



USD 320 Wamego-Phase 2-Bid Package 1- Sports Complex Locker Rooms and District Central Kitchen

Addendum 3

Issue Date: 7-28-17

Architect: BBN Architects Inc.

MEP: Orazem & Scalora Engineering, P.A.

Civil Engineer: SMH Consultants

Construction Manager: Coonrod & Associates Construction Co., Inc.

Owner: USD 320 Wamego

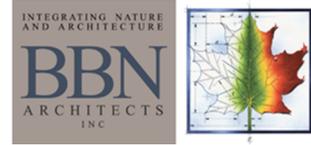
The attached documents and / or items below shall hereby become part of the Construction Documents for the referenced project above.

3-1: Add the following (attached) specification section to the Specifications / Project Manual.

- **073113-Asphalt Shingles**
- **104416-Fire Extinguishers**

3-2: Replace the existing specification sections / plan sheet in the Specifications / Project Manual with the new specification sections / plan sheet (attached), listed below.

- **Specifications / Project Manual- Table of Contents**
- **042000-Unit Masonry**
- **105115-Metal Athletic Lockers**
- **District Kitchen- M101-Mechanical Plan**
- **District Kitchen- E201- Electrical Power Plan**
- **District Kitchen- E301- Electrical Details & Schedules**
- **Sports Complex Locker Room- E101- Electrical Plans**
- **Sports Complex Locker Room- E201- Electrical Details**



3-3: Specification Section CLARIFICATION: 074293-Soffit Panels- MBCI is an acceptable Vee soffit panel manufacturer.

3-4: Specification Section CLARIFICATION: 220000-Plumbing- ZURN is an acceptable manufacturer for the mop / service sink.

3-5: In addition to emailing or faxing bids per the Instruction to Bidders, the bids may be delivered in person and will be opened and read aloud publicly at the Wamego High School library, 801 Lincoln Ave., Wamego, KS. Please enter on the east side of the high school at the main entrance. The library is on the 2nd floor.

If you will be **mailing** bids, please mail them to USD 320 District Office, 1008 8th St., Wamego, KS, 66547. Mailed bids must be received BEFORE THE BID DATE AND TIME.

3-6: The bid date has changed. The bids are now due on **FRIDAY, AUGUST 4th, 2017 at 2:00 PM CST.**

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SECTION 04 20 00 - UNIT MASONRY**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Decorative burnished concrete masonry veneer units for Sport Complex Locker Room.
3. Clay brick (Later).
4. Mortar and grout.
5. Steel reinforcing bars.
6. Masonry-joint reinforcement.
7. Ties and anchors.
8. Embedded flashing.
9. Miscellaneous masonry accessories.

B. Products Installed but not Furnished under This Section:

1. Steel lintels in unit masonry.
2. Steel shelf angles for supporting unit masonry.
3. Cavity wall insulation.

C. Related Requirements:

1. Sheet S201, "General Notes and Schedules" for additional masonry construction and inspection requirements.
2. Section 05 12 00 "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural steel frame.
3. Section 07 19 00 "Water Repellents" for water repellents applied to unit masonry assemblies.
4. Section 07 21 00 "Thermal Insulation" for cavity wall insulation.
5. Section 07 62 00 "Sheet Metal Flashing and Trim" for exposed sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.

1.3 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For the following:
1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
 2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.
 3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- C. Samples for Initial Selection:
1. Decorative CMUs, in the form of small-scale units.
 2. Colored mortar.
 3. Weep holes/cavity vents.
- D. Samples for Verification: For each type and color of the following:
1. Decorative CMUs, in the form of small-scale units.
 2. Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project.
 3. Accessories embedded in masonry.

1.6 INFORMATIONAL SUBMITTALS

- A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
1. Submittal is for information only. Receipt of list does not constitute approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.
- B. Qualification Data: For testing agency.
- C. Material Certificates: For each type and size of the following:
1. Masonry units.
 - a. Include material test reports substantiating compliance with requirements.
 - b. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.

2. Integral water repellent used in CMUs.
 3. Cementitious materials. Include name of manufacturer, brand name, and type.
 4. Mortar admixtures.
 5. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 6. Grout mixes. Include description of type and proportions of ingredients.
 7. Reinforcing bars.
 8. Joint reinforcement.
 9. Anchors, ties, and metal accessories.
- D. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91/C 91M for air content.
 2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- E. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.
- F. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.7 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
1. Build mockups for each type of exposed unit masonry construction and typical exterior and interior walls in sizes approximately 72 inches (1800 mm) long by 96 inches (2400 mm) long by high by full thickness, including face and backup wythes and accessories.
 - a. Include a sealant-filled joint at least 16 inches (400 mm) long in each mockup.
 - b. Include lower corner of window opening at upper corner of exterior wall mockup. Make opening approximately 12 inches (300 mm) wide by 16 inches (400 mm) high.
 - c. Include through-wall flashing installed for a 24-inch (600-mm) length in corner of exterior wall mockup approximately 16 inches (400 mm) down from top of mockup, with a 12-inch (300-mm) length of flashing left exposed to view (omit masonry above half of flashing).
 - d. Include water-resistive barrier, sheathing joint-and-penetration treatment, air barrier, veneer anchors, flashing, cavity drainage material, and weep holes in exterior masonry-veneer wall mockup.

2. Where masonry is to match existing, erect mockups adjacent and parallel to existing surface.
3. Clean one-half of exposed faces of mockups with masonry cleaner as indicated.
4. Protect accepted mockups from the elements with weather-resistant membrane.
5. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
 - a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
 - b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
6. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.9 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 1. Extend cover a minimum of 24 inches (600 mm) down both sides of walls, and hold cover securely in place.
 2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches (600 mm) down face next to unconstructed wythe, and hold cover in place.

- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 PERFORMANCE REQUIREMENTS

- A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.
 - 1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.

2.3 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work and will be within 20 feet (6 m) vertically and horizontally of a walking surface.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
 - 1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.4 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 - 2. Provide bullnose units for outside corners unless otherwise indicated.
- B. Integral Water Repellent: Provide units made with integral water repellent for exposed units.
 - 1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E 514/E 514M as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) BASF Corporation; Construction Systems.
 - 2) Euclid Chemical Company (The); an RPM company.
 - 3) GCP Applied Technologies Inc. (formerly Grace Construction Products).
- C. CMUs: ASTM C 90.
 - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of indicated on the Drawings.
 - 2. Density Classification: Lightweight units having an average density less than 105 lb/cu ft (1.680 kg/cu m).
 - 3. Size (Width): Manufactured to dimensions 3/8 inch (10 mm) less than nominal dimensions.

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4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.
- D. Decorative CMUs: ASTM C 90.
1. Products Subject to compliance with requirements, provide products by one of the following:
 - a. **Echelon Masonry** - Trenwyth, "Trendstone Plus Filled and Polished Masonry Units," with manufacturer's standard factory-applied water repellent, and extra water repellent for field finish final coat.
 - b. Anchor Block Company, "**Anchor** Burnished **Masonry UnitsBlock**" with manufacturer's standard factory-applied water repellent, **and extra water repellent for field finish final coat.**
 2. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2800 psi (19.3 MPa).
 3. Density Classification: ~~Lightweight~~**Medium-weight**.
 4. Size (Width): Manufactured to dimensions specified in "CMUs" Paragraph.
 5. Pattern and Texture:
 - a. Standard pattern, ground-face finish
 - a. Colors: As selected by Architect from manufacturer's full range.

2.5 MASONRY LINTELS

- A. General: Provide one of the following:
- B. Concrete Lintels: ASTM C 1623, matching CMUs in color, texture, and density classification; and with reinforcing bars indicated. Provide lintels with net-area compressive strength not less than that of CMUs.
- C. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.6 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150/C 150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
 1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.
- B. Hydrated Lime: ASTM C 207, Type S.

- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979/C 979M. Use only pigments with a record of satisfactory performance in masonry mortar.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Davis Colors.
 - b. Euclid Chemical Company (The); an RPM company.
- E. Aggregate for Mortar: ASTM C 144.
1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 2. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
 3. White-Mortar Aggregates: Natural white sand or crushed white stone.
 4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- F. Aggregate for Grout: ASTM C 404.
- G. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. BASF Corporation; Construction Systems.
 - b. Euclid Chemical Company (The); an RPM company.
 - c. GCP Applied Technologies Inc. (formerly Grace Construction Products).
- H. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. BASF Corporation; Construction Systems.
 - b. Euclid Chemical Company (The); an RPM company.
 - c. GCP Applied Technologies Inc. (formerly Grace Construction Products).
- I. Water: Potable.

2.7 REINFORCEMENT

- A. Uncoated-Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60 (Grade 420).
- B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch (3.77-mm) steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Dur-O-Wal; a Hohmann & Barnard company.
 - b. Heckmann Building Products, Inc.
 - c. Hohmann & Barnard, Inc.
 - d. Wire-Bond.
- C. Masonry-Joint Reinforcement, General: ASTM A 951/A 951M.
1. Interior Walls: Hot-dip galvanized carbon steel.
 2. Exterior Walls: Hot-dip galvanized carbon steel.
 3. Wire Size for Side Rods: 0.187-inch (4.76-mm) diameter.
 4. Wire Size for Cross Rods: 0.187-inch (4.76-mm) diameter.
 5. Wire Size for Veneer Ties: 0.187-inch (4.76-mm) diameter.
 6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches (407 mm) o.c.
 7. Provide in lengths of not less than 10 feet (3 m), with prefabricated corner and tee units.
- D. Masonry-Joint Reinforcement for Single-Wythe Masonry: Ladder type with single pair of side rods.
- E. Masonry-Joint Reinforcement for Multiwythe Masonry: Brick on both sides of concrete masonry units as indicated on the Drawings.
1. Ladder type with one side rod at each face shell of hollow masonry units more than 4 inches (100 mm) wide, plus one side rod at each wythe of masonry 4 inches (100 mm) wide or less.

2.8 TIES AND ANCHORS

- A. General: Ties and anchors shall extend at least 1-1/2 inches (38 mm) into veneer but with at least a 5/8-inch (16-mm) cover on outside face.
- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M, with ASTM A 153/A 153M, Class B-2 coating.

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2. Galvanized-Steel Sheet: ASTM A 653/A 653M, Commercial Steel, G60 (Z180) zinc coating.
 3. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
 4. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches (100 mm) wide.
1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches (50 mm) long may be used for masonry constructed from solid units.
 2. Where wythes do not align, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches (32 mm).
 3. Wire: Fabricate from 3/16-inch- (4.76-mm-) diameter, hot-dip galvanized steel wire.
- D. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- (6.35-mm-) diameter, hot-dip galvanized steel.
 2. Tie Section: Triangular-shaped wire tie made from 0.187-inch- (4.76-mm-) diameter, hot-dip galvanized steel.
- E. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.060-inch- (1.52-mm-) thick steel sheet, galvanized after fabrication.
 - a. 0.108-inch- (2.74-mm-) thick, galvanized-steel sheet may be used at interior walls unless otherwise indicated.
 2. Tie Section: Triangular-shaped wire tie made from 0.187-inch- (4.76-mm-) diameter, hot-dip galvanized steel wire.
- F. Partition Top Anchors: 0.105-inch- (2.66-mm-) thick metal plate with a 3/8-inch- (9.5-mm-) diameter metal rod 6 inches (152 mm) long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.
- G. Rigid Anchors: Fabricate from steel bars 1-1/2 inches (38 mm) wide by 1/4 inch (6.35 mm) thick by 24 inches (610 mm) long, with ends turned up 2 inches (51 mm) or with cross pins unless otherwise indicated.
1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.
- H. Adjustable Masonry-Veneer Anchors:

1. General: Provide anchors that allow vertical adjustment but resist a 100-lbf (445-N) load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch (1.5 mm).
2. Fabricate wire ties from 0.187-inch- (4.76-mm-) diameter, hot-dip galvanized-steel wire unless otherwise indicated.
3. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a rib-stiffened, sheet metal anchor section with screw holes top and bottom, with projecting tabs having holes for inserting vertical legs of wire tie formed to fit anchor section.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Heckmann Building Products, Inc.
 - 2) Hohmann & Barnard, Inc.
 - 3) Wire-Bond.
4. Stainless-Steel Drill Screws for Steel Studs: ASTM C 954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 (4.83-mm) diameter by length required to penetrate steel stud flange with not less than three exposed threads; either made from Type 410 stainless steel or made with a carbon-steel drill point and 300 Series stainless-steel shank.

2.9 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
 1. Stainless Steel: ASTM A 240/A 240M or ASTM A 666, Type 304, 0.016 inch (0.40 mm) thick.
 2. Fabricate continuous flashings in sections 96 inches (2400 mm) long minimum, but not exceeding 12 feet (3.7 m). Provide splice plates at joints of formed, smooth metal flashing.
 3. Fabricate metal drip edges from stainless steel. Extend at least 3 inches (76 mm) into wall and 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
 4. Fabricate metal expansion-joint strips from stainless steel to shapes indicated.
 5. Solder metal items at corners.
- B. Flexible Flashing: Use the following unless otherwise indicated:
 1. EPDM Flashing: Sheet flashing product made from ethylene-propylene-diene terpolymer, complying with ASTM D 4637/D 4637M, 0.040 inch (1.02 mm) thick.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Carlisle Coatings & Waterproofing Inc.
 - 2) Heckmann Building Products, Inc.
 - 3) Hohmann & Barnard, Inc.
 - 4) Wire-Bond.

- C. Application: Unless otherwise indicated, use the following:
1. Where flashing is indicated to receive counterflashing, use metal flashing.
 2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
 3. Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing or flexible flashing with a metal drip edge.
 4. Where flashing is fully concealed, use flexible flashing.
- D. Solder and Sealants for Sheet Metal Flashings:
1. Solder for Stainless Steel: ASTM B 32, Grade Sn96, with acid flux of type recommended by stainless-steel sheet manufacturer.
 2. Elastomeric Sealant: ASTM C 920, chemically curing silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and remain watertight.
- E. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.
- F. Termination Bars for Flexible Flashing: Stainless steel bars 1/8 inch by 1 inch (3 mm by 25 mm).

2.10 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D 226/D 226M, Type I (No. 15 asphalt felt).
- D. Weep/Cavity Vent Products: Use one of the following unless otherwise indicated:
1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch (3 mm) less than depth of outer wythe, in color selected from manufacturer's standard.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Advanced Building Products Inc.
 - 2) Heckmann Building Products, Inc.
 - 3) Hohmann & Barnard, Inc.
 - 4) Wire-Bond.

2. Mesh Weep/Vent: Free-draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch (3 mm) less than depth of outer wythe; in color selected from manufacturer's standard.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Advanced Building Products Inc.
 - 2) CavClear/Archovations, Inc.
 - 3) Keene Building Products.
 - 4) Mortar Net Solutions.
- E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Advanced Building Products Inc.
 - b. CavClear/Archovations, Inc.
 - c. Heckmann Building Products, Inc.
 - d. Hohmann & Barnard, Inc.
 - e. Mortar Net Solutions.
 - f. Wire-Bond.
 2. Configuration: Provide one of the following:
 - a. Strips, full depth of cavity and 10 inches (250 mm) high, with dovetail-shaped notches 7 inches (175 mm) deep that prevent clogging with mortar droppings.

2.11 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Diedrich Technologies, Inc.; a Hohmann & Barnard company.
 - b. PROSOCO, Inc.

2.12 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
 2. Use portland cement-lime mortar unless otherwise indicated.
 3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
1. For masonry below grade or in contact with earth, use Type M.
 2. For reinforced masonry, use Type S.
 3. For mortar parge coats, use Type N.
- C. Pigmented Mortar: Use colored cement product.
1. Pigments shall not exceed 10 percent of portland cement by weight.
 2. Mix to match Architect's sample.
 3. Application: Use pigmented mortar for exposed mortar joints with the following units:
 - a. Decorative CMUs.
- D. Grout for Unit Masonry: Comply with ASTM C 476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
 2. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than strength indicated on the Drawings.
 3. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
 2. Verify that foundations are within tolerances specified.
 3. Verify that reinforcing dowels are properly placed.
 4. Verify that substrates are free of substances that impair mortar bond.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.
- F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

3.3 TOLERANCES

- A. Dimensions and Locations of Elements:
1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.
- B. Lines and Levels:
1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
 3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
 5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.

6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm) except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm). Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch (3 mm).

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches (100 mm). Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- H. Fill cores in hollow CMUs with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

- I. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
 1. Install compressible filler in joint between top of partition and underside of structure above.
 2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch (13-mm) clearance between end of anchor rod and end of tube. Space anchors 48 inches (1200 mm) o.c. unless otherwise indicated.
 3. Wedge nonload-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
 4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 07 84 43 "Joint Firestopping."

3.5 MORTAR BEDDING AND JOINTING

- A. Lay CMUs as follows:
 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
 3. Bed webs in mortar in grouted masonry, including starting course on footings.
 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
 5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.
- B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
 1. For glazed masonry units, use a nonmetallic jointer 3/4 inch (19 mm) or more in width.
- C. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.
- D. Cut joints flush where indicated to receive cavity wall insulation and air barriers unless otherwise indicated.

3.6 COMPOSITE MASONRY

- A. Bond wythes of composite masonry together as follows:
 1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 2.67 sq. ft. (0.25 sq. m) of wall area spaced not to exceed 24 inches (610 mm) o.c. horizontally and 16 inches (406 mm) o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches (305 mm) of openings and space not more than 36 inches (914 mm) apart around perimeter of openings. At

intersecting and abutting walls, provide ties at no more than 24 inches (610 mm) o.c. vertically.

- a. Where bed joints of wythes do not align, use adjustable-type (two-piece-type) ties.
2. Masonry-Joint Reinforcement: Installed in horizontal mortar joints.
 - a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
 - B. Collar Joints: Solidly fill collar joints by parging face of first wythe that is laid and shoving units of other wythe into place.
 - C. Corners: Provide interlocking masonry unit bond in each wythe and course at corners unless otherwise indicated.
 1. Provide continuity with masonry-joint reinforcement at corners by using prefabricated L-shaped units as well as masonry bonding.
 - D. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, bond walls together as follows:
 1. Provide continuity with masonry-joint reinforcement by using prefabricated T-shaped units.

3.7 CAVITY WALLS

- A. Bond wythes of cavity walls together as follows:
 1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 2.67 sq. ft. (0.25 sq. m) of wall area spaced not to exceed 24 inches (610 mm) o.c. horizontally and 16 inches (406 mm) o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches (305 mm) of openings and space not more than 36 inches (915 mm) apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches (610 mm) o.c. vertically.
 - a. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable-type (two-piece-type) ties to allow for differential movement regardless of whether bed joints align.
 2. Masonry-Joint Reinforcement: Installed in horizontal mortar joints.
 - a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
 - b. Where bed joints of wythes do not align, use adjustable-type (two-piece-type) reinforcement with continuous horizontal wire in facing wythe attached to ties.
 3. Masonry-Veneer Anchors: Comply with requirements for anchoring masonry veneers.

- B. Bond wythes of cavity walls together using bonding system indicated on Drawings.
- C. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.
- D. Installing Cavity Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches (300 mm) o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
 - 1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

3.8 ANCHORED MASONRY VENEERS

- A. Anchor masonry veneers to wall framing and concrete and masonry backup with masonry-veneer anchors to comply with the following requirements:
 - 1. Fasten screw-attached anchors through sheathing to wall framing and to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
 - 2. Embed connector sections in masonry joints.
 - 3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
 - 4. Space anchors as indicated, but not more than 16 inches (406 mm) o.c. vertically and horizontally. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 24 inches (610 mm), around perimeter.
- B. Provide not less than 2 inches (50 mm) of airspace between back of masonry veneer and face of insulation.
 - 1. Keep airspace clean of mortar droppings and other materials during construction. Bevel beds away from airspace, to minimize mortar protrusions into airspace. Do not attempt to trowel or remove mortar fins protruding into airspace.

3.9 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).
 - 1. Space reinforcement not more than 16 inches (406 mm) o.c.
 - 2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.

3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.10 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:
 1. Provide an open space not less than 1 inch (25 mm) wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
 2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
 3. Space anchors as indicated, but not more than 24 inches (610 mm) o.c. vertically and 36 inches (915 mm) o.c. horizontally.

3.11 CONTROL AND EXPANSION JOINTS

- A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry using one of the following methods:
 1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout, and rake out joints in exposed faces for application of sealant.
 2. Install preformed control-joint gaskets designed to fit standard sash block.
 3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar, or rake out joint for application of sealant.
 4. Install temporary foam-plastic filler in head joints, and remove filler when unit masonry is complete for application of sealant.
- C. Provide horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 07 92 00 "Joint Sealants," but not less than 3/8 inch (10 mm).
 1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.12 LINTELS

- A. Install steel lintels where indicated.
- B. Provide concrete or masonry lintels where shown and where openings of more than 12 inches (305 mm) for brick-size units and 24 inches (610 mm) for block-size units are shown without structural steel or other supporting lintels.
- C. Provide minimum bearing of 8 inches (200 mm) at each jamb unless otherwise indicated.

3.13 FLASHING, WEEP HOLES, AND CAVITY VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install cavity vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
 - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 - 2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches (200 mm), to the termination bar.
 - 3. At masonry-veneer walls, extend flashing through veneer, across airspace behind veneer, and up face of inner wythe at least 8 inches (200 mm); with upper edge tucked under water-resistive barrier, lapping at least 4 inches (100 mm). Fasten upper edge of flexible flashing to inner wythe through termination bar.
 - 4. At lintels and shelf angles, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.
 - 5. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches (38 mm) or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 07 92 00 "Joint Sealants" for application indicated.
 - 6. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall, and adhere flexible flashing to top of metal drip edge.
- C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.
- D. Install weep holes in exterior wythes and veneers in head joints of first course of masonry immediately above embedded flashing.
 - 1. Use specified weep/cavity vent products to form weep holes.

2. Use wicking material to form weep holes above flashing under brick sills. Turn wicking down at lip of sill to be as inconspicuous as possible.
 3. Space weep holes formed from wicking material 16 inches (400 mm) o.c.
- E. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.
- F. Install cavity vents in head joints in exterior wythes at spacing indicated. Use specified weep/cavity vent products to form cavity vents.
1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

3.14 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 2. Limit height of vertical grout pours to not more than 60 inches (1520 mm).

3.15 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Engage special inspectors to perform tests and inspections and prepare reports as indicated on Sheet S201 of the Project Structural Drawings. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Testing Prior to Construction: One set of tests.
- C. Testing Frequency: One set of tests for each 5000 sq. ft. (464 sq. m) of wall area or portion thereof.

- D. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C 67 for compressive strength.
- E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.
- G. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.
- H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.
- I. Prism Test: For each type of construction provided, according to ASTM C 1314 at 7 days and at 28 days.

3.16 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 - 3. Protect adjacent nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 - 5. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.
 - 6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

3.17 DECORATIVE CONCRETE MASONRY WATER REPELLENT APPLICATION

- A. Apply a final coat of manufacturer's **recommended acrylic** water repellent to decorative concrete masonry unit walls that are completed, cleaned, and fully cured and dry. Apply evenly to cover the entire surface without forming drips or runs and in accordance with the manufacturer's instructions.

3.18 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
1. Crush masonry waste to less than 4 inches (100 mm) in each dimension.
 2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Section 31 20 00 "Earth Moving."
 3. Do not dispose of masonry waste as fill within 18 inches (450 mm) of finished grade.
- C. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.
- D. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 04 20 00

SECTION 07 31 13 - ASPHALT SHINGLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Asphalt shingles.
 - 2. Underlayment.
 - 3. Ridge vents.
 - 4. Metal flashing and trim.
- B. Related Requirements:
 - 1. Section 07 71 00 "Roof Specialties" for gutters and downspouts.
 - 2. Section 07 72 00 "Roof Accessories" for ridge vents.

1.3 DEFINITION

- A. Roofing Terminology: See ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.
 - 1. Asphalt Shingles: Full size.
 - 2. Ridge and Hip Cap Shingles: Full size.
 - 3. Ridge Vent: 12-inch- (300-mm-) long Sample.
 - 4. Exposed Valley Lining: 12 inches (300 mm) square.
- C. Samples for Initial Selection: For each type of asphalt shingle indicated.

1. Include similar Samples of accessories involving color selection.
- D. Samples for Verification: For the following products, of sizes indicated:
1. Asphalt Shingles: Full size.
 2. Ridge and Hip Cap Shingles: Full size.
 3. Ridge Vent: 12-inch- (300-mm-) long Sample.
 4. Exposed Valley Lining: 12 inches (300 mm) square.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each type of asphalt shingle and underlayment product indicated, for tests performed by manufacturer and witnessed by a qualified testing agency.
- C. Evaluation Reports: For high-temperature, self-adhering sheet underlayment, from ICC-ES or other testing and inspecting agency acceptable to authorities having jurisdiction, indicating that product is suitable for intended use under applicable building codes.
- D. Sample Warranty: For manufacturer's warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For asphalt shingles to include in maintenance manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Asphalt Shingles: 100 sq. ft. (9.3 sq. m) of each type, in unbroken bundles.

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Store roofing materials in a dry, well-ventilated location protected from weather, sunlight, and moisture according to manufacturer's written instructions.
- B. Store underlayment rolls on end on pallets or other raised surfaces. Do not double stack rolls.

- C. Protect unused roofing materials from weather, sunlight, and moisture when left overnight or when roofing work is not in progress.
- D. Handle, store, and place roofing materials in a manner to prevent damage to roof deck or structural supporting members.

1.11 FIELD CONDITIONS

- A. Environmental Limitations: Install self-adhering sheet underlayment within the range of ambient and substrate temperatures recommended in writing by manufacturer.

1.12 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace asphalt shingles that fail within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Manufacturing defects.
 - 2. Material Warranty Period: ~~30-20~~ years from date of Substantial Completion, prorated, with first 7 years nonprorated.
 - 3. Wind-Speed Warranty Period: Asphalt shingles will resist blow-off or damage caused by wind speeds of up to 100 mph (45 m/s) for 15 years from date of Substantial Completion.
 - ~~4. Algae Resistance Warranty Period: Asphalt shingles will not discolor for 20 years from date of Substantial Completion.~~
 - ~~5.4.~~ Workmanship Warranty Period: ~~20-Five~~ years from date of Substantial Completion.
- ~~B. Roofing Installer's Warranty: On warranty form at end of this Section, signed by Installer, in which Installer agrees to repair or replace components of asphalt shingle roofing that fail in materials or workmanship within specified warranty period.~~
- ~~1. Warranty Period: Five years from date of Substantial Completion.~~

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Exterior Fire-Test Exposure: Provide asphalt shingles and related roofing materials identical to those of assemblies tested for Class A fire resistance according to ASTM E 108 or UL 790 by Underwriters Laboratories or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.

2.2 GLASS-FIBER-REINFORCED ASPHALT SHINGLES

- A. Three-Tab-Strip Asphalt Shingles: ASTM D 3462/D 3462M, glass-fiber reinforced, mineral-granule surfaced, and self-sealing; with tabs regularly spaced.
1. Basis of Design Product Subject to compliance with requirements, provide CertainTeed Roofing Corporation, Landmark Pro, Max Def, or comparable products by one of the following:
 - a. Atlas Roofing Corporation.
 - b. GAF Materials Corporation.
 - c. Owens Corning.
 - d. Tamko Building Products, Inc.
 2. Strip Size: Manufacturer's standard.
 3. Weight: 250 pounds per square (100 square feet) (14.6 kg/sq m)
 4. Algae Resistance: Granules resist algae discoloration.
 5. Impact Resistance: UL 2218, Class 4.
 6. Color and Blends: As selected by Architect from manufacturer's full range.
- B. Hip and Ridge Shingles: Manufacturer's standard units to match asphalt shingles.

2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering Sheet Underlayment, High Temperature: Minimum of 40-mil- (1.0-mm-) thick; with slip-resisting, polymer-film-reinforced or glass-reinforced top surface laminated to layer of butyl or SBS-modified asphalt adhesive; with release backing; cold applied; and evaluated and documented to be suitable for use for intended purpose under applicable codes by a testing and inspecting agency acceptable to authorities having jurisdiction.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation.
 - b. GAF.
 - c. Owens Corning.
 - d. Tamko Building Products, Inc.
 2. Thermal Stability: Stable after testing at 240 deg F (116 deg C) according to ASTM D 1970/D 1970M.
 3. Low-Temperature Flexibility: Passes after testing at minus 20 deg F (29 deg C) according to ASTM D 1970/D 1970M.
- B. Granular-Surfaced Valley Lining: ASTM D 6380, Class M, organic-felt-based, asphalt roll roofing; 36 inches (914 mm) wide.

2.4 RIDGE VENTS

- A. Rigid Ridge Vent: Manufacturer's standard, rigid section high-density polypropylene or other UV-stabilized plastic ridge vent for use under ridge shingles.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Air Vent, Inc.; a Gibraltar Industries company.
 - b. CertainTeed Corporation.
 - c. GAF.
 - d. Owens Corning.
 - e. Tapco Group (The); Mid-America Siding Components.
 2. Features:
 - a. Nonwoven geotextile filter strips.
 - b. External deflector baffles.

2.5 ACCESSORIES

- A. Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos free.
- B. Roofing Nails: ASTM F 1667; aluminum, stainless-steel, copper, or hot-dip galvanized-steel wire shingle nails, minimum 0.120-inch- (3-mm-) diameter, sharp-pointed, with a minimum 3/8-inch- (9.5-mm-) diameter flat head and of sufficient length to penetrate 3/4 inch (19 mm) into solid wood decking or extend at least 1/8 inch (3 mm) through OSB or plywood sheathing.
1. Shank: Barbed.
 2. Where nails are in contact with metal flashing, use nails made from same metal as flashing.

2.6 METAL FLASHING AND TRIM

- A. General: Comply with requirements in Section 07 62 00 "Sheet Metal Flashing and Trim."
1. Sheet Metal: Stainless steel.
- B. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of the item.
1. Apron Flashings: Fabricate with lower flange a minimum of 5 inches (125 mm) over and 4 inches (100 mm) beyond each side of downslope asphalt shingles and 6 inches (150 mm) up the vertical surface.
 2. Step Flashings: Fabricate with a headlap of 2 inches (50 mm) and a minimum extension of 5 inches (125 mm) over the underlying asphalt shingle and up the vertical surface.

3. Cricket or Backer Flashings: Fabricate with concealed flange extending a minimum of 24 inches (600 mm) beneath upslope asphalt shingles and 6 inches (150 mm) beyond each side of chimney and 6 inches (150 mm) above the roof plane.
 4. Open-Valley Flashings: Fabricate in lengths not exceeding 10 feet (3 m) with 1-inch- (25-mm-) high, inverted-V profile at center of valley and equal flange widths of 10 inches (250 mm).
 5. Drip Edges: Fabricate in lengths not exceeding 10 feet (3 m) with 2-inch (50-mm) roof-deck flange and 1-1/2-inch (38-mm) fascia flange with 3/8-inch (9.5-mm) drip at lower edge.
- C. Vent Pipe Flashings: ASTM B 749, Type L51121, at least 1/16 inch (1.6 mm) thick. Provide lead sleeve sized to slip over and turn down into pipe, soldered to skirt at slope of roof, and extending at least 4 inches (100 mm) from pipe onto roof.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored; and that provisions have been made for flashings and penetrations through asphalt shingles.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

- A. General: Comply with underlayment manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.
- B. Self-Adhering Sheet Underlayment: Install, wrinkle free, on entire surface of roof substrate indicated to receive asphalt shingles. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install lapped in direction that sheds water. Lap sides not less than 3-1/2 inches (89 mm). Lap ends not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Roll laps with roller. Cover underlayment within seven days.
- C. Concealed Valley Lining: For closed-cut valleys. Comply with NRCA's "NRCA Guidelines for Asphalt Shingle Roof Systems." Install underlayment centered in valley and fastened to roof deck.

1. Lap roof-deck underlayment over valley underlayment at least 6 inches (150 mm).
- D. Metal-Flashed, Open-Valley Underlayment: Install two layers of minimum 36-inch- (914-mm-) wide underlayment centered in valley. Stagger end laps between layers at least 72 inches (1830 mm). Lap ends of each layer at least 12 inches (300 mm) in direction to shed water, and seal with asphalt roofing cement. Fasten each layer to roof deck.
 1. Lap roof-deck underlayment over first layer of valley underlayment at least 6 inches (150 mm).

3.3 METAL FLASHING INSTALLATION

- A. General: Install metal flashings and other sheet metal to comply with requirements in Section 07 62 00 "Sheet Metal Flashing and Trim."
 1. Install metal flashings according to recommendations in ARMA's "Residential Asphalt Roofing Manual" and NRCA's "NRCA Guidelines for Asphalt Shingle Roof Systems."
- B. Apron Flashings: Extend lower flange over and beyond each side of downslope asphalt shingles and up the vertical surface.
- C. Step Flashings: Install with a headlap of 2 inches (50 mm) and extend over the underlying asphalt shingle and up the vertical surface. Fasten to roof deck only.
- D. Cricket or Backer Flashings: Install against the roof-penetrating element extending concealed flange beneath upslope asphalt shingles and beyond each side.
- E. Open-Valley Flashings: Install centered in valleys, lapping ends at least 8 inches (200 mm) in direction to shed water. Fasten upper end of each length to roof deck beneath overlap.
 1. Secure hemmed flange edges into metal cleats spaced 12 inches (300 mm) apart and fastened to roof deck.
 2. Adhere 9-inch- (225-mm-) wide strip of self-adhering sheet to metal flanges and to self-adhering sheet underlayment.
- F. Rake Drip Edges: Install rake drip-edge flashings over underlayment and fasten to roof deck.
- G. Eave Drip Edges: Install eave drip-edge flashings below underlayment and fasten to roof sheathing.
- H. Pipe Flashings: Form flashing around pipe penetrations and asphalt shingles. Fasten and seal to asphalt shingles as recommended by manufacturer.

3.4 ASPHALT-SHINGLE INSTALLATION

- A. General: Install asphalt shingles according to manufacturer's written instructions, recommendations in ARMA's "Residential Asphalt Roofing Manual," and recommendations in NRCA's "NRCA Guidelines for Asphalt Shingle Roof Systems."

- B. Install starter strip along lowest roof edge, consisting of an asphalt-shingle strip at least 7 inches (175 mm) wide with self-sealing strip face up at roof edge.
1. Extend asphalt shingles 3/4 inch (19 mm) over fasciae at eaves and rakes.
 2. Install starter strip along rake edge.
- C. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.
- D. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.
- E. Install asphalt shingles by single-strip column or racking method, maintaining uniform exposure. Install full-length first course followed by cut second course, repeating alternating pattern in succeeding courses.
- F. Fasten asphalt-shingle strips with a minimum of four roofing nails located according to manufacturer's written instructions.
1. Where roof slope exceeds 21:12, seal asphalt shingles with asphalt roofing cement spots after fastening with additional roofing nails.
 2. Where roof slope is less than 4:12, seal asphalt shingles with asphalt roofing cement spots.
 3. When ambient temperature during installation is below 50 deg F (10 deg C), seal asphalt shingles with asphalt roofing cement spots.
- G. Closed-Cut Valleys: Extend asphalt-shingle strips from one side of valley 18 inches (450 mm) beyond center of valley. Use one-piece shingle strips without joints in valley. Fasten with extra nail in upper end of shingle. Install asphalt-shingle courses from other side of valley and cut back to a straight line 2 inches (50 mm) short of valley centerline. Trim upper concealed corners of cut-back shingle strips.
1. Do not nail asphalt shingles within 6 inches (150 mm) of valley center.
 2. Set trimmed, concealed-corner asphalt shingles in a 3-inch- (75-mm-) wide bed of asphalt roofing cement.
- H. Ridge Vents: Install continuous ridge vents over asphalt shingles according to manufacturer's written instructions. Fasten with roofing nails of sufficient length to penetrate sheathing.
- I. Hip and Ridge Shingles: Maintain same exposure of cap shingles as roofing shingle exposure. Lap cap shingles at ridges to shed water away from direction of prevailing winds. Fasten with roofing nails of sufficient length to penetrate sheathing.
1. Fasten ridge cap asphalt shingles to cover ridge vent without obstructing airflow.

END OF SECTION 07 31 13

SECTION 10 44 16 - FIRE EXTINGUISHERS**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers.
- B. Related Requirements:
 - 1. Section 10 44 13 "Fire Protection Specialties" for cabinets and mounting brackets.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to fire extinguishers including, but not limited to, the following:
 - a. Schedules and coordination requirements.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher.
- B. Product Schedule: For fire extinguishers. Coordinate final fire-extinguisher schedule with fire-protection cabinet schedule to ensure proper fit and function.

1.5 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.7 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Failure of hydrostatic test according to NFPA 10.
 - b. Faulty operation of valves or release levers.
 2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS**2.1 PERFORMANCE REQUIREMENTS**

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
1. Provide fire extinguishers approved, listed, and labeled by FM Global.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Badger Fire Protection
 - b. J.L. Industries, Inc.
 - c. Larsen's Manufacturing Company.
 - d. Potter-Roemer; Div. of Smith Industries, Inc.
 2. Valves: Manufacturer's standard.
 3. Handles and Levers: Stainless steel.
 4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.

- B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 4-A:60-B:C, 10-lb (4.5-kg) nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.
- C. Regular Dry-Chemical Type in Steel Container: UL-rated 60-B:C, 10-lb (4.5-kg) nominal capacity, with sodium bicarbonate-based dry chemical in enameled-steel container.
- D. Wet-Chemical Type: UL-rated 2-A:1-B:C:K, 2.5-gal. (9.5-L) nominal capacity, with potassium citrate-based chemical in stainless-steel container; with pressure-indicating gage.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.
 - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install fire extinguishers in locations indicated and in compliance with requirements of authorities having jurisdiction.

END OF SECTION 10 44 16

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SECTION 10 51 15 - METAL ATHLETIC LOCKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Welded, open-front athletic lockers: 24-inch-wide by 18-inch-deep by 72-inch-tall (610 mm by 457 mm by 1829 mm) units.
 - 2. **Welded, open-front accessible lockers: 24-inch-wide by 18-inch-deep by 72-inch-tall (610 mm by 457 mm by 1829 mm) units.**
 - ~~3.~~ Welded, two-tier athletic lockers: 18-inch-wide by 16-inch-deep by 30-inch-tall (457 mm by 406 mm by 762 mm) units.
 - ~~4.~~ Locker benches.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal locker.
- B. Shop Drawings: For metal lockers.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Show locker trim and accessories.
 - 3. Include locker identification system and numbering sequence.
- C. Samples: For each color specified, in manufacturer's standard size.
- D. Samples for Verification: For the following products, in manufacturer's standard size:
 - 1. Lockers and equipment.
 - 2. Locker benches.
- E. Product Schedule: For lockers.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Installation instructions.
- C. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver metal lockers until spaces to receive them are clean, dry, and ready for their installation.

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify actual dimensions of recessed openings by field measurements before fabrication.

1.9 COORDINATION

- A. Coordinate sizes and locations of bases for metal lockers.
- B. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other Sections to ensure that metal lockers can be supported and installed as indicated.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures.
 - b. Faulty operation of latches and other door hardware.
 - 2. Damage from deliberate destruction and vandalism is excluded.
 - 3. Warranty Period for Welded Metal Lockers: Lifetime from date of Substantial Completion.

PART 2 - PRODUCTS**2.1 MANUFACTURERS**

- A. Source Limitations: Obtain metal lockers and accessories from single source from single locker manufacturer.
1. Obtain locks from single lock manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: For lockers indicated to be accessible, comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and.

2.3 WELDED, OPEN-FRONT ATHLETIC LOCKERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide DeBourgh Mfg. Co.; All American Collegiate/Pro Model **and Open Front Locker - ADA** or comparable products by one of the following:
1. ASI Storage Solutions; ASI Group.
 2. List Industries Inc.
 3. Lyon Workspace Products, LLC.
 4. Penco Products, Inc.
 5. Republic Storage Systems, LLC.
- B. Locker Arrangement: Open front, with seat/footlocker and upper shelf with security box.
- C. Material: Metallic-coated steel sheet.
- D. Body: Assembled by welding body components together. Fabricate from unperforated steel sheet with thicknesses as follows:
1. Frames: Continuous 1 inch by 1 inch by 1/8-inch (25 mm by 25 mm by 3 mm) pickled angle iron steel.
 2. Tops and Bottoms: 0.060-inch (1.52-mm) nominal thickness, with single bend at edges.
 3. Backs: 0.048-inch (1.21-mm) nominal thickness.
 4. Shelves: 0.060-inch (1.52-mm) nominal thickness, with double bend at front and single bend at sides and back.
- E. Unperforated Sides: Fabricated from 0.060-inch (1.52-mm) nominal-thickness steel sheet.
- F. Frames: Channel formed; fabricated from 0.060-inch (1.52-mm) nominal-thickness steel sheet or 0.105-inch (2.66-mm) nominal-thickness steel angles; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames.
- G. Reinforced Bottoms: Structural channels, formed from 0.075-inch (1.90-mm) nominal-thickness steel sheet; welded to front and rear of side-panel frames.

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- H. Seats/Footlockers: Enclosure full width of bottom of metal locker; fabricated from cold-rolled steel sheet.
1. Seat/Lid: 0.075-inch (1.90-mm) nominal-thickness steel sheet; channel formed and reinforced with stiffeners; with manufacturer's standard, steel continuous hinge that is completely concealed and tamper resistant when seat/lid is closed; with padlock hasp.
 2. Front Panel: 0.075-inch (1.90-mm) nominal-thickness steel sheet; channel formed at top edge; with minilouvers for ventilation; recessed for padlock loop.
 3. Sides: Integral part of unperforated.
- I. Security Boxes: Nonperforated, consisting of partition extending from upper shelf to top of metal locker, fabricated from 0.060-inch (1.52-mm) nominal-thickness steel sheet; with channel-formed, 0.060-inch (1.52-mm) nominal-thickness, steel sheet door frame, and door fabricated from 0.075-inch (1.90-mm) nominal-thickness steel sheet with right-angle single bend at edges; with manufacturer's standard, steel continuous hinge that is completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees.
1. Single-Point Latching: Stainless-steel strike plate with integral pull; with steel, nonmoving latch hook with steel padlock loop that projects through door and is finished to match metal locker body.
 2. Locks: Combination padlocks.
- J. Identification Plates: Manufacturer's standard, etched, embossed, or stamped aluminum plates, with numbers and letters at least 3/8 inch (9 mm) high.
- K. Hooks: Manufacturer's standard ball-pointed, aluminum or steel; zinc plated.
- L. Coat Rods: Manufacturer's standard.
- ~~M. Coat Rods: 1 inch (25 mm) diameter steel, chrome finished.~~
- ~~N.M.~~ Continuous Sloping Tops: Fabricated from 0.048-inch (1.21-mm) nominal-thickness steel sheet, with a pitch of approximately 20 degrees.
1. Closures: Vertical-end type.
- ~~O.N.~~ Exposed End Panels: Constructed of 1 inch by 1 inch by 1/8-inch (25 mm by 25 mm by 3 mm) steel angle iron frame with 0.060-inch (1.52-mm) sheet steel welded to steel angle frame
- ~~P.O.~~ Materials: Metallic-Coated Steel Sheet; ASTM A 653/A 653M, Commercial Steel (CS), Type B; with A60 (ZF180) zinc-iron, alloy (galvannealed) coating designation.
- ~~Q.P.~~ Finish: Baked enamel or powder coat.
1. Color: DeBourgh Code Red.

2.4 WELDED TWO-TIERED ATHLETIC LOCKERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide DeBourgh Mfg. Co.; All American Team Lockers or comparable product by one of the following:
1. ASI Storage Solutions; ASI Group.
 2. List Industries Inc.
 3. Lyon Workspace Products, LLC.
 4. Penco Products, Inc.
 5. Republic Storage Systems, LLC.
- B. Expanded-Metal Doors: Fabricated from 3/4-inch (19 mm), 0.090-inch (2.28-mm) nominal-thickness expanded metal; welded to 0.125-inch (3.2-mm) nominal-thickness steel angle frame; with 0.090-inch (2.28-mm) nominal-thickness, steel sheet lock panel backed by 0.060-inch (1.52-mm) nominal-thickness, steel sheet retainer welded to door frame.
- C. Body and Frames: Assembled by welding body components together. Fabricate from unperforated steel sheet with thicknesses as follows:
1. Sides and Intermediate Partitions: Fabricated from 3/4-inch (19 mm), 0.090-inch (2.28-mm) nominal-thickness expanded metal; welded to 0.125-inch (3.2-mm) nominal-thickness steel angle frame.
 2. Tops and Bottoms: 0.060-inch (1.52-mm) nominal thickness, with single bend at edges.
 3. Backs: 0.048-inch (1.21-mm) nominal thickness.
 4. Cross Frames for Double-Tier Lockers: Channel formed and fabricated from same material as main frames; welded to vertical main frames.
- D. Reinforced Bottoms: Structural channels, formed from 0.060-inch (1.52-mm) nominal-thickness steel sheet; welded to front and rear of side-panel frames.
- E. Hinges: Welded to door and attached to door frame with no fewer than two factory-installed rivets per hinge that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees; self-closing.
1. Knuckle Hinges: Steel, full loop, five knuckles, tight pin; minimum 2 inches (51 mm) high. Provide no fewer than three hinges for each door more than 42 inches (1067 mm) high.
- F. Projecting Turn-Handle and Latch: Steel handle welded to manufacturer's standard, three-point, cremone-type latching mechanism consisting of steel rods or bars that engage locker frame at top and bottom of door, and center latch that engages strike jamb; with steel padlock loop.
- G. Identification Plates: Manufacturer's standard, etched, embossed, or stamped aluminum plates, with numbers and letters at least 3/8 inch (9 mm) high.
- H. Hooks: Manufacturer's standard ball-pointed, aluminum or steel; zinc plated.
- I. Continuous Zee Base: 4 inches (102 mm) high; fabricated from 0.075-inch (1.90-mm) nominal-thickness steel sheet.

- J. Continuous Sloping Tops: Fabricated from 0.048-inch (1.21-mm) nominal-thickness steel sheet, with a pitch of approximately 20 degrees.
 - 1. Closures: Vertical-end type.
- K. Materials:
 - 1. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with A60 (ZF180) zinc-iron, alloy (galvannealed) coating designation.
 - 2. Expanded Metal: ASTM F 1267, Type II (flattened), Class I (uncoated), 3/4-inch (19-mm) steel mesh, with at least 70 percent open area.
- L. Finish: Baked enamel or powder coat.
 - 1. Color: DeBourgh Code Red.

2.5 LOCKER BENCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. ASI Storage Solutions; ASI Group.
 - 2. Lyon Workspace Products, LLC.
 - 3. Penco Products, Inc.
 - 4. **DeBourgh Mfg. Co.**
- B. Provide bench units with overall assembly height of 17-1/2 inches (445 mm).
- C. Bench Tops: Manufacturer's standard one-piece units, with rounded corners and edges.
 - 1. Size: Minimum 12 inches wide by 1-1/4 inches thick (300 mm wide by 32 mm thick) except provide 20- to 24-inch- (508- to 610-mm-) wide tops where accessible benches are indicated.
 - a. Provide brackets for accessible bench backrest.
 - 2. Laminated clear hardwood with one coat of clear sealer on all surfaces and one coat of clear lacquer on top and sides.
- D. Fixed-Bench Pedestals: Manufacturer's standard supports, with predrilled fastener holes for attaching bench top and anchoring to floor, complete with fasteners and anchors, and as follows:
 - 1. Tubular Steel: 1-1/2-inch- (38-mm-) diameter steel tubing threaded on both ends, with standard pipe flange at top and bell-shaped cast-iron base; with baked-enamel or powder-coat finish; anchored with exposed fasteners.
 - a. Color: Match metal lockers.
- E. Materials:
 - 1. Steel Tube: ASTM A 500/A 500 M, cold rolled.

2.6 FABRICATION

- A. Fabricate metal lockers square, rigid, without warp, and with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch and free of sharp edges and burrs.
1. Form body panels, doors, shelves, and accessories from one-piece steel sheet unless otherwise indicated.
 2. Provide fasteners, filler plates, supports, clips, and closures as required for complete installation.
- B. Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments.
- C. Equipment: Provide each locker with an identification plate and the following equipment:
1. Coat Rods: For each compartment of each locker.
 2. Open-Front Athletic Lockers: Two single-prong wall hooks bolted to locker back and coat rod.
- D. Welded Construction: Factory preassemble metal lockers by welding all joints, seams, and connections; with no bolts, nuts, screws, or rivets used in assembly of main locker groups. Factory weld main locker groups into one-piece structures. Grind exposed welds smooth and flush.
- E. Accessible Lockers: Fabricate as follows:
1. Locate bottom shelf no lower than 15 inches (381 mm) above the floor.
 2. Where hooks, coat rods, or additional shelves are provided, locate no higher than 48 inches (1219 mm) above the floor.
- F. Continuous Zee Base: Fabricated in lengths as long as practical to enclose base and base ends; finished to match lockers.
- G. Continuous Sloping Tops: Fabricated in lengths as long as practical, without visible fasteners at splice locations; finished to match lockers.
1. Sloping-top corner fillers, mitered.
- H. Finished End Panels: Fabricated to conceal unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of nonrecessed metal lockers; finished to match lockers.

2.7 ACCESSORIES

- A. Fasteners: Zinc- or nickel-plated steel, slotless-type, exposed bolt heads; with self-locking nuts or lock washers for nuts on moving parts.
- B. Anchors: Material, type, and size required for secure anchorage to each substrate.

1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls, and elsewhere as indicated, for corrosion resistance.
2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls and floors or support bases, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install lockers level, plumb, and true; shim as required, using concealed shims.
 1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36 inches (910 mm) o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion.
 2. Anchor single rows of metal lockers to walls near top and bottom of lockers.
 3. Anchor back-to-back metal lockers to floor.
- B. Welded Lockers: Connect groups together with manufacturer's standard fasteners, with no exposed fasteners on face frames.
- C. Equipment:
 1. Attach hooks with at least two fasteners.
 2. Attach door locks on doors using security-type fasteners.
 3. Identification Plates: Identify metal lockers with identification indicated on Drawings.
 - a. Attach plates to upper shelf of each open-front metal locker, centered, with a least two aluminum rivets.
- D. Trim: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.
 1. Attach sloping-top units to metal lockers, with closures at exposed ends.
- E. Fixed Benches: Provide no fewer than two pedestals for each bench, uniformly spaced not more than 60 inches (1500 mm) apart. Securely fasten tops of pedestals to undersides of bench tops, and anchor bases to floor.
 1. Provide four pedestals for each accessible bench.

3.3 ADJUSTING

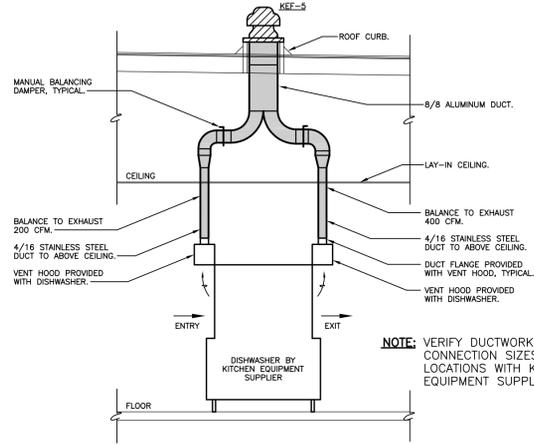
- A. Clean, lubricate, and adjust hardware. Adjust doors and latches to operate easily without binding. Verify that integral locking devices operate properly.

3.4 PROTECTION

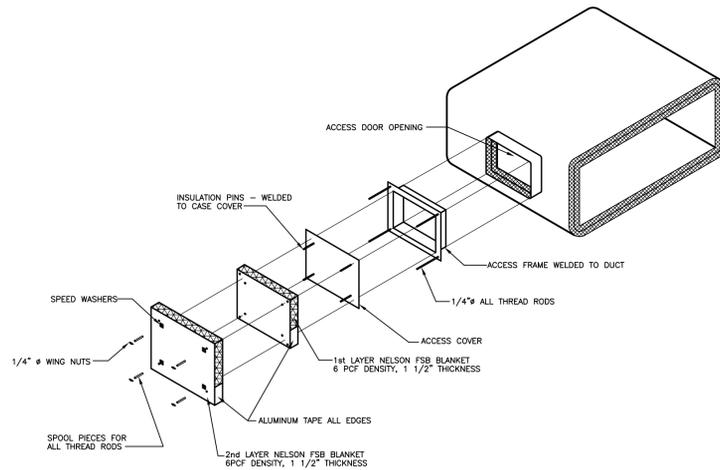
- A. Protect metal lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit use during construction.
- B. Touch up marred finishes, or replace metal lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION 10 51 15

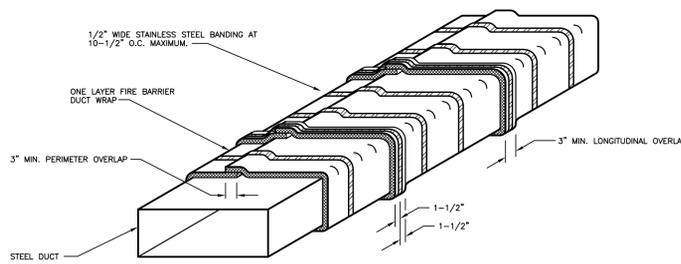
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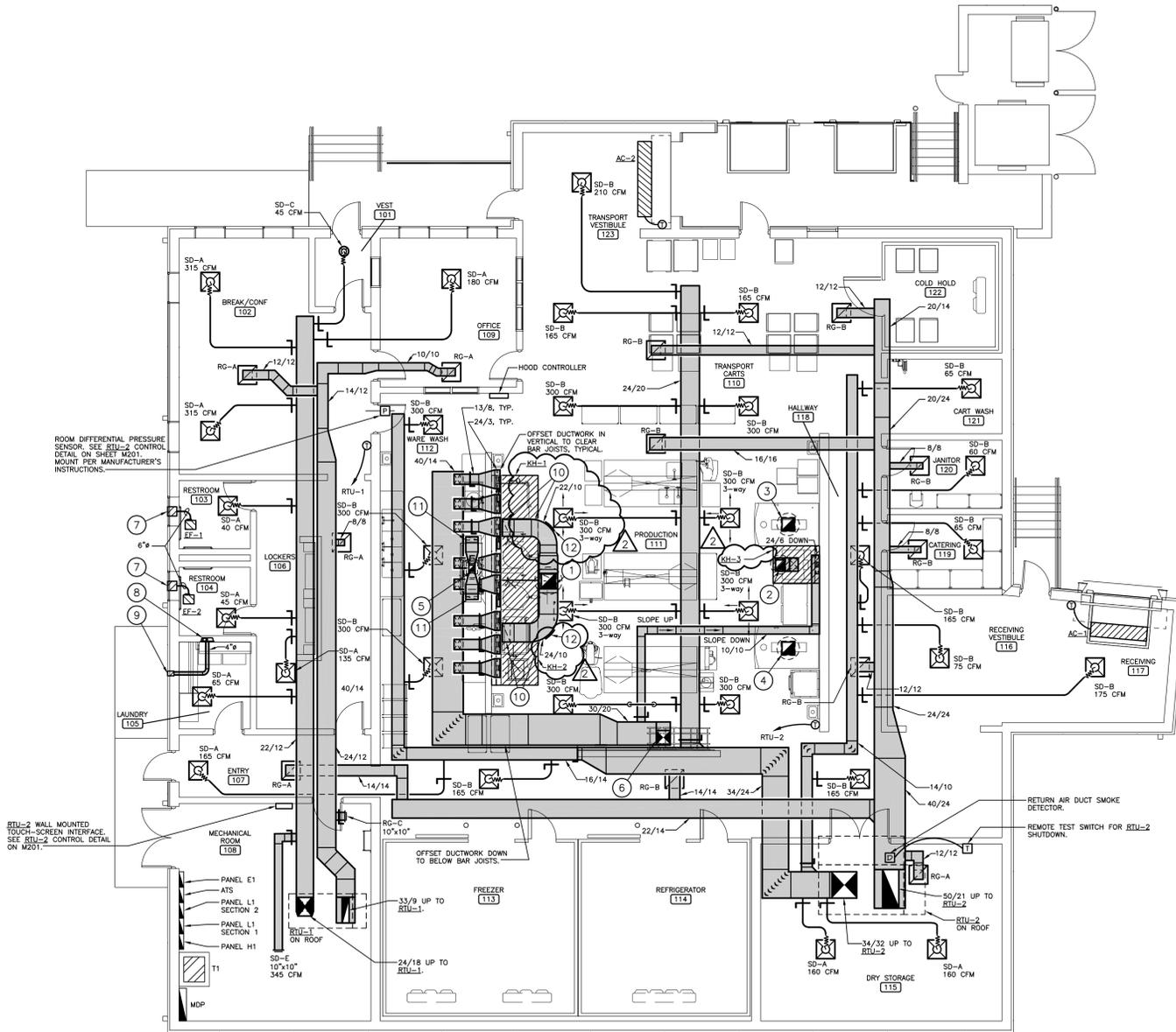
A DISHWASHER EXHAUST DETAIL
NO SCALE

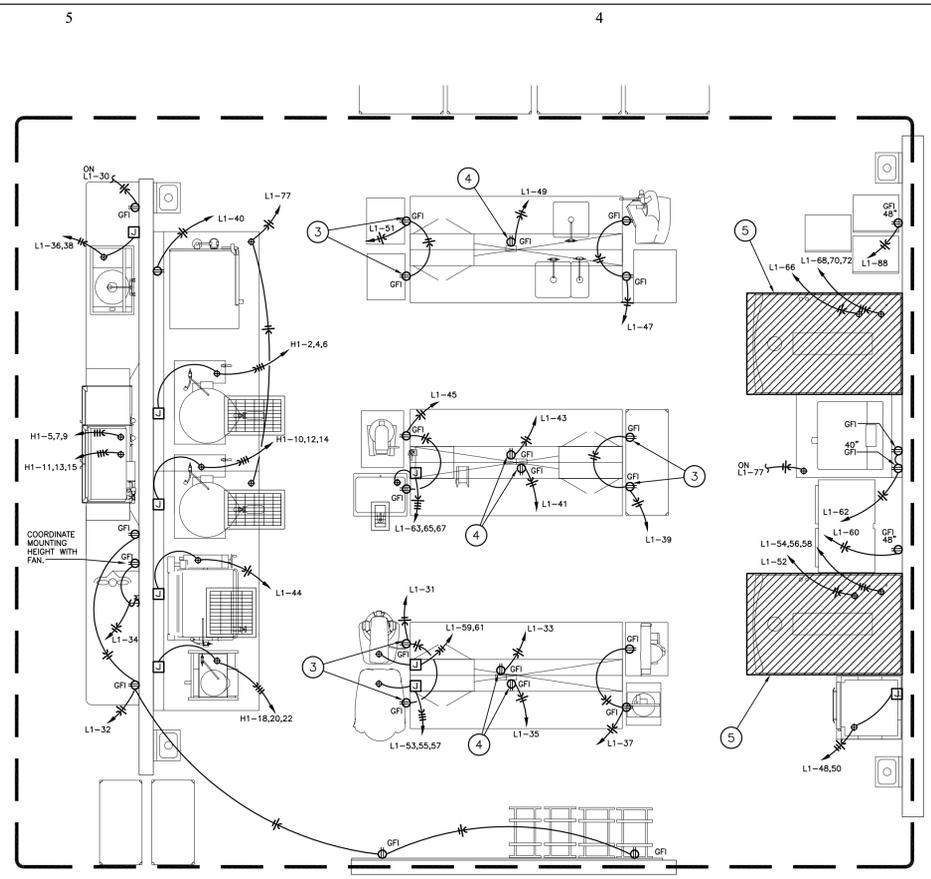


B KITCHEN HOOD DUCT ACCESS PANEL DETAIL
NO SCALE

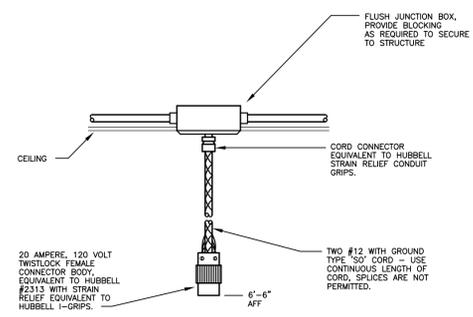


C KITCHEN HOOD DUCT WRAP DETAIL
NO SCALE

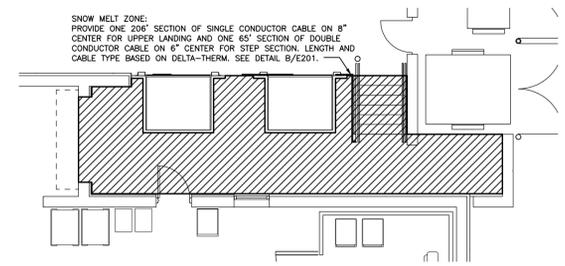




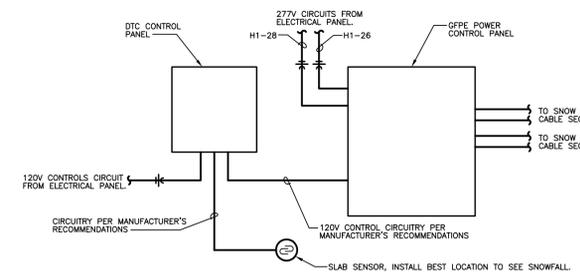
PARTIAL POWER PLAN
1/4" = 1'-0"



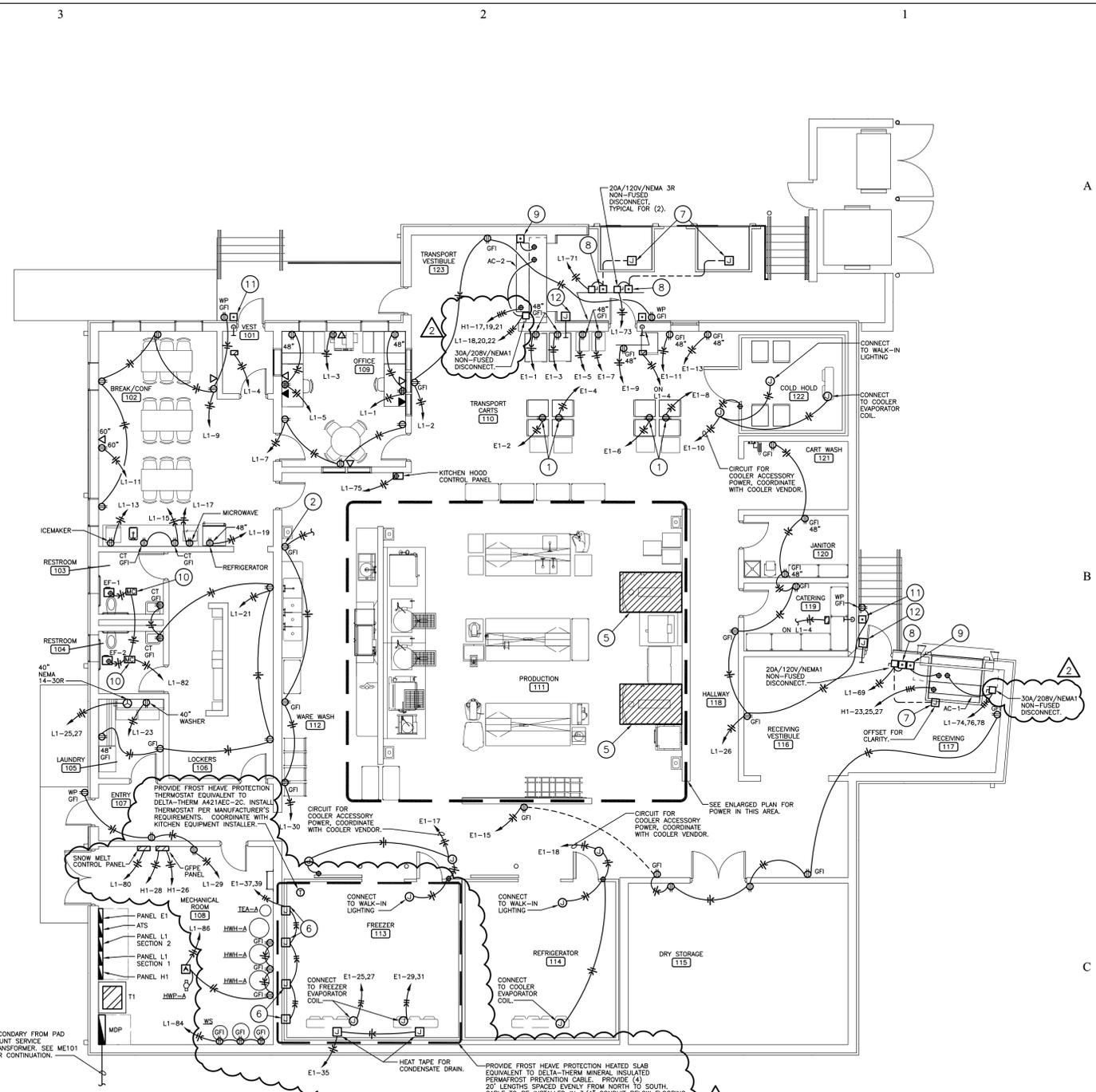
A DROP CORD DETAIL
NO SCALE



PARTIAL POWER PLAN FOR SNOW MELT
1/8" = 1'-0"



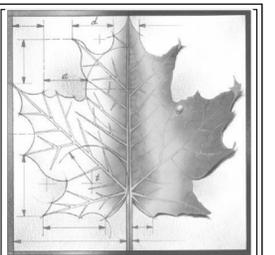
B SNOW MELT CONTROLS DETAIL
NO SCALE



FLOOR PLAN - POWER
1/8" = 1'-0"

NOTES BY SYMBOLS:

- ① Duplex receptacle suspended 4'-0" AFF. On drop cord from junction box at ceiling. See detail A/E201.
- ② NEMA 5-15R Receptacle. Provide cord for equipment with NEMA 5-15P plug. Reference kitchen drawings.
- ③ Duplex receptacle mounted in kitchen equipment junction box beneath work bench, typical for devices shown at each end of work bench. Reference kitchen drawings. Coordinate concealed routing of conductors with kitchen equipment.
- ④ Duplex receptacle mounted in kitchen equipment junction box under work bench shelf. Reference kitchen drawings. Coordinate concealed routing of conductors with kitchen equipment.
- ⑤ Do not route utilities below or in slab in area shown hatched.
- ⑥ Provide accessible junction box for freezer subgrade heat tape loops. Reference kitchen drawings.
- ⑦ Provide (1) 1/2"Ø conduit from the single button control station to the dock's power pack motor junction box. Coordinate final requirements with manufacturer recommendations.
- ⑧ Single button control station for dock leveler. Provide 120V/1P/30A/ NEMA 3R fused disconnect switch. Coordinate final requirements with manufacturer recommendations.
- ⑨ Overhead door control panel, coordinate with overhead door supplier.
- ⑩ Device controlled from mechanical control device interlocked with room lighting controller.
- ⑪ Access control, coordinate with access control provider. Provide 2-gang J-box with 3/4" conduit to above accessible ceiling, terminate with smooth bushing.
- ⑫ Provide junction box for camera and 3/4" conduit with smooth bushing to accessible location above ceiling. Coordinate with Owner and Architect.



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Information provided on the drawings regarding existing conditions has been obtained from the best sources available, but cannot be guaranteed in all respects. Contractor shall verify all such information prior to proceeding with any new work that may be affected. Include as part of the contract all work required to produce the indicated result. All drawings and written material appearing herein constitute the original and unpublished work of the Architect, and same may not be duplicated, used or disclosed without the written consent of the Architect.
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REVISIONS:	
▲	7/25/2017
▲	7/28/2017
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Project Number: **16036**
Date: **7/7/17**

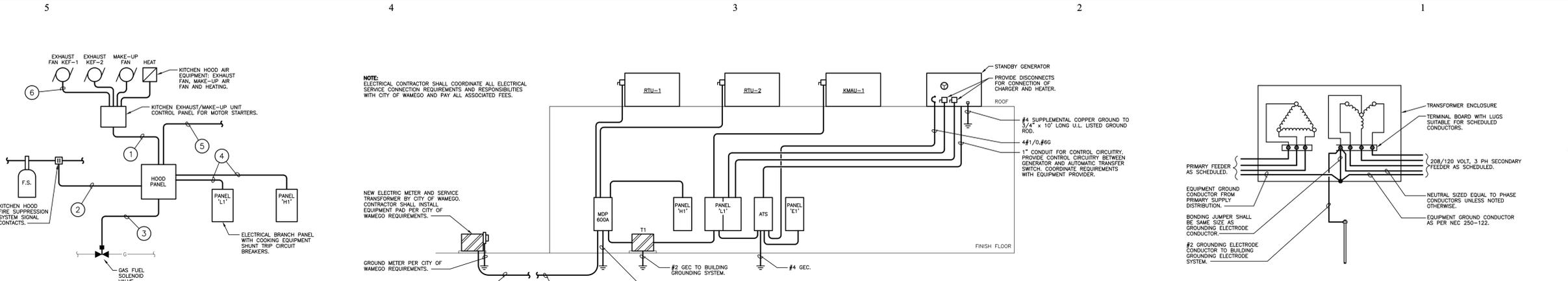
Project Name:
USD 320 WAMEGO-DISTRICT KITCHEN

Project Address:
**4290 Columbian Rd.
Wamego, KS**

Sheet Title:
**ELECTRICAL
POWER PLAN**

Sheet:
E201
OF: **8**

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Manhattan, Kansas
Job No. 15011-1
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- KITCHEN HOOD CONTROL NOTES**
- Provide control circuitry from Hood Panel to Exhaust Fans and Make-up air unit for interface of hood panel controls to air unit starters and temperature controls. Verify exact requirements with air unit supplier.
 - Provide signal circuitry from hood Fire Suppression system contacts to Hood Panel for signal to shut-down energization of associated components. Provide incidental control relays for contact configuration needed for multiple signals and voltages. Coordinate number of Fire Suppression signal contacts with system provider.
 - Provide control circuitry and interface with suppression system signal to shut fuel gas solenoid valve upon activation of Fire Suppression system. This circuitry is typically 120 VAC. Coordinate exact requirements with Plumbing Contractor.
 - Provide 120 VAC circuitry for control power and shunt trip from Hood Panel to Electrical Branch Panel. The shunt trip circuit breakers are to be operated upon activation of Fire Suppression system.
 - Provide additional circuitry and interface components for incidental equipment and systems associated with hood safety operation.
 - Provide wiring of Exhaust Fan and Make-up air unit components to hood control panel. Coordinate requirements with Mechanical Contractor.

KITCHEN HOOD CONTROL DETAIL
NO SCALE

ELECTRICAL EQUIPMENT SCHEDULE

MDP	TRANSFORMERS	MARK	AMPCACITY	VOLTAGE	POLES/WIRE	LOAD CIRCUITRY
480 volt Distribution Panelboard, service entrance rated 480/277 volt, 3 phase, 4 wire. 600 ampere Main Circuit Breaker, 32,000 ampere integrated equipment short circuit rating with 72" branch mounting space NEMA 1 enclosure and capacity for 400 ampere/3 pole branches. Equivalent to Square D HCP. Physical size: 42" W x 9.5" D x 86" H	Mark 150	Floor	2-Sets 4#3/0,#3G	#2		
Dry type transformer for indoor installation, U.L. listed, compliant with IEEE, NEMA and ANSI standards, three phase, 60 hertz, 480 volt delta primary 208/120 volt wye secondary, (6) 2-1/2% full capacity taps, 150 degree C temperature rise, ventilated enclosure and internal vibration isolation core mounting. Provide NEC compliant signage for transformers served by remote disconnects.	Mark 150	Floor	2-Sets 4#3/0,#3G	#2		
Equivalent to Cummins open delay transfer, 150A, 3-pole, NEMA 1 service entrance rated automatic transfer switch. Switch shall be equipped with 3-phase signaling, LED indicating lights, microprocessor based standard control. See specifications for additional requirements. Based on: Cummins OTEC-SE	Mark 150	Floor	2-Sets 4#3/0,#3G	#2		

ENGINE-GENERATOR SCHEDULE

DESIGNATION	G-1
ENGINE	4-cycle Spark Ignited
TYPE	Natural Gas
FUEL	359.0 cu. in. / 5.9 L
DISPLACEMENT	Natural
ASPIRATION	11 in. w.c.
SUPPLY PRESSURE	806.3 CFH
FUEL CONSUMPTION	Unit Mounted Radiator
COOLING	12 VDC
ELECTRICAL SYSTEM	
GENERATOR	
KW	50
POWER FACTOR	0.89
POLES	4
VOLTAGE/PHASE/FREQUENCY/WIRE	208/3/60/4
VOLTAGE REGULATION	+/- 1%
TOTAL HARMONIC DISTORTION	<5%
MAIN CIRCUIT BREAKER	150A/3P
STARTING REQUIREMENTS	
STEP 1 LOAD (STARTING KW)	34.2
STEP 1 EQUIPMENT	Miscellaneous Load
STEP 2 LOAD (STARTING KW)	1.89
STEP 2 EQUIPMENT	2 HP Motor
STEP 3 LOAD (STARTING KW)	4.88
STEP 3 EQUIPMENT	5.5 HP Motor
MAX VOLTAGE DIP	20%
MAX FREQUENCY DIP	10%
HOUSING	Weather Protective
PHYSICAL SIZE	40"x98"x58"H
WEIGHT	2,360 lbs.
BASED ON: (Cummins)	CSO N6
See specifications for additional requirements	

ELECTRICAL RISER DIAGRAM
NO SCALE

PANELBOARD SCHEDULE

PANEL DESIGNATION: Panel L1 - Section 1		MIN A.I.C.: 10000	FEATURES:				
LOCATION: Mechanical 108	MCB Amps: 400		- Panelboard Construction				
VOLTS: 120/208	BUS Amps: 400		- Equipment Ground Bus				
CONFIGURATION: 3 Phase/4 Wire	ENCL.: NEMA 1		- Equal to Square D NQ				
MOUNTING: Surface							
CKT.	Description	Conductors	C/B	CKT.	Description	Conductors	C/B
1	Rcpt-Rm 109 E. Desk	2#12,#12G	20/1	2	Rcpt-Rm 110 W. Drop Cord	2#12,#12G	20/1
3	Rcpt-Rm 109 Copier	2#12,#12G	20/1	4	Rcpt-Rm 110 Mid.W. Drop Cord	2#12,#12G	20/1
5	Rcpt-Rm 109 W. Desk	2#12,#12G	20/1	6	Rcpt-Rm 110 Mid.E. Drop Cord	2#12,#12G	20/1
7	Rcpt-Rm 109 Gen. Use	2#12,#12G	20/1	8	Rcpt-Rm 110 E. Drop Cord	2#12,#12G	20/1
9	Rcpt-Rm 102 Gen. Use, Exterior	2#12,#12G	20/1	10	Small Cooler - Ltq./Evap. Coil	2#12,#12G	20/1
11	Rcpt-Rm 102 W. TV	2#12,#12G	20/1	12	Small Cooler - Condensing Unit	3#12,#12G	15
13	Rcpt-Rm 102 Ice maker	2#12,#12G	20/1	14	Large Cooler - Ltq./Evap. Coil	2#12,#12G	20/1
15	Rcpt-Rm 102 CT Gen. Use	2#12,#12G	20/1	16	Large Cooler - Condensing Unit	3#12,#12G	15
17	Rcpt-Rm 102 Microwave	2#12,#12G	20/1	18	Freezer - Ltq. and Door Close	2#12,#12G	20/1
19	Rcpt-Rm 102 Refrigerator	2#12,#12G	20/1	20	Freezer - Condensing Unit	3#8,#10G	45
21	Rcpt-Rm 103-106 Gen. Use	2#12,#12G	20/1	22	Freezer - Evaporator	2#12,#12G	20
23	Rcpt-Rm 105 Washing Machine	2#12,#12G	20/1	24	Freezer - Evaporator	2#12,#12G	20
25	Rcpt-Rm105 Dryer	3#10,#10G	30	26	Freezer - Evaporator	2#12,#12G	20
27				28	Spare	---	20/1
29	Rcpt-Rm 107-108, Exterior	2#12,#12G	20/1	30	Spare	---	20/1
31	Rcpt-Rm 111 S. Table, W. End	2#12,#12G	20/1	32	Spare	---	20/1
33	Rcpt-Rm 111 S. Table, N. Side	2#12,#12G	20/1	34	Spare	---	20/1
35	Rcpt-Rm 111 S. Table, S. Side	2#12,#12G	20/1	36	Spare	---	20/1
37	Rcpt-Rm 111 S. Table, E. Side	2#12,#12G	20/1	38	Spare	---	20/1
39	Rcpt-Rm 111 Mid. Table, E. End	2#12,#12G	20/1	40	Spare	---	20/1
41	Rcpt-Rm 111 Mid. Table, S. Side	2#12,#12G	20/1	42	Spare	---	20/1
43	Rcpt-Rm 111 Mid. Table, N. Side	2#12,#12G	20/1	44	Spare	---	20/1
45	Rcpt-Rm 111 Mid. Table, W. End	2#12,#12G	20/1	46	Spare	---	20/1
47	Rcpt-Rm 111 N. Table, E. End	2#12,#12G	20/1	48	**Rm 111-N. Roll-in Controls	2#12,#12G	20/1
49	Rcpt-Rm 111 N. Table, N. Side	2#12,#12G	20/1	50	**Rm 111-S. Roll-in Controls	2#12,#12G	20/1
51	Rcpt-Rm 111 N. Table, W. End	2#12,#12G	20/1	52	**Rm 111-S. Roll-in Controls	2#12,#12G	20/1
53	**Rm 111-60 Qt. Mixer	3#12,#12G	20	54	**Rm 111-S. Roll-in Oven	3#12,#12G	3
55	**Rm 111-40 Qt. Mixer	2#12,#12G	20	56	**Rm 111-S. Roll-in Oven	3#12,#12G	3
57	**Rm 111-40 Qt. Mixer	2#12,#12G	20	58	**Rm 111-S. Roll-in Oven	3#12,#12G	3
59	**Rm 111-40 Qt. Mixer	2#12,#12G	20	60	Rcpt-Rm 111 Reach-in Fridge	2#12,#12G	20/1
61	**Rm 111-40 Qt. Mixer	2#12,#12G	20	62	Rcpt-Rm 111 Double-Oven	2#12,#12G	20/1
63	**Rm 111-40 Qt. Mixer	2#12,#12G	20	64	Spare	---	20/1
65	**Rm 111-Hot Water Dispenser	3#8,#10G	3	66	**Rm 111-N. Roll-in Controls	2#12,#12G	20/1
67	**Rm 111-Hot Water Dispenser	3#8,#10G	3	68	**Rm 111-N. Roll-in Oven	3#12,#12G	15
69	Dock Leveler - Rm 117	2#12,#12G	20/1	70	**Rm 111-N. Roll-in Oven	3#12,#12G	3
71	Dock Leveler - Rm 123 W	2#12,#12G	20/1	72	**Rm 111-N. Roll-in Oven	3#12,#12G	3
**	Provide lock-out kit for breaker.						

PANELBOARD SCHEDULE

PANEL DESIGNATION: Panel L1 - Section 2		MIN A.I.C.: 10000	FEATURES:				
LOCATION: Mechanical 108	MCB Amps: MLO		- Panelboard Construction				
VOLTS: 120/208	BUS Amps: 400		- Equipment Ground Bus				
CONFIGURATION: 3 Phase/4 Wire	ENCL.: NEMA 1		- Equal to Square D NQ				
MOUNTING: Surface							
CKT.	Description	Conductors	C/B	CKT.	Description	Conductors	C/B
73	Dock Leveler - Rm 123 W	2#12,#12G	20/1	74	Overhead Door - Rm 117	3#12,#12G	15
75	Kitchen Hood Control Panel	2#12,#12G	15/1	76	Overhead Door - Rm 117	3#12,#12G	3
77	Kitchen Hood Control Panel	2#12,#12G	15/1	78	Snow Melt Control Panel	2#12,#12G	20/1
79	(Shunt Trip)			80	EF-1 and EF-2	2#12,#12G	20/1
81				82	WS - Water Softener	2#12,#12G	20/1
83	KMAU-1	3#10,#10G	35	84	HWH-A and HWP-A Controls	2#12,#12G	20/1
85				86	Rcpt - Rm 111 General Use	2#12,#12G	20/1
87	Generator Charger	2#12,#12G	20/1	88	Rcpt - Rm 111 General Use	2#12,#12G	20/1
89	Generator Heater	2#12,#12G	20/1	90	Spare	---	20/1
91	(This space used for 150A breaker)	---	---	92	ATS	3#1/0,#6G	150
93				94			
95	Spare	---	20/1	96	Spare	---	20/1
97	Spare	---	20/1	98	Spare	---	20/1
99	Spare	---	20/1	100	Spare	---	20/1
101	Spare	---	20/1	102	Spare	---	20/1
103	Spare	---	20/1	104	Spare	---	20/1
105	Spare	---	20/1	106	Spare	---	20/1
107	Spare	---	20/1	108	Spare	---	20/1
109				110			
111				112			
113				114			
115				116			
117				118			
119				120			
121				122			
123				124			
125				126			
127				128			
129				130			
131				132			
133				134			
135				136			
137				138			
139				140			
141				142			
143				144			
**	Provide lock-out kit for breaker.						

PANELBOARD SCHEDULE

PANEL DESIGNATION: Panel E1		MIN A.I.C.: 10000	FEATURES:				
LOCATION: Mechanical 108	MCB Amps: MLO		- Panelboard Construction				
VOLTS: 120/208	BUS Amps: 200		- Equipment Ground Bus				
CONFIGURATION: 3 Phase/4 Wire	ENCL.: NEMA 1		- Equal to Square D NF				
MOUNTING: Surface							
CKT.	Description	Conductors	C/B	CKT.	Description	Conductors	C/B
1	Rcpt-Rm 110 Cart N. Wall	2#12,#12G	20/1	2	**Rm 111-N. Steam Kettle	3#8,#10G	35
3	Rcpt-Rm 110 Cart N. Wall	2#12,#12G	20/1	4	**Rm 111-N. Steam Kettle	3#8,#10G	3
5	Rcpt-Rm 110 Cart N. Wall	2#12,#12G	20/1	6	(Shunt Trip)		
7	Rcpt-Rm 110 Cart N. Wall	2#12,#12G	20/1	8	**Rm 111-S. Steam Kettle	3#8,#10G	35
9	Rcpt-Rm 110 Cart N. Wall	2#12,#12G	20/1	10	**Rm 111-S. Steam Kettle	3#8,#10G	3
11	Rcpt-Rm 110 Cart N. Wall	2#12,#12G	20/1	12	(Shunt Trip)		
13	Rcpt-Rm 110 Cart N. Wall	2#12,#12G	20/1	14	**Rm 111-20 Qt. Kettle	3#12,#12G	20
15	Rcpt-Rm 117,115,111 Gen. Use	2#12,#12G	20/1	16	(Shunt Trip)		
17	Freezer - Ltq. and Door Close	2#12,#12G	20/1	18	Snow Melt - Upper Landing	2#10,#10G	30/1
19	Freezer - Condensing Unit	3#8,#10G	45	20	Snow Melt - Stair	2#12,#12G	20/1
21	Freezer - Evaporator	2#12,#12G	20	22	Spare	---	---
23	Freezer - Evaporator	2#12,#12G	20	24	Spare	---	---
25	Freezer - Evaporator	2#12,#12G	20	26	Spare	---	---
27	Spare	---	---	28	Spare	---	---
29	Spare	---	---	30	Spare	---	---
31	Spare	---	---	32	Spare	---	---
33	Spare	---	---	34	Spare	---	---
35	Freezer - Cond. Heat Trace	2#12,#12G	20/1	36	Spare	---	---
37	**Freezer - Frost Heave Heater	2#12,#12G	20	38	Spare	---	---
39	**Freezer - Frost Heave Heater	2#12,#12G	20	40	Spare	---	---
41	**Freezer - Frost Heave Heater	2#12,#12G	20	42	Spare	---	---
**	Provide GFPE protected breaker at 30 mA trip						

PANELBOARD SCHEDULE

PANEL DESIGNATION: Panel H1		MIN A.I.C.: 10000	FEATURES:				
LOCATION: Mechanical 108	MCB Amps: MLO		- Panelboard Construction				
VOLTS: 277/480	BUS Amps: 400		- Equipment Ground Bus				
CONFIGURATION: 3 Phase/4 Wire	ENCL.: NEMA 1		- Equal to Square D NF				
MOUNTING: Surface							
CKT.	Description	Conductors	C/B	CKT.	Description	Conductors	C/B
1	Ltg - Interior	2#12,#12G	20/1	2	**Rm		

LIGHTING CONTROL PANEL SCHEDULE

PANEL DESIGNATION: LCP		FEATURES:	
LOCATION: Mech 116		- Integral Astronomical Timeclock	
VOLTS: 120		- SPST 20 amp independently programmable relays	
MOUNTING: Surface		- Keypad with LCD display	
ENCLOSURE: NEMA 1		- Equivalent to Wattstopper LP8	
		- Programmable Group Switching	

RELAY#	CKT.	Description	LV Switch / Sensor	Channel	Load (VA)
1	L-56	Mech 116	Timeclock/Switch	A	164
2	L-58	West Interior Lighting	Timeclock/Switch	A	1,742
3	L-60	East Interior Lighting	Timeclock/Switch	A	1,673
4	L-62	Concessions	Timeclock/Switch	A	423
5	L-64	Exterior Facade Lighting	Timeclock	B	209
6	L-45	Mechanical Equipment	Timeclock/Switch	C	150
7					
8					

Notes:
 1. See plans for low voltage (LV) switch and sensor locations.
 2. Provide all low voltage control circuitry between low voltage controls and panel.

Channel Schedule
 A. Lights shall be Timeclock on/off with manual override, manual 2-hour override during vacancy.
 B. Lights shall be turned on/off by adjustable input from astronomical time clock.
 C. Mechanical equipment activation with Timeclock and manual 2-hour override with light keypad activation from either relay 1 or 2 during vacancy. Manual override of mechanical equipment via low-voltage switch in Mech Room 116.

LIGHTING CONTROL DEVICE SCHEDULE

MARK	MANUF.	DESCRIPTION	MOUNTING
IC	Watt Stopper	LMRC-101 Series Digital On/Off room controller. Plenum-rated construction for mounting above ceiling, RJ45 receptacles for cable connections. Complete installation for integration to lighting management system.	Above Ceiling
KP	Watt Stopper	LMSW-104 Series 4-Button wall switch.	Switch Box

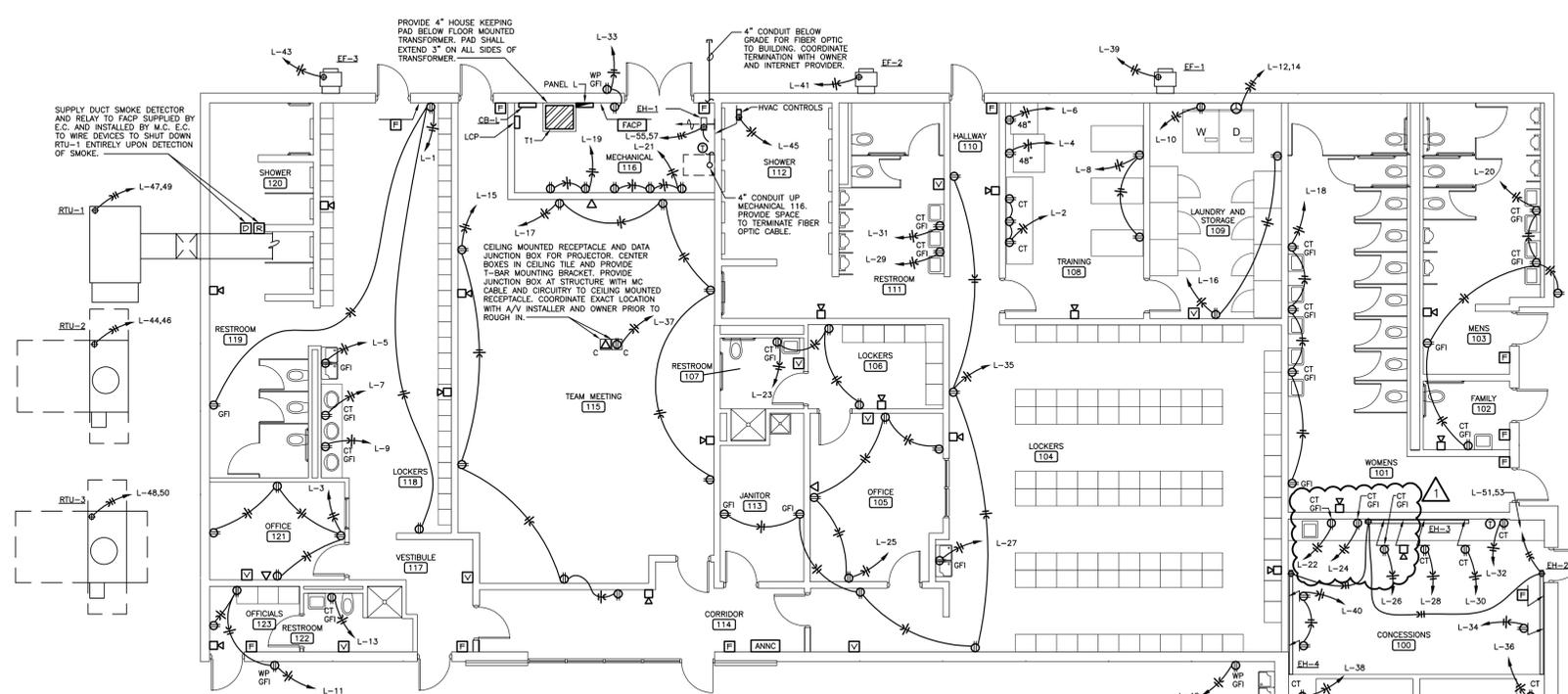
NOTES:
 1. Install occupancy and light level sensors per manufacturer's recommendations.
 2. Provide relays, power supplies, and circuitry for complete operation of sensors.
 3. Set time delays = 120 minutes.

KEYPAD BUTTON SCHEDULE

Room	Control Zone(s)	Rm. Controller	Switch	Occ. Sensor	Control Type
115 - Team Meeting	1	LMRC-101	LMSW-104	-	A

Control Type:
 A Manual On/Off/Dim by Occupant, Timeclock Off with Manual Override

Notes:
 1. Each keypad should have (1) button for on/hold to raise, (1) off/hold to dim, (1) dimming preset all fixtures 33%, and (1) dimming preset all fixtures 67%.

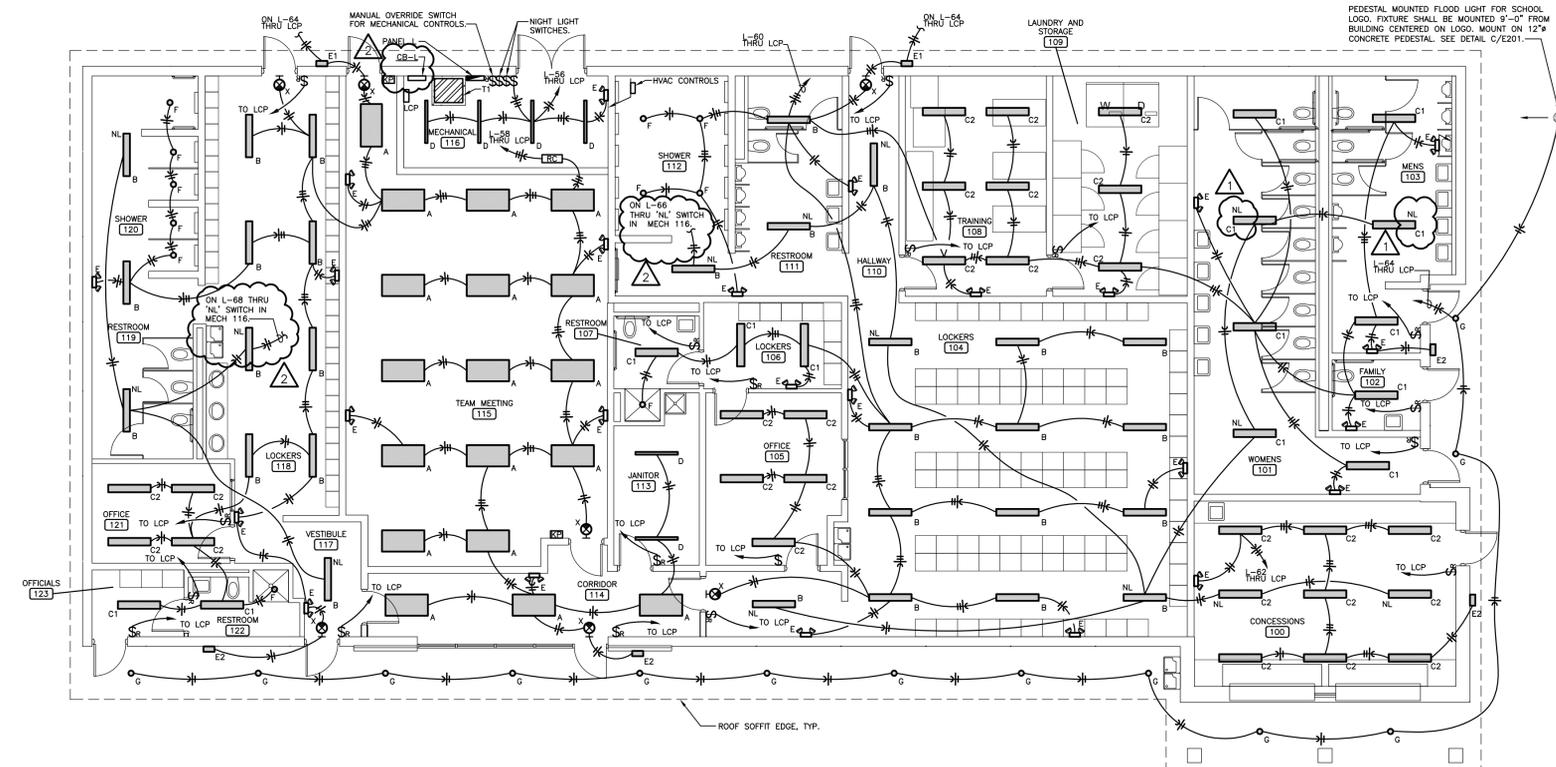


NORTH
FLOOR PLAN - POWER
 1/8" = 1'-0"

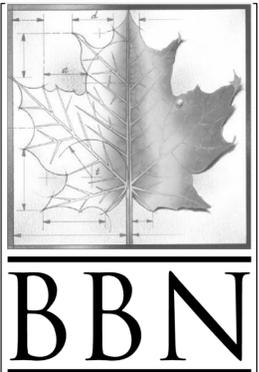
LIGHTING FIXTURE SCHEDULE

MARK	SIZE	MANUF.	DESCRIPTION	LAMPS
A	2' x 4'	Williams	Series PT shallow plenum LED lay-in troffer with die-formed 22 gauge cold rolled steel, diffuse ribbed acrylic, highly reflective non-glare matte white polyester powder coat finish, and electrical access from room-side to allow for service and/or cleaning without removing fixture from ceiling grid. Provide fixture with 4,000K lumen package producing 5,997 delivered lumens at 54 watts, 0-10V dimming driver, minimum 82 CRI and rated for 50,000 hours at 70% lumen maintenance.	LEDs 54W
B	7-3/8" W x 4-1/2" H x 51-7/8" L	Williams	Series 96 LED fully enclosed and gasketed industrial surface mount fixture with polycarbonate toggle latches, closed-cell polyurethane gasket, 5VA (f1) fiberglass exterior enclosure with aluminum internal housing, frosted and ribbed UV stabilized polycarbonate shielding, and electronic driver prewired for non-dimming applications. Provide fixture with 4,000K lumen package producing 4,700 nominal lumens at 40 watts.	LED 40W
C1	2-13/16" H x 8-1/2" W x 4' L	Williams	Series ASM Architectural Surface Mount LED with 0.04" die-formed aluminum housing with die-cast decorative end caps, ribbed acrylic diffuser, and textured matte white polyester powder coat finish. Provide fixture with 4,000K lumen package producing 2,500 nominal lumens at 24 watts, and rated for 50,000 hours at 85% lumen maintenance (L85).	LEDs 24W
C2	2-13/16" H x 8-1/2" W	Williams	Similar to type 'C1' except to be provided with 4,000K lumen package producing 4,600 nominal lumens at 47 watts.	LEDs 47W
D	2-3/4" W x 3-1/4" D x 48" L	Williams	Series 75L lensed LED strip fixture with 22 ga. cold rolled steel housing, all parts painted to a minimum 92% average reflectance, and 0.125" thick acrylic frosted lens. Provide all necessary hardware to surface mount or chain hang fixture as required, and 11-gauge white powder coated wireguard where indicated on plans. Provide fixture with 4,000K lumen package producing 3,800 nominal lumens at 41 watts, on an electronic driver prewired for non-dimming applications, and rated for 50,000 hours at 70% lumen maintenance.	LEDs 41W
E	12-1/2" x 5-1/2" x 5-7/8" D	Mule	Series MRD-HO wall mounted emergency light with white thermoplastic housing, 6 volt DC output, rated for 54 watts at 1.5 hours, solid-state battery charger, sealed maintenance free lead-calcium battery, equipped with two low profile adjustable heads and wall mounting bracket. Provide circuitry for and connect to unswitched power from lighting circuit serving the same area as emergency light.	2-12W MR-16
E1	9-1/16" x 6-5/16" x 4" D	Mule	Series MERU wall mounted architectural, low-profile LED with 'normally on' and emergency operation lighting, die-cast aluminum housing and heat sink, scratch resistant polyester powder coat finish in color to be selected by Architect, UV resistant polycarbonate lens, and neoprene seal for weatherproof installation. battery heater rated for -40°F to 122°F at 32 watts for 90 minutes. Provide 3,000K lumen package producing 1,600 lumens in AC operation, and 600 lumens in emergency operation. Provide circuitry for and connect to unswitched power from lighting circuit serving same area as emergency light.	LEDs 15.2W
E2	9-1/16" x 6-5/16" x 4" D	Mule	Similar to fixture type 'E2' except provide fixture for emergency operation only.	LEDs 15.2W
F	6" dia.	Spectrum	Series RDF16LEDXT 6" LED shower light with 20 gauge die formed galvanized housing and frame, aluminum heat sink, semi-diffuse finish, UL listed for damp locations, IC rated, and minimum 83 CRI. Provide fixture with 4,000K lumen package producing 1,000 nominal lumens at 11.1 watts.	LEDs 11.1W
G	6" dia.	Williams	Series ICL60 6" recessed round LED downlight with 22-gauge galvanized steel housing, aluminum heat sink, clear semi-specular reflector, powder coat finish, rated for direct contact to insulation, 55,000 hours at 70% lumen maintenance and minimum 80 CRI. Provide fixture with 3,500K lumen package producing 1,000 lumens at 15 watts, and an electronic driver with 0-10V dimming capability. Provide all hardware required to mount in building soffit.	LEDs 15W
H	8-3/8" H x 4-5/8" W x 6" dia.	Lumen Pulse	Series Lumen Beam small white grade mounted LED building facade light with low copper content high pressure die-cast aluminum housing, heavy aluminum former yoke, stainless steel hardware, silicone sealing devices, clear tempered glass lens and polyester powder coat finish. Provide fixture with white 3,500K LEDs with flood optic, producing 639 lumens at 14 watts, Snoot(LBL), and an electronic driver. Finish selected by Architect.	LEDs 14W
X	12-3/4" x 8-1/2"	Mule	Series Classic emergency powered exit light with red letters, vandal resistant die-cast aluminum housing, universal chevrons, 100 ft. visibility, all required mounting hardware, sealed NiCd emergency power battery rated for 90 minutes, integral solid state battery charger, one or two faces as indicated on plans, wall or ceiling mount as indicated on plans. Provide circuitry for and connect to unswitched power from lighting circuit serving same area as exit light.	LED

NOTES:
 1. All fixtures to be provided for 120 volt AC operation unless noted otherwise.
 2. Coordinate mounting heights of all wall mounted fixtures with Architect prior to roughing in.



NORTH
FLOOR PLAN - LIGHTING
 1/8" = 1'-0"



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REVISIONS:

7/25/2017	
7/28/2017	

Project Number: **16036**
 Date: **7/7/17**

Project Name:
USD 320 SPORTS COMPLEX LOCKER AND CONCESSIONS

Project Address:
**4290 Columbian Road
 Wamego, KS**

Sheet Title:
ELECTRICAL PLANS

Sheet:
E101

Job No. 15011-1

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ELECTRICAL EQUIPMENT SCHEDULE

TRANSFORMERS			
Mark	KVA	Mounting	Secondary Conductors
T1	100	Floor	3#500,#3G

Dry type transformer for indoor installation, U.L. listed, compliant with IEEE, NEMA and ANSI standards, single phase, 60 hertz, 480 volt primary 240/120 volt secondary, (6) 2-1/2% full capacity taps, 150 degree C temperature rise, ventilated enclosure and internal vibration isolation core mounting. Provide NEC compliant signage for transformers served by remote disconnects.

ENCLOSED CIRCUIT BREAKERS			
Mark	Voltage	Poles	Ampacity
CB-L	480	2	300

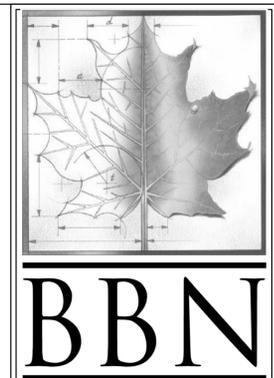
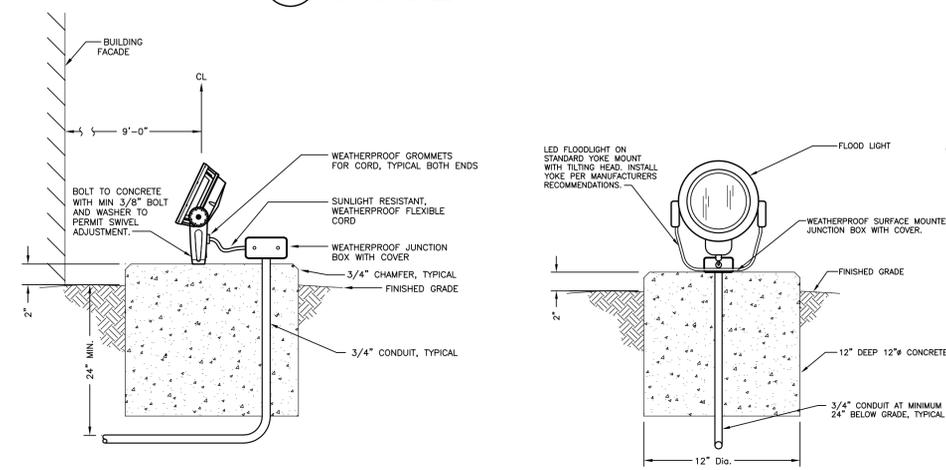
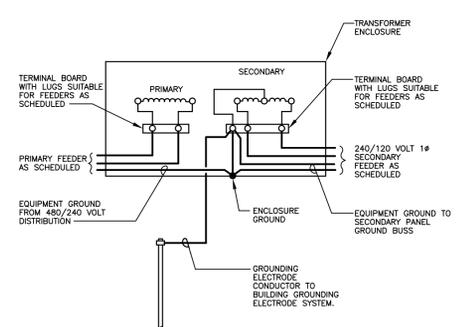
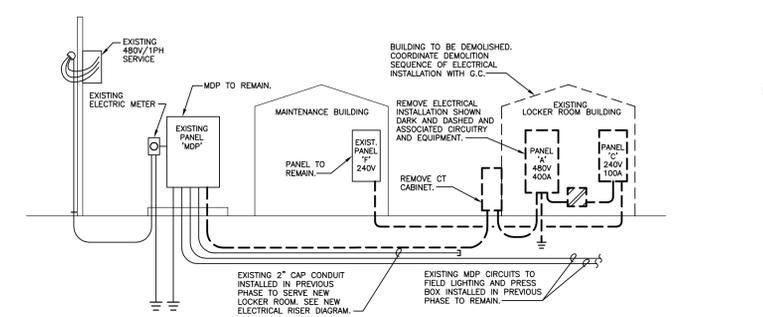
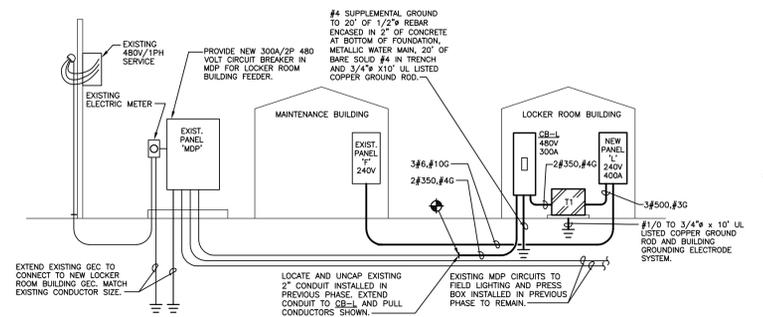
Enclosed circuit breaker shall have dual rated cable lugs and be equipped with a neutral terminal and grounding lug. Minimum AIC of 25,000 for 240 volts and 18,000 for 480 volts. Equivalent to Square D LAL.

BRANCH CIRCUIT PANELBOARD SCHEDULE

PANEL DESIGNATION: PANEL 'L'			
LOCATION: Mech 116			
VOLTS: 120/240			
CONFIGURATION: 1 Phase/3 Wire			
MOUNTING: Surface			
		MIN A.I.C.: 10,000	FEATURES:
		MCB Amps: 400	- Panelboard Construction
		BUS Amps: 400	- Equipment Ground Bus
		ENCL.: NEMA 1	- Equal to Square D NQ
CKT.	Description	Conductors	C/B
1	Rcpt - Rooms 118, 119	2#12,#12G	20/1
3	Rcpt - Office 121	2#12,#12G	20/1
5	Rcpt - Electric Water Cooler	2#12,#12G	20/1
7	Rcpt - Locker 118	2#12,#12G	20/1
9	Rcpt - Locker 118	2#12,#12G	20/1
11	Rcpt - Officials 123	2#12,#12G	20/1
13	Rcpt - Restroom 122	2#12,#12G	20/1
15	Rcpt - Team Meeting 115 West	2#12,#12G	20/1
17	Rcpt - Team Meeting 115 East	2#12,#12G	20/1
19	Rcpt - Mechanical 116 West	2#12,#12G	20/1
21	Rcpt - Mechanical 116 East	2#12,#12G	20/1
23	Rcpt - Rooms 106, 107	2#12,#12G	20/1
25	Rcpt - Office 105	2#12,#12G	20/1
27	*Rcpt - Electric Water Cooler	2#12,#12G	20/1
29	Rcpt - Restroom 111 South	2#12,#12G	20/1
31	Rcpt - Restroom 111 North	2#12,#12G	20/1
33	Rcpt - Mechanical 116 North	2#12,#12G	20/1
35	Rcpt - Rooms 104, 113	2#12,#12G	20/1
37	Rcpt - Projector Room 115	2#12,#12G	20/1
39	EF-1	2#12,#12G	15/1
41	EF-2	2#12,#12G	15/1
43	EF-3	2#12,#12G	15/1
45	HVAC Controls	2#12,#12G	20/1
47	RTU-1	2#10,#10G	25
49			2
51	EH-2, EH-3, EH-4	2#12,#12G	20
53			2
55	EH-1	2#12,#12G	20
57			2
59	Spare	---	20/1
61	Spare	---	20/1
63	Spare	---	20/1
65	Spare	---	20/1
67	Spare	---	20/1
69	Spare	---	20/1
71	Spare	---	20/1

CKT.	Description	Conductors	C/B
2	Rcpt - Training 108 West	2#12,#12G	20/1
4	Rcpt - Ice Machine	2#12,#12G	20/1
6	Rcpt - Refrigerator	2#12,#12G	20/1
8	Rcpt - Training 108 East	2#12,#12G	20/1
10	Rcpt - Washer	2#12,#12G	20/1
12	Rcpt - Dryer	2#12,#12G	30
14			2
16	Rcpt - Laundry, Storage 109	2#12,#12G	20/1
18	Rcpt - Womens 101	2#12,#12G	20/1
20	Rcpt - Rooms 102, 103	2#12,#12G	20/1
22	Rcpt - Concessions 100 NWC	2#12,#12G	20/1
24	Rcpt - Concessions 100 NWC	2#12,#12G	20/1
26	Rcpt - Concessions 100 NWC	2#12,#12G	20/1
28	Rcpt - Concessions 100 NEC	2#12,#12G	20/1
30	Rcpt - Concessions 100 NEC	2#12,#12G	20/1
32	Rcpt - Concessions 100 NEC	2#12,#12G	20/1
34	Rcpt - Concessions 100 SEC	2#12,#12G	20/1
36	Rcpt - Concessions 100 E Wall	2#12,#12G	20/1
38	Rcpt - Concessions 100 SWC	2#12,#12G	20/1
40	Rcpt - Concessions 100 W Wall	2#12,#12G	20/1
42	Rcpt - South Exterior	2#12,#12G	20/1
44	RTU-2	2#8,#10G	45
46			2
48	RTU-3	2#6,#10G	60
50			2
52	Existing Panel F	3#6,#10G	60
54			2
56	Ltg - Mech 116	2#12,#12G	20/1
58	Ltg - West Interior	2#12,#12G	20/1
60	Ltg - East Interior	2#12,#12G	20/1
62	Ltg - Concessions	2#12,#12G	20/1
64	Ltg - East 'NL' Fixtures	2#12,#12G	20/1
66	Ltg - West 'NL' Fixtures	2#12,#12G	20/1
68	Ltg - West 'NL' Fixtures	2#12,#12G	20/1
70	Spare	---	20/1
72	Spare	---	20/1

NOTES:
* = Provide GFCI protected circuit breaker



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Sheet Title:
ELECTRICAL DETAILS

Sheet:
E201
OF: **8**