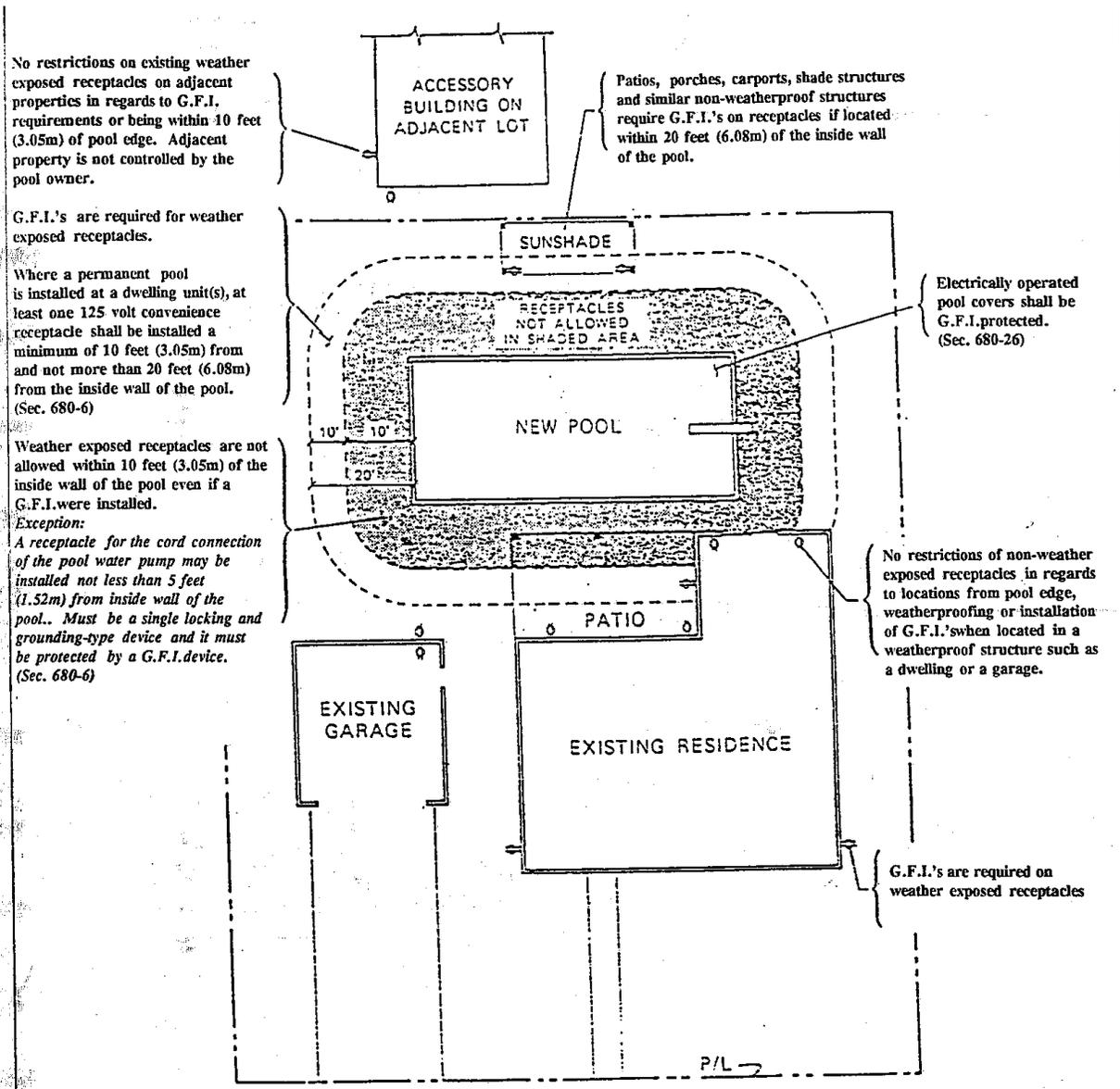


## Swimming Pool & Spa Electrical Requirements (per 1990 N.E.C.)



- NOTES:**
1. G.F.I. = Ground Fault Interrupter.
  2. Sections Refer to National Electric Code.
  3. When a residence is constructed at the same time as the pool, all weather exposed receptacles within 6 feet 6 inches (1.92m) of grade level shall be protected by ground-fault interrupters.

### GROUND FAULT INTERRUPTER REQUIREMENTS AND APPROVED ELECTRICAL RECEPTACLE LOCATIONS FOR SWIMMING POOLS

1. 680-25(d). The wiring system between the main panel and the subpanel must be rigid conduit and may be either metallic or nonmetallic. A green insulated grounding conductor shall be installed in the conduit, and shall be sized in accordance with table 250-95 (in no case smaller than No. 12 A.W.G.).

Exception #1: Electric metallic tubing or intermediate metal conduit may be used to protect conductors where installed on or within buildings.

Exception #2: For new pool installations in cases where there is an existing main panel and an existing subpanel, the wiring system between the existing main panel and the existing subpanel may be provided by (1) An approved cable assembly with an insulated or covered green grounding wire or (2) an insulated green grounding wire within an approved raceway, sized as per table 250-95 (in no case smaller than No. 12 A.W.G.).
2. 680-5. Transformers, ground-fault circuit interrupters, and switching devices.

(A) Transformers. Transformers used for the supply of fixtures, together with the transformer enclosure, shall be approved for the purpose. The transformer shall be a two-winding type having a grounded metal barrier between the primary and secondary windings.

(B) Wiring. Conductors on the load side of a ground fault circuit interrupter or of a transformer, used to comply with the provisions of Section 680-20(A)(1), shall not occupy conduit boxes or enclosures containing other conductors.

Exception #1: Ground-fault circuit interrupters shall be permitted in a panelboard that contains circuits protected by other than ground fault circuit interrupters.

Exception #2: Supply conductors to a feed through, receptacle-type, ground fault circuit interrupter shall be permitted in the same enclosure.

Exception #3: Conductors on the load side of a ground fault circuit interrupter shall be permitted to occupy conduit, boxes, or enclosures containing only conductors protected by ground fault circuit interrupters.

680-6(C). Switching devices on the property shall be located at least 5 feet (1.52 m) from the inside walls of a pool unless separated from the pool by a solid fence, wall, or other permanent barrier.
3. 680-20 and 680-25. A rigid metallic conduit or rigid nonmetallic conduit must be installed between the pool light junction box and main panel. In addition a green copper grounding wire, sized in accordance with table 250-95 (in no case smaller than No. 12 A.W.G.) shall be installed, and shall be continuous and unbroken, without joints or splices, between the junction box and the power supply panel.

Exception #1: Electrical metallic tubing or intermediate metal conduit may be used to protect conductors where installed on or within buildings.

Exception #2: Where the underwater lighting fixture is supplied from a transformer, ground fault circuit-interrupter, clock-operated switch, or a manual snap switch which is located between the panelboard and a junction box connected to the conduit that extends directly to the underwater lighting fixture the equipment grounding conductor shall be permitted to terminate on grounding terminals on the transformer, ground-fault circuit-interrupter, underwater light junction boxes, clock operated switch enclosure, or an outlet box used to enclose a snap switch.
4. 680-21. All junction boxes shall be installed so that they are 8 inches above the pool flood rim or 4 inches above the ground, whichever is greater, and shall be located at least 4 feet (1.22 m) from the edge of the pool. Junction boxes shall not be located in walkways and will be considered adequately protected when installed under diving boards or adjacent to fixed structures such as fences, walls, etc. The pool light junction box shall be made of copper, brass, or other corrosion resistant material and must be provided a number of grounding terminals which shall be one more than the number of conduit entries to the box (not metal is classed corrosive). The termination of a flexible cord of an underwater lighting fixture within a junction box, transformer enclosure, ground-fault circuit interrupter or other enclosure shall be provided with a strain relief.

Exception: On lighting systems of 15 volts or less a flush deck box may be used if box is filled with an approved potting compound to prevent the entrance of moisture.
5. 680-20(b). A conduit shall be installed between the forming shell of the underwater light fixture and the light junction box. The conduit shall be brass with threaded connections or type L copper with brazed or silver solder connections or rigid nonmetallic conduit. Where rigid non-metallic conduit is used, a No. 8 A.W.G. green insulated copper grounding conductor shall be installed in the conduit. The termination of the No. 8 conductor in the forming shell shall be encapsulated in a listed potting compound.
6. 680-20(a)3. The forming shell for underwater light fixtures must be installed so that the top of the fixture lens is at least 18 inches below the normal water level.
7. 680-20. Underwater light fixtures must be specifically designed, manufactured and UL listed for underwater lighting. A ground fault circuit interrupter shall be installed in the branch circuit supplying fixtures operating at more than 15 volts.

680-25. The cord supplying the underwater light fixture must have an insulated copper grounding wire that is an integral part of the cable. The grounding wire must be equal in size to the hot wires, but in no case smaller than No. 16 A.W.G.

Fixtures which depend on submersion for safe operation shall be inherently protected against the hazards of overheating when not submerged.
8. Reinforcing steel must be installed in accordance with the approved plans.
9. 680-22. The following parts shall be bonded together: All metallic parts of the pool structure, all forming shells, all metal parts of electric equipment associated with the pool water circulating system, including pump motors, all metal parts of pool cover equipment, metal conduit, metal piping, and all fixed metal parts that are within 5 feet (1.52 m) of the inside walls of the pool (i.e., ladders, fences, slides, light posts, etc.) and are not separated from the pool by a permanent barrier.

These parts shall be connected together with a solid copper conductor, insulated covered, or bare, not smaller than No. 8 A.W.G. (the usual steel tie wires are adequate for bonding the reinforcing steel together).

Exception: Isolated parts which are no more than 4 inches in any dimension and do not penetrate into the pool structure more than 1 inch shall not require bonding.
10. 680-25. Pool associated motors shall be connected to an equipment grounding conductor sized in accordance with Table 250-95 but not smaller than No. 12 A.W.G. It shall be an insulated copper conductor and shall be installed with the circuit conductors in rigid metal conduit, or rigid nonmetallic conduit.

Exception #1: Electrical metallic tubing, or intermediate metal conduit where installed on or within buildings.

Exception #2: Where necessary to employ flexible connections at or adjacent to the motor, liquid tight flexible conduit with approved fittings shall be permitted.

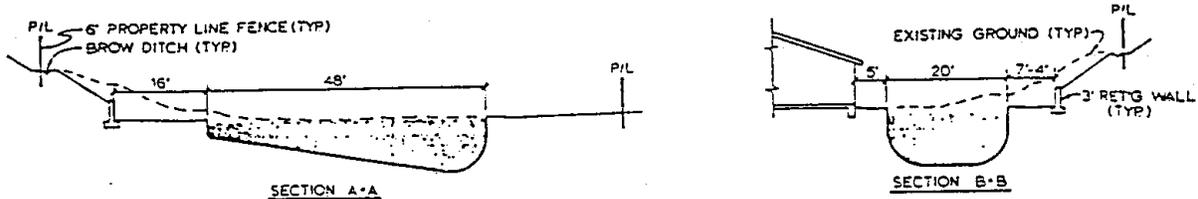
Exception #3: Any of the wiring methods recognized in Chapter 3 of this Code and which contain an equipment grounding conductor not smaller than No. 12 shall be permitted to be used in the interior of one family dwelling units.

680-10. Underground wiring not associated with pool equipment, if at all possible, shall not be installed under the pool or under the area extending 5 feet (1.52 m) horizontally from the inside walls of the pool.
11. 680-7. Flexible cords not longer than 3 feet (0.91 m) may be used to plug in pool pump motors, etc., rated 20 amperes or less. Cords must contain not smaller than No. 12 A.W.G. copper grounding conductor with a grounding type attachment plug.
- 680-26. Electrically Operated Pool Covers. Motors, controllers and wiring shall be located at least 5 feet (1.52 m) from the inside wall of the pool unless separated from the pool by a wall cover or other permanent barrier. Electric motors installed below grade level shall be of the totally enclosed type. The electric motor and controller shall be connected to a circuit protected by a ground fault circuit interrupter.
- 680-11. Electric equipment shall not be installed in rooms or pits which do not have adequate drainage to prevent water accumulation during normal operation or filter maintenance.
12. 680-6(a). No receptacle shall be located within 10 feet (3.05 m) of the inside edge of the swimming pool. In determining the above dimensions the distance to be measured is the shortest path the supply cord of an appliance connected to the receptacle would follow without piercing a floor, wall, or ceiling of a building or other effective permanent barrier.

Exception: A receptacle for the cord connection of the pool water pump may be installed not less than 5 feet (1.52 m) from inside wall of the pool, but it must be a single locking and grounding type device and it must be protected by a G.F.I. device.

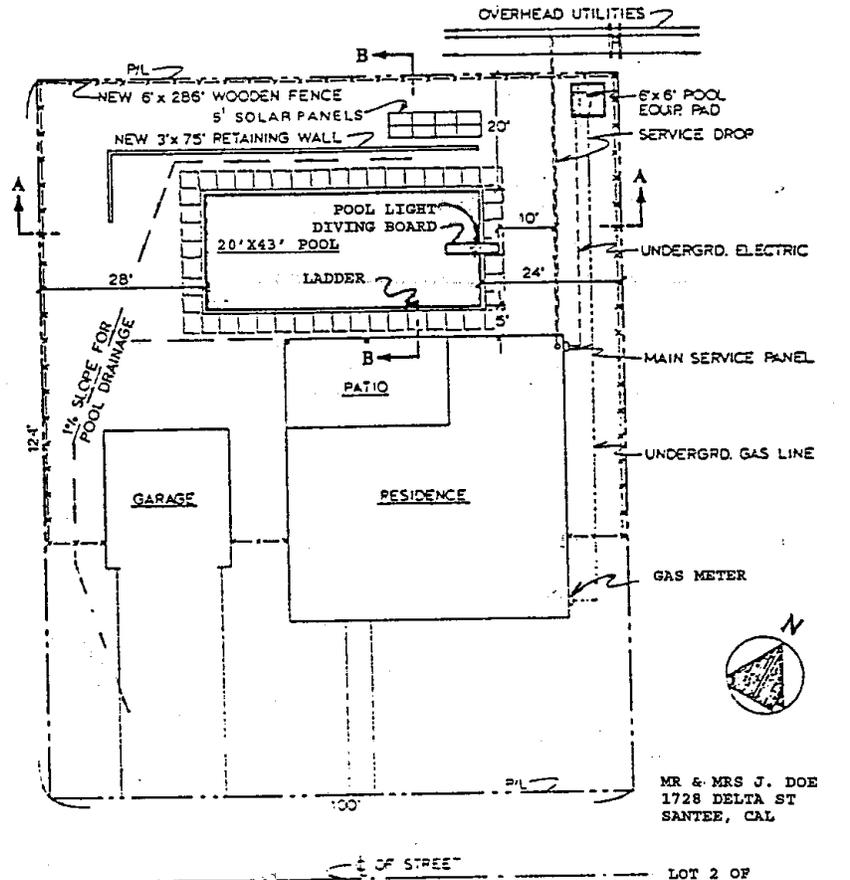
Where a permanently installed pool is installed at a dwelling unit(s), at least one 125 volt convenience receptacle shall be located a minimum of 10 feet (3.05 m) from and not more than 20 feet (6.08 m) from the inside wall of the pool.

**NOTE:** IF PROPOSED EDGE OF POOL IS LOCATED CLOSER THAN ONE-HALF OF THE POOL DEPTH TO A PROPERTY LINE, STRUCTURE, OR A CUT BANK STEEPER THAN 1 1/2 HORIZONTAL TO 1 VERTICAL, OR A FILL BANK STEEPER THAN 2 HORIZONTAL TO 1 VERTICAL, THEN A CROSS SECTION DRAWN TO SCALE TO SHOW THE PERTINENT EXISTING AND PROPOSED ELEVATIONS AND DISTANCES SHALL BE SUBMITTED.

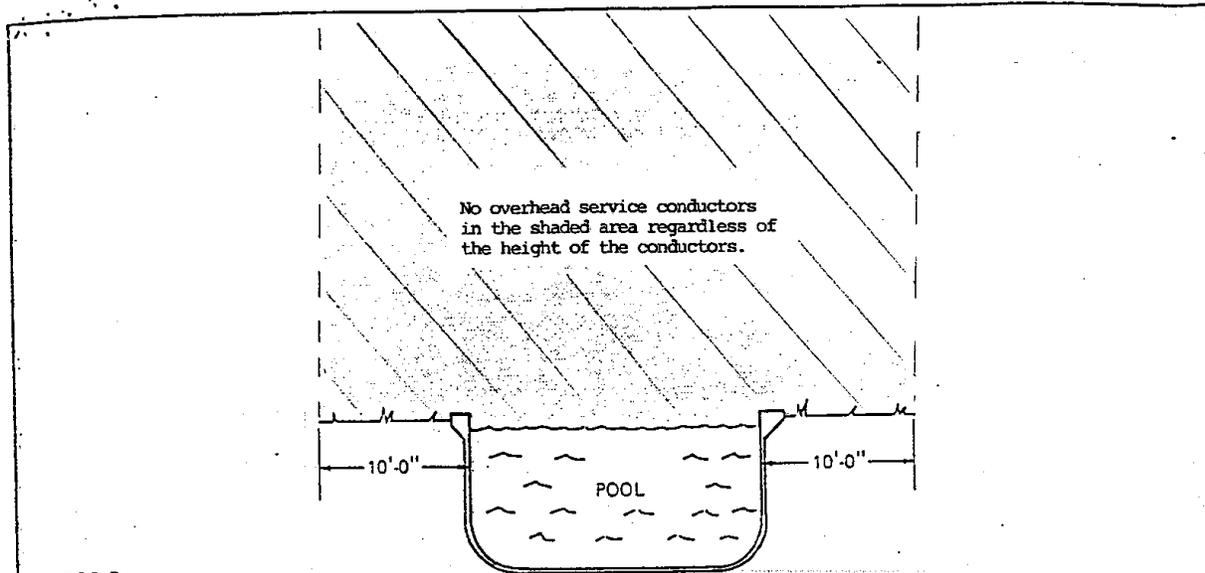


**PLEASE CHECK ALL ITEMS**

SITE CONDITIONS	YES	NO
NATURAL GROUND	<input type="checkbox"/>	<input type="checkbox"/>
ROCK	<input type="checkbox"/>	<input type="checkbox"/>
DECOMPOSED GRANITE	<input type="checkbox"/>	<input type="checkbox"/>
SAND	<input type="checkbox"/>	<input type="checkbox"/>
LOAM	<input type="checkbox"/>	<input type="checkbox"/>
CLAY	<input type="checkbox"/>	<input type="checkbox"/>
FILL GROUND	<input type="checkbox"/>	<input type="checkbox"/>
DEPTH OF FILL	<input type="checkbox"/>	<input type="checkbox"/>
FILL TESTED	<input type="checkbox"/>	<input type="checkbox"/>
GROUND WATER	<input type="checkbox"/>	<input type="checkbox"/>
GROUND IS LEVEL	<input type="checkbox"/>	<input type="checkbox"/>
GROUND IS SLOPED	<input type="checkbox"/>	<input type="checkbox"/>
SLOPE 1' IN 20' (5%)	<input type="checkbox"/>	<input type="checkbox"/>
SLOPE 1' IN 10' (10%)	<input type="checkbox"/>	<input type="checkbox"/>
SLOPE 1' IN 5' (20%)	<input type="checkbox"/>	<input type="checkbox"/>
GRADING PERMIT REQUIRED	<input type="checkbox"/>	<input type="checkbox"/>
EXCAVATED MATERIAL	<input type="checkbox"/>	<input type="checkbox"/>
a. DISPOSITION	<input type="checkbox"/>	<input type="checkbox"/>
b. MAX. DEPTH OF DISPERSED FILL IF ON SITE	<input type="checkbox"/>	<input type="checkbox"/>
SEPTIC SYSTEM ON PROPERTY	<input type="checkbox"/>	<input type="checkbox"/>
RAMP FOR EXCAVATION EQUIPMENT SHOWN	<input type="checkbox"/>	<input type="checkbox"/>
<b>ELECTRICAL</b>		
CONDUCTORS CLEAR OF POOL	<input type="checkbox"/>	<input type="checkbox"/>
RELOCATE OVERHEAD CONDUCTORS	<input type="checkbox"/>	<input type="checkbox"/>
RELOCATE SERVICE ENTRANCE DROP	<input type="checkbox"/>	<input type="checkbox"/>
INCREASE SERVICE PANEL SIZE	<input type="checkbox"/>	<input type="checkbox"/>
POOL LIGHT	<input type="checkbox"/>	<input type="checkbox"/>
YARD LIGHTING	<input type="checkbox"/>	<input type="checkbox"/>
TIME CLOCK	<input type="checkbox"/>	<input type="checkbox"/>
FILTER MOTOR _____ H.P.	<input type="checkbox"/>	<input type="checkbox"/>
<b>PLUMBING</b>		
OVER THE RIM FILL LINE	<input type="checkbox"/>	<input type="checkbox"/>
BELOW COPING FILL LINE	<input type="checkbox"/>	<input type="checkbox"/>
ANTI-SYPHON FILL LINE	<input type="checkbox"/>	<input type="checkbox"/>
HEATER _____ BTU	<input type="checkbox"/>	<input type="checkbox"/>
GAS LINE	<input type="checkbox"/>	<input type="checkbox"/>
COMBUSTION VENT (FLUE) 4" from property line	<input type="checkbox"/>	<input type="checkbox"/>
SOLAR PANELS	<input type="checkbox"/>	<input type="checkbox"/>
<b>MISC. EQUIPMENT</b>		
DIVING BOARD	<input type="checkbox"/>	<input type="checkbox"/>
LADDERS	<input type="checkbox"/>	<input type="checkbox"/>
SLIDE	<input type="checkbox"/>	<input type="checkbox"/>
METAL FENCE WITHIN 5' OF POOL	<input type="checkbox"/>	<input type="checkbox"/>
METAL PATIO POSTS WITHIN 5' OF POOL	<input type="checkbox"/>	<input type="checkbox"/>
5' HIGH FENCE WITH NO LADDER-LIKE ACCESS	<input type="checkbox"/>	<input type="checkbox"/>
SELF-CLOSING, SELF-LATCHING GATE	<input type="checkbox"/>	<input type="checkbox"/>



**TYPICAL POOL PLOT PLAN AND SITE CHECK LIST**



680-8.

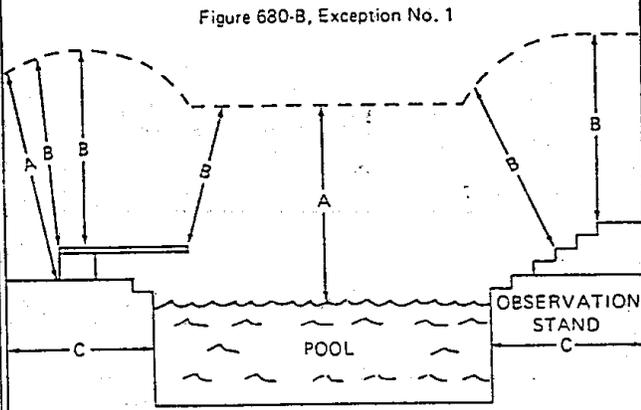
1. 680-8. Overhead Clearances.

The following parts of swimming pools shall not be placed under existing service drop conductors or any other open overhead wiring; nor shall such wiring be installed above the following:

- (A) Swimming pool and the area extending 10 feet horizontally from the inside walls of the pool.
- (B) Diving structure.
- (C) Observation towers or platforms.

*Exception #1: Structures listed in (A), (B) and (C) above shall be permitted under utility owned, operated and maintained supply lines or service drops where such installations provide the following clearances:*

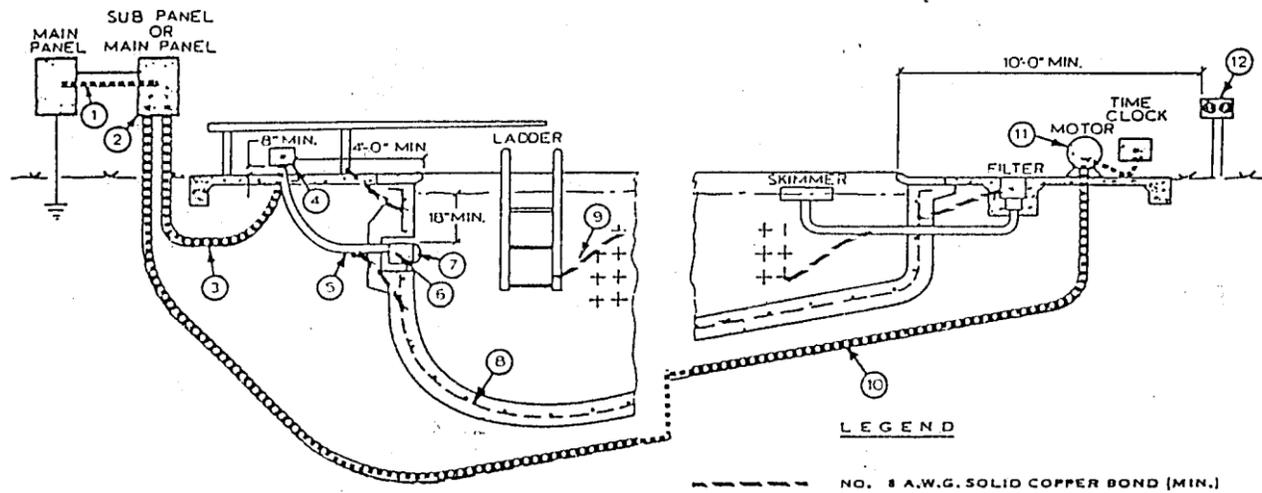
	Insulated supply or service drop cables, 0-750 volts to ground, supported on and cabled together with an effectively grounded bare messenger	All other supply or service drop conductors	
		Voltage to ground	
		0-15 KV	15-50 KV
A. Clearance in any direction to the water level edge of water surface, base of diving platform or permanently anchored raft	18 feet	25 feet	27 feet
B. Clearance in any direction to the diving platform or tower	14 feet	16 feet	18 feet
C. Horizontal limit of clearance measured from inside wall of the pool.	This limit shall extend to the outer edge of the structures listed in (1) & (2) above but not less than 10 feet (3.05m).		

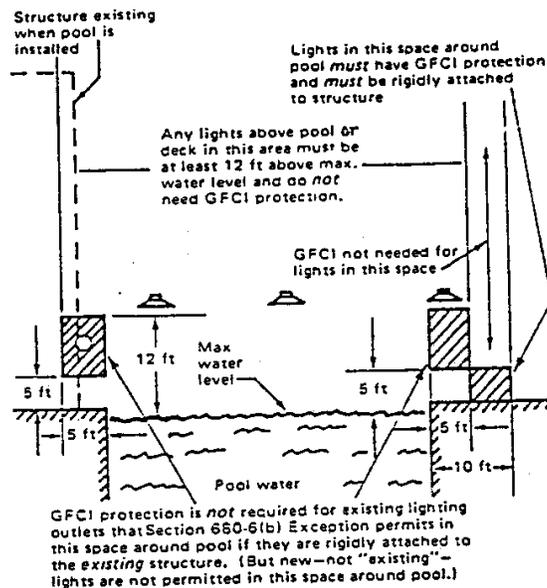


*Exception #2: Utility owned, operated, and maintained communication conductors, community antenna system coaxial cables complying with Article 820 and the supporting messengers shall be permitted at a height of not less than 10 feet (3.05 m) above swimming and wading pools, diving structures and observation stands, towers or platforms.*

**MINIMUM RADIAL AND VERTICAL CLEARANCE FOR OVERHEAD CONDUCTORS ABOVE AND ADJACENT TO POOL AREA**

## SWIMMING POOL WIRING REQUIREMENTS FOR ELECTRICAL GROUNDING AND BONDING





#### 680-6(B) LIGHTING FIXTURES AND LIGHTING OUTLETS

(1) Lighting fixtures and lighting outlets shall not be installed over the pool or over the area extending 5 feet horizontally from the inside walls of a pool unless 12 feet (3.66 m) above the maximum water level.

*Exception #1: Existing lighting fixtures and lighting outlets located less than 5 feet (1.52 m) measured horizontally from the inside walls of a pool shall be at least 5 feet (1.52 m) above the surface of the maximum water level and shall be rigidly attached to the existing structure.*

*Exception #2 Lighting fixtures may be installed less than 12 feet (3.66 m) above the water level of indoor pools.*

If the lighting fixtures are totally enclosed and supplied by a circuit with GFCI protection, they may be installed where there is at least 7½ feet (2.29 m) of clearance between the maximum water level of an indoor pool and the lowest part of the fixture.

(2) Lighting fixtures and lighting outlets installed in the area extending between 5 feet (1.52 m) and 10 feet (3.05 m) horizontally from the inside walls of a pool shall be protected by a ground-fault circuit-interrupter unless installed 5 feet (1.52 m) above the maximum water level and rigidly attached to the structure adjacent to or enclosing the pool.

(3) Cord-connected lighting fixtures when installed within 16 feet (4.88 m) of any point on the water surface, measured radially, rated 20 amperes or less, other than an underwater lighting fixture for a permanently installed pool, shall be permitted to be connected with a flexible cord to facilitate the removal or disconnection for maintenance or repair. For other than storable pools, the flexible cord shall not exceed 3 feet (.91 m) in length and shall have a copper equipment grounding conductor not smaller than No. 12 with a grounding-type attachment plug.

*See Section 680-25(E) for connection with flexible cords.*

#### 680-6(C) SWITCHING DEVICES.

Switching devices on the property shall be located at least 5 feet (1.52 m) from the inside walls of a pool unless separated from the pool by a solid fence, wall, or other permanent barrier.

## LIGHTING FIXTURES AND LIGHTING OUTLETS AROUND POOLS

**680-40 OUTDOOR INSTALLATIONS SPA OR HOT TUB**

A SPA OR HOT TUB INSTALLED OUTDOORS SHALL COMPLY WITH REQUIREMENTS OF A PERMANENTLY INSTALLED POOL.

*Exception #1: Metal bands or hoops used to secure wooden staves are exempt from bonding.*

*Exception #2: Listed packaged units may be cord connected with a cord no longer than 15 feet (4.57 m) and shall be protected by a G.F.C.I.*

*Exception #3: Bonding by metal-to-metal mounting on a common frame or base is permitted.*

**680-41 INDOOR INSTALLATIONS SPA OR HOT TUB**

A SPA OR HOT TUB INSTALLED INDOORS SHALL COMPLY WITH THE FOLLOWING REQUIREMENTS, AND SHALL BE CONNECTED BY A PERMANENT WIRING METHOD COMPLYING WITH THE NATIONAL ELECTRICAL CODE.

*Exception: Listed units rated 20 amperes or less shall be permitted to be connected with a flexible cord.*

(1) Receptacles shall be located at least 5 feet (1.52 m) from the inside walls of the spa or hot tub.

(2) Receptacles of 125 volts located within 10 feet (3.05 m) of the inside walls of a spa or hot tub shall be G.F.C.I. protected.

(In determining the above dimensions, follow the shortest path without piercing a floor, wall, ceiling or other effective permanent barrier.)

(3) Receptacles that provide power for a spa or hot tub shall be G.F.C.I. protected.

(4) Lighting fixtures and lighting outlets located over the spa or hot tub or within 5 feet (1.52 m) horizontally from the inside walls shall be a minimum of 7 feet 6 inches (2.29 m) above the maximum water level and shall be protected by a ground-fault circuit-interrupter.

*Exception #1: Lighting fixtures and lighting outlets located 12 feet (3.66 m) or more above the maximum water level shall not require protection by a ground-fault circuit-interrupter.*

*Exception #2: Lighting fixtures meeting the requirements of a. or b. below and protected by a ground-fault circuit-interrupter shall be permitted to be installed less than 7 feet 6 inches (2.29 m) over a spa or hot tub:*

*a. Recessed fixtures with a glass or plastic lens and nonmetallic trim suitable for use in wet locations.*

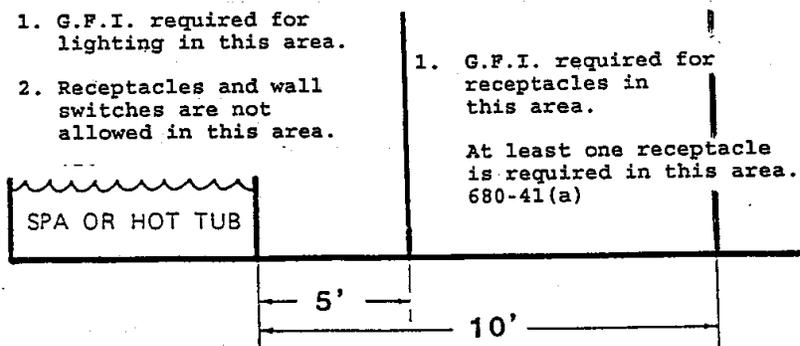
*b. Surface-mounted fixtures with a glass or plastic globe and a nonmetallic body suitable for use in wet locations.*

(5) Underwater lighting fixtures shall comply with the requirements of a permanently installed pool.

(6) Wall switches shall be located at least 5 feet (1.52m) horizontally from the inside walls of the spa or hot tub.

(7) All metallic items associated with the spa or hot tub, and other metal items located within 5 feet (1.52 m) of the spa or hot tub, shall be bonded together by any of the following methods: The interconnection of threaded metallic piping and fittings; metal-to-metal mounting on a common frame or base; or by a copper insulated wire (covered or bare) not smaller than No. 8 solid.

(8) All electric equipment located within 5 feet (1.52 m) of the inside walls of the spa, hot tub, or associated with the circulating system of the spa or hot tub shall be grounded as per Article 250 of the National Electrical Code.

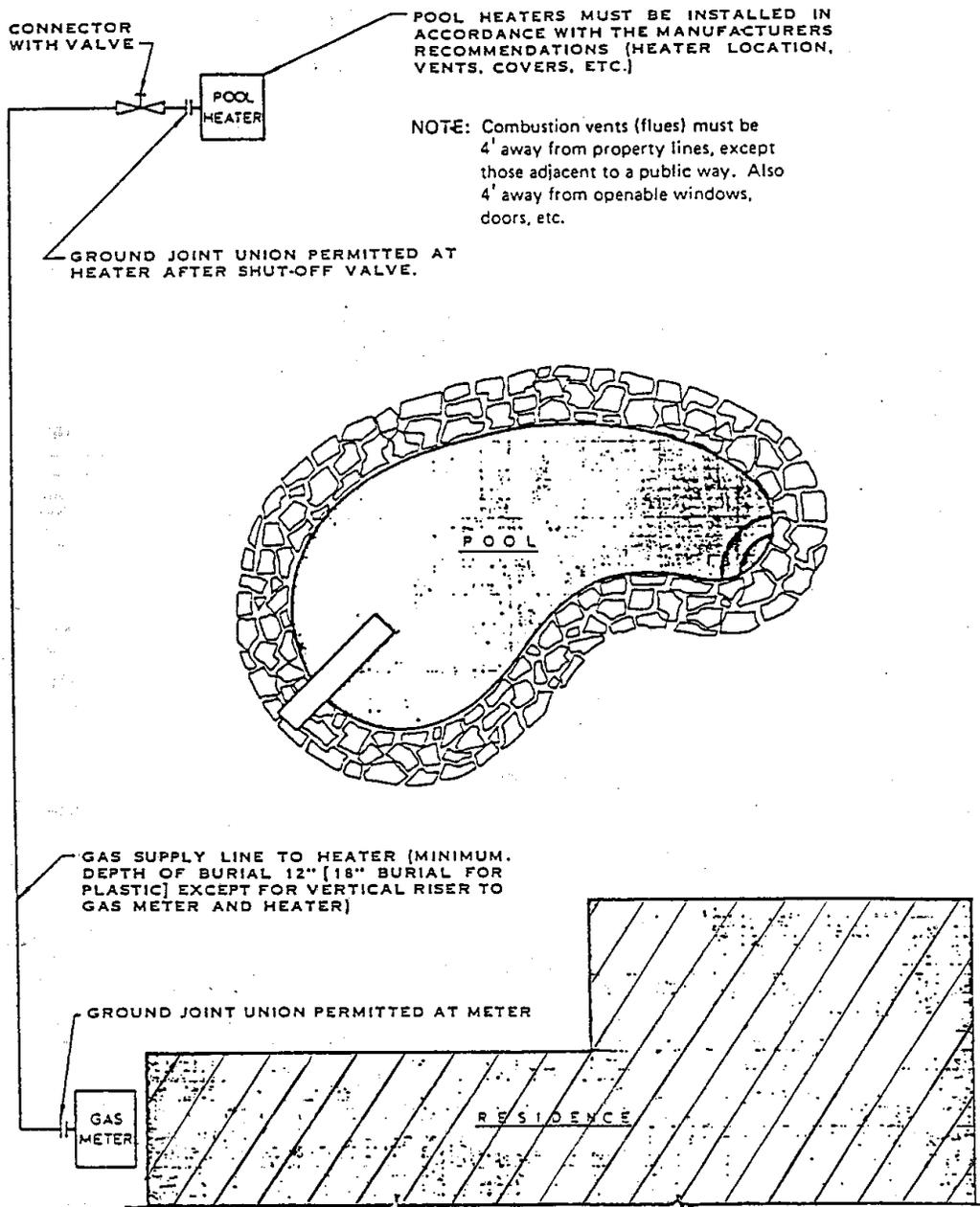


**680-70 HYDROMASSAGE BATHTUB INSTALLATIONS**

Protection (Section 680-70). Hydromassage bathtubs and their associated electric components shall be supplied by a circuit protected by a ground-fault circuit interrupter.

Other Electric Equipment (Section 680-71). Lighting fixtures, switches, receptacles, and other electric equipment located in the same room, and not directly associated with a hydromassage bathtub, shall be installed in accordance with the requirements of Chapters 1 through 4 in this Code covering the installation of that equipment in bathrooms.

**SPAS, HOT TUBS, AND HYDROMASSAGE BATHTUBS**



POOL HEATERS MUST BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS (HEATER LOCATION, VENTS, COVERS, ETC.)

NOTE: Combustion vents (flues) must be 4' away from property lines, except those adjacent to a public way. Also 4' away from openable windows, doors, etc.

GROUND JOINT UNION PERMITTED AT HEATER AFTER SHUT-OFF VALVE.

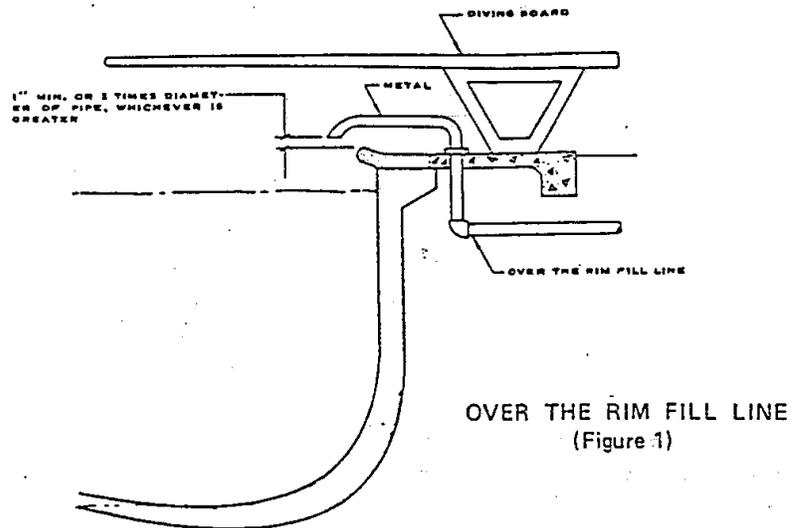
GAS SUPPLY LINE TO HEATER (MINIMUM DEPTH OF BURIAL 12" [18" BURIAL FOR PLASTIC] EXCEPT FOR VERTICAL RISER TO GAS METER AND HEATER)

GROUND JOINT UNION PERMITTED AT METER

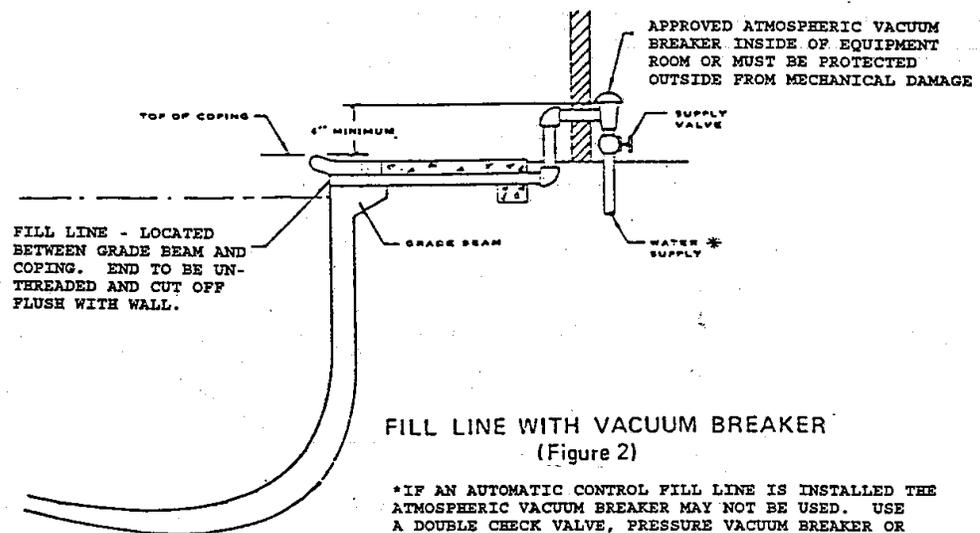
**GAS INSTALLATION**

GAS PIPING SHALL BE INSTALLED IN ACCORDANCE WITH CHAPTER 12 OF THE UNIFORM PLUMBING CODE; HOWEVER, GROUND JOINT UNIONS WHERE NECESSARY TO REASONABLY ACCOMPLISH A SWIMMING POOL INSTALLATION ARE PERMITTED. ALL UNIONS MUST BE INSTALLED IN AN ACCESSIBLE LOCATION AND ABOVE GRADE. GAS PIPING IS TO BE BURIED 12" MINIMUM OR SUPPORTED 6" ABOVE GRADE AND SHALL BE STANDARD WEIGHT WROUGHT IRON OR STEEL, YELLOW BRASS (CONTAINING NOT MORE THAN 75 PERCENT COPPER) OR OTHER APPROVED MATERIAL. THE GAS PIPING SHALL BE PROVIDED WITH AN APPROVED FACTORY APPLIED WRAPPING OR COATING. PLASTIC GAS LINES MUST BE BURIED A MINIMUM OF 18" DEEP AND BE INSTALLED WITH PLASTIC-TO-METAL RISERS. PLASTIC LINES ALSO REQUIRE A NUMBER 18 (MINIMUM) COPPER TRACER WIRE TO BE ATTACHED AND EXPOSED AT ONE END.

PERMANENT POOL GAS SUPPLY



OVER THE RIM FILL LINE  
 (Figure 1)



FILL LINE WITH VACUUM BREAKER  
 (Figure 2)

\*IF AN AUTOMATIC CONTROL FILL LINE IS INSTALLED THE ATMOSPHERIC VACUUM BREAKER MAY NOT BE USED. USE A DOUBLE CHECK VALVE, PRESSURE VACUUM BREAKER OR RP VALVE INSTALLED IN ACCORDANCE WITH THE UPC.

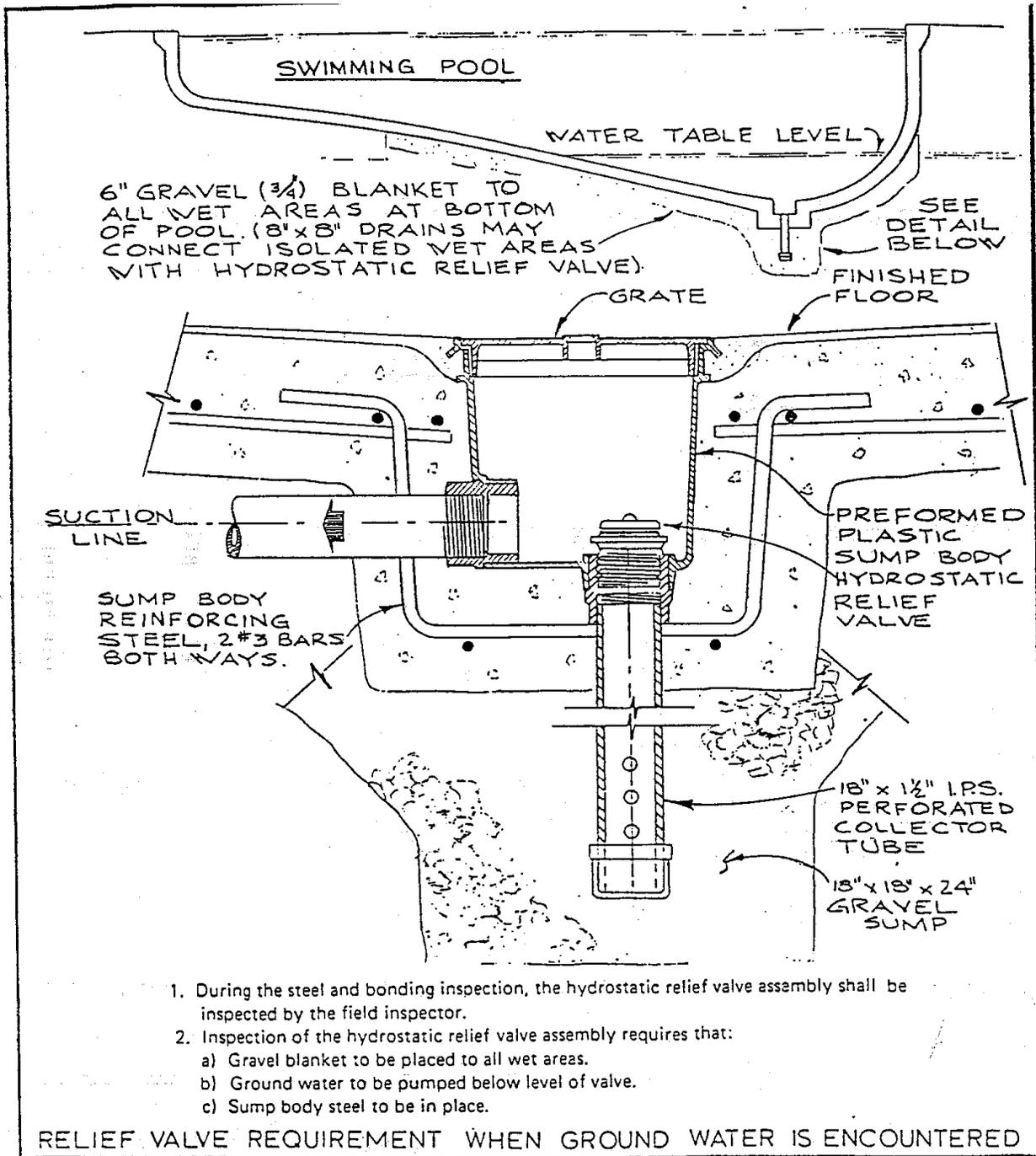
**PUBLIC SWIMMING POOLS MUST BE APPROVED BY THE HEALTH DEPARTMENT**

**PLUMBING INSTALLATION**

A positive means of potable water supply to each swimming pool is recommended as indicated by the following:

1. An over the rim fill spout with a 1" minimum air gap above the flood rim of the pool (the spout must be protected from damage by a diving board or other means). See Figure 1 or
2. A fill spout located above the grade beam and below the coping which is protected from back flow by an approved breaker located at least 6" above the flood rim of the pool. See Figure 2.

**RECOMMENDED POOL WATER SUPPLY**



**Building Division Counter is open between the hours of 7:30 a.m. and 5:30 p.m. (closed for lunch 11:30 a.m. - 12:30 p.m.) Monday through Thursday. City Hall and the Building Division counter are closed on alternating Fridays (see calendar). Our Friday hours are 8:00 a.m. - 5:00 p.m. (closed for lunch 11:30 a.m. - 12:30 p.m.).**

**\*\*\*Please contact the Poway Building Division if you have any questions or concerns at (858) 668-4645 or [building@poway.org](mailto:building@poway.org)\*\*\***