Definition of 30-60-90% Design Process

OVERALL PURPOSE OF THE 30-60-90% DESIGN PROCESS
Efficiently develop quality contract documents through a process that:

1) identifies stakeholders and their interests;
2) documents and defines design requirements; and
3) coordinates with permitting, environmental, regulatory and land acquisition needs.

The 30-60-90% design definition should:

1) Be defined in the consultant contract.
2) Be used to develop risk parameters in the design.

PURPOSE OF THE PREDESIGN
Select a preferred alternative for the project.

1) Develop project goals.
2) Develop design criteria.
3) Develop alternatives analysis.
4) Identify potential risks.
5) Develop a planning/conceptual level cost estimate.
6) Identify stakeholders.
7) Identify regulatory requirements.
8) Determine NEPA/SEPA requirements

PURPOSE OF 30% DESIGN
Define the major design elements of the project and refine the project’s scope, schedule and budget that the project design team can commit to delivering to management and critical stakeholders.

1) Determine any fatal flaws.
2) Define scope of the project.
3) Develop a project budget that the project manager can commit to (Baseline Budget).
4) Develop a project schedule that the project manager can commit to (Baseline Schedule).
5) Develop a cost estimate that the project manager can commit to (Baseline Cost Estimate).
6) Finalize design criteria.
7) Determine land acquisition needs

PURPOSE OF 60% DESIGN
Confirm that the project can be constructed and that the submitted plans and specifications will meet the objectives of the project without significant design changes.

1) Finalize the expectations and objectives of the project.
2) Confirm the constructability of the project.
3) Determine construction permit requirements.
4) Implement acceptable value engineering requirements, if applicable.
5) Identify preferred equipment and materials.

PURPOSE OF 90% DESIGN
Complete the project design, including plans and specifications, subject to review comments by the permitting agencies, funding agencies and the King County quality control review.

1) Confirm the bid viability of the project.
2) Prepare engineer's cost estimate for bid.
3) Finalize building permit package.
KING COUNTY/ACEC DEFINITION OF 30%, 60%, AND 90% DESIGN FOR VEHICLE, EQUIPMENT, AND MATERIAL (VEM) FACILITY

◆ 30% Schematic Design Submittal

◆ A. Project Needs

☐ 1) Basis of Design report finalized- including: design criteria, governing codes and standards
☐ 2) Defined scope of project.
☐ 3) Preliminary project schedule and detailed design schedule.
☐ 4) Preliminary cost estimate
☐ 5) Risk evaluation and register - determine contingency amount
☐ 6) List of required permits
☐ 7) Green building concepts identified -preliminary LEED checklist completed
☐ 8) Current master facility drawing
☐ 9) Table of contents for specifications
☐ 10) Draft SEPA document
☐ 11) Environmental report - including a Level I and II assessment of: asbestos, lead, soil contamination, PCBs, etc.
☐ 12) List of special and unique design requirements from permitting agencies
☐ 13) Proposed list of drawings.
☐ 14) Construction staging requirements determined
☐ 15) Performance design items determined and prescriptive design items determined.

◆ B. Architectural System

☐ 1) Design Program
☐ 2) Occupancy groups identified.
☐ 3) Occupancy loads determined.
☐ 4) Building footprint
☐ 5) Functional layout - including, by major functional area:
   a) IBC occupancy rating
   b) Location of exits
   c) IBC design occupancy classification
☐ 6) Floor plan- including:
   a) Room locations
   b) Room layouts
   c) Individual office locations
   d) Skylights
   e) Floor finishes determined for vehicle bays, toilet rooms, and offices
☐ 7) Building elevations show required clearances for vehicles
☐ 8) Roof system determined. Denote systems to access roof along with gutter and downspout locations
and material. Sloped metal roof preferred.

☐ 9) Exterior finishes and color. *Finishes should carry 35 year color performance warranty*

☐ 10) Storage locations of hazardous materials. List any special cabinet or furnishings or spill containment required.

☐ 11) Storage systems for materials, parts, and other inventory. Determine waste receptacle size and location for access.

☐ 12) Preliminary building demolition/deconstruction plan

☐ 13) Vehicle door weatherproofing and insulation determined. *Include bird roosting, nesting, and intrusion prevention plan.*

☐ 14) ADA issues determined

◆ C) Structural System

☐ 1) Type of structural system determined

☐ 2) Type of foundation and footings determined

☐ 3) Computer model for structural analysis selected if needed

☐ 4) Preliminary structural layout

☐ 5) Structural support requirements for mechanical equipment, exhaust system, hoists, and vehicle service equipment (oil, lube, and air) identified

◆ D) Civil Site Plan System

☐ 1) Survey of existing site including location of utilities

☐ 2) Geotechnical report(s) including Geotechnical Data Report, Geotechnical Interpretive Report and Geotechnical Baseline Report

☐ 3) Site layout drawing. Include Part 77 surface and Runway Protection Zone (RPZ)

☐ 4) Property line setback requirements determined

☐ 5) Landscaping requirements determined

☐ 6) Drainage report (TIR) including size and location of detention and water quality facilities determined

☐ 7) Type(s) of paving determined

☐ 8) Number of parking stalls determined

☐ 9) Driveway and vehicle circulation path to service road, taxiways, and runways determined

☐ 10) Utility capacity requirements and locations estimated- including: water, sewer, gas, fire flow, electrical service, and water pressures.

☐ 11) Offsite traffic mitigation determined

☐ 12) Preliminary site demolition plan

☐ 13) Preliminary grading plan

☐ 14) Estimate of fill and excavation quantities

☐ 15) Fencing/Security plan

☐ 16) Determine airports requirement for washpad or deicing area in or near new building.
E) Mechanical & Plumbing System
- 1) Basis of Mechanical Design- Standard and governing codes
- 2) Preliminary abbreviation and legend sheet
- 3) Mechanical system schematics
- 4) Location of heating and cooling zones
- 5) Preliminary heating and cooling load calculations
- 6) Ventilation requirements including vehicle bays
- 7) Ventilation calculations
- 8) Areas that need special HVAC equipment determined
- 9) Qualitative selection of performance requirements of major mechanical components. Recommend VRF with ERV system in offices and gas fired infrared heating in vehicle bays.
- 10) Preliminary equipment dimensions and weight
- 11) Preliminary equipment schedule
- 12) Location of major equipment and areas reserved for minor equipment identified
- 13) Mechanical room requirements (size and location)
- 14) Mechanical chase requirements (size and location)
- 15) Preliminary utility sizing
- 16) Preliminary sizing and routing of ductwork, piping and plumbing system mains
- 17) Electrical requirements for mechanical equipment identified
- 18) Input to Process and Instrumentation Diagrams (P & IDs) provided

F) Electrical System
- 1) Service points of connection with electrical utilities determined - including:
  - a) The power company
  - b) The telephone company
  - c) The cable company
- 2) Electrical room requirements (size am/location)
- 3) Electrical emergency generator panel and room requirements (size and location)
- 4) Telephone room requirements (size and location)
- 5) Determine voltage of power being provided by Power Company
- 6) Design lighting for night staging of vehicles outside in front of vehicle bay doors.

G) Instrumentation and Control (I&C) System
- 1) Process and Instrumentation Diagrams (P & ID) essentially complete
- 2
- 3) Preliminary control strategies
- 4) Network needs determined
- 5) Security equipment needs determined
- 6) Network room requirements (size am/location)
- 7) Security room requirements (size and location)
8) Control room requirements (size and location)
9) Emergency generator control room requirements (size and location)
10) Call out Fire Alarm system. The Airport standard for fire alarm uses AES-IntelliNet or equal.

VEM FACILITY

60% Design Development Submittal

A) Project Needs
1) Update of project schedule and detailed design schedule
2) Preliminary construction schedule - including equipment purchase lead times
3) Preliminary construction phasing plan
4) Preliminary construction staging plan
5) Detailed cost estimate with quantities and unit bid prices
6) Completed SEPA documents
7) Completed applications for any required land use permits
8) Completed requests for pre-application meetings for any required building permits
9) List of specific LEED items to be implemented
10) First draft of specifications that is specific to the project including Division I
11) Complete drawing index
12) Response to 30% comments completed
13) Value engineering comments incorporated
14) Preliminary code analysis sheet
15) Preliminary risk assessment of project to airport operations (FAA), airport security, and impacts to maintenance operations, etc.

B) Architectural System
1) Occupancy groups confirmed
2) Occupancy loads confirmed
3) Fire separation of occupancy groups determined
4) Type of construction determined, including fire rating
5) Typical wall construction shown - including:
   a) Interior wall section
   b) Exterior wall section
6) Typical roof construction shown including roof section, skylights, and roof access.
7) Complete architectural floor plans - including:
   a) Wall types and locations
   b) Interior door types and locations
   c) Window types and locations
   d) Fire wall locations
   e) Room numbering system determined
   f) Skylights
g) floor finishes determined

☐ 8) Exit system determined including corridors and exit locations - compliance with IBC verified

☐ 9) Architectural building sections showing vehicle clearances to structure and appurtenances/equipment.

☐ 10) Preliminary architectural details - including:
   a) Transitional details
   b) Building accessories
   c) Window accessories
   d) Vehicle Bay accessories

☐ 11) Complete roof plans with roof drainage system and mechanical components located on or penetrating roof.

☐ 12) Exterior finishes and color determined.

☐ 13) Storage systems for materials, parts, and other inventory determined. Waste receptacle size and location.

☐ 14) Final demolition/deconstruction plan determined.

☐ 15) Exterior door weatherproofing and bird proofing detail.

☐ 16) Final exterior signage and address size and location determined. Show on exterior elevation.

- C) Structural System
  ☐ 1) Basic structural system completed
  ☐ 2) Complete foundation/slab plans (consider weight of vehicles)
  ☐ 3) Complete floor plans
  ☐ 4) Complete floor framing plans
  ☐ 5) Complete structural roof plans
  ☐ 6) Preliminary structural calculations completed- with major structural components sized.
  ☐ 7) Preliminary foundation and footing details
  ☐ 8) Preliminary structural details- including construction details for support of mechanical equipment, exhaust system, hoists, and vehicle service equipment (oil, lube, and air).

- D) Civil Site Plan System
  ☐ 1) Final site demolition plan
  ☐ 2) Final grading plan - including contours, cross sections and spot elevations
  ☐ 3) Updated estimate of fill and excavation quantities
  ☐ 4) Location of new utilities determined
  ☐ 5) Utility connections determined
  ☐ 6) Final pavement section and details
  ☐ 7) Preliminary design of detention and water quality facilities - including:
      a) Location of detention and water quality facilities
      b) Layout of detention and water quality facilities
      c) Size and location of conveyance system
      d) Size and location of catch basins
  ☐ 8) Preliminary design of rainwater harvesting plans
9) Parking lot layout- including location of parking stalls
10) Preliminary channelization plans
11) Preliminary landscaping plans - including concept layout am/ plant types determined
12) Preliminary irrigation system plans
13) Preliminary erosion and sedimentation control plans
14) Preliminary design of traffic mitigation
15) Location of construction staging area determined
16) Geotechnical conditions investigated
17) Fencing/security plan determined.

E) Mechanical & Plumbing System
1) Final selection of basic mechanical equipment
2) Equipment schedule - known equipment is scheduled
3) Mechanical equipment's specifications determined- including size, weight, electrical load, ducting and piping requirements, etc.
4) Preliminary piping plans and section views
5) Preliminary HVAC plans and section views
6) Preliminary plumbing plans, determine special emergency washing fixtures
7) Final sizing and location of plumbing systems
8) Plumbing riser diagram
9) Preliminary fire protection plans-showing location of fire sprinkler areas and standpipes protected and hazard
10) Preliminary partial plans of mechanical rooms
11) Preliminary partial plans of toilet rooms
12) Final location of mechanical equipment
13) Final sizing and location of piping system mains and branches
14) Piping pressure loss calculations
15)
16) Final size and location of ducting/piping system and louver mains and branches
17) Ductwork and louver pressure loss calculations
18) HVAC equipment fan and system curves
19) Preliminary building components "U" value calculations
20) Preliminary mechanical details
21) Preliminary energy code calculations
22) Water systems isometric drawings

F) Electrical System
1) Complete lighting layout- including lighting calculations and fixture schedule
2) Complete receptacle layout
3) Complete power plan identifying electrical loads of all equipment
4) Location and size of electrical service panels determined - including panel schedules and emergency
generator interface

☐ 5) Size and location of fire alarm panels determined- coordinated with fire sprinkler system
☐ 6) Power factor analysis
☐ 7) Special electrical equipment identified and located
☐ 8) Establish corridors and layout strategies for conduit
☐ 9) Determine lighting system and operations for night staging of vehicles outside adjacent to building.

■ G) Instrumentation and Control System
   ☐ 1) Preliminary location of alarm devices determined
   ☐ 2) Fire alarm/suppression system and annunciator wiring diagram
   ☐ 3) Location of telecommunication and data connections determined
   ☐ 4) Preliminary control schematics
   ☐ 5) Preliminary security and access control plans
   ☐ 6) AC/DC power distribution wiring diagrams

VEM FACILITY

❖ 90% Submittal- Definition

❖ A) Project Needs
   ☐ 1) Final construction schedule and estimate of construction duration
   ☐ 2) Construction phasing plan
   ☐ 3) Final construction staging plan with access to construction staging area obtained or final staging area to be obtained by contractor identified.
   ☐ 4) Engineer's cost estimate for bid and backup documentation
   ☐ 5) All land use permits received
   ☐ 6) Complete set of stamped permit application drawings and documents
   ☐ 7) Completed set of project permit applications excluding contractor obtained permits
   ☐ 8) Report on implementation of LEED
   ☐ 9) Complete set of technical specifications
   ☐ 10) Complete application to King County Contract Compliance section for apprenticeship and W/MBE requirements
   ☐ 11) Complete set of documents for King County Contract Section - i.e. Summary of work, Bid tabs, etc.
   ☐ 12) Complete list of special conditions related to construction - i.e. Division I specifications
   ☐ 13) Response on incorporation of 60% comments completed

❖ B) Architectural System
   ☐ 1) Complete set of architectural drawings
   ☐ 2) Final architectural details - coordinated with structural system details
   ☐ 3) Special construction details completed
   ☐ 4) Complete reflected ceiling plan
   ☐ 5) All interior furniture identified
6) Room finish schedule - including:
   a) color selection
   b) floor selection
   c) wall finish
   d) ceiling finish
7) Door schedule- including hardware, provide master key plan working with Airport’s access control specialist.
8) Window schedule- including hardware
9) Architectural accessories schedule
10) Exterior finishes and color schedule

C) Structural System
1) Complete set of structural drawings
2) Final structural details- coordinated with architectural system details
3) Permit set of stamped structural calculations
4) Final foundation and footing details
5) Final structural details- including construction details
6) Final structural calculations
7) Performance requirements for shoring system identified

D) Civil Site Plan System
1) Final estimate of fill and excavation quantities
2) Location of new utilities finalized
3) Utility connections finalized
4) Final design of detention and water quality facilities
5) Final channelization plans
6) Final signing plans
7) Final design of rainwater harvesting plans
8) Final landscaping plans - including plant schedule
9) Final irrigation system plans
10) Final erosion and sediment control plans
11) Final design of traffic mitigation
12) Permit set of stamped storm water management calculations
13) Surface Water Pollution Prevention Plans (SWPPS)

E) Mechanical System
1) Complete equipment schedule
2) Final piping plans
3) Final HVAC plans
4) Final plumbing plans
5) Final fire protection plans and performance specifications
6) Final section views
7) Final plans of mechanical rooms
8) Final plans of mechanical rooms - i.e. kitchen, restrooms, etc.
9) Final control diagrams-including:
   a) Control points list
   b) Final sequence of operation
10) Final building components "U" value calculations
11) Final mechanical details
12) Final energy code calculations

F) Electrical System
1) Lighting and receptacles circuited
2) Special electrical equipment circuited
3) Final panel schedules-showing balanced loads
4) Final arc flash analysis
5) Final electrical fixture schedule
6) Complete one line diagrams which are directly applicable to the panel schedules
7) Final electrical details
8) Final electrical load calculations including emergency generator system

G) Instrumentation and Control System
1) Final control schematics
2) Final security and access control plans
3) Final location of alarm devices determined
4) Final PLC/DCS wiring diagram