



PLAN CHECK GUIDELINES

How to improve on your submittals for residential projects plan check and reduce time and frustrations as you obtain your building permit.



Introduction

The guidelines below, while not all-inclusive, are intended to help you prepare documents that are essentially "complete" when submitting for residential projects plan check. A complete set of documents allows the plans examiner to (hopefully) approve them, but even if corrections are needed, a "complete" set of documents usually only requires a single set of revisions.

Remember- the design documents are legal instruments that convey information to many people with diverse backgrounds that will be involved in your project. If they are clear and complete, your goal of obtaining the building permit and realizing your dream is that much closer.

For additional resources to help you prepare permit documents or ask code-related questions, consider using the following:

- Building Code Discussions Group (BCDG): <http://bcodes.infopop.net>
- World of Building Codes: www.NAFFAinc.com
- CodeBuddy- online building code lookup program: 
<http://www.naffa.com/x/CB2/index.html>

Before You Design

◇ Research your parcel! Many plan review issues center around planning considerations such as building setbacks, building height, drainage easements, coastal commission issues, airport safety districts, or flood zones. Obtain a copy of the Subdivision Map, Parcel Map, or Record of Survey, as well as the Grant Deed. Contact the Planning Dept. and give them your Assessor's Parcel Number (APN) to learn the zoning of the parcel, and the setback requirements from property lines and road easements (you can find your APN on your property tax bill). Note that these restrictions generally apply to buildings of all types: dwellings, garages, accessory buildings, barns, etc.

◇ Consider the physical characteristics of the land and the (above) restrictions prior to finalizing the design and placement of your structure. Even if your parcel is forty acres far from town, or a lot in an established subdivision, proper research in advance can save a significant amount of time and money down the road. It is easier to design a building to fit the land than it is to modify the building, move large amounts of earth, or build expensive retaining walls to accommodate a "stock" plan - the finished product is usually more desirable as well.

◇ Collect the design criteria needed for your building. Depending on the type of structure you are planning, you will need some or all of the following building criteria information: seismic (earthquake) zone, wind speed and exposure, soil bearing capacity; snow load, flood zone, and climate zone, etc.

◇ Check with the local jurisdiction regarding their policies dealing with soils report submittal, truss drawings/calcs (can they be deferred or are they required with submittals), how many sets of documents are needed for permit application, what are the expected turn-around times for plan check, and any other information and handouts that they can furnish you.

◇ If you are unclear about a certain requirement, feel free to contact the plans examiner or building department contact. They are here to help you. Do not assume, but always ask when you are not sure about a certain requirement.

◇ Remember- make the information clear and complete. Unconventional designs or methods of construction should be clarified in detail on the drawings. Do not make the design into a "cat and mouse" game where the plan checker and/or the inspector are guessing what you are doing or how you are accomplishing the design. This will only delay the documents approval and frustrate the parties involved.

What Should The Plans Look Like?

The site plan

- Minimum scale is 1"=20 feet.
- Show the entire parcel - if you have a very large parcel, you may use a reduced scale such as 1:50 or 1:100 as long as the grading portion of the site plan is no smaller than 1:20 scale.

The Building Plan

- Include an "Index of Drawings" on the cover sheet (this helps a quick view of what drawings are included).
- List on the cover sheet any required Special Inspections per UBC 1701 and Structural Observations per UBC 1702.
- Scope of Work: Should be very clear to the plans examiner, building inspector and builder. A statement summarizing the scope of work on the cover sheet will be very helpful.
- Minimum scale is 1/4" per foot. Use ink only (no pencil).
- Provide a Title Block on each page that includes the following: owner's name and mailing address, designer's contact information, job site address, APN (Assessor's Parcel Number), name and (wet) signature of the person preparing the plans [plans requiring design by a California-registered Architect or Engineer must bear the (wet) stamp and license number with current expiration date and signature].
- The first page of the plans should include a summary of the square footage for each occupancy type (for example: dwelling/2000s.f.; garage/470s.f.; deck/254s.f.; covered porch/50s.f.)
- The first page of the plans should include a statement that the construction will comply with the codes in effect at the time your application is accepted, currently the following: 2001 California Building Code; 2001 California Plumbing Code; 2001 California Mechanical Code; 2001 California Electrical Code; 2001 California Fire Code.

- When engineering design is required, a California-registered Architect or Engineer is required to prepare, stamp and sign structural calculations and drawings that pertain to the engineered design of a structure.

What Does The Plan Checker Look For?

The Site Plan

- Show all recorded easements located on the parcel. Show distances from the proposed structure(s) to all property lines (or nearest edge of road easements). Show to scale all existing or proposed structures on the property (such as a garage, well, shed, swimming pool, or HVAC equipment). Also show the septic system location, well, site retaining walls, etc.
- Show existing site topography (prior to grading) using contour lines at 1', 2', or 5' vertical increments. The contour lines must extend a minimum of 20 feet beyond the building site, driveway, or other disturbed area.
- Show the proposed grading. This is generally done by using one of two methods: darker, thicker contour lines that overlay the (lighter) existing contour lines; or darker, thicker lines that show cut and fill slopes to scale (the slopes are plotted using a scale). Due to the technical nature of this aspect of the building plans, we recommend that you have a professional (ie: civil engineer, architect, or landscape architect) assist with this portion of your plan preparation.
- Show how storm run-off will be controlled around the proposed structure. If the building site is relatively level, provide control elevations along drainage swales, showing that a minimum 1% slope will exist. Note that drainage swales should be located a minimum of five feet from the foundation where practicable, and be rock-lined where the slope exceeds a 1:10 slope (10%).
- Provide a fully-dimensioned driveway profile that includes the following: elevations at road edge or top of curb, garage floor, and at each grade break; percentage of slope between grade breaks; and distance between grade breaks.

The Building Plan

Energy

- Determine the Climate Zone where your project is located.
- Provide information showing compliance with the Title 24 Energy Regulations. Include Form CF-1R and the Mandatory Measures Checklist. The author of the energy documents must sign the package.
- Window orientation and area on the energy analysis must match the floor plan (a common error).
- Square footage of the conditioned area must match the energy analysis.
- Show all required energy conservation features on the plans, or attach the "Mandatory Energy Conservation Requirement" list to the plans.
- Show the R-value of the floor, walls and ceilings. Building sections are ideal to show this information.
- At Cathedral ceilings, make sure the rafters are deep enough to accommodate the batt insulation without compressing and to allow for 1" clear space above.
- At Cathedral ceilings, insure there is a low (eave) and hi (ridge) ventilation shown to allow for cross ventilation.
- Rigid type insulation should have listing information and approved by the local jurisdiction. Check for what is acceptable.

Floor Plan

- Provide a fully-dimensioned floor plan for each building level. Label each room or area with its proposed use and dimensions. Show all doors and windows with nominal sizes.
- Show the fire separation wall between the garage and adjacent living space (on the floor plans and building sections).
- Show a minimum 1-3/8" solid-core, self-closing door (or 20-minute rated) at the garage-house common wall.
- Show 5/8" type-x sheetrock on the garage side of the fire wall, and on the ceiling of the garage if there is living space above, or if the attic is continuous between the garage and adjacent living space.

- Watch out for posts in the garage protection when you have a living second floor above. Column jacketing should be provided to protect the post's fire-resistive protection. Floor structural elements supporting a second floor should be protected for one hour fire-resistive construction.
- In habitable rooms, the window area must be at least 10% of the floor area (one-half, open able for ventilation), with a minimum of ten square feet. Kitchens may use artificial light.
- In bathrooms and toilet rooms without sufficient natural ventilation, show mechanical ventilation that provides a minimum of five air changes per hour.
- Sleeping rooms shall have a window or exterior door for "emergency escape". Window sill height shall not exceed 44 inches above floor level. The window shall have a minimum net open able area of 5.7 feet, with a minimum net open able width of 20 inches and a minimum net open able height of 24 inches.
- Basements shall have an "emergency escape". Don't miss that one.
- Rooms that can be considered as "habitable" should be provided with natural light and ventilation (check for home theaters, entertainment centers in basements, etc).
- Show safety glazing in hazardous locations, such as (generally): any door if the glazing is within 60 inches of the floor; within 24 inches of a door if the bottom of the glass is less than 60 inches above the floor; within 60 inches of the standing surface or drain in a tub or shower enclosure (includes walls); in window panels that are larger than nine square feet and within 18 inches of the floor; any window within five feet of a stairway or landing. [Note that this information has been simplified - the actual hazardous location section of the code is complex and requires careful consideration during the design of the building].
- For additions, show the existing rooms adjacent to the addition, including door and window sizes. The plan examiner must determine if the existing room will have sufficient egress, light and ventilation.
- Show a minimum 36" x 36" landing on each side of an exterior doorway.
- Watch out for thresholds height. Max. 1".
- Exterior doors may have exterior landings that are up to 8" lower when the doors do not swing over the landing.

- Exterior door shall not open onto steps!
- Show a minimum 22" x 30" access to attic areas that have 30" of headroom.
- Show a minimum 36" high guardrail for walking surfaces, including stairs, more than 30" above the adjacent floor level or grade. Openings in the guardrail cannot allow the passage of a 4" sphere.
- Show a handrail installed on one side of each flight of stairs. A stairway is defined as four or more risers (three treads plus an upper floor level equals four risers).
- Details for the construction of the stairs should be on the drawings and appropriately keyed.
- Check that all stairs have handrails.

Elevations

- Provide four exterior elevations (side views) of the proposed structure (North, South, East and West). Show the proposed grade as it will be after final grading. For example, if the building foundation will be stepped to match an existing slope, this must be shown on each elevation. Discrepancies between the site plan topography and plan elevations will result in a correction comment (a common error).
- For additions, you may show elevations affected by the addition only.
- Exterior wall finishes should be clearly and completely detailed.
- Roof covering information to be completed (roof material, underlayment, plywood, etc).
- Chimney information and height to be noted.

Structural – General and Foundation Plan

- If the project does not comply with conventional framing or bracing per CBC 2320, engineering calcs should be provided.
- If only a portion of the project does not comply with conventional, then design only for that portion will be required. Engineer or Architect need to confirm this requirement.
- If conventional framing/bracing is proposed, make sure all the information, schedules and notes per CBC 2320 are included on the drawings.

- Watch out for braced wall panels location, extent, material and detailing (conventional bracing).
- Remember, the burden of proof that a building meets conventional farming/bracing is on the designer. The plan checker will evaluate the proposal per CBC 2320.
- Soils/Geotechnical Report: Check with local jurisdiction to see if a report is required.
- Attach a Soils Engineering Report by a licensed Geo-technical Engineer to the approved plans.
- Provide a North arrow that matches the building orientation on the site plan.
- Be certain that (properly-sized) piers are located under concentrated loads such as posts or trimmers supporting load bearing members such as beams or girder trusses. If the posts are located at an exterior footing, the footing should be widened to the same dimension as the required pier. Note: the omission of piers is the most common structural error found on plans and during framing inspections, and is a serious oversight.
- If there are holdowns, provide a holdown schedule on foundation plan.
- Holdowns should be shown on the foundation plan (location, type, etc).
- Holdowns installation details on the drawings are very helpful.
- Note on plan that all holdowns are to be fastened in place prior to foundation inspection.
- For building sites steeper than a 1:10 slope (10%), provide a stepped footing detail (cross section).
- Show all foundation elements in plan view, including interior footings and piers, if applicable.
- Provide a cross-section showing typical footing/stem wall or footing/slab dimensions, including placement and size of reinforcement.
- Specify foundation bolt size (min. 5/8" in seismic 4) and spacing. Make sure the washers at all bolts is specified. Usually by notes or on the specific foundation details.
- Indicate height and location of retaining walls. Note that walls exceeding 48 inches from the bottom of the footing to the top of the wall must be engineered, and designed or approved by the Engineer or Architect-of-Record, if applicable.

- For slab-on-grade construction, show type of slab reinforcement. Also show vapor barrier if it is a habitable area. Be sure that the reinforcement type installed matches the plan engineering (a common error).

Structural - Floor-framing Plan

- Show minimum under floor ventilation of 1 sq. ft. per 150 sq. ft. of floor area with cross-ventilation.
- Show minimum 18" clearance from grade to the bottom of floor joists (minimum 12" for girders).
- Show the type, size, and spacing of girders and floor joists. If manufactured joists are used, show the joist series and live-load deflection used. Note that floor joists must be spaced no further apart than 16" o.c. when the underside forms part of a fire separation, such as between a garage and a living space above.
- Show the thickness and span rating of the floor sheathing (for example: 3/4", 20/40 plywood).
- Provide additional support under concentrated loads such as brick hearths, rock work, wood stoves, gas stoves, and so forth.

Structural - Framing Plan

- Show all header/beam locations and sizes. Note that beam sizes must match the project engineering (a common error).
- Show method of bracing the structure. Provide fastener size and spacing for shear walls or braced wall panels.
- Provide one or more typical cross-sections to clearly showing how the structure will be constructed. Provide close-up details to clarify specific connections or other special framing.
- If a deck is to be built, provide a deck framing plan with a typical cross-section.
- Drag/strut elements on the roof and floor framing plans should be clearly shown and detailed. Engineer/Architect to check.
- Shearwalls height-to-width ratios to be checked for compliance with CBC (many times narrow panels are specified that will not work as "shearwalls" because they exceed the height-to-width ratio).

- Specific and clear SHEAR TRANSFER detailing will be checked. Typical cuts should be shown for exterior and interior shear walls. (This is critical. Time and time again, it has been shown that buildings fall or sustain great damage in an earthquake due to lack of adequate connections, especially for shear forces transfer). Do not skimp on shear transfer detailing.
- Simpson Strong Walls, Hardy Frame, Z-frames, etc, to be completely detailed on the drawings.

Structural - Roof-framing Plan

- If the roof consists of engineered trusses, provide two sets of wet-stamped and signed truss drawings. If there is an Engineer or Architect of Record, that individual must review the truss drawings and state (in writing) that the truss drawings are compatible with the building design (a common error).
- For engineered trusses, show hardware used to fasten truss to top plate (toe-nailing not permitted).
- Show the thickness and span rating of the roof sheathing (for example: 5/8" 24/16 plywood).
- Show minimum attic ventilation of 1 sq. ft. per 150 sq. ft. (1/150) of attic area. If the ventilation is evenly-divided between high and low (eaves), the area may be reduced to 1/300.
- For conventional (non-engineered) site-built roofs, show rafter size, grade, and spacing. Show wall ties (not collar ties) a minimum of 48" on center.

Electrical Plan

- The electrical plan may be included on the floor plan if sufficient clarity is retained.
- The electrical plan must include the location of the service panel and its rated ampacity (ie- 125 amps, 200 amps, etc.). Show all outlets, switches, light fixtures and smoke detectors. Label any 220-volt outlets. Label all required GFCI (ground fault interrupter circuit) outlets. Low-voltage wiring and components such as phone jacks, TV, and security systems may be omitted.

- Large service (typically over 200 amp) may require additional detailing and information (wire sizes, etc).
- UFER ground should be specified.
- Show the locations of all required smoke detectors.
- Note on the plans that smoke detectors shall be audible in all sleeping areas (for large or multi-story structures, this normally requires inter-connection of the detectors so that all detectors activate during a fire). Smoke detectors shall receive their primary power from the building wiring and shall be equipped with battery back-up.
- Outlets must be located in such a manner that no point along a wall is more than six feet from an outlet (each doorway starts a new wall area). A wall is defined as an area two feet wide.
- All kitchen counter top outlets must be GFCI-protected and be spaced no more than four feet apart. Counter top spaces 12 inches wide must have an outlet.
- Outlets located in the following locations must be GFCI-protected: garages, carports, underfloor areas, bathrooms, exterior locations, and at wet bar counter tops.
- Three-way light switches must be located at the top and bottom of each stairway.
- Branch circuits serving sleeping room outlets in dwelling units to be protected by Arc-Fault-Circuit Interrupters. Add notes on the plans.
- To meet Title 24 Energy requirements, show that general use lighting in bathrooms and kitchens will be high efficiency (minimum 40 lumens per watt).

Mechanical Plan

- The mechanical plan may be included on the floor plan if sufficient clarity is maintained.
- Show all gas appliance locations with the rated BTU (input) of each device.

- Show where the gas piping enters the building and the length and size of all piping. Specify the type of gas to be used (propane or natural gas). Note that sizing gas piping can be complex - we recommended that your gas supplier, licensed installer, or other qualified professional calculate the gas piping sizes. Note that undersized piping can create an unsafe condition. Some jurisdictions may defer the above requirement or deal with in the field instead of on the plans. Please check.
- Show how gas appliances in confined spaces will receive combustion air. Note the size and location of the openings. Again, under sizing combustion air openings can create an unsafe condition.
- Show the size and location of the vent (flue) from each appliance.
- If a water heater is located in the garage, show the burner assembly located a minimum of 18" above the floor. Show approved seismic bracing for all water heaters. Note that gas water heaters cannot be located in a bedroom or bathroom, or gain access through that room.
- Show physical protection for appliances in the garage that are in the path of vehicles (usually by concrete-filled bollards in front of the appliances or by wheel stops).
- Ducts through the garage-house common wall to be 26 ga.

last updated by imad naffa, 5/13/03