

List of Structural Deliverables

SN	Deliverable	Tool	Deliverable Contents	Developed During *	Deliverable/ Data required for				Comments
					Procurement	Construction	Start-up & Commissioning	Project Controls	
1	3D Model	See comment	The 3D model shall show realistic depictions and contain relevant design data for all physical disciplines in sufficient detail as per the project 3D CAD procedures	B&D	Y	Y	Y		Refer to Project Design Criteria for the requirement of 3D modelling and software to be used (typical comment, applicable for all disciplines)
2	Construction Facilities / Site Coordinating Plan	2D	Shows the location and type of required facilities, including lay down areas, trailer locations, fabrication areas, and temporary warehouses.	B&D		Y			Project to determine if this is done by Engineering or Construction, applicable for all disciplines
3	Permitting submittals	PDF	Includes documents and drawings required for applicable construction and environmental permitting activities for the project	B		Y			Refer to project permitting requirements, applicable for all disciplines
4	Load Assessment Studies	MS Word/PDF	Includes applied load studies like wind, wave, seismic, rainfall, etc.	B					
5	Design Basis / Design Criteria Document	MS Word	Refer document EPM-KES-TP-000009 and EPM-KER-TP-000030 for the contents of Design Criteria	B		Y			Each discipline will develop its Design Criteria
6	Scope of Work/ Specifications	MS Word	Refer to templates EPM-KEO-PR-000006 and EPM-KEO-TP-000009 for the contents of SOW and Specification	B&D	Y	Y	Y		
7	Vendor drawings	2D/PDF	Includes Overhead gantry crane details, reactions, Plan & sections, construction tolerances, equipment Foundation details and reactions.	D	Y	Y			gantry crane drawings, equipment reaction drawings
8	Bulk Quantity Takeoff / BOQ	2D	Bulk Quantity Takeoffs (QTOs) for tracking engineering-released quantities at 30%, 60%, & 90% Milestones to support construction.	B&D		Y		Y	Similar requirements for other disciplines (Structural, Mechanical, Civil, etc.)
9	Boring Location Plan	2D	Used by the Geotech engineering group to locate site soil exploration borings needed to establish foundation conditions. Note: If Geotech services are subcontracted, specify deliverable requirements placed on the subcontractor.	B		Y			
10	General Arrangement Plans & Sections	2D	Shows general arrangement of building and structures and its interface with other structures, utilities and future developments	B&D		Y			
11	Column and Base Plate Schedule	2D	Identifies the exact location of each building column. Several drawings may be required to show all building	D		Y			

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			columns and a column schedule may also be included on these drawings. Identifies column member sizes, splice locations, base plate details, design loads, and uniquely correlates the columns to a column number shown on the plan drawings.						
12	Crane Runway Support Plan	2D	Shows crane runway support girders, brackets, etc. The rails will be shown in sections.	B&D		Y			
13	Demolition Plan	2D	Identifies structures and facilities that must be cleared from the site.	B		Y			
14	Elevated Concrete Slab Plans and Details	2D	Shows concrete dimensions, types of concrete, special details, anchor bolts, baseplates, rebar requirements, location of equipment pads, blockouts, construction joints, embeds, openings, penetration, and expansion joints.	B&D		Y			
15	Elevation Drawings	2D	Show concrete structure and elevations including floor and wall penetrations with locations and sizes.	D		Y			
16	Foundation Drawings for special Site Features	2D	Shows concrete dimensions, types of concrete, blockouts, pipe trenches, embedded pits, chambers, manholes, thrust blocks, high mast foundation, light pole foundation, rebar, roadside gantries foundations, sign board foundations, base plates, and anchor bolts required for special features such as stockpiles, silos, conveyors, transformers, stacks, columns, etc. Foundation drawings for tanks also show bedding requirements. Note: Foundation Improvement Plans should be issued for sites with poor foundation conditions.	D		Y			
17	Grade Slab Drawings	2D	Shows concrete dimensions, types of concrete, surface treatments, anchor bolts, embeds, and rebar requirements for grade slabs. These drawings may be combined with structure foundation drawings.	B&D		Y			
18	Miscellaneous Steel Drawings	2D	Shows the locations, dimensions, and member sizes for miscellaneous platforms and other miscellaneous	D	Y	Y			

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			structural steel. Alternatively, this information may be shown on the main structural steel framing drawings.						
19	Piling Drawings	2D	Shows the locations, sizes, and types of piles (concrete & Steel). Also shows concrete dimensions and rebar requirements for pile caps.	B&D		Y			
20	Pipe Rack or Piping Bridge Framing, Elevations, and Details	2D	Shows locations, dimensions, member sizes, and connection details for pipe racks.	B&D	Y	Y			
21	Precast Concrete Plan, Sections, and Details	2D	Shows plans, elevations, locations, and details of precast concrete panels, including dimensions, "top of concrete" elevations for horizontal members, types of concrete, finish requirements, special details, rebar requirements, joint details, and connection details. Shows detailed drawings of all precast members showing the face-to-face dimensions, locations of embedded items, reinforcement steel, chamfers, and connections (including weld sizes and lengths). Shows plans and elevations of all cast-in-place concrete walls and superstructures with dimensions, locations, "top of concrete" elevations, penetrations, sleeves, embedded items, grout pockets, reinforcement steel locations and details, construction joints, crack control joints, decking with orientation of ribs, anchor bolts, and equipment centerlines.	B&D		Y			
22	Sections and Details (Concrete)	2D	Shows sections of walls and slabs and include concrete dimensions, types of concrete, special details, rebar requirements, blockouts, construction joints, expansion joints, and anchor bolts/embeds.	B&D		Y			
23	Stair Drawings	2D	Provides dimensions, riser and tread requirements, and member sizes for structural steel stairs.	B&D	Y	Y			
24	Standard Details and Notes	2D	The project selects those needed and shows them on a set of standard project drawings. These details include those items that do not need to be uniquely designed for a specific set of loads or job conditions. They include,	B&D		Y			

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			but are not limited to (strike through those not planned for the project, add others as required): *Typical concrete construction details (rebar configurations for walls, rebar splicing details, concrete stairs, construction joints, etc.) *Metal decking details *Grating details *Structural steel bracing and connection details *Precast concrete panel details *Equipment pads *Anchor bolt details *Miscellaneous steel details such as stairs, ladders, safety cages, and handrails. *Concrete masonry unit (CMU) wall details *Hatch openings *Wall/floor penetrations *Parking lot details *Gates and fences details						
25	Structural Erection Drawings	2D	Supplied by Steel fabricator and includes mark number	D		Y			
26	Structural Steel Connection Details	2D	Includes connection detail drawings and data developed by Engineering or steel fabricator.	D	Y	Y			
27	Structural Steel Elevations, Sections, and Details	2D	Shows structural steel elevations and additional sections and details necessary to completely describe the structural steel framing. Fire-proofing of steel sections should also be shown. Design loads should be shown where required.	D	Y	Y			
28	Structural Steel Framing Plans	2D	Shows structural steel framing and member sizes of all steel members. It should also show grating, metal decking handrail, toe plates, shear studs to beams, metal decking, sleeve penetrations, and design loads where required.	B&D		Y			
29	Structure, Building, and Equipment Foundations	2D	Shows concrete dimensions, types of concrete, special details, anchor bolts, embeds, rebar requirements,	B&D		Y			

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			locations of equipment pads, blockouts, construction joints, and expansion joints.						
30	Boundary Wall Drawings	2D	Include boundary wall foundations, precast panels details and lifting arrangement of precast panels.	B&D		Y			
31	Roadside Structures	2D	This includes culverts, crossings, vehicle crash barriers, overhead sign gantries, sign boards.	B&D		Y			
32	Anchor Bolts Drawings	2D	This includes all anchor bolts, base plates, non-shrink grout and anchor plate details	B&D	Y	Y			
33	Liquid and Earth Retaining Structural Drawings	2D	This includes water tanks, pumping stations, earth retaining structures, deep pits, chambers, gravity wall, Mechanically Stabilizes Earth (MSE) walls and water retaining structures	B&D		Y			

* B - Basic Design Phase, D - Detail Design Phase