**SECTION 2A-5**

**STRUCTURAL DESIGN CRITERIA**

* 1. **CODES**
     1. State Requirements for Educational Facilities (SREF), latest edition
     2. Florida Building Code, latest edition.
     3. ASCE 7
     4. All codes and standards, with the associated edition incorporated by reference into any of the above codes and standards.
     5. Additional Reference Standards (as applicable for the scope of work) with the edition to be the current edition at the time of issuance of this design criteria.
        1. American Concrete Institute (ACI).
        2. American Institute of Steel Construction (AISC).
        3. American Iron and Steel Institute (AISI).
        4. American Society for Testing and Materials (ASTM).
        5. American Welding Society (AWS).
        6. Applied Technology Council (ATC).
        7. Concrete Reinforcing Steel Institute (CRSI).
        8. Portland Cement Association (PCA).
        9. Pre-stressed Concrete Institute (PCI).
        10. Steel Deck Institute (SDI).
        11. U.S. Green Building Council (USGBC), Green Building Design and Construction Reference Guide (LEED for Schools New construction and Major Renovations rating system).
        12. Additional Reference Standards (as applicable for the scope of the work) with the edition current at the time of issuance of this design criteria
     6. If the requirements herein conflict with any of the above referenced codes and Standards, the more stringent shall apply.
  2. **LOADS**
     1. The structural design for buildings and other structures for wind forces must comply with requirements of ASCE 7. Basic wind criteria, per Section 1620 of the Florida Building Code shall be a three-second-gust velocity of 180 mph, for Risk Category III buildings and structures and Exposure Category “C”. All buildings and portions of buildings shall be designed as “enclosed” and all openings shall be “protected” or be impact resistant. The building envelope shall be designed and protected to maintain its integrity and protect the building contents and shall be designed in accordance with section 1626 of the Florida Building Code. It is not permitted to design for a “partially enclosed” condition that is due to a breach in the building envelope. Apply the appropriate load factors as described in Section 1605 of the Florida Building Code.
        1. Special attention shall be paid to louvered rooms such as mechanical rooms that will create an imbalance in the internal pressure. Depending on building geometry, this may require internal doors and walls designed for external pressures (compartmentalization effects).
        2. Exception: Overhangs, breezeways, and similar structures shall be designed as the appropriate enclosure classification.
        3. Exception: Design of fences 6’ high or less may be designed for wind V=115 MPH, in accordance with the FBC and SREF.
        4. Exception: Remote facilities such as concession stands, remote storage facilities, Scoreboards, etc may be designed as Risk Category II building and/or structure with a three-second-gust velocity of 170 mph. For a building or structure to be considered remote it must be located more than 100 feet from all adjacent permanent building structures.
     2. Enhanced Hurricane Protection Areas (EHPA’s) shall be designed to withstand the wind pressures developed using the basic wind speed noted above plus forty (40) MPH.
     3. The minimum design live load for roof of canopies and other roof structures having a slope greater than 1-1/2 inches per foot, drained to the exterior of the roof, with no restrictions of water to prevent it to flow off the roof shall be 20 psf.
        1. All other roofs shall be designed for a minimum live load of 30 psf.
        2. Roofs shall be designed to support special loading situations such as roof supported folding partitions, heavy rooftop or roof supported equipment, etc.
           1. Drawings shall state the design loads for heavily loaded areas that are in excess of the typical roof loads.
           2. Roof structure or substructure shall be designed to carry all of the equipment required to effectively run the theatres or other specialty spaces. This should include any pipe battens, electrics, a suspension grid system, elevated walkways, etc.
     4. The design dead loads of roofs shall be the actual dead loads of the structural systems, plus superimposed weights of the insulation, roofing, the MEP allowance, suspended ceilings, collateral loads supported above or below the roof, etc. plus 10 pounds per square foot (allowance for re-roofing).
     5. Roof uplift designs and assembly shall comply with the design loads as determined by American Society of Civil Engineers (ASCE 7) using the criteria listed above.
     6. Interior partitions shall be designed for minimum of a 5-psf lateral load.
     7. Stairs (steel or concrete) and their supports shall be designed for a 100-psf minimum live load.
     8. Railings and guardrails shall be designed in accordance with chapter 16 of the Florida Building Code (both the General and High Velocity Hurricane Zone Special Load Considerations). The system will be designed for each of the load cases and members sized based on maximum stresses that occur in those members.
     9. All exterior soffits and their supports shall be designed for the appropriate wind pressures/suctions due to wind load in conjunction with gravity loads.
     10. All buildings and portions of buildings shall meet the impact requirements stated in the Florida Building Code, Chapter 16, section 1626 and section 453.25.4 as applicable.
     11. All EHPA roof mounted equipment and structures shall be protected against wind-borne debris and meet the missile impact criteria as described in the Florida Building Code (section 453.25.4.5).
  3. **GENERAL DESIGN CRITERIA**
     1. Structural drawings and applicable sections of the project manual that indicate clearly structural portions of the work at the phase being done shall be submitted in accordance with normal professional industry standards.
     2. The criteria for Proprietary Systems, which qualify under the Florida Building Code, will be considered on an individual basis.
     3. Designs shall consider the effects of short and long term deflection, noise transfer, vibrations, crack control and other serviceability requirements.
     4. Structural modifications to existing buildings shall be shown and detailed on structural drawings.
     5. Structural bearing slip joint expansion joints shall be avoided and shall not be installed for bearing loads in excess of 5,000 lbs. If expansion slip joints must be used at other locations, provide a positive slip surface such as a Teflon plate between surfaces.
     6. Floor slabs consisting of poured concrete on grade shall have their contraction, isolation, construction and expansion joints shown on the floor plan. Place joints spaced in accordance per ACI 224R90 and 302.1. Longer side of a rectangular panel should not exceed more than approximately one and a half (1.5) times the smaller, with 1:1, the preferred smaller ratio. Provide additional joints as required to control cracking. Provide diamond shape construction joint around freestanding interior columns. Call for contraction joints to be saw-cut to 1/4 of the slab’s depth minimum. Sawing shall begin, as soon after placing so the concrete will not tear during cutting. Provide diagonal reinforcement at re-entrant corners where contraction joints do not intersect at that corner.
     7. Typically the Testing Laboratory who will perform testing during construction will be selected and paid by the Owner. All retests and all additional testing required due to non-compliance tests shall be the responsibility of the Design/Builder. Testing lab to note on their reports which tests are re-tests
     8. Provide permanent installed access to new roofs. (See Architectural Criteria Specifications.)
     9. The structure shall not bear on organic or other deleterious material.
     10. Exterior walls shall be masonry or concrete. Metal stud framing systems at exterior wall location, are accepted only on a per condition basis.
     11. Non-bearing walls shall be braced or reinforced to act as a cantilever.
     12. Do not use gypsum board or plywood on the exterior of building for stucco backing.
     13. Cementitious grout shall be non-metallic, non-corrosive, non-shrink, and non-staining. Grout shall be non-reactive with surrounding metals and substrates.
     14. Use high-strength, non-shrink grout for the setting of base plates and railing posts. Non-metallic grouts are acceptable for most uses; however, metallic grout shall be used when appropriate for the application.
     15. Powder driven fastening devices shall only be used when the public, staff, or students are not in the immediate area.
     16. Provide inserts, anchors, bolts, hangers, or other means to support equipment, piping, ceilings, or other items suspended from structure.
     17. All drawings containing structural design shall be signed and sealed by a Florida Licensed Professional Engineer. Title block shall contain printed name, address, and registration number of engineer of record. If engineer practices through a duly authorized engineering business, the engineer shall legibly indicate the engineers printed name, address and certificate of authorization number of the engineering business.
     18. Roofs shall be designed to resist ponding.
     19. Transformer Vault construction shall be coordinated with Electrical Requirements/Design Criteria and current FPL Standards for Vault Design.
     20. Exterior Building Skin/Envelope of permanent buildings shall be constructed of concrete masonry units or of concrete systems with the exterior face thereof being concrete. Finishes are to be applied directly to the CMU or concrete substrate without intermediate cavities, separators, or furr-outs, such as gypsum board, sheathing or plywood.
     21. Exterior walls of any material other than as indicated above are not permitted, except that soffits may be framed using light gage metal framing of either steel shapes or metal studs of adequate capacity to resist all gravity and wind loads.
     22. Roofs of EHPA’s shall be cast-in-place four (4) inch, or more, normal weight concrete. Concrete decks shall not be protected by a liquid membrane system as its sole waterproof protection; a built-up or single ply system must be used. As an alternate, structural pre-cast concrete roofs and composite metal decks with normal weight concrete with a minimum of 2-1/2” concrete above the metal deck roofs can be used. These roofs and roofing components must have adequate bearing, anchorage against wind uplift, diaphragm anchorage action, impact resistance, and resistance to rain based on the design loads the system would be expected to resist.
     23. Select materials that: Reduce impact from extraction and processing of virgin materials, increase the use of recycled content in building, increase demand for materials regionally extracted and manufactured, use rapidly renewable materials. Apply sustainability practices and procedures recommended by “LEED for Schools”. The materials selected shall not cause reduction in structural performance.
     24. Calculations, when specifically requested from the Design/Builder shall conform to the following:
         1. Provide clearly legible, organized, indexed, and collated calculations showing all of the load conditions considered and engineering assumptions made, including load reductions, units and code basis.
         2. Calculations generated by a computer program shall include both the input and analysis/design as part of the output.
         3. Calculations shall be signed and sealed by a Florida Licensed Professional Engineer.
     25. All items to be designed by a Delegated Specialty Engineer shall state “By Specialty Engineer” and the design intent and scope shall be clearly identified on the drawings. Specification sections shall be coordinated to reflect the submittal requirements for the Specialty Engineer. At a minimum, all pertinent dimensions, layout, connections, material type, design loads used, and assumptions made shall be shown on the submittal. Applicable drawings and calculations shall be signed and sealed. Although the delegated Specialty Engineer shall make the final design, the EOR/AOR shall perform enough preliminary investigation during development of the construction documents to ensure that the engineered system will fit into the dimensional and other restraints established by the AOR/EOR.
     26. For buildings that meet the requirements of a Threshold Building requiring a "Special Inspector", the Design/Builder shall submit with Phase III documents a "Threshold Inspection Plan". The Owner shall retain and pay the "Threshold Inspector". The requirement that a Threshold Building Inspection shall be required shall be noted on the drawings. Note that per SREF, all EHPA Buildings are considered to be “Threshold Buildings”.
     27. All plans for Threshold Buildings shall contain a statement that, "To the best of the Engineer’s knowledge, the plans and specifications comply with the applicable minimum building code.” (State Law 553.79)
  4. **METHODOLOGY**
     1. Investigate structural systems and methods for ease and speed of erection, cost effectiveness, long life, minimum maintenance, use of local materials, maximum flexibility, and adaptation for future expansion.
     2. Provide the Geotechnical Engineer with the following information:
        1. Building location/locations.
        2. Type of construction.
        3. Typical column and wall loads.
        4. Any other information pertinent to the foundation design of the building.
     3. Determine and design the foundation system and ground floor slab based on the Geotechnical Engineer's recommendations and test results.
     4. Results of soil testing are to be included in Phase II review submission. Copies of soil borings and geotechnical report shall be included in the project manual within Section 00200 “Information Available to Bidders”.
        1. If the Geotechnical Engineer recommends a special soil preparation procedure and the Design/Builder desires to have them executed, these procedures shall be included in a specification – Section 02200-Earthwork. These procedures may be preceded by the statement “that the following is based on the recommendations of the Geotechnical Engineer”. Do not use a statement referring to the Geotechnical Engineer’s recommendations in the specification, include the recommendations. In case of conflicts the Geotechnical Engineer’s recommendations take precedence.
        2. Install isolation trenches where stabilization by heavy vibratory roller is used within 200’-0” existing structures. Isolation trench to be 4 feet deep and 1 foot wide at bottom minimum. Install isolation trench between area to be compacted and existing structures.
     5. Provide a visual record of surrounding structures outside school property at construction projects requiring driven piles. The record shall be made before, during, and after completion of the pile driving.
     6. Design floors to minimize vibration effects. Floors shall be within allowable limits defined in the *Design Guide #11, “Floor Vibrations Due to Human Activity”,* published by AISC. Maximum allowable acceleration limit shall be 0.5% g (0.005 g). For floors designed by a Specialty Engineer, it is the responsibility of the EOR to communicate this same requirement to the Specialty Engineer and enforce this provision.
     7. Design and provide expansion joints, control joints, construction joints, and isolation joints to prevent uncontrolled stress cracks in the structure and site work according to the latest engineering standards. Use components designed for applicable locations and install according to manufacturer’s requirements. Details for expansion joints shall be shown on both architectural and structural drawings. Details for other joints shall be shown on the appropriate documents.
  5. **GENERAL REQUIREMENTS FOR DRAWINGS**
     1. Contract Drawings (General) Shall Include The Following:
        1. Provide a sheet including a list of all abbreviations, notations and symbology, as required by SREF 4.3(3)(b)2.
        2. The allowable design soil pressure for footings or allowable pile loads (as applicable)
        3. Structural drawings shall note dead and live floor and roof design loads at new construction. Clearly show any additional dead, live, wind, or concentrated loads applied to any system designated as designed by any Specialty Engineer.
        4. Where the overall stability of the finished structure is dependent on special support, jointing or sequencing clearly specify the sequence of construction.
        5. Recommend the judicious use of general structural notes and sheet notes specific to the type of plan (foundation, elevated levels, roof, etc.).
        6. On plan sheets add key plan and the north arrow. Key plan on each sheet should reflect the area of work shown on that sheet. Orientation and layout of buildings and column grids shall be consistent with architectural drawings. Plans, sections, and details shall be sized at a scale to be clearly legible as prescribed in the Document Submittal Checklist.
        7. Provide adequate sections and details to convey construction intent, especially of bearing condition for structural members.
        8. Locate all joints (expansion, isolation, construction, and contraction) on the drawings.
        9. Identify all materials used. Coordinate with appropriate technical specifications.
           1. Clearly designate masonry prism strength, unit masonry strength, mortar strength, and grout strength required.
           2. Clearly designate concrete strength required for each type of component, including min/max water/cement ratio or cement content as applicable. Conform to requirements under “concrete” for minimum requirements.
           3. Clearly designate steel strength for reinforcing steel, structural steel, miscellaneous steel, and other metals for each type of component as applicable.
           4. For other materials used, the required structural properties shall be clearly specified.
        10. Identify holding face(s) of columns or give centerline each direction. Use column grid lines, which are coordinated with the Architectural drawings.
        11. Drawings shall be appropriately dimensioned to show intent and layout and components located relative to a fixed point of construction.
        12. Component and cladding diagrams must be provided for all building components exposed to wind. This includes joists, facades, soffit framing, windows/doors, roofing components, etc. Diagrams (or equivalent method) shall clearly identify design wind pressures based on tributary area and note whether they represent gross or net uplift values.
        13. Note and locate provision for future extension - horizontal or vertical. Specify the maximum allowable loads accounted for by such extensions.
        14. In drawings and specifications, all directions are to be addressed to the (General) Contractor or the Design/Builder (as applicable) and not to any sub-contractor.
        15. Drawings shall clearly identify via notes, keys, or legends fire-rating requirements of structural components and how they are met.
        16. The drawings shall clearly detail areas of the building(s) that are subject to the Threshold Law requirement.
        17. Coordinate with Architectural Drawings, other Engineering Drawings and Project Specifications.
     2. Foundation Plans Shall Include The Following Minimum Information:
        1. All foundations, columns, slabs, walls, pile caps, grade beams, etc shall be scheduled.
        2. Give size and location of concrete or solid masonry piers and all columns.
        3. Reinforced walls and columns shall show size and spacing of bars, lap required, and length of dowels into beams or foundations. Other wall and column types shall be anchored to foundations (as structurally required) and detailed appropriately.
        4. Indicate and locate all wall footings, slabs, pile caps and grade beams (as applicable), top elevations and steps.
        5. Show extent of structural bearing and non-bearing walls.
        6. Provide grade slab (or structural ground floor slab) information. Slab-on-grade to be 4" thick minimum.
           1. Indicate and dimension all slab-on-grade depressions, slopes, recesses, and raised slab conditions.
           2. Indicate slab-on-grade joints and sequence of construction.
           3. Increase thickness for structural or other considerations, as required.
        7. Indicate pits - elevator, orchestra, sump, mechanical, etc.
        8. Identify all framed floor areas.
        9. Show utility tunnels and raceways. Locate and indicate elevation/size of all utilities crossing at a footing, pile cap, grade-beam or column location.
     3. Floor And Roof Framing Plans Shall Include The Following Minimum Information:
        1. Provide beam schedule listing individually each type of beam based on its top elevation (or their elevation shall be noted on the plans at each of their locations), size, reinforcing and any special details, or remarks. Beam marks shall include an identifier so that the building associated with that beam mark could be determined. Soffit beams shall clearly identify required design moments, shears, and any torsional requirements in the schedule. A shear-friction bar schedule shall be included showing the required shear friction reinforcing in each soffit beam.
        2. Note on drawings the bearing or top or bottom beam elevation of joists, or if joists are to bear on top of concrete beams whose top elevation is given, it shall be noted on each plan sheet showing joists.
        3. Call out locations of parapet walls, their top elevation and concrete cap on roof plan and provide appropriate details.
        4. Identify and locate all slabs, beams, girders, columns, bearing and non-bearing walls, etc.
        5. Identify all framing and bracing members, size, connections, and locations. Provide appropriate marks for all elements or appropriate data on plans.
        6. Note and locate moment connections - give design and/or construction requirements and provide details.
        7. Locate all openings (indicate and size framing) and indicate depressions.
        8. Guide rail support beams, hoist beams and sill details for elevator shafts, if applicable.
        9. Give finish floor elevations and variations including roof slopes.
        10. Indicate and identify lintels for wall openings - provide schedule.
        11. Mark reactions for steel beams and girders (greater than 10K) and at any locations containing connections by others.
        12. For load bearing partitions, soffits, and other load bearing steel framing identify and locate steel studs, number type, size and spacing.
        13. Designate steel decking type, gage, and direction of span.
        14. Note shoring for members or decking, if required during construction.
        15. Indicate cantilevers.
        16. Note support for stair framing
        17. Note any required camber of all steel and concrete members to eliminate or minimize deflection due to design loads.
        18. For Steel Joists and Steel Framing
            1. Note size, spacing and direction of span.
            2. Indicate bridging - type, size and location.
            3. Show headers and support for deck where deck direction changes.
            4. Note all loads and load locations on Specialty Engineered components, Special Joists, extended chords, etc.
  6. **SPECIFIC REQUIREMENTS FOR DIVISIONS DIVISION 3 - CONCRETE**
     1. General Design Criteria
        1. Foundations, miscellaneous flatwork and slabs-on-grade use f’c 3000 psi, all other concrete members must use f’c 4000 psi minimum except as follows. Concrete slabs-on-grade designated as concrete pavement - f’c 4000 psi, Architectural Precast Concrete - f’c 5000 psi.
        2. Lightweight-structural concrete shall be at least 2 inches thick.
        3. Synthetic fiber reinforcement is allowed for use to control shrinkage and thermal cracking in nonstructural concrete (plain concrete) slabs on grade. It is not allowed to replace any required steel reinforcement.
        4. All surfaces to receive concrete shall be wood formed. Earth forming of foundation work is not permitted for foundations or slabs-on-grade. Exception: Monolithic and shaft-type foundations may be earth formed provided the earth can maintain true lines and a vertical/sloped face as required by the drawings.
        5. Pre-cast lintels sized for the appropriate gravity and wind loads may be utilized. Lintels abutting cast-in-place columns shall be cast-in-place.
        6. Provide corner reinforcing at tie-beam and footing intersections as required by the Florida Building Code. Structural beams shall be detailed per ACI standards and requirements.
        7. The maximum water/cement ratio for 3,000 psi concrete shall be 0.6 and for 4,000 psi concrete shall be 0.54.
        8. For concrete flatwork (slabs), the addition of a midrange water reducer into the mix design is recommended. Mix design for slabs on grade should also conform to recommendations in ACI 302.
        9. For highly congested/reinforced spaces, addition of a high range water reducer into the mix design is recommended.
        10. Floor slabs consisting of poured concrete on grade shall have their contraction, isolation, construction and expansion joints shown on the floor plan. Place joints spaced in accordance with the section 1.3 of the General Design Criteria.
     2. Pre-Stressed Concrete Joists With A Composite Slab Construction:
        1. This system is recommended for second floor structures.
        2. Composite slabs shall be thick enough to allow for any in-slab conduit or similar items to have the proper coverage, without displacing reinforcing steel.
        3. Provide reinforcing in composite slab in both directions per ACI requirements. Maximum tensile stress at service loads shall not exceed 6 √ f’c in pre-compressed tensile zone.
        4. Pre-stressed concrete joists shop drawings shall be signed and sealed by the Delegated Engineer.
     3. Tilt-Up And Pre-Cast Concrete Construction:
        1. Provide anchorage at base of concrete tilt-up panels to concrete slab-on grade or foundation in the form of cast-in-place steel reinforcing bars or welded embedded anchor plates. Design embedded anchor plate assemblies to be protected from corrosion for the life of the structure. Slab-on-grade welded wire fabric shall not be acceptable as the medium of anchorage to tilt-up panels.
        2. Conform to ACI 551 (Tilt-Up concrete Structures) and ACI 533 (Guide for Pre-cast Concrete Wall Panels) as applicable
  7. **SPECIFIC REQUIREMENTS FOR DIVISION 4 - MASONRY** 
     1. General Design Criteria:
        1. The tie-beam/tie-column construction method as defined in the Florida Building Code is acceptable. A tie-beam/tie-column design must satisfy all design loads imposed upon them by gravity and/or wind loads. Tie-beam/tie-column construction and reinforced masonry construction shall not be mixed in the same building.
        2. Concrete masonry units in a fire-resistive assembly shall not be cut or channeled in a way to reduce the assembly’s fire resistance rating. Masonry shall be an UL tested assembly.
        3. Structures designed using reinforced masonry shall conform to the Florida Building Code and ACI 530/530.1 whichever is more stringent. This pertains to structurally designed masonry construction reinforced, partially reinforced or non-reinforced.
        4. The maximum spacing of vertical reinforcing in masonry walls, that support axial loads in addition to their own weight shall be 4 feet o/c.
        5. Do not use reinforced masonry columns for point loads in excess of 20,000 lbs (use a poured concrete column).
        6. A nominal eight-inch wide masonry wall with 2 layers of reinforcing in a single cell is prohibited. Use a thicker wall, stagger the reinforcing, or provide another method to limit the number of bars in a single cell of an eight-inch wall.
        7. Provide lateral support for block walls, vertical or horizontal either or both as required by ACI 530. The vertical heights of masonry between horizontal supports shall not exceed 16 feet maximum.
        8. All 8" block walls, including parapets 6 feet and taller shall be capped with a minimum 8-inch x 12-inch concrete beam reinforced with 2 #5 top and bottom (min.). All others may be capped with an 8-inch x 8-inch concrete cap with 2 #4 (min.). As an alternative to the 8-inch x 12-inch tie beam, an 8-inch x 16-inch bond beam with 2#5 or 1#7, top and bottom may be used. As an alternative to the 8-inch x 8-inch concrete cap, an 8-inch x 8-inch bond beam with 2#4 or 1#6 maybe used. The choice is a DESIGN choice, not a Contractor’s option during construction. Sizes of all such beams may need to be increased to conform to structural requirements.
        9. Footings supporting more than 10 feet of bearing block wall shall be a stem wall footing.
     2. Glass Block:
        1. Glass block may be used in limited applications.
        2. Glass block at exterior wall locations shall be 3-inch solid glass block.
        3. Glass block at interior locations shall have a wall thickness of at least 3/4".
        4. Glass block walls shall be limited in square footage based on area/load table listed in ACI 530 Chapter 7.
        5. Set glass block in 16 gage minimum steel frames.
  8. **SPECIFIC REQUIREMENTS FOR DIVISION 5 - METALS**
     1. General Design Criteria:
        1. Products made of aluminum, aluminized, or otherwise treated with aluminum to a significant extent shall not be used in the project or at the exterior building perimeter unless accepted by SBBC on a per condition basis.
        2. Specify isolation coatings where dissimilar metals are in contact or where aluminum is in contact with concrete or lime surfaces.
        3. Lead-based paints or primers are not allowed for use.
        4. Provide a coat of rust preventative touch-up paint to be applied to all surface damaged areas of steel members, joists and metal decking. For galvanized members and connections, a zinc-rich galvanizing paint shall be used, unless the fabricator requires an alternative product. After inspection, welds shall be painted with a material compatible with the original coating.
        5. The use of standing steam metal roofs is not recommended and is discouraged.
        6. Detail structural steel connections, or provide the design loads (shears and moments) and specify that a Specialty Engineer shall design these connections.
        7. All structural or miscellaneous steel exposed to earth or weather shall be hot dipped galvanized or have an electrostatically applied, powder coat finish. All other steel shall receive a primer applied at the shop. Steel which is to be encased in concrete, galvanized, powder coated, or will receive spray-on-fireproofing does not require a primer coat and shall be prepared as applicable for the type of coating or protection.
        8. For metal-framed components or assemblies, the structural drawings shall completely detail the entire component or assembly including all members, bracing, anchorage and connections. In lieu of showing the complete design, the designer shall modify the appropriate specification sections and put the Engineering and Shop Drawing requirements in those sections. All areas that will be delegated to the metal-framing Contractor’s Engineer shall clearly be designated on the drawings as requiring a Specialty Engineer and generate Shop Drawings. The Design/Builder Architect/Engineer will be expected to review and approve the Shop Drawings in accordance with the Florida Statutes governing the use of a Delegated Specialty Engineer. In either case these assemblies shall be completely detailed and be designed to conform to this and other Design Criteria and Material Standards.
        9. Floors and roofs utilizing steel and concrete systems designed for composite or non-composite concrete action may be used. This includes systems that use pre-cast or cast-in-place concrete. Composite systems shall conform to both the steel and concrete requirements listed in this document. Design shall be based on acceptable design methods based on rational design and shall consider serviceability requirements as well as strength design.
     2. Structural Steel And Other Metals:
        1. Provide with camber where applicable to eliminate or minimize deflection due to design loads. Do not exceed allowable deflections as stated in the Florida Building Code Chapter 16 and the following.
           1. Camber for structural steel members shall not exceed L/240 or 2 inches maximum.
           2. For members supporting plaster or stucco the deflection limit is L/360.
        2. Structural Steel shall be fire-protected. UL steel assembly rating provided to comply with applicable fire-resistive requirements.
     3. Steel Joists:
        1. Add a note on the drawings and in the specifications that joists shall not be fabricated using electrical resistance welding.
        2. Steel joist shop drawings shall be submitted signed and sealed by a Licensed Engineer (State of Florida), certifying that the joists are adequate for the gravity loads listed in SJI Specifications and load tables and the design uplift loads noted.
        3. Indicate typical joist connection per SJI standards but not less than the minimum required to resist all combined shear and uplift loads (whichever is greater). Indicate the minimum length of bearing and bearing condition of joist.
        4. Where joists are subject to uplift, provide continuous bottom bridging at the first interior bottom panel point.
        5. Supports shall provide an anchored stabilizer plate for joist girders and tie joists (as required). Do not rigidly attach joist or joist girder bottom chords to supports unless the live load and wind moments are specifically shown on the drawings.
        6. Provide with camber to eliminate or minimize deflection due to design loads.
        7. In concrete construction, steel joists shall bear on steel bearing plates embedded on masonry/concrete construction.
        8. In steel construction, steel joists shall bear on the top flange of steel beams or girders.
        9. Other joist bearing conditions require SBBC acceptance on a per condition basis.
        10. UL steel assembly rating provided to comply with applicable fire-resistive requirements.
     4. Metal Deck:
        1. For roof having metal decks, provide an angle or other structural element around perimeter of building and deck discontinuities to connect the deck to, both parallel and perpendicular to joist bearing. Connections of metal deck around perimeter and deck discontinuities shall be as required to develop the required diaphragm and uplift loads, but not more than 8 inches apart.
        2. Connections of metal deck, 24 gage in thickness and less, shall be made through a weld washer. If the Engineer requires weld washers for any thickness of metal deck, it shall be noted on the drawings.
        3. Call out connectors and connection spacing of metal deck to supporting framing.
        4. Vented metal deck shall not be used beneath a dry system roof deck.
        5. All metal deck shall be galvanized G-90.
        6. Metal deck supporting roof loads shall not be less than 24 gage, but not less than what is needed to meet structural requirements.
        7. Connections of metal deck around perimeter and deck discontinuities shall be as required to develop the required diaphragm and uplift loads, and withstand all relevant load combinations (including combined wind uplift and shear as required) but not less than as required by FBC Section 2222.

**END OF SECTION**