
B SHELL

B10 SUPERSTRUCTURE

B1010 Floor Construction

B1010.01 Typical Elevated Floor Construction

Typical elevated floors will be a 3-1/4" lightweight (115 pcf) concrete slabs on a 3", 20 gage galvanized metal deck (6-1/4" total thickness) supported on wide flange steel beams and girders. The slab will be reinforced with welded wire fabric and supplemental reinforcing bars over the girders and the composite deck will be anchored to the supporting steel framing with steel shear studs welded to the top flange of the beams and girders. (This floor system provides a 2 hour fire-rated floor slab without the need to spray fire-proof the deck.)

B1010.02 Heavy-Duty Floor Construction

Exterior Stairs (Loading Dock): Cast-in-place concrete slabs reinforced with reinforcing bars supported on reinforced concrete foundation walls and footings. Tread and landing surface will receive a broom finish.

Interior Ramps: 5-inches thick concrete slabs on grade reinforced with welded wire fabric.

Interior Stairs: See C20.

B1010.03 Floor Construction Fireproofing

The entire structural steel frame, including columns, beams and joists supporting floors, will be protected with sprayed-on fireproofing, 2-hour rated. Floor slab decks do not need fire proofing as their composite section provides for the rating.

B1020 Roof Construction

B1020.01 Typical Roof Framing

Typical roof framing will be 1-1/2-inches deep, 20 gage, Type B, galvanized metal deck supported on open-web bar joists and/or steel wide flange beams and girders. Roofs will be sloped to roof drains at 1/4 inch per foot.

The roof framing of Pod 2 will be framed as "floor structure" to enable a future third floor classroom addition. See B1010.01 for a detailed description.

B1020.02 Auditorium Roofs Framing

Auditorium roof framing will be 3-inches deep, 20 gage, Type NIA, galvanized, acoustic metal deck with field-installed acoustic batts, supported on steel wide flange beams spanning between deep steel trusses that clear-span the space. Roofs will be sloped to roof drains at 1/4 inch per foot.

B1020.03 Cafeteria/Commons Roof Framing

Cafeteria/Commons roof framing will be 6-inches deep, 18/20 gage (18 gage top deck, 20 gage bottom flat cover), Type HC6, galvanized, cellular acoustic metal deck, spanning between deep steel trusses that clear-span the space. Bridging between the trusses will occur at ¼ points of the truss span and will consist of structural members that closely match the truss framing. Roof will be sloped at a 1.5-to-12 pitch; crickets and other local roof adjustments will be sloped at 1/4 inch per foot to roof drains.

B1020.04 Gymnasium Roof Framing

Gymnasium roof framing will be 1-1/2" deep, 20 gage, Type BCA, galvanized, cellular acoustic metal deck supported on long-span open-web bar joists that clear-span the space and steel wide flange girders. Roofs will be sloped to roof drains at 1/4 inch per foot.

B1020.05 Roof Framing at Roof Top Mechanical Equipment

Areas of the roof supporting large mechanical equipment will be a 5" normal weight concrete slabs on a 3", 20 gage galvanized metal deck (8" total thickness) supported on wide flange steel beams and girders. The slab will be reinforced with welded wire fabric and supplemental reinforcing bars over the girders and the composite deck will be anchored to the supporting steel framing with steel shear studs welded to the top flange of the beams and girders. Concrete slabs under roof top mechanical equipment will be level (i.e.: not sloped for drainage.)

B1020.06 Entrance Canopies Framing

The entrance canopies framing will be 1-1/2" deep, 20 gage, Type B, galvanized metal deck supported on steel wide flange beams and girders. Roofs will be sloped to roof drains at 1/4 inch per foot.

B1020.07 Rooftop Equipment Screen Supports

Rooftop equipment screens will be supported on tube steel posts (and channel girts if design requirements to curtail sagging of bar grate panels is necessary). Where possible, the posts will be welded to column caps below to create a moment connection and avoid kickers. Where this isn't possible, the posts will be braced back to the roof with angled kickers, which attach at the other end to round pipe stanchions extending 12" above the roof to allow for roof penetration flashing. All structural steel exposed above the roof will be hot-dipped galvanized and painted. Bar grate wall panels are edge-banded powder coat painted.

B1020.08 Roof Construction Fireproofing

The entire structural steel frame, including columns, beams and joists supporting roofs, and roof deck, will be protected with sprayed-on fireproofing, 1-hour rated, except as follows:

- Gymnasium: The roof structural frame and deck are not fire proofed.
- Auditorium : The roof structural frame and deck are not fire proofed.
- Cafeteria/Commons : The roof structural trusses, cross braces, vertical framing (exposed above 20' above finish floor) and deck are not fire proofed.

B1030 Vertical Framing Elements

B1030.01 Columns

Columns will be steel wide flange or tube shapes.

B1030.02 Lateral Load-Resisting System

Lateral Load-Resisting System: Lateral loads due to wind and seismic forces will be resisted by braced frames at each level, at selected locations, and will be incorporated within the interior and/or exterior wall systems.

B1030.03 Exterior Wall Support

Exterior masonry veneer walls will be supported on suspended steel shelf angles at the window head of the third floor. Below that level, the veneer will bear on the perimeter foundation walls.

B20 EXTERIOR ENCLOSURE

B2010 Exterior Walls

B2010.01 Exterior Wall Skin

Masonry Walls: Brick and manufactured stone masonry facing (nominal 4-inch wythe) with precast concrete, anchored to stud framing with stainless steel ties. Loose steel lintels above window and door openings.

- **CMU Back-Up:** In limited areas (see B2010.02 for scope) face masonry will be anchored to reinforced concrete unit masonry back-up.
- **Brick:** Extruded brick, nominal 2-1/2 inches high by 12 inches long.
- **Manufactured Stone:** Arriscraft "Renaissance" calcium silicate masonry units, or equal. Utilized in single base course (12" tall) and top cap course (12" tall).
- **Precast Concrete:** Sills; color and finish to match the manufactured stone.
- **Through-Wall Flashing:** Self-adhering rubberized bitumen flashing lapped over formed zinc-tin-alloy-coated copper flashing. The zinc-tin alloy coated copper flashing will span the air space, providing support for the flexible flashing, and will extend forward of the face of the wall, terminating with a drip edge.

Metal Panels: Will be used at selected locations, including some walls, roof fascias and cornices, as well as soffits. As details are developed, these are likely composite metal panels with fire-rated core, installed with dry seal (gasketed) joints, such as Centria "Formabond" or "Alucobond," or less likely these may be insulated metal panels, such as Centria "Formawall." If the former are used, the air space behind will be insulated in the same way as the masonry walls.

B2010.02 Exterior Wall Construction

Metal Stud Framing: Curtainwall stud framing, 18 gauge or heavier steel studs with G90 galvanizing, covered with 1/2 inch thick glass-fiber-faced gypsum panel sheathing.

- Curtainwall stud framing will be designed to resist wind loads calculated for the Project, with deflection not to exceed 1/720 where framing carries masonry veneer; and not to exceed 1/360 where framing carries metal panels.
- Stud spacing as required to 16 inches on center maximum.

Cavity Wall Construction: In limited areas, such as the Student Activities Room, stair towers and perimeter splayed walls at the west end of the Cafeteria/Commons, cavity wall construction with masonry back-up may be used. In these locations, wall construction behind the brick facing or phenolic Trespa panel facing will be nominal 8-inch thick concrete unit masonry (CMU) reinforced with galvanized steel rebar and horizontal truss reinforcing to meet Code requirements for structural and seismic performance and, for egress stairs, 2-hour fireproof construction. Masonry lintels will be used in back-up wythe above doors, window, and louver openings.

B2010.03 Exterior Wall Air Barrier, Vapor Retarders, and Through-Wall Flashing Insulation

Combination Air Barrier, Vapor Retarder, and Waterproofing: Air barrier in stud-framed, masonry-clad or metal panel-clad wall assemblies will be provided by application of a self-adhering rubberized asphalt sheet over the sheathing. This material will also act as vapor retarder and as a waterproof surface which will prevent moisture that does get into the cavity from wetting the sheathing.

- Product: Monsey Bakor "Blueskin SA," W. R. Grace "Perm-a-Barrier," or Carlisle "CCW-705."

In limited areas, such as over concrete or concrete unit masonry back-up, a liquid-applied system such as Carlisle CCW-525; Monsey Bakor "Airbloc 06," Grace "Procor" may be used.

Through-Wall Flashing: Combination of flexible flashing and metal. Zinc-tin-alloy coated copper extending from face of wall to back-up, and forming a 2-inch deep metal pan. The air barrier system transition membrane, a 40 mils thick self-adhering rubberized asphalt, will lap over the metal pan, extending to face of wall.

B2010.04 Exterior Wall Insulation

Insulation Above Grade: 3" thick extruded polystyrene board insulation, installed in the air space behind the masonry, outboard of the air barrier.

In the unlikely event that insulated metal panels are used as cladding, insulation in the cavity may be reduced or eliminated.

3" thick extruded polystyrene board insulation behind spandrel glazing units.

Insulation Below Grade: See foundation insulation in Part A.

B2010.05 Exterior Wall Interior Skin

Typical: 5/8 inch thick gypsum board, with joints taped and finished.

At selected locations listed below, phenolic Trespa panels will be used as exterior skin (rain-screen application) and/or the interior finish. This veneer will be installed directly to wall studs with exposed metal fasteners.

- Academic wing stair enclosures: non-glass side walls (at landings) have painted masonry finish unless an Add-Alt of Trespa cladding is selected.
- Auditorium walls to have masonry cladding to 12' AFF. Trespa panels above.
- Gymnasium walls to just below the clerestory windows: concrete unit masonry veneer to the top of the bleachers and at least 20' AFF. Tectum on gypsum above, on steel studs.
- Splayed walls on western side of the Cafeteria/Commons, phenolic Trespa panels for full height on both sides (where exposed) and in portal jambs and heads/soffits. In these splayed walls there is a special base on the interior portions: below the Trespa panels at ground level, is a 15 5/8" wide (tall) steel grille/bar grating, McNichols GW75 or similar, standing on its side, creating both useable and blank HVAC diffusers. Other interior splayed walls are same construction.

Where the exterior wall construction is cavity wall with concrete unit masonry back-up, the interior face will be finished with 5/8 inch thick gypsum board applied over galvanized steel furring.

B2010.06 Exterior Louver

Mechanical Room Louvers: Extruded aluminum fixed blade louvers with drainable blade profile; high performance painted finish, with bird screen, and with insulated blank-out panels to cover excess louver area not connected to duct.

B2010.07 Sun Control Devices

Extruded aluminum grillework or louvered shading devices, supported on structural steel outrigger framing.

B2010.08 Exterior Soffits

Building Soffits, Except Cornice: Exterior finish system applied directly over Portland cement sheathing ("Durock"); with a layer of building wrap behind the sheathing.

Cornice Soffit: The underside of the cornice overhang will be finished composite-metal panels over sheathing. The building thermal insulation and air barrier will extend over this soffit, to enclose the supporting structure and tie into the roofing system.

Canopy Soffit: Composite-metal panels over sheathing. Assume canopies are uninsulated, and that the building air barrier/vapor barrier does not extend onto canopies. The area under the canopy will be illuminated with recessed lights.

B2020 Exterior Windows

B2020.01 Storefronts

Extruded aluminum, stick-built storefront assembly; thermal break, equal to Kawneer "Trifab 451T" framing system or similar system by EFCO or Vistawall, with high-performance organic coating ("Kynar 500") in an architectural color. Field-glazed with insulated glass as described in B2020.04.

- Extent of storefront is indicated on drawings or any expanse of glazing that is not a "punched window" and conforms to dimensional limitations acceptable for storefront construction. Everything beyond these limitations will be curtain wall glazing. Note that vertical clerestory glazing system in roof monitors is to be storefront system.

B2020.02 Glazed Curtain Wall

Extruded aluminum curtain wall system, employing Prevest 3400 HP, or EFCO Series 5600 Thermally-Improved Curtain Wall, or equivalent framing system by Kawneer or Vistawall. Mullions 2-1/2 inch face width, by depth required to resist wind loads. Framing will incorporate a thermal break consisting of a non-metallic structural strut between interior and exterior metal framing. Sloped glazing system of similar construction by same manufacturer at greenhouse roofs. U-value of 0.42 or lower when glazed.

- Extent of curtainwall is indicated on drawings. Assume any glazing system not identified as aluminum window or aluminum storefront is aluminum curtainwall.
- Note that exterior walls of greenhouses are to be curtainwall, and sloped roofs of greenhouses are to be a compatible, integrated sloped glazing system by same manufacturer. The system shall incorporate operable vents at top and bottom of wall.
- At selected locations, a special mullion cap in the shape of a 3-inch deep fin will be incorporated into the design.
- Field-glazed with insulated glass as described in B2020.04.

B2020.03 Aluminum Windows

Aluminum-framed windows in "punched" openings (masonry surrounding the window). These will be windows of traditional design, with casement and/or projecting operable (vent) panels. High-performing window assemblies, providing U-value 0.35 or less when glazed will be specified. Window frame extrusions will incorporate a non-metallic thermal break to reduce heat loss, and the insulating glass units will include a low-emissivity coating. Insect screens will be provided.

Product: For preliminary design, assume one of the following:

- A & D Prevest, Inc.; Series 1860; 6-inch deep frame.
- Wausau Window and Wall Systems 3250 H, modified or furnished with frame extensions to provide a 6-inch deep frame.
- Kawneer; an Alcoa Company; 5525 Isoweb Series, modified or furnished with frame extensions that provide a 6-inch deep frame.

B2020.04 Exterior Glazing

Vision Glass: Insulating glass units, 1" thick (1/4" glass + 1/2" air space + 1/4" glass), with high-performance low-E (low-emissivity) coating on the second surface. Air space filled with Argon. Glass performance U-value = 0.28 or less, (solar heat gain coefficient (SHGC) 0.27 or better. PPG Solarban 60 70XL or Viracon VE-1-2M or equal. Tempered glass where required by code (adjacent to doors, within 18" of floor. Heat-strengthened glass where thermal stresses may be induced by differential shading.

Spandrel Glass: Same as vision glass, with addition of opaque ceramic frit on the No. 4 (innermost) surface.

B2030 Exterior Doors

B2030.01 Exterior Entrance Doors

Aluminum Entrance Doors: Kawneer "500" doors with 5-inch wide stile, extra-heavy duty 0.125 inch thick extrusion, or equal by the curtainwall manufacturer, with custom arrangement of intermediate mullions. High performance fluoropolymer finish (made of 70% "Kynar 500" or "Hylar 5000" resin).

Frames: Adaptor as standard for the glazed aluminum curtainwall system into which the doors are installed.

Glass: Insulating glass units, 1" thick (1/4" glass + 1/2" air space + 1/4" glass), tempered safety glass, with high-performance low-E (low-emissivity) coating on the second surface.

Hardware: Full height continuous hinge; rim exit device; offset tubular pulls; surface-mounted overhead closers; stops; threshold; weatherstripping. Removable mullion at pairs of doors.

- One leaf at main entrance will also be activated by low-power power-assisted operating device, with push-plates located on both sides of the door.
- Locking will be coordinated with the security system for access control.

Security System: Entrance doors are monitored by the building's intrusion alarm system.

B2030.02 Exterior Service Doors

Flush steel doors, SDI 100 Extra Heavy Duty (16 gauge steel face with steel stiffeners in core), in fully welded, 14 gauge steel frames, G60 galvanized, shop-primed and field painted. U-value to be provided (min 0.37).

- Hardware: Mortised lockset with lever handle; butt hinges; threshold.

Security System: Exterior service doors are monitored by the building's intrusion alarm system.

B2030.03 Overhead Coiling Doors

Overhead coiling door, with curtain fabricated from insulated, flat-faced slats, with faces formed from 0.028 inch thick (22 gauge) galvanized steel. Shop-primed for field painting.

- 1 service door 8' wide x 10' high.
- Operation: Electrically operated with automatic-reversing bottom bar.
- Accessories: Jamb tracks, hood.

Security System: Service door is monitored by the building's intrusion alarm system.

Insulated exterior doors to be R-4.75 min.

B30 ROOFING

B3010 Roof Coverings

B3010.01 Low-Slope Roofs; Above Deck Roof Covering Components

Fully-adhered single-ply roofing over insulated steel deck. Deck will be concrete-filled below mechanical system rooftop units.

- Underlayment: 1/2 - inch thick gypsum board mechanically fastened to steel deck.
- Air Barrier/Vapor Retarder: Self-adhering rubberized asphalt sheet.
- Insulation: Polyisocyanurate with glass felt facers; 5-inch (6" add alternate) minimum thickness (excluding tapered layer), applied in at least two layers, with first layer mechanically fastened and the other layers adhered to layer below. Where structural roof deck is flat, tapered insulation will provide slope to drain; 1/8 inch per foot.
- Insulation Overlayment: 1/2 - inch thick glass-faced gypsum panel.
- Membrane: 60 mils thick thermoplastic membrane with heat-welded seams; product still to be determined. Either fabric-reinforced polyvinyl chloride (Samafil PVC) membrane with heat-welded seams; or 60 mils thick thermoplastic polyolefin (TPO) with heat welded seams.
- Walkways: To provide access to rooftop equipment, PVC walkway pads will be laid over and adhered to the roofing membrane.
- Roof Edge Flashing and Fascias: Furnished by roofing manufacturer. 2-piece assembly consisting of extruded aluminum clip and snap-on aluminum fascia. Assume custom profiles for the fascia and high performance painted finish.

Performance: Resist wind uplift calculated in accordance with the Massachusetts State Building Code for 100 mph design wind velocity, Exposure B.

Warranty: Total system warranty, 20 years with enhanced wind uplift warranty.

B3010.02 Other Flashing and Sheet Metal

Coping: 0.080 inch thick brake-formed aluminum, same finish as roof edge flashing.

Counter-Flashing: 0.050 inch thick aluminum, same finish as roof edge flashing.

B3010.03 Vegetated Roof

Approximately 10,000 square feet of roof above Pod 2 (and/or Maintenance roof adjacent to Library Deck) will be overlaid with an extensive vegetated roof system consisting of low-growing sedum on 3 to 5 inches of planting medium. The planted area will be bordered by a strip of riverbed gravel ballast about 24-inches wide.

Related Work: Hose bibbs on roof; access to planted area from the third floor Pod 1 wing.

B3020 Roof Openings

B3020.01 Skylights

Metal-Framed Skylights: As fabricated by Kawneer, LinEl Signature, Naturalite Skylight Systems (Vistawall Group), Wasco Products, Inc..

- Assume eight skylights, 12' x 12' and three 8' x 12' for Greenhouse Pop-outs (see F Special Construction)
- Glass: Insulated glass unit, 1-1/16" thick, fabricated with exterior pane 1/4 inch thick heat-treated clear glass with high-performance Low-E coating, and interior pane 5-1/16-inch thick of laminated safety glass consisting of 2 sheets of 1/8-inch thick annealed glass and 0.060 inch thick plastic interlayer. (Include min U-value 0.31 or less)

Plastic Unit Skylights: As manufactured by Naturalite, O'Keefe's or Wasco. Double-glazed acrylic dome units on thermally-broken, insulated curb.

- Quantity: Assume six units, each approximately 36" x 36"

Skylight Light Tubes: "Solatube" or equal, 21" diameter tubes with lengths of 18' and 32' to reach the second and first floor ceiling heights, respectively, excluding any length added for above-roof curb needs. Assume six of each. Square 24" ceiling light-diffuser panels at the bottom of the tubes.

B3020.02 Ventilators

Smoke Vents: Smoke vents will be provided at the top of the fly space above the stage in the auditorium; activated by fusible links. Five units will be required.

Elevator shaft ventilation is specified under Services, HVAC.
