

**PARKING STANDARDS**

**603.201 BUILDING COMPONENTS, BUILDING SHELL, SUPERSTRUCTURE**

This document contains requirements for superstructure elements for parking structures and is in alignment with the UniFormat II, Level 2 classification - B10. The document is subdivided into the following parts per the UniFormat II, Level 3 classifications.

UNIFORMAT II classification						MoP Document Number  603.201
Level 1 Major Elements		Level 2 Group Elements		Level 3 Individual Elements		
B	Substructure	B10	Super-structure	B1010	Floor Construction	
				B1020	Roof Construction	

[ELEMENT B1010, FLOOR CONSTRUCTION](#). Includes general design requirements for elevated floor slabs. Specific items of note include:

1. Design requirements
2. Concrete materials
3. Curing
4. Contract document requirements
5. Testing and Inspections

[ELEMENT B1020, ROOF CONSTRUCTION](#). Includes general design requirements for roof decks. Specific items of note include:

1. Insurance Requirements
2. Design Requirements

**ELEMENT B1010, FLOOR CONSTRUCTION**

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**PART 1 - GENERAL****1.01 OVERVIEW**

- A. Includes elevated floor slabs for parking structures.

**PART 2 - DESIGN CRITERIA****2.01 GENERAL**

- A. Floor-to-floor heights for parking structures shall be no less than 11'-0" and the clear dimension from floor slab to beam or other obstruction must meet both conditions below, unless otherwise directed by BJC Director of Design.
  - 1. Interior vertical clearance of 8'-6" minimum shall be maintained throughout the entire path a vehicle must travel to enter, access, and exit from all van accessible spaces. (Note: this requirement is more stringent than the 8'-2" ADA requirement)
  - 2. Maintain minimum interior vertical clearance of 7'-6" in all other locations.

**2.02 CONCRETE**

- A. The use of supplemental cementitious materials as directed by the structural engineer of record and in accordance with ACI 301 and ACI 318 is acceptable as long as strength, and appearance of finished materials are not compromised.
- B. Compressive strength of concrete at 28 days shall be 4,000 psi, minimum. Structural Engineer of record to provide design and calculations to meet project specific requirements.
- C. Maximum water-cementitious materials ratio for concrete slabs shall be 0.5.
- D. Normal weight concrete materials. Use the following cementitious materials, of the same type, brand, and source, throughout project.
  - 1. Cementitious materials.
    - a. Portland cement shall meet the minimum criteria established in ASTM C 150. Type I is intended for general construction applications. Other Types II through V will be considered on a project basis.

- b. Fly ash is permitted in accordance with ASTM C 618, Class C. Where concrete will be significantly exposed and where coloration of the concrete is an important design consideration, limit or avoid use of fly ash.
  - c. Ground granulated blast-furnace slag is permitted in accordance with ASTM C 989, Grade 100 or 120. No ground granulated blast furnace slag from plant co-fired with hazardous or medical waste or tire-derived fuel.
  - d. Use of other supplementary cementitious materials shall be approved in writing by the Owner.
2. Aggregate.
    - a. Normal-weight aggregates shall comply with ASTM C 33, graded (severe weather region). Important to provide a well-graded aggregate mix for quality.
    - b. Maximum coarse aggregate size Portland cement shall meet the minimum criteria established in ASTM C 150.
    - c. Coarse aggregate size shall not exceed 1-1/2" nominal.
    - d. Fine aggregate shall be free of materials with deleterious reactivity to alkali in cement. Use Meramec sand only.
  3. Water shall meet the requirements of ASTM C 94/C 94M, and potable.
    - a. Use chilled water or ice for hot weather conditions
    - b. Use heated water for cold weather applications.
  4. Admixtures.
    - a. Use of chloride-containing admixtures is strongly discouraged because of their detrimental effects on embedded reinforcement and the possible degradation of concrete structures.
    - b. Air-entraining admixtures may be permitted where increased resistance to freeze/thaw is important.
    - c. Chemical admixtures will be permitted upon approval by the PD&C project manager. The following types are identified in ASTM C 494.
      - 1) Type A: Water-reducing admixtures.
      - 2) Type B: Retarding admixtures.
      - 3) Type C: Accelerating admixtures.
      - 4) Type D: Water-reducing and retarding admixtures.
      - 5) Type E: Water-reducing and accelerating admixtures.
      - 6) Type F: High-range, water-reducing admixtures.
      - 7) Type G: High-range, water-reducing and retarding admixtures
- E. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
  - F. Use of fly ash, pozzolan, ground-granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be

used, is acceptable as long as the supplementary material does not exceed 40 percent of the Portland cement.

- G. The addition of job site water to the concrete mix will not be permitted unless specifically approved in writing by the Structural Engineer and Architect of record. When allowed, truck tickets shall be furnished to BJC Project Manager, Architect, and Structural Engineer identifying hold back water and batch information.
- H. Floor flatness and floor levelness requirements for projects shall consider the type of flooring to be installed. In some instances, the intended use of the space (surgery, imaging, laboratory, etc.) may require more stringent tolerances. Architect and Structural Engineer shall coordinate the requirements. The following minimum values for floor flatness and levelness shall be followed for elevated concrete slabs.

### 2.03 EMBEDDED OBJECTS

- A. Provide embedded objects to facilitate connection of items to concrete. Coordinate joint treatment embed requirements at slab-on-grade to elevated deck transition.
  - 1. Cast-in-place post tensioned concrete structures. Provide embedded metal plates, inserts, angles, etc. as necessary. Slab embeds may include anchor plates for breakaway bollards, guardrail attachment, etc. Underside of elevated slabs shall include threaded inserts spaced 5'-0" on center in both directions to accommodate the support of hanging pipes, conduits, and signage.
  - 2. Precast concrete structures. Provide embedded metal plates, inserts, angles, etc. as necessary. Bearing plates for double tees and haunches in addition to angles and plates for guards, rails, pipe supports, etc. are required.

## PART 3 - SPECIAL CONTRACT DOCUMENT REQUIREMENTS

### 3.01 GENERAL

- A. Identify and clearly dimension all recessed slab areas on drawings.
- B. Identify conditions requiring additional slab thickness and/or additional reinforcing.
- C. Coordinate all slab penetrations. Indicate and dimension on drawings.
- D. Consider opportunities to test rapid-drying concrete for concrete slabs.

## PART 4 - PRODUCTS

### 4.01 GENERAL

- A. Concrete mixture shall be free of materials containing lignite.

End of B1010 – Floor Construction

**ELEMENT B1020 – ROOF CONSTRUCTION**

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**PART 1 - GENERAL****1.01 OVERVIEW**

- A. Includes metal roof decks, slabs, and associated structural framing for portions of parking structures to receive roofing (typically stair and elevator towers).
- B. Roof Construction, along with Roof Covering, forms the complete roofing system approach. BJC HealthCare's insurance provider has conditions that will direct the Project requirements. Coordinate roofing selections with FM Global. Refer to RoofNav program for list of pre-approved roofing systems.

**PART 2 - DESIGN CRITERIA****2.01 GENERAL**

- A. Slope to drain may be achieved through use of sloped structure, or use of flat structure in combination with tapered insulation. Both options should be carefully evaluated.
- B. Parapet height shall extend a minimum of 42" above the roof surface. If no equipment is installed on the roof and if workers are not generally expected to access the roof, parapet height requirement will not apply.
- C. Roof structure shall be designed to accommodate tie-offs. Where top of parapet exceeds 90 feet above grade, provide tie-offs and davit bases.

**PART 3 - SPECIAL CONTRACT DOCUMENT REQUIREMENTS****3.01 GENERAL**

- A. Identify conditions requiring additional slab thickness and/or additional reinforcing.
- B. Identify associated fire-rated assemblies on drawings.
- C. Coordinate all slab penetrations. Indicate and dimension on drawings.

**PART 4 - PRODUCTS****4.01 GENERAL**

- A. Not applicable.

End of B1020 – Roof Construction

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**RESPONSIBILITY MATRIX**

The following matrix identifies those individuals, roles or departments responsible for maintaining the accuracy of the information and those responsible for providing input. Refer to Preface for detailed explanation.

	BJC HealthCare													Hospital/Entity				
	PD&C						Clinical Asset Management (CAM)	Risk Management	Real Estate	Ergonomics	Infection Prevention (IP)	Info Systems, Data, Telecom (IS)	Other:	Standards Review Committee	Facilities Engineering	Housekeeping	Security	Other:
	Corporate Architect	Corporate Engineer	Director of Planning	Director of Design	Director of Construction	Other:												
Primary Authorship	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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**DOCUMENT REVISION HISTORY**

The following table indicates the date the document originated and any subsequent revisions.

603.201 – Building Shell, Superstructure		
Issue	Description of Issue	Prepared by
2012v1	Original Issue	G. Zipfel
2012v2	Miscellaneous Review/Clarifications	G. Zipfel/B. Temple
2016v1	reissued	G. Zipfel
2018 v1	Combined and renumbered, misc. minor edits	G. Zipfel