Owen Ames Kimball
Building Since 1891

ADDENDUM NO. 01 – PORTAGE PUBLIC SCHOOLS – CENTRAL ELEMENTARY SCHOOL BP 4: CONSTRUCTION

June 5th, 2023

The following items are changes, clarifications, corrections of errors, etc., with respect to the Contract Documents previously issued. This addendum shall be a part of the Contract Documents.

Items listed below may or may not affect the cost of the Contractor's Proposal. Changes in cost shall be incorporated in the Contractor's Proposal.

ITEM No.1

DRAWING AND SPECIFICATION CHANGES AS NOTED BY TOWER PINKSTER - ATTACHED

- See Tower Pinkster write up
- Specification Sections: 04 2000, 08 7100, 09 8433, 10 2800, 26 0943, 26 3213, 28 3100
- Drawings: CD101, C500, L201, L202, L203, L302, S001, S003, S100, S101, S102, S111, S200, S211, S212, S500, S501, S511, S607, A101A, A101D, A401, A511, A512, FSE-1, FSE-5, M502, E102D, E103, E401, E402, E420, E502, E504, TS101, T101A, T101B, T101C, T401, T441

ITEM No.2

UPDATED ADVERTISEMENT FOR BIDS - ATTACHED

ITEM No.3

PRE-BID RFI's – ATTACHED

1. Note: Pre-Bid RFI's due: June 15th at noon.

ADDENDUM NO. 1 (BP 4)

DATE OF ISSUANCE:	**June 5, 2023**
PROJECT:	**Central Elementary School Bid Package 4: Construction** **8422 South Westnedge Avenue** **Portage, MI 49002**
OWNER:	**Portage Public Schools**
ARCHITECT'S PROJECT NO.:	**21-237.10**
ORIGINAL BID ISSUE DATE:	**May 17, 2023**

SCOPE OF WORK

This Addendum includes changes to, or clarifications of, the original Bidding Documents and any previously issued addenda, and shall be included in the Bid. All of these Addendum items form a part of the Contract Documents. The Bidder shall acknowledge receipt of this Addendum in the appropriate space provided on the Bid Form. Failure to do so may result in disqualification of the Bid.

DOCUMENTS INCLUDED IN THIS ADDENDUM

This Addendum includes six **(6)** pages of text and the following documents:

- Bidding Documents: **None.**
- Contract Conditions: **None.**
- Specification Sections: 04 2000, 08 7100, 09 8433, 10 2800, 26 0943, 26 3213, 28 3100
- Drawings: CD101, C500, L201, L202, L203, L302, S001, S003, S100, S101, S102, S111, S200, S211, S212, S500, S501, S511, S607, A101A, A101D, A401, A511, A512, FSE-1, FSE-5, M502, E102D, E103, E401, E402, E420, E502, E504, TS101, T101A, T101B, T101C, T401, T441

CHANGES TO PREVIOUSLY ISSUED ADDENDA

None.

CHANGES TO BIDDING REQUIREMENTS

None.

CHANGES TO CONTRACT CONDITIONS

None.

CHANGES TO SPECIFICATION

ADD-1 Item No. S-1 - Unit Masonry (Brick 2)

Refer to Specification Section: 04 2000 Unit Masonry

Revised paragraph 2.6 B. 2. b., delete 10% 8531 Velour FBX.

ADD-1 Item No. S-2 - Replace Door Hardware Specification

Refer to Specification Section: 08 7100 Door Hardware

Replace this section in its entirety.

ADD-1 Item No. S-3 - Add Sound Absorbing Perforated Metal Wall Panel (AWP-10)

Refer to Specification Section: 09 8433 Sound Absorbing Wall Units

Add Paragraph 2.3.D, Sound Absorbing Perforated Metal Wall Panel, Kinetics Noise Control, Inc; Model KNP.

ADD-1 Item No. S-4 - Add Fold Down Changing Seat

Refer to Specification Section: 10 2800 Toilet, Bath and Laundry Accessories

Add Para. 2.4.F: Fold Down Changing Seat

ADD-1 Item No. S-5 - Added Stock for Lighting and Associated Controls

Refer to Specification Section: 26 0943

Updated to include required additional stock for lighting components.

ADD-1 Item No. S-6 - Diesel Generator Sound Enclosure

Refer to Specification Section: 26 3213

Increased sound attenuating enclosure level from 1 to 2.

ADD-1 Item No. S-7 - Added Stock for Fire Alarm Devices and Equipment

Refer to Specification Section: 28 3100

Replaced this section in its entirety.

CHANGES TO DRAWINGS

ADD-1 Item No. D-1 - Sheet A111 in BP4 Drawing Set

Sheet A111 CANOPY, DUMPSTER ENCLOSURE, MONUMENT SIGN, was sorted and placed after A202D in the bid drawing set in lieu of numerical order.

ADD-1 Item No. D-2 - Site Demolition- South

Refer to Sheet(s): CD101

A tree in the southeast corner of the site was added to be cut down.

ADD-1 Item No. D-3 - Site Details

Refer to Sheet(s): C500

The grate was called out in the E2 Modified Curb Detail.

ADD-1 Item No. D-4 - Tree placement and Irrigation Value Chart and Details

Refer to Sheet(s): L201

Locate trees outside of water easement

Review updated details and value chart

ADD-1 Item No. D-5 - Stone Mulch in Entry Column Curbed Areas

Refer to Sheet(s): L202, L203

Provide stone mulch under grates on weed barrier as indicated.

ADD-1 Item No. D-6 - Irrigation Details

Refer to Sheet(s): L302

Revised irrigation details.

ADD-1 Item No. D-7 - General Notes

Refer to Sheet(s): S001

Clarified serviceability requirements for members supporting concrete and brick masonry

ADD-1 Item No. D-8 - Special Inspections and Structural Testing

Refer to Sheet(s): S003

Clarified inspection requirements for structural masonry

ADD-1 Item No. D-9 - Foundation Plan

Refer to Sheet(s): S100

Provided missing footing size near

Clarified footing geometry at gathering stair footing

Added section to clarify intent at HSS post

ADD-1 Item No. D-10 - First Floor Slab on Grade

Refer to Sheet(s): S101

Added section to clarify intent at HSS post

ADD-1 Item No. D-11 - Second Floor Framing Plan

Refer to Sheet(s): S102

Revised canopy framing per design team coordination

Revised beam sizes per serviceability requirements

Added section to clarify intent at HSS post

ADD-1 Item No. D-12 - First Floor CMU Plan

Refer to Sheet(s): S111

Revised lintel sizes to align with intent at HSS post

ADD-1 Item No. D-13 - Typical Footing Details

Refer to Sheet(s): S200

Clarified various dimensions

Revised detailing of SOG isolation joint at storefront per design team coordination

Added detail to clarify intent at interface between interior and exterior continuous footings

ADD-1 Item No. D-14 - Slab on Grade Details

Refer to Sheet(s): S211

Clarified rebar placement location in exterior housekeeping pads

ADD-1 Item No. D-15 - Gathering Stair Partial Plan, Sections, and Schedule

Refer to Sheet(s): S212

Clarified footing geometry at gathering stair footing

ADD-1 Item No. D-16 - Typical Steel Column Details

Refer to Sheet(s): S500

Clarified baseplate requirements at HSS post

Clarified anchor rod material requirements

Removed baseplate anchor weld requirement

ADD-1 Item No. D-17 - Steel Column Details

Refer to Sheet(s): S501

Added section and details to clarify intent at HSS post

ADD-1 Item No. D-18 - Steel Beam Details

Refer to Sheet(s): S511

Added detail at canopy spandrel beams per design team coordination

ADD-1 Item No. D-19 - Exterior Wall Sections

Refer to Sheet(s): S607

Clarified atypical bracing requirements at T/wall

ADD-1 Item No. D-20 - Entry Doors (Vestibule V100)

Refer to Sheet(s): A101A, A511

Updated door layout to reflect fixed mullions in lieu of pair of doors.

ADD-1 Item No. D-21 - Condenser Screen Wall Sound Panels

Refer to Sheet(s): A101D

Added Keynote 19. Provide sound absorbing metal panels as shown.

ADD-1 Item No. D-22 - Toilet, Bath, and Laundry Accessories

Refer to Sheet(s): A401

Added Enlarged Keynotes 16 through 20. Updated enlarged plans accordingly.

ADD-1 Item No. D-23 - Door Hardware

Refer to Sheet(s): A511, A512

Updated door hardware schedules.

ADD-1 Item No. D-24 - Item #301 Hood & Ventilation System – Make up air unit to change to the following:

Refer to Sheet(s): FSE-1, FSE-5, E103, E402, E502

Provide UL listed 208-volt 3 phase make up air roof top package with direct drive motor and control panel with starters and NEMA rated weatherproof disconnects. Make up air unit to be direct gas-fired tempered makeup air unit with the capability of a 70-degree minimum temperature rise equipped with full modulating gas train, thermostat, motorized inlet damper, fire damper, heavy gauge steel base, watertight cabinet with access doors, extended intake air cabinet with filters and bird screens, and all accessories as required for a complete system. MUA to include DX Cooling optimized for 100% OA. DX coil module, condensers, thermal expansion valves, and filter/dryer kits provided and pre-piped and charged by the

factory. Condensers to be located integral to the MUA unit requiring no additional roof footprint. Condensers to be High Efficiency Nominal 14 SEER rated. All equipment shall be sized for CFM as shown on drawing and shall conform to all applicable codes.

The listed electrical sheets were updated to accommodate this additional kitchen unit.

ADD-1 Item No. D-25 - Heating Water Pumps

Refer to Sheet(s): M502, E401, E402, E504

Updated heating water system pump selections. Adjusted supporting electrical accordingly.

ADD-1 Item No. D-26 - Elevator Disconnects Adjustment

Refer to Sheet(s): E102D

Adjusted so that only the main power disconnect for the elevator was in a lockable cabinet.

ADD-1 Item No. D-27 - Site Fiber Details

Refer to Sheet(s): TS101

Add details regarding fiber and pathway construction order of operation.

ADD-1 Item No. D-28 - Door Hardware

Refer to Sheet(s): T101A, T101B, T101C, & T441

Updates to door hardware information on plans, and to access control door schedule.

ADD-1 Item No. D-29 - Fiber Part Numbers

Refer to Sheet(s): T401

Update part numbers for fiber connectors and fiber adapter panels.

END OF ADDENDUM.

SECTION 04 2000 - UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units. (also refer to section 04 2200 for additional structural requirements)
   a. Decorative Concrete Masonry Units (DCMU) (Ground face interior)
   b. Pre-Faced Concrete Masonry Units (PFCMU) (Glazed face exterior)
2. Brick.
3. Mortar and grout materials.
4. Reinforcement.
5. Ties and anchors.
6. Embedded flashing.
7. Accessories.
8. Mortar and grout mixes.

B. Products Installed but not Furnished under This Section:

1. Cast-stone trim in unit masonry.
2. Steel lintels in unit masonry.
3. Steel shelf angles for supporting unit masonry.
4. Cavity wall insulation adhered to masonry backup.

C. Related Requirements:

1. Section 04 2200 “Concrete Masonry Units” for additional structural requirements.
2. Section 05 1200 "Structural Steel" for installing anchor sections of adjustable masonry anchors for connecting to structural steel frame.
3. Section 07 1900 "Water Repellents" for water repellents applied to unit masonry assemblies.
4. Section 07 2100 "Thermal Insulation" for parapet wall insulation.
5. Section 07 2119 “Foamed-in-Place Insulation” for cavity wall insulation.
6. Section 07 6200 "Sheet Metal Flashing and Trim" for exposed sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.

1.2 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For the following:

1. Masonry Units: Indicate sizes, profiles, coursing, and locations of special shapes.
2. Reinforcing Steel: Indicate bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315R. Indicate elevations of reinforced walls.

3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

C. Samples for Initial Selection:
1. Weep/cavity vents.

D. Samples for Verification: For each type and color of the following:

1. Decorative CMUs.
2. Pre-faced CMUs.
3. Clay face brick, in the form of straps of five or more bricks.
4. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project.

1.5 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. Material Certificates: For each type of the following:

1. Masonry units.
   a. Include data on material properties.
   b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
   c. For exposed brick, include test report for efflorescence in accordance with ASTM C67/C67M.
2. Cementitious materials. Include name of manufacturer, brand name, and type.
3. Mortar admixtures.
4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
5. Grout mixes. Include description of type and proportions of ingredients.
6. Reinforcing bars.
7. Joint reinforcement.
8. Anchors, ties, and metal accessories.

C. Qualification Statements: For testing agency.

D. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients. Provide one of the following:

1. Include test reports for mortar mixes required to comply with property specification. Test in accordance with ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.
2. Include test reports, in accordance with ASTM C1019, for grout mixes required to comply with compressive strength requirement.

E. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.6 QUALITY ASSURANCE

A. Qualifications:

1. Installers: All masonry flashing installers must complete the International Masonry Institute Flashing Upgrade training course.

2. Testing Agency Qualifications: Qualified in accordance with ASTM C1093 for testing indicated.

1.7 MOCKUPS

A. Sample Panel Mockups: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects. Comply with requirements in Section 01 4000 "Quality Requirements" for mockups.

1. Build sample panels for each type of exposed unit masonry construction and typical exterior wall in sizes approximately 60 inches long by 48 inches high by full thickness.
2. Clean one-half of exposed faces of panels with masonry cleaner indicated.
3. Protect approved sample panels from the elements with weather-resistant membrane.
4. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
    a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless Architect specifically approves such deviations in writing.

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 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 down face next to unconstructed wythe, and hold cover in place.

B. Do not apply uniform or concentrated loads for at least three days after building masonry walls, pilasters 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.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F 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.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain exposed masonry units from single source.

B. For cementitious mortar components, obtain each color and grade from single source with resources to provide materials of consistent quality in appearance and physical properties.

2.2 PERFORMANCE REQUIREMENTS

A. Concrete masonry shall have the minimum compressive strength f'm as indicated in the Structural Drawings.

2.3 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602, 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 ft. 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, use the equivalent thickness method for masonry units in accordance with ACI 216.1 or.

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 exterior 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 in accordance with ASTM E514/E514M as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, will show no visible water or leaks on the back of test specimen.
   a. Products: Subject to compliance with requirements, provide one of the following:
      1) ACM Chemistries;
      2) Euclid Chemical Company (The); an RPM company; Eucon Blocktite.

3) GCP Applied Technologies Inc.;
4) Master Builders Solutions;
5) Moxie International;

C. CMUs: ASTM C90, normal weight for below grade applications and normal weight for above grade applications, unless indicated otherwise.
1. For strength requirements refer to Structural Drawings.
2. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.

3. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.

D. Decorative CMUs (DCMU): ASTM C90, medium weight.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3050 psi.
2. Size (Width): Manufactured to dimensions specified in "CMUs" Paragraph above.

3. Pattern and Texture: Standard pattern, ground-face finish. Match Architect's samples.
4. Colors: Consumers Concrete, Perma Grind, Gray Hill with applied surface finish. Match Architect's Sample..

5. Special Aggregate: Provide units made with aggregate matching aggregate in Architect's sample.

E. Pre-faced CMUs (PFCMU): ASTM C90, lightweight solid units, with manufacturer's standard smooth resinous facing complying with ASTM C744. Exterior use – smooth, satin finish, conforming to ASTM C 744, ASTM C 67, paragraph 8 (freeze-thaw) and Thermal Shock Test B100JL, 24P.

1. Spectra-Glaze II Plus, with Block Rite System for block and mortar

2. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3050 psi.
3. Size: Manufactured to dimensions specified in "CMUs" Paragraph above but with pre-faced surfaces having 1/16-inch- wide returns of facing to create 1/4-inch- wide mortar joints with modular coursing.
4. Colors and Patterns: Match Architect's samples.:
   a. PFCMU 1: S-17 Deep Astra Blue. 15.75 inch long x 7.75 inch high x 3.75 inch deep. Stack bond field, Soldier course under window sills.
   b. PFCMU 2: S-16 Light Kingston Blue. 15.75 inch long x 7.75 inch high x 3.75 inch deep. Stack bond.
   c. PFCMU 3: S-27 Deep Olive Green. 15.75 inch long x 7.75 inch high x 3.75 inch deep. Stack bond.
   d. PFCMU 4: S-43 Deep Pumpkin 15.75 inch long x 7.75 inch high x 3.75 inch deep. Stack bond.
   e. PFCMU 5: S-35 Deep Honey. 15.75 inch long x 7.75 inch high x 3.75 inch deep. Stack bond.

5.

2.5 LINTELS

A. 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.

B. Offset Angle Supports: Steel plate brackets anchored to structure, allowing continuous insulation behind shelf angle supporting veneer. Component and anchor size and spacing engineered by manufacturer.

1. Manufacturers: Subject to compliance with requirements provide products by one of the following:
   a. FERO Corporation
   b. Halfen USA, Inc.
   c. Hohmann & Barnard, Inc.

2. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304.

2.6 BRICK

A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:

1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.

2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing where shapes produced by sawing would result in sawed surfaces being exposed to view.

B. Clay Face Brick: Facing brick complying with ASTM C216, Grade SW, Type FBX.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Acme Brick Company.
   b. Belden Brick Company (The). Basis of Design
   c. Boral Bricks, Inc; Boral Limited.
   d. Bowerston Shale Company
   e. Endicott Clay Products Co.
   f. General Shale Brick, Inc.
2. Central Elementary Products: Subject to compliance with requirements, provide the following:
   a. Central Brick 1: Color: Indian Full Range Course Velour. FBS Belden Brick. Modular 7.625 inch long x 2.25 inch high x 3.625 inch deep. Running Bond. Soldier course under 3 foot 4 inch high window sills.
   b. Central Brick 2: A blend of 3 brick:
      1) 80 % Dutch Gray Velour FBX
      2) 20 % Sea Gray Velour FBX
      ~~3) 10% 8531 Velour FBX~~

4) 'Brick 2' colors listed above are Belden Modular 7.625 inch long x 2.25 inch high x 3.625 inch deep. Running Bond. Soldier course under 3 foot 4 inch high window sills.

c. Central Brick 3: Color: Anchor Gray Velour, FBX . Belden Brick, Modular, 7.625 inch long x 2.25 inch high x 3.625 inch deep, Running Bond

3. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 6600 psi.

4. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested in accordance with ASTM C67/C67M.

5. Efflorescence: Provide brick that has been tested in accordance with ASTM C67/C67M and is rated "not effloresced."

6. Size (Actual Dimensions): 3-5/8 inches deep by 2-1/4 inches high by 7-5/8 inches long. Unless noted otherwise.

7. Application: Use where brick is exposed unless otherwise indicated.

2.7 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C150/C150M, 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 will not be more than 0.1 percent when tested in accordance with ASTM C114.

B. Hydrated Lime: ASTM C207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. ASTM C91/C91M does not require masonry cement to comply with any performance tests for flexural bond strength; confirm project requirements. See the Evaluations.

E. Mortar Cement: ASTM C1329/C1329M.

1. Lafarge North America, Inc.

F. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979/C979M. 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.
   c. Lanxess Corporation.
   d. Solomon Colors Inc.

G. Colored Cement Products: Packaged blend made from portland cement and hydrated lime and mortar pigments, all complying with specified requirements, and containing no other ingredients.

1. Colored Portland Cement-Lime Mix:
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1) Argos USA, LLC
      2) Holcim (US) Inc.
      3) Lehigh Hanson, HeidelbergCement Group
2. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.

3. Pigments do not exceed 10 percent of portland cement by weight.
4. Pigments do not exceed 5 percent of mortar cement by weight.

H. Preblended Dry Mortar Mix: Packaged blend made from portland cement and hydrated lime, sand, mortar pigments, water repellents, and admixtures and complying with ASTM C1714/C1714M.

I. Aggregate for Mortar: ASTM C144.

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 thick, use aggregate graded with 100 percent passing the No. 16 sieve.

J. Aggregate for Grout: ASTM C404.

K. For Pre-Faced CMU (PFCMU): Epoxy Pointing Mortar: ASTM C395, epoxy-resin-based material formulated for use as pointing mortar for glazed or pre-faced masonry units (and approved for use by manufacturer of units); in color indicated or, if not otherwise indicated, as selected by Architect from manufacturer's colors.

1. Basis of Design: Laticrete MVIS Two Part Epoxy Pointing Mortar

L. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, 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. Euclid Chemical Company (The); an RPM company.
   b. GCP Applied Technologies Inc.

M. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. ACM Chemistries;.
   b. Euclid Chemical Company (The); an RPM company
   c. GCP Applied Technologies Inc.;
   d. Master Builders Solutions;

N. Water: Potable.

2.8 REINFORCEMENT

A. Reinforcing Bars:

1. Horizontal and vertical reinforcement bars shall comply with requirements of Section 03 2000

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 steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated. Refer to Section 04 2200.

C. Masonry-Joint Reinforcement, General: ASTM A951/A951M.

1. Interior Walls: Hot-dip galvanized carbon steel.
2. Exterior Walls: Hot-dip galvanized carbon steel.
3. Wire Size for Side Rods: As indicated on Structural Drawings diameter.
4. Wire Size for Cross Rods: 0.148-inch diameter.

5. Wire Size for Veneer Ties: 0.187-inch diameter.
6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
7. Provide in lengths of not less than 10 ft., 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:

1. Walls Without Cavities Ladder type with one side rod at each face shell of hollow masonry units more than 4 inches wide, plus two side rods at each wythe of masonry 4 inches wide or less.
2. Walls With Cavities: Adjustable (two-piece) type, either ladder or truss design, with one side rod at each face shell of backing wythe and with separate adjustable ties with pintle-and-eye connections having a maximum horizontal play of 1/16 inch and maximum vertical adjustment of 1-1/4 inches. Size ties to extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face.

2.9 TIES AND ANCHORS

A. General: Ties and anchors extend at least 1-1/2 inches into veneer but with at least a 5/8-inch 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 A1064/A1064M, with ASTM A153/A153M, Class B-2 coating.
2. Steel Sheet, Galvanized after Fabrication: ASTM A1008/A1008M, Commercial Steel, with ASTM A153/A153M, Class B coating.

3. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

C. 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- diameter, hot-dip galvanized steel wire.
2. Tie Section: Triangular-shaped wire tie made from 0.187-inch- diameter, hot-dip galvanized steel wire.

D. 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- thick steel sheet, galvanized after fabrication.
2. Tie Section: Triangular-shaped wire tie made from 0.187-inch- diameter, hot-dip galvanized steel wire.

E. Partition Top Anchors: Refer to Section 04 2200.

F. Adjustable Masonry-Veneer Anchors:

1. General: Provide anchors that allow vertical adjustment but resist a 100 lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.
2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.0785-inch- thick steel sheet, galvanized after fabrication.
3. Fabricate wire ties from 0.187-inch- diameter, hot-dip galvanized-steel wire unless otherwise indicated.
4. Masonry-Veneer Anchors; Double-Pintle Plate: Rib-stiffened, sheet metal anchor section with screw holes at top and bottom, projecting horizontal leg with slots for vertical legs of double pintle wire tie.
    a. Products: Subject to compliance with requirements, provide one of the following:
        1) Heckmann Building Products, Inc.;
        2) Hohmann & Barnard, Inc; HB-213.HB-282
        3) Quality Steel and Wire LLC;
        4) Wire-Bond; RJ-711 (#2401).

5. Polymer-Coated, Steel Drill Screws for Steel Studs: ASTM C954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 diameter by length required to penetrate steel stud flange with not less than three exposed threads, and with organic polymer coating with salt-spray resistance to red rust of more than 800 hours in accordance with ASTM B117.

2.10 EMBEDDED FLASHING

A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:

1. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.016 inch thick.
2. Zinc Sheet: Zinc, 99 percent pure, alloyed with 0.08 to 1.00 percent copper, 0.06 to 0.20 percent titanium, and up to 0.015 percent aluminum; with manufacturer's standard factory-applied, flexible, protective back coating.
   a. Products: Subject to compliance with requirements, provide one of the following:
      1) Contrarian Metal Resources; Alloy 710 Zinc.
      2) Jarden Zinc Products; Solid Zinc Strip.
      3) Rheinzink America Inc.; RHEINZINK.
      4) Umicore Building Products USA, Inc.; VM ZINC series.
   b. Install Zinc above at all locations of cast stone
3. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 ft.. Provide splice plates at joints of formed, smooth metal flashing.

4. Fabricate through-wall flashing with snaplock receiver on exterior face where indicated to receive counterflashing.

5. Fabricate metal drip edges from stainless steel, except above cast stone provide zinc. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.

B. Flexible Flashing: Use one of the following unless otherwise indicated:

1. Copper-Fabric Flashing: 3 oz./sq. ft. copper sheet bonded between two layers of glass-fiber cloth.
   a. Manufacturers: Subject to compliance with requirements, provide products by the following:
      1) Advanced Building Products Inc.
      2) Hohmann & Barnard, Inc.
      3) STS Coatings, Inc.
      4) Wire-Bond.
      5) York Manufacturing, Inc., Flash-Vent Copper, Basis of Design

2. Self-Adhering, Stainless Steel Fabric Flashing: Composite, flashing product consisting of 2 mil of Type 304 stainless steel sheet, bonded to a layer of polymeric fabric with a permanent, clear adhesive, to produce an overall thickness of 10 mil.
   a. Products: Subject to compliance with requirements, provide one of the following:
      1) Hohmann & Barnard, Inc.; Mighty-Flash SA
      2) VaproShield LLC: VaproThru-Wall Flashing SA
      3) GE Silicones, Inc.: GE Elemax SS Flashing
      4) Wire-Bond, Bond-n-Flash S.A.
      5) York Manufacturing, Inc; York 304 SA SS
   b. Provide 20 year material warranty

C. Application: Provide metal flashing exterior drip edge termination with flexible flashing through wall.

1. At locations within 12 inches of grade, omit metal drip edge, extend flexible flashing beyond exterior face of wall and cut off flush with face of wall after masonry wall construction is completed.
2. At locations 12 inches to 72 inches above grade, smooth all sharp edges and corners to avoid injury.

D. Application: Use the following above all cast stone:

1. Provide flexible flashing with zinc drip edge or flexible flashing over zinc sheet with drip edge.

E. Drainage Plane Flashing: Contractors Option in lieu of providing materials separately. Fabricate from stainless steel and drainage membrane to shapes indicated, including weep tabs, termination bar, and drip edge. Provide flashing materials as follows:

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Mortar Net Solutions;
   b. STS Coatings, Inc.;

2. Stainless Steel: ASTM A240/A240M or ASTM A666,, 2 mil stainless steel sheet, bonded to a layer of polymeric fabric with a permanent, clear adhesive, to produce an overall thickness of 10 mil (0.25 mm).
3. Fabricate continuous flashings in sections 60 inches long, minimum.
4. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.

F. Solder and Sealants for Sheet Metal Flashings:

1. Solder for Stainless Steel: ASTM B32, Grade Sn60, with acid flux of type recommended by stainless steel sheet manufacturer.

2. Elastomeric Sealant: ASTM C920, chemically curingsilicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and remain watertight.

G. 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.

H. Termination Bars for Flexible Flashing, Flanged: Stainless steel sheet 0.019 inch by 1-1/2 inches with a 3/8-inch flange at top.

2.11 FERO FAST BRACKET SYSTEM

A. FAST Standard Brackets, Rectangular Washers, Shim Rods, and Shim Plates for support of shelf angles.

1. All components manufactured by FERO Corporation, Edmonton, AB.
2. FAST Brackets to not exceed maximum spacings listed in FERO published load table and technical information and as indicated on the drawings.
3. FAST Bracket depth to fill wall cavity or as shown in construction documents.
4. FAST Bracket height to meet anchor to shelf and distance.
5. FERO shim plates to be used for meeting construction tolerances.
6. Installer to install FAST Bracket system in compliance with FERO published technical
7. documentation.
8. All components to be hot dipped galvanized after fabrication to meet the requirements of ASTM
9. A123 and CSA A370-14.

2.12 ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D1056, 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 D2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated. Minimum durometer hardness of 80.

C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).

D. Weep/Cavity Vents: 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 less than depth of outer wythe, in color selected from manufacturer's standard.
a. Products: Subject to compliance with requirements, provide one of the following:
1) Advanced Building Products Inc.; Mortar Maze Weep Vent.
2) Heckmann Building Products, Inc
3) Hohmann & Barnard, Inc; QV Quadro-Vent.
4) Mortar Net Solutions
5) Wire-Bond; Cell Vent (#3601).

2. Mesh Weep/Vent: Free-draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch less than depth of outer wythe; in color selected from manufacturer's standard.
a. Products: Subject to compliance with requirements, provide one of the following:
1) CavClear; a division of Archovations, Inc.;
2) Hohmann & Barnard, Inc;
3) Keene Building Products; Driwall Weep Vents 025.
4) Mortar Net Solutions; Mortar Net Weep Vents.

E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

1. Mortar Deflector: Strips, full depth of cavity and 10 inches high, with dovetail-shaped notches that prevent clogging with mortar droppings.
a. Products: Subject to compliance with requirements, provide one of the following:
1) Advanced Building Products Inc.; Mortar Break DT.
2) Hohmann & Barnard, Inc; Mortar Trap.
3) Keene Building Products;
4) Mortar Net Solutions; Mortar Net with Insect Barrier.
5) Illinois Products Corporation; Mortar Grab
6) Wire-Bond; Cavity Net DT.
7) York Manufacturing, Inc; Weep-Net.

2. Rainscreen Drainage Mat: Sheets or strips not less than full depth of cavity thick and installed to full height of cavity, to prevent weep holes from clogging with mortar.
a. Products: Subject to compliance with requirements, provide one of the following:
1) Advanced Building Products Inc.; Mortairvent CW.

2) CavClear; a division of Archovations, Inc.;
3) Keene Building Products;
4) Mortar Net Solutions;
5) Wire-Bond;.

F. Proprietary Acidic Masonry 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. Products: Subject to compliance with requirements, provide one of the following:
   a. Diedrich Technologies, Inc.; a Hohmann & Barnard company;.
   b. EaCo Chem, Inc.;
   c. PROSOCO, Inc; Sure Klean® 600, Vana Trol

2.13 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 or mortar cement 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. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.

1. For masonry below grade or in contact with earth, use Type S.
2. For exterior, above-grade, load-bearing, nonload-bearing walls, and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.

D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.

1. Pigments do not exceed 10 percent of portland cement by weight.
2. Pigments do not exceed 5 percent of mortar cement by weight.
3. Mix to match Architect's sample.
4. Application: Use pigmented mortar for exposed mortar joints with the following units:
   a. Decorative CMUs
   b. Pre-faced CMUs
   c. Clay face brick.
   d. Cast stone trim units

E. Grout for Unit Masonry: Comply with ASTM C476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602 for dimensions of grout spaces and pour height.
2. Proportion grout in accordance with ASTM C476, Table 1.
3. Provide grout with a slump of 8 to 11 inches as measured in accordance with ASTM C143/C143M.

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.

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. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested in accordance with ASTM C67/C67M. Allow units to absorb water so they are damp but not wet at time of laying.

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 or minus 1/4 inch.

2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch 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 ft., or 1/2-inch 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 ft., 1/4 inch in 20 ft., or 1/2-inch maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 ft., 3/8 inch in 20 ft., or 1/2-inch 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 ft., 1/4 inch in 20 ft., or 1/2-inch maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 ft., 3/8 inch in 20 ft., or 1/2-inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 ft., or 1/2-inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch 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, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

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 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. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch 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, and wet brick if required before laying fresh masonry.

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 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 anchors, Space anchors 48 inches 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 8443 "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. With webs fully bedded in mortar in all courses of fire rated walls, including contiguous piers, columns and pilasters.
5. With webs fully bedded in mortar in all courses of walls forming mechanical shafts, including but not necessarily limited to, plumbing shafts, supply and return air shafts not containing fabricated ducts.
6. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
7. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.

1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
2. Allow cleaned surfaces to dry before setting.

3. Wet joint surfaces thoroughly before applying mortar.

D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
1. Provide raked joints for application of sealant in joints in sills, coping, and similar items.

E. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.6 COMPOSITE MASONRY

A. Bond wythes of composite masonry together as follows:
1. Masonry-Joint Reinforcement: Installed in horizontal mortar joints.

B. Bond wythes of composite masonry together using bonding system indicated on Drawings.

C. Collar Joints: Solidly fill collar joints by parging face of first wythe that is laid and shoving units of other wythe into place.

D. 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.

E. Intersecting and Abutting Walls: Unless vertical expansion or control joints are indicated 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. Masonry-Joint Reinforcement: Installed in horizontal mortar joints.

B. 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.

C. Installing Cavity Wall Insulation: Spray adhesive on cavity side of back-up in accordance with insulation manufacturer's written instructions and recommendations. Extend to adjacent materials to provide a complete installation without gaps.

D. Thickness: 3 inches unless indicated otherwise.

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 with masonry-veneer anchors to comply with the following requirements:

1. Fasten screw-attached anchors through sheathing to wall framing with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
2. Embed 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 18 inches o.c. vertically and 24 inches o.c. horizontally, with not less than one anchor for each 2 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 8 inches, around perimeter.

B. Provide not less than 2 inches 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 on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.

1. Space reinforcement not more than 16 inches o.c.
2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.

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 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 1/2 inch 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 o.c. vertically and 36 inches 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 as follows:
   1. Install preformed control-joint gaskets designed to fit standard sash block.

C. Form expansion joints in brick as follows:
   1. Build in compressible joint fillers where indicated.

D. 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 9200 "Joint Sealants," but not less than 3/8 inch.

   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 indicated and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are indicated without structural steel or other supporting lintels.

C. Provide minimum bearing of 8 inches 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, and secure top of flashing to the inner wythe with termination bar and sealant.
   3. At masonry-veneer walls, extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches; and secure top of flashing to the inner wythe with termination bar and sealant.

4. At lintels and shelf angles, extend flashing 6 inches minimum, to edge of next full unit at each end. At heads and sills, extend flashing 6 inches minimum, to edge of next full unit and turn ends up not less than 2 inches to form end dams.

5. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch 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 indicated 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. Space weep holes 24 inches o.c. unless otherwise indicated.

E. Retain last subparagraph above if weep holes other than those made of plastic tubing or wicking are used. Retain first subparagraph below if weep holes made of plastic tubing or wicking are usedDelete subparagraph below if pea gravel is not used full height in cavities. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "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.

3.14 REINFORCED UNIT MASONRY

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.

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 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.

3.15 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections. 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 will be at Contractor's expense.

B. Inspections: Special inspections in accordance with [TMS 402/ACI 530/ASCE 5 and TMS 602/ASCE 6.

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Testing Prior to Construction: One set of tests.

D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.

E. Clay Masonry Unit Test: For each type of unit provided, in accordance with ASTM C67/C67M for compressive strength.

F. Concrete Masonry Unit Test: For each type of unit provided, in accordance with ASTM C140/C140M for compressive strength.

G. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, in accordance with ASTM C780.

H. Grout Test (Compressive Strength): For each mix provided, in accordance with ASTM C1019.

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 stone and 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 brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
6. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

7. Clean masonry with a proprietary acidic masonry cleaner applied according to manufacturer's written instructions.
8. Clean cast stone trim to comply with cast stone manufacturer's written instructions.

3.17 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 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 2000 "Earth Moving."

3. Do not dispose of masonry waste as fill within 18 inches 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 2000

SECTION 08 7100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Sliding doors.
3. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Electromechanical door hardware.
3. Automatic operators.
4. Cylinders specified for doors in other sections.

C. Related Sections:

1. Division 08 Section “Hollow Metal Doors and Frames”.
2. Division 08 Section “Flush Wood Doors”.
3. Division 08 Section “Fiberglass Doors”,
4. Division 08 Section “Aluminum-Framed Entrances and Storefronts”.
5. Division 28 Section “Access Control”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. UL/ULC and CSA C22.2 - Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors.
8. Michigan Building Code 2015, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1. ANSI/BHMA Certified Product Standards - A156 Series.
2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
3. ANSI/UL 294 - Access Control System Units.
4. UL 305 - Panic Hardware.
5. ANSI/UL 437- Key Locks.

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
3. Content: Include the following information:
    a. Type, style, function, size, label, hand, and finish of each door hardware item.
    b. Manufacturer of each item.
    c. Fastenings and other pertinent information.
    d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    e. Explanation of abbreviations, symbols, and codes contained in schedule.
    f. Mounting locations for door hardware.
    g. Door and frame sizes and materials.
    h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Shop Drawings: Details of electrified access control hardware indicating the following:

1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
    a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
    b. Complete (risers, point-to-point) access control system block wiring diagrams.

c. Wiring instructions for each electronic component scheduled herein.

2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

E. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.4 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

E. Automatic Operator Supplier Qualifications: Power operator products and accessories are required to be supplied and installed through the Norton Preferred Installer (NPI) program. Suppliers are to be factory trained, certified, and a direct purchaser of the specified power operators and be responsible for the installation and maintenance of the units and accessories indicated for the Project.

F. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

G. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

H. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.
3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

I. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures

J. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

1.8 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:
   a. Two Hinges: For doors with heights up to 60 inchesThree Hinges: For doors with heights 61 to 90 inchesFour Hinges: For doors with heights 91 to 120 inchesFor doors with heights more than 120 inchesprovide 4 hinges, plus 1 hinge for every 30 inchesof door height greater than 120 inchesHinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
   a. Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.
   b. Sizes from 3’1” to 4’0”: 5” standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
   a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
   b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following:
   a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5. Manufacturers:

   a. McKinney (MK) - TA/T4A Series, 5 knuckle.

B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Where specified, provide modular continuous geared hinges that ship in two or three pieces and form a single continuous hinge upon installation.

2. Manufacturers:.

    a. Pemko (PE).

2.3 POWER TRANSFER DEVICES

A. Electrified Quick Connect Continuous Geared Transfer Hinges: Provide electrified transfer continuous geared hinges with a removable service panel cutout accessible without de-mounting door from the frame. Furnish with Molex™ standardized plug connectors with sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:

    a. Pemko (PE) - SER-QC (# wires) Option.

B. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:

    a. Securitron (SU) - EL-CEPT Series.

C. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

1. Provide one each of the following tools as part of the base bid contract:
    a. McKinney (MK) - Electrical Connecting Kit: QC-R001.
    b. McKinney (MK) - Connector Hand Tool: QC-R003.

2. Manufacturers:

    a. McKinney (MK) - QC-C Series.

2.4 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: Provide products conforming to ANSI/BHMA A156.3 and A156.16, Grade 1.

1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
2. Furnish dust proof strikes for bottom bolts.
3. Surface bolts to be minimum 8” in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
5. Manufacturers:

    a. Rockwood (RO).

B. Coordinators: ANSI/BHMA A156.3 door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.

1. Manufacturers:

    a. Rockwood (RO).

C. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inchthick, size as indicated in hardware sets,with beveled edges, secured with exposed screws unless otherwise indicated.
2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Pulls, where applicable, shall be provided with a 10” clearance from the finished floor on the push side to accommodate wheelchair accessibility.
5. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
6. Manufacturers:

    a. Rockwood (RO).

2.5 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:

1. Threaded mortise cylinders with rings and cams to suit hardware application.
2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
4. Tubular deadlocks and other auxiliary locks.
5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
6. Keyway: Match Facility Restricted Keyway.

C. Cylinders for interior doors: ANSI/BHMA A156.5, Grade 1 Certified Products Directory (CPD) listed cylinders. Cylinders are to be factory keyed with owner having the ability for on-site original key cutting.

1. Manufacturers:

a. Sargent (SA) - XC.
b. No Substitution.

D. Keying System: Each type of lock and cylinders to be factory keyed.

1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. Existing System (cylinders and keys for exterior doors): Owner shall provide all cylinders and keys for exterior doors.

E. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).

F. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.
3. Exterior doors: Furnish a list of opening numbers with locking devices, showing cylinder types and quantities required when cylinders or cores are to be owner furnished.

2.6 KEY CONTROL

A. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

1. Manufacturers:

a. Lund Equipment (LU).
b. MMF Industries (MM).
c. Telkee (TK).

2.7 MECHANICAL LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.

1. Where specified, provide status indicators with highly reflective color and wording for “locked/unlocked” or “vacant/occupied” with custom wording options if required. Indicator to be located above the cylinder with the inside thumb-turn not blocking the visibility of the indicator status. Indicator window size to be a minimum of 2.1” x 0.6” with a curved design allowing a 180-degree viewing angle with protective covering to prevent tampering.
2. Manufacturers:

    a. Sargent Manufacturing (SA) - 8200 Series.
    b. No Substitution.

2.8 ELECTRIC STRIKES

A. Standard Electric Strikes: Electric strikes conforming to ANSI/BHMA A156.31, Grade 1, for use on non-rated or fire rated openings. Strikes shall be of stainless steel construction tested to a minimum of 1500 pounds of static strength and 70 foot-pounds of dynamic strength with a minimum endurance of 1 million operating cycles. Provide strikes with 12 or 24 VDC capability, fail-secure unless otherwise specified. Where specified provide latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike.

1. Manufacturers:

    a. HES (HS) - 1500/1600 Series.

B. Surface Mounted Rim Electric Strikes: Surface mounted rim exit device electric strikes conforming to ANSI/BHMA A156.31, Grade 1, and UL Listed for both Burglary Resistance and for use on fire rated door assemblies. Construction includes internally mounted solenoid with two heavy-duty, stainless steel locking mechanisms operating independently to provide tamper resistance. Strikes tested for a minimum of 500,000 operating cycles. Provide strikes with 12 or 24 VDC capability supplied standard as fail-secure unless otherwise specified. Option available for latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike. Strike requires no cutting to the jamb prior to installation.

1. Manufacturers:

    a. HES (HS) - 9400/9500/9600/9700/9800 Series.

C. Provide electric strikes with in-line power controller and surge suppressor by the same manufacturer as the strike with the combined products having a five year warranty.

2.9 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
5. Flush End Caps: Provide flush end caps made of architectural metal in the same finish as the devices as in the Hardware Sets. Plastic end caps will not be acceptable.
6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
    a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
    b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
10. Rail Sizing: Provide exit device rails factory sized for proper door width application.
11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets.

1. Exit devices shall have no catch points.
2. Exit devices shall have concealed hex key dogging.
3. Exit devices shall have dogging and chassis indicators as specified in the hardware sets. Chassis indicator to show locked/unlocked status of exterior trim, dogging indicator to have both passive and active options.
4. Exit devices shall have narrow or wide style exterior trim as specified in the hardware sets.
5. Concealed vertical rod exit devices shall have center case adjustability.
6. Exit devices shall not require wire routing through the door for electromechanical functions.
7. Manufacturers:

    a. Corbin Russwin Hardware (RU) - PED4000 / PED5000 Series.
    b. No Substitution.

2.10 ELECTROMECHANICAL EXIT DEVICES

A. Electromechanical Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices subject to same compliance standards and requirements as mechanical exit devices. Electrified exit devices to be of type and design as specified below and in the hardware sets.

1. Energy Efficient Design: Provide devices which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.
2. Where conventional power supplies are not sufficient, include any specific controllers required to provide the proper inrush current.
3. Motorized Electric Latch Retraction: Devices with an electric latch retraction feature must use motors which have a maximum current draw of 600mA. Solenoid driven latch retraction is not acceptable.
4. Manufacturers:

    a. Corbin Russwin Hardware (RU) - PED5000 Series.
    b. No Substitution.

2.11 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
3. Cycle Testing: Provide closers which have surpassed 15 million cycles.
4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard..

1. Manufacturers:

    a. Norton Rixson (NO) - 7500 Series.
    b. No Substitution.

C. Door Closers, Surface Mounted (Cam Action): ANSI/BHMA 156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, high efficiency door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be of the cam and roller design, one piece cast aluminum silicon alloy body with adjustable backcheck and independently controlled valves for closing sweep and latch speed.

1. Manufacturers:

    a. Norton Rixson (NO) - 2800ST Series.
    b. No Substitution.

2.12 ELECTROHYDRAULIC DOOR OPERATORS

A. General: Provide low energy operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for compliance with UL 325. Coordinate operator mechanisms with door operation, hinges, and activation devices.

1. Fire-Rated Doors: Provide door operators for fire-rated door assemblies that comply with NFPA 80 for fire-rated door components and are listed and labeled by a qualified testing agency.

B. Standard: Conforming to ANSI/BHMA A156.19.

C. Performance Requirements:

1. Opening Force if Power Fails: Not more than 15 lbfrequired to release a latch if provided, not more than 30 lbfrequired to manually set door in motion, and not more than 15 lbfrequired to fully open door.
2. Entrapment Protection: Not more than 15 lbfrequired to prevent stopped door from closing or opening.

D. Configuration: Surface mounted or in-ground as required. Door operators to control single swinging and pair of swinging doors.

E. Operation: Power opening and spring closing operation capable of meeting ANSI A117.1 accessibility guideline. Provide time delay for door to remain open before initiating closing cycle as required by ANSI/BHMA A156.19. When not in automatic mode, door operator to function as manual door closer with fully adjustable opening and closing forces, with or without electrical power.

F. Features: Operator units to have full feature adjustments for door opening and closing force and speed, backcheck, motor assist acceleration from 0 to 30 seconds, time delay, vestibule interface delay, obstruction recycle, and hold open time from 0 up to 30 seconds.

G. Provide outputs and relays on board the operator to allow for coordination of exit device latch retraction, electric strikes, magnetic locks, card readers, safety and motion sensors and specified auxiliary contacts.

H. Brackets and Reinforcements: Manufacturer's standard, fabricated from aluminum with nonferrous shims for aligning system components.

I. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Norton Rixson (NO) - 6000 Series.
2. Record (RE) – 8100 Series.

2.13 SURFACE MOUNTED CLOSER HOLDERS

A. Closer Holder Release Devices: ANSI A156.15 certified closer holder release devices designed to hold open fire or smoke rated doors until interruption of signal from fire alarm, smoke detector or remote release switch. . Pull side, push side, or double egress mounting applications available with non-handed track and closer body and dual voltage input (24V/120V). Voltage to be 24VDC unless otherwise specified. Where optional detector is required, provide integral photo electric type with LED indicator. Auxiliary door stops are required at hold open point.

1. Manufacturers:

a. Norton Rixson (NO) - 7700PT(D) Series.

B. Electromagnetic Door Holders: ANSI A156.15 electromagnetic door holder/releases with a minimum 20 to 40 pounds holding power and single coil construction able to accommodate.12VDC, 24VAC, 24VDC and 120VAC. Coils to be independently wound, employing an integral fuse and armatures to include a positive release button.

1. Manufacturers:

a. Norton Rixson (RF) - 980/990 Series.

2.14 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Where plates are applied to fire rated doors with the top of the plate more than 16” above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer’s catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 protection plates (kick, armor, or mop), fabricated from the following:

a. Stainless Steel: 300 grade, 050-inchthick.

5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:

    a. Rockwood (RO).

2.15 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Manufacturers:

    a. Rockwood (RO).

C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

1. Manufacturers:

    a. Norton Rixson (RF).

2.16 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Manufacturers:

1. Pemko (PE).

2.17 ELECTRONIC ACCESSORIES

A. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.

1. Manufacturers:

a. Securitron (SU) - DPS Series.

B. Intelligent Switching Power Supplies: Provide power supplies with single, dual or multi-voltage configurations at 12 and/or 24VDC. Power Supply shall have battery backup function with an integrated battery charging circuit. The power supply shall have a standard, integrated Fire Alarm Interface (FAI). The power supply shall provide capability for secondary voltage, power distribution, direct lock control and network monitoring through add on modules. The power supply shall be expandable up to 16 individually protected outputs. Output modules shall provide individually protected, continuous outputs and/or individually protected, relay controlled outputs. Network modules shall provide remote monitoring functions such as status reporting, fault reporting and information logging.

1. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.
2. Manufacturers:

a. Provided by Security Contractor.

2.18 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.19 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. DHI TDH-007-20: Installation Guide for Doors and Hardware.

3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Sections “Closeout Procedures”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.
2. The supplier is responsible for handing and sizing all products.
3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

B. Manufacturer's Abbreviations:

1. MK - McKinney
2. PE - Pemko
3. OT - Other
4. RO - Rockwood
5. RU - Corbin Russwin
6. SA - SARGENT
7. AD - Adams Rite
8. AA - ASSA High Security Locks
9. HS - HES
10. RF - Rixson
11. NO - Norton
12. SU - Securitron

Hardware Sets

Set: 1.0

Doors: V180A

2 Continuous Hinge	CFM__SLF-HD1-M x QC12		PE	ϟ
1 Removable Mullion	910KM		RU	
1 Rim Exit Device, Exit Only	PED5200 EO M110 MELR M48 M52	630	RU	ϟ

1	Rim Exit Device, Exit Only	PED5200 EO M110 M91 MELR M48 M52	630	RU	ϟ
3	Mortise Cylinder	- Provided by Owner		AA	
2	Vandal Resistant Trim	VRT22	US32D	RO	
2	Conc Overhead Stop	6-X36	630	RF	
1	Automatic Opener (double door)	D6021 (D2) - confirm head detail	689	NO	ϟ
1	Threshold	253x4AFG MSES25SS		PE	
1	Weatherstrip	- integral within construction of door and frame assembly		00	
2	Sweep	29326CNB x TKSP8		PE	
1	Removable Mullion Seal	5110BL x height of mullion		PE	
2	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	ϟ
2	ElectroLynx Harness	QC-C (power transfer to exit device rail)		MK	ϟ
1	Door Switch	503/505 as required		NO	ϟ
1	Door Switch	504 - vestibule		NO	ϟ
2	Position Switch	- Provided by Security Contractor		00	ϟ
1	Power Supply	- Provided by Security Contractor		00	ϟ
1	Card Reader	- Provided by Security Contractor		00	

Notes: Operation Description:
Door normally closed and locked. Valid use of card reader outside retracts latch bolt of active leaf permitting entry. Dogging of latch bolts controlled by use of key inside. No key outside.
Activating actuator switch in vestibule retracts the latch bolt of the exit device, if locked, and initiates automatic operator cycle.
Activating exterior actuator switch will initiate cycle of automatic operator if the latch bolt is in the retracted position (push /pull operation). Utilize latch bolt monitor in exit device for this function.
After hours - access by valid use of card reader outside / automatic operator will only operate if card reader is authorized first.

Automatic operators and exit devices shall be connected to smoke alarm system. Upon activation of smoke alarm, the doors shall unlock and the automatic operators shall cycle open immediately. Doors shall remain open until system is manually reset.

Set: 2.0

Doors: 190C

1	Continuous Hinge	CFM__SLF-HD1-M		PE	
1	Continuous Hinge	CFM__SLF-HD1-M x QC12		PE	ϟ
1	Removable Mullion	910KM		RU	
1	Rim Exit Device, Exit Only	PED5200 EO M110 M48 M52	630	RU	
1	Rim Exit Device, Nightlatch	PED5200 K157ET M110 MELR M48	630	RU	ϟ

		M52			
3	Mortise Cylinder	- Provided by Owner		AA	
1	Rim Cylinder	- Provided by Owner		AA	
1	Vandal Resistant Trim	VRT22 C	US32D	RO	
2	Surface Closer	CPS7500 x 6890 x 6891	689	NO	
1	Threshold	253x4AFG MSES25SS		PE	
1	Weatherstrip	- integral within construction of door and frame assembly		00	
2	Sweep	29326CNB x TKSP8		PE	
1	Removable Mullion Seal	5110BL x height of mullion		PE	
1	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	ϟ
1	ElectroLynx Harness	QC-C (power transfer to exit device rail)		MK	ϟ
2	Position Switch	- Provided by Security Contractor		00	ϟ
1	Power Supply	- Provided by Security Contractor		00	ϟ
1	Card Reader	- Provided by Security Contractor		00	
1	Electric Power Transfer	EL-CEPT	630	SU	ϟ

Notes: Operation Description: Doors normally closed and locked. Key override outside retracts latch bolt of active leaf. Valid use of card reader outside temporarily retracts latch bolt of exit device electronically allowing access. Free egress always permitted.

Set: 3.0

Doors: V100A, V100B

1	Continuous Hinge	CFM__SLF-HD1-M x QC12		PE	ϟ
1	Rim Exit Device, Exit Only	PED5200 EO M110 MELR M48 M52	630	RU	ϟ
1	Mortise Cylinder	- Provided by Owner		AA	
1	Vandal Resistant Trim	VRT22	US32D	RO	
1	Conc Overhead Stop	6-X36	630	RF	
1	Automatic Opener	D6021 - confirm head detail	689	NO	ϟ
1	Threshold	253x4AFG MSES25SS		PE	
1	Weatherstrip	- integral within construction of door and frame assembly		00	
1	Sweep	29326CNB x TKSP8		PE	
1	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	ϟ
1	ElectroLynx Harness	QC-C (power transfer to exit device rail)		MK	ϟ
1	Position Switch	- Provided by Security Contractor		00	ϟ
1	Power Supply	- Provided by Security Contractor		00	ϟ

Notes: ** Fixed mullion in frame.

Doors normally closed and locked. Key inside controls manual dogging of latch bolt for push / pull operation. Doors shall unlock upon schedule as determined in access control system.
Free egress always permitted.

Automatic operators and exit devices shall be connected to smoke alarm system. Upon activation of smoke alarm, the doors shall unlock and the automatic operators shall cycle open immediately. Doors shall remain open until system is manually reset.

Set: 4.0

Doors: V100C

1	Continuous Hinge	CFM__SLF-HD1-M x QC12		PE	
1	Rim Exit Device, Nightlatch	PED5200 K157ET M110 M91 MELR M48 M52	630	RU	
1	Mortise Cylinder	- Provided by Owner		AA	
1	Rim Cylinder	- Provided by Owner		AA	
1	Vandal Resistant Trim	VRT22 C	US32D	RO	
1	Conc Overhead Stop	6-X36	630	RF	
1	Automatic Opener (single door)	6021 (D) - confirm head detail	689	NO	
1	Threshold	253x4AFG MSES25SS		PE	
1	Weatherstrip	- integral within construction of door and frame assembly		00	
1	Sweep	29326CNB x TKSP8		PE	
1	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	
1	ElectroLynx Harness	QC-C (power transfer to exit device rail)		MK	
1	Intercom / Video Station	- Provided by Security Contractor		OT	
1	Door Switch	503/505 as required		NO	
1	Door Switch (jamb mount)	503		NO	
1	Position Switch	- Provided by Security Contractor		00	
1	Power Supply	- Provided by Security Contractor		00	
1	Card Reader	- Provided by Security Contractor		00	

Notes: Operation Description:
Door normally closed and locked. Valid use of card reader outside or activation of remote push button in intercom system shall unlock exit device permitting entry. Dogging of latch bolt controlled by use of key inside. Door may be unlocked and used as push / pull door as programmed by access control system and then relocked at scheduled times.
Activating actuator switch in vestibule retracts the latch bolt of the exit device, if locked, and initiates automatic

operator cycle.
Activating exterior actuator switch will initiate cycle of automatic operator if the latch bolt is in the retracted position (push /pull operation). Utilize latch bolt monitor in exit device for this function.
After hours - access by valid use of card reader outside / automatic operator will only operate if card reader is authorized first.

Automatic operator and exit device shall be connected to smoke alarm system. Upon activation of smoke alarm, the door shall unlock and the automatic operator shall cycle open immediately. Door shall remain open until system is manually reset.

Set: 5.0

Doors: M193B

2	Continuous Hinge	CFM__SLF-HD1-M		PE
1	Removable Mullion	910KM		RU
1	Rim Exit Device, Exit Only	PED5200 EO M110 M48 M52	630	RU
1	Rim Exit Device, Nightlatch	PED5200 K157ET M110 M48 M52	630	RU
3	Mortise Cylinder	- Provided by Owner		AA
1	Rim Cylinder	- Provided by Owner		AA
1	Vandal Resistant Trim	VRT22 C	US32D	RO
2	Surface Closer	CPS7500 x 6890 x 6891	689	NO
1	Threshold	253x4AFG x MSES25SS		PE
1	Weatherstrip	- integral within construction of door and frame assembly		00
2	Sweep	29326CNB x TKSP8		PE
2	Position Switch	DPS-M-BK		SU

Notes: Function: Doors normally closed and locked. Key outside active leaf retracts latch bolt. Exit devices equipped with keyed cylinder inside to control dogging of latch bolt (push / pull operation). Free egress always permitted.

Set: 6.0

Doors: E199B

1	Continuous Hinge	CFM__SLF-HD1-M		PE
1	Rim Exit Device, Nightlatch	PED5200 K157ET M110 M48 M52	630	RU
1	Mortise Cylinder	- Provided by Owner		AA
1	Rim Cylinder	- Provided by Owner		AA
1	Vandal Resistant Trim	VRT22 C	US32D	RO
1	Surface Closer	CPS7500 x 6890 x 6891	689	NO
1	Threshold	253x4AFG x MSES25SS		PE

1 Weatherstrip	- integral within construction of door and frame assembly		00	
1 Sweep	29326CNB x TKSP8		PE	
1 Position Switch	DPS-M-BK		SU	⚡

Notes: Function: Key outside retracts latch bolt. Keyed cylinder inside controls latch bolt dogging. Free egress always permitted.

Set: 7.0

Doors: 112C, 114D, 130B, 140, 170B

1 Continuous Hinge	CFM__SLF-HD1-M		PE	
1 Rim Exit Device, Exit Only	PED5200 EO M110 M48 M52	630	RU	
1 Mortise Cylinder	- Provided by Owner		AA	
1 Electric Strike	9600	630	HS	⚡
1 SMART Pac Bridge Rectifier	2005M3		HS	⚡
1 ElectroLynx Adaptor	2004M		HS	⚡
1 Vandal Resistant Trim	VRT22	US32D	RO	
1 Surface Closer	CPS7500 x 6890 x 6891	689	NO	
1 Threshold	253x4AFG x MSES25SS		PE	
1 Weatherstrip	- integral within construction of door and frame assembly		00	
1 Sweep	29326CNB x TKSP8		PE	
1 ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	⚡
1 Position Switch	- Provided by Security Contractor		00	⚡
1 Power Supply	- Provided by Security Contractor		00	⚡
1 Card Reader	- Provided by Security Contractor		00	

Notes: Door normally closed and locked. Valid use of card reader outside unlocks electric strike permitting entry. Keyed cylinder inside controls dogging of latch bolt. No key outside.
Free egress always permitted.

Set: 8.0

Doors: 130C, 170C

1 Continuous Hinge	10BEFM__SLF-HD1-M		PE	
1 Rim Exit Device, Exit Only	PED5200 EO M110 M48 M52	613E	RU	
1 Mortise Cylinder	- Provided by Owner		AA	

1	Surface Closer	CPS7500 x 6890 x 6891	613E	NO	
1	Threshold	253x4-10BE-FG x MSES25SS		PE	
1	Sweep	29326-10BE-NB x TKSP		PE	
1	Weatherstrip	- integral within construction of door and frame assembly		00	
1	Position Switch	DPS-M-BK		SU	⚡

Notes: Exit only. Keyed cylinder inside controls dogging of latch bolt.
Free egress always permitted.

Set: 9.0

Doors: 107B, 183C

1	Continuous Hinge	CFM__SLF-HD1-M		PE	
1	Paddle Operator	4591 ("PUSH")	US26D	AD	
1	Deadlatch	4900	628	AD	
1	Electric Strike	7410M ELX	630	AD	⚡
1	Push Bar	RM3112 Mtg-Type 11XHD	US32D-316	RO	
1	Vandal Resistant Trim	VRT22	US32D	RO	
1	Surface Closer	CPS7500 x 6890 x 6891	689	NO	
1	Threshold	253x4AFG x MSES25SS		PE	
1	Weatherstrip	- integral within construction of door and frame assembly		00	
1	Sweep	29326CNB x TKSP8		PE	
1	Position Switch	- Provided by Security Contractor		00	⚡
1	Power Supply	- Provided by Security Contractor		00	⚡
1	Card Reader	- Provided by Security Contractor		00	

Notes: Door normally closed and locked. Valid use of card reader outside releases electric strike permitting entry. No key outside.
Free egress always permitted.

Set: 10.0

Doors: V100D, V100E

1	Continuous Hinge	CFM__SLF-HD1-M x QC12		PE	⚡
1	Fixed Mullion	In Frame		OT	
1	Rim Exit Device, Exit Only	PED5200 EO M110 MELR M48 M52	630	RU	⚡

1	Mortise Cylinder	- Provided by Owner		AA	
1	Vandal Resistant Trim	VRT22	US32D	RO	
1	Conc Overhead Stop	6-X36	630	RF	
1	Automatic Opener	D6021 - confirm head detail	689	NO	ϟ
1	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	ϟ
1	ElectroLynx Harness	QC-C (power transfer to exit device rail)		MK	ϟ
1	Power Supply	- Provided by Security Contractor		00	ϟ

Notes: ** Fixed mullion in frame.

Doors normally closed and locked. Key inside controls manual dogging of latch bolt for push / pull operation. Doors shall unlock upon schedule as determined in access control system.
Free egress always permitted.

Automatic operators and exit devices shall be connected to smoke alarm system. Upon activation of smoke alarm, the doors shall unlock and the automatic operators shall cycle open immediately. Doors shall remain open until system is manually reset.

Set: 11.0

Doors: V100F

1	Continuous Hinge	CFM__SLF-HD1-M x QC12		PE	ϟ
1	Rim Exit Device, Nightlatch	PED5200 K157ET M110 M91 MELR M48 M52	630	RU	ϟ
1	Mortise Cylinder	- Provided by Owner		AA	
1	Rim Cylinder	- Provided by Owner		AA	
1	Vandal Resistant Trim	VRT22 C	US32D	RO	
1	Conc Overhead Stop	6-X36	630	RF	
1	Automatic Opener (single door)	6021 (D) - confirm head detail	689	NO	ϟ
1	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	ϟ
1	ElectroLynx Harness	QC-C (power transfer to exit device rail)		MK	ϟ
1	Door Switch	503/505 as required		NO	ϟ
1	Door Switch (jamb mount)	503		NO	ϟ
1	Power Supply	- Provided by Security Contractor		00	ϟ
1	Card Reader	- Provided by Security Contractor		00	

Notes: Operation Description:
Door normally closed and locked. Valid use of card reader in vestibule shall unlock exit device permitting entry. Dogging of latch bolt controlled by use of key inside. Door may be unlocked and used as push / pull door as

programmed by access control system and then relocked at scheduled times.
Activating actuator switch in corridor retracts the latch bolt of the exit device, if locked, and initiates automatic operator cycle.
Activating actuator switch in vestibule will initiate cycle of automatic operator if the latch bolt is in the retracted position (push /pull operation). Utilize latch bolt monitor in exit device for this function.
After hours - access by valid use of card reader in vestibule / automatic operator will only operate if card reader is authorized first.

Automatic operator and exit device shall be connected to smoke alarm system. Upon activation of smoke alarm, the door shall unlock and the automatic operator shall cycle open immediately. Door shall remain open until system is manually reset.

Set: 12.0

Doors: V180B

2	Continuous Hinge	CFM__SLF-HD1-M		PE	
2	Push Bar	RM3112 Mtg-Type 11XHD	US32D-316	RO	
2	Vandal Resistant Trim	VRT22	US32D	RO	
2	Conc Overhead Stop	6-X36	630	RF	
1	Automatic Opener (double door)	D6021 (D2) - confirm head detail	689	NO	ϟ
1	Door Switch (jamb mount)	503		NO	ϟ

Notes: Doors are push / pull operation. Activation of door switch in vestibule or on corridor side of door shall cycle automatic operator on one leaf.

Automatic operators shall be connected to smoke alarm system. Upon activation of smoke alarm, the automatic operators shall cycle open immediately. Doors shall remain open until system is manually reset.

Set: 13.0

Doors: 120H, 150H, 220H, 250H, 280H

1	Continuous Hinge	CFM__HD1-M		PE	
1	Continuous Hinge	CFM__HD1-M x PT		PE	
1	Fire Rated Conc Vert Rod, Exit Only	PED5860B EO M55 M110	630	RU	
1	Fire Rated Conc Vert Rod, Storeroom	PED5860B N959PT M55 M110 MELR	630	RU	ϟ
1	Rim Cylinder	11 34 GGMK	US15	SA	
2	Surface Closer	7500 - pull side mount	689	NO	
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	
2	Electromagnetic Holder	994M	689	RF	ϟ
1	Smoke / Sound Seal	S88BL - head and jambs		PE	

1	Meeting Edge Seal	S772C x height of door		PE	
1	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	ϟ
1	ElectroLynx Harness	QC-C (power transfer to exit device lever trim)		MK	ϟ
1	Power Supply	- Provided by Security Contractor		00	ϟ
1	Electric Power Transfer	EL-CEPT	630	SU	ϟ
1	Card Reader	- Provided by Security Contractor		00	

Notes: Operation Description: Doors normally closed and locked. Key override outside retracts latch bolt of active leaf. Valid use of card reader outside temporarily retracts latch bolt of active leaf permitting entry.
Free egress always permitted.

Doors held open by electromagnetic door holders on adjacent walls. Power for electromagnetic holders shall be connected to fire alarm system in order that doors close immediately upon activation of fire alarm.

Set: 14.0

Doors: 110H, 210H

2	Continuous Hinge	CFM__HD1-M		PE	
2	Push Plate	70F	US32D	RO	
1	Automatic Opener (double egress)	D6001DE1R	689	NO	ϟ
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	
2	Electromagnetic Holder	994M	689	RF	ϟ
2	Silencer	608 / 609		RO	

Notes: Automatic operators and electromagnetic door holders shall be connected to smoke alarm system. Upon activation of smoke alarm, the electromagnetic holders shall energize and the automatic operators shall cycle open immediately. Doors shall remain open until system is manually reset.

Set: 15.0

Doors: E199A

3	Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1	Exit Device (rim, storeroom)	PED5200A N959PT M110	630	RU
1	Rim Cylinder	11 34 GGMK	US15	SA
1	Surface Closer	PR7500	689	NO
1	Arm Support Bracket	6890	689	NO
1	Kick Plate	K1050 10"high CSK BEV	US32D	RO
1	Wall Stop	406	US32D	RO
3	Silencer	608 / 609		RO

Notes: *(* Size hinges accordingly for 180 degree swing.

Key outside retracts latch bolt. Outside lever rigid.
Free egress always permitted.

Set: 16.0

Doors: M212

3	Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1	Exit Device (rim, storeroom)	PED5200A N959PT M110	630	RU
1	Rim Cylinder	11 34 GGMK	US15	SA
1	Conc Overhead Stop	1-X36	652	RF
1	Surface Closer	J7500 x mounting plate to suit application	689	NO
1	Kick Plate	K1050 10"high CSK BEV	US32D	RO
1	Threshold	253x4AFG MSES25SS (7-1/8" deep)		PE
1	Sound Seal	350CSPK TKSP - head and jamb		PE
1	Conc. Auto. Door Bottom	STC411APK x door width		PE

Notes: Key outside retracts latch bolt. Outside lever rigid.
Free egress always permitted.

Set: 17.0

Doors: 130A, 170A, 230A, 270A

3	Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1	Exit Device (rim, passage)	PED5200A N910PT M110	630	RU
1	Surface Closer	7500 - pull side mount	689	NO
1	Kick Plate	K1050 10"high CSK BEV	US32D	RO
1	Wall Stop	406	US32D	RO
1	Smoke / Sound Seal	S88BL - head and jambs		PE

Notes: Passage lever trim.
Free egress always permitted.

Set: 18.0

Doors: 122A, 126, 132A, 134, 142A, 146A, 152A, 154, 162A, 166A, 172A, 174, 222A, 226, 232A, 234, 242A, 246A, 252A, 254, 262A, 266A, 272A, 274

3	Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1	Exit Device (rim, classroom security)	PED5202 N955PT M110 M47	630	RU
1	Mortise Cylinder	11 41 GGMK	US15	SA
1	Rim Cylinder	11 34 GGMK	US15	SA
1	Surface Closer	J7500H (H.O.) x mounting plate to suit application	689	NO
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Wall Stop	406	US32D	RO
1	Threshold	173A		PE
1	Sound Seal	350CSPK TKSP - head and jamb		PE
1	Conc. Auto. Door Bottom	STC411APK x door width		PE

Notes: Key outside retracts latch bolt. Key inside locks or unlocks outside lever trim.
Free egress always permitted.

Set: 19.0

Doors: 112A, 114A

3	Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1	Fire Exit Device (rim, classroom security)	PED5202A N955PT M110 M47	630	RU
1	Mortise Cylinder	11 41 GGMK	US15	SA
1	Rim Cylinder	11 34 GGMK	US15	SA
1	Surface Closer	J7500 x mounting plate to suit application	689	NO
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Wall Stop	406	US32D	RO
1	Threshold	173A		PE
1	Sound Seal	350CSPK TKSP - head and jamb		PE
1	Conc. Auto. Door Bottom	STC411APK x door width		PE

Notes: Key outside retracts latch bolt. Key inside locks or unlocks outside lever trim.
Free egress always permitted.

Set: 20.0

Doors: 190A, 190B

2	Continuous Hinge	CFM__HD1-M		PE
1	Removable Mullion	CR908BKM		RU
2	Fire Rated Rim Exit, Classroom	PED5200A N955PT M110	630	RU

1 Mortise Cylinder	11 41 GGMK	US15	SA
2 Rim Cylinder	11 34 GGMK	US15	SA
2 Surface Closer	CPS7500	689	NO
2 Arm Support Bracket	6890	689	NO
2 Kick Plate	K1050 10" high CSK BEV	US32D	RO
1 Smoke / Sound Seal	S88BL - head and jambs		PE
1 Removable Mullion Seal	5110BL x height of mullion		PE

Notes: Key outside locks or unlocks lever trim. Free egress always permitted.

Set: 21.0

Doors: 111B

6 Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1 Top Flush Bolt	2905	US26D	RO
1 Storeroom Lock	11 8204 LNL GGMK	US26D	SA
2 Surf Overhead Stop	9-X36	652	RF
2 Kick Plate	K1050 10" high CSK BEV	US32D	RO
2 Silencer	608 / 609		RO

Notes: Function: Latch bolt operated by key outside or lever inside. Outside lever always rigid. Inside lever always free for egress.

Set: 22.0

Doors: M195

6 Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1 Top Flush Bolt	2905	US26D	RO
1 Storeroom Lock	11 8204 LNL GGMK	US26D	SA
1 Coordinator	2672	US28	RO
1 Filler Bar	FB-1 / FB-2	US28	RO
2 Mounting Bracket	2601AB / 2601C	US28	RO
2 Surface Closer	PR7500	689	NO
2 Kick Plate	K1050 10" high CSK BEV	US32D	RO
2 Wall Stop	406	US32D	RO
1 Smoke / Sound Seal	S88BL - head and jambs		PE
1 Meeting Edge Seal	S772C x height of door		PE

Notes: ** Size hinges accordingly for 180 degree swing.

Function: Latch bolt operated by key outside or lever inside. Outside lever always rigid. Inside lever always free for egress.

Set: 23.0

Doors: 112K, 189, 261S

3 Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1 Storeroom Lock	11 8204 LNL GGMK	US26D	SA
1 Wall Stop	406	US32D	RO
3 Silencer	608 / 609		RO

Notes: Function: Latch bolt operated by key outside or lever inside. Outside lever always rigid. Inside lever always free for egress.

Set: 24.0

Doors: E197

3 Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1 Storeroom Lock	11 8204 LNL GGMK	US26D	SA
1 Surface Closer	CPS7500	689	NO
1 Kick Plate	K1050 10"high CSK BEV	US32D	RO
1 Smoke / Sound Seal	S88BL - head and jambs		PE

Notes: Function: Latch bolt operated by key outside or lever inside. Outside lever always rigid. Inside lever always free for egress.

Set: 25.0

Doors: 102, 104, 106, 108, 109

3 Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1 Office Lock	11 V01 8205 LNL GGMK x LB thumb turn	US26D	SA
1 Wall Stop	406	US32D	RO
3 Silencer	608 / 609		RO

Notes: Latch operated by lever either side, unless outside lever is locked or unlocked by key outside or thumb turn inside. Outside lever is unlocked by key outside or thumb turn inside. Latch is retracted by key outside when outside lever is locked. Inside lever always free.

Set: 26.0

Doors: 107A

3 Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1 Classroom Security Intruder Lock	11 V01 8238 LNL GGMK	US26D	SA
1 Wall Stop	406	US32D	RO
3 Silencer	608 / 609		RO

Notes: Key from either side locks and unlocks lever outside.
Key from either side retracts latch bolt.
Lever outside retracts latch bolt, except when outside lever is locked by key.
Lever inside always retracts latch bolt for egress.

Set: 27.0

Doors: 104T

3 Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1 Privacy Lock	V21 8265 LNL x LB thumb turn	US26D	SA
1 Conc Overhead Stop	2-X36	652	RF
3 Silencer	608 / 609		RO

Set: 28.0

Doors: 100T, 122T, 123-5T, 126T, 132T, 134T, 136T, 140T, 161-5T, 223-5T, 240T, 261-5T

3 Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1 Privacy Lock	V21 8265 LNL x LB thumb turn	US26D	SA
1 Surface Closer	7500 - pull side mount	689	NO
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO
1 Wall Stop	406	US32D	RO
3 Silencer	608 / 609		RO
1 Coat Hook	RM828	US32D	RO

Notes: Install coat hook at 48" centerline above floor.

Set: 29.0

Doors: D140, D240

3 Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1 Storeroom Lock	11 8204 LNL GGMK	US26D	SA

1	Electric Strike	1500C	630	HS	ϟ
1	SMART Pac Bridge Rectifier	2005M3		HS	ϟ
1	ElectroLynx Adaptor	2004M		HS	ϟ
1	Surface Closer	7500 - pull side mount	689	NO	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	
1	Wall Stop	406	US32D	RO	
3	Silencer	608 / 609		RO	
1	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	ϟ
1	Power Supply	- Provided by Security Contractor		00	ϟ
1	Card Reader	- Provided by Security Contractor		00	

Notes: Door normally closed and locked. Valid use of card reader outside temporarily unlocks electric strike permitting access. Key override outside retracts latch bolt.
Free egress always permitted.

Set: 30.0

Doors: D100

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK	
1	Storeroom Lock	11 8204 LNL GGMK	US26D	SA	
1	Electric Strike	1500C	630	HS	ϟ
1	SMART Pac Bridge Rectifier	2005M3		HS	ϟ
1	ElectroLynx Adaptor	2004M		HS	ϟ
1	Surface Closer (w/ built in stop)	2800ST - pull side mount	689	NO	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	
3	Silencer	608 / 609		RO	
1	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	ϟ
1	Power Supply	- Provided by Security Contractor		00	ϟ
1	Card Reader	- Provided by Security Contractor		00	

Notes: Door normally closed and locked. Valid use of card reader outside temporarily unlocks electric strike permitting access. Key override outside retracts latch bolt.
Free egress always permitted.

Set: 31.0

Doors: 123-1T, 123-2T, 123-3T, 123-4T, 161-1T, 161-2T, 161-3T, 161-4T, 223-1T, 223-2T, 223-3T, 223-4T, 261-1T,

261-2T, 261-3T, 261-4T

3	Hinge (spring)	1502	US26D	MK
1	Privacy Lock	V21 8265 LNL x LB thumb turn	US26D	SA
1	Wall Stop	406	US32D	RO
3	Silencer	608 / 609		RO

Set: 32.0

Doors: 190S, M193A

6	Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1	Top Flush Bolt	2905	US26D	RO
1	Storeroom Lock	11 8204 LNL GGMK	US26D	SA
1	Coordinator	2672	US28	RO
1	Filler Bar	FB-1 / FB-2	US28	RO
2	Mounting Bracket	2601AB / 2601C	US28	RO
2	Surface Closer	CPS7500	689	NO
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Smoke / Sound Seal	S88BL - head and jambs		PE
1	Meeting Edge Seal	S772C x height of door		PE

Notes: Function: Latch bolt operated by key outside or lever inside. Outside lever always rigid. Inside lever always free for egress.

Set: 33.0

Doors: 117, 118, 161S, S111, S182, S291

3	Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1	Storeroom Lock	11 8204 LNL GGMK	US26D	SA
1	Surface Closer	7500 - pull side mount	689	NO
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Wall Stop	406	US32D	RO
1	Smoke / Sound Seal	S88BL - head and jambs		PE

Notes: Function: Latch bolt operated by key outside or lever inside. Outside lever always rigid. Inside lever always free for egress.

Set: 34.0

Doors: M290

3 Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1 Storeroom Lock	11 8204 LNL GGMK	US26D	SA
1 Surface Closer	7500 - pull side mount	689	NO
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO
1 Wall Stop	406	US32D	RO
1 Threshold	173A		PE
1 Sound Seal	350CSPK TKSP - head and jamb		PE
1 Conc. Auto. Door Bottom	STC411APK x door width		PE

Notes: Function: Latch bolt operated by key outside or lever inside. Outside lever always rigid. Inside lever always free for egress.

Set: 35.0

Doors: E101, E120, E160, E211, E260, S110

3 Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1 Storeroom Lock	11 8204 LNL GGMK	US26D	SA
1 Surface Closer	PR7500	689	NO
1 Arm Support Bracket	6890	689	NO
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO
1 Wall Stop	406	US32D	RO
1 Smoke / Sound Seal	S88BL - head and jambs		PE

Notes: ** Size hinges accordingly for 180 degree swing.

Function: Latch bolt operated by key outside or lever inside. Outside lever always rigid. Inside lever always free for egress.

Set: 36.0

Doors: 151B

3 Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1 Storeroom Lock	11 8204 LNL GGMK	US26D	SA
1 Surface Closer	J7500 x mounting plate to suit application	689	NO
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO
1 Wall Stop	406	US32D	RO
1 Threshold	2005AP		PE
1 Sound Seal	350CSPK TKSP - head and jamb		PE
1 Conc. Auto. Door Bottom	STC411APK x door width		PE

Notes: Function: Latch bolt operated by key outside or lever inside. Outside lever always rigid. Inside lever always free for egress.

Set: 37.0

Doors: 224, 244, 264

3 Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1 Office Lock	11 V01 8205 LNL GGMK x LB thumb turn	US26D	SA
1 Wall Stop	406	US32D	RO
1 Threshold	173A		PE
1 Sound Seal	350CSPK TKSP - head and jamb		PE
1 Conc. Auto. Door Bottom	STC411APK x door width		PE

Notes: Latch bolt by lever either side, unless outside lever is locked.
Outside lever locked or unlocked by thumb turn inside. Latch bolt retracted by key when outside lever is locked.
Auxiliary latch deadlocks latch bolt.
Inside lever always free for egress.

Set: 38.0

Doors: 192, 214

3 Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1 Office Lock	11 V01 8205 LNL GGMK x LB thumb turn	US26D	SA
1 Surface Closer	7500 - pull side mount	689	NO
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO
1 Wall Stop	406	US32D	RO
1 Smoke / Sound Seal	S88BL - head and jambs		PE

Notes: Latch bolt by lever either side, unless outside lever is locked.
Outside lever locked or unlocked by thumb turn inside. Latch bolt retracted by key when outside lever is locked.
Auxiliary latch deadlocks latch bolt.
Inside lever always free for egress.

Set: 39.0

Doors: 285

3 Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1 Office Lock	11 V01 8205 LNL GGMK x LB thumb turn	US26D	SA
1 Surface Closer	7500 - pull side mount	689	NO

1 Wall Stop	406	US32D	RO
1 Threshold	173A		PE
1 Sound Seal	350CSPK TKSP - head and jamb		PE
1 Conc. Auto. Door Bottom	STC411APK x door width		PE

Notes: Latch bolt by lever either side, unless outside lever is locked.
Outside lever locked or unlocked by thumb turn inside. Latch bolt retracted by key when outside lever is locked.
Auxiliary latch deadlocks latch bolt.
Inside lever always free for egress.

Set: 40.0

Doors: 112S

6 Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1 Top Flush Bolt	2905	US26D	RO
1 Classroom Lock	11 8237 LNL GGMK	US26D	SA
1 Coordinator	2672	US28	RO
1 Filler Bar	FB-1 / FB-2	US28	RO
2 Surface Closer (w/ built in stop)	2800ST - pull side mount	689	NO
2 Kick Plate	K1050 10"high CSK BEV	US32D	RO
1 Smoke / Sound Seal	S88BL - head and jambs		PE
1 Meeting Edge Seal	S772C x height of door		PE

Notes: Latch bolt by lever either side unless outside lever is locked by key outside. Outside lever remains locked unless unlocked by key. Inside lever always free for egress.

Set: 41.0

Doors: 116

3 Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1 Classroom Lock	11 8237 LNL GGMK	US26D	SA
1 Wall Stop	406	US32D	RO
3 Silencer	608 / 609		RO

Notes: Function: Latch bolt by lever either side unless outside lever is locked by key outside. Outside lever remains locked unless unlocked by key. Inside lever always free for egress.

Set: 42.0

Doors: 115, 119

3	Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1	Classroom Lock	11 8237 LNL GGMK	US26D	SA
1	Surface Closer	7500 - pull side mount	689	NO
1	Kick Plate	K1050 10"high CSK BEV	US32D	RO
1	Wall Stop	406	US32D	RO
1	Smoke / Sound Seal	S88BL - head and jambs		PE

Notes: Function: Latch bolt by lever either side unless outside lever is locked by key outside. Outside lever remains locked unless unlocked by key. Inside lever always free for egress.

Set: 43.0

Doors: 124, 136, 143, 144, 145, 147, 156, 164, 236, 241, 256, 282

3	Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1	Classroom Security Intruder Lock	11 V01 8238 LNL GGMK	US26D	SA
1	Wall Stop	406	US32D	RO
1	Threshold	173A		PE
1	Sound Seal	350CSPK TKSP - head and jamb		PE
1	Conc. Auto. Door Bottom	STC411APK x door width		PE

Notes: Key from either side locks and unlocks lever outside.
Key from either side retracts latch bolt.
Lever outside retracts latch bolt, except when outside lever is locked by key.
Lever inside always retracts latch bolt for egress.

Set: 44.0

Doors: 151A

3	Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1	Classroom Security Intruder Lock	11 V01 8238 LNL GGMK	US26D	SA
1	Wall Stop	406	US32D	RO
1	Threshold	2005AP		PE
1	Sound Seal	350CSPK TKSP - head and jamb		PE
1	Conc. Auto. Door Bottom	STC411APK x door width		PE

Notes: Key from either side locks and unlocks lever outside.
Key from either side retracts latch bolt.
Lever outside retracts latch bolt, except when outside lever is locked by key.
Lever inside always retracts latch bolt for egress.

Set: 45.0

Doors: 141, 163, 263

3 Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1 Classroom Security Intruder Lock	11 V01 8238 LNL GGMK	US26D	SA
1 Conc Overhead Stop	1-X36	652	RF
1 Threshold	173A		PE
1 Sound Seal	350CSPK TKSP - head and jamb		PE
1 Conc. Auto. Door Bottom	STC411APK x door width		PE

Notes: Key from either side locks and unlocks lever outside.
Key from either side retracts latch bolt.
Lever outside retracts latch bolt, except when outside lever is locked by key.
Lever inside always retracts latch bolt for egress.

Set: 46.0

Doors: 286

3 Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1 Classroom Security Intruder Lock	11 V01 8238 LNL GGMK	US26D	SA
1 Surface Closer	7500 - pull side mount	689	NO
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO
1 Wall Stop	406	US32D	RO
1 Threshold	173A		PE
1 Sound Seal	350CSPK TKSP - head and jamb		PE
1 Conc. Auto. Door Bottom	STC411APK x door width		PE

Notes: Key from either side locks and unlocks lever outside.
Key from either side retracts latch bolt.
Lever outside retracts latch bolt, except when outside lever is locked by key.
Lever inside always retracts latch bolt for egress.

Set: 47.0

Doors: 111A

3 Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1 Classroom Security Intruder Lock	11 V01 8238 LNL GGMK	US26D	SA
1 Surface Closer (w/ built in stop)	2800ST - pull side mount	689	NO
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO
3 Silencer	608 / 609		RO

Notes: Key from either side locks and unlocks lever outside.
Key from either side retracts latch bolt.
Lever outside retracts latch bolt, except when outside lever is locked by key.
Lever inside always retracts latch bolt for egress.

Set: 48.0

Doors: 288

3 Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1 Classroom Security Intruder Lock	11 V01 8238 LNL GGMK	US26D	SA
1 Surface Closer (w/ built in stop)	2800ST - pull side mount	689	NO
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO
1 Threshold	173A		PE
1 Sound Seal	350CSPK TKSP - head and jamb		PE
1 Conc. Auto. Door Bottom	STC411APK x door width		PE

Notes: Key from either side locks and unlocks lever outside.
Key from either side retracts latch bolt.
Lever outside retracts latch bolt, except when outside lever is locked by key.
Lever inside always retracts latch bolt for egress.

Set: 49.0

Doors: 180T

3 Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1 Privacy Lock	V21 8265 LNL x LB thumb turn	US26D	SA
1 Surface Closer	7500 - pull side mount	689	NO
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO
1 Wall Stop	406	US32D	RO
1 Smoke / Sound Seal	S88BL - head and jambs		PE

Set: 50.0

Doors: 112B

3 Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1 Store Door Lock	11 8226 LNL GGMK	US26D	SA
1 Conc Overhead Stop	1-X36	652	RF
1 Threshold	173A		PE
1 Sound Seal	350CSPK TKSP - head and jamb		PE
1 Conc. Auto. Door Bottom	STC411APK x door width		PE

Notes: Latch bolt operated by lever either side when deadbolt is in retracted position. Deadbolt projected or retracted by key either side. No simultaneous retraction of deadbolt and latch bolt.

Set: 51.0

Doors: 284A

3	Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK	
1	Storeroom Lock	11 8204 LNL GGMK	US26D	SA	
1	Electric Strike	1500C	630	HS	⚡
1	SMART Pac Bridge Rectifier	2005M3		HS	⚡
1	ElectroLynx Adaptor	2004M		HS	⚡
1	Surface Closer	J7500 x mounting plate to suit application	689	NO	
1	Kick Plate	K1050 10"high CSK BEV	US32D	RO	
1	Wall Stop	406	US32D	RO	
1	Threshold	173A		PE	
1	Sound Seal	350CSPK TKSP - head and jamb		PE	
1	Conc. Auto. Door Bottom	STC411APK x door width		PE	
1	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	⚡
1	Power Supply	- Provided by Security Contractor		00	⚡
1	Card Reader	- Provided by Security Contractor		00	

Notes: Valid use of card reader in vestibule unlocks electric strike to gain access. Key override outside lever retracts latch bolt. Free egress always permitted.
Door is not monitored.
Card reader, connection to electric strike, conductor, power supply, and access control system by Access Control Provider.

Set: 52.0

Doors: 103

3	Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK	
1	Storeroom Lock	11 8204 LNL GGMK	US26D	SA	
1	Electric Strike	1500C-DLMS	630	HS	⚡
1	SMART Pac Bridge Rectifier	2005M3		HS	⚡
1	Surface Closer	7500 - pull side mount	689	NO	
1	Kick Plate	K1050 10"high CSK BEV	US32D	RO	
1	Wall Stop	406	US32D	RO	

1	Smoke / Sound Seal	S88BL - head and jambs	PE
3	Silencer	608 / 609	RO
1	Card Reader	- Provided by Security Contractor	00

Notes: Valid use of card reader in vestibule unlocks electric strike to gain access. Key override outside lever retracts latch bolt. Free egress always permitted.
Door is not monitored.
Card reader, connection to electric strike, conductor, power supply, and access control system by Access Control Provider.

Set: 53.0

Doors: S180

6	Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1	Top Flush Bolt	2905	US26D	RO
1	Storeroom Lock	11 8204 LNL GGMK	US26D	SA
1	Coordinator	2672	US28	RO
1	Filler Bar	FB-1 / FB-2	US28	RO
2	Mounting Bracket	2601AB / 2601C	US28	RO
2	Surface Closer	CPS7500	689	NO
2	Armor Plate	K1050 36" high CSK BEV	US32D	RO
1	Smoke / Sound Seal	S88BL - head and jambs		PE
1	Meeting Edge Seal	S772C x height of door		PE

Notes: Function: Latch bolt operated by key outside or lever inside. Outside lever always rigid. Inside lever always free for egress.

Set: 54.0

Doors: 183B, 185S

1	Continuous Hinge	CFM__HD1-M		PE
1	Storeroom Lock	11 8204 LNL GGMK	US26D	SA
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Wall Stop	406	US32D	RO
3	Silencer	608 / 609		RO

Notes: Door normally closed and locked. Key outside retracts latch bolt. Outside lever always rigid. Inside lever always free for egress.

Set: 55.0

Doors: 183A

1	Continuous Hinge	CFM__HD1-M		PE
1	Storeroom Lock	11 8204 LNL GGMK	US26D	SA
1	Surface Closer	7500 - pull side mount	689	NO
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Wall Stop	406	US32D	RO
1	Smoke / Sound Seal	S88BL - head and jambs		PE

Notes: Door normally closed and locked. Key outside retracts latch bolt. Outside lever always rigid. Inside lever always free for egress.

Set: 56.0

Doors: 181A

1	Continuous Hinge	CFM__HD1-M		PE
1	Storeroom Lock	11 8204 LNL GGMK	US26D	SA
1	Surf Overhead Stop	9-X36 x LS	652	RF
1	Surface Closer (Elec. H.O.)	7705PTO	689	NO
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Smoke / Sound Seal	S88BL - head and jambs		PE

Notes: Door normally closed and locked. Key outside retracts latch bolt. Outside lever always rigid. Inside lever always free for egress.

Door held open by electromechanical hold open door closer. Install overhead stop with dead stop feature ("LS") at 5 degrees beyond hold open point of door closer. Door shall be reinforced for surface mount door hardware. Thru-bolt mounting of closer body and overhead stop are not permitted.

Power for electromechanical hold open closer shall be connected to fire alarm system in order that door shall close immediately upon activation of fire alarm.

Set: 57.0

Doors: 100B

1	Continuous Hinge	CFM__HD1-M		PE
1	Communicating Lock	11 10XG30 LL	US26D	SA
1	Electric Strike	1500C-DLMS	630	HS
1	SMART Pac Bridge Rectifier	2005M3		HS

1	ElectroLynx Adaptor	2004M		HS	⚡
1	Conc Overhead Stop	1-X36	652	RF	
1	Automatic Opener (single door)	6021 (D) - confirm head detail	689	NO	⚡
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	
1	Smoke / Sound Seal	S88BL - head and jambs		PE	
1	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	⚡
2	Door Switch (jamb mount)	503		NO	⚡
1	Power Supply	- Provided by Security Contractor		00	⚡
1	Remote Release Button	- Provided by Security Contractor		OT	
1	Card Reader	- Provided by Security Contractor		00	

Notes: ** Card reader located on push side of door.

Free ingress during day. Valid use of card reader inside or activation of remote release button unlocks electric strike permitting exit into school corridor.

Activation of door switch in corridor shall unlock electric strike and cycle automatic operator.
Activation of door switch in reception shall only cycle automatic operator when electric strike is in unlocked position (may use electric strike monitor switches for this function)

Set: 58.0

Doors: 100A

1	Continuous Hinge	CFM__HD1-M		PE	
1	Storeroom Lock	11 8204 LNL GGMK	US26D	SA	
1	Electric Strike	1500C-DLMS	630	HS	⚡
1	SMART Pac Bridge Rectifier	2005M3		HS	⚡
1	ElectroLynx Adaptor	2004M		HS	⚡
1	Conc Overhead Stop	1-X36	652	RF	
1	Automatic Opener (single door)	6021 (D) - confirm head detail	689	NO	⚡
1	Kick Plate	K1050 10"high CSK BEV	US32D	RO	
1	Smoke / Sound Seal	S88BL - head and jambs		PE	
1	Crimp Tool	QC-R003		MK	⚡
1	Repair Kit	QC-R001		MK	⚡
2	Extractor Tool	QC-R002		MK	⚡
1	Intercom / Video Station	- Provided by Security Contractor		OT	
2	Door Switch (jamb mount)	503		NO	⚡
1	Power Supply	- Provided by Security Contractor		00	⚡
1	Card Reader	- Provided by Security Contractor		00	

Notes: Valid use of card reader in vestibule or activation of remote switch in intercom system unlocks electric strike to gain access. Key override outside lever retracts latch bolt. Free egress always permitted.

Activation of door switch inside reception shall unlock electric strike and cycle automatic operator.
Activation of door switch in vestibule shall only cycle automatic operator when electric strike is in unlocked position (may use electric strike monitor switches for this function)

Set: 59.0

Doors: 122B, 132B, 142B, 152B, 162B, 172B, 222B, 232B, 242B, 252B, 262B, 272B

1 Sliding Door Track and Hardware	- Provided by Sliding Door Assembly Manufacturer	OT

Set: 60.0

Doors: 146B, 151C, 151D, 152C, 166B, 246B, 252C, 266B, 284B

1 Sliding Door Track and Hardware	- Provided by Sliding Door Assembly Manufacturer	OT

Set: 61.0

Doors: 114C, 181B

1 Hardware	- Provided by Overhead Door Section	OT

END OF SECTION 08 7100

SECTION 09 8433 - SOUND-ABSORBING WALL UNITS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes shop-fabricated, acoustical panel units tested for acoustical performance, including the following:

1. Sound-absorbing wall panels.
2. Preserved-Moss Acoustical logo.
3. **Sound-absorbing exterior perforated metal wall panels.**

B. Related Requirements:

1. Section 09 7200 "Wall Coverings" for adhesively applied textile wall coverings and for coordinated requirements for fabric.
2. Section 09 7723 "Fabric-Wrapped Panels" for decorative, fabric-wrapped wall panels that are not required to be tested for acoustical performance and for coordinated requirements for fabric.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For unit assembly and installation.

C. Samples for Verification: For the following products:

1. Fabric: Full-width by approximately 36-inch- long Sample, but not smaller than required to show complete pattern repeat, from dye lot to be used for the Work, and with specified treatments applied. Mark top and face of fabric.

1.3 INFORMATIONAL SUBMITTALS

A. Product certificates.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with fabric and unit manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.

B. Deliver materials and units in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not install units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Air-Quality Limitations: Protect units from exposure to airborne odors, such as tobacco smoke, and install units under conditions free from odor contamination of ambient air.

C. Field Measurements: Verify unit locations and actual dimensions of openings and penetrations by field measurements before fabrication, and indicate them on Shop Drawings.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace units and components that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to the following:
   a. Acoustical performance.
   b. Fabric sagging, distorting, or releasing from panel edge.
   c. Warping of core.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Units shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Fire-Test-Response Characteristics: Units shall comply with "Surface-Burning Characteristics" or "Fire Growth Contribution" Subparagraph below, or both, as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. Surface-Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   a. Flame-Spread Index: 25 or less.
   b. Smoke-Developed Index: 450 or less.
2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265 Method B Protocol or NFPA 286.

2.2 SOUND-ABSORBING WALL UNITS

A. Products: Subject to compliance with requirements, provide products indicated on Drawings.

2.3 SOUND-ABSORBING WALL UNITS

A. Sound-Absorbing Wall Panel (AWP-1, -2, -8, -9): Manufacturer's standard panel construction consisting of facing material stretched over front face of edge-framed core and bonded or attached to edges and back of frame.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Acoustical Panel Systems (APS, Inc.).
   b. Acoustical Solutions, Inc.
   c. Conwed Designscape; an Owens Corning company.
   d. Decoustics Limited; a Saint Gobain company.
   e. Essi Acoustical Products.
   f. Golterman & Sabo.
   g. Kinetics Noise Control; Hardside Panel (Basis of Design).

2. Panel Shape: Flat.

3. Mounting: Edge mounted with splines secured to substrate.
4. Mounting: Back mounted with manufacturer's standard impaling clips , secured to substrate.

5. Core: Glass-fiber board.
6. Edge Construction: Manufacturer's standard chemically hardened core with no frame.

7. Edge Profile: Square .
8. Corner Detail in Elevation: Square with continuous edge profile indicated.
9. Reveals between Panels: Flush reveals as selected by Architect from manufacturer's full range .

10. Facing Material: (single source) as indicated on drawings.

11. Acoustical Performance: Sound absorption NRC of 1.0 according to ASTM C 423 for Type A mounting according to ASTM E 795.

12. Nominal Overall Panel Thickness: 2 inches.
13. Panel Width: As indicated on Drawings.
14. Panel Height: As indicated on Drawings.
15.

B. Preserved-Moss Acoustical logo (MAL-1): Manufacturer's standard aluminum frame construction filled with preserved reindeer moss.

1. Product: Subject to compliance with requirements, provide Scandinavian Spaces Nordgrona, Letters + Logos – Custom
   a. Finishes and Size: as indicated by manufacturer’s reference number on drawings.

C. Sound-Absorbing Wall Panel (AWP-3, -4, -5, -6, -7): Cementitious wood fiber sound-absorbing panel with painted surface and as follows:

1. Product: Subject to compliance with requirements, provide Armstrong Ceiling and Wall Solutions; Tectum.

2. Panel Shape: Flat.
3. Color: Custom paint color as indicated on Material Selection Schedule.

4. Mounting: C-20 Direct-Attach method.

5. Core: Cementitious-fiber board.
6. Corner Detail in Elevation: Square with continuous edge profile indicated.
7. Reveals between Panels: Flush reveals as indicated on Drawings.

8. Acoustical Performance: Sound absorption NRC of not less than .80according to ASTM C 423 for C-20 mounting according to ASTM E 795.
9. Nominal Overall Panel Thickness: 2 inches.
10. Panel Width: As indicated on Drawings.
11. Panel Height: As indicated on Drawings.

D. Sound-Absorbing Exterior Perforated Metal Wall Panel (AWP-10): Perforated metal panel with glass fiber absorber in heat-sealed black polyethylene bag suitable for exterior use.

1. Basis-of-Design Product: Kinetics Noise Control, Inc.; Model KNP.
2. Mounting: Screwed to substrate with manufacturer's galvanized clips.
3. Core: 2 inches (51 mm) thick, 6 - 7 pcf (96 - 112 kg/m3) density fiberglass in sealed polyethylene bag.
4. Face, Back, and Edge Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
a. Nominal Thickness: 0.034 inch (0.86 mm).
b. Exterior Finish: Powder coat.
c. Face and Edge Perforation: Perforated with 3/32 inch (2.4 mm) holes on 3/16 inch (4.8 mm) staggered centers, providing 23 percent open area.
d. Color: As selected by Architect from manufacturer's full range.

5. Edge Profile: Square.
6. Corner Detail in Elevation: Square with continuous edge profile indicated.
7. Sound Absorption (ASTM E795, A mounting): Noise Reduction Coefficient of 0.90.
8. Nominal Thickness: 2 inches (51 mm).
9. Panel Width: As indicated on Drawings.
10. Panel Height: As indicated on Drawings.

2.4 MATERIALS

A. Core Materials: Manufacturer's standard.

1. Glass-Fiber Board: ASTM C 612; of type standard with manufacturer, unfaced, and dimensionally stable, molded rigid board; and with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.
2. Cementitious-Fiber Board: Density of not less than 20 lb/cu. ft..

B. Facing Material (AWP-1, -2, -8): Fabric from same dye lot; color and pattern as indicated on Drawings in Material Selection Schedule..

C. Mounting Devices: Concealed on back of unit, recommended by manufacturer to support weight of unit, and as follows:

1. Splines: Manufacturer's standard concealed metal or plastic splines that engage the kerfed edges of the unit, with other moldings and trim for interior corners, exterior corners, and exposed edges, with factory-applied finish on exposed items.

2. Adhesives: As recommended by unit manufacturer and with a VOC content of 70 g/L or less.

2.5 FABRICATION

A. Standard Construction: Use manufacturer's standard construction unless otherwise indicated; with facing material applied to face, edges, and back border of dimensionally stable core; and with rigid edges to reinforce panel perimeter against warpage and damage.

B. Edge Hardening: For glass-fiber board cores, chemically harden core edges and areas of core where mounting devices are attached.

C. Core-Face Layer: Evenly stretched over core face and edges and securely attached to core; free from puckers, ripples, wrinkles, or sags.

D. Dimensional Tolerances of Finished Units: Plus or minus 1/16 inch.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units in locations indicated. Unless otherwise indicated, install units with vertical surfaces and edges plumb, top edges level and in alignment with other units, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.

B. Comply with manufacturer's written instructions for installation of units using type of mounting devices indicated. Mount units securely to supporting substrate.

C. Align fabric pattern and grain with adjacent units.

D. Installation Tolerances:

1. Variation from Plumb and Level: Plus or minus 1/16 inch in 48 inches, noncumulative.
2. Variation of Joint Width: Not more than 1/16-inch variation from reveal line in 48 inches, noncumulative.

3.2 CLEANING

A. Clip loose threads; remove pills and extraneous materials.

B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

END OF SECTION 09 8433

SECTION 10 2800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.
2. Public-use shower room accessories.
3. Hand dryers.
4. Childcare accessories.
5. ~~Underlavatory guards.~~
6. Custodial accessories.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.

2. Identify accessories using designations indicated.

C. Delegated-Design Submittal: For grab bars, shower seats,.

1. Include structural design calculations indicating compliance with specified structural-performance requirements.

1.3 INFORMATIONAL SUBMITTALS

A. Sample warranties.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 WARRANTY

A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, visible silver spoilage defects.

2. Warranty Period: 15 years from date of Substantial Completion.

B. Manufacturer's Special Warranty for Hand Dryers: Manufacturer agrees to repair or replace hand dryers 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 OWNER-FURNISHED MATERIALS

A. Owner-Furnished Materials: soap dispenser, paper towel dispenser, toilet paper dispenser, sanitary napkin dispenser (if any), trash receptacle .

2.2 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Structural Performance: Design accessories and fasteners to comply with the following requirements:

1. Grab Bars: Installed units are able to resist 250 lbf concentrated load applied in any direction and at any point.
2. Shower Seats: Installed units are able to resist 400 lbf applied in any direction and at any point.
3. Diaper Changing Stations: Installed units are able to resist 250 lbf concentrated load applied in any direction and at any point.

2.3 PUBLIC-USE WASHROOM ACCESSORIES

A. Basis-of-Design Products: Subject to compliance with requirements, provide basis-of-design product indicated, or a comparable product by one of the following:

1. AJW Architectural Products.
2. American Specialties, Inc.
3. Bobrick Washroom Equipment, Inc.
4. Bradley Corporation.
5. GAMCO Specialty Accessories; a division of Bobrick.

B. Toilet Tissue (Roll) Dispenser: Surface mounted, Owner furnished and Contractor installed.

C. Paper Towel Dispenser: Surface mounted, Owner furnished and Contractor installed.

D. Soap Dispenser: Surface mounted, Owner furnished and Contractor installed.

E. Grab Bar:
1. Mounting: Flanges with concealed fasteners.
2. Material: Stainless steel, 0.05 inch thick.

a. Finish: Smooth, ASTM A480/A480M No. 4 finish (satin) on ends and slip-resistant texture in grip area.

3. Outside Diameter: 1-1/2 inches.
4. Configuration and Length: As indicated on Drawings.

F. Vendor: Surface mounted, Owner furnished and Contractor installed.

G. Sanitary-Napkin Disposal Unit:

1. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-270.
2. Mounting: Surface mounted.
3. Door or Cover: Self-closing, disposal-opening cover.
4. Receptacle: Removable.
5. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

H. Mirror Unit:

1. Frame: Stainless steel angle, 0.05 inch thick.
   a. Corners: Welded and ground smooth.

2. Size: 18 by 34 inches unless indicated otherwise.
3. Hangers: Manufacturer's standard rigid, tamper and theft resistant.

I. Hook:

1. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-76727.
2. Description: Double-prong unit.
3. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

2.4 PUBLIC-USE SHOWER ROOM ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. Basis-of-Design Products: Subject to compliance with requirements, provide basis-of-design product indicated, or a comparable product by one of the following”

1. AJW Architectural Products.
2. American Specialties, Inc.
3. Bobrick Washroom Equipment, Inc.
4. Bradley Corporation.
5. GAMCO Specialty Accessories; a division of Bobrick.

C. Shower Curtain Rod:

1. Description: 1-1/4-inch- outside diameter, straight rod.
2. Configuration: Curved
3. Mounting Flanges: Concealed fasteners; in material and finish matching rod.
4. Rod Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

D. Shower Curtain:

1. Sizes: 72 inches(1828 mm) high by width as follows:
   a. Openings less than 48 inches(1219 mm) Wide: 6 inches(152 mm) wider than opening.
   b. Openings 48 inches(1219 mm) Wide or Wider: 12 inches(305 mm) wider than opening.

2. Size: Minimum [**6 inches**] [**12 inches**] wider than opening by 72 inches high.
3. Material: Nylon-reinforced vinyl, minimum 9 oz. or 0.008-inch- thick vinyl, with integral antibacterial and flame-retardant agents.

4. Color: White.
5. Grommets: Corrosion resistant at minimum 6 inches o.c. through top hem.
6. Shower Curtain Hooks: Chrome-plated or stainless steel, spring wire curtain hooks with snap fasteners, sized to accommodate specified curtain rod. Provide one hook per curtain grommet.

E. Folding Shower Seat:

1. Basis-of-Design Product: American Specialties, Inc.; 8203-33.
2. Configuration: Rectangular seat.
3. Seat: Phenolic or polymeric composite of slat-type or one-piece construction in color as selected by Architect.
4. Mounting Mechanism: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
5. Dimensions: Minimum 31-1/2 inches(800 mm) wide by nominal 16 inches(406 mm) deep.

F. Fold Down Changing Seat

1. Basis of Design Product: American Specialties, Inc; 8209
2. Configuration: Rectangular four leg fold up changing seat
3. Seat: Phenolic or polymeric composite of slat-type or one-piece construction in color as selected by Architect.
4. Mounting Mechanism: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
5. Dimensions: Minimum 48 inches wide by 24 inches deep.

G. Soap Dish:

1. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-680.
2. Mounting: Surface mounted.
3. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

2.5 HAND DRYERS

A. High-Speed Air Dryer:

1. Product: Basis of Design: Dyson Airblade V HU2.
2. Description: High-speed, unheated-air hand dryer for rapid hand drying.
3. Mounting: Surface mounted.
   a. Protrusion Limit: Installed unit protrudes maximum 4 inches from wall surface.

4. Operation: Infrared-sensor activated with timed power cut-off switch.
   a. Average Dry Time: 15 seconds.
   b. Automatic Shut Off: At 30 seconds.

5. Maximum Sound Level: [79dB. Sound level at 2 meters max 63 dB.

6. Cover Material and Finish: Molded plastic, white.
7. Electrical Requirements: 115 V, 13 A, 1500 W.

2.6 CHILDCARE ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Specialties, Inc.
2. Foundations Children's Products.
3. GAMCO Specialty Accessories; a division of Bobrick.
4. Koala Kare Products; a division of Bobrick.

B. Diaper-Changing Station:
1. Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.
   a. Engineered to support minimum of 250-lb static load when opened.

2. Mounting: Surface mounted, with unit projecting not more than 4 inches from wall when closed.
3. Operation: By pneumatic shock-absorbing mechanism.
4. Material and Finish: HDPE in manufacturer's standard color.
5. Liner Dispenser: Provide built-in dispenser for disposable sanitary liners.

~~2.7 UNDERLAVATORY GUARDS~~

2.8 CUSTODIAL ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AJW Architectural Products.
2. American Specialties, Inc.
3. Bobrick Washroom Equipment, Inc.
4. Bradley Corporation.
5. GAMCO Specialty Accessories; a division of Bobrick.

B. General: Refer to "Public-Use Washroom Accessories" Article for accessories in custodial areas not listed in this Article.

C. Mop and Broom Holder:

1. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-223.
2. Description: Unit with shelf, hooks, holders, and rod suspended beneath shelf.
3. Length: 36 inches (914 mm).
4. Mop/Broom Holders: Four, spring-loaded, rubber hat, cam type.
5. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

2.9 FABRICATION

A. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

1. Remove temporary labels and protective coatings.

B. Grab Bars: Install to comply with specified structural-performance requirements.

C. Shower Seats: Install to comply with specified structural-performance requirements.

END OF SECTION 10 2800

SECTION 26 0943.23 - LIGHTING CONTROL SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish and install a complete system for the control of lighting and other equipment as indicated on the plans, detailed in the manufacturer submittal and as further defined herein. Contractor is solely responsible to verify quantity, installation locations and wiring requirements for this project. Specific manufacturer's catalog numbers, when listed in this section are for reference only. It is the responsibility of the contractor to verify with lighting control manufacturer all catalog information and specific product acceptability.

B. The system shall include but not be limited by the following list: Pre-wired, microprocessor controlled relay panels with electrically held, electronically latched relays panels controlled via a complete list of communication based accessories including digital switches, digital photocells, digital SmartBreaker panelboards, Digital Time Clock (DTC) and interface cards to dimming systems, building automation systems, thermostats, and other devices. The type of lighting control equipment and wiring specified in this section is covered by the description: Microprocessor Controlled Digital Relay Lighting Control system with RS 485 Bus communications. Requirements are indicated elsewhere in these specifications for work including, but not limited to, raceways and electrical boxes and fittings required for installation of control equipment and wiring.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For each relay panel and related equipment.

1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
2. Detail enclosure types and details for types other than NEMA 250, Type 1.
3. Detail wiring partition configuration, current, and voltage ratings.
4. Short-circuit current rating of relays.
5. Include diagrams for power, signal, and control wiring.
6. Product data for UPS supplied at each control panel.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Submit evidence that lighting controls are compatible with connected monitoring and control devices and systems specified in other Sections.

1. Show interconnecting signal and control wiring and interfacing devices that prove compatibility of inputs and outputs.
2. For networked controls, list network protocols and provide statements from manufacturers that input and output devices meet interoperability requirements of the network protocol.
3. Provide elevation of lighting control panels mounted on wall. Orient stacked and minimize wall space usage, consolidate into larger panels as feasible to keep future wall space for future added panels.

B. Field quality-control reports.

C. Software licenses and upgrades required by and installed for operation and programming of digital and analog devices.

D. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

B. Software and Firmware Operational Documentation:

1. Software operating and upgrade manuals.
2. Program Software Backup: On a magnetic media or compact disc, complete with data files.
3. Device address list.
4. Printout of software application and graphic screens.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Handle and prepare panels for installation according to NECA 407.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain lighting control module and power distribution components through one source from a single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with 47 CFR, Subparts A and B, for Class A digital devices.

D. Comply with protocol described in IEC 60929, Annex E, for DALI lighting control devices, wiring, and computer hardware and software.

E. Comply with NFPA 70.

F. Lighting control relay panels shall be UL 916 Listed.

G. Lighting control relay panels controlling emergency circuits shall be ETL listed to UL 924. Emergency source circuits controlled in normal operation by a relay panel shall fully comply with NEC 700-9(b). Electrical contractor to verify compliance.

H. The lighting control system shall also be listed or approved by all national, state and local energy codes to include but not limited to California Title 24 and ASHRAE 90.1-2007.

1.7 COORDINATION

A. Coordinate lighting control components to form an integrated interconnection of compatible components.

1. Match components and interconnections for optimum performance of lighting control functions.

2. Coordinate lighting controls with HVAC controls. Design display graphics showing building areas controlled; include the status of lighting controls in each area.

3. Coordinate lighting controls with that in Sections specifying distribution components that are monitored or controlled by power monitoring and control equipment.

3.4. Coordinate with fire alarm system, provide signal to turn on emergency lighting circuits in the event of a fire alarm.

B. Coordinate lighting control components specified in this Section with components specified in Division 26 Section "Panelboards."

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of lighting controls that fail in materials or workmanship or from transient voltage surges within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Failure of software input/output to execute switching or dimming commands.
   b. Failure of modular relays to operate under manual or software commands.
   c. Damage of electronic components due to transient voltage surges.

2. Warranty Period: Two years from date of Substantial Completion.
3. Extended Warranty Period Failure Due to Transient Voltage Surges: Eight years.
4. Extended Warranty Period for Electrically Held Relays: 10 years from date of Substantial Completion.

1.9 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Electrically Held Relays: Equal to 10 percent of amount installed for each size indicated, but no fewer than 10 relays.

1. **Manual Switches: Provide 10 5 additional single stations and 5 additional two button stations.**

2. **Occupancy Sensors: Provide 5 additional occupancy sensors or each type**

3. **Drivers: Provide 5 additional drivers of each type**

4. **Touchscreen Controllers: Provide 1 additional of each type**

2.5. **Lighting System Controller: Provide 1 additional of each type**

1.10 SOFTWARE SERVICE AGREEMENT

A. Technical Support: Beginning with Substantial Completion, provide software support for two years.

B. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of the software.

1. Provide 30 days' notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

PART 2 - PRODUCTS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Crestron Electronics Inc.
~~1.~~2. nLight Networked Lighting Controls Platform
~~2.~~3. Douglas Lighting Control
~~3.~~4. Intelligent Lighting Controls, Inc.
~~4.~~5. Leviton Mfg. Company Inc.
~~5.~~6. Lighting Control & Design, Inc.
~~6.~~7. Lightolier Controls; a Genlyte Company.
~~7.~~8. Lithonia Lighting; Acuity Lighting Group, Inc.
~~8.~~9. Lutron Electronics Company, Inc.
~~9.~~10. MicroLite Lighting Control Systems.
~~10.~~11. NexLight; Northport Engineering Group.
~~11.~~12. Starfield Controls, Inc.
~~12.~~13. Touch-Plate, Inc.
~~13.~~14. Watt Stopper (The).

2.2 SYSTEM REQUIREMENTS

A. The lighting control system is a networked system that communicates via RS485. The system must be able to communicate with fully digital centralized relay panels, micro relay panels, smart breaker panels, digital switches, photocells, various interfaces and shall include all operational software. The intent of the specification is to integrate all lighting control into one system, except for areas controlled by a single motion sensor such as rooms with a single luminaire and emergency fixtures designed to operate 24/7. Distributed lighting control shall be provided using a networked micro relay panel. A centralized relay panel shall control corridors and site lighting. Lighting control system shall include all hardware and software. Software to be resident within the lighting control system. System shall provide local access to all programming functions at the master LCP and remote access to all programming functions via dial up modem and through any standard computer workstation running an industry standard internet browser. Lighting control system shall have server built into the master LCP that “serves” HTML pages to any authorize workstation. Desktop computers are not part of this section and will be provided by others. Non-networked, non-digital, non-server capable systems not acceptable.

B. System software shall provide real time status of each relay, each zone and each group.

C. Lighting control system shall be able to be monitored by and take commands from a remote PC. At any time, should the remote PC go off-line all system programming uploaded to the lighting control system

shall continue to operate as intended. Systems requiring an on line PC or server for normal operation are not acceptable

D. All devices shall be pre-addressed at the factory. Field addressing is not acceptable.

E. All programs, schedules, time of day, etc, shall be held in non-volatile memory for a minimum of 10 years at power failure. At restoration of power, lighting control system shall implement programs required by current time and date.

F. System shall be capable of flashing lights Off/On any relay or any zone prior to the lights being turned Off. The warning interval time between the flash and the final lights off signal shall be definable for each zone. Occupant shall be able to override any scheduled Off sweep using local wall switches within the occupied space. Occupant override time shall be locally and remotely programmable and not exceed 2-hours.

G. The system shall be capable of implementing On commands, Off commands, Raise (dimming) commands, Lower (dimming) commands for any relay, group or zone by means of digital wall switches, specification grade line voltage type wall switches, photocell, web based software or other devices connected to programmable inputs in a lighting control panel.

H. The lighting control system shall provide the ability to control each relay and each relay group per this specifications requirement. All programming and scheduling shall be able to be done locally at the master LCP and remotely via dial up modem and via the Internet. Remote connection to the lighting control system shall provide real time control and real time feedback.

I. System may consist of centralized relay panels, micro relay panels, smart breaker panels, digital switches, photocells and various digital interfaces. Verify exact components specified. Micro relay panels, smart breaker panels, centralized relay panels and digital switches shall communicate as one network via RS485. Micro relay panels, mounted in each local area, per plans shall control all lighting fixtures in that space, provide power to occupancy sensors and take input from daylight sensor and occupancy sensors. Micro relay panels shall be capable of taking inputs from standard, line voltage type switches and outputting up to 8 independent 0v to 10v dimming signals. All micro relay panels and all devices connected to micro relay panels (switches, photocells and occupancy sensors, etc) shall be wired per lighting control manufacturers instructions.

J. Expandability: System shall be capable of increasing the number of control functions in the future by 25 percent of current capacity; to include equipment ratings, housing capacities, ~~spare relays,~~ terminals, number of conductors in control cables, and control software.

~~J.~~K. UPS: Provide with uninterruptable power supply battery system at each lighting control panel. Size as required for the panel power requirements with 40% spare capacity.

2.3 RELAY PANELS

A. NEMA rated enclosure with screw cover or hinged door. Other NEMA types optional.

B. 16 AWG steel barrier shall separate the high voltage and low voltage compartments of the panel and separate 120v, 277v and emergency circuits.

C. LCP input power shall be capable of accepting 120v or 277v without rewiring

D. Control electronics in the low voltage section shall be capable of driving 2 to 48, 30a, 18,000 SCCR rated latching relays, control any individual or group of relays, provide individual relay overrides, provide a master override for each panel, store all programming in non-volatile memory, after power is restored return system to current state, provide programmable blink warn timers for each relay and every zone, and be able to control relays that default to Open, Normally Open Latching (NOL) or relays that default to Closed, Normally Closed Latching (NCL).

E. Lighting control system shall be digital and consist of a Master LCP, Slave LCPs, Micro LCPs with up to 8 individual relays, digital switches, digital interface cards and if required, SmartBreaker panelboards. All system components shall connect and be controlled via a single Category 5, 4 twisted pair cable with RJ45 connectors, providing real time two-way communication with each system component. Analog systems are not acceptable.

F. The lighting control system is a networked system that communicates via RS485 and includes centralized relay panels, micro relay panels, digital switches, photocells, various interfaces and operational software. The intent of the specification is to integrate all lighting control into one system. Lighting control system shall include all hardware and software. Software to be resident within the lighting control system. System shall provide local access to all programming functions at the DTC and remote access to all programming functions via dial up modem and through any standard computer workstation running an industry standard internet browser. Lighting control system shall have server built into the master LCP that “serves” HTML pages to any authorized workstation. Desktop computers are not part of this section and will be provided by others. Non-networked, non-digital system not acceptable.

2.4 MICRO RELAY PANELS

A. Micro relay panels shall have up to 8-30a, 18,000 SCCR rated lighting relays and shall control all lighting in the designated area indicated on the plans and be networked to centralized relay panels, micro relay panels, smart breaker panels, digital switches, photocells, various interfaces. Each micro relay panel shall provide minimum 300ma at 12/24vdc for powering occupancy sensors. Micro relay panels that require a separate occupancy sensor power pack are not acceptable.

B. Micro relay panel shall provide a minimum 4-programmable photocell inputs, a minimum 4-programmable occupancy sensor inputs and matrixed contact closure inputs. This requirement is to insure integration of entire lighting system into one networked, lighting control system.

C. Micro relay panels shall be capable of outputting minimum 4 and up to 8 independent 0v to 10v dimming signals, one independent dimming signal at each of 8 relays. In order to maximize daylight harvesting and minimize disruption to occupants, each dimming output shall provide adjustment for baseline, start point, mid point, end point, trim, fade up rate, fade down rate, time delay and enable/disable masking. All photocell setting must be remotely accessible. Systems providing On, Off with Time Delay only, and system that do not provide remote access are not acceptable.

2.5 STANDARD OUTPUT RELAYS

A. UL Listed 30 Amp, Latching, 18,000 SCCR, 277VAC Ballast and HID and 20 Amp Tungsten at 120 Vac.

B. Relays shall be individually replaceable. Relay terminal blocks shall be capable of accepting two (2) #8AWG wires on both the line and the load side. Systems that do not allow for individual relay replacement or additions are not acceptable.

C. Relays to be rated for 250,000 operations minimum at a full 30a lighting load, default to closed at normal power loss, Normally Closed Latching (NCL). All incandescent circuits shall be energized by use of a Normally Closed SoftStart™ (NCSS) relay rated at 100,000 operations at full 20a load. No exceptions.

D. Optional relay types available shall include: Normally Open Latching (NOL) relay rated for 250,000 operations, a 600v 2-pole NO and NC and a Single Pole, Double Throw (SPDT) relay.

2.6 MANUAL SWITCHES AND PLATES

A. Push-Button Switches: Modular, momentary-contact, low-voltage type.

1. Match color specified in Division 26 Section "Wiring Devices."

2. Integral green LED pilot light to indicate when circuit is on.

B. Manual, Maintained Contact, Full- or Low-Voltage Switch: Comply with Division 26 Section "Wiring Devices."

C. Wall Plates: Single and multigang plates as specified in Division 26 Section "Wiring Devices."

D. Legend: Engraved or permanently silk-screened on wall plate where indicated. Use designations indicated on Drawings.

E. All switches shall be digital and communicate via RS 485. Contact closure style switches, except as specified for connection to the micro relay panel matrixed contact closure inputs, shall not be acceptable. The programming for a digital switch will reside in the switch itself, via double EPROM memory. Any digital switch button function shall be able to be changed locally (at the DTC or a PC) or remotely, via modem, Internet or Ethernet.

F. Digital low voltage switch shall be a device that sits on the lighting control system bus. Digital switch shall connect to the system bus using the same cable and connection method required for relay panels. System shall provide capability to locally and remotely program each individual switch button, monitor and change function of each button locally and remotely. Each button shall be capable of being programmed for On only, Off only, On/Off (toggle), Raise (Dim up) and Lower (Dim down). Switches shall also be capable of being disabled for specified times. Switches requiring low voltage control wires to be moved from one input terminal to another to accomplish these functions are not acceptable.

G. Digital switches for high abuse areas (common areas, atrium, etc.) shall be vandal resistant, contain no moving parts, and be touch sensitive and available with up to three buttons in a single gang. Multi gang versions shall also be available. Touch pads shall be Stainless Steel and capable of handling both high abuse and wash down locations. High abuse switches shall connect to the lighting control system digital bus. Each high abuse switch touch button shall be able to be control any relay or any group in any panel or panels that is part of the lighting control system. Each touch button shall be able to be programmed for On, Off, Toggle or Maintain operation. All programming shall be done locally or remotely via dial up modem or web interface as described in other paragraphs of this section. High abuse switches shall be able to be enabled or disabled digitally. Each touch pad is to be identified as to function by an engraved label. Switches must be capable of handling electrostatic discharges of at least 30,000 volts (1cmspark) without any interruption or failure in operation.

2.7 DTC - Digital Electronic Time Clock

A. A Digital Time Clock (DTC) shall control and program the entire lighting control system and supply all time functions and accept interface inputs.

B. DTC shall be capable of up to 32 schedules. Each schedule shall consist of one set of On and Off times per day for each day of the week and for each of two holiday lists. The schedules shall apply to any individual relay or group of relays.

C. The DTC shall be capable of controlling up to 126 digital devices on a single bus and capable of interfacing digitally with other individual busses using manufacturer supplied interface cards.

D. The DTC shall accept control locally using built in button prompts and use of a 8 line 21-letter display or from a computer or modem via an on-board RS 232 port. All commands shall be in plain English. Help pages shall display on the DTC screen.

E. The DTC shall be run from non-volatile memory so that all system programming and real time clock functions are maintained for a minimum of 15 years with loss of power.

F. Pre-installed Unity™ lighting control software shall provide via local or remote PC a visual representation of each device on the bus, show real time status and the ability to change the status of any individual device, relay or zone. System shall be capable of running optional Unity GX lighting control software, which shall provide for directly importing vector based graphics. No exceptions.

G. Pre-Installed modem that allows for remote programming from any location using a PC. Modem to include all necessary software for local or remote control.

H. DTC shall provide system wide timed overrides. Any relay, group or zone that is overridden On, before or after hours, shall automatically be swept Off by the DTC a maximum of 2 hours later.

2.8 PHOTOCELL

A. Photocells to be mounted in location indicated on the plans. Photocells used for exterior lights shall provide multiple trips point from 1 roof mounted unit. All trips points shall be able to be changed remotely via Internet or dial up modem. Photocells requiring manual trip point adjustment are not acceptable. Photocell used for interior lighting control shall have multiple settings such as start-point, mid-point, off-point, fade-up, fade-down, etc. All settings shall be remotely accessible and adjustable. Systems providing local adjustment only are not acceptable. Photocells to be certified to comply with the current energy code covering this project at time of submittal of plans for building permit.

2.9 INTERFACES

A. For future expansion capability, system to have available all of the following interfaces:

1. A dry contact input interface card that provides 14 programmable dry contact closure inputs. Use shielded cable to connect input devices to interface card.
2. Interface card providing digital communication from one system bus to another system bus, allowing up to 12,000 devices to communicate.

3. An interface card that allows the DTC to control up to 32 digital XCI brand thermostats. Programming of thermostats to be able to done locally (at the DTC or a PC) or remotely, via modem, Internet or Ethernet.
4. A voice prompted telephone override interface module. Interface module shall accept up to 3 phone lines and allow up to 3 simultaneous phone calls. Voice prompted menu and up to 999 unique pass codes shall be standard with each interface module.
5. Software pre-installed to run Unity GX Graphical Interface Software. Unity GX software shall provide via local or remote PC a visual representation of a specific area or the total area of the project. GX full graphic pages shall be designed to the owner's specifications. Owner to provide to manufacturer all necessary files and criteria
6. Direct digital interface to SmartBreaker panelboards. Relay panel and SmartBreaker panelboard circuits shall appear on the system software as similar, yet distinct, items and maintain all functions and features of the system software.
7. Direct digital interface to DMX 512 based systems. DMX interface shall provide 14 global commands, each of which can be modified locally or remotely using lighting controls manufacturer supplied software. DMX interface shall be integral to the system bus and shall connect and be controlled via a single Category 5, 4 twisted pair cable, providing real time response from the lighting control system to DMX commands.
8. Direct digital interface to building automation systems using DDC protocols such as BACnet, Metasys (N2), LonWorks, ModBus, etc that accept on/off commands, time schedules and report status of all relays in all panels in real time. Coordinate all interface requirements with the BAS provider. Interface cards shall "self populate" each individual relay and each group to the BAS. All BAS system programming required shall be the responsibility of the BAS system provider.

2.10 CONDUCTORS AND CABLES

A. Power Wiring to Supply Side of Class 2 Power Source: Not smaller than No. 12 AWG, complying with Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

B. Classes 2 and 3 Control Cables: Multiconductor cable with copper conductors not smaller than No. 18 AWG, complying with Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

C. Class 1 Control Cables: Multiconductor cable with copper conductors not smaller than No. 16 AWG, complying with Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

D. Digital and Multiplexed Signal Cables: Unshielded, twisted-pair cable with copper conductors, complying with TIA/EIA-568-B.2, Category 5 for horizontal copper cable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Receive, inspect, handle, and store panels according to NECA 407.

B. Examine panels before installation. Reject panels that are damaged or rusted or have been subjected to water saturation.

C. Examine elements and surfaces to receive panels for compliance with installation tolerances and other conditions affecting performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 WIRING INSTALLATION

A. Comply with NECA 1.

B. Wiring Method: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters. Conceal raceway except in unfinished spaces. Minimum conduit size shall be ½ inch.

1. Install plenum cable in environmental air spaces, including plenum ceilings.
2. Comply with requirements for cable trays specified in Section 26 0536 "Cable Trays for Electrical Systems."
3. Comply with requirements for raceways and boxes specified in Section 26 0533 "Raceways and Boxes for Electrical Systems."

~~C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.~~

~~D. In a building renovation or expansion, provide connection and programming to existing lighting control system so the entire building is on one system.~~

3.3 PANEL INSTALLATION

A. Comply with NECA 1.

B. Install panels and accessories according to NECA 407.

above finished floor or grade.Mount panel cabinet plumb and rigid without distortion of box.

D. Install filler plates in unused spaces.

3.4 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 26 0553 "Identification for Electrical Systems."

B. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Section 26 0553 "Identification for Electrical Systems."

C. Create a directory to indicate loads served by each relay; incorporate Owner's final room designations. Obtain approval before installing. Use a PC or typewriter to create directory; handwritten directories are unacceptable.

D. Lighting Control Panel Nameplates: Label each panel with a nameplate complying with requirements for identification specified in Section 26 0553 "Identification for Electrical Systems."

E. Provide a point-to-point wiring diagram for the entire lighting control system. Diagram must indicate exact mounting location of each system device. This accurate “as built” shall indicate the loads controlled by each relay and the identification number for that relay, placement of switches and location of photocell. Original to be given to owner, copies placed inside the door of each LCP.

3.5 INSTALLATION AND SET-UP

A. Verify that conduit for line voltage wires enters panel in line voltage areas and conduit for low-voltage control wires enters panel on low-voltage areas. Refer to manufacturer's plans and approved shop drawings for location of line and low-voltage areas. It is the responsibility of the contractor to verify with lighting control manufacturer all catalog information and specific product acceptability.

B. For approved line voltage type micro relay panel switches connected to matrixed inputs of the micro relay panel, furnish #18 AWG solid conductors. For all other digital switches provide wiring required by system manufacturer.

C. For classroom digital switches provide wiring required by system manufacturer

D. Contractor to test all low voltage cable for integrity and proper operation prior to turn over. Verify with system manufacturer all wiring and testing requirements.

E. Before Substantial Completion, arrange and provide a one-day Owner instruction period to designated Owner personnel. Set-up, commissioning of the lighting control system, and Owner instruction includes:

1. Confirmation of entire system operation and communication to each device.
2. Confirmation of operation of individual relays, switches, occupancy sensors and daylight sensors
3. Confirmation of system Programming, photocell settings, override settings, etc.
4. Provide training to cover installation, maintenance, troubleshooting, programming, and repair and operation of the lighting control system.

F. Panels shall be located so that they are readily accessible and not exposed to physical damage.

G. Panel locations shall be furnished with sufficient working space around panels to comply with the National Electrical Code.

H. Panels shall be securely fastened to the mounting surface by at least 4 points.

I. Unused openings in the cabinet shall be effectively closed.

J. Cabinets shall be grounded as specified in the National Electrical Code.

K. Lugs shall be suitable and listed for installation with the conductor being connected.

L. Conductor lengths shall be maintained to a minimum within the wiring gutter space. Conductors shall be long enough to reach the terminal location in a manner that avoids strain on the connecting lugs.

M. Maintain the required bending radius of conductors inside cabinets.

N. Clean cabinets of foreign material such as cement, plaster and paint.

O. Distribute and arrange conductors neatly in the wiring gutters.

P. Follow the manufacturer's torque values to tighten lugs.

Q. Before energizing the panelboard, the following steps shall be taken:

1. Retighten connections to the manufacturer's torque specifications. Verify that required connections have been furnished.
2. Remove shipping blocks from component devices and the panel interior.
3. Remove debris from panelboard interior.

R. Follow manufacturers' instructions for installation and all low voltage wiring.

S. Service and Operation Manuals:

1. Submit operation and service manuals. Complete manuals shall be bound in flexible binders and data shall be typewritten or drafted.
2. Manuals shall include instructions necessary for proper operation and servicing of system and shall include complete wiring circuit diagrams of system, wiring destination schedules for circuits and replacement part numbers. Manuals shall include as-built cable Project site plot plans and floor plans indicating cables, both underground and in each building with conduit, and as-built coding used on cables. Programming forms of systems shall be submitted with complete information.

T. Comply with energy code lighting control system "Acceptance Requirements". Acceptance tests are used to verify that lighting controls were installed and calibrated correctly. These tests may require that a responsible party certify that controls are installed and calibrated properly. This is the installing contractors responsibility. Verify requirements with building authority.

3.6 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

B. Perform the following tests and inspections[with the assistance of a factory-authorized service representative]:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

C. Acceptance Testing Preparation:

1. Test continuity of each circuit.

D. Lighting control panel will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports, including a certified report that identifies lighting control panels and describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations made after remedial action.

3.7 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.
2. Confirm correct communications wiring, initiate communications between panels, and program the lighting control system according to approved configuration schedules, time-of-day schedules, and input override assignments.

B. Provide factory-authorized personal for the following lighting control services:

1. Provide programming time including feedback and site visit with Owner present to program the zones and times with owner input. Notify Engineer what date and time is set up for programming session for optional attendance.
2. Provide lighting controls on-site commissioning and coordination with electrical contractor after initial programming and before building is occupied.
   a. Provide at least 3 days for a building less than 30,000 square foot.
   b. Provide at least 5 days for a building less than 200,000 square foot.
3. Provide up to (8) hours of owner training with Owner present.
4. Provide additional time after substation completion and within 30 days of owner Final Acceptance to make one-set of Owner requested changes.

3.8 ADJUSTING

A. Owner Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in programming scheduling, dimming and adjusting sensors and to assist Owner's personnel in making program changes to suit actual occupied conditions. Provide up to two visits to Project during other than normal occupancy hours for this purpose.

B. Occupancy sensors shall be adjusted for seamless operation, contractor will have to move sensor and adjust settings at no charge due to faulty operation of the sensor due to location or settings for up to 12 months from date of Substantial Completion.

3.9 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain lighting controls and software training for PC-based control systems. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 26 0943.23

SECTION 26 3213 - ENGINE GENERATORS

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. Failure to consult these documents shall not relieve the Contractor of the requirements therein.

1.2 SUMMARY

A. This Section includes packaged diesel-engine generator sets with the following features and accessories:

1. Battery charger.
2. Sub-base Style Day tank.
3. Engine generator set.
4. Muffler.
5. Exhaust piping internal to set.
6. Outdoor enclosure.
7. Remote annunciator.
8. Radiator.
9. Remote stop switch.
10. Starting battery.

1.3 DEFINITIONS

A. Standby Rating: Power output rating equal to the power the generator set delivers continuously under normally varying load factors for the duration of a power outage.

B. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

C. Steady-State Voltage Modulation: The uniform cyclical variation of voltage within the operational bandwidth, expressed in Hertz or cycles per second.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of packaged engine generator and accessory indicated.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1.5 INFORMATIONAL SUBMITTALS

A. Source quality-control test reports.

B. Field quality-control test reports.

C. Warranty: Special warranty specified in this Section.

1.6 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within 100 miles of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with ASME B15.1.

E. Comply with NFPA 37.

F. Comply with NFPA 70.

G. Comply with NFPA 99.

H. Comply with NFPA 110 requirements for Level 1 emergency power supply system.

I. Comply with UL 2200.

~~I.~~J. Comply with NFPA 70 requirements for monitoring of generator control wiring.

~~J.~~K. Engine Exhaust Emissions: Comply with applicable state and local government requirements.

~~K.~~L. Noise Emission: Comply with applicable state and local government requirements for maximum noise level at adjacent property boundaries due to sound emitted by generator set including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.

1.8 PROJECT CONDITIONS

A. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: Minus 15 to plus 40 deg C.

2. Relative Humidity: 0 to 95 percent.
3. Altitude: Sea level to 1000 feet.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver engine generator set and system components to their final locations in protective wrappings, containers, and other protection that will exclude dirt and moisture and prevent damage from construction operations. Remove protection only after equipment is safe from such hazards.

1.10 COORDINATION

A. Coordinate size and location of concrete bases for package engine generators~~[and remote radiators mounted on grade]~~. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.

B. Coordinate size and location of roof curbs, equipment supports, and roof penetrations for remote radiators. These items are specified in Section 07 7200 "Roof Accessories."

1.11 WARRANTY

A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace packaged engine generator and auxiliary components that fail in materials or workmanship within specified warranty period. The warranty shall have no deductibles.

1. Warranty Period: Five years from date of Substantial Completion.
2. Warranty to include: parts, labor and travel time for five years.

1.12 MAINTENANCE SERVICE

A. Maintenance: ~~[~~Provide 1 year service agreement with cost for 1 year renewal~~]~~. At Substantial Completion, begin 12 months' full maintenance by skilled employees of the manufacturer's designated service organization. Include routine preventive maintenance as recommended by manufacturer and adjusting as required for proper operation. Maintenance agreements shall include parts and supplies as used in the manufacture and installation of original equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cummins Power Generation. – Preferred by the client, others may be considered.
~~1.~~2. Caterpillar, Inc.; Engine Div.
~~2. Cummins Power Generation.~~
3. Generac Corp.
4. Kohler Co; Generator Division.

5. MTU - Detroit Diesel.

2.2 ENGINE GENERATOR SET

A. Furnish a coordinated assembly of compatible components.

B. Safety Standard: Comply with ASME B15.1.

C. Nameplates: Each major system component is equipped with a conspicuous nameplate of component manufacturer. Nameplate identifies manufacturer of origin and address, and model and serial number of item.

D. Power Output Ratings: Nominal ratings as indicated on drawings, with capacity as required to operate as a unit as evidenced by records of prototype testing.

E. Skid: Adequate strength and rigidity to maintain alignment of mounted components without depending on a concrete foundation. Skid is free from sharp edges and corners. Lifting attachments are arranged to facilitate lifting with slings without damaging any components.

2.3 GENERATOR-SET PERFORMANCE FOR SENSITIVE LOADS

A. Oversizing generator compared with the rated power output of the engine to meet performance requirements in paragraphs below is permissible.

1. Nameplate Data for Oversized Generator: Show ratings required by the Contract Documents rather than ratings that would normally be applied to generator size installed.

B. Steady-State Voltage Operational Bandwidth: 2 percent of rated output voltage from no load to full load.

C. Steady-State Voltage Modulation Frequency: Less than 1 Hz.

D. Transient Voltage Performance: Not more than 10 percent variation for 50 percent step-load increase or decrease. Voltage recovers to remain within the steady-state operating band within 0.5 second.

E. Steady-State Frequency Operational Bandwidth: Plus or minus 0.25 percent of rated frequency from no load to full load.

F. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there are no random speed variations outside the steady-state operational band and no hunting or surging of speed.

G. Transient Frequency Performance: Less than 2-Hz variation for a 50 percent step-load increase or decrease. Frequency recovers to remain within the steady-state operating band within three seconds.

H. Output Waveform: At no load, harmonic content measured line to neutral does not exceed 2 percent total with no slot ripple. The telephone influence factor, determined according to NEMA MG 1, shall not exceed 50.

I. Sustained Short-Circuit Current: For a three-phase, bolted short circuit at system output terminals, the system will supply a minimum of 300 percent of rated full-load current for not less than 10 seconds and

then clear the fault automatically, without damage to winding insulation or any other generator system component.

J. Excitation System: Performance is unaffected by voltage distortion caused by nonlinear load.

K. Start Time: Comply with NFPA 110, Type 10, system requirements.

2.4 SERVICE CONDITIONS

A. Environmental Conditions: Engine generator system withstands the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: -15 to +50 degrees C..
2. Altitude: Sea level to 1000 feet .

2.5 ENGINE

A. Comply with NFPA 37.

B. Fuel: Fuel oil, Grade DF-2.

C. Rated Engine Speed: 1800 rpm.

D. Maximum Piston Speed for Four-Cycle Engines: 2250 fpm .

E. Lubrication System: Pressurized by a positive-displacement pump driven from engine crankshaft. The following items are mounted on engine or skid:

1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
2. Thermostatic Control Valve: Controls flow in system to maintain optimum oil temperature. Unit is capable of full flow and is designed to be fail-safe.
3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps or siphons or special tools or appliances.

F. Engine Fuel System: Comply with NFPA 37. System includes the following:

1. Main Fuel Pump: Mounted on engine. Pump ensures adequate primary fuel flow under starting and load conditions.
2. Relief/Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.

G. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system. Heater shall be thermostatically controlled. Comply with NFPA 110 requirements for Level 1 equipment.

H. Provide vibration isolation between generator set and concrete pad per manufacturer recommendation (typically on larger units only), not required on units with integral vibration isolation between engine and frame rail.

2.6 GOVERNOR

A. Type: Adjustable isochronous, with speed sensing, electronic type.

2.7 ENGINE COOLING SYSTEM

A. Description: Closed loop, liquid cooled, with radiator factory mounted on engine generator-set skid and integral engine-driven coolant pump.

B. ~~[Description: Closed loop, liquid cooled, with remote radiator and integral engine-driven coolant pump. Radiator shall be rated at 122 F. and radiator fan must not derate specified Kw ratings.]~~

C. Radiator: Rated for specified coolant.

D. ~~[Remote Radiator: Vertical air discharge. Unit is rated for specified coolant.]~~

~~E. [Remote Radiator: Horizontal air discharge. Unit is rated for specified coolant.~~

~~1. Radiator Core Tubes: Nonferrous-metal construction other than aluminum.~~
~~2. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.~~
~~3. Fan: Driven by totally enclosed electric motor with sealed bearings.]~~

~~F.~~E. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.

~~G.~~F. Expansion Tank: Constructed of welded steel plate and equipped with gage glass and petcock.

~~H.~~G. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.

~~I.~~H. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging-, ultraviolet-, and abrasion-resistant fabric.

1. Rating: 50-psig maximum working pressure with 180 deg F coolant, and noncollapsible under vacuum.
2. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.

~~J.~~I. Coolant piping external to engine generator set. Refer to Division 23 Section "Hydronic Piping" for materials and installation requirements for piping.

2.8 FUEL SUPPLY SYSTEM

A. Comply with Michigan DEQ, NFPA 30 and NFPA 37.

B. Day Tank: Sub-base style, factory-fabricated assembly of a duel-walled fuel tank listed by a nationally recognized testing laboratory, with the following features:

1. Containment: Integral rupture basin with a capacity of 150 percent of nominal capacity of day tank.

a. Leak Detector: Locate in rupture basin and connect to provide audible and visual alarm in the event of day-tank leak.

2. Tank Capacity: Adequate to supply fuel to engine for an uninterrupted period of [~~48~~24] hours' operation at 100 percent of rated power output of engine generator system without being refilled.
3. Pump Capacity: Exceeds maximum flow of fuel drawn by engine-mounted fuel supply pump at 110 percent of rated capacity, including fuel returned from engine.
4. Unit, Including Alarm Contacts: Complies with UL 142.
5. Low-Level Alarm Sensor: Separate device operates alarm contacts at 75 percent of normal fuel level.

6. High-Level Alarm Sensor: Separate device operates alarm and redundant fuel shutoff contacts at 106 percent of normal fuel level.
7. Piping Connections: Include fuel suction and return lines to fuel storage tank; fuel supply; and return lines to engine, local fuel fill, vent line, overflow line, and tank drain line complete with shutoff valve.
8. Sub-base Day Tank shall have all options required to meet Mich DEQ Compliance.
9. Vandal-resistant fill cap in a lockable spill box.
10. Tank must be mounted on channels or have mastic coating between tank and concrete pad.

~~C. Remote Fuel Oil Storage Tank: As specified in Division 23 Section "Facility Underground Fuel-Storage Tanks" or Division 23 Section "Facility Aboveground Fuel-Oil Storage Tanks."~~

~~D.~~C. Interior Fuel Oil Piping: As specified in Division 23 Section "Facility Fuel-Oil Piping."

2.9 ENGINE EXHAUST SYSTEM

A. Muffler: Critical type, sized as recommended by engine manufacturer. Muffler shall reduce exhaust noise 30 dBA or better at 500Hz.

B. Condensate Drain for Muffler: Schedule 40, black steel pipe connected to muffler drain outlet through a petcock.

C. Connections from Engine to Exhaust System: Flexible section of corrugated stainless-steel pipe.

D. Connection from Exhaust Pipe to Muffler: Stainless-steel expansion joint with liners.

E. Insulation for Mufflers and Indoor Exhaust Piping: As specified in Division 23 Section "HVAC Equipment Insulation" and Division 23 Section "HVAC Piping Insulation."

F. Supports for Muffler and Exhaust Piping: Spring hangers and all-thread rods and vibration hangers as specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment" and Division 23 Section "Hangers and Supports for HVAC Piping and Equipment"; attached to building structure.

G. Exhaust Piping External to Engine: ASTM A 53, Schedule 40, welded, black steel, with welded joints and fittings. Refer to Division 23 Sections "Hydronic Piping" and " BREECHINGS, CHIMNEYS AND STACKS ~~Hydronic Pumps~~" for materials and installation requirements for piping.

2.10 COMBUSTION-AIR-INTAKE

A. Description: Standard-duty engine-mounted air cleaner with replaceable dry filter element and "blocked filter" indicator.

2.11 STARTING SYSTEM

A. Description: electric, with negative ground and including the following items:

1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in "Environmental Conditions" Paragraph in "Service Conditions" Article above.
2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
3. Cranking Cycle: As required by NFPA 110 for system level specified.
4. Battery: Adequate capacity within ambient temperature range specified in "Environmental Conditions" Paragraph in "Service Conditions" Article above to provide specified cranking cycle at least twice without recharging.
5. Battery Cable: Size as recommended by generator set manufacturer for cable length required. Include required interconnecting conductors and connection accessories.
6. Battery Compartment: Factory fabricated of metal with acid-resistant finish and thermal insulation. Thermostatically controlled heater is arranged to maintain battery above 10 deg C regardless of external ambient temperature within range specified in "Environmental Conditions" Paragraph in "Service Conditions" Article above. Include accessories required to support and fasten batteries in place.
7. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35-A minimum continuous rating.
8. Battery Charger: Current-limiting, automatic-equalizing and float-charging type with equalize charge timer. Unit complies with UL 1236 and includes the following features:
   a. Operation: Equalizing-charging rate of 10 A is initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit then automatically switches to a lower float-charging mode and continues operating in that mode until battery is discharged again.
   b. Automatic Temperature Compensation: Adjusts float and equalizes voltages for variations in ambient temperature from minus 40 deg C to plus 60 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.
   c. Automatic Voltage Regulation: Maintains output voltage constant regardless of input voltage variations up to plus or minus 10 percent.
   d. Ammeter and Voltmeter: Flush mounted in door. Meters indicate charging rates.
   e. Safety Functions: Include sensing of abnormally low battery voltage arranged to close contacts providing low battery voltage indication on control and monitoring panel. Also include sensing of high battery voltage and loss of ac input or dc output of battery charger. Either condition closes contacts that provide a battery-charger malfunction indication at system control and monitoring panel.
   f. Enclosure and Mounting: NEMA 250, Type 1, wall-mounted cabinet.
   g. Battery Heater: Provide battery heater for outdoor generator installations.

2.12 CONTROL AND MONITORING

A. Functional Description: When the mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic-transfer switches initiate starting and stopping of the generator set. When the mode-selector switch is switched to the on position, the generator set manually starts. The off position of the same switch initiates generator-set shutdown. When the generator set is running, specified system or equipment failures or derangements automatically shut down the generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down the generator set.

B. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages are grouped on a common control and monitoring panel mounted on the generator set. Mounting method isolates the control panel from generator-set vibration.

1. Current and Potential Transformers: Instrument accuracy class.

C. Indicating and Protective Devices and Controls: Include those required by NFPA 110 for a Level 1 system, and the following:

D. Indicating and Protective Devices and Controls: Include the following:

1. AC voltmeter.
2. AC ammeter.
3. AC frequency meter.
4. DC voltmeter (alternator battery charging).
5. Engine-coolant temperature gage.
6. Engine lubricating-oil pressure gage.
7. Running-time meter.
8. Ammeter-voltmeter, phase-selector switch(es).
9. Generator-voltage adjusting rheostat.
~~9.~~10. Permanent Generator Offline for Maintenance

~~10.~~11. Generator overload.

E. Supporting Items: Include sensors, transducers, terminals, relays, and other devices, and wiring required to support specified items. Locate sensors and other supporting items on engine, generator, or elsewhere as indicated. Where not indicated, locate to suit manufacturer's standard.

F. Provide connection to BAS system with a minimum of 10 points of generator status as outlined in BAS specification. ~~Match~~ Provide BACNET ~~or~~ and MODBUS protocol ~~of~~ compatible with BAS system to be coordinated with building controls contractor.

G. Common Remote Audible Alarm: Comply with NFPA 110 requirements for Level 1 systems. Include necessary contacts and terminals in control and monitoring panel. Locate audible device and silencing means where indicated.

~~G.~~H. Monitoring generator remote start circuits: Comply with NFPA 70, Section 700.10 to continuously monitor generator control wiring. Loss of integrity shall initiate visual and audible annunciation of the generator malfunction and local generator location and annunciator location and the loss of integrity shall start up the generator.

~~H.~~I. Remote Alarm Annunciator: Communications ready and installed by twisted pair wiring. Comply with NFPA 99. Labeled LEDs identify each alarm event. Common audible signal sounds for alarm conditions. Silencing switch in face of panel silences signal without altering visual indication. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset. Cabinet and faceplate are surface- or flush-mounting type to suit mounting conditions indicated.

~~I.~~J. Remote Emergency-Stop Switch: Flush wall-mounted, unless otherwise indicated and prominently labeled. Push button is protected from accidental operation.

2.13 GENERATOR OVERCURRENT AND FAULT PROTECTION

A. Generator Circuit Breaker: Molded-case, thermal-magnetic type; 100 percent rated; complying with NEMA AB 1 and UL 489.

1. Tripping Characteristic: Designed specifically for generator protection.
2. Trip Rating: Matched to generator rating.
3. Shunt Trip: For future use.
4. Mounting: Adjacent to or integrated with control and monitoring panel.
5. Kirk Key:
   a. Provide with auxiliary contacts to indicate if generator is offline for maintenance.
   b. Interlock with temporary generator connection switch breaker ~~switch~~ with same Kirk ~~Key~~ Key Lock.

B. Ground-Fault Indication: Comply with NFPA 70, Article 700-7(d). Integrate ground-fault alarm indication with other generator-set alarm indications.

2.14 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

A. Comply with NEMA MG 1 and specified performance requirements.

B. Drive: Generator shaft is directly connected to engine shaft. Exciter is rotated integrally with generator rotor.

C. Electrical Insulation: Class H or Class F.

D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required.

E. Construction prevents mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

F. Excitation uses no slip or collector rings, or brushes, and is arranged to sustain generator output under short-circuit conditions as specified.

G. Enclosure: Dripproof.

H. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified.

1. Adjusting rheostat on control and monitoring panel provides plus or minus 5 percent adjustment of output- voltage operating band.

I. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.

J. Alternator 105C rise rated. Provide alternator heater with circuit wired to it.

2.15 OUTDOOR GENERATOR-SET ENCLOSURE

A. Description: Vandal-resistant, weatherproof steel housing, wind resistant up to 100 mph . Multiple panels are lockable and provide adequate access to components requiring maintenance. Panels are removable by one person without tools. Instruments and control are mounted within enclosure. Provide skid bottom end plates.

B. Description: Prefabricated or pre-engineered enclosure with the following features:

1. Construction: Galvanized steel, metal-clad on steel frame.
2. Sound Attenuating Enclosure: Provide ~~[Level 1 – (maximum 89dBA at 7 meters)]~~ **[Level 2 – (maximum 78 dBA at 7 meters)]** sound attenuation.
3. Structural Design and Anchorage: Adequate to resist loads imposed by 100-mph wind.
4. ~~[~~Space Heater: Thermostatically controlled operating at one-half or less of rated voltage sized to prevent condensation.~~]~~
5. Louvers: Equipped with insect/rodent screen and filter arranged to permit air circulation when engine is not running while excluding exterior dust and rodents.
6. Hinged Doors: With padlocking provisions.
7. Ventilation: Louvers equipped with insect/rodent screen and filter arranged to permit air circulation while excluding exterior dust and rodents.
8. Thermal Insulation: As required to maintain winter interior temperature within limits required by components.
9. Finish: Two-coat enamel finish over cleaned and primed surfaces.

C. Muffler Location: Internal to enclosure.

D. Engine Cooling Airflow through Enclosure: Adequate to maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for two hours with ambient temperature at top of range specified in system service conditions.

E. Louvers: Fixed-engine cooling air inlet and discharge. Louvers prevent entry of rain and snow.

F. Automatic Dampers (for units 500kW or larger): At engine cooling air inlet and discharge. Dampers are fixed type.

G. Interior Lights: With switch. Factory-wired, LED vaporproof-type fixtures within housing; arranged to illuminate controls and accessible interior. Arrange for external circuit supply.

H. Convenience Outlets: Factory wired. Arrange for external circuit supply.

I. 500kVA and above to be supplied with integral auxiliary panel to supply power to generator charger, alternator heater, block heater and all other accessories.

2.16 FINISHES

A. Indoor Enclosures and Components: Manufacturer's standard enamel over corrosion-resistant pretreatment and compatible standard primer.

B. Outdoor Enclosures: Manufacturer's standard enamel over corrosion-resistant pretreatment and compatible standard primer.

2.17 SOURCE QUALITY CONTROL

A. Factory Tests: Include prototype testing and Project-specific equipment testing (testing of equipment manufactured specifically for this Project).

B. Prototype Testing: Performed on a separate engine generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.

1. Tests: Comply with those required for Level 1 energy converters in Paragraphs 3.2.1, 3.2.1.1, and 3.2.1.2 of NFPA 110.
2. Generator Tests: Comply with IEEE 115.
3. Components and Accessories: Items furnished with installed unit that are not identical to those on tested prototype have been tested to demonstrate compatibility and reliability.

C. Project-Specific Equipment Tests: Factory test engine generator set and other system components and accessories before shipment. Perform tests at rated load and power factor. Include the following tests.

1. Full load run.
2. Maximum power.
3. Voltage regulation.
4. Transient and steady-state governing.
5. Single-step load pickup.
6. Safety shutdown.

D. ~~[Observation of Factory Tests: Provide 14 days' advance notice of tests and opportunity for observation of test by Owner's representatives.]~~

E. Report factory test results within 10 days of completion of test.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, equipment foundations, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine generator performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Examine roughing-in of cooling-system piping systems and electrical connections. Verify actual locations of connections before packaged engine generator installation.

3.2 CONCRETE BASES

A. Install concrete bases of dimensions indicated for packaged engine generators. Refer to Division 03 Section "Cast-in-Place Concrete."

3.3 INSTALLATION

A. Packaged Engine Generator sets shall be installed in accordance with NECA/EGSA 404-2000, Recommended Practice for Installing Generator Sets (ANSI).

B. Comply with packaged engine generator manufacturers' written installation and alignment instructions, and with NFPA 110.

C. Set packaged engine generator set on concrete bases.

1. Support generator-set mounting feet on rectangular metal blocks and shims or on metal wedges having small taper, at points near foundation bolts to provide 3/4- to 1-1/2-inch gap between pump base and foundation for grouting.
2. Adjust metal supports or wedges until generator is level.

D. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.

E. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

1. Verify that electrical wiring is installed according to manufacturers' submittal and installation requirements in Division 26 Sections. Proceed with equipment startup only after wiring installation is satisfactory.

F. The Electrical Contractor shall provide initial filling of diesel fuel tank with fresh fuel. Top off tank at substantial completion.

3.4 CONNECTIONS

A. Piping installation requirements are specified in Division 23 Sections. Drawings indicate general arrangement of piping and specialties. The following are specific connection requirements:

1. Install piping adjacent to packaged engine generator to allow service and maintenance.
2. Connect water supply to cooling system.
3. Connect cooling-system water supply and drain piping to diesel-engine heat exchangers. Install flexible connectors at connections to engine generator and remote radiator.
4. Connect exhaust-system piping to diesel engines.

B. Electrical wiring and connections are specified in Division 26 Sections.

C. Ground equipment.

1. Provide at least (3) ground rods at generator.

2. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.5 IDENTIFICATION

A. Identify system components according to Division 23 Section "Identification for HVAC Piping and Equipment" and Division 26 Section "Identification for Electrical Systems."

3.6 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including piping and electrical connections, and to assist in testing. Report results in writing.

B. Testing: Perform field quality-control testing under the supervision of the manufacturer's factory-authorized service representative.

C. Tests: Include the following:

1. Factory standard tests recommended by manufacturer.
2. ~~[~~Perform each visual and mechanical inspection and electrical and mechanical test stated in NETA ATS for emergency engine generator sets, except omit vibration baseline test~~]~~
3. ~~[~~NFPA 110 Acceptance Tests: Perform tests required by NFPA 110. The authority having jurisdiction (Office of Fire Safety, Michigan Department of Consumer and Industry Services) shall be given advanced notification of the time at which the final test is to be performed so that the authority can witness the test. Provide signed documentation to the authority having jurisdiction documenting that these code requirements have been met. Loadbank test to full capacity for 4 hours in addition to building load test.~~]~~
4. Battery Tests: Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery. Verify acceptance of charge for each element of battery after discharge. Verify measurements are within manufacturer's specifications.
5. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
6. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine generator system before and during system operation. Check for air, exhaust, and fluid leaks.
7. ~~[~~**Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases, and verify that performance is as specified.**
8. **Harmonic-Content Tests: Measure harmonic content of output voltage under 25 percent and at 100 percent of rated linear load. Verify that harmonic content is within specified limits.**
9. **Load Bank Test: Perform a four hour load bank test at generator rated capacity.**]

D. Coordinate tests with tests for transfer switches and run them concurrently.

E. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.

F. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.

G. Test instruments shall have been calibrated within the last 12 months, traceable to standards of the National Institute for Standards and Technology, and adequate for making positive observation of test results. Make calibration records available for examination on request.

3.7 BATTERY EQUALIZATION

A. Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.

3.8 CLEANING

A. On completion of installation, inspect system components. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish. Clean components internally using methods and materials recommended by manufacturer.

3.9 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators as specified below:

1. Coordinate this training with that for transfer switches.
2. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining equipment.
3. Review data in maintenance manuals. Refer to Division 01 Section “Operation and Maintenance Data.”
4. Schedule training with Owner, through Architect, with at least seven days' advance notice.
5. Minimum Instruction Period: Eight hours.

END OF SECTION 26 3213

SECTION 28 3100 - FIRE DETECTION AND ALARM

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. Failure to consult these documents shall not relieve the Contractor of the requirements therein.

1.2 SUMMARY

A. This Section includes fire alarm systems with manual stations, detectors, signal equipment, controls, and devices.

B. Related Sections include the following:

1. Division 08 Section "Door Hardware".

~~C. Allowances: Allowances affect the Work of this Section. Refer to Division 01 Section "Allowances" for procedures for allowances.~~

~~1. Allowance No. **<Insert Number>** - Fire Alarm Devices: Provide a lump sum allowance in the amount of [**five thousand**] **<insert amount>** dollars ($[**5000.00**] **<insert amount>**) to cover the cost for additional fire alarm pull stations, smoke detectors or audio/visual signals required by the Authority Having Jurisdiction.~~

1.3 DEFINITIONS

A. FACP: Fire alarm control panel.

B. LED: Light-emitting diode.

C. Definitions in NFPA 72 apply to fire alarm terms used in this Section.

D. NICET: National Institute for Certification in Engineering Technologies.

1.4 SYSTEM DESCRIPTION

A. General: Digital-addressable system with manual and automatic alarm initiation; automatic sensitivity control of certain smoke detectors; and multiplexed signal transmission dedicated to fire alarm service only.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:

1. Shop Drawings shall be prepared by persons with the following qualifications:
   a. Trained and certified by manufacturer in fire alarm system design.
   b. Fire alarm certified by NICET, minimum Level III.

2. Wiring Diagrams: Detail wiring and differentiate between manufacturer-installed and field-installed wiring. Include diagrams for equipment and for system with all terminals and interconnections identified.
3. Battery: Sizing calculations.

4. Floor Plans: Indicate final outlet locations and routings of raceway connections.
5. Alarm Characteristics: Indicate the visual strobe candela and audible sound level requirements to satisfy NFPA 72 and the Authority having jurisdiction.

6. Device Address List: Coordinate with final system programming.
7. System Operation Description: Detailed description for this Project, including method of operation and supervision of each type of circuit and sequence of operations for manually and automatically initiated system inputs and outputs. Manufacturer's standard descriptions for generic systems are not acceptable.
8. Ductwork Coordination Drawings: Plans, sections, and elevations of ducts, drawn to scale and coordinating the installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, the detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.
9. Voice/Alarm Signaling Service: Equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.

C. Operating Instructions: For mounting at the FACP.

D. Installer Certificates: Signed by manufacturer certifying that installers comply with requirements.

E. Field Test Reports: Indicate and interpret test results for compliance with performance requirements. Comply with NFPA 72.

F. Maintenance Data: For fire alarm systems to include in maintenance manuals specified in Division 01. Comply with NFPA 72.

G. Submissions to Authorities Having Jurisdiction: In addition to distribution requirements for Submittals specified in Division 01 Section "Submittal Procedures," make an identical submission to authorities having jurisdiction, (Department of Labor & Economic Growth, Office of Fire Safety, P.O. Box 30254, Lansing, Michigan, 48909). Include copies of annotated Contract Drawings as needed to depict component locations to facilitate review. Resubmit if required to make clarifications or revisions to obtain approval. On receipt of comments from authorities having jurisdiction, submit them to Architect for review.

H. Certificate of Completion: Comply with NFPA 72.

I. Comply with NFPA 20 for fire pump installations.

J. Inspector's qualifications for the smoke control system.

K. Smoke control system's test results.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is a trained and certified representative of the FACP manufacturer for both installation and maintenance of units required for this Project.

B. Manufacturer Qualifications: A firm experienced in manufacturing systems similar to those indicated for this Project and with a record of successful in-service performance.

C. Source Limitations: Obtain fire alarm system components through one source from a single manufacturer.

D. Compliance with Local Requirements: Comply with applicable building code, local ordinances and regulations, and requirements of authorities having jurisdiction.

E. Comply with NFPA 72.

1.7 SEQUENCING AND SCHEDULING

A. Existing Fire Alarm Equipment: Maintain fully operational until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service and label existing fire alarm equipment "NOT IN SERVICE" until removed from the building.

B. Equipment Removal: After acceptance of the new fire alarm system, remove existing disconnected fire alarm equipment and restore damaged surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Edwards Systems Technology; Unit of General Signal.
2. Faraday, Inc.
3. National Time and Signal Corporation.
4. Notifier; a GE-Honeywell Company
5. Siemens Building Technologies, Inc.; a Cerberus Division.
6. Siemens Cerberus Pyrotronics.
7. Federal Signal Corp.; Commercial Products Group.
8. Fire Control Instruments, Inc.
9. Fire Lite Alarms, Inc.
10. Grinnell Fire Protection Systems.

2.2 EXTRA MATERIALS – 10% OF ADDITIONAL COMPONENTS FOR THE FOLLOWING ITEMS

A. HORN STROBES

B. PULL STATIONS

~~10.~~C. SMOKE DETECTORS

~~2.2~~2.3 FUNCTIONAL DESCRIPTION OF SYSTEM

A. Control of System: By the FACP.

B. System Supervision: Automatically detect and report open circuits, shorts, and grounds of wiring for initiating device, signaling line, and notification-appliance circuits.

C. Priority of Signals: Automatic alarm response functions resulting from an alarm signal from one device are not altered by subsequent alarm, supervisory, or trouble signals. An alarm signal is the highest priority. Supervisory and trouble signals have second- and third-level priority. Higher-priority signals take precedence over signals of lower priority, even when the lower-priority condition occurs first. Annunciate and display all alarm, supervisory, and trouble signals regardless of priority or order received.

D. Noninterference: A signal from one device shall not prevent the receipt of signals from other devices.

E. System Reset: All devices are manually resettable from the FACP after initiating devices are restored to normal.

F. Transmission to Remote Alarm Receiving Station: Automatically route alarm, supervisory, and trouble signals to a remote alarm station by means of a digital alarm communicator transmitter and telephone lines.

G. System Alarm Capability during Circuit Fault Conditions: System wiring and circuit arrangement prevent alarm capability reduction when a single ground or open circuit occurs in an initiating device circuit, signal line circuit, or notification-appliance circuit.

H. Loss of primary power at the FACP initiates a trouble signal at the FACP. The FACP indicates when the fire alarm system is operating on the secondary power supply.

I. Basic Alarm Performance Requirements: Unless otherwise indicated, operation of a manual station, automatic alarm operation of a smoke or flame or heat detector, or operation of a sprinkler flow device initiates the following:

1. Notification-appliance operation.

2. Identification at the FACP and the remote annunciator of the device originating the alarm.
3. Transmission of an alarm signal to the remote alarm receiving station.
4. Unlocking of electric door locks in designated egress paths.
5. Release of fire and smoke doors held open by magnetic door holders.

6. Shutdown of fans and other air-handling equipment serving area when alarm was initiated.
7. Closing of smoke dampers in air ducts of system serving area where alarm was initiated.
8. ~~Close~~ Open normally closed contact tied to lighting control system to turn on emergency lighting.
9. Recording of the event in the system memory.

J. Alarm Silencing, System Reset and Indication: Controlled by switches in the FACP.

1. Silencing-switch operation halts alarm operation of notification appliances and activates an "alarm silence" light. Display of identity of the alarm zone or device is retained.
2. Subsequent alarm signals from other devices reactivate notification appliances until silencing switch is operated again.

K. Water-flow alarm switch operation initiates the following:

1. Notification-appliance operation.
2. Flashing of the device location-indicating light for the device that has operated.

L. Smoke detection for detectors with alarm verification initiates the following:

1. Audible and visible indication of an "alarm verification" signal at the FACP.
2. Activation of a listed and approved "alarm verification" sequence at the FACP and the detector.
3. Recording of the event in the system memory.
4. General alarm if the alarm is verified.
5. Cancellation of the FACP indication and system reset if the alarm is not verified.

M. Sprinkler valve-tamper switch operation initiates the following:

1. A supervisory, audible, and visible "valve-tamper" signal indication at the FACP and the annunciator.
2. Flashing of the device location-indicating light for the device that has operated.
3. Recording of the event in the system memory.
4. Transmission of supervisory signal to remote alarm receiving station.

~~N. Fire-pump power failure, including a dead-phase or phase-reversal condition, initiates the following:~~

~~1. A supervisory, audible, and visible "fire-pump power failure" signal indication at the FACP and the annunciator.~~
~~2. Recording of the event in the system memory.~~
~~3. Transmission of trouble signal to remote alarm receiving station.~~

~~O. Fire-pump running condition, initiates the following:~~

~~1. A supervisory, audible, and visible "fire-pump running" signal indication at the FACP and the annunciator.~~
~~2. Recording of the event in the system memory.~~
~~3. Transmission of trouble signal to remote alarm receiving station.~~

~~P. Fire-pump alternate power supply condition, initiates the following:~~

~~1. A supervisory, audible, and visible "alternate power source supplying fire-pump" signal indication at the FACP and the annunciator.~~
~~2. Recording of the event in the system memory.~~
~~3. Transmission of trouble signal to remote alarm receiving station.~~

N. Generator connection to system shall monitor and display the following:

1. Generator in Fault Mode
2. Generator in Manual Mode
3. Generator is running

~~Q.~~O. Low-air-pressure switch operation on a dry-pipe or preaction sprinkler system initiates the following:

1. A supervisory, audible, and visible "sprinkler trouble" signal indication at the FACP and the annunciator.
2. Flashing of the device location-indicating light for the device that has operated.
3. Recording of the event in the system memory.
4. Transmission of trouble signal to remote central station.

~~R.~~P. Remote Detector Sensitivity Adjustment: Manipulation of controls at the FACP causes the selection of specific addressable smoke detectors for adjustment, display of their current status and sensitivity settings, and control of changes in those settings. Same controls can be used to program repetitive, scheduled, automated changes in sensitivity of specific detectors. Sensitivity adjustments and sensitivity-adjustment schedule changes are recorded in system memory.

~~S.~~Q. Removal of an alarm-initiating device or a notification appliance initiates the following:

1. A "trouble" signal indication at the FACP and the annunciator for the device or zone involved.
2. Recording of the event in the system memory.
3. Transmission of trouble signal to remote alarm receiving station.

~~T.~~R. Printout of Events: On receipt of the signal, print alarm, supervisory, and trouble events. Identify zone, device, and function. Include type of signal (alarm, supervisory, or trouble), and date and time of occurrence. Differentiate alarm signals from all other printed indications. Also print system reset event, including the same information for device, location, date, and time. Commands initiate the printout of a list of existing alarm, supervisory, and trouble conditions in the system and a historical log of events.

~~U.~~S. FACP Alphanumeric Display: Plain-English-language descriptions of alarm, supervisory, and trouble events; and addresses and locations of alarm-initiating or supervisory devices originating the report. Display monitoring actions, system and component status, system commands, programming information, and data from the system's historical memory.

~~2.3~~2.4 MANUAL PULL STATIONS

A. Description: Fabricated of metal or plastic, and finished in red with molded, raised-letter operating instructions of contrasting color.

1. Double-action mechanism requires two actions, such as a push and a pull, to initiate an alarm. Break glass/plastic stations are not acceptable.
2. Station Reset: Key or wrench operated; double pole, double throw; switch rated for the voltage and current at which it operates.

3. Indoor Protective Shield: Factory-fabricated clear plastic enclosure, hinged at the top to permit lifting for access to initiate an alarm. Lifting the cover actuates an integral battery-powered audible horn intended to discourage false alarm operation.

4. Integral Addressable Module: Arranged to communicate manual-station status (normal, alarm, or trouble) to the FACP.

~~2.4~~2.5 SMOKE DETECTORS

A. General: Include the following features:

1. Operating Voltage: 24-V dc, nominal.
2. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
3. Plug-in Arrangement: Detector and associated electronic components are mounted in a module that connects in a tamper-resistant manner to a fixed base with a twist-locking plug connection. Terminals in the fixed base accept building wiring.
4. Integral Visual-Indicating Light: LED type. Indicates detector has operated.
5. Sensitivity: Can be tested and adjusted in-place after installation.

6. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.

7. Remote Controllability: Unless otherwise indicated, detectors are analog-addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP.

B. Photoelectric Smoke Detectors: Include the following features:

1. Sensor: LED or infrared light source with matching silicon-cell receiver.
2. Detector Sensitivity: Between 2.5 and 3.5 percent/foot smoke obscuration when tested according to UL 268A.

3. Integral Thermal Detector: Fixed-temperature type with 135 deg F setting.

~~C. Beam-Type Smoke Detector: Each detector consists of a separate transmitter and receiver with the following features:~~

~~1. Adjustable Sensitivity: More than a six-level range, minimum.~~
~~2. Linear Range of Coverage: 330 feet , minimum.~~
~~3. Tamper Switch: Initiates trouble signal at the central FACP when either transmitter or receiver is disturbed.~~
~~4. Separate Color-Coded LEDs: Indicate normal, alarm, and trouble status. Any detector trouble, including power loss, is reported to the central FACP as a composite "trouble" signal.~~
~~5. Detectors with prism reflectors are not acceptable.~~

~~D.~~C. Duct Smoke Detector: Photoelectric type.

1. Photoelectric Smoke Detectors:
   a. Sensor: LED or infrared light source with matching silicon-cell receiver.
   b. Detector Sensitivity: Between 2.5 and 3.5 percent/foot smoke obscuration when tested according to UL 268A.

2. UL 268A listed, operating at 24-V dc, nominal.
3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.

4. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. The fixed base shall be designed for mounting directly to the air duct. Provide terminals in the fixed base for connection to building wiring.
5. Self-Restoring: Detectors shall not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type. Indicating ~~[~~detector has operated~~]~~ ~~[~~and power-on~~]~~ status.~~[~~ Provide remote status and alarm indicator and test station where indicated.~~]~~
7. Sampling Tubes: Design and dimensions as recommended by manufacturer for the specific duct size, air velocity, and installation conditions where applied.
8. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit. Motor shutdown wiring by Temperature Control Supplier.

~~2.5~~2.6 OTHER DETECTOR

A. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F or rate of rise of temperature that exceeds 15 deg F per minute, unless otherwise indicated.

1. Mounting: Plug-in base, interchangeable with smoke detector bases.

2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.

~~2.6~~2.7 NOTIFICATION APPLIANCES

A. Description: Equip for mounting as indicated and have screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly.

B. Chimes, High-Level Output: Vibrating type, 81 dB minimum rated output.

C. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Horns produce a sound-pressure level of 90 dB, measured 10 feet from the horn. Beige or Ivory color.

~~1. Where installed in sleeping areas, provide square wave signal with fundamental frequency of 520 Hz +- 10% per NFPA 72~~

D. Visible Alarm Devices: Xenon strobe lights listed under UL 1971 with clear or nominal white polycarbonate lens. Mount lens on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch high letters on the lens. Beige or Ivory color.

1. Rated Light Output: 15, 30, 75, or 110 candela, as required to satisfy NFPA 72 requirements.
2. Strobe Leads: Factory connected to screw terminals.
3. Strobes shall be sychronized.

E. Voice/Tone Speakers:

1. High-Range Units: Rated 2 to 15 W.
2. Low-Range Units: Rated 1 to 2 W.

3. Mounting: Flush, semirecessed, surface, or surface-mounted; bi-directional as indicated.
4. Matching Transformers: Tap range matched to the acoustical environment of the speaker location.

F. Fire Connection Strobe: Provide all required connections to the strobe/horn associated with the fire fighters hose connection on the exterior of the building. Provide 120V power from nearest panel for devices provided by sprinkler system supplier. Connect to emergency power when available.

~~2.7~~2.8 REMOTE DEVICE LOCATION-INDICATING LIGHTS AND IDENTIFICATION PLATES

A. Description: LED indicating light near each smoke detector that may not be readily visible, and each sprinkler water-flow switch and valve-tamper switch. Light is connected to flash when the associated device is in an alarm or trouble mode. Lamp is flush mounted in a single gang wall plate. A red, laminated, phenolic-resin identification plate at the indicating light identifies, in engraved white letters, device initiating the signal and room where the smoke detector or valve is located. For water-flow switches, the identification plate also designates protected spaces downstream from the water-flow switch.

~~2.8~~2.9 MAGNETIC DOOR HOLDERS

A. Provide wiring for magnetic door holders furnished and installed by the door hardware contractor.

~~2.9~~2.10 PROGRAMMER/TESTOR

A. Provide a programmer/testor for any fire alarm system requiring such a device for programming and maintenance of signal initiation devices. Furnish unit complete with carrying case and instructions.

~~2.10~~2.11 CENTRAL FACP

A. Cabinet: Lockable steel enclosure. Arrange interior components so operations required for testing or for normal maintenance of the system are performed from the front of the enclosure. If more than one unit is required to form a complete control panel, fabricate with matching modular unit enclosure to accommodate components and to allow ample gutter space for field wiring and interconnecting panels.

1. Identify each enclosure with an engraved, red, laminated, phenolic-resin nameplate with lettering not less than 1 inch high. Identify individual components and modules within cabinets with permanent labels.

2. Mounting: Flush.

B. Alarm and Supervisory Systems: Separate and independent in the FACP. Alarm-initiating zone boards consist of plug-in cards. Construction requiring removal of field wiring for module replacement is unacceptable.

C. Control Modules: Include types and capacities required to perform all functions of fire alarm systems. Provide 20% spare signal capacity for future alarm devices.

D. Indications: Local, visible, and audible signals announce alarm, supervisory, and trouble conditions. Each type of audible alarm has a different sound.

E. Resetting Controls: Prevent the resetting of alarm, supervisory, or trouble signals while the alarm or trouble condition still exists.

F. Alphanumeric Display and System Controls: Arranged for interface between human operator at the FACP and addressable system components, including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.

1. Display: Liquid-crystal type, 40 (small projects) or 80 (large projects) characters, minimum.
2. Keypad: Arranged to permit entry and execution of programming, display, and control commands.

G. Alphanumeric Display and System Controls: Arranged for interface between human operator at the FACP and addressable system components, including annunciation, supervision, and control.

1. Display: A minimum of 80 characters; alarm, supervisory, and component status messages; and indicate control commands to be entered into the system for control of smoke detector sensitivity and other parameters.
2. Keypad: Arranged to permit entry and execution of programming, display, and control commands.

H. Instructions: Printed or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

~~2.11~~2.12 NOTIFICATION APPLIANCE CIRCUIT (NAC) EXTENDER PANELS

A. Provide NAC panels as required to support notification appliances.

B. Provide layout of proposed NAC panel locations prior to installation.

~~2.12~~2.13 REMOTE ANNUNCIATOR

A. Description: Duplicate annunciator functions of the FACP for alarm, supervisory, and trouble indications. Also duplicate manual switching functions of the FACP, including acknowledging, silencing, reset, and test.

1. Mounting: Flush cabinet, NEMA 250, Class 1.

B. Display Type and Functional Performance: Alphanumeric display same as the FACP. Controls with associated LEDs permit acknowledging, silencing, resetting, and testing functions for alarm, supervisory, and trouble signals identical to those in the FACP.

~~B.~~C. Where main FACP is installed in electrical room, remote annunciator panel shall be capable of making voice announcements.

~~2.13~~2.14 FIREFIGHTER'S SMOKE CONTROL STATION

A. Firefighters Smoke Control Station (FSCS): shall provide full monitoring and manual control capability over all smoke-control/evacuation systems and equipment. The FSCS shall be furnished by the fire alarm system manufacturer. The FSCS shall have the highest priority control over all smoke-control systems

and equipment and shall override or bypass other building controls such as Hand-Off-Auto switches and On-Off switches. The FSCS shall depict graphically the physical building arrangement, smoke-control systems and equipment and the areas served by the equipment. Provide all equipment required for complete operation of the smoke control system including but not limited to conduit, wire and interface devices. System shall include the following:

1. Control panel shall be semi-flush mounting with a maximum panel width of 24 inches.
2. Operable controls shall be placed behind a lockable see-through door.
3. Graphic panel with pilot lamps and switches.
4. Provide a pilot lamp test switch to test all lamps on the panel.
5. All lamps shall be LED type.
6. Panel shall be UL Listed as a Firefighters Smoke Control Station under UL864-UUKL for smoke control.

B. Smoke Control System: Fans within the building shall be shown on the FSCS. A clear indication of the direction of the airflow and the relationship of the components shall be displayed. Status indicators shall be provided for all smoke control equipment, annunciated by fan and zone and by pilot lamp type indicators as follows:

1. Fans, dampers, and other operating equipment in their normal status – White.
2. Fans, dampers, and other operating equipment in their off or closed status – Red.
3. Fans, dampers, and other operating equipment in their on or open status – Green.
4. Fans, dampers, and other operating equipment in a fault status – Yellow/Amber.

C. Features: The FSCS shall provide control capability over the complete smoke control system equipment within the building as follows:

1. On-Auto-Off control over each individual piece of operating smoke control equipment that can also be controlled from other sources within the building. This includes stairway pressurization fans; smoke exhaust fans; supply, return and exhaust fans; elevator shaft fans; and other operating equipment used or intended for smoke control purposes.
2. Open-Auto-Close control over individual dampers related to smoke control and that are also controlled from other sources within the building.
3. On-Off or Open-Close control over smoke control and other critical equipment associated with a fire or smoke emergency and that can only be controlled from the FSCS.

D. Acceptance Testing: Devices, equipment, components and sequences shall be individually tested. These tests shall consist of determination of function, sequence and capacity of their installed condition. Tests shall include:

1. Detection devices.
2. Ducts.
3. Dampers.
4. Inlet and outlets.
5. Fans.
6. Smoke barriers.
7. Controls.

E. Special Inspections for Smoke Control: Smoke control systems shall be tested by a third party, special inspector as part of this contract.

1. Qualifications: Special inspection agencies for smoke control shall have experience in fire protection engineering, mechanical, engineering and certification as air balancers.
2. Reports: A complete report of testing shall be provided by the special inspector. The report shall include identification of all devices by manufacturer, nameplate data, design values, measured values and identification tag or mark.
3. Report Filing: A copy of the final report shall be filed with the fire code official and a copy shall be maintained in the building.

~~2.14 EMERGENCY POWER SUPPLY~~

~~A. General: Components include lead acid battery, charger, and an automatic transfer switch.~~

~~1. Battery Nominal Life Expectancy: 20 years, minimum.~~

~~B. Battery Capacity: Comply with NFPA 72.~~

~~1. Magnetic door holders are not served by emergency power. Magnetic door holders are released when normal power fails.~~

~~C. Battery Charger: Solid state, fully automatic, variable charging rate type. Provide capacity for 150 percent of the connected system load while maintaining batteries at full charge. If batteries are fully discharged, the charger recharges them completely within four hours. Charger output is supervised as part of system power supply supervision.~~

~~D. Integral Automatic Transfer Switch: Transfers the load to the battery without loss of signals or status indications when normal power fails.~~

2.15 ADDRESSABLE INTERFACE DEVICE

A. Description: Microelectronic monitor module listed for use in providing a multiplex system address for listed fire and sprinkler alarm-initiating devices with normally open contacts.

2.16 DIGITAL ALARM COMMUNICATOR TRANSMITTER

A. Listed and labeled under UL 864 and NFPA 72.

B. Functional Performance: Unit receives an alarm, supervisory, or trouble signal from the FACP panel, and automatically captures one or two telephone lines and dials a preset number for a remote central station. When contact is made with the central station(s), the signal is transmitted. The unit supervises up to two telephone lines. Where supervising two lines, if service on either line is interrupted for longer than 45 seconds, the unit initiates a local trouble signal and transmits a signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. When telephone service is restored, unit automatically reports that event to the central station. If service is lost on both telephone lines, the local trouble signal is initiated.

~~B.~~C. Contractor to confirm with other trades or owner the type of transmitter to provide. Provide Voice Over IP type dialler in installations where VOIP systems are in place.

~~C.~~D. Secondary Power: Integral rechargeable battery and automatic charger. Battery capacity is adequate to comply with NFPA 72 requirements.

~~D.~~E. Self Test: Conducted automatically every 24 hours with report transmitted to central station.

2.17 GUARDS FOR PHYSICAL PROTECTION

A. Description: Welded wire mesh of size and shape for the manual stations, smoke detectors, and audio/visual devices located in school gymnasiums, multi-purpose rooms and locker rooms.

1. Factory fabricated and furnished by the manufacturer of the device.
2. Finish: Paint of color to match the protected device.

2.18 WIRE

A. Non-Power-Limited Circuits: ~~Solid copper~~ Copper conductors with 600-V rated, 75 deg C, color-coded insulation.

1. Low-Voltage Circuits: No. 16 AWG, minimum.
2. Line-Voltage Circuits: No. 12 AWG, minimum.

B. Power-Limited Circuits: NFPA 70, Types FPL, FPLR, or FPLP, as recommended by manufacturer.

2.19 GENERATOR CONNECTION

A. Provide connection to emergency generator system and provide status as indicated in the fire alarm control panel section.

~~2.19~~2.20 BREAKER LOCK DEVICE

A. Provide breaker circuit lockout device on branch circuits feeding any fire alarm equipment including fire alarm panels and NAC panels. Utilize Elock fire alarm circuit lockout kit #ELOCK-FA and a red placard indicating “FIRE ALARM / EMERGENCY CIRCUIT INSIDE”.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

A. Install fire alarm system in accordance with manufacturer’s installation drawings and instructions.

B. Connecting to Existing Equipment: Verify that existing fire alarm system is operational before making changes or connections.

1. Connect new equipment to the existing control panel in the existing part of the building.

2. Expand, modify, and supplement the existing control equipment as necessary to extend the existing control functions to the new points. New components shall be capable of merging with the existing configuration without degrading the performance of either system.

C. Manual Pull Stations: Mount semiflush in recessed back boxes.

D. Water-Flow Detectors and Valve Supervisory Switches: Connection for each sprinkler valve station required to be supervised.

E. Ceiling-Mounted Smoke Detectors: Not less than 4 inches from a side wall to the near edge. For exposed solid-joist construction, mount detectors on the bottom of joists. On smooth ceilings, install not more than 30 feet apart in any direction.

F. Wall-Mounted Smoke Detectors: At least 4 inches, but not more than 12 inches, below the ceiling.

G. Smoke Detectors near Air Registers: Install no closer than 60 inches.

H. Duct Smoke Detectors: Comply with manufacturer's written instructions.

1. Verify that each unit is listed for the complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
2. Install sampling tubes so they extend the full width of the duct.

I. Audible Alarm-Indicating Devices: Install chimes and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille. Combine audible and visible alarms at the same location into a single unit.

J. Visible Alarm-Indicating Devices: Install adjacent to each alarm chime or alarm horn.

K. Device Location-Indicating Lights: Locate in public space near the device they monitor.

L. Horn/strobe at Fire Fighter's Hose Connection: Connect horn/strobe located on the exterior of the building associated with the sprinkler system.

M. FACP: Surface mount with tops of cabinets not more than 72 inches above the finished floor.

N. Annunciator: Install with the top of the panel not more than 60 inches above the finished floor.

O. Provide smoke detectors where required for all FACP and NAC panels.

P. Provide power to all FACP and NAC panels. Connect to emergency power when available.

3.2 WIRING INSTALLATION

A. Install wiring according to the following:

1. NECA 1.
2. TIA/EIA 568-A.

B. **[Wiring Method: Install wiring in metal raceway according to Division 26 Section "Raceway and Boxes for Electrical Systems."**

1. **Fire alarm circuits and equipment control wiring associated with the fire alarm system shall be installed in a dedicated raceway system. This system shall not be used for any other wire or cable.]**

C. Wiring Method:

1. Install wiring in raceways except in accessible ceiling spaces and in gypsum-board partitions where cable wiring method may be used. Route the fire alarm cable in cable tray system when available. Wiring run in ceiling space where there is no tray or conduit, support independently of other systems with dedicated low voltage rings / hooks. No zip ties or support from other systems or conduits allowed.
2. Conceal cables and raceways except in unfinished spaces.
3. Cables and raceways used for fire alarm circuits, and equipment control wiring associated with the fire alarm system, may not contain any other wire or cable.
4. Fire-Rated Cables: Use of 2-hour fire-rated fire alarm cables, NFPA 70 Types MI and CI, is not permitted.
5. Signaling Line Circuits: Power-limited fire alarm cables shall not be installed in the same cable or raceway as signaling line circuits.

D. [Wiring Method: Fire alarm systems that interface with smoke control systems shall have all wiring, regardless of voltage, installed in continuous raceways.]

E. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by the manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

F. Cable Taps: Use numbered terminal strips in junction, pull and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

G. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and a different color-code for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.

H. Risers: Install at least two vertical cable risers to serve the fire alarm system. Separate risers in close proximity to each other with a minimum one-hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signal from other floors.

I. Wiring to Remote Alarm Transmitting Device: 1-inch conduit between the FACP and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

J. Provide handle clamps on all circuit breakers feeding fire alarm system components. Handle clamps shall lock the circuit breaker in the “ON” position.

3.3 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals according to Division 26 Section Identification for Electrical Systems."

B. Install instructions frame in a location visible from the FACP.

C. Install circuit breaker lockout kit and plackard on panels indicating where emergency fire alarm circuits are fed from.

3.4 GROUNDING

A. Ground the FACP and associated circuits; comply with IEEE 1100. Install a #8 AWG ground wire from main service ground to the FACP.

B. Ground cable shields and equipment according to system manufacturer's written instructions to eliminate shock hazard and to minimize, to the greatest extent possible, ground loops, common-mode returns, noise pickup, cross talk, and other impairments.

C. Signal Ground Terminal: Locate at main equipment rack or cabinet. Isolate from power system and equipment grounding.

D. Install grounding electrodes of type, size, location, and quantity as indicated. Comply with installation requirements in Division 26 Section "Grounding and Bonding for Electrical Systems."

E. Ground equipment and conductor and cable shields. For audio circuits, minimize, to the greatest extent possible, ground loops, common-mode returns, noise pickup, cross talk, and other impairments. Provide 5-ohm ground at main equipment location. Measure, record, and report ground resistance.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and connections and to supervise pretesting, testing, and adjustment of the system. Report results in writing.

B. Pretesting: After installation, align, adjust, and balance the system and perform complete pretesting. Determine, through pretesting, the compliance of the system with requirements of Drawings and Specifications. Correct deficiencies observed in pretesting. Replace malfunctioning or damaged items with new ones, and retest until satisfactory performance and conditions are achieved. Prepare forms for systematic recording of acceptance test results.

C. Report of Pretesting: After pretesting is complete, provide a letter certifying the installation is complete and fully operable, including the names and titles of witnesses to preliminary tests.

D. Final Test Notice: Provide a minimum of 10 days' notice in writing when the system is ready for final acceptance testing.

E. Minimum System Tests: Test the system according to procedures outlined in NFPA 72. Minimum required tests are as follows:

1. Verify the absence of unwanted voltages between circuit conductors and ground.
2. Test all conductors for short circuits using an insulation-testing device.
3. With each circuit pair, short circuit at the far end of the circuit and measure the circuit resistance with an ohmmeter. Record the circuit resistance of each circuit on record drawings.
4. Verify that the control unit is in the normal condition as detailed in the manufacturer's operation and maintenance manual.
5. Test initiating and indicating circuits for proper signal transmission under open circuit conditions. One connection each should be opened at not less than 10 percent of initiating and indicating devices. Observe proper signal transmission according to class of wiring used.
6. Test each initiating and indicating device for alarm operation and proper response at the control unit. Test smoke detectors with actual products of combustion.
7. Test the system for all specified functions according to the approved operation and maintenance manual. Systematically initiate specified functional performance items at each station, including making all possible alarm and monitoring initiations and using all communications options. For each item, observe related performance at all devices required to be affected by the item under all system sequences. Observe indicating lights, displays, signal tones, and annunciator indications.
8. Test Both Primary and Secondary Power: Verify by test that the secondary power system is capable of operating the system for the period and in the manner specified.
9. ~~[~~Test smoke control operation startup and shutdown.~~]~~

F. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets Specifications and complies with applicable standards.

G. Report of Tests and Inspections: Provide a written record of inspections, tests, and detailed test results in the form of a test log. Submit log on the satisfactory completion of tests.

H. Tag all equipment, stations, and other components at which tests have been satisfactorily completed.

I. Provide certification of the fire alarm installation. Submit required documents to the Michigan Department of Labor & Economic Growth, Office of Fire Safety.

3.6 CLEANING AND ADJUSTING

A. Cleaning: Remove paint splatters and other spots, dirt, and debris. Touch up scratches and marred finish to match original finish. Clean unit internally using methods and materials recommended by manufacturer.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel as specified below:

1. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, adjusting, and maintaining equipment and schedules. Provide a minimum of 8 hours' training.
2. Training Aid: Use the approved final version of the operation and maintenance manual as a training aid.
3. Schedule training with Owner, through Architect, with at least seven days' advance notice.

3.8 ON-SITE ASSISTANCE

A. Occupancy Adjustments: When requested within one year of date of Substantial Completion, provide on-site assistance in adjusting sound levels, controls, and sensitivities to suit actual occupied conditions. Provide up to three requested visits to Project site for this purpose.

END OF SECTION 28 3100

811 Know what's below. Call before you dig.

ALL UTILITIES AS SHOWN ARE APPROXIMATE LOCATIONS DERIVED FROM ACTUAL MEASUREMENTS AND AVAILABLE RECORDS. THEY SHOULD NOT BE INTERPRETED TO BE EXACT LOCATION NOR SHOULD IT BE ASSUMED THAT THEY ARE THE ONLY UTILITIES IN THE AREA.

FIELD WORK PERFORMED BY:
DRIESENGA & ASSOCIATES, LLC

hurley & stewart
hurley & stewart, llc
2800 s. 11th street
kalamazoo, michigan 49009
269.552.4960 fax 269.552.4961
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REMOVALS LEGEND

- CURB REMOVAL
- SAWCUT
- PAVEMENT/SIDEWALK REMOVAL
- BUILDING DEMOLITION
- SALVAGE PLAYGROUND EQUIPMENT AREA
- UTILITY LINE REMOVAL
- TREE REMOVAL
- (R) REMOVE
- (P) PROTECT
- (S) SALVAGE
- LIMITS OF CONSTRUCTION

BENCHMARKS

BM # 01 ELEVATION = 877.82
NAIL IN NORTH SIDE OF POWER POLE LOCATED AT SOUTHEAST CORNER OF MARIGOLD AVE AND SOUTH WESTNEDGE AVE

BM # 02 ELEVATION = 867.7
NE ANCHOR BOLT OF LIGHT POLE LOCATED ±200' NORTH AND ±90' WEST OF THE NE SCHOOL BUILDING CORNER

REMOVAL NOTES (TO APPLY TO ENTIRE PROJECT)

1. REVIEW ALL THE REMOVALS AND PROTECTION WITH OWNER PRIOR TO COMMENCING CONSTRUCTION.
2. SAWCUT ALL CURB, SIDEWALK, AND PAVEMENTS PRIOR TO REMOVAL. ADDITIONAL SAWCUT MAY BE NECESSARY PRIOR TO REPLACEMENT TO ENSURE CLEAN EDGE.
3. ALL REMOVALS SHALL BE TAKEN OFF-SITE AND DISPOSED OF. NO STOCKPILE OR BURNING OF DEBRIS IS ALLOWED.
4. COMPLY WITH ALL ASPECTS OF THE SOIL EROSION CONTROL PERMIT AS ISSUED BY THE CITY OF KALAMAZOO. ALL TEMPORARY CONTROL MEASURES SHALL BE IN PLACE PRIOR TO COMMENCING CONSTRUCTION.
5. ALL REMOVALS SHALL BE TO THE LIMITS INDICATED ABOVE UNLESS OTHERWISE DIRECTED BY THE ENGINEER. UNAUTHORIZED REMOVALS AND SUBSEQUENT REPLACEMENT SHALL BE AT THE CONTRACTOR'S EXPENSE.
6. IF ANY ERRORS, DISCREPANCIES, OR OMISSIONS BECOME APPARENT, THESE SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO CONSTRUCTION OF ANYTHING AFFECTED SO THAT CLARIFICATION OR REDESIGN MAY OCCUR.
7. FOR PROTECTION OF UNDERGROUND UTILITIES, THE CONTRACTOR SHALL CALL 1-800-482-7171 A MINIMUM OF THREE FULL WORKING DAYS EXCLUDING SATURDAYS, SUNDAYS AND HOLIDAYS PRIOR TO BEGINNING EACH EXCAVATION IN AREAS WHERE PUBLIC UTILITIES HAVE NOT BEEN PREVIOUSLY LOCATED. MEMBERS WILL THUS BE ROUTINELY NOTIFIED. THIS DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF NOTIFYING OWNERS WHO MAY NOT BE A PART OF THE "MISS DIG" ALERT SYSTEM.

Existing Storm Sewer

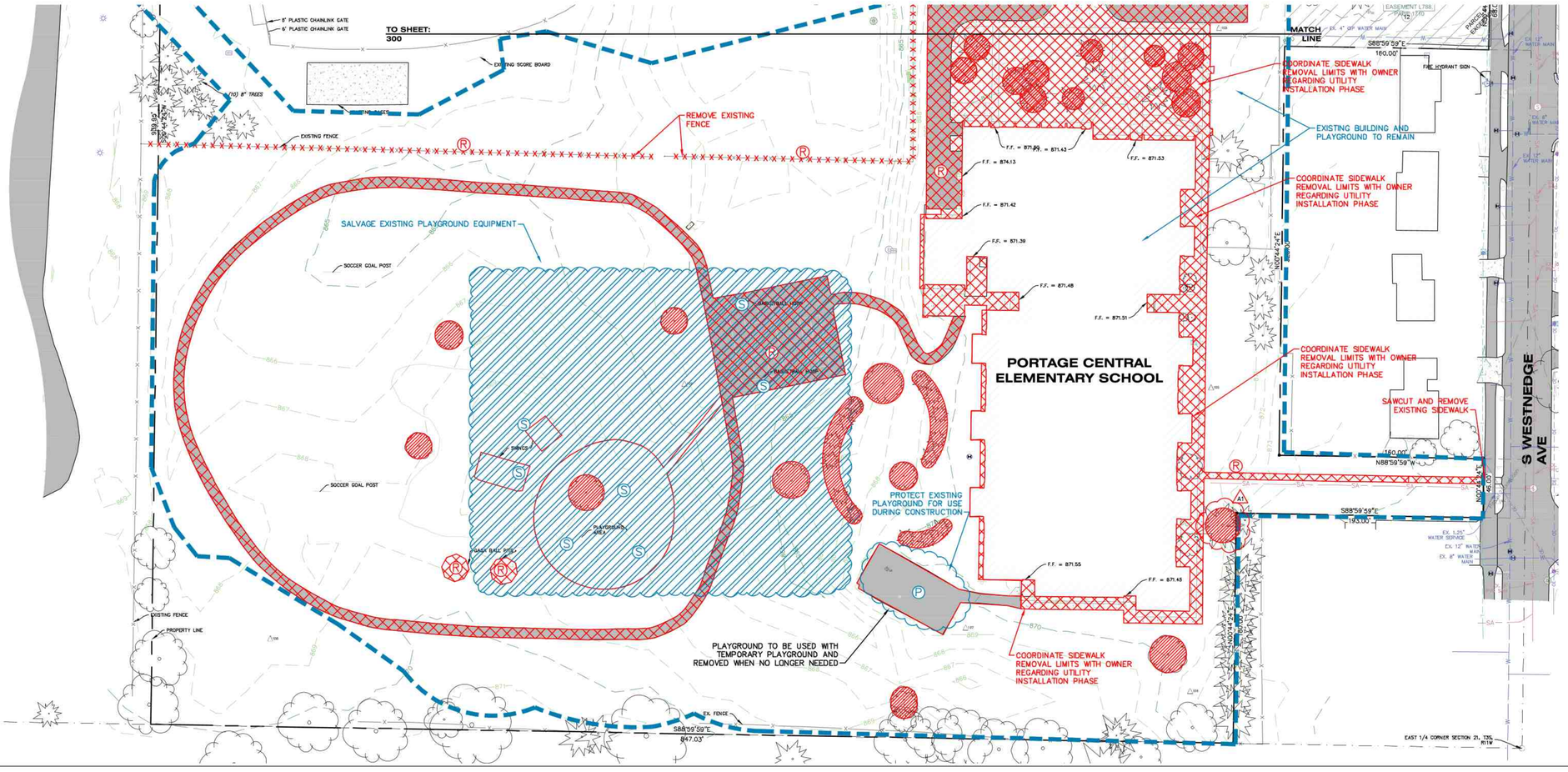
Number	Type	Rim	Invert
1239	Curb Inlet	872.14	12" W - 867.54
1269	Curb Inlet	872.10	12" E & W - 867.45
1396	Curb Inlet	869.72	24" E & W - 866.59
1412	Curb Inlet	869.44	12" W - 867.22
1415	Manhole	869.79	12" E - 867.61 24" W - 866.97
1707	Curb Inlet	871.94	
1718	Curb Inlet	872.01	15" N - 869.36
1797	Manhole	876.03	12" E - 871.98 12" SW - 872.13
1809	Round CB	875.77	12" NE - 873.27
1895	Round CB	863.99	18" NW - 858.97 10" SE - 858.57
1909	Round CB	866.23	24" E - 860.81 12" W - 860.08
1973	Round CB	866.54	18" NW - 861.70 12" SE - 861.70
1992	Manhole	870.12	24" E - 866.12 24" N - 864.16
2260	Square CB	861.05	Yard Drain
2264	Round CB	861.07	Leaching Basin
2911	Round CB	861.02	Leaching Basin
2940	Round CB	862.42	24" NW - 856.17 18" SE - 856.17
2941	Round CB	861.20	6" W - 858.00 12" NE - 857.80 24" NW & SE - 855.97
2958	Round CB	861.96	12" S - 858.41
2981	Round CB	861.40	10" N - 858.60
2997	Round CB	861.79	12" N & S - 857.99
3012	Round CB	861.61	12" NE - 858.51
3059	Round CB	861.46	12" W - 856.96
3113	Round CB	860.98	18" NW, SE - 857.20 12" N, SW - 857.38 10" S - 857.98
3152	Round CB	862.82	6" S - 859.32 6" E - 859.32
3252	Round CB	864.83	6" N & S - 861.93
3260	Round CB	865.59	6" N & S - 863.19
3265	Round CB	866.98	6" N - 864.65

Existing Sanitary Sewer

Number	Rim	Invert
1440	870.48	10" S - 862.53
1597	873.26	10" N & S - 860.94 10" E - 860.84
1791	876.48	8" E - 865.30
1816	875.76	10" S - 864.30 10" W - 862.73 10" N - 862.28

0 20 40 80
1 inch = 40 ft.

N W E S



BID PACKAGE 4-ADD. No. 1 JUNE 5, 2023
BID PACKAGE 4 MAY 17, 2023
BID PACKAGE 2-BUL. 3 MAY 1, 2023
ISSUED FOR DATE

PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
SITE DEMOLITION - SOUTH

DATE
MAY 17, 2023

SHEET NUMBER
CD 101
21-237.10

hurley & stewart

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2800 s. 11th street
kalamazoo, michigan 49009
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ISSUED FOR	DATE
BID PACKAGE 4-ADD. No. 1	JUNE 5, 2023
BID PACKAGE 4	MAY 17, 2023
BID PACKAGE 2-BUL. 3	MAY 1, 2023

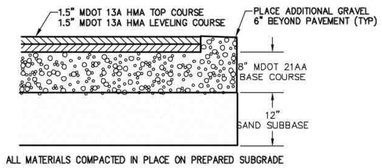
PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

DATE
MAY 17, 2023

SHEET TITLE
SITE DETAILS

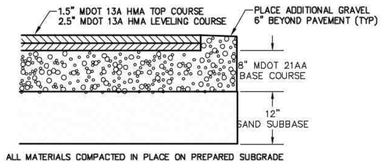
SHEET NUMBER
C 500
21-237.10



ALL MATERIALS COMPACTED IN PLACE ON PREPARED SUBGRADE

LIGHT DUTY PAVEMENT SECTION

NOT TO SCALE



ALL MATERIALS COMPACTED IN PLACE ON PREPARED SUBGRADE

HEAVY DUTY PAVEMENT SECTION

NOT TO SCALE

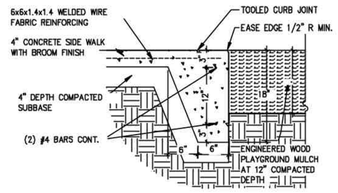
PAVEMENT NOTES:

1. THE SUBGRADE MATERIALS SHALL BE PROOF ROLLED AND/OR SCARIFIED AND COMPACTED PRIOR TO PLACEMENT OF BASE MATERIAL. WHERE EXISTING SUBGRADE MATERIALS ARE UNSUITABLE, THEY SHALL BE REMOVED AND REPLACED WITH COMPACTED SELECT MATERIAL IN ACCORDANCE WITH GEOTECHNICAL RECOMMENDATIONS.

2. HEAVY DUTY CONCRETE PAVEMENT AND STANDARD DUTY CONCRETE PAVEMENT (AS RECOMMENDED BY THE GEOTECHNICAL REPORT) SHALL BE STEEL REINFORCED.

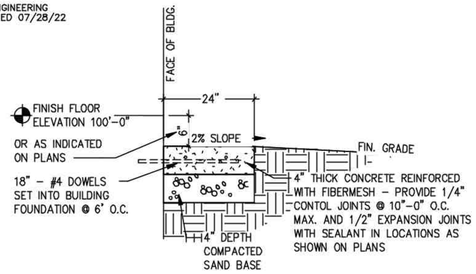
3. ALL JOINTS MUST BE SEALED WITH AN APPROVED SEALANT. STEEL REINFORCING SHALL BE USED AT JOINTS. REFER TO ACI 330R (GUIDE FOR DESIGN AND CONSTRUCTION OF CONCRETE PARKING LOTS) FOR JOINT DESIGN AND LAYOUT.

4. ALL PAVEMENT AND AGGREGATE MATERIALS SHALL BE IN ACCORDANCE WITH THE GEOTECHNICAL ENGINEERING REPORT, GEOTECHNICAL REPORT PORTAGE PS – CENTRAL ELEMENTARY PROJECT NO. 2250349.3A ISSUED 07/28/22



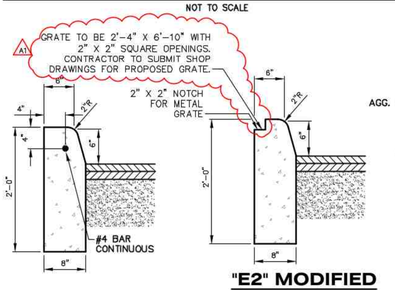
CONCRETE WALK MULCH EDGE

NOT TO SCALE



CONCRETE BUILDNG MAINTENANCE STRIP

NOT TO SCALE

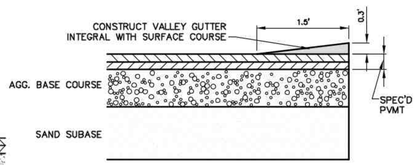


"E2" CURB DETAIL

NOT TO SCALE

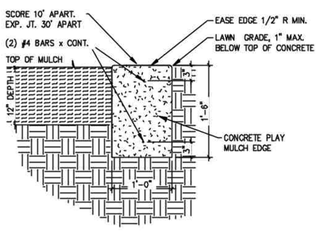
"E2" MODIFIED CURB DETAIL

NOT TO SCALE



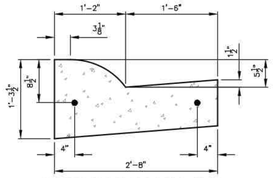
BITUMINOUS VALLEY GUTTER

NOT TO SCALE



CONCRETE MUCH EDGE

NOT TO SCALE



"B2" CURB DETAIL

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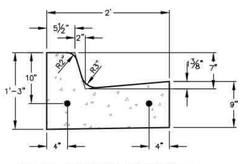
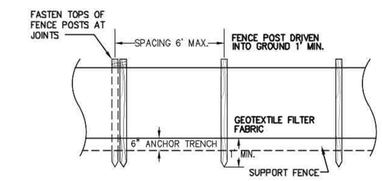


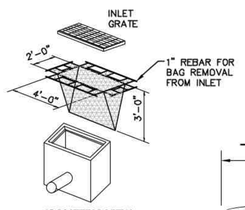
"C4" CURB DETAIL

NOT TO SCALE

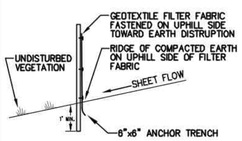


FRONT VIEW

NOT TO SCALE



ISOMETRIC VIEW



SECTION

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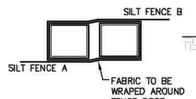

JOINT DETAIL

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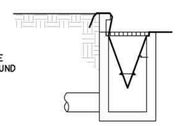
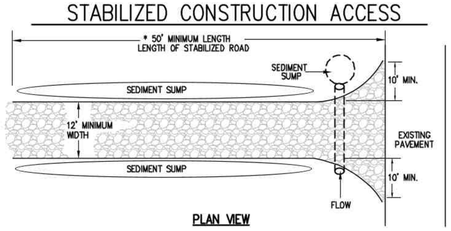


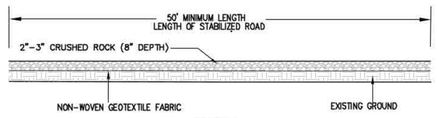
INSTALLATION DETAIL

SILT FENCE DETAILS

STABILIZED CONSTRUCTION ACCESS



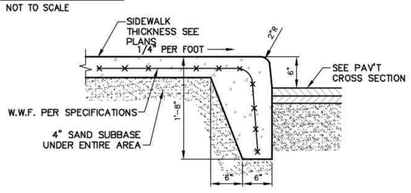
PLAN VIEW



PROFILE

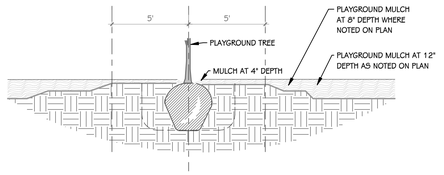
S58 INLET PROTECTION FABRIC DROP

NOT TO SCALE



INTEGRAL SIDEWALK/CURB

NOT TO SCALE



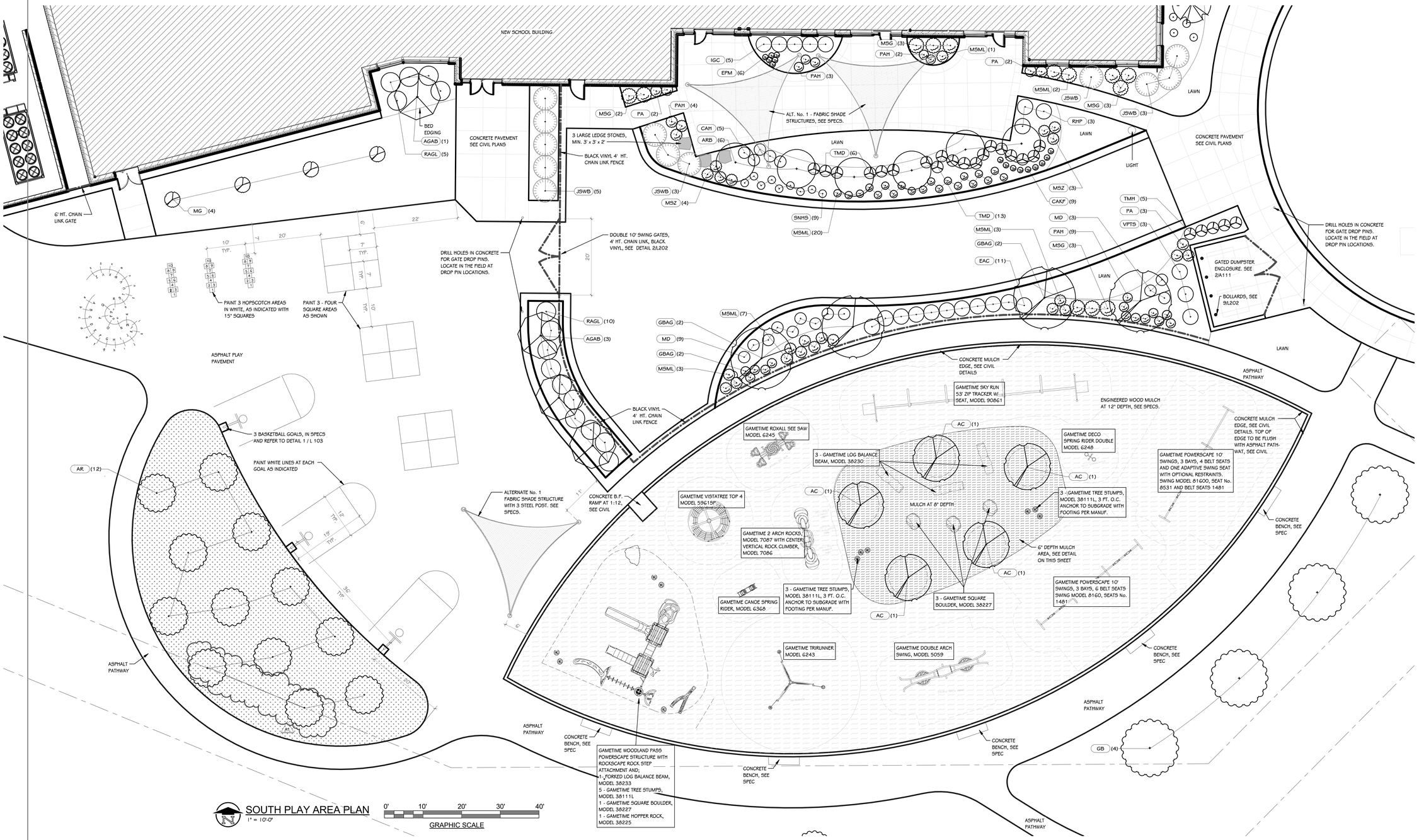
PLAY MULCH SECTION
1/4" = 1'-0"

LANDSCAPE NOTES

1. REFER TO SPECIFICATIONS AND PLANTING DETAILS ON SHEET L 203.
2. GUY AND STAKE ALL TREES AND MULCH PER DETAILS. INSTALL WATER BAGS ON ALL TREES. REMOVE BAGS AND GUY STAKES AFTER WARRANTY PERIOD.
3. SCORE ALL CONCRETE AS GRAPHICALLY SHOWN ON LANDSCAPE PLANS
4. PROVIDE TEMPORARY WATERING SYSTEM AS REQUIRED TO ESTABLISH LAWN PER SPECIFICATIONS.
5. SEE SHEET L 001 FOR PLANT LIST FOR ENTIRE PROJECT.
6. DO NOT PLANT TREES WITHIN WATER EASEMENTS.

LEGEND

- MAINTAINED LAWN SEED MIX PER SPECS.
- IRRIGATED SEEDED LAWN AREAS, SEE SHEET L 301
- NON-MOWED NATURAL SEED MIX AREAS, SEE SPECS
- ENGINEERED WOOD PLAY-GROUND MULCH, SEE SPEC
- CRUSHED STONE WITH WEED BARRIER, SEE SPEC.
- WET AREA SEED MIX, SEE SPECIFICATIONS



SOUTH PLAY AREA PLAN
1" = 10'-0"

GRAPHIC SCALE
0' 10' 20' 30' 40'

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ISSUED FOR	DATE
ADDENDUM No. 1	JUNE 5, 2023

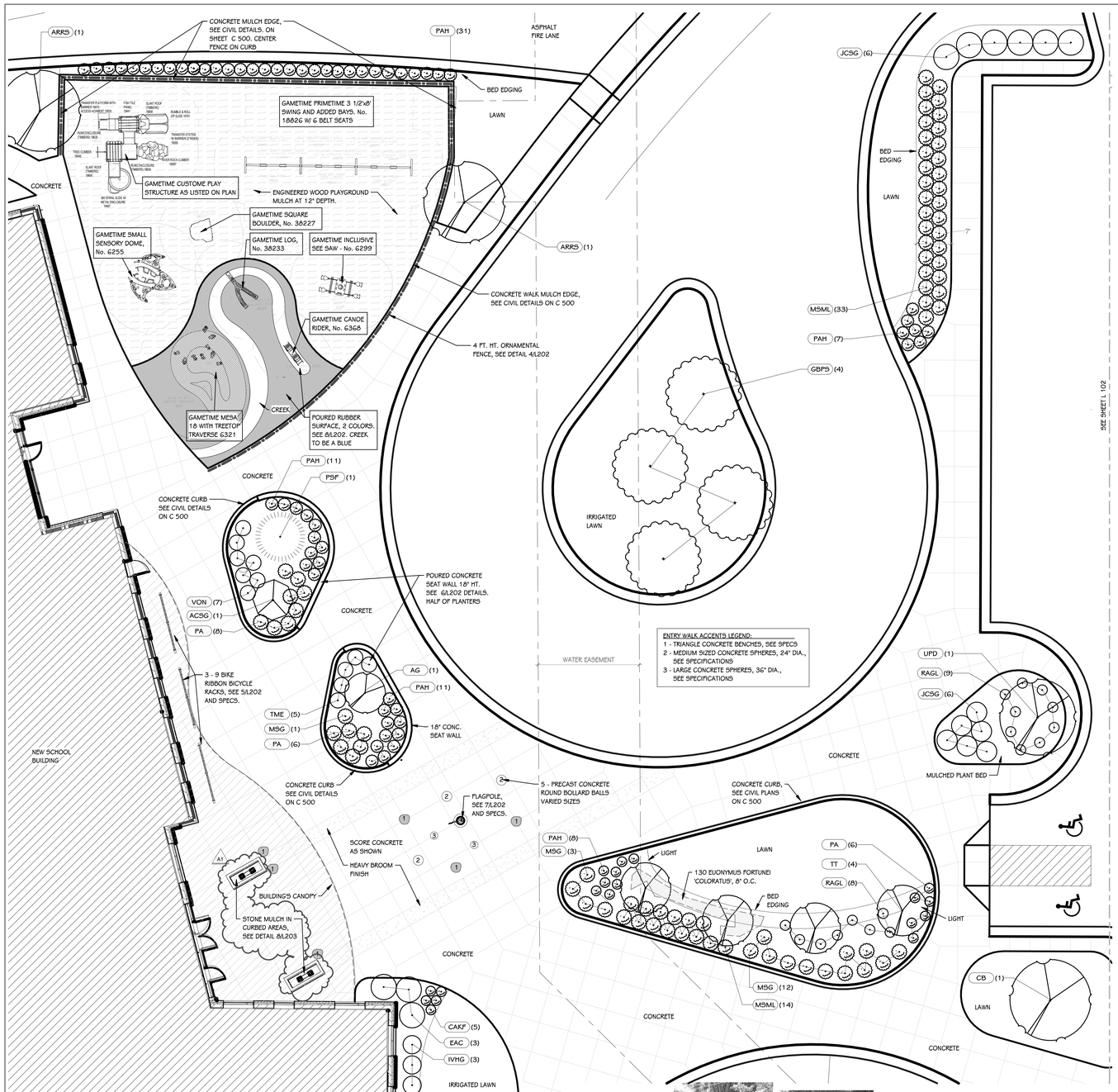
PROJECT TITLE
CENTRAL ELEMENTARY SCHOOLBID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
ENLARGED SOUTH PLAY AREA PLAN

DATE
MAY 17, 2023

SHEET NUMBER
L 201
21-237.10

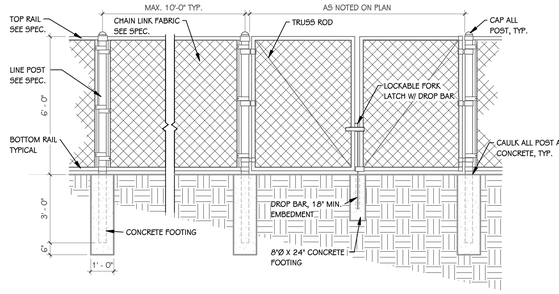


MAIN ENTRY SITE & LANDSCAPE PLAN

1" = 10'-0"

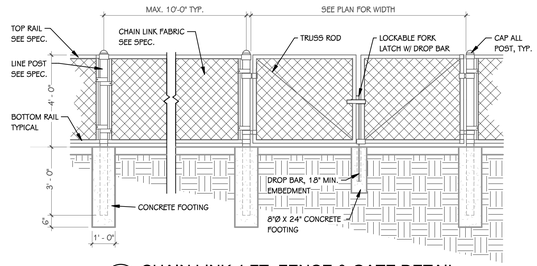
0' 10' 20' 30' 40'

GRAPHIC SCALE



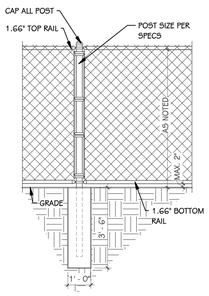
1 L 202 CHAIN LINK 6 FT. FENCE & GATE DETAIL

3/8" = 1'-0"



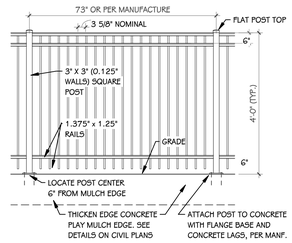
2 L 202 CHAIN LINK 4 FT. FENCE & GATE DETAIL

3/8" = 1'-0"



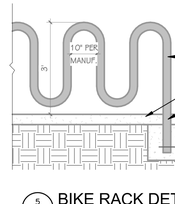
3 L 202 CHAIN LINK FENCE

3/8" = 1'-0"



4 L 202 ORNAMENTAL FENCING DETAIL

3/8" = 1'-0"

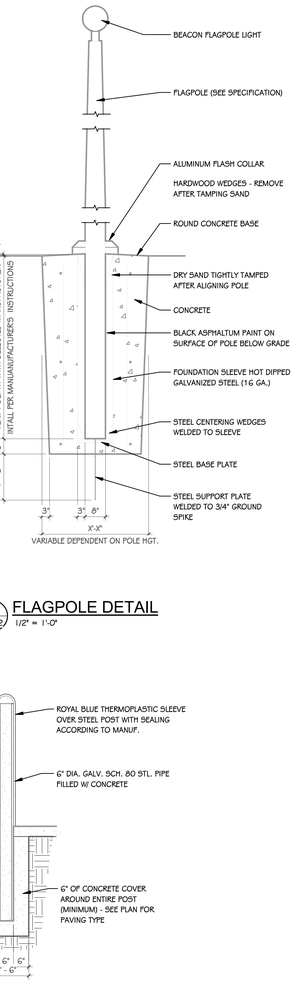


5 L 202 BIKE RACK DETAIL

1/2" = 1'-0"

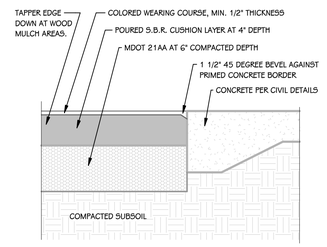
6 L 202 CONCRETE SEAT WALL

1/2" = 1'-0"



7 L 202 FLAGPOLE DETAIL

1/2" = 1'-0"



8 L 202 POURED RUBBER PLAY SURFACE

1 1/2" = 1'-0"

9 L 202 BOLLARD DETAIL - THERMOPLASTIC

1/2" = 1'-0"

LANDSCAPE NOTES

1. REFER TO SPECIFICATIONS AND PLANTING DETAILS ON SHEET L 203.
2. GUY AND STAKE ALL TREES AND MULCH PER DETAILS. INSTALL WATER BAGS ON ALL TREES. REMOVE BAGS AND GUY STAKES AFTER WARRANTY PERIOD.
3. SCORE ALL CONCRETE AS GRAPHICALLY SHOWN ON LANDSCAPE PLANS
4. PROVIDE TEMPORARY WATERING SYSTEM AS REQUIRED TO ESTABLISH LAWN PER SPECIFICATIONS.
5. SEE SHEET L 001 FOR PLANT LIST FOR ENTIRE PROJECT.
6. DO NOT PLANT TREES WITHIN WATER EASEMENTS.

LEGEND

- MAINTAINED LAWN SEED MIX PER SPEC5.
- ENGINEERED WOOD PLAY-GROUND MULCH, SEE SPEC
- IRRIGATED SEEDED LAWN AREAS, SEE SHEET L 301
- CRUSHED STONE WITH WEED BARRIER, SEE SPEC.
- NON-MOWED NATURAL SEED MIX AREAS, SEE SPEC5
- WET AREA SEED MIX, SEE SPECIFICATIONS

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ADDENDUM No. 1	JUNE 5, 2023
ISSUED FOR	DATE

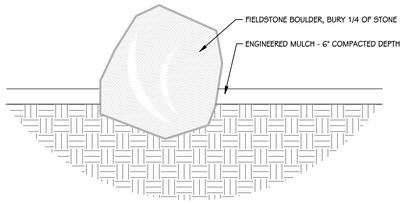
PROJECT TITLE
CENTRAL ELEMENTARY SCHOOLBID PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

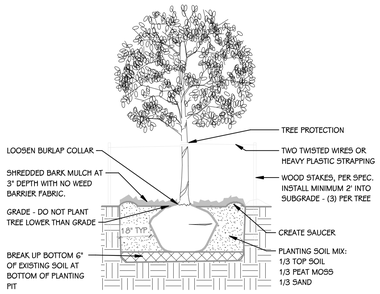
SHEET TITLE
MAIN ENTRY SITE, LANDSCAPE AND DETAIL PLAN

DATE
MAY 17, 2023

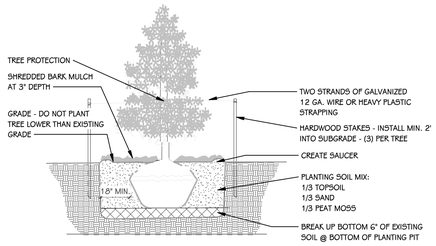
SHEET NUMBER
L 202
21-237.10



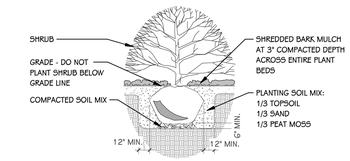
1 / L 203 ROCK
1/2" = 1'-0"



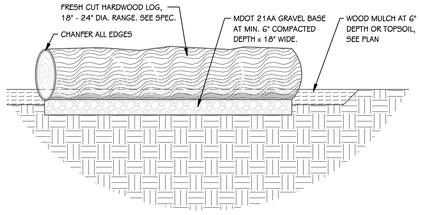
3 / L 203 DECIDUOUS TREE PLANTING DETAIL
1/2" = 1'-0"



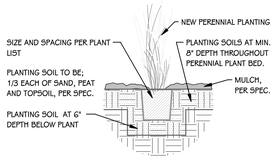
5 / L 203 EVERGREEN TREE STAKING DETAIL
1/8" = 1'-0"



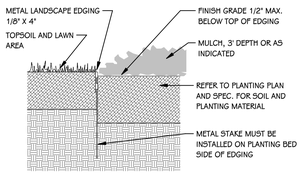
7 / L 203 SHRUB PLANTING DETAIL
1" = 10'-0"



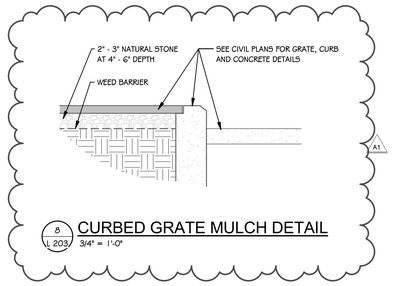
2 / L 203 LOG
1/2" = 1'-0"



4 / L 203 PERENIAL PLANTING DETAIL
1/2" = 1'-0"



6 / L 203 METAL EDGING DETAIL
1/8" = 1'-0"



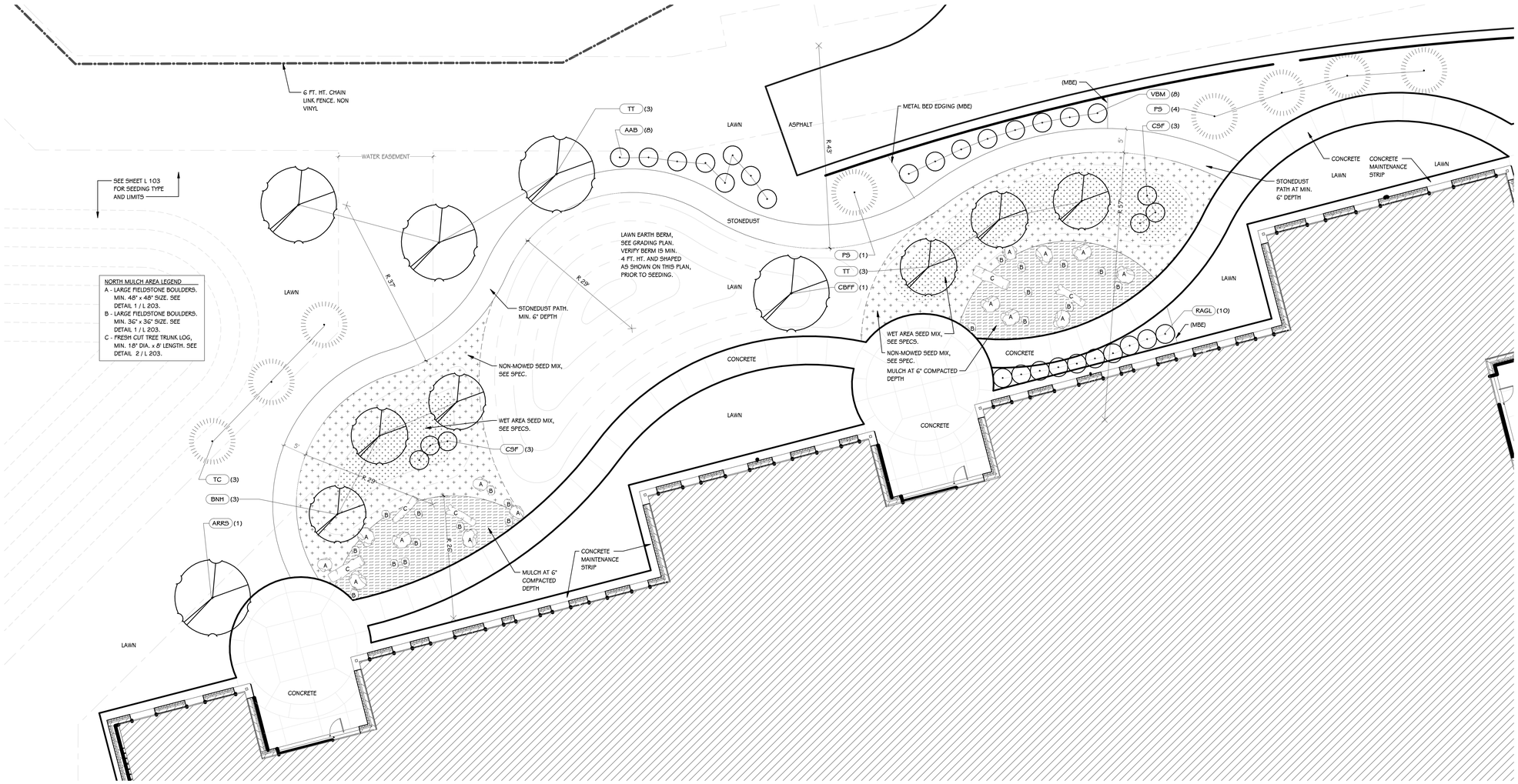
8 / L 203 CURBED GRATE MULCH DETAIL
3/4" = 1'-0"

LANDSCAPE NOTES

1. REFER TO SPECIFICATIONS AND PLANTING DETAILS ON SHEET L 203.
2. GUY AND STAKE ALL TREES AND MULCH PER DETAILS. INSTALL WATER BAGS ON ALL TREES. REMOVE BAGS AND GUY STAKES AFTER WARRANTY PERIOD.
3. SCORE ALL CONCRETE AS GRAPHICALLY SHOWN ON LANDSCAPE PLANS
4. PROVIDE TEMPORARY WATERING SYSTEM AS REQUIRED TO ESTABLISH LAWN PER SPECIFICATIONS.
5. SEE SHEET L 001 FOR PLANT LIST FOR ENTIRE PROJECT.
6. DO NOT PLANT TREES WITHIN WATER EASEMENTS.

LEGEND

- MAINTAINED LAWN SEED MIX PER SPECS.
- IRRIGATED SEEDED LAWN AREAS, SEE SHEET L 301
- NON-MOWED NATURAL SEED MIX AREAS, SEE SPECS
- ENGINEERED WOOD PLAY-GROUND MULCH, SEE SPEC
- CRUSHED STONE WITH WEED BARRIER, SEE SPEC.
- WET AREA SEED MIX, SEE SPECIFICATIONS



NORTH PLAY AREA
1" = 10'-0"

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ADDENDUM No. 1	JUNE 5, 2023
ISSUED FOR	DATE

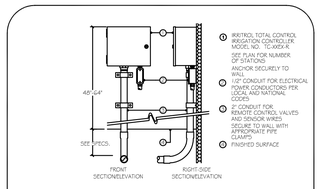
PROJECT TITLE
CENTRAL ELEMENTARY SCHOOLBID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

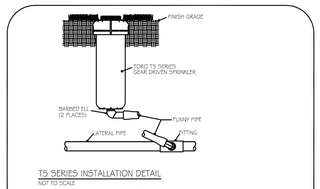
SHEET TITLE
ENLARGE NORTH CLASS AREA PLAN

DATE
MAY 17, 2023

SHEET NUMBER
L 203
21-237.10

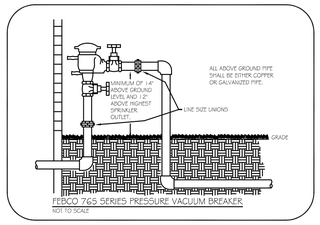


IRRITROL TOTAL CONTROL OUTDOOR CONTROLLER (6 TO 24 STATION)
NOT TO SCALE

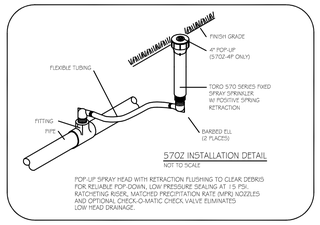


TS SERIES INSTALLATION DETAIL
NOT TO SCALE

5" POP-UP ROTOR WITH 25-50 RADIUS, 8 STANDARD NOZZLES AND 4 LOW-ANGLE INTERCHANGEABLE NOZZLES, STANDARD RUBBER COVER, 23° TRAJECTORY STANDARD AND 10° TRAJECTORY LOW-ANGLE, TOP ADJUSTMENT OF ARC FROM 40° TO 360°, AND OPTIONAL CHECK VALVE.

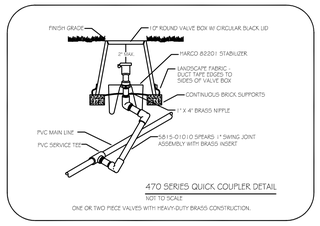


FEBCO 765 SERIES PRESSURE VACUUM BREAKER
NOT TO SCALE



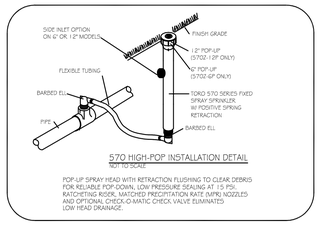
570Z INSTALLATION DETAIL
NOT TO SCALE

POP-UP SPRAY HEAD WITH RETRACTION FLUSHING TO CLEAR DEBRIS FOR RELIABLE POP-DOWN. LOW PRESSURE SEALING AT 15 PSI. RATCHETING RISER, MATCHED PRECIPITATION RATE (MPR) NOZZLES AND OPTIONAL CHECK-O-MATIC CHECK VALVE ELIMINATES LOW HEAD DRAINAGE.



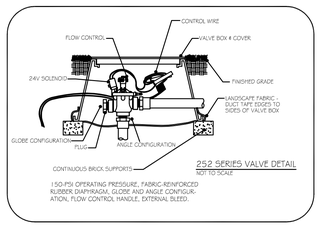
470 SERIES QUICK COUPLER DETAIL
NOT TO SCALE

ONE OR TWO PIECE VALVES WITH HEAVY-DUTY BRASS CONSTRUCTION.



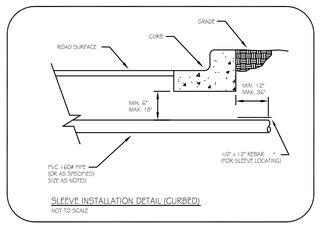
570 HIGH-POP INSTALLATION DETAIL
NOT TO SCALE

POP-UP SPRAY HEAD WITH RETRACTION FLUSHING TO CLEAR DEBRIS FOR RELIABLE POP-DOWN. LOW PRESSURE SEALING AT 15 PSI. RATCHETING RISER, MATCHED PRECIPITATION RATE (MPR) NOZZLES AND OPTIONAL CHECK-O-MATIC CHECK VALVE ELIMINATES LOW HEAD DRAINAGE.

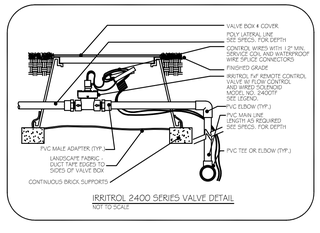


252 SERIES VALVE DETAIL
NOT TO SCALE

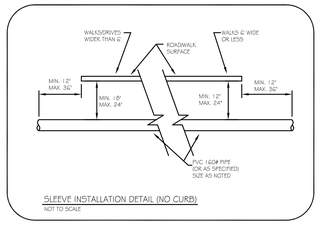
150 PSI OPERATING PRESSURE, FABRIC-REINFORCED RUBBER DIAPHRAGM, GLOBE AND ANGLE CONFIGURATION, FLOW CONTROL HANDLE, EXTERNAL BLEED.



SLEEVE INSTALLATION DETAIL (CURBED)
NOT TO SCALE



IRRITROL 2400 SERIES VALVE DETAIL
NOT TO SCALE



SLEEVE INSTALLATION DETAIL (NO CURB)
NOT TO SCALE

LEGEND

◎ ◎ ◎	570Z-4P	4ST-MPR SERIES	TORO FIXED SPRAY POP-UP (4")
● ● ● ● ● ●	570Z-4P	8'-MPR SERIES	TORO FIXED SPRAY POP-UP (4")
■ ■ ■ ■ ■ ■	570Z-4P	10'-MPR SERIES	TORO FIXED SPRAY POP-UP (4")
● ● ● ● ● ●	570Z-4P	12'-MPR SERIES	TORO FIXED SPRAY POP-UP (4")
▼ ▼ ▼ ▼ ▼ ▼	570Z-4P	15'-MPR SERIES	TORO FIXED SPRAY POP-UP (4")
⊖	570Z-4P	TVAN-12 NOZZLE	TORO FIXED SPRAY POP-UP (4")
⊖	570Z-4P	TVAN-15 NOZZLE	TORO FIXED SPRAY POP-UP (4")
◎ ◎ ◎	570Z-12P	4ST-MPR SERIES	TORO FIXED SPRAY POP-UP (12")
○ ○ ○ ○ ○ ○	570Z-12P	5'-MPR SERIES	TORO FIXED SPRAY POP-UP (12")
⊕ ⊖ ⊖ ⊖ ⊖ ⊖	570Z-12P	8'-MPR SERIES	TORO FIXED SPRAY POP-UP (12")
■ ■ ■ ■ ■ ■	570Z-12P	10'-MPR SERIES	TORO FIXED SPRAY POP-UP (12")
✱ ✱ ✱ ✱ ✱ ✱	570Z-12P	12'-MPR SERIES	TORO FIXED SPRAY POP-UP (12")
▼ ▼ ▼ ▼ ▼ ▼	570Z-12P	15'-MPR SERIES	TORO FIXED SPRAY POP-UP (12")
⊖	570Z-12P	TVAN-12 NOZZLE	TORO FIXED SPRAY POP-UP (12")
⊖	570Z-12P	TVAN-15 NOZZLE	TORO FIXED SPRAY POP-UP (12")
◎	T5PCK (F/C)	#1.5 LOW ANGLE NOZZLE	TORO GEAR DRIVEN ROTARY POP-UP
⊕	T5PCK (F/C)	#3.0 LOW ANGLE NOZZLE	TORO GEAR DRIVEN ROTARY POP-UP
◉	T5PCK (F/C)	#3.0 NOZZLE	TORO GEAR DRIVEN ROTARY POP-UP
●	T5PCK (F/C)	#6.0 NOZZLE	TORO GEAR DRIVEN ROTARY POP-UP
○○◉	474-00		TORO 1" QUICK COUPLER VALVE W/(1) KEY AND HOSE SWIVEL
	240OTF		IRRITROL 1" ELECTRIC VALVE
	252-26-06		TORO 1-1/2" ELECTRIC VALVE
T	TC-18EX-R	18 STATION	IRRITROL TOTAL CONTROL CONTROLLER W/RS1000 RAIN SWITCH

SDR 26 CLASS 160 PVC PIPE (ALL PIPE 1-1/2" AND LARGER)

100# POLYETHYLENE PIPE (PE-3408 NSF APPROVED) (ALL PIPE DOWNSTREAM OF VALVE 1-1/4" AND SMALLER)

NOT SHOWN #14 UL APPROVED 24V RED CONTROL WIRE WITH A #14 UL APPROVED WHITE COMMON WIRE

• POINT OF CONNECTION (P.O.C.)

▶ 2" REDUCED PRESSURE BACKFLOW PREVENTER WITH AIR GAP KIT — PROVIDED AND INSTALLED BY THE PLUMBING CONTRACTOR

GENERAL NOTES:

1. COORDINATE THIS WORK WITH ALL OTHER TRADES.
2. ALL PLUMBING AND ELECTRICAL SHALL BE INSTALLED ACCORDING TO STATE AND LOCAL CODES.
3. ALL SLEEVES SHALL BE 4" PVC CLASS 160 (UNLESS OTHERWISE SPECIFIED). SLEEVE INSTALLATION SHALL BE THE RESPONSIBILITY OF THE IRRIGATION CONTRACTOR.
4. ALL PIPE NOT SIZED DOWNSTREAM OF VALVE IS 1".
5. IRRIGATION CONTRACTOR'S POINT OF CONNECTION SHALL BE ON 2" TYPE K COPPER PIPE STUBBED AT THE LOCATION SHOWN ON PLAN. PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A MEANS OF WINTERIZATION FOR SUPPLY LINE UPSTREAM OF IRRIGATION CONTRACTOR'S POINT OF CONNECTION.
6. 115V POWER INTO CONTROLLER SHALL BE SUPPLIED BY ELECTRICAL CONTRACTOR.
7. CONTROLLER AND RAINSWITCH SHALL BE MOUNTED AT LOCATION SHOWN ON PLAN (VERIFY EXACT LOCATION WITH OWNER'S REPRESENTATIVE).
8. IRRIGATION CONTRACTOR SHALL ADJUST THE FLOW CONTROL FEATURE ON ALL ELECTRIC VALVES PER THE MANUFACTURER'S RECOMMENDATIONS TO MAXIMIZE THE VALVES PERFORMANCE AND LONGEVITY.
9. IF SITE PRESSURE IS NOT ADEQUATE, A BOOSTER PUMP AND RELATED EQUIPMENT MAY BE REQUIRED AT ADDITIONAL COST TO OWNER.
10. IRRIGATION PIPE AND EQUIPMENT SHOWN IN PAVED AREAS IS FOR CLARITY ONLY AND SHALL BE INSTALLED WITHIN THE TURF & LANDSCAPE AREAS.
11. PIPE ROUTING IS DIAGRAMMATIC. ALL EQUIPMENT AND PIPE ARE TO BE FIELD ADJUSTED TO TAKE INTO CONSIDERATION ANY OBSTRUCTIONS AND ALL LANDSCAPE.
12. TYPE K COPPER SUPPLY LINE AND 24V CONDUIT SHALL BE INSTALLED BY OTHER THAN THE IRRIGATION CONTRACTOR AND SHALL RUN PARALLEL TO EACH OTHER. ROUTING SHOWN IS DIAGRAMMATIC. 24V CONDUIT SHALL CONTAIN A PULL-STRING FROM CONTROLLER TO TERMINUS OF CONDUIT.

WATER REQUIREMENTS: 38 GPM @ 45 PSI AT THE P.O.C.

ZONE NUMBER	VALVE SIZE	GPM	ZONE TYPE
1-1	1"	12	TURF ROTORS
1-2	1"	14	LANDSCAPE SPRAYS
1-3	1"	27	LANDSCAPE SPRAYS
1-4A	1"	7	TURF SPRAYS
1-4B	1"	13	TURF SPRAYS
1-5	1"	9	LANDSCAPE SPRAYS
1-6	1"	26	TURF SPRAYS
1-7	1"	27	LANDSCAPE SPRAYS
1-8	1"	27	LANDSCAPE SPRAYS
1-9	1-1/2"	31	TURF ROTORS
1-10	1-1/2"	38	TURF ROTORS
1-11	1"	22	TURF SPRAYS
1-12	1-1/2"	29	TURF ROTORS
1-13	1-1/2"	33	LANDSCAPE SPRAYS
1-14	1"	8	TURF SPRAYS
1-15	1-1/2"	33	TURF SPRAYS
1-16	1-1/2"	33	TURF ROTORS
1-17	1"	5	LANDSCAPE SPRAYS

ZONE NUMBER SYMBOL: 1-1 — CONTROLLER NUMBER / STATION NUMBER

A1

SCALE: 1" = 20'

THIS DESIGN IS BASED ON INFORMATION PROVIDED BY THE ARCHITECT AND/OR OWNER WHO ASSUMES FULL RESPONSIBILITY FOR ITS CORRECTNESS.

Know what's **below.** **Call** before you dig.

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Fax: 248.373.8899

800.822.2216

Design By: CUMMINGS, C.I.D.
Plan #: 23-037C
Date: 3.24.23
Revisions: 5.2.23 TCC, 5.9.23 DCC

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ISSUED FOR	DATE
ADDENDUM No. 1	JUNE 5, 2023

PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

DATE
MARCH 16, 2022

SHEET TITLE
IRRIGATION DETAILS

SHEET NUMBER
L 302
21-237.10

GR GENERAL REQUIREMENTS

GR-1 AS USED IN THESE GENERAL NOTES:
"DRAWINGS" MEANS THE LATEST STRUCTURAL DESIGN DRAWINGS, UON.
"SPECIFICATIONS" MEANS THE LATEST PROJECT SPECIFICATIONS, UON.
"CONTRACT DOCUMENTS" IS DEFINED AS THE DESIGN DRAWINGS AND THE SPECIFICATIONS
"SER" IS DEFINED AS THE STRUCTURAL ENGINEER OF RECORD FOR THE STRUCTURE IN ITS FINAL CONDITION.
"DESIGN PROFESSIONALS" IS DEFINED AS THE OWNER'S ARCHITECT AND SER.
"MEP" INCLUDES, BUT IS NOT LIMITED TO MECHANICAL, ELECTRICAL, PLUMBING, FIRE PROTECTION.
"CONTRACTOR" IS DEFINED TO INCLUDE ANY OF THE FOLLOWING: GENERAL CONTRACTOR AND THEIR SUBCONTRACTORS, CONSTRUCTION MANAGER AND THEIR SUBCONTRACTORS, STRUCTURAL STEEL FABRICATOR OR STRUCTURAL STEEL ERECTOR.
"BASE BUILDING STRUCTURE" IS DEFINED AS THE STRUCTURAL FRAME DESIGNED BY THORNTON TOMASETTI.
"STRUCTURE IN ITS FINAL CONDITION" MEANS ALL STRUCTURAL ELEMENTS SHOWN ON THE STRUCTURAL CONTRACT DOCUMENTS ARE INSTALLED AND COMPLETELY CONNECTED AND INSPECTED WITH NO OUTSTANDING NON-COMPLIANCE ISSUES.
"DELEGATED DESIGN" MEANS A SCOPE OF WORK THAT MEETS PERFORMANCE CRITERIA ESTABLISHED IN THE CONTRACT DOCUMENTS AND IS TO BE COMPLETED BY THE CONTRACTOR'S LICENSED ENGINEER.
"SERVICE LEVEL" LOADS ARE DEFINED AS NOMINAL OR UNFACTORED LOADS TO BE COMBINED USING ALLOWABLE STRESS LOAD COMBINATIONS
"STRENGTH LEVEL" LOADS ARE DEFINED AS FACTORED LOADS TO BE COMBINED USING STRENGTH DESIGN LOAD COMBINATIONS

GR-2 THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF THE STRUCTURAL WORK WITH THE ARCHITECTURAL, CIVIL, MEP CONTRACT DOCUMENTS, AS WELL AS ANY OTHER APPLICABLE TRADES.

GR-3 THE CONTRACTOR IS RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE UNTIL THE CONSTRUCTION OF THE STRUCTURE REACHES ITS FINAL CONDITION.

GR-4 THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE DESIGN, INSTALLATION, AND REMOVAL OF TEMPORARY BRACING AND CONSTRUCTION SUPPORTS, FOR NEW AND EXISTING STRUCTURES, AS NECESSARY TO COMPLETE THE PROJECT. NO PORTION OF THE PROJECT WHILE UNDER CONSTRUCTION IS INTENDED TO BE STABLE IN THE ABSENCE OF THE CONTRACTOR'S TEMPORARY SUPPORTS AND BRACES. CONTRACTOR SHALL RETAIN A PROFESSIONAL ENGINEER LICENSED IN THE STATE WHERE THE PROJECT IS LOCATED TO DESIGN TEMPORARY BRACING AND CONSTRUCTION SUPPORTS.

GR-5 LATERAL LOAD RESISTANCE AND STABILITY OF THE STRUCTURE IN ITS FINAL CONDITION IS PROVIDED BY MASONRY WALL AND LATERAL STABILITY OF OTHER ELEMENTS IS PROVIDED THROUGH PRECAST PLANK TOPPING SLAB.

GR-6 THE SPECIFICATIONS ARE AN INTEGRAL PART OF THE CONTRACT DOCUMENTS AND SHALL BE USED IN CONJUNCTION WITH THE STRUCTURAL DRAWINGS.

GR-7 THE CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS AND COORDINATE WITH THE STRUCTURAL DRAWINGS, ARCHITECTURAL DRAWINGS, DRAWINGS FROM OTHER CONSULTANTS, PROJECT SHOP DRAWINGS AND FIELD CONDITIONS.

GR-8 IN CASES OF CONFLICT BETWEEN DRAWINGS AND/OR SPECIFICATIONS AND OTHER DISCIPLINES OR EXISTING CONDITIONS, CONTRACTOR SHALL NOTIFY THE DESIGN PROFESSIONALS AND OBTAIN CLARIFICATION PRIOR TO BIDDING AND PROCEEDING WITH WORK.

GR-9 APPLY DETAILS, SECTIONS, AND NOTES ON THE DRAWINGS WHERE CONDITIONS ARE SIMILAR TO THOSE INDICATED BY DETAIL, DETAIL TITLE OR NOTE.

GR-10 ONLY USE DIMENSIONS INDICATED ON THE DRAWINGS. DO NOT SCALE DRAWINGS.

GR-11 ASSUME EQUAL SPACING BETWEEN ESTABLISHED DIMENSIONS, IF NOT INDICATED ON DRAWINGS.

GR-12 CENTERLINES OF COLUMNS AND FOUNDATIONS COINCIDE WITH GRID LINE INTERSECTIONS, UON.

GR-13 CENTERLINES OF WALLS COINCIDE WITH CENTERLINES OF FOUNDATIONS, UON.

GR-14 CENTERLINES OF FRAMING MEMBERS COINCIDE WITH COLUMN CENTERLINES, UON.

GR-15 THE CONTRACTOR SHALL PROTECT EXISTING FACILITIES, STRUCTURES AND UTILITIES FROM DAMAGE.

GR-16 THE CONTRACTOR SHALL VERIFY THAT CONSTRUCTION LOADS DO NOT EXCEED THE CAPACITY OF THE STRUCTURE AT THE TIME THE LOAD IS APPLIED.

GR-17 THE CONTRACTOR SHALL COORDINATE THE BOTTOM OF BASE PLATE ELEVATIONS WITH THE AS-BUILT TOP OF SUPPORT ELEVATIONS.

GR-18 THE CONTRACTOR SHALL VERIFY ALL OPENING SIZES AND LOCATIONS WITH OTHER DISCIPLINES. THE DRAWINGS DO NOT SHOW ALL OPENINGS REQUIRED. ADDITIONAL OPENINGS, BLOCKOUTS AND SLEEVES MAY BE REQUIRED BY OTHER DISCIPLINES AND SHALL BE CONSTRUCTED USING THE TYPICAL DETAILS AND/OR THE CRITERIA INDICATED ON THE DRAWINGS. OPENINGS REQUIRED BUT NOT SHOWN ON THE STRUCTURAL DRAWINGS MUST BE APPROVED BY THE SER.

GR-19 ELEVATIONS INDICATED ON STRUCTURAL DRAWINGS ARE BASED ON A PROJECT DATUM INDICATED ON THE CIVIL DRAWINGS.

GR-20 SEE ARCHITECTURAL, CIVIL, AND MEP CONTRACT DOCUMENTS FOR ADDITIONAL INFORMATION RELATING TO THE COORDINATION OF STRUCTURAL COMPONENTS INCLUDING, BUT NOT LIMITED TO:

CIVIL:
PROJECT DATUM
SITING OF BUILDING GRID LINES WITH RESPECT TO CITY BENCHMARKS
SITE PREPARATION
BACKFILLING MATERIALS AND REQUIREMENTS
PAVING AND SITE ELEMENTS OUTSIDE OF BUILDING ENVELOPE
NEW AND EXISTING SITE UTILITIES

ARCHITECTURAL:
PLAN DIMENSIONS AND PROJECT DATUM
SLAB EDGE DIMENSIONS
FINISH ELEVATIONS
WATERPROOFING AND DAMP-PROOFING DETAILS
RAMP GEOMETRY, PITS, SLAB SLOPES AND DEPRESSIONS
EMBEDMENTS, INSERTS, BLOCKOUTS, ETC.
EXACT OPENING SIZES FOR PIPES, DUCTS, ETC.
CONCRETE FINISHES AND TOPPING SLABS
CONCRETE CURBS AND HOUSEKEEPING PADS
FIRE RATINGS
METAL PAN STAIRS AND SUPPORTS

MEP:
PIPE AND DUCT SIZES FOR OPENING AND SLEEVE COORDINATION
FLOOR DRAINS
UNDERFLOOR AND PERIMETER DRAINAGE SYSTEMS
EQUIPMENT CURBS
CONDUITS AND EMBEDMENTS IN WALLS AND SLABS

CD CODES AND DESIGN CRITERIA

CD-1 PERFORM ALL CONSTRUCTION IN CONFORMANCE WITH THE BUILDING AND DESIGN CODES REFERENCED WITHIN THESE DOCUMENTS. THE PROJECT DOCUMENTS REFER TO THE FOLLOWING CODES AND STANDARDS, UON:

MICHIGAN BUILDING CODE 2015 (INTERNATIONAL BUILDING CODE, 2015 EDITION)

STRUCTURAL CONCRETE:
"BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE"
THE AMERICAN CONCRETE INSTITUTE (ACI 318-14)

MASONRY:
"BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES"
THE AMERICAN CONCRETE INSTITUTE (TMS 402-13)

"SPECIFICATION FOR MASONRY STRUCTURES"
THE AMERICAN CONCRETE INSTITUTE (TMS 602-13)

STRUCTURAL STEEL:
"SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS", (AISC 360-10) CONFORMING TO THE PROVISIONS OF LOAD RESISTANCE FACTOR DESIGN, BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC-LRFD)

CD-2 SEE DESIGN LOAD DIAGRAMS ON SHEET S-006 FOR LOCATIONS AND EXTENT OF LIVE LOAD.

CD-3 SEE DESIGN LOAD DIAGRAMS ON SHEET S-006 FOR LOCATIONS AND EXTENT OF SUPERIMPOSED DEAD LOADS.

CD-4 OCCUPANCY OR RISK CATEGORY: III

CD-5 SNOW LOADS (SERVICE LEVEL):

FLAT ROOF SNOW LOAD (Pf):	23.1 PSF
GROUND SNOW LOAD (Pg)	30 PSF
SNOW EXPOSURE FACTOR (Ce):	1.0
SNOW LOAD IMPORTANCE FACTOR (Is):	1.1
THERMAL FACTOR (Ct):	1.0
SNOW DRIFTING PER CODE	

SEE DESIGN LOAD DIAGRAMS ON SHEET S-007 FOR LOCATIONS AND EXTENT OF ROOF AND SNOW LOADS.

CD-6 WIND LOAD DESIGN DATA (STRENGTH LEVEL):

MAIN WIND FORCE RESISTING SYSTEM	
BASIC WIND SPEED, V	120 MPH
EXPOSURE	B
INTERNAL PRESSURE COEFFICIENT	± 0.18

COMPONENT AND CLADDING DESIGN PRESSURES
REFER TO TABLE ON S 007 FOR COMPONENT AND CLADDING DESIGN PRESSURES

ROOF EFFECTIVE WIND AREA
REFER TO TABLE ON S 007 FOR ROOF DESIGN PRESSURES

CD-7 SEISMIC LOAD DESIGN DATA (STRENGTH LEVEL):

SEISMIC IMPORTANCE FACTOR (I_s)	1.25
S_s	0.089 g
S_1	0.051 g
S_{DS}	0.095 g
S_{D1}	0.081 g
SITE CLASS	D
SEISMIC DESIGN CATEGORY	B
LATERAL SYSTEM DESCRIPTION	ORDINARY REINFORCED MASONRY WALLS
SEISMIC RESPONSE COEFFICIENT (Cs)	0.079
RESPONSE MODIFICATION FACTOR (R)	2
ANALYSIS PROCEDURE DESCRIPTION	EQUIVALENT LATERAL FORCE
DESIGN BASE SHEAR	495 KIPS

CD-8 IN CASES WHERE THE CONTRACTOR DETERMINES THAT SUSPENDED OR FLOOR MOUNTED EQUIPMENT LOADS EXIST WHICH EXCEED DESIGN LOADS INDICATED ON CONTRACT DOCUMENTS, CONTRACTOR SHALL SUBMIT LOAD DATA TO DESIGN PROFESSIONALS FOR REVIEW PRIOR TO PROCEEDING WITH WORK.

CD-9 DISTRIBUTE THE MAXIMUM LOAD HUNG FROM ANY STRUCTURAL MEMBER FOR DUCTWORK, PIPING ETC OVER THE MEMBER'S TRIBUTARY AREA IN A WAY THAT THE MEP DESIGN SUPERIMPOSED DEAD LOADS LISTED IN CONTRACT DOCUMENTS ARE NOT EXCEEDED. THE CONTRACTOR SHALL COORDINATE THE LOADS OF ALL TRADES AND PROVIDE ADDITIONAL SUPPORT OR DISTRIBUTION FRAMING AS REQUIRED TO ACHIEVE THE ALLOWABLE LOAD DISTRIBUTION.

CD-10 ELEVATOR GUIDERAIL SUPPORTS, MACHINE ROOMS, PITS, AND PENTHOUSES ARE BASED ON ELEVATOR TYPES INDICATED ON ARCHITECTURAL CONTRACT DOCUMENTS. CONTRACTOR SHALL SUBMIT FOR REVIEW ANY PLANNED CHANGE TO ELEVATORS TO DESIGN PROFESSIONALS PRIOR TO SUBMITTING CORRESPONDING STRUCTURAL SHOP DRAWINGS FOR ACTION.

CD-11 STRUCTURAL COMPONENTS ARE NOT DESIGNED FOR VIBRATING EQUIPMENT. MOUNT VIBRATING EQUIPMENT ON VIBRATION ISOLATORS.

CD-12 SERVICEABILITY

LIVE LOAD DEFLECTION IS LESS THAN L/360

A1

LIVE LOAD DEFLECTION FOR ELEMENTS SUPPORTING CMU OR BRICK IS LESS THAN L/600

LONG-TERM TOTAL DEFLECTION IS LESS THAN L/240

LATERAL DRIFT DUE TO WIND LOADS IS LESS THAN OR EQUAL TO H/400

CD-13 CONNECTIONS OF SYSTEMS DESIGNED BY CONTRACTOR'S ENGINEER SUCH AS, BUT NOT LIMITED TO, CLADDING, STAIRS, ELEVATORS, ESCALATORS, PRECAST, AND MEP LOADS ARE ASSUMED TO IMPOSE VERTICAL AND/OR HORIZONTAL LOADS ON THE BASE BUILDING STRUCTURAL MEMBERS WITHOUT GENERATING TORSION IN THE SUPPORTING STRUCTURAL MEMBERS. CONTRACTOR IS RESPONSIBLE FOR FURNISHING AND INSTALLING ALL SUPPLEMENTARY BRACING MEMBERS AS REQUIRED TO PREVENT TORSION ON THE BASE BUILDING STRUCTURE.

CD-14 FOR FIRE RATING AND FIREPROOFING ASSEMBLY EVALUATIONS, CONSIDER THE FOLLOWING ASSEMBLIES RESTRAINED: COMPOSITE WIDE-FLANGE STEEL FRAMING, INTERIOR BAYS OF CONTINUOUS CAST-IN-PLACE CONCRETE CONSTRUCTION. CONSIDER ALL OTHER ASSEMBLIES UNRESTRAINED.

CD-15 THERE HAVE BEEN NO LOAD RESTRICTION FACTORS APPLIED TO THE STRUCTURAL DESIGN FOR THE PURPOSES OF SELECTING FIREPROOFING ASSEMBLIES.

DI DELEGATED DESIGN ITEMS

DI-1 THE CONTRACTOR SHALL EMPLOY OR RETAIN A PROFESSIONAL ENGINEER LICENSED IN THE STATE WHERE THIS PROJECT IS LOCATED TO DESIGN AND DETAIL DELEGATED DESIGN ITEMS TO MEET THE PERFORMANCE AND DESIGN CRITERIA ESTABLISHED AS PART OF THE BASE BUILDING STRUCTURE INDICATED IN THE CONTRACT DOCUMENTS INCLUDING BUT NOT LIMITED TO:

COLD FORMED METAL FRAMING
METAL PAN STAIRS
MEP ACCESS PLATFORMS
STRUCTURAL PRECAST HOLLOWCORE PLANK AND CONNECTIONS
STEEL JOISTS, BRIDGING AND CONNECTIONS

SU SUBMITTALS

SU-1 THE CONTRACTOR SHALL PROVIDE THE REQUIRED SUBMITTALS FOR STRUCTURAL REVIEW AS OUTLINED IN THE SPECIFICATIONS. THIS INCLUDES BOTH ITEMS FULLY DESIGNED ON THE CONTRACT DOCUMENTS AND ITEMS LISTED AS DELEGATED DESIGN. ITEMS INCLUDE BUT ARE NOT LIMITED TO:

031000	S	CALC	CONCRETE FORMWORK
032000	S		CONCRETE REINFORCEMENT AND EMBEDDED ASSEMBLIES
033000	S		CAST-IN-PLACE CONCRETE
033000		CALC	CONCRETE MIX DESIGNS
034100	S	CALC	PRECAST STRUCTURAL CONCRETE
042200	S		CONCRETE MASONRY UNITS
051200	S		STRUCTURAL STEEL
052000	S	CALC	STRUCTURAL STEEL JOISTS
053000	S		STEEL DECK
316100	S		FOOTINGS

S = SHOP DRAWINGS REQUIRED
CALC = SUPPORTING CALCULATIONS REQUIRED, SEALED AND SIGNED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE WHERE THE PROJECT IS LOCATED

SU-2 SUBMIT LOADS IMPOSED ONTO BASE BUILDING STRUCTURE BY THE FOLLOWING CONTRACTOR DESIGNED SYSTEMS:

PRECAST PLANK CONCRETE AND CONNECTIONS
EXTERIOR CLADDING SYSTEMS
ARCHITECTURAL ORNAMENTATION (FLAGPOLES, BANNERS, MASTS, ETC.)
ELEVATOR REACTIONS
METAL STAIRS
CATWALKS
MEP EQUIPMENT

WHERE CONTRACTOR LOADS IMPOSED DO NOT EXCEED AND/OR CONNECTION CONDITIONS DO NOT DIFFER FROM WHAT IS INDICATED IN THE STRUCTURAL DRAWINGS, SUBMIT FOR RECORD A LETTER SEALED AND SIGNED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE WHERE THE PROJECT IS LOCATED STATING THE FOLLOWING:

"THE CONTRACTOR DESIGNED SYSTEM HAS BEEN DESIGNED TO IMPOSE LOADS ON THE BASE BUILDING STRUCTURE THAT ARE WITHIN THE LOAD LIMITS AND AT THE LOCATIONS INDICATED ON THE STRUCTURAL DRAWINGS."

WHERE CONTRACTOR LOADS IMPOSED FOR THE ITEMS LISTED ABOVE EXCEED AND/OR CONNECTION CONDITIONS DIFFER FROM WHAT IS SHOWN IN THE STRUCTURAL DRAWINGS, SUBMIT FOR APPROVAL TO SER LOADS IMPOSED ON THE PRIMARY STRUCTURAL FRAME DUE TO THE DEAD, LIVE, AND WIND/SEISMIC LOADS INDICATED ON THE CONTRACT DOCUMENTS.

SUBMITTAL SHALL LIST THE DESIGN LOADS USED AND BE SEALED AND SIGNED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE WHERE THE PROJECT IS LOCATED. SUBMITTAL SHALL INCLUDE LOCATION, MAGNITUDE AND DIRECTION OF UNFACTORED IMPOSED LOADS, GRAPHICALLY REPRESENTED IN THEIR APPROPRIATE LOCATIONS ON A COPY OF THE CONTRACT DOCUMENT STRUCTURAL FRAMING PLANS OR ELEVATIONS AS APPROPRIATE. DETAIL REFERENCES IN THE CONNECTIONS APPLICABLE AT EACH LOCATION SHALL BE NOTED ON THE SUBMITTAL DRAWINGS.

FOR EXTERIOR WALL ASSEMBLIES, THE LOADS IMPOSED SUBMITTAL SHALL BE COMPREHENSIVE INDICATING THE LOADS IMPOSED ON THE BASE BUILDING STRUCTURE AND SHALL INCLUDE THE REACTIONS BASED ON THE ACTUAL LOADS OF THE ENTIRE ASSEMBLY, INCLUDING BUT NOT LIMITED TO GLAZING, CLADDING, METAL STUD BACKUP, AND MULLIONS.

FOR MEP SYSTEMS, THE LOADS IMPOSED SUBMITTAL SHALL BE COMPREHENSIVE INDICATING THE LOADS IMPOSED ON THE BASE BUILDING STRUCTURE AND SHALL INCLUDE THE REACTIONS BASED ON THE ACTUAL LOADS OF THE ENTIRE MECHANICAL, ELECTRICAL, PLUMBING, AND FIRE PROTECTION SYSTEM, INCLUDING BUT NOT LIMITED TO PIPING, DUCTS, ELECTRICAL RACEWAYS, AND EQUIPMENT WEIGHTS.

A SUBSTITUTION REQUEST MAY BE REQUIRED WHERE CONTRACTOR LOADS IMPOSED EXCEED AND/OR CONNECTION CONDITIONS DIFFER FROM THE BASIS OF DESIGN.

SU-3 THE SER'S REVIEW OF SUBMITTALS SHALL BE FOR GENERAL CONFORMANCE WITH THE DESIGN INTENT. NO WORK SHALL BE STARTED WITHOUT SUCH REVIEW.

FN FOUNDATIONS

FN-1 THE FOUNDATION DESIGN IS BASED ON THE GEOTECHNICAL REPORT BY DRIESENGA & ASSOCIATES, INC. DATED JULY 28, 2022.

FN-2 FOUNDATIONS HAVE BEEN DESIGNED BASED ON THE FOLLOWING DESIGN VALUES FROM THE GEOTECHNICAL REPORT (SERVICE LEVEL):

NET ALLOWABLE BEARING CAPACITY:	2,000 PSF	(ISOLATED FOOTINGS WITH COLUMN LOADS EXCEEDING 100 KIPS)
	2,500 PSF	(ISOLATED FOOTINGS OTHERWISE)
	2,500 PSF	(CONTINUOUS WALL FOOTINGS)

SEE GEOTECHNICAL REPORT FOR ADDITIONAL REQUIREMENTS AND INFORMATION. DESIGN VALUES SHALL BE FIELD VERIFIED BY QUALIFIED GEOTECHNICAL ENGINEER RETAINED BY THE OWNER.

FN-3 THE CONTRACTOR SHALL VERIFY ALL EARTHWORK AND FOUNDATION INSTALLATION/CONSTRUCTION IS IN CONFORMANCE WITH THE RECOMMENDATIONS OUTLINED IN THE GEOTECHNICAL REPORT.

FN-4 CONTRACTOR SHALL BE RESPONSIBLE TO ADEQUATELY PROTECT ALL EXCAVATION. WHERE NECESSARY, SHEET AND SHORE THE EXCAVATION WITH ALL REQUIRED TIEBACKS AND BRACING AS DETERMINED BY CONTRACTOR'S ENGINEER.

CM CONCRETE MATERIALS

CM-1 CONCRETE STRENGTH SHALL MEET THE FOLLOWING 28-DAY COMPRESSIVE STRENGTHS (f' c), UON:

FOOTINGS AND PIERS	4,000 PSI
FOUNDATION WALLS, PILASTERS, BUTTRESSES	4,000 PSI
NON-SHRINK GROUT	8,000 PSI
SLAB ON GRADE	4,000 PSI
HOLLOW CORE PRECAST PLANK	5,000 PSI AND HIGHER WHERE NEEDED, SEE PLAN
CONCRETE TOPPING	5,000 PSI AND HIGHER WHERE NEEDED, SEE PLAN

CM-2 PROVIDE NORMALWEIGHT CONCRETE WITH CURED DENSITY OF 145 +/- 5 PCF, AND AGGREGATE CONFORMING TO ASTM C33, UON.

CM-3 THE USE OF CALCIUM CHLORIDE AND OTHER CHLORIDE CONTAINING AGENTS IS PROHIBITED. THE USE OF RECYCLED CONCRETE IS PROHIBITED. PLACEMENT WITHIN AND CONTACT BETWEEN ALUMINUM ITEMS, INCLUDING ALUMINUM CONDUIT, AND CONCRETE IS PROHIBITED.

CM-4 ALL CAST-IN-PLACE CONCRETE WILL EXPERIENCE DIFFERING VARIATIONS OF CRACKING. ANY ELEMENT EXPOSED TO DIRECT WEATHER AND/OR TEMPERATURE VARIATIONS DURING CONSTRUCTION OR IN THE FINAL CONDITION IS TO BE TREATED AND REGULARLY MAINTAINED TO PREVENT PROPAGATION OF CRACKS AND WATER PENETRATION. THE CONTRACTOR SHALL DEVELOP A REGULAR MAINTENANCE PROGRAM AND SUBMIT IT TO THE OWNER.

RE CONCRETE REINFORCEMENT

RE-1 ALL CONCRETE SHALL INCLUDE REINFORCEMENT. IF REINFORCEMENT IS NOT SPECIFICALLY INDICATED ON THE DRAWINGS VERIFY WITH THE SER.

RE-2 REINFORCEMENT SHALL CONFORM TO THE FOLLOWING STANDARDS AND MATERIAL PROPERTIES UON:

DEFORMED BARS:	ASTM A615 GRADE 60
WELDABLE DEFORMED BARS:	ASTM A706
EPOXY COATED DEFORMED BARS:	ASTM A615 / A775
WELDED WIRE REINFORCEMENT	ASTM A1064
EPOXY COATED WELDED WIRE REINFORCEMENT	ASTM A1064 / A884

RE-3 DETAIL REINFORCEMENT BASED ON THE PROJECT REQUIREMENTS, ACI-318 AND ACI-315, UON.

RE-4 WHERE A 90-DEG, 135 –DEG OR 180-DEG HOOK IS GRAPHICALLY INDICATED, PROVIDE CORRESPONDING ACI STANDARD HOOKS UON.

RE-5 DOWELS SHALL MATCH SIZE AND SPACING OF MAIN REINFORCEMENT UON.

RE-6 REINFORCEMENT SHALL HAVE CONCRETE PROTECTION (CLEAR COVER) PER ACI 318 UNLESS OTHERWISE INDICATED ON THE DRAWINGS.

RE-7 LAP REINFORCEMENT ONLY AT LOCATIONS AS SPECIFICALLY DETAILED ON THE DRAWINGS EXCEPT REINFORCEMENT MARKED AS CONTINUOUS CAN BE SPLICED AT LOCATIONS DETERMINED BY CONTRACTOR USING TENSION LAP SPLICES (LTS). SEE LAP SPLICE AND EMBEDMENT SCHEDULE.

RE-8 UNLESS OTHERWISE NOTED ALL LAP SPLICES ARE TO BE TENSION LAP SPLICES PER LAP SPLICE AND EMBEDMENT SCHEDULE.

RE-9 LAP WELDED WIRE REINFORCEMENT TWO PANEL SPACINGS, UON.

CJ CONCRETE CONSTRUCTION AND CONTRACTION JOINTS

CJ-1 PROVIDE CONSTRUCTION JOINTS IN ACCORDANCE WITH ACI-318. SUBMIT SHOP DRAWINGS SHOWING PROPOSED CONSTRUCTION JOINT LOCATIONS, DETAILS AND THE PLACEMENT SEQUENCE FOR THE SER'S APPROVAL PRIOR TO PROCEEDING WITH WORK.

CJ-2 UNLESS SPECIFICALLY SHOWN ON THE DRAWINGS, HORIZONTAL CONSTRUCTION JOINTS SHALL NOT BE PERMITTED IN FOOTINGS, PILE CAPS, MAT FOUNDATIONS, GRADE BEAMS, BEAMS, UPTURNED BEAMS, SLABS, AND WALLS WITHOUT PRIOR WRITTEN APPROVAL FROM THE SER BEFORE CONSTRUCTION.

CJ-3 PLACE VERTICAL CONSTRUCTION JOINTS TO PROVIDE A 60 FT MAXIMUM LENGTH OF CONCRETE PLACEMENT AND LOCATE AS FOLLOWS:
A. FOUNDATION WALLS: MINIMUM OF 8 FT FROM ANY WALL INTERSECTION, PILASTER, PIER, OR WALL OPENING

CJ-4 PROVIDE CONTINUOUS WATERSTOPS AT ALL CONSTRUCTION JOINTS EXPOSED TO SOIL OR WATER, AS DESCRIBED IN THE SPECIFICATIONS AND WHERE INDICATED IN THE ARCHITECTURAL DOCUMENTS.

CJ-5 UNLESS OTHERWISE INDICATED ON DRAWINGS, PROVIDE CONTRACTION JOINTS IN CONCRETE SLAB ON GRADE AT COLUMN CENTERLINES AND BETWEEN COLUMN CENTERLINES AT A SPACING NOT TO EXCEED 36 X THE SLAB THICKNESS. REFER TO TYPICAL CONCRETE SLAB ON GRADE DETAIL FOR ADDITIONAL INFORMATION.

SP STRUCTURAL PRECAST CONCRETE

SP-1 TYPICAL DETAILS INDICATE GENERAL CRITERIA FOR DESIGN AND DETAILING OF PRECAST CONCRETE. PROVIDE DESIGNS THAT MEET INDICATED CRITERIA AND LISTED CODES AND STANDARDS.

SP-2 PROVIDE CONNECTIONS BETWEEN ADJACENT PRECAST UNITS TO TRANSMIT 1000 POUNDS PER LINEAR FOOT OF DIAPHRAGM LOADS.

SP-3 PROVIDE CAMBER TO LIMIT DEFLECTION SUCH THAT NO POINT OF THE DEFLECTED STRUCTURE EXCEEDS THE PLANK SPAN OVER 360 BELOW THE STATED ELEVATION. CAMBER DESIGN SHALL INCLUDE EFFECTS OF LONG-TERM DEFLECTION, SHRINKAGE, CREEP, AND MAXIMUM ALLOWABLE CONSTRUCTION TOLERANCES.

SP-4 DO NOT USE POWER-DRIVEN ANCHORS OR ANCHORS WHICH REQUIRE DRILLING INTO PRESTRESSED UNITS. SUBMIT PROPOSED ANCHOR PROCEDURES FOR PRECAST UNITS TO THE DESIGN PROFESSIONALS AND PRECAST SUPPLIER FOR REVIEW.

MA MASONRY

MA-1 LOAD BEARING, NON-LOAD BEARING, AND BACKUP WALL CONCRETE MASONRY CONSTRUCTION SHALL CONFORM TO THE FOLLOWING MATERIAL STANDARDS:

CONCRETE MASONRY UNITS:	ASTM C90, NORMALWEIGHT (135 PCF) (MINIMUM NET AREA COMPRESSIVE STRENGTH 2800 PSI FOR USE WITH TYPE S OR M MORTAR OR 3050 PSI FOR USE WITH TYPE N MORTAR)
MORTAR:	ASTM C270, TYPE S, M OR N
MORTAR USAGE (UON ON DRAWINGS):	USE TYPE S OR M MORTAR WHEN MASONRY IS IN DIRECT CONTACT WITH SOIL; USE TYPE S MORTAR FOR ALL EXTERIOR AND INTERIOR LOAD-BEARING WALLS; USE TYPE N MORTAR FOR ALL EXTERIOR AND INTERIOR NON-LOAD-BEARING WALLS
GROUT:	ASTM C476
REINFORCEMENT:	ASTM A615, GRADE 60
JOINT REINFORCEMENT:	ASTM A951, TRUSS OR LADDER TYPE
EXTERIOR JT REINF:	GALVANIZE PER ASTM A153
INTERIOR JT REINF:	
TYPICAL	GALVANIZE PER ASTM A641
RELATIVE HUMIDITY >75%	GALVANIZE PER ASTM A153
ADHESIVE ANCHORS:	HILTI HIT-HY 270

MA-2 THE MINIMUM COMPRESSIVE STRENGTH OF THE MASONRY (f' m) SHALL BE 2,000 PSI, UON ON DRAWINGS, DETERMINED BY THE UNIT STRENGTH METHOD IN ACCORDANCE WITH THE ABOVE REFERENCED SPECIFICATIONS.

MA-3 CALCIUM CHLORIDE SHALL NOT BE USED IN MORTAR OR GROUT.

MA-4 LAY MASONRY UNITS IN RUNNING BOND UON WITH UNITS DESIGNED TO ALIGN WITH WEBS IN EACH COURSE.

MA-5 ALL CELLS WITH REINFORCEMENT SHALL BE GROUTED SOLID. ALL CELLS WHERE MASONRY IS IN CONTACT WITH SOIL SHALL BE GROUTED SOLID.

MA-6 GROUT MINIMUM OF ONE (1) CELL WITH REINFORCEMENT AT EACH SIDE OF ALL OPENINGS. SEE DRAWINGS FOR ADDITIONAL REINFORCEMENT REQUIREMENTS.

MA-7 VENEER MASONRY TIE SYSTEM TO BE COORDINATED WITH TIE MANUFACTURER AND COMPONENT AND CLADDING WIND LOADING REQUIREMENTS OF IBC/MBC

SS STRUCTURAL STEEL

SS-1 STEEL MATERIALS SHALL CONFORM TO THE FOLLOWING MINIMUM REQUIREMENTS UNLESS OTHERWISE NOTED ON THE CONTRACT DOCUMENTS:

ASTM A6 ROLLED W SHAPES AND CHANNELS:	ASTM A572 OR A992, MINIMUM YIELD STRENGTH 50 KSI
MISCELLANEOUS ANGLES:	ASTM A36, MINIMUM YIELD STRENGTH 36 KSI
HOLLOW STRUCTURAL SECTIONS:	ASTM A500 GRADE C, MINIMUM YIELD STRENGTH 46 KSI FOR ROUND AND 50 KSI FOR RECTANGULAR HSS
PLATES:	ASTM A572 OR A529, MINIMUM YIELD STRENGTH 50 KSI

SS-2 CONNECTION MATERIAL SHALL CONFORM TO THE FOLLOWING MINIMUM REQUIREMENTS OR AS NEEDED FOR CONNECTION DESIGN:

ANGLES:	ASTM A572 OR A529, MINIMUM YIELD STRENGTH 50 KSI UON
WTs:	ASTM A572 OR A992, MINIMUM YIELD STRENGTH 50 KSI
PLATES:	ASTM A572 OR A529, MINIMUM YIELD STRENGTH 50 KSI UON
BOLTS:	ASTM F3125 GRADES A325 AND F1852 OR A490 AND F2280 OR AS INDICATED IN DETAILS
NUTS:	ASTM A563
WASHERS:	ASTM F436
ANCHOR RODS:	ASTM F1554 GRADE 55 WITH WELDABILITY SUPPLEMENT S1
HEADED STUDS:	ASTM A108, GRADE 1010 THROUGH 1020 HEADED STUD TYPE, COLD-FINISHED CARBON STEEL, AWS D1.1, TYPE B 3/4" DIAMETER UON
WELD ELECTRODES:	MINIMUM TENSILE STRENGTH 70 KSI

SS-3 WHERE NO CAMBER IS INDICATED, FABRICATE BEAMS SO THAT ANY NATURAL CAMBER IS UPWARD AFTER ERECTION.

SS-4 SPLICES SHALL BE ALLOWED ONLY AT LOCATIONS SPECIFICALLY INDICATED ON THE STRUCTURAL DRAWINGS UNLESS APPROVED OTHERWISE BY THE SER IN WRITING.

SS-5 FOR STEEL MEMBERS AND EMBEDMENTS EXPOSED TO WEATHER, PROVIDE HOT-DIPPED GALVANIZED FINISH.

SS-6 PROVIDE HOLES IN ALL STEEL AS REQUIRED TO PREVENT ANY ACCUMULATION OF WATER. ALL PENETRATIONS THROUGH MAIN MEMBERS SHALL NOT EXCEED 1 1/8" DIA. AND SHALL BE GROUND SMOOTH. THESE DRAINS MUST BE KEPT CLEAN AND OPEN.

SS-7 SHOW ALL COPES, HOLES, OPENINGS AND MODIFICATIONS REQUIRED IN STRUCTURAL STEEL MEMBERS FOR ERECTION OR THE WORK OF OTHER TRADES ON THE SHOP DRAWINGS FOR APPROVAL BY THE DESIGN PROFESSIONALS.

SS-8 FIELD MODIFICATION OF STRUCTURAL STEEL IS PROHIBITED WITHOUT PRIOR WRITTEN APPROVAL OF THE DESIGN PROFESSIONALS.

Thornton Tomasetti
Thornton Tomasetti, Inc.
330 N. Wabash Avenue, Suite 1500
Chicago, IL 60611-7622
T:312.596.2000 F:312.596.2001

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ADD. No. 1	JUN 5, 2023

PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
GENERAL NOTES I

DATE
JUNE 5, 2023

SHEET NUMBER
S 001
21-237.10

REQUIRED SPECIAL INSPECTIONS AND TESTS OF CONCRETE CONSTRUCTION

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD	IBC REFERENCE
1. INSPECT REINFORCEMENT, INCLUDING PRESTRESSING TENDONS, AND VERIFY PLACEMENT.	—	X	ACI 318 CH. 20, 25.2, 25.3, 26.6.1-26.6.3	1908.4
2. REINFORCING BAR WELDING:				
A. VERIFY WELDABILITY OF REINFORCING BARS OTHER THAN ASTM A706;	—	X	AWS D1.4, ACI 318: 26.6.4	—
B. INSPECT SINGLE-PASS FILLET WELDS, MAXIMUM 5/16"; AND		X		
C. INSPECT ALL OTHER WELDS.	X			
3. INSPECT ANCHORS CAST IN CONCRETE	—	X	ACI 318: 17.8.2	—
4. INSPECT ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS.[B]				—
A. ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS TO RESIST SUSTAINED TENSION LOADS	X		ACI 318: 17.8.2.4	
B. MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINED IN 4.A.		X	ACI 318: 17.8.2	
5. VERIFYING USE OF REQUIRED DESIGN MIX.	—	X	ACI 318: CH. 19, 26.4.3, 26.4.4	1904.1, 1904.2, 1908.2, 1908.3
6. PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE	X	—	ASTM C172 ASTM C31, ACI 318: 26.4, 26.12	1908.10
7. INSPECT CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES	X	—	ACI 318: 26.5	1908.6, 1908.7, 1908.3
8. VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES	—	X	ACI 318: 26.5.3-26.5.5	1908.9
9. INSPECT PRESTRESSED CONCRETE FOR:				
A. APPLICATION OF PRESTRESSING FORCES; AND	X	—	ACI 318: 26.10	—
B. GROUTING OF BONDED PRESTRESSING TENDONS	X	—		
10. INSPECT ERECTION OF PRECAST CONCRETE MEMBERS.	—	X	ACI 318: CH 26.8	—
11. VERIFY IN-SITU CONCRETE STRENGTH, PRIOR TO STRESSING OF TENDONS IN POST-TENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND STRCUTURAL SLABS.	—	X	ACI 318: 26.11.2	—
12. INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	—	X	ACI 318: 26.11.1.2[B]	—

REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD	IBC REFERENCE
1. MATERIAL VERIFICATION OF HIGH-STRENGTH BOLTS, NUTS AND WASHERS:				
A. IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS.	—	X	AISC 360, SECTION A3.3 AND APPLICABLE ASTM MATERIAL STANDARDS	—
B. MANUFACTURER'S CERTIFICATE OF COMPLIANCE REQUIRED.	—	X	—	—
2. INSPECTION OF HIGH-STRENGTH BOLTING:				
A. SNUG-TIGHT JOINTS	—	X	AISC 360, SECTION M2.5	—
B. SLIP-CRITICAL CONNECTIONS.	X	X		
C. PRETENSIONED AND SLIP-CRITICAL JOINTS USING TURN-OF-NUT WITH MATCHMARKING, TWIST-OFF BOLT OR DIRECT TENSION INDICATOR METHODS OF INSTALLATION.	X	—		
3. MATERIAL VERIFICATION OF STRUCTURAL STEEL AND COLD-FORMED STEEL DECK:				
A. FOR STRUCTURAL STEEL, IDENTIFICATION MARKINGS TO CONFORM TO AISC 360.	—	X	AISC 360, SECTION A3.1H	2203.1
B. FOR OTHER STEEL, IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS.	—	X	APPLICABLE ASTM MATERIAL STANDARDS	—
C. MANUFACTURER'S CERTIFIED MILL TEST REPORTS.	—	—	ASTM A 6 OR ASTM A 568	
4. MATERIAL VERIFICATION OF WELD FILLER MATERIALS:				
A. IDENTIFICATION MARKINGS TO CONFORM TO AWS SPECIFICATION IN THE APPROVED CONSTRUCTION DOCUMENTS.	—	—	AISC 360, SECTION A3.5 AND APPLICABLE AWS A5 DOCUMENTS	—
B. MANUFACTURER'S CERTIFICATE OF COMPLIANCE REQUIRED.	—	X	—	—
5. INSPECTION OF WELDING:	—	—		
A. STRUCTURAL STEEL AND COLD-FORMED STEEL DECK:	—	—		
1. COMPLETE AND PARTIAL PENETRATION GROOVE WELDS.	X	—	AWS D1.1	1705.2.1
2. MULTIPASS FILLET WELDS.	X	—		
3. SINGLE-PASS FILLET WELDS > 5/16"	X	—		
4. PLUG AND SLOT WELDS.	X	—		
5. SINGLE-PASS FILLET WELDS ≤ 5/16"	—	X		
6. FLOOR AND ROOF DECK WELDS.	—	X	AWS D1.3	—
B. REINFORCING STEEL:	—	—		
1. VERIFICATION OF WELDABILITY OF REINFORCING STEEL OTHER THAN ASTM A 706.	—	X	AWS D1.4, ACI 318: 3.5.2	—
2. REINFORCING STEEL-RESISTING FLEXURAL AND AXIAL FORCES IN INTERMEDIATE AND SPECIAL MOMENT FRAMES, AND BOUNDARY ELEMENTS OF SPECIAL REINFORCED CONCRETE SHEAR WALLS AND SHEAR REINFORCEMENT.	X	—		
3. SHEAR REINFORCEMENT.	X	—		
4. OTHER REINFORCING STEEL.	—	X		
6. INSPECTION OF STEEL FRAME JOINT DETAILS FOR COMPLIANCE WITH APPROVED CONSTRUCTION DOCUMENTS:	—	X	—	1705.2.1
DETAILS SUCH AS BRACING AND STIFFENING.	—	X		
B. MEMBER LOCATIONS.	—	X		
C. APPLICATION OF JOINT DETAILS AT EACH CONNECTION.	—	X		

REQUIRED SPECIAL INSPECTIONS OF OPEN-WEB STEEL JOISTS AND JOISTS GIRDERS

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION	REFERENCED STANDARD[B]
1. INSTALLATION OF OPEN-WEB STEEL JOISTS AND JOIST GIRDERS			
A. END CONNECTIONS - WELDING OR BOLTED	—	X	SJI SPECIFICATIONS LISTED IN SECTION 2207.1.
B. BRIDGING - HORIZONTAL OR DIAGONAL	—		
1. STANDARD BRIDGING	—	X	SJI SPECIFICATIONS LISTED IN SECTION 2207.1.
2. BRIDGING THAT DIFFERS FROM THE SJI SPECIFICATIONS LISTED IN SECTION 2207.1.		X	

[a] WHERE APPLICABLE, SEE ALSO SECTION 1705.12, SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE.

LEVEL B REQUIRED VERIFICATION AND INSPECTION OF MASONRY CONSTRUCTION

INSPECTION TASK	FREQUENCY[a]		REFERENCE FOR CRITERIA	
	CONTINUOUS	PERIODIC	TMS 402/ACI 530 /ASCE 5	TMS 602/ACI 530.1 /ASCE 6
1. VERIFY COMPLIANCE WITH THE APPROVED SUBMITTALS.	—	X	—	ART. 1.5
2. AS MASONRY CONSTRUCTION BEGINS, THE FOLLOWING ARE IN COMPLIANCE:				
A. PROPORTIONS OF SITE-PREPARED MORTAR	—	X	—	ART. 2.1, 2.6A
B. CONSTRUCTION OF MORTAR JOINTS	—	X	—	ART. 3.3B
C. GRADE AND SIZE OF PRESTRESSING TENDONS AND ANCHORAGES	—	X	—	ART. 2.4B, 2.4H
D. LOCATION OF REINFORCEMENT, CONNECTORS, AND PRESTRESSING TENDONS AND ANCHORAGES	—	X	—	ART. 3.4, 3.6A
E. PRESTRESSING TECHNIQUE	—	X	—	ART. 3.6B
F. PROPERTIES OF THIN-BED MORTAR FOR AAC MASONRY	X[b]	X[c]	—	ART. 2.1C
3. PRIOR TO GROUTING, VERIFY THAT THE FOLLOWING ARE IN COMPLIANCE:				
A. GROUT SPACE	—	X	—	ART. 3.2D, 3.2F
B. GRADE,TYPE, AND SIZE OF REINFORCEMENT AND ANCHOR BOLTS, AND PRESTRESSING TENDONS AND ANCHORAGES	—	X	SEC. 1.16	ART. 2.4, 3.4
C. PLACEMENT OF REINFORCEMENT, CONNECTORS, PRESTRESSING TENDONS AND ANCHORAGES	—	X	SEC. 1.16	ART. 3.2E, 3.4, 3.6A
D. PROPORTION OF SITE-PREPARED GROUT AND PRESTRESSING GROUT FOR BONDED TENDONS	—	X	—	ART. 2.6B, 2.4G.1.B
E. CONSTRUCTION OF MORTAR JOINTS	—	X	—	ART. 3.3B
4. VERIFY DURING CONSTRUCTION:				
A. SIZE AND LOCATION OF STRUCTURAL ELEMENTS	—	X	—	ART. 3.3F
B. TYPE, SIZE AND LOCATION OF ANCHORS, INCLUDING OTHER DETAILS OF ANCHORAGE OF MASONRY TO STRUCTURAL MEMBERS, FRAMES OR OTHER CONSTRUCTION.	—	X	SEC. 1.16.4.3, 1.17.1	—
C. WELDING OF REINFORCEMENT	X	—	SEC. 2.1.7.7.2, 3.3.3.4(c), 8.3.3.4 (b)	—
D. PREPARATION, CONSTRUCTION AND PROTECTION OF MASONRY DURING COLD WEATHER (TEMPERATURE BELOW 40°F (4.4°C)) OR HOT WEATHER (TEMPERATURE ABOVE 90°F (32.2°C)).	—	X	—	ART. 1.8C, 1.8D
E. APPLICATION AND MEASUREMENT OF PRESTRESSING FORCE.	X	—	—	ART. 3.6B
F. PLACEMENT OF GROUT AND PRESTRESSING GROUT FOR BONDED TENDONS IS IN COMPLIANCE	X	—	—	ART.3.5, 3.6C
G. PLACEMENT OF AAC MASONRY UNITS AND CONSTRUCTION OF THIN-BED MORTAR JOINTS	X[b]	X[c]	—	ART. 3.3B.8
5. OBSERVE PREPARATION OF GROUT SPECIMENS, MORTAR SPECIMENS, AND/OR PRISMS	—	X	—	ART. 1.4B.2.A.3, 1.4B.2.B.3, 1.4B.2.C.3 1.4B.3, 1.4B.4

(a) FREQUENCY REFERS TO THE FREQUENCY OF INSPECTION, WHICH MAY BE CONTINUOUS DURING THE TASK LISTED OR PERIODICALLY DURING THE LISTED TASK, AS DEFINED IN THE TABLE.
(b) REQUIRED FOR THE FIRST 5000 SQUARE FEET (465 SQUARE METERS) OF AAC MASONRY.
(c) REQUIRED AFTER THE FIRST 5000 SQUARE FEET (465 SQUARE METERS) OF AAC MASONRY.

A1

REQUIRED VERIFICATION AND INSPECTION OF SOILS

VERIFICATION AND INSPECTION TASK	CONTINUOUS DURING TASK LISTED	PERIODICALLY DURING TASK LISTED
1. VERIFY MATERIALS BELOW SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.	—	X
2. VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.	—	X
3. PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.	—	X
4. VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.	X	—
5. PRIOR TO PLACEMENT OF CONTROLLED FILL, OBSERVE SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY.	—	X

REQUIRED VERIFICATION OF STEEL CONSTRUCTION OTHER THAN STRUCTURAL STEEL

VERIFICATION AND INSPECTION TASK	CONTINUOUS	PERIODIC	REFERENCED STANDARD
1. MATERIAL VERIFICATION OF COLD-FORMED STEEL DECK:			
A. IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS	—	X	APPLICABLE ASTM MATERIAL STANDARDS
B. MANUFACTURER'S CERTIFIED TEST REPORTS	—	X	
2. INSPECTION OF WELDING:			
A. COLD-FORMED STEEL DECK:			
1. FLOOR AND ROOF DECK WELDS	—	X	AWS D1.3
B. REINFORCING STEEL:			
1. VERIFICATION OF WELDABILITY OF REINFORCING STEEL OTHER THAN ASTM A706	—	X	AWS D1.4, ACI 318: 3.5.2
2. REINFORCING STEEL RESISTING FLEXURAL AND AXIAL FORCES IN INTERMEDIATE AND SPECIAL MOMENT FRAMES, AND BOUNDARY ELEMENTS OF SPECIAL STRUCTURAL WALLS OF CONCRETE AND SHEAR REINFORCEMENT	X	—	
3. SHEAR REINFORCEMENT	X	—	
4. OTHER REINFORCING STEEL	—	X	

SI SPECIAL INSPECTIONS AND STRUCTURAL TESTING

SI-1) SPECIAL INSPECTIONS SHALL BE PERFORMED BY A SPECIAL INSPECTOR PER IBC SECTIONS 1704 AND 1705. THE SPECIAL INSPECTOR SHALL BE EMPLOYED BY THE OWNER AND NOT BY THE CONTRACTOR OR ANY OTHER PERSON RESPONSIBLE FOR THE WORK.

SI-2) THE SPECIAL INSPECTOR SHALL BE A QUALIFIED (LICENSED) PERSON WHO SHALL PROVIDE WRITTEN DOCUMENTATION TO THE BUILDING OFFICIAL DEMONSTRATING HIS OR HER COMPETENCE AND RELEVANT TRAINING OR EXPERIENCE TO THE SATISFACTION OF THE BUILDING OFFICIAL. EXPERIENCE SHALL BE FOR SPECIAL INSPECTION OF THE PARTICULAR TYPE OF CONSTRUCTION OR OPERATION REQUIRING SPECIAL INSPECTION.

SI-3) THE CONTRACTOR SHALL SUBMIT A WRITTEN STATEMENT OF RESPONSIBILITY PER IBC SECTION 1704.4 TO THE BUILDING OFFICIAL AND THE OWNER PRIOR TO THE COMMENCEMENT OF WORK WHEN RESPONSIBLE FOR THE CONSTRUCTION OF A MAIN WIND FORCE OR SEISMIC FORCE RESISTING SYSTEM. THE STATEMENT OF RESPONSIBILITY SHALL CONTAIN ACKNOWLEDGEMENT OF AWARENESS OF THE SPECIAL REQUIREMENTS CONTAINED IN THE STATEMENT OF SPECIAL INSPECTION.

SI-4) THE FOLLOWING WORK REQUIRES STRUCTURAL TESTS. FOR SPECIFIC REQUIREMENTS OF STRUCTURAL TESTS, SEE THE SPECIFICATIONS AND GENERAL NOTES.

1. CONCRETE REINFORCEMENT
2. CAST-IN-PLACE CONCRETE
3. SHOTCRETE
4. POST-INSTALLED ANCHORS
5 GROUTED DOWELS
6. CONCRETE UNIT MASONRY
7. STRUCTURAL STEEL MATERIALS AND FABRICATION
8 WELDING: STRUCTURAL STEEL AND REINFORCING STEEL
9. STEEL DECKING
10 COLD FORMED METAL FRAMING

SI-5) THE FOLLOWING ITEMS SHALL RECEIVE SPECIAL INSPECTION BY A CERTIFIED SPECIAL INSPECTOR IN ACCORDANCE WITH IBC 1704 AND 1705.

Thornton Tomasetti
Thornton Tomasetti, Inc.
330 N. Wabash Avenue, Suite 1500
Chicago, IL 60611-7622
T:312.596.2000 F:312.596.2001

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PROJECT TITLE
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PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS

Portage, Michigan

SHEET TITLE
SPECIAL INSPECTIONS AND STRUCTURAL TESTING

DATE
JUNE 5, 2023

SHEET NUMBER
S 003
21-237.10

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Thornton Tomasetti, Inc.
330 N. Wabash Avenue, Suite 1500
Chicago, IL 60611-7622
T:312.596.2000 F:312.596.2001

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OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
FOUNDATION PLAN

DATE
JUNE 5, 2023

SHEET NUMBER
S 100
21-237.10

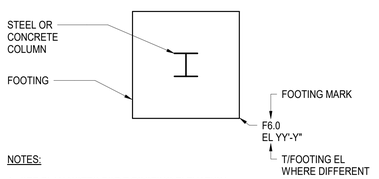
PLAN NOTES:

1. TOP OF EXTERIOR FOOTING EL 97'-9", UON
   TOP OF INTERIOR FOOTING EL 98'-8", UON
2. TOP OF CONCRETE FOUNDATION WALL EL 100'-0", UON
3. SEE GENERAL NOTES FOR CONCRETE COMPRESSIVE STRENGTH
4. FOR ADDITIONAL INFORMATION, REFER TO THE FOLLOWING DRAWINGS:

DRAWING LIST, GENERAL NOTES, AND LOADING DIAGRAMS	S0 SERIES DRAWINGS
TYPICAL FOUNDATION DETAILS	S2 SERIES DRAWINGS
STEEL SUPERSTRUCTURE SCHEDULES AND DETAILS	S5 SERIES DRAWINGS
MASONRY DETAILS	S6 SERIES DRAWINGS

5. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATIONS OF NONSTRUCTURAL CMU WALLS AND PARTITIONS. SEE ARCH FOR DOOR, WINDOW, AND OTHER PENETRATIONS. PROVIDE 6 / S 210 AT ALL NONSTRUCTURAL CMU WALL LOCATIONS.
6. ALL CMU WALLS SHOWN IN STRUCTURAL DRAWINGS ARE TO BE CONSIDERED LOAD-BEARING CMU WALLS AS DETAILED IN THE STRUCTURAL DRAWINGS. WALLS NOT INDICATED ON STRUCTURAL DRAWINGS SHALL BE OF THE WALL TYPE SPECIFIED IN THE ARCHITECTURAL DRAWINGS. ANY CMU WALLS SHOWN IN THE ARCHITECTURAL PLANS AND NOT INDICATED IN THE STRUCTURAL DRAWINGS AND SHALL BE DETAILED AS CMU-4 TYPE. NONSTRUCTURAL CMU WALLS ARE NOT PERMITTED ON SECOND LEVEL FRAMING UON ON PLAN. NOTIFY ENGINEER OF RECORD OF ANY DISCREPANCIES BETWEEN STRUCTURAL AND ARCHITECTURAL DRAWINGS.

ISOLATED FOOTING LEGEND



NOTES:
1. SEE PLAN NOTES FOR T/FOOTING ELEVATION
2. SEE TYPICAL ISOLATED FOOTING SCHEDULE AND DETAILS
3. SEE PLAN FOR FOOTING ORIENTATION

1 FOUNDATION PLAN
3/32" = 1'-0"

Thornton Tomasetti
Thornton Tomasetti, Inc.
330 N. Wabash Avenue, Suite 1500
Chicago, IL 60611-7622
T:312.596.2000 F:312.596.2001

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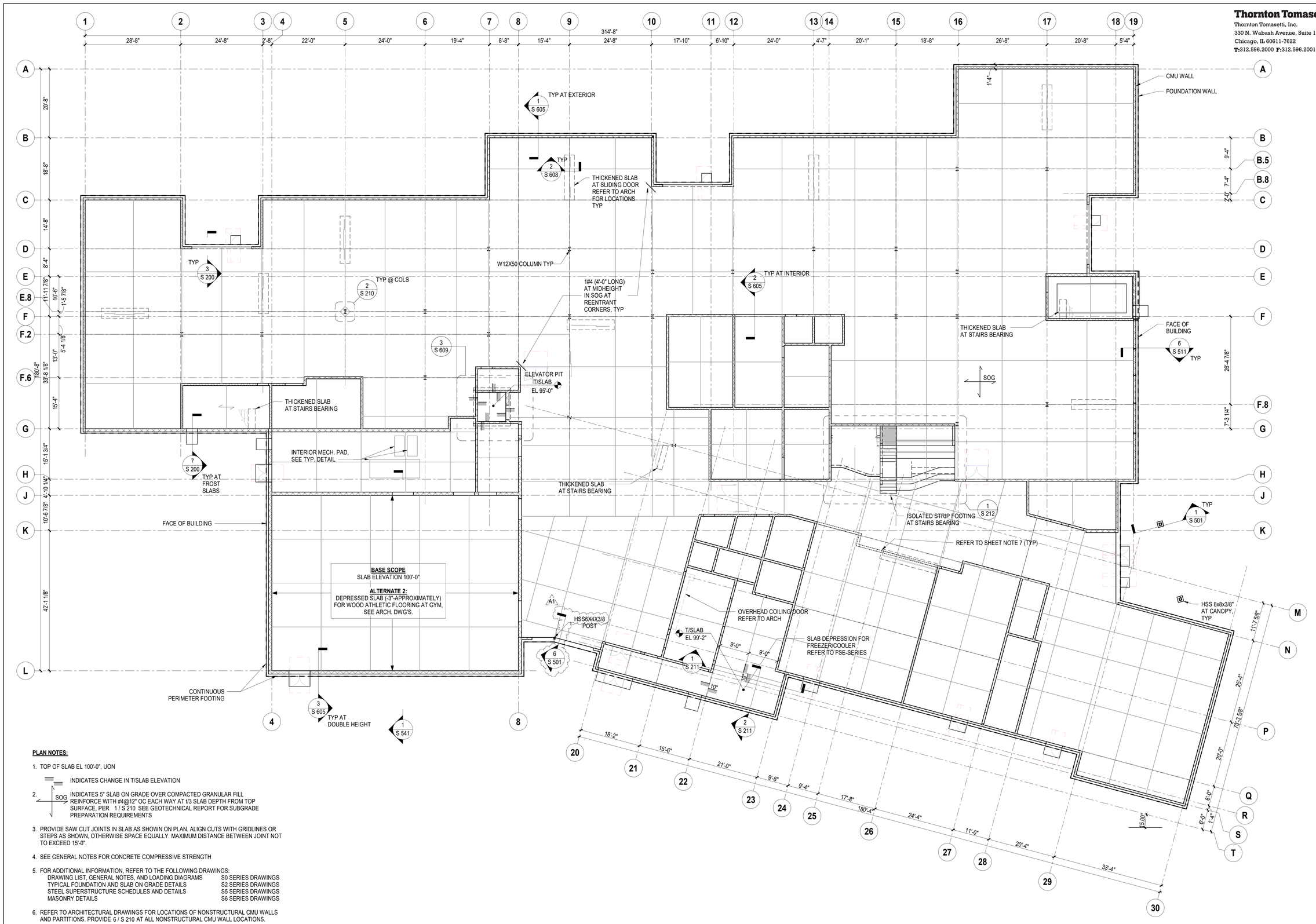

PLAN NOTES:

1. TOP OF SLAB EL 100'-0", UON

   INDICATES CHANGE IN T/SLAB ELEVATION

2. SOG — INDICATES 5" SLAB ON GRADE OVER COMPACTED GRANULAR FILL REINFORCE WITH #4@12" OC EACH WAY AT t/3 SLAB DEPTH FROM TOP SURFACE, PER 1 / S 210 SEE GEOTECHNICAL REPORT FOR SUBGRADE PREPARATION REQUIREMENTS

3. PROVIDE SAW CUT JOINTS IN SLAB AS SHOWN ON PLAN. ALIGN CUTS WITH GRIDLINES OR STEPS AS SHOWN, OTHERWISE SPACE EQUALLY. MAXIMUM DISTANCE BETWEEN JOINT NOT TO EXCEED 15'-0".

4. SEE GENERAL NOTES FOR CONCRETE COMPRESSIVE STRENGTH

5. FOR ADDITIONAL INFORMATION, REFER TO THE FOLLOWING DRAWINGS:

DRAWING LIST, GENERAL NOTES, AND LOADING DIAGRAMS	S0 SERIES DRAWINGS
TYPICAL FOUNDATION AND SLAB ON GRADE DETAILS	S2 SERIES DRAWINGS
STEEL SUPERSTRUCTURE SCHEDULES AND DETAILS	S5 SERIES DRAWINGS
MASONRY DETAILS	S6 SERIES DRAWINGS

6. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATIONS OF NONSTRUCTURAL CMU WALLS AND PARTITIONS. PROVIDE 6 / S 210 AT ALL NONSTRUCTURAL CMU WALL LOCATIONS.

7. ALL CMU WALLS SHOWN IN STRUCTURAL DRAWINGS ARE TO BE CONSIDERED LOAD-BEARING CMU WALLS AS DETAILED IN THE STRUCTURAL DRAWINGS. WALLS NOT INDICATED ON STRUCTURAL DRAWINGS SHALL BE OF THE WALL TYPE SPECIFIED IN THE ARCHITECTURAL DRAWINGS. ANY CMU WALLS SHOWN IN THE ARCHITECTURAL PLANS AND NOT INDICATED IN THE STRUCTURAL DRAWINGS AND SHALL BE DETAILED AS CMU-4 TYPE. NON-LOAD-BEARING CMU WALLS ARE NOT PERMITTED ON SECOND LEVEL FRAMING UON ON PLAN. NOTIFY ENGINEER OF RECORD OF ANY DISCREPANCIES BETWEEN STRUCTURAL AND ARCHITECTURAL DRAWINGS.

1 FIRST FLOOR PLAN
3/32" = 1'-0"

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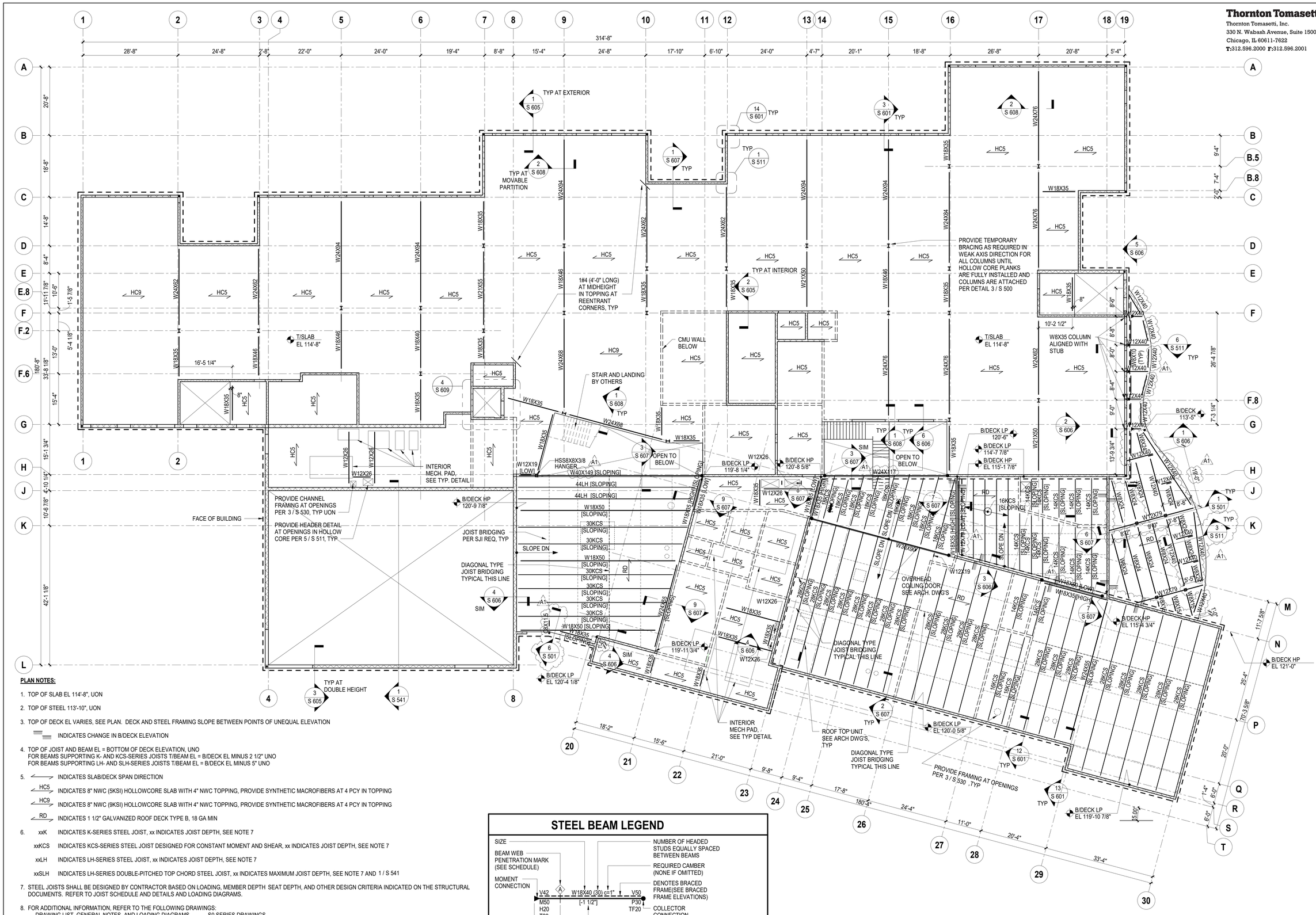
PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
FIRST FLOOR SLAB ON GRADE PLAN

DATE
JUNE 5, 2023

SHEET NUMBER
S101
21-237.10



PLAN NOTES:

1. TOP OF SLAB EL 114'-8", UON
2. TOP OF STEEL 113'-10", UON
3. TOP OF DECK EL VARIES, SEE PLAN. DECK AND STEEL FRAMING SLOPE BETWEEN POINTS OF UNEQUAL ELEVATION
   - INDICATES CHANGE IN B/DECK ELEVATION
4. TOP OF JOIST AND BEAM EL = BOTTOM OF DECK ELEVATION, UNO
   FOR BEAMS SUPPORTING K- AND KCS-SERIES JOISTS T/BEAM EL = B/DECK EL MINUS 2 1/2" UNO
   FOR BEAMS SUPPORTING LH- AND SLH-SERIES JOISTS T/BEAM EL = B/DECK EL MINUS 5" UNO
5. - INDICATES SLAB/DECK SPAN DIRECTION
   - HC5 INDICATES 8" NWC (5KSI) HOLLOWCORE SLAB WITH 4" NWC TOPPING, PROVIDE SYNTHETIC MACROFIBERS AT 4 PCY IN TOPPING
   - HC9 INDICATES 8" NWC (9KSI) HOLLOWCORE SLAB WITH 4" NWC TOPPING, PROVIDE SYNTHETIC MACROFIBERS AT 4 PCY IN TOPPING
   - RD INDICATES 1 1/2" GALVANIZED ROOF DECK TYPE B, 18 GA MIN
6. xxK INDICATES K-SERIES STEEL JOIST, xx INDICATES JOIST DEPTH, SEE NOTE 7
   - xxKCS INDICATES KCS-SERIES STEEL JOIST DESIGNED FOR CONSTANT MOMENT AND SHEAR, xx INDICATES JOIST DEPTH, SEE NOTE 7
   - xxLH INDICATES LH-SERIES STEEL JOIST, xx INDICATES JOIST DEPTH, SEE NOTE 7
   - xxSLH INDICATES LH-SERIES DOUBLE-PITCHED TOP CHORD STEEL JOIST, xx INDICATES MAXIMUM JOIST DEPTH, SEE NOTE 7 AND 1 / S 541
7. STEEL JOISTS SHALL BE DESIGNED BY CONTRACTOR BASED ON LOADING, MEMBER DEPTH SEAT DEPTH, AND OTHER DESIGN CRITERIA INDICATED ON THE STRUCTURAL DOCUMENTS. REFER TO JOIST SCHEDULE AND DETAILS AND LOADING DIAGRAMS.
8. FOR ADDITIONAL INFORMATION, REFER TO THE FOLLOWING DRAWINGS:

DRAWING LIST, GENERAL NOTES, AND LOADING DIAGRAMS	S0 SERIES DRAWINGS
TYPICAL FOUNDATION DETAILS	S2 SERIES DRAWINGS
STEEL SUPERSTRUCTURE SCHEDULES AND DETAILS	S5 SERIES DRAWINGS
MASONRY DETAILS	S6 SERIES DRAWINGS

9. ALL CMU WALLS SHOWN IN STRUCTURAL DRAWINGS ARE TO BE CONSIDERED LOAD-BEARING CMU WALLS AS DETAILED IN THE STRUCTURAL DRAWINGS. WALLS NOT INDICATED ON STRUCTURAL DRAWINGS SHALL BE OF THE WALL TYPE SPECIFIED IN THE ARCHITECTURAL DRAWINGS. ANY CMU WALLS SHOWN IN THE ARCHITECTURAL PLANS AND NOT INDICATED IN THE STRUCTURAL DRAWINGS AND SHALL BE DETAILED AS CMU-4 TYPE. NON-LOAD-BEARING CMU WALLS ARE PERMITTED ON SECOND LEVEL FRAMING UON ON PLAN. NOTIFY ENGINEER OF RECORD OF ANY DISCREPANCIES BETWEEN STRUCTURAL AND ARCHITECTURAL DRAWINGS.
10. ALL STEEL EXPOSED TO WEATHER, INCLUDING CANOPY FRAMING AND V-COLUMNS SHALL BE HOT DIP GALVANIZED.

STEEL BEAM LEGEND

V INDICATES FACTORED VERTICAL SHEAR IN KIPS
M INDICATES FACTORED END MOMENT IN KIP-FEET
H INDICATES FACTORED HORIZONTAL SHEAR FORCE IN KIPS
T INDICATES TORSIONAL MOMENT IN KIP-FEET
P INDICATES FACTORED MEMBER AXIAL FORCE IN KIPS
TF INDICATES FACTORED AXIAL FORCE TRANSFERRED THROUGH THE CONNECTION JOINT IF DIFFERENT THAN P IN KIPS

DESIGN SHEAR CONNECTION

W8-W12	V20
W14-W16	V40
W18-W21	V65
W24-W27	V85
W30+	V100
U.O.N.O.N PLAN	

1 SECOND FLOOR FRAMING PLAN

3/32" = 1'-0"

Thornton Tomasetti
Thornton Tomasetti, Inc.
330 N. Wabash Avenue, Suite 1500
Chicago, IL 60611-7622
T:312.596.2000 F:312.596.2001

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OWNER
PORTAGE PUBLIC SCHOOLS

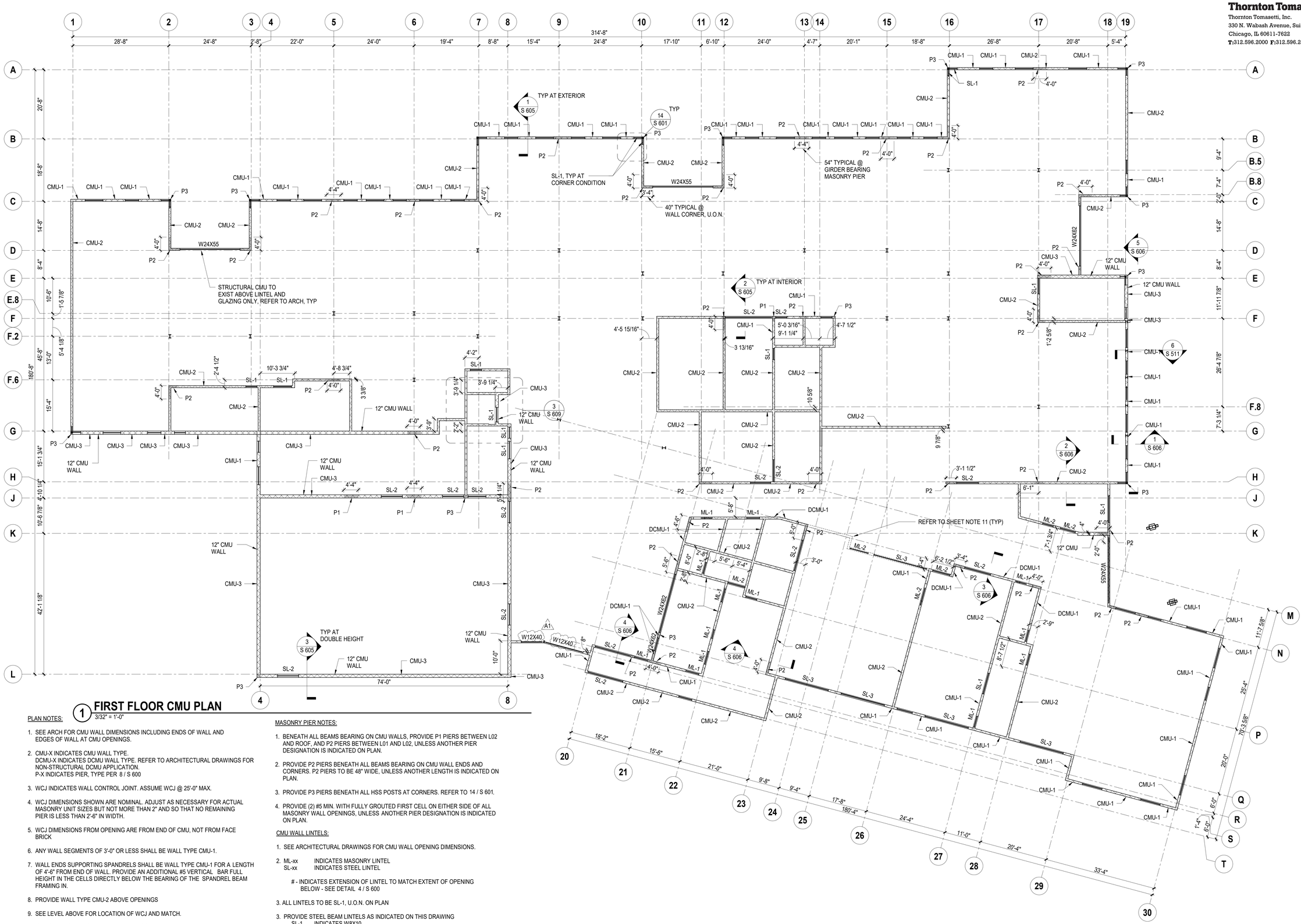
Portage, Michigan

SHEET TITLE
SECOND FLOOR FRAMING PLAN

DATE
JUNE 5, 2023

SHEET NUMBER
S 102
21-237.10

Thornton Tomasetti
Thornton Tomasetti, Inc.
330 N. Wabash Avenue, Suite 1500
Chicago, IL 60611-7622
T:312.596.2000 F:312.596.2001



1 FIRST FLOOR CMU PLAN
3/32" = 1'-0"

PLAN NOTES:

1. SEE ARCH FOR CMU WALL DIMENSIONS INCLUDING ENDS OF WALL AND EDGES OF WALL AT CMU OPENINGS.
2. CMU-X INDICATES CMU WALL TYPE.
   DCMU-X INDICATES DCMU WALL TYPE. REFER TO ARCHITECTURAL DRAWINGS FOR NON-STRUCTURAL DCMU APPLICATION.
   P-X INDICATES PIER, TYPE PER 8 / S 600
3. WCJ INDICATES WALL CONTROL JOINT. ASSUME WCJ @ 25'-0" MAX.
4. WCJ DIMENSIONS SHOWN ARE NOMINAL. ADJUST AS NECESSARY FOR ACTUAL MASONRY UNIT SIZES BUT NOT MORE THAN 2" AND SO THAT NO REMAINING PIER IS LESS THAN 2'-6" IN WIDTH.
5. WCJ DIMENSIONS FROM OPENING ARE FROM END OF CMU, NOT FROM FACE BRICK
6. ANY WALL SEGMENTS OF 3'-0" OR LESS SHALL BE WALL TYPE CMU-1.
7. WALL ENDS SUPPORTING SPANDRELS SHALL BE WALL TYPE CMU-1 FOR A LENGTH OF 4'-6" FROM END OF WALL. PROVIDE AN ADDITIONAL #5 VERTICAL BAR FULL HEIGHT IN THE CELLS DIRECTLY BELOW THE BEARING OF THE SPANDREL BEAM FRAMING IN.
8. PROVIDE WALL TYPE CMU-2 ABOVE OPENINGS
9. SEE LEVEL ABOVE FOR LOCATION OF WCJ AND MATCH.
10. SEE SHEET S 600 FOR CMU WALL TYPE SCHEDULE
11. ALL CMU WALLS SHOWN IN STRUCTURAL DRAWINGS ARE TO BE CONSIDERED LOAD-BEARING CMU WALLS AS DETAILED IN THE STRUCTURAL DRAWINGS. WALLS NOT INDICATED ON STRUCTURAL DRAWINGS SHALL BE OF THE WALL TYPE SPECIFIED IN THE ARCHITECTURAL DRAWINGS. ANY CMU WALLS SHOWN IN THE ARCHITECTURAL PLANS AND NOT INDICATED IN THE STRUCTURAL DRAWINGS AND SHALL BE DETAILED AS CMU-4 TYPE. NON-LOAD-BEARING CMU WALLS ARE NOT PERMITTED ON SECOND LEVEL FRAMING UON ON PLAN. NOTIFY ENGINEER OF RECORD OF ANY DISCREPANCIES BETWEEN STRUCTURAL AND ARCHITECTURAL DRAWINGS.

MASONRY PIER NOTES:

1. BENEATH ALL BEAMS BEARING ON CMU WALLS, PROVIDE P1 PIERS BETWEEN L02 AND ROOF, AND P2 PIERS BETWEEN L01 AND L02, UNLESS ANOTHER PIER DESIGNATION IS INDICATED ON PLAN.
2. PROVIDE P2 PIERS BENEATH ALL BEAMS BEARING ON CMU WALL ENDS AND CORNERS. P2 PIERS TO BE 48" WIDE, UNLESS ANOTHER LENGTH IS INDICATED ON PLAN.
3. PROVIDE P3 PIERS BENEATH ALL HSS POSTS AT CORNERS. REFER TO 14 / S 601.
4. PROVIDE (2) #5 MIN. WITH FULLY GROUTED FIRST CELL ON EITHER SIDE OF ALL MASONRY WALL OPENINGS, UNLESS ANOTHER PIER DESIGNATION IS INDICATED ON PLAN.

CMU WALL LINTELS:

1. SEE ARCHITECTURAL DRAWINGS FOR CMU WALL OPENING DIMENSIONS.
2. ML-xx INDICATES MASONRY LINTEL
   SL-xx INDICATES STEEL LINTEL
   # - INDICATES EXTENSION OF LINTEL TO MATCH EXTENT OF OPENING BELOW - SEE DETAIL 4 / S 600
3. ALL LINTELS TO BE SL-1, U.O.N. ON PLAN
3. PROVIDE STEEL BEAM LINTELS AS INDICATED ON THIS DRAWING
   SL-1 INDICATES W8X10
   SL-2 INDICATES W16X26
   SL-3 INDICATES W16X36
4. PROVIDE LINTELS AT ALL WALL OPENINGS AND RECESSES, INCLUDING MECHANICAL OPENINGS AND PENETRATIONS, CABINETS RECESSED INTO THE WALL, ETC.
5. SEE ARCHITECTURAL AND MEP DRAWINGS AND OTHER PROJECT DOCUMENTS FOR ADDITIONAL WALL OPENINGS AND PENETRATIONS NOT SHOWN ON THIS DRAWING. THIS DRAWING DOES NOT SHOW ALL THE OPENINGS THAT ARE REQUIRED.
6. SEE ARCHITECTURAL DRAWINGS FOR BRICK VENEER AND VENEER OPENINGS.

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PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
FIRST FLOOR CMU PLAN

DATE
JUNE 5, 2023

SHEET NUMBER
S111
21-237.10

Thornton Tomasetti
Thornton Tomasetti, Inc.
330 N. Wabash Avenue, Suite 1500
Chicago, IL 60611-7622
T:312.596.2000 F:312.596.2001

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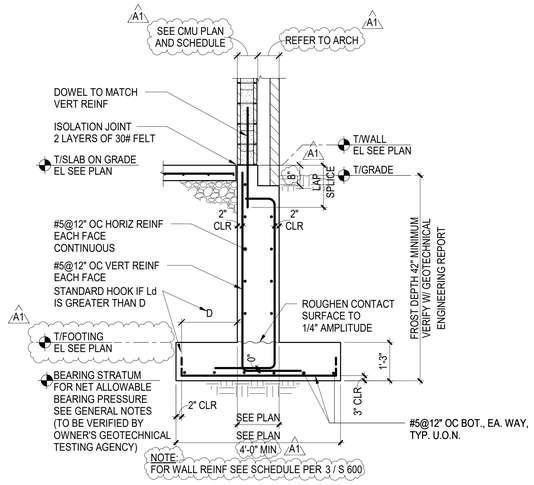
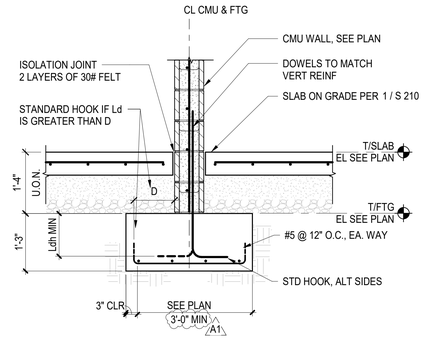
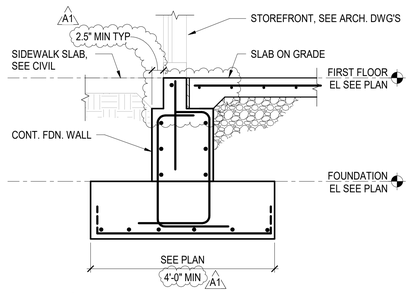


1 TYPICAL CONTINUOUS FOOTING AT FROST WALL
NOT TO SCALE



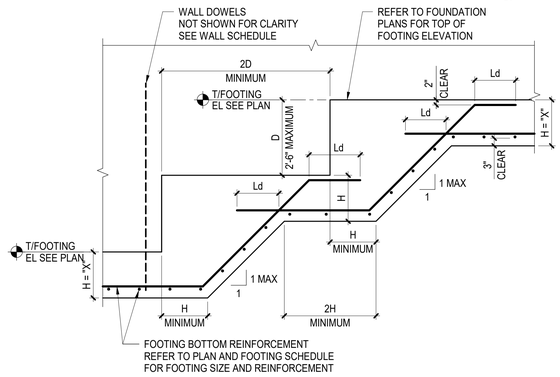
NOTE:
FOR WALL REINF SEE SCHEDULE PER 3 / S 600

2 INTERIOR CMU WALL FOOTING
3/4" = 1'-0"

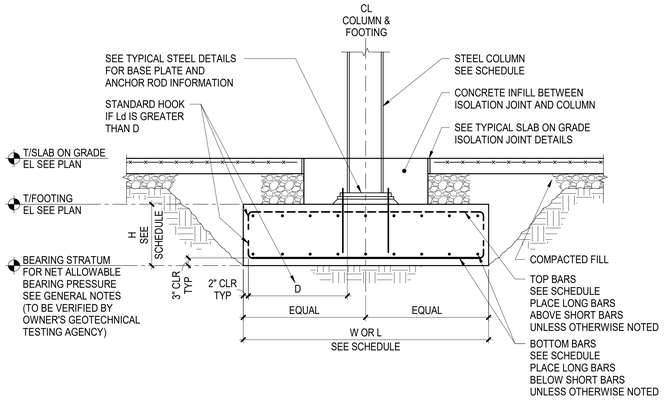


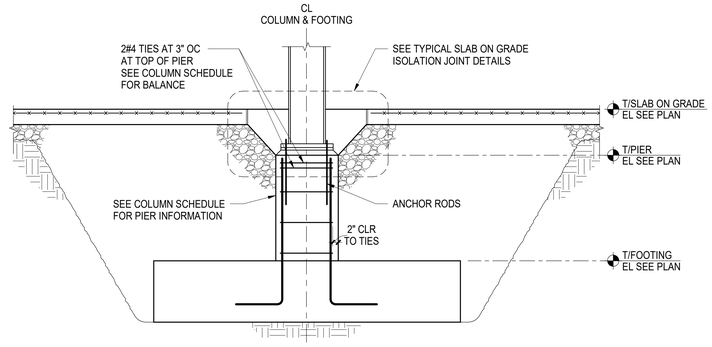
NOTE:
FOR REINFORCEMENT INFORMATION REFER TO 1 / S 200

3 STOREFRONT SECTION
3/4" = 1'-0"



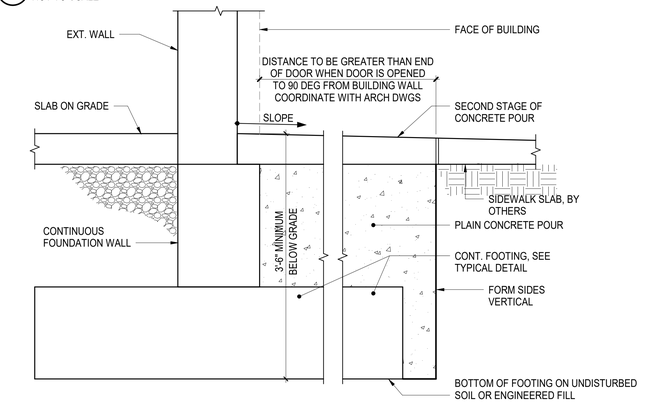
4 TYPICAL STEPPED WALL FOOTING DETAIL
NOT TO SCALE



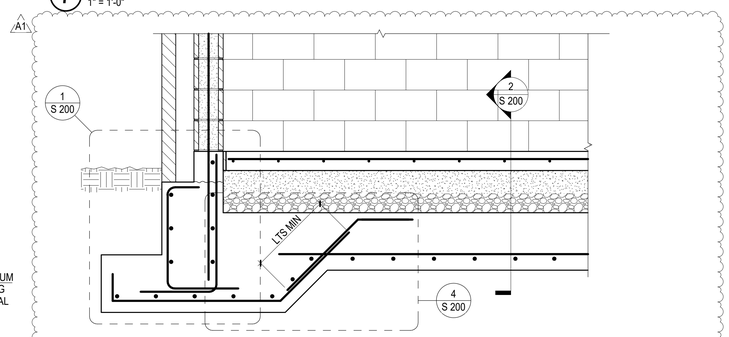


NOTES:

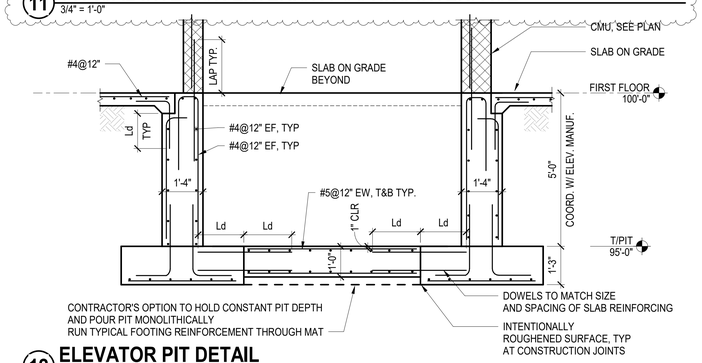
1. SEE TYPICAL ISOLATED FOOTING - BASE PLATE WITHIN CONCRETE INFILL DETAIL FOR ADDITIONAL INFORMATION.



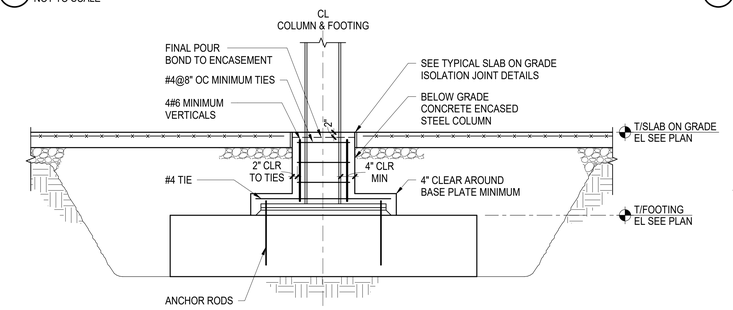
TYPICAL FROST PROTECTION AT EXTERIOR ENTRY WITH OUTSWING DOORS
1" = 1'-0"



11 TYPICAL INTERIOR/EXTERIOR FOOTING INTERFACE
3/4" = 1'-0"



12 ELEVATOR PIT DETAIL
1/2" = 1'-0"



NOTES:

1. SEE TYPICAL ISOLATED FOOTING - BASE PLATE WITHIN CONCRETE INFILL DETAIL FOR ADDITIONAL INFORMATION.

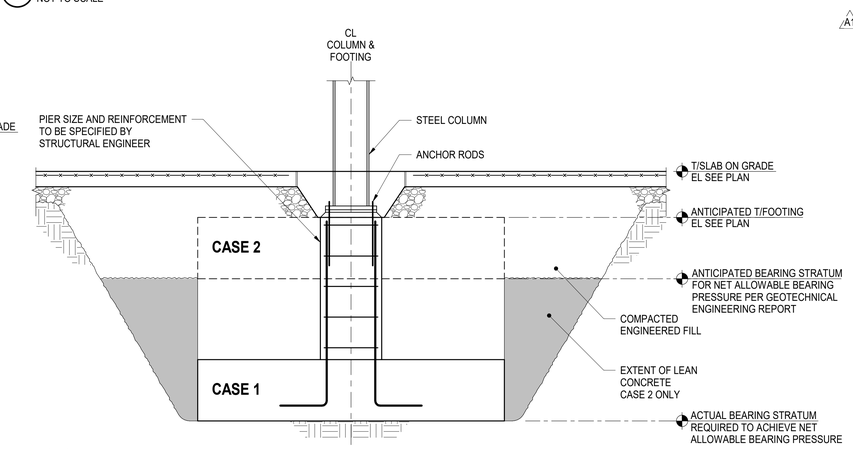
5 TYPICAL ISOLATED FOOTING - BASE PLATE WITHIN CONCRETE INFILL
NOT TO SCALE

8 TYPICAL ISOLATED FOOTING - CONCRETE ENCASED COLUMN AND BASE PLATE
NOT TO SCALE

ISOLATED FOOTING SCHEDULE — f'c = SEE GENERAL NOTES

MARK	SIZE			REINFORCEMENT		REMARKS
	L	W	H	BOTTOM BARS	TOP BARS	
F7	7'-0"	7'-0"	1'-6"	7#6 EA WAY	-	-
F9	9'-0"	9'-0"	1'-6"	9#6 EA WAY	-	-
F11	11'-0"	11'-0"	2'-0"	13#6 EA WAY	-	-

9 ISOLATED FOOTING SCHEDULE
NOT TO SCALE



NOTES:

1. THIS DETAIL SHALL NOT BE USED WITHOUT PRIOR WRITTEN APPROVAL FROM THE SER
2. THESE FOOTING INSTALLATION PROCEDURES ARE TO BE FOLLOWED IN THE EVENT THAT ANTICIPATED NET ALLOWABLE BEARING PRESSURE CANNOT BE OBTAINED AT THE ANTICIPATED STRATUM

   CASE 1:

   PLACE FOOTING AT ACTUAL BEARING STRATUM. INSTALL PIER TO ANTICIPATED TOP OF FOOTING ELEVATION

   CASE 2:

   AT CONTRACTOR'S OPTION, POUR LEAN CONCRETE (F'c=2000 PSI MINIMUM) TO THE ANTICIPATED BOTTOM OF FOOTING ELEVATION AND CAST FOOTING ON TOP OF LEAN CONCRETE
3. SEE TYPICAL ISOLATED FOOTING DETAILS FOR ADDITIONAL INFORMATION

10 TYPICAL FOOTING DETAIL WHERE OVER-EXCAVATION IS REQUIRED DUE TO UNANTICIPATED SOIL CONDITIONS - STEEL COLUMN
NOT TO SCALE

ADD. No.	DATE
1	JUN 5, 2023

ISSUED FOR

PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID PACKAGE 4: CONSTRUCTION

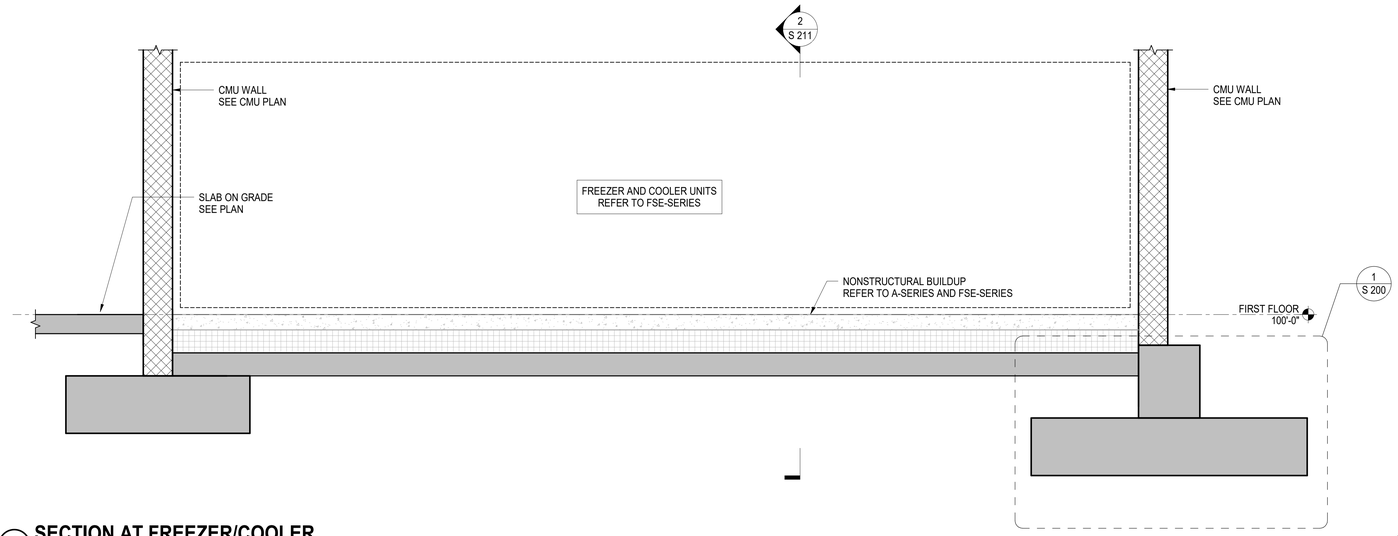
OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
TYPICAL FOOTING DETAILS

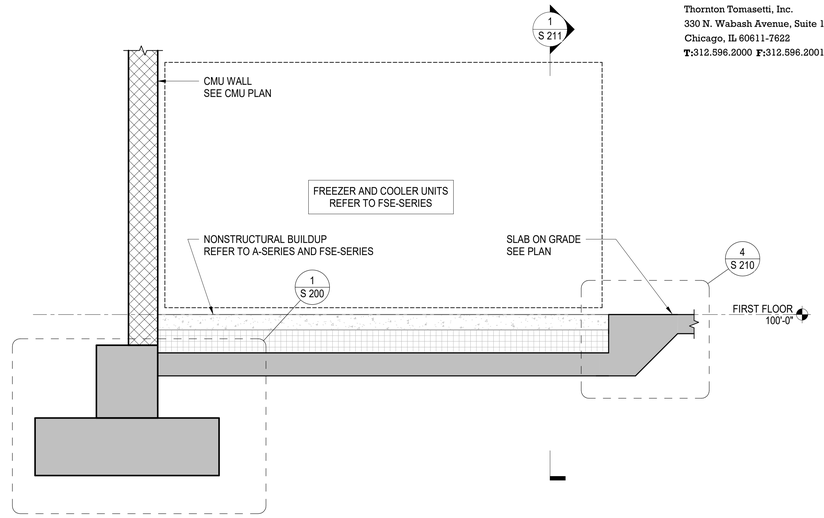
DATE
JUNE 5, 2023

SHEET NUMBER
S 200
21-237.10

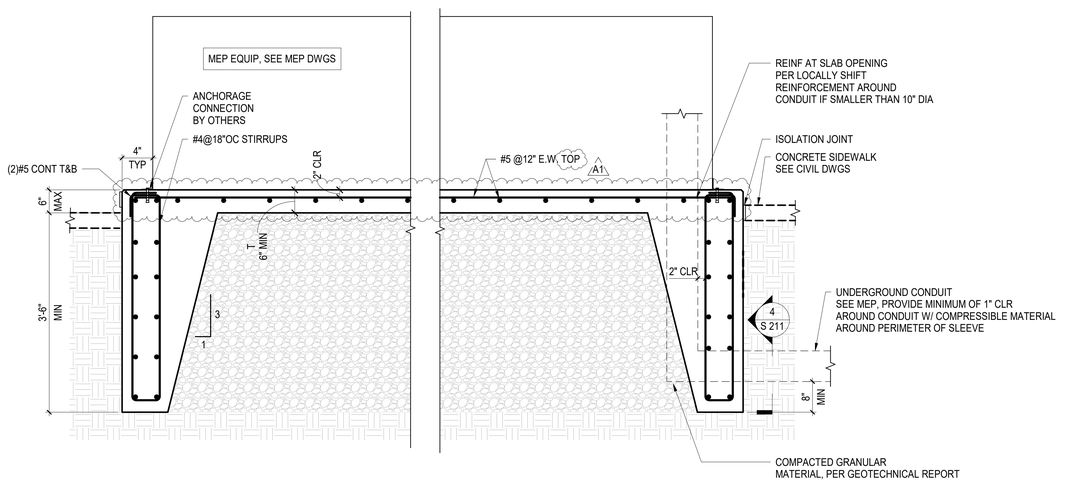
Thornton Tomasetti
Thornton Tomasetti, Inc.
330 N. Wabash Avenue, Suite 1500
Chicago, IL 60611-7622
T:312.596.2000 F:312.596.2001



1 SECTION AT FREEZER/COOLER
3/4" = 1'-0"



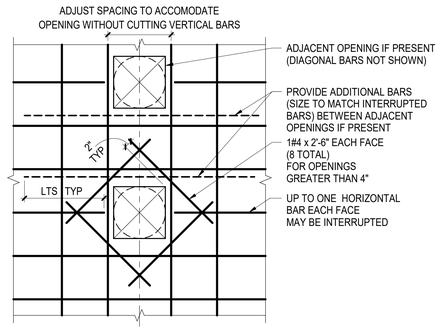
2 SECTION AT FREEZER/COOLER
3/4" = 1'-0"



NOTE:

6" SLAB THICKNESS IS A MINIMUM. AT GCs OPTION PAD MAY BE THICKENED, AS REQD. TO ACCOUNT FOR GRADE CHANGE WHILE MAINTAINING FLAT BOTTOM SURFACE.

3 GENERATOR PAD DETAIL
3/4" = 1'-0"



OPENING LESS THAN 10"

NOTES:

1. MINIMUM CLEAR DISTANCE BETWEEN OPENINGS IS 2 TIMES MAXIMUM OPENING SIZE
2. FOR OPENINGS NOT SHOWN ON STRUCTURAL DRAWINGS, CONTRACTOR TO SUBMIT LOCATIONS AND SPACING TO STRUCTURAL ENGINEER FOR WRITTEN APPROVAL

4 TYPICAL WALL OPENING DETAILS
NOT TO SCALE

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PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

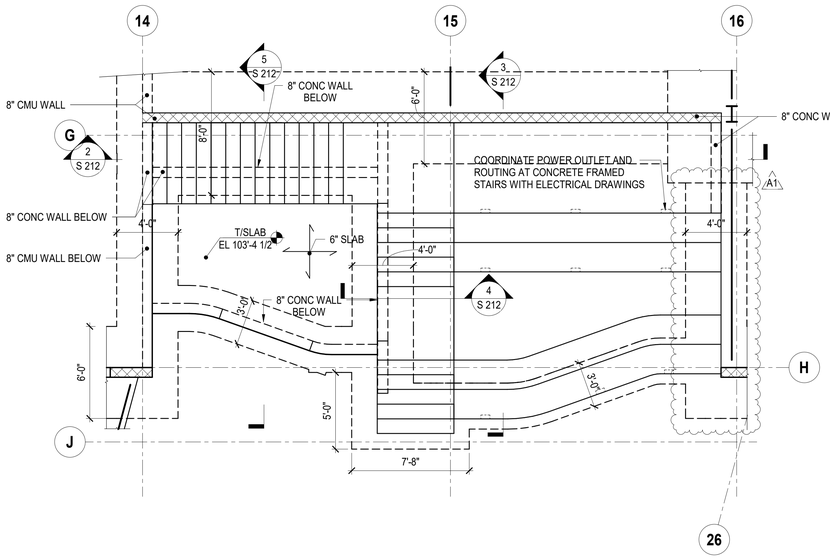
OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

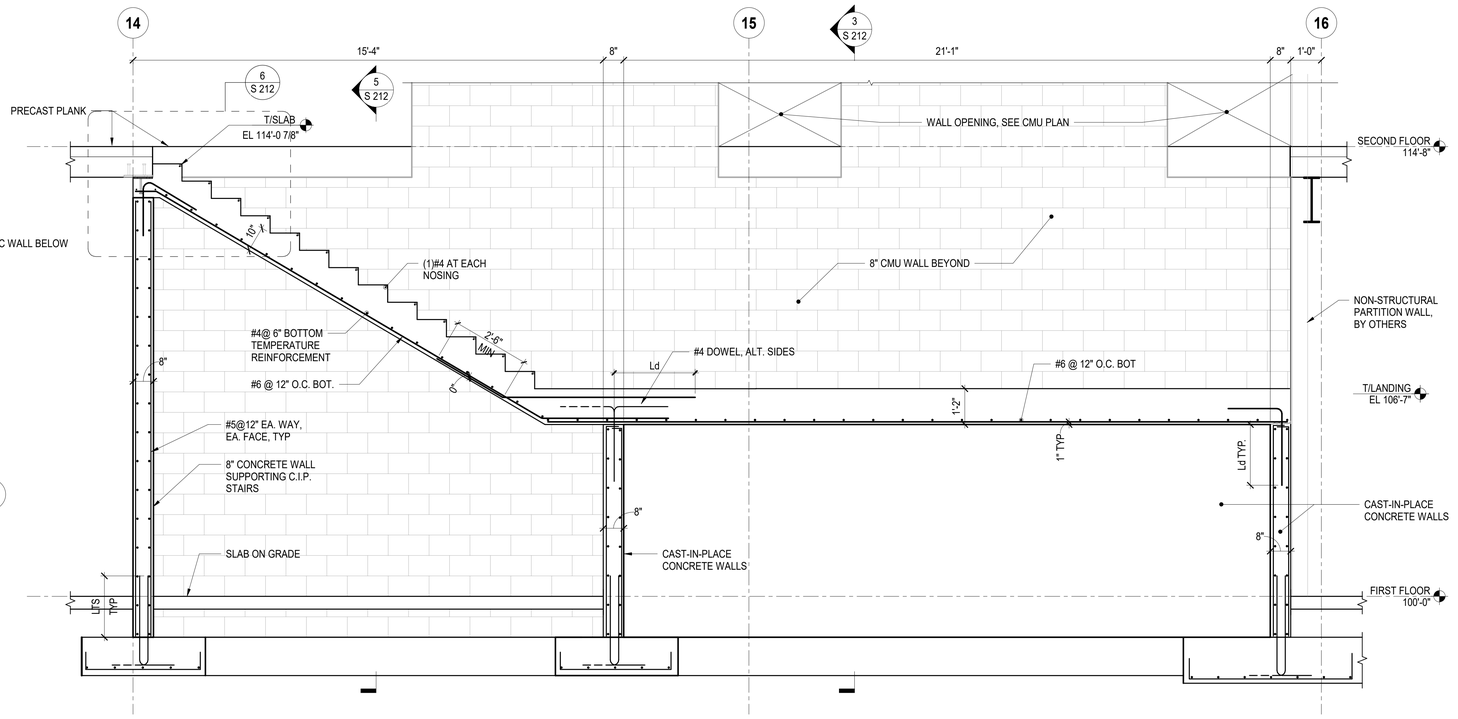
SHEET TITLE
SLAB ON GRADE DETAILS

DATE
JUNE 5, 2023

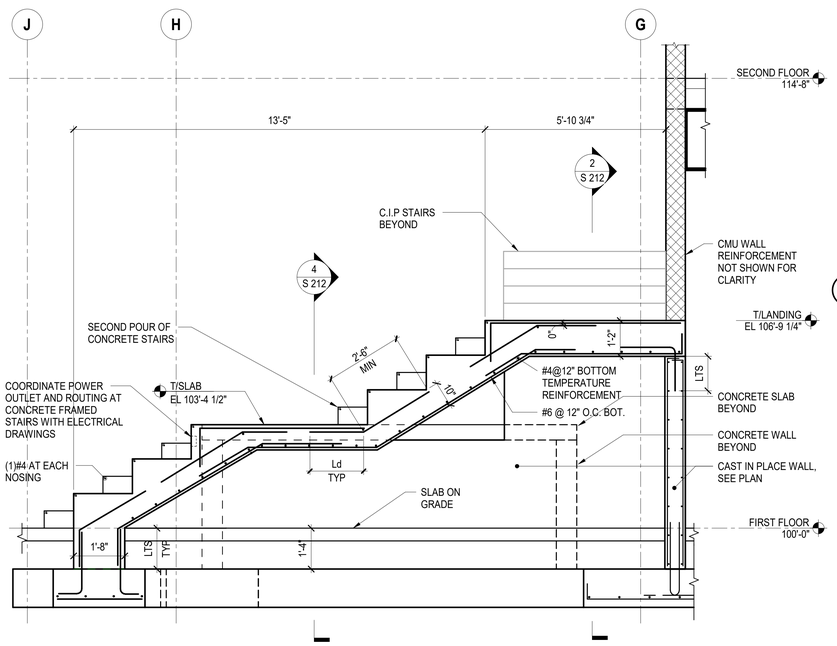
SHEET NUMBER
S 211
21-237.10

Thornton Tomasetti
Thornton Tomasetti, Inc.
330 N. Wabash Avenue, Suite 1500
Chicago, IL 60611-7622
T:312.596.2000 F:312.596.2001

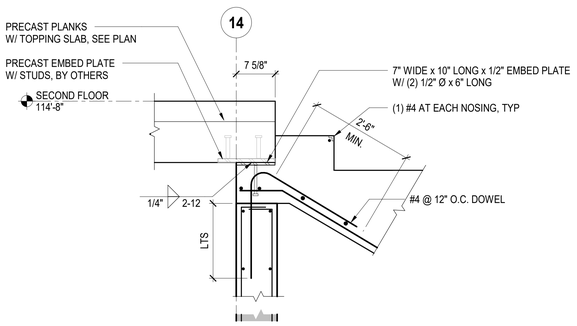




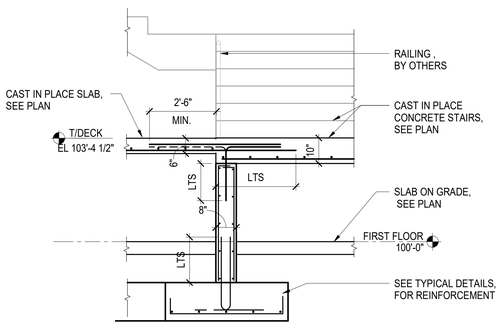
1 GATHERING STAIR PARTIAL PLAN
1/4" = 1'-0"



2 GATHERING STAIR SECTION
1/2" = 1'-0"

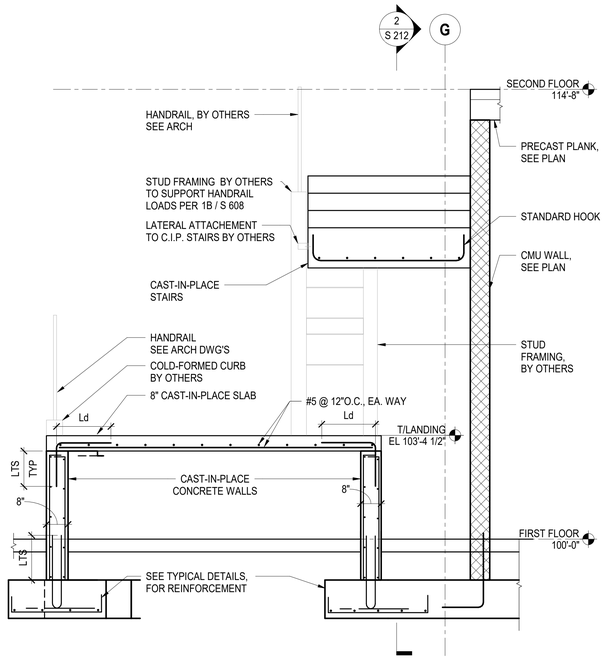


6 STAIRS BEARING AT CMU WALL
1" = 1'-0"



3 GATHERING STAIR SECTION
1/2" = 1'-0"

4 GATHERING STAIR SECTION
1/2" = 1'-0"



5 GATHERING STAIR SECTION
1/2" = 1'-0"

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PROJECT TITLE
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PACKAGE 4: CONSTRUCTION

OWNER
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Portage, Michigan

SHEET TITLE
GATHERING STAIR PARTIAL PLAN,
SECTIONS, AND SCHEDULE

DATE
JUNE 5, 2023

SHEET NUMBER
S212
21-237.10

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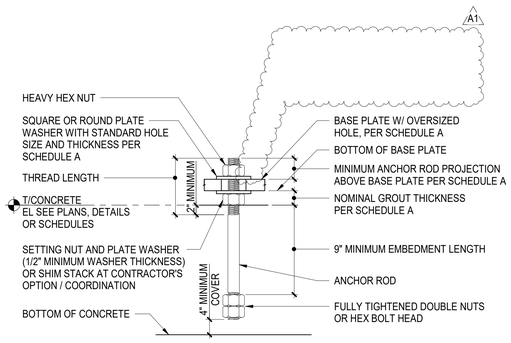
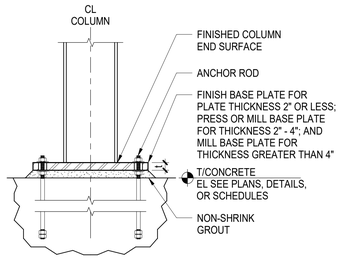
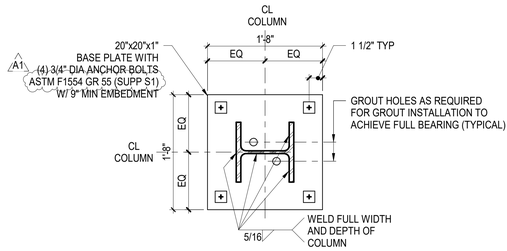
Thornton Tomasetti, Inc.
330 N. Wabash Avenue, Suite 1500
Chicago, IL 60611-7622
T:312.596.2000 F:312.596.2001

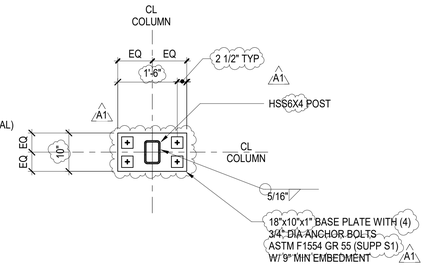




A **ELEVATION**



B **W12 PLAN**
WITH SQUARE ANCHOR ROD PATTERN OUTSIDE COLUMN



C **HSS POST PLAN**

SCHEDULE A					
ANCHOR ROD DIAMETER	BASE PL HOLE DIA	MIN WASHER SIZE	MIN WASHER t	MIN PROJ ABOVE BASE PL	NOMINAL GROUT THICKNESS
3/4"	1-5/16"	2"	1/4"	3"	2"

NOTES:

1. BASE PLATE THICKNESS SHOWN IS A MINIMUM. DIMENSION AFTER ALL MILLING IS COMPLETED
2. COLUMN STABILITY DURING ERECTION IS RESPONSIBILITY OF CONTRACTOR
3. SEE ANCHOR ROD SCHEDULE AND TYPICAL ANCHOR ROD DETAIL FOR ADDITIONAL INFORMATION
4. ANCHOR ROD CONFIGURATION IS TO USE SQUARE PATTERN OUTSIDE COLUMN. IF SPECIFIED BASE PLATE SIZE DOES NOT PERMIT OUTSIDE PLACEMENT USE SQUARE PATTERN INSIDE COLUMN. USE RECTANGULAR ANCHOR ROD CONFIGURATION WHERE NOTED

1 TYPICAL ANCHOR ROD DETAIL
NOT TO SCALE

2 TYPICAL BASE PLATE DETAIL
NOT TO SCALE

REFER TO INTERIOR COLUMNS FOR INFORMATION NOT SHOWN

3 INFILL, SLAB SUPPORT, AND LATERAL BRACING AT COLUMNS
3/4" = 1'-0"

4 LINTELS AT CORNER SUPPORTED BY TUBE POST
1 1/2" = 1'-0"

5 SILL AT CORNER WITH TUBE POST
1 1/2" = 1'-0"

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PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

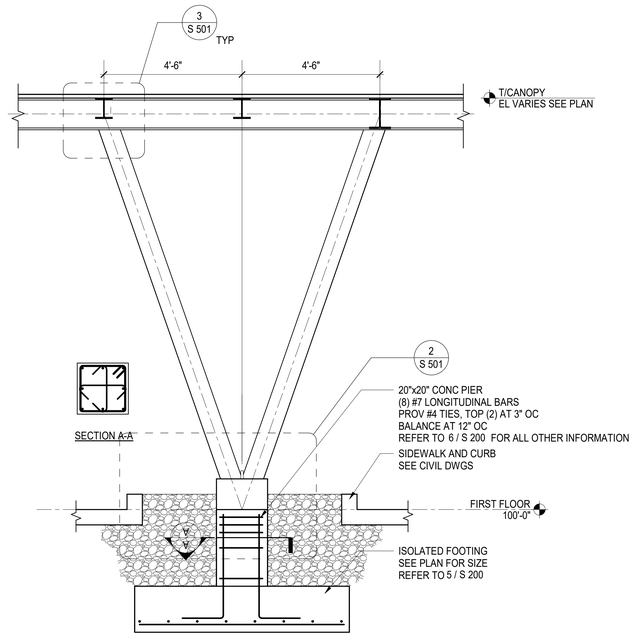
OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
TYPICAL STEEL COLUMN DETAILS

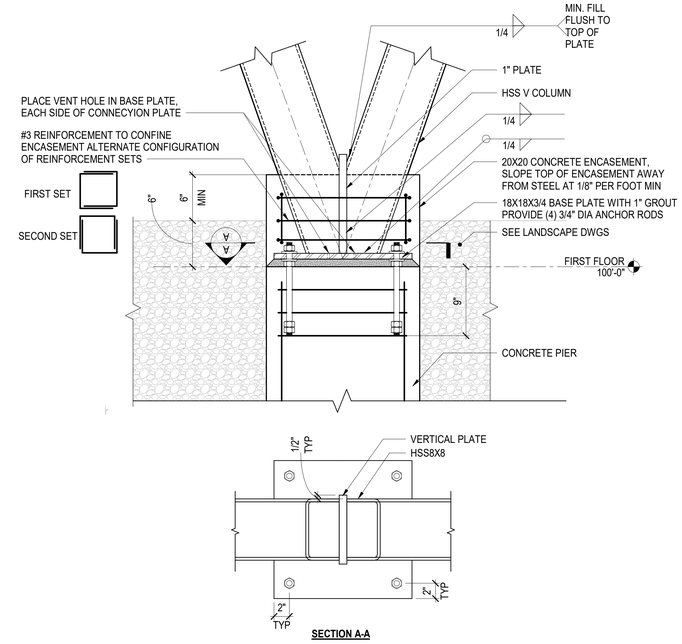
DATE
JUNE 5, 2023

SHEET NUMBER
S 500
21-237.10

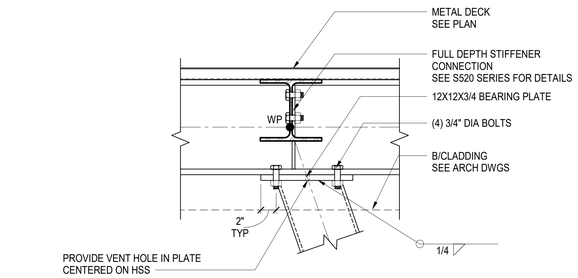
Thornton Tomasetti
Thornton Tomasetti, Inc.
330 N. Wabash Avenue, Suite 1500
Chicago, IL 60611-7622
T:312.596.2000 F:312.596.2001



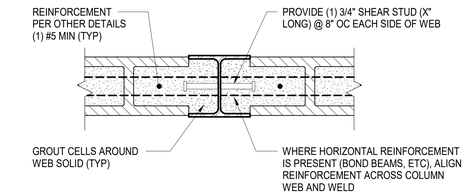
1 V-COLUMN AT CANOPY
1/2" = 1'-0"



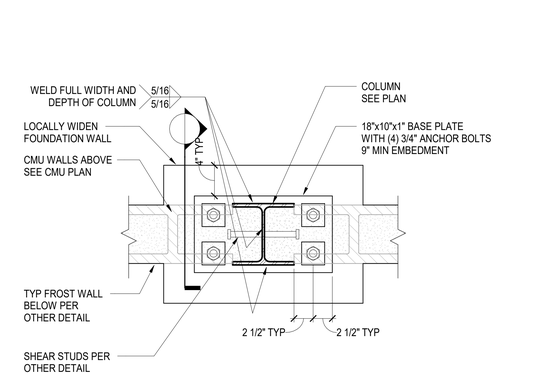
2 DETAIL AT V COLUMN BASE
1 1/2" = 1'-0"



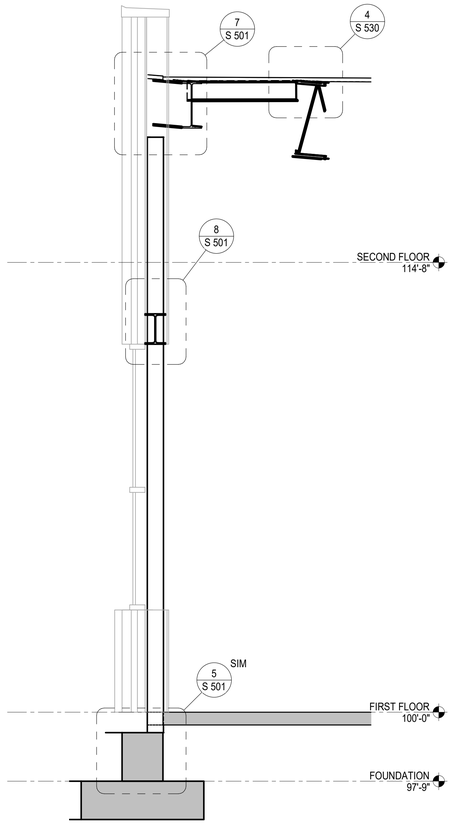
3 DETAIL AT TOP OF V COLUMN
1 1/2" = 1'-0"



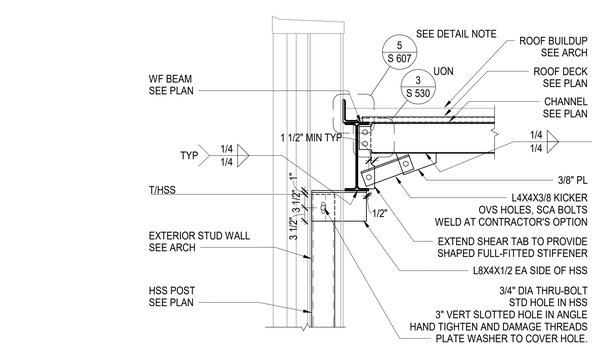
4 REINFORCING COLUMN EMBEDDED IN CMU WALL
1 1/2" = 1'-0"



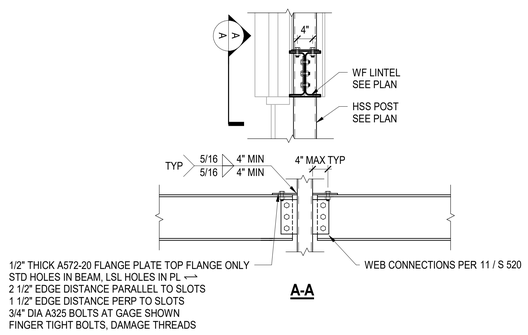
5 BASE OF EMBEDDED REINFORCING COLUMN
1 1/2" = 1'-0"



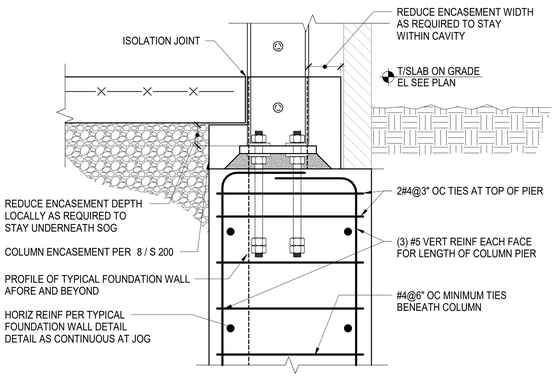
6 SECTION AT HSS COLUMN AT KINKED WINDOW
1/2" = 1'-0"



7 DETAIL AT HSS POST LATERAL BRACING
3/4" = 1'-0"



8 FLANGE PLATES AT LINTELS AT KINKED WINDOW
3/4" = 1'-0"



9 DETAIL AT SLAB ON GRADE
1 1/2" = 1'-0"

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OWNER
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Portage, Michigan

SHEET TITLE
STEEL COLUMN DETAILS

DATE
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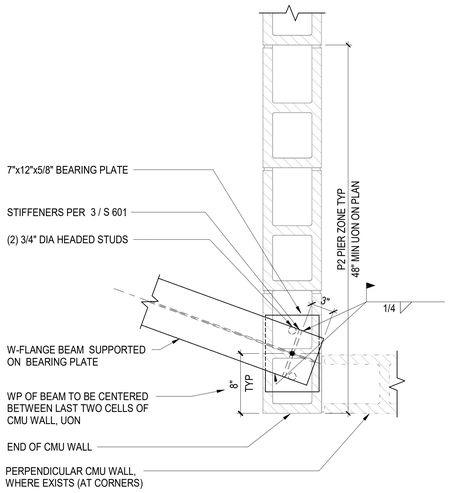
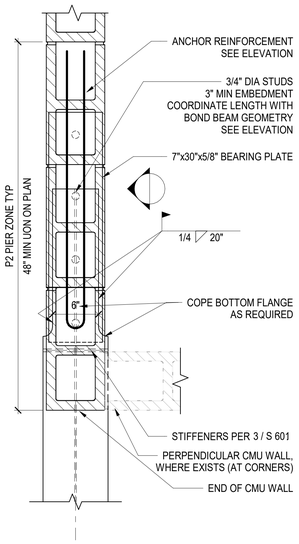
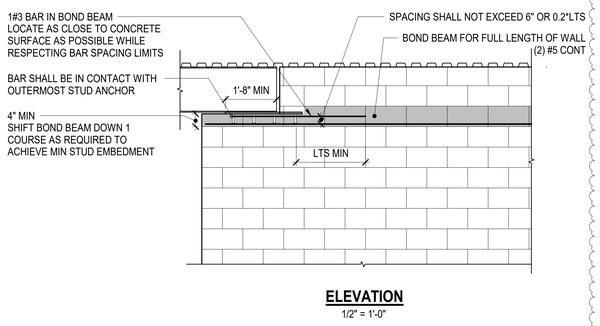
SHEET NUMBER
S 501
21-237.10



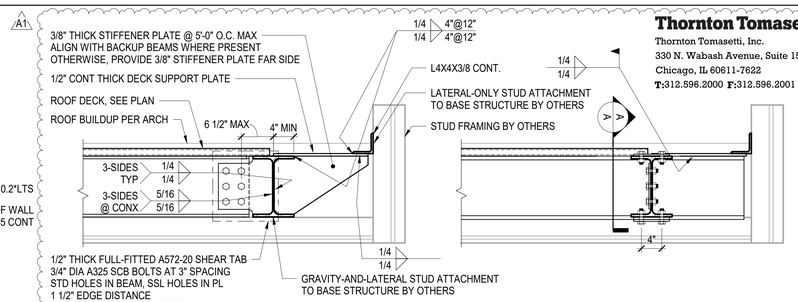
1 STEEL BEAM SUPPORTED BY END/CORNER OF CMU WALL
1 1/2" = 1'-0"





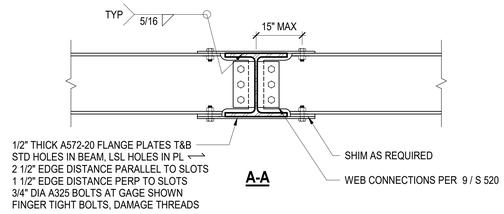
ELEVATION
1/2" = 1'-0"

2 STEEL DRAG STRUT CONNECTION TO CMU WALL
1 1/2" = 1'-0"



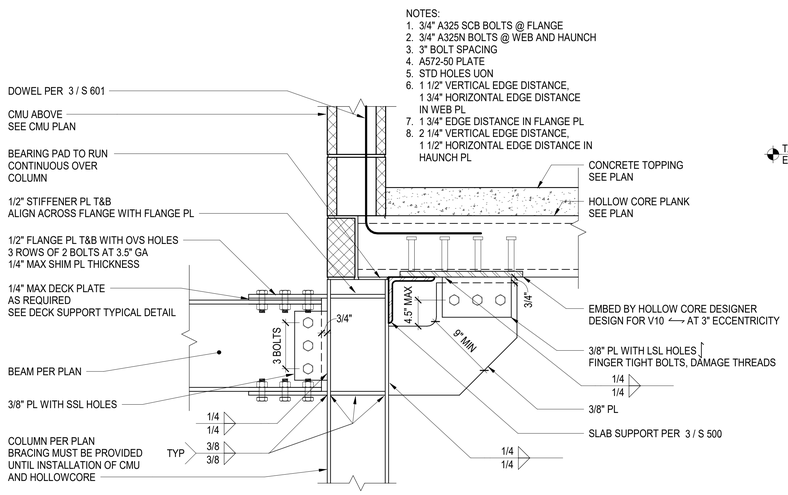
TYPICAL CONDITION

CANTILEVER CONDITION
REFER TO "TYPICAL CONDITION" FOR INFORMATION NOT SHOWN

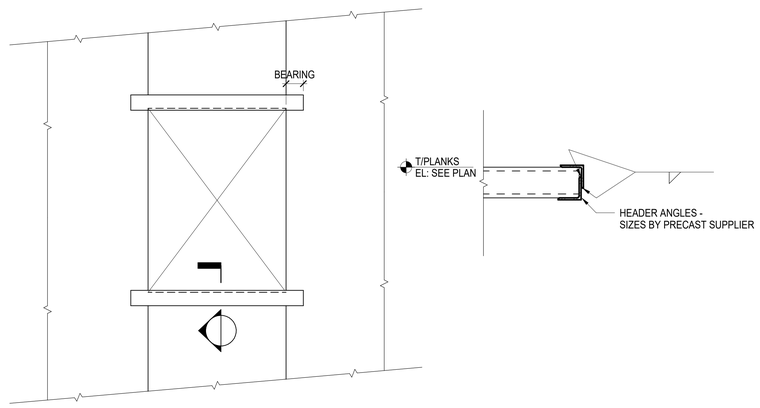


A-A

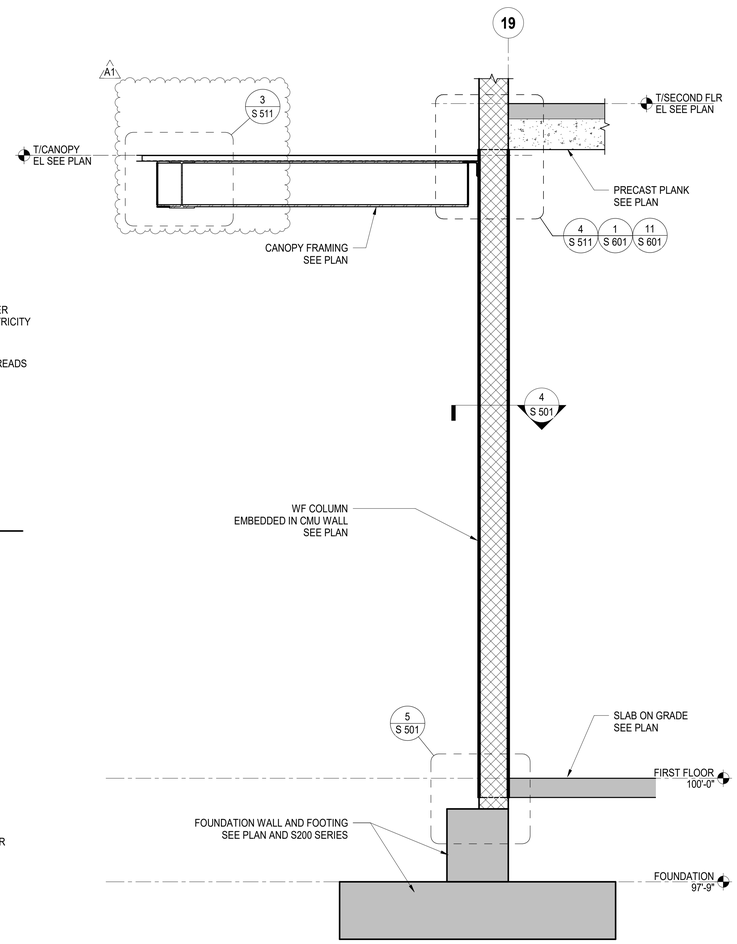
3 SECTION AT CANOPY SPANDREL BACKUP BEAMS AND EDGE SUPPORT
1" = 1'-0"



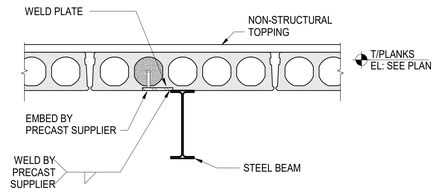
4 CANOPY STUB MOMENT CONNECTION TO EMBEDDED COLUMN
1 1/2" = 1'-0"



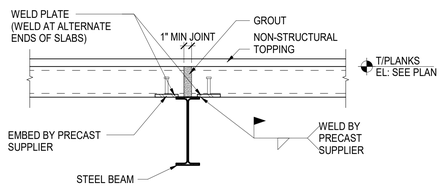
5 HOLLOW CORE HEADER AT OPENING
3/4" = 1'-0"



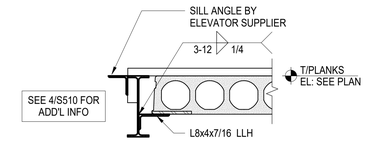
6 CANOPY SECTION
3/4" = 1'-0"



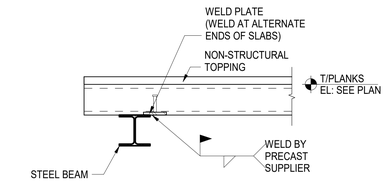
7 TYPICAL PLANK BEARING ON BEAM DETAIL, SPAN PARALLEL
3/4" = 1'-0"



8 TYPICAL PLANK BEARING ON BEAM DETAIL, SPAN PERPENDICULAR
3/4" = 1'-0"



9 ELEVATOR SILL DETAIL
3/4" = 1'-0"



10 TYPICAL PLANK BEARING ON EDGE BEAM DETAIL
3/4" = 1'-0"

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Thornton Tomasetti
Thornton Tomasetti, Inc.
330 N. Wabash Avenue, Suite 1500
Chicago, IL 60611-7622
T:312.596.2000 F:312.596.2001

ISSUED FOR	DATE
ADD. No. 1	JUN 5, 2023

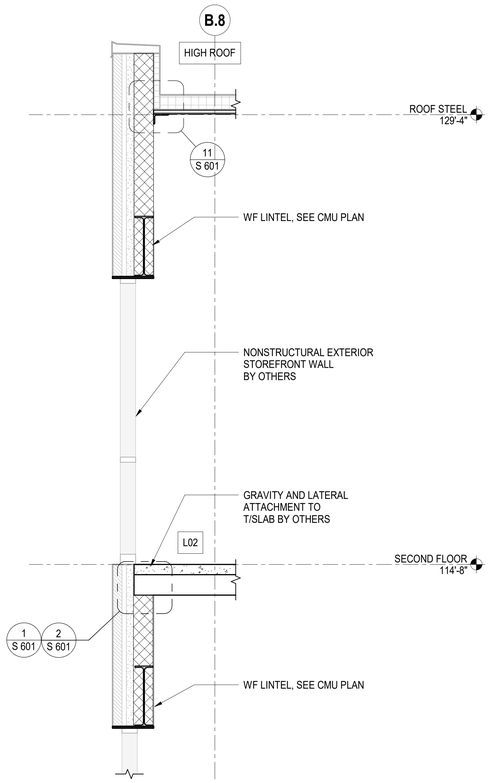
PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

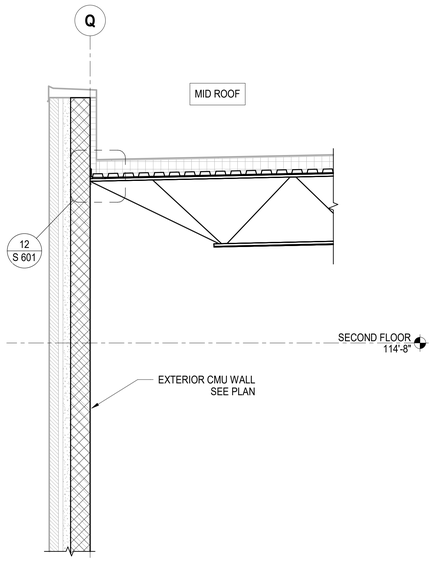
SHEET TITLE
STEEL BEAM DETAILS

DATE
JUNE 5, 2023

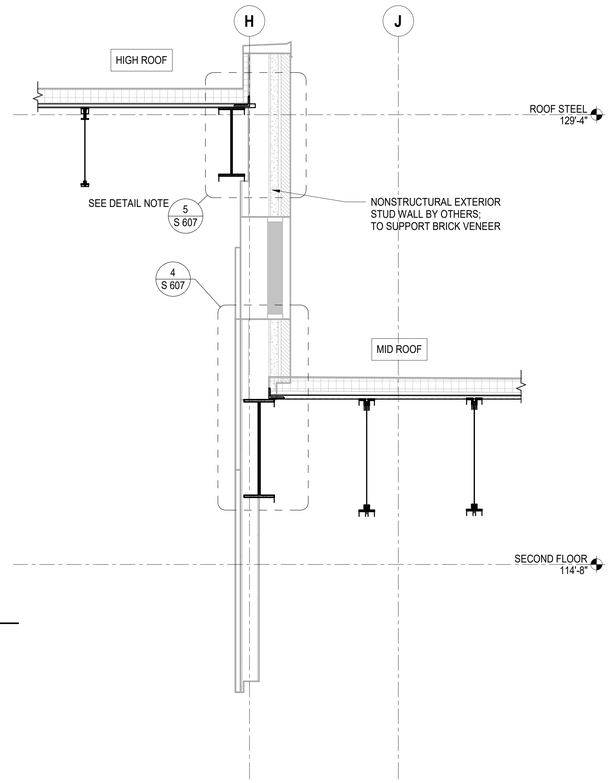
SHEET NUMBER
S 511
21-237.10



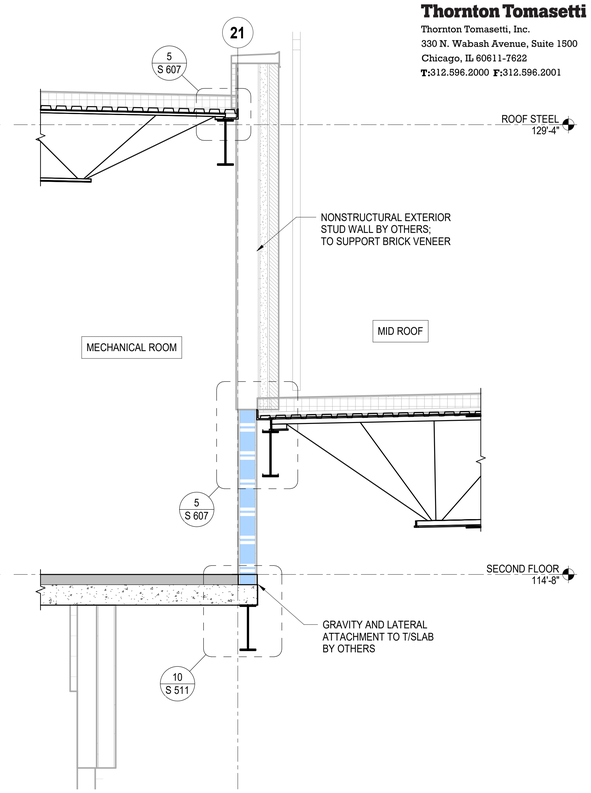
1 TYP EXT STOREFRONT AT HIGH ROOF AND L02
1/2" = 1'-0"



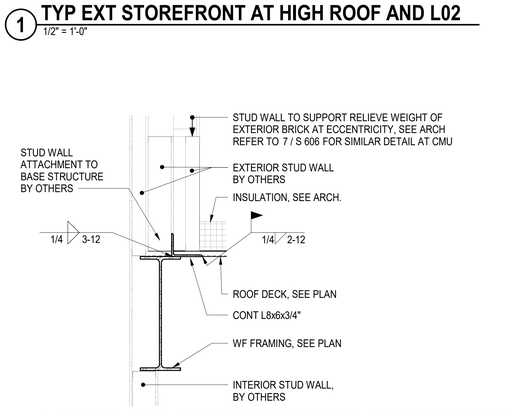
2 TYP EXT WALL AT MID ROOF
1/2" = 1'-0"



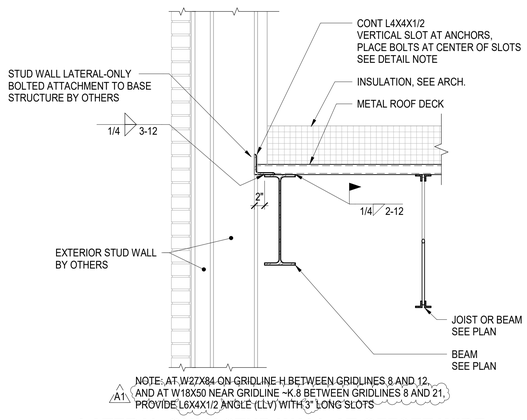
3 TYP EXT STUD WALL AT HIGH / MID ROOF INTERFACE
1/2" = 1'-0"



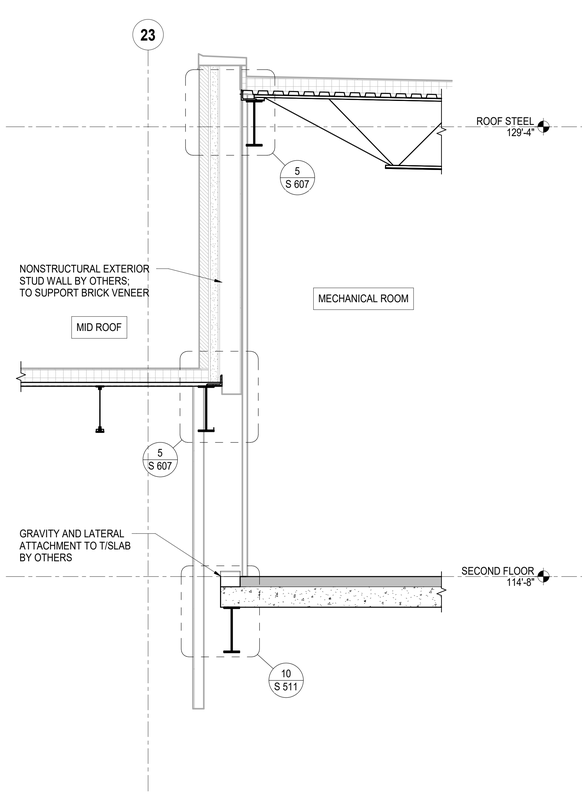
TYPICAL CONDITION



4 LATERAL-AND-GRAVITY STUD WALL BASE AT ROOF
3/4" = 1'-0"



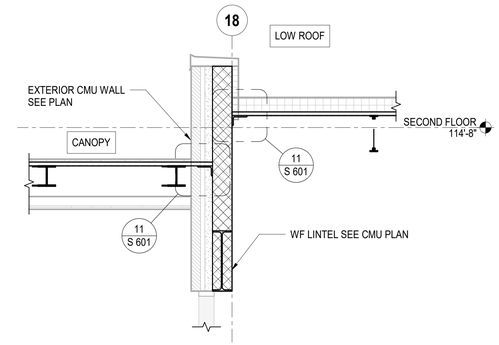
5 LATERAL-ONLY STUD WALL AT OFFSET WIDE FLANGE AT ROOF
NOT TO SCALE



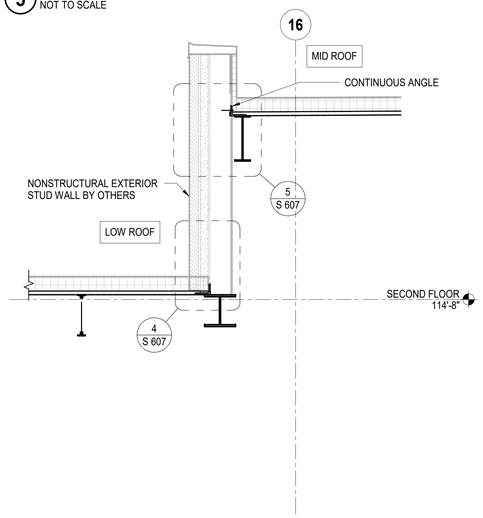
AT SERVERY

REFER TO "TYPICAL CONDITION" FOR INFORMATION NOT SHOWN

9 EXT STUD WALL AT MECH ROOM / MID ROOF INTERFACE
1/2" = 1'-0"



6 EXT STUD WALL AT LOW ROOF / CANOPY INTERFACE
1/2" = 1'-0"



7 EXT STUD WALL AT MID / LOW ROOF INTERFACE
1/2" = 1'-0"

8 EXT STUD WALL AT MECH ROOM / MID ROOF E INTERFACE
1/2" = 1'-0"

Thornton Tomasetti
Thornton Tomasetti, Inc.
330 N. Wabash Avenue, Suite 1500
Chicago, IL 60611-7622
T:312.596.2000 F:312.596.2001

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ISSUED FOR	DATE
ADD. No. 1	JUN 5, 2023

PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
EXTERIOR WALL SECTIONS

DATE
JUNE 5, 2023

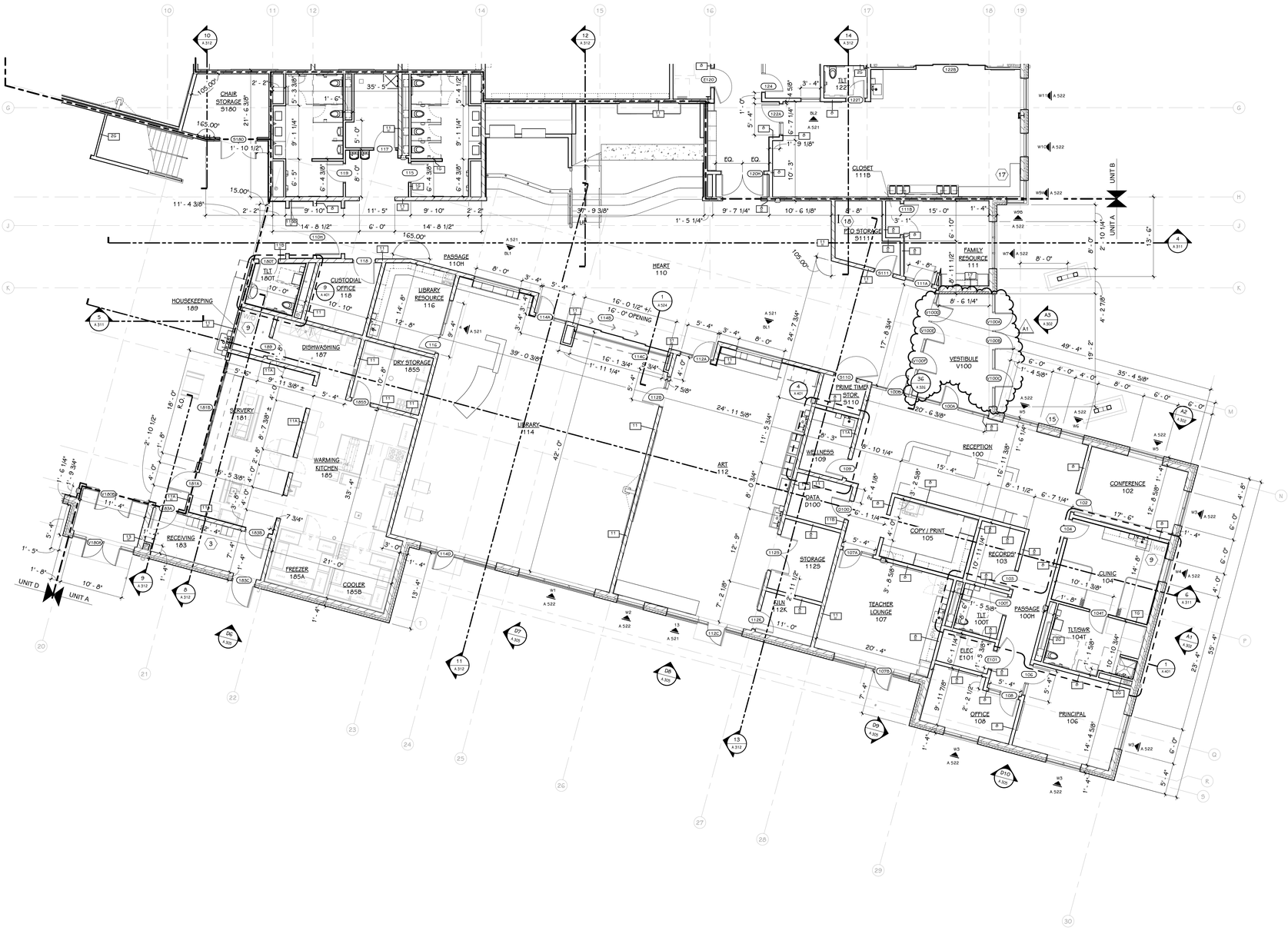
SHEET NUMBER
S 607
21-237.10

GENERAL NOTES

1. REFER TO CODE COMPLIANCE PLAN FOR WALL RATING LINES.
2. REFER TO FLOOR FINISH PLANS FOR INTERIOR ELEVATION CALLOUTS.
3. PROVIDE CEILING AND WALL ACCESS PANELS AS REQ'D. FOR MECH. AND PLUMBING, COORD WITH MECH/ELEC. AND WITH ARCHITECT. PAINT TO MATCH ADJACENT SURFACE.
4. PROVIDE EXPANSION JOINTS IN WALLS, FLOOR AND CEILING WHERE APPLICABLE, COORDINATE WITH INTERIOR FINISHES.

KEYED NOTES - NEW CONSTRUCTION

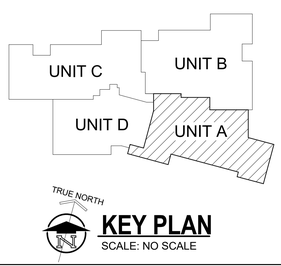
1 LOCKABLE CAB. FOR ELEV. DISCONNECT, PROVIDE BLOCKING SUPPORT FOR DISCONNECT, COORD. WITH ELECT.
2 ELEV. FIRE ALARM DISCONNECT TO BE LOCATED ABOVE CEILING, COORD. WITH ELECT. AND ELEV. MANUF.
3 (8) 12"x18"x60" SINGLE TIER METAL LOCKERS
4 SOUND STUD WALL - MAINTAIN SEPARATION FROM CMU WALL CONSTRUCTION, MUST NOT ATTACH TO CMU
5 2" DUCT LINER, FLOOR TO ROOF DECK
6 PROVIDE 4"x4" CONCRETE CURB AROUND OPENINGS THROUGH FLOOR, COORDINATE LOCATIONS WITH MECHANICAL
7 PROVIDE 4"H CONCRETE HOUSEKEEPING PAD WHERE REQUIRED BY MECH., COORD. LOCATION AND FOOTPRINT WITH MECH.
8 4"H CONCRETE CURB AT FLOOR UNDER CMU WALL, CONTINOUS THROUGH DOOR OPENING, REFER TO STRUCT.
9 STACKABLE WASHER/DRYER, OWNER FURNISHED, CONTRACTOR INSTALLED, COORD. UTILITIES WITH MECH/ELECT.
10 VOLLEYBALL SLEEVE, COORD. WITH VOLLEYBALL MANUF.
11 BB-1 - BACKWARD SWING OVERHEAD-SUPPORTED BACKSTOP (MOTORIZED)
12 BB-2 - WALL MOUNTED BACKSTOP
13 SAFETY PADS - 2'x6", MOUNT 12" A.F.F., CENTER ON BASKETBALL HOOP
14 CLIMBING WALL WITH MAT SYSTEM
15 KNOX BOX, RECESSED, 60" A.F.F. - COORDINATE LOCATION WITH AHJ, COLOR TO COORD. WITH ADJACENT DOOR/WINDOW FRAMING
16 KNOX BOX MINI ELEVATOR KEY BOX, ALUM. COORD. LOCATION WITH AHJ
17 PROVIDE METAL TRIM AT EXPOSED CORNER COLUMN, 1/A101B
18 SPACE RESERVED UNDER ROOF OVERHANG
19 AWP-10: SOUND ABSORBING PERFORATED METAL WALL PANEL, CONT. INSIDE PERIMETER OF CONDENSER SCREEN WALL, MOUNT 2" A.F.F. TO 7'-8" A.F.F.



FIRST FLOOR PLAN - UNIT A
1/8" = 1'-0"

ADD. No. 1	JUN 5, 2023
ISSUED FOR	DATE

CENTRAL ELEMENTARY



KEY PLAN
SCALE: NO SCALE

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PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS

Portage, Michigan

SHEET TITLE
FIRST FLOOR PLAN - UNIT A

DATE
MAY 17, 2023

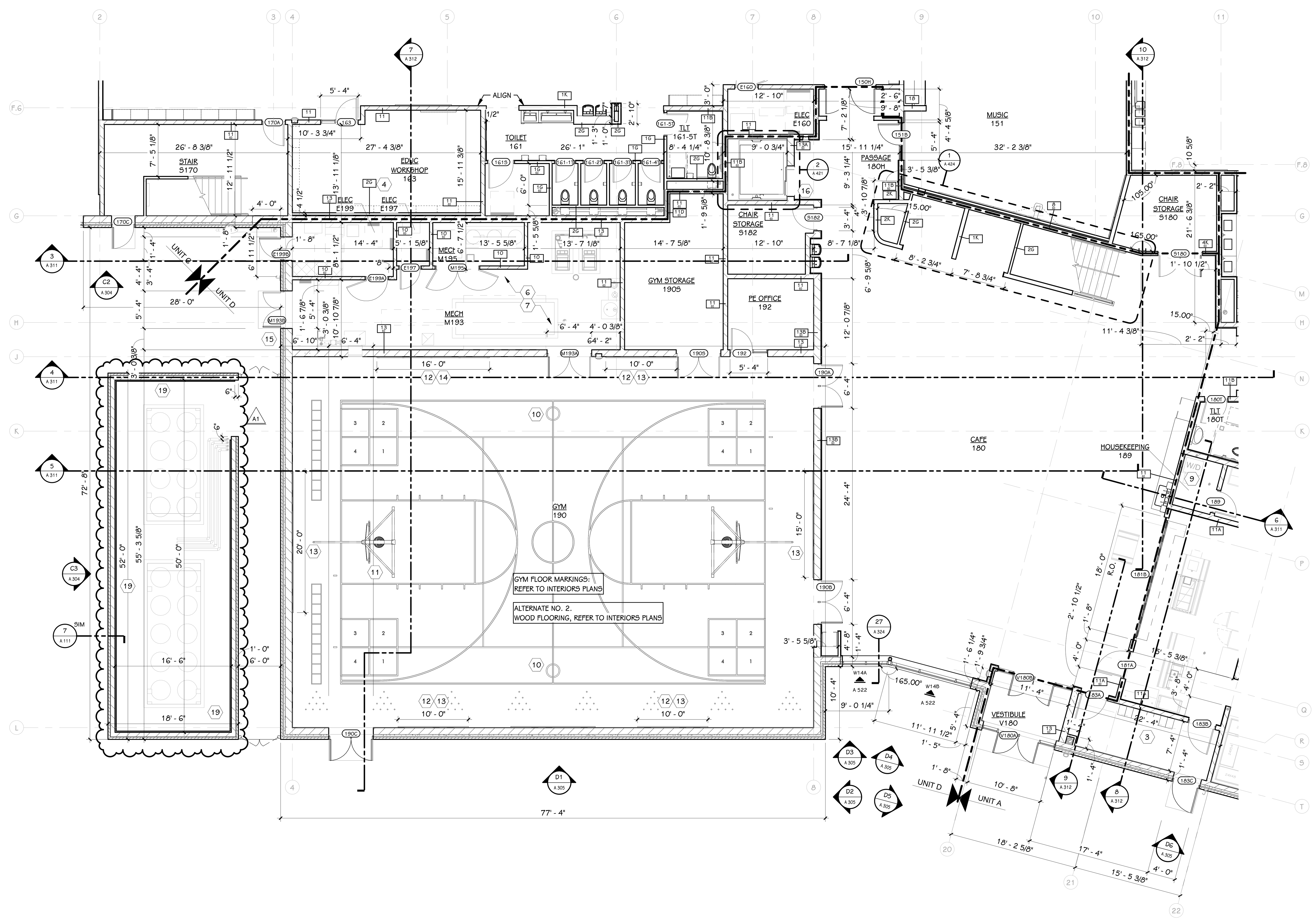
SHEET NUMBER
A101A
21-237.10

GENERAL NOTES

1. REFER TO CODE COMPLIANCE PLAN FOR WALL RATING LINES.
2. REFER TO FLOOR FINISH PLANS FOR INTERIOR ELEVATION CALLOUTS.
3. PROVIDE CEILING AND WALL ACCESS PANELS AS REQ'D. FOR MECH. AND PLUMBING, COORD WITH MECH/ELEC. AND WITH ARCHITECT. PAINT TO MATCH ADJACENT SURFACE.
4. PROVIDE EXPANSION JOINTS IN WALLS, FLOOR AND CEILING WHERE APPLICABLE, COORDINATE WITH INTERIOR FINISHES.

KEYED NOTES - NEW CONSTRUCTION

1 LOCKABLE CAB. FOR ELEV. DISCONNECT, PROVIDE BLOCKING SUPPORT FOR DISCONNECT, COORD. WITH ELECT.
2 ELEV. FIRE ALARM DISCONNECT TO BE LOCATED ABOVE CEILING, COORD. WITH ELECT. AND ELEV. MANUF.
3 (8) 12"x18"x60" SINGLE TIER METAL LOCKERS
4 SOUND STUD WALL - MAINTAIN SEPARATION FROM CMU WALL CONSTRUCTION, MUST NOT ATTACH TO CMU
5 2" DUCT LINER, FLOOR TO ROOF DECK
6 PROVIDE 4"x4" CONCRETE CURB AROUND OPENINGS THROUGH FLOOR, COORDINATE LOCATIONS WITH MECHANICAL
7 PROVIDE 4"H CONCRETE HOUSEKEEPING PAD WHERE REQUIRED BY MECH., COORD. LOCATION AND FOOTPRINT WITH MECH.
8 4"H CONCRETE CURB AT FLOOR UNDER CMU WALL, CONTINOUS THROUGH DOOR OPENING, REFER TO STRUCT.
9 STACKABLE WASHER/DRYER, OWNER FURNISHED, CONTRACTOR INSTALLED, COORD. UTILITIES WITH MECH/ELECT.
10 VOLLEYBALL SLEEVE, COORD. WITH VOLLEYBALL MANUF.
11 BB-1 - BACKWARD SWING OVERHEAD-SUPPORTED BACKSTOP (MOTORIZED)
12 BB-2 - WALL MOUNTED BACKSTOP
13 SAFETY PADS - 2'x6", MOUNT 12" A.F.F., CENTER ON BASKETBALL HOOP
14 CLIMBING WALL WITH MAT SYSTEM
15 KNOX BOX, RECESSED, 60" A.F.F. - COORDINATE LOCATION WITH AHJ, COLOR TO COORD. WITH ADJACENT DOOR/WINDOW FRAMING
16 KNOX BOX MINI ELEVATOR KEY BOX, ALUM. COORD. LOCATION WITH AHJ
17 PROVIDE METAL TRIM AT EXPOSED CORNER COLUMN, 1/A101B
18 ROOF ACCESS LADDER, REFER TO DETAIL ON A103
A1
19 AWP-10: SOUND ABSORBING PERFORATED METALL WALL PANEL, CONT. INSIDE PERIMETER OF CONDENSER SCREEN WALL, MOUNT 2" A.F.F. TO 7'-8" A.F.F.



FIRST FLOOR PLAN - UNIT D
1/8" = 1'-0"

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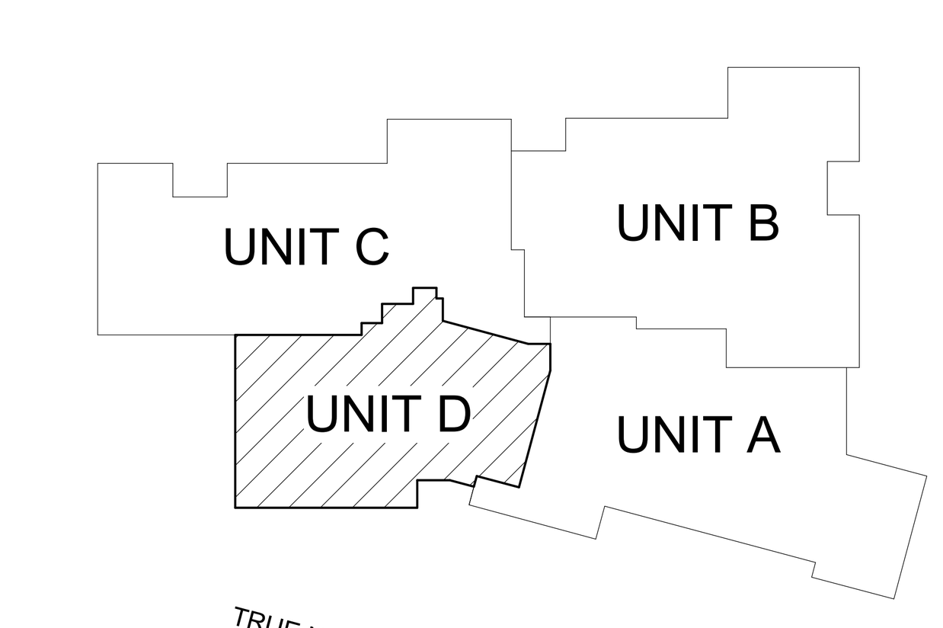
ADD. No. 1 JUN 5, 2023

ISSUED FOR DATE

PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

CENTRAL ELEMENTARY

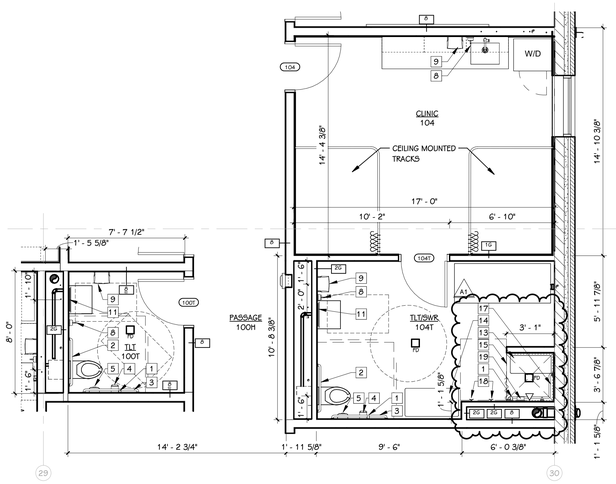


KEY PLAN
SCALE: NO SCALE

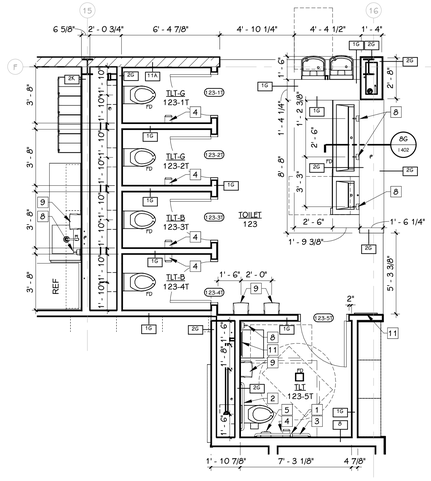
SHEET TITLE
FIRST FLOOR PLAN - UNIT D

DATE
MAY 17, 2023

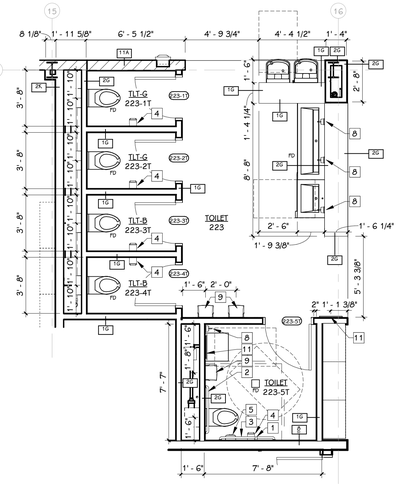
SHEET NUMBER
A 101D
21-237.10



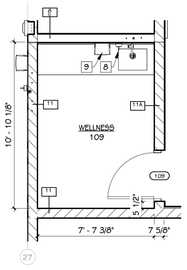
1 A.401 ENLARGED PLAN
1/4" = 1'-0"



2 A.401 ENLARGED PLAN
1/4" = 1'-0"



3 A.401 ENLARGED PLAN
1/4" = 1'-0"



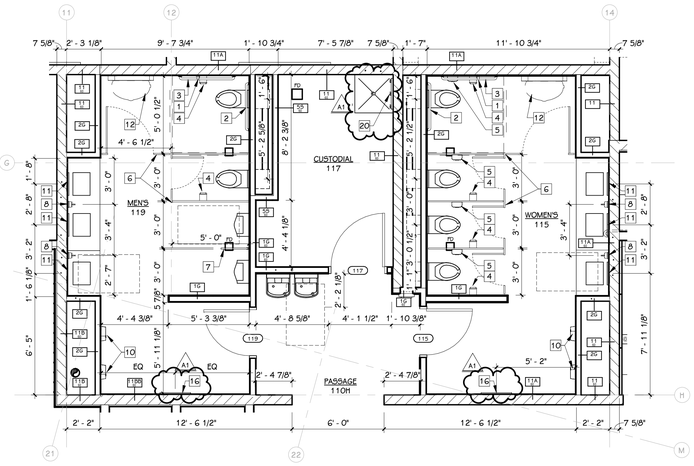
4 A.401 ENLARGED PLAN
1/4" = 1'-0"

KEYED NOTES - ENLARGED PLAN

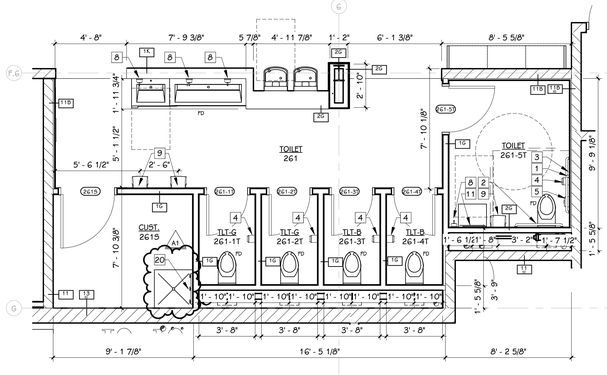
1. 18" VERTICAL STAINLESS STEEL GRAB BAR
2. 36" VERTICAL STAINLESS STEEL GRAB BAR
3. 42" STAINLESS STEEL GRAB BAR
4. TOILET PAPER DISPENSER, OP, CI
5. SANITARY NAPKIN DISPOSAL
6. TOILET PARTITION
7. URINAL SCREEN
8. SOAP DISPENSER, OP, CI
9. PAPER TOWEL (ROLL) DISPENSER, OP, CI
10. HAND DRYER
11. STAINLESS STEEL FRAMED MIRROR (18"Wx34"H)
12. BABY CHANGING STATION
13. FOLD DOWN SHOWER SEAT (14"Wx32"L)
14. CHANGING SEAT (22"Wx42"L)
15. SHOWER ROD AND CURTAIN
16. STAINLESS STEEL FRAMED MIRROR (24"Wx60"H)
17. CONTINUOUS STAINLESS STEEL SHOWER GRAB BAR
18. ROBE HOOK
19. SOAP DISH
20. MOP AND BROOM HOLDER

ACCESSORY NOTES

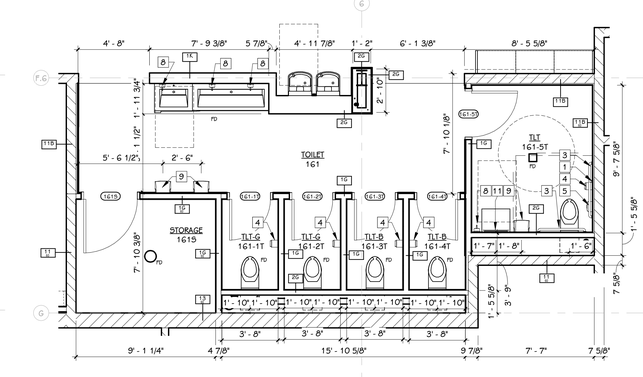
1. OP = OWNER PURCHASED, OI = OWNER INSTALLED, CP = CONTRACTOR PURCHASED, CI = CONTRACTOR INSTALLED.
2. DIMENSIONS INDICATED ARE TYPICAL UNLESS NOTED OTHERWISE ON PLANS.
3. GENERIC PLUMBING FIXTURES ARE SHOWN. REFER TO PLUMBING DRAWINGS AND SPECIFICATIONS FOR FIXTURE TYPES, MANUFACTURERS AND MOUNTING HEIGHTS.
4. CODE REQUIRED INTERIOR SIGNAGE - INCLUDES MINIMUM REQUIRED SIGN TYPES REQUIRED FOR OCCUPANCY AS DICTATED BY IBC, IFC, AND NFPA. COORDINATE WITH ANY OWNER-PROVIDED SIGNAGE.



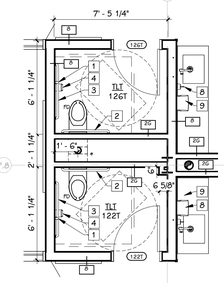
5 A.401 ENLARGED PLAN
1/4" = 1'-0"



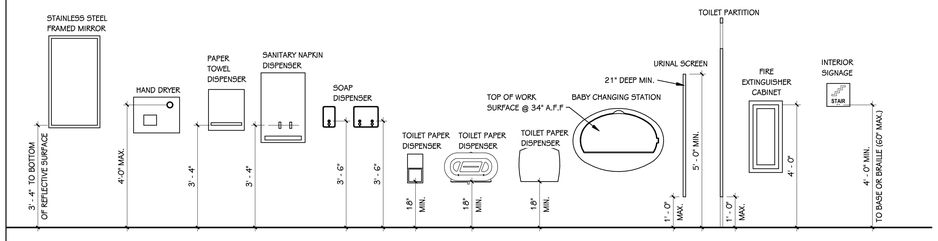
6 A.401 ENLARGED PLAN
1/4" = 1'-0"



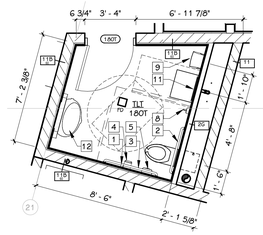
7 A.401 ENLARGED PLAN
1/4" = 1'-0"



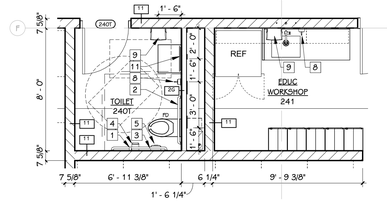
8 A.401 ENLARGED PLAN
1/4" = 1'-0"



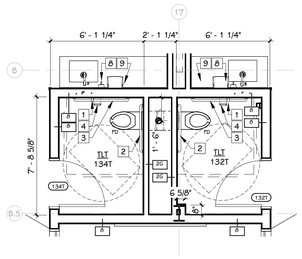
TYPICAL MOUNTING HEIGHTS
1/2" = 1'-0"



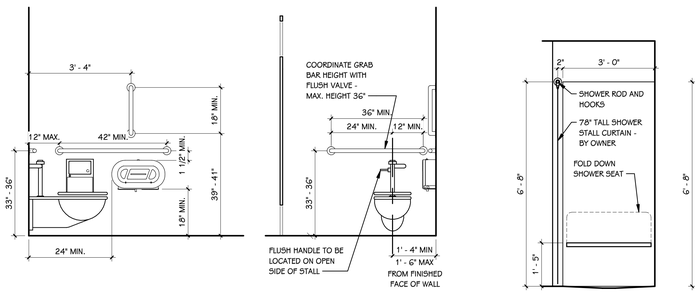
9 A.401 ENLARGED PLAN
1/4" = 1'-0"



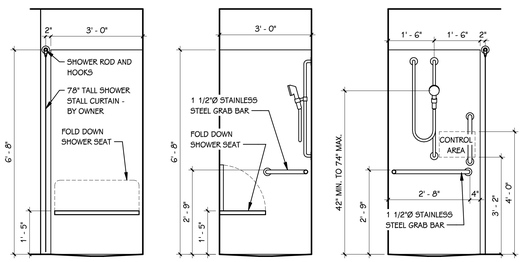
10 A.401 ENLARGED PLAN
1/4" = 1'-0"



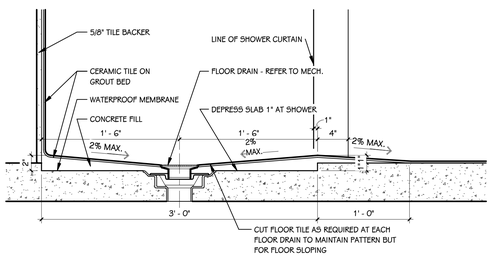
11 A.401 ENLARGED PLAN
1/4" = 1'-0"



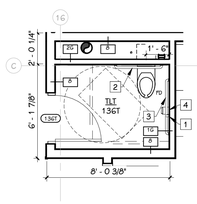
TYPICAL BARRIER-FREE MOUNTING HEIGHTS
1/2" = 1'-0"



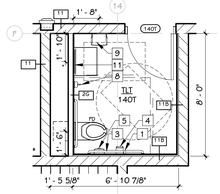
TYPICAL BARRIER-FREE SHOWER ELEVATION
1/2" = 1'-0"



TYPICAL SHOWER FLOOR DETAIL
1 1/2" = 1'-0"



12 A.401 ENLARGED PLAN
1/4" = 1'-0"



13 A.401 ENLARGED PLAN
1/4" = 1'-0"

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ADD. No. 1	JUN 5, 2023
ISSUED FOR	DATE

PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS

Portage, Michigan

SHEET TITLE
ENLARGED TOILET PLANS, TYPICAL MOUNTING HEIGHTS, AND BARRIER-FREE MOUNTING HEIGHTS

DATE
MAY 17, 2023

SHEET NUMBER
A 401
21-237.10

DOOR SCHEDULE - FIRST FLOOR

NUMBER			FIRE RATING		DOOR			SIZE		FRAME			DETAILS			GLASS	ACCESS CONTROLS					HW SET	REMARKS
DOOR	ROOM	ROOM NAME	DOOR	FRAME	TYPE	MAT	FIN	WIDTH	HEIGHT	ELEV	MAT	FIN	HEAD	JAMB	SILL		A-PHONE	BARRIER-FREE	CARD READER	ELEC. LOCK HDWR.	MAG HOLD		
100A	100	RECEPTION	45 MIN	45 MIN	FG2	WD	PREFIN	3' - 0"	7' - 2"	9	HM	P-1B	H-1	J-3	-	FP5G-1	No	Yes	Yes	Yes	No	58.0	-
100B	100	RECEPTION	45 MIN	45 MIN	FG2	WD	PREFIN	3' - 0"	7' - 2"	9	HM	P-1B	H-1	J-3	-	FP5G-1	No	Yes	Yes	Yes	No	57.0	-
100T	100T	TLT	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-1	J-1	-	-	No	No	No	No	No	28.0	-
102	102	CONFERENCE	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	25.0	-
103	103	RECORDS	60 MIN	60 MIN	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-1	J-1	-	-	No	No	Yes	Yes	No	52.0	-
104	104	CLINIC	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	25.0	-
104T	104T	TLT/SWR	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-5	J-5	-	-	No	No	No	No	No	27.0	-
106	106	PRINCIPAL	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	25.0	-
107A	107	TEACHER LOUNGE	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	26.0	-
107B	107	TEACHER LOUNGE	-	-	FG2	AL	CLR. ANOD	3' - 0"	7' - 2"	13	AL	CLR. ANOD	G/A321	B/A321	9/A321	SG-2	No	No	Yes	Yes	No	9.0	-
108	108	OFFICE	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	25.0	-
109	109	WELLNESS	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-3	J-3	-	-	No	No	No	No	No	25.0	-
110H	110H	PASSAGE	-	-	N	HM	P-1B	6' - 0"	7' - 2"	2	HM	P-1B	H-1	J-1	-	SG-1	No	No	No	No	No	14.0	4
111A	111	FAMILY RESOURCE	45 MIN	45 MIN	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	FP5G-1	No	No	No	No	No	47.0	-
111B	111	FAMILY RESOURCE	-	-	F	WD	PREFIN	5' - 0"	7' - 2"	2	HM	P-1B	H-1	J-1	-	-	No	No	No	No	No	21.0	-
112A	112	ART	45 MIN	45 MIN	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	FP5G-1	No	No	No	No	No	19.0	1
112B	112	ART	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	SAFETY	No	No	No	No	No	50.0	1
112C	112	ART	-	-	FG2	AL	CLR. ANOD	3' - 0"	7' - 2"	13	AL	CLR. ANOD	G/A321	B/A321	9/A321	SG-2	No	No	Yes	Yes	No	7.0	-
112K	112K	KILN	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-3	J-3	-	-	No	No	No	No	No	23.0	-
1125	1125	STORAGE	60 MIN	60 MIN	F	HM	P-1B	6' - 0"	7' - 2"	2	HM	P-1B	H-3	J-3	-	-	No	No	No	No	No	40.0	-
114A	114	LIBRARY	45 MIN	45 MIN	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	FP5G-1	No	No	No	No	No	19.0	1
114B	114	LIBRARY	-	-	SLIDER	AL	P-1B	16' - 0"	7' - 4"	6	AL	P-1B	2/A524	3/A524		SG-1	No	No	No	No	No		1, 2
114C	114	LIBRARY	60 MIN	60 MIN	OHC	-	-	16' - 0"	10' - 0"	-	-	-	2/A524	3/A524		-	No	No	No	No	No	61.0	
114D	114	LIBRARY	-	-	FG2	AL	CLR. ANOD	3' - 0"	7' - 2"	13 OPP. HAND	AL	CLR. ANOD	G/A321	B/A321	9/A321	SG-2	No	No	Yes	Yes	No	7.0	-
115	115	WOMEN'S	60 MIN	60 MIN	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-5	J-5	-	-	No	No	No	No	No	42.0	-
116	116	LIBRARY RESOURCE	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	4	HM	P-1B	H-3	J-3	5-2	SAFETY	No	No	No	No	No	41.0	-
117	117	CUSTODIAL	60 MIN	60 MIN	F	WD	PREFIN	3' - 6"	7' - 2"	1	HM	P-1B	H-5	J-5	-	-	No	No	No	No	No	33.0	-
118	118	CUSTODIAL OFFICE	60 MIN	60 MIN	F	WD	PREFIN	3' - 6"	7' - 2"	1	HM	P-1B	H-3	J-3	-	-	No	No	No	No	No	33.0	-
119	119	MEN'S	60 MIN	60 MIN	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-5	J-5	-		No	No	No	No	No	42.0	-
120H	120H	PASSAGE	45 MIN	45 MIN	N	HM	P-1B	7' - 0"	7' - 2"	2	HM	P-1B	H-1	J-1	-	FP5G-1	No	No	Yes	Yes	Yes	13.0	-
122A	122	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
122B	122	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	12' - 0"	7' - 4"	7	AL	P-1B	H-7	J-7	5-3	IG-2	No	No	No	No	No	59.0	1, 2
122T	122T	TLT	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-1	J-1	-	-	No	No	No	No	No	28.0	-
123-1T	123-1T	TLT-G	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
123-2T	123-2T	TLT-G	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
123-3T	123-3T	TLT-B	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
123-4T	123-4T	TLT-B	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
123-5T	123-5T	TLT	-	-	G1	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	28.0	-
124	124	SGR	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	5	HM	P-1B	H-1	J-1	-	IG-2	No	No	No	No	No	43.0	1
126	126	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
126T	126T	TLT	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-1	J-1	-	-	No	No	No	No	No	28.0	-
130A	5130	STAIR	60 MIN	60 MIN	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	FRG-1	No	No	No	No	No	17.0	-
130B	130	LEARNING COMMONS	-	-	FG2	FRP	CLR. ANOD	3' - 0"	7' - 2"	14	AL	CLR. ANOD	G/A321	B/A321	9/A321	SG-2	No	No	Yes	Yes	No	7.0	-
130C	5130	STAIR	-	-	FG2	FRP	DB. ANOD	3' - 0"	7' - 2"	1	AL	DB. ANOD	G/A321	B/A321	9/A321	IG-1	No	No	No	No	No	8.0	-
132A	132	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
132B	132	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	12' - 0"	7' - 4"	7	AL	P-1B	H-7	J-7	5-3	IG-2	No	No	No	No	No	59.0	1, 2
132T	132T	TLT	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-1	J-1	-	-	No	No	No	No	No	28.0	-
134	134	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
134T	134T	TLT	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-1	J-1	-	-	No	No	No	No	No	28.0	-
136	136	Y5 / FLEX	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	SAFETY	No	No	No	No	No	43.0	1
136T	136T	TLT	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-1	J-1	-	-	No	No	No	No	No	28.0	-
140	140	LEARNING COMMONS	-	-	FG2	FRP	CLR. ANOD	3' - 0"	7' - 2"	14 OPP. HAND	AL	CLR. ANOD	G/A321	B/A321	9/A321	SG-2	No	No	Yes	Yes	No	7.0	-
140T	140T	TLT	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-3	J-3	-	-	No	No	No	No	No	28.0	-
141	141	EDUC WORKSHOP	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	SAFETY	No	No	No	No	No	45.0	1
142A	142	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
142B	142	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	12' - 0"	7' - 4"	7	AL	P-1B	H-7	J-7	5-3	IG-2	No	No	No	No	No	59.0	1, 2
143	143	ESI WORKSHOP	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-3	J-3	-	SAFETY	No	No	No	No	No	43.0	1
144	144	SGR	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	5	HM	P-1B	H-1	J-1	-	IG-2	No	No	No	No	No	43.0	1
145	145	ESI SPEECH OFFICE	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	43.0	1
146A	146	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
146B	146	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	10' - 0"	7' - 4"	8	AL	P-1B	H-8	J-8	5-3	IG-2	No	No	No	No	No	60.0	1, 2
147	147	ESI STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	SAFETY	No	No	No	No	No	43.0	1
150H	150H	PASSAGE	45 MIN	45 MIN	N	HM	P-1B	7' - 0"	7' - 2"	2	HM	P-1B	H-3	J-3	-	FP5G-1	No	No	Yes	Yes	Yes	13.0	-
151A	151	MUSIC	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	SAFETY	No	No	No	No	No	44.0	3
151B	151	MUSIC	45 MIN	45 MIN	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	FP5G-3	No	No	Yes	Yes	No	36.0	3
151C	151	MUSIC	-	-	SLIDER	WD	PREFIN	11' - 3 5/8"	7' - 4"	15	WD	PREFIN	H-9	J-9	5-4	-	No	No	No	No	No		-
151D	151	MUSIC	-	-	SLIDER	WD	PREFIN	14' - 10"	7' - 4"	16	WD	PREFIN	H-9	J-9	5-4	-	No	No	No	No	No		-
152A	152	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
152B	152	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	12' - 0"	7' - 4"	7	AL	P-1B	H-7	J-7	5-3	IG-2	No	No	No	No	No	59.0	1, 2
152C	152	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	10' - 0"	7' - 4"	8	AL	P-1B	H-8	J-8	5-3	IG-2	No	No	No	No	No	60.0	1, 2
154	154	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
156	156	ASD	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	43.0	1
161-1T	161-1T	TLT-G	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
161-2T	161-2T	TLT-G	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
161-3T	161-3T	TLT-B	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
161-4T	161-4T	TLT-B	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
161-5T	161-5T	TLT	-	-	G1	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	28.0	-
1615	1615	STORAGE	60 MIN	60 MIN	F	WD	PREFIN	3' - 6"	7' - 2"	1	HM	P-1B	H-5	J-5	-		No	No	No	No	No	33.0	-
162A	162	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	SAFETY	No	No	No	No	No	18.0	1
162B	162	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	12' - 0"	7' - 4"	7	AL	P-1B	H-7	J-7	5-3	IG-2	No	No	No	No	No	59.0	1, 2
163	163	EDUC WORKSHOP	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	SAFETY	No	No	No	No	No	45.0	1
164	164	SGR	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	5	HM	P-1B	H-1	J-1	-	IG-2	No	No	No	No	No	43.0	1
166A	166	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
166B	166	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	10' - 0"	7' - 4"	8	AL	P-1B	H-8	J-8	5-3	IG-2	No	No	No	No	No	60.0	1, 2
170A	5170	STAIR	60 MIN	60 MIN	N	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-3	J-3	-	FRG-1	No	No	No	No	No	17.0	-
170B	170	LEARNING COMMONS	-	-	FG2	FRP	CLR. ANOD	3' - 0"	7' - 2"	14 OPP. HAND	AL	CLR. ANOD	G/A321	B/A321	9/A321	SG-2	No	No	Yes	Yes	No	7.0	-
170C	5170	STAIR	-	-	FG2	FRP	DB. ANOD	3' - 0"	7' - 2"	1	AL	DB. ANOD	G/A321	B/A321	9/A321	IG-1	No	No	No	No	No	8.0	-
172A	172	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
172B	172	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	12' - 0"	7' - 4"	7	AL	P-1B	H-7	J-7	5-3	IG-2	No	No	No	No	No	59.0	1, 2
174	174	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
180T	180T	TLT	60 MIN	60 MIN	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-3	J-3	-	-	No	No	No	No	No	49.0	-
181A	181	SERVERY	60 MIN	60 MIN	F	WD	PREFIN	3' - 8"	7' - 2"	1	HM	P-1B	H-3	J-3	-	-	No	No	No	No	No	56.0	-
181B	181	SERVERY	60 MIN	60 MIN	OHC	AL	ANOD	18' - 0"	8' - 0"	-	AL	ANOD	4/A524	5/A524	-	-	No	No	No	No	No	61.0	-
183A	183	RECEIVING	60 MIN	60 MIN	F	WD	PREFIN	3' - 8"	7' - 2"	1	HM	P-1B	H-3	J-3	-	-	No	No	No	No	No	55.0	-
183B	183	RECEIVING	-	-	N	WD	PREFIN	3' - 8"	7' - 2"	1	HM	P-1B	H-3	J-3	-	SAFETY	No	No	No	No	No	54.0	-
183C	183	RECEIVING	-	-	N	FRP	CLR. ANOD	3' - 8"	7' - 2"	1	AL	CLR. ANOD	G/A321	B/A321	9/A321	IG-1	No	No	Yes	Yes	No	9.0	-
185S	185S	DRY STORAGE	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-3	J-3	-		No	No	No	No	No	54.0	-
189	189	HOUSEKEEPING	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-3	J-3	-	-	No	No	No	No	No	23.0	-
190A	190	GYM	45 MIN	45 MIN	G	WD	PREFIN	6' - 0"	7' - 2"	2	HM	P-1B	H-3	J-3	-	FP5G-1	No	No	No	No	No	20.0	-
190B	190	GYM	45 MIN	45 MIN	G	WD	PREFIN	6' - 0"	7' - 2"	2	HM	P-1B	H-3	J-3	-	FP5G-1	No	No	No	No	No	20.0	-
190C	190	GYM	-	-	FG2	FRP	CLR. ANOD	6' - 0"	7' - 2"	2	AL	CLR. ANOD	G/A321	B/A321	9/A321	SG-2	No	No	Yes	Yes	No	2.0	-
190S	190S	GYM STORAGE	60 MIN	60 MIN	F	WD	PREFIN	6' - 0"	7' - 2"	2	HM	P-1B	H-3	J-3	-	-	No	No	No	No	No	32.0	-
192	192	PE OFFICE	60 MIN	60 MIN	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-3	J-3	-	FPG-1	No	No	No	No	No	38.0	-
D100	D100	DATA	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-3	J-3	-	-	No	No	No	Yes	Yes	No	30.0	-
D140	D140	DATA	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-3	J-3	-	-	No	No	Yes	Yes	No	29.0	-
E101	E101	ELEC	60 MIN	60 MIN	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-1	J-1	-	-	No	No	No	No	No	35.0	-
E120	E120	ELEC	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-1	J-1	-	-	No	No	No	No	No	35.0	-
E160	E160	ELEC	60 MIN	60 MIN	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-3	J-3	-	-	No	No	No	No	No	35.0	-
E197	M193	MECH	60 MIN	60 MIN	F	HM	P-1B	2' - 10"	7' - 2"	1	HM	P-1B	H-3	J-3	-	-	No	No	No	No	No	24.0	-
E199A	E199	ELEC	60 MIN	60 MIN	F	HM	P-1B	3' - 0"	7' - 2"	1	HM	P-1B	H-3	J-3	-	-	No	No	No	No	No	15.0	-
E199B	E199	ELEC	-	-	F	FRP	CLR. ANOD	3' - 0"	7' - 2"	1	AL	CLR. ANOD	G/A321	B/A321	9/A321	-	No	No	No	No	No	6.0	-
M193A	M193	MECH	60 MIN	60 MIN	F	WD	PREFIN	6' - 0"	7' - 2"	2	HM	P-1B	H-3	J-3	-	-	No	No	No	No	No	32.0	-
M193B	M193	MECH	-	-	F	FRP	CLR. ANOD	5' - 0"	7' - 2"	2	AL	CLR. ANOD	G/A321	B/A321	9/A321	-	No	No	No	No	No	5.0	-
M195	M195	MECH	-	-	F	HM	P-1B	6' - 0"	7' - 2"	2	HM	P-1B	H-3	J-3	-	-	No	No	No	No	No	22.0	-
S110	S110	PRIME TIME STOR.	60 MIN	60 MIN	F	WD	PREFIN	3' - 8"	7' - 2"	1	HM	P-1B	H-3	J-3	-	-	No	No	No	No	No	35.0	-
S111	S111	PTO STORAGE	60 MIN	60 MIN	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-3	J-3	-	-	No	No	No	No	No	33.0	-
S180	S180	CHAIR STORAGE	60 MIN	60 MIN	F	WD	PREFIN	6' - 0"	7' - 2"	2	HM	P-1B	H-5	J-5	-	-	No	No	No	No	No	53.0	-
S182	S182	CHAIR STORAGE	60 MIN	60 MIN	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-3	J-3	-	-	No	No	No	No	No	33.0	
V100A	V100	VESTIBULE	-	-	FG2	FRP	CLR. ANOD	3' - 0"	7' - 2"	11	AL	CLR. ANOD	G/A321	B/A321	9/A321	IG-1	No	Yes	Yes	Yes	No	3.0	4
V100B	V100	VESTIBULE	-	-	FG2	FRP	CLR. ANOD	3' - 0"	7' - 2"	11	AL	CLR. ANOD	G/A321	B/A321	9/A321	IG-1	No	Yes	Yes	Yes	No	3.0	4
V100C	V100	VESTIBULE	-	-	FG2	FRP	CLR. ANOD	3' - 0"	7' - 2"	11	AL	CLR. ANOD	G/A321	B/A321	9/A321	IG-1	No	Yes	Yes	Yes	No	4.0	4
V100D	V100	VESTIBULE	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	10	HM	P-1B	H-5	J-3	-	SG-1	No	Yes	No	Yes	No	10.0	4
V100E	V100	VESTIBULE	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	10	HM	P-1B	H-5	J-3	-	SG-1	No	Yes	No	Yes	No	10.0	4
V100F	V100	VESTIBULE	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	10	HM	P-1B	H-5	J-3	-	SG-1	No	Yes	No	Yes	No	11.0	4
V180A	V180	VESTIBULE	-	-	FG2	FRP	CLR. ANOD	6' - 0"	7' - 2"	12	AL	CLR. ANOD	G/A321	B/A321	9/A321	SG-2	No	Yes	Yes	Yes	No	1.0	4
V180B	V180	VESTIBULE	-	-	FG2	FRP	CLR. ANOD	6' - 0"	7' - 2"	12	AL	CLR. ANOD	H-6	J-6	-	IG-1	No	Yes	No	No	No	12.0	4

A1

REMARKS:

1. SOUND SEAL
2. FACTORY POWDER COATED
3. ACOUSTICAL SOUND DOOR AND SOUND SEAL
4. DOORS ASSOCIATED WITH SMOKE EVAC. SYSTEM

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ADD. No. 1 JUN 5, 2023

ISSUED FOR DATE

PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS

Portage, Michigan

SHEET TITLE
FIRST FLOOR DOOR SCHEDULE

DATE
MAY 17, 2023

SHEET NUMBER
A 511
21-237.10

DOOR SCHEDULE - SECOND FLOOR

NUMBER		ROOM NAME	FIRE RATING		DOOR			SIZE		FRAME			DETAILS			GLASS	ACCESS CONTROLS					HW SET	REMARKS
DOOR	ROOM		DOOR	FRAME	TYPE	MAT	FIN	WIDTH	HEIGHT	ELEV	MAT	FIN	HEAD	JAMB	SILL		A-PHONE	BARRIER-FREE	CARD READER	ELEC. LOCK HDWR.	MAG HOLD		
210H	210	PASSAGE	-	-	N	HM	P-1B	8' - 0"	7' - 2"	2	HM	P-1B	H-1	J-1	-	SG-1	No	No	No	No	No	14.0	4
214	214	IT OFFICE	45 MIN	45 MIN	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	FPSG-1	No	No	No	No	No	38.0	-
220H	220H	PASSAGE	45 MIN	45 MIN	N	HM	P-1B	6' - 0"	7' - 2"	2	HM	P-1B	H-1	J-1	-	FPSG-1	No	No	Yes	Yes	Yes	13.0	-
222A	222	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
222B	222	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	12' - 0"	7' - 4"	7	AL	P-1B	H-7	J-7	S-3	IG-2	No	No	No	No	No	59.0	1, 2
223-1T	223	TOILET	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
223-2T	223	TOILET	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
223-3T	223	TOILET	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
223-4T	223	TOILET	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
223-5T	223	TOILET	-	-	G1	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	28.0	-
224	224	SGR	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	5	HM	P-1B	H-1	J-1	-	IG-2	No	No	No	No	No	37.0	1
226	226	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
232A	232	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
232B	232	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	12' - 0"	7' - 4"	7	AL	P-1B	H-7	J-7	S-3	IG-2	No	No	No	No	No	59.0	1, 2
234	234	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
236	236	FLEX STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	43.0	1
240T	240T	TOILET	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-3	J-3	-	-	No	No	No	No	No	28.0	-
241	241	EDUC WORKSHOP	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	SAFETY	No	No	No	No	No	43.0	1
242A	242	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
242B	242	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	12' - 0"	7' - 4"	7	AL	P-1B	H-7	J-7	S-3	IG-2	No	No	No	No	No	59.0	1, 2
244	244	SGR	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	5	HM	P-1B	H-1	J-1	-	IG-2	No	No	No	No	No	37.0	1
246A	246	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
246B	246	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	10' - 0"	7' - 4"	8	AL	P-1B	H-8	J-8	S-3	IG-2	No	No	No	No	No	60.0	1, 2
250H	250H	PASSAGE	45 MIN	45 MIN	N	HM	P-1B	7' - 0"	7' - 2"	2	HM	P-1B	H-3	J-3	-	FPSG-1	No	No	Yes	Yes	Yes	13.0	-
252A	252	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
252B	252	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	12' - 0"	7' - 4"	7	AL	P-1B	H-7	J-7	S-3	IG-2	No	No	No	No	No	59.0	1, 2
252C	252	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	10' - 0"	7' - 4"	8	AL	P-1B	H-8	J-8	S-3	IG-2	No	No	No	No	No	60.0	1, 2
254	254	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
256	256	FLEX STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	43.0	1
261-1T	261	TOILET	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
261-2T	261	TOILET	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
261-3T	261	TOILET	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
261-4T	261	TOILET	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
261-5T	261	TOILET	-	-	G1	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	28.0	-
261S	261S	CUST.	-	-	F	WD	PREFIN	3' - 6"	7' - 2"	1	HM	P-1B	H-5	J-5	-	-	No	No	No	No	No	23.0	-
262A	262	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
262B	262	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	12' - 0"	7' - 4"	7	AL	P-1B	H-7	J-7	S-3	IG-2	No	No	No	No	No	59.0	1, 2
263	263	EDUC WORKSHOP	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	SAFETY	No	No	No	No	No	45.0	1
264	264	SGR	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	5	HM	P-1B	H-1	J-1	-	IG-2	No	No	No	No	No	37.0	1
266A	266	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
266B	266	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	10' - 0"	7' - 4"	8	AL	P-1B	H-8	J-8	S-3	IG-2	No	No	No	No	No	60.0	1, 2
270A	270	LEARNING COMMONS	60 MIN	60 MIN	N	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-3	J-3	-	FRG-1	No	No	No	No	No	17.0	-
272A	272	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
272B	272	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	12' - 0"	7' - 4"	7	AL	P-1B	H-7	J-7	S-3	IG-2	No	No	No	No	No	59.0	1, 2
274	274	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
280H	280H	PASSAGE	45 MIN	45 MIN	N	HM	P-1B	7' - 0"	7' - 2"	2	HM	P-1B	H-3	J-3	-	FPSG-1	No	No	Yes	Yes	Yes	13.0	-
282	282	ESI STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	SAFETY	No	No	No	No	No	43.0	1
284A	284	ESI STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	5	HM	P-1B	H-1	J-1	-	FPSG-3	No	No	Yes	Yes	No	51.0	1
284B	284	ESI STUDIO	-	-	SLIDER	AL	P-1B	10' - 0"	7' - 4"	8	AL	P-1B	H-8	J-8	S-3	IG-2	No	No	No	No	No	60.0	1, 2
285	285	ESI OFFICE	45 MIN	45 MIN	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	FPSG-1	No	No	No	No	No	39.0	1
286	286	ESI SENSORY	45 MIN	45 MIN	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	FPSG-3	No	No	No	No	No	46.0	1
288	288	ESI WORKSHOP	45 MIN	45 MIN	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	FPSG-3	No	No	No	No	No	48.0	1
D240	D240	DATA	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-3	J-3	-	-	No	No	Yes	Yes	No	29.0	-
E211	E211	ELEC	60 MIN	60 MIN	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-1	J-1	-	-	No	No	No	No	No	35.0	-
E260	E260	ELEC	60 MIN	60 MIN	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-3	J-3	-	-	No	No	No	No	No	35.0	-
M212	M212	MECH	60 MIN	60 MIN	F	WD	PREFIN	3' - 6"	6' - 10"	1	HM	P-1B	H-10	J-10	S-5	-	No	No	No	No	No	16.0	1
M290	M290	MECH	60 MIN	60 MIN	F	WD	PREFIN	3' - 6"	7' - 2"	1	HM	P-1B	H-1	J-1	-	-	No	No	No	No	No	34.0	1
S230A	S230	STAIR	60 MIN	60 MIN	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	FRG-1	No	No	No	No	No	17.0	-
S291	S291	STORAGE	60 MIN	60 MIN	F	WD	PREFIN	3' - 6"	7' - 2"	1	HM	P-1B	H-1	J-1	-	-	No	No	No	No	No	33.0	-

A1

REMARKS:

1. SOUND SEAL
2. FACTORY POWDER COATED
3. ACOUSTICAL SOUND DOOR AND SOUND SEAL
4. DOORS ASSOCIATED WITH SMOKE EVAC. SYSTEM

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PACKAGE 4: CONSTRUCTION

OWNER
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Portage, Michigan

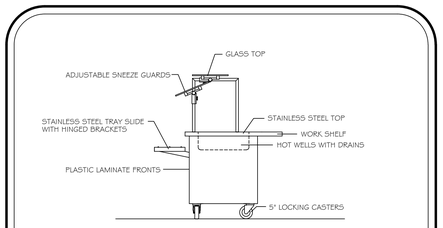
SHEET TITLE
SECOND FLOOR DOOR SCHEDULE

DATE
MAY 17, 2023

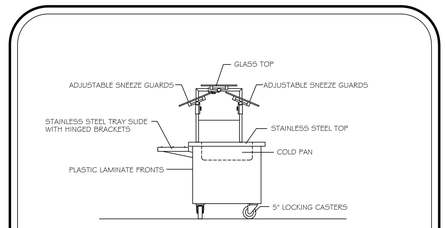
SHEET NUMBER
A 512
21-237.10

EQUIPMENT SCHEDULE

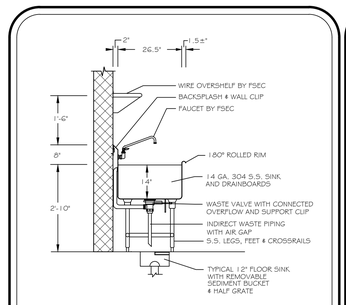
Item	Qty	DESCRIPTION	CW (in)	HW (in)	INDIRECT DRAIN	DIRECT DRAIN (IN)	GAS (in)	MBTUH	EXH DUCT	EXH CFM	MUA DUCT	MUA CFM	Volts	Ph	Amps load	Equipment Remarks
101	1	WALK-IN COOLER/FREEZER											120	1	(2) 8.0	INSULATED FLOOR: SEE REFRIGERATION PLAN
101A	1	COOLER COIL			FFD								120	1	5.0	
101B	1	COOLER COMPRESSOR											208	3	10.0	ROOF CURBS BY FSEC
101C	1	FREEZER COIL			FFD								208	1	15.0	
101D	1	FREEZER COMPRESSOR											208	3	15.0	ROOF CURBS BY FSEC
101E	1	FREEZER COIL HEAT TAPE											120	1	5.0	
102	2	UTILITY CART														
103	20	SHELVING - POLYMER														
104	1	LOCKERS - NIKEC														
105	1	PAN RACK														
106	2	DUNNAGE RACK														
107	1	FIRE PROTECTION SYSTEM											120	1	10.0	GAS SHUT OFF VALVE BY FSEC
201	2	TRASH BIN - BY OWNER														
202	1	PREP TABLE	0.5	0.5	FL SK											
203	1	COOKS TABLE	0.5	0.5	FL SK											
204	2	PORTABLE TABLE														
205	1	SPARE NUMBER														
206	1	PASS THRU HOT FOOD CABINET											120/208	1	7.8	UNIVERSAL ANGLES
207	1	CAN OPENER														
301	1	HOOD							13" X 13"		14" X 14"		120	1	10.0	WIRE LIGHTS & HEAT SENSOR
301A	1	EXHAUST FAN & CURB								1,800			208	3	10.0	INTERLOCK TO MUA UNIT
301B	1	MAKE UP AIR UNIT					1	119				1,500	208	3	15.0	CONNECT TO HOOD CONTROL PANEL
301C	1	MAKE UP AIR UNIT CONDENSER UNIT											208	3	14.5	
302	1	RANGE - FOUR BURNER					0.75	177								STANDARD OVEN
303	1	CONVECTION OVEN - DOUBLE DECK					(2) 0.75	90					120	1	(2) 8.9	
304	1	SPARE NUMBER														
305	1	SPARE NUMBER														
306	1	REFRIGERATOR											120	1	4.9	
401	1	HOT FOOD TABLE		0.5	FFD								120/208	1	32.8	
402	1	UTILITY COUNTER														
402A	1	CONDIMENT COUNTER														
403	1	COLD FOOD TABLE			FFD								120	1	4.7	
404	1	MICROWAVE OVEN											120	1	13.4	
405	1	MILK COOLER											120	1	7.5	
406	1	CASHIER COUNTER														
407	1	CASH REGISTER/POS - BY OWNER											120	1	10.0	DEDICATED CIRCUIT & DATA
501	1	SPARE NUMBER														
502	2	HAND SINK W/ SIDE SPLASHES	0.5	0.5		1.5										SOAP & TOWEL DISPENSER - BY OWNER
503	1	POT SINK	(2) 0.5	(2) 0.5	FL SK	2										PIPE 2" DIRECT WASTE TO GREASE TRAP



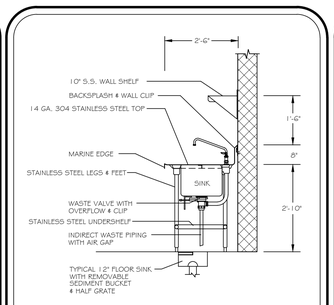
TYPICAL HOT FOOD TABLE
SECTION - ITEM #401
SCALE: 1/2" = 1'-0"



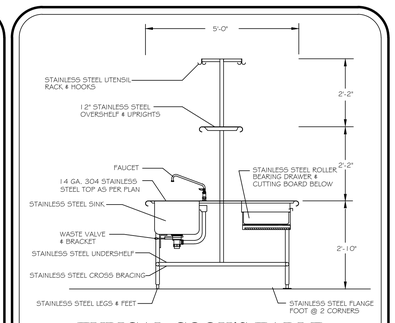
TYPICAL COLD FOOD TABLE
SECTION - ITEM #403
SCALE: 1/2" = 1'-0"



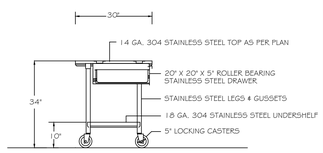
TYPICAL POT SINK
SECTION - ITEM #503
SCALE: 1/2" = 1'-0"



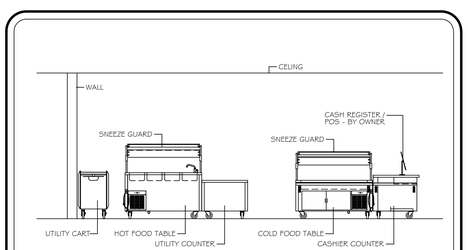
TYPICAL PREP TABLE
SECTION - ITEM #202
SCALE: 1/2" = 1'-0"



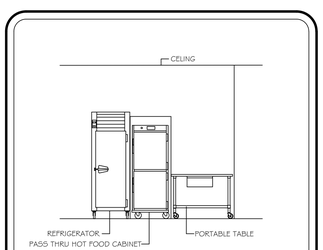
TYPICAL COOK'S TABLE
SECTION - ITEM #203
SCALE: 1/2" = 1'-0"



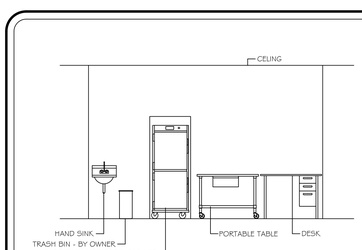
TYPICAL PORTABLE TABLE
SECTION - ITEM #204
SCALE: 1/2" = 1'-0"



ELEVATION
SCALE 1/4" = 1'-0" A



ELEVATION
SCALE 1/4" = 1'-0" B



ELEVATION
SCALE 1/4" = 1'-0" C

FOODSERVICE DESIGN BY:

JRA
Food Service Consultants

JRA FOOD SERVICE CONSULTANTS, LLC
401 HALL STREET SW - SUITE 185H
GRAND RAPIDS, MI 49503
PH: (616) 454-4433

TowerPinkster
Architecture · Engineering · Interiors
4 East Fulton Street, Suite 200
Grand Rapids, Michigan 49503
616.456.9944 PHONE 616.456.5936 FAX
242 East Kalamazoo Avenue, Suite 100
Kalamazoo, Michigan 49007-5828
269.342.6633 FAX
269.343.6133 PHONE

ADDENDUM 1 — 6/5/2023
ISSUED FOR — DATE

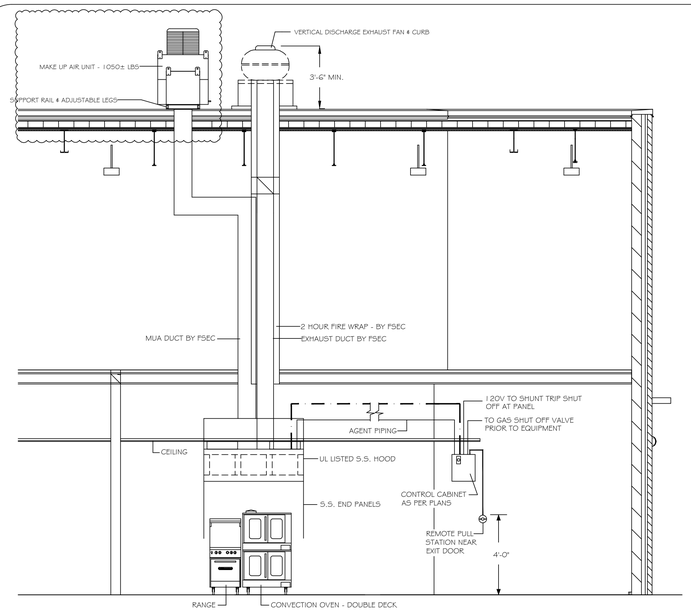
PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
FOOD SERVICE
EQUIPMENT
FLOOR PLAN
SCALE 1/4" = 1'-0"

DATE
MAY 17, 2023

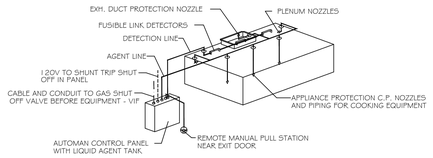
SHEET NUMBER
FSE-1
21-237.10



TYPICAL COOKING EQUIPMENT ELEVATION

SCALE: N.T.S.

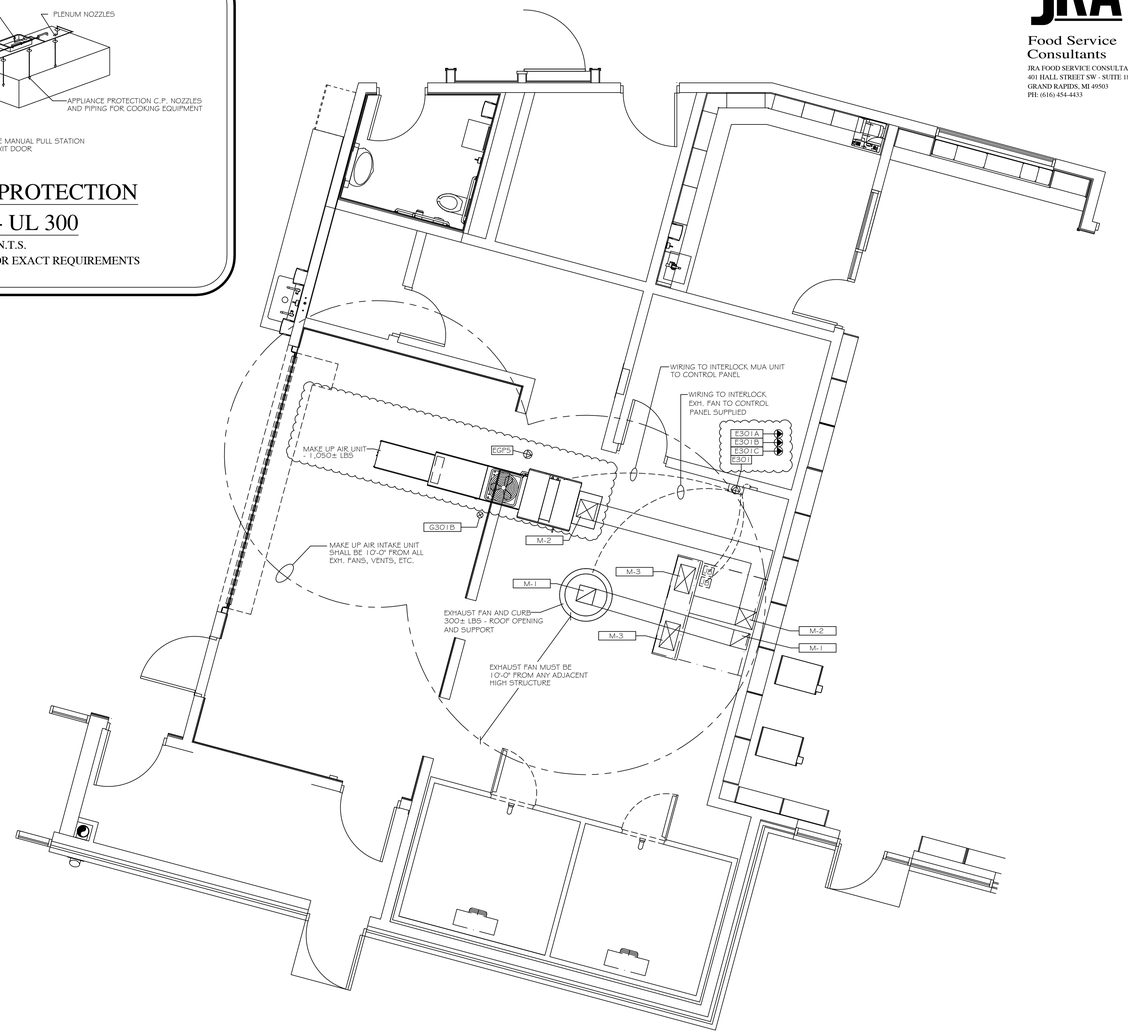
DETAIL IS FOR BIDDING PURPOSES ONLY.
ALL TRADES TO VERIFY REQUIREMENTS
WITH MANUFACTURER'S SHOP DRAWINGS

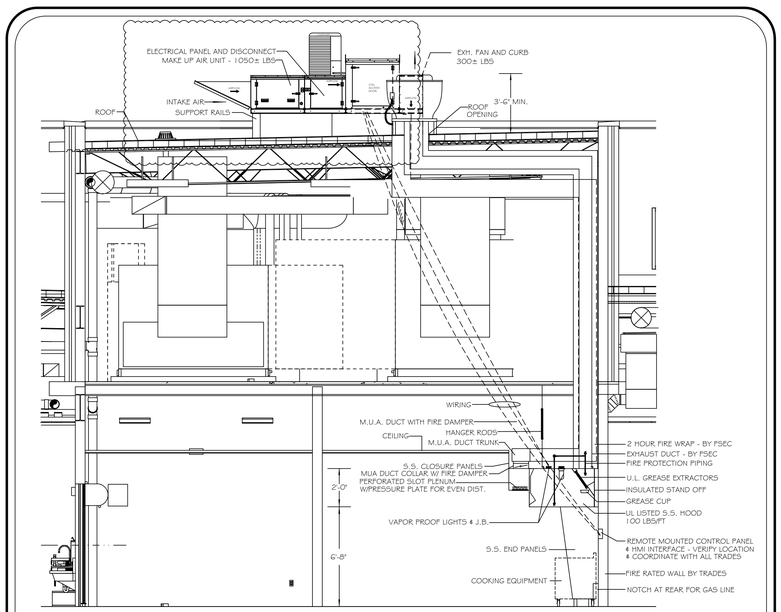


TYPICAL FIRE PROTECTION SYSTEM - UL 300

SCALE: N.T.S.

SEE FSEC SHOP DRAWINGS FOR EXACT REQUIREMENTS

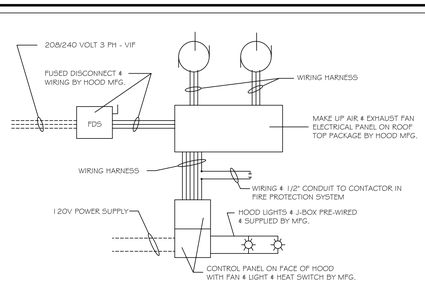




TYPICAL HOOD SECTION - ITEM #301

SCALE: N.T.S.

DETAIL IS FOR BIDDING PURPOSES ONLY.
ALL TRADES TO VERIFY REQUIREMENTS
WITH MANUFACTURER'S SHOP DRAWINGS



HOOD WIRING DIAGRAM - SEE FSEC

SCALE: N.T.S.

SEE SHOP DRAWINGS FOR EXACT REQUIREMENTS

UPON ACTIVATION OF THE FIRE PROTECTION SYSTEM, SHUT DOWN THE SUPPLY FAN. EXHAUST FAN SHALL CONTINUE TO RUN OR SHALL BE SHUT DOWN AS DIRECTED BY THE FIRE MARSHALL AND/OR THE HEALTH DEPARTMENT. VERIFY WITH LOCAL INSPECTORS. TRADES TO WIRE AS REQUIRED.

VENTILATION DATA - 301		
18 GA. S.S. HOOD - 100 LBS/FT	6'-6" X 6'-0" X 24"	6" OVERHANG & M.U.A. FRONT
UL LISTED GREASE EXTRACTOR FILTERS	3 - 16" BY 20"	351 FPM - FACE VELOCITY
EXHAUST DUCT COLLARS ON HOOD	13" X 13"	ONE REQUIRED
MUA DUCT COLLARS ON HOOD	12" X 24"	TWO REQUIRED
S.S. END PANELS	40" X 46"	TWO REQUIRED
TOTAL SYSTEM STATIC PRESSURE	1.00 WG	
EXHAUST FAN & CURB	PENN FMX-BPT	300± LBS
EXHAUST CFM - UL LISTING	1800	
EXH. DUCT - 16 GA. WELDED	13" X 13"	1525 FPM - DUCT VELOCITY
M.U.A. UNIT - 70° RISE	19,000	1050± LBS
M.U.A. CFM - TEMPERED	1500	300 CFM FROM BLDG HVAC
M.U.A. DUCT	14" X 14"	1094 FPM
ROOF OPENINGS	TWO REQUIRED - VIF	NIKEC

MECHANICAL CONNECTION SCHEDULE									
NO.	GAS	BTU	EXH	MUA	CFM	VOLTS	PH	AMPS	REMARKS
G301B	1"	119,000							ON ROOF FOR MUA UNIT - VERIFY EXACT LOACTION
E301						120	1	10.0	LIGHTS & HEAT SENSOR
E301A						208	3	10.0	ON ROOF FOR EXHAUST FAN - VIF
E301B						208	3	15.0	ON ROOF FOR MUA UNIT - VIF
E301C						208	3	14.5	ON ROOF FOR MUA CONDENSER UNIT - VIF
EGP5						120	1	10.0	SERVICE OUTLET FOR ROOFTOP EQUIPMENT
M-1			13" X 13"		1,800				EXHAUST DUCT - 2HR RATED BY FSEC IF REQUIRED BY CODE
M-2				14" X 14"	1,500				MUA DUCT - CONNECT TO DIFFUSERS ON HOOD FACE
M-3				12" X 24"					MAKE UP AIR DUCT COLLAR - FOUR REQUIRED

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TowerPinkster
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4 East Fulton Street, Suite 200
Grand Rapids, Michigan 49503
616.456.9944 PHONE 616.456.5358 FAX
242 East Kalamazoo Avenue, Suite 100
Kalamazoo, Michigan 49007-5828
269.343.6833 FAX
269.343.6133 PHONE

ADDENDUM 1 — 6/05/2023
ISSUED FOR — DATE

PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
FOOD SERVICE
VENTILATION
FLOOR PLAN
SCALE 1/4" = 1'-0"

DATE
MAY 17, 2023

SHEET NUMBER
FSE-5
21-237.10

TERMINAL UNITS

BASED ON PRICE

MARK	MAX CFM	TYPE	NC (MAX)	SP DROP (MAX)	INLET SIZE	REHEAT COIL (1)				MIN CFM		REMARKS
						MBH	TR	W.P.D.	GPM	CLG	HTG	
TU-100	770	SDV	25	0.4"	10	37.6	45	5' MAX	3.75	385	257	2
TU-102	380	SDV	25	0.4"	08	18.6	45	5' MAX	1.75	190	127	2
TU-104	395	SDV	25	0.4"	10	19.3	45	5' MAX	2.00	198	132	2
TU-105	160	SDV	25	0.4"	06	7.8	45	5' MAX	0.75	80	53	2
TU-106	400	SDV	25	0.4"	08	19.5	45	5' MAX	2.00	200	133	2
TU-107	600	SDV	25	0.4"	10	29.3	45	5' MAX	3.00	300	200	2
TU-108	300	SDV	25	0.4"	08	14.6	45	5' MAX	1.50	150	100	2
TU-110	2,140	SDV	25	0.4"	16	104.5	45	5' MAX	10.50	1070	713	2
TU-111	300	SDV	25	0.4"	08	14.6	45	5' MAX	1.50	150	100	2
TU-114	2,100	SDV	25	0.4"	16	102.5	45	5' MAX	10.25	1050	700	2
TU-115	990	SDV	25	0.4"	12	48.3	45	5' MAX	4.75	495	330	2
TU-122	1,140	SDV	25	0.4"	12	55.7	45	5' MAX	5.50	570	380	2
TU-124	150	SDV	25	0.4"	06	7.3	45	5' MAX	0.75	75	50	2
TU-126	1,140	SDV	25	0.4"	12	55.7	45	5' MAX	5.50	570	380	2
TU-130	1,200	SDV	25	0.4"	12	58.6	45	5' MAX	5.75	600	400	2
TU-132	1,140	SDV	25	0.4"	12	55.7	45	5' MAX	5.50	570	380	2
TU-134	1,140	SDV	25	0.4"	12	55.7	45	5' MAX	5.50	570	380	2
TU-136	1,050	SDV	25	0.4"	12	51.3	45	5' MAX	5.25	525	350	2
TU-140	800	SDV	25	0.4"	12	39.1	45	5' MAX	4.00	400	267	2
TU-141	900	SDV	25	0.4"	12	43.9	45	5' MAX	4.50	450	300	2
TU-142	1,140	SDV	25	0.4"	12	55.7	45	5' MAX	5.50	570	380	2
TU-144	150	SDV	25	0.4"	06	7.3	45	5' MAX	0.75	75	50	2
TU-145	825	SDV	25	0.4"	12	40.3	45	5' MAX	4.00	413	275	2
TU-146	1,140	SDV	25	0.4"	12	55.7	45	5' MAX	5.50	570	380	2
TU-147	300	SDV	25	0.4"	08	14.6	45	5' MAX	1.50	150	100	2
TU-151	1,500	SDV	25	0.4"	14	73.2	45	5' MAX	7.25	750	500	2
TU-152	1,140	SDV	25	0.4"	12	55.7	45	5' MAX	5.50	570	380	2
TU-153	200	SDV	25	0.4"	06	9.8	45	5' MAX	1.00	100	67	2
TU-154	1,140	SDV	25	0.4"	12	55.7	45	5' MAX	5.50	570	380	2
TU-156	1,050	SDV	25	0.4"	12	51.3	45	5' MAX	5.25	525	350	2
TU-160	1,325	SDV	25	0.4"	12	64.7	45	5' MAX	6.50	663	442	2
TU-162	1,140	SDV	25	0.4"	12	55.7	45	5' MAX	5.50	570	380	2
TU-163	550	SDV	25	0.4"	10	26.9	45	5' MAX	2.75	275	183	2
TU-164	150	SDV	25	0.4"	08	7.3	45	5' MAX	0.75	75	50	2
TU-166	1,140	SDV	25	0.4"	12	55.7	45	5' MAX	5.50	570	380	2
TU-170	800	SDV	25	0.4"	12	39.1	45	5' MAX	4.00	400	267	2
TU-172	1,170	SDV	25	0.4"	12	57.1	45	5' MAX	5.75	585	390	2
TU-174	1,170	SDV	25	0.4"	12	57.1	45	5' MAX	5.75	585	390	2
TU-181	100	SDV	25	0.4"	06	4.9	45	5' MAX	0.50	50	33	2
TU-212A	2,400	SDV	25	0.4"	16	117.2	45	5' MAX	11.75	1200	800	2
TU-212B	900	SDV	25	0.4"	12	43.9	45	5' MAX	4.50	450	300	2
TU-214	300	SDV	25	0.4"	08	14.6	45	5' MAX	1.50	150	100	2
TU-222	1,140	SDV	25	0.4"	12	55.7	45	5' MAX	5.50	570	380	2
TU-224	150	SDV	25	0.4"	06	7.3	45	5' MAX	0.75	75	50	2
TU-226	1,140	SDV	25	0.4"	12	55.7	45	5' MAX	5.50	570	380	2
TU-230	1,200	SDV	25	0.4"	12	58.6	45	5' MAX	5.75	600	400	2
TU-232	1,140	SDV	25	0.4"	12	55.7	45	5' MAX	5.50	570	380	2
TU-234	1,140	SDV	25	0.4"	12	55.7	45	5' MAX	5.50	570	380	2
TU-236	1,050	SDV	25	0.4"	12	51.3	45	5' MAX	5.25	525	350	2
TU-240	800	SDV	25	0.4"	12	39.1	45	5' MAX	4.00	400	267	2
TU-241	900	SDV	25	0.4"	12	43.9	45	5' MAX	4.50	450	300	2
TU-242	1,140	SDV	25	0.4"	12	55.7	45	5' MAX	5.50	570	380	2
TU-244	150	SDV	25	0.4"	06	7.3	45	5' MAX	0.75	75	50	2
TU-246	1,140	SDV	25	0.4"	12	55.7	45	5' MAX	5.50	570	380	2
TU-251	250	SDV	25	0.4"	08	12.2	45	5' MAX	1.25	125	83	2
TU-252	1,140	SDV	25	0.4"	12	55.7	45	5' MAX	5.50	570	380	2
TU-254	1,140	SDV	25	0.4"	12	55.7	45	5' MAX	5.50	570	380	2
TU-256	1,050	SDV	25	0.4"	12	51.3	45	5' MAX	5.25	525	350	2
TU-260	1,000	SDV	25	0.4"	12	48.8	45	5' MAX	5.00	500	333	2
TU-262	1,140	SDV	25	0.4"	12	55.7	45	5' MAX	5.50	570	380	2
TU-263	480	SDV	25	0.4"	10	23.4	45	5' MAX	2.25	240	160	2
TU-264	150	SDV	25	0.4"	06	7.3	45	5' MAX	0.75	75	50	2
TU-266	1,140	SDV	25	0.4"	12	55.7	45	5' MAX	5.50	570	380	2
TU-270	800	SDV	25	0.4"	12	39.1	45	5' MAX	4.00	400	267	2
TU-272	1,170	SDV	25	0.4"	12	57.1	45	5' MAX	5.75	585	390	2
TU-274	1,170	SDV	25	0.4"	12	57.1	45	5' MAX	5.75	585	390	2
TU-280	825	SDV	25	0.4"	10	40.3	45	5' MAX	4.00	413	275	2
TU-283	400	SDV	25	0.4"	08	19.5	45	5' MAX	2.00	200	133	2
TU-287	400	SDV	25	0.4"	10	19.5	45	5' MAX	2.00	200	133	2
Grand total: 69						2942.7						

NOTES:
1. REHEAT COIL SIZING BASED ON 55°F EAT, 130°F EWT, 110°F LWT, W/ BOX AT MAXIMUM FLOW.
2. MINIMUM 4-ROW HEATING COIL.
3. ROOM MOUNTED CO2 SENSOR BY TEMPERATURE CONTROLS CONTRACTOR.
4. OCCUPANCY SENSOR INTEGRAL WITH LIGHT SWITCH BY DIVISION 26.

GRILLES, REGISTERS, & DIFFUSERS

BASED ON PRICE

MARK	PANEL SIZE	FACE SIZE	NECK SIZE	MODEL	CFM RANGE	VCD	THROW	MATERIAL	FINISH	INSTALLATION	REMARKS
SA-1	12" x 12"	12" x 12"	6" Ø	A5CDA	0 - 100	NO	3 - 4 - 8	ALUMINUM	WHITE	LAY-IN	
SA-2	12" x 12"	12" x 12"	8" Ø	A5CDA	100 - 210	NO	3 - 5 - 10	ALUMINUM	WHITE	LAY-IN	
SA-3	24" x 24"	24" x 24"	8" Ø	A5CDA	100 - 210	NO	2 - 4 - 7	ALUMINUM	WHITE	LAY-IN	
SA-4	24" x 24"	24" x 24"	10" Ø	A5CDA	210 - 385	NO	3 - 4 - 9	ALUMINUM	WHITE	LAY-IN	
SA-5	-	10" x 8"	10" x 8"	620	0 - 350	NO	12 - 18 - 28	ALUMINUM	WHITE	SURFACE	
SA-6	-	10" x 8"	10" x 8"	620	0 - 350	YES	13 - 19 - 29	ALUMINUM	WHITE	SURFACE	1
SA-7	-	12" x 8"	12" x 8"	620	350 - 450	YES	18 - 26 - 37	ALUMINUM	WHITE	SURFACE	1
SA-8	-	30" x 12"	30" x 12"	HCD	450 - 1000	YES	30 - 44 - 63	STEEL	FIELD PAINTED	DUCT MOUNTED	2
SA-9	-	48" x 6 3/4"	10Ø	5D5100	0 - 385	YES	15 - 21 - 29	ALUMINUM	WHITE	SURFACE	3, 4
SA-10	-	48" x 6 3/4"	10Ø	5D5100	0 - 385	NO	15 - 21 - 29	ALUMINUM	WHITE	LAY-IN	4
SA-11	-	72" x 6 3/4"	12" Ø	5D5100	385 - 600	NO	17 - 23 - 32	ALUMINUM	WHITE	SURFACE	4
RA-1	24" x 24"	12" x 12"	12" x 12"	80	0 - 150	NO	-	ALUMINUM	WHITE	LAY-IN	
RA-2	24" x 24"	24" x 24"	24" x 24"	80	150 - 1990	NO	-	ALUMINUM	WHITE	LAY-IN	
RA-3	-	40" x 40"	40" x 40"	80	1990 - 5525	NO	-	ALUMINUM	WHITE	DUCT MOUNTED	
RA-4	-	24" x 72"	24" x 72"	99	0 - 6000	NO	-	ALUMINUM	WHITE	SIDEWALL	
RA-5	-	10" x 8"	10" x 8"	635	0 - 250	YES	-	ALUMINUM	WHITE	SURFACE	1
RA-6	-	16" x 10"	16" x 10"	635	250 - 990	NO	-	ALUMINUM	WHITE	SURFACE	
RA-7	-	20" x 14"	20" x 14"	635	990 - 1500	NO	-	ALUMINUM	WHITE	SURFACE	1
RA-8	-	26" x 16"	26" x 16"	635	1500 - 2800	YES	-	ALUMINUM	WHITE	SURFACE	1
EA-1	24" x 24"	12" x 12"	12" x 12"	80	0 - 75	NO	-	ALUMINUM	WHITE	LAY-IN	
EA-2	-	10" x 10"	10" x 10"	80	75 - 750	YES	-	ALUMINUM	WHITE	DUCT MOUNTED	1
EA-3	-	34" x 18"	34" x 18"	80	750 - 3900	NO	-	ALUMINUM	WHITE	DUCT MOUNTED	
EA-4	-	36" x 24"	36" x 24"	80	3900 - 7640	NO	-	ALUMINUM	WHITE	DUCT MOUNTED	
EA-5	-	54" x 24"	54" x 24"	80	7640 - 11460	NO	-	ALUMINUM	WHITE	DUCT MOUNTED	
EA-6	-	6" x 6"	6" x 6"	635	0 - 75	NO	-	ALUMINUM	WHITE	SURFACE	
EA-7	-	8" x 6"	8" x 6"	635	75 - 150	YES	-	ALUMINUM	WHITE	DUCT MOUNTED	1
EA-8	-	8" x 8"	8" x 8"	635	150 - 300	NO	-	ALUMINUM	WHITE	SURFACE	
EA-9	-	12" x 8"	12" x 8"	635	300 - 425	NO	-	ALUMINUM	WHITE	SURFACE	
OA-1	-	96" x 12"	96" x 12"	620	0 - 1500	NO	-	ALUMINUM	CLR ANODIZED	SURFACE	
OA-2	-	52" x 42"	52" x 42"	620	3000 - 13500	NO	-	ALUMINUM	WHITE	DUCT MOUNTED	
OA-3	-	24" x 18"	24" x 18"	620	1500 - 3000	NO	-	ALUMINUM	WHITE	DUCT MOUNTED	

NOTES:
1. VSC3 VOLUME DAMPER
2. VSC5 VOLUME DAMPER
3. VCR5EC VOLUME DAMPER
4. 3 LINEAR SLOTS

RELIEF FANS

BASED ON GREENHECK

MARK	MODEL	TYPE	AIR FLOW (CFM)	ESP (IN WC)	SONES	MOTOR DATA					REMARKS
						EC MOTOR	NOMINAL HP	BRAKE HP	RPM	VOLTAGE	
RF-1	SQ-33-M2-VG	INLINE FAN	21400	0.84	27	Yes	10	6.3	866	460/3/60	
RF-2	SQ-33-M2-VG	INLINE FAN	21700	0.84	28	Yes	10	6.4	875	460/3/60	
RF-3	SQ-20-M2-VG	INLINE FAN	6500	0.70	17.3	Yes	3	1.39	1160	460/3/60	
RF-4	SQ-16-M2-VG	INLINE FAN	5500	0.60	22	Yes	3	1.28	1746	460/3/60	

EXHAUST FANS

BASED ON GREENHECK

MARK	MODEL	TYPE	AIR FLOW (CFM)	ESP (IN WC)	SONES	MOTOR DATA					REMARKS
						EC MOTOR	NOMINAL HP	BRAKE HP	RPM	VOLTAGE	
EF-1	RDU-36-618-VG	UPBLAST	15600	0.25	33	Yes	3	2.2	992	460/3/60	UL LISTED FOR SMOKE CONTROL
EF-2	TAUD-48-617	UPBLAST	38200	0.23	92	Yes	10	7.9	1140	460/3/60	UL LISTED FOR SMOKE CONTROL
EF-3	G-100-VG	DOWNBLAST	420	0.63	10.3	Yes	0.167	0.1	1536	120/1/60	
EF-4	G-097-VG	DOWNBLAST	150	0.63	6.3	Yes	0.25	0.06	1351	120/1/60	
EF-5	G-130-VG	DOWNBLAST	1200	0.63	9.5	Yes	0.5	0.2	1214	120/1/60	
EF-6	G-097-VG	DOWNBLAST	200	0.63	7.6	Yes	0.25	0.08	1495	120/1/60	
EF-7	G-180-VG	DOWNBLAST	3000	0.63	11.6	Yes	1	0.59	975	460/3/60	
EF-8	G-140-VG	DOWNBLAST	1775	0.63	10.8	Yes	0.75	0.4	1250	120/1/60	
EF-9	G-097-VG	DOWNBLAST	150	0.63	6.3	Yes	0.25	0.06	1351	120/1/60	
EF-10	G-100-VG	DOWNBLAST	850	0.63	7.6	Yes	0.25	0.17	1411	120/1/60	
EF-11	G-100-VG	DOWNBLAST	850	0.63	7.6	Yes	0.25	0.17	1411	120/1/60	
EF-12	G-097-VG	DOWNBLAST	225	0.63	8.4	Yes	0.25	0.1	1576	120/1/60	
EF-13	G-097-VG	DOWNBLAST	200	0.63	7.6	Yes	0.25	0.08	1495	120/1/60	

NOTES:
1. INTERLOCK EXHAUST FAN WITH ASSOCIATED DAMPER.
2. PROVIDE WITH VARI-GREEN MOTOR FOR 0 - 10V SPEED CONTROL BY BAS.
3. PROVIDE WITH MOTORIZED DAMPER.

OUTDOOR AIR INTAKE / RELIEF HOODS

BASED ON GREENHECK

MARK	MODEL	THROAT SIZE	HOOD SIZE	CURB HEIGHT	AIR FLOW (CFM)	MAX APD (IN WC)	CONTROL DAMPER	REMARKS
IH-1	FGI-18x24	18" x 24"	40" x 39"	2' - 0"	3,000	0.24	Yes	1
IH-2	FGI-52x74	52" x 74"	100" x 123"	2' - 0"	27,000	0.24	Yes	1
IH-3	FGI-18x24	18" x 24"	40" x 39"	2' - 0"	3,000	0.24	Yes	1
RH-1	FGR-56x56	56" x 56"	79" x 87"	2' - 0"	21,400	0.23	Yes	2
RH-2	FGR-56x56	56" x 56"	79" x 87"	2' - 0"	21,700	0.23	Yes	2
RH-3	FGR-22x42	22" x 42"	36" x 63"	2' - 0"	6,500	0.25	Yes	2
RH-4	FGR-22x36	22" x 36"	37" x 51"	2' - 0"	5,500	0.24	Yes	2
RH-5	FGR-38x38	40.5" x 40.5"	52" x 63"	2' - 0"	6,000	0.10	Yes	2, 3

NOTES:
1. INTAKE HOOD.
2. RELIEF HOOD.
3. PROVIDE DRIP PAN. REFER TO DETAIL.

SOUND TRAP SCHEDULE

BASED ON PRICE

MARK	CFM	MODEL	TYPE	DIMENSIONS			P.D.	VELOCITY (FPM)	DUCT SERVICE	MINIMUM REQUIRED LOSS (dB)							REMARKS
				HEIGHT	WIDTH	LENGTH				63 OCT.	125 OCT.	250 OCT.	500 OCT.	1K OCT.	2K OCT.	4K OCT.	
ST-1A	21,400	RH36/8A	RECTANGULAR	29"	54"	36"	0.1	1968	AHU-1 SUPPLY	3	4	7	12	8	7	5	
ST-1B	21,400	RH36/2D	RECTANGULAR	40"	64"	36"	0.09	1204	AHU-1 RETURN	4	6	12	23	25	20	15	
ST-2A	21,700	RH36/2A	RECTANGULAR	36"	50"	36"	0.09	1736	AHU-2 SUPPLY	2	3	7	14	17	14	9	
ST-2B	21,700	RM84/1D	RECTANGULAR	40"	80"	60"	0.08	977	AHU-2 RETURN	7	11	15	21	16	11	9	
ST-3A	6,500	RH36/4A	RECTANGULAR	20"	24"	36"	0.12	1950	AHU-3 SUPPLY	2	3	7	13	13	11	7	
ST-3B	6,500	RH36/1D	RECTANGULAR	24"	32"	36"	0.10	1219	AHU-3 RETURN	4	6	12	23	28	25	18	
ST-4A	5,500	C9	ROUND	24"	24"	36"	0.03	1751	AHU-4 SUPPLY	1	4	8	17	17	10	9	
ST-4B	5,500	RH36/9A	RECTANGULAR	22"	30"	36"	0.05	1200	AHU-4 RETURN	3	4	6	10	9	7	5	
ST-5A	6,000	RH36/2A	RECTANGULAR	24"	30"	36"	0.05	1200	AHU-5 SUPPLY	3	4	5	8	7	7	5	
ST-5B	6,000	RH36/6D	RECTANGULAR	24"	36"	36"	0.07	1000	AHU-5 RETURN	4	6	13	20	18	13	11	

PUMPS

BASED ON BELL & GOSSETT

MARK	MODEL	FLOW RATE (GPM)	HEAD (FT)	PEI<1	MOTOR DATA				SYSTEM	LOCATION	REMARKS
					HP	BHP	RPM	VOLTAGE			
P-1	e-1510 3EB	350.0	70	0.89	10	8.8	1800	460/3/60	HEATING WATER	M286 MECH. ROOM	1
P-2	e-1510 3EB	350.0	70	0.89	10	8.8	1800	460/3/60	HEATING WATER	M286 MECH. ROOM	1
P-3	e-1510 3EB	430.0	120	0.89	20	18	1800	460/3/60	CHILLED WATER	M190 MECH. ROOM	1
P-4	e-1510 3EB	430.0	120	0.89	20	18	1800	460/3/60	CHILLED WATER	M130 MECH. ROOM	1
P-5	e60 2x2x5.25	90.0	12	-	0.75	0.417	1800	460/3/60	AHU-1 HEATING COIL	M212 MECH. ROOM	
P-6	e60 2x2x5.25	90.0	12	-	0.75	0.417	1800	460/3/60	AHU-2 HEATING COIL	M212 MECH. ROOM	
P-7	e60 1x1x5.25	25.0	12	-	0.25	0.37	1800	120/1/60	AHU-4 HEATING COIL	M212 MECH. ROOM	
P-8	e60 1x1x5.25	25.0	12	-	0.25	0.39	1800	120/1/60	AHU-3 HEATING COIL	M212 MECH. ROOM	
P-9	e60 1x1x5.25	25.0	12	-	0.25	0.39	1800	120/1/60	AHU-5 HEATING COIL	M290 MECH. ROOM	
P-10	NRF-22	7.5	10	-	0.125	0.02	2940	120/1/60	DOMESTIC WATER	M290 MECH. ROOM	
P-11	e-90	40.0	20	-	0.5	0.308	1800	120/1/60	HEATING WATER	M290 MECH. ROOM	
P-12	e-90	43.0	20	-	0.5	0.331	1800	120/1/60	HEATING WATER	M190 MECH. ROOM	

NOTES:
1. VFD PROVIDED BY TEMPERATURE CONTROLS CONTRACTOR.

CABINET HEATERS - WATER

BASED ON SIGMA

MARK	MODEL	TYPE	AIRFLOW (CFM)	HEATING COIL					MOTOR DATA		REMARKS
				CAPACITY (MBH)	FLOW (GPM)	WPD (FT)	EWT (°F)	LWT (°F)	HP	VOLTAGE	
CUH-1	CW008	WALL MOUNTED	730	40.0	7.1	3.40	130 °F	110 °F	0.05	120/1/60	1,3
CUH-2	CW002	WALL MOUNTED	200	12.0	2.0	3.50	130 °F	110 °F	0.03	120/1/60	1,3
CUH-3	CW004	WALL MOUNTED	360	22.0	3.6	2.00	130 °F	110 °F	0.05	120/1/60	1,3
CUH-4	CW010	WALL MOUNTED	920	63.0	8.6	4.80	130 °F	110 °F	0.05	120/1/60	1,3
CUH-5	CW008	WALL MOUNTED	730	42.0	7.1	3.40	130 °F	110 °F	0.05	120/1/60	1,3
CUH-6	CW004	CEILING MOUNTED	360	20.0	3.6	2.00	130 °F	110 °F	0.05	120/1/60	1,4

NOTES:
1. 4 ROW HEATING COIL, MEDIUM SPEED
2. BOTTOM FRONT DISCHARGE, TOP FRONT INLET
3. WALL MOUNTED, FULLY RECESSED.
4. CEILING MOUNTED, FULLY RECESSED.

UNIT HEATER - HOT WATER

BASED ON MODINE

MARK	MODEL	TYPE	CFM	MBH	GPM	WPD	HP	RPM	VOLTAGE	REMARKS
UH-M190A	H5B/HC 108	HORIZONTAL	2,010	83.7	8.7	2.8	1/8	1625	120/1	1
UH-M190B	H5B/HC 108	HORIZONTAL	2,010	83.7	8.7	2.8	1/8	1625	120/1	1
UH-M212	H5B/HC 258	HORIZONTAL	4,560	101	21	5.7	1/2	1075	120/1	1
UH-M290	H5B/HC 108	HORIZONTAL	2,010	41.9	8.7	2.8	1/8	1625	120/1	1

NOTES:
1. BASED ON 130°F EWT, 60°F EAT.

PANEL RADIATION - HOT WATER

BASED ON RUNTAL

MARK	MODEL	HEATING ELEMENT				EAT (F)	FINISH	MOUNTING		REMARKS
		LENGTH (2)	ROWS	GPM	BTUH/FT (1)			TYPE	HEIGHT	
PR-1	R2F-2	11' - 0"	2	0.5	427	65 °F	(3)	PEDESTAL	(4)	1ST LEVEL COMMONS
PR-2	R2F-2	11' - 0"	2	0.5	427	65 °F	(3)	PEDESTAL	(4)	1ST LEVEL COMMONS
PR-3	R2F-2	11' - 0"	2	0.5	427	65 °F	(3)	PEDESTAL	(4)	1ST LEVEL COMMONS
PR-4	R2F-2	16' - 0"	2	1.0	427	65 °F	(3)	PEDESTAL	(4)	2ND LEVEL COMMONS
PR-5	R2F-2	16' - 0"	2	1.0	427	65 °F	(3)	PEDESTAL	(4)	2ND LEVEL COMMONS
PR-6	R2F-2	16' - 0"	2	1.0	427	65 °F	(3)	PEDESTAL	(4)	2ND LEVEL COMMONS

NOTES:
1 BASED ON 130°F EWT, 110°F LWT, AND 65° F EAT.
2 VERIFY ALL LENGTHS IN FIELD.
3 FINAL COLOR SELECTION BY ARCHITECT FROM MANUFACTURER'S FULL RANGE OF STANDARD COLORS.
4 PEDESTAL MOUNTED ON FLOOR.
5 PROVIDE WITH TOP GRILLE.

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ADD. No. 1 Jun 5, 2023
ISSUED FOR DATE

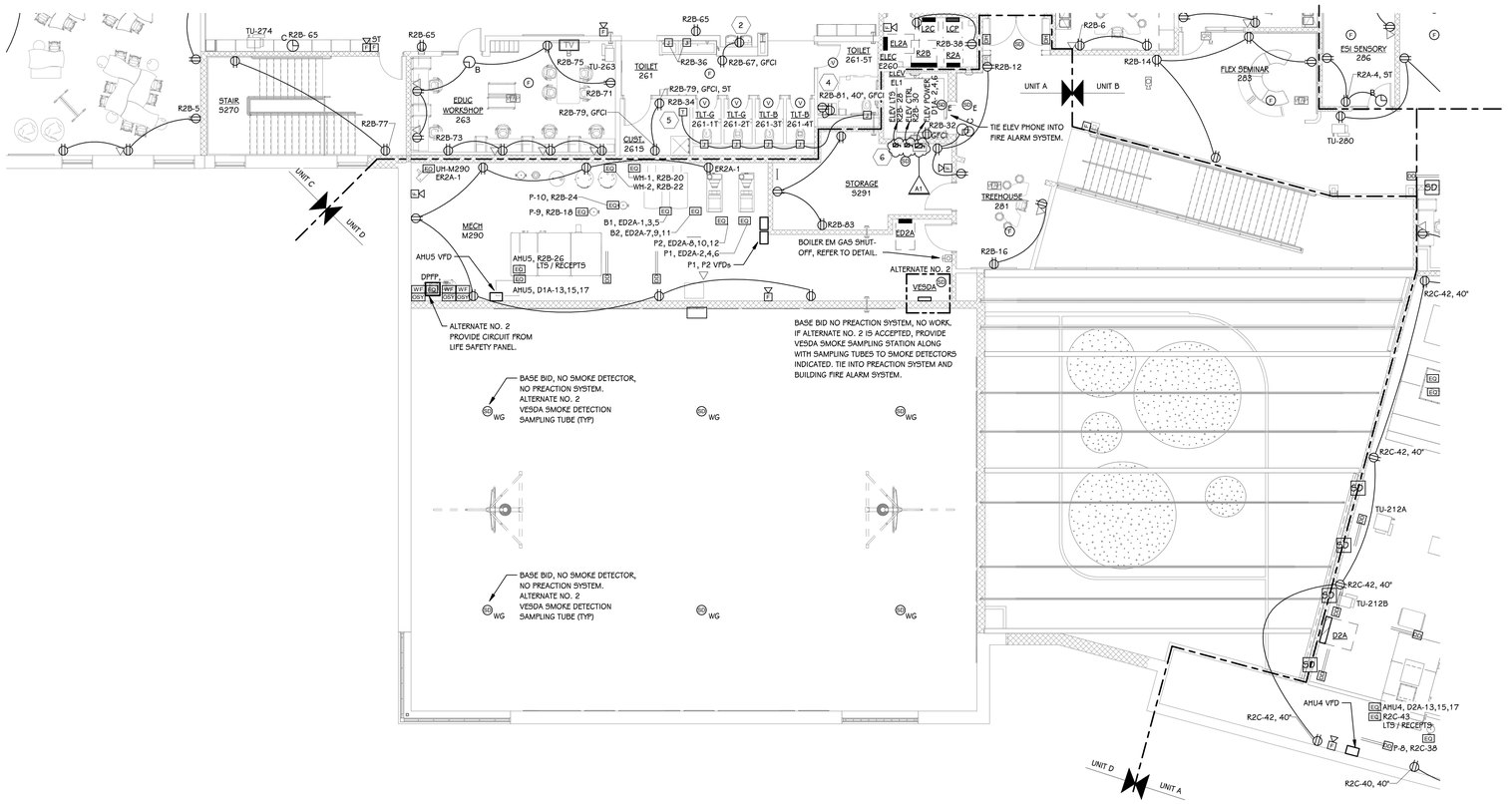
PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
MECHANICAL SCHEDULES

DATE
MAY 17, 2023

SHEET NUMBER
M502
21-237.10



SECOND FLOOR POWER PLAN - UNIT D
1/8" = 1'-0"

POWER KEYED NOTES

1 BACKBOARD CONTROLS SHALL HAVE RAISE/LOWER SWITCH AND HEIGHT ADJUSTMENT CONTROLS.

2 OTHER OUTLETS ARE SERVED FROM LOAD SIDE OF GFCI OUTLET OR BREAKER

3 REFER TO GENERAL NOTES: PROVIDE 4" HOUSEKEEPING PADS FOR MDP, ALL TRANSFORMERS, AND ALL FLOOR MOUNTED EQUIPMENT. PROVIDE FLEXIBLE CONNECTION TO TRANSFORMERS AND SIMILAR EQUIPMENT PER SPECIFICATIONS. AREAS WITHOUT KEYNOTE DO NOT ALLEVIATE CONTRACTOR FROM GENERAL NOTE REQUIREMENTS.

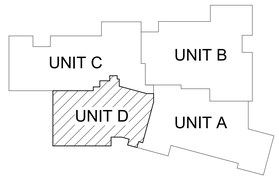
4 CONCEAL SINK SENSOR RECEPTACLES BEHIND LAV SHIELD. COORDINATE EXACT LOCATION AND MOUNTING HEIGHT OF UNDER SINK RECEPTACLES WITH MECHANICAL CONTRACTOR PRIOR TO INSTALLATION. FEED FROM LOAD SIDE OF ABOVE COUNTER GFCI RECEPTACLE.

5 LOW VOLTAGE TRANSFORMER AND BACKBOXES FOR FLUSH VALVES. COORDINATE LOCATION AND ADDITIONAL INSTALLATION REQUIREMENTS WITH MECHANICAL CONTRACTOR.

6 ELECTRIC ELEVATOR; CONNECT TO FIRE ALARM SYSTEM AND TELEPHONE SYSTEM WITH DEDICATED PHONE LINE. ALL DISCONNECTS SHALL HAVE AUX CONTACTS. COORDINATE FUSE SIZE FOR ELEVATOR POWER CIRCUIT WITH SHOP DRAWINGS. COORDINATE ALL INSTALLATION REQUIREMENTS WITH ELEVATOR CONTRACTOR. CONCEAL ALL DISCONNECTS IN LOCKABLE CABINET.

7 MOUNT DEVICE(S) IN TOE KICK AREA OF CASEWORK; CONCEAL ALL CONDUIT IN CAVITIES OF CASEWORK. COORDINATE WITH GENERAL TRADES.

CENTRAL ELEMENTARY



TRUE NORTH

KEY PLAN
SCALE: NO SCALE

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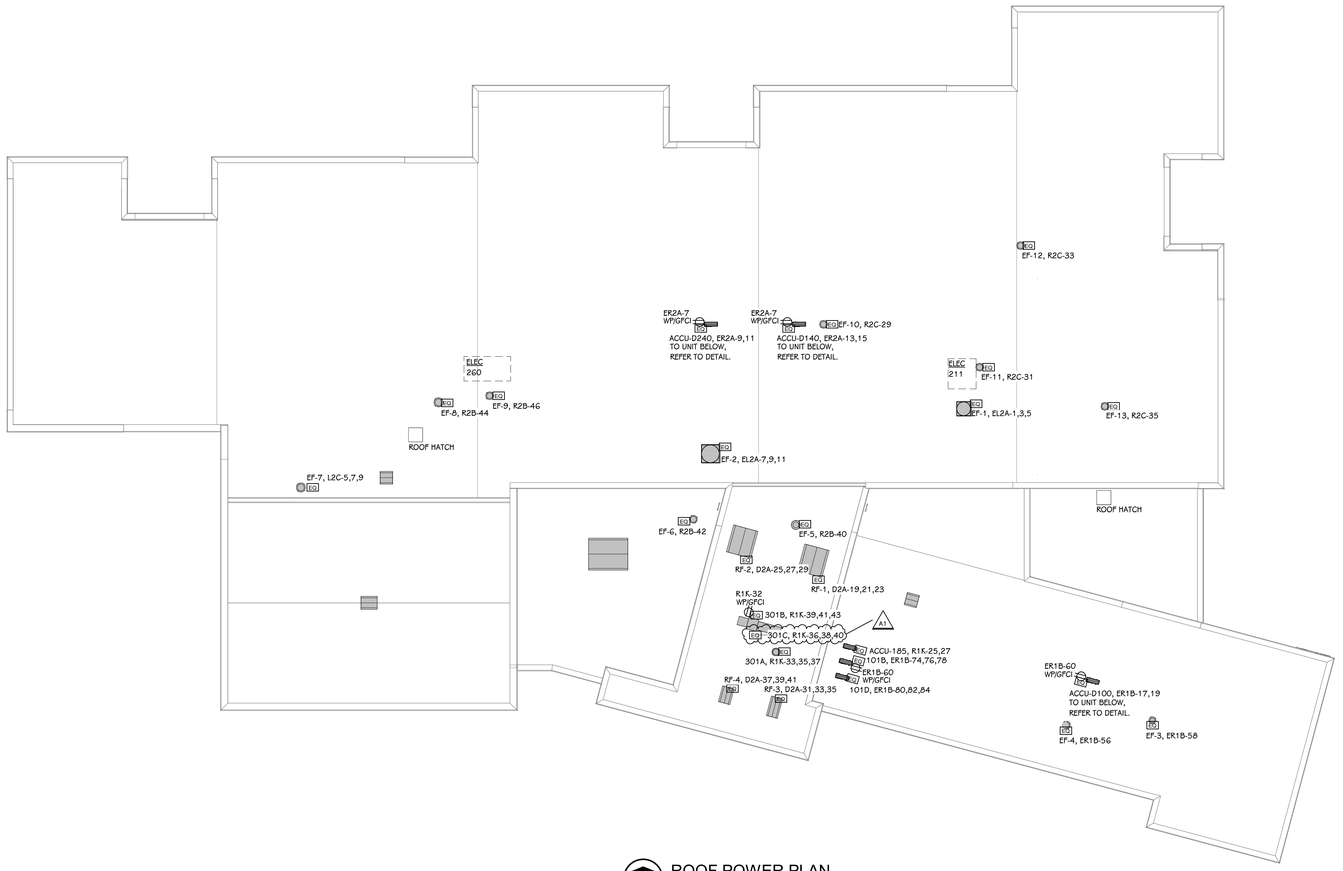
PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
SECOND FLOOR POWER PLAN - UNIT D

DATE
MAY 17, 2023

SHEET NUMBER
E 102D
21-237.10



ROOF POWER PLAN
1/16" = 1'-0"

POWER KEYED NOTES

1 BACKBOARD CONTROLS SHALL HAVE RAISE/LOWER SWITCH AND HEIGHT ADJUSTMENT CONTROLS.

2 OTHER OUTLETS ARE SERVED FROM LOAD SIDE OF GFCI OUTLET OR BREAKER

3 REFER TO GENERAL NOTES: PROVIDE 4" HOUSEKEEPING PADS FOR MDP, ALL TRANSFORMERS, AND ALL FLOOR MOUNTED EQUIPMENT. PROVIDE FLEXIBLE CONNECTION TO TRANSFORMERS AND SIMILAR EQUIPMENT PER SPECIFICATIONS. AREAS WITHOUT KEYNOTE DO NOT ALLEVIATE CONTRACTOR FROM GENERAL NOTE REQUIREMENTS.

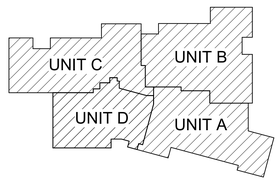
4 CONCEAL SINK SENSOR RECEPTACLES BEHIND LAV SHIELD. COORDINATE EXACT LOCATION AND MOUNTING HEIGHT OF UNDER SINK RECEPTACLES WITH MECHANICAL CONTRACTOR PRIOR TO INSTALLATION. FEED FROM LOAD SIDE OF ABOVE COUNTER GFCI RECEPTACLE.

5 LOW VOLTAGE TRANSFORMER AND BACKBOXES FOR FLUSH VALVES. COORDINATE LOCATION AND ADDITIONAL INSTALLATION REQUIREMENTS WITH MECHANICAL CONTRACTOR.

6 ELECTRIC ELEVATOR; CONNECT TO FIRE ALARM SYSTEM AND TELEPHONE SYSTEM WITH DEDICATED PHONE LINE. ALL DISCONNECTS SHALL HAVE AUX CONTACTS. COORDINATE FUSE SIZE FOR ELEVATOR POWER CIRCUIT WITH SHOP DRAWINGS. COORDINATE ALL INSTALLATION REQUIREMENTS WITH ELEVATOR CONTRACTOR. CONCEAL ALL DISCONNECTS IN LOCKABLE CABINET.

7 MOUNT DEVICE(S) IN TOE KICK AREA OF CASEWORK; CONCEAL ALL CONDUIT IN CAVITIES OF CASEWORK. COORDINATE WITH GENERAL TRADES.

CENTRAL ELEMENTARY



TRUE NORTH

KEY PLAN
SCALE: NO SCALE

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PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
ROOF POWER PLAN

DATE
MAY 17, 2023

SHEET NUMBER
E 103
21-237.10

TO UTILITY

SWITCH S2-A
PME-7

100A

#3 MV105
W/ #8 GND

CUSTOMER OWNED
MEDIUM VOLTAGE
PRIMARY TRANSFORMER

TX-MDP
PRI-1500kVA
8320V
480/277V

METER CAPABLE OF RECORDING TRANSIENTS AND WAVEFORMS

ARC FLASH HAZARD REDUCTION MAINTENANCE SWITCH,
LOCATED ON MDP.

AFM

M

MDP
480/277V 3Ø, 4W
DEMAND: 1214A

2000A/3P
ET
GFP
UL5E

GROUND BUS

#3/0 Cu GND (TYP)

WATER MAIN

10'-0"
GROUND ROD

10' SPACING (TYP)

SERVICE ENTRANCE SPD SCHEDULE

VOLTAGE	SWITCHBOARD AMPS	RAYVOSS SPD MODEL	SURGE RATING	PROTECTION MODES	MAX WIRE	MIN BREAKER
480/277V Wye	2000A-4000A	277-3Y-A1-7-04-C-H	200kA/Mode	L-N, L-G, N-G	4/0	100A

BRANCH PANEL SPD SCHEDULE

VOLTAGE	PANEL AMPS	RSE2 SPD MODEL	SURGE RATING	PROTECTION MODES	BREAKER AMPS
208/120V Wye	Up to 400A	RSE-2-120-3Y-A-05-E-F-S	50kA/Mode	L-N, L-G, N-G	30A
208/120V Wye	400A-2000A	RSE-2-120-3Y-A-10-E-F-S	100kA/Mode	L-N, L-G, N-G	60A
480/277V Wye	Up to 400A	RSE-2-277-3Y-A-05-E-F-S	50kA/Mode	L-N, L-G, N-G	30A

300A/3P ET — 5PD

TX-5DP
225kVA
115° RISE
208/120V
480V

5DP
208/120V 3Ø, 4W
DEMAND: 479A
800A/3P ET

225A/3P — PANEL R1A (TUB2) 5PD — DEMAND: 60A
225A/3P — PANEL R1B (TUB2) 5PD — DEMAND: 105A
225A/3P — PANEL R1C (TUB2) 5PD — DEMAND: 77A
225A/3P — PANEL R1K 5PD — DEMAND: 132A
225A/3P — PANEL R2A 5PD — DEMAND: 36A
225A/3P — PANEL R2B (TUB2) 5PD — DEMAND: 85A
225A/3P — PANEL R2C (TUB2) 5PD — DEMAND: 64A
225A/3P — 5PARES PER PANEL SCHEDULE

60A/3P — PANEL L1A 5PD — DEMAND: 17A
60A/3P — PANEL L2A 5PD — DEMAND: 9A
60A/3P — PANEL L1B 5PD — DEMAND: 16A
60A/3P — PANEL L2C 5PD — DEMAND: 11A
60A/3P ET — DEMAND: 462A — EQUIPMENT C1

250A/3P — 5PARE
250A/3P — 5PARE
100A/3P — 5PARE
60A/3P — 5PARE
30A/3P — 5PARE
175A/3P — ATS
70A/3P — ATS

175KW DIESEL GENERATOR

GENERATOR

175A/3P — ATS E N
70A/3P K — ATS E N

PERMANENT GENERATOR
K
PORTABLE GENERATOR CONNECTION
LOAD BANK CONNECTION SHUNT TRIP

PROVIDE NEC 700.10 COMPLIANT FEED FOR ALL EL FEEDERS.

ATS-L5

D2A
480/277V 3Ø, 4W
DEMAND: 190A

80A/3P — 5PD — DEMAND: 62A — EQUIPMENT AHU1
80A/3P — DEMAND: 62A — EQUIPMENT AHU2
35A/3P — DEMAND: 14A — EQUIPMENT AHU3
35A/3P — DEMAND: 11A — EQUIPMENT AHU4
5PARES PER PANEL SCHEDULE

DEMAND: 49A
PANEL EL1A 5PD

480V
TX-ER1C
15kVA
115° RISE
208/120V

DEMAND: 24A — PANEL EL2A 5PD
DEMAND: 27A — PANEL ER1C 5PD

D1A
480/277V 3Ø, 4W
DEMAND: 145A

40A/3P — SPARES PER PANEL SCHEDULE
50A/3P — DEMAND: 26A — EQUIPMENT ACCU-1
60A/3P — DEMAND: 34A — EQUIPMENT ACCU-2
60A/3P — DEMAND: 27A — EQUIPMENT P3
60A/3P — DEMAND: 27A — EQUIPMENT P4
30A/3P — DEMAND: 14A — EQUIPMENT AHU5
30A/3P — 5PD

ED1A
480/277V 3Ø, 4W
DEMAND: 110A
175A/3P A1

45A/3P — 5PD — 480V TX-ER1A 30kVA 115° RISE 208/120V — DEMAND: 52A — PANEL ER1A 5PD — DEMAND: 25A — PANEL ER2A 5PD
125A/3P — 480V TX-ER1B 75kVA 115° RISE 208/120V — DEMAND: 129A — PANEL ER1B 5PD
100A/3P — SPARES PER PANEL SCHEDULE

ED2A
480/277V 3Ø, 4W
DEMAND: 37A
A1

20A/3P — 5PD — DEMAND: 5A — EQUIPMENT B1
20A/3P — DEMAND: 14A — EQUIPMENT P1
20A/3P — DEMAND: 5A — EQUIPMENT B2
20A/3P — DEMAND: 14A — EQUIPMENT P2
SPARES PER PANEL SCHEDULE

NOTE:
REFER TO PANEL FEEDER SCHEDULE FOR EACH PANEL, TRANSFORMER AND ATS FEEDER SIZE.

REFER TO MECHANICAL EQUIPMENT SCHEDULE FOR EACH EQUIPMENT FEEDER SIZE.

DISCONNECT SIZES TO BE NEXT NOMINAL SIZE UP FROM FEEDER BREAKER SIZE.

PANEL LABEL NOMENCLATURE:

MAIN DISTRIBUTION PANEL	MDP	EMDP	EMERGENCY MAIN DISTRIBUTION PANEL
DISTRIBUTION PANEL	D	ED	EMERGENCY DISTRIBUTION PANEL
LIGHTING PANEL	L	EL	EMERGENCY LIGHTING PANEL (LIFE SAFETY)
SECONDARY DISTRIBUTION PANEL	S	ES	EMERGENCY SECONDARY DISTRIBUTION PANEL
RECEPTACLE BRANCH PANEL	R	ER	EMERGENCY RECEPTACLE BRANCH PANEL

ER1A-##

- CIRCUIT BREAKER NUMBER
A - SEQUENCE OR AREA
1 - FLOOR LEVEL (OMITTED IF SINGLE)
R - PANEL TYPE (SEE ABOVE)
E - EMERGENCY

TRANSFORMER/ATS LABEL NOMENCLATURE:

TX-R1A

NAME OF PANEL SERVED FROM SECONDARY
TX - TRANSFORMER PREFIX, ATS - AUTO TRANSFER SWITCH

ELECTRICAL ONE LINE

SCALE: NONE

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PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
ELECTRICAL ONE LINE

DATE
MAY 17, 2023

SHEET NUMBER
E 401
21-237.10

ELECTRICAL HVAC FEEDER SCHEDULE

DESCRIPTION	FED FROM	DISCONNECT MEANS	CURRENT (FLA)	DEMAND (FLA)	FEEDER BREAKER / POLES	FEEDER # OF SETS	FEEDER WIRE	FEEDER GROUND	FEEDER EMT	ACCUM VOLT DROP %	NOTES
480 V											
HVAC - ACCU-1	D1A		26 A	26 A	40 A / 3	1 SET	3 #8	#10 GND.	3/4"	1.2%	
HVAC - ACCU-2	D1A		34 A	34 A	50 A / 3	1 SET	3 #8	#10 GND.	3/4"	1.5%	
HVAC - AHU1	D2A		62 A	62 A	80 A / 3	1 SET	3 #4	#8 GND.	1 1/4"	2.3%	
HVAC - AHU2	D2A		62 A	62 A	80 A / 3	1 SET	3 #4	#8 GND.	1 1/4"	2.2%	
HVAC - AHU3	D2A		14 A	14 A	35 A / 3	1 SET	3 #8	#10 GND.	3/4"	1.8%	
HVAC - AHU4	D2A		11 A	11 A	35 A / 3	1 SET	3 #8	#10 GND.	3/4"	1.7%	
HVAC - AHU5	D1A		14 A	14 A	30 A / 3	1 SET	3 #10	#10 GND.	3/4"	0.9%	
HVAC - B1	ED2A		5 A	5 A	20 A / 3	1 SET	3 #12	#12 GND.	3/4"	1.2%	
HVAC - B2	ED2A		5 A	5 A	20 A / 3	1 SET	3 #12	#12 GND.	3/4"	1.2%	
HVAC - C1	MDP		462 A	462 A	600 A / 3	2 SETS	3 #500 KCMIL	#1 GND.	3 1/2"	0.7%	4
HVAC - EF-1	EL2A		5 A	5 A	15 A / 3	1 SET	3 #12	#12 GND.	3/4"	2.0%	
HVAC - EF-2	EL2A		14 A	14 A	25 A / 3	1 SET	3 #10	#10 GND.	3/4"	2.2%	
HVAC - EF-7	L2C		8 A	8 A	20 A / 3	1 SET	3 #12	#12 GND.	3/4"	0.9%	
HVAC - P1	ED2A		14 A	14 A	20 A / 3	1 SET	3 #12	#12 GND.	3/4"	1.5%	
HVAC - P2	ED2A		14 A	14 A	20 A / 3	1 SET	3 #12	#12 GND.	3/4"	1.5%	
HVAC - P3	D1A		27 A	27 A	60 A / 3	1 SET	3 #6	#10 GND.	1"	0.9%	
HVAC - P4	D1A		27 A	27 A	60 A / 3	1 SET	3 #6	#10 GND.	1"	0.9%	
HVAC - P-5	D2A		2 A	2 A	15 A / 3	1 SET	3 #12	#12 GND.	3/4"	1.7%	
HVAC - P-6	D2A		2 A	2 A	15 A / 3	1 SET	3 #12	#12 GND.	3/4"	1.7%	
HVAC - RF-1	D2A		14 A	14 A	25 A / 3	1 SET	3 #10	#10 GND.	3/4"	2.2%	
HVAC - RF-2	D2A		14 A	14 A	25 A / 3	1 SET	3 #10	#10 GND.	3/4"	2.1%	
HVAC - RF-3	D2A		5 A	5 A	15 A / 3	1 SET	3 #12	#12 GND.	3/4"	1.8%	
HVAC - RF-4	D2A		5 A	5 A	15 A / 3	1 SET	3 #12	#12 GND.	3/4"	1.8%	
POWER - ELEV-1	D1A		18 A	18 A	25 A / 3	1 SET	3 #3	#8 GND.	1 1/4"	0.7%	
208 V											
HVAC - 101B - COOLER COMPRESSOR	ER1B		10 A	10 A	20 A / 3	1 SET	3 #12	#12 GND.	3/4"	3.1%	
HVAC - 101D - FREEZER COMPRESSOR	ER1B		15 A	15 A	20 A / 3	1 SET	3 #8	#8 GND.	3/4"	2.0%	
HVAC - SLS - SEWAGE LIFT STATION	ER1B		24 A	24 A	35 A / 3	1 SET	3 #6	#8 GND.	1"	2.5%	
RECEPTACLE - KILN L15-50	R1B		40 A	40 A	50 A / 3	1 SET	4 #6	#8 GND.	1"	4.1%	
208 V											
HVAC - ACCU-185	R1K		40 A	40 A	60 A / 2	1 SET	2 #6	#10 GND.	1"	3.5%	3
HVAC - ACCU-D100	ER1B		10 A	10 A	15 A / 2	1 SET	2 #12	#12 GND.	3/4"	2.3%	3
HVAC - ACCU-D140	ER2A		10 A	10 A	15 A / 2	1 SET	2 #12	#12 GND.	3/4"	3.7%	3
HVAC - ACCU-D240	ER2A		10 A	10 A	15 A / 2	1 SET	2 #12	#12 GND.	3/4"	3.3%	3
HVAC - SS-185A, B	R1K		2 A	2 A	15 A / 2	1 SET	2 #12	#12 GND.	3/4"	2.0%	
RECEPTACLE - CLINIC 104, DRYER	ER1B		30 A	30 A	40 A / 2	1 SET	2 #8	#10 GND.	3/4"	2.1%	
RECEPTACLE - WD-1	R1K		30 A	30 A	40 A / 2	1 SET	2 #8	#10 GND.	3/4"	3.1%	

GENERAL: CONDUIT SIZES BASED ON EMT AND COPPER CONDUCTORS UNLESS OTHERWISE NOTED. UPSIZE AS REQUIRED WHERE PVC OR GALVANIZED IS USED OR REQUIRED PER SPECIFICATIONS.

1 PROVIDE DRY CONTACT FROM GENERATOR ATS TO ELEVATOR CONTROLLER TO INDICATE GENERATOR RUNNING ON EMERGENCY POWER.

2 PROVIDE RAINTIGHT DISCONNECT AT EQUIPMENT ON ROOF AND REMOTE STARTER IN ELECTRICAL ROOM.

3 PROVIDE CONNECTION TO ROOFTOP EQUIPMENT AND INTERCONNECT BETWEEN OUTSIDE UNIT AND INTERIOR UNIT. REFER TO MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE RAINTIGHT DISCONNECT ON EXTERIOR UNIT.

4 PROVIDE COPPER CONDUCTORS ONLY FOR CHILLER, ALUMINUM CONDUCTORS ARE NOT ACCEPTABLE FOR USE WITH CHILLER CONNECTIONS. DO NOT INCLUDE CHILLER FEEDS IN ANY ALUMINUM FEEDER ALTERNATES (VOLUNTARY OR ON DRAWINGS).

TERMINAL UNITS	
LEVEL	COUNT
FIRST FLOOR	43
SECOND FLOOR	26
Grand total: 69	

ELECTRICAL PANEL FEEDER SCHEDULE

DESCRIPTION	FED FROM	CURRENT (FLA)	DEMAND (FLA)	FEEDER BREAKER / POLES	FEEDER # OF SETS	FEEDER WIRE	FEEDER GROUND	FEEDER EMT	ACCUM VOLT DROP %	NOTES
480 V										
ATS	MDP	126 A	110 A	175 A / 3	1 SET	4 #300 KCMIL AL	#4 AL GND.	3"	0.6%	
ATS	GENERATOR	126 A	110 A	175 A / 3	1 SET	4 #300 KCMIL AL	#4 AL GND.	3"	0.0%	
ATS-L5	MDP	49 A	49 A	80 A / 3	1 SET	4 #4	#8 GND.	1 1/4"	0.7%	
ATS-L5	GENERATOR	49 A	49 A	80 A / 3	1 SET	4 #4	#8 GND.	1 1/4"	0.0%	
D1A	MDP	145 A	145 A	250 A / 3	2 SETS	4 #3/0 AL	#2 AL GND.	2 1/2"	0.5%	
D2A	MDP	191 A	191 A	250 A / 3	2 SETS	4 #3/0 AL	#2 AL GND.	2 1/2"	1.6%	
ED1A	ATS	126 A	110 A	175 A / 3	1 SET	4 #300 KCMIL AL	#4 AL GND.	3"	0.7%	
ED2A	ED1A	38 A	38 A	100 A / 3	1 SET	4 #1/0 AL	#6 AL GND.	2"	1.0%	
EL1A	ATS-L5	49 A	49 A	70 A / 3	1 SET	4 #4	#8 GND.	1 1/4"	0.9%	
EL2A	EL1A	25 A	25 A	60 A / 3	1 SET	4 #6	#10 GND.	1"	1.4%	
L1A	MDP	18 A	18 A	60 A / 3	1 SET	4 #6	#10 GND.	1"	0.8%	
L1B	MDP	17 A	17 A	60 A / 3	1 SET	4 #6	#10 GND.	1"	1.2%	
L2A	MDP	9 A	9 A	60 A / 3	1 SET	4 #6	#10 GND.	1"	0.9%	
L2C	MDP	12 A	12 A	60 A / 3	1 SET	4 #6	#10 GND.	1"	0.7%	
MDP	TX-MDP	1341 A	1221 A	2000 A / 3	8 SETS	4 #600 KCMIL AL	#3/0 G.E.C.	4"	0.4%	
208 V										
ER1A	TX-ER1A	54 A	52 A	100 A / 3	1 SET	4 #1/0 AL	#6 AL G.E.C.	2"	0.3%	
ER1B	TX-ER1B	151 A	129 A	225 A / 3	1 SET	4 #400 KCMIL AL	#1/0 AL G.E.C.	3 1/2"	0.3%	
ER1C	TX-ER1C	28 A	28 A	60 A / 3	1 SET	4 #6	#8 G.E.C.	1"	0.4%	
ER2A	ER1A	26 A	26 A	60 A / 3	1 SET	4 #6	#10 GND.	1"	2.4%	
R1A	SDP	81 A	61 A	225 A / 3	1 SET	4 #400 KCMIL AL	#2 AL GND.	3 1/2"	0.6%	
R1B	SDP	161 A	105 A	225 A / 3	1 SET	4 #400 KCMIL AL	#2 AL GND.	3 1/2"	1.5%	
R1C	SDP	100 A	77 A	225 A / 3	1 SET	4 #400 KCMIL AL	#2 AL GND.	3 1/2"	0.4%	
R1K	SDP	148 A	147 A	225 A / 3	1 SET	4 #500 KCMIL AL	#1 AL GND.	3 1/2"	1.8%	
R2A	SDP	43 A	37 A	225 A / 3	1 SET	4 #400 KCMIL AL	#2 AL GND.	3 1/2"	0.4%	
R2B	SDP	111 A	86 A	225 A / 3	1 SET	4 #400 KCMIL AL	#2 AL GND.	3 1/2"	0.5%	
R2C	SDP	76 A	65 A	225 A / 3	1 SET	4 #400 KCMIL AL	#2 AL GND.	3 1/2"	1.0%	
SDP	TX-SDP	721 A	494 A	800 A / 3	4 SETS	4 #600 KCMIL AL	#3/0 G.E.C.	4"	0.3%	

GENERAL: CONDUIT SIZES BASED ON EMT. UPSIZE AS REQUIRED WHERE PVC OR GALVANIZED IS USED OR REQUIRED PER SPECIFICATIONS.

1 CONDUIT SIZES BASED ON EMT AND COPPER CONDUCTORS (UNLESS OTHERWISE INDICATED WITH AN "AL" FOR ALUMINUM). UPSIZE AS REQUIRED WHERE PVC OR GALVANIZED IS USED OR REQUIRED PER SPECIFICATIONS.

2 G.E.C. = GROUNDING ELECTRODE CONDUCTOR FOR SEPARATELY DERIVED SYSTEM (PER SET, USE EQUIVALENT CMIL AND GEC FROM 250.66)

3 GND. = EQUIPMENT GROUNDING CONDUCTOR (E.G.C.)

ELECTRICAL KITCHEN FEEDER SCHEDULE

DESCRIPTION	FED FROM	CURRENT (FLA)	DEMAND (FLA)	FEEDER BREAKER / POLES	FEEDER # OF SETS	FEEDER WIRE	FEEDER GROUND	FEEDER EMT	ACCUM VOLT DROP %	NOTES
208 V										
KITCHEN - 301A - EXHAUST FAN & CURB	R1K	10 A	10 A	20 A / 3	1 SET	3 #12	#12 GND.	3/4"	2.9%	
KITCHEN - 301B - MAKE-UP AIR UNIT	R1K	15 A	15 A	25 A / 3	1 SET	3 #10	#10 GND.	3/4"	2.3%	
KITCHEN - 301C - MAU CONDENSING UNIT	R1K	15 A	15 A	20 A / 3	1 SET	3 #12	#12 GND.	3/4"	3.6%	
208 V										
KITCHEN - 101C - FREEZER COIL	ER1B	5 A	5 A	20 A / 2	1 SET	2 #12	#12 GND.	3/4"	1.7%	
KITCHEN - 401 - HOT FOOD TABLE	R1K	34 A	34 A	45 A / 2	1 SET	3 #8	#10 GND.	3/4"	3.7%	

ELECTRICAL TRANSFORMER SCHEDULE

TRANSFORMER NAME	FED FROM	SIZE	PRIMARY VOLTAGE (V)	PRIMARY FEEDER BREAKER / POLES	PRIMARY FEEDER # OF SETS	PRIMARY FEEDER WIRE	PRIMARY FEEDER GROUND	PRIMARY FEEDER EMT
TX-ER1A	ED1A	30 kVA	480 V	45 A / 3	1 SET	3 #6	#10 GND.	1"
TX-ER1B	ED1A	75 kVA	480 V	125 A / 3	1 SET	3 #3/0 AL	#4 AL GND.	2"
TX-MDP	UTILITY	1500 kVA	8320 V	100 A / 3	1 SET	3 #3	#8 GND.	1 1/4"
TX-ER1C	EL1A	15 kVA	480 V	70 A / 3	1 SET	3 #4	#8 GND.	1 1/4"
TX-SDP	MDP	225 kVA	480 V	300 A / 3	2 SETS	3 #400 KCMIL AL	#1/0 AL GND.	3"

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ADD. No. 1 JUN 5, 2023
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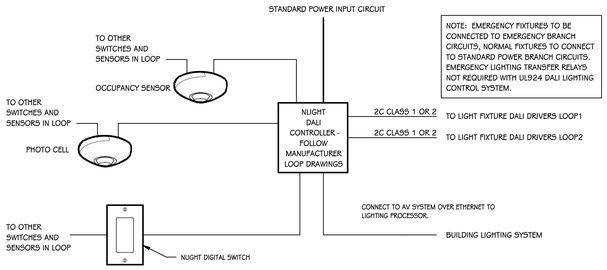
PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
ELECTRICAL CONNECTION SCHEDULES

DATE
MAY 17, 2023

SHEET NUMBER
E 402
21-237.10



TYPICAL DALI CONTROL DIAGRAM

SCALE: NONE

LIGHT FIXTURE SCHEDULE

TYPE	SERIES	DESCRIPTION	MOUNTING	DRIVER	WATTS	MANUFACTURER	NOTES
CA4	CA4	RECESSED DOWNLIGHT	RECESSED	DALI	14 VA	GOTHAM #EVO4-40/15-AR-LSS-MD-MVOLT-EDAB	1, 2, 3
CAG	CAG	RECESSED DOWNLIGHT	RECESSED	DALI	20 VA	GOTHAM #EVOG-40/20-AR-LSS-MD-MVOLT-EDAB	1, 2, 3
CB9-D	CB9-D	RECESSED DOWNLIGHT	RECESSED	DALI	28 VA	FLUXWERX #TC1-R-09-D-K2-C-C-M1-8-40-E-E3-M	1, 2, 3
EM4*	EM	PENDANT LINEAR, 4' - 0" LONG	PENDANT	DALI	36 VA	FINELITE #HP4 P D (LENGTH) V 840 F 96LG 277 SC FC DALI 1%	1, 2, 3, 4, 5
GL36	GL36	RECESSED GLOWRING 36"	AIRCRAFT CABLE	DALI	55 VA	OCL #GL1 C1ND 36 MW XXX LED1 840K UNV DALI 44" MOD071967	1, 2, 3
GL48	GL48	RECESSED GLOWRING 48"	AIRCRAFT CABLE	DALI	70 VA	OCL #GL1 C1ND 48 MW XXX LED1 840K UNV DALI 44" MOD071967	1, 2, 3
GL72	GL72	RECESSED GLOWRING 72"	RECESSED	DALI	100 VA	OCL #GL1 C1ND 72 MW XXX LED1 840K UNV DALI 44" MOD071967	1, 2, 3
HA	HA	HIGH BAY	PENDANT	DALI	185 VA	LITHONIA #IBL 24000LM GL MD MVOLT MEDDO365 40K BAL DWH20	1, 2, 3
IA	IA	INDUSTRIAL STRIP	CHAIN	DALI	41 VA	LITHONIA #CLX L48 5000LM HEF FDL MVOLT DALI 40K 80CRI WH MEZ185678	1, 2, 3
IB	IB	INDUSTRIAL STRIP	SURFACE	DALI	41 VA	LITHONIA #CLX L48 5000LM HEF FDL MVOLT DALI 40K 80CRI WH MEZ185678	1, 2, 3, 7
LA6*	LA	PENDANT LINEAR, 6' - 0" LONG	PENDANT	DALI	54 VA	FINELITE #HP4 P D (LENGTH) V 840 F 96LG 277 SC FC DALI 1% FA10O	1, 2, 3, 4, 5
LA8*	LA	PENDANT LINEAR, 8' - 0" LONG	PENDANT	DALI	72 VA	FINELITE #HP4 P D (LENGTH) V 840 F 96LG 277 SC FC DALI 1% FA10O	1, 2, 3, 4, 5
LA10*	LA	PENDANT LINEAR, 10' - 0" LONG	PENDANT	DALI	90 VA	FINELITE #HP4 P D (LENGTH) V 840 F 96LG 277 SC FC DALI 1% FA10O	1, 2, 3, 4, 5
PA2	PA2	SURFACE ROUND 24"	SURFACE	DALI	44 VA	FOCAL POINT #FSDEP 2 FL 5000DN 840K 1C UNV D11 SM XX	1, 2, 3
PA3	PA3	SURFACE ROUND 36"	SURFACE	DALI	43 VA	FOCAL POINT #FSDEP 3 FL 5000DN 840K 1C UNV D11 SM XX	1, 2, 3
PB2	PB2	PENDANT ROUND 24"	AIRCRAFT CABLE	DALI	44 VA	FOCAL POINT #FSDEP 2 FL 5000DN 840K 1C UNV D11 C9G XX	1, 2, 3
PB3	PB3	PENDANT ROUND 36"	AIRCRAFT CABLE	DALI	43 VA	FOCAL POINT #FSDEP 3 FL 5000DN 840K 1C UNV D11 C9G XX	1, 2, 3
PB3-A	PB3-A	PENDANT ACOUSTIC (NON-LIT) 36"	AIRCRAFT CABLE	N/A	0 VA	FOCAL POINT #AUSDEP 3 C9G XXX XX	1, 2
PB4-A	PB4-A	PENDANT ACOUSTIC (NON-LIT) 48"	AIRCRAFT CABLE	N/A	0 VA	FOCAL POINT #AUSDEP 4 C9G XXX XX	1, 2
PC4	PC4	PENDANT CYLINDER 3.5"	AIRCRAFT CABLE	DALI	26 VA	FOCAL POINT #FLCY2 RD XX 1700L 840K 1C UNV PC D11 C144 DNT FL2 WD XX	1, 2, 3
PC4	PC4	PENDANT CYLINDER 3.5", 0' - 3" LONG	AIRCRAFT CABLE	DALI	26 VA	FOCAL POINT #FLCY2 RD XX 1700L 840K 1C UNV PC D11 C144 DNT FL2 WD XX	1, 2, 3
PD36	PD36	PENDANT RING 36"	AIRCRAFT CABLE	DALI	77 VA	LUMENWERX #CURVMRIP DI 3 HLO HLO 5W 90 750 750 40 UNV RDA 2C POC CF 5C XXXIN XX CF#	1, 2, 3
PD48	PD48	PENDANT RING 48"	AIRCRAFT CABLE	DALI	77 VA	LUMENWERX #CURVMRIP DI 4 HLO HLO 5W 90 750 750 40 UNV RDA 2C POC CF 5C XXXIN XX CF#	1, 2, 3
PD72	PD72	PENDANT RING 72"	AIRCRAFT CABLE	DALI	77 VA	LUMENWERX #CURVMRIP DI 6 HLO HLO 5W 90 750 750 40 UNV RDA 2C POC CF 5C XXXIN XX CF#	1, 2, 3
PE	PE	SURFACE DISC	SURFACE	DALI	25 VA	OCL CT1-C1NA-14-WM-COLOR-LED2-40K-UNV-OAH48-DALI	1, 2, 3
RA2*	RA	LINEAR RECESSED, 2' - 0" LONG	RECESSED GYP	DALI	37 VA	FINELITE #HP4 R D XX V 840 F 96LG 277 SC FC DALI 1% VF ####	1, 2, 3, 4, 5
RA3*	RA	LINEAR RECESSED, 3' - 0" LONG	RECESSED GYP	DALI	56 VA	FINELITE #HP4 R D XX V 840 F 96LG 277 SC FC DALI 1% VF ####	1, 2, 3, 4, 5
RA4*	RA	LINEAR RECESSED, 4' - 0" LONG	RECESSED GYP	DALI	74 VA	FINELITE #HP4 R D XX V 840 F 96LG 277 SC FC DALI 1% VF ####	1, 2, 3, 4, 5
RA6*	RA	LINEAR RECESSED, 6' - 0" LONG	RECESSED GYP	DALI	111 VA	FINELITE #HP4 R D XX V 840 F 96LG 277 SC FC DALI 1% VF ####	1, 2, 3, 4, 5
RA8*	RA	LINEAR RECESSED, 8' - 0" LONG	RECESSED GYP	DALI	148 VA	FINELITE #HP4 R D XX V 840 F 96LG 277 SC FC DALI 1% VF ####	1, 2, 3, 4, 5
RB4*	RB	LINEAR RECESSED, 4' - 0" LONG	RECESSED GRID	DALI	28 VA	FINELITE #HP4 R D XX V 840 F 96LG 277 SC FC DALI 1% C1 ####	1, 2, 3
RB6*	RB	LINEAR RECESSED, 6' - 0" LONG	RECESSED GRID	DALI	42 VA	FINELITE #HP4 R D XX V 840 F 96LG 277 SC FC DALI 1% C1 ####	1, 2, 3
RB8*	RB	LINEAR RECESSED, 8' - 0" LONG	RECESSED GRID	DALI	56 VA	FINELITE #HP4 R D XX V 840 F 96LG 277 SC FC DALI 1% C1 ####	1, 2, 3
RB10*	RB	LINEAR RECESSED, 10' - 0" LONG	RECESSED GRID	DALI	70 VA	FINELITE #HP4 R D XX V 840 F 96LG 277 SC FC DALI 1% C1 ####	1, 2, 3
RB12*	RB	LINEAR RECESSED, 12' - 0" LONG	RECESSED GRID	DALI	84 VA	FINELITE #HP4 R D XX V 840 F 96LG 277 SC FC DALI 1% C1 ####	1, 2, 3
RB20*	RB	LINEAR RECESSED, 20' - 0" LONG	RECESSED GRID	DALI	140 VA	FINELITE #HP4 R D XX V 840 F 96LG 277 SC FC DALI 1% C1 ####	1, 2, 3
TA	TA	2x2 TROFFER, 2' - 0" LONG	RECESSED GRID	DALI	37 VA	FINELITE: #HPR LED-F-2X2-DCO-8-840-277V-SC-C1-OBO	1, 2
U	U	LED WALL PACK	WALL	DALI	46 VA	LITHONIA: #DSXW1 LED-20C-700-40K-T3M-MVOLT-DBW-PE-DBLXD	1, 2, 3, 4
WA6	WA6	WALL MOUNT LINEAR, 6' - 0" LONG	WALL	DALI	109 VA	FINELITE #HP 4 WM D XX V 840 F 96LG 277 SC FC DALI 1% MB FE ####	1, 2, 3
WA8	WA8	WALL MOUNT LINEAR, 8' - 0" LONG	WALL	DALI	145 VA	FINELITE #HP 4 WM D XX V 840 F 96LG 277 SC FC DALI 1% MB FE ####	1, 2, 3
WA12	WA12	WALL MOUNT LINEAR, 12' - 0" LONG	WALL	DALI	217 VA	FINELITE #HP 4 WM D XX V 840 F 96LG 277 SC FC DALI 1% MB FE ####	1, 2, 3
WA12C	WA12	WALL MOUNT LINEAR, 12' - 0" LONG	WALL	DALI	217 VA	FINELITE #HP 4 WM D XX V 840 F 96LG 277 SC FC DALI 1% MB FE ####	1, 2, 3
X1	X1	EXIT SIGN - SINGLE FACE	SURFACE	N/A	5 VA	LITHONIA: #EDG-1-RMR-EL	1, 2
X1M	X1M	EXIT SIGN - SINGLE FACE	SURFACE	N/A	5 VA	LITHONIA: #EDG-1-RMR-EL	1, 2
X2	X2	EXIT SIGN - DOUBLE FACE	SURFACE	N/A	5 VA	LITHONIA: #EDG-2-RMR-EL	1, 2
X3	X3	EXIT SIGN - HIGH ABUSE	SURFACE	N/A	5 VA	LITHONIA: #LV-S-W-1-R-120/277	1, 2

LIGHT FIXTURE SCHEDULE (SITE POLES)

TYPE	DESCRIPTION	MOUNTING	MANUFACTURER	NOTES
SA2	AREA SITE LIGHT	25' ROUND TAPERED AL POLE	LITHONIA: # DSX1 LED-P6-40K-T2M-277-RPA-NLTAIR2-PIRHN-DBLXD	1, 2
SA2H5	AREA SITE LIGHT	25' ROUND TAPERED AL POLE	LITHONIA: # DSX1 LED-P6-40K-T2M-277-RPA-NLTAIR2-PIRHN-H5-DBLXD	1, 2
SA4	AREA SITE LIGHT	25' ROUND TAPERED AL POLE	LITHONIA: # DSX1 LED-P6-40K-T4M-277-RPA-NLTAIR2-PIRHN-DBLXD	1, 2
SA5	AREA SITE LIGHT	25' ROUND TAPERED AL POLE	LITHONIA: # DSX1 LED-P6-40K-T5M-277-RPA-NLTAIR2-PIRHN-DBLXD	1, 2
SB5	AREA PATHWAY LIGHT	14' ROUND TAPERED AL POLE	LITHONIA: # RADPT LED-P4-40K-SYM-MVOLT-PT4-NLTAIR2-PIR-DBLBXD	1, 2
SC	SIGN FLOOD LIGHT	6" CONCRETE BASE	HYDREL: 4750L-4-500-40K-MVOLT-WFL-KM-PSSA-INJB-ZT-BL	1, 2

LIGHT FIXTURE SCHEDULE - CUSTOM MITERED ASSEMBLIES

FIXTURES WITH MULTIPLE SEGMENTS, MITERED TRANSITIONS AND CUSTOM ASSEMBLIES. REFFER TO DRAWINGS FOR LENGTHS AND CONFIGURATION.

CUSTOM	SERIES	ESTIMATED TOTAL LENGTH	DESCRIPTION	MOUNTING	DRIVER	WATTS	MANUFACTURER	NOTES
LAA	LA	287' - 6"	PENDANT LINEAR	PENDANT	DALI	2588 VA	FINELITE #HP4 P D (LENGTH) V 840 F 96LG 277 SC FC DALI 1% FA10O	1, 2, 3, 4, 5
LAB	LA	294' - 0"	PENDANT LINEAR	PENDANT	DALI	2646 VA	FINELITE #HP4 P D (LENGTH) V 840 F 96LG 277 SC FC DALI 1% FA10O	1, 2, 3, 4, 5
LAC	LA	72' - 0"	PENDANT LINEAR	PENDANT	DALI	648 VA	FINELITE #HP4 P D (LENGTH) V 840 F 96LG 277 SC FC DALI 1% FA10O	1, 2, 3, 4, 5
LAD	LA	54' - 0"	PENDANT LINEAR	PENDANT	DALI	486 VA	FINELITE #HP4 P D (LENGTH) V 840 F 96LG 277 SC FC DALI 1% FA10O	1, 2, 3, 4, 5
RAC	RA	85' - 0"	LINEAR RECESSED	RECESSED GYP	DALI	1573 VA	FINELITE #HP4 R D XX V 840 F 96LG 277 SC FC DALI 1% VF ####	1, 2, 3, 4, 5
RBA	RB	21' - 0"	LINEAR RECESSED	RECESSED GRID	DALI	147 VA	FINELITE #HP4 R D XX V 840 F 96LG 277 SC FC DALI 1% C1 ####	1, 2, 3
RBB	RB	21' - 0"	LINEAR RECESSED	RECESSED GRID	DALI	147 VA	FINELITE #HP4 R D XX V 840 F 96LG 277 SC FC DALI 1% C1 ####	1, 2, 3

* FIELD COORDINATE AND FIELD MEASURE FOR CUSTOM LENGTH FIXTURES, LENGTHS PROVIDED ARE ROUNDED AND DEPEND ON FIELD CONDITIONS.

1 ALL LED FIXTURES TO HAVE WARRANTY TO MEET OR EXCEED WARRANTY INCLUDED IN BASIS OF DESIGN. FIXTURES LISTED AS EQUALS SHALL MEET DELIVERED LUMENS, CRI, EFFICACY AND OPTIONS OF THAT SPECIFIED. REFER TO SPECIFICATIONS 265100 AND 265600 FOR ADDITIONAL REQUIREMENTS.

2 THE MOUNTING DESCRIPTION IS GENERAL. REFER TO SHOP DRAWINGS AND MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR SPECIFIC MOUNTING DETAILS.

3 FIXTURES WITH THE CENTER CIRCLE SHADED SHALL BE CONNECTED TO EMERGENCY POWER. DALI SYSTEM SHALL TURN THE FIXTURE "ON" WHEN NORMAL POWER FAILS AT 100% OUTPUT.

4 FIXTURE LENGTH PER DRAWINGS.

5 ONLY SUBMIT ONE SET OF LINEAR FIXTURE INFORMATION PER FIXTURE SERIES WHERE VARIOUS LENGTH FIXTURES OF SAME SERIES ARE USED.

6 EXIT SIGNS DIRECTIONAL ARROWS TO BE CONFIRMED ON PLANS PRIOR TO ORDERING. ARROWS ON GRAPHICS MAY NOT MATCH THOSE OF DESCRIPTION DUE TO FACE DIRECTION IN REFERENCE.

7 PROVIDE SEPERATE UN-SWITCHED LEG OF LOCAL LIGHTING CIRCUIT TO THE FIXTURE'S INTERNAL BATTERY.

LIGHT FIXTURE TYPE NAME NOMENCLATURE:

FIXTURE STYLE		CEILING TYPE
TROFFER (2X4, 2X2)	T	D DRYWALL (GYP BOARD)
RECESSED LINEAR	R	G GRID CEILING (LAY-IN)
RECESSED DOWNLIGHT (CAN)	C	O OPEN EXPOSED CEILING
LINEAR PENDANT	L	W WOOD CEILING
WALL MOUNTED	W	M METAL CEILING
PENDANT CYLINDER	PC	
PENDANT DECORATIVE	PD	

(RECESSED LINEAR 8' EXAMPLE)

RA8*-EM
LP3A-9

- R - FIXTURE STYLE
- A - FIXTURE SERIES
- 8 - FIXTURE LENGTH OR DIAMETER
- * - CUSTOM LENGTH
- EM - EMERGENCY
- ## - PANEL/CIRCUIT NUMBER

(RECESSED DOWNLIGHT IN WOOD CEILING EXAMPLE)

CD-W-EM
LP3A-9

- C - FIXTURE STYLE
- A - FIXTURE SERIES
- W - CEILING TYPE
- EM - EMERGENCY
- ## - PANEL/CIRCUIT NUMBER

CUSTOM MULTI-SEGMENT LINEAR LIGHT FIXTURE NOMENCLATURE:

(RECESSED EXAMPLE)

RAB 8'-0"

- R - FIXTURE STYLE
- A - FIXTURE SERIES
- B - VARIATION OF FIXTURE SHAPES/LENGTH
- SEGMENT LENGTH
- 4'-0" SEGMENT LENGTH
- 4'-0" RISE/DROP SEGMENT LENGTH

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ISSUED FOR	DATE
ADD. No. 1	JUN 5, 2023

PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS

Portage, Michigan

SHEET TITLE
LIGHTING SCHEDULE AND DETAILS

DATE
MAY 17, 2023

SHEET NUMBER
E 420
21-237.10

PANELBOARD " SDP" LOAD SCHEDULE

PANEL: SDP **MOUNTING:** SURFACE **VOLTAGE:** 208/120V, 3PH, 4W
LOCATION: ELEC E160 / FIRST FLOOR **AMPS:** 800 A MB **FED FROM:** TX-SDP
ADDED ACCESSORIES: SPD **FEED-THRU LUGS...** **A.I.C. VALUE:** 25304 kAIR
(PROVIDE 25% HIGHER A.I.C. RATING)

	CIRCUIT DESCRIPTION	TRIP (A)	POLES	A (VA)		B (VA)		C (VA)		POLES	TRIP (A)	CIRCUIT DESCRIPTION	
1	R1C	225	3	12000	10360					3	225	R1A	2
3	--	--	--			11780	10810			--	--	--	4
5	--	--	--					12280	7990	--	--	--	6
7	R1B	225	3	19653	13976					3	225	R2B	8
9	--	--	--			18723	13262			--	--	--	10
11	--	--	--					19603	12868	--	--	--	12
13	R2C	225	3	9282	22614					3	225	R1K	14
15	--	--	--			8716	18568			--	--	--	16
17	--	--	--					9268	12228	--	--	--	18
19	R2A	225	3	6360	0					3	225	SPARE	20
21	--	--	--			4860	0			--	--	--	22
23	--	--	--					4440	0	--	--	--	24
25	SPARE	225	3	0	--					1	--	SPACE	26
27	--	--	--			0	--			1	--	SPACE	28
29	--	--	--					0	--	1	--	SPACE	30
31	SPACE	--	1	--	--					1	--	SPACE	32
33	SPACE	--	1			--	--			1	--	SPACE	34
35	SPACE	--	1					--	--	1	--	SPACE	36
37	SURGE PROTECTIVE DEVICE (SPD)	60	3	0	--					1	--	SPACE	38
39	--	--	--			0	--			1	--	SPACE	40
41	--	--	--					0	--	1	--	SPACE	42
	TOTAL LOAD:			94245 VA		86719 VA		78677 VA					
	ADDITIONAL FEED THRU LUGS LOAD (IF APPLICABLE):			0 VA		0 VA		0 A					
	TOTAL AMPS:			796 A		733 A		656 A					

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC -	22932 VA	100.00%	22932 VA		
Other	2040 VA	100.00%	2040 VA	**TOTAL CONNECTED LOAD:**	259641 VA
POWER -	8800 VA	100.00%	8800 VA	**TOTAL ESTIMATED DEMAND:**	178036 VA
RECEPTACLE -	173210 VA	52.89%	91605 VA	**TOTAL CONNECTED LOAD (A):**	721 A
TECHNOLOGY -	16920 VA	100.00%	16920 VA	**TOTAL ESTIMATED DEMAND...**	494 A
KITCHEN -	32139 VA	100.00%	32139 VA		
HAND DRYER -	3600 VA	100.00%	3600 VA		

NOTES:

PROVIDE SPD BREAKER PER ONELINE SCHEDULE. RECEPTACLE DEMAND FACTOR = FIRST 10kVA X 100% + 50% OF REMAINDER
AIC RATING IS CALCULATED VALUE, PROVIDE IC RATING AT LEAST 25% HIGHER AS PER SPECIFICATIONS.

PANELBOARD " R1A" LOAD SCHEDULE

PANEL: R1A **MOUNTING:** SURFACE **VOLTAGE:** 208/120V, 3PH, 4W
LOCATION: STORAGE 161S / FIRST FLOOR **AMPS:** 225 A MLO **FED FROM:** SDP
ADDED ACCESSORIES: DOUBLE TUB, SPD **FEED-THRU LUGS...** **A.I.C. VALUE:** 12222 kAIR
(PROVIDE 25% HIGHER A.I.C. RATING)

	CIRCUIT DESCRIPTION	TRIP (A)	POLES	A		B		C		POLES	TRIP (A)	CIRCUIT DESCRIPTION	
1	RECEPTACLE - LEARNING STUDIO 174	20	1	900	540					1	20	RECEPTACLE - LEARNING STUDIO 174	2
3	RECEPTACLE - LEARNING STUDIO 174	20	1			540	780			1	20	TECHNOLOGY - LEARNING STUDIO 174	4
5	RECEPTACLE - LEARNING STUDIO 172	20	1					540	720	1	20	RECEPTACLE - LEARNING STUDIO 172	6
7	RECEPTACLE - LEARNING STUDIO 172	20	1	540	780					1	20	TECHNOLOGY - LEARNING STUDIO 172	8
9	RECEPTACLE - LEARNING STUDIO 166	20	1			720	900			1	20	RECEPTACLE - LEARNING STUDIO 166	10
11	TECHNOLOGY - LEARNING STUDIO 166	20	1					780	540	1	20	RECEPTACLE - LEARNING STUDIO 166	12
13	RECEPTACLE - LEARNING STUDIO 162	20	1	720	540					1	20	RECEPTACLE - LEARNING STUDIO 162	14
15	TECHNOLOGY - LEARNING STUDIO 162	20	1			780	900			1	20	RECEPTACLE - LEARNING STUDIO 162	16
17	RECEPTACLE - ASD 156	20	1					540	540	1	20	RECEPTACLE - ASD 156	18
19	RECEPTACLE - ASD 156	20	1	720	780					1	20	TECHNOLOGY - ASD 156	20
21	RECEPTACLE - LEARNING COMMONS 170	20	1			720	900			1	20	RECEPTACLE - MECH M190	22
23	RECEPTACLE - SGR 170G	20	1					540	360	1	20	RECEPTACLE - Room 160H, 161	24
25	RECEPTACLE - Room 160H, 170	20	1	600	1060					1	20	RECEPTACLE - TLT 161-5T	26
27	RECEPTACLE - STAIR S170	20	1			610	360			1	20	TECHNOLOGY - EDUC WORKSHOP 163	28
29	RECEPTACLE - EDUC WORKSHOP 163	20	1					360	540	1	20	RECEPTACLE - EDUC WORKSHOP 163	30
31	RECEPTACLE - EDUC WORKSHOP 163	20	1	600	600					1	20	RECEPTACLE - SGR 164	32
33	RECEPTACLE - MECH M190	20	1			720	720			1	20	RECEPTACLE - GYM STORAGE 190S	34
35	TECHNOLOGY - GYM STORAGE 190S	20	1					360	360	1	20	RECEPTACLE - CHAIR STORAGE S180	36
37	PE OFFICE 181	20	1	720	180					1	20	RECEPTACLE - ELEC E155	38
39	RECEPTACLE - STORAGE 161S	20	1			180	360			1	20	RECEPTACLE - GYM 190	40
41	TECHNOLOGY - GYM 190	20	1					360	420	1	20	GYM 190	42
43	RECEPTACLE - GYM 190	20	1	360	360					1	20	RECEPTACLE - GYM 190	44
45	RECEPTACLE - GYM 190	20	1			720	360			1	20	TECHNOLOGY - GYM 190	46
47	RECEPTACLE - GYM 190	20	1					360	670	1	20	RECEPTACLE - GYM 190	48
49	RECEPTACLE - WATER SOFTENER	20	1	180	180					1	20	RECEPTACLE - WATER SOFTENER	50
51	RECEPTACLE - MECH M193	20	1			180	360			1	20	RECEPTACLE - ELEC WATER COOLER 180H	52
53	SPARE	20	1					0	0	1	20	SPARE	54
55	SPARE	20	1	0	0					1	20	SPARE	56
57	SPARE	20	1			0	0			1	20	SPARE	58
59	SPARE	20	1					0	0	1	20	SPARE	60
61	SPARE	20	1	0	0					1	20	SPARE	62
63	SPACE	--	1			--	--			1	--	SPACE	64
65	SPACE	--	1					--	--	1	--	SPACE	66
67	SURGE PROTECTIVE DEVICE (SPD)	30	3	0	--					1	--	SPACE	68
69	--	--	--			0	--			1	--	SPACE	70
71	--	--	--					0	--	1	--	SPACE	72
	TOTAL LOAD:			10360 VA		10810 VA		7990 VA					
	ADDITIONAL FEED THRU LUGS LOAD (IF APPLICABLE):			0 VA		0 VA		0 A					
	TOTAL AMPS:			89 A		93 A		67 A					

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC -	500 VA	100.00%	500 VA		
Other	300 VA	100.00%	300 VA	**TOTAL CONNECTED LOAD:**	29160 VA
POWER -	700 VA	100.00%	700 VA	**TOTAL ESTIMATED DEMAND:**	21950 VA
RECEPTACLE -	24420 VA	70.48%	17210 VA	**TOTAL CONNECTED LOAD (A):**	81 A
TECHNOLOGY -	3240 VA	100.00%	3240 VA	**TOTAL ESTIMATED DEMAND...**	61 A

NOTES:

PROVIDE SPD BREAKER PER ONELINE SCHEDULE. RECEPTACLE DEMAND FACTOR = FIRST 10kVA X 100% + 50% OF REMAINDER
AIC RATING IS CALCULATED VALUE, PROVIDE IC RATING AT LEAST 25% HIGHER AS PER SPECIFICATIONS.

PANELBOARD " R1B" LOAD SCHEDULE

PANEL: R1B **MOUNTING:** SURFACE **VOLTAGE:** 208/120V, 3PH, 4W
LOCATION: ELEC E120 / FIRST FLOOR **AMPS:** 225 A MLO **FED FROM:** SDP
ADDED ACCESSORIES: DOUBLE TUB, SPD **FEED-THRU LUGS...** **A.I.C. VALUE:** 7885 kAIR
(PROVIDE 25% HIGHER A.I.C. RATING)

	CIRCUIT DESCRIPTION	TRIP (A)	POLES	A		B		C		POLES	TRIP (A)	CIRCUIT DESCRIPTION	
1	POWER - TLT 123 AUTO FLUSH / SINK	20	1	600	720					1	20	RECEPTACLE - LIBRARY 114	2
3	POWER - OVERHEAD DOOR	20	1			1200	360			1	20	RECEPTACLE - LIBRARY 114	4
5	LIBRARY 114	20	1					780	720	1	20	RECEPTACLE - LIBRARY 114	6
7	RECEPTACLE - LIBRARY 114	20	1	360	600					1	20	RECEPTACLE - LIBRARY 114	8
9	RECEPTACLE - LIBRARY 114	20	1			600	540			1	20	RECEPTACLE - LEARNING STUDIO 142	10
11	RECEPTACLE - LEARNING STUDIO 142	20	1					720	900	1	20	RECEPTACLE - LEARNING STUDIO 142	12
13	LEARNING STUDIO 142	20	1	780	460					1	20	RECEPTACLE - TLT 140T	14
15	RECEPTACLE - SGR 144	20	1			540	180			1	20	RECEPTACLE - FRIDGE	16
17	EDUC WORKSHOP 141	20	1					600	360	1	20	TECHNOLOGY - EDUC WORKSHOP 141	18
19	RECEPTACLE - EDUC WORKSHOP 141	20	1	360	540					1	20	RECEPTACLE - EDUC WORKSHOP 141	20
21	RECEPTACLE - EDUC WORKSHOP 141	20	1			600	540			1	20	RECEPTACLE - EDUC WORKSHOP 141	22
23	RECEPTACLE - EDUC WORKSHOP 141	20	1					720	540	1	20	RECEPTACLE - ART 112	24
25	RECEPTACLE - COPIER	20	1	180	1440					1	20	RECEPTACLE - ART 112 CORD REEL	26
27	RECEPTACLE - ART 112 CORD REEL	20	1			1440	360			1	20	RECEPTACLE - ART 112	28
29	RECEPTACLE - ART 112	20	1					900	4803	3	50	RECEPTACLE - KILN L15-50	30
31	RECEPTACLE - ART 112	20	1	960	4803					--	--	--	32
33	RECEPTACLE - ELEC E121	20	1			180	4803			--	--	--	34
35	HVAC - FP-1 - FIREPLACE	20	1					420	540	1	20	RECEPTACLE - Room 110, 113	36
37	RECEPTACLE - TLT 123-5T	20	1	460	540					1	20	RECEPTACLE - Y5 / FLEX 136	38
39	RECEPTACLE - Y5 / FLEX 136	20	1			900	540			1	20	RECEPTACLE - Y5 / FLEX 136	40
41	Y5 / FLEX 136	20	1					780	540	1	20	RECEPTACLE - LEARNING STUDIO 134	42
43	RECEPTACLE - LEARNING STUDIO 134	20	1	540	540					1	20	RECEPTACLE - LEARNING STUDIO 134	44
45	LEARNING STUDIO 134	20	1			780	540			1	20	RECEPTACLE - LEARNING STUDIO 132	46
47	RECEPTACLE - LEARNING STUDIO 132	20	1					540	720	1	20	RECEPTACLE - LEARNING STUDIO 132	48
49	LEARNING STUDIO 132	20	1	780	540					1	20	RECEPTACLE - Room 123, 140H, 120H	50
51	RECEPTACLE - SGR 130G	20	1			540	720			1	20	RECEPTACLE - LEARNING COMMONS 130	52
53	RECEPTACLE - Room 130H, 130	20	1					360	540	1	20	RECEPTACLE - LEARNING STUDIO 126	54
55	RECEPTACLE - STAIR S130	20	1	790	720					1	20	RECEPTACLE - LEARNING STUDIO 126	56
57	LEARNING STUDIO 126	20	1			780	540			1	20	RECEPTACLE - LEARNING STUDIO 122	58
59	RECEPTACLE - LEARNING STUDIO 126	20	1					540	780	1	20	LEARNING STUDIO 122	60
61	RECEPTACLE - LEARNING STUDIO 122	20	1	720	540					1	20	RECEPTACLE - GATHERING STAIR 113	62
63	RECEPTACLE - LEARNING STUDIO 122	20	1			540	360			1	20	RECEPTACLE - GATHERING STAIR	64
65	RECEPTACLE - GATHERING STAIR 113	20	1					540	360	1	20	RECEPTACLE - PASSAGE 120H	66
67	RECEPTACLE - SGR 124	20	1	540	360					1	20	RECEPTACLE - PTO STORAGE S110	68
69	FAMILY RESOURCE 111	20	1			600	540			1	20	RECEPTACLE - Room 110, S110	70
71	Room 110H, 110	20	1					1540	360	1	20	TECHNOLOGY - HEART 110	72
73	RECEPTACLE - HEART 110	20	1	600	180					1	20	RECEPTACLE -	74
75	SPARE	20	1			0	0			1	20	SPARE	76
77	SPARE	20	1					0	0	1	20	SPARE	78
79	SURGE PROTECTIVE DEVICE (SPD)	30	3	0	0					1	20	SPARE	80
81	--	--	--			0	0			1	20	SPARE	82
83	--	--	--					0	0	1	20	SPARE	84
	TOTAL LOAD:			19653 VA		18723 VA		19603 VA					
	ADDITIONAL FEED THRU LUGS LOAD (IF APPLICABLE):			0 VA		0 VA		0 A					
	TOTAL AMPS:			165 A		156 A		164 A					

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC -	670 VA	100.00%	670 VA		
Other	480 VA	100.00%	480 VA	**TOTAL CONNECTED LOAD:**	57980 VA
POWER -	2000 VA	100.00%	2000 VA	**TOTAL ESTIMATED DEMAND:**	37905 VA
RECEPTACLE -	50150 VA	59.97%	30075 VA	**TOTAL CONNECTED LOAD (A):**	161 A
TECHNOLOGY -	4680 VA	100.00%	4680 VA	**TOTAL ESTIMATED DEMAND...**	105 A

NOTES:

PROVIDE SPD BREAKER PER ONELINE SCHEDULE. RECEPTACLE DEMAND FACTOR = FIRST 10kVA X 100% + 50% OF REMAINDER
AIC RATING IS CALCULATED VALUE, PROVIDE IC RATING AT LEAST 25% HIGHER AS PER SPECIFICATIONS.

PANELBOARD " R1C" LOAD SCHEDULE

PANEL: R1C **MOUNTING:** SURFACE **VOLTAGE:** 208/120V, 3PH, 4W
LOCATION: ELEC E160 / FIRST FLOOR **AMPS:** 225 A MLO **FED FROM:** SDP
ADDED ACCESSORIES: DOUBLE TUB, SPD **FEED-THRU LUGS...** **A.I.C. VALUE:** 18242 kAIR
(PROVIDE 25% HIGHER A.I.C. RATING)

	CIRCUIT DESCRIPTION	TRIP (A)	POLES	A		B		C		POLES	TRIP (A)	CIRCUIT DESCRIPTION	
1	RECEPTACLE - LEARNING STUDIO 154	20	1	720	900					1	20	RECEPTACLE - LEARNING STUDIO 154	2
3	TECHNOLOGY - LEARNING STUDIO 154	20	1			780	540			1	20	RECEPTACLE - LEARNING STUDIO 154	4
5	RECEPTACLE - LEARNING STUDIO 152	20	1					720	360	1	20	RECEPTACLE - LEARNING STUDIO 152	6
7	TECHNOLOGY - LEARNING STUDIO 152	20	1	780	900					1	20	RECEPTACLE - LEARNING STUDIO 152	8
9	RECEPTACLE - SGR 150G	20	1			540	360			1	20	RECEPTACLE - LEARNING COMMONS 140	10
11	RECEPTACLE - LEARNING COMMONS 140	20	1					540	720	1	20	RECEPTACLE - LEARNING STUDIO 146	12
13	RECEPTACLE - LEARNING STUDIO 146	20	1	900	540					1	20	RECEPTACLE - LEARNING STUDIO 146	14
15	TECHNOLOGY - LEARNING STUDIO 146	20	1			780	540			1	20	RECEPTACLE - ESI SPEECH OFFICE 145	16
17	RECEPTACLE - ESI SPEECH OFFICE 145	20	1					540	420	1	20	ESI SPEECH OFFICE 145	18
19	RECEPTACLE - Room 150H, 140, 140H	20	1	600	540					1	20	RECEPTACLE - MUSIC 151	20
21	TECHNOLOGY - MUSIC 151	20	1			720	960			1	20	RECEPTACLE - MUSIC 151	22
23	RECEPTACLE - Room 180H, 180	20	1					960	540	1	20	RECEPTACLE - CHAIR STORAGE S180	24
25	RECEPTACLE - CAFE 180	20	1	420	540					1	20	RECEPTACLE - CAFE 180	26
27	RECEPTACLE - CAFE 180	20	1			360	360			1	20	TECHNOLOGY - CAFE 180	28
29	RECEPTACLE - CAFE 180, PRJ, SCREEN	20	1					1000	540	1	20	RECEPTACLE - CAFE 180	30
31	RECEPTACLE - VESTIBULE V180, CUH	20	1	540	960					1	20	RECEPTACLE - TLT 180T	32
33	HVAC - C1 - CHILLER CTRL	20	1			500	360			1	20	RECEPTACLE - ESI STUDIO 147	34
35	RECEPTACLE - ESI STUDIO 147	20	1					720	780	1	20	ESI STUDIO 147	36
37	RECEPTACLE - ESI WORKSHOP 143	20	1	540	600					1	20	RECEPTACLE - ESI WORKSHOP 143	38
39	RECEPTACLE - CUSTODIAL OFFICE 118	20	1			600	780			1	20	RECEPTACLE - LIBRARY RESOURCE 116	40
41	RECEPTACLE - COPIER	20	1					1200	540	1	20	RECEPTACLE - GATHERING STAIR	42
43	RECEPTACLE - Room 110, 110	20	1	720	720					1	20	RECEPTACLE - WOMEN'S 115	44
45	HAND DRYER - WOMEN'S 115	20	1			900	900			1	20	HAND DRYER - WOMEN'S 115	46
47	POWER - WOMEN'S 115, MENS 119 FLUSH VALVES	20	1					1800	540	1	20	RECEPTACLE - CUSTODIAL 117	48
49	RECEPTACLE - PASSAGE 110H ELEC WATER...	20	1	360	720					1	20	RECEPTACLE - MEN'S 119	50
51	HAND DRYER - MEN'S 119	20	1			900	900			1	20	HAND DRYER - MEN'S 119	52
53	TECHNOLOGY - ESI SPEECH OFFICE 145	20	1					360	0	1	20	SPARE	54
55	SPARE	20	1	0	0					1	20	SPARE	56
57	SPARE	20	1			0	0			1	20	SPARE	58
59	SPARE	20	1					0	0	1	20	SPARE	60
61	SPACE	--	1	--	0					1	20	SPARE	62
63	SPACE	--	1			--	0			1	20	SPARE	64
65	SPACE	--	1					--	--	1	--	SPACE	66
67	SURGE PROTECTIVE DEVICE (SPD)	30	3	0	--					1	--	SPACE	68
69	--	--	--			0	--			1	--	SPACE	70
71	--	--	--					0	--	1	--	SPACE	72
	TOTAL LOAD:			12000 VA		11780 VA		12280 VA					
	ADDITIONAL FEED THRU LUGS LOAD (IF APPLICABLE):			0 VA		0 VA		0 A					
	TOTAL AMPS:			100 A		98 A		103 A					

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC -	500 VA	100.00%	500 VA		
Other	300 VA	100.00%	300 VA	**TOTAL CONNECTED LOAD:**	36060 VA
POWER -	2400 VA	100.00%	2400 VA	**TOTAL ESTIMATED DEMAND:**	27870 VA
RECEPTACLE -	26380 VA	68.95%	18190 VA	**TOTAL CONNECTED LOAD (A):**	100 A
TECHNOLOGY -	2880 VA	100.00%	2880 VA	**TOTAL ESTIMATED DEMAND...**	77 A
HAND DRYER -	3600 VA	100.00%	3600 VA		

NOTES:

PROVIDE SPD BREAKER PER ONELINE SCHEDULE. RECEPTACLE DEMAND FACTOR = FIRST 10kVA X 100% + 50% OF REMAINDER
AIC RATING IS CALCULATED VALUE, PROVIDE IC RATING AT LEAST 25% HIGHER AS PER SPECIFICATIONS.

PANELBOARD " R1K" LOAD SCHEDULE

PANEL: R1K **MOUNTING:** FLUSH **VOLTAGE:** 208/120V, 3PH, 4W
LOCATION: DISHWASHING 187 / FIRST FLOOR **AMPS:** 225 A MLO **FED FROM:** SDP
ADDED ACCESSORIES: SPD **FEED-THRU LUGS...** **A.I.C. VALUE:** 8781 kAIR
STAINLESS STEEL COVER (PROVIDE 25% HIGHER A.I.C. RATING)

	CIRCUIT DESCRIPTION	TRIP (A)	POLES	A		B		C		POLES	TRIP (A)	CIRCUIT DESCRIPTION	
1	KITCHEN - 206 - HOT FOOD CABINET	20	1	1440	2136					1	30	KITCHEN - 303 - DOUBLE DECK CONVECTION...	2
3	KITCHEN - 306 - FRIDGE	20	1			588	--			1	--	----- SHUNT TRIP -----	4
5	KITCHEN - 403 - COLD FOOD TABLE	20	1					564	0	1	20	SPARE	6
7	KITCHEN - 404 - MICROWAVE	20	1	1608	0					1	20	SPARE	8
9	KITCHEN - 407 - CASH REGISTER	20	1			1200	1200			1	20	KITCHEN - 107 - FIRE PROTECTION SYSTEM	10
11	RECEPTACLE - DISHWASHING 187	20	1					540	1200	1	20	KITCHEN - 301 - HOOD	12
13	RECEPTACLE - WARMING KITCHEN 185	20	1	360	3536					2	45	KITCHEN - 401 - HOT FOOD TABLE	14
15	RECEPTACLE - WARMING KITCHEN 185, ISLAND	20	1			360	3536			--	--	--	16
17	RECEPTACLE - WARMING KITCHEN 185	20	1					180	900	1	20	KITCHEN - 405 - MILK COOLER	18
19	RECEPTACLE - SERVERY 181	20	1	360	720					1	20	RECEPTACLE - RECEIVING 183, CUH	20
21	RECEPTACLE - SERVERY 181	20	1			180	720			1	20	RECEPTACLE - HOUSEKEEPING 189	22
23	HVAC - COND. PUMP	20	1					250	3120	2	40	RECEPTACLE - WD-1	24
25	HVAC - ACCU-185	60	2	4160	3120					--	--	--	26
27	--	--	--			4160	500			1	20	RECEPTACLE - HOUSEKEEPING 189 WASHER	28
29	HVAC - SS-185A, B	15	2					250	480	1	20	RECEPTACLE - Room 185S, 181, 185	30
31	--	--	--	250	180					1	20	RECEPTACLE - ROOF MAU, EXHAUST FAN	32
33	KITCHEN - 301A - EXHAUST FAN & CURB	20	3			1201	180			1	20	RECEPTACLE - WARMING KITCHEN 185	34
35	--	--	--					1201	1741	3	20	KITCHEN - 301C - MAU CONDENSING UNIT	36
37	--	--	--	1201	1741					--	--	--	38
39	KITCHEN - 301B - MAKE-UP AIR UNIT	25	3			1801	1741			--	--	--	40
41	--	--	--					1801	0	1	20	SPARE	42
43	--	--	--	1801	0					1	20	SPARE	44
45	POWER - OVERHEAD DOOR	20	1			1200	0			1	20	SPARE	46
47	SPACE	--	1					--	0	1	20	SPARE	48
49	SURGE PROTECTIVE DEVICE (SPD)	30	3	0	--					1	--	SPACE	50
51	--	--	--			0	--			1	--	SPACE	52
53	--	--	--					0	--	1	--	SPACE	54
	TOTAL LOAD:			22614 VA		18568 VA		12228 VA					
	ADDITIONAL FEED THRU LUGS LOAD (IF APPLICABLE):			0 VA		0 VA		0 A					
	TOTAL AMPS:			197 A		163 A		102 A					

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC -	9070 VA	100.00%	9070 VA		
POWER -	1200 VA	100.00%	1200 VA	**TOTAL CONNECTED LOAD:**	53409 VA
RECEPTACLE -	11000 VA	95.45%	10500 VA	**TOTAL ESTIMATED DEMAND:**	52909 VA
KITCHEN -	32139 VA	100.00%	32139 VA	**TOTAL CONNECTED LOAD (A):**	148 A
				TOTAL ESTIMATED DEMAND...	147 A

NOTES:

PROVIDE SPD BREAKER PER ONELINE SCHEDULE. RECEPTACLE DEMAND FACTOR = FIRST 10kVA X 100% + 50% OF REMAINDER
AIC RATING IS CALCULATED VALUE, PROVIDE IC RATING AT LEAST 25% HIGHER AS PER SPECIFICATIONS.

A1

ADD. No. 1 JUN 5, 2023
ISSUED FOR DATE

PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
ELECTRICAL PANEL LOAD SHEETS

DATE
MAY 17, 2023

SHEET NUMBER
E 502
21-237.10

PANELBOARD " ED1A" LOAD SCHEDULE

PANEL: ED1A | **LOCATION:** ELEC E199 / FIRST FLOOR | **ADDED ACCESSORIES:** SPD
MOUNTING: SURFACE | **AMPS:** 175 A MB | **FEED-THRU LUGS...**
VOLTAGE: 480/277V, 3PH, 4W | **FED FROM:** ATS | **A.I.C. VALUE:** 19557 kAIR
(PROVIDE 25% HIGHER A.I.C. RATING)

	CIRCUIT DESCRIPTION	TRIP (A)	POLES	A (VA)		B (VA)		C (VA)		POLES	TRIP (A)	CIRCUIT DESCRIPTION	
1	ED2A	100	3	10415	7780					3	45	TX-ER1A	2
3	--	--	--			10415	5825			--	--	--	4
5	--	--	--					10415	5720	--	--	--	6
7	SPARE	225	3	0	17900					3	125	TX-ER1B	8
9	--	--	--			0	16472			--	--	--	10
11	--	--	--					0	19954	--	--	--	12
13	SPARE	125	3	0	0					3	45	SPARE	14
15	--	--	--			0	0			--	--	--	16
17	--	--	--					0	0	--	--	--	18
19	SPACE	--	1	--	--					1	--	SPACE	20
21	SPACE	--	1			--	--			1	--	SPACE	22
23	SPACE	--	1					--	--	1	--	SPACE	24
25	SURGE PROTECTIVE DEVICE (SPD)	30	3	0	--					1	--	SPACE	26
27	--	--	--			0	--			1	--	SPACE	28
29	--	--	--					0	--	1	--	SPACE	30

TOTAL LOAD: 36096 VA | 32713 VA | 36090 VA
ADDITIONAL FEED THRU LUGS LOAD (IF APPLICABLE): 0 VA | 0 VA | 0 A
TOTAL AMPS: 132 A | 118 A | 132 A

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC -	59738 VA	100.00%	59738 VA		
POWER -	3700 VA	100.00%	3700 VA	**TOTAL CONNECTED LOAD:**	104898 VA
RECEPTACLE -	36420 VA	63.73%	23210 VA	**TOTAL ESTIMATED DEMAND:**	91688 VA
TECHNOLOGY -	1440 VA	100.00%	1440 VA	**TOTAL CONNECTED LOAD (A):**	126 A
KITCHEN -	3600 VA	100.00%	3600 VA	**TOTAL ESTIMATED DEMAND...**	110 A

NOTES:
PROVIDE SPD BREAKER PER ONELINE SCHEDULE. RECEPTACLE DEMAND FACTOR = FIRST 10kVA X 100% + 50% OF REMAINDER
AIC RATING IS CALCULATED VALUE, PROVIDE IC RATING AT LEAST 25% HIGHER AS PER SPECIFICATIONS.

PANELBOARD " ED2A" LOAD SCHEDULE

PANEL: ED2A | **LOCATION:** MECH M290 / SECOND FLOOR | **ADDED ACCESSORIES:** SPD
MOUNTING: SURFACE | **AMPS:** 250 A MLO | **FEED-THRU LUGS...**
VOLTAGE: 480/277V, 3PH, 4W | **FED FROM:** ED1A | **A.I.C. VALUE:** 7902 kAIR
(PROVIDE 25% HIGHER A.I.C. RATING)

	CIRCUIT DESCRIPTION	TRIP (A)	POLES	A (VA)		B (VA)		C (VA)		POLES	TRIP (A)	CIRCUIT DESCRIPTION	
1	HVAC - B1	20	3	1328	3880					3	20	HVAC - P1	2
3	--	--	--			1328	3880			--	--	--	4
5	--	--	--					1328	3880	--	--	--	6
7	HVAC - B2	20	3	1328	3880					3	20	HVAC - P2	8
9	--	--	--			1328	3880			--	--	--	10
11	--	--	--					1328	3880	--	--	--	12
13	SPARE	20	3	0	0					3	60	SPARE	14
15	--	--	--			0	0			--	--	--	16
17	--	--	--					0	0	--	--	--	18
19	SPACE	--	1	--	--					1	--	SPACE	20
21	SPACE	--	1			--	--			1	--	SPACE	22
23	SPACE	--	1					--	--	1	--	SPACE	24
25	SURGE PROTECTIVE DEVICE (SPD)	30	3	0	--					1	--	SPACE	26
27	--	--	--			0	--			1	--	SPACE	28
29	--	--	--					0	--	1	--	SPACE	30

TOTAL LOAD: 10415 VA | 10415 VA | 10415 VA
ADDITIONAL FEED THRU LUGS LOAD (IF APPLICABLE): 0 VA | 0 VA | 0 A
TOTAL AMPS: 38 A | 38 A | 38 A

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC -	31246 VA	100.00%	31246 VA		
				TOTAL CONNECTED LOAD:	31246 VA
				TOTAL ESTIMATED DEMAND:	31246 VA
				TOTAL CONNECTED LOAD (A):	38 A
				TOTAL ESTIMATED DEMAND...	38 A

NOTES:
PROVIDE SPD BREAKER PER ONELINE SCHEDULE. RECEPTACLE DEMAND FACTOR = FIRST 10kVA X 100% + 50% OF REMAINDER
AIC RATING IS CALCULATED VALUE, PROVIDE IC RATING AT LEAST 25% HIGHER AS PER SPECIFICATIONS.

PANELBOARD " EL1A" LOAD SCHEDULE

PANEL: EL1A | **LOCATION:** ELEC E197 / FIRST FLOOR | **ADDED ACCESSORIES:** SPD
MOUNTING: SURFACE | **AMPS:** 125 A MLO | **FEED-THRU LUGS...**
VOLTAGE: 480/277V, 3PH, 4W | **FED FROM:** ATS-LS | **A.I.C. VALUE:** 7813 kAIR
(PROVIDE 25% HIGHER A.I.C. RATING)

	CIRCUIT DESCRIPTION	TRIP (A)	POLES	A (VA)		B (VA)		C (VA)		POLES	TRIP (A)	CIRCUIT DESCRIPTION	
1	EL2A	60	3	7927	3286					1	20	EM LIGHTING -	2
3	--	--	--			7451	2200			1	20	EM LIGHTING -	4
5	--	--	--					5209	3017	1	20	EM LIGHTING -	6
7	TX-ER1C	70	3	4000	1880					1	20	EM LIGHTING -	8
9	--	--	--			3500							10
11	--	--	--					2500	0	1	20	SPARE	12
13	SPACE	--	1	--	0					1	20	SPARE	14
15	SPACE	--	1			--	--			1	--	SPACE	16
17	SPACE	--	1					--	--	1	--	SPACE	18
19	SURGE PROTECTIVE DEVICE (SPD)	30	3	0	--					1	--	SPACE	20
21	--	--	--			0	--			1	--	SPACE	22
23	--	--	--					0	--	1	--	SPACE	24

TOTAL LOAD: 17094 VA | 13151 VA | 10726 VA
ADDITIONAL FEED THRU LUGS LOAD (IF APPLICABLE): 0 VA | 0 VA | 0 A
TOTAL AMPS: 63 A | 49 A | 39 A

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC -	15628 VA	100.00%	15628 VA		
LIGHTING -	953 VA	100.00%	953 VA	**TOTAL CONNECTED LOAD:**	40971 VA
Spare	1500 VA	100.00%	1500 VA	**TOTAL ESTIMATED DEMAND:**	40971 VA
EM LIGHTING -	14390 VA	100.00%	14390 VA	**TOTAL CONNECTED LOAD (A):**	49 A
FIRE ALARM -	8500 VA	100.00%	8500 VA	**TOTAL ESTIMATED DEMAND...**	49 A

NOTES:
PROVIDE SPD BREAKER PER ONELINE SCHEDULE. RECEPTACLE DEMAND FACTOR = FIRST 10kVA X 100% + 50% OF REMAINDER
AIC RATING IS CALCULATED VALUE, PROVIDE IC RATING AT LEAST 25% HIGHER AS PER SPECIFICATIONS.

PANELBOARD " EL2A" LOAD SCHEDULE

PANEL: EL2A | **LOCATION:** ELEC E260 / SECOND FLOOR | **ADDED ACCESSORIES:** SPD
MOUNTING: SURFACE | **AMPS:** 125 A MLO | **FEED-THRU LUGS...**
VOLTAGE: 480/277V, 3PH, 4W | **FED FROM:** EL1A | **A.I.C. VALUE:** 3298 kAIR
(PROVIDE 25% HIGHER A.I.C. RATING)

	CIRCUIT DESCRIPTION	TRIP (A)	POLES	A (VA)		B (VA)		C (VA)		POLES	TRIP (A)	CIRCUIT DESCRIPTION	
1	HVAC - EF-1	15	3	1330	2718					1	20	EM LIGHTING -	2
3	--	--	--			1330	2242			1	20	EM LIGHTING -	4
5	--	--	--					1330	0	1	20	SPARE	6
7	HVAC - EF-2	25	3	3880	0					1	20	SPARE	8
9	--	--	--			3880	0			1	20	SPARE	10
11	--	--	--					3880	0	1	20	SPARE	12
13	SPACE	--	1	--	--					1	--	SPACE	14
15	SPACE	--	1			--	--			1	--	SPACE	16
17	SPACE	--	1					--	--	1	--	SPACE	18
19	SURGE PROTECTIVE DEVICE (SPD)	30	3	0	--					1	--	SPACE	20
21	--	--	--			0	--			1	--	SPACE	22
23	--	--	--					0	--	1	--	SPACE	24

TOTAL LOAD: 7927 VA | 7451 VA | 5209 VA
ADDITIONAL FEED THRU LUGS LOAD (IF APPLICABLE): 0 VA | 0 VA | 0 A
TOTAL AMPS: 30 A | 28 A | 19 A

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC -	15628 VA	100.00%	15628 VA		
LIGHTING -	70 VA	100.00%	70 VA	**TOTAL CONNECTED LOAD:**	20588 VA
EM LIGHTING -	4890 VA	100.00%	4890 VA	**TOTAL ESTIMATED DEMAND:**	20588 VA
				TOTAL CONNECTED LOAD (A):	25 A
				TOTAL ESTIMATED DEMAND...	25 A

NOTES:
PROVIDE SPD BREAKER PER ONELINE SCHEDULE. RECEPTACLE DEMAND FACTOR = FIRST 10kVA X 100% + 50% OF REMAINDER
AIC RATING IS CALCULATED VALUE, PROVIDE IC RATING AT LEAST 25% HIGHER AS PER SPECIFICATIONS.

PANELBOARD " ER1A" LOAD SCHEDULE

PANEL: ER1A | **LOCATION:** ELEC E199 / FIRST FLOOR | **ADDED ACCESSORIES:** SPD
MOUNTING: SURFACE | **AMPS:** 100 A MB | **FEED-THRU LUGS...**
VOLTAGE: 208/120V, 3PH, 4W | **FED FROM:** TX-ER1A | **A.I.C. VALUE:** 1790 kAIR
(PROVIDE 25% HIGHER A.I.C. RATING)

	CIRCUIT DESCRIPTION	TRIP (A)	POLES	A (VA)		B (VA)		C (VA)		POLES	TRIP (A)	CIRCUIT DESCRIPTION	
1	ER2A	60	3	3410	500					1	20	POWER - GEN BLOCK HEATER	2
3	--	--	--			2800	500			1	20	POWER - GEN BATTERY HEATER	4
5	--	--	--					3040	500	1	20	POWER - GEN BATTERY CHARGER	6
7	HVAC - UHM193	20	1	250	900					1	20	RECEPTACLE - GEN, CHILLER ENCLOSURES	8
9	HVAC - ELEV-1 SUMP PUMP	25	1			1625	900			1	20	RECEPTACLE - Room E197, E199	10
11	RECEPTACLE - ELEV-1	20	1					180	2000	1	20	RECEPTACLE - DATA D140	12
13	RECEPTACLE - DATA D140	20	1	2000	720					1	20	RECEPTACLE - DATA D140	14
15	SPARE	20	1			0	0			1	20	SPARE	16
17	SPARE	20	1					0	0	1	20	SPARE	18
19	SPARE	20	1	0	0					1	20	SPARE	20
21	SPACE	--	1			--	--			1	--	SPACE	22
23	SPACE	--	1					--	--	1	--	SPACE	24
25	SPACE	--	1	--	--					1	--	SPACE	26
27	SPACE	--	1			--	--			1	--	SPACE	28
29	SPACE	--	1					--	--	1	--	SPACE	30
31	SPACE	--	1	--	--					1	--	SPACE	32
33	SPACE	--	1			--	--			1	--	SPACE	34
35	SPACE	--	1					--	--	1	--	SPACE	36
37	SURGE PROTECTIVE DEVICE (SPD)	30	3	0	--					1	--	SPACE	38
39	--	--	--			0	--			1	--	SPACE	40
41	--	--	--					0	--	1	--	SPACE	42

TOTAL LOAD: 7780 VA | 5825 VA | 5720 VA
ADDITIONAL FEED THRU LUGS LOAD (IF APPLICABLE): 0 VA | 0 VA | 0 A
TOTAL AMPS: 65 A | 49 A | 48 A

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC -	6785 VA	100.00%	6785 VA		
POWER -	1500 VA	100.00%	1500 VA	**TOTAL CONNECTED LOAD:**	19325 VA
RECEPTACLE -	11040 VA	95.29%	10520 VA	**TOTAL ESTIMATED DEMAND:**	18805 VA
				TOTAL CONNECTED LOAD (A):	54 A
				TOTAL ESTIMATED DEMAND...	52 A

NOTES:
PROVIDE SPD BREAKER PER ONELINE SCHEDULE. RECEPTACLE DEMAND FACTOR = FIRST 10kVA X 100% + 50% OF REMAINDER
AIC RATING IS CALCULATED VALUE, PROVIDE IC RATING AT LEAST 25% HIGHER AS PER SPECIFICATIONS.

PANELBOARD " ER1B" LOAD SCHEDULE

PANEL: ER1B | **LOCATION:** ELEC E101 / FIRST FLOOR | **ADDED ACCESSORIES:** SPD
MOUNTING: SURFACE | **AMPS:** 225 A MB | **FEED-THRU LUGS...**
VOLTAGE: 208/120V, 3PH, 4W | **FED FROM:** TX-ER1B | **A.I.C. VALUE:** 6483 kAIR
(PROVIDE 25% HIGHER A.I.C. RATING)

	CIRCUIT DESCRIPTION	TRIP (A)	POLES	A		B		C		POLES	TRIP (A)	CIRCUIT DESCRIPTION	
1	HVAC - SLS - SEWAGE LIFT STATION	35	3	2882	600					1	20	RECEPTACLE - CONFERENCE 102	2
3	--	--	--			2882	540			1	20	RECEPTACLE - COPY / PRINT 105	4
5	--	--	--					2882	600	1	20	RECEPTACLE - COPY / PRINT 105	6
7	RECEPTACLE - WELLNESS 109	20	1	600	180					1	20	RECEPTACLE - FRIDGE	8
9	RECEPTACLE - DATA D100	20	1			2000	540			1	20	RECEPTACLE - OFFICE 108	10
11	RECEPTACLE - DATA D100	20	1					720	360	1	20	TECHNOLOGY - OFFICE 108	12
13	RECEPTACLE - TLT/SWR 104T	20	1	460	540					1	20	RECEPTACLE - PRINCIPAL 106	14
15	RECEPTACLE - IT OFFICE 214	20	1			720	540			1	20	RECEPTACLE - PRINCIPAL 106	16
17	HVAC - ACCU-D100	15	2					1040	360	1	20	TECHNOLOGY - PRINCIPAL 106	18
19	--	--	--	1040	360								20
21	RECEPTACLE - STORAGE 112S	20	1			540	360			1	20	RECEPTACLE - ELEC E103	22
23	RECEPTACLE - TEACHER LOUNGE, NW CORNER	20	1					600	420	1	20	RECEPTACLE - CLINIC 104	24
25	RECEPTACLE - FRIDGE	20	1	180	180					1	20	RECEPTACLE - CLINIC 104, UNDERCAB FRIDGE	26
27	RECEPTACLE - TEACHER LOUNGE COUNTER	20	1			180	500			1	20	RECEPTACLE - CLINIC 104, WASHER	28
29	RECEPTACLE - TEACHER LOUNGE COUNTER	20	1					180	3120	2	40	RECEPTACLE - CLINIC 104, DRYER	30
31	RECEPTACLE - TEACHER LOUNGE COUNTER	20	1	180	3120					--	--	--	32
33	RECEPTACLE - TEACHER LOUNGE, DISHWASHER	20	1			180	540			1	20	RECEPTACLE - VESTIBULE V100, CH, EXTERIOR	34
35	RECEPTACLE - TEACHER LOUNGE, MICROWAVE	20	1					1000	1000	1	20	POWER - ADA DOOR OPERATORS	36
37	RECEPTACLE - TEACHER LOUNGE, MICROWAVE	20	1	1000	1000					1	20	POWER - ADA DOOR OPERATORS	38
39	RECEPTACLE - FRIDGE	20	1			360	0			1	20	SPARE	40
41	RECEPTACLE - RECEPTION 100	20	1					900	0	1	20	SPARE	42
43	RECEPTACLE - RECEPTION 100	20	1	360	0					1	20	SPARE	44
45	RECEPTACLE - RECEPTION 100	20	1			540	0			1	20	SPARE	46
47	RECEPTACLE - Room 100H, 100	20	1					600	0	1	20	SPARE	48
49	RECEPTACLE - COPIER	20	1	180	0					1	20	SPARE	50
51	RECEPTACLE - RECORDS 101	20	1			360	0			1	20	SPARE	52
53	RECEPTACLE - TLT 100T	20	1					460	0	1	20	SPARE	54
55	TECHNOLOGY - CONFERENCE 102	20	1	360	696					1	20	HVAC - EF-4	56
57	RECEPTACLE - CONFERENCE 102	20	1			600	528			1	20	HVAC - EF-3	58
59	RECEPTACLE - CONFERENCE 102	20	1					540	610	1	20	RECEPTACLE - ROOF ACCUs, COND. PUMP	60
61	SPARE	20	1	0	500					1	20	HVAC - FREEZER / COOLER COND. PUMPS	62
63	SPARE	20	1			0	1080			1	20	KITCHEN - 101 - HEAT TRACE	64
65	SPARE	20	1					0	600	1	20	KITCHEN - 101A - COOLER COIL	66
67	SPARE	20	1	0	480					2	20	KITCHEN - 101C - FREEZER COIL	68
69	SPARE	20	1			0	480			--	--	--	70
71	SPACE	--	1					--	960	1	20	KITCHEN - 101E - FREEZER HEAT TAPE	72
73	SPACE	--	1	--	1201					3	20	HVAC - 101B - COOLER COMPRESSOR	74
75	SPACE	--	1			--	1201			--	--	--	76
77	SPACE	--	1					--	1201	--	--	--	78
79	SURGE PROTECTIVE DEVICE (SPD)	30	3	0	1801					3	20	HVAC - 101D - FREEZER COMPRESSOR	80
81	--	--	--			0	1801			--	--	--	82
83	--	--	--					0	1801	--	--	--	84

TOTAL LOAD: 17900 VA | 16472 VA | 19954 VA
ADDITIONAL FEED THRU LUGS LOAD (IF APPLICABLE): 0 VA | 0 VA | 0 A
TOTAL AMPS: 151 A | 137 A | 168 A

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC -	21707 VA	100.00%	21707 VA		
POWER -	2200 VA	100.00%	2200 VA	**TOTAL CONNECTED LOAD:**	54327 VA
RECEPTACLE -	25380 VA	69.70%	17690 VA	**TOTAL ESTIMATED DEMAND:**	46637 VA
TECHNOLOGY -	1440 VA	100.00%	1440 VA	**TOTAL CONNECTED LOAD (A):**	151 A
KITCHEN -	3600 VA	100.00%	3600 VA	**TOTAL ESTIMATED DEMAND...**	129 A

NOTES:
PROVIDE SPD BREAKER PER ONELINE SCHEDULE. RECEPTACLE DEMAND FACTOR = FIRST 10kVA X 100% + 50% OF REMAINDER
AIC RATING IS CALCULATED VALUE, PROVIDE IC RATING AT LEAST 25% HIGHER AS PER SPECIFICATIONS.

PANELBOARD " ER1C" LOAD SCHEDULE

PANEL: ER1C | **LOCATION:** ELEC E101 / FIRST FLOOR | **ADDED ACCESSORIES:** SPD
MOUNTING: SURFACE | **AMPS:** 60 A MB | **FEED-THRU LUGS...**
VOLTAGE: 208/120V, 3PH, 4W | **FED FROM:** TX-ER1C | **A.I.C. VALUE:** 1790 kAIR
(PROVIDE 25% HIGHER A.I.C. RATING)

	CIRCUIT DESCRIPTION	TRIP (A)	POLES	A (VA)		B (VA)		C (VA)		POLES	TRIP (A)	CIRCUIT DESCRIPTION	
1	FIRE ALARM - CONTROL PANEL RECEPTION 100	20	1	500	1000					1	20	FIRE ALARM - SMOKE CONTROL DOORS 100A	2
3	FIRE ALARM - SMOKE CONTROL DOORS 110H	20	1			1000	1000			1	20	FIRE ALARM - SMOKE CONTROL DOORS 100B, C	4
5	FIRE ALARM - SMOKE CONTROL DOORS 180A	20	1					1000	1000	1	20	FIRE ALARM - SMOKE CONTROL DOORS 100D	6
7	FIRE ALARM - SMOKE CONTROL DOORS 180B	20	1	1000	1000					1	20	FIRE ALARM - SMOKE CONTROL DOORS 210H	8
9	FIRE ALARM - SMOKE CONTROL DOORS 183A,...	20	1			1000	0			1	20	SPARE	10
11	HVAC - SMOKE DAMPERS	20	1					0	--	1	--	SPACE	12
13	HVAC - SMOKE DAMPERS	20	1	0	--					1	--	SPACE	14
15	HVAC - SMOKE DAMPERS	20	1			0	--			1	--	SPACE	16
17	SPARE	20	1					0	--	1	--	SPACE	18
19	SPARE	20	1	500	--					1	--	SPACE	20
21	SPARE	20	1			500	--			1	--	SPACE	22
23	SPARE	20	1					500	--	1	--	SPACE	24
25	SURGE PROTECTIVE DEVICE (SPD)	30	3	0	--					1	--	SPACE	26
27	--	--	--			0	--			1	--	SPACE	28
29	--	--	--					0	--	1	--	SPACE	30

TOTAL LOAD: 4000 VA | 3500 VA | 2500 VA
ADDITIONAL FEED THRU LUGS LOAD (IF APPLICABLE): 0 VA | 0 VA | 0 A
TOTAL AMPS: 35 A | 30 A | 21 A

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
Spare	1500 VA	100.00%	1500 VA		
FIRE ALARM -	8500 VA	100.00%	8500 VA	**TOTAL CONNECTED LOAD:**	10000 VA
				TOTAL ESTIMATED DEMAND:	10000 VA
				TOTAL CONNECTED LOAD (A):	28 A
				TOTAL ESTIMATED DEMAND...	28 A

NOTES:
PROVIDE SPD BREAKER PER ONELINE SCHEDULE. RECEPTACLE DEMAND FACTOR = FIRST 10kVA X 100% + 50% OF REMAINDER
AIC RATING IS CALCULATED VALUE, PROVIDE IC RATING AT LEAST 25% HIGHER AS PER SPECIFICATIONS.

PANELBOARD " ER2A" LOAD SCHEDULE

PANEL: ER2A | **LOCATION:** DATA D240 / SECOND FLOOR | **ADDED ACCESSORIES:** SPD
MOUNTING: SURFACE | **AMPS:** 100 A MLO | **FEED-THRU LUGS...**
VOLTAGE: 208/120V, 3PH, 4W | **FED FROM:** ER1A | **A.I.C. VALUE:** 1070 kAIR
(PROVIDE 25% HIGHER A.I.C. RATING)

	CIRCUIT DESCRIPTION	TRIP (A)	POLES	A (VA)		B (VA)		C (VA)		POLES	TRIP (A)	CIRCUIT DESCRIPTION	
1	RECEPTACLE - MECH M290	20	1	1510	0					1	20	SPARE	2
3	RECEPTACLE - DATA D240	20	1			720	0			1	20	SPARE	4
5	RECEPTACLE - DATA D240	20	1					2000	0	1	20	SPARE	6
7	RECEPTACLE - ROOF IT ACCUs, COND. PUMPS	20	1	860	0					1	20	SPARE	8
9	HVAC - ACCU-D240	15	2			1040	0			1	20	SPARE	10
11	--	--	--					1040	0	1	20	SPARE	12
13	HVAC - ACCU-D140	15	2	1040	0					1	20	SPARE	14
15	--	--	--			1040	0			1	20	SPARE	16
17	SPARE	20	1					0	0	1	20	SPARE	18
19	SPARE	20	1	0	0					1	20	SPARE	20
21	SPARE	20	1			0	0			1	20	SPARE	22
23	SPARE	20	1					0	0	1	20	SPARE	24
25	SPARE	20	1	0	0					1	20	SPARE	26
27	SPARE	20	1			0	0			1	20	SPARE	28
29	SPARE	20	1					0	0	1	20	SPARE	30
31	SPACE	--	1	--	--					1	--	SPACE	32
33	SPACE	--	1			--	--			1	--	SPACE	34
35	SPACE	--	1					--	--	1	--	SPACE	36
37	SURGE PROTECTIVE DEVICE (SPD)	30	3	0	--					1	--	SPACE	38
39	--	--	--			0	--			1	--	SPACE	40
41	--	--	--					0	--	1	--	SPACE	42

TOTAL LOAD: 3410 VA | 2800 VA | 3040 VA
ADDITIONAL FEED THRU LUGS LOAD (IF APPLICABLE): 0 VA | 0 VA | 0 A
TOTAL AMPS: 29 A | 23 A | 26 A

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC -	4910 VA	100.00%	4910 VA		
RECEPTACLE -	4340 VA	100.00%	4340 VA	**TOTAL CONNECTED LOAD:**	9250 VA
				TOTAL ESTIMATED DEMAND:	9250 VA
				TOTAL CONNECTED LOAD (A):	26 A
				TOTAL ESTIMATED DEMAND...	26 A

NOTES:
PROVIDE SPD BREAKER PER ONELINE SCHEDULE. RECEPTACLE DEMAND FACTOR = FIRST 10kVA X 100% + 50% OF REMAINDER
AIC RATING IS CALCULATED VALUE, PROVIDE IC RATING AT LEAST 25% HIGHER AS PER SPECIFICATIONS.

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ISSUED FOR	DATE

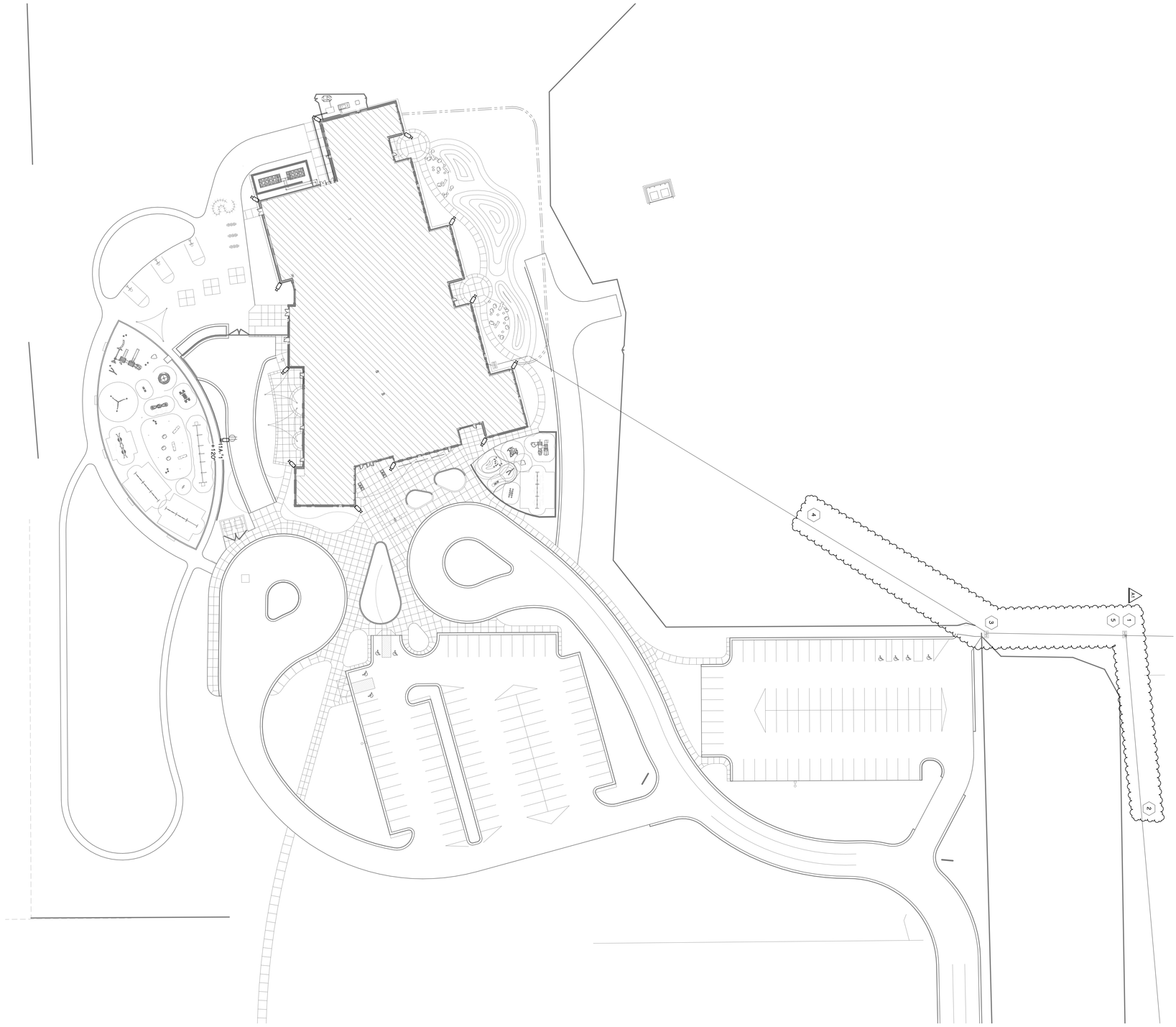
PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
ELECTRICAL PANEL LOAD SHEETS

DATE
MAY 17, 2023

SHEET NUMBER
E 504
21-237.10



TECHNOLOGY SITE PLAN
1" = 40'-0"

TECHNOLOGY SITE KEYED NOTES

IN ORDER TO MAINTAIN CONNECTIONS TO EXISTING BUILDINGS WHILE CONNECTING NEW BUILDING, CONSTRUCTION IS TO FOLLOW STEPS LISTED IN ORDER BELOW:

1. INSTALL NEW HANDHOLE AT EXISTING CONDUIT BETWEEN EXISTING CENTRAL ELEMENTARY SCHOOL AND TRAM BUILDING. CUT EXISTING CONDUIT AND FIBERS. PREPARE FIBERS FOR SPLICING.
2. DIRECTIONALLY BORE NEW 2" CONDUIT APPROXIMATELY 550 FEET FROM EXISTING HANDHOLE, CROSSING UNDER WESTNEDGE AVENUE, AND CONNECTING TO NEW HANDHOLE. PULL TWO NEW 12-STRAND FIBER-OPTIC CABLES INTO CONDUIT. ONE CABLE SHOULD HAVE ENOUGH LENGTH TO BE ABLE TO REACH THE NEW CENTRAL ELEMENTARY SCHOOL WHEN COMPLETE. SPLICE 6 STRANDS OF THE SHORTER 12-STRAND CABLE TO THE FIBERS GOING NORTH TO THE TRAM BUILDING. PULL THE REMAINING 6 STRANDS TO THE BUILDING AND SPLICE TO THE 6 STRANDS OF THE LONGER CABLES GOING SOUTH TO THE EXISTING SCHOOL.
3. INSTALL NEW INTERMEDIATE HANDHOLE TO CONNECT TO NEW BUILDING. TIE INTO EXISTING NORTH-SOUTH CONDUIT. MAINTAIN EXISTING FIBERS UNTIL EXISTING BUILDING IS READY FOR DEMOLITION.
4. DIRECTIONALLY BORE NEW 2" CONDUIT TO NEW CENTRAL ELEMENTARY BUILDING. PULL THE UNATTACHED 12 STRAND CABLE TO THE NEW BUILDING AND TERMINATE ALL 12 STRANDS.
5. RE-SPLICE 6 STRANDS FROM EXISTING CENTRAL ELEMENTARY SCHOOL TO FIBERS GOING NORTH TO THE TRAM BUILDING. REMOVE UNUSED CABLE BACK TO SOURCE. DEMO UNUSED HANDHOLES AND CONDUIT AS NEEDED FOR CONSTRUCTION OF NEW SITE AMENITIES.

SHEET TITLE
TECHNOLOGY SITE PLAN

SHEET NUMBER
TS 101
21-237.10

DATE
MAY 17, 2023

OWNER
PORTAGE PUBLIC SCHOOLS

Portage, Michigan

PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

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TECHNOLOGY KEYED NOTES

1 PROVIDE ROUGH-IN AND CABLING ONLY FOR INTERCOM LOCATION. NO DEVICES INSTALLED AT THIS LOCATION.

2 HIGH DATA DROP LOCATION FOR TIMECLOCK.

3 DATA DROP LOCATION FOR FACP. COORDINATE FINAL LOCATION WITH FIRE PROTECTION CONTRACTOR.

4 PROVIDE ROUGH-IN AND CABLING ONLY FOR DISPLAY LOCATION. NO DEVICES INSTALLED AT THIS LOCATION.

5 HIGH DATA DROP LOCATION FOR WALL MOUNT PHONE. PROVIDE SPECIALTY WALL-MOUNT FACEPLATE IN LIEU OF STANDARD FACEPLATE.

6 COIL DATA DROP FOR FUTURE TEMPERATURE MONITOR IN CEILING OF COOLER/FREEZER.

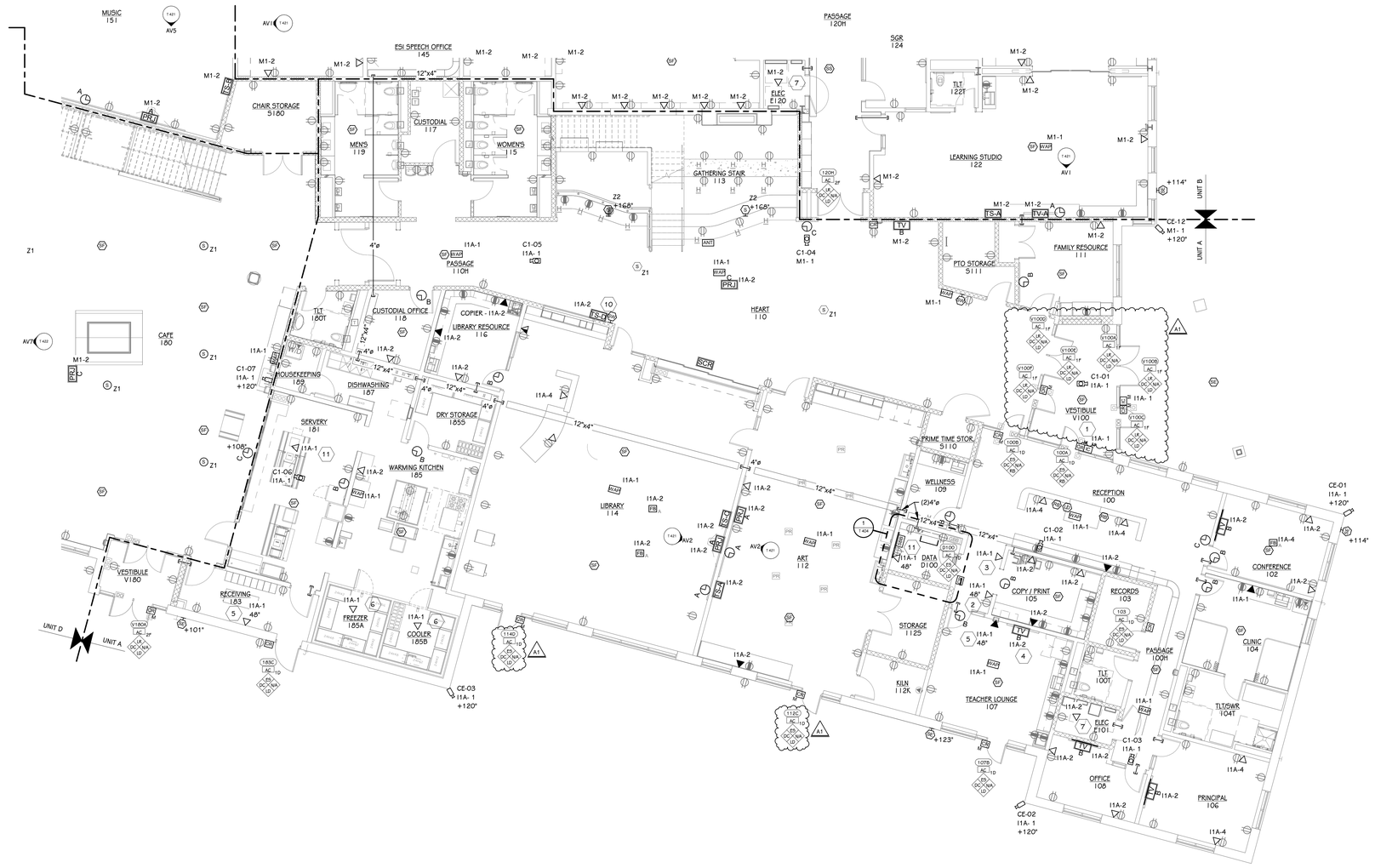
7 DATA DROP(S) FOR MECH/ELEC SYSTEMS. COORDINATE FINAL LOCATION(S) WITH MECH/ELEC CONTRACTORS.

8 DATA DROP FOR ELEVATOR CALLBOX. COORDINATE FINAL LOCATION WITH ELEVATOR CONTRACTOR.

9 COIL CAMERA CABLE ABOVE CEILING IN EDUC WORKSHOP 241.

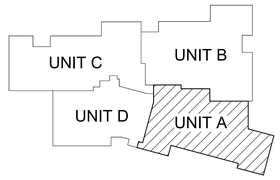
10 STACK THESE TWO DEVICES VERTICALLY AND CENTER BETWEEN EDGE OF WALL AND WINDOW.

11 DATA DROP LOCATION FOR ACP. COORDINATE FINAL LOCATION WITH THE ACCESS CONTROL CONTRACTOR.



FIRST FLOOR TECHNOLOGY PLAN - UNIT A
1/8" = 1'-0"

CENTRAL ELEMENTARY



TRUE NORTH
KEY PLAN
SCALE: NO SCALE

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PROJECT TITLE
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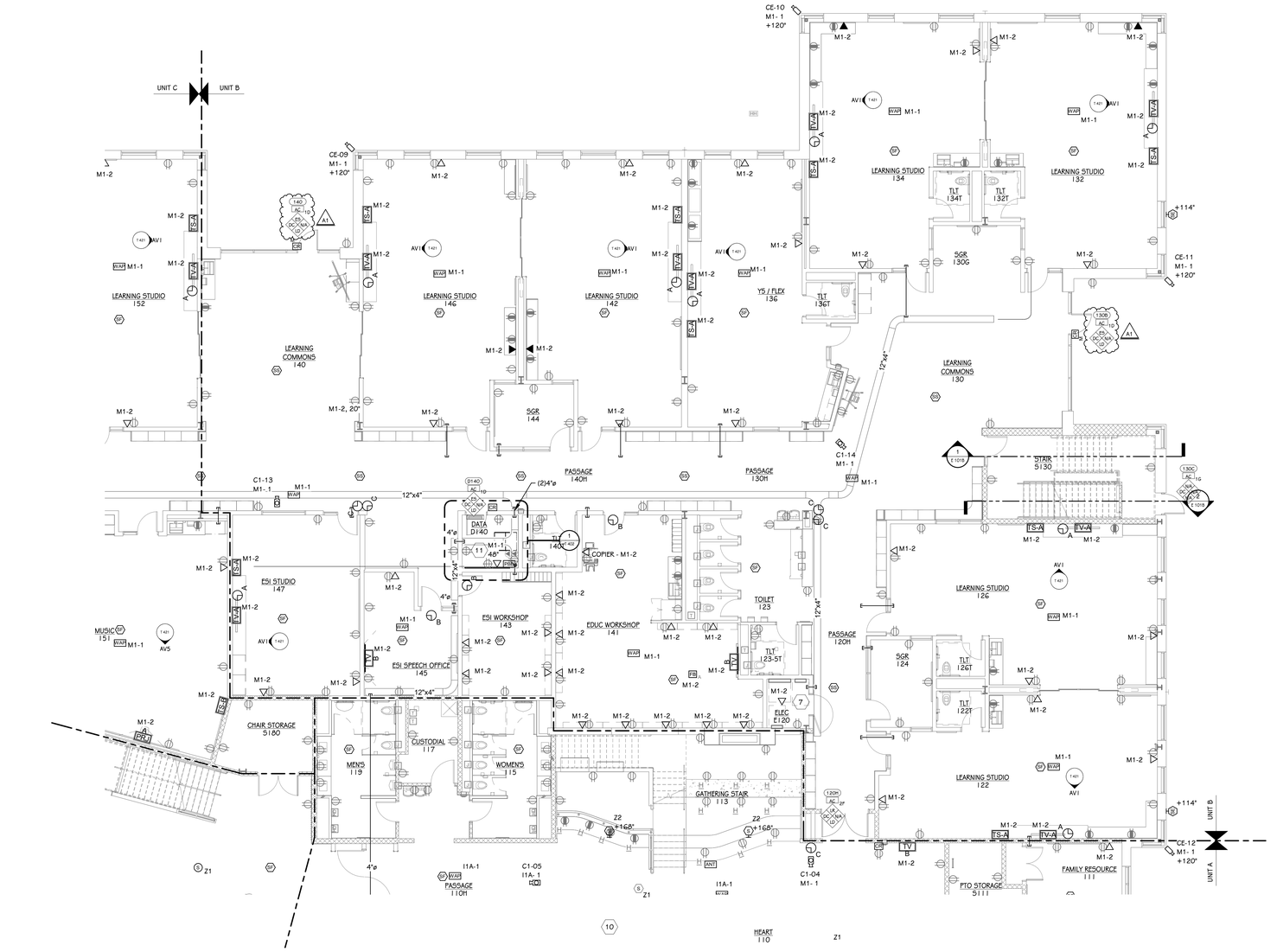
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
FIRST FLOOR TECHNOLOGY PLAN - UNIT A

DATE
MAY 17, 2023

SHEET NUMBER
T101A
21-237.10



FIRST FLOOR TECHNOLOGY PLAN - UNIT B
1/8" = 1'-0"

TECHNOLOGY KEYED NOTES

1 PROVIDE ROUGH-IN AND CABLING ONLY FOR INTERCOM LOCATION. NO DEVICES INSTALLED AT THIS LOCATION.

2 HIGH DATA DROP LOCATION FOR TIMECLOCK.

3 DATA DROP LOCATION FOR FACP. COORDINATE FINAL LOCATION WITH FIRE PROTECTION CONTRACTOR.

4 PROVIDE ROUGH-IN AND CABLING ONLY FOR DISPLAY LOCATION. NO DEVICES INSTALLED AT THIS LOCATION.

5 HIGH DATA DROP LOCATION FOR WALL MOUNT PHONE. PROVIDE SPECIALTY WALL-MOUNT FACEPLATE IN LIEU OF STANDARD FACEPLATE.

6 COIL DATA DROP FOR FUTURE TEMPERATURE MONITOR IN CEILING OF COOLER/FREEZER.

7 DATA DROP(S) FOR MECH/ELEC SYSTEMS. COORDINATE FINAL LOCATION(S) WITH MECH/ELEC CONTRACTORS.

8 DATA DROP FOR ELEVATOR CALLBOX. COORDINATE FINAL LOCATION WITH ELEVATOR CONTRACTOR.

9 COIL CAMERA CABLE ABOVE CEILING IN EDUC WORKSHOP 241.

10 STACK THESE TWO DEVICES VERTICALLY AND CENTER BETWEEN EDGE OF WALL AND WINDOW.

11 DATA DROP LOCATION FOR ACP. COORDINATE FINAL LOCATION WITH THE ACCESS CONTROL CONTRACTOR.

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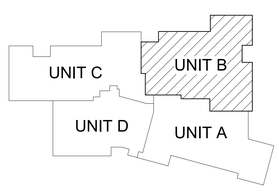
PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

CENTRAL ELEMENTARY



KEY PLAN
SCALE: NO SCALE

SHEET TITLE
FIRST FLOOR TECHNOLOGY PLAN - UNIT B

DATE
MAY 17, 2023

SHEET NUMBER
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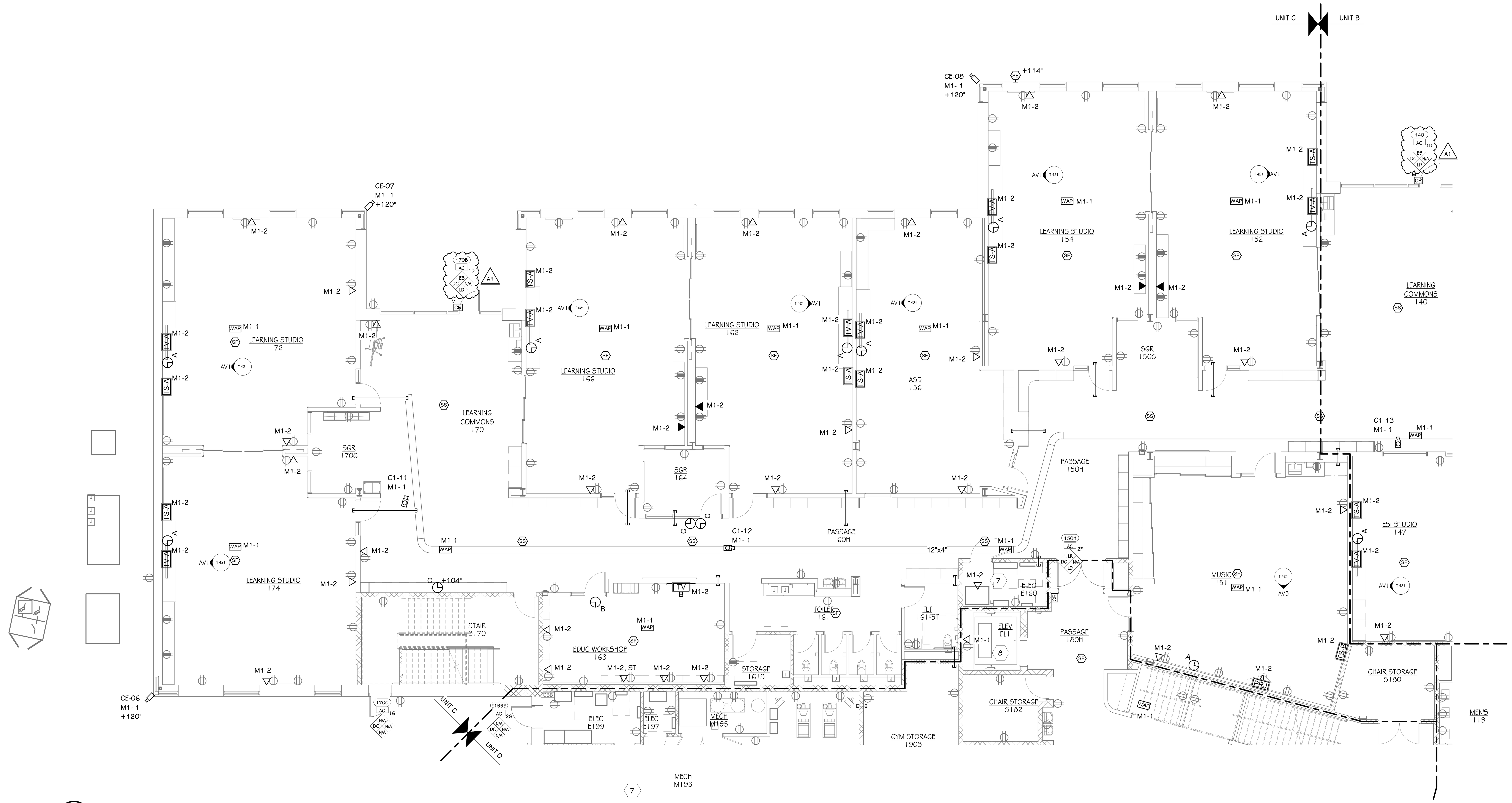
21-237.10



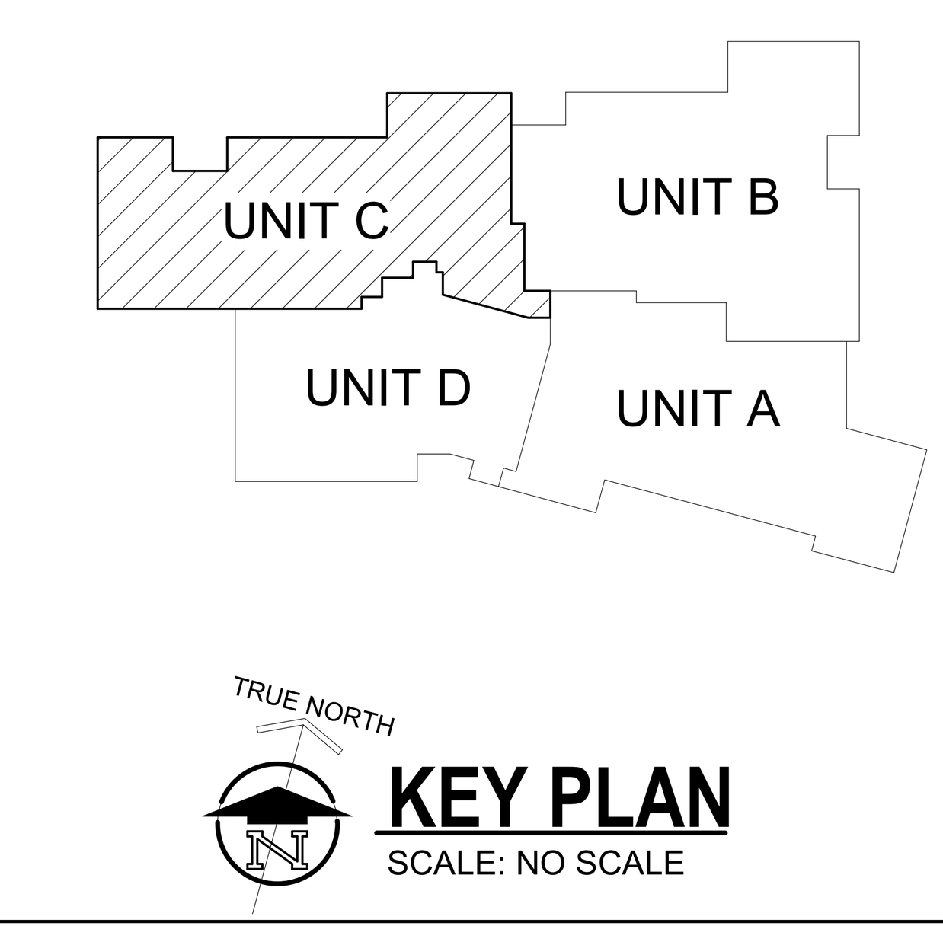
FIRST FLOOR TECHNOLOGY PLAN - UNIT C

1/8" = 1'-0"

TECHNOLOGY KEYED NOTES

1. PROVIDE ROUGH-IN AND CABLING ONLY FOR INTERCOM LOCATION. NO DEVICES INSTALLED AT THIS LOCATION.
2. HIGH DATA DROP LOCATION FOR TIMECLOCK.
3. DATA DROP LOCATION FOR FACP. COORDINATE FINAL LOCATION WITH FIRE PROTECTION CONTRACTOR.
4. PROVIDE ROUGH-IN AND CABLING ONLY FOR DISPLAY LOCATION. NO DEVICES INSTALLED AT THIS LOCATION.
5. HIGH DATA DROP LOCATION FOR WALL MOUNT PHONE. PROVIDE SPECIALTY WALL-MOUNT FACEPLATE IN LIEU OF STANDARD FACEPLATE.
6. COIL DATA DROP FOR FUTURE TEMPERATURE MONITOR IN CEILING OF COOLER/FREEZER.
7. DATA DROP(S) FOR MECH/ELEC SYSTEMS. COORDINATE FINAL LOCATION(S) WITH MECH/ELEC CONTRACTORS.
8. DATA DROP FOR ELEVATOR CALLBOX. COORDINATE FINAL LOCATION WITH ELEVATOR CONTRACTOR.
9. COIL CAMERA CABLE ABOVE CEILING IN EDUC WORKSHOP 241.
10. STACK THESE TWO DEVICES VERTICALLY AND CENTER BETWEEN EDGE OF WALL AND WINDOW.
11. DATA DROP LOCATION FOR ACP. COORDINATE FINAL LOCATION WITH THE ACCESS CONTROL CONTRACTOR.

CENTRAL ELEMENTARY



KEY PLAN

SCALE: NO SCALE

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PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID PACKAGE 4: CONSTRUCTION

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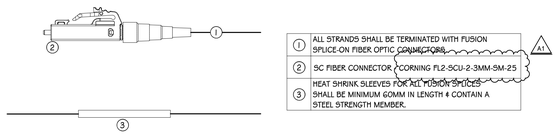
SHEET TITLE
FIRST FLOOR TECHNOLOGY PLAN - UNIT C

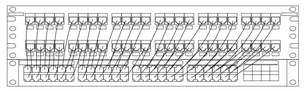
DATE
MAY 17, 2023

SHEET NUMBER
T 101C

21-237.10

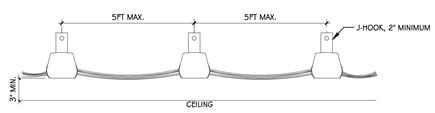


FIBER TERMINATION & SPLICING DETAIL
SCALE: NONE

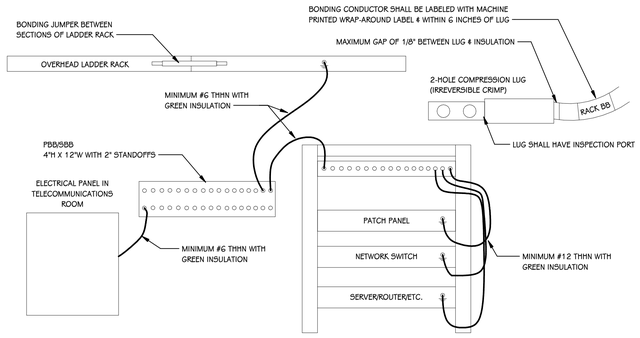


PATCH PANEL SHALL BE NUMBERED IN THE SAME PATTARN AS THE SWITCH. SWITCH PORT NUMBER SHALL CONNECT TO SAME PORT NUMBER ON PATCH PANEL.

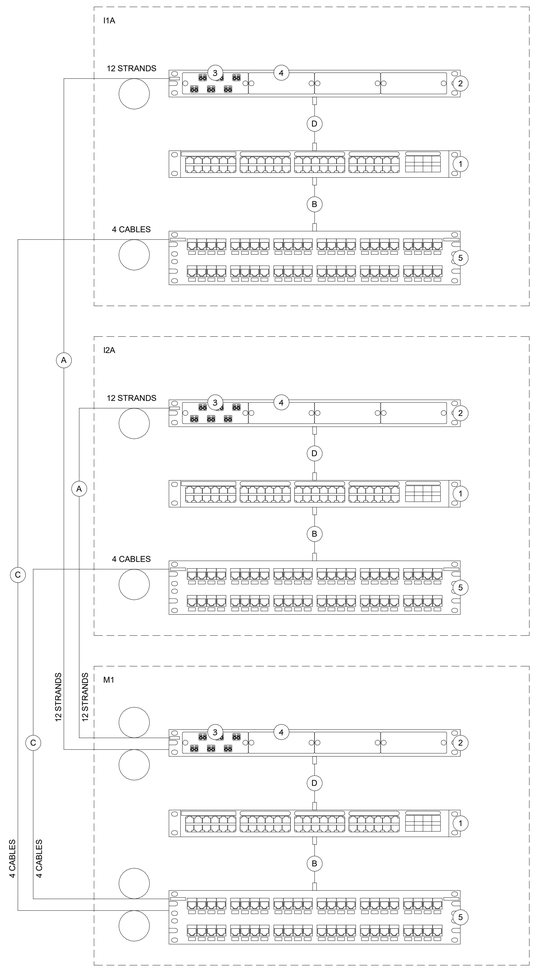
SWITCH - PATCH PANEL CROSS CONNECT SAMPLE
SCALE: NONE



CABLE SUPPORT DETAIL
SCALE: NONE



TELECOMMUNICATION ROOM BONDING DETAIL
SCALE: NONE



BACKBONE DETAIL
SCALE: NONE

BACKBONE EQUIPMENT SCHEDULE

KEY #	DESCRIPTION	MANUFACTURER	PART #	COMMENTS
1	NETWORK SWITCH	PROVIDED BY OWNER	PROVIDED BY OWNER	
2	FIBER ENCLOSURE	CORNING	~~CCH-01U~~	
3	FIBER ADAPTER	CORNING	CCH-CP12-D9	
4	FIBER BLANK	CORNING	~~CCH-BLNK~~	
5	PATCH PANEL	REFER TO RACK SCHEDULE	REFER TO RACK SCHEDULE	
A	FIBER OPTIC CABLE	CORNING	012ESP-T4101DA3	
B	PATCH CORD	REFER TO SCHEDULE	REFER TO SCHEDULE	
C	CATEGORY CABLE	REFER TO SCHEDULE	REFER TO SCHEDULE	INCLUDE MINIMUM 15FT SERVICE LOOP
D	FIBER PATCH CORD	PROVIDED BY OWNER	PROVIDED BY OWNER	

PATCH CORD SCHEDULE

COLOR	PURPOSE	QUANTITY 8 IN	1 FT	3 FT	5 FT	7 FT	10 FT	14 FT	MANUFACTURER	PART #
RED	DATA BACKBONE	9	0	0	0	0	0	0	PANDUIT	UTP28SP**RD
ORANGE	CLOCKS AND PAGING	0	0	0	0	0	0	0	PANDUIT	UTP28SP**OR
YELLOW	ACCESS POINTS	62	0	62	0	0	0	0	PANDUIT	UTP28X**YL
GREEN	PHONE BACKBONE	0	0	0	0	0	0	0	PANDUIT	UTP28SP**GR
BLUE	GENERAL DATA	512	0	0	0	0	0	0	PANDUIT	UTP28SP**BU
BLUE	GENERAL DATA	0	0	0	113	205	163	31	PANDUIT	UTP6SP**BU
VIOLET	SECURITY CAMERAS	32	0	0	0	32	0	0	PANDUIT	UTP28SP**VL
BLACK	A/V	110	0	55	55	0	0	0	PANDUIT	UTP28SP**BL
PINK	HVAC	19	0	19	0	0	0	0	PANDUIT	UTP28SP**PK

DATA CABLE SCHEDULE

COLOR	RATING	TYPE	PURPOSE	MANUFACTURER	PART #
RED	RISER	CAT6	DATA BACKBONE	GENERAL CABLE	7133804
ORANGE	RISER	CAT6	CLOCKS AND PAGING	GENERAL CABLE	7133805
YELLOW	RISER	CAT6A	ACCESS POINTS	GENERAL CABLE	7143802
GREEN	RISER	CAT6	POTS BACKBONE	GENERAL CABLE	7133806
BLUE	RISER	CAT6	GENERAL DATA	GENERAL CABLE	7133800
VIOLET	RISER	CAT6	SECURITY CAMERAS	GENERAL CABLE	7133809
BLACK	RISER	CAT6	A/V	GENERAL CABLE	7133807
PINK	RISER	CAT6	HVAC	GENERAL CABLE	7133808

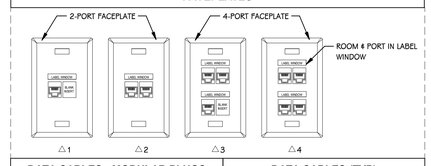
DATA JACK SCHEDULE

COLOR	PURPOSE	MANUFACTURER	PART #
RED	DATA BACKBONE	PANDUIT	CJ688TGRD
ORANGE	CLOCKS AND PAGING	PANDUIT	CJ688TGOR
YELLOW	ACCESS POINTS	PANDUIT	CJ6X88TGYL
GREEN	POTS BACKBONE	PANDUIT	CJ688TGGR
BLUE	GENERAL DATA	PANDUIT	CJ688TGBU
VIOLET	SECURITY CAMERAS	PANDUIT	CJ688TGVL
BLACK	A/V	PANDUIT	CJ688TGBL

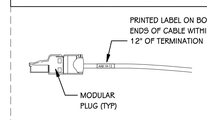
FACEPLATE & SURFACE BOX SCHEDULE

COLOR	TYPE	MANUFACTURER	PART #
MATCH ELEC	1-PORT FACEPLATE, SINGLE-GANG	PANDUIT	CFPL1**Y
MATCH ELEC	2-PORT FACEPLATE, SINGLE-GANG	PANDUIT	CFPL2**Y
MATCH ELEC	3-PORT FACEPLATE, SINGLE-GANG	PANDUIT	CFPL3**Y
MATCH ELEC	4-PORT FACEPLATE, SINGLE-GANG	PANDUIT	CFPL4**Y
MATCH ELEC	6-PORT FACEPLATE, SINGLE-GANG	PANDUIT	CFPL6**Y
MATCH ELEC	1-PORT SURFACE BOX	PANDUIT	CBX1IW-A
MATCH ELEC	2-PORT SURFACE BOX	PANDUIT	CBX2IW-AY
MATCH FURNITURE	4-PORT FURNITURE PLATE	PANDUIT	VARIES

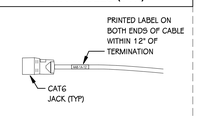
FACEPLATES



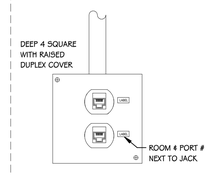
DATA CABLES - MODULAR PLUGS



DATA CABLES (TYP)

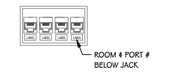


MODULAR FRAMES

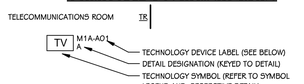


SURFACE BOXES

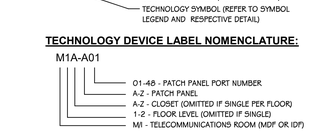
FURNITURE FACEPLATE



TECHNOLOGY LABEL NOMENCLATURE:



TECHNOLOGY DEVICE LABEL NOMENCLATURE:



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ISSUED FOR	DATE
ADD. No. 1	JUN 5, 2023

PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS

Portage, Michigan

DATE
MAY 17, 2023

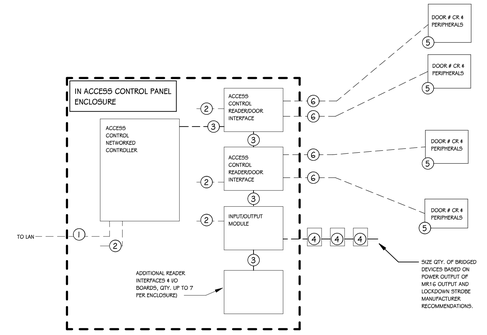
SHEET TITLE
TECHNOLOGY DETAILS

SHEET NUMBER
T 401
21-237.10

ACCESS CONTROL DOOR SCHEDULE

NUMBER	ACCESS CONTROLS	SECURITY INFO					
DOOR	CARD READER	LOCKING HARDWARE TYPE	DOOR CONTACT	OTHER	REX	DOOR DETAIL #	PROGRAMMING NOTES
100A	Yes	E5	DC	RB	N/A	1D	
100B	Yes	E5	DC	RB	N/A	1D	
103	Yes	E5	DC	LD	N/A	1D	
107B	Yes	E5	DC	LD	N/A	1D	
112C	Yes	E5	DC	LD	N/A	1D	
114D	Yes	E5	DC	LD	N/A	1D	
120H	Yes	LR	DC	LD	N/A	2F	
130B	Yes	E5	DC	LD	N/A	1D	
130C	No	N/A	DC	N/A	N/A	1G	
140	Yes	E5	DC	LD	N/A	1D	
150H	Yes	LR	DC	LD	N/A	2F	
170B	Yes	E5	DC	LD	N/A	1D	
170C	No	N/A	DC	N/A	N/A	1G	
183C	Yes	E5	DC	LD	N/A	1D	
190C	Yes	LR	DC	LD	N/A	2F	
220H	Yes	LR	DC	LD	N/A	2F	
250H	Yes	LR	DC	LD	N/A	2F	
280H	Yes	LR	DC	LD	N/A	2F	
284A	Yes	E5	DC	LD	N/A	1D	
D100	Yes	E5	DC	LD	N/A	1D	
D140	Yes	E5	DC	LD	N/A	1D	
D240	Yes	E5	DC	N/A	N/A	1D	
E199B	No	N/A	DC	N/A	N/A	2G	
M193B	No	N/A	DC	N/A	N/A	2G	
V100A	Yes	LR	DC	LD	N/A	1F	
V100B	Yes	LR	DC	LD	N/A	1F	
V100C	Yes	LR	DC	LD	N/A	1F	
V100D	No	LR	DC	LD	N/A	1F	
V100E	No	LR	DC	LD	N/A	1F	
V100F	No	LR	DC	LD	N/A	1F	
V180A	Yes	LR	DC	LD	N/A	2F	

A1



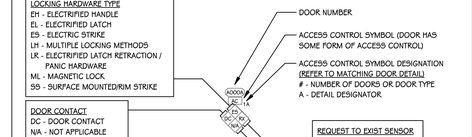
	DEVICE	MANUFACTURER/PART #	NOTES
1	CATEGORY CABLE	REFER TO SCHEDULE	PROVIDED BY STRUCTURED CABLING CONTRACTOR.
2	18AWG/2C	SEE SECURITY DEVICE AND CABLING CHART	12-24 VDC CONNECTION TO POWER DIST. MODULE/POWER SUPPLY
3	RS-485	BELDEN 82841	PROVIDE RS-485 LOOP TO CONNECT CONTROLLER TO MAX. NUMBER OF SUPPORTED DOWNSTREAM DEVICES.
4	LOCKDOWN DEVICE	SEE SECURITY DEVICE AND CABLING CHART FOR PART #	EXACT LAYOUT AND QTY. OF EACH DEVICE PER MODULE SHALL BE SIZED, CONFIGURED, AND SUPPLIED TO SUPPORT # OF DEVICES ON PLANS.
5	CR, RX, DC, LD, RB, # OTHER CONTROL INTERFACES		
6	MULTICONDUCTOR CABLE		

COORDINATE FAIL-SAFE VS. FAIL-SECURE LOCK CONNECTIONS IN COMPLIANCE WITH FIRE CODE AND COORDINATED WITH PROGRAMMING NOTES ON ACCESS CONTROL SCHEDULE.

ACCESS CONTROL DOOR LABEL NOMENCLATURE:

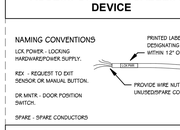
LOCKING HARDWARE TYPE
EH - ELECTRIFIED HANDLE
EL - ELECTRIFIED LATCH
ES - ELECTRIC STRIKE
LH - MULTIPLE LOCKING METHODS
LR - ELECTRIFIED LATCH RETRACTION / PANIC HARDWARE
ML - MAGNETIC LOCK
SS - SURFACE MOUNTED/RIM STRIKE

DOOR CONTACT
DC - DOOR CONTACT
N/A - NOT APPLICABLE

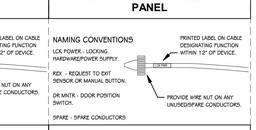


PROVIDE THESE DEVICES WHERE INDICATED AT EACH DOOR SYMBOL AND/OR IN SECURITY DOOR SCHEDULE. REFER TO CORRESPONDING DOOR DETAILS FOR ARRANGEMENT AND ROUGH-IN REQUIREMENTS.

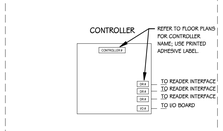
ACCESS CONTROL CABLES AT DEVICE



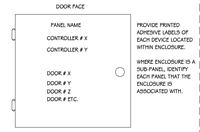
ACCESS CONTROL CABLES AT PANEL



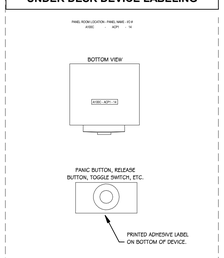
ACCESS CONTROL LABELING WITHIN PANEL

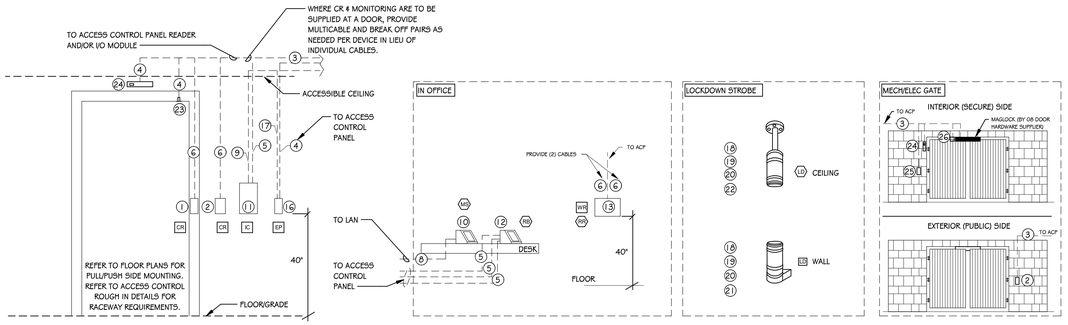


ACCESS CONTROL PANEL LABELING



UNDER DESK DEVICE LABELING



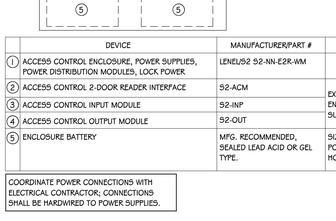


	DEVICE	MANUFACTURER/PART #	NOTES
1	CARD READER - MULLION	HID MINIPROX 5365	USE WHEN CR SYMBOL IS SHOWN ON MULLION, FRAME, OR OTHER NARROW-WIDTH MOUNTING APPLICATION.
2	CARD READER - STANDARD	HID PROXPRO 5355	N/A
3	CABLE - MULTICABLE	BELDEN 658AFJ ACCESS CONTROL	USE WHEN DOOR REQUIRES CR AND ANY OTHER DEVICE. OTHERWISE, SEE BELOW CABLES.
4	CABLE - 18/2 AWG/CONDUCTOR	BELDEN 6300FC	UPSIZE CABLE AS REQUIRED TO ELIMINATE SIGNAL LOSS.
5	CABLE - 18/4 AWG/CONDUCTOR	BELDEN 6341FE	UPSIZE CABLE AS REQUIRED TO ELIMINATE SIGNAL LOSS.
6	CABLE - 18/6 AWG/CONDUCTOR	BELDEN 6304FE	UPSIZE CABLE AS REQUIRED TO ELIMINATE SIGNAL LOSS.
7	CABLE - INTERCOM MASTER STATION DOOR RELEASE	N/A	DOOR RELEASE IS CONFIGURED SEPARATELY (SEE NO. 5, 13, & 14).
8	CABLE - INTERCOM MASTER STATION	CATEGORY CABLE	REFER TO COMMUNICATION CABLE # COMPONENT LEGEND
9	CABLE - INTERCOM DOOR STATION	CATEGORY CABLE	REFER TO COMMUNICATION CABLE # COMPONENT LEGEND
10	DEVICE - INTERCOM MASTER STATION	OWNER'S DESK PHONE	COORDINATE WITH OWNER TO PROGRAM PHONES FOR INTERCOM DIALING AND DOOR RELEASE THROUGH ACP
11	DEVICE - INTERCOM DOOR STATION	AXIS A8105-E	MOUNT ON MULLION
12	DEVICE - DESK MOUNT CONTROLS BOX # SWITCHES	SCHLAGE 8204-MMMM-M5	COORDINATE FINAL LOCATION WITH OWNER AT TIME OF INSTALL. PROVIDE ADHESIVE LABLE OF EACH DOOR TIED TO SPECIFIC RELEASE.
13	DEVICE - REMOTE RELEASE TRANSCEIVER # BUTTONS	N/A	N/A
14	DEVICE - RELEASE BUTTON MOUNTED UNDER DESK	N/A	N/A
15	DEVICE - UNUSED	N/A	N/A
16	DEVICE - WALL MOUNTED EMERGENCY PHONE	N/A	N/A
17	CABLE - WALL MOUNTED EMERGENCY PHONE	N/A	N/A
18	DEVICE - LOCKDOWN STROBE ELEMENT	N/A	N/A
19	DEVICE - LOCKDOWN STROBE POWER	N/A	N/A
20	CABLE - LOCKDOWN STROBE	N/A	N/A
21	DEVICE - LOCKDOWN WALL BRACKET	N/A	N/A
22	DEVICE - LOCKDOWN CEILING MOUNT	N/A	N/A
23	DEVICE - DOOR CONTACT	SCHLAGE 679-05HM	N/A
24	DEVICE - REQUEST TO EXIT SENSOR	SCHLAGE SCAN II WHT	MOUNT VERTICALLY AT MECH/ELEC GATE; HORIZONTALLY IN ALL OTHERS.
25	DEVICE - WALL MOUNTED REQUEST TO EXIT SENSOR	STI 552377PX-EN	CONNECT RX DIRECTLY TO POWER SUPPLY TO COMPLY WITH EGRESS CODE REQUIREMENTS. DEVICE SHALL MOMENTARILY INTERRUPT POWER AND RELEASE MAGLOCKS FOR CODE REQUIRED MINIMUM TIME.
26	DEVICE - GATE DOOR POSITION SWITCH	SCHLAGE 7766	N/A

GENERAL NOTES APPLY TO ALL LV CABLE*

- ALL CABLE SHALL BE PLENUM RATED IN PLENUM SPACE.
- CABLES UTILIZING WIEGAND COMMS SHALL NOT EXCEED 500FT TO ACCESS CONTROL PANEL.
- CABLES UTILIZING OSDP SHALL NOT EXCEED 2000FT.
- CABLE SIZING SHALL BE VERIFIED PRIOR TO INSTALLATION AND UPSIZED AS NECESSARY TO ELIMINATE SIGNAL LOSS.
- CABLES SHALL BE RUN IN CONTINUOUS OR NON-CONTINUOUS CABLE MANAGEMENT SYSTEMS. FREE-RUN CABLING IS NOT ACCEPTABLE ANYWHERE. ZIP TIES, ELECTRICAL TAPE, OR OTHER SIMILAR ADHESIVES ARE NOT ACCEPTABLE.
- WHERE IN EXPOSED AREAS (E.G. UNDER DESK, ALONG COUNTERTOP), CABLES SHALL BE RUN IN MESH CABLE SLEEVE (TECHFLEX F2NZ.00-25-BLACK, CUT TO SIZE).
- ALL DEVICES THAT CONTROL DOOR HARDWARE SHALL BE CABLED TO INTERFACE THROUGH THE ACCESS CONTROL PLATFORM AND NEVER BE DIRECTLY CONNECTED TO THE LOCK POWER.

*SEE COPPER CABLE DETAIL AND SPECIFICATIONS FOR REQUIREMENTS AND CONDITIONS.



	DEVICE	MANUFACTURER/PART #	NOTES
1	ACCESS CONTROL ENCLOSURE, POWER SUPPLIES, POWER DISTRIBUTION MODULES, LOCK POWER	LENEL/S2 S2-NN-E2R-WM	
2	ACCESS CONTROL 2-DOOR READER INTERFACE	S2-ACM	EXACT LAYOUT AND QTY. OF EACH MODULE PER ENCLOSURE SHALL BE CONFIGURED AND SUPPLIED TO SUPPORT # OF DEVICES ON PLANS.
3	ACCESS CONTROL INPUT MODULE	S2-INP	
4	ACCESS CONTROL OUTPUT MODULE	S2-OUT	
5	ENCLOSURE BATTERY	MFG. RECOMMENDED, SEALED LEAD ACID OR GEL TYPE.	SIZE BATTERY TO PROVIDE UNINTERRUPTED POWER TO CONTROLS AND LOCKS FOR MIN. 6 HOURS AT FULL CAPACITY.

COORDINATE POWER CONNECTIONS WITH ELECTRICAL CONTRACTOR; CONNECTIONS SHALL BE HARDWIRED TO POWER SUPPLIES.

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ADD. No. 1	JUN 5, 2023
ISSUED FOR	DATE

PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
SECURITY DETAILS

DATE
MAY 17, 2023

SHEET NUMBER
T 441
21-237.10

Owen Ames Kimball
Building Since 1891

ADVERTISEMENT FOR BIDS

BID PROPOSAL

Sealed bids, in triplicate, for the Central Elementary School Bid Package 4, for Portage Public Schools, will be received until noon local time, Wednesday, June 21st, 2023 at Owen-Ames-Kimball Co., 2700 Stadium Dr. Suite 2, Kalamazoo, MI 49008. Bids received after this time will neither be considered nor accepted.

All proposals received by the time and date stated above will be opened and read publicly at 2:00 pm local time, Wednesday, June 21st, 2023 at Portage Central High School, Auditorium **8135** ~~8422~~ S. Westnedge Ave, Portage, MI 49002.

Bids may be mailed to Owen-Ames-Kimball Co., 2700 Stadium Dr. Suite 2, Kalamazoo, MI 49008. Mailed bids must be received by noon, Wednesday, June 21st, 2023. FAXED, EMAILED OR UPLOADED TO BUILDING CONNECTED BIDS WILL **NOT** BE ACCEPTED.

In accordance with Section 1267 of the Revised School Code each bid must be accompanied by a sworn and notarized Familial Disclosure Statement completed by the bidder disclosing any familial relationship between the Owner or any employee of the Bidder and any member of the District's Board of Education or the Superintendent of the District.

SITE INSPECTION

A construction pre-bid meeting will be held at Portage Central Elementary School Cafeteria, 2:00pm local time, Monday, June 12th, 2023. All bidders are encouraged to attend.

BID DOCUMENTS

The Bidding Documents may be examined at the following locations:

- Owen-Ames-Kimball Co. Website: http://www.owen-ames-kimball.com/subcontractors/
- Builders Exchange plan rooms in Grand Rapids, Kalamazoo, Lansing and Traverse City.

BIDDER QUALIFICATIONS

Bidders submitting a Bid for this Project shall have qualifications as follows:

a. Shall be a reputable, recognized organization, with at least five (5) years successful experience on work of this type and scope of this project.
b. Shall have a license where required by public authorities having jurisdiction.
c. Shall have ample financial resources for work of this magnitude.

BID SECURITY - PERFORMANCE BONDS

Each bid shall be accompanied by good and sufficient bid security or bid bond in an amount not less than 5% of the Bid amount and shall secure the Owner from loss or damage by reason of the withdrawal of the Bid by a Bidder or by failure of the successful Bidder to enter into a Contract with the Owner if his Bid is accepted by the Owner.

Bid securities will not be released or returned until the bid "hold-firm" date or a subcontract has been successfully executed for the specific bid category of work, whichever occurs first.

Bid security may be provided by furnishing a bond from a surety company having a rating of A- or better or certified check. Owen-Ames-Kimball is not responsible for the loss of bid security if provided by certified check.

The successful Bidder will be required to secure Performance, Labor and Material bonds for all contracts exceeding $50,000, from a surety company having a rating of A- or better, for the full amount of the Contract.

Owen Ames Kimball
Building Since 1891
Owen-Ames-Kimball Co.

Printed on Wed Jun 7, 2023 at 02:43 pm EDT

Job #: 1090-A PPS - A - Central Elementary
8422 S Westnedge Ave
Portage, Michigan 49002
2693236100

RFI Response Report

#	Subject	Question	Official Response
BP 4 - Prebid RFI 01	Scope Clarification	1. Which bid category has the casework in Café 180? 2. Which bid category has the solid surface wall cap in detail 8G/I402? Tim Lasher, Clark Contracting Services, tlasher@clarkcc.com	1. Bid Category 31 - Casework; is responsible for casework in Café 180. 2. Bid Category 12 - General Trades; is responsible for the solid surface wall cap detail in 8G/I402.
BP 4 - Prebid RFI 002	Door Hardware Clarification	Specifications 087100 Door Hardware Door Hardware Specifications are incomplete and missing all Hardware Sets and Opening Assignments. With the Specifications that are currently included we are unable to begin pricing any materials; including Doors and Frames which required the correct and proper hardware preps. When will correct Hardware Specifications (087100) be issued – including complete Hardware Sets? Tom Roberts - S.A. Morman & Co., troberts@samorman.com	Hardware Specification to be included in Addendum No. 1 (OAK to have add.by June 6)M. Rossio 5/31/2023
BP 4 - Prebid RFI 003	Toilet Accessories - Clarification Enlarged Plans A401	Enlarged Plans A401 1/A401 Toilet/Shower 104T has Marks 16 and 17. There are no Marks 16 or 17 shown on Keyed Notes – Enlarged Plans. Please Clarify 5/A401 Women's 115 and Men's 119 have "Mark" 16. There is no Mark 16 shown on Keyed Notes – Enlarged Plans. Please Clarify Is a Shower Grab Bar required at 104T? Please clarify Tom Roberts, S.A. Morman & Co., troberts@samorman.com	Refer to Addendum No. 1Items 1 and 2:A401:Keynote 16: Stainless Steel Framed Mirror (24" x 60"). (Women's 115/Men's 119)Keynote 17: Continuous Stainless Steel Shower Grab Bar.Removed keynote to shower head.Item 3:Yes, shower grab bar is required, refer to revised keynote 17.M. Rossio 6/2/23
BP 4 - Prebid RFI 004	Specification 10 2800 - Manufacturer Clarification	No Manufacturer or Model Number is provided for Mark 12 Baby Changing Station. Please Clarify No Manufacturer or Model Number is provided for Mark 14 Changing Seat. Please Clarify Tom Roberts, S.A. Morman & Co., troberts@samorman.com	Keynote 12: Baby Changing Station shall be one of the 4 manufacturers listed in section10 2800 para 2.6.A meeting the requirements of para 2.6.B.Keynote 14: Fold Down Changing Seat, see section 10 2800 para 2.4.F attached toAddendum No. 1 (American Specialties, Inc; 8209)D. Heaton 6/1/23
BP 4 - Prebid RFI 005	Specification 10 2800 -Plans Clarification	Specifications include Bobrick B-76727 Hooks, but none are shown on Plans. Please clarify. Specifications include Bobrick B-680 Soap Dish, but none are shown on Plans. Please clarify. Specifications include Bobrick B-223 Mop & Broom Holder, but none are shown on Plans. Please clarify. Tom Roberts, S.A., Morman & Co., troberts@samorman.com	Refer to Addendum No. 1. Robe Hooks, Soap Dish added to Shower 104T. Mop and BroomHolders added to 117, 261S.M. Rossio 6/2/2023
BP 4 - Prebid RFI 007	Technology Clarification	1. Print T401, under backbone equipment schedule. Fiber optic parts are listed as Corning. In the upper right corner of the print it shows Panduit fiber optic ends. The written spec also states Corning. Which is correct? The corning part number for fiber is 3X the cost of Panduit/General Cable equivalent. 2. Demo print TS101. How many strands is the existing fiber that has to be pulled back and respliced? Dave Phillips, ElectroMedia, Inc., dphillips@electromediainc.com	1. All items should be Corning brand for the base bid. Updated part numbers will be included in addendum 1. If you would like to propose another manufacturer, please do so as a voluntary alternate. 2. See addendum 1 for revised instructions and more detail on sheet TS101.
BP 4 - Prebid RFI 008	Scope Clarification	Demo print TS101. Who is responsible for the demo of the existing conduit? Who is responsible for the directional bore and installation of the new conduit? Dave Phillips, ElectroMedia, Inc., dphillips@electromediainc.com	1. N/A as demo of the existing building is to be bid at a later date. 2. Electrical is responsible for the directional bore and install of the new conduit.
BP 4 - Prebid RFI 011	Scope Clarification	The specifications call for fiberglass Z girts. Who is responsible for this and where is it detailed on the drawings. Frank Wright, Advanced Construction Group Inc, frankw@acongrp.com	These would be at the canopy but none are shown on the drawings. Any "Z" girts would be provided as needed by the Metal Panel contractor.
BP 4 - Prebid RFI 012	Scope Clarification	1. Is the clock contractor responsible for providing the power pigtails to the awarded Electrical contractor? Ron Mielecki, Electromedia, rmielecki@electromediainc.com	1. Yes the clock contractor is responsible for providing the pigtails for the electrical contractor.