



# CODE WISE

**PIMA COUNTY  
BUILDING CODES**  
An Informational Newsletter

April 7, 2003

3

Volume

## Letter from the Director

Our customer surveys are in and key areas for improvement have been targeted. The two recommendations mentioned most by our customers include permits received in an acceptable time frame and clarity of information from the counter staff. In the next few months, we will be investigating methods for improving our service. The first step is to re-enforce our customer service communication skills through a training process. Then we will be able to assess our methodology for reviewing plans and assuring compliance with the ordinances and codes.

This month, a permit fee increase was approved by the Board of Supervisors. The increase is necessary to keep up with expenses in the department. Demand for development services remains high, therefore we could not make drastic budget cuts without effecting the level of service in our department. The typical building permit will rise 14% and the zoning permits will rise 20%. Some of the other services such as re-zonings and comprehensive plan amendments are set to increase by much more. The last fee adjustment occurred in 1997. This fee adjustment was based on Cost of Service methodology promoted to meet our financial goals for efficiency. The costs of the service were analyzed and grouped. The fee revenue was raised to cover the anticipated shortfall in next year's budget.

The new fees will take effect April 5, 2003. All permits issued after that date will be subject to the new fee schedule.

Carmine DeBonis, Jr.  
Director, Development Services

# BUT, I SHEATHED THE WHOLE BUILDING

This is the second in a series of articles on Brace Wall Panel requirements.

One of the misconceptions about the brace wall requirements in the IRC concerns section R602.10.5, 'Continuous structural panel



sheathing. It is often interpreted that by sheathing the entire structure, one satisfies the brace panel requirements of the Code. This is not correct as all this particular section does is modify the parameters for brace walls.

First, although it may seem obvious, it should be noted that this section only applies to Method #3 in section

R602.10.3, 'Wood structural panel sheathing... and the sheathing must be applied fully above and below openings. When this is complied with there is a reduction which can be applied to the bracing requirements of the code. **Note:** There still has to be brace walls in the structure and the size and location still have to be on the plan.

The application is straight forward:

1- Wood structural panel sheathing at corners is to be installed as shown in Figure R602.10.5.

2- For walls that have openings, the height of which is less than 85% of the wall height, a 10% reduction can be taken in the size of the required bracing in that wall.

3- For walls that have openings, the height of which is less than 67% of the wall height, a 20% reduction can be taken in the size of the required bracing in that wall.

This is summarized by Table R602.10.5 reproduced below (Linear interpolation is allowed):

The following is footnote "b" to the table: "Full height sheathed wall segments to either side of garage openings that support light frame roofs with roof covering dead loads of 3 psf or less shall be permitted to have a 4:1 aspect ratio."

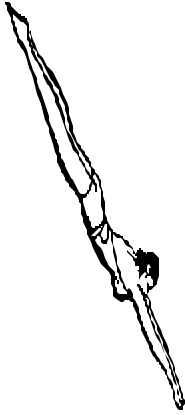
Several things are to be noted with regard to applying this table:

- 1- Footnote Ab (noted above) places garages in the lower row, but only those with a light weight roof such as a 3 ply felt composition roof with no gravel.
- 2- The requirement of brace panels at either end of a wall and a maximum 25' on centers still applies.
- 3- This "reduction" only applies to wood frame construction.



LENGTH OF BRACE WALL		PANEL (INCHES)	MAXIMUM OPENING NEXT TO THE BRACE WALL PANEL
8-FOOT WALL	9-FOOT WALL	10-FOOT WALL	
48	54	60	100%
32	36	40	85%
24	27	30	65%

## Summary/Hi-lights of the POOL/SPA CODE (Residential)



Any pool or spa, in or above ground, permanent or portable, that has a surface area exceeding 150 square feet, and a depth over 24" and holds over 2500 gallons of water is subject to the Pool Code and required to be permitted.

Applications for a pool permit shall be accompanied by plans and specification in sufficient detail to demonstrate compliance with the Code. These should, as a minimum, contain the following:

- 1- A Plot plan, fully dimensioned to show the shape and location of the pool, the residence, all property lines, setbacks, the location and route of all utilities and pool equipment, and the proposed barrier/enclosure.
- 2- A Structural plan, fully dimensioned to show the pool and details of the width, length, location of steps, swim-outs, ladders, diving boards and other such appurtenances with a sectional view to show the depths and slope of the floor.
- 3- A Mechanical, Plumbing and Electrical plan and/or specifications showing the capacities and Hp of all pumps, the types and capacities of all equipment (filters, chlorinators, ozonators, etc.), a time clock or other electric equipment, and the type and capacity of heater(s) or like equipment.
- 4- The tie-in point for electric, water and gas and the routing of those utilities are to be clearly shown on the plans.

If the pool or spa is not being built using approved model plans the following additional information will have to be supplied:

- A- Structural calculations sealed and signed by a structural engineer licensed in Arizona. These are to provide all of the design data and assumptions used in the design of the pool structure.
- B- Design drawings sealed and signed by the same structural engineer that provide dimensions of the pool structure and reinforcement, and the locations of all pool elements, steps, swim-outs, light boxes, skimmer box and the like.

If the pool or spa is an above ground type, the manufacturers' literature detailing all (1-4, A & B) of the above infor-

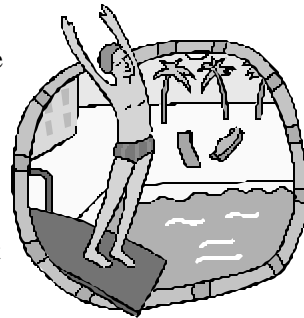
mation will be required to be submitted for review. In some cases a current ICBO report may be required.

Outdoor residential pools and spas will be required to be provided with an enclosure and a barrier.

An **enclosure** is an object or structure, which surround a swimming pool. A **barrier** is an object or structure, which separates a swimming pool from a building. An enclosure can also serve as a barrier. Barriers and enclosures are to be a minimum 4' high on the side opposite the pool and must be constructed such that they cannot be climbed over (no horizontal slats or ridges). In addition, they are to be constructed so that at no point will a 4" diameter sphere pass through and have self closing and latching gates. If the latches are on the side opposite the pool they must be 54" above the walking surface and 42" if installed on the pool side.

If a wall of a dwelling or building is part of the enclosure and it contains windows or doors that access the enclosure, they must be self-closing and self-latching with the devices at 42" above the walking surface or finish grade. In lieu of the self-closing doors an alarm which produces an audible warning, that is distinctively different from smoke detectors or other alarm, and that sounds continuously for 30 seconds when the door or its screen, if present, is open may be used.

These are just the highlights of the requirements in the Code. A more detailed version is available as a hand-out at Pima County Building Codes or, the complete Pool Code is available for purchase at that same location. If you have questions concerning swimming pools call Pima County Building Codes at 740-6490.





## Special Inspector? What's that?

There are some elements of a construction project which are required to have **Special Inspection (SI)** either because of a code requirement or the requirement of the designer. (Note: this SI is in addition to the regular inspections performed by County Inspectors). When

a SI is required it will usually be noted at the plan review stage, although, some occurrence during construction may necessitate the need for a SI.

Special Inspectors may be certified for the type of inspection by an agency recognized by the International Code Council (ICC) the International Conference of Building Officials (ICBO) or some other recognized certification agency, or may "... *demonstrate competence to the Building Official in the particular type of construction or operation requiring special inspection.*" (IBC-1704.1) The ICC, and previously the ICBO, have certification categories for SI in Structural Masonry, Reinforced Concrete and Prestressed Concrete. The American Welding Society has certifications for Welding Inspectors as does The American Steel Institute. Additionally, there are classes available at the Community Colleges and training through the craft unions which could qualify a person for special inspection.

**Pima County maintains a list of approved Special Inspectors which is available to the public on request to assist in locating an acceptable Special Inspector.**

To be placed on the list a person must demonstrate to the Building Official that he/she has attained certification in the particular discipline from a recognized agency, or has had training and/or experience which makes him/her quali-

fied as a Special Inspector. For instance, a Structural Engineer, licensed to practice in Arizona, could qualify for special inspection of Structural Masonry by demonstrating a knowledge and/or a design background in that area; or, a Mechanical Engineer, in the same way, could qualify as a welding inspector. However, just licensing by the State in a particular specialty of engineering does not mean approval for special inspection. By the same token, a craftsman with demonstrated years of experience in all areas of masonry construction could qualify as a SI in masonry.

Over the next several months Pima County will be updating the Approved Special Inspectors list. All persons who want to be included, and are not currently on the list, should submit their qualifications to the Pima County Building Official. After review and acceptance their name will be placed on the list. **It should be noted that after July 1, 2003, only Special Inspectors on the approved list will be acceptable.**



# WHY CAN'T I PASS MY RESIDENTIAL PLUMBING, MECHANICAL OR ELECTRICAL INSPECTIONS?



The following check list is a guide of the most common violations that field inspectors write. Fell free to use this as a checklist to improve the

rate of passed inspections and reduce the need for re-inspections.

## PLUMBING:

- 1 No support for gas piping and re-circulation pumps.
- 2 Sewage drain lines not correctly sloped.
- 3 PEX not supported at 32" o.c..
- 4 T&P line installed with flex connector.
- 5 Bathtub spigot not secured to wall.
- 6 Piping installed in front of appliances that require removal for repair or replacement.
- 7 Inadequate clearance to remove water heater.
- 8 Trap arm length and size not per code.
- 9 Nail straps to protect pipe not installed.
- 10 Over notching and over boring of plates and studs.
- 11 Vents not painted at final inspection.
- 12 Use of sanitary tee in horizontal position.
- 13 Vent take off below weir of trap.
- 14 Vent take of below horizontal centerline.
- 15 Aggregate vent area not equal to building drain size.
- 16 Island vent not extended full height.
- 17 Horizontal wet vents installed.
- 18 Gas piping undersized for total demand.
- 19 Cleanout caps not installed.

## MECHANICAL:

- 1 Flue clearances not per code.
- 2 Use of bathroom exhaust duct instead of kitchen hood.
- 3 Excessive length or too many bends in dryer exhaust duct.
- 4 Concealed dryer flex duct.
- 5 B-vent pipe cap not installed.

- 6 B-vent pipe not continuous from furnace.
- 7 B-vent flue not 2 feet above where within 10 feet of vertical surface.
- 8 Use of flex duct through firewall.
- 9 Nail straps not installed.
- 10 Inside of return air plenum not sealed.
- 11 Flex duct support exceeds 4 feet.
- 12 Flex duct secured incorrectly.
- 13 Forced-air furnace not separated from bedroom or bath.
- 14 Combustion Chamber clearance not 6 inches minimum to closed door.
- 15 Receptacle not installed within 25 feet of equipment.
- 16 Equipment electric disconnect not adjacent to and in sight of equipment.
- 17 Clearances not provided: 12 inches on sides, 6 inches in front.
- 18 Gas piping undersized for total demand.
- 19 Manufacture's installation listings instructions not followed.

## ELECTRICAL:

- 1 Incorrect working clearances at AC disconnect and gas meter.
- 2 GFCI not functioning correctly.
- 3 Kitchen receptacle spacing incorrect.
- 4 Excessive electric outlet box fill.
- 5 Not enough free conductor in box.
- 6 Nail straps not installed.
- 7 Wire nut not spliced through multiwire circuit.
- 8 Two neutral conductors under one lug.
- 9 Dedicated appliance receptacle not installed in garage.
- 10 Light fixtures not installed at final inspection.
- 11 Electrical sub panel penetration of firewall.
- 12 Smoke detectors not interconnected.
- 13 Neutrals in sub panel not isolated from grounds.
- 14 Sub panel located in clothes closet or bathroom.
- 15 Standard lock nuts or bushings used as equipment bond on supply side of service.
- 16 All metal piping not bonded.
- 17 Access to tub pump not provided.



## WHAT IS A SUB-DIAPHRAGM ?

Floor and roof diaphragms that provide out-of-plane lateral support of masonry or concrete walls are required to be anchored to framing members that extends an adequate distance into the roof sheathing. Too often anchors are tied to panelized framing that may be only three feet long or to blocking that does not extend a sufficient length into the diaphragm. Section 1620.2.1 of the 2000 IBC attempted to prevent this with the words **Diaphragms shall be provided with continuous ties or struts between diaphragm chords to distribute these anchorage forces into the diaphragms. Where added chords are used to form sub-diaphragms, such chords shall transmit the anchorage forces to the main crossties**. The intent of this provision was to anchor deep into the diaphragm by the use of sub-diaphragms.

After the 1971 San Fernando earthquake, extensive damage was observed to low buildings having flexible diaphragm and rigid walls of concrete or masonry. The requirements for continuous ties between the diaphragm chords and for positive anchorage between the diaphragm and walls were a result of these observations. The concept of a sub-diaphragm or mini-diaphragm, within the full diaphragm, has been allowed to reduce the length and number of ties required to achieve continuity between chords. As written in these requirements, ties need only extend from the wall anchorage point to the chord of the sub-diaphragm.

The depth of the sub-diaphragm should be large enough to allow full transfer of the prescribed anchorage force by development into the sheathing. However, Section 1620.2.1 also states that **“The maximum length to width ratio of the structural sub-diaphragm shall be 22 to 1”**. This section also states that **“In wood diaphragms, the continuous ties shall be in addition to the diaphragm sheathing and that the diaphragm sheathing shall not be considered effective as providing the ties or struts required by this section”**

Sub-diaphragm design is a concept used to pro-

vide a systematic means for anchoring masonry or concrete walls to flexible wood diaphragms. The use of sub-diaphragms is merely a mechanism by which buildings can be tied between diaphragm chords without requiring the splicing of an excessive number of framing members. Sub-diaphragms, as independently acting elements, do not exist. But they do serve as a useful tool for constructing a rational system of interconnected elements leading from the point where the wall-diaphragm anchorage occurs inward to a point where a main cross member, such as a girder, can be extended from diaphragm chord to diaphragm chord. Main cross ties should extend from exterior wall to exterior wall. Continuous ties for sub-diaphragms should be from the wall anchorage point to the chord of the sub-diaphragm.



## Information on Pima County DEQ Private Sewer Plan Review

The tables and other information mentioned in the following are available from Eric Shepp at Pima County DEQ offices.

The Arizona Administrative Code establishes minimum standards for the construction and operation of sewer collection systems. Pima County DEQ, through a delegation agreement with the State, reviews sewer plans to ensure compliance with these rules.

### Applicability:

1. All sewer collection system line extensions that are owned or operated by Pima County Wastewater Management (PCWWM).
2. Any private sewer that is constructed outside of the building(s) being served and collects wastewater *into a single pipe* accommodating a design flow of 3000 gpd or more.

### Procedure for private sewer plans:

1. All private sewer plans shall state the design flow rate on the plans. The design flow rate shall be calculated using the Arizona DEQ

Unit Flows Table (attached). If the design flow through any single pipe is greater than 3000 gpd, PDEQ plan review is required to ensure that project conforms to the minimum State standards. For any specific project, only those sewer lines that accommodate flows greater than 3000 gpd are required to meet the minimum State standards. Building Codes would review all other sewer lines in that project for conformance with the UPC.

If an entire project only has sewer lines that accommodate a design flow less than 3000 gpd, PDEQ review is not required. Building Codes would perform the review of the entire project for conformance with the UPC.

2. The Building Codes office can determine if the project requires PDEQ review by verifying the design flow noted on the plans.
  - a. If Building Codes determines that PDEQ plan review is required, they will place a hold on the project and forward the applicant to PDEQ for review.
  - b. If Building Codes determines that PDEQ plan review is not required, their review will proceed.
  - c. If Building Codes is uncertain or if there is disagreement between Building Codes and the applicant regarding the need for PDEQ plan review, the applicant shall be forwarded to PDEQ in order to make the determination.

### If PDEQ review is required

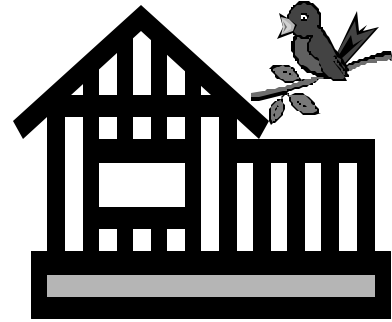
3. The applicant may contact PDEQ at 740-3340 for a list of documents and fees that must be submitted.
4. Upon approval of the project by PDEQ, the applicant shall contact the Building Codes office for any additional requirements. PDEQ will provide the applicant with sets of approved plans for Building Codes to review.





# SAHBA SPRING HOME & GARDEN SHOW

Tucson Convention Center  
 Friday Apr. 11, 10 AM– 9 PM  
 Saturday Apr. 12, 10 AM – 9 PM  
 Sunday Apr. 13, 10 AM – 6 PM



## Codes Education Opportunity AZBO Spring Education Institute

**April 21-25, 2003**



Will be held at:  
 The Prescott Resort  
 1500 Hwy 69  
 Prescott AZ  
 86301

Classes will be held on Resi-  
 dential Inspection, Building inspection, Building Classifi-  
 cation Residential Electrical Inspection, Property Mainte-  
 nance, Means of Egress and many more subjects. The  
 Arizona Building Officials and the Arizona Fire Marshals  
 Association invite you to attend. Call AZBO at (520) 498-

CODES in Effect in Pima County	
CODE	Effective Date
<b>International Residential Code (IRC- 2000)</b> IRC includes Structural, Mechanical, Plumbing and Electrical	<b>March 6, 2001</b>
<b>International Building Code (IBC-2000)</b>	<b>March 6, 2001</b>
<b>International Mechanical Code (IMC- 2000)</b>	<b>June 22, 2001</b>
<b>International Energy Conservation Code</b>	<b>June 22, 2001</b>
<b>International Property Maintenance Code</b>	<b>June 22, 2001</b>
<b>1994 Uniform Plumbing Code (For Commercial use only)</b>	<b>February 5, 1996</b>
<b>1999 National Electrical Code</b>	<b>June 22, 2001</b>
<b>1999 Spa and Pool Code</b>	<b>June 22, 2001</b>
<b>Outdoor Lighting Code</b>	<b>September 21, 2000</b>

Copies of these codes are available at the main branch of the Tucson-Pima County Library.  
 Help-Line 791-4010

Copies of some are available for purchase at Pima County Building Codes, 201 N. Stone.  
 Ph. 520-740-6490

Purchase on line at:  
[www.ICBO.org](http://www.ICBO.org)  
 Ph. 1-800-423-6587

Useful Telephone	Numbers
PC Bldg. Codes and Plan Review	740-6490
PC Bldg. Codes FAX	740-6555 740-6888
Inspection Request	740-6499
Building Inspectors between 7AM and 7:30AM	292-2255 293-5657
PC Zoning Enforcement	740-6470
Zoning Information	740-6450
Public Service	740-6510
City of Tucson	791-5550

Prepared by the **Plans Review Staff** of the Building Codes Division of Development Services Department.

**Carmine DeBonis, Director, Carla Blackwell, Deputy Director Development Services, Bill Jones, Chief Building Official**

The information provided herein is for information only and is not to be interpreted as superceding the codes as adopted by Pima County but should only be used as an aid in understanding the requirements of those codes to facilitate compliance.