
**CTS
AGREEMENT**

CUSTOMER NAME:
DATE OF SUBMISSION:

City of Ballwin, MO
October 31, 2013

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Note Regarding Modifications Made to this Agreement: Provisions in the printed document that are not to be included in the agreement may be deleted by striking through the word, sentence or paragraph to be omitted. It is recommended that unwanted provisions not be made illegible. The parties should be clearly aware of the material deleted from the standard form. **Do not make any modifications to this Agreement unless approval to do so has been granted. Changes may be made only by deletion as explained above, or, by addendum.**

ARTICLE 1

GENERAL PROVISIONS

1.1 This Agreement, including all Attachments, Exhibits, and Schedules referenced herein (hereinafter the "Agreement") dated (the "Effective Date") by and between Control Technology & Solutions ("CTS"), a Missouri Corporation, with a principal place of business at 15933 Clayton Rd., Suite 110, Ellisville, MO 63011, and City of Ballwin ("CUSTOMER") with a principal place of business at 14811 Manchester Road, Ballwin, MO 63011

(collectively the "Parties").

1.2 **EXTENT OF AGREEMENT:** This Agreement, including all attachments and exhibits hereto, represents the entire agreement between CUSTOMER and CTS and supersedes all prior negotiations, representations or agreements. This Agreement shall not be superseded by any provisions of the documents for construction and may be amended only by written instrument signed by both CUSTOMER and CTS. None of the provisions of this Agreement shall be modified, altered, changed or voided by any subsequent Purchase Order issued by CUSTOMER, which relates to the subject matter of this Agreement.

1.3 As used in this Agreement, the term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by CTS to fulfill CTS's obligations, as described in Attachment A and otherwise set forth in the Contract Documents. The Work may constitute the whole or a part of the Project. The Work specifically excludes certain design and construction, which are the subject of separate agreements between CUSTOMER and parties other than CTS.

1.4 The Project is the total construction of which the Work performed by CTS under this Agreement may be the whole or a part.

1.5 The Contract Documents consist of this Agreement, its attachments, exhibits, schedules, and addenda.

1.6 Installation Schedule means that schedule set out in Attachment B describing the Parties' intentions respecting the times by which the components or aspects of the Work therein set forth shall be installed and/or ready for acceptance or beneficial use by CUSTOMER.

ARTICLE 2

CTS'S RESPONSIBILITIES

2.1 CTS Services

2.1.1 CTS shall be responsible for construction of the Project.

2.1.2 CTS will assist in securing permits necessary for the Work. CUSTOMER shall pay such proper and legal fees to public officers and others as may be necessary to the due and faithful performance of the Work and which may arise incidental to the fulfilling of these specifications.

2.2 Responsibilities with Respect to the Work

2.2.1 CTS will provide construction supervision, inspection, labor, materials, tools, construction equipment and subcontracted items necessary for the execution and completion of the Work.

2.2.2 CTS shall keep the premises in an orderly fashion and free from unnecessary accumulation of waste materials or rubbish caused by its operations. If CTS damages property not needed for the Work, CTS shall repair the property to its pre-existing condition unless CUSTOMER directs otherwise. At the completion of the Work, CTS shall remove waste material supplied by CTS under this Agreement as well as all its tools, construction equipment, machinery and surplus material. CTS shall dispose of all waste materials or rubbish caused by its operations; provided, that unless otherwise specifically agreed to in this Agreement, CTS shall not be responsible for disposal of toxic or hazardous materials

removed from the facilities, such as fluorescent lights, potential polychlorinated biphenyl containing light ballasts and mercury-containing controls, but shall store those materials neatly at a location designated by CUSTOMER.

2.2.3 CTS shall give all notices and comply with all laws and ordinances legally enacted as of the date of execution of the Agreement governing the execution of the Work. Provided, however, that CTS shall not be responsible nor liable for the violation of any code, law or ordinance caused by CUSTOMER or existing in CUSTOMER's property prior to the commencement of the Work.

2.2.4 CTS shall comply with all applicable federal, state and municipal laws and regulations that regulate the health and safety of its workers while providing the Work, and shall take such measures as required by those laws and regulations to prevent injury and accidents to other persons on, about or adjacent to the site of the Work. It is understood and agreed, however, that CTS shall have no responsibility for elimination or abatement of health or safety hazards created or otherwise resulting from activities at the site of the Work carried on by persons not in a contractual relationship with CTS, including CUSTOMER, CUSTOMER's contractors or subcontractors, CUSTOMER's tenants or CUSTOMER's visitors. CUSTOMER agrees to cause its contractors, subcontractors and tenants to comply fully with all applicable federal, state and municipal laws and regulations governing health and safety and to comply with all reasonable requests and directions of CTS for the elimination or abatement of any such health or safety hazards at the site of the work.

2.3 Patent Indemnity

2.3.1 CTS shall, at its expense, defend or, at its option, settle any suit that may be instituted against CUSTOMER for alleged infringement of any United States patents related to the hardware manufactured and provided by CTS, provided that: 1. Such alleged infringement consists only in the use of such hardware by itself and not as part of, or in combination with, any other devices, parts or software not provided by CTS hereunder; 2. CUSTOMER gives CTS immediate notice in writing of any such suit and permits CTS, through counsel of its choice, to answer the charge of infringement and defend such suit; and 3. CUSTOMER gives CTS all needed information, assistance and authority, at CTS's expense, to enable CTS to defend such suit.

2.3.2 If such a suit has occurred, or in CTS's opinion is likely to occur, CTS may, at its election and expense: obtain for CUSTOMER the right to continue using such equipment; or replace, correct or modify it so that it is not infringing; or remove such equipment and grant CUSTOMER a credit therefore, as depreciated.

2.3.3 In the case of a final award of damages in any such suit, CTS will pay such award. CTS shall not, however, be responsible for any settlement made without its written consent.

2.3.4 This article states CTS's total liability and CUSTOMER's sole remedy for any actual or alleged infringement of any patent by the hardware manufactured and provided by CTS hereunder. In no event shall CTS be liable for any indirect, special or consequential damages resulting from any such actual or alleged infringement, except as set forth in this section 2.3.

2.4 Warranties and Completion

2.4.1 CTS warrants CUSTOMER good and clear title to all equipment and materials furnished to CUSTOMER pursuant to this Agreement free and clear of liens and encumbrances. CTS hereby warrants that all such equipment and materials shall be of good quality and shall be free from defects in materials and workmanship, including installation and setup, for a period of one (1) year from the date of beneficial use or substantial completion of the equipment or portion of the Work in question, provided that no repairs, substitutions, modifications, or additions have been made, except by CTS or with CTS's written permission, and provided that after delivery such equipment or materials have not been subjected by non-CTS personnel to accident, neglect, misuse, or use in violation of any instructions supplied by CTS. CTS's sole liability hereunder shall be to repair promptly or replace defective equipment or materials, at CTS's option and at CTS's expense. The limited warranty contained in this Section 2.4.1 shall constitute the exclusive remedy of CUSTOMER and the exclusive liability of CTS for any breach of any warranty related to the equipment and materials furnished by CTS pursuant to this Agreement.

2.4.2 In addition to the warranty set forth in Section 2.4.1 above, CTS shall, at CUSTOMER's request, assign to CUSTOMER any and all manufacturer's or installer's warranties for equipment or materials not manufactured by CTS and

provided as part of the Work, to the extent that such third-party warranties are assignable and extend beyond the one (1) year limited warranty set forth in Section 2.4.1.

2.4.3 The warranties set forth herein are exclusive, and CTS expressly disclaims all other warranties, whether written or oral, implied or statutory, including but not limited to, any warranties of merchantability and fitness for a particular purpose, with respect to the equipment and materials provided hereunder. CTS shall not be liable for any special, indirect, incidental or consequential damages arising from, or relating to, this limited warranty or its breach.

2.4.4 CTS's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by CTS, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage.

2.5 Hazardous Materials

2.5.1 CTS and its subcontractors shall not be required to handle, remove, come into contact with, dispose of, or otherwise work with hazardous materials existing on the project site at the date of this Agreement or resulting, either directly or indirectly, from any acts or omissions of CUSTOMER, its employees, agents or assigns, or any of its other contractors or subcontractors unless disturbed as a result of a negligent act or omission of CTS or CTS's subcontractor. "Hazardous materials" as used herein includes all hazardous or toxic substances or materials as may be so designated by federal, state or local governmental entities. "Hazardous materials" shall also include fungus and mold. If, during the performance of the Work, the presence of hazardous materials is discovered or reasonably suspected, CTS shall notify CUSTOMER of such discovery or suspicion and shall be permitted to immediately cease all work which requires contact with or exposure to such hazardous materials, until the CUSTOMER has made arrangements for the removal of the same. CTS shall be entitled to an extension of the Contract Time for ceasing work pursuant to this Section.

2.5.2 Unless prior to the execution of this Agreement, CTS received written notification from CUSTOMER of the existence of Hazardous Materials on the site, and said notice included a description of the Hazardous Materials, and the quantity and location of the Hazardous Materials, CUSTOMER is hereby representing to CTS that CUSTOMER is not aware of any Hazardous Materials present at the site.

2.5.3 If the structure(s) where the Contract Work is to be performed was built before 1978, CUSTOMER understands that it may contain lead paint. CUSTOMER also understands that the only way to know whether lead paint is present is to have one or more paint samples in the work area tested. CUSTOMER authorizes those tests to be done by CTS and agrees to pay CTS for the costs of those tests, in addition to the Contract Price. Alternatively, as a condition of accepting this Contract, CUSTOMER agrees to provide CTS with documentation demonstrating, to CTS's reasonable satisfaction, that: (1) the areas where the Contract Work is to be performed has been tested and determined to be lead free by a certified risk assessor, certified lead inspector or certified renovator; (2) the areas where the Contract Work is to be performed is paint free; and/or (3) the areas where the Contract Work is to be performed were built after 1977.

ARTICLE 3

CUSTOMER'S RESPONSIBILITIES

3.1 CUSTOMER shall provide CTS full information regarding the requirements for the Work.

3.2 CUSTOMER shall designate a representative who shall be fully acquainted with the Work, and who has authority to approve changes in the scope of the Work and render decisions promptly.

3.3 CUSTOMER shall furnish to CTS all information regarding legal limitations, utility locations and other information reasonably pertinent to this Agreement, the Work and the Project.

3.4 CUSTOMER shall secure and pay for all necessary approvals, easements, assessments, permits and charges required for the construction, use or occupancy of permanent structures or for permanent changes in existing facilities, including charges for legal and auditing services.

3.5 If CUSTOMER becomes aware of any fault or defect in the Work, it shall give prompt written notice thereof to CTS and if such notice is not promptly given, CUSTOMER shall be responsible for any additional repair or remedial costs which could have been avoided if such notice had been promptly given.

3.6 The services and information required by the above paragraphs shall be furnished with reasonable promptness at CUSTOMER's expense and CTS shall be entitled to rely upon the accuracy and the completeness thereof.

3.8 CUSTOMER shall comply with all applicable federal, state and municipal laws and regulations governing occupational health and safety in the areas where CTS will perform services and/or perform the Work.

CUSTOMER represents and warrants that, except as otherwise disclosed in this Agreement, in the areas where CTS will undertake Work or provide services, there are no: (a) materials or substances classified as toxic or hazardous either (i) on or within the walls, floors, ceilings or other structural components, or (ii) otherwise located in the work area, including asbestos or presumed asbestos-containing materials, formaldehyde, containers or pipelines containing petroleum products or hazardous substances, etc.; (b) situations subject to special precautions or equipment required by federal, state or local health or safety regulations; or (c) unsafe working conditions. CUSTOMER shall notify CTS of any changes or updates that occur during the course of the Agreement. If any such materials, situations or conditions, whether disclosed or not, are in fact discovered by CTS or others and provide an unsafe condition for the performance of the Work or services, the discovery of the material, situation or condition shall constitute a cause beyond CTS's reasonable control and CTS shall have the right to cease or not commence the Work until the area has been made safe by CUSTOMER or CUSTOMER's representative, at CUSTOMER's expense.

3.9 In addition to the price set forth in Article 6 of this Agreement, CUSTOMER shall pay any present and future taxes or any other governmental charges now or hereafter imposed by existing or future laws with respect to the sale, transfer, use, ownership or possession of the Work provided hereunder, excluding taxes on CTS's net income.

3.10 CTS shall be entitled to rely on the accuracy of the information furnished by CUSTOMER. The CUSTOMER shall furnish information and services required of CUSTOMER by the Contract Documents with reasonable promptness.

ARTICLE 4

SUBCONTRACTS

4.1 At its exclusive option, CTS may subcontract some or all of the Work; provided, however, that all subcontractors must be approved by CUSTOMER prior to commencement of any subcontractor work, which said consent shall not be unreasonably withheld or delayed.

4.2 A Subcontractor is a person or entity who has a direct contract with CTS to provide work, labor and materials in connection with the Work. The term Subcontractor does NOT include any separate contractors employed by CUSTOMER or such separate contractors' subcontractors.

4.3 For the purposes of this Agreement, no contractual relationship shall exist between CUSTOMER and any Subcontractor. CTS shall be responsible for the management of its Subcontractors in their performance of their Work.

4.4 CUSTOMER shall not hire any of CTS's Subcontractors without the prior written approval of CTS.

ARTICLE 5

INSTALLATION AND ACCEPTANCE

5.1 The Work to be performed under this Agreement shall be commenced and substantially completed as set forth in the Installation Schedule attached hereto as Attachment B.

5.2 If CTS is delayed at any time in the progress of performing its obligations under this Agreement by any act of neglect of CUSTOMER or of any employee or agent of CUSTOMER or any contractor employed by CUSTOMER; or by changes ordered or requested by CUSTOMER in the Work performed pursuant to this Agreement; or by labor disputes, fire, unusual delay in transportation or deliveries, adverse weather conditions or other events or occurrences which could

not be reasonably anticipated; or unavoidable casualties; or any other problem beyond CTS's reasonable control (an "Excusable Delay"), then the time for performance of the obligations affected by such Excusable Delay shall be extended by the period of any delay actually incurred as a result thereof. If any delay, or cumulative delays, within CUSTOMER's control, extends beyond ten (10) days, CUSTOMER shall reimburse CTS for all additional costs resulting therefrom.

5.3 CTS shall provide Delivery and Acceptance Certificates in a form acceptable to CUSTOMER and CTS (the "Delivery and Acceptance Certificates") for the Work provided pursuant to the Schedule identified in Attachment F. Upon receipt of each Delivery and Acceptance Certificate, CUSTOMER shall promptly inspect the Work performed by CTS identified therein and execute each such Delivery and Acceptance Certificate as soon as reasonably possible, but in no event later than ten (10) days after delivery of the same by CTS, unless CUSTOMER provides CTS with a written statement identifying specific material performance deficiencies that it wishes CTS to correct. CTS will use reasonably diligent efforts to correct all such material deficiencies and will give written notice to CUSTOMER when all such items have been corrected. The Parties intend that a final Delivery and Acceptance Certificate will be executed for the Work as soon as all Work is installed and operating. Execution and delivery by CUSTOMER of such final Delivery and Acceptance Certificate with respect to the Work shall constitute "Final Acceptance" of such Work performed by CTS pursuant to the Installation Schedule.

ARTICLE 6

PRICE AND PAYMENT

6.1 Price

6.1.1 The price for the Work is Three Million Nine Hundred Seventy Five Thousand Three Hundred and Twenty Six Dollars (\$ 3,975,326), subject to the adjustments set forth in Articles 5 and 7.

6.1.2 The price is based upon laws, codes and regulations in existence as of the date this Agreement is executed. Any changes in or to applicable laws, codes and regulations affecting the cost of the Work shall be the responsibility of CUSTOMER and shall entitle CTS to an equitable adjustment in the price and schedule.

6.1.3 The price will be modified for delays caused by CUSTOMER and for Changes in the Work, all pursuant to Article 7.

6.1.4 The license fees for all licensed software are included in the price to be paid by CUSTOMER as identified in this Article 6. All licenses for such licensed software, if any, shall become the property of the CUSTOMER.

6.1.5 If, at any time, CUSTOMER requests overtime work which requires overtime or premium pay, CTS shall be entitled to add such premium or overtime pay to the Contract Price, plus CTS's overhead and profit.

6.1.6 The Contract Price does not include the items of work specifically excluded in Attachment A. If CUSTOMER requests CTS to perform any of the work expressly excluded in said Attachment, the cost for this additional work, plus CTS's overhead and profit, shall be added to the Contract Price.

6.2 Payment

6.2.1 Upon execution of this Agreement, CUSTOMER shall pay or cause to be paid to CTS the full price for the Work, in accordance with the Payment Schedule, Attachment C. Payment shall be made net thirty (30) days of invoice date.

6.2.2 Payments due and unpaid shall bear interest from the date payment is due at the rate of 1 ½% per month, compounded monthly. In the event that Customer failed to pay CTS any sums due, Customer shall pay CTS all attorney's fees incurred by CTS in collecting amounts owed to CTS under this Agreement. If a progress payment is not paid by the due date, CTS reserves the right (without further notice) to immediately stop work until the progress payment then due is made, increased by the amount of CTS' costs of shutdown, delay and startup and, in such event, CTS will not be liable or responsible for any damages, costs or delays whatsoever due to such work stoppage. CTS reserves the right (without further notice) to terminate this Agreement altogether if work is stopped for thirty (30) or more days (whether or not

consecutive days) because of a failure to make progress payments, and, in such event, also reserves the right to recover payment for all work executed and losses from stoppage of the work including reasonable overhead and profit.

ARTICLE 7

CHANGES IN THE PROJECT

7.1 A Change Order is a written order signed by CUSTOMER and CTS authorizing a change in the Work or adjustment in the price, or a change to the Installation Schedule described in Attachment B. Each Change Order shall describe the change in the work, the amount of adjustment, if any, to the Contract Price, and the extent of any adjustment to the completion date.

7.2 CUSTOMER may request CTS to submit proposals for changes in the Work. Unless otherwise specifically agreed to in writing by both parties, if CTS submits a proposal pursuant to such request but CUSTOMER chooses not to proceed, CUSTOMER shall issue a Change Order to reimburse CTS for any and all costs incurred in preparing the proposal.

7.3 Claims for Concealed or Unknown Conditions

The Contract Price has been based on normal site conditions, without allowance for any additional work that might be caused by unanticipated site conditions. If conditions are encountered at the site that are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents, or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than twenty-one (21) days after first observance of the conditions, and, if appropriate, an equitable adjustment to the Contract Price and Installation Schedule shall be made by a Change Order. Said adjustment in Contract Price shall include CTS's overhead and profit. If agreement cannot be reached by the Parties, the party seeking an adjustment in the Price or Installation Schedule may assert a claim in accordance with Paragraph 7.4.

7.4 If CTS wishes to make a claim for an increase in the Contract Price or an extension in the Installation Schedule it shall give CUSTOMER written notice thereof within a reasonable time after the occurrence of the event giving rise to such claim. This notice shall be given by CTS before proceeding to execute the Work, except in an emergency endangering life or property, in which case CTS shall have the authority to act, in its discretion, to prevent threatened damage, injury or loss. Claims arising from delay shall be made within a reasonable time after the delay. Increases based upon design and estimating costs with respect to possible changes requested by CUSTOMER shall be made within a reasonable time after the decision is made not to proceed with the change. No such claim shall be valid unless so made. If CUSTOMER and CTS cannot agree on the amount of the adjustment in the Price, or the Installation Schedule, it shall be determined pursuant to the provisions of Article 12. Any change in the Price or the Installation Schedule resulting from such claim shall be authorized by Change Order.

7.5 Emergencies

In any emergency affecting the safety of persons or property, CTS shall act, at its discretion, to prevent threatened damage, injury or loss. Any increase in the Price or extension of time claimed by CTS on account of emergency work shall be determined as provided in Section 7.4.

all charges in the work shall be reviewed and approved by CUSTOMER.

ARTICLE 8

INSURANCE, INDEMNITY, WAIVER OF SUBROGATION, AND LIMITATION OF LIABILITY

8.1 Indemnity

8.1.1 CTS agrees to indemnify and hold CUSTOMER, and CUSTOMER's consultants, agents and employees harmless from all claims for bodily injury and property damages [other than the Work itself and other property insured under Paragraph 8.4] to the extent such claims result from or arise under CTS's negligent actions or willful misconduct in its performance of the Work, nothing in this article shall be construed or understood to alter the limitations of liability contained in this article, article 2, or the indemnification contained in section 3.8. Except as otherwise provided herein, CTS's obligation, if any, to indemnify the CUSTOMER does not extend to losses sustained in whole or in part as a result of the CUSTOMER's (or its agent's) acts or omissions.

8.1.2 CUSTOMER shall require any other contractor who may have a contract on this project with CUSTOMER to perform work in the areas where Work will be performed under this Agreement to agree to indemnify CUSTOMER and CTS and hold them harmless from all claims for bodily injury and property damage [other than property insured under Paragraph 8.4] that may arise from that contractor's operations. Such provisions shall be in a form satisfactory to CTS.

8.2 Contractor's Liability Insurance

8.2.1 CTS shall purchase and maintain such insurance as will protect it from claims that may arise out of or result from CTS's operations under this Agreement.

8.2.2 The Commercial General Liability Insurance shall include premises-operations (including explosion, collapse and underground coverage), elevators, independent contractors, completed operations, and blanket contractual liability on all written contracts, all including broad form property damage coverage.

8.2.3 CTS's Commercial General and Automobile Liability Insurance, as required by Subparagraphs 8.2.1 and 8.2.2, shall be written for not less than limits of liability as follows:

(a) **Commercial General Liability**

Combined Single Limit

\$3,000,000 Each Occurrence

\$ 2,000,000 Product & Completed Operations

Aggregate

\$ 2,000,000 General Aggregate

Other Than Products & Completed Operations

(b) **Commercial Automobile Liability** Combined Single Limit

\$ 3,000,000 Each Occurrence

8.2.4 CTS shall maintain at all times during the performance of the Work and Services hereunder, Workman's Compensation Insurance in accordance with the laws of the State in which the Work is performed.

8.3. CUSTOMER's Liability Insurance

8.3.1 CUSTOMER shall be responsible for purchasing and maintaining its own liability insurance and, at its option, may purchase and maintain such insurance as will protect it against claims that may arise from operations under this Agreement.

8.4 Insurance to Protect Project

8.4.1 CUSTOMER currently maintains all risk full cost replacement property insurance. in a form acceptable to CTS for the length of time to complete the Project. This insurance shall include as named additional insureds CTS and CTS's Subcontractors and Sub-subcontractors and shall include, at a minimum, coverage for fire, windstorm, flood, earthquake, theft, vandalism, malicious mischief, transit, collapse, testing, and damage resulting from defective design, workmanship,

or material. CUSTOMER will increase limits of coverage, if necessary, to reflect estimated replacement costs. CUSTOMER will be responsible for any co-insurance penalties or deductibles.

8.4.1.1 The parties acknowledge that CUSTOMER intends to occupy or use a portion or portions of the Facilities prior to Substantial Completion thereof. CUSTOMER represents that the insurance company or companies providing the property insurance have consented by endorsement to the policy or policies to said use during construction. CUSTOMER also represents that this insurance shall not be canceled or lapsed on account of such partial occupancy.

8.4.2 CUSTOMER shall purchase and maintain such insurance as will protect CUSTOMER and CTS against loss of use of CUSTOMER's property due to those perils insured pursuant to Subparagraph 8.4.1.

8.4.3 CUSTOMER shall provide Certificate(s) of Insurance to CTS before work on the Project begins. All insurance coverage(s) must be with a carrier rated A or better by one of the National Insurance Rating Agencies such as A.M. Best. CTS will be given sixty (60) days notice of cancellation, non-renewal, or any endorsements restricting or reducing coverage.

8.5 Property Insurance Loss Adjustment

8.5.1 Any insured loss shall be adjusted with CUSTOMER and CTS and made payable to CUSTOMER and CTS as trustees for the insureds, as their interests may appear, subject to any applicable mortgagee clause.

8.5.2 Upon the occurrence of an insured loss, monies received will be deposited in a separate account and the trustees shall make distribution in accordance with the agreement of the parties in interest, or in the absence of such agreement, in accordance with an arbitration award pursuant to Article 12. If the trustees are unable to agree between themselves on the settlement of the loss, such dispute shall also be submitted to arbitration pursuant to Article 12.

8.6 Waiver of Subrogation

8.6.1 CUSTOMER and CTS waive all rights against each other, Architects and Engineers, Subcontractors and Sub-subcontractors for damages caused by perils covered by insurance provided under Paragraph 8.4, except such rights as they may have to the proceeds of such insurance held by CUSTOMER and CTS as trustees. CTS may require similar waivers from all Subcontractors and Sub-subcontractors.

8.6.2 CUSTOMER and CTS waive all rights against each other, Architects and Engineers, Subcontractor and Sub-subcontractors for loss or damage to any equipment used in connection with the Project, which loss is covered by any property insurance. CTS may require similar waivers from all Subcontractors and Sub-subcontractors.

8.6.3 CUSTOMER waives subrogation against CTS, Subcontractors and Sub-subcontractors on all property and consequential loss policies carried by CUSTOMER on adjacent properties and under property and consequential loss policies purchased for the Project after its completion.

8.6.4 If the policies of insurance referred to in this Paragraph 8.6 require an endorsement to provide for continued coverage where there is a waiver of subrogation, the owners of such policies will cause them to be so endorsed.

8.7 Limitation of Liability

8.7.1 In no event shall either party be liable for any special, incidental, indirect, speculative, remote, or consequential damages arising from, relating to, or connected with the work, equipment, materials, or any goods or services provided hereunder. Each party waives claims against the other party for consequential damages arising out of or relating to this Agreement. This waiver includes damages incurred by the other party for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons.

ARTICLE 9

TERMINATION OF THE AGREEMENT

9.1 If CTS defaults in, or fails or neglects to carry forward the Work in accordance with this Agreement, CUSTOMER may provide notice in writing of its intention to terminate this Agreement to CTS. If CTS, following receipt of such written notice, neglects to cure or correct the identified deficiencies within thirty (30) business days, CUSTOMER may terminate this Agreement and take possession of the site together with all materials thereon, and move to complete the Work itself expediently. If the unpaid balance of the contract sum exceeds the expense of finishing the Work, the excess shall be paid to CTS, but if the expense exceeds the unpaid balance, CTS shall pay the difference to CUSTOMER.

9.2 If CUSTOMER fails to make payments as they become due, or otherwise defaults or breaches its obligations under this Agreement, CTS may give written notice to CUSTOMER of CTS's intention to terminate this Agreement. If, within seven (7) days following receipt of such notice, CUSTOMER fails to make the payments then due, or otherwise fails to cure or perform its non-monetary obligations within thirty (30) days following receipt of such notice, CTS may, by written notice to CUSTOMER, terminate this Agreement and recover from CUSTOMER payment for Work executed and for losses sustained for materials, and any other costs incurred by CTS and attributable to the Work, including but not limited to, reasonable overhead, profit.

ARTICLE 10

ASSIGNMENT

10.1 Neither party to the Agreement shall assign this Agreement or sublet it as a whole without the written consent of the other party. Such consent shall not be reasonably withheld, except that CTS may assign to another party the right to receive payments due under this Agreement. CUSTOMER shall approve all subcontractors, which said approval shall not be unreasonably withheld or delayed.

ARTICLE 11

MISCELLANEOUS PROVISIONS

11.1 The Table of Contents and headings in this Agreement are for information and convenience only and do not modify the obligations of this Agreement.

11.2 Confidentiality. As used herein, the term "CONFIDENTIAL INFORMATION" shall mean any information in readable form or in machine readable form, including software supplied to CUSTOMER by CTS that has been identified or labeled as "Confidential" and/or "Proprietary" or with words of similar import. CONFIDENTIAL INFORMATION shall also mean any information that is disclosed orally and is designated as "Confidential" and/or "Proprietary" or with words of similar import at the time of disclosure and is reduced to writing, marked as "Confidential" and/or "Proprietary" or with words of similar import, and supplied to the receiving party within ten (10) days of disclosure.

All rights in and to CONFIDENTIAL INFORMATION and to any proprietary and/or novel features contained in CONFIDENTIAL INFORMATION disclosed are reserved by the disclosing party; and the party receiving such disclosure will not use the CONFIDENTIAL INFORMATION for any purpose except in the performance of this Agreement and will not disclose any of the CONFIDENTIAL INFORMATION to benefit itself or to damage the disclosing party. This prohibition includes any business information (strategic plans, etc.) that may become known to either party.

Each party shall, upon request of the other party or upon completion or earlier termination of this Agreement, return the other party's CONFIDENTIAL INFORMATION and all copies thereof.

Notwithstanding the foregoing provisions, neither party shall be liable for any disclosure or use of information disclosed or communicated by the other party if the information:

- (a) is publicly available at the time of disclosure or later becomes publicly available other than through breach of this Agreement; or
- (b) is known to the receiving party at the time of disclosure;
- (c) is subsequently rightfully obtained from a third party on an unrestricted basis;
- (d) is approved for release in writing by an authorized representative of the disclosing party; or
- (e) if the CUSTOMER is required by law to disclose the information.

The obligation of this Article shall survive any expiration, cancellation or termination of this Agreement.

11.3 If any provision is held illegal, invalid or unenforceable, the remaining provisions of this Agreement shall be construed and interpreted to achieve the purposes of the Parties.

11.4 Risk of loss for all equipment and materials provided by CTS hereunder shall transfer to CUSTOMER upon delivery to CUSTOMER's Facilities from CTS or its Subcontractor and title shall pass upon final acceptance or final payment by CUSTOMER to CTS, whichever occurs later.

11.5 Final notice or other communications required or permitted hereunder shall be sufficiently given if personally delivered to the person specified below, or if sent by registered or certified mail, return receipt requested, postage prepaid, addressed as follows:

To CTS:
CTS
Attention: Robert Bennett
15933 Clayton Rd., Suite 110
St. Louis, MO 63011

To CUSTOMER: City of Ballwin
14811 Manchester Road
Ballwin, MO 63011
Attention: Linda Bruer

11.6 Waiver. CTS's failure to insist upon the performance or fulfillment of any of CUSTOMER's obligations under this Agreement shall not be deemed or construed as a waiver or relinquishment of the future performance of any such right or obligation hereunder.

11.7 If any provision of this Agreement or the application thereof to any circumstances shall be held to be invalid or unenforceable, then the remaining provisions of this Agreement or the application thereof to other circumstances shall not be affected hereby and shall be valid and enforceable to the fullest extent permitted by law.

11.8 Performance/Payment Bond. CTS shall furnish a performance bond and payment bond covering the construction of the work in an amount equal to the contract price prior to commencement of work in a form acceptable to CUSTOMER.

11.9 This bond covers only the performance and payment exposure associated with the performance of the construction portion of the work. The energy savings, additional savings, guaranteed savings, savings shortfalls are not under any circumstances covered under this bond or an obligation that the surety is responsible for.

11.10 Ambiguities. The parties have each had the opportunity to review and negotiate the terms of this Agreement, and any rule of construction to the effect that ambiguities are to be resolved against the drafting party shall not apply in the interpretation of this Agreement.

11.11 Headings. The section headings contained herein are intended for convenience and reference only, and are not a part of this Agreement.

11.12 Authority to Enter into this Contract. The persons signing the Agreement on behalf of the parties are authorized to execute and accept contracts of this nature.

11.13 CUSTOMER Representations. To the extent applicable, the CUSTOMER warrants that it has the necessary power and authority to enter into this Agreement and this Agreement has been duly authorized by its duly elected representatives. This Agreement is a legal, valid and binding obligation of the CUSTOMER.

ARTICLE 12
ARBITRATION

12.1 The Parties agree that any controversy or claim between CTS and CUSTOMER arising out of or relating to this Agreement, or the breach thereof, shall be settled by arbitration, conducted in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association.

Any award rendered by the arbitrator shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

ARTICLE 13
LIMIT OF LIABILITY – FIRE AND/OR SECURITY SYSTEMS

13.1 The parties agree that CTS is not an insurer; that the fire and/or security system and/or Service purchased herein is designed only to reduce the risk of loss; that CUSTOMER chose such system and/or Service from several levels of protection offered by CTS; that CTS will not be held liable for any loss, whether in tort or contract, which may arise from the failure of the system and/or Service; except that CTS shall be responsible for the cost of replacing CUSTOMER's existing system if CTS causes damage to the existing system. The parties further agree that this Agreement shall not confer any rights on the part of any person or entity not a party hereto, whether as a third-party beneficiary or otherwise.

Because it is extremely difficult to assess actual damages arising from the failure of a system and/or service, the parties agree that if any liability is imposed on CTS for damages or personal injury to either customer or any third party,

ARTICLE 14
**ALLOCATION OF SECTION 179D DEDUCTION
TO DESIGNER**

14.1 CUSTOMER acknowledges and represents that the project site where CTS's Work is to be performed and all building and improvements located on the same are "government-owned buildings" as CUSTOMER is a political subdivision and CUSTOMER owns said property, building and other improvements where the Work is to be performed. CUSTOMER hereby allocates to CTS any and all Section 179D deductions for the Work. CUSTOMER further acknowledges that CTS is the entity that has created and is primarily responsible for the technical specifications for installation of energy efficient work at CUSTOMER's commercial building property, as described herein. CUSTOMER agrees to complete and execute the "Form for Allocation of Section 179D Deduction", which is attached hereto as Schedule G and incorporated herein by reference. CUSTOMER also agrees to participate in any analysis, inspection and/or certification required by statute or otherwise deemed necessary by CTS to ensure that CTS receives the Section 179D deduction.

**THIS CONTRACT IS SUBJECT TO A BINDING ARBITRATION PROVISION
WHICH MAY BE REINFORCED BY THE PARTIES.**

APPROVALS:

The parties hereby execute this Agreement as of the date first set forth herein by the signatures of their duly authorized representatives:

Control Technology & Solutions

City of Ballwin, MO

By _____

By _____

Name _____

Title _____

Date _____

Name _____

Title _____

Date _____

ATTACHMENT A

SCOPE OF WORK

ECM #1: Mechanical System Replacement

The project scope of work for The Pointe located in the City of Ballwin was developed with the goal of providing a simplified, sustainable mechanical solution that will renew the facility's current HVAC assets, lower the long term operational and maintenance costs, reduce the facility's consumption of energy and enhance the quality of the indoor environment. The attached scope of work will address each of these goals.

ECM-1: HVAC System Upgrades

Scope Item 1: Geothermal Well Field Installation

The well field that will be installed at The Pointe to support the new Geothermal Heat Pump System will be sized based storing the heat rejected in the summer, cooling months and recovering it during the winter to supplement the heating load of the facility. The vertical bore field will be installed in the green space to the south of the facility. CTS shall provide the materials, equipment and labor required to drill 100 vertical wells, each at a depth of 330 feet with a minimum spacing of 18'-0". Each well will be approximately 6" in diameter to allow for the installation of a 1 1/4" diameter HDPE SDR 11 uni-loop. The wells will then be backfilled with a continuous mixture of thermally enhanced bentonite grout, silica sand and water to ensure proper thermal conductivity to the surrounding soil. The wells shall be located on Pointe property and placed in a manner that will reduce the risk of damage to the existing sidewalks, landmarks, retaining walls, underground utilities and trees. The site shall be kept as clean as possible and returned to its original condition once work is completed. Grading, removal of spoils, and seeding shall be provided. Refer to Mechanical Drawing, ME1, for the basis of design and construction of the well field.

The vertical wells shall be piped in circuits of 20. Each circuit branch pipe will be installed with an isolation valve then connected to HDPE headers that are routed to the building. All HDPE pipe and fittings shall be heat fused. Piping sizes shall be as indicated on Mechanical Drawing, ME2, as designed by CM Engineering. All horizontal circuit and header HDPE piping will be installed in 54" minimum deep trenches and backfilled per Detail 03 on Sheet ME2. All non-metallic pipe will be traced with 14ga wire and foil backed warning tape will be installed along the entire length of the piping trenches. Upon completion of the well field piping system, the well circuits will be pressure tested and purged to ensure that there are no leaks and obstructions in the system.

Where the geothermal loop piping is indicated to penetrate the building, as shown on the CM Engineering drawings, CTS will core drill through the concrete foundation wall and sawcut the existing floor as required for a complete installation. The foundation wall and floor shall be patched as required to match the existing construction and all pipe penetrations shall be appropriately sealed for water and air tightness.

Scope Item 2: Geothermal Pipe Loop Installation

CTS will provide the labor and materials required for the complete installation of the geothermal pipe loop in the interior of The Pointe facility. The new pipe loop shall be routed from the well field header into the South side of the facility. The pipe loop will be routed in such a way to reach the new heat pump units that will be located in the Detention Center Mechanical Room, then through the second floor ceiling plenum as required to reach the new rooftop heat pump units, before dropping two stories to the existing lower level mechanical space where the loop will be tied to a pair of parallel pumps before exiting the building and completing the loop to the well field.

All new piping installed under this project will comply with the following specification:

PIPING MATERIAL SCHEDULE													
SYSTEM	PIPING				FITTINGS			OPERATING		FIELD TEST		INSULATION	
	SIZE	MATERIAL	SCH	ASTM JOINTS	MAT	SCH	JOINTS	PRESS. (PSI)	TEMP. (°F)	PRESS. (PSI)	TYPE	TIME	THICKNESS JACKET TYPE
MAKE-UP WATER	ALL	CP	L	B 88 SJ	CP	L	SJ	65	45-65	150	PNEU	1 HR	1" - FG
HEAT PUMP LOOP (CLOSED) INTERIOR	<=2"	CP	L	B 88 SJ	CP	L	SJ	65	45-65	150	PNEU	1 HR	1" - FG
HEAT PUMP LOOP (CLOSED) INTERIOR	>2"	BLK	10	A 135 VIC	DI	150#	VIC	65	45-65	150	PNEU	1 HR	1" - FG
HEAT PUMP LOOP (CLOSED) EXTERIOR	ALL	HDPE	SDR-15	D 3350 F	HDPE	SDR-15	F	65	40-180	150	PNEU	1 HR	1" - FG
HVAC CONDENSATE DRAIN PIPING	ALL	CP	L	B 88 SJ	CP	L	SJ	N/A	N/A	150	PNEU	1 HR	1" - FG

PIPING MATERIAL LEGEND

ACR - COPPER (CLEAN AND CAPPED)
 BLK - BLACK STEEL PIPE
 CP - COPPER
 ERW - ELECTRIC RESISTANCE WELD BLACK STEEL
 HDPE - HIGH DENSITY POLYETHYLENE

FITTING MATERIAL LEGEND

CI - CAST IRON
 CS - CARBON STEEL
 DI - DUCTILE IRON

JOINING METHOD LEGEND

THRD - THREADED
 WELD - WELDED
 F - FUSED
 VIC-VICTAULIC WITH ROLLED GROOVES
 SJ - SOLDER JOINT 95-5 TIN-ANTIMONY
 FS - SOCKET FUSION

INSULATION TYPE LEGEND

FG - FIBERGLASS
 ARM - ARMAFLEX
 VIC-VICTAULIC WITH ROLLED GROOVES
 ALL SERVICE JACKET
 PVC - PVC JACKET
 A - ALUMINUM JACKET

Where pipe is shown to be routed through the facility, CTS will remove the existing ceiling tile and grid and store it for replacement upon completion of the work. This installation effort will be coordinated with The Pointe's Facility Director in an effort to minimize disruptions to the normal daily activities supported by the facility. Any piping that is shown to be routed in the occupied areas of the facility will be concealed by framed drywall walls or metal enclosures.

Scope Item 3: System Pumps

CTS will furnish the labor and materials required for the pumping systems. Pumps P-1 and P-2 shall variable speed controlled from variable frequency drives, and are base mounted pumps. All other pumps are in line pumps.

PUMP SCHEDULE									
MARK	MANUFACTURER	MODEL	GPM	HEAD FT. H ₂ O	EFF. %	MOTOR HP	RPM	ELECTRICAL VOLTS	REMARKS
P-1	BELL & GOSSETT	1510 3AC	185	27	67.5	3.0	1750	460	1,2,3,4,5,6
P-2	BELL & GOSSETT	1510 3AC	185	27	67.5	3.0	1750	460	1,2,3,4,5,6
P-3A	BELL & GOSSETT	80 3X3X7B	124	14	69.7	0.75	1150	460	1,4 3,4,7
P-3B	BELL & GOSSETT	80 3X3X7B	124	14	69.7	0.75	1150	460	1,4 3,4
P-4A	BELL & GOSSETT	80 3X3X7B	90	16	65.6	0.75	1150	460	1,4 3,4
P-4B	BELL & GOSSETT	80 3X3X7B	90	19	65.6	0.75	1150	460	1,4 3,4
P-5	EXISTING								
P-6A-D	BELL & GOSSETT	90 3AAB	59	10	59.0	0.75	1725	460	1,4 3,4,7
P-7A-D	BELL & GOSSETT	90 3AAB	70	13	63.5	0.75	1725	460	1,4 3,4

NOTES:

- Flow and head must be balanced with both pumps in operation
- Provide pumps with triple duty valve sized for 3 ft head pressure loss on the discharge of the pump
- All pump motors to be PREMIUM efficiency.
- Contractor to trim impellers to match actual flow and head requirements after installation.
- Pumps require VFD drive, BAC net compatible.
- Pumps to provide 370 gpm with both pumps in operation.
- Provide 1 additional pump as spare for owner.

Scope Item 4: Plate and Frame Heat Exchangers

The heat of rejection is a byproduct of air conditioning the facility. Typically it is rejected to the atmosphere or in the case of this geothermal project it is absorbed by the ground. This heat has the potential to heat the pool and spa in our design. To provide the ability to heat the pool and spa with the heat of rejection CTS will furnish the labor and materials required for the installation of plate and frame heat exchangers as scheduled.

PLATE AND FRAME HEAT EXCHANGER SCHEDULE														
MARK	MANUFACTURER	MODEL NUMBER	HOT SIDE					COLD SIDE					HEAT EXCH MBH	REMARKS
			FLUID	EWI (°F)	LWT (°F)	GPM	WPD FT H2O	FLUID	EWI (°F)	LWT (°F)	GPM	WPD FT H2O		
HX-1	EXISTING													
HX-2	SONDEX	S19A-IG10-15-TKTM42	WATER	115.0	78.0	51	3.5	P-WATER	40.0	80.0	50	3.4	1000.1	1,2,3
HX-3	SONDEX	S8A-IG18-26-TL	WATER	115.0	63.0	5.7	0.5	P-WATER	50.0	110.0	5.0	0.5	149.5	1,2,3

1. PLATE AND FRAME HEAT EXCHANGER
2. TITANIUM PLATES
3. HEAT EXCHANGERS TO BE USED FOR POOL WATER ALL MATERIALS SHALL BE COMPATIBLE WITH POOL WATER CHEMISTRY.

Scope Item 5: Geothermal Heat Pump Equipment Installation

The existing air-handling equipment currently in service at The Pointe will be removed in their entirety and replaced with new, Geothermal Heat Pump equipment. AHU-1 that serves the fitness area and workout rooms, offices, meeting rooms and atrium area VAV system and AHU-2 that serves the Gymnasium shall each be replaced with new, self-contained VAV heat pump units. Each unit shall be provided complete with factory controls, variable frequency drives and modulating capacity compressors as depicted in the following equipment schedule.

HEAT PUMP UNIT SCHEDULE																														
MARK	MANUFACTURER	MODEL NUMBER	CONFIGURATION POS. - CHIM	SUPPLY FAN		COOLING					HEATING					WATER HP PUMP/GROUNDWATER					OUTSIDE AIR	FILTER QTY	ELECTRICAL VOLTS PHASE AMP	NCA						
				CFM	ESP	EAT	CAPACITY (MBH) UNIT	EWI	LAT	EER	EAT	CAP. TOTAL (MBH) UNIT	EWI	LAT	COP	FLOW (GPM)	WPD	HEAD	PUMP MODEL	PIPING SIZE (IN)										
AHU-1	AACH	SA-075-3-CE-808	VERT SELF CONTAINED	24,000	3.4	104	78	808	23	811.7	72.2	85	87	54.8	9.3	53.7	500.0	50	87	4.0	200.0	18.0	34.0	42000	18	480	3	170	0	
AHU-2	MANMOTH	GA30YLE	VERT SELF CONTAINED	12,000	2.0	342	808	492.5	318.8	85	67.52	118	40.0	491.0	45	78	4.2	110.0	22.7	30.7			1500	10	20824X1	480	3	86	0	110

- NOTES:
1. PROVIDE WITH FACTORY INSTALLED CONTROLS CAPABLE OF COMMUNICATING WITH BACNET BASED BAS
 2. VAV SYSTEM
 3. PROVIDE WITH DISCHARGE AIR CONTROLLER HOT GAS BYPASS AND MODULATING HOT GAS REHEAT COIL
 4. PROVIDE WITH FACTORY WIRED 120V CONVENIENCE OUTLET
 5. PROVIDE WITH MODULATING CAPACITY COMPRESSORS FOR EACH STAGE

Scope Item 6: Geothermal Heat Pump Equipment Installation

The outside ventilation air provided to AHU-1 will be preconditioned by energy recovery unit ERU-1. The energy recovered from exhausted air will be transferred to the fresh air supplied to AHU-1. This unit will be roof mounted on a roof curb furnished and installed by CTS.

ENERGY RECOVERY UNIT SCHEDULE													
MARK	MANUFACTURER	MODEL NO.	SUPPLY FAN			EXHAUST FAN			EFFECTIVENESS	ELECTRICAL			
			CFM	E.S.P.	HP	CFM	E.S.P.	HP		VOLTS	φ	MCA	CIRCUIT
				"H2O"			"H2O"		%			AMPS	BREAKER
ERU-1	SEMCO	FV-5000	4500	0.5	3.0	4500	0.75	5.00	70	460	1	15.3	25

GENERAL NOTE: EQUIPMENT CONTROLS BY CONTROLS CONTRACTOR

- NOTES:
1. PROVIDE WITH A GRAVITY BACKDRAFT DAMPER ON EXHAUST AND MOTORIZED OA DAMPER.
 2. PROVIDE WITH "AQ FLOW" AIRFLOW MONITORING STATION AND FACTORY INSTALLED DISCONNECT SWITCH.
 3. PROVIDE WITH STOP/JOG ECONOMIZER AND FROST PROTECTION.
 4. PROVIDE WITH VARIABLE SPEED DRIVE.
 5. UNIT SHALL RUN AT 50% DURING OCCUPIDE TIMES, PROVIDE OVER RIDE TO INCREASE UNIT OPERATION TO 100% ON HIGH CO2.
 6. UNIT SHALL BE OFF DURING UNOCCUPIDE TIMES. MANUFACTURE CONTROLS WITH BAC NET INTERFACE.
 7. ERU TO HAVE VIBRATION ISOLATION CURB

Scope Item 7: Natatorium Conditioning Equipment

The existing PoolPak units will be removed in their entirety and be replaced with two (2) Dectron Pool Units as scheduled below. Two Heat Pipes will be installed to capture the heat exhausted from the pool area and transfer it to the Dectron units to pick up some of the heating load. A purge fan will be added to purge the pool area when the pool is shocked.

POOL UNIT SCHEDULE																								
MARK	MANUFACTURER	MODEL	PAN	AMP	ESP	INDUCTION	COOLING	SENSIBLE	COND COIL	COND COIL	PUMP	HEATING	HEAT COIL	HEAT COIL	HEAT COIL	HEAT COIL	PUMP	ESP	INDUCTION	COOLING	SENSIBLE	COND COIL	COND COIL	PUMP
C-1	DECTRON	DB 182	13000	80/80	2	181	100000	31100	124	10	P-30	245000	851000	120100	10	P-30	245000	851000	120100	10	P-30	245000	851000	120100
H-1	HEAT PIPE TECH	HPM-411220000	1 A	3300 CFM	SUPPLY FH 20" FL 48" 12 FPM 1/2" TUBING 8 ROW	EXHAUST FH 22" FL 48" 12 FPM 1/2" TUBING 8 ROW	ELECTROPH COATING																	
H-2	HEAT PIPE TECH	HPM-411220000	1 A	3300 CFM	SUPPLY FH 20" FL 48" 12 FPM 1/2" TUBING 8 ROW	EXHAUST FH 22" FL 48" 12 FPM 1/2" TUBING 8 ROW	ELECTROPH COATING																	

1 R 410A REFRIGERANT
2 NOTE ALL PUMPS ARE TO BE ACTIVATED BY DECTRON UNIT
3 PROPOSE SHOCK DETECTOR IN BUREAU DUCT AND THE WFO BUILDING FIRE ALARM SYSTEM
4 MANUFACTURE CONTROLS WITH BAC NET INTERFACE
5 MODEL WATER HEATING
6 INTERNAL EXHAUST FAN
7 PURGE FAN SHALL RUN FOR 12 MINUTES WHENEVER POOL IS SHOCKED FAN SHALL BE ACTIVATED ON SIGNAL FROM THE DECTRON UNIT

Scope Item 8: Water-Cooled Chillers

These chillers are water to water heat pumps that transfer heat from the geothermal loop to systems that need heat. These systems include the; Pool unit space heating; Domestic hot water; Pool water heating; Spa water heating; VAV heating coils and AHU-1 & 2 heating coils for space heating.

WATER-COOLED CHILLER SCHEDULE																			
MARK	MANUFACTURER	MODEL NO.	NOM. TONS	REFR. TYPE	SOURCE				LOAD				UNIT COP	UNIT TOTAL KW	ELECTRICAL				REMARKS
					EWT °F	LWT °F	FLOW GPM	WPD FT. H2O	EWT °F	LWT °F	FLOW GPM	WPD FT. H2O			VOLTS	Φ	MCA AMPS	MOCP AMPS	
C-1	WATER FURNACE	NXW360	30	410A	45	40.0	70.0	7.7	110	121	59	4.6	2.80	34.50	460	3	61	80	1,2,3,4
	HEATING																		
C-2	WATER FURNACE	NXW360	30	410A	45	40.0	70.0	7.7	110	121	59	4.6	2.80	34.50	460	3	61	80	1,2,3,4
	HEATING																		
C-3	WATER FURNACE	NXW360	30	410A	45	40.0	70.0	7.7	110	121	59	4.6	2.80	34.50	460	3	61	80	1,2,3,4
	HEATING																		
C-4	WATER FURNACE	NXW360	30	410A	45	40.0	70.0	7.7	110	121	59	4.6	2.80	34.50	460	3	61	80	1,2,3,4
	HEATING																		

NOTES:

1. UNIT NEEDS FREEZE STAT
2. NO PROPYLENE GLYCOL
3. UNIT SHALL HAVE MANUFACTURE CONTROLS WITH BAC NET PORTAL
4. LOAD AND SOURCE PUMPS SHALL BE ACTIVATED BY UNIT CONTROLS

Scope Item 9: Boilers

CTS will furnish and install two (2) new condensing boilers tied into the geothermal loop. These boilers are to provide supplemental heat to the geothermal loop as needed.

BOILER SCHEDULE								
MARK	MANUFACTURER	MODEL	MBH INPUT	MBH OUTPUT	PUMP	FLOW GPM	HEAD FT. H2O	ELECTRICAL EACH V/PH/AMPS
B-1	LOCHINVAR	KNIGHT KBN501	500	467	GRUNDFOS	26	10	120/1/60-12
B-2	LOCHINVAR	KNIGHT KBN501	500	467	UP-26-99FC	26	10	120/1/60-12

- 1 90% BOILER, DIRECT VENT PER MANUFACTURES RECOMMENDATIONS.
- 2 B-1, B-2 ARE TO BE STAGED USING THE LEAD-LAG CASCADE OPTION.
- 3 BOILERS ARE OPERATED ONLY WHEN THE LOOP TEMP TO THE FIELD DROPS TO 40F
- 4 PUMP POWER IS 115V RUN FROM THE SAME CIRCUIT AS THE BOILER POWER. INTERLOCKED TO RUN ONLY WHEN BOILER RUNS.

Scope Item 10: Domestic Water Heater

CTS will furnish and install one (1) new high efficiency condensing gas domestic water heater tied into the existing hot water tank.

WATER HEATER SCHEDULE							
MARK	MANUFACTURER	MODEL NO.	TYPE	GALLON CAP	GPH @ 40 DEG RISE	INPUT (KBTU/HR)	ACCESSORIES
WH-1	AO SMITH	BTH-300A	GAS	130	872	300	PTRV. WAR

NOTES

PTRV - PRESSURE TEMPERATURE RELIEF VALVE

WAR - MINIMUM 8 YEAR TANK WARRANTY, 2 YEAR PARTS WARRANTY

Scope Item 11: VAV Box w/Reheat Coil Replacement

The existing HVAC systems are designed as Variable Air Volume Systems. Supply air is fed at a constant temperature to the ductwork and prior to being discharged into the spaces or zones. If there is a call for heat in the zone, the supply air volume, typically at a minimum volume, is heated by the VAV Box reheat coil to the appropriate temperature required to satisfy the setpoint of the space. If cooling is required in a zone, the volume of air is varied as required to satisfy the temperature setpoint.

The existing VAV Boxes are operating beyond their typically anticipated service life and are considered obsolete. CTS will remove the existing VAV boxes and associated reheat coils and replace them with new VAV boxes complete and reheat coils. The new VAV boxes will utilize dampers that will be actuated electrically and be controlled by the new direct digital control (DDC) system. The new boxes will be supported by the existing building structure and connected to the existing supply air ductwork. Where convenient access to the existing VAV box is not currently evident, CTS will extend the existing supply air ductwork as required to support a more accessible location for future maintenance purposes.

The reheat coils located at each new VAV box will be sized for the space they will serve and will utilized 130°F entering water temperature that will be supplied by a new high efficiency water-to-water heat pump that will be connected to the new geothermal piping loop. New piping accessories and DDC actuated control valves will be installed at each VAV box/reheat coil location and the existing heating hot water distribution piping loop and branches will be reused.

The new VAV boxes with reheat coils will be supplied as specified in the attached VAV Box Replacement Schedule and located as shown on the CM Engineering Mechanical Plans.

A new VAV box will be provided to give independent control and more capacity to the spinning room.

There is a 20" x 18" section of duct that is undersized and limits the potential conditioning to the aerobics room. That section of duct will be replaced with new lined ductwork.

VAV BOX REPLACEMENT SCHEDULE																			
Tag ID	Model	Unit Size	Max (Primary CFM)	Min (Primary CFM)	Differential SP (in wg)	Min Oper PD (in wg)	Max Discharge NC	Max Radiated NC	Min Discharge NC	Min Radiated NC	Reheat(CFM)	Capacity (MBH)	EAT °F	LAT °P	Flud Flow(GPM)	EWT °F	LWT °F	Flud PD (ft wg)	Rows
VAV-1	SDV5	16	1800	589	0.80	0.36					800	33.84	56	95	4.56	115	100.08	1.74	3
VAV-2	SDV5	16	1800	589	0.80	0.36					800	33.84	56	95.00	4.56	115	100.05	1.74	3
VAV-3	SDV5	14	1030	439	0.96	0.30					600	25.37	56	94.98	2.17	115	91.53	0.32	4
VAV-4	SDV5	9	600	180	0.85	0.41	20				300	13.04	56	95.01	1.21	115	93.24	0.20	4
VAV-5	SDV5	8	300	132	1.06	0.16	20				200	6.69	56	95	1.21	115	100.49	0.51	3
VAV-6	SDV5	8	300	132	1.06	0.19					200	6.69	56	95	1.21	115	100.49	0.51	3
VAV-7	SDV5	9	600	180	0.85	0.41	20				300	13.04	56	95.01	1.21	115	93.24	0.20	4
VAV-8	SDV5	14	1000	400	0.95	0.31					600	26.08	56	94.98	2.27	115	91.90	0.34	4
VAV-9	SDV5	9	600	180	0.85	0.41	20				300	13.04	56	95.01	1.21	115	93.24	0.20	4
VAV-10	SDV5	8	400	132	1.03	0.23					225	8.50	56	95	1.21	115	100.49	0.51	2MC
VAV-11	SDV5	24x18	2070	1187	0.81	0.35	20	23			1300	56.48	56	96	4.59	115	105.02	1.10	4
VAV-12	SDV5	16	1500	589	0.80	0.36					800	34.80	56	95.00	4.56	115	100.05	1.74	4
VAV-13	SDV5	8	450	140	0.90	0.36					225	9.78	56	95	1.57	115	102.44	0.78	3
VAV-14	SDV5	7	400	120	0.96	0.33	21				200	6.69	56	95	1.21	115	100.49	0.51	3
VAV-15	SDV5	5	200	85	1.14	0.12	22				190	6.16	56	95.01	1.41	115	108.15	0.37	2MC
VAV-16	SDV5	9	600	180	0.85	0.41	20				300	13.04	56	95.01	1.21	115	93.24	0.20	4
VAV-17	SDV5	8	550	165	0.74	0.52		20			250	10.86	56	95.01	2.03	115	104.24	1.19	3
VAV-18	SDV5	14	1700	568	0.50	0.76					1100	45.30	56	93	3.37	115	94.09	0.70	4
VAV-19	SDV5	24x18	3000	1190	0.59	0.87	23	24			1800	89.50	56	95.01	5.88	115	92.68	1.73	4
VAV-20	SDV5	14	1800	439	0.75	0.61		21			500	21.70	56	95	6.35	115	103.98	4.06	3
VAV-21	SDV5	14	1600	439	0.75	0.51		21			500	21.70	56	95	6.35	115	103.98	4.06	3
VAV-22	SDV5	9	900	270	0.83	0.63					500	22.40	56	94.98	5.71	115	108.10	3.68	3
VAV-23	SDV5	24x18	2100	1187	0.81	0.36	20	23			1300	56.48	56	95	4.59	115	105.02	1.10	4
VAV-24	SDV5	24x18	3200	1187	0.51	0.75	23	24			1700	71.30	56	95	6.60	115	93.81	2.15	4
VAV-25	SDV5	12	800	500	0.87	0.39					800	34.80	56	95.01	5.18	115	93.24	2.95	4
VAV-26	SDV5	8	400																
VAV-27	SDV5	12	900	304	1.02	0.24	20				500	21.70	56	95	2.00	115	93.10	0.56	4

Footnotes

A - Selections based upon Price as manufacturer

B - Sound power levels and NC's are based on tests conducted in accordance with ARI Standard 880-98

C - Room NC levels shown include attenuation factors obtained from ARI Standard 885-98

D - Check submittal drawings for exact dimensions

E - Airflow units are cubic feet per minute, water flow units are US gallons per minute, all temperatures in degrees Fahrenheit, head loss in feet of water, air pressure drop in inches of water gauge

F - Airflow units are liters per second, water flow units are liters per second, all temperatures in degrees Centigrade, head loss in kilopascals, air pressure drop in Pascals

G - Blanks (-) indicate a sound power level of NC under 20

H - Water coil performance has been rated and certified in accordance with the edition of ARI Standard 410

ECM #2: New Building Control System

The temperature control scope of work includes the installation of an integrated web based energy management control system. The CTS proposed system will provide "Thin Client" computerized temperature control that is accessible from any computer that is connected to the Internet without the installation of any additional or proprietary software. The access shall allow multiple levels of access through hierarchy of passwords.

The system is proposed as an open protocol system based on an open Tridium Niagara framework. It is capable of integrating to LonMark, BACnet, and Modbus Networks. The system is fully capable of integrating a wide variety of control manufacturers back into the original system. No proprietary controls will be provided as part of our proposal.

The City of Ballwin will be provided with a full graphical interface. At the building level successive mouse clicks will open the various floors and building sections. Floor plans will have each room temperature dynamically displayed. A click on a room will bring up a graphic of the mechanical equipment serving that space. The equipment screen shall dynamically display the status of heating, cooling, and fan operation, as well as temperatures for sensors installed.

Time Schedules will be graphical and will have the ability to globally broadcast City of Ballwin changes to the system. Schedules will provide seven day schedules with holiday periods (summer, spring break, etc.), and special events like snow days and athletic events. Graphical timed override of schedules is provided. Provide the capability to group equipment control from common global schedules.

New space sensors will allow City of Ballwin occupants and staff to adjust the heating and cooling set point plus or minus 3 degrees (adjustable), and override setback for 2 hours (adjustable) from a space sensor override button.

On site Owner training for maintenance, troubleshooting, and system operations will be provided.

Our scope of work covers the following systems.

Equipment Summary:

- 27 VAV boxes with reheat
- 2 Boilers with circulating pumps
- 2 Hot water pump (existing)
- 1 ERV
- 2 Vertical Packaged Ground Source Heat Pump (AHU1 &2)
- 2 Dectron Pool Units (DEC1 &2) with circulating pumps
- 2 Heat Pipes
- 6 Water Cooled Chillers with two (2) circulating pumps each
- 2 Geothermal Loop pumps with VFDs, (4) immersion temperature sensors, (1) pressure sensor, (2) isolation valves
- 1 Console Cabinet Unit Heater (new at main entrance)
- 1 Unit Heater (existing)

Points for Controllers by Types:

VAV1-27 VAV Boxes (Typical of 27):

Mount and wire the following devices for the VAV boxes. Reuse any existing wiring as applicable. Controllers and control devices will be provided by CTS.

Inputs:

- Room Sensor – 5 conductors to the unit controller (reuse existing wire)

Outputs:

- Damper actuator/controller (reuse existing wire)
- Reheat Water Valve – 3 conductors to the unit controller. (reuse existing wire)

Communication:

- Communication bus to the controller (daisy chained)
- CTS will provide all necessary wire

Power:

- 24 VAC (10VA) is required at the controller. (reuse existing wire and transformer)

B-1.2 Boiler Plant:

Mount and wire the following devices.

Inputs:

- Hot Water Supply Immersion Sensor - 2 conductor to the central control panel
- Hot Water Return Immersion Sensor - 2 conductor to the central control panel
- Boiler #1 Supply Immersion Sensor - 2 conductor to the central control panel
- Boiler #2 Supply Immersion Sensor - 2 conductor to the central control panel

Outputs:

- Boiler #1 Start/Stop Relay - 2 conductor from the controller to the boiler control panel
- Boiler #1 Capacity Control – 3 conductors to the unit controller
- Boiler #1 Circulating Pump Start/Stop Interlock - hard wired to start with the boiler (from the boiler power circuit or directly or from the boiler per manufactures recommendation)
- Boiler #2 Start/Stop Relay - 2 conductor from the controller to the boiler control panel
- Boiler #2 Capacity Control – 3 conductors to the unit controller
- Boiler #2 Circulating Pump Start/Stop Interlock - hard wired to start with the boiler (from the boiler power circuit or directly or from the boiler per manufactures recommendation)
- Combustion Air Damper Actuator – 3 conductors to the unit controller (mounting and wiring of actuator by this contractor). The actuator is furnished by CTS.

Existing Hot Water Pumps [Constant Volume] (Typical of 1 lead lag system):

Mount and wire the following devices.

Inputs

- Lead Pumps Status (Current Switch) - 2 conductor to the central control panel
- Lag Pumps Status (Current Switch) - 2 conductor to the central control panel

Outputs:

- Lead Pump Start/Stop Relay - 2 conductor from the controller to the relay and 2 conductor from a relay to Starter
- Lead Pump Start/Stop Relay - 2 conductor from the controller to the relay and 2 conductor from a relay to Starter

Power:

- 24 VAC (10VA) is required at the controller. Use a minimum of 14 AWG wire.

C1-C6 - Water Cooled Chillers with circulating pumps (Typical of 6):

Mount and wire the following devices for each Water Source Heat Pump

Inputs

- Immersion Supply Water Temperature Sensor – 2 conductors to the unit controller
- Immersion Return Water Temperature Sensor – 2 conductors to the unit controller
- Immersion Entering Condenser Water Temperature Sensor – 2 conductors to the unit controller
- Immersion Leaving Condenser Water Temperature Sensor – 2 conductors to the unit controller
- System Circulating Pump Status – 2 conductors from current switch to the unit controller
- Condenser Circulating Pump Status – 2 conductors from current switch to the unit controller

Outputs:

- Start Stop – 2 conductors to the unit controller
- First Stage – 2 conductors to the unit controller
- Second Stage – 2 conductors to the unit controller
- Reversing Valve – 2 conductors to the unit controller
- System Circulating Pump – 2 conductors from the unit controller to the relay, and 2 conductors from the relay to the pump starter
- Condenser Circulating Pump – 2 conductors from the unit controller to the relay, and 2 conductors from the relay to the pump starter

Communication:

- Communication bus to the controller (daisy chained)

Power:

- 24 VAC (10VA) is required at the controller. Use a minimum of 14 AWG wire.

AHU-1 Ground Source Heat Pumps (Typical of 1):

Controllers and control devices will be factory supplied and installed. Communications to the system is through BACnet.

BACnet interface from the unit to the nearest Jace controller.

Inputs

- Room Sensor – 5 conductors to the unit mounted BACnet controller

AHU-2 Ground Source Heat Pumps (Typical of 1):

Controllers and control devices will be factory supplied and installed. Communications to the system is through BACnet. BACnet interface from the unit to the nearest Jace controller.

Inputs (BACnet)

- Room Sensor – 5 conductors to the unit mounted BACnet controller

Inputs: (auxiliary controller)

- Return Air CO2 Sensor – 4 conductors to the auxiliary controller
- Building Pressure Sensor - 4 conductors to the auxiliary controller

Outputs: (auxiliary controller)

- Outside air damper actuator – 3 conductors to the auxiliary controller
- Return air damper actuator – 3 conductors to the auxiliary controller

Communication (auxiliary controller):

- Communication bus to the auxiliary controller (daisy chained)

Power (auxiliary controller):

- 24 VAC (10VA) is required at the controller. Use a minimum of 14 AWG wire.

Air to Air Energy Recovery Ventilators (Typical of 1):

Controllers and control devices will be factory supplied and installed. Communications to the system is through BACnet. Wiring the BACnet interface from the unit to the nearest Jace controller.

Dectron Pool Units (DEC1 &2) with circulating pumps (Typical of 2):

Controllers and control devices will be factory supplied and installed. Communications to the system is through BACnet. BACnet interface from the unit to the nearest Jace controller.

Inputs (BACnet)

- Room Sensor – 5 conductors to the unit mounted BACnet controller

Outputs:

- Circulating Pump Start/Stop - 2 conductor from the unit mounted BACnet controller to the pump relay

Heat Pipe (Typical of 2)

Mount and wire the following devices.

Inputs:

- Supply Air Temperature Sensor - 2 conductors to the unit controller
- Return Air Temperature Sensor - 2 conductors to the unit controller
- Exhaust Air Temperature Sensor - 2 conductors to the unit controller
- Outside Air Temperature Sensor - 2 conductors to the unit controller

Unit Heaters (Typical of 2 – New console unit and existing unit heater):

Mount and wire the following devices.

Inputs:

- Room Sensor – 5 conductors to the unit controller

Outputs:

- Fan Start/Stop - 2 conductor from the controller to the fan relay
- Hot water valve actuator – 3 conductors to the unit controller

Communication:

- Communication bus to the controller (daisy chained)

Power:

- 24 VAC (10VA) is required at the controller. Use a minimum of 14 AWG wire.

Exhaust Fans (on/off control by time schedule):

Mount and wire the following devices.

Outputs:

- Fan Start/Stop - 2 conductor from the controller to the fan relay

Communication:

- Communication bus to the controller (daisy chained)

Power:

- 24 VAC (10VA) is required at the controller. Use a minimum of 14 AWG wire.

Make Up Water Safety Controls:

This is designed to shut off the makeup water in the event of a system leak. Mount and wire the following devices.

Inputs:

- One (1) Loop Pressure sensor (Geothermal Loop)
- One (1) Loop Pressure sensor (Hot Water Loop)

Outputs:

- One (1) Make up water solenoid valve (ASCO) (Geothermal Loop) – 3 conductors to the unit controller (mounting of valve by mechanical and wiring of valve by this contractor).
- One (1) Make up water solenoid valve (ASCO) (Hot Water Loop) – 3 conductors to the unit controller (mounting of valve by mechanical and wiring of valve by this contractor).
- Alarm LED & horn with silence - 2 conductor to the central control panel

Geothermal Loop Controls:

Mount and wire the following devices. –

Inputs:

- Four (4) Loop Immersion Sensors - 2 conductor to the central control panel
- Loop Pressure sensor

Geothermal Loop Pumps [Variable Volume] (Typical of 1 lead lag system):

Mount and wire the following devices.

Inputs

- Lead Pumps Status (Current Switch) - 2 conductor to the central control panel
- Lag Pumps Status (Current Switch) - 2 conductor to the central control panel

Outputs:

- Lead Pump Start/Stop Relay - 2 conductor from the controller to the relay and 2 conductor from a relay to VFD
- Lag Pump Start/Stop Relay - 2 conductor from the controller to the relay and 2 conductor from a relay to VFD
- Lead Pump VFD speed control - 2 conductor from controller to the relay and 2 conductors from the relay to the VFD
- Lag Pump VFD speed control - 2 conductor from controller to the relay and 2 conductors from the relay to the VFD

Power:

- 24 VAC (10VA) is required at the controller. Use a minimum of 14 AWG wire.

Miscellaneous Building Controls (one per building typical of 1):

Mount and wire the following devices.

Inputs:

- Outside Air Sensor – 5 conductors to the central control panel (Install on the North wall)
- Outside Air Relative Humidity Sensor – 5 conductors to the central control panel (Install on the North wall)

Central Controller:

- Jace (Central Controller) to be installed in the 2nd floor mechanical room.
Provide 120 Volt dedicated power circuit.
Provide Ethernet connection to server.

Communication:

- Communication bus to the controllers (daisy chained)

Computer (Building Supervisor):

- Provide Ethernet connection from computer to server

Training and Systems Support Provisions for the Tridium Building Automation System:

As a part of this contract CTS has included a three (3) year Remote System Support program for the Tridium Building Automation System at no additional cost to the Customer. This will assure that the new controls are operating at optimum performance and are maintaining a quality environment for the occupants. These support services are provided to insure that:

1. Employees become comfortable operating the new systems
2. Operations are monitored so that the energy savings projected with the new system become a reality
3. Retraining is accomplished as may be required for current or new employees
4. Technical assistance is available as needed which establishes a routine communications comfort level between your employees and the CTS support services personnel
5. Customer's specified HVAC service contractor is trained in the use of the system

The support services include:

1. Maintaining Monitoring Internet Interfaces: This enables remote operation of the new automation system and allows CTS software specialists to monitor operations to assure all parts of the system are operating properly.
2. Updating Software Programs as Required: Remote support of the operating software in the system often needs initial "tuning" as we pass through the seasons.
3. Backup Up the System: CTS will perform a remote backup annually which will be held off site and in the CTS office
4. Training/Retraining of Personnel: Included is remote retraining of your operating staff as required until they are comfortable with the system. This also includes training for new employees.
5. Training of HVAC Contractor: Training the customer's specified HVAC service contractor in the use of the system for troubleshooting is included in this contract
6. Operation Monitoring for Energy Savings: The software discipline in your new system is designed to provide a good environment as well as achieve energy cost savings. Although these efforts usually work in harmony, they can occasionally work at odds with each other. CTS will remotely monitor your operating program to uncover changes that may have been made that could frustrate these objectives and communicate corrective recommendations to you.
7. Technical Support: CTS will be available for remote technical support to help you identify problems you may be having with your mechanical HVAC systems

ECM #3: Lighting

CTS will provide the lighting materials described in the scope outline that follows and a more detailed attachment listed as Attachment H. CTS will provide qualified electricians as the labor to complete the turnkey lighting solution. All labor shall comply with the Prevailing Wage/Davis-Bacon Act. The work will be completed in a professional manner in compliance to all applicable codes. The result will be an energy efficient solution that will provide lighting levels appropriate for the tasks being performed in each space. The existing fixtures, lamps and ballasts indicated to be removed shall be properly demolished and discarded or recycled in a legally acceptable manner by CTS and our subcontractors. Necessary documentation will be provided to the City to document the recycling.

City of Ballwin will have final approval on new fixtures being provided and installed.

Retrofit Description/ Existing Equipment Affected	Existing
FIXTURE, 22W, LED Flood Light, 2,055 Lumens, Knuckle with 1/2" NPS, 120/277V, 100,000 hours l	1
Flood Light, Metal Halide, 100W, 1/2" Knuckle Mount	1
FIXTURE, 22W, LED Flood Light, 2,055 Lumens, Knuckle with 1/2" NPS, 120/277V, 100,000 hours l	1
Flood Light, Metal Halide, 100W, 1/2" Knuckle Mount	1
FIXTURE, 48W LED, 3100 Lumen Wall Pack, 120/277V, Bronze, with 120V Photo control, 100,000	6
Outdoor, Wall Mount Fixture, Metal Halide, 400W, 120/277V	6
FIXTURE, 4x 4ft TS, Custom Damp Location Aluminum Fluor., Powder coat After Make, Solid Top,	24
Wall Mount, Metal Halide, 400W, 120/277V, Damp Location, Pool Fixture	24
FIXTURE, 59W LED, 3600 Lumen, Ceiling Mount, 120/277V, Bronze, with 120V Photo control, 100	2
Outdoor, Low Bay Fixture, Metal Halide, 400W, 120/277V	2
FIXTURE, 6x TS HG, Gym with Wire Guard, Miro Reflector, HLO HE Program Start Ballast 120/277	30
New Installation	30
FIXTURE, LED 2400 Lumen, 2' x 2' Volumetric Grid Troffer, 120/277V, 5000K	33
Recessed Can, Metal Halide, 70W, 120/277V	33
FIXTURE, LED Exit Sign, Wet Location Rated, NiCad Battery Backup, Universal Mount, 1 or 2 sided	1
Exit Sign, Incandescent, 40W, Wet Location Rated	1
NO ACCESS, Room was not accessible and therefore not included in project scope	1
0	1
REMOVE, From Service and Electric power	13
High Bay Fixture, Metal Halide, 1000W, 120/277V	12
Grid Troffer, 2' x 4', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Parabolic Lense	1
RETRO, 100W, INDUCTION, Recessed Can Retrofit, 4700K, 90 CRI, 120/277V, 100,000 hour life ex	11
Recessed Can, Metal Halide, 250W, 120/277V	11
RETRO, 12W LED, A19, 800 Lumen, Dimmable, Medium Base, 120V, 3000K, 40,000 Hour Super Lo	12
Bollard Fixture, Metal Halide, 100W, 120/277V	12
RETRO, 1x 4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K Hi Vision Lamp	3
Under Cabinet Fixture, 1' x 4', 1x F34T12 (34W) Mag ES Ballast, 120/277V, Missing Lens	1
Under Cabinet Fixture, 1' x 4', 2x F34T12 (34W) Mag ES Ballast, 120/277V, Plug in	2
RETRO, 20W LED, PAR38, 1100 Lumen, 25" Narrow Flood, Dimmable, Medium Base, 120V, 3000K	45
Recessed Can, Metal Halide, 70W, 120/277V	45
RETRO, 20W LED, PAR38, 1200 Lumen, 40" Flood Up/ 20W LED, PAR38, 1100 Lumen, 25" Narrow	27
Wall Mount Cylinder Fixture, Metal Halide, 70W UP/100W Down, 120/277V	27
RETRO, 2x 4ft T8, NLO HE Instant Start Ballast 120/277V, 92% White Reflector Kit, 28W 5000K Hi	34
Grid Troffer, 2' x 4', 4x F34T12 (34W), Mag ES Ballast, 120/277V, Parabolic Lense	34
RETRO, 2x 4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K Hi Vision Lamp	85
Vapor Tight Fixture, 1' x 4', 2x F32T8 (32W), Elec Normal Power Ballast, 120/277V	35
Wall Mount Fixture, 1' x 4', 2x F32T8 (32W), Instant Start Ballast, 120/277V	4
Slim Strip Fixture, 1' x 4', 2x F34T12 (34W), Mag ES Ballast, 120/277V	1
Grid Troffer, 2' x 4', 2x F34T12 (34W), Mag ES Ballast, 120/277V, Prismatic Lense	38
Industrial Hooded Fixture, 1' x 4', 2x F32T8 (32W), Elec Normal Power Ballast, 120/277V	3
Slim Strip Fixture, 1' x 4', 2x F32T8 (32W), Elec Normal Power Ballast, 120/277V	4
RETRO, 4x 4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K Hi Vision Lamp	3
Slim Strip Fixture, 1' x 8', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V	3
RETRO, 4x 4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K Hi Vision Lamp	15
Industrial Hooded Fixture, 1' x 8', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V	15
RETRO, 5W LED, Flood 36", GS.3mm Bpin Base, 120V, 4000K, 50,000 Hour Super Long Life	5
Track Light, MR16, Halogen Lamp, 50W	5
RETRO, LED, 100W, 10,000 Lumen Spider Mount Custom Kit, 120/277V, 5000K Color, 100,000 ho	12
Outdoor Post Top Spider Mount Shoe Box, Metal Halide, 400W, 120/277V	12
SKIP, No Suitable Retrofit Available, Not included in project	1
Recessed Fixture 6", CFL 2xQ26, (26W), 120/277V	1
SKIP, Not Included in project	235
Grid Troffer, 2' x 4', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Parabolic Lense	86
Grid Troffer, 2' x 4', 2x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Prismatic Lense	4
Grid Troffer, 2' x 4', 2x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Prismatic Lense, Bath	2
Space or Fixture is not included in project	1
Grid Troffer, 2' x 2', 4x F17T8 (17W), Elec Normal Power Ballast, 120/277V, Parabolic Lense	8
Grid Troffer, 1' x 4', 2x F34T12 (34W), Mag ES Ballast, 120/277V, Parabolic Lense	2
Grid Troffer, 2' x 2', 4x F17T8 (17W), Elec Normal Power Ballast, 120/277V, Prismatic Lense	118
Flanged Grid Troffer, 1' x 4', 2x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Parabolic Ler	12
Grid Troffer, 2' x 4', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Prismatic Lense	2
Grand Total	600

ECM #4: Building Envelope Improvements

The intent of this measure is to improve the integrity of the building envelope and to reduce the building's overall heat gain and loss. The primary focus of all Building Envelope work is to create an impervious pressure boundary which will contain the conditioned air inside of the envelope. The two driving forces that Building Envelope focuses on are Stack Effect and Wind Effect. Stack effect is built into all structures and begins with unconditioned air being drawn at the bottom of the structure, conditioned, and then exhausted at the upper most point of the structure. Wind effect is driven by nature and the prevailing source and affects all surfaces and classifies them as either intake or exhaust for that given moment.

Air leakage is defined as the "uncontrolled migration of conditioned air through the building envelope." Caused by pressure differences due to wind, stack effect, and mechanical systems, it has been shown to represent the single largest source of heat loss or gain through the building envelopes of nearly all types of buildings. Tests carried out by the National Research Council of Canada on High Rise Commercial and Residential Buildings, Schools, Supermarkets, and Houses have shown levels of 30 % to 50% of heat loss could be attributed to Air Leakage.

Beyond representing potential for energy savings, uncontrolled air leakage can affect thermal comfort of occupants, air quality through ingress of contaminants from outside and the imbalance of mechanical systems, and the structural integrity of the building envelope - through moisture migration. Control of air leakage involves the sealing of gaps, cracks, and holes, using appropriate materials and systems to create, if possible, a continuous plane of "air-tightness" to completely encompass the Building Envelope. Part of this process also incorporates the need to "decouple" floor - to - floor, and to "compartmentalize" components of the building to equalize pressure differences.

Areas of Focus

Exterior Doors - Exterior doors provide a primary point of entry for unconditioned outside air, whether they are single entries or garage openings. It is absolutely necessary for doors to function and seal properly. These openings often times are provided with different materials such as door weather-strips and door sweeps or a felt material with a fin strip and lower threshold gaskets. Time and usage will deteriorate the best material as will some chemicals used to clear the access points.

Interior Doors - Interior doors in multiple story buildings allow stack effect to move between the spaces to the exhaust point. Stairwell doors that open into negatively pressured corridors at each floor contribute to the infiltration of unconditioned air into corridors serving as return air plenums. By weather-stripping these doors, the individual floors will be able to be decoupled so that the zoning controls for these levels may work properly. This also pertains to areas with more than a five degree temperature differential. Boiler Rooms or Mechanical Rooms with outside air provided for combustion have to be separated from the conditioned space. This includes all penetrations through walls and ceilings to the conditioned area. These areas are outside of the envelope for safety purposes and it is imperative that they remain so.

Roof Seams - Roof wall seam is the point at which the roof and wall meet and is in contact with either a masonry or frame material. This point normally represents the highest point in the structure and also the highest leakage rate of the structure. Suspended ceilings provide access points to seal this penetration in the pressure boundary. Drywall or hard ceilings negate the opportunity to seal this critical juncture and other avenues have to be evaluated for a plausible cost effective retrofit.

Building Insulation - Insulation is an absolute necessity in conservation measures and needs to be applied to a solid pressure boundary for effectiveness. Voids and imperfections such as the insulation's not being in contact with the heated surface degrade the R-Value exponentially, and the cost effectiveness of the retrofit has to be evaluated. R-Values meeting only the minimum requirements of the original construction will not measure to current energy code standards.

The scope of work should include the following:

- Caulking sides and tops of window casings where air infiltration is observed.
- Weather-stripping to all stairwell doors to seal the vertical shaft.
- Weather-stripping all vestibule entry doors.
- Sealing all obvious holes in walls, gaps around pipe and ductwork penetrations, and gaps around hatchways and access doors to provide separation between HVAC zones and floor levels.
- Applying weather-stripping at all mechanical room doors and at any service entrance doors opening directly to the outdoors.

ECM#5: Pool Equipment Upgrades

CTS will install the following in the pool filter room:

- The existing Becsys5 chemical controller for the leisure pool. By adding the total chlorine sensor and flow cell to the existing system it will allow it to work with the existing UV systems ramping it up and down as the combined chlorine levels increase. By running the UV system at half power the City will be saving energy and extending the life of the bulb. The controller will also control the flow of the leisure pool filter system.
- Spa control installed with all the same options as above, but will not be hooked to the air handling system.
- VFD drives (4) for the following 15 HP pumps. The main pool filter pump, two river drives and slide pump. Includes the drives installed and a flow meter for the main filter pump to control the flow.
- VFD Drive for 20 HP pump for SCS, no flow meter.
- VFD Drive for the 7.5 HP vortex pump, no flow meter.

ECM #6: Roof Replacement

CTS will replace the roof per the following:

- Demo Existing roof system down to the existing roof deck. All gravel ballasts and demolition debris to be removed off site and disposed of in a legal manner.
- Areas of existing tapered insulation to receive new ¼":12" tapered insulation with an average value of R-28. Insulation to be fastened to roof deck with screws and plates
- Areas of existing flat insulation will receive new 4.5" insulation with an R-28 value. Insulation to be fastened to roof deck with screws and plates
- Install new fully adhered .080 White TPO roof system with all flashings and accessories necessary for a complete roof system.
- Loose laid White TPO slip sheet to be installed beneath roof mounted solar panels
- Existing concrete pavers to be removed and replaced in the same configuration.
- All existing sheet metal to be reused.
- CTS will remove and replace existing solar panels.
- Complete roof system will come with 30 year manufacturer's warranty.

ECM #7: Exterior Door Replacements

CTS will replace all 16 doors with new monumental medium stile doors, new glass, new closers and new hinges. This does not include any framing, all framing will remain, new doors will be furnished and existing auto operators will be reused.

ATTACHMENT B

INSTALLATION SCHEDULE

CTS plans to install the project over the winter and spring of 2014 with substantial completion by May 2013. The CTS project manager will submit to the city a detailed schedule to be reviewed on a weekly basis with the City of Ballwin. See the preliminary schedule below subject to change base starting date, equipment lead time, and weather.

Task Name	Duration	Start	Finish
The Pointe - Ballwin	121 days	Wed 10/30/13	Fri 4/25/14
Project Approval	0 days	Wed 10/30/13	Wed 10/30/13
Approve Final Plans	4 days	Fri 11/15/13	Wed 11/20/13
Final Contract Issued	0 days	Mon 12/2/13	Mon 12/2/13
Mechanical System Replacement	103 days	Mon 11/18/13	Fri 4/18/14
Geothermal	74 days	Mon 11/18/13	Mon 3/10/14
Test Well	1 day	Mon 11/18/13	Mon 11/18/13
Wells	25 days	Mon 1/27/14	Fri 2/28/14
Trenching Well/Piping	4 days	Mon 3/3/14	Thu 3/6/14
Seed/Straw	2 days	Fri 3/7/14	Mon 3/10/14
Natatorium	81 days	Mon 12/2/13	Wed 4/2/14
Order Equipment (Lead Time & Shipping)	12 wks	Mon 12/2/13	Tue 3/4/14
Remove Equipment	2 days	Tue 3/11/14	Wed 3/12/14
Equipment Installation	3 days	Thu 3/13/14	Mon 3/17/14
Piping Installation	10 days	Tue 3/18/14	Mon 3/31/14
Start-up/Commissioning	2 days	Tue 4/1/14	Wed 4/2/14
HVAC	93 days	Mon 12/2/13	Fri 4/18/14
Order Equipment (Lead Time & Shipping)	10 wks	Mon 12/2/13	Tue 2/18/14
Phase I - Terminal Equipment	25 days	Mon 1/27/14	Fri 2/28/14
Remove Equipment	5 days	Mon 1/27/14	Fri 1/31/14
Equipment Installation	4 wks	Mon 2/3/14	Fri 2/28/14
Phase II - Machine Room Equipment	25 days	Tue 3/11/14	Mon 4/14/14
Remove Equipment	5 days	Tue 3/11/14	Mon 3/17/14
Equipment Installation	4 wks	Tue 3/18/14	Mon 4/14/14
Start-up/Commissioning	4 days	Tue 4/15/14	Fri 4/18/14
Lighting	43 days	Mon 12/2/13	Fri 2/7/14
Order Equipment (Lead Time & Shipping)	3 wks	Mon 12/2/13	Fri 12/20/13
Upgrade Lighting	2 wks	Mon 1/27/14	Fri 2/7/14
Building Envelope Improvements	5 days	Mon 12/2/13	Fri 12/6/13
Pool Equipment Upgrades	14 days	Mon 12/2/13	Thu 12/19/13
Roof Replacement	37 days	Mon 1/27/14	Tue 3/18/14
Order Equipment (Lead Time & Shipping)	2 wks	Mon 1/27/14	Fri 2/7/14
Remove Solar Equipment	2 days	Mon 3/3/14	Tue 3/4/14
Demo Equipment	2 days	Mon 2/10/14	Tue 2/11/14
Replace Roof	8 days	Wed 3/5/14	Fri 3/14/14
Reinstall Solar	2 days	Mon 3/17/14	Tue 3/18/14
Exterior Door Replacement	14 days	Mon 12/2/13	Thu 12/19/13
Punch List	5 days	Mon 4/21/14	Fri 4/25/14
Project Completion	0 days	Fri 4/25/14	Fri 4/25/14

ATTACHMENT C

PAYMENT SCHEDULE

1. The following is the payment schedule for the project.

Construction of the Project

The project shall be invoiced on a monthly basis for the work completed and equipment ordered for the project. These progress invoices shall be submitted on the last day of each month. All invoices shall be billed as net thirty (30) days.

A mobilization fee will be due upon contract execution for 10% of the contract price.

ATTACHMENT D

ENERGY GUARANTEE

1. DEFINITIONS

When used in this Agreement, the following capitalized words shall have the meanings ascribed to them below:

"Baseline Period" is the period of time which defines the Baseline Usage and is representative of the facilities' operations, consumption, and usage that is used as the benchmark for determining cost avoidance.

"Baseline Usage or Demand" the calculated or measured energy usage (demand) by a piece of equipment or a site prior to the implementation of the ECMs. Baseline physical conditions, such as equipment counts, nameplate date, and control strategies, will typically be determined through surveys, inspections, and/or metering at the site.

"Energy and Operational Cost avoidance Guarantee Practices" are those practices identified in Attachment E, intended to achieve avoided costs in energy and/or operating expenses.

"Energy Costs" may include the cost of electricity and fuels to operate HVAC equipment, facility mechanical and lighting systems, and energy management systems, and the cost of water and sewer usage, as applicable.

"ECM" the Energy Conservation Measure (ECM) is the installation of equipment or systems, or modification of equipment or systems as described in Attachment A.

"Facilities" shall mean those buildings where the energy and operational cost savings will be realized.

"F.E.M.P." shall mean the Federal Energy Management Program of the U.S. Department of Energy and its Measurement and Verification Guidelines for Federal Energy Projects (DOE/GO-10096-248, February 1996, or later versions). The F.E.M.P. guidelines classify measurement and verification approaches as Option A, Option B, Option C, and Option D. The F.E.M.P. guidelines is based on the International Performance Measurement and Verification Protocol (I.P.M.V.P.) and was written to be fully consistent with it. It is intended to be used by Federal procurement teams consisting of contracting and technical specialists. The focus of F.E.M.P. guidelines is on choosing the M&V option and method most appropriate for specific projects.

"Financing Document" refers to that document executed between CUSTOMER and a third-party financing entity providing for payments from CUSTOMER third-party financing entity.

"Final Project Acceptance" refers to the CUSTOMER acceptance of the installation of the ECMs as described in Attachment A.

"First Guarantee Year" is defined as the period beginning on the first (1st) day of the month following the date of Final Retrofit Acceptance of the Work installed and ending on the day prior to the first (1st) anniversary thereof.

"Guarantee Period" is defined as the period beginning on the first (1st) day of the First Guarantee Year and ending on the last day of the final Guarantee Year.

"Guarantee Year" is defined as the First Guarantee Year and each of the successive twelve (12) month periods commencing on the anniversary of the commencement of the First Guarantee Year throughout the Term of this Agreement.

"Guaranteed Savings" is defined as the amount of avoided Energy and Operational Costs necessary to pay for the cost of the Work incurred by CUSTOMER in each Guarantee Year (as identified in Section 3.1 hereof).

"I.P.M.V.P." International Performance Measurement and Verification Protocol (July 1997, or later version) provides an overview of current best practice techniques available for measurement and verification of performance contracts. This

document is the basis for the F.E.M.P. protocol and is fully consistent with it. The techniques are classified as Option A, Option B, Option C, and Option D.

"Measurement and Verification Plan" (M&V Plan) is defined as the plan providing details on how the Guarantee Savings will be verified.

"Operational Costs" shall include the cost of operating and maintaining the facilities, such as, but not limited to, the cost of inside and outside labor to repair and maintain Covered Systems and Equipment, the cost of custodial supplies, the cost of replacement parts, the cost of deferred maintenance, the cost of lamp and ballast disposal, and the cost of new capital equipment.

"Option A" is a verification approach that is designed for projects in which the potential to perform needs to be verified, but the actual performance can be stipulated based on the results of the "potential to perform and generate savings" verification and engineering calculations. Option A involves procedures for verifying that:

- Baseline conditions have been properly defined; and
- The equipment and/or systems that were contracted to be installed have been installed; and
- The installed equipment components or systems meet the specifications of the contract in terms of quantity, quality, and rating; and
- The installed equipment is operating and performing in accordance with the specifications in the contract and meeting all functional tests; and
- The installed equipment components or systems *continue, during the term of the contract*, to meet the specifications of the contract in terms of quantity, quality and rating, and operation and functional performance.

"Option B" is for projects in which the potential to perform and generate Savings needs to be verified; and actual performance during the term of the contract needs to be measured (verified). Option B involves procedures for verifying the same items as Option A plus verifying actual achieved energy savings during the term of the contract. Performance verification techniques involve engineering calculations with metering and monitoring.

"Option C" is also for projects in which the potential to perform needs to be verified and actual performance during the term of the contract needs to be verified. Option C involves procedures for verifying the same items as Option A plus verifying actual achieved energy savings during the term of the contract. Performance verification techniques involve utility whole building meter analysis and/or computer simulation calibrated with utility billing data.

"Option D" is a verification technique where calibrated simulations of the baseline energy use and/or calibrated simulations of the post-installation energy consumption are used to measure Savings for the Energy Conservation Measures. Option D can involve measurements of energy use both before and after the Retrofit for specific equipment or energy end use as needed to calibrate the simulation program. Periodic inspections of the equipment may also be warranted. Energy consumption is calculated by developing calibrated hourly simulation models of whole-building energy use, or equipment sub-systems in the baseline mode and in the post-installation mode and comparing the simulated annual differences for either an average year or for conditions that correspond to the specific year during either the baseline or post-installation period.

"Retrofit" is the work provided by CTS as defined by the "ECMs".

"Savings" is defined as avoided, defrayed, or reallocated costs.

"Term" shall have the meaning as defined in Section 2 hereof.

"Total Guarantee Year Savings" is defined as the summation of avoided Energy and Operational Costs realized by facilities in each Guarantee Year as a result of the Retrofit provided by CTS as well as Excess Savings, if any, carried forward from previous years.

2. TERM AND TERMINATION

2.1 Guarantee Term. The Term of this Guarantee Period shall commence on the first (1st) day of the month following the date of Final Project Acceptance of the Work installed pursuant to this agreement and shall terminate at the end of the

Guarantee Period unless terminated earlier as provided for herein. The Term of this Guarantee Period is defined in Section 1 of Attachment E.

2.2 Guarantee Termination. Should this Agreement be terminated in whole or in part for any reason prior to the end of the Term, the Guaranteed Savings for the Guarantee Year in which such termination becomes effective shall be prorated as of the effective date of such termination, with a reasonable adjustment for seasonal fluctuations in Energy and Operational Costs, and the Guaranteed Savings for all subsequent Guarantee Years shall be null and void.

3. SAVINGS GUARANTEE

3.1 Guaranteed Savings. CTS guarantees to CUSTOMER that the identified Facilities will realize the total energy and operational cost avoidance through the combined value of all ECMs over the Term of the contract as defined in Section 1 of Attachment E. In no event shall the savings guarantee provided herein exceed the total installation, maintenance, and financing costs for the Work under this Agreement. Notwithstanding any other provision of this Agreement required savings reconciliation or verification, the Total Guarantee Year Savings in each Guarantee Year are stipulated and agreed to by both parties to this Agreement to equal the Energy Costs and Operational Cost Avoidance amounts set forth in Attachment E (Schedule of Savings), and shall be deemed realized upon the date of final Project Acceptance.

3.1.1 Additional Savings. Additional energy and/or operational cost avoidance that can be demonstrated as a result of CTS's efforts that result in no additional costs to CUSTOMER beyond the costs identified in this Agreement will be included in the guarantee savings reconciliation report for the applicable Guarantee Years(s).

3.1.2 Savings Prior to Final Retrofit Acceptance. All energy and operational cost avoidance realized by CUSTOMER that result from activities undertaken by CTS prior to Final Project Acceptance, including any utility rebates or other incentives earned as a direct result of the installed Energy Conservation Measures provided by CTS, will be applied toward the Guaranteed Savings for the First Guarantee Year.

3.1.3 Cumulation of Savings. The Guaranteed Savings in each Guarantee Year are considered satisfied if the Total Guarantee Year Savings for such Guarantee Year equals or exceeds the Retrofit and Support Costs for such Guarantee Year or the amount identified in Section 1 of Attachment E hereto.

3.1.4 Excess Savings. In the event that the Total Guarantee Year Savings in any Guarantee Year exceed the Guaranteed Savings required for that Guarantee Year, such Excess Savings shall be billed to CUSTOMER (up to any amounts previously paid by CTS for a Guaranteed Savings shortfall pursuant to Section 3.1.5), which amount shall be payable within thirty (30) days after the amount of such Total Guarantee Year Savings has been determined and any remaining Excess Savings shall be carried forward and applied against Guaranteed Savings shortfalls in any future Guarantee Year.

3.1.5 Savings Shortfalls. In the event that the Total Guarantee Year Savings in any Guarantee Year is less than the Guaranteed Savings required for that Guarantee Year, after giving credit for any Excess Savings carried forward from previous Guarantee Years pursuant to Section 3.1.4. CTS shall, upon receipt of written demand from CUSTOMER, compensate CUSTOMER the amount of any such shortfall, limited by the value of the guarantee, within thirty (30) days. Resulting compensation shall be CTS's sole liability for any short fall in the Guaranteed Savings.

3.2 Savings Reconciliation Documentation. CTS will provide CUSTOMER with a guarantee savings reconciliation report after the first Guarantee Year. CUSTOMER will assist CTS in generating the savings reconciliation report by providing CTS with copies of all bills pertaining to Energy Costs within two (2) weeks following the CUSTOMER's receipt thereof, together with access to relevant records relating to such Energy Costs. CUSTOMER will also assist CTS by permitting access to any maintenance records, drawings, or other data deemed necessary by CTS to generate the said report. Data and calculations utilized by CTS in the preparation of its guarantee cost savings reconciliation report will be made available to CUSTOMER along with such explanations and clarifications as CUSTOMER may reasonably request.

3.2.1 Acceptance of Guarantee Reconciliation. At the end of the first Guarantee Year the CUSTOMER will have forty-five (45) days to review the guarantee savings reconciliation report and provide written notice to CTS of non-acceptance of the Guarantee Savings for that Guarantee Year. Failure to provide written notice within forty-five (45) days of the receipt of the guarantee savings reconciliation report will deem it accepted by CUSTOMER. If the annual guarantee savings have been met after the first year, the guarantee will be deemed realized for the entire guarantee term.

3.2.2 Guarantee Savings Reconciliation. Guarantee Savings will be determined in accordance with the methodology(s), operating parameters, formulas, and constants as described below and/or defined in Attachment E and/or additional methodologies defined by CTS that may be negotiated with CUSTOMER at any time.

For reconciliation of Guarantee Savings employing the method of utility bill analysis consistent with F.E.M.P. Option C.

Energy usage for the Facilities for such Guarantee Year will be summarized and compared with the adjusted Baseline Period energy usage for the Facilities through the use of energy accounting software. The difference between the adjusted Baseline Period energy usage and the Guarantee Year energy usage will be multiplied by the applicable energy rate as defined in Attachment E, to calculate the Energy Cost avoidance. Energy Cost avoidance may also include, but are not limited to, Savings from demand charges, power factor correction, taxes, ratchet charges, rate changes and other utility tariff charges that are reduced as a result of the CTS involvement. A Baseline Period will be specified (Section 1 of Attachment E) for the purpose of utility bill analysis.

AND/OR for those energy audits employing the method consistent with I.P.M.V.P. and/or F.E.M.P. Options A and/or B:

For each ECM, CTS will employ an M&V Plan which may be comprised of any or all of the following elements:

1. Pre-retrofit model of energy consumption or demand
2. Post-retrofit measured energy consumption
3. Post-retrofit measured demand and time-of-use
4. Post-retrofit energy and demand charges
5. Sampling plan
6. Stipulated Values

The value of the energy savings will be derived from the measured data and engineering formulae included herein, and the applicable energy charges during each Guarantee Year. In some cases, energy usage and/or demand will be calculated from measured variables that directly relate to energy consumption, demand or cost, such as, but not limited to, measured flow, temperature, current, voltage, enthalpy or pressure.

AND/OR for those energy audits employing the method consistent with I.P.M.V.P. and/or F.E.M.P. Option D:

For each Energy Conservation measure, CTS will employ an M&V Plan which may be comprised of any or all of the following elements:

1. Pre-retrofit model of energy consumption or demand
2. Post-retrofit model of energy consumption or demand
3. Post-retrofit measured energy consumption
4. Post-retrofit measured demand and time-of-use
5. Post-retrofit energy and demand charges
6. Sampling Plan
7. Stipulated values

The value of the energy savings will be derived from a calibrated simulation of either the whole building or of sub-systems in the building to determine the difference in the performance of the specific equipment being replaced. This method may entail as needed one-time measurements of the performance of the energy consuming systems in the building in order to calibrate the simulation model. Energy usage for the Facilities for such Guarantee Year will be derived through the use of simulation programs.

3.3 Operational Cost Avoidance. The agreed-upon Operational Cost Avoidance as described in Attachment E (Schedule of Savings) will be deemed realized upon execution of this Agreement and will begin to accrue on the date of the completion and acceptance of each Retrofit improvement. These Savings are representative of information provided by the CUSTOMER consisting of either whole or partial budgeted operational costs and as such, it is hereby understood and agreed that the CUSTOMER is wholly responsible for assuring that these budgeted Operational Costs are accurate and achievable.

3.4 Base Year Adjustments. Baseline Period shall be adjusted to reflect: changes in occupied square footage; changes in energy-consuming equipment; changes in the Facilities; changes in Energy and Operational Cost Avoidance Guarantee Practices adversely affecting energy consumption and/or demonstrated operational changes; changes in weather between the Baseline Period and the Guarantee Year; and documented or otherwise conclusively established metering errors for the Baseline Period and/or any Guarantee Year adversely affecting energy usage measurement.

3.4.1 Facility Operational Changes. Except in the case of emergencies CUSTOMER agrees it will not, without the consent of an Authorized Representative of CTS: make any significant deviations from the applicable Energy and Operational Cost Avoidance Guarantee Practices; put any system or item of equipment in a permanent "on" position, if the same would constitute a deviation from the applicable Energy and Operational Cost Avoidance Guarantee Practices; or assume manual control of any energy management system or item of equipment, if the same would constitute a deviation from the applicable Energy and Operational Cost Avoidance Guarantee Practices.

3.4.2 Hours and Practices. To achieve these energy savings, CTS and CUSTOMER agree upon the operating practices listed in Attachment E.

3.4.3 Activities and Events Adversely Impacting Savings. CUSTOMER shall promptly notify CTS of any activities known to CUSTOMER which adversely impact: CTS's ability to realize the Guaranteed Savings and CTS shall be entitled to reduce its Guaranteed Savings by the amount of any such adverse impact to the extent that such adverse impact is beyond CTS's reasonable control.

3.5 Guarantee Adjustment. CTS's Guaranteed Savings obligations under this Agreement are contingent upon: (1) CUSTOMER following the Energy and Operational Cost Avoidance Guarantee Practices set forth herein and in Attachment E; (2) no alterations or additions being made by CUSTOMER to any of the Covered systems and Equipment without prior notice to and agreement by CTS; (3) CUSTOMER sending all current utility bills to CTS within two (2) weeks after receipt by CUSTOMER, if CUSTOMER fails to provide current utility bills for a period of time in excess of six (6) months CTS may, at its sole discretion, deem the Guarantee Savings obligation met during that period and any successive periods, and (4) CTS's ability to render services not being impaired by circumstances beyond its control. To the extent CUSTOMER defaults in or fails to perform fully any of its obligations under this Agreement, CTS may, in its sole discretion, adjust its Guaranteed Savings obligation; provided, however, that no adjustment hereunder shall be effective unless CTS has first provided CUSTOMER with written notice of CUSTOMER's default(s) or failure(s) to perform and CUSTOMER has failed to cure its default(s) to perform within thirty (30) days after the date of such notice.

The bond provided for the construction of the project only covers the performance of materials and workmanship for the completion of said construction work, not the energy guarantee.

ATTACHMENT E
SCHEDULE OF SAVINGS

1. Schedule of Savings

The total energy and operational cost avoidance over the Term of the contract is equal to or greater than \$ 3,975,329 as defined in the following:

- Annual Operational Cost Savings/Capital Costs Avoidance are not less than \$ 153,933 as listed in 1.2 (based on difference between existing system and geothermal on an annual basis for first 15 years per Life Cycle Costs Analysis in 1.3.3)
- Annual Energy Savings are not less than \$ 54,729 as listed in 1.1. (based on 90% of energy savings calculated per Life cycle cost analysis in 1.3.3)

or the sum of the Retrofit and Support Costs for such Guarantee Year, whichever is less. Provided further, in no event shall the savings guarantee provided herein exceed the total installation, maintenance, and financing costs for the Work under this Agreement.

The Term of this contract is for 15 years from the date of Final Project Acceptance

The Baseline Period is defined as August 2012 to July 2013.

CTS and the customer agree that the energy savings for each will be based on a 3% escalation factor for the costs of utilities. The utility rates for the audit reports will be based on an annual escalation of not less than 3% or the actual utility rate in the current year whichever is higher.

1.1 Energy Savings. The annual guarantee of energy cost avoidance is the sum of the below listed ECMs. The savings are based on the listed Energy and operational Cost Avoidance Guarantee Practices contained in Section 1.3 herein.

ECM Description

ECM #1: Mechanical System Replacement
ECM #2: New Building Control System
ECM #3: Lighting
ECM #4: Building Envelope Improvements
ECM#5: Pool Equipment Upgrades
ECM #6: Roof Replacement
ECM #7: Exterior Door Replacements

1.2 Operational Cost Savings. The annual guarantee of operational cost avoidance strategies are listed below. The Savings are based on the listed Energy and Operational Cost Avoidance Guarantee practices contained in Section 1.3 herein. The operational cost savings identified below are deemed satisfied upon contract execution.

Operational Savings Description

ECM #1: Mechanical System Replacement
ECM #2: New Building Control System
ECM #3: Lighting
ECM #4: Building Envelope Improvements
ECM#5: Pool Equipment Upgrades
ECM #6: Roof Replacement
ECM #7: Exterior Door Replacements

1.3 Energy and Operational Cost Avoidance Guarantee Practices:

1.3.1 BASELINE Operating Parameters: are the facility(s) and system(s) operations measured and/or observed before commencement of the Work. The data summarized will be used in the calculation of the baseline energy consumption and/or demand and for calculating baseline adjustments for changes in facility operation that occur during the Guarantee Period. CTS and CUSTOMER agree that the operating parameters specified in this section are representative of equipment operating characteristics during the Base Year specified in this Agreement. The following data was collected with the assistance of John Hoffman, Superintendent of Parks and Facility Operations.

Baseline Operating Parameters:

HVAC and lighting systems operation in the facility operated during the base year as needed. Building temperatures were observed to be 74° - 78°F during the cooling season.

Baseline Lighting Hours

											Nom Lig Time Savings	Avg KW Savings
Main REC Area/Gym	52	5	17 Hrs	4,420 Hrs	53	13 Hrs	52	08 Hrs	1,105 Hrs	5,525 Hrs	42%	18%
Office Space	52	5	12 Hrs	3,120 Hrs	53	05 Hrs	52	05 Hrs	00 Hrs	3,120 Hrs	42%	18%
Pool	52	5	06 Hrs	1,560 Hrs	53	06 Hrs	52	06 Hrs	630 Hrs	2,190 Hrs	42%	21%
Storage	52	5	02 Hrs	520 Hrs	53	00 Hrs	52	00 Hrs	00 Hrs	520 Hrs	63%	31%
Mechanical	52	5	06 Hrs	1,560 Hrs	53	03 Hrs	52	03 Hrs	315 Hrs	1,875 Hrs	63%	31%
Outdoor Dusk til Dawn	52	5	13 Hrs	3,380 Hrs	53	13 Hrs	52	13 Hrs	1,365 Hrs	4,745 Hrs	0%	0%

1.3.2 PROPOSED Operating Parameters of the facility(s) and system(s) after completion of Work. The data summarized will be used in the calculation of the post-retrofit energy consumption and/or demand. CTS and CUSTOMER agree that the proposed operating parameters specified in this section are representative of equipment operating characteristics during the Guarantee Period specified in this Agreement.

Proposed Operating Parameters on which each ECM will rely for achieving energy savings:

The lighting systems savings are based on the hours of operation less the time savings due to the occupancy sensors in the space list in Attachment H. The occupancy sensors savings are based on a reduction in run hours equal to the percentage in the table.

The HVAC systems savings are based on the hours of operation

The Pointe:

Monday-Friday 5:15 am -10:00 pm
Saturday 7:00 am - 8:00 pm
Sunday 8:00 am - 6:00 pm

Pool Hours:

Monday-Friday 5:45- 8:30pm
Saturday 7:00 am - 7:30 pm
Sunday 8:00 am – 5:30 pm

Holiday Schedule

New Year's Eve 5:15 am - 3:00 pm
New Year's Day 10:00 am - 6:00 pm
Easter CLOSED
Memorial Day 8:00 am - 5:00 pm
Independence Day 8:00 am - 5:00 pm
Labor Day 8:00 am - 5:00 pm
Thanksgiving Day CLOSED
Thanksgiving Friday 5:15 am -10:00 pm

Christmas Eve
Christmas Day

5:15 am - 1:00 pm
CLOSED

1.3.3 Operational Cost Avoidance. The following methodologies and/or calculations were used in determining the Operational Costs and/or avoided costs due to the Retrofit implementation. This section is to document standard formulas and/or a brief explanation of how the Operational Cost Savings is supposed to be generated.

Life Cycle Cost analysis was completed to determine difference between costs of existing system and retrofit with similar type systems and a geothermal HVAC system which is being installed. Annual operational costs savings were calculated based on the following document.

City of Baldwin					Existing System				
30 Year Life Cycle Cost Analysis					Operational & Maintenance				
Study Title: The Pointe					Projected Costs	Present Worth	Projected Costs	Present Worth	
Discount Rate: 4.0%									
Date: August 2013									
Life Cycle (Yrs.) 30									
INITIAL / COLLATERAL	Capital Costs								
	A.	Estimated Cost of Installation					3,975,326	3,975,326	
	B.								
	C.								
	D.								
	Subtotal Construction Cost Estimates						3,975,326	3,975,326	
	Additional Project Costs								
A.									
B.									
Subtotal Additional Project Costs									
Total Initial / Collateral Costs (Present Worth)								3,975,326	
Difference								(3,975,326)	
REPAIR / REPLACEMENT / SALVAGE COSTS	Repair/Replacement/Salvage Costs (Expenditures in addition to typical M&O)								
		Year	Inflation/ Escal. Rate	PW Factor					
	Mechanical Component Requirements								
	A.	Repair HW Boilers (4)	3	3%	0.971	15,759	15,309		
	B.	Replace HW Boilers (4)	10	3%	0.908	264,341	239,996		
	C.	Replace Water Cooled Chiller	5	3%	0.953	317,709	302,725		
	D.	Repair Water Cooled Chiller	21	3%	0.816	84,375	68,880		
	E.	Replace Cooling Tower	1	3%	0.990	94,734	93,823		
	F.	Repair Cooling Tower	16	3%	0.857	19,238	16,482		
	G.	Replace Cooling Tower	30	3%	0.748	94,734	70,896		
	H.	Repair Pumps	3	3%	0.971	1,385	1,345		
	I.	Replace Pumps	12	3%	0.891	36,356	32,376		
	J.	Repair Pumps	22	3%	0.809	1,385	1,120		
	K.	Replace Air Handling Units	1	3%	0.990	176,883	175,182		
	L.	Repair Air Handling Units	11	3%	0.899	12,175	10,947		
	M.	Replace Air Handling Units	16	3%	0.857	176,883	151,547		
	N.	Repair Air Handling Units	26	3%	0.778	12,175	9,470		
	O.	Replace VAV Boxes (50%)	1	3%	0.990	34,931	34,595		
	P.	Replace VAV Boxes (50%)	6	3%	0.944	34,931	32,964		
	Q.	Repair VAV Boxes (50%)	11	3%	0.899	9,704	8,725		
	R.	Repair VAV Boxes (50%)	16	3%	0.857	9,704	8,314		
	S.	Replace VAV Boxes (50%)	26	3%	0.778	34,931	27,172		
	T.	DDC Control Replacement	1	3%	0.990	114,563	113,461		
	U.	DDC Control Repair	6	3%	0.944	15,000	14,155		
	V.	DDC Control Replacement	11	3%	0.899	61,100	54,939		
	W.	DDC Control Repair	16	3%	0.857	15,000	12,851		
	X.	DDC Control Replacement	21	3%	0.816	61,100	49,880		
	Y.	DDC Control Repair	26	3%	0.778	15,000	11,668		
	Z.	Lighting	6	3%	0.944	37,500	35,368		
	AA.	Lighting	15	3%	0.865			15,000	12,876
	BB.	Lighting	21	3%	0.816	37,500	30,613		
	CC.	Lighting	30	3%	0.748			15,000	11,126
	DD.	PoolPak Replacement	1	3%	0.990	515,625	510,667		
EE.	PoolPak Repair	11	3%	0.899	75,000	67,438			
FF.	PoolPak Replacement	16	3%	0.857	515,625	441,770			
GG.	PoolPak Repair	26	3%	0.778	75,000	58,339			
HH.	Air-Cooled Condensing Unit Replacement	1	3%	0.990	139,556	138,214			
II.	Air-Cooled Condensing Unit Repair	11	3%	0.899	21,913	19,703			
JJ.	Air-Cooled Condensing Unit Replacement	16	3%	0.857	139,556	119,567			
KK.	Air-Cooled Condensing Unit Repair	26	3%	0.778	21,913	17,045			
LL.	Repair HW Boilers (2)	20	3%	0.824			6,304	5,166	
MM.	Replace HW Boilers (2)	29	3%	0.756			70,491	53,266	

ANNUAL COSTS	NN.	Repair Pumps	20	3%	0.824				443	965
	OO.	Repair Self Contained HP Equipment	16	3%	0.857				12,170	70,400
	PP.	Repair Dectron Units	16	3%	0.857				59,335	50,887
	QQ.	Repair ERV	16	3%	0.857				3,652	3,129
	RR.	Repair VAV Boxes (50%)	10	3%	0.908				7,783	7,018
	SS.	Replace VAV Boxes (50%)	15	3%	0.865				18,630	16,117
	TT.	Repair VAV Boxes (50%)	15	3%	0.865				7,783	6,716
	UU.	Replace VAV Boxes (50%)	20	3%	0.824				18,630	15,856
	VV.	DDC Control Repair	5	3%	0.953				15,000	14,293
	WW.	DDC Control Replacement	10	3%	0.908				61,100	55,473
	XX.	DDC Control Repair	15	3%	0.865				15,000	12,876
	YY.	DDC Control Replacement	20	3%	0.824				61,100	50,384
	ZZ.	DDC Control Repair	25	3%	0.785				15,000	11,761
	AAA.	DDC Control Replacement	30	3%	0.748				61,100	45,725
	BBB.	Roof	1	3%	0.990	469,998	465,479			
	CCC.	Exterior Door Replacement	1	3%	0.990	46,898	46,447			
	Total Alteration/Replacement/Salvage Costs (Present Worth)						\$3,509,493		\$443,264	
	Difference								\$3,066,229	
ANNUAL COSTS	Maintenance Costs		Inflation/ Escal. Rate	PW Factor						
	A.	HW Boiler Annual PM	3%	25.918	2,246	58,212		1,123	29,106	
	B.	Water Cooled Chiller Annual PM	3%	25.918	928	24,052				
	C.	Cooling Tower Annual PM	3%	25.918	705	18,272				
	D.	Pump Annual PM	3%	25.918	170	4,406		88	1,782	
	E.	AHU Annual PM	3%	25.918	1,392	36,078				
	F.	VAV Box Annual PM	3%	25.918	891	23,093		891	23,093	
	G.	DDC Control Annual PM	3%	25.918	3,000	77,754		3,000	77,754	
	H.	PoolPak Annual PM	3%	25.918	2,892	74,954				
	I.	Self Contained HP Equipment Annual PM	3%	25.918				1,068	27,421	
	J.	Dectron Unit Annual PM	3%	25.918				2,892	74,954	
	K.	ERV Annual PM	3%	25.918				648	18,795	
	L.	Air Cooled Condensing Unit Annual PM	3%	25.918	495	12,829				
	M.		3%	25.918						
	N.		3%	25.918						
	O.		3%	25.918						
	P.		3%	25.918						
	Subtotal Annual PM				12,719	\$329,649.21		9,680	\$250,882.84	
LIFE CYCLE COSTS	Utility Costs									
		Building Electrical Consumption	4%	30,000	122,660	3,679,800		82,684	2,478,920	
		Building Natural Gas Consumption	4%	30,000	32,918	987,540		12,204	366,120	
		Subtotal Annual Utility Costs			155,578	4,667,340		94,788	2,845,040	
	Total Annual Costs				\$168,297	\$4,996,989		\$104,468	\$3,085,928	
	Total Life Cycle Costs (Present Worth)					\$8,506,482			\$7,512,485	
	Life Cycle Cost PW Difference								\$993,998	
	Payback - Simple Discounted (Added Cost/Annualized Savings)								13.8 Yrs.	
	- Fully Discounted (Added Cost+Interest/Annualized Savings)								20.5 Yrs.	
	Total Life Cycle Costs - Annualized				Per Year	\$491,931		Per Year	\$434,468	

★★ Repair, Replacement and Maintenance Costs were calculated based on information found in
The Whitestone Building Maintenance and Repair Cost Reference 2010-2011 Manual.

1.3.4 Other energy and operating savings measures taken include the following:

1.4 Guarantee Savings Measurement and Verification Plan

1.4.1 Measurement and Verification Methodology(s)

Energy Conservation Measure	Electric Savings Verification Method	Fuel Savings Verification Method	Other Utility Savings Verification Method
ECM #1: Mechanical System Replacement	Option D	Option D	N/A
ECM #2: New Building Control System	Option D	Option D	N/A
ECM #3: Lighting	Option A	N/A	N/A
ECM #4: Building Envelope Improvements	Option D	Option D	N/A
ECM #5: Pool Equipment Upgrades	Option D	N/A	N/A
ECM #6: Roof Replacement	Option D	Option D	N/A
ECM #7: Exterior Door Replacements	Option D	Option D	N/A

1.4.2 Energy Cost Avoidance: The following describes the Measurement and Verification procedures, formulas, and stipulated values which may be used in the calculation of the energy cost avoidance. The calculation of energy cost avoidance is based upon the utility rate paid during the Guarantee Year, or the Baseline Period utility rate, whichever is higher and/or as defined heretofore. Energy cost avoidance may also include, but is not limited to, Savings from demand charges, power factor correction, taxes, ratchet charges, rate changes and other utility tariff charges that are reduced as a result of the CTS involvement.

M&V Plan:

1.4.3 Constants: The following calibrated computer simulation model, constants and/or stipulated values are agreed to be reasonable and may be used in the calculation of the energy cost avoidance.

ECM#1, 2, 4, 5, 6,&7:

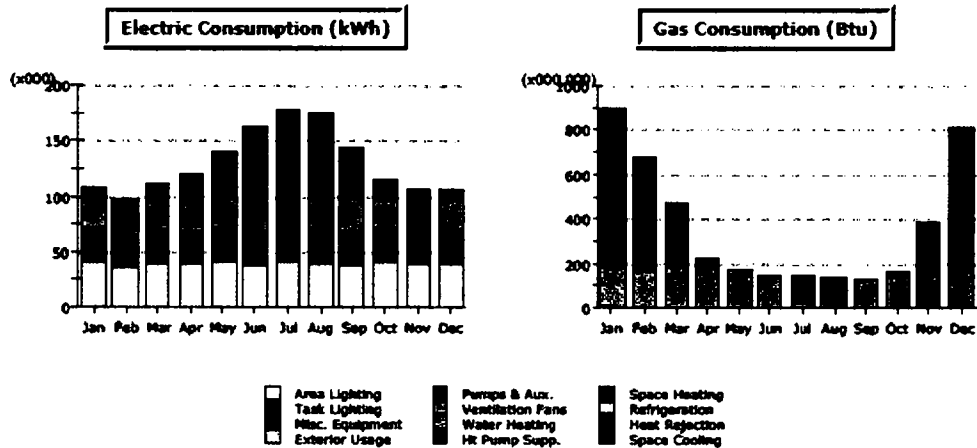
Based on eQUEST computer simulation models calibrated with whole-building metered data. The models were be calibrated with actual monthly billing data from the facility. Inputs to the model include facility characteristics; performance specifications of new equipment or systems; engineering estimates, short-term, measurements of system components; and long-term whole-building utility meter data.

After the model has been calibrated, savings are determined by comparing a simulation of the baseline with a simulation of the post retrofit energy conservation measures.

Existing Building:

Project/Run: Ballwin 2 Zoned - Baseline Design

Run Date/Time: 10/16/13 @ 13:01



Electric Consumption (kWh x1000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	11.4	10.2	16.5	25.0	40.5	63.3	72.0	69.8	47.2	17.8	13.5	11.2	398.5
Heat Reject.	-	-	0.5	1.6	3.3	7.4	8.4	8.2	4.7	0.6	0.2	-	35.0
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	-	-	-	-	-	-	-	-	-	-	-	-	-
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	25.1	22.2	24.1	23.6	25.1	24.2	26.1	25.8	24.2	24.5	23.4	24.5	292.8
Pumps & Aux.	15.5	13.9	15.2	19.0	15.5	14.6	15.5	15.4	14.7	15.5	14.9	15.3	181.0
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	15.7	14.1	15.5	15.2	15.7	14.9	15.7	15.6	15.0	15.7	15.1	15.5	183.6
Task Lights	0.3	0.2	0.3	0.3	0.3	0.2	0.3	0.3	0.2	0.3	0.2	0.3	3.0
Area Lights	40.2	35.9	39.3	38.8	40.2	37.9	40.2	39.9	38.1	40.2	38.5	39.5	448.7
Total	108.1	95.4	111.9	118.4	140.8	182.8	178.2	178.1	144.2	114.5	105.8	106.3	1,562.6

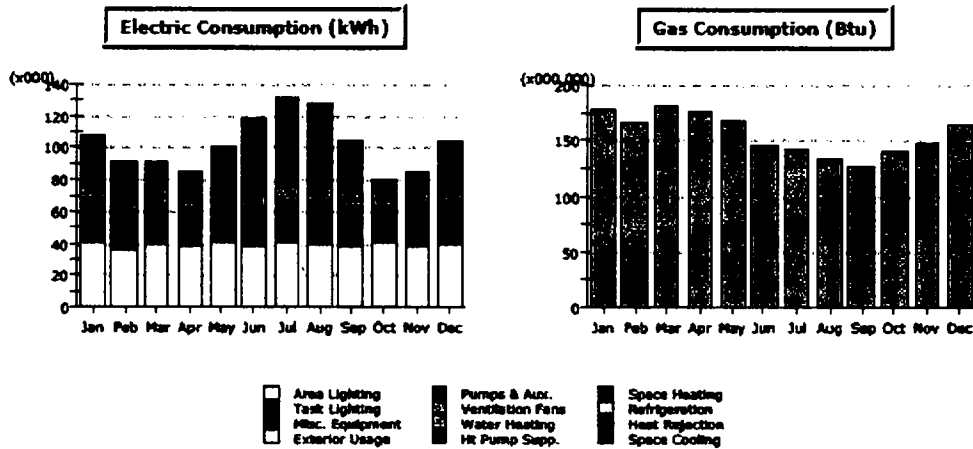
Gas Consumption (Btu x100,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	716.1	510.5	292.3	47.7	0.5	-	-	-	0.2	23.0	238.7	650.4	2,479.5
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	178.9	166.2	181.6	175.3	167.6	144.9	141.9	133.6	127.1	140.6	146.4	164.0	1,868.0
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	895.0	676.7	473.8	223.1	168.1	144.9	141.9	133.6	127.3	163.6	385.2	814.4	4,347.5

The Point with proposed ECMs:

Project/Run: Belwin 2 Ground Source - Pkg HVAC Eff EEM

Run Date/Time: 10/16/13 @ 13:11



Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	0.0	3.8	11.2	26.1	46.7	55.7	52.9	32.2	5.1	1.5	-	235.2
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	30.6	22.2	13.2	2.9	0.1	-	-	-	0.0	2.0	12.1	27.9	111.1
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	8.9	7.9	8.7	8.5	8.9	8.4	8.9	8.8	8.4	8.9	8.5	8.7	103.4
Pumps & Aux.	11.8	10.4	10.1	8.3	9.8	10.0	10.8	10.8	9.7	7.6	9.5	11.6	120.4
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	15.7	14.1	15.5	15.2	15.7	14.9	15.7	15.6	15.0	15.7	15.1	15.5	183.6
Task Lights	0.3	0.2	0.3	0.3	0.3	0.2	0.3	0.3	0.2	0.3	0.2	0.3	3.0
Area Lights	40.2	35.9	39.3	39.8	40.2	37.9	40.2	39.9	38.1	40.2	39.5	39.5	468.7
Total	187.4	90.8	90.8	85.1	101.8	118.0	131.5	128.3	103.8	79.7	85.5	103.6	1,225.5

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	-	-	-	-	-	-	-	-	-	-	-	-	-
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	178.5	166.0	181.5	175.4	167.6	144.9	141.8	133.5	127.1	140.7	146.5	163.7	1,867.3
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	178.5	166.0	181.5	175.4	167.6	144.9	141.8	133.5	127.1	140.7	146.5	163.7	1,867.3

Referring to the kWh and Therm totals in the eQUEST Model the energy savings for listed ECMs is:

ECM #1: Mechanical System Replacement
ECM #2: New Building Control System
ECM #4: Building Envelope Improvements
ECM #5: Pool Equipment Upgrades
ECM #6: Roof Replacement
ECM #7: Exterior Door Replacements

Electrical Savings:

Baseline energy use (kilowatt-hours) = 1,562,600

Post-retrofit energy use (kilowatt-hours) = 1,225,500

Savings (kilowatt-hours) = Baseline energy use (kilowatt-hours) - Post-retrofit energy use (kilowatt-hours)

Savings (kilowatt-hours) = 1,562,600 - 1,225,500

Savings (kilowatt-hours) = 337,100

Savings (\$) = Savings (kilowatt-hours) x \$/ kilowatt-hour

Savings (\$) = 337,100 (kilowatt-hours) x \$0.079 / kilowatt-hour

Savings (\$) = \$ 26,631

Natural Gas Savings:

Baseline energy use (therms) = 43,475

Post-retrofit energy use (therms) = 18,673

Savings (therms) = Baseline energy use (therms) - Post-retrofit energy use (therms)

Savings (therms) = 43,475 - 18,673

Savings (therms) = 24,802

Savings (\$) = Savings (therms) x \$/ therm

Savings (\$) = 24,802 (therms) x \$0.74 / therm

Savings (\$) = \$ 18,353

ECM#3 Lighting Savings:

Baseline energy use (kilowatt-hours) = kilowatts pre x hours of use

The energy use after the retrofit (post-retrofit) is the new kilowatts multiplied by the hours of use. The equation for the energy use of the new lighting system is:

Post-retrofit energy use (kilowatt-hours) = kilowatts post x hours of use

Savings (kilowatt-hours) = Baseline energy use (kilowatt-hours) - Post-retrofit energy use (kilowatt-hours)

Savings (\$) = Savings (kilowatt-hours) x \$/ kilowatt-hour

Referring to the totals in the lighting schedule in the equation for the energy use of the new lighting system is:

Baseline energy use (kilowatt-hours) = 264,144

Post-retrofit energy use (kilowatt-hours) = 78,464

Savings (kilowatt-hours) = Baseline energy use (kilowatt-hours) - Post-retrofit energy use (kilowatt-hours)

Savings (kilowatt-hours) = 264,144 – 78,464

Savings (kilowatt-hours) = 185,680

Savings (\$) = Savings (kilowatt-hours) x \$/ kilowatt-hour

Savings (\$) = 185,680 (kilowatt-hours) x \$0.079 / kilowatt-hour

Savings (\$) = \$ 14,669

ATTACHMENT F

FINAL DELIVERY AND ACCEPTANCE CERTIFICATE

Project Name _____

Agreement Effective Date: _____

Scope-of-Work (SOW) Item/Energy Conservation Measure (ECM): _____

To: CTS

Reference is made to the above listed Agreement between the undersigned and CTS and to the Scope of Work as defined in Attachment A herein. In connection therewith, we confirm to you the following:

1. The Scope of Work (SOW) Item/ Energy Conservation Measure (ECM) referenced above and also listed in Attachment A of the Agreement has been demonstrated to the satisfaction of the Owner's Representative as being substantially complete, including all punch list items generated during the Project Acceptance Procedure.
2. All of the Work has been delivered to and received by the undersigned and that said Work has been examined and /or tested and is in good operating order and condition and is in all respects satisfactory to the undersigned and as represented, and that said Work has been accepted by the undersigned and complies with all terms of the Agreement. Consequently, you are hereby authorized to invoice for the Final Payment, as defined in Attachment C, The Payment Schedule.

Owner Name: _____

By: _____
(Authorized Signature)

(Printed Name and Title)

(Date)

ATTACHMENT G

FORM ALLOCATION OF SECTION 179D DEDUCTION

ADDRESS OF GOVERNMENT-OWNED BUILDING: Project Name: _____ Project Street: _____ Project City, State & Zip Code: _____	
AUTHORIZED REPRESENTATIVE OF THE OWNER OF THE GOVERNMENT-OWNED BUILDING: Owner Name: _____ Representative Name: _____ Representative Title: _____ Representative Street Address: _____ Representative City, State & Zip: _____ Representative Phone Number: _____	
AUTHORIZED REPRESENTATIVE OF DESIGNER RECEIVING THE ALLOCATION OF THE SECTION 179D DEDUCTION: Designer Name: _____ Representative Name: _____ Representative Title: _____ Representative Street Address: _____ Representative City, State & Zip: _____ Representative Phone Number: _____	
PROJECT COST: _____	
DATE PROJECT PLACED IN SERVICE: _____	
AMOUNT OF SECTION 179D DEDUCTION ALLOCATED TO THE DESIGNER: Building Envelope: _____ Lighting System: _____ HVAC System: _____ TOTAL: _____	

Under penalties of perjury, I declare that I have examined this allocation, including accompanying documents, and to the best of my knowledge and belief, the facts presented in support of this allocation are true, correct and complete.

AUTHORIZED REPRESENTATIVE OF
OWNER OF GOVERNMENT-OWNED BUILDING:

AUTHORIZED REPRESENTATIVE OF
DESIGNER:

By: _____
Dated: _____

By: _____
Dated: _____

ATTACHMENT H

LIGHTING UPGRADE SPACELIST

CTS - The Pointe

Comprehensive Retrofit Minus LED Troffers

Space List

Totals		600		64.57		264,143.98												
Line	Space Description	Qty	Existing Description	Pre Watts	Pre kW	Pre Op Hours	Pre kWh	Proposed Description	Post Watts	Post kW	Post kWh	Sens Qty	Sensor Description	% Off	Sens kW Saved	Sens kWh Saved	Total kW Saved	Total kWh Saved
1	1st Floor, Main Gym Daylight	12	High Bay Fixture, Metal Halide, 1000W, 120/277V	1080	12.96	3445	44647.20	REMOVE, From Service and Electric power		0.00	0.00					0.00	12.96	44647.20
2	1st Floor, Main Gym Daylight	14	New Installation	0	0.00	3445	0.00	FIXTURE, 6x T5 HG, Gym with Wire Guard, Micro Reflector, HLO HE Program Start Ballast 120/277V, 6ft Cord, 5000K Hi-Vision Lamp	360	5.40	18603.00	1	Ceiling Mount, Daylight Harvester, Photocontrol, On/Off Switching, Low Voltage	35%	0.945	6511.05	4.46	12091.95
3	1st Floor, Main Gym Occupancy	15	New Installation	0	0.00	2780	0.00	FIXTURE, 6x T5 HG, Gym with Wire Guard, Micro Reflector, HLO HE Program Start Ballast 120/277V, 6ft Cord, 5000K Hi-Vision Lamp	360	5.40	11232.00	6	Ceiling Mount, 360° High Bay 15-50ft, Passive Infrared, Low Voltage	25%	0.675	2808.00	4.73	8424.00
4	1st Floor, Reversion Conference Entry	2	Recessed Can, Metal Halide, 20W, 120/277V	95	0.67	5525	3674.13	RETRO, 20W LED, PAR38, 1100 Lumen, 35° Narrow Flood, Dimmable, Medium Base, 120V, 3000K, 40,000 Hour Super Long Life	20	0.14	773.50					0.00	0.53	2900.63
5	1st Floor, Lobby High Ceiling Atrium	11	Wall Mount Cylinder Fixture, Metal Halide, 70W Upl/100W Down, 120/277V	220	2.42	5525	13370.50	RETRO, 20W LED, PAR38, 1200 Lumen, 40° Flood Up/20W LED, PAR38, 1100 Lumen, 25° Narrow Flood Down, Medium Base, 120V, 3000K, 40,000 Hour Super Long Life	40	0.44	2431.00					0.00	1.98	10939.50
6	1st Floor, Lobby High Ceiling	11	Recessed Can, Metal Halide, 250W, 120/277V	288	3.17	5525	17503.20	RETRO, 100W LED, PAR38, 1200 Lumen, 40° Flood Up/20W LED, PAR38, 1100 Lumen, 25° Narrow Flood Down, Medium Base, 120V, 3000K, 40,000 Hour Super Long Life	106	1.17	6442.15					0.00	2.00	11061.05
7	1st Floor, Lobby	29	Recessed Can, Metal Halide, 70W, 120/277V	95	2.76	5525	15220.38	FIXTURE, LED 2400 Lumen, 2' x 2' Volumetric Grid Troffer, 120/277V, 5000K	24	0.70	3845.40					0.00	3.06	11375.98
8	1st Floor, Vestibule	2	Recessed Can, Metal Halide, 70W, 120/277V	95	0.19	8760	1664.40	RETRO, 20W LED, PAR38, 1100 Lumen, 35° Narrow Flood, Dimmable, Medium Base, 120V, 3000K, 40,000 Hour Super Long Life	20	0.04	350.40					0.00	0.15	1314.00
9	1st Floor, Vestibule	2	Recessed Can, Metal Halide, 70W, 120/277V	95	0.19	8760	1664.40	RETRO, 20W LED, PAR38, 1100 Lumen, 35° Narrow Flood, Dimmable, Medium Base, 120V, 3000K, 40,000 Hour Super Long Life	20	0.04	350.40					0.00	0.15	1314.00
10	1st Floor, Art Case	3	Track Light, MR16, Halogen Lamp, 50W	35	0.11	8760	919.80	RETRO, 5W LED, Flood 36°, G5.3mm Bipin Base, 120V, 4000K, 50,000 Hour Super Long Life	5	0.02	131.40					0.00	0.09	788.40

1	1st Floor, Pool	12	Wall Mount, Metal Halide, 400W, 120/277V, Damp Location, Pool Fixture	458	5.50	2190	12036.24	FIXTURE, 4x4ft T5, Custom Damp Location Aluminum Fluor., Powder coat After Make, Solid Top, Hinged Micro Reflector, HLO HE 90C Program Start Ballast 120/277V, 54W/HO 5000K Hi Vision Lamps	240	2.88	6307.20	1	Ceiling Mount, Daylight Harvest, Photocontrol, On/Off Switching, Low Voltage	50%	0.72	3153.60	3.34	8882.64
2	1st Floor, Pool	12	Wall Mount, Metal Halide, 400W, 120/277V, Damp Location, Pool Fixture	458	5.50	2190	12036.24	FIXTURE, 4x4ft T5, Custom Damp Location Aluminum Fluor., Powder coat After Make, Solid Top, Hinged Micro Reflector, HLO HE 90C Program Start Ballast 120/277V, 54W/HO 5000K Hi Vision Lamps	240	2.88	6307.20	1	Tied in with sensor on another line	50%	0.72	3153.60	3.34	8882.64
3	1st Floor, Pool	2	Recessed Can, Metal Halide, 70W, 120/277V	95	0.19	4329	822.42	RETRO, 20W LED, PAR38, 1100 Lumen, 25" Narrow Flood, Dimmable, Medium Base, 120V, 3000K, 40,000 Hour Super Long Life	20	0.04	173.14					0.00	0.15	649.28
4	1st Floor, Pool Vending	2	Recessed Can, Metal Halide, 70W, 120/277V	95	0.19	4329	822.42	RETRO, 20W LED, PAR38, 1100 Lumen, 25" Narrow Flood, Dimmable, Medium Base, 120V, 3000K, 40,000 Hour Super Long Life	20	0.04	173.14					0.00	0.15	649.28
5	1st Floor, 144 Mechanical	1	Industrial Flooded Fixture, 1' x 8', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V	112	0.11	4329	484.70	RETRO, 4x4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K Hi Vision Lamp	86	0.09	372.25					0.00	0.03	112.54
6	1st Floor, Life Guard Private Office#1	2	Grid Troffer, 2' x 4', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Parabolic Lense	0	0.00	4329	0.00	SKIP, Not included in project		0.00	0.00	1	Ceiling Mount, Passive Infrared, Standard Range, 8-15' Mtg Hgt, 10-20' Radial Coverage, Line Voltage 120/277V	42%	0	0.00	0.00	0.00
7	1st Floor, Life Guard Private Office#2	2	Grid Troffer, 2' x 4', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Parabolic Lense	0	0.00	4329	0.00	SKIP, Not included in project		0.00	0.00	1	Ceiling Mount, Passive Infrared, Standard Range, 8-15' Mtg Hgt, 10-20' Radial Coverage, Line Voltage 120/277V	42%	0	0.00	0.00	0.00
8	1st Floor, 154 Storage	1	Industrial Flooded Fixture, 1' x 8', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V	112	0.11	4329	484.70	RETRO, 4x4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K Hi Vision Lamp	86	0.09	372.25	1	Ceiling Mount, Passive Infrared, Standard Range, 8-15' Mtg Hgt, 10-20' Radial Coverage, Line Voltage 120/277V	63%	0.0271	234.52	0.05	347.06
9	1st Floor, 150 First Aid Private Office	2	Grid Troffer, 2' x 4', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Parabolic Lense	0	0.00	4329	0.00	SKIP, Not included in project		0.00	0.00	1	Ceiling Mount, Passive Infrared, Standard Range, 8-15' Mtg Hgt, 10-20' Radial Coverage, Line Voltage 120/277V	42%	0	0.00	0.00	0.00
10	1st Floor, 154 Exit Corridor	2	Vapor Tight Fixture, 1' x 4', 2x F32T8 (32W), Elec Normal Power Ballast, 120/277V	58	0.12	520	60.32	RETRO, 2x4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K Hi Vision Lamp	43	0.09	44.72					0.00	0.03	15.60

2	1	1st Floor, 154 Exit Corridor	1	Exit Sign, Incandescent, 40W, Wet Location Rated	40	0.04	520	20.80	FIXTURE, LED Exit Sign, Wet Location Rated, NiCad Battery Backup, Universal Mount, 1 or 2 sided, 120/277V	4	0.00	2.08				0.00	0.04	18.72
2	2	1st Floor, 155 Pump Room	25	Vapor Light Fixture, 1' x 4', 2x F32T8 (32W), Elec Normal Power Ballast, 120/277V	58	1.45	520	754.00	RETRO, 2x 4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K Hi Vision Lamp	43	1.08	559.00				0.00	0.38	195.00
2	3	1st Floor, Birthday Room	9	Grid Troffer, 2' x 4', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Parabolic Lens	0	0.00	3120	0.00	SKIP, Not included in project		0.00	0.00	1	Ceiling Mount, Passive Infrared, Standard Range, 8-15' Mtg Hgt, 10-20' Radial Coverage, Line Voltage 120/277V	44%	0	0.00	0.00
2	4	1st Floor, 116-115 Hallway	15	Grid Troffer, 2' x 4', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Parabolic Lens	0	0.00	3120	0.00	SKIP, Not included in project		0.00	0.00				0.00	0.00	0.00
2	5	1st Floor, 114 Conference	4	Recessed Can, Metal 4" dia, 20W, 120/277V	95	0.36	3120	1185.60	FIXTURE, LED 2400 Lumen, 2' x 2' Volumetric Grid Troffer, 120/277V, 5000K	24	0.10	299.52	1	Ceiling Mount, Passive Infrared, Standard Range, 8-15' Mtg Hgt, 10-20' Radial Coverage, Line Voltage 120/277V	44%	0.0211	131.79	0.31
2	6	1st Floor, Private Office #1	4	Grid Troffer, 2' x 4', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Parabolic Lens	0	0.00	3120	0.00	SKIP, Not included in project		0.00	0.00	1	Ceiling Mount, Passive Infrared, Standard Range, 8-15' Mtg Hgt, 10-20' Radial Coverage, Line Voltage 120/277V	42%	0	0.00	0.00
2	7	1st Floor, Private Office #2	4	Grid Troffer, 2' x 4', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Parabolic Lens	0	0.00	3120	0.00	SKIP, Not included in project		0.00	0.00	1	Ceiling Mount, Passive Infrared, Standard Range, 8-15' Mtg Hgt, 10-20' Radial Coverage, Line Voltage 120/277V	42%	0	0.00	0.00
2	8	1st Floor, Private Office #3	2	Grid Troffer, 2' x 4', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Parabolic Lens	0	0.00	3120	0.00	SKIP, Not included in project		0.00	0.00	1	Ceiling Mount, Passive Infrared, Standard Range, 8-15' Mtg Hgt, 10-20' Radial Coverage, Line Voltage 120/277V	42%	0	0.00	0.00
2	9	1st Floor, 112 Break room	3	Grid Troffer, 2' x 4', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Parabolic Lens	0	0.00	3120	0.00	SKIP, Not included in project		0.00	0.00				0.00	0.00	0.00
3	0	1st Floor, 112 Break room	1	Grid Troffer, 2' x 4', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Parabolic Lens	112	0.11	3120	349.44	REMOVE, From Service and Electric power		0.00	0.00				0.00	0.11	349.44
3	1	1st Floor, 112 Break room, Under Cabinet	1	Under Cabinet Fixture, 1' x 4', 1x F34T12 (34W) Magt's Ballast, 120/277V, Missing Lens	47	0.05	3120	146.64	RETRO, 1x 4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K Hi Vision Lamp	20	0.02	62.40				0.00	0.03	84.24

3	1st Floor, 112 Break room Under cabinet	2	Under Cabinet Fixture, 1' x 4', 2x F34T12 (34W) Mag ES Ballast, 120/277V, Plug in	47	0.09	3120	293.28	RETRO, 1x 4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K HI Vision Lamp	20	0.04	124.80				0.00	0.05	168.48	
3	1st Floor, 112 Vending Area	6	Recessed Can, Metal Halide, 70W, 120/277V	95	0.57	5525	3149.25	RETRO, 20W LED, PAR38, 1100 Lumen, 25° Narrow Flood, Dimmable, Medium Base, 120V, 3000K, 40,000 Hour Super Long Life	20	0.12	663.00				0.00	0.45	2486.25	
3	1st Floor, Men's Restroom	2	Grid Troffer, 2' x 4', 2x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Prismatic Lens	0	0.00	5525	0.00	SKIP, Not included in project		0.00	0.00				0.00	0.00	0.00	
3	1st Floor, Men's Restroom	1	Grid Troffer, 2' x 4', 2x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Prismatic Lens, Battery Back up	0	0.00	5525	0.00	SKIP, Not included in project		0.00	0.00				0.00	0.00	0.00	
3	1st Floor, Men's Restroom	1	Wall Mount Fixture, 1' x 4', 2x F32T8 (32W), Instant Start Ballast, 120/277V	58	0.06	5525	320.45	RETRO, 2x 4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K HI Vision Lamp	43	0.04	237.58				0.00	0.02	82.88	
3	1st Floor, Women's Restroom	2	Grid Troffer, 2' x 4', 2x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Prismatic Lens	0	0.00	5525	0.00	SKIP, Not included in project		0.00	0.00				0.00	0.00	0.00	
3	1st Floor, Women's Restroom	1	Grid Troffer, 2' x 4', 2x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Prismatic Lens, Battery Back up	0	0.00	5525	0.00	SKIP, Not included in project		0.00	0.00				0.00	0.00	0.00	
3	1st Floor, Women's Restroom	1	Wall Mount Fixture, 1' x 4', 2x F32T8 (32W), Instant Start Ballast, 120/277V	58	0.06	5525	320.45	RETRO, 2x 4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K HI Vision Lamp	43	0.04	237.58				0.00	0.02	82.88	
4	1st Floor, Fish Closet	1	Space or Fixture is not included in project	0	0.00	5525	0.00	SKIP, Not included in project		0.00	0.00				0.00	0.00	0.00	
4	1st Floor, Stairwell Closet	1	Slim Strip Fixture, 1' x 4', 2x F34T12 (34W), Mag ES Ballast, 120/277V	74	0.07	5525	408.85	RETRO, 2x 4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K HI Vision Lamp	43	0.04	237.58				0.00	0.03	171.28	
4	1st Floor, Concession	3	Grid Troffer, 2' x 4', 2x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Parabolic Lens	0	0.00	3120	0.00	SKIP, Not included in project		0.00	0.00	1	Ceiling Mount, Passive Infrared, Standard Range, 8-15' Mtg Hgt, 10-20' Radial Coverage, Line Voltage 120/277V	23%	0	0.00	0.00	0.00

4	1st Floor, Concession Kitchen	2	Grid Troffer, 2' x 4', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Parabolic Lens	0	0.00	3120	0.00	SKIP, Not Included in project		0.00	0.00	1	Ceiling Mount, Passive Infrared, Standard Range, 8-15' Mtg Hgt, 10-20' Radial Coverage, Line Voltage 120/277V	238	0	0.00	0.00	0.00
4	1st Floor, Janitor's Closet - Hallway	3	Grid Troffer, 2' x 2', 4x F32T8 (17W), Elec Normal Power Ballast, 120/277V, Parabolic Lens	0	0.00	5525	0.00	SKIP, Not Included in project		0.00	0.00					0.00	0.00	0.00
4	1st Floor, MCC	2	Slim Strip Fixture, 1' x 8', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V	112	0.22	1875	420.00	RETRO, 4x 4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K HI Vision Lamp	86	0.17	322.50					0.00	0.05	97.50
4	1st Floor, Janitor's Closet	1	Slim Strip Fixture, 1' x 8', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V	112	0.11	1875	210.00	RETRO, 4x 4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K HI Vision Lamp	86	0.09	161.25					0.00	0.03	48.75
4	1st Floor, Gym Water Fountain	1	Recessed Can, Metal Halide, 70W, 120/277V	95	0.10	5525	524.86	RETRO, 20W LED, PAR38, 1100 Lumens, 25" Narrow Flood, Dimmable, Medium Base, 120V, 3000K, 40,000 Hour Super Long Life	20	0.02	110.50					0.00	0.08	414.38
4	1st Floor, 136 Men's Locker	19	Grid Troffer, 2' x 4', 2x F34T12 (34W), Mag ES Ballast, 120/277V, Prismatic Lens	24	1.41	5525	776.15	RETRO, 2x 4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K HI Vision Lamp	43	0.82	4513.93					0.00	0.59	3254.23
4	1st Floor, 136 Men's Locker	1	Grid Troffer, 1' x 4', 2x F34T12 (34W), Mag ES Ballast, 120/277V, Parabolic Lens	0	0.00	5525	0.00	SKIP, Not Included in project		0.00	0.00					0.00	0.00	0.00
5	1st Floor, 136 Men's Locker Shower	4	Vapor Tight Fixture, 1' x 4', 2x F32T8 (32W), Elec Normal Power Ballast, 120/277V	58	0.25	5525	1281.80	RETRO, 2x 4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K HI Vision Lamp	43	0.17	950.30					0.00	0.06	331.50
5	1st Floor, 134 Hall To Private Office	8	Grid Troffer, 2' x 2', 4x F32T8 (17W), Elec Normal Power Ballast, 120/277V, Prismatic Lens	0	0.00	5525	0.00	SKIP, Not Included in project		0.00	0.00					0.00	0.00	0.00
5	1st Floor, 134 Mechanical	1	0	0	0.00	5525	0.00	NO ACCESS, Room was not accessible and therefore not included in project scope		0.00	0.00					0.00	0.00	0.00
5	1st Floor, 138 Women's Locker	19	Grid Troffer, 2' x 4', 2x F34T12 (34W), Mag ES Ballast, 120/277V, Prismatic Lens	24	1.41	5525	776.15	RETRO, 2x 4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K HI Vision Lamp	43	0.82	4513.93					0.00	0.59	3254.23
5	1st Floor, 138 Women's Locker	1	Grid Troffer, 1' x 4', 2x F34T12 (34W), Mag ES Ballast, 120/277V, Parabolic Lens	0	0.00	5525	0.00	SKIP, Not Included in project		0.00	0.00					0.00	0.00	0.00

5	1st Floor, 138 Women's Locker Shower	4	Vapor Light Fixture, 1' x 4', 2x F32T8 (32W), Elec Normal Power Ballast, 120/277V	56	0.23	5525	1281.80	RETRO, 2x 4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K HI Vision Lamp	43	0.17	950.30					0.00	0.06	331.50
5	1st Floor, 145A Family Locker	8	Grid Troffer, 2' x 2', 4x F17T8 (17W), Elec Normal Power Ballast, 120/277V, Parabolic Lense	0	0.00	5525	0.00	SKIP, Not Included in project		0.00	0.00					0.00	0.00	0.00
5	1st Floor, Community Room	12	Grid Troffer, 2' x 4', 4x F34T12 (34W), Mag ES Ballast, 120/277V, Parabolic Lense	148	2.52	5525	13500.90	RETRO, 2x 4ft T8, NLO HE Instant Start Ballast 120/277V, 92% White Reflector Kit, 28W 5000K HI Vision Lamp	48	0.82	4508.40	2	Ceiling Mount, Passive Infrared, Extended Range, 7-15' Mtg Hgt, 16-36' Radial Coverage, Low Voltage	44%	0.1795	1983.70	1.88	11376.20
5	1st Floor, Community Room	12	Grid Troffer, 2' x 4', 4x F34T12 (34W), Mag ES Ballast, 120/277V, Parabolic Lense	148	2.52	5525	13500.90	RETRO, 2x 4ft T8, NLO HE Instant Start Ballast 120/277V, 92% White Reflector Kit, 28W 5000K HI Vision Lamp	48	0.82	4508.40	2	Ceiling Mount, Passive Infrared, Extended Range, 7-15' Mtg Hgt, 16-36' Radial Coverage, Low Voltage	44%	0.1795	1983.70	1.88	11376.20
5	1st Floor, Display Case	2	Track Light, MR16, Halogen Lamp, 50W	35	0.07	8760	615.20	RETRO, 5W LED, Flood 36", G5-3mm Bipin Base, 120V, 4000K, 50,000 Hour Super Long Life	5	0.01	87.60					0.00	0.06	525.60
6	1st Floor, 123 Child Care	12	Grid Troffer, 2' x 4', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Parabolic Lense	0	0.00	5525	0.00	SKIP, Not Included in project		0.00	0.00	2	Ceiling Mount, Passive Infrared, Extended Range, 7-15' Mtg Hgt, 16-36' Radial Coverage, Low Voltage	44%	0	0.00	0.00	0.00
6	1st Floor, 123 Child Care	2	Grid Troffer, 2' x 2', 4x F17T8 (17W), Elec Normal Power Ballast, 120/277V, Parabolic Lense	0	0.00	5525	0.00	SKIP, Not Included in project		0.00	0.00					0.00	0.00	0.00
6	1st Floor, 123 Child Care Restroom	2	Grid Troffer, 2' x 4', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Parabolic Lense	0	0.00	5525	0.00	SKIP, Not Included in project		0.00	0.00					0.00	0.00	0.00
6	1st Floor, Spin Class	6	Grid Troffer, 2' x 4', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Parabolic Lense	0	0.00	5525	0.00	SKIP, Not Included in project		0.00	0.00	1	Ceiling Mount, Passive Infrared, Standard Range, 8-15' Mtg Hgt, 10-20' Radial Coverage, Line Voltage 120/277V	43%	0	0.00	0.00	0.00
6	2nd Floor, Mechanical	13	Industrial Hooded Fixture, 1' x 8', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V	112	1.46	1875	2730.00	RETRO, 4x 4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K HI Vision Lamp	86	1.12	2096.25					0.00	0.34	633.75
6	2nd Floor, Mechanical	3	Industrial Hooded Fixture, 1' x 4', 2x F32T8 (32W), Elec Normal Power Ballast, 120/277V	58	0.17	1875	326.25	RETRO, 2x 4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K HI Vision Lamp	43	0.13	241.88					0.00	0.05	84.38

6 6	2nd Floor, Storage	2	Dim Strip Fixture, 1' x 4', 2x F32T8 (32W), Elec Normal Power Ballast, 120/277V	58	0.12	1875	217.50	RETRO, 2x 4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K HI Vision Lamp	43	0.09	161.25				0.00	0.03	56.25	
6 7	2nd Floor, Storage	2	Dim Strip Fixture, 1' x 4', 2x F32T8 (32W), Elec Normal Power Ballast, 120/277V	58	0.12	1875	217.50	RETRO, 2x 4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K HI Vision Lamp	43	0.09	161.25				0.00	0.03	56.25	
6 8	Exit Stairwell	2	Wall Mount Fixture, 1' x 4', 2x F32T8 (32W), Instant Start Ballast, 120/277V	58	0.12	8760	1016.16	RETRO, 2x 4ft T8, RLO HE Instant Start Ballast 120/277V, 28W 5000K HI Vision Lamp	43	0.09	753.36				0.00	0.03	262.80	
6 9	2nd Floor, Track	102	Grid Troffer, 2' x 2', 4x F17T8 (17W), Elec Normal Power Ballast, 120/277V, Prismatic Lense	0	0.00	5525	0.00	SKIP, Not Included In project		0.00	0.00				0.00	0.00	0.00	
7 0	2nd Floor, Track	2	Recessed Can, Metal Halide, 70W, 120/277V	95	0.19	5525	1049.75	RETRO, 20W LED, PAR38, 1100 Lumen, 25' Narrow Flood, Dimmable, Medium Base, 120V, 3000K, 40,000 Hour Super Long Life	20	0.04	221.00				0.00	0.15	828.75	
7 1	2nd Floor, Track	1	Recessed Fixture, 6", CFE, 23Q26, (16W), 120/277V	52	0.05	5525	262.50	SKIP, No Suitable Retrofit Available, Not Included In project	52	0.05	287.30				0.00	0.00	0.00	
7 2	2nd Floor, Track	12	Hanged Grid Troffer, 1' x 4', 2x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Parabolic Lense	0	0.00	5525	0.00	SKIP, Not Included in project		0.00	0.00	1	Ceiling Mount, Daylight Harvester, Photocontrol, On/Off Switching, Low Voltage	50%	0	0.00	0.00	0.00
7 3	2nd Floor, Aerobics	21	Grid Troffer, 2' x 4', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Parabolic Lense	0	0.00	5525	0.00	SKIP, Not Included in project		0.00	0.00	2	Ceiling Mount, Passive Infrared, Extended Range, 7-15' Mtg Hgt, 16-36' Radial Coverage, Low Voltage	43%	0	0.00	0.00	0.00
7 4	2nd Floor, Aerobics	3	Grid Troffer, 2' x 2', 4x F17T8 (17W), Elec Normal Power Ballast, 120/277V, Parabolic Lense	0	0.00	5525	0.00	SKIP, Not Included In project		0.00	0.00	1	Tied in with sensor on another line	43%	0	0.00	0.00	0.00
7 5	2nd Floor, Aerobics Storage	1	Grid Troffer, 2' x 4', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Prismatic Lense	0	0.00	540	0.00	SKIP, Not Included in project		0.00	0.00				0.00	0.00	0.00	
7 6	2nd Floor, 2nd Restroom	1	Grid Troffer, 2' x 4', 4x F32T8 (32W), Elec Normal Power Ballast, 120/277V, Prismatic Lense	0	0.00	5525	0.00	SKIP, Not Included In project		0.00	0.00				0.00	0.00	0.00	

7	Outdoor, Canopy	21	Recessed Can, Metal Hulide, 70W, 120/277V	95	2.00	4745	9466.28	RETRO, 20W LED, PAR38, 1100 Lumen, 35° Narrow Flood, Dimmable, Medium Base, 120V, 3000K, 40,000 Hour Super Long Life	20	0.42	1991.90				0.00	1.58	7473.38
7	Outdoor, Metal Canopy	16	Wall Mount Cylinder Fixture, Metal Hulide, 70W UP/Down Down, 120/277V	220	3.52	4745	16702.40	RETRO, 20W LED, PAR38, 1100 Lumen, 40° Flood Up/ 20W LED, PAR38, 1100 Lumen, 35° Narrow Flood Down, Medium Base, 120V, 3000K, 40,000 Hour Super Long Life	40	0.64	3036.80				0.00	2.88	13665.60
7	Outdoor, Pathway	12	Bollard Fixture, Metal Hulide, 100W, 120/277V	130	1.50	4745	2402.20	RETRO, 12W LED, A19, 800 Lumen, Dimmable, Medium Base, 120V, 3000K, 40,000 Hour Super Long Life	12	0.14	683.28				0.00	1.42	6718.92
8	Outdoor, Feature	1	Flood Light, Metal Hulide, 100W, 1/2" Knuckle Mount	130	0.13	4745	616.85	FIXTURE, 22W, LED Flood Light, 2,055 Lumens, Knuckle with 1/2" NPS, 120/277V, 100,000 hours life, IP65 Rated, Medium Flood Optics 3K3, White Finish	22	0.02	104.39				0.00	0.11	512.46
8	Outdoor, Flag	1	Flood Light, Metal Hulide, 100W, 1/2" Knuckle Mount	130	0.13	4745	616.85	FIXTURE, 22W, LED Flood Light, 2,055 Lumens, Knuckle with 1/2" NPS, 120/277V, 100,000 hours life, IP65 Rated, Narrow Spot Optics 2K2, White Finish	22	0.02	104.39				0.00	0.11	512.46
8	Outdoor, Wall Mounted	6	Outdoor, Wall Mount Fixture, Metal Hulide, 400W, 120/277V	458	2.75	4745	13039.46	FIXTURE, 48W LED, 3100 Lumen Wall Pack, 120/277V, Bronze, with 120V Photo control, 100,000 hour life expectancy	48	0.29	1366.56				0.00	2.46	11672.70
8	Outdoor, Picnic Shelter	2	Outdoor, Low Bay Fixture, Metal Hulide, 400W, 120/277V	458	0.92	4745	4346.42	FIXTURE, 59W LED, 3600 Lumen, Ceiling Mount, 120/277V, Bronze, with 120V Photo control, 100,000 hour life expectancy	59	0.12	559.91				0.00	0.80	3786.51
8	Outdoor, Parking Lot	12	Outdoor Post Top Spider Mount, Shoe Box, Metal Hulide, 400W, 120/277V	458	5.50	4745	26078.52	RETRO, LED, 100W, 10,000 Lumen Spider Mount Custom Kit, 120/277V, 5000K Color, 100,000 hour life expectancy	100	1.20	5694.00				0.00	4.30	20384.52