

Virtual Design and Construction (VDC) Functions

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*Interactions: As a project develops, functions may be added or deleted, and interactions might vary based on capabilities of the parties and whether or not a specific consultant is on board for a particular function. In an IPD setting functions of parties are often blurred - i.e., any party might use or support any function. The notations here refer to the most prevalent interactions. *Lead: Primary author. Note that some functions have multiple leads - this can be different leads for different aspects (e.g., 2D Drawing Generation) or a collaboration (e.g., Design Decision Support). *Support: Provide input to the Lead. *Use: Extract output from the model for input to one's own work.	Phase							Interaction with Model* L=Lead, S=Support, U=Use					
	Conceptualization	Criteria Design	Detailed Design	Implementation Docs	Final Buyout	Agency Review	Construction	Closeout	Owner	Architect	Engineers	GC	Subcontractors
1. Visualization													
1.1. Design decision support								S	L/U	L/U	S	S	
1.2. Rendering								U	L/U				
1.3. 2D Drawing generation									L/U	L/U	U	L/U	
2. Space or Program Planning													
2.1. Programming								S	L				
2.2. Safety and security								S	L/U				
2.3. Disaster planning								S	L				
2.4. Code compliance, ADA									L/U				
2.5. Operation simulation								S/U	L/U	S		S	
3. Analysis													
3.1. Structural analysis									S	L/U		S	
3.2. Sun path and climate studies									L/U	L/U			
3.3. Comfort studies								U	L/U	L/U			
3.4. Ventilation (natural and artificial)									S/U	L/U			
3.5. HVAC sizing and configuration									S/U	L/U		L/U	
3.6. CFD (computational fluid									S/U	L/U		U	
3.7. Lighting (natural and artificial)								S	S/U	L/U			
3.8. Energy consumption									S/U	L/U		S	
3.9. Fire safety									S/U	L/U			
3.10. Acoustics								S	S/U	L/U			
3.11. Code review									L				
4. Sustainability Measures													
4.1. Design for credits (LEED, other)								S	S/U	S	L	S	
4.2. Design for carbon footprint								S	S/U	S	L	S	
4.3. Design for renewable energy								S	L/U	L/U	S	S	
4.4. Sustainability metric tracking									U		L	S	

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5. 4D Scheduling													
5.1. Sequencing								U	S	S	L	S	
5.2. Logistics planning											L	S/U	
5.3. Location-based scheduling								U	S	S	L	S	
5.4. Schedule animation								U			L	S	
6. Cost Estimating													
6.1. Value Engineering								S/U	S/U	S/U	L	S/U	
6.2. Target Value Design (TVD)								S/U	L/U	S	L	S	
6.3. Detailed estimating								U	S	S	L	S	
7. Construction Coordination													
7.1. Safety planning and reporting											L	L/S/	
7.2. Prefabrication									S	S	SU	L	
7.3. Constructability review									U	S	L	S	
7.4. Building system coordination											L	S/U	
7.5. Automated fabrication									S/U	S/U	S/U	L/U	
7.6. Shop drawing generation									S/U		U	L/U	
7.7. Permit submittals									L/U	S	S	S	
7.8. Laser scanning									U		L/U	U	
7.9. Laser survey - precision									U		L/U	U	
7.10. Laser survey - precision layout									S	S	L/U	S/U	
7.11. Record model									U		L	S	
7.12. As-built model								U	U		L	S	
8. Closeout													
8.1. Punch list									S/U		L/U	S/U	
9. Facilities Management													
9.1. Space and asset management								S/U	L	S	S	S	
9.2. Maintenance management								S/U	L	S	S	S	
9.3. Remodeling/repurposing								S/U	L	S	S	S	
9.4. Wayfinding and mapping								S/U	L	S	S	S	
9.5. Energy mgt. / BAS integration								S/U	L	S	S	S	
9.6. Security								S/U	L	S	S	S	