

# Building Assessment Tool (BAT) USER'S Manual and Guidance Document

**Revision Table**

Release No.	Date	Revision Description
Rev. 1	2/28/2019	Post Pilot Revision
Rev. 2	10/3/2018	Update for Outside Testing
Rev. 3	5/19/2019	Updated for Revised BAT Interface
Rev. 4	7/8/2019	Updated for Administrator ECM forms
Rev. 5	7/26/2019	Updated for Condition Report form
Rev. 6	9/5/2019	Updated for peer edit and updated reports form
Rev. 7	10/10/2019	iPhone BPP instructions added
Rev. 8	11/26/2019	Pre-release final edits
Rev. 9	3/5/2020	Updates for some FCA Elements and Reflection of New Screens
Rev 10	4/6/2020	Updates to reflect latest revisions to BAT
Rev 11	5/1/2020	Editorial updates, Section 508 Compliance
Rev 12	7/2/2020	Editorial updates, Updates on Getting Started
Rev 13	6/17/2021	Editorial updates other updates to align with revisions to the BAT including describing new features and functions
Rev 14	04/01/2022	Editorial updates and image updates to reflect revisions and additions to the BAT.
Rev 15	8/20/2022	Added appendix for combining databases
Rev 16	1/5/2023	Editorial and image updates to align with January 2023 release of the BAT, including description of new features and functions.

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# General Information

## Acronyms and Abbreviations

The following table provides a list of common abbreviations and acronyms used throughout this guide.

Abbreviation	Description	Abbreviation	Description
AHU	Air Handling Unit	ID	Identification
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers	ILA Water	Industrial, Landscaping, and Agricultural Water
BAS	Building Automation System	kW	Kilowatts (electric demand unit)
BAT	Building Assessment Tool	kWh	Kilowatt-hour (electric use unit)
BPP	BAT Pix Processor Tool	LAN	Local Area Network
CAPSIS	Consolidated Asset Portfolio and Sustainability Information System	MMBtu	Millions of British Thermal Units (thermal use unit)
CSM	Contractor's System Manager	MMBtu/hr	Millions of British Thermal Units per hour (thermal demand unit)
CTS	Compliance Tracking System	MS	Microsoft
DCEC	Data Center Energy Conservation	M/V	Measurement and Verification
DHS	Department of Homeland Security	NIST	National Institute of Science and Technology
DHW	Domestic Hot Water	OEM	Original Equipment Manufacturer
ECM	Efficiency Conservation Measure	PC	Personal Computer
EISA	Energy Independence and Security Act	POC	Point of Contact
EMS	Energy Management System	RAM	Random Access Memory
ESC	Escape key	RPDW	Real Property Data Warehouse
EVHS	Exhaust Ventilation Hood Systems	RPUID	Real Property Unique ID
FCA	Facility Condition Assessment	SHW	Solar Hot Water
GB	Giga byte	SPM	Standards Portfolio Manager
GHG	Greenhouse Gas	TRIRIGA	An integrated workplace management and environmental sustainability software suite
GSF	Gross Square Footage	USB	Universal serial bus (type of memory stick connection)
GUI	Graphic User Interface	WCAG	Web Content Accessibility Guidelines
HVAC	Heating Ventilating and Air Conditioning		

## Purpose and Scope of the Building Assessment Tool (BAT)

The BAT provides a means to collect, validate, and update the information needed for auditors to conduct Energy and Facility Condition Assessments in an organized database structure. The tool is intended to leverage auditing/inspection activity that is already occurring at facilities to build a database of DHS' buildings; their energy equipment, energy usage and costs, and the condition of both the structure and equipment. The BAT is solely focused on organizing and reporting the descriptive elements of DHS buildings and cataloging current

conditions. It does not incorporate analytical tools which remain the purview of outside analysis. The tool is intended to be used in the field by auditors that are familiar with the best practices of their work. It has been designed to:

- Increase the effectiveness and value of energy/facility condition audits by imposing a certain level of standardization on the data collection portion of these tasks;
- Provide pre-flighting, quick-fill, and data pre-population functions that will decrease pre-audit preparation times and provide a historical review of past data collection reviews; and
- Provide data continuity for key pieces of information that are not subject to specific analytical approaches or methods, including building infrastructure and equipment data that should either be updated or reused.

Note that Authorized Users are expected to have a working understanding of building systems and energy auditors using the system are assumed to be experienced in the collection and analysis of building energy data. This manual is not intended to serve as a “How-To” guide for conducting a facility assessment or energy audit. However, following through with each menu item does impose a certain consistency on the data collection methods and processes involved with audits/assessments.

## Organization of the Manual

This manual begins with an overview of the software’s intended purpose, use, and basic administration functions. The balance of the manual provides step-by-step instructions and guidance in the use of the software in starting, completing, and uploading audit results. For Administrator functions that are distinctly different from the use of the BAT for audits/assessments, refer to APPENDIX A: Administrator User’s Manual Supplement provides instructions tailored to those functions. APPENDIX B: Special Instructions to Re-link Database Files provides information on setting up and re-linking database files to the BAT.

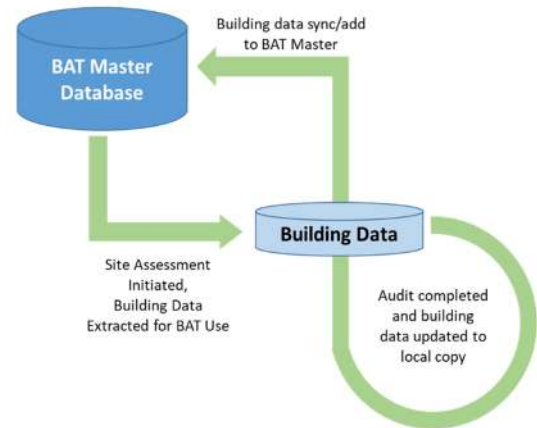
## System Overview

The BAT consists of two parts; 1) the BAT interface, which is an application used by auditors to collect data from Energy and Facility Condition Assessments during site audits, and 2) the BAT database. Both portions were developed in MS Access, which is widely available and will allow advanced users to use the BAT database directly to import or export data or create custom queries or reports. Collectively, the BAT is a tool to collect, add, and store information about Agency buildings for analysis and reporting of audit and condition information. Users of the tool are by default engaged in a process of continually adding to and improving the quality of the data the Agency maintains for each building. It is important for the user to keep this in mind as the end objective is to provide a cost effective and efficient means of collecting and storing building performance data.

The BAT database stores collected data and includes relational fields to connect collected data with other databases (CAPSIS, TRIRIGA, CTS). The database is building-focused so that it can be used as a foundation for future audits, with key data fields in common with CAPSIS and CTS. All or some of the data produced by the BAT can be incorporated into the enterprise data systems and dashboards planned for CAPSIS, or the enterprise-level systems being developed by DHS Components.

During an energy audit or facility condition assessment, users are given access to information for the specific buildings they are evaluating (and only the relevant buildings). As illustrated in Exhibit 1, any information collected as part of the site assessment is then uploaded and added/synchronized with the master BAT database. This information will be made available, through other back-end connections, to other databases and information systems. This user manual provides the information needed to operate the BAT. Other back-end functions are treated separately and are detailed in a separate Administrator’s Manual for the BAT, covered in Appendix A.

**Exhibit 1: Data Entry Flow  
BAT Interface & BAT Database Update Process**



The BAT Interface is broken into several modules:

- 1) Screens that collect background audit information, some of which may be pre-populated by the Agency administrator or a contractor’s designated manager prior to the audit assignment. If the assigned building has already had some site assessment work performed, information collected from prior visits will also be available.
- 2) Screens that collect information specific to the building systems to be evaluated during the assessment. The data fields included in the BAT in this part of the tool are based on checklists developed by ASHRAE under Standard 211-2018. These checklists are expected to be familiar to most experienced auditors and are widely-accepted as industry standard tools. The database structure behind the BAT interface is invisible to the user, but it is carefully matched to the interface’s input fields to ensure that all the data typical to an ASHRAE checklist is captured.

## BAT Design and Site Data Collection Best Practices

The designers of the BAT realize that the use of this tool may require users to make minor modifications in their approach to collecting data before, during, and after a site visit. Site visits are often conducted on a tight schedule and are often completed using a combination of auditor/assessor notes (which are often cryptic), pictures, and checklists (refer to Exhibit 2). This approach has the benefit of facilitating very speedy data collection during the site visit. The downside is that the data collected will require potentially significant post site visit processing and organization before being completely useful for analysis or assessment.

Use of the BAT requires a slightly different approach. Specifically, by using pre-populated data and imposing some additional discipline and standardization using pre-formatted data collection fields, the BAT seeks to provide the auditor/assessor with an improved data management system that increases data collection accuracy and decreases the overall time spent on the pre-analysis phase.

Data entry during site visits has also been carefully considered and tested. An effort has been made to include fields that are commonly found on checklists and worksheets that are typical tools for audits/assessments and required data entry fields have been minimized to allow users to access only the tools or informational fields they are most interested in or need. Similarly, the tool assumes that the user is generally familiar with the systems they

**Exhibit 2: Current Practice**



are auditing and there are few instances where rigorous field controls are imposed to lock the user from data entry. This provides flexibility but requires the user to carefully enter the data.

Recognizing that there is no perfect tool or single way to move through the process shown in Exhibit 2, the BAT provides considerable flexibility in the level of detail stored in the system and which components of the tool the user must employ. However, in general, the tool focuses on preparation activities and pre-walkthrough interviews (even if conducted on site during the site visit) to help the user to set-up the tool for efficient data collection. To the extent that the user fully uses the BAT's capabilities, post data processing can be virtually eliminated, and all data can be exported into well-organized reports or Microsoft Excel™ (MS Excel) files ready for use in the analysis phase.

In addition, the system is designed to carry through certain information from assessment to assessment allowing for it to be checked and refined. Over time, this should allow for continuous improvement of the data, facilitate shorter site visits, and allow project time to be focused on the analysis phase.

## Authorized Users

Authorized users of the BAT include DHS staff and contractors providing energy audits or facility condition assessments to a DHS component. Users of the system must be registered by either the designated BAT Agency Administrator or, in the case of multiple building audits assigned through a contract, the Contractor's System Manager (CSM).

## User Support

This user manual and instructions are supplied as part of the assessment contract and will serve as the primary support for use of the BAT. Problems with software function or other questions related to the use of the BAT should be directed to the Agency Administrator or the CSM.

## Software Set-up and Initialization

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This section describes the basic function and use of the BAT software. Questions regarding any issues experienced during the initial software installation and start-up should be directed either to the point of contact listed in the prior section or to the Agency/Corporate BAT Manager or Administrator.

## Getting Started

### *System Requirements*

The BAT is designed to be run and used in a MS Windows environment and the platform has been constructed using Microsoft Access™. Users should have a current, legal license of MS Windows 7 operating system or higher and a copy of MS Access 2013 or later installed on the machine that will be running the tool. The performance of the BAT is not guaranteed for older operating systems or older versions of MS Access.

The hardware requirements, including processor capabilities, RAM, and hard drive space requirements are comparable with the normal operation of a laptop or desktop used for professional business purposes and consistent with the proper operation of the specified operating system. It is recommended that the host computer have at least 1 GB of free hard drive space, plus additional space for any pictures that may be collected as part of the energy audit.

Currently, the BAT is not designed to operate on ANDROID or iPhone tablets or phones. However, the system has been tested using Windows Tablets and the use of a Windows tablet will greatly enhance a user's experience with the product. The BAT has been designed to facilitate rapid data entry using lightweight laptops or tablet hybrids such as the Microsoft Surface Pro.

## Downloading/Installing the Initial Data Set

The BAT consists of two MS Access files, several template MS Excel files and some subfolders. These files will be provided to authorized users in a "zip" file format either by the BAT Agency Administrator or your CSM. The files should be downloaded into a directory on the target computer's hard drive at the root directory with the following name.

C:\DHS\_BAT\

An example of what you should expect to see after installation (which includes first opening of the BAT) is provided in Exhibit 3. With these files installed, open the front-end file (Graphic User Interface) "DHS\_BAT\_GUI\_v[#.#.#]\_[monthyear]" and login to the tool with your credentials as provided by either the BAT Agency Administrator or by the CSM. If the file opens, it indicates that the BAT has been successfully installed and is available for use. The BAT will not work unless all necessary files are present.

If you wish to install the BAT files to another folder or another drive such as D: or to a drive on a LAN or a Cloud drive you will have to re-link the main database file as well as the "DelBuildingArchive" file in the "DelBldgArchv" Folder, seen in Exhibit 3: Example Files in C:\DHS\_BAT, to this front-end file. This process is explained APPENDIX B: Special Instructions to Re-link Database Files in detail, and users are **strongly** encouraged to familiarize themselves with this functionality since linking database files is a key property of the BAT. Once the correct file is relinked, the BAT will work normally.

It is recommended that the BAT be stored and operated on the C: Drive (locally) for a few reasons that may ease workflow as you use the BAT. Working from locations other than the C: Drive may cause version control issues among multiple users and lead to a need to relink the backend to the GUI. It is always important to check that your Database is linked to the GUI you intend on using. Steps to determine this, and remedy if not so, can be found in APPENDIX B: Special Instructions to Re-link Database Files.

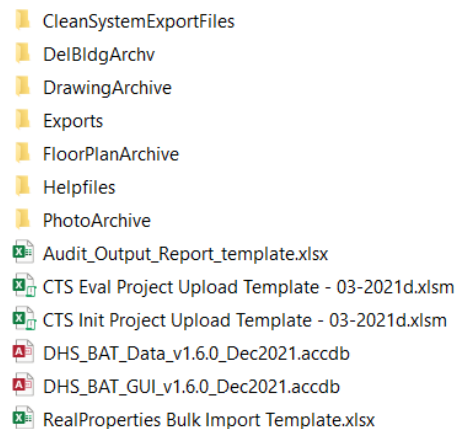
Additionally, while the BAT folder does not have to be named DHS\_BAT, it is important to use consistent naming conventions across versions to prevent confusion.

## User Access / Terms & Conditions of Use

By installing or using the BAT, the user, whether acting as an individual or of any other entity, is agreeing to be bound by the terms and conditions listed below.

1. The user acknowledges that the BAT is intended to be only used by authorized personnel. If the user is uncertain as to whether they are considered authorized personnel, they should cease using the tool and destroy any electronic copies of the BAT until they are rightly authorized for its use.

Exhibit 3: Example Files in C:\DHS\_BAT





- The user acknowledges that the BAT interface, data and application files in whole or in part are the property of the United States Government subject to usage and privilege restrictions consistent with the contract governing the use of the tool by the user. The user agrees that the BAT (in whole or in part) may not be copied, transferred, distributed to any persons or entities other than specifically allowed for in the contract under which the BAT and its files have been supplied.

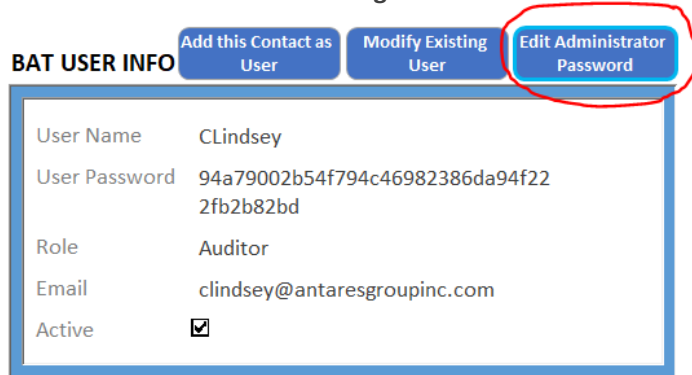
### Auditor/Assessor User ID and Password

Each auditor/assessor will be provided a unique User ID and Password by either the BAT Agency Administrator or by the CSM. The password and User ID are to remain confidential to the user and should be handled using best practices for safeguarding such credentials.

Default system administrator login:  
 - **Username:** Sysadmin1  
 - **Password:** Sysadmin1

The Building Assessment Tool (BAT) is preloaded with default system administrator login credentials. Using these credentials, new users can be created. When logged in as the System Administrator, the user will note

**Exhibit 4: User Credential Manager**



that the “Edit Administrator Password” button can be used to change to the default password.

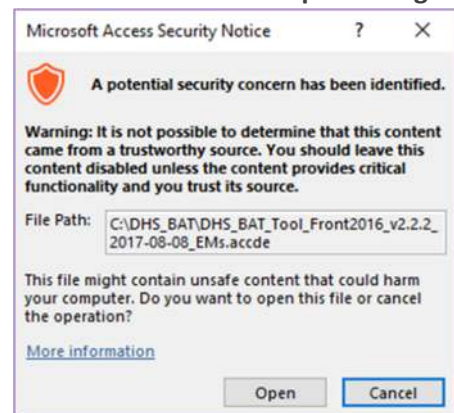
Upon first installation of the BAT, the program will run a series of checks to ensure all needed files and folders are available in the installation directory. If they are not, a warning will be displayed. Please double check that all the required files have been properly downloaded and placed in the C:\DHS\_BAT directory (or alternate). If an alternate directory is used, you must ensure that all files and sub-folders are saved together in the same location.

### Launching and Logging into the System

The BAT is an application built and designed for use in MS ACCESS. Once downloaded, the user may start the application by clicking the file name that begins with “DHS\_BAT\_GUI” and which is in the installation directory discussed above. The other file listed in the directory is used to store data and programs and is not accessible to the user and should not be opened or edited by Auditor or non-expert user.

Upon launch, the user may be presented with a warning dialog as shown in Exhibit 5. This warning may be ignored and the user should proceed to “OPEN” the form. Note, that if the wrong MS ACCESS file is launched, the following error message will be displayed (Exhibit 6).

**Exhibit 5: BAT Start-up Warning**



## Exhibit 6: Incorrect File Started for BAT

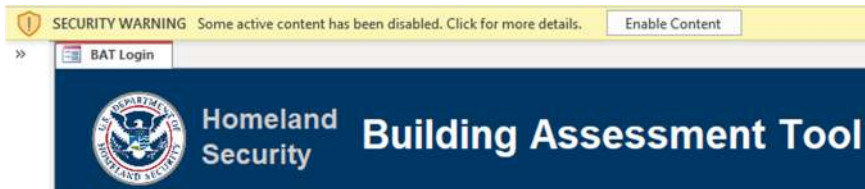
Welcome: Username

\* You opened the BAT Backend Database - not for data entering

\* Please open the other BAT file (front end) to enter data

At this point, the file may have a security warning and the user should click the “Enable Content” button (as shown in Exhibit 7) so that the macros in the program work properly. **Other warnings and dialogs may appear, but most are informative and maybe clicked through.**

## Exhibit 7: Security Warning Shown Upon Launch



### *Non-Administrator Login*

After proper launch, users will be prompted to provide their login credentials. Note that user ID entries are not case sensitive, but passwords are sensitive to upper and lower-case characters. Managers and Auditors are considered non-Administrators and distinctions between the various roles are described in the BAT User Info section of Appendix A.

Either by virtue of the user installing the supplied files in separate directories, or by receiving file updates of only one MS Access files, it is possible for the files to become disassociated from each other. A warning will be displayed indicating that the database files are not connected and must be reconnected to proceed. Separate instructions for relinking the Archive Building database and Main Database are provided in APPENDIX B: Special Instructions to Re-link Database Files.

After login, non-Administrator users are directed to the Real Property List (Exhibit 8) to begin using the BAT.

## Exhibit 8: Real Property List (which is the starting screen after login for Non-Administrator users)

Real Property List

SIGN OUT Shortcuts Help

Sauditor logged on as Auditor

Enter Search Criteria:

Installation ID: RPUID: Street Address: City: State: Zip Code: Latitude: Longitude: Audit Status:

Please click a RPUID to select the building to start audit

Facility Name	Real Property Unique ID (RPUID)	Address	Latitude	Longitude	Audit Status
Vehicle Storage	<a href="#">CBP0000ABCD0001</a>	555 Sesame Street , Bellingham, WA 98226, USA			Not Started
Classroom	<a href="#">FEMA000ABCD0002</a>	170-01 Union Turnpike , Queens, NY 11366, USA			Completed
Dormitory 1A	<a href="#">USCG000ABCD0001</a>	123 Main Street , Santa Fe, NM 87501, USA	35.6333	-106.0569	Completed
Administration	<a href="#">USCG000ABCD002</a>	220 Main Street . Santa Fe, NM 87501, USA			Completed

The Real Property List shows the properties that are available to the auditor for site assessment and the status of the audit for each facility – not started, started, or completed. Note that only facilities assigned to the auditor will be available for editing and data entry. Clicking on the hyperlinked property ID (RPUID) will bring the user to the main **Audit Menu** and the facility assessment can begin.

The Audit Menu provides the following:

- Basic information about the site being assessed, including Real Property Unique Identification (RPUID) and building address
- Auditor Login details showing user and role
- Hyperlinks to sign-out, return to the Real Property List, and to the keyboard Shortcuts informational pop-up (located in upper right-hand corner)
- Buttons to access Pre-Flight Input menus for general facility, audit, and building information (black buttons)
- Buttons to access Energy Audit Input menus for all building systems and information that are available for data entry (blue buttons)
- Buttons to access all facility assessment systems (maroon buttons)
- Buttons to access Post Audit Menus, including photo processing tool and administrative tasks such as marking the Audit Complete, viewing contact information, exporting data, etc. (green buttons)
- Buttons to access Drawing Archive for uploading drawings and Floor Plans to upload floor plan images and specify locations of spaces within each floor
- A text box for searching through specific fields in records, including Manufacturer/Model, Serial Number, Uniformat Code, or Notes which can be attached to records in many areas within the database. There are two options for this search function, distinguished by which (purple) button is pressed. The User may search through either the current building (Search Current), or all buildings a user has access to (Search All).

The main menu for the tool (**Audit Menu**) is shown below; using this menu is the primary focus of this guide.

## Exhibit 9: Main Audit Menu

Homeland Security Building Assessment Tool

SIGN OUT Real Property Shortcuts

Audit Menu Sysadmin1 logged on as Administrator

RPUID: Building Address:

**PRE-FLIGHT INPUTS**

- Audit Information
- Building Information
- Layout
- Add \ Edit Contacts
- Floor Plans
- Drawing
- Move Records

**ENERGY AUDIT INPUT MENU**

- Domestic Hot Water
- Building Envelope
- Water
- Lighting
- HVAC
- On-Site Energy
- Appliance & Plug
- Common Assets

**FACILITY CONDITION INPUT MENU**

<b>A. Substructure</b>	A10 A20	<b>B. Shell</b>	B10 ▲ B20 B30 ▼	<b>C. Interiors</b>	C10 C20 C30
<b>D. Services</b>	D10 ▲ D20 D30 D40 D50 ▼	<b>E. Equipment &amp; Furnishing</b>	E10 E20	<b>F. Special Construction &amp; Building Demo</b>	F10 F20
<b>G. Building Sitework</b>	G10 ▲ G20 G30 G40 G90 ▼	<b>H. Waterfront Structures &amp; Utilities</b>	H10 H30 H40 H50		

**POST AUDIT MENU**

- Photo Processing
- Energy Measures Input
- Export Audit Data to Excel
- CTS Export Imp ECMs
- CTS Export Eval ECMs
- Mark Audit as Complete

Search:

Search Current Search All

When using the software, the user should keep the following items in mind:

- Pre-flighting (discussed below) the energy audit will provide for a stream-lined user experience by disabling parts of the tool that are not relevant to the planned audit or assessment. Only menus relevant to the scope of the audit will be shown.
- The application is built to complete assessments on one building at a time.
- The software is designed to collect data in the field and does not require internet connectivity.
- The tool imposes certain naming conventions and standardized practices to ensure that the collected data is useful from user to user and over time. In some cases, this standardization may frustrate attempts to manage unique situations. However, note fields have been provided to account for this.
- It is worth noting again, that practicing with the default data set provided will aid in data collection. Familiarity with the BAT will play a large role in the degree of success you have.

### *Administrative Login*

Refer to APPENDIX A: Administrator User's Manual Supplement for the menu instructions as an Administrator. To access the starting screen after login as a non-administrative user, click the Real Property List text in the upper right-hand corner of the Administration screen.

# Menu Navigation and Data Entry

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## Pre-populated Data

Prior to building audit assignment, a portion of the data contained in BAT is pre-populated in a process designated as pre-flighting. The sources of the pre-flight data will be as follows; data from past site assessment work contained in the BAT database, data from other Agency databases, data inserted by the BAT Agency Administrator, or data inserted by the CSM. For example, the following fields will be pre-populated from CAPSIS (an Agency Data Warehouse):

- DHS Component Name
- Real Property Unique ID of the property used in SPM and RPDW
- Building Address (located near the top of the form)
  - Street Name
  - City Code
  - State Abbreviation
  - Postal Code (Zip Code)
- Gross Square Footage for a building as reported in RPDW (used in energy intensity calculations)
- Flags indicating the building is subject to or excluded from Energy Intensity Goals
- Flags indicating if the building is/is not designated a Covered Facility for EISA 432 reporting purposes
- Flags indicating if the building is part of GHG Targets/is GHG Non-Target

The intention of providing prepopulated data is to expedite facility assessment by reducing the need to re-enter information that is stored in other Agency databases and which is believed to be true and accurate. For example, once an initial assessment is completed for a building, baseline data will be available to all future auditors and will be used to pre-populate the BAT for subsequent audits. This should reduce the need for fresh data entry and instead allow an auditor to check the building and system data and either add or update the information.

## *Correcting Automatically Pre-populated, Previous Audit Data*

In general, the BAT provides two functions with respect to data entry; new data may be added, or existing data may be corrected. The addition of new data (i.e. data is not being overwritten) is generally unrestricted except for a few fields.

*Pre-Populated Data*

Certain fields are not available for data entry. For example, at the top of each page, there is an address field for the target building. If that information (or any other information contained in similarly restricted fields) is incorrect, the user should indicate the error using the note field that is available on most screens. Most pre-populated data are being transferred from other Agency databases and a significant portion is available under the “Building Information/Real Property” menu. For the user’s convenience, on this tab there is a radio “Yes/No” button that can be checked to indicate an error with pre-populated data. Details regarding required corrections can be inserted into the Note field.

N  
O  
T  
E  
S

Does any pre-populated information need correction?

Yes  No

*Previous Audit Data*

Once an initial assessment is completed for a building, baseline data will be available to all future auditors and will be used to pre-populate the BAT for subsequent audits. This should reduce the need for fresh data entry and instead allow an auditor to check the building and system data and either add or update the information. Adding data could be limited to information not included in an earlier audit. For example, an earlier audit may have been focused just on lighting as a priority, or simply a portion of the facility lighting. Additionally, updating could occur as building managers make changes if old audit data needs to be updated, particularly for implemented ECMs or repairs/renovations/additions to a facility. The database is designed to keep an archive of individual assessments over time so that there is a history of building modifications, but the most recent and up-to-date information is used as the default in pre-populating any data fields.

If the user is performing an assessment or audit on a building that lists prior data, they have the choice to use this data, ignore the data or reject it in whole. For example, an earlier lighting audit may have been performed. If the user is not reviewing lighting for the current audit or assessment, then this information may be ignored. If lighting is being reviewed and either is found to be incorrect or organized in a way that is inconsistent with the current scope, then the user may simply overwrite the past information. If past information is found to be out of date or in error, the notes field located on each page can be used to document corrections or changes. Note, that the user should respect their assigned scope of work in deciding if/when to update pre-populated data. In the example above, if lighting fixtures were not part of the assessor’s/auditor’s scope of work, then the decision to update such data should be discussed with appropriate agency personnel before such updates are made.

## Pre-Audit Data Entry (Pre-Flighting)

A certain amount of information regarding each building and facility may be known in advance of the site assessment visit. This obviously includes pre-populated data but may also include information derived from contract documents such as the scope of work. Ideally, any data that can be entered into the system prior to the site visit to save time and improve data collection efficiency will be completed prior to the site visit. The menu items associated with Pre-Flight Information are presented in Exhibit 11.

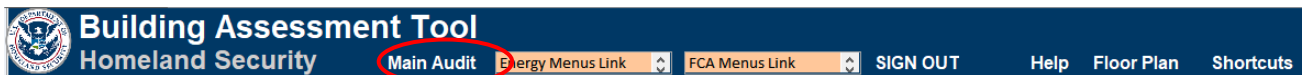
**NOTE: While it is possible to proceed with entering other data in the BAT, completing the Audit Info, Building Info and Contacts data is critical. Failure to do so may result in errors in generating system reports or other issues.**

## Menu Navigation

### Moving Between Input Forms

The “Main Audit” hyperlink shown in Exhibit 12 allows users to enter any input form and this is the central location for navigating the BAT. In many cases, the best way to move from one form to the next is to return to the **Audit Menu** and then select the desired form. All forms have a link in central area of the screen header that will take you back to the *Audit Menu* via hyperlink. Another way to navigate is to use the “Energy Menu Link” and “FCA Menu Link” dropdown navigation buttons next to the “Main Audit” button. These can be used to move directly to the selected form without going back to the main Audit Menu.

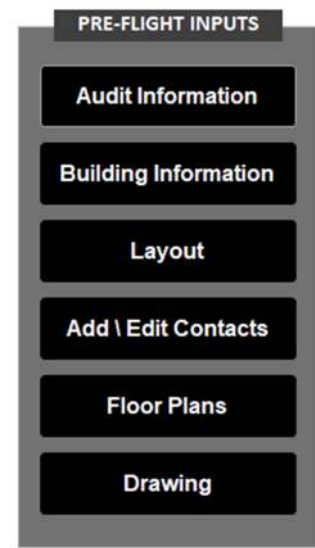
Exhibit 12: Audit Menu Hyperlink






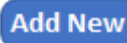




### Key Button and Functions

A variety of different command buttons are available throughout the BAT input screens. A listing and description of their functions are provided below.

Exhibit 11: Pre-flight Menu



**Exhibit 13: Description of Key Buttons and Functions**

	<p><b>The most important command button is the “Save” button.</b> MS Access functions differently than many other applications in that data entered into fields is not actually saved until they are committed to the database. This typically requires that either the user moves to a different record or the record is saved. <i>In general, clicking the save button after the user fills out information on a given input form is the safest and best way to ensure that no data is lost.</i></p>
	<p>This button will undo the user’s last data entry and revert to a fresh record. Note that not all actions can be undone and this feature is only intended to assist the user in correcting typographical errors.</p>
	<p>This button will duplicate a “saved” record. This is useful on forms where very similar information may be entered multiple times such as with lighting entries or building envelope information.</p>
	<p>This button simply adds a new record for data entry.</p>
	<p>This button is used to add a new space during data entry, and is available in many of the energy audit input menus.</p>
	<p>These are “Filter” data buttons allowing the user to add or remove filters to the real property list</p>
	<p>This button logs a time stamp on the data entry to be used in tandem with a photo taken on another device. After the audit, photo processing will allow the attachment of photos taken to entries, and this time stamp makes it easy to sort and attach.</p>
	<p>This allows you to add a photo directly to an entry from the computer. Useful for when time stamps don’t line up, or a photo was taken without pressing the “take pictures” button in the BAT.</p>

*Pictures*

Pictures can be assigned to BAT data entries. The process for assigning pictures to BAT data is explained elsewhere, but a few key features worthy of note here are as follows:

- First, the entry must be saved by pressing the “Save” button.
- In order to assign a picture to a particular record using the BAT Pix Processing Tool, the “Take Pictures” button, next to the photo subform, must be clicked, ideally near the time the photo is taken during a walk-through audit.
- More than one picture can be assigned to BAT data entry. These can be scrolled through using the subform provided.
- Double clicking on the picture should launch the user’s default picture viewer application allowing the user to view the picture at larger scale.

**Exhibit 14: Photo Subform**





- Pictures are NOT stored within the database to keep the database size manageable. Instead information needed for the BAT to find the pictures within the “Photo Archive” folder and subfolders is stored in the system. **It is critical that users do not interfere with the BAT’s operation in this regard by editing or moving the pictures within the BAT Photo Archive or any other BAT subdirectories.**
- By pressing the arrow and the delete button on your keyboard, you can delete an image from the BAT entirely.
- Load Photo can be used in lieu of the photo processing tool for edge cases where it is easier to do so. This button can be used to attached photos on at a time to a record.

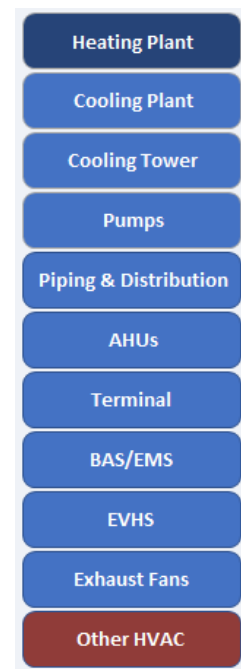
### *Moving Between Fields*

The BAT has been designed to be intuitive and user friendly and uses a combination of shortcut “buttons” and a “tabbed” menu system (where appropriate) for easy navigation. Tabbed navigation is usually available within a building system to allow for the user to quickly move between important data entry screens for that system without returning to the Audit Menu. The subsystem data entry menu that is currently active appears on the tab menu in a darker shade of blue. In the example shown in Exhibit 15, the user is currently entering data into the HVAC Building system and the “Heating Plant” submenu screen is active.

Navigating within a data entry screen can be accomplished in several ways. First, mouse/touch screen control is enabled throughout the application. In addition, moving from field to field is accomplished either by using the “Tab” key on the user’s keyboard or by hitting “Enter” after entering data into a field. “Tab” navigation has been predetermined to jump between fields in a pre-set and intuitive manner.

As noted, hyperlinks are also provided, where appropriate, to allow the user to make more dramatic jumps within the software. Standard hyperlinks for returning to the “Main Audit” menu and “Sign Out,” are always located in the header bar along the top of the screen. There are drop-down links to Energy Menu subforms and FCA Menu subforms from within most screens.

**Exhibit 15: Navigation Tabs**



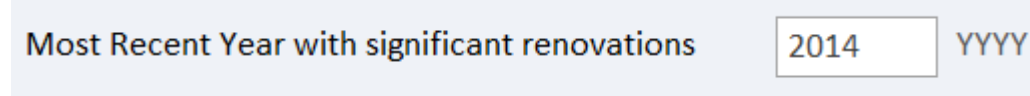
### *Data Entry*

Data is added to the BAT by entering data into pre-defined fields. The types of fields the user will encounter are as follows:

- Editable and required
- Editable, but not required
- Not editable (pre-populated)
- Specialty Fields – radio buttons, pull down menus, specialty entry fields (such as dates using calendar)
- Note fields
- Photo fields

Some fields have imposed formats (dates, percentages). The formatting requirements of these fields are usually indicated in the tool adjacent to the entry field, as in Exhibit 16. Data validity checks may prevent the user from saving or advancing to the next field if the formatting does not meet the required specifications.

**Exhibit 16: Format Restricted Field**



Most Recent Year with significant renovations  YYYY

Some fields do not have required formatting restrictions, but they may have character length restrictions. In most places, such restrictions are noted on the entry screen. Large note entry fields generally allow up to 4,000 characters, while smaller description fields may be restricted to as few as 255 characters or less.

Before proceeding to a new menu or sub menu, the user must take one of the following actions:

- Press the “Save” button, which is typically located at the top and bottom of every data entry form
- If available, select “Add New” which will save the record currently being worked on and prepare the form to enter an additional record
- Exit to the Audit Menu by following the “Main Audit” hyperlink at the top of the page.

Note that the BAT does not have an explicit “Cancel” button for all data entry screens. If data entry is begun on a form and the user attempts to exit before “Add New” or “Save” is requested, the user should press the escape key (“Esc”) which will clear the form and allow the user to move to another form.

## Detail Tables

The BAT includes tabular display of details on certain screens at the bottom of the input form. Detail tables are important for keeping track of information entered in the system and to allow quick editing. For example, once data has been entered in the main portion of the form, it is also available for quick edit or deletion directly in the detail table, as shown in Exhibit 17.

**Exhibit 17: Example Detail Table**

You may select a record below and press the "Delete" key on your keyboard to delete the record.			
	ID	Physical Space	Space SQFT
<input type="checkbox"/>	<a href="#">2</a>	Gym	10000
<input type="checkbox"/>	<a href="#">3</a>	Admin Offices	5000
<input type="checkbox"/>	<a href="#">4</a>	Library	15000

### Edit/Delete Information in Detail Tables

To edit information in the detail table, the user can simply move the mouse pointer to the blue “ID” number shown in the table and click. This will populate the data entry portion of the form (above the detail table) with the information from that record. The user may edit and save the data in the usual manner.

To delete a record, the user can move the mouse pointer to the empty box to the left of the blue “ID” number in the Detail Table for the record they wish to delete. Pressing delete will launch a warning dialogue

indicating that a record is to be deleted. Clicking the “Yes” button will permanently delete the selected record. This action cannot be undone.

## Description of the Menu System / Functions

The main **Audit Menu** is broken into 4 major subgroups, each with submenus that facilitate the following functions:

- **PRE-FLIGHT INFORMATION** – Data inputs and menus associated with pre-populated data and general building information such as floors, spaces, zones, and occupancy schedules
- **ENERGY AUDIT INPUT MENUS** – Data input forms relative to energy audits such as lighting and HVAC.
- **FACILITY CONDITION INPUT MENUS** – Data input forms specific to conducting a facility condition assessment.
- **POST AUDIT MENUS** – Data input forms and features typically performed as part of the Post Site Visit/Post Audit process such as Photo Processing and ECM Processing.

### User Input Controls

The BAT includes a variety of user input controls designed to facilitate data input through 2-in-1 devices (Laptop/Tablets) while in the field. Specifically, use of on-screen keyboards can obscure the data entry screen and because only one hand may be available for data entry, may be very slow to use. To address this issue, the following controls are available in many places throughout the BAT.

#### *Calculator Style Number Pad*

For most numerical data entry fields, double-clicking the field (with pen or finger) will launch a calculator style number pad with large buttons, as shown in Exhibit 18. The interface is intuitive. “Save” is used to commit the entry to the field and close the window. It should be noted that numerical entry using the number pad is not required and the user is free to use any other entry mechanism available including keyboard (on-screen or otherwise) or stylus. Importantly, the number pad can be repositioned by grabbing the top of the form and moving it.

**Exhibit 18: Pop-up Number Pad**



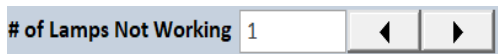
### On-Screen QWERTY Keyboard

In addition to the calculator style number pad, the BAT has an on-screen QWERTY keyboard that can be launched by double-clicking on most note or text fields. The function is intuitive, and the pad can be repositioned by grabbing the top of the form and moving it.

### Spinner Controls

Spinner or “dial” controls are also available for specific fields where short range of values may be valid, as in Exhibit 20. These can be used as an alternative to the Number Pad. Again, the user is free to use any other entry mechanism available including keyboard (on-screen or otherwise) or stylus.

Exhibit 20: Spinner Control Example



### Drop-Down Boxes

Where values are limited to a discrete list (either user-defined or defined by the program), the BAT includes drop-down selection boxes. In some cases, the user is able to add to these lists, in other cases, the lists may be fixed.

### Multi-Select Boxes

Where there are data entry fields with a discrete list of entries in which multiple options may be selected, a multi-select pop-up box is provided. An example is shown in Exhibit 21. The user can select and deselect by clicking on each item. To save the selections, select “Set” and then “Exit” to return to the main form.

### Pre-Flight Menu Selections

While it is possible to proceed without entering other data in the BAT, **completing the Audit Information, Building Information and Contacts data is critical**. Failure to do so may result in errors in generating system reports or other issues.

Exhibit 19: QWERTY Keyboard

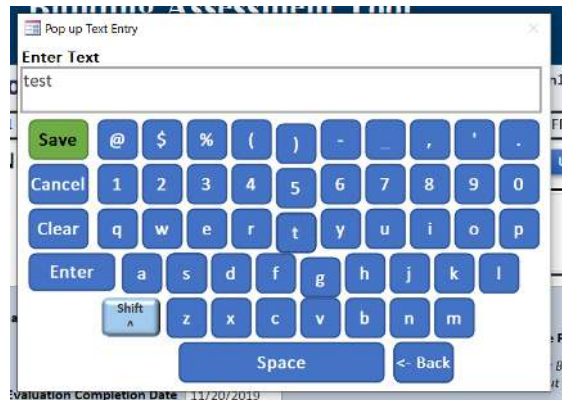
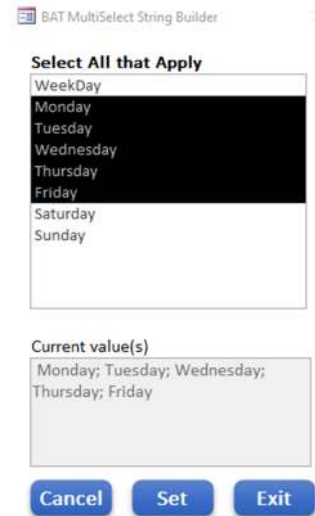


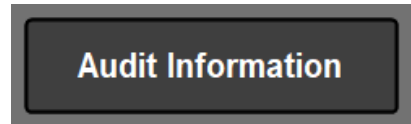
Exhibit 21: Multi-Select Box Example



## Audit Information

The Audit Information data entry form allows the user to enter information for the building that will be used for future version control, as well information that will be needed to assist in setting up the data for export and later use both in the analysis phase and for updating other Agency databases. There are no subforms associated with this menu. A few key features associated with this form are worth highlighting:

Exhibit 22: Audit Information Section



- Audited square footage is not necessarily the same as the building gross square footage, but the entered value cannot exceed the gross square footage.
- A drop-down list can be used to select an audit/assessment point of contact (POC) or a new POC may be entered via a separate input menu.
- There are several required fields on this form, all of which are self-explanatory. However, for a new auditor, if a contact information has not been entered previously, it may be necessary to add the "Auditor Contact" information to the database. Clicking the "[add a new contact](#)" link will take the user to a separate form that can be used to enter this information. Once an auditor's information is in the database, the drop-down list can be used to select the required information for future building audits.

## Building Information

The Building Information module is composed of three subforms as seen in Exhibit 23. This portion of the BAT is substantially pre-populated with information from other Agency databases and past audits (if any have been performed).

Exhibit 23: Building Info Sections



Most of the data entry is straightforward, but the user should consider the following when completing these forms:

### 1. Sub-menu Item: Real Property

- a. Building Unit - in situations where a building or group of buildings have the same general designation, an additional identifier such as "B" can be added for clarity.
- b. The Agency Designated Covered Facility ID is *only* required if the facility is designated as a Covered facility (see field further up in form).

### 2. Sub-menu Item: General Info

- a. There are several required fields including critical inputs about the building structure such as the number of floors above and below ground. These data are particularly important as this information is used by the BAT to auto-generate other information used during the audit/assessment in later sections. Note that there is an opportunity later to customize the name of each floor for convenient reference (see "Layout" menu).
- b. The date of construction is required. If this date is unknown, the user should make a best guess and then indicate in the notes that the precise date was not known.
- c. Renovation Notes is available for the user to provide some details regarding *major* renovations. Most buildings are continually being upgraded or serviced. This field is intended to provide information about major changes to building size (e.g. new wing, new floor). Major

renovations to mechanical/electrical systems can be recorded in the input forms for those subsystems.

- d. Gross Square footage should be pre-populated. If not, the note fields can be used for this information during pre-flighting or during the site visit.
3. **Sub-menu Item: Occupancy and Schedule**
    - a. The Occupancy and Schedule form is intended to allow the auditor to input information regarding building use schedules that are applicable for the audit – like for energy usage types that are heavily influenced by occupancy such as space conditioning. There is no limit to the number of schedules that can be entered, and the auditor should create schedule entries that are relevant to the current audit objectives.
    - b. After entering the first schedule the “Add New” button can be used to save the initial inputs and start the next schedule. A detail table is provided at the bottom of the page so that the auditor can easily keep track of schedules entered. Note that schedules from past audits are also available for use and there is no need to enter a new schedule if one of the existing schedules can be used.
    - c. Valid operating hours that can be entered in 24-hour format are from 00:00 (Midnight) to 23:59 (11:59 PM).

### Layout

The Layout section of the BAT allows the user to group spaces and build zones to facilitate convenient data collection and analysis. The concepts of spaces and zones are detailed further below. This sub-menu is composed of three subforms as shown in Exhibit 24 and described below.

Exhibit 24: Layout Section



1. **Sub-menu Item: Floors**

Allows custom names to be assigned to each floor while maintaining a consistent and predictable structure for organizing floors and avoiding confusion in future assessments.

- a. The number of above ground floors (labeled in detail table as “1,2,3...”) and the number of below ground floors (labeled in detail table as “S1, S2, ...”) are pre-populated based on information provided in the “Building Info” section.
  - b. Although large entry fields are provided, reasonable brief descriptions should be used where possible. For example, the Floor 1 may be described as “Main Lobby.” The choice to enter descriptions for the floor layout are entirely optional and the standard naming convention as well as the custom names are displayed on all relevant screens.
  - c. There are optional buttons in this sub-menu that can be used to indicate if a whole floor has Resiliency Issues or if it is a Flood Risk or Critical Area.
2. **Sub-menu Item: Spaces**
    - a. The BAT allows users to build custom spaces. These are intended to divide a floor or a zone into multiple areas for data collection and/or analytical convenience. For example, the second floor may be composed of a ballroom and offices, each with unique energy or infrastructure characteristics. Grouping energy measures by spaces and zones allows areas to be grouped for analysis and provide a convenient reference for reporting.

- b. The user may define as many spaces as may be needed. The saved spaces are presented in summary in the detail table at the bottom of the page.
- c. Typical reasons for creating spaces include: analysis and data collection for lighting fixture groupings, envelope element groupings (e.g. southwest facing windows), definition for heating/cooling elements (see zones), occupancy, etc.
- d. The user will be prompted to select “Spaces” in future screens.
- e. **Spaces may also be entered and edited in the Floor Layout Tool, and in many of the Energy Audit and Facility Condition Assessment sub-menus using the “Add Space” button.**
- f. An existing Space Name can be changed using the Replace Space Name checkbox and associated entry field.
- g. There are optional buttons in this sub-menu that can be used to indicate if a Space is a Flood Risk or Critical Area. Resiliency Issues can be described in the Notes field, and indicated with a check-box. Any notes with the Resiliency flag will be compiled together in data export.

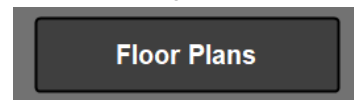
### 3. Sub-menu Item: Zones

- a. Zones provide another opportunity for users to combine floors and spaces into other useful groupings (called Zones). This could be particularly helpful for HVAC analysis, since heating and cooling systems may not be restricted to floor or “space” boundaries; zones provide a bridge to combine those areas accordingly.
- b. Each zone is a combination of floors and spaces, and data entered in those subforms is available via multi-select pop-up entry fields.
- c. The user may define as many zones as may be needed. The saved zones are presented in summary in the detail table at the bottom of the page.
- d. Typical reasons for creating zones are grouping spaces and floors to for energy systems with broad boundaries such as areas served by different, separate chillers for HVAC analysis. It could also be used to grouping spaces with similar characteristics to simplify data entry.
- e. There are optional buttons in this sub-menu that can be used to indicate if a Zone is a Flood Risk or Critical Area. Resiliency Issues can be described in the Notes field, and indicated with a check-box. Any notes with the Resiliency flag will be compiled together in data export.

### *Floor Plans*

The Floor Plan Layout tool for the BAT is a convenience feature intended to provide a useful geographic reference within a building during audits and consistency across audits. The tool provides a more intuitive and user-friendly means of entering in **Space** data into the BAT. It also allows users to upload floor plans (typically fire escape plans are sufficient) and label key spaces on those plans for future reference. The Tool is comprised of two modules: the Floor Plan Upload module, and the Floor Plan Layout editor. Both are shown below.

Exhibit 25: Layout Section



The Floor Plan Upload module allows a user to do the following:

1. Select a floor (only floors entered previously into Layout module will be available)
2. Import a floor plan image (saved as \*.jpg or other image file) somewhere on user’s computer or network

From that point, the image will be assigned to that floor and saved in the *Floor Plan Archive* folder within the BAT. Once the “Open Label Maker” button is pressed, the second module will be opened.

**Exhibit 26: Floor Plan Upload Module**

Spaces subform

### Floor Plan Update/Import Module

Open Label Maker Cancel/Close

Floor 2

Floor ID 156

Building FEMA000ABCD0002

Description Classrooms and Offices

Floor Plan Image File

C:\DHS\_BAT\FloorPlanArchive\FEMA000ABCD0002\_Floor\_2.jpg

Import Image

**INSTRUCTIONS:**

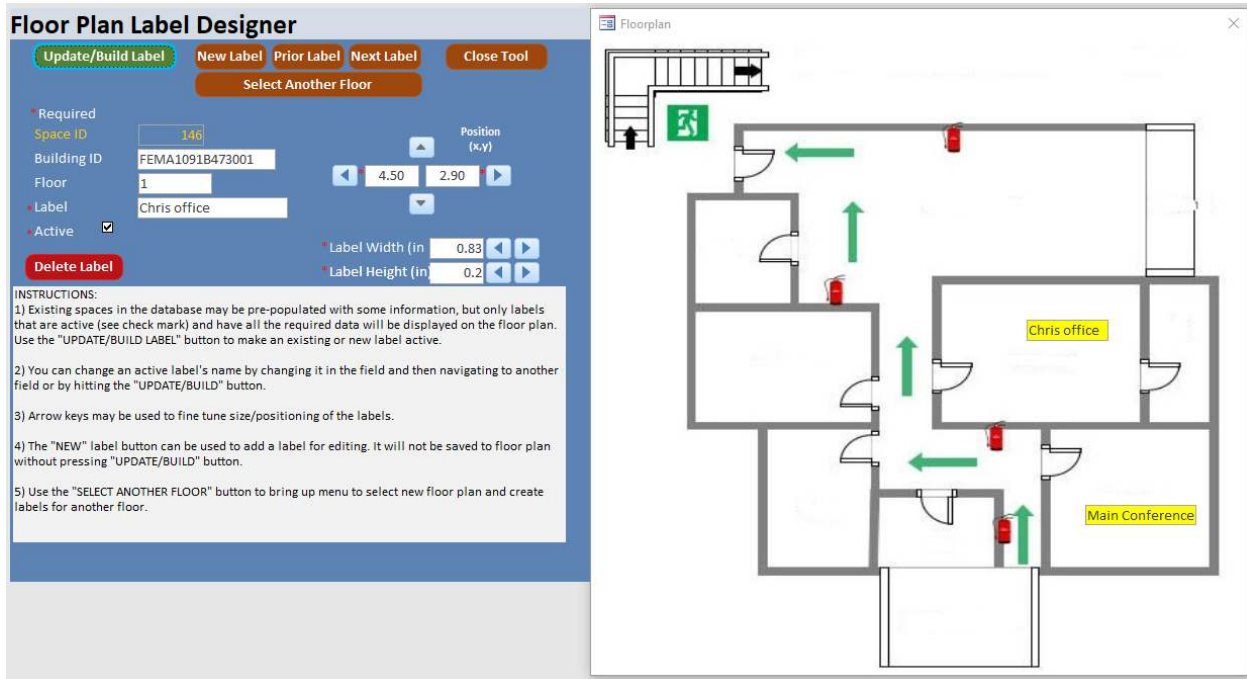
- 1) Select the floor for which the labeled plan is being prepared.
- 2) Use the "Import Image" button to navigate to and select the floor plan to be used. A copy will saved to the FloorPlanArchive folder, and named per the Building and floor.
- 3) Open the label maker utility. This form will close and launch utility.
- 4) This form can be relaunched from subsequent forms to work on other floors in the

The second module (Floor Plan Layout editor) consists of two additional forms. The first is the Floor Plan Label Designer and the second is the annotated floor plan. The user can add or edit existing labels and their position on the floor plan using the entry fields and arrows. Additional on-screen instructions are provided.

Closing the tool (using the “Close Tool” button) will save the user edits and the annotated floor plan will become available in the Audit screen and may also be used in reporting.



## Exhibit 27: Floor Plan Label Designer and Floor Plan Preview



### Special Discussion Regarding Spaces and Zones

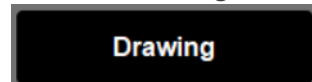
Spaces and zones are a distinctive feature of the BAT that has been added as a matter of user convenience. Using this feature *is not* required and in fact, in some cases may hinder rapid data entry. This is especially true of situations where an audit or assessment has a very narrow focus or involves only a small portion of a building. However, for larger, more detailed audits, this feature is intended to speed data entry by allowing data entry (and analysis) to occur by system or component, **provide granularity that will be useful in facility management and future audits**, or to analyze entire areas served by the same system.

Additionally, it is very helpful to establish as many zones and spaces during the pre-audit preparation phase as possible. This will greatly improve data entry efficiency.

### Drawings

The Drawing Archive tool for the BAT is a convenience feature intended to provide a way to upload drawings, fire escape plans, as-builts, handwritten notes and other documents. The tool provides a more intuitive and user-friendly means of entering in images and documents that aren't related to a particular fixture but are important to the audit of the building. If applicable, the user can indicate a floor the document relates to or add notes for future reference or identification. This is done by clicking on the floor name or notes cell within the table itself.

### Exhibit 28: Drawing Section



### Exhibit 29: Drawing Archive



## Move Records

The move records tool for the BAT is designed to make moving records from one table to another within the same building. This is useful when something is accidentally recorded in the wrong place and it would be easier to move the record than it would be to delete the incorrect one and create a new one. An example would be an exterior lighting fixture that was incorrectly added to the interior lighting form.

Exhibit 30: Move Records Button

Move Records

In the Move Records module (screenshot below), a user would first select the “From” and “To” locations for moving records. The detail table will be populated with available records once the “From” table is selected. Records must be selected one at a time, either using the “Select ID” drop-down box, or by selecting the record in the detail table itself. Pressing the “Move Records” button will initiate the move.

Exhibit 31: Move Records Tool

**Move Records** \* Required

RPUID: USCG000ABCD0001 Close

\* From: InteriorLighting \* To: ExteriorLighting

\* You may check a record below and select the record / move records. Select ID: 18633 Move Records

ID	Serial #	Equipment Type	Floor Name	Space Name
18630		T8		Laundry
18631		T8		Floor 1 Hallways
18632		T12		Mechanical Room
18633		T8	1	

## Energy Audit Menu Selections

The Energy Audit Menu includes various sub-menus for collecting information about specific building systems, as described below. It is notable that several of these categories also apply to Facility Condition Assessments and can be accessed through that menu as well since the forms are the same. See the Condition Assessment Input Menus section below for additional detail.

## Domestic Hot Water (DHW)

The domestic hot water input form includes information for the hot water generators as well as the associated piping distribution system. There are no submenus and the user is advised that the intent of the form is to capture information at a system level. The areas served by each DHW system, the associated infrastructure and the hot water generator itself can all be captured using this form. To the extent that more than one DHW system is present, the form accommodates the addition of multiple systems and a detail table is provided at the bottom of the form.

Exhibit 32: DHW Section

Domestic Hot Water

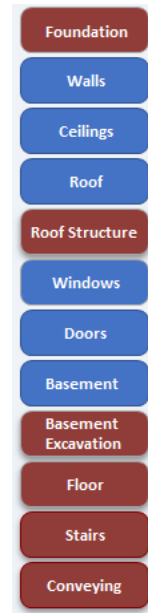
The only required data entry fields for this input form are the type of hot water generation unit and the energy source. While most of the data inputs are self-explanatory and consistent with data entry strategies in other sections, there are several helpful features built into the DHW data entry form that require some additional explanation.

- Drop-down menus are provided for typical DHW uses
- Three separate entries are provided for identifying the characteristics of inadequately insulated piping. Such information is typically used to specify areas needing improvement and calculate energy losses.
- Condition assessment is provided for piping (see above) and the hot water generators.

## Building Envelope

The “Building Envelope” section of the BAT allows users to enter data associated with key building envelope information.

**Exhibit 33: Building Envelope Menu**



### 1. Sub-menu Item: Foundations

- At least one foundation type must be entered, and the notes field can be used to describe any constraints or special conditions.
- If multiple foundations are present, the user can make multiple entries and the notes field can be used to describe the extent or special considerations for each foundation. The details for each are maintained in the detail table at the bottom of the form.

### 2. Sub-menu Item: Walls

- Information about walls or groups of walls can be entered into this form. Required fields include Wall Material, Wall Type, and Wall Description. Other optional fields provide an opportunity to enter other information that is typical for an auditor or assessor to consider in an assessment.
- Walls can be assigned to floors and spaces for analytical convenience.
- The user may define as many groups of walls as may be needed. The saved wall groupings are presented in summary in the detail table at the bottom of the page.

### 3. Sub-menu Items: Ceilings, Roof, & Roof Structure

- The data entry forms for these items is substantially similar in structure and requirements as the data entry for “Walls” except for a few fields uniquely relevant to ceilings and roofs.
- There are no required input fields for Ceilings. For Roof the only required inputs are Roof Type, Roof Material, and Roof Style.

### 4. Sub Menu Item – Windows & Doors

- The data entry form for Windows/Doors is like the data entry of information regarding “Walls” and the User should refer to those instructions above for basic information.
- However, the data entry forms for Windows/Doors also provides several unique fields. These include an option for inputting “counts” for the occurrence of each type of window/door. This provides the user an ability to group similar windows and doors for analytical convenience.
- The user may also use a special field, “Percent of Surface Area” for windows to indicate the amount of total wall surface area that is covered by windows, if this is more convenient.
- The only required input for Windows/Doors is the Window Style/Door Type and the number of windows/doors.

### 5. Sub-menu Item: Basement & Floor

- a. The data entry form for these items are similar in structure and requirements as the data entry for “Walls”. It includes insulation type and R-Factor.
- b. Note that Floor is part of the FCA menu, as indicated by the Red button coloring.

**6. Sub-menu Item: Excavation & Conveying**

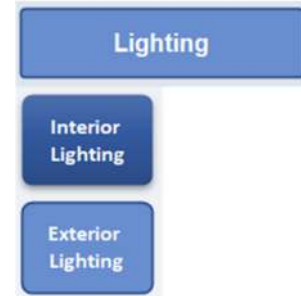
- a. The data entry form for these items are similar in structure and requirements as the data entry for “Walls”. It includes insulation type and R-Factor.
- b. Note that Excavation and Conveying are part of the FCA menu, as indicated by the Red button coloring.

*Lighting*

The “Lighting” data input menu is split into two sections: Interior and Exterior lighting. While there are minor differences, both sub-menus are very similar in form and function. Specifically, both sub-menus include:

1. Opportunity (but not required) to group lighting fixtures and counts by floor or spaces.
2. Drop-down menus for lighting types, fixture types, and control type.
3. Condition assessment fields for providing information on condition of fixtures or lights.
4. Required fields are lamp type, number of lamps per fixture, and number of fixtures.
5. Pre-populated inputs for several fields with common data entries are available from dropdown lists. These specifically include information on lamp/fixture type, mounting, controls, use and type of control.

**Exhibit 34: Lighting Section**



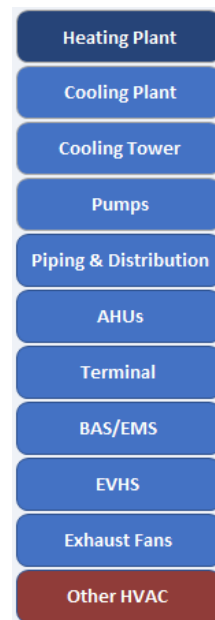
The user may enter as many groupings as they require, and a detail table is provided at the bottom of the input form that summarizes entered data.

*Heating, Ventilation, Air-Conditioning (HVAC)*

Building HVAC systems are both diverse and potentially very complicated. As such, this BAT section includes sub-menus for various important building HVAC subsystems, as listed in Exhibit 35. These HVAC sub-menus have many common elements including the following:

- Generally, floors, spaces and zones are available for defining the areas served by these systems and will be a big driver in how spaces and zones are used through the BAT.
- For the above reason, the sub-menus all include an additional link to the Floor Plan screen which is available in the upper right section of the header bar. The User can also add a new space using the “Add Space” button. It is not always obvious at the start of an audit/assessment what spaces and zones will be the most helpful to define in advance and this link can be used to quickly add or adjust these definitions for data collection efficiency in real-time during the walk-through.

**Exhibit 35: HVAC Section**



- Generally, spaces and zones are intended to help the user define the spaces “served” by the HVAC equipment. On some submenus, spaces may also be used to define the location of the equipment. These fields are so marked.
- All the sub-menus make extensive use of pre-populated dropdown lists to expedite data entry. These are specific to each area and the user should fully explore these prior to a site visit. Familiarity with the contents of these dropdowns will greatly enhance the user’s experience with the BAT.
- In some cases, the user may need to enter data into several sections to completely characterize a system, such as hybrid system which incorporates elements from multiple systems may require the user to break the data entry into component parts. For example, central cooling system may require entries in the Cooling Plant, Cooling Tower, Pumps, AHU, and/or Terminal Unit subsystems.

**1. Sub-menu Item: Heating Plant**

Unique fields on this submenu include the following:

- a. Type of Heating Plant** – Offers the user the option to specify whether the heating plant is centralized or decentralized.
- b. Equipment Type** – This drop-down list offers the user all the common types of heating equipment typical for central and decentralized plants.
- c. Heat Input / Output Ratings** – Fields are provided to enter heat input and output capacity numbers. Standard units are specified.
- d. Heating Fluid** – Steam and hot water are provided as options although “Other” systems may be specified.
- e. Boiler / Plant Accessories** – Options/Accessories such as Economizers and Oxygen Trim are provided through drop-down lists.
- f. Controls Description** – Given that control systems vary greatly from system to system, the user is provided a text box in which to describe the controls. The notes taken in this field will appear on the audit report for later use.
- g. Condition Assessment Fields** – There are several optional condition assessment fields in this submenu including boiler age and condition.

**2. Sub-menu Item: Cooling Plant**

This menu is like the one for Heating Plants in both form and function. However, equipment specification fields are customized to include equipment common for chiller plants.

**3. Sub-menu Item: Cooling Tower**

Cooling towers are an important part of a variety of heating/cooling systems and a separate input menu is provided for use to describe their use at the building/facility. The only required field is the Cooling Tower type.

**4. Sub-menu Item: Pumps**

An input form is provided to allow the user to characterize major pumps.

**5. Sub-menu Item: Piping**

An input form is provided to characterize the condition and characteristics of important pipe assemblies in the building or facility. Conceptually, the intention of this menu is to offer the user the ability to characterize potential heat losses from poorly insulated piping and inputs have been designed accordingly. The BAT will accommodate as many entries as are required to properly

characterize such losses. A text field is also provided to describe issues with uninsulated valves or steam traps.

**6. Sub-menu Item: AHUs**

The Air Handling Unit (AHU) input form is the longest and most complicated form in the BAT. Given the wide variety of options installed with such systems, an extensive list of input fields is provided. Fields to specify the area served, the type of equipment, supply fan characteristics, cooling and heating coil information and controls are available for input.

**7. Sub-menu Item: Terminal**

The input form for Terminal units is used to collect data for a wide variety of units, as listed in the Unit Type drop-down. Non-listed unit types can be added using the “Other” selection and input field. This form also includes data entry fields for the condensing unit, terminal unit control, and heating coil information as applicable.

**8. Sub-menu Item: BAS / EMS**

This form offers an opportunity to describe the scope of any BAS/EMS systems installed at the site.

**9. Sub-menu Item: EVHS**

This form is used to input details about any Exhaust Ventilation Hood Systems installed at the site.

**10. Sub-menu Item: Exhaust Fans**

This form is used to input details about any Exhaust Fan systems installed at the site.

**11. Sub-menu Item: Other HVAC**

This form is used to input FCA related information pertaining to HVAC not represented by any other submenus.

### Water

There are two submenus for entering Energy Audit related data in the Water section: Potable Water and Irrigation Water (ILA Water). The former provides fields for indicating the total number of fixtures in a building and separate entries for low-flow systems. The latter provides some simple entries for documenting any irrigation or non-potable water uses. The only required field in both cases is the source of water for the fixtures. There are also three FCA sub-menus in the Water section which are described in that section of the user Guide.

Exhibit 36: Water Section



### On-site Energy

This menu allows the user to enter information about on-site energy generation sources and uses.

Exhibit 37: On-site Energy Submenu



**1. Sub-menu Item: Renewable Energy**

The Renewable Energy submenu provides a dropdown list for the common renewable energy systems that auditors/assessors are likely to encounter, and associated data collection fields. Fields include the type of system, capacity and specific notes fields to allow broader description of the system.

**2. Sub-menu Item: Fossil Fuel**

The Fossil Fuel on-site energy data entry form focuses primarily on entering data associated with back-up generation systems since this is the most likely system type. Input entry fields include fuel type, run hours

per year, and service provided (such as back-up/emergency). Note fields are provided for more detailed descriptions if applicable.

### 3. *Sub-menu Item: Energy Storage*

The Energy Storage data entry form focuses on entering data associated with thermal and electrical energy storage systems. Electric storage systems include battery systems, while thermal storage systems include ice build systems for cooling and hot water storage systems for hydronic heating. The form includes data entry fields for system capacity in kWh (electric) and MMBtu (thermal), along with the discharge design rate in kW (electric) and MMBtu/hr (thermal).

### *Appliance & Plug*

The Appliance & Plug data entry form includes data associated with the appliances and notable plug loads within the building. Example plug loads include vending machines, refrigerators, clothes dryers, printer/copiers, computers/data centers, and space heaters. For each plug load, the user can enter the appliance count, input wattage, and run hours per week, and other details as applicable.

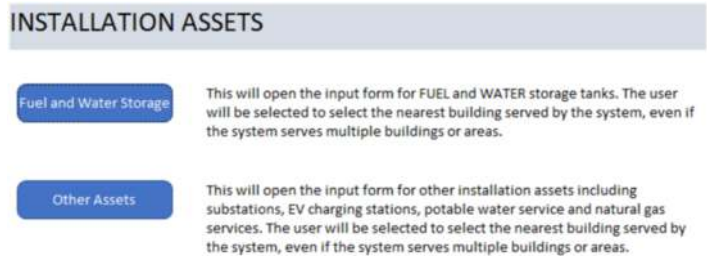
### *Common Assets*

The Common Assets button, seen in Exhibit 38, is used to list any other energy assets the building may have. Clicking the button will take you to an Installation Asset selection page, seen in Exhibit 39. These are split into two subcategories: “Fuel and Water Storage” and “Other Assets.” Information for each of these assets include a description of the asset and notes. As seen in Exhibit 39, “Fuel and Water Storage” is for what it describes. “Other Assets” is for other installation assets including substations, EV charging stations, potable water service, and natural gas services.

Exhibit 38: Common Assets



Exhibit 39: Common Assets Page



In Exhibit 40, you can see the data entry page for Fuel and Water Storage. Other Assets will look generally the same. On these pages you can connect an asset to any building(s) that utilize said asset. Important places for this page include Asset RPA UID, which is where you denote said Asset ID. This is critical. Once you add a building to an asset, you can view that asset in any of the buildings you have marked. All of the buttons work as described elsewhere.

## Exhibit 40: Fuel and Water Storage

### INSTALLATION ASSETS: Fuel and Water Storage

Sysadmin1 logged on as Administrator

RPUID: CBP0000ABCD0001 Building Address: 555 Sesame Street , Bellingham, WA 98226, USA

DATA FOR THIS ASSET WILL BE ASSOCIATED WITH THE RPUID ABOVE. THIS BUILDING SHOULD BE THE NEAREST ONE SERVICED BY THIS ASSET. ALL OTHER BUILDINGS SERVICED BY THIS ASSET SHOULD BE SPECIFIED BELOW.

\* Required

Add New Previous Next Save Undo Delete

Nearest Bldg RPUID

Asset RPA UID

BAT Storage ID  (New)

Installation  Agency

Other Buildings

Take Pictures

Load Photo

Record:  No Filter Search

4/12/2022 6:18:08 PM

Nearest Building serviced by this storage asset or nearest in proximity

\*Stored Commodity

\*Dispenser Type

\*Status

Storage Configuration

Storage Capacity

Storage UOM

Year Installed  (YYYY)

Overall Condition

Storage Location

Lat

Long

Leaking (Yes/No)  Yes  No

Storage Notes

N  
O  
T  
E  
S

## Condition Assessment Input Menus

The BAT also includes several input forms that are designed specifically for collecting facility condition assessment (FCA) information. The BAT FCA interface has been developed with the following three principles in mind:

- Principle #1: Navigating through data entry screens should be straightforward and familiar regardless of whether the data collection expert has a background in energy or facility condition assessment
- Principle #2: Uniform Codes (NIST) can be used to help experts navigate through the tool
- Principle #3: Color schemes and parallel menu structure to serve as navigation aid

The parallel menu structure is particularly because there is considerable overlap in the data collected.

Having presented the Menu structure for Energy Audits, the FCA included submenus are divided as follows:

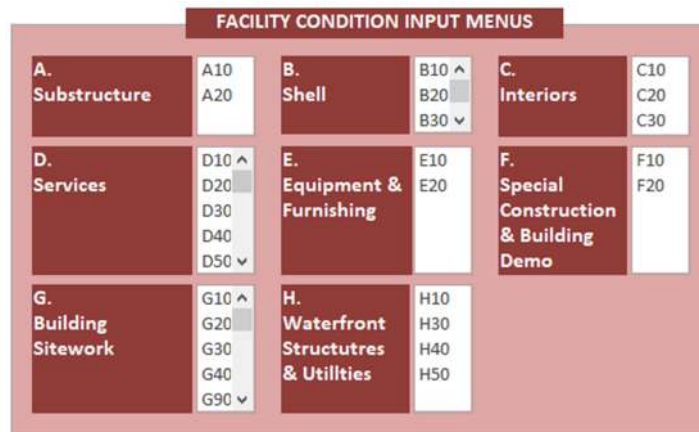
- Substructure
- Shell
- Interiors
- Services
- Equipment/Furnishings
- Special Construction & Building Demo
- Building Sitework
- Waterfront Structures and Utilities

The FCA Input Menu is very similar to the Energy Audit Input Menus. Because of the direct overlap in data collection and data collection methods, the FCA input menus are generally shared with the Energy Audit Input screens. However, recognizing differences in nomenclature, the BAT employs a dedicated menu that relies on



Uniformat Codes to help FCA auditors find their way to required data inputs as quickly as possible. As seen below, the main menu includes the first level (single letter) designations at a high level.

**Exhibit 41: Facility Condition Assessment Input**



Selecting a 2-digit Uniformat Code (e.g. A10) will launch an additional, intermediate menu intended to focus the user’s navigation. Exhibit 42 provides an example of an intermediate navigation window launched with the user selects D20 under the “D. Services” menu option from the main menu. Selection from this intermediate navigation menu will take the user directly to shared menus with FCA submenus, such as those shown in Exhibit 43. In this example, the red submenu items shown to the left are also ways to launch dedicated, FCA only input screens. However, FCA inputs can be found on every input screen (usually located at the bottom) and it is appropriate and expected that energy auditors and FCA auditors will use as much or as little of the available data input as needed to complete their assessment.

**Exhibit 42: Intermediate Navigation Window**

FCA Navigation

FCA NAVIGATION TABLE				Close
D20	<a href="#">D2010</a>	PLUMBING FIXTURES	Potable Water	
D20	<a href="#">D2020</a>	DOMESTIC WATER DISTRIBUTION	Fuel and Water Storage	
D20	<a href="#">D2020</a>	DOMESTIC WATER DISTRIBUTION	Domestic Hot Water Heater	
D20	<a href="#">D2020</a>	DOMESTIC WATER DISTRIBUTION	Domestic Water Distributor	
D20	<a href="#">D2030</a>	SANITARY WASTE	Waste and Sewer	
D20	<a href="#">D2040</a>	RAIN WATER DRAINAGE	Waste and Sewer	
D20	<a href="#">D2040</a>	RAIN WATER DRAINAGE	Other Water	
D20	<a href="#">D2090</a>	OTHER PLUMBING SYSTEMS	Other Water	

### Exhibit 43: Building Envelope FCA submenu items

The screenshot displays the 'Building Envelope' section of the 'Building Assessment Tool' (BAT) interface. The top navigation bar includes the BAT logo, 'Homeland Security', and links for 'Main Audit', 'Energy Menus Link', and 'FCA Menus Link'. The user is logged in as 'Sysadmin1'. The main content area is titled 'FOUNDATION' and features a sidebar with navigation buttons for various building components: Foundation, Walls, Ceilings, Roof, Roof Structure, Windows, Doors, Basement, Basement Excavation, Floor, Stairs, and Conveying. The 'FOUNDATION' form includes the following fields and options:

- RPUID:** FEMA000ABCD0004
- Foundation ID:** 55
- Agency Identifier:** (empty field)
- Temp Agency Identifier:** (empty field)
- Visual Condition:** Satisfactory (dropdown menu)
- Description 3 (4 digit UFC):** SLAB ON GRADE (dropdown menu)
- Description 4 (6 digit UFC):** STRUCTURAL SLAB ON GRADE (dropdown menu)
- Component Type:** A103002::General (dropdown menu)
- Current Repair Cost:** (input field)
- Present Replacement Value:** (input field)
- Condition Rating:** A+ (dropdown menu)
- Condition Index:** (input field)
- Condition Assessment Notes:** (text area)

Additional interface elements include 'Add New', 'Duplicate', and 'Save' buttons at the top right, and 'Take Pictures' and 'Load Photo' buttons on the right side of the form.

These menus will require the user to be more specific on the data entry category required so that they can be brought more quickly to the desired entry screen.

In some circumstances, FCA-only input screens and submenu structures have been created to gather information that is not directly related to energy use. An example of one such menu is provided below (Exhibit 44). These screens tend to be less complex and are focused on gathering data that is useful in FCA reporting. In this example, all subforms are FCA only.

It is important to point out the following inputs are available on almost every BAT input screen:

- Current Repair Cost
- Present Replacement Value
- Condition Index
- A dedicated Condition Assessment Notes field (kept separate from general notes also available on almost all input screens).

Note that entering these fields is generally not required. This maintains flexibility for all users.

Exhibit 44: Dedicated FCA Only Input Menu/Submenu

Exhibit 45: Post Audit Menu

## Post Audit Menu Options and Tools

This section describes the tools and other Post Audit Menus and forms available in the BAT. This includes the photo processing tool, ECM inputs, exporting data, and other options as listed in Exhibit 45.

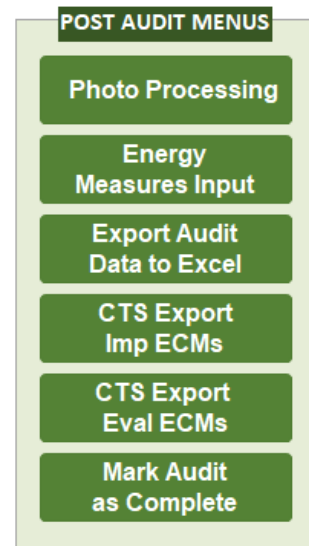
### BAT Pix Processing (BPP) Tool

The Tool is accessible from the Photo Processing button under the Post Audit Menu as shown in Exhibit 45.

The Post-Audit Photo Processing tool is designed to help manage and organize photos taken after an energy audit and prior to the start of analysis. It provides two main functions:

1. Allows other information stored in the BAT to be directly tied to photos for cross reference and future use; and
2. Allow photos to be placed in a common, archived directory with a common naming convention that will allow each photo to be easily referenced for future use by individuals not participating in the original audit.

Note that use of the tool will also make the photos available from within the BAT menus for real-time reference in future evaluations and walk-throughs.



**iPhone Users** – Please be sure to follow special instructions when using this tool. These are listed at the end of the BPP Tool help provided.

**STEP 1: Load Photos into the Tool**

The first step is to locate the files the directory where photos taken during the audit are located. Ideally, this is a local hard drive or portable drive (such as a USB memory stick) since working across a network or cloud-drive may present file access issues. If images are being taken and stored on a cellular device, make sure automatic cloud sync is turned off for audits where this could pose a security risk.

The process for loading files into the tool is as follows:

1. Be sure that all files are in **“\*.jpg”** format with this extension. The BPP can only process **“\*.jpg”** files at this time.
2. Click on the **Load Photos** button (shown at the top of the BPP screen in Exhibit 46). A file-picker dialogue box will become visible which can be used to navigate to the directory where the target files are located.
3. Once the target directory is selected (see **“Folder Name:”** near the bottom of the dialog box), click **“OK”** to proceed with loading the files.

**Exhibit 46: BAT Pix Processor User Input Screen**

BAT Menu Source	BAT Pic Date	BAT Pic Time	BAT Space Name	Detail Table ID	Building ID	Installation ID	
FireProtectionSpecialties	3/5/2020	1:53:03 PM	Chancellors Office	10	FEMA1091B47300	473	Assign Data
Standpipes	3/5/2020	1:53:27 PM	Chris office	17	FEMA1091B47300	473	Assign Data
OtherFireProtectionSystems	3/5/2020	1:56:18 PM	Chancellors Office	4	FEMA1091B47300	473	Assign Data
Sprinklers	3/5/2020	2:07:07 PM	Chris office	17	FEMA1091B47300	473	Assign Data
FireProtectionSpecialties	3/5/2020	2:08:26 PM	Chancellors Office	10	FEMA1091B47300	473	Assign Data
Exfans	3/5/2020	2:24:19 PM	Chris office	9	FEMA1091B47300	473	Assign Data
Exfans	3/5/2020	2:54:45 PM	Chris office	10	FEMA1091B47300	473	Assign Data
ExhaustVentilationHoodSystem	3/5/2020	2:55:12 PM	Processing 101	6	FEMA1091B47300	473	Assign Data
ExhaustVentilationHoodSystem	3/5/2020	2:55:18 PM	Processing 101	6	FEMA1091B47300	473	Assign Data
OtherWater	3/5/2020	3:07:11 PM	Processing 101	6	FFMA1091B47300	473	Assign Data

Once initiated, the BPP will read key information from the photo header, including information about when the file was created, and its current location. This information, as well as the photo itself, will be displayed for the first photo to be processed when the tool has completed this task. If you are processing hundreds of photos, the processing of loading and displaying files may take a few minutes.

## **Step 2: Assign BAT Data to Photos**

In the second step, users will be prompted to assign BAT data that was collected at or near the time the “Take Pictures” button was clicked during the Audit. The system will automatically bring up only BAT Data that was collected at approximately the time and date the picture shown was taken. See “Photo Time Stamp Filter” below for instructions on adjusting the time window.

- **Assigning data to the photo currently displayed:** Next to each BAT entry in the BAT Data Table at the bottom of the screen is an **Assign Data** button (see Exhibit 46). Clicking the Assign Data button will populate the fields to far right of the picture and associate the data with that picture. If you need to clear information from these fields, use the “**Clear Data**” button. To replace the data, simply click “Assign Data” on another BAT data record.
- **Add Notes:** The user can add notes to be associated with the picture using the Add Notes field.
- **Saving and Moving to Next Record:** The “previous” and “next” buttons at the top of the page can be used to move back and forth through the pictures. The Photo data is automatically saved when moving either to the Next or Previous picture.
- **Skipping/Ignoring Photos:** It is not necessary to assign all photos to BAT reference data. Photos that are not assigned can simply be skipped or trashed (see below). Photos that are not assigned BAT data will not be added to the BAT Photo Archive.

## **Step 3: Committing Changes and Archiving Photos**

Once the data assignment process is complete, you can commit the changes to the database and create a permanent archive of the photo records, by clicking the “**Save & Archive**” button on the form. Hitting this button does several things:

1. It renames any photos in the source directory adding “Archived –” to the front of each file name.
2. It makes a copy of the photo, renames it and places it in an archival directory within the BAT based on the installation ID for future reference and use.
3. It clears the form and returns the user to the main Audit Menu.
4. **IMPORTANT:** The BPP will not process photos in any source directory where files previously marked as having been archived still reside. Even if all photos are not processed in the first pass, any files that have been marked as archived will need to be removed from the source directory before the BPP will run. This is to prevent double archiving or mis-archiving photos. It is best practice to copy and paste these archived files into a folder for redundancy and backups. This can be a subfolder in the same folder directory as the rest of the stored photos.

## **Special Buttons and Operations**

The BPP has several features that will be useful to the user.

**Photo Time Stamp Filter:** This feature is intended to narrow the search window for BAT records that may be relevant to the photo displayed, based on the time the photo was taken and the time that the user indicated it was taken in the relevant BAT audit submenu. The default is 1 minute +/- of the time and date that the photo was created.

- In some cases, the time between when a BAT data entry was made and the actual time a photo was taken associated with that information will be longer (or shorter) than 1 minute. The filter can be

changed to expand the selection of relevant BAT data entries using the arrow keys and selecting a different time sensitivity filter.

- On the occasion that a photo was taken well after the BAT entry was made, the “24 hours” and “ALL” filter features allow the user to peruse all BAT entries made in a day or during the entire audit available for assignment to the photo.

**Filter/Clear Filter for Unassigned Photos:** Photos that are not assigned data can be quickly filtered. By adding this filter and expanding the Photo Time Stamp Filter to ALL Day, it is possible to quickly clean up any “orphaned” photos and make final assignments.

**Ignore Picture:** This button simply deletes the photo from consideration in the assignment process. This is useful for clearing photos that are either blurry or not useful. THIS BUTTON DOES NOT DELETE THE SOURCE PHOTO. However, once cleared, that photo cannot be assigned new data unless it is reloaded as part of a new processing batch.

**Clear Data Button:** This button will clear the information assigned to a photo. Note that reassigning data to a photo is as simple as selecting a different assignment button. There is no need to clear the data first.

**Process Final Close Out:** This button allows you to finalize all connections between data entries and uploaded photos. It also remove all instances of “PHOTO RECORD CREATED” from the notes in each data entry. This should only be done once there are no more photos to add and the audit is complete.



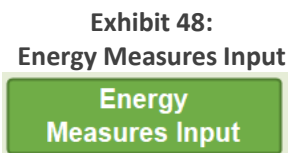
### **SPECIAL INSTRUCTIONS FOR iPhone USERS**

The BPP uses metadata stored with the pictures. Some methods of transferring pictures from an iPhone to a laptop do not preserve all the necessary metadata. As a best practice, users should:

1. Transfer photos from their iPhone to your computer (only Windows PCs are supported at this time) using the iPhone USB cable.
2. Only photos taken on your iPhone, not photos sent to you by others can be used.
3. Photos taken as ‘Live’ photos should be avoided as Windows may interpret these as movies. On your iPhone, make sure the Camera’s ‘Live’ setting is off before taking pictures.
4. During transfer, if a message pops up on the iPhone asking if another device can access it, answer Yes.
5. Use Windows Explorer to locate the photos on your iPhone and copy them to a folder on your computer.

### *Entering ECM Results Data into the BAT*

An important feature in the BAT is the ability to enter the results of the energy audit, in terms of recommended energy conservation measures (ECMs), back into the BAT for use in CTS reporting and as a reference for future auditors, building managers or other stakeholders.



The ECM entry menu includes submenus for all building systems and subsystems or processes consistent with categories listed in the CTS upload template. This results in an extensive submenu system for this form. However, the entry protocol is nearly the same for all submenus. Key data to complete ECM input includes the following:




- Description of the ECM – this data is entered using a freeform description text field.
- Measure Type – Dropdown list of measures common for the building subsystem. The data in the pulldown menu will vary depending on the submenu selected.
- Number of improvements – used to indicate the number of ECMs of the same type that are aggregated for data input into this form.
- Cost of ECM – The estimated installation cost of the ECM. Note, that for situations where measures are bundled (i.e. ECM Number is > 1), this and all other applicable values reported in this section should be the aggregate values.
- Annual Energy Savings – The estimated annual energy savings input in MMBtu per year (aggregated value as applicable). Conversion will be required in some cases. Conversion details may be included in the notes if not self-explanatory.
- Annual Cost Savings -The estimated annual energy cost savings that will accrue for the project (aggregated value as applicable).
- Present Value Life Cycle Energy Savings (Savings over the Life of the Measure) – The estimated total energy savings over the life of the measure, accounting for project life.
- Present Value of Cost Savings over Life of the Measures – The estimated present value of the energy cost savings over the life of the project.


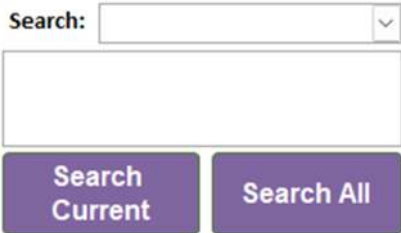
Any calculations (such as present value) should either use standardized parameters or the parameters should be specified in the notes or ECM measure description. For example, rates of return or weighted cost of capital values should be specified explicitly or by reference including applicable dates of publication for any reference material.

### *Closing and Searching the Building Record*

The following section describes the procedures for closing out the audit, exporting the information collected, and uploading energy conservation measure data into the BAT main database for use by the sponsoring agency. In addition, a few miscellaneous administrative functions are also reviewed.

**Exhibit 49: Post Audit Menus**

	<p>This button marks the current building as complete and updates its status in the Real Property List. This is useful both for project administrators and for the auditor to mark progress, but more importantly it is <b>required</b> to allow the data collected to be copied back to the Master Database.</p>
	<p>This button exports the data collected during the Audit to an MS Excel file that can be used for data analysis. The file includes tabs for each of the separate building sections and the output includes any notes taken during the audit.</p>
	<p>This button exports implemented ECMs to the latest CTS Initiated Project Upload Template. Additional instructions are included in the Excel file generated by this process.</p>

	<p>This button exports evaluated ECMs to the latest CTS Initiated Evaluated Project Upload Template. Additional instructions are included in the Excel file generated by this process.</p>
	<p>This search box enables you to search through Manufacturer/Model, Serial Number, Unifomat Code, or Notes that are attached to records. First you select the type of field you would like to search through using the drop-down selection, then enter the text to search for in the box. There are two options for buttons to perform the search. The “Search Current” button will search through the current building, and the “Search All” will search through all buildings the User has access to. The search will create a report with the location of each result.</p>

## Error Handling

The BAT is designed to offer a robust, error-free experience, but in the event and error is generated during use, there are several things for the user to understand.

### Internal Error Handling

- 1) **Data Protection:** Data is stored in the BAT as the user moves through each record. Under almost every circumstance, once a data record has been committed to the Database (by using the “Save” button) it will remain safe from edits or deletion. Only features and functions initiated deliberately by the user can edit or delete the data.
- 2) **Warning Dialog Boxes:** The BAT includes a variety of warning/error dialog boxes programmed to guide the user into making valid menu selections. Clearing these messages usually only requires acknowledging the error and correcting the data entry.
- 3) **System Warning Dialogs:** Some system warning dialog boxes are launched if data validation rules are violated. In most cases the user will have three choices in dealing with these errors:
  - a. Complete data entry as instructed by the dialog (usually pertains to required data)
  - b. Click “Undo” and proceed to navigate to a new record or form
  - c. Click “Esc” button on the keyboard
- 4) **System Errors:** System errors are more problematic. Although not necessarily required, the best practice if a system error is encountered is for the user to sign out of the tool, close MS Access and relaunch the tool. System errors should be documented and forwarded to the development team ([BATHELP@antaresgroupinc.com](mailto:BATHELP@antaresgroupinc.com)).
- 5) **Entry Locked before or After Error Message:** If an error occurs that seems to completely lock the user from editing, moving to a new record, or otherwise interact with the tool, the user should first attempt to either “Undo” or press “Esc” on the keyboard. If the problem persists, sign out of the tool, close MS Access and relaunch the tool. Prior information should then be available for editing and data entry can continue.
- 6) **Data Display Errors:** If an error occurs that seems to remove certain data from being displayed (in whole or in part), the user should sign-out of the tool, close MS Access, and relaunch the tool. Prior information should then be available for editing and data entry can continue.



## *Common Errors and Corrective Action*

There are certain errors that the user is likely to encounter more often than others. Most of these errors occur when the user begins to enter data and decides to either navigate away from the current screen or the specific record. By virtue of the database data validation rules or data requirements, this may trigger an error that does not allow the user to complete any additional actions or appears to otherwise create an error trap. In most cases, this situation can be resolved by simply hitting “Esc” or clicking the “Undo” button if it is available. That will unlock the record and allow for navigation to proceed.

## Section 508 Compliance

The BAT and associated training materials have been designed in context of the Functional Areas and Success Criteria (WCAG 2.0) which is driven by requirements described in Section 508 of the US Rehabilitation Act. In general, these criteria were developed for interactions with website content, but they are also relevant to non-web software. Importantly, the BAT is actually a Microsoft Access-based application, and the accessibility capabilities of the BAT are both enhanced and limited by the capabilities of the core application. However, key features of the BAT programmed into the application include specialty designed navigation features, shortcuts, and color palette. The BAT supports the use of Assistive Technologies to the extent that the software OEM has provided.

# APPENDIX A: Administrator User’s Manual Supplement

The BAT is equipped with separate features reserved for Agency and contract managers. At the Agency level, these features are associated with assigning sites for audit/assessment to the subcontractor(s) and with tools for reimporting and uploading data generated by the BAT and related audits/assessments. Contract managers are provided access to the tools to manage assignment of specific buildings to auditors/assessors. This Appendix details key administrative features including creating new users, assigning roles, designating work assignments, and generating working files for auditors/assessors/managers.

## Start-up/Set-up

Set-up, initialization, and logging as an Administrator/Manager is the same as it is for all users and the instructions in the body of this guide should be used as reference.

Once logged in, an Administrator/Manager will be presented with a unique menu set. A screen shot of the Administrator login screen displayed is presented in Exhibit 50. These features are strictly administrative. To access these features from the building level of the BAT, go to **REAL PROPERTY** and then **ADMINISTRATION**.

**NOTE: The proper use of the BAT requires that some information be entered into the system by the Administrator before the tool can be used by auditors/assessors.**

Exhibit 50: Administration Login Screen / Contact Information

The screenshot displays the Administration interface of the Building Assessment Tool. The top navigation bar includes 'SIGN OUT', 'Real Property', 'Help', and 'Shortcuts'. The user is logged in as 'Sysadmin1' with the role of 'Administrator'. The main content area is titled 'Administration' and features a sidebar with various tools and a central 'Contact Information' form. The form includes fields for Contact ID, First Name, Last Name, Company, Phone, Ext, Cell, Email, Contact Type, Address, City, State, Zip Code, and Country. A 'BAT User Info' section is also visible, containing fields for User Name, User Password, Role, Email, and an Active checkbox. Annotations highlight the 'Save' button and the 'BAT User Info' section.

**Remember to always click "Save" after modification or addition of contact information**

**BAT User Contact**

**BAT User Info**

User Name	SAuditor
User Password	7288edd0fc3ffcbe93a0cf06e3568e28521687bc
Role	Auditor
Email	sauditor@acme.com
Active	<input checked="" type="checkbox"/>

**PLEASE NOTE:**  
1) Not all CONTACTS must be USERS, but you must enter contact information before making CONTACT a BAT USER  
2) All Auditors or Auditor Managers must be BAT USERS

## Contacts

The first function shown on the Administrative Tool bar (also the default screen when logging into the BAT as an Administrator) allows the Administrator to enter information about the companies and people that will be responsible for completing assigned audits/assessments. The data fields are self-explanatory, but data entered through these screens support several essential functions. Most importantly, these forms create the valid pool of users and companies for which subsequent user access rights and assignments can be made. Key points of contact (POCs) and the contact information for the Contracting Company and POCs should be entered. At a minimum, each contact's e-mail is required as this information is used to uniquely identify users throughout the BAT. ***At least one auditor's contact information must be entered into the system to assign properties to an audit before the BAT can be used. All auditors (or auditor managers) must be considered a BAT USER.*** A BAT USER is a contact that has the credentials to use the BAT tool to enter and modify data; therefore, any person can be a contact but not all can be a BAT USER. The BAT USER's contact information must be entered into the BAT User Info box located on the right side of the Contacts screen.

Upon completion of modifying or adding a new user, select the green save button to retain the new information added to the contact information.

### *BAT User Info*

Adding contacts as users of the BAT and modifying existing users can be accomplished through the "BAT USER INFO" input form on the Contact Information Screen, as seen in the blue box on the lower right section of Exhibit 50. A contact can become a BAT User only after being saved as a contact (the required contact information has been entered and saved).

- **Add this Contact as User:** To add any contact as a User, the input form requires four fields: "User Name", "User Password", "Role", and "Email". There is also an "Active" check box that is automatically checked to indicate the contact has been added as a User in the system. You can determine if the contact is already a user or not if this information is populated in the subform.
  - Users can be added by selecting the button labeled "Add this Contact as User" after the required inputs on the "Contacts" form is completed. These required inputs include "First Name", "Last Name", "Phone", "Email", and "Contact Type". Clicking on the "Add this Contact as a User" button will then result in a pop-up box with some additional inputs as described below.
  - As an Administrator, you can generate new BAT USER and during this process you need to assign each new user both a User Name and Password. Best practice is to enter User Names that consist of the first initial of the persons first name followed by the persons last name – all lower case and without spaces.
  - Next the role should be assigned to the user. There are three different roles that can be assigned by the Agency Administrator:
    - Administrator and Manager – Both of these roles have full and complete administrative rights to BAT including creation of other users, property work assignments and audit/assessment level access. The different roles exist as a way for Agencies to manage the flow of data. A Manager has the same rights as the Administrator to data but could possibly only have a subset of the Agency data, such as the facility or buildings being audited, as assigned by the Administrator.

- Auditor – User access to only enter building data

Each User Name can only have one role assigned. When a Manager or Administrator conducts audits or assessments, a link in the upper right corner on the “Administration” screen leads to the “Real Property List” screen, which accesses the Audit/Assessment portion of the tool. Likewise, a link back to the “Administration” portion of the tool is provided in the upper right corner on the “Real Property List” screen.

- **Modify Existing User:** This input form can modify any of these fields on existing user including “User Name”, “User Password”, “Role”, and “Email”.
- **Edit Administrator Password:** This can be used to change the Administrator password.

## Real Property Assignment

Assigning properties for assessment from the Real Property Database is a two-step process; (1) selection and assignment, (2) creation of a customized BAT for the user. A variety of filters, including location information, are provided to narrow the pool of properties to those of interest to the Administrator. This form also includes some helpful step-by-step instructions to assist the Administrator in selecting and making assignments. The input screen is provided below in Exhibit 51. Making the assignments involves the following:

1. Enter search criteria in the top fields and press “Filter” button to narrow the list of properties to assign (Optional).
2. Select an Auditor/User that will be assigned to either manage or complete the Audits/Assessments (***at least one auditor’s information<sup>1</sup> must have been entered into the Contacts database to be available for assignment***).
3. Enter any special instructions in the field provided instruction box 2) and do not enter text or change any text in the table for that property. This information will be provided through the BAT to the user (again, this information is automatically saved but click away just in case).
4. Check the box(es) next to each property to assign an auditor (there is no save feature, this information is automatically saved but the user should make sure to click away from the last entry to make sure that the last entry is saved).

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<sup>1</sup> Note that an Administrator or Manager can be used as an Auditor for this assignment

## Exhibit 51: Real Property Assignment Input Screen

**REAL PROPERTY ASSIGNMENT** Use ("CTRL +a") to jump to Auditor User Name field

Enter Search Criteria:

Installation ID:  Auditor User Name:  Audit Status:  RPUID:  Street Address:  City:  State:  Zip Code:  Latitude:  Longitude:

1) Select an auditor:

2) Enter special instructions:

3) Check a RPLUID checkbox below to assign the building to the selected auditor. TO CHANGE, Click once to UNSELECT, Click again to REASSIGN

Assigned	User Name	Instructions	Facility Name	Real Property Unique ID (RPUID)	Address	Latitude	Longitude	Audit Status
<input checked="" type="checkbox"/>	SAuditor		Vehicle Storage	CBP0000ABCD0001	555 Sesame Street , Bellingham, WA 98226, USA			Not Started
<input checked="" type="checkbox"/>	LKlapper		Office	FEMA000ABCD0001	168-01 Union Turnpike , Queens, NY 11366, USA			Completed
<input checked="" type="checkbox"/>	SAuditor		Classroom	FEMA000ABCD0002	170-01 Union Turnpike , Queens, NY 11366, USA			Completed
<input checked="" type="checkbox"/>	JOlmsed		Library	FEMA000ABCD0003	172-01 Union Turnpike , Queens, NY 11366, USA			Completed
<input checked="" type="checkbox"/>	JOlmsed		Central Plant	FEMA000ABCD0004	80-01 Utopia Parkway , Queens, NY 11366, USA			Completed

Once auditors/assessors are assigned properties, the Administrator/Manager can generate the separate working BAT files for each user. The BAT consists of a front-end and a back-end database file. Both files are needed by the user. The master back-end file is maintained by the Agency Administrator or the Contract Manager for local assignments. This back-end file should be kept in a secure location accessible by the Admin/Contract manager as this file will be duplicated and forwarded to users, or used as the basis for the data export process, described below.

## Data Export

Exporting building data to a separate BAT file, intended to copy data for an individual user, can be done with the Data Export function. The steps for completing the data export are as follows:

1. The Administrator/Manager selects the "Data Export" button located on the left side of the main Administration form. The user screen is shown in Exhibit 52.
2. The "User Name" to be exported can be selected using the drop-down box.
3. The "Export" button is selected for confirmation and export of the needed files.

Note that all the files needed are placed in a directory in the C:/DHS\_BAT that will contain the Username. This folder may be zipped and forward for use to the auditor or Energy Contract manager. Users can refer to Appendix B to "Link or Re-link" all tables should this prove necessary.

Exhibit 52: Assignment Data Export User Screen, Prior to Exporting (top) and After (bottom)

SIGN OUT    Real Property  
Help  
Shortcuts

## Homeland Security Building Assessment Tool

Administration
\* Required    Sysadmin1 logged on as Administrator

- Contacts
- Real Property Assignment
- Data Export
- Data Import
- Add Building
- ECM Manager
- Reports
- Utility Meters
- Lookup Value
- Upgrade Utility
- Other Tools
- CLEAR ALL

### ASSIGNMENT DATA EXPORT

This function will export the buildings that are assigned to the User Name you select below to a copy of the BAT that will be created for that user. The user's copy will be located in a subfolder of BAT named for the selected user.

Export
Undo

Assignment Data Export ID    12

\* **User Name to Export** SAuditor

**Buildings assigned to the above selected User Name**  
USCG000ABCD0001 - Dormitory 1A,  
USCG000ABCD002 - Administration

**Location of User Folder**

**Name of User's Exported copy of BAT Datafile**

**Date Exported**

**Exported by**

**Export Status**

Notes

SIGN OUT    Real Property  
Help  
Shortcuts

## Homeland Security Building Assessment Tool

Administration
\* Required    Sysadmin1 logged on as Administrator

- Contacts
- Real Property Assignment
- Data Export
- Data Import
- Add Building
- ECM Manager
- Reports
- Utility Meters
- Lookup Value
- Upgrade Utility
- Other Tools
- CLEAR ALL

### ASSIGNMENT DATA EXPORT

This function will export the buildings that are assigned to the User Name you select below to a copy of the BAT that will be created for that user. The user's copy will be located in a subfolder of BAT named for the selected user.

Export
Undo

Assignment Data Export ID    12

\* **User Name to Export** SAuditor

**Buildings assigned to the above selected User Name**  
USCG000ABCD0001 - Dormitory 1A,  
USCG000ABCD002 - Administration

**Location of User Folder**  
C:\DHS\_BAT\DHS\_BAT\_for\_SAuditor

**Name of User's Exported copy of BAT Datafile**  
C:\DHS\_BAT\DHS\_BAT\_for\_SAuditor\SAuditor\_DHS\_BAT\_Data\_v1.7.0\_Apr2022.accdb

**Date Exported** 4/28/2022

**Exported by** Sysadmin1

**Export Status** Successful

Notes

## Import Audit Data (Data Import)

When Auditors/Assessors complete their assignments in the BAT, they will mark their audits as “complete.” This is a necessary precursor to importing data from the local BAT database file, so Administrators/Managers should check the status of any audit data before proceeding with the import step.

The following steps are required to import local data into either the central BAT database or the Company level database (managed at corporate contract level).

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*NOTE: Users should provide Administrator all folders provided to them after audit as items such as floor plans and photos will be added to master data store for later use.*

---

1. Navigate to the subform by clicking the “Data Import” button located on the left side of the main Administration form.
2. Select “Import Type” depending on the type of import. The options are:
  - a. **“Based on Import Template”** - importing system level data, based on selected systems by installation. The import template process is described below.
  - b. **“Entire Selected Database”** – import of all data associated with a BAT database, including all buildings information for all users
  - c. **“Based on User(s)”** – import of all data for selected Users within a BAT database.
3. If the “Based on Import Template” option is selected, follow these steps to create and populate an import template that is used by the BAT to guide the process. If you do not need to create an Import Template, please skip to item 4.
  - a. Click the “Create System Level Import Template” navigation button on the right side of the Data Import form. **Exhibit 53: Create Import Template**
  - b. Once the System Level Data Import form opens, you should then **Create System Level Import Template** browse for an external access database file that will be the basis for this import.
    - i. Click the button with three dots next to the “Select Database for Import” field. Browse to the database you plan to import data from, and select the backend (DATA) file.
    - ii. Click the “Load” button.
  - b. The list of buildings associated with the Data file that was loaded will be populated in the table on the lower portion of the form. The user should then select all buildings that contain data to be import. You may use the filters at the top of the form to narrow your search.
  - c. When all desired buildings are selected, you are ready to generate the Import Template.
    - i. Select a destination folder for the file by clicking the three dots next to the Destination Folder field, and browsing to the location. The default will be the Exports subfolder of the BAT directory.
    - ii. Click the “Create Template” button. This will generate an excel file template in your selected location.
    - iii. Close “System Level Data Import Template” module using the Close button.
  - d. Populate the System Level Import Template (excel file) with the systems by building that you would like to import from the source BAT file
    - i. Open the excel file you created in the previous step (3c)

- ii. Place "1"s in any boxes to indicate buildings/systems contain information to be imported. See example below (Exhibit 54).
- iii. Save the file.

**Exhibit 54: System Level Import Template**

	A	B	C	D	E	F	G	H	I	J	K	L
1	COMP_UNIQ_ID_TXT	FacilityName	City	State	AirHandlir	Appl_Plug	AssetsFue	AssetsOth	AuditInfo	Basement	Basement	Boilers
2	test	test	test	test	1				1	1	1	1
3												
4												

4. In the Data Import page, Select the Access Database to be imported. This is the back-end Data file that with data you are importing into the BAT file you have open. Click on the "Select File" button (shown in Exhibit 55), and browse to the file of interest.
5. If you are importing "**Entire Selected Database**" you may now click the Import button to start the process. Otherwise, if you are importing select Users or Systems DO NOT select Import yet until you have completed the steps described below.
6. For Import Type "**Based on Import Template**" you will need to load the populated import template.
  - a. Click "Select Import Template", browse to the template you have just created and click OK.
  - b. Click on the "Import data from Template" to load the file
7. For Import Type "**Based on User(s)**" you will need to select the Usernames to be imported. A multi-selection box will pop-up with available options based on the file you loaded to be imported.
8. Once you have input all the necessary data files and information, you may Click on the "Import" button underneath "Select file". This will initiate the import process.

Once the import is complete, the data in the Real Property List will be updated, including Audit Status.

**Exhibit 55: BAT Data Import User Screen**

**BAT DATA IMPORT**

Data Import ID (New) Add New Undo

Either select "Yes" in the "Import Entire Selected Database" or enter a correct User Name(s) existing in the selected Access file to import the audit data assigned to the user. Separate user names with a comma: or System Level Import.

\* Import Type:

\* Select the Access database (backend DATA file) to be imported

Select File

Import

Create System Level Import Template

This utility (button) will create an EXCEL template that will allow users to selectively import discrete systems into the BAT from a back-end database. The utility will allow users to manage the data import process so that different systems from the same building can be imported by different users without overwriting data that would otherwise be imported at the building level. For example, User A can specify that all data from their back-end data for Building 1 should be imported except for "lighting", while User B can specify that only "lighting" should be imported from their data for Building 1.

Imported by

Import Status

Notes

Date Imported



## Add Building

If the BAT is not pre-populated with data from an external real property database, or a user discovers that a building is missing from the pre-populated data, there are several mechanisms to add a building to the tool. After clicking the “Add Building” button located on the left side of the main Administration form (see Exhibit 56), the user will see a form with several required entries marked by asterisks.

Ideally, the missing building will just be the product of a problem with the data import from the external database, and the user will be able to manually look up RPA Unique ID and other information that will match the external real property database. If such information is not yet available, the user should enter placeholder values (an unused ID in the same format as the actual ID, such as an RPUID of FEMA9876543210) in these required fields, and then in the Notes explain that this building appears to be absent from the external real property data source. The rest of the menu inputs are self-explanatory.

Once the required fields are completed, the user should select “Save” or “Add New” to complete the addition or if another building needs to be added. Once Saved, the new building will appear in the Real Property List menu and can be assigned for audit.

Exhibit 56: Add Building User Screen

The screenshot displays the 'Add Building' form in the Building Assessment Tool. The form is titled 'ADD BUILDING' and includes a sidebar with navigation options. The main form area contains several required fields marked with asterisks: Sub-Agency Acronym, RPA Unique ID, Installation ID, RPTYPE, SubinstallationID, Facility Name, Building Unit, Building Address, City, State, Zip Code, Country, Gross Sq.Ft., Longitude, and Latitude. There are also radio buttons for 'Goal Subject, Energy Intensity' and 'Included in GHG Emissions Target?'. A 'Notes' field is present on the right side of the form. A callout box points to the 'Import' button, indicating the 'Bulk template file method'. The top of the screen shows the user is logged in as 'Administrator'.

An alternative method to adding buildings is using the Bulk Import process, which is particularly helpful if multiple buildings need to be added. A Real Property Bulk Input template included as an EXCEL file in the installation directory (“RealProperties Bulk Import Template.xlsx” in DHS\_BAT folder). This template allows the user to input Real Property into a tabular format and import the information into the BAT in a batch process. The template may be populated manually or information can be cut and paste from a real property database.

A directory navigation button and import button are provided on the Add Building form (see Exhibit 56) to navigate to and upload from the populated template.

Note that like the import form, the import template will create unique building identifiers from the Sub-Agency name, RPA Unique ID, Installation ID, RP Type, and Sub-installation ID. Duplicates are not allowed and error messages will warn users of needed corrective action if duplicates occur in the batch upload.

## ECM Manager

The ECM Management Form can be used to input savings information for each individual ECM evaluated as any prior audit effort. The previously evaluated ECMs are grouped into these 23 categories listed below in the same order as the subform buttons are shown on the left side of the ECM Management Form (Exhibit 57):

- Heating Plant
- Cooling Plant
- BAS / EMS
- HVAC
- Lighting
- Building Envelope
- Chilled/Hot Water
- Motors/Drives
- Refrigeration
- Distributed Generation
- Renewable Energy
- Utility Distribution
- Water / Sewer
- Peak Shaving
- Rate Adjustments
- Process
- Advanced Metering
- Appliance
- Commissioning
- Other
- SHW Systems
- DCEC
- Conveyance

---

*NOTE: Do not enter new ECMs on these screens, they are entered through the auditor's input menu on the Energy Measure Input Menus.*

---

Exhibit 57: ECM Management Form for Heating Plant ECM Example

**HEATING PLANT**

RPUID: FEMA000ABCD0004    EM Heating Plant ID: 5    Agency Identifier:    Temp Agency Identifier:   

Installator: 0001    City: Queens    State: NY

Uniformat Code:    Description of ECM: Steam Boiler Controls

	Estimated Values As:	
	Evaluated	Implemented
Implementation Cost of ECM (\$)	\$90,000	\$100,000
Other Costs (O/M, M/V, etc.) (\$)		\$0
Financing Costs (\$)		\$0
Annual Energy Savings (MMBtus)	1,500	1,200
Life Cycle Energy Savings (MMBtus)	22,500	18,000
Annual Cost Savings (\$/year)	\$7,500	\$6,000
Ann. Ancillary Cost Savings (\$)		\$0
Present Value Lifecycle Cost Savings (\$)		\$90,000
Pay back	0.00	
SIR	0.00	
Net Present Value (\$)	\$0	

\* Agency Designated Project ID: 1121

Initiation Date:    Implementation Date:    Acceptance Date:    Project Life (years): 0

Type	Amount	UOM
Energy/Water Savings Source 1: Natural Gas	100	MCF
Energy/Water Savings Source 2	0	
Energy/Water Savings Source 3	0	
Energy/Water Savings Source 4	0	
If Other, Type		

Funding Type: Energy Savings Performance Contract    Amount (\$): \$100,000

2nd Funding Source:    Amount (\$): \$0

3rd Funding Source:    Amount (\$): \$0

If Other, Type:    Amount (\$): \$0

RP Funding Category:    Amount (\$): \$0

Resilience Notes: *(i.e., "flood hardening", "critical load service", "critical operation protection" "load storage and controls to generation")*

M/V Detail Table - This table is used to track M/V results. M/V test dates must be unique to each set of results.

Bldg. ID: FEMA000ABCD0004    Proj. ID: 1121

M/V Date	Primary M/V Method	Source 1	Source 2	Source 3	Source 4 Notes
		0	0	0	

If there are no ECMs entered for a particular category, the screen will be blank in the Administrator’s menu.

There can be multiple ECMs for each category in the ECM Management Form. Navigation buttons (e.g. “Previous” and “Next”) are provided by ECM type, and allow the user to quickly move through all ECMs by category. Within each ECM, “Evaluated” information is shown in grey in fields on the left of the ECM data input table and the values cannot be changed. Once the measure is implemented, values can be added to the “Implemented” information on the right of the ECM data input table and the ECM will automatically be marked as implemented on the status selections (lower right area of the form). By default, ECMs are displayed for ALL entries currently in the master database, but filters are available for “Implemented” and “Resiliency” related ECMs in each category.

The ECM Manager allows either the Administrator or Manager to enter information at an Installation or Agency level that was not previously available to Auditors to be entered into the system, including data associated with measure implementation and M&V activities. Drop-down boxes contain pre-populated fields consistent with CTS reporting requirements. The form also includes several radio buttons:

- “Installation-Wide” button indicates if this ECM was implemented for all buildings for a given facility/campus. This may be changed by the user.
- “Resilience-Related” button indicates whether the ECM has resiliency elements considered as part of the evaluation. This may be changed by the user.
- “Implemented” is a flag, not directly input by the user. Entering cost data for implementation automatically invokes this flag.

The Measurement & Verification Detail Table (M/V Detail Table) is used to keep track of actual savings and monitoring activity throughout the life of an ECM. Each time an M&V event occurs, the details of the activity can be added as a new record in the support table at the bottom of the form. Data to be tracked includes the date of the M&V event, the type of verification activity, and the measured savings by energy source.

## Reports

The BAT Reporting Tool is a form in which reports can be generated for a variety of information. The form contains several horizontal navigation tabs at the top of the page, each for a different report (Exhibit 58). These reports include age/condition information, building information, reports on ECMs, and information on the overall condition of a building’s components (status reports). There is also a tab to access the Data Dictionary and run a data dictionary comparison report with a prior version of the BAT.

**Exhibit 58: BAT Reporting Tool User Screen**



### Age/Condition Reports

These reports can be found under the tab “Age/Condition”, see Exhibit 59. There are two different types of reports that can be run from this screen. Both reports can be filtered by Installation (Installation ID), State (building location), or Age (of building). At least one of the systems listed below each run button must be checked for the reports to run. Once the reports are run, a tab will open next to the BAT Reporting Tool with the report that can be printed or closed.

The left blue button for “Run Reports Select Age Reports” can be selected for simplified reporting for quick information on key systems. Information in these reports pertains to HVAC, domestic hot water, and renewable energy system equipment and can be filtered based on installation, state, or age. The reports include the installation year, unit age, and unit type.

Facility condition or inventory reports, often used for CFA Reports, can be generated using the blue “Run Condition/Inventory Reports” button on the right side of this submenu. This provides considerably more detail than the Select Age Reports, including reporting information entered into the “FCA Only” fields that are available on all screens. There can only be one Condition/Inventory Report open at one time.

Exhibit 59: BAT Reporting Tool – Age/Condition Reports Input Screen (top) and Example Results (bottom)

The screenshot shows the 'BAT Reporting Tool' interface. At the top, there is a navigation bar with 'SIGN OUT', 'Administration', 'Help', and 'Shortcuts'. Below this is a tabbed menu with 'Age/Condition', 'Bldg Info', 'ECM Reports', 'Status Reports', and 'Data Dictionary'. The 'Age/Condition' tab is active, showing filter options for 'Filter by Installation' (0002), 'State', and 'Filter by Age'. Below the filters are two main buttons: 'Run Reports Select Age Reports' and 'Run Condition/Inventory Reports'. Under the 'Run Reports Select Age Reports' button, there are checkboxes for 'Domestic Hot Water Systems' (checked) and 'Renewable Energy Systems'. Under the 'Run Condition/Inventory Reports' button, there are checkboxes for 'FCA Report with PRV & CI Values', 'FCA Report with Condition Assessment Notes', and 'Inventory Report (Mechanical Systems)'.

The screenshot shows a browser window with two tabs: 'BAT Reporting Tool' and 'rptDHWEquipmentAge'. The active tab displays a 'Domestic Hot Water Age Report'. The report header includes 'Created: 2/22/2022 3:55:47 PM' and buttons for 'PRINT' and 'CLOSE'. Below the header is a table with the following data:

Facility Name	Building	Install Year	Unit Age (years)	Unit Type
Installation ID: 0002	State: NM			
Administration	USCG000ABCD002	2009	13	Integrated Tank/Heater

At the bottom of the report, it says 'Report of Domestic Hot Water Units Age' and 'Page 1'.

### Building Information

This report is accessed using the “Bldg Info” tab, Exhibit 60. It shows the building location and specifications such as square footage, building age, and when the building was last evaluated. The report also has a list of which ECMs have been evaluated and implemented within the building, denoted by “True/False” status.

The “RealProperties Report” option will generate an excel report of the Real Property data in your BAT database. This can be particular useful to check if all desired buildings have been added to the BAT.

Exhibit 60: BAT Reporting Tool – Building Information Reports Screen (top) and Example Results (bottom)

The screenshot shows the top section of the BAT Reporting Tool. It features a dark blue header with the tool's name and navigation links. Below the header are several tabs for different report categories. Filter fields for 'Installation' and 'State' are present, along with a 'Run Reports' button. At the bottom of this section, there are checkboxes and input fields for selecting specific reports to run.

The screenshot shows the results page for a 'Building Demographics and Evaluation Status Report'. The page includes a title bar with 'PRINT' and 'CLOSE' buttons, and a timestamp. Below the title, there is a table with two main sections: 'Location Information' and 'Building Parameters'. The 'ECMs Implemented' section is a grid of checkboxes and labels for various energy conservation measures.

Location Information		Building Parameters	
Building Name	Vehicle Storage	Building Type	
Country	USA	Type of Lease	Agency Owned
State	WA	# of Stories	
Zip Code	98226	Building Age (Years)	
RPU ID:	21455	Gross Square Footage	
		Year Built	
		Number of Below Ground Stories	
		Occupancy	

ECMs Implemented					
Evaluation Completion Date					
Advanced Metering	False	Appliance	False	BAS/EMS	False
Boiler Plant	False	Chiller Plant	False	Commissioning	False
Cold/ Hot Water	False	Distributed Generation	False	Building Envelope	False
HVAC	False	Lighting	False	Peak Shaving	False
Motors/ Drivers	False	Process	False	Rate Adjustment	False
Refridgeration	False	Renewable Energy	False	Utility Distribution	False
Water/ Sewer	False	Other	False		

ECM Reports

The ECM reports available in the BAT can filtered by Installation (Installation ID) or State (building location). Each Report can be run on any combination of measures which the user selects, but at least one measure must be included in the selection. When the ECM Reports tab is clicked, nine options for reports with check boxes can be seen and multiple reports can be viewed at one time. These reports are primarily to view savings (either monetary or for a commodity) for each installation or for the entire agency. Reports also include information for evaluated ECMs, implemented ECMS, or all ECMs depending on which report is selected. Each report displays savings for each individual ECM and the total for either the installation or the entire agency. More than one report can be run at a time by using the check boxes and as many or few ECMs as the user desires can also be specified using the drop-down arrows next to “Measure Select” (Exhibit 61). Once these parameters are set, the “Run Report(s)” button can be clicked to report the specified ECM information.

Exhibit 61: BAT Reporting Tool – ECM Reports Screen (top) and Example Results (bottom)

**BAT Reporting Tool** SIGN OUT Administration Help Shortcuts

Age/Condition Bldg Info **ECM Reports** Status Reports Data Dictionary

Installation [ ] State [ ] Measure Select: EnergyMeasures\_AdvMtrng *Select one or more measures for reporting* **RUN REPORT(S)**

**REPORTS WILL BE DISPLAYED ONCE PARAMETERS ABOVE ARE SPECIFIED**

Currently Available Reports (select one or more)

- ECM Life Cycle Savings and Capex - All Projects (Evaluated and Implemented)
- ECM Life Cycle Savings and Capex - Implemented Projects by Installation
- ECM Life Cycle Savings and Capex - Evaluated by Installation
- ECM Life Cycle Savings and Capex - Ranked by Savings All Projects
- ECM Commodity Savings (Annual and Life Cycle) for All Projects by Installation
- ECM Commodity Savings (Annual and Life Cycle) for Implemented Projects by Installation
- ECM Commodity Savings (Annual and Life Cycle) for Evaluated Projects by Installation
- ECM Commodity Savings Ranked by Savings All Projects
- ECM Life Cycle Savings and Capex - All Projects (Resilient)

Building Name	Building ID	ECM Description	Capital Costs		Life Cycle Savings	
			Evaluated (\$)	Implemented (\$)	Evaluated (\$)	Implemented (\$)
<b>IMPLEMENTED PROJECTS: True</b>						
Installation ID: 0001 State: NY						
Central Plant	FEMA000ABCD0004	Occupancy sensors	\$2,000			
Office	FEMA000ABCD0001	New CRAC Unit	\$60,000			
<b>Installation Total</b>			<b>\$62,000</b>			
<b>IMPLEMENTED PROJECTS: False</b>						
Installation ID: 0001 State: NY						
Library	FEMA000ABCD0003	Occupancy sensors	\$60,000			
Classroom	FEMA000ABCD0002	Occupancy Sensors	\$50,000			
Office	FEMA000ABCD0001	Occupancy Sensors	\$50,000			
Library	FEMA000ABCD0003	New ECM Fans	\$60,000			
Classroom	FEMA000ABCD0002	Repair Economizers	\$15,000			
Classroom	FEMA000ABCD0002	New ECM motors for FCUs	\$100,000			
Office	FEMA000ABCD0001	Daylighting Controls	\$50,000		\$65,000	
<b>Installation Total</b>			<b>\$385,000</b>		<b>\$65,000</b>	

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Status Reports

The Status Reports form is used to generate reports for systems that include resiliency flags and all the notes associated with a particular system. Once data is filtered by Installation (Installation ID) or State (building location), a DHW report, HVAC report, or lighting report can be printed as a pdf or paper form. Condition reports for HVAC provide the notes and system description for HVAC equipment as well as other equipment and assets. Condition reports for lighting display the total number of lights working and number not working for the interior and exterior of the facility.

Exhibit 62: BAT Reporting Tool – Status Reports Screen (top) and Example Results (bottom)

The screenshot displays the BAT Reporting Tool interface. At the top, there is a navigation bar with 'SIGN OUT', 'Administration', 'Help', and 'Shortcuts'. Below this is a menu with tabs for 'Age/Condition', 'Bldg Info', 'ECM Reports', 'Status Reports', and 'Data Dictionary'. The 'Status Reports' tab is active. Below the menu, there are filters for 'Installation' and 'State', and buttons for 'DHW Report', 'HVAC Report', and 'Lighting Report'. A large grey box indicates 'REPORTS WILL BE DISPLAYED HERE'. Below this, two reports are shown:

**Domestic Hot Water Status Report**  
 Created: 2/22/2022 9:57:29 PM  
 Buttons: PRINT, CLOSE

State:	Building Name	Building ID	Condition	Unit Type	Energy Source
NY					
<b>Installation ID: 0001</b>					
	Office	FEMA000ABCD0001	Needs Repair	Integrated Tank/Heater	Electric
	Classroom	FEMA000ABCD0002		Integrated Tank/Heater	Natural gas
	Library	FEMA000ABCD0003	Good	Indirect – steam to hot water	Other

Domestic Hot Water Condition Page 1

**System Status Report w/Notes**  
 Created: 2/23/2022 10:53:15 AM  
 Buttons: PRINT, CLOSE

Building ID	System Description	Space Name	Res?	Condition Assessment Notes	Other Notes
<b>State: NM</b>					
<b>Installation ID: 0002</b>					
<b>System Type: AirHandlingUn</b>					
USCG000ABCD002	Custom modular (both indoor and outd		No	N/A	
USCG000ABCD002	Packaged unit (includes rooftop unitary		No	No issue	PICTURE RECORD CREATED. chilled and hot water coils, no reheat
<b>System Type: Appl_Plug</b>					
USCG000ABCD002	Computer		No		2 admin computers and 5 computers for guests
<b>System Type: Communicatio</b>					
USCG000ABCD002	INTERCOMMUNICATIONS SYSTEMS		No		
USCG000ABCD002	SECURITY SYSTEMS		No		
<b>System Type: Conveying</b>					
USCG000ABCD002	OTHER MOVING STAIRS & WALKS		No		
USCG000ABCD002	PNEUMATIC TUBE SYSTEMS		No		
<b>System Type: DomesticHotW</b>					
USCG000ABCD002	Integrated Tank/Heater		No		
<b>System Type: DomesticWate</b>					
USCG000ABCD002	PIPES & FITTINGS		No		

Data Dictionary

The full data dictionary can be viewed or printed from this form. Upon clicking the tab for ‘Data Dictionary Report,’ another tab opens with a list of table names and fields with an associated description and validation rules, as seen in Exhibit 63. The database comparison report will allow a user to compare an old database structure with any current version. This is useful prior to performing upgrades as differences in database versions may cause issues.



Exhibit 63: BAT Reporting Tool – Data Dictionary (top) and Partial Results (bottom)

BAT Reporting Tool x rptDataDictionary x

**Data Dictionary Report** PRINT CLOSE

Created: 2/23/2022 10:58:03 AM

Table Name	Field Name	Field Type	Field Size	Field Description/Menu Label	Form Name	Field Validation Rules	Control Type	Required/Optional/Automatic
Agency	AgencyName	Short Text	255				Keyboard Entry	Optional
Agency	SubAgencyName	Short Text	255				Keyboard Entry	Optional
AirHandlingUnits	AirHandlingUnit_ID	Long Integer	-	Air Handling Unit ID	frmAirHandlingUnits		None/System	Optional
AirHandlingUnits	COMP_UNIQ_ID_TXT	Short Text	50	COMP_TXT	frmAirHandlingUnits		None/System	Optional
AirHandlingUnits	FloorName	Short Text	50	Floor Name	frmAirHandlingUnits	Selections limited to FloorName inputs in Layout Menu.	Drop-down	Optional
AirHandlingUnits	SpaceName	Short Text	50	Space Name	frmAirHandlingUnits	Selections limited to choices input in Layout Menu or Floor Plan Editor	Drop-down	Optional
AirHandlingUnits	ZoneServed	Short Text	255	Zone Served	frmAirHandlingUnits	Selections limited to ZoneName inputs in Layout Menu.	Drop-down	Optional

Previewing, Printing and Exporting Full reports

Launched reports are available for preview and printing. Printing may be completed by simply using the “PRINT” button located at the top of each report. In addition, the user may “Preview” the full report by right clicking on the report tab (see Exhibit 64). Previewing will also launch a menu that will allow the user to export the reports content to MS Excel and other formats.

## Exhibit 64: Print Menu

The screenshot shows a software interface with a menu bar (File, Home, Create, External Data, Database Tools, Help) and a toolbar. The main window displays a report titled "Life Cycle Savings Report - Commodity and Value". A right-click context menu is open over the report tab, listing options: Save, Close, Close All, Report View, Design View, and Print Preview. The "Print Preview" option is circled in red. A red arrow points from the text "Right-Click on Report Tab to bring up sub-menu" to the "Print Preview" option. The report content includes a table with columns for Building Name, ECI 1 Description, Capital Costs (Evaluated (\$), Implemented (\$)), and Life Cycle Savings (Evaluated (\$)). The table is divided into sections for "IMPLEMENTED PROJECTS" and "Agency Total".

Building Name	ECI 1 Description	Capital Costs Evaluated (\$)	Capital Costs Implemented (\$)	Life Cycle Savings Evaluated (\$)	Life Cycle Savings Implemented (\$)
<b>IMPLEMENTED PROJECTS:</b> False					
Installation ID: 473	State: MD				
	Boiler Insulation	\$1,000		\$43,123	
	Boiler Retrofit	\$10,000		\$200,123	
	<b>Installation Total</b>	<b>\$11,000</b>		<b>\$243,246</b>	
Installation ID: 70	State: TX				
		\$1		\$1	
	<b>Installation Total</b>	<b>\$1</b>		<b>\$1</b>	
	<b>Agency Total</b>	<b>\$11,001</b>		<b>\$243,247</b>	

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## Utility Meters

Admin/Manager Users can also enter metered commodity data and allocate those commodities to individual buildings. Three user input forms are needed for this purpose.

1. The first sub-menu "Enter Meter Info" is used to input information about an individual utility meter including account information and commodity type. This data is used in subsequent menus. This menu also provides a user-selected choice for either completing building allocations by direct % (requested on subsequent screen) or by gross square footage (GSF). If the latter, metered commodities will be allocated to the building by GSF, otherwise user allocation percentages will be used.
2. In the second sub-menu "Allocate by Building", the user is prompted to assign each building to a meter. If the allocation method of "Direct %" has been selected, fields for assigning such percentages will be available for input. Direct percentage allocations across all assigned buildings must equal 100 percent.
3. In the final sub-menu "Enter Bill Data," billing data for each meter can be entered. The fields provided are typical for utility bills for the most common commodities. Only one month/year combination is available for each meter. Filters are available on this screen to limit the available meters for data entry to specific installations.

## Lookup Value

The Lookup Value form in the BAT is a tool that provides limited capability to customize many of the dropdown menus that are used throughout the BAT. This is intended to allow agency level customization or to accommodate changes made to standard lists due to evolving standards. This tool should be used during initial set-up and not on a going forward basis. This is because the tool only changes drop-down entries on a form to be used for data entry from that point forward and it does not change any information already stored in the data set. For such transformations, the user is encouraged to contact the BAT Development team.

## Exhibit 65: User Input Screen – Lookup Value

**Administration** \* Required Sysadmin1 logged on as Administrator

**LOOK-UP VALUE EDITS**

Buttons: Add New, Save, Cancel, Reset/Back

Form:

Category:

Form:

**Condition Index:**

CIValue	CIValHiRange	CIValLoRange
Functioning with useful remaining life	100	90
Priority 1 - Critical or Life Safety Issue	89.99999	70
Priority 2 - Functioning by requiring repair or replacement	69.9999	55
Priority 3 - Functioning but beyond useful life	54.9999	25
Priority 4 - Grandfathered	24.999	0
*	0	0

To use the tool, the user simply selects the form that needs to be altered. The corresponding dropdown lists that are available for edit can then be selected. The entries for the selected dropdown list can then be edited.

Additionally, there are capabilities to “Add New,” “Save,” “Undo,” and “Reset/Back.”

## Upgrade Utility

This Upgrade Utility provides the opportunity for the Administrator to upgrade older BAT data files from previous revisions / audits to the current version. The Administrator will follow the on-screen instructions as shown in Exhibit 66 to perform the upgrade.

NOTE: Before upgrading the BAT, you must start with a clear BAT file, and no photos, drawings, or any other information should be present in the associated subfolders. DO NOT clear your data from the older BAT you are upgrading though. Upgrading does not impact the prior BAT files, but rather it fully populates a new version of the BAT with the data in that previous copy, (including copying over photos, floorplans, and drawings) without having to manually move files. It is always best practice to make a backup of any important or critical files, folders, or documents before making changes.

## Exhibit 66: User Input Screen – BAT Upgrade Utility

**Administration** \* Required Sysadmin1 logged on as Administrator

**BAT UPGRADE UTILITY**

The BAT Upgrade Utility allows you to pull in the data from an older version of the BAT into this version's backend database. This allows you to use the additional features of each new version of BAT, while retaining your already collected data.

Upgrades only work on backend versions from April 2020 and later. You should be able to tell the backend version release date by the BAT data file name, (e.g. DHS\_BAT\_Data\_v1.1.0\_Mar2020\_pilot.accdb would be too old). If you try to upgrade older versions, the system may crash and result in incomplete or corrupted data.

Note that this routine will first delete all data and photo/floorplan files from this current version that you are running. If there is data you want to save in this version, you should exit and make a copy of this folder and save to a separate folder before running the upgrade. This utility does not merge the upgrade with existing data.

First browse and select the BAT Data file to be Upgraded, then click Upgrade

Browse for BAT Data File

\*

Upgrade Status: Upgrade Orphan Data Check

After upgrade, an “Orphan Data Check” report will pop-up to indicate if there are any fields that had data in the previous version of the BAT that are no longer actively showing or used in the newest version. None of this data is deleted, but it will no longer be visible in the BAT screens. The report is for informational purposes only and can be dismissed or closed when you are done.

## Other Tools

This menu provides a collection of miscellaneous tools that Users may find useful in very specific circumstances. This includes tools to assist in dealing with potential data entry errors that could cause problems with using the CTS export templates, Extract Transfer Load tools and building archiving tools.

### *CTS Data Editor – Agency Designated Project ID*

This form can be used to quickly sort through all ECMs in the Database and identify which ones do not have an Agency Designated Project ID. Typically this ID will be entered into the ECM implemented information form, but this form can be used to add/change such IDs in bulk. These IDs are important to the proper population of the CTS Upload Templates and ECMs can be effectively “grouped” by assigning the same project ID to multiple ECMs. Note that the Implemented (Initiated) CTS upload template will not work for an ECM without this ID.

### *CTS Data Editor – Agency Designated Covered Facility ID*

This form can be used to quickly sort through all buildings in the Database and identify which ones do not have an Agency Covered Facility ID. The form can be used to add/change such IDs. Note that the Evaluated CTS upload template will not work for a building without this ID.

## *Building Archive*

The BAT does not explicitly allow buildings to be “deleted” from the database. However, buildings may be archived which removes them from the User’s interface, but stores the data in a special “archived” system. Note that for users of CAPSIS, this function is not necessary given the archiving functions built into that system.

## *ETL Export*

The Extract Transfer Load tool built into the BAT is designed to allow users to create custom exports of BAT data. Instructions are provided in each of the templates. Use of these tools is intended for advanced users familiar with ETL tools.

## *Clear All*

This function is provided for advanced users. This utility will allow all or part of the data from the current database to be erased. In general, this utility will only be useful to “undo” erroneous imports or other situations where data has been introduced into a particular instance of the BAT and the user is seeking to clear the data set and try again. The actions performed by this utility are permanent and irreversible and users are encouraged to create a back-up copy of the Data file before using this feature. The Clear All feature does not delete files in the Archive folders (Photos, Drawings, FloorPlans) – those must be deleted manually if desired.

# APPENDIX B: Special Instructions to Re-link Database Files

The MS Access files provided in the BAT are linked. When these files become unlinked, it will cause the BAT to malfunction. Fortunately, linking or re-linking the files is straightforward. To re-link all linked tables in the DHS BAT, follow these steps:

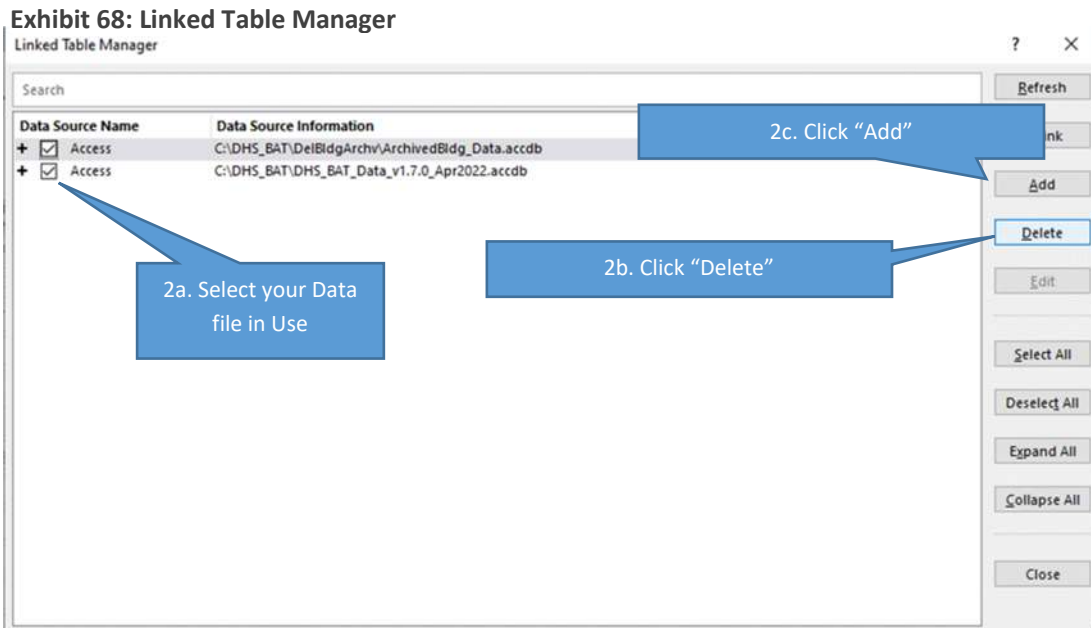
## MS Access 2016

1. On the Access menu, click on “Linked Table Manager” (see the screenshot below). It will open the “Linked Table Manager” Wizard shown in the subsequent graphic.

Exhibit 67: Accessing the Linked Table Manager

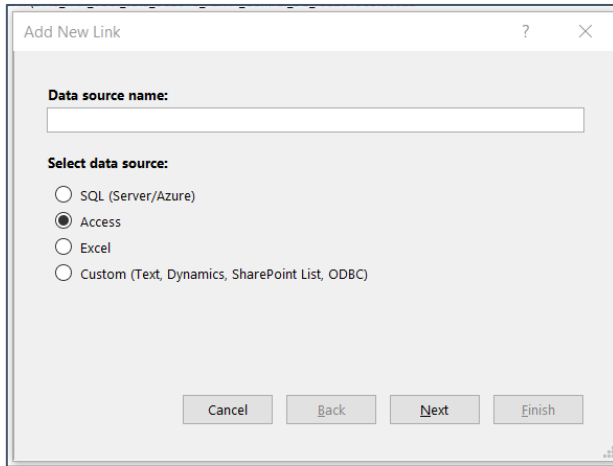


2. On the “Linked Table Manager” Wizard (Exhibit 68):
  - a. Check both BAT Data files that are currently linked to the BAT GUI.
  - b. Click the “Delete” button to the right.
  - c. Click “Add” to add a new data file. (This will be done to add both data files).

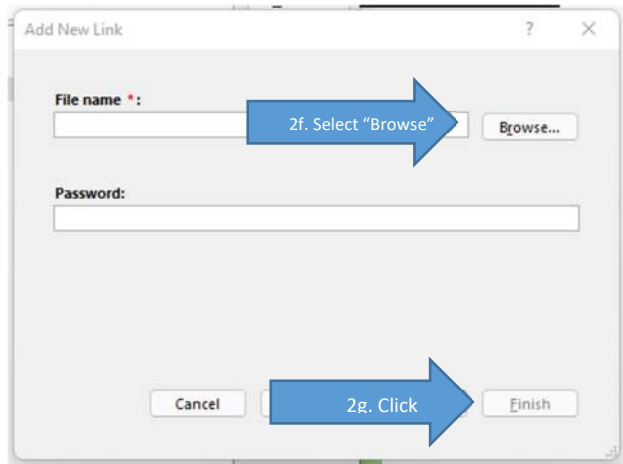


- d. Select the “Access” radio button, as shown in Exhibit 69
- e. Click Next
- f. Browse to the back-end file you wish to connect (the BAT access file with “Data” in the filename) as shown in Exhibit 75
- g. Click “Finish”

**Exhibit 69: Adding a New Link Window 1**

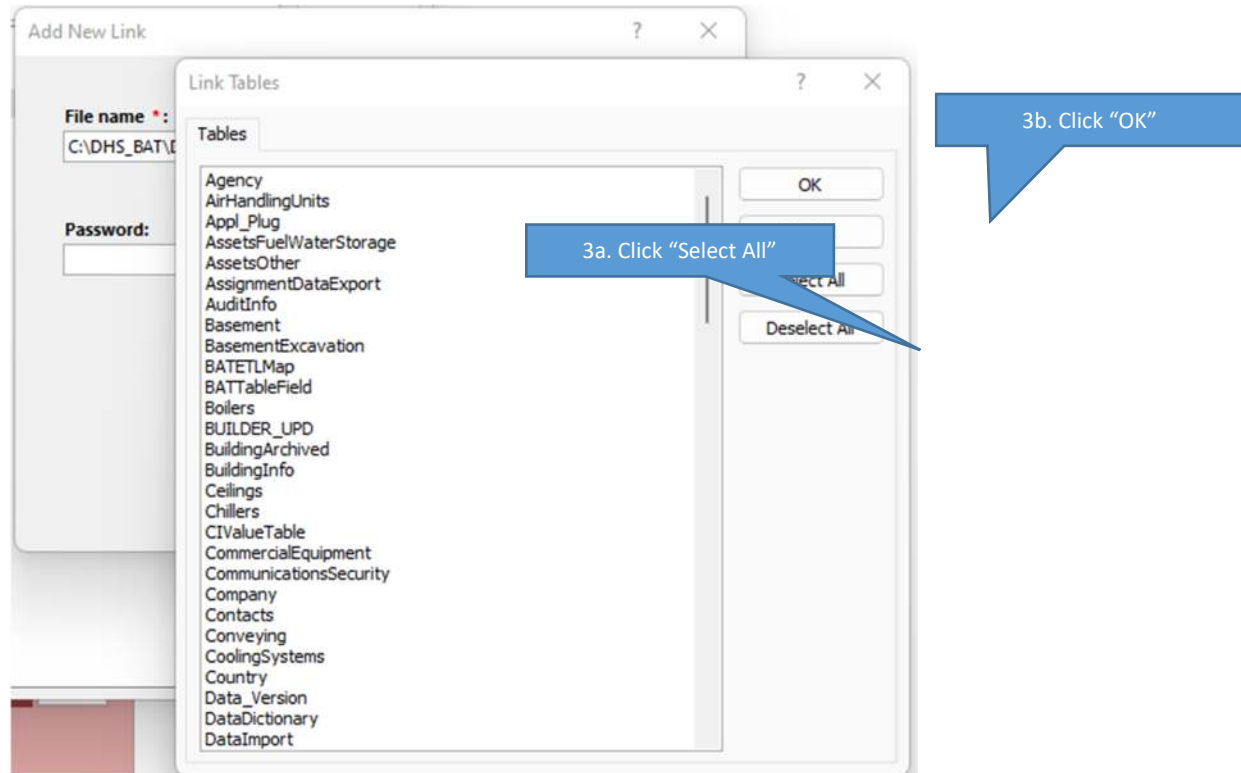


**Exhibit 70: – Adding a New Link Window 2**

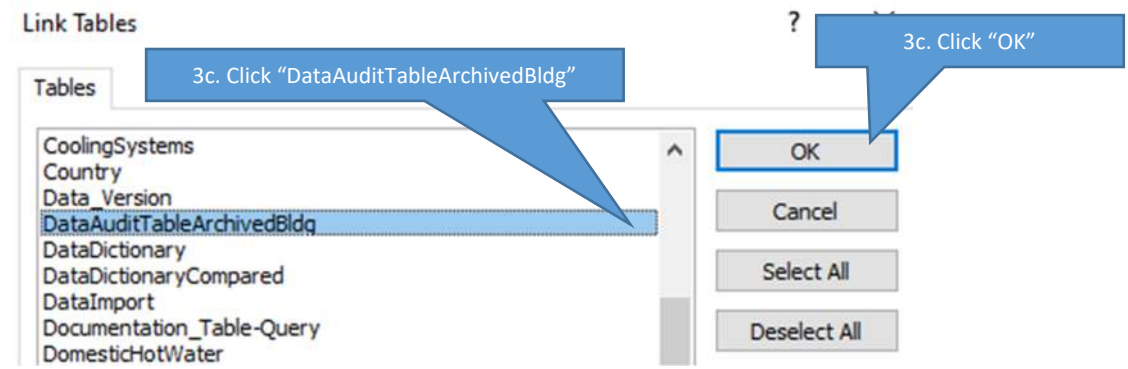


3. A new table manager will launch, as shown in Exhibit 71.
  - a. When you are linking the file “DHS\_BAT\_GUI\_v[#.#.#]\_[monthyear]” , Select “Select All”. (Example shown in in Exhibit 71)
  - b. When you are linking the file “ArchivedBldg\_Data.accdb” Only select “DataAuditTableArchivedBldg” Selecting all will cause errors. (Example shown in Exhibit 72)
  - c. Select “OK”
  - d. The system will process and return to the initial screen. Make sure that the “Data Source Name” lists the Data file you have just linked. The box does not need to be checked.
  - e. Press close

### Exhibit 71: Linking Tables



### Exhibit 72: Linking Archived Building Database



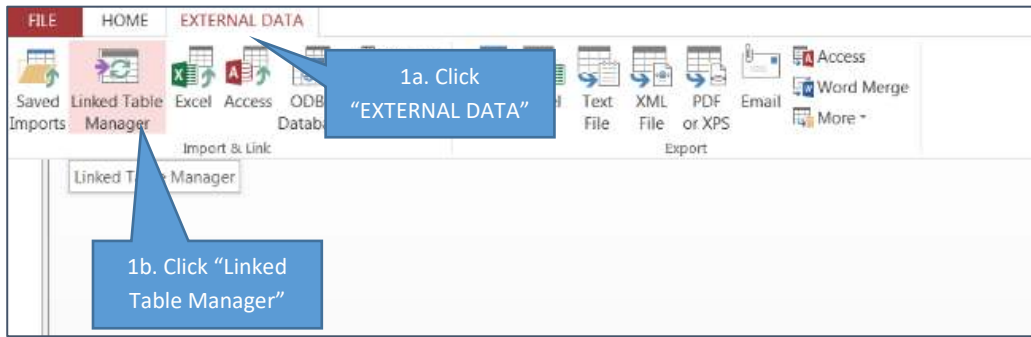
### MS Access 2013

The instructions for MS Access 2013 are similar, but the screens are slightly different. The linked table manager icon is in the same place as noted above, but the resulting screen is provided below. Follow 2016 version for Archive Building Process.

1. On the Access menu, click on "Linked Table Manager" (shown in the screenshot below). It will open the "Linked Table Manager" Wizard shown in the subsequent graphic.

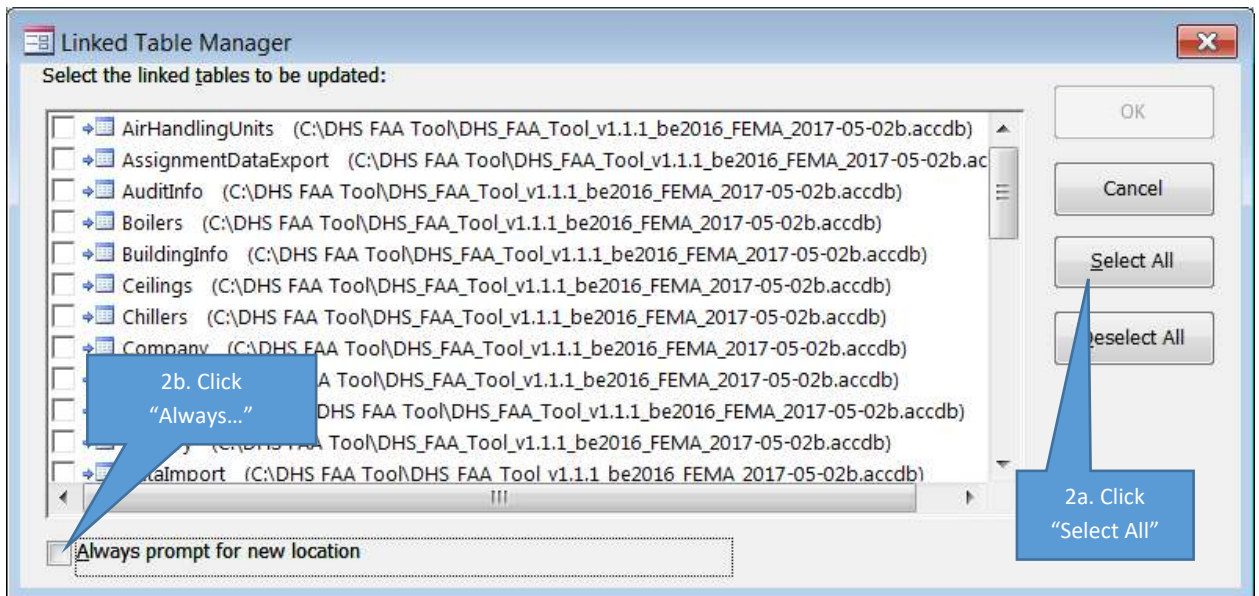


**Exhibit 73: Opening the Linked Table Manager**



2. On the “Linked Table Manager” Wizard, click “Select All” and check “Always prompt for new location” (screenshot below).

**Exhibit 74: Linked Table Manager**



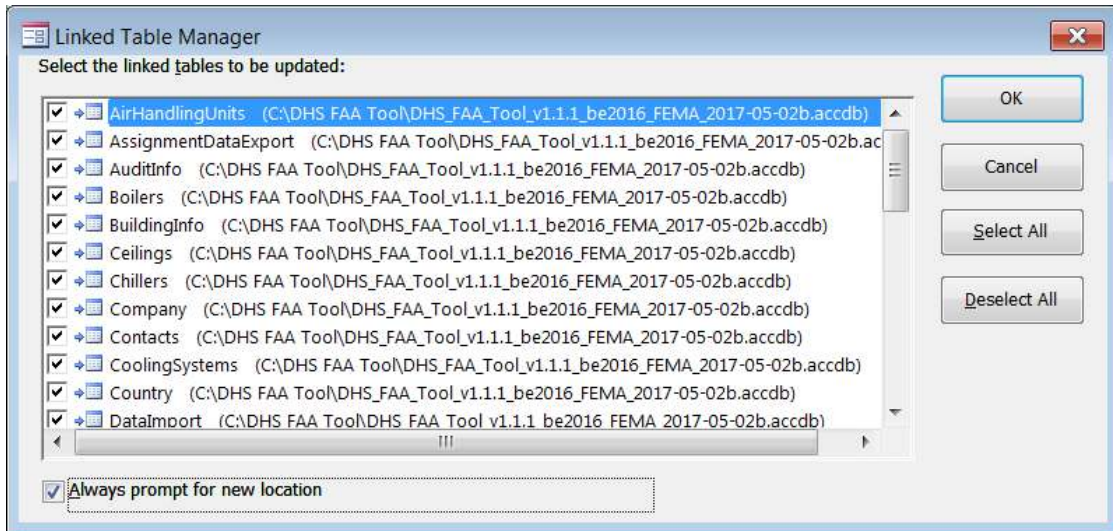
3. Click the “OK” button and browse to the backend database file.
4. Select the backend database file (contains “data in the file name) from your BAT folder (see below);

**Exhibit 75: Data and GUI Files**

CTS Init Project Upload Template - 03-2021d.xlsm	4/
<input checked="" type="checkbox"/> DHS_BAT_Data_v1.6.0_Dec2021.accdb	4/
DHS_BAT_GUI_v1.6.0_Dec2021.accdb	4/
RealProperties Bulk Import Template.xlsx	9/

5. Click “Open” button to complete the table re-link.
6. After the table link is completed, the message screen below will pop-up.

## Exhibit 76: Linked Table Manager



7. Click "OK" to close it.
8. Continue to use the forms in the tool.