: _____

Title: _____

Date: _____

**ACKNOWLEDGED & AGREED TO:
JOHNSON CONTROLS, INC.**

Signature: Justin R Surratt

Printed Name: Justin Reid Surratt

Title: Area General Manager, South

Date: October 23, 2020

CHANGE ORDER

Performance Contract dated , 20 between Johnson Controls, Inc. and Customer	Change Order No.	Date (mo/day/yr)
Customer County of Fort Bend		
The above referenced Performance Contract is hereby modified to the extent described below in accordance with the Terms and Conditions of the CHANGE ORDERS section thereof.		
Scope of Work changed as follows:		
Total amount of this Change Order	\$	
Total Performance Contract amount as revised by this Change Order	\$	
The time for completion is: <input type="checkbox"/> increased, <input type="checkbox"/> decreased, <input type="checkbox"/> unchanged. The new completion date resulting from this Change Order is:	(mo, day, yr)	
[check if applicable] Assured Performance Guarantee changed as follows:		
Unless specifically changed by this Change Order, all terms, conditions and provisions of the above referenced Performance Contract remain unchanged and in full effect.		
JOHNSON CONTROLS, INC.	CUSTOMER	
Signature:	Signature:	
Printed Name:	Printed Name:	
Title:	Title:	

CERTIFICATE OF SUBSTANTIAL COMPLETION

PARTIES: JOHNSON CONTROLS, INC. ("JCI")
8323 N. Eldridge Pkwy. Houston, TX 77041

County of Fort Bend ("Customer")
301 Jackson Street, Suite 301, Richmond, TX 77469.

PROJECT: Fort Bend County PC; Performance Contract dated _____, 20__ between JCI and Customer

By executing this Certificate of Substantial Completion, Customer acknowledges the following:

- a. The work set forth in the Performance Contract is substantially complete.
- b. Customer has received the manuals, warranty information, and training required under the Performance Contract.
- c. The following punch list items must be completed by JCI (check as applicable):
 - punch list attached
 - punch list complete
- d. Upon completion of the punch list items, or if such punch list items are complete, JCI and Customer shall sign the Certificate of Final Completion attached hereto.

Dated _____, 20__.

CUSTOMER:

JOHNSON CONTROLS, INC.

Signature: _____

Signature: _____

Printed Name: _____

Printed Name: _____

Title: _____

Title: _____

CERTIFICATE OF FINAL COMPLETION

PARTIES: JOHNSON CONTROLS, INC. ("JCI")
8323 N. Eldridge Pkwy. Houston, TX 77041

County of Fort Bend ("Customer")
301 Jackson Street, Suite 301, Richmond, TX 77469.

PROJECT: Fort Bend County PC; Performance Contract dated [REDACTED], 20 [REDACTED] between JCI and Customer

By executing this Certificate of Final Completion, Customer acknowledges the following:

- a. The work set forth in the Performance Contract has been reviewed and determined by Customer to be fully complete.
- b. Customer accepts the work as complete and hereby releases JCI's obligations under any performance and payment bonds posted for the project as of the date set forth below.

Dated [REDACTED], 20 [REDACTED].

CUSTOMER:

JOHNSON CONTROLS, INC.

Signature: _____

Signature: _____

Printed Name: _____

Printed Name: _____

Title: _____

Title: _____

CERTIFICATE OF INTERESTED PARTIES

FORM 1295

1 of 1

Complete Nos. 1 - 4 and 6 if there are interested parties.
Complete Nos. 1, 2, 3, 5, and 6 if there are no interested parties.

**OFFICE USE ONLY
CERTIFICATION OF FILING**

Certificate Number:
2020-682268

Date Filed:
10/23/2020

Date Acknowledged:
10/30/2020

1 Name of business entity filing form, and the city, state and country of the business entity's place of business.
Johnson Controls
Houston, TX United States

2 Name of governmental entity or state agency that is a party to the contract for which the form is being filed.
Fort Bend County

3 Provide the identification number used by the governmental entity or state agency to track or identify the contract, and provide a description of the services, goods, or other property to be provided under the contract.
030817
Energy and Facilities Services

4	Name of Interested Party	City, State, Country (place of business)	Nature of interest (check applicable)	
			Controlling	Intermediary

5 Check only if there is NO Interested Party.

6 UNSWORN DECLARATION

My name is _____, and my date of birth is _____.

My address is _____, _____, _____, _____, _____.
(street) (city) (state) (zip code) (country)

I declare under penalty of perjury that the foregoing is true and correct.

Executed in _____ County, State of _____, on the _____ day of _____, 20____.
(month) (year)

Signature of authorized agent of contracting business entity
(Declarant)