

The University of Minnesota's (U of MN) "**Design Deliverables**" outlines the information and minimum level of development anticipated with the standard contracted phases of design: *Pre-design*, *Schematic Design (SD)*, *Design Development (DD)*, and *Construction Documents (CD)*.

This document is a companion to the University's standard AIA documents. This document does not include "Work" associated with Bidding and Construction Administration (CA).

As part of the formal University of Minnesota (U of MN) review process at each of the major phases of design, the Design Professional shall review, validate and submit the "**Design Deliverables**" document to the University's Design Project Manager within Capital Project Management (CPM). The inclusion of each required item shall be validated by checking the associated mark on the official submission. The Design Professional shall clarify any missing information or omissions.

Deliverables include all items listed in the applicable design phase column AND, except as specifically stated, all deliverables listed in the preceding design phases.

Deviations to this "Design Deliverables" shall be reviewed as part of the project team's project proposal/work plan and agreed to by CPM as a basis for the contracted work.

NOTES:

1. Unless otherwise noted, all movable furnishings and artwork are considered to be independent of the architectural design project, but shall be coordinated as part of the budgeted project scope.
2. Submittals of deliverables for contracted phases of design are to be preceded by a complete University review and comments period consistent with the University's prescribed process.
3. All documents associated with a phase's submittal requirements shall be in .pdf format. When requested by the Project Manager, electronic .dwg files (with or without the Design Professional's title block) of current phased drawings for use as backgrounds for special construction bid packs (e.g. telephone/data and audio/visual wiring bid packs)
4. Projects procured through SDSB shall also meet the requirements outlined by the MN Department of Administration (https://mn.gov/admin/assets/RECS-CS-3rdpre-design-manual_tcm36-208251.pdf)

**GENERAL
INFORMATION**

Predesign

Project Scope

- Scope of work narrative, including Owner's Project Requirements and Basis of Design documents
- Preliminary project program
- Spreadsheet documenting anticipated exception requests

Building Codes / Jurisdiction(s)

- List of applicable building codes on drawing title sheet
- Building code review (describe means of compliance for major code issues and building systems)
- Anticipated building and space occupancy schedules

Sustainability

- When applicable, provide necessary documentation and information as applicable to initiate B3 tracking tool.
- Submit B3 tasks assigned to associated phase
- List of sustainability features incorporated into project design per B3 and/ or applicable "Sustainable Design Standards"

SHPO

- When applicable, assist the University in completing CPM template and associated documentation for 30% SHPO Submission

Project Schedule

- Design Schedule by phase, identifying and aligning with key University review/approval periods
- Preliminary Construction schedule, identifying anticipated delivery method, phasing, substantial completion, certificate of occupancy

Project Budget

- Project benchmarking
- Preliminary cost estimate based upon Unit/Costs and system narratives associated with Pre-design documentation price alternates

Schematic Design

Project Scope

- Initiate Request for Exceptions (RFE) to University Building Standards
- Complete spreadsheet documenting approved RFE

Building Codes / Jurisdiction(s)

- Life safety (egress) plans with identification of security and access control points
- Description of any proposed occupancy within construction area
- List of anticipated building code variance requests
- Preliminary SAC/WAC calculations

Sustainability

- Engage in Energy Design Assist (EDA) program if applicable
- Submit B3 tasks assigned to associated phase

SHPO

- When applicable, assist the University in completing CPM template and associated documentation for 60% SHPO Submission

Project Schedule

- Update design and construction schedule assumptions from Pre-design; identifying and aligning with key University review/approval periods, anticipated delivery method, phasing, substantial completion, certificate of occupancy, and other key milestones.

Project Budget

- Updated cost estimate per SD documentation
- Develop project alternates list as necessary to maintain project budget

Design Development

Project Scope

- Updated Request for Exceptions (RFE) to University Building Standards
- Update spreadsheet documenting approved RFE

Building Codes / Jurisdiction(s)

- List of all code variances being requested

Sustainability

- Engage in Energy Design Assist (EDA) program if applicable
- Submit B3 tasks assigned to associated phase

SHPO

- When applicable, assist the University in completing CPM template and associated documentation for 90% SHPO Submission

Project Schedule

- If multiple bid packages, clearly indicate the scope of each release
- Identification of construction phasing, including temporary requirements during each phase

Project Budget

- If a Construction Manager at Risk (CM@Risk) has been retained, reconcile DD /GMP pricing with University Review comments before proceeding to CDs
- If a CM@Risk has not been procured, provide an updated estimate based upon DD set of drawings.

Construction Documents

SPECIFICATIONS

Predesign

- System & material narrative description
 - Outline narrative for scope of work by building systems
 - General level of interior finishes
 - Special Equipment requirements – including relocation of specialty research equipment (if any)
 - B3/2030 considerations

Schematic Design

- Outline or preliminary specifications by CSI categories, indicating project specific features of major equipment as well as component materials
- Review and update assumptions associated with anticipated level of interior finishes

Design Development

- Preliminary draft of General Conditions and Special Conditions in accordance with contract agreements
- Draft specifications by CSI categories; indicating project specific features or major equipment as well as component materials

Construction Documents

- Complete specification including draft front end documents
- List of items which are sole-sourced or dual-sourced and justification for not specifying three acceptable products

SITE

Predesign

Civil

- Site plans to include the following:
 - Existing conditions
 - Extents of Demolition
 - Building outline(s) + location
 - Site Circulation
 - Building Entry and Access
 - Roads & driveways
 - Parking locations
 - Loading dock location
 - Waste/recycling collection locations
 - Bike Parking location and counts
 - Site Utility requirements identified
 - Stormwater management requirements identified
 - Review fire hydrant spacing
 - Wetland/Public Waters identified

Landscape

- Existing conditions
- Site concept plan

Schematic Design

Civil

- Preliminary site utility plans
- Site limits and constraints
- Soil Boring report
- Preliminary grading plan, topographic contours, and disturbed area
- Soil retention work, if needed
- Site survey
- Stormwater design intent memo

Landscape

- If applicable, identify key architectural site features
- Preliminary protection plan for existing trees and significant plantings
- Conceptual Landscape Plan

Design Development

Civil

- Preliminary site lighting plan
- Site development phasing
 - Extents of construction area
- General dimensions & elevations
- Grading plan w/ contours and spot elevations
- Erosion and sedimentation control/Stormwater Pollution Protection Plan (SWPPP)
- Plan to address existing hazardous/contaminated materials (if any)
- Profiles for underground utilities, size and depth
- Electrical service and distribution
- Parking/roadway, walks and hardscape plans & elevations
- Area traffic plan, if existing roads/walks are impacted, including vehicle & pedestrian traffic controls (if required)
- Stormwater report and design calculations

Landscape

- Planting plan (species, quantities, and locations)
- Irrigation plan
- Protection for existing trees and significant plantings during construction
- Soil preparation & planting specifications
- Site Furniture Locations

Construction Documents

Civil

- Utility plans, elevations, inverts & details
- Site lighting plans, simulations, specifications, equipment cut sheets and photometrics
- Final erosion and sedimentation control plan/SWPPP
- Dewatering plan
- Construction site access + Staging Area
- Site details, including hardscape
- Utility Connection details
- Final stormwater report and design calculations
- Final SWPPP and complete SWPPP review checklist

Landscape

- Landscaping Details
- Irrigation Detail
 - Piping diagrams
 - Pipe sizes

STRUCTURAL

Predesign

- Structural System Narrative
- Note extents of potential existing structure demolition or modification, forensic exploration if applicable

Schematic Design

- Conceptual foundation system and framing plan
- Requirements for engineered fill /soil correction
- If applicable, Pier / caisson recommendations
- If applicable, special excavation requirements

Design Development

- Foundation plan
 - Typical footing sizes
 - Typical foundation wall sizes
 - Typical reinforcing steel factors (i.e. lbs./SF)
 - General indication for moisture protection, insulation, foundation drainage
- Piling, sheeting, shoring, underpinning
- Excavation limits/ over excavations
- Typical floor framing plan
 - Dimensioned Structural Grid/ column lines
 - Beam / column layout for typical bay
 - Transfer beam locations
 - Slab / floor composition
 - Indication of fireproofing requirements
 - Wind and shear walls or cross bracing
- Framing plans at unique features
- Main member sizing
- Typical connection details
- Shaft walls & floor openings
- Canopy and penthouse framing.
- Definition of control joints
- Structural building and wall sections

Construction Documents

- Beam, column & slab schedules
- Mechanical and electrical concrete housekeeping pads
- Foundation details
- Structural details
- Structural calculations

**ARCHITECTURE:
EXTERIOR
ENVELOPE**

Predesign

- Building Massing
- Overall building cross-sections w/ floor elevations
- Design Narrative/diagram noting range of material palettes, including but not limited to transparency, fenestration, finish levels, etc.
- If applicable, indicate future opportunities for expansion & alterations
- Preliminary building elevations

Schematic Design

- Typical elevations w/ material indications
- Fenestration layout
- Architectural Screening
- Roof layout & drainage plan
 - Skylights
 - Penthouses
- Large scale building cross-sections

Design Development

- Typical exterior wall sections
- Parapet & coping details
- Thermal and moisture protection
- Fireproofing
- Typical window and door details
 - head, jamb, and sill conditions
- Details of unique features
- Expansion joint locations
- Roofing system section
- Control joint definition & details
- Roof-mounted equipment
- Identify anticipated Building signage, for submission to Signage Committee

Construction Documents

- Roof details
- Exterior details
- Flashing details

ARCHITECTURE/ INTERIOR

Predesign

- Area tabulations compared to program requirements
 - Document associated areas by University Space Definition categories:
 - See University Design Guidelines
- Typical floor plans (single-line block diagrams)
 - Include legend by space use
 - Mechanical, electrical & other service closets & rooms
 - Identify core vertical circulation elements including elevator(s) and elevator rooms
 - Note anticipated scope of demolition
- Circulation paths
- If applicable, indicate future opportunities for expansion & alterations, or phasing/sequencing of work
- Colored floor plans, renderings, models, or other graphics as necessary to clearly present concept as part of Capital Oversight Group (CPG) submission

Schematic Design

- Floor plans
 - Door and window locations
 - Millwork / casework locations
 - Defined seating, serving, & kitchen facilities
- Demolition plans (if applicable)
- Reflected Ceiling Plans
- Preliminary layout of major spaces w/ fixed equipment
- Typical wall types
- Preliminary room finish schedule with finish samples
- Indication of any special construction / rooms
- Preliminary FFE Schedule (for reference and budgeting purposes); see CPM Interior Standards Templates
- If applicable, work with U of MN Haz Mat to create preliminary Hazardous Abatement Plan
- Exterior building material samples reflective of design intent
- Colored floor plans, renderings, models, or other graphics as necessary to clearly present concept as part of Board of Regents (BOR) SD review as required by CPM, and for inclusion on CPM website

Design Development

- Assign room numbers (coordinate w/ Space Management Team)
- Sections and enlarged plans at vertical circulation (stairs and elevators)
 - Sections & details of hydraulic cylinder, if applicable
 - Description of shaft sump pits
 - Elevator car & equipment support details
 - Description of controls & fixtures
- Enlarged plans and elevations at toilet rooms
- Enlarged plans and elevations at Special rooms
- Reflected ceiling plans w/ elevation markers
- Typical Sections & details at soffits and ceiling features
- Wall types, fire ratings, smoke control zones
- Typical millwork / casework elevations
- Equipment & furniture preliminary layouts
- Finish schedule with finish samples
- Electronic interior finish boards
- Door & window schedule
- Updated renderings, models and graphics required only as appropriate for design development

Construction Documents

- Dimensioned floor plans
- Enlarged plans
- Partition details
- Interior details
- Interior elevations
- Finish schedule on finish plans
- Final finish sample set (max size 8"x11")
- Final electronic interior finish boards
- Door & hardware schedules
- FFE Schedule
- Details of unique features
- Details of fixed equipment
- Updated renderings, models and graphics required only as appropriate for construction document preparation

Predesign

HVAC

- Confirm existing capacity/distribution assumptions
- System Narratives
 - Identify specialty system requirements
- Indication of the required capacity/redundancy for all major pieces of equipment, e.g. "two AHU's 100% capacity each"
- Air intake & discharge locations
- Major equipment locations
- Identify major equipment types (e.g. evaporative cooling vs. water-cooled chiller, or steam distribution vs. natural gas boilers, etc.)
- Incorporate CURRENT equipment naming conventions/asset tags
- Identify controllability requirements and networking needs

Plumbing

- Confirm existing capacity/distribution assumptions
- System Narratives
 - Identify specialty system requirements
- Indication of the required capacity/redundancy for all major pieces of equipment, e.g. "two pumps 100% capacity each"
- Main water supply, storm, and sanitary leads
- Major equipment locations
- Restroom location(s) w/ fixture counts

Schematic Design

HVAC

- One-line diagrams for each air, hydronic, steam, condensate and all other HVAC related systems, and other materials as required to describe the fundamental design concept for all mechanical systems. Including zoning concept.
- Identify special occupancy zones
- Overall building air flow diagram indicating air handlers, exhaust fans, duct risers, duct mains
- Note special filtration requirements
- Mechanical Equipment
 - Air handling units - location, size and type
 - Chiller - location, size and type
 - Boilers, heat exchanger, pumps - location and size
- Plans indicating shaft, chase, recess requirements
- Preliminary building HVAC load/ventilation calculations (heating, cooling, humidity control, etc.)
- Total building kBtu/sq.ft. (energy intensity) calculations per B3
- Review mechanical equipment accessibility

Plumbing

- One-line (riser) diagrams for every plumbing system (e.g. domestic water, sanitary, storm, gas, RODI, etc.) and other materials as required to describe the fundamental design concept for all plumbing systems
- Updated design criteria for each plumbing system (including set points, water quality levels, etc.)
- Preliminary piping plans (domestic & process) with indication of required service access areas
- Preliminary calculations
- Preliminary outdoor lighting plans
- Fixture, lamp, and controls descriptions

Design Development

HVAC

- Equipment schedules (major equipment)
- Equipment locations (w/enlarged mechanical plans)
- Duct layout for typical spaces
- Indication of typical locations of fire dampers, smoke dampers, and combination F/S dampers
- Control diagrams (concept form) for all mechanical and plumbing systems
- Outline of major control sequences of operation
- M/E smoke control schemes
- Preliminary floor plans of mechanical rooms w/all components and required service access areas drawn to scale
- Meter locations and types
- Design building HVAC load/ventilation calculations (heating, cooling, humidity control, etc.)
- Steam piping system code stress analysis per applicable ASME Code (usually B31.1), including: structural support load calculations and all support and penetration loads (e.q. forces and moments)
- Noise calculations when required
- Total building kBtu/sq.ft. (energy intensity) calculations per B3
- Review locations/accessibility of valves/dampers etc.
- Pre-project TAB readings (air and hydronic systems) where applicable. If designing on a shared system, this is used to verify that the space not within scope is not impacted.

Plumbing

- Meter locations and types
- Back flow prevention locations
- Fixture schedules
- Equipment schedules (major equipment)
- Preliminary floor plans of mechanical rooms w/all components and required service access areas drawn to scale
- Floor drain locations
- Foundation drains
- Water riser diagram, including assumed fixture counts per floor connection
- Waste and vent riser diagrams including assumed fixture counts per floor connection
- Design calculations

Construction Documents

HVAC and Plumbing

- Detailed piping and duct design with all sizes indicate, including CFM in and out of all doors. Indicate location of control panels
- Detailed floor plans of mechanical rooms w/ all components and required service access areas drawn to actual scale
- Cross-sections through mechanical rooms and areas where there are installation/coordination issues (tight space, zoning of utilities). Indicate required service access areas.
- In common mechanical space, indication of space zoning by system
- Connection to fire alarm & campus control systems
- Equipment details, including structural support requirements
- Penetration/sleeve details
- Installation details
- Duct construction schedule (on the drawings), indicating materials and pressure class for each duct system
- Detailed controls drawings, including clear differentiation of trade responsibility for control, fire, and control power wiring
- Detailed sequences of operation including the specific set points for all control loops that will result in attainment of the required design criteria, as well as alarm set points and time delays
- Final building HVAC load/ventilation calculations (heating, cooling, humidity control, etc.)
- Steam piping system code stress analysis per applicable ASME Code (usually B31.1), including: structural support load calculations and all support and penetration loads (e.q. forces and moments)
- Noise calculations when required
- Total building kBtu/sq.ft. (energy intensity) calculations per B3
- Review locations/accessibility of valves/dampers/etc. and sizing of access panels

Predesign

Electrical/Lighting

- Confirm existing capacity/distribution assumptions
- System Narratives
 - Identify specialty system requirements
- Indication of the required capacity/redundancy for all major pieces of equipment
- Elementary one line diagram of proposed major electrical equipment and emergency systems
- (Remodel only) One line diagram of modifications, additions, deletions, etc.
- Project electrical load demand and how it was derived
- Confirmation with the University EE staff that there is sufficient capacity on the 13.8 kV system to support the new load
- (Remodel only) Confirmation of existing building service capacity to take on new loads and how it was derived
- General site plan identifying the connection point to existing 13.8 kV underground infrastructure (i.e. manhole) and proposed duct bank route
- Existing underground electrical infrastructure that requires relocation or demolition
- Special project requirements such added generation for specific standby loads, photo-voltaic arrays or anything beyond normal building infrastructure
- Design intent for internal and external lighting

Schematic Design

Electrical/Lighting

- Manhole, duct bank, and building entry plans and details
 - Site plan showing proposed electrical duct bank route based on site survey, and any required infrastructure upgrades or replacements
 - Cable pulling calculations for the 13.8 kV cable in the proposed duct bank
- Electrical equipment location plans
- Panel numbering scheme
- One-line diagram showing equipment ratings (not a riser diagram) of major electrical equipment showing redundancy and emergency system strategy
- Equipment
 - Switch gear - location and size
 - Transformers – location, size, and preliminary sizing calculations
 - Generators – location, size and preliminary sizing calculations
- Preliminary interior lighting plans
- Preliminary site plan showing outdoor lighting plans
- Fixture, lamp, and controls descriptions
- Preliminary high voltage and vault layout
- Updated electrical load demand calculations and how they were derived
- Equipment location plans and strategy for removing main power transformers

Design Development

Electrical/Lighting

- Refined site plan of electric utilities, site lighting, and emergency egress lighting
- Underground duct bank plan and profile drawings
- Equipment
 - Transformers – size and refined sizing calculations
 - Generators – size and refined sizing calculations
- Detailed one line diagram (not a riser diagram) showing equipment ratings, emergency system layout, ground fault interrupting strategy, metering, etc.
- Normal power distribution riser diagram with circuit breaker, fuse, conduit and wire sizes
- Emergency power riser diagram with circuit breaker, fuse, conduit and wire sizes
- Grounding riser diagram and calculations
- Provide ground grid calculations and layout
- Fault current and coordination studies used to specify equipment ratings and verifying coordination of devices
- Provide refined preliminary art flash study
- Substation standard details
- List of equipment on emergency power
- Electrical load calculations
- Panel schedules
- Interior and exterior lighting plans, including control systems and devices, lighting panels, switching and circuiting
- Fixture types and schedule
- Dimming, daylighting and low voltage control zones
- Emergency lighting
- Typical photometric calculations
- Typical electrical outlet location plans
- Plan for temporary power during construction
- Detailed vault layout with dimensions and all major equipment shown
- Preliminary cabling pulling calculations for medium voltage ductbanks
- Preliminary harmonic analysis per IEEE519 and means for arc flash reduction
- Access path for moving main power transformer into and out of the building

Construction Documents

Electrical/Lighting

- Details of power service to building
- Power plans, including primary cable raceways, feeder conduits, electrical loads, duplex and special receptacles and circuiting
- Emergency power system plans, controls, and details
- Connections to other building systems, including fire alarm and HVAC systems
- Details of non-standard electrical installations
- Conduit and wire sizes for services, feeders and special branch circuits
- Notes identifying locations of separate and shared neutrals
- MCC elevations
- Grounding details
- Roof and floor penetration details
- Lighting control system schematics and wiring diagrams
- Lighting control system detailed sequences of operation
- Installation details, including structural support details
- Final arc flash study
- Final cabling pulling calculations for medium voltage ductbanks
- Final harmonic analysis per IEEE519

Predesign

FIRE PROTECTION

- Confirm existing capacity/distribution assumptions
- System Narratives
 - Identify specialty system requirements
- Connection to utility and supply capacity
- Identify if a Fire Pump is required

Schematic Design

- Location of fire pump and controller, jockey pump and sprinkler valves
- Location of test headers and fire department connections
- Preliminary floor plans of mechanical rooms w/all components and required service access areas drawn to scale

Design Development

- One-line diagrams for each fire protection system, and other materials as required to describe the fundamental design concept for all fire protection systems
- Preliminary piping plans
- Fire pump sizing calculations
- Location of all sprinkler zone valves, drains, and fire hose connections
- Design calculations

Construction Documents

- Fire protection service entrance details
- Fire protection plans (incl. header and riser layout) with indication of any required service access areas
- Zoning extents, for areas where the contractor will size the piping
- Typical sprinkler installation details, including structural support details
- Penetration/sleeve details

Predesign

DATA + SECURITY

Low-Voltage / Data

- Confirm existing capacity/distribution assumptions
- System Narratives
 - Identify specialty system requirements
- Block diagram of MDF & IDF room locations

Security

- System Narratives
 - Identify specialty system requirements

Schematic Design

Low-Voltage / Data

- MDF & IDF room locations and sizes
- Preliminary AV device location plan
- Preliminary AV equipment schedule (for reference and budgeting purposes)

Security

- Panel locations
- Preliminary device location plans

Design Development

Low-Voltage / Data

- Preliminary equipment layouts in MDF & IDF rooms
- Raceway and grounding riser diagrams
- Conduit and cable tray plans with conduit and cable tray sizes
- Typical voice, data and video outlet location plans (Coordinate power and data requirements and locations)
- Riser diagram

Security

- Riser diagram
- Detailed sequences of operation

Construction Documents

Low-Voltage / Data

- Detailed voice, data and video outlet locations
- Detailed equipment location plans
- Equipment schedules
- Wiring diagrams
- Installation details for conduit, outlet box and floor boxes, including mounting heights
- Details of telecommunications service to the building

Security

- Detailed equipment location plans
- Equipment schedules
- Wiring diagrams
- General notes on conduit and wire sizes
- Installation details
- Detailed sequences of operation
- Details of connections to HVAC, fire pump, fire suppression, door hold-open, door lock, and University's central systems