



MasterLibrary

# Guide to Mapping Your Building Lifecycle

Understanding and leveraging your buildings' asset data throughout its lifespan.

At MasterLibrary, we know that every building in your district is at some point along a standard building lifecycle journey.

This guide is intended to provide a framework for defining the building lifecycle and the key work elements at each stage and to demonstrate how our software solutions map to it in support of the work necessary at each lifecycle stage.

You will also learn the benefit of having a Master Asset Platform that centralizes your applications across the lifecycle to provide consistent data on your assets and systems. And lastly, we will review the data standard we use in our applications, called Electronic Facility Records (EFR), and how that standard provides value at every stage of the building lifecycle.





Section 1 /

# Defining the Lifecycle of Your Building and Assets

Get to know the three key stages and the important aspects to manage at each stage.

# Plan

Long-term budget planning for school building facilities involves careful consideration of various factors to ensure the effective management and maintenance of the infrastructure. It is a constant exercise in understanding the needs and priorities of multiple stakeholders and critical assets in your district. Here are some key aspects to consider:

## 1. Needs Assessment

Regular assessments of the current condition of school facilities and assets are essential to identify maintenance, repair/replace decisions. This involves inspections by professionals to evaluate structural integrity, safety, functionality, and compliance with regulations as well as regular checks and PMs on assets around the building.

## 2. Life Cycle Cost Analysis

It's important to consider the lifecycle costs of maintaining and operating school facilities. This includes routine maintenance, repairs, upgrades, and eventual replacements on assets. Assessing these costs over the expected lifespan of different building assets helps in developing realistic long-term budgets and starts to fill in your annual budgets. This budget planning exercise will reduce surprise expenses and allow you to effectively communicate realistic capital plan scenarios to key stakeholders.

## 3. Prioritization

Not all maintenance and improvement projects will have the same level of urgency or impact. Prioritize projects based on factors such as safety concerns, regulatory compliance, impact on the learning environment, and potential cost savings in the long run. You also have to balance directives from your superintendent and other important stakeholders in the district. Having a priority matrix to put these items through helps eliminate subjectivity and provides a consistent lens from which you are measuring.

## 4. Contingency Planning

Anticipate unexpected expenses by setting aside contingency funds in the budget. This can help cover emergency repairs or unforeseen maintenance issues without disrupting educational activities. If you haven't started to measure your unforeseen expenses on an annual basis, start now. It will help inform the budget you need to set aside in future years.

## 5. Regular Review and Adjustments

Planning cannot be an exercise you do once a year, instead should become part of your routine as a facility leader. Continuously monitor the effectiveness of budget allocations and adjust plans as needed based on changing priorities, funding availability, and evolving facility needs.

## 6. Develop a Long-Term Vision

Develop a comprehensive long-term facility master plan that outlines goals, strategies, and timelines for maintaining and improving school facilities over several years or decades. This provides a roadmap for consistent and proactive facility management.

# Plan (cont.)

## Comprehensive Technology Planning

Accurate knowledge about the current state of your technology infrastructure and related IP-connected systems is critical for long-range strategic planning.

This involves careful consideration of various factors to ensure the technology solutions support educational goals while addressing administrative needs. In today's buildings, many devices that are managed by facilities now ride on the network and the line of responsibilities between Facilities and IT can get more and more blurred. It's imperative both departments work as partners in this process. Here are some key aspects to consider:

### 1. Technology Assessment

Conduct a comprehensive assessment of the technology needs of the school building, including educational requirements, administrative functions, and infrastructure capabilities. This assessment should involve input from teachers, administrators, IT staff, and outside consultants.

### 2. Infrastructure Readiness

Evaluate the existing infrastructure of the school building, including network infrastructure, electrical systems, and physical space for equipment installation. Ensure that the infrastructure can support the planned technology systems and accommodate future growth.

### 3. Scalability and Future-Proofing

Plan for scalability and future-proofing of technology systems to accommodate evolving needs and advances in technology. Choose flexible solutions that can be easily upgraded or expanded as necessary without requiring significant infrastructure changes.

### 4. Integration with Educational Goals

Align technology systems with educational goals and curriculum requirements to enhance teaching and learning experiences. Identify specific tools, software, and digital resources that support instructional objectives and promote student engagement and achievement.

### 5. Security and Privacy

Planning cannot be an exercise you do once a year, instead should become part of your routine as a facility leader. Continuously monitor the effectiveness of budget allocations and adjust plans as needed based on changing priorities, funding availability, and evolving facility needs.

### 6. Budget Planning

Allocate sufficient funds for technology procurement, implementation, and ongoing maintenance through third-party contracts. Consider long-term costs, including software licenses, equipment upgrades, and support services, as part of the budget planning process.

By considering these keys to building technology system planning, schools can implement technology solutions that enhance teaching and learning experiences, improve administrative efficiency, and support the overall mission of the district.

# Build

Capital project administration for school facilities involves managing various aspects of construction, renovation, and maintenance projects to ensure they are completed on time, within budget, and according to specifications. Here are the key aspects to consider:

## 1. Project Planning and Scope Definition

Clearly define the scope, objectives, and requirements of each capital project. Develop a detailed project plan that outlines timelines, milestones, budget estimates, and resource requirements.

## 2. Budgeting and Funding

With an effective planning process in place (as outlined above), the next step is to develop a comprehensive budget for each capital project, including costs for design, construction, materials, labor, permits, and contingencies. Identify potential funding sources, such as government grants, bonds, or fundraising initiatives.

## 3. Procurement and Contracting

Follow established procurement processes to select contractors, architects, engineers, and other vendors for the project. Develop clear and detailed contracts that outline expectations, deliverables, payment schedules, and dispute resolution mechanisms.

## 4. Permitting and Regulatory Compliance

Obtain the necessary permits and approvals from regulatory authorities, such as building departments, zoning boards, and environmental agencies. Ensure that all aspects of the project comply with relevant codes, regulations, and standards.

## 5. Project Management and Oversight

Assign a dedicated project manager or team to oversee the implementation of the capital project. Monitor progress, manage risks, and address issues as they arise to keep the project on track.

## 6. Communication and Stakeholder Engagement

Maintain open and transparent communication with stakeholders throughout the project lifecycle. Provide regular updates on progress, milestones, and any potential impacts on school operations or stakeholders.

## 7. Quality Assurance and Control

Implement quality assurance processes to ensure that workmanship and materials meet established standards and specifications. Conduct regular inspections and testing to identify and address any deficiencies or deviations from the plan.

## 8. Safety and Risk Management

Prioritize safety throughout the project by implementing appropriate safety protocols, training, and monitoring procedures. Identify and mitigate potential risks to the project, workers, students, and the surrounding community.

## 9. Documentation and Reporting

Keep detailed records of project activities, expenditures, and correspondence for documentation and reporting purposes. Provide comprehensive reports to stakeholders on project status, budget performance, and any deviations from the plan. If you are installing new assets, keep warranty and user guides and document dates of installation. This information acts as the “birth record” of the new assets in the scope of your building lifecycle and should be referenced throughout its usable lifetime.

# Build (cont.)

## Closeout Phase

The closeout phase of a school facility capital project is crucial for ensuring that all aspects of the project are completed satisfactorily and that the facility is ready for use. It is also a key component for setting yourself up with all of the documentation that will be important to reference and in the manage and planning stages. Here are the typical steps involved in closing out a school facility capital project:

### 1. Final Inspection

Conduct a final inspection of the completed project to ensure that all work has been finished according to the specifications outlined in the contract documents and meets regulatory requirements.

### 2. Punch List Resolution

Address any outstanding items or deficiencies identified during the final inspection by creating a punch list. Work with contractors to complete and rectify these items before final acceptance.

### 3. Documentation Review

Review all project documentation, including contracts, change orders, permits, inspection reports to ensure completeness and accuracy. Collect warranty documentation for materials, equipment, and workmanship installed as part of the project. Ensure that all warranties are transferred to the school or district and properly filed for future reference. As mentioned this information is critical for future reference in your manage and plan stages.

### 4. As-Built Drawings

Obtain and review final as-built drawings, which document any changes or deviations from the original construction plans. Ensure that these drawings accurately reflect the current state of the facility. These drawings are great to convert digitally and leverage as asset maps in software tools.

### 5. Training and Turnover

Provide training to school staff on the operation and maintenance of new systems, equipment, or technologies installed as part of the project. Transfer all relevant documentation, manuals, and keys to the school administration. Facilitate the transition of the facility from the construction phase to operational use, ensuring that all necessary services, utilities, and support systems are in place and functioning properly. Build new PM's for these systems and assets going forward.

### 6. Occupancy Permit

Obtain any necessary occupancy permits or certificates of completion from local authorities to officially certify that the facility meets all applicable building codes and regulations.

### 7. Closeout Meeting

Hold a closeout meeting with key stakeholders, including school administrators, project team members, contractors, and consultants, to review the project's achievements, lessons learned, and any outstanding issues.

**By following these project closeout steps, school administrators can ensure that capital projects are completed efficiently, effectively, and to the satisfaction of all stakeholders, leading to the successful delivery of high-quality educational facilities.**

# Manage

The Manage stage is where most of your time and activity will be spent with your team. It's the daily operations maintaining the facility and the critical assets inside of your buildings. This also includes the utility your buildings bring to your community and managing the operations and processes of various stakeholders who use your building and grounds for activities and events. Below are some key areas of Building Management.

## 1. Work Orders and Tickets

This is a core activity within every school district. As repairs and requests for assistance with building and asset-related issues come up, it is the job of the facilities team to respond and help. These requests need to be organized, documented and dispatched to team members. As updates and repairs happen around the building on a day to day basis, it is important to log the work done to keep a history and provide insights to other team members if the problem arises in the future.

## 2. Preventive Maintenance

Unlike work orders, preventive maintenance work is planned and dictated by the facilities team. Preventive maintenance is important to ensure your assets last or exceed their useful life. Tracking, maintaining and scheduling the work for your assets is also critical to the planning stage as you will be more aware of the assets that need expensive repairs or replacements in the upcoming cycles or you may be able to extend the lifetime of your assets and delay the expense into future years.

## 3. Inventory

Another important area of building management that has cost implications is inventory management. Understanding and organizing the supplies your building goes through on a regular basis helps with the budgeting of costs and ensuring supplies are always in stock when needed.

## 4. Surveying your building for current conditions

Building condition surveys and technology condition surveys are essential for ensuring the safety, functionality, and longevity of school buildings, as well as for effective budgeting and long-term planning. They provide valuable information about the current state of the facilities, allowing school administrators to plan and prioritize maintenance and repair activities effectively and provide valuable data for long-term planning, helping schools develop comprehensive maintenance plans and allocate resources strategically over time. Additionally, building condition surveys help identify any structural issues, hazards, or potential risks that could compromise safety. Building condition surveys

## 5. Managing event requests amongst multiple stakeholder groups

School buildings are integral spaces for the community. As such, it's critical for districts to have an organized system in place to manage the schedule of events for groups and spaces inside and outside on school property. While some of this work is administrative in nature and falls outside of the facilities department (such as invoicing & group management), it does require the preparation and clean up of spaces based on event requests. For some school districts, space rental is a revenue producer and could lead to capital improvements to encourage bigger or more events on school grounds. Facility professionals need to factor these district goals into their planning.



## Master Asset Platform (MAP): Concepts, Practices and Vision

Using facility asset data as its foundation, the cloud-based Master Asset Platform (MAP) collects and leverages accurate data during each building phase to extend assets' usable lives and do more with less.

### Across Building Phases

**GOAL** Leverage asset data to better manage, plan, and build facilities.

### Data, People, Functions, Solutions, Software and Services

**Examples of EFR data:** Building, Spaces, Systems, Schedules, Asset type, Project name, Architecture, Schematic design, System design, Construction drawings, Data.

PEOPLE (Staff & External)	Business Officials and Superintendents Architects and Engineers	Facility Directors Architects and CIOs	Facility & IT Directors Systems Contractors and Vendor
<b>FUNCTIONS AND SOLUTIONS</b>	<ul style="list-style-type: none"> <li>1. Long-Range Budget Planning               <ul style="list-style-type: none"> <li>Current Conditions Surveys</li> <li>10-Year Roadmap</li> <li>Asset Depreciation Reports</li> <li>Asset AMEP Systems</li> <li>Technology Systems</li> </ul> </li> <li>2. Systems 10-Year Planning</li> <li>3. Facility Planning               <ul style="list-style-type: none"> <li>Comprehensive Facilities Plan</li> <li>10-Year Facilities Roadmap</li> <li>10-Year Technology Roadmap</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>1. Capital Project Administration               <ul style="list-style-type: none"> <li>Construction Administration</li> <li>Systems Design drawings &amp; specs</li> <li>Project close-out documentation</li> </ul> </li> <li>2. Project Archive               <ul style="list-style-type: none"> <li>Systems Design drawings &amp; specs</li> <li>Project close-out documentation</li> <li>Commissioning Workbooks</li> </ul> </li> <li>3. Commissioning Guide               <ul style="list-style-type: none"> <li>Systems Theory of Operations</li> <li>Schematic diagrams</li> <li>Systems/Subsystems/Device settings</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>1. Event Management               <ul style="list-style-type: none"> <li>Requests</li> <li>Inventory</li> <li>Payment integrations</li> <li>Event registration</li> <li>Transportation requests</li> </ul> </li> <li>2. Work Orders               <ul style="list-style-type: none"> <li>Facilities work orders</li> <li>IT work orders</li> <li>Preventive Maintenance (PM)</li> <li>Inventory</li> <li>Enhanced IT work order features</li> <li>Business Intelligence</li> <li>Benchmarks &amp; KPIs</li> <li>Facility Cost Index (FCI) reports</li> </ul> </li> </ul>
<b>SOFTWARE PROFESSIONAL SERVICES</b>	<ul style="list-style-type: none"> <li>Technology readiness surveys</li> <li>Technology systems planning</li> <li>Workshop asset EFR data imports</li> <li>AMEP systems planning</li> <li>Facilities planning</li> </ul>	<ul style="list-style-type: none"> <li>Facility Data Construction Specs</li> <li>Project Execution Plans</li> <li>Facility Document Data</li> <li>Facility Data Webtools</li> </ul>	<ul style="list-style-type: none"> <li>Facility photography</li> </ul>
	<ul style="list-style-type: none"> <li>Capital Plans</li> </ul>	<ul style="list-style-type: none"> <li>Projects</li> <li>Binders</li> </ul>	<ul style="list-style-type: none"> <li>Schedules</li> <li>WorkOrders</li> <li>Drawings</li> </ul>

### Future Promise

- Next Generation Facility Managers (NGFM)** harness the power of information via real-time Building Conditions data. Learn more.
- Real-time Building Conditions** status information dashboards that allow for interactive analysis.
- AI Virtual Assistant** to automate and analyze your facility data.
- Building Operating System** with access to accurate real-time information that allows for better decision-making.

### Foundational Components

Beneath all phases in the MAP which is based on four foundational components:

- Electronic Facility Records (EFR)** Standard data sets distributed for EFR systems such as assets and systems. Learn more.
- Application Programming Interface (API)** allows software to translate EFR and other data.
- It's All About The Asset (IAATA)** Asset data is the path to better Facilities Management.
- Internet Of Things (IoT)** for real-time Building Conditions data.

Section 2 /

# Introducing ML's Master Asset Platform

In section 1, we broke up the building lifecycle into three core stages that are cyclical: Plan, Build and Manage. In this section, we introduce MasterLibrary's Master Asset Platform (MAP) and learn how its applications meet the different functional capabilities needed to optimize each building phase.

# Plan

In the plan stage, MasterLibrary provides ML CapitalPlans (MLC), a facility and systems planning tool that helps district and facility leaders build better facility budgets, manage capital plans and assets along their lifecycle.

As referenced in the earlier section, the Plan stage involves a constant process of prioritization, contingency planning, asset lifecycle cost analysis and developing a long-term vision. Because MasterLibrary’s suite of applications sits on the Master Asset Platform (MAP) - common data is shared on assets across the applications, making it seamless to pull asset lifecycle data for planning. We refer to this common asset data as Electronic Facility Records (EFR), which we break down in the next section.

Below are the capabilities facility leaders can leverage with ML CapitalPlans

## Long Range Budget Planning

- Current conditions survey
- Ten-Year Roadmaps

## Asset Lifecycle Planning

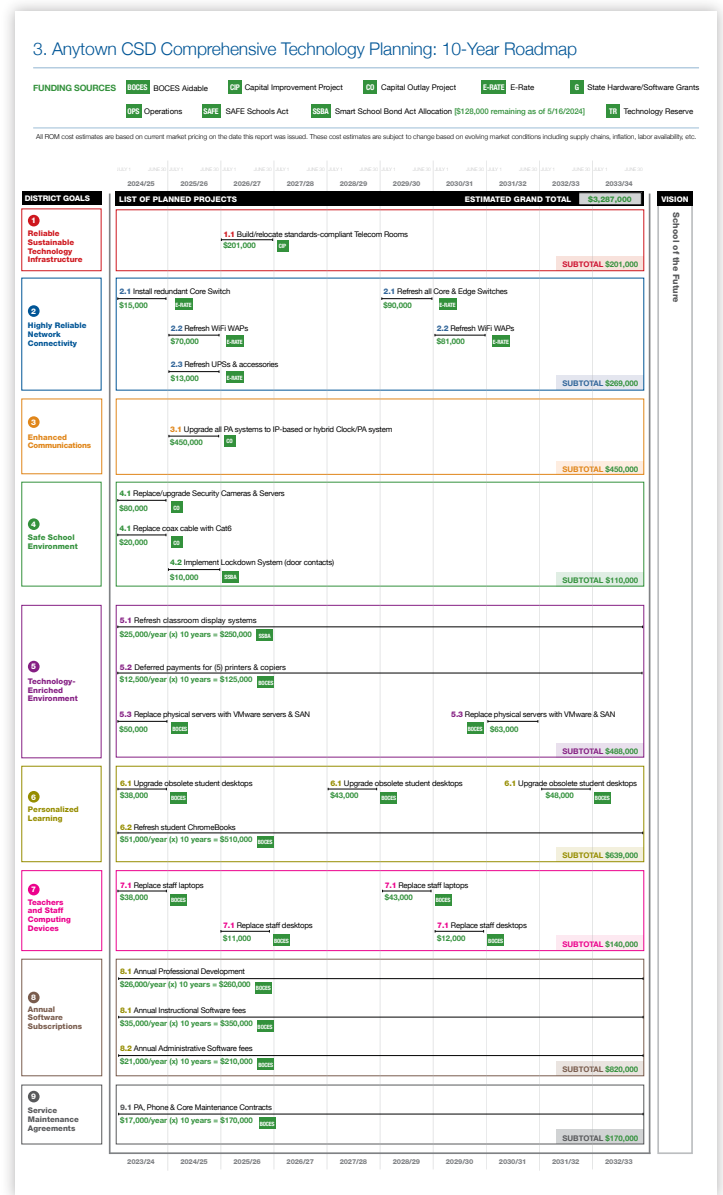
- Identification of assets coming to end of life
- Future capital expenditure plans

## Funding Stream Optimization

- Scenario planning with available funding streams
- Budget creation and allocation to solve for optimization of funds

## Communicating your Long Term Vision

- Data and visualizations to communicate decisions
- Report templates and reports to show future budget allocations



10 years of comprehensive technology planning captured on a single page.

# Build

Because the build stage is a complex stage that typically involves managing 3rd parties, multiple timelines, and heightened interest from key stakeholders; it's important to have a robust system that can manage these elements in a centralized location.

MasterLibrary provides tools to manage your projects while they are in process, ML Projects (MLP), and once complete, ML Binders (MLB) archives project data, as-built drawings, and closeout documentation digitally for easy access in the future.

**Below are some of the core capabilities of ML Projects:**

### RFIs and Submittals

- Issue and respond to RFIs and Submittals in real-time

### Bid Management

- Includes tools for Bid Packages, Questions, Addenda, and Submissions
- Updates financial reports in real-time

### Contract Management

- Contracts/Scopes Of Work (SOWs), Schedule of Values, Field Orders/RFPs, Proposals, Change Orders, and Pay Apps
- Changes made to any one element are automatically updated throughout the project

### Work Management

- Generate, track and close out change and field orders
- Auto-generate punch lists
- Work and jobsite reports
- Meeting notes and assignable action items

Once a project is complete, the close-out process begins as outlined in Section 1. There is a considerable amount of documentation that is generated in this stage that usually ends up living in boxes, binders and disorganized thumb drives. MasterLibrary helps districts organize, reference and populate close out data into the asset and facility records they represent through ML Binders. Below are the core capabilities of ML Binders

### Organization of documentation

- Folder structure helps makes sense of your documentation as you organize it by building, system and asset class
- Enhanced search makes it easy to quickly pull up the documentation you need
- Allows a one to many approach to organizing asset data. Rather than have a copy of the warranty or O&M document for every asset record you can link any assets to a single binder for future reference.

### Collaboration

- Share specific folders or docs with third parties through secure links

### Enhancing asset data

- The warranties, owners manuals and other documentation that comes along with new projects can be easily tied to specific asset records through the Master Asset Platform. This means when you are in the Manage phase and you need to perform work on an asset, the technician can view this critical asset information.

# Manage

A considerable amount of data is created on your assets in the Manage stage of your building lifecycle. With the MAP, all of this data is centralized across applications, ensuring robust information on those assets when accessed through the applications at the other stages of the building lifecycle.

There are three applications from MasterLibrary that compromise the Manage stage of the building lifecycle: ML Schedules (MLS), ML WorkOrders (MLW) and ML Drawings (MLD).

**ML Schedules manages the events and group requests within your school buildings and grounds**

## Conflict free scheduling

- Manage the calendar of your events in a centralized database
- Control the rules of booking spaces to ensure consistency
- Easy to use interface for event requests
- Auto-generate work orders for facility team based on space reservations and requirements

## Group management

- Manage the different classes of groups, both internal and external to your district
- Set up distinct rules for group classes, including insurance requirements
- Control access to spaces and times based on groups
- Automatically track and notify groups of insurance expirations

## Payments and invoices

- Create a closed-loop facility booking system by connecting your payment apps
- Generate account payables and receivable reports to stay on top of revenue

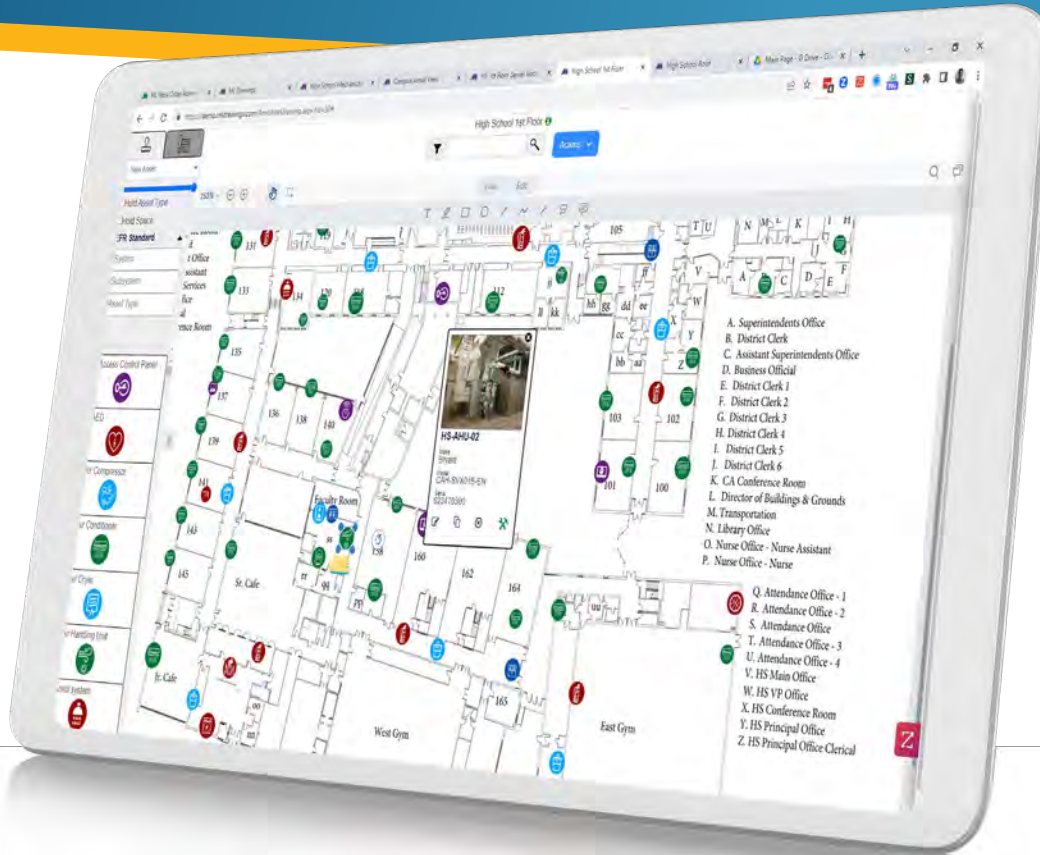
## Sports integrations

- Pull in your districts' sporting events with automatic updates as schedule changes
- Eliminate double entering events into your district calendar

**ML Work Orders manages the day to day facility management tasks within your buildings.**

## Work Orders

- Custom routing for maintenance, IT, transportation, equipment, key requests - among others
- Customized approval paths by request type, problem type, and/or specific facility
- All work performed stays linked to the asset record for future reference and decision making. Start building the story of your asset.



## Manage (cont.)

### Preventative Maintenance

- Build procedure templates to apply to individual assets or asset types
- Easy to schedule recurring PM tasks on assets

### Inventory

- Monitor and manage inventory supply levels in real time
- Link select supplies to Preventative Maintenance (PM) procedures to ensure all materials meet manufacturers' standards
- Easily access inventory records while completing work orders

### Expense Tracking

- Track labor and supply expenses back to assets

ML Drawings takes your blue prints and brings them to life, allowing your team to place assets and interact with them on a digital floor plan.

### Asset Stamps

- Create living as-built drawings by placing assets on their location
- Pulls asset data from the MAP into the stamp for quick access
- Help new staff learn the buildings by referring to ML Drawings

### Annotation

- Draw and write notes on your floor plans during building surveys



### Section 3 /

## Introduction to EFR: Examining the Data Inside Your Assets

Sections 1 and 2 have laid out the building lifecycle stages and supporting applications from MasterLibrary that manage those stages. In summary, the Build Stage populates baseline data for assets to be used in the Manage Stage to make better decisions on the maintenance and repair of those assets. The asset data generated from the Manage Stage helps decision making in the Plan Stage to support replace/repair decisions in long term planning exercises.

The Master Asset Platform (MAP) supports and centralizes all of the applications so that district team members can seamlessly work in different parts of the lifecycle while staying on a consistent system of record. The data fields on the asset records follow a standard called Electronic Facility Records (EFR). The EFR standard ensures that assets contain consistent and complete data for use across the building lifecycle. They are the DNA of the asset records. Here's a deeper dive into EFR and why MasterLibrary has chosen to build its platform and applications around this standard.



## Supporting the Lifecycle

One of the easiest ways to understand the concept of EFR is to compare it to that of an Electronic Medical Record (EMR).

Electronic medical records are the electronic version of the paper chart that simplifies and automates the data collection and organization, as well as care delivery, for a particular doctor or medical practice. Electronic Facility Records are all of the data about your buildings and assets in one place. Instead of doctors managing the systems, it's facility managers. Both systems get more valuable when they contain data from the early stages of life. Like people, buildings have starting points and the information and data from the planning and build stage are critical for decision making and forecasting when a building gets to the manage stage. The benefit to using this comparison is that it helps drive home the point in the purpose and functionality of an EFR and also the importance of data.

**Especially, data from the early stages of the building like:**

- Planning documents
- Drawings
- Building specs
- Schematic design sets
- Design development sets

Digitizing early stage building data that is most likely decades-old and stored away somewhere will go a long way in helping you understand, manage and maintain your building going forward.

# The 4 Ds of EFR

The EFR standard can easily be understood within the context of the 4 Ds below. With MasterLibrary, you can be sure your assets and systems are capable of containing these elements.

## 1. Data

The asset records inside of our Master Asset Platform are the data. This includes all of the discrete fields tied to an asset record (the physical, budget and technical information), any work orders or PMs that are digitally logged against an asset and any cost and forecasting information. All of this data should come equipped with the ability to neatly organize it by building, system and subsystem. Data portability is also key. Integrating with other applications that can read your asset data becomes incredibly valuable to the day to day management of your facilities.

## 2. Documents

The next element in an EFR system are documents. Think of them as “attachments” that you might find in your email. This includes things like warranties, manuals, disaster recovery plans, your building’s asbestos report, etc. It’s not data because systems can’t codify and report on the information that is contained in them. However, these are important pieces of information that you need to reference from time to time. For most, documents live everywhere - both digitally and physically in boxes and binders. ML Binders, the Build stage application, is built to store these documents and neatly organize them by building, system, sub-system and tag them by keywords.

## 3. Dollars

As we already noted, EFR asset types come standard with fields to capture lifetime value, purchase costs, replacement costs, and other financial data. To run your MAP at a high level, it’s critically important to capture the dollar/financial data tied to every asset or system in the same way that you capture the model and serial number of an asset. Combined with the work order data on your assets, ML Plan, used in the Planning Stage, will very quickly help you get to spending decisions faster and more accurately. Managing the dollars on your facility systems and assets can easily start to lay out purchase, replacement, and repair forecasts for your assets across all of your buildings over a period of multiple years.

## 4. Decisions

The final element of EFR is the decisions that you are enabled to make when you have all of the above pieces working together. With good stewardship of those elements and keeping your records clean and up to date, you will unlock a 360 degree view of your buildings and assets. Making better decisions about your facilities, systems and assets is at the heart of what EFR is all about.





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## Software to support every building phase

To discuss how MasterLibrary software can benefit your school district, contact:

**Aaron Barley** | Account Executive  
585.851.0696  
abarley@masterlibrary.com

[masterlibrary.com](https://masterlibrary.com)