Drawings (five types):

1. Preliminary Drawings (design concepts)
2. Contract drawings
3. Working drawings (actual construction)
4. Shop drawing (between design and construction)
5. As-built drawings (as completed or executed)
Pre - Drawing Activities

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- Bidding and construction information conveyed by two major devices:
  - Specifications (written material)
  - Drawing (graphic presentation)
Preliminary Activities

Provide design concept schematics
Outline & single line drawings
DFR’s (Diagram of functional relationship)
Sketches or renderings
Always submitted for approval
Preliminary drawings prepared to the degree that owner can visualize the total project.
Preliminary drawings complete enough to allow the preparation of a realistic budget estimate.
Anything that can contribute to a more complete understanding of the client shall be considered.
Contract Drawings

- The contract drawings are used as an essential part of the contract

- Keep a set on the job with all changes and revisions posted

- Assign someone this responsibility
Based on the design presented in the preliminary drawings, approved by owner.

The approved design is not changed but it is further developed, defined, and improved.

Working drawings together with specifications give complete picture of the project.

Used by several groups of people. Hence should be prepared to meet the requirement of each group.

Contain detail dimensioning information that establishes:

- Sizes, Relationships, and Location of all elements of the project.
Shop Drawings

- Shop drawings are reviewed by the design professional

- Approval of the shop drawings by Design Professional is a restricted approval

  (check against the intent of design drawings only)
Shop Drawings

- Shop drawings are actually an extension and further development of working drawings.

- Shop drawings do not change the intent of the working drawings.

- Prepared by subcontractors or material suppliers. In some cases also by the general contractor.

- Shop drawings are provided for works such as: Installation and fabrication, structural steel, mill work, metal windows and doors, pipes and pumps and etc.....
Shop Drawings

- Responsibility of errors and omissions in shop drawings lies with the contractor/subcontractor.
- **Timely** approval of shop drawings is of prime importance!
- Shop drawings approval may effect project schedule, if not submitted on time.
- Record shop drawings in contractor’s submittal log.
- Shop drawings should be stamped and dated immediately upon receipt.
Most specifications require that the contractor refrain from ordering material until the shop drawings are approved officially. (IN WRITING)

Usually these are “location drawings” to which the owner may refer for maintenance and repairs.

Working drawings show ”proposed” locations for pipes, valves, man holes, etc......, as built drawings show “actual” locations, of installations.

Usually general contractor or sub-contractors prepare as-built drawings.

Requirement for as-built drawing, should be included in bidding documents.
As-Built Drawings

- If not included in the contract documents, and if required legally, can be added by issuing a change order.

- The term as-built drawings is unpopular because of some legal difficulties with some design professionals. (FISK)
Legal Requirements

- Seal of design professional
- Seal of surveyors for site drawings
- Seal of AE for general project drawings
- Seal on various supporting drawings by related design professional e.g. Landscape architect, mechanical/electrical engineer.

- Each drawing sheet must contain a title block with
  - Number of project and sheet
  - Date of drawings
  - Type of information (plan, section)
  - Name of design professional
  - Checked by, date checked, etc.
Order Of Precedence

Some legal precedence has been established; many General Conditions cite the specific order so that a dispute may be settled.

It is desirable to establish some hierarchy between various parts of contract documents

When a specific listing of order is specified in the contract documents, that order will govern over policy listed in the following guide
Precedence

The contract documents are supplementary; what is called for in one is as binding as if called for in all. If the contractor finds a conflict, error, or discrepancy in the contract documents, it should be called to the attention of the AE, in writing, before proceeding with the work.

In resolving such conflicts the documents give preference in the following order:

1. Agreement
2. Specifications
3. Drawings
Precedence

**FISK**

- Agreement governs over specifications
- Specifications govern over drawings
- Detail specifications govern over general specifications
Precedence

Within the specifications, the order of precedence:

1. Addenda
2. Supplementary General Conditions (Special Conditions)
3. Instruction to Bidders
4. General Conditions
6. Standard Specifications
Precedence

Within Drawings:

1. Figures govern over scaled dimensions
2. Detail dwgs govern over general drawings
3. Change order dwgs govern over contract drawings
4. Contract dwgs govern over standard dwgs
5. Contract dwgs govern over shop drawings
6. Shop dwgs that deviate substantially from the requirement of the contract documents must be accompanied by a written change order.