

**DESIGN CRITERIA**

THE DESIGN OF THE STRUCTURE IS IN ACCORDANCE WITH NBCC 2010 AND PART 4 OF DIVISION B, STRUCTURAL DESIGN OF THE 2011 MANITOBA BUILDING CODE.

IMPORTANCE CATEGORY NORMAL  
 SNOW DESIGN DATA S<sub>s</sub> = 1.9 kPa (39.7psf) S<sub>r</sub> = 0.2 kPa (4.2 psf) I<sub>s</sub> = 1.0 ULS / 0.9 SLS  
 WIND DESIGN DATA 0.45 kPa (9.4 psf) q(1/50) 0.35 kPa (7.3 psf) q(1/10) I<sub>w</sub> = 1.0 ULS / 0.75 SLS  
 SITE CLASSIFICATION FOR SEISMIC SITE RESPONSE: SITE NOT CLASSIFIED, SEISMIC DESIGN NOT REQUIRED DUE TO MB CODE AMMENDMENT

REFER TO PLAN FOR DESIGN LOADING  
 CONTRACTOR TO ENSURE THAT CONSTRUCTION LOADS DO NOT EXCEED DESIGN LOADS.

**STRUCTURAL MOVEMENTS/ TOLERANCES**

- THIS STRUCTURE WILL UNDERGO NORMAL TYPES OF MOVEMENT AND DEFLECTION AND THE NON-STRUCTURAL COMPONENTS MUST BE DETAILED TO ACCOMMODATE THIS.
- DRYWALL PARTITIONS, MECHANICAL EQUIPMENT, ELECTRICAL EQUIPMENT, BUILDING FIXTURES, GLAZING AND CURTAIN WALLS MUST BE DETAILED AND INSTALLED TO ACCOMMODATE SLAB MOVEMENT.
- ALL STRUCTURES ARE SUBJECT TO CONSTRUCTION TOLERANCES. THIS SHOULD BE ALLOWED FOR IN DETAILING NON-STRUCTURAL COMPONENTS.

**NON-STRUCTURAL ELEMENTS**

- "NON-STRUCTURAL" OR "SECONDARY STRUCTURAL" ELEMENTS ARE NOT THE RESPONSIBILITY OF STRUCTURAL ENGINEER. THEY ARE DESIGNED, DETAILED, AND REVIEWED IN THE FIELD BY OTHERS. THEY APPEAR ON DRAWINGS OTHER THAN THE STRUCTURAL ENGINEER. WHERE STRUCTURAL ENGINEERING RESPONSIBILITY IS REQUIRED FOR THESE ELEMENTS, THIS SHALL BE PROVIDED BY SPECIALTY STRUCTURAL ENGINEERS, WHO SHALL ALSO PROVIDE ANY CERTIFICATION REQUIRED BY BUILDING PERMIT AUTHORITIES. SPECIALTY STRUCTURAL ENGINEERS ARE TO DESIGN THESE ELEMENTS ACCORDING TO THE APPLICABLE DESIGN LOADS AS NOTED IN PART 4 OF THE MOST CURRENT NBCC.
- EXAMPLES OF NON-STRUCTURAL OR SECONDARY STRUCTURAL ELEMENTS INCLUDE, BUT ARE NOT LIMITED TO:
  - ARCHITECTURAL COMPONENTS SUCH AS GUARDRAILS, HANDRAILS, CEILINGS, MILLWORK ETC.
  - LANDSCAPE ELEMENTS SUCH AS BENCHES, LIGHT POSTS, PLANTERS, ETC.
  - CLADDING, GLAZING, WINDOW MULLIONS, INTERIOR STUD WALLS AND EXTERIOR STUD WALLS.
  - ARCHITECTURAL PRECAST, PRECAST CLADDING.
  - MECHANICAL AND ELECTRICAL EQUIPMENT, COMPONENTS, AND THEIR ATTACHMENT DETAILS.
  - ELEVATORS, ELEVATOR HOIST BEAMS, ESCALATORS, AND OTHER CONVEYING SYSTEMS.
  - BRICK OR BLOCK VENEERS AND THEIR ATTACHMENTS.
  - NON-LOAD BEARING MASONRY.
  - NON-STRUCTURAL CONCRETE TOPPINGS
  - ALUMINUM SKYLIGHTS.
  - STAIRS
- SHOP DRAWINGS FOR NON-STRUCTURAL ELEMENTS WHICH MAY AFFECT THE PRIMARY STRUCTURAL SYSTEM SHALL BE SUBMITTED TO CONTRACT ADMINISTRATOR THESE DRAWINGS WILL BE REVIEWED ONLY FOR THE EFFECT ON THE PRIMARY STRUCTURAL SYSTEM.

**CONCRETE**

- ALL CONCRETE CONSTRUCTION, COLD WEATHER CONSTRUCTION & CONCRETE TESTING TO BE IN ACCORDANCE WITH THE LATEST EDITION CSA STANDARDS A23.1 AND A23.2.
- ALL CONCRETE TO BE NORMAL WEIGHT HARD ROCK CONCRETE WITH A MINIMUM 28 DAY COMPRESSIVE STRENGTH AS NOTED IN TABLE 2 OF THE LATEST EDITION CSA A23.1.
- CONCRETE CLASSES OF EXPOSURE (REFER TO TABLE 1, LATEST EDITION CSA A23.1):
 

A. SLAB ON GRADE, CONCRETE APRON SLABS	CLASS C-1 EXPOSURE (35 MPa @28d)
B. PILES AND GRADE BEAMS	CLASS S-2 EXPOSURE (32 MPa @56d)
- CONCRETE SLUMP TO BE COORDINATED BETWEEN CONTRACTOR AND CONCRETE SUPPLIER CONSIDERING THE PERFORMANCE CRITERIA AND THE CONTRACTOR'S CRITERIA FOR CONSTRUCTION AND PLACEMENT.
- MISCELLANEOUS CONCRETE ELEMENTS (PITS, TRENCHES, ETC.) TO BE MINIMUM 6" (150mm) THICK REINFORCED WITH 10M @ 12" (300mm) O/C EACH WAY U.N.O.
- CONCRETE SAMPLING AND TESTING TO BE COMPLETE IN ACCORDANCE WITH THE LATEST EDITION CSA A23.1/A23.2
- VOID FORM TO BE WAX COVERED OR POLY WRAPPED CARDBOARD. LOW DENSITY POLYSTYRENE MATERIAL IS AN ACCEPTABLE ALTERNATIVE. INFORMATION REGARDING PROPOSED PRODUCT SHALL BE SUBMITTED FOR REVIEW AND APPROVAL BY CONTRACT ADMINISTRATOR PRIOR TO COMMENCEMENT OF EXCAVATION AND FORMWORK

**REINFORCING**

- REINFORCING STEEL SHALL BE GRADE 400 DEFORMED NEW BILLET STOCK CONFORMING TO THE LATEST EDITION OF CSA SPECIFICATION G30.18. WELDED WIRE MESH SHALL CONFORM TO THE LATEST EDITION CSA A23.1 CLAUSE 6.1.1.1.
- CONCRETE COVER TO BE AS PER TABLE 17 OF THE LATEST EDITION CSA A23.1

EXPOSURE CONDITION	EXPOSURE CLASS		
	N	F-1, F-2, S-1, S-2	C-XL, C-1, C-3, A-1, A-2, A-3
CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH	-	75mm	75mm
BEAMS, GIRDERS, COLUMNS, AND PILES	30mm	40mm	60mm
SLABS, WALLS, JOISTS	20mm	40mm	60mm

- CONCRETE COVER FOR EXPOSURE CLASSES NOT NOTED ABOVE TO BE 40 mm.
- TOP STEEL IN GRADE BEAMS TO BE SPLICED AT CENTER SPAN AND BOTTOM STEEL TO BE SPLICED OVER SUPPORTS. SPLICE LENGTHS:
  - TENSION ZONE SPLICE TO BE AVOIDED WHEREVER POSSIBLE, BUT IF REQUIRED, LENGTH SHOULD BE SPECIFIED BY THE CONTRACT ADMINISTRATOR.
  - COMPRESSION ZONE SPLICE SHOULD NOT BE LESS THAN 30 BAR DIAMETERS.
- CONCRETE COVER FOR FIRE RATING REQUIREMENTS AS PER CURRENT EDITION OF NBCC

**ITEMS EMBEDDED IN CONCRETE**

SEE ALSO LATEST EDITION CSA A23.1  
 EXCEPT WHEN APPROVED BY THE CONTRACT ADMINISTRATOR, PIPES, CONDUITS, AND SLEEVES EMBEDDED IN CONCRETE SHALL BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING GUIDELINES:

- GENERAL
  - NOT WITHSTANDING THE SATISFACTION OF THESE GUIDELINES, THE CONDUIT, SLEEVES, PIPES, ETC. SHALL NOT IMPAIR THE STRUCTURAL STRENGTH AND SHALL BE MOVED IF SO DIRECTED BY THE CONTRACT ADMINISTRATOR.
  - CENTERLINE SPACING TO BE NOT LESS THAN 3 DIAMETERS.
  - CENTERLINE SPACING BETWEEN PARALLEL CONDUIT AND REINFORCING BARS TO BE 3 DIAMETERS.
  - ADD REINFORCING AT POINTS OF CONGESTION AS DIRECTED BY THE CONTRACT ADMINISTRATOR.
- FOR SLABS - CONDUITS IN THE PLANE OF THE SLAB:
  - LOCATE BETWEEN TOP AND BOTTOM REINFORCING. (WHERE APPLICABLE)
  - MAXIMUM SIZE IN ONE LAYER TO BE NOT MORE THAN 1/4 OF CONCRETE THICKNESS.
  - THREE LAYERS OR MORE CROSSING WILL NOT BE PERMITTED.
- FOR WALLS & SLABS - CONDUIT/ PIPES NOT ALLOWED WITHOUT THE WRITTEN APPROVAL OF THE CONTRACT ADMINISTRATOR.

