

ADDENDUM NO. 1

February 18, 2022

Loy Norrix High School & Kalamazoo Central High School Chiller Installation

Loy Norrix High School	Kalamazoo Central High School
606 Kilgore Road	2432 N. Drake Road
Kalamazoo, MI, 49001	Kalamazoo, MI 49006

TO: ALL BIDDERS OF RECORD

This Addendum forms a part of and modifies the Bidding Requirements, Contract Forms, Contract Conditions, the Specifications, and the Drawings dated January 24, 2022, by TowerPinkster. Acknowledge receipt of the Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification. This Addendum consists of pages ADD 1-1 through ADD 1-3, dated February 18, 2022, Guideline Schedule, RFI Log, and TowerPinkster Addendum No. 1 - Loy Norrix High School, dated February 11, 2022, consisting of 4 pages, Addendum No. 1 - Kalamazoo Central High School, dated February 11, 2022, consisting of 2 pages, Reissued Drawings: A 101D1, & E100.

A. SPECIFICATION SECTION 01 12 00b – MULTIPLE CONTRACT SUMMARY

Part 3.03 Bid Categories

A. Bid Category No. 1 - General Trades (Loy Norrix)

1. Revise the following Clarification:

1. Provide all work associated with slab repair, prepping, and sealing concrete at mechanical mezzanine including but not limited to cleaning, epoxy adhesive application, pipe sleeve removal, caulking edges of concrete slab to adjoining walls, formwork for dry packing grout, and waterproofing treatment of transformer.

2. Add the following Clarifications:

4. Kalamazoo Public Schools will provide abatement of metal panels. Provide temporary enclosures at these openings and install new window panels at new pipe penetration(s).
5. Provide patching of floors, walls, and ceilings as required to accommodate Mechanical and Plumbing work. Refer to notes on Structural Drawings for concrete repairs. Bid Category No. 3 Mechanical contractor will provide penetrations required for their own work.

B. Bid Category No. 2 - General Trades (Kalamazoo Central)

1. Add the following Specification Sections:

- 31 10 00 Site Clearing
- 31 20 00 Earth Moving
- 32 13 13 Concrete Paving
- 32 13 73 Concrete Paving Joint Sealants
- 32 31 13 Chain Link Fences and Gates

1. Add the following Clarifications:

1. Provide removal of existing equipment pads and installation of new concrete pads for mechanical equipment.
2. Provide patching of floors, walls, and ceilings as required to accommodate Mechanical and Plumbing work. Refer to notes on Structural Drawings for concrete repairs. Bid Category No. 4 Mechanical contractor will provide penetrations required for their own work.
3. Provide all work associated with gravel removal and replacement.
4. Provide excavation, backfilling, and compaction to accommodate underground piping removal by Bid Category No. 4 Mechanical, reference detail 4 on M310.

C. Bid Category No. 3 - Mechanical (Loy Norrix)

1. Add the following Clarifications:

4. Provide all work associated with demolition and installation of floor drains, cleanouts, piping, etc., including but not limited to coring new holes through floors, walls, and ceilings.
5. Provide removal of existing Chiller in March/April 2022, and installation of new chiller per previously issued Clarification No. 1. Reference section 01 32 00 Construction Guideline Schedule.
6. Bid Category No. 2 General Trades will provide excavation, backfilling, and compaction to accommodate underground piping removal by Bid Category No. 4 Mechanical, reference detail 4 on M310.

B. SPECIFICATION SECTION 01 32 00 – SCHEDULES AND REPORTS

Issued Guideline Schedule, dated February 17, 2022.

C. RFI LOG AND SUBSTITUTION REQUESTS

Refer to the attached Request for Information (RFI Log), dated February 17, 2022.

End of Addendum

SECTION 31 1000 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing above- and below-grade site improvements.
3. Disconnecting, capping, or sealing site utilities.
4. Temporary erosion and sedimentation control.

1.2 PREINSTALLATION MEETINGS

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

1.3 MATERIAL OWNERSHIP

- A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.4 FIELD CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 2. Provide alternate routes around closed or obstructed trafficways if required by Owner or authorities having jurisdiction.
- B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.
- C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- D. Do not commence site clearing operations until temporary erosion- and sedimentation-control measures are in place.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 31 2000 "Earth Moving."
 - 1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to authorities having jurisdiction.
- B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
- D. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

3.3 EXISTING UTILITIES

- A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.
 - 1. Arrange with utility companies to shut off indicated utilities.
- B. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Architect not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Architect's written permission.
- C. Removal of underground utilities is included in earthwork sections; in applicable fire suppression, plumbing, HVAC, electrical, communications, electronic safety and security, and utilities sections; and in Section 02 4116 "Structure Demolition" and Section 02 4119 "Selective Demolition."

3.4 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

3.5 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
- B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials, and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 31 1000

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SECTION 31 2000 - EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for slabs-on-grade.
3. Subbase course for concrete pavements.
4. Excavating and backfilling trenches for utilities and pits for buried utility structures.
5. Crush stone mulch

1.2 DEFINITIONS

A. Backfill: Soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

C. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

D. Fill: Soil materials used to raise existing grades.

E. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

F. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

G. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

H. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.3 PREINSTALLATION MEETINGS

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

1.4 INFORMATIONAL SUBMITTALS

- A. Material test reports.

1.5 FIELD CONDITIONS

- A. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth-moving operations.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: Soil Classification [Groups GW, GP, GM, SW, SP, and SM according to ASTM D2487] [Groups A-1, A-2-4, A-2-5, and A-3 according to AASHTO M 145], or a combination of these groups; free of rock or gravel larger than 3 inches (75 mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
 - 1.
- C. Unsatisfactory Soils: Soil Classification [Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D2487] [Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 according to AASHTO M 145], or a combination of these groups.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 95 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.
- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.

- H. Crushed Stone Mulch; Crushed stone, ½ inch size composed of broken edged stone. Natural local available colors.
- I. Weed Barrier; Woven geotextile polypropylene 4 ounce heavy duty fabric

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.
- B. Protect and maintain erosion and sedimentation controls during earth-moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (25 mm). If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 - 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
 - 2. Pile Foundations: Stop excavations 6 to 12 inches (150 to 300 mm) above bottom of pile cap before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.
 - 3. Excavation for Underground Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch (25 mm). Do not disturb bottom of excavations intended as bearing surfaces.

3.4 EXCAVATION FOR PAVEMENTS

- A. Excavate surfaces under pavements to indicated lines, cross sections, elevations, and subgrades.

3.5 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches (300 mm) higher than top of pipe or conduit unless otherwise indicated.
 - 1. Clearance: 12 inches (300 mm) each side of pipe or conduit.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
 - 1. Excavate trenches 6 inches (150 mm) deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.6 SUBGRADE INSPECTION

- A. Proof-roll subgrade below pavements to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
- B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.7 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi (17.2 MPa), may be used when approved by Architect.
 - 1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

3.8 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.9 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

- C. Trenches under Footings: Backfill trenches excavated under footings and within 18 inches (450 mm) of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Section 03 3000 "Cast-in-Place Concrete."
- D. Trenches under Roadways: Provide 4-inch- (100-mm-) thick, concrete-base slab support for piping or conduit less than 30 inches (750 mm) below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches (100 mm) of concrete before backfilling or placing roadway subbase course. Concrete is specified in Section 03 3000 "Cast-in-Place Concrete."
- E. Initial Backfill: Place and compact initial backfill of subbase material, free of particles larger than 1 inch (25 mm) in any dimension, to a height of 12 inches (300 mm) over the pipe or conduit.
 - 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- F. Final Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.

3.10 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.11 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D698 ASTM D1557:
 - 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches (300 mm) of existing subgrade and each layer of backfill or fill soil material at 95 percent.
 - 2. Under concrete, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill soil material at 92 percent.
 - 3. Under turf or unpaved areas, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill soil material at 85 percent.
 - 4. For utility trenches, compact each layer of initial and final backfill soil material at 85 percent.

3.12 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:
 - 1. Turf or Unpaved Areas: Plus or minus 1 inch (25 mm).
 - 2. Walks: Plus or minus 1 inch (25 mm).
 - 3. Pavements: Plus or minus 1/2 inch (13 mm).

3.13 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

- A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:
 - 1. Place subbase course and base course that exceeds 6 inches (150 mm) in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick.
 - 2. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D698 ASTM D1557.

3.14 MULCH AND WEED BARRIER

- A. Final grade to be graded smooth with minimal slope for drainage. Install weed barrier per manufactures recommendation. Place stone mulch at uniform thickness and hand compact.

3.15 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform inspections:
- B. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
- D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.
- E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.16 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.17 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 31 2000

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SECTION 32 1313 - CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Curbs and gutters.
2. Walks.

B. Related Sections:

1. Section 03 3000 "Cast-in-Place Concrete" for general building applications of concrete.
2. Section 31 2000 "Earth Moving" for subgrade preparation, grading, and subbase course.
3. Section 32 1373 "Concrete Paving Joint Sealants" for joint sealants in expansion and contraction joints within concrete paving and in joints between concrete paving and asphalt paving or adjacent construction.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Other Action Submittals:

1. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- B. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
- C. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.
- D. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

1.4 PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 - PRODUCTS

2.1 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
 - 1. Use flexible or uniformly curved forms for curves with a radius of 100 feet (30.5 m) or less. Do not use notched and bent forms.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.2 STEEL REINFORCEMENT

- A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from as-drawn steel wire into flat sheets.
- C. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420); deformed.
- D. Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420) plain-steel bars. Cut bars true to length with ends square and free of burrs.
- E. Tie Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- F. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified.

2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:
 - 1. Portland Cement: ASTM C 150, gray portland cement Type I/II. Supplement with the following:
 - a. Fly Ash: ASTM C 618, Class C or Class F.
 - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- B. Normal-Weight Aggregates: ASTM C 33, Class 4S, uniformly graded. Provide aggregates from a single source with documented service-record data of at least 10 years' satisfactory service in similar paving applications and service conditions using similar aggregates and cementitious materials.
 - 1. Coarse Aggregate: MDOT 6A or MDOT 6AA.
 - 2. Maximum Coarse-Aggregate Size: 1-1/2 inches (38 mm) nominal.

3. Fine Aggregate: MDOT 2NS.
4. Do not use fine or coarse aggregates containing substances that cause spalling.

C. Water: Potable and complying with ASTM C 94/C 94M.

D. Air-Entraining Admixture: ASTM C 260.

E. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

2.4 FIBER REINFORCEMENT

A. Synthetic Fiber: Monofilament polypropylene fibers engineered and designed for use in concrete paving, complying with ASTM C 1116/C 1116M, Type III, 1/2 to 3/4 inches (13 to 19 mm) long.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Monofilament Fibers:

- 1) FORTA Corporation; FORTA ECONO-MONO.
- 2) Grace, W. R. & Co. - Conn.; Grace MicroFiber.
- 3) QC Construction Products; QC FIBERS.

2.5 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry or cotton mats.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

2.6 RELATED MATERIALS

A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber in preformed strips.

B. Bonding Agent: ASTM C 1059, Type II, non-dispersible, acrylic emulsion or styrene butadiene.

2.7 DETECTABLE WARNING MATERIALS

A. Detectable Warning: provide as indicated on the drawings.

2.8 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301 (ACI 301M), with the following properties:
 - 1. Compressive Strength (28 Days): 4000 psi (27.6 MPa).
 - 2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.
 - 3. Slump Limit: 4 inches (100 mm), plus or minus 1 inch (25 mm).
 - 4. Air Content: 5-1/2 percent plus or minus 1.5 percent.
- B. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
- C. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.0 lb/cu. yd. (0.60 kg/cu. m).

2.9 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M. Furnish batch certificates for each batch discharged and used in the Work.
 - 1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.
 - 1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph (5 km/h).
 - 2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing not less than 15 tons (13.6 tonnes).
 - 3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch (13 mm) according to requirements in Section 31 2000 "Earth Moving."
- B. Remove loose material from compacted subbase surface immediately before placing concrete.

3.2 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.3 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
- D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.4 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
 - 1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.
 - 1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
 - 2. Provide tie bars at sides of paving strips where indicated.
 - 3. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys unless otherwise indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
 - 1. Locate expansion joints at intervals of 50 feet (15.25 m) unless otherwise indicated.
 - 2. Extend joint fillers full width and depth of joint.
 - 3. Terminate joint filler not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished surface if joint sealant is indicated.
 - 4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
 - 5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 - 6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness:
 - 1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.

- E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch (6-mm) radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.5 CONCRETE PLACEMENT

- A. Moisten subbase to provide a uniform dampened condition at time concrete is placed.
- B. Comply with ACI 301 (ACI 301M) requirements for measuring, mixing, transporting, placing, and consolidating concrete.
- C. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- D. Screed paving surface with a straightedge and strike off.
- E. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- F. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.
- G. Slip-Form Paving: Use design mixture for automatic machine placement. Produce paving to required thickness, lines, grades, finish, and jointing.
 - 1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of slip-form paving machine during operations.
- H. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
 - 1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.
- I. Hot-Weather Placement: Comply with ACI 301 (ACI 301M) and as follows when hot-weather conditions exist:
 - 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 - 3. Fog-spray forms and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.6 FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
 - 1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3.7 DETECTABLE WARNINGS

- A. Detectable Warnings: Install detectable warnings as part of a continuous concrete paving placement and according to manufacturer's written instructions.

3.8 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, or a combination of these.

3.9 PAVING TOLERANCES

- A. Comply with tolerances in ACI 117 and as follows:
 - 1. Elevation: 3/4 inch (19 mm).
 - 2. Thickness: Plus 3/8 inch (10 mm), minus 1/4 inch (6 mm).
 - 3. Surface: Gap below 10-foot- (3-m-) long, unlevelled straightedge not to exceed 1/2 inch (13 mm).
 - 4. Joint Spacing: 3 inches (75 mm).
 - 5. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.
 - 6. Joint Width: Plus 1/8 inch (3 mm), no minus.

3.10 PAVEMENT MARKING

- A. Allow concrete paving to cure for a minimum of 28 days and be dry before starting pavement marking.

- B. Sweep and clean surface to eliminate loose material and dust.
- C. Apply paint with mechanical equipment to produce markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils (0.4 mm).

3.11 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
 - 1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 - 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 - 3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - 4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when it is 80 deg F (27 deg C) and above, and one test for each composite sample.
 - 5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
 - 6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.
- C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
- D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

- F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
- G. Concrete paving will be considered defective if it does not pass tests and inspections.
- H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- I. Prepare test and inspection reports.

3.12 REPAIRS AND PROTECTION

- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.
- B. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- C. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 32 1313

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SECTION 32 1373 - CONCRETE PAVING JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cold-applied joint sealants.

B. Related Sections:

1. Section 07 9200 "Joint Sealants" for sealing nontraffic and traffic joints in locations not specified in this Section.
2. Section 32 1313 "Concrete Paving" for constructing joints in concrete pavement.

1.2 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.

1.3 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer based on testing and field experience.
- B. Colors of Exposed Joint Sealants: gray

2.2 COLD-APPLIED JOINT SEALANTS

- A. Single-Component, Self-Leveling, Silicone Joint Sealant for Concrete: ASTM D 5893, Type SL.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Crafco Inc., an ERGON company; RoadSaver Silicone SL.
- b. Dow Corning Corporation; 890-SL.
- c. Pecora Corporation; 300 SL.

2.3 JOINT-SEALANT BACKER MATERIALS

- A. Round Backer Rods for Cold- and Hot-Applied Joint Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

2.4 PRIMERS

- A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.
- B. Cleaning of Joints: Clean out joints immediately before installing joint sealants.
- C. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- D. Joint-Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- E. Install joint-sealant backings of kind indicated to support joint sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 1. Do not leave gaps between ends of joint-sealant backings.
 2. Do not stretch, twist, puncture, or tear joint-sealant backings.
 3. Remove absorbent joint-sealant backings that have become wet before sealant application and replace them with dry materials.
- F. Install joint sealants using proven techniques that comply with the following and at the same time backings are installed:
 1. Place joint sealants so they directly contact and fully wet joint substrates.
 2. Completely fill recesses in each joint configuration.

- 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- G. Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated.
- H. Clean off excess joint sealant or sealant smears adjacent to joints as the Work progresses, by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

END OF SECTION 32 1373

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SECTION 32 3113 - CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Chain-link fences.
 - 2. Swing gates.

1.2 PREINSTALLATION MEETINGS

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

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of fence and gate assembly.
 - 1. Include plans, elevations, sections, details, and attachments to other work.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample warranty.

1.5 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Chain-link fence and gate frameworks shall withstand the design wind loads and stresses for fence height(s) and under exposure conditions indicated according to ASCE/SEI 7:

2.2 CHAIN-LINK FENCE FABRIC

- A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist according to "CLFMI Product Manual" and requirements indicated below:
1. Fabric Height: As indicated on Drawings.
 2. Steel Wire for Fabric: Wire diameter of 0.192 inch (4.88 mm).
 - a. Mesh Size: 2 inches (50 mm).
 - b. Zinc-Coated Fabric: ASTM A392, Type II, Class 2, 2.0 oz./sq. ft. (610 g/sq. m) with zinc coating applied before weaving.
 - c. Coat selvage ends of metallic-coated fabric before the weaving process with manufacturer's standard clear protective coating.
 3. Aluminum Wire Fabric: ASTM F1183, with mill finish, and wire diameter of 0.192 inch (4.88 mm).
 - a. Mesh Size: 2 inches (50 mm).
 4. Selvage: Knuckled at both selvages.

2.3 FENCE FRAMEWORK

- A. Posts and Rails: ASTM F1043 for framework, including rails, braces, and line; terminal; and corner posts. Provide members with minimum dimensions and wall thickness according to ASTM F1043 or ASTM F1083 based on the following:
1. Fence Height: As indicated on Drawings.
 2. Light-Industrial-Strength Material: Group IC-L, round steel pipe, electric-resistance-welded pipe.
 - a. Line Post: 2.375 inches (60 mm) in diameter.
 - b. End, Corner, and Pull Posts: 2.875 inches (73 mm).
 3. Horizontal Framework Members: top and bottom rails according to ASTM F1043.
 4. Brace Rails: ASTM F1043.
 5. Metallic Coating for Steel Framework:
 - a. Type A zinc coating.
 - b. Type B zinc with organic overcoat.
 - c. External, Type B zinc with organic overcoat and internal, Type D zinc-pigmented coating.
 - d. Type C, Zn-5-Al-MM alloy coating.
 - e. Coatings: Any coating above.

2.4 TENSION WIRE

- A. Metallic-Coated Steel Wire: 0.177-inch- (4.5-mm-) diameter, marcelled tension wire according to ASTM A817 or ASTM A824, with the following metallic coating:
1. Type I: Aluminum coated (aluminized).

2.5 SWING GATES

- A. General: ASTM F900 for gate posts and double swing gate types.
 - 1. Gate Leaf Width: As indicated.
 - 2. Framework Member Sizes and Strength: Based on gate fabric height as indicated.
- B. Pipe and Tubing:
 - 1. Zinc-Coated Steel: ASTM F1043 and ASTM F1083; manufacturer's standard protective coating and finish.
 - 2. Gate Posts: Round tubular steel.
 - 3. Gate Frames and Bracing: Round tubular steel.
- C. Frame Corner Construction: Welded.
- D. Hardware:
 - 1. Hinges: 180-degree outward swing.
 - 2. Latch: Permitting operation from both sides of gate with provision for padlocking accessible from both sides of gate.
 - 3. Closer: Manufacturer's standard.
 - 4. .

2.6 FITTINGS

- A. Provide fittings according to ASTM F626.
- B. Finish:
 - 1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz./sq. ft. (366 g/sq. m) of zinc.

2.7 GROUT AND ANCHORING CEMENT

- A. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating, and that is recommended in writing by manufacturer for exterior applications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation before final grading is completed unless otherwise permitted by Architect.

3.2 PREPARATION

- A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet (152 m) or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

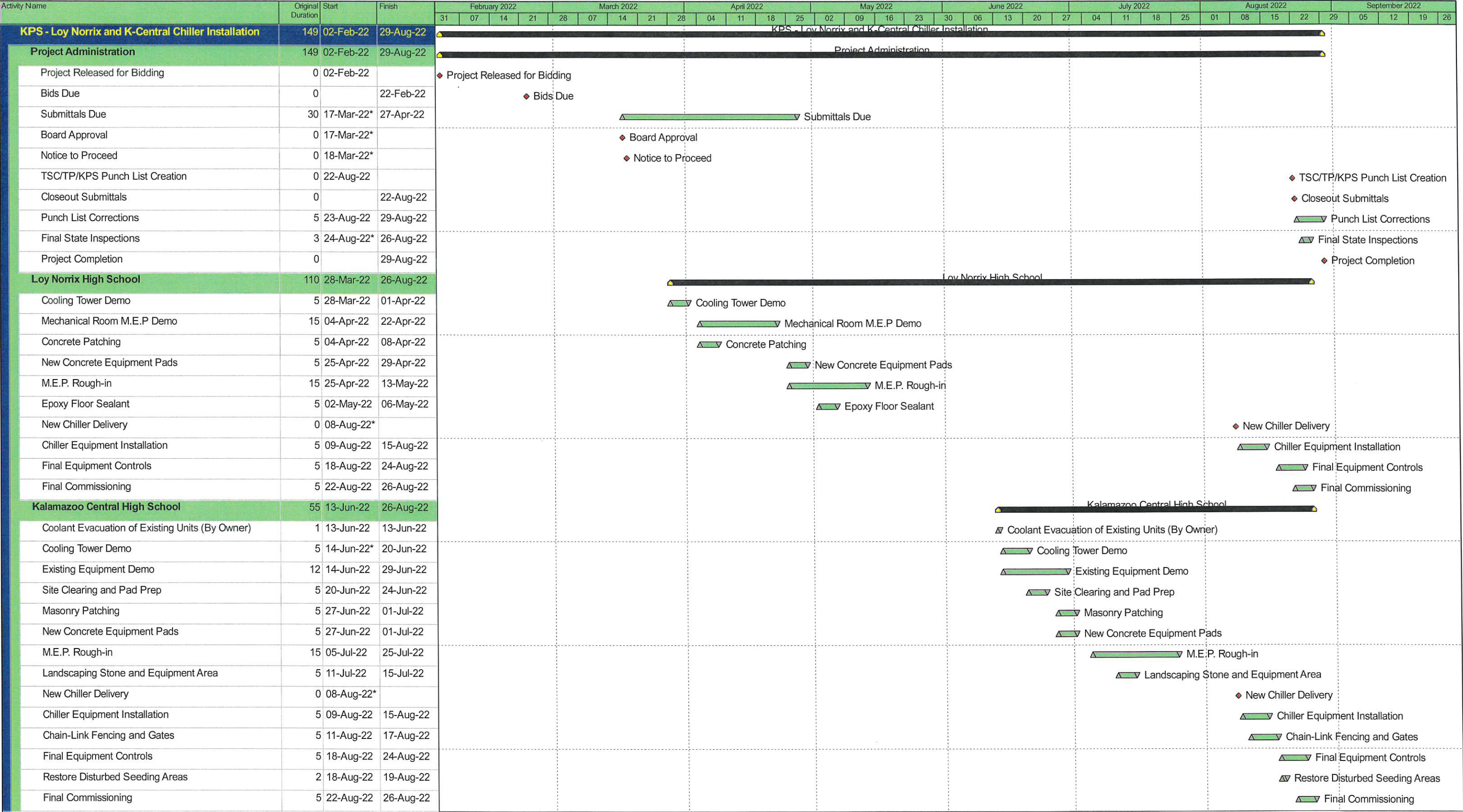
3.3 CHAIN-LINK FENCE INSTALLATION

- A. Install chain-link fencing according to ASTM F567 and more stringent requirements specified.
- B. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.
- C. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.
 - 1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
 - 2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
- D. Line Posts: Space line posts uniformly at 96 inches (2440 mm) o.c.
- E. Tension Wire: Install according to ASTM F567, maintaining plumb position and alignment of fence posts. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch- (3.05-mm-) diameter hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches (610 mm) o.c. Install tension wire in locations indicated before stretching fabric.
 - 1. .
- F. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 2-inch (50-mm) bottom clearance between finish grade or surface and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.

3.4 ADJUSTING

- A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Lubricate hardware and other moving parts.

END OF SECTION 32 3113



- Actual Work
- Remaining Work
- Critical Remaining Work
- ◆

 Milestone
- ▲

 Summary



KPS - K-Central and Loy Norrix Chiller Installation RFI Log
Date - 2/17/2022



RFI #	Company Submitting RFI	Date Received	RFI Description	RFI Response
1	Jergens	2/14/2022	I do not see that glycol is required in the chilled water systems at either school. Please confirm. If it is required, is there an estimated volume of the existing piping systems?	TowerPinkster: No glycol, the systems are designed to be drained in the winter.
2	Jergens	2/15/2022	I assume that the scope clarifications for Bid Category 1 (Loy Norrix) would also be the same scope clarifications for General Trades Bid Category 2 (K Central)...the clarifications were omitted for Bid Category 2 so I want to clarify General Trades will remove existing equipment pads and install new pads, as required.	Yes, General Trades will remove existing equipment pads and install new pads, as required for both projects.
3	Fredrick Construction	2/15/2022	Specification Section 01 28 00 – Schedule of Values: Will the schedule of values need to be separated between the two schools or can it be combined since it will be a single contract?	There will separate contracts for each school and separate Schedule of Values needed.
4	Fredrick Construction	2/15/2022	Specification Section 01 51 10 – Temporary Electricity, Lighting, & Warning Systems – Paragraph 1.02.C requires the electrician within the general trades bid package to provide one 200 AMP panel for temporary lighting and power distribution. Given the nature of this project, will this be required? If yes, will each school require this?	Yes, this will be required for each school. Include line item in Schedule of Values per specification section.
5	Fredrick Construction	2/15/2022	Specification Section 01 52 60 – Rubbish Container: Paragraph 1.02.C requires the general trades contractor to provide (3) once cubic yard mobile trash carts. Is each school to receive (3) trash carts, making a total of (6) for the project?	Provide a minimum of one trash cart per School.
6	Fredrick Construction	2/15/2022	Specification Section 01 52 60 – Rubbish Container: Paragraph 1.03 indicates trash chutes may be required. Will either school require a trash chute?	Contractor to provide if required.
7	Fredrick Construction	2/15/2022	Specification Section 01 12 00 – Bid Categories require the general trades contractor to remove existing equipment pads. Will the mechanical contractor be responsible for ALL equipment & piping demolition and disposal?	Yes, the Mechanical contractor will remove all equipment and associated piping.
8	Fredrick Construction	2/15/2022	Specification Section 02 4119 – Selective Demolition: Paragraph 1.4.B requires the demolition contractor to provide an engineering survey of the condition of the building before removing any element. Is this required for this project?	TowerPinkster: Photo documentation of pre-construction condition of work areas is sufficient for this requirement.
9	Fredrick Construction	2/15/2022	Specification Section 32 1313 – Concrete Paving has been included as part of the technical specification and includes concrete for curbs, gutters, and walks. Has this specification been included on accident or is this to be used for the exterior equipment pads?	Provide a concrete pad for all floor mounted equipment.
10	Fredrick Construction	2/15/2022	Please confirm painting will not be required for this project and that any new conduit, boxes, uni-strut, etc. being installed will not require paint. If painting is required, what is to receive paint and which bid package will be responsible for painting?	Refer to note 15 on Sheet G 002 (K-Central) and note 17 on G002 for Loy Norrix for painting clarifications.
11	Fredrick Construction	2/15/2022	Will the electrical contractor within the general trades bid package have any required work items for the BAS/BMS controls being installed within the mechanical bid package?	Provide electrical work per plans and specifications.
12	Fredrick Construction	2/15/2022	Will there be any masonry and/or drywall wall patching required at either school? If yes, what bid category will be responsible for this patching?	Yes, miscellaneous patching of walls is included at both schools. For example, refer to Loy Norrix, sheet A 101D1 concrete patching and K-Central A 102D masonry patching.
13	Fredrick Construction	2/15/2022	Will disconnect switches be provided with the Owner supplied mechanical equipment?	Disconnects are provided with Owner provided equipment.
14	Fredrick Construction	2/15/2022	What are the reinforcement requirements for the new interior concrete equipment pads? The project specification contains both reinforcing steel and fiber.	TowerPinkster: Provide #4@12 horizontal bars, each way. fiber may be removed from concrete mix.
15	Fredrick Construction	2/15/2022	Loy Norrix - Sheet S101D – Concrete Repair Area Layout Detail: Note 2 indicates all concrete repairs to be performed under the supervision and direction of a registered professional engineer retained by the contractor. Is a 3rd party engineer required to be hired by the general trades contractor for this project?	TowerPinkster: This requirement is waived for this project.

16	Fredrick Construction	2/15/2022	Loy Norrix - Sheet M302 – Roof Mechanical Plan – Keyed Note 6 indicates core drilling, grinding, and caulking at metal panels for new piping. This same note appears on Sheet A 101D1. What bid package is responsible for this core drilling and work at the metal panels.	Any penetrations through General Trades provided metal panels will be by the trade requiring the penetration.
17	Fredrick Construction	2/15/2022	Loy Norrix - Sheet M 310 – Section 1 indicates a new 4” thick concrete equipment pad being installed under the new chiller. Is the new 4” equipment pad to be installed before applying the traffic coating system or after so that the traffic coating encapsulates the new equipment pad? The concrete specification indicates new concrete is to receive penetrating liquid floor treatment.	Yes, the new equipment pad is to be installed before the traffic coating.
18	Fredrick Construction	2/15/2022	Loy Norrix - Sheet M 401 – Chilled Water Piping Schematic appears to show all new floor mounted equipment. Please confirm the follow pieces of equipment are to receive new 4” concrete pads and if there are any additional pieces of equipment not listed: CH-1, P-1, ET-1, and F-1. Please also confirm that pads are to be installed and not curbs as indicated by the notes.	TowerPinkster: Provide a concrete pad for all floor mounted equipment.
19	Fredrick Construction	2/15/2022	Loy Norrix - Sheet M501 – Pump Schedule – Note 1 indicates that the VFD for P-1 will be provided by the Temperature Controls Contractor. Will the Temperature Controls Contractor be providing the (2) additional VFD’s for the existing equipment as shown on Sheet E 100?	Yes, all VFD’s to be provided by Mechanical Contractor.
20	Fredrick Construction	2/15/2022	Loy Norrix - Sheet E 101 – General Note 5 indicates that the contractor is responsible for project phasing and installation of temporary power, egress lighting, exit signage, etc. while the building is occupied. Please provide a brief narrative specific to the expected temporary measures that will actually be required when replacing the MCCDA distribution panel and/or removing and reinstalling the existing transformer. Clarification will help ensure accurate contractor pricing.	Refer to TowerPinkster Addendum #1 for Transformer work.
21	Fredrick Construction	2/15/2022	Loy Norrix - Sheet E 102 – General Electrical Note 6 indicates that the electrician is to provide 120V circuit from nearest generator standby panel for all BMS/BAS control panels with the location and number of circuits to be coordinated with the controls contractor. Is this required for this project? If yes, for bidding purposes please provide the number of circuits required and approximate LF of run.	TowerPinkster: Yes, provide one dedicated 120V circuit out of panel EP1 to the temperature control panel.
22	Fredrick Construction	2/15/2022	Loy Norrix - Sheet A 101D1 contains a photo of an existing electrical transformer with a note that indicates the transformer to be removed and reinstalled for installation of the new epoxy adhesive traffic coating and refers the contractor to the electrical plans. The electrical plans do not indicate this work item, please confirm this is required.	Refer to Addendum #1 revisions to existing transformer.
23	Fredrick Construction	2/15/2022	Loy Norrix - Sheet E 102 – General Electrical Note 7 indicates that 4” housekeeping pads are required for any floor mounted gear or transformers. There is an existing transformer that is being removed and reinstalled due to new traffic coating installation. Does this transformer require a 4” concrete pad? Is there any other electrical equipment that would require a new 4” concrete pad?	No concrete pad required for existing transformer.
24	Fredrick Construction	2/15/2022	K-Central - Specification Section 32 3113 – Paragraph 2.2 indicates both steel wire fabric and aluminum wire fabric for the new fencing. Which is the contractor to utilize?	TowerPinkster: Steel wire fabric.
25	Fredrick Construction	2/15/2022	K-Central - Specification Section 32 3113 – Paragraph 2.5.D.3 indicates using the manufacturer’s standard closer for the gates. Are closers required for these gates or just the lockable fork latch with drop bar?	TowerPinkster: Lockable fork latch with drop bar per detail.
26	Fredrick Construction	2/15/2022	K-Central - Sheet A 102D, MD 301, and M 301 requires significant work from both the general trades bid package and the mechanical bid package. It would appear that lawn restoration may be required due to accessing this work area. For bidding purposes, should an allowance be established that the general trades package or mechanical package can include in their bids to address any repairs that are required?	General Trades to provide Lawn Restoration for all construction affected areas regardless of the trade performing the work as part of the base bid.

27	Fredrick Construction	2/15/2022	K-Central - Sheet A 102D – Typical Mechanical Equipment Pad detail indicates concrete to be 8” thick, reinforced both ways with rebar, and a 3’-0” turn down with a note stating final pad size to be coordinated with equipment supplier. Given the equipment has been ordered, can a final pad size be provided for bidding purposes? Please also confirm all details, including the 1’ of granular fill, thickness of concrete, and reinforcement requirements are applicable to this project.	TowerPinkster: Include 16' x 8' pad dimensions for each chiller at Kalamazoo-Central. All other details of pad are to be followed per sheet on A 102D.
28	Fredrick Construction	2/15/2022	K-Central - Sheet M 401 – Chilled Water Piping Schematic appears to show all new floor/ground mounted equipment. Please confirm the follow pieces of equipment are to receive new 4” concrete pads and if there are any additional pieces of equipment not listed: C-1, C-2, P-1, P-2, ET-1, and F-1. Please also confirm that pads are to be installed and not curbs as indicated by the notes.	TowerPinkster: Provide a concrete pad for all floor mounted equipment.

ADDENDUM NO. 1

DATE OF ISSUANCE: February 11, 2022

PROJECT: Loy Norrix High School Chiller Replacement
606 E Kilgore Rd
Kalamazoo, MI 49001

OWNER: Kalamazoo Public Schools

ARCHITECT'S PROJECT NO.: 21-802.00

ORIGINAL BID ISSUE DATE: January 24, 2022

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 **(2) two** pages of text and the following documents:

- Drawings: **A 101D1, & E100**

CHANGES TO SPECIFICATIONS

ADD-1 Item No. S-1 - None

none

CHANGES TO DRAWINGS

ADD-1 Item No. D-1 - Salvage Chiller Controls

Refer to Sheet(s): MD 301 (not reissued)

Chiller controller to be salvaged and turned over to the owner.

ADD-1 Item No. D-2 - Salvage Condenser Water Pump

Refer to Sheet(s): MD 301 (not reissued)

Refer to Keyed Demolition note #5. Salvage the condenser water pump, suction diffuser, triple duty valve, differential pressure assembly, and flexible connections. Return these items to the owner.

ADD-1 Item No. D-3 - Provide new Nameplate for panel MDPK

Refer to Sheet(s): E100 (reissued)

Nameplate for panel MPDK indicates panel is 480/277V, however, TX-MPDK being 500KVA and two sets of record drawings appear to indicate panel MDPK is actually 208/120V. Contractor to field verify and provide new nameplate for MDPK indicating correct volage.

ADD-1 Item No. D-4 - Existing Transformer to Remain

Refer to Sheet(s): A 101D1 (reissued)

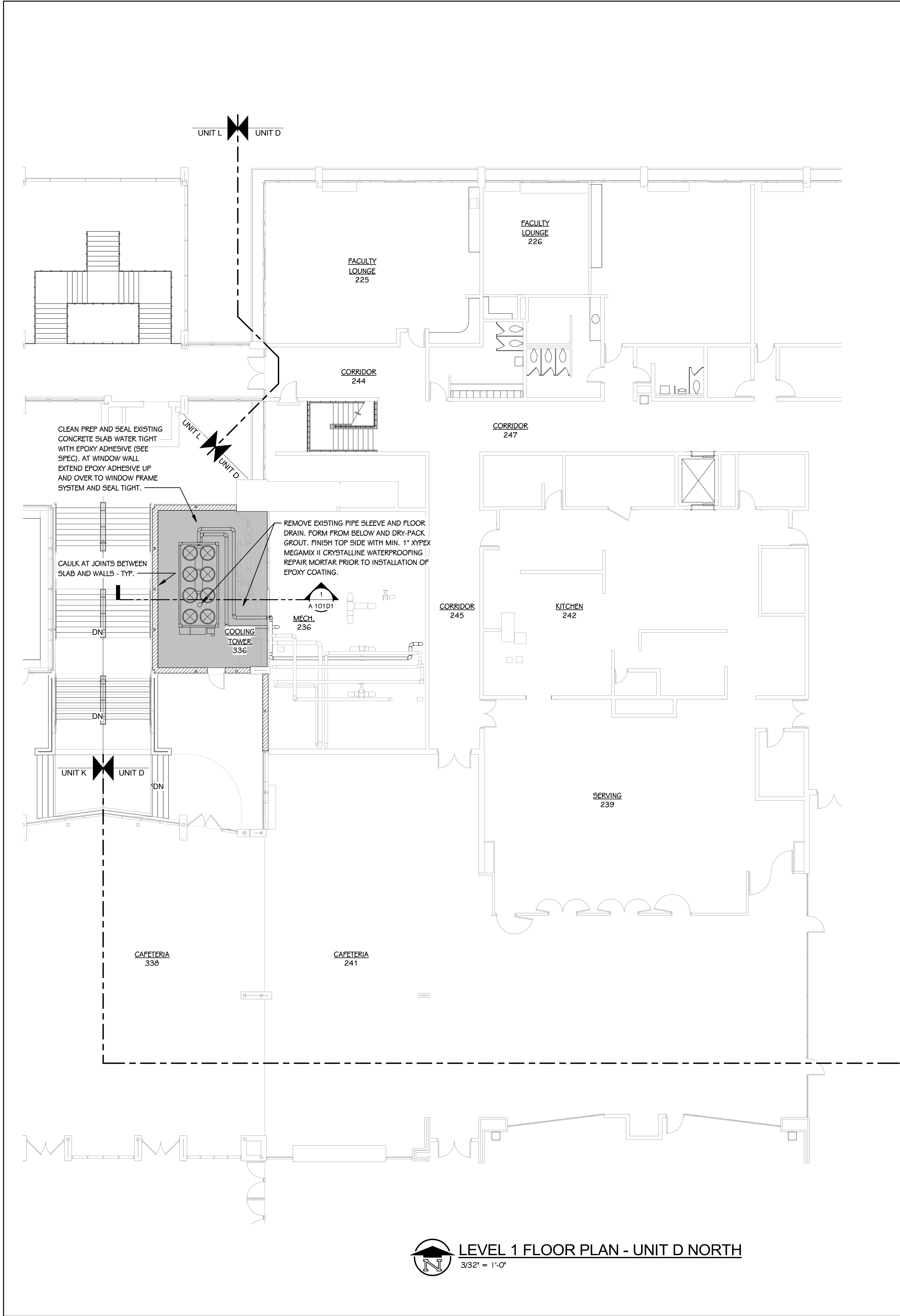
Existing transformer is to remain in place and epoxy flooring sealant is to be terminated tight around transformer. Caulk around transformer weather tight. See revised notes on picture on reissued drawing sheet A 101D1.

ADD-1 Item No. D-5 - Window Panels at New Pipe Penetration

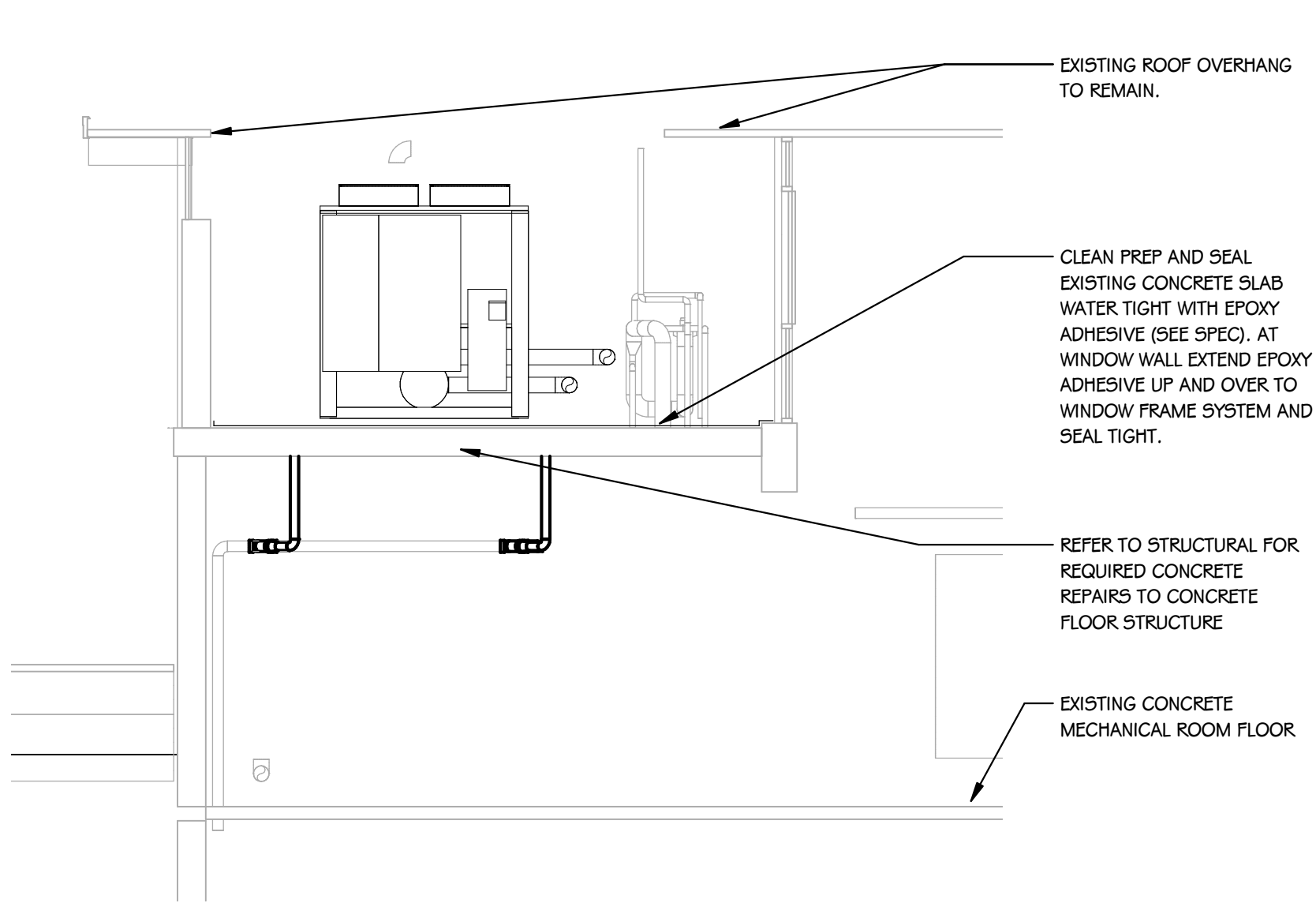
Refer to Sheet(s): A 101D1 (reissued)

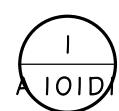
Existing panels contain asbestos, and removal of panels is by owner. Refer to revised note on revised and reissued drawing A101D1 for more information.

END OF ADDENDUM.



 **LEVEL 1 FLOOR PLAN - UNIT D NORTH**
3/32" = 1'-0"



 **BUILDING SECTION**
3/16" = 1'-0"



REMOVE EXISTING MECH. UNIT AND SUPPORTS AND PREP FOR NEW - SEE MECH. DRAWINGS.

REMOVE EXISTING PIPE SLEEVE. FORM FROM BELOW AND DRY-PACK GROUT. FINISH TOP SIDE WITH MIN. 1" XYPEX MEGAMIX II CRYSTALLINE WATERPROOFING REPAIR MORTAR. PRIOR TO INSTALLATION OF EPOXY COATING.

CAULK ALL EDGES BETWEEN EXISTING CONCRETE SLAB AND ADJOINING WALLS

CLEAN PREP AND SEAL EXISTING CONCRETE SLAB AS WELL AS CONCRETE CURB WATER TIGHT WITH EPOXY ADHESIVE (SEE SPEC). AT WINDOW WALL EXTEND EPOXY ADHESIVE UP AND OVER TO WINDOW FRAME SYSTEM AND SEAL TIGHT.



EXISTING TRANSFORMER TO REMAIN.

CLEAN TRANSFORMED AND SEAL TIGHT TO NEW EPOXY FLOOR - ALL SIDES OF TRANSFORMER

CLEAN PREP AND SEAL EXISTING CONCRETE SLAB WATER TIGHT WITH EPOXY ADHESIVE (SEE SPEC).



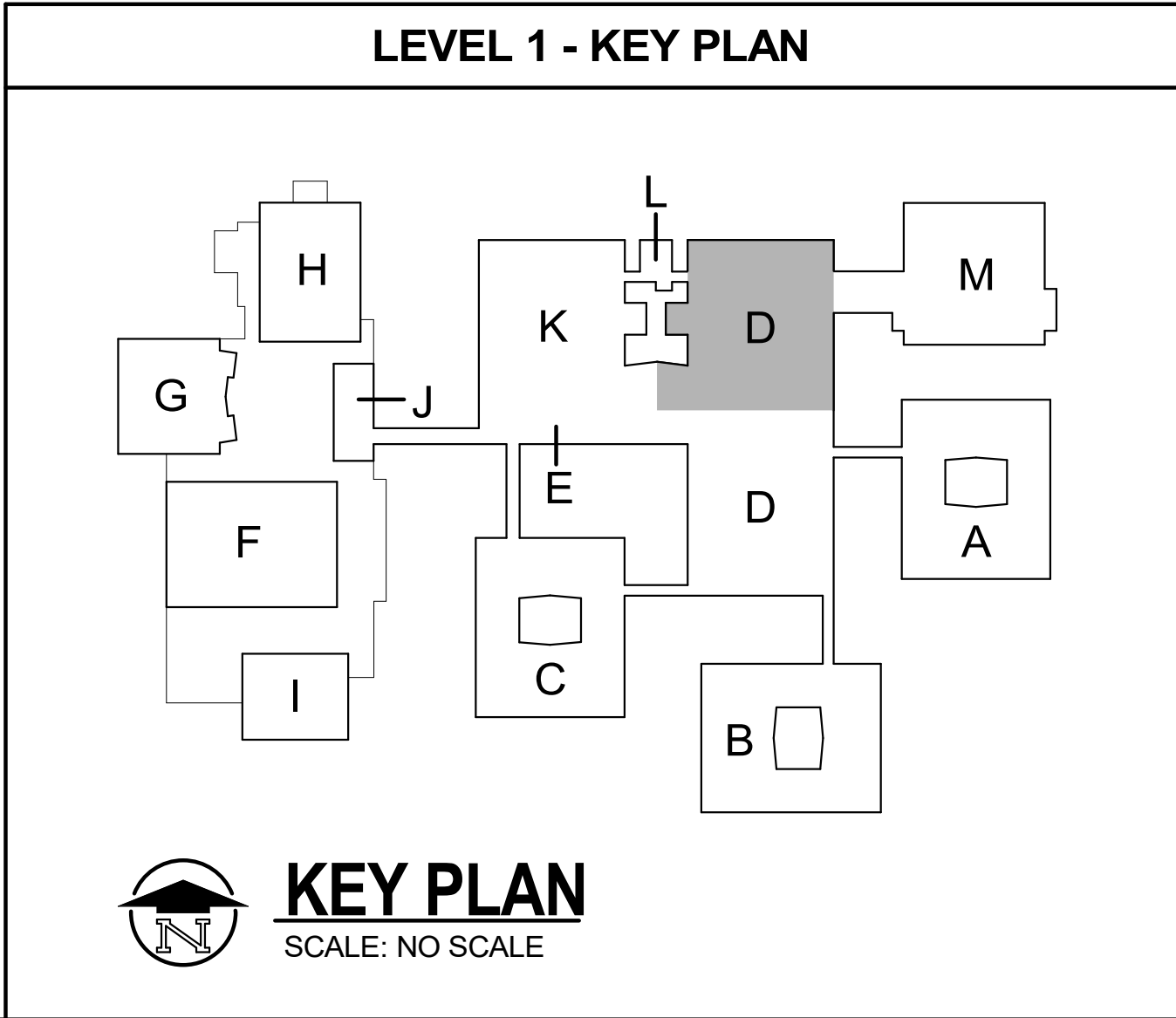
CAULK ALL EDGES BETWEEN EXISTING CONCRETE SLAB AND ADJOINING WALLS

EXISTING PANEL REMOVAL BY OWNER. INSTALL NEW CLEAR ANODIZED LAMINATED 0.050 ALUM. SHEETS TO THICKNESS TO MATCH EXISTING REMOVED PANELS. CORE DRILL NEW METAL PANEL ASSEMBLY AS REQUIRED FOR PIPE PENETRATION. WRAP OPENING WITH HEMMED BEND CLEAR ANODIZED ALUM. SLEEVE GLUED IN PLACE. AND CAULK BOTH SIDES WEATHER TIGHT BETWEEN SLEEVE AND PIPES. ALLOW FOR PIPE MOVEMENT AT METAL PANEL PENETRATION. GRIND ALL METAL PANEL EDGES SMOOTH. COORDINATE SIZE AND LOCATION WITH MECHANICAL.

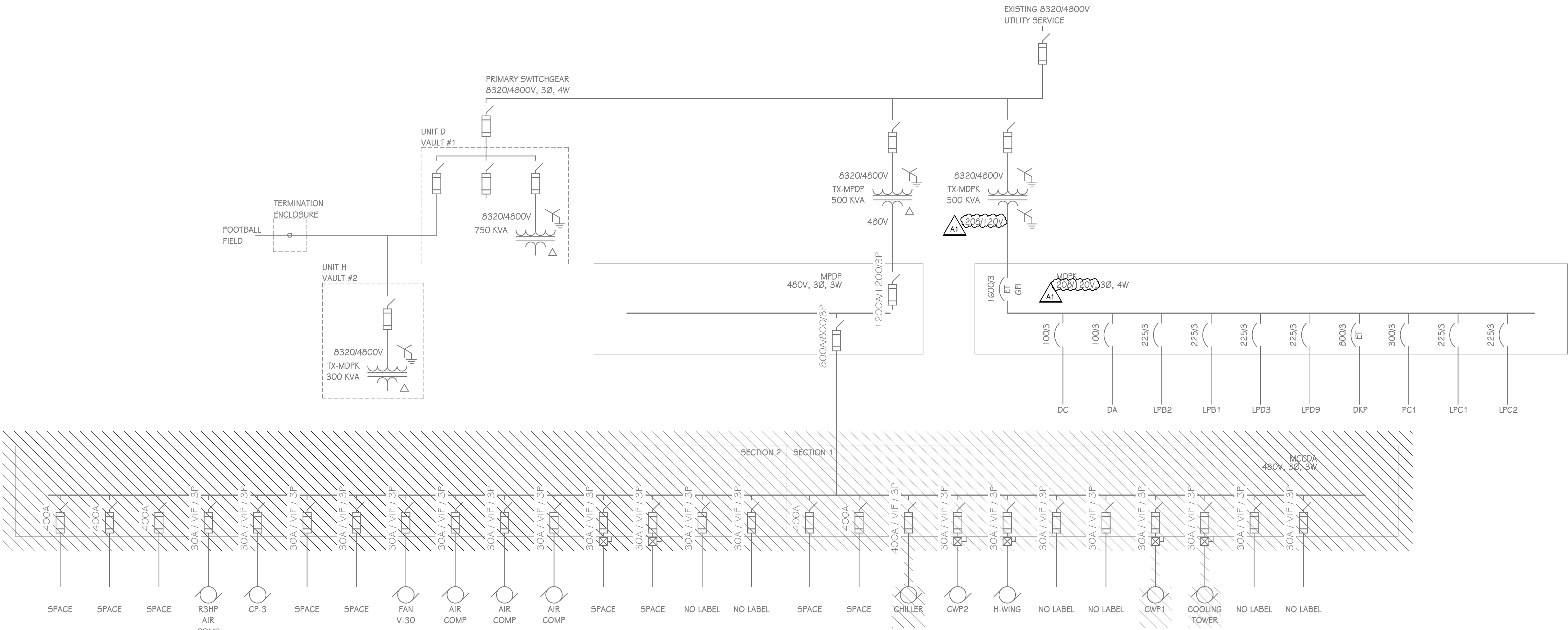
CAULK ALL EDGES BETWEEN EXISTING CONCRETE SLAB AND ADJOINING WALLS



EXISTING BRACING TO BE REMOVED AND REPLACED TO ALLOW INSTALLATION OF NEW CHILLER. MATCH EXISTING CONNECTIONS, TO BE VERIFIED IN FIELD. GALVANIZE ALL EXTERIOR STEEL. REFER TO STRUCTURAL FOR MORE DETAILS



KEY PLAN
SCALE: NO SCALE

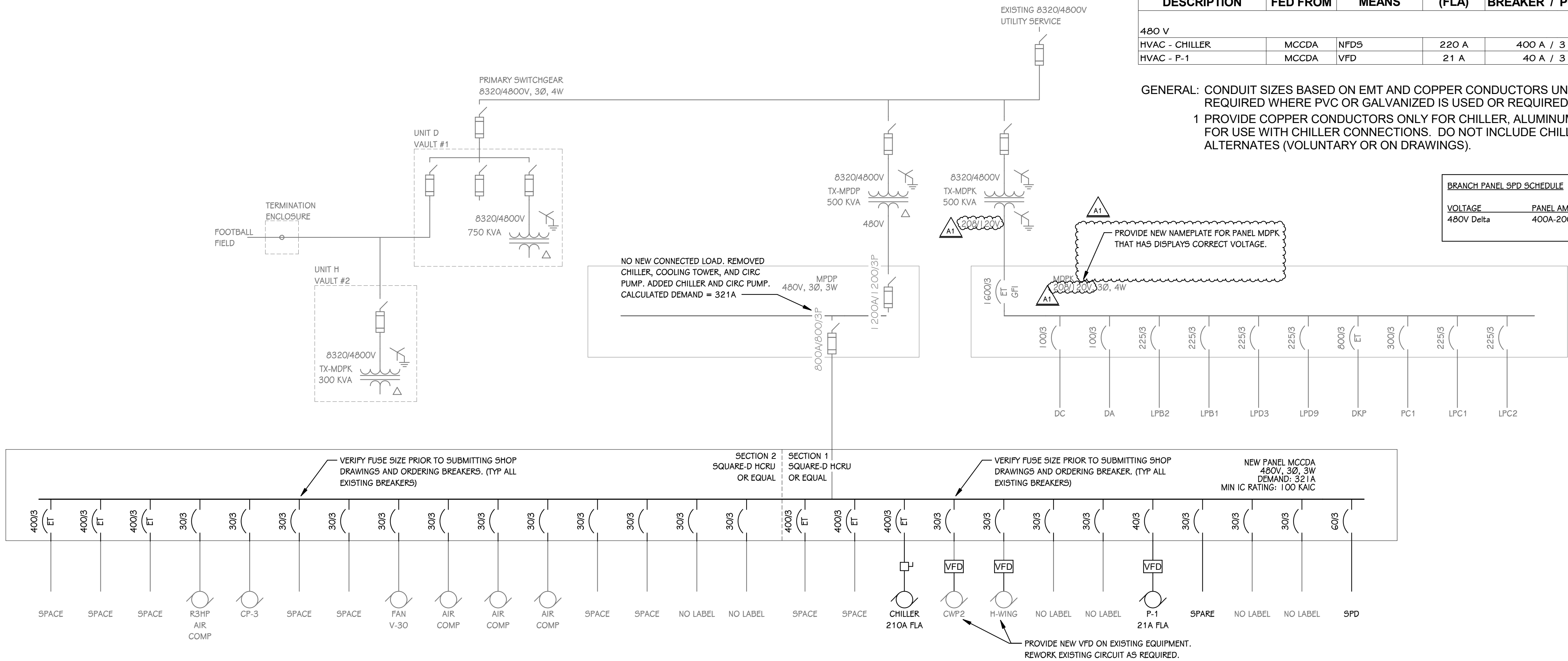


PARTIAL ELECTRICAL ONE-LINE DIAGRAM - DEMOLITION
SCALE: NONE

ELECTRICAL HVAC FEEDER SCHEDULE										
DESCRIPTION	FED FROM	DISCONNECT MEANS	CURRENT (FLA)	BREAKER / POLES	# OF SETS	FEEDER			FEED VOLT DROP %	NOTES
						WIRE	GROUND	EMT		
480 V										
HVAC - CHILLER	MCCDA	NFDS	220 A	400 A / 3	2 SETS	3 #3/O	#3 GND.	2"	0.48%	1
HVAC - P-1	MCCDA	VFD	21 A	40 A / 3	1 SET	3 #8	#10 GND.	3/4"	0.39%	

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 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).

BRANCH PANEL SPD SCHEDULE					
VOLTAGE	PANEL AMPS	RSE2 SPD MODEL	SURGE RATING	PROTECTION MODES	BREAKER AMPS
480V Delta	400A-2000A	RSE-2-277-3D-A-10-E-F-5	100kA@mode	L-G, L-G, N-G	60A



PARTIAL ELECTRICAL ONE-LINE DIAGRAM - NEW CONSTRUCTION
SCALE: NONE

ELECTRICAL SYMBOLS

SYMBOL DESCRIPTION MOUNTING HEIGHTS

RECEPTACLE SYMBOLS

WP/GFCI DUPLEX RECEPTACLE - WET LOCATION ENCLOSURE WITH GFI 16"

POWER SYMBOLS

ELECTRIC METER
SURGE PROTECTION DEVICE
PANELBOARD
DISTRIBUTION PANELBOARD
DISCONNECT SWITCH - UNFUSED
MOTOR - HP AS INDICATED
FUSE
CIRCUIT BREAKER
CIRCUIT BREAKER - ELECTRONIC TRIP
SWITCH
TRANSFORMER

NOTES:

MOUNT DEVICES AT HEIGHTS INDICATED UNLESS INDICATED OTHERWISE ON PLANS. HEIGHTS ARE TO BOTTOM OF DEVICE.

ADDENDUM NO. 1

DATE OF ISSUANCE: February 11, 2022

PROJECT: Kalamazoo Central High School Chiller Replacement Project
2432 North Drake Road
Kalamazoo, Michigan 49006

OWNER: Kalamazoo Public Schools

ARCHITECT'S PROJECT NO.: 21-801.00

ORIGINAL BID ISSUE DATE: January 24, 2022

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 **(2) Two** pages of text and the following documents:

- Bidding Documents: **None**
- Contract Conditions: **None**
- Specification Sections: **None**
- Drawings: **None**

CHANGES TO PREVIOUSLY ISSUED ADDENDA

None

CHANGES TO BIDDING REQUIREMENTS

ADD-1 Item No. B-1 - None

CHANGES TO CONTRACT CONDITIONS

ADD-1 Item No. C-1 - None

CHANGES TO SPECIFICATIONS

ADD-1 Item No. S-1 - None

CHANGES TO DRAWINGS

ADD-1 Item No. D-1 - Salvage Chiller Controls

Refer to Sheet(s): MD 301 (not reissued)

Chiller controller to be salvaged and turned over to the owner.

END OF ADDENDUM.