General Services Administration

Federal Acquisition Service

Authorized Federal Supply Schedule Price List

Schedule for

03FAC Facilities Maintenance and Management

Federal Supply Group: **871**

Contract Number: **GS-21F-0090Y**

Contract Period: **4/23/2012** through **4/22/2017**

Contractor:	**3QC, Inc.** **193 Blue Ravine Road, Suite 190** **Folsom, CA 95630-4758**
Business Size:	**Small Business**
DUNS Number	**14-8812006**
Telephone:	**(916) 496-8400**
Extension:	**222**
FAX Number:	**(916) 496-8401**
Web Site:	**www.3QCinc.com**
E-mail:	**JBecker@3QCinc.com**
Contract Administration:	**James Becker**

On-line access to contract ordering information, terms and conditions, up-to-date pricing, and the option to create an electronic delivery order is available through **GSA** *Advantage*!™, a menu-driven database system. The INTERNET address for **GSA** *Advantage*!™ is: http://www.GSAAdvantage.gov.

For more information on ordering from Federal Supply Schedules click on the FSS Schedules button at http://www.gsa.gov/schedules-ordering

Introduction | *"Enlightened Buildings"*

Today's challenges demand buildings that are environmentally friendly, economically feasible and operationally functional. 3QC is a company of building experts. We understand how buildings are designed, constructed, and operated and are committed to assisting owners realize their project requirements in an increasingly technical, financially complex, and "green" oriented design and construction industry. 3QC works collaboratively with your team to help create an "enlightened building" – a facility that is energy efficient, environmentally conscious, and functions as designed.

Established in 2003, 3QC's team specializes in supporting your facility program and team by providing building commissioning, energy/building audits, sustainability and LEED navigation, and facilities support services. 3QC's approach is focused on assuring quality and functional integrity from the beginning of design to completion of the facility and throughout its operational life cycle. Our experienced team of professional engineers, technicians, and project managers has practical experience in all phases of project development including planning, design, construction, management, functional testing, operations, and training. Combining the strength of technical competency, diverse project experience, and strong project management skills, 3QC represents our client's interests and environmental vision without bias since we neither design the facility nor profit from the construction contracts. We bring a practitioner's knowledge on how to add value to your program without adding an extra layer of management. Our goal is to provide you with a value-added engineering resource that is a collaborative part of your project team to assist you in achieving the quality facilities you intend to build.

Averaging over 20 years experience, each of our principals have served on a wide variety of projects including correctional and justice facilities, educational facilities, hospitals and medical care facilities, hotels, theaters, utility districts, military facilities, communications facilities, and city, county, state, and federal projects. Over their years of experience, our principals have developed not only a passion for quality in the design and construction process but also a knack for helping our clients reach their project goals. Our ultimate goal is to preserve the quality of your project - resulting in a facility that meets your requirements and serves you well into the future.

We are members of the US Green Building Council, the Building Commissioning Association, Construction Management Association of America, and Collaborative for High Performance Schools. Our principals are active members of committees and organizations staying at the forefront of industry trends and processes enabling us to assist our clients with a greater understanding of how to pursue quality standards and practices for their facilities. Our principals have been contributing to the development of expertise in the construction management and related industries through serving on numerous committees, task forces and leading educational classes and forums.

Customer Information

1a. AWARDED SPECIAL ITEM NUMBERS (SINS):

SIN 871-202	*Energy Management Planning and Strategies*
SIN 871-203	*Training on Energy Management*
SIN 871-204	*Metering Services*
SIN 871-206	*Building Commissioning*
SIN 871-207	*Energy Audit Services*

1b. LOWEST PRICED MODEL NUMBER AND LOWEST UNIT PRICE: Not applicable to this contract.

1c. COMMERCIAL JOB TITLES/DESCRIPTIONS: 3QC is proposing hourly rates. Job descriptions are listed on page 5.

2. MAXIMUM ORDER: $1,000,000.00

3. MINIMUM ORDER: $1,000.00

4. GEOGRAPHIC COVERAGE: Domestic only

5. POINT(S) OF PRODUCTION: Same as Company Address

6. DISCOUNT FROM LIST PRICES OR STATEMENT OF NET PRICE: Government net prices (discounts already deducted).

7. QUANTITY DISCOUNTS: .05% offered on orders of $100,000 or more

8. PROMPT PAYMENT TERMS: Net 30 days

9a. GOVERNMENT PURCHASE CARDS UP TO THE MICRO-PURCHASE THRESHOLD: Yes

9b. GOVERNMENT PURCHASE CARDS ABOVE THE MICRO-PURCHASE THRESHOLD: Will accept over $3,000

10. FOREIGN ITEMS: None

11a. TIME OF DELIVERY: Specified on the Task Order

11b. EXPEDITED DELIVERY: Contact Contractor

11c. OVERNIGHT AND 2-DAY DELIVERY: Contact Contractor

11d. URGENT REQUIREMENTS: Contact Contractor

12. F.O.B POINTS(S): Destination

13a. ORDERING ADDRESS: Same as Contractor

13b. ORDERING PROCEDURES: For supplies and services, the ordering procedures, information on Blanket Purchase Agreements (BPA's), and a sample BPA can be found at the GSA/FSS Schedule homepage (fss.gsa.gov/schedules).

14. PAYMENT ADDRESS: Same as Company Address

15. WARRANTY PROVISION: Contractor's standard commercial warranty

16. EXPORT PACKING CHARGES: N/A

17. TERMS AND CONDITIONS OF GOVERNMENT PURCHASE CARD ACCEPTANCE: Contact Contractor

18. TERMS AND CONDITIONS OF RENTAL, MAINTENANCE, AND REPAIR: N/A

19. TERMS AND CONDITIONS OF INSTALLATION: N/A

20. TERMS AND CONDITIONS OF REPAIR PARTS: N/A

20a. TERMS AND CONDITIONS FOR ANY OTHER SERVICES: N/A

21. LIST OF SERVICE AND DISTRIBUTION: N/A

22. LIST OF PARTICIPATING DEALERS: N/A

23. PREVENTIVE MAINTENANCE: N/A

24a. ENVIRONMENTAL ATTRIBUTES: N/A

24b. SECTION 508 COMPLIANCE: 3QC will comply with Section 508, and the EIT standards found at: www.Section508.gov/.

25. DATA UNIVERSAL NUMBERING SYSTEM (DUNS) NUMBER: 14-8812006

26. CENTRAL CONTRACTOR REGISTRATION (CCR) DATABASE: Registered

Service Contract Act

The Service Contract Act (SCA) is applicable to this contract and it includes SCA applicable labor categories. The prices for the cited SCA labor categories are based on the U.S. Department of Labor Wage Determination Number identified in the SCA matrix. The prices offered are based on the preponderance of where work is performed and should the contractor perform in an area with lower SCA rates, resulting in lower wages being paid, the task order prices will be discounted accordingly.

Service Contract Act (SCA) Matrix

SCA Eligible Contract Labor Category	SCA Equivalent Code Title	WD Number
Commissioning Technician III**	30086 Engineering Technician VI	05-2055
Commissioning Technician II**	30085 Engineering Technician V	05-2055
Commissioning Technician I**	30084 Engineering Technician IV	05-2055
Testing Project Engineer**	30083 Engineering Technician III	05-2055
Testing Technician II**	30082 Engineering Technician II	05-2055
Testing Technician I**	30081 Engineering Technician I	05-2055
Administrative/Clerical Support**	01312 Secretary II	05-2055

Price List / Job Categories / Position Descriptions

SERVICE PROPOSED / LABOR CATEGORY	POSITION DESCRIPTION	HOURLY RATE
Principal	Program oversight. Ensures resources are available and that tasks are fully staffed with personnel, equipment and other required support. Assigns the task to the appropriate Senior Project Manager. Bachelor's degree in Architecture, Engineering, or Construction Management and/or registered architect or professional engineer is required. Minimum of 20 years experience.	$202.14
Senior Project Manager	Provides business, technical, and personnel management and coordination for individual projects. Provides comprehensive definition of all technical aspects of project requirements. Program development, analysis of program mission, goals, and objectives. Bachelor's degree or higher in Architecture, Engineering, or Construction Management, and 15 or more years relevant experience.	$160.56
Project Manager	Supports the Senior Project Manager. Gathers data and performs basic analysis of the gathered information. Bachelor's degree or higher in Architecture, Engineering, or Construction Management or higher with 5 or more years relevant experience.	$156.69
Commissioning Authority	Provides business, technical, and personnel management across a major single project or multiple projects, involving multi-disciplinary and diverse functional activities, subordinate groups of technical and administrative personnel. Bachelor's degree or higher in an engineering discipline. Must be a registered professional engineer with 10 or more years relevant experience.	$169.26
Commissioning Agent - Electrical	Reviews all technical specifications and drawings related to electrical engineering, to ensure compliance with all regulations. Responsibilities also include report generation and data analysis. Bachelor's degree in engineering with a minimum of 5 years experience. Registration is preferred, but not required.	$152.82
Commissioning Agent - Mechanical	Reviews all technical specifications and drawings related to mechanical engineering, to ensure compliance with all regulations. Responsibilities also include report generation and data analysis. Bachelor's degree in engineering with a minimum of 5 years experience. Registration is preferred, but not required.	$155.72
Commissioning Provider	Manages multiple subcontractors, testing, commissioning, ensuring adherence to specifications and drawings, preparing progress reports, maintaining a daily log of activities, maintaining construction budget and meeting the needs of the customer and contract. Reads and interprets technical specifications and drawing and has good record keeping skills. AA degree required or special training/certification. 8 years of relevant experience required.	$148.95
Commissioning Technician III	Performs audits of construction and quality control measures. Checks compliance to specifications, standards, and construction practices. "Hands-on" experience shall include project equipment function reports, maintenance process and O&M Manual preparation. High School Diploma and 8 years of relevant experience.	$123.80
Commissioning Technician II	Performs audits of construction and quality control measures. Checks compliance to specifications, standards, and construction practices. Commissioning of built out space, O&M Manual receipt and tracking. Verification of as built conditions with trades and systems functional testing. Works under the supervision of a Commissioning Technician III or Commissioning Provider. High School Diploma and 4 years of relevant experience.	$109.29

Commissioning Technician I	Provides technical assistance in construction audits under the direct supervision of more senior personnel. High School Diploma with 2 years of relevant experience.	$94.79
Testing Project Engineer	Serves as the main contact for the planning, organization, and coordination of the activities of personnel engaged in equipment operations and testing. Establishes and maintains schedule for the group to be consistent with budgetary and time constraints. Assists employees with	$89.95
Testing Technician II	Responsible for equipment testing and maintenance programs; including report write-ups and equipment calibration. Responsible for training employees on testing and monitoring equipment. High School Diploma and 4 years of relevant experience.	$83.18
Testing Technician I	Assists with equipment testing and maintenance programs. Has working understanding of all testing and monitoring equipment. High School Diploma and 2 years of relevant experience.	$75.44
Senior Administrator	Provides clerical oversight to assure quality on the project. Ensures day-to-day contract administration including project coordination and communication liaison. High School Diploma minimum requirement with 5 years relevant experience.	$90.92
Administrative/Clerical Support	Performs clerical and word processing functions including typing, word processing, data entry, filing, copying, binding, faxing, and electronic communication. High School Diploma with 2 years experience.	$56.10

SIN Description

871 202 Energy Management Planning and Strategies

541618 *Other Scientific and Technical Consulting Services*

A four-phase Comprehensive Energy Management Solution consisting of all four phases of an energy project and could pertain to a variety of energy projects that include, but are not limited to, renewable energy, sustainable energy, and energy efficient buildings certification programs such as LEED.

1. Consulting/Auditing/Energy Management Solutions - This includes the strategic planning, energy assessments e.g. feasibility, vulnerability and other detailed assessments, developing and executing of energy audits, audit plans, renewable energy surveys and energy management solutions.
2. Concept Development and Requirements Analysis? This includes the analysis of the audit results and outlined requirements to design a detailed energy management project concept.
3. Implementation and Change Management - This includes the implementation and integration of more energy efficient practices and systems and training in using them effectively.
4. Measurement and Verification - This includes the performance assessment and measurement of the effectiveness and energy efficiency of the project and can include long term monitoring, verification of savings and benchmarking.

871 203 Training on Energy Management

611430 *Professional and Management Development Training*

Including, but not limited to, reducing energy consumption, mitigating risk with energy systems, operating systems efficiently, making energy efficient system choices, and energy efficient buildings certification programs such as LEED.

871 204 Metering Services

561990 *All Other Support Services*

Including, but not limited to, the installation of metering equipment ands software used for the collection of data and measurement of energy consumption through electric, gas, water or steam utilities, the utilization of data to ensure energy conservation goals are being met, and allows for the measurement and tracking of the cost effectiveness of energy technology investments. This could include basic metering services, advanced metering services, maintenance, installation, removal and disposal of new or existing equipment. Security clearances such as HSPD-12 may be required.

871 206 Building Commissioning Services

541380 *Testing Laboratories*

Including, but not limited to, comprehensive building commissioning services on new construction, major modernization projects, and existing energy consuming buildings and facilities designed to ensure the building systems are designed and built to operate as efficiently as possible. This includes re-commissioning and retro-commissioning services. Energy efficient buildings certification programs such as LEED may be included.

871 207 Energy Audit Services

541330 *Engineering Services*

Including, but not limited to, developing, executing, and reporting on audit plans and/or perform energy and water audit services. Energy audits may range from cursory to comprehensive. Including, but not limited to data collection, data analysis, benchmarking with tools such as Energy Star, and written recommendations of suggested upgrades of electrical and mechanical infrastructure, including their impact on energy consumption and pollution can include recommendations for using alternative Energy Sources. Energy efficient buildings certification programs such as LEED may be included.

New County Administration Building *San Joaquin County, CA*

Customer/Client Name: *County of San Joaquin, CA*	**Project Name/Contract Number:** *New County Administration Building*	**Customer Point of Contact (PoC):** *Gabe Karam – Dir. of Capital Projects*
	Project Performance Period *July 2007 – December 2010*	**Dollar Value of the Entire Project:** *$92,800,000*
Dollar Value Received for Work: *$345,060*	**Brief Summary of Project:** Design-build construction of a new, 250,000 sq. ft., 5-story office building & parking structure to consolidate several county departments. The administrative facilities provide office space for hundreds of county employees use as well as public chambers for the County Board of Supervisors. The building achieved LEED Gold Certification in addition to numerous awards.	

Scope of Work –

3QC was contracted by San Joaquin County to plan, organize, develop, manage, and perform a systematic quality assurance process for the building technical systems meeting the USGBC LEED Gold Fundamental and Enhanced Commissioning requirements. A major focus of our services were planning, auditing and measuring building energy consumption. These services included independent analysis and verification of the HVAC system, the mechanical control system, the lighting control system and the energy management system to meet the tight energy conservation goals of the project. Along with documentation of critical building characteristics and the design review of the design and construction documents, 3QC developed a testing and documentation process, complete with quality assurance checklists and inspection forms, to test and document the successful installation, programming, and tuning of each of these systems. Subsequent to final testing of these systems, a comprehensive training plan was developed to train the County maintenance staff on proper building operation to manage building energy consumption.

Critical to the correct operation of these systems is the measurement and control of energy used by this equipment. During the design phase 3QC developed an energy metering, monitoring and management plan. Electrical sub-meters were used to measure kWh and in conjunction with a systems level energy model, the actual energy used by each system was compared against a simulated building energy model allowing 3QC to measure (audit) actual energy performance. During the first year of building occupancy, 3QC consulted to the County Operations staff to analyze energy performance, train the building staff on energy conservation and to develop energy conservation measures including adjustments to time clocks, set point revisions, and operating point adjustments. 3QC worked with the County energy manager to develop a continuous measurement plan and trained the energy manager how to monitor building system energy usage and identify system anomalies for subsequent adjustment or correction. 3QC provided independent verification and validation of the building systems performance.

Methodology –

For the commissioning quality assurance scope of work, 3QC follows the ASHRAE Guideline 0 commissioning process as standard practice. 3QC staff worked with the owner to develop the project quality standards and the functional performance requirements for the project. This process included working with the building owner and user groups to clearly define functional intent and system purpose. These criteria were developed into an Owner Performance Requirments (OPR) document. Subsequently, this criteria was used to perform an independent evaluation of the design documents to verify system compliance and inclusion of critical performance characteristics. Building system energy performance was modeled to confirm concurrance with the strict project energy performance requirements. 3QC developed a project quality assurance plan that included (amoung numerous other items) duct sealant and pressure testing requirements, building sensor calibration and testing requirements, pre-functional checklists for HVAC equipment, and temperature control sequence tests.

For example, during installation of the ductwork the sheetmetal contractor was required to pressure test sections of completed work to demonstrate that the installation met the project requirements. 3QC monitored the work and verified correct performance of the test requirements and subsequent documentation. During installation of the mechanical

equipment, the contractor completed an initial quality control process using the pre-functional checklists developed by 3QC prior to start-up. 3QC performed an independent inspection process using a sampling methodology to confirm correct use of these forms and equipment installation meeting specification. Upon completion of building mechanical, electrical, and plumbing systems installations, the contractor was required to demonstrate the final operation of the equipment and the systems to meet the original design criteria which was verified by 3QC.

Upon completion of final testing, 3QC managed and observed training of the County building operations staff by the contractor and/or manufacturer representatives. The operations staff were encouraged to test and evaluate system operations to develop a thorough understanding of system capabilities during training. Of particular note was the operation of the building lighting system and the lighting sensors. Lighting sensors throughout exterior wall office spaces and near interior spaces illuminated by sky lights were calibrated to reduce electrical lighting levels when sufficient exterior light was available. 3QC developed a testing plan to cover (and then expose) the light sensor and simulate the absence of avaiable sun light. Using a stop watch as a timer, each sensor was measured to verify the speed of activation and the consisency from one zone to the next. A calibrated light meter was also used to validate that the required foot candle lighting levels were achieved at the desk top and that the lighting levels throughout the space where even and consistent as designed. Measurements and test results were compliled in a written log for distribution and tracking. Lighting sensor or system deficiences and their subsequent correction were verified and documented by 3QC.

Schedule Relevance –

- Energy Management Planning and Strategies (871 202)
  3QC conducted meetings with the client to establish and document the County energy conservation goals. 3QC advised the client on the use of renewable energy systems, including solar power. Solar panels where incorporated into the design documents and installed on the roof of the building. 3QC worked with the County and the mechanical design professional to select energy efficient equipment and subsequently developed energy efficient building control strategies. During the design process, 3QC reviewed the MEP designs and recommended the location of sub-meters for energy metering and management. During construction, 3QC reviewed the contractor's proposed sub-meter product data for compatibility with the M&V project goals. 3QC inspected the installation of the sub-meters to verify the correct meters were installed and watched the contractor test meter operation. 3QC assisted in the problem solving process as the contractor integrated the metered data with the building management system. 3QC verified that the recorded data was consistent with the actual meter readings and agreed with the utility billings. After several months of collected meter data was compared with the building design energy model, 3QC recommended changes to various building system set points and equipment operational schedules to reduce energy consumption. At the completion of one full year of occupancy, 3QC calibrated the energy model to create a benchmark.
- Training on Energy Management (871 203)
  3QC provided continuous training to the building operations staff during the first 16 months of building operation in the collection and analysis of sub-metered building energy consumption and implementation of energy conservation strategies based upon the metered data.
- Metering Services (871 204)
  3QC developed the building sub-metering plan and meter requirements. 3QC reviewed and approved the contractor meter submittals and provided inspection of installation and meter calibration of all electrical, water and gas sub-meters. 3QC tested and verified the energy management software used to collect the data and 3QC subsequently trained the building operating staff on use of the software.
- Building Commissioning Services (871 206)
  3QC provided comprehensive commissioning services for the project including development of critical owner project requirements, energy system analysis and selection, design review, contractor submittal review, construction inspection, MEP systems functional testing, owner training and documentation.
- Energy Audit Services (871 207)
  Using the energy management software and following the M&V plan, 3QC performed a thorough energy audit of the project for approximately 16 months and incorporated energy conservation measures based upon the analysis. Building energy performance was benchmarked after one year of operation.

Modular Gen7 Buildings *State of California*

Customer/Client Name: *American Modular Systems, Inc.*	**Project Name/Contract Number:** *Modular Gen7 Buildings*	**Customer Point of Contact (PoC):** *Tony Sarich – President*
	Project Performance Period: *June 2010 – January 2012*	**Dollar Value of the Entire Project:** *$17,750,000*
Dollar Value Received for Work: *$25,000*	**Brief Summary of Project:** 3QC provided systems testing, energy analysis, sustainability review and record documentation for the construction of the prototype American Modular Systems Gen 7 classroom building and for six classrooms at the Bolsa Knowles Middle School in the Santa Rita Union School District and four classrooms at the Brentwood School. The Gen 7 modular building is a new prototype classroom building designed and constructed to provide a cost effective classroom structure that incorporates energy efficient systems with high indoor environmental qualities. As an independent 3rd party, 3QC provided energy systems testing and IEQ evaluation services to meet the sustainable goals for the Collaborative for High Performance Schools (CHPS) certification of this project.	

Gen7

healthy schools, delivered

Scope of Work –

3QC was contracted for testing and evaluation of the energy systems and sustainable construction goals by the manufacturer and installer of a new type of modular classroom building (Gen7). This modular classroom system was installed on the Bolsa Knowles Middle School in Salinas, Ca. and the Brentwood School in Los Angeles, Ca. This prototype classroom building was developed as a "green" building to save significant energy and provide an improved learning environment for students throughout California. 3QC developed, managed and performed a systematic testing and documentation process to qualify the Gen7 structure for certification as a CHPS Verified classroom. CHPS is a sustainable building program similar to LEED for Schools. 3QC's services were focused on the construction phase of the first building, the construction of subsequent buildings and the documentation to meet the certification standards. 3QC services included the preparation of energy systems functional test plans and electrical sub-metering design to meet the CHPS criteria, the preparation of inspection criteria and reporting forms to document test results, inspection of the installed environmental controls systems, installation and calibration of electrical meters, simulation of mechanical control operation, energy modeling and energy benchmarking, energy analysis and reporting, and documentation of CHPS criteria. 3QC contributed to the successful launch of this prototype building and the successful certification of the building to meet CHPS requirements.

The Gen7 classroom is designed and built to provide a cost effective classroom structure that exceeds California T24 building requirements in energy use and indoor air quality. The building includes a well insulated envelope and advanced mechanical systems coupled with extensive daylight harvesting strategies including skylights, light-shelves, operable windows and daylight sensors. 3QC provided independent energy testing, measurement and verification to support the fact that the building has a reduced energy usage of 60% over conventional classroom buildings of this type. Indoor environmental quality is a priority in this structure and includes the use of large low-E windows giving students a direct view of the outdoors. The building includes an ultra-quiet Thermal Displacement Ventilation system that quickly responds to changes in temperature, humidity and carbon dioxide levels. All systems are controllable and allow teachers to adjust for natural ventilation and filtration, bringing in 100% fresh air without the use of the mechanical cooling system. Proper operation of these systems is critical to energy conservation and indoor environmental quality.

3QC provided quality assurance services by identifying key operational characteristics and preparing test strategies. Testing was performed by the installing contractor under the observation and verification of 3QC staff. After the successful installation of the modular building, 3QC then provided systems training to the school staff and teachers on the proper operation of the mechanical and electrical systems.

To meet one of the key milestones for this prototype building, 3QC developed an energy measurement, monitoring and management plan to validate the actual performance. Electrical sub-meters were used to measure kWh in the prototype building and a comparable modular classroom building. A detailed analysis was performed and the actual energy usage by system was recorded and compared against the simulated energy model and the comparable modular classroom building. Final results proved the design goal of 60% reduction compared to the standard modular classroom building. Successful documentation of these results earned the building a CHPS Certification as a High Performance Building.

Statement of Qualifications – Project Experience

Methodology –

Testing, inspection and certification of the prototype building was based upon a process developed by 3QC from the ASHRAE Guideline 0 and ASHRAE Guideline 1 processes for quality assurance of building systems.

Task 1 – *Identify and document sustainable project requirements, energy effeciency goals, equipment functional performance requirements and operating points and development of a training plan.*

3QC worked with the manufacturer to coordinate these project goals and requirements into a documented project plan. 3QC developed a detailed energy management plan including effecitive methods to meter electrical usage and integrate energy conservation measures.

Task 2 – *Develop construction testing and quality control requirements for use by the installing contractor.*

As part of this task, testing requirements and equipment operational standards were developed by 3QC and provided to the contractor. This included the design of an electrical sub-metering plan, meter calibration and energy management software set-up, and energy data collection and management.

Task 3 – *Develop a systematic quality assurance plan for inspection, testing and documentation of the systems performance.*

A project quality assurance plan was developed by 3QC to systematically verify the proper installation of the energy systems installed in the building, and to validate and document the functional performance of the equipment. Quality checklists and templates were prepared as guidelines for the proper installation and testing. 3QC performed independent inspection and verification of the energy systems and energy monitoring equipment.

Task 4 – *Perform project inspection and verification.*

3QC used the quality assurance plan to comprehensively inspect and verify the mechanical and electrical systems operational characteristics and functional integrity and reliablity. Install thermal sensors and electrical metering devices to record and document the equipment operational characteristics, indoor environmental quality, and to verify energy consumption.

Task 5 – *Document systems performance for CHPS certification.*

Test results were analyzed and a report was generated to document the successful operation of the building equipment, the building systems and the building as a whole. CHPS templates were prepared by 3QC and submitted for cerification. Optimization solutions and energy conservation measures were developed to further reduce energy consumption.The project was successfully certified and met the project goals.

Task 6 – *Building Operator Training.*

Provide a training and instructional program for building staff to ensure that the occupants operate the energy systems in an energy efficient manner and understand the effect of their energy conservation.

Schedule Relevance –

- Energy Management Planning and Strategies (871 202)

  3QC developed and provided a detailed energy assessment and audit of the modular buildings to verify compliance with the manufacturer energy conservation goals and provided documentation to meet the sustainable energy criteria and requirements for CHPS. 3QC benchmarked energy consumption for the standardized building. 3QC developed an energy measurement and verification procedure to monitor energy consumption of the buildings when placed on school sites under normal operating conditions.
- Training on Energy Management (871 203)

  3QC Developed energy conservation measures based upon system testing and data analysis. The manufacturer incorporated energy conservation measures into subsequent manufacture of classroom buildings. 3QC provided energy training to the building occupant (school staff) on proper usage of the classroom energy systems including the building lighting and HVAC systems.
- Metering Services (871 204)

  3QC prepared a sub-metering plan to measure and record electrical consumption of the modular units. 3QC verified installation and calibration of the meters. 3QC installed temporary meters and data recorders to validate interior conditions, including humidity, temperature, noise and lighting to measure and document the indoor environmental quality (IEQ) to meet CHPS requirements. Trending software was programmed to document recorded measurements which were subsequently analyzed to determine optimal equipment performance.
- Energy Audit Services (871 207)

  3QC prepared an energy metering and monitoring plan for review by the modular classroom manufacturer. The plan was modified after review and discussion with the manufacturer and was implemented by 3QC. The audit included data collection, analysis of measured data, and establishment of a benchmark. Energy conservation measures (ECMs) were provided and implemented to improve energy performance. Subsequent energy audits were performed on installed classrooms to verify correct installation and continued performance.

documentation and Title 24 Report. We prepared a commissioning plan that outlined the team's quality control and quality assurance responsibilities including the quality team's (owner, commissioning agent, contractor, subcontractor, inspector) responsibilities, systems testing requirements, and communications protocol during construction. Equipment testing schedule requirements were developed and incorporated into the construction documents at this time.

Currently in the construction phase of the project 3QC is coordinating the project schedule milestones for inspection, start-up, and testing of the mechanical, electrical and plumbing systems. As the owner's representative we are working with the construction contractor to develop and manage construction schedule activities including the submittal of MEP documentation, installation and inspection activities for the mechanical, electrical and plumbing systems, equipment start-up activities, testing and balancing, calibration of sensors and final functional performance testing.

3QC is monitoring the submittal status of the mechanical, electrical, plumbing and LEED required submittals provided by the contractor and the subcontractors. We are performing a formal review of the submittals and documenting deficiencies and required corrections. Our review is focused on two critical aspects: conformance with the contract requirements and project functional performance requirements to meet "Net Zero" and LEED Platinum.

During installation of the MEP equipment, 3QC will manage the contractor to verify that proper quality control procedures are follwed. This is accomplished using the commissioning plan developed for the project specific requirements and includes the use of pre-functional checklists developed by 3QC prior to start-up. The contractor will provide quality control of his installation using the checklists as a guide and 3QC will provide observation and verification to check the results. 3QC will perform an independent inspection process using a sampling methodology to confirm correct use of the inspection forms and verification that equipment installations meet specification requirements. Upon completion of building mechanical, electrical, and plumbing system installations the contractor will be required to demonstrate that the final operation of the equipment and the systems meet the original design criteria which will be verified by 3QC.

Currently our staff are conducting, managing and documenting regular project coordination meetings with the contractor, sub-contractors, inspectors and owner staff. 3QC prepares the agenda prior to each meeting, leads the meeting, prepares meeting minutes after the meeting and tracks project issues using a master issues log. Currently the major focus during the meetings is centered on equipment performance requirements and testing milestones as well as LEED documentation and template preparation for building certification.

3QC has developed a systematic testing plan to verify that the mechanical, electrical, plumbing and building management systems function correctly, are controllable with the designed project parameters, and are tuned for optimum energy performance. 3QC is responsible to manage the construction contractor to ensure that these systems have been configured and tested to perform correctly prior to occupancy by the building users and tenants. Contractors will provide a written log of measurements and test results for distribution and tracking. 3QC staff will review the testing results and documentation provided by the contractor and will perform re-testing to verify proper performance. System deficiences and their subsequent corrections are then identified, verified, and documented by 3QC. Final performance and set points will be documented for use by the facilities maintenance staff and referenced during training.

Upon completion of final testing, 3QC will coordinate training of the building operations staff by the contractor and/or manufacturer representatives, documenting the training process and provide verification that the training is sufficient for continuing operations. The operations staff will be encouraged to test and evaluate system operations to develop a thorough understanding of system capabilities during training.

CM and Engineering Scope –

- Professional Advisor
- Design and Management Experience
- Project Design Phase Services
- Project Procurement Phase Services
- Project Construction Phase Services
- Commissioning Services
- Testing Services / Demonstration and Validation / Independent Verification and Validation
- Education and Training
- Building Regulatory Certification / Regulatory Compliance Support
- Life Cycle Costing / Statistical Analysis / Control Systems
- Mechanical Engineering / Materials – Power – Noise Control and Acoustics
- Post Construction Service / Analysis of Program Goals, Objectives, Performance
- Technical Analysis / Simulation and Modeling