FACILITIES & OPERATIONS
ARCHITECTURE, ENGINEERING AND CONSTRUCTION
UNIVERSITY OF MICHIGAN

Design Deliverables

March 2021

As part of the deliverables for formal UM review at each of the major phases of design listed below, the Design Professional shall submit this "Design Deliverables" document to the University's Design Coordinator. On the "Design Deliverables" document, the Design Professional shall indicate the status of each required item (a check mark is interpreted to mean that an item has been included in the deliverables). On or attached to the "Design Deliverables" document, the Design Professional shall identify all items NOT included in the review package.

Note: Design Deliverables for the Design Development phase are to include all items listed in the Design Development column of the "Design Deliverables" table AND, except as specifically stated to the contrary in the table, all items listed in the Schematic Design column of the table (which are to have been further developed during Design Development).

Note: Design Deliverables for the Construction Document phase are to include all items listed in the Construction Document column of the "Design Deliverables" table AND, except as specifically stated to the contrary in the table, all items listed in the Schematic Design column and all items listed in the Design Development column of the table (which are to have been further developed during the Construction Document phase).

Item		Schematic Phase		Design Development Phase		Construction Document Phase
General Description	1	Scope of work narrative.	1	Description of construction phasing.	1	Documentation on drawings as required by building codes (specifically to include indication of maximum allowable number of people in each room).
	2	Comparison of capacities (see "Building Interior" for area comparison) to program.	2	Description of any proposed occupancy within construction area.	2	List of all code variances (on drawings cover sheet).
	3	List of applicable building codes on drawing title sheet.	3	Description of water and vapor characteristics of roof and exterior walls.	3	When special inspection or testing is required by building code, a separately bound “Statement of Special Inspections” as stipulated by Michigan Building Code.
	4	Building code review (describe means of compliance for major code issues and building systems).	4	Update Owner's Project Requirements and Basis of Design document as described in DG 2.0 "Design Intent Documents"	4	If multiple bid packages, clear indication of scope of each release.
	5	List of anticipated building code variance request.			5	Identification of construction phasing, including temporary requirements during each phase.
	6	Anticipated building and space occupancy schedules.			6	Provide electronic, clean 2D files per DG 2.4 in Microstation or AutoCAD format (with or without the Design Professional's title block) of CD Phase drawings for use by U-M or the Construction Manager as backgrounds for special construction bid packs (e.g. telephone/data and audio/visual wiring bid packs) or creation of UM master floor plans.
	7	Life Safety (egress) plans with identification of security and access control points.			7	Update Owner's Project Requirements and Basis of Design document as described in DG 2.0 "Design Intent Documents"
	8	For project over $5 million construction cost, U-M's list of outstanding Facility Condition Assessment improvement recommendations with notation as to which will be addressed by the project.				
	9	Owner's Project Requirements and Basis of Design document as described in DG 2.0 "Design Intent Documents"				
Specifications	1	System & material narrative description	1	Outline or preliminary specifications indicating project specific features of major equipment as well as component materials, E.G. "welded Schedule 40 steel pipe", "quarter sawn oak", etc. w. same section numbering as final specification.	1	Complete specification including draft front end documents.
			2	Provide a specification APPENDIX that shall be an inclusive list of testing requirements included within specifications. List shall include name of test and specification section referenced..	2	List of items which are sole-sourced or dual-sourced and justification for not specifying three acceptable products.
					3	For items listed in UM's "Preferred Manufacturers List", a table of specified items that are NOT indicated in UM's PML, and the justification for specifying these items.
					4	For door hardware sets that require electricity, indicate the proposed sequence of operations for the hardware.
					5	Provide updated Appendix that shall be an inclusive list of testing requirements included within specifications
Site, Circulation & Utilities	1	Civil Sheet Set-Up Checklist (SD Level)	1	Civil Sheet Set-Up Checklist (DD Level)	1	Civil Sheet Set-Up Checklist (CD Level)
	2	Existing Condition/Survey on plan sheet .	2	Soil erosion and sedimentation control (SESC) plans, per DG 312500 **a)** U-M EHS Design & Review checklist **b)** SESC addressed during construction **c)** Dewatering during construction	2	Final details, notes, and specifications.
	3	Soil borings - locations and logs on plan sheet, as appropriate.	3		3	Storm Water Management (see procedure)
	4	Traffic study with electronic modeling files to ensure proposed improvements do not negatively impact existing pedestrian, vehicular, transit and parking system. Identify if Traffic Control Order will be required to implement permanent changes to roadways.	4	Finalized Maintenance of Multi-Modal Traffic during construction, including Traffic Control per Michigan MUTCD **a)** Construction logistics/phasing with vehicle/pedestrian closures and detours, signs, and barricades (refer to MMUTCD) including staging locations, fencing and gates, site access, etc. **b)** Campus pedestrian wayfinding signs	4	Sidewalk/concrete pavement expansion and control jointing plan (include existing adjacent pavement jointing)

	5	Preliminary Maintenance of Multi-Modal Traffic, including Traffic Control per Michigan MUTCD **a)** Traffic study for significant temporary traffic impacts or multiple construction impacts to the road network **b)** Preliminary construction logistics/phasing with vehicle/pedestrian closures and detours; traffic signs, and barricades per MMUTCD; staging locations; fencing and gates; site access; etc. **c)** Preliminary Maintenance of Traffic memorandum explaining impacts, with summarized narrative to provide to local governing agency	5	Grading Plan(s) - **a)** 1' contours and critical spot elevations for constructability **b)** Plan view with critical spot elevations for accessible routes and curb ramps (10' scale) **c)** Profiles with spot elevations and control/expansion jointing of retaining/seat walls, including foundations and showing finished grade	5	Utility pipe sizing calculations (engineer stamped submittal/spreadsheet delivery)
	6	Community engagement graphics	6	Utility Plan(s) **a)** Utility plan view over profile with stationing starting at 0+00 for each utility over 50 feet & per City requirements **b)** Proposed Capital Cost Recovery Tables	6	FCA - Final list of FCA incorporated items
	7	Demolition Plan for site features, including hardscape, softscape, utilities, trees, Capital cost recovery credit table	7	Storm Water Management (see procedure)		
	8	Proposed Preliminary Site Plan sheets (overall **and** 20 or 40 scale with page breaks) **a)** Proposed building outline, overhangs, below grade extensions, and building entrances (future buildings accommodated) **b)** Dimensions on site features, such as drive approaches, roads, walks **c)** Site entrance; roads/access drives; drop off/pick up; loading docks, trash receptacles/recycling dumpsters; etc. **d)** Multi-modal transportation, such as pedestrian walks, crosswalks, access routes; bus stop/shelter; bikes; etc. **e)** Parking (Visitor/staff, service, business, accessible, moped/bike/electric scooter, special events, etc.) **f)** Retaining walls, seat walls, ramps, stairs, handrails and extensions **g)** Pedestrian, road, and parking lighting locations: light level modeling **h)** Permanent signs & pavement marking, including Building ID Signs, traffic signs, pavement markings **i)** Emergency phones **j)** Site snow storage k) Natural features, such as woodlands, water bodies, wetlands, steep slopes	8	Site Details and notes		
	9	Preliminary Grading Plan & strategic site cross sections	9	Utility and ROW Occupancy Preliminary Submittal Plans for local governing agency approval (iterative process - City, County, MDOT, etc.)		
	10	Preliminary soil retention work (temporary and/or permanent), if applicable				
	11	Site Utilities **a)** Preliminary site utility plan (overall and at 20 or 40 scale with page breaks) **b)** Show and label roof/foundation drain storm sewer connections; roof overflow outlets **c)** Sanitary Sewer Flow Mitigation Calculations **d)** Proposed Capital Cost Recovery Table				
	12	Storm Water Management (see procedure)				
	13	Fire/Emergency Access Plan				
	14	Preliminary Site Details and notes				
	15	Identify high-level impacts which are likely from building/site generated noise, exhaust, shading, window reflections, site lighting, etc. on surrounding properties, and preliminary mitigation measures assumed, e.g. berms, sound attenuation.				
	16	Address contaminated materials, non-hazardous and hazardous materials, if applicable (refer to EHS for soil / material testing)				
	17	Environmental: review for Radon contaminated soils				
	18	FCA - Preliminary list of FCA incorporated items				
	19	Utility and ROW Occupancy Preliminary Submittal Plans for local governing agency approval (iterative process - City, County, MDOT, etc.)				
Landscaping	1	Existing conditions	1	Planting plan	1	Protection for existing trees and significant plantings during construction
	2	Landscaping concept	2	Irrigation plan	2	Soil preparation & planting specifications
	3	Existing irrigation	3	Irrigation electrical and water source, including building penetration details and interior piping to panels.	3	Guying diagrams
			4	Irrigation controls	4	Irrigation Piping diagrams
					5	Irrigation Pipe sizes
					6	Landscape and irrigation details and legends
Structural	1	Structural Scheme plans	1	Foundation plan	1	Definition of control joints
	2	Written description	2	Typical floor framing plan	2	Beam, column & slab schedules
			3	Framing plans at unique features	3	Mechanical and electrical concrete housekeeping pads
			4	Main member sizing	4	Foundation details
			5	Structural sections	5	Structural details
					6	Structural notes
					7	Structural calculations
Building Exterior Envelope	1	Typical elevations	1	All building elevations w/ dimensional heights	1	Roof-mounted equipment
	2	Fenestration layout	2	Typical wall sections	2	Roof details
	3	Material designations	3	Parapet & coping details	3	Exterior details
	4	Overall building cross-sections	4	Roof & drainage plan	4	Flashing details
	5	Roof layout	5	Exterior door details	5	Control joint definition & details

			6	Typical window details		
			7	Details of unique features		
			8	Expansion join locations		
			9	Large scale building cross- sections		
Building Interior	1	Typical floor plans (min. 1/16" scale) w/ legends	1	All floor plans (min. 1/16" scale)	1	Dimensioned floor plans
	2	Floor plans for room numbering & public use (see DG 2.4)	2	Submit floor plans for revised room numbers (see DG 2.4)	2	Enlarged plans
	3	Demolition Plans	3	Enlarged plans at elevation changes (such as stairs)	3	Partition details
			4	Enlarged plans at toilet rooms	4	Interior details
	4	Area use identification & area in square ft.	5	Reflected ceiling plans	5	Interior elevations
	5	Mechanical, electrical & other service closets & rooms	6	Wall types, fire ratings, smoke control zones	6	Finish schedules
	6	Circulating paths	7	Plan to address existing hazardous materials, if applicable	7	Door & hardware schedules
	7	Area tabulations compared to program requirements	8	Fixed seating	8	Room signage
	8	Show flexibility for expansion & alterations	9	Defined seating, serving, & kitchen facilities	9	Schedule of proposed movable equipment that is NOT indicated on documents (for reference)
	9	Preliminary layout of major spaces w/ fixed equipment	10	Equipment & furniture layouts	10	Schedule of lab fixtures (turrets, etc.), if applicable
	10	Perform pre-construction infrared thermal imaging to detect areas of excess air leakage if project is renovation over $10M construction cost.	11	Important interior elevations		
			12	Details of unique features		
			13	Details of fixed equipment		
			14	Preliminary finish schedule		
			15	Preliminary door schedule		
			16	Informational signage		
Elevators	1	Elevator locations	1	Elevator shaft section	1	Dimensioned plans
	2	Equipment room locations	2	Equipment description	2	Sections & details of hydraulic cylinder, if applicable
	3	Determine type of elevator			3	Description of shaft sump pits
	4	Identify backup power source, if required.			4	Elevator car & equipment support details
	5	Note if any of th elevators will be an accessible means of egress			5	Description of controls & Fixtures
					6	Door & frame details
					7	Interior details including lighting
HVAC	1	Identify all systems	1	Overall building air flow diagram indicating air handlers, exhaust fans, duct risers, and duct mains	1	Detailed piping and duct design with all sizes indicated
	2	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	2	Duct layout for typical spaces	2	Floor plans w/ all components and required service access areas drawn to actual scale. On the plans, indicate duct sizes and air flow quantities relative to each room, including CFM in and out of all doors. Indicate location of control panels.
	3	Indication of the amount of redundancy for all major pieces of mechanical equipment, e.g. "two pumps 100% capacity each"	3	Equipment schedules (major equipment)	3	Lab air valves and volume control boxes (note that each is to be identified by a unique number assigned by the engineer). Provide a schedule that indicates the control sequence that applies to each room (room #, room descriptor, control sequence #)
	4	Major equipment locations.	4	Equipment locations (w/ enlarged mechanical plans)	4	Detailed floor plans of mechanical rooms w/ all components and required service access areas drawn to actual scale
	5	Air intake & discharge locations	5	Indication of typical locations of fire dampers, smoke dampers, and combination F/S dampers	5	Cross-sections through mechanical rooms and areas where there are installation/coordination issues (tight space, zoning of utilities). Indicate required service access areas
	6	Gross HVAC zoning, and typical individual space zoning (e.g. VAV boxes per office =?)	6	Control diagrams (concept form) for all mechanical and plumbing systems	6	In common mechanical space, indication of space zoning by system
	7	Mechanical legend	7	Outline of major control sequences of operation	7	Connection to fire alarm & campus control systems
	8	Special occupancy zones	8	M/E smoke control schemes	8	Equipment details, including structural support requirements
			9	Preliminary floor plans of mechanical rooms w/ all components and required service access areas drawn to scale	9	Penetration/ sleeve details
			10	Preliminary calculations	10	Installation details
			11	Meter locations and types	11	Duct construction schedule (on the drawings), indicating materials and pressure class for each duct system
					12	Detailed controls drawings, including clear differentiation of trade responsibility for control, fire, and control power wiring
					13	Detailed sequences of operation including the specific set points and time delays
					14	Design calculations
Plumbing & Piping	1	One-line (riser) diagrams for every plumbing system (e.g. domestic water, sanitary, storm, gas, RODI, etc.) and	1	Updated design criteria for each plumbing system (including set points, water quality levels, etc.)	1	Water riser diagram, including assumed fixture counts per floor connection
	2	Indication of the amount of redundancy for all major pieces of mechanical equipment, e.g. "two pumps 100% capacity each"	2	Preliminary piping plans (domestic & process) with indication of required service access areas	2	Waste and vent riser diagrams including assumed fixture counts per floor connection
	3	Main water supple, storm, and sanitary leads	3	Meter locations and system submittals	3	Foundation drains
	4	Major equipment locations	4	Back flow prevention locations	4	Detailed piping design with all pipe sizes indicated
	5	Restroom location(s)	5	Fixture schedules, to include lab fixtures	5	Typical plumbing details, including structural support requirements
	6	Plumbing legend	6	Equipment schedules (major equipment)	6	Water heating piping details
			7	Preliminary floor plans of mechanical rooms w/ all components and required service access areas drawn to scale	7	Penetration sleeve details
			8	Provide water metering service system submittals for DM submission to City of Ann Arbor reference DG 6.2 220010 Plumbing Specialties	8	Design calculations
Fire Protection (Mechanical)	1	One-line diagrams for each fire protection system, and other materials as required to describe the fundamental design concept for all fire protection systems	1	Location of test headers and fire department connections	1	Fire protect, service entrance details

	2	Report documenting adequacy of utility	2	Preliminary piping plans (domestic & process) with indication of required service access areas	2	Fire protection plans (incl. header and riser layout) with indication of any required service access areas
	3	Connection to utility	3	Preliminary floor plans of mechanical rooms w/ all components and required service access areas drawn to scale	3	Detailed piping design with all major pipe sizes indicated
	4	Location of fire pump and controller, jockey pump and	4	Fire pump sizing calculations	4	Location of all sprinkler zone valves, drains, and
	5	Sprinkler legend			5	Zoning extents, for areas where the contractor
	6	Optional F.P. systems			6	Typical sprinkler installation details, including structural support details
					7	Penetration/ sleeve details
					8	Design calculations
Lighting	1	Electrical symbols legend	1	Typical interior lighting and control plans	1	Interior and outdoor lighting plans, including control systems and devices, lighting panels, switching and circuiting
	2	General drawing notes	2	Outdoor lighting and control plans	2	Lighting control system schematics and wiring diagrams
	3	General photometric levels	3	Fixture types and schedule	3	Lighting control system detailed sequences of operation
	4	Fixture, lamp, and controls descriptions	4	Control system and control device descriptions	4	Installation details, including structural support details
	5	Preliminary interior lighting plans	5	Typical photometric calculations	5	Normal lighting photometric calculations
	6	Preliminary outdoor lighting plans	6	Dimming, daylighting and low voltage control zones	6	Emergency lighting photo metric calculations on 2'x2' grid for State BFS approval
	7	Identify lighting concepts for interior and exterior systems.			7	General notes on conduit and wire sizes for 20 amp single phase lighting branch circuits
	8	Identify target footcandle levels for common space types.				
	9	Identify common lighting control strategies.				
Electrical Power Distribution	1	Electrical demolition	1	Manhole, duct bank, and building entry plans and details	1	Details of power service to building
	2	One-line and riser diagrams with equipment ratings	2	Normal power riser diagram with circuit breaker, fuse, conduit and wire sizes	2	Detailed power plans, including primary cable raceways, feeder conduits, electrical loads, duplex and special receptacles, and circuiting
	3	Manhole, duct bank, and building entry locations	3	Emergency power riser diagram with circuit breaker, fuse, conduit and wire sizes	3	Emergency power system plans, controls, and details
	4	Exterior equipment locations	4	Grounding riser diagram	4	Connections to other building systems, including fire alarm and HVAC systems
	5	Substation, generator and ATS descriptions	5	Substation standard detail	5	Details of non-standard electrical installations
	6	Substation, generator, and electric room locations	6	Substation front elevation	6	Final short circuit, coordination and arc flash hazard study
	7	Preliminary substation and generator room plans	7	List of equipment on emergency power	7	Conduit and wire sizes for services, feeders, and special branch circuits (other than 20 amp single phase)
	8	Electrical load calculations based on watts/ sf	8	Electrical load calculations	8	General notes on conduit and wire sizes for 20 amp single phase branch circuits
	9	Identify if facility requires a lightening protection system.	9	Panel schedules	9	Notes identifying locations of separate and shared neutrals
	10	Note allocated space for electrical closets.	10	Preliminary short circuit and protective device coordination study	10	MCC elevations
	11	Identify what types of loads are emergency and which ones are optional/ standby. Conceptually identify the approximate generator size.	11	Electrical equipment location plans	11	Grounding details
			12	Typical electrical outlet location plans	12	Roof, wall and floor penetration details
			13	Plan for temporary power during construction.		
Fire Alarm and Emergency Communications	1	System descriptions	1	Riser diagrams	1	Detailed FA and EC panel, device and appliance location plans including duct detectors, fire/ smoke dampers, sprinkler flow and tamper switches, monitor and control modules, door hold -opens, door lock releases, etc.
	2	FA and EC panel locations	2	Auxiliary panel, remote panel, device and appliance location plans including pull stations, smoke detectors, horns, speakers, strobes, etc.	2	Strobe light candela ratings
	3	MOSCAD panel location	3	MOSCAD standard detail	3	Risk analyses required by NFPA-72
	4	Preliminary FA and EC device and appliance location plans			4	General notes on conduit and wire sizes
					5	Details of connections to HVAC, fire pump, fire suppression, door hold-open, door lock, and MOSCAD systems
					6	MOSCAD antenna location plans and installation details
					7	Detailed sequences of operation and/or alarm matrix
Communications (Including voice, data & video systems)	1	Manhole, duct bank, and building entry locations	1	BE and TR locations, sizes, and door swings	1	Detailed voice, data and video outlet locations
	2	Building Entrance (BE) and local Telephone Room (TR) locations	2	Backboard locations in BE and TR's	2	Details of telecommunications service to the building
	3	Riser diagram	3	Raceway and grounding riser diagrams	3	Floor box schedule
	4	Preliminary cable tray plans	4	Conduit and cable tray plans with conduit and cable tray sizes	4	Conduit, outlet box and floor box installation details
	5	Identify if any assistive listening systems are required.	5	Material cut-sheets	5	Power outlet locations in the BE and TR's
	6	Identify audio/ visual system requirements.	6	List of equipment to share telecom rooms	6	Locations of non-telecom equipment in the BE and TR's
	7	Note if project scope will include a cell phone signal reinforcement system	7	BE and TR heat loads		
			8	Typical voice, data and video outlet location plans		
			9	Emergency phone locations and types (wall or pedestal)		
			10	Courtesy phone locations		
Security (including CCTV and Card Access Control Systems)	1	System descriptions	1	Riser Diagrams	1	Detailed equipment location plans
	2	Panel locations	2	Equipment descriptions	2	Equipment schedules
	3	Preliminary device location plans	3	A/V equipment location plans	3	Wiring diagrams
	4	Note is project scope includes CCTV.	4	Clock and other equipment location plans	4	Installation details (including cabinets, hangers, and connection boxes)
					5	Detailed sequences of operation
LEED and Sustainability	1	LEED Project Boundary included on site plan.	1	Update LEED Project Boundary included on site plan.	1	Update LEED Project Boundary included on site plan.

	2	Complete DG 3.2.1 or DG 3.2.2 (Energy and Water Conservation Report based on project Construction Cost)	2	Update DG 3.2.1 or DG 3.2.2 (Energy and Water Conservation Report based on project Construction Cost)	2	Update DG 3.2.1 or DG 3.2.2 (Energy and Water Conservation Report based on project Construction Cost)
	3	Complete DG 3.2.3 Energy Impact Statement.	3	Update DG 3.2.3 Energy Impact Statement.	3	Update DG 3.2.3 Energy Impact Statement.
	4	Complete additional documentation as required in DG 3.2 Energy and Water Conservation	4	Update additional documentation as required in DG 3.2 Energy and Water Conservation	4	Update additional documentation as required in DG 3.2 Energy and Water Conservation
	5	List of sustainability features incorporated into project design as described in-DG 3.1 "Sustainable Design and LEED Requirements".	5	Update list of sustainability features incorporated into project design as described in-DG 3.1 "Sustainable Design and LEED Requirements".	5	Update list of sustainability features incorporated into project design as described in-DG 3.1 "Sustainable Design and LEED Requirements".
	6	Complete Project Specific LEED Checklist, per DG 3.1	6	Update Project Specific LEED Checklist, per DG 3.1	6	Update Project Specific LEED Checklist, per DG 3.1
					7	For all projects over $10 million construction cost, provide digital copy of Visual Display as noted in DG 3.1 "Sustainable Design and LEED Requirements"
Other Graphics	1	Renderings or other graphics as necessary to clearly present	1	Update renderings, models and graphics required only as appropriate for design development	1	Update renderings, models and graphics required only as appropriate for construction document preparation
Cost	1	Preliminary cost estimate. For projects with cost greater than $500,000, use format described n UM Design Guidelines 2.5 "Project Estimates"				
	2	Cost Benchmarking. For projects with const. cost $5million or greater ref. DG 2.5 Project Estimates for Project Benchmarking Requirements				
Notes	1. All movable furnishings and artwork are considered to be independent of the architectural design.					
	2. Submittals of deliverable for DD and CD phases are to be proceeded by a complete response to U-M review comments on the previous phase of design work.					