



# Principles and Protocols for Conducting Remote Audits on Multifamily Buildings



## Notice

Information in this document represents the policies at the date of publication for the *BPI Multifamily Remote Audit Protocol*. Information in this document supersedes information contained in any previously published document under the same title.

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## Acknowledgements

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## Disclaimer

A Remote Audit assesses and characterizes building/in-unit energy usage, and health and safety hazards by integrating qualitative observations with limited quantitative diagnostics to determine and prioritize recommendations. The information contained in the resulting evaluation report communicates the recommendations to the occupant with the goal of reducing energy usage, environmental health and safety, and quality of life.

It is understood and agreed that this evaluation will be of the readily accessible areas of the subject building and is limited to observations of apparent conditions existing only at the time of the evaluation. Latent and concealed defects and deficiencies are excluded from the evaluation.

Maintenance, repairs, possible fixes, recommendations, and other similar items may be discussed during the evaluation and referenced in the report, but they are not to be considered technically exhaustive or cover every possible condition. The evaluation and report are not a compliance inspection or certification for past or present governmental codes, regulations, ordinances, statutes, or special utility restrictions of any kind.

The client ("Customer") agrees that auditor ("Contractor"), its agents and employees shall not be liable or responsible for the cost of repairing or replacing any reported or unreported energy usage, and/or health and safety hazard, either current or arising in the future, or for any and all claims, losses, expenses, injuries, or damages arising out of or in any way related to the reported or unreported energy usage, and/or health and safety hazard by reason of any act or omission, including breach of contract or negligence. The parties further agree that Contractor shall not be liable to Customer for any special or consequential damages, including but not limited to, lost profits, loss of use, and costs of replacement, caused by the Contractor's negligence, breach of contract, or any other cause whatsoever.

The parties acknowledge that this evaluation and report is not intended, or to be used, as a guarantee or warranty, expressed or implied, regarding the adequacy, performance or condition of any evaluated structure, item, or system. The parties further acknowledge that Contractor is not an insurer and that the evaluation and report are not insurance against any health and safety hazard condition(s).

Notwithstanding the foregoing, it is understood and agreed that if Contractor is found liable to Customer as a result of failure to perform any of its obligations, including but not limited to failure as a result of negligence, breach of agreement, or otherwise, the liability of Contractor, its agents and employees shall be limited to a sum equal to the amount of the fee paid by the Homeowner for the evaluation and report.

## Multifamily Remote Audit Protocol

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### **PREAMBLE:**

#### **Purposes and Principles Governing the Inclusion of a Remote Assessment Component (RAC) in Audits of Multifamily Buildings during the COVID 19 Pandemic**

1. The development of the RAC as described here is assumed to be a temporary, not permanent, solution resulting from the conditions imposed by the Pandemic, not an intentional new normal, although it is understood that some aspects of the RAC may become part of “business as usual” at some future point.
2. The health and safety of building staff and residents, as well as representatives of third parties engaged in carrying out/completing an energy audit or implementing items in the proposed scope of work (SOW), will be a continuing priority throughout all stages of this AUDIT process.
3. The overarching goal is to collect the data necessary for completion of a quality audit for purposes of developing an appropriate scope of proposed upgrade work while also minimizing time on site and direct contact with building staff and residents during the AUDIT process.
4. The professional/organization/firm/entity specified as the EVALUATOR in this document is expected to have the required credentials and experience to have overall responsibility for the production of the Energy Audit Report, including the work product summarizing the proposed SOW.
5. The specific remote assessment tools, forms, and procedures to be used by SITE REPRESENTATIVES (SITE REPS) should be developed and implemented by the EVALUATOR (energy audit firm or other service provider) and are specifically not prescribed by this Protocol.
6. The relative balance of in-unit and common area data collection and analysis to be carried out by SITE REPS as part of the Remote Assessment Component of the Audit in contrast to field observation and analysis carried out by experienced and certified professionals who are part of the EVALUATOR team will be determined based upon building and site-specific conditions and specified in advance in the Agreement between the OWNER and the EVALUATOR and are not prescribed here.
7. The SITE REP should be a named individual who is the lead responsible party at the building level who is expected to be the primary point of contact for communications of the on-site data collection protocols. (It is assumed, but not required, that this person is regularly on site at the specific building/property being audited.)
8. The building OWNER/PROPERTY MANAGER is the documented and named party that has the legal authority and responsibility to conduct business in the name of the specified building/property, including, but not limited to, entering into contracts with third parties to provide energy audits, propose SOWs or carry out energy efficiency-related upgrade work in the facility.
9. PROGRAM ADMINISTRATOR is the entity with authority to designate and allocate funds to provide support for approved energy efficiency and health and safety upgrade work for which the building may be eligible and may be specified through an AUDIT process.

10. The type(s) of utility METERING and the location and accessibility of HVAC/MECHANICAL SYSTEMS serving apartments and common areas in the building may vary and substantially affect accessibility for data collection and analytic purposes.
  - a. The roles and division of labor between the SITE REPS and the members of the EVALUATOR team are expected to be different when mechanical systems are centrally located in common areas such as in sections of the basement or physically located within residents' apartments.
    - i. When mechanical systems are centrally located it is expected that the EVALUATOR will visit the site to inspect the equipment and record appropriate operational and diagnostic information.
    - ii. When mechanical systems are located within each apartment, a sample of those units, including, where possible, vacant units, will be expected to be visited, at least initially, by a team composed of both the SITE REP and the EVALUATOR.
  - b. Opportunities and responsibility for data collection and observation of system operations may also vary between vacant and occupied apartments.
  - c. The amount of time and type of audit-related work possible/required for the EVALUATOR to carry out on site may vary for these and other reasons that should be able to be described, explained, or documented.
11. On-site personnel who may normally have, or for this purpose are assigned to have, responsibility for the operation and maintenance of existing or proposed mechanical systems serving the building are expected to be made available for orientation or training regarding on-site support roles for data collection purposes in support of the AUDIT, using specified tools or equipment, including cameras to record required and reviewable information.
12. The precise balance of third-party professional on-site inspection and assessment required in any specific building is expected to vary based on a series of factors, including ways to reduce the EVALUATOR's time in COVID 19 sensitive spaces, and is not specifically prescribed in advance for each building.
13. When deciding the appropriate balance of responsibilities among the parties, an overarching concern is that the load placed on the SITE REP may be quite heavy and could cause the whole process to become very time consuming and challenging or to fail completely (e.g., if the SITE REP underperforms for a variety of reasons, or the OWNER backs out of the commitment to provide the required information and cooperation). Many facilities may not have someone with sufficient experience to make meaningful determinations even of such basics as finding and properly reading equipment nameplate data without targeted training or mentoring.
14. Therefore, this protocol recognizes that the EVALUATOR should be allowed some discretion to take on these responsibilities directly, while also ensuring that proper facial covering, social distancing, and other appropriate PPE are utilized when on the multifamily building site. Without this flexibility, this concern may be a continued source of uncertainty for many EVALUATORS with respect to some buildings where the impact of relying on a SITE REP to play a critical role in the Remote Assessment Component of an Energy Audit of multifamily buildings could unacceptably jeopardize quality.

## **GUIDANCE AND PROTOCOL OUTLINE**

**This guidance and protocol outline shall be utilized to validate that an energy audit containing some components that are the product of remote assessment has been completed in a methodical and consistent manner.**

The intent of this document is to outline the specific requirements and procedures associated with all multifamily building sets and to verify that remote audit data collected is complete and provides the information needed to perform a cogent analysis of existing conditions in the building affecting energy use, and health and safety. This document shall serve as a basis of minimum effort and requirements to complete a successful building-wide AUDIT using remote assessment procedures when deemed appropriate by the firm responsible for completing the overall energy audit (the EVALUATOR) in a manner and form which will give the EVALUATOR the information required to make a complete list of findings and recommendations. In addition, the intent of this protocol is to have a pathway for auditing multifamily buildings during a pandemic/restricted periods in order to support improvements to the building to benefit the tenants.

### **This Protocol shall list three parties:**

1. **OWNER-** This is the entity requesting the services to be performed. This may be an owner's representative such as a property manager or proxy performing duties on the owner's behalf.
2. **SITE REP-** This is the entity performing the physical activity of conducting aspects of the onsite survey in cooperation with the EVALUATOR. This will likely be a member of the building staff, or perhaps a resident or tenant. This may include multiple people, however the responsibilities outlined herein shall apply to the group.
3. **EVALUATOR-** This is the entity hired to perform the overall analysis and direct the remote audit activities. This should be a team of licensed or certified professionals<sup>1</sup> with documented experience in conducting multifamily energy audits and the preparation of subsequent findings and reports, including description of current conditions, modeling current energy use, and developing a proposed scope of upgrade work with forecasts of projected savings.

### **The Agreement between the Owner and Evaluator shall establish three key criteria from this Protocol:**

1. **Responsible party-** The Agreement shall use a matrix style designation to determine the responsible party for each task associated with the process.
2. **Task list-** The document shall create a full and complete list of the equipment, data points, and documentation required to be submitted by the OWNER and SITE REP to the EVALUATOR. The list shall be general enough to allow for building specific characteristics to determine best practices.
3. **Best Practices-** This document shall outline the appropriate means and methods with which to gather the data, transmit the data to the EVALUATOR, and respond to additional data requests, and generate the final report. The goal is to provide all parties with a direct guidance on these best practices, while allowing for each EVALUATOR to utilize their own methodologies to generate consistent results in the field.

## Scope of Services

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These protocols define the minimum criteria for incorporating a remote assessment component in the overall building science-based multifamily building energy audit. Multifamily building types covered are defined as existing residential buildings with 5 or more residential units.

The remote energy audit component will assist the EVALUATOR in addressing energy usage and limited aspects of building durability and occupant health and safety. The overall energy audit will provide a comprehensive report with a list of prioritized recommendations to improve the building and will include a cost-benefit analysis.

This report will be in part dependent upon the quality and accuracy of the data collected on site by the SITE REP team representing the **OWNER/PROPERTY MANAGER** as well as the analysis and report provided by the EVALUATOR, i.e., the certified professional-led energy audit team<sup>1</sup> responsible for reviewing and, when necessary, verifying the data collected by the SITE REP team, modeling the performance of the building currently, using energy use data collected on the project, and making energy efficiency upgrade and healthy housing recommendations consistent with that data.

### **General Requirements**

Energy audits shall be based on building science principles and include the use of appropriate equipment and technologies for improving energy efficiency and minimizing health and safety hazards.

All remote multifamily energy audits shall include the following from the EVALUATOR:

- Remote Meet and Greet and initial consultation with OWNER and the designated SITE REP.
- Preparing the OWNER and SITE REP by providing and reviewing field data collection forms and procedures in advance and making sure they have accurate devices, e.g., thermometers, light meters and other project specific tools needed to meet the requirements of successful remote audit communication, including synchronous calls, video, and photographs.
- Obtaining and confirming the name of the person representing the OWNER who will be responsible for the SITE REP roles and responsibilities described below.
- Receiving a commitment from the OWNER that the person(s) designated as the Team lead for the SITE REP role shall be made available for the full duration of the site survey/remote assessment.
- Obtaining building information through available resources (utility, Green Button, Zillow, etc.) and tools (such as Google Earth).
- A review of input data received from the OWNER and SITE REP and verifying the completeness and accuracy of information submitted by them to the EVALUATOR.
- Immediate disclosure to building owner/property manager when any suspected emergency or urgent health and safety hazard or situation is suspected/present in the building.
- A report as outlined by these protocols.
- Evaluator review of energy audit report recommendations with OWNER via some form of telecommunication.

### **ASSIGNING OWNER and SITE REP RESPONSIBILITIES**

EVALUATOR will devise and provide a building-specific protocol for use by the SITE REP to obtain and record equipment/device and nameplate information and pictures thereof, as well as other data described below, based

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<sup>1</sup>A Multifamily Building Analyst (MFBA), Certified Energy Manager (CEM), Certified Energy Auditor (CEA), or Building Energy Assessment Professional (BEAP) as certified by BPI, AEE or ASHRAE respectively; or a person who holds a certification from a credentialing program approved by the U.S. Department of Energy Better Buildings Workforce Guidelines for Building Energy Auditors.

upon the information provided by the OWNER in advance, using forms provided by the audit firm, as well as data collected by the audit firm remotely from sources such as GOOGLE EARTH

This will also include real time cell phone and internet communication during one or more walkthroughs and be supplemented by preparation and delivery of requested on-site information to the EVALUATOR, followed by hosting an on-site quality control inspection of the data provided as part of the REMOTE ASSESSMENT.

Instructions for the OWNER and SITE REP could be developed by each EVALUATOR FIRM for its potential clients or NYSEDA could CO-BRAND some marketing materials to promote this approach, particularly if the intent is to learn from this experience and incorporate some “remote” aspects going forward.

An example of an approach using photographs, video, or body CAM.

Whole series of photos start with a photo of the building or the sign/address of the building.

Then a photograph is taken of the room number or apartment number or the room name ("boiler room") before starting photos in that space to make it clear what is being pictured and where.

Inside a space, before taking a nameplate photo, there is a photo of the device that has the nameplate as a whole. For example, a photo of a boiler, then its nameplate; a photo of a water heater, then its nameplate; a photo of a refrigerator, then its nameplate.

Similarly, with controls, a photo of the device a control serves, then a photo of the control, then photos of its settings.

This type of consistent organizing and naming of the pictures can provide clarity of what the nameplates go with, and what room/space they are in.

**All energy audit reports shall include the following:**

- Results of visual/sensory inspections.
- Information on energy programs, incentives, regulations, and energy costs relevant to prioritized recommendations for improving the building.
- A baseline energy use analysis, based upon sufficient energy-consumption records that must be made available by the OWNER/property manager or SITE REP.
- A comprehensive set of recommended energy efficiency measures for the building (including their projected energy savings and relative cost-effectiveness if implemented).
  - Including advice to the building owner/property manager/occupants on user-controlled energy reduction strategies.
- A comprehensive set of recommended health and safety measures.
- List of “measures considered but not recommended” with short description of why not.
- **In-Unit:** This section of the audit includes results of apartment inspections and recommended measures.
  - This can be important, as many apartments have their own heating systems.
  - An appropriate sample of in-unit apartment inspections is important to provide the basis for estimating the in-unit scope of work.
  - This may provide greater challenges in some buildings during the Covid-19 pandemic but targeting empty apartments and those occupants who permit access and are willing to follow facial covering and social distancing requirements may provide a sufficient sample.

- Examples of in-unit data collection information:
  - In-unit HVAC
  - Water flows
  - Refrigerator
  - AC units
  - Windows (#, dimensions, specs, use in ventilation system)
  - Location and description of fans (and role in ventilation system)
  - Given the new emphasis on electrification, getting a photo of the electric panel, and inventory of in-unit electric loads can be useful, e.g., stoves, in-unit DHW, and in-unit laundry components.
  - Other in-unit measures in one and two pipe steam buildings, including TRVs and Steam Traps, are likely to require participation of trained technicians/auditors, rather than SITE REPS.

### **Health and Safety Related Requirements**

The health and safety requirements included in these protocols are intended to ensure that building performance upgrade activities do not negatively affect indoor air quality or otherwise cause or exacerbate an unsafe condition in the building.

### **Scope: Review all systems or subsystems of a building that use energy and/or impact energy consumption**

#### **Base Building Systems:**

- Building Envelope
- Heating, Ventilating, and Air Conditioning Systems
- Temperature Controls
- Domestic Hot Water Systems
- Electrical and Lighting Systems
- Conveying Systems

#### **Audit**

A systematic process of identifying and developing modifications and improvements of the base building systems, including but not limited to alterations of such systems and the installation of new equipment, insulation or other generally recognized energy efficiency technologies to optimize energy performance of the building and achieve energy savings, provided that such overall AUDIT process shall not be less stringent than the Level II Energy Survey and Engineering Analysis of the 2011 (2<sup>nd</sup>) edition of *Procedures for Commercial Building Energy Audits* published by the American Society of Heating, Refrigerating and Air-conditioning Engineers Inc. (ASHRAE). In instances in which RACs are incorporated into the AUDIT process, the specific tasks and procedures used will need to be identified in the Audit Report along with a description of the level of experience, training and EVALUATOR quality control oversight of the SITE REPS and approval of the tools and equipment used to complete certain specified tasks remotely.

#### **Energy Efficiency Report**

At the completion of the process, the EVALUATOR shall submit to the OWNER an Energy Efficiency Report documenting the findings and energy saving recommendations and opportunities.



## Scope of Work

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### 1. Pre-Audit Review (Review)

- 1.1. During the Pre-Audit Review period, EVALUATOR staff will require the following documentation (as applicable) from the site to facilitate the Initial Site Walkthrough (Audit). These document templates shall be provided by EVALUATOR to the OWNER upon Notice to Proceed.
  - 1.1.1. Basic Site Information
  - 1.1.2. Capital Improvement Plan
  - 1.1.3. Operations and Maintenance Costs
  - 1.1.4. Space Functions Summary
  - 1.1.5. Occupancy Schedules
  - 1.1.6. Peak Occupancy
- 1.2. **EVALUATOR** staff will also require the facility to provide the following documentation in native file format (**where possible**):
  - 1.2.1. Facility drawings, plans or as-built
  - 1.2.2. Equipment Schedules
  - 1.2.3. Maintenance Logs
  - 1.2.4. Operations and Maintenance Manuals (if and when available)
  - 1.2.5. Previously completed energy efficiency, commissioning or retro commissioning, or engineering studies
  - 1.2.6. Two years of energy bills as applicable, or utility account #s and release forms/approvals for EVALUATOR to receive from energy providers:
    - 1.2.6.1. Electric
    - 1.2.6.2. Natural Gas
    - 1.2.6.3. Fuel Oil
    - 1.2.6.4. LPG
    - 1.2.6.5. District Steam
    - 1.2.6.6. Distributed Generation Assets Meter Data
- 1.3. The EVALUATOR shall review the documentation provided to the team. Upon review, the EVALUATOR shall develop a list of the required equipment schedules, set points and data points to be collected by the SITE REP.
- 1.4. The EVALUATOR shall also provide concise written guidance on the requirements of the Audit. This guidance shall discuss and develop the methodology for the following:
  - 1.4.1. What will be the means of communication during the audit?
  - 1.4.2. How will the audit site-based work be recorded, if at all?
  - 1.4.3. Expectations on completions of forms
  - 1.4.4. Expectations on photographic evidence

1.4.5. Safety and Hazard guidelines

1.4.6. Reporting and data delivery methodology

1.5. The written guidance shall be reviewed and approved by all three parties involved.

## **2. Initial Site Walkthrough**

2.1. During the Initial Site Walkthrough, **SITE REP** shall document the following systems and equipment with input as detailed below:

### **2.1.1. Geometry and Envelope**

#### **2.1.1.1. OWNER**

##### 2.1.1.1.1. NA

#### **2.1.1.2. SITE REP**

2.1.1.2.1. Sketches- Complete diagrams, take measurements to account for total square footage and building height and depth where the EVALUATOR cannot get these measurements by other means prior to this walkthrough.

2.1.1.2.2. Fenestration- Document the arrangement and size/configuration and technical specifications (if available) of windows and doors at various locations in the building (particularly where the EVALUATOR cannot get these measurements remotely and when doors or windows may have been recently replaced).

2.1.1.2.3. Opaque Surfaces- Record details on the building envelope construction, exterior walls, insulation, and roofing materials. This is often by visual inspection only but may include measuring the depth and type of insulation wherever possible, for example in attics, and crawlspaces.

2.1.1.2.4. Opaque Doors- Identify all doors and document the door material and condition of frames, weather stripping and door checks, as well as the presence of vestibule doors.

2.1.1.2.5. Overall best practices for engaging SITE REPs may include such items as training SITE REPS to perform a “body cam host” role for the EVALUATOR when deemed appropriate and feasible by both parties.

#### **2.1.1.3. EVALUATOR**

2.1.1.3.1. Sketches- Utilize Google Earth or similar tool to generate complete diagrams, take measurements to account for total square footage and building height and depth.

2.1.1.3.2. Fenestration- Where possible utilize Google Earth or similar tool to document the arrangement of windows and doors on the elevations of the building.

2.1.1.3.3. Support- The EVALUATOR should be available or live to support the SITE REP in clarification of any questions or detail required

### **2.1.2. Schedules**

#### **2.1.2.1. OWNER & SITE REP**

2.1.2.1.1. Occupancy- Develop list of all building spaces and the operating hours for that space. If there are times of varying occupancy, describe the general patterns.

### 2.1.2.2. **SITE REP**

- 2.1.2.2.1. Occupancy- Confirm accuracy of list of all building spaces and the operating hours for the space types, as well as the variations in the general patterns.
- 2.1.2.2.2. Lighting- Use building spaces list to define lighting controls. This may include manual, automatic or timers.
- 2.1.2.2.3. Plug Loads- Identify any devices that utilize power in common spaces. This may include computers, vending, ice machines, televisions, etc.
- 2.1.2.2.4. HVAC- Working with EVALUATOR, identify set points, cut-offs, and operating parameters that are part of a building or system-wide control scheme. This MAY NOT apply to some local or end use devices. The team should identify and agree on this issue.
- 2.1.2.2.5. Peak Occupancy- Defined above in occupancy when necessary

### 2.1.2.3. **EVALUATOR**

- 2.1.2.3.1. HVAC- Review the overall system parameters. If part of a system or Building Management System (BMS) control scheme, discuss with SITE REP how to navigate menus and verify the settings. EVALUATOR may request remote (view only) access to control systems for review prior to the Audit.

## 2.1.3. **Lighting**

### 2.1.3.1. **OWNER**

- 2.1.3.1.1. Prior to the Initial Site Walkthrough, IF lighting has been changed in past 3 years, OWNER shall provide EVALUATOR with details including specs (and equipment counts) on new systems and any fixture reconfigurations that have been done by OWNER to any common area, exterior, or in-residence area if applicable.

### 2.1.3.2. **SITE REP**

- 2.1.3.2.1. Interior Lighting- SITE REP shall identify all unique lighting fixtures throughout all common areas. SITE REP shall document all bulb and ballast types in each fixture type. SITE REP shall compile fixture counts for each unique lighting fixture, along with hours of operation for each grouping (to be defined in coordination with EVALUATOR, i.e., hallways, entrance area, basement, storage room, office...).
- 2.1.3.2.2. Exterior Lighting- SITE REP shall identify all unique lighting fixtures throughout all exterior areas. SITE REP shall document all bulb and ballast types in each fixture type. SITE REP shall compile fixture counts for each unique lighting fixture, along with hours of operation for each grouping (to be defined in coordination with EVALUATOR, i.e., on timer, photocell control...).

### 2.1.3.3. **EVALUATOR**

- 2.1.3.3.1. Interior Lighting- Provide guidance on ballast types, provide resources to identify fixture or bulb types unknown or not labeled.
- 2.1.3.3.2. Exterior Lighting- Provide guidance on ballast types, provide resources to identify fixture or bulb types unknown or not labeled.
- 2.1.3.3.3. All- If required for local regulatory purposes EVALUATOR should record

foot-candles and code compliance per the Illuminating Engineering Society (IES). This may be performed later.

#### **2.1.4. Domestic Hot Water**

##### **2.1.4.1. OWNER**

###### **2.1.4.1.1. NA**

##### **2.1.4.2. SITE REP**

2.1.4.2.1. Equipment- personnel shall record nameplate information, condition of equipment, operating set points and limits.

2.1.4.2.2. Fixtures and Use- personnel shall record temperature readings, time hot water circulation loops, and verify flow rates of fixtures.

##### **2.1.4.3. EVALUATOR**

2.1.4.3.1. Equipment- Assist in the collection of required data. Verify accuracy via video or photographic evidence.

2.1.4.3.2. Fixtures and Use- Assist in the collection of required data. Verify accuracy via video or photographic evidence.

#### **2.1.5. HVAC and Controls Options**

##### **2.1.5.1. OWNER**

2.1.5.1.1. Where such exists, provide EVALUATOR (read only) access to Energy Management System (EMS), BMS, and web-based control systems.

##### **2.1.5.2. SITE REP**

2.1.5.2.1. Boilers- Personnel shall record nameplate information, condition of equipment, operating set points and limits, as well as listing of what loads/end use appliances it serves.

2.1.5.2.2. Chillers- Personnel shall record nameplate information, condition of equipment, operating set points and limits, as well as listing of what loads/end use appliances it serves.

2.1.5.2.3. Cooling Towers and Fluid Coolers- Personnel shall record nameplate information, condition of equipment, operating set points and limits.

2.1.5.2.4. Pumps, Piping and Distribution Systems- Personnel shall record nameplate information, condition of equipment, operating set points and limits.

2.1.5.2.5. Air Handling System Equipment- Personnel shall record nameplate information, condition of equipment, operating set points and limits.

2.1.5.2.6. Air Handling System Controls- Personnel shall record nameplate information, condition of equipment, operating set points and limits.

2.1.5.2.7. Air System Terminal Units- Personnel shall record nameplate information, condition of equipment, operating set points and limits.

2.1.5.2.8. Zone Heating Equipment- Personnel shall record nameplate information, condition of equipment, operating set points and limits.

2.1.5.2.9. Fan-Coil Units- Personnel shall record nameplate information, condition of equipment, operating set points and limits.

2.1.5.2.10. Exhaust/Return Fans- Personnel shall record nameplate information,

condition of equipment, operating set points and limits.

2.1.5.2.11. Packaged Units: DX, Heat Pumps- Personnel shall record nameplate information, condition of equipment, operating set points and limits.

2.1.5.2.12. Condensing Unit and Condensers- Personnel shall record nameplate information, condition of equipment, operating set points and limits.

#### 2.1.5.3. **EVALUATOR**

2.1.5.3.1. Boilers- Assist in the collection of required data. Verify accuracy via video or photographic evidence.

2.1.5.3.2. Chillers- Assist in the collection of required data. Verify accuracy via video or photographic evidence.

2.1.5.3.3. Cooling Towers and Fluid Coolers- Assist in the collection of required data. Verify accuracy via video or photographic evidence.

2.1.5.3.4. Pumps and Piping Systems- Assist in the collection of required data. Verify accuracy via video or photographic evidence.

2.1.5.3.5. Air Handling System Equipment- Assist in the collection of required data. Verify accuracy via video or photographic evidence.

2.1.5.3.6. Air Handling System Controls- Assist in the collection of required data. Verify accuracy via video or photographic evidence.

2.1.5.3.7. Air System Terminal Units- Assist in the collection of required data. Verify accuracy via video or photographic evidence.

2.1.5.3.8. Zone Heating Equipment- Assist in the collection of required data. Verify accuracy via video or photographic evidence.

2.1.5.3.9. Fan-Coil Units- Assist in the collection of required data. Verify accuracy via video or photographic evidence.

2.1.5.3.10. Exhaust/Return Fans- Assist in the collection of required data. Verify accuracy via video or photographic evidence.

2.1.5.3.11. Packaged Units: DX, Heat Pumps- Assist in the collection of required data. Verify accuracy via video or photographic evidence.

2.1.5.3.12. Condensing Unit and Condensers- Assist in the collection of required data. Verify accuracy via video or photographic evidence.

#### 2.1.6. Specialty Loads (if applicable)

##### 2.1.6.1. **OWNER**

2.1.6.1.1. Define any lease or other agreements related to the items below, such as fully tenant owned and operated, metering configurations, and responsibility for equipment and consumption that exists.

##### 2.1.6.2. **SITE REP**

2.1.6.2.1. Swimming Pools - Personnel shall record nameplate information, condition of equipment, operating set points and limits, as well as hours of operations.

2.1.6.2.2. Kitchen Equipment- Personnel shall record nameplate information, condition of equipment, operating set points and limits, as well as hours

of operations.

- 2.1.6.2.3. Lab Equipment- Personnel shall record nameplate information, condition of equipment, operating set points and limits, as well as hours of operations.
- 2.1.6.2.4. Refrigeration Equipment- Personnel shall record nameplate information, condition of equipment, as well as hours of operations.
- 2.1.6.2.5. Data Centers/ IT Rooms- Personnel shall record nameplate information, condition of equipment, as well as hours of operations.
- 2.1.6.2.6. Process Equipment- Personnel shall record nameplate information, condition of equipment, operating set points and limits, as well as hours of operations.
- 2.1.6.2.7. Conveying Systems- Personnel shall record nameplate information, condition of equipment, as well as hours of operations.
- 2.1.6.2.8. Additional Ancillary Systems- Personnel shall record nameplate information, condition of equipment, operating set points and limits, as well as hours of operations.

#### 2.1.6.3. **EVALUATOR**

- 2.1.6.3.1. Swimming Pools- Assist in the collection of required data. Verify accuracy via video or photographic evidence.
- 2.1.6.3.2. Kitchen Equipment- Assist in the collection of required data. Verify accuracy via video or photographic evidence.
- 2.1.6.3.3. Lab Equipment- Assist in the collection of required data. Verify accuracy via video or photographic evidence.
- 2.1.6.3.4. Refrigeration Equipment- Assist in the collection of required data. Verify accuracy via video or photographic evidence.
- 2.1.6.3.5. Data Centers/ IT Rooms- Assist in the collection of required data. Verify accuracy via video or photographic evidence.
- 2.1.6.3.6. Process Equipment- Assist in the collection of required data. Verify accuracy via video or photographic evidence.
- 2.1.6.3.7. Conveying Systems- Assist in the collection of required data. Verify accuracy via video or photographic evidence.
- 2.1.6.3.8. Additional Ancillary Systems- Assist in the collection of required data. Verify accuracy via video or photographic evidence.

- 2.2. It is important to note that some of these systems may be seasonal. In this instance, a second Site Walkthrough may be required to complete the AUDIT process in order to obtain data when such seasonal equipment is in operation.
- 2.3. Upon completion of the Site Walkthrough, the findings shall be logged in the appropriate documentation forms by SITE REP Team and delivered to the EVALUATOR in the agreed upon method.
- 2.4. EVALUATOR staff shall then compile the following information within the agreed upon timeframe.

**3. Final Report and Energy Efficiency Report (Report):**

3.1. Upon completion of the AUDIT process, EVALUATOR shall submit to the customer/OWNER a Final Report that shall include the following:

3.2. Final Report

3.2.1. Shall be a full written report of the means and methods used to determine results. A detailed list of all findings, actions recommended, and suggested methodologies will be included.

3.2.1.1. Audit results

3.2.1.2. Energy Efficiency Measures (EEMs)

3.2.1.3. Operations and Maintenance procedures

3.2.1.4. Training recommendations

**4. Requirements for Completion (Requirements):**

4.1. **EVALUATOR** shall be provided all relevant site documentation (Review) within an agreed upon number of business days of the Notice to Proceed.

4.2. **SITE REP** shall have complete and total access to all required common area building spaces and mechanical equipment for audit data collection purposes. The typical survey area includes common spaces, roof, mechanical rooms, and a sampling of tenant space.

4.3. **Coordination of access to tenant spaces** should be arranged by the OWNER and, potentially, the SITE REP, at the request of the **EVALUATOR, according to sampling protocols determined and communicated** prior to the AUDIT process.