

# PIMA COUNTY REGIONAL FLOOD CONTROL DISTRICT TECHNICAL POLICY

**POLICY NO.:** Technical Policy, TECH-007

**EFFECTIVE DATE:** DRAFT 1/27/20

**REVISED DATE:** N/A

**POLICY TITLE:** Use of Piers for Site-built Structures within Regulatory Floodplains

**PURPOSE:**

Provide clarity on the use of piers and pilings to elevate site-built structures in a floodplain.

**BACKGROUND:**

Section 16.34 of the Floodplain Management Ordinance (Ordinance) refers to the use of piers or pilings (hereafter, piers) as a method to elevate manufactured homes within a regulatory floodplain. Elevating manufactured homes on piers, regardless of location in a floodplain, is standard practice in Pima County and the nation as a whole. Since 16.34 is the only section of the Ordinance to refer to piers, the District has long held that piers are methods of elevation that are available only for manufactured homes.

Applicants have proposed elevating site-built structures on piers in extreme hazard areas to address the issue of adverse impact due to encroachment, and/or to reduce foundation costs. In the past, the District has denied these requests because piers do not address the underlying risk of placing structures in extremely hazardous areas, including the need for emergency response. It is recognized, however, that in certain circumstances, constructing site-built structures on piers does not create additional risk and may even be preferable in some cases. This policy has been created to establish criteria for the use of piers for site-built structures in a floodplain.

**POLICY:**

**A. Prohibitions on the Use of Piers in Floodplains**

Piers shall be prohibited in high hazard conditions, as determined by the Chief Engineer, including but not limited to:

1. Locations where the construction of a site-built structure on fill or a stem wall would otherwise be prohibited by the Ordinance, including floodways.
2. Areas where the flow depth is greater than 3 feet or the product of the depth of flow times the square of the flow velocity ( $DV^2$ ) is greater than 18.
3. Within or spanning the channel of a regulatory wash or spanning a defined drainage area within a sheetflow floodplain.
4. Within the erosion hazard area of a regulatory wash or within an area with identified foundation hazards (e.g., Tortolita Soils).

**B. Allowable Use of Piers in Sheetflow Floodplains**

Piers may be allowed in sheetflow floodplains provided none of the prohibitions detailed in Section A above apply. In addition, the following criteria must be met.

1. Piers must be constructed per a sealed design based on an analysis performed by an Arizona registered civil engineer (structural). This analysis must be submitted to the District for review and approval. The analysis must determine, at minimum:

- a. The hydraulic characteristics of the base flood flow surrounding and beneath the footprint of the structure, including the maximum depth of flow impacting the piers. If the placement of piers will affect the flow characteristics, then the analysis must also include this effect;
  - b. The pier with the maximum anticipated scour depth, including considerations for anticipated debris collection on the piers and/or lateral migration scour for any pier within an erosion hazard setback area from a regulatory wash;
  - c. The load supporting capacity of the piers under conditions of the maximum anticipated scour evaluated above;
  - d. The anticipated aggradation depth, if the area is within an active alluvial fan or other area subject to aggradation (e.g., floodplain of Sutherland Wash post Aspen fire or outflow area of Finger Rocks wash).
2. The depth of flow at any point within the footprint of the structure shall not exceed two (2) feet.
  3. To ensure adequate access beneath the structure for repair, maintenance, and passage/removal of debris, the pier foundation must provide a minimum elevation of 2.5 feet plus aggradation depth, above natural grade regardless of the Regulatory Flood Elevation;
  4. All piers must extend below natural grade based on the engineered calculated scour depth for the pier with the maximum anticipated scour.
  5. No portion of the structure other than the piers shall extend below the Regulatory Flood Elevation plus aggradation, or 2.5 feet above HANG plus aggradation, whichever is greater, including pier caps, any electrical/mechanical equipment, associated pipes, wires or ductwork, or any other appurtenances.
  6. The property owner(s) must sign covenants and restrictions stating that the area under the structure:
    - a. Shall be maintained open to flow
    - b. Shall not be enclosed
    - c. Shall not be used for storage of equipment or materials
  7. The structure need not be oriented parallel to flow, but piers must be aligned with the direction of flow to minimize obstruction.

APPROVED BY:

\_\_\_\_\_  
 Suzanne Shields, P.E.  
 Director

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 Date

Original Policy Approved: \_\_\_\_\_  
 Date(s) Revised: \_\_\_\_\_