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WAYNE STATE UNIVERSITY

STEM INNOVATION LEARNING CENTER
5048 Gullen Mall, Detroit, MI 48202
WSU Project No.: 008-302306
NORR Project No.: JCDT27-0232

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PROJECT SUMMARY

1. THE EXISTING WAYNE STATE SCIENCE & ENGINEERING LIBRARY BUILDING WILL BE CONVERTED TO A STEM STUDENT INSTRUCTIONAL BUILDING INCLUDING WET AND DRY LABORATORIES, COMPUTER LABS, LECTURING CLASSROOMS, STUDY AREAS AND OTHER ASSOCIATED SUPPORT SPACES REQUIRED FOR HIGHER EDUCATION PURPOSES.
2. A SMALL MECHANICAL YARD IN SUPPORT OF THE RENOVATED STEM BUILDING WILL BE BUILD NORTH OF THE MAIN SITE ADJACENT TO AN EXISTING CHEMISTRY BUILDING.
3. FIRE SUPPRESSION TO BE EXTENDED THROUGHOUT FLOORS 2-7. EXISTING FIRE SUPPRESSION TO REMAIN IN PLACE ON THE FIRST FLOOR, BASEMENT AND SUB-BASEMENT LEVELS.
4. THE EXISTING LIBRARY BUILDING WILL BE SELECTIVELY DEMOLISHED LEAVING ONLY ITS EXISTING CORE CIRCULATION ELEVATORS AND EQUIPMENT, STAIRS, 2ST FLOOR FIRE SUPPRESSION SYSTEM AND OTHER SELECTIVE FIRE PROTECTION SYSTEMS AND DATA INFRASTRUCTURE IN PLACE.
5. SCHEDULED EXTERIOR WORK INCLUDES REPLACING THE EXISTING ROOF IN ITS ENTIRETY. NEW OVERFLOW ROOF DRAINS WILL BE ADDED. A MECHANICAL ROOFTOP EXHAUST FAN WILL BE INSTALLED ALONG WITH REPLACEMENT MECHANICAL EQUIPMENT AIR INTAKE LOUVERS. EXISTING STOREFRONT UNITS WILL BE REPLACED THROUGHOUT.
   A NEW MAIN ENTRY VESTIBULE WILL BE ADDED TO THE NORTH FACADE.
6. A NEW DEDICATED LABORATORY EXHAUST SHAFT WILL BE ADDED TO THE SOUTH FACADE ABOVE THE SOUTH ENTRY VESTIBULE.
7. A DEDICATED LABORATORY EXHAUST SHAFT WILL BE ADDED TO THE SOUTH FACADE OF THE BUILDING.
   SPECIALTY HARDWARE HANGING PROMOTIONAL VINYL BANNERS WILL BE ADDED TO THE WEST FACADE.
8. NEW INTERIOR WORK WILL INVOLVE THE BUILDOUT OF SCHEDULED WORKSHOPS, LABORATORIES, CLASSROOMS, WORK ROOMS, STUDY SPACE AND ADDITIONAL ELECTRICAL AND IT INFRASTRUCTURE SPACES. EXISTING MECHANICAL ROOMS WILL RECEIVE NEW EQUIPMENT TO SERVICE THE SPACES.
9. MODERNIZATION OF THE EXISTING ELEVATOR SYSTEMS FOR PASSENGER AND FREIGHT ELEVATORS: NEW CONTROLLERS, GOVERNORS, TRACTION MACHINES & AC MOTORS, DOOR OPERATORS, INTERLOCKS, CLOSERS, CONTROL PANELS AND INDICATORS, EMERGENCY PHONE.
10. ENCLOSING AND CONDITIONING OF EXISTING MACHINE ROOMS AND INSTALLATION OF REQUIRED HOISTWAY EMERGENCY EXHAUST SHAFTS AND PRESSURIZATION OF HOISTWAY ENCLOSURES.
11. CRACKED, SPALLED OR OTHERWISE DAMAGED EXTERIOR CONCRETE/STONE VENEER TO BE PATCHED OR REPLACED AS REQ'D. FOR FINISHED "LIKE-NEW" APPEAREANCE.

    BID ALTERNATE #1:
    PAINT EXTERIOR CONCRETE AND STONE VENEER TO THE EXTENTS SHOWN ON THE EXTERIOR ELEVATIONS WITH EXPT-1 EXTERIOR LATEX PAINT.

    BID ALTERNATE #2:
    INCREASE POLISHED CONCRETE FLOOR FINISH FROM BASIS OF DESIGN #2 SATIN FINISH (WITH FINE AGGREGATE EXPOSURE (1/16" GRIND) TO #3 SEMI POLISHED FINISH WITH MEDIUM AGGREGATE EXPOSURE (1/8" GRIND)

    BID ALTERNATE #5:
    STUDENT MURAL ARTWORK TO BE DIGITALLY PRINTED ON VINYL WALLCOVERING IN STAIRWELLS. MURAL TO BE FULL HEIGHT FROM BASEMENT THROUGH THE SEVENTH FLOOR, LOCATED ON THE SOUTH LANDING WALL IN STAIRS A & B.

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ARCHITECTURAL SHEET INDEX

Sheet Number	Sheet Name	Current Revision	Current Revision Date
A15	Unnamed		
A00-00	TITLE SHEET	7	05/03/19
A00-01	SYMBOLS AND ABBREVIATIONS	7	05/03/19
A00-02	THROUGH PENETRATION FIRESTOP SYSTEMS	7	05/03/19
A00-03	FIRE RESISTANT JOINT SYSTEMS HEAD OF WALL	7	05/03/19
A01-01	CODE COMPLIANCE INFORMATION	7	05/03/19
A01-02	CODE COMPLIANCE PLAN - SUB-BASEMENT	7	05/03/19
A01-03	CODE COMPLIANCE PLAN - BASEMENT	7	05/03/19
A01-04	CODE COMPLIANCE PLAN - FIRST FLOOR	7	05/03/19
A01-05	CODE COMPLIANCE PLAN - SECOND FLOOR	7	05/03/19
A01-06	CODE COMPLIANCE PLAN - THIRD AND FOURTH FLOOR	7	05/03/19
A01-07	CODE COMPLIANCE PLAN - FIFTH AND SIXTH FLOOR	7	05/03/19
A01-08	CODE COMPLIANCE PLAN - SEVENTH FLOOR & PENTHOUSE	7	05/03/19
AD02-01	SUB-BASEMENT DEMOLITION PLAN	2	11/05/18
AD02-02	BASEMENT DEMOLITION PLAN	2	11/05/18
AD02-03	FIRST FLOOR DEMOLITION PLAN	6	3/15/19
AD02-04	SECOND FLOOR DEMOLITION PLAN	2	11/05/18
AD02-05	THIRD AND FOURTH FLOOR DEMOLITION PLAN	2	11/05/18
AD02-06	FIFTH AND SIXTH DEMOLITION PLAN	2	11/05/18
AD02-07	SEVENTH AND PENTHOUSE DEMOLITION PLAN	2	11/05/18
AD02-08	ROOF DEMOLITION PLAN	2	11/05/18
AD02-09	SITE DEMOLITION AND WORK PLAN	2	11/05/18
A02-01	SUB-BASEMENT PLAN	7	05/03/19
A02-02	BASEMENT PLAN	7	05/03/19
A02-03	FIRST FLOOR PLAN	8	XX/XX/XX
A02-04	SECOND FLOOR PLAN	7	05/03/19
A02-05	THIRD AND FOURTH FLOOR PLAN	7	05/03/19
A02-06	FIFTH AND SIXTH FLOOR PLAN	7	05/03/19
A02-07	SEVENTH AND PENTHOUSE FLOOR PLAN	7	05/03/19
A02-08	ROOF PLAN	7	05/03/19
A02-09	ARCHITECTURAL SITE PLAN	7	05/03/19
A03-01	NORTH ELEVATION	7	05/03/19
A03-02	EAST ELEVATION	7	05/03/19
A03-03	SOUTH ELEVATION	7	05/03/19
A03-04	WEST ELEVATION	7	05/03/19
A03-05	EXTERIOR ELEVATIONS	7	05/03/19
A03-06	METAL PANEL SYSTEM ELEVATIONS	7	05/03/19
A03-10	BUILDING SECTION	7	05/03/19
A03-11	BUILDING SECTION	7	05/03/19
A03-12	BUILDING SECTION	7	05/03/19
A03-13	BUILDING SECTION	7	05/03/19
A03-14	BUILDING SECTION	7	05/03/19
A04-00	TYPICAL MOUNTING HEIGHTS AND ELEVATIONS	7	05/03/19
A04-01	ENLARGED TOILET ROOM PLANS	7	05/03/19
A04-02	ENLARGED TOILET ROOM PLANS	7	05/03/19
A04-03	ENLARGED VESTIBULES	7	05/03/19
A04-04	ENLARGED LECTURE / DISCUSSION PLANS	7	05/03/19
A04-05	ENLARGED COMPUTER LAB PLAN	7	05/03/19
A04-06	ENLARGED COMPUTER LAB PLAN	7	05/03/19
A04-07	ENLARGED STAIR PLANS	7	05/03/19
A04-08	ENLARGED MECH YARD PLAN	7	05/03/19
A04-09	ENLARGED STORAGE PLAN	7	05/03/19
A04-10	ENLARGED 1ST FLOOR LAB	7	05/03/19
A04-10a	CASEWORK DETAILS	7	05/03/19
A04-10b	CASEWORK DETAILS	7	05/03/19
A04-10c	CASEWORK DETAILS	7	05/03/19
A04-11	EQUIPMENT WET LAB SECOND FLOOR PLAN	7	05/03/19
A04-11a	EQUIPMENT WET LAB - 2ND FLOOR ELEVATIONS	7	05/03/19
A04-12	EQUIPMENT WET LAB - 3RD FLOOR PLANS	7	05/03/19
A04-12A	EQUIPMENT WET LAB - 3RD FLOOR ELEVATIONS	7	05/03/19
A04-13	EQUIPMENT WET LAB -TYPE 1A PLAN	7	05/03/19
A04-14	EQUIPMENT WET LAB PLANS	7	05/03/19
A04-14a	EQUIPMENT WET LAB PLANS - ELEVATIONS	7	05/03/19
A04-15	ENLARGED 4TH FLOOR LAB	7	05/03/19
A04-15a	EQUIPMENT WET LAB - 4TH FLOOR ELEVATIONS	7	05/03/19
A04-16	EQUIPMENT WET LAB 5TH FLOOR PLANS	7	05/03/19
A04-17	EQUIPMENT DRY LAB - 6TH FLOOR PLAN	7	05/03/19
A04-17a	EQUIPMENT DRY LAB - 6TH FLOOR ELEVATIONS	7	05/03/19
A04-18	EQUIPMENT DRY LAB - 7TH FLOOR PLAN	7	05/03/19
A04-19	EQUIPMENT DRY LAB - 7TH FLOOR TYPE 1 PLAN	7	05/03/19
A04-19a	EQUIPMENT DRY LAB PLAN - ELEVATIONS	7	05/03/19
A04-20	INTERIOR ELEVATIONS	7	05/03/19
A04-21	INTERIOR ELEVATIONS	7	05/03/19
A04-22	INTERIOR ELEVATIONS	7	05/03/19
A04-23	INTERIOR ELEVATIONS	7	05/03/19
A04-24	ENLARGED ELEVATOR PLANS AND ELEVATIONS	7	05/03/19
A05-00	SECTION DETAILS	7	05/03/19
A05-01	SECTION DETAILS	7	05/03/19
A05-02	SECTION DETAILS	7	05/03/19
A05-10	PLAN DETAILS	7	05/03/19
A05-11	PLAN DETAILS	7	05/03/19
A05-15	NORTH VESTIBULE DETAILS	7	05/03/19
A05-16	SOUTH VESTIBULE DETAILS	7	05/03/19
A05-20	ROOF DETAILS	7	05/03/19
A05-21	ROOF DETAILS	7	05/03/19
A05-22	ROOF DETAILS	7	05/03/19
A05-30	CEILING DETAILS	7	05/03/19
A06-01	BASEMENT REFLECTED CEILING PLAN	7	05/03/19
A06-02	FIRST FLOOR REFLECTED CEILING PLAN	7	05/03/19
A06-03	SECOND FLOOR REFLECTED CEILING PLAN	7	05/03/19
A06-04	THIRD AND FOURTH FLOOR REFLECTED CEILING PLAN	7	05/03/19
A06-05	FIFTH AND SIXTH FLOOR REFLECTED CEILING PLAN	7	05/03/19
A06-06	SEVENTH AND PENTHOUSE REFLECTED CEILING PLAN	7	05/03/19
A07-00	PARTITION TYPES	7	05/03/19
A07-02	DOOR AND LOUVER SCHEDULE	8	XX/XX/XX
A07-03	DOOR DETAILS	7	05/03/19
A07-04	STOREFRONT SCHEDULE	7	05/03/19
A07-05	STOREFRONT DETAILS	7	05/03/19
A09-01	MATERIAL SCHEDULE	3	12/21/18
A09-02	ROOM FINISH SCHEDULE	4	01/14/19
A09-21	BASEMENT FINISH PLAN	4	01/14/19
A09-22	FIRST FLOOR FINISH PLAN	4	01/14/19
A09-23	SECOND FLOOR FINISH PLAN	4	01/14/19
A09-24	THIRD AND FOURTH FLOOR FINISH PLAN	4	01/14/19

ARCHITECTURAL SHEET INDEX

Sheet Number	Sheet Name	Current Revision	Current Revision Date
A09-25	FIFTH AND SIXTH FLOOR FINISH PLAN	4	01/14/19
A09-26	SEVENTH FINISH PLAN	4	01/14/19
A09-40	SIGNAGE TYPES	3	12/21/18
A09-41	BASEMENT SIGNAGE AND REVEAL PLAN	3	12/21/18
A09-42	FIRST FLOOR SIGNAGE AND REVEAL PLAN	3	12/21/18
A09-43	SECOND FLOOR SIGNAGE AND REVEAL PLAN	3	12/21/18
A09-44	THIRD AND FOURTH FLOOR SIGNAGE AND REVEAL PLAN	3	12/21/18
A09-45	FIFTH AND SIXTH FLOOR SIGNAGE AND REVEAL PLAN	3	12/21/18
A09-46	SEVENTH FLOOR SIGNAGE AND REVEAL PLAN	3	12/21/18
A09-60	WALL GRAPHICS ELEVATIONS	3	12/21/18

CIVIL SHEET INDEX

Sheet Number	Sheet Name	Current Revision	Current Revision Date
C101	SITE REMOVAL PLAN	7	05-03-19
C201	SITE LAYOUT PLAN	7	05-03-19
C301	SITE UTILITY PLAN	7	05-03-19
C401	SITE DETAILS	7	05-03-19
C402	SITE DETAILS	7	05-03-19

STRUCTURAL SHEET INDEX

Sheet Number	Sheet Name	Current Revision	Current Revision Date
S00-01	GENERAL NOTES & SCHEDULES	7	05-03-2019
S00-02	TYPICAL DETAILS	7	05-03-2019
S10-01	NORTH VESTIBULE PLANS & SECTIONS	7	05-03-2019
S10-02	SOUTH VESTIBULE AND MECHANICAL SHAFT PLANS	7	05-03-2019
S20-01	SOUTH VESTIBULE AND MECHANICAL SHAFT SECTIONS	7	05-03-2019

PLUMBING INDEX SHEET

Sheet Number	Sheet Name	Current Revision	Current Revision Date
P00-01	GENERAL NOTES AND LEGEND	6	05/06/2019
PD10-01	SUB-BASEMENT PLUMBING DEMOLITION PLAN	7	03/15/2019
PD10-02	BASEMENT PLUMBING DEMOLITION PLAN	2	11/05/2018
PD10-03	FIRST FLOOR PLUMBING DEMOLITION PLAN	2	11/05/2018
PD10-04	BASEMENT - SEVENTH FLOOR TOILET ROOM PLUMBING DEMOLITION PLANS	2	11/05/2018
PD10-05	SEVENTH FLOOR AND PENTHOUSE PLUMBING DEMOLITION PLAN	2	11/05/2018
P10-01	SUB-BASEMENT SANITARY & STORM PLAN	6	05/06/2019
P10-02	BASEMENT SANITARY & STORM PLAN	6	05/06/2019
P10-03	FIRST FLOOR SANITARY & STORM PLAN	6	05/06/2019
P10-04	SECOND FLOOR SANITARY & STORM PLAN	6	05/06/2019
P10-05	THIRD AND FOURTH FLOOR SANITARY & STORM PLANS	6	05/06/2019
P10-06	FIFTH AND SIXTH FLOOR SANITARY & STORM PLANS	6	05/06/2019
P10-07	SEVENTH AND PENTHOUSE SANITARY & STORM PLANS	6	05/06/2019
P20-01	SUB-BASEMENT SUPPLY PIPING PLAN	6	05/06/2019
P20-02	BASEMENT SUPPLY PIPING PLAN	6	05/06/2019
P20-03	FIRST FLOOR SUPPLY PIPING PLAN	6	05/06/2019
P20-04	SECOND FLOOR SUPPLY PIPING PLAN	6	05/06/2019
P20-05	THIRD AND FOURTH FLOOR SUPPLY PIPING PLANS	6	05/06/2019
P20-06	FIFTH AND SIXTH FLOOR SUPPLY PIPING PLANS	6	05/06/2019
P20-07	SEVENTH AND PENTHOUSE SUPPLY PIPING PLAN	6	05/06/2019
P30-01	ENLARGED PLANS - SUB-BASEMENT MECHANICAL ROOM	7	03/15/2019
P30-02	ENLARGED PLANS - TOILET ROOMS	6	05/06/2019
P30-03	ENLARGED PLANS - SECOND FLOOR	7	03/15/2019
P30-04	ENLARGED PLANS - THIRD FLOOR	6	05/06/2019
P30-05	ENLARGED PLANS - FOURTH FLOOR	6	05/06/2019
P30-06	ENLARGED PLANS - FIFTH FLOOR LABS	6	05/06/2019
P40-01	SCHEDULES	7	03/15/2019
P50-01	DETAILS	6	05/06/2019
P50-02	DETAILS	6	05/06/2019
P50-03	RISER DIAGRAMS	6	05/06/2019
P60-01	SUB-BASEMENT FIRE PROTECTION PLAN	6	05/06/2019
P60-02	BASEMENT FIRE PROTECTION PLAN	6	05/06/2019
P60-03	FIRST FLOOR FIRE PROTECTION PLAN	6	05/06/2019
P60-04	SECOND FLOOR FIRE PROTECTION PLAN	6	05/06/2019
P60-05	THIRD AND FOURTH FLOOR FIRE PROTECTION PLANS	6	05/06/2019
P60-06	FIFTH AND SIXTH FLOOR FIRE PROTECTION PLANS	6	05/06/2019
P60-07	SEVENTH AND PENTHOUSE FIRE PROTECTION PLANS	6	05/06/2019

MECHANICAL SHEET INDEX

Sheet Number	Sheet Name	Current Revision	Current Revision Date
M00-01	MECHANICAL GENERAL NOTES AND LEGEND	6	05/06/2019
MD10-01	SUB-BASEMENT MECHANICAL DEMOLITION PLAN	2	11/05/2018
MD10-02	SUB-BASEMENT CHEMISTRY MECHANICAL DEMOLITION PLAN	2	11/05/2018
MD10-03	BASEMENT MECHANICAL DEMOLITION PLAN	2	11/05/2018
MD10-04	FIRST FLOOR MECHANICAL DEMOLITION PLAN	2	11/05/2018
MD10-05	SECOND FLOOR MECHANICAL DEMOLITION PLAN	2	11/05/2018
MD10-06	THIRD AND FOURTH FLOOR MECHANICAL DEMOLITION PLAN	2	11/05/2018
MD10-07	FIFTH AND SIXTH FLOOR MECHANICAL DEMOLITION PLAN	2	11/05/2018
MD10-08	SEVENTH FLOOR AND PENTHOUSE MECHANICAL DEMOLITION PLAN	2	11/05/2018
M10-01	SUB-BASEMENT SHEET METAL PLAN	6	05/06/2019
M10-02	BASEMENT SHEET METAL PLAN	6	05/06/2019
M10-03	FIRST FLOOR SHEET METAL PLAN	6	05/06/2019
M10-04	SECOND FLOOR SHEET METAL PLAN	6	05/06/2019
M10-05	THIRD AND FOURTH FLOOR SHEET METAL PLANS	6	05/06/2019
M10-06	FIFTH AND SIXTH FLOOR SHEET METAL PLANS	6	05/06/2019
M10-07	SEVENTH FLOOR AND PENTHOUSE SHEET METAL PLANS	6	05/06/2019
M20-01	SUB-BASEMENT MECHANICAL PIPING PLANS	6	05/06/2019
M20-02	BASEMENT MECHANICAL PIPING PLANS	6	05/06/2019
M20-03	FIRST FLOOR MECHANICAL PIPING PLANS	6	05/06/2019

MECHANICAL SHEET INDEX

Sheet Number	Sheet Name	Current Revision	Current Revision Date
M20-04	SECOND FLOOR MECHANICAL PIPING PLANS	6	05/06/2019
M20-05	THIRD AND FOURTH FLOOR MECHANICAL PIPING PLANS	6	05/06/2019
M20-06	FIFTH AND SIXTH FLOOR MECHANICAL PIPING PLANS	6	05/06/2019
M20-07	SEVENTH FLOOR AND PENTHOUSE MECHANICAL PIPING PLANS	6	05/06/2019
M30-01	SUB-BASEMENT ENLARGED MECHANICAL PLAN - CHEMISTRY	6	05/06/2019
M30-02	SUB-BASEMENT ENLARGED MECHANICAL PLAN	6	05/06/2019
M30-03	SECOND & THIRD FLOOR ENLARGED PLANS	6	05/06/2019
M30-04	PENTHOUSE ENLARGED MECHANICAL PLAN	6	05/06/2019
M30-05	ENLARGED HYDRONIC PIPING RISERS	6	05/06/2019
M40-01	SUB-BASEMENT MECHANICAL ROOM SECTIONS	6	05/06/2019
M40-02	UTILITY SHAFT SECTIONS	6	05/06/2019
M40-03	SECTIONS	6	05/06/2019
M40-04	PENTHOUSE SECTIONS	6	05/06/2019
M50-01	CHILLED WATER SCHEMATIC	6	05/06/2019
M50-02	HEATING WATER SCHEMATIC	6	05/06/2019
M50-03	CONTROLS SCHEMATICS AHU-1	6	05/06/2019
M50-04	CONTROLS SCHEMATICS AHU-2	6	05/06/2019
M50-05	CONTROLS SCHEMATICS AHU-3	6	05/06/2019
M50-06	CONTROL SCHEMATICS, AHU-4 & MISCELLANEOUS	6	05/06/2019
M50-07	HEATING SYSTEM CONTROL SCHEMATICS	6	05/06/2019
M50-08	RUNAROUND HEATING SYSTEM CONTROL SCHEMATICS	6	05/06/2019
M50-09	LAB SPACE CONTROL SCHEMATICS	6	05/06/2019
M50-10	MISELLANEOUS CONTROLS SCHEMATICS	6	05/06/2019
M50-11	MISCELLANEOUS CONTROL SCHEMATICS	6	05/06/2019
M60-01	SCHEDULES	6	05/06/2019
M60-02	SCHEDULES	6	05/06/2019
M60-03	SCHEDULES	6	05/06/2019
M60-04	MECHANICAL AIR BALANCE	6	05/06/2019
M70-01	DETAILS	6	05/06/2019
M70-02	DETAILS	6	05/06/2019
M70-03	DETAILS	6	05/06/2019

ELECTRICAL SHEET INDEX

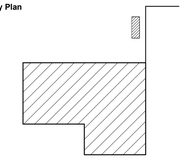
Sheet Number	Sheet Name	Current Revision	Current Revision Date
E00-01	LEGENDS AND GENERAL NOTES	7	05/06/2019
E00-02	MISCELLANEOUS SCHEDULES	7	05/06/2019
ED10-01	SUB-BASEMENT ELECTRICAL DEMOLITION PLAN	2	11/05/2018
ED10-02	BASEMENT ELECTRICAL DEMOLITION PLAN	2	11/05/2018
ED10-03	FIRST FLOOR ELECTRICAL DEMOLITION PLAN	2	11/05/2018
ED10-04	SECOND FLOOR ELECTRICAL DEMOLITION PLAN	2	11/05/2018
ED10-05	THIRD AND FOURTH FLOOR ELECTRICAL DEMOLITION PLAN	2	11/05/2018
ED10-06	FIFTH AND SIXTH FLOOR ELECTRICAL DEMOLITION PLAN	2	11/05/2018
ED10-07	SEVENTH FLOOR AND PENTHOUSE ELECTRICAL DEMOLITION PLAN	2	11/05/2018
ED40-01	DEMOLITION ONE LINE DIAGRAM	2	11/05/2018
E10-01	SUB-BASEMENT LIGHTING PLAN	7	05/06/2019
E10-02	BASEMENT LIGHTING PLAN	8	Date 7
E10-03	FIRST FLOOR LIGHTING PLAN	5	01/22/2019
E10-04	SECOND FLOOR LIGHTING PLAN	3	12/21/2018
E10-05	THIRD AND FOURTH FLOOR LIGHTING PLAN	3	12/21/2018
E10-06	FIFTH AND SIXTH FLOOR LIGHTING PLAN	3	12/21/2018
E10-07	SEVENTH AND PENTHOUSE LIGHTING PLAN	3	12/21/2018
E20-01	SUB-BASEMENT POWER & SYSTEMS PLAN	8	Date 7
E20-02	BASEMENT POWER & SYSTEMS PLAN	8	Date 7
E20-03	FIRST FLOOR POWER & SYSTEMS PLAN	8	Date 7
E20-04	SECOND FLOOR POWER & SYSTEMS PLAN	8	Date 7
E20-05	THIRD AND FOURTH FLOOR POWER & SYSTEMS PLAN	7	05/06/2019
E20-06	FIFTH AND SIXTH FLOOR POWER & SYSTEMS PLAN	8	Date 7
E20-07	SEVENTH AND PENTHOUSE POWER & SYSTEMS PLAN	8	Date 7
E30-01	ENLARGED ELECTRICAL PLANS	7	05/06/2019
E30-02	ENLARGED ELECTRICAL PLANS	7	05/06/2019
E40-01	PARTIAL ONE LINE DIAGRAM MAIN	8	Date 7
E40-02	PARTIAL ONE LINE DIAGRAM DP	7	05/06/2019
E40-03	PARTIAL ONE LINE DIAGRAM TOWER	7	05/06/2019
E40-04	PARTIAL ONE LINE DIAGRAM	7	05/06/2019
E50-01	ELECTRICAL DETAILS	7	05/06/2019
E50-02	ELECTRICAL DETAILS	7	05/06/2019
E50-03	ELECTRICAL DETAILS	7	05/06/2019
E60-01	PANELBOARD SCHEDULES	8	Date 7
E60-02	PANELBOARD SCHEDULES	8	Date 7
E60-03	PANELBOARD SCHEDULES	8	Date 7
E60-04	PANELBOARD SCHEDULES	8	Date 7
E60-05	PANELBOARD SCHEDULES	7	05/06/2019
E60-06	PANELBOARD SCHEDULES	8	Date 7

TELECOMMUNICATIONS SHEET LIST

Sheet Number	Sheet Name	Current Revision	Current Revision Date
TC101	CABLING	3	12/21/18
TC102	CABLING	3	12/21/18
TC103	CABLING	3	12/21/18
TC104	CABLING	3	12/21/18
TC105	CABLING	3	12/21/18
TC106	CABLING	3	12/21/18
TC501	SECURITY	3	12/21/18
TC502	SECURITY	3	12/21/18
TC503	SECURITY	3	12/21/18
TC504	SECURITY	3	12/21/18
TC505	CABLING	3	12/21/18
TC506	SECURITY	3	12/21/18
TC901	TECHNOLOGY PLAN SUB-BASEMENT	3	12/21/18
TC902	TECHNOLOGY PLAN BASEMENT	3	12/21/18
TC903	TECHNOLOGY PLAN FIRST FLOOR	3	12/21/18
TC904	TECHNOLOGY PLAN SECOND FLOOR	3	12/21/18
TC905	TECHNOLOGY PLAN THIRD FLOOR	3	12/21/18
TC906	TECHNOLOGY PLAN FOURTH FLOOR	3	12/21/18
TC907	TECHNOLOGY PLAN FIFTH FLOOR	3	12/21/18
TC908	TECHNOLOGY PLAN SIXTH FLOOR	3	12/21/18
TC909	TECHNOLOGY PLAN SEVENTH FLOOR	3	12/21/18
TC910	TECHNOLOGY PLAN ROOF	3	12/21/18

DATE	ISSUED FOR	REV
11/05/18	DEMO PACKAGE - BIDS	2
12/21/18	100% CD PACKAGE	3
01/14/19	ADDENDUM #1	4
3/15/19	BULLETIN #1	6
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants
Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

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WAYNE STATE UNIVERSITY

Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
TITLE SHEET

Scale

Project No. JCDT17-0231

Drawing No.
A00-00

5/6/2019 11:53:25 AM

ABBREVIATIONS

A

AB	ANCHOR BOLT
ACT	ACOUSTICAL CEILING TILE
ACP	ACOUSTICAL CEILING PANEL
ACS PNL	ACCESS PANEL
AD	AREA DRAIN
ADDL	ADDITIONAL
ADH	ADHESIVE
ADJ	ADJUSTABLE
ADJ	ADJACENT
AFF	ABOVE FINISH FLOOR
AFG	ABOVE FINISH GRADE
AFS	ABOVE FINISH SLAB
AGGR	AGGREGATE
ALUM	ALUMINUM
ALT	ALTERNATE
ANOD	ANODIZED
APPROX	APPROXIMATE(LY)
ARCH	ARCHITECT(URAL)

B

BB	BULLETIN BOARD
BD	BOARD
BTWN	BETWEEN
BITUM	BITUMINOUS
BLDG	BUILDING
BM	BENCHMARK
BOT	BOTTOM
BOS	BOTTOM OF STEEL
BRG	BEARING
BSMT	BASEMENT
BUR	BUILT UP ROOFING

C

CAB	CABINET
CB	CATCH BASIN
CCR	CARD CONTROL READER
CCT	CUBICLE CURTAIN TRACK
CCTV	CLOSED CIRCUIT TELEVISION
CG	CORNER GUARD
CEM	CEMENT, CEMENTITIOUS
CER	CERAMIC
CI	CAST IRON
CJ	CONTROL JOINT
CL	CENTER LINE
CLG	CEILING
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
CNTR	COUNTER
COL	COLUMN
CONC	CONCRETE
CONF	CONFERENCE
CONN	CONNECTION
CONSTR	CONSTRUCTION
CONT	CONTINUOUS
CONTR	CONTRACTOR
CORR	CORRUGATED
CPT	CARPET
CSK	COUNTERSUNK
CSP	COMBINATION STANDPIPE
CSWK	CASEWORK
CT	CERAMIC TILE
CU	CUBIC
CW	COLD WATER

D

D	DEPTH
DBL	DOUBLE
DBL ACT	DOUBLE ACTING
DEG	DEGREE
DEMO	DEMOLISH
DEPT	DEPARTMENT
DET	DETAIL
DF	DRINKING FOUNTAIN
DIA	DIAMETER
DIAG	DIAGONAL
DIFF	DIFFUSER
DIM	DIMENSION
DIM PT	DIMENSION POINT
DISP	DISPENSER
DIST	DISTANCE
DN	DOWN
DO	DATA OUTLET
DR	DRAIN
DS	DOWNSPOUT
DSP	DRY STANDPIPE
DT	DRAPERY TRACK
DWG	DRAWING
DWGS	DRAWINGS

E

(E)	EXISTING
EA	EACH
EDR	EQUIPMENT DRAWING
EG	EDGE GUARD
EIFS	EXTERIOR INSULATION FINISH SYSTEM
EL	ELEVATION
ELAST	ELASTOMERIC
ELEC	ELECTRICAL
ELEV	ELEVATOR
EMER	EMERGENCY
ENCL	ENCLOSURE
ENGR	ENGINEER
EO	ELECTRICAL OUTLET
EOS	EDGE OF SLAB
EP	ELECTRICAL PANEL
EPB	ELECTRICAL PANEL BOARD
EPDM	ETHYLENE PROPYLENE DIENE MONOMER
EQ	EQUAL
EQL SP	EQUALLY SPACED
EQUIP	EQUIPMENT
EQPM	EQUIPMENT
EQUIV	EQUIVALENT
ESCAL	ESCALATOR
EST	ESTIMATE(D)
EWC	ELECTRIC WATER COOLER
EXC	EXCAVATE
EXH	EXHAUST
EXP	EXPANSION
EXP JT	EXPANSION JOINT
EXT	EXTERIOR

F

F/F	FACE TO FACE
FA	FIRE ALARM
FAS	FIRE ALARM STATION
FB	FLAT BAR
FCU	FAN COIL UNIT
FD	FLOOR DRAIN
FDC	FIRE DEPARTMENT CONNECTION
FEC	FIRE EXTINGUISHER CABINET
FE	FIRE EXTINGUISHER
FF	FINISH FACE
FHC	FIRE HOSE CABINET
FH/FEC	FIRE HOSE / FIRE EXTINGUISHER CABINET
FIP	FOAM IN PLACE
FLAM	FLAMMABLE
FLASH	FLASHING
FLEX	FLEXIBLE
FLUOR	FLUORESCENT
FNDN	FOUNDATION
FO	FACE OF
FRW	FIRE RATED WOOD
FSTNR	FASTENER
FT	FOOT, FEET
FURN	FURNITURE
FVC	FIRE VALVE CABINET
FXTR	FIXTURE

G

G	GAS
GA	GAUGE, GAGE
GAL	GALLON
GALV	GALVANIZED
GB	GRAB BAR
GBR	GYPSUM BOARD
GC	GENERAL CONTRACTOR
GCW	GLASS CURTAIN WALL
GFRC	GLASS FIBER REINFORCED
GFRG	GLASS FIBER REINFORCED GYPSUM
GL	GLASS
GLU LAM	GLUE LAMINATED
GLZ	GLAZING
GR	GRADE OR GRADING
GVL	GRAVEL
GYP	GYPSUM
GYP BD	GYPSUM BOARD
GYP PLAS	GYPSUM PLASTER

H

H	HIGH
HB	HOSE BIBB
HC	HOLLOW CORE
HD	HEAD
HDBD	HARDBOARD
HDW	HARDWARE
HDWD	HARDWOOD
HGT	HEIGHT
HM	HOLLOW METAL
HNDRL	HANDRAIL
HORIZ	HORIZONTAL
HPT	HIGH POINT
HR	HOUR
HVAC	HEATING-VENTILATION-AIR CONDITIONING
HW	HOT WATER

I

ID	INSIDE DIAMETER
IN	INCH
INCAND	INCANDESCENT
INCL	INCLUDE, INCLUDING
INFO	INFORMATION
INSUL	INSULATION
INTR	INTERIOR
INV	INVERT
IVT	INTRAVENOUS TRACK

J

JAN	JANITOR
JST	JOIST
JT	JOINT

K

KIT	KITCHEN
KPL	KICK PLATE
KS	KNEE SPACE

L

L	LENGTH, LONG
LAB	LABORATORY
LAM	LAMINATE, LAMINATION
LAV	LAVATORY
LB	POUND
LED	LIGHT EMITTING DIODE
LF	LINEAR FOOT
LG	LENGTH
LIN	LINEAR
LL	LEAD LINED
LPT	LOW POINT
LT	LIGHT
LTP	LIGHTING PROTECTION
LTG	LIGHTING
LVR	LOUVER

M

M	METERS
MACH	MACHINE
MATL	MATERIAL
MATV	MASTER ANTENNA TELEVISION SYSTEM
MAX	MAXIMUM
MB	MACHINE BOLT
MC	MEDICINE CABINET
MDO	MEDIUM DENSITY OVERLAY
MECH	MECHANICAL
MED	MEDIUM
MEMB	MEMBRANE
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MLDG	MOLDING
MM	MILLIMETERS
MO	MASONRY OPENING
MOD	MODULE, MODULAR
MTD	MOUNTED
MTG	MOUNTING
MVBL	MOVABLE
MULL	MULLION

N

(N)	NEW
NA	NOT APPLICABLE
NAT	NATURAL
NE	NORTHEAST
NIC	NOT IN CONTRACT
NO	NUMBER
NOM	NOMINAL
NRC	NOICE REDUCTION COEFFICIENT
NTS	NOT TO SCALE
NW	NORTHWEST

O

OC	ON CENTER
OA	OVERALL
OD	OUTSIDE DIAMETER
OFCI	OWNER FURNISHED-CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED-OWNER INSTALLED
OPP	OPPOSITE
OFRD	OVERFLOW ROOF DRAIN
OVHD	OVERHEAD
OZ	OUNCE

P

PA	PUBLIC ADDRESS
PART	PARTIAL
PBD	PARTICLEBOARD
PBX	PRIVATE TELEPHONE EXCHANGE
PCF	POUNDS PER CUBIC FOOT
PCI	POUNDS PER CUBIC INCH
PERF	PERFORATED
PERIM	PERIMETER
PERM	PERMANENT
PERP	PERPENDICULAR
PI	POINT OF INTERSECTION
PL	PLATE
PLAM	PLASTIC LAMINATE
PLAS	PLASTER
PLBG	PLUMBING
PLF	POUNDS PER LINEAR FOOT
PLYWD	PLYWOOD
PNEU	PNEUMATIC
PNL	PANEL
PNL BD	PANEL BOARD
PNT	PAINT
PORT	PORTABLE
PP	PUSH PLATE
PPM	PARTS PER MILLION
PR	PAIR
PRCST	PRECAST
PREP	PREPARATION
PREFAB	PREFABRICATION
PRKG	PARKING
PROJ	PROJECT
PROP	PROPERTY
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	POINT
PTN	PARTITION
PTS	PNEUMATIC TUBE
PVC	POLYVINYL CHLORIDE
PVG	PAVING
PVMT	PAVEMENT
PWR	POWER

Q

QT	QUARRY TILE
QTR	QUARTER
QTY	QUANTITY

R

R	RISER
RA	RETURN AIR
RAD	RADIUS
RB	RESILIENT BASE
RBK	ROOM SCHEDULING
RCP	REFLECTED CEILING PLAN
RCPT	RECEPTACLE
RD	ROOF DRAIN
RECT	RECTANGULAR
REF	REFERENCE
REFR	REFRIGERATOR
REG	REGISTER
REINF	REINFORCE (D) (ING) (MENT)
REQD	REQUIRED
REQT	REQUIREMENT
RESIL	RESILIENT
RET	RETURN
REV	REVISION
RF	RESILIENT FLOORING
RH	RIGHT HAND
RHMS	ROUND HEAD MACHINE SCREW
RHWS	ROUND HEAD WOOD SCREW
RM	ROOM
RND	ROUND
RO	ROUGH OPENING
ROW	RIGHT OF WAY
RWL	RAIN WATER LEADER

S

S	SOUTH
SA	SUPPLY AIR
SAB	SOUND ABSORBING BAT
SC	SOLID CORE
SCHED	SCHEDULE
SCRN	SCREEN
SD	STORM DRAIN
SE	SOUTHEAST
SECT	SECTION
SEG	SEGMENT
SEP	SEPARATION OR SEPARATE
SEP JT	SEPARATION JOINT
SHT	SHEET, SHEETING
SHWR	SHOWER
SHV	SHELVES, SHELVING
SIM	SIMILAR
SK	SINK
SMS	SHEET METAL SCREW
SP	SPACE, SPACED, SPACING
SPEC	SPECIFICATION
SPKLR	SPRINKLER
SPKR	SPEAKER
SQ	SQUARE
SRD	SUMP ROOF DRAIN
SS	SANITARY SEWER
SSK	SERVICE SINK
SSM	SOLID SURFACE MATERIALS
SST	STAINLESS STEEL
ST	STREET
STAG	STAGGERED
STC	SOUND TRANSMISSION COEFFICIENT
STD	STANDARD
STL	STEEL
STOR	STORAGE
STRUCT	STRUCTURAL
STS	SELF-TAPPING STEEL
SUSP	SUSPENDED
SUSP CLG	SUSPENDED CEILING
SVCE	SERVICE
SW	SOUTHWEST
SYMM	SYMMETRICAL
SYST	SYSTEM

T

T/O	TOP OF
T	TREAD
T&B	TOP AND BOTTOM
T&G	TONGUE AND GROOVE
TC	TOP OF CONCRETE, TOP OF CURB
TD	TRENCH DRAIN
TEL	TELEPHONE
TEMP	TEMPORARY
THERM	THERMAL
THK	THICK, THICKNESS
THRES	THRESHOLD
THRU	THROUGH
TMPD GL	TEMPERED GLASS
TO	TOP OF
TOR	TOP OF RAILING
TOS	TOP OF STEEL
TOT	TOTAL
TOW	TOP OF WALL
TP	TOP OF PAVEMENT
TTB	TELEPHONE TERMINAL BOARD
TV	TELEVISION
TYP	TYPICAL

U

U/C	UNDER COUNTER
U/S	UNDERSIDE
UL	UNINTERRUPTABLE POWER SUPPLY
UON	UNDERWRITERS LABORATORIES
UPS	UNLESS OTHERWISE NOTED
UTIL	UTILITY

V

VAC	VACUUM
VB	VALVE BOX
VCT	VINYL COMPOSITION TILE
VERT	VERTICAL
VEST	VESTIBULE
VIT	VITREOUS
VP	VENT PIPE
VOL	VOLUME
VWC	VINYL WALL COVERING

W

W	WEST
W/	WITH
W/O	WITHOUT
W/W	WALL TO WALL
WC	WATER CLOSET OR WALL COVERING
WD	WOOD
WDW	WINDOW
WGL	WIRE GLASS
WCHR	WHEELCHAIR
WM	WIRE MESH
WO	WHERE OCCURS
W/O	WITHOUT
WPT	WORKING POINT
WR	WATER RESISTANT
WSCT	WAINSCOT
WSP	WET STANDPIPE
WT	WEIGHT
WTHPRF	WEATHERPROOF
WTRPRF	WATERPROOF
WWF	WELDED WIRE FABRIC
WWM	WELDED WIRE MESH

FLOOR PLAN SYMBOLS

DIMENSION SYMBOLS

10' - 0" — DIMENSION SHOWN TO:
- STRUCTURAL GRID
- LAYOUT GRID
- CENTERLINE OF ASSEMBLY
- CENTER OF OPENING
- CENTER OF EQUIP/ FURN
- GRID OR CENTER LINE TYPICAL

10' - 0" — DIMENSION SHOWN TO:
- PARTITION ASSEMBLY
- EDGE OF DOOR OPENING
- OTHER BUILDING ELEMENT
- WORKING POINT INDICATED ON DETAIL

GENERAL SYMBOLS

BASE CABINETS

BASE AND WALL CABINETS

WALL CABINETS

HANDRAIL

BUMPER GUARD

CG CG — CORNER GUARD

EG — EDGE GUARD

FIRE EXTINGUISHER SYMBOLS

FE — FIRE EXTINGUISHER BRACKET MOUNTED

FEC — FIRE EXTINGUISHER SURFACE MOUNTED

FEC — FIRE EXTINGUISHER CABINET SEMI-RECESSED

FEC — FIRE EXTINGUISHER CABINET RECESSED

PLUMBING SYMBOLS

TOILET - WALL HUNG

LAVATORY - COUNTERTOP

LAVATORY - PEDESTAL/WALL HUNG

UTILITY SINK

JANITOR'S RECEPTOR

PLAN AND SECTION

EARTH

AGGREGATE BASE COURSE

CONCRETE

CONCRETE MASONRY UNIT

BRICK MASONRY

PRECAST CONCRETE

LIMESTONE, SANDSTONE, GRANITE

MARBLE

STEEL, STAINLESS STEEL (LARGE SCALE)

ALUMINUM (LARGE SCALE)

OTHER METALS (LARGE SCALE)

WOOD FRAMING - CONTINUOUS (LARGE SCALE)

WOOD FRAMING - DISCONTINUOUS (LARGE SCALE)

PLYWOOD (LARGE SCALE)

FINISH WOOD (LARGE SCALE)

EIFS INSULATION BOARD (LARGE SCALE)

SEMI-RIGID INSULATION (LARGE SCALE)

BATT INSULATION (LARGE SCALE)

MORTAR, SAND, FIREPROOFING, STUCCO, GYPSUM BOARD

TERRAZZO (LARGE SCALE)

COMPOSITE BOARD (LARGE SCALE)

ACOUSTIC TILE (LARGE SCALE)

PROTECTION BOARD (LARGE SCALE)

CERAMIC TILE (LARGE SCALE)

GLASS (LARGE SCALE)

ELEVATION

PLASTER CONCRETE

MASONRY, METAL SIDING (HORIZONTAL)

GLASS BLOCK, CERAMIC TILE

METAL SIDING (VERTICAL0

GLASS

REFERENCE SYMBOLS

88 — GRID

Elevation Name 100.000 — LEVEL

100.000' (GEO.) 100.000 Elevation Name — LEVEL -GEODETIC

INTERIOR ELEVATION

1 / A00-00-00 / 3 — 2 — VIEW No. / SHEET No.

PARTIAL INTERIOR ELEVATION

1 / A00-00-00 / 3 — 2 — ?? / VIEW No. / SHEET No.

EXTERIOR ELEVATION

/ A00-00-00 — VIEW No. / SHEET No.

PARTIAL EXTERIOR ELEVATION

/ A00-00-00 — VIEW No. / SHEET No.

DRAWING TITLE

/ A00-00-00 — VIEW No. / VIEW NAME — XXXXX XXXXXXXXXXXXXXX XXXXX / SCALE: 1/8" = 1'-0" / SCALE / SHEET No.

DETAIL REFERENCE

/ A00-00-00 — VIEW No. / SHEET No. / SIM — REFERENCE (WHERE OCCURS)

F1 — FLOOR TYPE

DXXX — DOOR NUMBER

XX-XX — WALL TYPE

— WINDOW TYPE

? — MATERIAL TAG

— ROOF TAG

BUILDING SECTION

1 / A00-00-00 / SIM — VIEW No. / SHEET No. / REFERENCE (WHERE OCCURS)

1 / A00-00-00

WALL SECTION

1 / A00-00-00 / SIM — VIEW No. / SHEET No. / REFERENCE (WHERE OCCURS)

PARTIAL SECTION

1 / A00-00-00 / SIM — VIEW No. / SHEET No. / REFERENCE (WHERE OCCURS)

ROOM TAG

NAME

XXXXXX XXXXXX — ROOM No.

— ADDRESSING TAG UNIT ADDRESS

— REVISION TAG

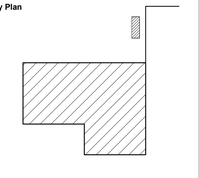
NORTH ARROW

#'-## — SPOT ELEVATION

ACCESSIBLE CLEARANCE

DATE	ISSUED FOR	REV
11/05/18	DEMO PACKAGE - BIDS	2
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil:	FTC&H
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Architecture	NORR
Structural:	FTC&H
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Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

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Design Lead: C. MENARD	Drawn: R. HAAS
Project Leader: C. MENARD	Checked: G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project

STEM INNOVATION LEARNING CENTER

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

SYMBOLS AND ABBREVIATIONS

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A00-01

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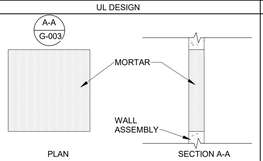
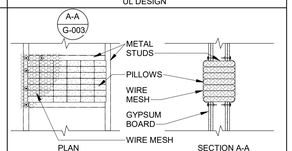
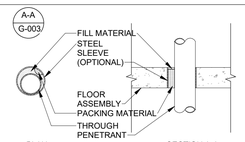
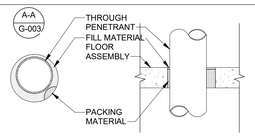
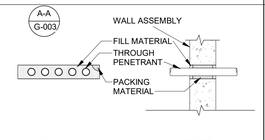
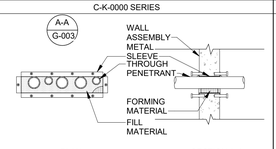
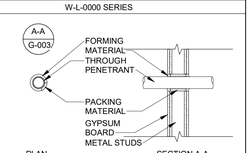
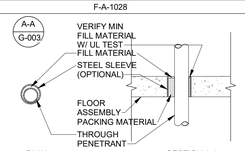
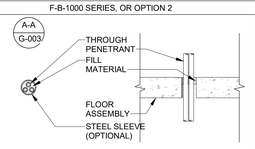
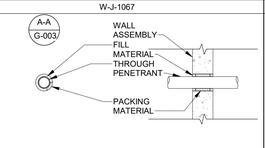
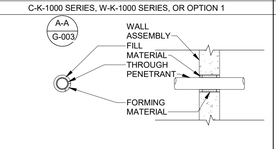
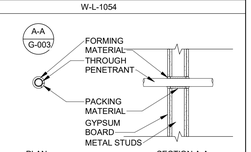
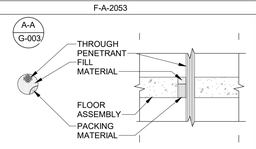
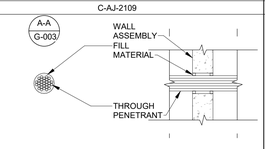
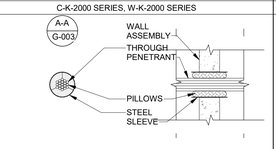
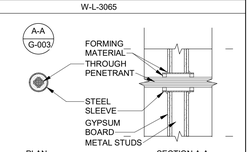
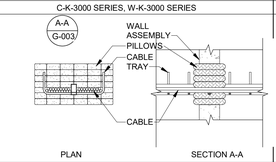
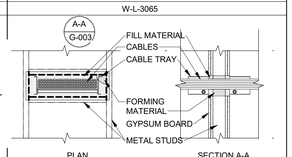
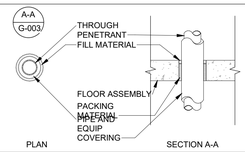
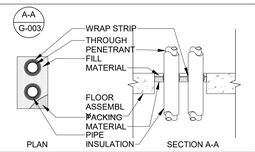
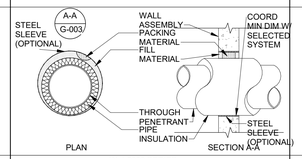
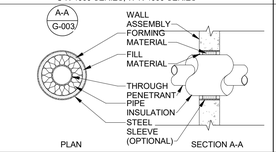
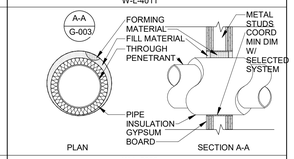
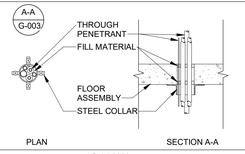
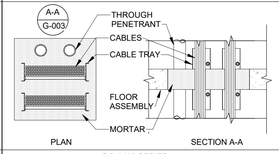
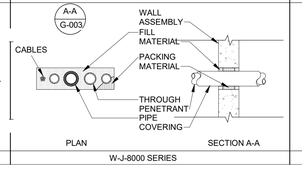
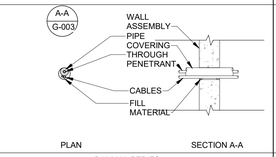
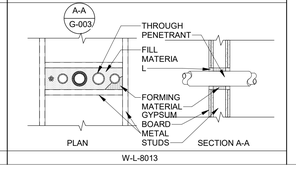
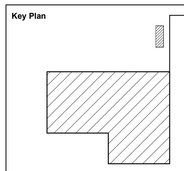
ASSEMBLY BEING PENETRATED	A - FLOOR, CONCRETE, 5 INCHES OR LESS	B - FLOOR, CONCRETE, MORE THAN 5 INCHES	J - WALL, MASONRY OR CONCRETE, 8 INCHES OR LESS	K - WALL, MASONRY OR CONCRETE, MORE THAN 8 INCHES	L - WALL, GYPSUM BOARD ON METAL STUDS
L RATING	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
T RATING	NOT LESS THAN 1-HOUR BUT NOT LESS THAN THE REQUIRED RATING OF THE FLOOR PENETRATED	NOT LESS THAN 1-HOUR BUT NOT LESS THAN THE REQUIRED RATING OF THE FLOOR PENETRATED	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
F RATING	NOT LESS THAN 1-HOUR BUT NOT LESS THAN THE REQUIRED RATING OF THE FLOOR PENETRATED	NOT LESS THAN 1-HOUR BUT NOT LESS THAN THE REQUIRED RATING OF THE FLOOR PENETRATED	NOT LESS THAN 1-HOUR BUT NOT LESS THAN THE REQUIRED RATING OF THE WALL PENETRATED	NOT LESS THAN 1-HOUR BUT NOT LESS THAN THE REQUIRED RATING OF THE WALL PENETRATED	NOT LESS THAN 1-HOUR BUT NOT LESS THAN THE REQUIRED RATING OF THE WALL PENETRATED
MOVEMENT	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
PENETRANTS	UL DESIGN	UL DESIGN	UL DESIGN	UL DESIGN	UL DESIGN
					
NO PENETRANTS				C-K-0000 SERIES	W-L-0000 SERIES
					
METAL PIPE, CONDUIT AND TUBING	F-A-1028	F-B-1000 SERIES, OR OPTION 2	W-J-1067	C-K-1000 SERIES, W-K-1000 SERIES, OR OPTION 1	W-L-1054
					
NON-METALLIC PIPE, CONDUIT AND TUBING	F-A-2053	F-B-2000 SERIES	C-AJ-2109	C-K-2000 SERIES, W-K-2000 SERIES	W-L-3065
					
ELECTRICAL CABLES	F-A-3007		W-J-3036	C-K-3000 SERIES, W-K-3000 SERIES	W-L-3065
					
ELECTRICAL CABLES IN CABLE TRAYS				C-K-4000 SERIES, W-K-4000 SERIES	W-L-4011
					
INSULATED PIPES	F-A-5015	F-B-5000 SERIES	W-J-5000 SERIES	C-K-5000 SERIES	W-L-5028
MISCELLANEOUS ELECTRICAL PENETRANTS					
APPLIES WHEN DUCTS AND AIR TRANSFER OPENINGS ARE NOT PROTECTED WITH FIRE DAMPERS					
MISCELLANEOUS ELECTRICAL PENETRANTS					
					
MIXED PENETRANTS CONTAINING ANY OF THE ABOVE	C-AJ-8099	F-B-8000 SERIES	W-J-8000 SERIES	C-K-8000 SERIES	W-L-8013

NOTES:

1. FIRESTOP SYSTEMS SHALL BE INSTALLED AND TESTED IN ACCORDANCE WITH ASTM E814 WITH MINIMUM POSITIVE PRESSURE DIFFERENTIAL OF 0.01 INCH OF WATER.
2. MAINTAIN INTEGRITY OF FIRE-RESISTANT-RATED ASSEMBLIES AT PENETRATIONS.
3. APPLIES TO FIRE-RESISTANT-RATED-
   a. WALLS
   b. HORIZONTAL ASSEMBLIES
4. SLEEVES
   a. WHERE INSTALLED, SECURELY FASTEN TO ASSEMBLY PENETRATED.
   b. PROTECT SPACE BETWEEN PENETRANT AND SLEEVE AND BETWEEN SLEEVE AND ASSEMBLY BEING PENETRATED.
5. FIRE-RESISTANT-RATED WALLS:
   a. PROTECT THROUGH PENETRATIONS INTO OR THROUGH FIRE WALLS, FIRE BARRIERS, SMOKE BARRIERS AND FIRE PARTITIONS.
   b. OPTION 1 -
      1) PENETRANT: METALLIC AND NOT MORE THAN 6 INCH NOMINAL DIAMETER.
      2) OPENING: NOT MORE THAN 144 SQUARE INCHES.
      3) FILL MATERIAL: CONCRETE, GROUT, OR MORTAR INSTALLED FULL THICKNESS OF WALL OR THICKNESS TO MAINTAIN FIRE RESISTANCE RATING.
6. FIRE-RESISTANCE-RATED HORIZONTAL ASSEMBLIES:
   a. PROTECT THROUGH PENETRATIONS OF FLOORS, FLOOR/CEILING ASSEMBLIES, AND CEILING MEMBRANE OF ROOF/CEILING ASSEMBLIES.
   b. OPTION 2 -
      1) PENETRANT: METALLIC AND NOT MORE THAN 6 INCH NOMINAL DIAMETER.
      2) OPENING: NOT MORE THAN 144 SQUARE INCHES.
      3) FILL MATERIAL: CONCRETE, GROUT, OR MORTAR INSTALLED FULL THICKNESS OF FLOOR OR THICKNESS TO MAINTAIN FIRE RESISTANCE RATING.

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

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Project Leader	Checked
C. MENARD	G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project

STEM INNOVATION LEARNING CENTER

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

THROUGH PENETRATION FIRESTOP SYSTEMS

Scale 1 : 18

Project No. JCDT17-0231

Drawing No.

A00-02

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PROJECT CODES & STANDARDS

AUTHORITY HAVING JURISDICTION: LARA BFS & CITY OF DETROIT (ELEVATORS)

MICHIGAN BUILDING CODES

(MRC) MICHIGAN REHABILITATION CODE FOR EXISTING BUILDINGS 2015
(MBC) MICHIGAN BUILDING CODE (AS REFERENCED IN MBC 2015) 2015
(MEC) MICHIAN ENERGY CODE 2015
(MMC) MICHIGAN MECHANICAL CODE 2015
(MPC) MICHIGAN PLUMBING CODE 2015

DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS (LARA) - STATE FIRE SAFETY BOARD
NEW AND EXISTING SCHOOL, COLLEGE AND UNIVERSITY FIRE SAFETY.

NATIONAL FIRE PROTECTION ASSOCIATION

NFPA 10 STANDARD FOR PORTABLE FIRE EXTINGUISHERS 2018
NFPA 13 INSTALLATION OF SPRINKLER SYSTEMS 2016
NFPA 14 STANDARD FOR THE INSTALLATION OF STANDPIPE AND HOSE SYSTEMS 2016
NFPA 45 STANDARD ON FIRE PROTECTION FOR LABORATORIES USING CHEMICALS 2015
NFPA 70 NATIONAL ELECTRICAL CODE 2014
NFPA 72 NATIONAL FIRE ALARM AND SIGNALING CODE 2016
NFPA 101 LIFE SAFETY CODE 2012

DETROIT BUILDING CODES

CITY OF DETROIT ELEVATOR CODE 2003

ACCESSIBILITY CODES

ADA ADA STANDARDS FOR ACCESSIBLE DESIGN BY THE U.S. DEPARTMENT OF JUSTICE 2010
ICC/ANSI 117.1 ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES 2009

BUILDING CLASSIFICATION

OCCUPANCY CLASSIFICATION & CONSTRUCTION TYPES FROM MBC CHAPTERS 3, 4, 5, 6
2015 MICHIGAN REHABILITATION CODE FOR EXISTING BUILDINGS

EXISTING BUILDING WAS PREVIOUSLY USED AS A LIBRARY. FIRST FLOOR AND BASEMENT (SPRINKLERED) AND 7 STORY TOWER (NOT SPINKLERED).

PROPOSED BUILDING USE – STEM FACILITY FOR WAYNE STATE UNIVERSITY – USE GROUP B (EDUCATIONAL OCCUPANCIES FOR STUDENTS ABOVE 12TH GRADE; LABORATORIES).

2015 MICHIGAN REHABILITATION CODE / NFPA 101 LIFE SAFETY CODE 2012

CHAPTER 08 - ALTERATIONS

805.2 - MEANS OF EGRESS SHALL COMPLY WITH THIS SECTION
EXCEPTION 2: MEANS OF EGRESS CONFIRMING TO REQUIREMENTS OF CODE WHEN BUILDING WAS CONSTRUCTED AND IN THE OPINION OF CODE OFFICIAL THEY DO NOT CONSTITUTE A DISTINCT HAZARD TO LIFE.

CHANGE OF OCCUPANCY (MBC TABLE 407)

EXISTING INTERIOR WALLS ON ALL FLOORS WILL BE DEMOLISHED DOWN TO BUILDING SHELL.

NFPA 101, 2012 LIFE SAFETY CODE - BUILDING REHABILITATION
4.6.7.1 (5) CHANGE OF USE OR OCCUPANCY CLASSIFICIATION

43.2.2.1.6 CHANGE OF OCCUPANCY CLASSIFICATION
THE CHANGE IN THE OCCUPANCY CLASSIFICATION OF A STRUCTURE OR PORTION OF A STRUCTURE

T 43.7.3 HAZARD CATEGORY CLASSIFICATIONS
BUSINESS AND ASSEMBLY OCCUPANCY CLASSIFICATIONS (HAZARD CATEGORY 3)

MRC SECTION 1001

1001.2 "CHANGE OF OCCUPANCY SHALL NOT BE MADE WHERE THERE IS A DIFFERENT FIRE PROTECTION SYSTEM THRESHOLD REQUIREMENT IN CHAPTER 9 OF MBC, WITHOUT THE APPROVAL OF THE CODE OFFICIAL."

EXISTING BUILDING – BASEMENT & 1ST FLOOR SPRINKLERED WITH NFPA 13 SYSTEM. PROPOSED BUILDING USE WILL EXTEND NFPA 13 SPRINKLER SYSTEM TO UPPER SEVEN FLOORS OF THE TOWER AND RECONFIGURE EXISTING SPRINKLER SYSTEM ON 1ST FLOOR & BASEMENT.

1001.3 – "CERTIFICATE OF OCCUPANCY SHALL BE ISSUED WHERE CHANGE OF OCCUPANCY RESULTS IN DIFFERENT OCCUPANCY CLASSIFICATION AS DETERMINED BY MBC."

MRC SECTION 1002

1002.1
"WHERE CHARACTER OR USE OF EXISTING BUILDING OR PART OF AN EXISTING BUILDING IS CHANGED TO ONE OF THE FOLLOWING SPECIAL USE OF OCCUPANCY AS DEFINED IN MBC, THE BUILDING SHALL COMPLY WITH ALL OF THE APPLICABLE REQUIREMENTS OF MBC:
- INCIDENTAL USE AREAS
- HAZARDOUS MATERIALS
(OTHER USES N/A TO THIS PROJECT)

MRC SECTION 1006

1006.1
ACCESSIBILITY SHALL COMPLY WITH THE PROVISIONS OF SECTION 410.4 WHICH REFERS TO 410.4.2 (COMPLETE CHANGE OF OCCUPANCY) AND S.4106, 410.7 AND 410.8.
410.4.2, 1012.8.2
- AT LEAST ONE ACCESSIBLE BUILDING ENTRANCE
- AT LEAST ONE ACCESSIBLE ROUTE FROM ACCESSIBLE BUILDING ENTRANCE TO PRIMARY FUNCTION AREAS.(NFPA 101 2012 - 3.3.3 & 7.5.4)
- SIGNAGE COMPLYING WITH S.1111 OF MRC
- ACCESSIBLE PARKING
- AT LEAST ONE ACCESSIBLE LOADING ZONE (PASSENGER)
- AT LEAST ONE ACCESSIBLE ROUTE FROM ACCESSIBLE PARKING AND ACCESSIBLE PASSENGER LOADING ZONE TO AN ACCESSIBLE ENTRANCE

MRC SECTION 1007 – STRUCTURAL

MRC SECTION 1008 – ELECTRICAL

MRC SECTION 1009 – PLUMBING

MRC SECTION 1011 – LIGHT AND VENTILATION

REFER TO SCHEMATIC DRAWINGS OR SCHEMATIC NARRATIVES FOR EACH DISCIPLINE

MRC SECTION 1012

1012.2.1 – FIRE SPRINKLER SYSTEM [NFPA 9.7.1.1(1) & 43.7.2.1(2)]
PROVIDE THROUGHOUT THE BUILDING SPRINKLER SYSTEM IN ACCORDANCE WITH CH. 9 OF MBC

1012.2.2 – FIRE ALARM DETECTION SYSTEM (NFPA 38.3.4)
TO BE PROVIDED THROUGHOUT THE BUILDING IN ACCORDANCE WITH CHAPTER 9 OF MBC

1012.3 – INTERIOR FINISHES (NFPA 12.3.3.2, 12.3.3.3, 38.3.3.2, 33.3.3.2.1, 33.3.3.3)
IN ACCORDANCE WITH MRC REQUIREMENTS

1012.4 – MEANS OF EGRESS (T.1012.4)
HAZARD CATEGORY – 4, FOR OCCUPANCY 'B'; LOWER CATEGORY

1012.4.1 – MEANS OF EGRESS CHANGE TO HIGHER HAZARD CATEGORY.
ORIGINAL USE – LIBRARY – "A-3' OCCUPANCY HAZARD CATEGORY – 3 (HIGHER HAZARD THAN PROPOSED USE – 'B' OCCUPANCY).

1012.4.2 – MEANS OF EGRESS CHANGE TO EQUAL OR LOWER CATEGORY.
REFERRED TO S.905 AND S.805 (LEVEL 3 AND LEVEL 2 ALTERATIONS)

1012.4.3 - EGRESS CAPACITY TO MEET OR EXCEED OCCUPANT LOADS PER MBC FOR NEW OCCUPANCY.

1012.4.4 (NFPA 7.2.2.4) - HANDRAILS TO COMPLY WITH S.805.11 PROVIDED ON LEAST ONE SIDE AND IF EXISTING HANDRAILS ARE IN DANGER OF COLLAPSING IF NEW HANDRAILS REQUIRED THEY SHOULD COMPLY WITH MBC.

1012.4.5 (NFPA 7.2.2.4) - GUARDRAILS TO COMPLY WITH S.805.11 EVERY OPEN PORTION OF STAIRWAY AND LANDING MORE THAN 30" ABOVE GRADE BELOW NOT CURRENTLY PROVIDED WITH GUARDS OR EXISTING GUARDS IN DANGER OF COLLAPSING IF REQUIRED THEY SHOULD COMPLY WITH MBC.

1012.5 (NFPA TABLE 43.7.3) HAZARD CATEGORIES
– T.1012.5 PREVIOUS USE – LIBRARY – A-3 OCCUPANCY IS CLASSIFIED AS RELATIVE HAZARD 2. PROPOSED OCCUPANCY 'B' IS CLASSIFIED AS RELATIVE HAZARD 4 (LOWEST)

1012.5.2 – CHANGE TO EQUAL OR LESSER HAZARD CATEGORY IS DEEMED ACCEPTABLE

1012.6 – EXTERIOR WALL FIRE RESISTANCE RATING T.1012.6 OCCUPANCY 'A' (PREVIOUS) AND 'B' (PROPOSED) ARE IN CATEGORY 3 HAZARD

1012.6.2 – EXTERIOR WALL RATING CHANGE TO AN EQUAL OR LESSER HAZARD CATEGORY – EXISTING EXTERIOR WALLS SHALL BE ACCEPTED (WALL TOWARDS CHEMISTRY BUILDING)

1012.6.3 – OPENING PROTECTIVES – EXC. 4 – NOT REQUIRED WHEN CHANGED OF OCCUPANCY IS TO THE SAME OF LOWER HAZARD

1012.7.1 – ENCLOSURE OF VERTICAL SHAFTS. NEW SHAFTS PER MRC REQUIREMENTS, 403.2.1.2

1012.7.4 – ALL OPENINGS INTO EXISTING VERTICAL SHAFT ENCLOSURES TO BE PROTECTED WITH 1-HOUR FIRE ASSEMBLIES

CHAPTER 15 - CONSTRUCTION SAFEGUARDS
SAFETY DURING CONSTRUCTION UNDER JURISDICTION OF THIS CODE
MIXED USE AND OCCUPANCY (MBC SECTION 508)
ACCESSORY OCCUPANCIES (MBC 508.2)
(ACCESSORY OCCUPANCIES <10% OF STORY SQ FOOTAGE)

INCIDENTAL OCCUPANCIES (MRC TABLE 509.4.2)

STEM FACILITY – OCC. GROUP 'B' AND 'A-3' (LECT-RMS, LABS) – "NON-SEPARATED USES"

2015 MICHIGAN BUILDING CODE / NFPA 101 LIFE SAFETY CODE 2012

CHAPTER 4 - SPECIAL REQUIREMENTS

HIGH RISE BUILDING (MBC SECTION 403)

SECTION 403 – HIGH RISE BUILDINGS 403.1, EXC. 6

EXISTING BUILDING MORE THAN 75 FT. HIGH-LOWEST GRADE ELEVATION TO HIGHEST FLOOR ELVATION – 84'-4" +/-

403.2.1 – REDUCTION IN FIRE RESISTANCE RATING

403.2.1.1-1 – REDUCTION FROM CONSTRUCTION TYPE 1-A TO 1-B ALLOWED (EXCEPT COLUMN AND FIRE RATING). CONDITION-SPRINKLER CONTROL VALVES WITH SUPERVISORY INITIATING DEVICES AND WATER-FLOW INITIATING DEVICES. PENTHOUSE SEPARATED WITH (2) 90 MINUTE DOORS & 2-HR FLOOR CONSTRUCTION - NO ADDITIONAL FIREPROOFING PROVIDED **(SPRINKLER BEING PROVIDED, CONSTRUCTION TYPE REDUCED FROM I-A TO I-B)**

403.2.1.1-2 -IN OTHER THAN F-1, M & S-1 OCCUPANCIES, THE FIRE RESISTANCE RATING OF THE BUILDING ELEMENTS IN TYPE IB CONSTRUCTION SHALL BE PERMITTED TO BE REDUCED TO THE FIRE RESISTANCE RATINS IN TYPE IIA **(NOT PURSUED)**

403.2.1.2 – SHAFT ENCLOSURES (EXCEPT RATED STAIR WAYS AND ELEVATORS) CAN BE REDUCED TO 1-HR. IF SPRINKLERS INSTALLED WITHIN SWAFT @ TOP AND ALTERNATE FLOORS.

403.2.3 – RISK CATEGORY 3 (PER T.1604.5) ENCLOSURES FOR STAIRWAYS AND ELEVATORS – STRUCTURAL INTEGRITY.
PER 403.2.3.3 MASONRY WALLS SATISFY STRUCTURAL INTEGRITY REQUIREMENTS.
EXISTING BUILDING STAIRWAYS AND ELEVATOR ENCLOSURES ARE MASONRY.

403.2.4 – SPRAYED FIRE RESISTANT MATERIAL 430 PSF MIN. BOND STRENGTH (IN NEW APPLICATIONS).

403.4 – EMERGENCY SYSTEMS TO BE PROVIDED.

403.4.6 (NFPA 11.8.6) - FIRE COMMAND CENTER TO BE PROVIDED. LOCATION TO BE APPROVED BY FIRE DEPARTMENT. 1 HR RATED FIRE ENCLOSURE. **(FIRST FLOOR LOCATION)**

403.4.7 – SMOKE REMOVAL OPTIONS (POST FIRE)
1. TEMPERED GLAZING BREAKOUTS @ 50'-0" INTERVALS AROUND PERIMETER **(PROVIDED)**
2. MECHANICAL AIR HANDLING EQUIPMENT

403.4.8 – STANDBY AND EMERGENCY POWER (NFPA 11.8.5)

403.5.3 – STAIRWAY DOOR OPERATION

403.5.3.1 – STAIRWAY COMMUNICATION SYSTEM

403.5.4 – SMOKEPROOF EXIT ENCLOSURES IN ACCORDANCE WITH S.909.20 AND 1023.11 (ONLY FOR STAIRS SERVING FLOORS MORE THAN 55 FT. (EXIST. BLDG.)

NFPA 101 LIFE SAFETY CODE SMOKE PROOF ENCLOSURE NOT REQUIRED FOR STAIRWELLS

NFPA 101 LIFE SAFETY CODE: EXISTING HI-RISE; NO REQUIREMENT TO PRESSURIZE STAIR

ELEVATOR HOISTWAYS TO BE PRESSURIZED PER CITY OF DETROIT ELEVATOR ELEVATOR CODE

BUILDING AREA CALCULATIONS:

UNLIMITED ARA ALLOWED (MBC TABLE 506.)

NO ALLOWABLE HEIGHT OR AREA MODIFICATIONS USED

FIRE RESISTANCE REQUIREMENTS

TYPE OF CONSTRUCTION: TYPE IB (SPRINKLERED)

PRIMARY STRUCTURAL FRAME:	2 HRS
	2 HRS
BEARING WALLS (EXT)	2 HRS
BEARING WALLS (INTR)	0 HOURS
NON-BRG WALLS AND PARTITIONS (EXT)	0 HOURS
NON-BRG WALLS AND PARTITIONS (INTR)	2 HOURS
FLOOR CONSTR AND SECONDARY	1 HOURS
MEMBERS:	
ROOF CONSTR AND SECONDARY:	

MAXIMUM AREA OF EXTERIOR WALL OPENINGS BASED ON FIRE SEPARATION DISTANCE [PER MBC TABLE 705.8]

ADDITIONAL FIRE RESISTIVE RATINGS

TYPE	FIRE RATING (HR)
SHAFT ENCLOSURES [MBC 713.4] [NFPA 8.6.5]	
4+ STORIES	2
<4 STORIES	1
EXIT ENCLOSURES [MBC 1023.2] [NFPA 7.1.3.2.1]	
4+ STORIES	2
<4 STORIES	1
EXIT PASSAGEWAYS [MBC 1024.3]	1
HOISTWAY ENCLOSURES [MBC 713.4]	2
ELEVATOR MACHINE ROOMS [MBC 3005.4]	1
CORRIDORS [MBC 1020.1]	
TYPE B OCCUPANCY (SPRINKLERED)	0

FIRE DOOR AND FIRE SHUTTER FIRE PROTECTION RATINGS
(REFER TO MBC TABLE 716.5] & [NFPA T.8.3.4.2]

TYPE OF ASSEMBLY	REQ'D ASSEMBLY RATING	MIN. FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING
FIRE WALLS AND FIRE BARRIERS HAVING A REQUIRED FIRE RESISTANCE RATING	4 3 2 1 1/2	3 3 1 1/2 1 1/2
FIRE BARRIERS HAVING A REQUIRED FIRE RESISTANCE RATING OF 1 HR		
SHAFT, EXIT ENCLOSURE AND EXIT PASSAGEWAY WALLS:	1	1
OTHER FIRE BARRIERS:	1	3/4
FIRE PARTITIONS		
CORRIDOR WALLS:	1 0.5	1/3 1/3
OTHER FIRE PARTITIONS:	1 0.5	3/4 1/3
EXTERIOR WALLS	3 2 1	1 1/2 1 1/2 3/4
SMOKE BARRIERS	1	1/3

MEANS OF EGRESS

*REFER TO THE LIFE SAFETY PLANS FOR ACTUAL MEASURED DISTANCES.

DOORS:
[PER MBC 1010.1.1]
THE MINIMUM CLEAR WIDTH AND HEIGHT OF A DOOR SHALL NOT BE LESS THAN 32 INCHES AND 80 INCHES, RESPECTIVELY.

[PER MBC 1010.1.2.1]
DOORS SHALL SWING IN THE DIRECTION OF EGRESS TRAVEL, WHERE SERVING AN OCCUPANT LOAD OF 50 OR MORE PERSONS.

CORRIDORS:
[PER MBC 1020.2 EX. 6]
CORRIDOR WIDTH SHALL HAVE A MINIMUM WIDTH OF 44 INCHES
PER MBC 1008.1.2

COMMON PATH OF EGRESS TRAVEL (MBC 1006.2.1) (NFPA 38.2.5.3.1)

OCCUPANCY	SPRINKLERED	TRAVEL DISTANCE
BUSINESS	YES	100'-0"
ASSEMBLY	YES	75'-0"

EXIT ACCESS TRAVEL DISTANCE (MBC TABLE 1017.2) (NFPA 38.2.6.3)

OCCUPANCY	SPRINKLERED	TRAVEL DISTANCE
BUSINESS	YES	300'-0"
ASSEMBLY	YES	250'-0"

DEAD ENDS (MBC 1020.4 EX 2) (NFPA 38.2.5.2.1)

OCCUPANCY	SPRINKLERED	TRAVEL DISTANCE
BUSINESS	YES	50'-0"

MIN. NUMBER OF EXITS FOR OCCUPANT LOAD (MBC 1006.3.1) (NFPA 7.4.1.2)

OCCUPANCY	SPRINKLERED	MIN # OF EXITS PER STORY
1-500	YES	2
501-1000	YES	3
1000+	YES	4

EXIT CAPACITY FACTORS

[PER MBC 1005.3.1, 1005.3.2] [PER NFPA TABLE 7.3.3]
MINIMUM EGRESS WIDTH (SPRINKLERED)
STAIRWAYS: CLEAR WIDTH IN INCHES/0.3
OTHER EGRESS COMPONENETS: CLEAR WIDTH IN INCHES/0.2

REFER TO LIFE SAFETY PLANS FOR COMPLIANCE WITH MEANS OF EGRESS COMPONENTS

LIFE SAFETY SYSTEMS

[PER MBC & IFC CHAPTER 9, NFPA 2012 11.8 - HIGH RISE BLDGS]

AUTOMATIC SPRINKLERS PROVIDED PER NFPA 13 & MBC 403.3*

STANDPIPE SYSTEM PROVIDED PER NFPA 14 & MBC 403.4.3 AN 905.3: CLASS 1**

PORTABLE FIRE EXTINGUISHERS PROVIDED PER NFPA 10 & MBC SECTION 906

EMERGENCY VOICE/ALARM SYSTEM PROVIDED PER NFPA 72 & MBC 403.4.4

AUTOMATIC SMOKE DETECTECTION PER MBC 403.4.1 & 907.2.13.1

FIRE DEPARTMENT COMMUNICATION SYSTEM PER MBC 403.4.5

*BLDG IS PROPOSED TO BE SPRINKLERED THROUGHOUT WITH NFPA 13 SPRINKLER SYSTEM

**905.3.1.EX 1 (NFPA 11.8.3.2)
CLASS 1 STANDPIPES ARE ALLOWED IN BUILDINGS EQUIPPED THROUGHOUT WITH AN AUTOMATIC SPRINKLER SYSTEM IN ACCORDANCE WITH 903.3.1.1 OR 903.3.1.2

INTERIOR FINISHES BY OCCUPANCY

[PER MBC TABLE 803.11]
FOR OCCUPANCY A-3,

INTERIOR EXIT STAIRWAYS AND RAMPS AND EXIT PASSAGEWAYS	B (NFPA 12.3.3.2)
CORRIDORS AND ENCLOSURE FOR EXIT ACCESS STAIRWAYS AND RAMPS	B (NFPA 12.3.3.2)
ROOMS AND ENCLOSED SPACES	C (NFPA 12.3.3.3)

FOR OCCUPANCY B

INTERIOR EXIT STAIRWAYS AND RAMPS AND EXIT PASSAGEWAYS	B (NFPA 38.3.3.2)
CORRIDORS AND ENCLOSURE FOR EXIT ACCESS STAIRWAYS AND RAMPS	C (NFPA 38.3.3.2)
ROOMS AND ENCLOSED SPACES	C (NFPA 38.3.3.2)

BUILDING OCCUPANCY LOADS (T.1004.1.2 MBC; T.7.3.1.2 NFPA 2012)

FLOOR	AREA	OCCUPANT LOAD FACTOR	OCCUPANT LOAD
SUB-BASEMENT:			
MECHANICAL (B)	24,639 SF	300 GROSS	83
BASEMENT			
BUSINESS (A-3)	4,398 SF	100 GROSS	44
EDUCATIONAL SHOP (A-3)	1,870 SF	50 NET	38
CLASSROOM (A-3)	8,340 SF	20 NET	419
ACCESORY STORAGE (B)	3,002	300 GROSS	12
UNCONCENTRATED ASSEMBLY (A-3)	374SF	15 NET	25
TOTAL			538
1ST FLOOR	6,411 SF	100 GROSS	66
BUSINESS (B)	4,287 SF	50 NET	86
SHOP/VOCATIONAL (A-3)	2,038 SF	20 NET	103
CLASSROOM (A-3)	346 SF	300 GROSS	2
ACCESSORY STORAGE (B)	5,919 SF	15 NET	371
UNCONCENTRATED ASSEMBLY (A-3)			628
TOTAL			
2ND FLOOR	2,444 SF	100 GROSS	25
BUSINESS (B)	4,115 SF	50 NET	83
LABORATORY (A-3)	1,027 SF	20 NET	52
CLASSROOM (A-3)	488 SF	300 GROSS	3
ACCESSORY STORAGE (B)	423 SF	15 NET	29
UNCONCENTRATED ASSEMBLY (A-3)			192
TOTAL			
3RD FLOOR	2,334 SF	100 GROSS	24
BUSINESS (B)	4,114 SF	50 NET	83
LABORATORY (A-3)	1,026 SF	20 NET	52
CLASSROOM (A-3)	846 SF	300 GROSS	5
ACCESSORY STORAGE (B)	418 SF	15 NET	28
UNCONCENTRATED ASSEMBLY (A-3)			192
TOTAL			
4TH FLOOR	2,489 SF	100 GROSS	25
BUSINESS (B)	4,112 SF	50 NET	83
LABORATORY (A-3)	1,026 SF	20 NET	52
CLASSROOM (A-3)	701SF	300 GROSS	2
ACCESSORY STORAGE (B)	419 SF	15 NET	28
UNCONCENTRATED ASSEMBLY (A-3)			190
TOTAL			
5TH FLOOR	2,268 SF	100 GROSS	24
BUSINESS (B)	2,578 SF	50 NET	52
LABORATORY (A-3)	2,455 SF	20 NET	124
CLASSROOM (A-3)	888 SF	300 GROSS	5
ACCESSORY STORAGE (B)	422 SF	15 NET	28
UNCONCENTRATED ASSEMBLY (A-3)			233
TOTAL			
6TH FLOOR	2,517 SF	100 GROSS	25
BUSINESS (B)	2,806 SF	50 NET	47
LABORATORY (A-3)	2,840 SF	20 NET	143
CLASSROOM (A-3)	880 SF	300 GROSS	5
ACCESSORY STORAGE (B)	414 SF	15 NET	28
UNCONCENTRATED ASSEMBLY (A-3)			290
TOTAL			
7TH FLOOR	2,367 SF	100 GROSS	23
BUSINESS (B)	2,968 SF	50 NET	60
LABORATORY (A-3)	2,258 SF	20 NET	106
CLASSROOM (A-3)	892 SF	300 GROSS	6
ACCESSORY STORAGE (B)	422 SF	15 NET	28
UNCONCENTRATED ASSEMBLY (A-3)			223
TOTAL			
	3,300	300 GROSS	11
PENTHOUSE MECHANICAL (B)			2,580

MINIMUM PLUMBING FACILITIES (MBC CHAPTER 29)

OCCUPANCY: BUSINESS - B	WATER CLOSET		LAVATORIES		BATHTUBS OR SHOWERS	DRINKING FOUNTAINS	OTHER
	MALE	FEMALE	MALE	FEMALE			
RATIO:	1:25 FIRST 50 1:50 REMAIN		1:40 FIRST 80 1:80 REMAIN			1:100	
REQUIRED:	4.90	4.90	3.44	3.44	---	3.90	NOTE 1

OCCUPANTS: 390 (195 MALE 195 FEMALE)

OCCUPANCY: ASSEMBLY - A-3 (AUDITORIUMS, ETC.)	WATER CLOSET		LAVATORIES		BATHTUBS OR SHOWERS	DRINKING FOUNTAINS	OTHER
	MALE	FEMALE	MALE	FEMALE			
RATIO:	1:125	1:65	1:200	1:200		1:500	
REQUIRED:	8.76	16.85	5.48	5.48	---	4.38	NOTE 1

OCCUPANTS: 2190 (1095 MALE 1095 FEMALE)

OVERALL BUILDING SUMMARY	WATER CLOSET		LAVATORIES		BATHTUBS OR SHOWERS	DRINKING FOUNTAINS	OTHER
	MALE	FEMALE	MALE	FEMALE			
SUBTOTAL REQUIRED:	13.66	21.75	8.92	8.92	0	8.28	1 SERVICE SINK
TOTAL REQUIRED:	14	22	9	9	0	9	1 SERVICE SINK
WC PROVIDED:	12	22	--	--	--	--	--
LAV PROVIDED:	--	--	19	19	--	--	--
URINALS PROVIDED: *(NOTE 2)*	9	--	--	--	--	--	--
DF PROVIDED: *(NOTE 6)*	--	--	--	--	--	16	--
TOTAL PROVIDED:	21	22	19	19	0	16	1 SERVICE SINK

SINGLE-OCCUPANT RESTROOMS INCLUDED IN THE ABOVE TOTALS *(NOTE 3)*: 3
FAMILY RESTROOMS PROVIDED IN ADDITION TO ABOVE TOTALS *(NOTE 4)*: 0
FAMILY BATHING ROOMS PROVIDED IN ADDITION TO ABOVE TOTALS *(NOTE 5)*: 0

NOTE 1:
THE CODE REQUIRES ONLY (1) SERVICE SINK PER BUILDING IF ALL OCCUPANCIES HAVE ACCESS TO THE SERVICE SINK AT ALL TIMES.

NOTE 2:
URINALS SHALL NOT BE SUBSTITUTED FOR MORE THAN 50% OF THE REQ'D WC.

NOTE 3:
SINGLE-OCCUPANT RESTROOM = (1) WC AND (1) LAV PROVIDED FIXTURES DISTRIBUTED AMONGST EACH SEX

NOTE 4:
WATER COOLERS OR BOTTLED WATER DISPENSERS SHALL BE PERMITTED TO BE SUBSTITUTED FOR NOT MORE THAN 50 PERCENT OF THE REQUIRED DRINKING FOUNTAINS.

NOTE 5:

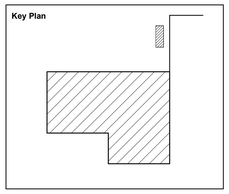
NOTE 6:

MBC TABLE 414.2.2
DESIGN AND NUMBER OF CONTROL AREAS

FLOOR LEVEL		PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA	NUMBER OF CONTROL AREAS PER FLOOR	FIRE-RESISTANCE RATING FOR FIRE BARRIERS IN HOURS
ABOVE GRADE PLANE	HIGHER THAN 9	5	1	2
	7-9	5	2	2
	6	12.5	2	2
	5	12.5	2	2
	4	12.5	2	2
	3	50	2	1
	2	75	3	1
	1	100	4	1
BELOW GRADE PLANE	1	75	3	1
	2	50	2	1
	LOWER THAN 2	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



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WAYNE STATE UNIVERSITY

Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
CODE COMPLIANCE INFORMATION

Scale 12" = 1'-0"

Project No. JCDT17-0231

Drawing No.
A01-01

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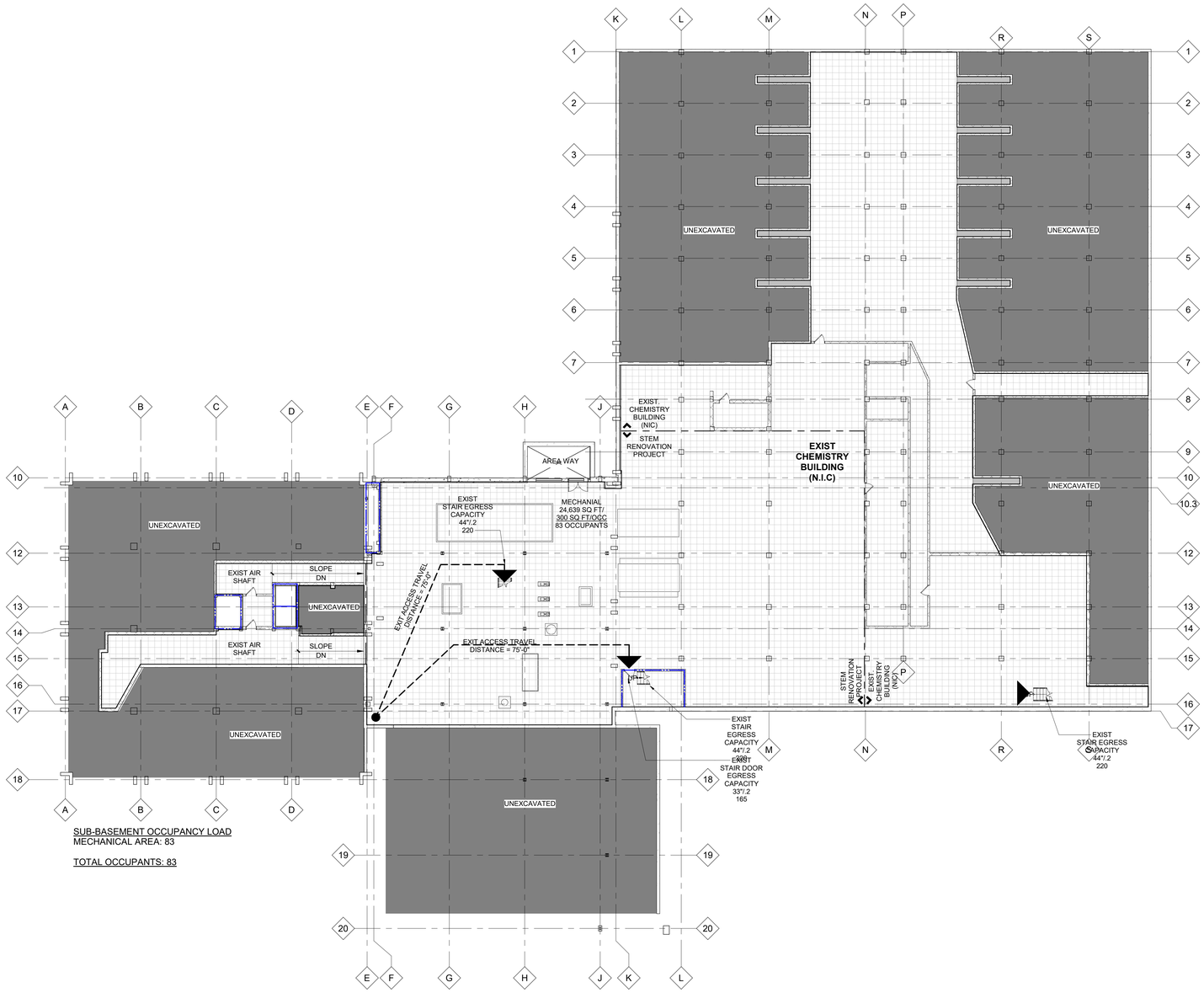


SUB-BASEMENT OCCUPANCY LOAD
MECHANICAL AREA: 83

TOTAL OCCUPANTS: 83

1 / A01-02 CODE COMPLIANCE PLAN - SUB-BASEMENT
SCALE: 1/16" = 1'-0"

CODE COMPLIANCE LEGEND

- EXIT/EXIT ACCESS
- TRAVEL DISTANCE (MAX 300'-0")
- 1 HOUR FIRE PARTITION
- 2 HOUR FIRE PARTITION

GENERAL NOTES:

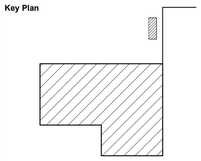
1. REFER TO DRAWING G0-01 FOR CODE SUMMARY.
2. STAIRS S-1 & S-2 PROVIDED WITH LUMINOUS EGRESS PATH MARKINGS PER SECTION 1024

OCCUPANCY TYPE

- EDUCATIONAL - CLASSROOM AREA 20 NET SQ FT/OCCUPANT
- EDUCATIONAL - LAB, SHOP & VOCATIONAL AREAS 50 NET SQ FT/OCCUPANT
- BUSINESS AREA 100 GROSS SQ FT/ OCCUPANT
- STORAGE & MECHANICAL AREA 300 GROSS SQ FT/ OCCUPANT
- UNCONCENTRATED ASSEMBLY 15 NET SQ FT/OCCUPANT
- NOT IN SCOPE OF WORK
- FEC — FIRE EXTINGUISHER CABINET
- FE — FIRE EXTINGUISHER BRACKET MOUNTED

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants
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Structural: FTC&H
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DETROIT, MI 48202

Drawing Title
CODE COMPLIANCE PLAN - SUB-BASEMENT

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A01-02

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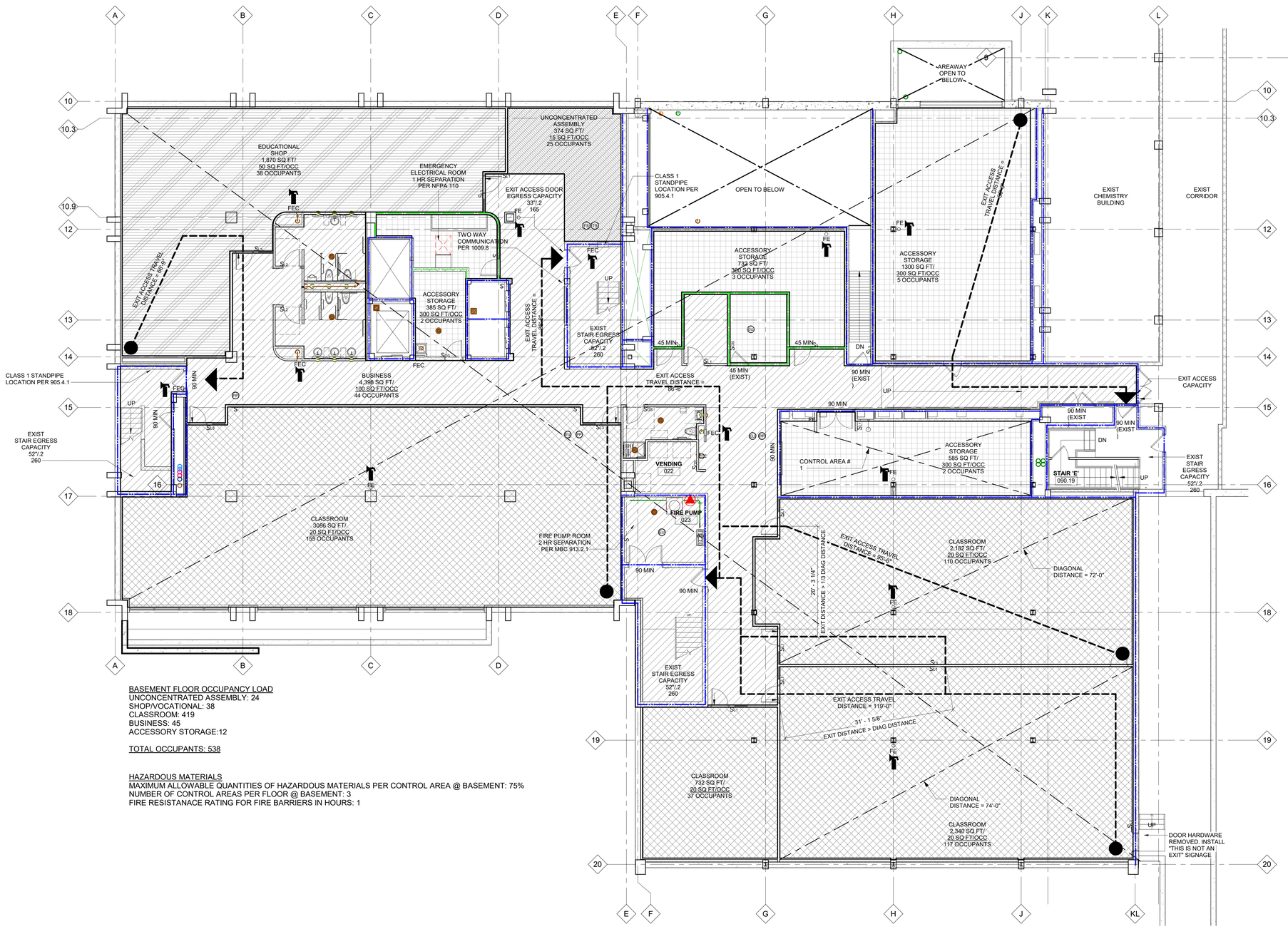


BASEMENT FLOOR OCCUPANCY LOAD
UNCONCENTRATED ASSEMBLY: 24
SHOP/VOCATIONAL: 38
CLASSROOM: 419
BUSINESS: 45
ACCESSORY STORAGE:12

TOTAL OCCUPANTS: 538

HAZARDOUS MATERIALS
MAXIMUM ALLOWABLE QUANTITIES OF HAZARDOUS MATERIALS PER CONTROL AREA @ BASEMENT: 75%
NUMBER OF CONTROL AREAS PER FLOOR @ BASEMENT: 3
FIRE RESISTANACE RATING FOR FIRE BARRIERS IN HOURS: 1

1 / A01-03 CODE COMPLIANCE PLAN - BASEMENT
SCALE: 1/8" = 1'-0"

CODE COMPLIANCE LEGEND

- EXIT/EXIT ACCESS
- TRAVEL DISTANCE (MAX 300'-0")
- 1 HOUR FIRE PARTITION
- 2 HOUR FIRE PARTITION

GENERAL NOTES:

1. REFER TO DRAWING G0-01 FOR CODE SUMMARY.
2. STAIRS S-1 & S-2 PROVIDED WITH LUMINOUS EGRESS PATH MARKINGS PER SECTION 1024

OCCUPANCY TYPE

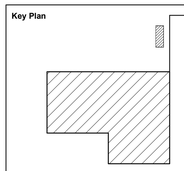
- EDUCATIONAL - CLASSROOM AREA — 20 NET SQ FT/OCCUPANT
- EDUCATIONAL - LAB, SHOP & VOCATIONAL AREAS — 50 NET SQ FT/OCCUPANT
- BUSINESS AREA — 100 GROSS SQ FT/ OCCUPANT
- STORAGE & MECHANICAL AREA — 300 GROSS SQ FT/ OCCUPANT
- UNCONCENTRATED ASSEMBLY — 15 NET SQ FT/OCCUPANT
- NOT IN SCOPE OF WORK
- FIRE EXTINGUISHER CABINET (FEC)
- FIRE EXTINGUISHER BRACKET MOUNTED (FE)

PLAN NOTES:

1. SCOPE OF WORK IN SUB-BASEMENT IS LIMITED TO DEMOLITION AND REMOVAL OF EXISTING MECHANICAL AND PLUMBING EQUIPMENT. THEIR HOUSEKEEPING PADS AND ASSOUIATED UTILITY AND DUCTING HOOKUPS; AND THEIR REPLACEMENT SYSTEMS INSTALLATION WITHIN THE SAME SPACE. NO NEW PARTITIONS OR OTHER OPENS OCCURRING IN THIS AREA.

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



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Drawing Title
CODE COMPLIANCE PLAN - BASEMENT

Scale	1/8" = 1'-0"
Project No.	JCDT17-0231
Drawing No.	A01-03

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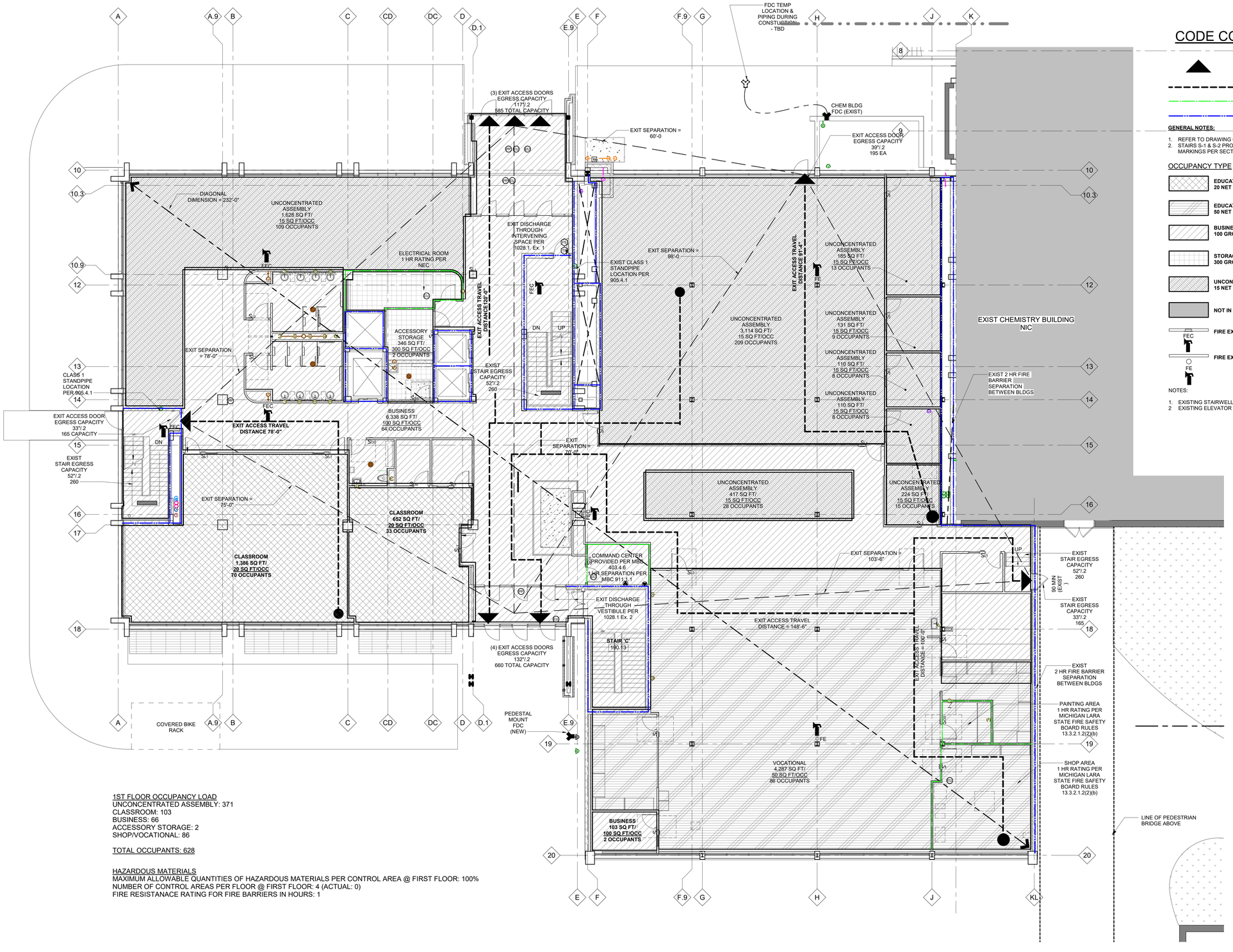


1ST FLOOR OCCUPANCY LOAD
UNCONCENTRATED ASSEMBLY: 371
CLASSROOM: 103
BUSINESS: 66
ACCESSORY STORAGE: 2
SHOP/VOCATIONAL: 86

TOTAL OCCUPANTS: 628

HAZARDOUS MATERIALS
MAXIMUM ALLOWABLE QUANTITIES OF HAZARDOUS MATERIALS PER CONTROL AREA @ FIRST FLOOR: 100%
NUMBER OF CONTROL AREAS PER FLOOR @ FIRST FLOOR: 4 (ACTUAL: 0)
FIRE RESISTANACE RATING FOR FIRE BARRIERS IN HOURS: 1

1 / A01-04 CODE COMPLIANCE PLAN - FIRST FLOOR
SCALE: 1/8" = 1'-0"

CODE COMPLIANCE LEGEND

- EXIT/EXIT ACCESS
- TRAVEL DISTANCE (MAX 300'-0")
- 1 HOUR FIRE PARTITION
- 2 HOUR FIRE PARTITION

GENERAL NOTES:

1. REFER TO DRAWING G0-01 FOR CODE SUMMARY.
2. STAIRS S-1 & S-2 PROVIDED WITH LUMINOUS EGRESS PATH MARKINGS PER SECTION 1024

OCCUPANCY TYPE

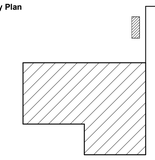
- EDUCATIONAL - CLASSROOM AREA 20 NET SQ FT/OCCUPANT
- EDUCATIONAL - LAB, SHOP & VOCATIONAL AREAS 50 NET SQ FT/OCCUPANT
- BUSINESS AREA 100 GROSS SQ FT/ OCCUPANT
- STORAGE & MECHANICAL AREA 300 GROSS SQ FT/ OCCUPANT
- UNCONCENTRATED ASSEMBLY 15 NET SQ FT/OCCUPANT
- NOT IN SCOPE OF WORK
- FIRE EXTINGUISHER CABINET (FEC)
- FIRE EXTINGUISHER BRACKET MOUNTED (FE)

NOTES:

1. EXISTING STAIRWELLS TO REMAIN IN PLACE.
2. EXISTING ELEVATOR AND SHAFTS TO REMAIN IN PLACE.

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



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DETROIT, MI 48202

Drawing Title
CODE COMPLIANCE PLAN - FIRST FLOOR

Scale	1/8" = 1'-0"
Project No.	JCDT17-0231
Drawing No.	A01-04

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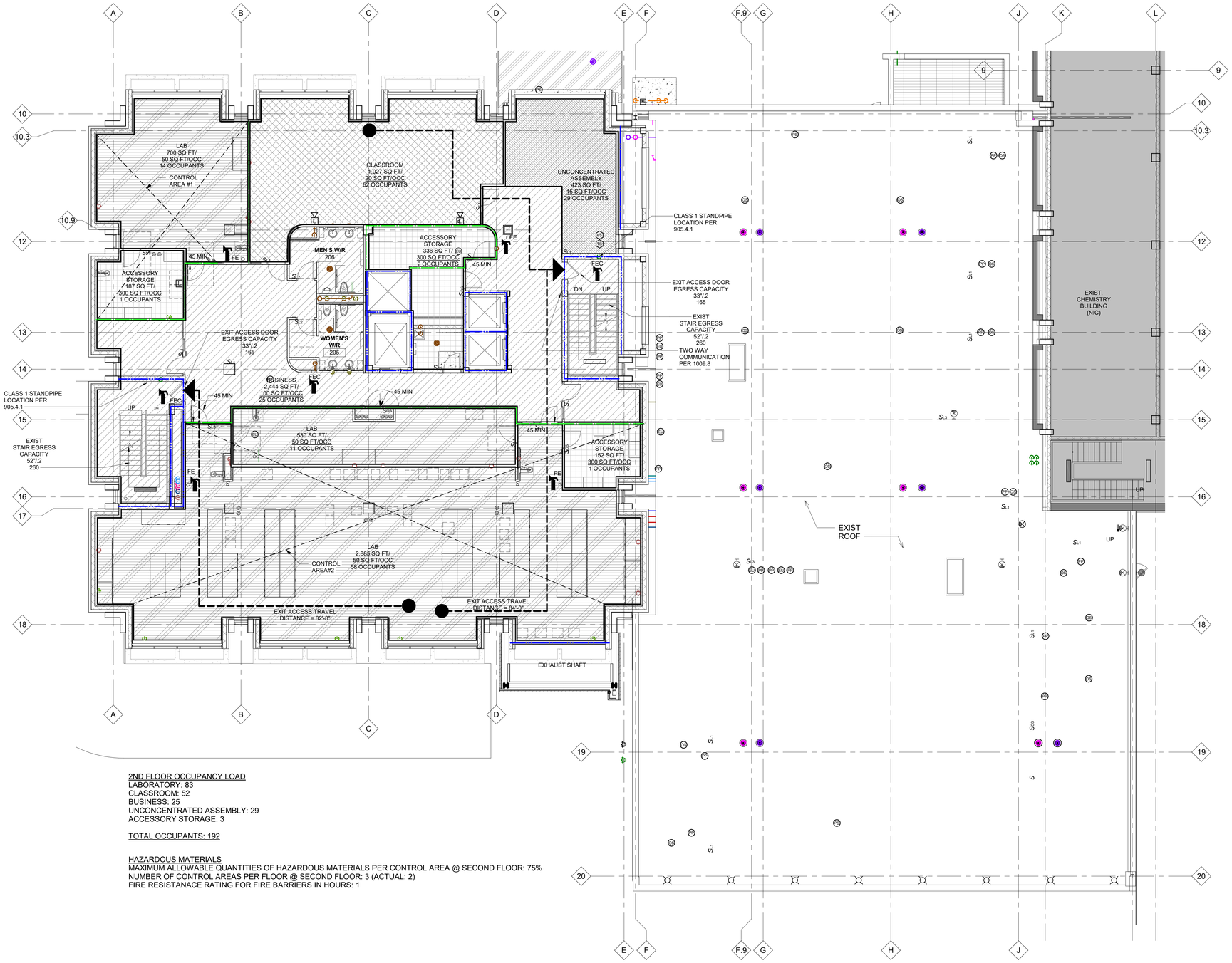


2ND FLOOR OCCUPANCY LOAD

LABORATORY: 83
CLASSROOM: 52
BUSINESS: 25
UNCONCENTRATED ASSEMBLY: 29
ACCESSORY STORAGE: 3

TOTAL OCCUPANTS: 192

HAZARDOUS MATERIALS

MAXIMUM ALLOWABLE QUANTITIES OF HAZARDOUS MATERIALS PER CONTROL AREA @ SECOND FLOOR: 75%
NUMBER OF CONTROL AREAS PER FLOOR @ SECOND FLOOR: 3 (ACTUAL: 2)
FIRE RESISTANACE RATING FOR FIRE BARRIERS IN HOURS: 1

1 / A01-05 CODE COMPLIANCE PLAN - SECOND FLOOR
SCALE: 1/8" = 1'-0"

CODE COMPLIANCE LEGEND

- EXIT/EXIT ACCESS
- TRAVEL DISTANCE (MAX 300'-0")
- 1 HOUR FIRE PARTITION
- 2 HOUR FIRE PARTITION

GENERAL NOTES:

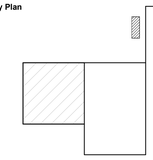
1. REFER TO DRAWING G0-01 FOR CODE SUMMARY.
2. STAIRS S-1 & S-2 PROVIDED WITH LUMINOUS EGRESS PATH MARKINGS PER SECTION 1024

OCCUPANCY TYPE

- EDUCATIONAL - CLASSROOM AREA 20 NET SQ FT/OCCUPANT
- EDUCATIONAL - LAB, SHOP & VOCATIONAL AREAS 50 NET SQ FT/OCCUPANT
- BUSINESS AREA 100 GROSS SQ FT/ OCCUPANT
- STORAGE & MECHANICAL AREA 300 GROSS SQ FT/ OCCUPANT
- UNCONCENTRATED ASSEMBLY 15 NET SQ FT/OCCUPANT
- NOT IN SCOPE OF WORK
- FIRE EXTINGUISHER CABINET (FEC)
- FIRE EXTINGUISHER BRACKET MOUNTED (FE)

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Manager: A. NOLFF	BIM Lead: R. HAAS
Design Lead: C. MENARD	Drawn: R. HAAS
Project Leader: C. MENARD	Checked: G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project

STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

CODE COMPLIANCE PLAN - SECOND FLOOR

Scale	1/8" = 1'-0"
Project No.	JCDT17-0231
Drawing No.	A01-05

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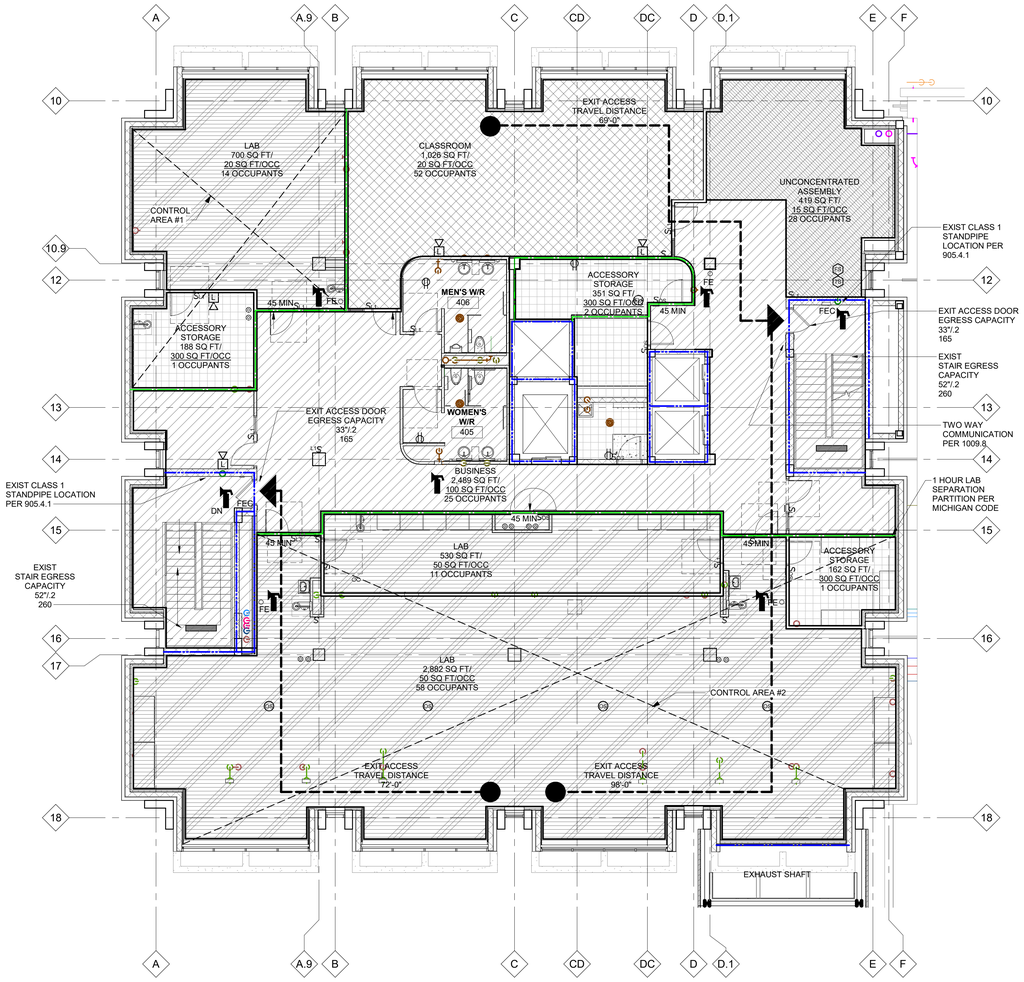
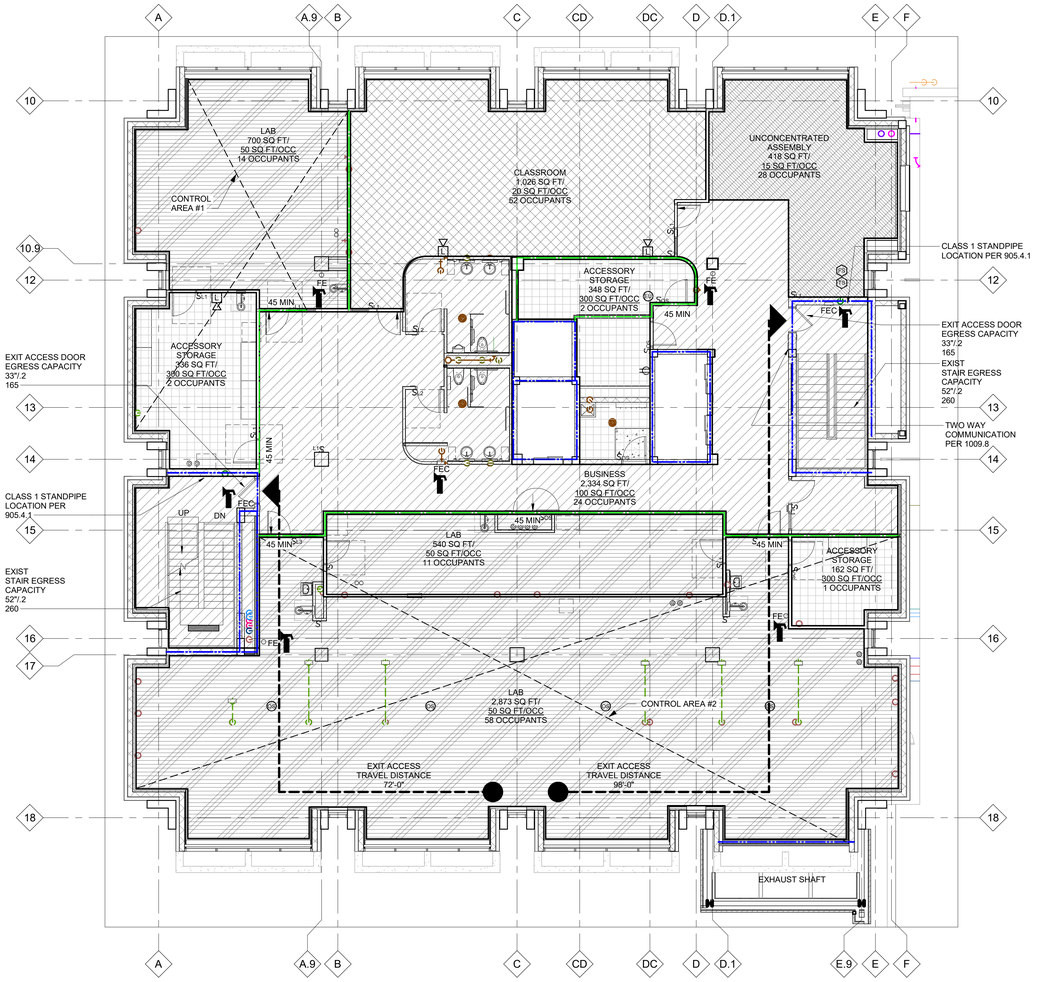




4TH FLOOR OCCUPANCY LOAD
LABORATORY: 83
CLASSROOM: 52
BUSINESS: 25
UNCONCENTRATED ASSEMBLY: 28
ACCESSORY STORAGE: 2

TOTAL OCCUPANTS: 190

HAZARDOUS MATERIALS
MAXIMUM ALLOWABLE QUANTITIES OF HAZARDOUS MATERIALS PER CONTROL AREA @ FOURTH FLOOR: 12.5%
NUMBER OF CONTROL AREAS PER FLOOR @ SECOND FLOOR: 2 (ACTUAL: 1)
FIRE RESISTANACE RATING FOR FIRE BARRIERS IN HOURS: 2

2 / A01-06 CODE COMPLIANCE PLAN - FOURTH FLOOR
SCALE: 1/8" = 1'-0"

3RD FLOOR OCCUPANCY LOAD
LABORATORY: 83
CLASSROOM: 52
BUSINESS: 24
UNCONCENTRATED ASSEMBLY: 28
ACCESSORY STORAGE: 5

TOTAL OCCUPANTS: 192

HAZARDOUS MATERIALS
MAXIMUM ALLOWABLE QUANTITIES OF HAZARDOUS MATERIALS PER CONTROL AREA @ THIRD FLOOR: 50%
NUMBER OF CONTROL AREAS PER FLOOR @ SECOND FLOOR: 2 (ACTUAL: 2)
FIRE RESISTANACE RATING FOR FIRE BARRIERS IN HOURS: 1

1 / A01-06 CODE COMPLIANCE PLAN - THIRD FLOOR
SCALE: 1/8" = 1'-0"

CODE COMPLIANCE LEGEND

- EXIT/EXIT ACCESS
- TRAVEL DISTANCE (MAX 300'-0")
- 1 HOUR FIRE PARTITION
- 2 HOUR FIRE PARTITION

GENERAL NOTES:

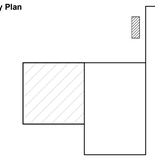
1. REFER TO DRAWING G0-01 FOR CODE SUMMARY.
2. STAIRS S-1 & S-2 PROVIDED WITH LUMINOUS EGRESS PATH MARKINGS PER SECTION 1024

OCCUPANCY TYPE

- EDUCATIONAL - CLASSROOM AREA — 20 NET SQ FT/OCCUPANT
- EDUCATIONAL - LAB, SHOP & VOCATIONAL AREAS — 50 NET SQ FT/OCCUPANT
- BUSINESS AREA — 100 GROSS SQ FT/ OCCUPANT
- STORAGE & MECHANICAL AREA — 300 GROSS SQ FT/ OCCUPANT
- UNCONCENTRATED ASSEMBLY — 15 NET SQ FT/OCCUPANT
- NOT IN SCOPE OF WORK
- FEC — FIRE EXTINGUISHER CABINET
- FE — FIRE EXTINGUISHER BRACKET MOUNTED

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

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Project Manager	BIM Lead
A. NOLFF	R. HAAS
Design Lead	Drawn
C. MENARD	R. HAAS
Project Leader	Checked
C. MENARD	G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

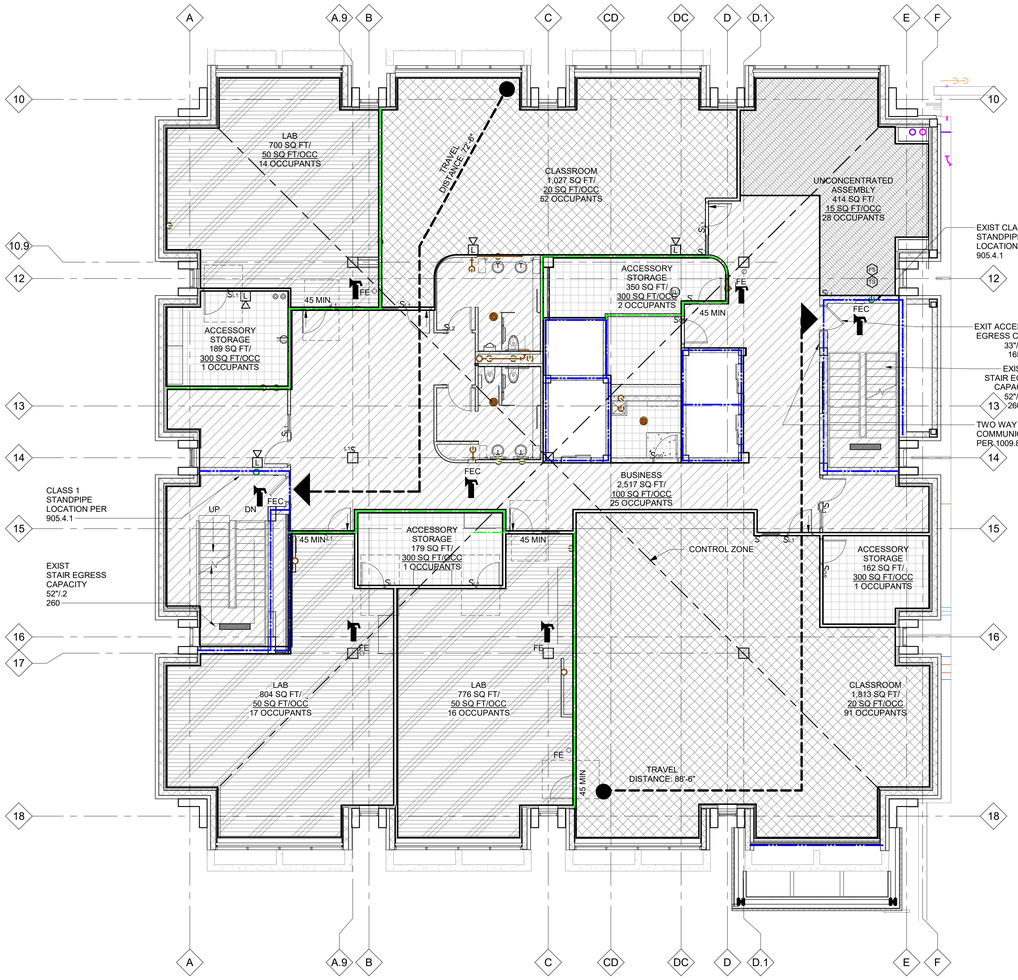
Drawing Title
CODE COMPLIANCE PLAN - THIRD AND FOURTH FLOOR

Scale 1/8" = 1'-0"

Project No. JCDT17-0231

Drawing No.
A01-06

5/6/2019 11:54:14 AM

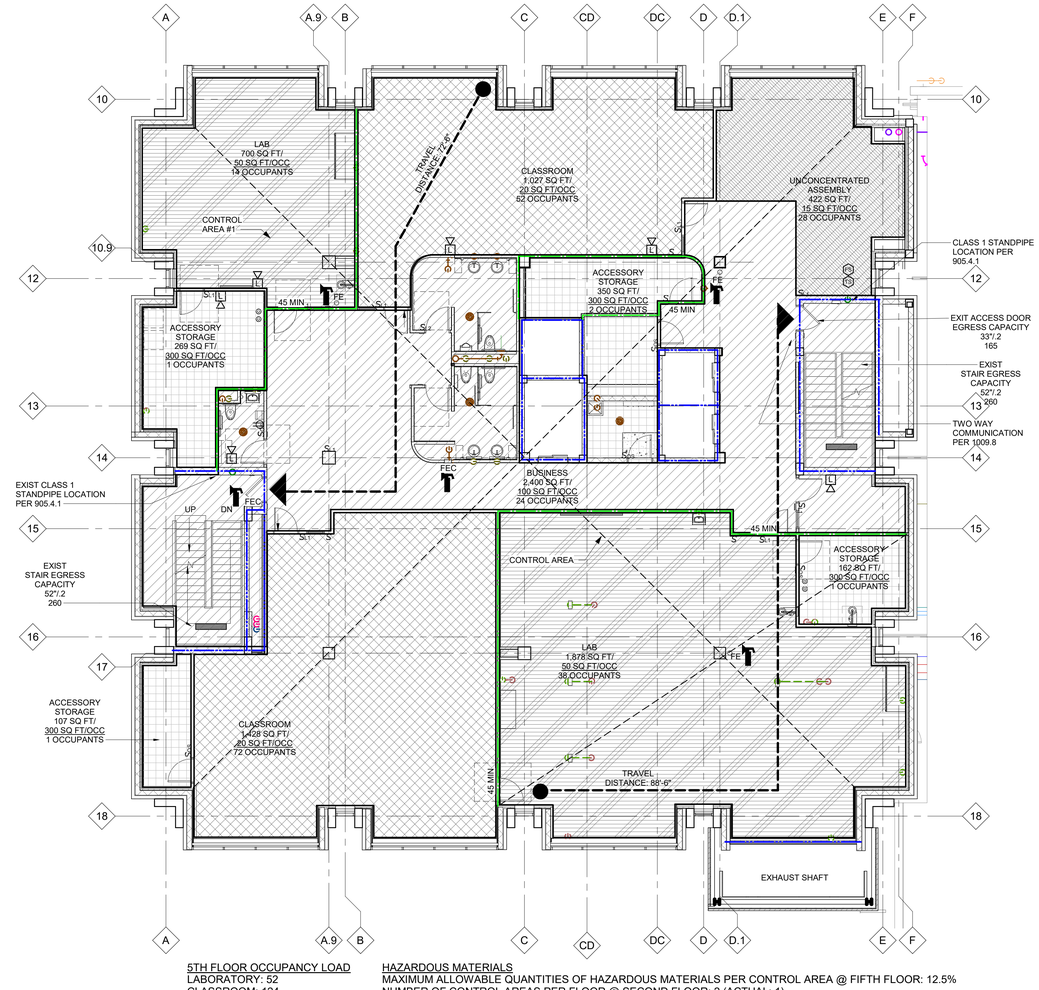


6TH FLOOR OCCUPANCY LOAD
LABORATORY: 47
CLASSROOM: 143
BUSINESS: 25
UNCONCENTRATED ASSEMBLY: 28
ACCESSORY STORAGE: 5

TOTAL OCCUPANTS: 248

HAZARDOUS MATERIALS
MAXIMUM ALLOWABLE QUANTITIES OF HAZARDOUS MATERIALS PER CONTROL AREA @ SIXTH FLOOR: 12.5%
NUMBER OF CONTROL AREAS PER FLOOR @ SECOND FLOOR: 2 (ACTUAL: 1)
FIRE RESISTANACE RATING FOR FIRE BARRIERS IN HOURS: 2

2 / A01-07 CODE COMPLIANCE PLAN - SIXTH FLOOR
SCALE: 1/8" = 1'-0"



5TH FLOOR OCCUPANCY LOAD
LABORATORY: 52
CLASSROOM: 124
BUSINESS: 24
UNCONCENTRATED ASSEMBLY: 28
ACCESSORY STORAGE: 5

TOTAL OCCUPANTS: 233

HAZARDOUS MATERIALS
MAXIMUM ALLOWABLE QUANTITIES OF HAZARDOUS MATERIALS PER CONTROL AREA @ FIFTH FLOOR: 12.5%
NUMBER OF CONTROL AREAS PER FLOOR @ SECOND FLOOR: 2 (ACTUAL: 1)
FIRE RESISTANACE RATING FOR FIRE BARRIERS IN HOURS: 2

1 / A01-07 CODE COMPLIANCE PLAN - FIFTH FLOOR
SCALE: 1/8" = 1'-0"

CODE COMPLIANCE LEGEND

- EXIT/EXIT ACCESS
- TRAVEL DISTANCE (MAX 300'-0")
- 1 HOUR FIRE PARTITION
- 2 HOUR FIRE PARTITION

GENERAL NOTES:

1. REFER TO DRAWING G0-01 FOR CODE SUMMARY.
2. STAIRS S-1 & S-2 PROVIDED WITH LUMINOUS EGRESS PATH MARKINGS PER SECTION 1024

OCCUPANCY TYPE

- EDUCATIONAL - CLASSROOM AREA 20 NET SQ FT/OCCUPANT
- EDUCATIONAL - LAB, SHOP & VOCATIONAL AREAS 50 NET SQ FT/OCCUPANT
- BUSINESS AREA 100 GROSS SQ FT/ OCCUPANT
- STORAGE & MECHANICAL AREA 300 GROSS SQ FT/ OCCUPANT
- UNCONCENTRATED ASSEMBLY 15 NET SQ FT/OCCUPANT
- NOT IN SCOPE OF WORK
- FIRE EXTINGUISHER CABINET (FEC)
- FIRE EXTINGUISHER BRACKET MOUNTED (FE)

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan

Consultants

Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

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Design Lead	Drawn
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Project Leader	Checked
C. MENARD	G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
CODE COMPLIANCE PLAN - FIFTH AND SIXTH FLOOR

Scale 1/8" = 1'-0"

Project No. JCDT17-0231

Drawing No.
A01-07

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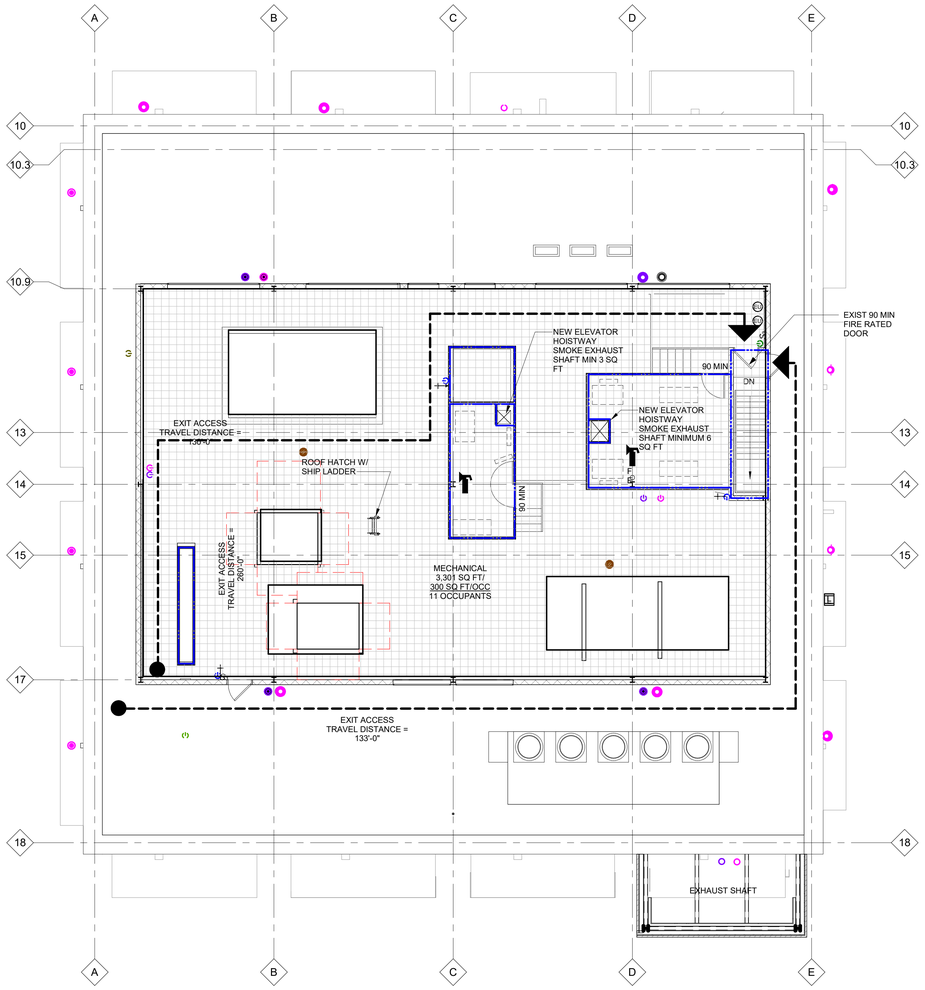

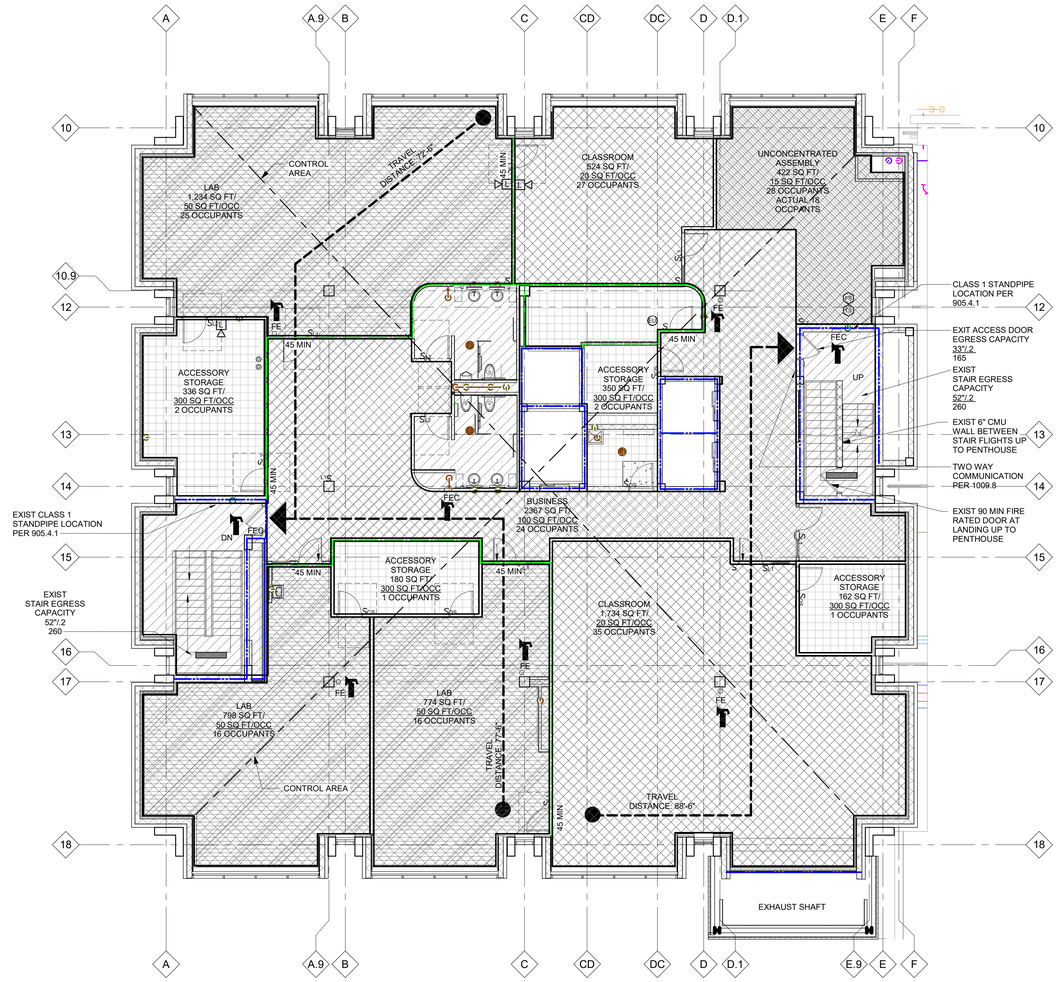

PENTHOUSE OCCUPANCY LOAD
MECHANICAL: 11

TOTAL OCCUPANTS: 11

2 / A01-08 CODE COMPLIANCE PLAN - PENTHOUSE FLOOR
SCALE: 1/8" = 1'-0"

7TH FLOOR OCCUPANCY LOAD
LABORATORY: 60
CLASSROOM: 106
BUSINESS: 23
UNCONCENTRATED ASSEMBLY: 28
ACCESSORY STORAGE: 6

TOTAL OCCUPANTS: 223

HAZARDOUS MATERIALS
MAXIMUM ALLOWABLE QUANTITIES OF HAZARDOUS MATERIALS PER CONTROL AREA @ SEVENTH FLOOR: 5%
NUMBER OF CONTROL AREAS PER FLOOR @ SECOND FLOOR: 2 (ACTUAL: 1)
FIRE RESISTANACE RATING FOR FIRE BARRIERS IN HOURS: 2

1 / A01-08 CODE COMPLIANCE PLAN - SEVENTH FLOOR
SCALE: 1/8" = 1'-0"

CODE COMPLIANCE LEGEND

- EXIT/EXIT ACCESS
- TRAVEL DISTANCE (MAX 300'-0")
- 1 HOUR FIRE PARTITION
- 2 HOUR FIRE PARTITION

GENERAL NOTES:

1. REFER TO DRAWING G0-01 FOR CODE SUMMARY.
2. STAIRS S-1 & S-2 PROVIDED WITH LUMINOUS EGRESS PATH MARKINGS PER SECTION 1024

OCCUPANCY TYPE

- EDUCATIONAL - CLASSROOM AREA 20 NET SQ FT/OCCUPANT
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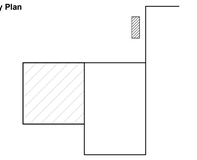
- BUSINESS AREA 100 GROSS SQ FT/ OCCUPANT
- STORAGE & MECHANICAL AREA 300 GROSS SQ FT/ OCCUPANT
- UNCONCENTRATED ASSEMBLY 15 NET SQ FT/OCCUPANT
- NOT IN SCOPE OF WORK
- FIRE EXTINGUISHER CABINET (FEC)
- FIRE EXTINGUISHER BRACKET MOUNTED (FE)

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

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Project Leader C. MENARD	Checked G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
CODE COMPLIANCE PLAN - SEVENTH FLOOR & PENTHOUSE

Scale 1/8" = 1'-0"

Project No. JCDT17-0231

Drawing No.
A01-08

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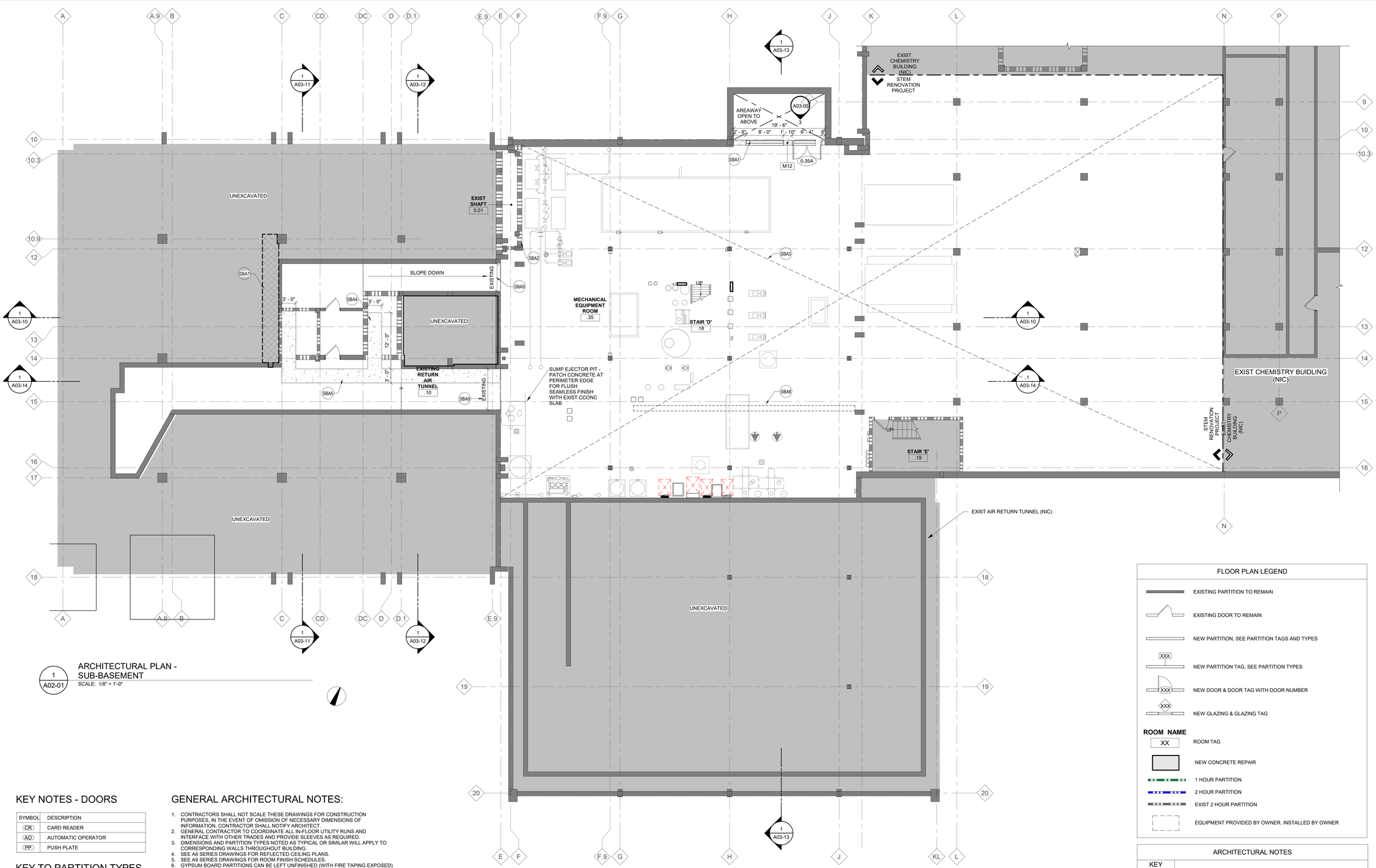

1 A02-01 ARCHITECTURAL PLAN - SUB-BASEMENT

SCALE: 1/8" = 1'-0"

KEY NOTES - DOORS

SYMBOL	DESCRIPTION
CR	CARD READER
AO	AUTOMATIC OPERATOR
PP	PUSH PLATE

KEY TO PARTITION TYPES

EACH PARTITION IS INDICATED WITH EITHER:
- A LETTER
- A LETTER AND A NUMERIC OR LETTER MODIFIER
- A LETTER, NUMERIC MODIFIER, AND LETTER MODIFIER

EXAMPLE - A2

LETTER INDICATES PARTITION TYPE
NUMBER AND/OR LETTER INDICATES MODIFICATION TO THE PARTITION TYPE

KEY NOTE ABBREVIATION

EACH KEY NOTE IS INDICATED WITH:
- FIRST LETTER
  - -#: FLOOR NOTE
    - B(BASEMENT)
    - -S(SUB - BASEMENT)
  - -G: GENERAL NOTE
- SECOND LETTER
  - -D: DEMOLITION
  - -A: ARCHITECTURAL
  - -S: SITE
  - -R: REFLECTED CEILING
- A NUMBER

EXAMPLE - 1D1

FIRST FLOOR NOTE
DEMOLISH NOTE
KEY NOTE NUMBER

GENERAL ARCHITECTURAL NOTES:

1. CONTRACTORS SHALL NOT SCALE THESE DRAWINGS FOR CONSTRUCTION PURPOSES, IN THE EVENT OF OMISSION OF NECESSARY DIMENSIONS OF INFORMATION, CONTRACTOR SHALL NOTIFY ARCHITECT.
2. GENERAL CONTRACTOR TO COORDINATE ALL IN-FLOOR UTILITY RUNS AND INTERFACE WITH OTHER TRADES AND PROVIDE SLEEVES AS REQUIRED.
3. DIMENSIONS AND PARTITION TYPES NOTED AS TYPICAL OR SIMILAR WILL APPLY TO CORRESPONDING WALLS THROUGHOUT BUILDING.
4. SEE A6 SERIES DRAWINGS FOR REFLECTED CEILING PLANS.
5. SEE A9 SERIES DRAWINGS FOR ROOM FINISH SCHEDULES.
6. GYPSUM BOARD PARTITIONS CAN BE LEFT UNFINISHED (WITH FIRE TAPING EXPOSED) ABOVE FINISHED CEILINGS (TYP).
7. ALL WOOD BLOCKING TO BE FIRE-RETARDANT TREATED OR PRESERVATIVE TREATED, REFER TO DETAILS.
8. PROVIDE SUPPORT AND BLOCKING FOR ALL OWNER FURNISHED EQUIPMENT.
9. VERIFY SIZE, LOCATION AND CHARACTERISTICS OF ALL EQUIPMENT TO BE FURNISHED PRIOR TO INSTALLATION AND REPORT ANY DISCREPANCIES TO ARCHITECT / ENGINEER.
10. COORDINATE SIZE AND LOCATION OF ALL OPENINGS FOR MECHANICAL AND ELECTRICAL EQUIPMENT.
11. TRANSITION OF DIFFERENT FLOORING MATERIALS AT DOORWAYS SHALL OCCUR AT THE CENTERLINE OF THE DOOR AND SHALL NOT EXCEEDED 1/4" IN HEIGHT.
12. ADD SUFFICIENT BLOCKING IN STUD WALLS TO SUPPORT ALL ITEMS OR EQUIPMENT SHOWN OR SPECIFIED TO BE ATTACHED TO THE WALLS.
13. ALL DUCT & PIPE PENETRATIONS THRU FIRE RATED FLOOR AND WALL CONSTRUCTION TO BE SEALED TO SAME FIRE RATING AS ASSEMBLY PER UL APPROVED DETAILS.
14. ALL WOOD USED IN INTERIOR FIRE RATED PARTITIONS AND CEILINGS TO BE FIRE RETARDANT TREATED, PER S.603 MBC 2012.
15. ALL DIMENSIONS ARE TO FACE OF DRYWALL UNLESS OTHERWISE NOTED.
16. EXISTING FIREPROOFING ENCOUNTERED DURING CONSTRUCTION SHALL BE REPAIRED AS A RESULT OF ANY WORK WHICH DISTURBS CONTINUITY. PROVIDE FIRE RATING TO MATCH.
17. INTERIOR PARTITIONS ARE TO BE C3C UNLESS NOTED OTHERWISE.

FLOOR PLAN LEGEND

- EXISTING PARTITION TO REMAIN
- EXISTING DOOR TO REMAIN
- NEW PARTITION, SEE PARTITION TAGS AND TYPES
- XXX — NEW PARTITION TAG, SEE PARTITION TYPES
- XXX — NEW DOOR & DOOR TAG WITH DOOR NUMBER
- XXX — NEW GLAZING & GLAZING TAG

ROOM NAME
XX — ROOM TAG

- NEW CONCRETE REPAIR
- 1 HOUR PARTITION
- 2 HOUR PARTITION
- EXIST 2 HOUR PARTITION
- EQUIPMENT PROVIDED BY OWNER. INSTALLED BY OWNER

ARCHITECTURAL NOTES

KEY VALUE	NOTE
SBA1	INSTALL SUB-BASEMENT AREAWAY CMU WALL, LOUVERS AND DOORS AS SCHEDULED. HOSTWAY DRAIN TO REMAIN UNOBSTRUCTED. REFER TO PLUMBING SHEETS FOR ADDITIONAL SCHEDULED SCOPE.
SBA2	INSTALL BASEMENT LEVEL CMU SHAFT PARTITION AND LINTEL AS REQUIRED FROM DEMOLITION.
SBA3	REFER TO MECH, ELEC AND PLUMBING SHEETS FOR MECHANICAL EQUIPMENT, HOUSEKEEPING PADS, CONDUIT, WIRING, ELECTRICAL PANELS, DUCTING, AND MISC ACCESSORY SCOPE. EXIST FLOOR DRAINS TO BE MAINTAINED IN WORKING ORDER.
SBA4	INFILL ELEVATOR HOISTWAY PIT SLAB AS REQ'D FOR INSTALLED OF SCHEDULED DEDICATED SUMP DRAIN. REFER TO PLUMBING SHEETS FOR ADDITIONAL SCOPE.
SBA5	INFILL RETURN AIR TUNNEL SLAB ON GRADE AS REQ'D FOR SANITARY PIPING ROUTE. REFER TO PLUMBING SHEETS FOR ADDITIONAL SCOPE.
SBA7	INFILL SLAB-ON GRADE @ BASEMENT LEVEL AS REQUIRED.
SBA8	OPENINGS IN SLAB ABOVE TO BE INFILLED.
SBA9	UTILIZE EXISTING DUCT OPENING FOR NEW UTILITY LINES AND DUCT RUNS. PROVIDE RATED SHAFT INFILL TO SEPARATE AIR TUNNELS FROM REST OF SUB-BASEMENT.

DATE	ISSUED FOR	REV
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05/03/19	TEST AND BALANCE BID	7

Key Plan

Consultants

Civil:	FTC&H
Landscape:	FTCH
Architecture	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

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WAYNE STATE UNIVERSITY

Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
SUB-BASEMENT PLAN

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A02-01

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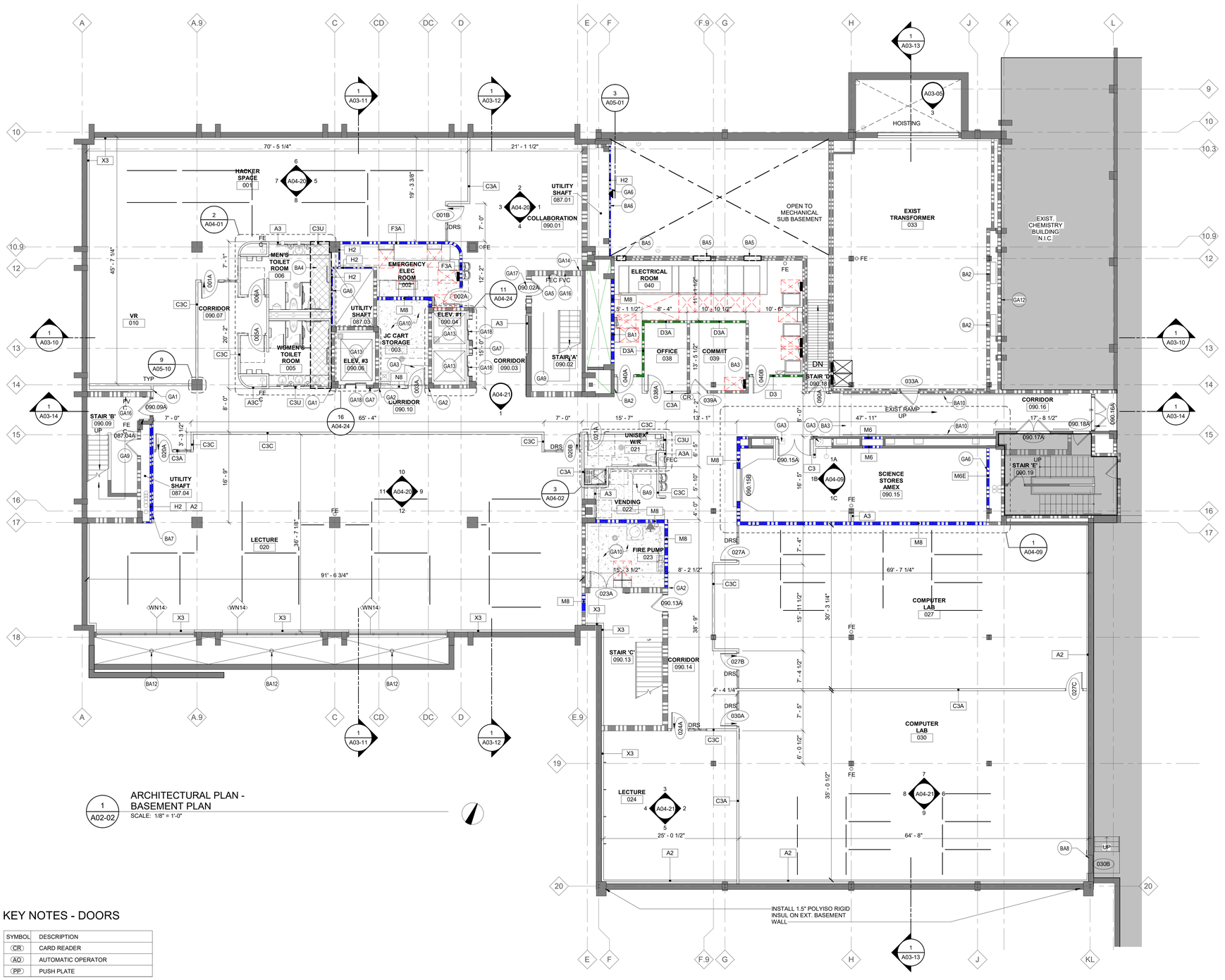


1 A02-02 ARCHITECTURAL PLAN - BASEMENT PLAN
SCALE: 1/8" = 1'-0"

KEY NOTES - DOORS

SYMBOL	DESCRIPTION
CR	CARD READER
AO	AUTOMATIC OPERATOR
PP	PUSH PLATE

KEY TO PARTITION TYPES

EACH PARTITION IS INDICATED WITH EITHER:
- A LETTER
- A LETTER AND A NUMERIC OR LETTER MODIFIER
- A LETTER, NUMERIC MODIFIER, AND LETTER MODIFIER

EXAMPLE - A2
- LETTER INDICATES PARTITION TYPE
- NUMBER AND/OR LETTER INDICATES MODIFICATION TO THE PARTITION TYPE

KEY NOTE ABBREVIATION

EACH KEY NOTE IS INDICATED WITH:
- FIRST LETTER
  - #: FLOOR NOTE
    - B(BASEMENT)
    - S(SUB - BASEMENT)
  - G: GENERAL NOTE
- SECOND LETTER
  - D: DEMOLITION
  - A: ARCHITECTURAL
  - S: SITE
  - R: REFLECTED CEILING
- A NUMBER

EXAMPLE - 1D1
- FIRST FLOOR NOTE
- DEMOLISH NOTE
- KEY NOTE NUMBER

FLOOR PLAN LEGEND

- EXISTING PARTITION TO REMAIN
- EXISTING DOOR TO REMAIN
- NEW PARTITION, SEE PARTITION TAGS AND TYPES
- XXX — NEW PARTITION TAG, SEE PARTITION TYPES
- XXX — NEW DOOR & DOOR TAG WITH DOOR NUMBER
- XXX — NEW GLAZING & GLAZING TAG

ROOM NAME
XX — ROOM TAG

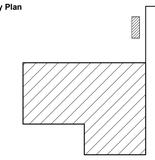
- NEW CONCRETE REPAIR
- 1 HOUR PARTITION
- 2 HOUR PARTITION
- EXIST 2 HOUR PARTITION
- EQUIPMENT PROVIDED BY OWNER. INSTALLED BY OWNER

ARCHITECTURAL NOTES

KEY VALUE	NOTE
BA1	INFILL CMU PARTITION TO THE INTENTS SHOWN. EXIST MDF CABLING CONNECTIONS TO REMAIN IN PLACE. TAKE PRECAUTIONS TO NOT DAMAGE FIBER OPTIC CABLING IN THIS AREA.
BA2	CONTRACTOR TO VERIFY EXISTING MECHANICAL SHAFTS AND OPENINGS FOR REMOVAL OF EXISTING MEP EQUIPMENT. PATCH AND REPAIR WALL W/ 2-HR RATED CMU CONSTRUCTION AS REQUIRED.
BA3	EXIST RAMP TO REMAIN IN PLACE. MAINTAIN EXIST 6" CMU WALL AT SLOPE.
BA4	INFILL SLAB ON GRADE AS REQ'D AS A RESULT OF SAWCUTING TO RUN SCHEDULED SANITARY LINE.
BA5	PROVIDE LINTELS AND THROUGH PENETRATION FIRE STOPPING AT OPENINGS AS REQ'D FOR SCHEDULED MECHANICAL DUCT PENETRATIONS.
BA6	OPENING TO RECEIVE NEW 2-HR SHAFT WALL INFILL AND LINTEL FROM CONCRETE BEAM TO CONCRETE BEAM. REFER TO MECH, ELECT, AND PLUMBING FOR SCHEDULED WORK.
BA7	PROVIDE NEW LINTELS FOR SCHEDULED DUCT PENETRATIONS. PROVIDE APPROPRIATE THROUGH PENETRATION FIRE STOPPING AT OPENINGS.
BA8	EXIST EXIT DOOR TO HAVE HARDWARE REMOVED, BE PERMANENTLY SEALED AND SIGNAGE INDICATING "NOT AN EXIT" APPLIED TO DOOR.
BA9	VENDING MACHINE (OF/CI)
BA10	INSTALL ADA COMPLIANT HAND RAIL @ 2'-10" AFF ON BOTH SIDES OF EXISTING RAMP.
BA12	EXISTING FLOOR DRAIN TO REMAIN AND KEEP IN OPERATION FOR THE DURATION OF CONSTRUCTION.
GA1	ALIGN NEW GYP BD PARTITION WITH EXISTING CONSTRUCTION. REFER TO DETAIL 10/A05-10 FOR TYP GYP TO EXISTING CONSTRUCTION REVEAL.
GA2	TOOTH IN NEW CMU WALL CONSTRUCTION INTO EXITING CMU WALL.
GA3	INFILL SHAFT FLOOR AS INDICATED ON THE PLAN. REFER TO STRUCTURAL SHEETS FOR TYPICAL SLAB INFILL DETAIL. PROVIDE SMOOTH LEVEL FLOOR READY TO ACCEPT NEW FINISHES.
GA5	EXISTING STAIRWELL FIRE PROTECTION DEVICES IN STAIRWELL INCLUDING PULL STATIONS, PHONE JACK, AND FIRE EXTINGUISHER CABINET TO REMAIN IN PLACE. REPLACE EXISTING FIRE VALVE CABINET AS SCHEDULED.
GA6	ALL WALL PENETRATIONS TO BE CAULKED AND PAINTED, APPLY FIRE CAULK IN REQUIRED RATED PENETRATIONS. SAND SMOOTH FOR FINISHED APPEARANCE AND PREP TO RECEIVE SCHEDULED PAINT FINISH.
GA7	REPLACE ELEVATOR CONTROL PANEL AND CALL STATION IN EXIST CMU WALL.
GA9	CLEAN AND PREP EXISTING STAIRWELL WALLS, STRINGERS, HANDRAILS AND GUARDS. WALLS AND HANDRAILS TO RECEIVE PAINT. REFER TO FINISH PLANS. CLEAN AND PREPARE CONCRETE STEPS FOR EXTRUDED ALUMINUM NOSING TREADS
GA10	PLUMBING PENETRATIONS AT CHASE LOCATIONS TO BE GROUTED SOLID. PROVIDE 1/2" CONCRETE TOPPING INFILL FLUSH WITH ADJACENT CONCRETE FLOOR CONSTRUCTION. PREP TO RECEIVE EPOXY SEALANT FINISH .TYPICAL AT ALL EXISTING TOILET ROOMS.
GA12	EXISTING CONVECTOR UNIT CAVITY TO BE INFILLED.MOUNTED NEW CABINENT UNIT HEATER TO UNDERSIDE OF STAIR LANDING. REFER TO MECH FOR ADDITIONAL INFORMATION.
GA13	EXIST ELEVATOR CAB TO RECEIVE NEW FINISHES AND COMPONENTS. CAB TO RECEIVE MODERN CONTROL PANEL, TWO-WAY COMMUNICATION, ADA SIGNALING AND CAMPUS EMERGENCY PHONE.
GA14	INFILL CONCRETE AT LOCATION OF JANITOR SINK PENETRATIONS.
GA16	REPLACE EXIST STANDPIPE CABINET. REPAIR WALL WITH 2-HR CMU CONSTRUCTION TO MAINTAIN EXIST FIRE RATING.
GA17	PROVIDE 2-HR CMU IN INFILL AT FORMER DUCT PENETRATIONS OF STAIRWELL PARTITIONS.
GA18	REPLACE EXIST ELEVATOR DOOR. EXISTING JAMB, TRACKS AND ROLLERS & HANGERS TO REMAIN IN PLACE.

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
01/14/19	ADDENDUM #1	4
05/03/19	TEST AND BALANCE BID	7

Key Plan



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Lab Design: NORR

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Design Lead: C. MENARD	Drawn: R. HAAS
Project Leader: C. MENARD	Checked: G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project
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DETROIT, MI 48202

Drawing Title
BASEMENT PLAN

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A02-02

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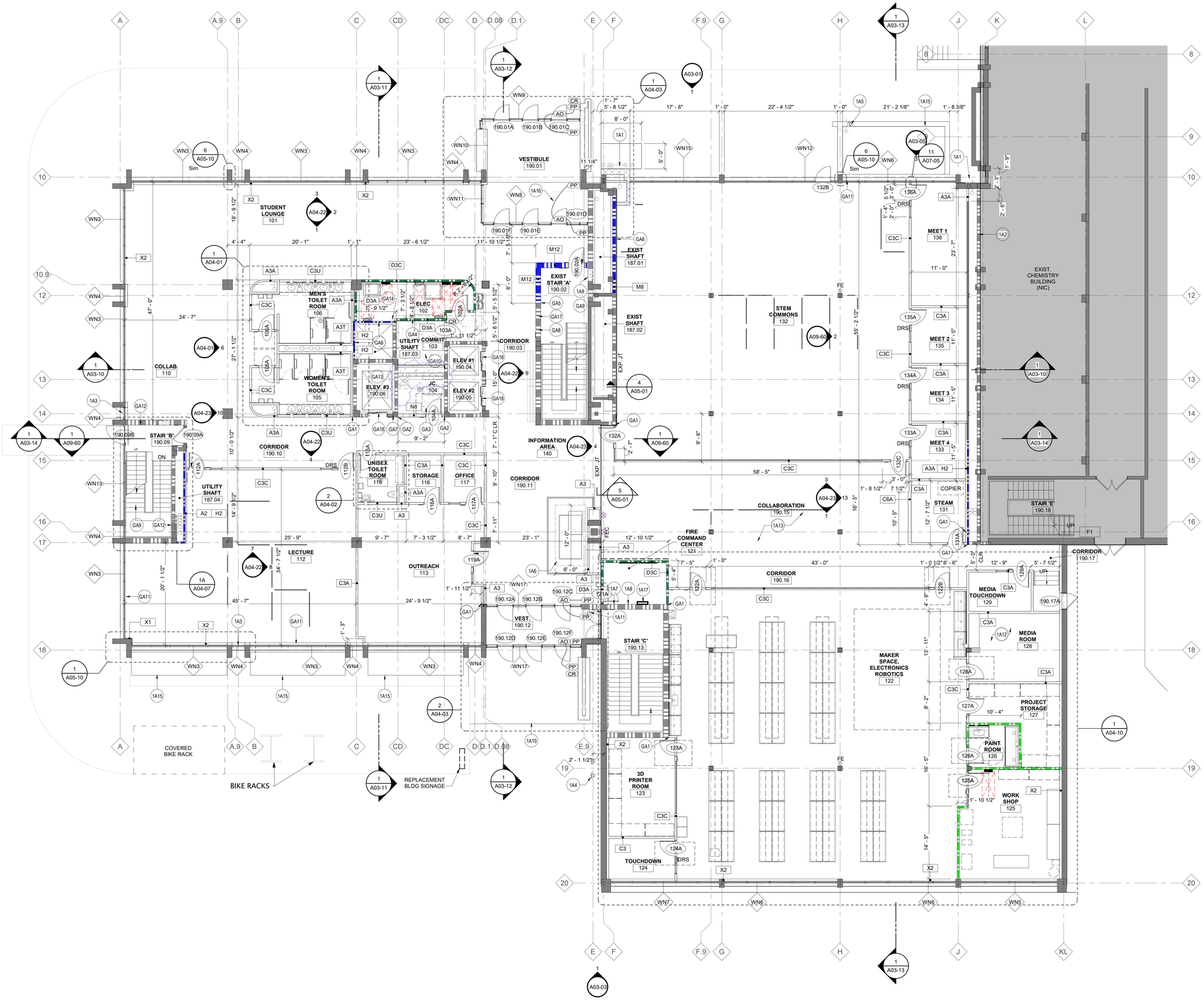

1 A02-03 ARCHITECTURAL PLAN - FIRST FLOOR
SCALE: 1/8" = 1'-0"

FLOOR PLAN LEGEND

- EXISTING PARTITION TO REMAIN
- EXISTING DOOR TO REMAIN
- NEW PARTITION, SEE PARTITION TAGS AND TYPES
- XXX — NEW PARTITION TAG, SEE PARTITION TYPES
- XXX — NEW DOOR & DOOR TAG WITH DOOR NUMBER
- XXX — NEW GLAZING & GLAZING TAG

ROOM NAME
XX ROOM TAG

- NEW CONCRETE REPAIR
- 1 HOUR PARTITION
- 2 HOUR PARTITION
- EXIST 2 HOUR PARTITION
- EQUIPMENT PROVIDED BY OWNER. INSTALLED BY OWNER

ARCHITECTURAL NOTES

KEY VALUE	NOTE
1A1	OVERFLOW ROOF DRAIN DOWNSPOUT.
1A2	GAS METER LOCATION - REFER TO MECHANICAL SHEETS.
1A3	EXIST OPENING FOR LIBRARY BOOK RETURN CHUTE TO BE PREPARED TO RECEIVE STOREFRONT.
1A4	PEDESTAL MOUNTED FIRE DEPARTMENT CONNECTION FOR STEM BUILDING.
1A5	REINSTALL FIRE DEPARTMENT CONNECTION IN EXISTING LOCATION FOR CHEMISTRY BUILDING AT THE CONCLUSION FOR WORK.
1A6	NEW LOCATION FOR RELOCATED ELEPHANT SKELETON. REFER TO A90 SERIES FOR ELEPHANT DISPLAY DETAILS.
1A7	EXIST FIRE PANEL TO BE SALVAGED AND REINSTALLED WITHIN PLANNED FIRE COMMAND CENTER.
1A8	EXIST WIRED FIRE COMMUNICATION PHONE BOX TO BE UNINSTALLED AND RELOCATED TO PLANNED FIRE COMMAND CENTER.
1A9	INSTALL STANDPIPE CABINET
1A10	PROVIDE EXTERIOR CONCRETE WALKWAY AS REQUIRED FOR SCHEDULED ENTRY FOUNDATIONAL WORK.
1A11	EXIST CARD READER TO REMAIN IN PLACE AS PART OF SCHEDULED WORK.
1A12	MEDIA ROOM TO RECEIVE ACOUSTIC ATTENUATING BATT ABOVE LAY-IN CEILING, SAB IN SURROUNDING WALL, AND AN ATC WITH SOUND SEALS DOOR.
1A13	APPLY SPRAY APPLIED FIRE PROOFING TO EXIST STEEL JOIST.
1A15	REINSTALL EXIST STL GRATE SUPPORT BEAMS FOR AFTER DELIVERY OF EQUIPMENT.GRILLE TO BE REINSTALLED AT WORKS CONCLUSION.
1A16	PROVIDE CONCRETE INFILL OF EXIST DEPRESSION TO MATCH FLOOR LINE.
1A17	PROVIDE FIRE ALARM CONTROL PANEL. ELEVATOR FIRE RECALL SWITCH, GENERATOR REMOTE ANNUNCIATOR IN FIRE COMMAND CENTER. REFER TO MECH, ELECT, AND PLUMBING SHEETS FOR ADDITIONAL REQUIREMENTS.
GA1	ALIGN NEW GYP BD PARTITION WITH EXISTING CONSTRUCTION. REFER TO DETAIL 10/A05-10 FOR TYP GYP TO EXISTING CONSTRUCTION REVEAL.
GA2	TOOTH IN NEW CMU WALL CONSTRUCTION INTO EXITING CMU WALL.
GA3	INFILL SHAFT FLOOR AS INDICATED ON THE PLAN. REFER TO STRUCTURAL SHEETS FOR TYPICAL SLAB INFILL DETAIL. PROVIDE SMOOTH LEVEL FLOOR READY TO ACCEPT NEW FINISHES.
GA4	PROVIDE 3/4" FIRE RETARDANT TREATED PLYWD BACKING FROM 3'-6" AFF TO 8'-0" AFF ON THE NORTH, WEST, AND SOUTH PARTITION WALLS FOR COMM/IT EQUIPMENT MOUNTING.
GA5	EXISTING STAIRWELL FIRE PROTECTION DEVICES IN STAIRWELL INCLUDING PULL STATIONS, PHONE JACK, AND FIRE EXTINGUISHER CABINET TO REMAIN IN PLACE. REPLACE EXISTING FIRE VALVE CABINET AS SCHEDULED.
GA6	ALL WALL PENETRATIONS TO BE CAULKED AND PAINTED, APPLY FIRE CAULK IN REQUIRED RATED PENETRATIONS. SAND SMOOTH FOR FINISHED APPEARANCE AND PREP TO RECEIVE SCHEDULED PAINT FINISH.
GA7	REPLACE ELEVATOR CONTROL PANEL AND CALL STATION IN EXIST CMU WALL.
GA8	REFER TO COMMTECH SHEETS TO CAMERA LOCATIONS.
GA9	CLEAN AND PREP EXISTING STAIRWELL WALLS, STRINGERS, HANDRAILS AND GUARDS. WALLS AND HANDRAILS TO RECEIVE PAINT. REFER TO FINISH PLANS. CLEAN AND PREPARE CONCRETE STEPS FOR EXTRUDED ALUMINUM NOSING TREADS
GA10	PLUMBING PENETRATIONS AT CHASE LOCATIONS TO BE GROUTED SOLID. PROVIDE 1/2" CONCRETE TOPPING INFILL FLUSH WITH ADJACENT CONCRETE FLOOR CONSTRUCTION. PREP TO RECEIVE EPOXY SEALANT FINISH .TYPICAL AT ALL EXISTING TOILET ROOMS.
GA11	REFER TO MECH, ELECT AND PLUMBING SHEETS FOR MECHANICAL EQUIPMENT, HOUSEKEEPING PADS, CONDUIT, WIRING, ELECTRICAL PANELS, DUCTING, AND MISC ACCESSORY SCOPE
GA12	EXISTING CONVECTOR UNIT CAVITY TO BE INFILLED.MOUNTED NEW CABINENT UNIT HEATER TO UNDERSIDE OF STAIR LANDING. REFER TO MECH FOR ADDITIONAL INFORMATION.
GA13	EXIST ELEVATOR CAB TO RECEIVE NEW FINISHES AND COMPONENTS. CAB TO RECEIVE MODERN CONTROL PANEL, TWO-WAY COMMUNICATION, ADA SIGNALING AND CAMPUS EMERGENCY PHONE.
GA14	INFILL CONCRETE AT LOCATION OF JANITOR SINK PENETRATIONS.
GA17	PROVIDE 2-HR CMU IN INFILL AT FORMER DUCT PENETRATIONS OF STAIRWELL PARTITIONS.
GA18	REPLACE EXIST ELEVATOR DOOR. EXISTING JAMB, TRACKS AND ROLLERS & HANGERS TO REMAIN IN PLACE.

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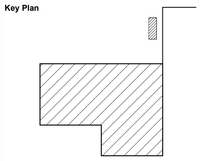
3/15/19	BULLETIN #1	6
05/03/19	TEST AND BALANCE BID	7
XX/XX/XX	BULLETIN #2	8

Key Plan



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Project Leader	Checked
C. MENARD	G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

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DETROIT, MI 48202

Drawing Title
FIRST FLOOR PLAN

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A02-03

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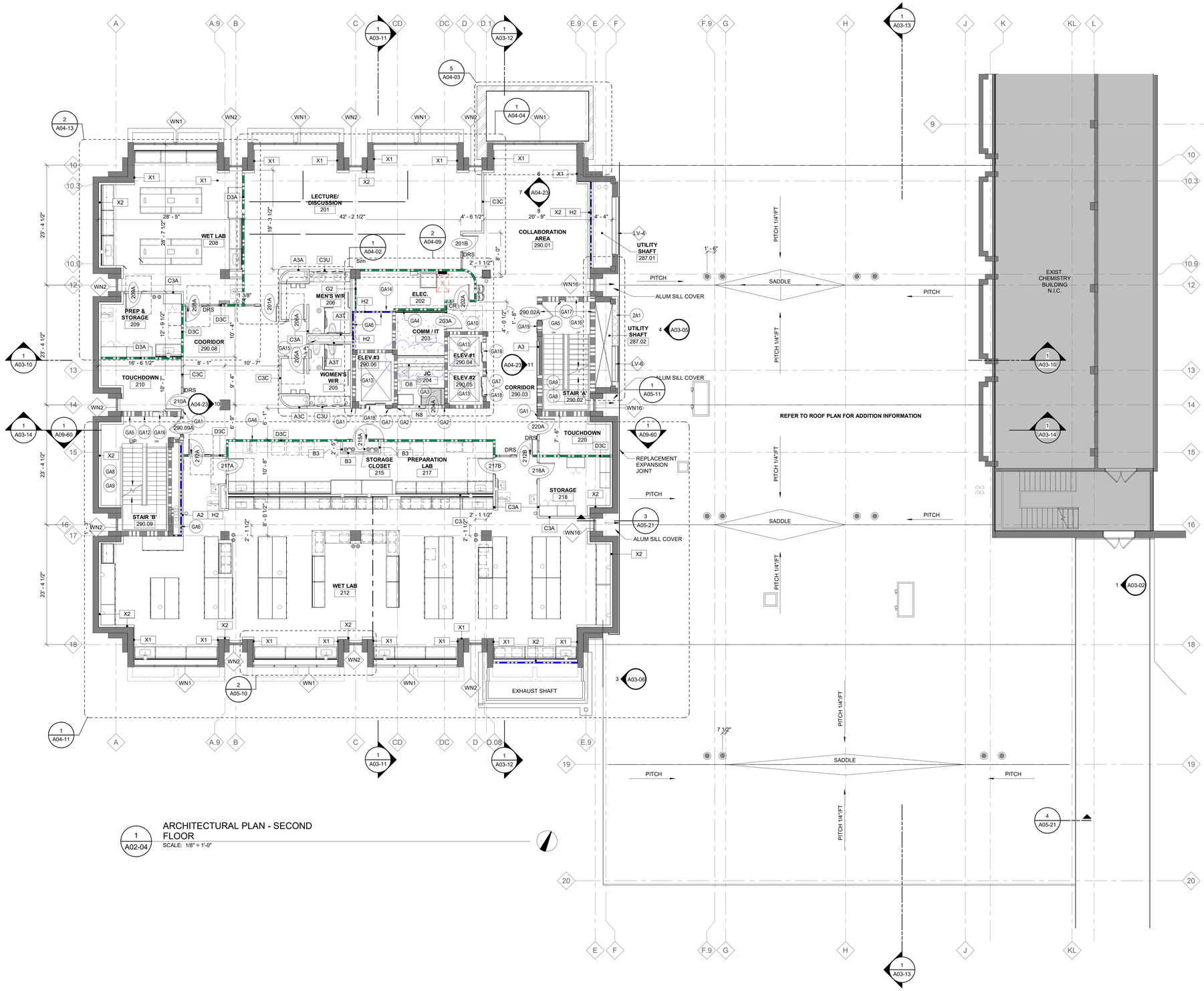

1 A02-04 — ARCHITECTURAL PLAN - SECOND FLOOR
SCALE: 1/8" = 1'-0"

FLOOR PLAN LEGEND

- EXISTING PARTITION TO REMAIN
- EXISTING DOOR TO REMAIN
- NEW PARTITION, SEE PARTITION TAGS AND TYPES
- XXX — NEW PARTITION TAG, SEE PARTITION TYPES
- 9 / XXX — NEW DOOR & DOOR TAG WITH DOOR NUMBER
- XXX — NEW GLAZING & GLAZING TAG

ROOM NAME

- XX — ROOM TAG
- NEW CONCRETE REPAIR
- 1 HOUR PARTITION
- 2 HOUR PARTITION
- EXIST 2 HOUR PARTITION
- EQUIPMENT PROVIDED BY OWNER, INSTALLED BY OWNER

ARCHITECTURAL NOTES

KEY VALUE	NOTE
2A1	REPLACEMENT STONE VENEER ON 8" NOMINAL CMU.
GA1	ALIGN NEW GYP BD PARTITION WITH EXISTING CONSTRUCTION. REFER TO DETAIL 10/A05-10 FOR TYP GYP TO EXISTING CONSTRUCTION REVEAL.
GA2	TOOTH IN NEW CMU WALL CONSTRUCTION INTO EXITING CMU WALL.
GA3	INFILL SHAFT FLOOR AS INDICATED ON THE PLAN. REFER TO STRUCTURAL SHEETS FOR TYPICAL SLAB INFILL DETAIL. PROVIDE SMOOTH LEVEL FLOOR READY TO ACCEPT NEW FINISHES.
GA4	PROVIDE 3/4" FIRE RETARDANT TREATED PLYWD BACKING FROM 3'-6" AFF TO 8'-0" AFF ON THE NORTH, WEST, AND SOUTH PARTITION WALLS FOR COMM/IT EQUIPMENT MOUNTING.
GA5	EXISTING STAIRWELL FIRE PROTECTION DEVICES IN STAIRWELL INCLUDING PULL STATIONS, PHONE JACK, AND FIRE EXTINGUISHER CABINET TO REMAIN IN PLACE. REPLACE EXISTING FIRE VALVE CABINET AS SCHEDULED.
GA6	ALL WALL PENETRATIONS TO BE CAULKED AND PAINTED, APPLY FIRE CAULK IN REQUIRED RATED PENETRATIONS. SAND SMOOTH FOR FINISHED APPEARANCE AND PREP TO RECEIVE SCHEDULED PAINT FINISH.
GA7	REPLACE ELEVATOR CONTROL PANEL AND CALL STATION IN EXIST CMU WALL.
GA8	REFER TO COMMTECH SHEETS TO CAMERA LOCATIONS.
GA9	CLEAN AND PREP EXISTING STAIRWELL WALLS, STRINGERS, HANDRAILS AND GUARDS. WALLS AND HANDRAILS TO RECEIVE PAINT. REFER TO FINISH PLANS. CLEAN AND PREPARE CONCRETE STEPS FOR EXTRUDED ALUMINUM NOSING TREADS
GA10	PLUMBING PENETRATIONS AT CHASE LOCATIONS TO BE GROUTED SOLID. PROVIDE 1/2" CONCRETE TOPPING INFILL FLUSH WITH ADJACENT CONCRETE FLOOR CONSTRUCTION. PREP TO RECEIVE EPOXY SEALANT FINISH .TYPICAL AT ALL EXISTING TOILET ROOMS.
GA12	EXISTING CONVECTOR UNIT CAVITY TO BE INFILLED.MOUNTED NEW CABINENT UNIT HEATER TO UNDERSIDE OF STAIR LANDING. REFER TO MECH FOR ADDITIONAL INFORMATION.
GA13	EXIST ELEVATOR CAB TO RECEIVE NEW FINISHES AND COMPONENTS. CAB TO RECEIVE MODERN CONTROL PANEL, TWO-WAY COMMUNICATION, ADA SIGNALING AND CAMPUS EMERGENCY PHONE.
GA14	INFILL CONCRETE AT LOCATION OF JANITOR SINK PENETRATIONS.
GA15	CORE SLAB AS REQ'D FOR SCHEDULED RISERS. REFER TO PLUMBING SHEETS FOR ADDITIONAL SCOPE.
GA16	REPLACE EXIST STANDPIPE CABINET. REPAIR WALL WITH 2-HR CMU CONSTRUCTION TO MAINTAIN EXIST FIRE RATING.
GA17	PROVIDE 2-HR CMU IN INFILL AT FORMER DUCT PENETRATIONS OF STAIRWELL PARTITIONS.
GA18	REPLACE EXIST ELEVATOR DOOR. EXISTING JAMB, TRACKS AND ROLLERS & HANGERS TO REMAIN IN PLACE.
GA19	TWO WAY COMMUNICATION. REFER TO COMMTECH SHEETS FOR ADDITIONAL INFORMATION.

KEY NOTES - DOORS

SYMBOL	DESCRIPTION
CR	CARD READER
AO	AUTOMATIC OPERATOR
PP	PUSH PLATE

KEY TO PARTITION TYPES

EACH PARTITION IS INDICATED WITH EITHER:
- A LETTER
- A LETTER AND A NUMERIC OR LETTER MODIFIER
- A LETTER, NUMERIC MODIFIER, AND LETTER MODIFIER

EXAMPLE - A2

- LETTER INDICATES PARTITION TYPE
- NUMBER AND/OR LETTER INDICATES MODIFICATION TO THE PARTITION TYPE

KEY NOTE ABBREVIATION

EACH KEY NOTE IS INDICATED WITH:
- FIRST LETTER
  - -#: FLOOR NOTE
    - B(BASEMENT)
    - -S(SUB - BASEMENT)
  - -G: GENERAL NOTE
- SECOND LETTER
  - -D: DEMOLITION
  - -A: ARCHITECTURAL
  - -S: SITE
  - -R: REFLECTED CEILING
- A NUMBER

EXAMPLE - 1D1

- FIRST FLOOR NOTE
- DEMOLISH NOTE
- KEY NOTE NUMBER

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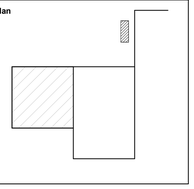
3/15/19	BULLETIN #1	6
05/03/19	TEST AND BALANCE BID	7

Key Plan



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Project Leader	Checked
C. MENARD	G. KARANFILOVSKI

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Drawing Title
SECOND FLOOR PLAN

Scale As indicated

Project No. JCDT17-0231

Drawing No.
A02-04

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ARCHITECTURAL NOTES	
KEY VALUE	NOTE
GA1	ALIGN NEW GYP BD PARTITION WITH EXISTING CONSTRUCTION. REFER TO DETAIL 10/A05-10 FOR TYP GYP TO EXISTING CONSTRUCTION REVEAL.
GA2	TOOTH IN NEW CMU WALL CONSTRUCTION INTO EXITING CMU WALL.
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GA4	PROVIDE 3/4" FIRE RETARDANT TREATED PLYWD BACKING FROM 3'-6" AFF TO 8'-0" AFF ON THE NORTH, WEST, AND SOUTH PARTITION WALLS FOR COMM/T EQUIPMENT MOUNTING.
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GA8	REFER TO COMMTECH SHEETS TO CAMERA LOCATIONS.

ARCHITECTURAL NOTES	
KEY VALUE	NOTE
GA9	CLEAN AND PREP EXISTING STAIRWELL WALLS, STRINGERS, HANDRAILS AND GUARDS. WALLS AND HANDRAILS TO RECEIVE PAINT. REFER TO FINISH PLANS. CLEAN AND PREPARE CONCRETE STEPS FOR EXTRUDED ALUMINUM NOSING TREADS
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GA19	TWO WAY COMMUNICATION. REFER TO COMMTECH SHEETS FOR ADDITIONAL INFORMATION.

FLOOR PLAN LEGEND

- EXISTING PARTITION TO REMAIN
- EXISTING DOOR TO REMAIN
- NEW PARTITION, SEE PARTITION TAGS AND TYPES
- XXX — NEW PARTITION TAG, SEE PARTITION TYPES
- XXX — NEW DOOR & DOOR TAG WITH DOOR NUMBER
- XXX — NEW GLAZING & GLAZING TAG

ROOM NAME
XX — ROOM TAG

- NEW CONCRETE REPAIR
- 1 HOUR PARTITION
- 2 HOUR PARTITION
- EXIST 2 HOUR PARTITION
- EQUIPMENT PROVIDED BY OWNER. INSTALLED BY OWNER

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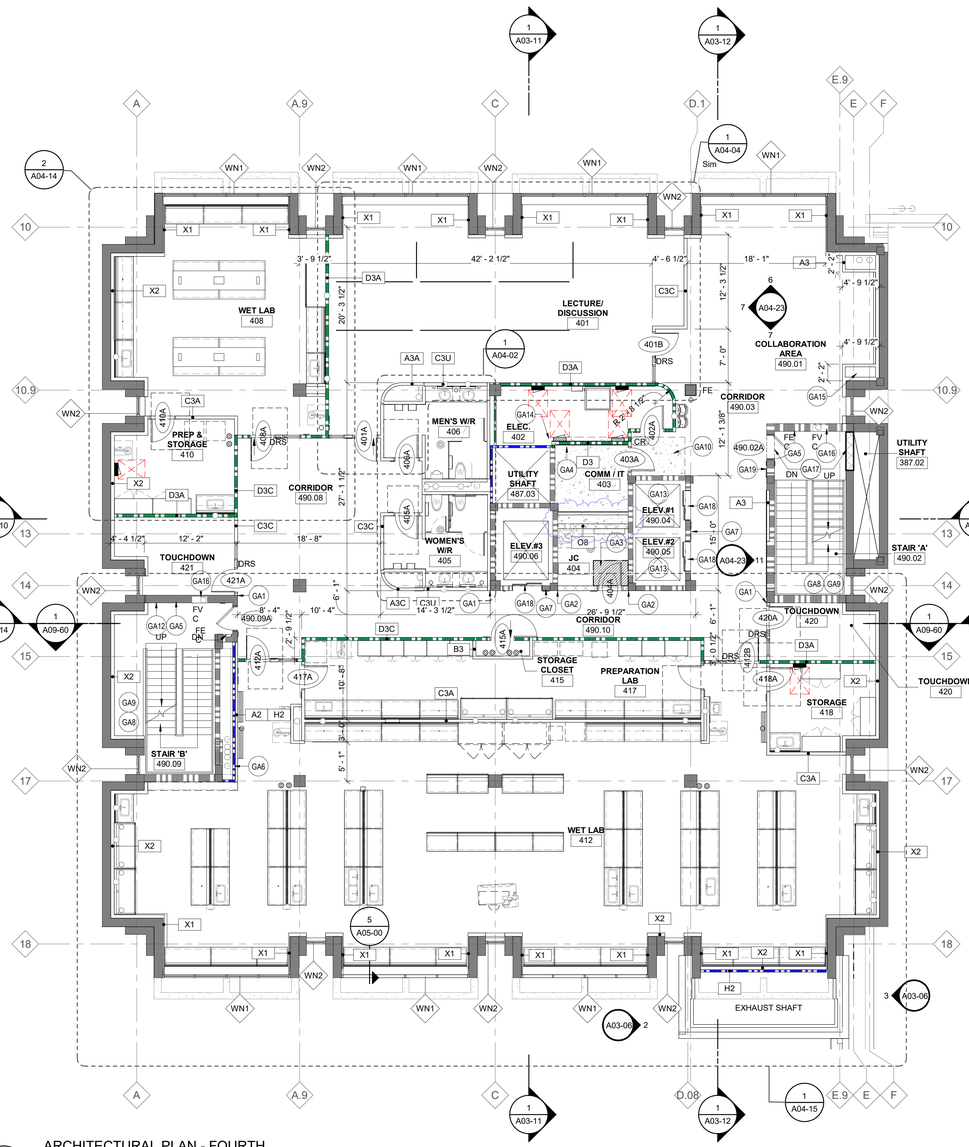
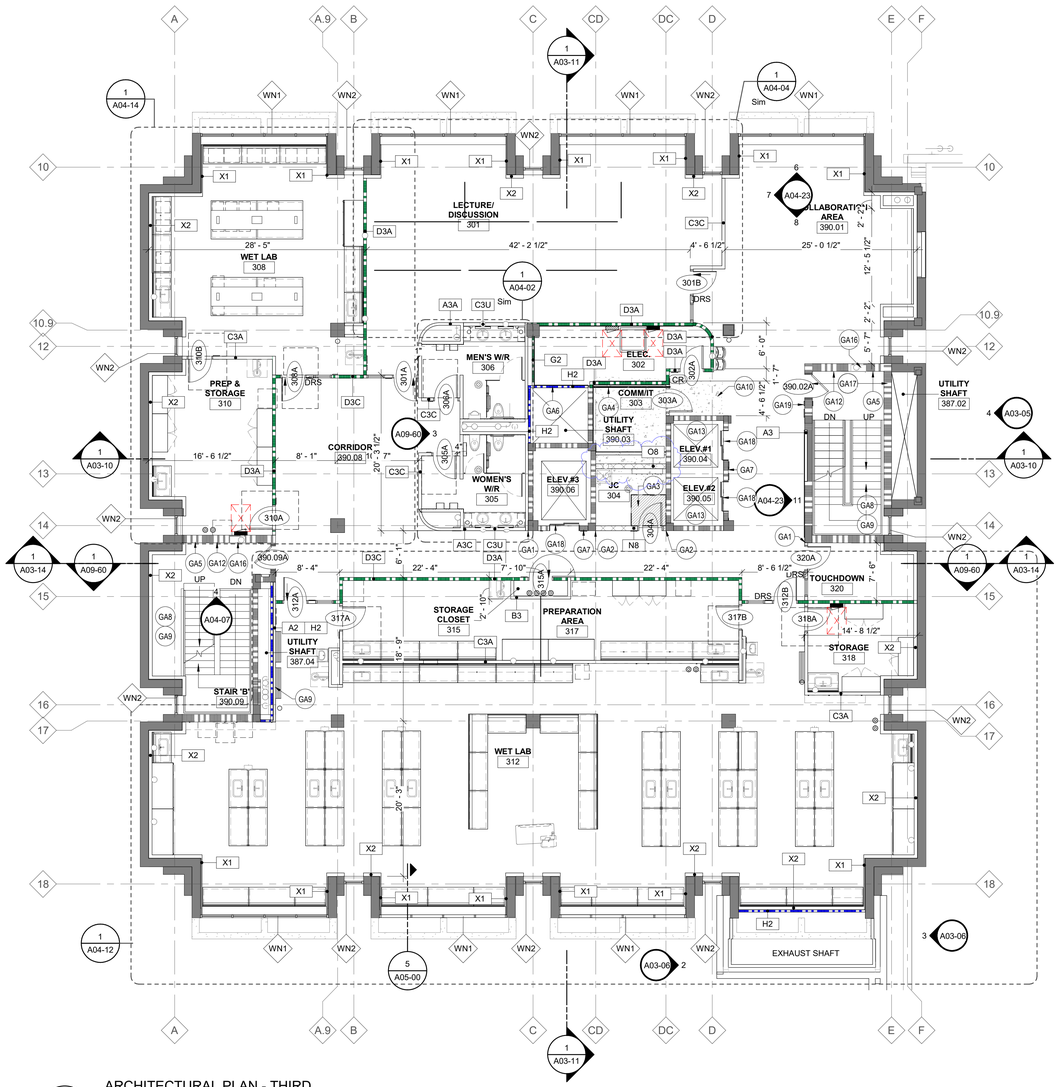
- A NUMBER

EXAMPLE - 1D1
- FIRST FLOOR NOTE
- DEMOLISH NOTE
- KEY NOTE NUMBER



2 A02-05 — ARCHITECTURAL PLAN - FOURTH FLOOR
SCALE: 1/8" = 1'-0"



1 A02-05 — ARCHITECTURAL PLAN - THIRD FLOOR
SCALE: 1/8" = 1'-0"

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
3/15/19	BULLETIN #1	6
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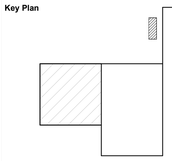
Key Plan



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Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

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WAYNE STATE UNIVERSITY

Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
THIRD AND FOURTH FLOOR PLAN

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A02-05

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ARCHITECTURAL NOTES	
KEY VALUE	NOTE
6A1	DARK ROOM TO HAVE IN USE SIGN ABOVE DOOR. REFER TO ELECT SHEETS.
GA1	ALIGN NEW GYP BD PARTITION WITH EXISTING CONSTRUCTION. REFER TO DETAIL 10/A05-10 FOR TYP GYP TO EXISTING CONSTRUCTION REVEAL.
GA2	TOOTH IN NEW CMU WALL CONSTRUCTION INTO EXITING CMU WALL.
GA3	INFILL SHAFT FLOOR AS INDICATED ON THE PLAN. REFER TO STRUCTURAL SHEETS FOR TYPICAL SLAB INFILL DETAIL. PROVIDE SMOOTH LEVEL FLOOR READY TO ACCEPT NEW FINISHES.
GA4	PROVIDE 3/4" FIRE RETARDANT TREATED PLYWD BACKING FROM 3'-6" AFF TO 8'-0" AFF ON THE NORTH, WEST, AND SOUTH PARTITION WALLS FOR COMM/IT EQUIPMENT MOUNTING.
GA5	EXISTING STAIRWELL FIRE PROTECTION DEVICES IN STAIRWELL INCLUDING PULL STATIONS, PHONE JACK, AND FIRE EXTINGUISHER CABINET TO REMAIN IN PLACE. REPLACE EXISTING FIRE VALVE CABINET AS SCHEDULED.
GA6	ALL WALL PENETRATIONS TO BE CAULKED AND PAINTED, APPLY FIRE CAULK IN REQUIRED RATED PENETRATIONS. SAND SMOOTH FOR FINISHED APPEARANCE AND PREP TO RECEIVE SCHEDULED PAINT FINISH.
GA7	REPLACE ELEVATOR CONTROL PANEL AND CALL STATION IN EXIST CMU WALL.
GA8	REFER TO COMMTECH SHEETS TO CAMERA LOCATIONS.
GA9	CLEAN AND PREP EXISTING STAIRWELL WALLS, STRINGERS, HANDRAILS AND GUARDS. WALLS AND HANDRAILS TO RECEIVE PAINT. REFER TO FINISH PLANS. CLEAN AND PREPARE CONCRETE STEPS FOR EXTRUDED ALUMINUM NOSING TREADS

ARCHITECTURAL NOTES	
KEY VALUE	NOTE
GA10	PLUMBING PENETRATIONS AT CHASE LOCATIONS TO BE GROUTED SOLID. PROVIDE 1/2" CONCRETE TOPPING INFILL FLUSH WITH ADJACENT CONCRETE FLOOR CONSTRUCTION. PREP TO RECEIVE EPOXY SEALANT FINISH .TYPICAL AT ALL EXISTING TOILET ROOMS.
GA11	REFER TO MECH, ELECT AND PLUMBING SHEETS FOR MECHANICAL EQUIPMENT, HOUSEKEEPING PADS, CONDUIT, WIRING, ELECTRICAL PANELS, DUCTING, AND MISC ACCESSORY SCOPE
GA12	EXISTING CONVECTOR UNIT CAVITY TO BE INFILLED.MOUNTED NEW CABINENT UNIT HEATER TO UNDERSIDE OF STAIR LANDING. REFER TO MECH FOR ADDITIONAL INFORMATION.
GA13	EXIST ELEVATOR CAB TO RECEIVE NEW FINISHES AND COMPONENTS. CAB TO RECEIVE MODERN CONTROL PANEL, TWO-WAY COMMUNICATION, ADA SIGNALING AND CAMPUS EMERGENCY PHONE.
GA16	REPLACE EXIST STANDPIPE CABINET. REPAIR WALL WITH 2-HR CMU CONSTRUCTION TO MAINTAIN EXIST FIRE RATING.
GA17	PROVIDE 2-HR CMU IN INFILL AT FORMER DUCT PENETRATIONS OF STAIRWELL PARTITIONS.
GA18	REPLACE EXIST ELEVATOR DOOR. EXISTING JAMB, TRACKS AND ROLLERS & HANGERS TO REMAIN IN PLACE.
GA19	TWO WAY COMMUNICATION. REFER TO COMMTECH SHEETS FOR ADDITIONAL INFORMATION.

FLOOR PLAN LEGEND

- EXISTING PARTITION TO REMAIN
- EXISTING DOOR TO REMAIN
- NEW PARTITION, SEE PARTITION TAGS AND TYPES
- XXX — NEW PARTITION TAG, SEE PARTITION TYPES
- XXX — NEW DOOR & DOOR TAG WITH DOOR NUMBER
- XXX — NEW GLAZING & GLAZING TAG

ROOM NAME
XX — ROOM TAG

- NEW CONCRETE REPAIR
- 1 HOUR PARTITION
- 2 HOUR PARTITION
- EXIST 2 HOUR PARTITION
- EQUIPMENT PROVIDED BY OWNER. INSTALLED BY OWNER

KEY NOTES - DOORS

SYMBOL	DESCRIPTION
CR	CARD READER
AO	AUTOMATIC OPERATOR
PP	PUSH PLATE

KEY TO PARTITION TYPES

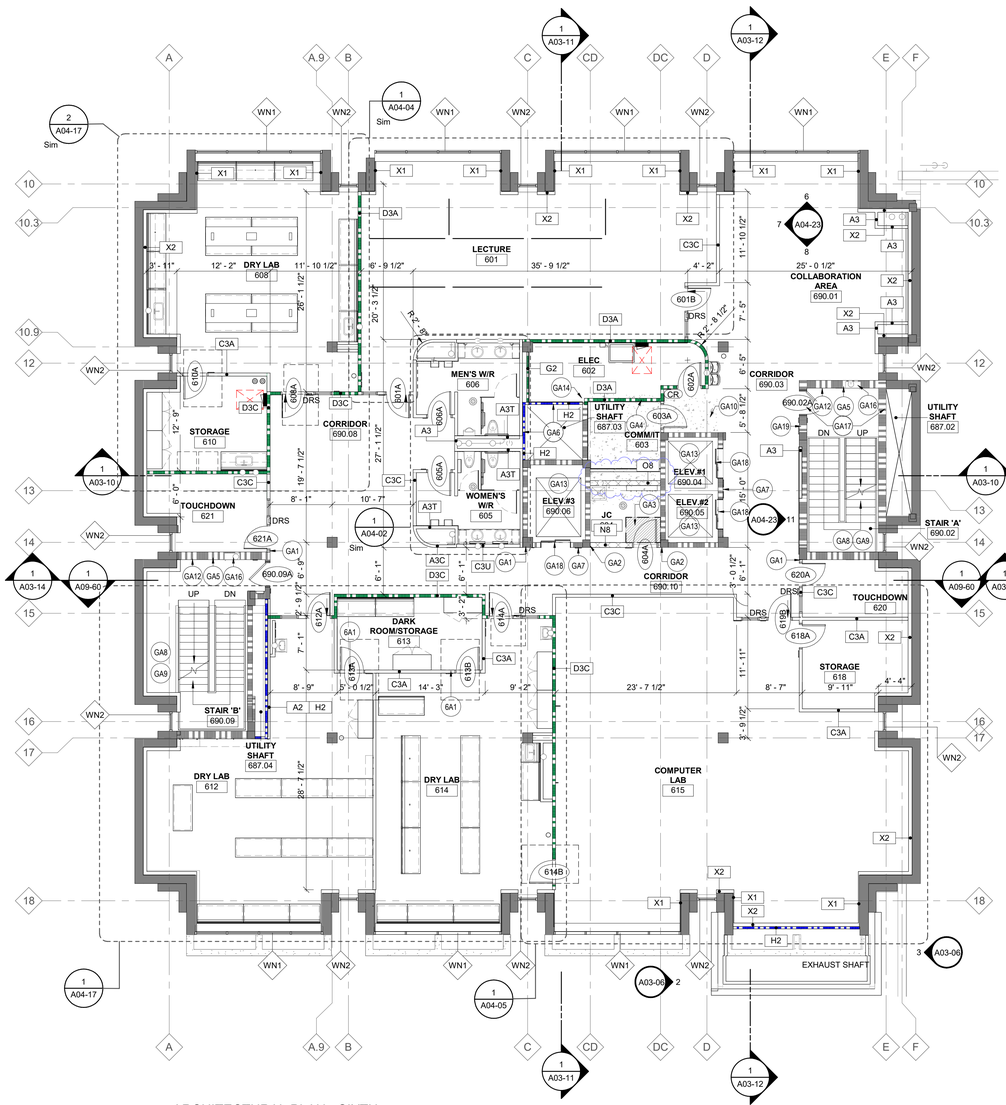
EACH PARTITION IS INDICATED WITH EITHER:
- A LETTER
- A LETTER AND A NUMERIC OR LETTER MODIFIER
- A LETTER, NUMERIC MODIFIER, AND LETTER MODIFIER

EXAMPLE - A2
- LETTER INDICATES PARTITION TYPE
- NUMBER AND/OR LETTER INDICATES MODIFICATION TO THE PARTITION TYPE

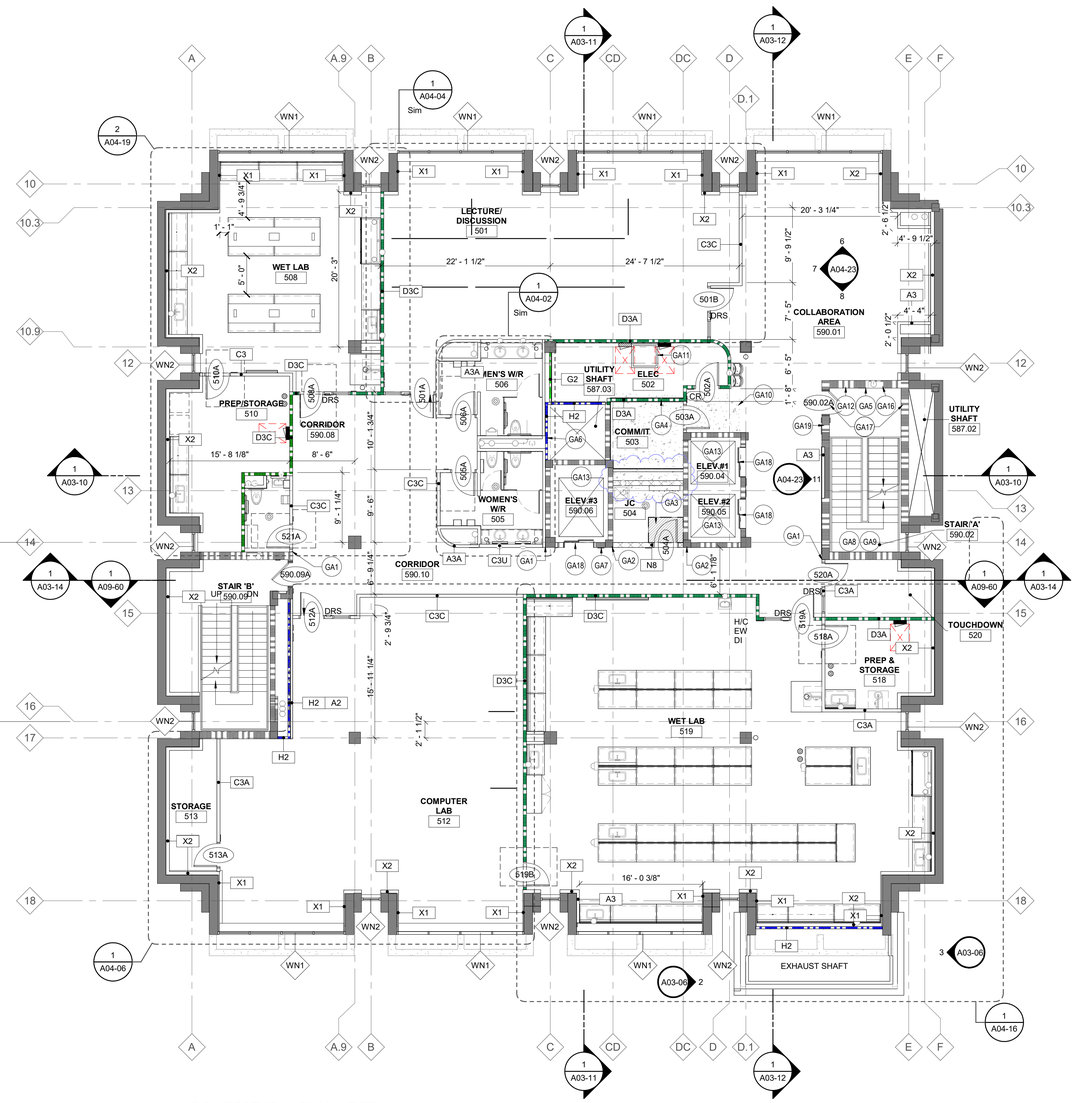
KEY NOTE ABBREVIATION

EACH KEY NOTE IS INDICATED WITH:
- FIRST LETTER
  - -#: FLOOR NOTE
    - B(BASEMENT)
    - S(SUB - BASEMENT)
  - -G: GENERAL NOTE
- SECOND LETTER
  - -D: DEMOLITION
  - -A: ARCHITECTURAL
  - -S: SITE
  - -R: REFLECTED CEILING
- A NUMBER

EXAMPLE - 1D1
- FIRST FLOOR NOTE
- DEMOLISH NOTE
- KEY NOTE NUMBER



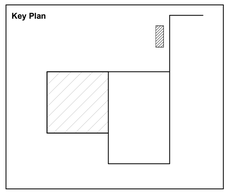
2 A02-06 — ARCHITECTURAL PLAN - SIXTH FLOOR
SCALE: 1/8" = 1'-0"



1 A02-06 — ARCHITECTURAL PLAN - FIFTH FLOOR
SCALE: 1/8" = 1'-0"

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
3/15/19	BULLETIN #1	6
05/03/19	TEST AND BALANCE BID	7

Key Plan



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Landscape: FTCH
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Drawing Title
FIFTH AND SIXTH FLOOR PLAN

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A02-06

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ARCHITECTURAL NOTES	
KEY VALUE	NOTE
GA1	ALIGN NEW GYP BD PARTITION WITH EXISTING CONSTRUCTION. REFER TO DETAIL 10/A05-10 FOR TYP GYP TO EXISTING CONSTRUCTION REVEAL.
GA2	TOOTH IN NEW CMU WALL CONSTRUCTION INTO EXITING CMU WALL.
GA3	INFILL SHAFT FLOOR AS INDICATED ON THE PLAN. REFER TO STRUCTURAL SHEETS FOR TYPICAL SLAB INFILL DETAIL. PROVIDE SMOOTH LEVEL FLOOR READY TO ACCEPT NEW FINISHES.
GA4	PROVIDE 3/4" FIRE RETARDANT TREATED PLYWD BACKING FROM 3'-6" AFF TO 8'-0" AFF ON THE NORTH, WEST, AND SOUTH PARTITION WALLS FOR COMM/IT EQUIPMENT MOUNTING.
GA5	EXISTING STAIRWELL FIRE PROTECTION DEVICES IN STAIRWELL INCLUDING PULL STATIONS, PHONE JACK, AND FIRE EXTINGUISHER CABINET TO REMAIN IN PLACE. REPLACE EXISTING FIRE VALVE CABINET AS SCHEDULED.
GA6	ALL WALL PENETRATIONS TO BE CAULKED AND PAINTED, APPLY FIRE CAULK IN REQUIRED RATED PENETRATIONS. SAND SMOOTH FOR FINISHED APPEARANCE AND PREP TO RECEIVE SCHEDULED PAINT FINISH.
GA7	REPLACE ELEVATOR CONTROL PANEL AND CALL STATION IN EXIST CMU WALL.
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GA10	PLUMBING PENETRATIONS AT CHASE LOCATIONS TO BE GROUTED SOLID. PROVIDE 1/2" CONCRETE TOPPING INFILL FLUSH WITH ADJACENT CONCRETE FLOOR CONSTRUCTION. PREP TO RECEIVE EPOXY SEALANT FINISH .TYPICAL AT ALL EXISTING TOILET ROOMS.
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ARCHITECTURAL NOTES	
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GA14	INFILL CONCRETE AT LOCATION OF JANITOR SINK PENETRATIONS.
GA15	CORE SLAB AS REQ'D FOR SCHEDULED RISERS. REFER TO PLUMBING SHEETS FOR ADDITIONAL SCOPE.
GA16	REPLACE EXIST STANDPIPE CABINET. REPAIR WALL WITH 2-HR CMU CONSTRUCTION TO MAINTAIN EXIST FIRE RATING.
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GA19	TWO WAY COMMUNICATION. REFER TO COMMTECH SHEETS FOR ADDITIONAL INFORMATION.
PA1	ELEVATOR MACHINE ROOM TRACTION MACHINES, CONTROL CABINETS, GOVERNORS, MOTORS AND ASSOCIATED WIRING TO BE REPLACED. DEDICATED EXHAUST ENCLOSURES TO BE INSTALLED AS PART OF WORK.
PA2	REFER TO MECH, ELECT AND PLUMBING SHEETS FOR MECHANICAL EQUIPMENT, HOUSEKEEPING PADS, CONDUIT, WIRING, ELECTRICAL PANELS, DUCTING, AND MISC ACCESSORY SCOPE
PA3	REPLACEMENT LOUVER WITHIN EXISTING MASONRY OPENING.
PA4	EXISTING MACHINE ROOM VERTICAL PLENUM OPENING TO BE INFILLED WITH 2-HR RATED 8" NOMINAL CMU INFILL.

FLOOR PLAN LEGEND

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- EXISTING DOOR TO REMAIN
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ROOM NAME

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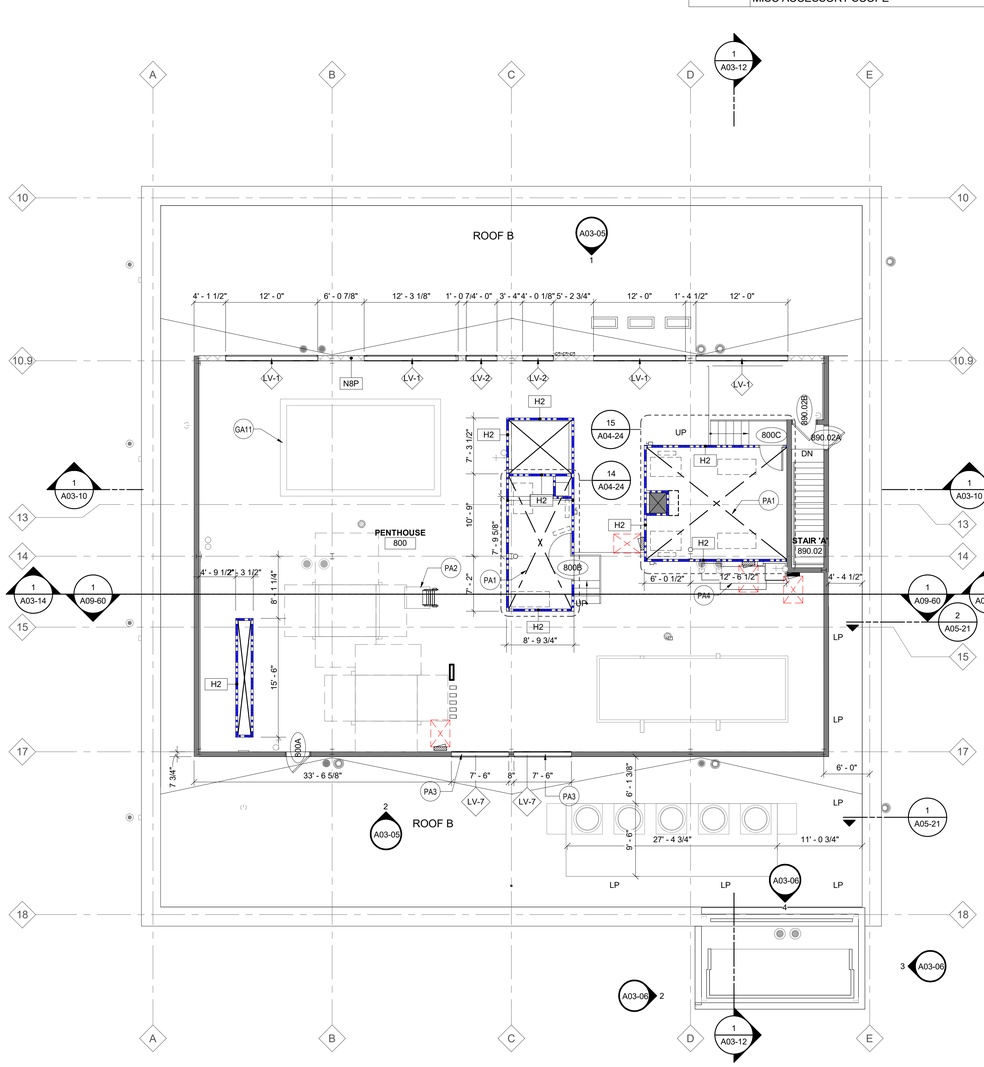
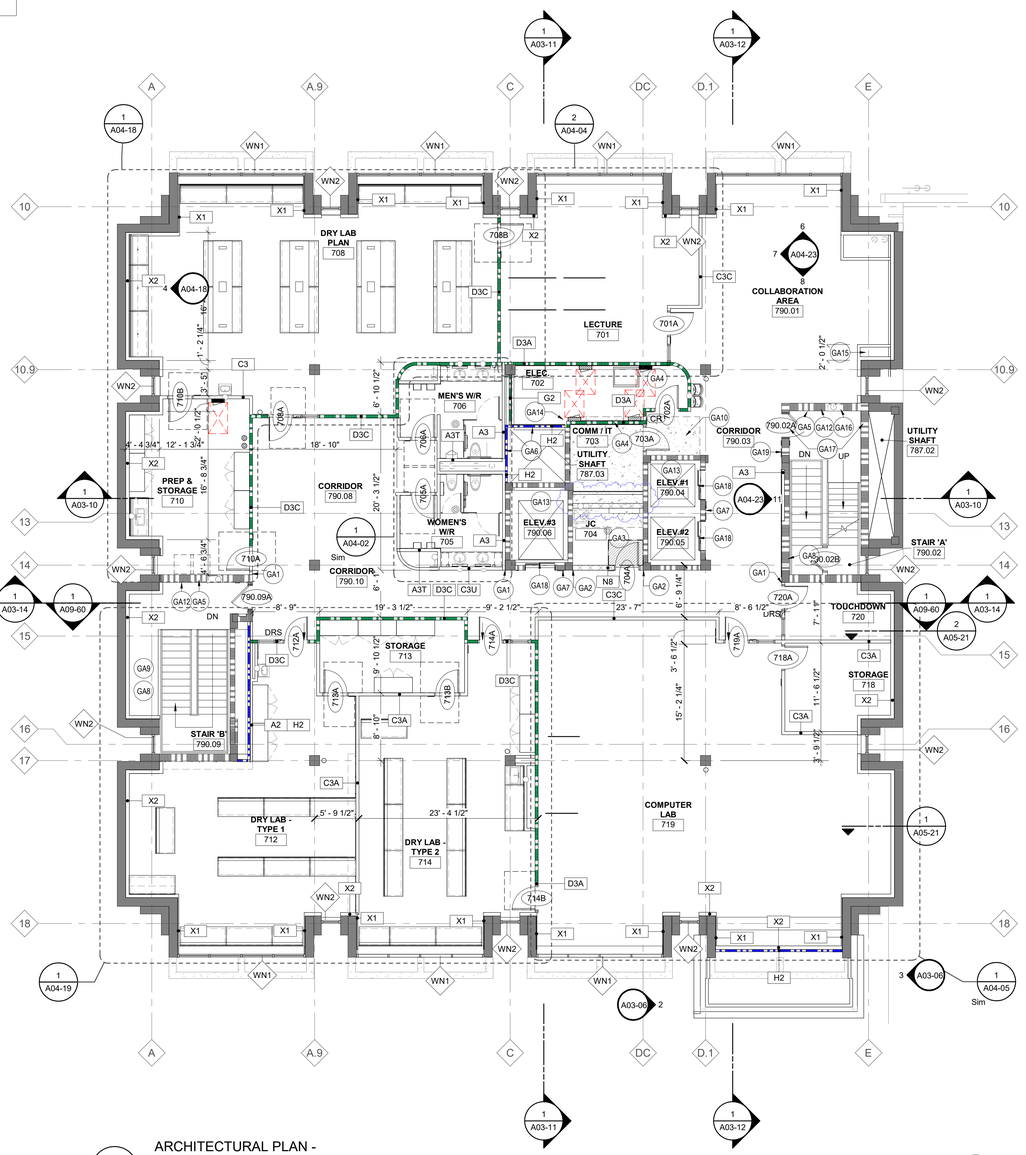
  - -R: REFLECTED CEILING
- A NUMBER

EXAMPLE - 1D1
- FIRST FLOOR NOTE
- DEMOLISH NOTE
- KEY NOTE NUMBER



2 A02-07 — ARCHITECTURAL PLAN - PENTHOUSE
SCALE: 1/8" = 1'-0"



1 A03-01 — ARCHITECTURAL PLAN - SEVENTH FLOOR
SCALE: 1/8" = 1'-0"

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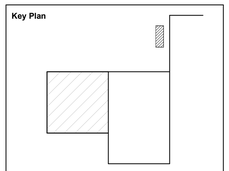
12/21/18	100% CD PACKAGE	3
3/15/19	BULLETIN #1	6
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
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DETROIT, MI 48202

Drawing Title
SEVENTH AND PENTHOUSE FLOOR PLAN

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A02-07

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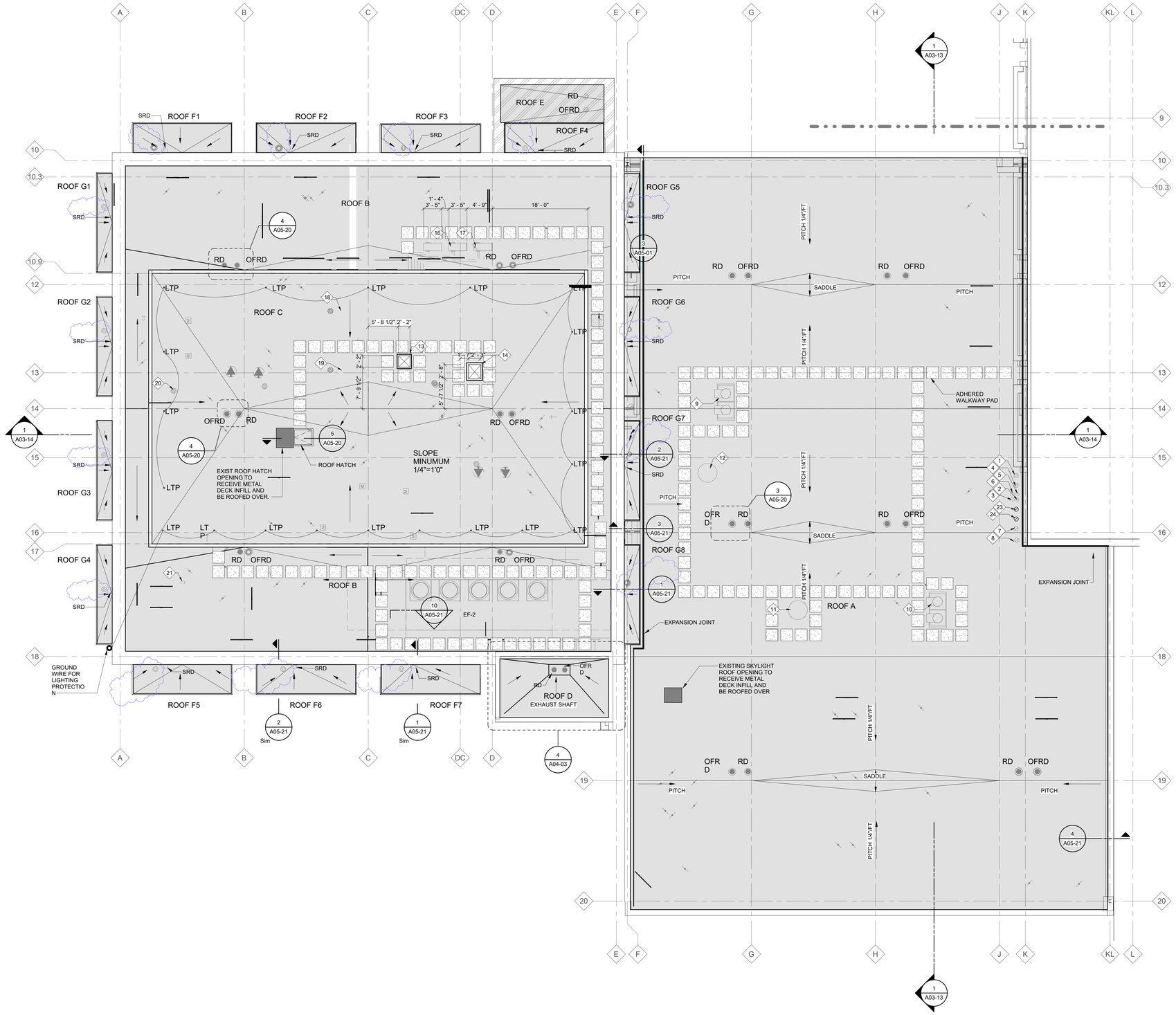


1 A02-08 ARCHITECTURAL PLAN - ROOF FLOOR
SCALE: 1/8" = 1'-0"

ROOF SYMBOLS LEGEND

X	ROOF OPENING TAG
LP	LIGHTNING PROTECTION

ROOF SCHEDULE

MARK	SQ FT	TYPE	SUBSTRATE	REMARKS
A	11,600 SQ FT	BUR	GYP ROOF DECK	
B	3,900 SQ FT	BUR	CONCRETE SLAB	
C	4,200 SQ FT	BUR	GYP ROOF DECK	
D	210 SQ FT	BUR	METAL DECK	REQUIRES BASEBOARD
E	190 SQ FT	BUR	METAL DECK	REQUIRES BASEBOARD
F1-F7	(7) @ 110 SQ FT 777 TOTAL SQ FT	BUR	CONCRETE SLAB	
G1-G8	(8) @ 60 SQ FT 480 TOTAL SQ FT	BUR	CONCRETE SLAB	
	21,400 SQ FT TOTAL			

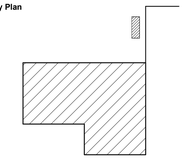
ROOF OPENING SCHEDULE

MARK	OPENING SIZE	DETAIL NUMBER	FURNISHED BY	REMARKS
1	10" DIA	6/A05-21	CONTRACTOR	BOILER EXHAUST
2	4" DIA	6/A04-21	CONTRACTOR	PLUMBING VENT
3	4" DIA	6/A04-21	CONTRACTOR	PLUMBING VENT
4	10" DIA	6/A04-21	CONTRACTOR	BOILER EXHAUST
5	4" DIA	6/A04-21	CONTRACTOR	PLUMBING VENT
6	4" DIA	6/A05-21	CONTRACTOR	PLUMBING VENT
7	10" DIA	6/A04-21	CONTRACTOR	BOILER EXHAUST
8	10" DIA	6/A05-21	CONTRACTOR	BOILER EXHAUST
9	3'-3" X 6'-10"	11/A05-20	CONTRACTOR	EXHAUST FAN UPBLAST
10	3'-3" X 6'-10"	11/A05-20	CONTRACTOR	EXHAUST FAN UPBLAST
11	2'-2" X 2'-2"	11/A05-20	CONTRACTOR	EXHAUST FAN CENTRIFUGAL UPBLAST
12	2'-2" X 2'-2"	11/A05-20	CONTRACTOR	EXHAUST FAN CENTRIFUGAL UPBLAST
13	2'-2" X 2'-2"	11/A05-20	CONTRACTOR	EMERGENCY SMOKE EXHAUST LOUVER
14	2'-4" X 2'-11"	11/A05-20	CONTRACTOR	EMERGENCY SMOKE EXHAUST LOUVER
15	NO OPENING	11/A05-20	CONTRACTOR	CONDUCTOR
16	NO OPENING	11/A05-20	CONTRACTOR	CONDUCTOR
17	NO OPENING	11/A05-20	CONTRACTOR	CONDUCTOR
18	12" DIA	6/A05-21	CONTRACTOR	STACK -REFER TO PLUMBING FOR LOCATION
19	12" DIA	6/A05-21	CONTRACTOR	STACK -REFER TO PLUMBING FOR LOCATION
20	12" DIA	6/A05-21	CONTRACTOR	STACK -REFER TO PLUMBING FOR LOCATION
21	4" DIA	6/A05-21	CONTRACTOR	PLUMBING VENT
22	NO OPENING	8/A05-21	CONTRACTOR	STACK
23	10" DIA	6/A04-21	CONTRACTOR	BOILER EXHAUST
24	10" DIA	6/A05-21	CONTRACTOR	BOILER EXHAUST

NOTE: ALL PENITRATIONS MUST BE AT A MINIMUM 12" ABOVE FROM EACH OTHER.

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
01/14/19	ADDENDUM #1	4
3/15/19	BULLETIN #1	6
05/03/19	TEST AND BALANCE BID	7

Key Plan



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Drawing Title
ROOF PLAN

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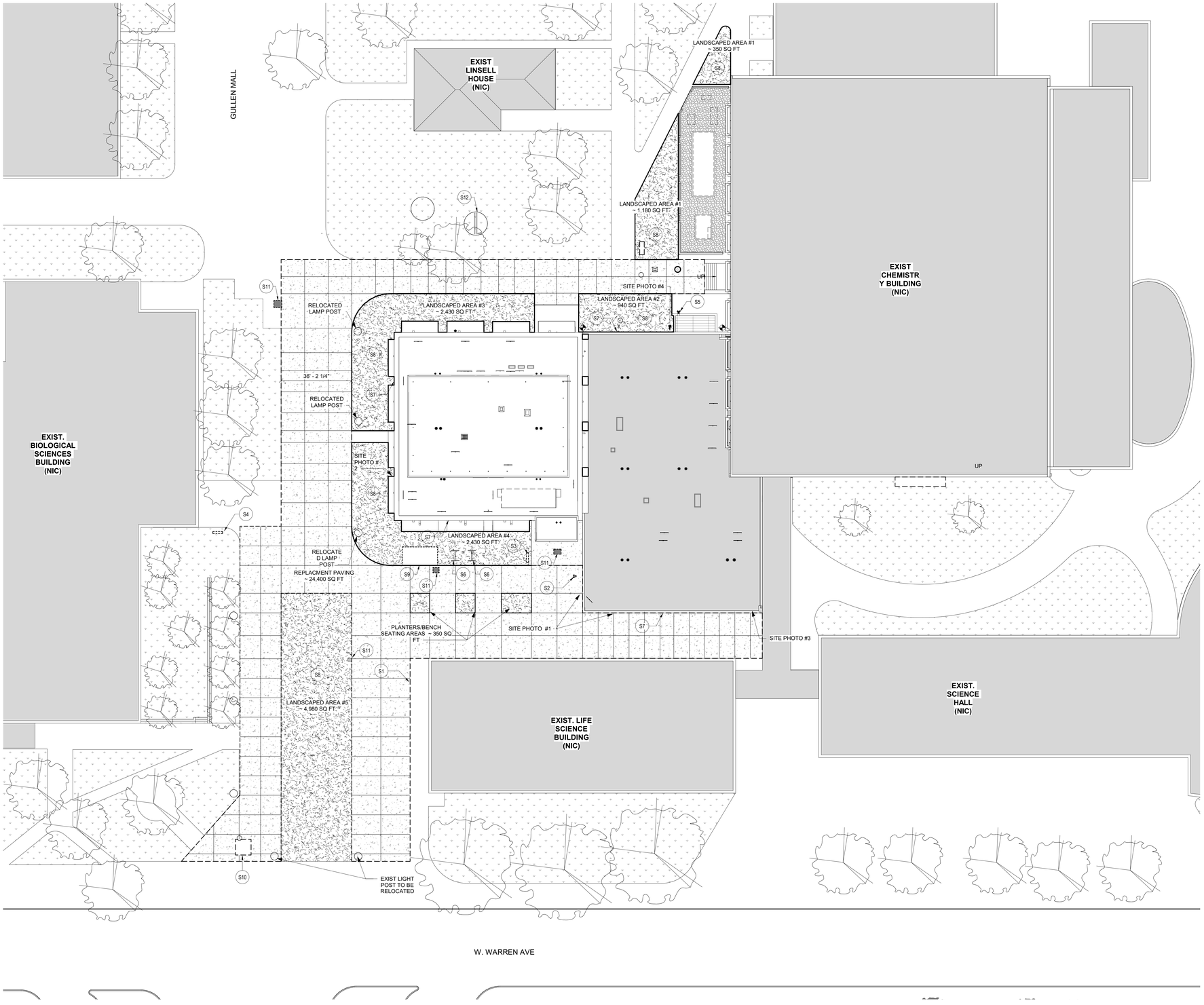


1 A02-09 SITE PLAN
SCALE: 3/64" = 1'-0"

SITE PLAN LEGEND

- CONCRETE REPAIR / NEW CONCRETE SLAB
- EXIST LANDSCAPING
- NEW LANDSCAPE AREA
- BUILDINGS NOT IN SCOPE
- FDC LOCATION
- OVRD LOCATION
- XX SHEET NOTE

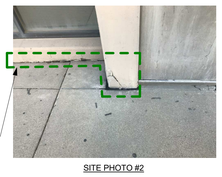
ARCHITECTURAL NOTES

KEY VALUE	NOTE
S1	REPLACE EXISTING CONCRETE WALKWAY PAVING TO THE EXTENTS SHOWN. REFER TO CIVIL SHEETS FOR ADDITIONAL SCOPE.
S2	PEDESTAL FIRE DEPARTMENT CONNECTION LOCATION FOR STEM INNOVATION LEARNING CENTER.
S3	SCHEDULED BUILDING SIGNAGE ON NEW CONCRETE FOUNDATION PAD.
S4	REINSTALL EXIST BUILDING SIGNAGE AT ORIGINAL LOCATION ON REPLACEMENT CONC FNDN PAD.
S5	EXISTING CHEMISTRY BUILDING FIRE DEPARTMENT CONNECTION TO BE REINSTALLED AT ORIGINAL LOCATION AT WORK'S COMPLETION.
S6	GALV STEEL BIKE RACKS W/ DUAL SIDED APPROACHES.
S7	PERIMETER CONCRETE FOUNDATION WALLS TO BE REVIEWED FOR CRACKING/SPALLING DAMAGE AT GRADE. PATCH AND REPAIR DEFICIENT MATERIALS WITH PATCHING COMPOUND.
S8	AREA TO RECEIVE LANDSCAPING. FINAL LANDSCAPING SCOPE TBD. FINAL LANDSCAPING SCOPE NOT TO EXCEED AGREED UPON PROJECT BUDGET ALLOCATED FOR LANDSCAPING FEATURES.
S9	MANUFACTURED COVERED BIKE ASSEMBLY LOCATION. COORDINATION INSTALLATION REQUIRMENTS WITH MANUFACTURER'S INSTRUCTIONS.
S10	EXISTING ART INSTALLATION PC TO BE REINSTALLED AT PREVIOUS LOCATION.
S11	EXIST STORM INLETS TO REMAIN IN SERVICE DURING CONSTRUCTION. AVOID DAMAGE DURING CONCRETE WALKWAY DEMOLITION AND SCHEDULED WATER MAIN CONNECTION WORK. REFER TO CIVIL SHEETS FOR ADDITIONAL SCOPE.
S12	REINSTALL EXIST SCULPTURE AT PROJECT COMPLETION.

REPLACE EXIST LIMESTONE CLADDING PANELS IN THEIR ENTIRETY

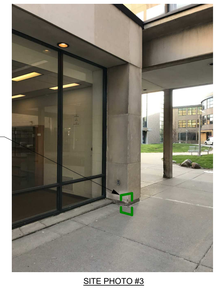
SITE PHOTO #1

EXAMPLE OF CRACKED CONCRETE DAMAGE TO BE PATCH REPAIRED. TYP @ PERIMETER FOUNDATION WALL



SITE PHOTO #2

EXAMPLE OF LIMESTONE PANEL DAMAGE TO BE PATCH REPAIRED. TYP @ PERIMETER FOUNDATION FIRST FLOOR LIMESTONE CLADDING



SITE PHOTO #3

TYPICAL EXAMPLE OF CRACKED CONCRETE DAMAGE TO BE PATCH REPAIRED. TYP @ PERIMETER FOUNDATION WALL

SITE PHOTO #4

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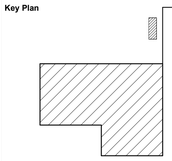
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil:	FTC&H
Landscape:	FTCH
Architecture	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

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Project Manager: A. NOLFF	BIM Lead: R. HAAS
Design Lead: C. MENARD	Drawn: R. HAAS
Project Leader: C. MENARD	Checked: G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
ARCHITECTURAL SITE PLAN

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A02-09

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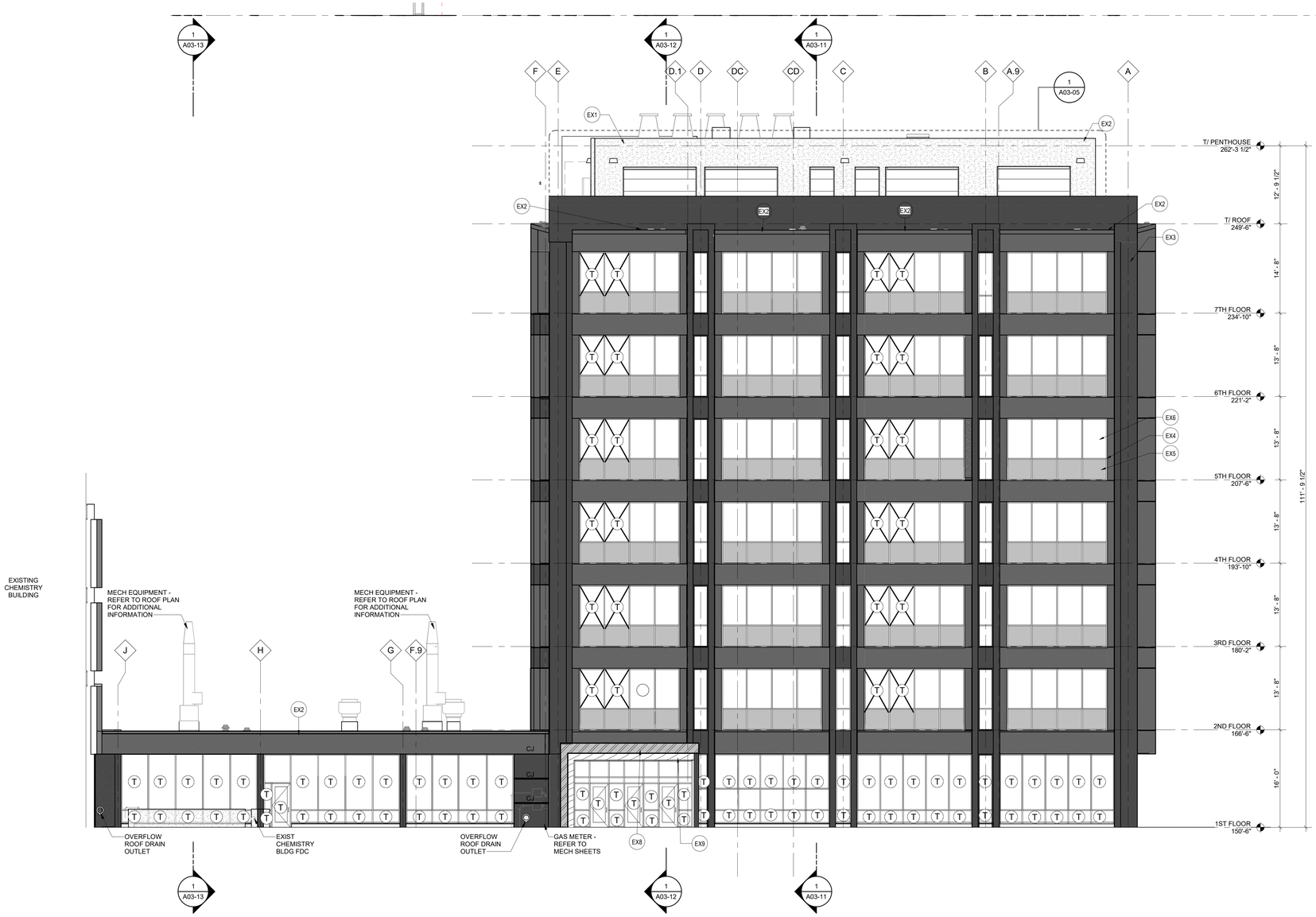
EXTERIOR ELEVATION LEGEND	
	EXPT-1 (BASIS OF DESIGN: SHERWIN WILLIAMS SW6258 TRICORN BLACK)
T	1" TEMPERED GLASS INFILL

EXTERIOR MATERIAL SCHEDULE			
MATERIAL VALUE	MANUFACTURER (BOD)	DESCRIPTION	FINISH
EX1	N/A	NEW PARGE COAT OVER CMU CONSTRUCTION	MATCH EXIST
EX2	N/A	ALUMINUM EDGE FLASHING	BLACK ANODIZED
EX3	ALTERNATE #1	EXIST EXT. CONCRETE FRAMING & STONE VENEER	PAINT EXPT-1
EX4	KAWNEER 451UT	STOREFRONT SYSTEM	BLACK ANODIZED
EX5	GUARDIAN GLASS	SPANDREL GLAZING - 1" INFILL	PER MANUFACTURER
EX6	GUARDIAN GLASS	VISION GLAZING - 1" INFILL	PER MANUFACTURER
EX7	NOT USED	NOT USED	NOT USED
EX8	CENTRIA	DIMENSION SERIES 2 1/2" INSULATED METAL PANEL	9916 RICH BLACK
EX9	PRODEMA	PRODEX NATURAL WOOD VENEER	RUSTIK

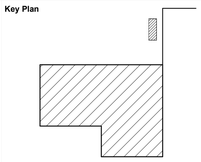
BID ALTERNATE #1:
PAINT ENTIRETY OF EXIST EXTERIOR EXPOSED CONCRETE COLUMNS, BEAMS AND STONE VENEER W/ EXTERIOR LATEX PAINT - BASIS OF DESIGN



1 A03-01 NORTH ELEVATION
SCALE: 1/8" = 1'-0"

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
01/14/19	ADDENDUM #1	4
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

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Project Manager	BIM Lead
A. NOLFF	R. HAAS
Design Lead	Drawn
C. MENARD	R. HAAS
Project Leader	Checked
C. MENARD	G. KARANFILOVSKI

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Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
NORTH ELEVATION

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A03-01

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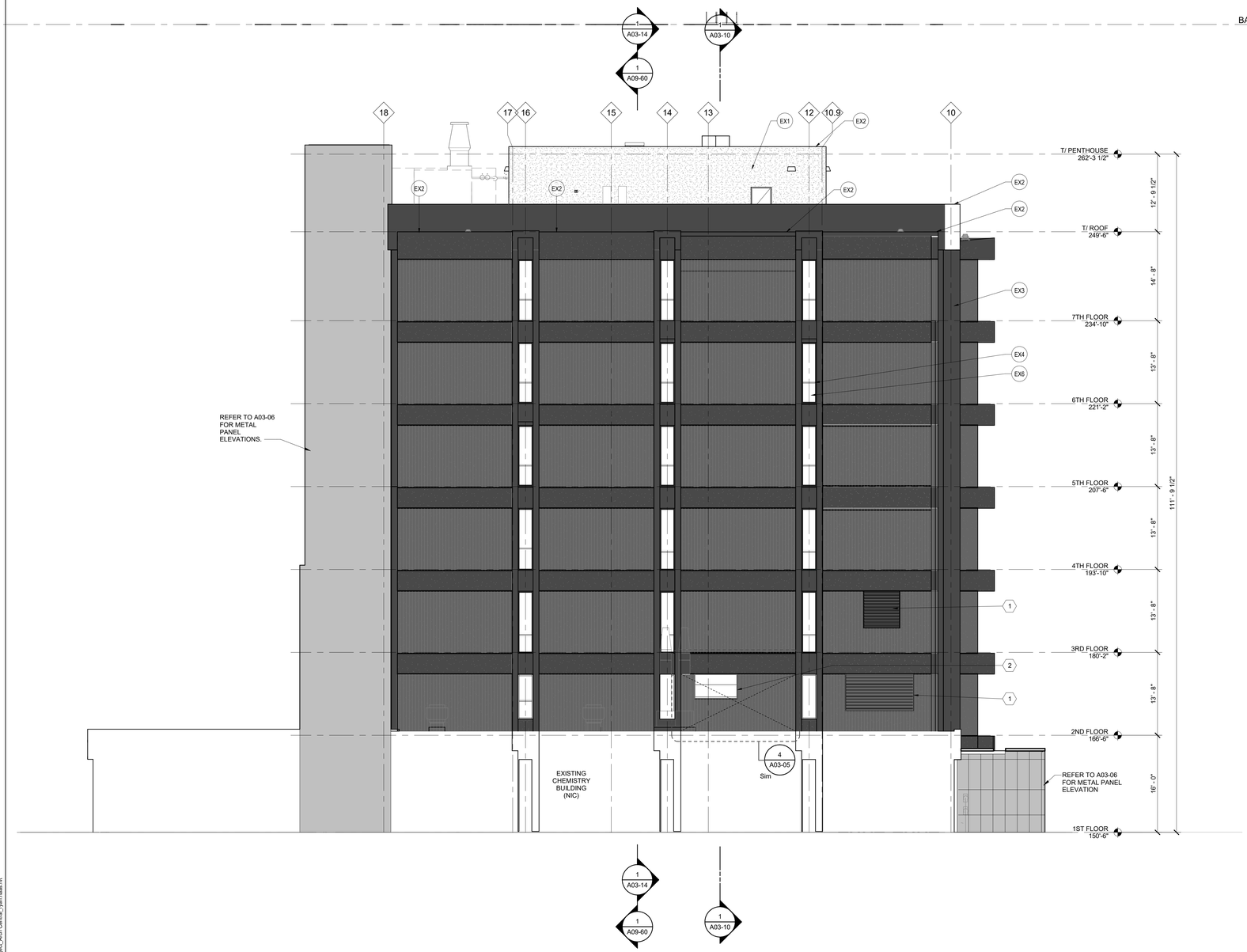


1 A03-02 EAST ELEVATION

SCALE: 1/8" = 1'-0"

EXTERIOR ELEVATION LEGEND

EXPT-1 (BASIS OF DESIGN: SHERWIN WILLIAMS SW6258 TRICORN BLACK)

T — 1" TEMPERED GLASS INFILL

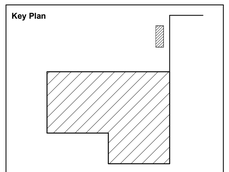
EXTERIOR MATERIAL SCHEDULE

MATERIAL VALUE	MANUFACTURER (BOD)	DESCRIPTION	FINISH
EX1	N/A	NEW PARGE COAT OVER CMU CONSTRUCTION	MATCH EXIST
EX2	N/A	ALUMINUM EDGE FLASHING	BLACK ANODIZED
EX3	ALTERNATE #1	EXIST EXT. CONCRETE FRAMING & STONE VENEER	PAINT EXPT-1
EX4	KAWNEER 451UT	STOREFRONT SYSTEM	BLACK ANODIZED
EX5	GUARDIAN GLASS	SPANDREL GLAZING - 1" INFILL	PER MANUFACTURER
EX6	GUARDIAN GLASS	VISION GLAZING - 1" INFILL	PER MANUFACTURER
EX7	NOT USED	NOT USED	NOT USED
EX8	CENTRIA	DIMENSION SERIES 2 1/2" INSULATED METAL PANEL	9916 RICH BLACK
EX9	PRODEMA	PRODEX NATURAL WOOD VENEER	RUSTIK

BID ALTERNATE #1:
PAINT ENTIRETY OF EXIST EXTERIOR EXPOSED CONCRETE COLUMNS, BEAMS AND STONE VENEER W/ EXTERIOR LATEX PAINT - BASIS OF DESIGN

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

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Project Manager	BIM Lead
A. NOLFF	R. HAAS
Design Lead	Drawn
C. MENARD	R. HAAS
Project Leader	Checked
C. MENARD	G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project

STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

EAST ELEVATION

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A03-02

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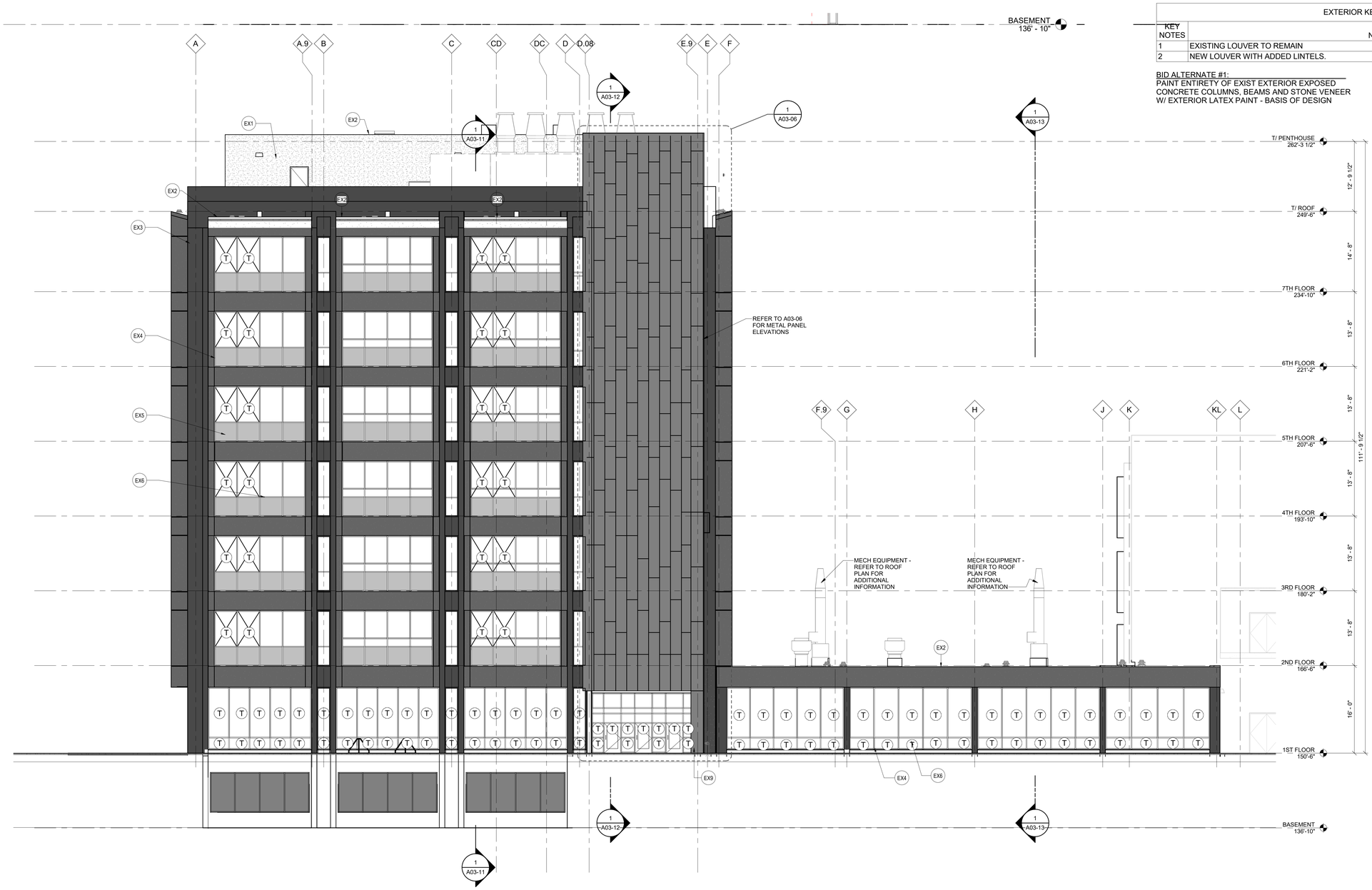

1 / A03-03 SOUTH ELEVATION
SCALE: 1/8" = 1'-0"

EXTERIOR ELEVATION LEGEND

	EXPT-1 (BASIS OF DESIGN: SHERWIN WILLIAMS SW6258 TRICORN BLACK)
T	1" TEMPERED GLASS INFILL

EXTERIOR MATERIAL SCHEDULE

MATERIAL VALUE	MANUFACTURER (BOD)	DESCRIPTION	FINISH
EX1	N/A	NEW PARGE COAT OVER CMU CONSTRUCTION	MATCH EXIST
EX2	N/A	ALUMINUM EDGE FLASHING	BLACK ANODIZED
EX3	ALTERNATE #1	EXIST EXT. CONCRETE FRAMING & STONE VENEER	PAINT EXPT-1
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EX5	GUARDIAN GLASS	SPANDREL GLAZING - 1" INFILL	PER MANUFACTURER
EX6	GUARDIAN GLASS	VISION GLAZING - 1" INFILL	PER MANUFACTURER
EX7	NOT USED	NOT USED	NOT USED
EX8	CENTRIA	DIMENSION SERIES 2 1/2" INSULATED METAL PANEL	9916 RICH BLACK
EX9	PRODEMA	PRODEX NATURAL WOOD VENEER	RUSTIK

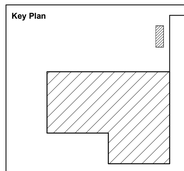
EXTERIOR KEY NOTES

KEY NOTES	NOTES
1	EXISTING LOUVER TO REMAIN
2	NEW LOUVER WITH ADDED LINTELS.

BID ALTERNATE #1:
PAINT ENTIRETY OF EXIST EXTERIOR EXPOSED CONCRETE COLUMNS, BEAMS AND STONE VENEER W/ EXTERIOR LATEX PAINT - BASIS OF DESIGN

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants
Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Design Lead: C. MENARD	Drawn: R. HAAS
Project Leader: C. MENARD	Checked: G. KARANFILOVSKI

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Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
SOUTH ELEVATION

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A03-03

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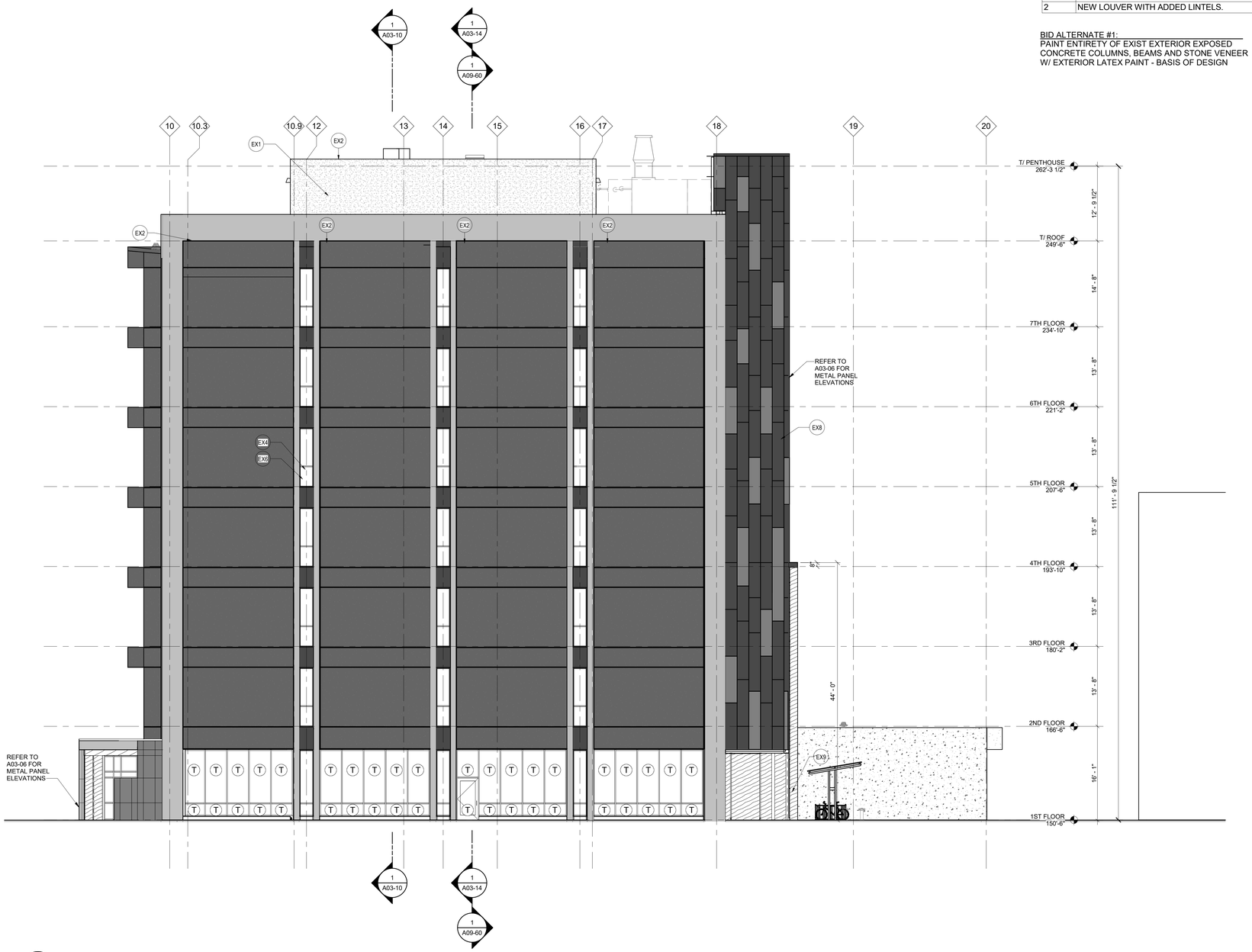


1 / A03-04 WEST ELEVATION
SCALE: 1/8" = 1'-0"

EXTERIOR ELEVATION LEGEND

EXPT-1 (BASIS OF DESIGN: SHERWIN WILLIAMS SW6258 TRICORN BLACK)

T — 1" TEMPERED GLASS INFILL

EXTERIOR MATERIAL SCHEDULE

MATERIAL VALUE	MANUFACTURER (BOD)	DESCRIPTION	FINISH
EX1	N/A	NEW PARGE COAT OVER CMU CONSTRUCTION	MATCH EXIST
EX2	N/A	ALUMINUM EDGE FLASHING	BLACK ANODIZED
EX3	ALTERNATE #1	EXIST EXT. CONCRETE FRAMING & STONE VENEER	PAINT EXPT-1
EX4	KAWNEER 451UT	STOREFRONT SYSTEM	BLACK ANODIZED
EX5	GUARDIAN GLASS	SPANDREL GLAZING - 1" INFILL	PER MANUFACTURER
EX6	GUARDIAN GLASS	VISION GLAZING - 1" INFILL	PER MANUFACTURER
EX7	NOT USED	NOT USED	NOT USED
EX8	CENTRIA	DIMENSION SERIES 2 1/2" INSULATED METAL PANEL	9916 RICH BLACK
EX9	PRODEMA	PRODEX NATURAL WOOD VENEER	RUSTIK

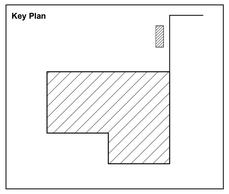
EXTERIOR KEY NOTES

KEY NOTES	NOTES
1	EXISTING LOUVER TO REMAIN
2	NEW LOUVER WITH ADDED LINTELS.

BID ALTERNATE #1:
PAINT ENTIRETY OF EXIST EXTERIOR EXPOSED CONCRETE COLUMNS, BEAMS AND STONE VENEER W/ EXTERIOR LATEX PAINT - BASIS OF DESIGN

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Manager: A. NOLFF	BIM Lead: R. HAAS
Design Lead: C. MENARD	Drawn: R. HAAS
Project Leader: C. MENARD	Checked: G. KARANFILOVSKI

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Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
WEST ELEVATION

Scale As indicated

Project No. JCDT17-0231

Drawing No.
A03-04

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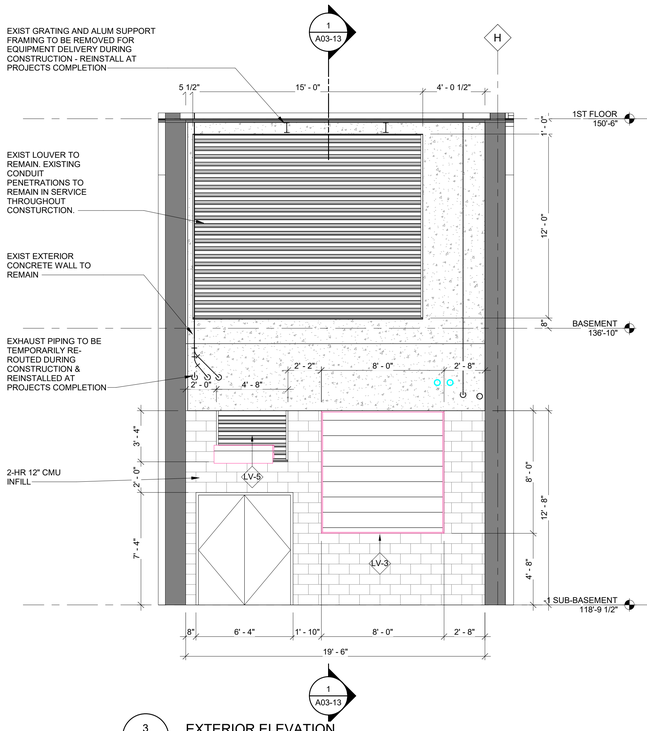
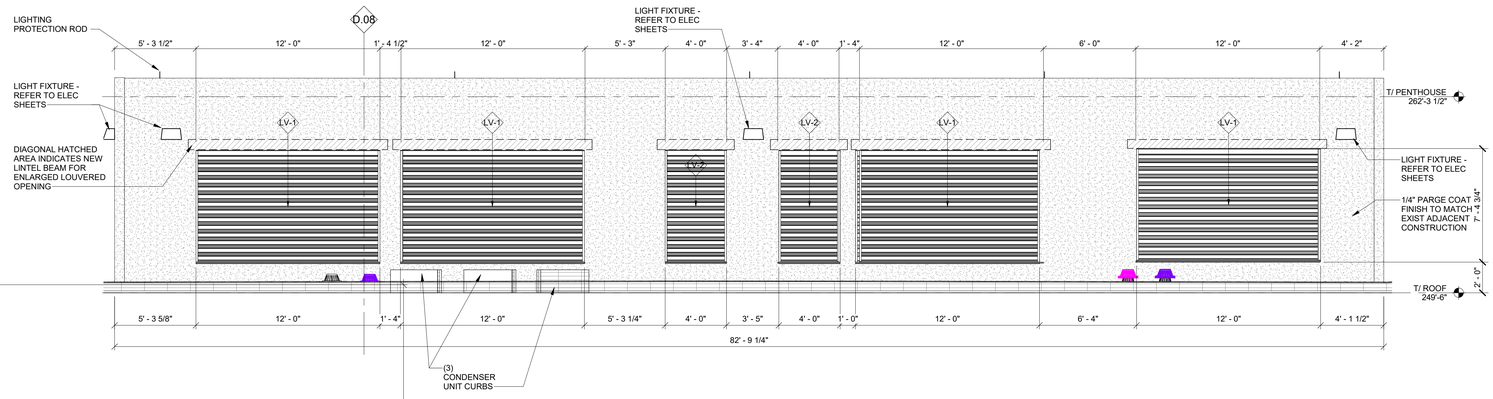
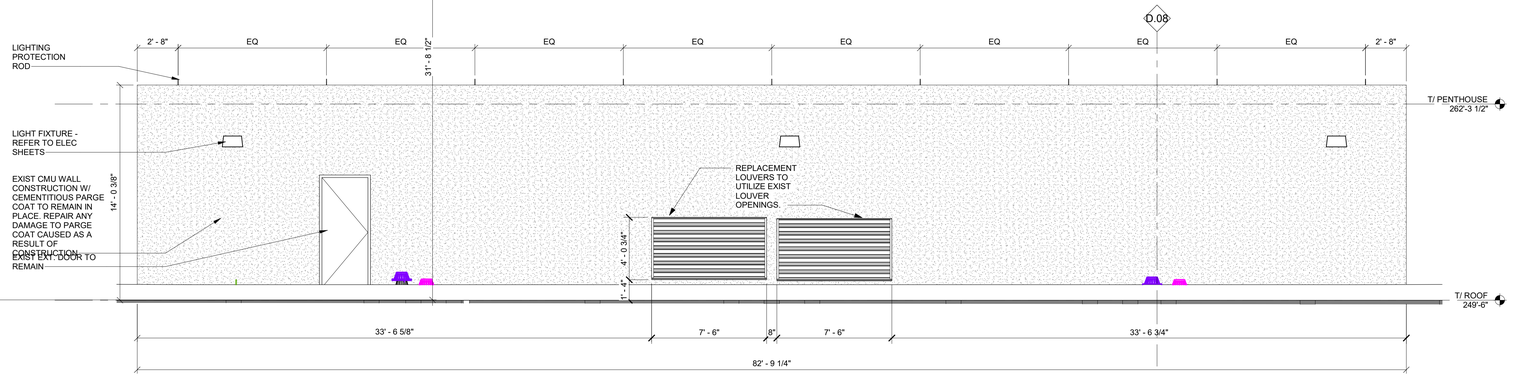


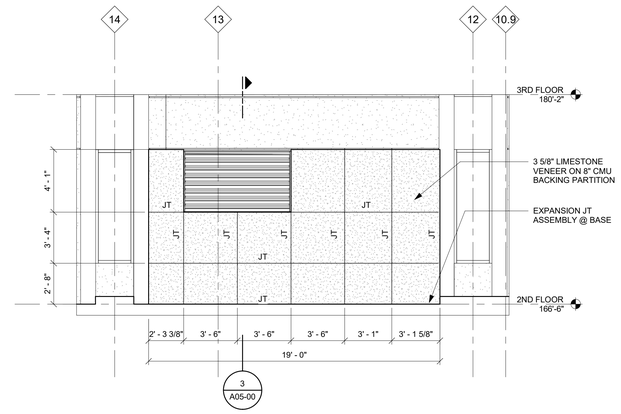
3 A03-05 EXTERIOR ELEVATION
SCALE: 1/4" = 1'-0"



1 A03-05 PENTHOUSE NORTH ELEVATION
SCALE: 1/4" = 1'-0"



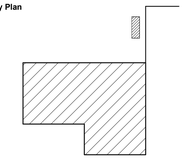
2 A03-05 PENTHOUSE SOUTH ELEVATION
SCALE: 1/4" = 1'-0"



4 A03-05 ELEVATION
SCALE: 1/4" = 1'-0"

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Design Lead	Drawn
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Project Leader	Checked
C. MENARD	G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

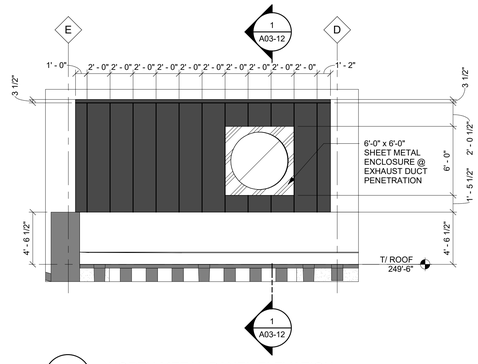
Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

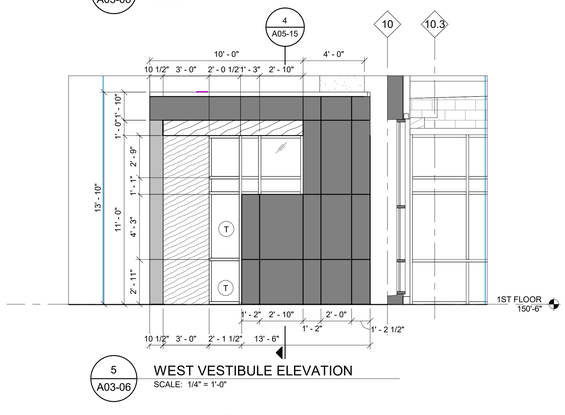
Drawing Title
EXTERIOR ELEVATIONS

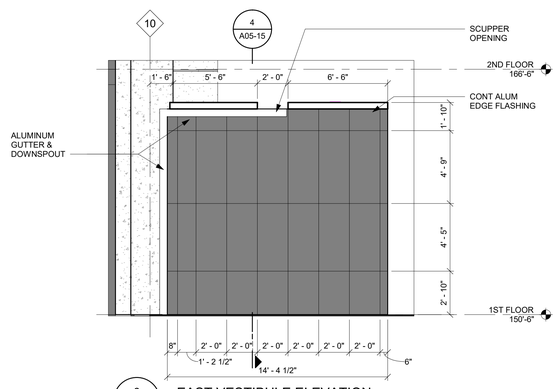
Scale 1/4" = 1'-0"

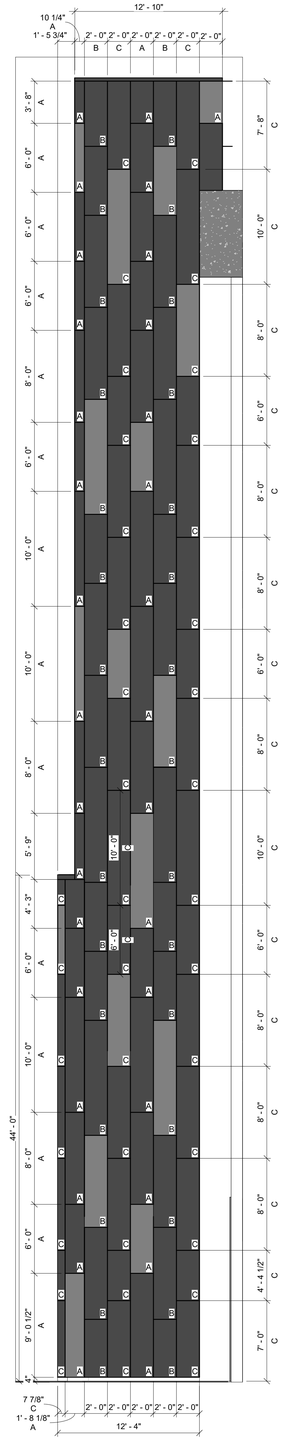
Project No. JCDT17-0231

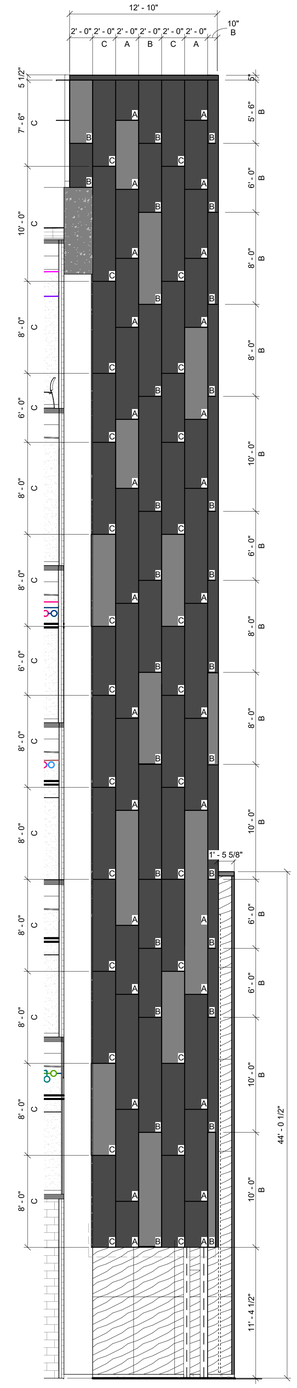
Drawing No.
A03-05











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4 A03-06 NORTH METAL PANEL ELEVATION

SCALE: 3/16" = 1'-0"

5 A03-06 WEST VESTIBULE ELEVATION

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

6 A03-06 EAST VESTIBULE ELEVATION

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

7 A03-06 NORTH VESTIBULE ELEVATION

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

3 A03-06 EAST METAL PANEL ELEVATION

SCALE: 3/16" = 1'-0"

2 A03-06 WEST METAL PANEL ELEVATION

SCALE: 3/16" = 1'-0"

INSULATED METAL PANEL FINISH KEY

▩	CENTRIA FLUOROFINISH RICH BLACK
▨	CENTRIA FLUOROFINISH : LG RICH BLACK

NOTE: "A", "B", AND "C" PANEL DESIGNATIONS REFER TO THE VERTICAL DIMENSION STRINGS - TYP ELEVATIONS 1-3 THIS SHEET.

1 A03-06 SOUTH METAL PANEL ELEVATION

SCALE: 3/16" = 1'-0"

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
01/14/19	ADDENDUM #1	4
05/03/19	TEST AND BALANCE BID	7

Key Plan

Consultants

Civil:	FTC&H
Landscape:	FTCH
Architecture	NORR
Structural:	FTC&H
Mechanical:	FTC&H
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Design Lead C. MENARD	Drawn R. HAAS
Project Leader C. MENARD	Checked G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project

STEM INNOVATION
LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

METAL PANEL SYSTEM
ELEVATIONS

Scale As indicated

Project No. JCDT17-0231

Drawing No. A03-06

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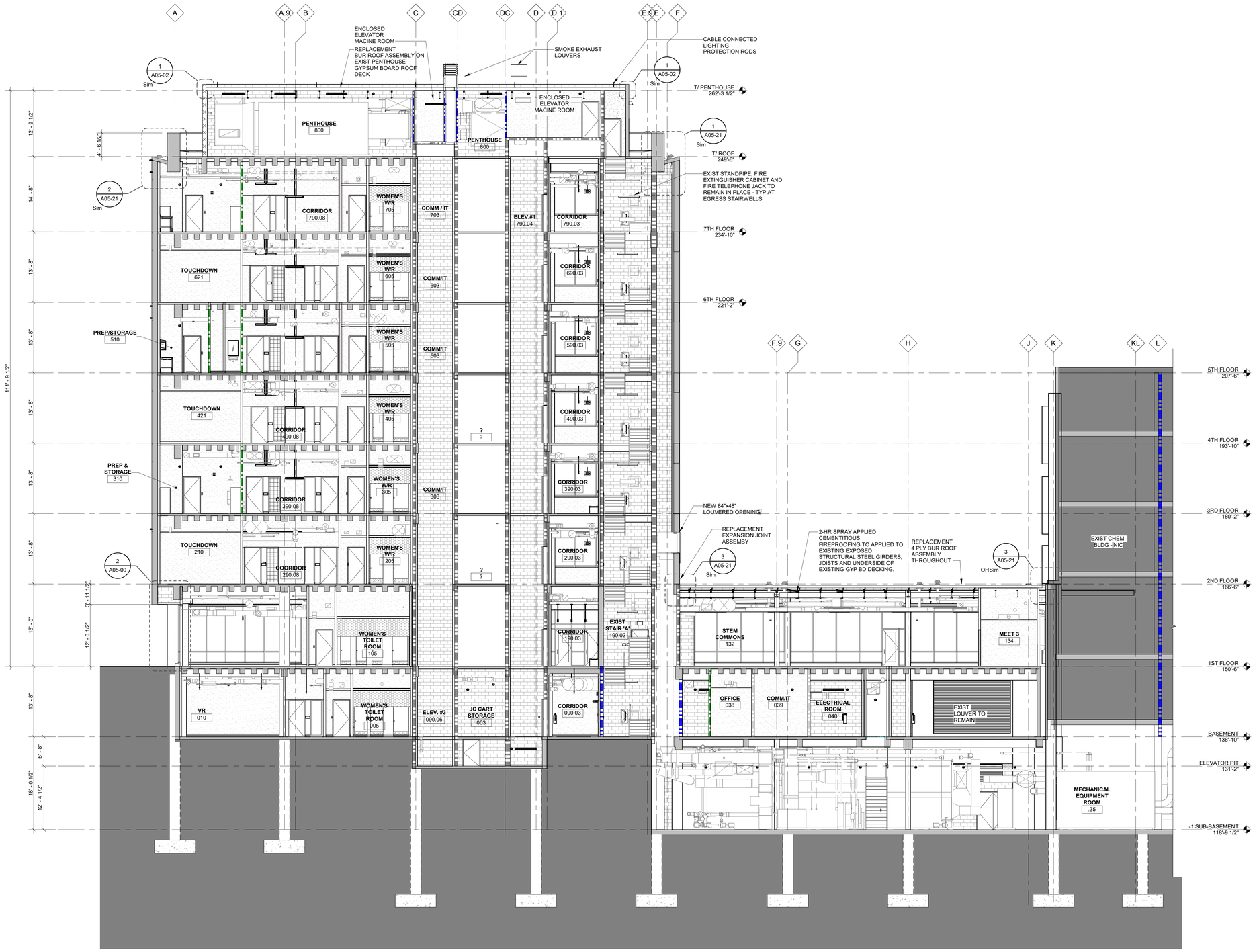
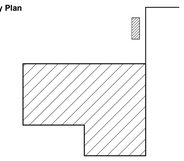


1 A03-10 BUILDING SECTION
SCALE: 1/8" = 1'-0"

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
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Lab Design: NORR

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Project Leader	Checked
C. MENARD	G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project

STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

BUILDING SECTION

Scale	1/8" = 1'-0"
Project No.	JCDT17-0231
Drawing No.	A03-10

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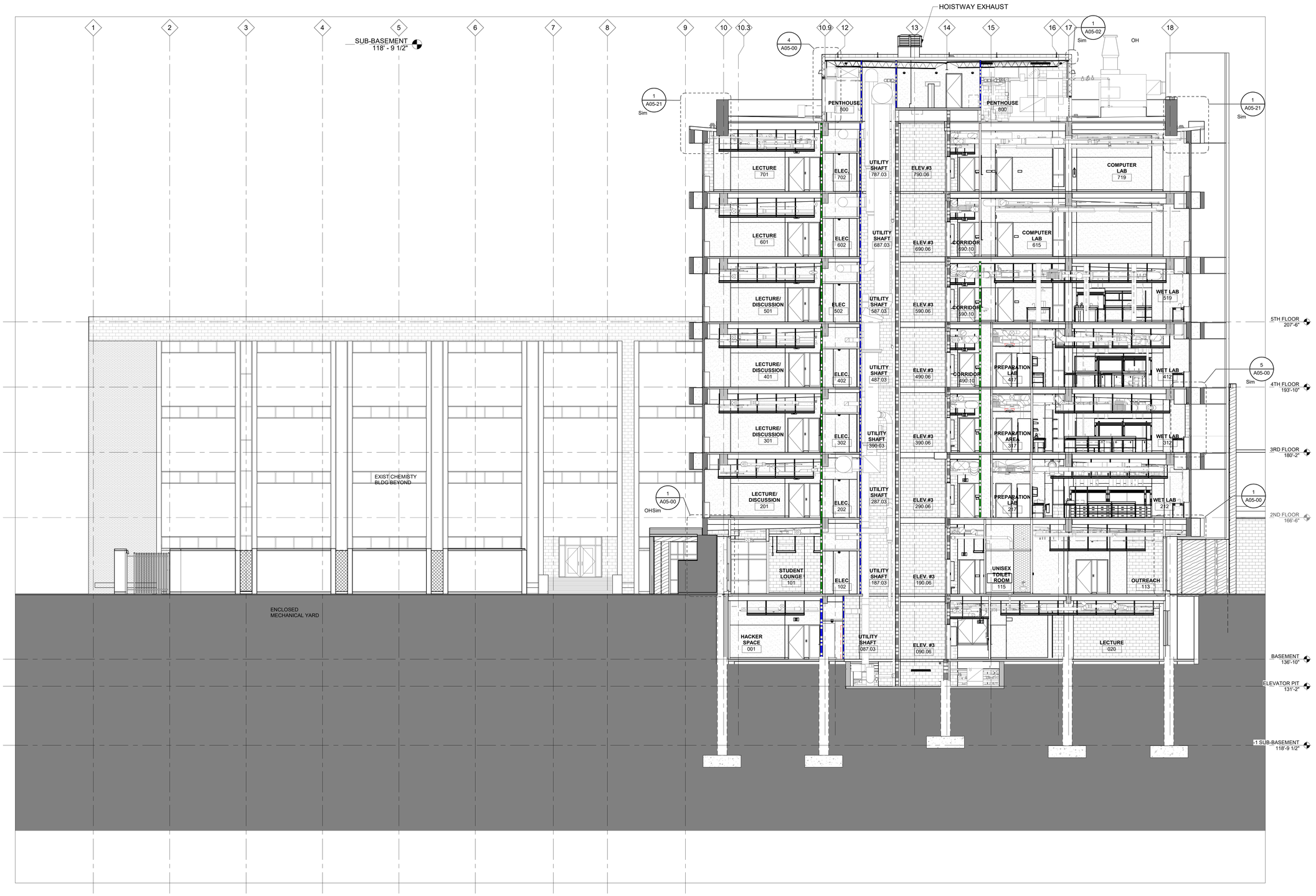


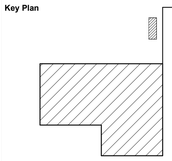
1
A03-11

BUILDING SECTION

SCALE: 1/8" = 1'-0"

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

NORR
An Ingenium International Company
150 W. Jefferson Avenue, Suite 1300
Detroit, MI 48226 U.S.A
norr.com

ftc&h engineers scientists architects constructors
Fishbeck, Thompson, Carr & Huber, Inc.
1515 Arboretum Drive, SE
Grand Rapids, Michigan 49546
T 800.456.3824, F 616.464.3997
www.ftch.com

Project Manager A. NOLFF	BIM Lead R. HAAS
Design Lead C. MENARD	Drawn R. HAAS
Project Leader C. MENARD	Checked G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project

STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

BUILDING SECTION

Scale 1/8" = 1'-0"

Project No. JCDT17-0231

Drawing No.

A03-11

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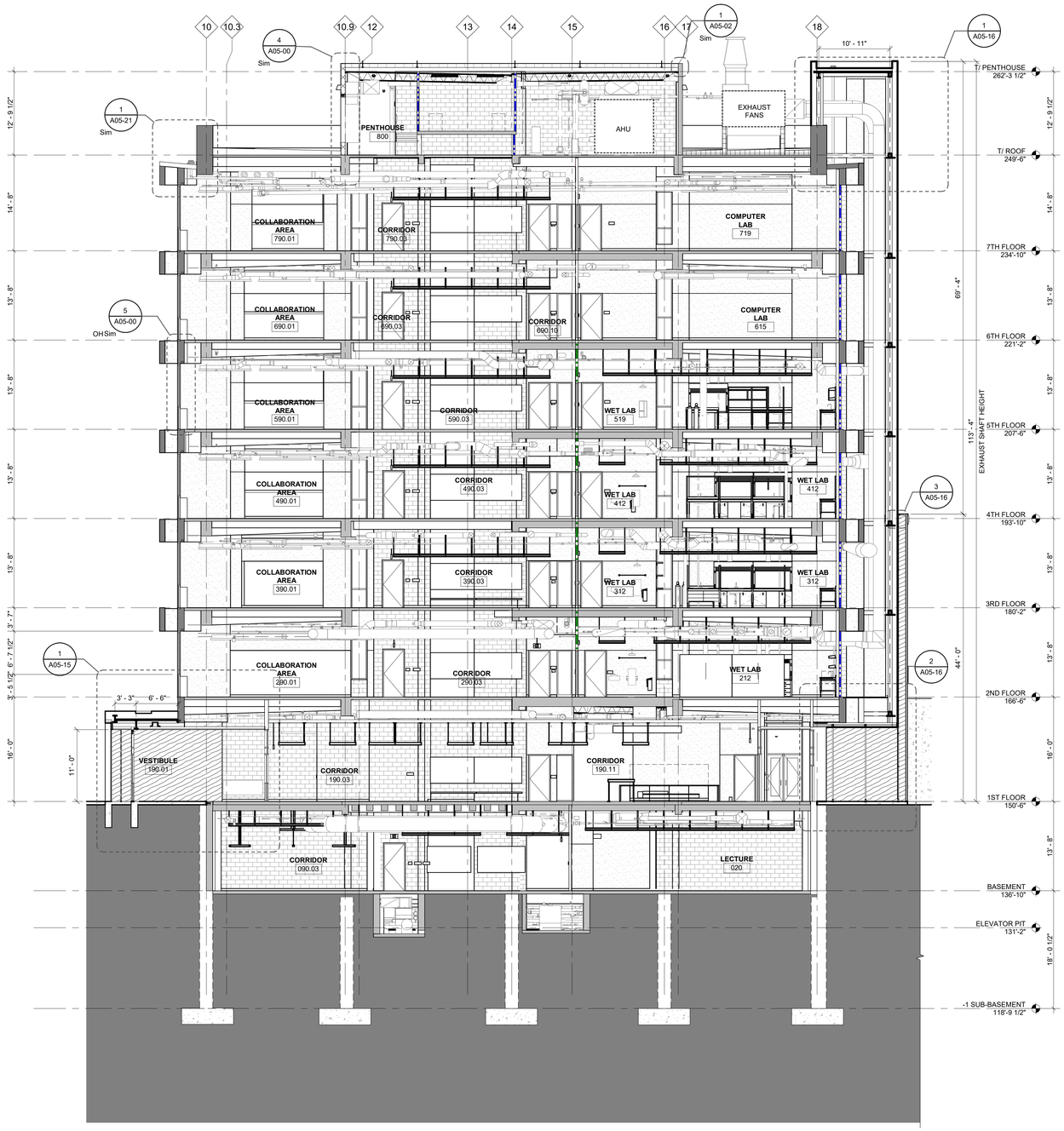

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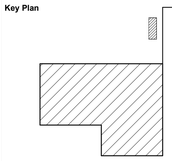
SCALE: 1/8" = 1'-0"

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil:	FTC&H
Landscape:	FTCH
Architecture	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

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Project Manager: A. NOLFF	BIM Lead: R. HAAS
Design Lead: C. MENARD	Drawn: R. HAAS
Project Leader: C. MENARD	Checked: G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
BUILDING SECTION

Scale 1/8" = 1'-0"

Project No. JCDT17-0231

Drawing No.
A03-12

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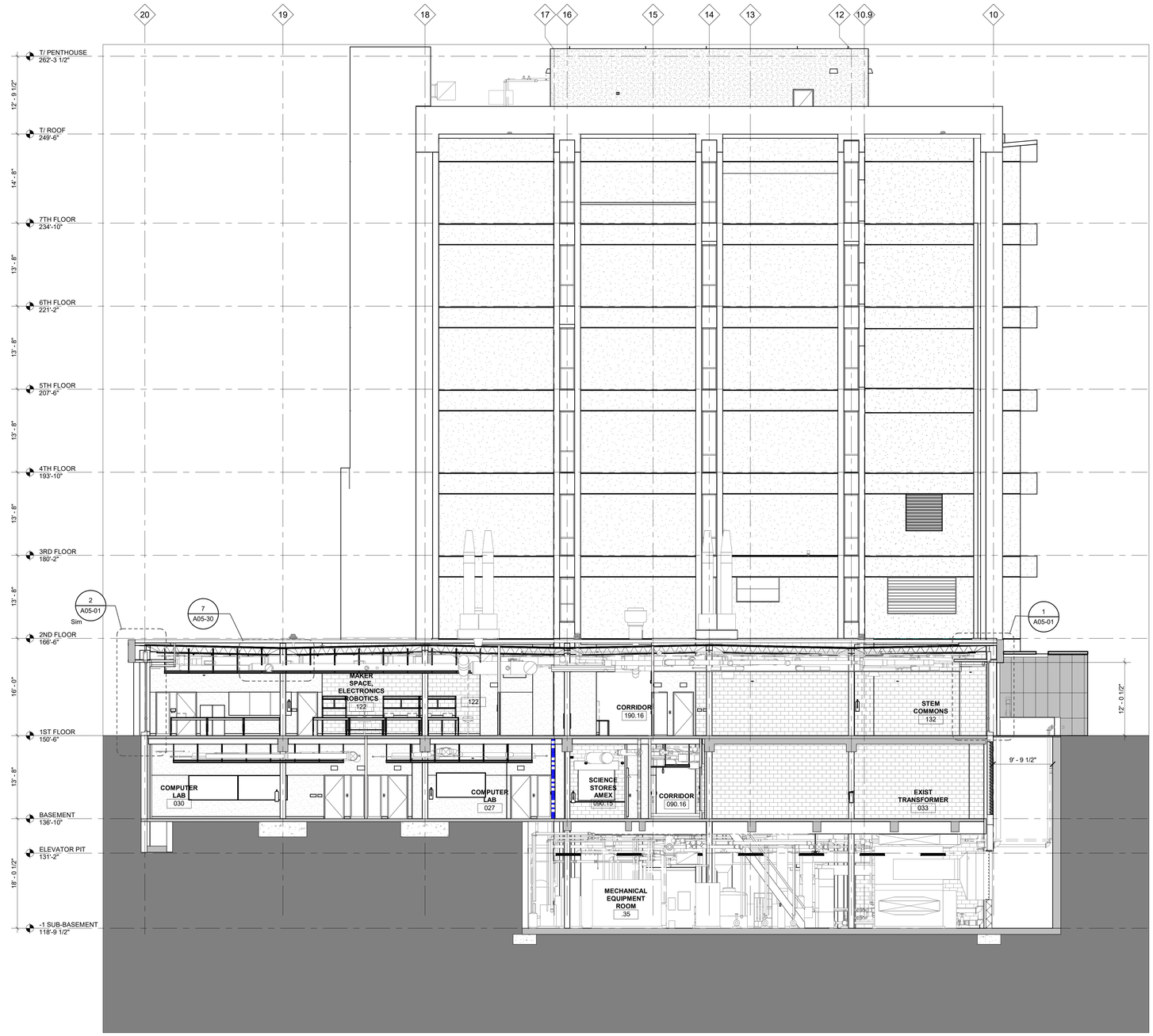
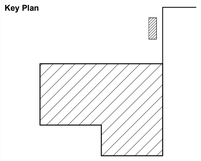


1 / A03-13 BUILDING SECTION
SCALE: 1/8" = 1'-0"

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

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Project Manager	BIM Lead
A. NOLFF	R. HAAS
Design Lead	Drawn
C. MENARD	R. HAAS
Project Leader	Checked
C. MENARD	G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
BUILDING SECTION

Scale 1/8" = 1'-0"
Project No. JCDT17-0231
Drawing No. A03-13

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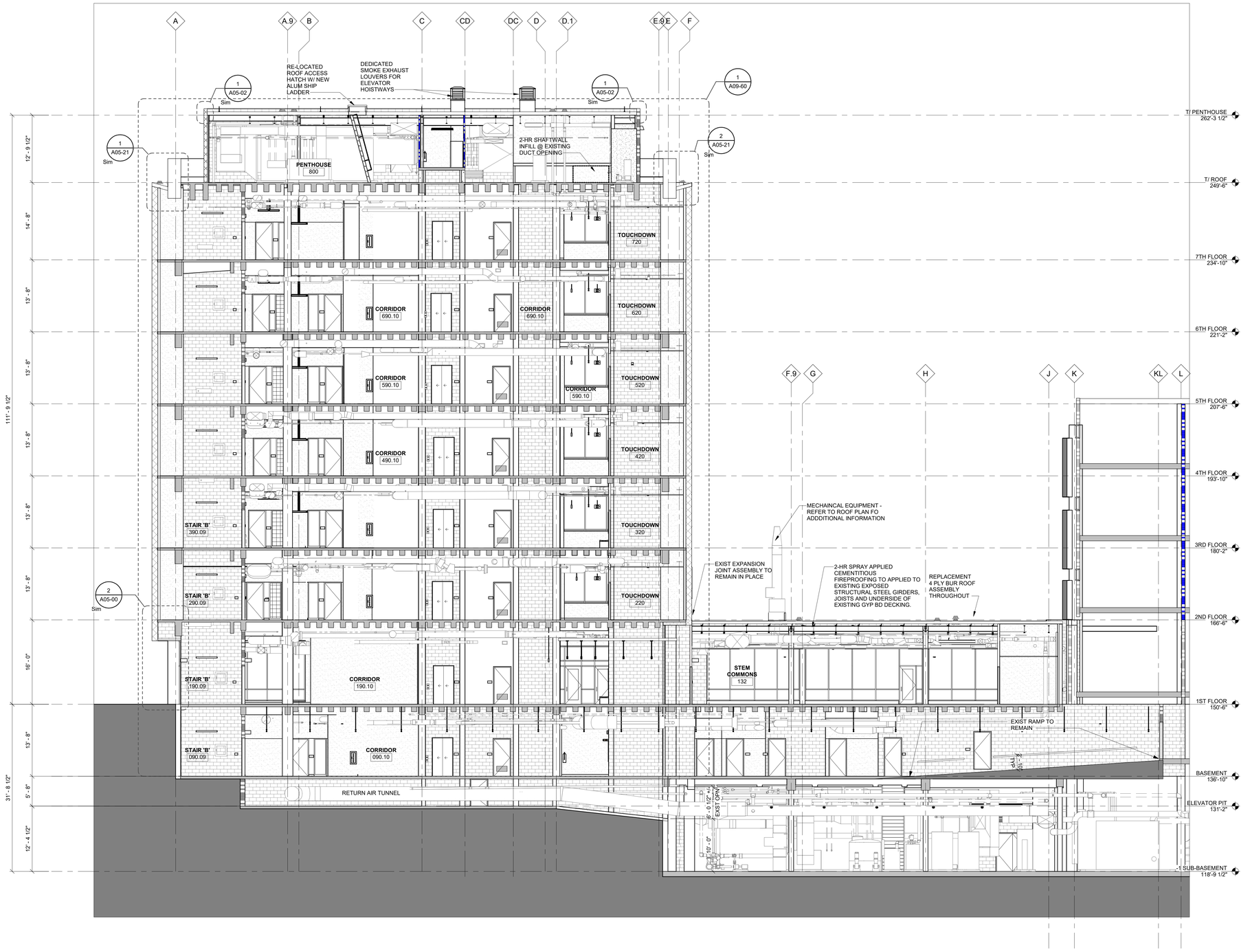
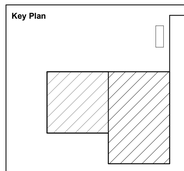


1 / A03-14 BUILDING SECTION
SCALE: 1/8" = 1'-0"

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

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Project Manager	BIM Lead
A. NOLFF	R. HAAS
Design Lead	Drawn
C. MENARD	R. HAAS
Project Leader	Checked
C. MENARD	G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
BUILDING SECTION

Scale 1/8" = 1'-0"
Project No. JCDT17-0231
Drawing No.
A03-14

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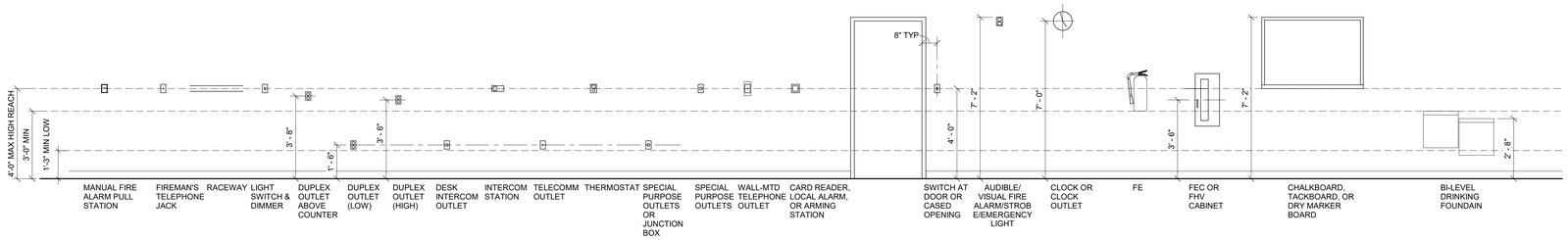
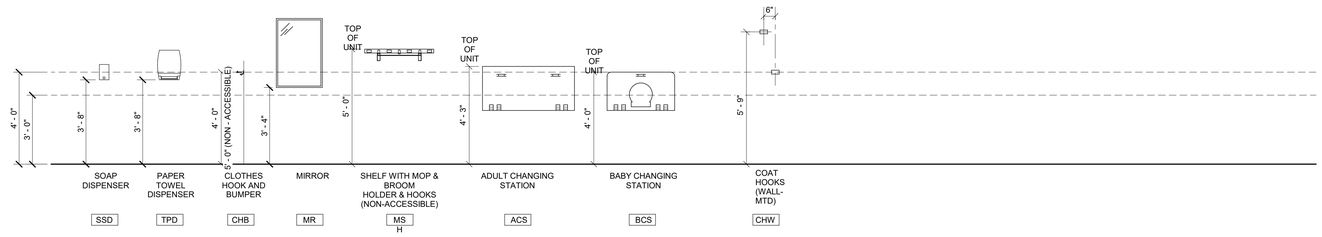


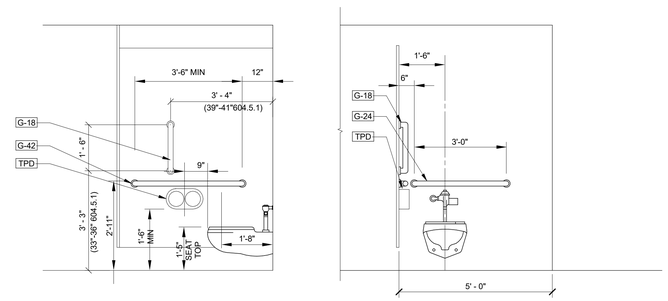
1 / A04-00 Typical Corridor & Room Device & Accessory Mounting Heights

SCALE: 3/8" = 1'-0"



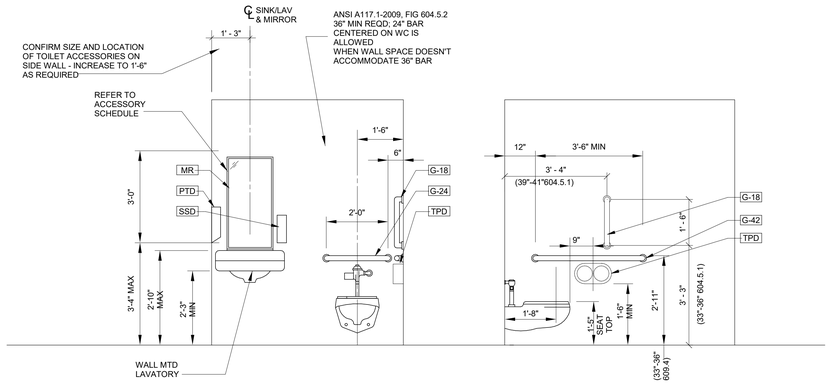
2 / A04-00 Typical Toilet Room & Janitor Closet Accessory Mounting Height

SCALE: 3/8" = 1'-0"



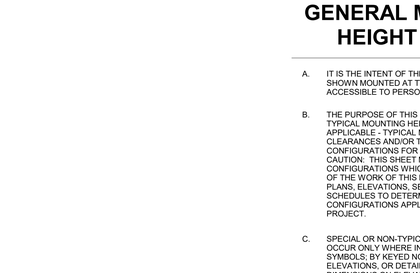
5 / A04-00 ADA STALL GRAB BAR LOCATION

SCALE: 1/2" = 1'-0"



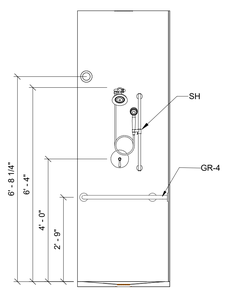
4 / A04-00 SINGLE OCCUPANT TOILET ROOMS

SCALE: 1/2" = 1'-0"



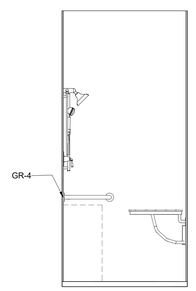
3 / A04-00 TYPICAL TOLET ROOM

SCALE: 1/2" = 1'-0"



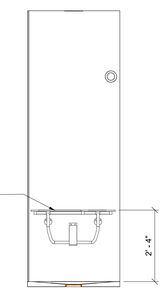
8 / A04-00 STANDARD SHOWER CONTROLS

SCALE: 1/2" = 1'-0"



7 / A04-00 STANDARD SHOWER BACK WALL

SCALE: 1/2" = 1'-0"



6 / A04-00 STANDARD SHOWER SEAT WALL

SCALE: 1/2" = 1'-0"

GENERAL MOUNTING HEIGHT NOTES

A. IT IS THE INTENT OF THE DESIGN THAT ALL ITEMS SHOWN MOUNTED AT TYPICAL HEIGHTS BE ACCESSIBLE TO PERSONS WITH DISABILITIES.

B. THE PURPOSE OF THIS SHEET IS TO ILLUSTRATE TYPICAL MOUNTING HEIGHTS AND - WHERE APPLICABLE - TYPICAL MINIMUM OR MAXIMUM CLEARANCES AND/OR TYPICAL MOUNTING CONFIGURATIONS FOR A VARIETY OF ITEMS. CAUTION: THIS SHEET MAY ILLUSTRATE ITEMS OR CONFIGURATIONS WHICH DO NOT OCCUR AS PART OF THE WORK OF THIS PROJECT. REFER TO THE PLANS, ELEVATIONS, SECTIONS, DETAILS, AND SCHEDULES TO DETERMINE WHICH ITEMS AND CONFIGURATIONS APPLY TO THE WORK OF THIS PROJECT.

C. SPECIAL OR NON-TYPICAL MOUNTING HEIGHTS OCCUR ONLY WHERE INDICATED BY ANNOTATED SYMBOLS; BY KEYED NOTES; BY NOTES ON PLANS, ELEVATIONS, OR DETAILS; OR BY UNIQUE DIMENSIONS ON ELEVATIONS OR DETAILS.

D. MOUNTING HEIGHTS, DIMENSIONS, CLEARANCES, AND ACCESS REQUIREMENTS FOR TOILET ACCESSORIES SHOWN ON THIS SHEET ARE BASED UPON SPECIFIC MANUFACTURERS AND MODELS AS INDICATED BY THE "TOILET ACCESSORY SCHEDULE" OR PER THE SPECIFICATIONS. WHEN SIMILAR ACCESSORIES OF OTHER SPECIFIED, ACCEPTABLE MANUFACTURERS (IF ANY) ARE UTILIZED, MOUNTING HEIGHTS, DIMENSIONS, CLEARANCES, AND ACCESS REQUIREMENTS OF THE SIMILAR ACCESSORIES MAY VARY FROM THOSE SHOWN. WHEN SIMILAR ACCESSORIES ARE UTILIZED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COORDINATION REQUIRED TO ACHIEVE THE SAME AESTHETIC AND FUNCTIONAL DESIGN INTENT ILLUSTRATED BY THAT SHOWN ON THE DRAWINGS.

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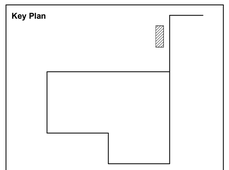
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
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Project Manager	BIM Lead
A. NOLFF	R. HAAS
Design Lead	Drawn
C. MENARD	R. HAAS
Project Leader	Checked
C. MENARD	G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
TYPICAL MOUNTING HEIGHTS AND ELEVATIONS

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A04-00

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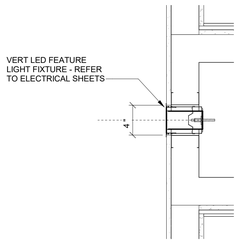
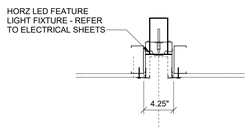
ACCESSORY EQUIPMENT SCHEDULE			
MARK	MANUFACTURE	DESCRIPTION	RESPONSIBLITY
ACS	FOUNDATIONS	ADULT CHANGING STATION	CF/CI
BCS	KOALA KARE	BABY CHANGING STATION	CF/CI
GR	BOBRICK	GRAB BAR	CF/CI
MH	BRADLEY CORPORATION	MOP STRIPS AND HOOKS	CF/CI
MR1	BOBRICK	24 X 36 MIRROR WITH SHELF	CF/CI
PTD	SAN JAMAR	PAPER TOWEL DISPENSER	CF/CI
SSD	DIAL	SANITARY SOAP DISPENSER	CF/CI
TPD	SAN JAMAR	TOLIET PAPER DISPENSER	CF/CI
WR	BOBRICK	WASTE RECEPTACLE	CF/CI

INTERIOR ELEVATION GENERAL NOTES

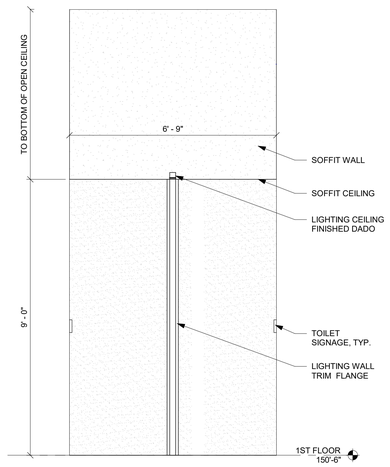
1. PAINT ENTIRE WALL SURFACE TO UNDERSIDE OF CONCRETE STRUCTUE. INCLUDING WALL SURFACE BETWEEN RIBBING OF CONCRETE STRUCTURE.
2. REFER TO MATERIAL SCHEDULES (SHEET SERIES A09-0) AND FINISH PLANS (SHEET SERIES A09-2) FOR ACCENT COLOR DESIGNATIONS.



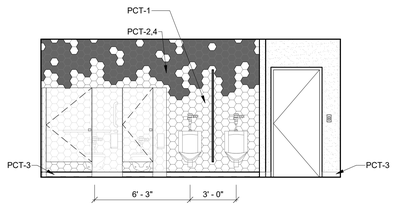
8 / A04-01 TOILET ALCOVE LIGHTING PLAN DETAIL
SCALE: 1 1/2" = 1'-0"



7 / A04-01 TOILET ALCOVE CEILING LIGHTING SECTION DETAIL
SCALE: 1 1/2" = 1'-0"



6 / A04-01 TOILET ALCOVE ELEVATION - TYP.
SCALE: 1/2" = 1'-0"



1B / A04-01 MEN'S TOILET ELEVATION
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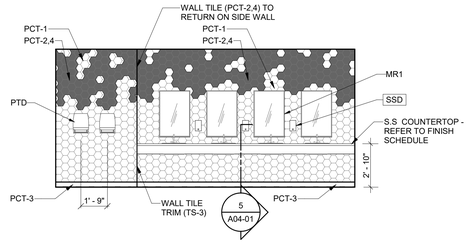
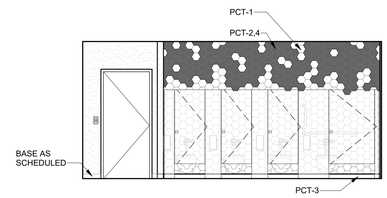


1A / A04-01 MEN'S TOILET ELEVATION
SCALE: 1/4" = 1'-0"



1D / A04-01 WOMEN'S TOILET ELEVATION
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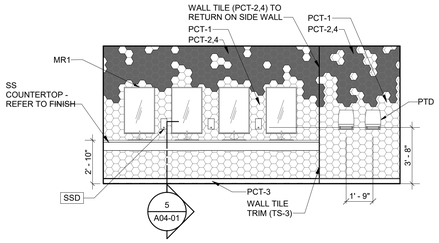

1C / A04-01 WOMEN'S TOILET ELEVATION
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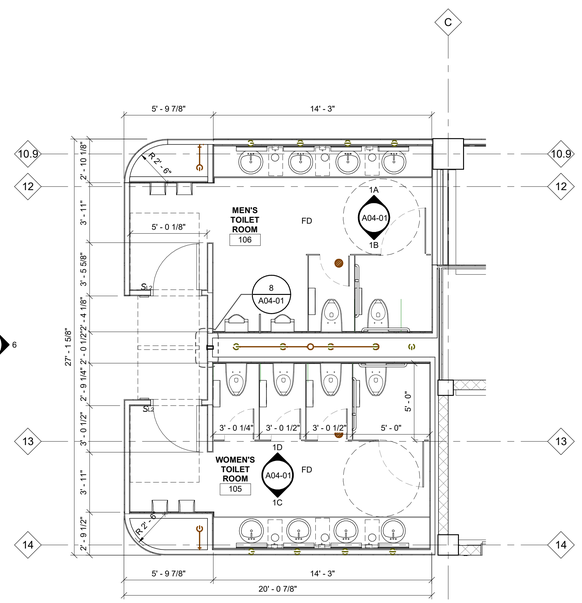
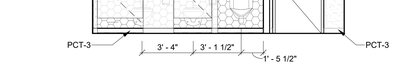


1 / A04-01 ENLARGED TOILET PLAN - FIRST FLOOR
SCALE: 1/4" = 1'-0"



2B / A04-01 MEN'S TOILET ELEVATION
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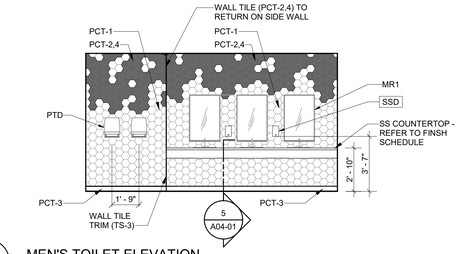

2A / A04-01 MEN'S TOILET ELEVATION
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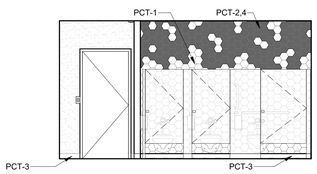

2D / A04-01 WOMEN'S TOILET ELEVATION
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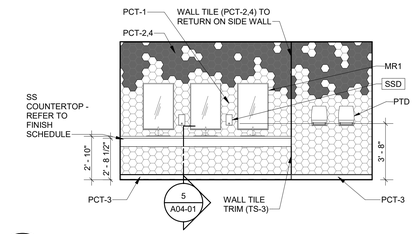

2C / A04-01 WOMEN'S TOILET ELEVATION
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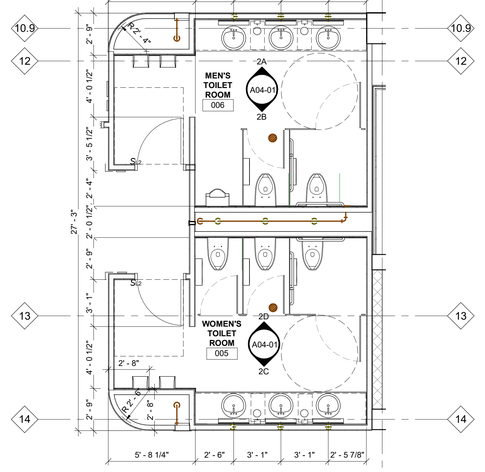
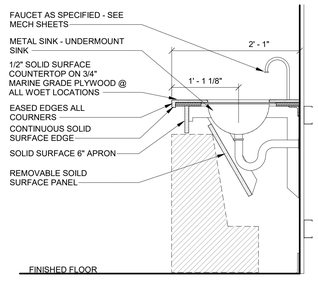
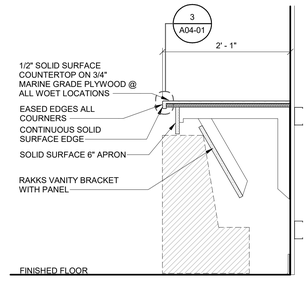


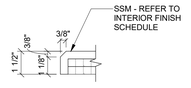
2 / A04-01 ENLARGED TOILET PLAN - BASEMENT
SCALE: 1/4" = 1'-0"



5 / A04-01 TOILET ROOM COUNTER WITH SINK ENCLOSURE
SCALE: 1" = 1'-0"



4 / A04-01 TOILET ROOM COUNTER ENCLOSURE
SCALE: 1" = 1'-0"



3 / A04-01 CHAMFERED EDGE
SCALE: 3" = 1'-0"

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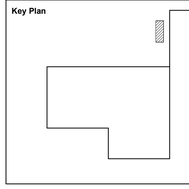
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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An Ingenium International Company
150 W. Jefferson Avenue, Suite 1300
Detroit, MI 48226 U.S.A
norr.com

FTC&H engineers scientists architects constructors
Fishbeck, Thompson, Carr & Huber, Inc.
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T 800.456.3824, F 616.464.3997
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Project Manager: A. NOLFF	BIM Lead: R. HAAS
Design Lead: C. MENARD	Drawn: R. HAAS
Project Leader: C. MENARD	Checked: G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
ENLARGED TOILET ROOM PLANS

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A04-01

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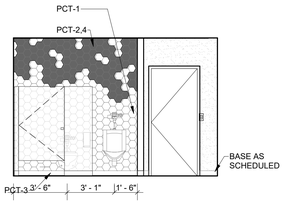
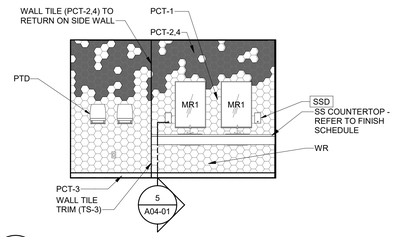
ACCESSORY EQUIPMENT SCHEDULE			
MARK	MANUFACTURE	DESCRIPTION	RESPONSIBLITY
ACS	FOUNDATIONS	ADULT CHANGING STATION	CF/CI
BCS	KOALA KARE	BABY CHANGING STATION	CF/CI
GR	BOBRICK	GRAB BAR	CF/CI
MH	BRADLEY CORPORATION	MOP STRIPS AND HOOKS	CF/CI
MR1	BOBRICK	24 X 36 MIRROR WITH SHELF	CF/CI
PTD	SAN JAMAR	PAPER TOWEL DISPENSER	CF/CI
SSD	DIAL	SANITARY SOAP DISPENSER	CF/CI
TPD	SAN JAMAR	TOLIET PAPER DISPENSER	CF/CI
WR	BOBRICK	WASTE RECEPTACLE	CF/CI

INTERIOR ELEVATION GENERAL NOTES

1. PAINT ENTIRE WALL SURFACE TO UNDERSIDE OF CONCRETE STRUCTUE. INCLUDING WALL SURFACE BETWEEN RIBBING OF CONCRETE STRUCTURE.
2. REFER TO MATERIAL SCHEDULES (SHEET SERIES A09-0) AND FINISH PLANS (SHEET SERIES A09-2) FOR ACCENT COLOR DESIGNATIONS.



1B A04-02 MEN'S TOILET ELEVATION
SCALE: 1/4" = 1'-0"



1A A04-02 MEN'S TOILET ELEVATION
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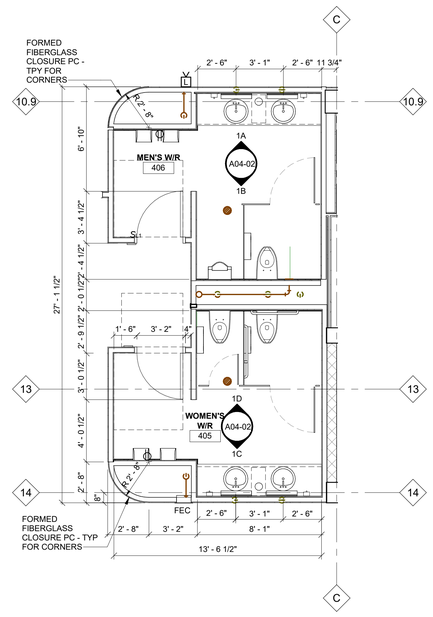

1 A02-04 ENLARGED TOILET PLAN - TOWER (TYP)
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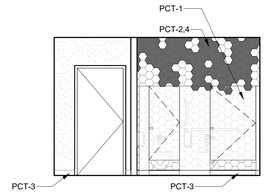
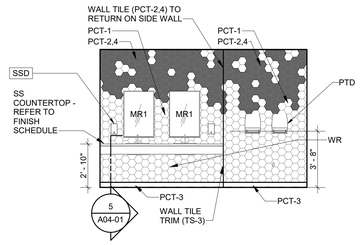
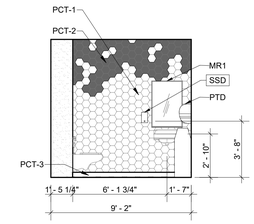


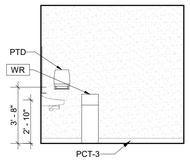
1D A04-02 WOMEN'S TOILET ELEVATION
SCALE: 1/4" = 1'-0"



1C A04-02 WOMEN'S TOILET ELEVATION
SCALE: 1/4" = 1'-0"



2D A04-02 SINGLE OCCUPANT TOILET ELEVATION
SCALE: 1/4" = 1'-0"



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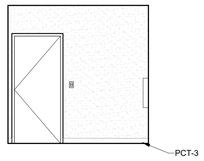

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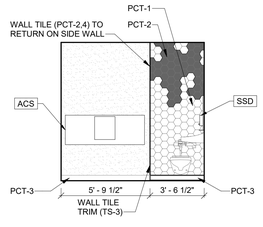

2A A04-02 SINGLE OCCUPANT TOILET ELEVATION
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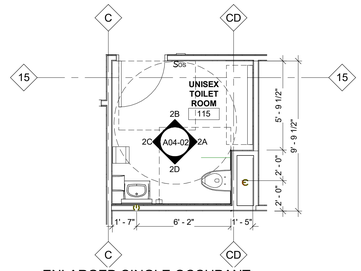

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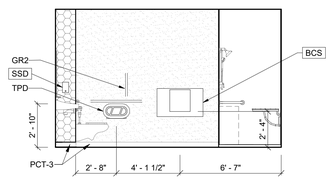

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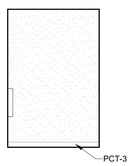

3C A04-02 SINGLE OCCUPANT TOILET ELEVATION
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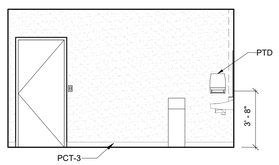

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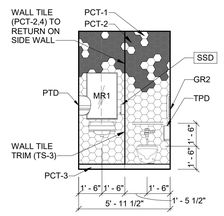
SCALE: 1/4" = 1'-0"



3A A04-02 SINGLE OCCUPANT TOILET ELEVATION
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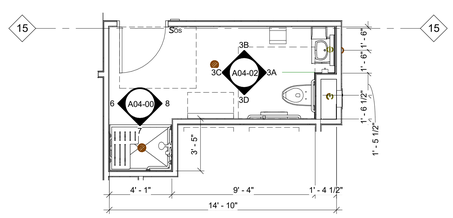
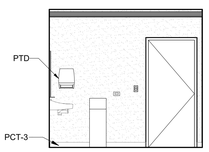
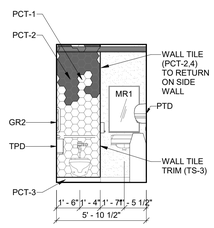


3 A04-02 ENLARGED SINGLE OCCUPANT TOILET PLAN - BASEMENT
SCALE: 1/4" = 1'-0"

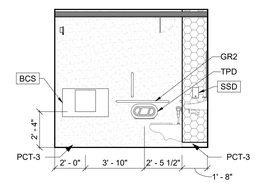


4D A04-02 SINGLE OCCUPANT TOILET ELEVATION
SCALE: 1/4" = 1'-0"

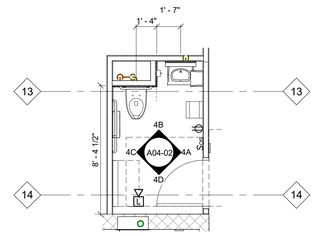
4A A04-02 SINGLE OCCUPANT TOILET ELEVATION
SCALE: 1/4" = 1'-0"



4B A04-02 SINGLE OCCUPANT TOILET ELEVATION
SCALE: 1/4" = 1'-0"



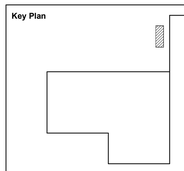
4C A04-02 SINGLE OCCUPANT TOILET ELEVATION
SCALE: 1/4" = 1'-0"



4 A04-02 SINGLE OCCUPANT TOILET PLAN - FIFTH FLOOR
SCALE: 1/4" = 1'-0"

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

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Landscape: FTCH
Architecture NORR
Structural: FTC&H
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DETROIT, MI 48202

Drawing Title
ENLARGED TOILET ROOM PLANS

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A04-02

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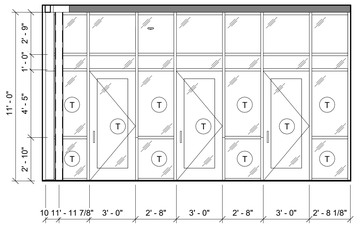
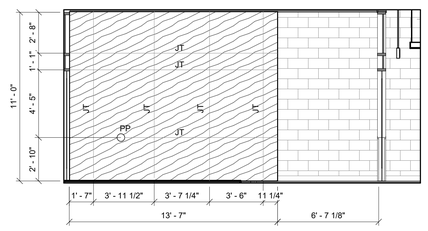
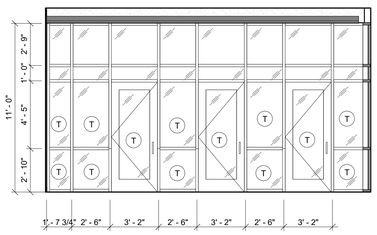


1B A04-03 NEW VESTIBLE ELEVATION
SCALE: 1/4" = 1'-0"



1A A04-03 NEW VESTIBLE ELEVATION
SCALE: 1/4" = 1'-0"



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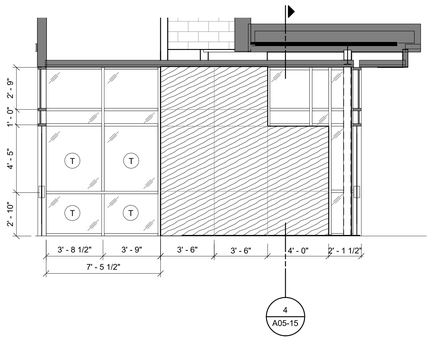
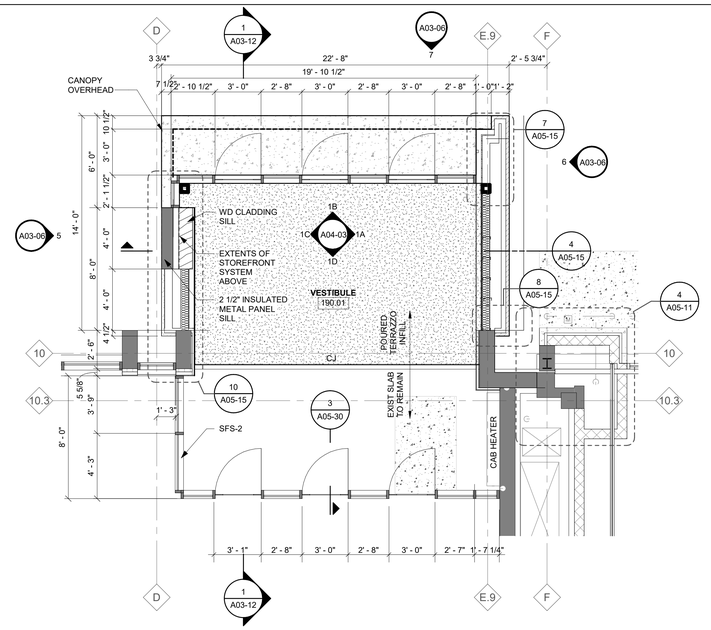
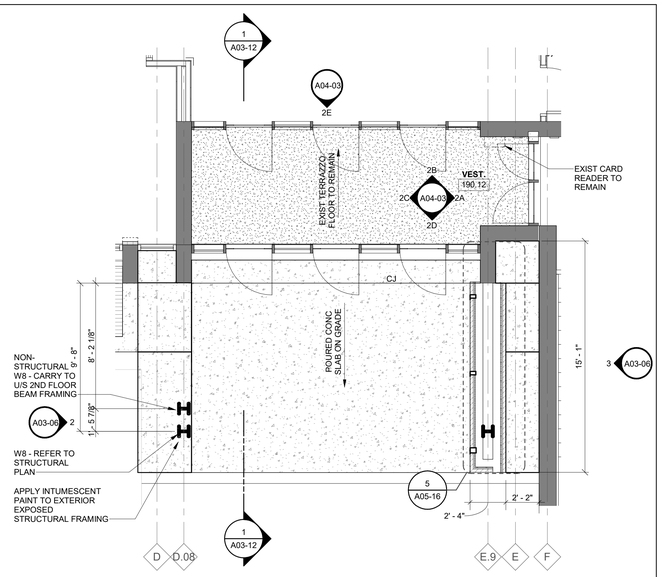
SCALE: 1/4" = 1'-0"



1C A04-03 NEW VESTIBLE ELEVATION
SCALE: 1/4" = 1'-0"



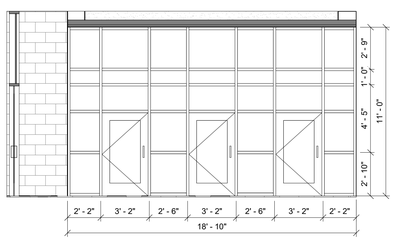
1 A04-03 ENLARGED NEW VESTIBULE PLAN
SCALE: 1/4" = 1'-0"



2 A04-03 ENLARGED PLAN - SOUTH VESTIBULE
SCALE: 1/4" = 1'-0"

2B A04-03 SOUTH VESTIBULE - NORTH ELEVATION
SCALE: 1/4" = 1'-0"

2A A04-03 SOUTH VESTIBULE - EAST ELEVATION
SCALE: 1/4" = 1'-0"



2D A04-03 SOUTH VESTIBULE - SOUTH ELEVATION
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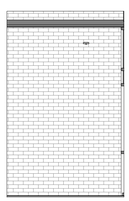

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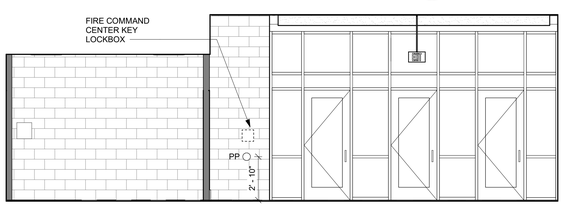

2E A04-03 FIRE COMMAND AND VESTIBLE ELEVATION
SCALE: 1/4" = 1'-0"

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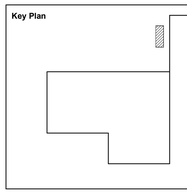
5 A04-03 NORTH VESTIBULE ROOF PLAN
SCALE: 1/4" = 1'-0"

3 A04-03 TYPICAL EXTERIOR EXHAUST SHAFT PLAN
SCALE: 1/4" = 1'-0"

4 A04-03 EXHAUST SHAFT ROOF
SCALE: 1/4" = 1'-0"

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
01/14/19	ADDENDUM #1	4
05/03/19	TEST AND BALANCE BID	7

Key Plan



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WAYNE STATE UNIVERSITY

Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
ENLARGED VESTIBULES

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A04-03

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INTERIOR ELEVATION GENERAL NOTES

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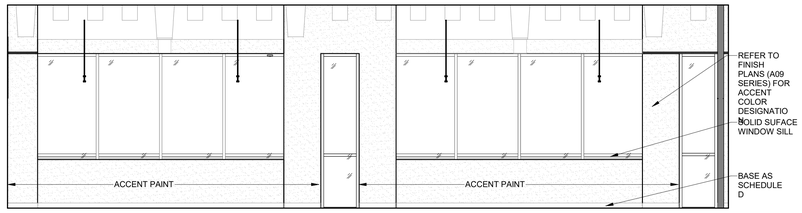
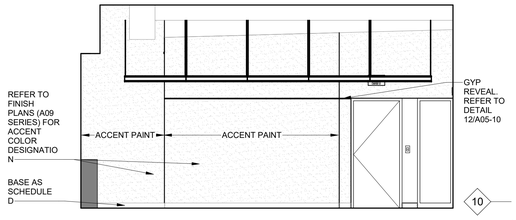
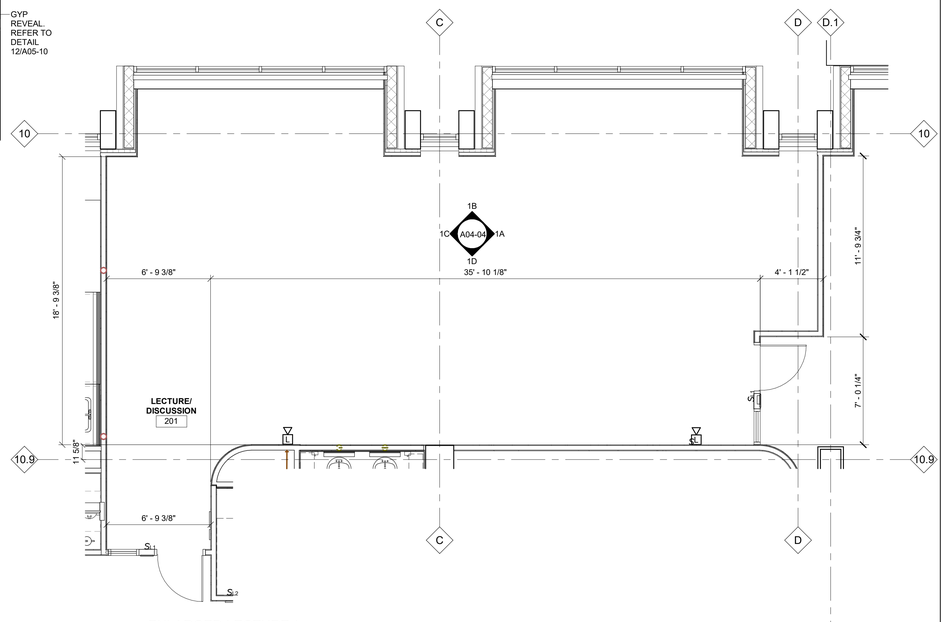
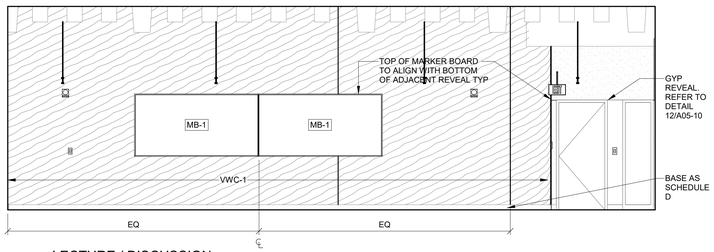


1B A04-04 LECTURE / DISCUSSION ELEVATION
SCALE: 1/4" = 1'-0"

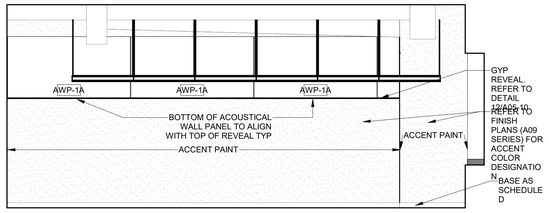


1A A04-04 LECTURE / DISCUSSION ELEVATION
SCALE: 1/4" = 1'-0"



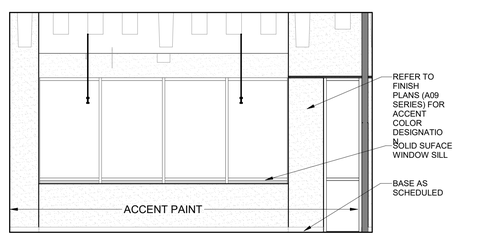


1D A04-04 LECTURE / DISCUSSION ELEVATION
SCALE: 1/4" = 1'-0"



1C A04-04 LECTURE / DISCUSSION ELEVATION
SCALE: 1/4" = 1'-0"

1 A04-04 ENLARGED LECTURE / DISCUSSION PLAN
SCALE: 1/4" = 1'-0"



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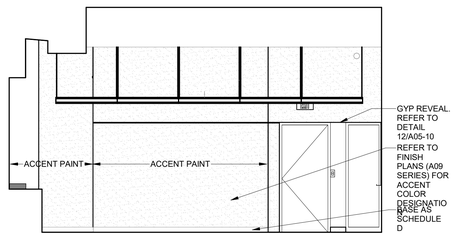
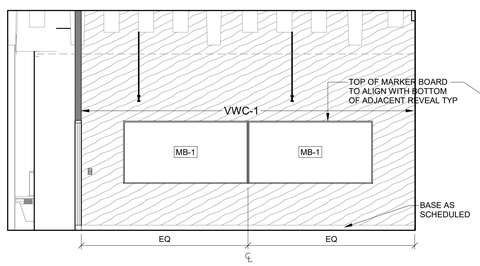
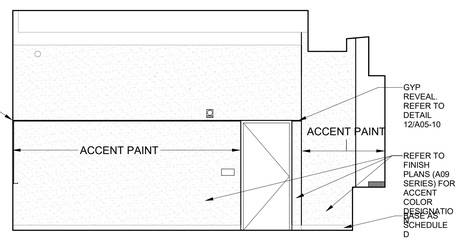
SCALE: 1/4" = 1'-0"



2A A04-04 LECTURE ELEVATION
SCALE: 1/4" = 1'-0"



2D A04-04 LECTURE ELEVATION
SCALE: 1/4" = 1'-0"



2C A04-04 LECTURE ELEVATION
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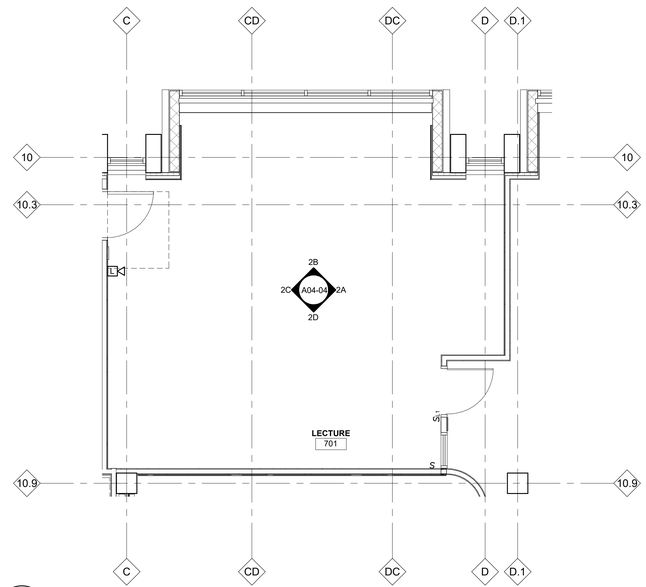
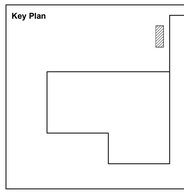


2 A04-04 ENLARGED LECTURE PLAN
SCALE: 1/4" = 1'-0"

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Manager A. NOLFF	BIM Lead R. HAAS
Design Lead C. MENARD	Drawn R. HAAS
Project Leader C. MENARD	Checked G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
ENLARGED LECTURE / DISCUSSION PLANS

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A04-04

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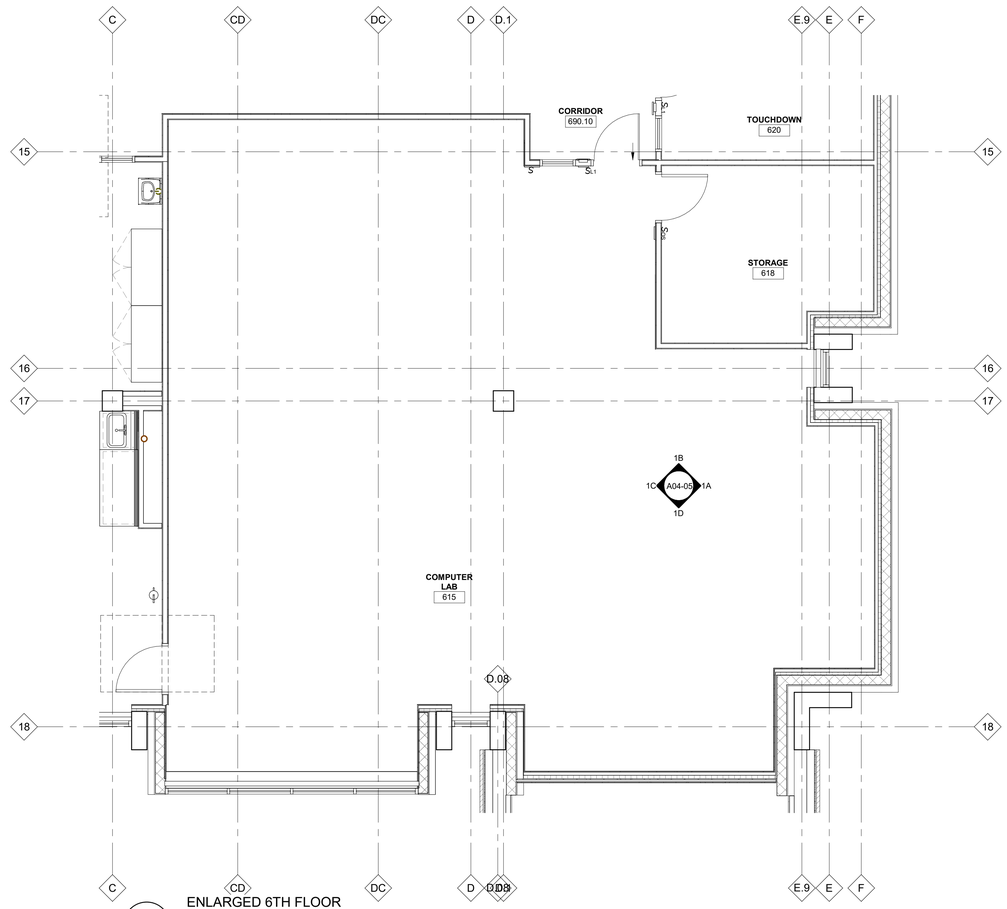
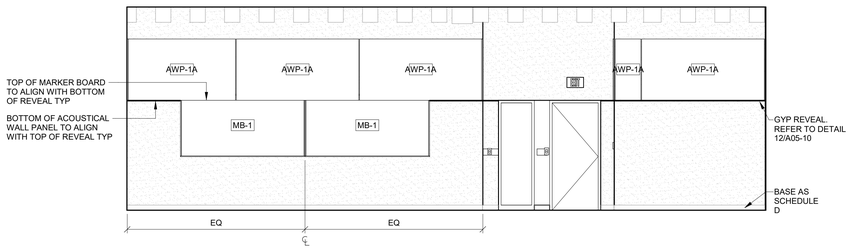
INTERIOR ELEVATION GENERAL NOTES

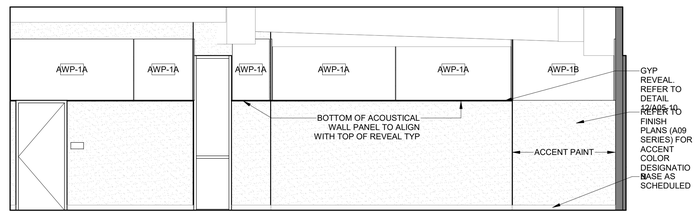
1. PAINT ENTIRE WALL SURFACE TO UNDERSIDE OF CONCRETE STRUCTUE. INCLUDING WALL SURFACE BETWEEN RIBBING OF CONCRETE STRUCTURE.
2. REFER TO MATERIAL SCHEDULES (SHEET SERIES A09-0) AND FINISH PLANS (SHEET SERIES A09-2) FOR ACCENT COLOR DESIGNATIONS.



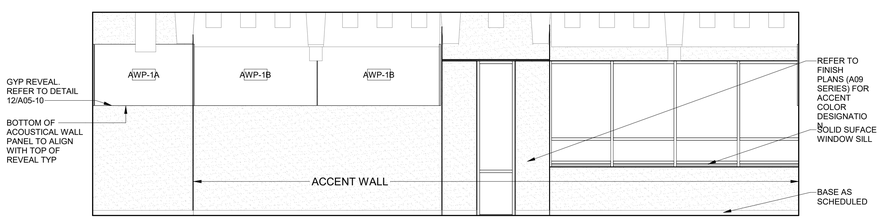
1 / A04-05 ENLARGED 6TH FLOOR COMPUTER LAB PLAN
SCALE: 1/4" = 1'-0"



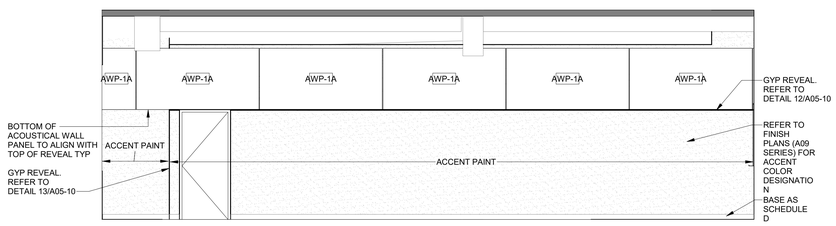
1B / A04-05 COMPUTER LAB - 42 STUDENTS ELEVATION
SCALE: 1/4" = 1'-0"



1A / A04-05 COMPUTER LAB - 42 STUDENTS ELEVATION
SCALE: 1/4" = 1'-0"



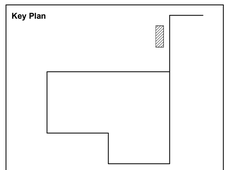
1D / A04-05 COMPUTER LAB - 42 STUDENTS ELEVATION
SCALE: 1/4" = 1'-0"



1C / A04-05 COMPUTER LAB - 42 STUDENTS ELEVATION
SCALE: 1/4" = 1'-0"

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

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Structural: FTC&H
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Design Lead	Drawn
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Project Leader	Checked
C. MENARD	G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project

STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

ENLARGED COMPUTER LAB PLAN

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A04-05

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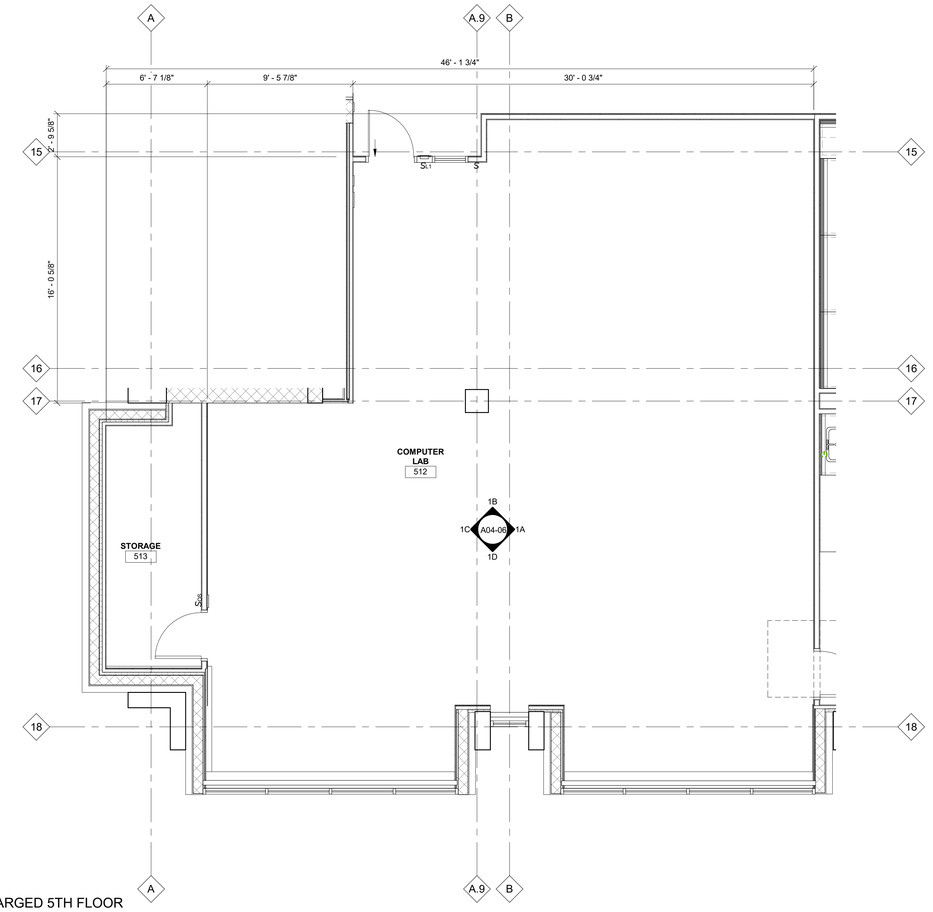
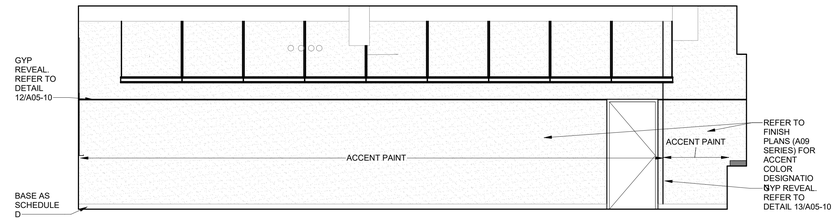
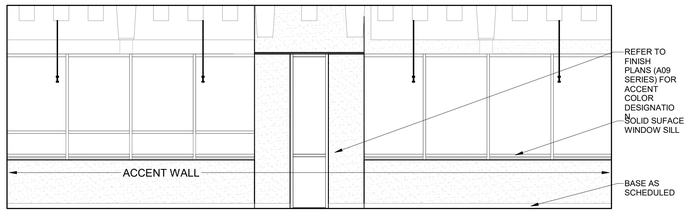


1 A04-06 ENLARGED 5TH FLOOR COMPUTER LAB PLAN
SCALE: 1/4" = 1'-0"

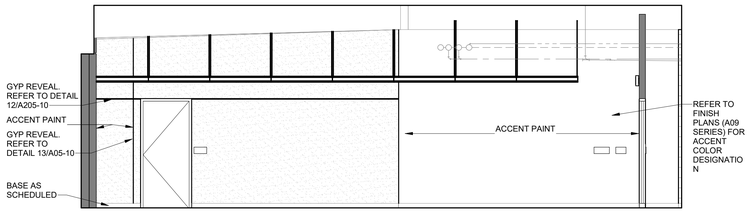
1B A04-06 COMPUTER LAB ELEVATION
SCALE: 1/4" = 1'-0"



1A A04-06 COMPUTER LAB ELEVATION
SCALE: 1/4" = 1'-0"



1D A04-06 COMPUTER LAB ELEVATION
SCALE: 1/4" = 1'-0"



1C A04-06 COMPUTER LAB ELEVATION
SCALE: 1/4" = 1'-0"

DATE	ISSUED FOR	REV
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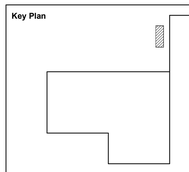
Key Plan



Consultants

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Structural: FTC&H
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Project

STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

ENLARGED COMPUTER LAB PLAN

Scale 1/4" = 1'-0"

Project No. JCDT17-0231

Drawing No.

A04-06

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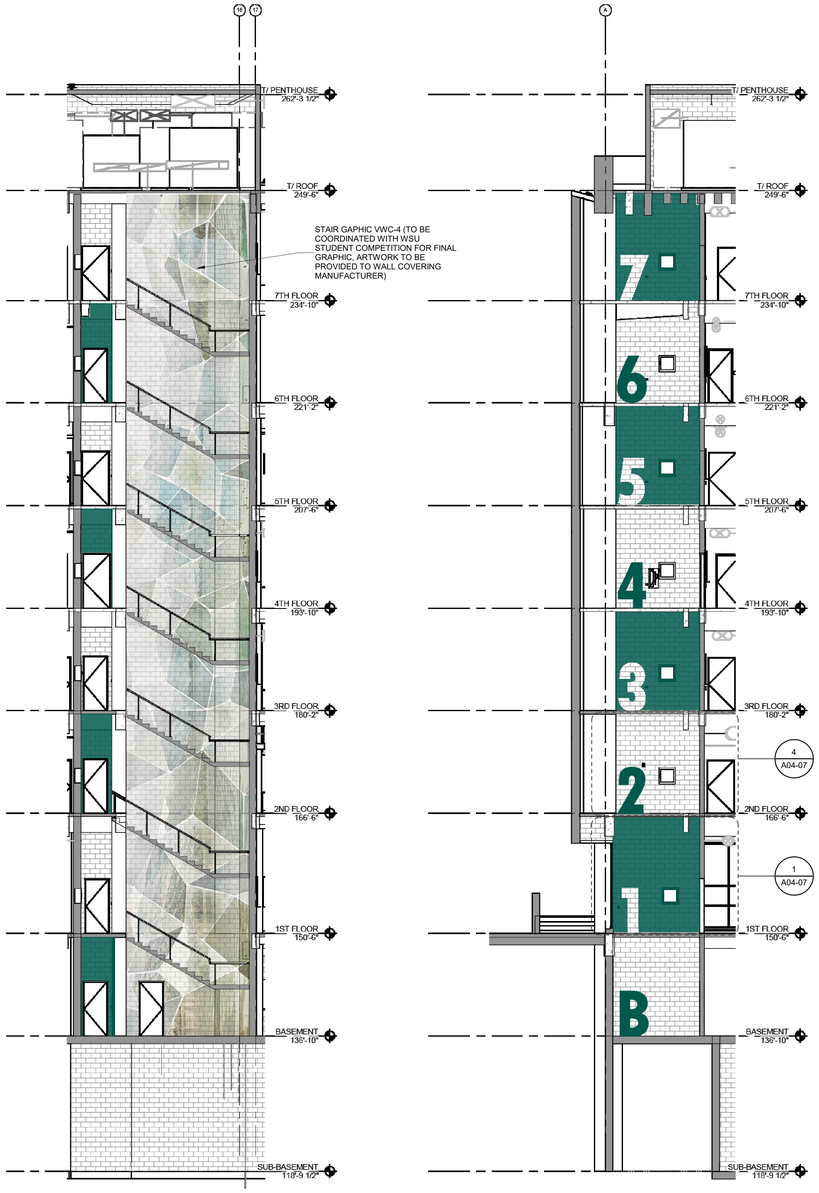
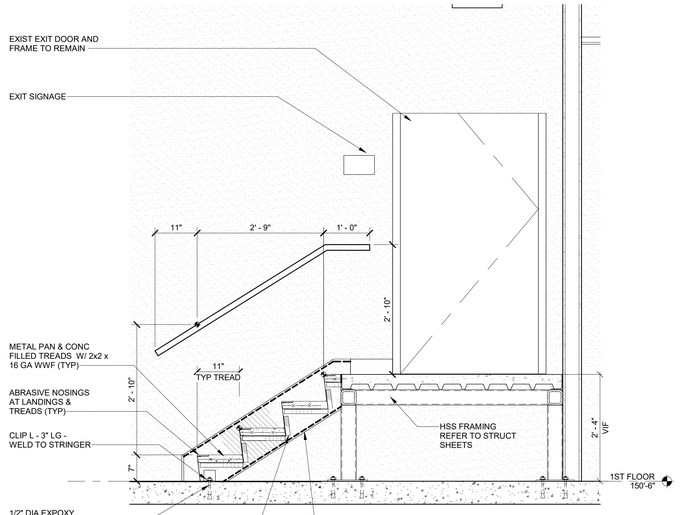
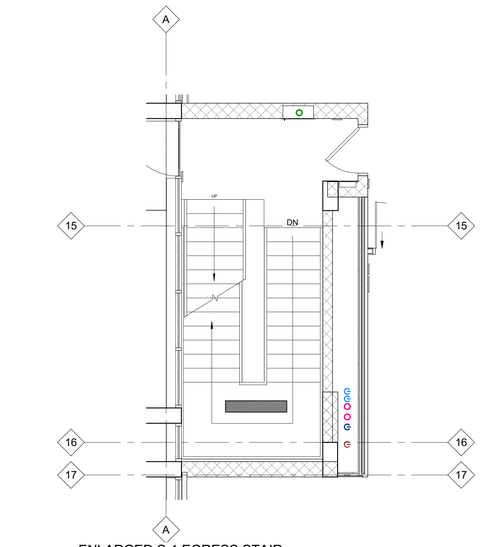


6 A04-07 STAIR SECTION GRAPHIC
SCALE: NTS



3 A04-07 MINI STAIR SECTION
SCALE: 3/4" = 1'-0"



1A A04-07 ENLARGED S-1 EGRESS STAIR PLAN
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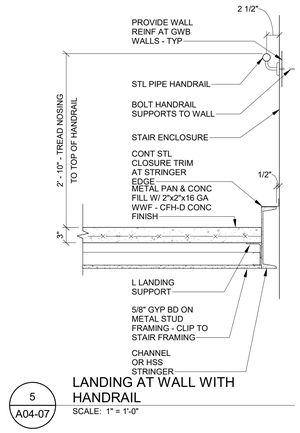
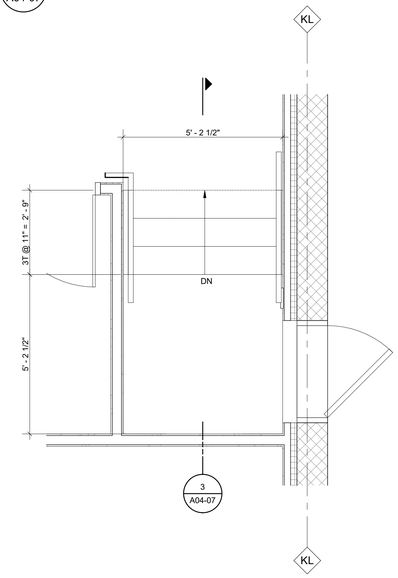
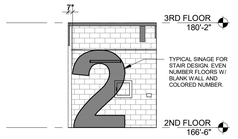


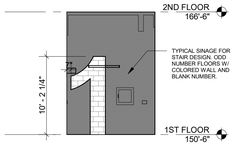
5 A04-07 LANDING AT WALL WITH HANDRAIL
SCALE: 1" = 1'-0"



2 A04-07 ENLARGED STAIR PLAN
SCALE: 1/2" = 1'-0"



4 A04-07 STAIR SIGNAGE EVEN NUMBER FLOORS
SCALE: 1/8" = 1'-0"



1 A04-07 STAIR SIGNAGE ODD NUMBER FLOORS
SCALE: 1/8" = 1'-0"

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
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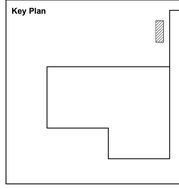
Key Plan



Consultants

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Landscape:	FTCH
Architecture	NORR
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Design Lead	Drawn
C. MENARD	R. HAAS
Project Leader	Checked
C. MENARD	G. KARANFILOVSKI

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Project
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DETROIT, MI 48202

Drawing Title
ENLARGED STAIR PLANS

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A04-07

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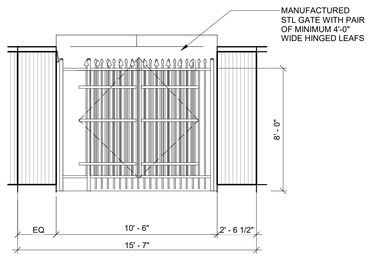
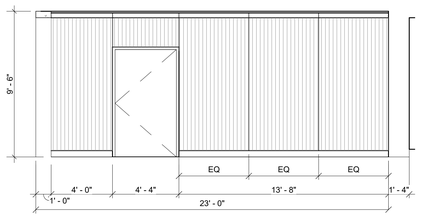
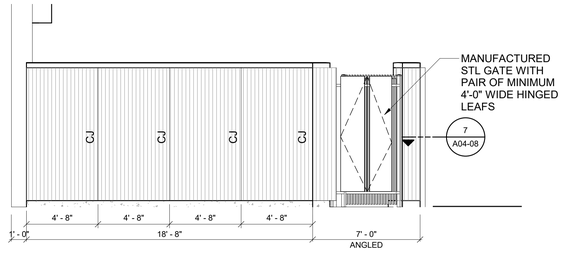


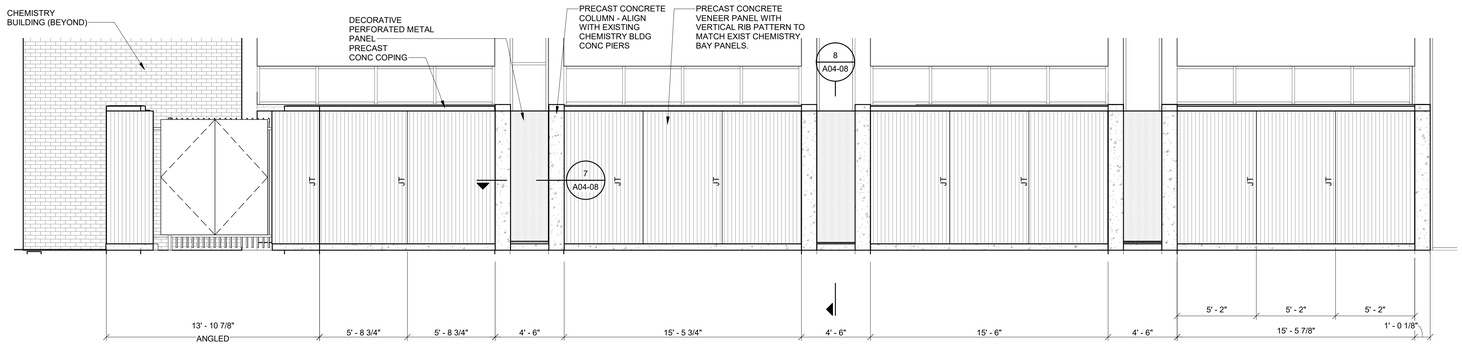
4 / A04-08 MECH YARD NW ELEVATION
SCALE: 1/4" = 1'-0"



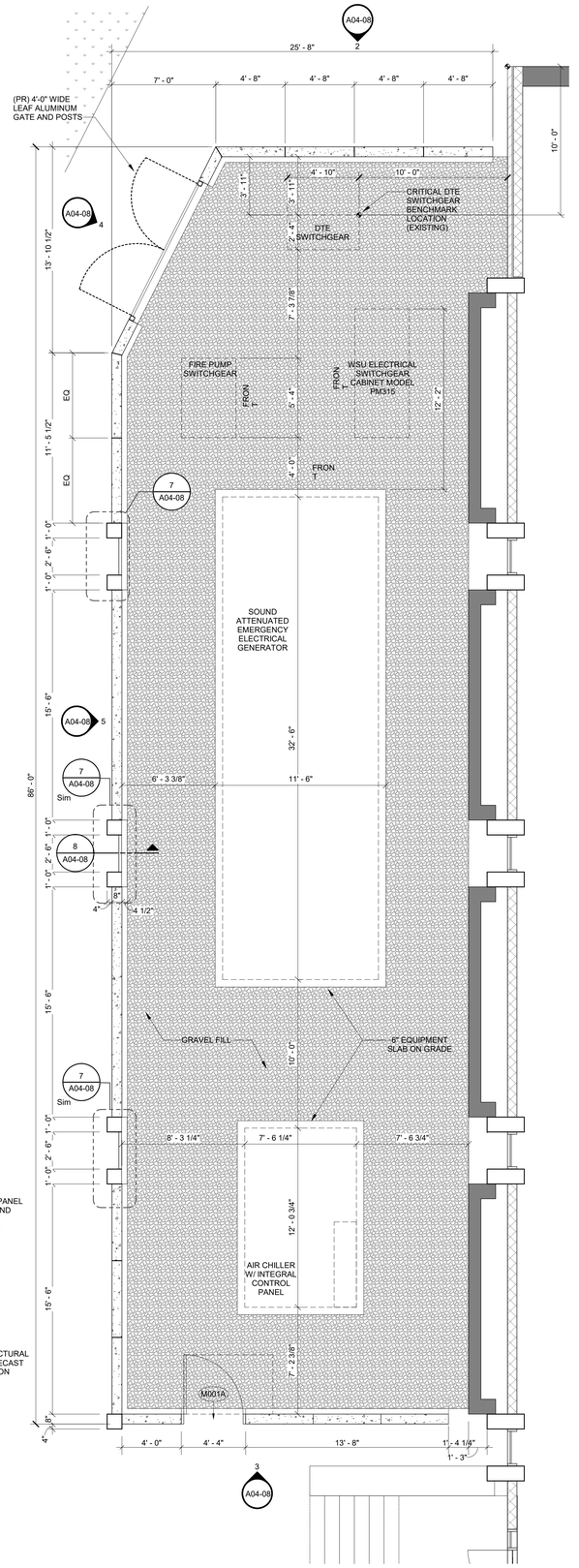
3 / A04-08 MECH YARD SOUTH ELEVATION
SCALE: 1/4" = 1'-0"

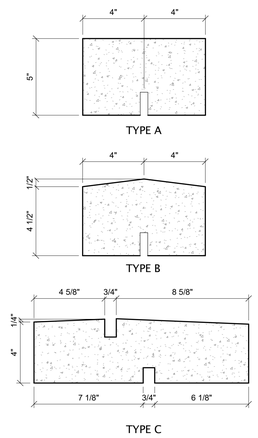


2 / A04-08 MECH YARD NORTH ELEVATION
SCALE: 1/4" = 1'-0"

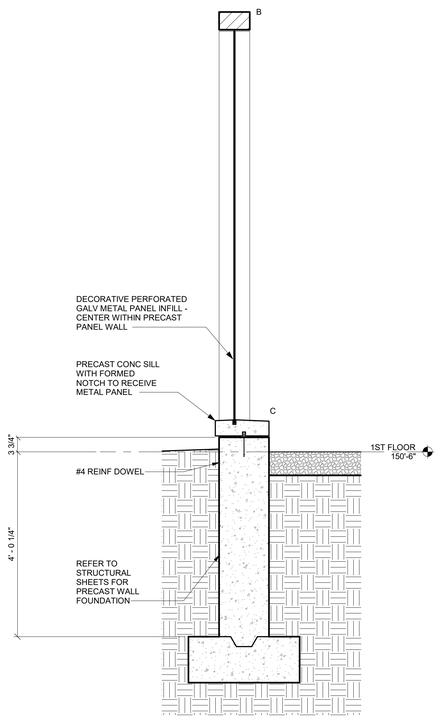


5 / A04-08 MECH YARD WEST ELEVATION
SCALE: 1/4" = 1'-0"





9 / A04-08 PRECSAT SILAST SILL DIMENSIONS
SCALE: 3" = 1'-0"



8 / A04-08 WALL SECTION
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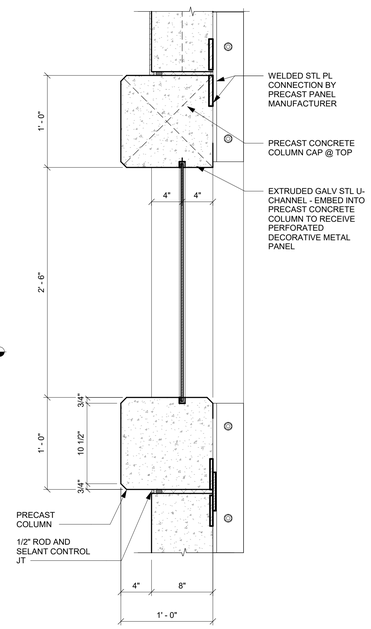
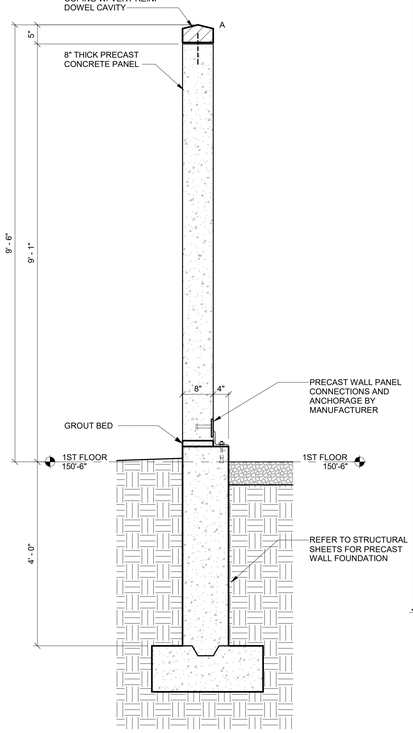


7 / A04-08 MECH YARD PIER DETAIL
SCALE: 1 1/2" = 1'-0"



6 / A04-08 TYP SCREEN WALL SECTION
SCALE: 3/4" = 1'-0"

1 / A04-08 ENLARGED NEW MECH YARD PLAN
SCALE: 1/4" = 1'-0"

DATE	ISSUED FOR	REV
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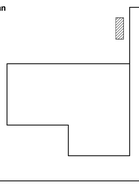
Key Plan



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DETROIT, MI 48202

Drawing Title

ENLARGED MECH YARD PLAN

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A04-08

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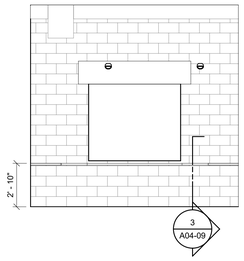
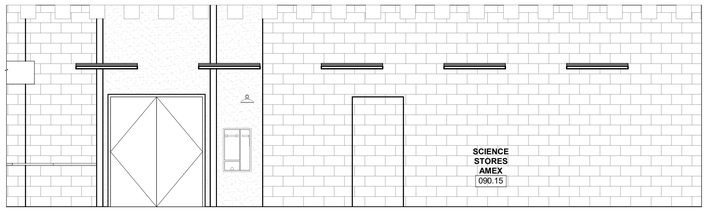
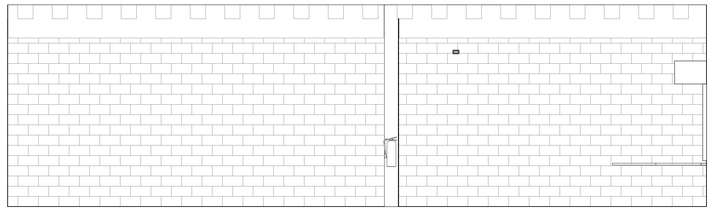


1B A04-09 SCIENCE STORE AMEX INTERIOR ELEVATION
SCALE: 1/4" = 1'-0"



1A A04-09 SCIENCE STORE AMEX INTERIOR ELEVATION
SCALE: 1/4" = 1'-0"



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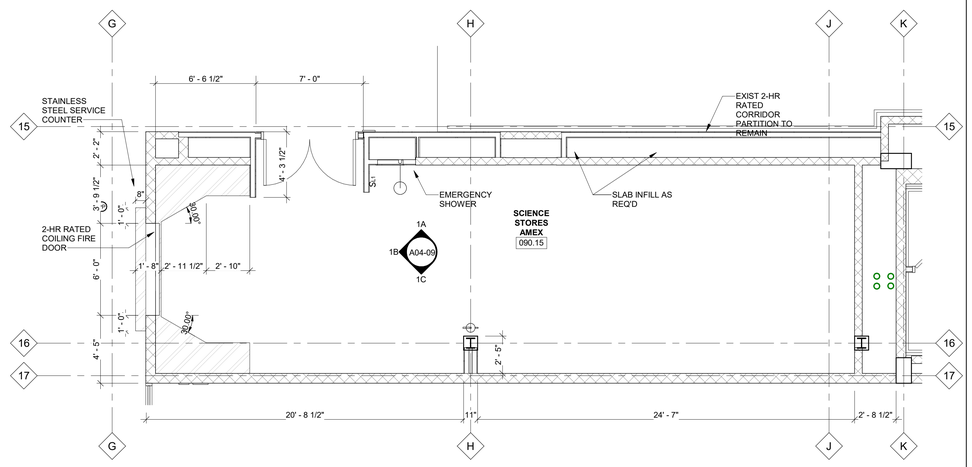
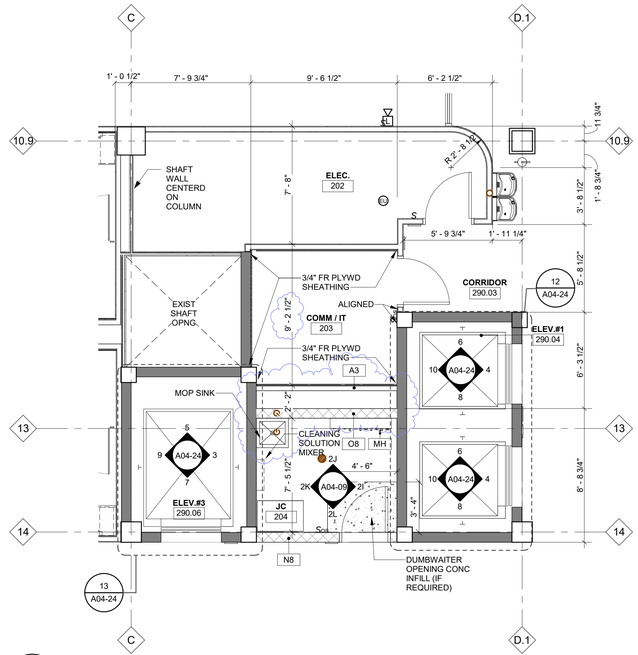


1 A04-09 ENLARGED SCIENCE STORE AMEX PLAN - BASEMENT
SCALE: 1/4" = 1'-0"



2 A04-09 ENLARGED CORE PLAN
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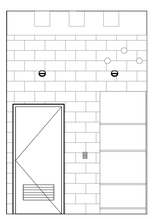
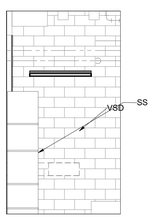
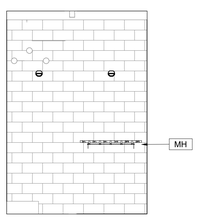


2L A04-09 SOUTH JC ELEVATION
SCALE: 1/4" = 1'-0"



2K A04-09 WEST JC ELEVATION
SCALE: 1/4" = 1'-0"



2J A04-09 NORTH JC ELEVATION
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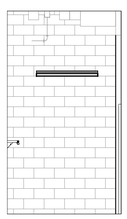

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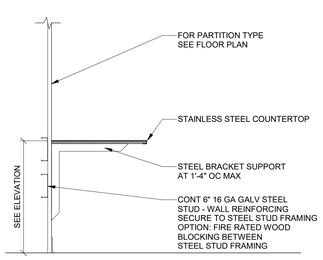
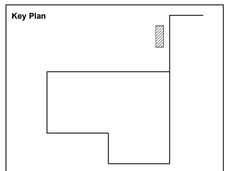
SCALE: 1/4" = 1'-0"



3 A04-09 COUNTER BRACKET - SURFACE MOUNTED
SCALE: 3/4" = 1'-0"

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
3/15/19	BULLETIN #1	6
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants
Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
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Seal(s)

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Project
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DETROIT, MI 48202

Drawing Title
ENLARGED STORAGE PLAN

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A04-09

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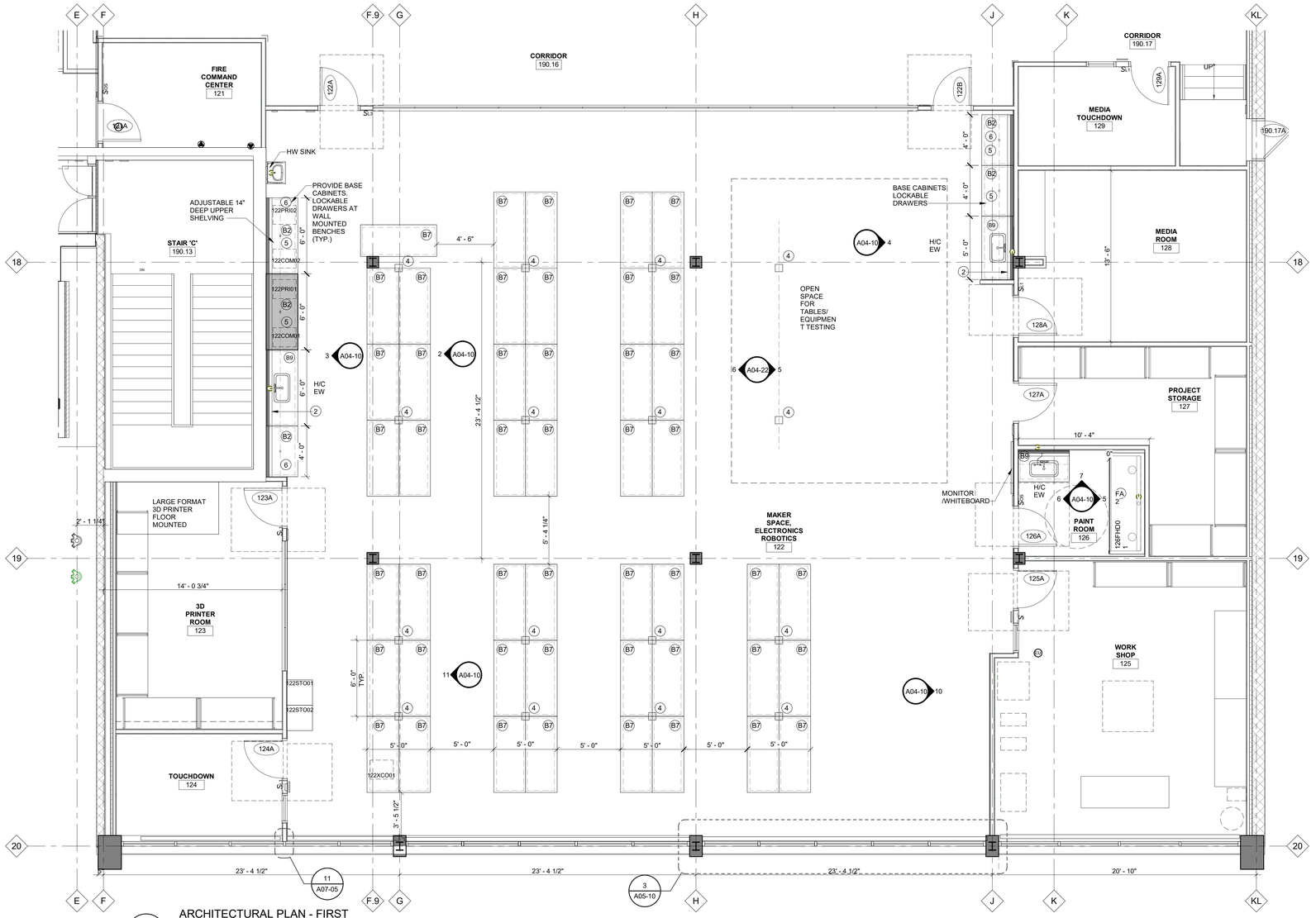
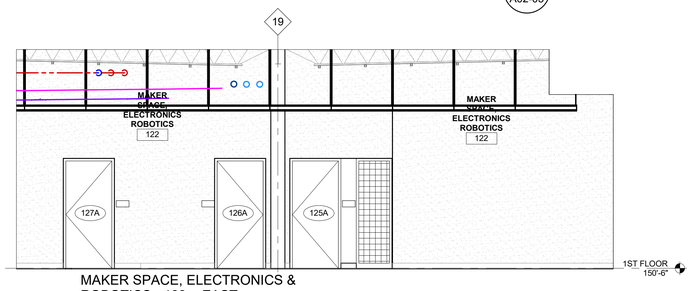
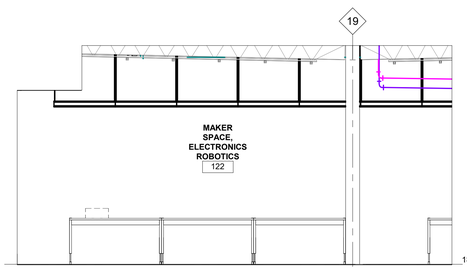


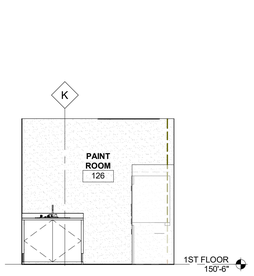
1 A02-03 ARCHITECTURAL PLAN - FIRST FLOOR
SCALE: 1/4" = 1'-0"



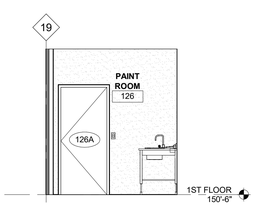
10 A04-10 MAKER SPACE, ELECTRONICS & ROBOTICS - 122 - EAST ELEVATION
SCALE: 1/4" = 1'-0"



11 A04-10 MAKER SPACE, ELECTRONICS & ROBOTICS - 122 - ELEVATION
SCALE: 1/4" = 1'-0"

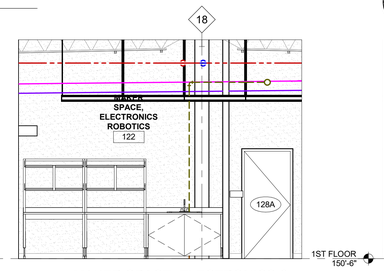


7 A04-10 PAINT ROOM - 126 - NORTH ELEVATION
SCALE: 1/4" = 1'-0"

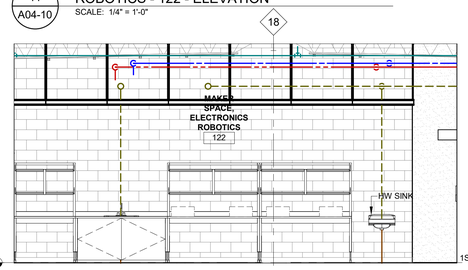


6 A04-10 PAINT ROOM - 126 - WEST ELEVATION
SCALE: 1/4" = 1'-0"

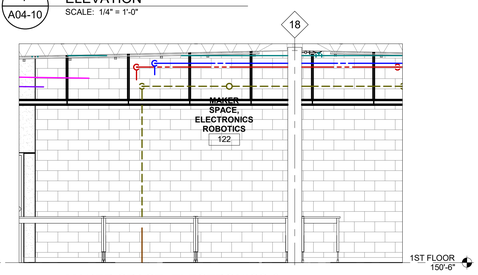
5 A04-10 PAINT ROOM - 122 - EAST ELEVATION
SCALE: 1/4" = 1'-0"



4 A04-10 MAKER SPACE, ELECTRONICS & ROBOTICS - 122 - ELEVATION 3
SCALE: 1/4" = 1'-0"



3 A04-10 MAKER SPACE, ELECTRONICS & ROBOTICS - 122 - ELEVATION 2
SCALE: 1/4" = 1'-0"



2 A04-10 MAKER SPACE, ELECTRONICS & ROBOTICS - 122 - ELEVATION 1
SCALE: 1/4" = 1'-0"

LAB NOTES

FUMEHOODS
- COMPRESSED AIR
- DOMESTIC NON-PORTABLE COLD WATER
- CUP SINKS
- NITROGEN
- RO

FUMEHOODS
- DOMESTIC NON-PORTABLE COLD WATER
- CUP SINKS

DENOTES ADJUSTABLE HEIGHT BENCHING AND ACCESSIBLE FUMEHOODS

1. ELECTRICAL SERVICE DROP 12"x16": 2 COMPARTMENTS
2. INSTALL 4" HIGH EPOXY BACKSPLASH FOR ALL BENCHES WITH INTEGRATED SINKS, AS WELL AS ADJACENT BENCHES MOUNTED AGAINST WALLS
3. WALL MOUNTED ELECTRICAL WIREWAY ABOVE BENCH HEIGHT TO HOST POWER AND 2 DATA RECEPTACLES AT EACH BENCH
4. OVERHEAD ELECTRICAL CORD REEL
5. DASHED LINE REPRESENTS ADJUSTABLE UPPER SHELVES INSTALLED WITHIN CASEWORK FRAMING FRAMING/UPRIGHTS, WITH LIPPED EDGE
6. 2x DATA OUTLET
7. FRS BOX - REFER TO ELECTRICAL DRAWINGS
8. PREFABRICATED SERVICE CHASE TO U/S OF SLAB ABOVE - PAINTED STEEL, 6" WIDE x 1' 1/2" DEEP. FRAMING AS SHOWN/REQUIRED

FUMEHOOD TYPES:
REFER TO PLANS FOR LOCATIONS AND DWG A09-50 FOR DETAILS.
ALL FUMEHOODS TO BE 2'6" DEEP.

FA1
FA2
FB1
FB2
FB3
FC1

- FOR ALL SERVICES DROPS PROVIDE CONTINUOUS VERTICAL STRUTS WITH HORIZONTAL PLUMBING/ELEC SUPPORT STRUTS
- ALL LAB CASEWORK SERVICES AND COMPONENTS SHOULD BE QUANTIFIED AND MANUFACTURED BASED ON THE PLANS AND NOT ON THE ELEVATIONS WITH THE EXEPTION OF BASE CABINETS
- ES/EW EMERGENCY SHOWER WITH EYE WASH STATION, REFER TO MECHANICAL DWGS.
- HW SINK: WALL MOUNTED STAINLESS STEEL HAND WASHING SINK - REFER TO MECHANICAL DWG.
- ALL SINKS AT LAB BENCHES TO BE INTEGRATED EPOXY, PROVIDE MARINE EDGES
- DI = DEIONIZED WATER
- H/C = HOT & COLD
- RO = REVERSE OSMOSIS
- EW = EYE WASH
- C+S = GAS CYLINDER INCLUDING INCLUDING SUPPORT

LAB BENCH NOTES

WITHIN FUMEHOOD

****ALL LAB BENCHES TO BE SYMPHONY II SYSTEM FROM BEDCOLAB / CIF - AS BASIS OF DESIGN, REFER TO SPECIFICATIONS**

****INSTALL 4" HIGH EPOXY BACKSPLASH FOR ALL BENCHES WITH INTEGRATED SINKS, AS WELL AS ALL BENCHES MOUNTED AGAINST WALLS**

**** LAB BENCHES FOR ALL WET LABS (ROOMS 208, 209, 212, 217, 218, 308, 310, 312, 317, 318, 408, 410, 412, 417, 418, 508, 510, 518 AND 519 AND THEIR PREP AREAS TO RECEIVE 1" THICK EPOXY RESIN COUNTERTOPS**

**** LAB BECHES FOR ALL DRY LABS (ROOMS 608, 610, 612, 613, 614, 708, 710, 712, 713 AND 714) AND THEIR PREP AREAS TO RECEIVE 1" THICK PHENOLIC PANEL COUNTERTOPS.**

****GIF ELECTRICAL OUTLETS TO BE INSTALLED WHERE RECEPTACLES ARE LESS THAN 6FT AWAY FROM A SINK. REFER TO ELECTRICAL DWG.**

LAB CASEWORK TABLE TYPES

B1: FIXED BENCHES W/ SERVICE UPRIGHTS AT EACH END WHICH HOUSE ALL SERVICES FROM CEILING SPACE INTO BENCHES. SEPARATE COMPARTMENTS ARE REQUIRED FOR POWER, DATA AND MECHANICAL PLUMBING / FITINGS AS REQUIRED.

B2: SERVICE UPRIGHTS AND INTEGRATED HORIZONTAL ELECTRICAL RACEWAY: SAME PROVISIONS OUTLINED FOR B1 BUT WITH HORIZONTAL RACEWAY

B3: BENCH W/ NO UPRIGHTS. OVERHEAD SERVICE CARRIERS FOR ALL POWER AND DATA CONNECTIONS. NO MECHANICAL FIXTURES.

B4: BENCH WITH NO UPRIGHTS, PROVIDE OVERHEAD ELECTRICAL CORD REEL. DATA OUTLETS TO BE MOUNTED ON ADJACENT WALLS.

B5: WALL MOUNTED HORIZONTAL ELECTRICAL WIREWAY ABOVE BACKSPLASH HEIGHT TO HOUSE POWER AND DATA RECEPTACLES

B6: BENCH INSTALLED AGAINST WALL WITH GLAZING ABOVE. PROVIDE TWO 2" DIA GROMMETS HOLE AND CAP PER BENCH (ONE AT EACH SIDE)

B7: FLEXIBLE / MOVABLE BENCHES WITH SWIVEL CASTER WHEELS AND NO ELECTRICAL RECEPTACLES

B8: SHOCK ABSORBENT / VIBRATION SENSITIVE BENCHES. INSTALL HORIZONTAL ELECTRICAL WIREWAY MOUNTED ON BENCH

B9: FIXED BENCH W/ BASE CABINET AND INTEGRATED EPOXY SINK - ADD MARINE EDGES. NO ELECTRICAL RECEPTACLES.

B10: STAINLESS STEEL STANDARD 4-LEG TABLE AND COUNTERTOP WITH INTEGRATED STAINLESS STEEL DOUBLE SINK, 4" HIGH BACKSPLASH AND MARINE EDGE. NO ELECTRICAL RECEPTACLES. CONNECT PLUMBING FROM ADJACENT BENCH. ADD SUSPENDED BASE CABINETS.

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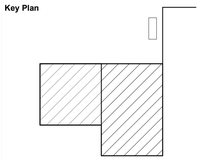
Key Plan



Consultants

Civil:	FTC&H
Landscape:	FTCH
Architecture	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

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Project Manager: A. NOLFF	BIM Lead: R. HAAS
Design Lead: C. MENARD	Drawn: R. HAAS
Project Leader: C. MENARD	Checked: G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
ENLARGED 1ST FLOOR LAB

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A04-10

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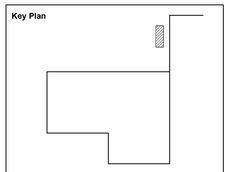
05/03/19	TEST AND BALANCE BID	7

Key Plan



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Landscape: FTCH
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Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
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Project Manager	BIM Lead
A. NOLFF	R. HAAS
Design Lead	Drawn
C. MENARD	Author
Project Leader	Checked
C. MENARD	Checker

WAYNE STATE UNIVERSITY

Project

STEM INNOVATION LEARNING CENTER

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

CASEWORK DETAILS

Scale

Project No. JCDT17-0231

Drawing No.

A04-10a

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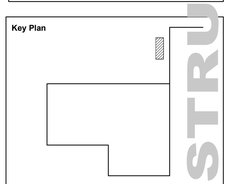
Key Plan



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Structural: FTC&H
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A. NOLFF	R. HAAS
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C. MENARD	Author
Project Leader	Checked
C. MENARD	Checker

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Project

STEM INNOVATION LEARNING CENTER

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

CASEWORK DETAILS

Scale

Project No. JCDT17-0231

Drawing No.

A04-10b

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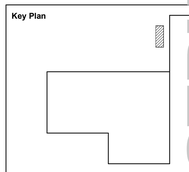
05/03/19	TEST AND BALANCE BID	7

Key Plan



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Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
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Seal(s)

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A. NOLFF	R. HAAS
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Project Leader	Checked
C. MENARD	Checker

WAYNE STATE UNIVERSITY

Project

STEM INNOVATION LEARNING CENTER

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DETROIT, MI 48202

Drawing Title

CASEWORK DETAILS

Scale

Project No. JCDT17-0231

Drawing No.

A04-10c

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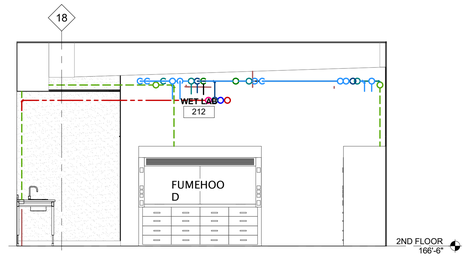
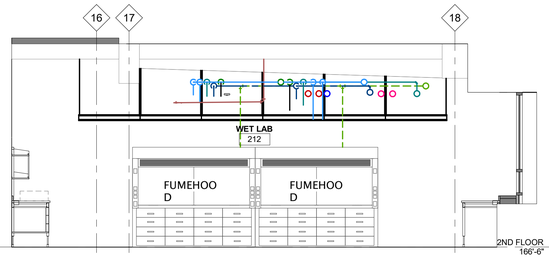
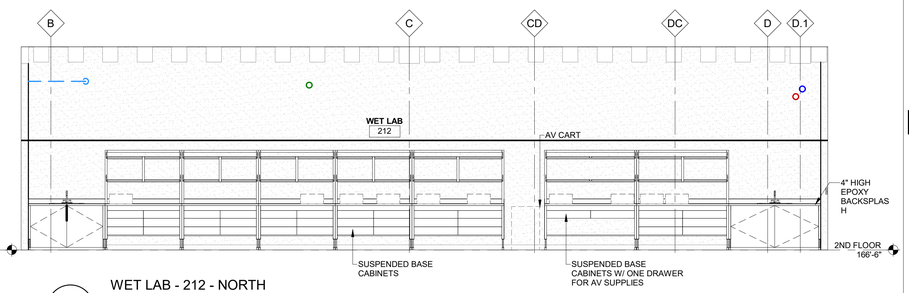


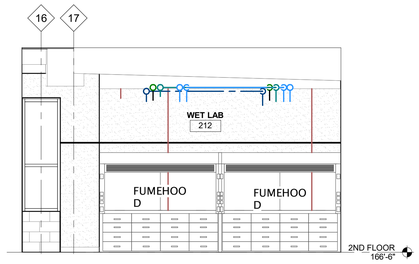
6 A04-11 WET LAB - 212 - WEST ELEVATION
SCALE: 1/4" = 1'-0"



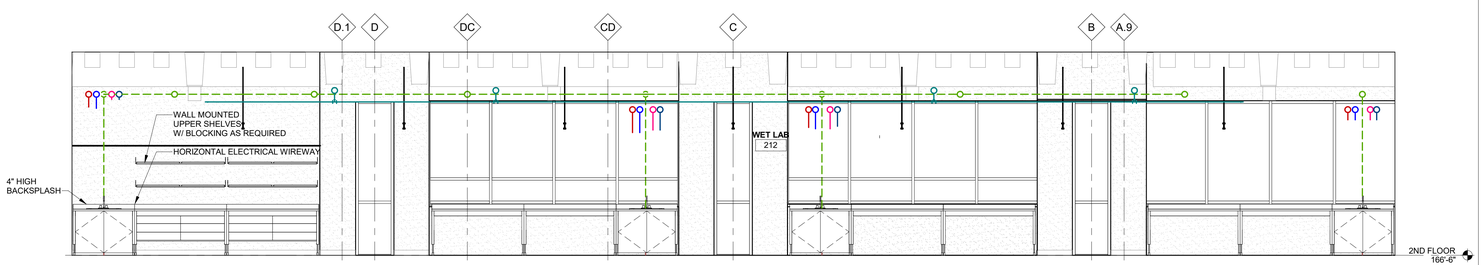
5 A04-11 WET LAB - 212 - FUMEHOOD/AISLE ELEVATION
SCALE: 1/4" = 1'-0"



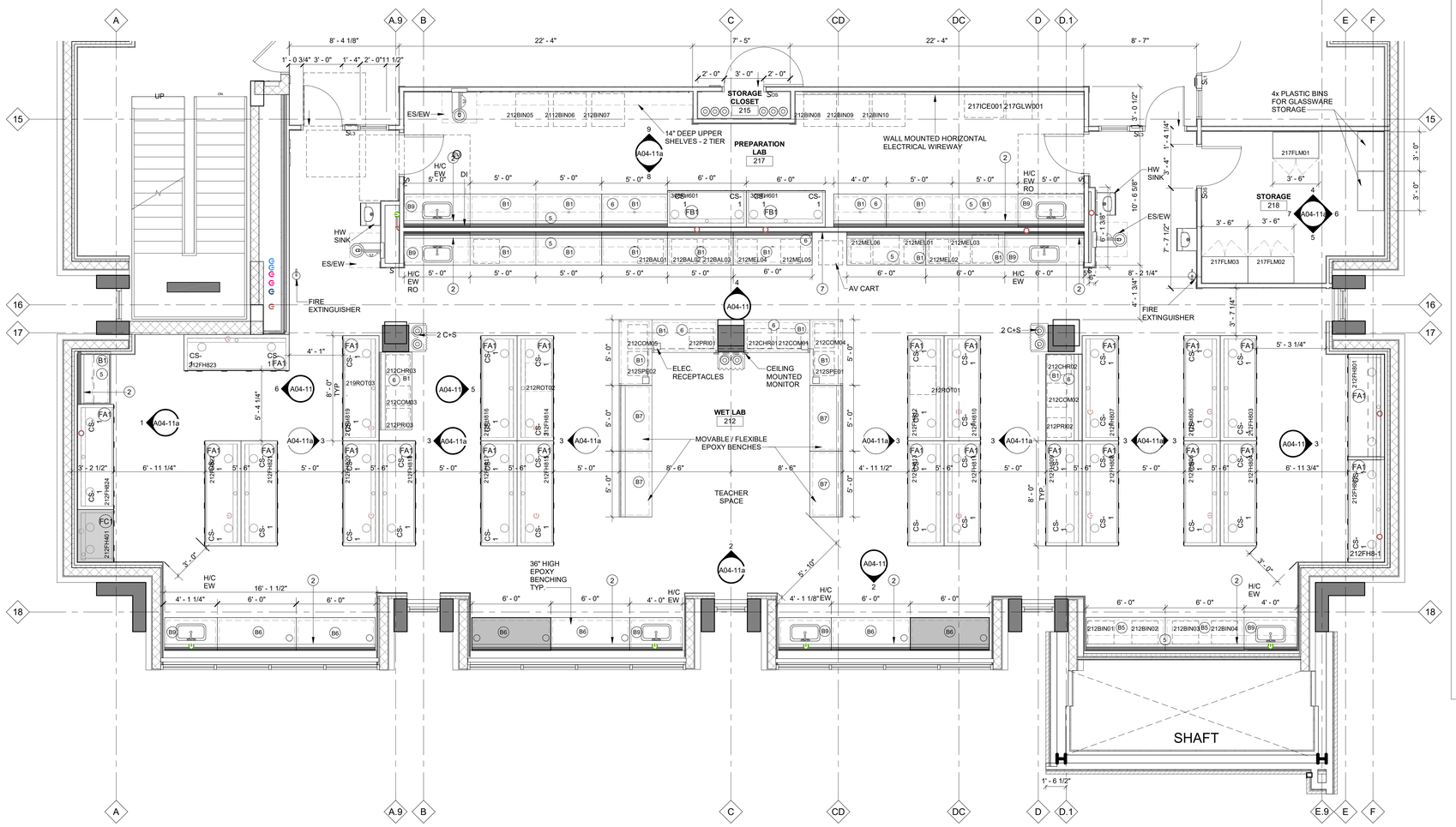
4 A04-11 WET LAB - 212 - NORTH ELEVATION
SCALE: 1/4" = 1'-0"



3 A04-03 WET LAB - 212 - EAST ELEVATION
SCALE: 1/4" = 1'-0"



2 A04-11 WET LAB - 212 - SOUTH ELEVATION
SCALE: 1/4" = 1'-0"



1 A02-04 ENLARGED WET LAB - 212 - PLAN
SCALE: 1/4" = 1'-0"

LAB NOTES

A
FUMEHOODS
- **COMPRESSED AIR**
- **DOMESTIC NON-PORTABLE COLD WATER**
- **CUP SINKS**
- **NITROGEN**
- **RO**

B
FUMEHOODS
- **DOMESTIC NON-PORTABLE COLD WATER**
- **CUP SINKS**

DENOTES ADJUSTABLE HEIGHT BENCHING AND ACCESSIBLE FUMEHOODS

1. **ELECTRICAL SERVICE DROP 12"x16": 2 COMPARTMENTS**
2. **INSTALL 4" HIGH EPOXY BACKSPLASH FOR ALL BENCHES WITH INTEGRATED SINKS, AS WELL AS ADJACENT BENCHES MOUNTED AGAINST WALLS**
3. **WALL MOUNTED ELECTRICAL WIREWAY ABOVE BENCH HEIGHT TO HOST POWER AND 2 DATA RECEPTACLES AT EACH BENCH**
4. **OVERHEAD ELECTRICAL CORD REEL**
5. **DASHED LINE REPRESENTS ADJUSTABLE UPPER SHELVES INSTALLED WITHIN CASEWORK FRAMING FRAMING/UPRIGHTS, WITH LIPPED EDGE**
6. **2x DATA OUTLET**
7. **FRS BOX - REFER TO ELECTRICAL DRAWINGS**
8. **PREFABRICATED SERVICE CHASE TO U/S OF SLAB ABOVE - PAINTED STEEL, 6" WIDE x 1' 1/2" DEEP. FRAMING AS REQUIRED**

FUMEHOOD TYPES:
REFER TO PLANS FOR LOCATIONS AND DWG A04-50 FOR DETAILS.
ALL FUMEHOODS TO BE 2'6" DEEP.

FA1
FA2
FB1
FB2
FB3
FC1

- **FOR ALL SERVICES DROPS PROVIDE CONTINUOUS VERTICAL STRUTS WITH HORIZONTAL PLUMBING/ELEC SUPPORT STRUTS**
- **ALL LAB CASEWORK SERVICES AND COMPONENTS SHOULD BE QUANTIFIED AND MANUFACTURED BASED ON THE PLANS AND NOT ON THE ELEVATIONS WITH THE EXEPTION OF BASE CABINETS**
- **ES/EW EMERGENCY SHOWER WITH EYE WASH STATION, REFER TO MECHANICAL DWGS.**
- **HW SINK: WALL MOUNTED STAINLESS STEEL HAND WASHING SINK - REFER TO MECHANICAL DWG.**
- **ALL SINKS AT LAB BENCHES TO BE INTEGRATED EPOXY, PROVIDE MARINE EDGES**
- **DI = DEIONIZED WATER**
- **H/C = HOT & COLD**
- **RO = REVERSE OSMOSIS**
- **EW = EYE WASH**
- **C+S = GAS CYLINDER INCLUDING INCLUDING SUPPORT**

LAB BENCH NOTES WITHIN FUMEHOOD

****ALL LAB BENCHES TO BE SYMPHONY II SYSTEM FROM BEDCOLAB / CIF - AS BASIS OF DESIGN, REFER TO SPECIFICATIONS**

****INSTALL 4" HIGH EPOXY BACKSPLASH FOR ALL BENCHES WITH INTEGRATED SINKS, AS WELL AS ALL BENCHES MOUNTED AGAINST WALLS**

**** LAB BENCHES FOR ALL WET LABS (ROOMS 208, 209, 212, 217, 216, 306, 310, 312, 317, 318, 408, 410, 412, 417, 418, 508, 510, 518 AND 519 AND THEIR PREP AREAS TO RECEIVE 1" THICK EPOXY RESIN COUNTERTOPS**

**** LAB BECHES FOR ALL DRY LABS (ROOMS 608, 610, 612, 613, 614, 708, 710, 712, 713 AND 714) AND THEIR PREP AREAS TO RECEIVE 1" THICK PHENOLIC PANEL COUNTERTOPS.**

****GIF ELECTRICAL OUTLETS TO BE INSTALLED WHERE RECEPTACLES ARE LESS THAN 6FT AWAY FROM A SINK. REFER TO ELECTRICAL DWG.**

LAB CASEWORK TABLE TYPES

B1: FIXED BENCHES W/ SERVICE UPRIGHTS AT EACH END WHICH HOUSE ALL SERVICES FROM CEILING SPACE INTO BENCHES. SEPARATE COMPARMENTS ARE REQUIRED FOR POWER, DATA AND MECHANICAL PLUMBING / FITINGS AS REQUIRED.

B2: SERVICE UPRIGHTS AND INTEGRATED HORIZONTAL ELECTRICAL RACEWAY: SAME PROVISIONS OUTLINED FOR B1 BUT WITH HORIZONTAL RACEWAY

B3: BENCH W/ NO UPRIGHTS. OVERHEAD SERVICE CARRIERS FOR ALL POWER AND DATA CONNECTIONS. NO MECHANICAL FIXTURES.

B4: BENCH WITH NO UPRIGHTS, PROVIDE OVERHEAD ELECTRICAL CORD REEL. DATA OUTLETS TO BE MOUNTED ON ADJACENT WALLS.

B5: WALL MOUNTED HORIZONTAL ELECTRICAL WIREWAY ABOVE BACKSPLASH HEIGHT TO HOUSE POWER AND DATA RECEPTACLES

B6: BENCH INSTALLED AGAINST WALL WITH GLAZING ABOVE. PROVIDE TWO 2" DIA GROMMETS HOLE AND CAP PER BENCH (ONE AT EACH SIDE)

B7: FLEXIBLE / MOVABLE BENCHES WITH SWIVEL CASTER WHEELS AND NO ELECTRICAL RECEPTACLES

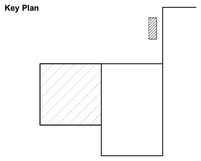
B8: SHOCK ABSORBENT / VIBRATION SENSITIVE BENCHES. INSTALL HORIZONTAL ELECTRICAL WIREWAY MOUNTED ON BENCH

B9: FIXED BENCH W/ BASE CABINET AND INTEGRATED EPOXY SINK - ADD MARINE EDGES. NO ELECTRICAL RECEPTACLES.

B10: STAINLESS STEEL STANDARD 4-LEG TABLE AND COUNTERTOP WITH INTEGRATED STAINLESS STEEL DOUBLE SINK, 4" HIGH BACKSPLASH AND MARINE EDGE. NO ELECTRICAL RECEPTACLES. CONNECT PLUMBING FROM ADJACENT BENCH. ADD SUSPENDED BASE CABINETS.

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil:	FTC&H
Landscape:	FTCH
Architecture	NORR
Structural:	FTC&H
Mechanical:	FTC&H
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Lab Design:	NORR

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Design Lead C. MENARD	Drawn A. GODEK
Project Leader C. MENARD	Checked G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
EQUIPMENT WET LAB SECOND FLOOR PLAN

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A04-11

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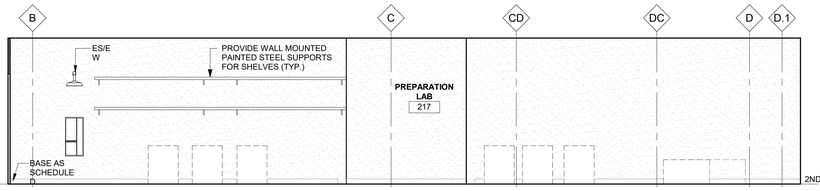
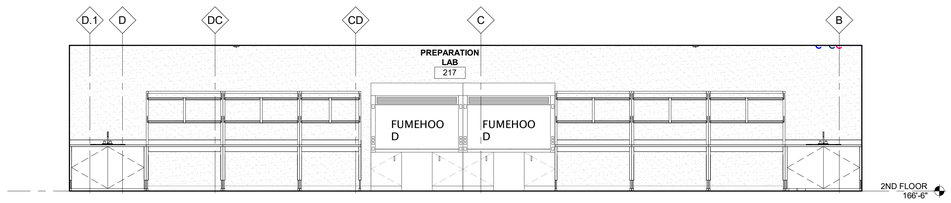
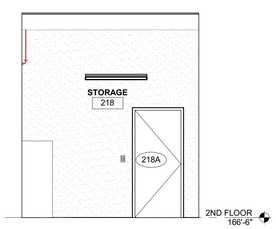


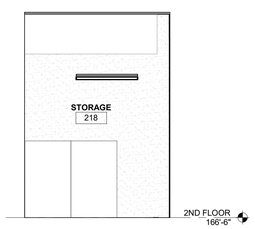
9 A04-11 PREPERATION LAB - 217 - ELEVATION
SCALE: 1/4" = 1'-0"



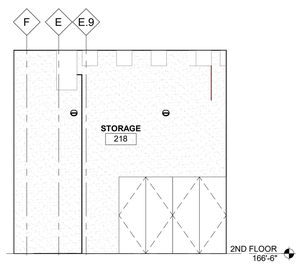
8 A04-11 PREPARATION AREA - 217 -ELEVATION
SCALE: 1/4" = 1'-0"



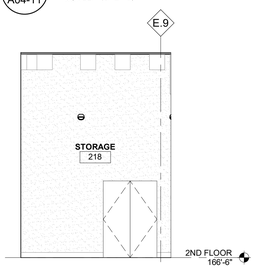
7 A04-11 STORAGE - 218 - WEST ELEVATION
SCALE: 1/4" = 1'-0"



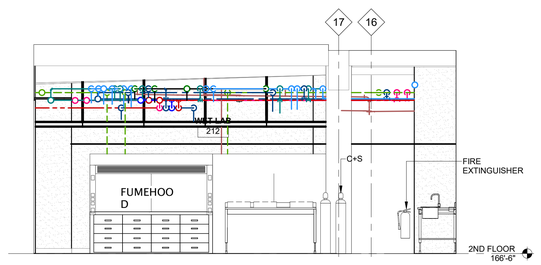
6 A04-11 STORAGE - 218 - EAST ELEVATION
SCALE: 1/4" = 1'-0"



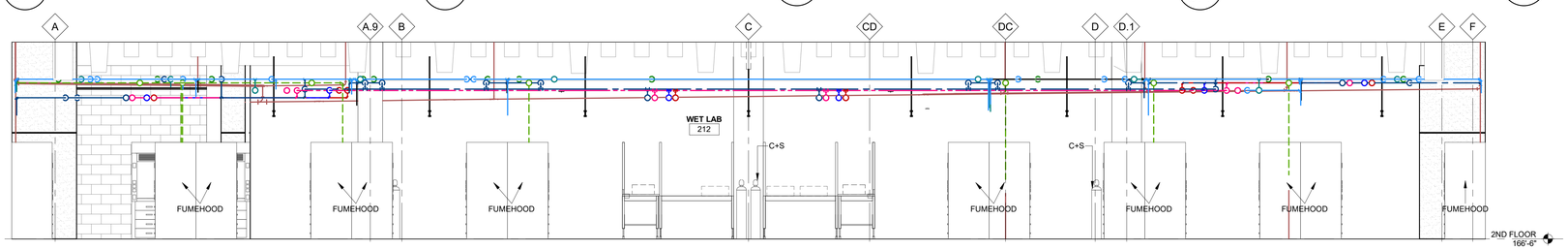
5 A04-11 STORAGE - 218 - SOUTH ELEVATION
SCALE: 1/4" = 1'-0"



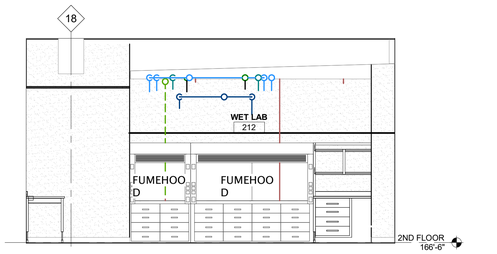
4 A04-11 STORAGE - 218 - NORTH ELEVATION
SCALE: 1/4" = 1'-0"



3 A04-11 WET LAB - 212 - ELEVATION 5
SCALE: 1/4" = 1'-0"



2 A04-11 WET LAB - 212 - NORTH CENTRAL ELEVATION
SCALE: 1/4" = 1'-0"



1 A04-11 WET LAB - 212 - ELEVATION
SCALE: 1/4" = 1'-0"

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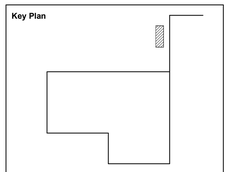
Key Plan



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DETROIT, MI 48202

Drawing Title
EQUIPMENT WET LAB - 2ND FLOOR ELEVATIONS

Scale 1/4" = 1'-0"

Project No. JCDT17-0231

Drawing No.
A04-11a

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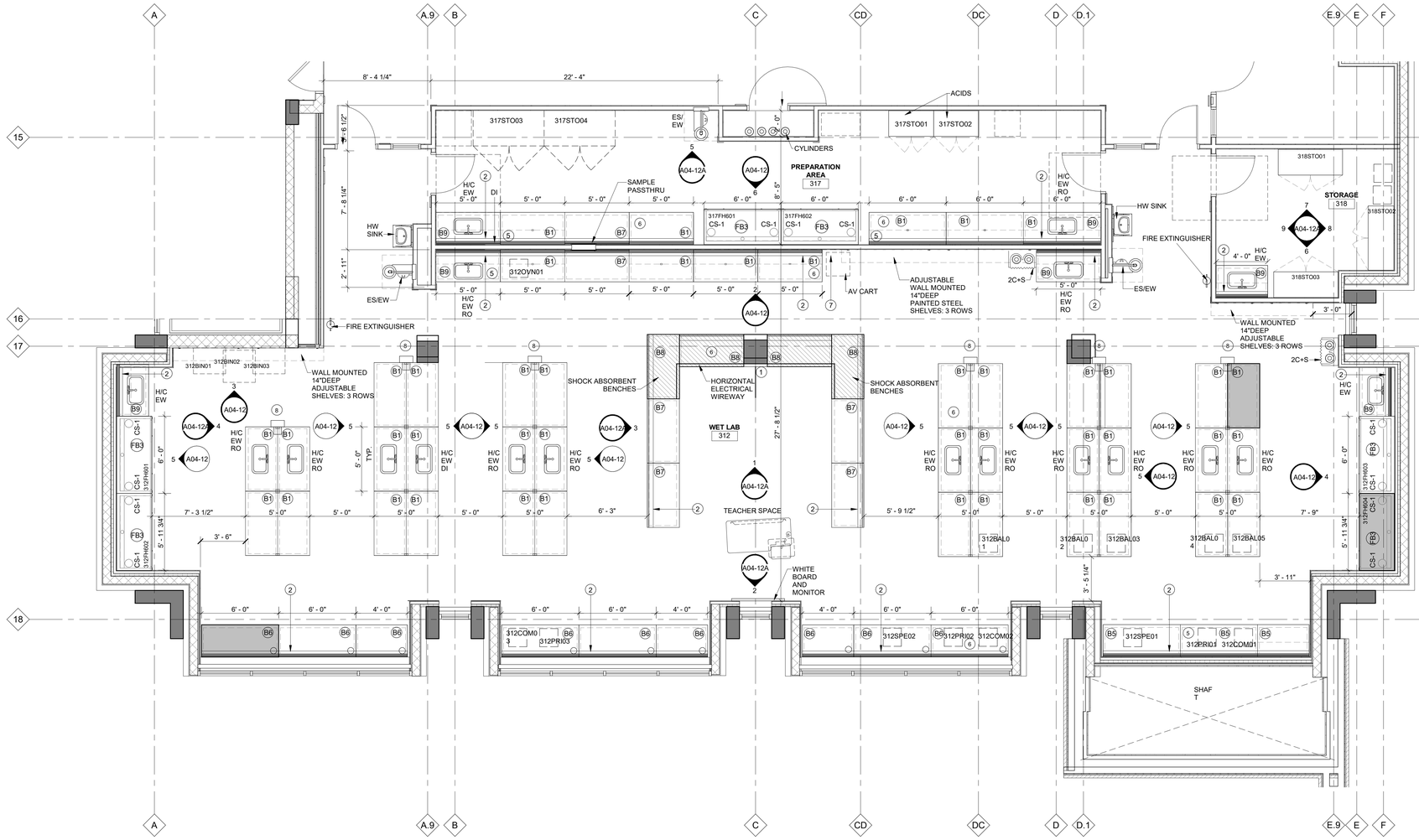
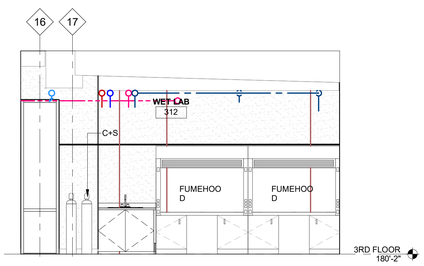
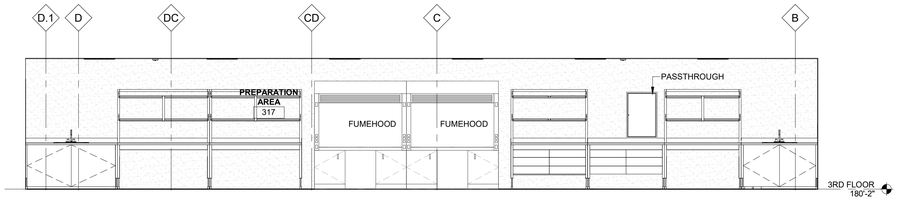


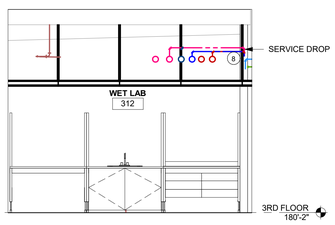
1 A02-05 ENLARGED WET LAB - 312 - PLAN
SCALE: 1/4" = 1'-0"



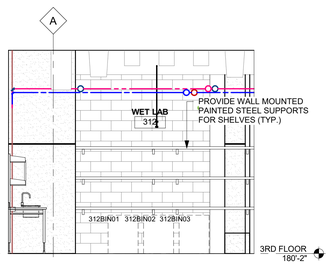
4 A04-03 WET LAB - 312 - EAST ELEVATION
SCALE: 1/4" = 1'-0"



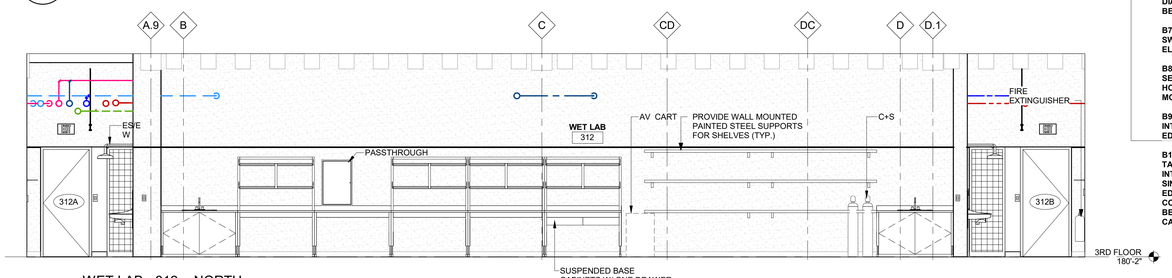
6 A04-12 PREPARATION AREA - 317 - SOUTH ELEVATION
SCALE: 1/4" = 1'-0"



5 A04-12 WET LAB - 312 - TYPE 2 ELEVATION
SCALE: 1/4" = 1'-0"



3 A04-12 WET LAB - 312 - PARTIAL NORTH ELEVATION
SCALE: 1/4" = 1'-0"



2 A04-12 WET LAB - 312 - NORTH ELEVATION 1
SCALE: 1/4" = 1'-0"

LAB NOTES

A — **FUMEHOODS**
- COMPRESSED AIR
- DOMESTIC NON-PORTABLE COLD WATER
- CUP SINKS
- NITROGEN
- RO

B — **FUMEHOODS**
- DOMESTIC NON-PORTABLE COLD WATER
- CUP SINKS

DENOTES ADJUSTABLE HEIGHT BENCHING AND ACCESSIBLE FUMEHOODS

1. ELECTRICAL SERVICE DROP 12"x16": 2 COMPARTMENTS
2. INSTALL 4" HIGH EPOXY BACKSPLASH FOR ALL BENCHES WITH INTEGRATED SINKS, AS WELL AS ADJACENT BENCHES MOUNTED AGAINST WALLS
3. WALL MOUNTED ELECTRICAL WIREWAY ABOVE BENCH HEIGHT TO HOST POWER AND 2 DATA RECEPTACLES AT EACH BENCH
4. OVERHEAD ELECTRICAL CORD REEL
5. DASHED LINE REPRESENTS ADJUSTABLE UPPER SHELVES INSTALLED WITHIN CASEWORK FRAMING/UPRIGHTS, WITH LIPPED EDGE
6. 2x DATA OUTLET
7. FRS BOX - REFER TO ELECTRICAL DRAWINGS
8. PREFABRICATED SERVICE CHASE TO U/S OF SLAB ABOVE - PAINTED STEEL, 6" WIDE x 1' 1/2" DEEP. FRAMING AS REQUIRED

FUMEHOOD TYPES:
REFER TO PLANS FOR LOCATIONS AND DWG A09-50 FOR DETAILS.
ALL FUMEHOODS TO BE 2'6" DEEP.

FA1
FA2
FB1
FB2
FB3
FC1

- FOR ALL SERVICES DROPS PROVIDE CONTINUOUS VERTICAL STRUTS WITH HORIZONTAL PLUMBING/ELEC SUPPORT STRUTS
- ALL LAB CASEWORK SERVICES AND COMPONENTS SHOULD BE QUANTIFIED AND MANUFACTURED BASED ON THE PLANS AND NOT ON THE ELEVATIONS WITH THE EXEPTION OF BASE CABINETS
- ES/EW EMERGENCY SHOWER WITH EYE WASH STATION, REFER TO MECHANICAL DWGS.
- HW SINK: WALL MOUNTED STAINLESS STEEL HAND WASHING SINK - REFER TO MECHANICAL DWG.
- ALL SINKS AT LAB BENCHES TO BE INTEGRATED EPOXY, PROVIDE MARINE EDGES
- DI = DEIONIZED WATER
- H/C = HOT & COLD
- RO = REVERSE OSMOSIS
- EW = EYE WASH
- C+S = GAS CYLINDER INCLUDING INCLUDING SUPPORT

LAB BENCH NOTES WITHIN FUMEHOOD

****ALL LAB BENCHES TO BE SYMPHONY II SYSTEM FROM BEDCOLAB / CIF - AS BASIS OF DESIGN, REFER TO SPECIFICATIONS**

****INSTALL 4" HIGH EPOXY BACKSPLASH FOR ALL BENCHES WITH INTEGRATED SINKS, AS WELL AS ALL BENCHES MOUNTED AGAINST WALLS**

**** LAB BENCHES FOR ALL WET LABS (ROOMS 208, 209, 212, 217, 218, 308, 310, 312, 317, 318, 408, 410, 412, 417, 418, 508, 510, 518 AND 519 AND THEIR PREP AREAS TO RECEIVE 1" THICK EPOXY RESIN COUNTERTOPS**

**** LAB BECHES FOR ALL DRY LABS (ROOMS 608, 610, 612, 613, 614, 708, 710, 712, 713 AND 714) AND THEIR PREP AREAS TO RECEIVE 1" THICK PHENOLIC PANEL COUNTERTOPS.**

****GIF ELECTRICAL OUTLETS TO BE INSTALLED WHERE RECEPTACLES ARE LESS THAN 6FT AWAY FROM A SINK. REFER TO ELECTRICAL DWG.**

LAB CASEWORK TABLE TYPES

B1: FIXED BENCHES W/ SERVICE UPRIGHTS AT EACH END WHICH HOUSE ALL SERVICES FROM CEILING SPACE INTO BENCHES. SEPARATE COMPARMENTS ARE REQUIRED FOR POWER, DATA AND MECHANICAL PLUMBING / FITINGS AS REQUIRED.

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B10: STAINLESS STEEL STANDARD 4-LEG TABLE AND COUNTERTOP WITH INTEGRATED STAINLESS STEEL DOUBLE SINK, 4" HIGH BACKSPLASH AND MARINE EDGE. NO ELECTRICAL RECEPTACLES. CONNECT PLUMBING FROM ADJACENT BENCH. ADD SUSPENDED BASE CABINETS.

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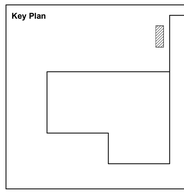
Key Plan



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Drawing Title
EQUIPMENT WET LAB - 3RD FLOOR PLANS

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A04-12

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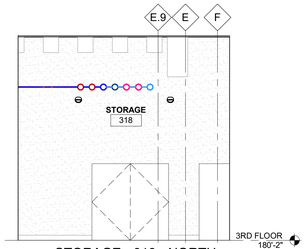
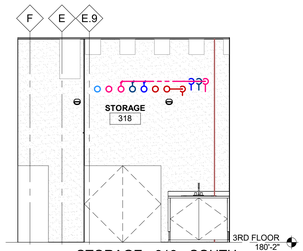
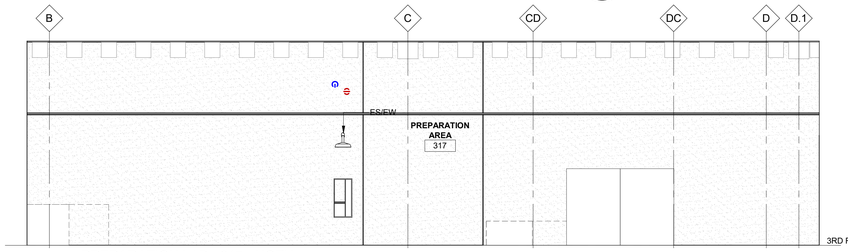


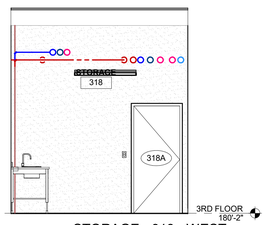
7 A04-12 STORAGE - 318 - NORTH ELEVATION
SCALE: 1/4" = 1'-0"



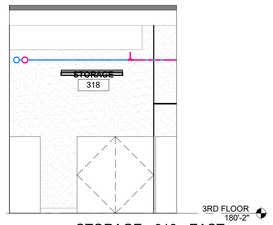
6 A04-12 STORAGE - 318 - SOUTH ELEVATION
SCALE: 1/4" = 1'-0"



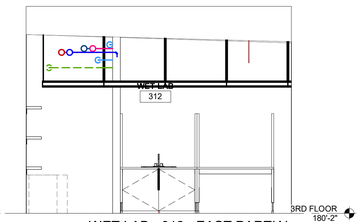
5 A04-12 PREPARATION LAB - 317 - NOTH ELEVATION
SCALE: 1/4" = 1'-0"



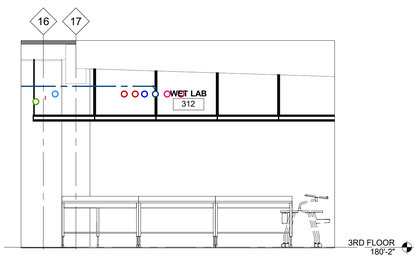
9 A04-12 STORAGE - 318 - WEST ELEVATION
SCALE: 1/4" = 1'-0"



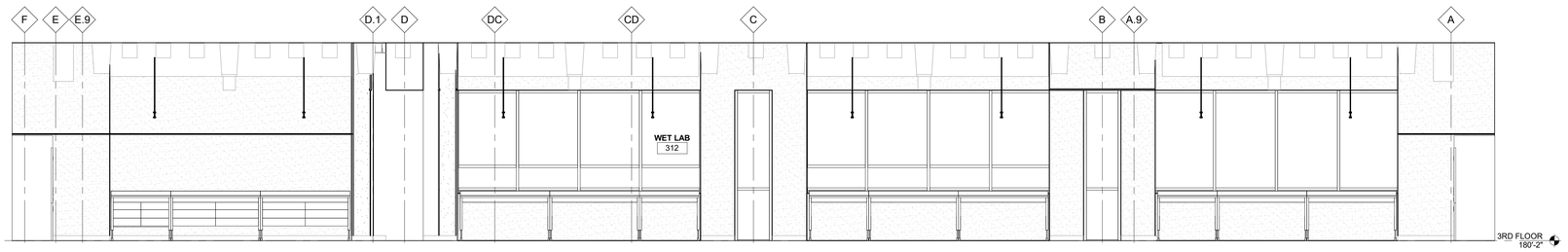
8 A04-12 STORAGE - 318 - EAST ELEVATION
SCALE: 1/4" = 1'-0"



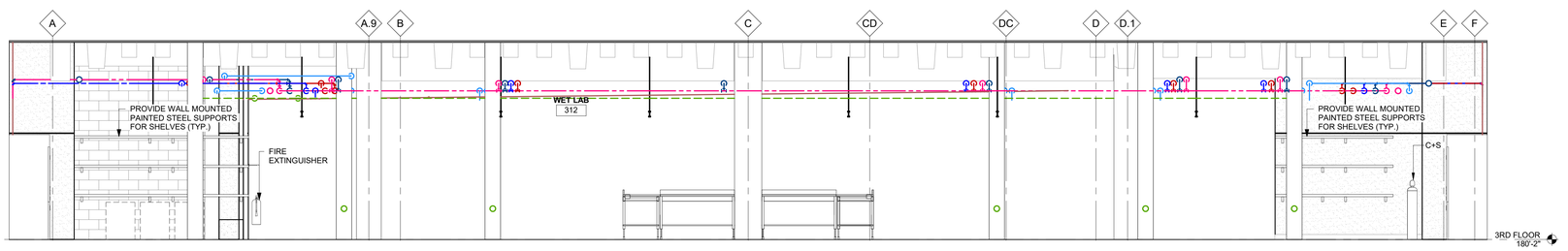
4 A04-12 WET LAB - 312 - EAST PARTIAL ELEVATION
SCALE: 1/4" = 1'-0"



3 A04-12 WET LAB - 312 - CENTRAL AREA - EAST ELEVATION
SCALE: 1/4" = 1'-0"



2 A04-12 WET LAB - 312 - LONGITUDINAL ELEVATION
SCALE: 1/4" = 1'-0"



1 A04-12 WET LAB - 312 - NORTH ELEVATION
SCALE: 1/4" = 1'-0"

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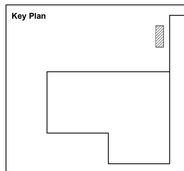

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WAYNE STATE UNIVERSITY

Project

STEM INNOVATION LEARNING CENTER

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DETROIT, MI 48202

Drawing Title

EQUIPMENT WET LAB - 3RD FLOOR ELEVATIONS

Scale	1/4" = 1'-0"
Project No.	JCDT17-0231
Drawing No.	A04-12A

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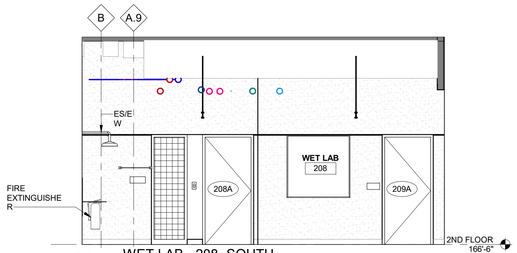

7 A04-04 WET LAB - 208 -SOUTH ELEVATION
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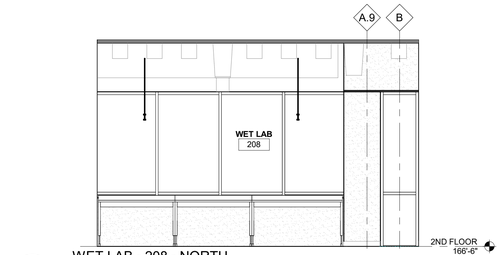

6 A04-04 WET LAB - 208 - NORTH ELEVATION
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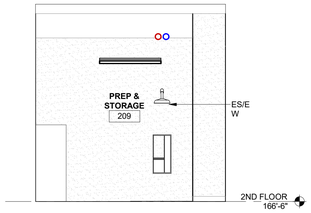

12 A04-13 PREP & STORAGE - 209 - WEST ELEVATION
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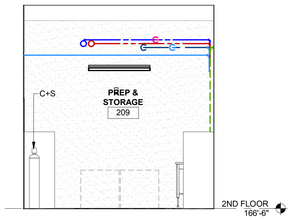

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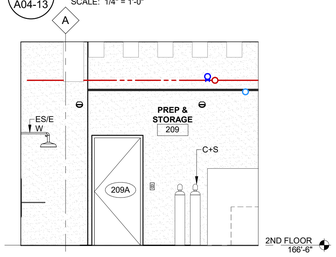

10 A04-13 PREP AND STORAGE -209 - NORTH ELEVATION
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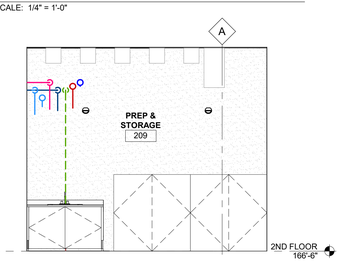

8 A04-13 PREP AND STORAGE - 209 - SOUTH ELEVATION
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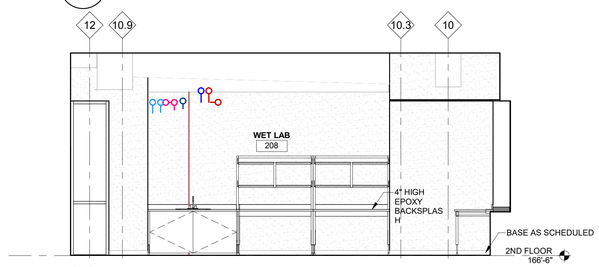

5 A04-13 WET LAB -208 - WEST ELEVATION
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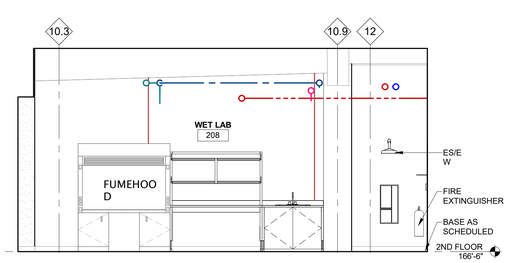

4 A04-13 WET LAB - 208 - EAST ELEVATION
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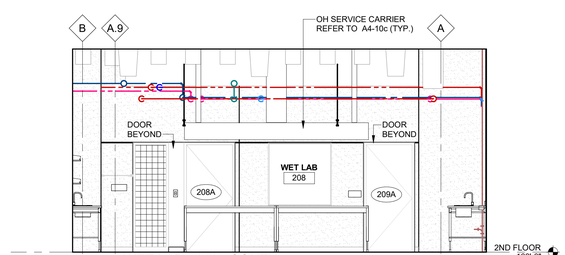

3 A04-04 WET LAB - 208 - SOUTH ELEVATION
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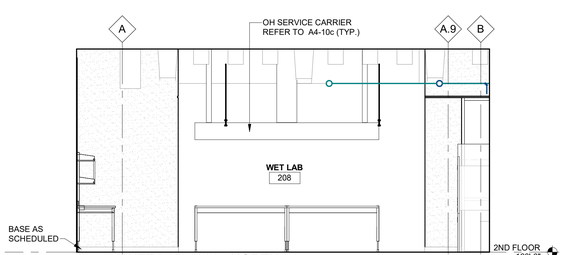
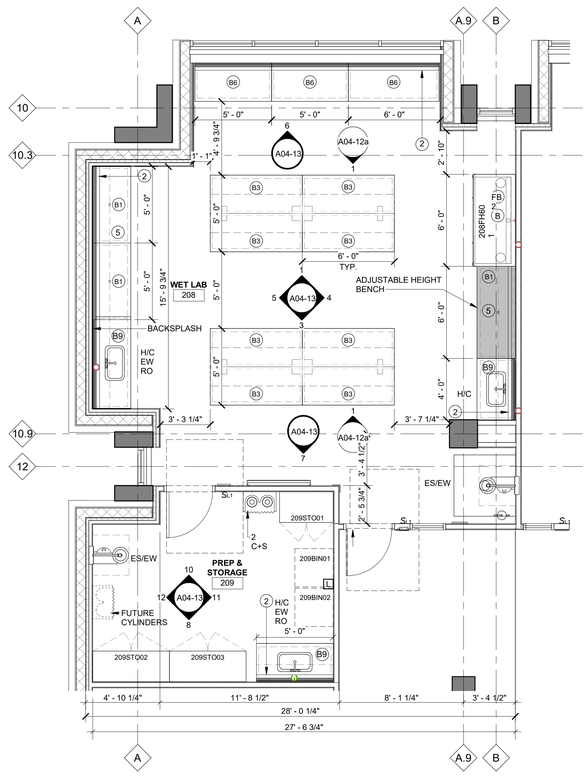


1 A04-04 WET LAB - 208 - NORTH ELEVATION
SCALE: 1/4" = 1'-0"



2 A02-04 ENLARGED WET LAB - 208 - PLAN
SCALE: 1/4" = 1'-0"

LAB NOTES

A
FUMEHOODS
- **COMPRESSED AIR**
- **DOMESTIC NON-PORTABLE COLD WATER**
- **CUP SINKS**
- **NITROGEN**
- **RO**

B
FUMEHOODS
- **DOMESTIC NON-PORTABLE COLD WATER**
- **CUP SINKS**

DENOTES ADJUSTABLE HEIGHT BENCHING AND ACCESSIBLE FUMEHOODS

1 - **ELECTRICAL SERVICE DROP 12"x16": 2 COMPARTMENTS**

2 - **INSTALL 4" HIGH EPOXY BACKSPLASH FOR ALL BENCHES WITH INTEGRATED SINKS, AS WELL AS ADJACENT BENCHES MOUNTED AGAINST WALLS**

3 - **WALL MOUNTED ELECTRICAL WIREWAY ABOVE BENCH HEIGHT TO HOST POWER AND 2 DATA RECEPTACLES AT EACH BENCH**

4 - **OVERHEAD ELECTRICAL CORD REEL**

5 - **DASHED LINE REPRESENTS ADJUSTABLE UPPER SHELVES INSTALLED WITHIN CASEWORK FRAMING FRAMING/UPRIGHTS, WITH LIPPED EDGE**

6 - **2x DATA OUTLET**

7 - **FRS BOX - REFER TO ELECTRICAL DRAWINGS**

8 - **PREFABRICATED SERVICE CHASE TO U/S OF SLAB ABOVE - PAINTED STEEL, 6" WIDE x 1' 1/2" DEEP. FRAMING AS REQUIRED**

FUMEHOOD TYPES:
REFER TO PLANS FOR LOCATIONS AND DWG A09-50 FOR DETAILS.
ALL FUMEHOODS TO BE 2'6" DEEP.

FA1
FA2
FB1
FB2
FB3
FC1

- **FOR ALL SERVICES DROPS PROVIDE CONTINUOUS VERTICAL STRUTS WITH HORIZONTAL PLUMBING/ELEC SUPPORT STRUTS**
- **ALL LAB CASEWORK SERVICES AND COMPONENTS SHOULD BE QUANTIFIED AND MANUFACTURED BASED ON THE PLANS AND NOT ON THE ELEVATIONS WITH THE EXEPTION OF BASE CABINETS**
- **ES/EW EMERGENCY SHOWER WITH EYE WASH STATION, REFER TO MECHANICAL DWGS.**
- **HW SINK: WALL MOUNTED STAINLESS STEEL HAND WASHING SINK - REFER TO MECHANICAL DWG.**
- **ALL SINKS AT LAB BENCHES TO BE INTEGRATED EPOXY, PROVIDE MARINE EDGES**
- **DI = DEIONIZED WATER**
- **H/C = HOT & COLD**
- **RO = REVERSE OSMOSIS**
- **EW = EYE WASH**
- **C+S = GAS CYLINDER INCLUDING INCLUDING SUPPORT**

LAB BENCH NOTES WITHIN FUMEHOOD

"ALL LAB BENCHES TO BE SYMPHONY II SYSTEM FROM BEDCOLAB / CIF - AS BASIS OF DESIGN, REFER TO SPECIFICATIONS

"INSTALL 4" HIGH EPOXY BACKSPLASH FOR ALL BENCHES WITH INTEGRATED SINKS, AS WELL AS ALL BENCHES MOUNTED AGAINST WALLS

" LAB BENCHES FOR ALL WET LABS (ROOMS 208, 209, 212, 217, 218, 308, 310, 312, 317, 318, 408, 410, 412, 417, 418, 508, 510, 518 AND 519 AND THEIR PREP AREAS TO RECEIVE 1" THICK EPOXY RESIN COUNTERTOPS

" LAB BECHES FOR ALL DRY LABS (ROOMS 608, 610, 612, 613, 614, 708, 710, 712, 713 AND 714) AND THEIR PREP AREAS TO RECEIVE 1" THICK PHENOLIC PANEL COUNTERTOPS.

"GIF ELECTRICAL OUTLETS TO BE INSTALLED WHERE RECEPTACLES ARE LESS THAN 6FT AWAY FROM A SINK. REFER TO ELECTRICAL DWG.

LAB CASEWORK TABLE TYPES

B1: FIXED BENCHES W/ SERVICE UPRIGHTS AT EACH END WHICH HOUSE ALL SERVICES FROM CEILING SPACE INTO BENCHES. SEPARATE COMPARMENTS ARE REQUIRED FOR POWER, DATA AND MECHANICAL PLUMBING / FITINGS AS REQUIRED.

B2: SERVICE UPRIGHTS AND INTEGRATED HORIZONTAL ELECTRICAL RACEWAY: SAME PROVISIONS OUTLINED FOR B1 BUT WITH HORIZONTAL RACEWAY

B3: BENCH W/ NO UPRIGHTS. OVERHEAD SERVICE CARRIERS FOR ALL POWER AND DATA CONNECTIONS. NO MECHANICAL FIXTURES.

B4: BENCH WITH NO UPRIGHTS, PROVIDE OVERHEAD ELECTRICAL CORD REEL. DATA OUTLETS TO BE MOUNTED ON ADJACENT WALLS.

B5: WALL MOUNTED HORIZONTAL ELECTRICAL WIREWAY ABOVE BACKSPLASH HEIGHT TO HOUSE POWER AND DATA RECEPTACLES

B6: BENCH INSTALLED AGAINST WALL WITH GLAZING ABOVE. PROVIDE TWO 2" DIA GROMMETS HOLE AND CAP PER BENCH (ONE AT EACH SIDE)

B7: FLEXIBLE / MOVABLE BENCHES WITH SWIVEL CASTER WHEELS AND NO ELECTRICAL RECEPTACLES

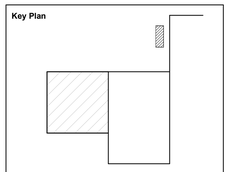
B8: SHOCK ABSORBENT / VIBRATION SENSITIVE BENCHES. INSTALL HORIZONTAL ELECTRICAL WIREWAY MOUNTED ON BENCH

B9: FIXED BENCH W/ BASE CABINET AND INTEGRATED EPOXY SINK - ADD MARINE EDGES. NO ELECTRICAL RECEPTACLES.

B10: STAINLESS STEEL STANDARD 4-LEG TABLE AND COUNTERTOP WITH INTEGRATED STAINLESS STEEL DOUBLE SINK, 4" HIGH BACKSPLASH AND MARINE EDGE. NO ELECTRICAL RECEPTACLES. CONNECT PLUMBING FROM ADJACENT BENCH. ADD SUSPENDED BASE CABINETS.

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil:	FTC&H
Landscape:	FTCH
Architecture	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

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Design Lead	Drawn
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Project Leader	Checked
C. MENARD	G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
EQUIPMENT WET LAB -TYPE 1A PLAN

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A04-13

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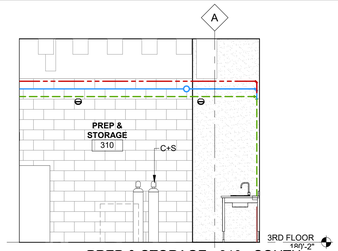
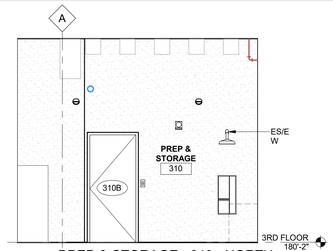


16 A04-14 PREP & STORAGE - 310 - SOUTH ELEVATION
SCALE: 1/4" = 1'-0"



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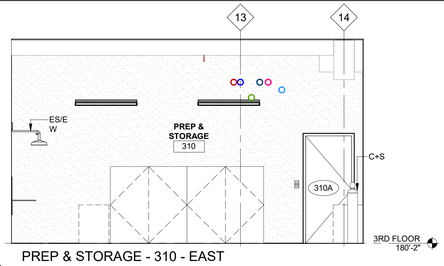
SCALE: 1/4" = 1'-0"



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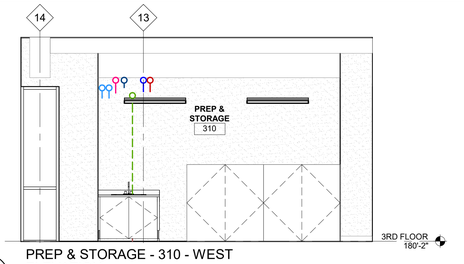
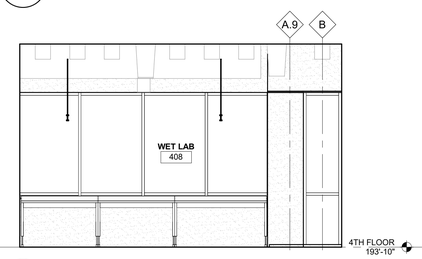
SCALE: 1/4" = 1'-0"



13 A04-14 PREP & STORAGE - 310 - WEST ELEVATION
SCALE: 1/4" = 1'-0"

12 A04-14 WET LAB - 408
SCALE: 1/4" = 1'-0"



11 A04-14 WET LAB - 408 - ELEVATION
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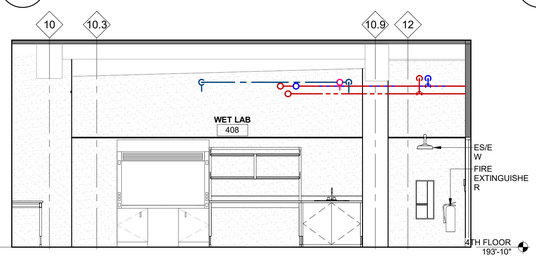
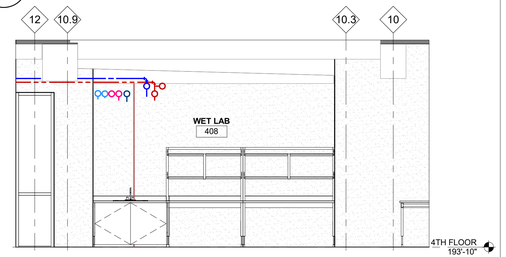


10 A04-14 WET LAB - 408 - EAST ELEVATION
SCALE: 1/4" = 1'-0"



9 A04-14 WET LAB - 408 - WEST ELEVATION
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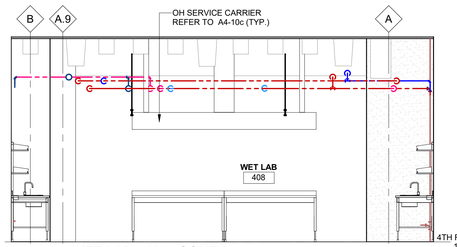

8 A04-14 WET LAB - 408 - SOUTH ELEVATION
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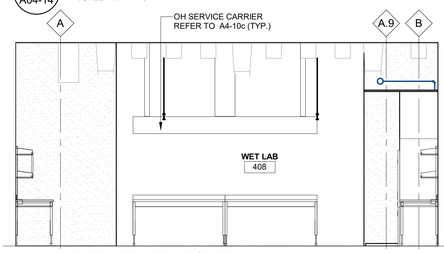

7 A04-14 WET LAB - 408 - NORTH ELEVATION
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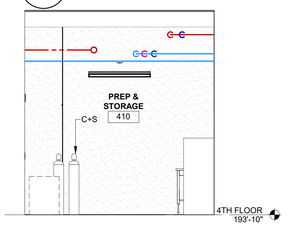
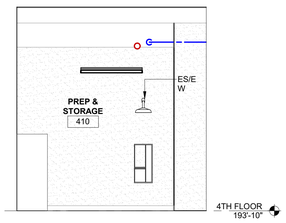


6 A04-14 PREP & STORAGE - 410 - EAST ELEVATION
SCALE: 1/4" = 1'-0"



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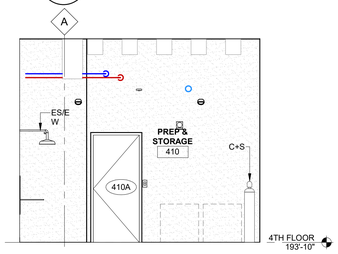

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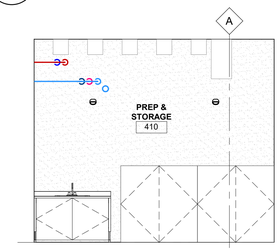

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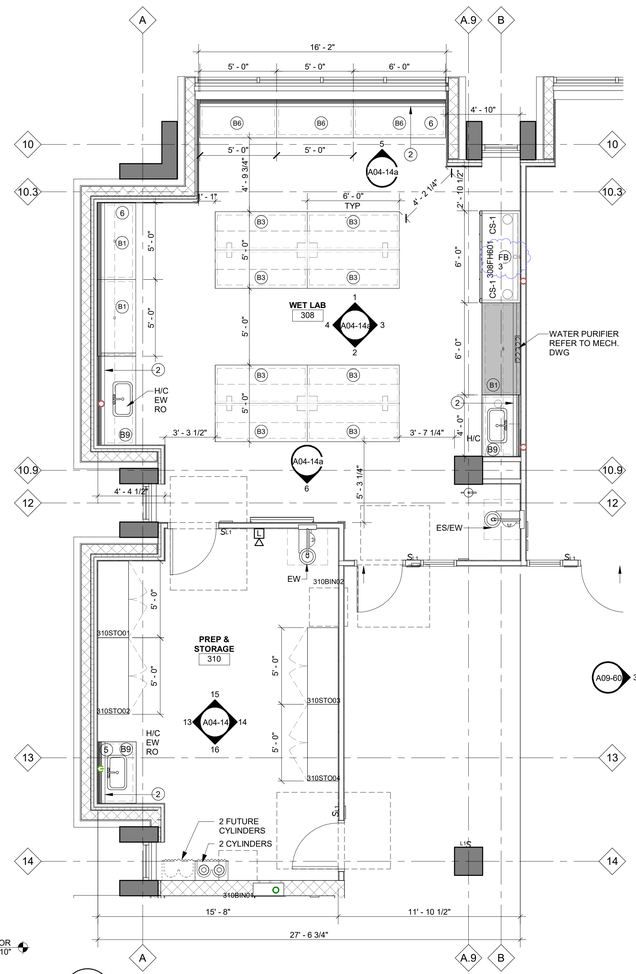
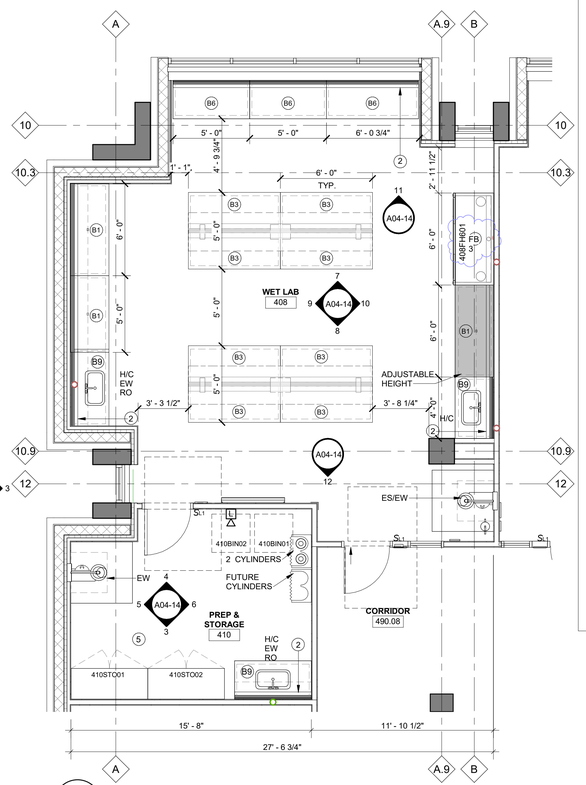
SCALE: 1/4" = 1'-0"



1 A04-14 ENLARGED WET LAB PLAN
SCALE: 1/4" = 1'-0"



2 A02-05 ENLARGED WET LAB PLAN
SCALE: 1/4" = 1'-0"

LAB NOTES

A
FUMEHOODS
- **COMPRESSED AIR**
- **DOMESTIC NON-PORTABLE COLD WATER**
- **CUP SINKS**
- **NITROGEN**
- **RO**

B
FUMEHOODS
- **DOMESTIC NON-PORTABLE COLD WATER**
- **CUP SINKS**

DENOTES ADJUSTABLE HEIGHT BENCHING AND ACCESSIBLE FUMEHOODS

1. **ELECTRICAL SERVICE DROP 12"x16": 2 COMPARTMENTS**
2. **INSTALL 4" HIGH EPOXY BACKSPLASH FOR ALL BENCHES WITH INTEGRATED SINKS, AS WELL AS ADJACENT BENCHES MOUNTED AGAINST WALLS**
3. **WALL MOUNTED ELECTRICAL WIREWAY ABOVE BENCH HEIGHT TO HOST POWER AND 2 DATA RECEPTACLES AT EACH BENCH**
4. **OVERHEAD ELECTRICAL CORD REEL**
5. **DASHED LINE REPRESENTS ADJUSTABLE UPPER SHELVES INSTALLED WITHIN CASEWORK FRAMING FRAMING/UPRIGHTS, WITH LIPPED EDGE**
6. **2x DATA OUTLET**
7. **FRS BOX - REFER TO ELECTRICAL DRAWINGS**
8. **PREFABRICATED SERVICE CHASE TO U/S OF SLAB ABOVE - PAINTED STEEL, 6" WIDE x 1' 1/2" DEEP. FRAMING AS REQUIRED**

FUMEHOOD TYPES:
REFER TO PLANS FOR LOCATIONS AND DWG A09-50 FOR DETAILS.
ALL FUMEHOODS TO BE 2'6" DEEP.

FA1
FA2
FB1
FB2
FB3
FC1

- **FOR ALL SERVICES DROPS PROVIDE CONTINUOUS VERTICAL STRUTS WITH HORIZONTAL PLUMBING/ELEC SUPPORT STRUTS**
- **ALL LAB CASEWORK SERVICES AND COMPONENTS SHOULD BE QUANTIFIED AND MANUFACTURED BASED ON THE PLANS AND NOT ON THE ELEVATIONS WITH THE EXEPTION OF BASE CABINETS**
- **ES/EW EMERGENCY SHOWER WITH EYE WASH STATION, REFER TO MECHANICAL DWGS.**
- **HW SINK: WALL MOUNTED STAINLESS STEEL HAND WASHING SINK - REFER TO MECHANICAL DWG.**
- **ALL SINKS AT LAB BENCHES TO BE INTEGRATED EPOXY, PROVIDE MARINE EDGES**
- **DI = DEIONIZED WATER**
- **H/C = HOT & COLD**
- **RO = REVERSE OSMOSIS**
- **EW = EYE WASH**
- **C+S = GAS CYLINDER INCLUDING INCLUDING SUPPORT**
- **WITHIN FUMEHOOD**

LAB BENCH NOTES

****ALL LAB BENCHES TO BE SYMPHONY II SYSTEM FROM BEDCOLAB / CSF - AS BASIS OF DESIGN, REFER TO SPECIFICATIONS**

****INSTALL 4" HIGH EPOXY BACKSPLASH FOR ALL BENCHES WITH INTEGRATED SINKS, AS WELL AS ALL BENCHES MOUNTED AGAINST WALLS**

**** LAB BENCHES FOR ALL WET LABS (ROOMS 208, 209, 212, 217, 218, 308, 310, 312, 317, 318, 408, 410, 412, 417, 418, 508, 510, 518 AND 519 AND THEIR PREP AREAS TO RECEIVE 1" THICK EPOXY RESIN COUNTERTOPS**

**** LAB BECHES FOR ALL DRY LABS (ROOMS 608, 610, 612, 613, 614, 708, 710, 712, 713 AND 714) AND THEIR PREP AREAS TO RECEIVE 1" THICK PHENOLIC PANEL COUNTERTOPS.**

****GIF ELECTRICAL OUTLETS TO BE INSTALLED WHERE RECEPTACLES ARE LESS THAN 6FT AWAY FROM A SINK. REFER TO ELECTRICAL DWG.**

LAB CASEWORK TABLE TYPES

B1: FIXED BENCHES W/ SERVICE UPRIGHTS AT EACH END WHICH HOUSE ALL SERVICES FROM CEILING SPACE INTO BENCHES. SEPARATE COMPARMENTS ARE REQUIRED FOR POWER, DATA AND MECHANICAL PLUMBING / FITINGS AS REQUIRED.

B2: SERVICE UPRIGHTS AND INTEGRATED HORIZONTAL ELECTRICAL RACEWAY: SAME PROVISIONS OUTLINED FOR B1 BUT WITH HORIZONTAL RACEWAY

B3: BENCH W/ NO UPRIGHTS. OVERHEAD SERVICE CARRIERS FOR ALL POWER AND DATA CONNECTIONS. NO MECHANICAL FIXTURES.

B4: BENCH WITH NO UPRIGHTS, PROVIDE OVERHEAD ELECTRICAL CORD REEL. DATA OUTLETS TO BE MOUNTED ON ADJACENT WALLS.

B5: WALL MOUNTED HORIZONTAL ELECTRICAL WIREWAY ABOVE BACKSPLASH HEIGHT TO HOUSE POWER AND DATA RECEPTACLES

B6: BENCH INSTALLED AGAINST WALL WITH GLAZING ABOVE. PROVIDE TWO 2" DIA GROMMETS HOLE AND CAP PER BENCH (ONE AT EACH SIDE)

B7: FLEXIBLE / MOVABLE BENCHES WITH SWIVEL CASTER WHEELS AND NO ELECTRICAL RECEPTACLES

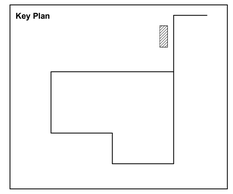
B8: SHOCK ABSORBENT / VIBRATION SENSITIVE BENCHES. INSTALL HORIZONTAL ELECTRICAL WIREWAY MOUNTED ON BENCH

B9: FIXED BENCH W/ BASE CABINET AND INTEGRATED EPOXY SINK - ADD MARINE EDGES. NO ELECTRICAL RECEPTACLES.

B10: STAINLESS STEEL STANDARD 4-LEG TABLE AND COUNTERTOP WITH INTEGRATED STAINLESS STEEL DOUBLE SINK, 4" HIGH BACKSPLASH AND MARINE EDGE. NO ELECTRICAL RECEPTACLES. CONNECT PLUMBING FROM ADJACENT BENCH. ADD SUSPENDED BASE CABINETS.

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
3/15/19	BULLETIN #1	6
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil:	FTC&H
Landscape:	FTCH
Architecture	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

NORR
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Design Lead C. MENARD	Drawn A. GODEK
Project Leader C. MENARD	Checked G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
EQUIPMENT WET LAB PLANS

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A04-14

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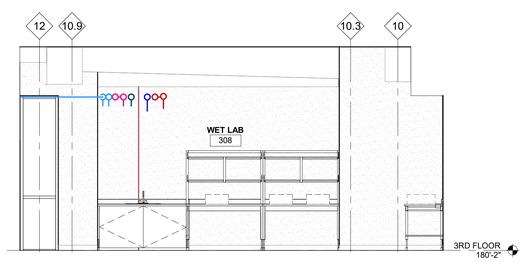
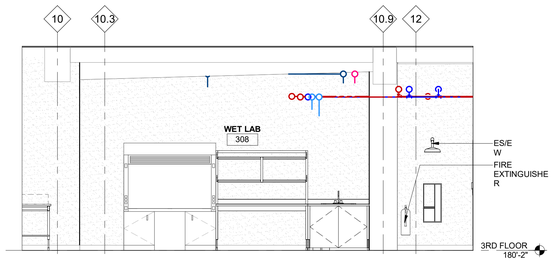


4 A04-14 WET LAB - 308 - WEST ELEVATION
SCALE: 1/4" = 1'-0"



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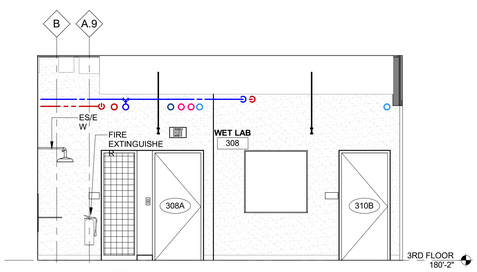

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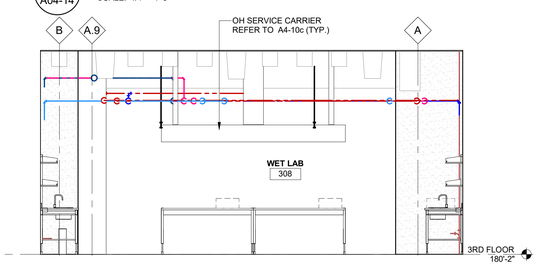
SCALE: 1/4" = 1'-0"



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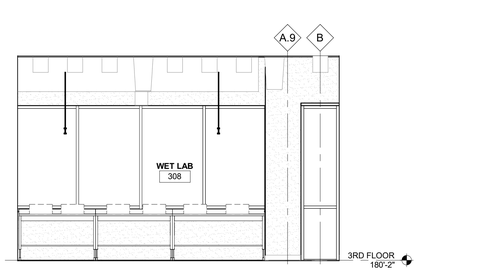

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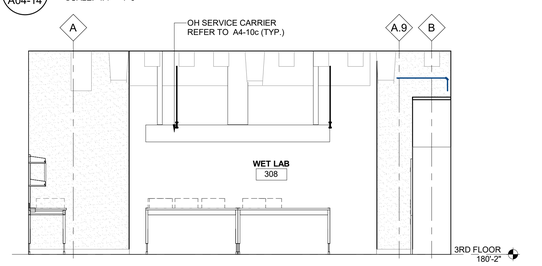
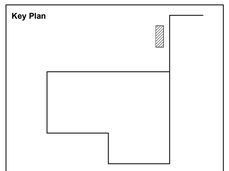


1 A04-14 WET LAB - 308 - NORTH ELEVATION
SCALE: 1/4" = 1'-0"

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
05/03/19	TEST AND BALANCE BID	7

Key Plan



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Drawing Title

EQUIPMENT WET LAB PLANS - ELEVATIONS

Scale 1/4" = 1'-0"

Project No. JCDT17-0231

Drawing No.

A04-14a

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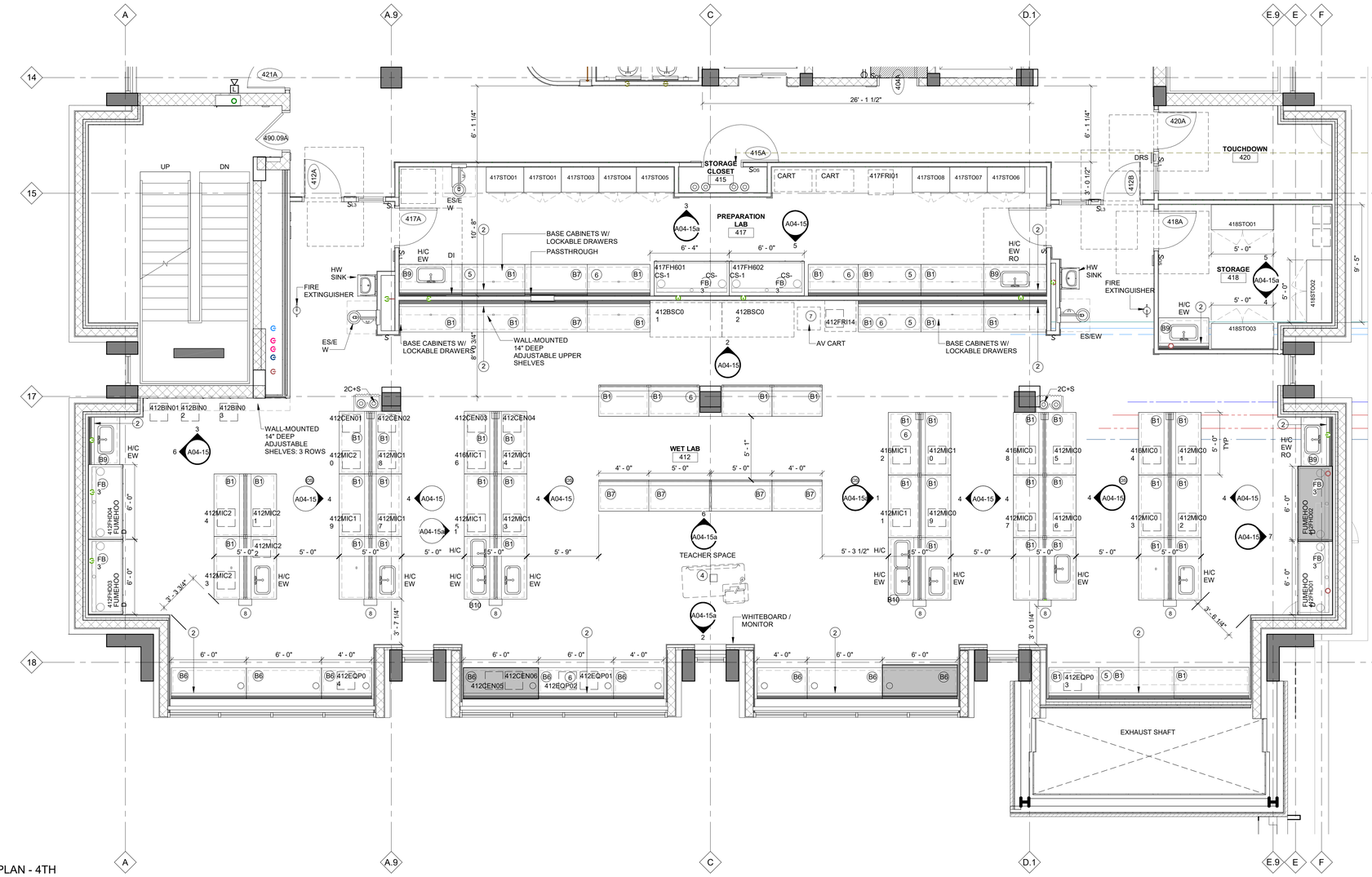

1 A04-15 ARCHITECTURAL PLAN - 4TH FLOOR
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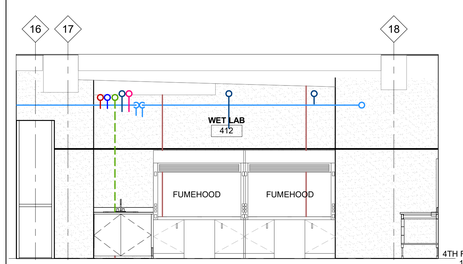
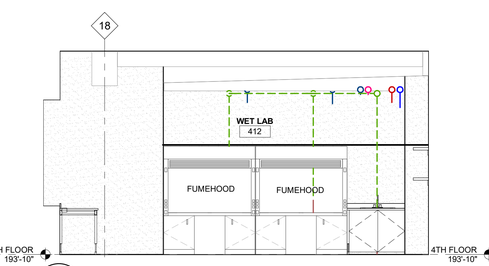
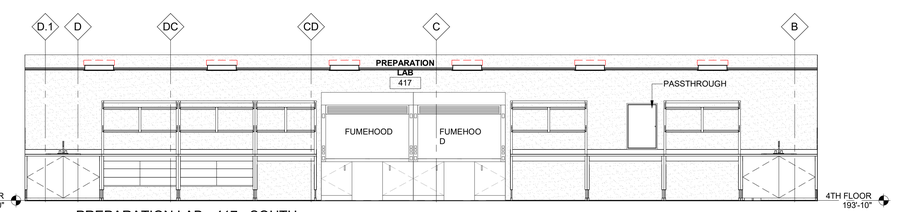


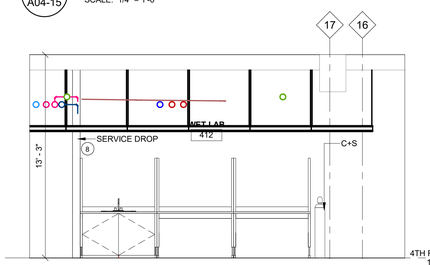
7 A04-15 WET LAB - 412 - EAST ELEVATION
SCALE: 1/4" = 1'-0"



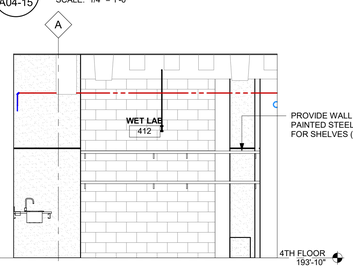
6 A04-15 WET LAB - 412 - WEST ELEVATION
SCALE: 1/4" = 1'-0"



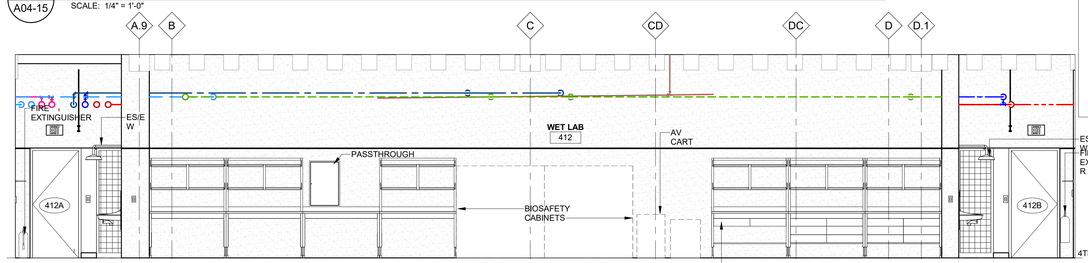
5 A04-15 PREPARATION LAB - 417 - SOUTH ELEVATION
SCALE: 1/4" = 1'-0"



4 A04-15 WET LAB - 412 - ELEVATION 3
SCALE: 1/4" = 1'-0"



3 A04-15 WET LAB - 412 - PARTIAL NORTH ELEVATION
SCALE: 1/4" = 1'-0"



2 A04-15 WET LAB - 412 - NORTH ELEVATION
SCALE: 1/4" = 1'-0"

LAB NOTES

A **FUMEHOODS**
- COMPRESSED AIR
- DOMESTIC NON-PORTABLE COLD WATER
- CUP SINKS
- NITROGEN
- RO

B **FUMEHOODS**
- DOMESTIC NON-PORTABLE COLD WATER
- CUP SINKS

DENOTES ADJUSTABLE HEIGHT BENCHING AND ACCESSIBLE FUMEHOODS

1. ELECTRICAL SERVICE DROP 12"x16": 2 COMPARTMENTS
2. INSTALL 4" HIGH EPOXY BACKSPLASH FOR ALL BENCHES WITH INTEGRATED SINKS, AS WELL AS ADJACENT BENCHES MOUNTED AGAINST WALLS
3. WALL MOUNTED ELECTRICAL WIREWAY ABOVE BENCH HEIGHT TO HOST POWER AND 2 DATA RECEPTACLES AT EACH BENCH
4. OVERHEAD ELECTRICAL CORD REEL
5. DASHED LINE REPRESENTS ADJUSTABLE UPPER SHELVES INSTALLED WITHIN CASEWORK FRAMING/UPRIGHTS, WITH LIPPED EDGE
6. 2x DATA OUTLET
7. FRS BOX - REFER TO ELECTRICAL DRAWINGS
8. PREFABRICATED SERVICE CHASE TO U/S OF SLAB ABOVE - PAINTED STEEL, 6" WIDE x 1' 1/2" DEEP. FRAMING AS REQUIRED

FUMEHOOD TYPES:
REFER TO PLANS FOR LOCATIONS AND DWG A09-50 FOR DETAILS.
ALL FUMEHOODS TO BE 2'6" DEEP.

FA1
FA2
FB1
FB2
FB3
FC1

- **FOR ALL SERVICES DROPS PROVIDE CONTINUOUS VERTICAL STRUTS WITH HORIZONTAL PLUMBING/ELEC SUPPORT STRUTS**
- **ALL LAB CASEWORK SERVICES AND COMPONENTS SHOULD BE QUANTIFIED AND MANUFACTURED BASED ON THE PLANS AND NOT ON THE ELEVATIONS WITH THE EXEPTION OF BASE CABINETS**
- **ES/EW EMERGENCY SHOWER WITH EYE WASH STATION, REFER TO MECHANICAL DWGS.**
- **HW SINK: WALL MOUNTED STAINLESS STEEL HAND WASHING SINK - REFER TO MECHANICAL DWG.**
- **ALL SINKS AT LAB BENCHES TO BE INTEGRATED EPOXY, PROVIDE MARINE EDGES**
- **DI = DEIONIZED WATER**
- **H/C = HOT & COLD**
- **RO = REVERSE OSMOSIS**
- **EW = EYE WASH**
- **C+S = GAS CYLINDER INCLUDING INCLUDING SUPPORT**

LAB BENCH NOTES WITHIN FUMEHOOD

"ALL LAB BENCHES TO BE SYMPHONY II SYSTEM FROM BEDCOLAB / CIF - AS BASIS OF DESIGN, REFER TO SPECIFICATIONS

"INSTALL 4" HIGH EPOXY BACKSPLASH FOR ALL BENCHES WITH INTEGRATED SINKS, AS WELL AS ALL BENCHES MOUNTED AGAINST WALLS

" LAB BENCHES FOR ALL WET LABS (ROOMS 208, 209, 212, 217, 218, 308, 310, 312, 317, 318, 408, 410, 412, 417, 418, 508, 510, 518 AND 519 AND THEIR PREP AREAS TO RECEIVE 1" THICK EPOXY RESIN COUNTERTOPS

" LAB BECHES FOR ALL DRY LABS (ROOMS 608, 610, 612, 613, 614, 708, 710, 712, 713 AND 714) AND THEIR PREP AREAS TO RECEIVE 1" THICK PHENOLIC PANEL COUNTERTOPS.

"GIF ELECTRICAL OUTLETS TO BE INSTALLED WHERE RECEPTACLES ARE LESS THAN 6FT AWAY FROM A SINK. REFER TO ELECTRICAL DWG.

LAB CASEWORK TABLE TYPES

B1: FIXED BENCHES W/ SERVICE UPRIGHTS AT EACH END WHICH HOUSE ALL SERVICES FROM CEILING SPACE INTO BENCHES. SEPARATE COMPARMENTS ARE REQUIRED FOR POWER, DATA AND MECHANICAL PLUMBING / FITINGS AS REQUIRED.

B2: SERVICE UPRIGHTS AND INTEGRATED HORIZONTAL ELECTRICAL RACEWAY: SAME PROVISIONS OUTLINED FOR B1 BUT WITH HORIZONTAL RACEWAY

B3: BENCH W/ NO UPRIGHTS. OVERHEAD SERVICE CARRIERS FOR ALL POWER AND DATA CONNECTIONS. NO MECHANICAL FIXTURES.

B4: BENCH WITH NO UPRIGHTS, PROVIDE OVERHEAD ELECTRICAL CORD REEL. DATA OUTLETS TO BE MOUNTED ON ADJACENT WALLS.

B5: WALL MOUNTED HORIZONTAL ELECTRICAL WIREWAY ABOVE BACKSPLASH HEIGHT TO HOUSE POWER AND DATA RECEPTACLES

B6: BENCH INSTALLED AGAINST WALL WITH GLAZING ABOVE. PROVIDE TWO 2" DIA GROMMETS HOLE AND CAP PER BENCH (ONE AT EACH SIDE)

B7: FLEXIBLE / MOVABLE BENCHES WITH SWIVEL CASTER WHEELS AND NO ELECTRICAL RECEPTACLES

B8: SHOCK ABSORBENT / VIBRATION SENSITIVE BENCHES. INSTALL HORIZONTAL ELECTRICAL WIREWAY MOUNTED ON BENCH

B9: FIXED BENCH W/ BASE CABINET AND INTEGRATED EPOXY SINK - ADD MARINE EDGES. NO ELECTRICAL RECEPTACLES.

B10: STAINLESS STEEL STANDARD 4-LEG TABLE AND COUNTERTOP WITH INTEGRATED STAINLESS STEEL DOUBLE SINK, 4" HIGH BACKSPLASH AND MARINE EDGE. NO ELECTRICAL RECEPTACLES. CONNECT PLUMBING FROM ADJACENT BENCH. ADD SUSPENDED BASE CABINETS.

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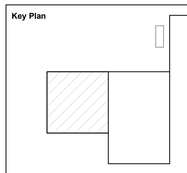
This drawing shall not be used for construction purposes until the seal appearing hereon is signed and dated by the Architect or Engineer.

Key Plan



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Architecture NORR
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Drawing Title
ENLARGED 4TH FLOOR LAB

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A04-15

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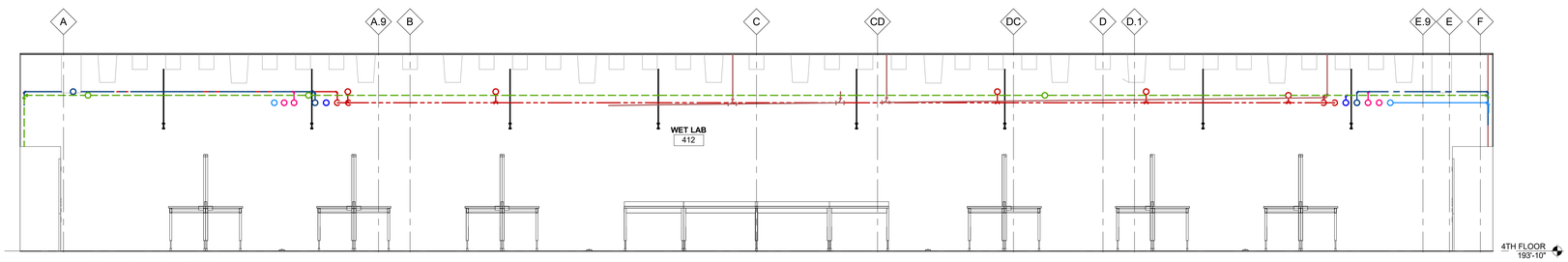
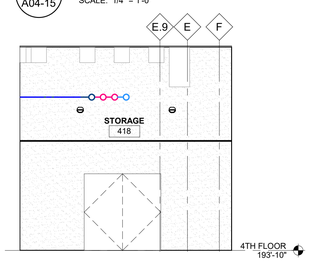


6 A04-15 WET LAB - 412 -NORTH ELEVATION
SCALE: 1/4" = 1'-0"



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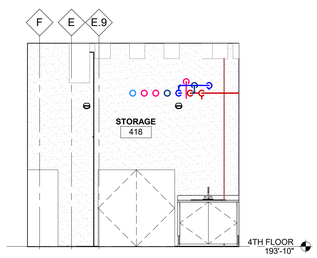

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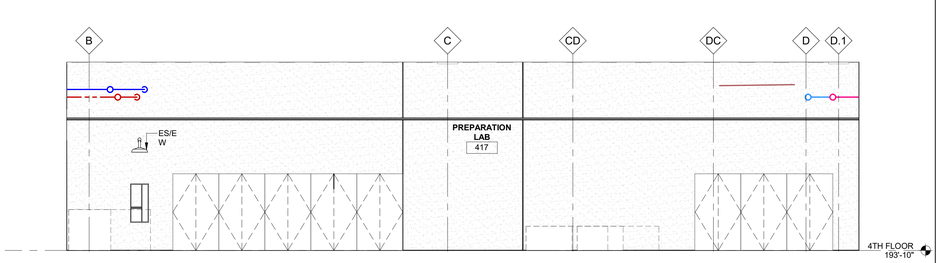

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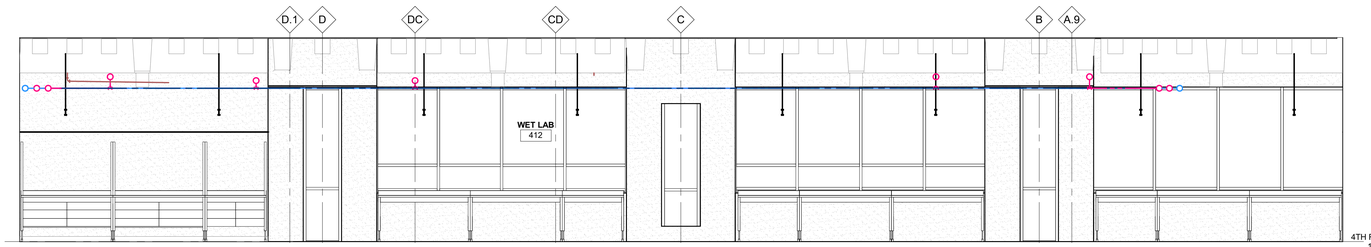

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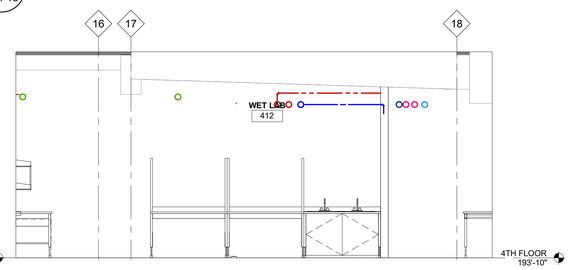

1 A04-15 WET LAB -412 - EAST ELEVATION
SCALE: 1/4" = 1'-0"

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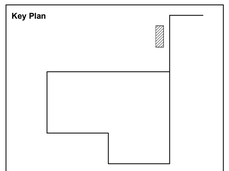
Key Plan



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Drawing Title
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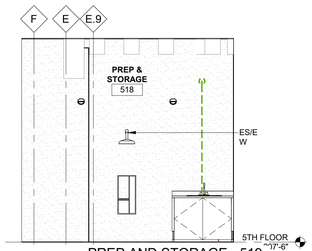
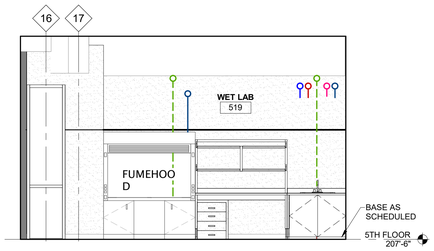


8 A04-16 PREP AND STORAGE - 519 - ELEVATION
SCALE: 1/4" = 1'-0"



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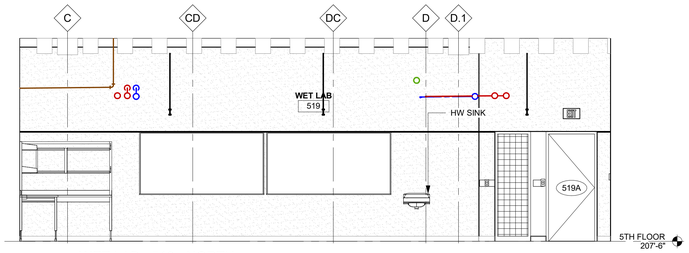

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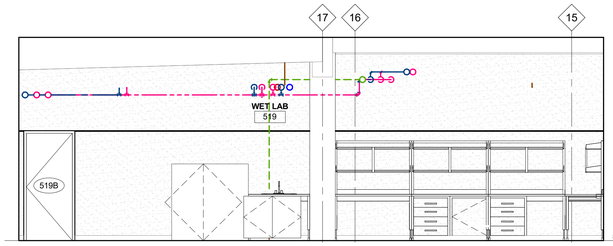

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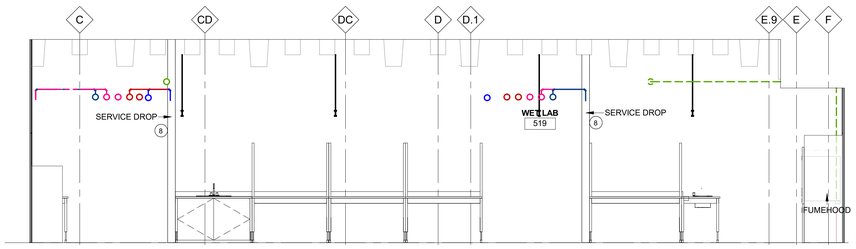
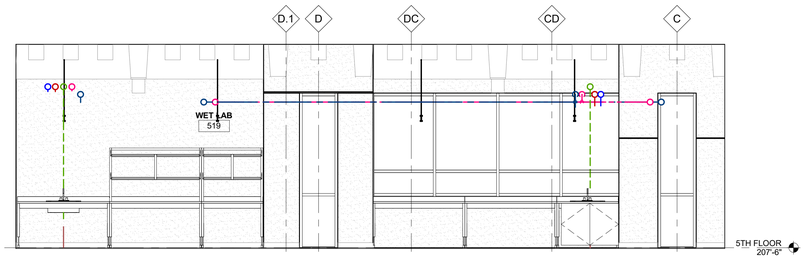


3 A04-06 WET LAB - 519 - CENTRAL NORTH ELEVATION
SCALE: 1/4" = 1'-0"



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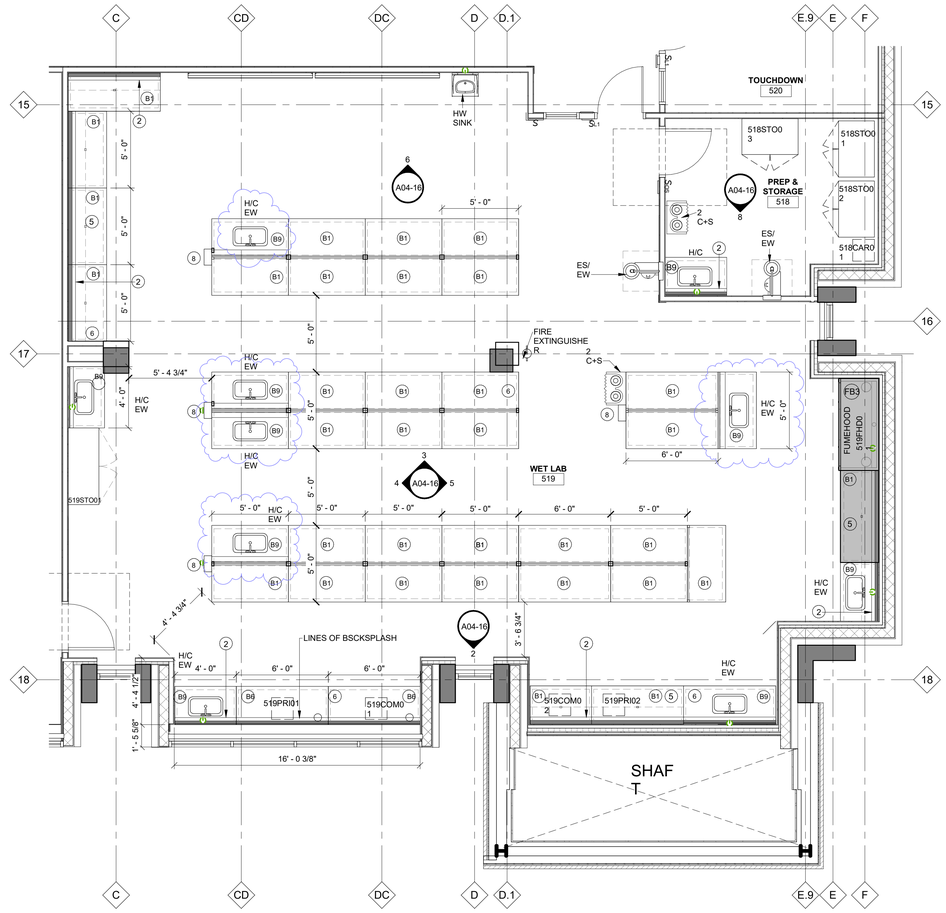


1 A02-06 ENLARGED WET LAB PLAN
SCALE: 1/4" = 1'-0"

LAB NOTES

A **FUMEHOODS**
- COMPRESSED AIR
- DOMESTIC NON-PORTABLE COLD WATER
- CUP SINKS
- NITROGEN
- RO

B **FUMEHOODS**
- DOMESTIC NON-PORTABLE COLD WATER
- CUP SINKS

DENOTES ADJUSTABLE HEIGHT BENCHING AND ACCESSIBLE FUMEHOODS

1 - ELECTRICAL SERVICE DROP 12"x16": 2 COMPARTMENTS
2 - INSTALL 4" HIGH EPOXY BACKSPLASH FOR ALL BENCHES WITH INTEGRATED SINKS, AS WELL AS ADJACENT BENCHES MOUNTED AGAINST WALLS
3 - WALL MOUNTED ELECTRICAL WIREWAY ABOVE BENCH HEIGHT TO HOST POWER AND 2 DATA RECEPTACLES AT EACH BENCH
4 - OVERHEAD ELECTRICAL CORD REEL
5 - DASHED LINE REPRESENTS ADJUSTABLE UPPER SHELVES INSTALLED WITHIN CASEWORK FRAMING FRAMING/UPRIGHTS, WITH LIPPED EDGE
6 - 2x DATA OUTLET
7 - FRS BOX - REFER TO ELECTRICAL DRAWINGS
8 - PREFABRICATED SERVICE CHASE TO U/S OF SLAB ABOVE - PAINTED STEEL, 6" WIDE x 1" 1/2" DEEP. FRAMING AS REQUIRED

FUMEHOOD TYPES:
REFER TO PLANS FOR LOCATIONS AND DWG A09-50 FOR DETAILS.
ALL FUMEHOODS TO BE 2'6" DEEP.

FA1
FA2
FB1
FB2
FB3
FC1

- FOR ALL SERVICES DROPS PROVIDE CONTINUOUS VERTICAL STRUTS WITH HORIZONTAL PLUMBING/ELEC SUPPORT STRUTS
- ALL LAB CASEWORK SERVICES AND COMPONENTS SHOULD BE QUANTIFIED AND MANUFACTURED BASED ON THE PLANS AND NOT ON THE ELEVATIONS WITH THE EXEPTION OF BASE CABINETS
- ES/EW EMERGENCY SHOWER WITH EYE WASH STATION, REFER TO MECHANICAL DWGS.
- HW SINK: WALL MOUNTED STAINLESS STEEL HAND WASHING SINK - REFER TO MECHANICAL DWG.
- ALL SINKS AT LAB BENCHES TO BE INTEGRATED EPOXY, PROVIDE MARINE EDGES
- DI = DEIONIZED WATER
- H/C = HOT & COLD
- RO = REVERSE OSMOSIS
- EW = EYE WASH
- C+S = GAS CYLINDER INCLUDING INCLUDING SUPPORT

LAB BENCH NOTES WITHIN FUMEHOOD

****ALL LAB BENCHES TO BE SYMPHONY II SYSTEM FROM BEDCOLAB / CIF - AS BASIS OF DESIGN, REFER TO SPECIFICATIONS**

****INSTALL 4" HIGH EPOXY BACKSPLASH FOR ALL BENCHES WITH INTEGRATED SINKS, AS WELL AS ALL BENCHES MOUNTED AGAINST WALLS**

**** LAB BENCHES FOR ALL WET LABS (ROOMS 208, 209, 212, 217, 218, 308, 310, 312, 317, 318, 408, 410, 412, 417, 418, 508, 510, 518 AND 519 AND THEIR PREP AREAS TO RECEIVE 1" THICK EPOXY RESIN COUNTERTOPS**

**** LAB BECHES FOR ALL DRY LABS (ROOMS 608, 610, 612, 613, 614, 708, 710, 712, 713 AND 714) AND THEIR PREP AREAS TO RECEIVE 1" THICK PHENOLIC PANEL COUNTERTOPS.**

****GIF ELECTRICAL OUTLETS TO BE INSTALLED WHERE RECEPTACLES ARE LESS THAN 6FT AWAY FROM A SINK. REFER TO ELECTRICAL DWG.**

LAB CASEWORK TABLE TYPES

B1: FIXED BENCHES W/ SERVICE UPRIGHTS AT EACH END WHICH HOUSE ALL SERVICES FROM CEILING SPACE INTO BENCHES. SEPARATE COMPARMENTS ARE REQUIRED FOR POWER, DATA AND MECHANICAL PLUMBING / FITINGS AS REQUIRED.

B2: SERVICE UPRIGHTS AND INTEGRATED HORIZONTAL ELECTRICAL RACEWAY: SAME PROVISIONS OUTLINED FOR B1 BUT WITH HORIZONTAL RACEWAY

B3: BENCH W/ NO UPRIGHTS. OVERHEAD SERVICE CARRIERS FOR ALL POWER AND DATA CONNECTIONS. NO MECHANICAL FIXTURES.

B4: BENCH WITH NO UPRIGHTS, PROVIDE OVERHEAD ELECTRICAL CORD REEL. DATA OUTLETS TO BE MOUNTED ON ADJACENT WALLS.

B5: WALL MOUNTED HORIZONTAL ELECTRICAL WIREWAY ABOVE BACKSPLASH HEIGHT TO HOUSE POWER AND DATA RECEPTACLES

B6: BENCH INSTALLED AGAINST WALL WITH GLAZING ABOVE. PROVIDE TWO 2" DIA GROMMETS HOLE AND CAP PER BENCH (ONE AT EACH SIDE)

B7: FLEXIBLE / MOVABLE BENCHES WITH SWIVEL CASTER WHEELS AND NO ELECTRICAL RECEPTACLES

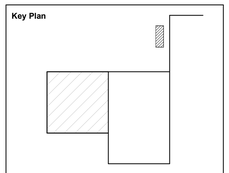
B8: SHOCK ABSORBENT / VIBRATION SENSITIVE BENCHES. INSTALL HORIZONTAL ELECTRICAL WIREWAY MOUNTED ON BENCH

B9: FIXED BENCH W/ BASE CABINET AND INTEGRATED EPOXY SINK - ADD MARINE EDGES. NO ELECTRICAL RECEPTACLES.

B10: STAINLESS STEEL STANDARD 4-LEG TABLE AND COUNTERTOP WITH INTEGRATED STAINLESS STEEL DOUBLE SINK, 4" HIGH BACKSPLASH AND MARINE EDGE. NO ELECTRICAL RECEPTACLES. CONNECT PLUMBING FROM ADJACENT BENCH. ADD SUSPENDED BASE CABINETS.

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
3/15/19	BULLETIN #1	6
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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An Ingenium International Company
150 W. Jefferson Avenue, Suite 1300
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Project Manager: A. NOLFF	BIM Lead: R. HAAS
Design Lead: C. MENARD	Drawn: A. GODEK
Project Leader: C. MENARD	Checked: G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
EQUIPMENT WET LAB 5TH FLOOR PLANS

Scale As indicated
Project No. JCDT17-0231
Drawing No. A04-16

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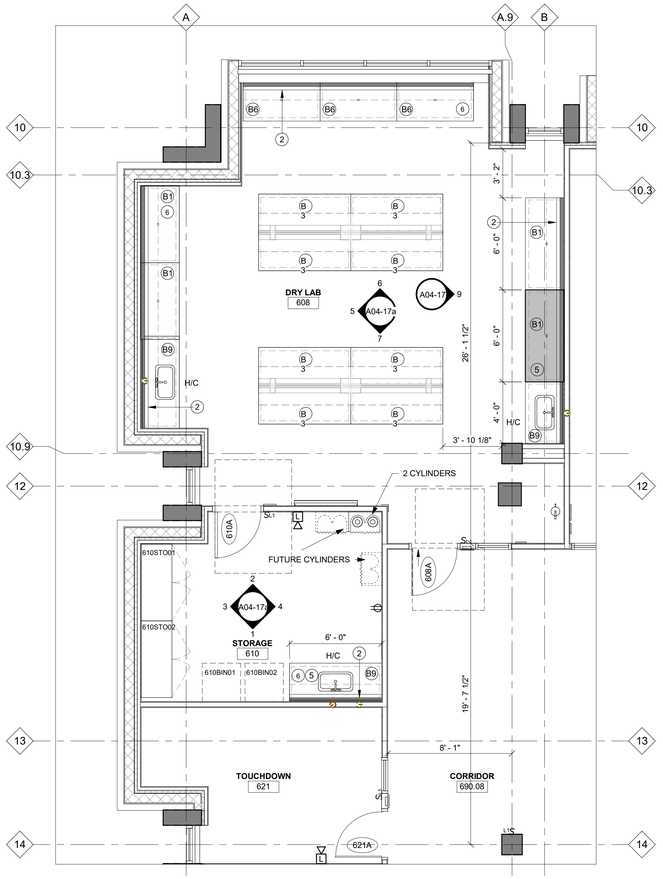
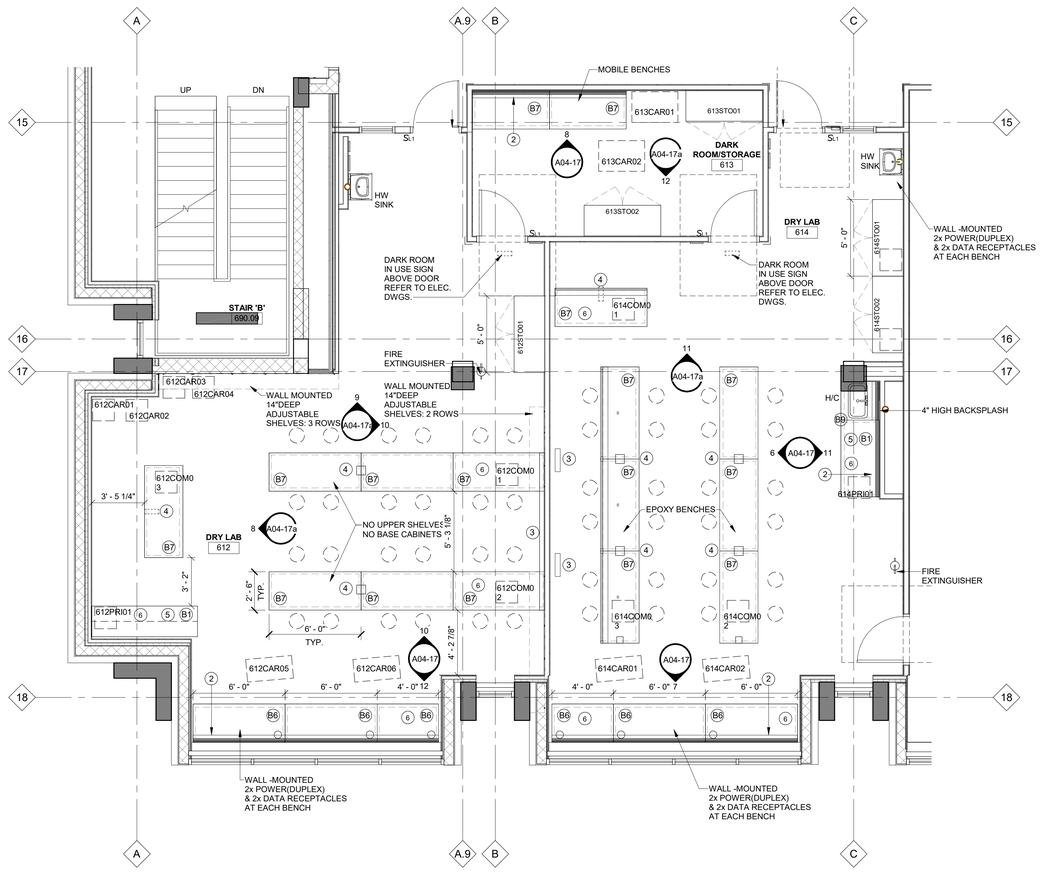
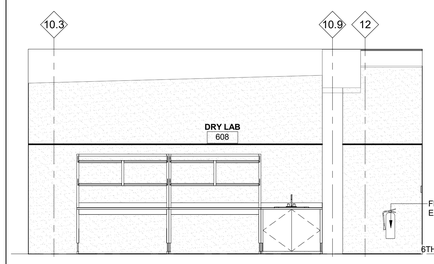


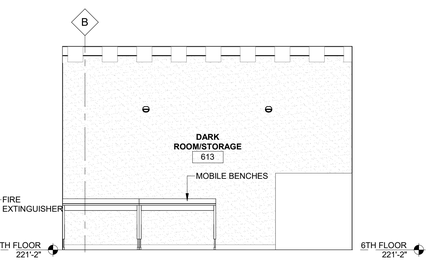
2 A04-17 DRY LAB & STORAGE - 6TH FLOOR
SCALE: 1/4" = 1'-0"



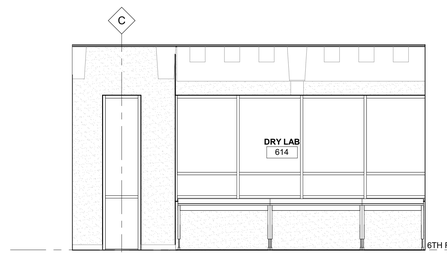
1 A04-17 ENLARGED DRY LAB PLAN
SCALE: 1/4" = 1'-0"



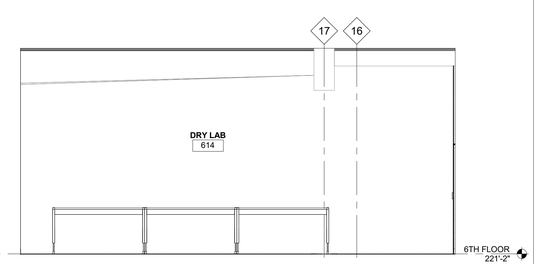
9 A04-17 DRY LAB - 608 - ELEVATION
SCALE: 1/4" = 1'-0"



8 A04-17 DARK ROOM/STORAGE - 613 - ELEVATION
SCALE: 1/4" = 1'-0"



7 A04-05 DRY LAB - 614 ELEVATION
SCALE: 1/4" = 1'-0"



6 A04-17 DRY LAB - 614 - WEST ELEVATION
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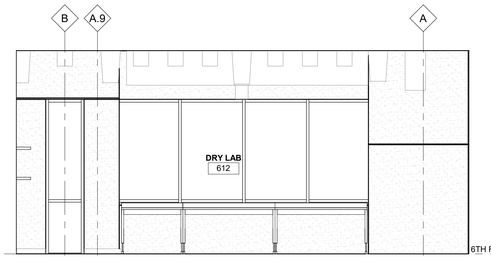
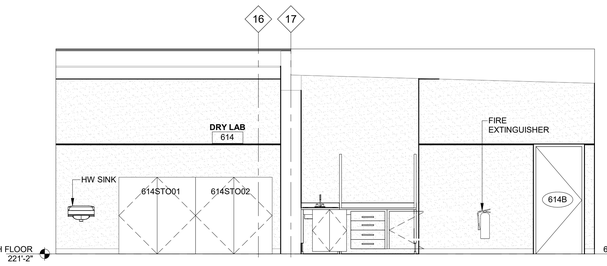
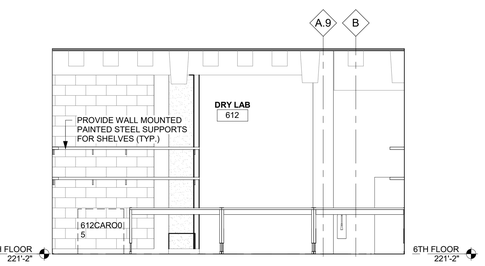


12 A04-17 DRY LAB - 612 -ELEVATION
SCALE: 1/4" = 1'-0"



11 A04-17 DRY LAB - 614 - EAST ELEVATION
SCALE: 1/4" = 1'-0"



10 A04-17 DRY LABS - 612 - SOUTH ELEVATION
SCALE: 1/4" = 1'-0"

LAB NOTES

A — **FUMEHOODS**
- **COMPRESSED AIR**
- **DOMESTIC NON-PORTABLE COLD WATER**
- **CUP SINKS**
- **NITROGEN**
- **RO**

B — **FUMEHOODS**
- **DOMESTIC NON-PORTABLE COLD WATER**
- **CUP SINKS**

DENOTES ADJUSTABLE HEIGHT BENCHING AND ACCESSIBLE FUMEHOODS

1. **ELECTRICAL SERVICE DROP 12"x16": 2 COMPARTMENTS**
2. **INSTALL 4" HIGH EPOXY BACKSPLASH FOR ALL BENCHES WITH INTEGRATED SINKS, AS WELL AS ADJACENT BENCHES MOUNTED AGAINST WALLS**
3. **WALL MOUNTED ELECTRICAL WIREWAY ABOVE BENCH HEIGHT TO HOST POWER AND 2 DATA RECEPTACLES AT EACH BENCH**
4. **OVERHEAD ELECTRICAL CORD REEL**
5. **DASHED LINE REPRESENTS ADJUSTABLE UPPER SHELVES INSTALLED WITHIN CASEWORK FRAMING FRAMING/UPRIGHTS, WITH LIPPED EDGE**
6. **2x DATA OUTLET**
7. **FRS BOX - REFER TO ELECTRICAL DRAWINGS**
8. **PREFABRICATED SERVICE CHASE TO U/S OF SLAB ABOVE - PAINTED STEEL, 6" WIDE x 1' 1/2" DEEP. FRAMING AS SHOWN. CONDUIT IRED**

FUMEHOOD TYPES, REFER TO PLANS FOR LOCATIONS AND DWG A05-50 FOR DETAILS. ALL FUMEHOODS TO BE 2'6" DEEP.

FA1
FA2
FB1
FB2
FB3
FC1

- **FOR ALL SERVICES DROPS PROVIDE CONTINUOUS VERTICAL STRUTS WITH HORIZONTAL PLUMBING/ELEC SUPPORT STRUTS**
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- **EW = EYE WASH**
- **C+S = GAS CYLINDER INCLUDING INCLUDING SUPPORT**
- **[illegible] WITHIN FUMEHOOD**

LAB BENCH NOTES

****ALL LAB BENCHES TO BE SYMPHONY II SYSTEM FROM BEDCOLAB / CIF - AS BASIS OF DESIGN, REFER TO SPECIFICATIONS**

****INSTALL 4" HIGH EPOXY BACKSPLASH FOR ALL BENCHES WITH INTEGRATED SINKS, AS WELL AS ALL BENCHES MOUNTED AGAINST WALLS**

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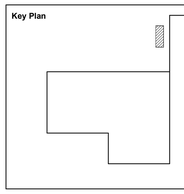
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

NORR
An Ingenium International Company
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Design Lead	Drawn
C. MENARD	A. GODEK
Project Leader	Checked
C. MENARD	G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
EQUIPMENT DRY LAB - 6TH FLOOR PLAN

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A04-17

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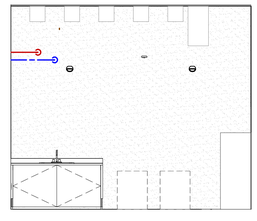
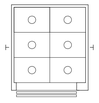
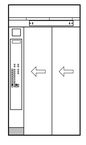
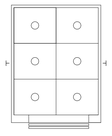
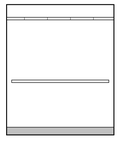
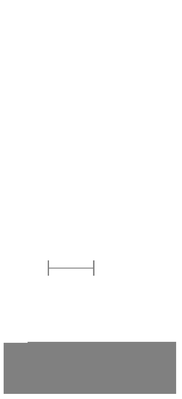


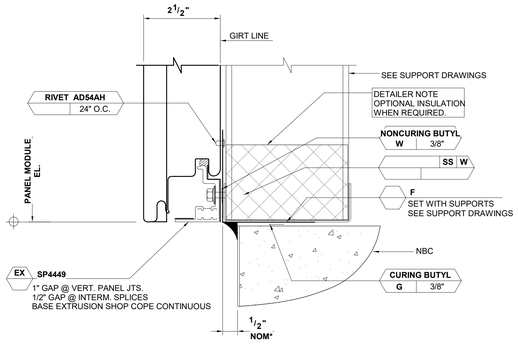


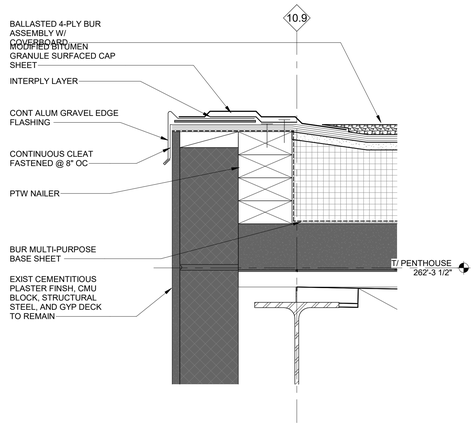


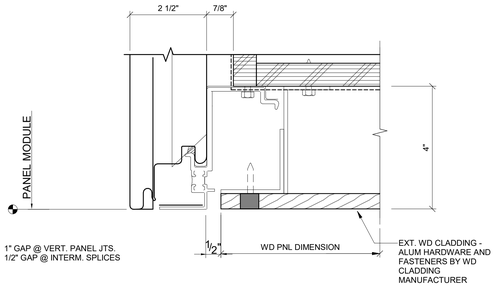


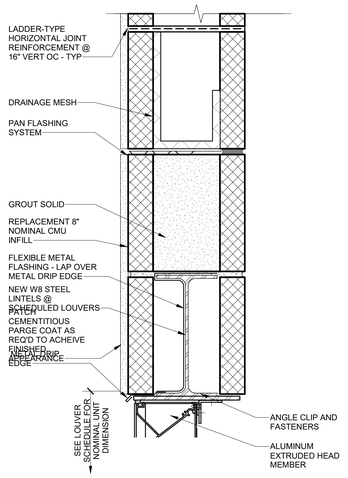


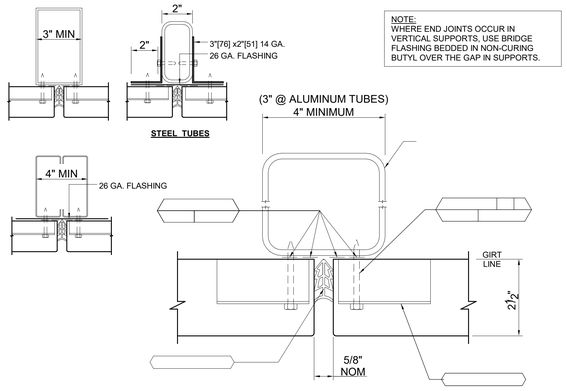




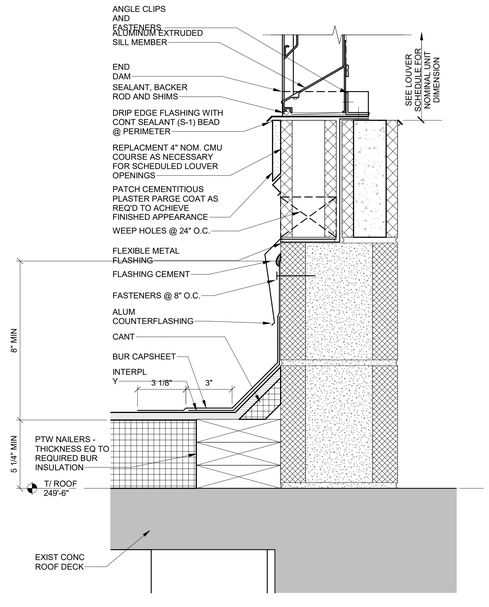


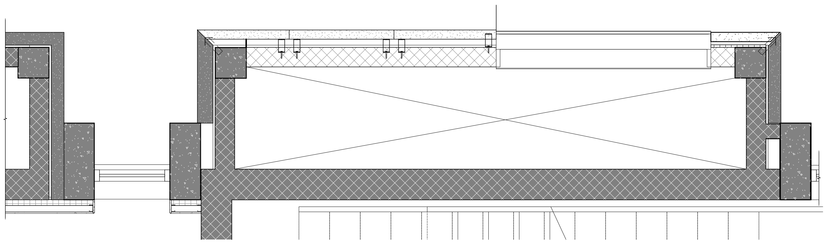


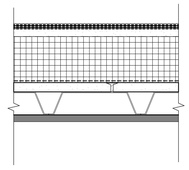


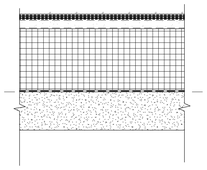


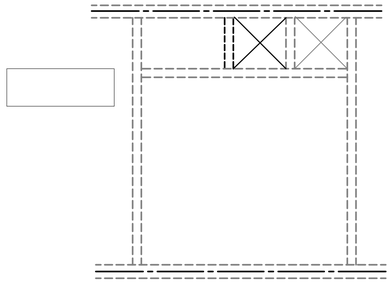
NOTE:
WHERE END JOINTS OCCUR IN VERTICAL SUPPORTS, USE BRIDGE FLASHING BEDDED IN NON-CURING BUTYL OVER THE GAP IN SUPPORTS.

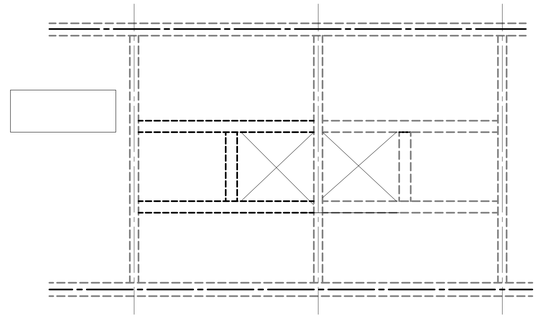


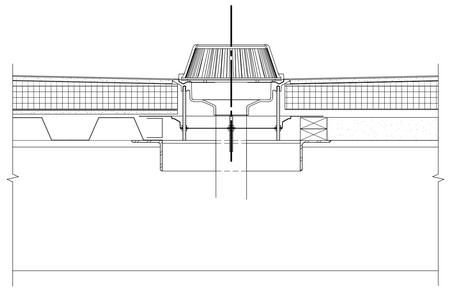


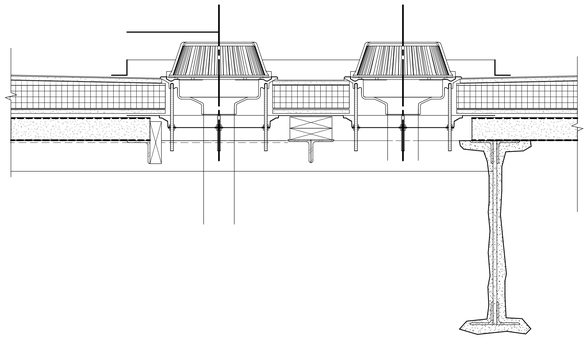


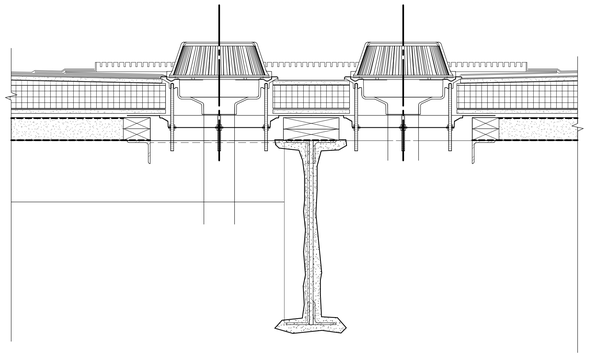


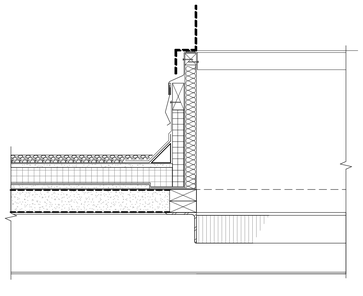


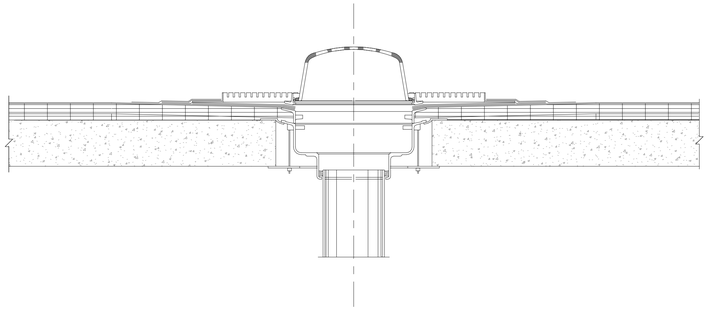


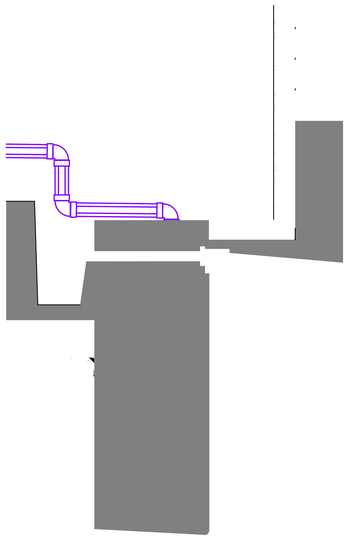


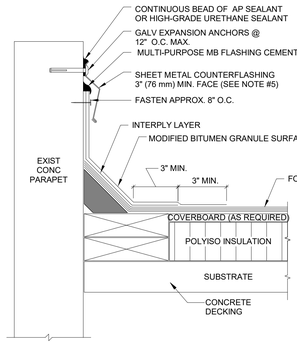












NOTES:

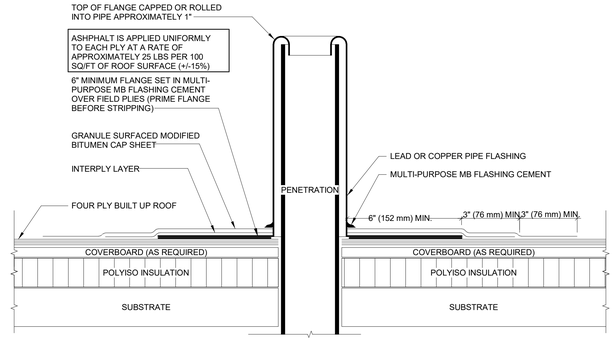
1. THIS DETAIL TO BE USED OVER LIGHTWEIGHT INSULATION OR CELLULAR CONCRETE WET-FILL DECKS.
2. ATTACH NAILER TO DECK WITH SUITABLE FASTENER.
3. ALL SHEET METAL IS TO BE INSTALLED PER SMACNA GUIDELINES.
4. JOINTS IN SHEET METAL COUNTERFLASHING MUST NOT BE SOLDERED OR FASTENED.
5. GRANULES MUST BE EMBEDDED WHEN USING TORCH APPLIED GRANULE SURFACED CAP SHEETS PRIOR TO COMPLETING SIDE LAPS. FLASHING LAPS MUST BE OFFSET FROM FIELD SHEET LAPSA MIN. 12"
6. IF FLASHING MUST EXTEND ABOVE 24" IN HEIGHT, FLASHING WIDTH MUST NOT EXCEED 39" AND SHALL BE ATTACHED IN SIDE LAPS AT 9" O.C.
7. EXPOSED SMOOTH CONCRETE SURFACES MUST BE WATERPROOFED.
8. SEALANT AT WALL JOINTS MUST BE COMPATIBLE WITH COUNTERFLASHING SEALANT.

ASHPHALT IS APPLIED UNIFORMLY TO EACH PLY AT A RATE OF APPROXIMATELY 25 LBS PER 100 SQ/FT OF ROOF SURFACE (+/-15%)

1 / A05-22

SURFACE MOUNTED COUNTER-FLASHING

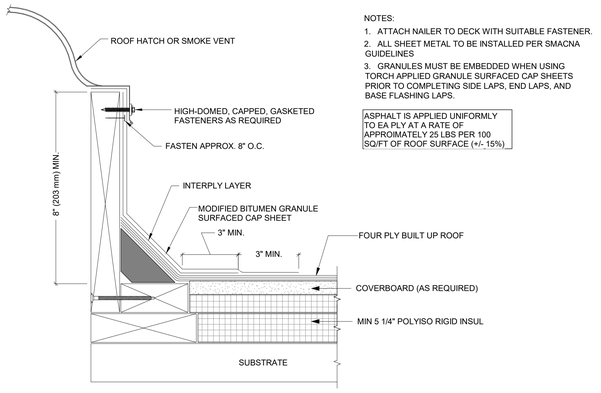
SCALE: 6" = 1'-0"



2 / A05-22

PLUMBING VENT

SCALE: 6" = 1'-0"



NOTES:

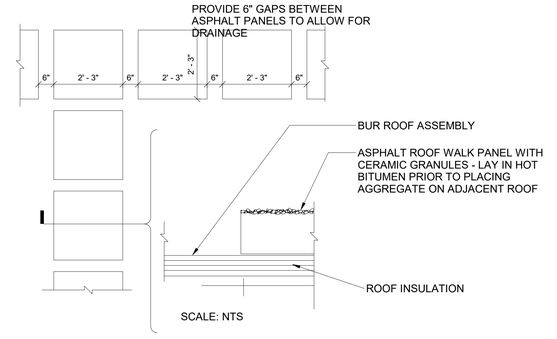
1. ATTACH NAILER TO DECK WITH SUITABLE FASTENER.
2. ALL SHEET METAL TO BE INSTALLED PER SMACNA GUIDELINES
3. GRANULES MUST BE EMBEDDED WHEN USING TORCH APPLIED GRANULE SURFACED CAP SHEETS PRIOR TO COMPLETING SIDE LAPS, END LAPS, AND BASE FLASHING LAPS.

ASPHALT IS APPLIED UNIFORMLY TO EA PLY AT A RATE OF APPROIMATELY 25 LBS PER 100 SQ/FT OF ROOF SURFACE (+/-.15%)

3 / A05-22

ROOF HATCH AND SMOKE VENT

SCALE: 6" = 1'-0"



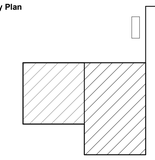
4 / A05-22

ROOF WALKWAY - ASPHALT

SCALE: 1/2" = 1'-0"

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
01/14/19	ADDENDUM #1	4
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

NORR

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Project Manager A. NOLFF	BIM Lead R. HAAS
Design Lead C. MENARD	Drawn R. HAAS
Project Leader C. MENARD	Checked G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project

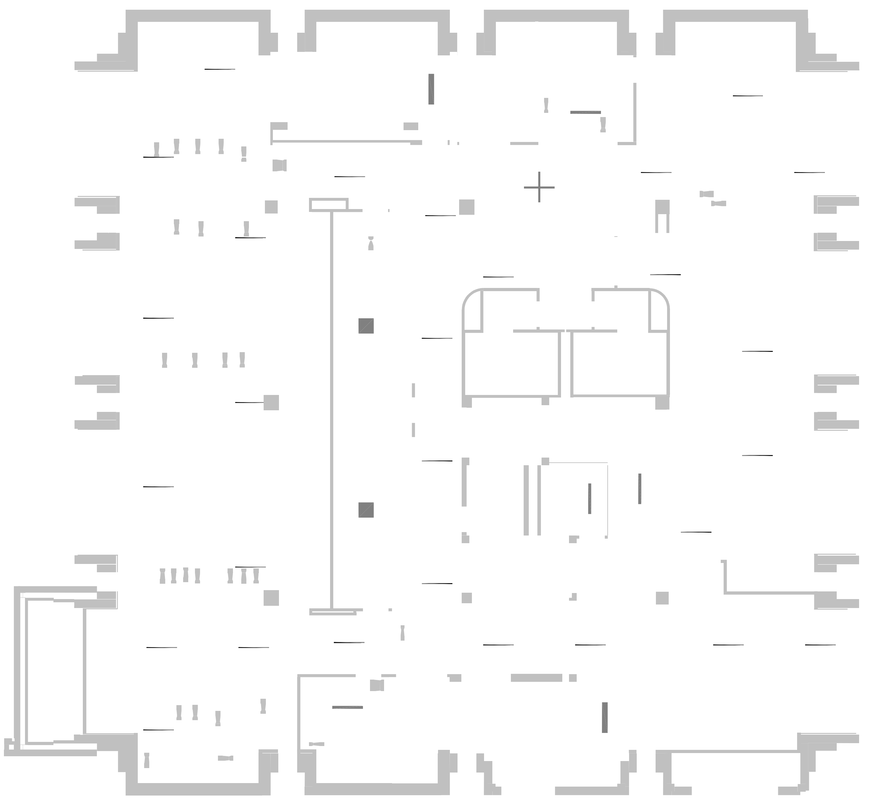
STEM INNOVATION LEARNING CENTER

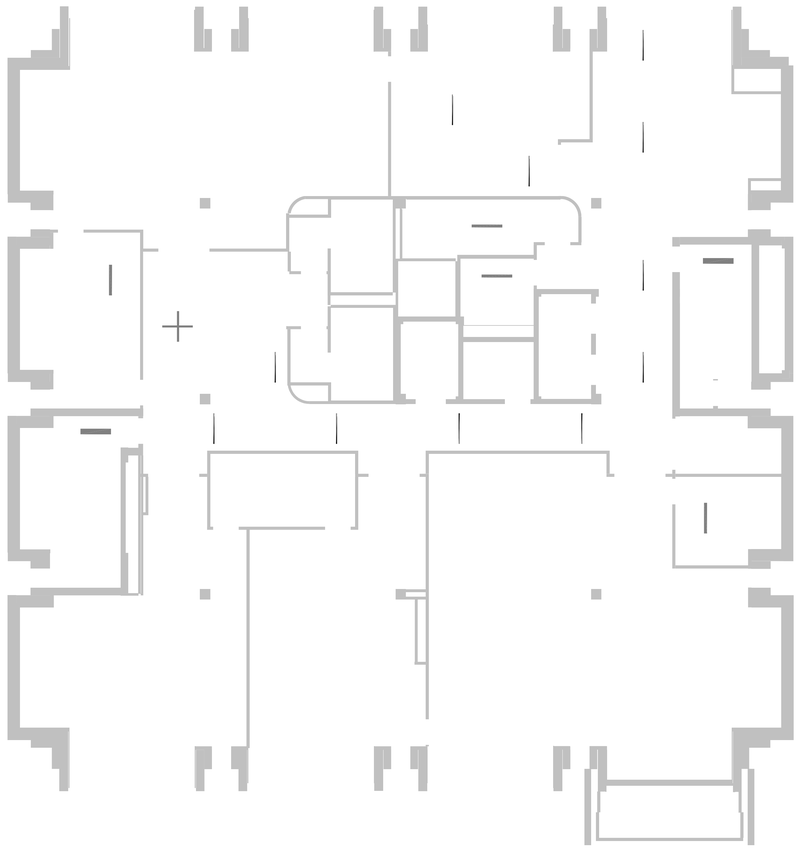
5048 GULLEN MALL
DETROIT, MI 48202

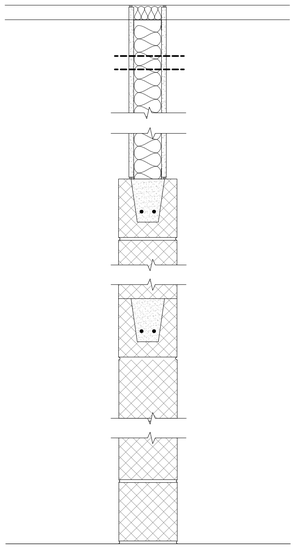
Drawing Title

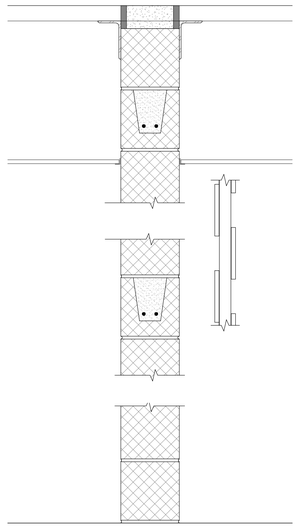
ROOF DETAILS

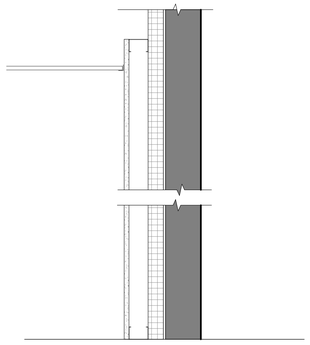
Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A05-22

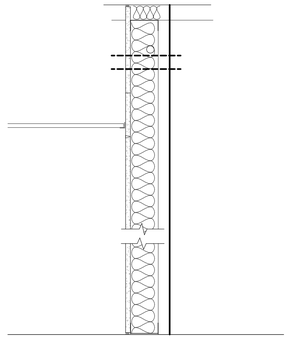


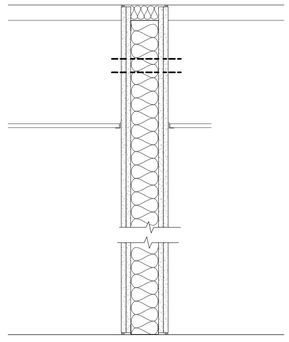


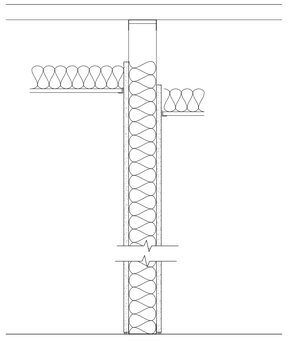


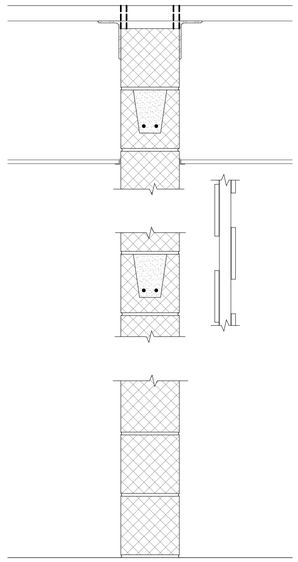


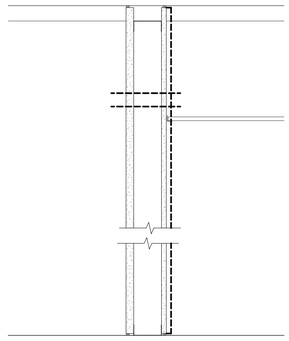


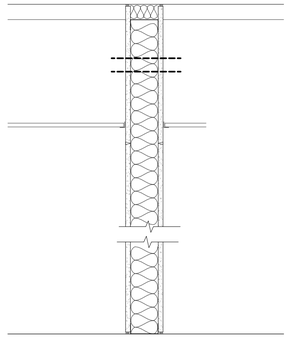


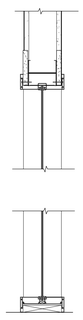


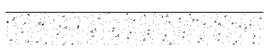


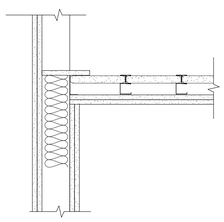


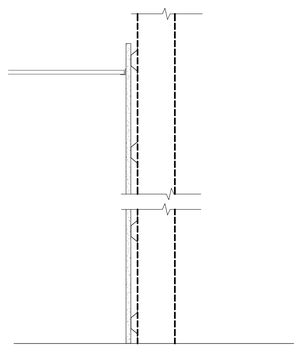


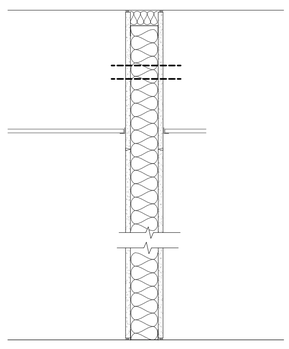












5/6/2019 12:04:31 PM

DOOR SCHEDULE

DOOR TAG	FIRE RATING	SIZE		DOOR				FRAME					REMARKS
		WIDTH	HEIGHT	TYPE	MATERIAL	FINSH	GLASS TYPE	TYPE	MATERIAL	FINISH	HEAD DETAIL	JAMB DETAIL	
0.35A		6' - 0"	7' - 2"	F-F	SD-HD	PT-2		A	SF-HD	PT-2	2A	2B	
001A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
001B		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
002A	90 MIN	3' - 0"	7' - 0"	F	SD-HD-FR	PT-2		A	SF-HD-FR	PT-2	1A	1B	
003A		3' - 0"	7' - 0"	L	SD-HD	PT-2		A	SF-HD	PT-2	2A	2B	
005A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
006A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
020A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
020B		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
021A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
023A	90 MIN	6' - 0"	7' - 2"	F-F	SD-HD	PT-2		A	SF-HD	PT-2	2A	2B	
024A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
027A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
027B		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
027C		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
030A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
030B	EXISTING	3' - 0"	7' - 2"	F	EXISTING	PT-2		A	EXISTING	PT-2	1A	1B	1
033A	EXISTING	3' - 0"	7' - 0"	F	EXISTING	PT-2		C	SF-HD-FR	PT-2	2A	2B	
038A		3' - 0"	7' - 0"	F	SD-HD	PT-2		A	SF-HD	PT-2	1A	1B	3
039A	EXISTING	3' - 0"	7' - 0"	F	EXISTING	PT-2		C	EXISTING	PT-2	2A	2B	3
040A	90 MIN	3' - 0"	7' - 0"	F	SD-HD-FR	PT-2		A	SF-HD-FR	PT-2	1A	1B	
040B	90 MIN	3' - 0"	7' - 0"	F	SD-HD-FR	PT-2		A	SF-HD-FR	PT-2	1A	1B	
087.04A	EXISTING	3' - 0"	7' - 2"	F	EXISTING	PT-2		EXISTING	EXISITNG	PT-2	EXISTING	EXISTING	
090.02A	EXISTING	3' - 0"	7' - 2"	F	EXISTING	PT-2		EXISTING	EXISTING	PT-2	EXISTING	EXISTING	
090.09A	EXISTING	3' - 0"	7' - 2"	F	EXISTING	PT-2		EXISTING	EXISTING	PT-2	EXISTING	EXISTING	
090.13A	EXISTING	3' - 0"	7' - 2"	F	EXISTING	PT-2		EXISTING	EXISTING	PT-2	EXISTING	EXISTING	
090.15A	90 MIN	6' - 0"	7' - 2"	F-F	SD-HD-FR	PNT		A	SF-HD-FR	PNT	1A	1B	
090.15B	90 MIN	6' - 0"	5' - 0"	CD	CD-O	-		-	-	-	4A	4B	
090.16A	EXISTING	6' - 0"	7' - 2"	F-F	EXISTING	PT-2		A	EXISTING	PT-2	EXISTING	EXISTING	
090.17A	EXISTING	6' - 0"	7' - 2"	F-F	EXISTING	PT-2		A	EXISTING	PT-2	EXISTING	EXISTING	
090.18A	EXISTING	3' - 0"	7' - 2"	F	EXISTING	PT-2		EXISTING	EXISTING	PT-2	EXISTING	EXISTING	
090A	EXISTING	3' - 0"	7' - 2"	F	EXISTING	PT-2		EXISTING	EXISTING	PT-2	EXISTING	EXISTING	
102A	45 MIN	3' - 0"	7' - 0"	F	SD-HD	PT-2		A	SF-HD-FR	PT-2	1A	1B	
103A		3' - 0"	7' - 0"	F	WD	PT-2		A	SF-HD	PT-2	1A	1B	3
104A		3' - 0"	7' - 0"	L	SD-HD	PT-2		A	SF-HD	PT-2	2A	2B	
105A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
106A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
112A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
112B		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
115A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
116A		3' - 0"	7' - 0"	F	WD	WT	GL-5	A	SF-HD	PT-2	1A	1B	
117A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
119A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
121A	45 MIN	3' - 0"	7' - 0"	F	SD-HD-FR	PT-2		A	SF-HD-FR	PT-2	1A	1B	
122A		3' - 0"	7' - 0"	F	WD	WT	GL-5	A	SF-HD	PT-2	1A	1B	
122B		3' - 0"	7' - 0"	F	WD	WT	GL-5	A	SF-HD	PT-2	1A	1B	
123A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
124A		3' - 0"	7' - 0"	F	WD	WT		B	SF-HD	PT-2	1A , 3A	3B	
125A	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT		D	SF-HD-FR	PT-2	1A	1B	
126A	45 MIN	3' - 0"	7' - 0"	F	WD	WT		A	SF-HD-FR	PT-2	1A	1B	
127A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
128A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	2
129A		3' - 0"	7' - 0"	F	WD	WT		B	SF-HD	PT-2	1A , 3A	3B	
131A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
132A		3' - 0"	7' - 0"	F	WD	WT	GL-5	A	SF-HD	PT-2	1A	1B	
132B		3' - 0"	7' - 2"	G	AE			SEE ELEV	ALF				
132C		3' - 0"	7' - 0"	F	WD	WT	GL-5	A	SF-HD	PT-2	1A	1B	
133A		3' - 0"	7' - 0"	F	WD	WT		B	SF-HD	PT-2	1A , 3A	3B	
134A		3' - 0"	7' - 0"	F	WD	WT		B	SF-HD	PT-2	1A , 3A	3B	
135A		3' - 0"	7' - 0"	F	WD	WT		B	SF-HD	PT-2	1A , 3A	3B	
136A		3' - 0"	7' - 0"	F	WD	WT		B	SF-HD	PT-2	1A , 3A	3B	
190.01A		3' - 0"	7' - 2"	G	AE		GL-1	SEE ELEV	ALF				6
190.01B		3' - 0"	7' - 2"	G	AE		GL-1	SEE ELEV	ALF				6
190.01C		3' - 0"	7' - 2"	G	AE		GL-1	SEE ELEV	ALF				3,4,5,6
190.01D		3' - 0"	7' - 2"	G	AE		GL-1	SEE ELEV	ALF				4,5
190.01E		3' - 0"	7' - 2"	G	AE		GL-1	SEE ELEV	ALF				
190.01F		3' - 0"	7' - 2"	G	AE		GL-1	SEE ELEV	ALF				
190.02A	90 MIN	3' - 0"	7' - 0"	F	SD-HD-FR	PT-2		C	SF-HD-FR	PT-2	2A	2B	
190.09A	EXISTING	3' - 0"	7' - 2"	F	EXISTING	PT-2		EXISTING	EXISTING	PT-2	EXISTING	EXISTING	
190.09B		3' - 7"	7' - 2"	G	AE	WS		SEE ELEV	ALF	ALF	6A	6B	
190.12A		3' - 0"	7' - 2"	G	AE		GL-1	SEE ELEV	ALF				
190.12B		3' - 0"	7' - 2"	G	AE		GL-1	SEE ELEV	ALF				
190.12C		3' - 0"	7' - 2"	G	AE		GL-1	SEE ELEV	ALF				4,5
190.12D		3' - 0"	5' - 5"	G	AE		GL-1	SEE ELEV	ALF				6
190.12E		3' - 0"	5' - 5"	G	AE		GL-1	SEE ELEV	ALF				6
190.12F		3' - 0"	5' - 5"	G	AE		GL-1	SEE ELEV	ALF				3,4,5,6
190.17A	EXISTING	3' - 0"	7' - 2"	F	SD	PT-2		EXISTING	SF-HD	PT-2	EXISTING	EXISTING	
201A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
201B		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
202A	45 MIN	3' - 0"	7' - 0"	F	SD-HD-FR	PT-2		A	SF-HD-FR	PT-2	1A	1B	
203A		3' - 0"	7' - 0"	F	WD	PT-2		A	SF-HD	PT-2	1A	1B	3
204A		3' - 0"	7' - 0"	L	WD	PT-2		A	SF-HD	PT-2	2A	2B	
205A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
206A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
208A	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT	GL-6	D	SF-HD-FR	PT-2	1A	1B	
209A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
210A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
212A	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT	GL-6	D	SF-HD-FR	PT-2	1A	1B	
212B	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT	GL-6	D	SF-HD-FR	PT-2	1A	1B	
215A	45 MIN	3' - 0"	7' - 0"	F	WD	WT		A	SF-HD-FR	PT-2	1A	1B	
217A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
217B		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
218A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
220A		3' - 0"	7' - 0"	F	WD	WT		B	SF-HD	PT-2	1A , 3A	3B	
290.02A	EXISTING	3' - 0"	7' - 2"	F	EXISTING	PT-2		EXISTING	EXISTING	PT-2	EXISTING	EXISTING	
290.09A	EXISTING	3' - 0"	7' - 2"	F	EXISTING	PT-2		EXISTING	EXISTING	PT-2	EXISTING	EXISTING	
301A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
301B		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
302A	45 MIN	3' - 0"	7' - 0"	F	WD-FR	PT-2		A	SF-HD	PT-2	1A	1B	
303A	45 MIN	3' - 0"	7' - 0"	F	SD-HD-FR	PT-2		A	SF-HD-FR	PT-2	1A	1B	3
304A		3' - 0"	7' - 0"	L	SD-HD	PT-2		A	SF-HD	PT-2	2A	2B	
305A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
306A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
308A	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT	GL-6	D	SF-HD-FR	PT-2	1A	1B	
310A	45 MIN	3' - 0"	7' - 0"	F	WD	WT		A	SF-HD-FR	PT-2	1A	1B	
310B		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
312A	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT	GL-6	D	SF-HD-FR	PT-2	1A	1B	
312B	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT	GL-6	D	SF-HD-FR	PT-2	1A	1B	
315A	45 MIN	3' - 0"	7' - 0"	F	WD	WT		A	SF-HD-FR	PT-2	1A	1B	
317A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
317B		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
318A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
320A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
390.02A	EXISTING	3' - 0"	7' - 2"	F	EXISTING	PT-2		EXISTING	EXISTING	PT-2	EXISTING	EXISTING	
390.09A	EXISTING	3' - 0"	7' - 2"	F	EXISTING	PT-2		EXISTING	EXISTING	PT-2	EXISTING	EXISTING	
401A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
401B		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
402A	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT		A	SF-HD-FR	PT-2	1A	1B	
403A		3' - 0"	7' - 0"	F	WD	PT-2		A	SF-HD	PT-2	1A	1B	3
404A		3' - 0"	7' - 0"	L	WD	PT-2		A	SF-HD	PT-2	2A	2B	
405A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
406A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
408A	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT	GL-6	D	SF-HD-FR	PT-2	1A	1B	
410A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
412A	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT	GL-6	D	SF-HD-FR	PT-2	1A	1B	
412B	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT	GL-6	D	SF-HD-FR	PT-2	1A	1B	
415A	45 MIN	3' - 0"	7' - 0"	F	WD	WT		A	SF-HD-FR	PT-2	1A	1B	
417A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
417B		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
418A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
420A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
421A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
490.02A	EXISTING	3' - 0"	7' - 2"	F	EXISTING	PT-2		EXISTING	EXISTING	PT-2	EXISTING	EXISTING	
490.09A	EXISTING	3' - 0"	7' - 2"	F	EXISTING	PT-2		EXISTING	EXISTING	PT-2	EXISTING	EXISTING	
501A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
501B		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
502A	45 MIN	3' - 0"	7' - 0"	F	WD-FR	PT-2		A	SF-HD-FR	PT-2	1A	1B	
503A		3' - 0"	7' - 0"	F	WD	PT-2		A	SF-HD	PT-2	1A	1B	3
504A		3' - 0"	7' - 0"	L	WD	PT-2		A	SF-HD	PT-2	2A	2B	
505A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
506A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
508A	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT	GL-6	D	SF-HD-FR	PT-2	1A	1B	
510A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
512A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
513A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
518A		3' - 0"	7' - 0"	F	SD-HD	PT-2		A	SF-HD	PT-2	1A	1B	
519A	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT	GL-6	D	SF-HD-FR	PT-2	1A	1B	
519B	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT		A	SF-HD-FR	PT-2	1A	1B	
520A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
521A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
590.02A	EXISTING	3' - 0"	7' - 2"	F	EXISTING	PT-2		EXISTING	EXISITNG	PT-2	EXISTING	EXISTING	

DOOR SCHEDULE

DOOR TAG	FIRE RATING	SIZE		DOOR				FRAME					REMARKS
		WIDTH	HEIGHT	TYPE	MATERIAL	FINSH	GLASS TYPE	TYPE	MATERIAL	FINISH	HEAD DETAIL	JAMB DETAIL	
590.09A	EXISTING	3' - 0"	7' - 2"	F	EXISTING	PT-2		EXISTING	EXISTING	PT-2	EXISTING	EXISTING	
601A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
601B		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
602A	45 MIN	3' - 0"	7' - 0"	F	WD-FR	PT-2		A	SF-HD-FR	PT-2	1A	1B	
603A		3' - 0"	7' - 0"	F	WD	PT-2		A	SF-HD	PT-2	1A	1B	3
604A		3' - 0"	7' - 0"	L	WD	PT-2		A	SF-HD	PT-2	2A	2B	
605A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
606A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
608A	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT	GL-6	D	SF-HD-FR	PT-2	1A	1B	
610A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
612A	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT	GL-6	D	SF-HD-FR	PT-2	1A	1B	
613A		3' - 0"	7' - 0"	N	WD	WT		A	SF-HD	PT-2	1A	1B	
613B		3' - 0"	7' - 0"	N	WD	WT		A	SF-HD	PT-2	1A	1B	
614A	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT	GL-6	D	SF-HD-FR	PT-2	1A	1B	
614B	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT		A	SF-HD-FR	PT-2	1A	1B	
618A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
619B		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
620A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
621A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
690.02A	EXISTING	3' - 0"	7' - 2"	F	EXISTING	PT-2		EXISTING	SF-HD	PT-2	EXISTING	EXISTING	
690.09A	EXISTING	3' - 0"	7' - 2"	F	EXISTING	PT-2		EXISTING	SF-HD	PT-2	EXISTING	EXISTING	
701A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
702A	45 MIN	3' - 0"	7' - 0"	F	SD-HD-FR	WT		A	SF-HD-FR	PT-2	1A	1B	
703A		3' - 0"	7' - 0"	F	SD-HD	WT		A	SF-HD	PT-2	1A	1B	3
704A		3' - 0"	7' - 0"	L	SD-HD	PT-2		A	SF-HD	PT-2	2A	2B	
705A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
706A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
708A	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT	GL-6	D	SF-HD-FR	PT-2	1A,3A	1B	
708B	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT		A	SF-HD-FR	PT-2	1A	1B	
710A	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT		A	SF-HD-FR	PT-2	1A	1B	
710B		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
712A	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT	GL-6	D	SF-HD-FR	PT-2	1A	1B	
713A		3' - 0"	7' - 0"	N	WD	WT		A	SF-HD	PT-2	1A	1B	
713B		3' - 0"	7' - 0"	N	WD	WT		A	SF-HD	PT-2	1A	1B	
714A	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT	GL-6	D	SF-HD-FR	PT-2	1A	1B	
714B	45 MIN	3' - 0"	7' - 0"	F	WD-FR	WT		A	SF-HD-FR	PT-2	1A	1B	
718A		3' - 0"	7' - 0"	F	WD	WT		A	SF-HD	PT-2	1A	1B	
719A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
720A		3' - 0"	7' - 0"	F	WD	WT	GL-5	B	SF-HD	PT-2	1A , 3A	3B	
790.02A	EXISTING	3' - 0"	7' - 2"	F	EXISTING	PT-2		EXISTING	EXISTING	PT-2	EXISTING	EXISTING	
790.02B	EXISTING	3' - 0"	7' - 0"	F	EXISTING	PT-2		A	EXISTING	PT-2	1A	1B	
790.09A	EXISTING	3' - 0"	7' - 2"	F	EXISTING	PT-2		EXISTING	EXISTING	PT-2	EXISTING	EXISTING	
800A	EXISTING	3' - 0"	7' - 2"	F	EXISTING	PT-2		A	EXISTING	PT-2	1A	1B	
800B	90 MIN	3' - 0"	7' - 0"	F	SD-HD-FR	PT-2		A	SF-HD-FR	PT-2	1A	1B	
800C	90 MIN	3' - 0"	7' - 0"	F	SD-HD-FR	PT-2		A	SF-HD-FR	PT-2	1A	1B	
890.02A	EXISTING	3' - 0"	7' - 2"	F	EXISTING	PT-2		EXISTING	EXISITNG	PT-2	EXISTING	EXISTING	
890.02B	EXISTING	3' - 0"	7' - 2"	F	EXISTING	PT-2		EXISTING	EXISTING	PT-2	EXISTING	EXISTING	
M001A		4' - 0"	7' - 0"	F	SD-HD			C	SF-HD		2A	2C	

EXTERIOR LOUVER SCHEDULE

REFER TO STRUCTURAL SHEETS FOR TYP LINTEL SIZES AND DETAILS

NOTE	#	DIMENSIONS	DESCRIPTION	LINTEL SIZE	LOCATION
LV1	4	12'-0" x 7'-4"	NEW	W-SHAPE	PENTHOUSE
LV2	2	4'-0" x 7'-4"	NEW	W-SHAPE	PENTHOUSE
LV3	1	8'-0" x 8'-0"	NEW	N/A (EXIST CONC BEAM)	SUB-BASEMENT
LV4	ETR	11'-3" x 6'-0"	EXIST.OPNG	N/A (EXIST CONC BEAM)	2ND FLOOR
LV5	1	4'-8" x 3'-4"	NEW	2L	SUB-BASEMENT
LV6	1	7'-0" x 4'-0"	NEW	N/A (EXIST CONC BEAM)	2ND FLOOR
LV7	2	7'-6" x 4'-0"	EXIST. OPNG	ETR	PENTHOUSE

GENERAL NOTES:

A. GENERAL OPENING SCHEDULE HEADINGS:

1. DOOR TYPE: CODE IN SCHEDULE REFERS TO ELEVATION. REFER TO THIS SHEET FOR ELEVATIONS.

2. FRAME TYPE: CODE IN SCHEDULE REFERS TO ELEVATION. REFER TO THIS SHEET FOR ELEVATIONS.

3. DOOR MATERIAL, DOOR FINISH, FRAME MATERIAL, FRAME FINISH: SEE "SCHEDULE ABBREVIATIONS" BELOW FOR MATERIALS USED.

4. HARDWARE GROUP: REFER TO SPECIFICATION SECTION 087100 FOR SPECIFIC REQUIREMENTS.

5. GLASS TYPE: REFER TO "GLASS TYPES" BELOW FOR TYPE OF GLASS USED IN DOOR AND FRAME.

B. WOOD AND HOLLOW METAL DOORS ARE 1-3/4" THICK, TYP. UNLESS OTHERWISE NOTED. FOR ALL OTHER DOORS SEE INDICATED DETAILS AND SPECIFICATIONS.

C. FOR DOOR TYPES WHERE GLAZING IS SHOWN, ALL GLAZING SHALL BE FACTORY INSTALLED. DO NOT INSTALL GLAZING IN THE FIELD.

D. UNDERCUT OF FIRE RATED OPENINGS SHALL BE NO GREATER THAN 3/4" ABOVE THE TOP OF FINISH FLOOR SURFACE OR APPLIED THRESHOLD PER NFPA 80.

E. ALL DOORS TO PROVIDE A MIN. CLEAR OPENING WIDTH OF 32" WITH DOOR OPEN AT 90°.

F. DOOR OPENING FORCE NOT TO EXCEED 5 LBS. AT INTERIOR HINGED, SLIDING OR FOLDING DOORS AND GATES; WITH THE EXCEPTION OF FIRE DOORS.

G. FIRE DOORS SHALL BE SUBJECT TO THE FOLLOWING OPENING FORCES: THE LATCH SHALL RELEASE AT 15 LBS; SET IN MOTION AT 30 LBS.; SWING TO A FULL-OPEN POSITION AT 15 LBS.

H. ALL EGRESS DOORS SHALL BE READILY OPENABLE FROM THE EGRESS SIDE WITHOUT THE USE OF A KEY OR SPECIAL KNOWLEDGE OR EFFORT, UNLESS OTHERWISE APPROVED BY THE AHJ.

J. GROUTING OF FRAMES IN GYPSUM BOARD CONSTRUCTION IS PROHIBITED, EXCEPT WHERE SPECIFICALLY IDENTIFIED BY DETAIL OR SPECIFICATION.

L. -----

ABBREVIATIONS USED IN THE "OPENING MATERIAL" AND "FRAME MATERIAL" AND COLUMNS IN THE SCHEDULE

AE	ALUMINUM ENTRANCE
ALF	ALUMINIUM
CO	COILED
GL	GLASS
SD	STEEL
SD-HD	STEEL HEAVY DUTY
SD-HD-FR	STEEL HEAVY DUTY FIRE RATED
WD	WOOD
WD-FR	WOOD FIRE RATED

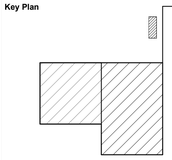
ABBREVIATIONS USED IN THE "DOOR FINISH" AND THE "FRAME FINISH" AND "REMARKS" COLUMNS IN THE SCHEDULE

-	NOT APPLICABLE
ALF	ALUMINUM
PT	PAINT
WT	STAIN

TYPES DEFINED IN THE "GLASS TYPES" COLUMNS UNDER THE "OPENING" AND "FRAME" COLUMNS OF THE SCHEDULE

GL-1	CLEAR TEMPERED GLASS - 1" INFILL W/ E-COATING
GL-2	CLEAR GLASS - 1" INFILL W/ E-COATING
GL-3	SPANDREL GLASS -1" INFILL W/ E-COATING
GL-4	CLEAR GLASS - 1/4" MONOLITHIC
GL-5	CLEAR TEMPERED GLASS - 1/4" MONOLITHIC
GL-6	CERAMIC FIRE RATED GLASS - 1/4" MONOLITHIC
GL-7	CLEAR TEMPERED GLASS - 3/8" MONOLITHIC

Key Plan



Consultants

Civil:	FTC&H
Landscape:	FTCH
Architecture	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
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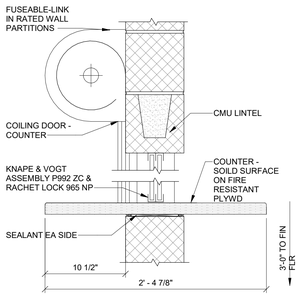
WAYNE STATE UNIVERSITY

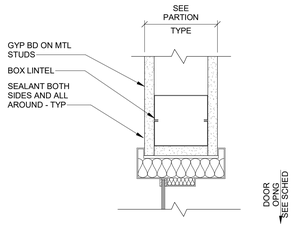
Project
STEM INNOVATION
LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

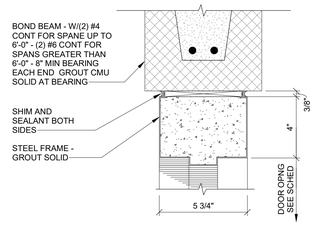
Drawing Title
DOOR AND LOUVER SCHEDULE

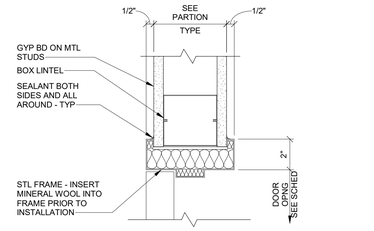
Scale 12" = 1'-0"
Project No. JCDT17-0231
Drawing No. A07-02

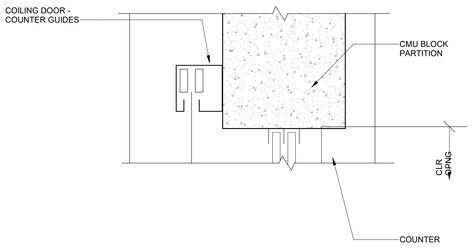
C:\Users\ryan.haas\Documents\WSU Stem Project_Arch Central_ryan.haas.rvt

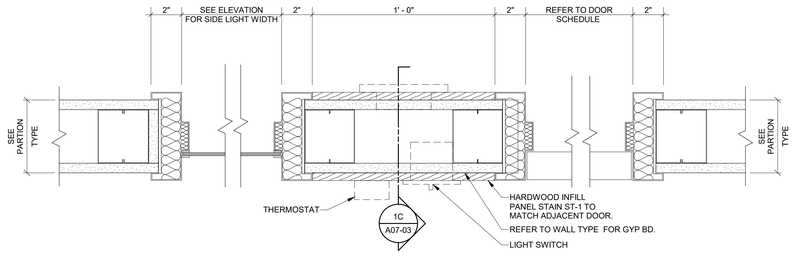


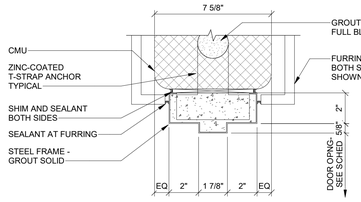


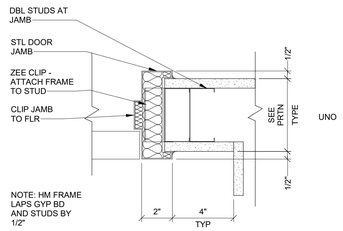


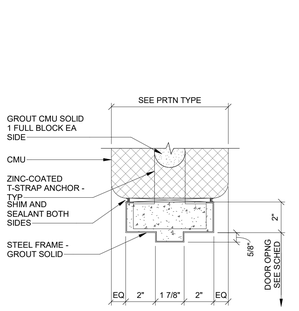


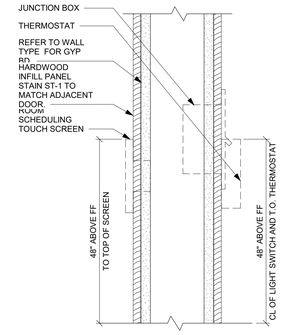




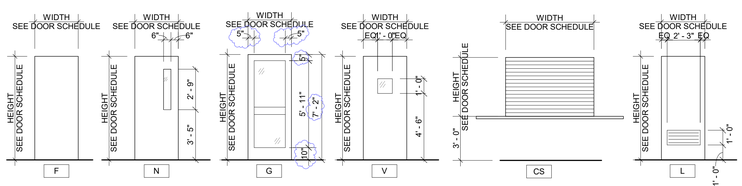








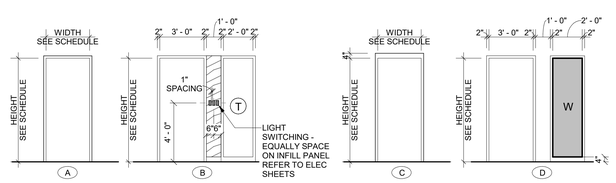
DOOR TYPES

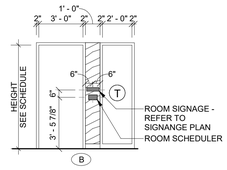


F: FLUSH
N: NARROW LITE
G: GLASS
V: VISION - RATED
OHC: OVERHEAD DOOR, COILING
CS: COUNTER SHUTTER
L: LOUVERED

NOTE:
1. SEE DOOR SCHEDULE FOR MATERIALS AND FINISHES
2. ALL GLASS TO BE TEMPERED, UNLESS NOTED OTHERWISE
3. SEE HARDWARE SCHEDULE FOR SPECIFIC DOOR HARDWARE

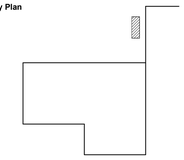
DOOR FRAME TYPES





NOTE:
1. SEE DOOR SCHEDULE FOR MATERIALS AND FINISHES
2. ALL GLASS TO BE TEMPERED, UNLESS NOTED OTHERWISE
3. SEE HARDWARE SCHEDULE FOR SPECIFIC DOOR HARDWARE

Key Plan



Consultants

Civil: FTC&H
Landscape: FTCH
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

NORR

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Design Lead C. MENARD	Drawn R. HAAS
Project Leader C. MENARD	Checked G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project

STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

DOOR DETAILS

Scale	As indicated
Project No.	JCDT17-0231
Drawing No.	A07-03

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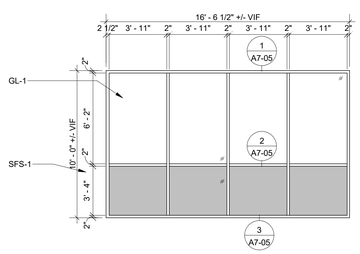
STOREFRONT FRAME TYPES

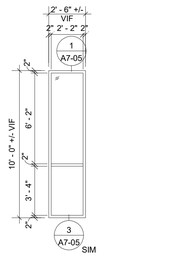
NOTE:
1. **ALL STOREFRONTS ARE SFS-1 UNO**
2. SEE WINDOW SCHEDULE FOR MATERIALS AND FINISHES
3. ALL GLASS TO BE TEMPERED, UNLESS NOTED OTHERWISE
4. FIELD VERIFY STOREFRONT OPENING.
5. SEE ELEVATIONS SERIES A03 FOR TEMPERED GLASS BREAKOUT PANELS LOCATIONS AS REQUIRED FOR 403.4.7 ex. 2
6. ALL STOREFRONTS ARE SFS-1 UNO

TYPES DEFINED IN THE "GLASS TYPES" COLUMNS UNDER THE "OPENING" AND "FRAME" COLUMNS OF THE SCHEDULE

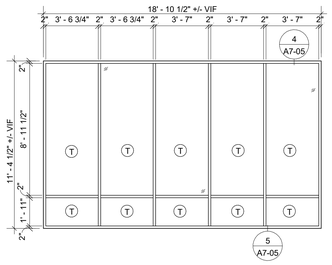
GL-1	CLEAR TEMPERED GLASS - 1" INFILL W/ E-COATING
GL-2	CLEAR GLASS - 1" INFILL W/ E-COATING
GL-3	SPANDREL GLASS -1" INFILL W/ E-COATING
GL-4	CLEAR GLASS - 1/4" MONOLITHIC
GL-5	CLEAR TEMPERED GLASS - 1/4" MONOLITHIC
GL-6	CERAMIC FIRE RATED GLASS - 1/4" MONOLITHIC
GL-7	CLEAR TEMPERED GLASS - 3/8" MONOLITHIC



WN1 STOREFRONT TYPE 1



WN2 STOREFRONT TYPE 2



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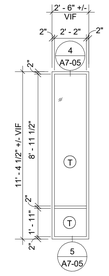
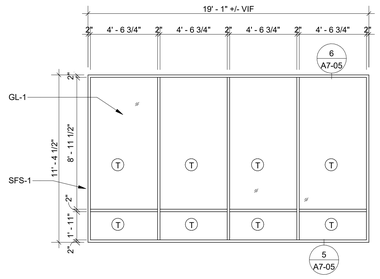
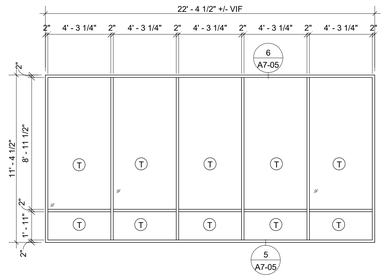


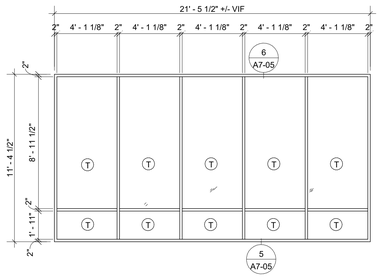
WN4 STOREFRONT TYPE 4



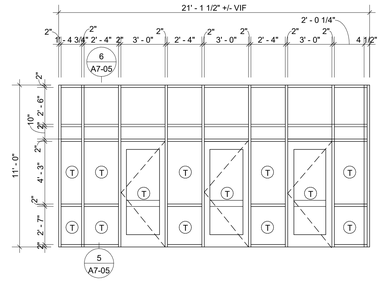
WN5 STOREFRONT TYPE 5



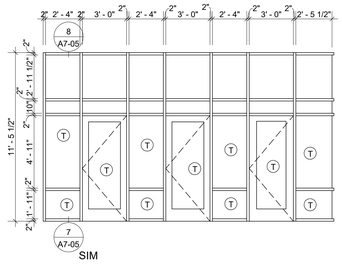
WN6 STOREFRONT TYPE 6



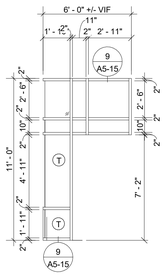
WN7 STOREFRONT TYPE 7



WN8 STOREFRONT TYPE 8 - SFS-2



WN9 STOREFRONT TYPE 9 SFS-2



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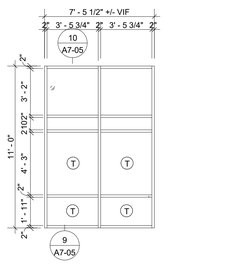

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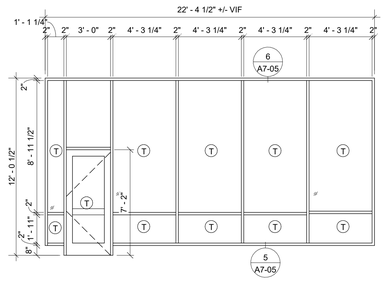
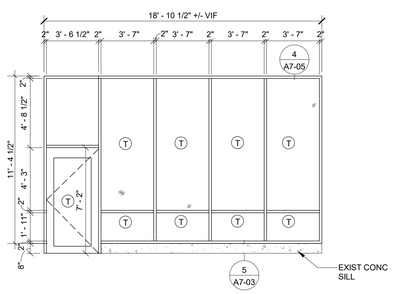
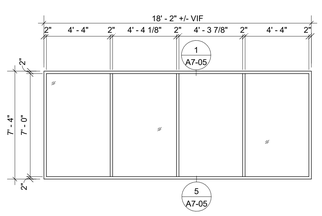


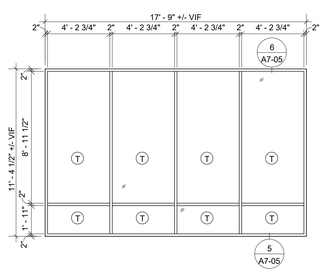
WN12 STOREFRONT TYPE 12



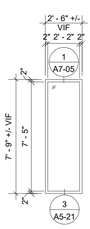
WN13 STOREFRONT TYPE 13



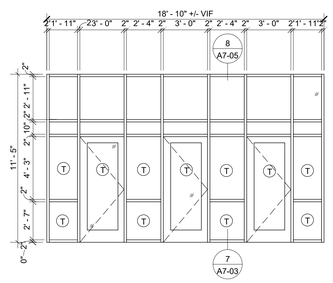
WN14 STOREFRONT TYPE 14



WN15 STOREFRONT TYPE 15



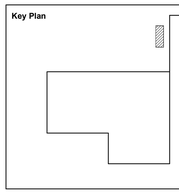
WN16 STOREFRONT TYPE 16



WN17 STOREFRONT TYPE 17

DATE	ISSUED FOR	REV
12/21/18	100% CD PACKAGE	3
01/14/19	ADDENDUM #1	4
05/03/19	TEST AND BALANCE BID	7

Key Plan



Consultants

Civil:	FTC&H
Landscape:	FTCH
Architecture	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

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An Ingenium International Company
150 W. Jefferson Avenue, Suite 1300
Detroit, MI 48226 U.S.A
norr.com

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Project Manager A. NOLFF	BIM Lead R. HAAS
Design Lead C. MENARD	Drawn R. HAAS
Project Leader C. MENARD	Checked G. KARANFILOVSKI

WAYNE STATE UNIVERSITY

Project
STEM INNOVATION LEARNING CENTER
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
STOREFRONT SCHEDULE

Scale	1 : 50
Project No.	JCDT17-0231
Drawing No.	A07-04

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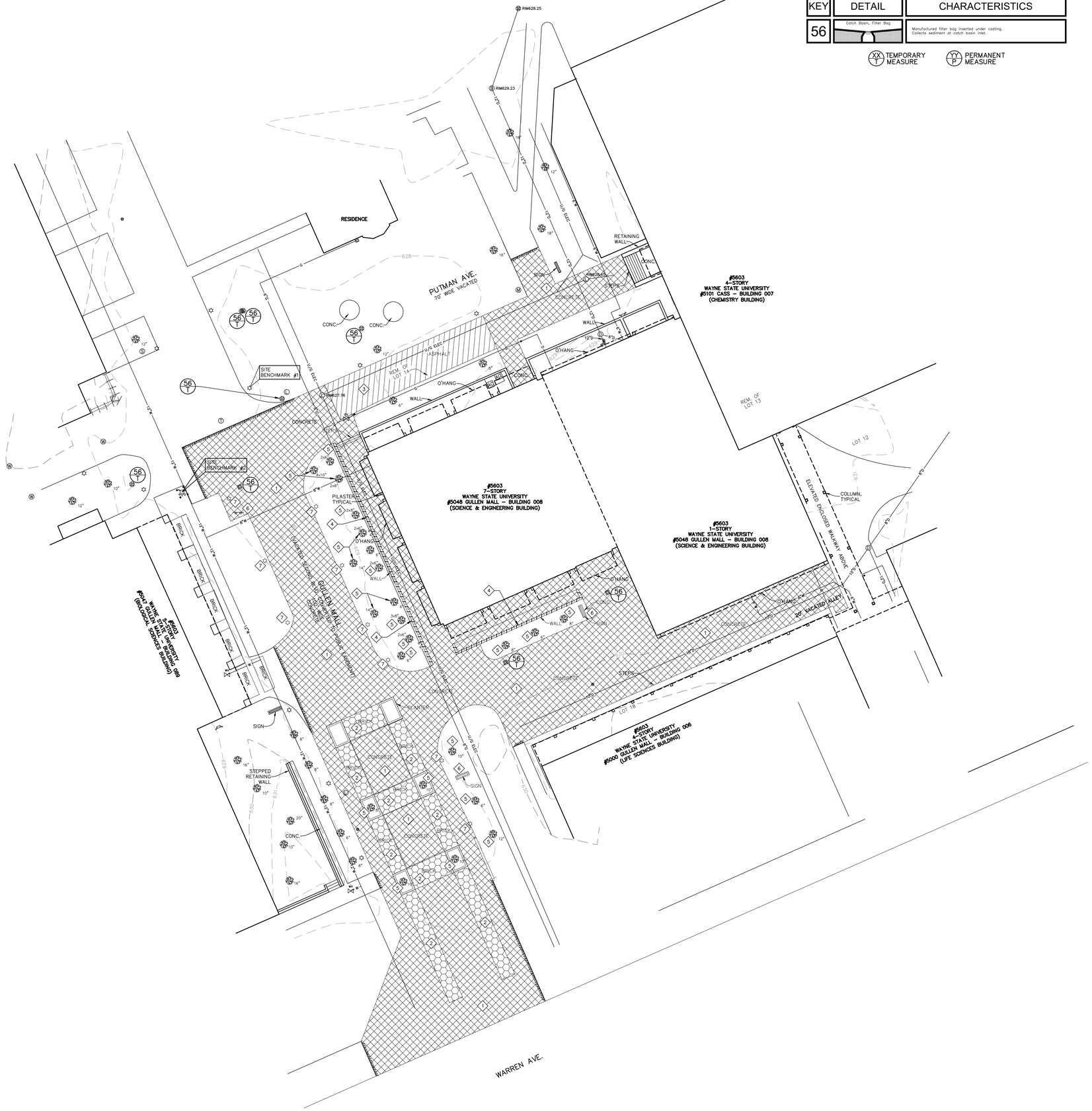
MDEQ SOIL EROSION AND SEDIMENTATION CONTROL MEASURES

KEY	DETAIL	CHARACTERISTICS
56	Catch Basin, Filter Bag	Manufactured filter bag inserted under casting. Collects sediment at catch basin inlet.

XX T TEMPORARY MEASURE

YY P PERMANENT MEASURE



LEGEND

- REMOVE CONCRETE PAVEMENT
- REMOVE ASPHALT PAVEMENT
- REMOVE BRICK SIDEWALK
- REMOVE WALL
- SAWCUT
- SET 1/2" REBAR WITH CAP P.S. 47976
- FOUND MONUMENT (AS NOTED)
- (R&M) RECORD AND MEASURED DIMENSION
- (R) RECORD DIMENSION
- (M) MEASURED DIMENSION
- 000.0 GROUND POINT
- GAS METER
- GAS VALVE
- PUBLIC LIGHTING MANHOLE
- TELEPHONE MANHOLE
- CLEANOUT
- ROUND CATCH BASIN
- SQUARE CATCH BASIN
- STORM DRAIN MANHOLE
- UNKNOWN MANHOLE
- AC AIR CONDITIONING UNIT
- BOLLARD
- LIGHTPOST/LAMP POST
- TREE
- PARCEL BOUNDARY LINE
- PLATTED LOT LINE
- ADJOINER PARCEL LINE
- BUILDING
- BUILDING OVERHANG
- BUILDING HATCH
- EDGE OF CONCRETE (CONC.)
- WALL (AS NOTED)
- OVERHEAD UTILITY LINE
- G GAS LINE
- S SANITARY LINE
- D STORM LINE
- W WATER LINE
- U/G ELEC UNDERGROUND ELECTRICAL LINE
- CONTOUR MAJOR
- CONTOUR MINOR

NOTES

1. THE EXTENT OF REMOVALS AND DEMOLITION SHALL BE FIELD VERIFIED BY CONSTRUCTION MANAGER PRIOR TO CONSTRUCTION. NOTIFY ENGINEER OF ANY DEVIATIONS FROM INFORMATION SHOWN.
2. PRIOR TO CONSTRUCTION ALL FENCING, BARRICADES, ENCLOSURES, ETC., MUST BE INSTALLED AND APPROVED BY OWNER OR CONSTRUCTION MANAGER.
3. DISPOSE OF DEMOLITION AND EXCAVATION MATERIALS IN ACCORDANCE WITH CONTRACT DOCUMENTS.
4. SOIL EROSION AND SEDIMENTATION CONTROL MEASURES MUST BE IN PLACE PRIOR TO STARTING REMOVALS AND DEMOLITION.
5. UNLESS SPECIFICALLY NOTED FOR REMOVAL ON THE PLANS, ALL SIDEWALKS, DRIVES, CULVERTS, DRAINAGE STRUCTURES, AND ABOVE AS WELL AS BELOW GRADE UTILITIES SHALL BE PROTECTED. ALL SUCH ITEMS DAMAGED OR DESTROYED DURING CONSTRUCTION SHALL BE REMOVED AND REPLACED WITH NEW AT NO ADDITIONAL COST TO THE OWNER.
6. THE LOCATIONS OF ALL EXISTING UTILITIES SHOWN ON THIS DRAWING HAVE BEEN DETERMINED FROM THE BEST INFORMATION AVAILABLE AND ARE GIVEN FOR THE CONVENIENCE OF THE CONTRACTOR. VERIFY CRITICAL INVERT INFORMATION PRIOR TO BEGINNING CONSTRUCTION.
7. DAMAGE CAUSED TO SURROUNDING AREA PAVEMENT OUTSIDE THE CONSTRUCTION LIMITS SHALL BE SAWCUT AND REPLACED AT NO ADDITIONAL COST TO THE OWNER.
8. SAWCUT CURB AND GUTTER AND SIDEWALKS TO NEAREST JOINT.
9. UNLESS SPECIFICALLY NOTED FOR REMOVAL ON THE PLANS, ALL BUILDINGS, BUILDING OVERHANGS, STAIRS AND LANDSCAPING SHALL BE PROTECTED. ALL SUCH ITEMS DAMAGED OR DESTROYED DURING CONSTRUCTION SHALL BE REMOVED AND REPLACED WITH NEW AT NO ADDITIONAL COST TO THE OWNER.

SURVEY NOTES

1. SURVEY BY KEM-TEC & ASSOCIATES MARCH 2018
2. ADDITIONAL SURVEY REQUESTED. REMOVAL LIMITS TO BE VERIFIED AFTER THE COMPLETION OF ADDITIONAL SURVEY.

KEY NOTES

1. REMOVE CONCRETE PAVEMENT.
2. REMOVE BRICK SIDEWALK.
3. REMOVE ASPHALT PAVEMENT.
4. REMOVE CONCRETE WALL.
5. REMOVE TREE.
6. REMOVE SIGN AND BASE.
7. REMOVE LIGHT POLE.

NORTH

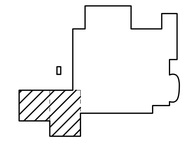
SITE REMOVAL PLAN

SCALE: 1" = 20'

0 10 20 40

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants
Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Manager	BIM Lead
J. SMITH	C. BAKER
Design Lead	Drawn
M. Leppek	M. Leppek
Project Leader	Checked
J. SMITH	

WAYNE STATE UNIVERSITY

Project
STEM Innovation Learning Center
GULLEN MALL,
DETROIT, MI 48202

Drawing Title
SITE REMOVAL PLAN

Scale	1" = 20'
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	C101

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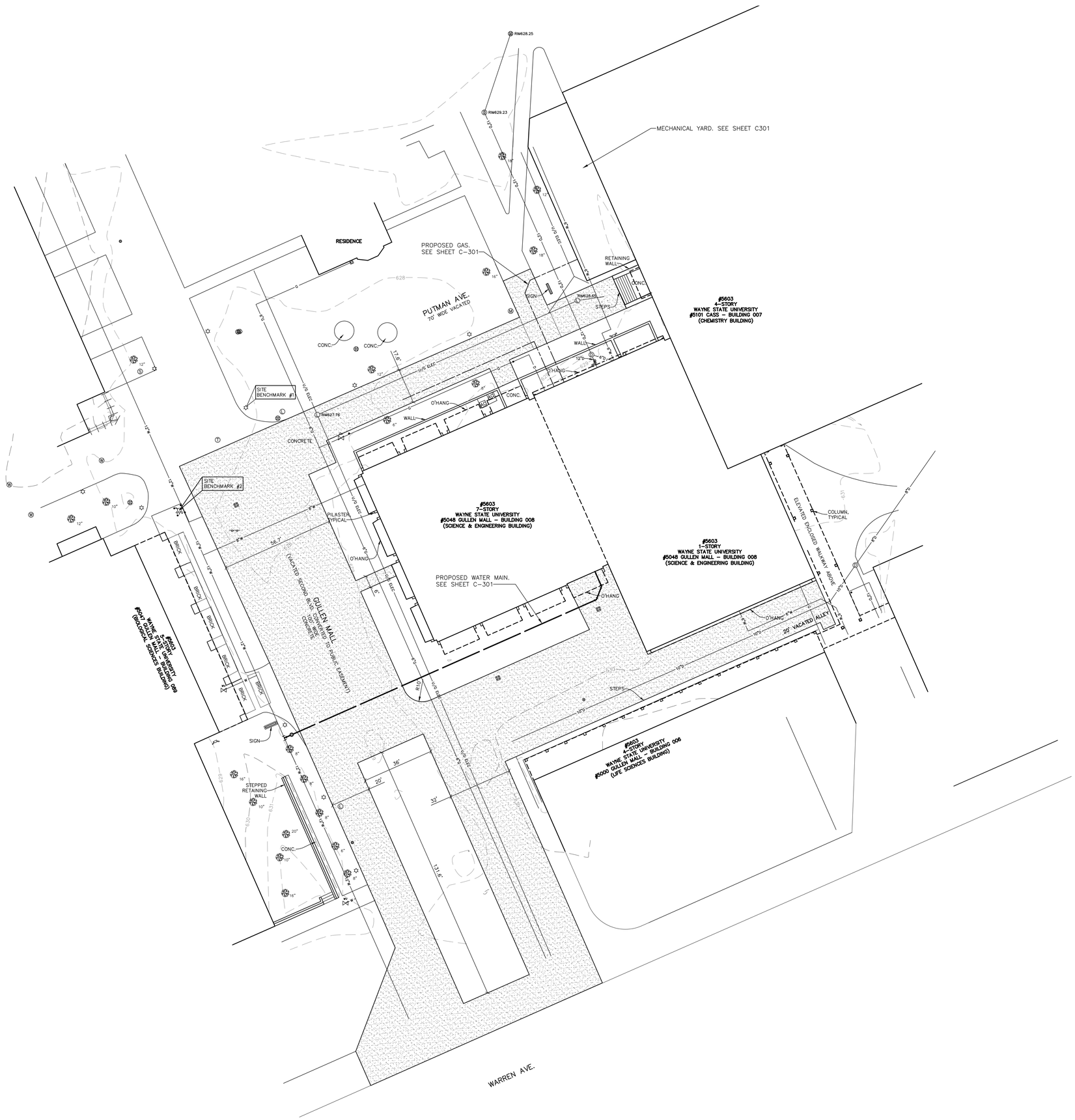


LEGEND

- 8" CONCRETE PAVEMENT ON 8" CLASS II SAND
- PROPOSED WATERMAIN
- PROPOSED GAS
- SET 1/2" REBAR WITH CAP P.S. 47976
- FOUND MONUMENT (AS NOTED)
- (R&M) RECORD AND MEASURED DIMENSION
- (R) RECORD DIMENSION
- (M) MEASURED DIMENSION
- GROUND POINT
- GAS METER
- GAS VALVE
- PUBLIC LIGHTING MANHOLE
- TELEPHONE MANHOLE
- CLEANOUT
- ROUND CATCH BASIN
- SQUARE CATCH BASIN
- STORM DRAIN MANHOLE
- UNKNOWN MANHOLE
- AC AIR CONDITIONING UNIT
- BOLLARD
- LIGHTPOST/LAMP POST
- TREE
- PARCEL BOUNDARY LINE
- PLATTED LOT LINE
- ADJOINER PARCEL LINE
- BUILDING
- BUILDING OVERHANG
- BUILDING HATCH
- EDGE OF CONCRETE (CONC.)
- WALL (AS NOTED)
- OVERHEAD UTILITY LINE
- G GAS LINE
- S SANITARY LINE
- D STORM LINE
- W WATER LINE
- U/G ELEC UNDERGROUND ELECTRICAL LINE
- CONTOUR MAJOR
- CONTOUR MINOR

NOTES

1. PRIOR TO CONSTRUCTION ALL FENCING, BARRICADES, ENCLOSURES, ETC., MUST BE INSTALLED AND APPROVED BY OWNER OR CONSTRUCTION MANAGER.
2. NEW CONCRETE PAVEMENT TO MATCH EXISTING CROSS SECTION AND EXISTING JOINT LAYOUT.
3. FINAL SITE LAYOUT TO BE DETERMINED AFTER ADDITIONAL SURVEY HAS BEEN COMPLETED.

NORTH

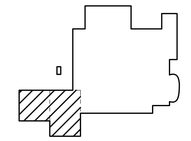
SITE LAYOUT PLAN

SCALE: 1" = 20'

0 5 20 40

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

NORR

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norr.com

ftc&h engineers scientists architects constructors

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Project Manager	BIM Lead
J. SMITH	C. BAKER
Design Lead	Drawn
M. Leppek	M. Leppek
Project Leader	Checked
J. SMITH	

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

GULLEN MALL,
DETROIT, MI 48202

Drawing Title

SITE LAYOUT PLAN

Scale 1" = 20'

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

C201

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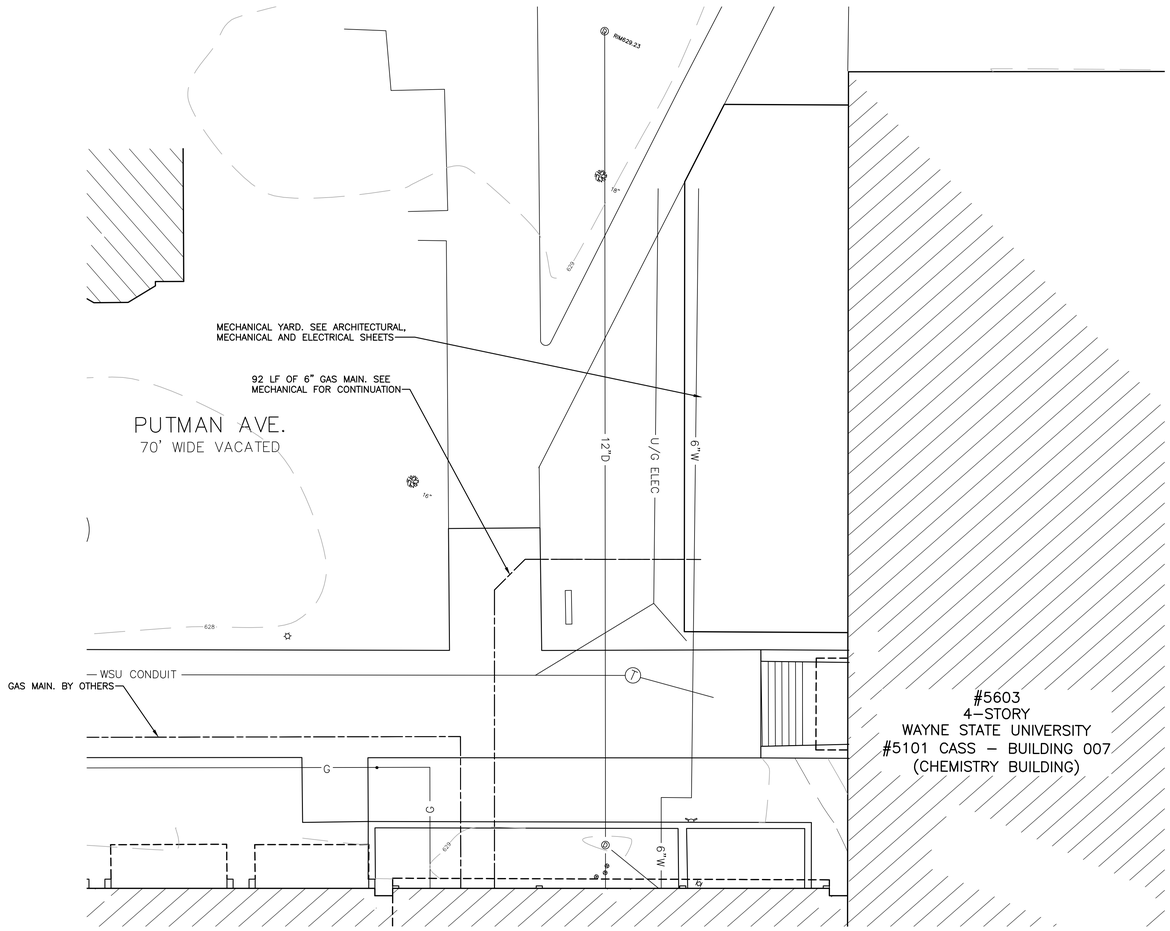
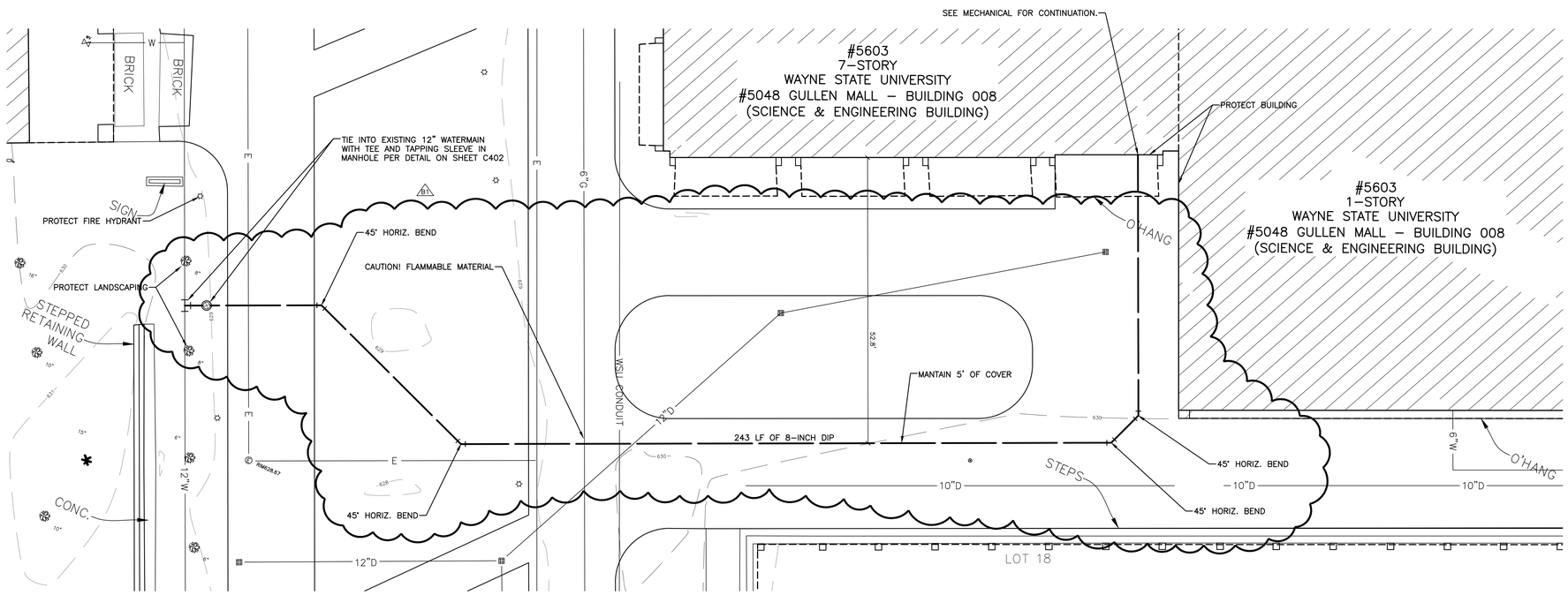


MECHANICAL YARD PLAN

SCALE: 1" = 10'

NORTH



WATER MAIN PLAN

SCALE: 1" = 10'

NORTH

LEGEND

PROPOSED GAS

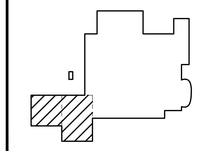
PROPOSED WATERMAIN

NOTES

1. SOIL EROSION AND SEDIMENTATION CONTROL MEASURES MUST BE IN PLACE PRIOR TO STARTING REMOVALS AND DEMOLITION.
2. THE LOCATIONS OF ALL EXISTING UTILITIES SHOWN ON THIS DRAWING HAVE BEEN DETERMINED FROM THE BEST INFORMATION AVAILABLE AND ARE GIVEN FOR THE CONVENIENCE OF THE CONTRACTOR. VERIFY CRITICAL INVERT INFORMATION PRIOR TO BEGINNING CONSTRUCTION.
3. WATER MAIN TO HAVE A MINIMUM OF 5.5 FEET OF COVER.
4. PROVIDE A MINIMUM OF EIGHTEEN (18) INCHES OF VERTICAL SEPARATION AND TEN (10) FEET OF HORIZONTAL SEPARATION BETWEEN THE WATER MAIN AND ALL SANITARY AND STORM SEWERS.

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
03/15/2019	BULLETIN NO. 1	5
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

NORR

An Ingenium International Company

150 W. Jefferson Avenue, Suite 1300
Detroit, MI 48226 U.S.A
norr.com

FTC&H engineers scientists architects constructors

Fishbeck, Thompson, Carr & Huber, Inc.
1515 Arboretum Drive, SE
Grand Rapids, Michigan 49546
T 800.456.3824, F 616.464.3997
www.ftch.com

Project Manager	BIM Lead
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Design Lead	Drawn
M. Leppek	M. Leppek
Project Leader	Checked
J. SMITH	

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

GULLEN MALL,
DETROIT, MI 48202

Drawing Title

SITE UTILITY PLAN

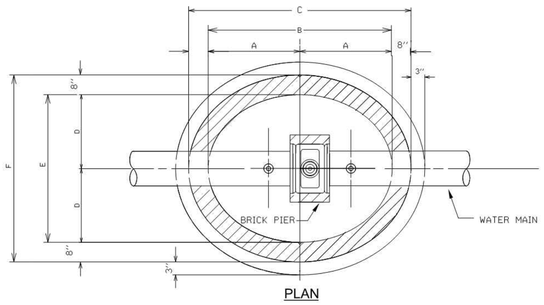
Scale 1" = 10'

Project No. JCDT17-0231 (FTCH 180050)

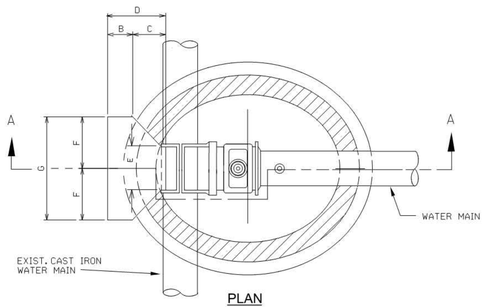
Drawing No.

C301

File Path



PLAN



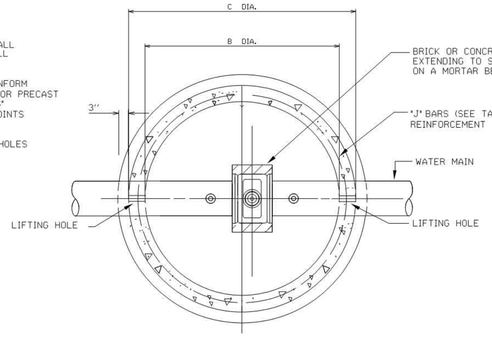
PLAN

NOTES:

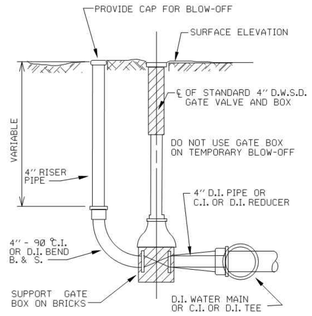
MANHOLE STEPS SHALL BE INSTALLED IN WELL WALL WHERE HEIGHT FROM TOP OF PIPE TO TOP OF WELL EXCEEDS 5' - 0".

PRECAST CONCRETE MANHOLE SECTIONS SHALL CONFORM TO ALL THE REQUIREMENTS OF "SPECIFICATIONS FOR PRECAST REINFORCED CONCRETE MANHOLE RISERS AND TOPS" A.S.T.M. C-478 WITH MODIFIED GROOVED TONGUE JOINTS AND RUBBER GASKETS.

EACH SECTION SHALL HAVE NOT MORE THAN TWO HOLES FOR HANDLING PURPOSES. THESE HOLES SHALL BE SATISFACTORILY PLUGGED AFTER INSTALLATION.



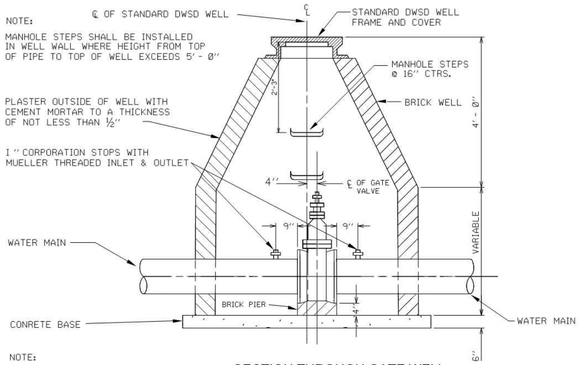
PLAN



ELEVATION

DETAIL 0F 4" TEMPORARY BLOW-OFF

NOTE:
MANHOLE STEPS SHALL BE INSTALLED IN WELL WALL WHERE HEIGHT FROM TOP OF PIPE TO TOP OF WELL EXCEEDS 5' - 0"



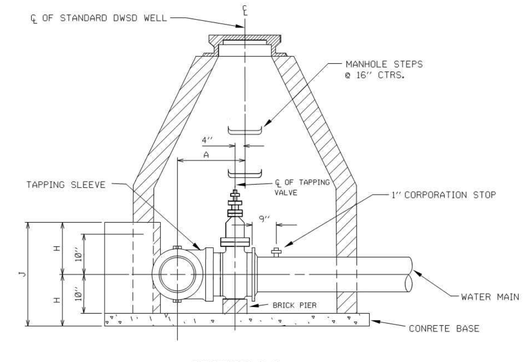
SECTION THROUGH GATE WELL

NOTE:
WHERE A REDUCER/OMNI COUPLING IS CALLED FOR ON THE DRAWINGS, THE FACE OF THE NEAREST JOINT ON THE REDUCER/OMNI COUPLING SHALL BE APPROX. 2 FT. OR AS SHOWN ON THE DRAWING FROM THE OUTSIDE FACE OF THE WELL WALL

SCHEDULE OF GATE WELL DIMENSIONS						
SIZE	A	B	C	D	E	F
6"	2' - 6"	5' - 0"	6' - 4"	2' - 0"	4' - 0"	5' - 4"
8"	2' - 6"	5' - 0"	6' - 4"	**2' - 0"**	**4' - 0"**	5' - 4"
12"	2' - 9"	5' - 6"	6' - 10"	2' - 3"	4' - 6"	5' - 10"
16"	3' - 0"	6' - 0"	7' - 4"	**2' - 9"**	5' - 6"	6' - 10"

DETAIL OF STANDARD GATE WELLS

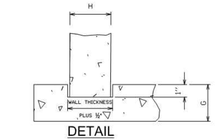
FOR USE WITH CAST IRON OR DUCTILE IRON PIPE



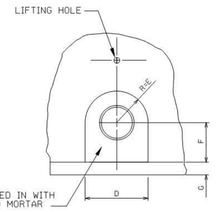
SECTION A-A

SCHEDULE OF THRUST BLOCK DIMENSIONS FOR TAPPING VALVE									
SIZE	A	B	C	D	E	F	G	H	J
8" X 8"	1' - 6¾"				0' - 7"				
12" X 8"	1' - 9"				0 - 7"				
16" X 8"	1' - 11¼"				0 - 7½"				
12" X 12"	1' - 8¾"	1' - 6"	0' - 9"	2' - 3"	0 - 7"	1' - 9"	3' - 6"	1' - 6"	3' - 0"
16" X 12"	1' - 11⅝"	1' - 6"	0' - 9"	2' - 3"	0' - 10½"	1' - 9"	3' - 6"	1' - 6"	3' - 0"
16" X 16"	2' - 2"	2' - 7"	1' - 0"	3' - 7"	0 - 10½"	2' - 11"	5' - 10"	1' - 8"	3' - 4"

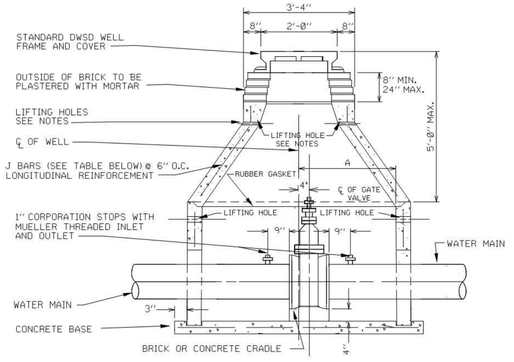
DETAIL OF STANDARD THRUST BLOCKS FOR TAPPING VALVES



DETAIL KEYWAY AT BASE



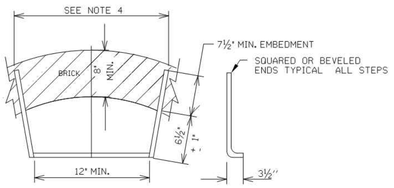
SIDE VIEW



SECTION THROUGH GATE WELL

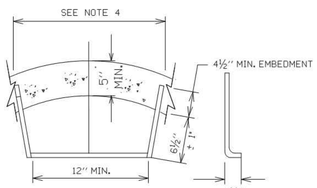
SCHEDULE OF PRECAST GATE WELL DIMENSIONS									
SIZE	A	B	C	D	E	F	G	H	J
6" & 8"	2' - 6"	5' - 0"	5' - 10"	1' - 3"	7½"	10½"	6"	5"	½"
12"	3' - 0"	6' - 0"	7' - 2"	1' - 7½"	9¾"	1' - ⅜"	8"	7"	⅝"
16"	3' - 0"	6' - 0"	7' - 2"	2' - 1"	1' - ½"	1' - 3½"	8"	7"	⅝"

DETAIL OF PRECAST GATE WELLS



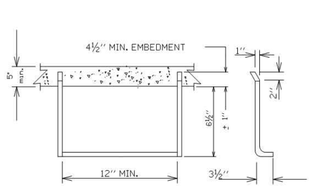
PLAN

(FOR USE WITH BRICK CONSTRUCTION)



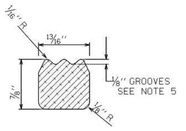
PLAN

(FOR USE WITH PRECAST CONCRETE CONSTRUCTION)



PLAN

(FOR USE WITH POURED IN PLACE CONSTRUCTION)

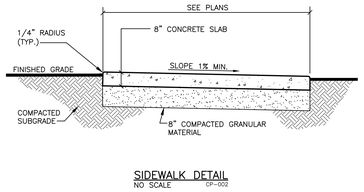


TYPICAL STEP CROSS SECTION

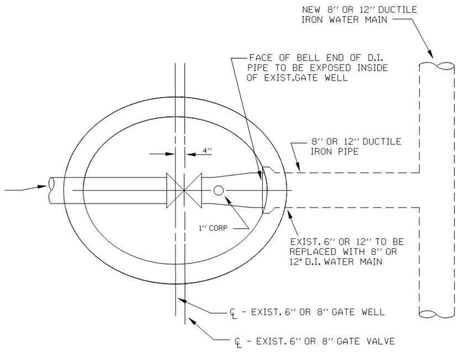
NOTES:

1. MANHOLE STEPS SHALL CONFORM TO THE REQUIREMENTS FOR "ALUMINUM ALLOY EXTRUDED BARS, RODS, SHAPES AND TUBES," A.S.T.M. B-221 (CURRENT), ALLOY 6061, TEMPER T-6, OR APPROVED EQUAL.
2. EITHER THE FLARED LEG OR PARALLEL LEG STEP MAY BE USED FOR POURED IN PLACE CONSTRUCTION OR IN WETCAST MANHOLE UNITS.
3. THE PARALLEL LEG STEP SHALL BE USED IN EXISTING STRUCTURES BY PLACING IN DRILLED HOLES AND GROUTING WITH NON-SHRINK GROUT.
4. FLARED LEGS SHALL BE RADIAL TO THE MANHOLE WALL.
5. IN LIEU OF GROOVES, ALTERNATE FOOTHOLD CONFIGURATIONS WILL BE CONSIDERED FOR APPROVAL.
6. THE VERTICAL SPACING BETWEEN INSTALLED STEPS SHALL NOT BE MORE THAN SIXTEEN INCHES.
7. ALL MANHOLE STEPS SHALL COMPLY WITH SAFETY STANDARDS (PART 3 FIXED LADDERS) AS ESTABLISHED BY THE OCCUPATIONAL SAFETY STANDARDS COMMISSION OF THE MICHIGAN DEPARTMENT OF LABOR.

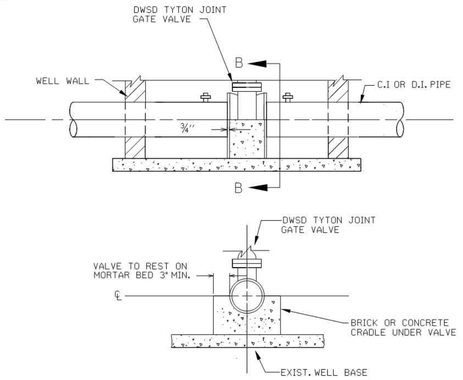
MANHOLE STEP DETAIL



SIDEWALK DETAIL
NO SCALE CP-002



CONNECTION AT EXIST. VALVE BETWEEN NEW 8" OR 12" DUCTILE IRON MAIN AND EXIST. 6" OR 8" VALVE



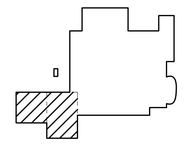
SECTION B-B

BRICK OR CONCRETE CRADLE SUPPORT DWSD TYTON JOINT GATE VALVES

SITE DETAILS

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants
Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

NORR
An Ingenium International Company
150 W. Jefferson Avenue, Suite 1300
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Project Manager	BIM Lead
J. SMITH	C. BAKER
Design Lead	Drawn
M. Leppek	M. Leppek
Project Leader	Checked
J. SMITH	

WAYNE STATE UNIVERSITY

Project
STEM Innovation Learning Center
GULLEN MALL,
DETROIT, MI 48202

Drawing Title
SITE DETAILS

Scale NO SCALE

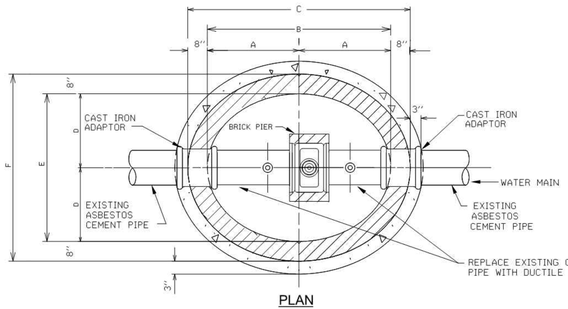
Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
C401

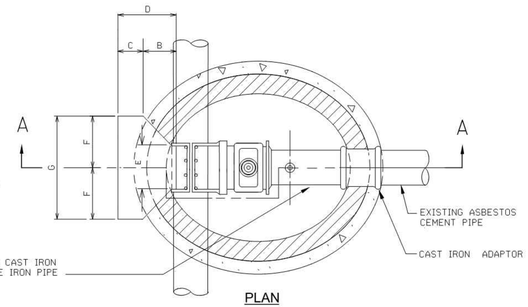
9/27/2019 3:39:34 PM

File Path

9/27/2019 3:39:34 PM



PLAN



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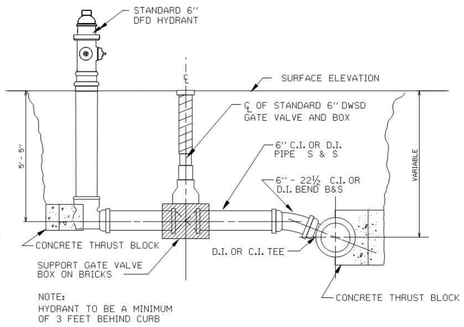
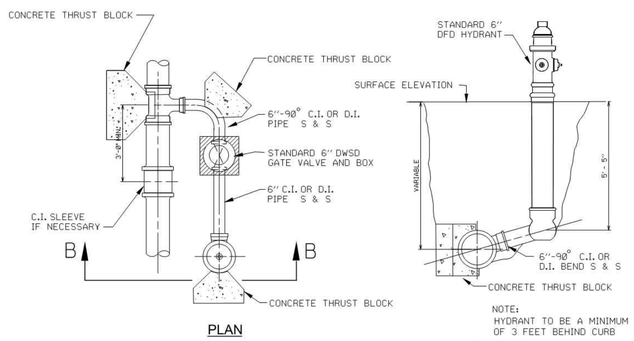


NOTE:
HYDRANT TO BE A MINIMUM OF 3 FEET BEHIND CURB

DETAIL OF 6" HYDRANT INSTALLATION STRAIGHT AWAY



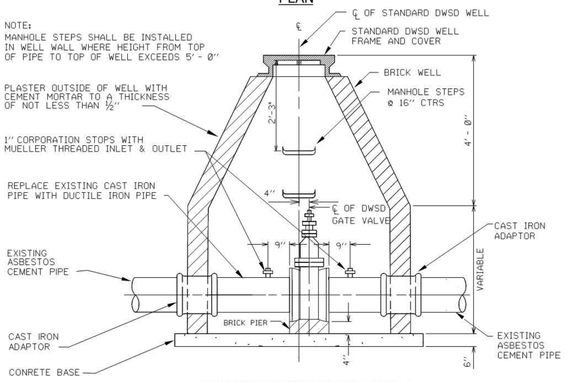
PLAN

SECTION B-B

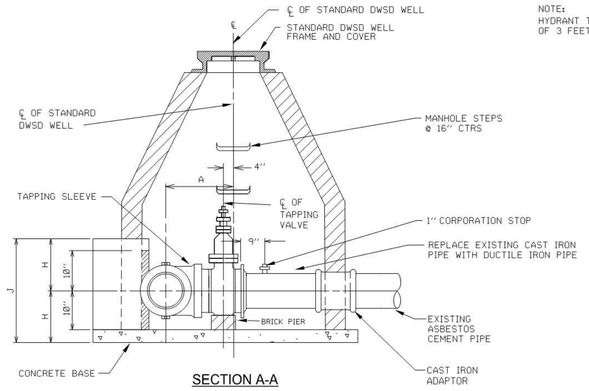
NOTE:
HYDRANT TO BE A MINIMUM OF 3 FEET BEHIND CURB

DETAIL OF 6" HYDRANT INSTALLATION OFF SET

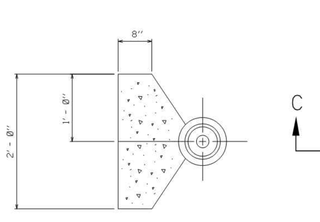
NOTE:
MANHOLE STEPS SHALL BE INSTALLED IN WELL WALL WHERE HEIGHT FROM TOP OF PIPE TO TOP OF WELL EXCEEDS 5' - 0"



SECTION THROUGH GATE WELL



SECTION A-A



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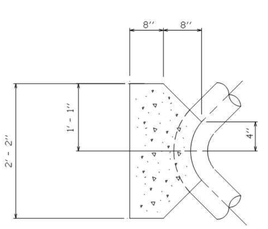
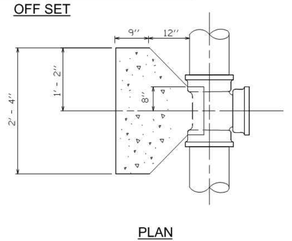


PLAN



PLAN

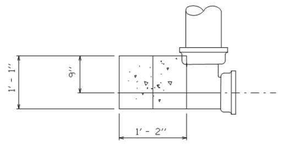
NOTE:
WHERE A REDUCER/OMNI COUPLING IS CALLED FOR ON THE DRAWINGS, THE FACE OF THE NEAREST JOINT ON THE REDUCER/OMNI COUPLING SHALL BE APPROX. 2FT. OR AS SHOWN ON THE DRAWINGS FROM THE OUTSIDE FACE OF THE WELL WALL.

SCHEDULE OF GATE WELL DIMENSIONS						
SIZE	A	B	C	D	E	F
6"	2' - 6"	5' - 0"	6' - 4"	2' - 0"	4' - 0"	5' - 4"
8"	2' - 6"	5' - 0"	6' - 4"	**2' - 0"**	**4' - 0"**	5' - 4"
12"	2' - 9"	5' - 6"	6' - 10"	2' - 3"	4' - 6"	5' - 10"
16"	3' - 0"	6' - 0"	7' - 4"	**2' - 9"**	5' - 6"	6' - 10"

DETAIL OF STANDARD GATE WELLS

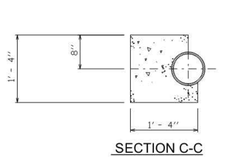
SCHEDULE OF THRUST BLOCK DIMENSIONS FOR TAPPING VALVE									
SIZE	A	B	C	D	E	F	G	H	J
8" X 8"	1' - 6⅜"				Ø - 7"				
12" X 8"	1' - 9"				Ø - 7"				
16" X 8"	1' - 11⅛"				Ø - 7⅛"				
12" X 12"	1' - 8⅜"	**1' - 6"**	Ø' - 9"	2' - 3"	Ø - 7"	1' - 9"	3' - 6"	1' - 6"	3' - Ø"
16" X 12"	1' - 11⅜"	**1' - 6"**	Ø' - 9"	2' - 3"	Ø - 10½"	1' - 9"	3' - 6"	1' - 6"	3' - Ø"
16" X 16"	2' - 2"	**2' - 7"**	1' - Ø"	3' - 7"	Ø - 10½"	2' - 11"	5' - 10"	1' - 8"	3' - 4"

DETAIL OF STANDARD THRUST BLOCKS FOR TAPPING VALVES



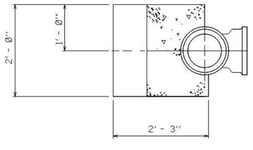
ELEVATION

THRUST BLOCK FOR 6" HYDRANT



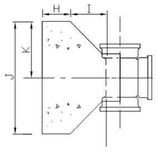
SECTION C-C

THRUST BLOCK FOR 6" HYDRANT BEND



ELEVATION

THRUST BLOCK FOR HYDRANT TEE



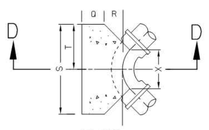
PLAN

ELEVATION

DETAIL OF STANDARD THRUST BLOCKS FOR TEES

SCHEDULE OF THRUST BLOCK DIMENSIONS								
TEE SIZE	H	I	J	K	L	M	N	P
6" X 6"	Ø' - 9"	1' - Ø"	2' - 6"	1' - 3"	1' - 6"	Ø' - 9"	2' - 3"	Ø' - 6"
8" X 8"	Ø' - 9"	1' - Ø"	3' - Ø"	1' - 6"	2' - Ø"	1' - Ø"	2' - 3"	Ø' - 6"
12" X 8"	Ø' - 9"	1' - Ø"	3' - Ø"	1' - 6"	2' - Ø"	1' - Ø"	2' - 5"	Ø' - 6"
12" X 12"	Ø' - 9"	1' - 4"	4' - Ø"	2' - Ø"	3' - Ø"	1' - 6"	2' - 9"	Ø' - 8"
16" X 8"	Ø' - 9"	1' - Ø"	3' - Ø"	1' - 6"	2' - Ø"	1' - Ø"	2' - 9"	Ø' - 6"
16" X 12"	Ø' - 9"	1' - 4"	4' - Ø"	2' - Ø"	3' - Ø"	1' - 6"	3' - 1"	Ø' - 8"
16" X 16"	1' - Ø"	1' - Ø"	5' - Ø"	2' - 6"	4' - Ø"	2' - Ø"	3' - Ø"	Ø' - 11"

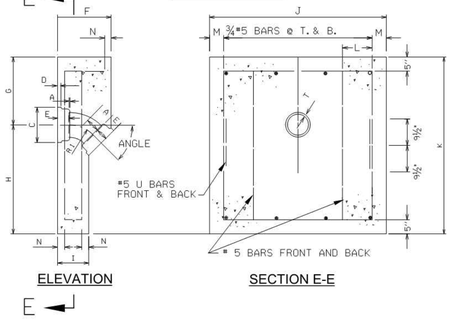
DETAIL OF STANDARD THRUST BLOCKS FOR BENDS



PLAN

SECTION D-D

SCHEDULE OF THRUST BLOCK DIMENSIONS								
BEND SIZE	Q	R	S	T	U	V	W	X
6" - 45	Ø' - 9"	1' - Ø"	2' - Ø"	1' - Ø"	1' - 6"	Ø' - 9"	1' - 11"	1' - 4"
6" - 90	Ø' - 9"	1' - Ø"	3' - Ø"	1' - 6"	2' - Ø"	1' - Ø"	1' - 11"	1' - 2"
8" - 45	Ø' - 9"	1' - Ø"	2' - 4"	1' - 2"	2' - Ø"	1' - Ø"	1' - 11"	1' - 4"
8" - 90	Ø' - 9"	1' - Ø"	3' - 4"	1' - 8"	2' - 6"	1' - 3"	1' - 11"	1' - 2"
12" - 22½	Ø' - 9"	1' - Ø"	2' - 6"	1' - 3"	2' - Ø"	1' - Ø"	2' - Ø"	1' - 4"
12" - 45	Ø' - 9"	1' - 4"	3' - 6"	1' - 9"	2' - 6"	1' - 3"	2' - 4"	1' - 4"
12" - 90	Ø' - 9"	1' - Ø"	5' - 6"	2' - 9"	3' - Ø"	1' - 6"	2' - 4"	1' - 8"
16" - 22½	1' - Ø"	1' - Ø"	3' - 4"	1' - 8"	2' - 6"	1' - 3"	3' - Ø"	1' - 2"
16" - 45	1' - Ø"	1' - Ø"	5' - 4"	2' - Ø"	3' - Ø"	1' - 6"	3' - Ø"	2' - 6"
16" - 90	1' - Ø"	1' - Ø"	6' - Ø"	3' - Ø"	5' - Ø"	2' - 6"	3' - Ø"	2' - Ø"



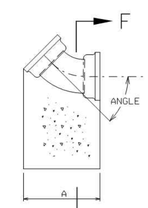
ELEVATION

SECTION E-E

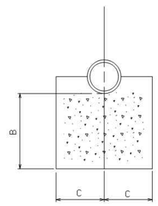
DETAIL OF THRUST BLOCK FOR VERTICAL TOP BEND

SCHEDULE OF THRUST BLOCK DIMENSIONS											DIMENSIONS - INCHES					
BEND SIZE	F	G	H	I	J	K	L	M	N	••	A	C	E	R	D	T
6" - 22½	1' - 7"	1' - 4"	1' - 8"	1' - 4"	2' - 8"	3' - Ø"	Ø	Ø' - 4"	Ø' - 3"	3 @ 8"	5.Ø	10.6	4.Ø	15.Ø6	1.5Ø	Ø.55
6" - 45	1' - 7"	1' - 4"	1' - 8"	1' - Ø"	2' - 8"	3' - Ø"	Ø	Ø' - 4"	Ø' - 3"	3 @ 8"	5.Ø	10.6	4.Ø	Ø7.25	1.5Ø	Ø.55
8" - 22½	1' - 7"	1' - 4"	1' - 8"	1' - 4"	2' - 8"	3' - Ø"	Ø' - 4"	Ø' - 4"	Ø' - 3"	4 @ 8"	5.5	13.Ø	4.Ø	17.62	1.5Ø	Ø.68
8" - 45	1' - 8"	1' - 6"	2' - 6"	1' - Ø"	4' - Ø"	4' - Ø"	Ø' - 6"	Ø' - 6"	Ø' - 3"	4 @ 12"	5.5	13.Ø	4.Ø	Ø8.44	1.5Ø	Ø.68
10" - 22½	1' - 10"	1' - 6"	2' - 6"	1' - 5"	3' - 6"	4' - Ø"	Ø' - 6"	Ø' - 6"	Ø' - 3"	4 @ 10"	6.5	15.3	4.Ø	22.62	1.5Ø	Ø.68
10" - 45	1' - 11"	1' - 8"	2' - 10"	1' - Ø"	4' - Ø"	4' - 6"	Ø' - 8"	Ø' - 8"	Ø' - 3"	4 @ 12"	6.5	15.3	4.Ø	1Ø.88	1.5Ø	Ø.68
12" - 22½	2' - Ø"	1' - 6"	2' - 6"	1' - 7"	4' - Ø"	4' - Ø"	Ø' - 8"	Ø' - 6"	Ø' - 4"	4 @ 12"	7.5	17.6	4.Ø	27.62	1.5Ø	Ø.75
12" - 45	2' - 1"	1' - 6"	3' - Ø"	1' - 2"	5' - Ø"	4' - 6"	Ø' - 11"	Ø' - 9"	Ø' - 3"	4 @ 14"	7.5	17.6	4.Ø	13.25	1.5Ø	Ø.75
16" - 22½	2' - 2"	1' - 8"	2' - 10"	1' - 7"	5' - Ø"	4' - 6"	Ø' - 10"	Ø' - 9"	Ø' - 4"	4 @ 14"	8.Ø	22.2	4.Ø	27.62	1.75	Ø.89

DETAIL OF THRUST BLOCK FOR VERTICAL BOTTOM BEND



ELEVATION



SECTION F-F

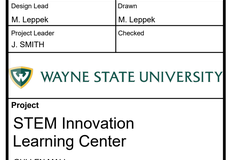
BEND SIZE		A	B	C	BEND SIZE		A	B	C
6" - 22½	°	1' - 8"	1' - Ø"	1' - Ø"	6" - 45	°	1' - 8"	1' - Ø"	1' - Ø"
8" - 22½	°	1' - 9"	1' - Ø"	1' - Ø"	8" - 45	°	1' - 9"	1' - Ø"	1' - Ø"
10" - 22½	°	1' - 11"	1' - Ø"	1' - Ø"	10" - 45	°	1' - 11"	1' - Ø"	1' - Ø"
12" - 22½	°	2' - 2"	1' - Ø"	1' - Ø"	12" - 45	°	**2' - 2"**	1' - Ø"	1' - Ø"
16" - 22½	°	2' - 3"	1' - Ø"	1' - 3"	16" - 45	°	**2' - 3"**	1' - Ø"	1' - 3"

• A.S.A. DIMENSIONS FROM CAST IRON PIPE HANDBOOK
•• NUMBERS AND SPACING FOR * 5 BARS

SITE DETAILS

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants
Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Leader	Checked
J. SMITH	

WAYNE STATE UNIVERSITY

Project
STEM Innovation Learning Center
GULLEN MALL,
DETROIT, MI 48202

Drawing Title
SITE DETAILS

Scale	NO SCALE
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	C402

File Path

GENERAL NOTES

GENERAL NOTES:

1. THE INFORMATION ON THIS SHEET SHALL APPLY TO ALL STRUCTURAL DRAWING SHEETS.
2. INFORMATION ON THIS SHEET SUPPLEMENTS THE PROJECT SPECIFICATIONS, REFER TO THE PROJECT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
3. DRAWINGS HAVE NOT NECESSARILY BEEN ORGANIZED ACCORDING TO TRADES. A FULL SET OF DESIGN DRAWINGS MAY BE REQUIRED FOR AN INDIVIDUAL TRADE TO DETERMINE THE FULL SCOPE OF WORK. REFER TO OTHER DISCIPLINE DRAWINGS FOR OTHER ELEMENTS OF CONCRETE, MASONRY, STEEL AND WOOD CONSTRUCTION.
4. DRAWINGS HAVE BEEN SET UP TO PLOT AS INTENDED WHEN PLOTTED AS FULL SIZE DRAWINGS. USE OF REDUCED SIZE DRAWINGS SHALL BE AT CONTRACTOR'S RISK.
5. COORDINATE WORK OF ALL TRADES. NOTIFY ENGINEER OF ANY VARIANCE BEFORE WORK BEGINS.
6. COORDINATE SIZE AND LOCATION OF ALL ROOF AND/OR SLAB OPENINGS WITH ASSOCIATED TRADES.
7. ALTERATIONS TO A STRUCTURAL ITEM OR MEMBER SHALL ONLY BE MADE AFTER APPROVAL BY THE ENGINEER.
8. DO NOT SCALE DRAWINGS TO OBTAIN DIMENSIONS NOT INDICATED.
9. WHERE SHOP DRAWINGS ARE REQUIRED BY THE SPECIFICATIONS, DESIGN DRAWINGS SHALL NOT BE USED AS SHOP AND/OR ERECTION DRAWINGS.
10. FIELD VERIFY EXISTING CONDITIONS.
11. FOR LIMITS OF DEPRESSED SLABS AND FLOOR SLOPES, SEE ARCHITECTURAL.
12. SEE G0-00 SERIES OF SHEETS FOR REQUIRED FIRE RATINGS AND SPRAY FIREPROOFING REQUIREMENTS.
13. NOT NECESSARILY ALL KEYNOTES ON A DRAWING APPLY TO THAT DRAWING.
14. CONTRACTOR SHALL BE RESPONSIBLE TO DESIGN AND CONSTRUCT CONNECTIONS OF ALL ROOFTOP EQUIPMENT TO SUPPORTING STRUCTURE. WHERE ROOFTOP EQUIPMENT IS MOUNTED ON PRODUCTS SUCH AS CURBS, RAILS OR SIMILAR SYSTEMS, CONTRACTOR SHALL BE RESPONSIBLE TO DESIGN AND CONSTRUCT CONNECTIONS OF THE EQUIPMENT TO THE MOUNTING PRODUCTS AND OF THE MOUNTING PRODUCTS TO THE SUPPORTING STRUCTURE. CONNECTIONS SHALL BE DESIGNED FOR ALL APPLICABLE LOADS IN ACCORDANCE WITH THE BUILDING CODE AND ASCE 7, INCLUDING WIND AND SEISMIC LOADS. DESIGN SHALL BE PERFORMED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE IN WHICH THE PROJECT IS LOCATED IF SO REQUIRED BY THE AUTHORITY HAVING JURISDICTION. COORDINATE THE EXACT LOCATIONS OF SUPPORTING STRUCTURAL MEMBERS WITH THE EQUIPMENT SUPPLIER.

STRUCTURE STABILITY:

1. THIS STRUCTURE, OR PORTIONS THEREOF, HAS BEEN DESIGNED AS A NON SELF-SUPPORTING STRUCTURE RELYING ON THE ROOF, SHEAR WALLS, MOMENT FRAMES AND EXISTING BUILDING FOR LATERAL STABILITY. PROVIDE TEMPORARY BRACING OF ALL STRUCTURAL STEEL AND STUD WALLS TO MAINTAIN SAFETY AND ALIGNMENT UNTIL ALL ROOFS, SHEAR WALLS AND MOMENT FRAMES HAVE BEEN COMPLETED AND INTERCONNECTING ATTACHEMENTS HAVE BEEN MADE.

SOIL AND FOUNDATION NOTES:

1. FOUNDATION DESIGN IS BASED ON THE RECOMMENDATIONS MADE IN THE GEOTECHNICAL REPORT PREPARED BY SME AND DATED AUGUST 29, 2018.
2. FOUNDATION WALLS THAT RETAIN EARTH SHALL BE BRACED AGAINST BACKFILLING PRESSURES UNTIL FLOOR SLABS AT TOP AND BOTTOM ARE IN PLACE.
3. FOOTINGS SHALL BE CARRIED TO SATISFACTORY SOIL BEARING REGARDLESS OF ELEVATIONS NOTED ON THE DRAWINGS.
4. EARTH FORMED FOOTINGS MAY BE USED IN LIEU OF FORMED FOOTINGS AT CONTRACTORS OPTION, IN NO CASE SHALL FOOTING SIZE BE LESS THAN INDICATED FOR FORMED FOOTINGS. FOUNDATION WALLS EXPOSED TO VIEW SHALL BE FORMED.

STEEL NOTES:

1. POSTED BEAM REACTIONS HAVE BEEN DETERMINED FROM AN ALLOWABLE STRESS DESIGN (ASD) ANALYSIS. LOADS ARE UNFACTORED (SERVICE). NO 1/3 STRESS INCREASE IS PERMITTED FOR CONNECTION DESIGN.
2. ABSENT OF WELD LENGTH IN WELD SYMBOLS MEANS WELD FULL LENGTH OF JOINT.
3. ABSENT FILLET WELD SIZE IN WELD SYMBOLS MEANS CHOOSE WELD SIZE BASED ON THICKNESS OF PIECES JOINED PER AISC SPECIFICATIONS.
4. WHERE BOLTED CONNECTIONS ARE LOCATED IN ENCLOSED, BUT UNCONDITIONED SPACES, INCLUDING IN EXTERIOR CANOPIES AND ABOVE VESTIBULES, THE BOLTS, NUTS AND WASHERS SHALL BE HOT-DIP GALVANIZED.

MASONRY NOTES:

1. FOR STEEL BEAMS AND LINTELS BEARING ON MASONRY WALLS, GROUT EACH CELL SOLID UNDER BEAM BEARING DOWN TO FOUNDATION. MINIMUM BEAM BEARING LENGTH IS 8", UNLESS NOTED OTHERWISE.
2. BUILD POCKETS IN MASONRY WALLS FOR BASE PLATES WHERE REQUIRED AND BACK PATCH.
3. UNLESS NOTED OTHERWISE, MINIMUM REINFORCING BAR LAP SPLICE LENGTH IN INCHES SHALL BE AS INDICATED IN THE SCHEDULE ON THIS SHEET.
4. UNLESS NOTED OTHERWISE, HORIZONTAL JOINT REINFORCING SHALL BE LADDER TYPE CONTINUOUS WIRE WITH TWO NO. 9 GAGE SIDE RODS. SPACE HORIZONTAL JOINT REINFORCING AT 16" O.C. MAXIMUM VERTICALLY.

CAST-IN-PLACE CONCRETE NOTES:

1. COORDINATE SIZE, LOCATION AND PLACEMENT OF EMBEDDED ITEMS (PLATES, HARDWARE, PIPE SLEEVES, ETC.) WITH ALL RESPECTIVE TRADES.
2. EMBEDDED ITEMS SHALL BE SECURELY PLACED PRIOR TO PLACING CONCRETE.
3. CORING OR CUTTING CONCRETE SHALL NOT BE PERMITTED UNLESS APPROVED BY ENGINEER.
4. IF DRILLING OR CUTTING INTO HARDENED CONCRETE IS REQUIRED, FIELD LOCATE REINFORCEMENT WITH A REBAR DETECTOR TO AVOID DAMAGING THE REBAR.
5. DO NOT SAW CUT ELEVATED FLOOR SLABS.
6. THE LOCATION OF CONSTRUCTION OR CONTROL JOINTS, OTHER THAN INDICATED ON THE DRAWINGS, SHALL BE APPROVED BY THE ENGINEER PRIOR TO PLACING CONCRETE.
7. CORNER BARS OF THE SAME SIZE AND SPACING AS HORIZONTAL WALL REINFORCING ARE REQUIRED FOR ALL WALLS UNLESS NOTED OTHERWISE.
8. UNLESS NOTED OTHERWISE, PROVIDE CLEAR COVER TO REINFORCING BARS AS SCHEDULED, SEE SCHEDULE THIS SHEET.
9. UNLESS NOTED OTHERWISE, MINIMUM LAP SPLICE LENGTH, IN INCHES, SHALL BE AS SCHEDULED, SEE SCHEDULE THIS SHEET.
10. FOOTINGS AND PIERS ARE CENTERED BENEATH COLUMNS UNLESS NOTED OTHERWISE.
11. BUILD POCKETS IN CONCRETE WALLS FOR STEEL BEAMS AND COLUMN BASE PLATES WHERE REQUIRED. BACK PATCH WITH CONCRETE.
12. UNLESS NOTED OTHERWISE, PROVIDE 3/4" CHAMFERS ON ALL EXPOSED EDGES.
13. UNLESS NOTED OTHERWISE, DOWELS AND BENT BARS TO HAVE STANDARD ACI/CRSI 90 OR 180 DEGREE BEND AS INDICATED.

LEGENDS

CONCRETE LEGEND:

FX	SPREAD FOOTING DESIGNATION, SEE SPREAD FOOTING SCHEDULE.
PX	PIER DESIGNATION, SEE PIER SCHEDULE.
BPX	BASEPLATE DESIGNATION, SEE BASEPLATE SCHEDULE. TAG IS PLACED AT LEVEL CORRESPONDING TO THE BOTTOM OF THE COLUMN.
C.J.	CONSTRUCTION OR CONTROL JOINT, SEE TYPICAL DETAILS.
WSJ	WATERSTOP CONSTRUCTION JOINT, SEE TYPICAL DETAIL.
*	FOOTINGS MARKED THUS " * " REQUIRE INDICATED REINFORCEMENT IN TOP AND BOTTOM OF FOOTING.
S.F.	STEP FOOTING, SEE TYPICAL DETAIL.

METAL DECK LEGEND:

R20 — SPAN DIRECTION FOR 1 1/2"ν 20 GA. WIDE RIB METAL ROOF DECK. FASTEN DECK TO SUPPORTING MEMBERS WITH HILTI X-ENP-19L15 (OR EQUAL) IN 36/4 PATTERN. INSTALL #10 SELF-DRILLING SCREW SIDELAP FASTENERS AT 12" (MAX.) BETWEEN SUPPORTS.

STEEL LEGEND:

WXxXX	BEAM SHAPE
C=XX"	SHOP CAMBER (UPWARD)
[XX]	NUMBER OF SHEAR STUDS REQUIRED (EQUALLY SPACED)
(xxK)	SERVICE LOAD VERTICAL BEAM END REACTION (KIPS) FOR SIMPLE SHEAR CONNECTION DESIGN (6 KIPS, MIN.).
WXxXX	COLUMN SHAPE, TAG IS PLACED ON LEVEL CORRESPONDING TO THE TOP OF THE COLUMN OR HANGER.
	INDICATES A COLUMN THAT STARTS AND ENDS ON THE SAME LEVEL (E.G. HANGER)
XX	BRACED FRAME OR MOMENT FRAME DESIGNATION, SEE FRAME ELEVATIONS.
	RIGID MOMENT CONNECTION, SEE FRAME ELEVATIONS.
	CANTILEVERED RIGID MOMENT CONNECTION, SEE FRAME ELEVATIONS.
LX	LINTEL DESIGNATION, SEE LINTEL SCHEDULE.
	INDICATES A COLUMN THAT BEGINS AT THIS LEVEL AND EXTENDS UPWARDS.
(XXX'-XX")	TOP OF DECK OR SLAB SPOT ELEVATION. SUBTRACT TOTAL DECK OR SLAB THICKNESS TO OBTAIN TOP OF STEEL ELEVATION. UNIFORMLY SLOPE STEEL STRUCTURE BETWEEN VARYING SPOT ELEVATIONS AS INDICATED.
WXxXX (XXX'-XX")	BEAM SHAPE WITH TOP OF STEEL ELEVATION IF DIFFERENT THAN TYPICAL.

ABBREVIATIONS

ALT	ALTERNATE	FS	FAR SIDE	SCH	SCHEDULE
APPROX	APPROXIMATE	HEF	HORIZONTAL EACH FACE	SF	STEP FOOTING
BRG	BEARING	MO	MASONRY OPENING	SYS	SYSTEM
BOD	BOTTOM OF DECK	NOM	NOMINAL	TAN	TANGENT
BOS	BOTTOM OF STEEL	NTS	NOT TO SCALE	T & B	TOP AND BOTTOM
BIT	BITUMINOUS	NS	NEAR SIDE	TOM	TOP OF MASONRY
BOT	BOTTOM	OD	OUTSIDE DIAMETER	TOC	TOP OF CONCRETE
C/L	CENTERLINE	PERP	PERPENDICULAR	TOF	TOP OF FOOTING
CJ	CONSTRUCTION JOINT	PL	PLATE	TOS	TOP OF STEEL
CJ	CONTROL JOINT	PSF	POUNDS PER SQUARE FOOT	TOS	TOP OF SLAB
CONT	CONTINUOUS	PSI	POUNDS PER SQUARE INCH	TOW	TOP OF WALL
COORD	COORDINATE	PROP	PROPOSED	UNO	UNLESS NOTED OTHERWISE
DBL	DOUBLE	R	RADIUS	VEF	VERTICAL EACH FACE
DEMO	DEMOLITION	REF	REFERENCE	VOL	VOLUME
EA	EACH	REINF	REINFORCING	WP	WORK POINT
EX	EXISTING	RCP	REINFORCED CONCRETE PIPE	WTR	WATER
EXP	EXPANSION	ROW	RIGHT OF WAY	WSJ	WATERSTOP JOINT
EXT	EXTERIOR	RD	ROOF DRAIN		

SCHEDULES / DIAGRAMS

CONCRETE REINFORCEMENT COVER REQUIREMENTS

CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH:	3"
CONCRETE EXPOSED TO EARTH OR WEATHER: NO. 5 BAR AND SMALLER:	1 1/2"
NO. 6 BAR AND LARGER:	2"
CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH EARTH:	
SLABS, WALLS, JOISTS: NO. 11 BAR AND SMALLER:	3/4"
NO. 14 BAR AND LARGER:	1 1/2"
BEAMS, COLUMNS: PRIMARY REINFORCEMENT, TIES, STIRRUPS, SPIRALS:	1 1/2"

COMPONENT AND CLADDING WIND LOAD SCHEDULE - NORTH VESTIBULE/CANOPY

EFFECTIVE WIND AREA (SQ. FT.)	WALL: INTERIOR ZONE (PSF)	WALL: EDGE ZONE (PSF)	ROOF: INTERIOR ZONE (PSF)	ROOF: EDGE ZONE (PSF)	ROOF: CORNER ZONE (PSF)
<= 10	+29.2/-31.0	+29.2/-36.5	+16.0/-31.2	+16.0/-47.3	+16.0/-67.5
20	+28.2/-30.1	+28.2/-34.5	+16.0/-30.6	+16.0/-43.1	+16.0/-57.2
50	+27.0/-28.8	+27.0/-32.0	+16.0/-29.8	+16.0/-37.5	+16.0/-43.5
100	+26.0/-27.8	+26.0/-30.1	+16.0/-29.2	+16.0/-33.2	+16.0/-33.2
>= 500	+23.8/-25.6	+23.8/-25.6	+16.0/-29.2	+16.0/-33.2	+16.0/-33.2

NOTES:
1. WIDTH OF CORNER ZONES (EACH DIRECTION) AND EDGE ZONES IS 3'-0". REFER TO ASCE 7-10, FIGURE 30.4-2A
2. POSITIVE PRESSURES ACT TOWARDS THE SURFACE. NEGATIVE PRESSURES ACT AWAY FROM THE SURFACE.
3. LINEAR INTERPOLATE PRESSURES FOR EFFECTIVE WIND AREAS BETWEEN THOSE SCHEDULED OR USE PRESSURES FOR THE SMALLER EFFECTIVE WIND AREA.

COMPONENT AND CLADDING WIND LOAD SCHEDULE - SOUTH VESTIBULE/MECHANICAL CHASE

EFFECTIVE WIND AREA (SQ. FT.)	WALL: INTERIOR ZONE (PSF)	WALL: EDGE ZONE (PSF)	ROOF: INTERIOR ZONE (PSF)	ROOF: EDGE ZONE (PSF)	ROOF: CORNER ZONE (PSF)
<= 10	+33.5/-33.5	+33.5/-61.4	+16.0/-49.0	+16.0/-76.9	+16.0/-104.8
20	+33.5/-33.5	+33.5/-61.4	+16.0/-46.2	+16.0/-73.1	+16.0/-99.9
50	+30.8/-31.7	+30.8/-54.3	+16.0/-42.6	+16.0/-68.0	+16.0/-93.3
100	+28.8/-30.4	+28.8/-49.0	+16.0/-39.9	+16.0/-64.1	+16.0/-88.4
>= 500	+24.2/-27.3	+24.2/-36.6	+16.0/-33.5	+16.0/-55.2	+16.0/-76.9

NOTES:
1. WIDTH OF CORNER ZONES (EACH DIRECTION) AND EDGE ZONES IS 3'-0". REFER TO ASCE 7-10, FIGURE 30.6-1
2. POSITIVE PRESSURES ACT TOWARDS THE SURFACE. NEGATIVE PRESSURES ACT AWAY FROM THE SURFACE.
3. LINEAR INTERPOLATE PRESSURES FOR EFFECTIVE WIND AREAS BETWEEN THOSE SCHEDULED OR USE PRESSURES FOR THE SMALLER EFFECTIVE WIND AREA.

CONCRETE REINFORCEMENT LAP SPLICE SCHEDULE (INCHES)

BAR SIZE	BEAMS & COLUMNS: TOP BARS	BEAMS & COLUMNS: OTHERS	WALLS & SLABS: TOP BARS	WALLS & SLABS: OTHERS
3	43	33	37	29
4	52	41	46	36
5	60	47	54	41
6	67	52	60	47
7	114	88	103	80
8	121	94	112	86
9	128	99	120	93
10	134	104	128	98
11	141	108	134	103

NOTE:
TOP BARS ARE HORIZONTAL BARS SO PLACED THAT MORE THAN 12" OF CONCRETE IS CAST BELOW THE BAR. HORIZONTAL BARS IN WALLS ARE TOP BARS. VERTICAL BARS ARE OTHER BARS.

MASONRY REINFORCEMENT LAP SPLICE SCHEDULE (INCHES)

BAR SIZE	BARS CENTERED	BARS IN (2) LAYERS
3	19	19
4	26	32
5	32	50
6	58	100
7	80	135
8	114	189

NOTES:
1. FOR MASONRY LINTEL REINFORCEMENT LAP SPLICES SHALL BE THAT FOR WALLS WITH BARS IN (2) LAYERS.
2. LAP SPLICE NOT RECOMMENDED FOR LAPS EXCEEDING 64". USE MECHANICAL CONNECTORS.

DESIGN DATA

BUILDING CODE	2015 MICHIGAN BUILDING CODE	
RISK CATEGORY	II	
ALLOWABLE SOIL PRESSURE	1000	PSF
DESIGN STRESSES		
CONCRETE REINFORCING	Fy = 60,000	PSI
WELDED WIRE FABRIC	Fy = 65,000	PSI
STRUCTURAL STEEL		
W-SHAPES	Fy = 50,000	PSI
RECTANGULAR HSS	Fy = 46,000	PSI
ALL OTHERS	Fy = 36,000	PSI
CONCRETE		
FOUNDATION WALLS AND FOOTINGS	f'c = 4,000	PSI
SLABS	f'c = 4,000	PSI
MASONRY	f'm = 2,000	PSI
DESIGN LOADS		
ROOF DEAD LOADS (NORTH VESTIBULE/CANOPY)		
METAL DECK, INSULATION & MEMBRANE	13	PSF
MECHANICAL, ELECTRICAL, PLUMBING	2	PSF
FRAMING	10	PSF
CEILING (1/4" STEEL PLATE)	10	PSF
MISCELLANEOUS	5	PSF
TOTAL =	40	PSF
ROOF DEAD LOADS (SOUTH VESTIBULE/MECHANICAL CHASE)		
METAL DECK, INSULATION & MEMBRANE	5	PSF
MECHANICAL, ELECTRICAL, PLUMBING	5	PSF
FRAMING	5	PSF
MISCELLANEOUS	5	PSF
TOTAL =	20	PSF
LIVE LOADS		
ROOF	20	PSF
REDUCTION	PER	CODE
SNOW LOADS		
GROUND (Pg)	25	PSF
FLAT ROOF (Pf) - NORTH VESTIBULE	22	PSF
FLAT ROOF (Pf) - SOUTH VESTIBULE/MECHANICAL CHASE	22	PSF
EXPOSURE FACTOR (Ce)	0.9	
IMPORTANCE FACTOR (Is)	1.1	
THERMAL FACTOR (Ct)	1.0	
THERMAL FACTOR (Ct) - UNHEATED PORTIONS	1.2	
WIND LOADS		
ULTIMATE DESIGN WIND SPEED (3-SECOND GUST)	115	MPH
NOMINAL DESIGN WIND SPEED	89	MPH
EXPOSURE (ALL DIRECTIONS)	B	
INTERNAL PRESSURE COEFFICIENT	±0.18	
COMPONENTS AND CLADDING	SEE	SCHEDULE
SEISMIC LOADS		
IMPORTANCE FACTOR (Ie)	1.25	
MAPPED SPECTRAL RESPONSE (Ss)	9.6	% g
MAPPED SPECTRAL RESPONSE (S1)	4.7	% g
SITE CLASS	E	
SPECTRAL RESPONSE COEFFICIENT (Sds)	16.0	% g
SPECTRAL RESPONSE COEFFICIENT (Sd1)	11.0	% g
SEISMIC DESIGN CATEGORY	B	
FORCE-RESISTING SYSTEM	STEEL SYSTEMS NOT SPECIFICALLY DETAILED FOR SEISMIC RESISTANCE	
BASE SHEAR (NORTH VESTIBULE)	3	KIPS
BASE SHEAR (SOUTH VESTIBULE AND MECHANICAL SHAFT)		KIPS
SEISMIC RESPONSE COEFFICIENT (Cs)	6.7	%
RESPONSE MODIFICATION FACTOR (R)	3	
ANALYSIS PROCEDURE	EQUIVALENT LATERAL FORCE	

NOTES:

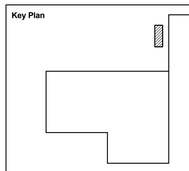
DEAD LOAD OF ROOFTOP MECHANICAL UNITS AND ARCHITECTURAL BULKHEADS ARE IN ADDITION TO THOSE LISTED ABOVE.

DRIFTING AND SLIDING SNOW LOADS ARE IN ADDITION TO THE LOADING ABOVE.

WHEN CONTRACTOR PLANS TO PLACE A CONCENTRATED LOAD ON AN EXISTING SLAB GREATER OR PLACE MULTIPLE CONCENTRATED LOADS (E.G. SCAFFOLDING OR A MULTI WHEELED VEHICLE) ON A SLAB, CONTRACTOR SHALL PROVIDE CALCULATIONS FROM AND SEALED BY AN ENGINEER REGISTERED IN THE STATE IN WHICH THE PROJECT IS LOCATED, DEMONSTRATING THAT THE SLAB WILL SAFELY CARRY THE PLANNED LOADING WITH NO DISTRESS.

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

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Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: K. BARTLETT	Drawn: K. BARTLETT
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

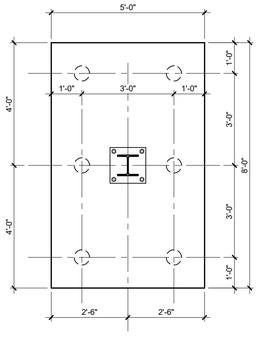
GENERAL NOTES & SCHEDULES

Scale 12" = 1'-0"

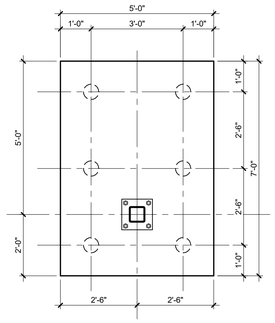
Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

S00-01



PILE CAP 3 PLAN
SCALE: 1/2" = 1'-0"



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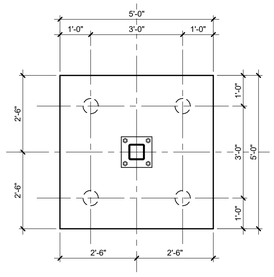
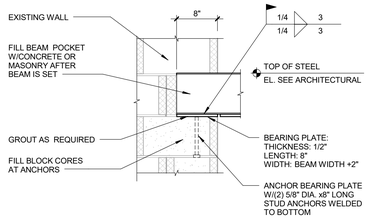
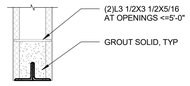
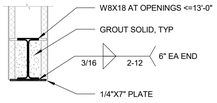


PILE CAP 1 PLAN
SCALE: 1/2" = 1'-0"



BEAM BEARING DETAIL
NO SCALE



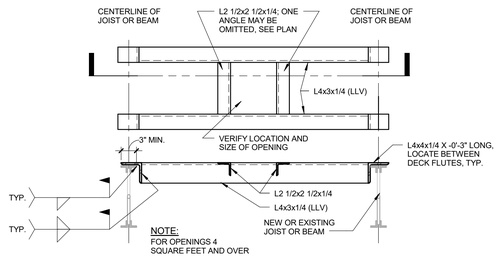


NOTE: BEARING PLATE REQUIRED AT EACH END OF WIDE FLANGE LINTEL, SEE BEAM BEARING DETAIL.

LINTEL NOTES

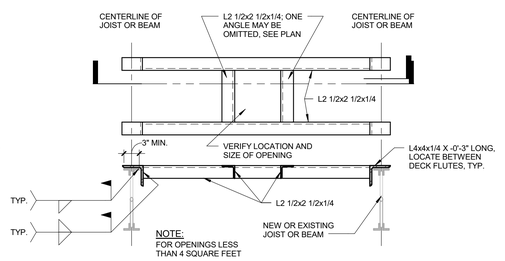
1. SEE ARCHITECTURAL FOR LINTEL SCHEDULE.
2. ALL LINTELS IN EXTERIOR WALLS SHALL BE GALVANIZED.
3. ALL LINTELS SHALL BEAR 8" MINIMUM ON MASONRY U.N.O. GROUT CMU CELLS SOLID BELOW LINTEL BEARING DOWN TO FOUNDATION OR SUPPORTING STRUCTURE.

LINTEL DETAILS
NO SCALE



NOTE:
FOR OPENINGS 4 SQUARE FEET AND OVER

LARGE ROOF OPENING ANGLE FRAME
NO SCALE

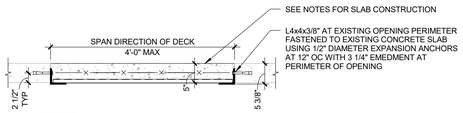


NOTE:
FOR OPENINGS LESS THAN 4 SQUARE FEET

SMALL ROOF OPENING ANGLE FRAME
NO SCALE

COORDINATE ROOF OPENING LOCATIONS AND SIZES WITH OTHER DISCIPLINES. OPENINGS INCLUDE, BUT ARE NOT LIMITED TO:

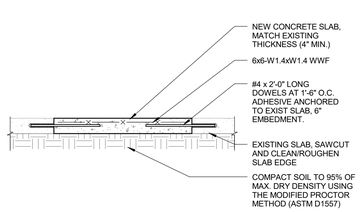
1. P10-03: PRIMARY AND OVERFLOW DRAINS ON SECOND FLOOR.
2. P10-07: PRIMARY AND OVERFLOW DRAIN ON PENTHOUSE ROOF AND SOUTH VESTIBULE MECHANICAL SHAFT ROOF.
3. M10-04: EXHAUST FANS, BOILER INTAKES VENTS AND EXHAUSTS ON SECOND FLOOR.



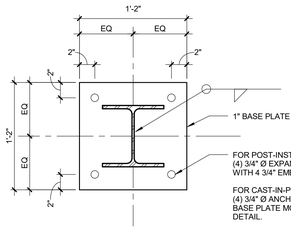
NOTES

1. 3.5" CONCRETE SLAB ON 1.5"x22 GA. COMPOSITE DECK (5" TOTAL SLAB THICKNESS). DECK SPAN DIRECTION OF DECK SHALL BE IN SAME DIRECTION AS SHORTER OPENING DIMENSION. FASTEN DECK EDGES TO HORIZONTAL LEG OF ANGLE WITH ENP-19 L15 DECK FASTENERS AT 12" OC. SHORING OF DECK IS NOT REQUIRED. REINFORCE CONCRETE SLAB WITH 6x6-W2.1xW2.1 WWF.
2. CLOSURE ANGLE / POUR STOP TO PREVENT CONCRETE FROM LEAKING

ELEVATED SLAB INFILL DETAIL
NO SCALE



SLAB ON GRADE INFILL DETAIL
NO SCALE



BASE PLATE - WIDE FLANGE
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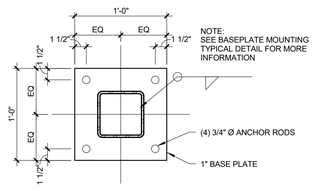
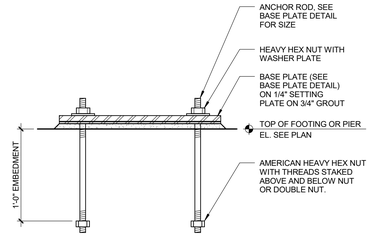
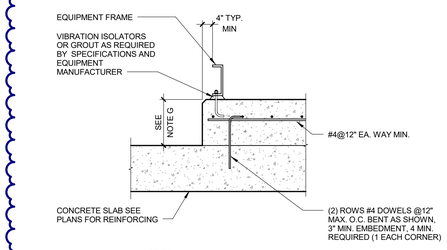


BASE PLATE - HSS
NO SCALE



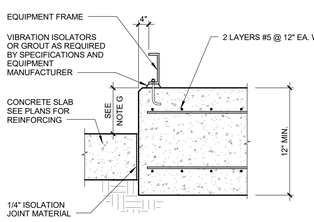
BASE PLATE MOUNTING DETAIL
NO SCALE



NOTES:

A. ANCHOR BOLTS AS SPECIFIED OR SUPPLIED BY EQUIPMENT MANUFACTURER.
B. ALL ANCHOR BOLTS TO BE CAST INTO BASE PAD.
C. COORDINATE ANCHOR BOLT LENGTH WITH PAD THICKNESS.
D. SET EQUIPMENT FRAME ON ANCHOR BOLTS CAST INTO EQUIPMENT PAD.
E. SHIM EQUIPMENT FRAME AND GROUT WITH NON-METALLIC NON-SHRINK GROUT, OR PROVIDE VIBRATION ISOLATORS AS REQUIRED BY THE SPECIFICATIONS AND THE EQUIPMENT MANUFACTURER.
F. USE ADJUSTABLE SLEEVED ANCHOR BOLT WHERE NOTED ON PLANS.
G. COORDINATE PAD HEIGHT WITH EQUIPMENT AND PIPING ELEVATIONS - MIN. 3 1/2"

EQUIPMENT PAD ON CONCRETE SLAB
NO SCALE



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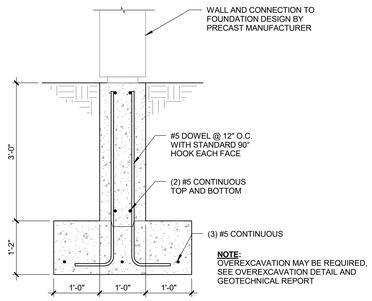
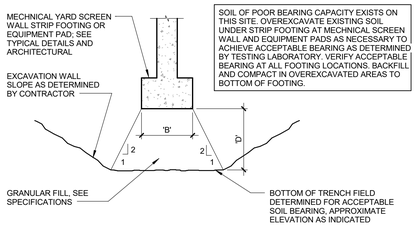
F. USE ADJUSTABLE SLEEVED ANCHOR BOLT WHERE NOTED ON PLANS.
G. COORDINATE PAD HEIGHT WITH EQUIPMENT AND PIPING ELEVATIONS - MIN. 3 1/2"
H. OVEREXCAVATION MAY BE REQUIRED UNDER EQUIPMENT PAD, SEE OVEREXCAVATION DETAIL AND GEOTECHNICAL REPORT FOR MORE INFORMATION.

ISOLATED EQUIPMENT PAD - MECHANICAL SCREEN YARD
NO SCALE



NOTE:
OVEREXCAVATION MAY BE REQUIRED, SEE OVEREXCAVATION DETAIL AND GEOTECHNICAL REPORT

MECHANICAL YARD PRECAST WALL FOUNDATION
NO SCALE

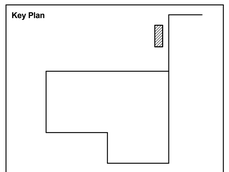


SOIL OF POOR BEARING CAPACITY EXISTS ON THIS SITE. OVEREXCAVATE EXISTING SOIL UNDER STRIP FOOTING AT MECHNICAL SCREEN WALL AND EQUIPMENT PADS AS NECESSARY TO ACHIEVE ACCEPTABLE BEARING AS DETERMINED BY TESTING LABORATORY. VERIFY ACCEPTABLE BEARING AT ALL FOOTING LOCATIONS. BACKFILL AND COMPACT IN OVEREXCAVATED AREAS TO BOTTOM OF FOOTING.

OVEREXCAVATION DETAIL
NO SCALE

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
1/22/2019	ADDENDUM 2	5
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants
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Design Lead	Drawn
Designer	Author
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

Project
STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

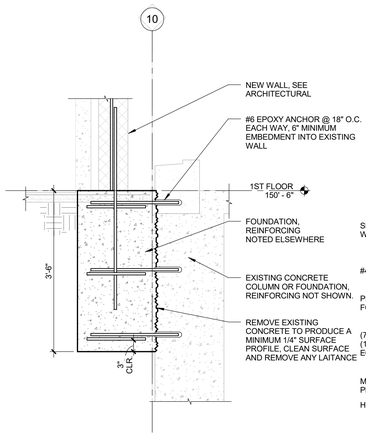
Drawing Title
TYPICAL DETAILS

Scale As indicated

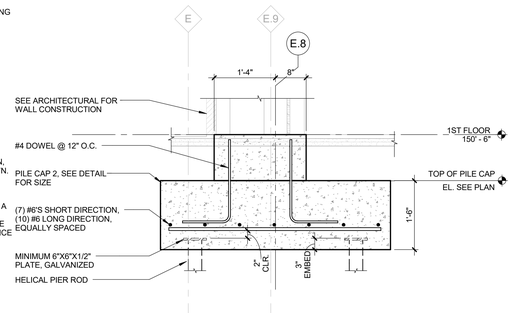
Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
S00-02

12/20/2018 8:10:57 AM



7 SECTION
SCALE: 3/4" = 1'-0"



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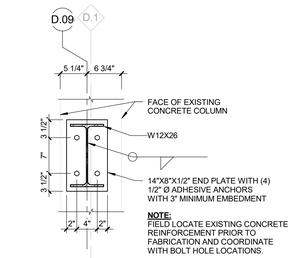

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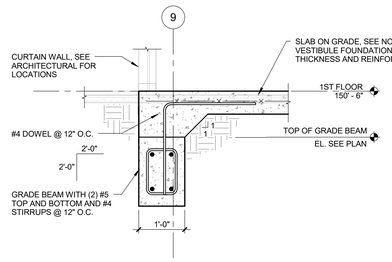

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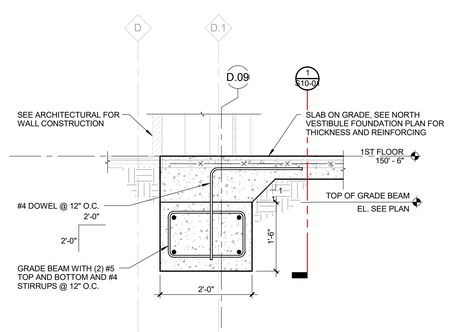

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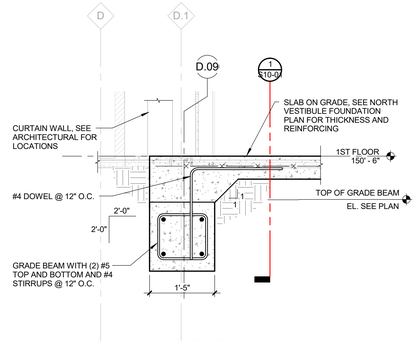

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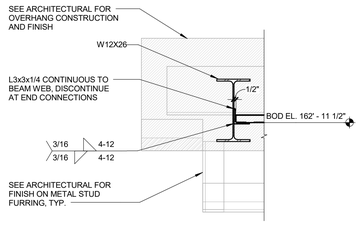

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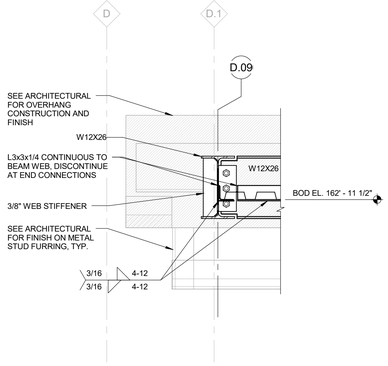

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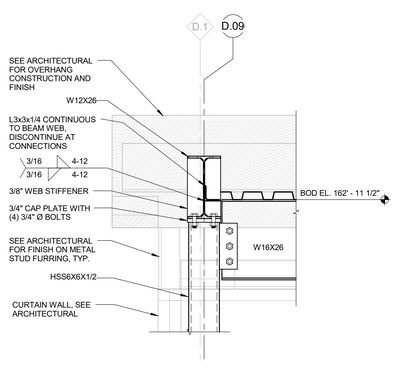

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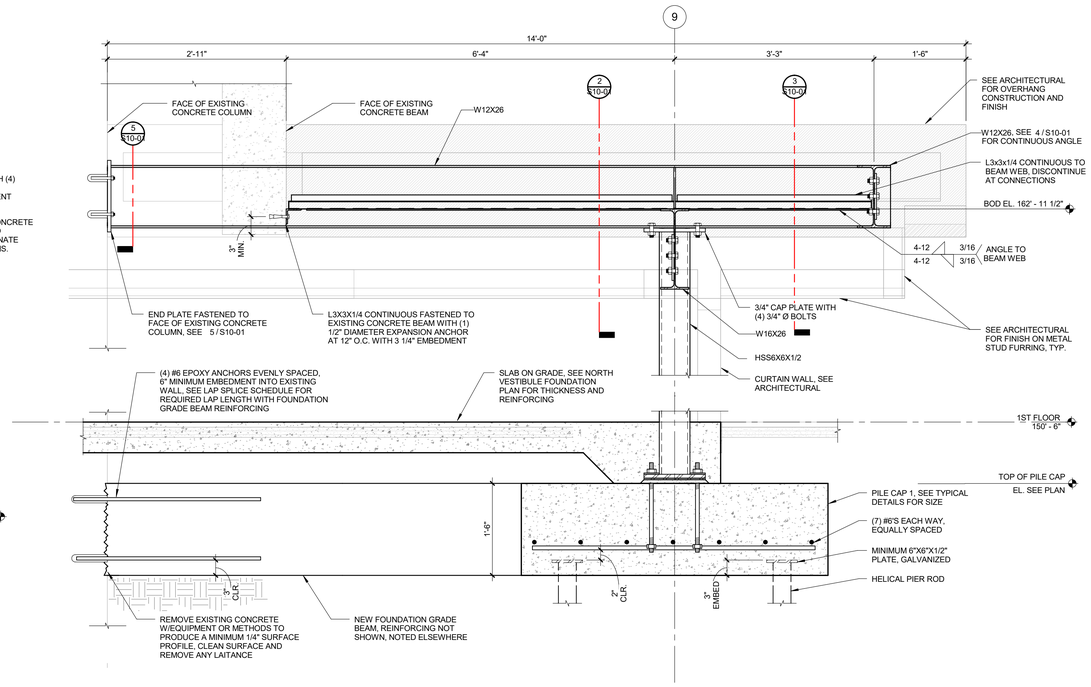

1 SECTION
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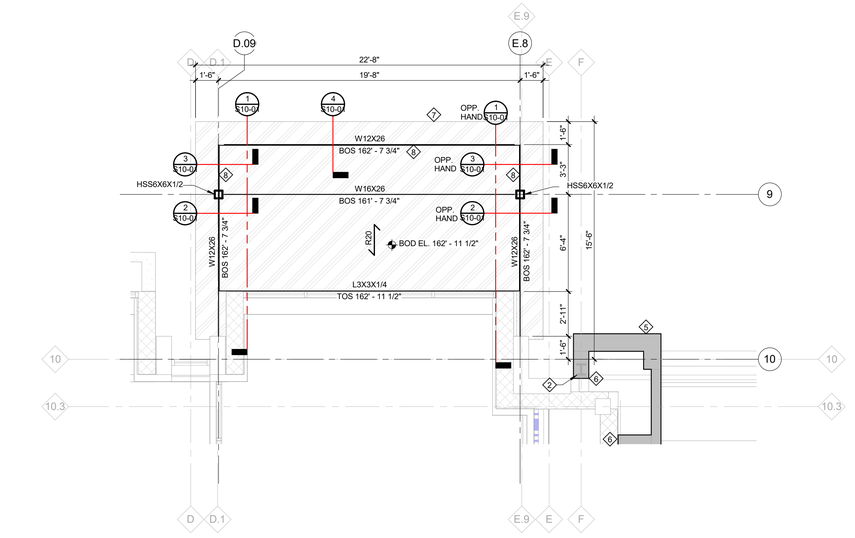
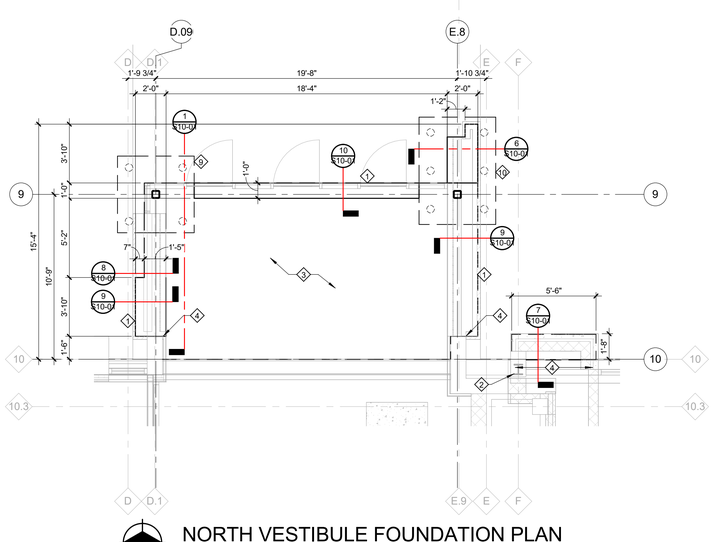


NORTH VESTIBULE FRAMING PLAN
SCALE: 1/4" = 1'-0"

NORTH



NORTH VESTIBULE FOUNDATION PLAN
SCALE: 1/4" = 1'-0"

NORTH

NOTES

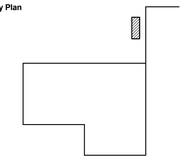
1. ALL FRAMING AND CONNECTIONS SHALL BE HOT-DIPPED GALVANIZED.
2. DESIGN BEAM END CONNECTIONS FOR A 10 KIP VERTICAL REACTION. THIS IS A SERVICE LOAD (ASD-LEVEL). SEE PLAN AND KEYNOTES FOR OTHER CONNECTION DESIGN REQUIREMENTS, INCLUDING HORIZONTAL AND AXIAL CONNECTION DESIGN FORCES.
3. TOP OF GRADE BEAM AND PILE CAPS AT ELEVATION 149'-6".
4. FIELD VERIFY LOCATION OF EXISTING REBAR IN EXISTING CONCRETE MEMBERS USING NON-DESTRUCTIVE MEANS PRIOR TO FABRICATED OF ALL END PLATES AND BASE PLATES REQUIRED FOR CONNECTIONS TO EXISTING STRUCTURE. PROVIDE REQUIRED MODIFICATIONS TO CONNECTION END PLATES OR BASE PLATES TO ENGINEER FOR APPROVAL PRIOR TO FABRICATION.
5. PILE CAPS SHALL BE SUPPORTED BY HELICAL PIERS. THE HELICAL PIERS SHALL BE DESIGNED TO TRANSFER DESIGN LOADS FROM PILE CAP TO THE SOILS. THE FOLLOWING ASSUMPTIONS WERE MADE IN THE PILE CAP DESIGN:
   - PIER LOCATION TOLERANCE = 3"
   - HELIX DIAMETER = 12"
   - HELICAL PIER CAPACITY = 17 KIPS (ULTIMATE)
   - MINIMUM SPACING BETWEEN HELICES = 36"
   - MINIMUM ROD DIAMETER = 2 1/2"

KEY NOTES

1. FOUNDATION GRADE BEAM SPANNING BETWEEN PILE CAPS OR BETWEEN PILE CAP AND EXISTING CONCRETE WALL.
2. EXISTING COLUMN.
3. 6" THICK CONCRETE SLAB ON GRADE WITH 6X6-W1.4XW1.4 WWF ON 10 MIL POLYETHYLENE VAPOR RETARDER ON 2'-6" GRANULAR FILL.
4. ANCHOR FOUNDATION TO EXISTING CONCRETE WALL WITH EPOXY ANCHORS, SEE SECTION.
5. SHADED AREA REPRESENTS FULLY GROUTED CMU WALL WITH #5 VERTICAL IN EACH CELL. SEE ARCHITECTURAL FOR WALL DIMENSIONS AND FINISH.
6. ANCHOR CMU WALL TO EXISTING STRUCTURE WITH #5 EPOXY ANCHORS @ 48" O.C., 3" MINIMUM EMBEDMENT.
7. OUTLINE OF VESTIBULE ROOF OVERHANG, SEE ARCHITECTURAL FOR CONSTRUCTION.
8. L3X3X1/4 CONTINUOUS ATTACHED TO BEAM WEB FOR METAL DECK SUPPORT, SEE SECTION.
9. PILE CAP 1, SEE TYPICAL DETAIL.
10. PILE CAP 2, SEE TYPICAL DETAIL.

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



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Lab Design:	NORR

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Project Leader Approver	Checked Checker

WAYNE STATE UNIVERSITY

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STEM Innovation Learning Center
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DETROIT, MI 48202

Drawing Title
NORTH VESTIBULE PLANS & SECTIONS

Scale	As indicated
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	S10-01

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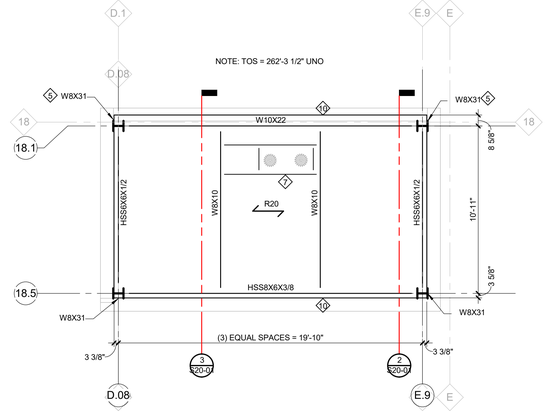
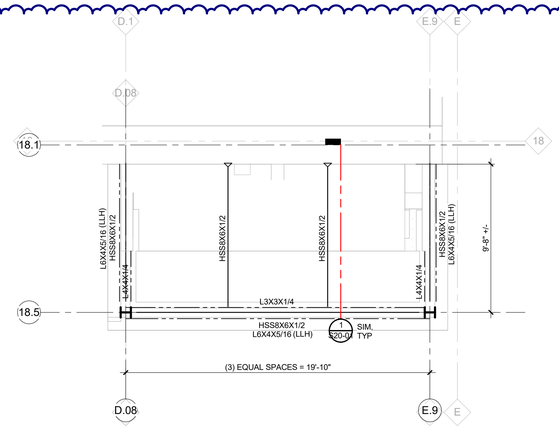


MECHANICAL SHAFT PENTHOUSE ROOF FRAMING PLAN

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

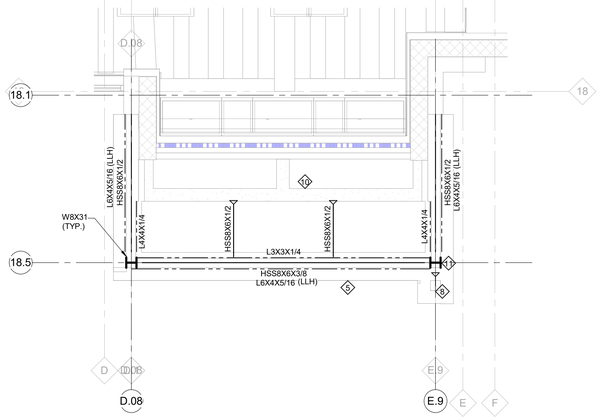
NORTH



MECHANICAL SHAFT ROOF FRAMING PLAN

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

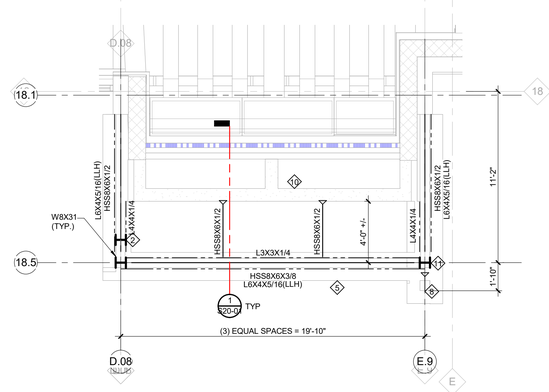
NORTH



TYPICAL MECHANICAL SHAFT FRAMING PLAN AT 3RD - 7TH FLOOR

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

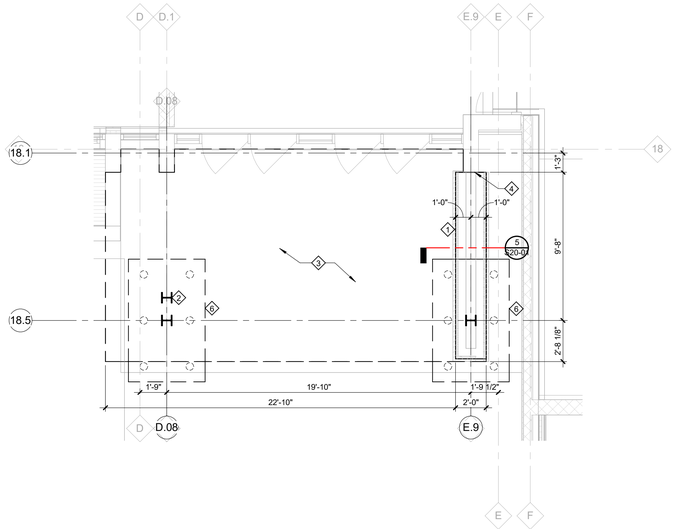
NORTH



MECHANICAL SHAFT FRAMING PLAN AT 2ND FLOOR

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

NORTH



SOUTH VESTIBULE FOUNDATION PLAN

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

NORTH

NOTES

1. BOTTOM 24" OF STRUCTURAL STEEL COLUMNS SHALL BE HOT-DIPPED GALVANIZED.
2. TOP OF GRADE BEAM AND PILE CAPS AT ELEVATION 149'-6".
3. FIELD VERIFY LOCATION OF EXISTING REBAR IN EXISTING CONCRETE MEMBERS USING NON-DESTRUCTIVE MEANS PRIOR TO FABRICATED OF ALL END PLATES AND BASE PLATES REQUIRED FOR CONNECTIONS TO EXISTING STRUCTURE. PROVIDE REQUIRED MODIFICATIONS TO CONNECTION END PLATES OR BASE PLATES TO ENGINEER FOR APPROVAL PRIOR TO FABRICATION.
4. PILE CAPS SHALL BE SUPPORTED BY HELICAL PIERS. THE HELICAL PIERS SHALL BE DESIGNED TO TRANSFER DESIGN LOADS FROM PILE CAP TO THE SOILS. THE FOLLOWING ASSUMPTIONS WERE MADE IN THE PILE CAP DESIGN:
   - PIER LOCATION TOLERANCE = 3"
   - HELIX DIAMETER = 12"
   - HELICAL PIER CAPACITY = 24 KIPS (ULTIMATE)
   - MINIMUM SPACING BETWEEN HELICES = 36"
   - MINIMUM ROD DIAMETER = 2 1/2"
5. SPLICE COLUMNS AS REQUIRED USING BOLTED OR WELDED SPLICE CONNECTION AT COLUMN WEB AND FLANGES THAT ALLOWS FOR COLUMN BEARING TO TRANSFER AXIAL COMPRESSION.

KEY NOTES

1. FOUNDATION GRADE BEAM SPANNING BETWEEN PILE CAPS OR BETWEEN PILE CAP AND EXISTING CONCRETE WALL.
2. ARCHITECTURAL COLUMN, SIZE AND BASEPLATE TO MATCH COLUMN AT D0.8-18.5. SEE ARCHITECTURAL FOR TOP OF COLUMN ELEVATION.
3. 6" THICK CONCRETE SLAB ON GRADE WITH 6X6-W1.4XW1.4 WWF ON 10 MIL POLYETHYLENE VAPOR RETARDER ON 2'-6" GRANULAR FILL.
4. ANCHOR FOUNDATION TO EXISTING CONCRETE WALL WITH EPOXY ANCHORS, SEE SECTION.
5. OUTLINE OF MECHANICAL SHAFT WALL, SEE ARCHITECTURAL FOR CONSTRUCTION.
6. PILE CAP 3, SEE TYPICAL DETAIL.
7. STEEL ANGLE FRAME FROM ROOF DRAIN SUPPORT. SEE TYPICAL DETAILS FOR MORE INFORMATION.
8. HSS 8X6X3/8 BEAM OUTRIGGER WITH 1/2" END CAP AT 2ND, 3RD AND 4TH FLOOR ONLY FOR SUPPORT OF ARCHITECTURAL BUMPOUT SUPPORT. L6X4X5/16 (LLH) FILLET WELDED TO EACH VERTICAL FACE AND END CAP OF HSS OUTRIGGER FOR METAL STUD SUPPORT. BOTTOM OF HORIZONTAL LEG ELEVATION TO MATCH BOTTOM OF OUTRIGGER ELEVATON. SEE ARCHITECTURAL FOR WALL FINISH DIMENSIONS AND DETAILS.
9. 1/4" BENT PLATE
10. EXISTING CONCRETE SUNBEAM.
11. L4X4X1/4 WELDED TO COLUMN FLANGE FOR METAL STUD SUPPORT.BOTTOM OF HORIZONTAL LEG ELEVATIONTO MATCH BOTTOM OF HSS BEAM ELEVATION. SEE ARCHITECTURAL FOR WALL FINISH DIMENSIONS AND DETAILS.

DATE	ISSUED FOR	REV
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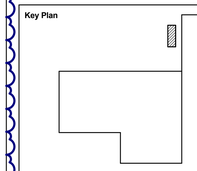
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
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Design Lead: K. BARTLETT	Drawn: K. BARTLETT
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

SOUTH VESTIBULE AND MECHANICAL SHAFT PLANS

Scale	1/4" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	S10-02

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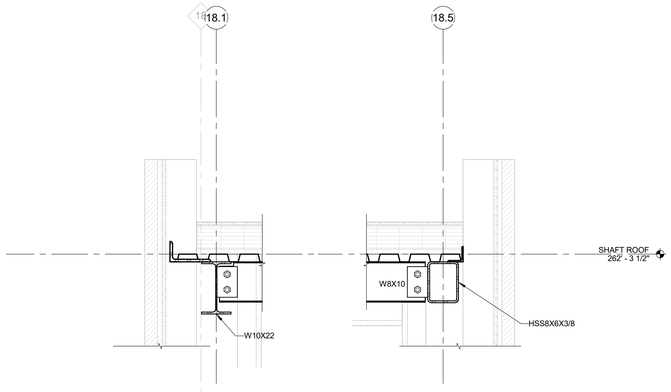

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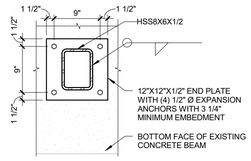

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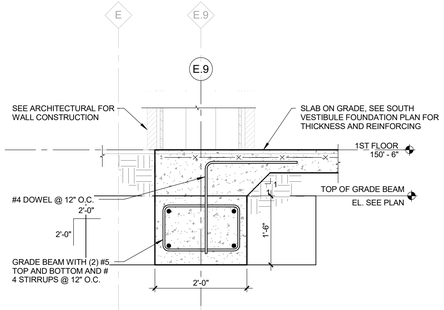

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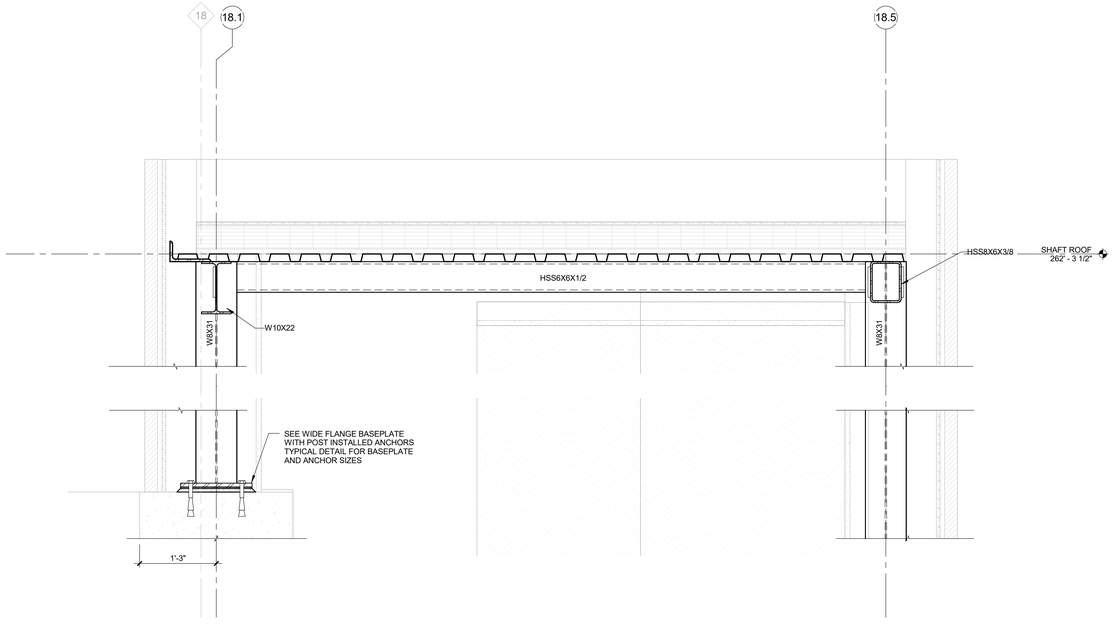

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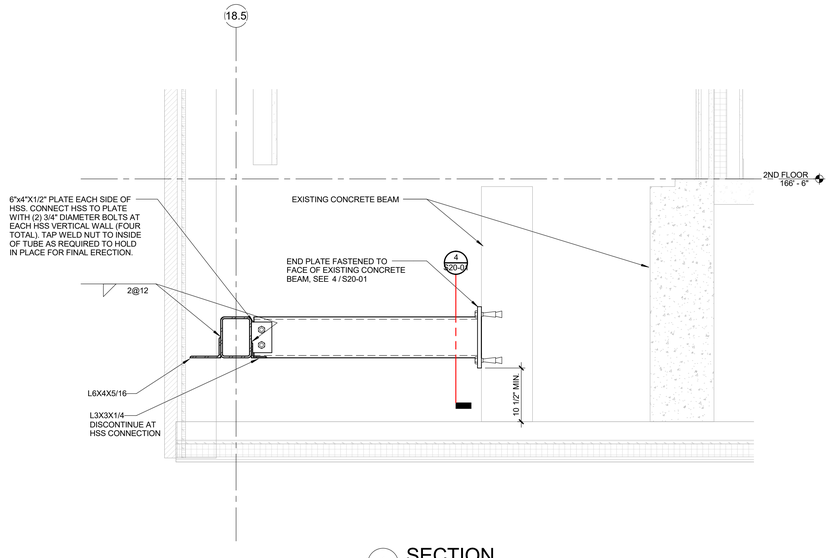

1 SECTION
SCALE: 1" = 1'-0"

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12/21/2018	100% CD PACKAGE	3
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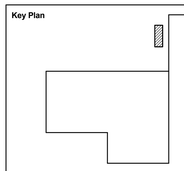

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Design Lead Designer	Drawn Author
Project Leader Approver	Checked Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation
Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

SOUTH VESTIBULE AND
MECHANICAL SHAFT SECTIONS

Scale	As indicated
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	S20-01

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GENERAL NOTES

DEMOLITION NOTES

1. REMOVE ALL PORTIONS OF WORK IDENTIFIED BY CROSS HATCHING UNLESS NOTED OTHERWISE.
2. FIELD DETERMINE EXACT LOCATIONS AND REMOVE PORTIONS OF DUCTWORK, PIPING AND EQUIPMENT SHOWN BY CROSS-HATCHING. SCHEDULE SHUT-DOWNS WITH OWNER. CAP ALL OPEN DUCT AND PIPE ENDS AT END OF WORK DAY. REFER TO OTHER DRAWINGS FOR COORDINATION OF EXTENT OF DEMOLITION WITH NEW WORK.
3. UTILITIES PASSING FROM ONE PHASE TO ANOTHER THAT ARE ACTIVELY SERVING OCCUPIED AREAS SHALL REMAIN IN SERVICE IN THEIR PRESENT POSITION, OR SHALL BE REROUTED AND RECONNECTED TO THE EXTENT NECESSARY TO INSTALL THE NEW WORK OF THE CURRENT CONSTRUCTION PHASE.
4. OPENINGS LEFT BY DEMOLITION IN ROOF, WALLS AND FLOORS SHALL BE PATCHED TEMPORARILY OR PERMANENTLY AS REQUIRED FOR NEW WORK.
5. PROVIDE ISOLATION, DRAIN AND FILLING OF PIPING SYSTEMS AS REQUIRED TO PERFORM THE WORK OF DEMOLITION.
6. REMOVE ALL POWER AND CONTROL WIRING AND DEVICES ASSOCIATED WITH EQUIPMENT BEING REMOVED.

PLUMBING PIPING NOTES

1. THE INSTALLATION OF ALL PIPING SHALL BE CLOSELY COORDINATED WITH NEW SHEET METAL, HVAC PIPING, ELECTRICAL, AND STRUCTURAL CONDITIONS. NOT ALL REQUIRED OFFSETS AND FITTINGS ARE INDICATED, BUT SHALL BE PROVIDED. REFER TO ARCHITECTURAL AND STRUCTURAL PLANS FOR CLEARANCES. THE LOCATION OF SANITARY, STORM AND VENT LINES SHALL TAKE PRECEDENCE OVER HVAC AND FIRE PROTECTION PIPING AND ELECTRICAL CONDUIT AND CABLE TRAY.
2. ALL EXISTING DUCT, PIPING, AND CONDUIT HANGERS THAT ARE IN CONFLICT WITH NEW PIPING SHALL BE RELOCATED.
3. PIPING AND EQUIPMENT SHOWN LIGHTLY IS EXISTING TO REMAIN.
4. AT RENOVATED AREAS THE INDICATED ROUTING OF PIPING SYSTEMS IS INTENDED TO INDICATE REUSE OF AS MUCH OF THE EXISTING SYSTEMS AS POSSIBLE. THE ROUTE SHOWN AND INFORMATION GIVEN IS NOT INTENDED TO REPRESENT EXACTLY WHERE AND HOW TO INSTALL THESE SYSTEMS. IT HAS BEEN DETERMINED THAT ADEQUATE SPACE EXISTS BUT NO ATTEMPT HAS BEEN MADE TO INDICATE THE LOCATION AND IDENTITY EVERY INTERFERENCE, NOR THE RESULTANT REQUIRED RESOLUTION OF INTERFERENCES. ADDITIONAL PIPE, MATERIAL, LABOR AND LAYOUT TIME REQUIRED TO RESOLVE INTERFERENCES AND THEIR REROUTING SHALL BE INCLUDED.
5. PIPE ROUTING INDICATED IS SCHEMATIC IN CONCEPT. FIELD LOCATE EXACT TIE-IN-POINTS TO EXISTING PIPING. FINAL ROUTING SHALL BE COORDINATED WITH SHEET METAL, ELECTRICAL, AND STRUCTURAL SYSTEMS. PROVIDE ALL NECESSARY OFFSETS. COORDINATE TIME OF EXISTING PIPING REROUTING WITH OWNER TO MINIMIZE DOWNTIME.
6. SHUTOFF VALVES SHALL BE PROVIDED ON ALL RUNOUT PIPING SERVING MULTIPLE FIXTURES.
7. SLEEVE AND SEAL EXTERIOR WALL AND ROOF PENETRATIONS TO A WEATHER TIGHT CONDITION. SLEEVE AND SEAL INTERIOR FLOOR PENETRATIONS TO A WATERTIGHT CONDITION.
8. FIRESTOP SHALL BE PROVIDED IN NEW HOLES AND PENETRATIONS IN CORRIDORS AND OTHER RATED WALLS.
9. SAWCUT CONCRETE AS REQUIRED TO INSTALL NEW PIPING. CONCRETE PATCH SHALL BE FINISHED TO RECEIVE NEW SURFACE FINISH AS REQUIRED.
10. OPENINGS IN WALLS AND SLABS SHALL BE CORE DRILLED AS REQUIRED FOR NEW PIPING. LOCATION OF REINFORCING STEEL SHALL BE COORDINATED TO AVOID DAMAGE.
11. WHERE NEW CONNECTIONS TO EXISTING PIPE ARE INDICATED, SYSTEM SERVICE INTERRUPTION IS TO BE MINIMIZED AND COORDINATED WITH OWNER. TIE-IN METHODS TO INCLUDE HOT TAP AS REQUIRED.
12. NEW PIPING SHALL NOT BE ROUTED OVER ELECTRICAL GEAR UNLESS IT MEETS THE CLEARANCE REQUIREMENTS OF THE NEC.
13. VALVE INDICATIONS ARE GENERIC. REFER TO SPECIFICATION FOR ACCEPTABLE VALVE TYPES PER APPLICATION.

FIRE PROTECTION NOTES

1. A FULL COVERAGE AUTOMATIC SPRINKLER AND STANDPIPE SYSTEM SHALL SERVE THE ENTIRE BUILDING AND SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH THE PROVISIONS OF STATE OF MICHIGAN BUILDING CODE LATEST EDITION, STATE OF MICHIGAN FIRE CODE LATEST EDITION, NFPA 13, NFPA 14 AND NFPA 20. THE AREAS SHALL BE DESIGNED FOR HAZARD OCCUPANCY CLASSIFICATION AS INDICATED ON CODE COMPLIANCE DRAWINGS.
2. FLOW TEST INFORMATION TAKEN FROM A FLOW TEST PERFORMED IN JUNE 2018 IS AS FOLLOWS: 44 PSI STATIC,34 PSI RESIDUAL, 1849 GPM FLOWING FROM A 3.75" NOZZLE. HYDRANT FLOWED WAS LOCATED AT THE SOUTHWEST CORNER OF VACATED SECOND STREET (GULLEN MALL) AND MERRICK OF THE 12" MAIN LOCATED IN GULLEN MALL. THE CONTRACTOR SHALL VERIFY THE ABOVE FLOW TEST INFORMATION PRIOR TO SYSTEM DESIGN.
3. CONTRACTOR SHALL PROVIDE A FIRE PUMP AND ASSOCIATED COMPONENTS TO PROVIDE ADEQUATE PRESSURE FOR SYSTEM OPERATION.
4. ALL EQUIPMENT SHALL BE UL LISTED AND FM APPROVED.
5. APPROVED SHOP DRAWINGS SHALL BE REVIEWED BY THE STATE FIRE MARSHAL AND ALLENDALE TOWNSHIP AUTHORITY HAVING JURISDICTION AND THE OWNERS INSURANCE UNDERWRITER.
6. INSPECTOR TEST LOCATIONS SHALL BE AT SERVICE SINKS IN JANITOR CLOSETS OR DISCHARGE TO THE EXTERIOR OF THE BUILDING IN AN APPROVED LOCATION.
7. COORDINATE FIRE PROTECTION SYSTEMS WITH WORK OF ALL OTHER TRADES PRIOR TO ANY FABRICATION OR INSTALLATION TO AVOID CONFLICTS. PROVIDE ALL FITTINGS, OFFSETS AND TRANSITIONS AS REQUIRED FOR A COMPLETE WORKABLE INSTALLATION.
8. PROVIDE CONCRETE PADS AND CURBS AS REQUIRED FOR FIRE PROTECTION EQUIPMENT, COORDINATE EXACT SIZES OF REQUIRED OPENINGS AND SUPPORTS FOR FURNISHED EQUIPMENT.
9. ALL EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS AND APPLICABLE CODES.
10. COORDINATE LOCATIONS OF ALL SPRINKLER HEADS WITH THE ARCHITECTURAL REFLECTED CEILING PLANS AND ELECTRICAL LIGHTING LAYOUT PRIOR TO FABRICATION, SUBMIT LAYOUT DRAWINGS FOR ARCHITECTURAL REVIEW AND ACCEPTANCE. COORDINATE LOCATIONS OF ALL SPRINKLER MAINS, BRANCH PIPING, ETC. WITH ALL OTHER TRADES PRIOR TO INSTALLATION.
11. PIPE SIZES INDICATED ARE ONLY MINIMUMS. CONTRACTOR SHALL BE RESPONSIBLE FOR SYSTEM DESIGN CALCULATIONS AND FINAL PIPE SIZES AND FOR COMPLIANCE WITH ALL STATE AND LOCAL CODES.
12. FIRESTOP SHALL BE PROVIDED IN ALL HOLES AND PENETRATIONS IN CORRIDORS AND OTHER RATED WALLS.
13. PIPE ROUTING AS INDICATED IS SCHEMATIC IN CONCEPT. FINAL ROUTING SHALL BE COORDINATED WITH OTHER TRADES BEFORE PROCEEDING. DUCTWORK AND STORM, SANITARY AND VENT PIPING LOCATIONS SHALL TAKE PRECEDENCE OVER FIRE PROTECTION PIPING.
14. ADEQUATE ACCESS TO VALVES AND SPRINKLER HEADS SHALL BE PROVIDED. REQUIREMENTS SHALL BE COORDINATED.
15. ALL WORK NECESSARY TO ENSURE THAT NO PIPING OR SPRINKLER HEADS WILL FREEZE SHALL BE PROVIDED. DRY PENDENT TYPE HEADS, WARM AIR VENTILATION PATHWAYS OR OTHER APPROVED MEANS SHALL BE USED TO ACHIEVE A FREEZE PROOF INSTALLATION.
16. PROVIDE PRESSURE REGULATING HOSE VALVES AS REQUIRED AT STANDPIPES.
17. PRELIMINARY FIRE PUMP FP-1 SIZING CALCULATIONS, BASED ON STANDPIPE DEMAND OF 750 GPM AND 100 PSI AT TOP OF STANDPIPE, INDICATE REQUIREMENTS FOR A 60 HP PUMP TO PROVIDE A 100 PSI BOOST AT 750 GPM FLOW AND A 1.5 HP JOCKEY PUMP. CONTRACTOR SHALL VERIFY AND PROVIDE FINAL PUMP SIZE REQUIREMENTS.
18. PROVIDE QUICK RESPONSE SPRINKLER HEADS AS ALLOWED BY NFPA 13 UNLESS NOTED OTHERWISE.
19. FLEXIBLE SPINKLER CONNECTIONS ARE NOT ALLOWED.
20. PROVIDE FIRE SUPPRESSION WITHIN EACH ELEVATOR HOISTWAY. PROVIDE ISOLATION VALVE OUTSIDE ELEVATORS AT EACH LEVEL.

LEGEND

PIPE/FITTING SYMBOLS

- EXISTING PIPE
- EXISTING PIPE TO BE REMOVED
- NEW PIPE
- ELBOW UP
- ELBOW DOWN
- TEE UP
- TEE DOWN
- UNION
- CAP

PIPING DESIGNATION

- CHWS — PIPE CONTENTS SEE ABBREVIATIONS

GENERAL DESIGNATION

- NOTE SYMBOL (REFER TO SHEET NOTES)
- NEW TO EXISTING CONNECTION

VALVE SYMBOLS

- GENERIC VALVE (REFER TO SPEC FOR TYPE)
- BALL VALVE
- GLOBE VALVE
- BUTTERFLY VALVE
- PLUG VALVE
- GAS COCK
- SWING CHECK VALVE
- PRESSURE REDUCING VALVE
- PRESSURE RELIEF VALVE
- 2-WAY VALVE
- 3-WAY VALVE
- BACKFLOW PREVENTER
- CIRCUIT SETTER

MISC. PIPING SYMBOLS

- PUMP (LIQUID)
- PUMP (AIR)
- STRAINER
- EXPANSION JOINT & PIPE GUIDE
- FLEX CONNECTION
- STEAM TRAP
- PIPE ANCHOR
- PIPE GUIDE
- MANUAL AIR VENT (MV)
- AUTOMATIC AIR VENT (AV)
- VACUUM BREAKER (VB)
- CO — CLEANOUT LOCATED IN FLOOR
- CO — CLEANOUT LOCATED IN WALL, PIPE COMING UP FROM BELOW.
- CO — HORIZONTAL CLEANOUT (LOCATED BELOW FLOOR AND ABOVE CEILING OF FLOOR BELOW)
- F.I. FLOW INDICATOR
- P PRESSURE GAGE
- PRESSURE TAP WITH NEEDLE VALVE
- T THERMOMETER
- THERMOWELL
- WATER HAMMER ARRESTER WITH P.D.I. DESIGNATION

CONTROLS

- TS — TAMPER SWITCH
- FS — FLOW SWITCH

GENERAL ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR	MC	MECHANICAL CONTRACTOR
AP	ACCESS PANEL	NIC	NOT IN CONTRACT
CI	CAST IRON	RC	RAIN CONDUCTOR
EC	ELECTRICAL CONTRACTOR	RD	ROOF DRAIN
ES	EMERGENCY SHOWER	S	SINK
EW	EYEWASH	SS	STAINLESS STEEL
EWC	ELECTRIC WATER COOLER	VTR	VENT THRU ROOF
FD	FLOOR DRAIN	WC	WATER CLOSET
FS	FLOOR SINK	W.C.	WATER COLUMN
GC	GENERAL CONTRACTOR	WH	WALL HYDRANT
HB	HOSE BIBB	WS	WASTE STACK
IE	INVERT ELEVATION	YH	YARD HYDRANT
LAV	LAVATORY		

PIPE CONTENTS ABBREVIATIONS

AV	ACID VENT
AW	ACID WASTE
CA	COMPRESSED AIR
CW	COLD WATER
COND	CONDENSATE
DWS	DEIONIZED WATER SUPPLY
DWR	DEIONIZED WATER RETURN
FP	FIRE PROTECTION WATER SUPPLY
G	GAS SUPPLY
HW	HOT WATER
HWR	HOT WATER RETURN
N2	NITROGEN
NO	NITRIC OXIDE
NPCW	NON-POTABLE COLD WATER
NPHW	NON-POTABLE HOT WATER
ROR	REVERSE OSMOSIS WATER RETURN
ROS	REVERSE OSMOSIS WATER SUPPLY
SAN	SANITARY
SCW	SOFT COLD WATER
STM	STORM SEWER
TW	TEMPERED WATER
V	SANITARY VENT
VAC	VACUUM

1 — NUMBER OF THE DETAIL/SECTION

DETAIL OR SECTION
SCALE: SCALE OF DETAIL/SECTION

DATE	ISSUED FOR	REV
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12/21/2018	100% CD PACKAGE	3
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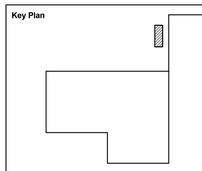
Key Plan



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5048 GULLEN MALL
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Drawing Title

GENERAL NOTES AND LEGEND

Scale 12" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

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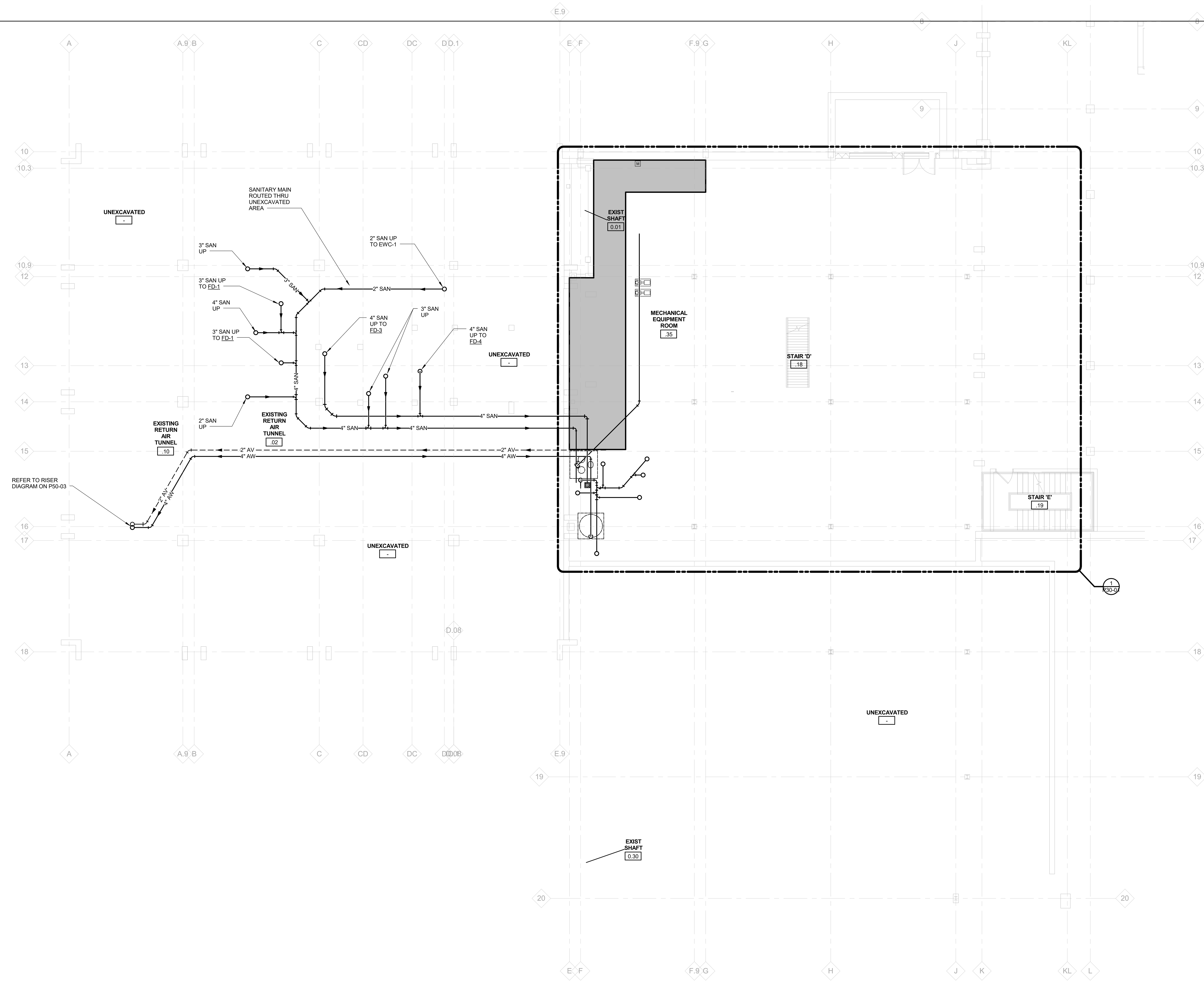

SUB BASEMENT SANITARY & STORM FLOOR PLAN

SCALE: 1/8" = 1'-0"

NORTH

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Design Lead: B. HALL	Drawn: B. HALL
Project Leader: Approver	Checked: Checker

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DETROIT, MI 48202

Drawing Title
SUB-BASEMENT SANITARY & STORM PLAN

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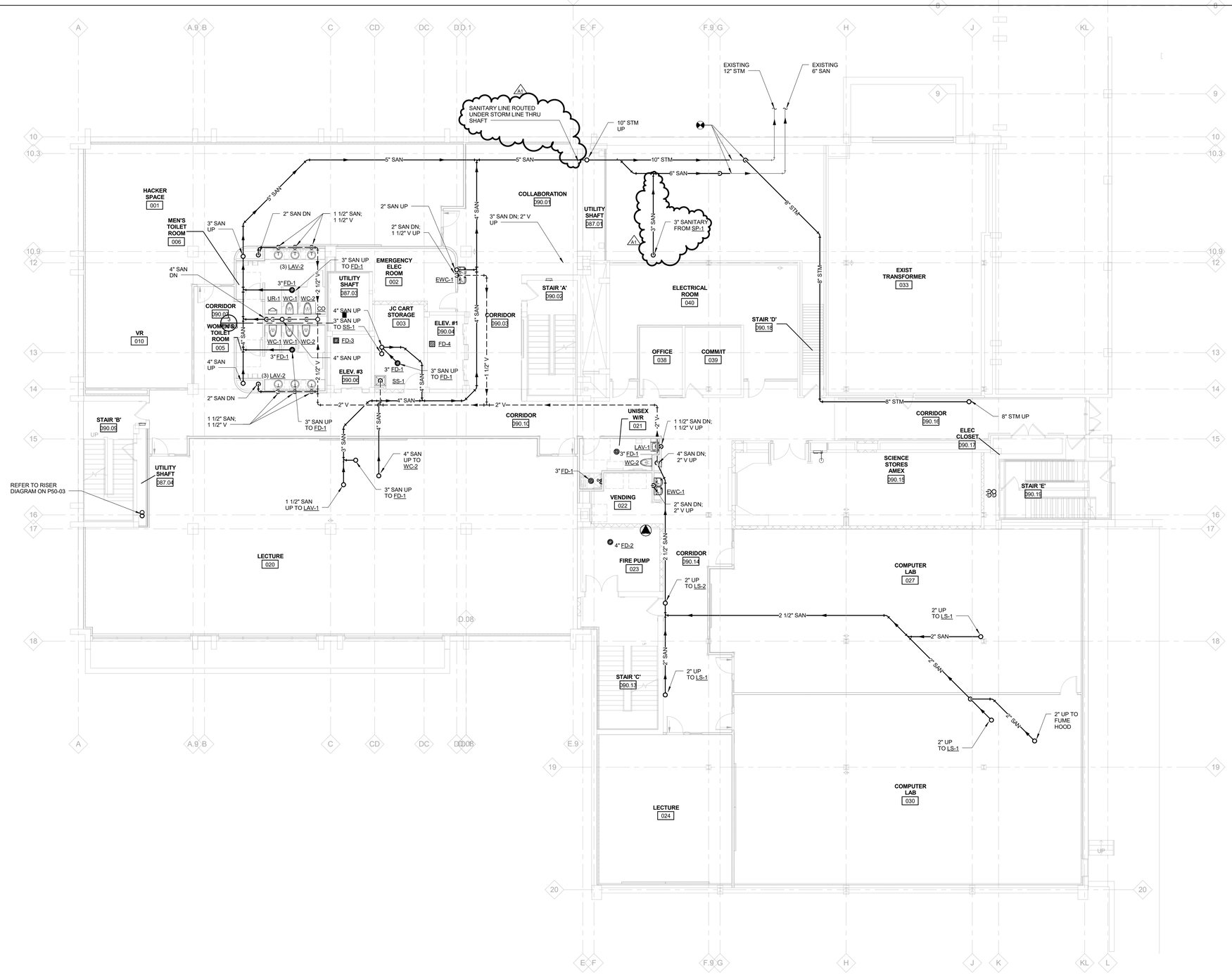
Drawing No.: P10-01



BASEMENT SANITARY & STORM FLOOR PLAN

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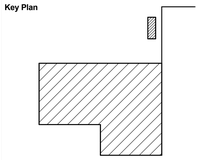

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Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

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Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: B. HALL	Drawn: B. HALL
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

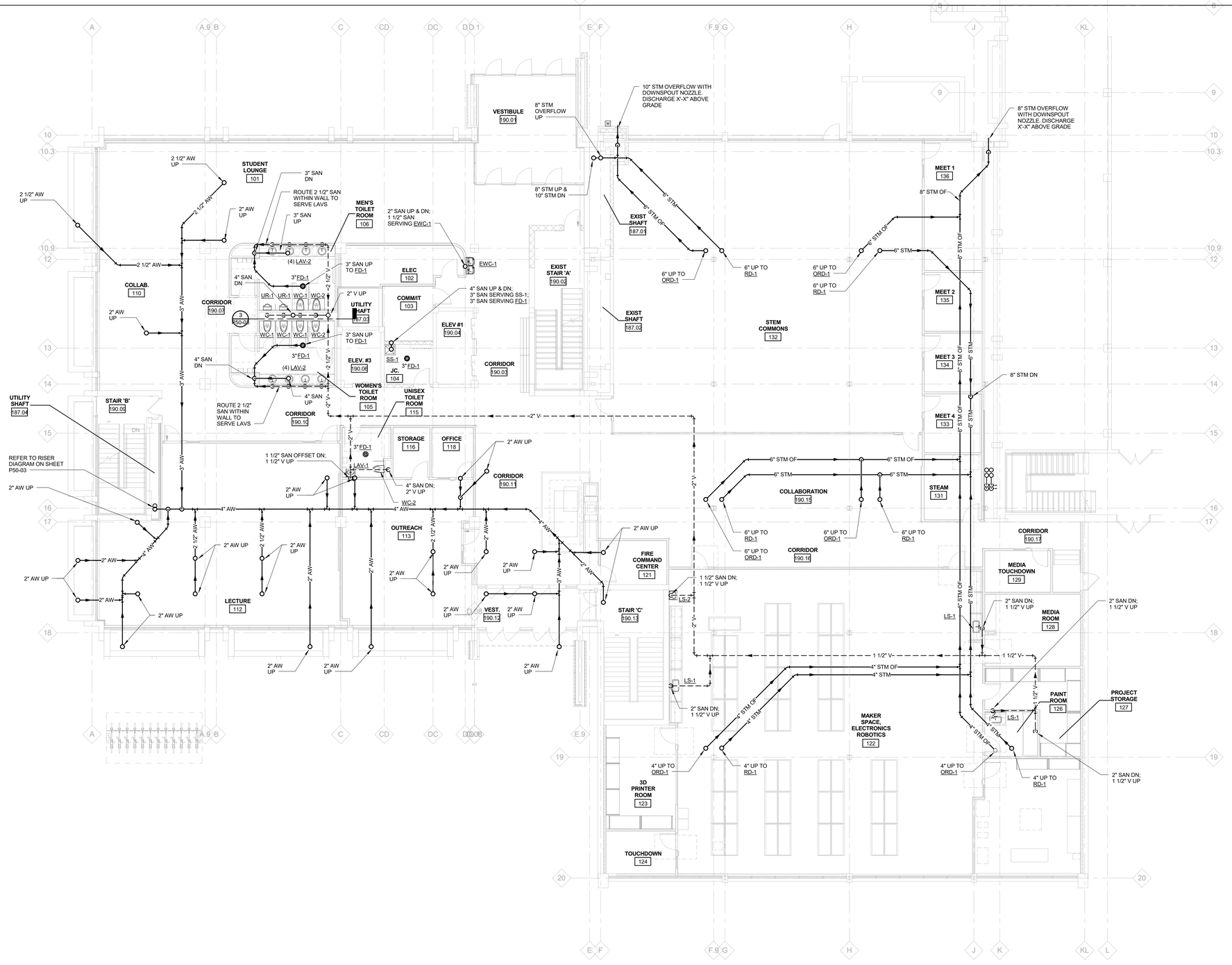
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

BASEMENT SANITARY & STORM PLAN

Scale	1/8" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	P10-02

12/20/2018 2:57:27 PM



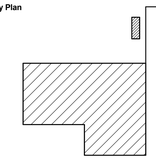
FIRST FLOOR SANITARY & STORM FLOOR PLAN

SCALE: 1/8" = 1'-0"

NORTH

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: B. HALL	Drawn: B. HALL
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

FIRST FLOOR SANITARY & STORM PLAN

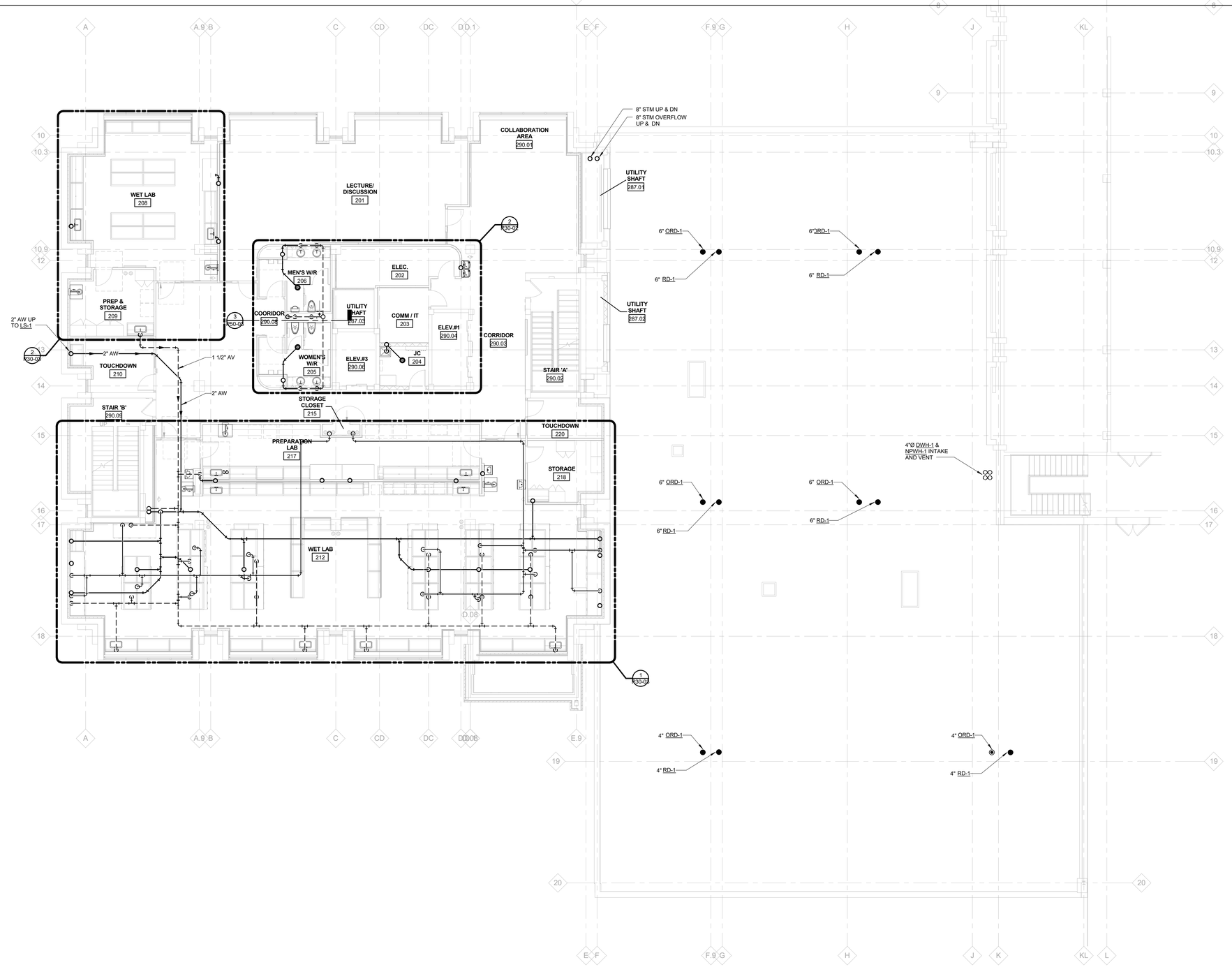
Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

P10-03

C:\Work\Revit2016_P_180050_cstalker.rvt



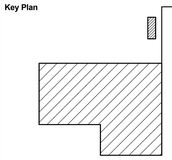
SECOND FLOOR SANITARY & STORM PLAN

SCALE: 1/8" = 1'-0"

NORTH

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Manager	BIM Lead
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Design Lead	Drawn
B. HALL	B. HALL
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

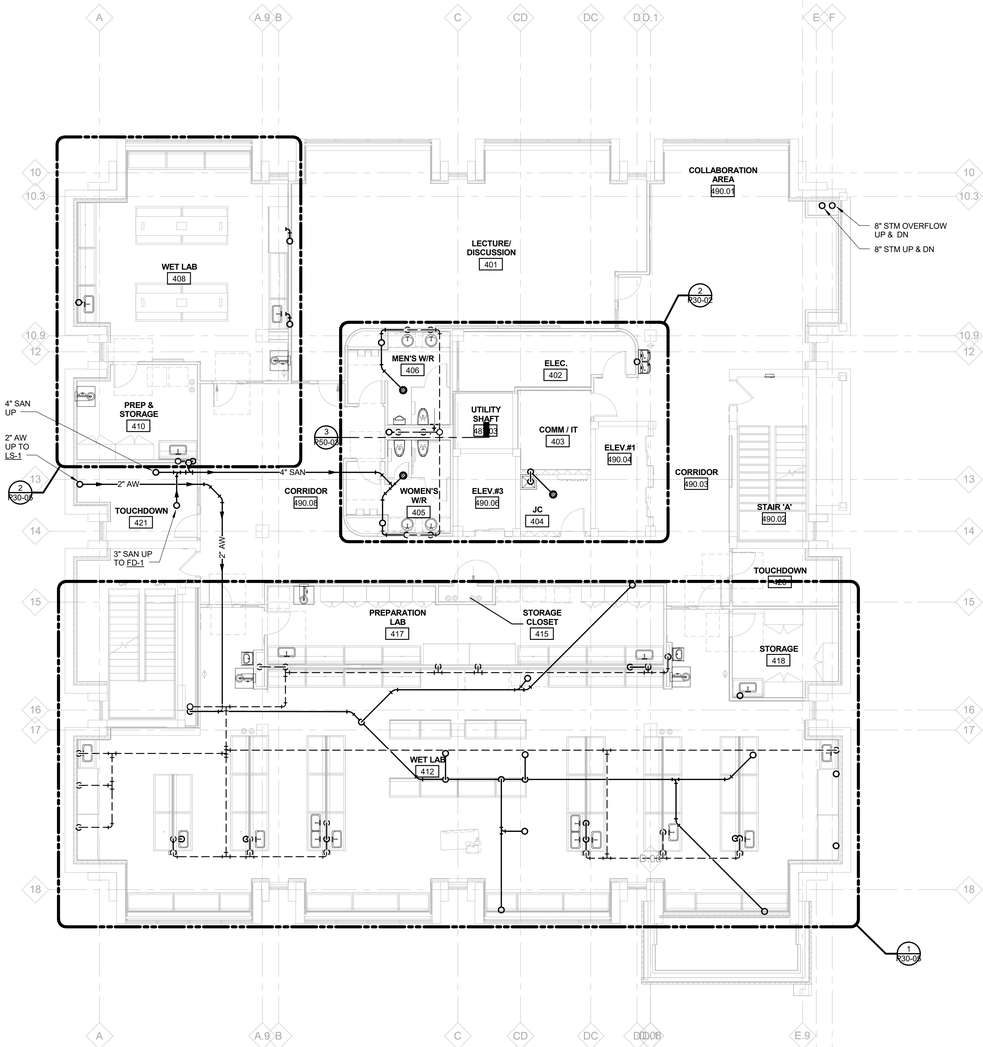
SECOND FLOOR SANITARY & STORM PLAN

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

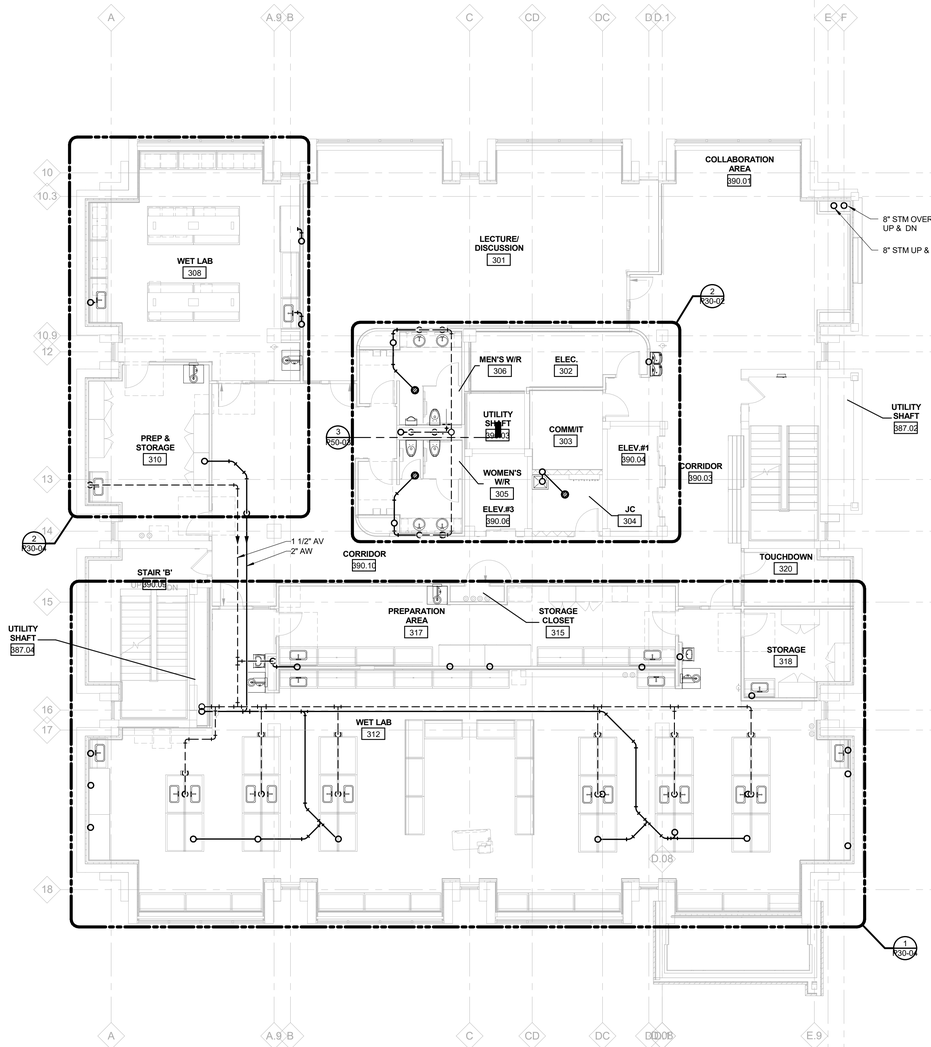
P10-04



FOURTH FLOOR SANITARY & STORM PLAN

SCALE: 1/8" = 1'-0"

NORTH



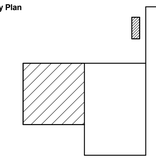
THIRD FLOOR SANITARY & STORM PLAN

SCALE: 1/8" = 1'-0"

NORTH

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

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Project Manager J. SMITH	BIM Lead C. BAKER
Design Lead B. HALL	Drawn B. HALL
Project Leader Approver	Checked Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

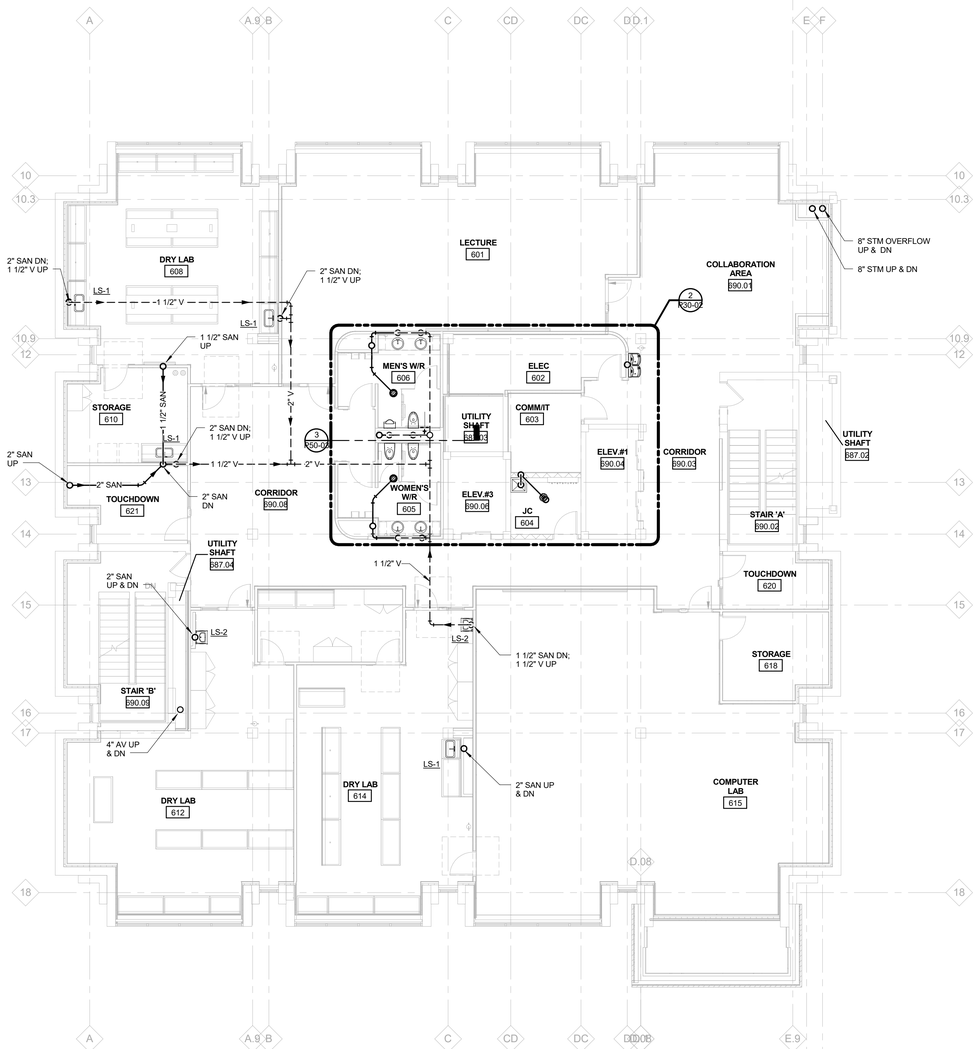
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

THIRD AND FOURTH FLOOR SANITARY & STORM PLANS

Scale	1/8" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	P10-05

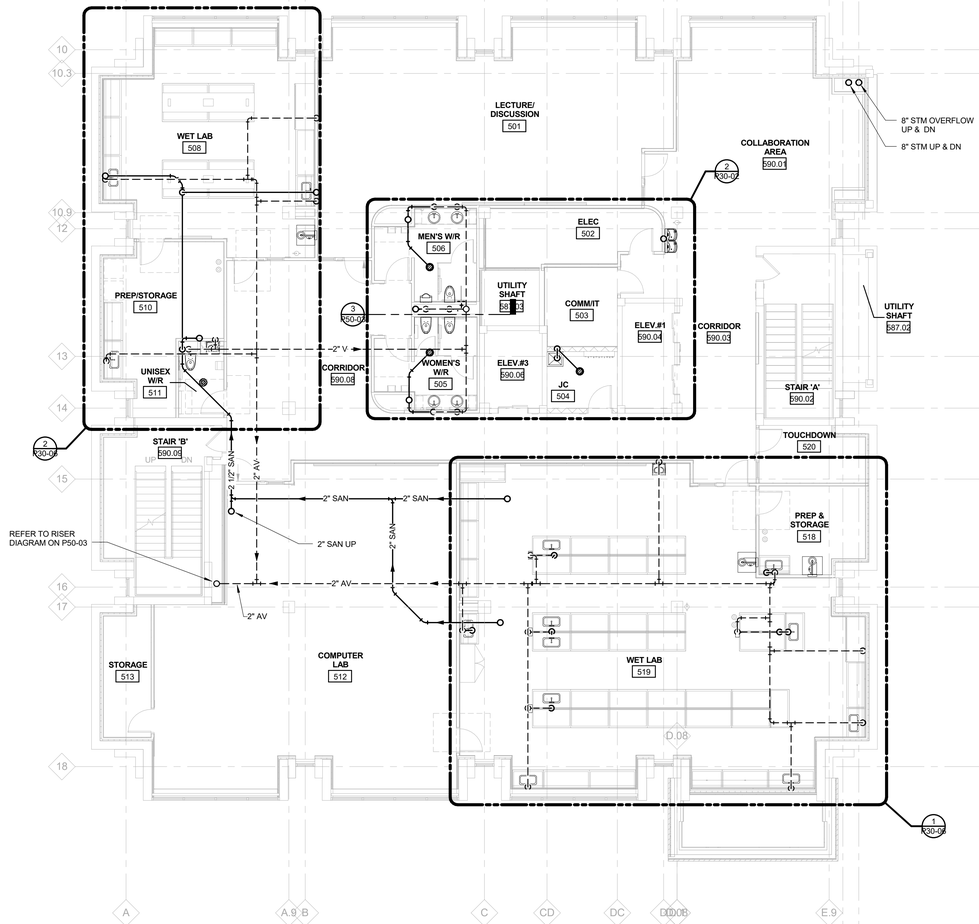
12/20/2018 2:57:53 PM



SIXTH FLOOR SANITARY & STORM PLAN

SCALE: 1/8" = 1'-0"

NORTH



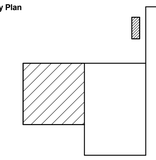
FIFTH FLOOR SANITARY & STORM PLAN

SCALE: 1/8" = 1'-0"

NORTH

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Manager	BIM Lead
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Design Lead	Drawn
B. HALL	B. HALL
Project Leader	Checked
Approver	Checker

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Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

FIFTH AND SIXTH FLOOR SANITARY & STORM PLANS

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

P10-06

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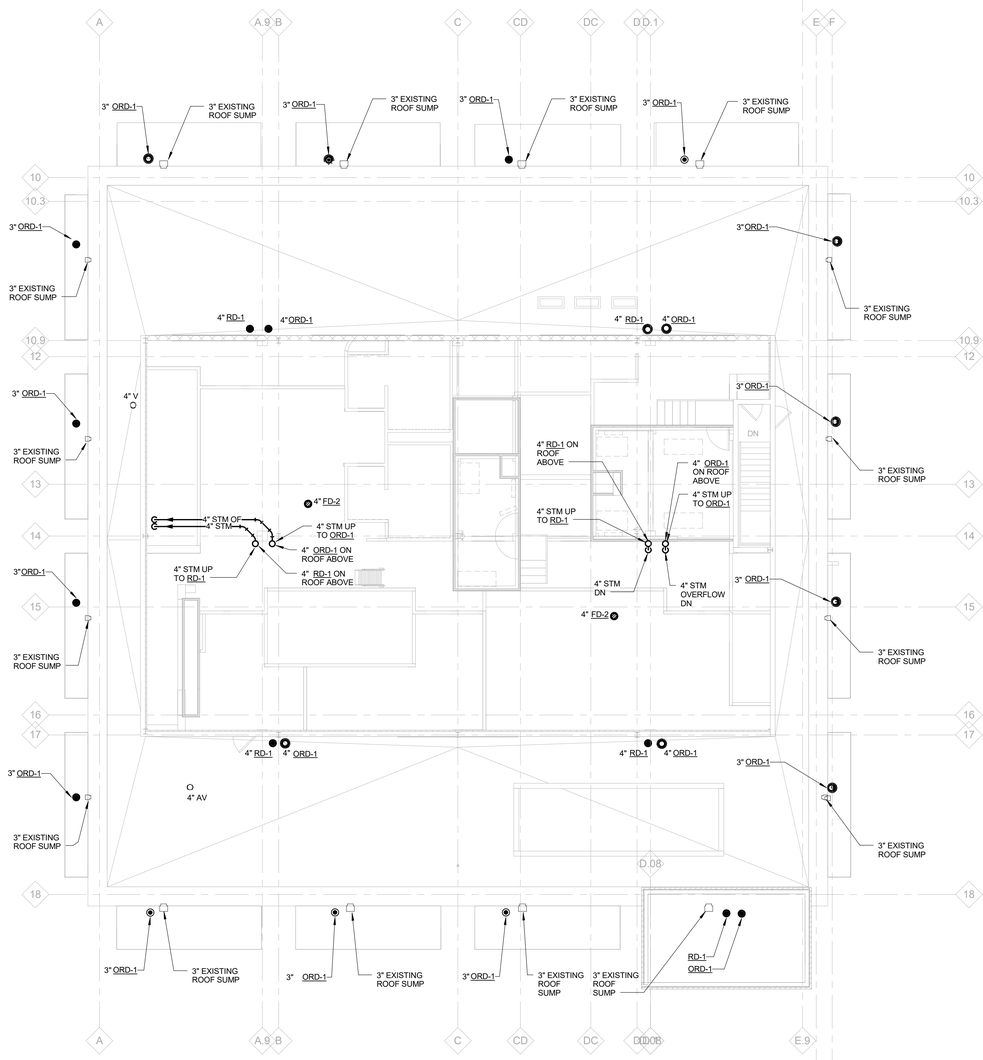
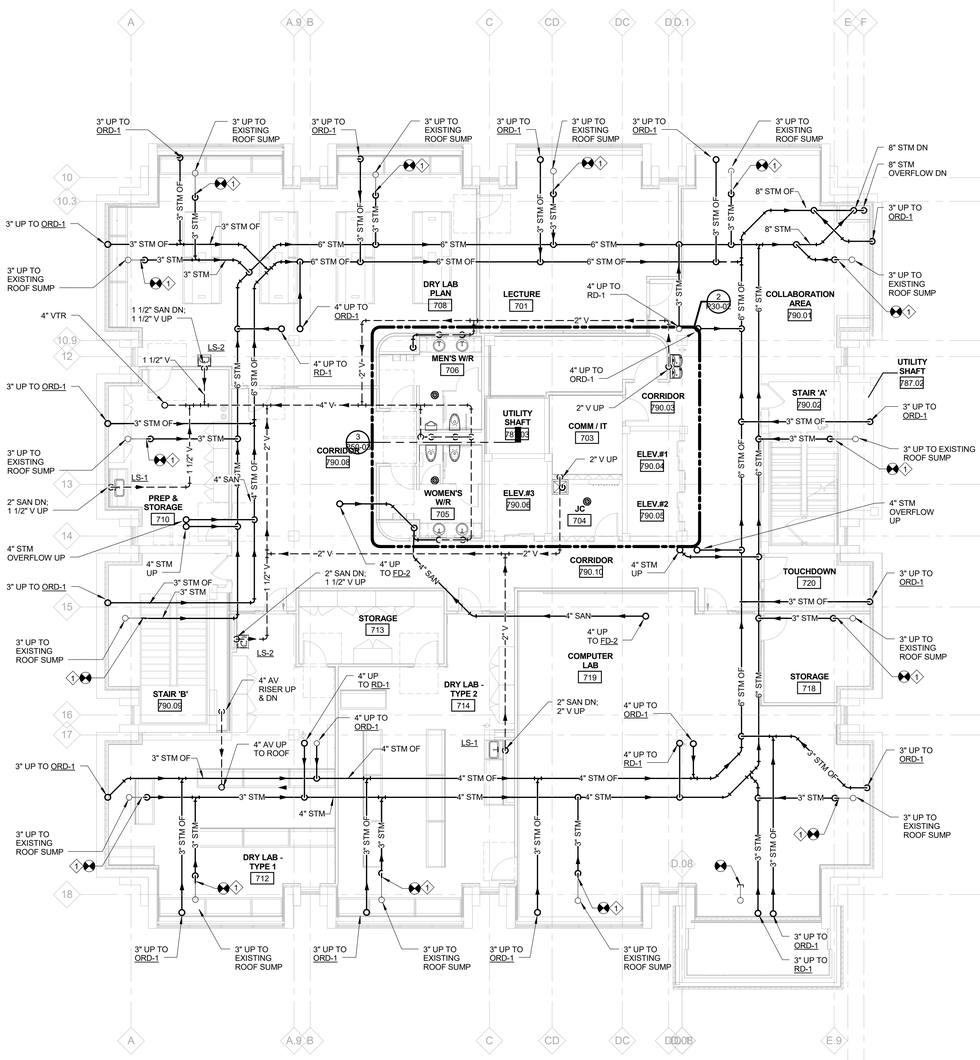


PENTHOUSE SANITARY & STORM PLAN

SCALE: 1/8" = 1'-0"

NORTH



SEVENTH FLOOR SANITARY & STORM PLAN

SCALE: 1/8" = 1'-0"

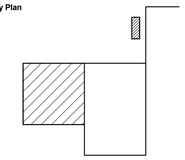
NORTH

KEY NOTES

1. CONNECT TO EXISTING 3" STM PIPE.

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

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www.ftch.com

Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: B. HALL	Drawn: B. HALL
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

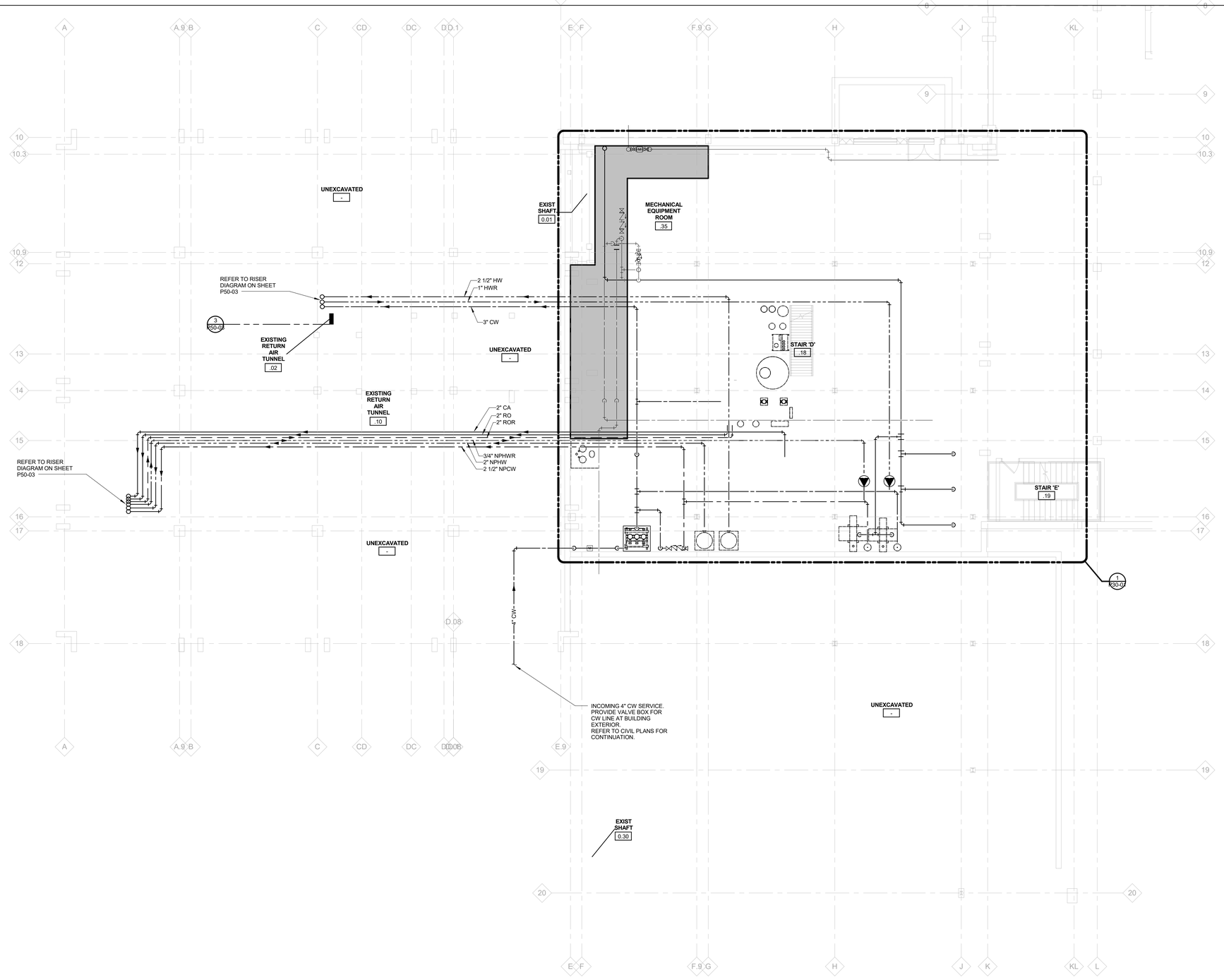
SEVENTH AND PENTHOUSE SANITARY & STORM PLANS

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

P10-07



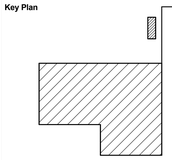
SUB BASEMENT SUPPLY PIPING PLAN

SCALE: 1/8" = 1'-0"

NORTH

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Manager	BIM Lead
J. SMITH	C. BAKER
Design Lead	Drawn
B. HALL	B. HALL
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

Project

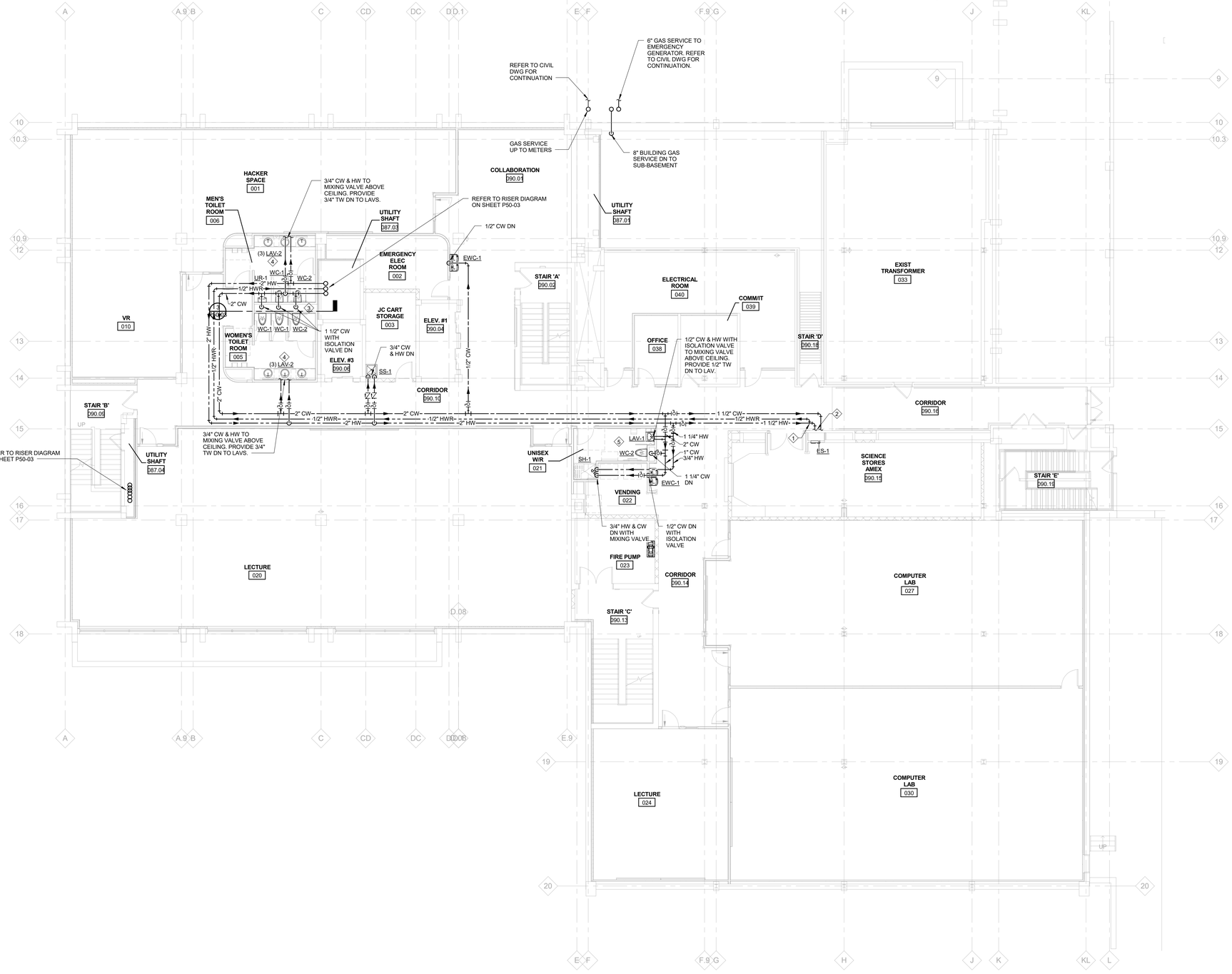
STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

SUB-BASEMENT SUPPLY PIPING PLAN

Scale	1/8" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	P20-01



BASEMENT SUPPLY PIPING PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

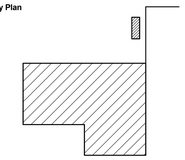
1. PROVIDE ISOLATION VALVES ON ALL SUPPLY BRANCH LINES SERVING FIXTURES.
2. ALL MIXING VALVES SHALL BE LOCATED AS CLOSE TO FIXTURES AS POSSIBLE WITH ACCESS FOR SERVICE.

KEY NOTES

1. CONNECT HWR TO HW LINE.
2. 1 1/2" HW & CW TO MV-2. 1 1/2" TW DN TO ES-1.
3. PROVIDE (1) SLOAN MODEL EL-154 TRANSFORMER TO SERVE WATER CLOSET AND URINAL FLUSH VALVES IN WOMEN'S & MEN'S ROOM.
4. PROVIDE (1) SLOAN MODEL EL-248-40 TRANSFORMER FOR LAVATORY FAUCETS.
5. PROVIDE (1) SLOAN MODEL EL-154 TRANSFORMER FOR WATER CLOSET FLUSH VALVE AND (1) SLOAN MODEL EL-248-40 TRANSFORMER FOR LAVATORY FAUCET.

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

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www.ftch.com

Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: B. HALL	Drawn: B. HALL
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

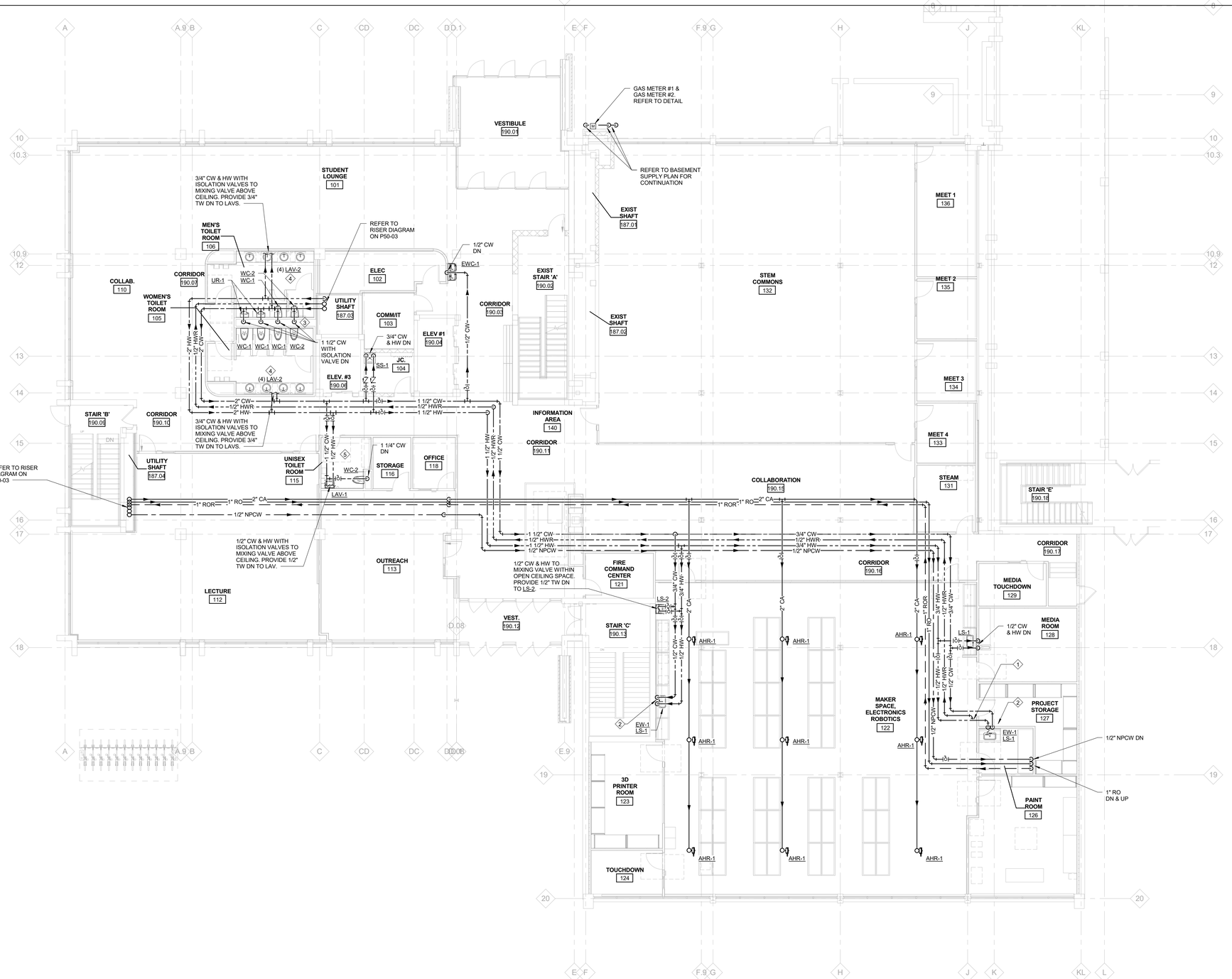
BASEMENT SUPPLY PIPING PLAN

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

P20-02



FIRST FLOOR SUPPLY PIPING PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

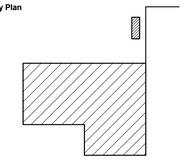
1. PROVIDE ISOLATION VALVES ON ALL SUPPLY BRANCH LINES SERVING FIXTURES.
2. ALL MIXING VALVES SHALL BE LOCATED AS CLOSE TO FIXTURES AS POSSIBLE WITH ACCESS FOR SERVICE.
3. PROVIDE SIGNAGE AT ALL NON POTABLE WATER FIXTURES IN ACCORDANCE WITH 2015 MICHIGAN PLUMBING CODE SECTION 608.8.1.
4. PROVIDE PIPE LABELS ON NON POTABLE WATER PIPING IN ACCORDANCE WITH 2015 MICHIGAN PLUMBING CODE SECTION 608.8.2.

KEY NOTES

1. CONNECT HWR TO HW LINE.
2. 1/2" HW & CW TO MV-1 UNDER SINK. 1/2" TW TO EW-1. 1/2" HW & CW DN TO LS-1.
3. PROVIDE (1) SLOAN MODEL EL-154 TRANSFORMER TO SERVE WATER CLOSET AND URINAL FLUSH VALVES IN WOMEN'S & MEN'S ROOM.
4. PROVIDE (1) SLOAN MODEL EL-248-40 TRANSFORMER FOR LAVATORY FAUCETS.
5. PROVIDE (1) SLOAN MODEL EL-154 TRANSFORMER FOR WATER CLOSET FLUSH VALVE AND (1) SLOAN MODEL EL-248-40 TRANSFORMER FOR LAVATORY FAUCET.

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

NORR

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Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: B. HALL	Drawn: B. HALL
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

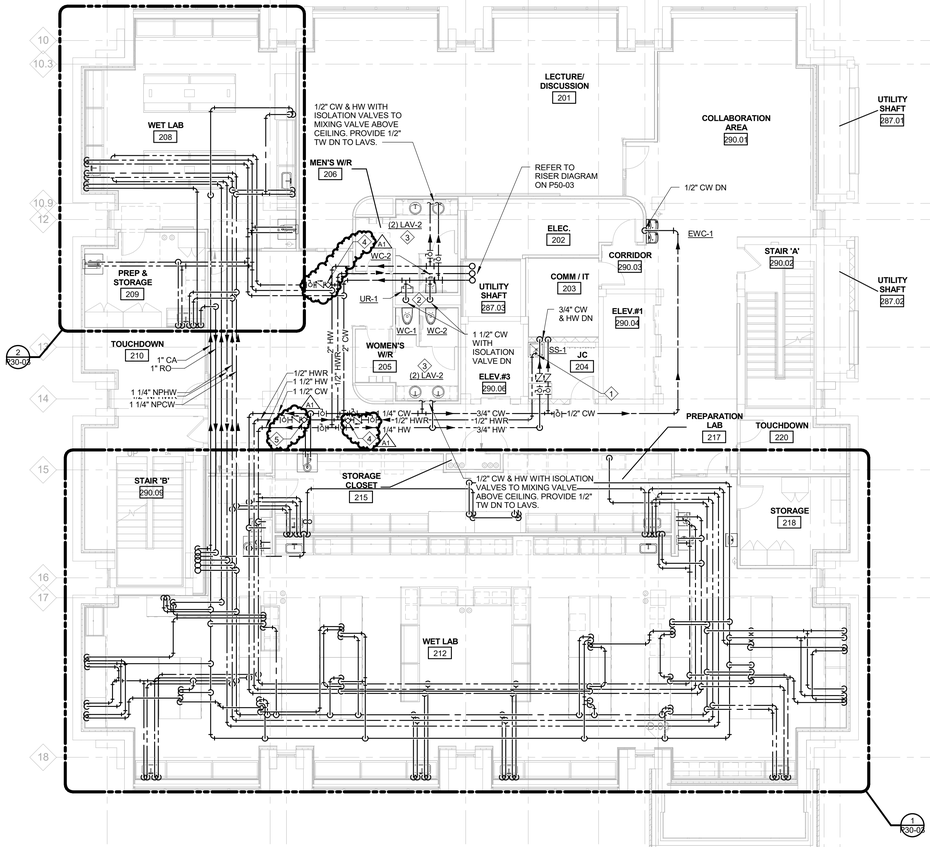
STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

FIRST FLOOR SUPPLY PIPING PLAN

Scale	1/8" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	P20-03



SECOND FLOOR SUPPLY PIPING PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

1. PROVIDE ISOLATION VALVES ON ALL SUPPLY BRANCH LINES SERVING FIXTURES.
2. ALL MIXING VALVES SHALL BE LOCATED AS CLOSE TO FIXTURES AS POSSIBLE WITH ACCESS FOR SERVICE.

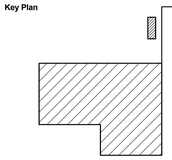
KEY NOTES

1. CONNECT HWR TO HW LINE.
2. PROVIDE (1) SLOAN MODEL EL-154 TRANSFORMER TO SERVE WATER CLOSET AND URINAL FLUSH VALVES IN WOMEN'S & MEN'S ROOM.
3. PROVIDE (1) SLOAN MODEL EL-248-40 TRANSFORMER FOR LAVATORY FAUCETS.
4. BALANCE FOR 0.3 GPM.
5. BALANCE FOR 0.5 GPM.

A1

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

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Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: B. HALL	Drawn: B. HALL
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

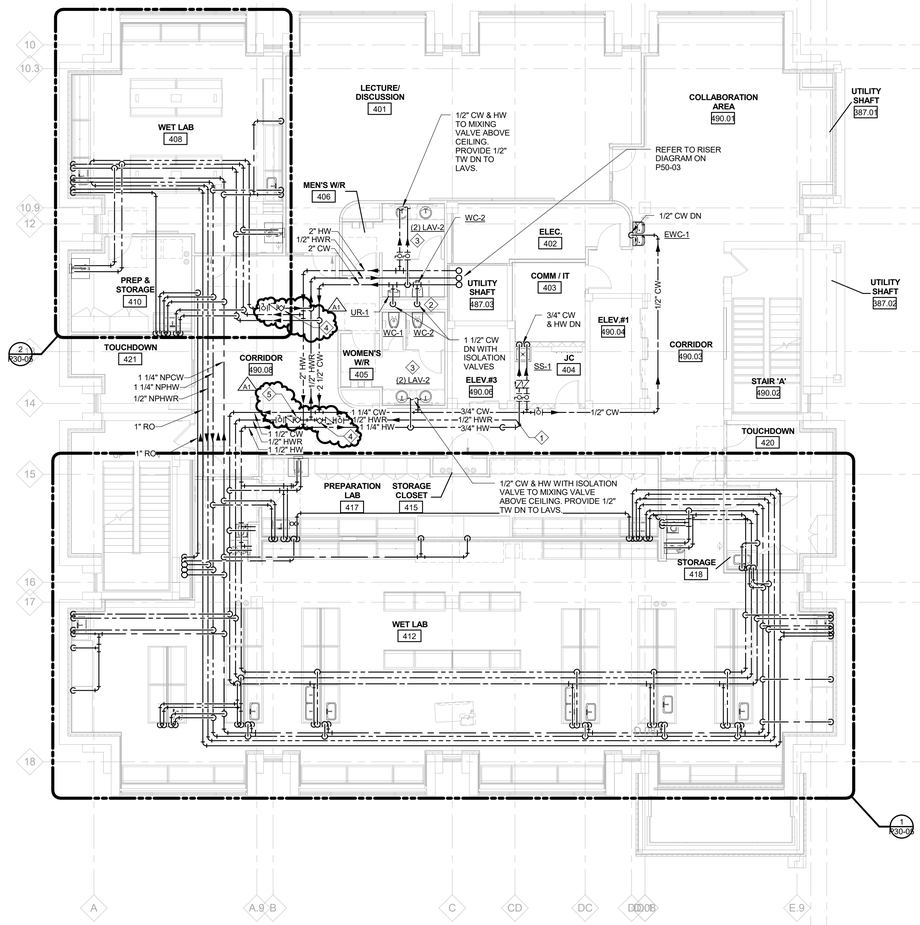
STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

SECOND FLOOR SUPPLY PIPING PLAN

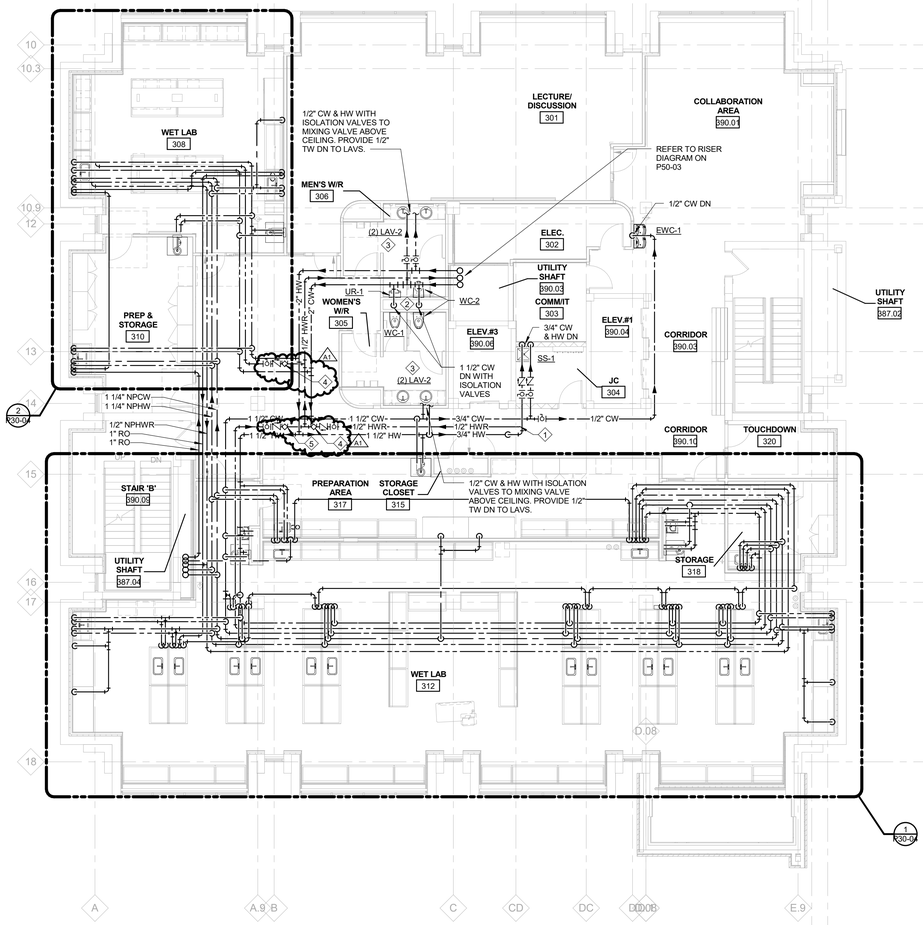
Scale	1/8" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	P20-04



FOURTH FLOOR SUPPLY PIPING PLAN

SCALE: 1/8" = 1'-0"

NORTH



THIRD FLOOR SUPPLY PIPING PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

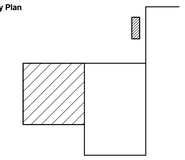
1. PROVIDE ISOLATION VALVES ON ALL SUPPLY BRANCH LINES SERVING FIXTURES.
2. ALL MIXING VALVES SHALL BE LOCATED AS CLOSE TO FIXTURES AS POSSIBLE WITH ACCESS FOR SERVICE.

KEY NOTES

1. CONNECT HWR TO HW LINE.
2. PROVIDE (1) SLOAN MODEL EL-154 TRANSFORMER TO SERVE WATER CLOSET AND URINAL FLUSH VALVES IN WOMEN'S & MEN'S ROOM.
3. PROVIDE (1) SLOAN MODEL EL-248-40 TRANSFORMER FOR LAVATORY FAUCETS.
4. BALANCE FOR 0.3 GPM.
5. BALANCE FOR 0.4 GPM.

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

NORR

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150 W. Jefferson Avenue, Suite 1300
Detroit, MI 48226 U.S.A
norr.com

FTC&H engineers scientists architects constructors

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www.ftch.com

Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: B. HALL	Drawn: B. HALL
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation
Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

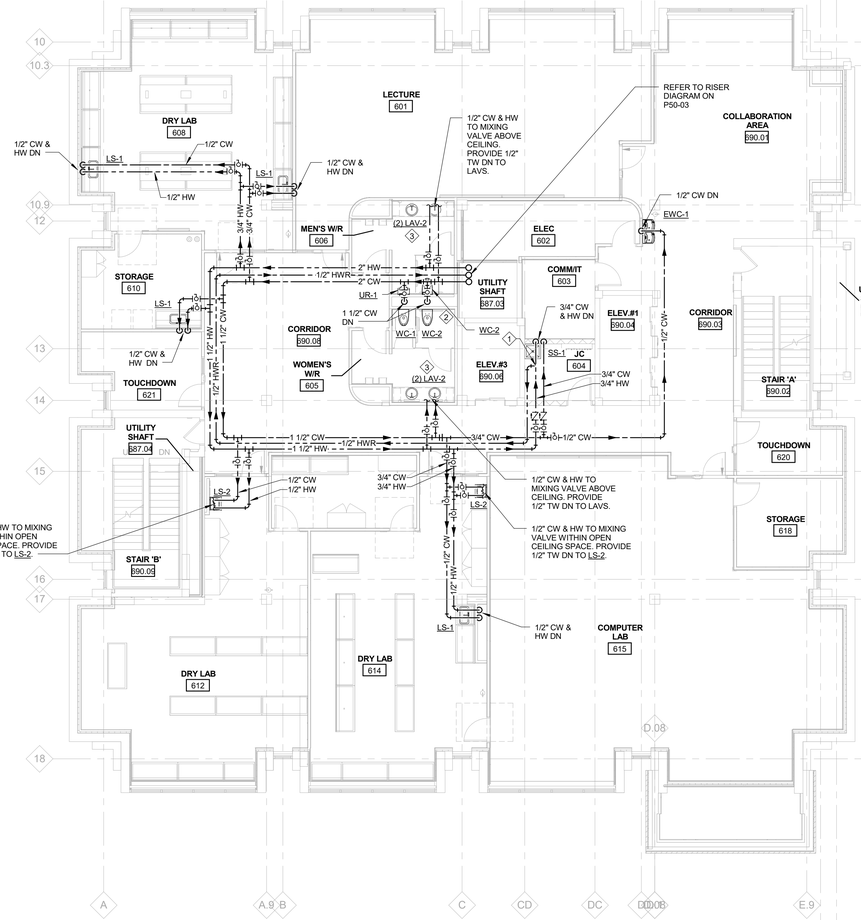
THIRD AND FOURTH FLOOR
SUPPLY PIPING PLANS

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

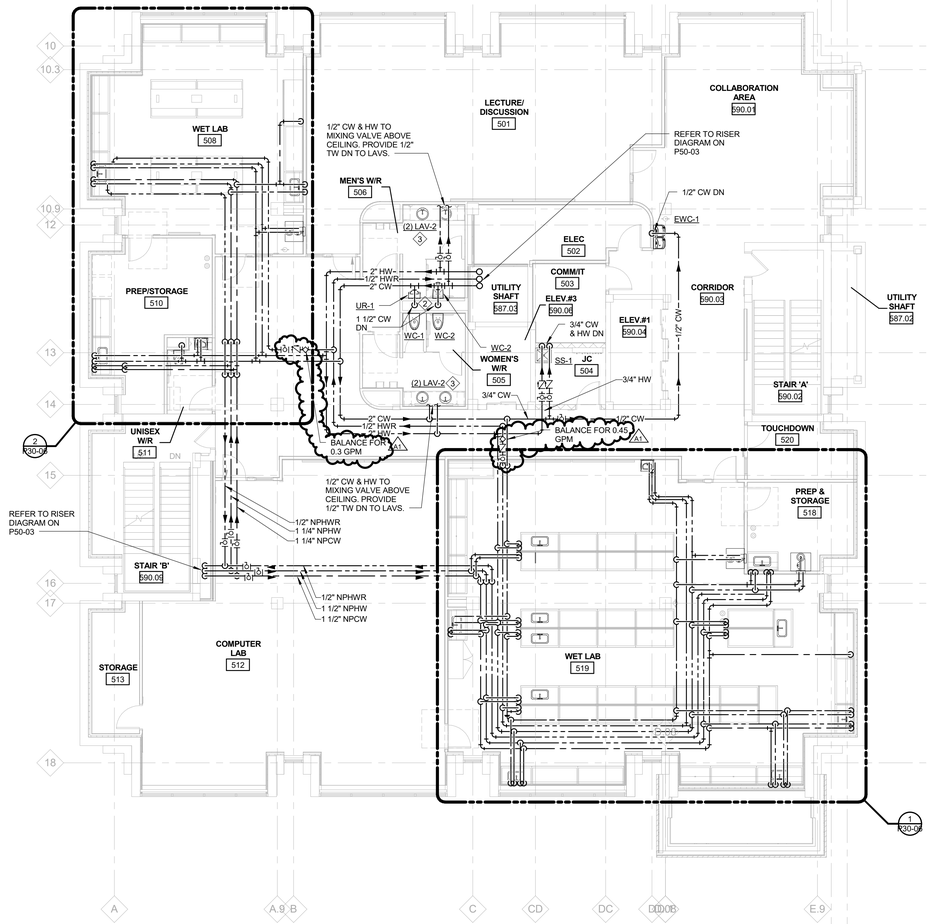
P20-05



SIXTH FLOOR SUPPLY PIPING PLAN

SCALE: 1/8" = 1'-0"

NORTH



FIFTH FLOOR SUPPLY PIPING PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

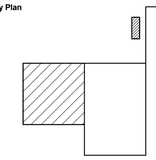
1. PROVIDE ISOLATION VALVES ON ALL SUPPLY BRANCH LINES SERVING FIXTURES.
2. ALL MIXING VALVES SHALL BE LOCATED AS CLOSE TO FIXTURES AS POSSIBLE WITH ACCESS FOR SERVICE.

KEY NOTES

1. CONNECT HWR TO HW LINE.
2. PROVIDE (1) SLOAN MODEL EL-154 TRANSFORMER TO SERVE WATER CLOSET AND URINAL FLUSH VALVES IN WOMEN'S & MEN'S ROOM.
3. PROVIDE (1) SLOAN MODEL EL-248-40 TRANSFORMER FOR LAVATORY FAUCETS.

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

NORR

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Detroit, MI 48226 U.S.A
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www.ftch.com

Project Manager	BIM Lead
J. SMITH	C. BAKER
Design Lead	Drawn
B. HALL	B. HALL
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

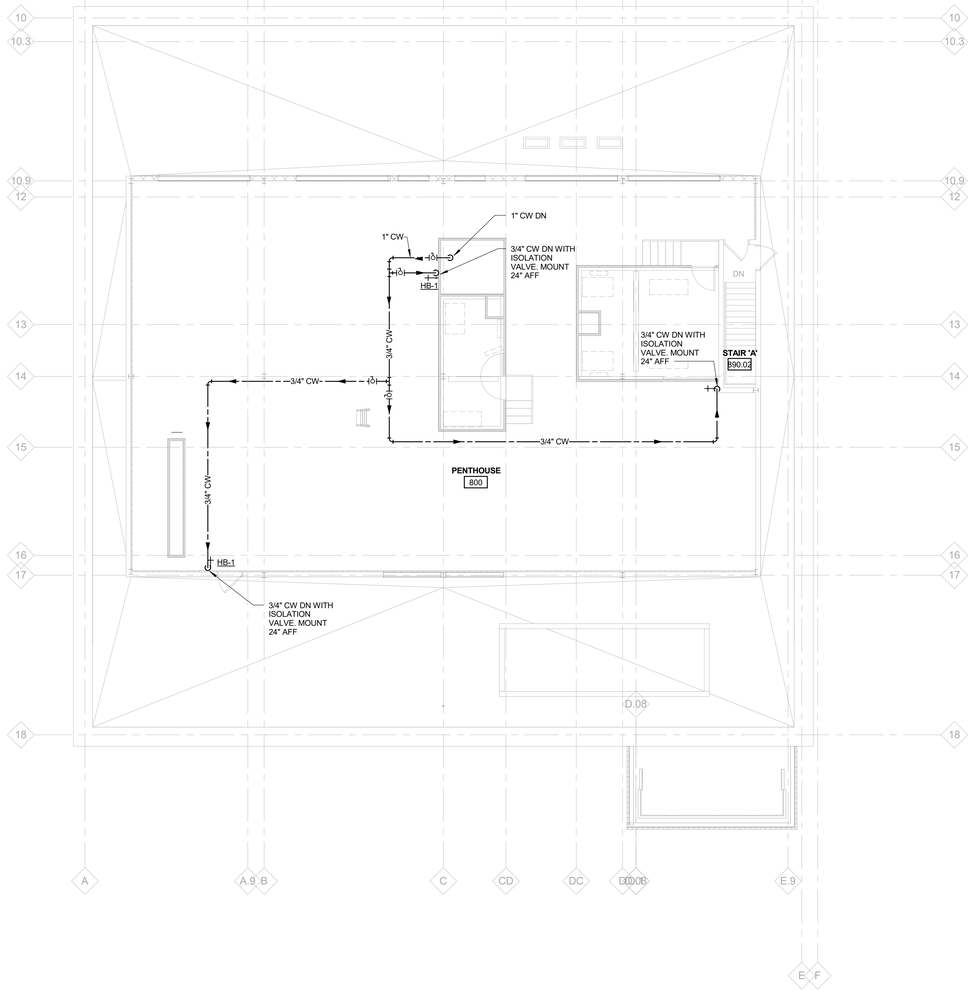
FIFTH AND SIXTH FLOOR SUPPLY PIPING PLANS

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

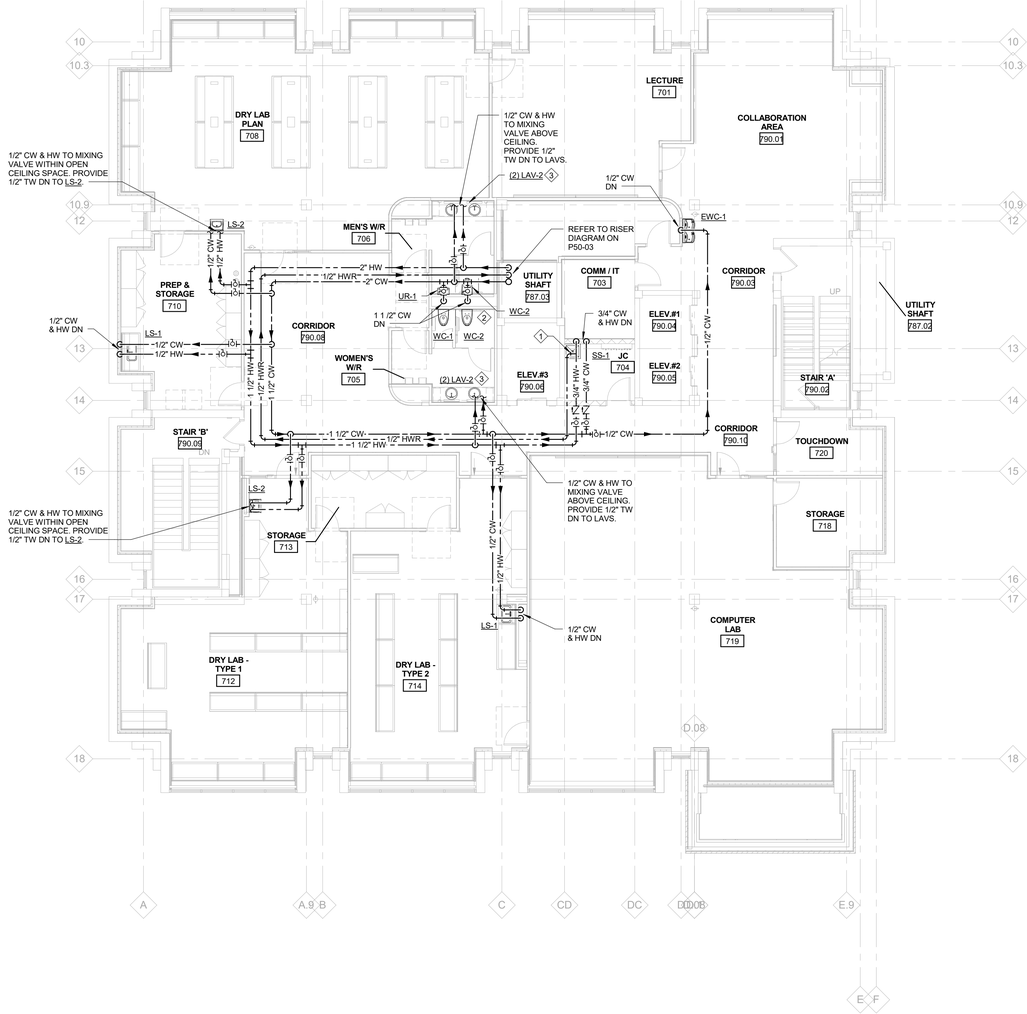
P20-06



PENTHOUSE SUPPLY PIPING PLAN

SCALE: 1/8" = 1'-0"

NORTH



SEVENTH FLOOR SUPPLY PIPING PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

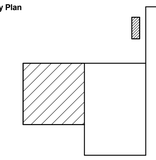
1. PROVIDE ISOLATION VALVES ON ALL SUPPLY BRANCH LINES SERVING FIXTURES.
2. ALL MIXING VALVES SHALL BE LOCATED AS CLOSE TO FIXTURES AS POSSIBLE WITH ACCESS FOR SERVICE.

KEY NOTES

1. CONNECT HWR TO HW LINE.
2. PROVIDE (1) SLOAN MODEL EL-154 TRANSFORMER TO SERVE WATER CLOSET AND URINAL FLUSH VALVES IN WOMEN'S & MEN'S ROOM.
3. PROVIDE (1) SLOAN MODEL EL-248-40 TRANSFORMER FOR LAVATORY FAUCETS.

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

NORR

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www.ftch.com

Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: B. HALL	Drawn: B. HALL
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

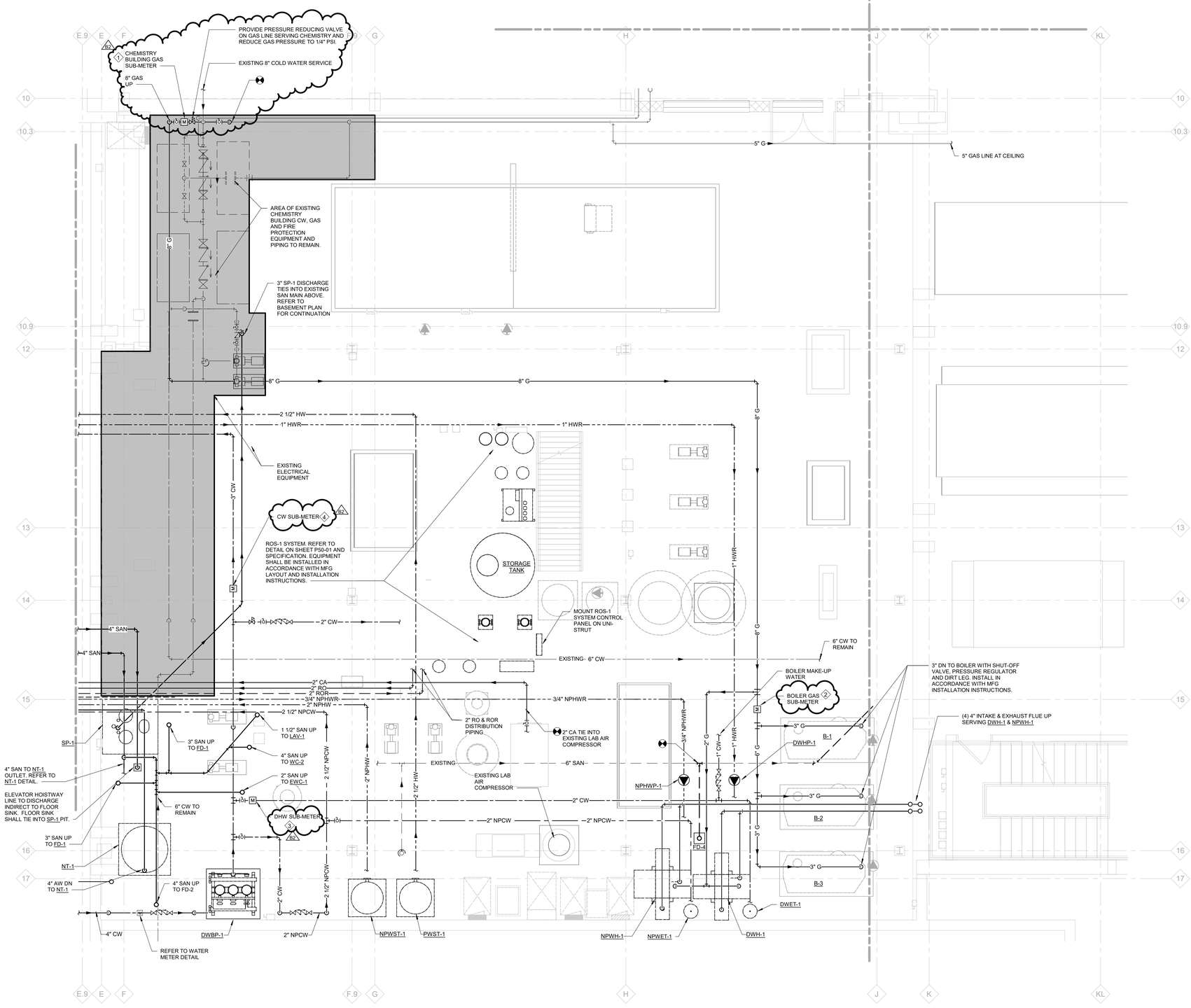
STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

SEVENTH AND PENTHOUSE SUPPLY PIPING PLAN

Scale	1/8" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	P20-07



1 SUB-BASEMENT ENLARGED PLUMBING PLAN

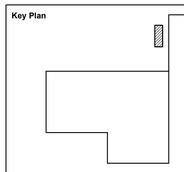
SCALE: 1/4" = 1'-0"

KEY NOTES

1. PROVIDE NORGAS NDM ROTARY GAS METER MODEL 3M OR APPROVED EQUAL. PROVIDE WITH 4-20 MA OUTPUT FOR BMS MONITORING. METER SHALL RECORD AT INTERVALS OF ONE HOUR OR LESS, AND BE CAPABLE OF REOPORTING HOURLY, DAILY, MONTHLY ANDN ANNUALLY WITH 36 MONTHS OF DATA STORAGE.
2. PROVIDE NORGAS NDM ROTARY GAS METER MODEL 11M OR APPROVED EQUAL. PROVIDE WITH 4-20 MA OUTPUT FOR BMS MONITORING. METER SHALL RECORD AT INTERVALS OF ONE HOUR OR LESS, AND BE CAPABLE OF REOPORTING HOURLY, DAILY, MONTHLY ANDN ANNUALLY WITH 36 MONTHS OF DATA STORAGE.
3. PROVIDE KELE RECORDALL COMPOUND SERIES METER MODEL C200BRW. PROVIDE WITH 4-20 MA OUTPUT FOR BMS MONITORING. METER SHALL RECORD AT INTERVALS OF ONE HOUR OR LESS, AND BE CAPABLE OF REOPORTING HOURLY, DAILY, MONTHLY ANDN ANNUALLY WITH 36 MONTHS OF DATA STORAGE.
4. PROVIDE KELE RECORDALL COMPOUND SERIES METER MODEL C300BRW. PROVIDE WITH 4-20 MA OUTPUT FOR BMS MONITORING. METER SHALL RECORD AT INTERVALS OF ONE HOUR OR LESS, AND BE CAPABLE OF REOPORTING HOURLY, DAILY, MONTHLY ANDN ANNUALLY WITH 36 MONTHS OF DATA STORAGE.

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
03/15/2019	BULLETIN NO. 2	6
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: B. HALL	Drawn: B. HALL
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

ENLARGED PLANS - SUB-BASEMENT MECHANICAL ROOM

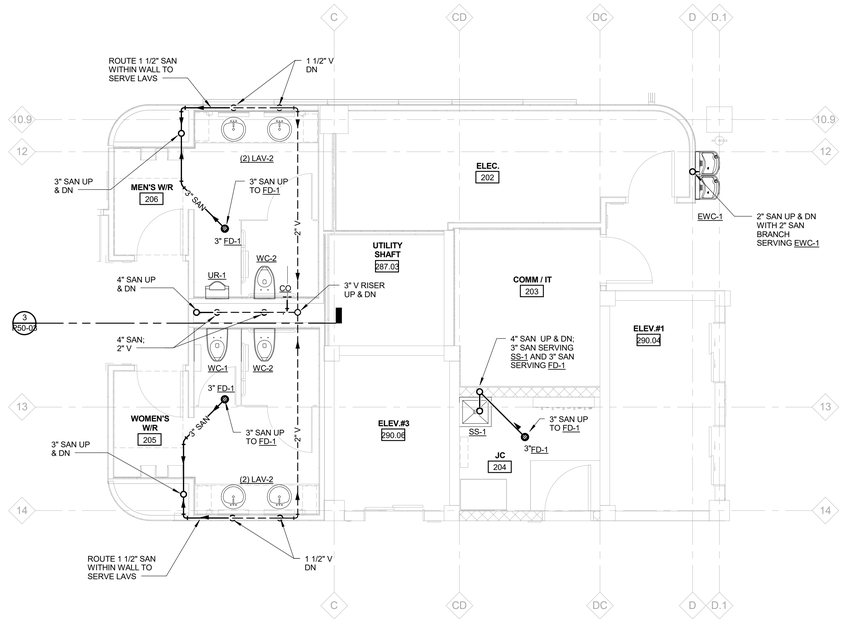
Scale 1/4" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

P30-01

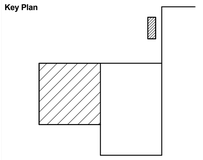
12/20/2018 2:59:03 PM



2 ENLARGED SANITARY PLAN
SCALE: 1/4" = 1'-0"

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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www.ftch.com

Project Manager	BIM Lead
J. SMITH	C. BAKER
Design Lead	Drawn
B. HALL	B. HALL
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

ENLARGED PLANS - TOILET ROOMS

Scale 1/4" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

P30-02

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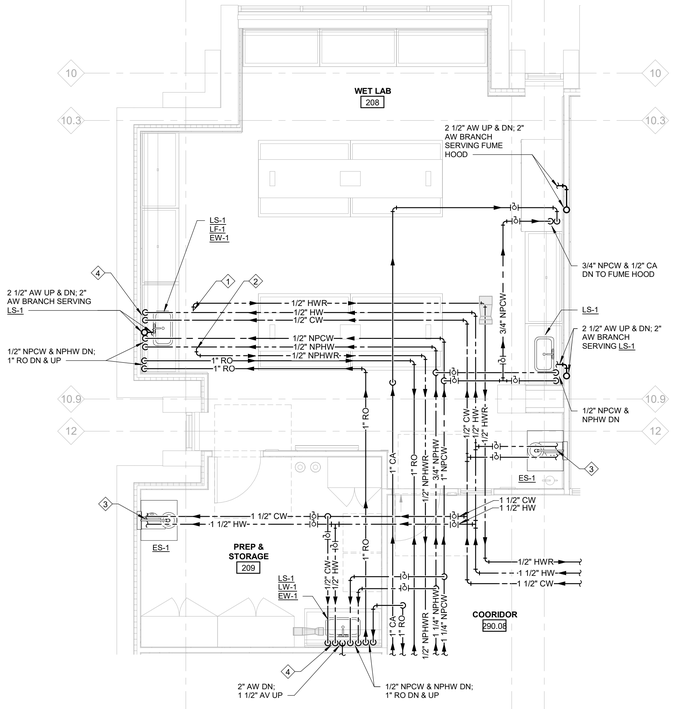
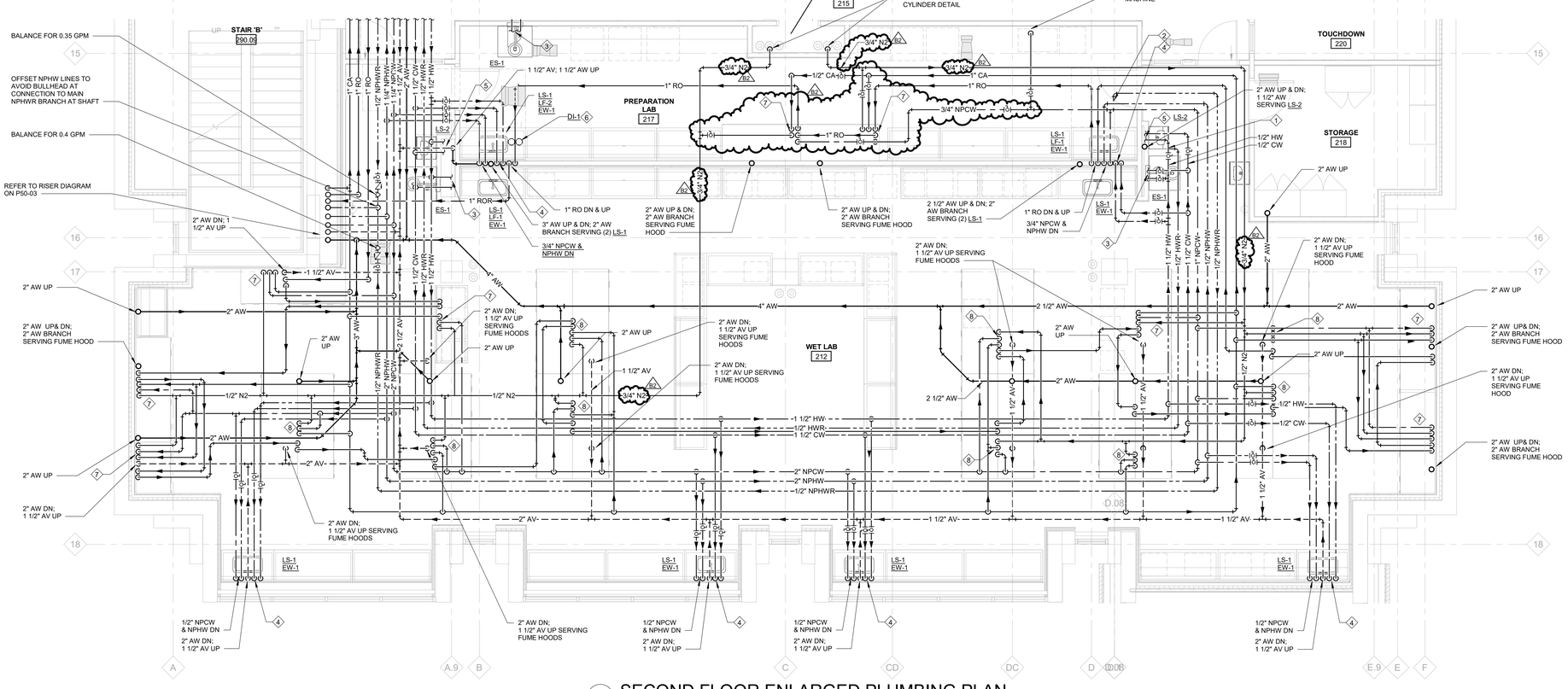


2 SECOND FLOOR ENLARGED PLUMBING PLAN

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



1 SECOND FLOOR ENLARGED PLUMBING PLAN

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

NOTES

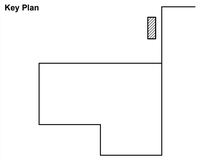
1. PROVIDE ISOLATION VALVES ON ALL SUPPLY BRANCH LINES SERVING FIXTURES.
2. ALL MIXING VALVES SHALL BE LOCATED AS CLOSE TO FIXTURES AS POSSIBLE WITH ACCESS FOR SERVICE.
3. PROVIDE SIGNAGE AT ALL NON POTABLE WATER FIXTURES IN ACCORDANCE WITH 2015 MICHIGAN PLUMBING CODE SECTION 608.8.1.
4. PROVIDE PIPE LABELS ON NON POTABLE WATER PIPING IN ACCORDANCE WITH 2015 MICHIGAN PLUMBING CODE SECTION 608.8.2.

KEY NOTES

1. CONNECT HWR TO HW LINE.
2. CONNECT NPHWR LINE TO NPHW LINE.
3. 1 1/2" HW & CW WITH ISOLATION VALVES TO MV-2. MOUNT MV-2 IN ACCESSIBLE LOCATION WITHIN OPEN CEILING SPACE. PROVIDE 1 1/2" TW DN TO ES-1.
4. 1/2" HW & CW DN TO MV-1 UNDER SINK. 1/2" TW TO EW-1.
5. 1/2" CW & HW TO MIXING VALVE. MOUNT MIXING VALVE IN ACCESIBLE LOCATION WITHIN OPEN CEILING. PROVIDE 1/2" TW DN TO LS-2.
6. LOCATE FREESTANDING UNIT UNDER SINK. ROUTE PIPING TO LF-2.
7. 1/2" CA, 1/2" N, 1/2" NPCW DN,1" RO DN & UP SERVING FUME HOOD.
8. 1/2"CA, 1/2" N, 3/4" NPCW DN, 1" RO DN & UP SERVING FUME HOOD.

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
01/22/2019	ADDENDUM NO. 2	5
03/15/2019	BULLETIN NO. 2	6
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

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Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: B. HALL	Drawn: B. HALL
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project
STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
ENLARGED PLANS - SECOND FLOOR

Scale	1/4" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	P30-03

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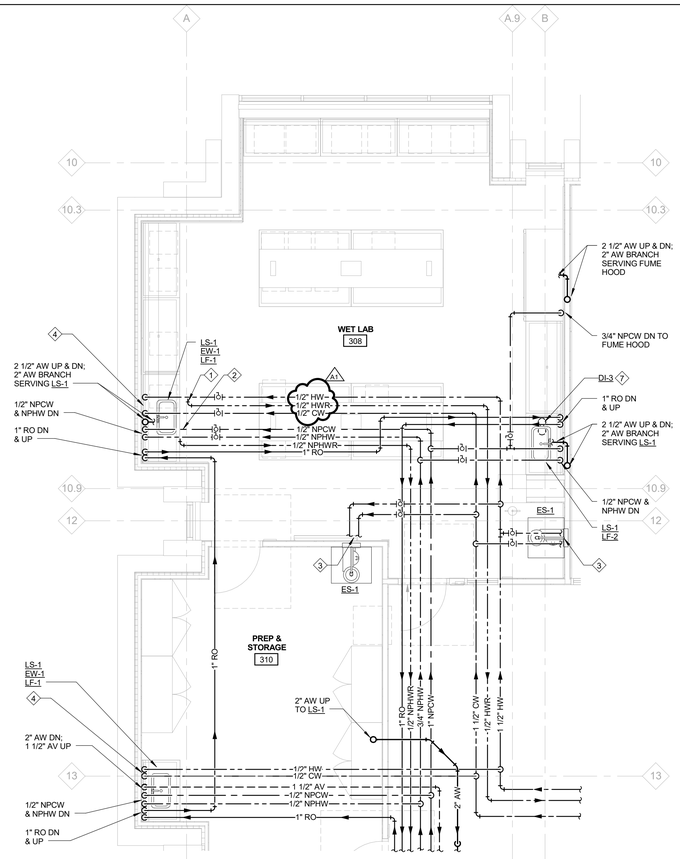
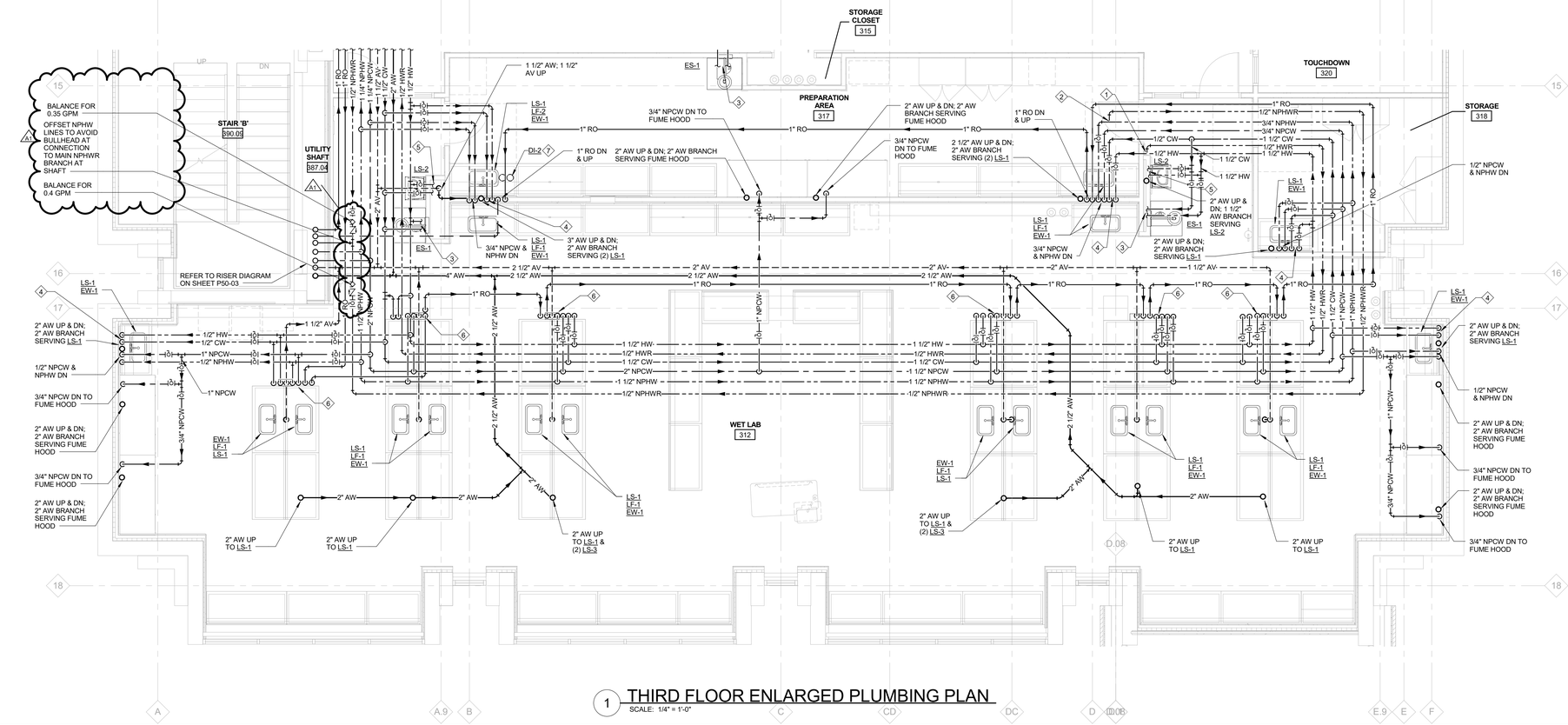


2 THIRD FLOOR ENLARGED PLUMBING PLAN

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



1 THIRD FLOOR ENLARGED PLUMBING PLAN

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

NOTES

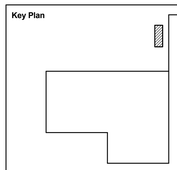
1. PROVIDE ISOLATION VALVES ON ALL SUPPLY BRANCH LINES SERVING FIXTURES.
2. ALL MIXING VALVES SHALL BE LOCATED AS CLOSE TO FIXTURES AS POSSIBLE WITH ACCESS FOR SERVICE.
3. PROVIDE SIGNAGE AT ALL NON POTABLE WATER FIXTURES IN ACCORDANCE WITH 2015 MICHIGAN PLUMBING CODE SECTION 608.8.1.
4. PROVIDE PIPE LABELS ON NON POTABLE WATER PIPING IN ACCORDANCE WITH 2015 MICHIGAN PLUMBING CODE SECTION 608.8.2.

KEY NOTES

1. CONNECT HWR TO HW LINE.
2. CONNECT NPHWR LINE TO NPHW LINE.
3. 1 1/2" HW & CW WITH ISOLATION VALVES TO MV-2. MOUNT MV-2 IN ACCESSIBLE LOCATION WITHIN OPEN CEILING SPACE. PROVIDE 1 1/2" TW DN TO ES-1.
4. 1/2" HW & CW DN TO MV-1 UNDER SINK. 1/2" TW TO EW-1.
5. 1/2" CW & HW TO MIXING VALVE. MOUNT MIXING VALVE IN ACCESSIBLE LOCATION WITHIN OPEN CEILING. PROVIDE 1/2" TW DN TO LS-2.
6. 1/2" HW & CW DN TO MV-1 UNDER SINK. 1/2" TW TO EW-1. 3/4" NPCW & 3/4" NPHW DN. 1" RO DN & UP. 1 1/2" AV UP. ROUTE PIPING WITH PLUMBING CHASE. REFER TO LAB PLANS AND COORDINATE REQUIRED PREFABRICATED CHASE DIMENSIONS.
7. LOCATE FREESTANDING UNIT UNDER SINK. ROUTE PIPING TO LF-2.

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Manager	BIM Lead
J. SMITH	C. BAKER
Design Lead	Drawn
B. HALL	B. HALL
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

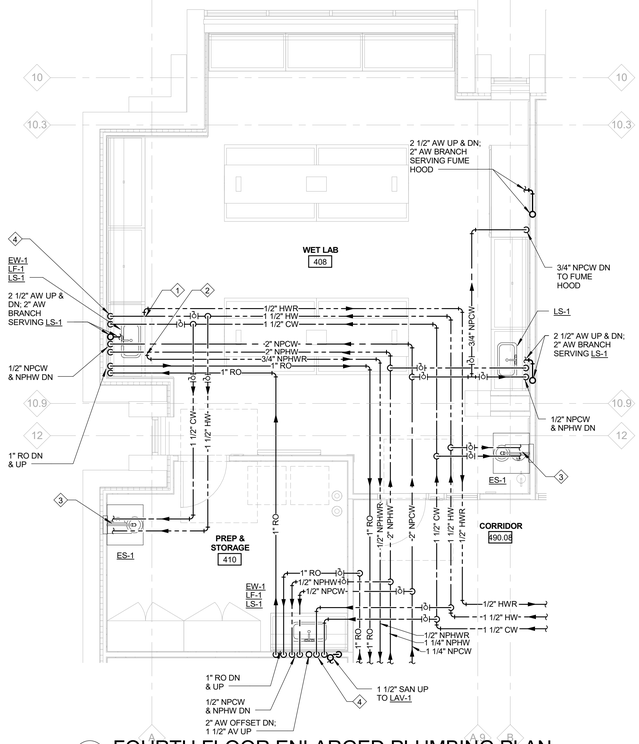
ENLARGED PLANS - THIRD FLOOR

Scale 1/4" = 1'-0"

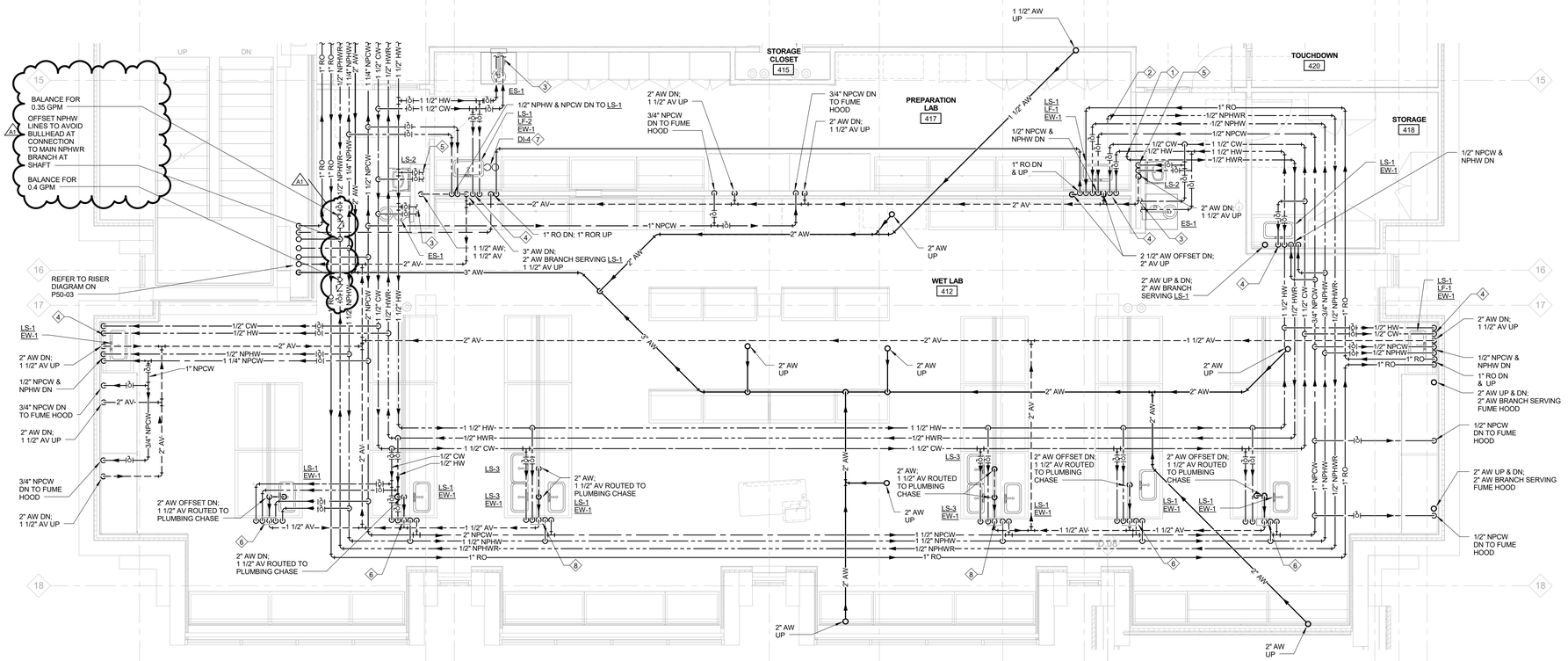
Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

P30-04



2 FOURTH FLOOR ENLARGED PLUMBING PLAN
SCALE: 1/4" = 1'-0"



1 FOURTH FLOOR ENLARGED PLUMBING PLAN
SCALE: 1/4" = 1'-0"

NOTES

1. PROVIDE ISOLATION VALVES ON ALL SUPPLY BRANCH LINES SERVING FIXTURES.
2. ALL MIXING VALVES SHALL BE LOCATED AS CLOSE TO FIXTURES AS POSSIBLE WITH ACCESS FOR SERVICE.
3. PROVIDE SIGNAGE AT ALL NON POTABLE WATER FIXTURES IN ACCORDANCE WITH 2015 MICHIGAN PLUMBING CODE SECTION 608.8.1.
4. PROVIDE PIPE LABELS ON NON POTABLE WATER PIPING IN ACCORDANCE WITH 2015 MICHIGAN PLUMBING CODE SECTION 608.8.2.

KEY NOTES

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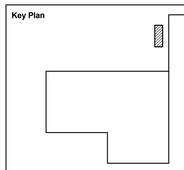
4. 1/2" HW & CW DN TO MV-1 UNDER SINK. 1/2" TW TO EW-1.
5. 1/2" CW & HW TO MIXING VALVE. MOUNT MIXING VALVE IN ACCESIBLE LOCATION WITHIN OPEN CEILING. PROVIDE 1/2" TW DN TO LS-2.
6. 1/2" HW & CW DN TO MV-1 UNDER SINK. 1/2" TW TO EW-1. 1/2" NPCW & 1/2" NPHW DN. 1 1/2" AV UP. ROUTE PIPING WITH PLUMBING CHASE. REFER TO LAB PLANS AND COORDINATE REQUIRED PREFABRICATED CHASE DIMENSIONS.
7. LOCATE FREESTANDING UNIT UNDER SINK. ROUTE PIPING TO LF-2.
8. 1/2" HW & CW DN TO MV-1 UNDER SINK. 1/2" TW TO EW-1. 1" NPCW & 1" NPHW DN. 1 1/2" AV UP. ROUTE PIPING WITH PLUMBING CHASE. REFER TO LAB PLANS AND COORDINATE REQUIRED PREFABRICATED CHASE DIMENSIONS.

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

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WAYNE STATE UNIVERSITY

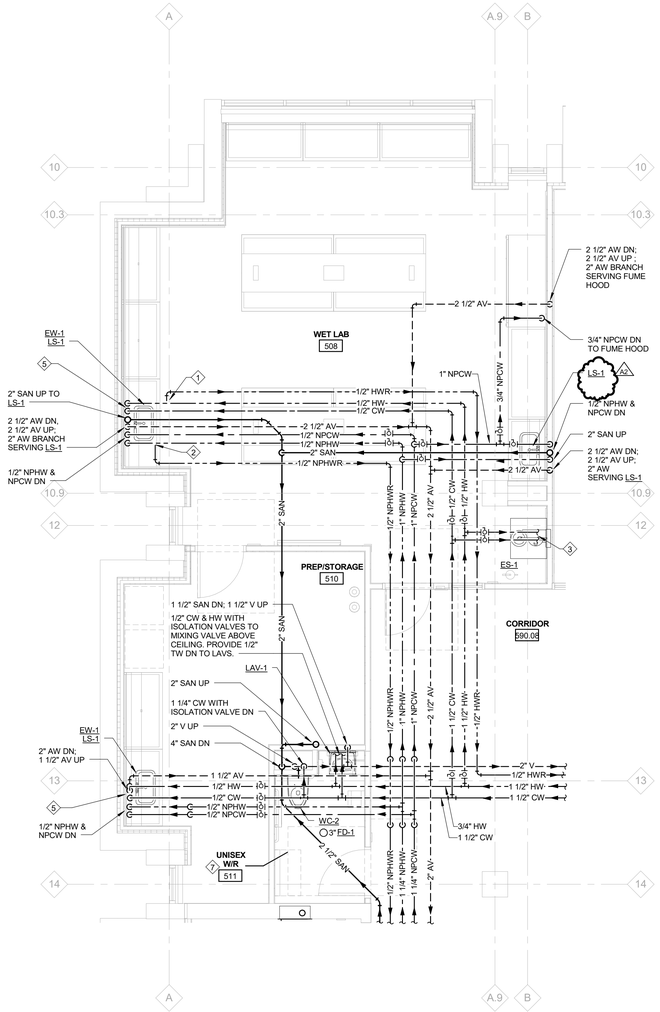
Project
STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
ENLARGED PLANS - FOURTH FLOOR

Scale 1/4" = 1'-0"

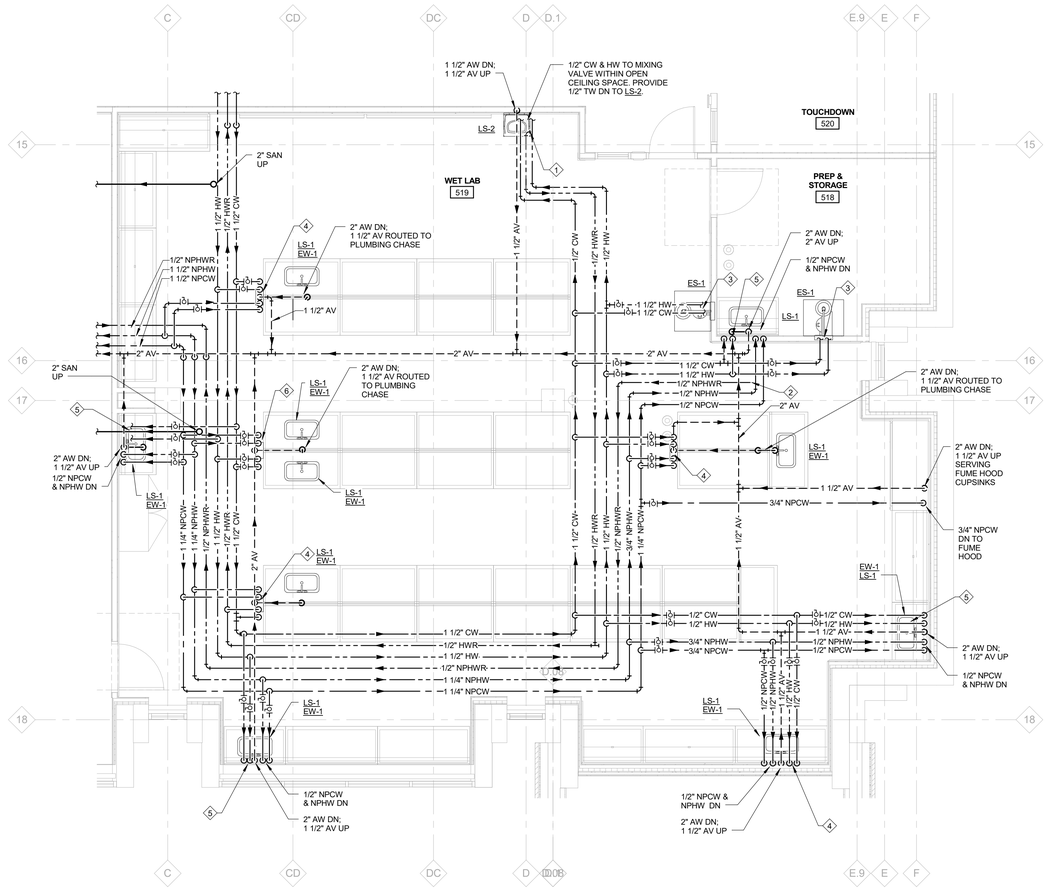
Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
P30-05



2 FIFTH FLOOR ENLARGED PLUMBING PLAN

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



1 FIFTH FLOOR ENLARGED PLUMBING PLAN

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

NOTES

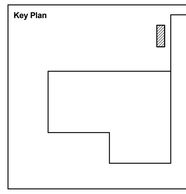
1. PROVIDE ISOLATION VALVES ON ALL SUPPLY BRANCH LINES SERVING FIXTURES.
2. ALL MIXING VALVES SHALL BE LOCATED AS CLOSE TO FIXTURES AS POSSIBLE WITH ACCESS FOR SERVICE.
3. PROVIDE SIGNAGE AT ALL NON POTABLE WATER FIXTURES IN ACCORDANCE WITH 2015 MICHIGAN PLUMBING CODE SECTION 608.8.1.
4. PROVIDE PIPE LABELS ON NON POTABLE WATER PIPING IN ACCORDANCE WITH 2015 MICHIGAN PLUMBING CODE SECTION 608.8.2.

KEY NOTES

1. CONNECT HWR TO HW LINE.
2. CONNECT NPHWR LINE TO NPHW LINE.
3. 1 1/2" HW & CW WITH ISOLATION VALVES TO MV-2. 1 1/2" TW DN TO ES-1.
4. 1/2" HW & CW DN TO MV-1 UNDER SINK. 1/2" TW TO EW-1. 1/2" NPCW & 1/2" NPHW DN. 1 1/2" AV UP. ROUTE PIPING WITH PLUMBING CHASE. REFER TO LAB PLANS AND COORDINATE REQUIRED PREFABRICATED CHASE DIMENSIONS.
5. 1/2" HW & CW WITH ISOLATION VALVES TO MV-1. 1/2" TW DN TO EW-1.
6. 1/2" HW & CW DN TO MV-1 UNDER SINK. 1/2" TW TO EW-1. 3/4" NPCW & 3/4" NPHW DN. 1 1/2" AV UP. ROUTE PIPING WITH PLUMBING CHASE. REFER TO LAB PLANS AND COORDINATE REQUIRED PREFABRICATED CHASE DIMENSIONS.
7. PROVIDE (1) SLOAN MODEL EL-154 TRANSFORMER FOR WATER CLOSET FLUSH VALVE AND (1) SLOAN MODEL EL-248-40 TRANSFORMER FOR LAVATORY FAUCET.

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/22/2019	ADDENDUM NO. 2	5
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

NORR

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Project

STEM Innovation Learning Center

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Drawing Title

ENLARGED PLANS - FIFTH FLOOR LABS

Scale	1/4" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	P30-06

DWBP-1 SEQUENCE OF OPERATION:

A. THE LEAD PUMP SHALL RUN ONLY AS NECESSARY TO MAINTAIN SYSTEM PRESSURE AND WILL BE CONTROLLED AUTOMATICALLY BY MEANS OF THE PRESSURE SENSOR/TRANSMITTER AND PROGRAMMABLE LOGIC CONTROLLER (PLC) DESIGNED TO PREVENT SHORT CYCLING AND PROVIDE SENSOR-LESS FLOW DETECTION. IF THE LEAD PUMP IS UNABLE TO MAINTAIN SYSTEM PRESSURE THE LAG PUMP(S) WILL BE CALLED ON AS REQUIRED BY THE SENSOR-LESS FLOW ALGORITHM AND WILL OPERATE IN PARALLEL WITH THE LEAD PUMP UNTIL NO LONGER NECESSARY AND BE SEQUENCED OFF. WHEN ONE PUMP CAN HANDLE THE SYSTEM DEMAND THE CONTROLS WILL OPTIMIZE ENERGY CONSUMPTION BY ELIMINATING THE LAG PUMP FROM SEQUENCE. WHEN A LOW OR NO-FLOW CONDITION IS REACHED, THE SYSTEM SHALL REVERT TO THE STAND-BY MODE WHEN NO FLOW IS PRESENT VIA AN INTELLIGENT FLOW DETECTION ALGORITHM, WHICH DOES NOT RAISE THE SET PRESSURE TO CHARGE A TANK TO DETECT LOW FLOW. THESE SYSTEMS DO NOT REQUIRE A HYDRO-PNEUMATIC TANK INSTALLED. NOTE: RAISING SYSTEM PRESSURE TO CHARGE A TANK VIOLATES ANSI/ASHRAE/IES STANDARD 90.1 BY RAISING THE PRESSURE IN LIEU OF MAINTAINING CONSTANT SYSTEM PRESSURE.

B. AN EMPTY PIPE CONDITION IS TO BE DETERMINED BY AN ALGORITHM ALLOWING FOR A SLOW RAMP TO SET POINT TO PREVENT SYSTEM PRESSURE SHOCKS. THE “PIPE-FILL” ALGORITHM WILL ALSO PREVENT VFD “WIND-UP” AND PRESSURE SPIKES ASSOCIATED WITH THIS CONDITION.

C. THE SYSTEM SHALL EMPLOY SOFTWARE TO DETECT PIPE BREAK AND STOP SYSTEM, INITIATE AN ALARM AND LOG THE EVENT. IN THE EVENT OF A SENSOR FAILURE, THE SYSTEM SHALL RUN ONE PUMP IN A SEMI-AUTOMATIC MODE ALLOWING THE BUILDING TO MAINTAIN A MINIMUM PRESSURE UNTIL THE SENSOR CAN BE REPAIRED OR REPLACED.

D. AN AUTO-TUNING PID ALGORITHM SHALL CONTINUOUSLY MONITOR SYSTEM PRESSURE AND MAINTAIN STEADY-STATE SYSTEM PRESSURE AS DEMAND LOAD CHANGES RAPIDLY AND PUMP MOVES HORIZONTALLY ON ITS PLUMBING-PERFORMANCE CURVE. THE PID ALGORITHMS SHALL INCORPORATE INTELLIGENT ALGORITHMS TO START THE PUMPS ATTHE POINT OF CREATING PRESSURE SAVING ENERGY AND REDUCING TIME TO SET PRESSURE UPON PUMP CALL.

MISCELLANEOUS EQUIPMENT SCHEDULE

ID TAG	DESCRIPTION
DWBP-1	DOMESTIC WATER BOOSTER PUMP: QUANTUMFLO GENIUS TRIPLEX QDP_25/2. 3 VERTICAL SKID MOUNTED VARIABLE SPEED 7.5 HP PUMPS (33% FLOW SPLIT), SYSTEM FLOW 350 GPM, 178 FT HD, 25 PSI SUCTION PRESSURE, 66.75 PSI BOOST PRESSURE, 86.75 PSI DISCHARGE PRESSURE. 480/3/60, 29.1 FLA. 3450 RPM. PUMP CONTROLLER. PACKAGE 100KAIC SHALL BE WIRED, PIPED AND COMPLETELY FACTORY TESTED WITH SINGLE POWER CONNECTION. REFER TO SPECIFICATION SECTION 22 10 29 FOR ADDITIONAL REQUIREMENTS. SYSTEM SHALL BE MONITORED BY BUILDING MANAGEMENT SYSTEM. REFER TO "M" DRAWINGS FOR CONTROLS.
DWET-1	DOMESTIC WATER DIAPHRAGM EXPANSION TANK TO SERVE DWH-1: 22 GALLON TANK VOLUME, 14.5 GALLON ACCEPTANCE VOLUME. FLOOR MOUNT, 16" D x 31" H, 1" SYSTEM CONNECTION, ASME CERTIFIED, 150 PSI WORKING PRESSURE. BASED ON LOCHINVAR LTCPA42.
DWST-1	DOMESTIC WATER STORAGE TANK TO SERVE DWH-1: 200 GALLON CAPACITY. VERTICAL FLOOR MOUNT, ASME CONSTRUCTION. TEMPERATURE AND PRESSURE RELIEF VALVE. 150 PSI WORKING PRESSURE. BASED ON LOCHINVAR MODEL RJA200.
NPWET-1	NON-POTABLE WATER DIAPHRAGM EXPANSION TANK TO SERVE NPWH-1: 22 GALLON TANK VOLUME, 14.5 GALLON ACCEPTANCE VOLUME. FLOOR MOUNT, 16" D x 31" H, 1" SYSTEM CONNECTION, ASME CERTIFIED, 150 PSI WORKING PRESSURE. BASED ON LOCHINVAR LTCPA42.
NPWST-1	NON-POTABLE WATER STORAGE TANK TO SERVE NPWH-1: 200 GALLON CAPACITY. VERTICAL FLOOR MOUNT, ASME CONSTRUCTION. TEMPERATURE AND PRESSURE RELIEF VALVE. 150 PSI WORKING PRESSURE. BASED ON LOCHINVAR MODEL RJA200.
MV-1	EMERGENCY FIXTURE MIXING VALVE BASED ON POWERS MODEL ES150 FOR USE WITH EW-1. TEMPERATURE ADJUSTMENT BETWEEN 60°F-95°F. 1/2" INLET AND OUTLET. 180°F MAXIMUM HOT WATER TEMPERATURE. 5 PSI PRESSURE DROP AT 3.6 GPM.
MV-2	EMERGENCY FIXTURE MIXING VALVE BASED ON POWERS MODEL ETV200 FOR USE WITH ES-1. TEMPERATURE ADJUSTMENT BETWEEN 60°F-95°F. 3/4" INLET AND 1" OUTLET. 180°F MAXIMUM HOT WATER TEMPERATURE. 15 PSI PRESSURE DROP AT 23.2 GPM.
NT-1	ACID WASTE NEUTRALIZATION SYSTEM: BASED ON ORION MODEL 500G T5 PE-12GAMMA. HIGH DENSITY POLYETHYLENE RESIN STAND-ALONE CYLINDRICAL TANK CONFORMING TO ASTMD-1248. 500 GALLON CAPACITY BASED ON 2.5 HOUR DWELL TIME. SINGLE INLET, OUTLET AND VENT CONNECTION. 12" GAMMA TOP ACCESS FOR LIMESTONE ACCESS, 4500 LBS OF LIMESTONE REQUIRED. PROVIDE WITH ORION MODEL 5G T5 PE-12GAMMA ON OUTLET PIPE TO BE UTILIZED AS SAMPLE PORT.
SP-1	SEWAGE EJECTION PUMP SERVING BASEMENT AND SUB-BASEMENT FIXTURES, NT-1 DISCHARGE, AND ELEVATOR HOISTWAY DRAINS: (2) WEINMAN SERIES 800 MODEL 3402SM-VS COLUMN TYPE SUMP PUMPS. EACH PUMP SHALL BE CAPABLE OF PUMPING 85-300 GPM. 7.5 HP VFD, 1750 RPM. 480V/3PH/60HZ. PROVIDE WITH DUPLEX SUMP COVER AND CONTROL PANEL. REFER TO SPECIFICATION SECTION 22 10 29 FOR ADDITIONAL REQUIREMENTS. SYSTEM SHALL BE MONITORED BY BUILDING MANAGEMENT SYSTEM. REFER TO "M" DRAWINGS FOR CONTROLS.
ROS-1	REVERSE OSMOSIS WATER SYSTEM: BASED ON EVOQUA PACKAGED SYSTEM. REFER TO SPECIFICATION SECTION 22 67 00 FOR SYSTEM REQUIREMENTS. SYSTEM SHALL BE MONITORED BY BUILDING MANAGEMENT SYSTEM. REFER TO "M" DRAWINGS FOR CONTROLS.
DI-1, DI-2, DI-3, DI-4	DEIONIZED WATER POINT OF USE SYSTEM: BASED ON EVOQUA PACKAGED UNITS. REFER TO SPECIFICATION SECTION 22 67 00 FOR SYSTEM REQUIREMENTS.
AHR-1	AIR HOSE REEL: BASED ON REELCRAFT SERIES 7000 SPRING RETRACTABLE HOSE REEL FOR AIR SERVICE, MODEL NO. 7850OLP. 1/2" NPT REEL INLET, 1/2" I.D. HOSE DIAMETER, 3/8" NPT HOSE END, 50' HOSE LENGTH, 150°F MAX TEMPERATURE, MAX 300 PSI RATING, HOSE BUMPER, 4-WAY ROLLER HOSE ASSEMBLY, CEILING MOUNTING BRACKET. INSTALL PER MANUFACTURER'S INSTRUCTIONS. HOSE BUMPER TO BE SET AT 5' A.F.F. (ADJUSTABLE).

WATER HEATER SCHEDULE

TAG NO	MANUFACTURER	MODEL	GAS INPUT (BTUH)	WATER TEMP (°F)	RECOVERY (GPH)	AIR INTAKE ("DIA)	FLUE EXHAUST ("DIA)	VENT		NOTES
								CATEGORY	TYPE	
DWH-1	LOCHINVAR	AWN400PM-M9	399,999	140	465	4	4	IV	SS	1,2,3
NPWH-1	LOCHINVAR	AWN501PM-M9	500,000	140	582	4	4	IV	SS	1,2,3

NOTES:

1. PROVIDE WITH FLOW SWITCH AND CONDENSATE NEUTRALIZATION KIT.
2. RECOVERY CAPACITY BASED ON 100°F TEMPERATURE RISE.
3. COMBUSTION AIR AND VENT MAXIMUM LENGTH = 100'-0".
4. CONTROLLED BY BUILDING MANAGEMENT SYSTEM. REFER TO "M" DRAWINGS FOR CONTROLS.

WATER CIRCULATOR PUMP SCHEDULE

TAG NO.	SERVES	LOCATION	MODEL	GPM	TDH FT	MOTOR SPEC			RPM	NOTES
						WATTS	FLA	VOLTAGE		
DHWP-1	DWH-1	SUB-BASEMENT MECH ROOM	NBF-36 (3-SPEED)	7.25	18	270	2.3	120V, 1Ø	3300	1, 2
NPHWP-1	NPWH-1	SUB-BASEMENT MECH ROOM	NBF-36 (3-SPEED)	3.75	14	270	2.3	120V, 1Ø	3300	1, 2

NOTES:

1. CIRCULATOR SHALL BE IN-LINE, LEAD-FREE BRONZE CONSTRUCTION, CENTRIFUGAL PUMP. MOTOR SHALL BE NON-OVERLOADING WITH BUILT-IN THERMAL OVERLOAD PROTECTION.
2. PUMP CONTROLLED BY BUILDING MANAGEMENT SYSTEM, REFER TO "M" DRAWINGS FOR CONTROLS.

B2

GAS LOAD SCHEDULE - METER #1

ID TAG	LOCATION	CFH	NOTES
DWH-1	SUB-BASMENT MECHANICAL ROOM 35	400	1,2
NPWH-1	SUB-BASMENT MECHANICAL ROOM 35	500	1,2
B-1	SUB-BASMENT MECHANICAL ROOM 35	3500	1,2
B-2	SUB-BASMENT MECHANICAL ROOM 35	3500	1,2
B-3	SUB-BASMENT MECHANICAL ROOM 35	3500	1,2
CHEM. BLDG	SUB-BASMENT MECHANICAL ROOM 35	3000	3
	TOTAL:	11700	

NOTES:

1. MAXIMUM INLET PRESSURE = 14.0" WC
2. 8" BUILDING SERVICE SIZED BASED ON 275' OF PIPE AT 0.3 IN WC PRESSURE DROP
3. EXISTING CHEMISTRY BUILDING SERVICE. SIZED FOR MAXIMUM CFH ALLOWABLE BY PREVIOUS GAS METER. MAXIMUM SERVICE PRESSURE = 7" WC

GAS LOAD SCHEDULE - METER #2

ID TAG	LOCATION	CFH	NOTES
EMERGENCY GENERATOR	BUILDING EXTERIOR	7158	1,2,3
	TOTAL:	7158	

NOTES:

1. REQUIRED PRESSURE AT REGULATOR INLET = 14-20" W.C.
2. PROVIDE PRESSURE REGULATOR REQUIRED BY GENERATOR MANUFACTURER AT UNIT.
3. 6" GENERATOR SERVICE SIZE BASED ON 150' OF PIPE AT 0.3 IN WC PRESSURE DROP.

SP-1 SEQUENCE OF OPERATION

A. NORMAL OPERATION
THE SYSTEM SHALL BE CONFIGURED FOR ONE 4-20MA CONTINUOUS READ-OUT SIGNAL AND TWO WIDE ANGLE TILT TYPE FLOAT SWITCH OPERATION. THE 4-20MA SIGNAL WILL CONTROL EACH PUMP START LEVEL, MOTOR SPEED, STOP AND LEVEL ALARM INDICATION. THE CONTROLLER WILL STAGE THE LEAD PUMP TO PROVIDE 85 GPM FLOW AT A NORMAL PUMP DOWN LEVEL AND RAMP THE MOTOR SPEED TO ACHIEVE 300 GPM AT AN ADJUSTABLE SECONDARY PUMP DOWN LEVEL. WITH THE LEAD PUMP SELECTOR IN “AUTO“ AFTER EACH PUMPING CYCLE THE CONTROLLER SHALL ALTERNATE THE LEAD PUMP.

B. BACK-UP HIGH LEVEL OPERATION – THE FOLLOWING WILL OCCUR:
1. BOTH PUMPS WILL BE STARTED
2. GENERAL ALARM RED LED BEACON WILL ILLUMINATE
3. ALARM BUZZER WILL SOUND
4. TOUCHSCREEN WILL INDICATE “HIGH LEVEL ALARM”
5. GENERAL ALARM AUXILIARY CONTACT FOR THE BAS WILL CLOSE
6. ALARM SILENCE BUTTON WILL APPEAR ON THE SCREEN AND FLASH.

C. DRY RUN PROTECTION OPERATION – THE FOLLOWING WILL OCCUR:
1. ALL PUMPS WILL BE STOPPED
2. GENERAL ALARM RED LED BEACON WILL ILLUMINATE
3. ALARM BUZZER WILL SOUND
4. TOUCHSCREEN WILL INDICATE “DRY RUN ALARM”
5. GENERAL ALARM AUXILIARY CONTACT FOR THE BAS WILL CLOSE
6. ALARM SILENCE BUTTON WILL APPEAR ON THE SCREEN AND FLASH.

THE ALARM BUZZER CAN BE SILENCED BY PUSHING THE SILENCE BUTTON ON THE TOUCH SCREEN; HOWEVER, BOTH PUMPS WILL RUN, THE ALARM BEACON WILL REMAIN ON AND THE AUXILIARY ALARM CONTACT WILL REMAIN CLOSED UNTIL THE LEVEL IN THE WET WELL PUMPS DOWN AND THE LAG PUMP/HIGH LEVEL ALARM FLOAT RESETS .

D. SEAL FAILURE ALARM – THE FOLLOWING WILL OCCUR:
1. GENERAL ALARM RED LED BEACON WILL ILLUMINATE
2. TOUCHSCREEN WILL FLASH “SEAL FAIL PUMP #1 OR “SEAL FAIL PUMP #2”
3. GENERAL ALARM AUXILIARY CONTACT FOR THE BAS WILL CLOSE

THE PUMPS WILL CONTINUE TO RUN REGARDLESS OF THE SEAL FAILURE ALARM. THE ALARM BEACON WILL REMAIN ON AND THE GENERAL ALARM CONTACT WILL REMAIN CLOSED UNTIL THE SEAL FAILURE CONDITION HAS BEEN CORRECTED.

E. HIGH TEMPERATURE ALARM – THE FOLLOWING WILL OCCUR:
1. AFFECTED PUMP WILL BE DISABLED
2. GENERAL ALARM RED LED BEACON WILL ILLUMINATE
3. ALARM BUZZER WILL SOUND
4. TOUCHSCREEN WILL FLASH “HIGH TEMP PUMP #1 OR “HIGH TEMP PUMP #2”
5. GENERAL ALARM AUXILIARY CONTACT FOR THE BAS WILL CLOSE
6. ALARM SILENCE BUTTON WILL APPEAR ON THE SCREEN AND FLASH.

THE ALARM BUZZER CAN BE SILENCED BY PRESSING THE SILENCING BUTTON ON THE TOUCHSCREEN; HOWEVER, THE ALARM BEACON WILL REMAIN ON, THE AFFECTED PUMP(S) WILL REMAIN DISABLED AND THE GENERAL ALARM CONTACT WILL REMAINED CLOSED UNTIL THE HIGH TEMPERATURE CONDITION CLEARS.

PLUMBING FIXTURE SCHEDULE

IDENTIFICATION	DESCRIPTION
WC-1	WATER CLOSET: WALL MOUNTED, SENSOR FLUSH VALVE: 1. AMERICAN STANDARD "AFWALL" (1.28 GPF) MODEL 2257.001, WALL HUNG SIPHON JET, WHITE VITREOUS CHINA WITH ELONGATED BOWL, 1 1/2-INCH TOP SPUD, CHINA BOLD CAPS. 2. VALVE: SLOAN CROWN OPTIMA MODEL 115 ESS HARDWIRED-1.28-DFB-OR-HW. INFRARED SENSOR OPERATED WITH INDICATOR LIGHT, 1.28 GPF, DUAL-FILTERED FIXED BYPASS DIAPHRAGM, POLISHED CHROME FINISH WITH POLISHED CHROME WALL PLATE. OVERRIDE BUTTON, VACUUM BREAKER, VANDAL RESISTANT ANGLE STOP, SPUD COUPLING AND FLANGE FOR TOP SPUD. 3. SEAT: SOLID WHITE PLASTIC, OPEN FRONT, EXTENDED BACK, BRASS BOLTS, STAINLESS STEEL SELF-SUSTAINING CHECK HINGE AND POST, "STATITE" FASTENING SYSTEM (NO SUBSTITUTE), WITHOUT COVER; BEMIS 1955SSCT. 4. CARRIER: ANSI A112.6.1; ADJUSTABLE CAST IRON FRAME, LUGS FOR FLOOR AND WALL ATTACHMENT, THREADED FIXTURE STUDS WITH NUTS AND WASHERS; WADE 300 SERIES. 5. REFER TO DRAWINGS AND PROVIDE TRANSFORMER FOR VALVE AS INDICATED (INSTALLED BY EC). PROVIDE LOW VOLTAGE WIRING FROM TRANSFORMER TO FIXTURES (BY MC).
WC-2	WATER CLOSET: WALL MOUNTED, AUTOMATIC FLUSH VALVE, ADA COMPLIANT: 1. SAME AS WC-1 EXCEPT MOUNT PER ADA REQUIREMENTS.
UR-1	URINAL: WALL MOUNTED, SENSOR FLUSH VALVE: 1. AMERICAN STANDARD "WASHBROOK FLOWISE" 6590.525, WALL HUNG WHITE, VITREOUS CHINA, WASHOUT URINAL WITH SHIELDS, INTEGRAL TRAP, 3/4-INCH TOP SPUD, 0.125 GPF, STEEL SUPPORTING HANGER. 2. VALVE: SLOAN CROWN OPTIMA MODEL 186 ESS HARDWIRED-0.125-DBP-OR-HW. INFRARED SENSOR OPERATED WITH INDICATOR LIGHT, 0.125 GPF, DUAL-FILTERED BYPASS, POLISHED CHROME FINISH WITH POLISHED CHROME WALL PLATE. OVERRIDE BUTTON, VACUUM BREAKER, VANDAL RESISTANT ANGLE STOP, SPUD COUPLING AND FLANGE FOR TOP SPUD. 3. CARRIER: ANSI A112.6.1; CAST IRON AND STEEL FRAME WITH TUBULAR LEGS, LUGS FOR FLOOR AND WALL ATTACHMENT, CONCEALED ARM SUPPORTS, BEARING PLATE, AND STUDS; WADE 400 SERIES. 4. REFER TO DRAWINGS AND PROVIDE TRANSFORMER FOR VALVE AS INDICATED (INSTALLED BY EC). PROVIDE LOW VOLTAGE WIRING FROM TRANSFORMER TO FIXTURES (BY MC).
LAV-1	LAVATORY: WALL MOUNT, ADA COMPLIANT: 1. BOWL: AMERICAN STANDARD "LUCERNE" 0356.421, WHITE VITREOUS CHINA WALL MOUNTED LAVATORY, 20 1/2" x 18 1/4" x 6 1/2" DEEP BOWL, SINGLE CENTER HOLE, FRONT OVERFLOW, SELF DRAINING DECK WITH BACK AND SIDE SPLASH SHIELDS, CONCEALED ARM SUPPORTS. 2. TRIM: SLOAN OPTIMA MODEL ETF-880-4-B DECK MOUNTED FAUCET. 0.5 GPM, INFRARED SENSOR ACTIVATED, POLISHED CHROME FINISH, 4" TRIM PLATE. VANDAL RESISTANT SPRAY HEAD WITH PRESSURE COMPENSATING FLOW CONTROL. TROUBLESHOOTING LED INDICATOR LIGHTS. 3. SUPPLIES: CHICAGO FAUCETS 1017, 3/8-INCH KEY OPERATED ANGLE STOPS WITH ANNEALED RISERS. 4. DRAIN: 1 1/4-INCH CHROME PLATED TAILPIECE WITH OPEN GRID STRAINER. 5. TRAP: 1 1/4-INCH CHROME PLATED, 17 GAUGE BRASS P-TRAP WITH CLEANOUT PLUG. 6. MIXING VALVE: ASSE 1070 MIXING VALVE TO PROVIDE TEMPERED WATER TO FAUCET. MOUNT ABOVE CEILING IN ACCESSIBLE LOCATION; COORDINATE LOCATION WITH ACCESS PANEL. 7. PIPE COVERS: PROVIDE PROTECTIVE PIPE COVERS ON DRAIN AND SUPPLY PIPING BELOW LAVATORY - "LAV GUARD" AS MANUFACTURED BY TRUEBRO. 8. CARRIER: ANSI A112.6.1; CAST IRON AND STEEL FRAME WITH TUBULAR LEGS, LUGS FOR FLOOR AND WALL ATTACHMENT, CONCEALED ARM SUPPORTS, BEARING PLATE, AND STUDS; WADE 400 SERIES. 9. REFER TO DRAWINGS AND PROVIDE BOX MOUNT TRANSFORMER AS INDICATED (INSTALLED BY EC). PROVIDE LOW VOLTAGE WIRING FROM TRANSFORMER TO FIXTURES (BY MC).
LAV-2	LAVATORY: UNDERMOUNT, ADA COMPLIANT: 1. BOWL: ELKAY "ASANA" MODEL NO. ELUH12LV. 18 GAUGE TYPE 304 STAINLESS STEEL UNDERMOUNT LAVATORY. 14 3/8" x 14 3/8" x 6" DEEP BOWL, CENTER DRAIN WITH FRONT OVERFLOW AND MOUNTING KIT. 2. TRIM: SLOAN OPTIMA MODEL ETF-880-4-B DECK MOUNTED FAUCET. 0.5 GPM, INFRARED SENSOR ACTIVATED, POLISHED CHROME FINISH, 4" TRIM PLATE. VANDAL RESISTANT SPRAY HEAD WITH PRESSURE COMPENSATING FLOW CONTROL. TROUBLESHOOTING LED INDICATOR LIGHTS. 3. SUPPLIES: CHICAGO FAUCETS 1017, 3/8-INCH KEY OPERATED ANGLE STOPS WITH ANNEALED RISERS. 4. DRAIN: 1 1/4-INCH CHROME PLATED TAILPIECE WITH OPEN GRID STRAINER. 5. TRAP: 1 1/4-INCH CHROME PLATED, 17 GAUGE BRASS P-TRAP WITH CLEANOUT PLUG. 6. MIXING VALVE: ASSE 1070 MIXING VALVE TO PROVIDE TEMPERED WATER TO FAUCET. MOUNT ABOVE CEILING IN ACCESSIBLE LOCATION; COORDINATE LOCATION WITH ACCESS PANEL. 7. PIPE COVERS: PROVIDE PROTECTIVE PIPE COVERS ON DRAIN AND SUPPLY PIPING BELOW LAVATORY - "LAV GUARD" AS MANUFACTURED BY TRUEBRO. 8. REFER TO DRAWINGS AND PROVIDE BOX MOUNT TRANSFORMER AS INDICATED (INSTALLED BY EC). PROVIDE LOW VOLTAGE WIRING FROM TRANSFORMER TO FIXTURES (BY MC).
SH-1	SHOWER 1. TRIM: KOHLER RITE-TEMP MODEL NO. K-8304-K-NA PRESSURE BALANCING VALVE BODY AND CARTRIDGE KIT, KOHLER MODEL #K-TS15621-4-CP VALVE TRIM, KOHLER AWAKEN MODEL #K-98361-G-CP 1.75 GPM HANDSHOWER KIT AND ALL REQUIRED COMPONENTS AND ACCESSORIES. 2. PROVIDE WITH ASSE 1016 MIXING VALVE.
LS-1	LABORATORY SINK 1. BOWL: DURCON EPOXY RESIN UNDERMOUNT SINK. 28"L x 15"W x 12"D. MANUFACTURER AND COLOR TO MATCH LABORATORY BENCHES AS SPECIFIED BY ARCHITECT. 2. TRIM: WATERSAVER MODEL L2222VB. DECK MOUNTED FAUCET, 8" CENTERS, WITH VACUUM BREAKER. 6" SWING GOOSENECK. 4" FORGED BRASS WRIST BLADE HANDLES WITH COLOR-CODED INDEX DISCS. 3. DRAIN: EPOXY RESIN STRAINER, STOPPER AND OPEN-END OVERFLOW. 4. TAILPIECE & TRAP: COMPATIBLE WITH ACID WASTE PIPING SYSTEM.
LS-2	LABORATORY HANDWASH SINK 1. BOWL: JUST MFG. MODEL A-33338-T WALL HUNG LAVATORY. SEAMLESS WELDED CONSTRUCTION, 18 GAUGE TYPE 304 STAINLESS STEEL WITH INTEGRAL-FORMED APRON AND BACKSPLASH. UNDERSIDE COATED TO INSULATE FOR SOUND AND REDUCE CONDENSATION. PROVIDE WITH WALL CLIP AND INTEGRAL FLANGE FOR WALL MOUNTING. 2. TRIM: PROVIDE WITH MODEL JV-1139-A FAUCET, PVD COATED SOLID CAST BRASS BODY, CHROME CENTERESET LAVATORY FAUCET. REPLACEABLE SEATS AND AERATOR. 2.2 GPM FLOW RATE AT 80 PSI. 3. DRAIN: JUST MFG. MODEL J-115-FS, CHROME PLATED CASE BRASS BODY, 17 GAUGE CHROME PLATED BRASS DRAIN PIPE 4. TRAP: COMPATIBLE WITH WASTE PIPING SYSTEM.
LS-3	LABORATORY SINK 1. BOWL: ELKAY MODEL ELUH211512 STAINLESS STEEL UNDERMOUNT SINK. 23-1/2"L x 18-1/4"W x 12"D. 18 GAUGE TYPE 304 STAINLESS STEEL WITH LUSTERTONE FINISH. REAR CENTER DRAIN. 2. TRIM: WATERSAVER MODEL L2222VB. DECK MOUNTED FAUCET, 8" CENTERS, WITH VACUUM BREAKER. 6" SWING GOOSENECK. 4" FORGED BRASS WRIST BLADE HANDLES WITH COLOR-CODED INDEX DISCS. 3. DRAIN: TYPE 304 STAINLESS STEEL BODY STRAINER, RUBBER SEAL AND TYPE 304 STAINLESS STEEL TAILPIECE. 4. TRAP: COMPATIBLE WITH ACID WASTE PIPING SYSTEM.
LF-1	LABORATORY FAUCET - REVERSE OSMOSIS WATER: 1. WATERSAVER MODEL L7837 RECIRCULATING PURE WATER FAUCET. DECK MOUNTED, MANUAL CONTROL. POLYPROPYLENE-LINED WITH POLISHED CHROME PLATED FINISH. INDEX DISC TO BE LABELED "RO".
LF-2	LABORATORY FAUCET - DI WATER: 1. WATERSAVER MODEL L7837 RECIRCULATING PURE WATER FAUCET. DECK MOUNTED, MANUAL CONTROL. POLYPROPYLENE-LINED WITH POLISHED CHROME PLATED FINISH. INDEX DISC TO BE LABELED "DI".
EW-1	EMERGENCY EYE/FACE WASH: 1. GUARDIAN MODEL G1779 BARRIER FREE EYE/FACE WASH. DECK MOUNTED WITH 90° SWING DOWN TO OPERATIONAL POSITION AT 3.2 GPM. TWO SPRAY HEADS WITH DUST COVER, INTERNAL FLOW CONTROL AND FILTER. 1/2" INLET. POLISHED CHROME PLATED BRASS CONSTRUCTION. ANSI-COMPLIANT IDENTIFICATION SIGN.
ES-1	EMERGENCY SHOWER: 1. GUARDIAN MODEL GBF2172, RECESSED BARRIER FREE EYE/FACE WASH AND EMERGENCY SHOWER. 10" DIAMETER STAINLESS STEEL SHOWER HEAD WITH FLOW CONTROL, STAINLESS STEEL PANIC BAR ACTUATOR, HORIZONTAL SUPPLY PIPE AND WALL ESCUTCHEON. 16 GAUGE STAINLESS STEEL COMBINATION COVER AND DRAIN PAN. PANIC BAR HANDLE PULL DOWN TO ACTIVATE EYE/FACE WASH. WASTE WATER COLLECTIN WITH DRAIN PAN TO BE RE-DIRECTED TO DAYLIGHT DRAIN FOR DRAINAGE OUT THE FRONT OF THE UNIT. TWO SPRAY HEADS WITH FLOW CONTROL AND FILTER. 1" INLET, 1" STAINLESS STEEL DRAIN ELBOW ON FRONT OF UNIT. ANSI-COMPLIANT IDENTIFICATION SIGN.
SS-1	SERVICE SINK: 1. BOWL: KOHLER "WHITBY" MODEL K-6710 SERVICE SINK. CAST IRON CORNER BASIN. ACID-RESITANT ENAMEL FINISH WITHOUT OVERFLOW. 2. TRIM: CHICAGO MODEL 897-RCF FAUCET. WALL MOUNTED, 8" BODY WITH 7 5/8" - 8 3/8" ADJUSTABLE ARMS. CHROME PLATED WITH VACUUM BREAKER. INTEGRAL STOPS, PAIL HOOK, WALL BRACE AND 3/4" MALE HOSE THREAD OUTLET. 3. ACCESSORIES: KOHLER MODEL K-8940 DURABLE COATED WIRE CONSTRUCTION SINK RIM GUARD; KOHLER MODEL K-8801-CP BRASS CONSTRUCTION STRAINER AND TAILPIECE.
EWC-1	ELECTRIC WATER COOLER WITH BOTTLE FILLER STATION AND FILTER: ADA COMPLIANT 1. FOUNTAIN: "ELKAY" MODEL NO. LVRCTL8WSK, BARRIER-FREE, SURFACE MOUNTED BI-LEVEL ELECTRIC WATER COOLER WITH STAINLESS STEEL TOP AND BODY. VANDAL RESISTANT BUBBLER. ELECTRONIC BOTTLE FILLER BUTTON WITH MECHANICAL FRONT BUBBLER BUTTON. AUTOMATIC 20-SECOND SHUT-OFF TIMER ON BOTTLE FILLER. PROVIDE WITH WALL MOUNTING BRACKET. SOLENOID TO CYCLE UNIT EVERY 12 HOURS. INTEGRAL AIR COOLED CONDENSER, CAPACITY OF 8.0 GPH OF 50 DEGREE F WATER WITH INLET AT 80°F AND ROOM TEMPERATURE OF 90° F, 3000-GALLON CAPACITY FILTRATION SYSTEM WITH AUTOMATIC FILTER STATUS RESET WITH FILTER CHANGE, 5.0 FLA COMPRESSOR, 120-1-60. ACCESS TO SERVICE UNIT FROM FRONT AND SIDE PANELS. 2. TRAP: 1 1/4-INCH CHROME PLATED, 17 GAUGE BRASS P-TRAP. 3. HANGERS: PROVIDE STRUCTURAL STEEL MEMBERS EMBEDDED IN WALL WITH MOUNTING BOLTS FOR SECURING WATER COOLER.
FLOOR DRAINS, FLOOR SINKS	MANUFACTURER: J.R. SMITH, WADE, JOSAM, ZURN. IDENTIFICATION / DESCRIPTION FD-1 — FLOOR DRAIN: ZURN ZN415, CAST IRON FLOOR DRAIN, COMBINATION INVERTIBLE MEMBRANE CLAMP AND ADJUSTABLE COLLAR WITH SEEPAGE SLOTS, "TYPE B" 6-INCH ROUND ADJUSTABLE NICKEL BRONZE STRAINER. FD-2 — FLOOR DRAIN: ZURN Z550 CAST IRON FLOOR DRAIN WITH SEEPAGE PAN, 9-INCH DIAMETER MEDIUM DUTY CAST IRON DEEP SLOTTED GRATE AND COMBINATION MEMBRANE FLASHING CLAMP AND FRAME. FD-3 — FLOOR DRAIN: ZURN Z415S, CAST IRON FLOOR DRAIN, COMBINATION INVERTIBLE MEMBRANE CLAMP AND ADJUSTABLE COLLAR WITH SEEPAGE SLOTS, 8-INCH x 8-INCH SQUARE ADJUSTABLE NICKEL BRONZE STRAINER. FD-4 — FLOOR DRAIN: ZURN Z610LY HEAVY-DUTY CAST IRON FLOOR DRAIN, COMBINATION MEMBRANE FLASHING CLAMP AND SEEPAGE PAN. 12-INCH x 12-INCH SQUARE CAST IRON SLOTTED GRATE. LESS SEDIMENT BUCKET.
TRAP SEAL	1. PROVIDE FOR ALL FLOOR DRAINS. 2. INLINE FLOOR DRAIN TRAP SEAL, ASSE A1072 APPROVED, MANUFACTURED BY "SURE SEAL" OR "J.R. SMITH".
ROOF DRAINS	IDENTIFICATION / DESCRIPTION RD-1 — ROOF DRAIN: ZURN ZC100, 15" DIAMETER, CAST IRON BODY WITH COMBINATION MEMBRANE FLASHING CLAMP/GRAVEL GUARDS, LOW SILHOUETTE CAST IRON DOME. PROVIDE EXTENSIONS AS REQUIRED. ORD-1 — ROOF DRAIN (OVERFLOW): SAME AS RD-1 EXCEPT PROVIDE WITH 2-INCH INTERNAL WATER DAM.

FIXTURE PIPE SIZE SCHEDULE

ID TAG	FIXTURE	COLD WATER SUPPLY (inches)	HOT WATER SUPPLY (inches)	MINIMUM SAN TRAP SIZE (inches)	MINIMUM SAN VENT SIZE (inches)
WC	WATER CLOSET, VALVE - PER (1) WC	1 1/4	--	4	2
	SUPPLY LINE FOR (2) WC	1 1/2	--	--	2
	SUPPLY LINE FOR (3) WC	2	--	--	2
	SUPPLY LINE FOR (4) WC	2	--	--	2
UR	URINAL, VALVE - PER (1) UR	1 1/4	--	2	2
	SUPPLY LINE FOR (2) UR	1 1/2	--	--	--
LAV	LAVATORY - PER (1) LAV	1/2	1/2	1 1/2	1 1/2
	SUPPLY LINE FOR (2) LAV	1/2	1/2	--	--
	SUPPLY LINE FOR (3) LAV	3/4	3/4	--	--
	SUPPLY LINE FOR (4) LAV	3/4	3/4	--	--
S	SINK, HAND - 1 COMPARTMENT	1/2	1/2	2	2
SS	SERVICE SINK	3/4	3/4	3	2
FD	FLOOR DRAIN	--	--	3	2
EWC	ELECTRIC WATER CHILLER	1/2	--	2	1 1/2
HB/WH	HOSE BIBB/WALL HYDRANT	3/4	--	--	--

WATER HAMMER ARRESTER SCHEDULE (WHA)

P.D.I. SIZE	WATER SUPPLY FIXTURE UNITS
"A"	1 TO 11
"B"	12 TO 32
"C"	33 TO 60
"D"	61 TO 113
"E"	114 TO 154
"F"	155 TO 330

NOTES:

1. USE NEXT LARGER SIZE WATER HAMMER ARRESTER WHEN FLOW PRESSURE EXCEEDS 65 PSIG.
2. BASED ON: PLUMBING AND DRAINAGE INSTITUTE STANDARD PDI-WH-201.

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
03/15/2019	BULLETIN NO. 2	6
05/06/2019	TEST AND BALANCE BID	

Key Plan

Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

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Project Manager J. SMITH	BIM Lead C. BAKER
Design Lead B. HALL	Drawn B. HALL
Project Leader Approver	Checked Checker

WAYNE STATE UNIVERSITY

Project
STEM Innovation
Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

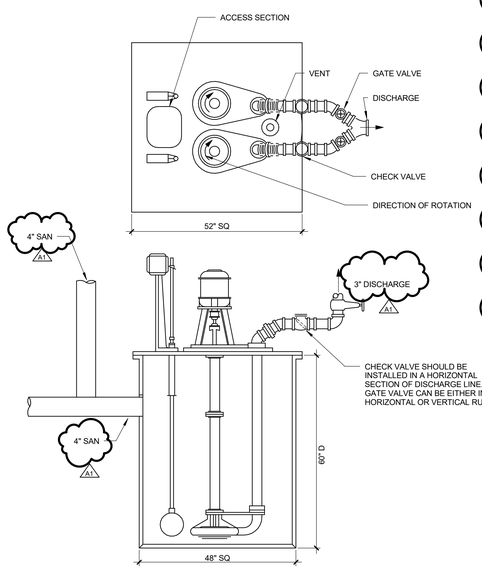
Drawing Title
SCHEDULES

Scale 12" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

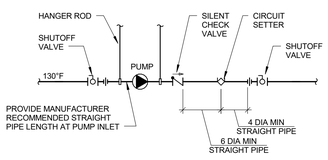
Drawing No.
P40-01

1/14/2019 2:04:07 PM



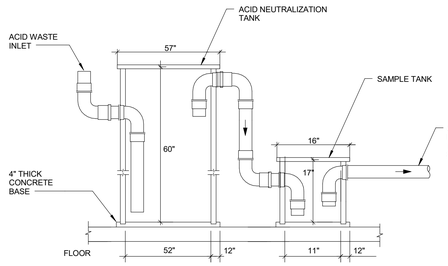
SEWAGE EJECTOR (SP-1) DETAIL
NO SCALE

A1



NOTES
1. 2" AND SMALLER PIPE TO BE SCREWED.
2. INSULATE PUMP IN ACCORDANCE WITH SPECIFICATIONS.
3. FOR 2" AND SMALLER PIPE PROVIDE CIRCUIT SETTER.
4. FLOW INDICATOR MAY BE ON RETURN SIDE.

IN-LINE HOT WATER RETURN PUMP DETAIL
NO SCALE



ACID NEUTRALIZATION TANK (NT-1) DETAIL
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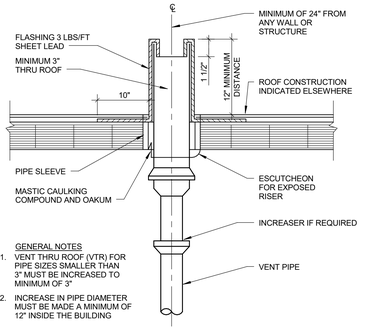
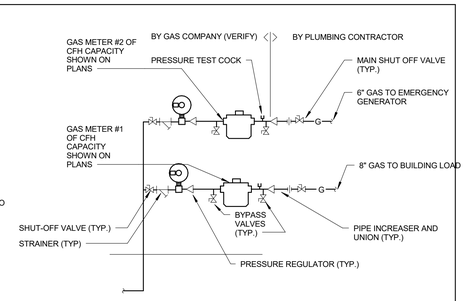


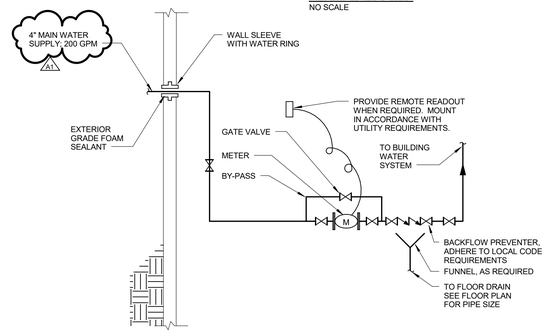
GENERAL NOTES
1. VENT THRU ROOF (VTR) FOR PIPE SIZES SMALLER THAN 3" MUST BE INCREASED TO MINIMUM OF 3"
2. INCREASE IN PIPE DIAMETER MUST BE MADE A MINIMUM OF 12" INSIDE THE BUILDING

PLUMBING VENT THRU ROOF DETAIL
NO SCALE



NOTES
1. VERIFY REQUIREMENTS FOR METERING AND PIPING WITH GAS COMPANY. INSTALL OTHER UTILITIES MINIMUM TEN FEET FROM GAS LINE. PLUMBING CONTRACTOR SHALL PAY ALL GAS COMPANY FEES FOR INSTALLATION. USE WELDED OR SCREWED PIPE AND FITTINGS PER PLUMBING SPECS. GAS COMPANY SHALL EXCAVATE, BACKFILL AND REPAIR ANY PAVING OR SOD FOR GAS SERVICE LINE INSTALLATION FROM MAIN TO BUILDING.
2. PROVIDE SIGNAGE FOR GAS SUPPLY LINE FOR EMERGENCY GENERATOR IN ACCORDANCE WITH NFPA 110 7.9.7.

GAS METER DETAIL
NO SCALE



WATER METER DETAIL
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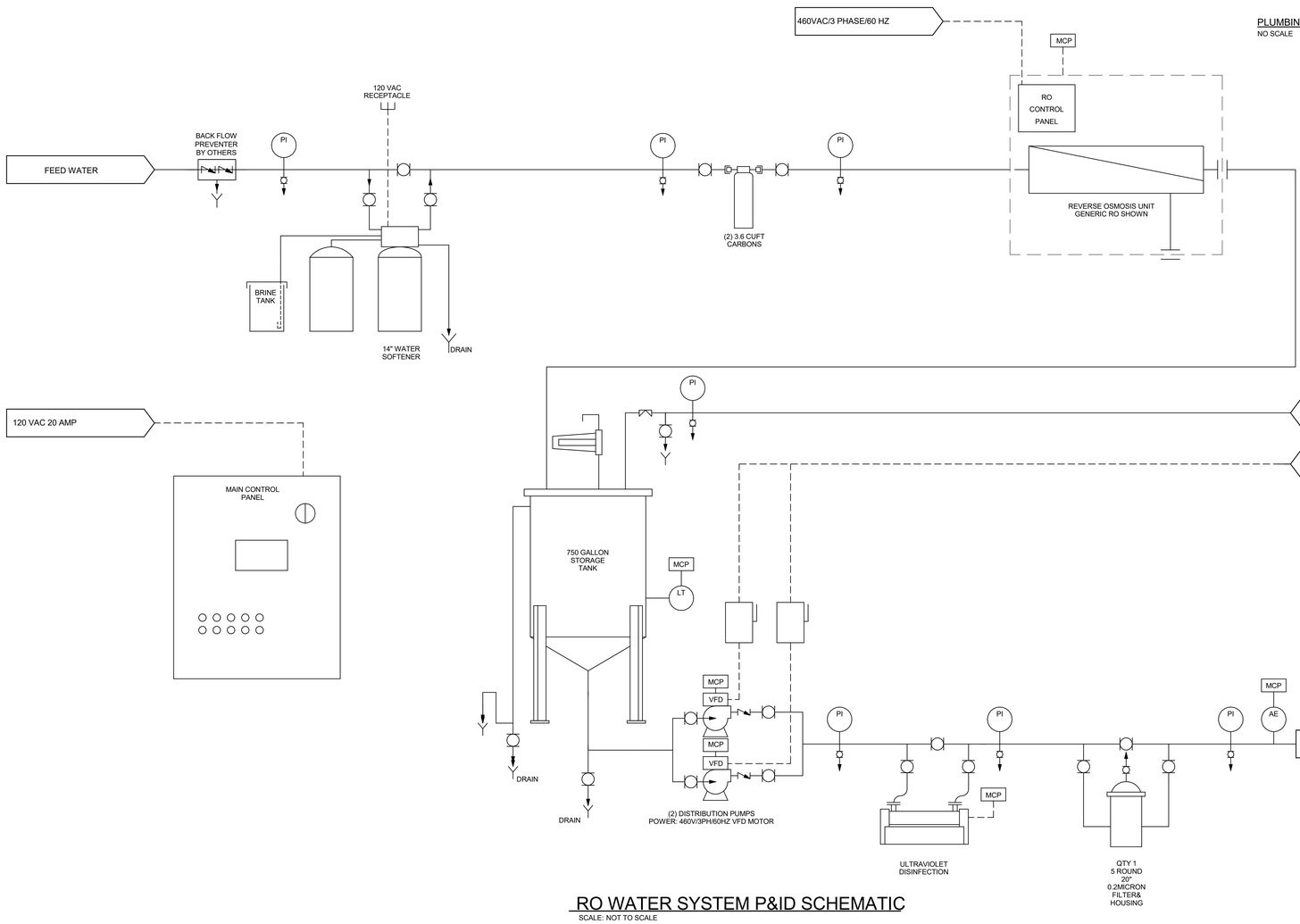
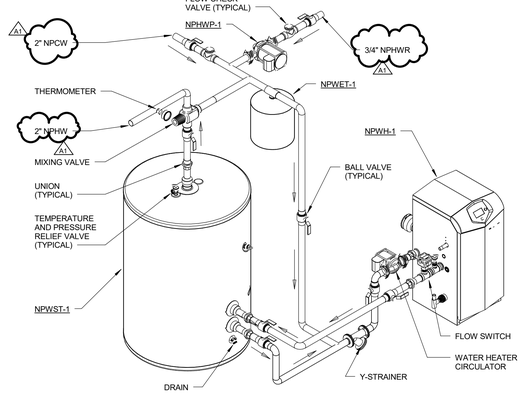
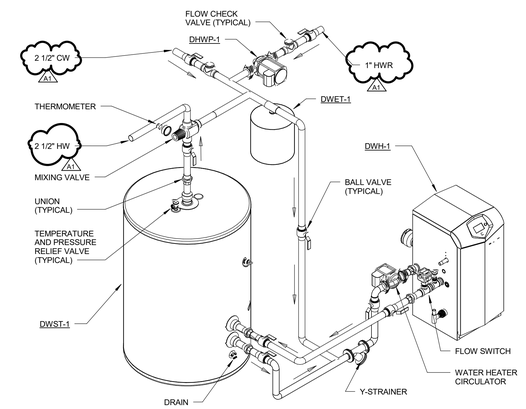


RO WATER SYSTEM P&ID SCHEMATIC
SCALE: NOT TO SCALE



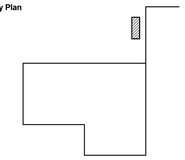
NPWH-1 SYSTEM DETAIL
NO SCALE



DWH-1 SYSTEM DETAIL
NO SCALE

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

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Design Lead B. HALL	Drawn B. HALL
Project Leader Approver	Checked Checker

WAYNE STATE UNIVERSITY

Project
STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
DETAILS

Scale 12" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
P50-01

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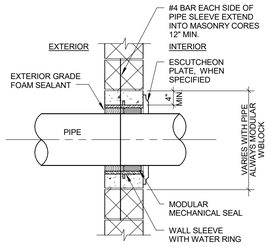
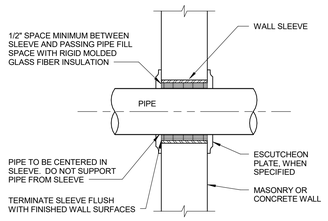


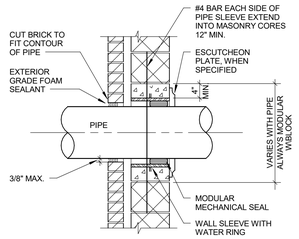
NOTE
USE TYPE 3 WALL SLEEVE FOR ALL PIPING PASSING THROUGH NEW EXTERIOR BLOCK WALLS.

WALL SLEEVE DETAIL - TYPE 3
NO SCALE



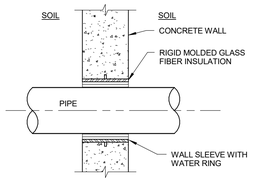
NOTE
USE TYPE 6 WALL SLEEVE FOR ALL PIPING PASSING THROUGH NEW INTERIOR NON-FIRE RATED MASONRY OR CONCRETE WALLS.

WALL SLEEVE DETAIL - TYPE 6
NO SCALE



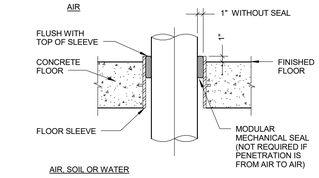
NOTE
USE TYPE 2 WALL SLEEVE FOR ALL PIPING PASSING THROUGH NEW EXTERIOR BLOCK AND BRICK WALLS.

WALL SLEEVE DETAIL - TYPE 2
NO SCALE



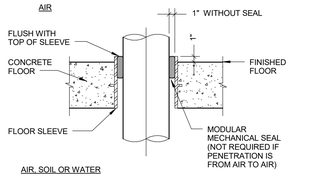
NOTE
USE TYPE 4 WALL SLEEVE FOR ALL PIPING 4" AND UP IN SIZE PASSING THROUGH NEW BELOW GRADE CAST-IN-PLACE CONCRETE WALLS WITH SOIL ON BOTH SIDES.

WALL SLEEVE DETAIL - TYPE 4
NO SCALE



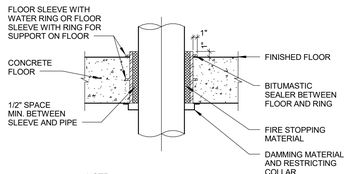
NOTE
USE TYPE 1 FLOOR SLEEVE FOR ALL PIPING PASSING THROUGH NEW NON-FIRE RATED CAST-IN-PLACE CONCRETE FLOORS.

FLOOR SLEEVE DETAIL - TYPE 1
NO SCALE



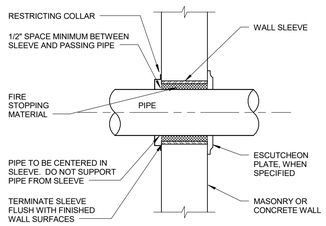
NOTE
USE TYPE 1 FLOOR SLEEVE FOR ALL PIPING PASSING THROUGH NEW NON-FIRE RATED CAST-IN-PLACE CONCRETE FLOORS.

FLOOR SLEEVE DETAIL - TYPE 1
NO SCALE



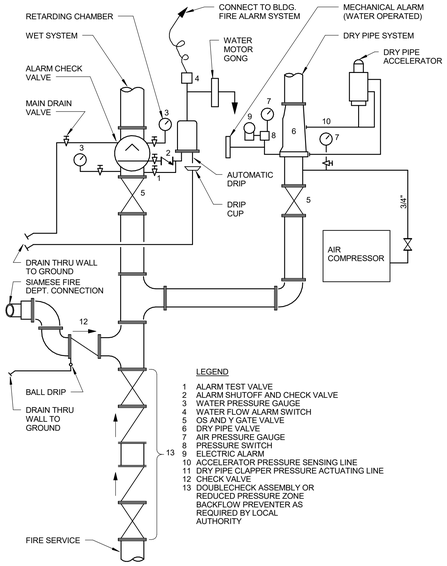
NOTE
USE TYPE 3 FLOOR SLEEVE FOR ALL PIPING PASSING THROUGH NEW OR EXISTING FIRE RATED CONCRETE FLOORS.

FLOOR SLEEVE DETAIL - TYPE 3
NO SCALE

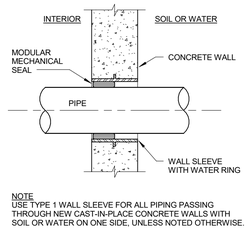


NOTE
USE TYPE 5 WALL SLEEVE FOR ALL PIPING PASSING THROUGH NEW FIRE RATED INTERIOR MASONRY OR CONCRETE WALLS.

WALL SLEEVE DETAIL - TYPE 5
NO SCALE

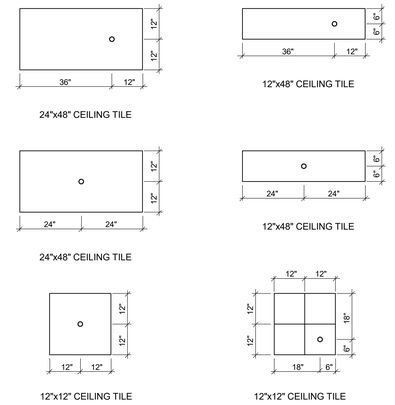


WET AND DRY SPRINKLER SERVICE
NO SCALE



NOTE
USE TYPE 1 WALL SLEEVE FOR ALL PIPING PASSING THROUGH NEW CAST-IN-PLACE CONCRETE WALLS WITH SOIL OR WATER ON ONE SIDE, UNLESS NOTED OTHERWISE.

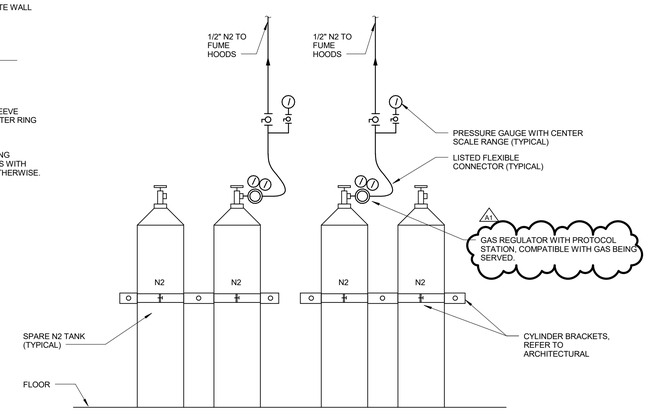
WALL SLEEVE DETAIL - TYPE 1
NO SCALE



NOTES:

1. ALL LOCATIONS INDICATED ARE TO BE MAINTAINED WITHIN PLUS OR MINUS 1/2", AND ALIGNED WITH ADJACENT HEADS FOR A UNIFORM, EVEN APPEARANCE OF COMPLETED INSTALLATION. POSITIONS INDICATED APPLY TO FULL SIZE SMOOTH SURFACE TILES, AS WELL AS FULL SIZE SUB-GRIDDED (SCORED OR GRAPHICALLY DIVIDED) SURFACE TILES. THE APPEARANCE OF THE FINISHED CEILING TILE FACE AS INSTALLED OVERRIDES THE ACTUAL PHYSICAL DIMENSIONS OF THE TILE FOR PLACEMENTS INDICATED HEREIN. VERIFY CEILING TILE TYPES FROM ARCHITECTURAL DOCUMENTS.
2. PENDANT SPRINKLER HEADS TO BE INSTALLED WITH DEFLECTORS AT SAME ELEVATION AS ADJACENT SPRINKLERS IN SAME AREA / ENCLOSURE, PLUS OR MINUS 1/4". RECESSED HEADS TO BE INSTALLED SO DEFLECTOR IS A MAXIMUM OF 1" BELOW THE ELEVATION OF THE CEILING PLANE. CONCEALED HEADS TO BE INSTALLED WITH COVERS FLUSH TO CEILING PLANE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
3. INSTALLATION OF ALL SPRINKLER HEADS TO BE COORDINATED WITH STRUCTURE AND WORK OF OTHER TRADES, VERIFIED IN ADVANCE BY THE FIRE PROTECTION CONTRACTOR.

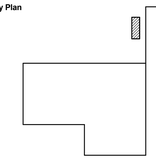
SPRINKLER HEAD DETAIL
NO SCALE



GAS CYLINDER DETAIL
NO SCALE

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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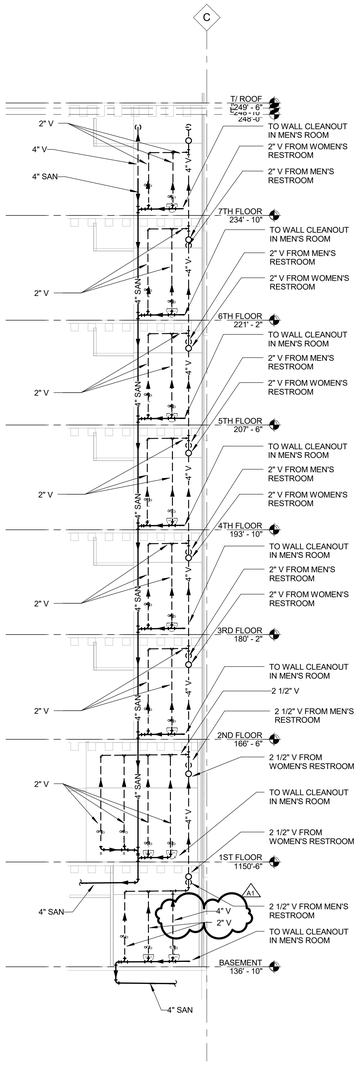
J. SMITH	C. BAKER
Design Lead	Drawn
B. HALL	B. HALL
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

Project
STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
DETAILS

Scale 12" = 1'-0"
Project No. JCDT17-0231 (FTCH 180050)
Drawing No.
P50-02



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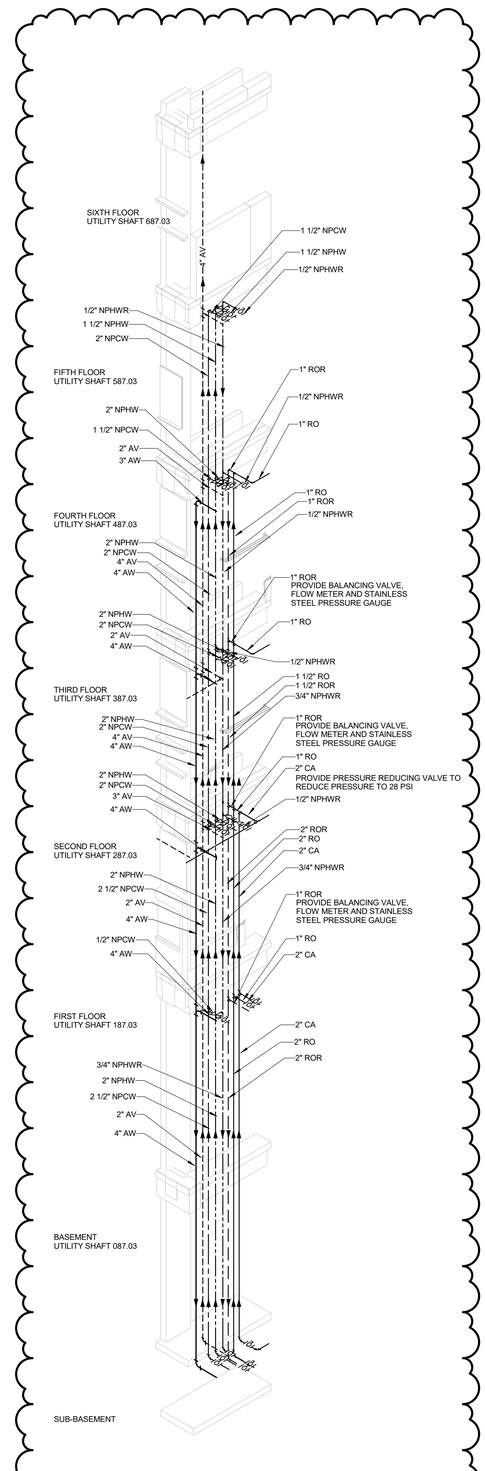

2 SUPPLY PIPING RISER - LABS
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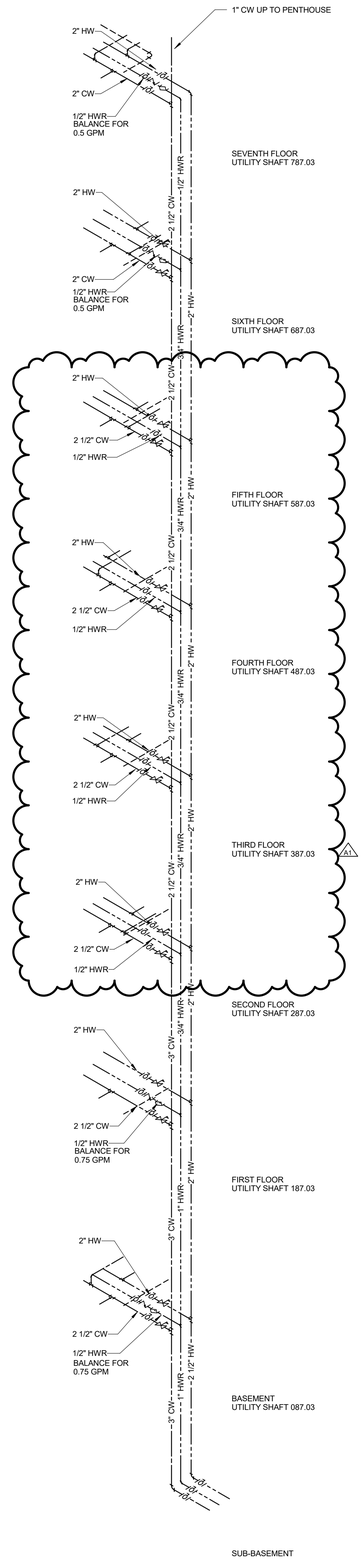
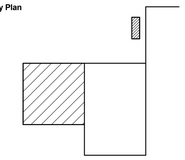


1 SUPPLY PIPING RISER - SHAFT X87.03
SCALE:

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

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Design Lead	Drawn
B. HALL	B. HALL
Project Leader	Checked
Approver	Checker

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Project

STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

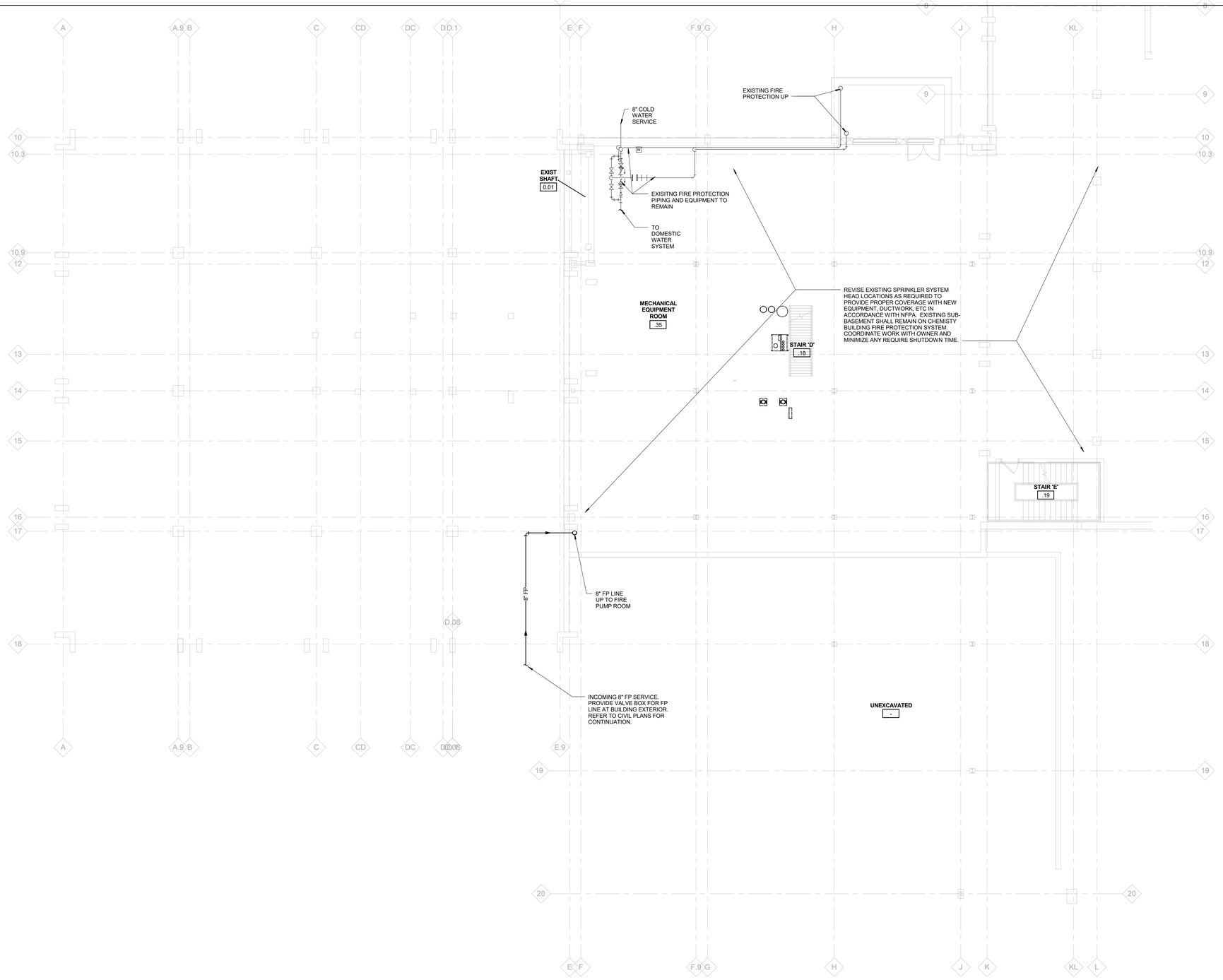
RISER DIAGRAMS

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

P50-03



SUB-BASEMENT FIRE PROTECTION PLAN

SCALE: 1/8" = 1'-0"

NORTH

DATE	ISSUED FOR	REV
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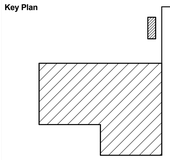
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

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Project Manager J. SMITH	BIM Lead C. BAKER
Design Lead B. HALL	Drawn B. HALL
Project Leader Approver	Checked Checker

WAYNE STATE UNIVERSITY

Project

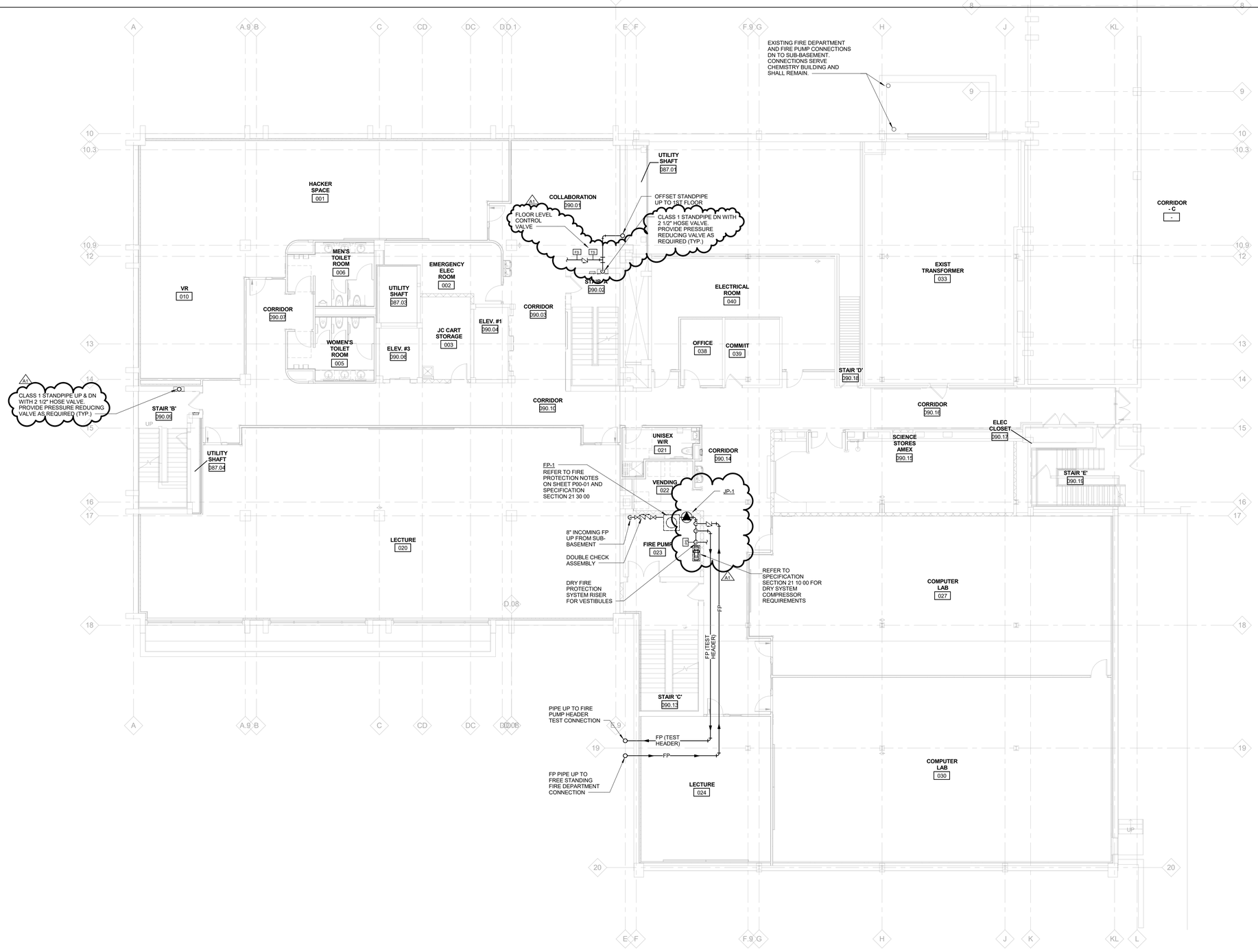
STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

SUB-BASEMENT FIRE PROTECTION PLAN

Scale	1/8" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	P60-01



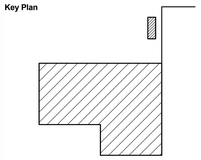
NORTH

BASEMENT FIRE PROTECTION PLAN

SCALE: 1/8" = 1'-0"

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
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B. HALL	B. HALL
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

BASEMENT FIRE PROTECTION PLAN

Scale	1/8" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	P60-02

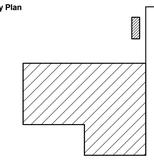
FIRST FLOOR FIRE PROTECTION PLAN

SCALE: 1/8" = 1'-0"

NORTH

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

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Design Lead: B. HALL	Drawn: B. HALL
Project Leader: Approver	Checked: Checker

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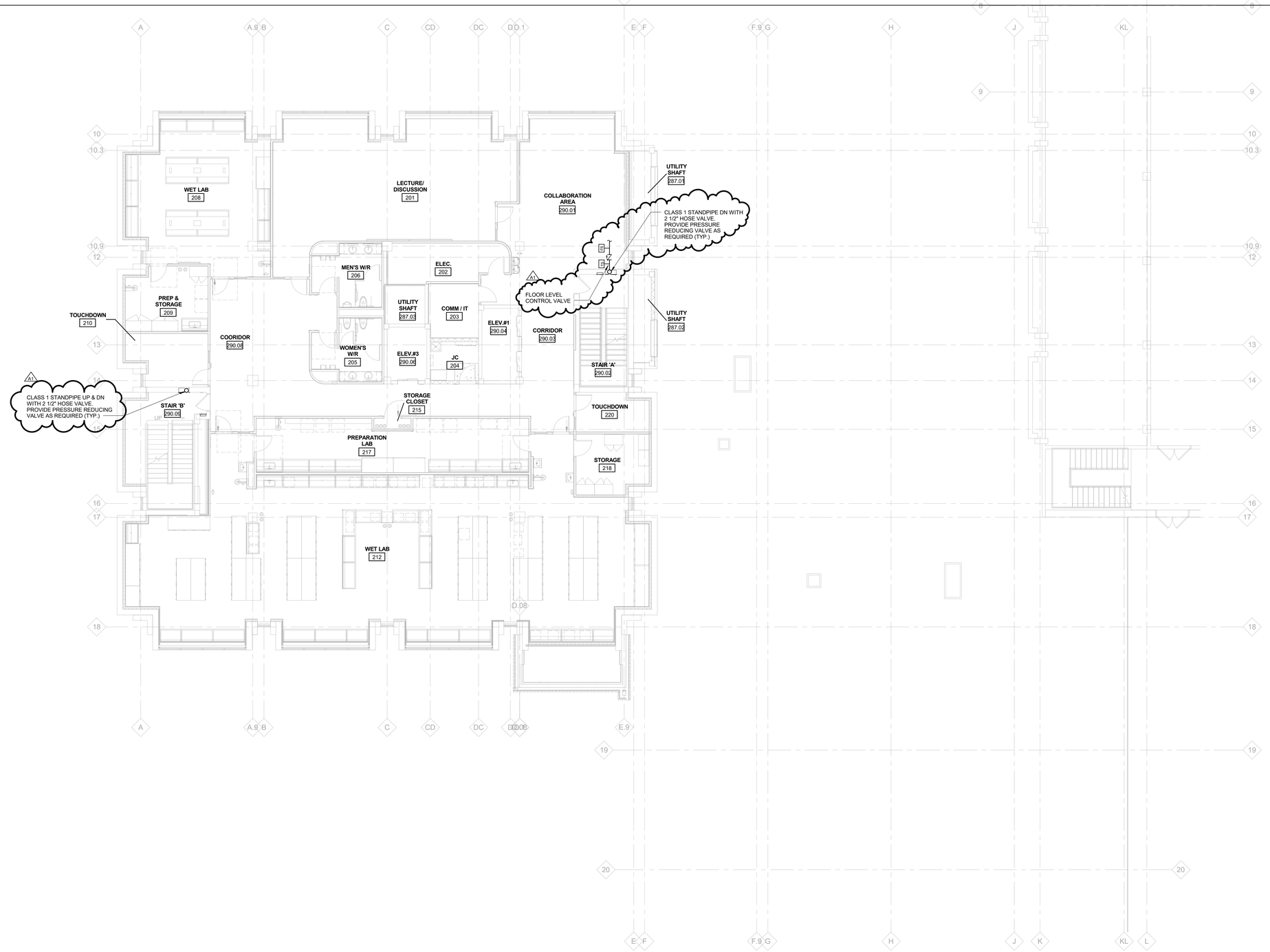
STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

FIRST FLOOR FIRE PROTECTION PLAN

Scale	1/8" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	P60-03



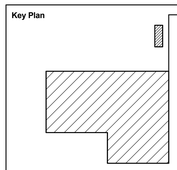
SECOND FLOOR FIRE PROTECTION PLAN

SCALE: 1/8" = 1'-0"

NORTH

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Design Lead	Drawn
B. HALL	B. HALL
Project Leader	Checked
Approver	Checker

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Project

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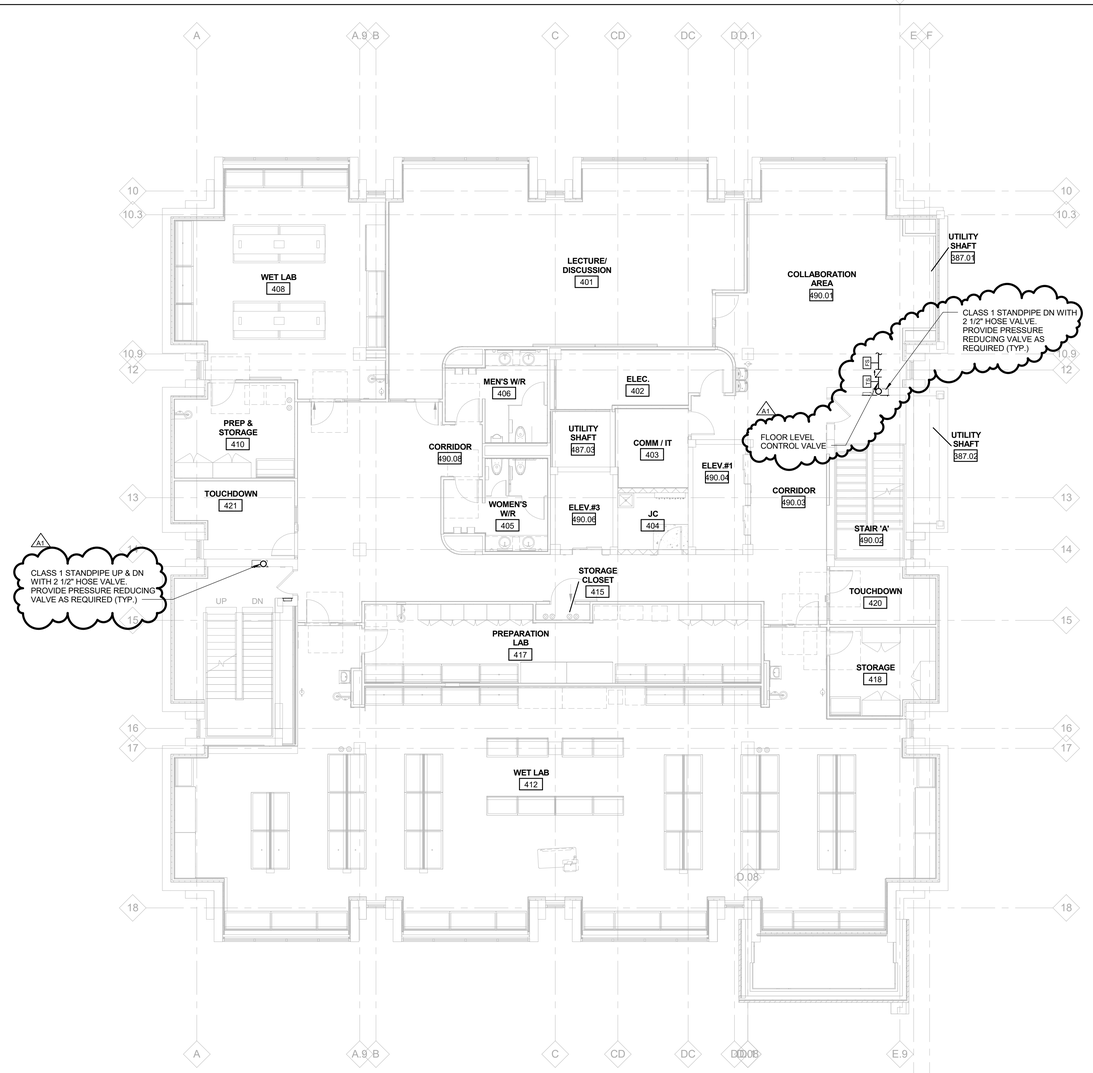
Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

SECOND FLOOR FIRE
PROTECTION PLAN

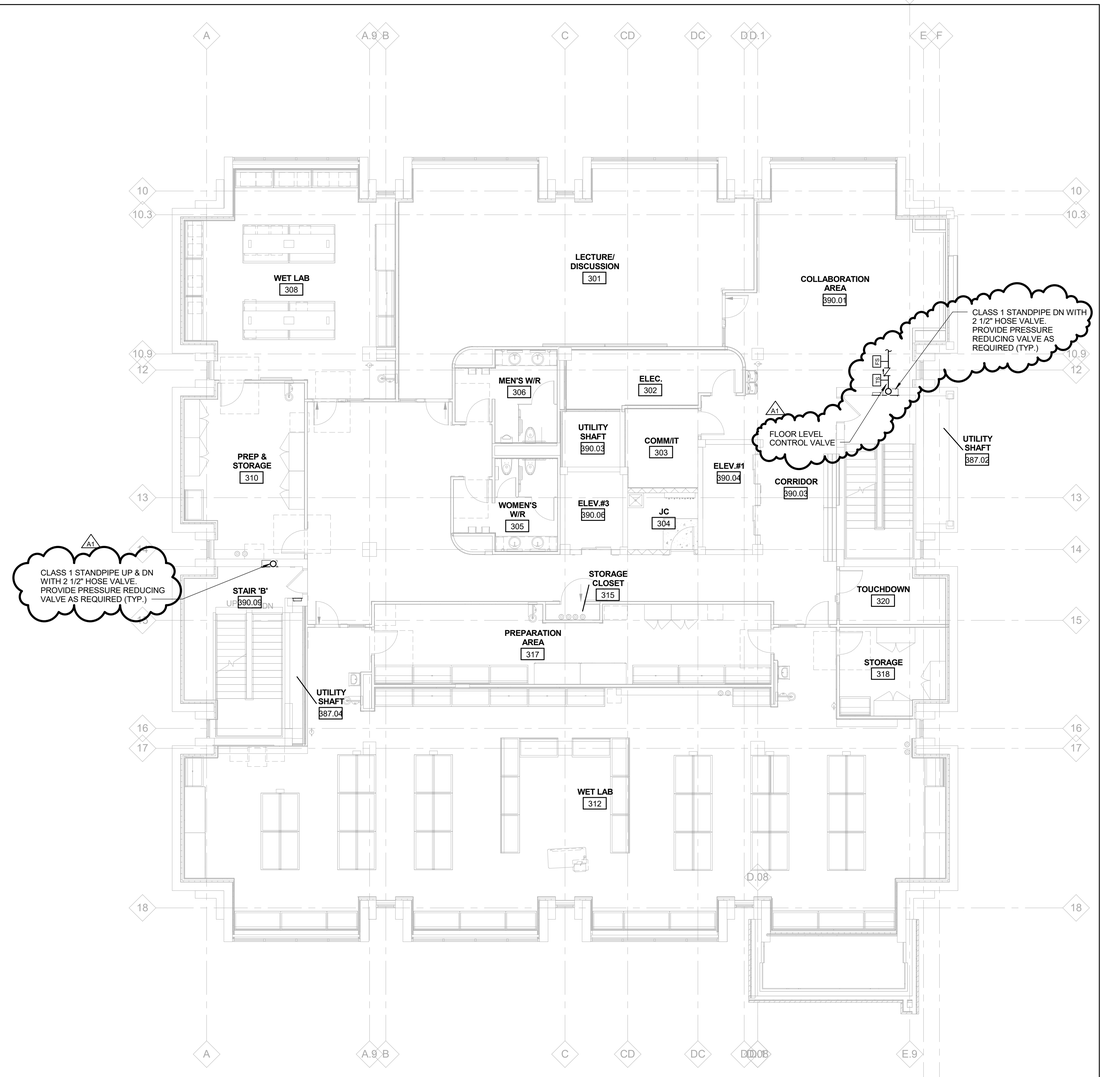
Scale	1/8" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	P60-04



FOURTH FLOOR FIRE PROTECTION PLAN

SCALE: 1/8" = 1'-0"

NORTH



THIRD FLOOR FIRE PROTECTION PLAN

SCALE: 1/8" = 1'-0"

NORTH

DATE	ISSUED FOR	REV
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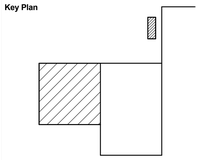
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

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Project Manager J. SMITH	BIM Lead C. BAKER
Design Lead B. HALL	Drawn B. HALL
Project Leader Approver	Checked Checker

WAYNE STATE UNIVERSITY

Project

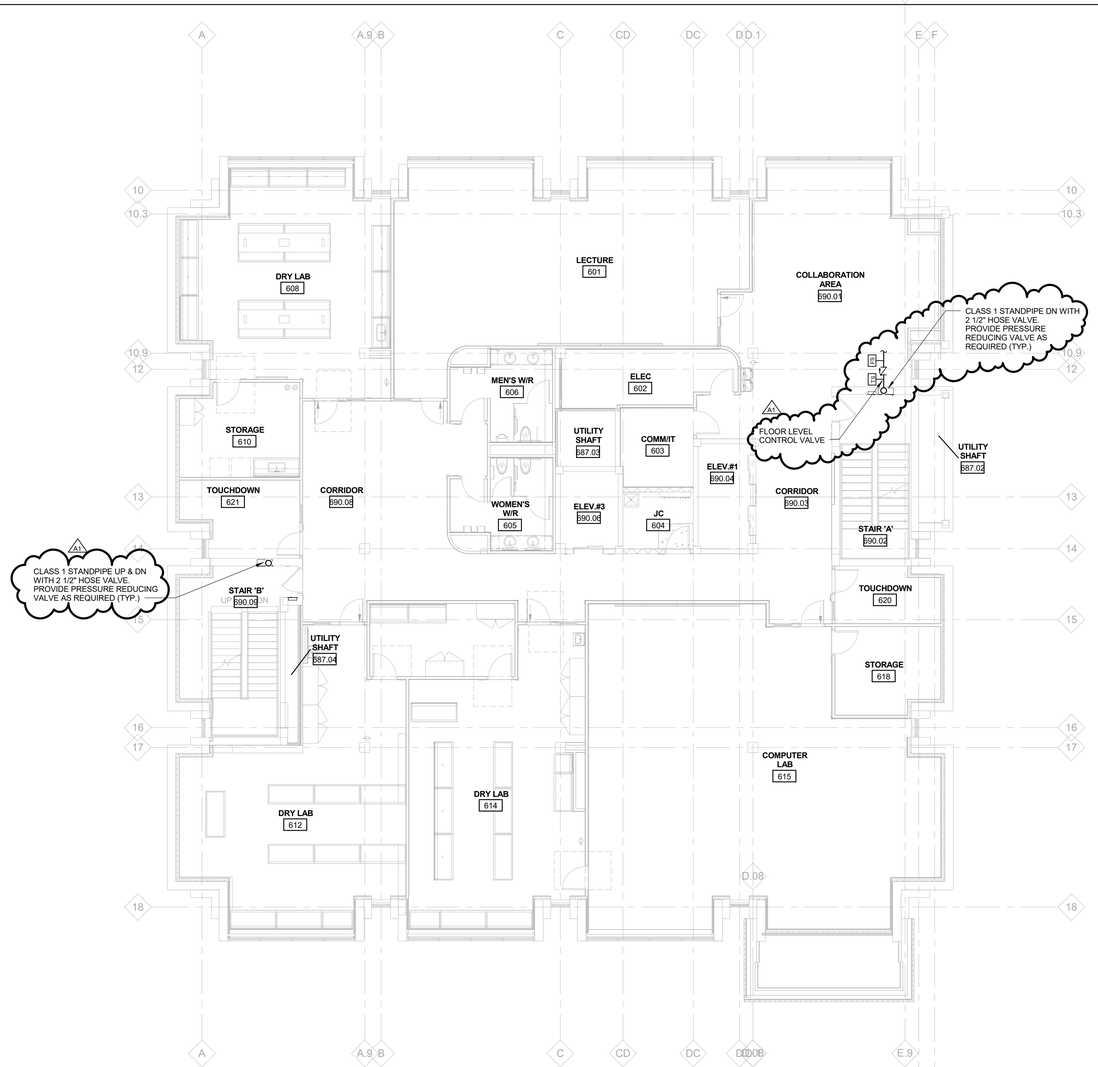
STEM Innovation
Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

THIRD AND FOURTH FLOOR
FIRE PROTECTION PLANS

Scale	1/8" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	P60-05



NORTH

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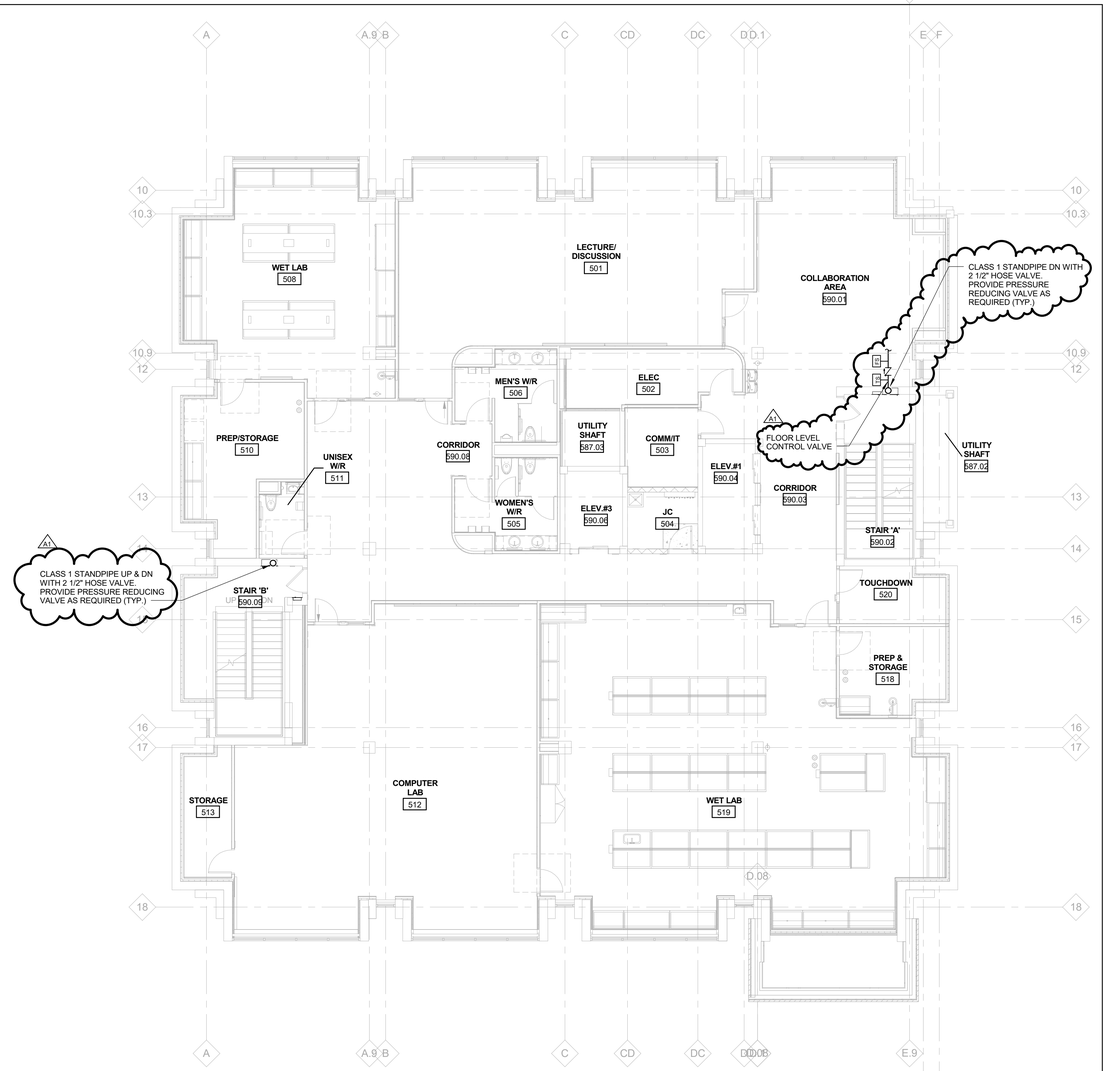

NORTH

FIFITH FLOOR FIRE PROTECTION PLAN

SCALE: 1/8" = 1'-0"

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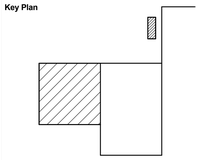
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Manager	BIM Lead
J. SMITH	C. BAKER
Design Lead	Drawn
B. HALL	B. HALL
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

FIFTH AND SIXTH FLOOR FIRE PROTECTION PLANS

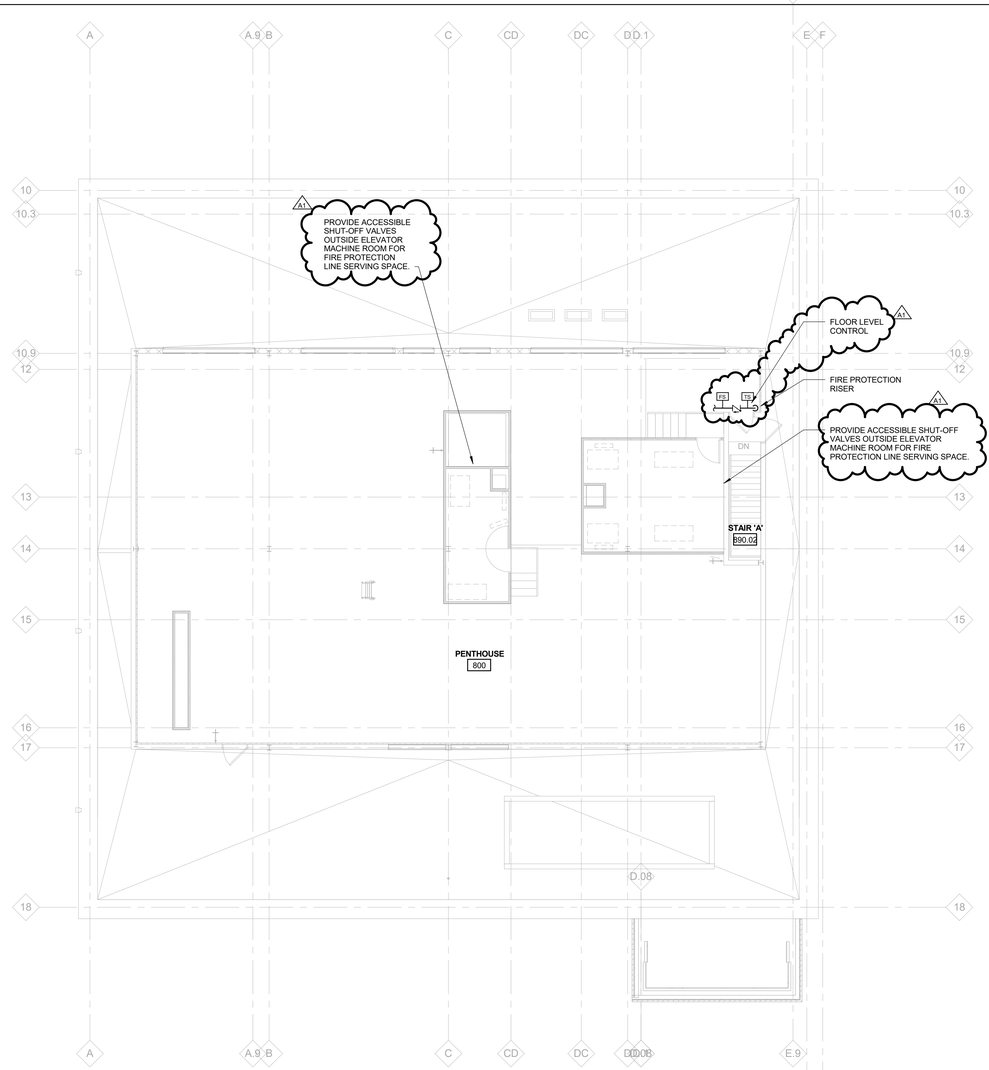
Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

P60-06

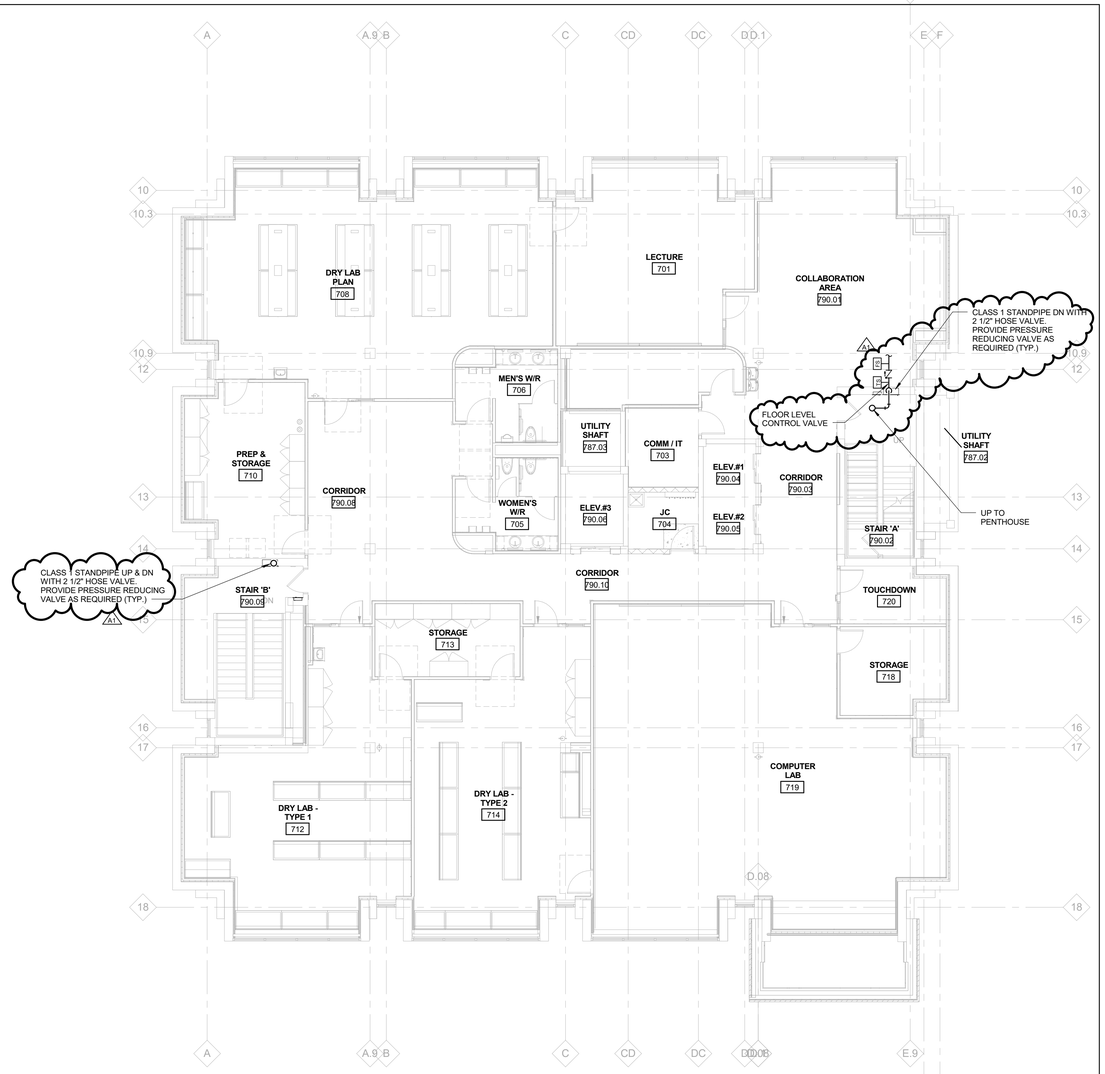
1/14/2019 2:06:09 PM



PENTHOUSE FIRE PROTECTION PLAN

SCALE: 1/8" = 1'-0"

NORTH



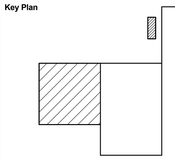
SEVENTH FLOOR FIRE PROTECTION PLAN

SCALE: 1/8" = 1'-0"

NORTH

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

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Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: B. HALL	Drawn: B. HALL
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

SEVENTH AND PENTHOUSE FIRE PROTECTION PLANS

Scale	1/8" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	P60-07

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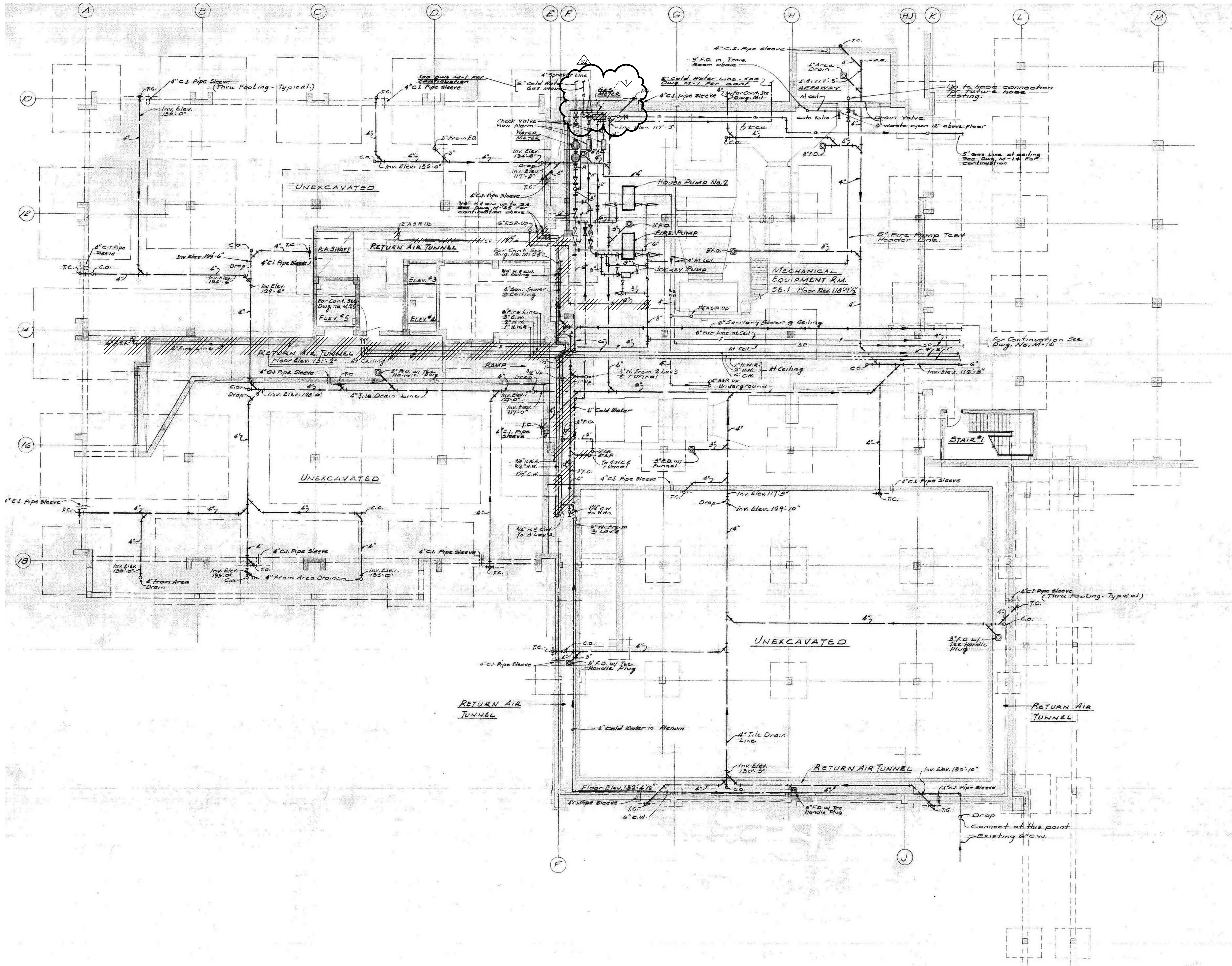


AS-BUILT RECORD DRAWING
MAY 1972

FOUNDATION AND SUB-BASEMENT PLAN - SCIENCE LIBRARY   MICH. 4-0200, MICH. 2-0071   PLUMBING   Scale: 1/8"=1'-0"

SNYDER & McLEAN, INC. ENGINEERS 18461 W. McNICHOLS RD. DETROIT 19, MICHIGAN ENGINEERS JOB NO. 2372	Revised Incorporating Alternates No 2, 11, 12, 14, 15, 19, + 23 & Addendums No 1-M Thru 6-M. April 10, 1967 REVISIONS	NATURAL SCIENCE BUILDING AND SCIENCE LIBRARY WAYNE STATE UNIVERSITY DETROIT MICHIGAN	DR. S.G. B.W. C.C. TR. C.C. CH. B.W. S.G. REV. ISSUED 11-1-66 DATE 6-30-66	RALPH CALDER AND ASSOCIATES, INC. ARCHITECTS 1600 MUTUAL BLDG. DETROIT, MICHIGAN 48226	JOB 6424

SUB-BASEMENT PLUMBING DEMOLITION PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

1. ALL FOUNDATION AND SUB-BASEMENT FIRE PROTECTION PIPING INDICATED SHALL BE REMOVED.

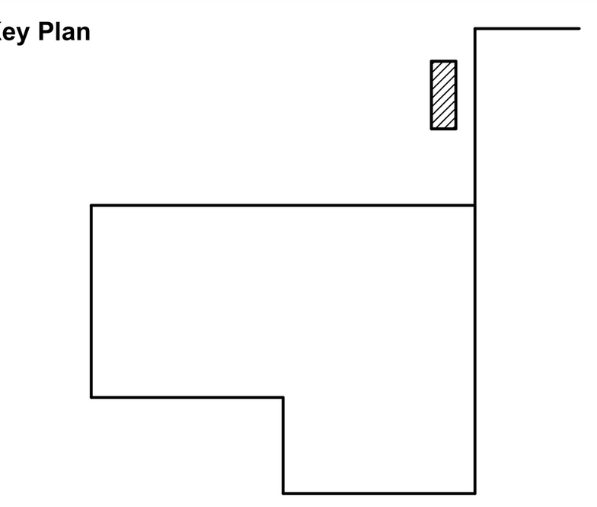
B2

KEY NOTES

1. EXISTING 3M GAS METER SERVING CHEMISTRY BUILDING, ASSOCAITED PRV, PIPING AND SUPPORTS TO BE REMOVED. COORDINATE REMOVAL OF METER AND PRV WITH UTILITY COMPANY. REFER TO DRAWING P30-01 FOR EXTENT OF PIPING REMOVAL REQUIRED. EXISTING GAS PIPE SHALL BE CAPPED TEMPORARILY. COORDINATE WORK AND GAS SERVICE SHUT-DOWN WITH OWNER.

DATE	ISSUED FOR	REV
11/05/2018	DEMO PACKAGE - BIDS	2
03/15/2019	BULLETIN NO. 2	6
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture NORR
Structural: FTC&H
Mechanical: FTC&H
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Lab Design: NORR

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B. HALL	B. HALL
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

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STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
SUB-BASEMENT PLUMBING DEMOLITION PLAN

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No. PD10-01

GENERAL NOTES

HVAC DEMOLITION NOTES

1. REMOVE ALL PORTIONS OF WORK IDENTIFIED BY CROSS HATCHING UNLESS NOTED OTHERWISE.
2. FIELD DETERMINE EXACT LOCATIONS AND REMOVE PORTIONS OF DUCTWORK, PIPING AND EQUIPMENT SHOWN BY CROSS-HATCHING. SCHEDULE SHUT-DOWNS WITH OWNER. CAP ALL OPEN DUCT AND PIPE ENDS AT END OF WORK DAY. REFER TO OTHER DRAWINGS FOR COORDINATION OF EXTENT OF DEMOLITION WITH NEW WORK.
3. UTILITIES PASSING FROM ONE PHASE TO ANOTHER THAT ARE ACTIVELY SERVING OCCUPIED AREAS SHALL REMAIN IN SERVICE IN THEIR PRESENT POSITION, OR SHALL BE REROUTED AND RECONNECTED TO THE EXTENT NECESSARY TO INSTALL THE NEW WORK OF THE CURRENT CONSTRUCTION PHASE.
4. OPENINGS LEFT BY DEMOLITION IN ROOF, WALLS AND FLOORS SHALL BE PATCHED TO MATCH SURROUNDING SURFACES.
5. WHERE DEMOLITION REQUIRES THE REMOVAL OF CEILINGS, PROVIDE REMOVAL AND REINSTALLATION OF CEILINGS. DAMAGED CEILING TILES AND GRID SHALL BE REPLACED.
6. FIRESTOP SHALL BE PROVIDED IN NEW AND EXISTING HOLES AND PENETRATIONS IN OTHER RATED WALLS IN AREAS OF DEMOLITION WORK.
7. PROVIDE ISOLATION, DRAIN AND FILLING OF PIPING SYSTEMS AS REQUIRED TO PERFORM THE WORK OF DEMOLITION.
8. REMOVE ALL POWER AND CONTROL WIRING AND DEVICES ASSOCIATED WITH EQUIPMENT BEING REMOVED.

SHEET METAL NOTES

1. THE INSTALLATION OF ALL DUCTWORK SHALL BE CLOSELY COORDINATED WITH NEW PLUMBING, ELECTRICAL, AND STRUCTURAL CONDITIONS. NOT ALL REQUIRED OFFSETS AND FITTINGS ARE INDICATED, BUT SHALL BE PROVIDED. REFER TO ARCHITECTURAL AND STRUCTURAL PLANS FOR CLEARANCES. ALTERNATE DUCT ROUTING SHALL BE APPROVED BEFORE PROCEEDING IN ORDER TO ENSURE THAT THE AVAILABLE STATIC PRESSURE REMAINS ADEQUATE. DUCTWORK LOCATION SHALL TAKE PRECEDENCE OVER HVAC AND FIRE PROTECTION PIPING AND ELECTRICAL CONDUIT AND CABLE TRAY.
2. REFER TO DUCT TAKEOFF DETAILS. SPIN-IN TYPE WITH SCOOPS SHALL NOT BE ACCEPTED. A MINIMUM OF 2 FEET SHALL BE PROVIDED BETWEEN RUNOUT TAKEOFFS FROM TRUNK DUCTS.
3. SENSOR LOCATIONS SHALL BE VERIFIED WITH ARCHITECT AND ENGINEER BEFORE ROUGH-IN.
4. EXISTING DUCTWORK AND EQUIPMENT SHOWN LIGHTLY SHALL REMAIN.
5. DIFFUSER BLADES SHALL BE SET TO THROW AIR IN DIRECTIONS INDICATED BY ARROWS.
6. RUNOUT BALANCING DAMPERS SHALL BE MOUNTED AS CLOSE TO MAIN DUCT AS POSSIBLE.
7. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR DIFFUSER LOCATIONS.
8. NEW DUCTWORK AND PIPE ROUTING AS INDICATED ARE SCHEMATIC IN CONCEPT. FIELD LOCATE EXACT TIE-IN-POINTS TO EXISTING DUCTWORK AND COORDINATE FINAL ROUTING WITH EXISTING CONDITIONS AND NEW EQUIPMENT. PROVIDE ALL NECESSARY OFFSETS.
9. AT RENOVATED AREAS THE INDICATED ROUTING OF DUCTWORK SYSTEMS IS INTENDED TO INDICATE REUSE OF AS MUCH OF THE EXISTING SYSTEMS AS POSSIBLE. THE ROUTE SHOWN AND INFORMATION GIVEN IS NOT INTENDED TO REPRESENT EXACTLY WHERE AND HOW TO INSTALL THESE SYSTEMS. IT HAS BEEN DETERMINED THAT ADEQUATE SPACE EXISTS BUT NO ATTEMPT HAS BEEN MADE TO INDICATE THE LOCATION AND IDENTITY OF EVERY INTERFERENCE, NOR THE RESULTANT REQUIRED RESOLUTION OF INTERFERENCES. ADDITIONAL DUCT, MATERIAL, LABOR AND LAYOUT TIME REQUIRED TO RESOLVE INTERFERENCES AND THEIR REROUTING SHALL BE INCLUDED.
10. TERMINAL UNITS SHALL BE MOUNTED TO NOT IMPAIR ACCESS TO FILTERS, COILS AND CONTROLS.
11. CEILING GRID AND TILE SHALL BE REMOVED AND REPLACED AS REQUIRED TO ACCESS THE WORK. DAMAGED GRID AND TILE SHALL BE REPLACED TO MATCH EXISTING.
12. ALL NEW DIFFUSERS AND GRILLES SHALL BE BALANCED TO CFM INDICATED.
13. WATERTIGHT CONCRETE CURBS SHALL BE PROVIDED AROUND ELEVATED FLOOR SLAB PENETRATIONS.
14. TO REDUCE NOISE, A MAXIMUM OF 5' OF INSULATED FLEX DUCT SHALL BE PROVIDED AT RUNOUTS TO DIFFUSERS.

HVAC PIPING NOTES

1. THE INSTALLATION OF ALL PIPING SHALL BE CLOSELY COORDINATED WITH NEW SHEET METAL, PLUMBING, ELECTRICAL, AND STRUCTURAL CONDITIONS. NOT ALL REQUIRED OFFSETS AND FITTINGS ARE INDICATED, BUT SHALL BE PROVIDED. REFER TO ARCHITECTURAL AND STRUCTURAL PLANS FOR CLEARANCES.
2. PIPING AND EQUIPMENT SHOWN LIGHTLY IS EXISTING TO REMAIN.
3. AT RENOVATED AREAS THE INDICATED ROUTING OF PIPING SYSTEMS IS INTENDED TO INDICATE REUSE OF AS MUCH OF THE EXISTING SYSTEMS AS POSSIBLE. THE ROUTE SHOWN AND INFORMATION GIVEN IS NOT INTENDED TO REPRESENT EXACTLY WHERE AND HOW TO INSTALL THESE SYSTEMS. IT HAS BEEN DETERMINED THAT ADEQUATE SPACE EXISTS BUT NO ATTEMPT HAS BEEN MADE TO INDICATE THE LOCATION AND IDENTITY OF EVERY INTERFERENCE, NOR THE RESULTANT REQUIRED RESOLUTION OF INTERFERENCES. ADDITIONAL PIPE, MATERIAL, LABOR AND LAYOUT TIME REQUIRED TO RESOLVE INTERFERENCES AND THEIR REROUTING SHALL BE INCLUDED.
4. PIPE ROUTING AS INDICATED IS SCHEMATIC IN CONCEPT. FIELD LOCATE EXACT TIE-IN-POINTS TO EXISTING PIPING. FINAL ROUTING SHALL BE COORDINATED WITH SHEET METAL, ELECTRICAL, AND STRUCTURAL SYSTEMS. ALL NECESSARY OFFSETS SHALL BE PROVIDED. COORDINATE TIME OF EXISTING PIPING REROUTING WITH OWNER TO MINIMIZE DOWNTIME.
5. SHUTOFF VALVES SHALL BE PROVIDED ON ALL RUNOUT PIPING SERVING MULTIPLE COILS/DEVICES.
6. ALL PIPING SHALL BE INSTALLED TO CLEAR COIL REMOVAL AND ACCESS PANELS.
7. INSTALL MAINS AS HIGH AS POSSIBLE. VENTS SHALL BE PROVIDED AT ALL PIPING HIGH POINTS; DRAINS SHALL BE PROVIDED AT ALL LOW POINTS. SEE PIPING DETAILS.
8. CEILING GRID AND TILES SHALL BE REMOVED AND REPLACED AS REQUIRED TO ACCESS WORK. DAMAGED GRID AND TILE SHALL BE REPLACED TO MATCH EXISTING.
9. ALL NEW COILS SHALL BE BALANCED WHERE FLOW IS INDICATED.
10. SLEEVE AND SEAL EXTERIOR WALL PENETRATIONS TO A WEATHER TIGHT CONDITION. SLEEVE AND SEAL INTERIOR FLOOR PENETRATIONS TO A WATER TIGHT CONDITION.
11. FIRESTOP SHALL BE PROVIDED IN NEW AND EXISTING HOLES AND PENETRATIONS IN RATED WALLS.
12. OPENINGS IN WALLS AND SLABS SHALL BE CORE DRILLED AS REQUIRED FOR NEW PIPING. LOCATION OF REINFORCING STEEL SHALL BE COORDINATED TO AVOID DAMAGE. USE PENETRATING RADAR TO LOCATE REINFORCING STEEL AS REQUIRED.
13. PROVIDE ISOLATION, DRAIN AND FILLING OF EXISTING PIPING SYSTEMS AS REQUIRED TO PERFORM THE WORK.
14. WHERE NEW CONNECTIONS TO EXISTING PIPE ARE INDICATED, SYSTEM SERVICE INTERRUPTION IS TO BE MINIMIZED AND COORDINATED WITH OWNER. TIE-IN METHODS TO INCLUDE HOT TAP AS REQUIRED.
15. NEW PIPING SHALL NOT BE ROUTED OVER ELECTRICAL GEAR UNLESS IT MEETS THE CLEARANCE REQUIREMENTS OF THE NEC.
16. VALVE INDICATIONS ARE GENERIC. REFER TO SPECIFICATION FOR ACCEPTABLE VALVE TYPES PER APPLICATION.

LEGEND

PIPE/FITTING SYMBOLS

- EXISTING PIPE
- EXISTING PIPE TO BE REMOVED
- NEW PIPE
- ELBOW UP
- ELBOW DOWN
- TEE UP
- TEE DOWN
- UNION
- CAP

PIPING DESIGNATION

- CHWS — PIPE CONTENTS SEE ABBREVIATIONS

GENERAL DESIGNATION

- NOTE SYMBOL (REFER TO SHEET NOTES)
- NEW TO EXISTING CONNECTION

VALVE SYMBOLS

- GENERIC VALVE (REFER TO SPEC FOR TYPE)
- BALL VALVE
- GLOBE VALVE
- BUTTERFLY VALVE
- PLUG VALVE
- GAS COCK
- SWING CHECK VALVE
- PRESSURE REDUCING VALVE
- PRESSURE RELIEF VALVE
- 2-WAY VALVE
- 3-WAY VALVE
- BACKFLOW PREVENTER
- CIRCUIT SETTER

MISC. PIPING SYMBOLS

- PUMP (LIQUID)
- PUMP (AIR)
- STRAINER
- EXPANSION JOINT & PIPE GUIDE
- FLEX CONNECTION
- STEAM TRAP
- PIPE ANCHOR
- PIPE GUIDE
- MANUAL AIR VENT (MV)
- AUTOMATIC AIR VENT (AV)
- VACUUM BREAKER (VB)
- CO — CLEANOUT LOCATED IN FLOOR
- CO — CLEANOUT LOCATED IN WALL, PIPE COMING UP FROM BELOW.
- CO — HORIZONTAL CLEANOUT (LOCATED BELOW FLOOR AND ABOVE CEILING OF FLOOR BELOW)
- F.I. FLOW INDICATOR
- P PRESSURE GAGE
- PRESSURE TAP WITH NEEDLE VALVE
- T THERMOMETER
- THERMOWELL
- WATER HAMMER ARRESTER WITH P.D.I. DESIGNATION

CONTROLS

- C CARBON DIOXIDE SENSOR
- T THERMOSTAT
- H HUMIDISTAT
- S SENSOR
- FS FLOW SWITCH
- S DUCT SMOKE DETECTOR

DOUBLE LINE / SINGLE LINE

- EXISTING DUCT
- EXISTING DUCT TO BE REMOVED
- NEW DUCT
- CAPPED DUCT
- SUPPLY AIR DUCT UP
- SUPPLY AIR DUCT DOWN
- EXHAUST OR RETURN AIR DUCT UP
- EXHAUST OR RETURN AIR DUCT DOWN
- ROUND DUCT UP
- ROUND DUCT DOWN
- ROUND DUCT MITRED ELBOW

HVAC DUCTWORK SYMBOLS

DOUBLE LINE / SINGLE LINE

- FLEXIBLE DUCT
- BALANCING DAMPER
- MOTORIZED DAMPER
- TURNING VANES
- SIDE WALL DIFFUSER/GRILLE
- S-X / XXX CFM — SUPPLY AIR DIFFUSER WITH TAG NUMBER (SEE SCHEDULE) AND CFM. ARROWS INDICATE AIR FLOW DIRECTION.
- E-X / XXX CFM OR R-X / XXX CFM — EXHAUST AIR OR RETURN AIR GRILLE WITH TAG NUMBER (SEE SCHEDULE) AND CFM
- EXISTING FIRE DAMPER HORIZONTAL INSTALLATION
- EXISTING FIRE DAMPER VERTICAL INSTALLATION
- FIRE DAMPER HORIZONTAL INSTALLATION
- FIRE DAMPER VERTICAL INSTALLATION
- FIRE/SMOKE DAMPER HORIZONTAL INSTALLATION
- FIRE/SMOKE DAMPER VERTICAL INSTALLATION
- SMOKE DAMPER
- SUPPLY AIR DIFFUSER WITH RADIATION DAMPER AND THERMAL BLANKET.
- EXHAUST AIR OR RETURN AIR GRILLE WITH RADIATION DAMPER.
- M — MOTOR

GENERAL ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR	MC	MECHANICAL CONTRACTOR
AI	ACOUSTICAL INSULATION	MD	MOTORIZED DAMPER
AL	ACOUSTICAL LINING	NIC	NOT IN CONTRACT
AP	ACCESS PANEL	OA	OUTSIDE AIR
BD	BALANCING DAMPER	RA	RETURN AIR
BDD	BACKDRAFT DAMPER	RF	RETURN FAN
CI	CAST IRON	RAG	RETURN AIR GRILLE
CS	CLINIC SINK	RC	RAIN CONDUCTOR
DF	DRINKING FOUNTAIN	RD	ROOF DRAIN
EA	EXHAUST AIR	S	SINK
EF	EXHAUST FAN	SA	SUPPLY AIR
EAG	EXHAUST AIR GRILLE	SF	SUPPLY FAN
EC	ELECTRICAL CONTRACTOR	SH	SHOWER
EM SH	EMERGENCY SHOWER	SS	SERVICE SINK
EW	EYEWASH	TCC	TEMPERATURE CONTROL CONTRACTOR
EWC	ELECTRIC WATER COOLER	UR	URINAL
FC	FLEXIBLE CONNECTION	VAV	VARIABLE AIR VOLUME
FD	FLOOR DRAIN	VI	VIBRATION ISOLATOR
FC	FLOOR SINK	VTR	VENT THRU ROOF
GC	GENERAL CONTRACTOR	W	WASTE
HB	HOSE BIBB	WC	WATER COLUMN
IE	INVERT ELEVATION	WH	WALL HYDRANT
L	LOUVER	YH	YARD HYDRANT
LAV	LAVATORY		

PIPE CONTENTS ABBREVIATIONS

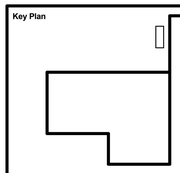
AR	ARGON GAS
AV	ACID VENT
AW	ACID WASTE
BF	BOILER FEED
CA	COMPRESSED AIR
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
COND	CONDENSATE
CR	CONDENSER WATER RETURN
CS	CONDENSER WATER SUPPLY
DWS	DEIONIZED WATER SUPPLY
DWR	DEIONIZED WATER RETURN
FOR	FUEL OIL RETURN
FOS	FUEL OIL SUPPLY
FP	FIRE PROTECTION WATER SUPPLY
G	GAS SUPPLY
GCWR	GLYCOL CHILLED WATER RETURN
GCWS	GLYCOL CHILLEDD WATER SUPPLY
GHRR	GLYCOL HOT RUNAROUND RETURN
GHRS	GLYCOL HOT RUNAROUND SUPPLY
HPS	HIGH PRESSURE STEAM
HCHWR	HIGH TEMPERATURE CHILLED WATER RETURN
HCHWS	HIGH TEMPERATURE CHILLED WATER SUPPLY
HWR	HEATING WATER RETURN
HWS	HEATING WATER SUPPLY
LA	LABORATORY AIR
LPS	LOW PRESSURE STEAM
LCHWR	LOW TEMPERATURE CHILLED WATER RETURN
LCHWS	LOW TEMPERATURE CHILLED WATER SUPPLY
LV	LABORATORY VACUUM
MA	MEDICAL AIR
MPS	MEDIUM PRESSURE STEAM
N2	NITROGEN
N2O	NITROUS OXIDE
NPW	NON-POTABLE WATER
OXY	OXYGEN
PC	PUMPED CONDENSATE
PHWR	PRIMARY HEATING WATER RETURN
PHWS	PRIMARY HEATING WATER SUPPLY
PW	POTABLE WATER
RD	REFRIGERANT RELIEF
RO/R	REVERSE OSMOSIS WATER RETURN
RO/S	REVERSE OSMOSIS WATER SUPPLY
SAN	SANITARY
SCW	SOFT COLD WATER
SM	STEAM
STM	STORM SEWER
V	SANITARY VENT
VAC	VACUUM
WWR	WELL WATER RETURN
WWS	WELL WATER SUPPLY

NUMBER OF THE DETAIL/SECTION

1 DETAIL OR SECTION
SCALE: SCALE OF DETAIL/SECTION

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

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Design Lead: J. SMITH	Drawn: S. FIORENZO
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

MECHANICAL GENERAL NOTES AND LEGEND

Scale 12" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

M00-01

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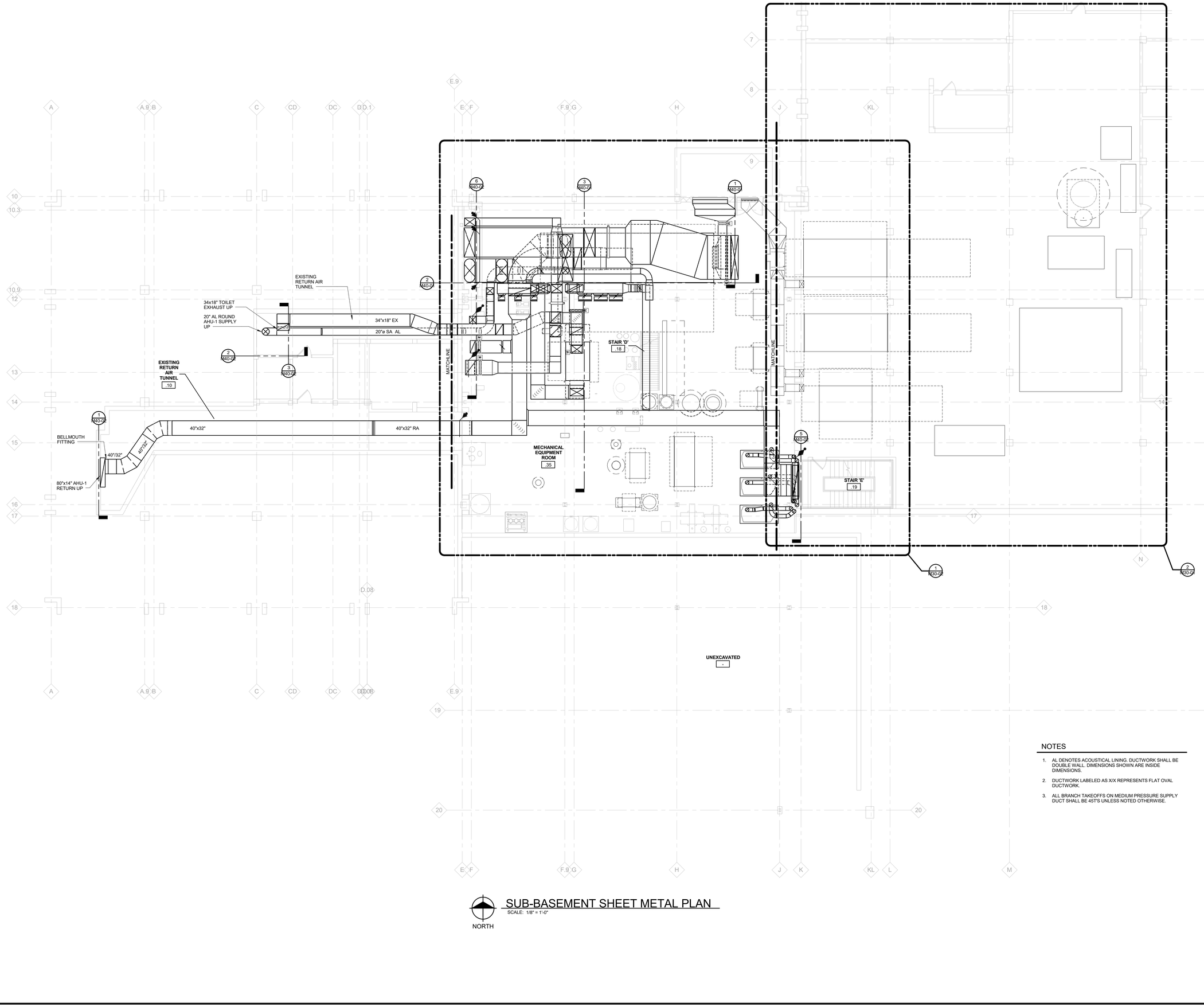

NOTES

1. AL DENOTES ACOUSTICAL LINING. DUCTWORK SHALL BE DOUBLE WALL. DIMENSIONS SHOWN ARE INSIDE DIMENSIONS.
2. DUCTWORK LABELED AS X/X REPRESENTS FLAT OVAL DUCTWORK.
3. ALL BRANCH TAKEOFFS ON MEDIUM PRESSURE SUPPLY DUCT SHALL BE 45T'S UNLESS NOTED OTHERWISE.

NORTH

SUB-BASEMENT SHEET METAL PLAN

SCALE: 1/8" = 1'-0"

DATE	ISSUED FOR	REV
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12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan

Consultants

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Structural:	FTC&H
Mechanical:	FTC&H
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Design Lead: J. SMITH	Drawn: S. FIORENZO
Project Leader: Approver	Checked: Checker

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Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

SUB-BASEMENT SHEET METAL PLAN

Scale	1/8" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	M10-01

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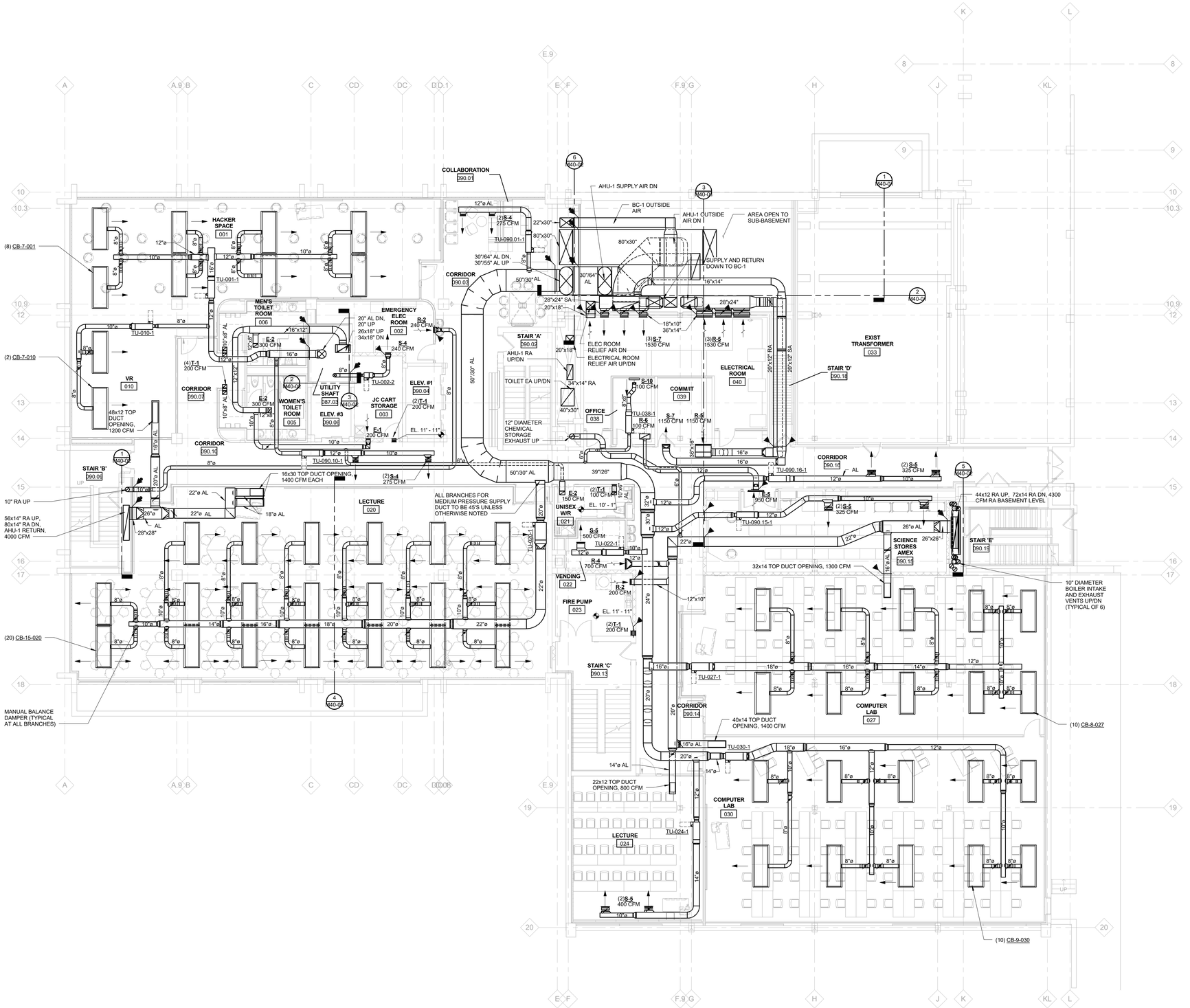

BASEMENT SHEET METAL PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

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11/5/2018	DEMO PACKAGE - BIDS	2
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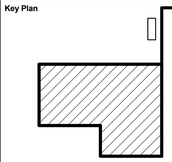
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

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Design Lead: J. SMITH	Drawn: S. FIORENZO
Project Leader: Approver	Checked: Checker

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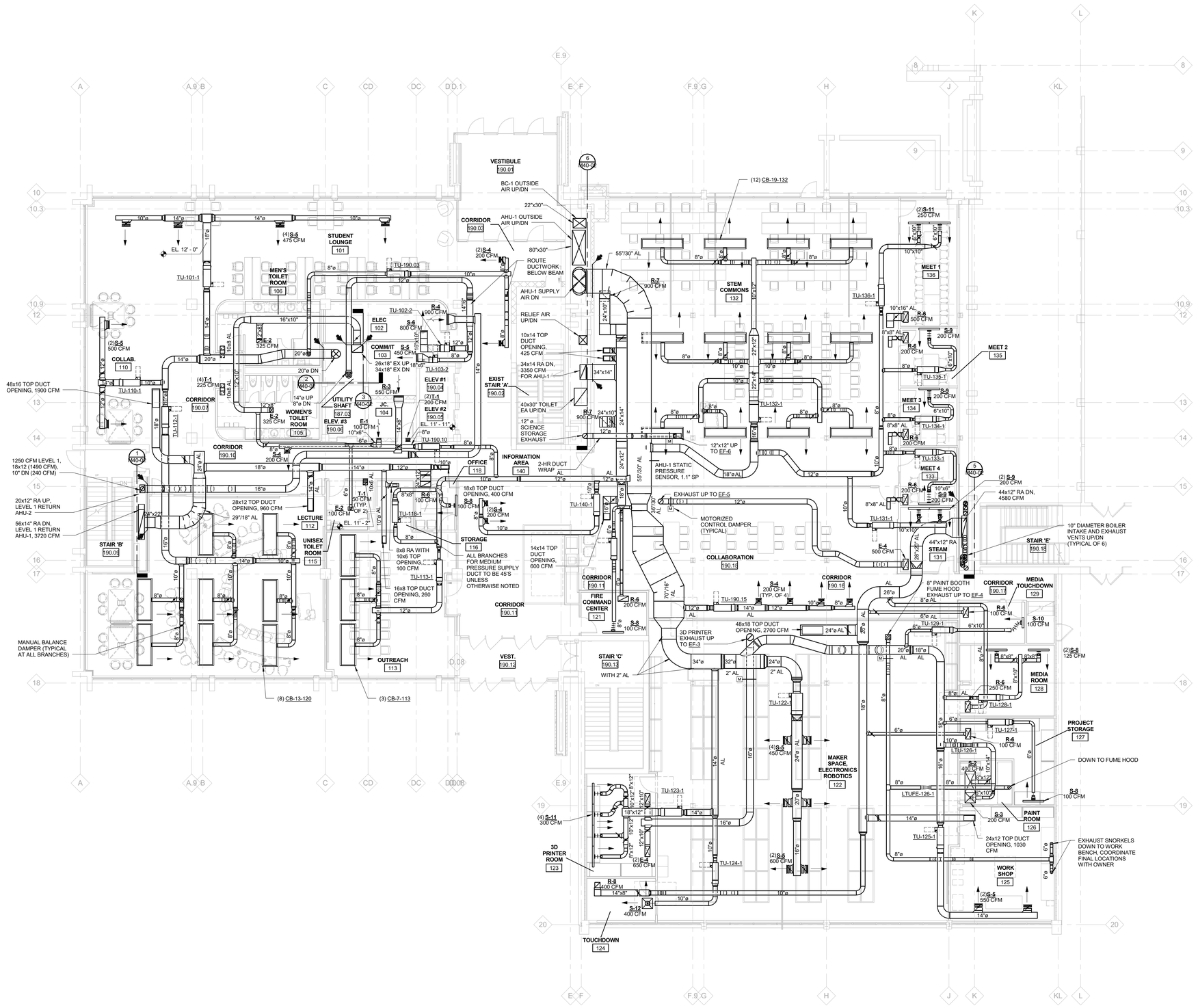
Drawing Title

BASEMENT SHEET METAL PLAN

Scale	1/8" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	M10-02



NORTH

FIRST FLOOR SHEET METAL PLAN

SCALE: 1/8" = 1'-0"

NOTES

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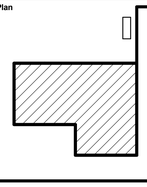
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

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Design Lead: J. SMITH	Drawn: S. FIORENZO
Project Leader: JPS	Checked:

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Project
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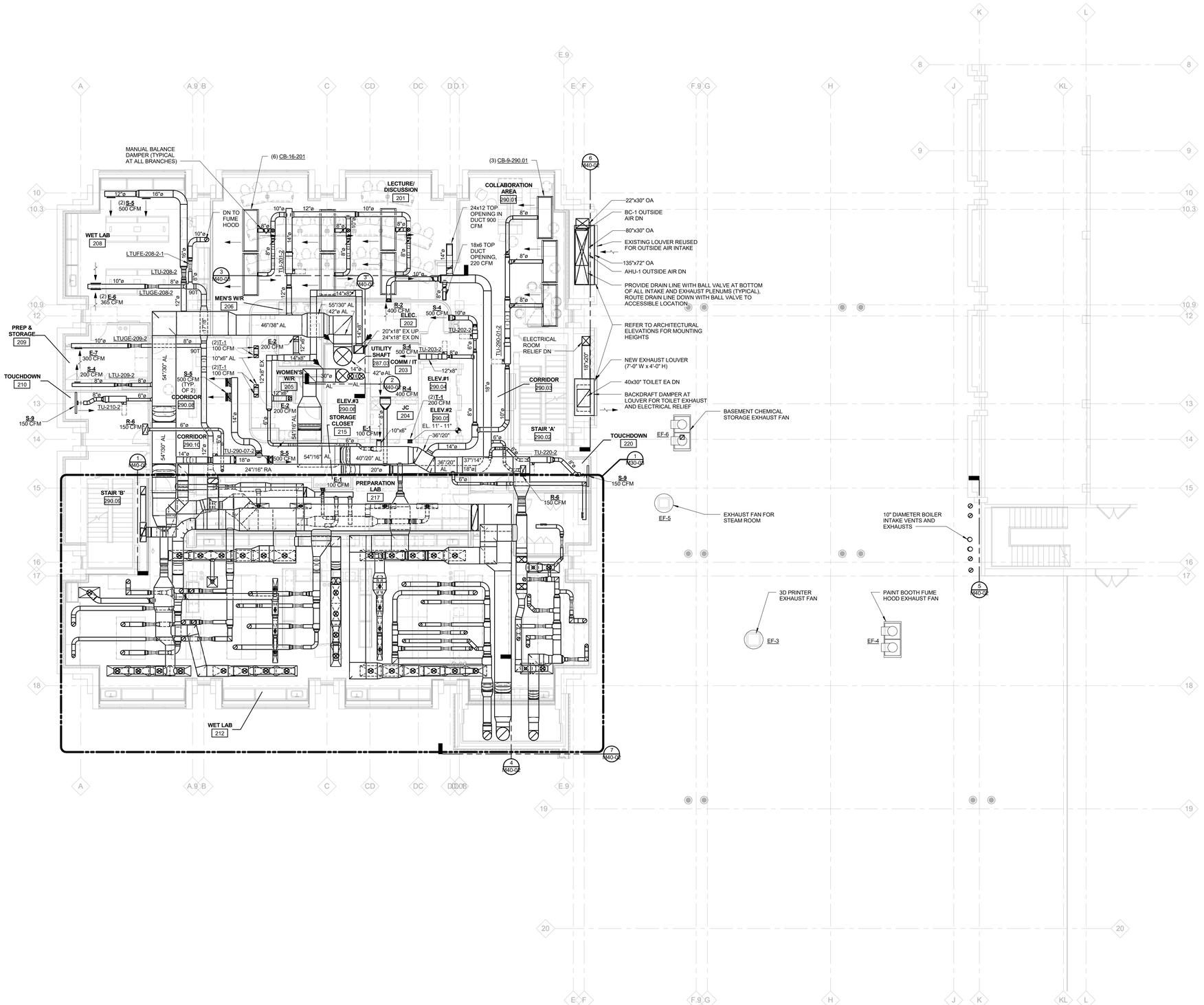
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
FIRST FLOOR SHEET METAL PLAN

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
M10-03



SECOND FLOOR SHEET METAL PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

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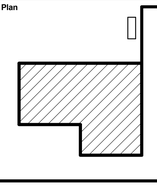
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

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Project Leader: Approver	Checked: Checker

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Drawing Title

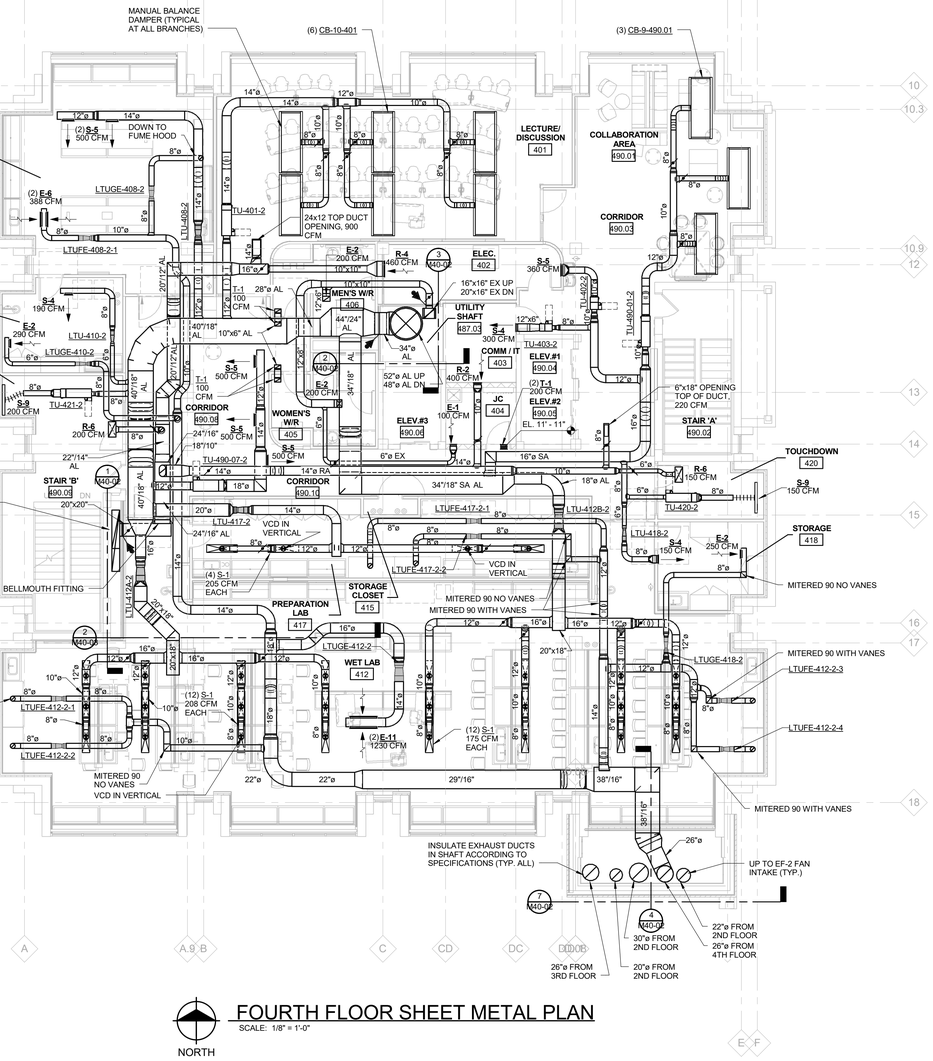
SECOND FLOOR SHEET METAL PLAN

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

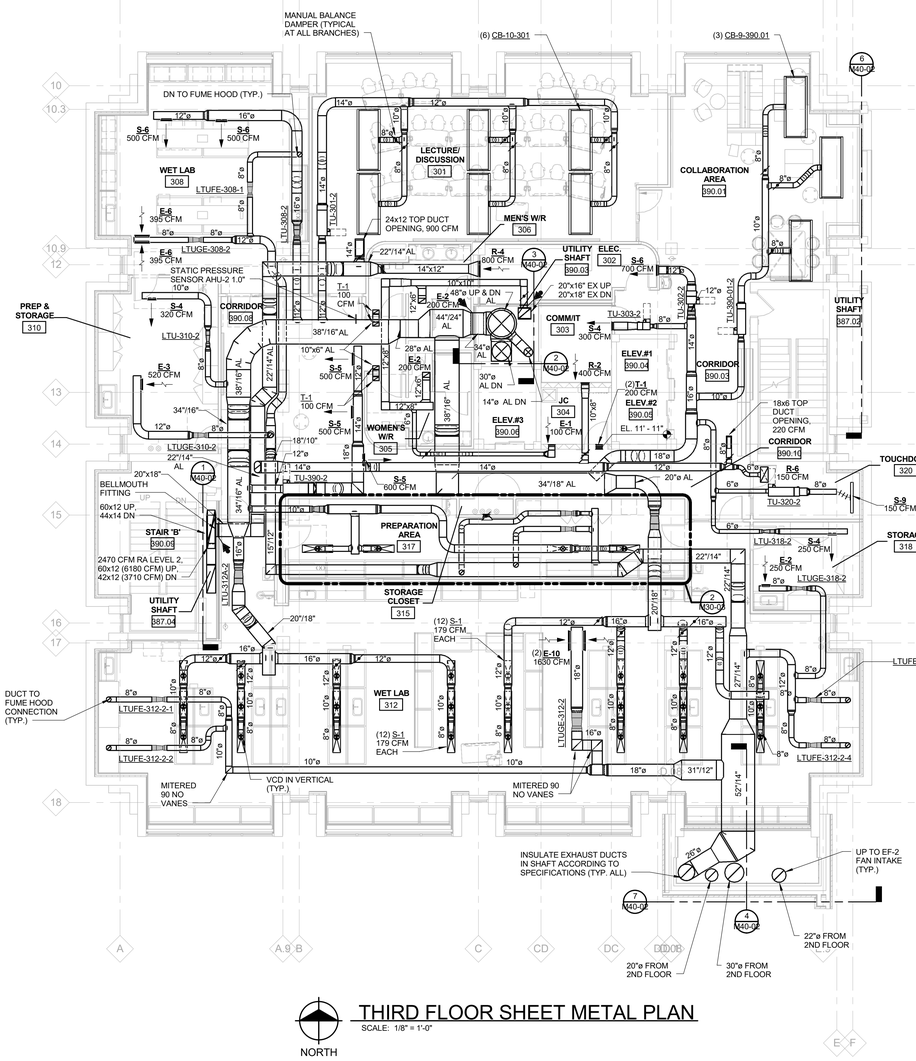
M10-04



FOURTH FLOOR SHEET METAL PLAN

SCALE: 1/8" = 1'-0"

NORTH



THIRD FLOOR SHEET METAL PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

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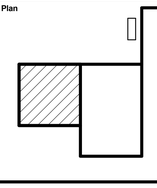
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

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Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

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www.ftch.com

Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: J. SMITH	Drawn: S. FIORENZO
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

THIRD AND FOURTH FLOOR SHEET METAL PLANS

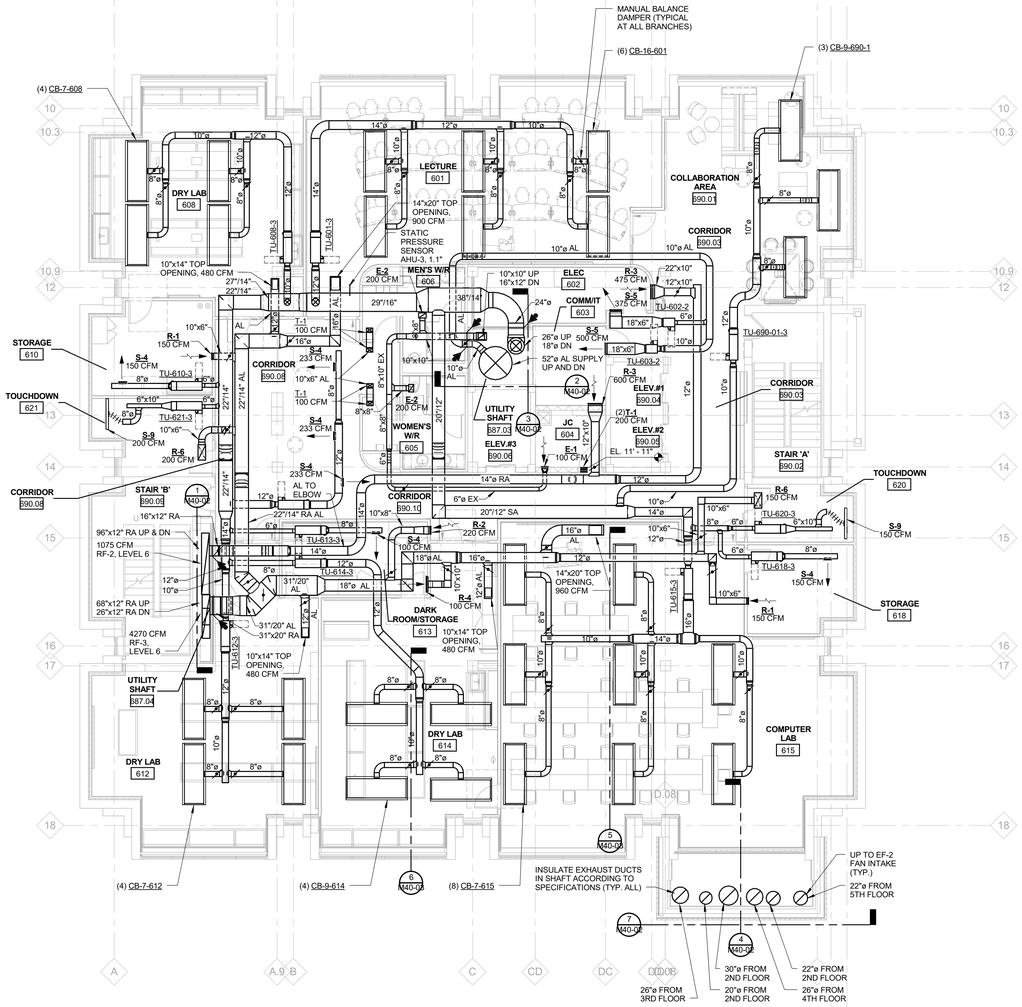
Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

M10-05

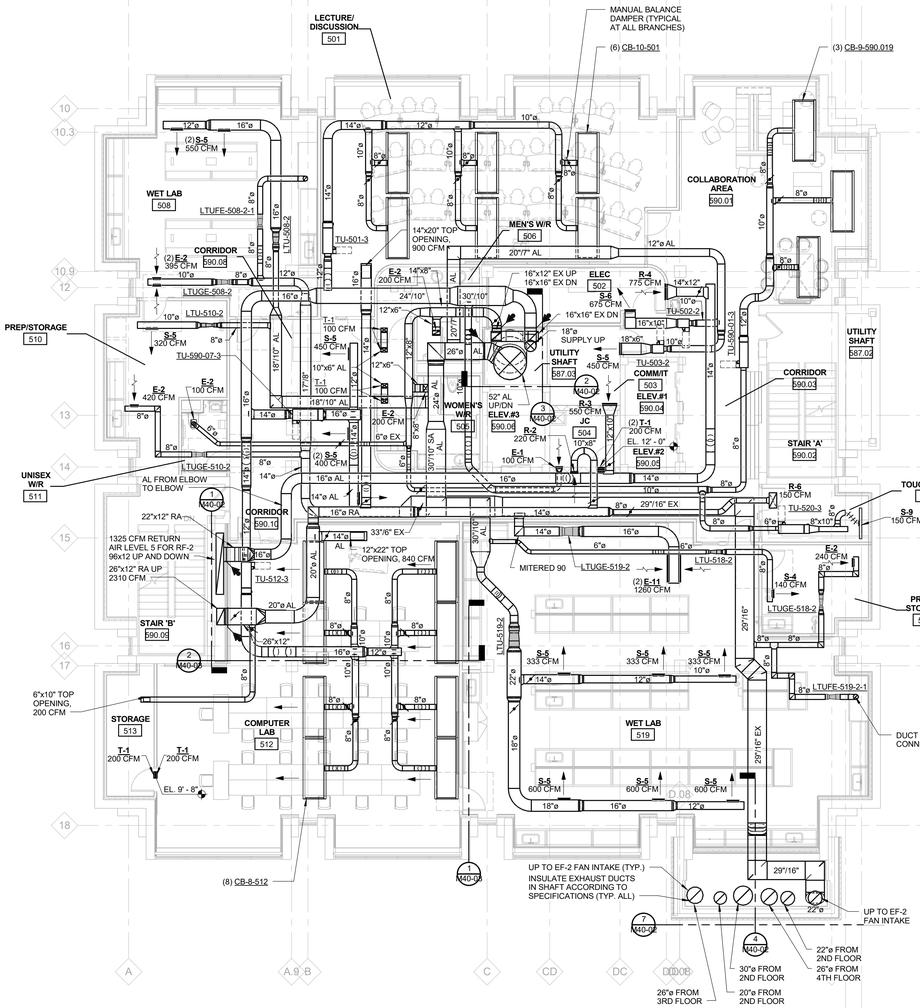
12/20/2018 2:54:55 PM



SIXTH FLOOR SHEET METAL PLAN

SCALE: 1/8" = 1'-0"

NORTH



FIFTH FLOOR SHEET METAL PLAN

SCALE: 1/8" = 1'-0"

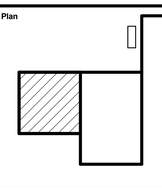
NORTH

NOTES

1. AL DENOTES ACOUSTICAL LINING. DUCTWORK SHALL BE DOUBLE WALL. DIMENSIONS SHOWN ARE INSIDE DIMENSIONS.
2. DUCTWORK LABELED AS X/X REPRESENTS FLAT OVAL DUCTWORK.
3. ALL BRANCH TAKEOFFS ON MEDIUM PRESSURE SUPPLY DUCT SHALL BE 45'T'S UNLESS NOTED OTHERWISE.

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

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Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

FIFTH AND SIXTH FLOOR SHEET METAL PLANS

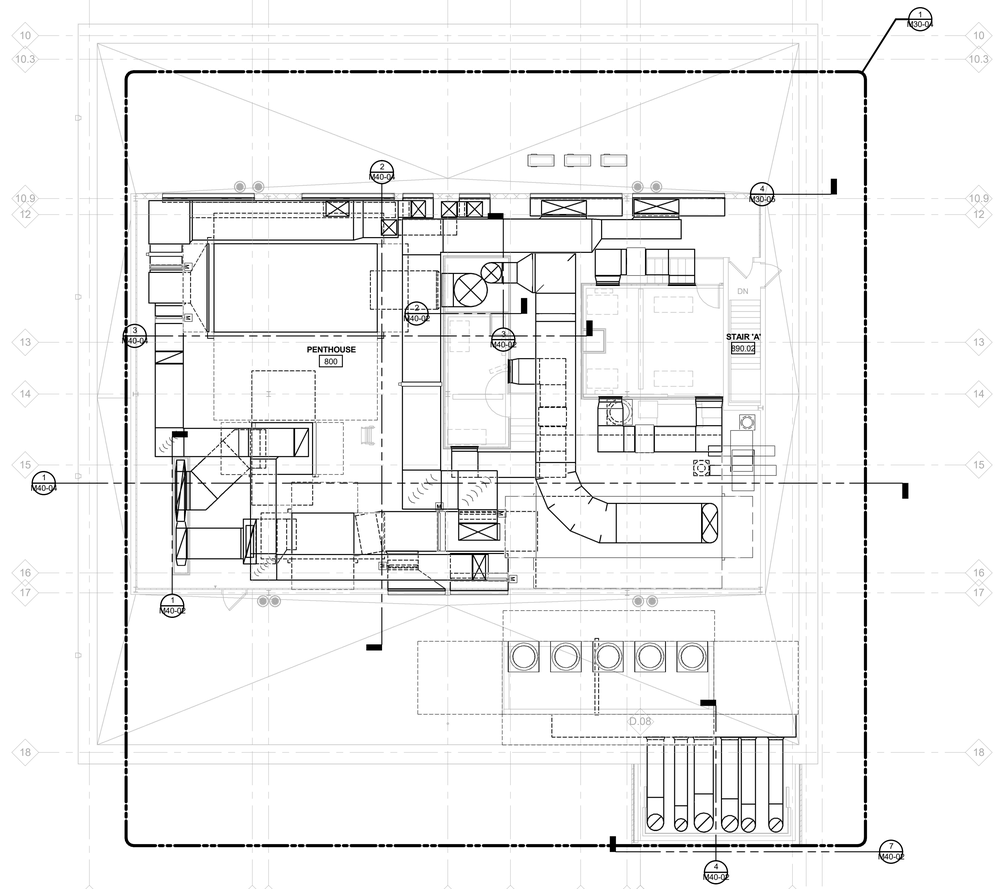
Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

M10-06

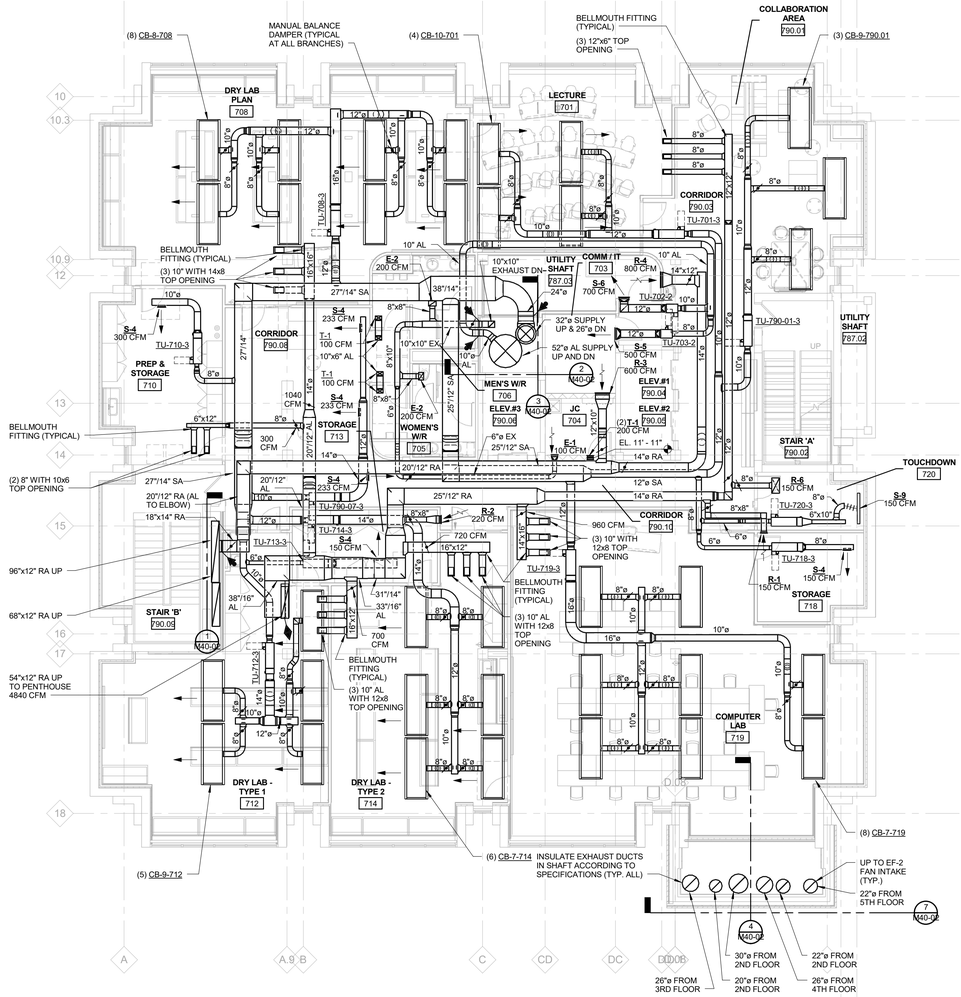
C:\Work\Revit\2016_M_180050_d2.rvt



PENTHOUSE SHEET METAL PLAN

SCALE: 1/8" = 1'-0"

NORTH



SEVENTH FLOOR SHEET METAL PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

1. AL DENOTES ACOUSTICAL LINING. DUCTWORK SHALL BE DOUBLE WALL. DIMENSIONS SHOWN ARE INSIDE DIMENSIONS.
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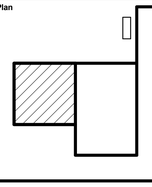
DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

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Design Lead: J. SMITH	Drawn: S. FIORENZO
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

SEVENTH FLOOR AND PENTHOUSE SHEET METAL PLANS

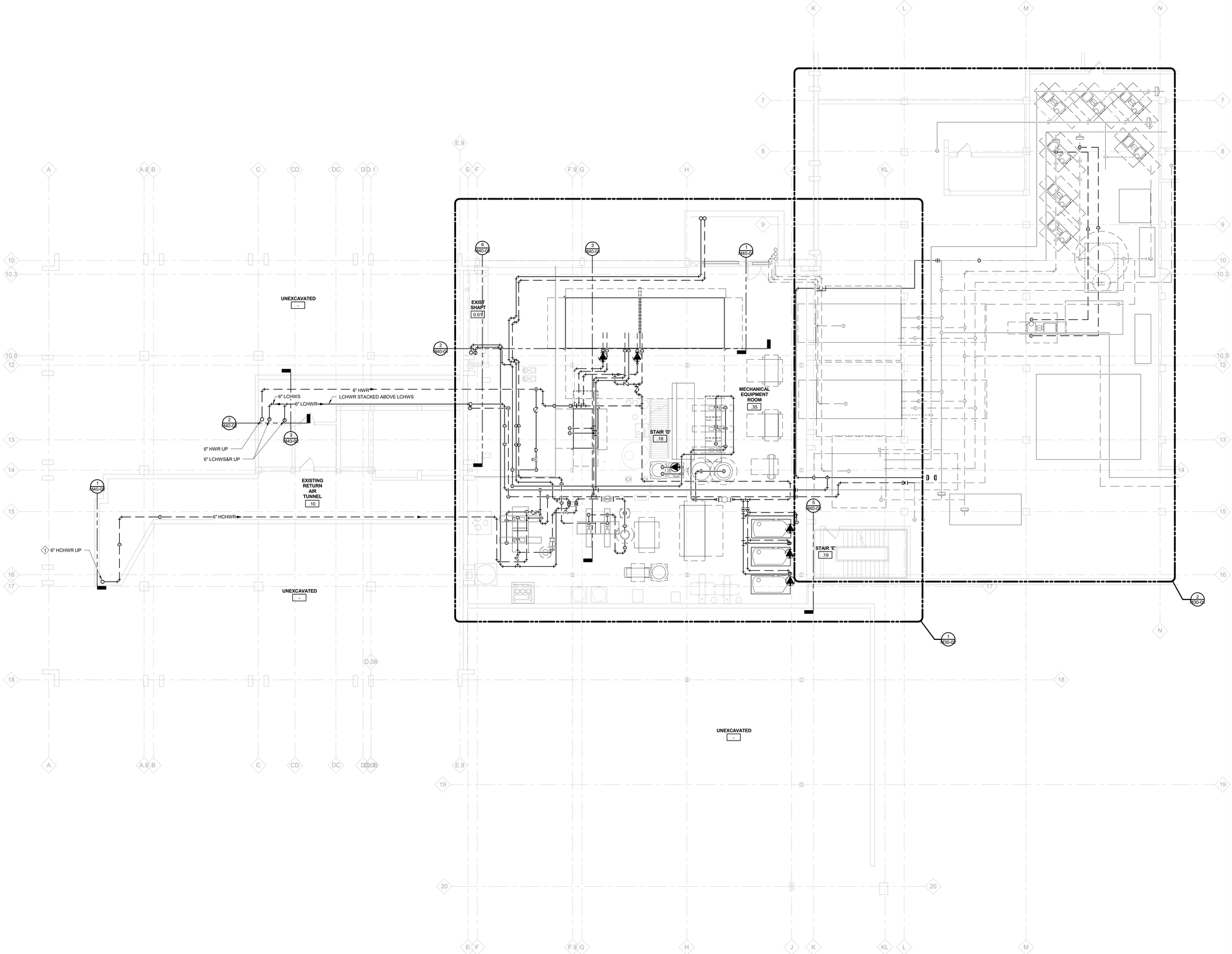
Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

M10-07

12/20/2018 2:55:33 PM



SUB-BASEMENT MECHANICAL PIPING PLAN

SCALE: 1/8" = 1'-0"

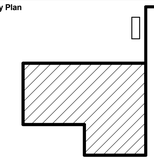
NORTH

NOTES

1. REFER TO M30-07 FOR SECTION CUTS OF PIPING IN NORTHEAST AND SOUTHWEST CHASES.

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

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Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: J. BATES	Drawn: S. FIORENZO
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

SUB-BASEMENT MECHANICAL PIPING PLANS

Scale	1/8" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	M20-01

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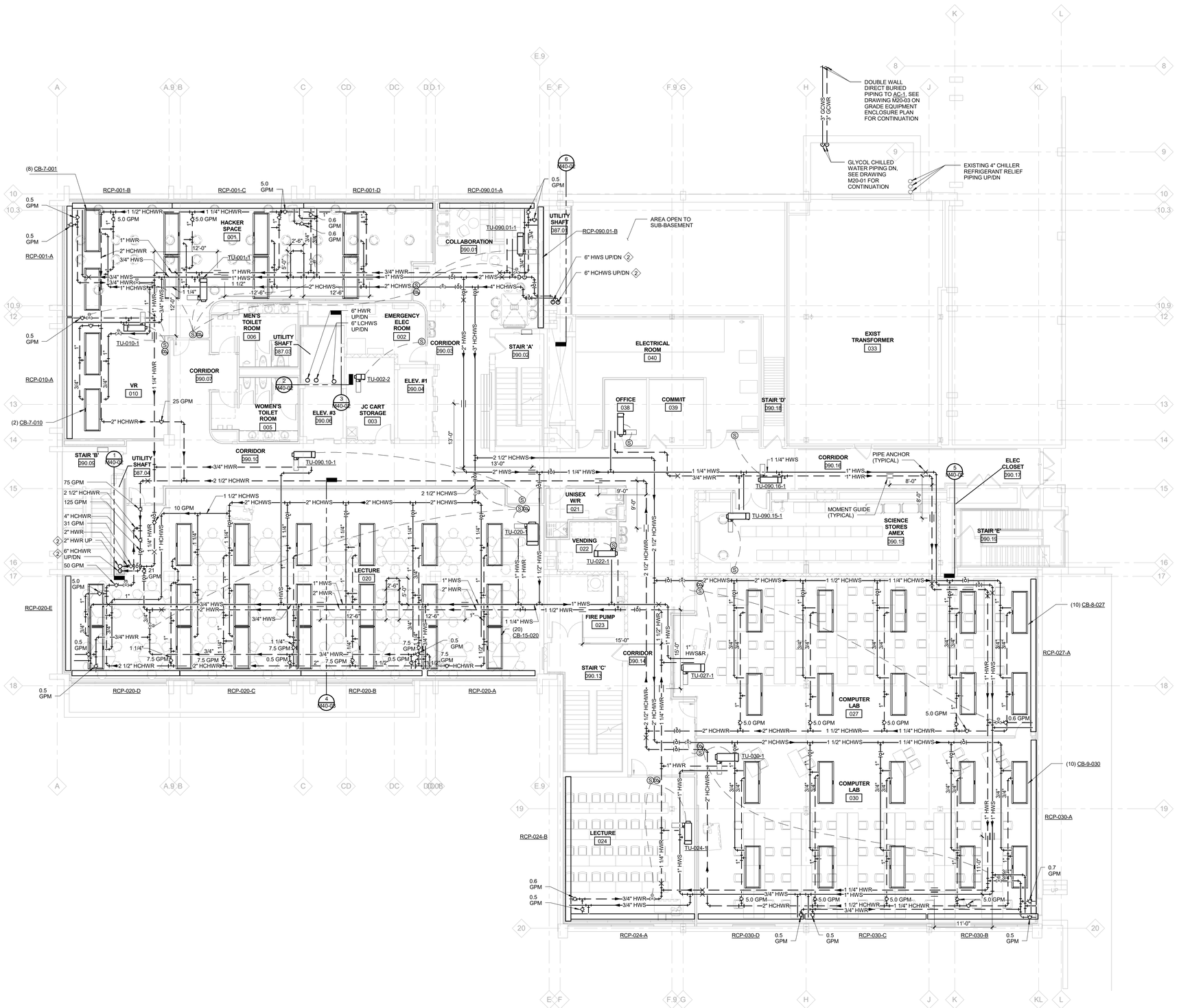

BASEMENT MECHANICAL PIPING PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

1. ALL HYDRONIC PIPING BRANCHES TO EQUIPMENT SHALL BE 3/4" UNLESS OTHERWISE NOTED.
2. REFER TO M30-05 FOR SECTION CUTS OF PIPING IN NORTHEAST AND SOUTHWEST CHASES.

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan

Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

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Project Manager J. SMITH	BIM Lead C. BAKER
Design Lead J. BATES	Drawn S. FIORENZO
Project Leader Approver	Checked Checker

WAYNE STATE UNIVERSITY

Project
STEM Innovation
Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
BASEMENT MECHANICAL PIPING PLANS

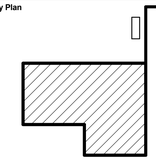
Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No. M20-02

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

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Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: J. BATES	Drawn: S. FIORENZO
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

FIRST FLOOR MECHANICAL PIPING PLANS

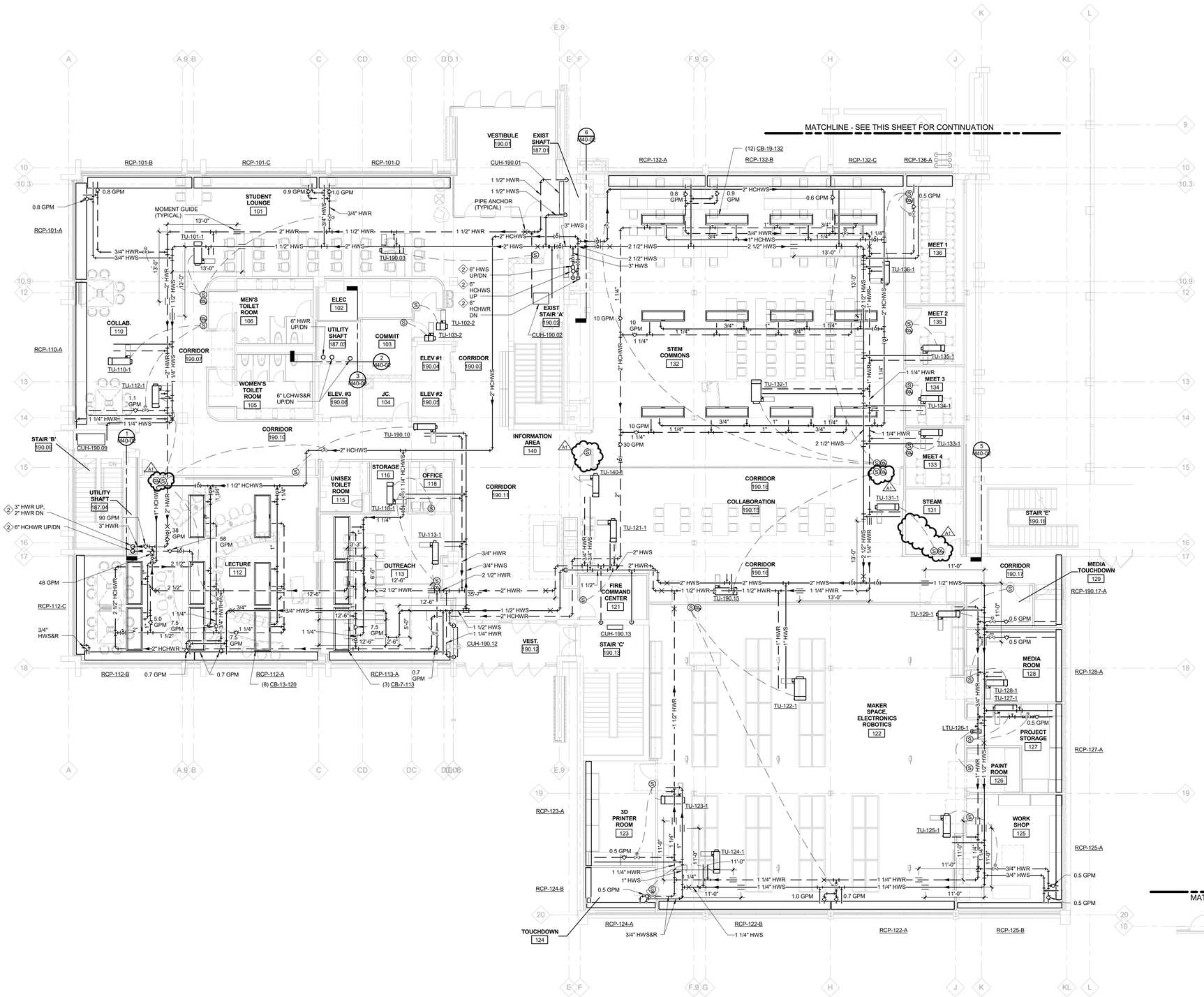
Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

M20-03

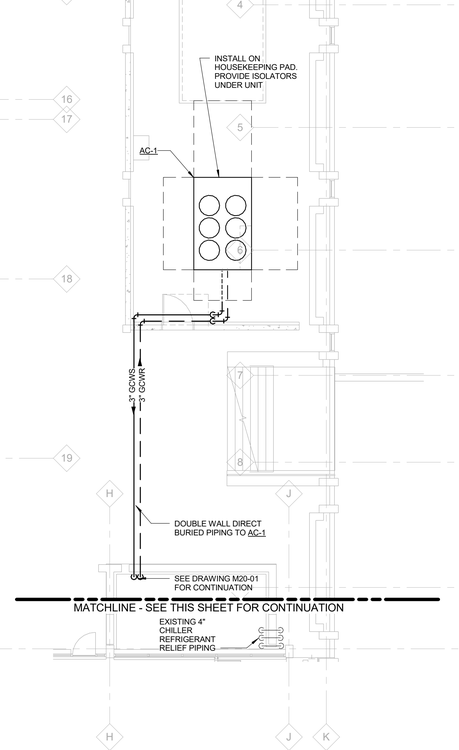
MATCHLINE - SEE THIS SHEET FOR CONTINUATION



FIRST FLOOR MECHANICAL PIPING PLAN

SCALE: 1/8" = 1'-0"

NORTH



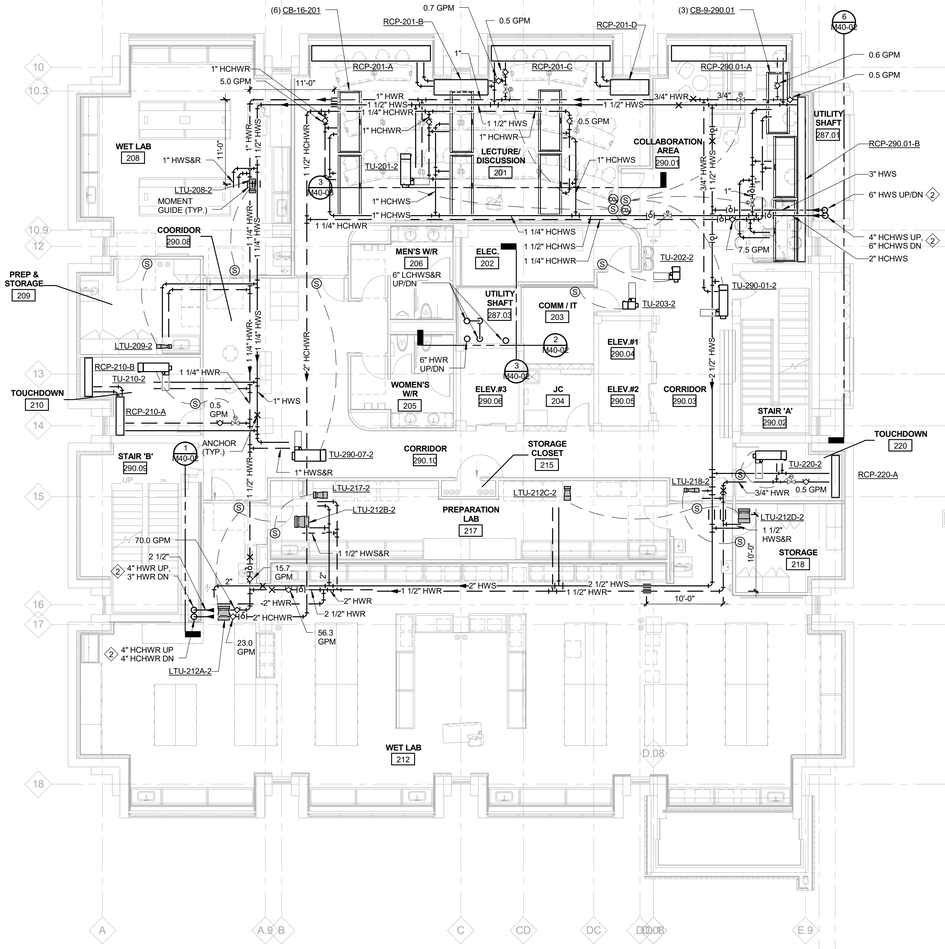
ON GRADE EQUIPMENT ENCLOSURE PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

1. ALL HYDRONIC PIPING BRANCHES TO EQUIPMENT SHALL BE 3/4" UNLESS OTHERWISE NOTED.
2. REFER TO M30-05 FOR SECTION CUTS OF PIPING IN NORTHEAST AND SOUTHWEST CHASES.



SECOND FLOOR MECHANICAL PIPING PLAN

SCALE: 1/8" = 1'-0"

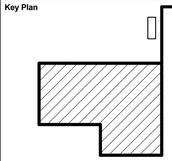
NORTH

NOTES

1. ALL HYDRONIC PIPING BRANCHES TO EQUIPMENT SHALL BE 3/4" UNLESS OTHERWISE NOTED.
2. REFER TO M30-05 FOR SECTION CUTS OF PIPING IN NORTHEAST AND SOUTHWEST CHASES.

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Manager	BIM Lead
J. SMITH	C. BAKER
Design Lead	Drawn
J. BATES	S. FIORENZO
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

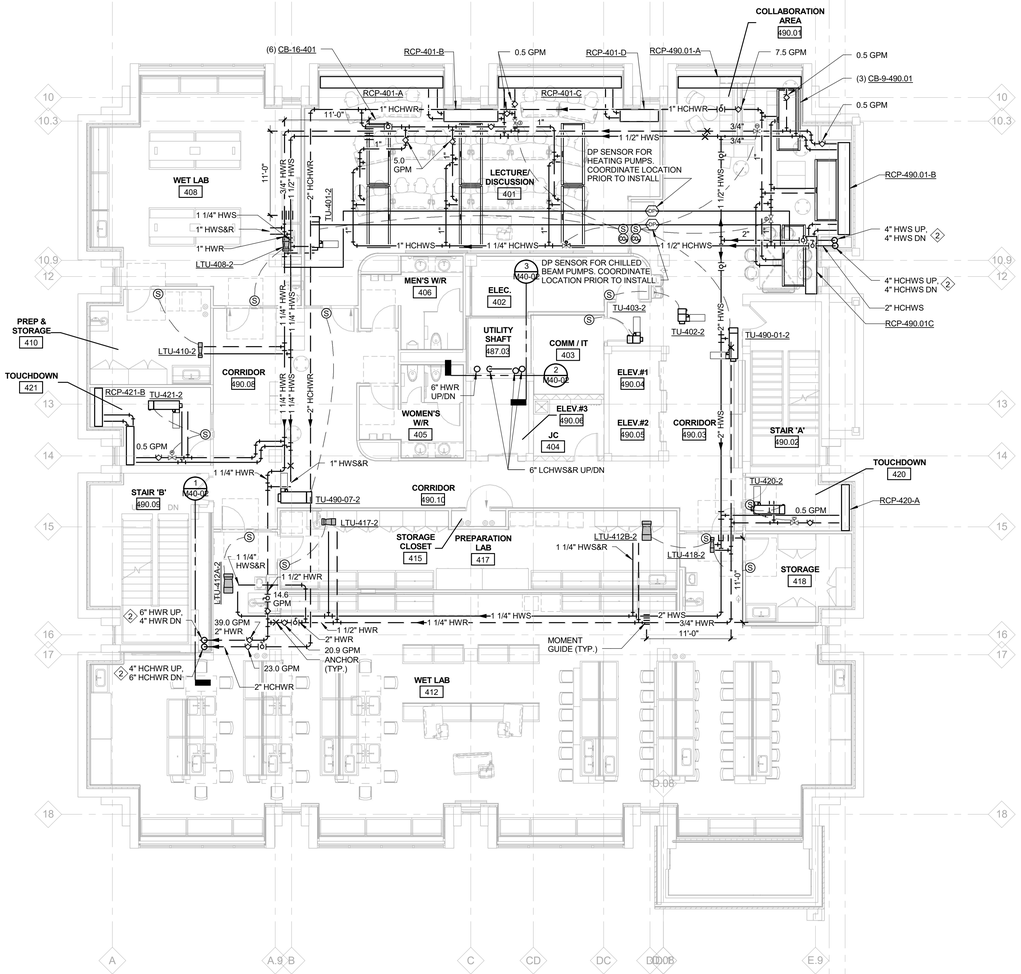
Project

STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

SECOND FLOOR MECHANICAL PIPING PLANS

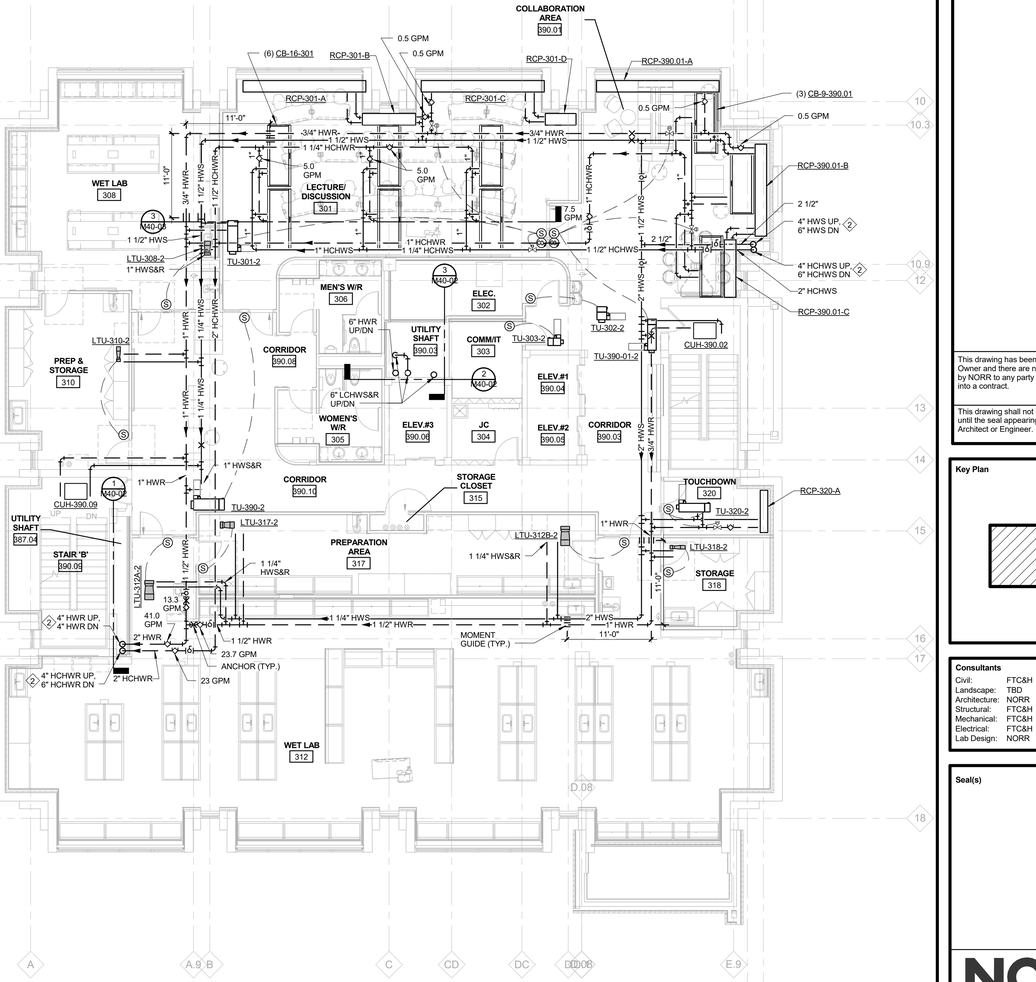
Scale	1/8" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	M20-04



FOURTH FLOOR MECHANICAL PIPING PLAN

SCALE: 1/8" = 1'-0"

NORTH



THIRD FLOOR MECHANICAL PIPING PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

1. ALL HYDRONIC PIPING BRANCHES TO EQUIPMENT SHALL BE 3/4" UNLESS OTHERWISE NOTED.
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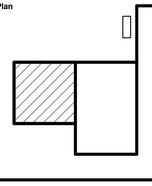
DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Manager	BIM Lead
J. SMITH	C. BAKER
Design Lead	Drawn
J. BATES	S. FIORENZO
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

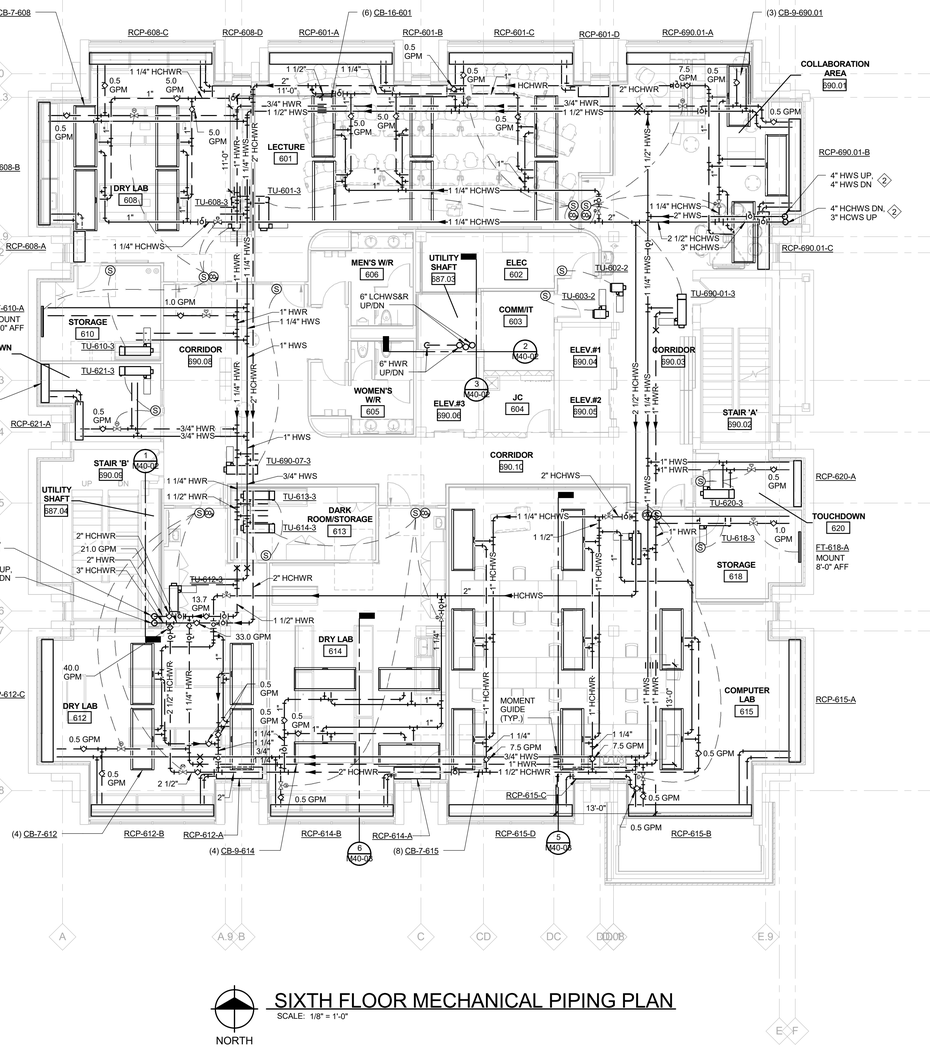
THIRD AND FOURTH FLOOR MECHANICAL PIPING PLANS

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

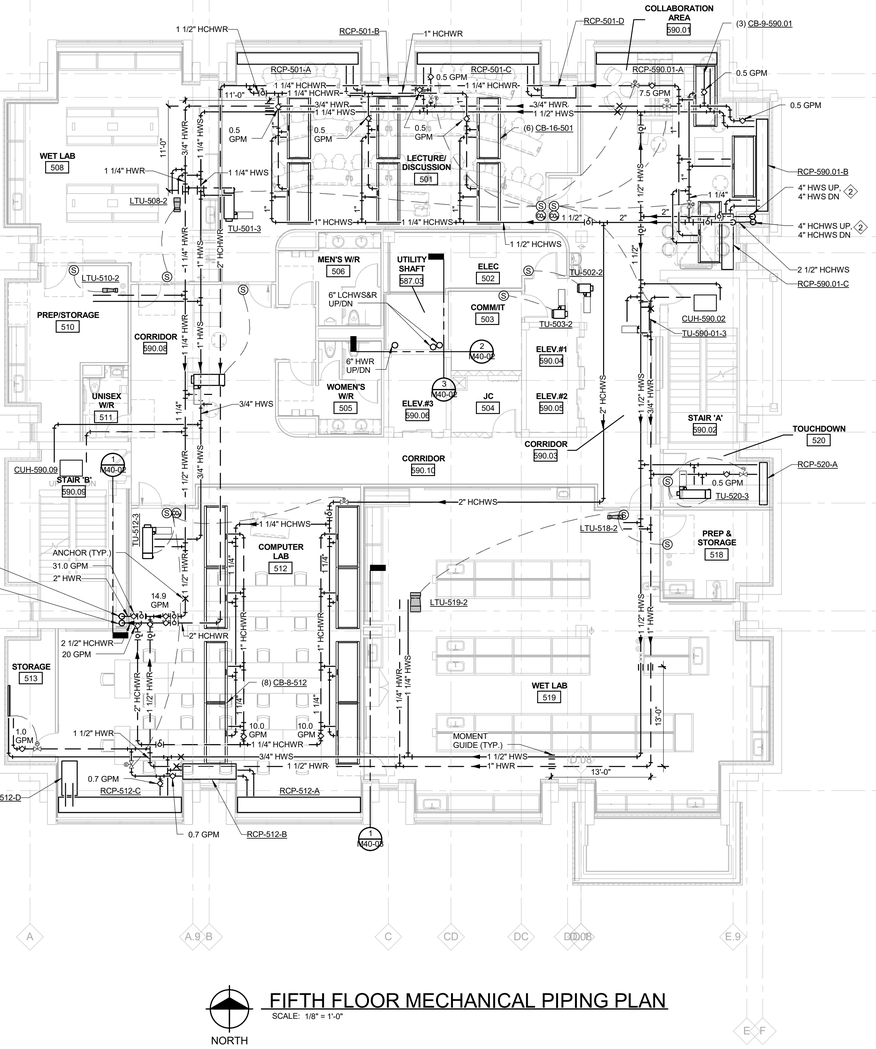
M20-05



SIXTH FLOOR MECHANICAL PIPING PLAN

SCALE: 1/8" = 1'-0"

NORTH



FIFTH FLOOR MECHANICAL PIPING PLAN

SCALE: 1/8" = 1'-0"

NORTH

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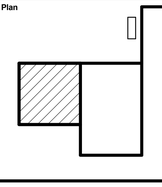
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

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Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project
STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

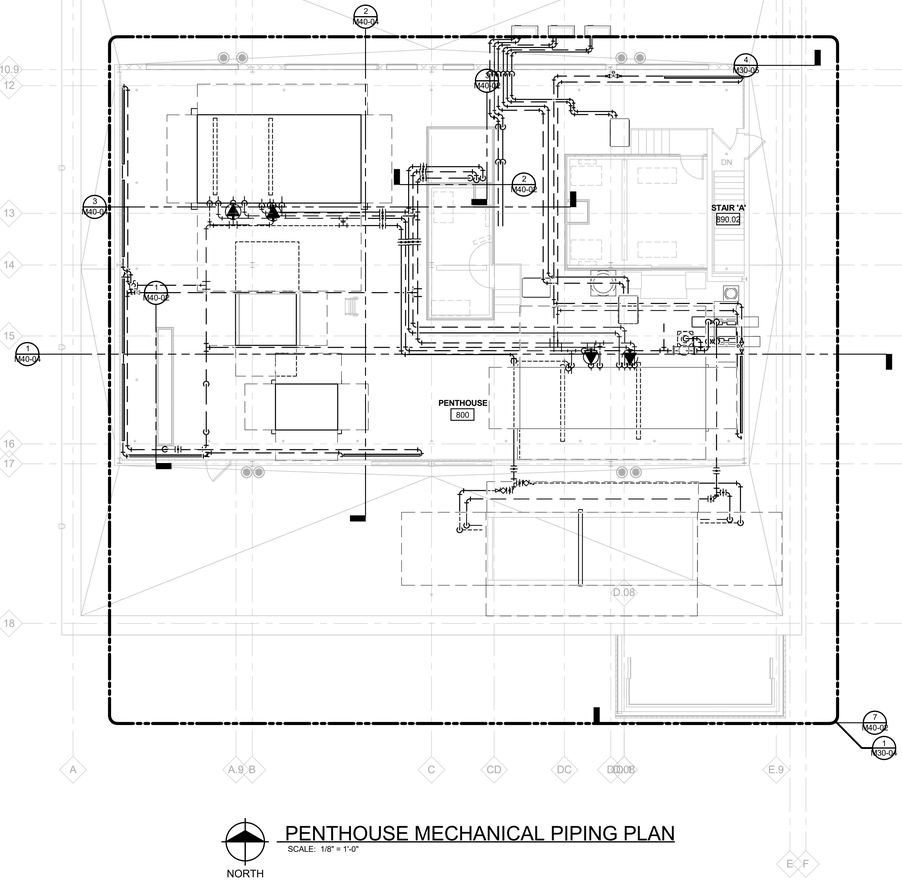
Drawing Title
FIFTH AND SIXTH FLOOR MECHANICAL PIPING PLANS

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
M20-06

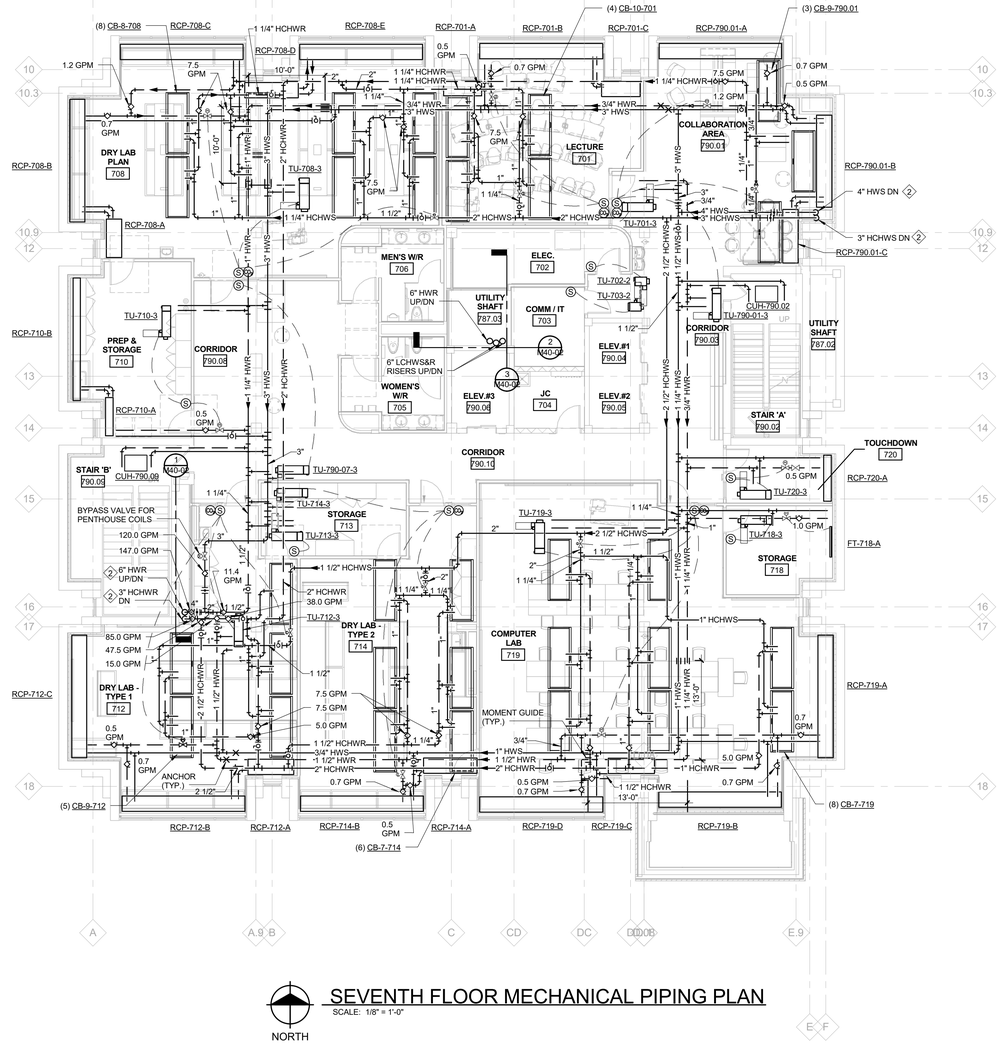
12/20/2018 2:58:22 PM



PENTHOUSE MECHANICAL PIPING PLAN

SCALE: 1/8" = 1'-0"

NORTH



SEVENTH FLOOR MECHANICAL PIPING PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

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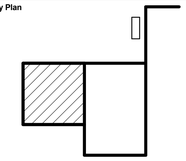
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

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Design Lead: J. BATES	Drawn: S. FIORENZO
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

SEVENTH FLOOR AND PENTHOUSE MECHANICAL PIPING PLANS

Scale 1/8" = 1'-0"

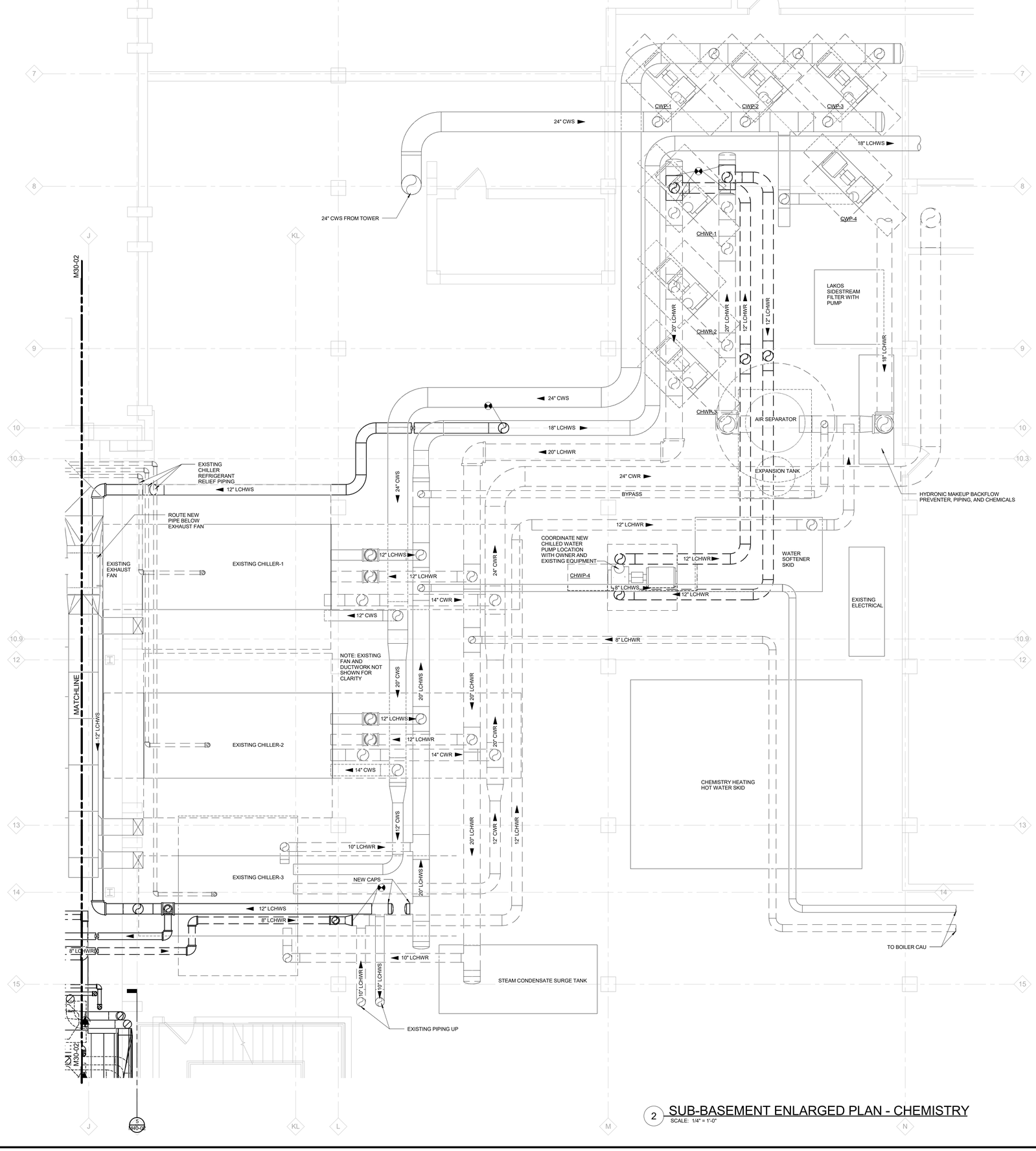
Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

M20-07

C:\Work\Revit\2018_M_180050_#2.rvt

12/20/2018 3:07:06 PM

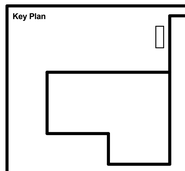


2 SUB-BASEMENT ENLARGED PLAN - CHEMISTRY

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

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

NORR

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www.ftch.com

Project Manager	BIM Lead
J. SMITH	C. BAKER
Design Lead	Drawn
J. SMITH	J. BATES
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

SUB-BASEMENT ENLARGED MECHANICAL PLAN - CHEMISTRY

Scale 1/4" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No. M30-01

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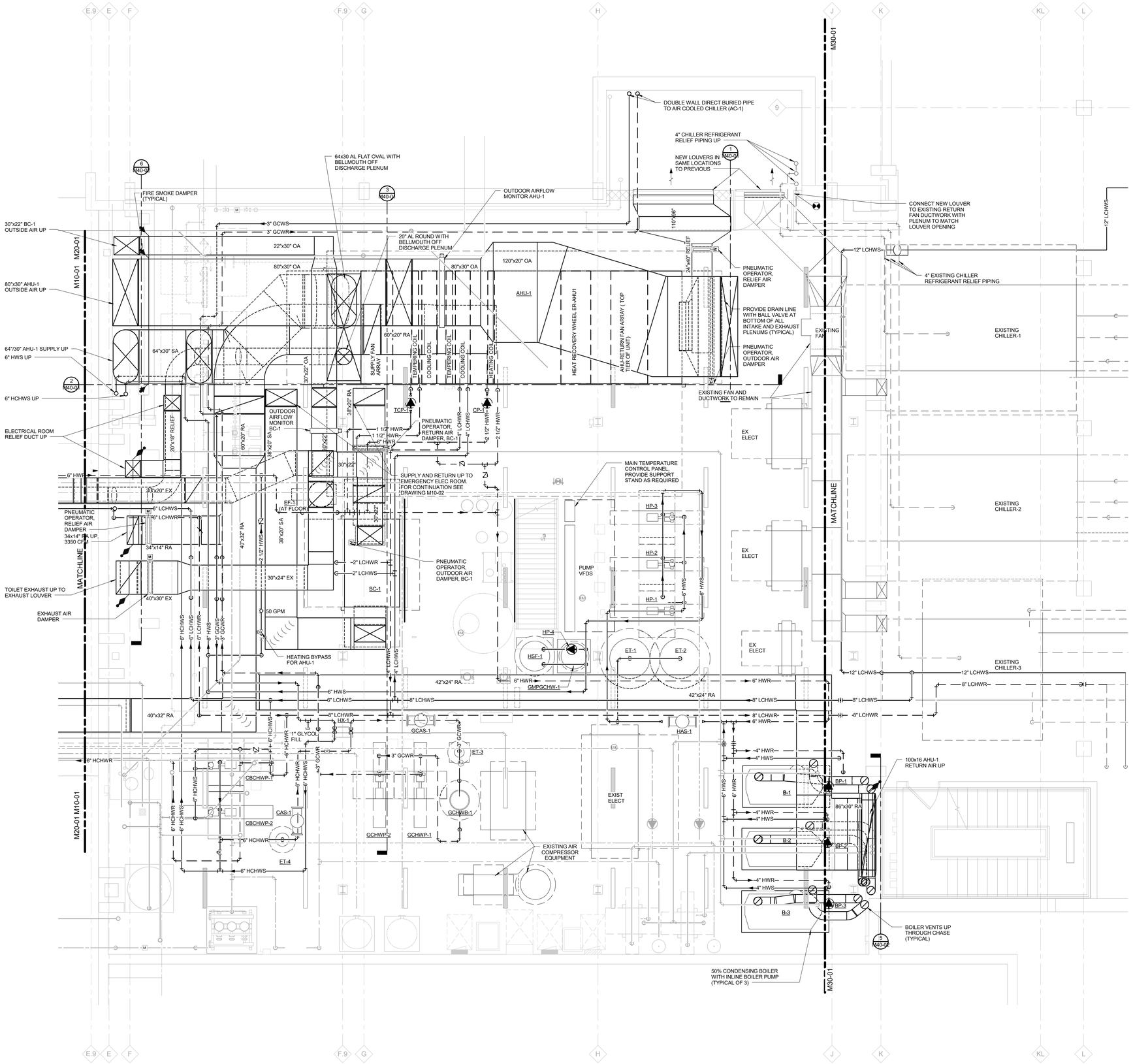


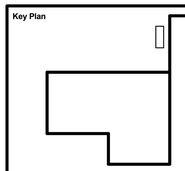
1 SUB-BASEMENT ENLARGED PLAN
SCALE: 1/4" = 1'-0"

NOTES

1. AL DENOTES ACOUSTICAL LINING. DUCTWORK SHALL BE DOUBLE WALL. DIMENSIONS SHOWN ARE INSIDE DIMENSIONS.
2. DUCTWORK LABELED AS X/X REPRESENTS FLAT OVAL DUCTWORK.
3. ALL BRANCH TAKEOFFS ON MEDIUM PRESSURE SUPPLY DUCT SHALL BE 45TS UNLESS NOTED OTHERWISE.
4. ALL HYRDRONIC PIPING BRANCHES TO EQUIPMENT SHALL BE 3/4" UNLESS OTHERWISE NOTED.
5. REFER TO M30-07 FOR SECTION CUTS OF PIPING IN NORTHEAST AND SOUTHWEST CHASES.

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

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Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: J. BATES	Drawn: S. FIORENZO
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project
STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
SUB-BASEMENT ENLARGED MECHANICAL PLAN

Scale 1/4" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
M30-02

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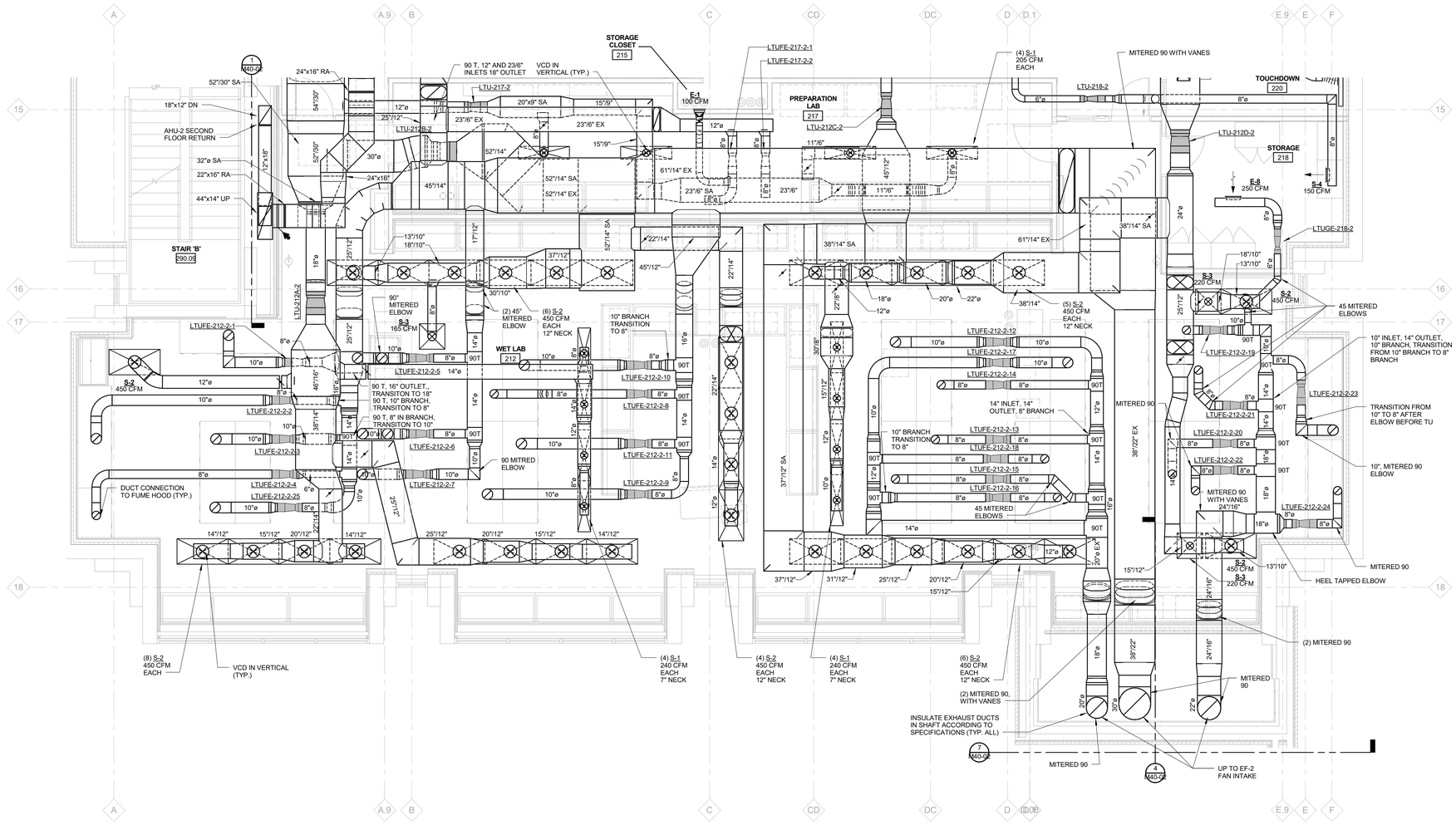
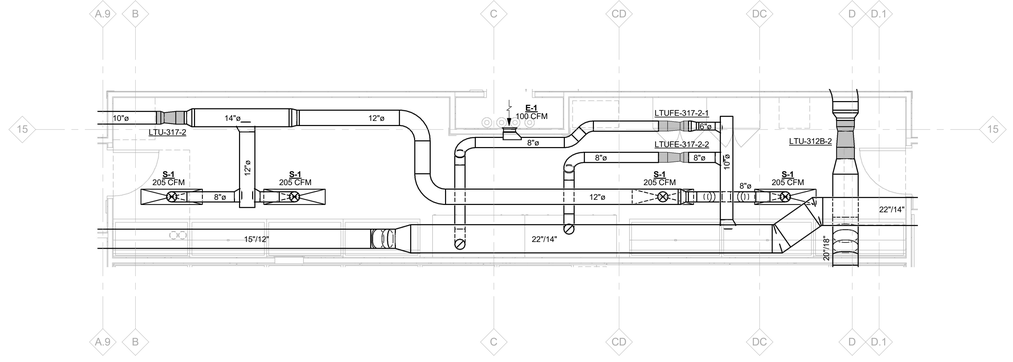


1 SECOND FLOOR ENLARGED PLAN
SCALE: 1/4" = 1'-0"



2 THIRD FLOOR ENLARGED PLAN
SCALE: 1/4" = 1'-0"

NOTES

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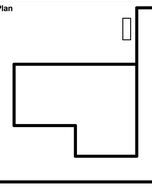
4. ALL HYRDRONIC PIPING BRANCHES TO EQUIPMENT SHALL BE 3/4" UNLESS OTHERWISE NOTED.
5. REFER TO M30-07 FOR SECTION CUTS OF PIPING IN NORTHEAST AND SOUTHWEST CHASES.

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

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www.ftch.com

Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: J. SMITH	Drawn: S. FIORENZO
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project
STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
SECOND & THIRD FLOOR ENLARGED PLANS

Scale 1/4" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
M30-03

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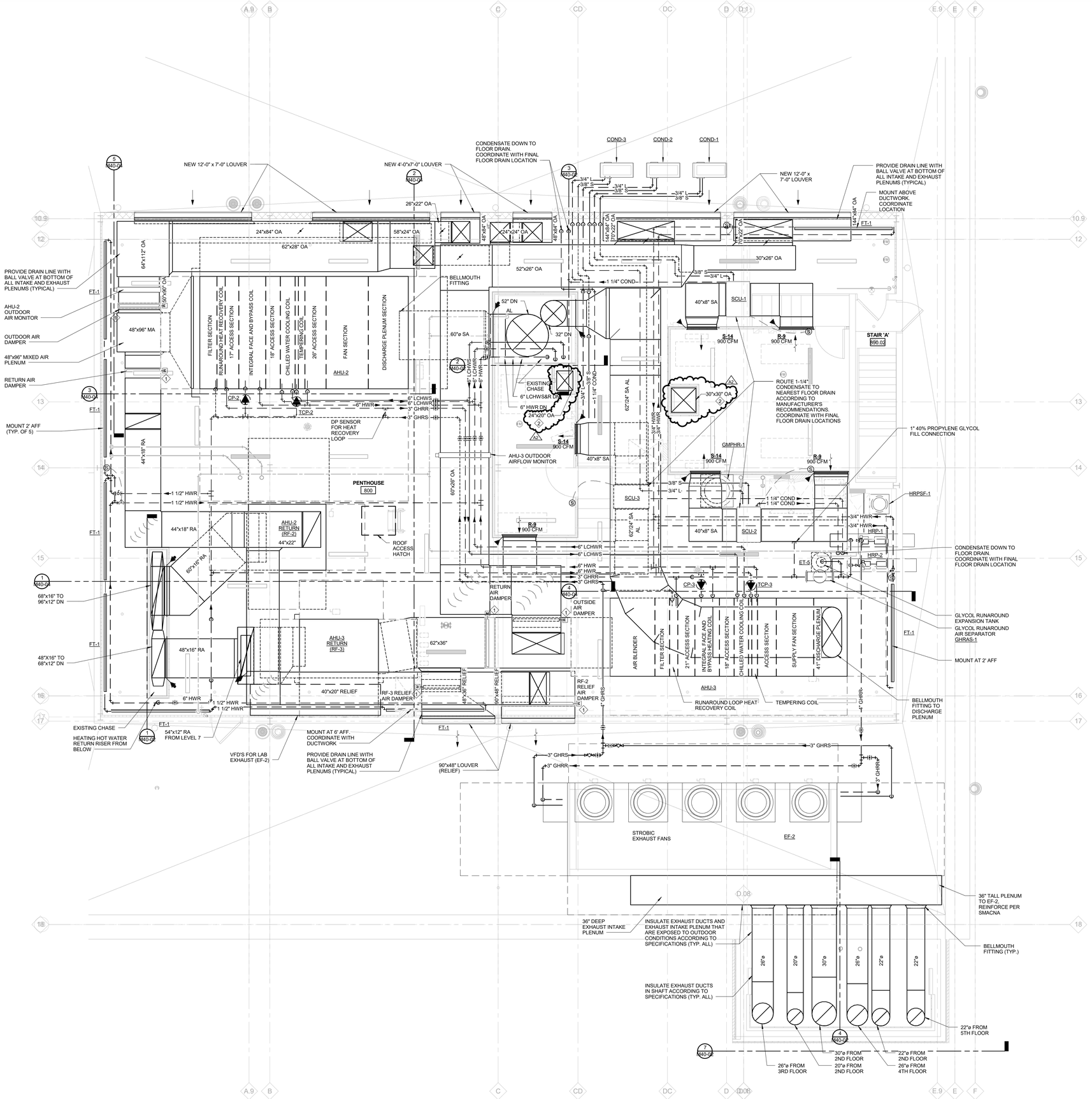
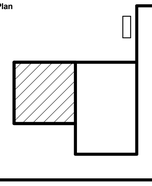


1 PENTHOUSE MECHANICAL ENLARGED PLAN

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

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/22/2019	ADDENDUM NO. 2	5
05/06/2019	TEST AND BALANCE BID	

Key Plan



NOTES

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4. ALL HYRDRONIC PIPING BRANCHES TO EQUIPMENT SHALL BE 3/4" UNLESS OTHERWISE NOTED.
5. REFER TO M30-07 FOR SECTION CUTS OF PIPING IN NORTHEAST AND SOUTHWEST CHASES.

KEY NOTES

1. PNEUMATIC CONTROL DAMPER.
2. ROUTE OA DUCT FROM 3" BELOW PENTHOUSE FLOOR (IN ELEVATOR HOISTWAY) UP TO ROOF VENT. PROVIDE OFFSETS AS REQUIRED TO CONNECT TO ROOF VENT. SEE ARCHITECTURAL PLANS FOR ROOF VENT, FLOOR AND ROOF OPENING INFORMATION. SEE DETAIL ON DRAWING M70-03. INSULATE ACCORDING TO SPECIFICATIONS.

Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Manager	BIM Lead
J. SMITH	C. BAKER
Design Lead	Drawn
J. SMITH	S. FIORENZO
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

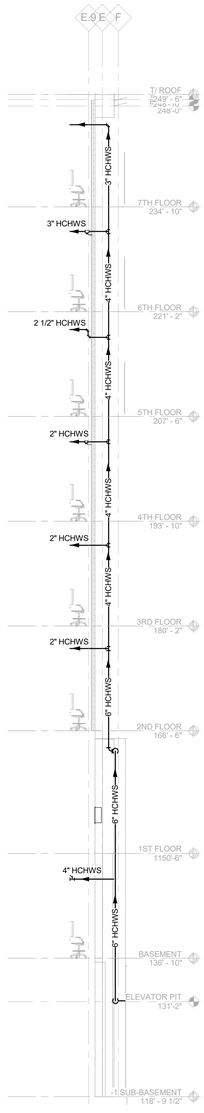
PENTHOUSE ENLARGED MECHANICAL PLAN

Scale 1/4" = 1'-0"

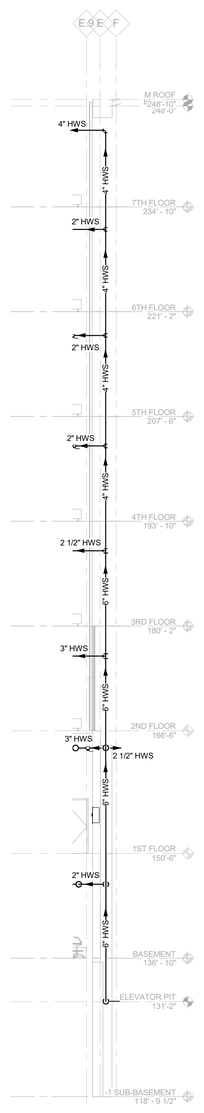
Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

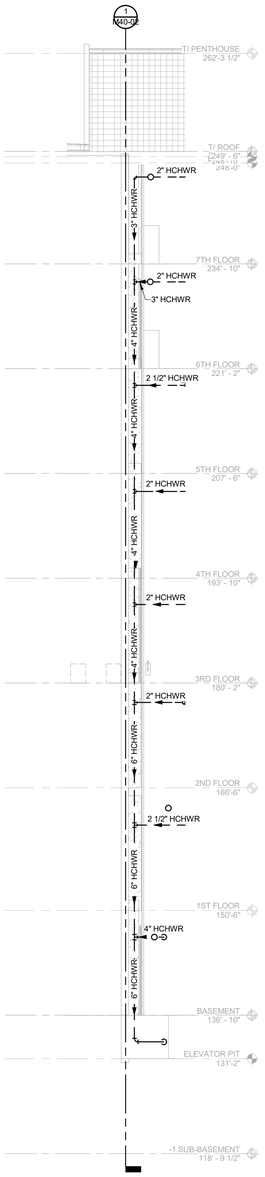
M30-04



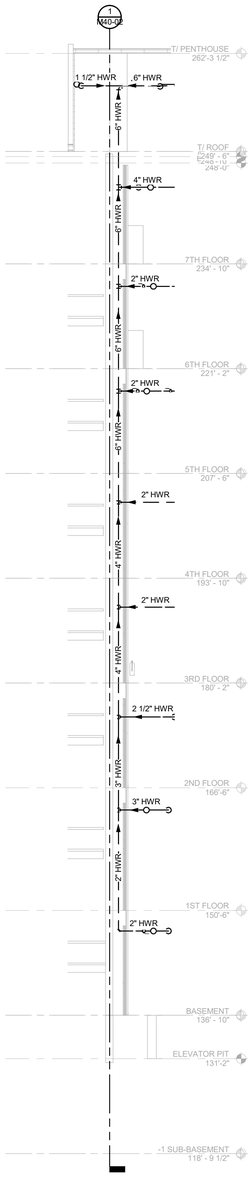
4 HCHWS NE RISER
SCALE: 1/8" = 1'-0"



3 HWS NE RISER
SCALE: 1/8" = 1'-0"



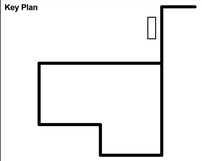
2 HCHWR SW RISER
SCALE: 1/8" = 1'-0"



1 HWR SW RISER
SCALE: 1/8" = 1'-0"

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Manager	BIM Lead
J. SMITH	C. BAKER
Design Lead	Drawn
J. SMITH	S. FIORENZO
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

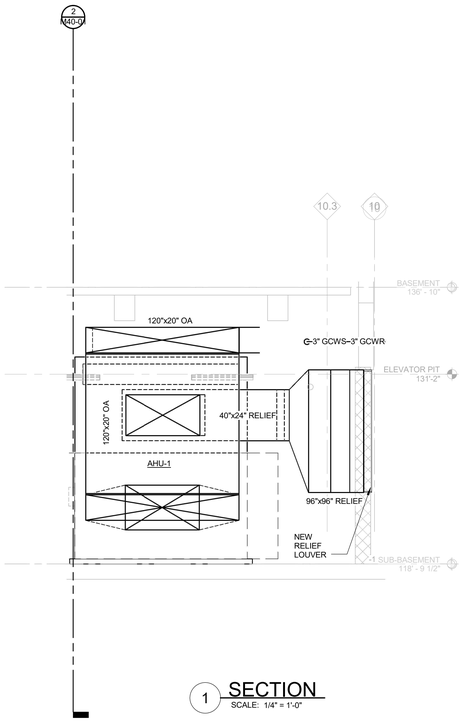
ENLARGED HYDRONIC PIPING RISERS

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No. M30-05

12/20/2018 2:09:00 PM



1 SECTION
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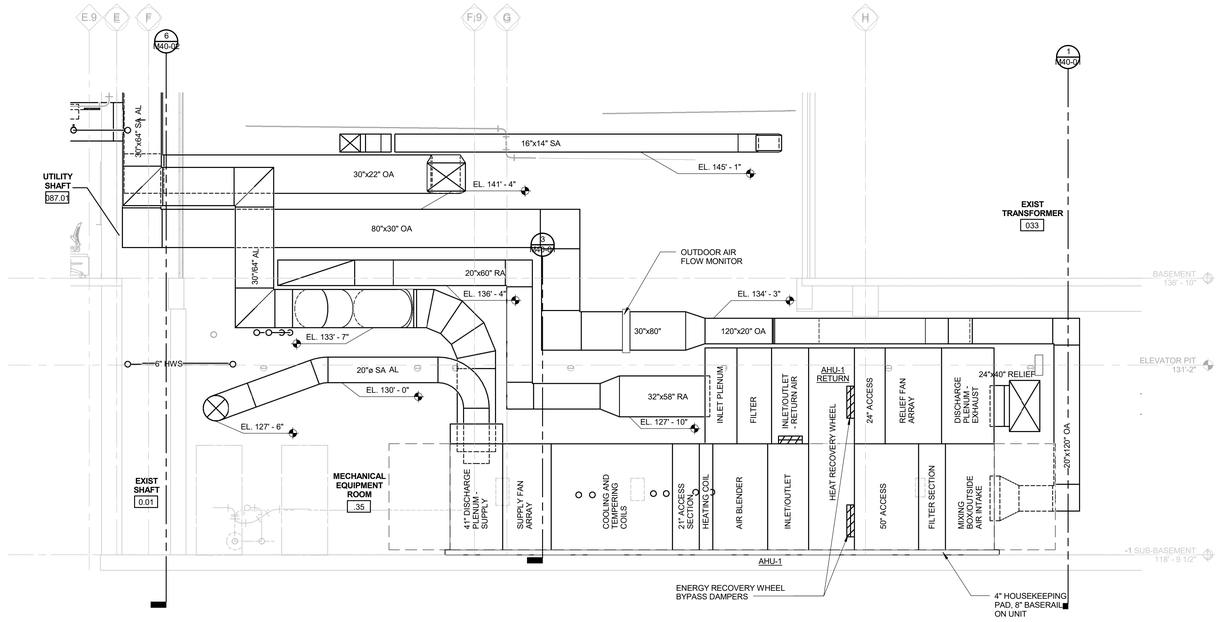

2 AHU-1 SECTION
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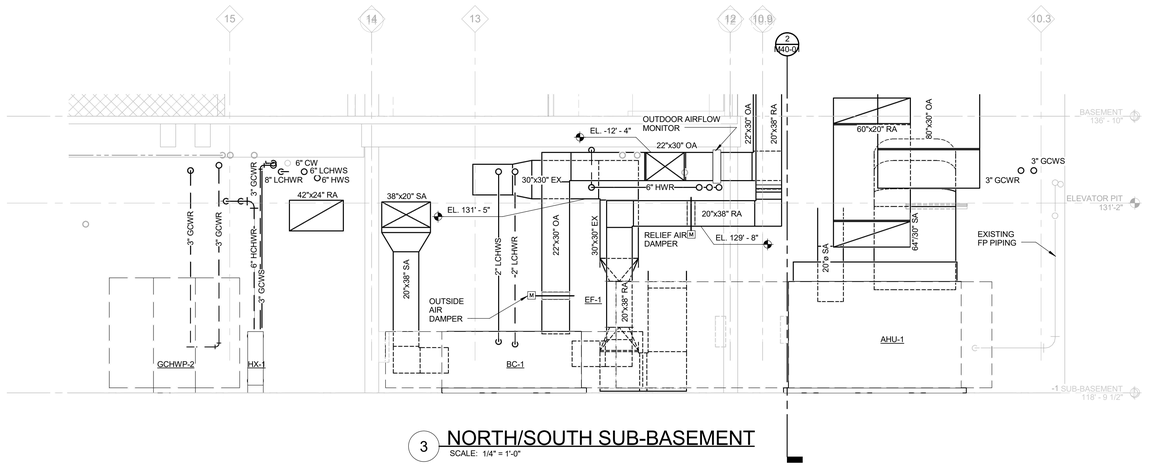
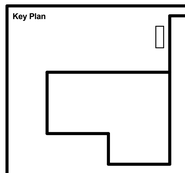


3 NORTH/SOUTH SUB-BASEMENT
SCALE: 1/4" = 1'-0"

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

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Design Lead: J. SMITH	Drawn: S. FIORENZO
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation
Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

SUB-BASEMENT MECHANICAL ROOM SECTIONS

Scale 1/4" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

M40-01

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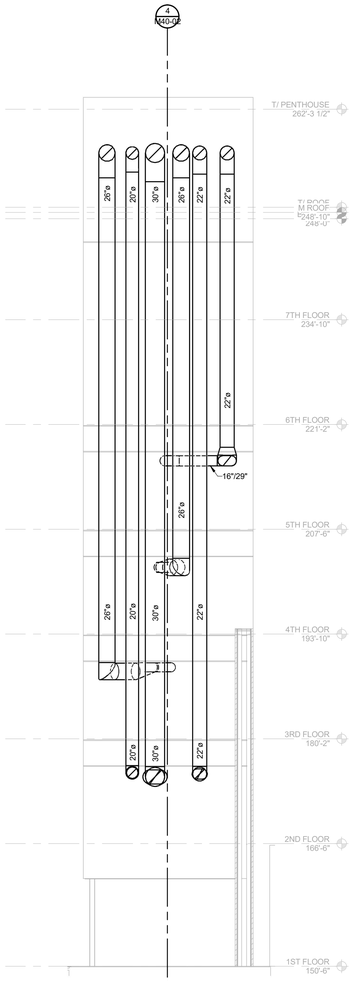
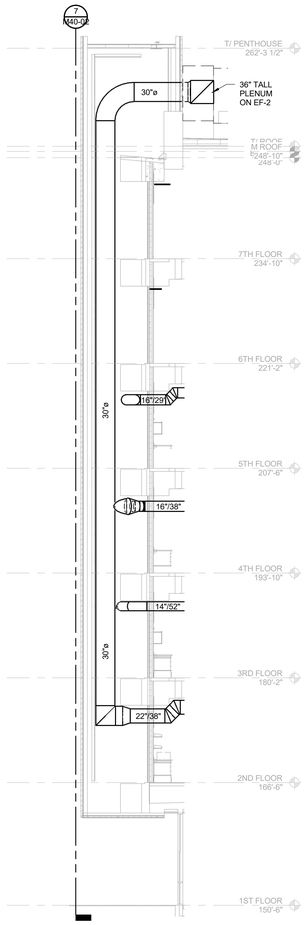
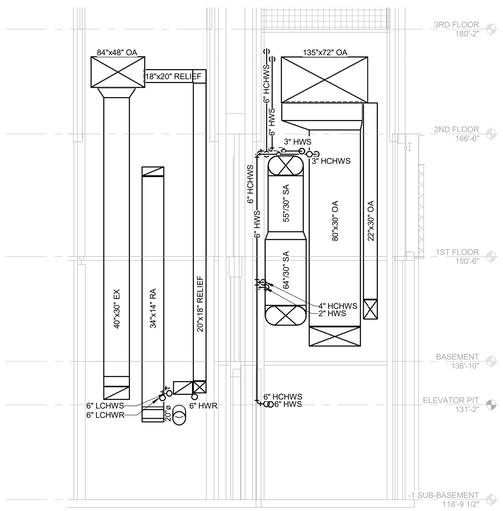


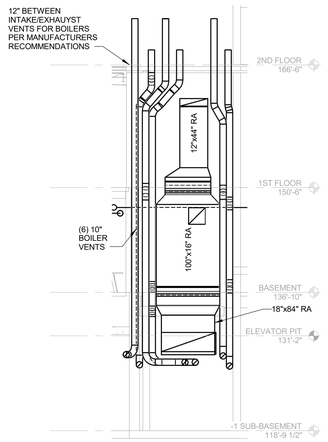
7 EXHAUST SHAFT LOOKING NORTH
SCALE: 1/8" = 1'-0"



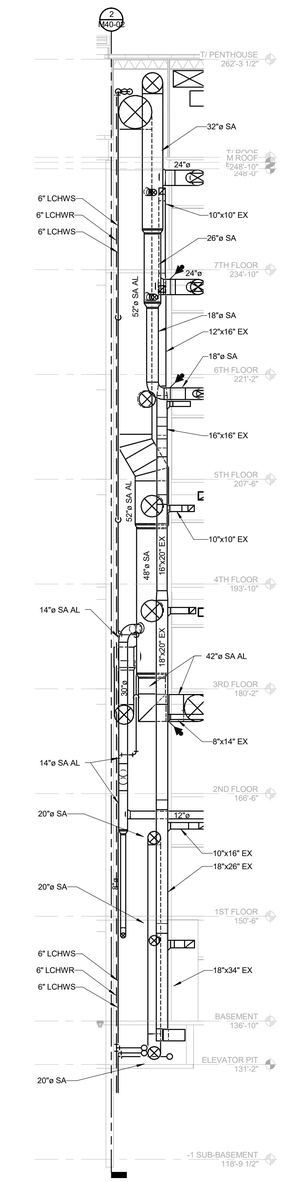
4 EXHAUST SHAFT N/S
SCALE: 1/8" = 1'-0"



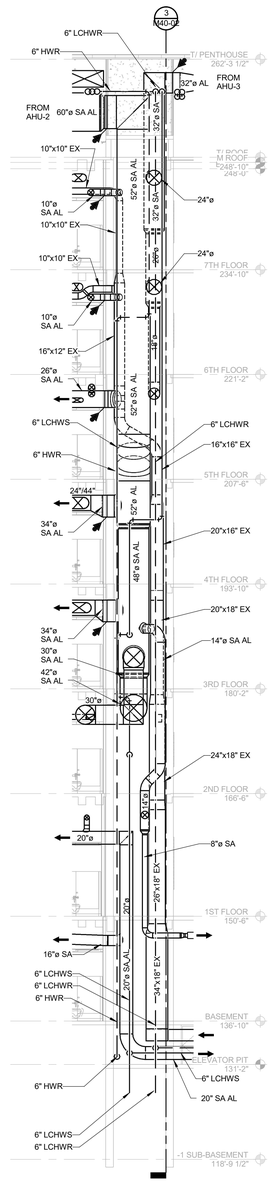
6 SUB-2ND CHASE
SCALE: 1/8" = 1'-0"



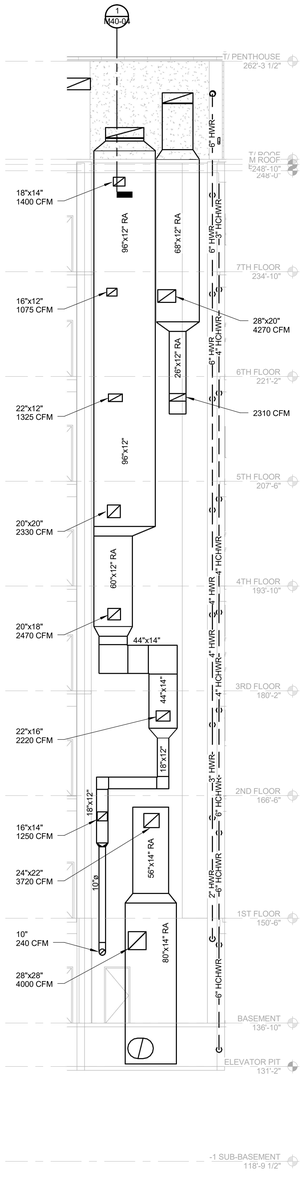
5 SOUTHEAST SHAFT
SCALE: 1/8" = 1'-0"



3 CENTRAL UTILITY SHAFT
SCALE: 1/8" = 1'-0"



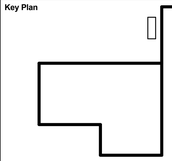
2 CENTRAL UTILITY SHAFT
SCALE: 1/8" = 1'-0"



1 RETURN DUCT SHAFT
SCALE: 1/8" = 1'-0"

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Manager	BIM Lead
J. SMITH	C. BAKER
Design Lead	Drawn
J. SMITH	S. FIORENZO
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

Project
STEM Innovation
Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
UTILITY SHAFT SECTIONS

Scale 1/8" = 1'-0"
Project No. JCDT17-0231 (FTCH 180050)
Drawing No. M40-02

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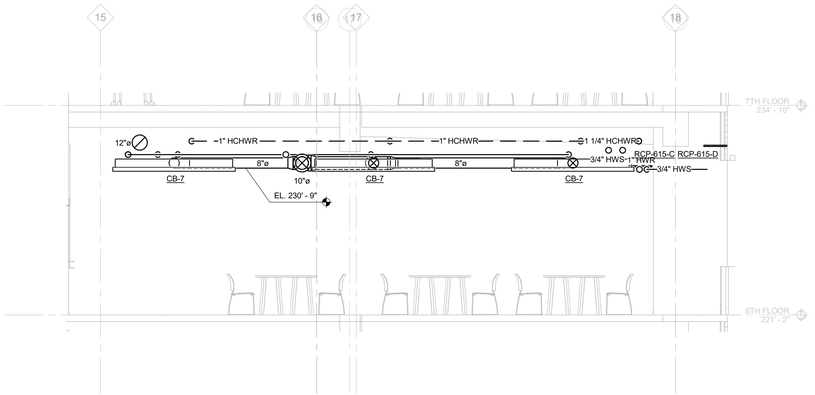
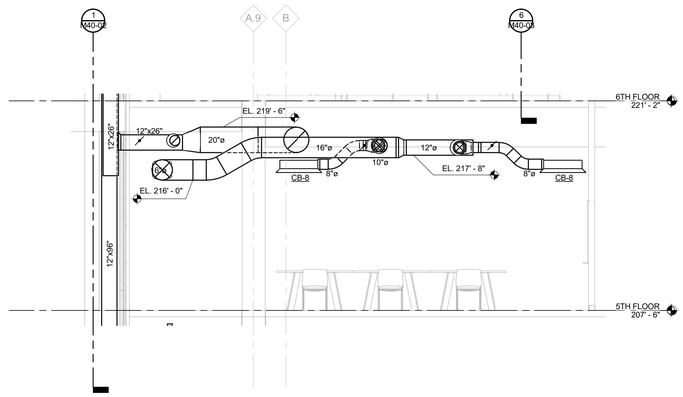
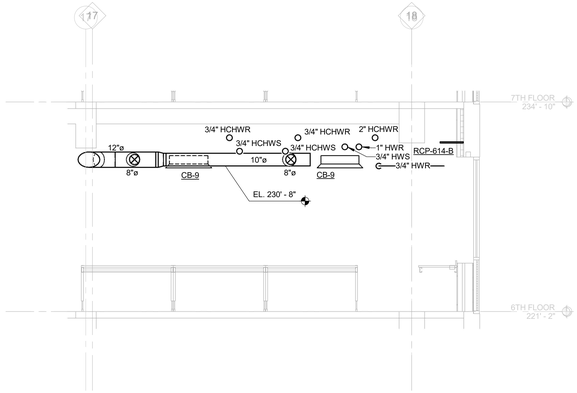


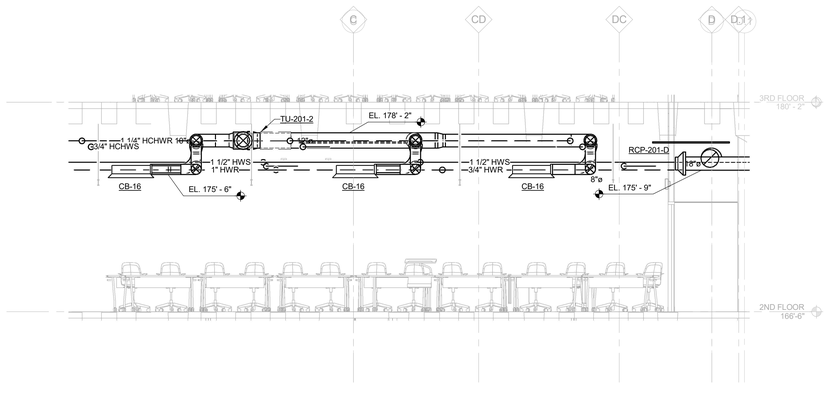
5 SIXTH FLOOR COMPUTER LAB 615
SCALE: 1/4" = 1'-0"



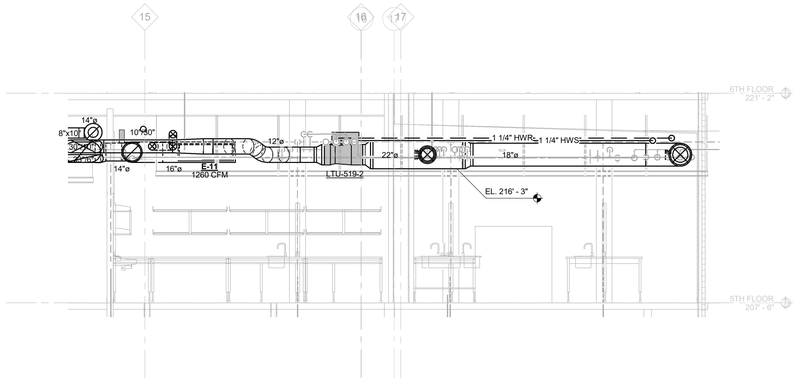
2 FIFTH FLOOR COMPUTER LAB 512
SCALE: 1/4" = 1'-0"



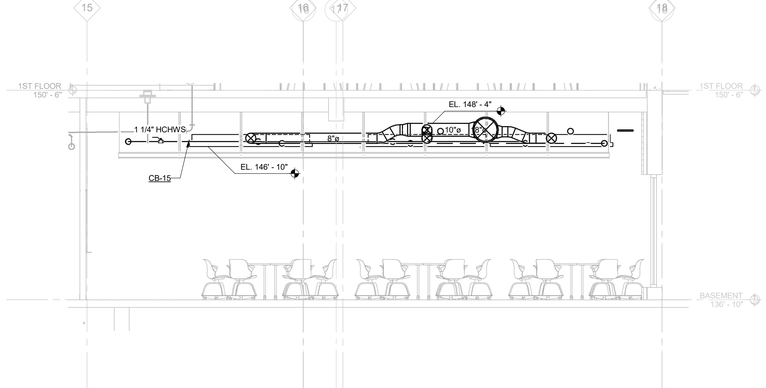
6 SIXTH FLOOR DRY LAB 614
SCALE: 1/4" = 1'-0"



3 2ND FLOOR LECTURE/DISCUSSION 201 SECTION
SCALE: 1/4" = 1'-0"



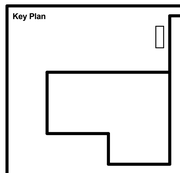
1 FIFTH FLOOR WET LAB 519 SECTION
SCALE: 1/4" = 1'-0"



4 BASEMENT LECTURE 020 SECTION
SCALE: 1/4" = 1'-0"

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

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Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: J. SMITH	Drawn: S. FIORENZO
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

SECTIONS

Scale	1/4" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	M40-03

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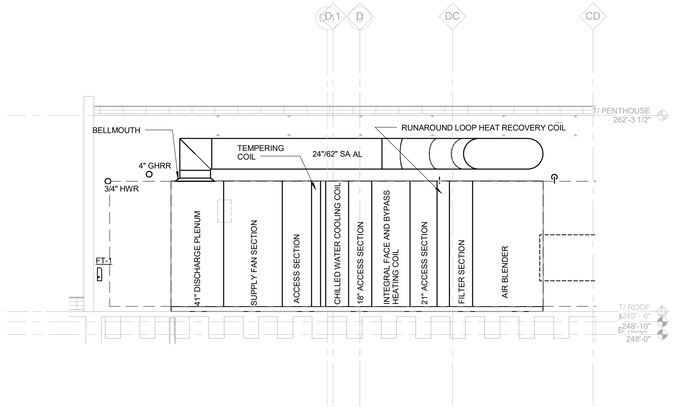

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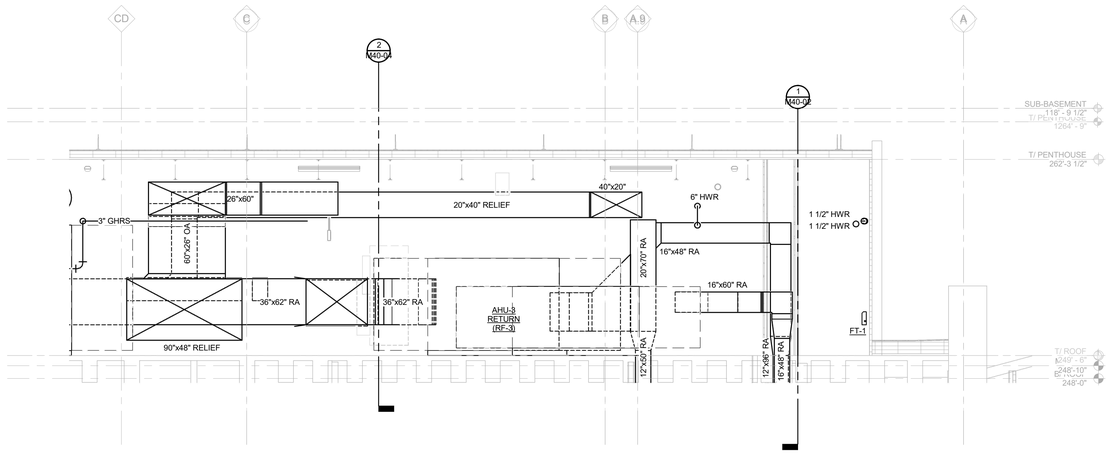

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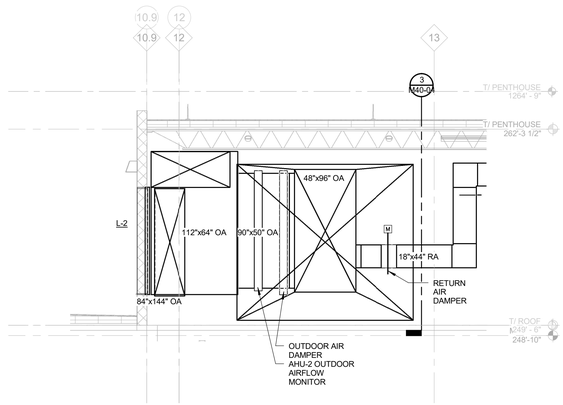

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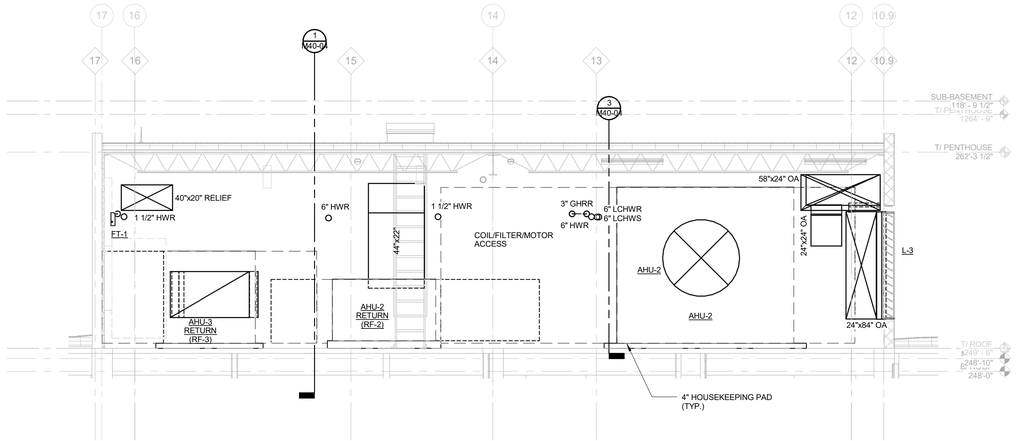

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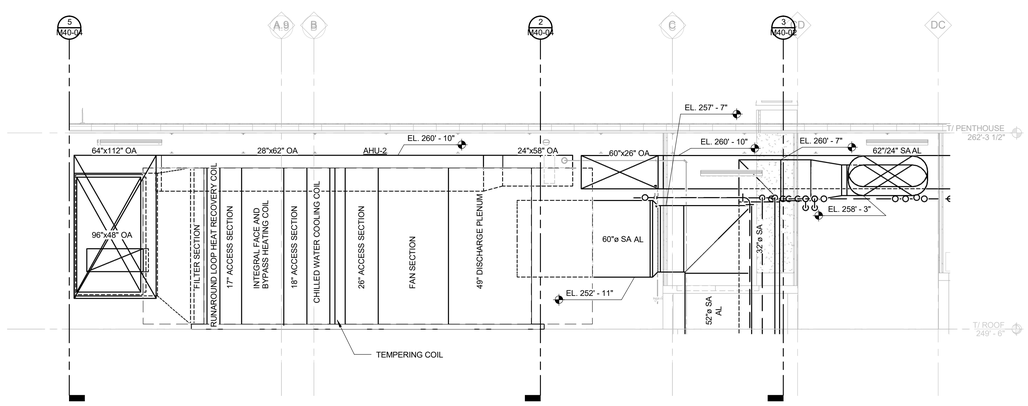

3 SECTION
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DATE	ISSUED FOR	REV
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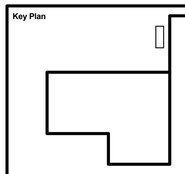
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

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Design Lead: J. SMITH	Drawn: S. FIORENZO
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project
STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
PENTHOUSE SECTIONS

Scale 1/4" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
M40-04

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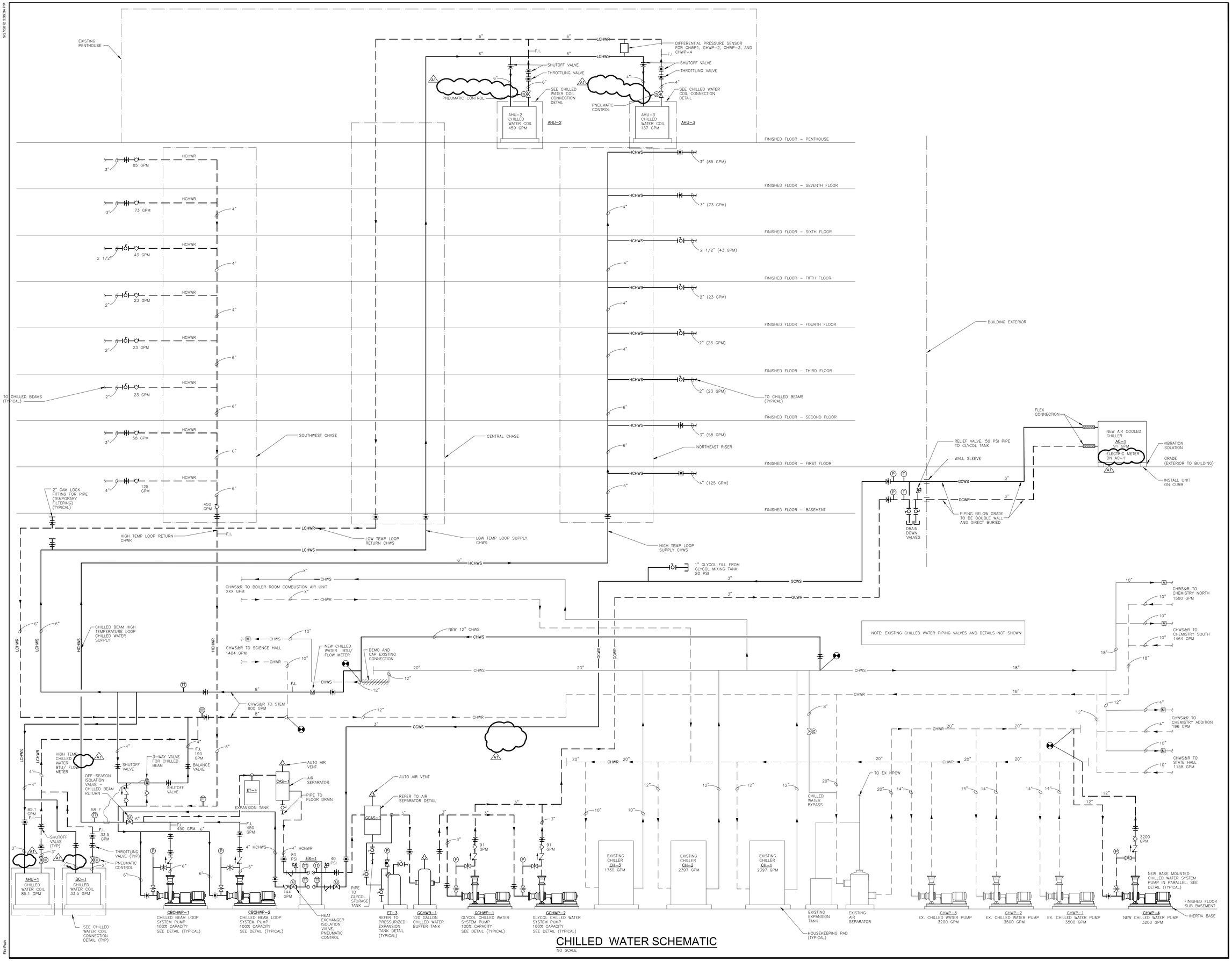
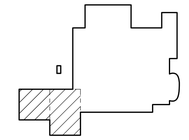


CHILLED WATER SCHEMATIC

NO SCALE

DATE	ISSUED FOR	REV.
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

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Project Manager	BIM Lead
J. SMITH	C. BAKER
Design Lead	Drawn
J. BATES	J. BATES
Project Leader	Checked
J. SMITH	.

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

GULLEN MALL,
DETROIT, MI 48202

Drawing Title

CHILLED WATER SCHEMATIC

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

M50-01

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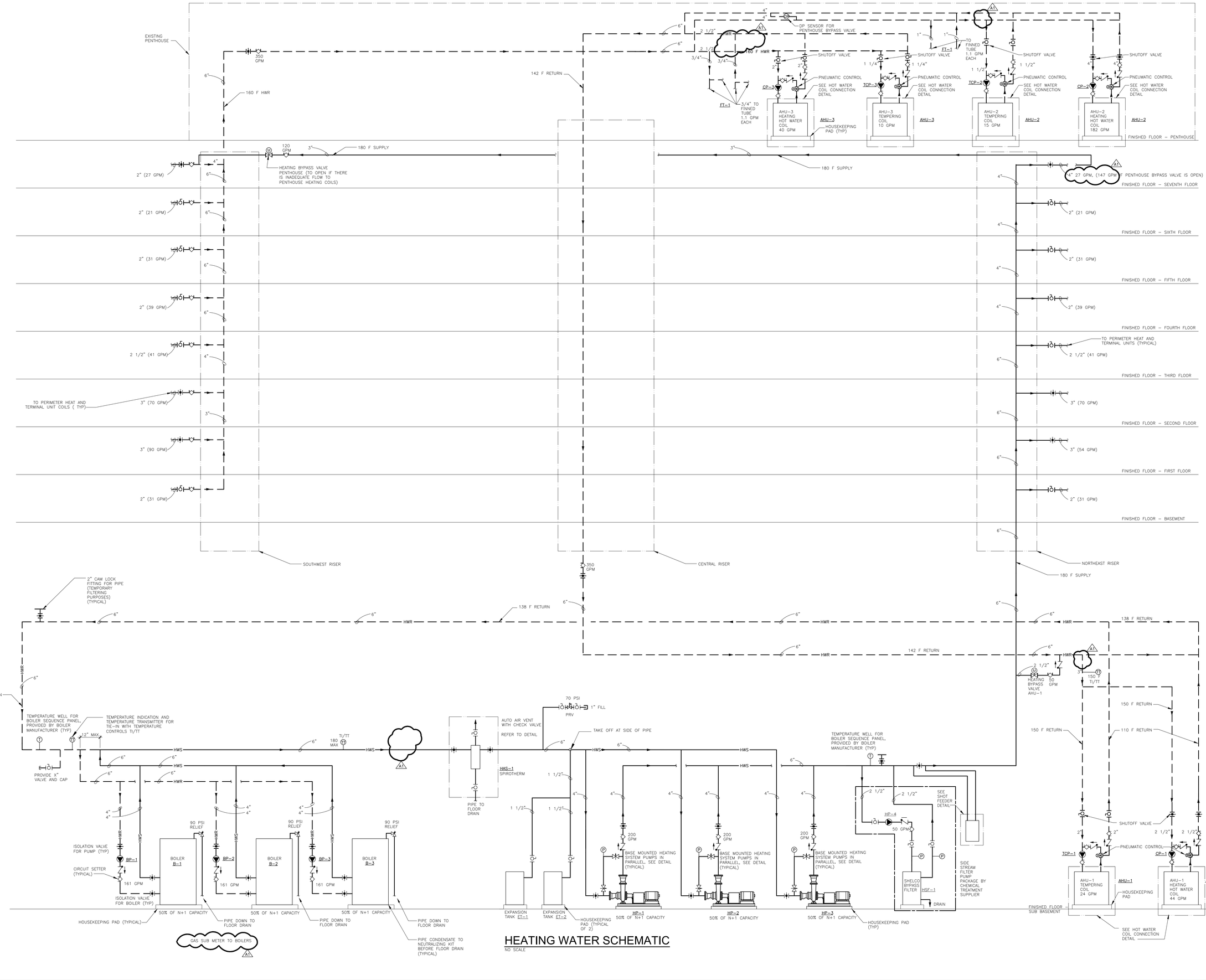
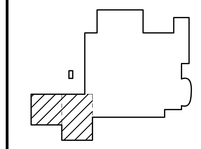


HEATING WATER SCHEMATIC

NO SCALE

DATE	ISSUED FOR	REV.
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

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Design Lead	Drawn
J. BATES	J. BATES
Project Leader	Checked
J. SMITH	.

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

GULLEN MALL,
DETROIT, MI 48202

Drawing Title

HEATING WATER SCHEMATIC

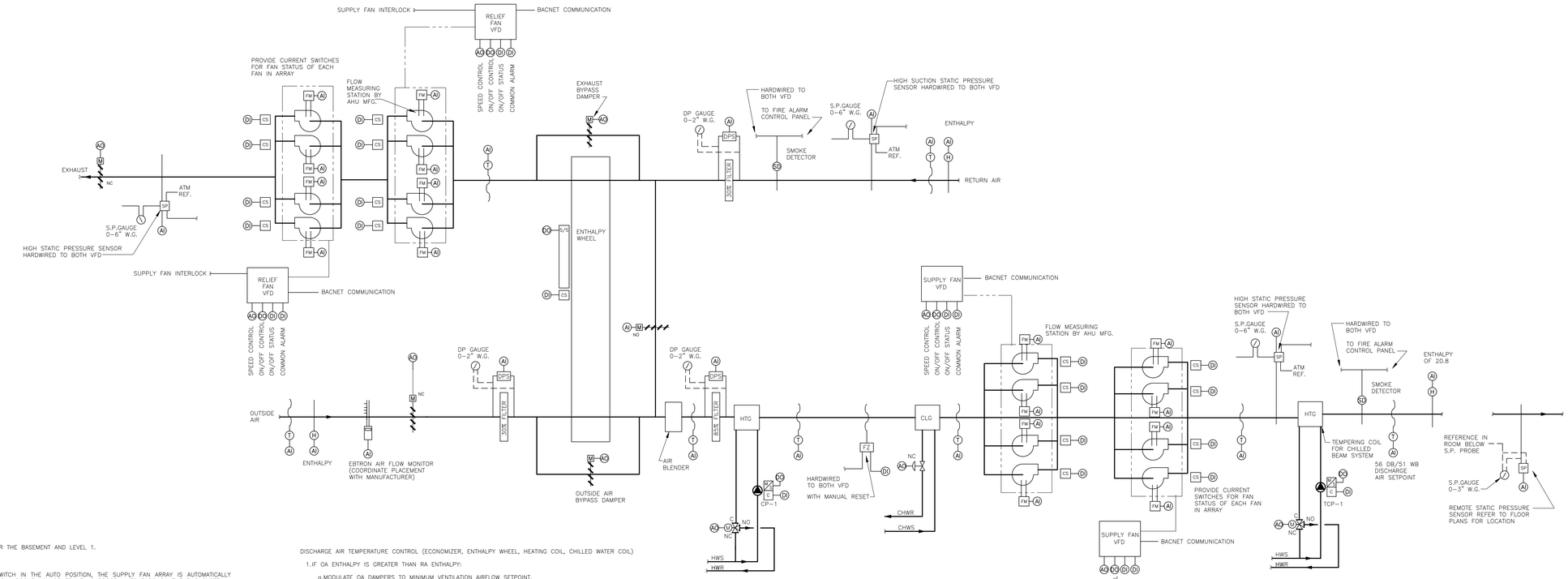
Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

M50-02

File Path:



AHU–1 SYSTEM CONTROLS SCHEMATIC

NO SCALE

AHU–1 SEQUENCE OF OPERATION

AHU SERVES VAV AND VAV CHILLED BEAM SYSTEM FOR THE BASEMENT AND LEVEL 1.

AHU START / STOP

1. WITH THE SUPPLY FAN VFD HAND/OFF/AUTO SWITCH IN THE AUTO POSITION, THE SUPPLY FAN ARRAY IS AUTOMATICALLY STARTED AND STOPPED BASED ON THE TIME OF DAY OCCUPANCY SCHEDULE AS PROGRAMMED THROUGH THE BMS SYSTEM.

2. WITH THE RELIEF FAN VFD HAND/OFF/AUTO SWITCH IN THE AUTO POSITION, THE RELIEF FAN ARRAY IS HARDWIRE INTERLOCKED TO RUN WITH THE SUPPLY FAN ARRAY AND STARTS WHENEVER THE SUPPLY FAN IS STARTED. THE AHU RELIEF FAN AIRFLOW SHALL TRACK OUTDOOR AIRFLOW WITH THE DESIRED OFFSET (900 CFM ADJ.).

3. AT SYSTEM STARTUP, PROVIDE NECESSARY TIME DELAYS AND RAMP–UP DURATIONS FOR ALL CONTROLLED DEVICES TO PROVIDE STABLE START–UP AND AVOID NUISANCE TRIPPING (I.E. FREEZESTAT, HIGH / LOW STATIC PRESSURE SWITCH).

4. WHEN SYSTEM IS DE–ENERGIZED, CONTROL DEVICES SHALL RESPOND AS FOLLOWS:

   a. SUPPLY FANS SHALL DE–ENERGIZE (IN UNISON)
   b. RELIEF FANS SHALL DE–ENERGIZE (IN UNISON)
   c. ENTHALPY WHEEL SHALL DE–ENERGIZE
   d. ENTHALPY WHEEL BYPASS DAMPERS SHALL OPEN
   e. OUTDOOR AIR DAMPER SHALL CLOSE (RETURN AIR DAMPER OPEN)
   f. CHILLED WATER COIL VALVE SHALL CLOSE
   g. HEATING COIL VALVE SHALL MODULATE TO MAINTAIN CHILLED WATER COIL DAT AT 50°F (ADJ.)
   h. COIL PUMP SHALL REMAIN ENERGIZED AT OA TEMPERATURES BELOW 40°F AND DE–ENERGIZE AT OA TEMPERATURE 40°F OR ABOVE.

OPTIMIZED START WARM–UP OPERATION

1. BEFORE THE START OF THE OCCUPIED TIME PERIOD, THE CONTROL SYSTEM SHALL MONITOR THE SPACES SERVED TO DETERMINE THE OPTIMUM START TIME FOR THE UNIT. THE SYSTEM START TIME SHALL BE VARIED TO BRING THE AREAS SERVED THROUGH THE TERMINAL UNITS TO SETPOINT AT THE START OF THE OCCUPIED PERIOD.

2. IF THE MAJORITY OF THE ZONES SERVED BY THE UNIT ARE BELOW SETPOINT, THE UNIT SHALL BE STARTED IN THE WARM–UP MODE.
3. SUPPLY FAN(S) ARE ENERGIZED, RELIEF FAN(S) REMAIN DE–ENERGIZED, OUTDOOR AIR DAMPER REMAINS CLOSED (RETURN AIR DAMPER OPEN), AND RELIEF AIR DAMPER REMAINS CLOSED.
4. SUPPLY FAN VFD CONTROLS TO DUCT STATIC PRESSURE SETPOINT (AS IN OCCUPIED MODE).
5. HEATING COIL VALVE SHALL MODULATE TO CONTROL TO A DISCHARGE AIR TEMPERATURE SETPOINT OF 56°F (ADJ.).
6. COOLING COIL VALVE SHALL REMAIN CLOSED.
7. WHEN 75% (ADJ.) OF ASSOCIATED ZONES REACH SETPOINT, THE OPTIMIZED START MODE IS COMPLETE AND UNIT ENTERS OCCUPIED MODE OF OPERATION.

OPTIMIZED START COOL–DOWN OPERATION

1. IF THE MAJORITY OF THE ZONES SERVED BY THE UNIT ARE ABOVE SETPOINT, THE UNIT SHALL BE STARTED IN THE COOL–DOWN MODE.
2. IF OA ENTHALPY IS GREATER THAN RETURN AIR ENTHALPY:
   a. SUPPLY FAN(S) ARE ENERGIZED, RELIEF FAN(S) REMAIN DE–ENERGIZED, OUTDOOR AIR DAMPER REMAINS CLOSED (RETURN AIR DAMPER OPEN), AND RELIEF AIR DAMPER REMAINS CLOSED.
   b. SUPPLY FAN VFD CONTROLS TO DUCT STATIC PRESSURE SETPOINT (AS IN OCCUPIED MODE).
   c. HEATING COIL VALVE SHALL REMAIN CLOSED.
   d. CHILLED WATER VALVE IS MODULATED TO MAINTAIN DAT AND RH FROM UNIT.
   e. MODULATE TEMPERING HEATING COIL VALVE TO MAINTAIN 56°F DB/51°F WB.
3. IF OA ENTHALPY LESS THAN RETURN AIR ENTHALPY:
   a. SUPPLY FAN(S) ARE ENERGIZED, OUTDOOR AIR DAMPER IS OPENED, RELIEF AIR DAMPER IS OPENED, AND RELIEF FAN(S) ARE ENERGIZED
   b. SUPPLY FAN VFD CONTROLS TO DUCT STATIC PRESSURE SETPOINT (AS IN OCCUPIED MODE).
   c. RELIEF FAN VFD CONTROLS TO AN AIRFLOW OFFSET (900 CFM ADJ.) FROM MEASURED OUTDOOR AIRFLOW.
   d. OUTDOOR AIR DAMPER MODULATES FULLY OPEN.
   e. HEATING COIL VALVE SHALL REMAIN CLOSED.
   f. CHILLED WATER VALVE IS MODULATED TO MAINTAIN 56°F DB/51°F WB (ADJ.) DAT FROM UNIT.
4. MODULATE TEMPERING HEATING COIL VALVE TO MAINTAIN 56°F DB/51° WHEN 75% (ADJ.) OF ASSOCIATED ZONES REACH SETPOINT, THE OPTIMIZED START MODE IS COMPLETE AND UNIT ENTERS OCCUPIED MODE OF OPERATION.

OUTDOOR AIR VENTILATION CONTROL:

1. WHEN AHU IS ENERGIZED, OA DAMPER MODULATES AIRFLOW (AS MEASURED BY OUTDOOR AIRFLOW MEASURING STATION) TO CONTROL TO MINIMUM VENTILATION AIRFLOW SETPOINT (EXHAUST AIR CFM OF 5600) (RA DAMPER TRACKS OPPOSITE OA DAMPER VIA SAME CONTROL SIGNAL).

2. MINIMUM VENTILATION AIRFLOW SETPOINT IS RESET BETWEEN MINIMUM VENTILATION (5600 CFM) AND CODE VENTILATION SETPOINTS BASED SPACE CO2 LEVELS IN HIGH OCCUPANT DENSITY SPACES. IF CO2 LEVELS IN ANY SPACE RISE ABOVE SETPOINT (1,000 PPM) AND ASSOCIATED SPACE VAV DAMPER IS AT MAX DESIGN COOLING AIRFLOW, AHU OUTDOOR AIR DAMPER OPENS TO MODULATE AIRFLOW TOWARD CODE VENTILATION RATE.

SYSTEM SUPPLY AND RELIEF AIRFLOW CONTROL:

1. THE BMS MONITORS SUPPLY, RETURN, AND OUTDOOR AIRFLOW.

2. SUPPLY FAN ARRAY VFD'S SHALL BE MODULATED BY BMS TO MAINTAIN REMOTE SYSTEM SUPPLY AIR STATIC PRESSURE SETPOINT. REMOTE DUCT STATIC PRESSURE SETPOINT VALUE SHALL BE DETERMINED BY THE AIR BALANCE CONTRACTOR DURING SYSTEM BALANCING.

3. SUPPLY DUCT STATIC PRESSURE SETPOINT SHALL BE RESET BASED ON ALL ASSOCIATED TERMINAL UNIT DAMPER POSITIONS. RESET DUCT STATIC PRESSURE SETPOINT TO MAINTAIN MOST OPEN TERMINAL UNIT DAMPER AT 95% OPEN. AS MOST OPEN DAMPER FALLS BELOW 95% OPEN, GRADUALLY REDUCE DUCT STATIC PRESSURE SETPOINT. AS MOST OPEN DAMPER RISES ABOVE 95% OPEN, GRADUALLY RAISE DUCT STATIC PRESSURE SETPOINT. DUCT STATIC PRESSURE SETPOINT SHALL HAVE AN ADJUSTABLE HIGH LIMIT (DETERMINED BY TAB AS REQUIRED TO ACHIEVE DESIGN AIRFLOW) AND AN ADJUSTABLE LOW LIMIT (0.75–INCHES W.G. LESS THAN HIGH LIMIT).

4. RELIEF FAN ARRAY VFD'S SHALL BE MODULATED BY BMS TO MAINTAIN SPECIFIED OFFSET (900 CFM ADJ.) TO MAINTAIN SPACE PRESSURIZATION BETWEEN MEASURED RELIEF AND OUTDOOR AIRFLOW. RELIEF AIR DAMPER SHALL BE OPEN.

5. SUPPLY FAN DISCHARGE STATIC PRESSURE HIGH LIMIT SWITCH AT AHU WITH SETPOINT OF 5.0–INCHES W.G. (ADJ.) SHALL PROVIDE HARDWIRED SAFETY (SEE SAFETY SHUTDOWN SEQUENCE).

6. SUCTION STATIC PRESSURE HIGH LIMIT SWITCH AT AHU WITH SETPOINT OF 5.0–INCHES W.G. (ADJ.) SHALL PROVIDE HARDWIRED SAFETY (SEE SAFETY SHUTDOWN SEQUENCE).

7. RELIEF FAN DISCHARGE STATIC PRESSURE HIGH LIMIT SWITCH AT AHU WITH SETPOINT OF 3.0–INCHES W.G. (ADJ.) SHALL PROVIDE HARDWIRED SAFETY (SEE SAFETY SHUTDOWN SEQUENCE).

DISCHARGE AIR TEMPERATURE CONTROL (ECONOMIZER, ENTHALPY WHEEL, HEATING COIL, CHILLED WATER COIL)

1. IF OA ENTHALPY IS GREATER THAN RA ENTHALPY:
   a. MODULATE OA DAMPERS TO MINIMUM VENTILATION AIRFLOW SETPOINT.
   b. ENERGIZE ENTHALPY WHEEL AND CLOSE ENTHALPY WHEEL BYPASS DAMPERS (EXHAUST AND OUTDOOR AIR)
   c. MODULATE COOLING COIL CONTROL VALVE TO SATISFY DAT SETPOINT.

2. IF OA ENTHALPY IS BELOW RA ENTHALPY AND OA TEMPERATURE IS ABOVE 40°F:
   a. ENTHALPY WHEEL IS DE–ENERGIZED AND ENTHALPY WHEEL BYPASS DAMPERS ARE OPENED (EXHAUST AND OUTDOOR AIR)
   b. OUTDOOR AIR DAMPER MODULATES ABOVE MINIMUM VENTILATION AIRFLOW SETPOINT AS NECESSARY TO CONTROL DAT AT SETPOINT.
   c. IF DAT FALLS BELOW SETPOINT (WITH OUTDOOR AIRFLOW AT MINIMUM VENTILATION SETPOINT), MODULATE HEATING COIL VALVE OPEN AS NECESSARY TO SATISFY DAT SETPOINT.

3. IF OA TEMPERATURE IS BELOW 40°F, ENTHALPY WHEEL IS ENERGIZED AND ENTHALPY WHEEL BYPASS DAMPERS ARE CLOSED (EXHAUST AND OUTDOOR AIR).
   a. IF DAT IS BELOW SETPOINT, FIRST MODULATE OA DAMPER TO MINIMUM VENTILATION AIRFLOW SETPOINT AS NECESSARY TO SATISFY DAT SETPOINT. IF DAT IS STILL BELOW SETPOINT, MODULATE HEATING COIL VALVE OPEN AS NECESSARY TO SATISFY DAT SETPOINT.
   b. IF DAT IS ABOVE SETPOINT, FIRST MODULATE OA DAMPER ABOVE MINIMUM VENTILATION AIRFLOW SETPOINT AS NECESSARY TO SATISFY DAT SETPOINT. IF DAT IS STILL ABOVE SETPOINT, MODULATE ENTHALPY WHEEL EXHAUST AIR BYPASS DAMPER OPEN AS NECESSARY TO SATISFY DAT SETPOINT.

4. FOR ALL DISCHARGE AIR TEMPERATURE CONTROL SEQUENCES, PROVIDE NECESSARY DEADBANDS AND TIME DELAYS TO PREVENT SIMULTANEOUS HEATING AND COOLING FROM OVERLAP OF HEATING COIL CONTROL VALVE AND COOLING COIL CONTROL VALVE.

5. SUPPLY AIR RESET: WHILE THE FAN IS PROVEN ON, EVERY 2 MINUTES (ADJ) INCREASE THE SETPOINT BY 0.2 F IF THERE IS ONE(ADJUSTABLE) OR FEWER ZONE COOLING REQUESTS. IF THERE IS MORE THAN ONE (ADJ) COOLING REQUEST, DECREASE THE SETPOINT BY 0.3 F. A COOLING REQUEST IS GENERATED WHEN THE COOLING LOOP OF ANY ZONE SERVED BY THE SYSTEM IS GREATER THAN 99% UNTIL IT FALLS TO 90%. PRIMARY AIR TO THE SPACES WITH CHILLED BEAMS SHALL BE 18.3 GRAINS/LB (DRY AIR) LESS THAN ROOM SETPOINT.

ENTHALPY WHEEL FROST PROTECTION

1. IF EXHAUST AIR TEMPERATURE FROM ENTHALPY WHEEL FALLS TO SETPOINT (21°F ADJ.), SLOWLY MODULATE ENTHALPY WHEEL OUTDOOR AIR BYPASS DAMPER OPEN AS NECESSARY TO MAINTAIN EXHAUST AIR TEMPERATURE ABOVE SETPOINT.

HEATING COIL PUMP CONTROL

1. ENERGIZE COIL PUMP IF ANY OF THE FOLLOWING OCCUR:
   a. OUTDOOR AIR TEMPERATURE FALLS BELOW 40F
   b. HEATING COIL VALVE MODULATES OPEN
   c. FREEZESTAT SAFETY IS TRIPPED

TEMPERING COIL PUMP CONTROL

1. ENERGIZE COIL PUMP WHEN OA IS 55 (ADJUSTABLE) OR ABOVE.
2. ENERGIZE COIL PUMP WHEN AIR LEAVING SUPPLY FANS IS LESS THAN 56F.

UNOCCUPIED (NIGHT) HEATING MODE

1. IN THE UNOCCUPIED MODE OF OPERATION, THE SUPPLY AIR AND RELIEF AIR FANS SHALL NORMALLY BE OFF.
2. IF THE SPACE TEMPERATURE DROPS BELOW THE NIGHT SETBACK TEMPERATURE OF 60°F (ADJ.), (AS SENSED BY THE COLDEST TERMINAL UNIT ZONE SENSOR) THE UNIT SHALL BE CYCLED ON TO HEAT THE SPACE.
3. SUPPLY FAN(S) ARE ENERGIZED, RELIEF FAN(S) REMAIN DE–ENERGIZED, OUTDOOR AIR DAMPER REMAINS CLOSED (RETURN AIR DAMPER OPEN), AND RELIEF AIR DAMPER REMAINS CLOSED.
4. SUPPLY FAN VFD CONTROLS TO DUCT STATIC PRESSURE SETPOINT (AS IN OCCUPIED MODE).
5. HEATING COIL VALVE SHALL MODULATE TO CONTROL TO A DISCHARGE AIR TEMPERATURE SETPOINT OF 56°F (ADJ.).
6. COOLING COIL VALVE SHALL REMAIN CLOSED.

UNOCCUPIED (NIGHT) COOLING MODE

1. IN THE UNOCCUPIED MODE OF OPERATION, THE SUPPLY AIR AND RELIEF AIR FANS SHALL NORMALLY BE OFF.
2. IF THE SPACE TEMPERATURE RISES ABOVE THE NIGHT SETBACK TEMPERATURE OF 80°F (ADJ.), (AS SENSED BY THE WARMEST TERMINAL UNIT ZONE SENSOR) THE UNIT SHALL BE CYCLED ON TO COOL THE SPACE.
3. SUPPLY FAN(S) ARE ENERGIZED, RELIEF FAN(S) REMAIN DE–ENERGIZED, OUTDOOR AIR DAMPER REMAINS CLOSED (RETURN AIR DAMPER OPEN), AND RELIEF AIR DAMPER REMAINS CLOSED.
4. SUPPLY FAN VFD CONTROLS TO DUCT STATIC PRESSURE SETPOINT (AS IN OCCUPIED MODE).
5. CHILLED WATER COIL VALVE SHALL MODULATE TO CONTROL TO A DISCHARGE AIR TEMPERATURE SETPOINT OF 56°F DB/51°F WB. CHILLED BEAM VALVES SHALL MODULATE.
6. HEATING COIL VALVE SHALL REMAIN CLOSED.
7. MODULATE TEMPERING HEATING COIL VALVE TO MAINTAIN 56 F DB/51 DISCHARGE AIR.
8. WHEN ALL ZONES ARE SATISFIED UNIT CAN BE DE–ENERGIZED AND COIL VALVES CLOSED.

SAFETY SHUTDOWN AND MISCELANEOUS MONITORING

1. FREEZESTAT(S) WIRED TO SAFETY CIRCUIT SHALL DEACTIVATE SUPPLY FANS AND RELIEF FANS AND CLOSE OA DAMPER WHEN TEMPERATURE SENSED IS 35°F OR BELOW. BMS SHALL MONITOR FREEZESTAT STATUS AND SIGNAL AN ALARM IF FREEZESTAT TRIPS. WHEN FREEZESTAT ALARM IS ACTIVATED, THE BMS SHALL ENERGIZE THE HEATING COIL PUMP AND MODULATE THE HEATING COIL VALVE TO MAINTAIN CHW COIL DAT AT 50°F (UNTIL FREEZESTAT IS MANUALLY RESET).

2. THE AHU SUPPLY FAN DISCHARGE HIGH LIMIT STATIC PRESSURE SWITCH SHALL STOP THE SUPPLY FAN(S) AND RELIEF FAN(S) TO PREVENT THE DISCHARGE STATIC PRESSURE FROM EXCEEDING ITS HIGH LIMIT SETPOINT. BMS SHALL MONITOR DISCHARGE STATIC PRESSURE SWITCH AND SIGNAL AN ALARM IF HIGH LIMIT IS TRIPPED.

3. THE AHU SUCTION HIGH LIMIT STATIC PRESSURE SWITCH SHALL STOP THE SUPPLY FAN(S) AND RELIEF FAN(S) TO PREVENT THE SUCTION STATIC PRESSURE FROM EXCEEDING ITS HIGH LIMIT SETPOINT. BMS SHALL MONITOR SUCTION STATIC PRESSURE SWITCH AND SIGNAL AN ALARM IF HIGH LIMIT IS TRIPPED.

4. DUCT SMOKE DETECTORS SHALL DEACTIVATE SUPPLY FANS AND RELIEF FANS THROUGH FIRE ALARM SYSTEM CONTROL MODULE (WIRED TO SAFETY CIRCUIT) WHEN PRODUCTS OF COMBUSTION ARE DETECTED.

5. BOTH PRE–FILTER AND FINAL FILTER STATUS SHALL BE MONITORED BY BMS THROUGH RESPECTIVE DIFFERENTIAL PRESSURE TRANSMITTERS. WHEN DP REACHES SETPOINT, THE BMS SHALL ACTIVATE A DIRTY FILTER ALARM.

6. THE AHU RELIEF FAN DISCHARGE HIGH LIMIT STATIC PRESSURE SWITCH SHALL STOP THE SUPPLY FAN(S) AND RELIEF FAN(S) TO PREVENT THE DISCHARGE STATIC PRESSURE FROM EXCEEDING ITS HIGH LIMIT SETPOINT. BMS SHALL MONITOR DISCHARGE STATIC PRESSURE SWITCH AND SIGNAL AN ALARM IF HIGH LIMIT IS TRIPPED.

7.

8. SYSTEM SHALL INTERLOCK WITH CENTRAL FIRE ALARM PANEL FOR REMOTE ACCESS AND CONTROL.

THE FOLLOWING ALARMS SHALL BE SENT TO THE BMS

1. SUPPLY FAN VFD FAULT / FAILURE
2. RELIEF FAN VFD FAULT / FAILURE
3. SUPPLY FAN MOTOR FAILURE
4. RELIEF FAN MOTOR FAILURE
5. ENTHALPY WHEEL MOTOR FAILURE
6. HEATING COIL PUMP FAILURE
7. TEMPERING COIL PUMP FAILURE
8. FREEZESTAT TRIP
9. HIGH DISCHARGE DUCT STATIC PRESSURE
10. HIGH SUCTION DUCT STATIC PRESSURE
11. HIGH FILTER PRESSURE DROP
12. HIGH RELIEF FAN DISCHARGE DUCT STATIC PRESSURE
13. DISCHARGE AIR ENTHALPY
14. OUTSIDE AIRFLOW VARIES FROM SET POINT BY 15" OR MORE (G1)

DATE	ISSUED FOR	REV
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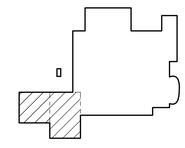
01/14/2019	ADDENDUM NO. 1	4
03/15/2019	BULLETIN NO. 1	5
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
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WAYNE STATE UNIVERSITY

Project
STEM Innovation Learning Center
GULLEN MALL,
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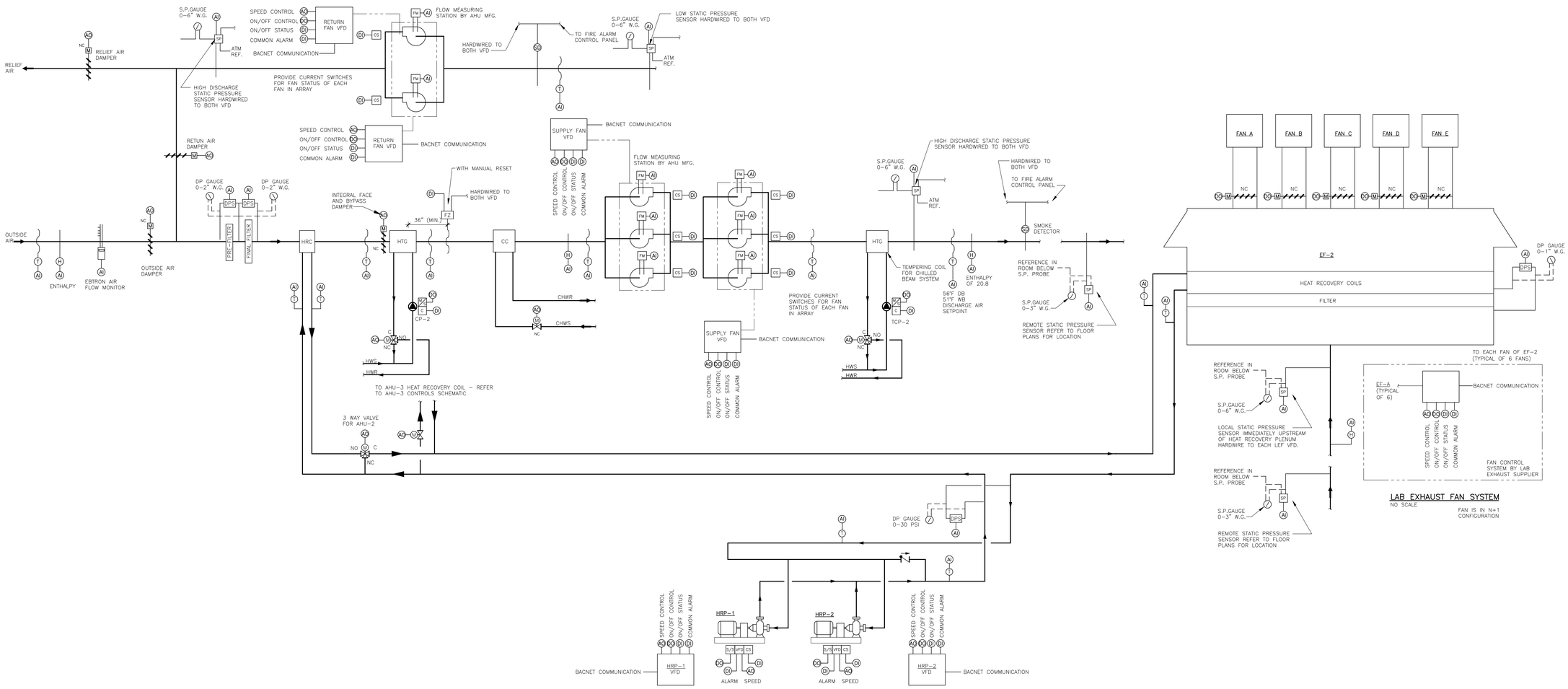
Drawing Title
CONTROL SCHEMATICS AHU-1

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No. M50-03



AHU–2 CONTROLS SCHEMATIC

NO SCALE

AHU–2 SEQUENCE OF OPERATION

GENERAL

1. INDEXATION BETWEEN OCCUPIED AND UNOCCUPIED MODES:
   A. AHU–2 SERVES LAB SPACES WITH FUME HOODS AND SHALL RUN CONTINUOUSLY. SPACES THAT ARE ALSO ON THIS SYSTEM INCLUDE, ROOMS ON LEVEL 2 THROUGH 4, IT/COMM LEVEL 1 THROUGH 7 AND ELEC ROOMS LEVEL 1 THROUGH 7.
   B. MANUAL START / STOP SHALL BE ACHIEVED THROUGH BMS.
2. UPON START, SUPPLY FANS SHALL INCREASE SPEED GRADUALLY OVER FIELD–ADJUSTABLE RAMP UP TIME OF 120 SECONDS.

OPERATIONAL MODES

AHU–2:

1. FIRST STAGE OF HEATING TO BE THE HEAT RECOVERY COIL. HRC VALVE CONTROLS TO DAT SETPOINT (56°F ADJ.).
   a. HRC PUMP (HRP–1 OR HRP–2) IS ENERGIZED WHEN HRC VALVE MODULATES ABOVE 50% OPEN.
   b. HRC PUMP STOP SIGNAL IS TRANSMITTED THROUGH BMS WHEN HRC VALVE MODULATES FULLY CLOSED FOR 15 MIN (ADJ). (NOTE: HRC PUMP IS DE–ENERGIZED ONLY IF THERE IS NO CALL TO RUN FROM AHU CONTROL SEQUENCE.
   c. NOTE: HRP–1 & 2 SHALL BE IN A MAIN / STANDBY ARRANGEMENT WITH MAIN / STANDBY DESIGNATION ROTATING EVERY MONTH.
2. SECOND STAGE OF HEATING TO BE INTEGRAL FACE AND BYPASS (IFB) COIL. IFB COIL CONTROLS TO DAT SETPOINT (56°F ADJ.) ONLY AFTER HRC VALVE HAS MODULATED FULLY OPEN OR IF HRC ALONE IS UNABLE TO SATISFY DAT SETPOINT.
   a. WHEN IFB COIL ENTERING AIR TEMPERATURE IS ABOVE 40°F (ADJ.), IFB DAMPERS SHALL BE FULLY OPEN TO THE COIL AND THE COIL VALVE SHALL MODULATE IN SEQUENCE TO CONTROL TO DAT SETPOINT. COIL PUMP SHALL BE ENERGIZED.
   b. WHEN IFB COIL ENTERING AIR TEMPERATURE IS BELOW 40°F (ADJ.), COIL VALVE(S) SHALL OPEN FULLY AND IFB DAMPERS SHALL MODULATE TO CONTROL DAT AT SETPOINT. COIL PUMP SHALL BE ENERGIZED.

COOLING MODE: OUTSIDE AIR AND RELIEF AIR DAMPERS AT MINIMUM POSITION. RETURN DAMPER OPEN. SUPPLY FANS VFD CONTROLS TO DUCT STATIC PRESSURE SETPOINT. RETURN FAN VFD CONTROLS TO MAINTAIN AN AIRFLOW OF SUPPLY AIR – EXHAUST AIR AND AN ADDITIONAL 600 CFM OFFSET (ADJ).

1. FIRST STAGE OF COOLING TO BE THE HEAT RECOVERY COIL. HRC VALVE CONTROLS TO DAT SETPOINT (56 F DB/51 F WB)
   a. HRC PUMP (HRP–1 OR HRP–2) IS ENERGIZED WHEN HRC VALVE MODULATES OPEN.
   b. HRC PUMP STOP SIGNAL IS TRANSMITTED THROUGH BMS WHEN HRC VALVE MODULATES FULLY CLOSED TO COIL FOR 15 MIN (ADJ). HRC PUMP IS DE–ENERGIZED ONLY IF THERE IS NO CALL TO RUN FROM AHU CONTROL SEQUENCE.
2. SECOND STAGE OF COOLING TO BE AHU CHILLED WATER COIL. CHILLED WATER COIL VALVES MODULATE TO DAT SETPOINT (56°F DB/51°F WB) WITHOUT OVERLAP WITH HEATING MODE (HRC VALVE, IFB VALVE).
3. TEMPERING HEATING COIL VALVE SHALL MODULATE AS NECESSARY TO CONTROL TO DAT SETPOINT OF (56°F DB/51°F WB). TEMPERING COIL PUMP SHALL OPERATE WHEN OUTSIDE AIR IS 55F AND ABOVE (ADJUSTABLE) OR IF TEMPERATURE LEAVING THE SUPPLY FAN ARRAY IS BELOW 56 F.

AHU START / STOP:

1. AHU SHALL NORMALLY RUN CONTINUOUSLY.
2. A SYSTEM START / STOP POINT SHALL BE PROVIDED FOR MANUAL START–UP AND SHUTDOWN OF SYSTEM VIA BMS.
3. WHEN SYSTEM IS MANUALLY STOPPED, CONTROL DEVICES SHALL RESPOND AS FOLLOWS:
   a. SUPPLY AND RETURN FANS SHALL DE–ENERGIZE (IN UNISON)
   b. CHILLED WATER COIL VALVE SHALL CLOSE
   c. IFB DAMPERS SHALL OPEN TO IFB COIL
   d. HEATING COIL VALVE SHALL MODULATE TO MAINTAIN CHILLED WATER COIL DAT AT 50°F (ADJ.)
   e. OUTSIDE AIR AND RELIEF AIR DAMPERS SHALL BE CLOSED
4. WHEN SYSTEM IS ENERGIZED, CONTROL DEVICES SHALL RESPOND AS FOLLOWS:
   a. SUPPLY AND RETURN FANS SHALL START.
5. COLD START (AHU–2 IS STARTED WHEN OA TEMPERATURE IS BELOW 40°F)
   a. IFB DAMPERS OPEN FULLY TO IFB COIL
   b. IFB COIL VALVE OPENS FULLY
   c. SUPPLY AND RETURN FANS SHALL START.
   d. ADJUST SUPPLY AND RETURN FAN RAMP SPEED AND TUNE IFB DAMPER CONTROL LOOP TO PREVENT NUISANCE FREEZESTAT TRIPPING DURING COLD START–UP.

OUTDOOR AIR VENTILATION CONTROL:

1. WHEN AHU IS ENERGIZED, OA DAMPER MODULATES AIRFLOW (AS MEASURED BY OUTDOOR AIRFLOW MEASURING STATION) TO CONTROL TO MINIMUM VENTILATION AIRFLOW SETPOINT (RA DAMPER TRACKS OPPOSITE OA DAMPER VIA SAME CONTROL SIGNAL).
2. MINIMUM VENTILATION AIRFLOW SETPOINT IS RESET BETWEEN MINIMUM VENTILATION AND CODE VENTILATION SETPOINTS BASED SPACE CO2 LEVELS IN HIGH OCCUPANT DENSITY SPACES. IF CO2 LEVELS IN ANY SPACE RISE ABOVE SETPOINT (1,000 PPM) AND ASSOCIATED SPACE VAV DAMPER IS AT MAX DESIGN COOLING AIRFLOW, AHU OUTDOOR AIR DAMPER OPENS TO MODULATE AIRFLOW TOWARD CODE VENTILATION RATE. CODE VENTILATION IS 6800 CFM.

SYSTEM AIRFLOW:

1. THE BMS MONITORS AHU AIRFLOW.

DUCT STATIC PRESSURE CONTROL:

1. SUPPLY FAN ARRAY VFDS SHALL BE MODULATED BY BMS, IN UNISON, TO MAINTAIN REMOTE SYSTEM SUPPLY AIR STATIC PRESSURE SETPOINT. EACH VFD SHALL RECEIVE SAME SIGNAL FROM BMS. REMOTE DUCT STATIC PRESSURE SETPOINT VALUE SHALL BE DETERMINED BY THE AIR BALANCE CONTRACTOR DURING SYSTEM BALANCING.
2. RETURN FAN ARRAY VFDS SHALL BE MODULATED BY BMS, IN UNISON TO MAINTAIN SUPPLY AIR OFFSET. OFFSET SHALL BE EXHAUST AIR AND 600 CFM SPACE PRESSURIZATION. EACH VFD SHALL RECEIVE THE SAME SIGNAL FROM BMS.
3. DISCHARGE STATIC PRESSURE HIGH LIMIT AT AHU WITH SETPOINT OF 5.0–INCHES W.G. (ADJ.) SHALL PROVIDE OVERRIDE CONTROL OF SUPPLY FAN VFD. HIGH LIMIT SWITCH WITH SETPOINT OF 5.5–INCHES W.G. (ADJ.) SHALL PROVIDE HARDWIRED SAFETY. BMS SHALL ACTIVATE ALARM IF OPERATING IN OVERRIDE CONDITION.

FROST PREVENTION SEQUENCE OF OPERATION:

1. IF HEAT RECOVERY LOOP EXHAUST COIL ENTERING WATER TEMPERATURE IS BELOW A SETPOINT OF 32°F (ADJ), AHU HEAT RECOVERY COIL VALVE OPERATION IS OVERRIDDEN AND MODULATES TO HOLD THE EXHAUST COIL ENTERING WATER TEMPERATURE AT SETPOINT.

SAFETY SHUTDOWN AND MISCELLANEOUS MONITORING

1. FREEZESTAT(S) WIRED TO SAFETY CIRCUIT SHALL DEACTIVATE SUPPLY AND RETURN FANS AND CLOSE OA DAMPER WHEN TEMPERATURE SENSED IS 35°F OR BELOW. BMS SHALL MONITOR FREEZESTAT STATUS AND SIGNAL AN ALARM IF FREEZESTAT TRIPS. WHEN FREEZESTAT ALARM IS ACTIVATED, THE BMS SHALL MODULATE THE HEATING COIL VALVE TO MAINTAIN CHW COIL DAT AT 50°F (UNTIL FREEZESTAT IS MANUALLY RESET). ENERGIZE HEATING WATER PUMP.
2. THE DISCHARGE HIGH LIMIT STATIC PRESSURE SWITCH SHALL INDIVIDUALLY STOP THE SUPPLY FAN(S) TO PREVENT THE DISCHARGE STATIC PRESSURE FROM EXCEEDING ITS HIGH LIMIT SETPOINT. BMS SHALL MONITOR PRESSURE SWITCH AND SIGNAL AN ALARM IF HIGH LIMIT IS TRIPPED.
3. DUCT SMOKE DETECTORS SHALL DEACTIVATE SUPPLY AND RETURN FANS THROUGH FIRE ALARM SYSTEM CONTROL MODULE (WIRED TO SAFETY CIRCUIT) WHEN PRODUCTS OF COMBUSTION ARE DETECTED.
4. BOTH PRE–FILTER AND FINAL FILTER STATUS SHALL BE MONITORED BY BMS THROUGH RESPECTIVE DIFFERENTIAL PRESSURE TRANSMITTERS. WHEN DP REACHES SETPOINT, THE BMS SHALL ACTIVATE A DIRTY FILTER ALARM.
5. THE AHU SUCTION HIGH LIMIT STATIC PRESSURE SWITCH SHALL STOP THE SUPPLY FANS AND RETURN FANS TO PREVENT THE SUCTION STATIC PRESSURE FROM EXCEEDING ITS HIGH LIMIT SETPOINT. BMS SHALL MONITOR SUCTION STATIC PRESSURE SWITCH AND SIGNAL AN ALARM IF HIGH LIMIT IS TRIPPED.
6.
7. SYSTEM SHALL INTERLOCK WITH CENTRAL FIRE ALARM PANEL FOR REMOTE SHUTDOWN.

THE FOLLOWING ALARMS SHALL BE SENT TO THE BMS

1. SUPPLY FAN VFD FAULT/FAILURE
2. RETURN FAN VFD FAULT/FAILURE
3. SUPPLY FAN MOTOR FAILURE
4. RETURN FAN MOTOR FAILURE
5. HEAT RECOVERY PUMP FAILURE
6. ENTHALPY SETPOINT (DISHARGE AIR TEMPERATURE)
7. HEATING COIL PUMP FAILURE
8. TEMPERING COIL PUMP FAILURE
9. FREEZESTAT TRIP
10. HIGH DISCHARGE DUCT STATIC PRESSURE
11. HIGH FILTER PRESSURE DROP.
12. HIGH RETURN FAN DISCHARGE DUCT STATIC PRESSURE
13. OUTSIDE AIR TEMPERATURE.
14. OUTSIDE AIR ENTHALPY
15. BUILDING PRESSURE
16. HEATING OR COOLING MODE
17. RUNAROUND COIL VALVE POSITION
18. IFB COIL VALVE POSITION
19. CHILLED WATER COIL VALVE POSITION
20. TEMPERING COIL VALVE POSITION
21. OUTSIDE AIRFLOW CFM BY AIRFLOW MONITOR
22. SUPPLY AIR CFM BY SUPPLY FAN AIRFLOW MEASURING DEVICE
23. RETURN AIR CFM BY RETURN FAN AIRFLOW MEASURING DEVICE
24. SMOKE DAMPER STATUS ON SUPPLY AND RETURN.
25. SUCTION HIGH LIMIT.
26. OUTSIDE AIRFLOW VARIES FROM SET POINT BY 15" OR MORE. (B1)

DISCHARGE AIR TEMPERATURE CONTROL (ECONOMIZER, HEATING COIL, CHILLED WATER COIL)

1. IF OA ENTHALPY IS GREATER THAN RA ENTHALPY:
   a. MODULATE OA DAMPERS TO MINIMUM VENTILATION AIRFLOW SETPOINT.
   b. ENERGIZE RUNAROUND HEAT RECOVERY PUMPS AND MODULATE HEAT RECOVERY COIL.
   c. MODULATE COOLING COIL CONTROL VAVLE TO SATISFY DAT SETPOINT.
   d. MODULATE TEMPERING COIL TO MEET DAT SETPOINT.
2. IF OA ENTHALPY IS BELOW RA ENTHALPY AND OA TEMPERATURE IS ABOVE 40°F (ADJ).
   a. DE–ENERGIZE RUNAROUND HEAT RECOVERY PUMPS AND CLOSE HEAT RECOVERY COIL VALVE.
   b. OUTDOOR AIR DAMPER MODULATES ABOVE MINIMUM VENTILATION AIRFLOW SETPOINT AS NECESSARY TO CONTROL DAT AT SETPOINT.
   c. IF DAT FALLS BELOW SETPOINT (WITH OUTDOOR AIRFLOW AT MINIMUM VENTILATION SETPOINT), MODULATE HEATING COIL VALVE OPEN AS NECESSARY TO SATISFY DAT SETPOINT.
3. IF OA TEMPERATURE IS BELOW 40°F.
   a. IF DAT IS BELOW SETPOINT, FIRST MODULATE OA DAMPER TO MINIMUM VENTILATION AIRFLOW SETPOINT AS NECESSARY TO MEET EXHAUST AIRFLOW REQUIREMENTS AND SATISFY DAT SETPOINT. IF DAT IS STILL BELOW SETPOINT, MODULATE HEAT RECOVERY COIL VALVE AND ENERGIZE HEAT RECOVERY COIL PUMP
   b. IF DAT IS STILL BELOW SETPOINT, MODULATE HEATING COIL VALVE OPEN AS NECESSARY TO SATISFY DAT SETPOINT.
   c. IF DAT IS ABOVE SETPOINT, MODULATE OA DAMPER ABOVE MINIMUM VENTILATION AIRFLOW SETPOINT AS NECESSARY TO SATISFY DAT SETPOINT.
4. FOR ALL DISCHARGE AIR TEMPERATURE CONTROL SEQUENCES, PROVIDE NECESSARY DEADBANDS AND TIME DELAYS TO PREVENT SIMULTANEOUS HEATING AND COOLING FROM OVERLAP OF HEATING COIL CONTROL VALVE AND COOLING COIL CONTROL VALVE.
5. SUPPLY AIR TEMPERATURE RESET: WHILE THE FAN IS PROVEN ON, EVERY 2 MINUTES INCREASE THE SETPOINT BY 0.2 F IF THERE IS ONE OR FEWER ZONE COOLING REQUESTS. IF THERE IS MORE THAN ONE (ADJUSTABLE) COOLING REQUESTS, DECREASE THE SETPOINT BY 0.3 F. A COOLING REQUEST IS GENERATED WHEN THE COOLING LOOP OF ANY ZONE SERVED BY THE SYSTEM IS GREATER THAT 99% UNTIL IT FALLS TO 90%. PRIMARY AIR TO THE SPACES WITH CHILLED BEAMS SHALL BE 18.3 GRAINS/LB (DRY AIR) LESS THAN ROOM SETPOINT.

UNOCCUPIED (NIGHT) HEATING MODE

1. IN THE UNOCCUPIED MODE OF OPERATION, THE SUPPLY AIR AND RELIEF AIR FANS SHALL RUN CONTINUOUSLY.
2. IF THE SPACE TEMPERATURE DROPS BELOW THE NIGHT SETBACK TEMPERATURE OF 60°F (ADJ.), (AS SENSED BY THE COLDEST TERMINAL UNIT ZONE SENSOR) THE UNIT SHALL BE CYCLED ON TO HEAT THE SPACE.
3. SUPPLY FAN(S) ARE ENERGIZED, RELIEF FAN(S) REMAIN DE–ENERGIZED, OUTDOOR AIR DAMPER REMAINS CLOSED (RETURN AIR DAMPER OPEN), AND RELIEF AIR DAMPER REMAINS CLOSED.
4. SUPPLY FAN VFD CONTROLS TO DUCT STATIC PRESSURE SETPOINT (AS IN OCCUPIED MODE).
5. HEATING COIL VALVE SHALL MODULATE TO CONTROL TO A DISCHARGE AIR TEMPERATURE SETPOINT OF 56°F (ADJ.).
6. COOLING COIL VALVE SHALL REMAIN CLOSED.

UNOCCUPIED (NIGHT) COOLING MODE

1. IN THE UNOCCUPIED MODE OF OPERATION, THE SUPPLY AIR AND RELIEF AIR FANS SHALL RUN CONTINUOUSLY.
2. IF THE SPACE TEMPERATURE RISES ABOVE THE NIGHT SETBACK TEMPERATURE OF 80°F (ADJ.), (AS SENSED BY THE WARMEST TERMINAL UNIT ZONE SENSOR) THE UNIT SHALL BE CYCLED ON TO COOL THE SPACE.
3. SUPPLY FAN(S) ARE ENERGIZED, RELIEF FAN(S) REMAIN DE–ENERGIZED, OUTDOOR AIR DAMPER REMAINS CLOSED (RETURN AIR DAMPER OPEN), AND RELIEF AIR DAMPER REMAINS CLOSED.
4. SUPPLY FAN VFD CONTROLS TO DUCT STATIC PRESSURE SETPOINT (AS IN OCCUPIED MODE).
5. CHILLED WATER COIL VALVE SHALL MODULATE TO CONTROL TO A DISCHARGE AIR TEMPERATURE SETPOINT OF 56°F DB/51°F WB CHILLED BEAM VALVES SHALL MODULATE.
6. HEATING COIL VALVE SHALL REMAIN CLOSED.

SYSTEM SUPPLY AND RETURN AIRFLOW CONTROL

1. THE BMS MONITORS SUPPLY, RETURN AND OUTDOOR AIRFLOW.
2. SUPPLY FAN ARRAY VFDS SHALL BE MODULATED BY BMS TO MAINTAIN REMOTE SYSTEM SUPPLY AIR STATIC PRESSURE SETPOINT. REMOTE DUCT STATIC PRESSURE SETPOINT VALUE SHALL BE DETERMINED BY THE AIR BALANCE CONTRACTOR DURING SYSTEM BALANCING.
3. SUPPLY DUCT STATIC PRESSURE SETPOINT SHALL BE RESET BASED ON ALL ASSOCIATED TERMINAL UNIT DAMPER POSITIONS. RESET DUCT STATIC PRESSURE SETPOINT TO MAINTAIN MOST OPEN TERMINAL UNIT DAMPER AT 95% OPEN, AS MOST OPEN DAMPER FALLS BELOW 95% OPEN, GRADUALLY REDUCE DUCT STATIC PRESSURE SETPOINT. AS MOST OPEN DAMPER RISES ABOVE 95% OPEN, GRADUALLY RAISE DUCT STATIC PRESSURE SETPOINT. DUCT STATIC PRESSURE SETPOINT SHALL HAVE AN ADJUSTABLE HIGH LIMIT (DETERMINED BY TAB AS REQUIRED TO ACHIEVE DESIGN AIRFLOW) AND AN ADJUSTABLE LOW LIMIT (0.75–INCHES W.G. LESS THAN HIGH LIMIT).
4. RETURN FAN ARRAY VFDS SHALL BE MODULATED BY BMS TO MAINTAIN EXHAUST AIR OFFSET BETWEEN MEASURED RETURN AND SUPPLY AIRFLOW AND AN ADDITIONAL 600 CFM (ADJUSTABLE).
5. SUPPLY FAN DISCHARGE STATIC PRESSURE HIGH LIMIT SWITCH AT AHU WITH SETPOINT OF 5.0–INCHES W.G. (ADJ.) SHALL PROVIDE HARDWIRED SAFETY (SEE SAFETY SHUTDOWN SEQUENCE).
6. SUCTION STATIC PRESSURE HIGH LIMIT SWITCH AT AHU WITH SETPOINT OF 5.0–INCHES W.G. (ADJ.) SHALL PROVIDE HARDWIRED SAFETY (SEE SAFETY SHUTDOWN SEQUENCE).
7. RETURN FAN DISCHARGE STATIC PRESSURE HIGH LIMIT SWITCH AT AHU WITH SETPOINT OF 3.0–INCHES W.G. (ADJ.) SHALL PROVIDE HARDWIRED SAFETY (SEE SAFETY SHUTDOWN SEQUENCE).
8. UPON ACTIVATION OF ANY FIRE/SMOKE DAMPERS OR DUCT DETECTORS THE SUPPLY AIR TERMINAL UNITS ON THAT FLOOR SHALL BE CLOSED. OTHER FLOORS SHALL REMAIN OPERATIONAL TO MAINTAIN SPACE PRESSURIZATION.

LAB EXHAUST FANS SEQUENCE OF OPERATION

LAB EXHAUST SYSTEM SHALL BE MANUALLY ENABLED AND DISABLED FROM BMS. LAB EXHAUST FAN CONTROLLER SHALL INTERFACE WITH BMS AND CONTROL THE LAB EXHAUST FAN. SYSTEM CONSISTS OF 6 EXHAUST FANS MOUNTED ON A COMMON PLENUM WITH HEAT RECOVERY COIL. FIVE FANS SHALL BE UTILIZED TO ACHIEVE DESIGN AIRFLOW, WITH ONE FAN PROVIDING PARTIAL REDUNDANCY.

STARTUP SEQUENCE

1. THE SYSTEM CAN BE STARTED WHEN AT LEAST ONE VARIABLE FREQUENCY DRIVE(VFD) IS SET TO AUTO.
2. WHEN ENABLED, ALL DEVICES WILL BE PUT INTO AUTO AND THE LEAD EXHAUST FAN SHALL BE ENERGIZED TO RUN CONTINUOUSLY.
3. WHEN THE LEAD FAN ENERGIZES, THE CORRESPONDING ISOLATION DAMPER WILL POSITION TO FULLY OPEN AND THE CORRESPONDING VFD WILL BE COMMANDED TO RUN AND MODULATE SPEED BASED ON THE SYSTEM PRESSURE PROPORTIONAL–INTEGRAAL DERIVATIVE (PID) OUTPUT.

NORMAL OPERATION

1. THE SYSTEM PRESSURE WILL MAINTAIN TO SPECIFIED SETPOINT THROUGH THE LAB EXHAUST CONTROLLER.
2. A HIGH PRESSURE SETPOINT WILL BE SET TO PREVENT OVERPRESSURIZING THE SYSTEM.
3. IF THE SYSTEM EVER EXCEEDS THE HIGH PRESSURE SETPOINT THE SYSTEM WILL LOWER THE FAN VFD SPEED.
4. IF THE PRESSURE IS STILL ABOVE THE HIGH PRESSURE SETPOINT FOR 30 SECONDS (ADJ), THE SYSTEM WILL SHUT DOWN AUTOMATICALLY.

FAILURES

1. IF THE LEAD FAN FAILS EITHER BY VFD FAULT OR ISOLATION DAMPER FAILURE TO OPEN OR CLOSE, ANOTHER FAN WILL TAKE OVER AND BECOME THE LEAD FAN.
2. THE NEW LEAD FAN WILL ENERGIZE, ITS ISOLATION DAMPER WILL FULLY OPEN AND ITS VFD WILL BE ENABLED.
3. THE FAILED FAN WILL DEENERGIZE, ITS ISOLATION DAMPER SHALL CLOSE AND ITS VFD DISABLED. IF BOTH FANS FAIL, THE NEXT FAN WILL BE ENERGIZED.
4. IF ALL FANS FAIL, THE SYSTEM WILL PROCEED TO THE SHUTDOWN SEQUENCE AUTOMATICALLY.
5. THE SYSTEM WILL ALARM WITH FAN FAILURES AND LOW PRESSURE ALARMS.

SHUTDOWN SEQUENCE

1. THE SYSTEM CAN BE SHUT DOWN MANUALLY IF AN OPERATOR PRESSES THE STOP BUTTON ON THE SYSTEM CONTROL SCREEN OF THE FAN CONTROLLER.
2. DURING SHUTDOWN, THE VFD'S WILL BE DISABLED AND THE ISOLATION DAMPERS WILL CLOSE. IF THESE SETPS DO NOT COMPLETE WITHIN 180 SECONDS, THE SHUTDOWN SEQUENCE WILL FAIL AND SIGNAL AN ALARM.
3. SYSTEM SHALL HAVE AN INTERLOCK WITH THE FIRE ALARM PANEL TO BE CONTROLLED REMOTELY.

SMOKE DETECTOR SEQUENCE

1. IF A SMOKE DETECTOR IS ACTIVATED ON A FLOOR THE FAN WILL REMAIN OPERATIONAL BUT, THE LAB CONTROLS WILL SHUT DOWN THE FUME HOOD SUPPLY AND RETURN VALVES ON THE FLOOR THAT HAS EXPERIENCED THE ACTIVATION.

ROTATION SEQUENCE

1. IF THERE IS A RUNTIME DIFFERENCE OF AT LEAST 720 HOURS (ADJ) BETWEEN FANS AND IT IS PAST 11 PM(ADJ), THE ROTATION SEQUENCE WILL BE INITIATED.
2. WHEN THE ROTATION SEQUENCE BEGINS, ONE OF THE REDUNDANT FANS WILL BECOME THE LEAD FAN, AND THE LEAD FAN WILL BECOME ONE OF THE REDUNDANT FANS.
3. THE NEW LEAD FAN WILL ENERGIZE TO THE SAME SPEED AS THE PREVIOUS LEAD FAN AND ITS ISOLATION DAMPER WILL OPEN.
4. DURING THIS PROCESS THE FAN SPEED OF THE ORIGINAL LEAD FAN WILL BE DECREASED TO KEEP SETPOINT.
5. WHEN THE NEW LEAD FAN'S ISOLATION DAMPER IS CONFIRMED FULLY OPEN, THE NEW REDUNDANT FAN WILL DE–ENERGIZE AND ITS ISOLATION DAMPER WILL CLOSE.
6. IF THESE STEPS ARE NOT COMPLETED WITHIN 180 SECONDS, THE ROTATION SEQUENCE WILL FAIL AND THE LEAD AND REDUNDANT FAN WILL REVERSE.

INCREMENT/DECREMENT SEQUENCE

1. IF THE FANS ARE RUNNING ABOVE THE INCREMENT SPEED SETPOINT FOR 30 SECONDS AND THERE IS AN AVAILABLE FAN, THE NEXT FAN WILL BE ENERGIZED AND ITS ISOLATION DAMPER WILL OPEN.
2. IF THE FANS ARE RUNNING BELOW THE DECREMENT SPEED SETPOINT FOR 30 SECONDS AND MORE THAN ONE FAN IS RUNNING, THE LAST FAN WILL BE DE–ENERGIZED. AND ITS ISOLATION DAMPER WILL CLOSE.
3. THE INCREMENT AND DECREMENT SETPOINTS ARE ADJUSTABLE.
4. IF EITHER OF THESE SEQUENCES DO NOT COMPLETE WITHIN 180 SECONDS, THE INCREMENT FAN OR DECREMENT SEQUENCE WILL FAIL AND SIGNAL AN ALARM.

FILTER STATUS

1. FILTER STATUS WILL BE MONITORED BY THE BMS THROUGH RESPECTIVE DIFFERENTIAL PRESSURE TRANSMITTER. WHEN DP REACHES SETPOINT, THE FAN CONTROLLER SHALL SEND AN ALARM THROUGH THE BMS. THE BMS SHALL ACTIVATE A DIRTY FILTER ALARM.

BACNET INTERFACE

1. BACNET COMMUNICATION CARD TO BE PROVIDED WITH ALL VFD'S. IN ADDITION PROVIDE THE FOLLOWING HARDWIRED POINTS BETWEEN THE BMS AND THE VFD: ENABLE/DISABLE, SPEED ADJUST AND FAULT.

ALARMS

1. THE FOLLOWING CRITICAL ALARMS WILL BE PRESENT ON THE SYSTEM, MUST BE CLEARED FOR STANDARD USE, AND WILL BE INDICATED ON THE FAN CONTROLLER ALARMS SCREEN;
   a. VFD FAILURE
   b. ISOLATION DAMPER FAILURE
   c. START SEQUENCE FAILURE
   d. SHUTDOWN SEQUENCE FAILURE
   e. ROTATION SEQUENCE FAILURE
   f. INCREMENT SEQUENCE FAILURE
   g. DECREMENT SEQUENCE FAILURE
   h. CRITICAL HIGH SYSTEM PRESSURE
   i. SYSTEM PRESSURE TRANSMITTER FAILURE
   j. PLENUM PRESSURE TRANSMITTER FAILURE
   k. DIRTY FILTER

DATE	ISSUED FOR	REV.
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
03/15/2019	BULLETIN NO. 1	5
05/06/2019	TEST AND BALANCE BID	

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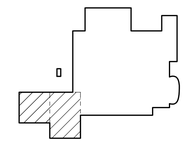

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Project

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Drawing Title

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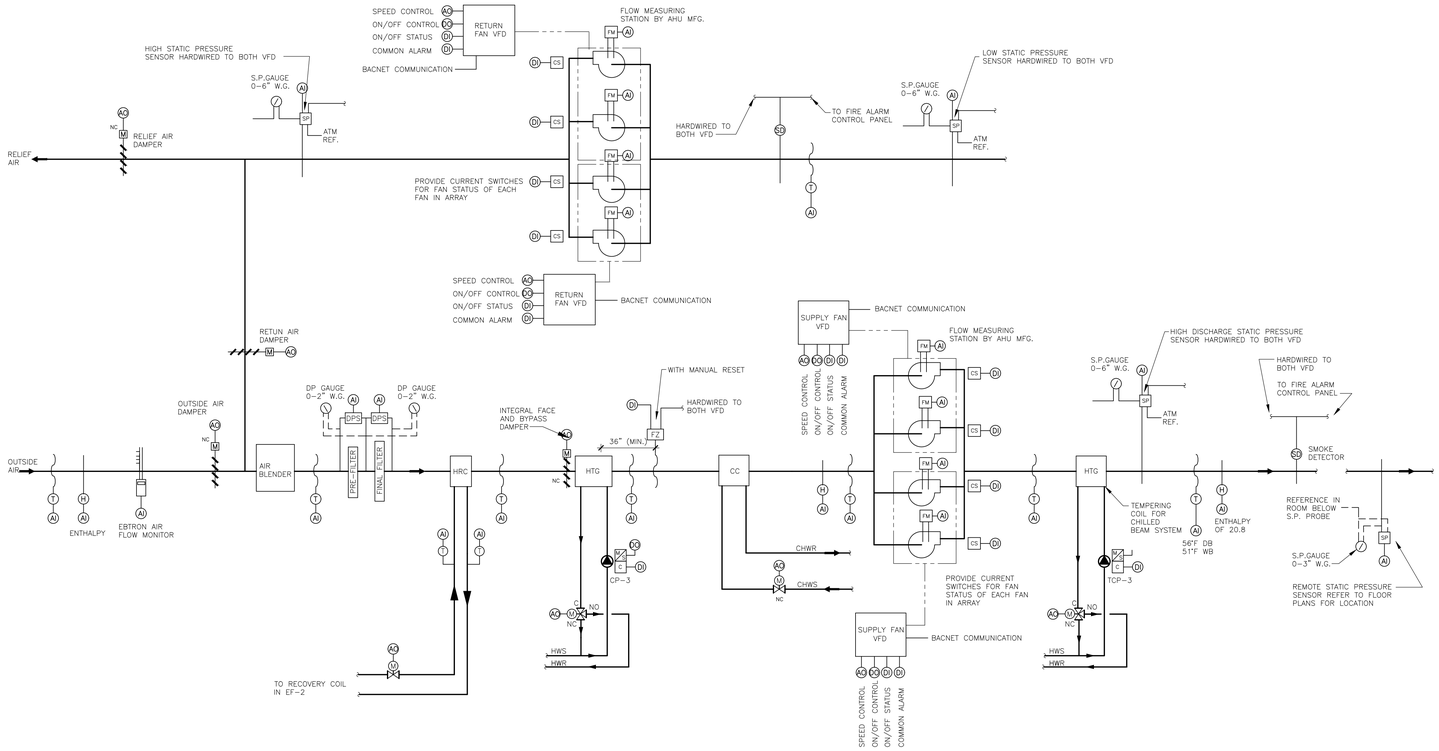


AHU-3 CONTROLS SCHEMATIC
NO SCALE

AHU-3 SEQUENCE OF OPERATION

GENERAL

1. INDEXATION BETWEEN OCCUPIED AND UNOCCUPIED MODES:
   A. AHU SHALL ENERGIZE DURING BUILDING OCCUPIED TIME OF DAY.
   B. MANUAL START / STOP SHALL BE ACHIEVED THROUGH BMS.
2. UPON START, SUPPLY FANS SHALL INCREASE SPEED GRADUALLY OVER FIELD-ADJUSTABLE RAMP UP TIME OF 120 SECONDS.
3. UNIT SERVES FLOOR LEVELS F THROUGH 7 EXCEPT FOR WET LABS, COMM/IT AND ELEC ROOMS.

OPERATIONAL MODES

AHU-3:

1. FIRST STAGE OF HEATING TO BE THE HEAT RECOVERY COIL. HRC VALVE CONTROLS TO DAT SETPOINT (56°F ADJ.).
   a. HRC PUMP (HRP-1 OR HRP-2) IS ENERGIZED WHEN HRC VALVE MODULATES ABOVE 50% OPEN.
   b. HRC PUMP STOP SIGNAL IS TRANSMITTED THROUGH BMS WHEN HRC VALVE MODULATES FULLY CLOSED FOR 15 MIN (ADJ). (NOTE: HRC PUMP IS DE-ENERGIZED ONLY IF THERE IS NO CALL TO RUN FROM AHU CONTROL SEQUENCE.
   c. NOTE: HRP-1 & 2 SHALL BE IN A MAIN / STANDBY ARRANGEMENT WITH MAIN / STANDBY DESIGNATION ROTATING EVERY MONTH.
2. SECOND STAGE OF HEATING TO BE INTEGRAL FACE AND BYPASS (IFB) WATER COIL. IFB COIL CONTROLS TO DAT SETPOINT (56°F ADJ.) ONLY AFTER HRC VALVE HAS MODULATED FULLY OPEN OR IF HRC ALONE IS UNABLE TO SATISFY DAT SETPOINT.
   a. WHEN IFB COIL ENTERING AIR TEMPERATURE IS ABOVE 40°F (ADJ.), IFB DAMPERS SHALL BE FULLY OPEN TO THE COIL AND THE COIL VALVE SHALL MODULATE IN SEQUENCE TO CONTROL TO DAT SETPOINT. COIL PUMP SHALL BE ENERGIZED.
   b. WHEN IFB COIL ENTERING AIR TEMPERATURE IS BELOW 40°F (ADJ.), COIL VALVE(S) SHALL OPEN FULLY AND IFB DAMPERS SHALL MODULATE TO CONTROL DAT AT SETPOINT. COIL PUMP SHALL BE ENERGIZED.

COOLING MODE: OUTSIDE AIR AND RELIEF AIR DAMPERS AT MINIMUM POSITION. RETURN DAMPER OPEN. SUPPLY FANS VFD CONTROLS TO DUCT STATIC PRESSURE SETPOINT. RETURN FAN VFD CONTROLS TO MAINTAIN AN AIRFLOW OF SUPPLY AIR – EXHAUST AIR OF 1600 CFM AND AN ADDITIONAL 600 CFM OFFSET (ADJ).

1. FIRST STAGE OF COOLING TO BE THE HEAT RECOVERY COIL. HRC VALVE CONTROLS TO DAT SETPOINT (56 F DB/51 F WB)
   a. HRC PUMP (HRP-1 OR HRP-2) IS ENERGIZED WHEN HRC VALVE MODULATES OPEN.
   b. HRC PUMP STOP SIGNAL IS TRANSMITTED THROUGH BMS WHEN HRC VALVE MODULATES FULLY CLOSED TO COIL FOR 15 MIN (ADJ). HRC PUMP IS DE-ENERGIZED ONLY IF THERE IS NO CALL TO RUN FROM AHU CONTROL SEQUENCE.
2. SECOND STAGE OF COOLING TO BE AHU CHILLED WATER COIL. CHILLED WATER COIL VALVES MODULATE TO DAT SETPOINT (56°F DB/51°F WB) WITHOUT OVERLAP WITH HEATING MODE (HRC VALVE, IFB VALVE).
3. TEMPERING HEATING COIL VALVE SHALL MODULATE AS NECESSARY TO CONTROL TO DAT SETPOINT OF (56°F DB/51°F WB). TEMPERING COIL PUMP SHALL OPERATE WHEN OUTSIDE AIR IS 55 F(ADJUSTABLE) AND ABOVE OR IF TEMPERATURE LEAVING THE SUPPLY FAN ARRAY IS BELOW 56 F.

AHU START / STOP:

1. AHU SHALL NORMALLY RUN CONTINUOUSLY.
2. A SYSTEM START / STOP POINT SHALL BE PROVIDED FOR MANUAL START-UP AND SHUTDOWN OF SYSTEM VIA BMS.
3. WHEN SYSTEM IS MANUALLY STOPPED, CONTROL DEVICES SHALL RESPOND AS FOLLOWS:
   a. SUPPLY AND RETURN FANS SHALL DE-ENERGIZE (IN UNISON)
   b. CHILLED WATER COIL VALVE SHALL CLOSE
   c. IFB DAMPERS SHALL OPEN TO IFB COIL
   d. HEATING COIL VALVE SHALL MODULATE TO MAINTAIN CHILLED WATER COIL DAT AT 50°F. (ADJ.)
   e. OUTSIDE AIR AND RELIEF AIR DAMPERS SHALL BE CLOSED
4. WHEN SYSTEM IS ENERGIZED, CONTROL DEVICES SHALL RESPOND AS FOLLOWS:
   a. SUPPLY AND RETURN FANS SHALL START.
5. COLD START (AHU-2 IS STARTED WHEN OA TEMPERATURE IS BELOW 40°F)
   a. IFB DAMPERS OPEN FULLY TO IFB COIL
   b. IFB COIL VALVE OPENS FULLY
   c. SUPPLY AND RETURN FANS SHALL START.
   d. ADJUST SUPPLY AND RETURN FAN RAMP SPEED AND TUNE IFB DAMPER CONTROL LOOP TO PREVENT NUISANCE FREEZESTAT TRIPPING DURING COLD START-UP.

OUTDOOR AIR VENTILATION CONTROL:

1. WHEN AHU IS ENERGIZED, OA DAMPER MODULATES AIRFLOW (AS MEASURED BY OUTDOOR AIRFLOW MEASURING STATION) TO CONTROL TO MINIMUM VENTILATION AIRFLOW SETPOINT (RA DAMPER TRACKS OPPOSITE OA DAMPER VIA SAME CONTROL SIGNAL).
2. MINIMUM VENTILATION AIRFLOW SETPOINT (EXHAUST AIR OF 1600 CFM) IS RESET BETWEEN MINIMUM VENTILATION AND CODE VENTILATION SETPOINTS BASED SPACE CO2 LEVELS IN HIGH OCCUPANT DENSITY SPACES. IF CO2 LEVELS IN ANY SPACE RISE ABOVE SETPOINT (1,000 PPM) AND ASSOCIATED SPACE VAV DAMPER IS AT MAX DESIGN COOLING AIRFLOW, AHU OUTDOOR AIR DAMPER OPENS TO MODULATE AIRFLOW TOWARD CODE VENTILATION RATE.

SYSTEM AIRFLOW:

1. THE BMS MONITORS AHU AIRFLOW.

DUCT STATIC PRESSURE CONTROL:

1. SUPPLY FAN VFD SHALL BE MODULATED BY BMS, IN UNISON, TO MAINTAIN REMOTE SYSTEM SUPPLY AIR STATIC PRESSURE SETPOINT. EACH VFD SHALL RECEIVE SAME SIGNAL FROM BMS. REMOTE DUCT STATIC PRESSURE SETPOINT VALUE SHALL BE DETERMINED BY THE AIR BALANCE CONTRACTOR DURING SYSTEM BALANCING.
2. RETURN FAN VFD SHALL BE MODULATED BY BMS, IN UNISON TO MAINTAIN SPECIFIED OFFSET (1600 CFM EXHAUST AND 600 CFM SPACE POSITIVE PRESSURIZATION ADJ) FROM SUPPLY AIR TO MAINTAIN SPACE PRESSURIZATION. EACH VFD SHALL RECEIVE THE SAME SIGNAL FROM BMS.
3. DISCHARGE STATIC PRESSURE HIGH LIMIT AT AHU WITH SETPOINT OF 5.0-INCHES W.G. (ADJ.) SHALL PROVIDE OVERRIDE CONTROL OF SUPPLY FAN VFD. HIGH LIMIT SWITCH WITH SETPOINT OF 5.5-INCHES W.G. (ADJ.) SHALL PROVIDE HARDWIRED SAFETY. BMS SHALL ACTIVATE ALARM IF OPERATING IN OVERRIDE CONDITION.
4. SUPPLY DUCT STATIC PRESSURE SETPOINT SHALL RESET BASED ON ALL ASSOCIATED TERMINAL UNIT DAMPER POSITIONS. RESET DUCT STATIC PRESSURE SETPOINT TO MAINTAIN MOST OPEN TERMINAL UNIT DAMPER AT 95% OPEN. AS MOST OPEN DAMPER FALLS BELOW 95% OPEN, GRADUALLY REDUCE DUCT STATIC PRESSURE SETPOINT. AS MOST OPEN DAMPER RISES ABOVE 95% OPEN, GRADUALLY RAISE DUCT STATIC PRESSURE SETPOINT. DUCT STATIC PRESURE SETPOINT SHALL HAVE AN ADJUSTABLE HIGH LIMIT (DETERMINED BY TAB AS REQUIRED TO ACHIEVE DESIGN AIRFLOW) AND AN ADJUSTABLE LOW LIMIT (0.75 INCHES W.G. LESS THAN HIGH LIMIT).

FROST PREVENTION SEQUENCE OF OPERATION:

1. IF HEAT RECOVERY LOOP EXHAUST COIL ENTERING WATER TEMPERATURE IS BELOW A SETPOINT OF 32°F (ADJ), AHU HEAT RECOVERY COIL VALVE OPERATION IS OVERRIDDEN AND MODULATES TO HOLD THE EXHAUST COIL ENTERING WATER TEMPERATURE AT SETPOINT.

SAFETY SHUTDOWN AND MISCELLANEOUS MONITORING

1. FREEZESTAT(S) WIRED TO SAFETY CIRCUIT SHALL DEACTIVATE SUPPLY AND RETURN FANS AND CLOSE OA DAMPER WHEN TEMPERATURE SENSED IS 35°F OR BELOW. BMS SHALL MONITOR FREEZESTAT STATUS AND SIGNAL AN ALARM IF FREEZESTAT TRIPS. WHEN FREEZESTAT ALARM IS ACTIVATED, THE BMS SHALL MODULATE THE HEATING COIL VALVE TO MAINTAIN CHW COIL DAT AT 50°F (UNTIL FREEZESTAT IS MANUALLY RESET). ENERGIZE HEATING WATER PUMP.
2. THE DISCHARGE HIGH LIMIT STATIC PRESSURE SWITCH SHALL INDIVIDUALLY STOP THE SUPPLY FAN(S) TO PREVENT THE DISCHARGE STATIC PRESSURE FROM EXCEEDING ITS HIGH LIMIT SETPOINT. BMS SHALL MONITOR PRESSURE SWITCH AND SIGNAL AN ALARM IF HIGH LIMIT IS TRIPPED.
3. DUCT SMOKE DETECTORS SHALL DEACTIVATE SUPPLY AND RETURN FANS THROUGH FIRE ALARM SYSTEM CONTROL MODULE (WIRED TO SAFETY CIRCUIT) WHEN PRODUCTS OF COMBUSTION ARE DETECTED.
4. BOTH PRE-FILTER AND FINAL FILTER STATUS SHALL BE MONITORED BY BMS THROUGH RESPECTIVE DIFFERENTIAL PRESSURE TRANSMITTERS. WHEN DP REACHES SETPOINT, THE BMS SHALL ACTIVATE A DIRTY FILTER ALARM.
5. THE AHU SUCTION HIGH LIMIT STATIC PRESSURE SWITCH SHALL STOP THE SUPPLY FANS AND RETURN FANS TO PREVENT THE SUCTION STATIC PRESSURE FROM EXCEEDING ITS HIGH LIMIT SETPOINT. BMS SHALL MONITOR SUCTION STATIC PRESSURE SWITCH AND SIGNAL AN ALARM IF HIGH LIMIT IS TRIPPED.
6.
7. SYSTEM SHALL INTERLOCK WITH CENTRAL FIRE ALARM PANEL FOR REMOTE ACCESS AND CONTROL.

THE FOLLOWING ALARMS SHALL BE SENT TO THE BMS

1. SUPPLY FAN VFD FAULT/FAILURE
2. RETURN FAN VFD FAULT/FAILURE
3. SUPPLY FAN MOTOR FAILURE
4. RETURN FAN MOTOR FAILURE
6. HEAT RECOVERY PUMP FAILURE
7. ENTHALPY SETPOINT (DISHARGE AIR TEMPERATURE)
8. HEATING COIL PUMP FAILURE
9. TEMPERING COIL PUMP FAILURE
10. FREEZESTAT TRIP
11. HIGH DISCHARGE DUCT STATIC PRESSURE
12. HIGH FILTER PRESSURE DROP
13. HIGH RETURN FAN DISCHARGE DUCT STATIC PRESSURE
14. OUTSIDE AIR TEMPERATURE.
15. OUTSIDE AIR ENTHALPY
16. BUILDING PRESSURE
17. HEATING OR COOLING MODE
18. RUNAROUND COIL VALVE POSITION
19. IFB COIL VALVE POSITION
20. CHILLED WATER COIL VALVE POSITION
21. TEMPERING COIL VALVE POSITION.
22. OUTSIDE AIRFLOW CFM BY AIRFLOW MONITOR
23. SUPPLY AIR CFM BY SUPPLY FAN AIRFLOW MEASURING DEVICE
24. RETURN AIR CFM BY RETURN FAN AIRFLOW MEASURING DEVICE
25. SMOKE DAMPER STATUS ON SUPPLY AND RETURN.
26. SUCTION HIGH LIMIT.
27. OUTSIDE AIRFLOW VARIES FROM SET POINT BY 15" OR MORE (B1)

DISCHARGE AIR TEMPERATURE CONTROL (ECONOMIZER, HEATING COIL, CHILLED WATER COIL)

1. IF OA ENTHALPY IS GREATER THAN RA ENTHALPY:
   a. MODULATE OA DAMPERS TO MINIMUM VENTILATION AIRFLOW SETPOINT.
   b. ENERGIZE RUNAROUND HEAT RECOVERY PUMPS AND MODULATE HEAT RECOVERY COIL.
   c. MODULATE COOLING COIL CONTROL VALVE TO SATISFY DAT SETPOINT.
   d. MODULATE TEMPERING COIL TO MEET DAT SETPOINT.
2. IF OA ENTHALPY IS BELOW RA ENTHALPY AND OA TEMPERATURE IS ABOVE 40°F (ADJ).
   a. DE-ENERGIZE RUNAROUND HEAT RECOVERY PUMPS AND CLOSE HEAT RECOVERY COIL VALVE.
   b. OUTDOOR AIR DAMPER MODULATES ABOVE MINIMUM VENTILATION AIRFLOW SETPOINT AS NECESSARY TO CONTROL DAT AT SETPOINT.
   c. IF DAT FALLS BELOW SETPOINT (WITH OUTDOOR AIRFLOW AT MINIMUM VENTILATION SETPOINT), MODULATE HEATING COIL VALVE OPEN AS NECESSARY TO SATISFY DAT SETPOINT.
3. IF OA TEMPERATURE IS BELOW 40°F:
   a. IF DAT IS BELOW SETPOINT, FIRST MODULATE OA DAMPER TO MINIMUM VENTILATION AIRFLOW SETPOINT AS NECESSARY TO MEET EXHAUST AIRFLOW REQUIREMENTS AND SATISFY DAT SETPOINT. IF DAT IS STILL BELOW SETPOINT, MODULATE HEAT RECOVERY COIL VALVE AND ENERGIZE HEAT RECOVERY COIL PUMP.
   b. IF DAT IS STILL BELOW SETPOINT, MODULATE HEATING COIL VALVE OPEN AS NECESSARY TO SATISFY DAT SETPOINT.
   c. IF DAT IS ABOVE SETPOINT, MODULATE OA DAMPER ABOVE MINIMUM VENTILATION AIRFLOW SETPOINT AS NECESSARY TO SATISFY DAT SETPOINT.
4. FOR ALL DISCHARGE AIR TEMPERATURE CONTROL SEQUENCES, PROVIDE NECESSARY DEADBANDS AND TIME DELAYS TO PREVENT SIMULTANEOUS HEATING AND COOLING FROM OVERLAP OF HEATING COIL CONTROL VALVE AND COOLING COIL CONTROL VALVE.
5. SUPPLY AIR TEMPERATURE RESET: WHILE THE FAN IS PROVEN ON, EVERY 2 MINUTES INCREASE THE SETPOINT BY 0.2 F IF THERE IS ONE (ADJUSTABLE) OR FEWER ZONE COOLING REQUESTS. IF THERE IS MORE THAN ONE (ADJUSTABLE) COOLING REQUEST, DECREASE THE SETPOINT BY 0.3F. A COOLING REQUEST IS GENERATED WHEN THE COOLING LOOP OF ANY ZONE SERVED BY THE SYSTEM IS GREATER THAN 99% UNTIL IT FALLS TO 90%. PRIMARY AIR TO THE SPACES WITH CHILLED BEAMS SHALL BE 18.3 GRAINS/LB (DRY AIR) LESS THAN ROOM SETPOINT.

UNOCCUPIED (NIGHT) HEATING MODE

1. IN THE UNOCCUPIED MODE OF OPERATION, THE SUPPLY AIR AND RELIEF AIR FANS SHALL NORMALLY BE OFF.
2. IF THE SPACE TEMPERATURE DROPS BELOW THE NIGHT SETBACK TEMPERATURE OF 60°F (ADJ.), (AS SENSED BY THE COLDEST TERMINAL UNIT ZONE SENSOR) THE UNIT SHALL BE CYCLED ON TO HEAT THE SPACE.
3. SUPPLY FAN(S) ARE ENERGIZED, RELIEF FAN(S) REMAIN DE-ENERGIZED, OUTDOOR AIR DAMPER REMAINS CLOSED (RETURN AIR DAMPER OPEN), AND RELIEF AIR DAMPER REMAINS CLOSED.
4. SUPPLY FAN VFD CONTROLS TO DUCT STATIC PRESSURE SETPOINT (AS IN OCCUPIED MODE).
5. HEATING COIL VALVE SHALL MODULATE TO CONTROL TO A DISCHARGE AIR TEMPERATURE SETPOINT OF 56° F (ADJ.).
6. COOLING COIL VALVE SHALL REMAIN CLOSED.

UNOCCUPIED (NIGHT) COOLING MODE

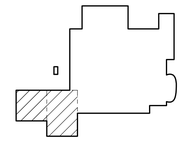
1. IN THE UNOCCUPIED MODE OF OPERATION, THE SUPPLY AIR AND RELIEF AIR FANS SHALL NORMALLY BE OFF.
2. IF THE SPACE TEMPERATURE RISES ABOVE THE NIGHT SETBACK TEMPERATURE OF 80°F (ADJ.), (AS SENSED BY THE WARMEST TERMINAL UNIT ZONE SENSOR) THE UNIT SHALL BE CYCLED ON TO COOL THE SPACE.
3. SUPPLY FAN(S) ARE ENERGIZED, RELIEF FAN(S) REMAIN DE-ENERGIZED, OUTDOOR AIR DAMPER REMAINS CLOSED (RETURN AIR DAMPER OPEN), AND RELIEF AIR DAMPER REMAINS CLOSED.
4. SUPPLY FAN VFD CONTROLS TO DUCT STATIC PRESSURE SETPOINT (AS IN OCCUPIED MODE).
5. CHILLED WATER COIL VALVE SHALL MODULATE TO CONTROL TO A DISCHARGE AIR TEMPERATURE SETPOINT OF 56°F DB/51°F WB CHILLED BEAM VALVES SHALL MODULATE.
6. HEATING COIL VALVE SHALL REMAIN CLOSED.

SYSTEM SUPPLY AND RETURN AIRFLOW CONTROL

1. THE BMS MONITORS SUPPLY, RETURN AND OUTDOOR AIRFLOW.
2. SUPPLY FAN ARRAY VFDS SHALL BE MODULATED BY BMS TO MAINTAIN REMOTE SYSTEM SUPPLY AIR STATIC PRESSURE SETPOINT. REMOTE DUCT STATIC PRESSURE SETPOINT VALUE SHALL BE DETERMINED BY THE AIR BALANCE CONTRACTOR DURING SYSTEM BALANCING.
3. SUPPLY DUCT STATIC PRESSURE SETPOINT SHALL BE RESET BASED ON ALL ASSOCIATED TERMINAL UNIT DAMPER POSITIONS. RESET DUCT STATIC PRESSURE SETPOINT TO MAINTAIN MOST OPEN TERMINAL UNIT DAMPER AT 95% OPEN. AS MOST OPEN DAMPER FALLS BELOW 95% OPEN, GRADUALLY REDUCE DUCT STATIC PRESSURE SETPOINT. AS MOST OPEN DAMPER RISES ABOVE 95% OPEN, GRADUALLY RAISE DUCT STATIC PRESSURE SETPOINT. DUCT STATIC PRESSURE SETPOINT SHALL HAVE AN ADJUSTABLE HIGH LIMIT (DETERMINED BY TAB AS REQUIRED TO ACHIEVE DESIGN AIRFLOW) AND AN ADJUSTABLE LOW LIMIT (0.75-INCHES W.G. LESS THAN HIGH LIMIT).
4. RETURN FAN ARRAY VFDS SHALL BE MODULATED BY BMS TO MAINTAIN EXHAUST AIR OFFSET (1600 CFM) AND 600 CFM(ADJUSTABLE) BETWEEN MEASURED RETURN AND SUPPLY AIRFLOW.
5. SUPPLY FAN DISCHARGE STATIC PRESSURE HIGH LIMIT SWITCH AT AHU WITH SETPOINT OF 5.0-INCHES W.G. (ADJ.) SHALL PROVIDE HARDWIRED SAFETY (SEE SAFETY SHUTDOWN SEQUENCE).
6. SUCTION STATIC PRESSURE HIGH LIMIT SWITCH AT AHU WITH SETPOINT OF 5.0-INCHES W.G. (ADJ.) SHALL PROVIDE HARDWIRED SAFETY (SEE SAFETY SHUTDOWN SEQUENCE).
7. RETURN FAN DISCHARGE STATIC PRESSURE HIGH LIMIT SWITCH AT AHU WITH SETPOINT OF 3.0-INCHES W.G. (ADJ.) SHALL PROVIDE HARDWIRED SAFETY (SEE SAFETY SHUTDOWN SEQUENCE).

DATE	ISSUED FOR	REV.
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
03/15/2019	BULLETIN NO. 1	5
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

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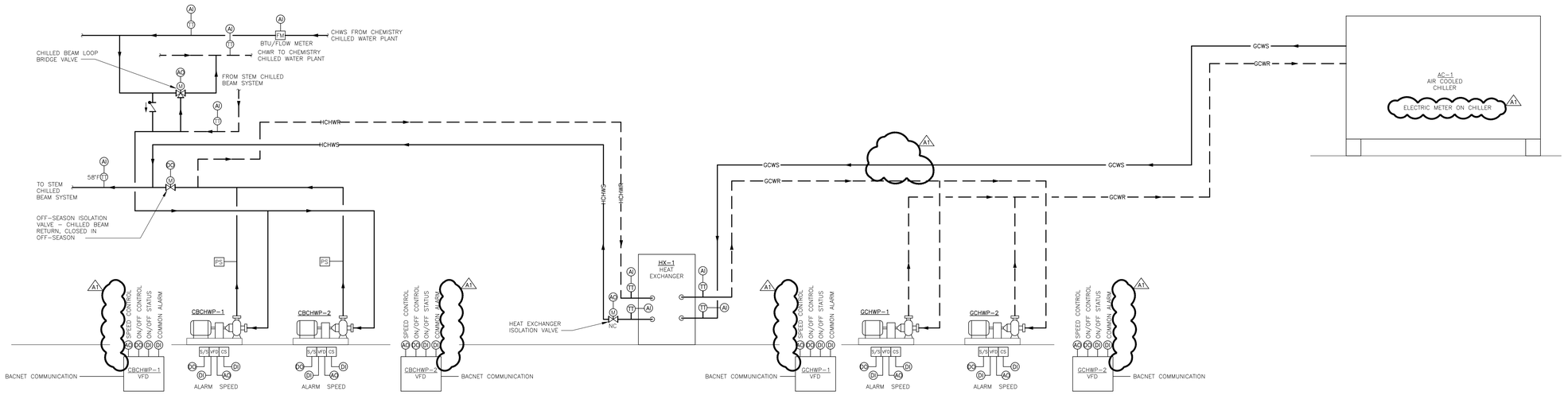
Drawing Title
CONTROL SCHEMATICS AHU-3

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
M50-05

File Path



CHILLED BEAM CHILLED WATER CONTROL SCHEMATIC

NO SCALE

CHILLED BEAM CHILLED WATER LOOP

CHILLED BEAM CHILLED WATER LOOP SUPPLIES HIGH TEMPERATURE CHILLED WATER (58 F) TO THE CHILLED BEAMS LOCATED THROUGHOUT THE BUILDING. OFF-SEASON BYPASS VALVE SHALL BE OPEN WHEN SYSTEM IS USING CHILLED WATER FROM THE CHEMISTRY PLANT. HEAT EXCHANGER ISOLATION VALVE SHALL BE CLOSED.

1. AT SYSTEM STARTUP CHILLED BEAM CHILLED WATER PUMPS (CBCHWP-1 OR 2) SHALL BE ENERGIZED. PUMP SHALL RUN TO SATISFY SYSTEM DIFFERENTIAL PRESSURE SETPOINT.

2. THE BMS SHALL ALTERNATE MAIN/STANDBY PUMP OPERATION EACH MONTH.

3 UPON PUMP FAILURE TO RUN IS SENSED BY THE CURRENT SENSOR, THE BMS SHALL ACTIVATE FAILURE ALARM AND AUTOMATICALLY START THE STANDBY PUMP. IF BOTH PUMPS FAIL, THE BMS SHALL ACTIVATE A CRITICAL PUMP FAILURE AND SEND AN ALARM MESSAGE.

4. CHILLED BEAM LOOP WATER SETPOINT IS 58 F. CHILLED BEAM PUMPS SHALL BE DE-ENERGIZED IF CHILLED WATER SUPPLY SETPOINT REACHES 56.5 F. (ROOM DEWPOINT AT 56F).

5. CHILLED BEAM LOOP TEMPERATURE SHALL BE RESET IN SEQUENCE WITH THE AIR HANDLING UNIT SUPPLY AIR RESET SCHEDULE. AS SUPPLY AIR IS RAISED LOOP TEMPERATURE SHALL KEEP A 2 F (ADJUSTABLE) OFFSET ABOVE THE SPACE DEWPOINT.

6. 3-WAY MIXING VALVE SHALL MODULATE TO MAINTAIN 58 F CHILLED BEAM LOOP TEMPERATURE WHEN CHILLED WATER IS COMING FROM THE CHEMISTRY CHILLER PLANT.

7. WHEN CHEMISTRY PLANT IS SHUT DOWN, UTILIZE AIR COOLED CHILLER AND PLATE AND FRAME HEAT EXCHANGER TO MAINTAIN 58 F CHILLED WATER TO THE LOOP. CLOSE OFF-SEASON ISOLATION VALVE AND OPEN HEAT EXCHANGER VALVE.

8. PUMP DISCHARGE HIGH PRESSURE SWITCH SHALL BE HARDWIRED TO HX-1 ISOLATION VALVE AND SHALL DE-ENERGIZE PUMP IF VALVE IS CLOSED DURING OFF-SEASON.

9.

10. THE FOLLOWING ALARMS SHALL BE SENT TO THE BMS:
    a. VFD FAULT
    b. PUMP FAILURE
    c. HIGH CHILLED WATER SUPPLY TEMPERATURE
    d. LOW CHILLED WATER SUPPLY TEMPERATURE
    e. CHILLED WATER SUPPLY TEMPERATURE 1 DEGREE F ABOVE ROOM DEWPOINT.

AIR COOLED CHILLER CONTROL SCHEMATIC

NO SCALE

AIR COOLED CHILLER

GENERAL NOTES:

1. PRIMARY PURPOSE OF AIR-COOLED CHILLER, AC-1 IS TO PROVIDE COOLING FOR SPACES WITH CHILLED BEAMS WHEN THE CHEMISTRY BUILDING CHILLED WATER PLANT IS OFF.

2. PROVIDE FULL INTEGRATION OF CHILLER CONTROL POINTS VIA BACNET FOR MONITORING PURPOSES. BMS SHALL ENABLE CHILLER AND PROVIDE FOR EVAPORATOR LWT SETPOINT ADJUSTMENTS.

SEQUENCE OF OPERATION

1. AIR COOLED CHILLER SYSTEM SHALL BE AUTOMATICALLY ENABLED THROUGH BMS WHEN THE CHEMISTRY CHILLED WATER PLANT IS UNAVAILABLE.

   a. HEAT EXCHANGER ISOLATION VALVE SHALL BE OPEN.
      OFF SEASON ISOLATION VALVE – CHILLED BEAM RETURN SHALL BE CLOSED.
      CHILLED BEAM 3-WAY BRIDGE VALVE CLOSED TO MAIN CHILLED WATER LOOP.

   b. AIR COOLED PUMPS (GCHWP-1 OR 2) ARE ENERGIZED BY BMS (PUMPS ARE MAIN/STANDBY AND BMS SHALL ROTATE MAIN/STANDBY ASSIGNMENT ON A MONTHLY BASIS). PUMPS SHALL CONTINUE TO RUN FOR 5 MINUTES (ADJ) AFTER CHILLER HAS BEEN DISABLED. VFD SPEED SHALL BE SET BY THE BALANCER.

   c. CHILLER OPERATES OFF ITS PACKAGED CHILLER CONTROLLER AND FLOW SWITCHES. CHILLER LEAVING WATER TEMPERATURE SETPOINTS ARE ADJUSTABLE THROUGH THE BMS AND SHALL RESET TO MAINTAIN THE BUILDING CHILLED WATER SUPPLY AT SETPOINT.

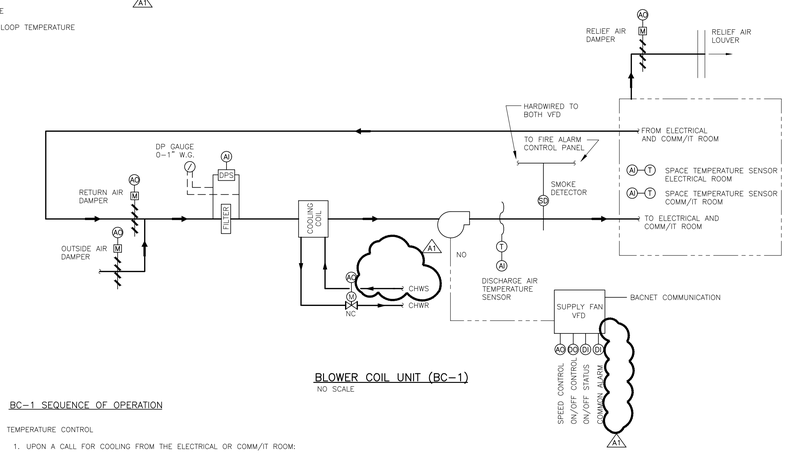
2. RESET GLYCOL CHILLED WATER SUPPLY TEMPERATURE TO MAINTAIN CHILLED WATER SUPPLY SETPOINT OFF HEAT EXCHANGER (HX-1) TO THE CHILLED BEAM SYSTEM LOOP (58F).

3. WHEN AIR COOLED CHILLER IS NOT IS USE. MODULATE CHILLED BEAM LOOP BRIDGE VALVE. CLOSE HEAT EXCHANGER ISOLATION VALVE AND CLOSE OFF SEASON ISOLATION VALVE.

4.

5. PROVIDE THE FOLLOWING ALARMS THROUGH THE BMS:

A. GCHWP-1 OR 2 PUMP FAILURE
B. AC-1 FAIL TO RUN ALARM
C. HIGH CHILLED WATER SUPPLY LOOP TEMPERATURE



BLOWER COIL UNIT (BC-1)

NO SCALE

BC-1 SEQUENCE OF OPERATION

TEMPERATURE CONTROL

1. UPON A CALL FOR COOLING FROM THE ELECTRICAL OR COMM/IT ROOM:

   a.FAN SHALL RUN AT 50%.
   b.IF OA TEMPERATURE IS BELOW RA TEMPERATURE UNIT SHALL OPERATE ON AIRSIDE ECONOMIZER. OUTSIDE AIR DAMPER SHALL MODULATE, RETURN DAMPER SHALL MODULATE AND RELIEF DAMPER SHALL MODULATE.

   c.IF OA TEMPERATURE IS ABOVE THE RA TEMPERATURE THE COOLING COIL VALVE SHALL MODULATE TO MAINTAIN SETPOINT. RELIEF AIR DAMPER CLOSED. RETURN AIR DAMPER OPEN.
   d.IF SETPOINT IS STILL NOT MET FAN SHALL RUN AT 100%.

2. IF ZONE TEMPERATURE SETPOINTS ARE SATISFIED:

   a.COOLING COIL VALVE SHALL BE FULLY CLOSED
   b.FAN SHALL RUN AT 50%.

3. IF SPACE TEMPERATURE IN ELECTRICAL OR COMM/IT ROOM RISES TO 5'F (OR MORE) ABOVE SETPOINT:

   a.MODULATE COOLING COIL VALVE.
   b.IF SPACE SETPOINT IS STILL NOT MET RUN FAN AND 100% CAPACITY.

4. IF SPACE TEMPERATURE IN ELECTRICAL ROOM RISES TO 10'F (OR MORE) ABOVE SETPOINT AN ALARM IS ISSUED THROUGH THE BMS, INDICATING THE HIGH TEMPERATURE CONDITION.

5. SUPPLY AIR TEMPERATURE RESET: THE SUPPLY AIR TEMPERATURE SHALL BE RESET FROM A MINIMUM OF 55 F WHEN THE OUTDOOR TEMPERATURE IS 70 F AND ABOVE, PROPORTIONALLY UP TO A MAX TEMP EQUAL TO ROOM SETPOINT WHEN THE OUTDOOR AIR IS 60F AND BELOW. WHEN THE FAN IS OFF, FREEZE THE MAX TEMP AT THE MAX VALUE. WHILE THE FAN IS PROVEN ON, EVERY 2 MINUTES INCREASE THE SETPOINT BY 0.2F. IF SPACE TEMPERATURE IS NOT MET WITH RESET THEN DECREASE THE SETPOINT BY 0.3F.

SAFETY SHUTDOWN AND MISCELLANEOUS MONITORING

1. DUCT SMOKE DETECTORS SHALL DEACTIVATE SUPPLY FANS THROUGH FIRE ALARM SYSTEM CONTROL MODULE (WIRED TO SAFETY CIRCUIT) WHEN PRODUCTS OF COMBUSTION ARE DETECTED.

2. FILTER STATUS SHALL BE MONITORED BY BMS THROUGH DIFFERENTIAL PRESSURE TRANSMITTER. WHEN DP REACHES SETPOINT, THE BMS SHALL ACTIVATE A DIRTY FILTER ALARM.

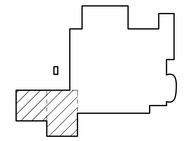
3.

THE FOLLOWING ALARMS SHALL BE SENT TO THE BMS

1. SUPPLY FAN VFD FAULT / FAILURE
2. SUPPLY FAN MOTOR FAILURE
3. HIGH ELECTRICAL ROOM SPACE TEMPERATURE.
4. HIGH FILTER PRESSURE DROP

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants
Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Design Lead	Drawn
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WAYNE STATE UNIVERSITY

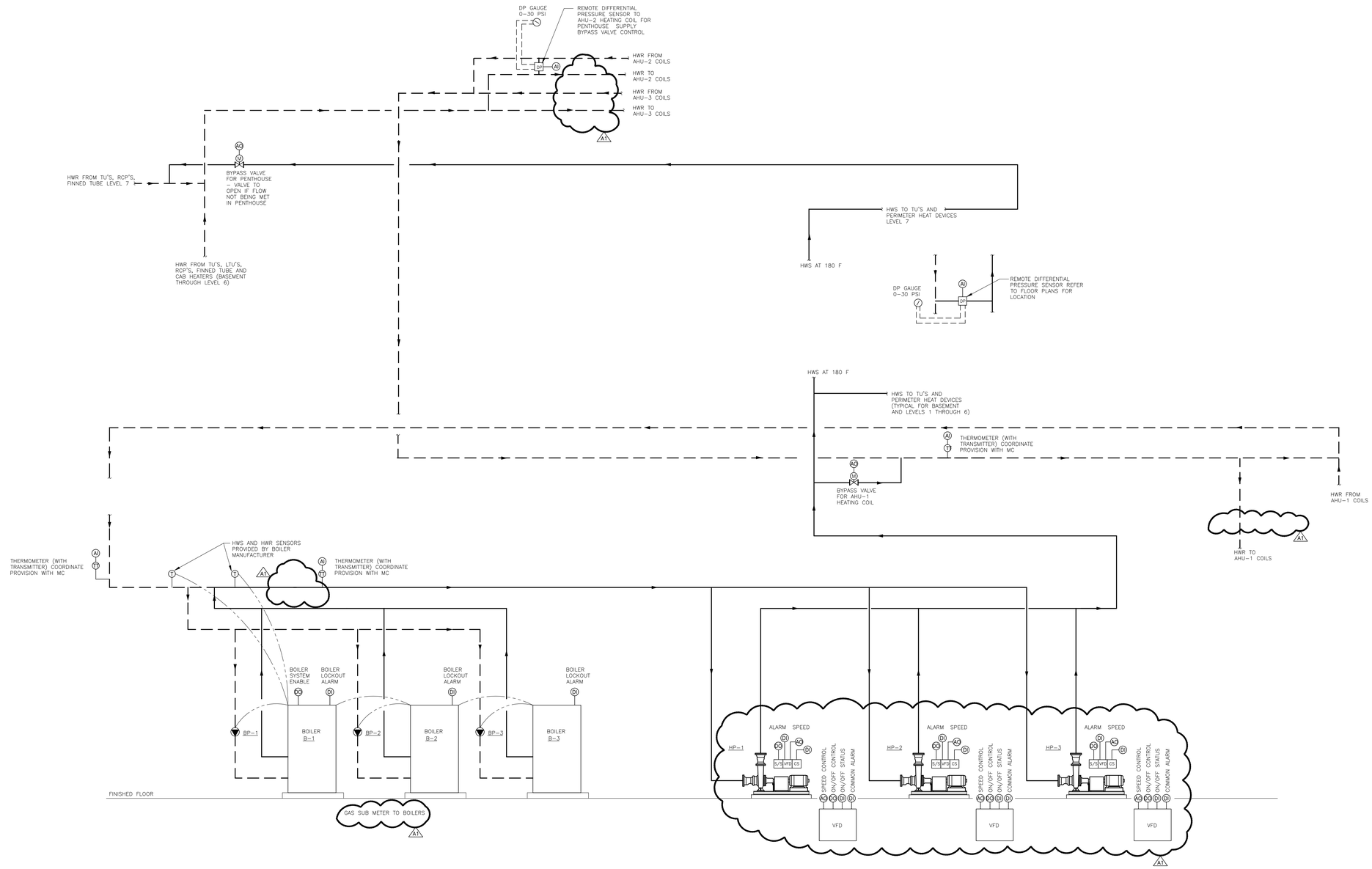
Project
STEM Innovation Learning Center
GULLEN MALL,
DETROIT, MI 48202

Drawing Title
CONTROL SCHEMATICS, AHU-4 & MISCELLANEOUS

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
M50-06



SEQUENCES OF OPERATION

GENERAL

1. THE HEATING HOT WATER SYSTEM, INCLUDING BOILERS AND PUMPS ARE ENABLED TO OPERATE CONTINUOUSLY BY THE BMS. PROVIDE HAND, OFF, AUTO RELAY SWITCH FOR LOCAL OVERRIDE CONTROL OF BOILERS.
2. ONCE ENABLED BY THE BMS, THE SYSTEM PUMPS VARY SPEED BASED ON A REMOTE DIFFERENTIAL PRESSURE SENSOR.
3. ONCE ENABLED BY THE BMS, THE PACKAGED BOILER CONTROLS RESPOND TO THE SYSTEM SUPPLY TEMPERATURE SENSOR TO MODULATE BOILER FIRING RATE AND STAGE ON ADDITIONAL BOILERS TO SATISFY THE SUPPLY WATER TEMPERATURE SETPOINT.
4. THE BMS SYSTEM CALCULATES THE SUPPLY WATER TEMPERATURE SETPOINT BASED OFF AN OUTDOOR AIR RESET SCHEDULE AND TRANSMITS THE TEMPERATURE SETPOINT TO THE PACKAGED BOILER CONTROLS. THE BOILER CONTROLS RESPOND BY MODULATING BOILER FIRING RATE AND BOILER STAGING TO SATISFY THE SETPOINT.
5. ALL SETPOINTS AND TIME DELAY INTERVALS DESCRIBED IN SEQUENCE SHALL BE ADJUSTABLE BY SYSTEM OPERATORS. APPROPRIATE DEADBANDS AND TIME DELAYS SHALL BE USED TO PREVENT SHORT CYCLING.

HEATING HOT WATER SYSTEM CONTROLS

NO SCALE

OPERATIONAL MODES

1. ALL PUMP MOTOR CONTROL SWITCHES AND BOILER ENABLE RELAYS SHALL NORMALLY BE IN THE AUTO POSITION.
2. THE HEATING HOT WATER SYSTEM SHALL BE MANUALLY ENABLED FROM THE BMS TO RUN CONTINUOUSLY. THE SYSTEM HEATING WATER PUMP(S) AND BOILER PUMP(S) SHALL BE PROVEN ON BEFORE BOILERS ARE ENERGIZED.
3. THE BMS SYSTEM CALCULATES THE SUPPLY WATER TEMPERATURE SETPOINT BASED ON AN OUTDOOR AIR RESET SCHEDULE AND TRANSMITS THE TEMPERATURE SETPOINT TO THE PACKAGED BOILER CONTROLS. WHEN OUTDOOR AIR TEMPERATURE IS 20F OR BELOW, SUPPLY WATER TEMPERATURE SETPOINT SHALL BE 180F. WHEN OUTDOOR AIR TEMPERATURE IS 55F OR ABOVE, SUPPLY WATER TEMPERATURE SETPOINT SHALL BE 160F. SUPPLY WATER TEMPERATURE SHALL BE RESET LINEARLY BETWEEN THESE TWO LIMITS.
4. ONCE ENABLED BY THE BMS, THE PACKAGED BOILER CONTROLS RESPOND TO THE SYSTEM SUPPLY TEMPERATURE SENSOR TO MODULATE BOILER FIRING RATE AND STAGE ON ADDITIONAL BOILERS TO SATISFY THE SUPPLY WATER TEMPERATURE SETPOINT.
5. BOILER PUMPS ARE EQUIPPED WITH INTEGRAL VFD AND SPEED IS MODULATED BY A SIGNAL FROM THE PACKAGED BOILER CONTROLS. BOILER PUMP SPEED IS MODULATED TO MAINTAIN A CONSTANT TEMPERATURE DIFFERENCE BETWEEN SUPPLY AND RETURN WATER FROM THE BOILER OVER ITS FULL FIRING RANGE. BOILER PUMP SPEED SHALL BE LIMITED TO A MINIMUM OF 18 HZ OR AS DIRECTED BY PUMP MANUFACTURER (WHICHEVER IS GREATER).
6. IF THE LEAD BOILER IS DOWN FOR SERVICING OR ALARM, LAG BOILER (S) SHALL BE ENERGIZED TO SATISFY SETPOINT. WHEN LEAD BOILER IS BACK IN SERVICE, ORIGINAL SEQUENCE SHALL BE ENABLED.
8. IF MAIN SYSTEM DIFFERENTIAL PRESSURE FALLS BELOW SETPOINT, AND LEAD PUMP HAS RAMPED UP TO FULL SPEED, LAG PUMP SHALL BE ENERGIZED TO RUN IN PARALLEL WITH LEAD PUMP (MATCHING SPEED). PUMP SPEEDS SHALL BE RESET THROUGH THE PUMP(S) VARIABLE FREQUENCY DRIVES TO CONTROL THE SYSTEM DIFFERENTIAL PRESSURE AT SETPOINT.
9. IF AHU-2 COIL DIFFERENTIAL PRESSURE FALLS BELOW SETPOINT, PENTHOUSE BYPASS VALVE AT HWS RISER SHALL OPEN UNTIL SETPOINT IS REACHED.
10. IF THE TEMPERATURE IN THE MAIN RETURN LOOP SERVING AHU-1 FALLS BELOW 150 F AND AHU-1 HEATING COIL CANNOT MAINTAIN REQUIRED SETPOINT, BYPASS VALVE AT AHU-1 SHALL OPEN UNTIL HC-1 LAT IS MET.
11. LAG PUMP SHALL BE DE-ENERGIZED WHEN LEAD / LAG PUMP SPEEDS DROP BELOW 25 HZ (ADJ.).
12. LEAD / LAG DESIGNATION FOR HP-1 HP-2 AND 3 AND 3 SHALL BE AUTOMATICALLY SWITCHED EVERY MONTH OF OPERATION. THE NEW LEAD PUMP SHALL BE PROVEN ON BEFORE OTHER PUMP IS DE-ENERGIZED.
13. PUMP SPEED SHALL BE LIMITED TO A MINIMUM OF 18 HZ OR AS DIRECTED BY PUMP MANUFACTURER (WHICHEVER IS GREATER).
14. PUMP FAILURE: IF EITHER LEAD, LAG, OR LOW LOAD PUMP FAILS, AN ALARM IS TRANSMITTED THROUGH THE BMS AND THE REMAINING PUMPS SHALL BE AUTOMATICALLY ENERGIZED IN SEQUENCE AND CONTROLLED TO SATISFY THE DIFFERENTIAL PRESSURE SETPOINT.
15. A COMMON ALARM FROM EACH PUMP VFD SHALL BE MONITORED BY BMS.
16. THE BMS SHALL MONITOR BUILDING HEATING WATER LOOP FLOW THROUGH A BTU/FLOW METER AND CALCULATE THE HEATING WATER SYSTEM INSTANTANEOUS AND MONTHLY TOTAL BTU USAGE. BOTH WATER FLOW AND BTU USAGE ARE MONITORED BY THE BMS.

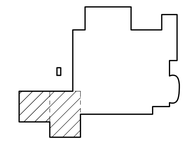
DDC POINTS

THE FOLLOWING POINTS WILL BE MONITORED AND ALARMED ON THE BMS:

A. BOILER SYSTEM ENABLE (DO)
B. HHW SYSTEM SUPPLY WATER TEMPERATURE SETPOINT (DO)
C. BOILER-1 INTEGRATION (BACNET IP)
C. BOILER-2 INTEGRATION (BACNET IP)
C. BOILER-3 INTEGRATION (BACNET IP)
D. SYSTEM PUMP (HP-1) VFD INTEGRATION (FLN)
E. SYSTEM PUMP (HP-1) STATUS (DI)
D. SYSTEM PUMP (HP-2) VFD INTEGRATION (FLN)
E. SYSTEM PUMP (HP-2) STATUS (DI)
D. SYSTEM PUMP (HP-3) VFD INTEGRATION (FLN)
E. SYSTEM PUMP (HP-3) STATUS (DI)
F. HHW SYSTEM SUPPLY TEMPERATURE (AI)
G. HHW SYSTEM RETURN TEMPERATURE (AI)
H. FLOW / BTU METER (S) (AI)
I. SYSTEM DIFFERENTIAL PRESSURE SENSOR (AI)
J. PENTHOUSE BYPASS VALVE STATUS (AI)
K. AHU-1 SUPPLY BYPASS VALVE STATUS (AI)

DATE	ISSUED FOR	REV.
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants
Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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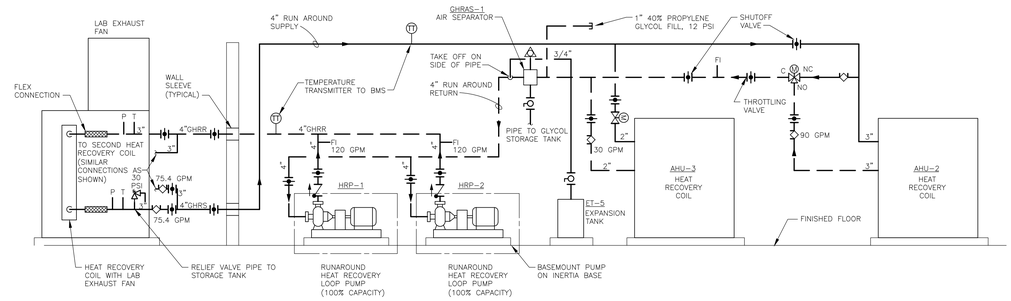
Drawing Title
HEATING SYSTEM CONTROL SCHEMATICS

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
M50-07

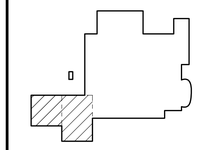


RUN AROUND HEAT RECOVERY SCHEMATIC

NO SCALE

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

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Project

STEM Innovation Learning Center

GULLEN MALL,
DETROIT, MI 48202

Drawing Title

RUNAROUND HEATING SYSTEM CONTROL SCHEMATICS

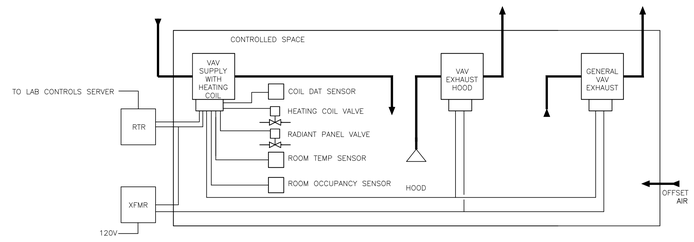
Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

M50-08

9/27/2019 3:39:34 PM



SUPPLY CFM = TOTAL EXHAUST - OFFSET

CONTROL SCHEDULE

ROOM TEMP. F	- F	SET POINT	+ F
	HTG		CLG

MAX
SUPPLY AIR
TOTAL EXH. AIR
REHEAT VLV
MIN
OFFSET

TEMPERATURE SETPOINT SCHEDULE		
OCCUPANCY STATE	HEATING	COOLING
OCCUPIED	70	76
UNOCCUPIED STANDBY	66	78
UNOCCUPIED	60	81

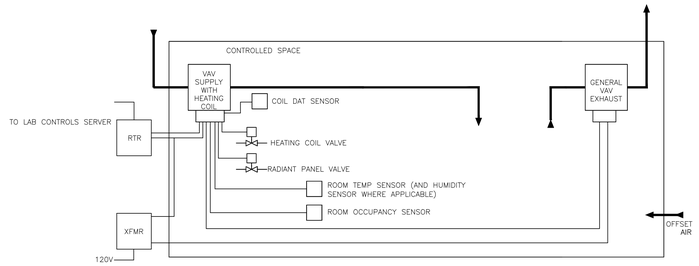
NOTES:
1. TIME OF DAY OCCUPIED / UNOCCUPIED HOURS TO BE DETERMINED BY WSU.
2. SETPOINTS TO BE OCCUPANT ADJUSTABLE BETWEEN SCHEDULED VALUES ABOVE. PROVIDE 2-DEGREE DEADBAND BETWEEN HEATING AND COOLING SETPOINTS.

GENERAL NOTES:

WHERE A LAB ZONE INCLUDES MULTIPLE FUME HOODS, SUPPLY AIR VALVES OR GENERAL EXHAUST AIR VALVES; CONTROL OF LAB ZONE SHALL BE PERFORMED BY A SINGLE LAB ZONE CONTROLLER TO MAINTAIN LABORATORY CONDITIONS IN THAT ZONE AS DESCRIBED IN SEQUENCES OF OPERATION (BELOW). INCREASE / DECREASE OF AIRFLOW AT EACH SUPPLY AIR VALVE OR GENERAL EXHAUST VALVE SHALL BE PROPORTIONAL TO INCREASE / DECREASE OF TOTAL ZONE AIRFLOW:

1. THE ROOM CONTROL SEQUENCE WITH INPUT FROM A SPACE TEMPERATURE SENSOR WILL MODULATE THE VAV SUPPLY TERMINAL UNIT DAMPER(S) AND ASSOCIATED HEATING COIL VALVE(S) IN SEQUENCE TO MAINTAIN THE DESIRED SPACE CONDITION.
2. WHEN THE TOTAL HOOD EXHAUST MEASURED IS LESS THAN OR EQUAL TO THE VAV SUPPLY TERMINAL UNIT(S).
   A. UPON A RISE IN SPACE TEMPERATURE ABOVE THE ROOM'S SETPOINT, THE HEATING COIL VALVE(S) WILL BE CLOSED, THE SUPPLY TERMINAL UNIT DAMPER(S) WILL MODULATE TOWARD THEIR COOLING BASED CFM SETPOINT, AND THE GENERAL EXHAUST TERMINAL UNIT DAMPER WILL MODULATE TO MAINTAIN THE OFFSET.
   B. UPON A FALL IN SPACE TEMPERATURE BELOW THE ROOM'S SETPOINT, THE SUPPLY TERMINAL UNIT DAMPER(S) WILL MODULATE TOWARDS THEIR MINIMUM SETPOINT, THE ASSOCIATED HEATING COIL VALVES WILL MODULATE OPEN, AND THE GENERAL EXHAUST TERMINAL UNIT DAMPER WILL MODULATE TO MAINTAIN THE OFFSET.
3. WHEN THE TOTAL HOOD EXHAUST MEASURED IS GREATER THAN OR EQUAL TO THE MINIMUM AIRFLOW REQUIREMENTS FOR THE LAB, INVOKE THE FOLLOWING:
   A. THE GENERAL EXHAUST TERMINAL UNIT DAMPER WILL BE AT MINIMUM AIRFLOW SETPOINT AND THE SUPPLY TERMINAL UNIT SETPOINT WILL TRACK THE TOTAL ROOM EXHAUST (SUPPLY SETPOINT = TOTAL EXHAUST VOLUME – OFFSET). UPON A RISE IN SPACE TEMPERATURE ABOVE THE ROOM'S SETPOINT, THE HEATING COIL VALVE(S) WILL MODULATE CLOSED. UPON A FALL IN SPACE TEMPERATURE BELOW THE ROOM'S SETPOINT, THE HEATING COIL VALVE(S) WILL MODULATE TOWARDS OPEN.
4. MINIMUM SUPPLY AIRFLOW SETPOINT IS RESET BETWEEN OCCUPIED MINIMUM AND UNOCCUPIED MINIMUM AS INDICATED ON SUPPLY AIR VALVE SCHEDULE. NOTE:
   A. ROOM OCCUPANCY SENOR DETERMINES OCCUPIED / UNOCCUPIED STATE.
      OR
   B. TIME OF DAY SCHEDULE DETERMINES OCCUPIED / UNOCCUPIED STATE.
5. SPACE HEATING AND COOLING TEMPERATURE SETPOINTS SHALL BE RESET BASED ON ROOM OCCUPANCY SENSOR STATUS AND TIME OF DAY STATUS:
   A. OCCUPIED SETPOINTS SHALL BE USED WHENEVER TIME OF DAY SCHEDULE OR OCCUPANCY SENSOR INDICATE AN OCCUPIED STATE.
   B. UNOCCUPIED SETPOINTS SHALL BE USED WHENEVER BOTH TIME OF DAY SCHEDULE AND OCCUPANCY SENSOR INDICATE AN UNOCCUPIED STATE.
   C. UNOCCUPIED STANDBY SETPOINTS SHALL BE USED WHENEVER TIME OF DAY SCHEDULE IS IN AN OCCUPIED STATE AND OCCUPANCY SENSOR IS IN AN OCCUPIED STATE.
6. SAFETIES:
   A. IF THE EXHAUST SYSTEM IS UNABLE TO HOLD PLENUM STATIC PRESSURE SETPOINT WITH ALL FANS OPERATING AND BYPASS DAMPERS FULLY CLOSED, THE COOLING CONTROL WILL BE DISABLED (SUPPLY AIR TERMINAL UNIT DAMPER POSITIONS WILL RESPOND ONLY TO THE ROOM EXHAUST REQUIREMENTS).
7. MISCELLANEOUS:
   A. RADIANT CEILING PANEL VALVES SHALL MODULATE OPEN IN UNISON WITH REHEAT COIL VALVES UPON A CALL FOR HEATING. ABOVE 50°F OA TEMPERATURE, RADIANT CEILING PANEL VALVES SHALL BE OVERRIDEN CLOSED.)

VAV (VARIABLE AIR VOLUME) WITH HOOD AND GENERAL EXHAUST
ROOM PRESSURE AND TEMPERATURE CONTROL SEQUENCE (CONTROL TYPE 1)
NO SCALE



SUPPLY CFM = TOTAL EXHAUST - OFFSET

CONTROL SCHEDULE

ROOM TEMP. F	- F	SET POINT	+ F
	HTG		CLG

MAX
SUPPLY AIR
TOTAL EXH. AIR
REHEAT VLV
MIN
OFFSET

TEMPERATURE SETPOINT SCHEDULE		
OCCUPANCY STATE	HEATING	COOLING
OCCUPIED	70	76
UNOCCUPIED STANDBY	66	78
UNOCCUPIED	60	81

NOTES:
1. TIME OF DAY OCCUPIED / UNOCCUPIED HOURS TO BE DETERMINED BY WSU.
2. SETPOINTS TO BE OCCUPANT ADJUSTABLE BETWEEN SCHEDULED VALUES ABOVE. PROVIDE 2-DEGREE DEADBAND BETWEEN HEATING AND COOLING SETPOINTS.

1. THE ROOM CONTROL SEQUENCE WITH INPUT FROM A SPACE TEMPERATURE SENSOR AND ROOM OCCUPANCY SENSOR WILL MODULATE THE VAV SUPPLY TERMINAL UNIT DAMPER(S) AND ASSOCIATED HEATING COIL VALVE(S) IN SEQUENCE TO MAINTAIN THE DESIRED SPACE CONDITION.
2. UPON A RISE IN SPACE TEMPERATURE ABOVE THE ROOM'S SETPOINT, THE HEATING COIL VALVE(S) WILL BE CLOSED, THE SUPPLY TERMINAL UNIT DAMPER(S) WILL MODULATE TOWARD THEIR MAXIMUM CFM SETPOINT, AND THE GENERAL EXHAUST TERMINAL UNIT DAMPER WILL MODULATE TO MAINTAIN THE OFFSET.
3. UPON A FALL IN SPACE TEMPERATURE BELOW THE ROOM'S SETPOINT, THE SUPPLY TERMINAL UNIT DAMPER(S) WILL MODULATE TOWARDS THEIR MINIMUM SETPOINT, THE ASSOCIATED HEATING COIL VALVES WILL MODULATE OPEN, AND THE GENERAL EXHAUST TERMINAL UNIT DAMPER WILL MODULATE TO MAINTAIN THE OFFSET.
4. MINIMUM SUPPLY AIRFLOW SETPOINT RESET BETWEEN OCCUPIED MINIMUM AND UNOCCUPIED MINIMUM AS INDICATED ON SUPPLY AIR VALVE SCHEDULE. NOTE:
   A. ROOM OCCUPANCY SENOR DETERMINES OCCUPIED / UNOCCUPIED STATE.
      OR
   B. TIME OF DAY SCHEDULE DETERMINES OCCUPIED / UNOCCUPIED STATE.
5. SPACE HEATING AND COOLING TEMPERATURE SETPOINTS SHALL BE RESET BASED ON ROOM OCCUPANCY SENSOR STATUS AND TIME OF DAY STATUS:
   A. OCCUPIED SETPOINTS SHALL BE USED WHENEVER TIME OF DAY SCHEDULE OR OCCUPANCY SENSOR INDICATE AN OCCUPIED STATE.
   B. UNOCCUPIED SETPOINTS SHALL BE USED WHENEVER BOTH TIME OF DAY SCHEDULE AND OCCUPANCY SENSOR INDICATE AN UNOCCUPIED STATE.
   C. UNOCCUPIED STANDBY SETPOINTS SHALL BE USED WHENEVER TIME OF DAY SCHEDULE IS IN AN OCCUPIED STATE AND OCCUPANCY SENSOR IS IN AN OCCUPIED STATE.
6. SAFETIES:
   A. IF THE EXHAUST SYSTEM IS UNABLE TO HOLD PLENUM STATIC PRESSURE SETPOINT WITH ALL FANS OPERATING AND BYPASS DAMPERS FULLY CLOSED, THE COOLING CONTROL WILL BE DISABLED (THE SUPPLY AIR TERMINAL UNIT DAMPER POSITIONS WILL RESPOND ONLY TO THE ROOM EXHAUST REQUIREMENTS).
7. MISCELLANEOUS:
   A. RADIANT CEILING PANEL VALVES SHALL MODULATE OPEN IN UNISON WITH REHEAT COIL VALVES UPON A CALL FOR HEATING. ABOVE 50°F OA TEMPERATURE, RADIANT CEILING PANEL VALVES SHALL BE OVERRIDEN CLOSED.)

VAV (VARIABLE AIR VOLUME) WITH GENERAL EXHAUST
ROOM PRESSURE AND TEMPERATURE CONTROL SEQUENCE (CONTROL TYPE 2)
NO SCALE

1. WHEN OCCUPANT PRESENCE IS SENSED AT THE FUME HOOD, THE FUME HOOD CONTROLLER MAINTAINS CONSTANT AVERAGE FACE VELOCITY TO A USER DEFINED SETPOINT VALUE 100 FPM (ADJ.)
2. WHEN OCCUPANT PRESENCE IS NOT SENSED AT THE FUME HOOD, THE FUME HOOD CONTROLLER MAINTAINS CONSTANT AVERAGE FACE VELOCITY TO A USER DEFINED SETPOINT VALUE OF 60 FPM (ADJ.)
3. ANY FAULT DETECTED BY PRESENCE SENSOR SHALL RETURN FACE VELOCITY CONTROL FROM SETBACK STATE TO NORMAL STATE (100 FPM).
4. THE FUME HOOD CONTROLLER MONITORS THE PRESENCE SENSOR, SASH POSITION SENSOR AND EXHAUST AIRFLOW SWITCH THROUGH PID CONTROL ALGORITHM. THE CONTROLLER MODULATES THE EXHAUST AIR VALVE TO MAINTAIN THE EXHAUST FLOW SETPOINT. THE OPERATOR DISPLAY PANEL IS CONTINUOUSLY UPDATED WITH THE FACE VELOCITY VALUE AND STATUS (NORMAL, WARNING, OR ALARM).

NORMAL OPERATION:
AS THE SASH POSITION CHANGES, THE CONTROLLER CALCULATES THE REQUIRED EXHAUST FLOW FROM TOTAL OPEN SASH AREA AND FACE VELOCITY SETPOINT. THE CONTROLLER PID OUTPUT MODULATES THE EXHAUST AIR VALVE TO MAINTAIN THE EXHAUST FLOW AT THE REQUIRED SETPOINT. IF THE EXHAUST FLOW SETPOINT IS LESS THAN THE SET MINIMUM FLOW, THE CONTROLLER WILL MODULATE THE EXHAUST AIR VALVE TO MAINTAIN THE MINIMUM FLOW.

EMERGENCY OPERATION:
WHEN THE EMERGENCY PURGE BUTTON ON THE OPERATOR DISPLAY IS PUSHED. THE CONTROLLER IMMEDIATELY OPENS THE EXHAUST DAMPER TO ITS MAXIMUM OPEN POSITION, ACTIVATES THE OPERATOR DISPLAY PANEL EMERGENCY DISPLAY AND ALARM HORN AND ENABLES THE EMERGENCY TIMER. THE DAMPER IS MAINTAINED AT MAXIMUM OPEN POSITION UNTIL THE EMERGENCY TIMER (ADJ.) EXPIRES. AT THE EXPIRATION OF THE USER DEFINED EMERGENCY TIMER, THE CONTROLLER CONTROLS THE EXHAUST DAMPER TO THE EMERGENCY FLOW SETPOINT. WHEN THE EMERGENCY PURGE BUTTON IS PUSHED A SECOND TIME, THE CONTROLLER RETURNS TO NORMAL POSITION.

FUME HOOD CONTROL SEQUENCE

ALARM POINTS:
JAM ALARM – READ ONLY
FLOW ALARM – READ ONLY

FLOW POINTS:
AIR VALVE FLOW COMMAND – READ ONLY
AIR VALVE FLOW FEEDBACK – READ ONLY

HOOD VALVE POINTS:
BROKEN SASH CABLE ALARM – READ ONLY
HOOD EMERGENCY OVERRIDE ALARM – READ ONLY
SASH HEIGHT ALARM – READ ONLY
HOOD FACE VELOCITY – READ ONLY
SASH OPEN (PERCENT) – READ ONLY
PRESENCE MODE (NORMAL / STANDBY) – READ ONLY

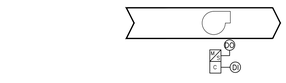
OCCUPANCY CONTROL:
OCCUPANCY COMMAND (OCCUPIED, UNOCCUPIED, STANDBY) – READ / WRITE
OCCUPANCY STATUS (OCCUPIED, UNOCCUPIED, STANDBY) – READ ONLY

EMERGENCY MODE:
EMERGENCY MODE STATE – READ ONLY
COMMANDED EMERGENCY MODE STATE – READ / WRITE

TEMPERATURE CONTROL:
OCCUPIED COOLING SETPOINT – READ / WRITE
OCCUPIED HEATING SETPOINT – READ / WRITE
UNOCCUPIED COOLING SETPOINT – READ / WRITE
UNOCCUPIED HEATING SETPOINT – READ / WRITE
STANDBY COOLING SETPOINT – READ / WRITE
STANDBY HEATING SETPOINT – READ / WRITE
EFFECTIVE TEMPERATURE SETPOINT – READ ONLY
OCCUPIED TEMPERATURE SETPOINT – READ / WRITE
AVERAGE SPACE TEMPERATURE – READ ONLY
OCCUPANT TEMPERATURE ADJUSTMENT ENABLE – READ / WRITE
DISCHARGE TEMPERATURE FROM REHEAT COIL – READ ONLY
TEMPERATURE CONTROL MODE – READ ONLY

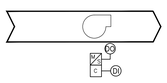
ZONE BALANCE:
OFFSET CFM – READ ONLY
OCCUPIED MINIMUM VENTILATION FLOW SETPOINT – READ / WRITE
UNOCCUPIED MINIMUM VENTILATION FLOW SETPOINT – READ / WRITE
TOTAL ZONE SUPPLY – READ ONLY
TOTAL ZONE EXHAUST – READ ONLY

LAB CONTROLS POINTS (FOR INTEGRATION)



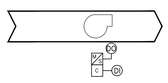
1. ENABLED BY THE DDC SYSTEM TO RUN CONTINUOUSLY.
2. THE BMS SYSTEM, THROUGH A CURRENT SENSOR MONITORS THE FAN STATUS. IF ENABLED AND THE CURRENT SENSOR DOES NOT PROVE OPERATION, AFTER AN ADJUSTABLE TIME:
   A. A LOCAL AUDIBLE AND VISUAL ALARM, OUTSIDE CHEMICAL STORAGE / WILL NOTIFY OCCUPANTS OF FAN FAILURE
   B. AN ALARM WILL BE SENT THROUGH BMS
3. ASSOCIATED CONTROL POINTS:
   A. START STOP (DO)
   B. STATUS (DI)

EXHAUST FAN (EF-6) SCIENCE STORAGE CONTROL SEQUENCE
NO SCALE



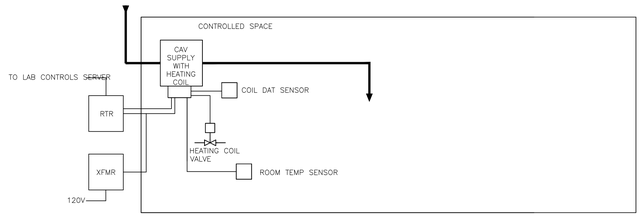
1. ENABLED BY THE DDC SYSTEM TO RUN.
2. THE BMS SYSTEM, THROUGH A CURRENT SENSOR MONITORS THE FAN STATUS. IF ENABLED AND THE CURRENT SENSOR DOES NOT PROVE OPERATION, AFTER AN ADJUSTABLE TIME:
   A. A LOCAL AUDIBLE AND VISUAL ALARM, OUTSIDE PAINT ROOM WILL NOTIFY OCCUPANTS OF FAN FAILURE
   B. AN ALARM WILL BE SENT THROUGH BMS
3. ASSOCIATED CONTROL POINTS:
   A. START STOP (DO)
   B. STATUS (DI)

EXHAUST FAN (EF-4) PAINT FUME HOOD CONTROL SEQUENCE
NO SCALE



1. ENABLED BY THE DDC SYSTEM TO RUN CONTINUOUSLY.
2. THE BMS SYSTEM, THROUGH A CURRENT SENSOR MONITORS THE FAN STATUS. IF ENABLED AND THE CURRENT SENSOR DOES NOT PROVE OPERATION, AFTER AN ADJUSTABLE TIME:
   A. A LOCAL AUDIBLE AND VISUAL ALARM, OUTSIDE WILL NOTIFY OCCUPANTS OF FAN FAILURE
   B. AN ALARM WILL BE SENT THROUGH BMS
3. ASSOCIATED CONTROL POINTS:
   A. START STOP (DO)
   B. STATUS (DI)

EXHAUST FAN (EF-3) 3D PRINTER ROOM CONTROL SEQUENCE
NO SCALE



SUPPLY CFM = CONSTANT

CONTROL SCHEDULE

ROOM TEMP. F	- F	SET POINT	+ F
	HTG		CLG

MAX
SUPPLY AIR
REHEAT VLV
MIN

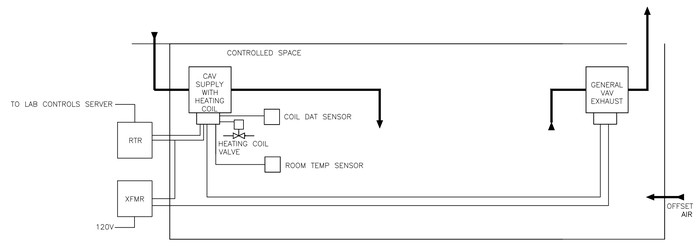
TEMPERATURE SETPOINT SCHEDULE		
OCCUPANCY STATE	HEATING	COOLING
CONTINUOUS OCCUPIED	70	76

GENERAL NOTES:

THIS SEQUENCE APPLIES PRIMARILY TO SUPPLY AIR VALVES SERVING CORRIDORS.

1. SUPPLY AIR VALVE CONTROLS TO A CONSTANT AIRFLOW SETPOINT.
2. IF SPACE TEMPERATURE DROPS BELOW SETPOINT, THE REHEAT COIL CONTROL VALVE MODULATES OPEN TO SATISFY SPACE TEMPERATURE SETPOINT.
3. IF SPACE TEMPERATURE RISES ABOVE SETPOINT, THE REHEAT COIL CONTROL VALVE MODULATES CLOSED TO SATISFY SPACE TEMPERATURE SETPOINT.

CONSTANT VOLUME – SUPPLY
ROOM PRESSURE AND TEMPERATURE CONTROL SEQUENCE (CONTROL TYPE 3)
NO SCALE



SUPPLY CFM = TOTAL EXHAUST - OFFSET

CONTROL SCHEDULE

ROOM TEMP. F	- F	SET POINT	+ F
	HTG		CLG

MAX
SUPPLY AIR
TOTAL EXH. AIR
REHEAT VLV
MIN
OFFSET

TEMPERATURE SETPOINT SCHEDULE		
OCCUPANCY STATE	HEATING	COOLING
OCCUPIED	70	76
UNOCCUPIED	62	80

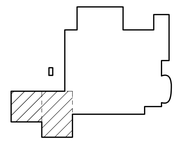
NOTES:
TIME OF DAY OCCUPIED / UNOCCUPIED HOURS TO BE DETERMINED BY WSU.
1. SETPOINTS TO BE OCCUPANT ADJUSTABLE BETWEEN SCHEDULED VALUES ABOVE. PROVIDE 2-DEGREE DEADBAND BETWEEN HEATING AND COOLING SETPOINTS.

1. DURING OCCUPIED HOURS, SUPPLY AIR VALVE AND EXHAUST AIR VALVE CONTROL TO THEIR OCCUPIED AIRFLOW SETPOINTS (CONSTANT) AND MAINTAIN A CONSTANT AIRFLOW OFFSET TO MAINTAIN REQUIRED PRESSURE RELATIONSHIPS WITH ADJACENT SPACES.
2. DURING UNOCCUPIED HOURS, SUPPLY AIR VALVE AND EXHAUST AIR VALVE CONTROL TO THEIR UNOCCUPIED AIRFLOW SETPOINTS (CONSTANT). SEE SUPPLY AIR VALVE SCHEDULE ON FOR AIRFLOW SETPOINTS.
3. OCCUPIED / UNOCCUPIED TIME SCHEDULE TO BE DETERMINED BY OWNER.
4. IF SPACE TEMPERATURE DROPS BELOW SETPOINT, THE REHEAT COIL CONTROL VALVE MODULATES OPEN TO SATISFY SPACE TEMPERATURE SETPOINT.
5. IF SPACE TEMPERATURE RISES ABOVE SETPOINT, THE REHEAT COIL CONTROL VALVE MODULATES CLOSED TO SATISFY SPACE TEMPERATURE SETPOINT.
6. SPACE WITH CONSTANT VOLUME DURING UNOCCUPIED PERIODS ARE; STORAGE AREAS ON LEVELS 2, 3, AND 4 AND CHEMICAL STORAGE IN BASEMENT.

CONSTANT VOLUME – SUPPLY / EXHAUST
ROOM PRESSURE AND TEMPERATURE CONTROL SEQUENCE (CONTROL TYPE 4)
NO SCALE

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants
Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead:	Drawn: J. Bates
Project Leader: J. SMITH	Checked: -

WAYNE STATE UNIVERSITY

Project
STEM Innovation Learning Center
GULLEN MALL,
DETROIT, MI 48202

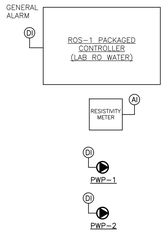
Drawing Title
LAB SPACE CONTROL SCHEMATICS

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
M50-09

File Path



REVERSE OSMOSIS PACKAGED CONTROLLER IS FURNISHED BY RO SYSTEM MANUFACTURER AND CONTROLS ALL FUNCTIONS OF THE RO SYSTEM. A GENERAL ALARM FROM EACH RO PACKAGED CONTROLLER IS TRANSMITTED THROUGH BMS.

THE BMS MONITORS THE FINAL QUALITY (RESISTIVITY) OF LAB RO WATER.

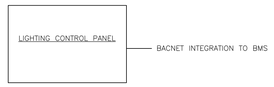
DISTRIBUTION PUMP STATUS MONITORS GENERATE A SIGNAL UPON FAILURE OF DISTRIBUTION PUMPS. THE PUMP STATUS MONITORS ARE PROVIDED BY RO/DI SYSTEM MANUFACTURER. THE BMS MONITORS EACH DISTRIBUTION PUMP FOR FAILURE ALARM.

REVERSE OSMOSIS WATER SYSTEM CONTROL DIAGRAM
NO SCALE

THE BMS MONITORS AIR COMPRESSOR CONTROL PANEL FOR A GENERAL SYSTEM ALARM.

AIR COMPRESSOR CONTROL DIAGRAM
NO SCALE

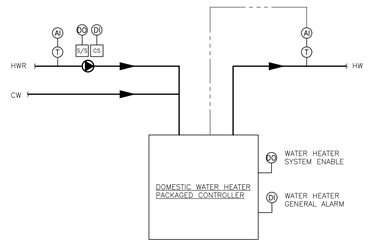
EXISTING LAB COMPRESSORS ARE NOT INCLUDED IN NEW TEMPERATURE CONTROLS



TIME OF DAY SCHEDULING FOR LIGHTING CONTROL ZONES SHALL BE PERFORMED THROUGH BMS SYSTEM.

BMS SYSTEM SHALL MONITOR OCCUPANCY SENSOR STATUS FOR ALL ZONES (WHERE TERMINAL UNIT ZONE CONTROLS OR LABORATORY ZONE CONTROLS REQUIRE OCCUPANCY SENSOR INPUT TO FULFILL THEIR SEQUENCE OF OPERATION). OCCUPANCY SENSORS SHALL BE HARDWIRED TO TERMINAL UNIT CONTROLLERS OR LAB CONTROLLERS)

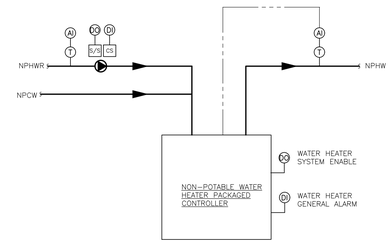
LIGHTING CONTROLS DIAGRAM
NO SCALE



1. THE DOMESTIC WATER HEATING SYSTEM, INCLUDING WATER HEATER AND PUMPS ARE ENABLED TO OPERATE CONTINUOUSLY BY THE BMS. PROVIDE HAND, OFF, AUTO RELAY SWITCH FOR LOCAL OVERRIDE CONTROL OF WATER HEATERS.
2. BMS SHALL TIE INTO ALARM CONTACTS FOR THE WATER HEATER TO PROVIDE FEEDBACK TO THE BMS WHEN WATER HEATER IS LOCKED OUT OR POWER IS TURNED OFF.
3. ONCE ENABLED BY THE BMS, THE PACKAGED WATER HEATER CONTROLS (PROVIDED BY WATER HEATER MANUFACTURER) RESPOND TO THE STORAGE TANK TEMPERATURE SENSOR TO MODULATE FIRING RATE AND STAGE ON ADDITIONAL WATER HEATERS TO SATISFY THE STORAGE TANK TEMPERATURE SETPOINT.
4. THE DOMESTIC HOT WATER RE-CIRCULATION PUMP OPERATION IS CONTROLLED BY THE BMS. THE PUMP SHALL CYCLE ON WHEN HOT WATER RETURN TEMPERATURE DROPS BELOW SETPOINT OF 130°F (ADJ.). THE PUMP SHALL CYCLE OFF WHEN HOT WATER RETURN TEMPERATURE RISES ABOVE SETPOINT OF 135°F (ADJ.).
5. DDC POINTS (QTY. 1 EACH UNLESS NOTED OTHERWISE):

   RE-CIRCULATING PUMP START/STOP (DO)
   RE-CIRCULATION PUMP STATUS (DI)
   RETURN WATER TEMPERATURE (AI)
   HWS TEMP (HIGH TEMP ALARM) (AI)
   WATER HEATER SYSTEM ENABLE (DO)
   WATER HEATER GENERAL ALARM (EACH) (DI)

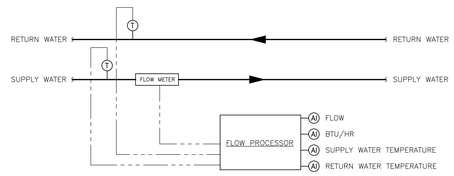
DOMESTIC WATER HEATER CONTROL DIAGRAM
NO SCALE



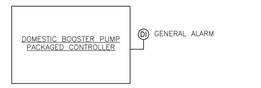
1. THE NON-POTABLE WATER HEATING SYSTEM, INCLUDING WATER HEATER AND PUMPS ARE ENABLED TO OPERATE CONTINUOUSLY BY THE BMS. PROVIDE HAND, OFF, AUTO RELAY SWITCH FOR LOCAL OVERRIDE CONTROL OF WATER HEATER.
2. BMS SHALL TIE INTO ALARM CONTACTS FOR THE WATER HEATER TO PROVIDE FEEDBACK TO THE BMS WHEN WATER HEATER IS LOCKED OUT OR POWER IS TURNED OFF.
3. ONCE ENABLED BY THE BMS, THE PACKAGED WATER HEATER CONTROLS (PROVIDED BY WATER HEATER MANUFACTURER) RESPOND TO THE STORAGE TANK TEMPERATURE SENSOR TO MODULATE FIRING RATE AND STAGE ON ADDITIONAL WATER HEATERS TO SATISFY THE STORAGE TANK TEMPERATURE SETPOINT.
4. THE NON-POTABLE HOT WATER RE-CIRCULATION PUMP OPERATION IS CONTROLLED BY THE BMS. THE PUMP SHALL CYCLE ON WHEN NON-POTABLE HOT WATER RETURN TEMPERATURE DROPS BELOW SETPOINT OF 130°F (ADJ.). THE PUMP SHALL CYCLE OFF WHEN HOT WATER RETURN TEMPERATURE RISES ABOVE SETPOINT OF 135°F (ADJ.).
5. DDC POINTS (QTY. 1 EACH UNLESS NOTED OTHERWISE):

   RE-CIRCULATING PUMP START/STOP (DO)
   RE-CIRCULATION PUMP STATUS (DI)
   RETURN WATER TEMPERATURE (AI)
   HW TEMP (HIGH TEMP ALARM) (AI)
   WATER HEATER SYSTEM ENABLE (DO)
   WATER HEATER GENERAL ALARM (EACH) (DI)

NON-POTABLE WATER HEATER CONTROL DIAGRAM
NO SCALE

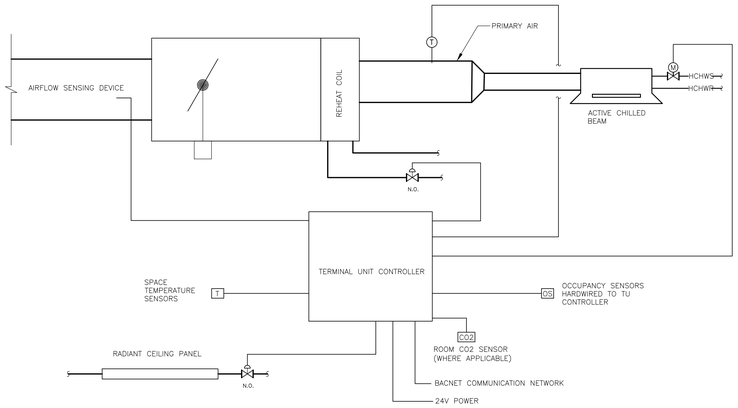


BTU/FLOW METER CONTROL DIAGRAM
NO SCALE



BMS SYSTEM SHALL MONITOR DOMESTIC WATER BOOSTER PUMP PACKAGED CONTROLLER FOR GENERAL ALARM STATUS.

DOMESTIC WATER BOOSTER PUMP CONTROL DIAGRAM
NO SCALE



2-PIPE ACTIVE CHILLED BEAM WITH TERMINAL UNIT AND RADIANT CEILING PANEL

NOTES:

A. THE SPACE OCCUPANCY SENSOR IS FURNISHED AND MOUNTED BY THE ELECTRICAL CONTRACTOR. THE CONTROL WIRING BETWEEN THE TERMINAL BOX CONTROLLER AND THE OCCUPANCY SENSOR SHALL BE BY THE TEMPERATURE CONTROL CONTRACTOR.

B. THE TERMINAL BOX CONTROLLER, DAMPER ACTUATOR AND AIR FLOW PROBE ARE PROVIDED BY THE TEMPERATURE CONTROL CONTRACTOR. THESE DEVICES SHALL BE SHIPPED TO THE MANUFACTURER. ALL OTHER FIELD MOUNTED CONTROL DEVICES ARE FURNISHED, MOUNTED AND WIRED BY THE TEMPERATURE CONTROL CONTRACTOR.

SEQUENCE OF OPERATION:

A. THE OPERATING MODE OF THE TERMINAL BOX AND CHILLED BEAM SHALL BE AUTOMATICALLY CYCLED FROM THE OCCUPIED MODE TO THE UNOCCUPIED MODE OF OPERATION BASED ON A TIME CLOCK SCHEDULE AND THE SPACE MOUNTED OCCUPANCY SENSOR.
B. IN THE OCCUPIED MODE OF OPERATION (SCHEDULED OCCUPIED AND SPACE SENSOR OCCUPIED): THE SPACE TEMPERATURE SENSOR SHALL RESET THE TERMINAL BOX VOLUME CONTROLLER FROM MINIMUM DESIGN FLOW TO MAXIMUM DESIGN FLOW TO MAINTAIN THE PRIMARY AIRFLOW TO THE CHILLED BEAM. IF SPACE SETPOINT IN COOLING IS STILL NOT MET, CHILLED BEAM CONTROL VALVE SHALL MODULATE TO MAINTAIN SPACE SET POINT. IF THE SPACE TEMPERATURE FALLS BELOW THE HEATING SETPOINT, THE TERMINAL BOX SHALL MAINTAIN THE MINIMUM DESIGN FLOW TO THE SPACE AND CONTROL THE TERMINAL BOX REHEAT COIL AND RADIANT CEILING PANEL VALVES IN UNISON TO MAINTAIN SPACE TEMPERATURE SETPOINT. CHILLED WATER VALVE SHALL BE CLOSED. WHEN THE SPACE TEMPERATURE IS BETWEEN THE HEATING AND COOLING SETPOINTS, THE TERMINAL UNIT SHALL MAINTAIN MINIMUM DESIGN FLOW TO THE SPACE AND THE REHEAT COIL AND CHILLED WATER VALVE AND RADIANT CEILING PANEL CONTROL VALVES SHALL BE FULLY CLOSED.
C. FOR ZONES WITH SPACE CO2 SENSOR, THE SPACE CO2 SENSOR SHALL OVERRIDE THE NORMAL OPERATION OF THE TERMINAL UNIT. IF THE SPACE CO2 LEVEL EXCEEDS 800 PPM, THE AIRFLOW RATE TO THE SPACE SHALL BE RESET UPWARDS TO CONTROL THE SPACE CO2. THE FLOW RATE SHALL BE RESET FROM MINIMUM FLOW TO MAXIMUM DESIGN FLOW AS THE SPACE CO2 LEVEL RISES FROM 800 PPM TO 900 PPM.
D. IN THE UNOCCUPIED MODE OF OPERATION (SCHEDULED OCCUPIED AND SPACE SENSOR UNOCCUPIED): THE TERMINAL BOX AND CHILLED BEAM SHALL CONTROL THE SAME AS IN SCHEDULED OCCUPIED AND SPACE SENSOR OCCUPIED, BUT SHALL CONTROL TO STANDBY SPACE TEMPERATURE SETPOINTS AND MINIMUM AIRFLOW SETPOINT SHALL BE RESET TO STANDBY MINIMUM (AS SCHEDULED).
E. IF THE TERMINAL UNIT TIME CLOCK SCHEDULE IS UNOCCUPIED, THE TERMINAL BOX VOLUME DAMPER SHALL BE CLOSED AN THE REHEAT COIL CONTROL VALVE SHALL BE CLOSED. THE RADIANT CEILING PANEL SHALL BE MODULATED TO CONTROL TO UNOCCUPIED SPACE TEMPERATURE SETPOINT.
F. IF THE AIR HANDLING UNIT THAT SERVES THE TERMINAL BOX IS NOT OPERATING, THE TERMINAL UNIT DAMPER SHALL BE FULLY CLOSED AND THE REHEAT COIL SHALL BE FULLY CLOSED AND CHILLED WATER VALVE SHALL BE CLOSED. THE RADIANT CEILING PANELS ARE USED TO HEAT THE BUILDING. THE RADIANT CEILING PANEL SHALL BE MODULATED TO CONTROL TO UNOCCUPIED SPACE TEMPERATURE SETPOINT.
G. THE NORMAL OPERATION OF THE RADIANT CEILING PANEL CONTROL VALVE SHALL BE OVERRIDDEN ON OUTSIDE AIR TEMPERATURE. THE VALVE SHALL BE FULLY CLOSED WHEN THE OUTSIDE AIR TEMPERATURE EXCEEDS 55F.
H. IF THE AIR HANDLING UNIT SYSTEM THAT SERVES THE TERMINAL UNIT IS ENERGIZED IN THE UNIT'S UNOCCUPIED MODE OF OPERATION, THE TERMINAL UNIT AND CHILLED BEAM SHALL CONTROL THE SAME AS IN SCHEDULED OCCUPIED AND SPACE SENSOR OCCUPIED, BUT SHALL CONTROL TO UNOCCUPIED SPACE TEMPERATURE SETPOINTS AND MINIMUM AIRFLOW SETPOINT SHALL BE RESET TO STANDBY MINIMUM (AS SCHEDULED).
H. IF THE AIR HANDLING UNIT SYSTEM THAT SERVES THE TERMINAL UNIT IS ENERGIZED IN THE UNIT'S OPTIMIZED START MODE OF OPERATION, THE TERMINAL UNIT AND CHILLED BEAM SHALL CONTROL TO OCCUPIED SPACE TEMPERATURE SETPOINTS AND AIRFLOW SETPOINTS.
I. ASSOCIATED CONTROL POINTS

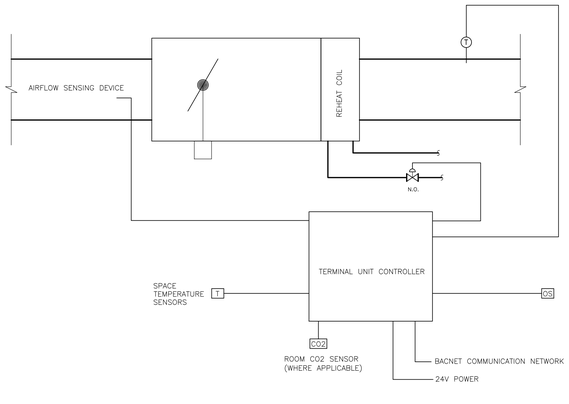
   A. SPACE TEMPERATURE SENSOR
   B. TERMINAL UNIT CONTROLLER
   C. OCCUPANCY SENSOR
   D. AIR FLOW SENSOR
   E. DISCHARGE AIR SENSOR
   F. HEATING COIL VALVE WITH ACTUATOR
   G. RADIANT CEILING PANEL VALVE WITH ACTUATOR
   H. DAMPER ACTUATOR
   I. CO2 SENSOR HIGH DENSITY SPACES
   J. CHILLED WATER VALVE

TEMPERATURE SETPOINT SCHEDULE

OCCUPANCY STATE	HEATING	COOLING
OCCUPIED	70	76
UNOCCUPIED STANDBY	66	78
UNOCCUPIED	60	81

NOTES:
1. TIME OF DAY OCCUPIED / UNOCCUPIED HOURS TO BE DETERMINED
2. SETPOINTS TO BE OCCUPANT ADJUSTABLE BETWEEN SCHEDULED VALUES ABOVE. PROVIDE 2-DEGREE DEADBAND BETWEEN HEATING AND COOLING SETPOINTS.

2-PIPE ACTIVE CHILLED BEAM WITH TU AND RCP
NO SCALE



TERMINAL UNITS WITH HEATING COILS

NOTES:

A. THE SPACE OCCUPANCY SENSOR IS FURNISHED AND MOUNTED BY THE ELECTRICAL CONTRACTOR. THE CONTROL WIRING BETWEEN THE TERMINAL BOX CONTROLLER AND THE OCCUPANCY SENSOR SHALL BE BY THE TEMPERATURE CONTROL CONTRACTOR.

B. THE TERMINAL BOX CONTROLLER, DAMPER ACTUATOR AND AIR FLOW PROBE ARE PROVIDED BY THE TEMPERATURE CONTROL CONTRACTOR. THESE DEVICES SHALL BE SHIPPED TO THE MANUFACTURER. ALL OTHER FIELD MOUNTED CONTROL DEVICES ARE FURNISHED, MOUNTED AN WIRED BY THE TEMPERATURE CONTROL CONTRACTOR.

SEQUENCE OF OPERATION:

A. THE OPERATING MODE OF THE TERMINAL BOX SHALL BE AUTOMATICALLY CYCLED FROM THE OCCUPIED MODE TO THE UNOCCUPIED MODE OF OPERATION BASED ON A TIME CLOCK SCHEDULE AND THE SPACE MOUNTED OCCUPANCY SENSOR.
B. IN THE OCCUPIED MODE OF OPERATION (SCHEDULED OCCUPIED AND SPACE SENSOR OCCUPIED): THE SPACE TEMPERATURE SENSOR SHALL RESET THE TERMINAL BOX VOLUME CONTROLLER FROM MINIMUM DESIGN FLOW TO MAXIMUM DESIGN FLOW TO MAINTAIN THE SPACE AT THE COOLING SETPOINT. IF THE SPACE TEMPERATURE FALLS BELOW THE HEATING SETPOINT, THE TERMINAL BOX SHALL MAINTAIN THE MINIMUM DESIGN FLOW TO THE SPACE AND CONTROL THE TERMINAL BOX REHEAT COIL TO MAINTAIN SPACE TEMPERATURE SETPOINT. WHEN THE SPACE TEMPERATURE IS BETWEEN THE HEATING AND COOLING SETPOINTS, THE TERMINAL UNIT SHALL MAINTAIN MINIMUM DESIGN FLOW TO THE SPACE AND THE REHEAT COIL CONTROL VALVE SHALL BE FULLY CLOSED.
C. FOR ZONES WITH SPACE CO2 SENSOR, THE SPACE CO2 SENSOR SHALL OVERRIDE THE NORMAL OPERATION OF THE TERMINAL UNIT. IF THE SPACE CO2 LEVEL EXCEEDS 800 PPM, THE AIRFLOW RATE TO THE SPACE SHALL BE RESET UPWARDS TO CONTROL THE SPACE CO2. THE FLOW RATE SHALL BE RESET FROM MINIMUM FLOW TO MAXIMUM DESIGN FLOW AS THE SPACE CO2 LEVEL RISES FROM 800 PPM TO 900 PPM.
D. IN THE UNOCCUPIED MODE OF OPERATION (SCHEDULED OCCUPIED AND SPACE SENSOR UNOCCUPIED): THE TERMINAL BOX SHALL CONTROL THE SAME AS IN SCHEDULED OCCUPIED AND SPACE SENSOR OCCUPIED, BUT SHALL CONTROL TO STANDBY SPACE TEMPERATURE SETPOINTS AND MINIMUM AIRFLOW SETPOINT SHALL BE RESET TO STANDBY MINIMUM (AS SCHEDULED).
E. IF THE TERMINAL UNIT TIME CLOCK SCHEDULE IS UNOCCUPIED, THE TERMINAL BOX VOLUME DAMPER SHALL BE CLOSED AN THE REHEAT COIL CONTROL VALVE SHALL BE CLOSED.
F. IF THE AIR HANDLING UNIT THAT SERVES THE TERMINAL BOX IS NOT OPERATING, THE TERMINAL UNIT DAMPER SHALL BE FULLY CLOSED AND THE REHEAT COIL SHALL BE FULLY CLOSED.
G. IF THE AIR HANDLING UNIT SYSTEM THAT SERVES THE TERMINAL UNIT IS ENERGIZED IN THE UNIT'S UNOCCUPIED MODE OF OPERATION, THE TERMINAL UNIT SHALL CONTROL THE SAME AS IN SCHEDULED OCCUPIED AND SPACE SENSOR OCCUPIED, BUT SHALL CONTROL TO UNOCCUPIED SPACE TEMPERATURE SETPOINTS AND MINIMUM AIRFLOW SETPOINT SHALL BE RESET TO STANDBY MINIMUM (AS SCHEDULED).
H. IF THE AIR HANDLING UNIT SYSTEM THAT SERVES THE TERMINAL UNIT IS ENERGIZED IN THE UNIT'S OPTIMIZED START MODE OF OPERATION, THE TERMINAL UNIT SHALL CONTROL TO OCCUPIED SPACE TEMPERATURE SETPOINTS AND AIRFLOW SETPOINTS.
I. ASSOCIATED CONTROL POINTS

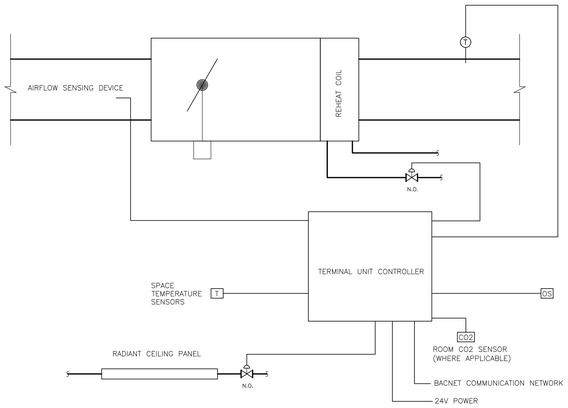
   A. SPACE TEMPERATURE SENSOR
   B. TERMINAL UNIT CONTROLLER
   C. OCCUPANCY SENSOR
   D. AIR FLOW SENSOR
   E. DISCHARGE AIR SENSOR
   F. HEATING COIL VALVE WITH ACTUATOR
   G. DAMPER ACTUATOR
   H. CO2 SENSOR (CLASSROOMS AND LARGE CONFERENCE ROOM ONLY)

TEMPERATURE SETPOINT SCHEDULE

OCCUPANCY STATE	HEATING	COOLING
OCCUPIED	70	76
UNOCCUPIED STANDBY	66	78
UNOCCUPIED	60	81

NOTES:
1. TIME OF DAY OCCUPIED / UNOCCUPIED HOURS TO BE DETERMINED
2. SETPOINTS TO BE OCCUPANT ADJUSTABLE BETWEEN SCHEDULED VALUES ABOVE. PROVIDE 2-DEGREE DEADBAND BETWEEN HEATING AND COOLING SETPOINTS.

TERMINAL BOX WITH REHEAT COIL
NO SCALE



TERMINAL UNITS WITH HEATING COILS

NOTES:

A. THE SPACE OCCUPANCY SENSOR IS FURNISHED AND MOUNTED BY THE ELECTRICAL CONTRACTOR. THE CONTROL WIRING BETWEEN THE TERMINAL BOX CONTROLLER AND THE OCCUPANCY SENSOR SHALL BE BY THE TEMPERATURE CONTROL CONTRACTOR.

B. THE TERMINAL BOX CONTROLLER, DAMPER ACTUATOR AND AIR FLOW PROBE ARE PROVIDED BY THE TEMPERATURE CONTROL CONTRACTOR. THESE DEVICES SHALL BE SHIPPED TO THE MANUFACTURER. ALL OTHER FIELD MOUNTED CONTROL DEVICES ARE FURNISHED, MOUNTED AND WIRED BY THE TEMPERATURE CONTROL CONTRACTOR.

SEQUENCE OF OPERATION:

A. THE OPERATING MODE OF THE TERMINAL BOX SHALL BE AUTOMATICALLY CYCLED FROM THE OCCUPIED MODE TO THE UNOCCUPIED MODE OF OPERATION BASED ON A TIME CLOCK SCHEDULE AND THE SPACE MOUNTED OCCUPANCY SENSOR.
B. IN THE OCCUPIED MODE OF OPERATION (SCHEDULED OCCUPIED AND SPACE SENSOR OCCUPIED): THE SPACE TEMPERATURE SENSOR SHALL RESET THE TERMINAL BOX VOLUME CONTROLLER FROM MINIMUM DESIGN FLOW TO MAXIMUM DESIGN FLOW TO MAINTAIN THE SPACE AT THE COOLING SETPOINT. IF THE SPACE TEMPERATURE FALLS BELOW THE HEATING SETPOINT, THE TERMINAL BOX SHALL MAINTAIN THE MINIMUM DESIGN FLOW TO THE SPACE AND CONTROL THE TERMINAL BOX REHEAT COIL AND RADIANT CEILING PANEL VALVES IN UNISON TO MAINTAIN SPACE TEMPERATURE SETPOINT. WHEN THE SPACE TEMPERATURE IS BETWEEN THE HEATING AND COOLING SETPOINTS, THE TERMINAL UNIT SHALL MAINTAIN MINIMUM DESIGN FLOW TO THE SPACE AND THE REHEAT COIL AND RADIANT CEILING PANEL CONTROL VALVES SHALL BE FULLY CLOSED.
C. FOR ZONES WITH SPACE CO2 SENSOR, THE SPACE CO2 SENSOR SHALL OVERRIDE THE NORMAL OPERATION OF THE TERMINAL UNIT. IF THE SPACE CO2 LEVEL EXCEEDS 800 PPM, THE AIRFLOW RATE TO THE SPACE SHALL BE RESET UPWARDS TO CONTROL THE SPACE CO2. THE FLOW RATE SHALL BE RESET FROM MINIMUM FLOW TO MAXIMUM DESIGN FLOW AS THE SPACE CO2 LEVEL RISES FROM 800 PPM TO 900 PPM.
D. IN THE UNOCCUPIED MODE OF OPERATION (SCHEDULED OCCUPIED AND SPACE SENSOR UNOCCUPIED): THE TERMINAL BOX SHALL CONTROL THE SAME AS IN SCHEDULED OCCUPIED AND SPACE SENSOR OCCUPIED, BUT SHALL CONTROL TO STANDBY SPACE TEMPERATURE SETPOINTS AND MINIMUM AIRFLOW SETPOINT SHALL BE RESET TO STANDBY MINIMUM (AS SCHEDULED).
E. IF THE TERMINAL UNIT TIME CLOCK SCHEDULE IS UNOCCUPIED, THE TERMINAL BOX VOLUME DAMPER SHALL BE CLOSED AN THE REHEAT COIL CONTROL VALVE SHALL BE CLOSED. THE RADIANT CEILING PANEL SHALL BE MODULATED TO CONTROL TO UNOCCUPIED SPACE TEMPERATURE SETPOINT.
F. IF THE AIR HANDLING UNIT THAT SERVES THE TERMINAL BOX IS NOT OPERATING, THE TERMINAL UNIT DAMPER SHALL BE FULLY CLOSED AND THE REHEAT COIL SHALL BE FULLY CLOSED. THE RADIANT CEILING PANELS ARE USED TO HEAT THE BUILDING. THE RADIANT CEILING PANEL SHALL BE MODULATED TO CONTROL TO UNOCCUPIED SPACE TEMPERATURE SETPOINT.
G. THE NORMAL OPERATION OF THE RADIANT CEILING PANEL CONTROL VALVE SHALL BE OVERRIDDEN ON OUTSIDE AIR TEMPERATURE. THE VALVE SHALL BE FULLY CLOSED WHEN THE OUTSIDE AIR TEMPERATURE EXCEEDS 55F.
H. IF THE AIR HANDLING UNIT SYSTEM THAT SERVES THE TERMINAL UNIT IS ENERGIZED IN THE UNIT'S UNOCCUPIED MODE OF OPERATION, THE TERMINAL UNIT SHALL CONTROL THE SAME AS IN SCHEDULED OCCUPIED AND SPACE SENSOR OCCUPIED, BUT SHALL CONTROL TO UNOCCUPIED SPACE TEMPERATURE SETPOINTS AND MINIMUM AIRFLOW SETPOINT SHALL BE RESET TO STANDBY MINIMUM (AS SCHEDULED).
H. IF THE AIR HANDLING UNIT SYSTEM THAT SERVES THE TERMINAL UNIT IS ENERGIZED IN THE UNIT'S OPTIMIZED START MODE OF OPERATION, THE TERMINAL UNIT SHALL CONTROL TO OCCUPIED SPACE TEMPERATURE SETPOINTS AND AIRFLOW SETPOINTS.
I. ASSOCIATED CONTROL POINTS

   A. SPACE TEMPERATURE SENSOR
   B. TERMINAL UNIT CONTROLLER
   C. OCCUPANCY SENSOR
   D. AIR FLOW SENSOR
   E. DISCHARGE AIR SENSOR
   F. HEATING COIL VALVE WITH ACTUATOR
   G. RADIANT CEILING PANEL VALVE WITH ACTUATOR
   H. DAMPER ACTUATOR
   I. CO2 SENSOR (CLASSROOMS AND LARGE CONFERENCE ROOM ONLY)

TEMPERATURE SETPOINT SCHEDULE

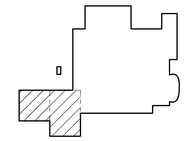
OCCUPANCY STATE	HEATING	COOLING
OCCUPIED	70	76
UNOCCUPIED STANDBY	66	78
UNOCCUPIED	60	81

NOTES:
1. TIME OF DAY OCCUPIED / UNOCCUPIED HOURS TO BE DETERMINED
2. SETPOINTS TO BE OCCUPANT ADJUSTABLE BETWEEN SCHEDULED VALUES ABOVE. PROVIDE 2-DEGREE DEADBAND BETWEEN HEATING AND COOLING SETPOINTS.

TERMINAL BOX WITH REHEAT COIL AND RADIANT PANEL
NO SCALE

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants
Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

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Drawing Title
MISCELLANEOUS CONTROL SCHEMATICS

Scale	1/8" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	M50-10

File Path:

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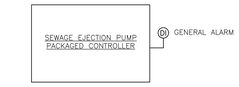
METER INTERFACE FOR LEED

1. BMS SHALL INTERFACE WITH VARIOUS METERS FOR LEED SUB METERING REQUIREMENTS. THE METERS SHALL INCLUDE; (2) GAS METERS, (2) WATER METERS AND ONE BTU/FLOW METER.

2. BMS SHALL TRACK THE FOLLOWING
   A. METERS SHALL RECORD AT INTERVALS OF ONE HOUR OR LESS AND TRANSMIT DATA TO A REMOTE LOCATION.
   B. THE SYSTEM MUST BE CAPABLE OF STORING ALL METER DATA FOR AT LEAST 36 MONTHS.
   C. THE DATA MUST BE REMOTELY ACCESSIBLE.
   D. METERS ARE CAPABLE OF REPORTING HOURLY, DAILY, MONTHLY AND ANNUAL ENERGY USE.

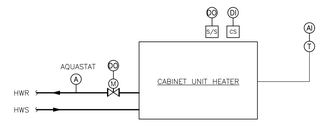
3. BMS SHALL INTERFACE WITH ELECTRICAL METERS AS A REMOTE DEVICE. ALL RECORDING AND DATA GATHERING WILL BE AT ELECTRICAL METER.

B1



BMS SYSTEM SHALL MONITOR THE SEWAGE EJECTION PUMP PACKAGED CONTROLLER FOR GENERAL ALARM STATUS.

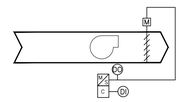
SEWAGE EJECTION PUMP CONTROL DIAGRAM
NO SCALE



CABINET UNIT HEATERS SHALL INTERFACE WITH BUILDING MANAGEMENT SYSTEM

A SPACE TEMPERATURE SENSOR WILL OPEN THE TWO POSITION CONTROL VALVE AND COMMAND THE SUPPLY FAN ON UPON A CALL FOR HEAT WHEN OUTSIDE AIR IS 45F OR BELOW. MAXIMUM SETPOINT SHALL BE 60F. AN AQUASTAT SHALL ALLOW SUPPLY FAN TO ENERGIZE WHEN HOT WATER IS PRESENT (110°F ADJ.) AND THERE IS A CALL FOR HEAT.
DDC POINTS
THE FOLLOWING POINTS WILL BE MONITORED AND ALARMED ON THE BMS:
A. SPACE TEMPERATURE SENSOR (AI)
B. SUPPLY FAN START / STOP (DO)
C. SUPPLY FAN STATUS CURRENT SENSOR (DI)
D. HEATING COIL VALVE WITH ACTUATOR OUTPUT (DO)

CABINET UNIT HEATERS



ENABLED BY THE DDC SYSTEM WITH AN ADJUSTABLE OCCUPIED / UNOCCUPIED SCHEDULE. THE SCHEDULE SHALL BE SAME AS ASSOCIATED AHU-1 OCCUPIED / UNOCCUPIED SCHEDULE.

MOTORIZED DAMPER OPENS WHEN THE FAN STARTS AND CLOSES WHEN THE FAN STOPS. THE DDC SYSTEM, THROUGH A CURRENT SENSOR MONITORS THE FAN STATUS. IF ENABLED AND THE CURRENT SENSOR DOES NOT PROVE OPERATION, AFTER AN ADJUSTABLE TIME, AN ALARM WILL BE SENT THROUGH BMS.

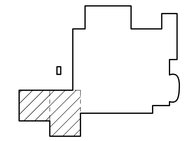
ASSOCIATED CONTROL POINTS:
A. START STOP (DO)
B. STATUS (DI)

EF-1 (TOILET EXHAUST AND EF-5 (STEAM ROOM EXHAUST)

GENERAL EXHAUST FANS
SCALE

DATE	ISSUED FOR	REV.
12/21/2018	100% CD PACKAGE	3
03/15/2019	BULLETIN NO. 1	5
05/06/2019	TEST AND BALANCE BID	

Key Plan



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Drawing Title
MISCELLANEOUS CONTROL SCHEMATICS

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
M50-11

File Path

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BOILER SCHEDULE

ID TAG	LOCATION	MFG	MODEL	MIN INPUT MBH	MAX INPUT MBH	HEATING		GAS PRESSURE		ELECTRICAL			NOTES
						EWT (F)	LWT (F)	MIN (IN WC)	MAX (IN WC)	VOLTAGE	PHASE		
B-1	SUB-BASEMENT	LOCHINVAR	FBN3500	3220	3500	140	180	4	14	208	3		1,2
B-2	SUB-BASEMENT	LOCHINVAR	FBN3500	3220	3500	140	180	4	14	208	3		1,2
B-3	SUB-BASEMENT	LOCHINVAR	FBN3500	3220	3500	140	180	4	14	208	3		1

NOTES:
1. WITH INTEGRAL PUMP AND BMS GATEWAY. EACH BOILER IS 50% OF THE CAPACITY FOR N+1 REDUNDANCY.
2. CONNECTED TO EMERGENCY GENERATOR SYSTEM.

BLOWER COIL SCHEDULE

ID TAG	LOCATION	Manufacturer	MODEL	CFM	COOLING COIL								ESP (IN WC)	MOTOR HP	ELECTRICAL		NOTES
					EAT (F DB)	EAT (F WB)	SENSIBLE CAPACITY (MBH)	TOTAL CAPACITY (MBH)	EWT (F)	LWT (F)	GPM	WPD (FT H20)			VOLTAGE	PHASE	
BC-1	SUB BASEMENT MECHANICAL ROOM	YORK	AMI-H12	5800	75	63	133.9	168.5	44	54	33.5	4.36	1	7.5	480	3	1

NOTES:
1. PROVIDE WITH VFD.

AIR HANDLING UNIT SUPPLY SECTION SCHEDULE

ID TAG	LOCATION	SERVICE AREA	MFG	MODEL	CFM	FACE VELOCITY (FPM)	MIN O.A. CFM	TSP (IN WC)	ESP (IN WC)	MOTOR HP	MAX MOTOR BHP	VOLTAGE	PHASE	DRIVE TYPE	MAX WEIGHT (LBS)	NOTES
AHU-1	SUB-BASEMENT MECHANICAL ROOM	BASEMENT & FIRST FLOOR	YORK	SOLUTION XT 75 x 135	23000 CFM	398	10900	7.33	2.7	(8) 7.5	(8) 5.45	480	3	DIRECT	12883	1,4,6,7,8
AHU-2	PENTHOUSE	SECOND, THIRD, & FOURTH FLOOR, WET LABS 5TH FLOOR + IT AND ELEC ON ALL FLOORS	YORK	SOLUTION XT 114 x 138	44000 CFM	491	35500	6.66	3.1	(6) 25	(6) 12.5	480	3	DIRECT	16466	2,3,5,7,8
AHU-3	PENTHOUSE	FIFTH, SIXTH, & SEVENTH FLOOR	YORK	SOLUTION XT 90 x 96	14000 CFM	300	6400	4.56	2.5	(4) 7.5	(4) 4.19	480	3	DIRECT	10655	2,3,7,8

NOTES:
1. ENERGY RECOVERY UNIT WITH EXHAUST FAN.
2. RUN AROUND HEAT RECOVERY COIL WITH LAB EXHAUST HEAT RECOVERY.
3. UNIT HAS 4 PLENUM SUPPLY FANS IN A 2X3 ARRANGEMENT WITH ONE VFD PER ROW.
4. UNIT HAS 8 PLENUM SUPPLY FANS IN A 2X4 ARRANGEMENT WITH ONE VFD PER ROW.
5. UNIT CONNECTED TO EMERGENCY GENERATOR SYSTEM.
6. AIR HANDLING UNIT TO BE BROKEN DOWN INTO SEGMENTS IN LIEU OF SHIPPING SPLITS FOR INSTALLATION.
7. PROVIDE WITH 8" BASE RAIL.
8. FUSED DISCONNECT AND VFD BY AHU MANUFACTURER.

AIR HANDLING UNIT RETURN SECTION SCHEDULE

ID TAG	LOCATION	SERVICE AREA	MFG	MODEL	FACE VELOCITY (FPM)	CFM	TSP (IN WC)	ESP (IN WC)	MOTOR HP	MAX MOTOR BHP	VOLTAGE	PHASE	DRIVE TYPE	MAX WEIGHT (LBS)	NOTES
AHU-1 RETURN	SUB BASEMENT MECHANICAL ROOM	BASEMENT, FIRST	YORK	SOLUTION XT 75 x 135	413	23000 CFM	3.01	0.9	(8) 5	(8) 2.27	480	3	DIRECT	9060	1,2,6
AHU-2 RETURN (RF-2)	PENTHOUSE	SECOND, THIRD, & FOURTH FLOOR, WET LABS 5TH FLOOR + IT AND ELEC ALL FLOORS	YORK	SOLUTION XT 48 x 81	600	8500 CFM	2.04	1	(2) 5	(2) 2.27	480	3	DIRECT	2500	3,4,6
AHU-3 RETURN (RF-3)	PENTHOUSE	FIFTH, SIXTH, & SEVENTH FLOOR	YORK	SOLUTION XT 72 x 72	600	12400 CFM	2.07	1	(4) 3	(4) 1.75	480	3	DIRECT	3200	5,6

NOTES:
1. ENERGY RECOVERY UNIT WITH EXHAUST FAN IS PART OF ONE UNIT.
2. FANS IN A 2H x 4W ARRAY. PROVIDE ONE VFD PER ROW.
3. UNIT CONNECTED TO EMERGENCY GENERATOR SYSTEM.
4. RETURN FAN SECTION IS SEPARATE FROM SUPPLY UNIT. FANS IN A 1H x 2W ARRAY. PROVIDE 1 VFD PER FAN.
5. RETURN FAN SECTION IS SEPARATE FROM SUPPLY UNIT. FANS IN A 2H x 2W ARRAY. PROVIDE 1 VFD PER ROW.
6. FUSED DISCONNECT AND VFD BY AHU MANUFACTURER.

ENERGY RECOVERY WHEEL SCHEDULE

ID TAG	LOCATION	MFG	MODEL	SUPPLY CFM	EXHAUST CFM	OUTDOOR CFM	APD SUPPLY	APD EXHAUST	SUMMER COOLING MODE										WINTER HEATING MODE										MATERIAL	MOTOR HP	ELECTRICAL		NOTES
									OA DB (F)	OA WB (F)	SA DB (F)	SA WB (F)	RA DB (F)	RA WB (F)	EA DB (F)	EA WB (F)	SENSIBLE EFFECTIVENESS	LATENT EFFECTIVENESS	NET EFFECTIVENESS	OA DB (F)	OA WB (F)	SA DB (F)	SA WB (F)	RA DB (F)	RA WB (F)	EA DB (F)	EA WB (F)	SENSIBLE EFFECTIVENESS	LATENT EFFECTIVENESS	NET EFFECTIVENESS			VOLTAGE	PHASE	
ER-AHU1	AHU-1	AIRXCHANGE	ERC-5874C	23000	6540	9701	0.98	0.67	95	75	85.44	69.46	76	62.5	--	--	74.85	69.63	71.94	0	-1	32.43	28.49	70	53	--	--	75.66	70.4	74.02	SILICA GEL	0.25	480	3	

AIR HANDLING UNIT COOLING COIL SCHEDULE

ID TAG	AHU	LOCATION	CFM	FACE VELOCITY (FPM)	COIL APD (IN WC)	EAT (F DB)	EAT (F WB)	EWT (F)	LWT (F)	TUBE DIA (IN)	FIN SPACING (FPI)	FLOW (GPM)	LAT (F DB)	LAT (F WB)	NUMBER OF ROWS	SENSIBLE MBH	TOTAL MBH	WPD (FT H20)	NOTES
CC-1	AHU-1	SUB-BASEMENT MECHANICAL ROOM	23000 CFM	398	1.13	85.5	68.7	45	61	1/2"	12	85.1	47.9	47.8	12	453	681.3	19.7	1
CC-2	AHU-2	PENTHOUSE	44000 CFM	491	1.68	91.5	72.7	45	59	1/2"	12	459.2	48	47.9	12	1991	3208	23.4	
CC-3	AHU-3	PENTHOUSE	14000 CFM	300	0.45	85.2	68.5	45	56.9	1/2"	10	137	47.9	47.8	10	547	821	14.6	

NOTES:
1. THERE ARE (2) COOLING COILS IN UNIT WITH PERFORMANCE NOTED.

AIR HANDLING UNIT HEATING COIL SCHEDULE

ID TAG	AHU	LOCATION	CFM	EAT (F DB)	LAT (F DB)	GPM	EWT (F)	LWT (F)	HEATING TOTAL MBH	NO. ROWS	TUBE DIA (IN)	FINS/IN	MAX FACE VELOCITY (FPM)	MAX APD (IN WC)	MAX WPD (FT HD)	NOTES
HC-1	AHU-1	SUB-BASEMENT MECHANICAL ROOM	23000 CFM	36	69.2	43.9	150	109.9	862.3	1	0.500	12	414	0.05	2.7	
TC-1	AHU-1	SUB BASEMENT MECHANICAL ROOM	23000 CFM	50	68.3	12	150	110	230.9	1	0.500	8	398	0.03	0.9	2
HC-2	AHU-2	PENTHOUSE	44000 CFM	7	57.4	182	155	128.3	2408.3	3	0.625	11	690	0.58	1.07	1
TC-2	AHU-2	PENTHOUSE	44000 CFM	49	58.8	15	150	85.6	473	1	0.500	8	491	0.04	0.2	
HC-3	AHU-3	PENTHOUSE	14000 CFM	31	67.0	80	150	134	650	2	0.500	12	594	0.24	3.25	1
TC-3	AHU-3	PENTHOUSE	14000 CFM	49	64.2	10	150	102.3	234	1	0.500	8	300	0.02	0.1	

NOTES:
1. VERTICAL INTEGRAL FACE AND BYPASS COIL, BASED ON WING.
2. THERE ARE (2) TEMPERING COILS IN UNIT WITH PERFORMANCE NOTED.

FAN SCHEDULE

ID TAG	LOCATION	SERVICE	MFG	MODEL	FAN TYPE	CFM	TSP (IN WC)	ESP (IN WC)	WHEEL		SOUND SONES	DBA	MOTOR HP	MAX MOTOR BHP	FAN RPM	ELECTRICAL		MOTOR CONTROLLER			MAX WEIGHT (LBS)	NOTES
									MATERIAL	TYPE						VOLTAGE	PHASE	MOTOR STARTER	DISCONNECT SWITCH	VFD		
EF-1	SUB-BASEMENT	TOILET EXHAUST	GREENHECK	EQB-20-30	INLINE	6000	2.00	2.00	ALUMINUM	CENTRIFUGAL	19.2	70	3	2.21	1725	480	3	VFD BY MFR	MFR	YES	350	1
EF-2	7TH FLOOR ROOF	LAB EXHAUST	STROBIC	TS1L150B18	STROBIC	(5) 8506	5.50	4.50	ALUMINUM	CENTRIFUGAL	--	75	(5) 15	(5) 13.42	1725	480	3	VFD BY MFR	MFR	YES	20800	2,3,4,6,7
EF-3	FIRST FLOOR ROOF	3D PRINTER EXHAUST	GREENHECK	CUE-131-VG	CENTRIFUGAL	2000	0.75	0.75	ALUMINUM	CENTRIFUGAL	16.8	68	0.75	0.48	1649	120	1		MFR	NO	100	8
EF-4	FIRST FLOOR ROOF	PAINT BOOTH FUME HOOD EXHAUST	STROBIC	BS00212	STROBIC	870	1.20	1.20	ALUMINUM	CENTRIFUGAL	--	66	(2) 1.00	(2) 0.56	1200	480	3	VFD BY MFR	MFR	YES	1500	5,6,7
EF-5	FIRST FLOOR ROOF	STEAM/PRINT ROOM EXHAUST	GREENHECK	CUE-090-VG	CENTRIFUGAL	500	0.75	0.75	ALUMINUM	CENTRIFUGAL	7.5	54	0.10	0.09	1561	120	1		MFR	NO	100	8
EF-6	FIRST FLOOR ROOF	SCIENCE STORAGE EXHAUST	STROBIC	BS00218-5	STROBIC	950	1.00	1.00	ALUMINUM	CENTRIFUGAL	--	66	(2) 3.00	(2) 2.12	1500	460	3	VFD BY MFR	MFR	YES	1500	5,6,7

NOTES:
1. PREMIUM EFFICIENCY MOTOR.
2. TRISTACK STROBIC EXHAUST FAN WITH HEAT RECOVERY.
3. 5 FANS TOTAL, 1x5 ARRANGEMENT, N+1 REDUNDANCY.
4. CONNECTED TO EMERGENCY GENERATOR SYSTEM.
5. 2 FANS TOTAL, 1x2 ARRANGEMENT, N+1 REDUNDANCY.
6. SCHEDULED DATA IS SINGLE FAN PERFORMANCE.
7. PROVIDE WITH SOUND ATTENTUATION PACKAGE.
8. ECM MOTOR.

PUMP SCHEDULE

ID TAG	LOCATION	SERVICE	MANUFACTURER	MODEL	TYPE	FLOW (GPM)	TDH (FT)	MINIMUM NOZZLE		MAX RPM	MOTOR HP	MOTOR BHP	VOLTAGE	PHASE	AMPS	MOTOR CONTROLLER		NOTES
								SUCTION (IN)	DISCHARGE (IN)							VFD	DISCONNECT	
BP-1	SUB BASEMENT MECHANICAL ROOM	BOILER PUMP - B-1	PROVIDED WITH BOILER	PUM20078	INLINE	161	2.2	0	0	1750	0	0	115	1	5.6			1,2
BP-2	SUB BASEMENT MECHANICAL ROOM	BOILER PUMP - B-2	PROVIDED WITH BOILER	PUM20078	INLINE	161	2.2	0	0	1750	0	0	115	1	5.6			1,2
BP-3	SUB BASEMENT MECHANICAL ROOM	BOILER PUMP - B-3	PROVIDED WITH BOILER	PUM20078	INLINE	161	2.2	0	0	1750	0	0	115	1	5.6			1,2
CBCHWP-1	SUB BASEMENT MECHANICAL ROOM	CHILLED BEAM (100%)	BELL & GOSSETT	1510 - 4EB	ES	450	70	5	4	1750	15	10.4	480	3		E	E	5
CBCHWP-2	SUB BASEMENT MECHANICAL ROOM	CHILLED BEAM (100%)	BELL & GOSSETT	1510 - 4EB	ES	450	70	5	4	1750	15	10.4	480	3		E	E	5
CHWP-4	SUB BASEMENT MECHANICAL ROOM	CHILLED WATER PUMP (ADDED TO CHEMISTRY PLANT)	BELL & GOSSETT	VSX - VSC 10x12x13.5A	DS	3200	135	12	10	1750	200	152	480	3		E	E	
CP-1	SUB BASEMENT MECHANICAL ROOM	HEATING COIL PUMP - AHU-1	BELL & GOSSETT	ECOCIRC XL 65-130	INLINE	44	20	1.5	1.5	2097	1	0.472	480	3			EC	4
CP-2	PENTHOUSE	HEATING COIL PUMP - AHU-2	BELL & GOSSETT	ECOCIRC XL 40-275	INLINE	182	20	3	3	2668	2	1.56	208	1			EC	4
CP-3	PENTHOUSE	HEATING COIL PUMP - AHU-3	BELL & GOSSETT	ECOCIRC XL 65-130	INLINE	44	20	1.5	1.5	2067	1	0.452	480	3			EC	4
GCHWP-1	SUB BASEMENT MECHANICAL ROOM	AIR COOLED CHILLER GLYCOL LOOP PUMP (100%)	BELL & GOSSETT	1510 - 1.5BC	ES	91	70	2	1.5	1750	5	3.03	480	3		E	E	3
GCHWP-2	SUB BASEMENT MECHANICAL ROOM	AIR COOLED CHILLER GLYCOL LOOP PUMP (100%)	BELL & GOSSETT	1510 - 1.5BC	ES	91	70	2	1.5	1750	5	3.03	480	3		E	E	3
HP-1	SUB BASEMENT MECHANICAL ROOM	HEATING SYSTEM PUMP (50%)	BELL & GOSSETT	1510 - 2EB	ES	200	90	3	2	1750	10	6.33	480	3		E	E	1
HP-2	SUB BASEMENT MECHANICAL ROOM	HEATING SYSTEM PUMP (50%)	BELL & GOSSETT	1510 - 2EB	ES	200	90	3	2	1750	10	6.33	480	3		E	E	
HP-3	SUB BASEMENT MECHANICAL ROOM	HEATING SYSTEM PUMP (50%)	BELL & GOSSETT	1510 - 2EB	ES	200	90	3	2	1750	10	6.33	480	3		E	E	1
HP-4	SUB BASEMENT MECHANICAL ROOM	HEATING SYSTEM SIDESTREAM FILTER PUMP	BELL & GOSSETT	ECOCIRC XL 65-130	INLINE	50	20	1.5	1.5	2149	1	0.508	480	3			EC	4
HRP-1	PENTHOUSE	RUNAROUND LOOP HEAT RECOVERY PUMP (100%)	BELL & GOSSETT	1510 - 2BD	ES	120	65	2.5	2	1750	5	3.18	480	3		E	E	3
HRP-2	PENTHOUSE	RUNAROUND LOOP HEAT RECOVERY PUMP (100%)	BELL & GOSSETT	1510 - 2BD	ES	120	65	2.5	2	1750	5	3.18	480	3		E	E	3
TCP-1	SUB BASEMENT MECHANICAL ROOM	TEMPERING COIL PUMP - AHU-1	BELL & GOSSETT	ECOCIRC XL 55-45	INLINE	24	15	1.5	1.5	2902	0.5	0.231	208	1			EC	4
TCP-2	PENTHOUSE	TEMPERING COIL PUMP - AHU-2	BELL & GOSSETT	ECOCIRC XL 36-45	INLINE	15	15	1.25	1.25	2963	0.167	0.155	115	1			EC	1,4
TCP-3	PENTHOUSE	TEMPERING COIL PUMP - AHU-3	BELL & GOSSETT	ECOCIRC XL 36-45	INLINE	10	15	1.25	1.25	2963	0.167	0.147	115	1			EC	4

NOTES:
1. PUMP CONNECTED TO EMERGENCY GENERATOR SYSTEM.
2. ECM MOTOR, HP IS FRACTIONAL.
3. 40% PROPYLENE GLYCOL.
4. ECM MOTOR.
5. 60 GPM MIN FLOW RATE.

E EQUIPMENT SUPPLIER
EC ELECTRICAL CONTRACTOR

HEAT RECOVERY COILS

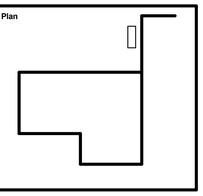
TAG	EQUIPMENT	LOCATION	CFM	FLUID TYPE	NO. ROWS	TUBE DIA (IN)	FIN STYLE	FINS/IN	SUMMER PERFORMANCE											WINTER PERFORMANCE									NOTES
									EAT (F DB)	EAT (F WB)	LAT (F DB)	LAT (F WB)	EWT (F)	LWT (F)	GPM	COOLING BTU/HR	APD (IN WC)	FACE VELOCITY (FPM)	WPD (FT HD)	EAT (F DB)	LAT (F DB)	EWT (F)	LWT (F)	GPM	HEATING BTU/HR	FACE VELOCITY (FPM)	APD (IN WC)	WPD (FT HD)	
HRC-1	EF-2	PENTHOUSE ROOF	34000 CFM	40% PROPYLENE GLYCOL	6	0.63	CORRUGATED	12	75	62	81.5	62	85.8	81.5	120	239305	0.53	514.5	6.12	72	53	32.9	43	150.7	692021	514.5	0.51	10.27	
RHRC-2	AHU-2	PENTHOUSE	44000 CFM	40% PROPYLENE GLYCOL	4	0.50	CORRUGATED	12	95	75	89.6	73.54	81.5	87.81	90	264200	0.3	491	2.6	3	11	43	32.5	90	432200	491	0.37	8.2	
RHRC-3	AHU-3	PENTHOUSE	14000 CFM	40% PROPYLENE GLYCOL	4	0.50	CORRUGATED	12	95	75	90.99	73.92	81.5	86.85	25	62200	0.14	300	0.4	3	14	43	30	25	179600	300	0.17	2.2	

BUFFER TANK SCHEDULE

TAG	MANUFACTURER	SERVICE	MODEL	LOCATION	TANK VOLUME (GAL)	DIAMETER (IN)	HEIGHT (IN)	NOTES
GCHWB-1	CEMLINE	GLYCOL CHILLED WATER LOOP	V120CWB	SUB-BASEMENT MECHANICAL ROOM	120	24	60	

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants
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Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
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Drawing Title
SCHEDULES

Scale

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
M60-01

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SOUND POWER RATINGS (DB)

ID TAG	LOCATION	SERVICE	POINT OF MEASUREMENT	OCTAVE BAND (HZ)								NOTES
				63	125	250	500	1000	2000	4000	8000	
AC-1	GRADE	SUPPLEMENTAL COOLING	DISCHARGE	95	91	93	88	84	82	78	74	1,2
AHU-1	SUB-BASEMENT MECHANICAL ROOM	BASEMENT & FIRST FLOOR	DUCTED DISCHARGE	94	96	95	98	95	92	89	93	
AHU-1 RETURN	SUB BASEMENT MECHANICAL ROOM	BASEMENT, FIRST	RETURN AIR INLET	91	90	95	89	87	84	79	76	
AHU-2	PENTHOUSE	SECOND, THIRD, & FOURTH FLOOR, WET LABS 5TH FLOOR + IT AND ELEC ON ALL FLOORS	DUCTED DISCHARGE	95	97	100	101	96	91	88	88	
AHU-2 RETURN (RF-2)	PENTHOUSE	SECOND, THIRD, & FOURTH FLOOR, WET LABS 5TH FLOOR + IT AND ELEC ALL FLOORS	RETURN AIR INLET	83	80	83	86	82	83	80	70	
AHU-3	PENTHOUSE	FIFTH, SIXTH, & SEVENTH FLOOR	DUCTED DISCHARGE	89	91	94	91	88	85	82	82	
AHU-3 RETURN (RF-3)	PENTHOUSE	FIFTH, SIXTH, & SEVENTH FLOOR	RETURN AIR INLET	86	83	85	90	87	87	84	74	
BC-1	SUB BASEMENT MECHANICAL ROOM	BASEMENT ELECTRICAL ROOM	DUCTED DISCHARGE	91	88	87	87	94	77	68	64	
EF-2	7TH FLOOR ROOF	LAB EXHAUST	DISCHARGE	99	94	96	95	96	92	86	79	3
EF-3	FIRST FLOOR ROOF	3D PRINTER EXHAUST	INLET	80	79	85	77	69	69	65	62	
EF-4	FIRST FLOOR ROOF	PAINT BOOTH FUME HOOD EXHAUST	DISCHARGE	66	75	80	80	78	77	71	62	3
EF-5	FIRST FLOOR ROOF	STEAM/PRINT ROOM EXHAUST	INLET	76	73	69	62	58	55	51	44	
EF-6	FIRST FLOOR ROOF	SCIENCE STORAGE EXHAUST	DISCHARGE	75	79	78	75	72	71	70	65	3

NOTES:
1. UNIT IS EQUIPPED WITH ACOUSTIC SOUND BLANKET AND ULTRA QUIET FANS.
2. MEASUREMENTS ARE SOUND POWER LEVELS.
3. PROVIDE WITH SOUND ATTENTUATION PACKAGE TO MEET SCHEDULED VALUES.

REGISTER, GRILLE AND DIFFUSER SCHEDULE

ID TAG	MFG	MODEL	NECK SIZE (IN)	FACE SIZE (IN)	MAX NC	THROW PATTERN	MATERIAL	FINISH	MOUNTING	DAMPER (Y/N)	NOTES
E-1	TITUS	23RL	10 x 6	10 x 6	30	-	STEEL	MILL	DUCT/SURFACE	No	1
E-2	TITUS	23RL	12 x 8	12 x 8	30	-	STEEL	MILL	DUCT/SURFACE	No	1
E-4	TITUS	23RL	24 x 12	24 x 12	30	-	STEEL	MILL	DUCT/SURFACE	No	1
E-5	TITUS	23RL	36 x 14	36 x 14	30	-	STEEL	MILL	DUCT/SURFACE	No	1
R-1	TITUS	23RL	10 x 6	10 x 6	30	-	STEEL	MILL	DUCT/SURFACE	No	1
R-2	TITUS	23RL	12 x 8	12 x 8	30	-	STEEL	MILL	DUCT/SURFACE	No	1
R-3	TITUS	23RL	22 x 10	22 x 10	30	-	STEEL	MILL	DUCT/SURFACE	No	1
R-4	TITUS	23RL	24 x 12	24 x 12	30	-	STEEL	MILL	DUCT/SURFACE	No	1
R-5	TITUS	23RL	36 x 14	36 x 14	30	-	STEEL	MILL	DUCT/SURFACE	No	1
R-6	TITUS	23RL	24 x 12	24 x 12	30	-	STEEL	WHITE	LAY-IN	No	
R-8	TITUS	23RL	12 x 12	12 x 12	30	-	STEEL	WHITE	SURFACE	No	
R-9	TITUS	23RL	42 x 12	42 x 12	30	DOUBLE DEFLECTION	STEEL	MILL/WHITE	DUCT/SURFACE	Yes	
S-1	TITUS	TLF	7	12 x 48	37	LAMINAR FLOW	STEEL	MILL	DUCT	No	
S-2	TITUS	TLF	12	24 x 48	37	LAMINAR FLOW	STEEL	MILL	DUCT	No	
S-3	TITUS	TLF	7	24 x 24	37	LAMINAR FLOW	STEEL	MILL	DUCT	No	
S-4	TITUS	JFA-L	12 x 6	12 x 6	30	DOUBLE DEFLECTION	STEEL	MILL/WHITE	DUCT/SURFACE	Yes	
S-5	TITUS	JFA-L	18 x 6	18 x 6	30	DOUBLE DEFLECTION	STEEL	MILL/WHITE	DUCT/SURFACE	Yes	
S-6	TITUS	JFA-L	16 x 8	16 x 8	30	DOUBLE DEFLECTION	STEEL	MILL/WHITE	DUCT/SURFACE	Yes	
S-7	TITUS	JFA-L	18 x 10	18 x 10	30	DOUBLE DEFLECTION	STEEL	MILL/WHITE	DUCT/SURFACE	Yes	
S-8	TITUS	TBD-30	8	4 FT, (1) 1" SLOTS	30	HORIZONTAL	STEEL	WHITE	LAY-IN	No	
S-9	TITUS	TBD-30	6	4 FT, (2) 1" SLOTS	30	HORIZONTAL	STEEL	WHITE	LAY-IN	No	
S-11	TITUS	TBD-30	10	4 FT, (3) 1" SLOTS	30	HORIZONTAL	STEEL	WHITE	LAY-IN	No	
S-14	TITUS	JFA-L	36 x 10	36 x 10	30	DOUBLE DEFLECTION	STEEL	MILL/WHITE	DUCT/SURFACE	Yes	
T-1	TITUS	23RL	10x6	10 x 6	30	-	STEEL	MILL	SURFACE	No	

NOTES:
1. PROVIDE DAMPER FOR NON-ACCESSIBLE CEILINGS.

FINNED TUBE SCHEDULE

ID TAG	LOCATION	MANUFACTURER	MODEL	BTUH / LF	AVG WATER TEMP (F)	LENGTH (FT)	MBH	GPM	NOTES
FT-1	PENTHOUSE	VULCAN	LV3X	740	170	10	11.1	1.1	1
FT-513-A	513	VULCAN	LV3X	740	170	15	11.1	1.1	1
FT-610-A	610	VULCAN	LV3X	740	170	10	7.4	1	1
FT-618-A	618	VULCAN	LV3X	740	170	10	7.4	1	1
FT-718-A	718	VULCAN	LV3X	740	170	9	6.66	1	1

NOTES:
1. MOUNT 8'-0" AFF.

CABINET UNIT HEATER SCHEDULE

ID TAG	LOCATION	MFG	MODEL	SIZE	CFM	MBH	GPM	EWT (F)	LWT (F)	WPD (FT)	MOTOR HP	AMPS (FLA)	VOLTS	PHASE	NOTES
CUH-190.01	01 - NEW VEST 190.01	VULCAN	W-1080	12	1210	120	12	180	160	13.2	1/10	2.8	120	1	2,4
CUH-190.02	01 - STAIR A 190.02	VULCAN	C-1170	2	230	10	2.5	180	160	0.36	1/15	2.2	120	1	3,4
CUH-190.09	01 - STAIR B 190.09	VULCAN	C-1170	8	860	46	8	180	160	3.85	1@1/10, 1@1/15	0.8	120	1	3,4
CUH-190.12	01 - VEST 190.12	VULCAN	RW-1120	10	1060	102	10.18	180	160	8.85	1@1/10, 1@1/15	2.2	120	1	1,4
CUH-190.13	01 - STAIR C 190.13	VULCAN	W-1080	2	225	10	3.5	180	160	0.96	1/15	0.8	120	1	2,4
CUH-390.02	03 - STAIR A 390.02	VULCAN	C-1170	2	230	6	2.5	180	160	0.36	1/15	0.8	120	1	3,4
CUH-390.09	03 - STAIR B 390.09	VULCAN	C-1170	2	230	20	2.5	180	160	0.36	1/15	0.8	120	1	3,4
CUH-590.02	05 - STAIR A 590.02	VULCAN	C-1170	2	230	6	2.5	180	160	0.36	1/15	0.8	120	1	3,4
CUH-590.09	05 - STAIR B 590.09	VULCAN	C-1170	2	230	20	2.5	180	160	0.36	1/15	0.8	120	1	3,4
CUH-790.02	07 - STAIR A 790.02	VULCAN	C-1170	2	230	6	2.5	180	160	0.36	1/15	0.8	120	1	3,4
CUH-790.09	07 - STAIR B 790.09	VULCAN	C-1170	2	230	20	2.5	180	160	0.36	1/15	0.8	120	1	3,4

NOTES:
1. RECESSED WALL INSTALLATION.
2. SURFACE WALL INSTALLATION.
3. SURFACE CEILING INSTALLATION.
4. PROVIDE WITH DISCONNECT.

CHILLED BEAM SCHEDULE

ID TAG	MANUFACTURER	MODEL	LENGTH	2 OR 4 PIPE	PRIMARY AIR						BEAM				MAX NC	NOTES
					CFM	INLET SIZE	INLET LOCATION	SENSIBLE (MBH)	LATENT (MBH)	APD (IN WC)	SENSIBLE MBH	GPM	WPD (FT HD)	LWT (F)		
CB-7	PRICE	ACBL-HE24W-1 WAY THROW	8	2	120	0' - 8"	SIDE	2638	1610	0.62	5744	2.5	5.2	62.7	18	1,2,3
CB-8	PRICE	ACBL-HE24W-1 WAY THROW	8	2	130	0' - 8"	SIDE	2858	1744	0.72	6117	2.5	5.2	63	21	1,2,4
CB-9	PRICE	ACBL-HE24W-1 WAY THROW	8	2	140	0' - 8"	SIDE	3078	1878	0.49	5594	2.5	5.2	62.6	20	1,2,3
CB-10	PRICE	ACBL-HE24W-1 WAY THROW	8	2	150	0' - 8"	SIDE	3298	2012	0.56	5860	2.5	5.2	62.8	22	1,2,3
CB-13	PRICE	ACBL-HE24W-1 WAY THROW	8	2	120	0' - 8"	SIDE	2638	1610	0.6	6117	2.5	5.2	63.2	24	1,2,3
CB-15	PRICE	ACBL-HE24W-1 WAY THROW	8	2	140	0' - 8"	SIDE	3078	1878	0.54	6368	2.5	5.2	63.3	23	1,2,3
CB-16	PRICE	ACBL-HE24W-1 WAY THROW	8	2	150	0' - 8"	SIDE	3298	2012	0.61	6871	2.5	5.2	63.6	25	1,2,3
CB-19	PRICE	ACBL-HE24W-1 WAY THROW	8	2	120	0' - 8"	SIDE	2638	1610	0.6	6414	2.5	5.2	63.2	24	2,3,4

NOTES:
1. PROVIDE WITH WING EXTENSION.
2. PROVIDE WITH DAMPER.
3. PROVIDE WITH PATTERN CONTROLLERS.
4. LAY-IN CEILING INSTALLATION.

AIR COOLED CHILLER SCHEDULE

ID TAG	LOCATION	MFG	MODEL	TONS	EER	ARI NPLV (BTU/W-HR)	EVAPORATOR					ELECTRICAL			MCA	OPERATING WEIGHT (LBS)	NOTES
							GPM	EWT (F)	LWT (F)	MAX PD (FT)	FOUL FACTOR	VOLTAGE	PHASE	AMPS (FLA)			
AC-1	GRADE	YORK	YCAL0052EE46XEBSDTX	45.18	10.16	15.05	91.1	58	45	13.5	0.0001	460	3	108	114	3208	1,2,3

NOTES:
1. 40% PROPYLENE GLYCOL.
2. AMBIENT DESIGN TEMPERATURE FOR CONDENSER IS 95 F.
3. PROVIDE ACOUSTICAL PACKAGE.

AIR SEPARATOR SCHEDULE

ID TAG	MANUFACTURER	MODEL	LOCATION	SERVICE	WPD (FT HEAD)	FLUID VELOCITY (FPS)	PIPE CONNECTION SIZE (IN)	GPM	WEIGHT (LBS)	NOTES
CAS-1	SPIROTHERM	VSR400	SUB-BASEMENT MECHANICAL ROOM	HIGH TEMP CHILLED WATER SUPPLY TO HX-1	0.9	4.03	4	160	107	
GCAS-1	SPIROTHERM	VSR300	SUB-BASEMENT MECHANICAL ROOM	GLYCOL CHILLED WATER TO AC-1	0.8	3.99	3	92	95	
GRHAS-1	SPIROTHERM	VSR400	PENTHOUSE MECHANICAL ROOM	HEAT RECOVERY LOOP	0.4	3	4	120	107	
HAS-1	SPIROTHERM	VSR600	SUB-BASEMENT MECHANICAL ROOM	HEATING WATER	1.5	4.44	6	400	200	

SPLIT SYSTEM SCHEDULE

ID TAG	LOCATION	SERVICE	MANUFACTURER	INDOOR UNIT											OUTDOOR UNIT					REFRIGERANT	NOTES
				MODEL	FAN CFM (LOW-MID-HIGH)	COOLING (BTU/HR)	FAN ESP (IN WC)	POWER CONSUMPTION COOLING (WATTS)	SOUND PRESSURE (DB)	EER	FAN MOTOR FLA (ECM)	ELECTRICAL			MODEL	FAN MOTOR FLA (ECM)	CFM	SOUND PRESSURE (DB)	VOLT-PHASE-HZ		
												VOLTAGE	PHASE	HZ							
SCU-1/COND-1	PENTHOUSE	ELEVATOR MACHINE ROOM	MITSUBISHI	PEAD-A30AA7	618-742-883	30,000	0.5	121	30-34-39	10	2.18	208	1	60	PUY-A30NHA7	0.4	1940	47	208/1/60	R-410A	1,2
SCU-2/COND-2	PENTHOUSE	ELEVATOR MACHINE ROOM	MITSUBISHI	PEAD-A30AA7	618-742-883	30,000	0.5	121	30-34-39	10	2.18	208	1	60	PUY-A30NHA7	0.4	1940	47	208/1/60	R-410A	1,2
SCU-3/COND-3	PENTHOUSE	ELEVATOR MACHINE ROOM	MITSUBISHI	PEAD-A30AA7	618-742-883	30,000	0.5	121	30-34-39	10	2.18	208	1	60	PUY-A30NHA7	0.4	1940	47	208/1/60	R-410A	1,2

NOTES:
1. PROVIDE WITH LOW AMBIENT (-20F) OPERATING CONDITIONS.
2. UNIT TO OPERATE ON OWN CONTROLS WITH SENSOR AND HIGH LEVEL ALARM INTERFACE WITH BMS.
3. INDOOR AND OUTDOOR UNITS TO BE PROVIDED WITH DISCONNECT BY ELECTRICAL CONTRACTOR.

HEAT EXCHANGER SCHEDULE

LOCATION	SERVICE	MANUFACTURER	MODEL	STYLE	TOTAL MBH	CHILLED WATER SIDE					AIR COOLED CHILLER SIDE - 40% PROPYLENE GLYCOL					WEIGHT (LBS)	NOTES
						EWT (F)	LWT (F)	GPM	WPD (FT H20)	CONNECTION SIZE (IN)	EWT (F)	LWT (F)	GPM	WPD (FT HD)	CONNECTION SIZE (IN)		
SUB-BASEMENT MECHANICAL ROOM	AIR COOLED CHILLER	BELL & GOSSETT	GPX - P20	PLATE & FRAME	541.83	63.5	56	144.1	14.5	2	45	57.9	91	7.4	2	526	

GLYCOL MAKE-UP UNIT SCHEDULE

ID TAG	LOCATION	SERVICE	MANUFACTURER	MODEL	GPM	HEIGHT	VOLUME	DIAMETER	WEIGHT	FILL PRESSURE TO MAINTAIN	MOTOR HP	VOLTAGE	PHASE	NOTES
GMPGCHW-1	SUB-BASEMENT MECHANICAL ROOM	AIR COOLED CHILLER GLYCOL LOOP	BELL & GOSSETT	GMU30	10	4' - 10"	55.00 gal	2' - 6 7/8"	160	30 PSI	0.5	120	1	
GMPHR-1	PENTHOUSE MECHANICAL ROOM	RUNAROUND HEAT RECOVERY LOOP	BELL & GOSSETT	GMU30	10	4' - 10"	55.00 gal	2' - 6 7/8"	160	30 PSI	0.5	120	1	

RADIANT CEILING PANEL SCHEDULE

ID TAG	LOCATION	MFG	MODEL	BTUH/LF	AVG WATER TEMP (F)	WIDTH	LENGTH (FT)	MBH	NOTES
RCP-001-A	001	AEROTECH	AXO	212	170	1' - 0"	21	4.45	1
RCP-001-B	001	AEROTECH	AXO	212	170	1' - 0"	19	4.03	1
RCP-001-C	001	AEROTECH	AXO	212	170	1' - 0"	25	5.30	1
RCP-001-D	001	AEROTECH	AXO	212	170	1' - 0"	25	5.19	1
RCP-010-A	010	AEROTECH	AXO	212	170	1' - 0"	23	4.88	1
RCP-020-A	020	AEROTECH	AXO	212	170	1' - 0"	21	4.35	1
RCP-020-B	020	AEROTECH	AXO	212	170	1' - 0"	23	4.88	1
RCP-020-C	020	AEROTECH	AXO	212	170	1' - 0"	23	4.88	1
RCP-020-D	020	AEROTECH	AXO	212	170	1' - 0"	21	4.35	1
RCP-020-E	020	AEROTECH	AXO	212	170	1' - 0"	18	3.82	1
RCP-024-A	024	AEROTECH	AXO	212	170	1' - 0"	24	4.98	1
RCP-024-B	024	AEROTECH	AXO	212	170	1' - 0"	28	5.83	1
RCP-027-A	027	AEROTECH	AXO	212	170	1' - 0"	29	6.15	1
RCP-030-A	030	AEROTECH	AXO	212	170	1' - 0"	33	7.00	1
RCP-030-B	030	AEROTECH	AXO	212	170	1' - 0"	21	4.45	1
RCP-030-C	030	AEROTECH	AXO	212	170	1' - 0"	23	4.88	1
RCP-030-D	030	AEROTECH	AXO	212	170	1' - 0"	20	4.24	1
RCP-090.01-A	090.01	AEROTECH	AXO	212	170	1' - 0"	18	3.82	1
RCP-090.01-B	090.01	AEROTECH	AXO	212	170	1' - 0"	23	4.88	1
RCP-101-A	101	AEROTECH	AXO	389	170	2' - 0"	18	7.00	1
RCP-101-B	101	AEROTECH	AXO	389	170	2' - 0"	20	7.59	1
RCP-101-C	101	AEROTECH	AXO	389	170	2' - 0"	23	8.95	1
RCP-101-D	101	AEROTECH	AXO	389	170	2' - 0"	25	9.53	1
RCP-110-A	110	AEROTECH	AXO	389	170	2' - 0"	27	10.31	1
RCP-112-A	112	AEROTECH	AXO	303	170	1' - 6"	23	6.97	1
RCP-112-B	112	AEROTECH	AXO	303	170	1' - 6"	21	6.21	1
RCP-112-C	112	AEROTECH	AXO	303	170	1' - 6"	19	5.61	1
RCP-113-A	113	AEROTECH	AXO	303	170	1' - 6"	23	6.82	1
RCP-122-A	122	AEROTECH	AXO	303	170	1' - 6"	23	6.97	1
RCP-122-B	122	AEROTECH	AXO	303	170	1' - 6"	32	9.70	1
RCP-123-A	123	AEROTECH	AXO	212	170	1' - 0"	20	4.13	1
RCP-124-A	124	AEROTECH	AXO	212	170	1' - 0"	13	2.70	1
RCP-124-B	124	AEROTECH	AXO	212	170	1' - 0"	6	1.20	1
RCP-125-A	125	AEROTECH	AXO	212	170	1' - 0"	20	4.13	1
RCP-125-B	125	AEROTECH	AXO	212	170	1' - 0"	20	4.13	1
RCP-127-A	127	AEROTECH	AXO	212	170	1' - 0"	17	3.50	1
RCP-128-A	128	AEROTECH	AXO	212	170	1' - 0"	14	2.86	1
RCP-132-A	132	AEROTECH	AXO	389	170	2' - 0"	18	7.00	1
RCP-132-B	132	AEROTECH	AXO	389	170	2' - 0"	23	8.95	1
RCP-132-C	132	AEROTECH	AXO	389	170	2' - 0"	14	5.25	1
RCP-136-A	136	AEROTECH	AXO	389	170	2' - 0"	9	3.31	1
RCP-190.17-A	190.17	AEROTECH	AXO	212	170	1' - 0"	13	2.76	1
RCP-201-A	201	AEROTECH	AXO	389	170	2' - 0"	16	6.03	1
RCP-201-B	201	AEROTECH	AXO	389	170	2' - 0"	7	2.72	1
RCP-201-C	201	AEROTECH	AXO	389	170	2' - 0"	16	6.03	1
RCP-201-D	201	AEROTECH	AXO	389	170	2' - 0"	5	1.95	1
RCP-210-A	210	AEROTECH	AXO	212	170	1' - 0"	5	1.06	1
RCP-210-B	210	AEROTECH	AXO	212	170	1' - 0"	5	1.06	1
RCP-220-A	220	AEROTECH	AXO	212	170	1' - 0"	6	1.17	1
RCP-290.01-A	290.01	AEROTECH	AXO	389	170	2' - 0"	15	5.84	1
RCP-290.01-B	290.01	AEROTECH	AXO	212	170	1' - 0"	22	4.56	1
RCP-301-A	301	AEROTECH	AXO	303	170	1' - 6"	16	4.85	1
RCP-301-B	301	AEROTECH	AXO	303	170	1' - 6"	7	2.12	1
RCP-301-C	301	AEROTECH	AXO	303	170	1' - 6"	16	4.85	1
RCP-301-D	301	AEROTECH	AXO	303	170	1' - 6"	4	1.21	1
RCP-320-A	320	AEROTECH	AXO	212	170	1' - 0"	6	1.17	1
RCP-390.01-A	390.01	AEROTECH	AXO	303	170	1' - 6"	16	4.85	1
RCP-390.01-B	390.01	AEROTECH	AXO	303	170	1' - 6"	12	3.64	1
RCP-390.01-C	390.01	AEROTECH	AXO	303	170	1' - 6"	8	2.27	1
RCP-401-A	401	AEROTECH	AXO	303	170	1' - 6"	16	4.85	1
RCP-401-B	401	AEROTECH	AXO	303	170	1' - 6"	7	2.12	1
RCP-401-C	401	AEROTECH	AXO	303	170	1' - 6"	16	4.85	1
RCP-401-D	401	AEROTECH	AXO	303	170	1' - 6"	5	1.52	1
RCP-420-A	420	AEROTECH	AXO	212	170	1' - 0"	6	1.27	1
RCP-421-A	421	AEROTECH	AXO	212	170	1' - 0"	5	1.06	1
RCP-421-B	421	AEROTECH	AXO	212	170	1' - 0"	5	1.06	1
RCP-490.01-A	490.01	AEROTECH	AXO	303	170	1' - 6"	16	4.85	1
RCP-490.01-B	490.01	AEROTECH	AXO	303	170	1' - 6"	12	3.64	1
RCP-490.01C	490.01	AEROTECH	AXO	303	170	1' - 6"	8	2.27	1
RCP-501-A	501	AEROTECH	AXO	303	170	1' - 6"	16	4.77	1
RCP-501-B	501	AEROTECH	AXO	303	170	1' - 6"	7	2.12	1
RCP-501-C	501	AEROTECH	AXO	303	170	1' - 6"	16	4.77	1
RCP-501-D	501	AEROTECH	AXO	303	170	1' - 6"	5	1.36	1
RCP-512-A	512	AEROTECH	AXO	389	170	2' - 0"	16	6.22	1
RCP-512-B	512	AEROTECH	AXO	389	170	2' - 0"	7	2.72	1
RCP-512-C	512	AEROTECH	AXO	389	170	2' - 0"	16	6.22	1
RCP-512-D	512	AEROTECH	AXO	389	170	2' - 0"	5	1.75	1
RCP-520-A	520	AEROTECH	AXO	212	170	1' - 0"	6	1.17	1
RCP-590.01-A	590.01	AEROTECH	AXO	303	170	1' - 6"	16	4.77	1
RCP-590.01-B	590.01	AEROTECH	AXO	303	170	1' - 6"	12	3.64	1
RCP-590.01-C	590.01	AEROTECH	AXO	303	170	1' - 6"	7	2.20	1
RCP-601-A	601	AEROTECH	AXO	303	170	1' - 6"	16	4.85	1
RCP-601-B	601	AEROTECH	AXO	303	170	1' - 6"	7	2.12	1
RCP-601-C	601	AEROTECH	AXO	303	170	1' - 6"	16	4.85	1
RCP-601-D	601	AEROTECH	AXO	303	170	1' - 6"	4	1.21	1
RCP-608-A	608	AEROTECH	AXO	303	170	1' - 6"	4	1.21	1
RCP-608-B	608	AEROTECH	AXO	303	170	1' - 6"	16	4.85	1
RCP-608-C	608	AEROTECH	AXO	303	170	1' - 6"	16	4.85	1
RCP-608-D	608	AEROTECH	AXO	303	170	1' - 6"	5	1.52	1
RCP-612-A	612	AEROTECH	AXO	303	170	1' - 6"	6	1.82	1
RCP-612-B	612	AEROTECH	AXO	303	170	1' - 6"	16	4.85	1
RCP-612-C	612	AEROTECH	AXO	303	170	1' - 6"	16	4.85	1
RCP-614-A	614	AEROTECH	AXO	303	170	1' - 6"	6	1.82	1
RCP-614-B	614	AEROTECH	AXO	303	170	1' - 6"	16	4.85	1
RCP-615-A	615	AEROTECH	AXO	303	170	1' - 6"	16	4.85	1
RCP-615-B	615	AEROTECH	AXO	303	170	1' - 6"	16	4.85	1
RCP-615-C	615	AEROTECH	AXO	303	170	1' - 6"	7	2.12	1
RCP-615-D	615	AEROTECH	AXO	303	170	1' - 6"	16	4.85	1
RCP-620-A	620	AEROTECH	AXO	212	170	1' - 0"	6	1.27	1
RCP-621-A	621	AEROTECH	AXO	212	170	1' - 0"	5	1.06	1
RCP-621-B	621	AEROTECH	AXO	212	170	1' - 0"	5	1.06	1
RCP-690.01-A	690.01	AEROTECH	AXO	303	170	1' - 6"	16	4.85	1
RCP-690.01-B	690.01	AEROTECH	AXO	303	170	1' - 6"	12	3.64	1
RCP-690.01-C	690.01	AEROTECH	AXO	303	170	1' - 6"	8	2.27	1
RCP-701-A	701	AEROTECH	AXO	389	170	2' - 0"	5	1.95	1
RCP-701-B	701	AEROTECH	AXO	389	170	2' - 0"	16	6.22	1
RCP-701-C	701	AEROTECH	AXO	389	170	2' - 0"	5	1.95	1
RCP-708-A	708	AEROTECH	AXO	389	170	2' - 0"	5	1.95	1
RCP-708-B	708	AEROTECH	AXO	389	170	2' - 0"	16	6.22	1
RCP-708-C	708	AEROTECH	AXO	389	170	2' - 0"	16	6.22	1
RCP-708-D	708	AEROTECH	AXO	389	170	2' - 0"	7	2.72	1
RCP-708-E	708	AEROTECH	AXO	389	170	2' - 0"	16	6.22	1
RCP-710-A	710	AEROTECH	AXO	212	170	1' - 0"	5	1.06	1
RCP-710-B	710	AEROTECH	AXO	212	170	1' - 0"	16	3.39	1
RCP-712-A	712	AEROTECH	AXO	389	170	2' - 0"	6	2.33	1
RCP-712-B	712	AEROTECH	AXO	389	170	2' - 0"	16	6.22	1
RCP-712-C	712	AEROTECH	AXO	389	170	2' - 0"	16	6.22	1
RCP-714-A	714	AEROTECH	AXO	389	170	2' - 0"	7	2.72	1
RCP-714-B	714	AEROTECH	AXO	389	170	2' - 0"	16	6.22	1
RCP-719-A	719	AEROTECH	AXO	389	170	2' - 0"	16	6.22	1
RCP-719-B	719	AEROTECH	AXO	389	170	2' - 0"	16	6.22	1
RCP-719-C	719	AEROTECH	AXO	389	170	2' - 0"	6	2.33	1
RCP-719-D	719	AEROTECH	AXO	389	170	2' - 0"	16	6.22	1
RCP-720-A	720	AEROTECH	AXO	212	170	1' - 0"	6	1.27	1
RCP-790.01-A	790.01	AEROTECH	AXO	389	170	2' - 0"	16	6.22	1
RCP-790.01-B	790.01	AEROTECH	AXO	389	170	2' - 0"	12	4.67	1
RCP-790.01-C	790.01	AEROTECH	AXO	389	170	2' - 0"	7	2.72	1

NOTES:
1. PROVIDE WITH SURFACE MOUNT FRAME AND END CAPS FOR SUSPENDED MOUNTING.
2. LAY-IN CEILING INSTALLATION.

EXPANSION TANK SCHEDULE

TAG	MANUFACTURER	MODEL	SERVICE	LOCATION	FLUID	TANK VOLUME (GAL)	TANK ACCEPTANCE (GAL)	DIAMETER (IN)	HEIGHT (IN)	SYSTEM CONNECTION (IN)	NOTES
ET-1	BELL & GOSSETT	B-2000	HEATING WATER	SUB-BASEMENT MECHANICAL ROOM	WATER	2000	2000	48	86	0' - 1 1/2"	
ET-2	BELL & GOSSETT	B-2000	HEATING WATER	SUB-BASEMENT MECHANICAL ROOM	WATER	2000	2000	48	86	0' - 1 1/2"	
ET-3	BELL & GOSSETT	D-20V	AIR COOLED CHILLER LOOP	SUB-BASEMENT MECHANICAL ROOM	40% PROPYLENE GLYCOL	10.9	2.4	12	26	0' - 0 1/2"	
ET-4	BELL & GOSSETT	D-40V	CHILLED BEAM OFF SEASON	SUB-BASEMENT MECHANICAL ROOM	WATER	21.7	11.3	16	29	0' - 0 1/2"	
ET-5	BELL & GOSSETT	D-20V	RUN AROUND HEAT RECOVERY LOOP	PENTHOUSE MECHANICAL ROOM	40% PROPYLENE GLYCOL	10.9	2.4	12	26	0' - 0 1/2"	

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DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan

Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

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WAYNE STATE UNIVERSITY

Project
STEM Innovation
Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
SCHEDULES

Scale

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
M60-02

SUPPLY AIR VALVE SCHEDULE

						OCCUPIED				HEATING COIL									
ID TAG	MANUFACTURER	MODEL	INLET	TYPE	ACTUATOR TYPE	MAX AIRFLOW	MIN AIRFLOW	UNOCCUPIED MIN CFM	APD (IN)	CFM	EAT (F DB)	LAT (F DB)	MBH	GPM	HEATING EWT (F)	WPD (FT HD)	CONTROL VALVE	NC	NOTES
LTU-126-1	SIEMENS	LGS	8"	SINGLE	ELECTRIC	600	300	300	.25	600	50	84 °F	22	2.2	180	5	2-WAY	35	
LTU-208-2	SIEMENS	LGS	10"	SINGLE	ELECTRIC	1000	985	545	.35	1000	50	84 °F	37	3.7	180	5	2-WAY	35	
LTU-209-2	SIEMENS	LGS	6"	SINGLE	ELECTRIC	200	190	145	.25	200	50	84 °F	7	0.7	180	5	2-WAY	35	
LTU-212A-2	SIEMENS	LGS	18"	SINGLE	ELECTRIC	5010	2400	2400	.35	5010	50	84 °F	184	18.4	180	5	3-WAY	35	
LTU-212B-2	SIEMENS	LGS	18"	SINGLE	ELECTRIC	4665	2400	2400	.35	4665	50	84 °F	171	17.1	180	5	2-WAY	35	
LTU-212C-2	SIEMENS	LGS	10"	SINGLE	ELECTRIC	820	2400	2400	.35	820	50	84 °F	30	3	180	5	2-WAY	35	
LTU-212D-2	SIEMENS	LGS	18"	SINGLE	ELECTRIC	3590	2400	2400	.35	3590	50	84 °F	132	13.2	180	5	3-WAY	35	
LTU-217-2	SIEMENS	LGS	10"	SINGLE	ELECTRIC	820	320	325	.35	820	50	84 °F	30	3	180	5	2-WAY	35	
LTU-218-2	SIEMENS	LGS	6"	SINGLE	ELECTRIC	150	135	120	.25	150	50	84 °F	6	0.6	180	5	2-WAY	35	
LTU-308-2	SIEMENS	LGS	10"	SINGLE	ELECTRIC	1000	940	520	.35	1000	50	84 °F	37	3.7	180	5	2-WAY	35	
LTU-310-2	SIEMENS	LGS	6"	SINGLE	ELECTRIC	320	415	260	.25	320	50	84 °F	12	1.2	180	5	2-WAY	35	
LTU-312A-2	SIEMENS	LGS	14"	SINGLE	ELECTRIC	2150	2150	1125	.35	215	50	84 °F	79	7.9	180	5	3-WAY	35	
LTU-312B-2	SIEMENS	LGS	14"	SINGLE	ELECTRIC	2150	2150	1125	.35	2150	50	84 °F	79	7.9	180	5	2-WAY	35	
LTU-317-2	SIEMENS	LGS	10"	SINGLE	ELECTRIC	820	320	330	.35	820	50	84 °F	30	3	180	5	2-WAY	35	
LTU-318-2	SIEMENS	LGS	6"	SINGLE	ELECTRIC	150	135	120	.25	150	50	84 °F	6	0.6	180	5	2-WAY	35	
LTU-408-2	SIEMENS	LGS	10"	SINGLE	ELECTRIC	1000	985	545	.35	1000	50	84 °F	37	3.7	180	5	3-WAY	35	
LTU-410-2	SIEMENS	LGS	6"	SINGLE	ELECTRIC	190	190	145	.25	190	50	84 °F	7	0.7	180	5	2-WAY	35	
LTU-412A-2	SIEMENS	LGS	14"	SINGLE	ELECTRIC	2150	2150	1125	.35	2150	50	84 °F	79	7.9	180	5	3-WAY	35	
LTU-412B-2	SIEMENS	LGS	14"	SINGLE	ELECTRIC	2150	2150	1125	.35	2150	50	84 °F	79	7.9	180	5	2-WAY	35	
LTU-417-2	SIEMENS	LGS	10"	SINGLE	ELECTRIC	820	320	325	.35	820	50	84 °F	30	3	180	5	2-WAY	35	
LTU-418-2	SIEMENS	LGS	6"	SINGLE	ELECTRIC	150	135	120	.25	150	50	84 °F	6	0.6	180	5	2-WAY	35	
LTU-508-2	SIEMENS	LGS	10"	SINGLE	ELECTRIC	1100	1000	545	.35	1100	50	84 °F	40	4	180	5	2-WAY	35	
LTU-510-2	SIEMENS	LGS	6"	SINGLE	ELECTRIC	320	320	210	.25	320	50	84 °F	12	1.2	180	5	2-WAY	35	
LTU-518-2	SIEMENS	LGS	6"	SINGLE	ELECTRIC	140	140	120	.25	140	50	84 °F	5	0.5	180	5	2-WAY	35	
LTU-519-2	SIEMENS	LGS	16"	SINGLE	ELECTRIC	2800	2630	1465	.35	2800	50	84 °F	103	10.3	180	5	3-WAY	35	

EXHAUST VALVE SCHEDULE

							OCCUPIED					
ID TAG	SERVICE	MANUFACTURER	MODEL	INLET	TYPE	ACTUATOR TYPE	MAX CFM	MIN CFM	UNOCCUPIED MIN CFM	APD (IN)	NC	NOTES
LTUFE-126-1	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	105	0	0.15	35	
LTUFE-208-2-1	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	510	310	310	0.15	35	
LTUFE-212-2-1	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-2	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-3	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-4	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-5	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-6	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-7	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-8	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-9	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-10	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-11	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-12	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-13	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-14	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-15	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-16	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-17	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-18	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-19	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-20	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-21	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-22	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-23	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-24	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	700	400	400	0.15	35	
LTUFE-212-2-25	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	325	200	200	0.15	35	
LTUFE-217-2-1	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	610	410	410	0.15	35	
LTUFE-217-2-2	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	510	310	310	0.15	35	
LTUFE-308-1	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	510	310	310	0.15	35	
LTUFE-312-2-1	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	510	310	300	0.15	35	
LTUFE-312-2-2	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	510	310	300	0.15	35	
LTUFE-312-2-3	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	510	310	300	0.15	35	
LTUFE-312-2-4	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	510	310	300	0.15	35	
LTUFE-317-2-1	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	610	410	410	0.15	35	
LTUFE-317-2-2	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	510	310	310	0.15	35	
LTUFE-408-2-1	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	510	310	0	0.15	35	
LTUFE-412-2-1	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	510	310	310	0.15	35	
LTUFE-412-2-2	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	510	310	310	0.15	35	
LTUFE-412-2-3	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	510	310	310	0.15	35	
LTUFE-412-2-4	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	510	310	310	0.15	35	
LTUFE-417-2-1	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	610	410	410	0.15	35	
LTUFE-417-2-2	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	510	310	310	0.15	35	
LTUFE-508-2-1	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	510	310	310	0.15	35	
LTUFE-519-2-1	FUME HOOD EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	510	310	310	0.15	35	
LTUGE-208-2	GENERAL EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	775	775	235	0.15	35	
LTUGE-209-2	GENERAL EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	300	300	145	0.15	35	
LTUGE-218-2	GENERAL EXHAUST	SIEMENS	LGE	6"	SINGLE	ELECTRIC	235	235	120	0.15	35	
LTUGE-308-2	GENERAL EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	730	530	210	0.15	35	
LTUGE-310-2	GENERAL EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	510	310	310	0.15	35	
LTUGE-312-2	GENERAL EXHAUST	SIEMENS	LGE	16"	SINGLE	ELECTRIC	3260	2460	1010	0.15	35	
LTUGE-318-2	GENERAL EXHAUST	SIEMENS	LGE	6"	SINGLE	ELECTRIC	235	235	120	0.15	35	
LTUGE-408-2	GENERAL EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	775	575	235	0.15	35	
LTUGE-410-2	GENERAL EXHAUST	SIEMENS	LGE	6"	SINGLE	ELECTRIC	290	290	150	0.15	35	
LTUGE-412-2	GENERAL EXHAUST	SIEMENS	LGE	14"	SINGLE	ELECTRIC	2460	3260	210	0.15	35	
LTUGE-418-2	GENERAL EXHAUST	SIEMENS	LGE	6"	SINGLE	ELECTRIC	235	235	120	0.15	35	
LTUGE-508-2	GENERAL EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	790	590	235	0.15	35	
LTUGE-510-2	GENERAL EXHAUST	SIEMENS	LGE	8"	SINGLE	ELECTRIC	420	420	210	0.15	35	
LTUGE-518-2	GENERAL EXHAUST	SIEMENS	LGE	6"	SINGLE	ELECTRIC	240	240	120	0.15	35	
LTUGE-519-2	GENERAL EXHAUST	SIEMENS	LGE	14"	SINGLE	ELECTRIC	2520	2320	1155	0.15	35	

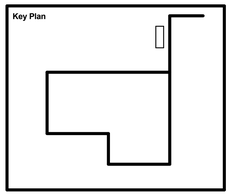
VAV TERMINAL UNIT SCHEDULE

						HEATING COIL								
ID TAG	MODEL	INLET SIZE	CFM MAX	CFM COOLING MIN	APD (IN WC)	CFM	EAT (F DB)	LAT (F DB)	MBH	GPM	HEATING EWT (F)	WPD (FT)	MAX NC	NOTES
TU-001-1	PRICE-SDV	10"	960	555	0.4	555	50	84	20.4	2	180	2	35	
TU-002-2	PRICE-SDV	6"	240	65	0.1	0	0	0	0	0	0	0	35	COOLING ONLY
TU-010-1	PRICE-SDV	6"	240	145	0.15	145	50	84	5.3	0.05	180	2	35	
TU-020-1	PRICE-SDV	16"	2800	1190	0.4	1400	50	84	51.4	5.1	180	2	35	3-WAY CONTROL VALVE
TU-022-1	PRICE-SDV	8"	500	130	0.35	250	50	84	9.2	0.9	180	2	35	
TU-024-1	PRICE-SDV	10"	800	290	0.4	400	50	84	14.7	1.5	180	2	35	3-WAY CONTROL VALVE
TU-027-1	PRICE-SDV	12"	1350	800	0.4	800	50	84	29.4	2.9	180	2	35	
TU-030-1	PRICE-SDV	12"	1400	890	0.4	890	50	84	32.7	3.3	180	2	35	
TU-038-1	PRICE-SDV	6"	100	65	0.15	65	50	84	2.4	0.5	180	2	35	
TU-090.01-1	PRICE-SDV	8"	550	550	0.4	550	50	84	20.2	2	180	2	35	
TU-090.10-1	PRICE-SDV	8"	550	550	0.35	550	50	84	20.2	2	180	2	35	3-WAY CONTROL VALVE
TU-090.15-1	PRICE-SDV	8"	650	125	0.35	325	50	84	11.9	1.2	180	2	35	
TU-090.16-1	PRICE-SDV	8"	620	650	0.35	650	50	84	23.9	2.4	180	2	35	
TU-101-1	PRICE-SDV	12"	1900	400	0.4	950	50	84	34.9	3.5	180	2	35	
TU-102-2	PRICE-SDV	10"	800	210	0.2	0	0	0	0	0	0	0	35	COOLING ONLY
TU-103-2	PRICE-SDV	8"	450	125	0.02	0	0	0	0	0	0	0	35	COOLING ONLY
TU-110-1	PRICE-SDV	10"	1000	210	0.4	500	50	84	18.4	1.8	180	2	35	3-WAY CONTROL VALVE
TU-112-1	PRICE-SDV	10"	960	420	0.4	480	50	84	17.6	1.8	180	2	35	3-WAY CONTROL VALVE
TU-113-1	PRICE-SDV	6"	360	120	0.15	180	50	84	6.6	0.7	180	2	35	
TU-118-1	PRICE-SDV	6"	100	65	0.15	65	50	84	2.4	0.5	180	2	35	
TU-121-1	PRICE-SDV	8"	400	125	0.35	820	50	84	7.3	0.7	180	2	35	
TU-122-1	PRICE-SDV	16"	3000	1100	0.4	1500	50	84	55.1	5.5	180	2	35	
TU-123-1	PRICE-SDV	12"	1200	300	0.4	1300	50	84	47.7	4.8	180	2	35	
TU-124-1	PRICE-SDV	8"	400	125	0.35	200	50	84	7.3	0.7	180	2	35	
TU-125-1	PRICE-SDV	10"	1100	210	0.4	550	50	84	20.2	2.1	180	2	35	3-WAY CONTROL VALVE
TU-127-1	PRICE-SDV	6"	100	65	0.15	65	50	84	2.4	0.5	180	2	35	
TU-128-1	PRICE-SDV	6"	250	90	0.15	125	50	84	4.6	0.5	180	2	35	
TU-129-1	PRICE-SDV	6"	100	65	0.15	100	50	84	2.4	0.5	180	2	35	
TU-131-1	PRICE-SDV	8"	400	125	0.35	1350	50	84	7.3	0.7	180	2	35	
TU-132-1	PRICE-SDV	14"	1800	1210	0.4	450	50	84	44.4	4.4	180	2	35	3-WAY CONTROL VALVE
TU-133-1	PRICE-SDV	6"	200	65	0.15	300	50	84	3.7	0.5	180	2	35	
TU-134-1	PRICE-SDV	6"	200	65	0.15	75	50	84	3.7	0.5	180	2	35	
TU-135-1	PRICE-SDV	6"	200	65	0.15	1350	50	84	3.7	0.5	180	2	35	
TU-136-1	PRICE-SDV	8"	500	90	0.15	500	50	84	18.4	1.8	180	2	35	
TU-140-1	PRICE-SDV	8"	400	125	0.35	820	50	84	7.3	0.7	180	2	35	
TU-190.03	PRICE-SDV	8"	400	125	0.35	200	50	84	7.3	0.7	180	2	35	
TU-190.10	PRICE-SDV	6"	200	65	0.15	100	50	84	3.7	0.5	180	2	35	
TU-190.15	PRICE-SDV	10"	800	210	0.4	400	50	84	14.7	1.5	180	2	35	
TU-201-2	PRICE-SDV	10"	900	340	0.4	450	50	84	16.5	1.7	180	2	35	
TU-202-2	PRICE-SDV	6"	300	65	0.1	0	0	0	0	0	0	0	35	COOLING ONLY
TU-203-2	PRICE-SDV	6"	300	65	0.1	0	0	0	0	0	0	0	35	COOLING ONLY
TU-210-2	PRICE-SDV	6"	150	65	0.15	75	50	84	2.8	0.5	180	2	35	
TU-220-2	PRICE-SDV	6"	150	65	0.15	75	50	84	2.8	0.5	180	2	35	
TU-290-01-2	PRICE-SDV	8"	420	175	0.35	210	50	84	7.7	0.8	180	2	35	
TU-290-07-2	PRICE-SDV	12"	1500	1500	0.4	1500	50	84	55.1	5.5	180	2	35	3-WAY CONTROL VALVE
TU-301-2	PRICE-SDV	10"	900	340	0.4	450	50	84	16.5	1.7	180	2	35	
TU-302-2	PRICE-SDV	10"	700	210	0.2	0	0	0	0	0	0	0	35	COOLING ONLY
TU-303-2	PRICE-SDV	6"	300	65	0.1	0	0	0	0	0	0	0	35	COOLING ONLY
TU-320-2	PRICE-SDV	6"	150	65	0.15	75	50	84	2.8	0.5	180	2	35	
TU-390-01-2	PRICE-SDV	8"	420	150	0.35	210	50	84	7.7	0.8	180	2	35	
TU-390-2	PRICE-SDV	12"	1600	1600	0.4	1600	50	84	58.8	5.9	180	2	35	3-WAY CONTROL VALVE
TU-401-2	PRICE-SDV	10"	900	340	0.4	450	50	84	16.5	1.7	180	2	35	
TU-402-2	PRICE-SDV	8"	360	125	0.2	0	0	0	0	0	0	0	35	COOLING ONLY
TU-403-2	PRICE-SDV	6"	360	65	0.1	0	0	0	0	0	0	0	35	COOLING ONLY
TU-420-2	PRICE-SDV	6"	150	65	0.15	75	50	84	2.8	0.5	180	2	35	
TU-421-2	PRICE-SDV	6"	200	65	0.15	100	50	84	3.7	1.8	180	2	35	
TU-490-01-2	PRICE-SDV	8"	420	125	0.35	210	50	84	7.7	0.6	180	2	35	
TU-490-07-2	PRICE-SDV	12"	1500	1500	0.4	1500	50	84	55.1	5.5	180	2	35	3-WAY CONTROL VALVE
TU-501-3	PRICE-SDV	10"	900	260	0.4	450	50	84	16.5	1.7	180	2	35	
TU-502-2	PRICE-SDV	8"	675	125	0.2	0	0	0	0	0	0	0	35	COOLING ONLY
TU-503-2	PRICE-SDV	8"	450	125	0.2	0	0	0	0	0	0	0	35	COOLING ONLY
TU-512-3	PRICE-SDV	10"	1040	210	0.4	520	50	84	19.1	1.9	180	2	35	3-WAY CONTROL VALVE
TU-520-3	PRICE-SDV	6"	150	65	0.4	75	50	84	2.8	0.5	180	2	35	
TU-590-01-3	PRICE-SDV	8"	420	125	0.4	210	50	84	7.7	0.8	180	2	35	
TU-590-07-3	PRICE-SDV	12"	1300	1300	0.4	1300	50	84	47.7	4.8	180	2	35	
TU-601-3	PRICE-SDV	10"	900	340	0.4	450	50	84	16.5	1.7	180	2	35	
TU-602-2	PRICE-SDV	6"	375	65	0.1	0	0	0	0	0	0	0	35	COOLING ONLY
TU-603-2	PRICE-SDV	8"	500	125	0.2	0	0	0	0	0	0	0	35	COOLING ONLY
TU-608-3	PRICE-SDV	8"	480	270	0.35	270	50	84	9.9	1	180	2	35	
TU-610-3	PRICE-SDV	6"	150	65	0.15	75	50	84	2.8	0.5	180	2	35	
TU-612-3	PRICE-SDV	8"	480	325	0.35	325	50	84	11.9	1.2	180	2	35	3-WAY CONTROL VALVE
TU-613-3	PRICE-SDV	6"	100	65	0.15	65	50	84	2.4	0.5	180	2	35	
TU-614-3	PRICE-SDV	8"	480	320	0.35	320	50	84	11.8	1.2	180	2	35	
TU-615-3	PRICE-SDV	8"	960	485	0.35	485	50	84	17.8	1.8	180	2	35	
TU-618-3	PRICE-SDV	6"	150	65	0.15	75	50	84	2.8	0.5	180	2	35	
TU-620-3	PRICE-SDV	6"	100	65	0.4	65	50	84	2.4	0.5	180	2	35	
TU-621-3	PRICE-SDV	6"	200	65	0.15	100	50	84	3.7	0.5	180	2	35	
TU-690-01-3	PRICE-SDV	8"	420	140	0.35	210	50	84	7.7	0.8	180	2	35	
TU-690-07-3	PRICE-SDV	8"	700	700	0.35	700	50	84	25.7	2.6	180	2	35	
TU-701-3	PRICE-SDV	8"	600	220	0.35	300	50	84	11	1.1	180	2	35	
TU-702-2	PRICE-SDV	8"	700	125	0.2	0	0	0	0	0	0	0	35	COOLING ONLY
TU-703-2	PRICE-SDV	8"	500	125	0.2	0	0	0	0	0	0	0	35	COOLING ONLY
TU-708-3	PRICE-SDV	10"	1040	520	0.4	520	50	84	19.1	1.9	180	2	35	3-WAY CONTROL VALVE
TU-710-3	PRICE-SDV	6"	300	65	0.15	150	50	84	5.5	0.6	180	2	35	
TU-712-3	PRICE-SDV	8"	700	350	0.35	350	50	84	12.9	1.3	180	2	35	3-WAY CONTROL VALVE
TU-713-3	PRICE-SDV	6"	150	65	0.35	75	50	84	2.8	0.5	180	2	35	
TU-714-3	PRICE-SDV	8"	720	360	0.35	360	50	84	13.2	1.3	180	2	35	
TU-718-3	PRICE-SDV	6"	150	65	0.35	75	50	84	2.8	0.5	180	2	35	
TU-719-3	PRICE-SDV	10"	960	490	0.4	490	50	84	18	1.8	180	2	35	
TU-720-3	PRICE-SDV	6"	150	65	0.15	75	50	84	2.8	0.5	180	2	35	
TU-790-01-3	PRICE-SDV	8"	420	125	0.35	210	50	84	7.7	0.8	180	2	35	3-WAY CONTROL VALVE
TU-790-07-3	PRICE-SDV	8"	700	125	0.35	350	50	84	12.9	1.3	180	2	35	3-WAY CONTROL VALVE

NOTES:
1. ALL HEATING COIL CONTROL VALVES ARE 2-WAY EXCEPT FOR THOSE NOTED AS 3-WAY.

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

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WAYNE STATE UNIVERSITY

Project
STEM Innovation
Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
SCHEDULES

Scale

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
M60-03

9/27/2012 3:39:34 PM

ROOM NAME	ROOM		VENTILATION AIR	OUTSIDE AIR							SUPPLY AIR				TRANSFER AIR		RETURN AIR
	AREA	CEILING HEIGHT	62.1 - 2010 MIN VENT REQ.	OCC AC/HR	EA CALC BASED ON AC	UNOCC MIN AC/HR	UNOCC MIN CFM BASED ON AC/HR	UNOCC MIN CFM BASED ON AC/HR	FUME HOOD MIN TOTAL	EA FOR Design	SA VAV CALC. CFM	OCC MIN BASED ON 8 AC/HR	SA DESIGN CFM - VAV	CHILLED BEAM SA	TA FROM OTHER SPACES	TA TO OTHER SPACE	RA CFM
00 BASEMENT - BASEMENT ELEC ROOM 040	583	12	35	0	0	0	0	0	0	0	5382	0	0	0	0	0	0
00 BASEMENT - COLLABORATION 090-01	370	12	135	0	0	0	0	0	0	0	342	0	550	0	0	550	0
00 BASEMENT - COMM/IT 039	131	12	8	0	0	0	0	0	0	0	1266	0	0	0	0	0	0
00 BASEMENT - COMPUTER LAB 027	2174	12	801	0	0	0	0	0	0	0	2033	0	0	1300	0	0	1300
00 BASEMENT - COMPUTER LAB 030	2302	12	866	0	0	0	0	0	0	0	2269	0	0	1400	0	0	1400
00 BASEMENT - CORRIDOR 090-03	400	12	34	0	0	0	0	0	0	0	149	0	0	0	0	0	0
00 BASEMENT - CORRIDOR 090-07	180	12	21	0	0	0	0	0	0	0	118	0	0	0	0	0	0
00 BASEMENT - CORRIDOR 090-10	900	12	64	0	0	0	0	0	0	0	332	0	550	0	0	550	0
00 BASEMENT - CORRIDOR 090-14	610	12	47	0	0	0	0	0	0	0	214	0	0	0	0	550	0
00 BASEMENT - CORRIDOR 090-16	510	12	41	0	0	0	0	0	0	0	203	0	650	0	0	650	0
00 BASEMENT - EMERGENCY ELEC ROOM 002	190	12	11	0	0	0	0	0	0	0	247	0	240	0	0	0	240
00 BASEMENT - FIRE PUMP 023	175	12	11	0	0	0	0	0	0	0	500	0	0	0	200	0	200
00 BASEMENT - HACKER SPACE 001	1500	12	610	0	0	0	0	0	0	0	940	0	0	960	0	0	960
00 BASEMENT - JC CART STORAGE 003	145	12	0	6	174	0	0	0	0	200	43	0	0	0	200	0	0
00 BASEMENT - LECTURE 020	3070	12	1309	0	0	0	0	0	0	0	4063	0	0	2800	0	0	2800
00 BASEMENT - LECTURE 024	681	12	341	0	0	0	0	0	0	0	817	0	800	0	0	0	800
00 BASEMENT - MENS W/R 006	175	9	11	10	263	0	0	0	0	300	22	0	0	0	300	0	0
00 BASEMENT - OFFICE 038	100	9.5	16	0	0	0	0	0	0	0	64	0	100	0	0	0	100
00 BASEMENT - SCIENCE STORES AMEX 090-15	590	12	81	8	944	0	0	0	0	950	286	0	650	0	300	0	0
00 BASEMENT - VENDING 022	130	12	13	0	0	0	0	0	0	0	707	0	500	0	200	0	700
00 BASEMENT - VR 010	376	12	145	0	0	0	0	0	0	0	290	0	0	240	0	0	240
00 BASEMENT - WOMENS W/R 005	175	9	11	10	263	0	0	0	0	300	22	0	0	0	300	0	0
FLOOR PRESSURIZATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0
BASEMENT TOTAL	16255		4681	0	1771	0	0	0	0	1900	20403	0	4040	6700	1750	1750	8740
01 FIRST FLOOR - 3D PRINTER ROOM 123	255	9.5	75	0	0	0	0	0	0	1400	1263	0	1300	0	100	0	0
01 FIRST FLOOR - COLLABORATION 110	526	13.6	152	0	0	0	0	0	0	0	896	0	1000	0	0	800	200
01 FIRST FLOOR - COLLABORATION 190-15	431	13.6	146	0	0	0	0	0	0	0	398	0	0	0	0	0	0
01 FIRST FLOOR - COMM/IT 103	97	13.6	6	0	0	0	0	0	0	0	536	0	450	0	100	0	550
01 FIRST FLOOR - CORRIDOR 190-03	508	13.6	40	0	0	0	0	0	0	0	99	0	400	0	0	200	200
01 FIRST FLOOR - CORRIDOR 190-07	172	13.6	41	0	0	0	0	0	0	0	94	0	0	0	0	0	0
01 FIRST FLOOR - CORRIDOR 190-10	613	13.6	47	0	0	0	0	0	0	0	198	0	200	0	0	200	0
01 FIRST FLOOR - CORRIDOR 190-11	980	12	186	0	0	0	0	0	0	0	255	0	0	0	0	0	0
01 FIRST FLOOR - CORRIDOR 190-16	853	13.6	164	0	0	0	0	0	0	0	237	0	800	0	0	200	600
01 FIRST FLOOR - CORRIDOR 190-17	134	13.6	18	0	0	0	0	0	0	0	88	0	0	0	0	0	0
01 FIRST FLOOR - ELECTRICAL 102	158	13.6	9	0	0	0	0	0	0	0	1137	0	800	0	100	0	900
01 FIRST FLOOR - FIRE COMMAND CENTER 121	100	9.5	16	0	0	0	0	0	0	0	89	0	100	0	0	0	100
01 FIRST FLOOR - INFORMATION AREA 140	65	12	14	0	0	0	0	0	0	0	78	0	400	0	0	200	200
01 FIRST FLOOR - JC 104	69	13.6	4	6	94	0	0	0	0	100	8	0	0	0	100	0	0
01 FIRST FLOOR - LECTURE 112	1382	13.6	458	0	0	0	0	0	0	0	2007	0	0	960	0	0	960
01 FIRST FLOOR - MAKER, ELEC, ROBO 122	3325	13.6	575	0	0	0	0	0	0	0	2592	0	3000	0	0	300	2700
01 FIRST FLOOR - MEDIA ROOM 128	242	9.5	109	0	0	0	0	0	0	0	208	0	250	0	0	0	250
01 FIRST FLOOR - MEDIA TOUCHDOWN 129	97	9.5	16	0	0	0	0	0	0	0	48	0	100	0	0	0	100
01 FIRST FLOOR - MEET 1 136	265	11	61	0	0	0	0	0	0	0	500	0	500	0	0	0	500
01 FIRST FLOOR - MEET 2 135	131	11	88	0	0	0	0	0	0	0	143	0	200	0	0	0	200
01 FIRST FLOOR - MEET 3 134	110	11	37	0	0	0	0	0	0	0	129	0	200	0	0	0	200
01 FIRST FLOOR - MEET 4 133	110	11	37	0	0	0	0	0	0	0	129	0	200	0	0	0	200
01 FIRST FLOOR - MENS W/R 106	211	9	13	10	317	0	0	0	0	325	35	0	0	0	350	0	0
01 FIRST FLOOR - OFFICE 118	75	9	20	0	0	0	0	0	0	0	76	0	100	0	0	0	100
01 FIRST FLOOR - OUTREACH 113	652	15	139	0	0	0	0	0	0	0	776	0	0	360	0	0	360
01 FIRST FLOOR - PAINT ROOM 126	83	9.5	35	8	105	4	53	53	400	700	47	0	600	0	100	0	0
01 FIRST FLOOR - PROJECT STORAGE 127	207	9.5	12	0	0	0	0	0	0	0	71	0	100	0	0	0	100
01 FIRST FLOOR - SHOP AREA 125	425	13.6	177	snorkel	0	0	0	0	170	170	929	0	1100	0	100	0	1030
01 FIRST FLOOR - STEAM 131	218	11	68	0	0	0	0	0	0	500	395	0	400	0	100	0	0
01 FIRST FLOOR - STEM COMMONS 132	3186	10.5	1213	0	0	0	0	0	0	0	1921	0	0	1800	0	0	1800
01 FIRST FLOOR - STORAGE 116	65	13.6	4	0	0	0	0	0	0	0	8	0	0	0	0	0	0
01 FIRST FLOOR - STUDENT LOUNGE 101	1343	13.6	396	0	0	0	0	0	0	0	1879	0	1900	0	0	200	1700
01 FIRST FLOOR - TOUCHDOWN 124	111	13.6	17	0	0	0	0	0	0	0	287	0	400	0	0	0	400
01 FIRST FLOOR - UNISEX W/R 115	81	9	5	10	122	0	0	0	0	150	8	0	0	0	100	0	0
01 FIRST FLOOR - WOMENS W/R 105	210	9	13	10	315	0	0	0	0	325	35	0	0	0	350	0	0
FLOOR PRESSURIZATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	600	0	0
FIRST FLOOR TOTAL	18768		4484	44	952	0	53	53	570	3670	19171	0	14500	3120	2100	2100	13350
02 SECOND FLOOR - COLLAB AREA 290-01	594	11.625	126	0	0	0	0	0	0	0	556	0	0	420	0	200	220
02 SECOND FLOOR - COLLABORATION 290-08	151	11.625	34	0	0	0	0	0	0	0	85	0	0	0	0	0	0
02 SECOND FLOOR - COMM/IT 203	98	11.625	6	0	0	0	0	0	0	0	360	0	300	0	100	0	400
02 SECOND FLOOR - CORRIDOR 290-03	266	11.625	26	0	0	0	0	0	0	0	63	0	0	0	0	0	0
02 SECOND FLOOR - CORRIDOR 290-07	227	11.625	24	0	0	0	0	0	0	0	135	0	1500	0	0	1500	0
02 SECOND FLOOR - CORRIDOR 290-10	503	11.625	40	0	0	0	0	0	0	0	143	0	0	0	0	0	0
02 SECOND FLOOR - ELECTRICAL 202	159	11.625	10	0	0	0	0	0	0	0	499	0	300	0	100	0	400
02 SECOND FLOOR - JC 204	69	11.625	4	6	80	0	0	0	0	100	15	0	0	0	100	0	0
02 SECOND FLOOR - LECTURE/DISCUSSION 201	1030	11.625	362	0	0	0	0	0	0	0	1333	0	0	900	0	0	900
02 SECOND FLOOR - MENS W/R 206	135	9	8	10	203	0	0	0	0	200	23	0	0	0	200	0	0
02 SECOND FLOOR - PREP & STORAGE 209	185	11.625	32	8	287	4	143	143	0	300	83	186.75	200	0	100	0	0
02 SECOND FLOOR - PREPARATION LAB 217	512	9.5	71	8	649	4	324	324	620	1120	580	548.533333	820	0	300	0	0
02 SECOND FLOOR - STORAGE 218	151	11.625	9	8	234	4	117	117	0	250	48	134.05	150	0	100	0	0
02 SECOND FLOOR - TOUCHDOWN 210	141	10	18	0	0	0	0	0	0	0	126	0	150	0	0	0	150
02 SECOND FLOOR - TOUCHDOWN 220	98	10	16	0	0	0	0	0	0	0	59	0	150	0	0	0	150
02 SECOND FLOOR - WET LAB 1 212	2900	11.625	1102	8	4495	4	2248	2248	9800	17125	3940	4395	16925	0	200	0	0
02 SECOND FLOOR - WET LAB 1A 208	698	11.625	266	8	1082	4	541	541	310	1100	1124	981.9	1000	0	100	0	0
02 SECOND FLOOR - WOMENS W/R 205	135	9	8	10	203	0	0	0	0	200	23	0	0	0	200	0	0
FLOOR PRESSURIZATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	200	0	0
SECOND FLOOR TOTAL	8562	221.875	2192	66	7231	0	3373	3373	10730	20395	9447	6246.23333	21495	1320	1700	1700	2220
03 THIRD FLOOR - COLLAB AREA 390-01	606	11.625	126	0	0	0	0	0	0	0	611	0	0	420	0	#REF!	220
03 THIRD FLOOR - COLLABORATION 390-08	226	11.625	44	0	0	0	0	0	0	0	135	0	0	0	0	200	0
03 THIRD FLOOR - COMM/IT 303	91	11.625	5	0	0	0	0	0	0	0	360	0	300	0	100	0	400
03 THIRD FLOOR - CORRIDOR 390-03	310	11.625	29	0	0	0	0	0	0	0	66	0	0	0	0	0	0
03 THIRD FLOOR - CORRIDOR 390-07	226	11.625	51	0	0	0	0	0	0	0	62	0	1600	0	0	1600	0
03 THIRD FLOOR - CORRIDOR 390-10	475	11.625	96	0	0	0	0	0	0	0	117	0	0	0	0	0	0
03 THIRD FLOOR - ELECTRICAL 302	160	11.625	29	0	0	0	0	0	0	0	994	0	700	0	100	0	800
03 THIRD FLOOR - JC 304	68	11.625	4	6	79	0	0	0	0	100	16	0	0	0	100	0	0
03 THIRD FLOOR - LECTURE/DISCUSSION 301	1030	11.625	362	0	0	0	0	0	0	0	1306	0	0	900	0	0	900
03 THIRD FLOOR - MENS W/R 306	135	9	8	10	203	0	0	0	0	200	23	0	0	0	200	0	0
03 THIRD FLOOR - PREP & STORAGE 310	332	11.625	45	8	515	4	257	257	0	520	186	414.6	320	0	200	0	0
03 THIRD FLOOR - PREPARATION LAB 317	520	9.5	72	8	659	4	329	329	620	1120	247	558.666667	820	0	300	0	0
03 THIRD FLOOR - STORAGE 318	151	11.625	9	8	234	4	117	117	0	250	50	0	150	0	100	0	0
03 THIRD FLOOR - TOUCHDOWN 320	98	10	16	0	0	0	0	0	0	0	59	0	150	0	0	0	150
03 THIRD FLOOR - WET LAB 2 312	2892	11.625	1121	8	4483	4	2241	2241	1240	4500	3517	4382.6	4300	0	200	0	0
03 THIRD FLOOR - WET LAB 2A 308	670	11.625	301	8	1039	4	519	519	310	1100	1084	938.5	1000	0	100	0	0
03 THIRD FLOOR - WOMENS W/R 305	135	9	8	10	203	0	0	0	0	200	22	0	0	0	200	0	0
FLOOR PRESSURIZATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	200	0	0
THIRD FLOOR TOTAL	8488	211.875	2346	66	7412	0	3464	3464	2170	7990	9103	6294.36667	9340	1320	1800	1800	2470

ROOM NAME	ROOM		VENTILATION AIR	OUTSIDE AIR							SUPPLY AIR				TRANSFER AIR		RETURN AIR
	AREA	CEILING HEIGHT	62.1 - 2010 MIN VENT REQ.	OCC AC/HR	EA CALC BASED ON AC	UNOCC MIN AC/HR	UNOCC MIN CFM BASED ON AC/HR	UNOCC MIN CFM BASED ON AC/HR	FUME HOOD MIN TOTAL	EA FOR Design	SA VAV CALC. CFM	OCC MIN BASED ON 8 AC/HR	SA DESIGN CFM - VAV	CHILLED BEAM SA	TA FROM OTHER SPACES	TA TO OTHER SPACE	RA CFM
04 FOURTH FLOOR - COLLAB AREA 490-01	452	11.625	117	0	0	0	0	0	0	0	597	0	0	420	0	200	220
04 FOURTH FLOOR - COLLABORATION 490-08	178	11.625	41	0	0	0	0	0	0	0	128	0	0	0	0	0	0
04 FOURTH FLOOR - COMM/IT 403	99	11.625	6	0	0	0	0	0	0	0	360	0	300	0	100	0	400
04 FOURTH FLOOR - CORRIDOR 490-03	433	11.625	36	0	0	0	0	0	0	0	78	0	0	0	0	0	0
04 FOURTH FLOOR - CORRIDOR 490-07	226	11.625	24	0	0	0	0	0	0	0	98	0	1500	0	0	1500	0
04 FOURTH FLOOR - CORRIDOR 490-10	473	11.625	38	0	0	0	0	0	0	0	99	0	0	0	0	0	0
04 FOURTH FLOOR - ELECTRICAL 402	159	11.625	10	0	0	0	0	0	0	0	580	0	360	0	100	0	460
04 FOURTH FLOOR - JC 404	68	11.625	4	6	79	0	0	0	0	100	9	0	0	0	100	0	0
04 FOURTH FLOOR - LECTURE/DISCUSSION 401	1030	11.625	362	0	0	0	0	0	0	0	1325	0	0	900	0	0	900
04 FOURTH FLOOR - MENS W/R 406	135	9	8	10	203	0	0	0	0	200	23	0	0	0	200	0	0
04 FOURTH FLOOR - PREP & STORAGE 410	185	11.625	27	8	287	4	143	143	0	290	74	186.75	190	0	100	0	0
04 FOURTH FLOOR - PREPARATION LAB 417	512	9.5	71	8	649	4	324	324	620	1120	227	548.533333	820	0	300	0	0
04 FOURTH FLOOR - STORAGE 418	151	11.625	9	8	234	4	117	117	0	250	50	0	150	0	100	0	0
04 FOURTH FLOOR - TOUCHDOWN 420	98	10	16	0	0	0	0	0	0	0	62	0	150	0	0	0	150
04 FOURTH FLOOR - TOUCHDOWN 421	141	10	18	0	0	0	bsc cab	bsc cab	0	0	140	0	200	0	0	0	200
04 FOURTH FLOOR - WET LAB 2 412	2900	11.625	1122	8	4495	4	2248	2248	1240	4500	4289	4395	4300	0	200	0	0
04 FOURTH FLOOR - WET LAB 3A 408	700	11.625	306	8	1085	4	543	543	310	1100	1017	985	1000	0	100	0	0
04 FOURTH FLOOR - WOMENS W/R 405	137	9	8	10	206	0	0	0	0	200	23	0	0	0	200	0	0
FLOOR PRESSURIZATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	200	0	0
FOURTH FLOOR TOTAL	8587	221.875	2254	66	7236	0	0	0	2170	7760	9459	6115.28333	8970	1320	1700	1700	2330
05 FIFTH FLOOR - COLLAB AREA 590-01	481	11.625	119	0	0	0	0	0	0	0	614	0	0	420	0	200	220
05 FIFTH FLOOR - COLLABORATION 590-08	178	11.625	41	0	0	0	0	0	0	0	128	0	0	0	0	0	0
05 FIFTH FLOOR - COMM/IT 503	100	11.625	6	0	0	0	0	0	0	0	536	0	450	0	100	0	550
05 FIFTH FLOOR - COMPUTER LAB 512	1540	11.625	585	0	0	0	0	0	0	0	2312	0	0	1040	0	0	1040
05 FIFTH FLOOR - CORRIDOR 590-03	432	11.625	36	0	0	0	0	0	0	0	78	0	0	0	0	0	0
05 FIFTH FLOOR - CORRIDOR 590-07	227	11.625	24	0	0	0	0	0	0	0	98	0	1300	0	0	1300	0
05 FIFTH FLOOR - CORRIDOR 590-10	542	11.625	43	0	0	0	0	0	0	0	110	0	0	0	0	0	0
05 FIFTH FLOOR - ELECTRICAL 502	47	11.625	3	0	0	0	0	0	0	0	973	0	675	0	100	0	775
05 FIFTH FLOOR - JC 504	68	11.625	4	6	79	0	0	0	0	100	13	0	0	0	100	0	0
05 FIFTH FLOOR - LECTURE/DISCUSSION 501	1030	11.625	362	0	0	0	0	0	0	0	1314	0	0	900	0	0	900
05 FIFTH FLOOR - MENS W/R 506	135	9	8	10	203	0	0	0	0	200	23	0	0	0	200	0	0
05 FIFTH FLOOR - PREP & STORAGE 510	267	11.625	42	8	414	4	207	207	0	420	193	313.85	320	0	100	0	0
05 FIFTH FLOOR - PREP & STORAGE 518	151	11.625	28	8	234	4	117	117	0	240	73	134.05	140	0	100	0	0
05 FIFTH FLOOR - TOUCHDOWN 520	98	10	16	0	0	0	0	0	0	0	59	0	150	0	0	0	150
05 FIFTH FLOOR - UNISEX W/R 511	54	9	3	10	81	0	0	0	0	100	6	0	0	0	100	0	0
05 FIFTH FLOOR - WET LAB 4 519	1890	11.625	740	8	2930	4	1465	1465	310	3000	1716	2829.5	2800	0	200	0	0
05 FIFTH FLOOR - WET LAB 4A 508	705	11.625	307	8	1093	4	546	546	310	1200	1110	992.75	1100	0	100	0	0
05 FIFTH FLOOR - WOMENS W/R 505	135	9	8	10	203	0	0	0	0	200	26	0	0	0	200	0	0
FLOOR PRESSURIZATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	200	0	0
FIFTH FLOOR TOTAL	8592	223.75	2404	68	5235	0	2335	2335	620	5460	9661	4270.15	6935	2360	1500	1500	3635
06 SIXTH FLOOR - COLLAB AREA 690-01	481	11.625	119	0	0	0	0	0	0	0	599	0	0	420	0	200	220
06 SIXTH FLOOR - COLLABORATION 690-08	177	11.625	41	0	0	0	0	0	0	0	128	0	0	0	0	0	0
06 SIXTH FLOOR - COMM/IT 603	99	11.625	6	0	0	0	0	0	0	0	536	0	500	0	100	0	600
06 SIXTH FLOOR - COMPUTER LAB 615	1630	11.625	596	0	0	0	0	0	0	0	1968	0	0	960	0	0	960
06 SIXTH FLOOR - CORRIDOR 690-03	433	11.625	36	0	0	0	0	0	0	0	78	0	0	0	0	0	0
06 SIXTH FLOOR - CORRIDOR 690-07	228	11.625	24	0	0	0	0	0	0	0	99	0	700	0	0	700	0
06 SIXTH FLOOR - CORRIDOR 690-10	498	11.625	40	0	0	0	0	0	0	0	119	0	0	0	0	0	0
06 SIXTH FLOOR - DARK ROOM/STORAGE 613	180	11.625	36	0	0	0	0	0	0	0	90	0	100	0	0	0	100
06 SIXTH FLOOR - DRY LAB 1 608	702	11.625	306	0	0	0	0	0	0	0	953	0	0	480	0	0	480
06 SIXTH FLOOR - DRY LABS 612	803	11.625	345	0	0	0	0	0	0	0	1069	0	0	480	0	0	480
06 SIXTH FLOOR - DRY LABS 614	781	11.625	341	0	0	0	0	0	0	0	1091	0	0	480	0	0	480
06 SIXTH FLOOR - ELECTRICAL 602	159	11.625	10	0	0	0	0	0	0	0	587	0	375	0	100	0	475
06 SIXTH FLOOR - JC 604	68	11.625	4	6	79	0	0	0	0	100	9	0	0	0	100	0	0
06 SIXTH FLOOR - LECTURE 601	1030	11.625	362	0	0	0	0	0	0	0	1314	0	0	900	0	0	900
06 SIXTH FLOOR - MENS W/R 606	136	9	8	10	204	0	0	0	0	200	23	0	0	0	200	0	0
06 SIXTH FLOOR - STORAGE 610	185	11.625	11	0	0	0	0	0	0	0	74	0	150	0	0	0	150
06 SIXTH FLOOR - STORAGE 618	151	11.625	9	0	0	0	0	0	0	0	55	0	150	0	0	0	150
06 SIXTH FLOOR - TOUCHDOWN 620	98	10	16	0	0	0	0	0	0	0	61	0	150	0	0	0	150
06 SIXTH FLOOR - TOUCHDOWN 621	138	10	18	0	0	0	0	0	0	0	138	0	200	0	0	0	200
06 SIXTH FLOOR - WOMENS W/R 605	135	9	8	10	203	0	0	0	0	200	23	0	0	0	200	0	0
FLOOR PRESSURIZATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	200	0	0
SIXTH FLOOR TOTAL	8622	247.25	2364	26	486	0	0	0	0	500	9294	0	2325	3720	900	900	5345
07 SEVENTH FLOOR - COLLAB AREA 790-01	482	11.625	119	0	0	0	0	0	0	0	636	0	0	420	0	200	220
07 SEVENTH FLOOR - COLLABORATION 790-08	177	11.625	41	0	0	0	0	0	0	0	111	0	0	0	0	0	0
07 SEVENTH FLOOR - COMM/IT 703	99	11.625	6	0	0	0	0	0	0	0	536	0	500	0	100	0	600
07 SEVENTH FLOOR - COMPUTER LAB 719	1608	11.625	593	0	0	0	0	0	0	0	2076	0	0	960	0	0	960
07 SEVENTH FLOOR - CORRIDOR 790-03	432	11.625	36	0	0	0	0	0	0	0	78	0	0	0	0	0	0
07 SEVENTH FLOOR - CORRIDOR 790-07	226	11.625	24	0	0	0	0	0	0	0	98	0	700	0	0	700	0
07 SEVENTH FLOOR - CORRIDOR 790-10	502	11.625	40	0	0	0	0	0	0	0	119	0	0	0	0	0	0
07 SEVENTH FLOOR - DRY LAB 1 712	801	11.625	444	0	0	0	0	0	0	0	1277	0	0	700	0	0	700
07 SEVENTH FLOOR - DRY LAB 2 714	779	11.625	440	0	0	0	0	0	0	0	1240	0	0	720	0	0	720
07 SEVENTH FLOOR - DRY LAB 2A 708	1207	11.625	617	0	0	0	0	0	0	0	1711	0	0	1040	0	0	1040
07 SEVENTH FLOOR - ELECTRICAL 702	159	11.625	10	0	0	0	0	0	0	0	986	0	700	0	100	0	800
07 SEVENTH FLOOR - JC 704	68	11.625	4	6	79	0	0	0	0	100	9	0	0	0	100	0	0
07 SEVENTH FLOOR - LECTURE 701	514	11.625	256	0	0	0	0	0	0	0	1092	0	0	600	0	0	600
07 SEVENTH FLOOR - MENS W/R 706	136	9	8	10	204	0	0	0	0	200	23	0	0	0	200	0	0
07 SEVENTH FLOOR - PREP & STORAGE 710	332	11.625	25	0	0	0	0	0	0	0	204	0	300	0	0	0	300
07 SEVENTH FLOOR - STORAGE 713	180	11.625	11	0	0	0	0	0	0	0	18	0	150	0	0	0	150
07 SEVENTH FLOOR - STORAGE 718	151	11.625	9	0	0	0	0	0	0	0	63	0	150	0	0	0	150
07 SEVENTH FLOOR - TOUCHDOWN 720	100	10	16	0	0	0	0	0	0	0	61	0	150	0	0	0	150
07 SEVENTH FLOOR - WOMENS W/R 705	135	9	13	10	203	0	0	0	0	200	35	0	0	0	200	0	0
FLOOR PRESSURIZATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	200	0	0
SEVENTH FLOOR TOTAL	8600	237.25	2742	26	486	0	0	0	0	500	10658	0	2650	4440	900	900	6390
08 PENTHOUSE	4157	13.6	0	0	0	0	0	0	0	0	0	0	400	0	0	0	0

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

This drawing has been prepared solely for the use of the Client Name and there are no representations of any kind made by NORR to any party with whom NORR has not entered into a contract.

This drawing shall not be used for construction purposes until the seal appearing hereon is signed and dated by the Architect or Engineer.

Key Plan

Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

NORR

An Ingenium International Company

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Design Lead	Drawn J. Bates
Project Leader J. SMITH	Checked .

WAYNE STATE UNIVERSITY

Project

STEM Innovation
Learning Center

GULLEN MALL,
DETROIT, MI 48202

Drawing Title

MECHANICAL AIR
BALANCE

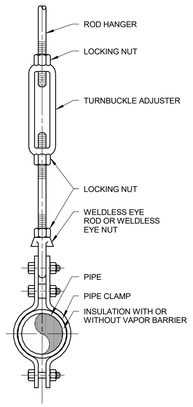
Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

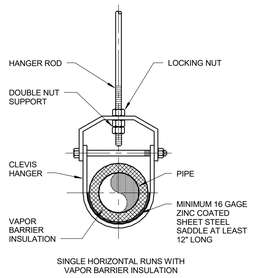
Drawing No.

M60-04

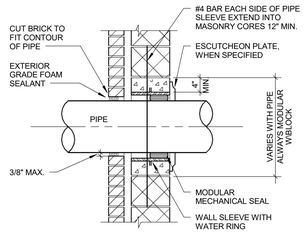
File Path



TYPICAL PIPE CLAMP HANGER
(STEEL 3-BOLT PIPE CLAMP)
NO SCALE

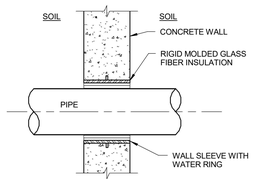


TYPICAL CLEVIS HANGER
NO SCALE



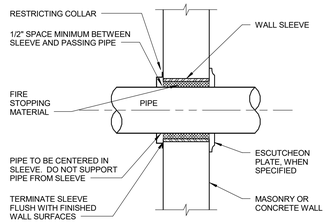
NOTE
USE TYPE 2 WALL SLEEVE FOR ALL PIPING PASSING THROUGH NEW EXTERIOR BLOCK AND BRICK WALLS.

WALL SLEEVE DETAIL - TYPE 2
NO SCALE



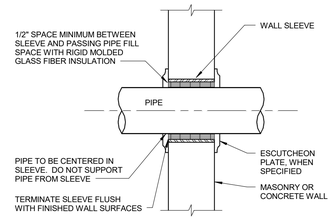
NOTE
USE TYPE 4 WALL SLEEVE FOR ALL PIPING 4" AND UP IN SIZE PASSING THROUGH NEW BELOW GRADE CAST-IN-PLACE CONCRETE WALLS WITH SOIL ON BOTH SIDES.

WALL SLEEVE DETAIL - TYPE 4
NO SCALE



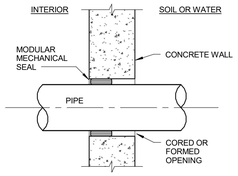
NOTE
USE TYPE 5 WALL SLEEVE FOR ALL PIPING PASSING THROUGH NEW FIRE RATED INTERIOR MASONRY OR CONCRETE WALLS.

WALL SLEEVE DETAIL - TYPE 5
NO SCALE



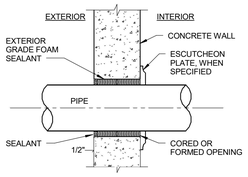
NOTE
USE TYPE 6 WALL SLEEVE FOR ALL PIPING PASSING THROUGH NEW INTERIOR NON-FIRE RATED MASONRY OR CONCRETE WALLS.

WALL SLEEVE DETAIL - TYPE 6
NO SCALE



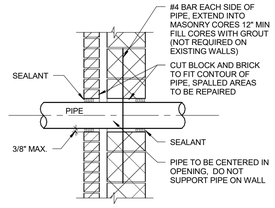
NOTE
USE TYPE 1 WALL PENETRATION FOR ALL PIPING PASSING THROUGH CORED OR FORMED OPENING IN CONCRETE WALLS WITH SOIL OR WATER ON ONE SIDE WHERE NO WALL SLEEVE IS USED.

WALL PENETRATION DETAIL - TYPE 1
NO SCALE



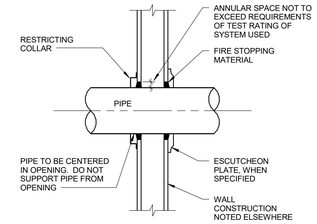
NOTE
USE TYPE 2 WALL PENETRATION FOR ALL PIPING PASSING THROUGH CORED OR FORMED OPENING IN ABOVE GRADE CONCRETE WALLS WHERE NO WALL SLEEVE IS USED.

WALL PENETRATION DETAIL - TYPE 2
NO SCALE



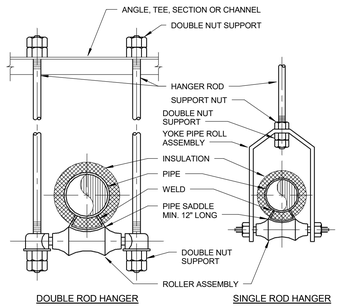
NOTE
USE TYPE 3 WALL PENETRATION FOR ALL PIPING PASSING THROUGH EXTERIOR BLOCK OR BLOCK AND BRICK WALLS WHERE NO WALL SLEEVE IS USED.

WALL PENETRATION DETAIL - TYPE 3
NO SCALE

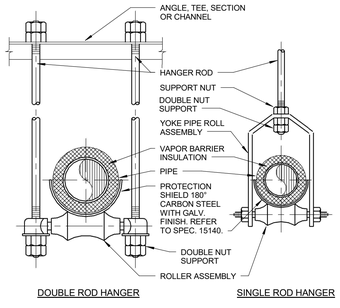


NOTE
USE TYPE 4 WALL PENETRATION FOR ALL PIPING PASSING THROUGH NEW FIRE RATED INTERIOR STUD WALLS.

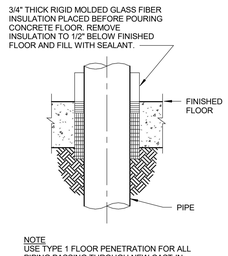
WALL PENETRATION DETAIL - TYPE 4
NO SCALE



PIPE ROLLER DETAIL (NO VAPOR BARRIER)
NO SCALE

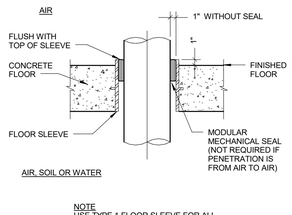


PIPE ROLLER DETAIL (WITH VAPOR BARRIER INSULATION)
NO SCALE



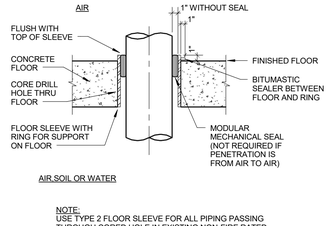
NOTE
USE TYPE 1 FLOOR PENETRATION FOR ALL PIPING PASSING THROUGH NEW CAST-IN-PLACE CONCRETE SLAB ON GRADE.

FLOOR PENETRATION DETAIL - TYPE 1
NO SCALE



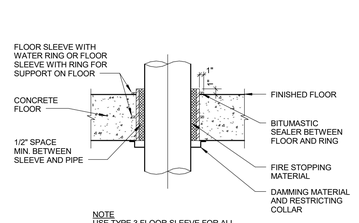
NOTE
USE TYPE 1 FLOOR SLEEVE FOR ALL PIPING PASSING THROUGH CORED HOLE IN EXISTING NON-FIRE RATED CAST-IN-PLACE CONCRETE FLOORS.

FLOOR SLEEVE DETAIL - TYPE 1
NO SCALE



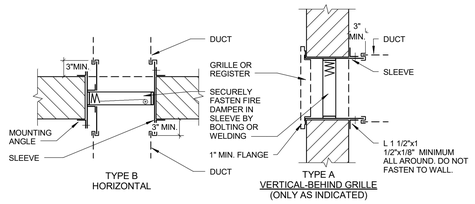
NOTE
USE TYPE 2 FLOOR SLEEVE FOR ALL PIPING PASSING THROUGH CORED HOLE IN EXISTING NON-FIRE RATED CONCRETE FLOORS.

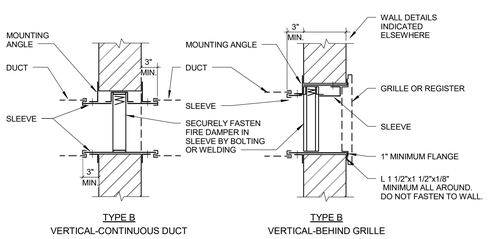
FLOOR SLEEVE DETAIL - TYPE 2
NO SCALE



NOTE
USE TYPE 3 FLOOR SLEEVE FOR ALL PIPING PASSING THROUGH NEW OR EXISTING FIRE RATED CONCRETE FLOORS.

FLOOR SLEEVE DETAIL - TYPE 3
NO SCALE

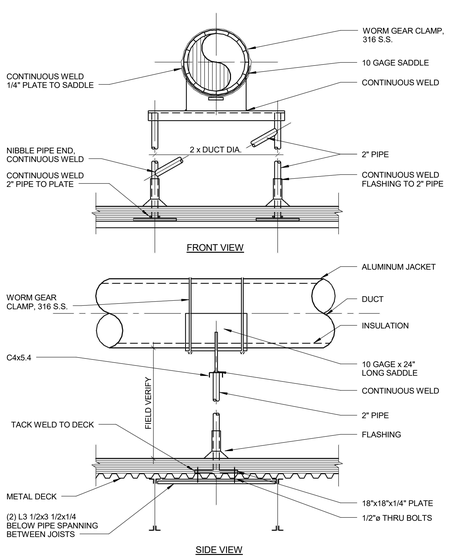




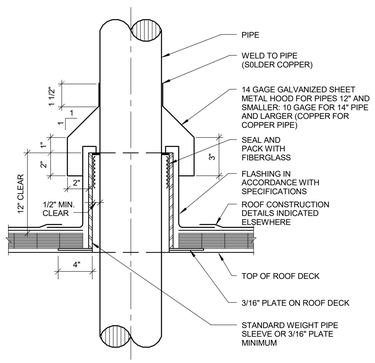
NOTES

1. USE TYPE B UNLESS NOTED OTHERWISE.
2. OPENINGS ARE TO BE 1/8" PER FOOT OF DAMPER SIZE LARGER THAN DAMPER IN BOTH DIRECTIONS; MINIMUM OF 1/4".
3. SLEEVES ARE TO BE OF GALVANIZED STEEL, GAGE AS REQUIRED BY SMACNA STANDARD OR LOCAL FIRE OFFICIAL, WHICHEVER REQUIREMENT IS MORE STRINGENT.

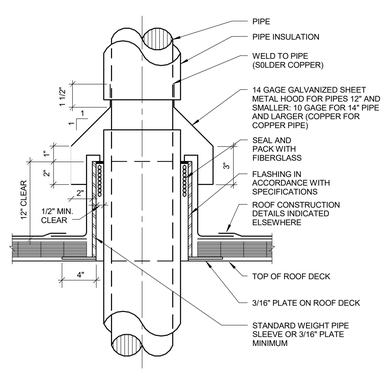
FIRE DAMPER DETAILS
NO SCALE



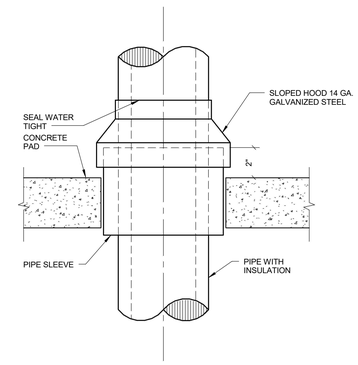
ROOF MOUNTED DUCT SUPPORT DETAIL
NO SCALE



UNINSULATED PIPE ROOF PENETRATION DETAIL
NO SCALE



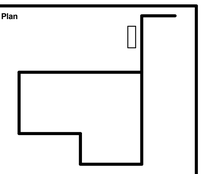
INSULATED PIPE ROOF PENETRATION DETAIL
NO SCALE



PIPE SLEEVE DETAIL - EQUIPMENT PAD
NO SCALE

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

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Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: J. SMITH	Drawn: S. FIORENZO
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

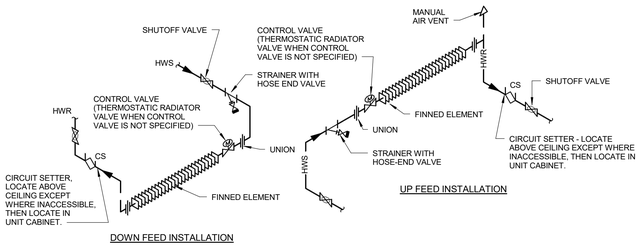
Project
STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
DETAILS

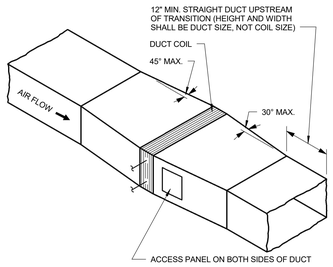
Scale 12" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

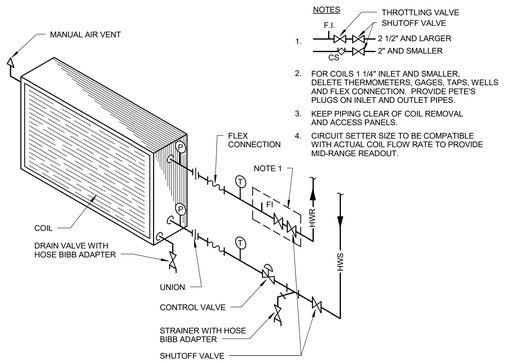
Drawing No.
M70-01



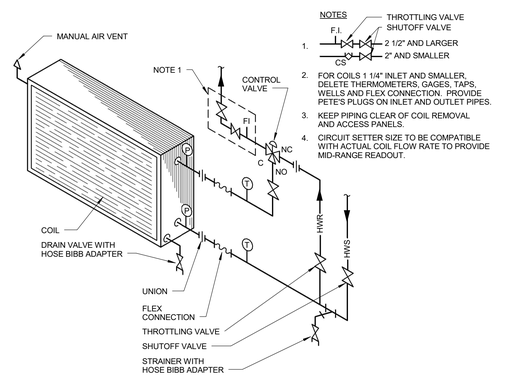
FINNED TUBE PIPING DETAIL
NO SCALE



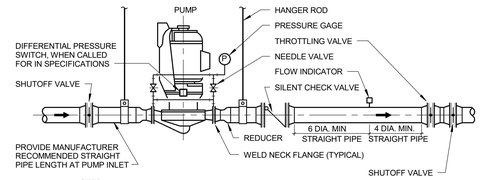
DUCT MOUNTED HOT WATER COIL DETAIL
NO SCALE



(2-WAY VALVE)
HOT WATER COIL PIPING DETAIL
NO SCALE

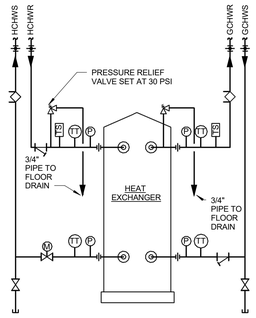


(3-WAY VALVE)
HOT WATER COIL PIPING DETAIL
NO SCALE

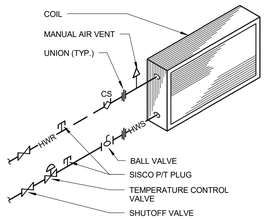


NOTES
1. 2" AND SMALLER PIPE TO BE SCREWED.
2. INSULATE CHILLED WATER PUMPS IN ACCORDANCE WITH SPECIFICATIONS.
3. FOR 2" AND SMALLER PIPE PROVIDE CIRCUIT SETTER INSTEAD OF FLOW INDICATOR.
4. FLOW INDICATOR MAY BE ON RETURN SIDE, SEE SYSTEM SCHEMATIC.
5. FOR PUMPS IN PARALLEL ONLY ONE FLOW INDICATOR MAY BE USED IF INSTALLED IN COMMON SUPPLY OR RETURN HEADER FLOW FROM BOTH PUMPS CAN BE MEASURED.

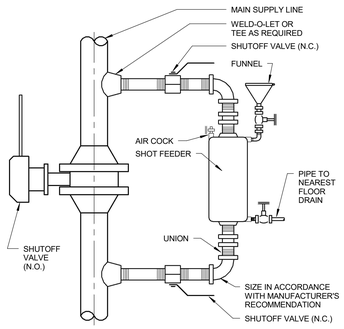
IN-LINE PUMP DETAIL
NO SCALE



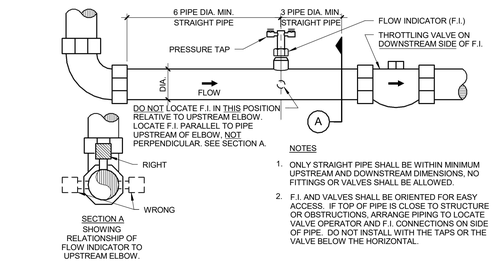
HEAT EXCHANGER PIPING DETAIL
NO SCALE



CABINET HEATER PIPING DETAIL
NO SCALE

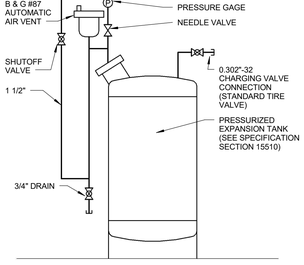


SHOT FEEDER PIPING DETAIL
NO SCALE

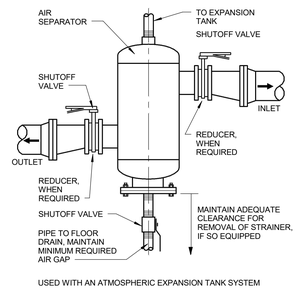


NOTES
1. ONLY STRAIGHT PIPE SHALL BE WITHIN MINIMUM UPSTREAM AND DOWNSTREAM DIMENSIONS, NO FITTINGS OR VALVES SHALL BE ALLOWED.
2. F.I. AND VALVES SHALL BE ORIENTED FOR EASY ACCESS. IF TOP OF PIPE IS CLOSE TO STRUCTURE OR OBSTRUCTIONS, ARRANGE PIPING TO LOCATE VALVE OPERATOR AND F.I. CONNECTIONS ON SIDE OF PIPE. DO NOT INSTALL WITH THE TAPS OR THE VALVE BELOW THE HORIZONTAL.

FLOW INDICATOR DETAIL
NO SCALE

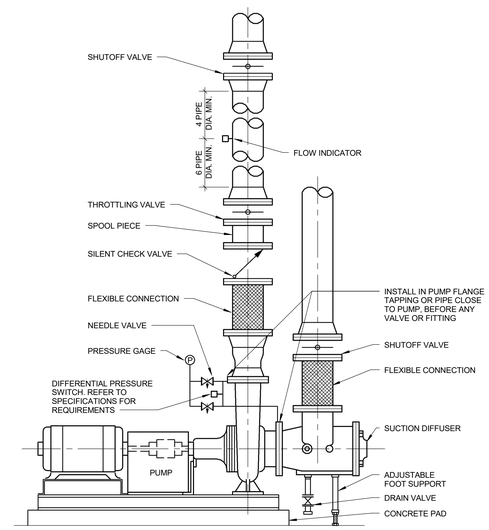


PRESSURIZED EXPANSION TANK DETAIL
NO SCALE



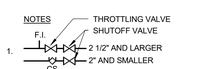
USED WITH AN ATMOSPHERIC EXPANSION TANK SYSTEM

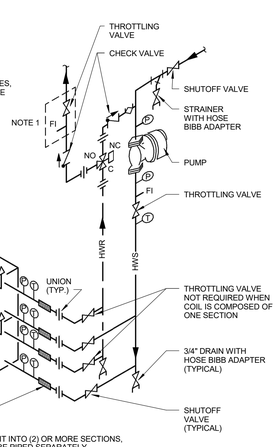
AIR SEPARATOR PIPING DETAIL
NO SCALE



NOTES
1. FOR PIPE SIZES 2" AND SMALLER, CIRCUIT SETTER MAY BE USED IN LIEU OF FLOW INDICATOR AND THROTTLING VALVE.
2. FLOW INDICATOR MAY BE ON RETURN SIDE, SEE SYSTEM SCHEMATIC.
3. REFER TO SPECIFICATION FOR INERTIA BASE REQUIREMENTS.

BASE MOUNTED PUMP WITH SUCTION DIFFUSER
NO SCALE

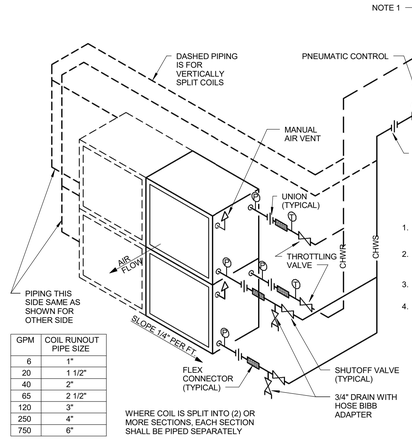




GPM	COIL RUNOUT PIPE SIZE
6	1"
20	1 1/2"
40	2"
65	2 1/2"
120	3"
250	4"
750	6"

WHERE COILS ARE SPLIT INTO (2) OR MORE SECTIONS, EACH SECTION SHALL BE PIPED SEPARATELY

AHU HEATING COIL AND TEMPERING COIL PIPING DIAGRAM (PUMPED)
NO SCALE

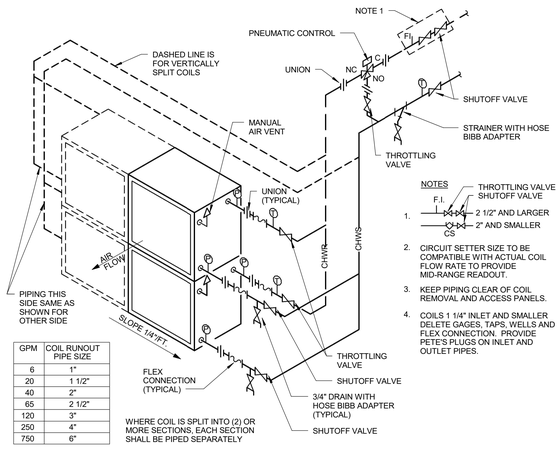


NOTES
1. THROTTLING VALVE SHUTOFF VALVE, F.I., 2 1/2" AND LARGER, 2" AND SMALLER, CS
2. CIRCUIT SETTER SIZE TO BE COMPATIBLE WITH ACTUAL COIL FLOW RATE TO PROVIDE MID-RANGE READOUT.
3. KEEP PIPING CLEAR OF COIL REMOVAL AND ACCESS PANELS.
4. COILS 1 1/4" INLET AND SMALLER DELETE GAGES, TAPS, WELLS AND FLEX CONNECTION. PROVIDE PETE'S PLUGS ON INLET AND OUTLET PIPES.

GPM	COIL RUNOUT PIPE SIZE
6	1"
20	1 1/2"
40	2"
65	2 1/2"
120	3"
250	4"
750	6"

WHERE COIL IS SPLIT INTO (2) OR MORE SECTIONS, EACH SECTION SHALL BE PIPED SEPARATELY

(2-WAY VALVE)
MULTIPLE CHILLED WATER COIL AND RUNAROUND COIL AT AHU-3 PIPING DIAGRAM
NO SCALE



NOTES
1. THROTTLING VALVE SHUTOFF VALVE, F.I., 2 1/2" AND LARGER, 2" AND SMALLER, CS
2. CIRCUIT SETTER SIZE TO BE COMPATIBLE WITH ACTUAL COIL FLOW RATE TO PROVIDE MID-RANGE READOUT.
3. KEEP PIPING CLEAR OF COIL REMOVAL AND ACCESS PANELS.
4. COILS 1 1/4" INLET AND SMALLER DELETE GAGES, TAPS, WELLS AND FLEX CONNECTION. PROVIDE PETE'S PLUGS ON INLET AND OUTLET PIPES.

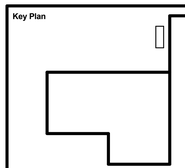
GPM	COIL RUNOUT PIPE SIZE
6	1"
20	1 1/2"
40	2"
65	2 1/2"
120	3"
250	4"
750	6"

WHERE COIL IS SPLIT INTO (2) OR MORE SECTIONS, EACH SECTION SHALL BE PIPED SEPARATELY

(3-WAY VALVE)
MULTIPLE CHILLED WATER COIL AND RUNAROUND COIL AT AHU-2 PIPING DIAGRAM
NO SCALE

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants
Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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An Ingenium International Company
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Design Lead	Drawn
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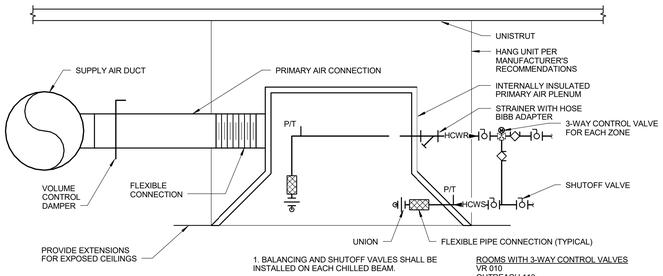
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

Project
STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
DETAILS

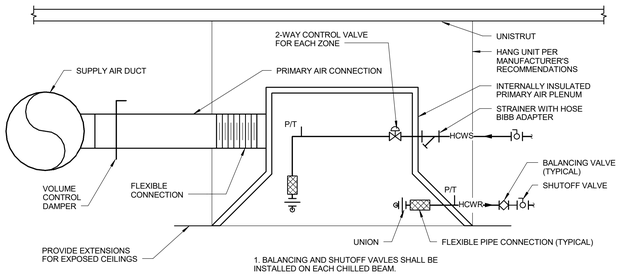
Scale 12" = 1'-0"
Project No. JCDT17-0231 (FTCH 180050)
Drawing No. M70-02



1. BALANCING AND SHUTOFF VAVLES SHALL BE INSTALLED ON EACH CHILLED BEAM.

ROOMS WITH 3-WAY CONTROL VALVES
VR 010
OUTREACH 113
COLLABORATION AREA 290.01
COLLABORATION AREA 390.01
COLLABORATION AREA 490.01
COLLABORATION AREA 590.01
COLLABORATION AREA 690.01
COLLABORATION AREA 790.01
LECTURE 701

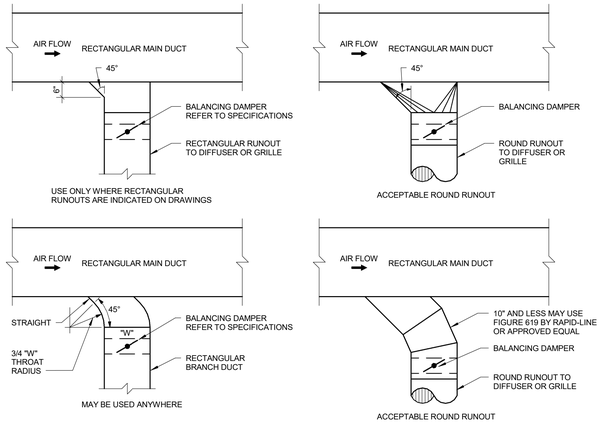
2-PIPE 3-WAY VALVE CHILLED BEAM DETAIL
NO SCALE



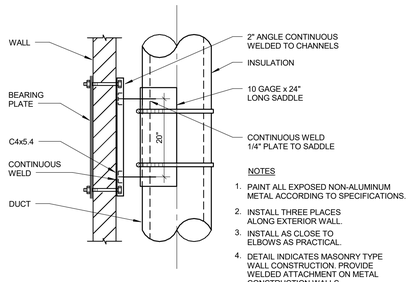
1. BALANCING AND SHUTOFF VAVLES SHALL BE INSTALLED ON EACH CHILLED BEAM.

2. ALL ROOMS SHALL HAVE 2-WAY CONTROL VALVES EXCEPT THOSE LISTED WITH 3-WAY VALVE DETAIL.

2-PIPE 2-WAY VALVE CHILLED BEAM DETAIL
NO SCALE



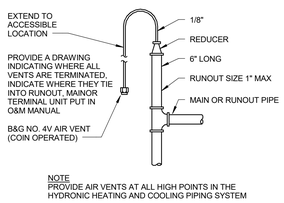
RUNOUT AND BRANCH CONNECTIONS
NO SCALE



NOTES

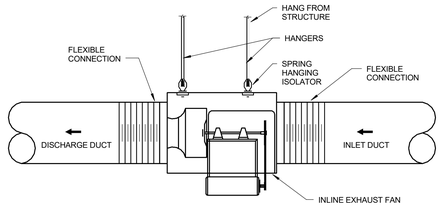
1. PAINT ALL EXPOSED NON-ALUMINUM METAL ACCORDING TO SPECIFICATIONS.
2. INSTALL THREE PLACES ALONG EXTERIOR WALL.
3. INSTALL AS CLOSE TO ELBOWS AS PRACTICAL.
4. DETAIL INDICATES MASONRY TYPE WALL CONSTRUCTION. PROVIDE WELDED ATTACHMENT ON METAL CONSTRUCTION WALLS.

WALL MOUNTED DUCT SUPPORT DETAIL
NO SCALE

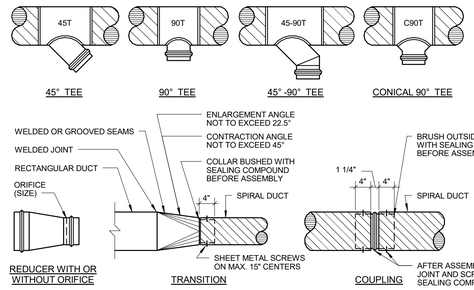


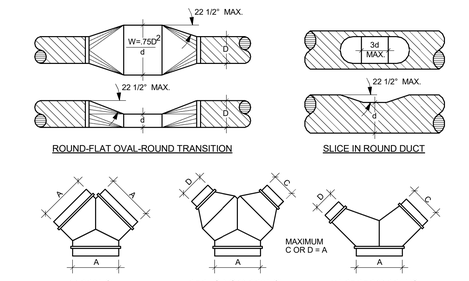
NOTE
PROVIDE AIR VENTS AT ALL HIGH POINTS IN THE HYDRONIC HEATING AND COOLING PIPING SYSTEM

TYPICAL AIR VENT
NO SCALE

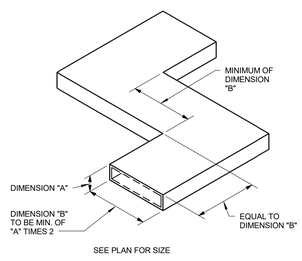


INLINE EXHAUST FAN
NO SCALE



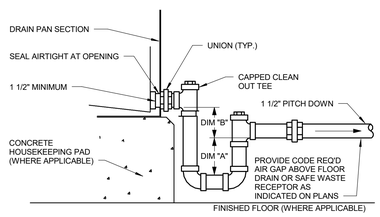


HIGH VELOCITY DUCT DETAILS
NO SCALE



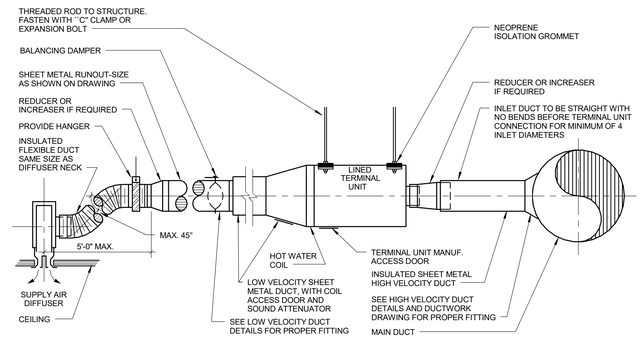
SEE PLAN FOR SIZE

TYPICAL TRANSFER DUCT
NO SCALE

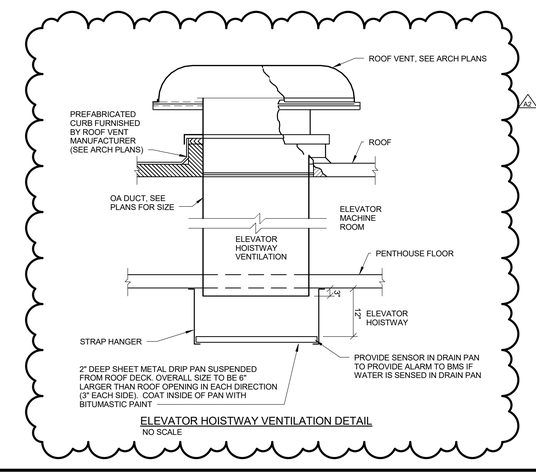


AHU TAG	DIM B	DIM A
AHU-1	5.9	3.0
AHU-2	5.2	2.6
AHU-3	3.9	1.9
BC-1	3.3	1.6

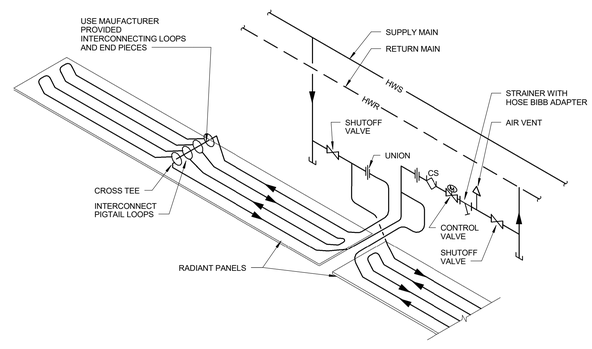
DRAIN PAN TRAP DETAIL
NO SCALE



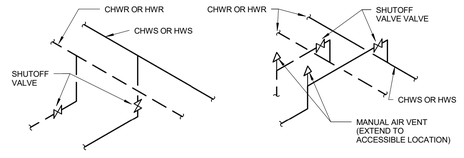
TYPICAL TERMINAL UNIT AND DUCT INSTALLATION
NO SCALE



ELEVATOR HOISTWAY VENTILATION DETAIL
NO SCALE



HOT WATER RADIANT PANEL
NO SCALE



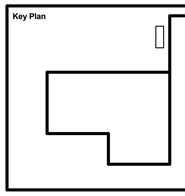
NOTES

1. MAKE ALL TAKE OFFS WITH SWING JOINTS.
2. DOWN FEED TO BE USED UNLESS INDICATED OTHERWISE.

PIPING TAKE OFF DETAILS
NO SCALE

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/22/2019	ADDENDUM NO. 2	5
05/06/2019	TEST AND BALANCE BID	

Key Plan



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Scale 12" = 1'-0"
Project No. JCDT17-0231 (FTCH 180050)
Drawing No. M70-03

ELECTRICAL SYMBOL LEGEND

SYMBOL	DESCRIPTION
S	SINGLE POLE MANUAL LIGHTING SWITCH
S_2	TWO POLE MANUAL LIGHTING SWITCH
S_3	THREE-WAY MANUAL LIGHTING SWITCH
S_4	FOUR-WAY MANUAL LIGHTING SWITCH
S_D	MANUAL DIMMER LIGHTING SWITCH
S_P	SINGLE POLE MANUAL LIGHTING SWITCH WITH PILOT LIGHT
S_T	MANUAL TIMER LIGHTING SWITCH
S_F	SINGLE POLE MANUAL FUSED SWITCH
S_M	SINGLE POLE MANUAL MOTOR STARTER
S_M	SINGLE POLE MANUAL MOTOR STARTER
S_{MP}	SINGLE POLE MANUAL MOTOR STARTER WITH PILOT LIGHT
S_{LV}	SINGLE POLE LOW VOLTAGE SWITCH
S_{OC}	OCCUPANCY SENSOR WALL SWITCH
OS	CEILING MOUNTED OCCUPANCY SENSOR
OS	WALL MOUNTED OCCUPANCY SENSOR
PP	POWER PACK FOR OCCUPANCY SENSOR
RP	RELAY PACK FOR OCCUPANCY SENSOR
EU	UL 924 EMERGENCY LIGHTING CONTROL UNIT
PS	CLG MTD DAYLIGHT HARVESTING PHOTO SENSOR
⊖	SIMPLEX RECEPTACLE
⊜	DUPLEX RECEPTACLE
●	DUPLEX RECEPTACLE (ABOVE COUNTER)
⊕	DOUBLE DUPLEX RECEPTACLE
●	DOUBLE DUPLEX RECEPTACLE (ABOVE COUNTER)
⊜	SPECIAL RECEPTACLE (AS NOTED)
⊖ C	CEILING MOUNTED SIMPLEX RECEPTACLE
⊜ C	CEILING MOUNTED DUPLEX RECEPTACLE
⊕ C	CEILING MOUNTED DOUBLE DUPLEX RECEPTACLE
⊜ C	CEILING MOUNTED SPECIAL RECEPTACLE
⊟	SIMPLEX RECEPTACLE (CONTROLLED)
⊟ ◪	DUPLEX RECEPTACLE (CONTROLLED)
■ ◪	DUPLEX RECEPTACLE (CONTROLLED - ABOVE COUNTER)
⊞ ◪	DOUBLE DUPLEX RECEPTACLE (CONTROLLED)
■ ◪	DOUBLE DUPLEX RECEPT (CONTROLLED - ABOVE COUNTER)
⊟ C	CEILING MOUNTED SIMPLEX RECEPTACLE (CONTROLLED)
⊟ C ◪ C	CEILING MOUNTED DUPLEX RECEPTACLE (CONTROLLED)
⊞ C ◪ C	CLG MTD DOUBLE DUPLEX RECEPTACLE (CONTROLLED)
⊙	POWER AND DATA POKE-THRU FLOOR DEVICE
FB	POWER AND DATA FLOOR BOX
TV	VIDEO MONITOR POWER AND DATA WALL BOX
⊗	CEILING MOUNTED JUNCTION BOX
J	WALL MOUNTED JUNCTION BOX
J	FLOOR MOUNTED JUNCTION BOX
PC	PHOTOCELL
PB	PUSHBUTTON
TC	TIME CLOCK
XL	LOW VOLTAGE TRANSFORMER
T	THERMOSTAT
H	HUMIDISTAT
▲	SPECIAL CONNECTION (AS NOTED)
▨	PANELBOARD (480Y/277V) OR (480V)
■	PANELBOARD (208Y/120V) OR (120/240V)
●	SINGLE PHASE MOTOR CONNECTION
◐	THREE PHASE MOTOR CONNECTION
☐	NON FUSIBLE DISCONNECT SWITCH
◩ ZPX/Y	FUSIBLE DISCONNECT SWITCH (Z=No. POLES; X=SWITCH SIZE; Y=FUSE SIZE; MOUNT AT 5'-0" AFF, UNO)
☒ X N	MOTOR STARTER N=STARTER SIZE; X=STARTER TYPE, (RV: REDUCED VOLTAGE; BLANK: FULL VOLTAGE); MOUNT AT 5'-0" AFF, UNO
☒ X N	COMBINATION MOTOR STARTER / DISCONNECT SWITCH N=STARTER SIZE; X=STARTER TYPE, (RV: REDUCED VOLTAGE; BLANK: FULL VOLTAGE); MOUNT AT 5'-0" AFF, UNO
⊕	GROUND ROD
--------	CONDUIT UNDER FLOOR
———	CONDUIT ABOVE FLOOR
☐	SURFACE OR RECESSED LUMINAIRE
○	SURFACE OR RECESSED DIRECTIONAL LUMINAIRE
○	WALL MOUNTED LUMINAIRE
▽	TRACK MOUNTED LUMINAIRE
▨	EMERGENCY LUMINAIRE
◢	NIGHT LIGHT LUMINAIRE
◢	EMERGENCY NIGHT LIGHT LUMINAIRE
⊳☐⊲	BATTERY POWERED EMERGENCY LIGHTING UNIT
⊗	CEILING MOUNTED EXIT SIGN
⊗	WALL MOUNTED EXIT SIGN
■○	SITE LUMINAIRE AND POLE

FIRE ALARM SYMBOL LEGEND

SYMBOL	DESCRIPTION
FACP	MAIN FIRE ALARM CONTROL PANEL
FAAP	FIRE ALARM REMOTE ANNUNCIATOR PANEL
NACP	NOTIFICATION APPLIANCE CONTROL PANEL
F	MANUAL PULL STATION
H	HEAT DETECTOR; CEILING MOUNTED
H	HEAT DETECTOR; WALL MOUNTED
S	SMOKE DETECTOR; CEILING MOUNTED
S	SMOKE DETECTO; WALL MOUNTED
S EL	ELEVATOR SMOKE DETECTOR
D	DUCT-TYPE SMOKE DETECTOR
BD	BEAM-TYPE SMOKE DETECTOR; WALL MOUNTED
RT	REMOTE TEST STATION; CEILING MOUNTED
RT	REMOTE TEST STATION; WALL MOUNTED
A	AUDIO DEVICE, CEILING MOUNTED
⊳☐	AUDIO DEVICE; WALL MOUNTED
L	VISUAL DEVICE; CEILING MOUNTED
L	VISUAL DEVICE; WALL MOUNTED
AV	COMBINATION AUDIO/VISUAL DEVICE; CEILING MOUNTED
⊳L	COMBINATION AUDIO/VISUAL DEVICE; WALL MOUNTED
SD	SMOKE DAMPER
FS	FIRE PROTECTION SPRINKLER FLOW SWITCH
TS	FIRE PROTECTION SPRINKLER TAMPER SWITCH
PV	FIRE PROTECTION POST INDICATOR VALVE
CF	FIRE PROTECTION CO2 SYSTEM FLOW SWITCH
F	FIRE FIGHTER'S PHONE OUTLET
B	FIRE ALARM BELL
M	MAGNETIC DOOR HOLDER
▲	FIRE ALARM INTERLOCK / CONTROL CONNECTION

SECURITY SYMBOL LEGEND

SYMBOL	DESCRIPTION
⊗	CAMERA OUTLET; CEILING OR PENDANT MOUNTED
C	CAMERA OUTLET; WALL MOUNTED
KP	KEYPAD CONTROLLER OUTLET
CR	PROXIMITY CARD READER OUTLET
PB	PANIC BUTTON OUTLET
MD	MOTION DETECTOR OUTLET
GB	GLASS BREAK SENSOR OUTLET
S	SECURITY SIREN OUTLET
MC	DOOR MAGNETIC CONTACTS
DS	ELECTRIC DOOR STRIKE
DL	ELECTRIC DOOR LATCH
EH	ELECTRIC POWER TRANSFER HINGE
RE	REQUEST-TO-EXIT DEVICE OUTLET

GENERAL ABBREVIATIONS

A	AMPERES	KO	KNOCKOUT
AC	ALTERNATING CURRENT	KVA	KILOVOLT AMPERE
ACP	ACOUSTICAL CEILING PANEL	KW	KILOWATT
ADA	AMERICANS WITH DISABILITIES ACT	KWHR	KILOWATT-HOUR
AFF	ABOVE FINISHED FLOOR	LED	LIGHT-EMITTING DIODE
AHJ	AUTHORITY HAVING JURISDICTION	LS	LIMIT SWITCH
AIC	AMPERE-INTERRUPTING CURRENT	LT	LIGHT
AL	ALUMINUM	LTFMC	LIQUID-TIGHT FLEXIBLE METAL CONDUIT
AMP	AMPERES	LTG	LIGHTING
ATM	AUTOMATIC TELLER MACHINE	LV	LOW VOLTAGE
ATS	AUTOMATIC TRANSFER SWITCH	M	METER
BRKR	BREAKER	MANUF	MANUFACTURER
C	CONDUIT, CELSIUS	MCA	MINIMUM CIRCUIT AMPACITY
CB	CIRCUIT BREAKER	MCB	MAIN CIRCUIT BREAKER
CATV	CABLE TELEVISION	MCC	MOTOR CONTROL CENTER
CIP	CAST-IN-PLACE	MCP	MOTOR CIRCUIT PROTECTOR
CJ	CONTROL JOINT	MH	MANHOLE
CKT	CIRCUIT	MLO	MAIN LUGS ONLY
CLG	CEILING	MT	MOUNT
CM	CONSTRUCTION MANAGER	MTD	MOUNTED
CMU	CONCRETE MASONRY UNIT	MV	MEDIUM VOLTAGE
COAX	COAXIAL	N, NEUT	NEUTRAL
CONC	CONCRETE	NC	NORMALLY CLOSED
CP	CONTROL PANEL	NL	NIGHT LIGHT
CT	CURRENT TRANSFORMER	NO	NORMALLY OPEN
CU	COPPER	NOM	NOMINAL
Cx	COMMISSIONING	NTS	NOT TO SCALE
CxA	COMMISSIONING AGENT	OD	OUTSIDE DIAMETER
BMS	BUILDING MANAGEMENT SYSTEM	OH	OVERHEAD
DB	DECIBEL	OHD	OVERHEAD DOOR
DC	DIRECT CURRENT	OL	OVERLOAD
DEM	DEMOLISH	PA	PUBLIC ADDRESS
DEMO	DEMOLITION	PB	PULL BOX; PUSH BUTTON
DF	DRINKING FOUNTAIN	PFC	POWER FACTOR CORRECTION
DISC	DISCONNECT	PH	PHASE
DPDT	DOUBLE POLE DOUBLE THROW	PNL	PANELBOARD
DPST	DOUBLE POLE SINGLE THROW	PT	POTENTIAL TRANSFORMER
EC	ELECTRICAL CONTRACTOR	PTZ	PAN-TILT-ZOOM
EJ	EXPANSION JOINT	PWR	POWER
ELEC	ELECTRICAL	RCP	REFLECTED CEILING PLAN
ELEV	ELEVATOR; ELEVATION	REBAR	REINFORCING BAR
EM	EMERGENCY	RECEPT	RECEPTACLE
EMT	ELECTRICAL METALLIC TUBING	RM	ROOM
ENCL	ENCLOSURE	RNMC	RIGID NON-METALLIC CONDUIT
ETR	EXISTING TO REMAIN	ROW	RIGHT-OF-WAY
EWC	ELECTRIC WATER COOLER	RMC	RIGID METAL CONDUIT
EWH	ELECTRIC WATER HEATER	SEC	SECONDARY
EXIST	EXISTING	SPDT	SINGLE POLE DOUBLE THROW
F	FUSE; FAHRENHEIT	SPECS	SPECIFICATIONS
FA	FIRE ALARM	SPST	SINGLE POLE SINGLE THROW
FAAP	FIRE ALARM ANNUNCIATOR PANEL	SQ	SQUARE
FACP	FIRE ALARM CONTROL PANEL	SS	STAINLESS STEEL
FF&E	FIXTs, FURNISHINGS & EQUIPMENT	SV	SOLENOID VALVE
FIXT	FIXTURE	SWBD	SWITCHBOARD
FLA	FULL LOAD AMPERES	SWGR	SWITCHGEAR
FM	FACTORY MUTUAL	TCC	TEMPERATURE CONTROL CONTRACTOR
FMC	FLEXIBLE METAL CONDUIT	TCP	TEMPERATURE CONTROL PANEL
FO	FIBER OPTIC	TRANS	TRANSFORMER
FRT	FIRE RETARDANT	TS	TIME SWITCH
GC	GENERAL CONTRACTOR	TYP	TYPICAL
GEN	GENERATOR	UL	UNDERWRITERS' LABORATORIES
GFCI	GROUND FAULT CKT INTERRUPTER	UNO	UNLESS NOTED OTHERWISE
GFI	GROUND FAULT INTERRUPTER	UPS	UNINTERRUPTIBLE POWER SUPPLY
GND	GROUND	V	VOLTS
GYP BD	GYPSUM BOARD	VA	VOLT-AMPERE
HH	HAND HOLE	VAC	VOLTS-ALTERNATING CURRENT
HOA	HAND-OFF-AUTO	VDC	VOLTS-DIRECT CURRENT
HP	HORSE POWER	VFD	VARIABLE FREQUENCY DRIVE
HV	HIGH VOLTAGE	W	WATTS
ID	INSIDE DIAMETER	WH	WATER HEATER
JB	JUNCTION BOX	WP	WEATHERPROOF

LUMINAIRE SCHEDULE

MARK	DESCRIPTION	MANUFACTURER	CATALOG NO.	OR EQUAL BY	LAMPS	VOLTAGE	LOAD	REMARKS
A1	2'x2', RECESSED LED TROFFER, 4074 DELIVERED LUMENS, 4000K CCT	FLUXWERX	TR1-22-C-40-F2-M	METALUX: 24SR-LD2-45-C SERIES, FOCAL POINT: FEQ2-24-MG-4500L-480 SERIES	(LED LAMPS PROVIDED)	277 V	39 VA	3% DIMMING.
A2	2'x4', RECESSED LED TROFFER, 5001 DELIVERED LUMENS, 4000K CCT	FLUXWERX	TR1-24-D-40-F2-M	METALUX: 24SR-LD2-45-C SERIES, FOCAL POINT: FEQ2-24-MG-5500L-480 SERIES	(LED LAMPS PROVIDED)	277 V	47 VA	3% DIMMING.
A3	2'x2', RECESSED LED TROFFER, 2750 DELIVERED LUMENS, 4000K CCT, FLANGED TRIM.	FLUXWERX	TR1-22-A-40-F2-M-K	METALUX: 24SR-LD2-45-C SERIES, FOCAL POINT: FEQ2-22-MG-3000L-480 SERIES	(LED LAMPS PROVIDED)	277 V	23 VA	3% DIMMING.
B	LINEAR LED, BEAM PROFILE, PENDANT MOUNTED, DIRECT INDIRECT LUMINAIRE 20U/80D, 2850 LUMENS/4 FT. PROVIDE RUNS IN LENGTHS, PER PLANS.	FLUXWERX	VU1-B-B-C-40-W-XX-S-E1-M-06-A	IODINE-CS-XX-4-40K-CPO-CPO SERIES, FOCAL POINT: FNRS-FL-750LF-40 SERIES	(LED LAMPS INCLUDED)	277 V	29 VA	WHITE FINISH, STRUCTURE MOUNTING (WITH REMOTE DRIVER), ALTERNATE WIRING (NORMAL AND EMERGENCY WIRING ROUTED THROUGHOUT FIXTURE), 1% DIMMING.
C	LINEAR LED, RADIUS PROFILE, PENDANT MOUNTED, DIRECT INDIRECT LUMINAIRE 20U/80D, 2850 LUMEN/4 FT. PROVIDE RUNS IN LENGTHS, PER PLANS.	FLUXWERX	VU1-R-B-C-40-W-XX-S-E1-M-06-A	IODINE-CS-XX-4-40K-CPO-CPO SERIES, FOCAL POINT: FNRS-FL-750LF-40 SERIES	(LED LAMPS INCLUDED)	277 V	29 VA	WHITE FINISH, STRUCTURE MOUNTING (WITH REMOTE DRIVER), ALTERNATE WIRING (NORMAL AND EMERGENCY WIRING ROUTED THROUGHOUT FIXTURE), 1% DIMMING.
D	SINGLE FACE LED SIGN, WALL MOUNTED "DARKROOM IN USE"	SIGNTEX INC.	RPRO-NB-1-R-W-W-TW-"DARKROOM IN USE"	KENALL: METESW-MW SERIES. DUAL-LITE: OBN-U-S SERIES	INCLUDED	277 V	6 VA	
E	RECESSED LED COVE, 4 FOOT.	FLUXWERX	NT1-L-D1-BB-40-F2-M-4	AXIS: ZERLED-SQ-600L SERIES, LUMENWERX: CAVR-RLO-LED-80-750	(LED LAMPS PROVIDED)	277 V	24 VA	3% DIMMING.
E1	RECESSED LED COVE. 3 FOOT.	FLUXWERX	NT1-L-D1-BB-40-F2-M-3	AXIS: ZERLED-SQ-600L SERIES, LUMENWERX: CAVR-RLO-LED-80-750	(LED LAMPS INCLUDED)	277 V	18 VA	3% DIMMING.
F	4', LED, CHAIN MOUNTED LENSED INDUSTRIAL WHITE FINISH. 3190 LUMENS	LITHONIA	CLX-L48-3000LM-SEF-RDL-277-GZ10-40K-80CRI-HC36	METALUX: 4-SNLED-LD5-LN SERIES, HE WILLIAMS: 75R-4-L45 SERIES	(LED LAMPS PROVIDED)	277 V	20 VA	10% DIMMING
FEM	4', LED, CHAIN MOUNTED LENSED INDUSTRIAL, WHITE FINISH. 3190 LUMENS AND 10W INTEGRAL EMERGENCY BATTERY.	LITHONIA	CLX-L48-3000LM-SEF-RDL-277-GZ10-40K-80CRI-PS1050-HC36	METALUX: 4-SNLED-LD5-LN-EM SERIES, HE WILLIAMS: 75R-4-L45-EM/10WLP SERIES	(LED LAMPS PROVIDED)	277 V	20 VA	10% DIMMING
H	LINEAR LED, SQUARE PROFILE, PENDANT. MOUNTED, DIRECT INDIRECT LUMINAIRE 20U/80D, 3630 LUMENS/4 FT. PROVIDE RUNS IN LENGTHS, PER PLANS.	FLUXWERX	VU1-S-B-D-40-W-XX-S-E1-M-06-A	IODINE-CS-XX-4-40K-CPO-CPO SERIES, FOCAL POINT: FNRS-FL-750LF-40 SERIES	(LED LAMPS INCLUDED)	277 V	38 VA	WHITE FINISH, STRUCTURE MOUNTING (WITH REMOTE DRIVER), ALTERNATE WIRING (NORMAL AND EMERGENCY WIRING ROUTED THROUGHOUT FIXTURE), 1% DIMMING.
I	4' LINEAR LED, PENDANT MOUNTED, DIRECT INDIRECT LUMINAIRE 15U/85D, 4100 LUMEN, ANGLED END CAP.	FLUXWERX	PF1-A-D-D-40-W-04-S-E1-M-06	AXIS: ZESQDI-SL-20/80 SERIES, LUMENWERX: CAVSPDI-OP-RLO-LED-80 SERIES	(LED LAMPS PROVIDED)	277 V	38 VA	WHITE FINISH, STRUCTURE MOUNTING (WITH REMOTE DRIVER), 1% DIMMING
J1	DECORATIVE LED PENDANT WITH 3 SPOKES, 4000K	FLUXWERX	PS1-F-D-C-40-C-3S-F2-M-03	AXIS: SCDI-CUSTOM, ALWUSA-RPD08-P1-XX-3-4000-1% SERIES	(LED LAMPS INCLUDED)	277 V	44 VA	ONE CUSTOM COLOR AS SELECTED DURING THE SHOP DRAWING PHASE. STRUCTURE MOUNTING (WITH REMOTE DRIVER), FLAT END CAP. 3% DIMMING.
J2	DECORATIVE LED PENDANT WITH 4 SPOKES, 4000K	FLUXWERX	PS1-F-D-C-40-C-4S-S-F2-M-03	AXIS: SCDI-CUSTOM, ALWUSA-RPD08-P1-XX-4-4000-1% SERIES	(LED LAMPS PROVIDED)	277 V	58 VA	ONE CUSTOM COLOR AS SELECTED DURING THE SHOP DRAWING PHASE. STRUCTURE MOUNTING (WITH REMOTE DRIVER), FLAT END CAP. 3% DIMMING.
K	RECESSED LED TROFFER WALL AND CEILING MOUNTED FORMING A CORNER, TRIMLESS, 2 ROWS ONE CORNER, 600 LUMEN PER FT. 3% DIMMING.	FLUXWERX	NT2-P-P2-D2-B-D-40-F2-M-XX	AXIS: ZERLED-SQ-600L SERIES, PEERLESS: OPRS-FL-LOP-XFT-80-40K-800LMF SERIES	(LED LAMPS PROVIDED)	277 V	139 VA	FIELD CONFIRM MEASUREMENTS: HORIZONTAL SEGMENT SHALL BE 5'0" AND VERTICAL SEGMENT SHALL BE APPROXIMATELY 9'0"
K1	RECESSED LED TROFFER WALL AND CEILING MOUNTED FORMING A CORNER, TRIMLESS, 2 ROWS ONE CORNER, 600 LUMEN PER FT. 3% DIMMING.	FLUXWERX	NT2-P-P2-D2-B-D-40-F2-M-XX	AXIS: ZERLED-SQ-600L SERIES, P	(LED LAMPS PROVIDED)	277 V	665 VA	FIELD CONFIRM MEASUREMENTS: HORIZONTAL SEGMENT SHALL BE APPROXIMATELY 60'0" AND VERTICAL SEGMENT SHALL BE APPROXIMATELY 10'6"
K2	SIMILAR TO K2 BUT CEILING MOUNTED, WITHOUT THE CORNER AND A LENGTH OF 9 FEET. TRIMLESS, 600 LUMENS PER FOOT, 3% DIMMING	FLUXWERX	NT1-L-D1-BB-40-F2-M-X	AXIS: ZERLED-SQ-600L SERIES, P	(LED LAMPS INCLUDED)	277 V	950 VA	
L	4' LONG x 3-3/4"H x 1-1/2" W RECTALINEAR NARROW PENDANT. MATTE WHITE, 500 LUMENS / FT. 5% DIMMING.	LUMENWERX	VIA1.5PD-HLO-LED-80-500-40-4-277-D5-1-53WAC36-W	AXIS: SCD-500 SERIES, ALWUSA-HBMCS-S4-XX-80-40 SERIES	(LED LAMPS INCLUDED)	277 V	22 VA	
M	6-INCH APERTURE, 1821 LUMEN, 4000K, RECESSED LED DOWNLIGHT, WET LOCATION SHOWER LIGHT. TEXTURED LENS.	ACUITY GOTHAM	EVO-6SH-40/30-6DFR-SOL-MVOLT-EZ10	USAI: LN25RD-T-MTG2-20-40K SERIES, EDISON PRICE:SHW-FTF-4DL-L20-DMV-AD SERIES	(LED LAMPS PROVIDED)	277 V	32 VA	
N	4', LED, CHAIN MOUNTED LENSED INDUSTRIAL. WHITE FINISH. 7101 LUMENS	LITHONIA	CLX-L48-7000LM-SEF-RDL-277-GZ10-40K-80CRI	METALUX: 4-SNLED-LD5-LN	(LED LAMPS PROVIDED)	277 V	49 VA	10% DIMMING
OA	6-INCH APERTURE, RETROFIT APPLICATION,1000 LUMEN, 4000K, RECESSED LED DOWNLIGHT WITH DIFFUSE CLEAR LENS AND FLANGE.	ACUITY GOTHAM	EVO-R-40-10-6AR-MD-LD-277	PORTFOLIO: LDRT6B SERIES, SPECTRUM: RP6LED-1200LU SERIES	(LED LAMPS PROVIDED)	277 V	12 VA	
OB	LED WALL PACK WITH SURFACE MOUNTED BACKBOX. TRAPAZOID SHAPE. WIDE DISTRIBUTION.	LITHONIA	WST LED-P2-40K-VW-277-BBW-PIR	MCGRAW-EDISON: ISW-AF SERIES, USARCHITECTURAL: TSUW-LED-1VLED-48-525MA-XX SERIES	(LED LAMPS INCLUDED)	277 V	42 VA	COLOR AS SELECTED DURING THE SHOP DRAWING PHASE
OC	IP65 RATED LED LUMINIARE. NOMINAL 59.25"L 3359 LUMENS, 4000K. DIE-CAST ALUMINUM HOUSING. STAINLESS STEEL FASTENERS. WHITE SAFETY GLASS.	BEGA	24 320-K4-BLK	OCL: ZE1-S1SE-XX-MW-LED SERIES, ECLIPSE: GALILEO XL4-4K-NEPTUNE-EL67-D7-9002	(LED LAMPS INCLUDED)	277 V	55 VA	
OC1	IP65 RATED LED LUMINIARE. NOMINAL 40"L 2038 LUMENS, 4000K. DIE-CAST ALUMINUM HOUSING. STAINLESS STEEL FASTENERS. WHITE SAFETY GLASS.	BEGA	24 319-K4-BLK	OCL: ZE1-S1SE-XX-MW-LED SERIES, ECLIPSE: GALILEO XL4-4K-NEPTUNE-EL67-D7-9002	(LED LAMPS INCLUDED)	277 V	36 VA	
OD	NARROW, RECESSED LED EXTRUDED ALUMINUM FIXTURE THAT TRANSISTIONS FROM THE CEILING TO THE WALL. 375 LUMENS / FT. 4000K. DAMP LOCATION LISTED.	FOCAL POINT	FSM2L-FL-375LF-40K-1C-UNV-LD1-CXFF-WH-19'CX11'W	AXIS: BRLEDPAT--OPI-90 SERIES, ECLIPSE: GALILEO XL4-4K-NEPTUNE-EL67-D7-9002	(LED LAMPS INCLUDED)	277 V	570 VA	
P	LINEAR LED, BEAM PROFILE, PENDANT MOUNTED, GRID CEILING, DIRECT INDIRECT LUMINAIRE 20U/80D, 2850/4 FT. LUMEN	FLUXWERX	VU1-B-B-C-40-W-XX-G-E1-M-06-A	IODINE-CS-XX-4-40K-CPO-CPO SERIES, FOCAL POINT: FNRS-FL-750LF-40 SERIES	(LED LAMPS INCLUDED)	277 V	29 VA	WHITE FINISH, GRID MOUNTING, ALTERNATE WIRING (NORMAL AND EMERGENCY WIRING ROUTED THROUGHOUT FIXTURE), 1% DIMMING.
R	THREE ADUSTABLE HEAD DOWNLIGHT IN A RECESSED HOUSING. 1500 LUMENS, 35 DEGREE, PER HEAD. BEVELED TRIM, BLACK DIFFUSE REFLECTOR, FLANGELESS WHITE TRIM.	ACUITY: ACULUX	AX2SQ 3A G2-15LM-40K-80CRI-35D-ZT-MVOLT-2SQ3ABV-BD-WHFM-FMA2SQ3/075	USAI-LNMLMR-3 SERIES, CONTRASTE: ISMOD-3-XX-D-1-40-M SERIES	(LED LAMPS PROVIDED)	277 V	49 VA	1% DIMMING.
XA	SINGLE FACE LED EXIT SIGN, PENDANT MOUNTED	LITHONIA:	TLE-1-R	SURE-LITES: CX 6 1 SD, ATLITE: XLN2-8-D-R-1 SERIES	(INCLUDED)	277 V	6 VA	CHEVRONS AS INDICATED ON PLANS
XB	SINGLE FACE LED EXIT SIGN, PENDANT MOUNTED	LITHONIA	TLE-1-R	SURE-LITES: CX 6 1 SD, ATLITE: XLN2-8-D-R-1 SERIES	(INCLUDED)	277 V	6 VA	CHEVRONS AS INDICATED ON PLANS
XC	SINGLE FACE LED EXIT SIGN, BACK MOUNTED	LITHONIA:	TLE-1-R	SURE-LITES: CX 6 1 SD, ATLITE: XLN2-8-D-R-1 SERIES	INCLUDED		6 VA	CHEVRONS AS INDICATED ON PLANS

LIGHTING FIXTURE SCHEDULE NOTES:

1. ALL LUMINAIRE COLOR TEMPERATURES SHALL BE 4000K.

GENERAL NOTES

1. SYMBOLS AND GENERAL DESCRIPTIONS IN SYMBOL LEGENDS ARE INDICATED FOR GENERAL REFERENCE ONLY. NOT ALL SYMBOLS ARE USED ON THIS PROJECT. SEE SCHEDULES, SPECIFICATIONS AND PLANS FOR ADDITIONAL INFORMATION INCLUDING MOUNTING HEIGHTS.
2. THESE ELECTRICAL DRAWINGS ARE DIAGRAMMATIC AND REPRESENT THE ELECTRICAL DESIGN INTENT. PROVIDE ALL WORK AND MATERIALS THAT ARE REQUIRED FOR COMPLETE AND FUNCTIONAL ELECTRICAL SYSTEMS THAT FULLY MEET THE ELECTRICAL DESIGN INTENT. ALL ELECTRICAL WORK SHALL CONFORM TO THE LATEST VERSION OF THE NEC AS ADOPTED BY THE AUTHORITY HAVING JURISDICTION. SEE SPECIFICATIONS FOR ADDITIONAL INSTALLATION REQUIREMENTS AND ITEMS THAT MAY BE REQUIRED ABOVE AND BEYOND THE MINIMUM REQUIREMENTS THAT ARE OUTLINED IN THE NATIONAL ELECTRICAL CODE (NEC).
3. THOROUGHLY AND CAREFULLY REVIEW ALL DRAWINGS, SPECIFICATIONS AND WORK SCOPES IN CONTRACT DOCUMENTS PRIOR TO BIDS AND CONSTRUCTION. WHERE THERE ARE CONFLICTS AMONG THE DRAWINGS, SPECIFICATIONS AND WORK SCOPES, THE MORE STRINGENT OR GREATER QUANTITY REQUIREMENTS SHALL APPLY.
4. ALL ELECTRICAL EQUIPMENT SHALL BE UL LISTED.
5. SEE INDIVIDUAL SPECIFICATION SECTIONS FOR SPECIFIC REQUIREMENTS RELATED TO TESTING, MANUFACTURER STARTUP, TRAINING, ETC. ALL APPLICABLE TESTING AND MANUFACTURER STARTUP REPORTS SHALL BE SUBMITTED AND APPROVED PRIOR TO THE DEVELOPMENT OF ELECTRICAL PUNCH LISTS.
6. ALL CONDUCTORS, INCLUDING THE GROUNDED CONDUCTORS (NEUTRALS), SHALL BE LABELED AT ALL ENDS AND JOINTS, WITH THE CORRESPONDING PANELBOARD NAME AND CIRCUIT NUMBER OR OTHERWISE IDENTIFIED TO CORRESPOND WITH THE ASSOCIATED EQUIPMENT MANUFACTURER'S IDENTIFICATION SYSTEM.
7. AT A MINIMUM, PROVIDE 1#12, 1#12N, 1#12G FOR 20A BRANCH CIRCUITING, UNO. MINIMUM CONDUIT SIZE SHALL BE 3/4", UNO. NO MORE THAN NINE CURRENT CARRYING CONDUCTORS, SHALL BE ALLOWED IN A RACEWAY, UNO. EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH THE NEC AND MAY BE SHARED. ALL GROUNDED CONDUCTORS (NEUTRALS) SHALL BE TREATED AS CURRENT CARRYING CONDUCTORS.
8. PROVIDE A DEDICATED GROUNDED CONDUCTOR (NEUTRAL) FOR EACH BRANCH CIRCUIT. SHARED NEUTRALS ARE NOT ALLOWED.
9. INSTALL GREEN, INSULATED, COPPER EQUIPMENT GROUNDING CONDUCTORS IN ALL RACEWAYS INCLUDING ALL FLEXIBLE METAL CONDUITS AND NON-METALLIC RACEWAYS. GREEN INSULATED, EQUIPMENT GROUNDING CONDUCTORS SHALL BE INSTALLED WITH ALL FEEDERS AND BRANCH CIRCUITS.
10. PROVIDE FIRE STOPPING FOR ALL CONDUIT AND OTHER ELECTRICAL EQUIPMENT PENETRATIONS THROUGH FLOORS, WALLS AND CEILINGS TO MAINTAIN FIRE RATINGS. SEE ARCHITECTURAL FOR THE SPECIFIED FIRE RATINGS OF FLOORS, WALLS, AND CEILINGS. PROVIDE AND INSTALL HILTI SPEED SLEEVE MODEL CP-630 OR EZ PATH FIRE STOP SYSTEM WHEREVER CONDUITS OR CABLING PASS THROUGH FIRE RATED WALLS, FLOORS OR CABLES PASS THROUGH OPENINGS IN WALLS.
11. LIMIT VOLTAGE DROP IN CONDUCTORS TO 2% FOR FEEDERS AND 3% FOR BRANCH CIRCUITS, ASSUMING FULL LOAD CONDITIONS. VOLTAGE DROP SHALL NOT EXCEED 5% FROM THE ELECTRICAL SERVICE TO THE FURTHEST ELECTRICAL DEVICE.
12. CALCULATE AND APPLY THE APPROPRIATE NEC DERATING FACTOR FOR CONDUCTORS INSTALLED IN ROOF MOUNTED CONDUITS.
13. PROVIDE THERMAL SEALS IN ALL CONDUITS THAT RUN FROM CONDITIONED SPACES TO UNCONDITIONED SPACES.
14. ALL WIRING FOR INTERIOR LED LUMINAIRES THAT ARE REQUIRED TO BE DIMMED SHALL INCLUDE (2) #18 AWG WIRES FROM EACH LUMINAIRE TO THE ASSOCIATED LIGHTING CONTROLLER FOR 0-10V LIGHTING CONTROL. ALL CONTROL WIRES SHALL BE LABELED.
15. SEE ARCHITECTURAL REFLECTED CEILING PLANS AND ELEVATIONS FOR LOCATIONS OF CEILING AND WALL MOUNTED DEVICES.
16. ALL LUMINAIRES SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE.
17. UNLESS NOTED OTHERWISE, ALL CONDUIT AND WIRING SHALL BE CONCEALED. ELECTRICAL CONNECTIONS SHOWN ON DRAWINGS ARE DIAGRAMMATIC AND ARE USED TO ILLUSTRATE CIRCUITING AND WIRING REQUIREMENTS ONLY.
18. ALL JUNCTION BOXES SERVING BRANCH CIRCUIT WIRING SHALL BE LABELED TO IDENTIFY THE CIRCUIT(S) ROUTED THROUGH EACH RESPECTIVE JUNCTION BOX BY UTILIZING BRADY LABELS.
19. WHERE PLENUMS ARE UTILIZED FOR HVAC AIR DISTRIBUTION, PROVIDE PLENUM RATED CABLES AND CONDUCTORS IN THOSE PLENUMS. SEE MECHANICAL FOR LOCATIONS OF HVAC PLENUMS.
20. ELECTRICAL EQUIPMENT INSTALLED ABOVE CEILINGS SHALL BE INSTALLED IN READILY ACCESSIBLE LOCATIONS, SUCH AS, BUT NOT LIMITED TO, ABOVE DOORWAYS TO ROOMS. COORDINATE ALL LOCATIONS WITH OTHER TRADES TO AVOID CONFLICTS WITH OTHER EQUIPMENT AND THE NEED FOR EXCESSIVELY LONG LADDER REQUIREMENTS TO ACCESS EQUIPMENT AND DIFFICULT AND AWKWARD CLIMBING AND/OR UNNECESSARY BENDING DURING SERVICING OF EQUIPMENT.
21. CONDUCTORS INSTALLED IN WIREWAYS THAT CONTAIN MORE THAN 30 CURRENT CARRYING CONDUCTORS SHALL BE DERATED IN ACCORDANCE WITH THE NEC.
22. DO NOT USE LOAD CENTERS, PANELBOARDS, SWITCHBOARDS, MOTOR CONTROL CENTERS AND OTHER POWER DISTRIBUTION EQUIPMENT AS RACEWAYS.
23. SEE SPECIFICATION SECTION 26 05 34, RACEWAYS FOR ELECTRICAL SYSTEMS, FOR PROJECT SPECIFIC RACEWAY INSTALLATION REQUIREMENTS.
24. SEE SPECIFICATION SECTION 26 05 53, IDENTIFICATION FOR ELECTRICAL SYSTEMS, FOR PROJECT SPECIFIC IDENTIFICATION REQUIREMENTS.
25. EXISTING ELECTRICAL ITEMS INDICATED IN THE CONTRACT DRAWINGS ARE BASED ON THE OWNER'S LIMITED RECORD DRAWINGS AND THE ENGINEER'S LIMITED FIELD OBSERVATIONS. CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS SHALL VISIT THE SITE TO UNDERSTAND COMPLETELY THE CONDITIONS UNDER WHICH THE WORK SHALL BE PERFORMED. PERFORM ALL INCIDENTAL ELECTRICAL DEMOLITION AND/OR RELOCATION OF DEVICES AND EQUIPMENT REQUIRED TO FACILITATE THE DEMOLITION WORK OF OTHER TRADES AT NO ADDITIONAL COST TO THE OWNER.
26. DRAWINGS DO NOT INDICATE ALL ELECTRICAL EQUIPMENT AND DEVICES INTENDED TO BE REMOVED. DRAWINGS INDICATE MAJOR ELECTRICAL EQUIPMENT, FIXTURES AND DEVICES THAT ARE REQUIRED TO BE REMOVED. CONTRACTOR SHALL REMOVE OR RELOCATE ELECTRICAL EQUIPMENT, FIXTURES AND DEVICES AS NECESSARY FOR A COMPLETE AND PROFESSIONAL INSTALLATION. SEE NEW LIGHTING, POWER, SYSTEMS, ARCHITECTURAL, PLUMBING AND MECHANICAL PLANS FOR ADDITIONAL DEMOLITION REQUIREMENTS.
27. UNLESS NOTED OTHERWISE, DISPOSE ALL REMOVED MATERIALS OFF SITE AND INCLUDE ALL COSTS FOR DISPOSAL IN BID. THE DISPOSAL OF MATERIALS SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS INCLUDING TCLP TESTING.

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

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This drawing shall not be used for construction purposes until the seal appearing hereon is signed and dated by the Architect or Engineer.

Key Plan

Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

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WAYNE STATE UNIVERSITY

Project

STEM Innovation
Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

LEGENDS AND GENERAL NOTES

Scale 12" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

E00-01

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LIGHTING CONTROL PANEL	
LTG CTRL CIRCUIT	LOAD(S) CONTROLLED
LCP1-1	SUB-BASEMENT MECHANICAL EQUIPMENT ROOM NORTHEAST NORMAL LIGHTING
LCP1-2	SUB-BASEMENT MECHANICAL EQUIPMENT ROOM SOUTHEAST NORMAL LIGHTING
LCP1-3	SUB-BASEMENT MECHANICAL EQUIPMENT ROOM NORTHWEST NORMAL LIGHTING
LCP1-4	SUB-BASEMENT MECHANICAL EQUIPMENT ROOM NORTHWEST NORMAL LIGHTING
LCP1-7	BASEMENT CORRIDORS NORMAL LIGHTING
LCP1-8	BASEMENT CORRIDORS NORMAL LIGHTING
LCP1-11	FIRST FLOOR CENTER CORRIDOR 190.03 NORMAL LIGHTING
LCP1-23	SECOND FLOOR CORRIDOR NORMAL LIGHTING
LCP5-2	THIRD FLOOR CORRIDOR NORMAL LIGHTING
LCP5-4	FOURTH FLOOR CORRIDOR NORMAL LIGHTING
LCP5-6	FIFTH FLOOR CORRIDOR NORMAL LIGHTING
LCP5-8	SIXTH FLOOR CORRIDOR NORMAL LIGHTING
LCP5-10	SEVENTH FLOOR CORRIDOR NORMAL LIGHTING

LCP1-5, LCP1-6, LCP1-9, LCP1-22, LCP5-1, LCP5-3, LCP5-5, LCP5-7, LCP5-9 SHALL BE SPARES

(#) LIGHTING CONTROL FUNCTIONAL SCHEDULE

PLAN TAG	AREA	METHOD OF LIGHTING CONTROL	DIMMING	AUTOMATIC ON OFF CONTROL DESCRIPTION												DAYLIGHT HARVESTING (0-50-100)			REMARKS
				SENSOR TYPE DESCRIPTION															
				LOW VOLTAGE SWITCH WITH RELAY SYSTEM	LINE VOLTAGE SWITCH	CEILING DAYLIGHT SENSOR	CEILING OCCUPANCY SENSOR	WALL OCCUPANCY SENSOR	WALL SWITCH (LOW VOLTAGE)	LOW VOLTAGE WALL SWITCH WITH DIMMER CONTROL	WALL MOUNTED LIGHT SWITCH / DIMMER CONTROL WITH INTEGRAL OCCUPANCY SENSOR	WALL MOUNTED LINE VOLTAGE SWITCH WITH INTEGRAL VACANCY SENSOR	PRESET LIGHTING CONTROL STATION	CONTACT FOR VAV CONTROLS	LIGHTING AUTOMATIC ON TO PRESET PERCENT LEVEL	FULL OFF AFTER PRE-DETERMINED TIME INDICATED	SIDE LIGHT	TOP LIGHT	ILLUMINATION LEVEL GOAL	
1	SUB BASEMENT MECH RM.	MANUAL ON - MANUAL OFF	NO	X															NOTE 1
2	COMMON AREAS (INCLUDING CORRIDORS AND STAIRS)	AUTOMATIC ON - AUTOMATIC OFF, REMOTE SWITCH FOR SAFETY CONCERNS	STEPPED	X									AT FIRE COM #121	NO	100%	15 MINUTES	N/A			NOTES 1 & 2
3	MISC. ELECT. RMS, FIRE PUMP ROOM	MANUAL ON - MANUAL OFF	NO		X									NO	100%	N/A	N/A			NOTE 1
4	STORAGE, IT AND OTHER UTILITARIAN USAGE ROOMS	MANUAL ON - AUTOMATIC OFF	NO									X		NO	100%	15 MINUTES	N/A			NOTE 1
5	COMMON USE TOILET ROOMS	MANUAL ON - AUTOMATIC OFF	NO				X		X					NO	100%	15 MINUTES	N/A			NOTE 1
6	LECTURE, MEETING AND TOUCHDOWN ROOMS	MANUAL ON - AUTOMATIC OFF	YES				X			X				YES	100%	15 MINUTES	N/A			NOTE 1
7	EXTERIOR OF BUILDING	AUTOMATIC ON - AUTOMATIC OFF	YES											NO	100%	15 MINUTES	N/A			DIMMED VIA RELAY PANEL. NOTE 1
8	LECTURE WITH WINDOWS	MANUAL ON - AUTOMATIC OFF	YES			X	X			X				YES	100%	15 MINUTES	YES			NOTE 1
9	LECTURE ROOMS WITH VIDEO PROJECTORS	MANUAL ON - AUTOMATIC OFF	YES				X			X				YES	100%	15 MINUTES	N/A			SWITCH TO SEPARATELY CONTROL FIXTURES ADJACENT TO PROJECTION SCREEN. NOTE 1.
10	LECTURE ROOMS WITH VIDEO PROJECTORS AND WITH WINDOWS	MANUAL ON - AUTOMATIC OFF	YES			X	X			X				YES	100%	15 MINUTES	YES			SWITCH TO SEPARATELY CONTROL FIXTURES ADJACENT TO PROJECTION SCREEN. NOTE 1.
11	EMERGENCY ELECTRICAL ROOM	MANUAL ON - MANUAL OFF	NO		X									NO	100%	N/A	N/A			NOTE 1 & 3
12																				

NOTES:

1. INCLUDE ALL RELAYS, SENSORS, DIMMER MODULES, EMERGENCY LOAD TRANSFERS RELAYS, ETC AS REQUIRED TO ACCOMPLISH THE CONTROL INTENT INDICATED ON PLANS AND SCHEDULES. NOTE THAT EMERGENCY LIGHTING SHALL BE CONTROLLED WITH NORMAL LIGHTING, HOWEVER, UPON LOSS OF NORMAL POWER, SHALL AUTOMATICALLY ILLUMINATE TO FULL ON VIA UL 924 LISTED LOAD TRANSFER RELAYS.
2. LIGHTING SHALL BE CONTROLLED WITH RELAYS VIA LIGHTING CONTROL PANEL. PROGRAM ON AND OFF AS COORDINATED WITH BUILDING MANAGEMENT TEAM. LIGHTS SHALL DIM TO 30% WHEN NO OCCUPANCY IS DETECTED. IN OFF HOURS, LIGHT SHALL TURN COMPLETELY OFF. HOWEVER, IN EITHER CASE, LIGHT SHALL TURN ON TO 100% FOR 15 MINUTES WHEN OCCUPANCY IS DETECTED. LOCATE LOCAL MANUAL OVER-RIDE SWITCH ADJACENT TO FIRE ALARM CONTROL PANEL, LABEL SWITCH WITH LAMICOID NAMEPLATE AS FOLLOWS: "BUILDING STAIRWELL AND CORRIDOR LIGHTING."
3. ROOM UTILIZED NORMAL POWER, STAND-BY POWER AND BATTERY BACKUP POWER FOR LIGHTING. INLCUDE RELAYS, WIRING AS REQUIRED TO ACCOMPLISH CONTTROL INTENT INDICATED ON PLANS AND SCHEDULES.

FIRE ALARM DEVICES SCHEDULE

SYMBOL	DESCRIPTION	MANUFACTURER	CATALOG NO.	REMARKS
F	MANUAL PULL STATION	(SEE SPECIFICATIONS)	(SEE SPECIFICATIONS)	MOUNT AT 46-INCHES TO CENTER OF BOX, UNO. PROVIDE BACKBOX AS RECOMMENDED BY FIRE ALARM SYSTEM MANUFACTURER.
H	CEILING MTD RATE-OF-RISE/FIXED TEMPERATURE HEAT DETECTOR	(SEE SPECIFICATIONS)	(SEE SPECIFICATIONS)	PROVIDE BACKBOX AS RECOMMENDED BY FIRE ALARM SYSTEM MANUFACTURER.
H	PENDANT MOUNTED RATE-OF-RISE/FIXED TEMPERATURE HEAT DETECTOR	(SEE SPECIFICATIONS)	(SEE SPECIFICATIONS)	PROVIDE BACKBOX AS RECOMMENDED BY FIRE ALARM SYSTEM MANUFACTURER.
S	CEILING MTD PHOTOELECTRIC SMOKE DETECTOR	(SEE SPECIFICATIONS)	(SEE SPECIFICATIONS)	PROVIDE BACKBOX AS RECOMMENDED BY FIRE ALARM SYSTEM MANUFACTURER.
S P	PENDANT MOUNTED PHOTOELECTRIC SMOKE DETECTOR	(SEE SPECIFICATIONS)	(SEE SPECIFICATIONS)	PROVIDE BACKBOX AS RECOMMENDED BY FIRE ALARM SYSTEM MANUFACTURER.
D	DUCT TYPE SMOKE DETECTOR	(SEE SPECIFICATIONS)	(SEE SPECIFICATIONS)	PROVIDED BY DIVISION 28. EXACT PLACEMENT TO BE DETERMINED BY DIVISION 23.
L	VISUAL STROBE SIGNAL, WALL MOUNTED	(SEE SPECIFICATIONS)	(SEE SPECIFICATIONS)	MOUNT AT 90-INCHES AFF TO BOTTOM OF BOX, UNO. PROVIDE BACKBOX AS RECOMMENDED BY FIRE ALARM SYSTEM MANUFACTURER.
	AUDIO SPEAKER SIGNAL, WALL MOUNTED	(SEE SPECIFICATIONS)	(SEE SPECIFICATIONS)	MOUNT AT 90-INCHES AFF TO BOTTOM OF BOX, UNO. PROVIDE BACKBOX AS RECOMMENDED BY FIRE ALARM SYSTEM MANUFACTURER.
L	COMBINATION AUDIO SPEAKER / VISUAL STROBE SIGNAL, WALL MOUNTED	(SEE SPECIFICATIONS)	(SEE SPECIFICATIONS)	MOUNT AT 90-INCHES AFF TO BOTTOM OF BOX, UNO. PROVIDE BACKBOX AS RECOMMENDED BY FIRE ALARM SYSTEM MANUFACTURER.
AV	CEILING MOUNTED COMBINATION AUDIO / VISUAL DEVICE	(SEE SPECIFICATIONS)	(SEE SPECIFICATIONS)	PROVIDE BACKBOX AS RECOMMENDED BY FIRE ALARM SYSTEM MANUFACTURER.
AV P	PENDANT MOUNTED COMBINATION AUDIO / VISUAL DEVICE	(SEE SPECIFICATIONS)	(SEE SPECIFICATIONS)	PROVIDE BACKBOX AS RECOMMENDED BY FIRE ALARM SYSTEM MANUFACTURER.
MT	WALL MTD REMOTE TEST STATION	(SEE SPECIFICATIONS)	(SEE SPECIFICATIONS)	MOUNT AT 46-INCHES TO CENTER OF BOX, UNO. PROVIDE BACKBOX AS RECOMMENDED BY FIRE ALARM SYSTEM MANUFACTURER.

WIRING DEVICES - OCCUPANCY SENSOR AND LOW VOLTAGE LTG CONTROL DEVICE SCHEDULE

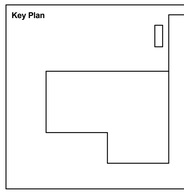
SYMBOL	DESCRIPTION	MANUFACTURER	CATALOG NO.	REMARKS
S OS	20A, 120-277V, OCCUPANCY SENSOR WALL SWITCH	SENSOR SWITCH	DSW-100-W	MOUNT AT 46" AFF, UNO.
OS C	DUAL TECHNOLOGY OCCUPANCY SENSOR - CEILING MOUNTED	SENSOR SWITCH	nCMP-PDT-10-RJ B-AR	
OS P	DUAL TECHNOLOGY OCCUPANCY SENSOR - PENDANT MOUNTED	SENSOR SWITCH	nCMB-PDT-10	
PP	OCCUPANCY SENSOR POWER PACK	SENSOR SWITCH	nPP-16-D	
ELU	EMERGENCY LIGHTING CONTROL UNIT	SENSOR SWITCH	nPP-D-16ER	
PS	DAYLIGHT HARVESTING PHOTO SENSOR - CEILING MOUNTED	SENSOR SWITCH	nCM-ADCX-DZ-R JB	
PS P	DAYLIGHT HARVESTING PHOTO SENSOR - PENDANT MOUNTED	SENSOR SWITCH	nCMB-ADCX-DZ-RJB	
S L1	LOW VOLTAGE LIGHTING CONTROLLER - ON/OFF, RAISE/LOWER	SENSOR SWITCH	nPODM 2P-DX	MOUNT AT 46" AFF, UNO.
S L2	LOW VOLTAGE LIGHTING CONTROLLER - ON/OFF	SENSOR SWITCH	nPODM	MOUNT AT 46" AFF, UNO.
S L3	LOW VOLTAGE LIGHTING CONTROLLER - 2 ZONES ON/OFF RAISE LOWER	SENSOR SWITCH	nPODM 4P-DX	MOUNT AT 46" AFF, UNO.

WIRING DEVICES - RECEPTACLE SCHEDULE

SYMBOL	DESCRIPTION	MANUFACTURER	CATALOG NO.	REMARKS
	DUPLEX RECEPTACLE	HUBBELL	HBL5362I	MOUNT 18" AFF, UNO
GFI	GFCI DUPLEX RECEPTACLE	HUBBELL	GFR5362SGI	MOUNT 18" AFF, UNO
GFI	GFCI DUPLEX RECEPTACLE (ABOVE COUNTER)	HUBBELL	GFR5362SGI	MOUNT HORIZONTALLY ABOVE COUNTER; 2-INCHES ABOVE BACKSPLASH, UNO
WP	WEATHERPROOF, GFCI DUPLEX RECEPTACLE WITH WEATHERPROOF WHILE-IN-USE, EXTRA DUTY COVER	HUBBELL	GFR5362SGI, WP26EH	MOUNT 18" AFF, UNO
	DUPLEX RECEPTACLE WITH TWO USB CHARGING PORTS	HUBBELL	USB8300I	MOUNT 18" AFF, UNO
C/TV	DUPLEX RECEPTACLE - CEILING MOUNTED	HUBBELL	HBL5362I	MOUNT IN CEILING
CR	GFCI DUPLEX RECEPTACLE - CEILING MOUNTED. CORD REEL WITH BLACK, #12 GAUGE SO CORD, 25' LONG, WHITE ENCLOSURE.	HUBBELL / KH INDUSTRIES	HBL5362 - RECEPTACLE, RTAN3LW-WC520-J12K - CORD REEL	RECEPTACLE AND CORD REEL
	DUAL CONTROLLED DUPLEX RECEPTACLE	HUBBELL	HBL5362I	MOUNT AT 18" AFF, UNO; RECEPTACLE SHALL BE MARKED AS A DUAL CONTROLLED RECEPTACLE
	DUAL CONTROLLED DUPLEX RECEPTACLE (ABOVE COUNTER)	HUBBELL	HBL5362I	MOUNT HORIZONTALLY ABOVE COUNTER; 2" ABOVE BACKSPLASH, UNO; RECEPTACLE SHALL BE MARKED AS A DUAL CONTROLLED RECEPTACLE
	DOUBLE DUPLEX RECEPTACLE	HUBBELL	(2) HBL5362I	MOUNT AT 18" AFF, UNO
USB	DOUBLE DUPLEX RECEPTACLE WITH FOUR USB CHARGING PORTS	HUBBELL	(2) USB8300I	MOUNT AT 18" AFF, UNO
	DUAL CONTROLLED DOUBLE DUPLEX RECEPTACLE	HUBBELL	(2) HBL5362I	MOUNT AT 18" AFF, UNO; RECEPTACLE SHALL BE MARKED AS A DUAL CONTROLLED RECEPTACLE
1	20A, 120V, 1 PHASE. L5-20R, TWISTLOCK RECEPTACLE	HUBBELL	HBL2310	MOUNT AT 18" AFF, UNO
2	30A, 208V, 1 PHASE. L6-30R, TWISTLOCK RECEPTACLE	HUBBELL	HBL2620	MOUNT AT 18" AFF, UNO
3	20A, 208V, 1 PHASE. L6-20R, TWISTLOCK RECEPTACLE	HUBBELL	HBL2320	MOUNT AT 18" AFF, UNO
SPD/ 2D	2-GANG RECESSED WALL BOX FOR VIDEO MONITOR POWER AND DATA WITH DUPLEX RECEPTACLE	LEGRAND WIREMOLD	EFSB2	MOUNT AT 18" AFF, UNO; PROVIDE (1) HUBBELL #HBL5362I DUPLEX RECEPTACLE
SPD/ 2D	2-GANG RECESSED WALL BOX FOR VIDEO MONITOR POWER AND DATA WITH SURGE SUPPRESSION DUPLEX RECEPTACLE WITH 2 DATA DROPS	SEE 5/E701	SEE 5/E701	MOUNT AT 60" AFF, UNO; PROVIDE (1) HUBBELL #HBL5362ISA SURGE SUPPRESSION DUPLEX RECEPTACLE

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Manager	BIM Lead
J. SMITH	C. BAKER
Design Lead	Drawn
J. MILOCH	M. FLANDERS
Project Leader	Checked

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

MISCELLANEOUS SCHEDULES

Scale

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

E00-02

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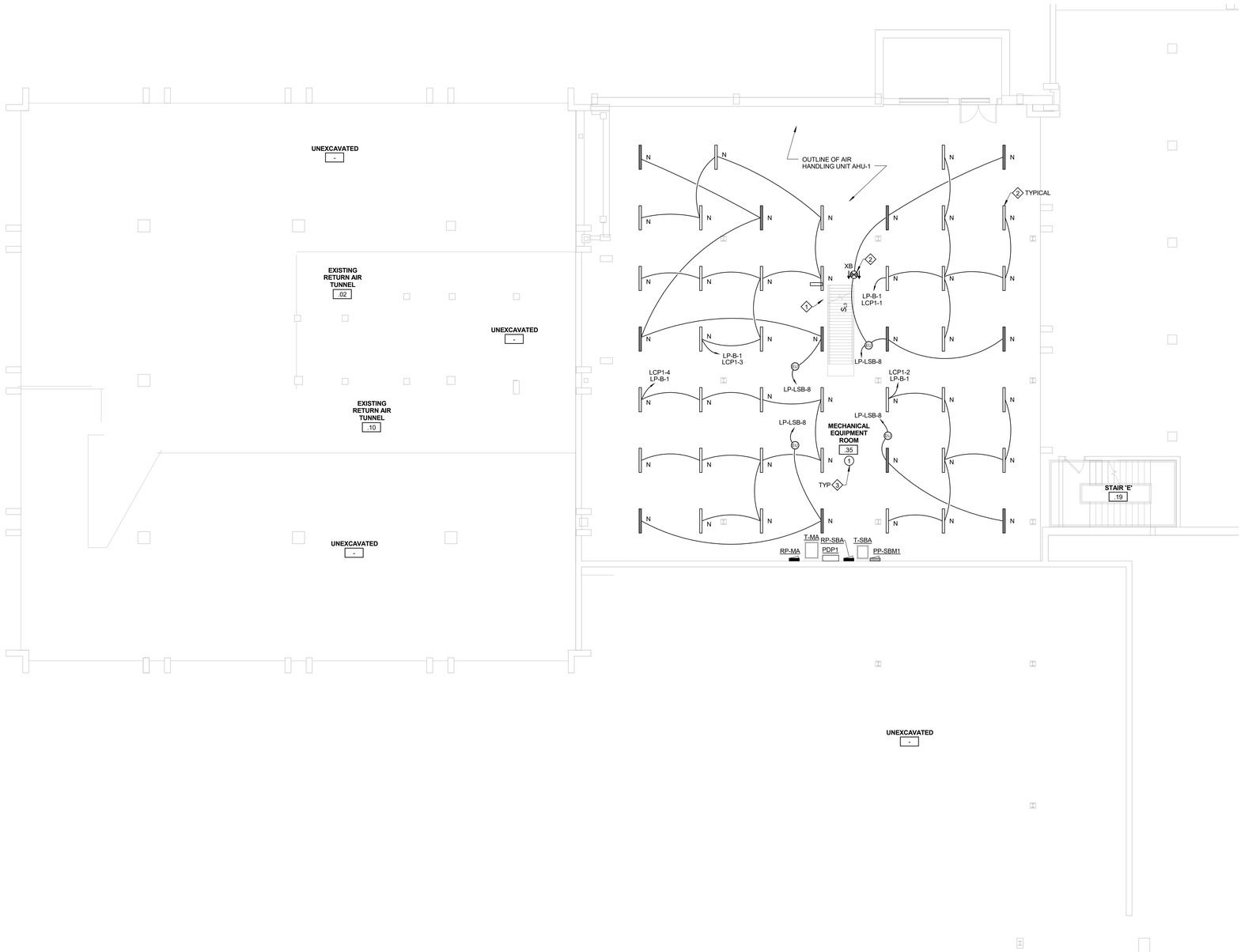


SUB-BASEMENT LIGHTING PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

1. REFER TO DRAWING E001 AND THE SPECIFICATION FOR GENERAL REQUIREMENTS.
2. DURING NORMAL OPERATION EMERGENCY LIGHTING SHALL BE SERVED FROM THE LIFE SAFETY CIRCUIT INDICATED OR IN THE AREA AND CONTROLLED BY THE AREA NORMAL LIGHTING CONTROLS. UPON SENSING LOSS OF NORMAL LIGHTING POWER, EMERGENCY LIGHTING FIXTURES SHALL BE AUTOMATICALLY ENERGIZED VIA A UL 924 LISTED RELAY.
3. EXIT SIGNS SHALL BE SERVED FROM THE LIFE SAFETY CIRCUIT INDICATED OR THE AREA LIFE SAFETY CIRCUIT AHEAD OF ANY LOCAL CONTROLS.

KEYNOTES

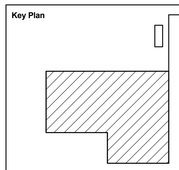
1 PROVIDE UNISTRUT SUPPORT TO MOUNT LOW VOLTAGE SWITCH.

2 LOCATE LUMINAIRES AT 12'-0"AFF. COORDINATE LOCATIONS WITH THE MECHANICAL DUCTWORK AND PIPING DURING INSTALLATION.

3 LIGHTING CONTROL FUNCTIONAL INTENT NOTE. REFER TO THE SCHEDULE ON DRAWING E00-02.

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

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Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: J. MILOCH	Drawn: M. FLANDERS
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

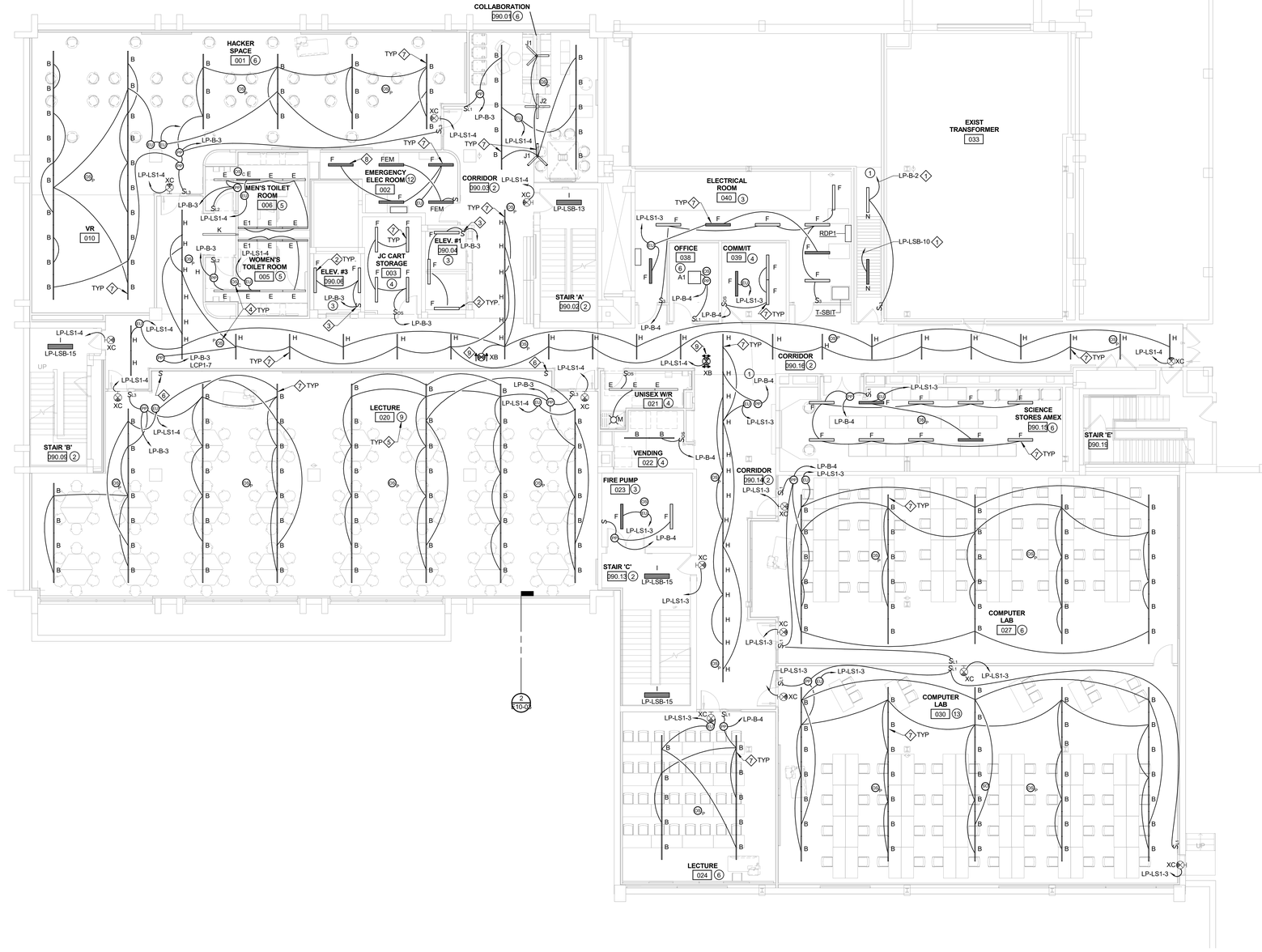
STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

SUB-BASEMENT LIGHTING PLAN

Scale	1/8" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	E10-01



BASEMENT LIGHTING PLAN

SCALE: 1/8" = 1'-0"

NOTES

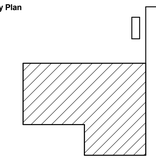
1. REFER TO DRAWING E001 AND THE SPECIFICATION FOR GENERAL REQUIREMENTS.
2. DURING NORMAL OPERATION EMERGENCY LIGHTING SHALL BE SERVED FROM THE LIFE SAFETY CIRCUIT INDICATED OR IN THE AREA AND CONTROLLED BY THE AREA NORMAL LIGHTING CONTROLS. UPON SENSING LOSS OF NORMAL LIGHTING POWER, EMERGENCY LIGHTING FIXTURES SHALL BE AUTOMATICALLY ENERGIZED VIA A UL 924 LISTED RELAY.
3. EXIT SIGNS SHALL BE SERVED FROM THE LIFE SAFETY CIRCUIT INDICATED OR THE AREA LIFE SAFETY CIRCUIT AHEAD OF ANY LOCAL CONTROLS.
4. LIGHTING CONNECTION POINTS SHOWN FOR LINEAR LIGHTING ARE INDICATED FOR DESIGN INTENT. THE ACTUAL CONNECTION POINTS WILL BE DETERMINED BY THE LUMINAIRE MANUFACTURER. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING POWER AT ALL NECESSARY CONNECTION POINTS. REFER TO THE MANUFACTURER'S INSTALLATION DRAWINGS.

KEYNOTES

1 TO SUB BASEMENT LIGHTING. REFER TO DRAWING E10-01
2 ELEVATOR PIT LIGHT. COORDINATE LOCATION WITH ELEVATOR CONTRACTOR.
3 LIGHT SWITCH IN PIT. COORDINATE LOCATION WITH ELEVATOR CONTRACTOR.
4 OCCUPANCY SENSOR WITH LOW VOLTAGE WIRING (NOT SHOWN) TO THE ASSOCIATED POWER PACK.
5 LIGHTING CONTROL FUNCTIONAL INTENT NOTE. REFER TO THE SCHEDULE ON DRAWING E00-02.
6 PROVIDE SWITCH TO SHUT OFF LIGHTING THAT IS ADJACENT TO THE PROJECTION SCREENS.
7 TYPICAL MOUNTING HEIGHT SHALL BE 9'-0" AFF UNLESS NOTED OTHERWISE.
8 TYPICAL MOUNTING HEIGHT SHALL BE 7'-8" AFF.
9 TYPICAL MOUNTING HEIGHT SHALL BE 8'-0" AFF.

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
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Structural: FTC&H
Mechanical: FTC&H
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Lab Design: NORR

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Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project
STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

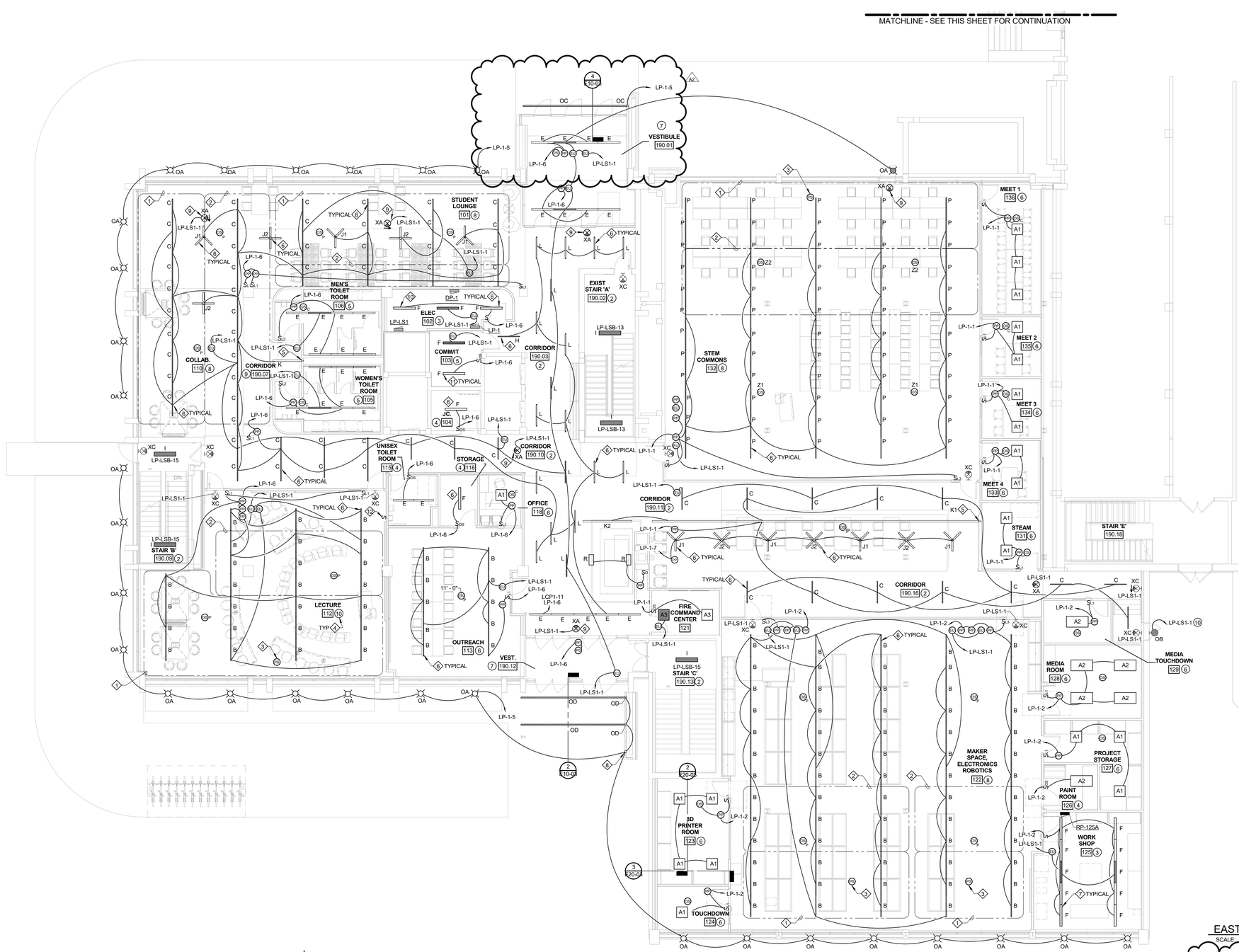
Drawing Title
BASEMENT LIGHTING PLAN

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

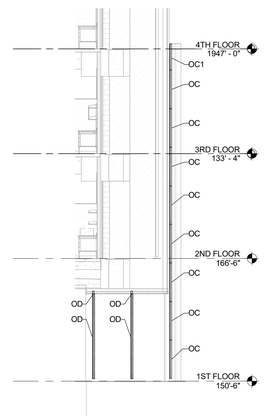
Drawing No.
E10-02

MATCHLINE - SEE THIS SHEET FOR CONTINUATION



COMPOSITE LIGHTING PLAN

SCALE: 1/8" = 1'-0"

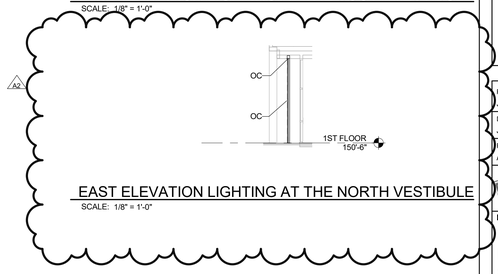


EAST ELEVATION LIGHTING AT THE SOUTH VESTIBULE

SCALE: 1/8" = 1'-0"

EAST ELEVATION LIGHTING AT THE NORTH VESTIBULE

SCALE: 1/8" = 1'-0"



NORTH

FIRST FLOOR LIGHTING PLAN

SCALE: 1/8" = 1'-0"

NOTES

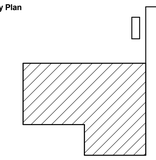
1. REFER TO DRAWING E001 AND THE SPECIFICATION FOR GENERAL REQUIREMENTS.
2. DURING NORMAL OPERATION EMERGENCY LIGHTING SHALL BE SERVED FROM THE LIFE SAFETY CIRCUIT INDICATED OR IN THE AREA AND CONTROLLED BY THE AREA NORMAL LIGHTING CONTROLS. UPON SENSING LOSS OF NORMAL LIGHTING POWER, EMERGENCY LIGHTING FIXTURES SHALL BE AUTOMATICALLY ENERGIZED VIA A UL 924 LISTED RELAY.
3. EXIT SIGNS SHALL BE SERVED FROM THE LIFE SAFETY CIRCUIT INDICATED OR THE AREA LIFE SAFETY CIRCUIT AHEAD OF ANY LOCAL CONTROLS.
4. LIGHTING CONNECTION POINTS SHOWN FOR LINEAR LIGHTING ARE INDICATED FOR DESIGN INTENT. THE ACTUAL CONNECTION POINTS WILL BE DETERMINED BY THE LUMINAIRE MANUFACTURER. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING POWER AT ALL NECESSARY CONNECTION POINTS. REFER TO THE MANUFACTURER'S INSTALLATION DRAWINGS.

KEYNOTES

1. DAYLIGHT HARVESTING PRIMARY ZONE.
2. DAYLIGHT HARVESTING SECONDARY ZONE.
3. DAYLIGHT HARVESTING PHOTOCELL TO CONTROL THE PRIMARY AND SECONDARY LIGHTING ZONES.
4. LIGHTING CONTROL FUNCTIONAL INTENT NOTE. REFER TO THE SCHEDULE ON DRAWING E00-02.
5. VERTICAL PORTION OF THE LUMINAIRE.
6. TYPICAL MOUNTING HEIGHT SHALL BE 9'-0" AFF UNLESS NOTED OTHERWISE.
7. TYPICAL MOUNTING HEIGHT SHALL BE 12'-0" AFF.
8. VERTICAL RUNS OF TYPE "OC" AND "OC-1" LUMINAIRES. REFER TO THE ELEVATION ON THIS DRAWING.
9. TYPICAL MOUNTING HEIGHT SHALL BE 8'-0" AFF.
10. TYPICAL MOUNTING HEIGHT SHALL BE 7'-8" AFF.
11. TYPICAL MOUNTING HEIGHT SHALL BE 10'-0" AFF.
12. PROVIDE SWITCH TO SHUT OFF LIGHTING THAT IS ADJACENT TO THE PROJECTION SCREENS.

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/22/2019	ADDENDUM NO. 2	5
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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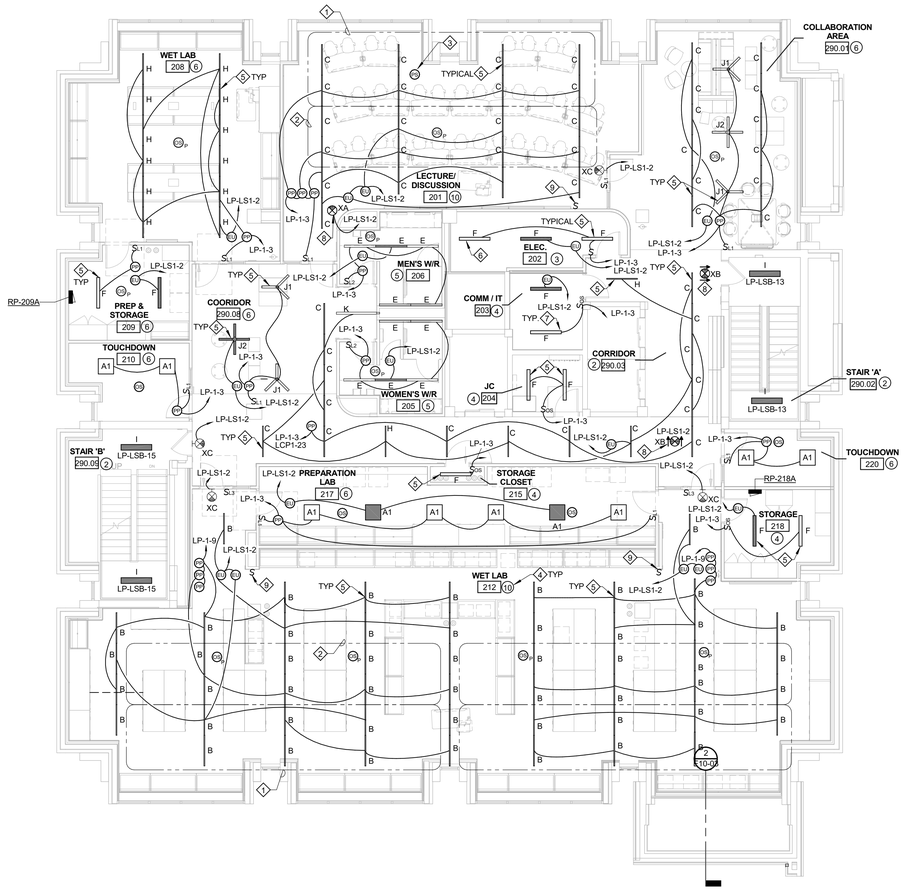
Project Manager J. SMITH	BIM Lead C. BAKER
Design Lead J. MILOCH	Drawn M. FLANDERS
Project Leader Approver	Checked Checker

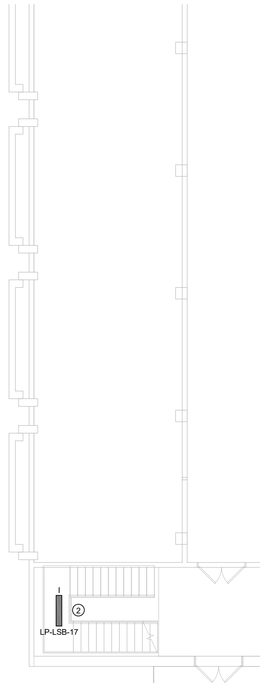
WAYNE STATE UNIVERSITY

Project
STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
FIRST FLOOR LIGHTING PLAN

Scale	1/8" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	E10-03





NORTH

SECOND FLOOR LIGHTING PLAN

SCALE: 1/8" = 1'-0"

NOTES

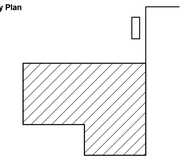
1. REFER TO DRAWING E001 AND THE SPECIFICATION FOR GENERAL REQUIREMENTS.
2. DURING NORMAL OPERATION EMERGENCY LIGHTING SHALL BE SERVED FROM THE LIFE SAFETY CIRCUIT INDICATED OR IN THE AREA AND CONTROLLED BY THE AREA NORMAL LIGHTING CONTROLS. UPON SENSING LOSS OF NORMAL LIGHTING POWER, EMERGENCY LIGHTING FIXTURES SHALL BE AUTOMATICALLY ENERGIZED VIA A UL 924 LISTED RELAY.
3. EXIT SIGNS SHALL BE SERVED FROM THE LIFE SAFETY CIRCUIT INDICATED OR THE AREA LIFE SAFETY CIRCUIT AHEAD OF ANY LOCAL CONTROLS.
4. LIGHTING CONNECTION POINTS SHOWN FOR LINEAR LIGHTING ARE INDICATED FOR DESIGN INTENT. THE ACTUAL CONNECTION POINTS WILL BE DETERMINED BY THE LUMINAIRE MANUFACTURER. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING POWER AT ALL NECESSARY CONNECTION POINTS. REFER TO THE MANUFACTURER'S INSTALLATION DRAWINGS.

KEYNOTES

1 DAYLIGHT HARVESTING PRIMARY ZONE.
2 DAYLIGHT HARVESTING SECONDARY ZONE.
3 DAYLIGHT HARVESTING PHOTOCELL TO CONTROL THE PRIMARY AND SECONDARY LIGHTING ZONES.
4 LIGHTING CONTROL FUNCTIONAL INTENT NOTE. REFER TO THE SCHEDULE ON DRAWING E00-02.
5 TYPICAL MOUNTING HEIGHT SHALL BE 9'-0" AFF UNLESS NOTED OTHERWISE.
6 TYPICAL MOUNTING HEIGHT SHALL BE 7'-8" AFF.
7 TYPICAL MOUNTING HEIGHT SHALL BE 10'-0" AFF.
8 TYPICAL MOUNTING HEIGHT SHALL BE 8'-0" AFF.
9 PROVIDE SWITCH TO SHUT OFF LIGHTING THAT IS ADJACENT TO THE PROJECTION SCREENS.

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

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Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: J. MILOCH	Drawn: M. FLANDERS
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

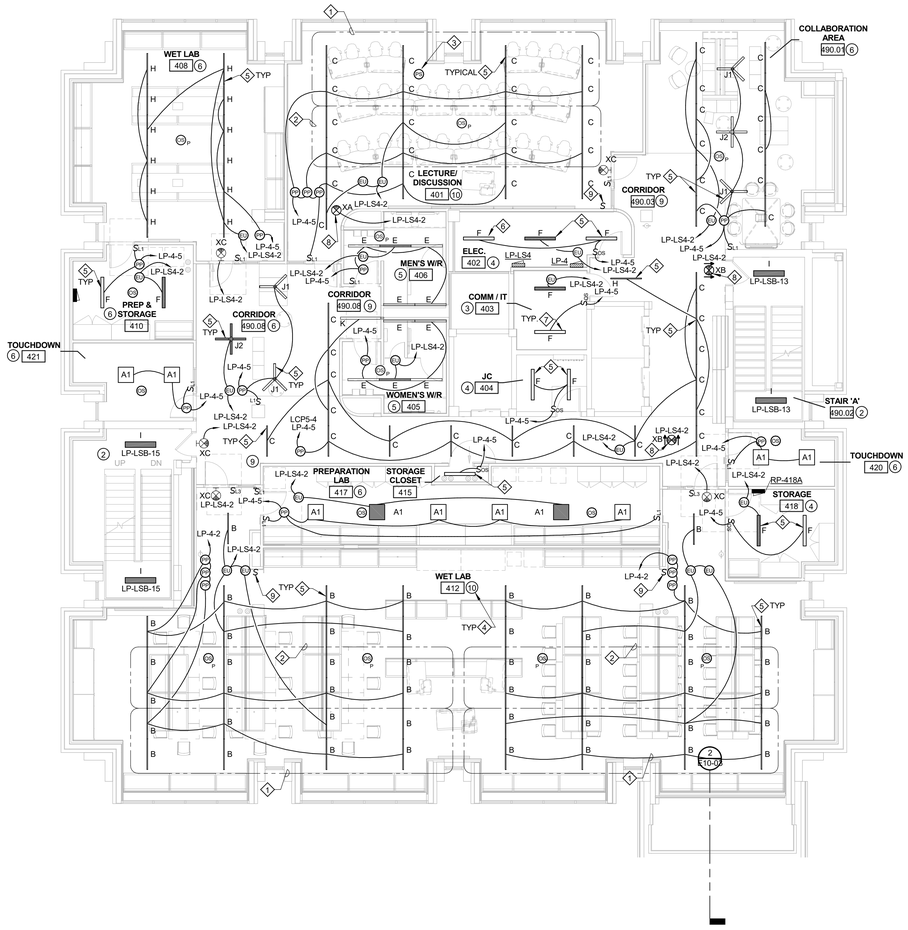
Project
STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
SECOND FLOOR LIGHTING PLAN

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

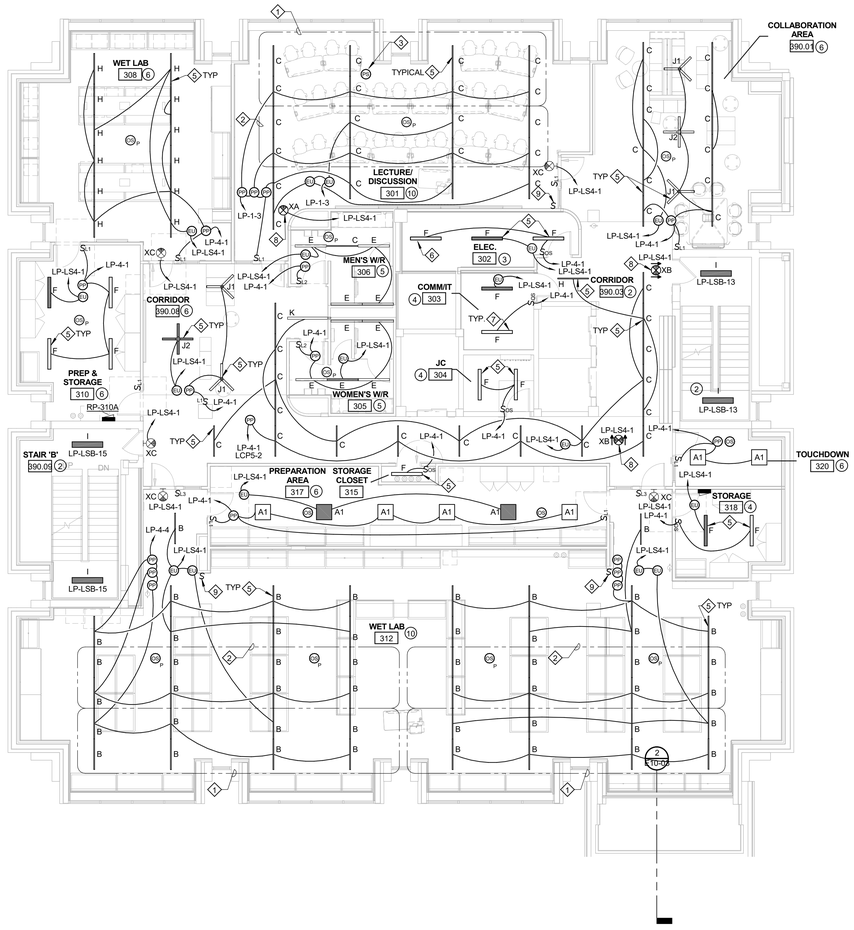
Drawing No.
E10-04



FOURTH FLOOR LIGHTING PLAN

SCALE: 1/8" = 1'-0"

NORTH



THIRD FLOOR LIGHTING PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

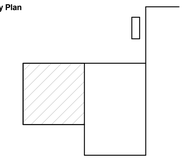
1. REFER TO DRAWING E001 AND THE SPECIFICATION FOR GENERAL REQUIREMENTS.
2. DURING NORMAL OPERATION EMERGENCY LIGHTING SHALL BE SERVED FROM THE LIFE SAFETY CIRCUIT INDICATED OR IN THE AREA AND CONTROLLED BY THE AREA NORMAL LIGHTING CONTROLS. UPON SENSING LOSS OF NORMAL LIGHTING POWER, EMERGENCY LIGHTING FIXTURES SHALL BE AUTOMATICALLY ENERGIZED VIA A UL 924 LISTED RELAY.
3. EXIT SIGNS SHALL BE SERVED FROM THE LIFE SAFETY CIRCUIT INDICATED OR THE AREA LIFE SAFETY CIRCUIT AHEAD OF ANY LOCAL CONTROLS.
4. LIGHTING CONNECTION POINTS SHOWN FOR LINEAR LIGHTING ARE INDICATED FOR DESIGN INTENT. THE ACTUAL CONNECTION POINTS WILL BE DETERMINED BY THE LUMINAIRE MANUFACTURER. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING POWER AT ALL NECESSARY CONNECTION POINTS. REFER TO THE MANUFACTURER'S INSTALLATION DRAWINGS.

KEYNOTES

1 DAYLIGHT HARVESTING PRIMARY ZONE.
2 DAYLIGHT HARVESTING SECONDARY ZONE.
3 DAYLIGHT HARVESTING PHOTOCELL TO CONTROL THE PRIMARY AND SECONDARY LIGHTING ZONES.
4 LIGHTING CONTROL FUNCTIONAL INTENT NOTE. REFER TO THE SCHEDULE ON DRAWING E00-02.
5 TYPICAL MOUNTING HEIGHT SHALL BE 9'-0" AFF UNLESS NOTED OTHERWISE.
6 TYPICAL MOUNTING HEIGHT SHALL BE 7'-8" AFF.
7 TYPICAL MOUNTING HEIGHT SHALL BE 10'-0" AFF.
8 TYPICAL MOUNTING HEIGHT SHALL BE 8'-0" AFF.
9 PROVIDE SWITCH TO SHUT OFF LIGHTING THAT IS ADJACENT TO THE PROJECTION SCREENS.

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Design Lead	Drawn
J. MILOCH	M. FLANDERS
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

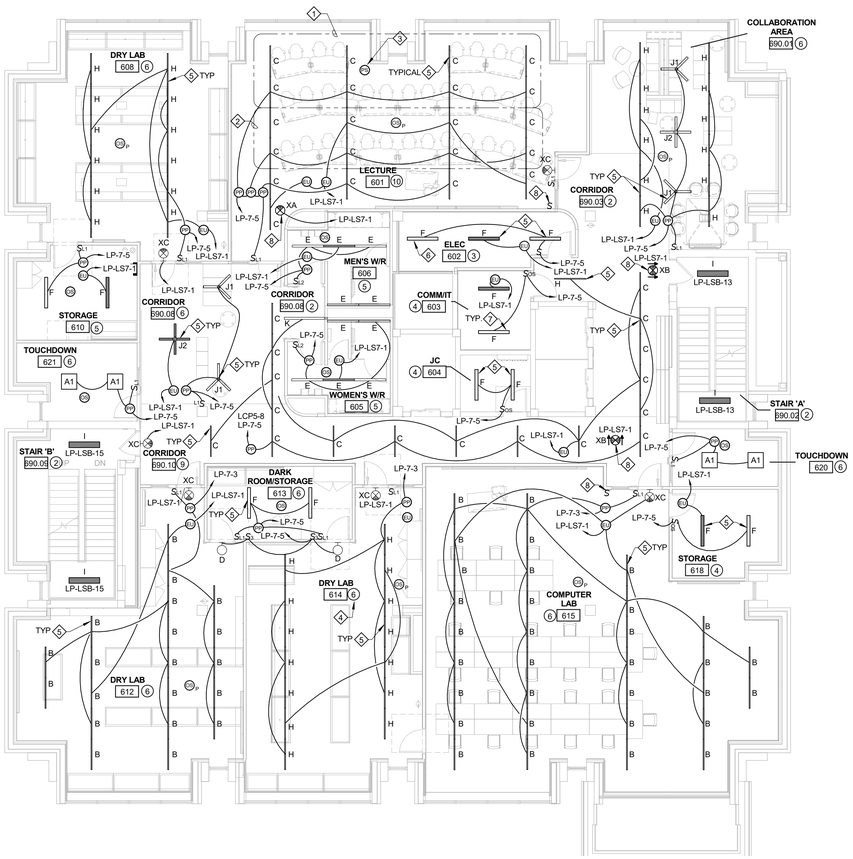
Project
STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

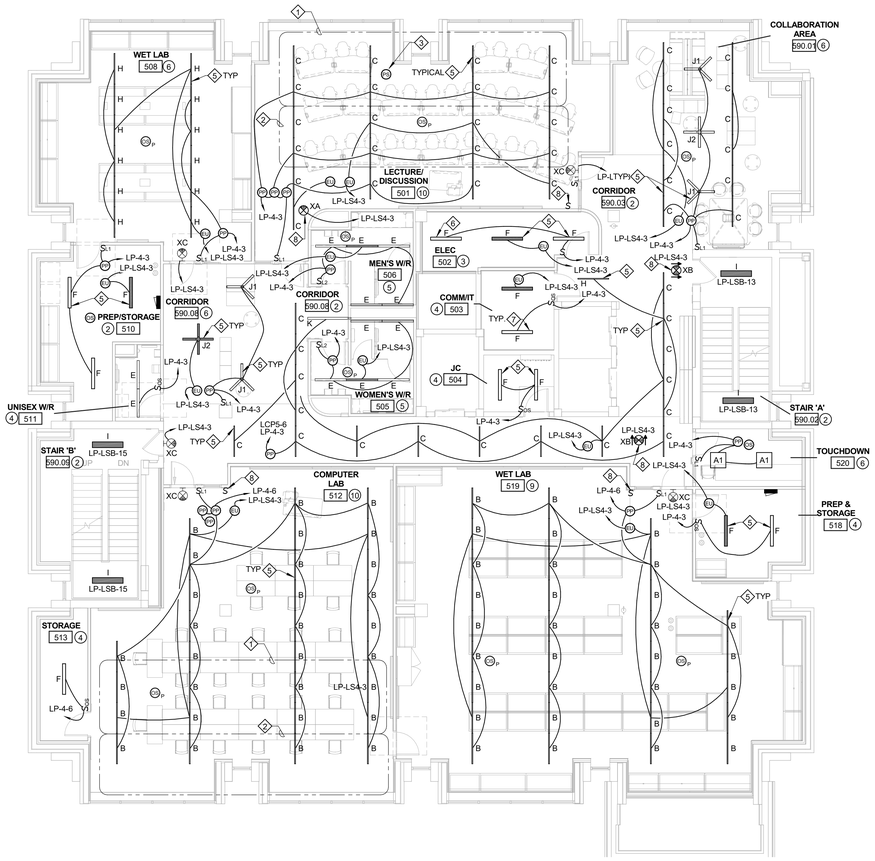
Drawing Title
THIRD AND FOURTH FLOOR LIGHTING PLAN

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
E10-05





SIXTH FLOOR LIGHTING PLAN

SCALE: 1/8" = 1'-0"

NORTH

FIFTH FLOOR LIGHTING PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

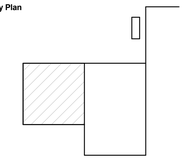
1. REFER TO DRAWING E001 AND THE SPECIFICATION FOR GENERAL REQUIREMENTS.
2. DURING NORMAL OPERATION EMERGENCY LIGHTING SHALL BE SERVED FROM THE LIFE SAFETY CIRCUIT INDICATED OR IN THE AREA AND CONTROLLED BY THE AREA NORMAL LIGHTING CONTROLS. UPON SENSING LOSS OF NORMAL LIGHTING POWER, EMERGENCY LIGHTING FIXTURES SHALL BE AUTOMATICALLY ENERGIZED VIA A UL 924 LISTED RELAY.
3. EXIT SIGNS SHALL BE SERVED FROM THE LIFE SAFETY CIRCUIT INDICATED OR THE AREA LIFE SAFETY CIRCUIT AHEAD OF ANY LOCAL CONTROLS.
4. LIGHTING CONNECTION POINTS SHOWN FOR LINEAR LIGHTING ARE INDICATED FOR DESIGN INTENT. THE ACTUAL CONNECTION POINTS WILL BE DETERMINED BY THE LUMINAIRE MANUFACTURER. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING POWER AT ALL NECESSARY CONNECTION POINTS. REFER TO THE MANUFACTURER'S INSTALLATION DRAWINGS.

KEYNOTES

1. DAYLIGHT HARVESTING PRIMARY ZONE.
2. DAYLIGHT HARVESTING SECONDARY ZONE.
3. DAYLIGHT HARVESTING PHOTOCELL TO CONTROL THE PRIMARY AND SECONDARY LIGHTING ZONES.
4. LIGHTING CONTROL FUNCTIONAL INTENT NOTE. REFER TO THE SCHEDULE ON DRAWING E00-02.
5. TYPICAL MOUNTING HEIGHT SHALL BE 9'-0" AFF UNLESS NOTED OTHERWISE.
6. TYPICAL MOUNTING HEIGHT SHALL BE 7'-8" AFF.
7. TYPICAL MOUNTING HEIGHT SHALL BE 10'-0" AFF.
8. PROVIDE SWITCH TO SHUT OFF LIGHTING THAT IS ADJACENT TO THE PROJECTION SCREENS.

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

FIFTH AND SIXTH FLOOR LIGHTING PLAN

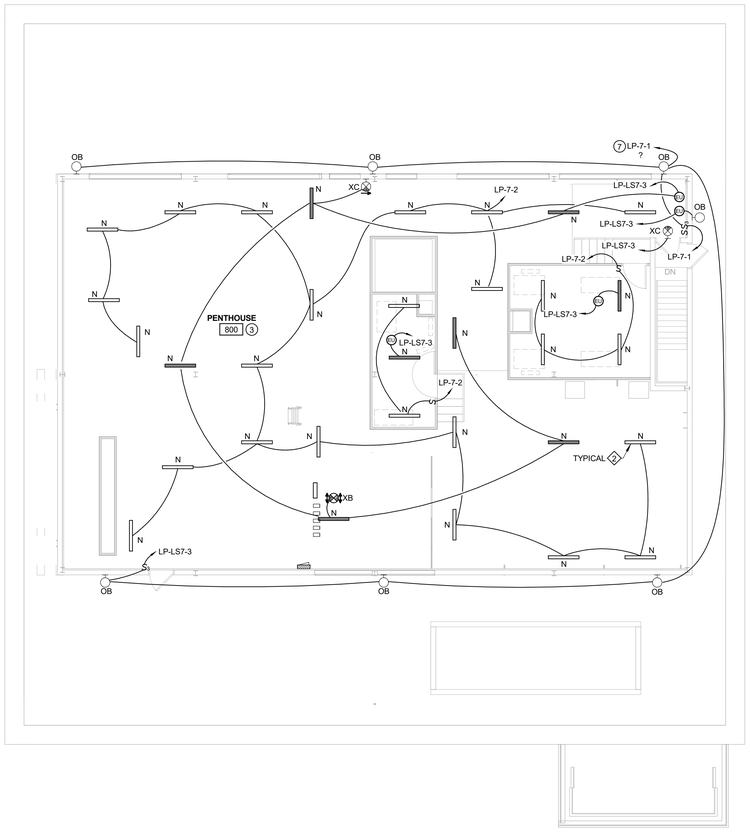
Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

E10-06

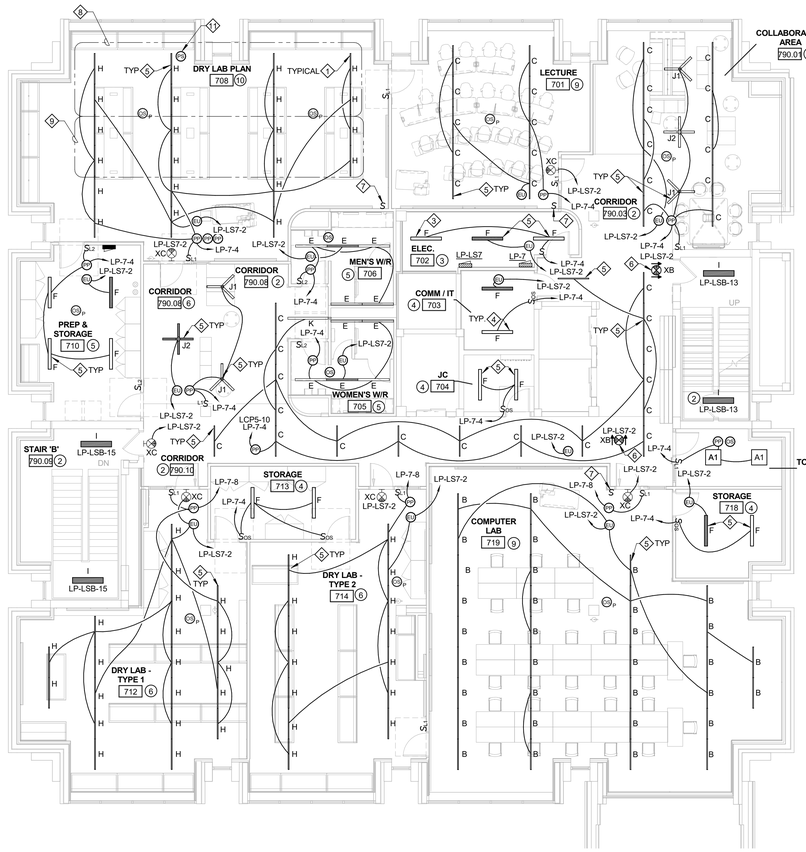
12/20/2018 1:58:25 PM



PENTHOUSE LIGHTING PLAN

SCALE: 1/8" = 1'-0"

NORTH



SEVENTH FLOOR LIGHTING PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

1. REFER TO DRAWING E001 AND THE SPECIFICATION FOR GENERAL REQUIREMENTS.
2. DURING NORMAL OPERATION EMERGENCY LIGHTING SHALL BE SERVED FROM THE LIFE SAFETY CIRCUIT INDICATED OR IN THE AREA AND CONTROLLED BY THE AREA NORMAL LIGHTING CONTROLS. UPON SENSING LOSS OF NORMAL LIGHTING POWER, EMERGENCY LIGHTING FIXTURES SHALL BE AUTOMATICALLY ENERGIZED VIA A UL 924 LISTED RELAY.
3. EXIT SIGNS SHALL BE SERVED FROM THE LIFE SAFETY CIRCUIT INDICATED OR THE AREA LIFE SAFETY CIRCUIT AHEAD OF ANY LOCAL CONTROLS.
4. LIGHTING CONNECTION POINTS SHOWN FOR LINEAR LIGHTING ARE INDICATED FOR DESIGN INTENT. THE ACTUAL CONNECTION POINTS WILL BE DETERMINED BY THE LUMINAIRE MANUFACTURER. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING POWER AT ALL NECESSARY CONNECTION POINTS. REFER TO THE MANUFACTURER'S INSTALLATION DRAWINGS.

KEYNOTES

1 TYPICAL MOUNTING HEIGHT SHALL BE 9'-0" AFF UNLESS NOTED OTHERWISE.
2 LOCATE LUMINAIRES AT 12'-0"AFF. COORDINATE LOCATIONS WITH THE MECHANICAL DUCTWORK AND PIPING DURING INSTALLATION.
3 TYPICAL MOUNTING HEIGHT SHALL BE 7'-8" AFF.
4 TYPICAL MOUNTING HEIGHT SHALL BE 10'-0" AFF.
5 TYPICAL MOUNTING HEIGHT SHALL BE 9'-0" AFF UNLESS NOTED OTHERWISE.
6 TYPICAL MOUNTING HEIGHT SHALL BE 8'-0" AFF.
7 PROVIDE SWITCH TO SHUT OFF LIGHTING THAT IS ADJACENT TO THE PROJECTION SCREENS.
8 DAYLIGHT HARVESTING PRIMARY ZONE.
9 DAYLIGHT HARVESTING SECONDARY ZONE.
11 DAYLIGHT HARVESTING PHOTOCELL TO CONTROL THE PRIMARY AND SECONDARY LIGHTING ZONES.

DATE	ISSUED FOR	REV
11/5/2018	BIDDER PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Date / Revision

Key Plan

Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

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Design Lead	Drawn
J. MILOCH	M. FLANDERS
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

SEVENTH AND PENTHOUSE LIGHTING PLAN

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

E10-07

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SUB-BASEMENT POWER AND SYSTEMS PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

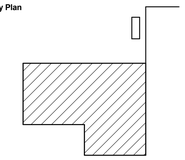
1. REFER TO DRAWING E001 AND THE SPECIFICATION FOR GENERAL REQUIREMENTS.
2. REFER TO THE ONE LINE DIAGRAMS FOR FEEDER, SWITCH, AND/OR STARTER SIZES.

KEYNOTES

1 MEDIUM VOLTAGE DRIVES SERVING THE EXISTING CHILLERS TO REMAIN.
2 JUNCTION BOX FOR CONTROL MODULE AND DUCT DETECTOR FOR SMOKE DAMPERS.
3 POWER FOR INTERNAL AHU LIGHTING.
4 EXISTING TO REMAIN.
5 VFD WITH INTEGRAL DISCONNECT, PROVIDED BY THE MANUFACTURER, INSTALLED BY THE ELECTRICAL CONTRACTOR.
6 MANUFACTURERS INTEGRAL DISCONNECT. CONFIRM LOCATION WITH THE SHOP DRAWING.
7 BY ELECTRICAL CONTRACTOR. PROVIDE CONTROL WIRING TO SHUT DOWN THE BOILERS. REFER TO THE WIRING DIAGRAM ON DRAWINGS E50-03.
8 208V, 3PH, 30A
9 RO SYSTEM MAIN CONTROL PANEL.
10 RO CONTROL PANEL
11 SIZE 1, COMBINATION MOTOR STARTER / DISCONNECT, 480V, NEMA 1 FOR RO DISTRIBUTION PUMPS
12 VFD FOR EF-4. ONE ACTIVE, ONE REDUNDANT. LOCATE A JUNCTION BOX ABOVE TO SERVE VFD'S FROM A COMMON CIRCUIT. CONDUIT AND WIRING OUT TO EXHAUST FAN SHALL BE SEPARATE. 3#10, #10G, 3/4"C.
13 VFD FOR EF-6. ONE ACTIVE, ONE REDUNDANT. LOCATE A JUNCTION BOX ABOVE TO SERVE VFD'S FROM A COMMON CIRCUIT. CONDUIT AND WIRING OUT TO EXHAUST FAN SHALL BE SEPARATE. 3#10, #10G, 3/4"C.

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/22/2019	ADDENDUM NO. 2	5
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Manager	BIM Lead
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Design Lead	Drawn
J. MILOCH	M. FLANDERS
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

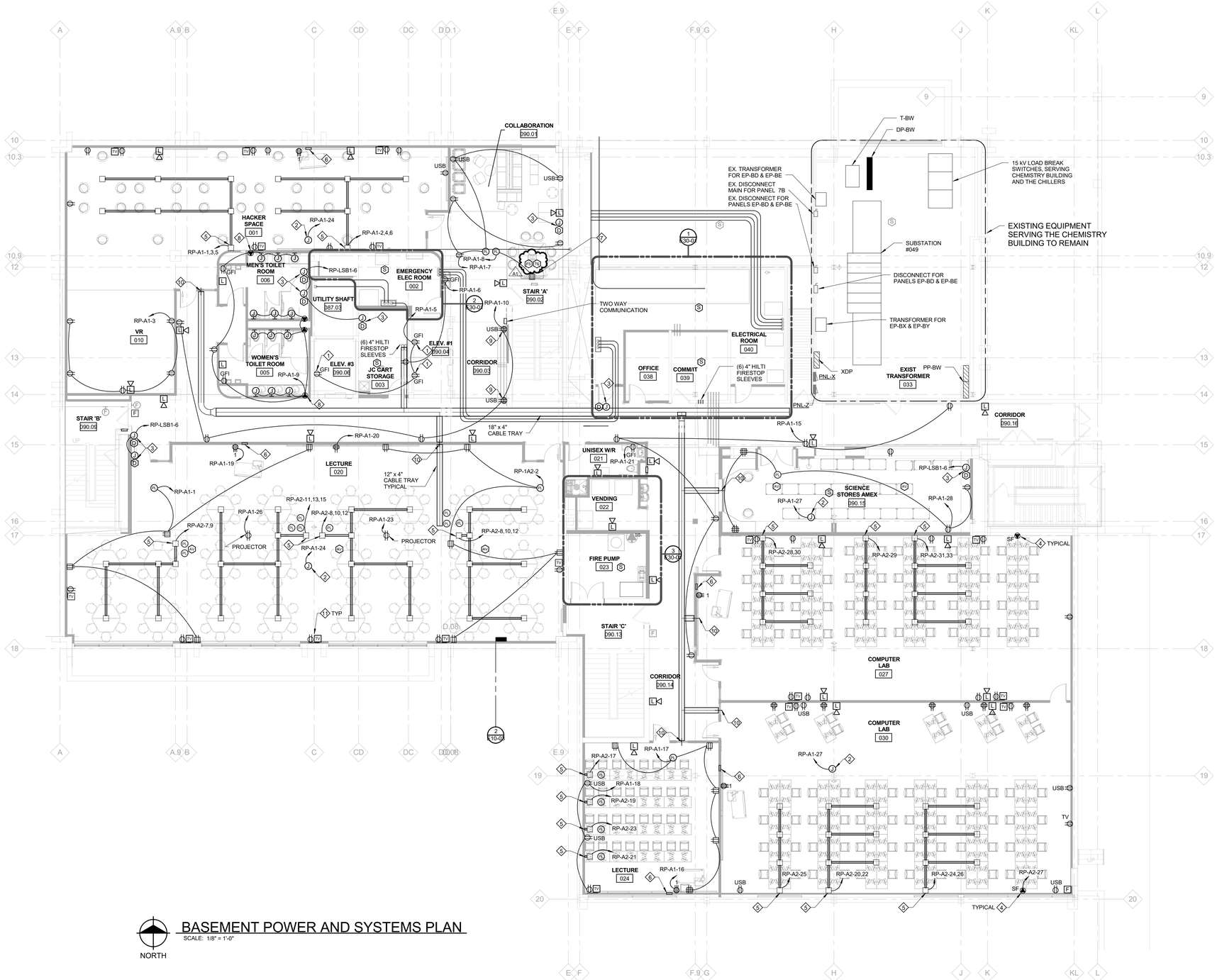
Project
STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
SUB-BASEMENT POWER & SYSTEMS PLAN

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
E20-01



BASEMENT POWER AND SYSTEMS PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

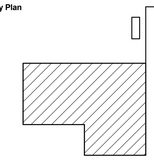
1. REFER TO DRAWING E001 AND THE SPECIFICATION FOR GENERAL REQUIREMENTS.

KEYNOTES

1 LOCATE IN ELEVATOR PIT. COORDINATE LOCATION WITH THE ELEVATOR CONTRACTOR.
2 JUNCTION BOX LOCATED NEAR THE CEILING FOR MECHANICAL CONTROLS
3 JUNCTION BOX FOR CONTROL MODULE AND DUCT DETECTOR FOR SMOKE DAMPERS.
4 2#12, 2#12 N, #12GRD, AND SEALTITE CONNECTION TO SYSTEMS FURNITURE.
5 POWER FEED TO FURNITURE "THREAD" SYSTEM, PROVIDED BY OTHERS. MAKE FINAL CONNECTION TO THE SYSTEM.
6 FSR BOX, #WB-X2-GNG WITH WB-X2-CVR-WHT COVER. PROVIDE TWO 1-1/4"C. UP TO ACCESSIBLE CEILING FOR AV/VOICE/DATA.
7 CONTROLLED RECEPTACLE TO BE USED TO POWER ELECTRIFIED TABLE.
8 JUNCTION BOX AND CONNECTION TO THE PLUMBING CONTROL TRANSFORMER ABOVE CEILING AT THE ACCESS PANEL. COORDINATE THE EXACT LOCATION WITH THE PLUMBING CONTRACTOR. PROVIDE 1/2" FLEXIBLE METAL CONDUIT AND APPLETON FSD1 BOX AND 8470 PLASTER RING FOR EACH SENSOR.
9 SERVE FROM BELOW. MOUNT DEVICE AT 1'10 MOUNT DEVICE AT 1'10" AFF.
10 3"C SLEEVE WITH FIRESTOPPING.
11 RECESSED BOX FOR A/V JACKS AND DUPLEX RECEPTACLE AT 55" AFF TO THE CENTERLINE. BOX SHALL BE AN FSR: PWB-100-WH WITH WHITE COVER. PROVIDE 1-1/4"C. STUBBED UP TO CEILING SPACE.

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

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Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: J. MILOCH	Drawn: M. FLANDERS
Project Leader: Approver	Checked: Checker

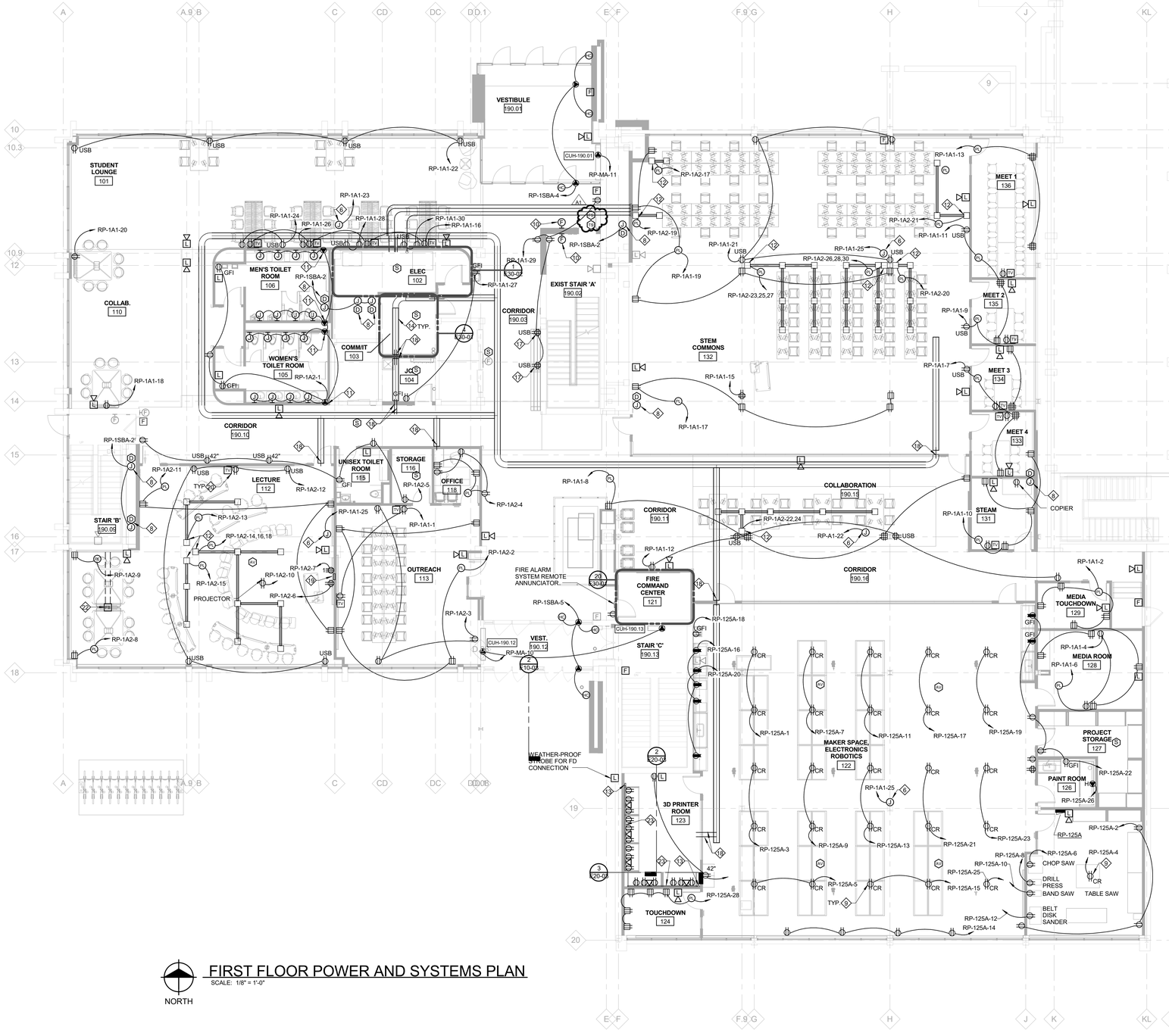
WAYNE STATE UNIVERSITY

Project
STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
BASEMENT POWER & SYSTEMS PLAN

Scale	1/8" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	E20-02

MATCHLINE - SEE THIS SHEET FOR CONTINUATION

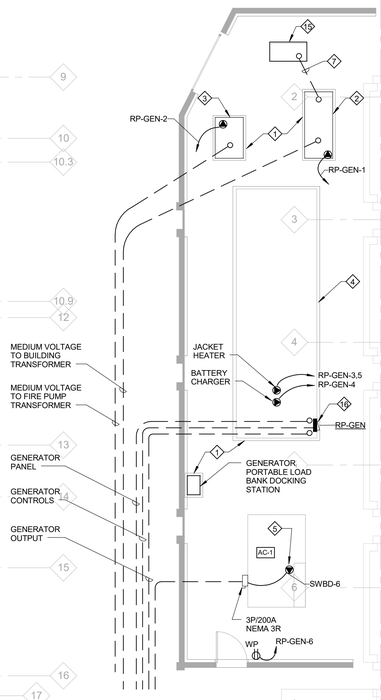


FIRST FLOOR POWER AND SYSTEMS PLAN

SCALE: 1/8" = 1'-0"

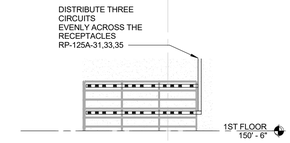
NORTH

MATCHLINE - SEE THIS SHEET FOR CONTINUATION



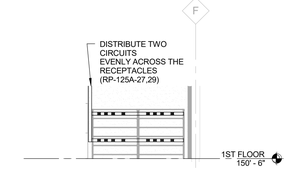
COMPOSITE POWER AND SYSTEMS PLAN

SCALE: 1/8" = 1'-0"



ROOM #123 WEST ELEVATION

SCALE: 1/8" = 1'-0"



ROOM #123 SOUTH ELEVATION

SCALE: 1/8" = 1'-0"

NOTES

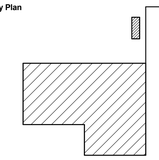
1. REFER TO DRAWING E001 AND THE SPECIFICATION FOR GENERAL REQUIREMENTS.

KEYNOTES

1 PROVIDE CONCRETE PADS FOR ALL ELECTRICAL EQUIPMENT.
2 MEDIUM VOLTAGE SWITCH FOR FIRE PUMP FEEDER.
3 MEDIUM VOLTAGE SWITCH, METERING FOR BUILDING FEEDER AND TAP FOR FIRE PUMP SWITCH.
4 GENERATOR. PROVIDE WITH PANEL FOR BATTERY CHARGER, JACKET HEATER. PROVIDE CONDUIT AND WIRING FOR CONTROLS AND FEEDERS.
5 AIR COOLED CHILLER.
6 JUNCTION BOX LOCATED NEAR THE CEILING FOR MECHANICAL CONTROLS.
7 REFER TO ONE LINE DIAGRAM.
8 JUNCTION BOX FOR CONTROL MODULE AND DUCT DETECTOR FOR SMOKE DAMPERS.
9 CEILING MOUNTED RECEPTACLE AND CORD REEL. #12/3 SOW, 25' LONG WITH (2) DUPLEX GFCI RECEPTACLES AND BALL STOP ASSEMBLY EQUAL TO DANIEL WOODHEAD #9383-3070G OR APPROVED EQUAL.
10 RELOCATED, INCLUDING CONDUIT AND WIRING.
11 JUNCTION BOX AND CONNECTION TO THE PLUMBING CONTROL TRANSFORMER ABOVE CEILING AT THE ACCESS PANEL. COORDINATE THE EXACT LOCATION WITH THE PLUMBING CONTRACTOR. PROVIDE 1/2" FLEXIBLE METAL CONDUIT AND APPLETON FSD1 BOX AND 8470 PLASTER RING FOR EACH SENSOR.
12 FURNITURE "THREAD" SYSTEM. PROVIDE CIRCUITS AS INDICATED.
13 PROVIDE 1-1/4"C. TO CEILING SPACE FOR DATA CABLING.
14 12" LADDER RACK CABLE TRAY.
15 MEDIUM VOLTAGE SEPARABLE CONNECTION CABINET, PROVIDED AND INSTALLED BY DTE ENERGY. ALL WORK DOWNSTREAM OF THE SEPARABLE CONNECTION CABINET SHALL BE PROVIDED BY THE STEM BUILDING ELECTRICAL CONTRACTOR.
16 GENERATOR PANEL, FED FROM RP-MA TO SERVE MEDIUM VOLTAGE SWITCH HEATERS, JACKET HEATER, BATTERY CHARGER, ETC. REFER TO THE DETAILS FOR FURTHER INFORMATION.
17 MOUNT DEVICE AT 1'10"
18 3"C SLEEVE WITH FIRESTOPPING, WHERE REQUIRED.
19 FSR BOX, #WB-X2-GNG WITH WB-X2-CVR-WHT COVER. PROVIDE TWO 1-1/4"C. UP TO ACCESSIBLE CEILING FOR AV/VOICE/DATA.
20 RECESSED BOX FOR A/V JACKS AND DUPLEX RECEPTACLE AT 55" AFF TO THE CENTERLINE. BOX SHALL BE AN FSR, PWB-100-WH WITH WHITE COVER. PROVIDE 1-1/4"C. STUBBED UP TO CEILING SPACE.
22 CONNECTRAC RACEWAY. REFER TO THE DETAIL ON DRAWING E501.
23 MULTIPLE ROWS OF WIREMOLD 4000 WITH LOW VOLTAGE DIVIDER AND OUTLETS AS INDICATED, REFER TO THE ELEVATIONS ON THIS SHEET.

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Manager	BIM Lead
J. SMITH	C. BAKER
Design Lead	Drawn
J. MILOCH	M. FLANDERS
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

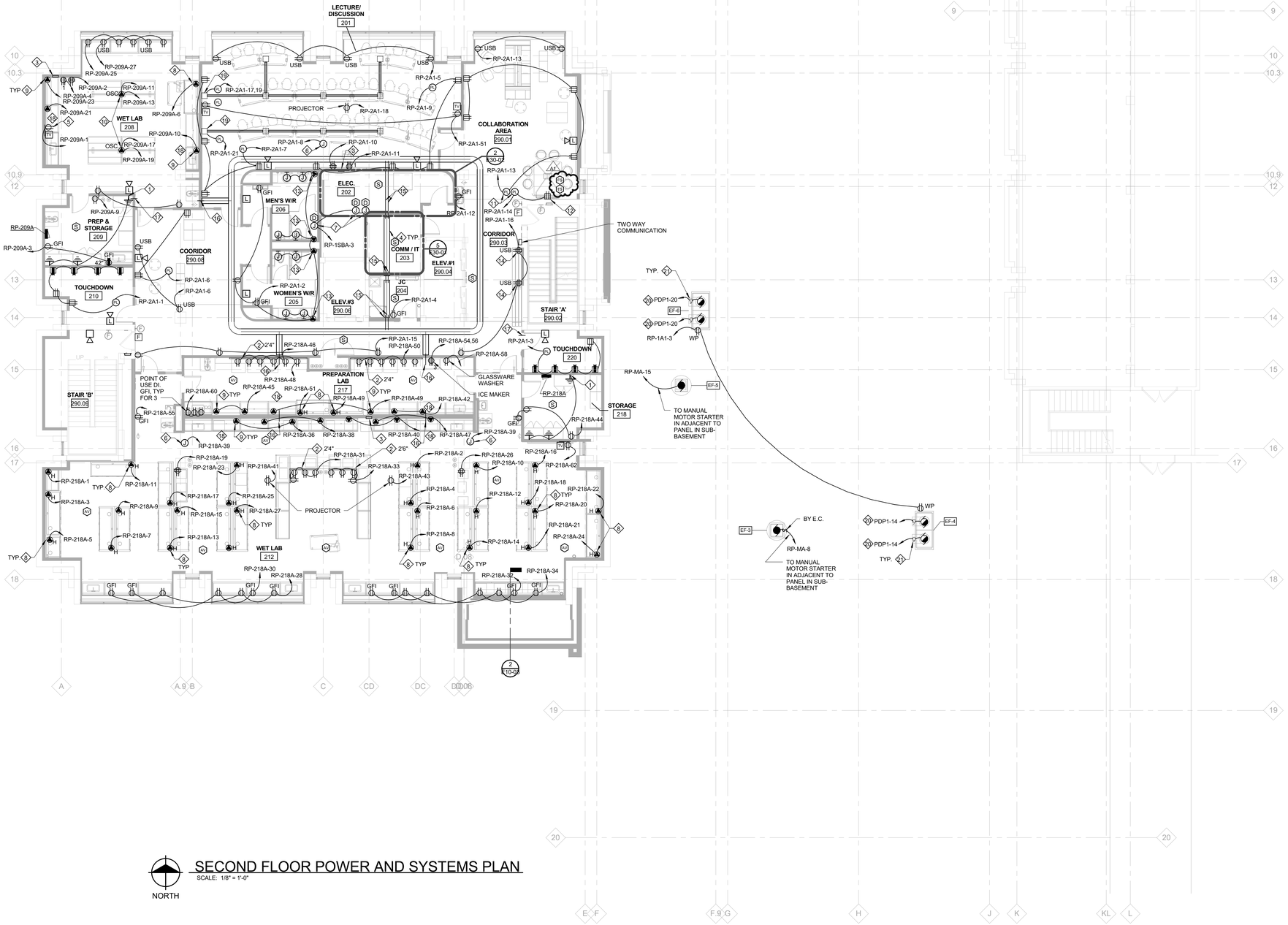
Project
STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
FIRST FLOOR POWER & SYSTEMS PLAN

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
E20-03



SECOND FLOOR POWER AND SYSTEMS PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

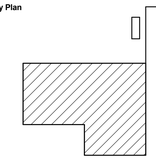
1. REFER TO DRAWING E001 AND THE SPECIFICATION FOR GENERAL REQUIREMENTS.

KEYNOTES

1 BOND CABINET WITH #6 AWG BACK TO THE GROUND BAR IN THE NEAREST PANELBOARD.
2 FINISHED SURFACE MOUNTED RACEWAY, MOUNTED AT HEIGHT INDICATED. WIREMOLD DS4000 SERIES WITH DEVICES INDICATED.
3 FSR BOX, #WB-X2-GNG WITH WB-X2-CVR-WHT COVER. PROVIDE TWO 1-1/4"C. UP TO ACCESSIBLE CEILING FOR AV/VOICE/DATA.
4 12"x 4" BASKET CABLE TRAY.
5 RECESSED BOX FOR A/V JACKS AND DUPLEX RECEPTACLE AT 55" AFF TO THE CENTERLINE. BOX SHALL BE AN FSR: PWB-100-WH WITH WHITE COVER. PROVIDE 1-1/4"C. STUBBED UP TO CEILING SPACE.
6 JUNCTION BOX LOCATED NEAR THE CEILING FOR MECHANICAL CONTROLS.
7 JUNCTION BOX FOR CONTROL MODULE AND DUCT DETECTOR FOR SMOKE DAMPERS.
8 PROVIDE 2#12, #12 GROUND AND CONNECTION TO HOOD. REFER TO THE DETAIL ON DRAWING E501.
9 PROVIDE A 120V CIRCUIT AS INDICATED TO SERVE BENCH WITH SERVICE UPRIGHT CHANNEL AND INTEGRAL RECEPTACLES.
10 PROVIDE 2#12, 2#12N, #12 GRD, 3/4"C. FOR TWO 120V CIRCUITS TO SERVE THE OVERHEAD SERVICE CARRIER, WITH (8) DUPLEX OUTLETS.
11 PLUG LOAD RELAY THAT WORKS IN CONJUNCTION WITH THE LIGHTING CONTROLS. REFER TO THE LIGHTING PLANS FOR FURTHER INFORMATION.
12 CONTROLLED RECEPTACLE TO BE USED TO POWER ELECTRIFIED TABLE.
13 JUNCTION BOX AND CONNECTION TO THE PLUMBING CONTROL TRANSFORMER ABOVE CEILING AT THE ACCESS PANEL. COORDINATE THE EXACT LOCATION WITH THE PLUMBING CONTRACTOR. PROVIDE 1/2" FLEXIBLE METAL CONDUIT AND APPLETON FSD1 BOX AND 8470 PLASTER RING FOR EACH SENSOR.
14 MOUNT DEVICE AT 1'10"
15 4"C SLEEVE WITH FIRESTOPPING, WHERE REQUIRED.
16 3"C SLEEVE WITH FIRESTOPPING, WHERE REQUIRED.
17 2"C SLEEVE.
18 LAB BENCH SHALL HAVE GFCI RECEPTACLES.
19 POWER FEED TO FURNITURE "THREAD" SYSTEM, PROVIDED BY OTHERS. MAKE FINAL CONNECTION TO THE SYSTEM.
20 3#12, #12 GROUND VIA VFD IN THE SUB-BASEMENT.
21 3P/30A DISCONNECT, NEMA 3R

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

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150 W. Jefferson Avenue, Suite 1300
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FTC&H engineers scientists architects constructors
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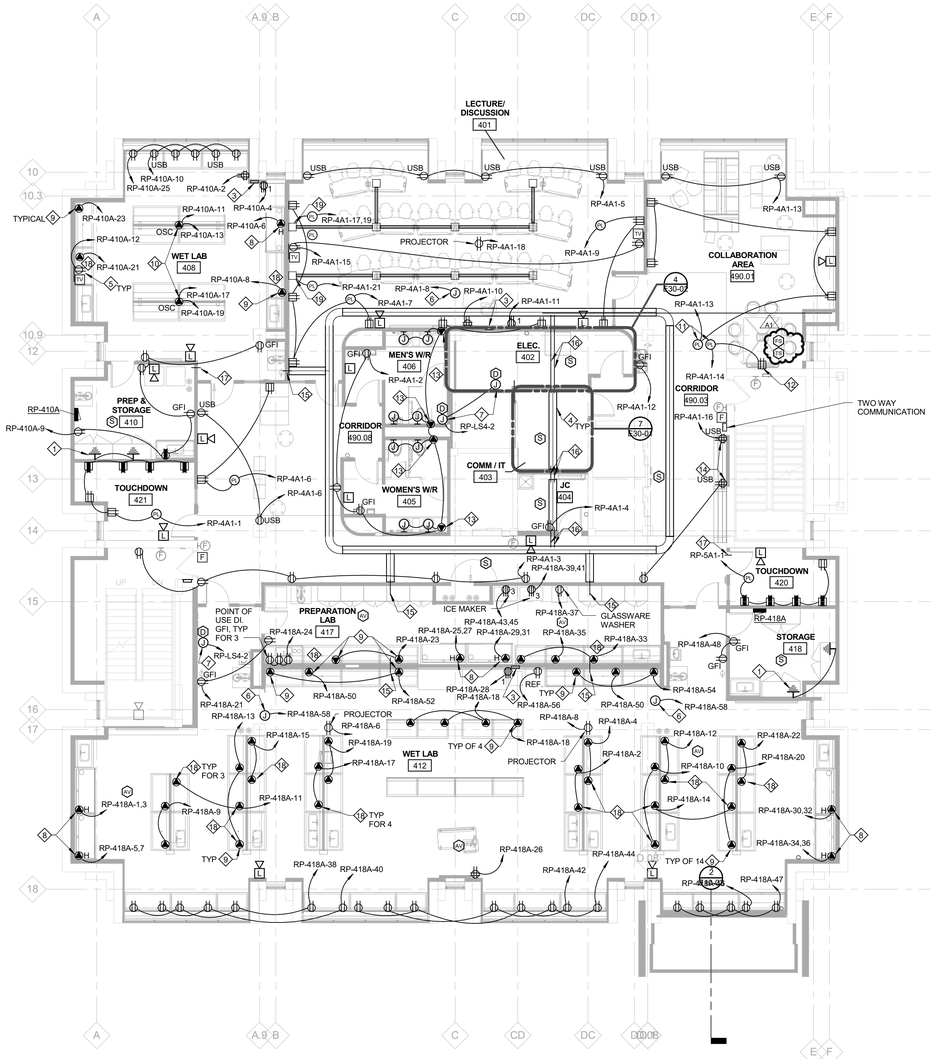
Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: J. MILOCH	Drawn: M. FLANDERS
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project
STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
SECOND FLOOR POWER & SYSTEMS PLAN

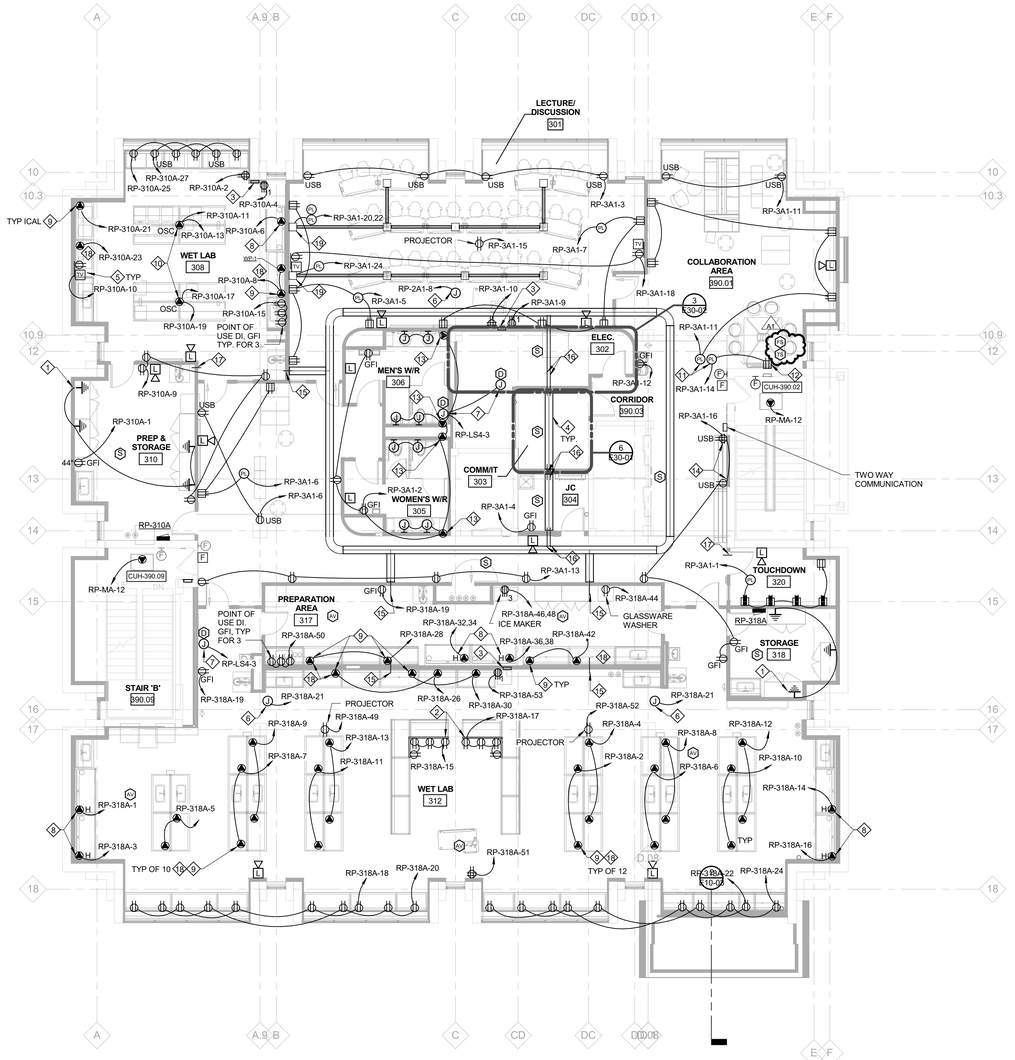
Scale	1/8" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	E20-04



FOURTH FLOOR POWER AND SYSTEMS PLAN

SCALE: 1/8" = 1'-0"

NORTH



THIRD FLOOR POWER AND SYSTEMS PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

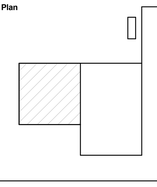
1. REFER TO DRAWING E001 AND THE SPECIFICATION FOR GENERAL REQUIREMENTS.

KEYNOTES

1. BOND CABINET WITH #6 AWG BACK TO THE GROUND BAR IN THE FLOOR ELECTRICAL ROOM.
2. FINISHED SURFACE MOUNTED RACEWAY, MOUNTED AT HEIGHT INDICATED. WIREMOLD DS4000 SERIES WITH DEVICES INDICATED.
3. FSR BOX, #WB-X2-GNG WITH WB-X2-CVR-WHT COVER. PROVIDE TWO 1-1/4"C. UP TO ACCESSIBLE CEILING FOR AV/VOICE/DATA.
4. 12" LADDER RACK CABLE TRAY.
5. RECESSED BOX FOR A/V JACKS AND DUPLEX RECEPTACLE AT 55" AFF TO THE CENTERLINE. BOX SHALL BE AN FSR: PWB-100-WH WITH WHITE COVER. PROVIDE 1-1/4"C. STUBBED UP TO CEILING SPACE.
6. JUNCTION BOX LOCATED NEAR THE CEILING FOR MECHANICAL CONTROLS.
7. JUNCTION BOX FOR CONTROL MODULE AND DUCT DETECTOR FOR SMOKE DAMPERS.
8. PROVIDE 2#12, #12 GROUND AND CONNECTION TO HOOD. REFER TO THE DETAIL ON DRAWING E501.
9. PROVIDE A 120V CIRCUIT AS INDICATED TO SERVE BENCH WITH SERVICE UPRIGHT CHANNEL AND INTEGRAL RECEPTACLES.
10. PROVIDE 2#12, 2#12N, #12 GRD, 3/4"C. FOR TWO 120V CIRCUITS AND (2) DATA OUTLETS TO SERVE THE OVERHEAD SERVICE CARRIER, WITH (8) DUPLEX OUTLETS.
11. PLUG LOAD RELAY THAT WORKS IN CONJUNCTION WITH THE LIGHTING CONTROLS. REFER TO THE LIGHTING PLANS FOR FURTHER INFORMATION.
12. CONTROLLED RECEPTACLE TO BE USED TO POWER ELECTRIFIED TABLE.
13. JUNCTION BOX AND CONNECTION TO THE PLUMBING CONTROL TRANSFORMER ABOVE CEILING AT THE ACCESS PANEL. COORDINATE THE EXACT LOCATION WITH THE PLUMBING CONTRACTOR. PROVIDE 1/2" FLEXIBLE METAL CONDUIT AND APPLETON FSD1 BOX AND 8470 PLASTER RING FOR EACH SENSOR.
14. SERVE FROM BELOW. MOUNT DEVICE AT 1'10
15. 3"C SLEEVE WITH FIRESTOPPING, WHERE REQUIRED.
16. 4"C SLEEVE WITH FIRESTOPPING, WHERE REQUIRED.
17. 2"C SLEEVE.
18. LAB BENCH SHALL HAVE GFCI RECEPTACLES.
19. POWER FEED TO FURNITURE "THREAD" SYSTEM, PROVIDED BY OTHERS. MAKE FINAL CONNECTION TO THE SYSTEM.

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

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Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: J. MILOCH	Drawn: M. FLANDERS
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

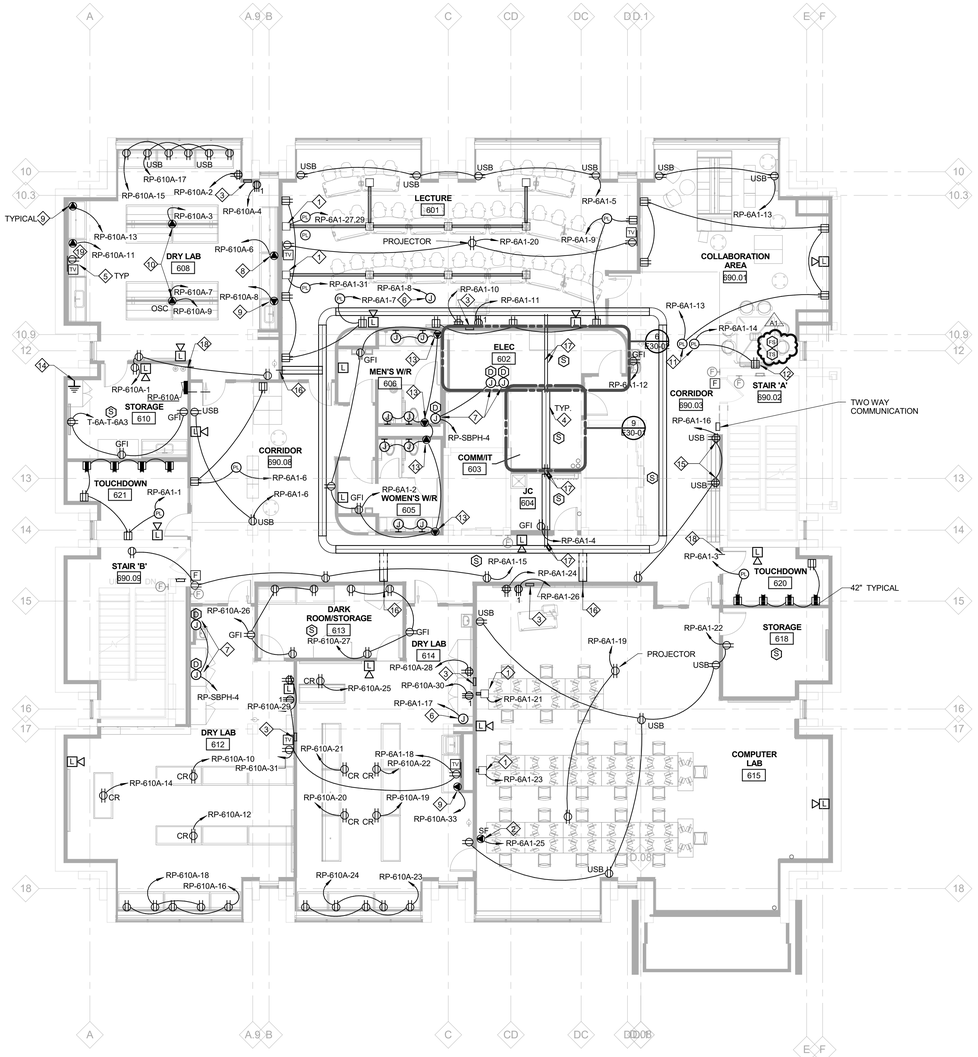
STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

THIRD AND FOURTH FLOOR POWER & SYSTEMS PLAN

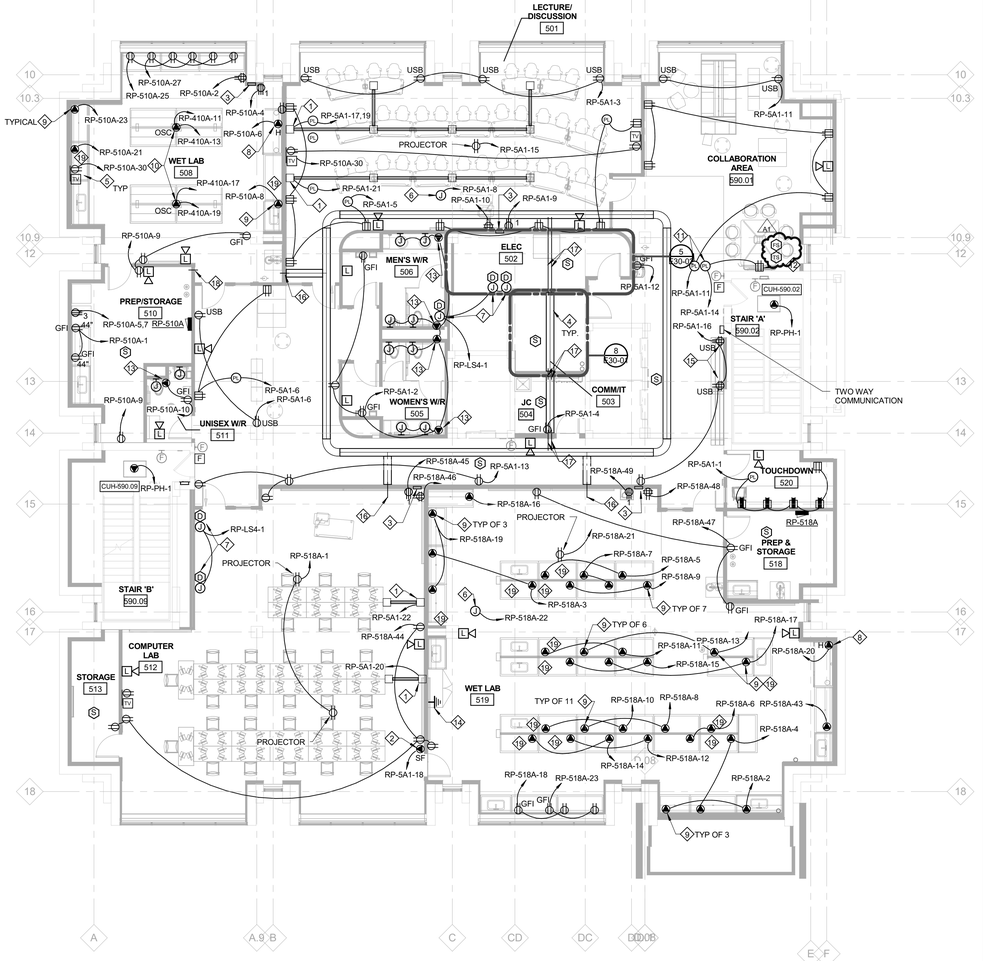
Scale	1/8" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	E20-05



SIXTH FLOOR POWER AND SYSTEMS PLAN

SCALE: 1/8" = 1'-0"

NORTH



FIFTH FLOOR POWER AND SYSTEMS PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

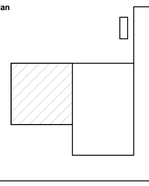
1. REFER TO DRAWING E001 AND THE SPECIFICATION FOR GENERAL REQUIREMENTS.

KEYNOTES

1. POWER FEED TO FURNITURE "THREAD" SYSTEM, PROVIDED BY OTHERS. MAKE FINAL CONNECTION TO THE SYSTEM.
2. 2#12, 2#12 N, #12GRD, AND SEALTITE CONNECTION TO SYSTEMS FURNITURE.
3. FSR BOX, #WB-X2-GNG WITH WB-X2-CVR-WHT COVER WITH CONDUITS UP TO ACCESSIBLE CEILING FOR AV/VOICE/DATA.
4. 12" LADDER RACK CABLE TRAY.
5. RECESSED BOX FOR A/V JACKS AND DUPLEX RECEPTACLE AT 55" AFF TO THE CENTERLINE. BOX SHALL BE AN FSR: PWB-100-WH WITH WHITE COVER. PROVIDE 1-1/4"C. STUBBED UP TO CEILING SPACE.
6. JUNCTION BOX LOCATED NEAR THE CEILING FOR MECHANICAL CONTROLS.
7. JUNCTION BOX FOR CONTROL MODULE AND DUCT DETECTOR FOR SMOKE DAMPERS.
8. PROVIDE 2#12, #12 GROUND AND CONNECTION TO HOOD. REFER TO THE DETAIL ON DRAWING E501.
9. PROVIDE A 120V CIRCUIT AS INDICATED TO SERVE BENCH WITH SERVICE UPRIGHT CHANNEL AND INTEGRAL RECEPTACLES.
10. PROVIDE 2#12, 2#12N, #12 GRD, 3/4"C. FOR TWO 120V CIRCUITS TO SERVE THE OVERHEAD SERVICE CARRIER, WITH (8) DUPLEX OUTLETS
11. PLUG LOAD RELAY THAT WORKS IN CONJUNCTION WITH THE LIGHTING CONTROLS. REFER TO THE LIGHTING PLANS FOR FURTHER INFORMATION.
12. CONTROLLED RECEPTACLE TO BE USED TO POWER ELECTRIFIED TABLE.
13. JUNCTION BOX AND CONNECTION TO THE PLUMBING CONTROL TRANSFORMER ABOVE CEILING AT THE ACCESS PANEL. COORDINATE THE EXACT LOCATION WITH THE PLUMBING CONTRACTOR. PROVIDE 1/2" FLEXIBLE METAL CONDUIT AND APPLETON FSD1 BOX AND 8470 PLASTER RING FOR EACH SENSOR.
14. BOND CABINET WITH #6 AWG BACK TO THE GROUND BAR IN THE FLOOR ELECTRICAL ROOM.
15. SERVE FROM BELOW. MOUNT DEVICE AT 1'10
16. 3"C SLEEVE WITH FIRESTOPPING, WHERE REQUIRED.
17. 4"C SLEEVE WITH FIRESTOPPING, WHERE REQUIRED.
18. 2"C SLEEVE.
19. LAB BENCH SHALL HAVE GFCI RECEPTACLES.

DATE	ISSUED FOR	REV
09/07/2018	100% DD	1
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

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Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: J. MILOCH	Drawn: M. FLANDERS
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

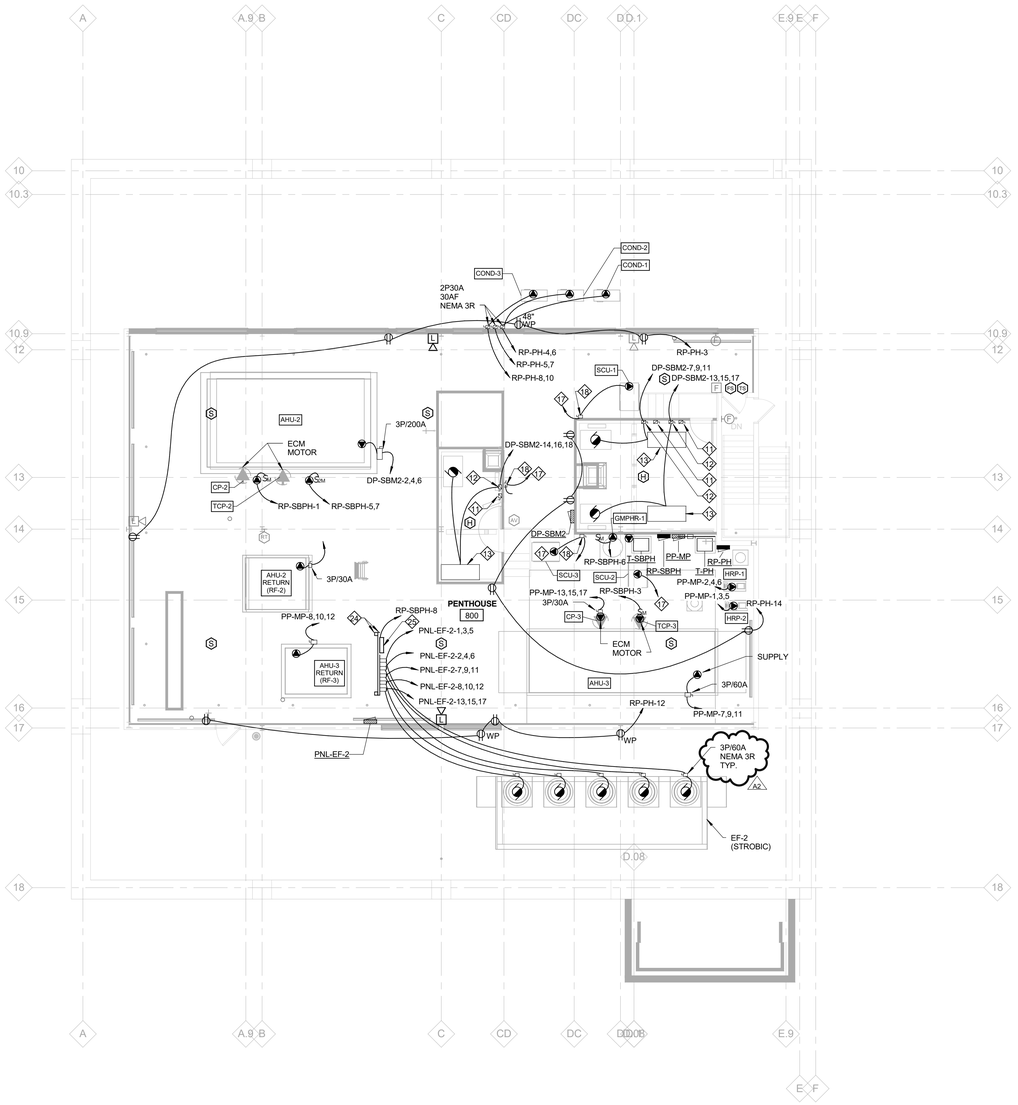
FIFTH AND SIXTH FLOOR POWER & SYSTEMS PLAN

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

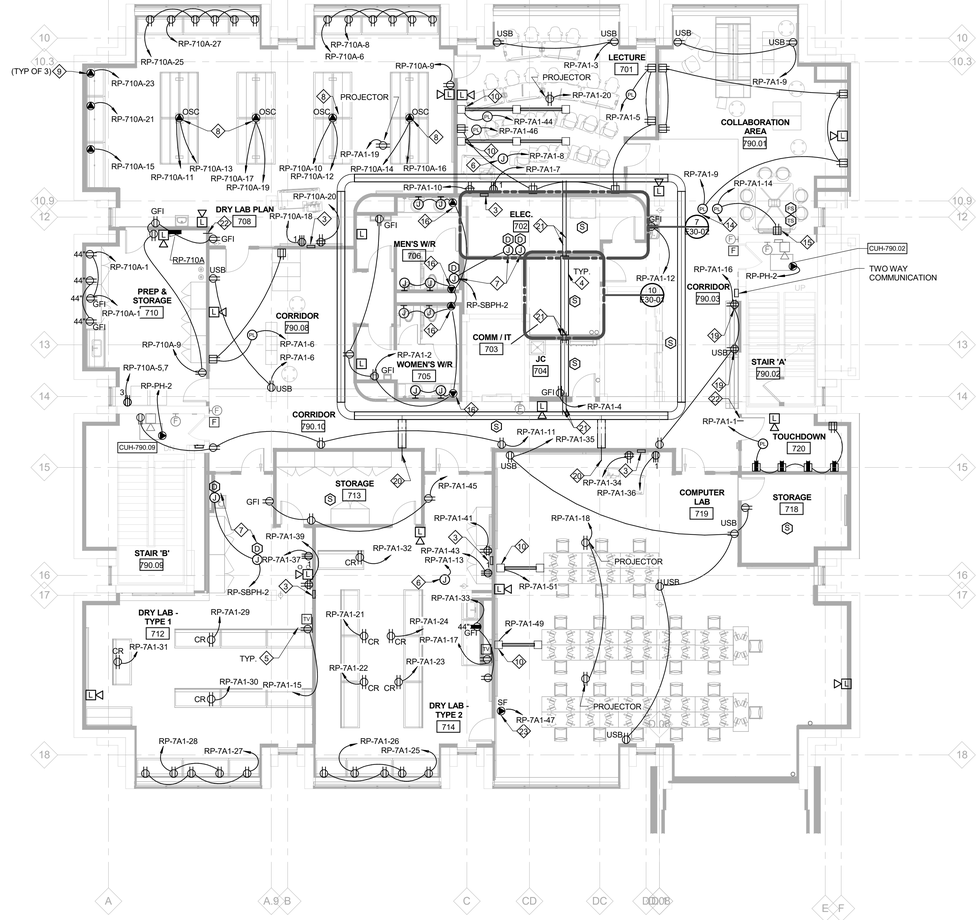
E20-06



PENTHOUSE POWER AND SYSTEMS PLAN

SCALE: 1/8" = 1'-0"

NORTH



SEVENTH FLOOR POWER AND SYSTEMS PLAN

SCALE: 1/8" = 1'-0"

NORTH

NOTES

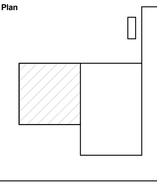
1. REFER TO DRAWING E001 AND THE SPECIFICATION FOR GENERAL REQUIREMENTS.
2. REFER TO THE ONE LINE DIAGRAMS FOR FEEDER, SWITCH, AND/OR STARTER SIZES.
3. PROVIDE A HEAT DETECTOR AND SHUNT TRIP BREAKER WITHIN ELEVATOR MACHINE ROOMS FOR HOIST MACHINE POWER. HEAT DETECTOR WILL TRANSMIT A SIGNAL TO THE ELEVATOR CONTROLLER WHICH WILL THEN SEND THE CAB TO "CAPTURE FLOOR". ONCE AT THE CAPTURE FLOOR, THE ELEVATOR CONTROLLER WILL SEND A SIGNAL TO OPEN THE SHUNT TRIP BREAKER AND INTERRUPT ELEVATOR CONTROLLER POWER COMPLETELY. CAB LIGHTING TO REMAIN ON. FINAL CONNECTIONS TO ELEVATOR CONTROLLER BY ELEVATOR CONTRACTOR. COORDINATE THIS INSTALLATION WITH ELEVATOR SPECIFICATION.

KEYNOTES

1. EXHAUST FAN WITH INTEGRAL LOCAL DISCONNECT.
2. FINISHED SURFACE MOUNTED RACEWAY, MOUNTED AT HEIGHT INDICATED. WIREMOLD DS4000 SERIES WITH DEVICES INDICATED.
3. FSR BOX WITH WITH CONDUITS UP FOR AV/VOICE/DATA. REFER TO THE AV DRAWINGS.
4. 12" LADDER RACK CABLE TRAY.
5. RECESSED BOX FOR A/V JACKS AND DUPLEX RECEPTACLE AT 55" AFF TO THE CENTERLINE. BOX SHALL BE AN FSR: PWB-100-WH WITH WHITE COVER. PROVIDE 1-1/4"C. STUBBED UP TO CEILING SPACE.
6. JUNCTION BOX LOCATED NEAR THE CEILING FOR MECHANICAL CONTROLS.
7. JUNCTION BOX FOR CONTROL MODULE AND DUCT DETECTOR FOR SMOKE DAMPERS.
8. PROVIDE 2#12, 2#12N, #12 GRD, 3/4"C. FOR TWO 120V CIRCUITS AND (2) DATA OUTLETS TO SERVE THE OVERHEAD SERVICE CARRIER, WITH (8) DUPLEX OUTLETS.
9. PROVIDE A 120V CIRCUIT AS INDICATED TO SERVE BENCH WITH SERVICE UPRIGHT CHANNEL AND INTEGRAL RECEPTACLES.
10. POWER FEED TO FURNITURE "THREAD" SYSTEM, PROVIDED BY OTHERS. MAKE FINAL CONNECTION TO THE SYSTEM.
11. 2P30A FUSED DISCONNECT WITH 20A FUSES TO SERVE ELEVATOR CAB LIGHTS AND FAN.
12. 3P30A FUSED SHUNT TRIP SAFETY SWITCH. FUSED AT 30A TO SERVE REPLACEMENT ELEVATOR CONTROLLER.
13. ELEVATOR CONTROLLER.
14. PLUG LOAD RELAY THAT WORKS IN CONJUNCTION WITH THE LIGHTING CONTROLS. REFER TO THE LIGHTING PLANS FOR FURTHER INFORMATION.
15. CONTROLLED RECEPTACLE TO BE USED TO POWER ELECTRIFIED TABLE.
16. JUNCTION BOX AND CONNECTION TO THE PLUMBING CONTROL TRANSFORMER ABOVE CEILING AT THE ACCESS PANEL. COORDINATE THE EXACT LOCATION WITH THE PLUMBING CONTRACTOR. PROVIDE 1/2" FLEXIBLE METAL CONDUIT AND APPLETON FSD1 BOX AND 8470 PLASTER RING FOR EACH SENSOR.
17. 3#12, #12 GRD, 3/4"C TO RESPECTIVE CONDENSING UNIT CONTROL PANEL.
18. 3P/30A DISCONNECT
19. SERVE FROM BELOW. MOUNT DEVICE AT 1"10
20. 3"C SLEEVE WITH FIRESTOPPING, WHERE REQUIRED.
21. 4"C SLEEVE WITH FIRESTOPPING, WHERE REQUIRED.
22. 2"C SLEEVE.
23. 2#12, 2#12 N, #12GRD, AND SEALTITE CONNECTION TO SYSTEMS FURNITURE.
24. PROVIDE UNISTRUT SUPPORT.
25. STROBIC FAN (EF-2) SMART SYSTEM CONTROLLER.

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
01/22/2019	ADDENDUM NO. 2	5
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Manager	BIM Lead
J. SMITH	C. BAKER
Design Lead	Drawn
J. MILOCH	M. FLANDERS
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

SEVENTH AND PENTHOUSE POWER & SYSTEMS PLAN

Scale 1/8" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

E20-07

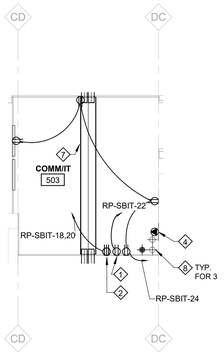
3/15/2019 8:45:57 AM

NOTES

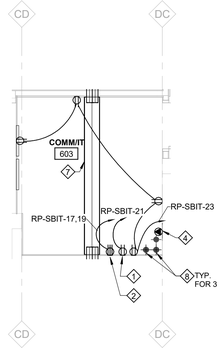
1. REFER TO DRAWING E001 AND THE SPECIFICATION FOR GENERAL REQUIREMENTS.

KEYNOTES

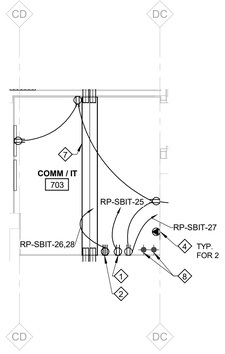
1 DEDICATED RECEPTACLE FOR THE IT RACK. PROVIDE METERED PDU PLUGSTRIP
2 PROVIDE 208 VOLT, 30 AMP , SINGLE PHASE RECEPTACLE AND METERED POWER STRIP, CONNECT TO EMERGENCY CIRCUIT.
3 EXISTING CONDUITS WITH FIBER OPTIC CABLE TO REMAIN.
4 PROVIDE 1/4" X 2" X 2" GROUND BUS. PROVIDE #4/0 AWG. INSULATED COOPER TO MDF ROOM.
5 PROVIDE 1/4" X 2" X 4" GROUND BUS. PROVIDE #4/0 AWG INSULATED COPPER TO THE IDF ROOMS GROUND BUS WITH #6 JUMPER.
6 25"W x 4"H x 1/4" THICK COPPER BUSBAR. REFER TO THE GROUNDING DETAIL ON DRAWINGE 50-01.
7 12"W BASKET TRAY.
8 PROVIDE AND INSTALL HILTI SPEED SLEEVE MODEL CP-630 OR EZ PATH FIRE STOP SYSTEM WHEREVER CONDUITS OR CABLING PASS THROUGH FIRE RATED WALLS, FLOORS OR CABLES PASS THROUGH OPENINGS IN WALLS.



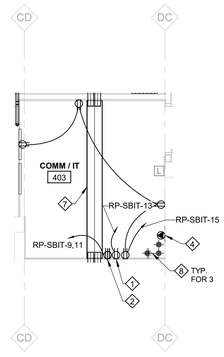
8 COMM/IT #503 ENLARGED PLAN
SCALE: 1/4" = 1'-0"



9 COMM/IT #603 ENLARGED PLAN
SCALE: 1/4" = 1'-0"



10 COMM/IT #703 ENLARGED PLAN
SCALE: 1/4" = 1'-0"



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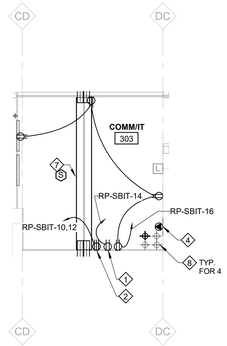
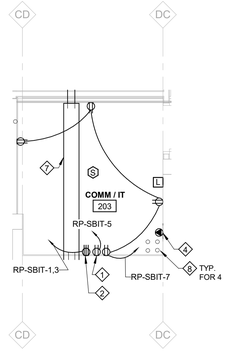
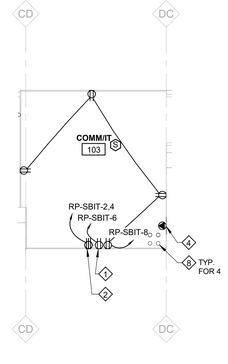
SCALE: 1/4" = 1'-0"



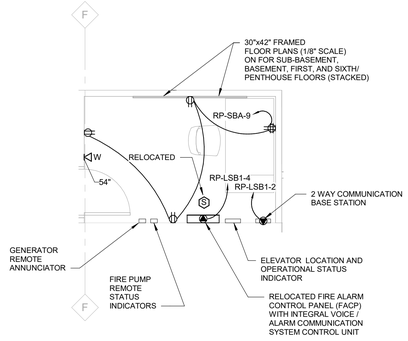
6 COMM/IT #303 ENLARGED PLAN
SCALE: 1/4" = 1'-0"



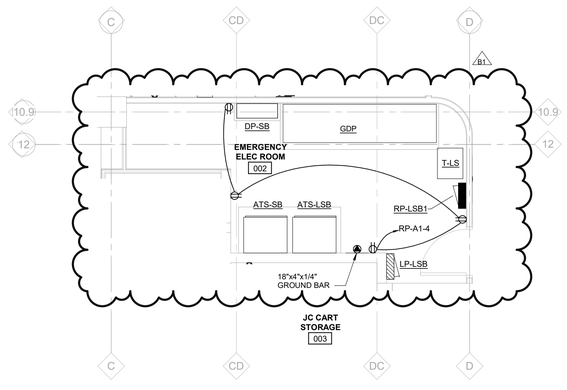
5 COMM/IT #203 ENLARGED PLAN
SCALE: 1/4" = 1'-0"



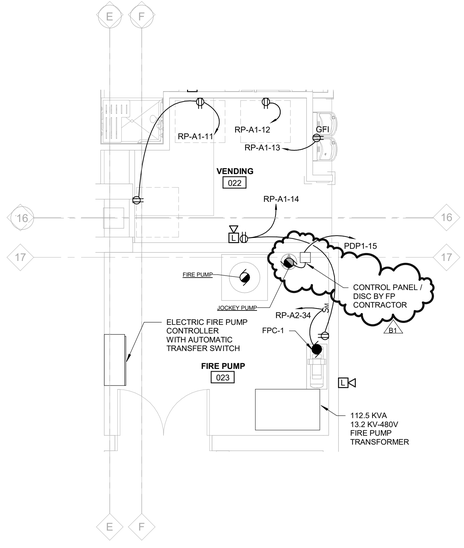
4 COMM/IT #103 ENLARGED PLAN
SCALE: 1/4" = 1'-0"



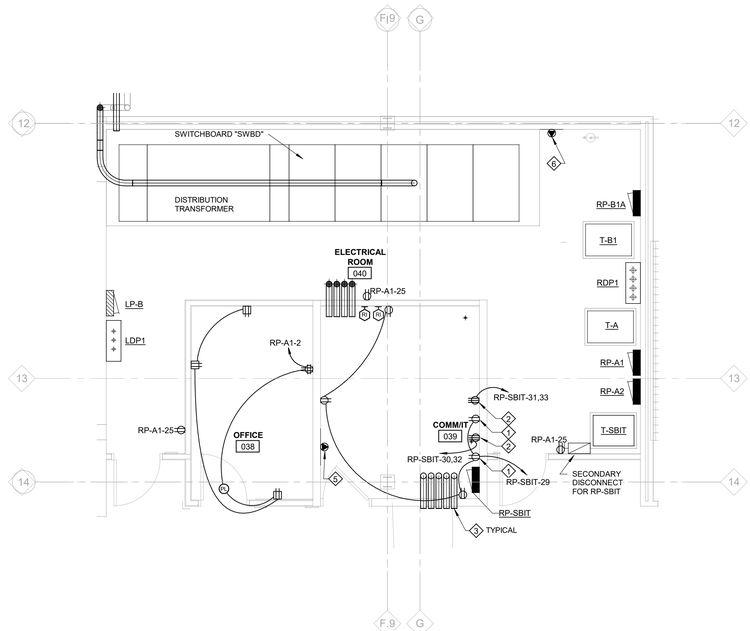
20 FIRE COMMAND CENTER ENLARGED PLAN #121
SCALE: 1/4" = 1'-0"



2 ENLARGED BASEMENT EMERGENCY ELECTRICAL ROOM
SCALE: 1/4" = 1'-0"



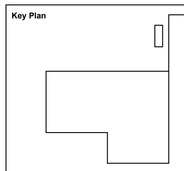
3 BASEMENT FIRE COMMAND
SCALE: 1/4" = 1'-0"



1 ENLARGED BASEMENT ELECT, IT/COMM, OFFICE
SCALE: 1/4" = 1'-0"

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
01/22/2019	ADDENDUM NO. 2	5
03/15/2019	BULLETIN NO. 1	6
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

Seal(s)

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Project Manager J. SMITH	BIM Lead C. BAKER
Design Lead J. MILOCH	Drawn M. FLANDERS
Project Leader Approver	Checked Checker

WAYNE STATE UNIVERSITY

Project
STEM Innovation
Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
ENLARGED ELECTRICAL PLANS

Scale	1/4" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	E30-01

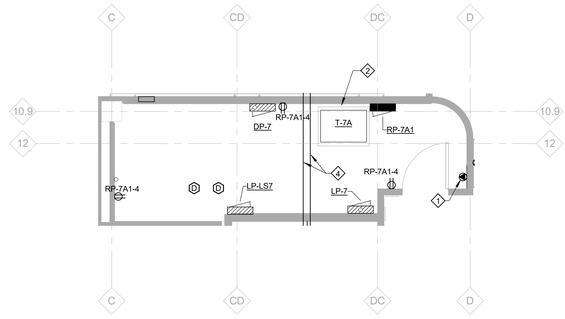
C:\Work\Revit\2018_E_180050_MRF.rvt

NOTES

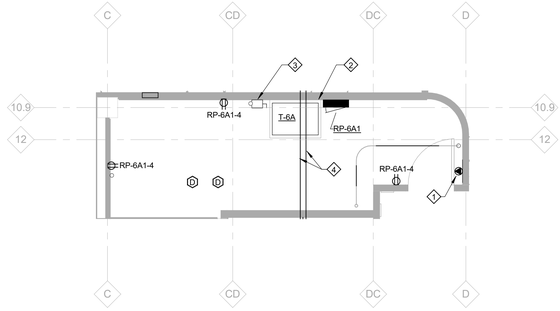
1. REFER TO DRAWING E001 AND THE SPECIFICATION FOR GENERAL REQUIREMENTS.

KEYNOTES

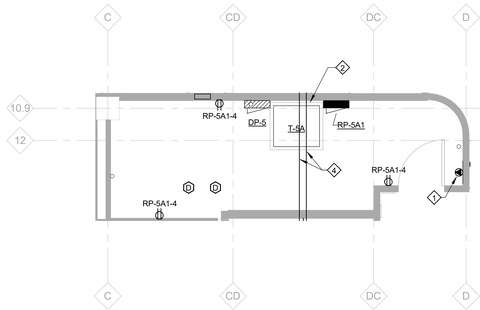
1 25"W x 4"H x 1/4" THICK COPPER BUSBAR. REFER TO THE GROUNDING DETAIL ON DRAWINGE 50-01.
2 CONCRETE HOUSEKEEPING PAD.
3 480V DISCONNECT FOR THE ADJACENT TRANSFORMER.
4 4"C. OVERHEAD FROM IDF TO ADJACENT ROOM.



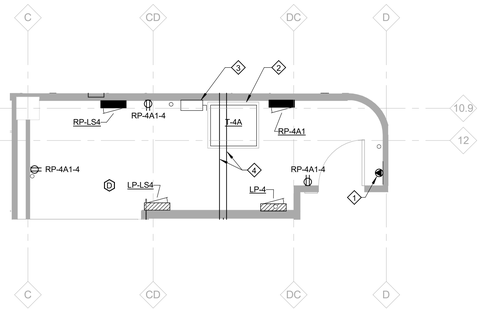
ELECT #702 ENLARGED PLAN
SCALE: 1/4" = 1'-0"



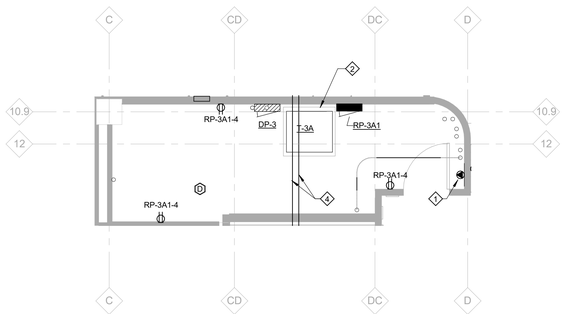
ELECT #602 ENLARGED PLAN
SCALE: 1/4" = 1'-0"



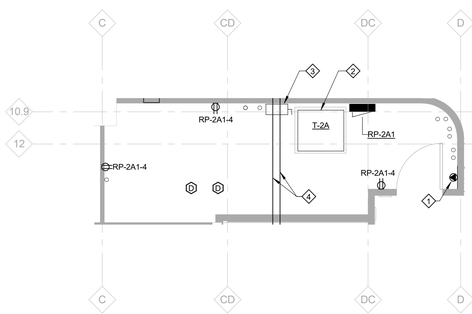
ELECT #502 ENLARGED PLAN
SCALE: 1/4" = 1'-0"



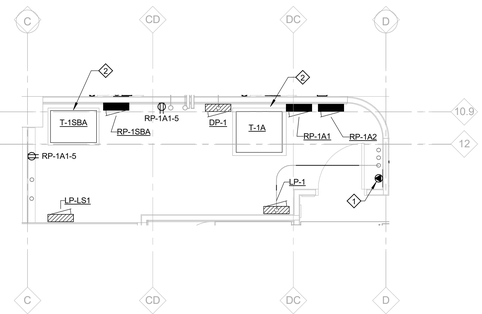
ELECT #402 ENLARGED PLAN
SCALE: 1/4" = 1'-0"



ELECT #302 ENLARGED PLAN
SCALE: 1/4" = 1'-0"



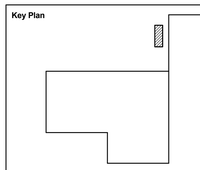
ELECT #202 ENLARGED PLAN
SCALE: 1/4" = 1'-0"



ELECT #102 ENLARGED PLAN
SCALE: 1/4" = 1'-0"

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

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Project Manager: J. SMITH	BIM Lead: C. BAKER
Design Lead: Designer	Drawn: Author
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

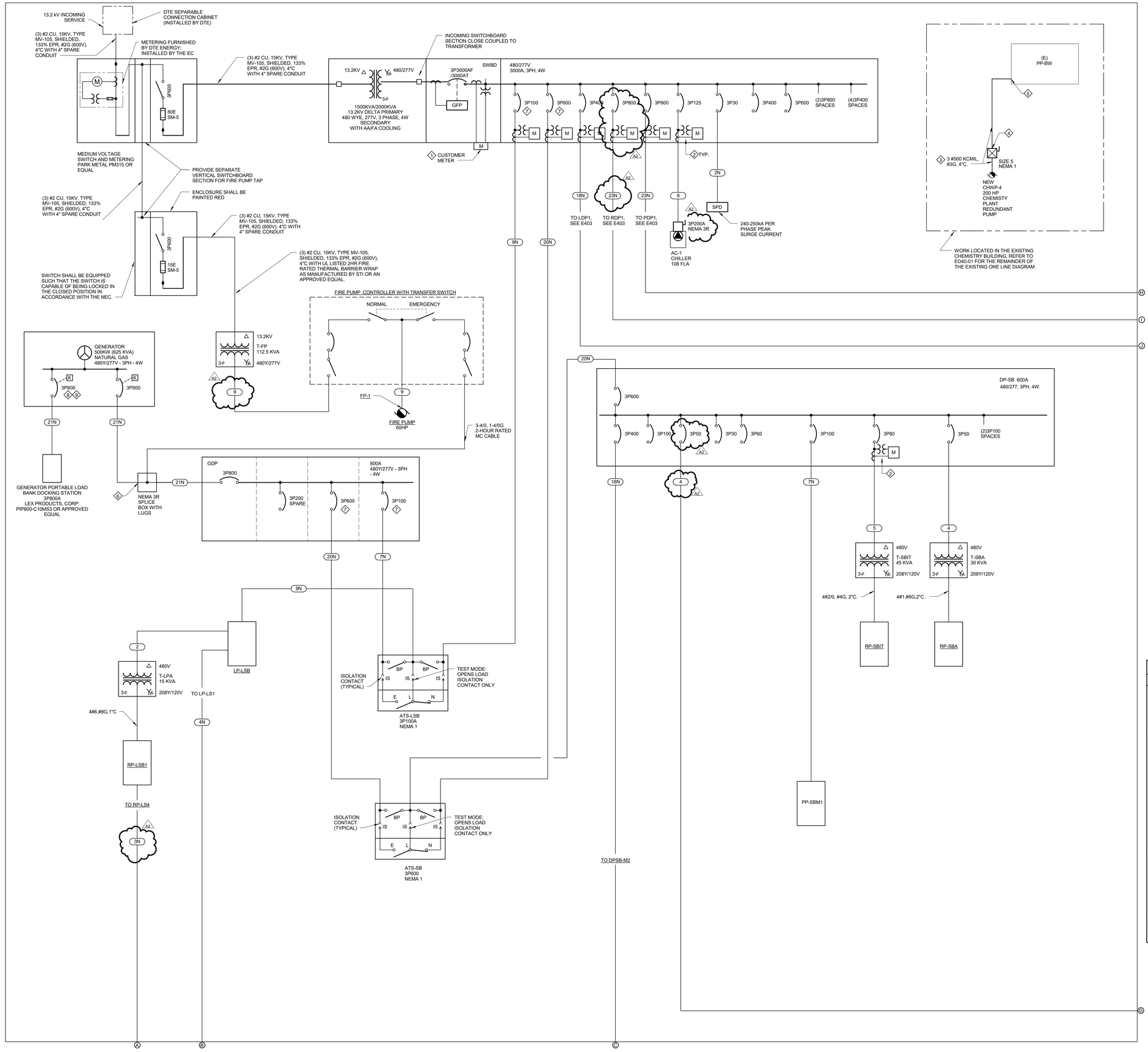
ENLARGED ELECTRICAL PLANS

Scale 1/4" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

E30-02



NOTES

1. REFER TO DRAWING E00-01 AND THE SPECIFICATION FOR GENERAL REQUIREMENTS.

KEYNOTES

1. PROVIDE A COMPLETE FUNCTIONING DEMAND METERING SYSTEM, INCLUDING ALL WIRING, SOFTWARE AND HARDWARE.
2. DEMAND METERING. THIS MAY BE ACHIEVED BY UTILIZING CIRCUIT BREAKERS WITH DEMAND METERING FEATURES.
3. INSTALL NEW FEEDER AND MAKE ALL TERMINATIONS.
4. COMBINATION MOTOR STARTER / DISCONNECT.
5. INSTALL NEW 45KVA GE SPECTRA SERIES SWITCH WITH 350A FUSE UNIT TO SERVE THE NEW PUMP MOTOR INDICATED.
6. PROVIDE POLARIS, HEAVY DUTY, PRE-INSULATED, MULTI-CABLE, CONNECTOR BLOCKS WITH EITHER SIDE WIRE ENTRY.
7. CIRCUIT BREAKER SHALL BE COORDINATED WITH THE WITHSTAND AND CLOSING RATING OF THE ASSOCIATED TRANSFER SWITCH.
8. CIRCUIT BREAKER SHALL BE DEDICATED FOR LOAD BANK TESTING.
9. PROVIDE SHUNT TRIP CIRCUIT BREAKER. WHEN UTILITY POWER IS INTERRUPTED AND THE GENERATOR RECEIVES A START SIGNAL, THE GENERATOR CONTROLLER WILL IMMEDIATELY AND AUTOMATICALLY SHUNT TRIP THE LOAD BANK CIRCUIT BREAKER, SO THAT LOAD BANK CIRCUIT BREAKER IS TRIPPED AND THE GENERATOR AND ASSOCIATED TRANSFER SWITCHES WILL AUTOMATICALLY CONNECT TO THE EMERGENCY LOADS. PLACE CIRCUIT BREAKER IN THE OPEN POSITION. CIRCUIT BREAKER SHALL BE PLACED IN THE CLOSED POSITION DURING LOAD BANK TESTING. THE CIRCUIT BREAKER SHALL NEVER BE IN THE CLOSED POSITION WHEN THE GENERATOR'S TRANSFER SWITCHES ARE IN THE EMERGENCY POSITION.

ONE LINE FEEDER LEGEND

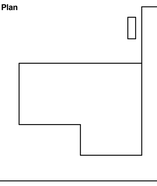
TAG	DESCRIPTION - (3)COND+G	TAG	DESCRIPTION - (4)COND+G
1	3#12,#12G,1/2"C	1N	4#12,#12G,3/4"C
2	3#10,#10G,3/4"C	2N	4#10,#10G,3/4"C
3	3#8,#10G,3/4"C	3N	4#8,#10G,3/4"C
4	3#6,#10G,1"C	4N	4#6,#10G,1"C
5	3#4,#8G,1 1/4"C	5N	4#4,#8G,1 1/4"C
6	3#3,#8G,1 1/4"C	6N	4#3,#8G,1 1/2"C
7	3#2,#6G,1 1/2"C	7N	4#2,#8G,1 1/2"C
8	3#1,#6G,2"C	8N	4#1,#6G,2"C
9	3-1/0,#6G,2"C	9N	4-1/0,#6G,2"C
10	3-2/0,#6G,2"C	10N	4-2/0,#6G,2"C
11	3-3/0,#6G,2 1/2"C	11N	4-3/0,#6G,2 1/2"C
12	3-4/0,#4G,2 1/2"C	12N	4-4/0,#6G,2 1/2"C
13	3-250kcmil,#4G,3"C	13N	4-250kcmil,#4G,3"C
14	3-300kcmil,#4G,3"C	14N	4-300kcmil,#4G,3"C
15	3-350kcmil,#4G,3"C	15N	4-350kcmil,#4G,4"C
16	3-500kcmil,#3G,4"C	16N	4-400kcmil,#4G,4"C
17	(2)3-250kcmil,#2G,3"C	17N	4-500kcmil,#3G,4"C
18	(2)3-350kcmil,#1G,3"C	18N	4-600kcmil,#3G,4"C
19	(2)3-400kcmil,1/0G,4"C	19N	(2)4-300kcmil,#2G,3"C
20	(2)3-500kcmil,1/0G,4"C	20N	(2)4-400kcmil,#1G,4"C
21	(3)3-400kcmil,2/0G,4"C	21N	(2)4-500kcmil,1/0G,4"C
22	(4)3-350kcmil,3/0G,4"C	22N	(2)4-600kcmil,1/0G,4"C
23	(4)3-500kcmil,4/0G,4"C	23N	(3)4-500kcmil,2/0G,4"C
24	(5)3-400kcmil,4/0G,4"C	24N	(4)4-400kcmil,3/0G,4"C
25	(6)3-400kcmil,250kcmil G,4"C	25N	(4)4-600kcmil,4/0G,4"C
26	(7)3-500kcmil,350kcmil G,4"C	26N	(6)4-350kcmil,4/0G,4"C
27	(8)3-500kcmil,400kcmil G,4"C	27N	(6)4-500kcmil,250kcmil G,4"C
		28N	(7)4-600kcmil,350kcmil G,4"C
		29N	(8)4-600kcmil,400kcmil G,4"C

PARTIAL ONE LINE DIAGRAM MAIN

SCALE: NOT TO SCALE

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/22/2019	ADDENDUM NO. 2	5
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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Project Manager	BIM Lead
J. SMITH	C. BAKER
Design Lead	Drawn
J. MILOCH	M. FLANDERS
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

Project

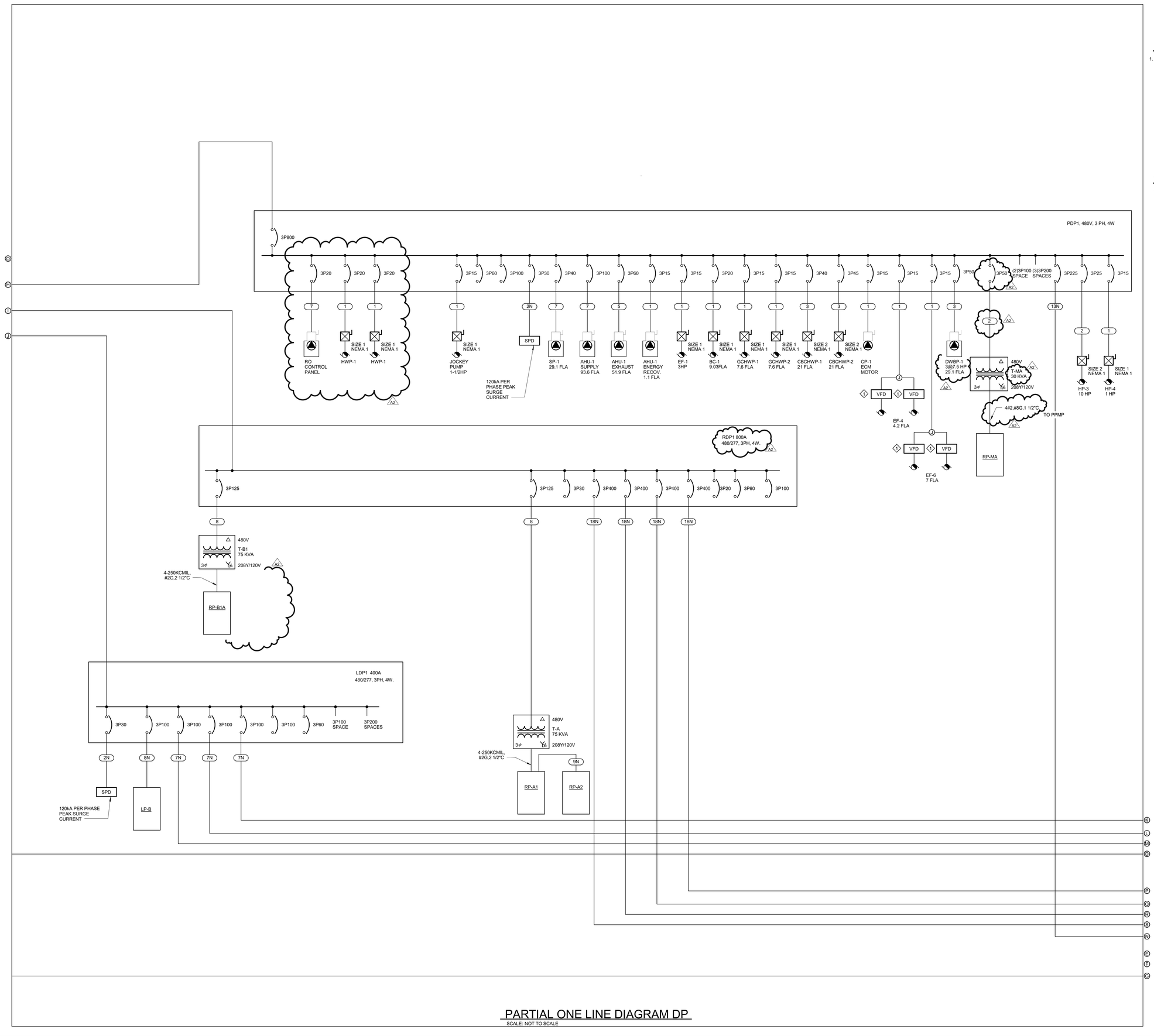
STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

PARTIAL ONE LINE DIAGRAM MAIN

Scale	12" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	E40-01



NOTES

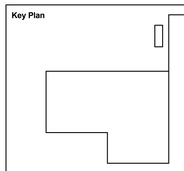
1. REFER TO DRAWING E001 AND THE SPECIFICATION FOR GENERAL REQUIREMENTS.

KEYNOTES

1 VFD SUPPLIED BY FAN MANUFACTURER

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
01/22/2019	ADDENDUM NO. 2	5
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

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Design Lead: J. MILOCH	Drawn: M. FLANDERS
Project Leader: Approver	Checked: Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

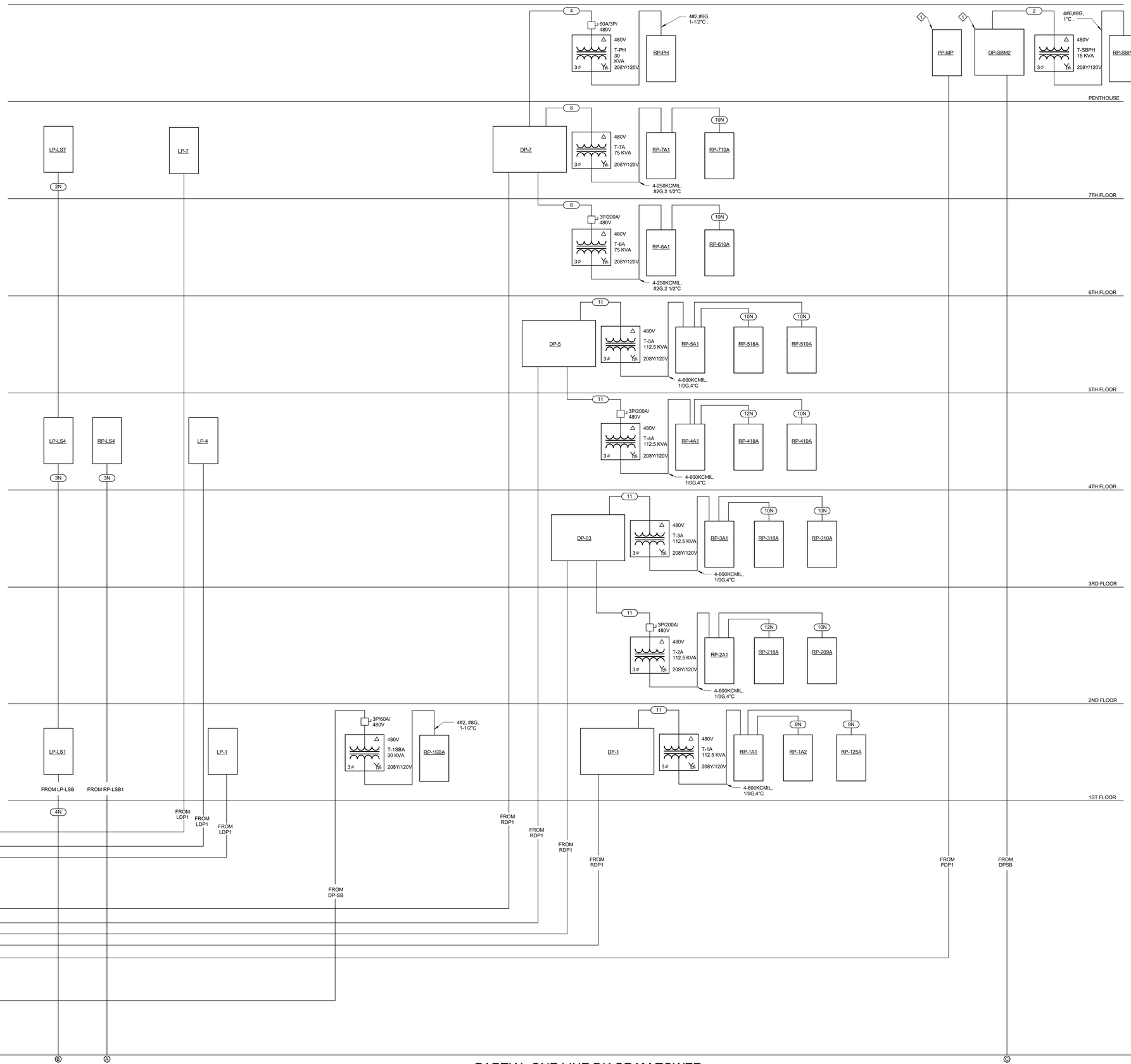
Drawing Title

PARTIAL ONE LINE DIAGRAM DP

Scale	12" = 1'-0"
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	E40-02

PARTIAL ONE LINE DIAGRAM DP

SCALE: NOT TO SCALE



PARTIAL ONE LINE DIAGRAM TOWER

SCALE: 12" = 1'-0"

NOTES

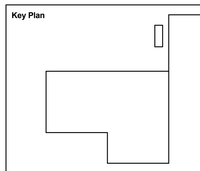
1. REFER TO DRAWING E001 AND THE SPECIFICATION FOR GENERAL REQUIREMENTS.

KEYNOTES

1 REFER TO DRAWING E40-04 FOR FURTHER INFORMATION.

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

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Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation
Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

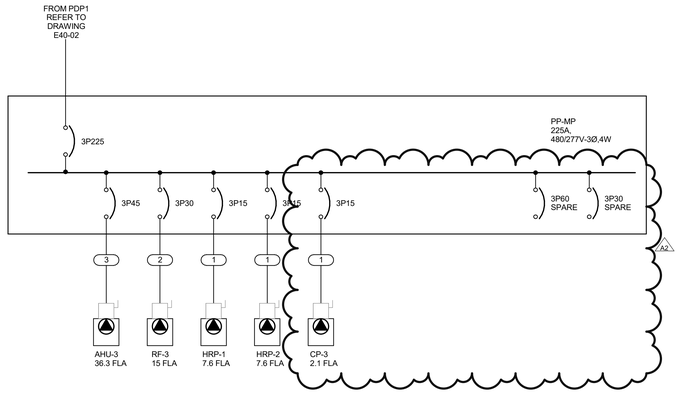
PARTIAL ONE LINE DIAGRAM
TOWER

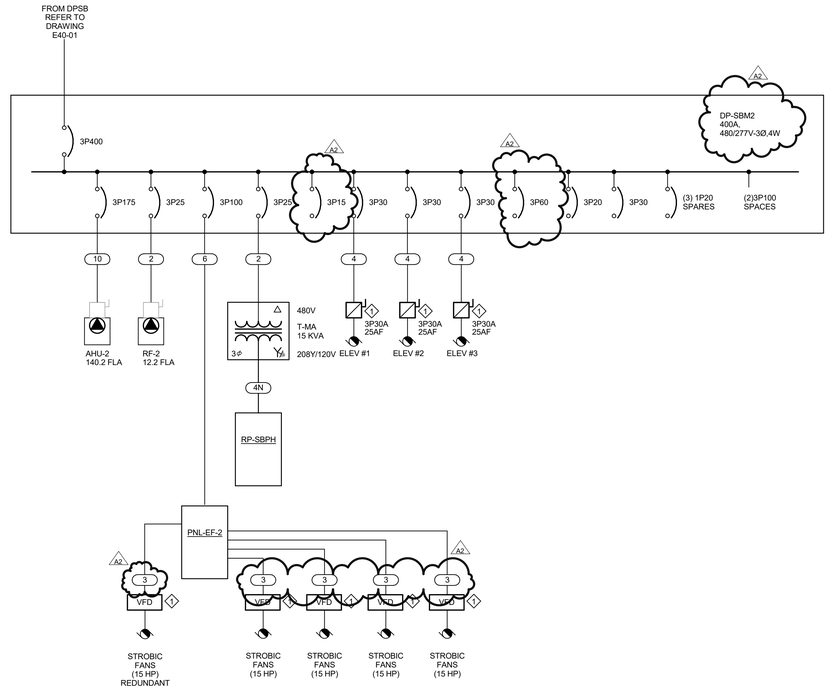
Scale 12" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

E40-03





NOTES

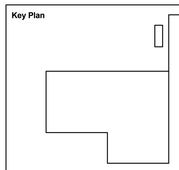
1. REFER TO DRAWING E001 AND THE SPECIFICATION FOR GENERAL REQUIREMENTS.

KEYNOTES

1

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/22/2019	ADDENDUM NO. 2	5
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
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Drawing Title

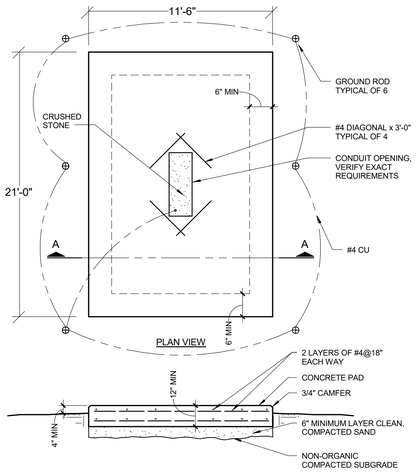
PARTIAL ONE LINE DIAGRAM

Scale 12" = 1'-0"

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

E40-04



GENERATOR PAD DETAIL

SCALE: 12" = 1'-0"

PANEL ID	PANEL DESCRIPTION
RP-GEN	

Location:
Supply From: RP-MA
Mounting: SURFACE
Enclosure: NEMA 1
Voltage: 208/120 Wye
Phase: 3
Wires: 4
No. of Poles: 18
A.I.C. Rating: 18K
Mains Type: MAIN BREAKER
MCB Rating: 60 A
Bussing: COPPER

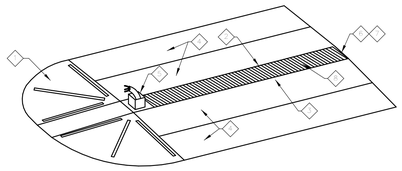
CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		MEDIUM VOLT SWITCH HTR	20 A	1	500 VA / 500 VA			1	20 A	MEDIUM VOLT SWITCH HTR		2
3		JACKET HEATER	20 A	2		1000 VA / 1500 VA		1	20 A	BATTERY CHARGER		4
5	--	--	--	--			1000 VA / 180 VA	1	20 A	RECEPT		6
7		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		8
9		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		10
11		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		12
13												14
15												16
17												18
					Total Load:	1000 VA	2500 VA	1180 VA				
					Total Amps:	8 A	21 A	10 A				

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
RECEPT	180 VA	100.00%	180 VA		
Equip.	4500 VA	100.00%	4500 VA	**Total Connected Load:**	4680 VA
				Total Estimated Demand:	4680 VA
				Total Connected Current:	13 A
				Total Est. Demand Current:	13 A

Notes:

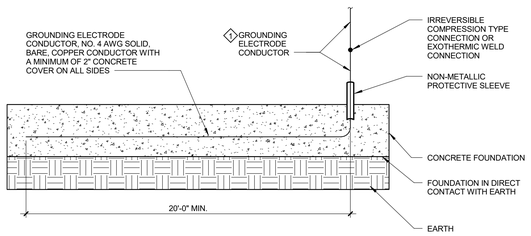
CONNECTRAC DIAGRAM KEY NOTES

1. END TRANSITION RAMP WIREWAY
2. TRACK WIREWAY – LENGTHS SPECIFIC TO EACH ROOM AND FURNITURE LAYOUT. COORDINATE LENGTHS WITH FURNITURE LAYOUT.
3. TOP CAP – LENGTHS SPECIFIC TO EACH ROOM AND FURNITURE LAYOUT. COORDINATE LENGTHS WITH FURNITURE LAYOUT.
4. SIDE TRANSITION RAMPS
5. D-SERIES FURNITURE FEED – DATA AND POWER FEED INTO TABLE. COORDINATE CONNECTRAC FURNITURE FEED WITH FURNITURE VENDOR.
6. 4"x1-1/2" WALL JUNCTION BOX – CONTRACTOR TO INSTALL 4"x1-1/2" JUNCTION BOX IN WALL FOR CONNECTION TO WIREWAY AND POWER ENTRY CABLE.
7. POWER ENTRY CABLE – COORDINATE EXACT LENGTH OF ENTRY CABLE WITH WITH FURNITURE LAYOUT.
8. QUICK-CONNECT JUMPER CABLE – LENGTHS SPECIFIC TO THE ROOM AND RECEPTACLE LAYOUT. COORDINATE EXACT LENGTHS WITH FURNITURE LAYOUT.

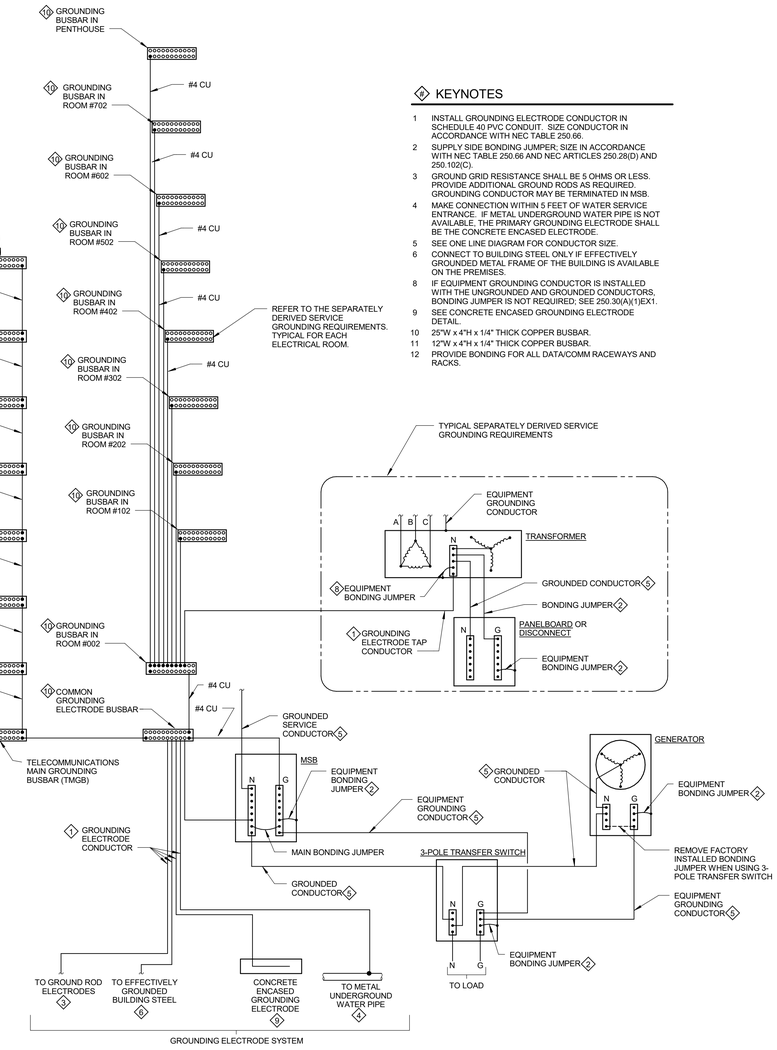


CONNECTRAC INSTALLATION DETAIL

SCALE: NOT TO SCALE



CONCRETE ENCASED GROUNDING ELECTRODE DETAIL
NO SCALE

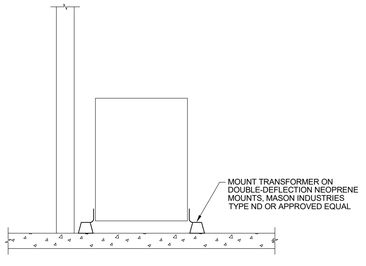


ELECTRICAL GROUNDING DETAIL

SCALE: NOT TO SCALE

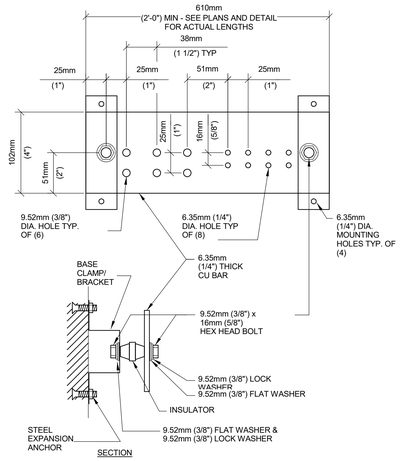
KEYNOTES

1. INSTALL GROUNDING ELECTRODE CONDUCTOR IN SCHEDULE 40 PVC CONDUIT. SIZE CONDUCTOR IN ACCORDANCE WITH NEC TABLE 250.66.
2. SUPPLY SIDE BONDING JUMPER; SIZE IN ACCORDANCE WITH NEC TABLE 250.66 AND NEC ARTICLES 250.28(D) AND 250.102(C).
3. GROUND GRID RESISTANCE SHALL BE 5 OHMS OR LESS. PROVIDE ADDITIONAL GROUND RODS AS REQUIRED. GROUNDING CONDUCTOR MAY BE TERMINATED IN MSB.
4. MAKE CONNECTION WITHIN 5 FEET OF WATER SERVICE ENTRANCE. IF METAL UNDERGROUND WATER PIPE IS NOT AVAILABLE, THE PRIMARY GROUNDING ELECTRODE SHALL BE THE CONCRETE ENCASED ELECTRODE.
5. SEE ONE LINE DIAGRAM FOR CONDUCTOR SIZE.
6. CONNECT TO BUILDING STEEL ONLY IF EFFECTIVELY GROUNDED METAL FRAME OF THE BUILDING IS AVAILABLE ON THE PREMISES.
8. IF EQUIPMENT GROUNDING CONDUCTOR IS INSTALLED WITH THE UNGROUNDED AND GROUNDED CONDUCTORS, BONDING JUMPER IS NOT REQUIRED; SEE 250.30(A)(1)EX1.
9. SEE CONCRETE ENCASED GROUNDING ELECTRODE DETAIL.
10. 25"W x 4"H x 1/4" THICK COPPER BUSBAR.
11. 12"W x 4"H x 1/4" THICK COPPER BUSBAR.
12. PROVIDE BONDING FOR ALL DATA/COMM RACEWAYS AND RACKS.



TRANSFORMER PAD DETAIL

SCALE: NOT TO SCALE



GENERAL NOTES:

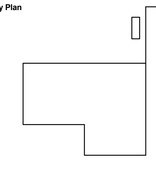
1. ALL HARDWARE SHALL BE STAINLESS STEEL.
2. PROVIDE 1 MOUNTING POINT PER 305mm (12") OF BAR LENGTH.
3. ADD HOLES AS REQUIRED.

GROUND BAR DETAIL

SCALE: NOT TO SCALE

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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An Ingenium International Company
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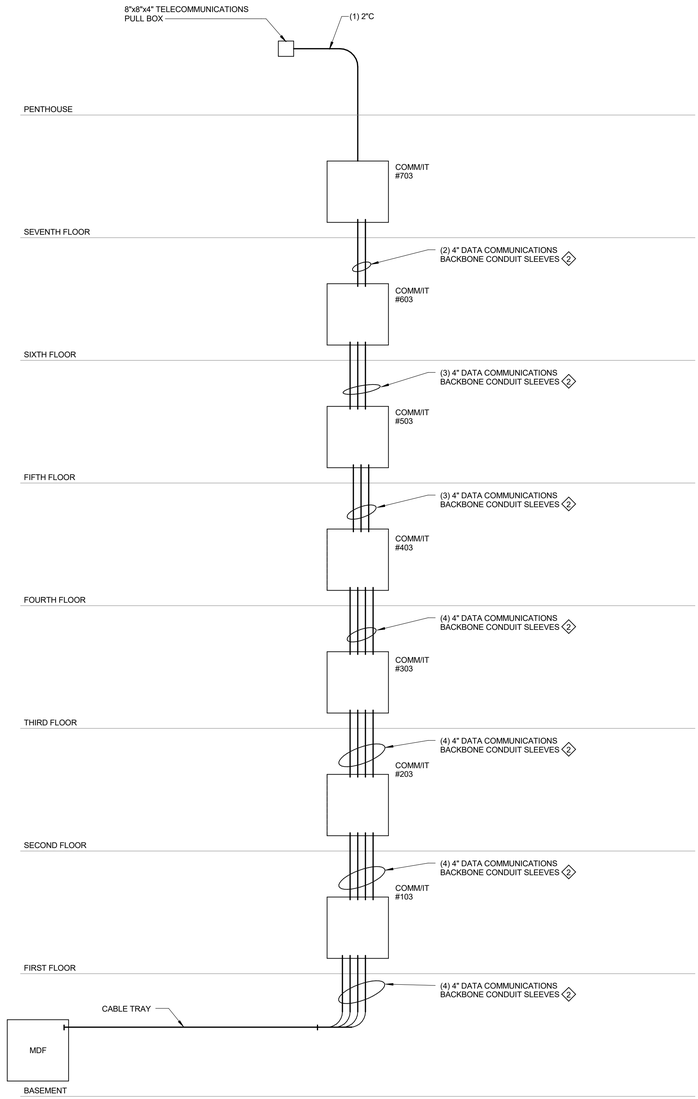
Design Lead	Drawn
J. MILOCH	M. FLANDERS
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

Project
STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
ELECTRICAL DETAILS

Scale	As indicated
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	E50-01



7 IT DATA COMMUNICATIONS BACKBONE CONDUIT RISER DIAGRAM 1
SCALE: NOT TO SCALE

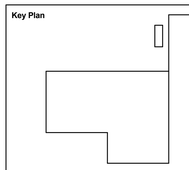
2 KEYNOTES

1 BACKBONE CONDUIT SYSTEM SHALL ONLY BE USED FOR WSU C & IT TELECOMMUNICATIONS CABLING.

2 COORDINATE THE CONDUIT LOCATIONS WITH WSU C&IT AND THE LOW VOLTAGE CONTRACTOR.

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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An Ingenium International Company
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norr.com

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Project Manager	BIM Lead
J. SMITH	C. BAKER
Design Lead	Drawn
J. MILOCH	M. FLANDERS
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

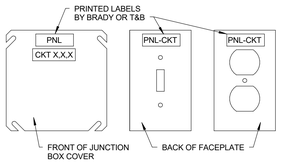
ELECTRICAL DETAILS

Scale 12" = 1'-0"

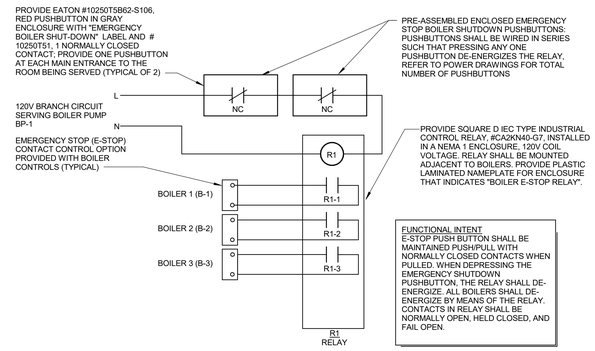
Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

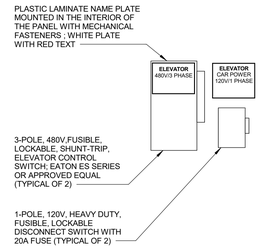
E50-02



2 CIRCUIT LABELING
SCALE: NOT TO SCALE



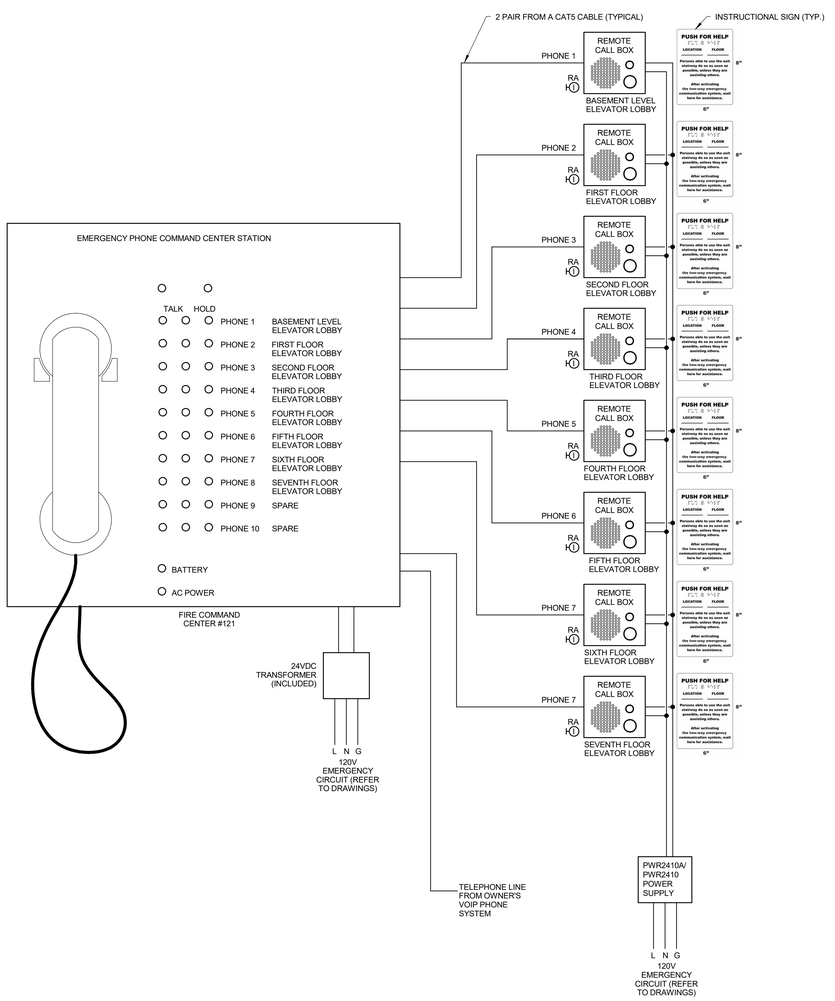
3 EMERGENCY BOILER SHUTDOWN WIRING DIAGRAM
SCALE: NOT TO SCALE



NOTES:

1. INSTALL ELEVATOR DISCONNECT SWITCHES AND ASSOCIATED EQUIPMENT IN ACCORDANCE WITH NFPA 70 (NEC), NFPA 72 (NATIONAL FIRE ALARM CODE), ANSI/ASME A17.1 (SAFETY CODE FOR ELEVATORS AND ESCALATORS), THE AUTHORITY HAVING JURISDICTION, AND THE REQUIREMENTS OF THE ELEVATOR SUPPLIER AND INSTALLER.

4 TYPICAL ELEVATOR DISCONNECT DETAIL
SCALE: NOT TO SCALE



DIVISION 27 - ELEVATOR LANDING AREA OF RESCUE TWO-WAY COMMUNICATION SYSTEM SPECIFICATIONS

ELEVATOR LANDING AREA OF RESCUE SYSTEM SHALL BE BY ALPHA COMMUNICATIONS, RATH COMMUNICATIONS OR EQUAL. REFUGE CALL CENTER SHALL BE ALPHAREFUGE™ 2100 SERIES SYSTEM, ALPHA COMMUNICATIONS® RCC2510SF (10-STATION).

REFUGE CALL CENTER SHALL BE FLUSH MOUNT TYPE AND SHALL BE FINISHED IN BRUSHED STAINLESS STEEL WITH A GALVANIZED STEEL FLUSH BACKBOX/HOUSING. REFUGE CALL CENTER SHALL CONTAIN A BUILT-IN BATTERY BACK-UP AND CHARGER CIRCUITRY AND SHALL BE PROGRAMMABLE TO CALL OUT ON A TELEPHONE LINE TO A 911 CALL CENTER OR OTHER EMERGENCY CALL LOCATIONS. RCC25010SF REFUGE CALL CENTER SHALL BE CAPABLE OF CONNECTING WITH UP TO TEN (10) OF THE RCB2100 SERIES REFUGE CALL BOXES

REFUGE CALL BOXES SHALL BE ALPHA COMMUNICATIONS® RCB2100SFRCOV, BRUSHED STAINLESS STEEL FLUSH CALL BOX WITH PROTECTIVE COVER, OR APPROVED EQUAL.

REFUGE CALL BOXES SHALL BE FLUSH MOUNT TYPE AND FACEPLATE SHALL BE FINISHED IN #16AWG BRUSHED STAINLESS STEEL WITH A GALVANIZED STEEL FLUSH BACKBOX/HOUSING. REFUGE CALL BOXES SHALL CONTAIN A BUILT-IN BATTERY BACK-UP AND CHARGER CIRCUITRY AND SHALL BE PROGRAMMABLE WITH AN OUTGOING VOICE MESSAGE. REFUGE CALL BOXES SHALL BE CAPABLE OF DIALING UP TO FIVE (5) REMOTE PHONE NUMBERS AND SHALL CONTAIN A BUILT-IN HEAVY-DUTY METAL CALL BUTTON AND RED CALL PLACED / CALL ANSWERED LED.

REFUGE MASTER CALL CENTER AND ASSOCIATED CALL BOXES, SHALL BE IBC, NFPA AND ADAAG CODE COMPLIANT, AND SHALL ALSO BE ELEVATOR CODE COMPLIANT.

PROVIDE AREA OF RESCUE INSTRUCTION AND LOCATION SIGNS.

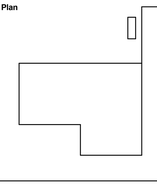
PROVIDE PRODUCT DATA SHEETS AND SHOP DRAWINGS FOR REVIEW BY ENGINEER. PROVIDE TWO (2) HOURS OF OWNER TRANING. PROVIDE O&M MANAUALS AND CLOSEOUT DOCUMENTATION.

INSTALL ALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURERS WRITTEN INSTRUCTIONS. CONTRACTOR SHALL CONFORM TO ALL LOCAL AND NATIONAL ELECTRICAL AND BUILDING CODES (AND A.D.A. REGULATIONS).

1 ELEVATOR LANDING AREA OF RESCUE ASSISTANCE SYSTEM DIAGRAM
SCALE: NOT TO SCALE

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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www.ftch.com

Project Manager	BIM Lead
J. SMITH	C. BAKER
Design Lead	Drawn
Designer	Author
Project Leader	Checked
Approver	Checker

WAYNE STATE UNIVERSITY

Project

STEM Innovation Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

ELECTRICAL DETAILS

Scale	As indicated
Project No.	JCDT17-0231 (FTCH 180050)
Drawing No.	E50-03

1/22/2019 10:45:39 AM

PANEL ID	PANEL DESCRIPTION
SWBD	

Location: BASEMENT... | Supply From: | Mounting: SURFACE | Enclosure: Type 1
Voltage: 480/277 Wye | Phase: 3 | Wires: 4
A.I.C. Rating: 65K | Mains Type: MAIN BREAKER | MCB Rating: 3000 A | Bussing: COPPER

A2

CKT	Rev. No.	Circuit Description	# of Poles	Trip Rating	Load	Remarks
1		LP-LSB	3	100 A	14,604 VA	
2		DP-SB	3	600 A	300,367 VA	
3		LDP1	3	400 A	47,022 VA	
4		RDP1	3	800 A	513,459 VA	
5		PDP1	3	800 A	339,470 VA	
6		AC-1	3	125 A	94,778 VA	
7		SPD	3	30 A	0 VA	
8		Spare	3	400 A	0 VA	
9		Spare	3	600 A	0 VA	
10	--	3P800 Space	--	--	0 VA	--
11	--	3P800 Space	--	--	0 VA	--
12	--	3P400 Space	--	--	0 VA	--
13	--	3P400 Space	--	--	0 VA	--
14	--	3P400 Space	--	--	0 VA	--
15	--	3P400 Space	--	--	0 VA	--
16						
17						
18						
19						
20						

PHASE A	PHASE B	PHASE C	TOTAL AMPS
452 kVA	441 kVA	416 kVA	1575 A

Load Classification	Connected Load	Demand Factor	NEC Calc. Load	Panel Totals	
Equip.	654161 VA	100.00%	654161 VA		
HVAC	207408 VA	100.00%	207408 VA	Total Connected Load:	1310 kVA
Heating	5680 VA	125.00%	7100 VA	Total NEC Calc. Load:	1262 kVA
Motor	113200 VA	125.00%	141500 VA	Total Connected Current:	1575 A
Other	406 VA	100.00%	406 VA	Total NEC Calc. Current:	1518 A
Power	76860 VA	100.00%	76860 VA		
RECEPT	193640 VA	52.58%	101820 VA		
Lighting	58456 VA	125.00%	73070 VA		

Notes:

PANEL ID	PANEL DESCRIPTION
DP-SB	

Location: EMERGENCY ELEC... | Supply From: SWBD | Mounting: SURFACE | Enclosure: NEMA 1
Voltage: 480/277 Wye | Phase: 3 | Wires: 4
A.I.C. Rating: 42K | Mains Type: MAIN BREAKER | MCB Rating: 600 A | Bussing: COPPER

A2

CKT	Rev. No.	Circuit Description	# of Poles	Trip Rating	Load	Remarks
1		T-1SBA	3	50 A	2,760 VA	
2		DP-SBM2	3	400 A	234,610 VA	
3		PP-SBM1	3	100 A	22,400 VA	
4		T-SBA	3	50 A	8,257 VA	
5		T-SBIT	3	80 A	32,340 VA	
6		Spare	1	100 A	0 VA	
7		Spare	1	30 A	0 VA	
8		Spare	1	60 A	0 VA	
9	--	Space	--	--	0 VA	--
10	--	Space	--	--	0 VA	--
11						
12						
13						
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16						
17						
18						
19						
20						

PHASE A	PHASE B	PHASE C	TOTAL AMPS
102 kVA	99 kVA	99 kVA	361 A

Load Classification	Connected Load	Demand Factor	NEC Calc. Load	Panel Totals	
Equip.	164202 VA	100.00%	164202 VA		
HVAC	12226 VA	100.00%	12226 VA	Total Connected Load:	300 kVA
Motor	113200 VA	125.00%	141500 VA	Total NEC Calc. Load:	328 kVA
RECEPT	10740 VA	96.55%	10370 VA	Total Connected Current:	361 A
				Total NEC Calc. Current:	395 A

Notes:

PANEL ID	PANEL DESCRIPTION
RDP1	

Location: BASEMENT... | Supply From: SWBD | Mounting: SURFACE | Enclosure: NEMA 1
Voltage: 480/277 Wye | Phase: 3 | Wires: 4
A.I.C. Rating: 42K | Mains Type: MAIN LUGS ONLY | Mains Rating: 800 A | Bussing: COPPER

A2

CKT	Rev. No.	Circuit Description	# of Poles	Trip Rating	Load	Remarks
1		T-B1	3	125 A	0 VA	
2		T-A	3	125 A	53,380 VA	
3		DP-1	3	400 A	69,220 VA	
4		DP-3	3	400 A	142,190 VA	
5		DP-5	3	400 A	138,260 VA	
6		DP-7	3	400 A	110,409 VA	
7		Spare	3	20 A	0 VA	
8		Spare	3	60 A	0 VA	
9		Spare	3	30 A	0 VA	
10		Spare	3	100 A	0 VA	
11						
12						
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19						
20						

PHASE A	PHASE B	PHASE C	TOTAL AMPS
182 kVA	175 kVA	156 kVA	618 A

Load Classification	Connected Load	Demand Factor	NEC Calc. Load	Panel Totals	
Equip.	239620 VA	100.00%	239620 VA		
HVAC	9146 VA	100.00%	9146 VA	Total Connected Load:	513 kVA
Heating	720 VA	125.00%	900 VA	Total NEC Calc. Load:	429 kVA
Motor	4573 VA	125.00%	5716 VA	Total Connected Current:	618 A
Power	76860 VA	100.00%	76860 VA	Total NEC Calc. Current:	515 A
RECEPT	182540 VA	52.74%	96270 VA		

Notes:

PANEL ID	PANEL DESCRIPTION
LDP1	

Location: BASEMENT... | Supply From: SWBD | Mounting: SURFACE | Enclosure: NEMA 1
Voltage: 480/277 Wye | Phase: 3 | Wires: 4
A.I.C. Rating: 42K | Mains Type: MAIN LUGS ONLY | Mains Rating: 400 A | Bussing: COPPER

CKT	Rev. No.	Circuit Description	# of Poles	Trip Rating	Load	Remarks
1		LP-1	3	125 A	17,581 VA	
2		LP-B	3	100 A	8,577 VA	
3		LP-4	3	100 A	10,638 VA	
4		LP-7	3	100 A	10,227 VA	
5		SPD	3	30 A	0 VA	
6		Spare	3	100 A	0 VA	
7		Spare	3	60 A	0 VA	
8	--	Space	--	--	0 VA	--
9	--	Space	--	--	0 VA	--
10						
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PHASE A	PHASE B	PHASE C	TOTAL AMPS
15 kVA	19 kVA	13 kVA	57 A

Load Classification	Connected Load	Demand Factor	NEC Calc. Load	Panel Totals	
Equip.	0 VA	0.00%	0 VA		
Other	116 VA	100.00%	116 VA	Total Connected Load:	47 kVA
Lighting	46906 VA	125.00%	58633 VA	Total NEC Calc. Load:	59 kVA
				Total Connected Current:	57 A
				Total NEC Calc. Current:	71 A

Notes:

PANEL ID	PANEL DESCRIPTION
PDP1	

Location: MECHANICAL... | Supply From: SWBD | Mounting: SURFACE | Enclosure: NEMA 1
Voltage: 480/277 Wye | Phase: 3 | Wires: 4
A.I.C. Rating: 42K | Mains Type: MAIN BREAKER | MCB Rating: 600 A | Bussing: COPPER

A2

CKT	Rev. No.	Circuit Description	# of Poles	Trip Rating	Load	Remarks
1		T-MA	3	50 A	12,964 VA	
2		PP-MP	3	225 A	69,780 VA	
3		AHU-1 SUPPLY	3	100 A	50,280 VA	
4		AHU-1 EXHAUST	3	60 A	43,100 VA	
5		AHU-1 ERW	3	15 A	910 VA	
6		GCHWP-1	3	15 A	6,100 VA	
7		GCHWP-2	3	15 A	6,100 VA	
8		CBCHWP-2	3	40 A	17,000 VA	
9		CBCHWP-1	3	40 A	17,000 VA	
10		BC-1	3	20 A	9,100 VA	
11		EF-1	3	15 A	4,000 VA	
12		HP-3	3	25 A	11,200 VA	
13		HP-4	3	15 A	22,000 VA	
14		EF-4	3	20 A	1,491 VA	
15		JOCKEY PUMP 023	3	20 A	2,400 VA	
16		CP-1	3	15 A	3,400 VA	
17		SPD	3	30 A	0 VA	
18		DWBP-1	3	50 A	23,185 VA	
19		SP-1	3	40 A	23,185 VA	
20		EF-6	3	20 A	4,474 VA	
21		Spare	1	60 A	0 VA	
22		Spare	3	100 A	0 VA	
23		RO CONTROL PANEL	3	20 A	4,200 VA	
24		HWP-1 (RO PUMPS)	3	20 A	3,800 VA	
25		HWP-1 (RO PUMPS)	3	20 A	3,800 VA	
26						
27						
28						
29						
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40						

PHASE A	PHASE B	PHASE C	TOTAL AMPS
114 kVA	112 kVA	113 kVA	408 A

Load Classification	Connected Load	Demand Factor	NEC Calc. Load	Panel Totals	
Equip.	197184 VA	100.00%	197184 VA		
HVAC	86686 VA	100.00%	86686 VA	Total Connected Load:	339 kVA
Heating	4960 VA	125.00%	6200 VA	Total NEC Calc. Load:	353 kVA
Motor	50280 VA	125.00%	62850 VA	Total Connected Current:	408 A
RECEPT	360 VA	100.00%	360 VA	Total NEC Calc. Current:	425 A

Notes:

PANEL ID	PANEL DESCRIPTION
DP-1	

Location: ELEC 102 | Supply From: RDP1 | Mounting: SURFACE | Enclosure: NEMA 1
Voltage: 480/277 Wye | Phase: | Wires: 4 | No. of Poles: 30
A.I.C. Rating: 18K | Mains Type: MAIN BREAKER | MCB Rating: 400 A | Bussing: COPPER

A2

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		T-1A	125 A	3	24840 VA / 0 VA			3	125 A	Spare		2
3	--	--	--	--		22640 VA / 0 VA		--	--	--	--	4
5	--	--	--	--			21740 VA / 0 VA	--	--	--	--	6
7		Spare	80 A	1	0 VA / 0 VA			3	50 A	Spare		8
9	--	Space	--	--		0 VA / 0 VA		--	--	--	--	10
11	--	Space	--	--			0 VA / 0 VA	--	--	--	--	12
13	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	14
15	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	16
17	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	18
19	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	20
21	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	22
23	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	24
25	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	26
27	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	28
29	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	30
				Total Load:	24840 VA	22640 VA	21740 VA					
				Total Amps:	90 A	82 A	78 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Power	17100 VA	100.00%	17100 VA		
RECEPT	46700 VA	60.71%	28350 VA	Total Connected Load:	69220 VA
Equip.	5420 VA	100.00%	5420 VA	Total Estimated Demand:	50870 VA
				Total Connected Current.:	83 A
				Total Est. Demand Current:	61 A

Notes:

PANEL ID	PANEL DESCRIPTION
DP-3	

Location: ELEC. 202 | Supply From: RDP1 | Mounting: SURFACE | Enclosure: NEMA 1
Voltage: 480/277 Wye | Phase: 3 | Wires: 4 | No. of Poles: 30
A.I.C. Rating: 18K | Mains Type: MAIN BREAKER | MCB Rating: 400 A | Bussing: COPPER

A2

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		T-2A	200 A	3	25240 VA / 23250 VA			3	200 A	T-3A		2
3	--	--	--	--		25740 VA / 21820...		--	--	--	--	4
5	--	--	--	--			24440 VA / 21700 VA	--	--	--	--	6
7	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	8
9	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	10
11	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	12
13	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	14
15	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	16
17	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	18
19	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	20
21	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	22
23	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	24
25	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	26
27	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	28
29	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	30
				Total Load:	48490 VA	47560 VA	46140 VA					
				Total Amps:	176 A	172 A	167 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Power	6300 VA	100.00%	6300 VA		
RECEPT	44300 VA	61.29%	27150 VA	Total Connected Load:	142190 VA
Equip.	91590 VA	100.00%	91590 VA	Total Estimated Demand:	125040 VA
				Total Connected Current.:	171 A
				Total Est. Demand Current:	150 A

Notes:

PANEL ID	PANEL DESCRIPTION
DP-5	

Location: ELEC 502 | Supply From: RDP1 | Mounting: SURFACE | Enclosure: NEMA 1
Voltage: 480/277 Wye | Phase: 3 | Wires: 4 | No. of Poles: 30
A.I.C. Rating: 18K | Mains Type: MAIN BREAKER | MCB Rating: 400 A | Bussing: COPPER

A2

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		T-4A	200 A	3	25800 VA / 25360 VA			3	200 A	T-5A		2
3	--	--	--	--		27160 VA / 19720...		--	--	--	--	4
5	--	--	--	--			23000 VA / 17220 VA	--	--	--	--	6
7	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	8
9	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	10
11	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	12
13	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	14
15	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	16
17	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	18
19	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	20
21	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	22
23	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	24
25	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	26
27	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	28
29	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	30
				Total Load:	51160 VA	46880 VA	40220 VA					
				Total Amps:	188 A	173 A	145 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Power	8460 VA	100.00%	8460 VA		
RECEPT	37780 VA	63.23%	23890 VA	Total Connected Load:	138260 VA
Equip.	92020 VA	100.00%	92020 VA	Total Estimated Demand:	124370 VA
				Total Connected Current.:	166 A
				Total Est. Demand Current:	150 A

Notes:

PANEL ID	PANEL DESCRIPTION
DP-7	

Location: ELEC. 702 | Supply From: RDP1 | Mounting: SURFACE | Enclosure: NEMA 1
Voltage: 480/277 Wye | Phase: 3 | Wires: 4 | No. of Poles: 30
A.I.C. Rating: 18K | Mains Type: MAIN LUGS ONLY | Mains Rating: 400 A | Bussing: COPPER

A2

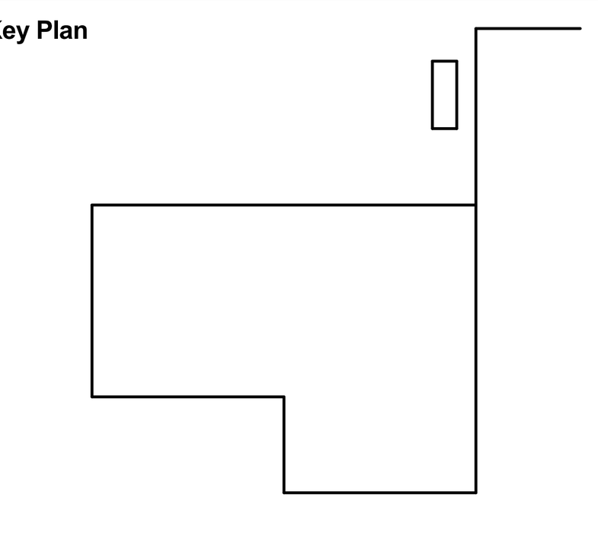
CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		T-7A	125 A	3	19650 VA / 13380 VA			3	125 A	T-6A		2
3	--	--	--	--		17280 VA / 15700...		--	--	--	--	4
5	--	--	--	--			16800 VA / 11000 VA	--	--	--	--	6
7		T-PH	50 A	3	6013 VA / 0 VA			3	60 A	Spare		8
9	--	--	--	--		5293 VA / 0 VA		--	--	--	--	10
11	--	--	--	--			5293 VA / 0 VA	--	--	--	--	12
13	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	14
15	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	16
17	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	18
19	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	20
21	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	22
23	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	24
25	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	26
27	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	28
29	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	30
				Total Load:	39043 VA	38273 VA	33093 VA					
				Total Amps:	144 A	141 A	119 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
HVAC	9146 VA	100.00%	9146 VA		
Heating	720 VA	125.00%	900 VA	Total Connected Load:	110409 VA
Motor	4573 VA	125.00%	5716 VA	Total Estimated Demand:	95702 VA
Power	12600 VA	100.00%	12600 VA	Total Connected Current.:	133 A
RECEPT	42060 VA	61.89%	26030 VA	Total Est. Demand Current:	115 A
Equip.	41310 VA	100.00%	41310 VA		

Notes:

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/22/2019	ADDENDUM NO. 2	5
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants
Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

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STEM Innovation Learning Center
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DETROIT, MI 48202

Drawing Title
PANELBOARD SCHEDULES

Scale

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
E60-01

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LP-B

Location: BASEMENT ELECTRICAL ROOM 040 | **Supply From:** LDP1 | **Mounting:** SURFACE | **Enclosure:** NEMA 1
Voltage: 480/277 Wye | **Phase:** 3 | **Wires:** 4 | **No. of Poles:** 30
A.I.C. Rating: 10K | **Mains Type:** MAIN LUGS ONLY | **Mains Rating:** 100 A | **Bussing:** COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		MECHANICAL EQUIP RM LTG	20 A	1	1668 VA / 49 VA			1	20 A	BASEMENT STAIR LTG		2
3		BASEMENT WEST LTG	20 A	1		4184 VA / 2677 VA		1	20 A	BASEMENT EAST LTG		4
5		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		6
7		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		8
9		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		10
11	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	12
13	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	14
15	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	16
17	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	18
19	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	20
21	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	22
23	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	24
25	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	26
27	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	28
29	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	30
		Total Load:			1717 VA	6861 VA	0 VA					
		Total Amps:			7 A	26 A	0 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Other	58 VA	100.00%	58 VA		
Lighting	8519 VA	125.00%	10649 VA	**Total Connected Load:**	8577 VA
				Total Estimated Demand:	10707 VA
				Total Connected Current.:	10 A
				Total Est. Demand Current:	13 A

Notes:

LP-1

Location: ELEC 102 | **Supply From:** LDP1 | **Mounting:** SURFACE | **Enclosure:** NEMA 1
Voltage: 480/277 Wye | **Phase:** 3 | **Wires:** 4 | **No. of Poles:** 30
A.I.C. Rating: 10K | **Mains Type:** MAIN LUGS ONLY | **Mains Rating:** 100 A | **Bussing:** COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		1st FLOOR LTG NE	20 A	1	3928 VA / 2471 VA			1	20 A	1st FLOOR LTG SE		2
3		2nd FLOOR LTG	20 A	1		3243 VA / 0 VA		1	20 A	Spare		4
5		EXTERIOR LTG	20 A	1			3196 VA / 3273 VA	1	20 A	1st FLOOR LTG W		6
7		Lighting CORRIDOR 190.11	20 A	1	448 VA / 0 VA			1	20 A	Spare		8
9		Lighting WET LAB 212	20 A	1		1131 VA / 0 VA		1	20 A	Spare		10
11		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		12
13		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		14
15		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		16
17		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		18
19	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	20
21	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	22
23	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	24
25	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	26
27	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	28
29	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	30
		Total Load:			6847 VA	4374 VA	6469 VA					
		Total Amps:			26 A	16 A	25 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Other	58 VA	100.00%	58 VA		
Lighting	17523 VA	125.00%	21904 VA	**Total Connected Load:**	17581 VA
				Total Estimated Demand:	21962 VA
				Total Connected Current.:	21 A
				Total Est. Demand Current:	26 A

Notes:

LP-4

Location: ELEC. 402 | **Supply From:** LDP1 | **Mounting:** SURFACE | **Enclosure:** NEMA 1
Voltage: 480/277 Wye | **Phase:** 3 | **Wires:** 4 | **No. of Poles:** 30
A.I.C. Rating: 10K | **Mains Type:** MAIN LUGS ONLY | **Mains Rating:** 100 A | **Bussing:** COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		3rd FLOOR LTG	20 A	1	2144 VA / 1073 VA			1	20 A	Lighting WET LAB 412		2
3		5th FLOOR LTG	20 A	1		2446 VA / 841 VA		1	20 A	Lighting WET LAB 212		4
5		4th FLOOR LTG	20 A	1			2634 VA / 1499 VA	1	20 A	Lighting WET LAB 519		6
7		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		8
9		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		10
11		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		12
13		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		14
15		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		16
17		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		18
19	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	20
21	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	22
23	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	24
25	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	26
27	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	28
29	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	30
		Total Load:			3217 VA	3287 VA	4133 VA					
		Total Amps:			12 A	12 A	15 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Lighting	10638 VA	125.00%	13297 VA		
				Total Connected Load:	10638 VA
				Total Estimated Demand:	13297 VA
				Total Connected Current.:	13 A
				Total Est. Demand Current:	16 A

Notes:

LP-7

Location: ELEC. 702 | **Supply From:** LDP1 | **Mounting:** SURFACE | **Enclosure:** NEMA 1
Voltage: 480/277 Wye | **Phase:** 3 | **Wires:** 4 | **No. of Poles:** 30
A.I.C. Rating: 10K | **Mains Type:** MAIN LUGS ONLY | **Mains Rating:** 100 A | **Bussing:** COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		PENTHOUSE EXTERIOR LTG	20 A	1	126 VA / 1226 VA			1	20 A	PENTHOUSE LTG		2
3		Lighting DRY LAB 614	20 A	1		1752 VA / 2598 VA		1	20 A	7th FLOOR LTG		4
5		6th FLOOR LTG	20 A	1			2619 VA / 0 VA	1	20 A	Spare		6
7		Spare	20 A	1	0 VA / 1905 VA			1	20 A	Lighting DRY LAB - TYPE 1 712		8
9		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		10
11		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		12
13		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		14
15	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	16
17	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	18
19	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	20
21	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	22
23	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	24
25	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	26
27	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	28
29	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	30
		Total Load:			3257 VA	4350 VA	2619 VA					
		Total Amps:			12 A	16 A	9 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Lighting	10227 VA	125.00%	12783 VA		
				Total Connected Load:	10227 VA
				Total Estimated Demand:	12783 VA
				Total Connected Current.:	12 A
				Total Est. Demand Current:	15 A

Notes:

RP-MA

Location: MECHANICAL EQUIPMENT ROOM :35 | **Supply From:** T-MA | **Mounting:** SURFACE | **Enclosure:** NEMA 1
Voltage: 208/120 Wye | **Phase:** 3 | **Wires:** 4 | **No. of Poles:** 30
A.I.C. Rating: 10K | **Mains Type:** MAIN BREAKER | **MCB Rating:** 100 A | **Bussing:** COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		B-3	20 A	3	400 VA / 672 VA			1	20 A	BP-3		2
3	--	--	--	--		400 VA / 180 VA		1	20 A	RECEPT MECHANICAL EQUIPMEN..		4
5	--	--	--	--			400 VA / 500 VA	1	20 A	Equip. MECHANICAL EQUIPMENT...		6
7		CP-1	20 A	2	1250 VA / 1600 VA			1	20 A	HVAC		8
9	--	--	--	--		1250 VA / 432 VA		1	20 A	CUH-190.12,13		10
11		CUH-090.09,11	20 A	1			600 VA / 360 VA	1	20 A	CUH-390.02,09		12
13		Equip. MECHANICAL EQUIPMENT...	20 A	1	0 VA / 0 VA							14
15		EF-5	20 A	1		240 VA / 0 VA						16
17												18
19												20
21						0 VA / 1000 VA		3	50 A	RP-GEN_		22
23							0 VA / 2500 VA	--	--	--	--	24
25					0 VA / 1180 VA			--	--	--	--	26
27												28
29												30
31												32
33												34
35												36
37												38
39												40
41												42
		Total Load:			5102 VA	3502 VA	4360 VA					
		Total Amps:			44 A	29 A	37 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
HVAC	1840 VA	100.00%	1840 VA		
Heating	960 VA	125.00%	1200 VA	**Total Connected Load:**	12964 VA
Motor	2500 VA	125.00%	3125 VA	**Total Estimated Demand:**	13829 VA
RECEPT	360 VA	100.00%	360 VA	**Total Connected Current.:**	36 A
Equip.	7304 VA	100.00%	7304 VA	**Total Est. Demand Current:**	38 A

Notes:

RP-A1

Location: BASEMENT ELECTRICAL ROOM 040 | **Supply From:** T-A | **Mounting:** SURFACE | **Enclosure:** NEMA 1
Voltage: 208/120 Wye | **Phase:** 3 | **Wires:** 4 | **No. of Poles:** 42
A.I.C. Rating: 10K | **Mains Type:** MAIN BREAKER | **MCB Rating:** 225 A | **Bussing:** COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		RECEPT LECTURE 020	20 A	1	720 VA / 900 VA			1	20 A	RECEPT OFFICE 038		2
3		RECEPT VR 010	20 A	1		180 VA / 720 VA		1	20 A	RECEPT JC CART STORAGE 003		4
5		RECEPT	20 A	1			540 VA / 360 VA	1	20 A	RECEPT JC CART STORAGE 003		6
7		RECEPT COLLABORATION 090.01	20 A	1	900 VA / 180 VA			1	20 A	RECEPT COLLABORATION 090.01		8
9		RECEPT WOMEN'S W/R 005	20 A	1		700 VA / 1080 VA		1	20 A	RECEPT CORRIDOR 090.10		10
11		RECEPT VENDING 022	20 A	1			360 VA / 180 VA	1	20 A	RECEPT VENDING 022		12
13		RECEPT	20 A	1	180 VA / 360 VA			1	20 A	RECEPT VENDING 022		14
15		RECEPT CORRIDOR 090.10	20 A	1		900 VA / 1200 VA		1	20 A	Equip. LECTURE 024		16
17		RECEPT LECTURE 024	20 A	1			1080 VA / 540 VA	1	20 A	Equip. LECTURE 024		18
19		Equip. LECTURE 020	20 A	1	1200 VA / 360 VA			1	20 A	RECEPT LECTURE 020		20
21		RECEPT UNISEX W/R 021	20 A	1		180 VA / 500 VA		1	20 A	MECHANICAL CONTROLS		22
23		PROJECTOR LECTURE 020	20 A	1			180 VA / 1000 VA	1	20 A	MECHANICAL CONTROLS		24
25		RECEPT BASEMENT ELECTRICAL..	20 A	1	540 VA / 500 VA			1	20 A	PROJECTOR LECTURE 020		26
27		MECHANICAL CONTROLS	20 A	1		1000 VA / 1080 VA		1	20 A	RECEPT SCIENCE STORES AMEX..		28
29		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		30
31		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		32
33		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		34
35		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		36
37		RP-A2	150 A	3	12960 VA / 0 VA			1	20 A	Spare		38
39	--	--	--	--		12000 VA / 0 VA		1	20 A	Spare		40
41	--	--	--	--			10800 VA / 0 VA	1	20 A	Spare		42
		Total Load:			18800 VA	19540 VA	15040 VA					
		Total Amps:			161 A	168 A	125 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Motor	1200 VA	125.00%	1500 VA		
Power	32400 VA	100.00%	32400 VA	**Total Connected Load:**	53380 VA
RECEPT	11700 VA	92.74%	10850 VA	**Total Estimated Demand:**	52830 VA
Equip.	8080 VA	100.00%	8080 VA	**Total Connected Current.:**	148 A
				Total Est. Demand Current:	147 A

Notes:

RP-A2

Location: BASEMENT ELECTRICAL ROOM 040 | **Supply From:** RP-A1 | **Mounting:** SURFACE | **Enclosure:** NEMA 1
Voltage: 208/120 Wye | **Phase:** 3 | **Wires:** 4 | **No. of Poles:** 42
A.I.C. Rating: 18K | **Mains Type:** MAIN LUGS ONLY | **Mains Rating:** 150 A | **Bussing:** COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		FURNITURE HACKER SPACE 001	20 A	1	1080 VA / 1080 VA			1	20 A	FURNITURE HACKER SPACE 001		2
3		FURNITURE HACKER SPACE 001	20 A	1		1080 VA / 1080 VA		1	20 A	FURNITURE HACKER SPACE 001		4
5		FURNITURE HACKER SPACE 001	20 A	1			1080 VA / 1080 VA	1	20 A	FURNITURE HACKER SPACE 001		6
7		FURNITURE LECTURE 020	20 A	1	1080 VA / 1080 VA			1	20 A	FURNITURE LECTURE 020		8
9		FURNITURE LECTURE 020	20 A	1		1080 VA / 1080 VA		1	20 A	FURNITURE LECTURE 020		10
11		FURNITURE LECTURE 020	20 A	1			1080 VA / 1080 VA	1	20 A	FURNITURE LECTURE 020		12
13		FURNITURE LECTURE 020	20 A	1	1080 VA / 1080 VA			1	20 A	FURNITURE LECTURE 020		14
15		FURNITURE LECTURE 020	20 A	1		1080 VA / 1080 VA		1	20 A	FURNITURE LECTURE 020		16
17		FURNITURE LECTURE 024	20 A	1			1080 VA / 1080 VA	1	20 A	FURNITURE LECTURE 020		18
19		FURNITURE LECTURE 024	20 A	1	1080 VA / 1080 VA			1	20 A	FURNITURE COMPUTER LAB 030		20
21		FURNITURE LECTURE 024	20 A	1		1080 VA / 0 VA		1	20 A	FURNITURE COMPUTER LAB 030		22
23		FURNITURE LECTURE 024	20 A	1			1080 VA / 1080 VA	1	20 A	FURNITURE COMPUTER LAB 030		24
25		FURNITURE COMPUTER LAB 030	20 A	1	1080 VA / 1080 VA			1	20 A	FURNITURE COMPUTER LAB 030		26
27		FURNITURE COMPUTER LAB 030	20 A	1		1080 VA / 1080 VA		1	20 A	FURNITURE COMPUTER LAB 027		28
29		FURNITURE COMPUTER LAB 030	20 A	1			1080 VA / 1080 VA	1	20 A	FURNITURE COMPUTER LAB 027		30
31		FURNITURE COMPUTER LAB 027	20 A	1	1080 VA / 1080 VA			1	20 A	FURNITURE COMPUTER LAB 027		32
33		FURNITURE COMPUTER LAB 027	20 A	1		1080 VA / 1200 VA		1	20 A	Equip. FIRE PROT COMP 023		34
35		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		36
37		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		38
39		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		40
41		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		42
		Total Load:			12960 VA	12000 VA	10800 VA					
		Total Amps:			110 A	102 A	90 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Motor	1200 VA	125.00%	1500 VA		
Power	32400 VA	100.00%	32400 VA	**Total Connected Load:**	35760 VA
Equip.	2160 VA	100.00%	2160 VA	**Total Estimated Demand:**	36060 VA
				Total Connected Current.:	99 A
				Total Est. Demand Current:	100 A

Notes:

RP-B1A

Location: BASEMENT ELECTRICAL ROOM 040 | **Supply From:** T-B1 | **Mounting:** SURFACE | **Enclosure:** NEMA 1
Voltage: 208/120 Wye | **Phase:** 3 | **Wires:** 4 | **No. of Poles:** 42
A.I.C. Rating: 10K | **Mains Type:** MAIN BREAKER | **MCB Rating:** 225 A | **Bussing:** COPPER

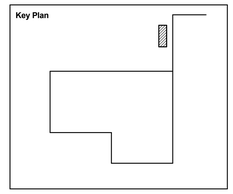
CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		2
3		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		4
5		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		6
7		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		8
9		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		10
11		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		12
13												14
15												16
17												18
19												20
21												22
23												24
25												26
27												28
29												30
31												32
33												34
35												36
37												38
39												40
41												42
		Total Load:			0 VA	0 VA	0 VA					
		Total Amps:			0 A	0 A	0 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
				Total Connected Load:	0 VA
				Total Estimated Demand:	0 VA
				Total Connected Current.:	0 A
				Total Est. Demand Current:	0 A

Notes:

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/14/2019	ADDENDUM NO. 1	4
01/22/2019	ADDENDUM NO. 2	5
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
Lab Design: NORR

Seal(s)

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WAYNE STATE UNIVERSITY

Project
STEM Innovation Learning Center
5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title
PANELBOARD SCHEDULES

Scale

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
E60-02

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PANEL ID: RP-1A1

PANEL DESCRIPTION

Location: ELEC 102
Supply From: T-1A
Mounting: SURFACE
Enclosure: NEMA 1
Voltage: 208/120 Wye
Phase: 3
Wires: 4
No. of Poles: 84
A.I.C. Rating: 10K
Mains Type: MAIN BREAKER
Mains Rating: 400 A
Bussing: COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		Equip. OUTREACH 113	20 A	1	360 VA / 720 VA			1	20 A	RECEPT MEDIA TOUCHDOWN 129		2
3		LOWER ROOF GFI RECEPT	20 A	1		360 VA / 360 VA		1	20 A	RECEPT MEDIA ROOM 128		4
5		RECEPT ELEC 102	20 A	1			360 VA / 720 VA	1	20 A	RECEPT MEDIA ROOM 128		6
7		RECEPT MEET 4 133	20 A	1	720 VA / 1080 VA			1	20 A	RECEPT CORRIDOR 190.11		8
9		RECEPT	20 A	1		720 VA / 720 VA		1	20 A	RECEPT STEAM 131		10
11		RECEPT	20 A	1			720 VA / 1080 VA	1	20 A	RECEPT CORRIDOR 190.11		12
13		RECEPT MEET 1 136	20 A	1	720 VA / 1200 VA			1	20 A	COPIER STEAM 131		14
15		RECEPT COMM/IT 039	20 A	1		360 VA / 720 VA		1	20 A	Equip. STUDENT LOUNGE 101		16
17		RECEPT	20 A	1			720 VA / 180 VA	1	20 A	RECEPT COLLAB. 110		18
19		RECEPT	20 A	1	900 VA / 180 VA			1	20 A	RECEPT COLLAB. 110		20
21		RECEPT	20 A	1		720 VA / 720 VA		1	20 A	RECEPT STUDENT LOUNGE 101		22
23		MECHANICAL CONTROLS	20 A	1			500 VA / 1260 VA	1	20 A	RECEPT STUDENT LOUNGE 101		24
25		MECHANICAL CONTROLS	20 A	1	1500 VA / 1080 VA			1	20 A	RECEPT STUDENT LOUNGE 101		26
27		RECEPT JC. 104	20 A	1		360 VA / 1080 VA		1	20 A	RECEPT STUDENT LOUNGE 101		28
29		RECEPT Room 190.03, 190.02,...	20 A	1			1260 VA / 1260 VA	1	20 A	RECEPT STUDENT LOUNGE 101		30
31		Spare	20 A	1	0 VA / 0 VA							32
33		Spare	20 A	1		0 VA / 0 VA						34
35		Spare	20 A	1			0 VA / 0 VA					36
37		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		38
39		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		40
41		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		42
43	--	Space	--	--	0 VA / 0 VA			1	20 A	Spare		44
45	--	Space	--	--		0 VA / 0 VA		1	20 A	Spare		46
47	--	Space	--	--			0 VA / 0 VA	1	20 A	Spare		48
49	--	Space	--	--	0 VA / 0 VA			1	20 A	Spare		50
51	--	Space	--	--		0 VA / 0 VA		1	20 A	Spare		52
53	--	Space	--	--			0 VA / 0 VA	1	20 A	Spare		54
55	--	Space	--	--	0 VA / 0 VA			1	20 A	Spare		56
57	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	58
59	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	60
61	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	62
63	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	64
65	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	66
67	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	68
69	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	70
71	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	72
73	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	74
75	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	76
77	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	78
79		RP-1A2	150 A	3	9100 VA / 7280 VA			3	150 A	RP-125A		80
81	--	--	--	--		8600 VA / 7920 VA		--	--	--	--	82
83	--	--	--	--			8100 VA / 5580 VA	--	--	--	--	84
				Total Load:	24840 VA	22640 VA	21740 VA					
				Total Amps:	208 A	190 A	181 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Power	17100 VA	100.00%	17100 VA		
RECEPT	46700 VA	60.71%	28350 VA	**Total Connected Load:**	69220 VA
Equip.	5420 VA	100.00%	5420 VA	**Total Estimated Demand:**	50870 VA
				Total Connected Current.:	192 A
				Total Est. Demand Current:	141 A

Notes:

PANEL ID: RP-2A1

PANEL DESCRIPTION

Location: ELEC. 202
Supply From: T-2A
Mounting: SURFACE
Enclosure: NEMA 1
Voltage: 208/120 Wye
Phase: 3
Wires: 4
No. of Poles: 84
A.I.C. Rating: 10K
Mains Type: MAIN BREAKER
MCB Rating: 400 A
Bussing: COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		RECEPT TOUCHDOWN 210	20 A	1	1080 VA / 700 VA			1	20 A	RECEPT + VALVES M/W		2
3		RECEPT TOUCHDOWN 220	20 A	1		900 VA / 720 VA		1	20 A	RECEPT Room 202, 204		4
5		RECEPT LECTURE/ DISCUSSION...	20 A	1			720 VA / 720 VA	1	20 A	RECEPT Room 290.07, 290.08		6
7		RECEPT LECTURE/ DISCUSSION...	20 A	1	720 VA / 500 VA			1	20 A	MECHANICAL CONTROLS		8
9		RECEPT LECTURE/ DISCUSSION...	20 A	1		720 VA / 360 VA		1	20 A	RECEPT LECTURE/ DISCUSSION...		10
11		Equip. LECTURE/ DISCUSSION 201	20 A	1			1200 VA / 180 VA	1	20 A	RECEPT COLLABORATION AREA...		12
13		RECEPT COLLABORATION AREA...	20 A	1	1080 VA / 180 VA			1	20 A	RECEPT COLLABORATION AREA...		14
15		RECEPT COLLABORATION-1...	20 A	1		720 VA / 900 VA		1	20 A	RECEPT COLLABORATION-1...		16
17		FURN LECTURE/ DISCUSSION 201	20 A	1			1080 VA / 500 VA	1	20 A	PROJECTOR 201		18
19		FURN LECTURE/ DISCUSSION 201	20 A	1	900 VA / 0 VA			1	20 A	Spare		20
21		FURN LECTURE/ DISCUSSION 201	20 A	1		1080 VA / 0 VA		1	20 A	Spare		22
23		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		24
25		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		26
27		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		28
29		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		30
31		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		32
33		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		34
35		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		36
37		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		38
39		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		40
41		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		42
43		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		44
45		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		46
47		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		48
49		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		50
51		RECEPT LECTURE/ DISCUSSION...	20 A	1		360 VA / 0 VA						52
53												54
55												56
57												58
59												60
61												62
63												64
65												66
67												68
69												70
71												72
73												74
75												76
77												78
79		RP-209A	150 A	3	4780 VA / 15300 VA			3	200 A	RP-218A		80
81	--	--	--	--		3860 VA / 16120 VA		--	--	--	--	82
83	--	--	--	--			4400 VA / 15640 VA	--	--	--	--	84
				Total Load:	25240 VA	25740 VA	24440 VA					
				Total Amps:	211 A	216 A	204 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Power	3060 VA	100.00%	3060 VA		
RECEPT	22560 VA	72.16%	16280 VA	**Total Connected Load:**	75420 VA
Equip.	49800 VA	100.00%	49800 VA	**Total Estimated Demand:**	69140 VA
				Total Connected Current.:	209 A
				Total Est. Demand Current:	192 A

Notes:

PANEL ID: RP-1A2

PANEL DESCRIPTION

Location: ELEC 102
Supply From: RP-1A1
Mounting: SURFACE
Enclosure: NEMA 1
Voltage: 208/120 Wye
Phase: 3
Wires: 4
No. of Poles: 42
A.I.C. Rating: 10K
Mains Type: MAIN LUGS ONLY
Mains Rating: 150 A
Bussing: COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		Equip.	20 A	1	700 VA / 1620 VA			1	20 A	RECEPT OUTREACH 113		2
3		OUTREACH 113	20 A	1		540 VA / 900 VA		1	20 A	RECEPT CORRIDOR 190.11		4
5		RECEPT CORRIDOR 190.10	20 A	1			1080 VA / 360 VA	1	20 A	RECEPT LECTURE 112		6
7		Equip. LECTURE 112	20 A	1	1200 VA / 180 VA			1	20 A	RECEPT LECTURE 112		8
9		RECEPT LECTURE 112	20 A	1		180 VA / 500 VA		1	20 A	RECEPT LECTURE 112		10
11		RECEPT LECTURE 112	20 A	1			540 VA / 900 VA	1	20 A	RECEPT LECTURE 112		12
13		FURNITURE LECTURE 112	20 A	1	0 VA / 1080 VA			1	20 A	FURNITURE LECTURE 112		14
15		FURNITURE LECTURE 112	20 A	1		1080 VA / 1080 VA		1	20 A	FURNITURE LECTURE 112		16
17		FURNITURE STEM COMMONS 132	20 A	1			1080 VA / 1080 VA	1	20 A	FURNITURE LECTURE 112		18
19		FURNITURE STEM COMMONS 132	20 A	1	1080 VA / 1080 VA			1	20 A	FURNITURE STEM COMMONS 132		20
21		FURNITURE STEM COMMONS 132	20 A	1		1080 VA / 1080 VA		1	20 A	FURNITURE COLL 190.15		22
23		FURNITURE STEM COMMONS 132	20 A	1			1080 VA / 900 VA	1	20 A	FURNITURE COLL 190.15		24
25		FURNITURE STEM COMMONS 132	20 A	1	1080 VA / 1080 VA			1	20 A	FURNITURE STEM COMMONS 132		26
27		FURNITURE STEM COMMONS 132	20 A	1		1080 VA / 1080 VA		1	20 A	FURNITURE STEM COMMONS 132		28
29		Spare	20 A	1			0 VA / 1080 VA	1	20 A	FURNITURE STEM COMMONS 132		30
31		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		32
33		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		34
35		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		36
37		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		38
39		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		40
41		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		42
				Total Load:	9100 VA	8600 VA	8100 VA					
				Total Amps:	76 A	72 A	68 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Power	17100 VA	100.00%	17100 VA		
RECEPT	7160 VA	100.00%	7160 VA	**Total Connected Load:**	25800 VA
Equip.	1540 VA	100.00%	1540 VA	**Total Estimated Demand:**	25800 VA
				Total Connected Current.:	72 A
				Total Est. Demand Current:	72 A

Notes:

PANEL ID: RP-125A

PANEL DESCRIPTION

Location: WORK SHOP 125
Supply From: RP-1A1
Mounting: SURFACE
Enclosure: NEMA 1
Voltage: 208/120 Wye
Phase: 3
Wires: 4
No. of Poles: 84
A.I.C. Rating: 10K
Mains Type: MAIN BREAKER
MCB Rating: 150 A
Bussing: COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		RECEPT MAKER SPACE,...	20 A	1	720 VA / 540 VA			1	20 A	RECEPT MAKER SPACE,...		2
3		RECEPT MAKER SPACE,...	20 A	1		720 VA / 360 VA		1	20 A	RECEPT MAKER SPACE,...		4
5		RECEPT MAKER SPACE,...	20 A	1			720 VA / 180 VA	1	20 A	RECEPT MAKER SPACE,...		6
7		RECEPT MAKER SPACE,...	20 A	1	720 VA / 180 VA			1	20 A	RECEPT MAKER SPACE,...		8
9		RECEPT MAKER SPACE,...	20 A	1		720 VA / 180 VA		1	20 A	RECEPT MAKER SPACE,...		10
11		RECEPT MAKER SPACE,...	20 A	1			720 VA / 180 VA	1	20 A	RECEPT MAKER SPACE,...		12
13		RECEPT MAKER SPACE,...	20 A	1	720 VA / 720 VA			1	20 A	RECEPT MAKER SPACE,...		14
15		RECEPT MAKER SPACE,...	20 A	1		720 VA / 540 VA		1	20 A	RECEPT MAKER SPACE,...		16
17		RECEPT MAKER SPACE,...	20 A	1			720 VA / 180 VA	1	20 A	RECEPT MAKER SPACE,...		18
19		RECEPT MAKER SPACE,...	20 A	1	720 VA / 360 VA			1	20 A	RECEPT MAKER SPACE,...		20
21		RECEPT MAKER SPACE,...	20 A	1		720 VA / 900 VA		1	20 A	RECEPT MAKER SPACE,...		22
23		RECEPT MAKER SPACE,...	20 A	1			720 VA / 0 VA	1	20 A	Spare		24
25		RECEPT MAKER SPACE,...	20 A	1	360 VA / 800 VA			1	20 A	Equip. PAINT ROOM 126		26
27		RECEPT 3D PRINTER ROOM 123	20 A	1		1080 VA / 900 VA		1	20 A	RECEPT TOUCHDOWN 124		28
29		RECEPT 3D PRINTER ROOM 123	20 A	1			1080 VA / 0 VA	1	0 A	Spare		30
31		RECEPT 3D PRINTER ROOM 123	20 A	1	1080 VA / 0 VA			1	0 A	Spare		32
33		RECEPT 3D PRINTER ROOM 123	20 A	1		1080 VA / 0 VA		1	0 A	Spare		34
35		RECEPT 3D PRINTER ROOM 123	20 A	1			1080 VA / 0 VA	1	0 A	Spare		36
37		RECEPT MAKER SPACE,...	20 A	1	360 VA / 0 VA			1	0 A	Spare		38
39						0 VA / 0 VA		1	0 A	Spare		40
41							0 VA / 0 VA	1	0 A	Spare		42
43		Spare	20 A	1	0 VA / 0 VA							44
45		Spare	20 A	1		0 VA / 0 VA						46
47		Spare	20 A	1			0 VA / 0 VA					48
49		Spare	20 A	1	0 VA / 0 VA							50
51		Spare	20 A	1		0 VA / 0 VA						52
53		Spare	20 A	1			0 VA / 0 VA					54
55		Spare	20 A	1	0 VA / 0 VA							56
57		Spare	20 A	1		0 VA / 0 VA						58
59		Spare	20 A	1			0 VA / 0 VA					60
61												62
63												64
65												66
67												68
69												70
71												72
73												74
75												76
77												78
79												80
81												82
83												84
				Total Load:	7280 VA	7920 VA	5580 VA					
				Total Amps:	63 A	68 A	47 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
RECEPT	19980 VA	75.03%	14990 VA		
Equip.	800 VA	100.00%	800 VA	**Total Connected Load:**	20780 VA
				Total Estimated Demand:	15790 VA
				Total Connected Current.:	58 A
				Total Est. Demand Current:	44 A

Notes:

PANEL ID: RP-209A

PANEL DESCRIPTION

Location: PREP & STORAGE 209
Supply From: RP-2A1
Mounting: SURFACE
Enclosure: NEMA 1
Voltage: 208/120 Wye
Phase: 3
Wires: 4
No. of Poles: 42
A.I.C. Rating: 10K
Mains Type: MAIN LUGS ONLY
Mains Rating: 200 A
Bussing: COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		RECEPT WET LAB 208	20 A	1	180 VA / 360 VA			1	20 A	Equip. WET LAB 208		2
3		RECEPT PREP & STORAGE 209	20 A	1		360 VA / 1200 VA		1	20 A	Equip. WET LAB 208		4
5							0 VA / 800 VA	1	20 A	Equip. WET LAB 208		6
7												8
9		RECEPT Room 209, 208	20 A	1		540 VA / 500 VA		1	20 A	Equip. WET LAB 208		10
11		Equip. WET LAB 208	20 A	1			1440 VA / 0 VA					12
13		Equip. WET LAB 208	20 A	1	1440 VA / 0 VA							14
15		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		16
17		Equip. WET LAB 208	20 A	1			1440 VA / 0 VA	1	20 A	Spare		18
19		Equip. WET LAB 208	20 A	1	1440 VA / 0 VA			1	20 A	Spare		20
21		Equip. WET LAB 208	20 A	1		720 VA / 0 VA		1	20 A	Spare		22
23		Equip. WET LAB 208	20 A	1			720 VA / 0 VA	1	20 A	Spare		24
25		WET LAB 208	20 A	1	1360 VA / 0 VA			1	20 A	Spare		26
27		RECEPT WET LAB 208	20 A	1		540 VA / 0 VA		1	20 A	Spare		28
29		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		30
31		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		32
33		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		34
35		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		36
37		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		38
39		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		40
41		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		42
				Total Load:	4780 VA	3860 VA	4400 VA					
				Total Amps:	41 A	32 A	37 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
RECEPT	1980 VA	100.00%	1980 VA		
Equip.	11060 VA	100.00%	11060 VA	**Total Connected Load:**	13040 VA
				Total Estimated Demand:	13040 VA
				Total Connected Current.:	36 A
				Total Est. Demand Current:	36 A

Notes:

PANEL ID: RP-218A

PANEL DESCRIPTION

Location: STORAGE 218
Supply From: RP-2A1
Mounting: SURFACE
Enclosure: NEMA 1
Voltage: 208/120 Wye
Phase: 3
Wires: 4
No. of Poles: 84
A.I.C. Rating: 22K
Mains Type: MAIN LUGS ONLY
Mains Rating: 225 A
Bussing: COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		Equip. WET LAB 212	20 A	1	800 VA / 800 VA			1	20 A	Equip. WET LAB 212		2
3		Equip. WET LAB 212	20 A	1		800 VA / 800 VA		1	20 A	Equip. WET LAB 212		4
5		Equip. WET LAB 212	20 A	1			800 VA / 800 VA	1	20 A	Equip. WET LAB 212		6
7		Equip. WET LAB 212	20 A	1	800 VA / 800 VA			1	20 A	Equip. WET LAB 212		8
9		Equip. WET LAB 212	20 A	1		800 VA / 800 VA		1	20 A	Equip. WET LAB 212		10
11		Equip. WET LAB 212	20 A	1			800 VA / 800 VA	1	20 A	Equip. WET LAB 212		12
13		Equip. WET LAB 212	20 A	1	800 VA / 800 VA			1	20 A	Equip. WET LAB 212		14
15		Equip. WET LAB 212	20 A	1		800 VA / 800 VA		1	20 A	Equip. WET LAB 212		16
17		Equip. WET LAB 212	20 A	1			800 VA / 800 VA	1	20 A	Equip. WET LAB 212		18
19		RECEPT WET LAB 212	20 A	1	720 VA / 800 VA			1	20 A	Equip. WET LAB 212		20
21		Equip. WET LAB 212	20 A	1		800 VA / 800 VA		1	20 A	Equip. WET LAB 212		22
23		Equip. WET LAB 212	20 A	1			800 VA / 800 VA	1	20 A	Equip. WET LAB 212		24
25		Equip. WET LAB 212	20 A	1	800 VA / 720 VA			1	20 A	RECEPT WET LAB 212		26
27		Equip. WET LAB 212	20 A	1		800 VA / 720 VA		1	20 A	RECEPT WET LAB 212		28
29		Equip. WET LAB 212	20 A	1			800 VA / 540 VA	1	20 A	RECEPT WET LAB 212		30
31		RECEPT WET LAB 212	20 A	1	720 VA / 720 VA			1	20 A	RECEPT WET LAB 212		32
33		RECEPT WET LAB 212	20 A	1		720 VA / 720 VA		1	20 A	RECEPT WET LAB 212		34
35		Spare	20 A	1			0 VA / 1440 VA	1	20 A	Equip. WET LAB 212		36
37		Spare	20 A	1	0 VA / 1440 VA			1	20 A	Equip. WET LAB 212		38
39		MECHANICAL CONTROLS	20 A	1		1000 VA / 1440 VA		1	20 A	Equip. WET LAB 212		40
41		PROJECTOR 212	20 A	1			500 VA / 1440 VA	1	20 A	Equip. WET LAB 212		42
43		PROJECTOR 212	20 A	1	500 VA / 540 VA			1	20 A	RECEPT Room 218, 212		44
45		Equip. PREPARATION LAB 217	20 A	1		1440 VA / 540 VA		1	20 A	RECEPT PREPARATION LAB 217		46
47		Equip. PREPARATION LAB 217	20 A	1			1440 VA / 540 VA	1	20 A	RECEPT PREPARATION LAB 217		48
49		Equip. PREPARATION LAB 217	20 A	1	1440 VA / 540 VA			1	20 A	RECEPT PREPARATION LAB 217		50
51		Equip. PREPARATION LAB 217	20 A	1		800 VA / 540 VA		1	20 A	RECEPT PREPARATION LAB 217		52
53		Equip. PREPARATION LAB 217	20 A	1			800 VA / 1200 VA	2	20 A	Equip. PREPARATION LAB 217		54
55		RECEPT WET LAB 212	20 A	1	180 VA / 1200 VA			--	--	--	--	56
57		Spare	0 A	1		0 VA / 1000 VA		1	20 A	Equip. PREPARATION LAB 217		58
59		Spare	20 A	1			0 VA / 540 VA	1	20 A	RECEPT DI PREPARATION LAB 217		60
61		Spare	20 A	1	0 VA / 180 VA			1	20 A	RECEPT WET LAB 212		62
63		Spare	20 A	1		0 VA / 0 VA						64
65		Spare	20 A	1			0 VA / 0 VA					66
67		Spare	20 A	1	0 VA / 0 VA							68
69		Spare	20 A	1		0 VA / 0 VA						70
71		Spare	20 A	1			0 VA / 0 VA					72
73		Spare	20 A	1	0 VA / 0 VA							74
75												76
77												78
79												80
81												82
83												84
				Total Load:	15300 VA	16120 VA	15640 VA					
				Total Amps:	128 A	135 A	131 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
RECEPT	10180 VA	99.12%	10090 VA		
Equip.	36880 VA	100.00%	36880 VA	**Total Connected Load:**	47060 VA
				Total Estimated Demand:	46970 VA
				Total Connected Current.:	131 A
				Total Est. Demand Current:	130 A

Notes:

PANEL ID: RP-3A1

PANEL DESCRIPTION

Location: ELEC. 202
Supply From: T-3A
Mounting: SURFACE
Enclosure: NEMA 1
Voltage: 208/120 Wye
Phase: 3
Wires: 4
No. of Poles: 84
A.I.C. Rating: 10K
Mains Type: MAIN BREAKER
MCB Rating: 400 A
Bussing: COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		RECEPT TOUCHDOWN 220	20 A	1	900 VA / 700 VA			1	20 A	RECEPT Room 290.08-1, 205, 206		2
3		RECP LECTURE/ DISCUSSION 201	20 A	1		720 VA / 720 VA		1	20 A	RECEPT Room 204, 202		4
5		RECP LECTURE/ DISCUSSION 201	20 A	1			720 VA / 720 VA	1	20 A	RECEPT Room 290.08, 290.07		6
7		RECP LECTURE/ DISCUSSION 201	20 A	1	720 VA / 500 VA			1	20 A	MECHANCIAL CONTROLS		8
9		Equip. LECTURE/ DISCUSSION 201	20 A	1		1200 VA / 360 VA		1	20 A	RECP LECTURE/ DISCUSSION 201		10
11		RECEPT Room 290.01, 390.01	20 A	1			1080 VA / 180 VA	1	20 A	EWC COLLAB AREA 290.01		12
13		RECEPT COLLABORATION-1...	20 A	1	720 VA / 180 VA			1	20 A	RECEPT COLLABORATION AREA...		14
15		PROJECTOR 201	20 A	1		500 VA / 1080 VA		1	20 A	RECEPT Room 290.03, 290.08-1		16
17		Spare	20 A	1			0 VA / 360 VA	1	20 A	RECEPT LECTURE/ DISCUSSION...		18
19		Spare	20 A	1	0 VA / 1080 VA			1	20 A	FURN LECTURE/ DISCUSSION 201		20
21		Spare	20 A	1		0 VA / 1080 VA		1	20 A	FURN LECTURE/ DISCUSSION 201		22
23		Spare	20 A	1			0 VA / 1080 VA	1	20 A	FURN LECTURE/ DISCUSSION 201		24
25		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		26
27		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		28
29		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		30
31		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		32
33		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		34
35		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		36
37	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	38
39	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	40
41	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	42
43	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	44
45	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	46
47	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	48
49	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	50
51	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	52
53	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	54
55	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	56
57	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	58
59	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	60
61	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	62
63	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	64
65	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	66
67	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	68
69	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	70
71	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	72
73	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	74
75	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	76
77	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	78
79		RP-310A	150 A	3	5550 VA / 12900 VA			3	150 A	RP-318A		80
81	--	--	--	--		3720 VA / 12440 VA		--	--	--	--	82
83	--	--	--	--			3600 VA / 13960 VA	--	--	--	--	84
				Total Load:	23250 VA	21820 VA	21700 VA					
				Total Amps:	194 A	182 A	181 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Power	3240 VA	100.00%	3240 VA		
RECEPT	21740 VA	73.00%	15870 VA	**Total Connected Load:**	66770 VA
Equip.	41790 VA	100.00%	41790 VA	**Total Estimated Demand:**	60900 VA
				Total Connected Current.:	185 A
				Total Est. Demand Current:	169 A

Notes:

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

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Project

STEM Innovation
Learning Center

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DETROIT, MI 48202

Drawing Title

PANELBOARD SCHEDULES

Scale

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

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PANEL ID	PANEL DESCRIPTION
RP-310A	

Location:	TOUCHDOWN 210	**Voltage:**	208/120 Wye	**A.I.C. Rating:**	10K
Supply From:	RP-3A1	**Phase:**	3	**Mains Type:**	MAIN LUGS ONLY
Mounting:	SURFACE	**Wires:**	4	**Mains Rating:**	150 A
Enclosure:	NEMA 1	**No. of Poles:**	42	**Bussing:**	COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		RECEPT PREP & STORAGE 209	20 A	1	180 VA / 360 VA			1	20 A	Equip. WET LAB 308		2
3						0 VA / 1200 VA		1	20 A	Equip. WET LAB 308		4
5							0 VA / 0 VA	1	20 A	HOOD. WET LAB 308		6
7					0 VA / 770 VA			1	20 A	BENCH. WET LAB 308		8
9		RECEPT Room 308,310	20 A	1		540 VA / 180 VA		1	20 A	RECEPT WET LAB 208		10
11		OS WET LAB 308	20 A	1			1440 VA / 0 VA					12
13		OS WET LAB 308	20 A	1	1440 VA / 0 VA							14
15		RECEPT ID WET LAB 308	20 A	1		540 VA / 0 VA		1	20 A	Spare		16
17		OS WET LAB 308	20 A	1			1440 VA / 0 VA	1	20 A	Spare		18
19		OS WET LAB 308	20 A	1	1440 VA / 0 VA			1	20 A	Spare		20
21		BENCH. WET LAB 308	20 A	1		720 VA / 0 VA		1	20 A	Spare		22
23		BENCH. WET LAB 308	20 A	1			720 VA / 0 VA	1	20 A	Spare		24
25		RECEPT WET LAB 308	20 A	1	1360 VA / 0 VA			1	20 A	Spare		26
27		RECEPT WET LAB 208	20 A	1		540 VA / 0 VA		1	20 A	Spare		28
29		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		30
31		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		32
33		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		34
35		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		36
37		Spare	20 A	1	0 VA / 0 VA							38
39		Spare	20 A	1		0 VA / 0 VA						40
41		Spare	20 A	1			0 VA / 0 VA					42
				Total Load:	5550 VA	3720 VA	3600 VA					
				Total Amps:	46 A	31 A	30 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
RECEPT	2340 VA	100.00%	2340 VA		
Equip.	10530 VA	100.00%	10530 VA	**Total Connected Load:**	12870 VA
				Total Estimated Demand:	12870 VA
				Total Connected Current.:	36 A
				Total Est. Demand Current:	36 A

Notes:

PANEL ID	PANEL DESCRIPTION
RP-410A	

Location:	PREP & STORAGE 410	**Voltage:**	208/120 Wye	**A.I.C. Rating:**	10K
Supply From:	RP-4A1	**Phase:**	3	**Mains Type:**	MAIN LUGS ONLY
Mounting:	SURFACE	**Wires:**	4	**Mains Rating:**	150 A
Enclosure:	NEMA 1	**No. of Poles:**	42	**Bussing:**	COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1					0 VA / 360 VA			1	20 A	Equip. WET LAB 408		2
3						0 VA / 1200 VA		1	20 A	Equip. WET LAB 408		4
5							0 VA / 0 VA	1	20 A	HOOD WET LAB 408		6
7					0 VA / 720 VA			1	20 A	BENCH WET LAB 408		8
9		RECEPT Room 408, 410	20 A	1		1080 VA / 540 VA		1	20 A	RECEPT WET LAB 408		10
11		OSC WET LAB 408	20 A	1			1440 VA / 180 VA	1	20 A	RECEPT WET LAB 408		12
13		OSC WET LAB 408	20 A	1	1440 VA / 0 VA							14
15												16
17		OSC WET LAB 408	20 A	1			1440 VA / 0 VA	1	20 A	Spare		18
19		OSC WET LAB 408	20 A	1	1440 VA / 0 VA			1	20 A	Spare		20
21		BENCH WET LAB 408	20 A	1		720 VA / 0 VA		1	20 A	Spare		22
23		BENCH WET LAB 408	20 A	1			720 VA / 0 VA	1	20 A	Spare		24
25		RECEP WET LAB 408	20 A	1	1360 VA / 0 VA			1	20 A	Spare		26
27		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		28
29		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		30
31		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		32
33		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		34
35		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		36
37		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		38
39		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		40
41		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		42
				Total Load:	5320 VA	3540 VA	3780 VA					
				Total Amps:	45 A	30 A	32 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
RECEPT	2160 VA	100.00%	2160 VA		
Equip.	10480 VA	100.00%	10480 VA	**Total Connected Load:**	12640 VA
				Total Estimated Demand:	12640 VA
				Total Connected Current.:	35 A
				Total Est. Demand Current:	35 A

Notes:

PANEL ID	ANEL DESCRIPTION
RP-510A	

Location:	PREP/STORAGE 510	**Voltage:**	208/120 Wye	**A.I.C. Rating:**	10K
Supply From:	RP-5A1	**Phase:**	3	**Mains Type:**	MAIN LUGS ONLY
Mounting:	SURFACE	**Wires:**	4	**MCB Rating:**	150 A
Enclosure:	NEMA 1	**No. of Poles:**	42	**Bussing:**	COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		RECEPT PREP/STORAGE 510	20 A	1	360 VA / 360 VA			1	20 A	Equip. WET LAB 508		2
3		Spare	0 A	1		0 VA / 1200 VA		1	20 A	Equip. WET LAB 508		4
5		Equip. PREP/STORAGE 510	20 A	2			1200 VA / 0 VA	1	20 A	HOOD WET LAB 508		6
7	--	--	--	--	1200 VA / 0 VA			1	20 A	BENCH WET LAB 508		8
9		RECEPT PREP/STORAGE 510	20 A	1		720 VA / 220 VA		1	20 A	RECEPT UNISEX W/R 511		10
11		OSC WET LAB 508	20 A	1			1440 VA / 0 VA	1	20 A	Spare		12
13		OSC WET LAB 508	20 A	1	1440 VA / 0 VA			1	20 A	Spare		14
15		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		16
17		OSC WET LAB 508	20 A	1			1440 VA / 0 VA	1	20 A	Spare		18
19		OSC WET LAB 508	20 A	1	1440 VA / 0 VA			1	20 A	Spare		20
21		BENCH WET LAB 508	20 A	1		0 VA / 0 VA		1	20 A	Spare		22
23		BENCH WET LAB 508	20 A	1			0 VA / 0 VA	1	20 A	Spare		24
25		RECEPT WET LAB 508	20 A	1	1360 VA / 0 VA			1	20 A	Spare		26
27		RECEPT WET LAB 508	20 A	1		540 VA / 0 VA		1	20 A	Spare		28
29		Spare	20 A	1			0 VA / 540 VA	1	20 A	RECEPT WET LAB 508		30
31		Spare	20 A	1	0 VA / 0 VA							32
33		Spare	20 A	1		0 VA / 0 VA						34
35												36
37												38
39												40
41												42
				Total Load:	6160 VA	2680 VA	4620 VA					
				Total Amps:	54 A	22 A	41 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
RECEPT	2700 VA	100.00%	2700 VA		
Equip.	10760 VA	100.00%	10760 VA	**Total Connected Load:**	13460 VA
				Total Estimated Demand:	13460 VA
				Total Connected Current.:	37 A
				Total Est. Demand Current:	37 A

Notes:

PANEL ID	PANEL DESCRIPTION
RP-318A	

Location:	STORAGE 218	**Voltage:**	208/120 Wye	**A.I.C. Rating:**	22K
Supply From:	RP-3A1	**Phase:**	3	**Mains Type:**	MAIN LUGS ONLY
Mounting:	SURFACE	**Wires:**	4	**Mains Rating:**	150 A
Enclosure:	NEMA 1	**No. of Poles:**	74	**Bussing:**	COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		HOOD WET LAB 212	20 A	1	800 VA / 1440 VA			1	20 A	BENCH WET LAB 212		2
3		HOOD WET LAB 212	20 A	1		800 VA / 1440 VA		1	20 A	BENCH WET LAB 212		4
5		BENCH WET LAB 212	20 A	1			1440 VA / 1440 VA	1	20 A	BENCH WET LAB 212		6
7		BENCH WET LAB 212	20 A	1	1440 VA / 1440 VA			1	20 A	BENCH WET LAB 212		8
9		BENCH WET LAB 212	20 A	1		1440 VA / 1440 VA		1	20 A	BENCH WET LAB 212		10
11		BENCH WET LAB 212	20 A	1			1440 VA / 1440 VA	1	20 A	BENCH WET LAB 212		12
13		BENCH WET LAB 212	20 A	1	1440 VA / 800 VA			1	20 A	HOOD WET LAB 212		14
15		WIREWAY WET LAB 212	20 A	1		720 VA / 800 VA		1	20 A	HOOD WET LAB 212		16
17		WIREWAY WET LAB 212	20 A	1			720 VA / 900 VA	1	20 A	RECEPT WET LAB 212		18
19		RECEPT Room 217, 212	20 A	1	360 VA / 900 VA			1	20 A	RECEPT WET LAB 212		20
21		MECHANICAL CONTROLS	20 A	1		1000 VA / 900 VA		1	20 A	RECEPT WET LAB 212		22
23		Spare	20 A	1			0 VA / 900 VA	1	20 A	RECEPT WET LAB 212		24
25		Spare	20 A	1	0 VA / 1440 VA			1	20 A	BENCH WET LAB 212		26
27		Spare	20 A	1		0 VA / 1440 VA		1	20 A	BENCH PREPARATION LAB 217		28
29		Spare	20 A	1			0 VA / 1440 VA	1	20 A	BENCH PREPARATION LAB 217		30
31		Spare	20 A	1	0 VA / 400 VA			2	20 A	HOOD PREPARATION LAB 217		32
33		Spare	20 A	1		0 VA / 400 VA		--	--	--	--	34
35		Spare	20 A	1			0 VA / 400 VA	2	20 A	HOOD PREPARATION LAB 217		36
37		Spare	20 A	1	0 VA / 400 VA			--	--	--	--	38
39		Spare	20 A	1		0 VA / 0 VA						40
41		Spare	20 A	1			0 VA / 1440 VA	1	20 A	BENCH PREPARATION LAB 217		42
43		Spare	20 A	1	0 VA / 1000 VA			1	20 A	RECEPT PREPARATION LAB 217		44
45		Spare	20 A	1		0 VA / 1200 VA		2	20 A	ICE MAKER PREPARATION LAB 217		46
47		Spare	20 A	1			0 VA / 1200 VA	--	--	--	--	48
49		PROJECTOR 212	20 A	1	500 VA / 540 VA			1	20 A	RECEPT DI PREPARATION LAB 217		50
51		RECEPT WET LAB 212	20 A	1		360 VA / 500 VA		1	20 A	RECEPT WET LAB 212		52
53		Equip. WET LAB 212	20 A	1			1200 VA / 0 VA					54
55												56
57												58
59												60
61												62
63												64
65												66
67												68
69												70
71												72
73												74
				Total Load:	12900 VA	12440 VA	13960 VA					
				Total Amps:	108 A	104 A	117 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
RECEPT	9900 VA	100.00%	9900 VA		
Equip.	29400 VA	100.00%	29400 VA	**Total Connected Load:**	39300 VA
				Total Estimated Demand:	39300 VA
				Total Connected Current.:	109 A
				Total Est. Demand Current:	109 A

Notes:

PANEL ID	PANEL DESCRIPTION
RP-418A	

Location:	STORAGE 418	**Voltage:**	208/120 Wye	**A.I.C. Rating:**	22K
Supply From:	RP-4A1	**Phase:**	3	**Mains Type:**	MAIN LUGS ONLY
Mounting:	SURFACE	**Wires:**	4	**Mains Rating:**	200 A
Enclosure:	NEMA 1	**No. of Poles:**	74	**Bussing:**	COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		HOOD WET LAB 412	20 A	2	400 VA / 1440 VA			1	20 A	BENCH WET LAB 412		2
3	--	--	--	--		400 VA / 1440 VA		1	20 A	BENCH WET LAB 412		4
5		HOOD WET LAB 412	20 A	2			400 VA / 500 VA	1	20 A	PROJECTOR ROOM 412		6
7	--	--	--	--	400 VA / 500 VA			1	20 A	PROJECTOR ROOM 412		8
9		BENCH WET LAB 412	20 A	1		1440 VA / 1440 VA		1	20 A	BENCH WET LAB 412		10
11		BENCH WET LAB 412	20 A	1			1440 VA / 1440 VA	1	20 A	BENCH WET LAB 412		12
13		BENCH WET LAB 412	20 A	1	1440 VA / 1440 VA			1	20 A	BENCH WET LAB 412		14
15		BENCH WET LAB 412	20 A	1		1440 VA / 1440 VA		1	20 A	Equip. WET LAB 412		16
17		BENCH WET LAB 412	20 A	1			1440 VA / 1440 VA	1	20 A	Equip. WET LAB 412		18
19		BENCH WET LAB 412	20 A	1	1440 VA / 1440 VA			1	20 A	BENCH WET LAB 412		20
21		RECEPT Room 412, 417	20 A	1		360 VA / 1440 VA		1	20 A	BENCH WET LAB 412		22
23		BENCH PREPARATION LAB 417	20 A	1			1440 VA / 540 VA	1	20 A	RECEPT ID PREPARATION LAB 417		24
25		HOOD PREPARATION LAB 417	20 A	2	400 VA / 360 VA			1	20 A	RECEPT WET LAB 412		26
27	--	--	--	--		400 VA / 1200 VA		1	20 A	Equip. WET LAB 412		28
29		HOOD PREPARATION LAB 417	20 A	2			400 VA / 400 VA	2	20 A	HOOD WET LAB 412		30
31	--	--	--	--	400 VA / 400 VA			--	--	--	--	32
33		BENCH PREPARATION LAB 417	20 A	1		1440 VA / 400 VA		2	20 A	HOOD WET LAB 412		34
35		BENCH PREPARATION LAB 417	20 A	1			720 VA / 400 VA	--	--	--	--	36
37		GLASS WASHER PRE LAB 417	20 A	1	1000 VA / 720 VA			1	20 A	RECEPT WET LAB 412		38
39		ICE MAKER PREPARATION LAB 417	20 A	2		1200 VA / 540 VA		1	20 A	RECEPT WET LAB 412		40
41	--	--	--	--			1200 VA / 720 VA	1	20 A	RECEPT WET LAB 412		42
43		ICE MAKER PREPARATION LAB 417	20 A	2	1200 VA / 720 VA			1	20 A	RECEPT WET LAB 412		44
45	--	--	--	--		1200 VA / 360 VA		1	20 A	RECEPT WET LAB 412		46
47		RECEPT WET LAB 412	20 A	1			540 VA / 360 VA	1	20 A	RECEPT, BENCH Room 412, 418		48
49		Spare	20 A	1	0 VA / 1440 VA			1	20 A	BENCH WET LAB 412		50
51		Spare	20 A	1		0 VA / 1440 VA		1	20 A	BENCH WET LAB 412		52
53		Spare	20 A	1			0 VA / 1440 VA	1	20 A	BENCH WET LAB 412		54
55		Spare	20 A	1	0 VA / 180 VA			1	20 A	REFRIGERATOR WET LAB 412		56
57		Spare	20 A	1		0 VA / 1000 VA		1	20 A	MECHANICAL CONTROLS		58
59		Spare	20 A	1			0 VA / 0 VA					60
61		Spare	20 A	1	0 VA / 0 VA							62
63		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		64
65		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		66
67		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		68
69		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		70
71												72
73												74
75												76
77												78
79												80
81												82
83												84
				Total Load:	15320 VA	18580 VA	14820 VA					
				Total Amps:	128 A	155 A	124 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
RECEPT	9000 VA	100.00%	9000 VA		
Equip.	39720 VA	100.00%	39720 VA	**Total Connected Load:**	48720 VA
				Total Estimated Demand:	48720 VA
				Total Connected Current.:	135 A
				Total Est. Demand Current:	135 A

Notes:

PANEL ID	PANEL DESCRIPTION
RP-4A1	

Location:	ELEC. 402	**Voltage:**	208/120 Wye	**A.I.C. Rating:**	10K
Supply From:	T-4A	**Phase:**	3	**Mains Type:**	MAIN BREAKER
Mounting:	SURFACE	**Wires:**	4	**MCB Rating:**	400 A
Enclosure:	NEMA 1	**No. of Poles:**	84	**Bussing:**	COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		RECEPT TOUCHDOWN 421	20 A	1	1080 VA / 700 VA			1	20 A	RECEPT Room 405, 406, 490.07-1		2
3		RECEPT CORRIDOR-1 490.07-1	20 A	1		900 VA / 720 VA		1	20 A	RECEPT Room 402, 404		4
5		RECP LECTURE/ DISCUSSION 401	20 A	1			720 VA / 720 VA	1	20 A	RECEPT CORRIDOR-1 490.07-1		6
7		RECP LECTURE/ DISCUSSION 401	20 A	1	720 VA / 500 VA			1	20 A	MECHANICAL CONTROLS		8
9		RECP LECTURE/ DISCUSSION 401	20 A	1		720 VA / 360 VA		1	20 A	RECP LECTURE/ DISCUSSION 401		10
11		Equip. LECTURE/ DISCUSSION 401	20 A	1			1200 VA / 180 VA	1	20 A	EWC CORRIDOR 490.03		12
13		RECEPT Room 490.01, 490.03	20 A	1	1080 VA / 180 VA			1	20 A	RECEPT Room 490.01, 490.03		14
15		RECEPT LECTURE/ DISCUSSION...	20 A	1		360 VA / 900 VA		1	20 A	RECEPT Room 490.03, 490.07-1		16
17		FURN LECTURE/ DISCUSSION 401	20 A	1			1080 VA / 500 VA	1	20 A	PROJECTOR ROOM 401		18
19		FURN LECTURE/ DISCUSSION 401	20 A	1	900 VA / 0 VA							20
21		FURN LECTURE/ DISCUSSION 401	20 A	1		1080 VA / 0 VA						22
23												24
25												26
27												28
29												30
31												32
33												34
35												36
37												38
39												40
41												42
43												44
45												46
47												48
49												50
51												52
53												54
55												56
57												58
59												60
61												62
63												64
65												66
67												68
69												70
71												72
73												74
75												76
77												78
79		RP-410A	125 A	3	5320 VA / 15320 VA			3	200 A	RP-418A		80
81	--	--	--	--		3540 VA / 18580 VA		--	--	--	--	82
83	--	--	--	--			3780 VA / 14820 VA	--	--	--	--	84
				Total Load:	25800 VA	27160 VA	23000 VA					
				Total Amps:	219 A	230 A	192 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Power	3060 VA	100.00%	3060 VA		
RECEPT	20840 VA	73.99%	15420 VA	**Total Connected Load:**	75960 VA
Equip.	52060 VA	100.00%	52060 VA	**Total Estimated Demand:**	70540 VA
				Total Connected Current.:	211 A
				Total Est. Demand Current:	196 A

Notes:

PANEL ID	PANEL DESCRIPTION
RP-5A1	

Location:	ELEC 502	**Voltage:**	208/120 Wye	**A.I.C. Rating:**	10K
Supply From:	T-5A	**Phase:**	3	**Mains Type:**	MAIN BREAKER
Mounting:	SURFACE	**Wires:**	4	**MCB Rating:**	400 A
Enclosure:	NEMA 1	**No. of Poles:**	84	**Bussing:**	COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		RECEPT TOUCHDOWN 520	20 A	1	1800 VA / 660 VA			1	20 A	RECEPT Room 505, 506, 590.07		2
3		RECP LECTURE/ DISCUSSION 501	20 A	1		720 VA / 720 VA		1	20 A	RECEPT ELEC 502		4
5		RECP LECTURE/ DISCUSSION 501	20 A	1			720 VA / 720 VA	1	20 A	RECEPT Room 590.08, 590.07		6
7		RECP LECTURE/ DISCUSSION 501	20 A	1	720 VA / 500 VA			1	20 A	MECHANICAL CONTROLS		8
9		Equip. LECTURE/ DISCUSSION 501	20 A	1		1200 VA / 360 VA		1	20 A	RECP LECTURE/ DISCUSSION 501		10
11		RECEPT Room 590.01, 590.03	20 A	1			1080 VA / 180 VA	1	20 A	EWC CORRIDOR 590.03		12
13		RECEPT CORRIDOR	20 A	1	720 VA / 180 VA			1	20 A	RECEPT Room 590.01, 590.03		14
15		RECEPT LECTURE/ DISCUSSION...	20 A	1		500 VA / 900 VA		1	20 A	RECEPT CORRIDOR 590.03		16
17		FURN LECTURE/ DISCUSSION 501	20 A	1			1080 VA / 0 VA	1	20 A	FURNITURE COMPUTER LAB 512		18
19		FURN LECTURE/ DISCUSSION 501	20 A	1	1080 VA / 1080 VA			1	20 A	FURNITURE COMPUTER LAB 512		20
21		FURN LECTURE/ DISCUSSION 501	20 A	1		1080 VA / 1080 VA		1	20 A	FURNITURE COMPUTER LAB 512		22
23		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		24
25		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		26
27		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		28
29		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		30
31		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		32
33		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		34
35		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		36
37	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	38
39	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	40
41	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	42
43	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	44
45	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	46
47	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	48
49	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	50
51	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	52
53	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	54
55	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	56
57	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	58
59	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	60
61	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	62
63	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	64
65	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	66
67	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	68
69	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	70
71	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	72
73	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	74
75	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	76
77	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	78
79		RP-510A	150 A	3	6160 VA / 12460 VA			3	150 A	RP-518A		80
81	--	--	--	--		2680 VA / 10480 VA		--	--	--	--	82
83	--	--	--	--			4620 VA / 8820 VA	--	--	--	--	84
				Total Load:	25360 VA	19720 VA	17220 VA					
				Total Amps:	215 A	168 A	144 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Power	5400 VA	100.00%	5400 VA		
RECEPT	16940 VA	79.52%	13470 VA	**Total Connected Load:**	62300 VA
Equip.	39960 VA	100.00%	39960 VA	**Total Estimated Demand:**	58830 VA
				Total Connected Current.:	173 A
				Total Est. Demand Current:	163 A

Notes:

DATE	ISSUED FOR	REV
11/5/2018	DEMO PACKAGE - BIDS	2
12/21/2018	100% CD PACKAGE	3
05/06/2019	TEST AND BALANCE BID	

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Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

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WAYNE STATE UNIVERSITY

Project

STEM Innovation
Learning Center

5048 GULLEN MALL
DETROIT, MI 48202

Drawing Title

PANELBOARD SCHEDULES

Scale

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.

E60-04

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PANEL ID: RP-518A

PANEL DESCRIPTION

Location: PREP & STORAGE 518
Supply From: RP-5A1
Mounting: SURFACE
Enclosure: NEMA 1
Voltage: 208/120 Wye
Phase: 3
Wires: 4
No. of Poles: 74
A.I.C. Rating: 10K
Mains Type: MAIN LUGS ONLY
Mains Rating: 150 A
Bussing: COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		PROJECTOR LAB 512	20 A	1	1000 VA / 1440 VA			1	20 A	BENCH WET LAB 519		2
3		BENCH WET LAB 519	20 A	1		1440 VA / 1440 VA		1	20 A	BENCH WET LAB 519		4
5		BENCH WET LAB 519	20 A	1			1440 VA / 1440 VA	1	20 A	BENCH WET LAB 519		6
7		BENCH WET LAB 519	20 A	1	1440 VA / 1440 VA			1	20 A	BENCH WET LAB 519		8
9		BENCH WET LAB 519	20 A	1		1440 VA / 1440 VA		1	20 A	BENCH WET LAB 519		10
11		BENCH WET LAB 519	20 A	1			1440 VA / 1440 VA	1	20 A	BENCH WET LAB 519		12
13		BENCH WET LAB 519	20 A	1	1440 VA / 1440 VA			1	20 A	BENCH WET LAB 519		14
15		BENCH WET LAB 519	20 A	1		1440 VA / 720 VA		1	20 A	BENCH WET LAB 519		16
17		BENCH WET LAB 519	20 A	1			1440 VA / 360 VA	1	20 A	RECEPT WET LAB 519		18
19		BENCH WET LAB 519	20 A	1	1440 VA / 0 VA			1	20 A	HOOD WET LAB 519		20
21		PROJECTOR LAB 519	20 A	1		500 VA / 500 VA		1	20 A	MECHANICAL CONTROLS		22
23		RECEPT WET LAB 519	20 A	1			360 VA / 0 VA	1	20 A	Spare		24
25		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		26
27		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		28
29		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		30
31		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		32
33		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		34
35		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		36
37		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		38
39		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		40
41		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		42
43		Equip. WET LAB 519	20 A	1	720 VA / 900 VA			1	20 A	RECEPT STORAGE 513		44
45		Equip. COMPUTER LAB 512	20 A	1		1200 VA / 360 VA		1	20 A	RECEPT COMPUTER LAB 512		46
47		RECEPT WET LAB 519	20 A	1			540 VA / 360 VA	1	20 A	RECEPT WET LAB 519		48
49		Equip. WET LAB 519	20 A	1	1200 VA / 0 VA							50
51												52
53												54
55												56
57												58
59												60
61												62
63												64
65												66
67												68
69												70
71												72
73												74
				Total Load:	12460 VA	10480 VA	8820 VA					
				Total Amps:	106 A	89 A	74 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
RECEPT	4380 VA	100.00%	4380 VA		
Equip.	27380 VA	100.00%	27380 VA	Total Connected Load:	31760 VA
				Total Estimated Demand:	31760 VA
				Total Connected Current.:	88 A
				Total Est. Demand Current:	88 A

Notes:

PANEL ID: RP-7A1

PANEL DESCRIPTION

Location: ELEC. 702
Supply From: T-7A
Mounting: SURFACE
Enclosure: NEMA 1
Voltage: 208/120 Wye
Phase: 3
Wires: 4
No. of Poles: 84
A.I.C. Rating: 10K
Mains Type: MAIN LUGS ONLY
MCB Rating: 225 A
Bussing: COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		RECEPT TOUCHDOWN 720	20 A	1	900 VA / 580 VA			1	20 A	RECEPT Room 705, 706, 790.07		2
3		RECEPT LECTURE 701	20 A	1		360 VA / 720 VA		1	20 A	RECEPT Room 704, 702		4
5		RECEPT LECTURE 701	20 A	1			900 VA / 720 VA	1	20 A	RECEPT Room 790.08, 790.07		6
7		Equip. LECTURE 701	20 A	1	1200 VA / 500 VA			1	20 A	MECHANICAL CONTROLS		8
9		RECEPT COLLABORATION AREA...	20 A	1		1080 VA / 360 VA		1	20 A	RECEPT LECTURE 701		10
11		RECEPT CORRIDOR 790.10	20 A	1			720 VA / 180 VA	1	20 A	EWC CORRIDOR 790.03		12
13		MECHANICAL CONTROLS	20 A	1	250 VA / 180 VA			1	20 A	RECEPT Room 790.01, 790.03		14
15		PROJECTOR ROOM 712	20 A	1		180 VA / 900 VA		1	20 A	RECEPT Room 790.03, 790.10		16
17		PROJECTOR ROOM 714	20 A	1			180 VA / 500 VA	1	20 A	PROJECTOR ROOM 719		18
19		PROJECTOR ROOM 708	20 A	1	500 VA / 500 VA			1	20 A	PROJECTOR ROOM 701		20
21		CORD RECEPT DRY LAB - TYPE 2...	20 A	1		180 VA / 180 VA		1	20 A	CORD RECEPT DRY LAB - TYPE 2...		22
23		CORD RECEPT DRY LAB - TYPE 2...	20 A	1			180 VA / 180 VA	1	20 A	CORD RECEPT DRY LAB - TYPE 2...		24
25		RECEPT DRY LAB - TYPE 2 714	20 A	1	540 VA / 360 VA			1	20 A	RECEPT DRY LAB - TYPE 2 714		26
27		RECEPT DRY LAB - TYPE 1 712	20 A	1		540 VA / 360 VA		1	20 A	RECEPT DRY LAB - TYPE 1 712		28
29		CORD RECEPT DRY LAB - TYPE 1...	20 A	1			180 VA / 180 VA	1	20 A	CORD RECEPT DRY LAB - TYPE 1...		30
31		CORD RECEPT DRY LAB - TYPE 1...	20 A	1	180 VA / 180 VA			1	20 A	RECEPT DRY LAB - TYPE 2 714		32
33		RECEPT DRY LAB - TYPE 2 714	20 A	1		360 VA / 360 VA		1	20 A	RECEPT COMP LAB 719		34
35		RECEPT STORAGE 718	20 A	1			900 VA / 1200 VA	1	20 A	RACK COMPUTER LAB 719		36
37		Equip. DRY LAB - TYPE 1 712	20 A	1	1200 VA / 1080 VA			1	20 A	Power COMPUTER LAB 719		38
39		RECEPT DRY LAB - TYPE 1 712	20 A	1		360 VA / 1080 VA		1	20 A	Power COMPUTER LAB 719		40
41		RECEPT DRY LAB - TYPE 2 714	20 A	1			360 VA / 900 VA	1	20 A	Power COMPUTER LAB 719		42
43		Equip. DRY LAB - TYPE 2 714	20 A	1	1200 VA / 1080 VA			1	20 A	FURNITURE LECTURE 701		44
45		RECEPT DRY LAB - TYPE 1 712	20 A	1		540 VA / 1080 VA		1	20 A	FURNITURE LECTURE 701		46
47		FURNITURE COMPUTER LAB 719	20 A	1			0 VA / 0 VA	1	20 A	Spare		48
49		FURNITURE COMPUTER LAB 719	20 A	1	1080 VA / 0 VA			1	20 A	Spare		50
51		FURNITURE COMPUTER LAB 719	20 A	1		1080 VA / 0 VA		1	20 A	Spare		52
53		Spare	0 A	1			0 VA / 0 VA	1	20 A	Spare		54
55		Spare	0 A	1	0 VA / 0 VA			1	20 A	Spare		56
57	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	58
59	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	60
61	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	62
63	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	64
65	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	66
67	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	68
69	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	70
71	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	72
73	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	74
75	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	76
77	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	78
79	--	Space	--	--	0 VA / 8140 VA			3	150 A	RP-710A		80
81	--	Space	--	--		0 VA / 7560 VA		--	--	--	--	82
83	--	Space	--	--			0 VA / 9520 VA	--	--	--	--	84
				Total Load:	19650 VA	17280 VA	16800 VA					
				Total Amps:	164 A	145 A	140 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Power	7380 VA	100.00%	7380 VA		
RECEPT	19320 VA	75.88%	14660 VA	Total Connected Load:	53730 VA
Equip.	27030 VA	100.00%	27030 VA	Total Estimated Demand:	49070 VA
				Total Connected Current.:	149 A
				Total Est. Demand Current:	136 A

Notes:

PANEL ID: PNL-EF-2

PANEL DESCRIPTION

A2

Location: PENTHOUSE 800
Supply From: DP-SBM2
Mounting: SURFACE
Enclosure: NEMA 1
Voltage: 480/277 Wye
Phase: 3
Wires: 4
No. of Poles: 18
A.I.C. Rating: 18K
Mains Type: MAIN BREAKER
MCB Rating: 200 A
Bussing: COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		EF-2	40 A	3	3729 VA / 3729 VA			3	40 A	EF-2		2
3	--	--	--	--		3729 VA / 3729 VA		--	--	--	--	4
5	--	--	--	--			3729 VA / 3729 VA	--	--	--	--	6
7		EF-2	40 A	3	3729 VA / 3729 VA			3	40 A	EF-2		8
9	--	--	--	--		3729 VA / 3729 VA		--	--	--	--	10
11	--	--	--	--			3729 VA / 3729 VA	--	--	--	--	12
13		EF-2	40 A	3	3729 VA / 0 VA							14
15	--	--	--	--		3729 VA / 0 VA						16
17	--	--	--	--			3729 VA / 0 VA					18
				Total Load:	18643 VA	18643 VA	18643 VA					
				Total Amps:	67 A	67 A	67 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
HVAC	0 VA	0.00%	0 VA		
Motor	11186 VA	125.00%	13982 VA	Total Connected Load:	55928 VA
Equip.	44742 VA	100.00%	44742 VA	Total Estimated Demand:	58724 VA
				Total Connected Current.:	67 A
				Total Est. Demand Current:	71 A

Notes:

PANEL ID: RP-6A1

PANEL DESCRIPTION

Location:
Supply From: T-6A
Mounting: SURFACE
Enclosure: NEMA 1
Voltage: 208/120 Wye
Phase: 3
Wires: 4
No. of Poles: 84
A.I.C. Rating: 10K
Mains Type: MAIN BREAKER
MCB Rating: 225 A
Bussing: COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		RECEPT TOUCHDOWN 621	20 A	1	1080 VA / 700 VA			1	20 A	RECEPT Room 605, 606, 690.07		2
3		RECEPT TOUCHDOWN 620	20 A	1		900 VA / 720 VA		1	20 A	RECEPT Room 602, 604		4
5		RECEPT LECTURE 601	20 A	1			720 VA / 720 VA	1	20 A	RECEPT Room 690.08, 690.07		6
7		RECEPT LECTURE 601	20 A	1	720 VA / 500 VA			1	20 A	MECHANICAL CONTROLS		8
9		RECEPT LECTURE 601	20 A	1		720 VA / 360 VA		1	20 A	RECEPT LECTURE 601		10
11		Equip. LECTURE 601	20 A	1			1200 VA / 180 VA	1	20 A	EWC CORRIDOR 690.03		12
13		RECEPT Room 690.01, 690.03	20 A	1	1080 VA / 180 VA			1	20 A	RECEPT Room 690.03, 690.01		14
15		RECEPT CORRIDOR 690.10	20 A	1		720 VA / 900 VA		1	20 A	RECEPT CORRIDOR 690.03		16
17		MECHANICAL CONTROLS	20 A	1			500 VA / 360 VA	1	20 A	PROJECTOR ROOM 614		18
19		PROJECTOR 615	20 A	1	1000 VA / 860 VA			1	20 A	RECEPT LECTURE 601		20
21		FURNITURE COMPUTER LAB 615	20 A	1		1080 VA / 1080 VA		1	20 A	RECEPT COMPUTER LAB 615		22
23		FURNITURE COMPUTER LAB 615	20 A	1			1080 VA / 360 VA	1	20 A	RECEPT COMPUTER LAB 615		24
25		FURNITURE COMPUTER LAB 615	20 A	1	0 VA / 1200 VA			1	20 A	Equip. COMPUTER LAB 615		26
27		FURNITURE LECTURE 601	20 A	1		1080 VA / 0 VA		1	0 A	Spare		28
29		FURNITURE LECTURE 601	20 A	1			900 VA / 0 VA	1	0 A	Spare		30
31		FURNITURE LECTURE 601	20 A	1	1080 VA / 0 VA			1	0 A	Spare		32
33		Spare	20 A	1		0 VA / 0 VA		1	0 A	Spare		34
35		Spare	20 A	1			0 VA / 0 VA	1	0 A	Spare		36
37		Spare	20 A	1	0 VA / 0 VA			1	0 A	Spare		38
39		Spare	20 A	1		0 VA / 0 VA		1	0 A	Spare		40
41		Spare	20 A	1			0 VA / 0 VA	1	0 A	Spare		42
43		Spare	20 A	1	0 VA / 0 VA			1	0 A	Spare		44
45		Spare	20 A	1		0 VA / 0 VA						46
47		Spare	20 A	1			0 VA / 0 VA					48
49	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	50
51	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	52
53	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	54
55	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	56
57	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	58
59	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	60
61	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	62
63	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	64
65	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	66
67	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	68
69	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	70
71	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	72
73	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	74
75	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	76
77	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	78
79		RP-610A	150 A	3	4980 VA / 0 VA			--	--	Space	--	80
81	--	--	--	--		7600 VA / 0 VA		--	--	Space	--	82
83	--	--	--	--			4980 VA / 0 VA	--	--	Space	--	84
				Total Load:	13380 VA	15160 VA	11000 VA					
				Total Amps:	115 A	129 A	92 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Power	5220 VA	100.00%	5220 VA		
RECEPT	20040 VA	74.95%	15020 VA	Total Connected Load:	39540 VA
Equip.	14280 VA	100.00%	14280 VA	Total Estimated Demand:	34520 VA
				Total Connected Current.:	110 A
				Total Est. Demand Current:	96 A

Notes:

PANEL ID: RP-710A

PANEL DESCRIPTION

Location: PREP & STORAGE 710
Supply From: RP-7A1
Mounting: SURFACE
Enclosure: NEMA 1
Voltage: 208/120 Wye
Phase: 3
Wires: 4
No. of Poles: 42
A.I.C. Rating: 10K
Mains Type: MAIN LUGS ONLY
Mains Rating: 150 A
Bussing: COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		RECEPT PREP & STORAGE 710	20 A	1	360 VA / 0 VA							2
3		RECEPT PREP & STORAGE 710	20 A	1		360 VA / 0 VA						4
5		Equip. PREP & STORAGE 710	20 A	2			1200 VA / 1360 VA	1	20 A	RECEPT DRY LAB PLAN 708		6
7	--	--	--	--	1200 VA / 540 VA			1	20 A	RECEPT DRY LAB PLAN 708		8
9		RECEPT Room 710, 708	20 A	1		900 VA / 1440 VA		1	20 A	OSC DRY LAB PLAN 708		10
11		OSC DRY LAB PLAN 708	20 A	1			1440 VA / 1440 VA	1	20 A	OSC DRY LAB PLAN 708		12
13		OSC DRY LAB PLAN 708	20 A	1	1440 VA / 1440 VA			1	20 A	OSC DRY LAB PLAN 708		14
15		BENCH DRY LAB PLAN 708	20 A	1		1440 VA / 1440 VA		1	20 A	OSC DRY LAB PLAN 708		16
17		OSC DRY LAB PLAN 708	20 A	1			1440 VA / 1200 VA	1	20 A	Equip. DRY LAB PLAN 708		18
19		OSC DRY LAB PLAN 708	20 A	1	1440 VA / 360 VA			1	20 A	RECEPT DRY LAB PLAN 708		20
21		BENCH DRY LAB PLAN 708	20 A	1		1440 VA / 0 VA						22
23		BENCH DRY LAB PLAN 708	20 A	1			1440 VA / 0 VA	1	20 A	Spare		24
25		RECEPT DRY LAB PLAN 708	20 A	1	1360 VA / 0 VA			1	20 A	Spare		26
27		RECEPT DRY LAB PLAN 708	20 A	1		540 VA / 0 VA		1	20 A	Spare		28
29		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		30
31		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		32
33		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		34
35		Spare	20 A	1			0 VA / 0 VA					36
37		Spare	20 A	1	0 VA / 0 VA							38
39												40
41												42
				Total Load:	8140 VA	7560 VA	9520 VA					
				Total Amps:	69 A	63 A	80 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
RECEPT	3780 VA	100.00%	3780 VA		
Equip.	21440 VA	100.00%	21440 VA	Total Connected Load:	25220 VA
				Total Estimated Demand:	25220 VA
				Total Connected Current.:	70 A
				Total Est. Demand Current:	70 A

Notes:

PANEL ID: PP-MP

PANEL DESCRIPTION

A2

Location: PENTHOUSE 800
Supply From: PDP1
Mounting: SURFACE
Enclosure: NEMA 1
Voltage: 480/277 Wye
Phase: 3
Wires: 4
No. of Poles: 30
A.I.C. Rating: 18K
Mains Type: MAIN LUGS ONLY
Mains Rating: 225 A
Bussing: COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		HRP-2	15 A	3	2033 VA / 2033 VA			3	15 A	HRP-1		2
3	--	--	--	--		2033 VA / 2033 VA		--	--	--	--	4
5	--	--	--	--			2033 VA / 2033 VA	--	--	--	--	6
7		AHU-3	45 A	3	10047 VA / 8580 VA			3	60 A	AHU-3 RETURN		8
9	--	--	--	--		10047 VA / 8580 VA		--	--	--	--	10
11	--	--	--	--			10047 VA / 8580 VA	--	--	--	--	12
13		CP-3	15 A	3	567 VA / 0 VA			3	60 A	Spare		14
15	--	--	--	--		567 VA / 0 VA		--	--	--	--	16
17	--	--	--	--			567 VA / 0 VA	--	--	--	--	18
19		Spare	30 A	3	0 VA / 0 VA							20
21	--	--	--	--		0 VA / 0 VA						22
23	--	--	--	--			0 VA / 0 VA					24
25												26
27												28
29												30
				Total Load:	23260 VA	23260 VA	23260 VA					
				Total Amps:	84 A	84 A	84 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
HVAC	39640 VA	100.00%	39640 VA		
Motor	30140 VA	125.00%	37675 VA	Total Connected Load:	69780 VA
Equip.	0 VA	0.00%	0 VA	Total Estimated Demand:	77315 VA
				Total Connected Current.:	84 A
				Total Est. Demand Current:	93 A

Notes:

PANEL ID: RP-610A

PANEL DESCRIPTION

Location: STORAGE 610
Supply From: RP-6A1
Mounting: SURFACE
Enclosure: NEMA 1
Voltage: 208/120 Wye
Phase: 3
Wires: 4
No. of Poles: 42
A.I.C. Rating: 10K
Mains Type: MAIN LUGS ONLY
Mains Rating: 150 A
Bussing: COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		RECEPT Room 608, 610	20 A	1	540 VA / 360 VA			1	20 A	Equip. DRY LAB 608		2
3		Equip. DRY LAB 608	20 A	1		1440 VA / 1200 VA		1	20 A	Equip. DRY LAB 608		4
5		Equip. DRY LAB 608	20 A	1			1440 VA / 0 VA	1	20 A	HOOD DRY LAB 608		6
7		OSC DRY LAB 608	20 A	1	1440 VA / 0 VA			1	20 A	BENCH DRY LAB 608		8
9		OSC DRY LAB 608	20 A	1		1440 VA / 180 VA		1	20 A	CORD RECEPT DRY LAB 612		10
11		BENCH DRY LAB 608	20 A	1			0 VA / 180 VA	1	20 A	CORD RECEPT DRY LAB 612		12
13		BENCH DRY LAB 608	20 A	1	0 VA / 180 VA			1	20 A	CORD RECEPT DRY LAB 612		14
15		RECEPT DRY LAB 608	20 A	1		1360 VA / 540 VA		1	20 A	RECEPT DRY LAB 612		16
17		RECEPT DRY LAB 608	20 A	1			540 VA / 360 VA	1	20 A	RECEPT DRY LAB 612		18
19		CORD RECEPT DRY LAB 614	20 A	1	180 VA / 180 VA			1	20 A	CORD RECEPT DRY LAB 614		20
21		CORD RECEPT DRY LAB 614	20 A	1		180 VA / 180 VA		1	20 A	CORD RECEPT DRY LAB 614		22
23		RECEPT DRY LAB 614	20 A	1			540 VA / 360 VA	1	20 A	RECEPT DRY LAB 614		24
25		CORD RECEPT DRY LAB 614	20 A	1	180 VA / 720 VA			1	20 A	RECEPT Room 613, 612		26
27		RECEPT Room 614, 613	20 A	1		720 VA / 360 VA		1	20 A	RECEPT DRY LAB 614		28
29		RECEPT DRY LAB 612	20 A	1			360 VA / 1200 VA	1	20 A	Equip. DRY LAB 614		30
31		Equip. DRY LAB 612	20 A	1	1200 VA / 0 VA							32
33		Equip. DRY LAB 614	20 A	1		0 VA / 0 VA		1	20 A	Spare		34
35		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		36
37		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		38
39		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		40
41		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		42
43												44
45												46
47												48
49												50
51												52
53												54
55												56
57												58
59												60
61												62
63												64
65												66
67												68
69												70
71												72
73												74
75												76
77												78
79												80
81												82
83												84
				Total Load:	4980 VA	7600 VA	4980 VA					
				Total Amps:	42 A	63 A	42 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
RECEPT	6840 VA	100.00%	6840 VA		
Equip.	10720 VA	100.00%	10720 VA	Total Connected Load:	17560 VA
				Total Estimated Demand:	17560 VA
				Total Connected Current.:	49 A
				Total Est. Demand Current:	49 A

Notes:

PANEL ID: RP-PH

PANEL DESCRIPTION

Location: PENTHOUSE 800
Supply From: T-PH
Mounting: SURFACE
Enclosure: NEMA 1
Voltage: 208/120 Wye
Phase: 3
Wires: 4
No. of Poles: 30
A.I.C. Rating: 10K
Mains Type: MAIN BREAKER
MCB Rating: 100 A
Bussing: COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		CUH-590.02,09	20 A	1	360 VA / 360 VA			1	20 A	CUH-790.02,09		2
3		RECEPT PENTHOUSE 800	20 A	1		720 VA / 2287 VA		2	30 A	CUH-1		4
5		CUH-2	30 A	2			2287 VA / 2287 VA	--	--	--	--	6
7	--	--	--	--	2287 VA / 2287 VA			2	30 A	CUH-3		8
9		Spare	20 A	1		0 VA / 2287 VA		--	--	--	--	10
11		Spare	20 A	1			0 VA / 720 VA	1	20 A	RECEPT PENTHOUSE 800		12
13		Spare	20 A	1	0 VA / 720 VA			1	20 A	RECEPT PENTHOUSE 800		14
15		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		16
17		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		18
19		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		20
21		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		22
23												24
25												26
27												28
29												30
				Total Load:	6013 VA	5293 VA	5293 VA					
				Total Amps:	50 A	44 A	44 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
HVAC	9146 VA	100.00%	9146 VA		
Heating	720 VA	125.00%	900 VA	Total Connected Load:	16599 VA
Motor	4573 VA	125.00%	5716 VA	Total Estimated Demand:	17922 VA
RECEPT	2160 VA	100.00%	2160 VA	Total Connected Current.:	46 A
Equip.	0 VA	0.00%	0 VA	Total Est. Demand Current:	50 A

Notes:

PANEL ID: DP-SBM2

PANEL DESCRIPTION

Location: PENTHOUSE 800
Supply From: DP-SB
Mounting: SURFACE
Enclosure: NEMA 1
Voltage: 480/277 Wye
Phase: 3
Wires: 4
No. of Poles: 42
A.I.C. Rating: 18K
Mains Type: MAIN LUGS ONLY
MCB Rating: 400 A
Bussing: COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		T-SBPH	25 A	3	2625 VA / 37733 VA			3	175 A	AHU-2		2
3	--	--	--	--		875 VA / 37733 VA		--	--	--	--	4
5	--	--	--	--			1623 VA / 37733 VA	--	--	--	--	6
7		ELEVATOR #1	30 A	3	5820 VA / 2660 VA			3	25 A	AHU-2 RETURN (RF-2)		8
9	--	--	--	--		5820 VA / 2660 VA		--	--	--	--	10
11	--	--	--	--			5820 VA / 2660 VA	--	--	--	--	12
13		ELEVATOR #2	30 A	3	5820 VA / 5820 VA			3	30 A	ELEVATOR #3		14
15	--	--	--	--		5820 VA / 5820 VA		--	--	--	--	16
17	--	--	--	--			5820 VA / 5820 VA	--	--	--	--	18
19		Spare	20 A	3	0 VA / 0 VA			3	60 A	Spare		20
21	--	--	--	--		0 VA / 0 VA		--	--	--	--	22
23	--	--	--	--			0 VA / 0 VA	--	--	--	--	24
25		PNL-EF-2	100 A	3	18643 VA / 0 VA			3	30 A	Spare		26
27	--	--	--	--		18643 VA / 0 VA		--	--	--	--	28
29	--	--	--	--			18643 VA / 0 VA	--	--	--	--	30
31		Spare	15 A	3	0 VA / 0 VA			1	20 A	Spare		32
33	--	--	--	--		0 VA / 0 VA		1	20 A	--		34
35	--	--	--	--			0 VA / 0 VA	1	20 A	--		36
37	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	38
39	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	40
41	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	42
				Total Load:	79121 VA	77371 VA	78119 VA					
				Total Amps:	286 A	279 A	282 A					

A2

A2

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
HVAC	11853 VA	100.00%	11853 VA		
Motor	113200 VA	125.00%	141500 VA	Total Connected Load:	234610 VA
Equip.	109558 VA	100.00%	109558 VA	Total Estimated Demand:	262910 VA
				Total Connected Current.:	282 A
				Total Est. Demand Current:	316 A

Notes:

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/22/2019	ADDENDUM NO. 2	5
05/06/2019	TEST AND BALANCE BID	

This drawing has been prepared solely for the use of the Owner and there are no representations of any kind made by NORR to any party with whom NORR has not entered into a contract.

This drawing shall not be used for construction purposes until the seal appearing hereon is signed and dated by the Architect or Engineer.

Key Plan

Consultants

Civil:	FTC&H
Landscape:	TBD
Architecture:	NORR
Structural:	FTC&H
Mechanical:	FTC&H
Electrical:	FTC&H
Lab Design:	NORR

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Project
STEM Innovation
Learning Center
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DETROIT, MI 48202

Drawing Title
PANELBOARD SCHEDULES

Scale

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
E60-05

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PP-SBM1

Location: MECHANICAL EQUIPMENT ROOM .35 **Supply From:** DP-SB **Mounting:** SURFACE **Enclosure:** NEMA 1
Voltage: 480/277 Wye **Phase:** 3 **Wires:** 4 **No. of Poles:** 30
A.I.C. Rating: 18K **Mains Type:** MAIN LUGS ONLY **Mains Rating:** 100 A **Bussing:** COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		HP-1	25 A	3	3733 VA / 3733 VA			3	25 A	HP-2		2
3	--	--	--	--		3733 VA / 3733 VA		--	--	--	--	4
5	--	--	--	--			3733 VA / 3733 VA	--	--	--	--	6
7		Spare	20 A	1	0 VA / 0 VA			3	30 A	Spare		8
9		Spare	20 A	1		0 VA / 0 VA		--	--	--	--	10
11		Spare	20 A	1			0 VA / 0 VA	--	--	--	--	12
13												14
15												16
17												18
19												20
21												22
23												24
25												26
27												28
29												30
		Total Load:			7467 VA	7467 VA	7467 VA					
		Total Amps:			27 A	27 A	27 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Motor	11200 VA	125.00%	14000 VA		
Equip.	11200 VA	100.00%	11200 VA	**Total Connected Load:**	22400 VA
				Total Estimated Demand:	25200 VA
				Total Connected Current.:	27 A
				Total Est. Demand Current:	30 A

Notes:

RP-SBA

Location: MECHANICAL EQUIPMENT ROOM .35 **Supply From:** T-SBA **Mounting:** SURFACE **Enclosure:** NEMA 1
Voltage: 208/120 Wye **Phase:** 3 **Wires:** 4 **No. of Poles:** 30
A.I.C. Rating: 10K **Mains Type:** MAIN BREAKER **MCB Rating:** 100 A **Bussing:** COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		B-1	20 A	3	400 VA / 400 VA			3	20 A	B-2		2
3	--	--	--	--		400 VA / 400 VA		--	--	--	--	4
5	--	--	--	--			400 VA / 400 VA	--	--	--	--	6
7		BP-1	20 A	1	672 VA / 672 VA			1	20 A	BP-2		8
9		RECEPT FIRE COMMAND CENTE...	20 A	1		900 VA / 948 VA		1	20 A	Heating MECHANICAL EQUIPMEN...		10
11		Heating	20 A	1			948 VA / 672 VA	1	20 A	Heating		12
13		GLYCOL TANK	20 A	1	672 VA / 373 VA			1	20 A	HVAC MECHANICAL EQUIPMENT...		14
15												16
17												18
19												20
21												22
23												24
25												26
27												28
29												30
31												32
33												34
35												36
37												38
39												40
41												42
		Total Load:			3189 VA	2648 VA	2420 VA					
		Total Amps:			27 A	22 A	20 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
HVAC	373 VA	100.00%	373 VA		
Motor	1200 VA	125.00%	1500 VA	**Total Connected Load:**	8257 VA
RECEPT	900 VA	100.00%	900 VA	**Total Estimated Demand:**	8557 VA
Equip.	5784 VA	100.00%	5784 VA	**Total Connected Current.:**	23 A
				Total Est. Demand Current:	24 A

Notes:

RP-SBIT

Location: COMM/IT 039 **Supply From:** T-SBIT **Mounting:** SURFACE **Enclosure:** NEMA 1
Voltage: 208/120 Wye **Phase:** 3 **Wires:** 4 **No. of Poles:** 42
A.I.C. Rating: 10K **Mains Type:** MAIN LUGS ONLY **MCB Rating:** 150 A **Bussing:** COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		COMM / IT 203	30 A	2	1250 VA / 1250 VA			2	20 A	COMM/IT 103		2
3	--	--	--	--		1250 VA / 1250 VA		--	--	--	--	4
5		RECEPT COMM / IT 203	20 A	1			180 VA / 1500 VA	1	20 A	RECEPT COMM/IT 103		6
7		RECEPT COMM / IT 203	20 A	1	720 VA / 720 VA			1	20 A	RECEPT COMM/IT 103		8
9		COMM / IT 403	20 A	2		1250 VA / 1250 VA		2	20 A	COMM / IT 303		10
11	--	--	--	--			1250 VA / 1250 VA	--	--	--	--	12
13		RECEPT COMM / IT 403	20 A	1	180 VA / 180 VA			1	20 A	RECEPT COMM / IT 303		14
15		RECEPT COMM / IT 403	20 A	1		720 VA / 720 VA		1	20 A	RECEPT COMM / IT 303		16
17		COMM/IT 603	20 A	2			1250 VA / 1250 VA	2	20 A	COMM/IT 503		18
19	--	--	--	--	1250 VA / 1250 VA			--	--	--	--	20
21		RECEPT COMM/IT 603	20 A	1		180 VA / 180 VA		1	20 A	RECEPT COMM/IT 503		22
23		RECEPT COMM/IT 603	20 A	1			720 VA / 720 VA	1	20 A	RECEPT COMM/IT 503		24
25		RECEPT COMM / IT 703	20 A	1	1500 VA / 1250 VA			2	20 A	COMM / IT 703		26
27		RECEPT COMM / IT 703	20 A	1		720 VA / 1250 VA		--	--	--	--	28
29		RECEPT COMM/IT 039	20 A	1			900 VA / 1250 VA	2	20 A	Equip. COMM/IT 039		30
31		Equip. COMM/IT 039	20 A	2	1250 VA / 1250 VA			--	--	--	--	32
33	--	--	--	--		1250 VA / 0 VA						34
35												36
37												38
39												40
41												42
		Total Load:			12050 VA	10020 VA	10270 VA					
		Total Amps:			101 A	84 A	86 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
RECEPT	9840 VA	100.00%	9840 VA		
Equip.	22500 VA	100.00%	22500 VA	**Total Connected Load:**	32340 VA
				Total Estimated Demand:	32340 VA
				Total Connected Current.:	90 A
				Total Est. Demand Current:	90 A

Notes:

RP-1SBA

Location: ELEC 102 **Supply From:** T-1SBA **Mounting:** SURFACE **Enclosure:** NEMA 1
Voltage: 208/120 Wye **Phase:** 3 **Wires:** 4 **No. of Poles:** 42
A.I.C. Rating: 10K **Mains Type:** MAIN BREAKER **Mains Rating:** 225 A **Bussing:** COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1					0 VA / 375 VA			1	20 A	DUCT DETECTORS		2
3		DUCT DETECTORS 206, 202	20 A	1		225 VA / 1080 VA		1	20 A	Equip.		4
5		Equip. VEST. 190.12	20 A	1			1080 VA / 0 VA					6
7												8
9												10
11												12
13												14
15												16
17												18
19												20
21												22
23												24
25												26
27												28
29												30
31												32
33												34
35												36
37												38
39												40
41												42
		Total Load:			375 VA	1305 VA	1080 VA					
		Total Amps:			3 A	12 A	10 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Equip.	2760 VA	100.00%	2760 VA		
				Total Connected Load:	2760 VA
				Total Estimated Demand:	2760 VA
				Total Connected Current.:	8 A
				Total Est. Demand Current:	8 A

Notes:

RP-SBPH

Location: PENTHOUSE 800 **Supply From:** T-SBPH **Mounting:** SURFACE **Enclosure:** NEMA 1
Voltage: 208/120 Wye **Phase:** 3 **Wires:** 4 **No. of Poles:** 18
A.I.C. Rating: 10K **Mains Type:** MAIN BREAKER **MCB Rating:** 60 A **Bussing:** COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		TCP-2	20 A	1	500 VA / 375 VA			1	20 A	SMOKE DAMPERS 712, 702, 706		2
3		TCP-3	20 A	1		500 VA / 375 VA		1	20 A	SMOKE DAMPERS 612, 602, 606		4
5		CP-2	20 A	2			1250 VA / 373 VA	1	20 A	GLYCOL TANK		6
7	--	--	--	--	1250 VA / 500 VA			1	20 A	Equip. PENTHOUSE 800		8
9		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		10
11		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		12
13		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		14
15		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		16
17		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		18
19												20
21												22
23												24
25												26
27												28
29												30
		Total Load:			2625 VA	875 VA	1623 VA					
		Total Amps:			23 A	7 A	14 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
HVAC	1373 VA	100.00%	1373 VA		
Motor	2500 VA	125.00%	3125 VA	**Total Connected Load:**	5123 VA
Equip.	1250 VA	100.00%	1250 VA	**Total Estimated Demand:**	5748 VA
				Total Connected Current.:	14 A
				Total Est. Demand Current:	16 A

Notes:

LP-LSB

Location: EMERGENCY ELEC ROOM 002 **Supply From:** SWBD **Mounting:** SURFACE **Enclosure:** NEMA 1
Voltage: 480/277 Wye **Phase:** 3 **Wires:** 4 **No. of Poles:** 30
A.I.C. Rating: 18K **Mains Type:** MAIN LUGS ONLY **Mains Rating:** 100 A **Bussing:** COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		2
3		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		4
5		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		6
7		LP-LS1	60 A	3	5112 VA / 594 VA			1	20 A	MECHANICAL EQUIP RM LTG		8
9	--	--	--	--		2233 VA / 49 VA		1	20 A	BASEMENT STAIR LTG		10
11	--	--	--	--			2221 VA / 0 VA					12
13		NORTH STAIRS LTG	20 A	1	570 VA / 1000 VA			3	25 A	T-LPA		14
15		WEST STAIRS LTG	20 A	1		684 VA / 1425 VA		--	--	--	--	16
17		EAST STAIRS LTG	20 A	1			266 VA / 450 VA	--	--	--	--	18
19		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		20
21		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		22
23		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		24
25		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		26
27		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		28
29		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		30
		Total Load:			7277 VA	4391 VA	2937 VA					
		Total Amps:			27 A	17 A	11 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Other	290 VA	100.00%	290 VA		
Lighting	11439 VA	125.00%	14299 VA	**Total Connected Load:**	14604 VA
Equip.	2875 VA	100.00%	2875 VA	**Total Estimated Demand:**	17464 VA
				Total Connected Current.:	18 A
				Total Est. Demand Current:	21 A

Notes:

LP-LS1

Location: ELEC 102 **Supply From:** LP-LSB **Mounting:** SURFACE **Enclosure:** NEMA 1
Voltage: 480/277 Wye **Phase:** 3 **Wires:** 4 **No. of Poles:** 18
A.I.C. Rating: 18K **Mains Type:** MAIN LUGS ONLY **Mains Rating:** 100 A **Bussing:** COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		1st FLOOR LTG	20 A	1	1420 VA / 1096 VA			1	20 A	2nd FLOOR LTG		2
3		BASEMENT LTG	20 A	1		741 VA / 914 VA		1	20 A	BASEMENT EAST LTG		4
5		LP-LS4 (LP-LS7)	60 A	3			2095 VA / 126 VA	1	20 A	GENERATOR COURT YARD		6
7	--	--	--	--	2597 VA / 0 VA			1	20 A	Spare		8
9	--	--	--	--		578 VA / 0 VA		1	20 A	Spare		10
11		Spare	20 A	1			0 VA / 0 VA	1	0 A	Spare		12
13		Spare	20 A	1	0 VA / 0 VA			1	0 A	Spare		14
15		Spare	20 A	1		0 VA / 0 VA		1	0 A	Spare		16
17		Spare	0 A	1			0 VA / 0 VA	1	0 A	Spare		18
		Total Load:			5112 VA	2233 VA	2221 VA					
		Total Amps:			18 A	8 A	8 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Other	290 VA	100.00%	290 VA		
Lighting	9276 VA	125.00%	11595 VA	**Total Connected Load:**	9566 VA
				Total Estimated Demand:	11885 VA
				Total Connected Current.:	12 A
				Total Est. Demand Current:	14 A

Notes:

LP-LS7

Location: ELEC. 702 **Supply From:** LP-LS4 **Mounting:** SURFACE **Enclosure:** NEMA 1
Voltage: 480/277 Wye **Phase:** 3 **Wires:** 4 **No. of Poles:** 18
A.I.C. Rating: 18K **Mains Type:** MAIN LUGS ONLY **Mains Rating:** 100 A **Bussing:** COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		6th FLOOR LTG	20 A	1	1027 VA / 579 VA			1	20 A	7th FLOOR LTG		2
3		PENTHOUSE LTG	20 A	1		578 VA / 0 VA		1	20 A	Spare		4
5		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		6
7		Spare	20 A	1	0 VA / 0 VA			1	20 A	Spare		8
9		Spare	20 A	1		0 VA / 0 VA		--	--	Space	--	10
11	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	12
13	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	14
15	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	16
17	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	18
		Total Load:			1607 VA	578 VA	0 VA					
		Total Amps:			6 A	2 A	0 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Other	116 VA	100.00%	116 VA		
Lighting	2068 VA	125.00%	2585 VA	**Total Connected Load:**	2184 VA
				Total Estimated Demand:	2701 VA
				Total Connected Current.:	3 A
				Total Est. Demand Current:	3 A

Notes:

RP-LS4

Location: ELEC. 402 **Supply From:** RP-LSB1 **Mounting:** SURFACE **Enclosure:** NEMA 1
Voltage: 208/120 Wye **Phase:** 3 **Wires:** 4 **No. of Poles:** 18
A.I.C. Rating: 10K **Mains Type:** MAIN BREAKER **MCB Rating:** 30 A **Bussing:** COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		DUCT DETECTORS 512, 506, 502	20 A	1	375 VA / 225 VA			1	20 A	DUCT DETECTORS 412, 402, 406		2
3		DUCT DETECTORS 212, 202, 206	20 A	1		225 VA / 0 VA						4
5												6
7												8
9												10
11												12
13												14
15												16
17												18
		Total Load:			600 VA	225 VA	0 VA					
		Total Amps:			5 A	2 A	0 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Equip.	825 VA	100.00%	825 VA		
				Total Connected Load:	825 VA
				Total Estimated Demand:	825 VA
				Total Connected Current.:	2 A
				Total Est. Demand Current:	2 A

Notes:

PNL-EF-2

Location: PENTHOUSE 800 **Supply From:** DP-SBM2 **Mounting:** SURFACE **Enclosure:** NEMA 1
Voltage: 480/277 Wye **Phase:** 3 **Wires:** 4 **No. of Poles:** 18
A.I.C. Rating: 18K **Mains Type:** MAIN BREAKER **MCB Rating:** 200 A **Bussing:** COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		EF-2	40 A	3	3729 VA / 3729 VA			3	40 A	EF-2		2
3	--	--	--	--		3729 VA / 3729 VA		--	--	--	--	4
5	--	--	--	--			3729 VA / 3729 VA	--	--	--	--	6
7	3	EF-2	40 A	3	3729 VA / 3729 VA			3	40 A	EF-2		8
9	--	--	--	--		3729 VA / 3729 VA		--	--	--	--	10
11	--	--	--	--			3729 VA / 3729 VA	--	--	--	--	12
13	3	EF-2	40 A	3	3729 VA / 0 VA							14
15	--	--	--	--		3729 VA / 0 VA						16
17	--	--	--	--			3729 VA / 0 VA					18
		Total Load:			18643 VA	18643 VA	18643 VA					
		Total Amps:			67 A	67 A	67 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
HVAC	0 VA	0.00%	0 VA		
Motor	11186 VA	125.00%	13982 VA	**Total Connected Load:**	55928 VA
Equip.	44742 VA	100.00%	44742 VA	**Total Estimated Demand:**	58724 VA
				Total Connected Current.:	67 A
				Total Est. Demand Current:	71 A

Notes:

RP-LSB1

Location: EMERGENCY ELEC ROOM 002 **Supply From:** T-LS **Mounting:** SURFACE **Enclosure:** NEMA 1
Voltage: 208/120 Wye **Phase:** 3 **Wires:** 4 **No. of Poles:** 18
A.I.C. Rating: 10K **Mains Type:** MAIN BREAKER **MCB Rating:** 50 A **Bussing:** COPPER

CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		RP-LS4	20 A	3	600 VA / 400 VA			1	20 A	Equip.		2
3	--	--	--	--		225 VA / 1200 VA		1	20 A	Equip. FIRE COMMAND CENTER 121		4
5	--	--	--	--			0 VA / 450 VA	1	20 A	DUCT DETECTORS		6
7		Spare	20 A	1	0 VA / 0 VA							8
9		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		10
11		Spare	20 A	1			0 VA / 0 VA	1	20 A	Spare		12
13	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	14
15	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	16
17	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	18
		Total Load:			1000 VA	1425 VA	450 VA					
		Total Amps:			9 A	13 A	4 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Equip.	2875 VA	100.00%	2875 VA		
				Total Connected Load:	2875 VA
				Total Estimated Demand:	2875 VA
				Total Connected Current.:	8 A
				Total Est. Demand Current:	8 A

Notes:

LP-LS4

Location: ELEC. 402 **Supply From:** LP-LS1 **Mounting:** SURFACE **Enclosure:** NEMA 1
Voltage: 480/277 Wye **Phase:** 3 **Wires:** 4 **No. of Poles:** 30
A.I.C. Rating: 18K **Mains Type:** MAIN BREAKER **Mains Rating:** 30 A **Bussing:** COPPER

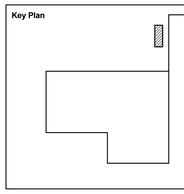
CKT	Rev. No.	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	Rev. No.	CKT
1		3rd FLOOR LTG	20 A	1	1002 VA / 1093 VA			1	20 A	4th FLOOR LTG		2
3		5th FLOOR LTG	20 A	1		990 VA / 1607 VA		3	30 A	LP-LS7		4
5		Spare	20 A	1			0 VA / 578 VA	--	--	--	--	6
7		Spare	20 A	1	0 VA / 0 VA			--	--	--	--	8
9		Spare	20 A	1		0 VA / 0 VA		1	20 A	Spare		10
11	--	Space	--	--			0 VA / 0 VA	1	20 A	Spare		12
13	--	Space	--	--	0 VA / 0 VA			--	--	Space	--	14
15	--	Space	--	--		0 VA / 0 VA		--	--	Space	--	16
17	--	Space	--	--			0 VA / 0 VA	--	--	Space	--	18
		Total Load:			2095 VA	2597 VA	578 VA					
		Total Amps:			8 A	10 A	2 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Other	290 VA	100.00%	290 VA		
Lighting	4979 VA	125.00%	6224 VA	**Total Connected Load:**	5269 VA
				Total Estimated Demand:	6514 VA
				Total Connected Current.:	6 A
				Total Est. Demand Current:	8 A

Notes:

DATE	ISSUED FOR	REV
12/21/2018	100% CD PACKAGE	3
01/22/2019	ADDENDUM NO. 2	5
05/06/2019	TEST AND BALANCE BID	

Key Plan



Consultants

Civil: FTC&H
Landscape: TBD
Architecture: NORR
Structural: FTC&H
Mechanical: FTC&H
Electrical: FTC&H
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Drawing Title
PANELBOARD SCHEDULES

Scale

Project No. JCDT17-0231 (FTCH 180050)

Drawing No.
E60-06

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