Hammes

EXECUTIVE STRATEGY ARTICLE

Healthcare Planning, Design & Construction:

A Collaborative Approach to Document Coordination

By Wade Milligan, Regional Vice President, Hammes Healthcare

Healthcare Planning, Design & Construction Best Practices: A Collaborative Approach to Document Coordination

In healthcare planning, design, and construction, project team members should always be mindful of the project's intended impact rather than just the technical aspects of project delivery. The project aligns with a specific strategic and functional purpose, such as improving patient care, enhancing the well-being of healthcare staff, or optimizing operational efficiency. The project's design phase is the critical time when the team translates these objectives into the building's physical design. While the architectural team carries much of the responsibility during the design phase, many of the most successful project's stem from collaborative, interdisciplinary teams where project members know when and how to contribute.

So let's consider the key stakeholders involved during the design phase of the project—the owner, the owner's representative, the architectural team, and the construction facilitator—and how their roles and expectations can contribute to the design phase and overall project success:

Owner: The owner should endeavor to have a project champion who attends all meetings, has decision-making abilities, and can communicate directly with all end users and department heads. The owner needs to be diligent about timelines and budgets while keeping the overall project program and objectives needs in mind. As the project evolves, changes are inevitable but get substantially more expensive as the timeline progresses. It is understood that the owner has many other responsibilities they are dealing with outside of the project, and the team must be aware and mindful of these constraints.

Owner's Representative: The owner's representative is an extension of the Owner to help facilitate decision making and manage the daily project schedule activities to provide for executive leverage. The owner's representative will work daily with the project team to ensure that team members required to address any given topic are aware of and are given ample time to address accordingly. They will collaborate with all team members to disseminate information with the team, key stakeholders, and the community. They will coordinate meetings with the Authorities Having Jurisdiction (AHJ) and develop with the Owner the enabling activities and strategy to support successful delivery once design is complete. The owner's representative can look at the overall project and fill gaps where needed, maintain schedule and budget, ensure that the owner's requirements are being met, and keep the entire project team focused on the end goal.

Architecture & Engineering (AE) Team: The AE team has the toughest assignment during the design process. They must assimilate all information directed towards them, including verbal directions, and put them to paper. The AE team must ensure all their team members are hearing the same things and getting all design criteria coordinated on the working documents. Again, changes are inevitable, but collaborating with the entire team reduces the potential for scope gaps and mistakes. The AE team is tasked with creating the documents—the final product—that is presented to the owner and used by the entire team. The architect should be completely transparent with the team if they are delayed. If more time is needed to complete a specific deliverable, whether due to a delay in decision making, AHJ approvals, a project delay brought on by unforeseen circumstances, or an internal workforce delay, open communication will help inform the team and determine how best to work around it. It is better to have complete documents rather than risk delays in the project budget and schedule due to a lack of coordination and thoroughness for all parties to respond to.

Construction Facilitator / Pre-Construction Partner: At Hammes, we believe the best way to design a project is to integrate your construction partner early during design. This allows for active review and input on materials, equipment, and finishes for schedule, longevity, and durability of the material and project estimates to ensure the design is consistent with the stated financial goals and budget. The CF should review the drawings for the correct coordination between architectural and MEP engineering to help develop a comprehensive set of documents that are as inclusive as possible for accurate estimates and the creation of a timely GMP.

The design and engineering documents produced during the design phase are critical to establishing a solid foundation for the project. These documents ensure that the project team stays aligned, safeguarding the project's impact, budget, and timeline. Design documents clearly define the requirements, bringing the conceptual design to reality by detailing the civil, architectural, structural, mechanical, electrical, IT and plumbing solutions. Once the owner approves the design development package, changes to the drawings should be limited to comply with construction or code requirements to minimize cost impact.

Coordinating design documents presents an opportunity to innovate by leveraging the principles of creative problem-solving across the entire project team—the owner and/or owner's representative, architects, engineers, and construction professionals. Project team members should be wary of working in silos rather than tapping into the collective experience, expertise, and perspectives of the broader project team. All team members should have a sense of ownership of and responsibility for the design documents, just as they should the project's overarching vision and mission. Team members should proactively ask the right questions at the right time to ensure the documents are complete and sufficiently detailed. Taking these steps can help avoid problems down the road and reduce the tendency to point fingers, or worse, delay the project.

An interdisciplinary approach to document coordination during the design phase could involve the following elements:

1. **Collaborative Project Team Workspace Design:** The coordination process can benefit from utilizing collaborative, live workspaces that facilitate effective communication and idea exchange among the project team. These workspaces can enhance the efficiency of document coordination and foster a culture of creativity and innovation within the team by creating a shared sense of place and community around the project.

2. **Design-Thinking Principles:** Infusing the design process with design-thinking principles can enable engineers and designers to co-create documents that meet technical requirements and address user needs, usability, and the overall experience of the healthcare facility. A human-centered approach can lead to more cohesive and impactful coordinated documents.

3. **Agile Project Management:** Adapting agile project management methodologies can inject flexibility and responsiveness into the coordination process. This can facilitate iterative document refinement, rapid problem-solving, and continuous improvement, ultimately leading to more dynamic and effective design and engineering coordination.

4. **Impact-Driven Engineering:** Aligning engineering efforts to significantly enhance healthcare delivery can be a driving force behind the coordinated documents. This involves seeking innovative engineering solutions that improve patient outcomes, optimize operational efficiency, and enhance the overall healthcare environment.

By synthesizing these diverse elements, the coordination of healthcare design and engineering documents can evolve from a purely technical endeavor to a creative, purpose-driven process that aims to maximize the potential impact of the healthcare facility on patients, staff, and the broader community.

The deliverables list in Appendix A can help ensure expectations are aligned around the level of detail required for each set of document drawings and ensure better outcome with coordinated documentation.

Wade Milligan is a Regional Vice President with Hammes Healthcare. He has more than 30 years of experience in healthcare facility development, including large-scale hospital expansion and renovation projects. His experience as a business owner, general contractor, and owner's representative brings unique strengths in developing optimal design and construction solutions for healthcare development projects

Appendix A: Documents Deliverable List

1. Schematic Design Documents Checklist

The following design review checklist is to be used to evaluate the completeness of the deliverables issued by the design consultant team prior to being issued to the Authority Having Jurisdiction (AHJ) for review and permitting, or to the Pre-Construction Team for pricing. Some items may or may not be used depending on the size, scope, and duration of the project.

GENERAL SHEETS

- ☐ Project number
- ☐ Project scope narrative
- ☐ Index of drawings
- ☐ Code information
- ☐ Project location map w/north arrow
- ☐ Area calculations for each space, floor, and building total
- ☐ Life safety information and floor plans (egress paths, distances, fire ratings, fire protection (if required)
- ☐ Occupancy type and occupancy loads noted and labeled on plans
- ☐ Construction type and fire rating separation noted and labeled on plans
- ☐ Drawing issuance type (ex: 75% SD, etc.) and date
- ☐ Design team contact information
- ☐ Standard details
- ☐ Typical restroom details
- ☐ Standard wall partition types
- ☐ ADA/accessibility standards and details
- ☐ General notes (demolition, construction, etc.)
- ☐ LEED or other sustainability initiatives identified and preliminarily established

CIVIL + SITE DESIGN

- ☐ Existing conditions and topography (parking, roads, entrances, utilities, etc.)
- ☐ Finish floor elevations and grades at entrances, exits, and ramps
- ☐ Site demolition plan
- ☐ Existing and new building plan (if required) with preliminary new topography plan
- ☐ New utility requirements and connection locations

LANDSCAPE

- ☐ Existing conditions (parking, roads, entrances, utilities, etc.)
- ☐ Existing landscape and demolition plan
- ☐ New landscape plan
- ☐ Preliminary planting types and species

ARCHITECTURAL

☐ Floor plans (all floors: existing/renovated and new)
☐ Preliminary reflected ceiling plans with special areas identified
☐ Roof plan
☐ North arrow and scale on all plans
☐ Exterior elevations (if required) w/overall dimensions established
☐ Preliminary material designations
☐ Fenestration layout
☐ Overall building cross-sections
☐ Wall Sections
☐ Interior elevations
☐ Identify key design element (entry lobby, common spaces, etc.)

STRUCTURAL

☐ Structural design narrative identifying the existing and new conditions, overall structural system, foundation system, preliminary structural member sizing, seismic requirements (if required), and specific design challenges and/or conditions

or

☐ Structural floor plans for all floors
☐ Existing and new foundation plans
☐ Structural grid and column locations
☐ Preliminary structural member sizing
☐ Seismic requirements (if required)

MEPFP

☐ MEPFP design narrative identifying the existing and new conditions, overall MEPFP system, and specific design challenges and/or conditions

or

☐ MEP floor plans for all floors
☐ Existing and new MEP plans
☐ Preliminary MEP equipment sizing and locations

PROJECT MANUAL SPECIFICATIONS

☐ Owners Project Requirements (OPR)
☐ General state of purpose of SD deliverables
☐ Narrative and/or outline specification identifying preliminary ‘Basis of Design (BOD)’ for the exterior building enclosure

2. Design Development Documents Deliverable List

CIVIL DRAWINGS

Site Plans

1. Building location plan – building tied down dimensionally with pertinent adjacencies, permanent benchmark, street lines, property lines, required setbacks, easements, rights of way, manholes, sewers, hydrants, light standards, interface with survey.
2. Grading and paving plans, include contours, critical spot elevations. (Main level datum elevation)
   a. Include sidewalks, ramps, stairs, driveways, parking areas including layout geometry
   b. Site drainage and retention areas
3. Utility Plans
   a. Identify existing and new utilities to the building (electrical, water, gas, telephone and cable)
   b. Identify sanitary and storm laterals from the building to the mains
   c. Identify site storm sewers, inlets, manholes, etc.

Site Sections

1. Include typical driveway, parking area, sidewalk cross sections.

Typical Design Details

1. Railing, stairs, ramps, walkway paving types and patterns, benches, site lighting, other significant features.

ARCHITECTURAL DRAWINGS

Code Analysis Plan

1. Code Footprint
   a. Include all fire rated partitions
2. Code Analysis (Show on drawings)

Architectural Floor Plans

1. Dimensioned structural bay system
2. Internal partitions located, drawn, and located and dimensioned
3. All casework and other equipment called out on plans
4. Major mechanical/electrical systems determined, and their requirements reflected and indicated on the plans including louvers, areaways and utility entrances
5. Locate all plumbing fixtures
6. All rooms named and numbered
7. Locate exterior and interior doors and windows
8. Locate typical and fire rated partition types
9. All keyed references: match lines, building sections, enlarged plans, etc. keyed notes
10. Finish floor elevations noted
11. Expansion joints indicated
12. Building cores (stairs, elevators, toilets, shafts, etc.) drawn to a larger scale (+/ -¼”), dimensioned and keyed to larger plans
13. Plans and elevations of feature areas (lobby, special spaces) drawn to a larger scale (+/ - ¼”) with all surfaces shown and materials called out and keyed to larger plans
14. Demolition plan, roof plan

Reflected Ceiling Plans

1. Located lighting fixtures, speakers, cameras
2. Soffits/bulkheads, skylights
3. Identify major ceiling materials and their relationship with partitions
4. Identify all areas with exposed structure

Building Elevations

1. Building elevations including roof structures and foundations
2. Identify and locate all exterior windows and doors
3. Identify floor levels, vertical dimensions and overall building heights
4. Column center lines
5. Locate expansion joints and major panel joints
6. Exterior mechanical equipment
7. All materials noted; demarcation of materials shown
8. Detailed elevations at a larger scale (+/ - ¼”) as necessary to explain intent (building entrance, special brickwork or masonry, building canopy, etc.)
9. Major keyed references: match lines, buildings sections, wall sections

Building and Wall Sections

1. Include major building sections, identify column lines, feature openings and relationships between floors, ceilings, structure and mechanical systems
2. Vertical dimensions including floor to floor and ceiling heights
3. Finished grades around the building
4. Typical wall sections or assembly details

Landscaping Plan

1. Site plan indicating lawn and plantings.
2. Consideration is to be given to the topographic information for drainage.

Details

1. Large scale details of major exterior wall assemblies, (parapets to foundation)
2. Large scale details of major foundation and perimeter treatment
3. Typical window and door details (i.e. head jamb and sill conditions)
4. Typical interior and exterior columns details
5. Key areas shown including stairs, elevators, escalators, loading docks, shafts and other conditions where wall sections reveal the third dimension
6. Major casework elevations and millwork profiles
7. Partition types

Interior Elevations

1. Elevations of significant interior spaces

Schedules

1. Draft interior finish schedule
2. Draft door and frame schedules
3. Draft window and glazing schedule

STRUCTURAL DRAWINGS

Structural Plans

1. Foundation plan including interior and perimeter foundations, footings, piles, caissons, wall beams and grade beams as needed.
2. Framing plans for all floors and roof including major member sizes noted or scheduled, typical and maximum column sizes
3. Locate columns, beams, purlins, joists, etc.

Structural Sections/Details

1. Location of in-floor electrical system
2. Major penetrations (i.e. slab openings, pits, tunnels and ramps) located on drawings
3. Expansion joints located
4. Typical edge of slab details for cladding attachment
5. Special conditions noted (shoring, underpinning, etc.)
6. Provide wind, seismic, dead and live loads design information.
7. Footing, beam, column and connection details.
8. Updated building elevations.

MECHANICAL DRAWINGS

Floor Plans

1. Size and locate utility risers, shafts, chases and equipment coordinated with architectural plans
2. Heating and cooling load criteria for each space and major duct or pipe runs sized to interface with structural and architectural building components.
3. Mechanical room equipment layouts are shown
4. Locate major equipment such as boilers, cooling towers, air handling units, heat pumps, exhaust fans, unit heaters, perimeter fin tubes, etc.
5. Locate intake and exhaust louvers
6. Indicate typical layouts of all ceiling devices
7. Consider access and replacement requirements with all equipment room layouts
8. Coordinate ceiling plenum space with architectural, plumbing, fire protection, electrical, structural
9. Air and water flow diagrams showing CFM and GPM respectively.
10. Show electrical requirements such as panel size, location, voltage and current requirements for mechanical equipment

Sections

1. Critical mechanical room cross sections
2. Corridor sections indicating duct clearances

Catalog Cuts

1. Grills and diffusers

2. Special equipment
3. Controls/Building Management Control Systems (BMCS)

PLUMBING/FIRE PROTECTION DRAWINGS

Floor Plans

1. Size and locate utility risers, shafts, chases and equipment on architectural plans

Detail Plans

1. Locate all toilets, urinals, lavatories, mop sinks, floor drains and drinking fountains
2. Locate under-slab sanitary and supply lines
3. Locate maintenance hose bibs in toilet rooms and on exterior of building
4. Include roof drainage system (quantity and location of roof drains, internal and external downspouts
5. Coordinate fixture sizes and mounting heights (for special accessibility and age groups)
6. Coordinate plumbing chase and shaft depths with architectural
7. Consider access and replacement requirements with all room layouts
8. Coordinate ceiling plenum space with architectural, fire protection, mechanical, electrical structural
9. Coordinate piping site and flows with existing sprinklers if applicable.
10. Fire Sprinklers: On new construction, make arrangements with the water company to have a hydrant flow test made. Include the flow test report in the Contract Documents.

Catalog Cuts

1. Plumbing fixtures
2. Sprinkler heads
3. Special equipment
4. Fire suppression system

ELECTRICAL DRAWINGS

Floor Plans

1. Size and locate utility equipment on architectural plans.
2. Major electrical equipment (switch gear, distribution panels, emergency generator, transfer switches, UPS system, etc.) dimensioned and drawn to scale into the space allocated, also include riser diagram or one line diagram.
3. Identify service amperage and voltage requirements
4. Locate size of conduit runs, cable trays, risers, shafts, chases, etc.
5. Locate size site electrical: transformers, underground service, entrance details, etc.
6. Identify typical and feature lighting fixtures: ceiling and wall types reflective ceiling plan
7. Identify electric and telephone panel room locations
8. Locate electrical devices for typical classroom, offices, special classrooms including power receptacles, computer, telephone, TV, light switches, closed circuit TV, fire alarm, security and intercom devices
9. Locate exit and emergency lighting and fire alarm devices (consider ADA requirements)
10. Consider access and replacement requirements with all utility room layouts
11. Coordinate ceiling plenum space with architectural, plumbing, fire protection, mechanical, structural
12. Update design calculations to include power consuming equipment and load characteristics.
13. Site lighting, locate and identify all lighting fixtures.

Catalog Cuts

1. Light fixtures
2. Fire alarm devices
3. Special equipment
4. Factory-installed lighting and voltage surge protection equipment

OTHER REQUIREMENTS

Specialty Consultants

1. All specialty consultants should provide the same level of information which is required for MEP disciplines. Typical specialty consultants include: Lab, security, acoustical, A/V and kitchen consultants

Specifications

1. Draft specification
2. When a product is specified, three manufacturers must be listed as acceptable. Contact the Project Manager if circumstances require a product to be sole sourced.

Estimates

1. Major line items costs for all building components, verify inclusion of all elements by cross-checking against specification for omissions
2. Identify escalation to mid-point of construction
3. Update cost estimate of construction and compare it to the allowable for construction.
4. Estimate construction period, identify any phased work and any long-lead time for special item.

5. Sole source items identified as approved.

Energy

1. Updated energy report

General

1. As documents develop, confer with regulatory agencies such as:
    a. Fire marshal (state and local)
    b. Department of Health
    c. Department of Education
    d. Local zoning commission
    e. Local planning commission
    f. Other
2. Identify all documents with project number and date.
3. Review the building design program, scope of work and verify compliance.
4. As documents develop, confer with regulatory agencies such as:
    a. Contact utility companies and public authorities for all services and initiate approval process as needed for connection to their systems.
    b. Investigate and report on their review of all applicable local, public and utility regulations;
    c. Notify the Architect of space and location requirements for systems
    d. Prepare estimates of probable operating costs with recommendations for implementation

Submittals for Review

1. Four complete sets of drawings and specifications, plus extras required.
2. CADD Deliverables for review for adherence to CADD Deliverable Guidelines if not previously submitted in the Schematic Design Phase

3. Construction Documents Checklist

The following design review checklist is to be used to evaluate the completeness of the deliverables issued by the design consultant team prior to being issued to the Authority Having Jurisdiction (AHJ) for review and permitting, or to the Pre-Construction Team for pricing. Some items may or may not be used depending on the size, scope, and duration of the project.

GENERAL AND LIFE-SAFETY SHEETS

- ☐ Project number
- ☐ Drawing issuance type (ex: 75% SD, etc.) and date
- ☐ Project scope narrative
- ☐ Design team and owner contact information
- ☐ Index of drawings
- ☐ Governing codes (IBC 2018, IECC, NFPA, NEC, etc.) listed and all code compliance drawings finalized
- ☐ LEED or other sustainability initiatives description, goals, checklists, and calculations completed
- ☐ Verify drawings are not stamped by the architect/engineer unless they are to be submitted for permitting by the AHJ
- ☐ Project location map w/north arrow
- ☐ Area calculations for each space, floor, and building total
- ☐ Life safety information and floor plans (egress paths, distances, fire ratings, fire protection (if required) completed
- ☐ Occupancy type and occupancy loads noted and labeled on plans
- ☐ Construction type and fire rating separation noted and labeled on plans
- ☐ Adjacent building separations and required fire separation ratings
- ☐ Percentage of openings and required rating in existing or new walls
- ☐ Rated wall assemblies and UL specifications
- ☐ Standard details
- ☐ Typical restroom details
- ☐ Standard wall partition types
- ☐ ADA/accessibility standards and details
- ☐ General notes (demolition, construction, etc.)

CIVIL & SITE DESIGN

- ☐ Existing conditions and topography (parking, roads, entrances, utilities, etc.)
- ☐ Finish floor elevations and grades at entrances, exits, and ramps
- ☐ Final site grading and drainage plans
- ☐ Site demolition plan
- ☐ Existing and new building plan (if required) with new topography plan
- ☐ New utility requirements and connection locations
- ☐ Final paving plans identifying materials, patterns, and details
- ☐ Site fixture layout and preliminary specifications (site lighting, trash containers, site seating, etc.)
- ☐ Site lighting plan
- ☐ Dewatering plan
- ☐ Parking plan with dimensions and accessible paths (if required)
- ☐ Protection requirements for existing conditions to remain during construction
- ☐ Final specifications

LANDSCAPE

- ☐ Existing conditions (parking, roads, entrances, utilities, etc.)
- ☐ Existing landscape and demolition plan
- ☐ New landscape plan
- ☐ Final planting types and species
- ☐ Irrigation plan and calculations
- ☐ Protection requirements for existing plantings to remain during construction

☐ Final specifications

ARCHITECTURAL

☐ North arrow and scale on all plans
☐ Floor plans (all floors: existing/renovated and new)
- ☐ All walls, doors, and windows dimensioned
- ☐ All enlarged plans and details called out
- ☐ Room tags shown in all rooms
- ☐ Door and window tags shown on all openings

☐ Reflected ceiling plans (all floors: existing/renovated and new)
- ☐ All interior spaces noted with dimensions, ceiling heights, ACT grid origin points, light fixtures and HVAC diffusers located, sprinkler heads located, desired control joint locations, etc.
- ☐ All exterior canopies, soffits, and overhangs noted with dimensions, ceiling heights, light fixtures located, sprinkler heads located, desired control joint locations etc.

☐ Roof plan
- ☐ Roof drain locations
- ☐ Roof slope to all drains
- ☐ All MEP equipment and roof screening shown and dimensioned
- ☐ Exterior roof types and control layers identified
- ☐ All rooftop access hatches, walkway pads, window washing anchors identified

☐ Exterior elevations (if required)
- ☐ All exterior materials noted and tagged
- ☐ Exterior dimensions, structural grids, and section references identified

☐ Exterior material schedule
- ☐ All material manufacturers, product numbers, colors, sizes, etc. identified

☐ Fenestration layout
- ☐ All mullions and panels dimensioned
- ☐ Glass types noted on exterior elevations

☐ Overall building cross-sections
☐ Final vertical circulation elements identified, dimensioned, and noted (stairs, elevators, etc.)
☐ Wall Sections
- ☐ All exterior wall types with control layers identified and terminations indicated

☐ Section details at all exterior transitions and corners
☐ Plan details at all exterior transitions and corners including doors, entry systems, curtain walls, etc. with all control layer terminations and transitions indicated
☐ Final interior elevations with dimensions and all materials noted.
☐ Final interior material schedule with all products identified
☐ Millwork details with material designations
☐ Final specifications

STRUCTURAL

☐ Structural floor plans for all floors
☐ Existing and new foundation plans
☐ Structural grid and column locations
☐ Completed structural member sizing
☐ Seismic requirements (if required)
☐ Final specifications

MEPFP

☐ MEP floor plans for all floors
☐ Existing and new MEP plans

☐ MEP equipment sizing and locations
☐ Duct and piping sizes
☐ One-line diagrams for MEP systems
☐ Final specifications

PROJECT MANUAL/SPECIFICATIONS

☐ Owners Project Requirements (OPR)
☐ Final specifications from all design disciplines

DELEGATED DESIGN/CONSULTANT/TRADE PARTNER DELIVERABLES (IF APPLICABLE)

☐ Curtain wall design consultant drawings w/elevations, sections, details, and outline specifications
☐ Final data and security plans and specifications
☐ Information and drawings for other design partners may include, but not be limited to elevators, exterior wall systems, rooftop anchors and window washing equipment, food service, pools and spas, fire suppression systems, laboratory design, etc.