DSA IR PC-1

PRE-CHECK (PC) DESIGN CRITERIA FOR FREESTANDING SIGNS, SCOREBOARDS, AND BALL WALLS: 2025 CBC

Disciplines: All

History: Revised 12/29/25 under 2025 CBC
Last Revised 11/09/22 under 2022 CBC
Original Issue 04/09/20 under 2019 CBC

Division of the State Architect (DSA) documents referenced within this publication are available on the DSA Forms or DSA Publications webpages.

PURPOSE

This Interpretation of Regulations (IR) clarifies requirements for pre-check (PC) applications to promote uniform statewide criteria for code compliance in the design and plan review of freestanding signs, scoreboards, and ball walls for projects under DSA jurisdiction. The PC design criteria documents were created by DSA as a means for the responsible engineer to demonstrate code compliance when developing and submitting construction documents for DSA review.

The provisions of this IR are intended as a tool to identify and highlight the common and unique, critical and/or overlooked code requirements that must be considered and incorporated into the design, as applicable, to provide a complete and consistent set of construction documents accepted at all DSA regional offices. Other methods proposed by design professionals to solve a particular issue may be considered by DSA and reviewed for code and regulation compliance, subject to concurrence of the DSA Codes and Standards Unit. For methods not specifically prescribed in the code, see California Building Code (CBC) Section 104.2.3.

Appendix A below is provided as a guide to assist design professionals and DSA plan reviewers when preparing and reviewing site-specific project applications that incorporate PC freestanding signs, scoreboards, or ball walls designed in accordance with this IR.

SCOPE

The provisions of this IR apply to 2025 PC plans for new freestanding signs, scoreboards, or ball walls submitted to DSA under the 2025 CBC. Freestanding signs, scoreboards, and ball walls are defined as exterior self-supported structures with steel cantilever columns and independent foundation systems. They are not attached to nor supported by other structures. Freestanding signs, scoreboards, and ball walls are nonbuilding structures without an occupancy classification.

As noted in Bulletin (*BU) 18-01: Applicability of Pre-Check (PC) Design Criteria for Non-PC Projects*, these provisions shall also be considered and incorporated in site-specific applications for structures of the same project type, even if not part of a PC application.

BACKGROUND

The PC approval process is intended to streamline DSA plan review by providing a procedure for approving the design of commonly used structures prior to the submission of plans to DSA for a construction project. The PC approval process allows designers to incorporate designs for structures that have already been “pre-checked” by DSA into their plans for actual site-specific construction projects. The design criteria provided in this document are neither regulations nor law and are not appropriate for verbatim inclusion in project specifications. The design professional in responsible charge is responsible for specifying and detailing the requirements for each project. Additional information regarding the design and site application of PC structures can be found in *Procedure (PR) 07-01: Pre-Check (PC) Approval* and *Policy (PL) 07-02: Over-the-Counter Review of Projects Using Pre-Check (PC) Approved Designs*.

PRE-CHECK (PC) DESIGN CRITERIA FOR FREESTANDING SIGNS, SCOREBOARDS, AND BALL WALLS: 2025 CBC

1. GENERAL

1.1 Pre-Check Submission Requirements

Refer to PR 07-01 for a detailed list of items required for all PC applications. The documents required to be submitted for PC approval are listed on form *DSA 3: Project Submittal Checklist*. Site-specific information is not necessary, as that information will be provided when a specific construction project is submitted for DSA review.

1.2 Cover Sheet and General Notes

1.2.1 In accordance with PR 07-01 Section 1.4.2, the first sheet(s) of the PC drawings shall include a design information section that defines the basis of the PC design. Refer to PR 07-01 Appendices B and C and the remainder of this IR for required content of the design information section.

1.2.2 The PC construction documents shall include complete and comprehensive general notes and/or specifications as required for construction and inspection. It is common for PC construction documents to consist of drawings only, without a book specification or project manual. Refer to PR 07-01 Appendix B, Footnote 8. In this case, the PC drawings shall include information that might otherwise be communicated in a project manual or book specification. For each primary material or group of materials, the following information shall be specified in the construction documents when applicable:

1.2.2.1 Required material properties, including compliance with American Society for Testing and Materials (ASTM) specifications when applicable.

1.2.2.2 Proprietary products' name, manufacturer, and evaluation report number. Refer to Section 1.12 below.

1.2.2.3 Quality control performed by the supplier.

1.2.2.4 Standards for the execution of the work, including associated tolerances. References to recognized standards are acceptable.

1.2.2.5 Required qualifications of personnel performing the work for each applicable trade.

1.2.2.6 Product and material finish requirements for weather protection or safety.

1.2.2.7 Quality assurance tests not covered by Section 1.3 below, including frequency requirements and citation of ASTM standards when applicable.

1.3 Structural Tests and Special Inspections

The PC drawings shall include example form(s) *DSA 103: List of Structural Tests and Special Inspections*. See PR 07-01 Section 1.5 for additional information.

1.3.1 The example DSA 103 will be used as a guide to develop the DSA 103 for the site-specific project. Example form(s) on the PC drawings will be crossed out when the DSA 103 is provided with the site-specific application.

1.3.2 The example DSA 103 shall include both in-plant and on-site testing and inspection requirements as applicable. Manufacturers shall be involved in the coordination of in-plant testing and inspection with the project inspector, Laboratory of Record, and owner of the site-specific project using the PC design prior to commencing fabrication.

1.3.3 Only the site-specific DSA 103 can exempt structural tests and special inspections; therefore, the exemptions appendix of the example DSA 103 shall not be included on the PC drawings. The applicability of exemptions may be considered during plan review of the site-

specific project scope, must be justified by the project design professional, and is subject to DSA review and approval. Refer to Appendix A below for additional information.

1.4 Options and Variations

The PC drawings shall provide checkboxes of options and variations if there is more than one configuration or design criteria. See PR 07-01 Section 2 for more information, including the maximum number of options permitted.

1.5 Design Parameters

The PC drawings shall state on the cover sheet (and subsequent sheets if necessary) design information as defined in PR 07-01 Section 1.4.2 and Appendix B. If the PC includes design variations for multiple tiers or levels of the same design parameter, that design information should be presented in a checklist format and provide general direction to future users (i.e., design professionals and plan reviewers) for the application of the PC to site-specific projects. Additionally, refer to and coordinate with PL 07-02 Section 3, which summarizes common site-specific parameters to be verified at over-the-counter (OTC) plan reviews.

1.6 Risk Category

The PC drawings shall indicate the maximum Risk Category (RC) the structure is designed for in the design information section. In addition, if the PC drawings include designs for multiple RC, the checklist shall include a note requiring the design professional of the site application to determine and designate the RC of the PC structure as it applies to the site in accordance with CBC Section 1604A.5.

1.7 Flood Zone

The PC design shall comply with CBC Section 1612A and *PR 14-01: Flood Design and Project Submittal Requirements*.

1.7.1 The design information section shall include a note stating that when the site-specific project is located in a flood zone other than Zone X, a letter stamped and signed by a geotechnical engineer is required to validate the applicability of the allowable soil values listed on the PC drawings. This note may include an exemption for the validation letter for projects located in Zone D (undefined) if the applicant provides either of the following:

1.7.1.1 Evidence from the local jurisdiction or a qualified design professional confirming the site is not in a flood hazard zone.

1.7.1.2 Geotechnical report written for improvements on the same campus and in accordance with the current CBC that acknowledges the flood hazard but confirms it does not reduce the soil capacity.

1.7.2 Electrical component locations shall conform to American Society of Civil Engineers (ASCE) Standard 24: Flood Resistant Design and Construction (ASCE 24), Section 7.2.

1.8 Geohazard Reports

It is recommended the design information section include a note indicating that geohazard reports are not required for nonbuilding structures. Refer to *IR A-4: Geohazard Report Requirements*, Section 3.1 for additional information.

1.9 Weather Protection

The PC drawings shall specify adequate weather protection for all weather-exposed steel members (i.e., structural steel and cold-formed steel) in accordance with CBC Section 2201A.3.

1.9.1 Structural steel shall comply with one of the following:

1.9.1.1 Hot-dip galvanized in accordance with ASTM A123 or ASTM A153.

1.9.1.2 Painted with zinc-rich primer (undercoat and finish coat) or an equivalent paint system specified on the PC construction documents and approved by DSA.

1.9.2 Cold-formed steel members shall be 55 percent aluminum-zinc alloy coated per ASTM A792 standard in accordance with the American Iron and Steel Institute (AISI) S240: North American Standard for Cold-Formed Steel Structural Framing, Table A4-1 (CP 90 coating designation). Tube members formed from uncoated steel shall be hot-dip galvanized in accordance with ASTM A1057 and comply with a minimum ZT 50 coating designation.

1.9.3 Exposed steel fasteners, including cast-in-place anchor rods, shall comply with one of the following:

1.9.3.1 Stainless steel in accordance with American Institute of Steel Construction (AISC) 370: Specification for Structural Stainless Steel Buildings, Section A3.

1.9.3.2 Hot-dip galvanized in accordance with ASTM A153 or ASTM F2329.

1.9.3.3 Protected with corrosion-preventive coating that demonstrated no more than 2 percent of red rust in minimum 1,000 hours of exposure in salt spray test per ASTM B117. Zinc-plated fasteners do not comply with this requirement. Examples of proprietary coatings that do comply with the 1,000-hour requirement include, but are not necessarily limited to, Quik Guard by Simpson, Kwik-Cote by Hilti, Stalgard by Elco, vistaCorr by SFS intec, etc.

1.9.4 Post-installed anchors used for exterior exposure shall comply with the requirements of the evaluation report.

1.10 Sheet Index

The PC drawings shall include a sheet index. When a PC includes multiple major options such that not all sheets are applicable to a given site-specific project based on the option being used, the sheet index shall include check boxes. When the PC drawings are incorporated into a site-specific application, the submitted sheets will be identified by marking the check boxes (i.e., it is not necessary to strike out sheets that are not applicable). See PR 07-01 Appendix E for additional information.

1.11 Stamps

The PC drawings shall include the following:

1.11.1 2025 CBC PC Stamp per PR 07-01 Section 1.4.1.

1.11.2 Two blank areas on each PC sheet title block as required by *PR 18-04: Electronic Plan Review for Design Professionals*, Section 1: one for the PC Identification Stamp and one for the future site-specific Identification Stamp.

1.12 Structural Product Acceptance

All manufactured structural products such as board or panel connection clips or brackets shall meet the requirements set forth in *IR A-5: Product and Material Acceptance Based on a Valid Evaluation Report*. Code-based engineering calculations to substantiate the adequacy of a manufactured product will be considered by DSA.

1.13 California Green Building Standards Code and California Energy Code

The PC design shall comply with the mandatory measures of the California Green Building Standards Code and the California Energy Code. The design shall provide sign controls to reduce lighting by 65 percent during nighttime hours. Refer to California Energy Code Sections 130.3 and 140.8 for additional requirements.

PRE-CHECK (PC) DESIGN CRITERIA FOR FREESTANDING SIGNS, SCOREBOARDS, AND BALL WALLS: 2025 CBC

2. COMPONENTS AND ACCESSORIES

2.1 Information Required on the Drawings

The following shall be clearly delineated in the design information section of the PC drawings.

2.1.1 Note stating that the manufacturer's data for the boards, boxes, and equipment to be mounted on the structure, including weights and dimensions shall be submitted with the site-specific application.

2.1.2 Maximum weight of each signage and scoreboard component accounted for in the PC design.

2.1.3 Maximum and minimum dimensions of each signage and scoreboard component accounted for in the PC design.

2.1.4 Dimensions defining the location of each component accounted for in the PC design relative to the primary supporting structure.

2.1.5 Any limitations on the quantity, combinations, or combined weight of the components applied to a single supporting structure.

2.2 Design Basis

If the PC design includes multiple options of combinations and/or locations of components (refer to Section 1.4 above), the adequacy of the supporting structure shall be demonstrated by the design for the most critical loading condition resulting from all potential options.

2.3 Component Construction and Connections

2.3.1 It is the responsibility of the manufacturer to design premanufactured score and display boards, signs, electrical equipment, and light fixtures in accordance with the CBC. The internal framework and enclosure of such components will be accepted as a "black box" and is not subject to DSA review.

2.3.2 Mounting requirements, including fasteners, for such components shall be designed and shown on the PC drawings as required by ASCE Standard 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE 7) Chapter 13 and CBC Section 1617A.1.18. Supporting calculations must substantiate the design for gravity, wind, and seismic loads.

2.3.3 Custom designed architectural components (e.g., decorative framework, beams, trusses) shall be justified by calculation or recognized testing and be included in the PC design, either as a typical or an optional detail.

3. GRAVITY LOAD DESIGN

3.1 Eccentricities of Loads

Often scoreboards or signs are mounted on arms or other components that extend substantially from the column. The structural analysis and design shall explicitly consider the effects of load eccentricities created by these configurations.

3.2 Framing Between Columns

The structural calculations shall demonstrate the adequacy of framing and connections for gravity, seismic, and wind loads, including torsion and biaxial bending as applicable. The unbraced length of beams shall be accounted for in the design, recognizing that there is typically not a traditional diaphragm nor lateral bracing.

3.3 Snow Load

If the structure is designed for snow load, it shall be stated in the design information section according to CBC Section 1603A.1.3. The effective seismic weight shall include snow load as required by ASCE 7 Section 12.7.2.

4. LATERAL LOAD DESIGN

4.1 Seismic Load Criteria

4.1.1 The seismic design criteria upon which the PC design is based shall be stated in the design information section of the PC drawings in accordance with PR 07-01 and CBC Section 1603A.1.5.

4.1.2 If the design is based upon the maximum spectral response acceleration parameters occurring in the state of California, the PC can be used at any site in the state. The PC design may be based on lesser values but doing so will limit the sites where the PC can be used.

4.1.3 Limiting the S_{DS} value in accordance with ASCE 7 Section 12.8.1.3 is not permitted, as this provision does not apply to nonbuilding structures designed in accordance with ASCE 7 Chapter 15.

4.2 Seismic Force Resisting System

Typical cantilever column systems shall be designed as nonbuilding structure type “Signs and Billboards” as listed in ASCE 7 Table 15.4-2, except as permitted in Section 5.4.1 below. Seismic response parameters are as follows:

4.2.1 Response Modification Coefficient: R = 3.

4.2.2 Overstrength Factor: $\Omega_0 = 1.75$.

4.2.3 Deflection Amplification Factor: $C_d = 3$.

4.2.4 A redundancy factor of 1.0 may be used for both directions per the Exception of ASCE 7 Section 15.6.

4.3 Direction of Seismic Loading

For structures with horizontal cantilevers or otherwise sensitive to vertical ground motions, the design shall include the directional load combinations required by ASCE 7 Section 15.1.4.1.

4.4 Wind Load Criteria

The PC design shall demonstrate compliance with wind loads in accordance with ASCE 7 Section 29.3.1, including substantiation of Cases A, B, and C as defined by ASCE 7 Figure 29.3-1. In addition to all signage, scoreboard, ball wall, and framing components subject to wind pressure, the PC design shall include wind load on the following:

4.4.1 Projected area of the columns.

4.4.2 Projected area of any architectural framing and decorative elements, including those that are unsheathed or uncovered.

4.5 Column Design

Built-up columns of different materials shall not be permitted unless approved as an alternative design with supplemental full-scale testing.

4.5.1 Columns (including built-up sections) shall comply with either of the following:

4.5.1.1 AISC 360: Specification for Structural Steel Buildings and AISC 341: Seismic Provisions for Structural Steel Buildings for structural steel.

4.5.1.2 AISI S100: North American Specification for the Design of Cold-Formed Steel Structural Members and AISI S400: North American Standard for Seismic Design of Cold-Formed Steel Structural Systems for cold-formed steel.

4.5.2 Columns must be designed for P-Δ (first order) effects of the ½" displacement of the foundation if two times the lateral bearing pressure is used per CBC Section 1806A.3.4. See Section 5.2 below.

4.5.3 The PC design shall demonstrate the adequacy of the column subject to weak axis bending when applicable.

4.5.4 The weights, heights, and horizontal offsets of all equipment and fixtures attaching to the columns shall be explicitly accounted for in the column design.

4.6 Drift

Components and their mounting to the structure shall be protected from damage resulting from drift between the upper and lower framing levels. Protection may be provided in the detailing of framing connections, detailing of the component mounting, or another approved means.

5. FOUNDATION

5.1 Vertical Allowable Soil Pressure

The PC design shall be based on the presumptive allowable soil bearing pressure corresponding to Class 5 soil in CBC Table 1806A.2 unless justified by a site-specific geotechnical report. To base the design on values greater than those stated for Class 5 soil, a statement requiring a site-specific geotechnical report at the time of site application must be included in the design information section of the PC drawings.

An allowable stress increase in the presumptive load-bearing value is not permitted when using the allowable stress design load combinations per ASCE 7 Section 2.4. An allowable stress increase is permitted in accordance with CBC Section 1806A.2 when using the alternative allowable stress design load combinations per CBC Section 1605A.2 that include wind or seismic loads.

5.2 Lateral Bearing Pressure

The PC design shall be based on the presumptive lateral bearing pressure corresponding to Class 5 soil in CBC Table 1806A.2 unless justified by a site-specific geotechnical report. To base the design on values greater than those stated for Class 5 soil, a statement requiring a site-specific geotechnical report at the time of site application must be included in the design information section of the PC drawings.

When justified in accordance with Section 4.5.2 above, the presumptive lateral bearing pressure may be increased in accordance with CBC Section 1806A.3.4. This increase is not permitted to lateral bearing values determined by a site-specific geotechnical evaluation. The design information section of the PC drawings shall clearly state if the lateral bearing pressure value used in the design has been increased per CBC Section 1806A.3.4.

5.3 Foundation Design Load

ASCE 7 Section 15.1.1 requires the foundations of nonbuilding structures to comply with ASCE 7 Sections 12.1.5 and 12.13. However, DSA does not intend and historically has not required the structure types covered by this IR to be designed for the amplified seismic forces required

by CBC Section 1617A.1.15, which is a modification of ASCE 7 Section 12.13.1. DSA will not enforce CBC Section 1617A.1.15 on the design of signs, scoreboards, and ball walls.

5.4 Cast-in-place Deep Foundation (Drilled Pier)

5.4.1 The PC design shall comply with CBC Section 1810A.3.9 if the column anchors to the top of the drilled pier (i.e., with base plate and anchor rods) or is partially embedded. See Sections 5.12 and 5.13 below.

The alternate design provisions in *IR 18-5: Foundation Design and Detailing*, Section 1.4.3 can be applied if the steel column is fully embedded (i.e., to within six inches of the bottom of the drilled pier) and meets all of the parameters noted therein (i.e., nonconstrained, $R \leq 2$, $R/\Omega_0 = 1.0$ or less, etc.), which would require design for a lesser response modification coefficient than listed in Section 4.2 above.

5.4.2 In accordance with CBC Section 1810A.2.4, the depth of the drilled pier may be designed in accordance with CBC Section 1807A.3.2 when the drilled pier is assumed to be rigid.

5.4.2.1 The drilled pier may be assumed to be rigid if the ratio of the specified depth (not the depth required by CBC Section 1807A.3.2) to diameter is equal to or less than 8 and the California Geological Survey does not otherwise require analysis per Section 5.4.2.3 below.

5.4.2.2 The drilled pier shall be designed for the maximum moment and shear below grade based on engineering mechanics. IR 18-5 Sections 1.4.2.1 and 1.4.2.2 provide an acceptable method for determining internal moments and shears.

5.4.2.3 When the drilled pier does not comply with Section 5.4.2.1 above, the design, including reinforcing, shall consider the nonlinear interaction of the drilled pier and soil (e.g., L-pile analysis or equivalent) per CBC Section 1810A.2.4 with consideration of group effects as required by CBC Section 1810A.2.5.

5.4.3 For drilled piers with partial column embedment or a base plate and embedded anchor rods, transverse reinforcing shall comply with CBC Section 1810A.3.9.4.2 and American Concrete Institute (ACI) 318: Building Code Requirements for Structural Concrete and Commentary. See ACI 318 Table 18.13.5.7.1 for additional information.

Exception: The transverse reinforcement (i.e., ties or spiral) need not exceed that required in the subsections below when the drilled pier is assumed to be rigid per Section 5.4.2 above and the factored axial force is less than 10 percent of the specified concrete compressive strength multiplied by the gross area of the concrete section (i.e., $P_u < 0.10f'_cA_g$). This exception is only applicable to drilled piers supporting freestanding signs, scoreboards, or ball walls. This type of structure is lightly loaded and has a low ductility demand. These exceptions may not be extended to other types of structures.

5.4.3.1 Per CBC Section 1810A.3.9.4.2, the size of transverse reinforcement shall comply with the following:

5.4.3.1.1 Drilled pier diameter 20-inches or less: #3 bar minimum.

5.4.3.1.2 Drilled pier diameter greater than 20-inches: #4 bar minimum.

5.4.3.2 For drilled piers in soil categorized as Site Class A, B, BC, C, CD, D, or DE, transverse reinforcement spacing shall not exceed the smallest of the following in the top 3d of the drilled pier (where “d” is the drilled pier diameter). Refer to Figures 5.4A and 5.4C below.

5.4.3.2.1 One quarter the drilled pier diameter: d/4.

5.4.3.2.2 Six times the least Grade 60 longitudinal bar diameter: $6d_b$.

5.4.3.2.3 Five times the least Grade 80 longitudinal bar diameter: $5d_b$

5.4.3.2.4 Six inches: 6".

5.4.3.3 For drilled piers in soil categorized as Site Class E, transverse reinforcement spacing shall comply with Section 5.4.3.2 above in the top 7d of the drilled pier (where "d" is the drilled pier diameter). Refer to Figures 5.4B and 5.4D below. In consideration that 7d is 88 percent or more of the overall pier depth and the requirement of Section 5.4.3.5 below, it is recommended this transverse reinforcement spacing requirement simply be extended over the full depth of the drilled pier.

5.4.3.4 Transverse reinforcement spacing shall not exceed the smallest of the following in the remainder of the drilled pier except as required by Section 5.4.3.5 below. Refer to Figures 5.4A, 5.4B, 5.4C, and 5.4D below.

5.4.3.4.1 One half the drilled pier diameter: d/2.

5.4.3.4.2 Twelve times the least longitudinal bar diameter: $12d_b$.

5.4.3.4.3 Twelve inches: 12".

5.4.3.5 For drilled piers in soil categorized as Site Class E, transverse reinforcement spacing shall comply with Section 5.4.3.2 above at all depths within 7d above and below (where "d" is the drilled pier diameter) interfaces between hard/stiff and soft strata as required by CBC Section 1810A.3.9.4.2.2.

5.4.3.6 For drilled piers with partially embedded columns, the transverse reinforcement spacing shall comply with that required by Section 5.12.1 below.

5.5 Allowable Friction Resistance and Uplift Capacity

The allowable friction resistance and uplift capacity used in the design of cast-in-place deep foundations (drilled piers) shall be included in the design information section. When a site-specific geotechnical report is not available, CBC Section 1810A.3.3.1.4 can be used to determine the allowable friction resistance value assuming Class 5 soils as described in Sections 5.1 and 5.2 above.

5.6 Ground Surface Condition

When the design is based on CBC Section 1807A.3.2, asphalt pavement does not constitute a "constrained" condition and does not justify the use of CBC Equation 18A-2 or 18A-3 to determine the required drilled pier depth. Where the constrained condition is used with concrete pavement, the reaction shall be adequately resisted and justified by calculations. The construction necessary to resist this reaction shall be clearly detailed on the PC drawings.

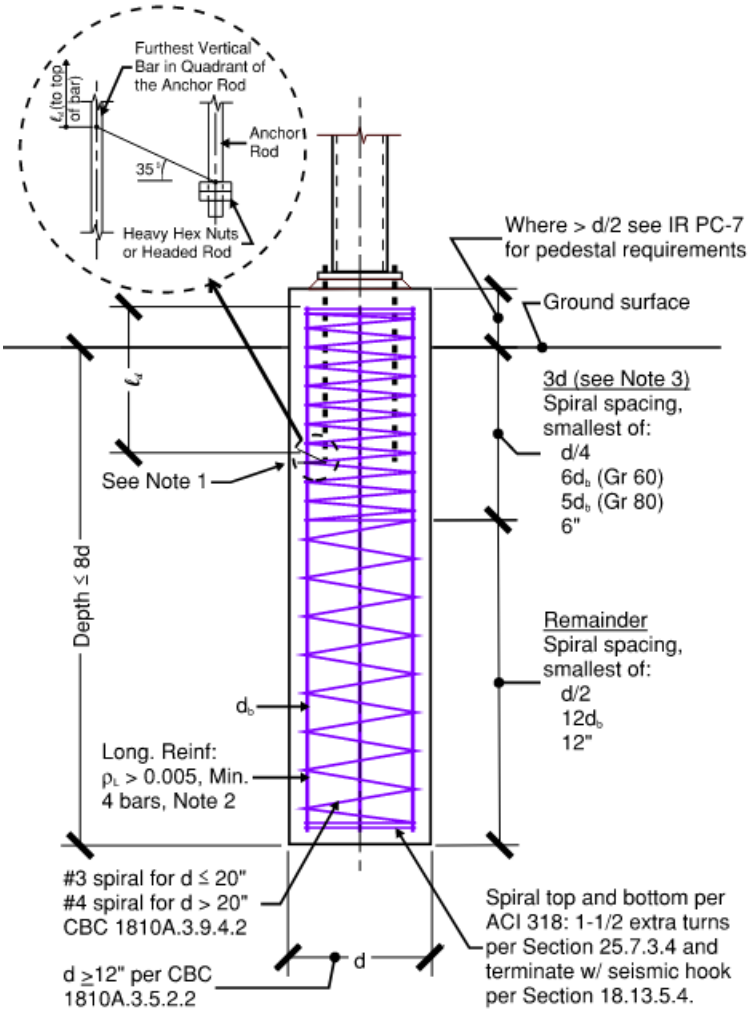
5.7 Shallow Foundations

Shallow spread footings shall be designed per CBC Chapter 18A and for stability in accordance with CBC Section 1605A.1.1. The structure shall not be supported by a combination of deep foundation elements (e.g., drilled pier) and shallow spread footings.

5.8 Adjacent Slopes

The PC drawings shall specify minimum setback limits (values are required) of the structure relative to slopes per CBC Section 1808A.7. If the PC drawings define setback limits smaller than the CBC allows, a statement requiring a site-specific geotechnical report at the time of site application must be included in the design information section. Alternatively, when delineated on the approved PC drawings, the required depth of the cast-in-place deep foundation (drilled pier) can be increased in accordance with Figure 5.8 below.

PRE-CHECK (PC) DESIGN CRITERIA FOR FREESTANDING SIGNS, SCOREBOARDS, AND BALL WALLS: 2025 CBC



The prescriptive requirements shown in this detail may be used when the pier depth to diameter ratio is less than or equal to 8. If this ratio is exceeded, the pier must be analyzed and designed as required by CBC Section 1810A.2.4.

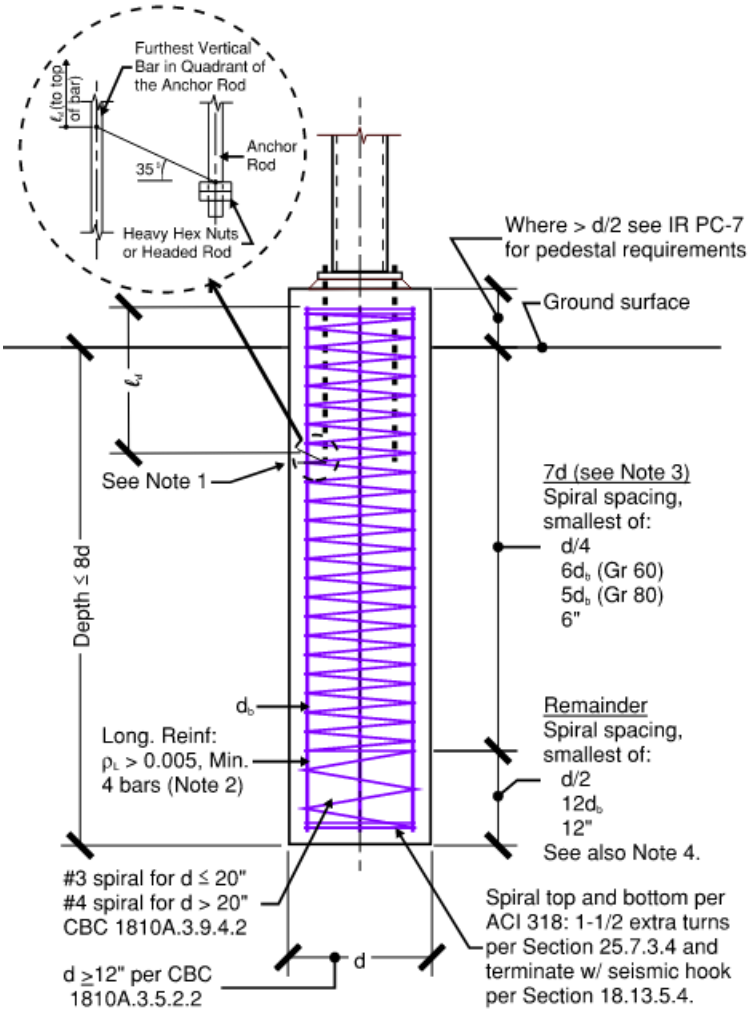
Note 1: Development length of vertical reinforcing steel that engages the anchor rod, ℓ_d, must meet ACI 318 Section 25.4. It is measured from the top of vertical bar to the point shown in the enlarged detail. Alternatively, the embedment depth of the anchor rod may be determined as the development length of the vertical bar plus one quarter of the pier diameter (ℓ_d + d/4).

Note 2: The total longitudinal reinforcing steel area (A_s) shall be enough to transfer the loads from the total required anchor rod area ($A_{rod\text{-}req}$) taking into account relative yield stress, as follows: $A_s \geq A_{rod\text{-}req} \times (f_{y\text{-}rod} / f_{ys})$
However, if the spacing between vertical bars is 6" or less, the steel area (A_s) need not exceed 33% more than that required to resist the column design moment in the pier section.

Note 3: When a site-specific geotechnical report requires lateral bearing resistance be neglected over a specified depth from the ground surface, the 3d dimension shall start where the lateral bearing resistance starts, and the tighter spacing shall be extended through the neglected zone.

Figure 5.4A: Spiral Reinforcing in Site Class A, B, BC, C, CD, D, or DE

PRE-CHECK (PC) DESIGN CRITERIA FOR FREESTANDING SIGNS, SCOREBOARDS, AND BALL WALLS: 2025 CBC



The prescriptive requirements shown in this detail may be used when the pier depth to diameter ratio is less than or equal to 8. If this ratio is exceeded, the pier must be analyzed and designed as required by CBC Section 1810A.2.4.

Note 1: Development length of vertical reinforcing steel that engages the anchor rod, ℓ_d, must meet ACI 318 Section 25.4. It is measured from the top of vertical bar to the point shown in the enlarged detail. Alternatively, the embedment depth of the anchor rod may be determined as the development length of the vertical bar plus one quarter of the pier diameter (ℓ_d + d/4).

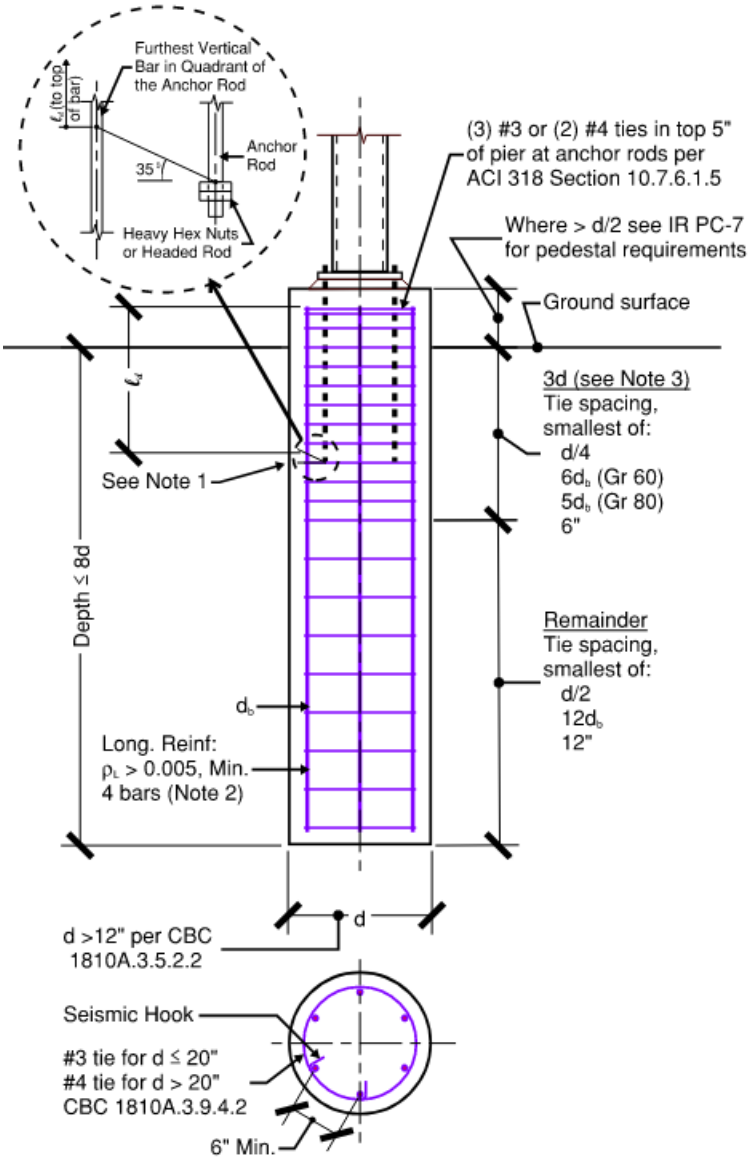
Note 2: The total longitudinal reinforcing steel area (A_s) shall be enough to transfer the loads from the total required anchor rod area ($A_{rod\text{-}req}$) taking into account relative yield stress, as follows: $A_s \geq A_{rod\text{-}req} \times (f_{y\text{-}rod} / f_{ys})$
However, if the spacing between vertical bars is 6" or less, the steel area (A_s) need not exceed 33% more than that required to resist the column design moment in the pier section.

Note 3: When a site-specific geotechnical report requires lateral bearing resistance be neglected over a specified depth from the ground surface, the 7d dimension shall start where the lateral bearing resistance starts, and the tighter spacing shall be extended through the neglected zone.

Note 4: At all depths in the remainder of the pier that are 7d above and below interfaces between hard/stiff and soft soil strata the spiral spacing shall be reduced to match that required in the "7d" region. Refer to CBC Section 1810A.3.9.4.2.2.

Figure 5.4B: Spiral Reinforcing in Site Class E

PRE-CHECK (PC) DESIGN CRITERIA FOR FREESTANDING SIGNS, SCOREBOARDS, AND BALL WALLS: 2025 CBC



The prescriptive requirements shown in this detail may be used when the pier depth to diameter ratio is less than or equal to 8. If this ratio is exceeded, the pier must be analyzed and designed as required by CBC Section 1810A.2.4.

Note 1: Development length of vertical reinforcing steel that engages the anchor rod, ℓ_d, must meet ACI 318 Section 25.4. It is measured from the top of vertical bar to the point shown in the enlarged detail. Alternatively, the embedment depth of the anchor rod may be determined as the development length of the vertical bar plus one quarter of the pier diameter (ℓ_d + d/4).

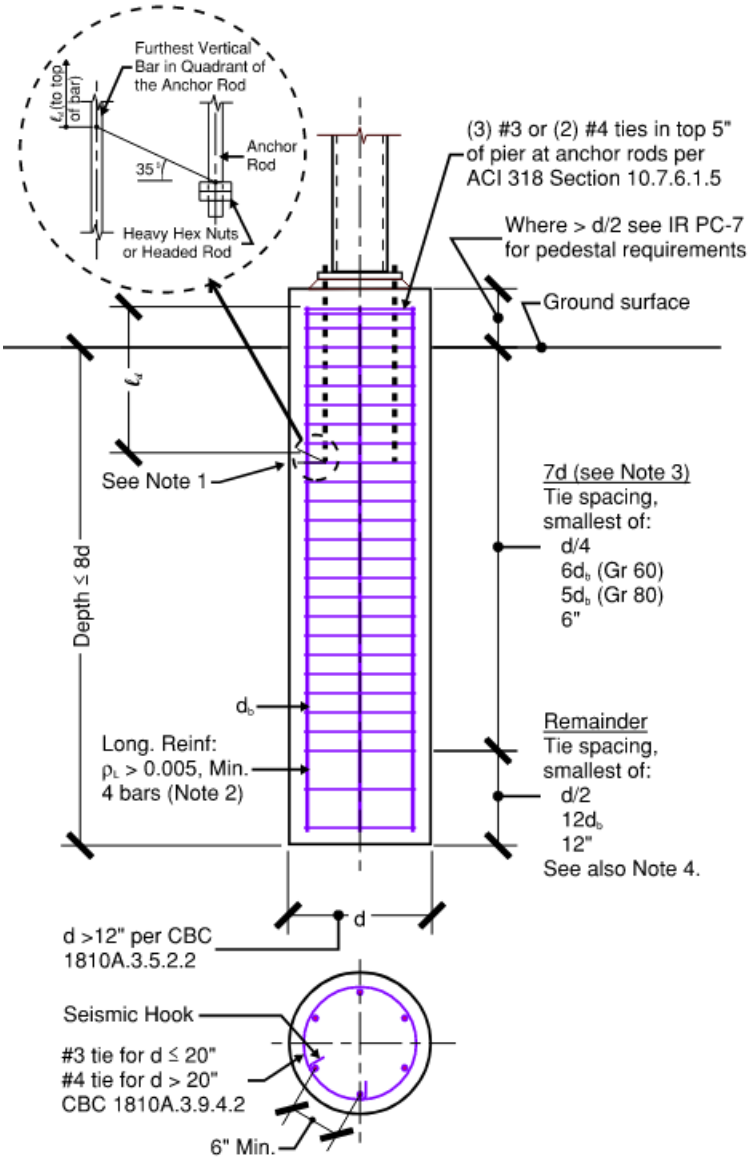
Note 2: The total longitudinal reinforcing steel area (A_s) shall be enough to transfer the loads from the total required anchor rod area ($A_{rod\text{-}req}$) taking into account relative yield stress, as follows: $A_s \geq A_{rod\text{-}req} \times (f_{y\text{-}rod} / f_{ys})$
However, if the spacing between vertical bars is 6" or less, the steel area (A_s) need not exceed 33% more than that required to resist the column design moment in the pier section.

Note 3: When a site-specific geotechnical report requires lateral bearing resistance be neglected over a specified depth from the ground surface, the 3d dimension shall start where the lateral bearing resistance starts, and the tighter spacing shall be extended through the neglected zone.

Note 4: Ties shall comply with ACI 318 Section 25.7.2.4.1 including: (a) ends overlap by at least 6", (b) ends terminate with a seismic hook engaging a longitudinal bar, and (c) overlaps of adjacent ties are staggered around the perimeter.

Figure 5.4C: Tie Reinforcing in Site Class A, B, BC, C, CD, D, or DE

PRE-CHECK (PC) DESIGN CRITERIA FOR FREESTANDING SIGNS, SCOREBOARDS, AND BALL WALLS: 2025 CBC



The prescriptive requirements shown in this detail may be used when the pier depth to diameter ratio is less than or equal to 8. If this ratio is exceeded, the pier must be analyzed and designed as required by CBC Section 1810A.2.4.

Note 1: Development length of vertical reinforcing steel that engages the anchor rod, ℓ_d, must meet ACI 318 Section 25.4. It is measured from the top of vertical bar to the point shown in the enlarged detail. Alternatively, the embedment depth of the anchor rod may be determined as the development length of the vertical bar plus one quarter of the pier diameter (ℓ_d + d/4).

Note 2: The total longitudinal reinforcing steel area (A_s) shall be enough to transfer the loads from the total required anchor rod area ($A_{rod\text{-}req}$) taking into account relative yield stress, as follows: $A_s \geq A_{rod\text{-}req} \times (f_{y\text{-}rod} / f_{ys})$
However, if the spacing between vertical bars is 6" or less, the steel area (A_s) need not exceed 33% more than that required to resist the column design moment in the pier section.

Note 3: When a site-specific geotechnical report requires lateral bearing resistance be neglected over a specified depth from the ground surface, the 7d dimension shall start where the lateral bearing resistance starts, and the tighter spacing shall be extended through the neglected zone.

Note 4: At all depths in the remainder of the pier that are 7d above and below interfaces between hard/stiff and soft soil strata the tie spacing shall be reduced to match that required in the "7d" region. Refer to CBC Section 1810A.3.9.4.2.2.

Note 5: Ties shall comply with ACI 318 Section 25.7.2.4.1 including: (a) ends overlap by at least 6", (b) ends terminate with a seismic hook engaging a longitudinal bar, and (c) overlaps of adjacent ties are staggered around the perimeter.

Figure 5.4D: Tie Reinforcing in Site Class E

The pier depth shall be increased such that the depth required by analysis (i.e., “D” designated in Figure 5.8) is provided below a horizontal plane projected from a horizontal distance seven times the pier diameter (i.e., “7d” designated in Figure 5.8). Additionally, design parameters dependent on column height shall be determined based on a theoretical column height starting from the same horizontal plane (i.e., “H” designated in Figure 5.8).

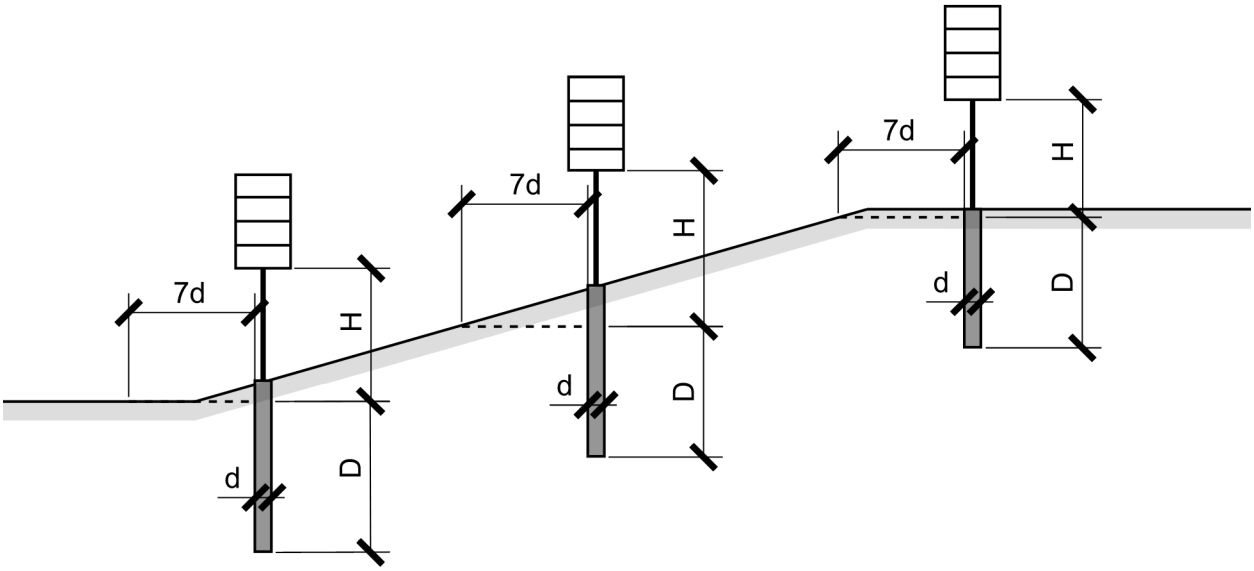


Figure 5.8: Sloped Sites

5.9 Liquefiable Soil or Site Class F

PC designs will not be approved with an option for construction on sites with liquefiable soil or soil categorized as Site Class F. If the site is not in a mapped liquefaction hazard zone, it may be presumed that no liquefaction hazard exists on that site unless a site-specific geotechnical report identifies such a hazard. Refer to IR A-4 Section 4.

5.10 Concrete Mix

In addition to those requirements dictated by the PC design, the concrete used in the foundation elements shall comply with the durability requirements of ACI 318 Section 19.3. The PC drawings shall account for the dependency of these durability requirements on site-specific characteristics.

5.10.1 When the PC drawings do not require a site-specific geotechnical report that quantifies sulfate content in the soil, the PC drawings shall require a concrete mix complying with one of the following per ACI 318 Table 19.3.2.1:

5.10.1.1 Maximum water/cement ratio of 0.45; minimum compressive strength of 4,500 pounds per square inch (psi); Type V cement plus pozzolan or slag cement complying with footnote 7 of the table; and prohibition of admixtures containing calcium chloride.

5.10.1.2 Maximum water/cement ratio of 0.40; minimum compressive strength of 5,000 psi; Type V cement complying with footnote 8 of the table; and prohibition of admixtures containing calcium chloride.

5.10.2 When the PC drawings require a site-specific geotechnical report that quantifies sulfate content in the soil, the PC drawings shall clearly state the exposure class for each category (i.e., F, S, W and C), or combination thereof, for which the PC design is approved. The maximum

water/cement ratio, minimum compressive strength, cementitious material requirements, and admixture limitations shall be stated on the PC drawings for each approved case.

5.10.3 Both approaches given in Sections 5.10.1 and 5.10.2 above can be included on the PC drawings as separate options in accordance with Section 1.4 above.

5.10.4 The PC drawings shall include a note requiring that concrete exposed to freezing-and-thawing cycles be air entrained per ACI 318 Section 19.3.3.

5.11 Conduits in Foundation

The PC drawings shall clearly show the size and number of conduits adjacent to or penetrating the foundation elements (e.g., drilled pier, shallow footing, etc.). The drawings shall include an elevation showing the location of the conduits relative to the foundation element and its reinforcement.

5.11.1 The presence of conduits may require the portion of the foundation above the conduits to be neglected in the structural design. The impact of conduits on the foundation strength, effective column height, and foundation depth shall be justified by calculation.

5.11.2 The base plate shall be designed for any holes or notches required for conduits. Details of holes and notches in the base plate shall be included on the PC drawings.

5.12 Partially Embedded Columns

When steel columns are partially embedded into a cast-in-place deep foundation (drilled pier), the alternate design provisions in IR 18-5 Section 1.4.3 are not applicable.

5.12.1 The load transfer mechanism of partially embedded columns shall include the design of both the column and drilled pier ties or spiral. The transverse reinforcement size and spacing shall be sufficient to transfer the required force based on a rational method and accepted principles of engineering mechanics.

5.12.2 The minimum column embedment depth into the drilled pier shall be the greater of the following:

5.12.2.1 Seven times the least dimension of the column section.

5.12.2.2 Minimum development length of the longitudinal drilled pier reinforcing based on ACI 318 Section 25.4.

5.12.3 All embedded columns into pier footings shall have a mechanical connection to resist uplift. AISC 360 Section I6 provides acceptable criteria for demonstrating the adequacy of the load transfer from the partially embedded column to the drilled pier.

Exception: For steel columns embedded into the drilled pier 4 feet or more, it is permitted to assume an allowable bond stress of 25 psi between the steel column and concrete. The upper 12 inches of the column embedment must be disregarded and no increase in this allowable bond stress is permitted for wind or seismic loads.

5.13 Column Base Connection

AISC *Design Guide 1: Base Plate and Anchor Rod Design* provides useful guidance on the design of the column base connection.

5.13.1 The embedment depth of the anchor rods shall be sufficient to lap with the longitudinal drilled pier reinforcement, when applicable. The lap length shall be based on developing the longitudinal reinforcement beyond the projected failure plane of the anchor rod heads. Refer to Figures 5.4A, 5.4B, 5.4C, and 5.4D above and ACI 318 Figure R17.5.2.1a. The lap length is not

permitted to be reduced based on providing reinforcement beyond that required for the applied loads.

5.13.2 Anchor rods shall be designed for combined shear and tension. If the maximum grout thickness between the top of the foundation and bottom of the base plate exceeds two times the anchor rod diameter, the anchor rods shall be designed for bending in combination with tension and shear. Compliance with Telecommunications Industry Association (TIA) 222-I Section 4.9.9 is an acceptable method of designing anchor rods for combined tension, shear, and bending.

5.13.3 When oversized holes are used in the base plate the design shall comply with CBC Section 2201A.5.1.

6. ACCESS COMPLIANCE REQUIREMENTS

Freestanding signs and scoreboards may be protruding objects and affect required vertical clearance in circulation paths; refer to CBC Section 11B-307. Appropriate details shall be provided on the PC drawings to assure compliance with all applicable code requirements.

7. FIRE AND LIFE SAFETY REQUIREMENTS

7.1 Fire Apparatus Access Roadways

Freestanding signs, scoreboards, post-mounted objects, and ball walls shall not be located within, obstruct, or impeded required fire apparatus access roadways.

7.2 Post-Mounted Objects

Post-mounted objects including marquees and scoreboards shall comply with CBC 1003.3.2.

7.3 Special Construction Requirements for Freestanding Signs and Scoreboards

Freestanding signs and scoreboards shall comply with the special construction requirements of CBC Sections 3106 and 3107.

7.4 Underground Raceways

Electrical conduit or other raceways supplying power to freestanding signs and scoreboards shall comply with California Electrical Code (CEC), Article 300.5 and Table 300.50.

7.5 Electrical Disconnects, Grounding, and Bonding

Freestanding signs and scoreboards shall be provided with a means of disconnect per CEC Article 600.6. Freestanding signs and scoreboards shall be grounded and bonded per CEC Articles 250 and 600.7.

REFERENCES:
2025 California Code of Regulations (CCR) Title 24

Part 2: California Building Code (CBC).
Part 6: California Energy Code
Part 11: California Green Building Standards Code.

PRE-CHECK (PC) DESIGN CRITERIA FOR FREESTANDING SIGNS, SCOREBOARDS, AND BALL WALLS: 2025 CBC

APPENDIX A: SITE-SPECIFIC APPLICATION GUIDE

The following notes are provided as a guide to assist design professionals and DSA plan reviewers when preparing and reviewing site-specific project applications that incorporate PC structures designed in accordance with this IR. This appendix is not intended to be an all-inclusive list of design and submission requirements, but rather is an aid to identify aspects of the design criteria described in this IR of particular interest to its site application.

- ☐ Verify site-specific suitability of the PC including all parameters in PL 07-02 Section 3.
- ☐ Verify site-specific requirements of PL 07-02 Section 4 are met.
- ☐ Review the site-specific DSA 103 in comparison with the example DSA 103 for required structural tests and special inspections and for any site-specific exemptions. Refer to Section 1.3 above.
- ☐ Verify Risk Category (RC) of the site-specific design is compliant with the design information section of the PC drawings. Refer to Section 1.6.
- ☐ If the site is located in a flood zone other than Zone X, verify a validation letter from a geotechnical engineer is provided. Refer to Section 1.7 above.
- ☐ Verify the weight, dimensions, and location of all signage and scoreboard components specified on the site-specific drawings comply with the limits defined on the PC drawings. Verify the quantity and combination of components also comply with the limits defined on the PC drawings. Refer to Section 2.1 above. ←
- ☐ If drilled pier foundations are used and the constrained ground surface condition option is applied, verify the site-specific drawings comply with the ground surface requirements defined on the PC drawings. Note: Asphalt concrete is not acceptable. Refer to Section 5.6 above.
- ☐ Verify the site-specific application does not mix deep foundation elements (e.g., drilled piers) and shallow spread footings. Refer to Section 5.7 above.
- ☐ If structures are sited on or adjacent to a slope, verify the site-specific drawings comply with the setback and/or pier embedment requirements defined on the PC drawings. Refer to Section 5.8 above.
- ☐ Verify no part of signs, marquees, etc. obstructs the required width or vertical clearance of designated fire lanes.