

# Project Documents

## Construction Documents

- **The Purpose of Construction Documentation**
- **Communicating to the owner**, in detail, what the project involves
- **Establishing the contractual obligations the owner and contractor** owe each other during a project
- **Laying out the responsibilities** of the architect or any other party administering or managing construction contracts for the owner
- **Communicating to the contractor the quantities, qualities, and configuration of the elements to construct** the project. In turn the contractor uses the documentation to solicit bids or quotations to the subcontractors and suppliers.

# PROJECT DOCUMENTS

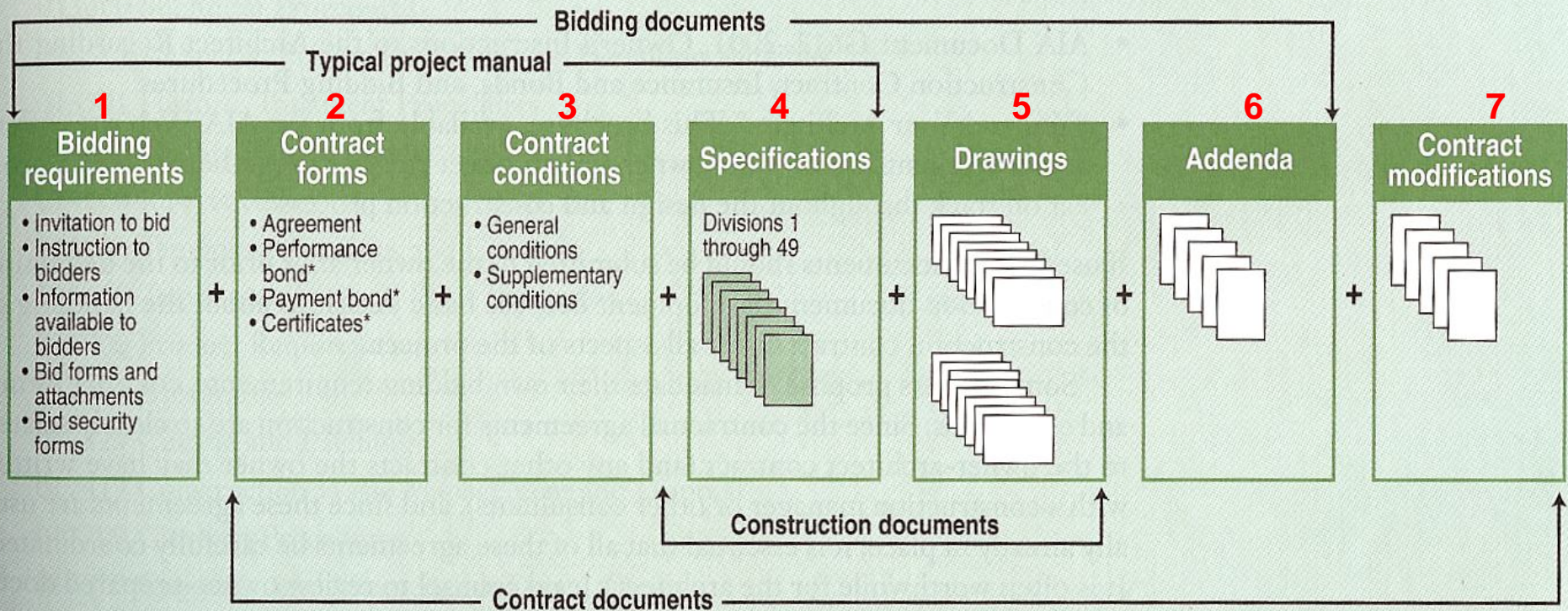
A variety of document types must be produced to accomplish building design and construction.

The *project manual* includes the bidding requirements, contract forms and conditions, and specifications.

*Bidding documents* are the documents required to bid or negotiate the construction contract.

*Construction documents* are the drawings and the specifications the architect prepares to set forth the requirements for construction of the project.

*Contract documents* form the legal agreement between the owner and contractor.



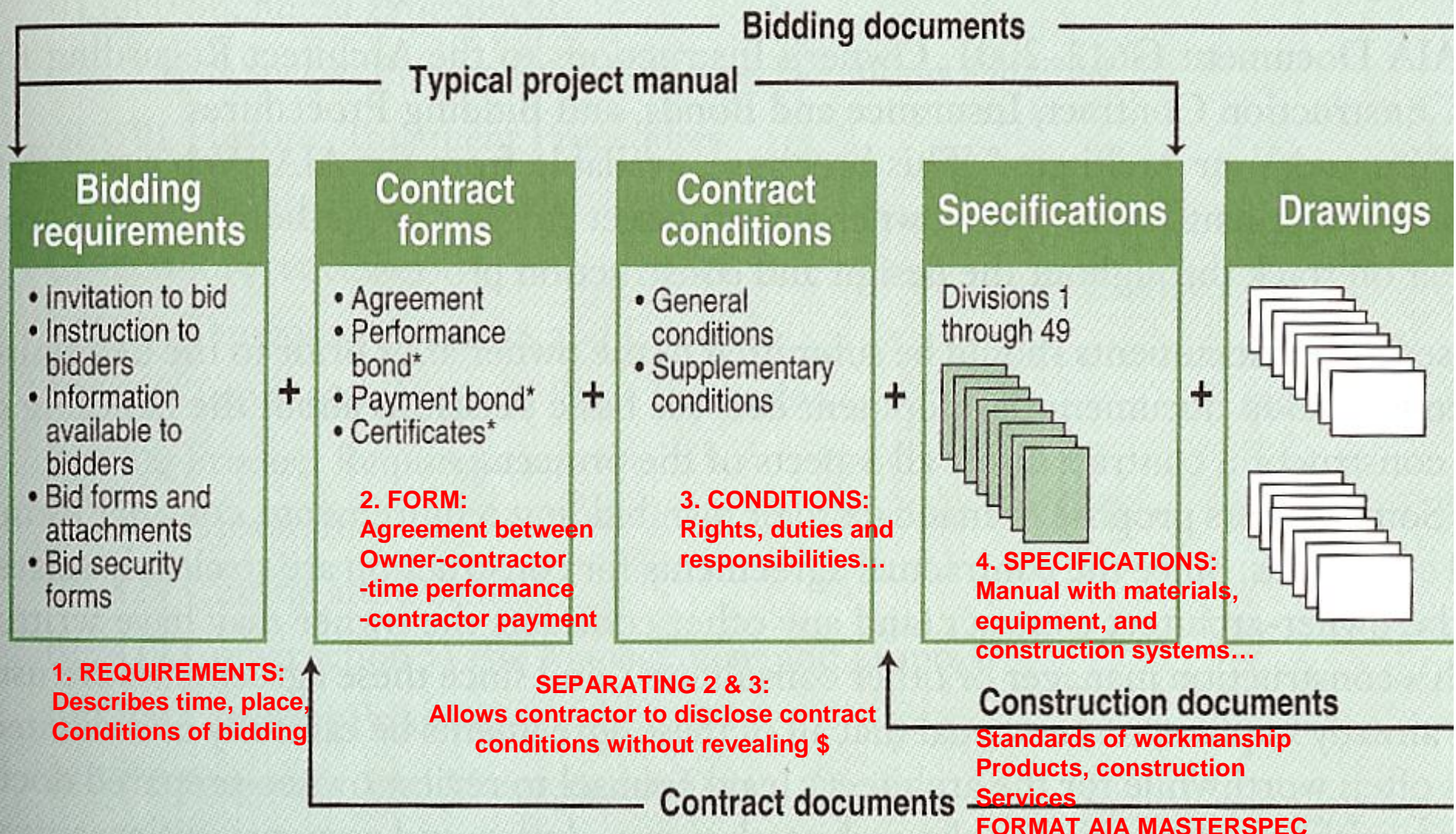
\* These become contract documents when the owner-contractor agreement is signed if they have been included in the agreement.

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*Bidding documents* are the documents required to bid or negotiate the construction contract.

requirements for construction. *Contract documents*

between the owner and contractor.



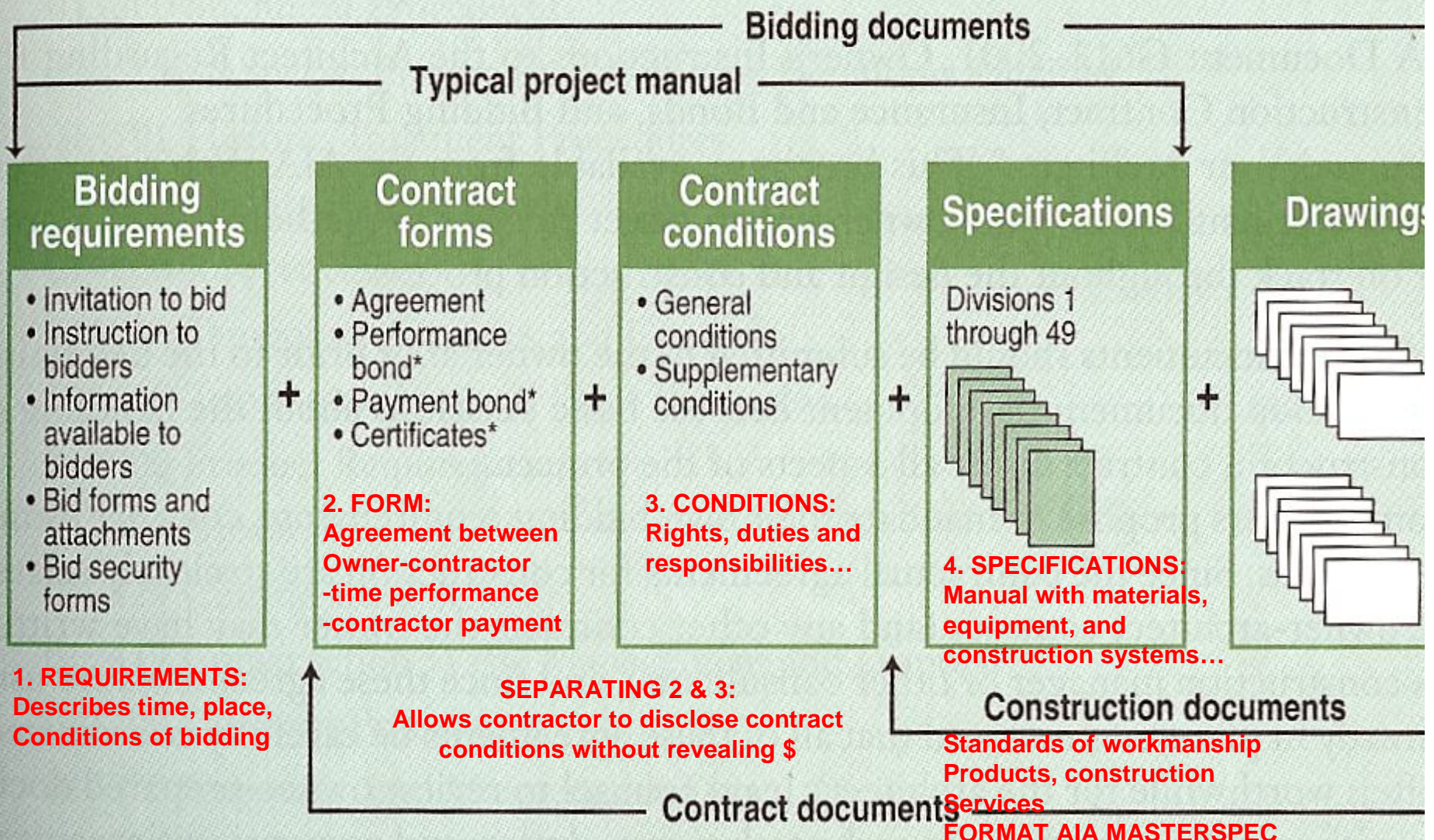
- Examples

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requirements for c  
Contract docu

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between the owner



## MASTERSPEC DIVISIONS AND SECTIONS

Master Outline Specifications Table of Contents, AIA Master Systems (1999)

This outline, based on the MasterFormat developed by the Construction Specifications Institute, is used by AIA Master Systems for its Master Outline Specifications.

### Division 1—GENERAL REQUIREMENTS

01000 General requirements  
01013 Summary of work (FF&E)

### Division 2—SITE CONSTRUCTION

02060 Building demolition  
02230 Site clearing  
02240 Dewatering  
02260 Excavation support and protection  
02300 Earthwork  
02361 Termite control  
02455 Driven piles  
02511 Hot-mix asphalt paving  
02630 Storm drainage  
02751 Cement concrete pavement  
02780 Unit pavers  
02900 Landscaping  
02930 Lawns and grasses

### Division 3—CONCRETE

03300 Cast-in-place concrete  
03331 Cast-in-place architectural concrete  
03410 Plant-precast structural concrete  
03450 Plant-precast architectural concrete  
03511 Cementitious wood-fiber deck  
03532 Concrete floor topping  
03542 Cement-based underlayment

### Division 4—MASONRY

04410 Stone masonry veneer  
04720 Cast stone  
04810 Unit masonry assemblies  
04851 Dimension stone cladding

### Division 5—METALS

05120 Structural steel  
05210 Steel joists  
05310 Steel deck  
05400 Cold-formed metal framing  
05500 Metal fabrications  
05511 Metal stairs  
05521 Pipe and tube railings  
05700 Ornamental metal  
05720 Ornamental handrails and railings  
05811 Architectural joint systems

### Division 6—WOOD AND PLASTICS

06100 Rough carpentry  
06130 Heavy timber construction  
06130 Wood decking  
06185 Structural glued-laminated timber  
06192 Metal-plate-connected wood trusses  
06200 Finish carpentry  
06401 Exterior architectural woodwork  
06402 Interior architectural woodwork  
06420 Paneling

### Division 7—THERMAL AND MOISTURE PROTECTION

07131 Self-adhering sheet waterproofing  
07132 Elastomeric sheet waterproofing  
07190 Water repellents  
07210 Building insulation  
07241 Exterior insulation and finish systems—class PB

07242 Exterior insulation and finish systems—class PM  
07311 Asphalt shingles  
07313 Metal shingles  
07315 Slate shingles  
07317 Wood shingles and shakes  
07460 Siding  
07511 Built-up asphalt roofing  
07512 Built-up coal-tar roofing  
07531 EPDM single-ply membrane roofing  
07532 CSPE single-ply membrane roofing  
07610 Sheet metal roofing  
07620 Sheet metal flashing and trim  
07720 Roof accessories  
07810 Plastic unit skylights  
07920 Joint sealants

### Division 8—DOORS AND WINDOWS

08110 Steel doors and frames  
08114 Custom steel doors and frames  
08163 Sliding aluminum-framed glass doors  
08211 Flush wood doors  
08212 Stile and rail wood doors  
08263 Sliding wood-frame glass doors  
08305 Access doors  
08314 Sliding metal fire doors  
08331 Overhead coiling doors  
08410 Aluminum entrances and storefronts  
08460 Automatic entrance doors  
08510 Steel windows  
08520 Aluminum windows  
08550 Wood windows  
08610 Roof windows  
08710 Door hardware  
08800 Glazing  
08840 Plastic glazing

### Division 9—FINISHES

09210 Gypsum plaster  
09251 Factory-finished gypsum board  
09253 Gypsum sheathing  
09260 Gypsum board assemblies  
09310 Ceramic tile  
09385 Dimension stone tile  
09400 Terrazzo  
09511 Acoustical panel ceilings  
09513 Acoustical snap-in metal pan ceilings  
09600 Stone paving and flooring  
09640 Wood flooring  
09651 Resilient tile flooring  
09652 Sheet vinyl floor coverings  
09653 Resilient wall base and accessories  
09654 Linoleum floor coverings  
09680 Carpet  
09681 Carpet tile  
09900 Painting  
09920 Interior painting  
09931 Exterior wood stains  
09950 Wall coverings  
09967 Intumescent paints  
09981 Cementitious coatings

### Division 10—SPECIALTIES

10100 Visual display boards

10155 Toilet compartments  
10200 Louvers and vents  
10270 Access flooring  
10350 Flagpoles  
10416 Directories and bulletin boards  
10425 Signs  
10505 Metal lockers  
10520 Fire-protection specialties  
10550 Postal specialties  
10605 Wire mesh partitions  
10615 Demountable partitions  
10655 Accordion folding partitions  
10671 Metal storage shelving  
10750 Telephone specialties  
10801 Toilet and bath accessories

### Division 11—EQUIPMENT

11054 Library stack systems  
11062 Folding and portable stages  
11063 Stage curtains  
11132 Projection screens  
11150 Parking control equipment  
11160 Loading dock equipment  
11170 Waste compactors  
11307 Packaged sewage pump stations  
11400 Food service equipment  
11451 Residential appliances  
11460 Unit kitchens  
11610 Laboratory fume hoods  
11695 Mailroom equipment

### Division 12—FURNISHINGS

12311 Metal file cabinets  
12320 Restaurant and cafeteria casework  
12347 Metal laboratory casework  
12348 Wood laboratory casework  
12353 Display casework  
12356 Kitchen casework  
12510 Office furniture  
12567 Library furniture

### Division 13—SPECIAL CONSTRUCTION

13052 Saunas  
13090 Radiation protection  
13100 Lightning protection  
13110 Cathodic protection  
13125 Metal building systems  
13720 Intrusion detection

### Division 14—CONVEYING SYSTEMS

14100 Dumbwaiters  
14210 Electric traction elevators  
14240 Hydraulic elevators  
14310 Escalators  
14320 Moving walks  
14420 Wheelchair lifts  
14560 Chutes

### Division 15—MECHANICAL

### Division 16—ELECTRICAL

Not included in Master Outline Specifications

## MASTERFORMAT SECTION OUTLINE

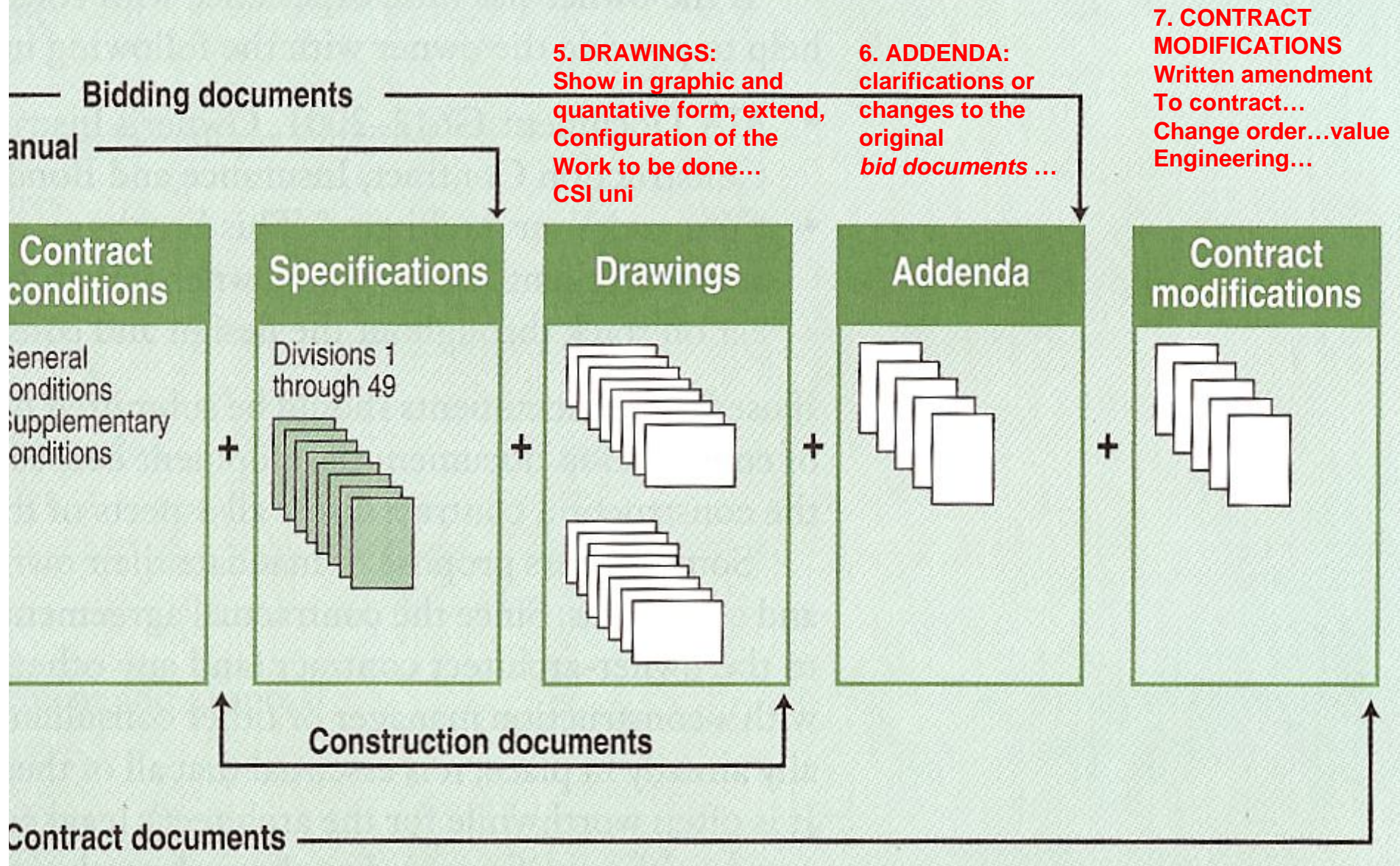
Construction Specifications Institute, Manual of Practice (1996)

Each specification section is presented in these three parts:

<b>Part 1—General</b>	SEQUENCING	<b>Part 3—Execution</b>
SUMMARY		EXAMINATION
Section includes:	SCHEDULING	Site verification of conditions
Products supplied but not installed under this section	WARRANTY	PREPARATION
Products installed but not supplied under this section	Special warranty	Protection
Related sections	SYSTEM STARTUP	Surface preparation
Allowances		ERECTION
Unit prices	OWNER'S INSTRUCTIONS	INSTALLATION
Measurement procedures	COMMISSIONING	APPLICATION
Payment procedures		CONSTRUCTION
Alternates	MAINTENANCE	Special techniques
REFERENCES	Extra materials	Interface with other work
	Maintenance service	Sequences of operation
DEFINITIONS		Site tolerances
SYSTEM DESCRIPTION	<b>Part 2—Products</b>	
Design requirements	MANUFACTURERS	REPAIR/RESTORATION
Performance requirements	EXISTING PRODUCTS	REINSTALLATION
SUBMITTALS	MATERIALS	FIELD QUALITY CONTROL
Product data	MANUFACTURED UNITS	Site tests
Shop drawings	EQUIPMENT	Inspection
Samples	COMPONENTS	Manufacturer's field services
Quality assurance/control submittals	ACCESSORIES	ADJUSTING
Design data	MIXES	CLEANING
Test reports	FABRICATION	DEMONSTRATION
Certificates	Shop assembly	PROTECTION
Manufacturer's instructions	Fabrication tolerances	SCHEDULES
Manufacturer's field reports	FINISHES	
Qualification statements	Shop priming	
Closeout submittals	Shop finishing	
QUALITY ASSURANCE	SOURCE QUALITY CONTROL	
Qualifications	Fabrication tolerances	
Regulatory requirements	Tests	
Certifications	Inspection	
Field samples	Verification of performance	
Mockups		
Preinstallation meetings		
DELIVERY, STORAGE, AND HANDLING		
Packing, shipping, handling, and unloading		
Acceptance at site		
Storage and protection		
Waste management and disposal		
PROJECT/ SITE CONDITIONS		
Environmental requirements		
Existing conditions		

adding requirements,  
specifications.  
documents required to bid

requirements for construction of the project.  
*Contract documents* form the legal agreement  
between the owner and contractor.





column grid, and then measure distances from the column

## DRAWING SEQUENCE: THE CONDOC® SYSTEM

Most architects—and some owners—develop their own preferences for sequencing and numbering drawings. The ConDoc system offers the following format. Each discipline is subdivided into groups (only architecture is illustrated).

**G** General project requirements

### *Sitework*

**TS** Topographic survey

**SB** Soil borings data

**SD** Site demolition

**C** Civil

**L** Landscaping

### *Major disciplines*

<b>A</b> Architecture A000, A001, etc.	Schedules, master keynote legend, general notes
A100, A101, etc.	Plans
A200, A201, etc.	Exterior elevations, transverse building sections
A300, A301, etc.	Vertical circulation, core plan and details
A400, A401, etc.	Reflected ceiling plans, details
A500, A501, etc.	Exterior envelope, details
A600, A601, etc.	Architecture interiors

**S** Structural

**M** Mechanical

**P** Plumbing

**FP** Fire protection

**E** Electrical

### *Special elements*

**ID** Interior design

**FS** Food service

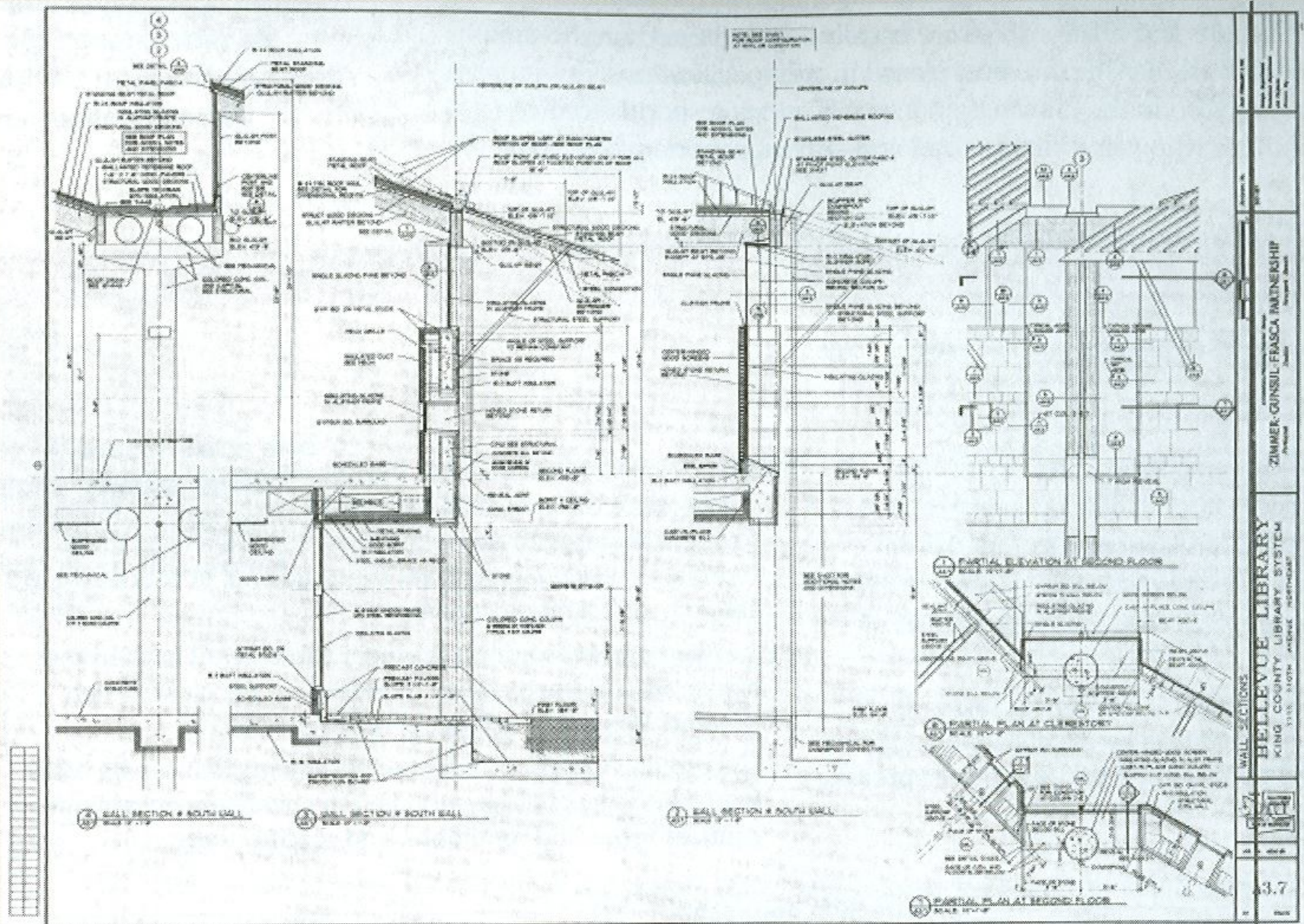
**SG** Signage/graphics

**FF** Furniture/furnishings

**AA** Asbestos abatement

Etc.

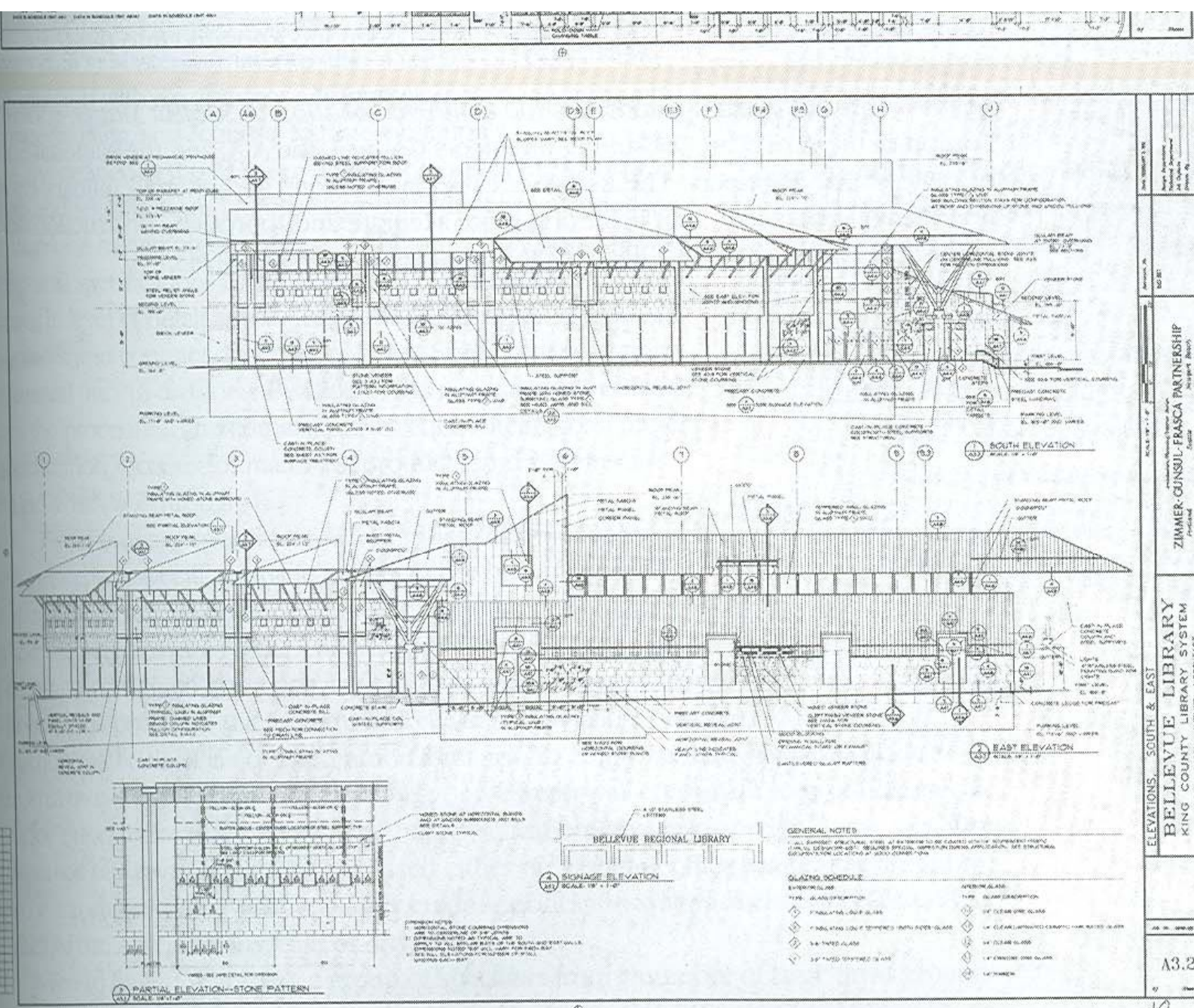
# Sample Construction Drawing



Construction documents are a critical component of the information bidding process for construction projects. They provide the project team with the information needed to build the project.

Zimmerman Partners  
Oregon





Scale: 1/8" = 1'-0"  
 Project: BELLEVUE REGIONAL LIBRARY  
 Architect: ZIMMER-GENSU-FRASCA PARTNERSHIP  
 Location: 1111 110TH AVENUE, NORTHEAST  
 Drawing No.: A3.2

- GENERAL NOTES**
1. ALL DIMENSIONS UNLESS OTHERWISE NOTED ARE TO FACE UNLESS OTHERWISE SPECIFIED.
  2. ALL DIMENSIONS UNLESS OTHERWISE NOTED ARE TO FACE UNLESS OTHERWISE SPECIFIED.
  3. ALL DIMENSIONS UNLESS OTHERWISE NOTED ARE TO FACE UNLESS OTHERWISE SPECIFIED.
- GLAZING SCHEDULE**
- | SYMBOL | DESCRIPTION                               | SYMBOL | DESCRIPTION                        |
|--------|---|--------|------------------------------------|
| ◆      | EXTERIOR GLASS                            | ◆      | 1/2" CLEAR GLASS                   |
| ◆      | TYPE GLASS DESCRIPTION                    | ◆      | 1/4" CLEAR GLASS                   |
| ◆      | INSULATED GLAZING GLASS                   | ◆      | 1/2" CLEAR GLASS WITH TINTED GLASS |
| ◆      | INSULATING GLAZING UNIT WITH TINTED GLASS | ◆      | 1/4" CLEAR GLASS                   |
| ◆      | 5/8" TINTED GLASS                         | ◆      | 1/2" CLEAR GLASS                   |
| ◆      | 3/4" TINTED GLASS                         | ◆      | 1/4" CLEAR GLASS                   |
| ◆      | 1/2" TINTED GLASS                         | ◆      | 1/4" CLEAR GLASS                   |

**DIMENSION NOTES**

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3. DIMENSIONS UNLESS OTHERWISE NOTED ARE TO FACE UNLESS OTHERWISE SPECIFIED.

Construction drawings—together with construction specifications—are used to obtain regulatory and financial approvals, to determine cost of construction through bidding or negotiation, and finally to carry

# Bidding or Negotiating Phase

The procurement of construction services brings together the team and resources needed to translate building plans into physical reality.

The Architect can assist/advise the client in obtaining competent construction bids or negotiating the construction contract.

One of Basic services. During competitive bids or negotiated proposals are sought as the basis for awarding a contract.

Maybe 4 weeks for bidding and 4 weeks for review, selection and negotiation of contractor.

What are the dynamics involved in bidding for a project?

[http://www.youtube.com/watch?v=lah20Go6\\_lc&feature=related](http://www.youtube.com/watch?v=lah20Go6_lc&feature=related)

**Negotiating vs. Bidding is TIME.** Time can be saved by eliminating the bid period when a contract is negotiated directly with a preselected contractor, using different forms of agreements ( owner/contractor, Cost Plus a Fee, GMP, CM services...).

### **Bidding Process**

- Prequalification of Bidders ( pre-selected based on performance, integrity, reputation...)
- Preparation of Bidding Documents (should begin with the selection of the project delivery method and the structure of the construction contracts)
  - Advertise for Bids (invitation, announcement...)
  - Provide Instructions to Bidders (procedures, for of agreement...)
- Prepare a Bid Form ( ensures that all bids will be submitted in an identical format)
- Owner-Contractor Agreement Form ( contract documents explaining the rights, duties, and obligations of the two parties)
- Performance Bond (it is a guarantee that if the contractor fails to perform, it will be covered, and also protects against default of subcontractors)
- Labor and Material Bond ( payment bond , it is a guarantee that the project will be paid, it protects the owner from claims against unpaid suppliers and subcontractors in the event of the default of the contractor)
- Addenda( review of the bidding documents, revisions)

## Management and Control of the Bidding Process

- ***Distribution of the bidding documents.*** Bidders should have complete access to all drawings and specs
- ***Distribution of addenda and notices.*** List of contractors who have received bid docs.
- ***Pre-bid conference.*** Provide clear and consistent understanding of the project requirements and scope
- ***Receipts of bid.*** Instructions on how to submit proposals
- ***Bidding results.*** Final selection of the contractor by the owner, w/ the assistance of the Architect
- ***Errors, withdrawals, and revocations.*** Bidders have until this date to withdraw their bid proposal
- ***Bid bond.*** Provide a bid security allow the bidder if selected to enter into a formal agreement with the owner.
- ***Evaluation of Bids.*** Evaluate the proposals
- ***Negotiation of Bids.*** Time in which minor changes are negotiated with the selected bidder
- ***Rejection of bids.*** The owner reserves the right to reject any or all bids
- ***Notification of bidders.*** All bidders are notified which contractor has been selected
- ***Contract award.*** Preparation of a contract that should be signed by the contractor and owner
- ***Letter of intent.*** If the owner wants to move forward and not wait for the contract agreement, he may write a letter of intent, allowing the selected contractor to begin work
- ***Preconstruction conference.*** The conference will provide everyone involved with an understanding of project procedures, requirements, due dates, and special characteristics.



## **Avoiding Bidding Problems**

- Understanding the bid –drawings should be accurate
- Bids based on insufficient construction documents-all documents should be provided for a precise bid proposal
- Use of Alternates/Substitutions –precise description of alternates should be specified
- Managing Addenda –addenda should be dated and sequentially numbered
- Keeping the design team involved –the architect project manager and all involved in the preparation of drawings should be available during the construction phase
- Responding to bidder questions–all bidder questions should be submitted to the architect in writing, and vice versa for the answers.
- Use of legal and insurance consultants –make sure agreements are back up by an insurance agent and lawyer.

# Controlling Construction Cost on Bid Projects

## Two main causes of cost overruns:

- Owner program changes
- Uncoordinated documents

## To Avoid Cost Overruns:

Detailed Programming

Detailed Cost Estimates

Preconstruction Services from a GC or CM

Use of Program Manager

Peer Reviews

Regulatory agency or building department reviews

Design-Build cost control

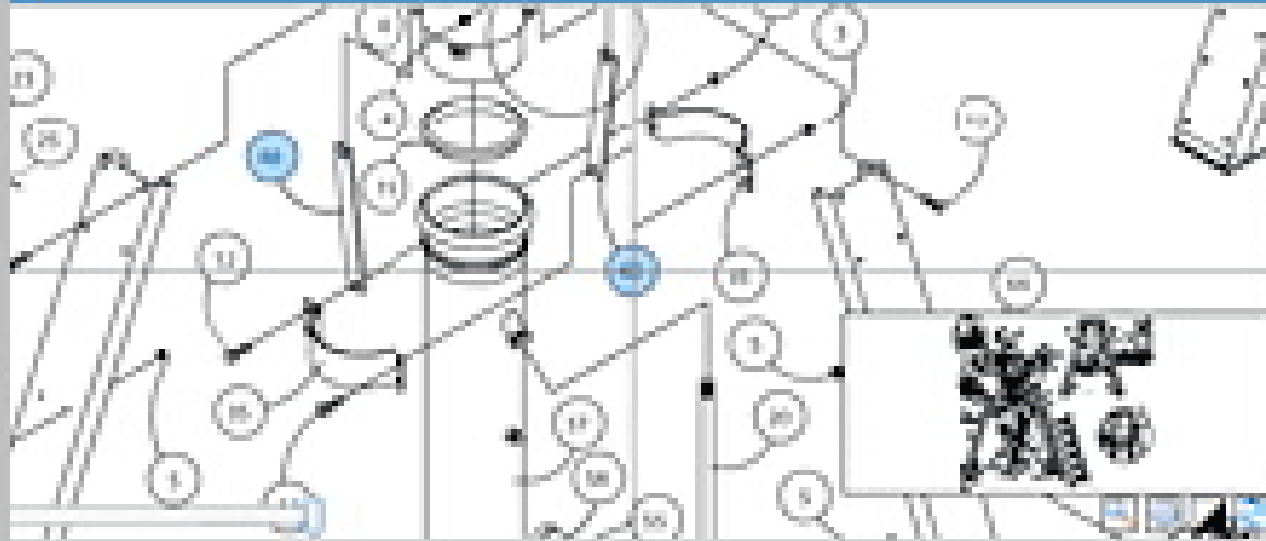


...Future...



Diagram Alternate Views Diagram Notes

2150 (Fixed Standard)



Add Checked to Order

Update

Qty	Part #	Description	
1	81118	ROB-LOCK PIN	<input type="checkbox"/>
2	81091-G	STRAP-SUPT-PTH-CTR PIPE BRG	<input type="checkbox"/>
2	81091-G	HALF-CLMP 18 PTH-CTR LWR BRACE	<input type="checkbox"/>
1	81599	SEAL-RING 10"	<input type="checkbox"/>
1	82081	DIAPHR-ARREST W/1.5WR STD-2121	<input type="checkbox"/>
2	817	NUT F1928 ZC	<input type="checkbox"/>
3	820	WASHER 1 IN P/T 1/55 ZC	<input type="checkbox"/>
4	81028	BOLT-ANCHOR 1.5 IN DIA/8MM	<input type="checkbox"/>

Refresh

Part Info

**STRAP-SUPT-PTH**

Part #

Superseding

Part #

List Price

Your Price

Qty

Add

Add

Diagram Tools

Related Diagrams

BOLT 1/2NC X 1 1/2

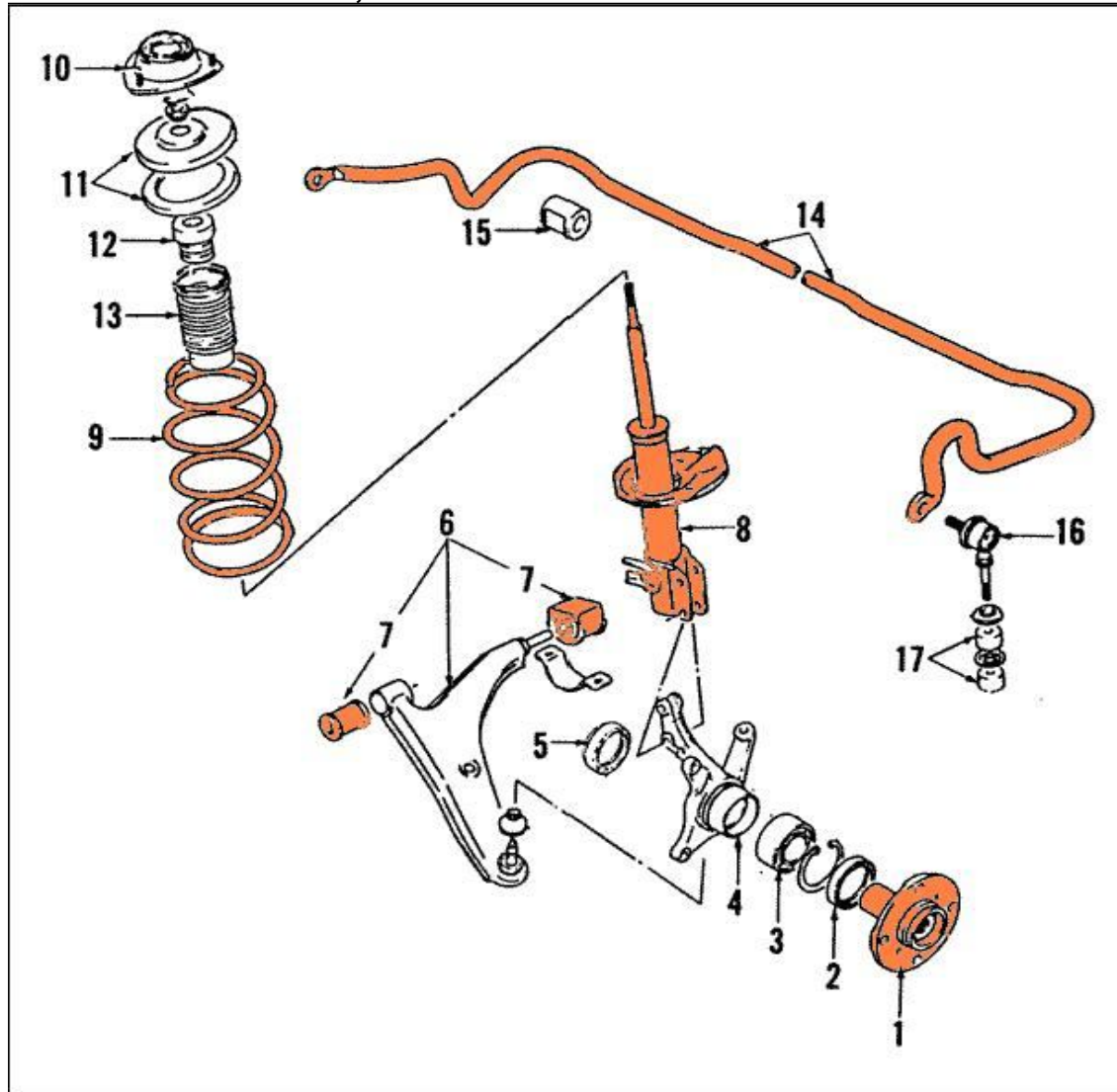
GASKET-10" COU

BOLT 3/8NC X 1 1/2

CONNECTOR-14

# Motivation. Parts purchasing

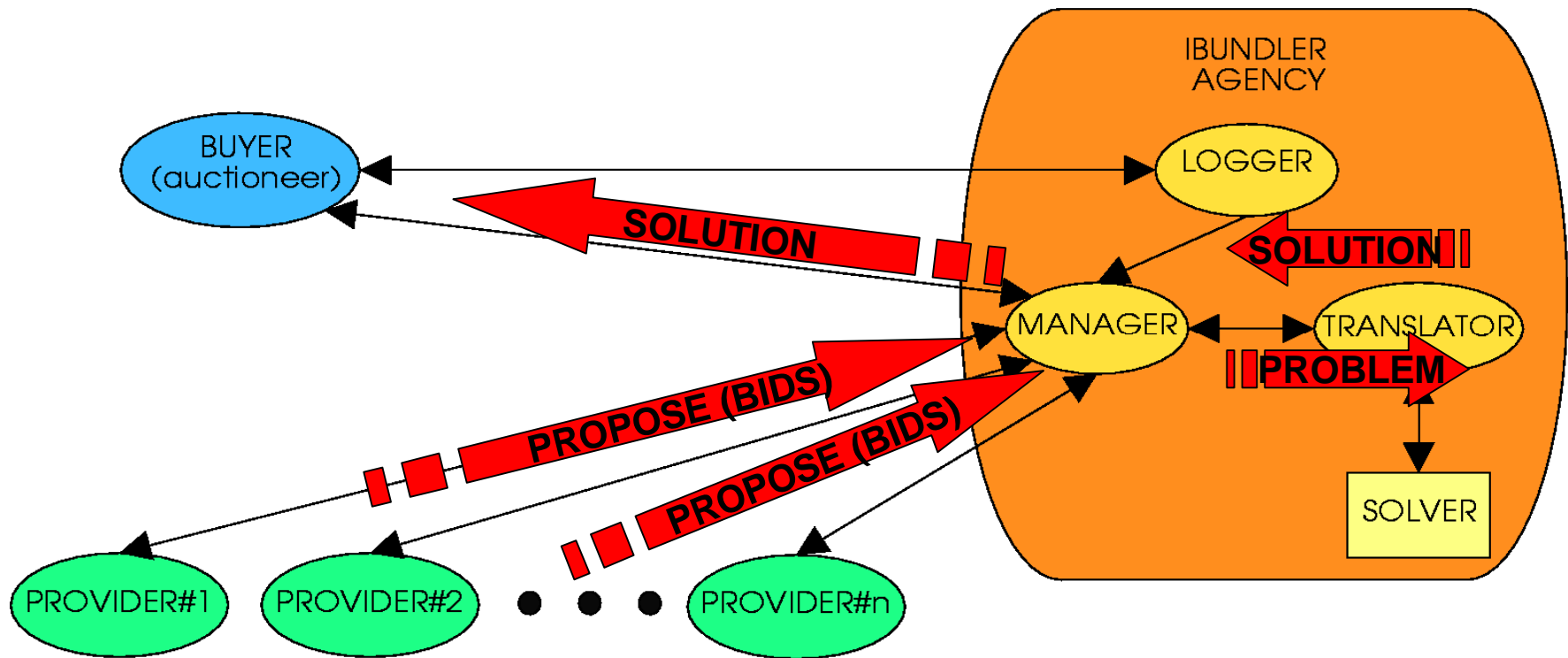
## FRONT SUSPENSION, FRONT WHEEL BEARING ACQUISITION



**GOAL: BUY PARTS TO  
PRODUCE 200 CARS**

PART NUMBER	DESCRIPTION	UNITS
1	FRONT HUB	2
7	LOWER CONTROL ARM BUSHINGS	3
8	STRUT	4
9	COIL SPRING	2
14	STABILIZER BAR	1

# Service Architecture



# iBundler @ work

