



Building Lifecycle Management Initiative

The Role of Master Data Management

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Spanning the Building Lifecycle with Master Data Management

The goal of Building Lifecycle Management (BLM) is to establish a comprehensive and cohesive approach to overseeing a building throughout its entire life—from initial concept and design, through construction, operations, maintenance, and eventually, decommissioning. BLM stresses the significance of proficient master data management, which includes capturing, maintaining, and integrating data from various sources throughout each stage of the building lifecycle. This data needs to be meticulously managed by assigned owners or stewards to guarantee its accuracy, consistency, and usefulness. Typically, this data is stored in specialized technology repositories, ensuring that it is accessible and valuable to all stakeholders involved.

Achieving true BLM necessitates a considerable cultural shift within the commercial real estate industry. Traditionally, the industry has functioned in isolated functional silos, where different teams and stages of a building's lifecycle—such as design, construction, and operations—rarely interact or share data effectively. This fragmented approach results in inefficiencies, data loss, and suboptimal building performance.

To move from these isolated silos to a shared BLM mindset, the industry must embrace collaboration, transparency, and a long-term perspective. Stakeholders across all lifecycle phases must acknowledge the importance of integrated data management and commit to dismantling barriers between disciplines. By doing so, they can ensure that essential information flows seamlessly throughout the building's life, leading to improved decision-making, enhanced building performance, and greater sustainability.

The following representation of building lifecycle content creation and interactions was developed through an iterative process with generative AI, drawing on publicly available resources across lifecycle phases and disciplines. This illustration is intended to stimulate thought and encourage industry to adopt a holistic, lifecycle-oriented approach. By moving toward a shared BLM mindset, the industry can unlock the full potential of buildings, providing long-term value for all stakeholders involved.

Organized by lifecycle phase, the representation starts with a category (grouping) of data elements [list level “a”)”] and attempts to infer where the data is captured [list levels “i) ii) iii)” etc...], the probable uses of the data, the Users of the data, the data owners (stewards), the technology repository (where it may be stored), and the relevant data types (fields and/or tables of data). While this is an extensive list, it is not represented as complete or comprehensive.



Concept and Design Phase

a) Building Information Modeling (BIM):

- i) Data Captured: Design specifications, 3D models, material selections, spatial relationships, and system layouts.
- ii) Uses: Detailed design review, clash detection, energy modeling, and simulation.
- iii) Users: Architects, engineers, contractors, facility managers, sustainability consultants, regulatory authorities.
- iv) Data Owners/Stewards: Architects, BIM managers.
- v) Technology Repository: BIM platforms (e.g., Autodesk Revit, Bentley Systems, ArchiCAD).
- vi) Relevant Data Types:
 - (1) Project name and ID
 - (2) Design parameters (e.g., dimensions, materials, specifications)
 - (3) Spatial relationships and geometry
 - (4) Material selections and specifications
 - (5) Mechanical, Electrical, Plumbing (MEP) systems layouts
 - (6) Energy performance metrics (e.g., U-values, thermal mass)
 - (7) Compliance requirements (e.g., building codes, standards)
 - (8) Sustainability targets (e.g., LEED credits, energy efficiency goals)

b) Computer-Aided Design (CAD) Software:

- i) Data Captured: Detailed engineering drawings, design specifications, and layout plans.
- ii) Uses: Precise engineering documentation, cost estimation, and construction planning.
- iii) Users: Architects, engineers, contractors, quantity surveyors, project managers.
- iv) Data Owners/Stewards: Engineers, design teams.



- v) Technology Repository: CAD software (e.g., AutoCAD, MicroStation, SolidWorks).
- vi) Relevant Data Types:
 - (1) Drawing files (e.g., DWG, DXF)
 - (2) Layer information
 - (3) Design specifications and notes
 - (4) Tolerances and dimensions
 - (5) Revision history
 - (6) Material specifications
 - (7) Structural load calculations
 - (8) Electrical and plumbing schematics

Construction Phase

a) Construction Project Management Software:

- i) Data Captured: Project schedules, cost estimates, resource allocations, and progress tracking.
- ii) Uses: Monitoring project timelines, resource management, budget tracking, and risk management.
- iii) Users: Project managers, contractors, subcontractors, owners, financial controllers.
- iv) Data Owners/Stewards: Project managers, construction managers.
- v) Technology Repository: Project management software (e.g., Procore, Primavera, Microsoft Project).
- vi) Relevant Data Types:
 - (1) Drawing files (e.g., DWG, DXF)
 - (2) Layer information
 - (3) Design specifications and notes
 - (4) Tolerances and dimensions
 - (5) Revision history
 - (6) Material specifications



- (7) Structural load calculations
- (8) Electrical and plumbing schematics

b) Construction Documentation (e.g., As-Built Drawings):

- i) Data Captured: Finalized construction details, including deviations from initial designs.
- ii) Uses: Reference for future renovations, legal compliance, and maintenance planning.
- iii) Users: Contractors, facility managers, regulatory authorities, legal teams.
- iv) Data Owners/Stewards: Contractors, construction managers.
- v) Technology Repository: Document management systems (e.g., Aconex, SharePoint, Bluebeam).
- vi) Relevant Data Types:
 - (1) Drawing files (e.g., DWG, DXF)
 - (2) Layer information
 - (3) Design specifications and notes
 - (4) Tolerances and dimensions
 - (5) Revision history
 - (6) Material specifications
 - (7) Structural load calculations
 - (8) Electrical and plumbing schematics

Commissioning Phase

a) Commissioning Software:

- i) Data Captured: Equipment performance tests, system verifications, and commissioning reports.
- ii) Uses: Validation of system performance, creation of operation manuals, baseline data for ongoing monitoring.
- iii) Users: Facility managers, engineers, commissioning agents, building owners.
- iv) Data Owners/Stewards: Commissioning agents, engineers.



v) Technology Repository: Commissioning management software (e.g., CxAlloy, Testo).

vi) Relevant Data Types:

- (1) Drawing files (e.g., DWG, DXF)
- (2) Layer information
- (3) Design specifications and notes
- (4) Tolerances and dimensions
- (5) Revision history
- (6) Material specifications
- (7) Structural load calculations
- (8) Electrical and plumbing schematics

b) Building Automation System (BAS):

i) Data Captured: System controls, energy usage, real-time operational data.

ii) Uses: Real-time monitoring, energy management, fault detection.

iii) Users: Facility managers, energy managers, maintenance teams, building operators.

iv) Data Owners/Stewards: Facility managers, BAS administrators.

v) Technology Repository: BAS platforms (e.g., Siemens Desigo, Johnson Controls Metasys, Honeywell)

vi) Relevant Data Types:

- (1) Drawing files (e.g., DWG, DXF)
- (2) Layer information
- (3) Design specifications and notes
- (4) Tolerances and dimensions
- (5) Revision history
- (6) Material specifications
- (7) Structural load calculations
- (8) Electrical and plumbing schematics



Operations Phase

a) Building Automation Systems (BAS):

- i) Data Captured: Real-time data on HVAC, lighting, energy consumption, security systems.
- ii) Uses: Daily operations management, energy optimization, security monitoring.
- iii) Users: Facility managers, energy managers, security personnel, operations teams.
- iv) Data Owners/Stewards: Facility managers, BAS administrators.
- v) Technology Repository: BAS platforms (e.g., Siemens Desigo, Johnson Controls Metasys, Honeywell).
- vi) Relevant Data Types:
 - (1) Drawing files (e.g., DWG, DXF)
 - (2) Layer information
 - (3) Design specifications and notes
 - (4) Tolerances and dimensions
 - (5) Revision history
 - (6) Material specifications
 - (7) Structural load calculations
 - (8) Electrical and plumbing schematics

b) Fault Detection and Diagnostics (FDD) Systems:

- i) Data Captured: Alerts, diagnostic reports, predictive analytics on system performance.
- ii) Uses: Early detection of system inefficiencies, predictive maintenance, performance optimization.
- iii) Users: Maintenance teams, facility managers, engineers, system integrators.
- iv) Data Owners/Stewards: Facility managers, FDD system administrators.
- v) Technology Repository: FDD systems (e.g., SkySpark, BuildingIQ, Schneider Electric).



vi) Relevant Data Types:

- (1) Drawing files (e.g., DWG, DXF)
- (2) Layer information
- (3) Design specifications and notes
- (4) Tolerances and dimensions
- (5) Revision history
- (6) Material specifications
- (7) Structural load calculations
- (8) Electrical and plumbing schematics

c) Energy Management Systems (EMS):

- i) Data Captured: Energy usage, utility data, demand response information.
- ii) Uses: Energy consumption analysis, sustainability reporting, cost management.
- iii) Users: Energy managers, sustainability officers, financial controllers, regulatory bodies.
- iv) Data Owners/Stewards: Energy managers, EMS administrators.
- v) Technology Repository: EMS platforms (e.g., Schneider Electric EcoStruxure, Siemens Energy Manager, Honeywell Energy Manager).
- vi) Relevant Data Types:
 - (1) Drawing files (e.g., DWG, DXF)
 - (2) Layer information
 - (3) Design specifications and notes
 - (4) Tolerances and dimensions
 - (5) Revision history
 - (6) Material specifications
 - (7) Structural load calculations
 - (8) Electrical and plumbing schematics



d) Space and Occupancy Management Software:

- i) Data Captured: Space utilization, occupancy levels, and spatial configurations.
- ii) Uses: Space planning, occupancy optimization, real estate strategy.
- iii) Users: Facility managers, space planners, HR departments, corporate real estate managers.
- iv) Data Owners/Stewards: Space planners, facility managers.
- v) Technology Repository: Space management platforms (e.g., Archibus, iOFFICE, Serraview).
- vi) Relevant Data Types:
 - (1) Space inventory and floor plans
 - (2) Occupancy rates and patterns
 - (3) Desk and room booking data
 - (4) Space allocation and reconfiguration history
 - (5) Occupant density metrics
 - (6) Utilization trends over time
 - (7) Occupant feedback on space usage
 - (8) Space efficiency and cost per square foot

e) Environmental Health and Safety (EHS) Management Systems:

- i) Data Captured: Compliance records, incident reports, risk assessments, safety audits.
- ii) Uses: Regulatory compliance, risk management, workplace safety improvement.
- iii) Users: EHS managers, facility managers, compliance officers, legal teams.
- iv) Data Owners/Stewards: EHS managers, compliance officers.
- v) Technology Repository: EHS management systems (e.g., Enablon, InteleX, Sphera).
- vi) Relevant Data Types
 - (1) Compliance documentation and audit trails
 - (2) Incident and near-miss reports



- (3) Hazardous material inventories
- (4) Workplace safety training records
- (5) Risk assessment and mitigation plans
- (6) Safety inspection checklists and results
- (7) Emergency response plans and drills
- (8) Personal protective equipment (PPE) usage logs
- (9) Occupational health records
- (10) Environmental monitoring data (e.g., air quality, water quality)
- (11) Safety and compliance audit schedules
- (12) Regulatory and legal compliance records
- (13) Corrective action plans and follow-up status

f) Workplace Wellness and Well-Being Platforms:

- i) Data Captured: Indoor air quality, lighting, thermal comfort, noise levels, and occupant feedback.
- ii) Uses: Enhancing occupant health, improving workplace productivity, compliance with wellness standards.
- iii) Users: HR departments, facility managers, wellness coordinators, corporate leadership.
- iv) Data Owners/Stewards: HR departments, wellness coordinators.
- v) Technology Repository: Wellness platforms (e.g., Delos DARWIN, WELL Building Standard, Comfy by Siemens).
- vi) Relevant Data Types:
 - (1) Indoor air quality (IAQ) metrics (e.g., CO2 levels, VOCs)
 - (2) Lighting levels and daylight exposure
 - (3) Thermal comfort measurements (e.g., temperature, humidity)
 - (4) Noise levels and acoustic performance
 - (5) Occupant satisfaction surveys and feedback



- (6) Wellness program participation records
- (7) Compliance with WELL Building Standard criteria
- (8) Health and wellness event tracking

Maintenance Phase

a) Computerized Maintenance Management Systems (CMMS):

- i) Data Captured: Maintenance schedules, work orders, asset histories, and condition assessments.
- ii) Uses: Maintenance planning, tracking asset performance, budgeting for repairs and replacements.
- iii) Users: Maintenance teams, facility managers, asset managers, financial planners.
- iv) Data Owners/Stewards: Facility managers, maintenance supervisors.
- v) Technology Repository: CMMS platforms (e.g., IBM Maximo, Hippo CMMS, Fiix).
- vi) Relevant Data Types:
 - (1) Asset inventory and classification
 - (2) Preventive maintenance schedules
 - (3) Work order history and completion status
 - (4) Maintenance cost tracking and budgeting
 - (5) Asset condition and performance assessments
 - (6) Spare parts and inventory management
 - (7) Vendor and service contract details
 - (8) Downtime logs and impact analysis

b) Asset Management Software:

- i) Data Captured: Asset inventories, lifecycle data, depreciation schedules.
- ii) Uses: Asset tracking, lifecycle cost analysis, financial reporting.
- iii) Users: Asset managers, financial controllers, facility managers, auditors.



- iv) Data Owners/Stewards: Asset managers, financial controllers.
- v) Technology Repository: Asset management platforms (e.g., Infor EAM, SAP EAM, Oracle EAM).
- vi) Relevant Data Types:
 - (1) Asset registration and identification data
 - (2) Lifecycle cost analysis (e.g., total cost of ownership)
 - (3) Depreciation schedules and financial reporting
 - (4) Asset utilization and productivity metrics
 - (5) Replacement and upgrade planning
 - (6) Warranty and service agreement details
 - (7) Asset risk and criticality assessments
 - (8) Compliance with asset management standards (e.g., ISO 55000)

c) Condition Monitoring Systems:

- i) Data Captured: Real-time data on the condition of critical building systems and components.
- ii) Uses: Predictive maintenance, system performance optimization, failure prevention.
- iii) Users: Maintenance teams, facility managers, engineers, system integrators.
- iv) Data Owners/Stewards: Facility managers, condition monitoring specialists.
- v) Technology Repository: Condition monitoring platforms (e.g., SKF @ptitude, Emerson AMS, GE Bently Nevada).
- vi) Relevant Data Types:
 - (1) Real-time condition monitoring data (e.g., vibration, temperature)
 - (2) Equipment performance trends and analytics
 - (3) Predictive maintenance alerts and schedules
 - (4) Failure mode and effects analysis (FMEA) data
 - (5) Root cause analysis (RCA) reports
 - (6) Historical maintenance and repair data



- (7) Equipment health indices and scoring
- (8) Integration with CMMS for work order generation

Renovation and Retrofits

a) BIM and CAD Systems:

- i) Data Captured: Updated models reflecting renovations, modifications, and retrofits.
- ii) Uses: Accurate as-built documentation, planning future renovations, ensuring compliance with new standards.
- iii) Users: Architects, engineers, facility managers, contractors.
- iv) Data Owners/Stewards: Architects, renovation project managers.
- v) Technology Repository: BIM and CAD platforms (e.g., Autodesk Revit, AutoCAD, Bentley Systems).
- vi) Relevant Data Types:
 - (1) Updated architectural and structural models
 - (2) Retrofit design plans and specifications
 - (3) Compliance with new building codes and regulations
 - (4) Energy performance improvements (e.g., insulation, HVAC upgrades)
 - (5) Sustainability certifications and assessments (e.g., LEED, BREEAM)
 - (6) Historical renovation records and impacts
 - (7) Integration with existing building systems (e.g., BAS, EMS)
 - (8) Cost-benefit analysis of renovation projects

b) Environmental Assessment Tools (e.g., LEED, BREEAM):

- i) Data Captured: Sustainability assessments, material reuse data, impact evaluations.
- ii) Uses: Certification for green building standards, sustainability planning, regulatory compliance.
- iii) Users: Sustainability officers, facility managers, corporate leadership, regulatory authorities.



- iv) Data Owners/Stewards: Sustainability officers, environmental consultants.
- v) Technology Repository: Environmental assessment platforms (e.g., LEED Online, BREEAM In-Use, GRESB).
- vi) Relevant Data Types:
 - (1) Energy and environmental performance metrics
 - (2) Material sourcing and reuse data
 - (3) Waste management and recycling records
 - (4) Indoor environmental quality (IEQ) assessments
 - (5) Water conservation and efficiency data
 - (6) Carbon footprint and greenhouse gas (GHG) emissions
 - (7) Sustainability certification status and documentation
 - (8) Life cycle assessment (LCA) results

c) Space and Occupancy Management Software:

- i) Data Captured: Adjustments to space usage and occupancy as a result of renovations.
- ii) Uses: Post-renovation space optimization, compliance with occupancy regulations.
- iii) Users: Space planners, facility managers, HR departments, real estate strategists.
- iv) Data Owners/Stewards: Space planners, facility managers.
- v) Technology Repository: Space management platforms (e.g., Archibus, iOFFICE, Serraview).
- vi) Relevant Data Types:
 - (1) Revised space inventory and floor plans
 - (2) Occupancy adjustments and new seating arrangements
 - (3) Compliance with space allocation guidelines and regulations
 - (4) Employee feedback on renovated spaces
 - (5) Space efficiency metrics and utilization rates
 - (6) Workplace wellness and comfort assessments



- (7) Integration with facility management and HR systems
- (8) Real estate portfolio optimization data

End-of-Life/Decommissioning Phase

a) Decommissioning Plans:

- i) Data Captured: Procedures for safe deconstruction, recycling plans, hazardous material handling.
- ii) Uses: Safe and compliant decommissioning, environmental impact reduction, cost management.
- iii) Users: Facility managers, environmental consultants, contractors, legal teams.
- iv) Data Owners/Stewards: Decommissioning project managers, environmental consultants.
- v) Technology Repository: Decommissioning management software (e.g., Enviance, Locus EIM, EHS Insight).
- vi) Relevant Data Types:
 - (1) Decommissioning project plans and schedules
 - (2) Hazardous material inventories and disposal records
 - (3) Recycling and waste management logs
 - (4) Environmental impact assessments
 - (5) Demolition permits and regulatory compliance documentation
 - (6) Cost estimates and actuals for decommissioning
 - (7) Salvaged materials and asset recovery records
 - (8) Stakeholder communication and reporting

b) Historical BIM and CMMS Data:

- i) Data Captured: Complete building history, including design, construction, operation, and maintenance records.
- ii) Uses: Informing decommissioning strategies, planning for material reuse, archival for future reference.



- iii) Users: Facility managers, architects, engineers, contractors, corporate historians.
- iv) Data Owners/Stewards: Facility managers, data archivists.
- v) Technology Repository: Document management systems (e.g., Aconex, SharePoint, Bluebeam).
- vi) Relevant Data Types:
 - (1) Historical design and construction documentation
 - (2) Maintenance and operation logs
 - (3) Asset performance and lifecycle data
 - (4) Environmental and energy performance records
 - (5) Renovation and retrofit history
 - (6) As-built and updated BIM models
 - (7) Legal and compliance documentation
 - (8) Decommissioning impact reports

Regulatory Compliance and Reporting

a) Environmental and Building Performance Reporting Tools:

- i) Data Captured: Compliance with energy codes, sustainability certifications, and environmental impact reports.
- ii) Uses: Compliance audits, sustainability reporting, operational improvements.
- iii) Users: Regulatory authorities, sustainability officers, facility managers, corporate leadership.
- iv) Data Owners/Stewards: Compliance officers, sustainability officers.
- v) Technology Repository: Reporting platforms (e.g., Energy Star Portfolio Manager, GRESB, CDP).
- vi) Relevant Data Types:
 - (1) Energy and utility usage reports
 - (2) Compliance with energy efficiency standards
 - (3) Sustainability certification documentation (e.g., LEED, BREEAM)



- (4) Environmental impact assessments and audits
- (5) Greenhouse gas (GHG) emissions reporting
- (6) Water usage and conservation data
- (7) Waste management and recycling performance
- (8) Corporate social responsibility (CSR) reporting

b) Environmental Health and Safety (EHS) Management Systems:

- i) Data Captured: Regulatory compliance records, safety audits, environmental monitoring data.
- ii) Uses: Ensuring compliance with health and safety regulations, improving workplace safety, risk mitigation.
- iii) Users: EHS managers, facility managers, compliance officers, regulatory bodies.
- iv) Data Owners/Stewards: EHS managers, compliance officers.
- v) Technology Repository: EHS management systems (e.g., Enablon, Intelex, Sphera).
- vi) Relevant Data Types:
 - (1) Regulatory compliance documentation and audit trails
 - (2) Safety inspection and audit reports
 - (3) Incident and accident logs
 - (4) Environmental monitoring data (e.g., air, water quality)
 - (5) Risk assessment and hazard identification records
 - (6) Corrective action plans and status updates
 - (7) Safety training records and certifications
 - (8) Emergency preparedness and response plans

c) Digital Twins:

- i) Data Captured: Real-time and historical data from the physical building mirrored in a digital replica.



- ii) Uses: Ongoing performance optimization, scenario planning, predictive maintenance.
- iii) Users: Facility managers, engineers, corporate leadership, system integrators.
- iv) Data Owners/Stewards: Facility managers, digital twin administrators.
- v) Technology Repository: Digital twin platforms (e.g., Siemens MindSphere, GE Predix, Bentley iTwin).
- vi) Relevant Data Types:
 - (1) Real-time operational data (e.g., HVAC, lighting, energy usage)
 - (2) Historical performance data and trends
 - (3) Predictive maintenance schedules and alerts
 - (4) Scenario planning and what-if analysis data
 - (5) 3D models and spatial configurations
 - (6) Integration points with other building systems (e.g., BAS, EMS)
 - (7) Asset health monitoring and diagnostics
 - (8) User interaction and control settings

Conclusion

Master data management throughout the building lifecycle involves a broad spectrum of data sources, each essential to various phases of a building's existence—from the initial concept through design, construction, operations, maintenance, renovation, and eventually decommissioning. Each of these data sources serves multiple purposes and users, necessitating diligent stewardship by designated data owners to maintain their accuracy, integrity, and accessibility.

These data elements—captured through advanced technology systems like BIM (Building Information Modeling), CMMS (Computerized Maintenance Management Systems), BAS (Building Automation Systems), and EHS (Environmental, Health, and Safety) management systems—constitute the foundation of effective Building Lifecycle Management. By integrating and managing these data elements within a strong data governance framework, stakeholders can ensure that buildings are designed, constructed, operated, and maintained with the highest levels of efficiency, sustainability, and occupant well-being.

Adopting a Building Lifecycle Management mindset calls for the industry to embrace this comprehensive approach to data management, ensuring that the valuable



information generated at each stage of the building lifecycle is utilized to optimize performance, reduce costs, and achieve both regulatory and decarbonization objectives. As the commercial real estate industry continues to progress, the capacity to manage this data effectively will be crucial for driving innovation, ensuring compliance, and delivering buildings that meet future demands.



Relevant Data Types (Groups) Traversing Building Lifecycle Phases

The following mapping demonstrates the connection between common data types and the phases of the building lifecycle where they originate or are utilized. This mapping does not aim to provide a comprehensive list of individual data items but rather represents general data types that may be captured through various unique data fields.

The significance of these data items across multiple lifecycle phases highlights the necessity of an integrated Building Lifecycle Management (BLM) approach. In traditional, siloed operations, data is often confined to a single phase, such as design or construction, with limited accessibility to other stakeholders throughout the building's lifecycle. However, many data items have substantial value beyond their point of origin. For instance, design specifications are not only critical during the design and construction phases but are also vital for operations, maintenance, and future renovations. Similarly, data on material selections, energy performance, and compliance requirements must be consistently referenced and updated throughout the building's lifecycle to ensure optimal performance, sustainability, and regulatory compliance.

Understanding the multi-phase relevance of these data types is essential for adopting a BLM mindset. When data is effectively captured, maintained, and shared, it enhances decision-making across all phases—ensuring that the building operates efficiently, adapts to changes, and meets the evolving needs of its occupants. This mapping aims to emphasize the interconnectedness of data throughout the building lifecycle, underscoring the need for a collaborative and integrated approach to data management that spans the entire life of the building. By doing so, stakeholders can achieve better outcomes, reduce costs, and ensure the long-term success of the built environment.

The list is organized by Data Type (numbered item), followed by bullet points itemizing the phases where the Data Type originates or is used.

1) Project Name and ID

- Phases: Concept and Design, Construction, Commissioning, Operations, Renovation and Retrofits, End-of-Life/Decommissioning, Regulatory Compliance and Reporting



- 2) **Design Parameters (e.g., dimensions, materials, specifications)**
 - Phases: Concept and Design, Construction, Renovation and Retrofits, End-of-Life/Decommissioning
- 3) **Spatial Relationships and Geometry**
 - Phases: Concept and Design, Construction, Operations, Renovation and Retrofits
- 4) **Material Selections and Specifications**
 - Phases: Concept and Design, Construction, Commissioning, Renovation and Retrofits, End-of-Life/Decommissioning
- 5) **Mechanical, Electrical, Plumbing (MEP) Systems Layouts**
 - Phases: Concept and Design, Construction, Operations, Renovation and Retrofits, End-of-Life/Decommissioning
- 6) **Energy Performance Metrics (e.g., U-values, thermal mass)**
 - Phases: Concept and Design, Construction, Operations, Renovation and Retrofits, Regulatory Compliance and Reporting
- 7) **Compliance Requirements (e.g., building codes, standards)**
 - Phases: Concept and Design, Construction, Commissioning, Operations, Renovation and Retrofits, Regulatory Compliance and Reporting
- 8) **Sustainability Targets (e.g., LEED credits, energy efficiency goals)**
 - Phases: Concept and Design, Construction, Operations, Renovation and Retrofits, Regulatory Compliance and Reporting



- 9) **Drawing Files (e.g., DWG, DXF)**
 - Phases: Concept and Design, Construction, Renovation and Retrofits, End-of-Life/Decommissioning
- 10) **Layer Information**
 - Phases: Concept and Design, Construction, Renovation and Retrofits
- 11) **Structural Load Calculations**
 - Phases: Concept and Design, Construction, Renovation and Retrofits
- 12) **Project Timelines and Milestones**
 - Phases: Construction, Commissioning, Renovation and Retrofits, End-of-Life/Decommissioning
- 13) **Resource Allocations (e.g., labor, materials)**
 - Phases: Construction, Renovation and Retrofits
- 14) **Budget Estimates and Actuals**
 - Phases: Construction, Renovation and Retrofits, End-of-Life/Decommissioning
- 15) **Risk Assessments and Mitigation Plans**
 - Phases: Construction, Commissioning, Operations, Maintenance, Renovation and Retrofits, Regulatory Compliance and Reporting
- 16) **Task Assignments and Progress Status**
 - Phases: Construction, Commissioning, Renovation and Retrofits, End-of-Life/Decommissioning



- 17) **Change Orders and Approvals**
 - Phases: Construction, Renovation and Retrofits
- 18) **Subcontractor Details and Contracts**
 - Phases: Construction, Renovation and Retrofits
- 19) **Safety Plans and Incident Reports**
 - Phases: Construction, Operations, Maintenance, Regulatory Compliance and Reporting
- 20) **As-Built Drawings and Specifications**
 - Phases: Construction, Commissioning, Operations, Renovation and Retrofits, End-of-Life/Decommissioning
- 21) **Construction Logs and Field Notes**
 - Phases: Construction, End-of-Life/Decommissioning
- 22) **Equipment Specifications and Performance Metrics**
 - Phases: Commissioning, Operations, Maintenance, Renovation and Retrofits, End-of-Life/Decommissioning
- 23) **Testing and Verification Results**
 - Phases: Commissioning
- 24) **System Calibration Data**
 - Phases: Commissioning, Operations, Maintenance



- 25) **Operational Manuals and Guidelines**
 - Phases: Commissioning, Operations, Maintenance, End-of-Life/Decommissioning
- 26) **Commissioning Schedules and Timelines**
 - Phases: Commissioning
- 27) **Compliance and Certification Records**
 - Phases: Commissioning, Operations, Maintenance, Regulatory Compliance and Reporting
- 28) **Punch List Items and Resolutions**
 - Phases: Commissioning, Construction, Renovation and Retrofits
- 29) **29. Warranty Information and Service Agreements**
 - Phases: Commissioning, Operations, Maintenance
- 30) **HVAC Settings and Schedules**
 - Phases: Operations, Maintenance
- 31) **Lighting Controls and Occupancy Data**
 - Phases: Operations, Maintenance, Workplace Wellness
- 32) **Energy Consumption Metrics**
 - Phases: Commissioning, Operations, Maintenance, Regulatory Compliance and Reporting
- 33) **Alarm and Fault Logs**
 - Phases: Operations, Maintenance



- 34) Sensor Data (e.g., temperature, humidity, CO2 levels)**
 - Phases: Operations, Maintenance, Workplace Wellness

- 35) System Integration Points (e.g., with EMS, FDD)**
 - Phases: Commissioning, Operations, Maintenance, Renovation and Retrofits

- 36) Maintenance Alerts and Notifications**
 - Phases: Operations, Maintenance

- 37) Real-Time Operational Data (e.g., HVAC, lighting, energy usage)**
 - Phases: Operations, Maintenance, Digital Twins

- 38) Fault Detection Alerts and Severity Levels**
 - Phases: Operations, Maintenance

- 39) Diagnostic Reports and Analysis**
 - Phases: Operations, Maintenance

- 40) Predictive Maintenance Schedules**
 - Phases: Operations, Maintenance

- 41) Root Cause Analysis Data**
 - Phases: Operations, Maintenance

- 42) Corrective Action Recommendations**
 - Phases: Operations, Maintenance



43) Utility Billing and Tariff Data

- Phases: Operations, Regulatory Compliance and Reporting

44) Space Inventory and Floor Plans

- Phases: Concept and Design, Construction, Operations, Maintenance, Renovation and Retrofits, End-of-Life/Decommissioning

45) Occupancy Rates and Patterns

- Phases: Operations, Maintenance, Workplace Wellness

46) Desk and Room Booking Data

- Phases: Operations, Maintenance

47) Compliance Documentation and Audit Trails

- Phases: Commissioning, Operations, Maintenance, Regulatory Compliance and Reporting

48) Incident and Near-Miss Reports

- Phases: Construction, Operations, Maintenance, Regulatory Compliance and Reporting

49) Workplace Safety Training Records

- Phases: Construction, Operations, Maintenance, Regulatory Compliance and Reporting

50) Emergency Response Plans and Drills

- Phases: Operations, Maintenance, Regulatory Compliance and Reporting



- 51) Indoor Air Quality (IAQ) Metrics (e.g., CO2 levels, VOCs)**
 - Phases: Operations, Maintenance, Workplace Wellness

- 52) Lighting Levels and Daylight Exposure**
 - Phases: Operations, Workplace Wellness

- 53) Thermal Comfort Measurements (e.g., temperature, humidity)**
 - Phases: Operations, Workplace Wellness

- 54) Noise Levels and Acoustic Performance**
 - Phases: Operations, Workplace Wellness

- 55) Occupant Satisfaction Surveys and Feedback**
 - Phases: Operations, Workplace Wellness

- 56) Asset Inventory and Classification**
 - Phases: Operations, Maintenance, Renovation and Retrofits, End-of-Life/Decommissioning

- 57) Preventive Maintenance Schedules**
 - Phases: Operations, Maintenance

- 58) Work Order History and Completion Status**
 - Phases: Maintenance

- 59) Maintenance Cost Tracking and Budgeting**
 - Phases: Maintenance



- 60) Historical Maintenance and Repair Data**
 - Phases: Operations, Maintenance

- 61) Equipment Health Indices and Scoring**
 - Phases: Operations, Maintenance, Condition Monitoring

- 62) Replacement and Upgrade Planning**
 - Phases: Maintenance, Renovation and Retrofits

- 63) Depreciation Schedules and Financial Reporting**
 - Phases: Maintenance, End-of-Life/Decommissioning

- 64) Real-Time Condition Monitoring Data (e.g., vibration, temperature)**
 - Phases: Operations, Maintenance, Condition Monitoring

- 65) Updated Architectural and Structural Models**
 - Phases: Renovation and Retrofits

- 66) Retrofit Design Plans and Specifications**
 - Phases: Renovation and Retrofits

- 67) Energy and Environmental Performance Metrics**
 - Phases: Commissioning, Operations, Maintenance, Renovation and Retrofits, Regulatory Compliance and Reporting

- 68) Decommissioning Project Plans and Schedules**
 - Phases: End-of-Life/Decommissioning



- 69) Hazardous Material Inventories and Disposal Records**
- Phases: End-of-Life/Decommissioning, Regulatory Compliance and Reporting
- 70) Recycling and Waste Management Logs**
- Phases: Construction, Renovation and Retrofits, End-of-Life/Decommissioning, Regulatory Compliance and Reporting
- 71) Historical Design and Construction Documentation**
- Phases: End-of-Life/Decommissioning
- 72) Energy and Utility Usage Reports**
- Phases: Operations, Maintenance, Regulatory Compliance and Reporting
- 73) Sustainability Certification Documentation (e.g., LEED, BREEAM)**
- Phases: Construction, Commissioning, Operations, Maintenance, Renovation and Retrofits, Regulatory Compliance and Reporting
- 74) Carbon Footprint and Greenhouse Gas (GHG) Emissions Data**
- Phases: Operations, Maintenance, Regulatory Compliance and Reporting
- 75) Compliance with Energy Efficiency Standards**
- Phases: Commissioning, Operations, Maintenance, Regulatory Compliance and Reporting
- 76) Safety Inspection and Audit Reports**
- Phases: Construction, Operations, Maintenance, Regulatory Compliance and Reporting



77) Real-Time Data from Digital Twins

- Phases: Operations, Maintenance, Digital Twins

78) Scenario Planning and What-If Analysis Data

- Phases: Operations, Maintenance, Digital Twins, Renovation and Retrofits

79) Asset Health Monitoring and Diagnostics

- Phases: Operations, Maintenance, Condition Monitoring, Digital Twins

Master data management is fundamental to successful Building Lifecycle Management (BLM). It guarantees that essential information is accurately captured, meticulously maintained, and smoothly integrated throughout every phase of a building's lifecycle. By adopting a collaborative approach to data management, stakeholders can significantly improve decision-making, boost building performance, and ensure sustainability throughout the building's lifespan. Achieving BLM goes beyond managing data within isolated phases; it involves understanding the interconnected nature of that data across the entire lifecycle. This comprehensive approach is crucial for delivering long-term value and plays a vital role in creating a more efficient and sustainable built environment.

➔ See the companion Excel workbook “Building Lifecycle – Master Data Mapping” for a visualization of the data flow across the BLM phases.

