



STRUCTURAL PLAN REVIEW GUIDELINES

I. SOILS & FOUNDATIONS

A. Soils Investigation

1. A soils investigation report is required for all new foundations for new construction/additions, or other excavation more than 5' below adjacent grade, per code Bulletin B9906-R7, with the following exceptions:
 - Additions with a footprint of less than 2,000 sq. ft. and 3 or less stories. This exception does not apply to new buildings requiring excavation or foundation work near existing foundations.
 - Excavations for utilities, geotechnical exploration, or performed under a complete demolition permit.
 - Reports from adjacent properties may be used, with Engineer's letter of approval.
2. A soils investigation report shall include any required supporting data and a statement by a registered professional engineer that the soils is capable of adequately supporting the proposed construction and occupancy based on her/his observation and investigation.
3. Plans Examiner shall verify that the content complies with Code Bulletin B9906-R7:
 - Test pits may not be excavated to a depth greater than 14 feet or depth of existing foundation, whichever is less.
 - The minimum depth of exploration is 10 feet or to the undisturbed soil, whichever is deeper.
4. The soils investigation report shall include:
 - A plot containing the area, height, and use (or average area loading) of the proposed structure.
 - Soil samples including the method of exploration.
 - Soil profile including a description of the different stratum, standard test pit and/or boring logs, proposed footing depth, record of penetration resistance of the sample spoon, and location plan of the test pit and/or borings.
 - Depth of footings within 10 feet of the excavation. The depth of footing must be measured and cannot be assumed based on visual observations only.
 - Elevation of the water table, if encountered.
 - Recommendation for foundation type and design criteria, to include, but not limited to bearing capacity of natural & compacted soil, method of determining value, provisions to mitigate the effects of expansive soils, differential settlement and varying soil strength, and the effects of adjacent loads.
 - Expected total and differential settlement.
 - Pile and pier foundation information in accordance with Section 1803.5.5.
 - Special design and construction provisions for footings or foundations of structures founded on expansive soils, as necessary.
 - Compacted fill material properties and testing in accordance with Section 1803.5.8.

B. Foundation Design

1. The foundation plan must be sealed by a registered professional engineer and a sealed statement confirming the design was based upon the findings and recommendations of the soils investigation report.
2. The foundation plan must indicate the depth and material of adjacent footing.



3. When a foundation design meets the prescriptive requirements of Section 1808 of the 2018 IBC, or when the design deviates from the recommendation of the soils investigation report, the engineered foundation plans must be sealed by a registered professional engineer and include a sealed statement.
 - An architect is not permitted to 'engineer' a foundation system.
 - Foundations must extend at least 30" below grade or meet one of the alternative criteria or exception (low-risk, one-story structures) of Section 1809.9.
 - Where the soils report identifies hydrostatic pressure, the design must comply with ground-water control system requirements of Section 1803.5.4 or waterproofing requirements of Section 1805.3.

C. Excavation & Underpinning

1. Excavations shall not remove lateral support from any footing or foundation without first underpinning or protecting the footing or foundation against settlement or lateral translation, per Section 1804.1.
2. An excavation plan must provide the following information (Refer to [Excavation plan requirements](#) for more info):
 - Location and dimensions of property lines, adjacent walkways, easements, streets.
 - Location of neighboring structures including height, stories, construction type.
 - Foundation/Retaining walls within 10 feet of excavation (to include Depth & Construction Materials of Footing/Foundation).
 - PA One Call Number.
 - Area and depth of excavation.
 - Required protection of footings and foundations of buildings and structures within 10 feet of excavation, including sequencing. If the proposal reflects no special precautions, the plan must include a note indicating that no special precautions or measures are required to protect existing footings and foundation on the subject property or on the immediately adjoining property.
 - Protective support system for all excavation (width, area, and depth of installation), including immediately adjacent ROW, alleys, and yards of adjacent properties in accordance with OSHA regulations., including section and profile views showing all elevations of any feature 10 feet above grade and 10 feet below the deepest portion of any tie-back, pile, micro-piles, support.
 - Damp-proofing of exposed foundation walls.
 - Soil type, bearing capacity, and density.
 - Surcharge loads, including pedestrian and vehicular traffic, and anticipated construction staging, earth pressure, friction angle and maximum deflection of support system.
 - Water table elevation.
 - Identification of utilities located within work area and within 10 feet of the excavation and identifications of any required utility protection.
 - Construction barrier per Philadelphia Building Code Chapter 33 and/or crash protection installations, if required.
 - Description of any required dewatering operations
3. An engineered design must be accompanied by structural calculations bearing the engineer's seal and signature.

II. BEARING WALLS & PARTY WALLS

A. Bearing Walls

1. Plans Examiner shall check to ensure that the bearing walls are designed to transfer the structure loads to the foundation, and to ensure that the load transfer to the foundation shall not have an adverse effect on the wall stability.



2. The Plans Examiner shall review the load path of every floor and roof assembly to the bearing wall or column.
3. In structures with cantilevered assemblies, dead or live loads would create a force to the supporting structure. The Plans Examiner shall review the proposed connection for adequate stability.

B. Existing Party Wall Construction & Stability (2018 IBC)

Where applicable, plans are required to include adequate protection of party walls or other shared components during construction or demolition. Note that a party wall is identified as a wall located on a lot line that can be used or adapted for joint service between two buildings, which should be constructed as a fire wall. Party walls are utilized to maintain separate buildings that are independent structures and should be constructed/maintained without any openings (*with exception to Malls and Anchor Buildings in accordance with IBC 2018, Ch 4*). A wall located on a lot line does not need to be maintained in joint service of two buildings to be considered a party wall.

1. Plans Examiner shall review the location of the property line to confirm that the proposed or existing wall is a party wall and not an exterior wall.
2. Plans Examiner shall confirm that a party wall is constructed as a fire wall in accordance with Section 706.
 - Party walls shall be constructed without openings and shall create separate buildings that maintain structural independence of each building on both sides of the party wall.
 - Exception: Party walls in anchor buildings and malls shall be in accordance with IBC Chapter 4.
3. Plans Examiner shall confirm that party walls (fire walls) have sufficient structural stability under fire conditions to allow collapse of construction on either side without collapse of the wall for the duration of time indicated by the required fire-resistance rating.
4. Plans Examiner should review the joist framed connection into the party wall to confirm that the wall will keep its structural integrity under fire conditions.
 - Party walls can be constructed of any approved noncombustible materials with exception to Type V construction.
 - Break away clips shall be provided to protect the structural integrity of the party wall, fire wall or area separation wall.
 - Masonry construction shall comply with Section 2104. No joist shall be installed into a masonry party wall that extends beyond the property line.

III. FLOOR / CEILING FRAMING

A. General:

1. Materials shall be identified (steel, wood, masonry, concrete)

B. 2018 IBC

Wood / Common Lumber:

1. Plans Examiner to verify that the Design Professional checked the following:
 - Structural design loads (Floor live loads) conform to *Table 1607.1*
 - Snow loads conform to (*Section 1608 / ASCE Chapter 7*)
 - Common Lumber – Floor joist spans conform to **Table 2308.4.2.1**
 - Headers/Girders conform to *Table 2308.4.1.1*
 - Common Lumber – Ceiling joist span conform to *Table 2308.7.1*.

Steel:

2. Plans Examiner to verify that the Design Professional checked that steel joist and joist girders shall be in accordance with SJI CJ-1.0; SJI K-1.1; SJI LH/DLH-1.1 or SJI JG-1.1 (*Section 2207*).



C. 2018 IRC

Wood / Common Lumber:

1. Plans Examiner to verify that the Design Professional checked the following:
 - Floor joist spans conform to *Table 502.3.1*
 - Cantilever span for exterior balconies conform to *Table 502.3.3(2)*
 - Truss Design Specs – manufacturer drawings required
 - No cutting or notching in accordance with *Section 502.8*

Cold-form steel:

1. Plans Examiner to verify that the Design Professional checked the following:
 - Floor joist span conform with *Table 505.3.2*
 - Joist sizes conform to *Table 505.2.3*
 - No cutting / notching per *Section 505.3.5*

Wood Ceiling Joist / Rafters:

1. Plans Examiner to verify that the Design Professional checked the following:
 - Ceiling rafter spans shall conform to *Table 802.5.1*
 - Uplift Strap connections conform to *Section 802.11*
 - Roof ventilation conforms to *Section 806*
 - Attic access conforms to *Section 807*

IV. WALL BRACING

A. Scoping Provisions

1. All wood framed systems must include a separate wall bracing plan. Please refer to the [wall bracing plan information sheet](#) for more information.
2. Engineered Design
 - All prescriptive wall bracing requirements are limited to a building maximum of 3 stories with no pilothouse; any building taller must be designed by a Design Professional.
3. Prescriptive Requirements
 - 2018 IBC - Section 2308.6
 - 2018 IRC – Section R602.10 (per PA Act 106 of 2008 & PA Act 1 of 2011)

B. 2018 IBC Prescriptive Design

1. Plans Examiner must verify that the proposed building is eligible to utilize Prescriptive Bracing Design Methods.
2. Design Professional must identify which method of bracing they will be using (Section 2308.6.1) or if they will be utilizing the Alternative Bracing Provisions of Section 2308.6.5.1 and submit plans and details that conform to that method.
3. Plans Examiner must review Wall Bracing Plan and verify that the submitted plans and details comply with the requirements of the bracing method identified including verifying maximum wall spacing and minimum bracing length.
4. Plans Examiner should utilize Figure 2308.6.1 and Table 2308.6.1 to verify compliance with the prescriptive method(s).

C. 2018 IRC Prescriptive Design

1. Plans Examiner must verify that the proposed building is eligible to utilize Prescriptive Bracing Design Methods.



2. Design Professional must identify which method of bracing they will be using (Method 1-8, Section & Table R602.10.4, per PA Act 1 of 2011 and PA Act 106 of 2008) or if they will be utilizing the Alternative Bracing Provisions of Section R602.10.6 and submit plans and details that conform to that method.
3. Plans Examiner must review Wall Bracing Plan and verify that the submitted plans and details comply with the requirements of the bracing method identified including verifying maximum wall spacing and minimum bracing length.
4. Plans Examiner should utilize Table R602.10.4 to verify compliance with the prescriptive method(s).

D. Engineered Design

1. Professional Engineer must design a wall bracing system that complies with the applicable wind and seismicloading requirements per the ASCE 7 Standard.
2. Professional Engineer must submit plans, details and calculations for the compliance wall bracing system.
3. Plans Examiner must review Wall Bracing Plan and calculations to verify that the plan dimensions and details comply with the design parameters utilized in the calculations. Plans Examiner should not verify formulas and calculations, only building dimensional and connection inputs for correlation. The calculations must be reflective of plan details and must be sealed.

V. MASONRY FACADES (VENEERS)

A. 2018 IBC

1. Construction documents shall show all of the items required by 2016 TMS-402 Section 1.2.1, including thefollowing:
 - Specified size, grade, type and location of reinforcement, anchors, and wall ties.
 - Reinforcing bars to be welded and welding procedure.
 - Size and location of structural elements.
 - Provisions for dimensional changes resulting from elastic deformation, creep, shrinkage, temperature and moisture.
 - Loads used in the design of masonry.
 - Specified compressive strength of masonry at stated ages or stages of construction for which masonry isdesigned, except where specifically exempted by this code.
 - Details of anchorage of masonry to structural members, frames and other construction, including the type,size and location of connectors.
 - Size and location of conduits, pipes and sleeves.
 - The minimum level of testing and inspection as defined in Chapter 17.
2. Anchored masonry veneer shall comply with Sections 1404.6, 1404.7, 1404.8 and 1404.9 and Sections 6.1 and 6.2 of TMS 402/ACI 530/ASCE 5.
3. The backing of anchored and adhered masonry shall be of concrete, masonry, steel framing or wood framing per 1403.4.

B. 2018 IRC

1. Plans Examiner to verify that the Design Professional checked the following:
 - Adhered masonry veneers shall comply with Table R703.8 and Figure R703.8, along with the requirements of Sections 6.1 and 6.3 of TMS 402/ACI 530/ASCE 5.
 - Masonry veneer shall be anchored to the supporting wall with corrosion-resistant metal ties in accordance with R703.8.4 and shall be installed along the entire length of the wall at fixed vertical intervals, to ensure that the vertical spacing of the reinforcement does not exceed 24 inches.
 - The internal wythe wall shall be bonded and interlocked to each of the two-party walls at maximum vertical intervals of 4 feet.



- Flashing shall be located below the first course of masonry above finished ground level above foundation wall; at all window and door openings; at wall and roof intersections; under and at the ends of masonry, wood or metal copings and sill; where exterior porches, decks or stairs attach to a wall; and, above all projecting wood trim.
- Weepholes (minimum 3/16 inch diam.) shall be provided in the outside wythe of the masonry wall at a maximum spacing of 33 inches on center, in veneer wythe at bottom of wall, and above wall openings (minimum of 2 weep holes above openings), and shall be located above the flashing.
- Masonry over openings shall be supported by steel lintels (minimum 4-inch bearing per side), reinforced concrete or masonry lintels, or masonry arches, designed to support load imposed.

VI. CALCULATIONS

A. Wall Bracing Plans

1. The Plans Examiner shall request from the Design Professional a copy of all calculations used in the structural design of the building.
2. Calculations must be submitted by the Design Professional to ensure compliance of all wall bracing systems.

B. Miscellaneous

1. The Plans Examiner shall have the right to request from the Design Professional a copy of all calculations used in the structural design of **any** project being reviewed (per Administrative Code Section A-301.6.1).

C. Review

The Plans Examiner is only reviewing structural design criteria and load path.

D. Excavation

1. All plans must be accompanied by signed and sealed calculations with the following:
 - Utilize the latest design standards.
 - All support of excavation characteristics and elements are factored into design calculations.
 - Soils characteristics identified in calculations shall be consistent with the Geotechnical Investigation Report findings.
 - Surcharge loads applicable to the site conditions to include:
 - Vehicular live load surcharge (as applicable, per PennDot Design Manual 4 or AASHTO Standards)
 - Parked vehicles (i.e. surface parking spaces)
 - Existing structures adjacent to the excavation
 - Expected deflections for support of excavations supporting the Right-of-Way (maximum deflection limitation of 1-inch)
 - Calculated Factor of Safety, to include a minimum safety factor of 1.5 to be maintained for all aspects of a Support of Excavation design where Right-of-Way support is being provided.