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CONTRACTOR GENERAL CONDITIONS NOTES

1. CONTRACTOR SHALL MEET WITH ARCHITECT / ENGINEER TO REVIEW AND VERIFY ALL DRAWINGS PRIOR TO WORK BEING PERFORMED. MANDATORY SITE VISIT WILL BE CONDUCTED PRIOR TO ANY WORK BEING PERFORMED.

2. ALL INFORMATION ON THIS DOCUMENT IS DEPENDENT ON THE EXISTING CONDITIONS AT THE TIME OF CONSTRUCTION. CONTRACTOR SHALL MANDATORY SITE VISIT WITH THE OWNER PRIOR TO ANY WORK BEING PERFORMED.

3. CONTRACTOR SHALL MEET WITH OWNER TO REVIEW AND VERIFY ALL DRAWINGS PRIOR TO WORK BEING PERFORMED.

4. CONTRACTOR SHALL SUBMIT A REQUEST FOR INFORMATION (RFI) TO ARCHITECT / ENGINEER PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

5. CONTRACTOR SHALL SUBMIT A REQUEST FOR PROPOSAL (RFP) TO OWNER PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

6. CONTRACTOR SHALL SUBMIT A REQUEST FOR QUOTATION (RFQ) TO SUPPLIERS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

7. CONTRACTOR SHALL SUBMIT A REQUEST FOR BID (RFB) TO BIDDERS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

8. CONTRACTOR SHALL SUBMIT A REQUEST FOR TENDER (RFT) TO TENDERS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

9. CONTRACTOR SHALL SUBMIT A REQUEST FOR QuRANCE (RFQ) TO QUARANTINE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

10. CONTRACTOR SHALL SUBMIT A REQUEST FOR HAZARD (RFH) TO HAZARDOUS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

11. CONTRACTOR SHALL SUBMIT A REQUEST FOR SAFETY (RFS) TO SAFETY PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

12. CONTRACTOR SHALL SUBMIT A REQUEST FOR QUALITY (RFQ) TO QUALITY ASSURANCE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

13. CONTRACTOR SHALL SUBMIT A REQUEST FOR ENVIRONMENTAL (RFE) TO ENVIRONMENTAL PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

14. CONTRACTOR SHALL SUBMIT A REQUEST FOR SOCIAL (RFS) TO SOCIAL SERVICES PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

15. CONTRACTOR SHALL SUBMIT A REQUEST FOR ECONOMIC (RFE) TO ECONOMIC DEVELOPMENT PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

16. CONTRACTOR SHALL SUBMIT A REQUEST FOR LEGAL (RFL) TO LEGAL DEPARTMENT PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

17. CONTRACTOR SHALL SUBMIT A REQUEST FOR TECHNOLOGICAL (RFT) TO TECHNOLOGY PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

18. CONTRACTOR SHALL SUBMIT A REQUEST FOR OTHER (RFO) TO OTHER DEPARTMENT PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

19. CONTRACTOR SHALL SUBMIT A REQUEST FOR ADMINISTRATIVE (RFA) TO ADMINISTRATION PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

20. CONTRACTOR SHALL SUBMIT A REQUEST FOR OPERATIONAL (RFO) TO OPERATIONS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

21. CONTRACTOR SHALL SUBMIT A REQUEST FOR MANAGERIAL (RFM) TO MANAGEMENT PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

22. CONTRACTOR SHALL SUBMIT A REQUEST FOR PROFESSIONAL (RFP) TO PROFESSIONAL SERVICES PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

23. CONTRACTOR SHALL SUBMIT A REQUEST FOR CONSTRUCTION (RFO) TO CONSTRUCTION DEPARTMENT PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

24. CONTRACTOR SHALL SUBMIT A REQUEST FOR DESIGN (RFD) TO DESIGN DEPARTMENT PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

25. CONTRACTOR SHALL SUBMIT A REQUEST FOR ARCHITECTURAL (RFA) TO ARCHITECTURAL SERVICES PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

26. CONTRACTOR SHALL SUBMIT A REQUEST FOR ENGINEERING (RFEN) TO ENGINEERING SERVICES PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

27. CONTRACTOR SHALL SUBMIT A REQUEST FOR CONTRACTUAL (RFC) TO CONTRACTUAL SERVICES PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

28. CONTRACTOR SHALL SUBMIT A REQUEST FOR PROCUREMENT (RFP) TO PROCUREMENT SERVICES PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

29. CONTRACTOR SHALL SUBMIT A REQUEST FOR PROCUREMENT (RPO) TO PROCUREMENT DEPARTMENT PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

30. CONTRACTOR SHALL SUBMIT A REQUEST FOR PROCUREMENT (RPP) TO PROCUREMENT GROUP PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

31. CONTRACTOR SHALL SUBMIT A REQUEST FOR PROCUREMENT (RPA) TO PROCUREMENT MANAGER PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

32. CONTRACTOR SHALL SUBMIT A REQUEST FOR PROCUREMENT (RPF) TO PROCUREMENT FIRM PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

33. CONTRACTOR SHALL SUBMIT A REQUEST FOR PROCUREMENT (RPO) TO PROCUREMENT OFFICE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

34. CONTRACTOR SHALL SUBMIT A REQUEST FOR PROCUREMENT (RPP) TO PROCUREMENT PROGRAM PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

35. CONTRACTOR SHALL SUBMIT A REQUEST FOR PROCUREMENT (RPA) TO PROCUREMENT PROCEDURE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

36. CONTRACTOR SHALL SUBMIT A REQUEST FOR PROCUREMENT (RPF) TO PROCUREMENT PROCESS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

37. CONTRACTOR SHALL SUBMIT A REQUEST FOR PROCUREMENT (RPO) TO PROCUREMENT PROJECT PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

38. CONTRACTOR SHALL SUBMIT A REQUEST FOR PROCUREMENT (RPP) TO PROCUREMENT PROPOSAL PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

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42. CONTRACTOR SHALL SUBMIT A REQUEST FOR PROCUREMENT (RPP) TO PROCUREMENT PROPOSAL PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

43. CONTRACTOR SHALL SUBMIT A REQUEST FOR PROCUREMENT (RPA) TO PROCUREMENT PROGRAM PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
**Architectural Notes:**

1. **EXISTING CONDITION:** Be sure to check floor plans and equipment schedules for updated information. Rough location dimensions provided, confirm exact location with building owner.

2. **EXISTING WALL TO ACCOMMODATE NEW DOOR:** New door, frame and hardware. See door schedule.

3. **EXISTING GLASSWASHER:** Glasswasher - Steris Reliance Model 400XLS

4. **EXISTING SINK WITH NEW FAUCET WITH WRIST BLADE HANDLES:** Install new recessed soap dispenser, Coaching, Soap, Dispenser, Recessed.

5. **EXISTING SINK WITH NEW FAUCET WITH WRIST BLADE HANDLES:** Existing wall to accommodate new door. Demo existing door frame and portion of existing door.

6. **EXISTING SINK WITH NEW FAUCET WITH WRIST BLADE HANDLES:** Remove and expose of existing faucet.

7. **EXISTING WALL TO ACCOMMODATE NEW DOOR:** New door, frame and hardware. See door schedule.

8. **EXISTING WATER LINE:** Existing water line to accommodate new water line.

9. **EXISTING WATER LINE:** Existing water line to accommodate new water line.

10. **EXISTING WATER LINE:** Existing water line to accommodate new water line.

11. **EXISTING WALL TO ACCOMMODATE NEW DOOR:** New door, frame and hardware. See door schedule.

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13. **EXISTING WALL TO ACCOMMODATE NEW DOOR:** New door, frame and hardware. See door schedule.

14. **EXISTING WALL TO ACCOMMODATE NEW DOOR:** New door, frame and hardware. See door schedule.

**Demolition Floor Plan - Equipment Room (Level 3):**

- **EXISTING TO REMAIN:** New construction.
- **EXISTING TO REMOVE:** New construction.
- **EXISTING TO DEMOLISH:** New construction.
EXISTING GYPSUM PLANS

NEW WORK FLOOR PLAN - SUITE 5155

EXISTING TO REMAIN

EXISTING TO BE DEMOLISHED

NEW WORK RCP - SUITE 5155

EXISTING TO REMAIN

EXISTING TO BE DEMOLISHED

EXISTING LIGHT FIXTURES TO BE CENTERED IN ROOM, UNLESS NOTED OTHERWISE.

EXISTING SINK TO BE REMOVED. SEE MECHANICAL AND ELECTRICAL DRAWINGS FOR MORE INFORMATION.

EXISTING CABINET TO BE REMOVED. SEE MECHANICAL AND ELECTRICAL DRAWINGS FOR MORE INFORMATION.

EXISTING SHELVING, CASE WORK INSTALL NEW METAL CASEWORK WITH 1" EPOXY INSTALL NEW METAL HAND SINK WITH METAL BASE CABINET AND SPLASH GUARD. SEE ELECTRICAL AND MECHANICAL DRAWINGS FOR MORE INFORMATION.

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EXISTING LIGHT FIXTURES TO BE CENTERED IN ROOM, UNLESS NOTED OTHERWISE.

EXISTING SINK TO BE REMOVED. SEE MECHANICAL AND ELECTRICAL DRAWINGS FOR MORE INFORMATION.
GENERAL NOTES:
1. SEE SHEETS AE1-R1-01 AND AE5-01-01 FOR DETAILS AND ADDITIONAL INFORMATION ON GREENHOUSE RENOVATION.
2. REFER TO THE REFERENCE DRAWINGS INCLUDED AS PART OF THIS SET FOR CURRENT GREENHOUSE CONDITIONS AND DETAILS.
3. GREENHOUSE ROOMS 6162, 6170, 6178 AND 6180 TO RECEIVE NEW GREENHOUSE GLAZING SYSTEM INSTALLED IN EXISTING PANEL STRUCTURE (SEE PROJECT SPECIFICATIONS FOR PERFORMANCE REQUIREMENTS AND ADDITIONAL INFORMATION).
4. GLAZING SUPPLIER/CONTRACTOR TO SUPPLY ARCHITECT WITH ALL APPLICABLE DETAILS PRIOR TO FABRICATION.
5. SEE EL1-06-01 FOR LIGHTING LAYOUT.
**TYPICAL ROOF OPENING AND EQUIPMENT SUPPORT FRAME**

- **EXISTING STEEL BEAM**
- **EXISTING METAL DECK**
- **EXISTING ROOFING, INSULATION AND METAL DECK**
- **NEW 3" RIGID ROOF INSULATION**
- **NEW 3-5/8" METAL STUD FRAMING**
- **NEW SHEET METAL FLASHING**
- **NEW MEMBRANE FLASHING**
- **NEW MECHANICAL DUCT**
- **DASHED LINE INDICATES PERIMETER OF GREENHOUSE BELOW.**

**NOTE:**
1. ALL EXISTING STEEL STRUCTURAL FRAMING TO REMAIN.
2. FINAL LOCATION OF NEW HVAC UNITS BASED ON EXISTING DUCTS TO BE REWORKED.

- **EXISTING W12**
- **EXISTING W18**
- **EXISTING W12**
- **EXISTING W12**
- **EXISTING W12**
- **EXISTING W12**
- **EXISTING W12**
- **EXISTING W18**
- **EXISTING W12**
- **EXISTING W12**

**SCALE:** 1/8" = 1'-0"
DETAILS
GREENHOUSE
SHEET TITLE
QUALCHECK
O. WAGNER / D. RUTKOWSKI
DRAWN BY
T. WALKER
G:\Projects\2013\137378 WSU Bio Science Bldg Greenhouse Assessment\Cad\Working Drawings\137378AE5-01-01.dwg
DESIGNED
T. WALKER
PROJECT MANAGER
S. HAHN
ELEV: 0'-0"
TO REMAIN.
EXISTING STRUCTURAL STEEL TO REMAIN.
EXISTING CURTAIN WALL TO REMAIN.
EXISTING METAL COPING ON STRUCTURAL FRAME.
EXISTING METAL PANEL TO REMAIN.
EXISTING ROOF GUTTER AND ROOF SUMP TO REMAIN.
EXISTING ALUMINUM BOX BEAM TO REMAIN.
EXISTING ALUMINUM GUTTER TO REMAIN.
EXISTING STRUCTURAL STEEL BEAM TO REMAIN.
EXISTING METAL SIDING TO REMAIN.
EXISTING ROOF DRAIN TO REMAIN.
EXISTING ROOF DRAIN TO REMAIN.
EXISTING THRU WALL Flashing TO REMAIN.
EXISTING EAVE CLOSURE TO REMAIN.
EXISTING RUBBERIZED ASPHALT SHEET WATERPROOFING TO REMAIN.
EXISTING RUBBERIZED ASPHALT SHEET WATERPROOFING TO REMAIN.
EXISTING ALUMINUM BOX STRUCTURAL FRAME.
EXISTING METAL COPING ON STRUCTURAL FRAME.
EXISTING METAL PANEL TO REMAIN.
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EXISTING METAL COPING ON STRUCTURAL FRAME.
### Ductwork Symbol List

- **CA**: Backflow Preventer
- **EL**: Elbow Up
- **ST**: Strainer
- **RD**: Round Duct Up
- **EX**: Exhaust Duct Down
- **EXU**: Exhaust Duct Up
- **RD**: Return Duct Down
- **E**: Existing Ductwork
- **N**: New Ductwork

### Piping Symbol List

- **CT**: Compressed Air
- **SV**: Steam High Pressure
- **ST**: Steam
- **HTR**: HTR
- **HTG**: HTG
- **PLBG**: Plumbing
- **HVAC**: HVAC
- **EL**: Ele.
- **DWG**: DWG
- **DDC**: DDC
- **BOP**: BOP
- **N/A**: N/A
- **MECH**: Mechanical
- **TO**: To
- **PLAN**: Plan
- **TOP**: Top
- **OUTSIDE**: Outside Diameter
- **TOS**: Top of Steel
- **TOD**: Top of Duct
- **GND**: Ground
- **FIN**: Above Finished Grade
- **ISO**: Isolation Valves or Control Valve

### General Mechanical Demolition Notes

1. **Schematic**: Indicates a schematic drawing by adding an arrow to the end of the description instead of a single being used on the main drawing. All schematic drawings shall be issued at the issuance of the final submittal drawing.
2. **Protection**: Provides protection for systems or equipment being removed or modified. All protection shall be outlined in red on the schematic. All protection shall be removed before the next phase of the project begins.
3. **Contractor**: The contractor shall provide all tools, equipment, and labor required to complete the demolition work.
4. **Piping**: The contractor shall provide all pipes, valves, and fittings required to complete the demolition work.
5. **Demolition**: The contractor shall demolish existing construction only to the extent required by the engineer of record.
6. **Existing Ductwork**: The contractor shall demolish existing ductwork and modify existing air handling and HVAC equipment. All existing ductwork shall be removed before the next phase of the project begins.
7. **Protect**: The contractor shall protect all existing equipment from damage due to demolition and construction.
8. **It shall be the responsibility of the mechanical contractor to remove all existing equipment from the building and prepare the site for the new installation.
9. **Aluminum**: All aluminum ductwork shall be insulated with fiberglass insulation with a minimum R-value of 3.5.
10. **Top of Duct**: All ductwork shall be insulated to the top of the duct, unless noted otherwise.
11. **Round Duct**: For round ductwork, the insulation thickness shall be 1" thick.
12. **Exposed Round Duct**: Exposed round ductwork shall be spiral duct with exterior insulation.
13. **Exposed Duct**: Exposed ductwork, diffusers, and piping/insulation shall be protected from construction debris by sealing during construction.
14. **Coolant**: Coolant shall be protected from construction debris by sealing during construction.
15. **Hot Air**: Hot air systems shall be protected from construction debris by sealing during construction.

### General Mechanical Notes

1. **Bids**: Bids shall be submitted by 10/31/14.
2. **Architectural**: Architectural plans and specifications shall be reviewed by the architectural committee at Wayne State University.
3. **Health and Safety**: All construction shall comply with the latest health and safety guidelines issued by the Occupational Safety and Health Administration (OSHA).
4. **Fire Protection**: Fire protection systems shall be installed in accordance with the latest NFPA codes and standards.
5. **Lighting**: All lighting shall be installed by the electrical contractor in accordance with the latest NFPA codes and standards.
6. **Plumbing**: Plumbing systems shall be installed in accordance with the latest ASME codes and standards.
7. **HVAC**: HVAC systems shall be installed in accordance with the latest ASHRAE codes and standards.
8. **Electrical**: Electrical systems shall be installed in accordance with the latest NFPA codes and standards.
9. **Mechanical**: Mechanical systems shall be installed in accordance with the latest ASHRAE and NFPA codes and standards.
10. **Commissioning**: Commissioning shall be performed by a registered professional engineer in accordance with the latest commissioning guidelines issued by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) and the Society of Building Performance Engineers (ASHE).
11. **Testing and Balancing**: All systems shall be tested and balanced in accordance with the latest American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) guidelines.

### General HVAC (Sheet Metal) Notes

1. **All Existing Ductwork**: Existing ductwork shall be removed before the final submittal drawing is issued.
2. **New Ductwork**: New ductwork shall be added to the final submittal drawing.
3. **Duct Work**: Duct work shall be fabricated in accordance with the latest ASHRAE codes and standards.
4. **痧 Duct**: Duct work shall be fabricated in accordance with the latest ASHRAE codes and standards.
5. **Round Duct**: Round ductwork shall be fabricated in accordance with the latest ASHRAE codes and standards.
6. **Square Duct**: Square ductwork shall be fabricated in accordance with the latest ASHRAE codes and standards.
7. **Exposure**: Exposure of ductwork shall be minimized to prevent damage to surrounding areas.
8. **Insulation**: Insulation shall be installed in accordance with the latest ASHRAE codes and standards.

### General HVAC (Piping) Notes

1. **All Existing Piping**: All existing piping shall be removed before the final submittal drawing is issued.
2. **New Piping**: New piping shall be added to the final submittal drawing.
3. **Duct Work**: Duct work shall be fabricated in accordance with the latest ASHRAE codes and standards.
4. **Round Duct**: Round ductwork shall be fabricated in accordance with the latest ASHRAE codes and standards.
5. **Square Duct**: Square ductwork shall be fabricated in accordance with the latest ASHRAE codes and standards.
6. **Exposure**: Exposure of ductwork shall be minimized to prevent damage to surrounding areas.
7. **Insulation**: Insulation shall be installed in accordance with the latest ASHRAE codes and standards.

### Abbreviation List

- **APP**: Architectural Project Plan
- **APR**: Architectural Project Plan
- **AWS**: ACCA Working draft standards
- **BOP**: Building Operations
- **CA**: Backflow Preventer
- **EL**: Elbow Up
- **ST**: Strainer
- **RD**: Round Duct Up
- **EX**: Exhaust Duct Down
- **EXU**: Exhaust Duct Up
- **RD**: Return Duct Down
- **E**: Existing Ductwork
- **N**: New Ductwork
- **CT**: Compressed Air
- **SV**: Steam High Pressure
- **ST**: Steam
- **HTR**: HTR
- **HTG**: HTG
- **PLBG**: Plumbing
- **HVAC**: HVAC
- **EL**: Ele.
- **DWG**: DWG
- **DDC**: DDC
- **BOP**: BOP
- **N/A**: N/A
- **MECH**: Mechanical
- **TO**: To
- **PLAN**: Plan
- **TOP**: Top
- **OUTSIDE**: Outside Diameter
- **TOS**: Top of Steel
- **TOD**: Top of Duct
- **GND**: Ground
- **FIN**: Above Finished Grade
- **ISO**: Isolation Valves or Control Valve
**DEMOLITION & NEW WORK**

**EXIST DRYER**
- Remove existing 6" DIA. DRYER and WASHER
- Remove existing 1 1/2" STEAM PIPING
- Remove existing 3/4" DI WATER SUPPLY LINE

**EXIST AUTOCLAVES**
- Remove existing 1 1/2" CW PIPING
- Remove existing 2" CW PIPING

**EXISTING TO REMAIN**
- EXISTING FLOOR SINK
- EXISTING 6" DIA. DUCTWORK

**NEW WORK**
- New 1" CW HW
- New 1" HW
- New 1 1/4" CW LINE
- New 6" DIA. EXHAUST DUCT
- New 3" DRAIN FROM STERILIZER TO EXIST (STERIS) OR EQUAL.
- New GLASSWASHER, RELIANCE MODEL 400XLS
- New AUTOCLAVE, AMSCO LAB 250 (STERIS) OR EQUAL.
- New FLOOR MOUNTED AIR COMPRESSOR
- New 1/2" CA LINE TO EXIST GLASSWASHER

**EXISTING TO CLEAN**
- EXIST AUTOCLAVES
- EXIST BACKFLOW PREVENTER
- EXIST SUPPLY DUCTWORK
- EXIST EXHAUST DUCTWORK

**LEGEND**
- **EXIST**
- **EXIST TO CLEAN**
- **EXIST TO REMAIN**
- **NEW**
- **NEW TO CLEAN**
- **NEW TO REMAIN**

**SCALE:** 1/4" = 1'-0"
MECHANICAL KEYED NOTES:
1. PROVIDE NEW FIN TUBE RADITOR COVER ALONG PERIMETER OF GREENHOUSES. COORDINATE COLOR OF FIN TUBE COVER WITH OWNER.
2. REMOVE EXISTING EXHAUST FAN SWITCH, ABANDON WIRING IN PLACE.
3. REMOVE EXISTING HEATING THERMOSTAT, ABANDON WIRING IN PLACE.
4. REMOVE EXISTING HUMIDISTAT, ABANDON WIRING IN PLACE.
5. REMOVE EXISTING EVAP. COOLING THERMOSTAT, ABANDON WIRING IN PLACE.
6. REMOVE EXISTING HIGH LIMIT THERMOSTAT, ABANDON WIRING IN PLACE.
7. REMOVE EXISTING EXHAUST DUCT TO BE REMOVED.
8. REMOVE PORTIONS OF EXISTING VERTICAL SUPPLY AIR DUCT AS NECESSARY TO MAKE CONNECTIONS TO THE NEW ROOFTOP UNIT.
9. EXTEND 1/2" STEAM AND 1/2" COND. LINES UP TO HUMIDIFIER HD-9.
10. EXTEND 1/2" STEAM LINES UP TO HUMIDIFIER HD-8.
11. EXTEND 1/2" COND. LINES UP TO HUMIDIFIER HD-7.
12. PROVIDE NEW RETURN AIR DUCT COVER ALONG PERIMETER OF GREENHOUSES. COORDINATE COLOR OF RETURN AIR DUCT COVER WITH OWNER.

LEGEND:
- EXISTING TO BE REMOVED
- EXISTING TO REMAIN
- NEW INSTALLATION
- PROVIDE NEW EXHAUST DUCT TO BE REMOVED
- EXISTING TO BE DEMOLISHED

SCALE: 1/8"=1'-0"
MECHANICAL KEYED NOTES:
1. Run RTU #1 & #2 Ductwork down and connect to existing supply ductwork on the roof.
2. Run RTU #3 & #4 Ductwork down to a new return air ducting system.
3. Run Ductwork from RTU #1 & #2 to existing condensate drain line of the evaporative cooler that is being removed.
4. Existing exhaust fan to remain.
5. New 24’ x 8’ duct from return level.
6. Open file, duct to return level.
7. Contractor to provide ductwork support for area supply and area return ducting on roof.

MECHANICAL DEMOLITION KEYED NOTES:
1. Remove existing evaporative cooler and condensate drain line at the roof level.
2. Remove portions of sheeting and duct as necessary to make removal of ducting easier.
3. Remove portions of existing area supply duct as necessary as to make removal of duct easier.
4. Remove existing greenhouse exhaust fan and all associated electrical wiring.

LEGEND:
- EXISTING TO BE REMOVED
- \nEXISTING TO BE DEMOLISHED

NOTE:
1. See Note #7 above for duct tray support locations.
2. Model No. MIFAB DSA10 or equal duct support.
3. Related..
**ABBREVIATIONS:**
- RELIEF AIR
- OUTSIDE AIR
- RETURN AIR
- RETURN DUCT
- REFRAFRIGERANT SUCTION
- REFRAFRIGERANT LIQUID
- NORMALLY OPEN
- NORMALLY CLOSED
- MOTOR
- HOT GAS BYPASS
- DIFFERENTIAL PRESSURE SWITCH
- SMOKE DETECTOR
- TEMPERATURE TRANSMITTER
- ZONE TEMPERATURE
- VENT DUCT

**NOTES:**
1. ALL CONTROLS NOT INCLUDING THOSE PROVIDED BY THE UNIT MANUFACTURER SHALL BE BY SIEMENS.
2. DISCONNECT SWITCH SHALL MEET ALL REQUIREMENTS OF ELECTRICAL SPECIFICATIONS.
3. MOTOR CONTROLLERS SHALL BE FIELD ADJUSTABLE BY OWNER.
4. ALL SYSTEM SETPOINTS SHALL BE FIELD ADJUSTABLE BY OWNER.
5. SUPPLY DUCTS, AN ALARM SIGNAL SHALL BE SENT TO THE BUILDING MANAGEMENT SYSTEM, AND RUN CONTINUOUSLY. UPON SHUTDOWN DAMPERS SHALL FAIL CLOSED.
6. THE UNIT SHALL AUTOMATICALLY UTILIZE OUTSIDE AIR FOR THE ZONE AIR TEMPERATURE SETPOINT.
7. THE UNIT SHALL SHUT DOWN. THE UNIT SHALL RESTART UPON MANUAL RESET OF THE FIRE ALARM CIRCUIT.
8. SUPPLY FAN FAILURE ALARM SHALL BE INITIATED.
9. SUPPLY FAN OPERATION HAS NOT BEEN CONFIRMED, A "SUPPLY FAN FAILURE" ALARM SHALL BE INITIATED.
10. ALL UNIT MONITOR, CONTROL AND ALARM POINTS SHALL BE TO THE SPECIFIED "NORMAL" POSITIONS.
11. THE UNIT SHALL AUTOMATICALLY UTILIZE OUTSIDE AIR FOR THE ZONE AIR TEMPERATURE SETPOINT.
12. THE UNIT SHALL AUTOMATICALLY UTILIZE OUTSIDE AIR FOR THE ZONE AIR TEMPERATURE SETPOINT.
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24. THE UNIT SHALL AUTOMATICALLY UTILIZE OUTSIDE AIR FOR THE ZONE AIR TEMPERATURE SETPOINT.
25. THE UNIT SHALL AUTOMATICALLY UTILIZE OUTSIDE AIR FOR THE ZONE AIR TEMPERATURE SETPOINT.
COMMUNICATION OUTLETS: INSTALL TWO (2) GANG, 3-1/2" DEEP WALL BOX WITH THE DRAWINGS AND SPECIFICATIONS INCLUDED WITH THIS DOCUMENT. INSTALLATION OF ELECTRICAL EQUIPMENT AND DEVICES WITH ALL REQUIRED HARDWARE, SUPPORTS, BRACKETS,等内容。
NEW WORK FLOOR PLAN - POWER AND AUXILIARY SYSTEMS - MICROSCOPY

DEMOLITION FLOOR PLAN - POWER AND AUXILIARY SYSTEMS - MICROSCOPY

GENERAL NOTICES:
1. REFER TO SCALE 1/4"=1'-0" FOR ELECTRICAL, HISTORIC, MECHANICAL AND OTHER DRAWINGS.
2. (E) - INDICATES EXISTING TO REMAIN.
3. PROVIDE ELECTRICAL NOTING SOME PRACTICE (STICKY FOCUS ON SELECTED ITEMS) OR USE "TYP." NOTES FOR ITEMS NOT LISTED.
4. A/1 INDICATES NEW ITEMS TO BE ADDED.
5. ALL FIRE ALARMS MOUNTED IN WALL CEILINGS TO CONFORM TO THE REQUIREMENTS OF THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA), THE NATIONAL ELECTRICAL CODE, AND THE AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) STANDARDS.
6. NOTIFICATION DEVICES SHALL BE AT LEAST 15dB ABOVE THE AVERAGE AMBIENT SOUND LEVEL.
7. THE EXISTING CURC IT BREAKER PANEL IS LOCATED IN THE LOBBY ON THE FIRST FLOOR.

KEY NOTES:
1. INSTALL MICROSCOPY TO MATCH EXISTING.
2. DISCONNECT AND REMOVE THE DUPLEX POWER SOURCE.
3. BOX AND CONDUIT AND WIRE BACK TO THE RECEPTACLE ALONG WITH THE SWITCHES, BACK BOXES BACK TO POWER SOURCE.
4. PROVIDE ELECTRICAL WORK SAFE PRACTICE LEGEND, ABBREVIATION AND SYMBOLS.
5. SHEET E0-00-02 FOR ELECTRICAL GENERAL NOTES.
6. SHEET E0-00-01 FOR ELECTRICAL CODE, AND SHALL BE AS RECOMMENDED BY THE NATIONAL ELECTRICAL CODE.
7. SHEET E0-00-02 FOR ELECTRICAL NOTIFICATION DEVICES SHALL BE AT LEAST 15dB ABOVE THE AVERAGE AMBIENT SOUND LEVEL.
8. ALL CABLE USED SHALL BE APPROVED FOR FIRE RESISTANCE. CIRCUIT BREAKERS AND BOXES SHALL BE U.L. LISTED FOR FIRE ALARM USE. ALL AUDIO ANNUNCIATORS AND STROBES SHALL BE RATED IN CANDELA AS DETERMINED BY STANDARD U.L. TESTS.
9. THE FIRE ALARM POWER SOURCE IS LOCATED IN THE LOBBY ON THE FIRST FLOOR.

KEY PLAN

EP1-L1-01

WAYNE STATE UNIVERSITY
5041 GULLEN MALL
DETOUR, MI 48202

DRAWN BY

PROJECT MANAGER

QUALCHECK

SHEET TITLE

QUALCHECK

SHEET NUMBER

QUALCHECK

AREA OF WORK

QUALCHECK

10/16/14

10/31/14

01/20/15

5047 GULLEN MALL

WAYNE STATE UNIVERSITY

DATE

ISSUED FOR

90% OWNER REVIEW

90% OWNER REVIEW UPDATE

FINAL OWNER REVIEW

100% OWNER REVIEW

KEY PLAN

LOWER LEVEL
ELECTRICAL FLOOR PLANS
DEMOLITION & NEW WORK

EP1-L1-01

QUALCHECK

QUALCHECK

QUALCHECK

QUALCHECK

QUALCHECK

QUALCHECK

QUALCHECK

QUALCHECK

QUALCHECK

QUALCHECK
NEW WORK FLOOR PLAN - LIGHTING - EQUIPMENT ROOM

NEW WORK FLOOR PLAN - POWER AND AUXILIARY SYSTEMS - EQUIPMENT ROOM

DEMOLITION FLOOR PLAN - EQUIPMENT ROOM

GENERAL NOTES:

1. REMOVE EXISTING EQUIPMENT BEFORE PROCEEDING WITH NEW WORK. UNPACK ALL MACHINERY AND INSTALL IN DESIGNATED AREA. INSTALL NEW ELECTRICAL MATERIAL AS REQUIRED.

2. (E): INDICATES EXISTING TO REMAIN.

3. PROVIDE ELECTRICAL WORK SAFE PRACTICE CIRCUIT BREAKER PARAMETERS IN ALL NEW CIRCUITS. DISCONNECT AND REMOVE SAFETY SWITCH AND BOX IN THE CEILING SPACE, WITH NEW CONDUIT AND WIRE TO THE NEW SWITCH.

4. INSTALL A NEW SAFETY SWITCH ALONG WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

5. DISCONNECT AND REMOVE RECEPTACLE RETAINING BOX IN THE CEILING SPACE, WITH NEW CONDUIT AND WIRE, TO THE NEW SWITCH.

6. INSTALL A NEW EMERGENCY BATTERY PACK COMPATIBLE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

7. INSTALL PLUG-IN FUSIBLE SWITCH UNIT OR PLUG-IN BUS DUCT.

KEY PLAN

1. EXPLODED VIEW OF EQUIPMENT.

2. EXPLODED VIEW OF PANELS.

3. EXPLODED VIEW OF LEVERS AND HANDLES.

4. EXPLODED VIEW OF MOVABLE PARTS.

5. EXPLODED VIEW OF GASKETS AND SEALANTS.

6. EXPLODED VIEW OF MOUNTING AND INSTALLATION.

7. EXPLODED VIEW OF ACCESSORIES.

NEW ITEMS.

EXISTING ITEMS TO REMAIN.

SHEET TITLE: NORTH

SCALE: 1/4"=1'-0"

DEMOGESTION KEY NOTES:

1. DISCONNECT AND REMOVE SAFETY SWITCH ALONG WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

2. DISCONNECT AND REMOVE SAFETY SWITCH ALONG WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

3. DISCONNECT AND REMOVE SAFETY SWITCH ALONG WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

4. DISCONNECT AND REMOVE SAFETY SWITCH ALONG WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

5. DISCONNECT AND REMOVE SAFETY SWITCH ALONG WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

6. DISCONNECT AND REMOVE SAFETY SWITCH ALONG WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

7. DISCONNECT AND REMOVE SAFETY SWITCH ALONG WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

8. DISCONNECT AND REMOVE SAFETY SWITCH ALONG WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

LINEWEIGHT LEGEND:

- SW 3/4"=1'-0"

- ST 3/8"=1'-0"

- NEW ITEMS

- EXISTING ITEMS TO REMAIN

LEVEL THREE

ELECTRICAL FLOOR PLANS

DETRLOMION & NEW WORK

G:Projects\2013\137378 WSU Bio Science Bldg Greenhouse Assessment\Cad\Working Drawings\137378EP1-03-01.dwg

(D) RP-13

(E) LP-A3

RELOCATED.

ITEMS TO BE REMOVED OR DISCONNECT AND REMOVE SAFETY SWITCH.

PLUG-IN BUS DUCT.

NO WORK.

NEW WORK.

1/13/2015 4:49:28 PM
GENERAL NOTES:
1. REFER TO SHEET E0-00-01 FOR ELECTRICAL LEGEND, ABBREVIATION AND SYMBOLS.
2. SHEET E0-00-02 FOR ELECTRICAL GENERAL NOTES.
3. PROPOSED EQUIPMENT AND SYMBOLS TO BE USED ARE SHOWN AS EXAMPLES AND TACTICS. CHANGES TO SHEET E0-00-02 TO REFLECT PROJECT SPECIFIC CHANGES.
4. REFER TO SHEET E0-00-01 FOR THE BRANCH WIRING SCHEDULE.

KEY NOTES:
1. INSTALL A FUSIBLE SWITCH FUSE UNIT WITH FUSES AS SHOWN. UNIT SHALL BE COMPATIBLE WITH THE EXISTING GENERAL ELECTRIC 8000 LINE MOTOR CONTROL CENTER.

UNWEIGHT LEGEND:
- ITEMS TO BE REMOVED OR RELOCATED
- EXISTING ITEMS TO REMAIN
- NEW ITEMS

DEMOLITION KEY NOTES:
1. DISCONNECT AND REMOVE THE FUSIBLE SWITCH, FUSE UNIT ALONG WITH THE CONTACTOR AND HEATER. RETAIN COMPARTMENT FOR RE-USE.

WAYNE STATE UNIVERSITY
5047 GULLEN MALL
DETROIT, MI 48202

MCC #2 ONE LINE DIAGRAM - DEMOLITION

MCC #2 ONE LINE DIAGRAM - NEW WORK

MCC #2 ONE LINE DIAGRAM - DEMOLITION
KEY NOTES:

1. INSTALL A NEW WALL MOUNTED DIMMING SWITCH IN THE EXISTING BACK BOX. DIMMING SWITCH SHALL BE MANUFACTURED BY LEVITON, CAT # AWSMT - EAW, 277V, 1385W OR APPROVED EQUAL, CONNECT TO THE EXISTING CIRCUIT.

2. INSTALL A CEILING MOUNTED OCCUPANCY SENSOR MANUFACTURED BY COOPER CONTROLS, GREENGATE OR APPROVED EQUAL. THE SENSOR SHALL BE A MICROSET DUAL TECHNOLOGY LINE VOLTAGE SENSOR, CAT # OAC-DT-2000-MV OR APPROVED EQUAL.

3. EXTEND THE EXISTING CIRCUIT WITH NEW CONDUITS AND WIRE, TO THE NEW LUMINAIRES.

4. SEE SHEET AC1-01-01 FOR NEW LUMINAIRE LOCATIONS.

DEMO KEY NOTES:

1. DISCONNECT AND REMOVE THE LUMINAIRES IN THE ROOM ALONG WITH THE SWITCH AND WALL PLATE. RETAIN BACK BOX IN THE WALL AND WIRING IN THE CEILING SPACE FOR REUSE.

2. INSTALL A NEW WALL MOUNTED DIMMING SWITCH IN THE EXISTING BACK BOX. DIMMING SWITCH SHALL BE MANUFACTURED BY LEVITON, CAT # AWSMT - EAW, 277V, 1385W OR APPROVED EQUAL, CONNECT TO THE EXISTING CIRCUIT.

3. INSTALL A CEILING MOUNTED OCCUPANCY SENSOR MANUFACTURED BY COOPER CONTROLS, GREENGATE OR APPROVED EQUAL. THE SENSOR SHALL BE A MICROSET DUAL TECHNOLOGY LINE VOLTAGE SENSOR, CAT # OAC-DT-2000-MV OR APPROVED EQUAL.

4. EXTEND THE EXISTING CIRCUIT WITH NEW CONDUITS AND WIRE, TO THE NEW LUMINAIRES.

5. SEE SHEET AC1-01-01 FOR NEW LUMINAIRE LOCATIONS.
GENERAL NOTES:
1. REFER TO SHEET El-00-01 FOR ELECTRICAL, MECHANICAL, AND FIRE PROTECTION DETAILS.
2. PROVIDE ELECTRICAL CORDS TO MEET NATIONAL ELECTRICAL CODE
3. PROVIDE HORTICULTURAL LUMINAIRES WITH MANUFACTURER PROVIDED LEGEND, ABBREVIATION AND SYMBOLS.
4. REFER TO SHEET El-00-01 FOR THE LUMINAIRES SCHEDULE.
5. REFER TO SHEET El-00-01 FOR THE LOCATION OF THE OLD FIXTURES.

KEY NOTES:
1. DEMOLISH THE FOLLOWING ITEMS:
   A. VERTICAL TUBE LIGHTS.
   B. FLUORESCENT LUMINAIRES.
   C. CONDUIT AND WIRE.

2. PROVIDE HORTICULTURAL LUMINAIRES (5080, 5092, 5093) FOR THE FOLLOWING AREAS:
   A. GREENHOUSE 1
   B. GREENHOUSE 2
   C. GREENHOUSE 3
   D. GREENHOUSE 4

3. PROVIDE ELECTRICAL CORDS TO MEET NATIONAL ELECTRICAL CODE

LEGEND, ABBREVIATION AND SYMBOLS REFER TO SHEET E0-00-01 FOR ELECTRICAL AND MECHANICAL.

DEMOLITION KEY NOTES:
1. DEMOLISH THE FOLLOWING ITEMS:
   A. VERTICAL TUBE LIGHTS.
   B. FLUORESCENT LUMINAIRES.
   C. CONDUIT AND WIRE.

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   A. VERTICAL TUBE LIGHTS.
   B. FLUORESCENT LUMINAIRES.
   C. CONDUIT AND WIRE.

3. DEMOLISH THE FOLLOWING ITEMS:
   A. VERTICAL TUBE LIGHTS.
   B. FLUORESCENT LUMINAIRES.
   C. CONDUIT AND WIRE.

4. RECORD THE LOCATION OF THE OLD FIXTURES ON THE WALL. COVER JUNCTION BOX IN WALL WITH "SPARE" COVER.

5. LABEL CIRCUIT BREAKERS AS THE JUNCTION BOX ON THE WALL. RETAIN THE LOCATION OF THE OLD FIXTURES ON THE WALL.

6. COVER JUNCTION BOX IN WALL WITH "SPARE" COVER. LABEL CIRCUIT BREAKERS AS THE JUNCTION BOX ON THE WALL.

7. RETAIN THE LOCATION OF THE OLD FIXTURES ON THE WALL.

8. COVER JUNCTION BOX IN WALL WITH "SPARE" COVER. LABEL CIRCUIT BREAKERS AS THE JUNCTION BOX ON THE WALL.

NEW WORK FLOOR PLAN - LIGHTING - GREENHOUSES

SCALE: 1"=1'-0"

DEMOlITION FLOOR PLAN - LIGHTING - GREENHOUSES

SCALE: 1"=1'-0"

LEVEL 60
ELECTRICAL FLOOR PLANS
DEMOLITION & NEW WORK

EL1-06-01

WAYNE STATE UNIVERSITY
5017 WOODEN MALL
DETOIT, MI 48202

DATE
11/14/14

AREA OF WORK
NORTH

DATE
12/10/14

90% OWNER REVIEW

90% OWNER REVIEW UPDATE

J. JASSAL

2000'

G:\Projects\2013\137378 WSU Bio Science Bldg Greenhouse Assessment\Cad\Working Drawings\137378EL1-06-01.dwg

1"=500'-0"

1"=100'-0"

1"=200'-0"

1"=400'-0"

1"=1000'-0"

16"=1'-0"
# Anixter Building Automation Cables

## Non-Plenum

<table>
<thead>
<tr>
<th>SBT Part Number</th>
<th>Description</th>
<th>Print Legend</th>
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<tbody>
<tr>
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<td>2AWG, 6STR, 1TP, CM, BLUE JACKET</td>
<td>NORTHFLEX 6-1-H-TPE-26-CM &quot;DI, DO, AU, AG&quot; ( practitioner) 2AWG 1P 7/0CM CM (L) (UA)</td>
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## Assemblies

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**Revised History**

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<td>01/09/16</td>
<td>New document creation</td>
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**Siemens**

Siemens Industry, Inc.
Building Technologies Division

46470 Commerce Ctr. Dr
Plymouth Twp, MI 48170
USA
PHONE: 734.496.9000
FAX: 734.89.0740

**WSU Bio Science**

Detroit, MI

JJK
JJK

**Anixter Building Auto. Cables**

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NEAL - ELECTRICAL INSTALLATION AND WIRING FOR HVAC TEMPERATURE AND LAB CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Division 23, Common Work Results for mechanical requirements apply to this section and will require the contractor participation on the Above Ceiling Coordination Program.

1.2 GENERAL INFORMATION

A. This specification section shall include all electrical responsibilities required for the installation & wiring of all temperature controls, as outlined on job plans, specification and temperature control drawings. Specifically, this contractor shall provide pricing direct to those general or mechanical contractors (bid to prime on project) contractors bidding this work, and will be responsible for installation & wiring of all automatic temperature control devices furnished by Siemens Building Technologies as outlined below and as may be required per the project plans & specifications.

B. Siemens Building Technologies, Inc. will provide the following equipment for the building automation system as shown in the temperature control drawings Bill of Materials to include but not limited to:

1. Terminal Equipment Controllers (TEC's)
2. Auxiliary TEC power panels
3. Room Temperature Sensors
4. Damper actuators
5. Relays
6. Low Voltage Transformers

The Electrical Installation & Wiring Contractor (EWC) shall be responsible for installation of all preceding devices as applicable to this project. This list shall not be considered complete and all bidding should refer to temperature control drawings for specific equipment quantities and locations.

C. During the bidding process, the EWC shall address all questions relative to the Siemens temperature control drawings, as well as any issues the EWC is aware of through the tier of bidding contractors. Siemens shall respond in writing through the tier of bidding contractors.

D. The EWC shall assist all control equipment provided by Siemens. The EWC shall furnish, install and terminate all necessary wiring, conduit, hangers, etc. to provide a complete control system installation. All controls to be installed and adjusted by a Siemens qualified electrician in the full time employ of the EWC.

E. The EWC must have full time project superintendents who shall attend all construction meetings after notification that their services are required onsite.

F. Upon completion of all installation and wiring by the EWC, Siemens Building Technologies will conduct verification of point to point wiring and any pneumatic tubing. The EWC will be responsible to make any necessary wiring corrections. At the completion of the point to point verification, approval shall be made by the Owner's Construction Inspection Department and Siemens Building Technologies, Inc.

G. Upon approval by the Owner's Construction Inspection Department, Siemens shall program all DDC panels, create necessary graphics and provide any interface between the building automation system and the campus environmental control system.

H. Upon completion of the aforementioned, a performance test shall be conducted as specified in the commissioning section of this specifications.

I. Upon a successful conclusion of the final checkout, performance test and the Owner's acceptance, the EWC's responsibility reverts to a standard warranty (12 months) for labor and materials installed by the EWC and labor only for equipment supplied by others.

J. Siemens assumes the manufacturers warranty for all equipment supplied to the EWC for installation on this project.

K. Siemens services to include the following: Design engineering labor required to Interface with WSU and the consulting engineer to design the temperature control system. Supervision of the EWC installation and final checkout and approval.

L. Equipment provided by others may require specific cable type and terminations. It is up to EWC to provide cable and terminations needed for a complete working system.

1.3 DEFINITIONS

A. DDC: Direct digital control.

B. I/O: Input/output.

C. BACnet: A control network technology platform for designing and implementing interoperable control devices and systems.

D. WS/TP: Master slave/token passing.

E. FC: Personal computer.

F. PID: Proportional integral plus derivative.

G. RTD: Resistance temperature detector.
1.4 PRODUCTS & SERVICES PROVIDED BY OTHERS
A. Mechanical Contractor: Installation of flow switches, temperature or thermostatic sensor walls, gage taps, pressure sensor pipe taps, test valves & tubing into pipe pressure taps and variable frequency drives.
B. Electrical Contractor: Provide 120/208 VAC power to all DDC panels, wiring power to all VFD’s. Furnish & install 4" x 4" nonmetallic conduit above all control panels. Furnish & install conduit up maximum ten feet from all 4" x 4" outlets. Installation of required nipples between electrical panels and through.
C. Sheetmetal Contractor: Installing all terminal units, airflow stations and dampers.

1.5 PRODUCTS INSTALLED BY THE EWC BUT NOT FURNISHED UNDER THIS SECTION
A. Connect control components, as shown on the plans, factory supplied as part of equipment controlled.

1.6 RELATED SECTIONS
A. Division 23 – General Mechanical Requirements.
B. Division 23 – Instrumentation and controls for HVAC.
C. Division 23 – Indoor Air Handling Units.
D. Division 23 – Air Terminal Units.
E. Division 23 – Testing and Balancing for HVAC.
F. Division 23 – Commissioning of HVAC.
G. Division 26 – Electrical Work.
H. Standards and Specification: In addition to the requirements shown or specified, comply with the following applicable standards specifications, codes or ordinances:
2. UL – Underwriters Laboratories.

1.7 QUALIFICATIONS FOR THE EWC
A. Controls Installation Contractor: The EWC’s will be pre approved by WSU prior to bidding this project.

1.8 QUALITY ASSURANCE
A. Installer Qualifications: EWC contractors must be able to provide references, upon request, for similar projects (in type & scope) that were completed satisfactorily, in Michigan. Project names, owner contacts and companies who awarded this work to you shall all be provided upon request to WSU and/or the AE at record. EWC contractor must be prepared to submit a minimum of three (3) satisfactorily completed projects, annually, for the past five (5) years.
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 ASHRAE 135 for DDC system components.

1.9 SEQUENCING AND SCHEDULING
A. Sequence work to ensure installation of components is complimentary to installation of similar components in other systems.
B. Coordinate work with other Contractors and subcontractors to ensure system is completed and commissioned by the Date of Substantial Completion.
C. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.

1.10 WARRANTY
A. Provide as per project general conditions.

1.11 CONTROL WIRING
A. The EWC is required to use the cable below.
B. The EWC is required to tag all wiring. Wiring that is used for DDC control points should be tagged with abbreviated DDC point name from control submittal. If wire is to be demo’d make sure the wire is labeled “spare” or “not in use”.

1.12 INSTALLATION
A. Refer to project plans and DDC temperature control drawings for control wiring and equipment locations.
B. Install control devices per installation requirements of control device. Before installing, always refer to local codes.

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ELECTRICAL INSTALLATION AND WIRING FOR HVAC TEMPERATURE AND LAB CONTROLS

2G 0600 1  ELECTRICAL INSTALLATION AND WIRING FOR HVAC TEMPERATURE AND LAB CONTROLS

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REVISION HISTORY

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SIEMENS
45470 Commerce Ctr Dr
Plymouth Twp, MI 48170
USA
PHONE: 734.658.0080
FAX: 808.866.0740

WSU Bio Science
Detroit, MI

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ELECTRICAL INSTALL SPEC.

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SPEC2
ELECTRICAL WIRING INSTALLATION BY THE EWC (Project Plans and Specifications Prevail)

A. Furnish and install ALL wiring and interlock wiring as specified and as shown on the project plans. DDC temperature control drawings. Connect controls in accordance with DDC temperature control drawings.

B. Installation minimum requirements:
1. Mechanical Rooms & Penthouse Areas: ENT up ten feet, then exposed plenum I/O point wiring.
2. TEC Space Sensors: All cables furnished by Siemens, installed within wall construction without EMT.
3. Other Space Sensors: I/O point wire in EMT for all non-accessible walls, approved plenum open wire in accessible walls.
5. Ceiling Returns (non-accessible) and all other inaccessible areas: All wiring in EMT.
6. Power and low voltage wiring shall not be run in the same conduit.

ON-SITE TESTING

A. Provide Owner-approved operation and acceptance testing of the complete system. The following shall witness the performance test:

1. The EWC – Electrical (controls) installation & wiring contractor
2. The equipment manufacturers representative
3. The Owner's agent
4. The Owner
5. Architect/Engineer

B. Field Test: When installation of the system is complete, all systems shall be tested to their sequence of operation including all safety circuits.

END OF SECTION 26 0900

ELECTRICAL INSTALLATION AND WIRING FOR HVAC TEMPERATURE AND LAB CONTROLS

REVISION HISTORY

0 SPEC3
**TXM1 TERMINATION TABLES**

1. **TXM1.8D, TXM1.16D**
   - **I/O POINT**
     - (1) (2) (3) (4) (5) (6) (7) (8)
   - **SYSTEM NEUTRAL**
     - (1) (2) (3) (4) (5) (6) (7) (8)
   - **GND**
     - (1) (2) (3) (4) (5) (6) (7) (8)
   - **DIGITAL INPUT**
     - (+) (-)

2. **TXM1.16D**
   - **I/O POINT**
     - (1) (2) (3) (4) (5) (6) (7) (8)
   - **SYSTEM NEUTRAL**
     - (1) (2) (3) (4) (5) (6) (7) (8)
   - **GND**
     - (1) (2) (3) (4) (5) (6) (7) (8)
   - **DIGITAL INPUT**
     - (+) (-)

3. **TXM1.8D. TXM1.16D**
   - **I/O POINT**
     - (1) (2) (3) (4) (5) (6) (7) (8)
   - **SYSTEM NEUTRAL**
     - (1) (2) (3) (4) (5) (6) (7) (8)
   - **GND**
     - (1) (2) (3) (4) (5) (6) (7) (8)
   - **DIGITAL INPUT**
     - (+) (-)

4. **TXM1.16D**
   - **I/O POINT**
     - (1) (2) (3) (4) (5) (6) (7) (8)
   - **SYSTEM NEUTRAL**
     - (1) (2) (3) (4) (5) (6) (7) (8)
   - **GND**
     - (1) (2) (3) (4) (5) (6) (7) (8)
   - **DIGITAL INPUT**
     - (+) (-)

5. **TXM1.8D, TXM1.16D**
   - **I/O POINT**
     - (1) (2) (3) (4) (5) (6) (7) (8)
   - **SYSTEM NEUTRAL**
     - (1) (2) (3) (4) (5) (6) (7) (8)
   - **GND**
     - (1) (2) (3) (4) (5) (6) (7) (8)
   - **DIGITAL INPUT**
     - (+) (-)

6. **TXM1.16D**
   - **I/O POINT**
     - (1) (2) (3) (4) (5) (6) (7) (8)
   - **SYSTEM NEUTRAL**
     - (1) (2) (3) (4) (5) (6) (7) (8)
   - **GND**
     - (1) (2) (3) (4) (5) (6) (7) (8)
   - **DIGITAL INPUT**
     - (+) (-)

**REVISION HISTORY**

- Siemens Industry, Inc.
  - Building Technologies Division

- Siemens Industry, Inc.
  - Building Technologies Division

- 48470 Commerce Ctr. Dr
  - Plymouth, MI, 48170
  - USA
  - PHONE: 754-498-5000
  - FAX: 866.806.0740

- WSB Uro Science
  - Detroit, MI

- 01/06/15
  - 01/06/15
**PXCM Modular Wiring Type and Gauge Requirements**

**Circuit Type Class**

<table>
<thead>
<tr>
<th>Circuit Type</th>
<th>Class</th>
<th>Wire Type</th>
<th>Max Distance</th>
<th>Conduit Sharing</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Line Power</td>
<td>1-4 kVA</td>
<td>E-14/18 HNM</td>
<td>Refer to NEC</td>
<td>CHECK LOCAL CODES</td>
</tr>
<tr>
<td>Digital Output</td>
<td>1 &amp; 2</td>
<td>E-14/18 HNM</td>
<td>Refer to NEC</td>
<td>CHECK LOCAL CODES</td>
</tr>
<tr>
<td>Digital Input</td>
<td>2</td>
<td>E-14/18 HNM</td>
<td>Refer to NEC</td>
<td>CHECK LOCAL CODES</td>
</tr>
<tr>
<td>Analog Input</td>
<td>0-10 Vm</td>
<td>E-14/18 HNM</td>
<td>Refer to NEC</td>
<td>CHECK LOCAL CODES</td>
</tr>
<tr>
<td>Analog Input</td>
<td>4-20 mA</td>
<td>E-14/18 HNM</td>
<td>Refer to NEC</td>
<td>CHECK LOCAL CODES</td>
</tr>
<tr>
<td>Analog Output</td>
<td>0-10 Vm</td>
<td>E-14/18 HNM</td>
<td>Refer to NEC</td>
<td>CHECK LOCAL CODES</td>
</tr>
<tr>
<td>Analog Output</td>
<td>4-20 mA</td>
<td>E-14/18 HNM</td>
<td>Refer to NEC</td>
<td>CHECK LOCAL CODES</td>
</tr>
<tr>
<td>Ethernet Aln</td>
<td>1</td>
<td>E-14/18 HNM</td>
<td>Refer to NEC</td>
<td>CHECK LOCAL CODES</td>
</tr>
<tr>
<td>Aln Trunk</td>
<td>2</td>
<td>E-14/18 HNM</td>
<td>Refer to NEC</td>
<td>CHECK LOCAL CODES</td>
</tr>
</tbody>
</table>

1. **Maximal Do Wire Run Lengths**

<table>
<thead>
<tr>
<th>Maximal Do Wire Run Lengths</th>
<th>Cable Type</th>
<th>Braid</th>
<th>Max Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 VA</td>
<td>0</td>
<td>500 ft (152 m)</td>
<td>800 ft (244 m)</td>
</tr>
<tr>
<td>550 VA</td>
<td>2</td>
<td>1000 ft (305 m)</td>
<td>1500 ft (457 m)</td>
</tr>
<tr>
<td>1150 VA</td>
<td>3</td>
<td>1500 ft (457 m)</td>
<td>2500 ft (762 m)</td>
</tr>
<tr>
<td>1500 VA</td>
<td>4</td>
<td>2000 ft (610 m)</td>
<td>3000 ft (914 m)</td>
</tr>
</tbody>
</table>

**Notes:**
- See Table 3 for additional information.
- Refer to local codes for conduit sharing.
- See Table 4 for further details.

**Revision History**

Siemens Industry, Inc.
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Siemens

WSU Bio Science
Detroit, MI

01/09/15

**Table 2:**

<table>
<thead>
<tr>
<th>Low-Voltage Port Specifications</th>
<th>Point Code</th>
<th>ALP Term</th>
<th>SAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shielded Pair (TP)</td>
<td>888 to 889 (stranded)</td>
<td>236dB (stranded)</td>
<td>236dB (stranded)</td>
</tr>
<tr>
<td>Unshielded Pair (TP)</td>
<td>888 to 889 (stranded)</td>
<td>236dB (stranded)</td>
<td>236dB (stranded)</td>
</tr>
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</table>

**Table 3:**

<table>
<thead>
<tr>
<th>Maximal Distances</th>
<th>Braid</th>
<th>Max Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 ft</td>
<td>800 ft (244 m)</td>
<td>800 ft (244 m)</td>
</tr>
<tr>
<td>1000 ft</td>
<td>1500 ft (457 m)</td>
<td>1500 ft (457 m)</td>
</tr>
<tr>
<td>1500 ft</td>
<td>2500 ft (762 m)</td>
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</tr>
<tr>
<td>2000 ft</td>
<td>3000 ft (914 m)</td>
<td>3000 ft (914 m)</td>
</tr>
</tbody>
</table>

**Table 4:**

Series of Taps in Series on Aln Trunk

<table>
<thead>
<tr>
<th>Wire Size</th>
<th>Use</th>
<th>BMD (B)</th>
<th>BMD (B)</th>
<th>BMD (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 VA</td>
<td>0</td>
<td>500 ft (152 m)</td>
<td>800 ft (244 m)</td>
<td></td>
</tr>
<tr>
<td>550 VA</td>
<td>2</td>
<td>1000 ft (305 m)</td>
<td>1500 ft (457 m)</td>
<td></td>
</tr>
<tr>
<td>1150 VA</td>
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<td></td>
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<td>1500 VA</td>
<td>4</td>
<td>2000 ft (610 m)</td>
<td>3000 ft (914 m)</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- See Table 3 for additional information.
- Refer to local codes for conduit sharing.
- See Table 4 for further details.
Reference Only

This drawing is for reference only. Its design must be used only to add additional detail to what is being provided by the engineer of record. All terminations, wire pulls or interlocks are shown in these diagrams as this will be dependent on equipment purchased by others. Each equipment supplier is to provide a full and functioning control system outline in the plans and specs. It is the builder's responsibility to review all control documents provided by the engineer of record to ensure that a complete scope is bid. Quantity of items and location of various panels that are not clearly spelled out in the drawings must be field verified to ensure that the project is properly bid. It is assumed that the builder of the temperature controls electrical installation is knowledgeable in such work and requires minimal guidance. Siemens assumes no responsibility or risk for builders not fully understanding the scope or extent of the work required.

WSU BIO SCIENCE BUILDING
Reference Only
This drawing is for reference only. This drawing must be used only to add additional detail to what is being provided by the engineer of record. Not all terminations, wire pulls or interlocks are shown in these diagrams as this will be dependent on the equipment purchased by others. Once equipment submittals are secured, the final drawings will reflect all work necessary to provide a full and functioning control system as outlined in the plans and specifications. It is the bidder's responsibility to review all contract documents provided by engineer of record to ensure that a complete scope of bid is included. Quantity of items and location of devices/panels that are not clearly spelled out in the drawings must be field reviewed to ensure that the project is properly bid. It is assumed that the bidder of the temperature controls electrical installation is knowledgeable in such work and requires minimal guidance. Siemens assumes no responsibility or risk for bidders not fully understanding the scope or extent of the work required.

GREEN HOUSE CONTROL SYSTEM
LOCATION: GREEN HOUSE LABS
SERVES: GREEN HOUSES

REVISION HISTORY

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002A
Reference Only
This drawing is for reference only. This drawing must be used only to add additional detail to what is being provided by the engineer of record. Not all terminations, wire pulls or interlocks are shown in these diagrams as this will be dependent on the equipment purchased by others. Once equipment submittals are secured, the final drawings will reflect all work necessary to provide a full and functioning control system as outlined in the plans and spec. It is the bidder’s responsibility to review all contract documents provided by engineer of record to ensure that a complete scope is bid. Quantity of items and location of devices/panels that are not clearly spelled out in the drawings must be field verified to ensure that the project is properly bid. It is assumed that the bidder of the temperature controls electrical installation is knowledgeable in such work and requires minimal guidance. Siemens assumes no responsibility or risk for bidders not fully understanding the scope or extent of the work required.
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INSTALLATION NOTES:
1. RELAY LOCATED AT FAN STARTER.
2. POINTS TO BE WIRING TO RXCH-1 PANEL.
3. DEVICE TO BE MOUNTED IN RESPECTIVE TEMPERATURE CONTROL PANEL.

EXHAUST FAN EF-20
LOCATION: BIO SCIENCE ROOF
SERVES: 5155, 5155.1, 5155.2 AND 5155.3

REVISION HISTORY

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Detroit, MI

ENGINEER
DJK
CHECKED BY
DJK
OPENED BY
DJK
DATE: 01/09/16
LAST REV DATE
01/09/16

EX FAN CONTROL SYSTEM