Structural Design Criteria

Building Code and Design Basis

Item	Description
Building Code	2015 International Building Code (IBC) with local amendments
Authority Having Jurisdiction	City of Janesville, Wisconsin
Risk Category	II

Dead Loads

Dead loads are determined from the actual weights of materials and fixed service equipment. Typical assumed weights for assemblies are as follows:

Assembly Type	Dead Load (PSF)
Metal Panels	3
Curtain Walls	10
Stone or Brick Veneer	40
Adhered Stone or Brick	10
Single-Ply Membrane Roof with Insulation	10

Equipment Loads

- Assumed loads for known equipment are shown on the structural drawings.
  Any change in type, size, location, or weight of equipment must be reported to the Engineer of Record (EOR) for verification of the supporting members **before** shop drawing submission.
- Equipment loads include the weight of concrete pads or curbs, if applicable.
- For equipment **not shown** on the structural drawings, if the unit weight divided by its bearing area exceeds the specified live load for that location, the contractor must notify the EOR prior to shop drawing submission.

Suspended Ceilings and Mechanical Systems

Item | **Allowance** |

|---|:---:|

| Hanging Ceilings and Mechanical Equipment (ductwork, sprinkler piping, etc.) | 5 PSF |

Live Loads

Live loads shall be as indicated on the structural drawings and comply with the applicable sections of the IBC.

Occupancy or Use	Uniform	Concentrated
Corridors	100 psf	-
Office Buildings - Corridors above first floor	80 psf	2,000 psf
Office Buildings - Offices	50 psf	2,000 psf
Stairs and exits	100 psf	300 psf
Roof - Ordinary, flat, pitched, or curved unoccupied roofs	20 PSF	300psf

Snow Loadafasdasdfa

Parameter	Value
Ground Snow Load, P_g	30 PSF

Wind Design

Parameter	Value
Ultimate Design Wind Speed (V_{ult})	115 mph (3-sec gust)
Nominal Design Wind Speed (V_{asd})	89 mph (3-sec gust)
Exposure Category	II
Internal Pressure Coefficient	± 0.18
Components and Cladding Pressures	See structural drawings and pressure schedule
Main Wind Force Resisting System	Wood shear walls

Rain Load

Parameter	Value
100-Year Rainfall Intensity	3.0 in/hr
Maximum Roof Rain Load	0 PSF (i.e. no accumulation)
Maximum Rainwater Depth (Static + Hydraulic Head)	0 in (i.e. no accumulation)

Seismic Design

Parameter	Value
Geotechnical Report No.	N/A - assuming min. soil bearing
Site Class	D
Mapped Spectral Accelerations (S_S, S_1)	0.11, 0.06
Design Spectral Accelerations (S_{DS}, S_{D1})	0.099, 0.086
Seismic Design Category (SDC)	B
Design Base Shear	XX% of Seismic Weight

Foundation Design Notes

Foundation Movement Considerations:

The foundation design parameters **do not eliminate post-construction movement**. Measures should be taken to improve structural tolerance, including:
- Frequent control joints in masonry, brick, stone, or stucco veneers (maximum 15'-0")
- Vertically slotted clips to attach roof trusses to non-load-bearing walls
- Other measures as needed to accommodate minor foundation movement

Abnormal Conditions

If construction occurs during **extreme dry or wet periods**, the contractor must notify both the **geotechnical engineer** and **foundation engineer** before beginning work. This may require soil conditioning or foundation redesign.

Foundation Movement

The foundation is designed assuming **movement within standard performance limits**.

Performance Limit	Value
Deflection Limit	L/260
Tilt Limit	1%

Soil Moisture

A reasonably **uniform soil moisture level** should be maintained around the foundation throughout the life of the structure.

Foundation Maintenance

- **Positive drainage** away from the structure must be maintained for the life of the building.
- The contractor must inform the owner of this requirement.
- The foundation should be maintained in accordance with the **Foundation Performance Association (FPA) document FPA-SC-07**. *Foundation Maintenance and Inspection Guide for Residential and Low-Rise Buildings*, available at www.foundationperformance.org.
- The contractor must provide a copy of this guide to the owner.

Expiration of Plans

- Plans are **valid for 6 months** from the issue or revision date.
- Contact the engineer for review if construction has **not commenced within this time frame** or if plans have expired.

Design Standards for Stairs, Railings, and Restroom Accessories

All stairs, guardrails, handrails, and restroom accessories shall be designed by a **registered structural engineer** according to the following criteria:

Stairs

Component	Design Requirement
Stringers, Treads, Risers	Designed for **100 PSF live load**
Individual Treads	Designed for **300 lb concentrated load** at the position causing maximum stress

Handrails and Guardrails

Component	Design Requirement
Top Rail (Guards and Handrails)	Withstand **50 PLF horizontal load** at right angles **or 200 lb concentrated load** in any direction
Intermediate Rails, Panel Fillers, Connections	Withstand **50 PSF horizontal load** over the entire tributary area, including openings and spaces

Restroom Accessories

Component	Design Requirement
Grab Bars, Tub & Shower Seats, Fasteners, Mounting Devices	Resist a **250 lb concentrated load** at any location and in any direction

Structural Deferred Submittals

Structural deferred submittals are portions of the design requiring **structural engineering** that are **not submitted at the time of the permit application** but must be submitted to the building official at a later date. All deferred submittals must be **approved by the building official before installation**.

Shop Drawings and Engineer Requirements

- **Shop drawings for any building component not designed by the Structural Engineer of Record (SER)** or not fully specified in the project construction documents must be:
  - Prepared by a **Specialty Structural Engineer (SSE)**
  - Signed and sealed by a licensed professional engineer registered in the state where the project is being built
  - Qualified to perform the work specified
- **Exceptions:**
  - Products tested and certified by an approved agency (e.g., ICC) do **not** require a PE seal.
  - Components fabricated by a certified fabricator that does **not** require sealing according to the approving agency (e.g., Steel Joist Institute for open web steel joists) are also exempt.

SSE Responsibilities

The SSE must:

- Include a **cover page** on the shop drawings stating that they are the **Structural Engineer Responsible for the Deferred Submittal**.
- Confirm that the drawings **comply with their design and calculations**.

SER Review

- Include a **cover page** on the shop drawings stating that they are the **Structural Engineer Responsible for the Deferred Submittal**. Before submitting to the **Authority Having Jurisdiction (AHJ)** or releasing for fabrication:
- All deferred submittals must be **reviewed by the SER**.
- The SER must mark the submittal as either **"No Exceptions"** or **"Exception Noted"**.

Examples of Deferred Submittals

Structural deferred submittals for this project include (unless using certified/tested products or assemblies):

Component	Notes
Stairs, Guardrails, Handrails, Grab Bars, Ladders	Not required if using certified/tested products
Curtainwall, Storefront, Windows	Not required if using certified/tested products
Metal Plate Connected Wood Trusses	All designs must be submitted and reviewed

General Structural Contractor Notes

These notes outline responsibilities, procedures, and requirements for contractors during the construction of the structural elements of the project.

Contractor Responsibilities

- The **structural drawings and specifications** represent the finished structure. **Methods, procedures, and sequencing of construction** are the contractor's responsibility.
- The contractor must take all necessary precautions to **maintain structural integrity** at every stage of construction.
- The contractor is responsible for **quality control**, including workmanship and materials furnished by subcontractors or suppliers.
- All work must conform to **OSHA standards**.

Coordination and Documentation

- Refer to **non-structural drawings** for complete information regarding sleeves, curbs, inserts, depressions, openings, etc.
- The general contractor is responsible for obtaining all **contract documents and the latest revisions/addenda** and distributing them to subcontractors and suppliers before shop drawing submittals or material procurement.
- Using or reproducing contract drawings in lieu of shop drawings signifies **acceptance of all information shown** and obligates the contractor to bear costs for any resulting errors.
- The general contractor must **compare architectural and structural drawings** and report discrepancies to the architect and engineer prior to fabrication or installation. Here's a **clarified and reorganized version** of your note on material substitutions:
- Substitutions:
  - All requests for substitutions of materials or details shown in the contract documents **must be submitted for approval during the bidding period**.
  - Once bids are accepted, proposed substitutions will only be considered if:
    - They are **officially submitted**
    - They include a **clearly identified cost savings** to be **deducted from the contract**

Excavation and Site Safety

- The contractor is solely responsible for all **excavation procedures**, including lagging, shoring, and protection of adjacent property, structures, streets, and utilities, in accordance with all applicable codes.

Framing and Member Placement

- Framing layouts represent **design concepts and systems construction**; the contractor and subcontractors are responsible for material quantities and unspecified components.
- Members not specifically dimensioned should be located **on column lines or equally spaced between located members**.
- Features not fully shown or specified shall be constructed to **match similar conditions** elsewhere.
- In case of conflicts among structural drawings, general notes, and specifications, the **strictest requirement indicated by the engineer shall govern**.

Live Load Posting

- Elevated floor structures with a **design live load exceeding 50 PSF** must have the load **posted on durable, conspicuous signs** in the applicable areas.

Structural Maintenance

- All structures require periodic maintenance to **extend lifespan and ensure integrity**.
- The building owner shall establish a maintenance program including, but not limited to:
  - Painting structural steel
  - Protective coatings for concrete
  - Sealants and caulking of joints
  - Maintenance of expansion and control joints
  - Repair of spalls and cracks in concrete
  - Pressure washing of elements exposed to salt or harsh chemicals

Structural Engineer's Role

- The structural engineer **does not control or supervise construction means, methods, sequences, or safety programs** and is not responsible for the acts or omissions of the contractor or subcontractors.
- Periodic site observations by the engineer's representatives are solely to **become generally familiar with progress and quality** and ensure that work appears to comply with contract documents.
- These observations are **not exhaustive** or continuous and do not substitute for contractor responsibility.

Waterproofing

- Proper **waterproofing of the building envelope** is critical to long-term structural performance.
- Waterproofing design is the responsibility of the **architect/contractor** and must follow **best practices for the locality and assembly type**.

Contractor and Subcontractor Responsibilities

Qualified Personnel

- All work must be performed by a **qualified construction contractor and subcontractor** experienced in this type of work.
- Contractors must follow **industry standards of care** and make proper allowances for performing work of this nature.

Understanding and Coordination of Drawings

- Contractors and subcontractors must understand the **nature of drawing production** and **coordination among consultants**.
- They should **not enter contracts** based on drawings believed to contain discrepancies or incomplete information unless proper allowances are made for potential **cost implications** arising from future drawing updates or revisions.

Stages of Drawings and Responsibilities

- During the production and issuance of drawings, multiple stages of completion are developed, such as **permit, pricing, and construction drawings**.
- Contractors and subcontractors are responsible for:
  - Understanding the purpose and content of each stage of drawings
  - Evaluating **cost implications and contractibility**
- Any deviations or arrangements outside of standard practice must be coordinated with the **owner prior to execution**.

Request for Information (RFI) Requirements

All RFIs must include the following information:

- **RFI Number**
- **RFI Category** (select one):
  - Request for Substitution
  - Corrective Repair
  - Additional Information Required
  - Discrepancy Between Construction Documents
- **Dates**
  - Date Submitted
  - Date Response Needed
- **Submitted By**
  - Include **name, email, and phone number**
- **RFI Description**
  - Include applicable **sheet number, detail number, or specification number**
  - Attach **sketches** if applicable
  - Attach **photos** if applicable

Submittals: List, Schedule, and Requirements

Submittal List and Schedule

- The **general contractor** shall prepare a **detailed list and schedule** of all submittal items to be sent to the **structural engineer** prior to the start of construction.
- This list shall be **updated and revised** as the project progresses.

Submittal Requirements

- **Review:**
  - All submittals must be **reviewed and electronically stamped** by the general contractor before submission to the design team (No Exceptions).
- **Transmittal Sheet:**
  Each submittal must include a transmittal sheet containing:
  I. **Submittal Number** – Format example: `03 30 00-01.00` (Division, Submittal # for Division, Issue #; e.g., first submittal, first issue of a concrete submittal)
  II. **Brief Description** of submittal contents
  III. **Date Issued**
  IV. **Requested Return Date**
  V. **Issuing Party** – Name, phone number, and email
- **Format:**
  - Submittals must be provided in **electronic PDF format**.
  - **Scanned copies** of printed documents are **not acceptable**.
- **Completeness:**
  - Omission of any materials from shop drawings **does not relieve the contractor** of the responsibility to furnish and install all required materials, whether shown or commented in the shop drawings.
- **Review Time:**
  - Allow a minimum of **14 days** for structural review of all submittals.
  - Expedited review may be requested for an **agreed-upon fee** with the structural engineer.
- **Structural Steel Submittals:**
  - Must include the **SDS/2 or Tekla model**, which will serve as a **visual aid** to the shop drawings.

Reference

- Refer to the **project specifications** for a complete list of required submittals.

Engineer Review Stamp Designations

All designations indicate review for **general conformance** with construction documents;

Designation	Meaning
No Exceptions	No items conflict with the construction documents; no resubmittal required.
Exceptions Noted	Items conflict with construction documents; revisions needed before "For Construction" submittal.
Revise and Resubmit	Significant conflicts with construction documents; resubmittal required "For Review".
Not Reviewed	Submittal is not structural.
For Information Only	Submittal does not require review; filed for record.
Impact to Structure	Reviewed only for structural impact.

Inspections and Testing Requirements

Revise and Resubmit | Significant conflicts with construction documents; resubmittal required "For Review". |

Construction or work requiring a **permit** must remain **accessible and exposed** for inspection until it has been approved by the **building official**. Required testing and inspections include, but are not limited to, the following:

Foundation Inspection

- **Timing:** After excavations for footings are complete and any required reinforcing steel is in place.
- **Concrete Foundations:**
  - Required forms must be in place prior to inspection.
  - Materials for the foundation must be on-site, except when using ready-mixed concrete in accordance with **ASTM C94**, which does not need to be on-site.

Concrete Slab and Under-Floor Inspection

- **Timing:** After placement of in-slab or under-floor reinforcing steel, building service equipment, conduit, piping, accessories, and other ancillary items—but **before concrete is placed** or floor sheathing/subfloor installed.

Framing Inspection

- **Timing:** After the roof deck or sheathing, all framing, fireblocking, and bracing are in place.
- **Additional Requirements:**
  - All pipes, chimneys, and vents to be concealed must be complete.
  - Rough electrical, plumbing, heating wires, pipes, and ducts must be installed and approved.

Special Inspections

- Refer to the **Statement of Special Inspection** for required **structural special inspections**.

Additional Inspections

- Any additional inspections required by the **structural engineer** are referenced in the project **specifications**.

Concrete Reinforcement Requirements

Detailing Standards

- All detailing of **reinforcing bars and accessories** shall conform to:
  - **ACI Detailing Manual (ACI 315 and SP-66)**

Material Standards

- **Reinforcing bars** shall conform to **ASTM A615, Grade 60**, with supplementary requirements.

Placement Drawings

- Complete **reinforcing placement drawings**, prepared per **ACI 315**, shall be:
  - Reviewed by the engineer
  - Available on the job site **prior to and during concrete placement**

Support and Chairs

- All reinforcing steel shall be **supported at designed depth** using **plastic or metallic chairs**, spaced **48 inches on center** in all directions.
- Alternate chair systems may be used **only if submitted in writing and approved** by the Engineer of Record (EOR).

Hooks, Development, and Splices

- End hooks, development lengths, and splices shall conform to **ACI 318** requirements.
- Reinforcement may be placed in **bundles of no more than two bars**, with a **minimum clear distance of 3 inches between bundles or tendons**.

Concrete Cover

- Concrete cover not specified on drawings shall comply with **ACI 318**. Minimum coverage requirements:

Condition	Minimum Cover
Concrete cast against and permanently exposed to earth	3"
Concrete exposed to earth or weather	No. 6 and larger: 2" No. 5 and smaller: 1½"
Concrete not exposed to weather or in contact with ground	¾"

Lap Splices

- Unless noted otherwise (UNO):
  - Lap splices of reinforcement in **ground-supported elements** (grade beams, footings, mat foundations) shall be a minimum of **48×Ø**, where Ø = bar diameter.
  - Reinforcement in **elevated structures** shall follow the **typical lap splice detail**.

Concrete Specifications

General

- All concrete work shall conform to the latest edition of **ACI 301 – Specifications for Structural Concrete**, unless otherwise noted (UNO) in these construction documents.

Mix Design

- All concrete mixes shall be designed by a **qualified registered engineer**. Mix design data must comply with either field experience or the **trial mixture method per ACI 301/318**.
- Mix proportions shall:
  I. Ensure **workability and consistency** for proper placement around reinforcement and in forms without segregation or excessive bleeding.
  II. Meet the **required exposure conditions**.
  III. Meet or exceed the required **f'c**.
  IV. Not exceed the **maximum water/cement (w/c) ratio**.
- The contractor shall indicate the **planned placement method** for each concrete mix.
- **Retempering** (adding water on-site) is prohibited unless the **special inspector** is present to verify compliance with the w/c ratio and design slump. The ready-mix supplier must provide the **maximum water withheld** at the plant. Concrete exceeding these limits shall be **rejected**.
- **Slump tests** shall be performed at the **point of placement**, except when:
  - The point of delivery is the same as the point of placement, or
  - The contractor has an approved correlation between fresh concrete properties at delivery and placement.
- **Air-entrained concrete** shall **not** be used in normal-weight floor slabs intended for **hard-troweled finishes**.

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Date	Description
12/15/2025	PROGRESS SET

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