

# Wayne State University

CHEMISTRY LABORATORY 150 MODIFICATION CHEMISTRY BUILDING

PROJECT NO. 007-286023

ISSUE: BID ISSUE 11-23-2016

OWNER: WAYNE STATE UNIVERSITY

Design & Construction Services

5454 Cass Avenue Detroit, Michigan 48202

PROJECT Chemistry Building Room No. 150

5101 Cass Avenue

Detroit, Michigan 48202

ARCHITECT: iDesign Solutions

2531 Ridge Road, Suite 100

White Lake, MI 48383 Tel: 248.440.7310

www.iDesign-Solutions.info

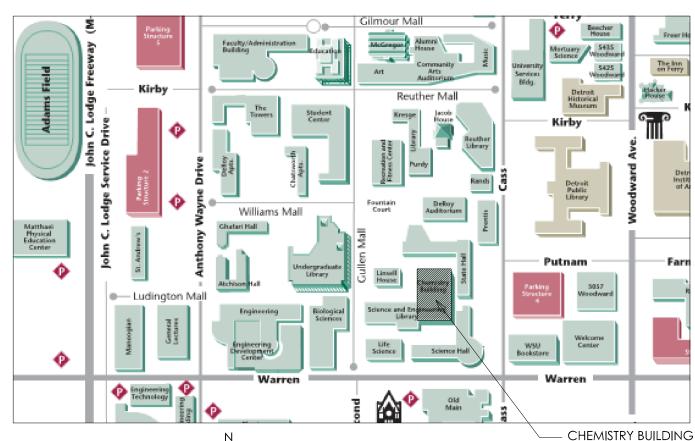
MECH / ELECT ENGINEER:

MAEngineering 200 E. Brown Street Birmingham, MI 48009 Tel: 248.258.1610

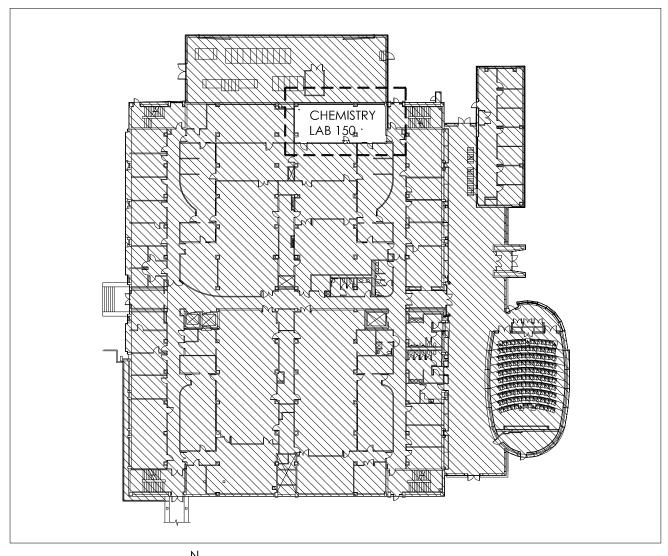
www.ma-engineering.com

Alternate No. 1: Provide a stacked Vacuum pump cabinet for (4) vacuum pumps. See Laboratory Equipment Plan Sheet A201, Elevation 5 Sheet A301, Detail Sheet 402 and Specification 12 36 53.13 PAINTED METAL LABORATORY CASEWORK Sheet G-04.

Alternate No. 2: Paint all walls and Gypsum Board ceiling soffit in Chemistry Lab150. See Finish Schedule Sheet A401 and Specification 09 91 00 PAINTS on Sheet G-02.



Vicinity Map - Not to Scale



1st Floor Chemistry Building Location Map - Not to Scale

#### **DRAWING INDEX**

#### <u>Sheet #</u> <u>Sheet Title</u> **COVER SHEET** LIFE SAFETY PLAN AND CODE REVIEW ARCHITECTURAL SPECIFICATIONS ARCHITECTURAL SPECIFICATIONS ARCHITECTURAL SPECIFICATIONS - ALTERNATE ARCHITECTURAL DRAWINGS PARTIAL 1ST FLOOR DEMO PLAN AND 1ST FLOOR ARCHITECTURAL PLAN PARTIAL 1ST FLOOR LABORATORY EQUIPMENT PLAN AND PARTIAL 1ST FLOOR REFLECTED CEILING PLAN PARTIAL 1ST FLOOR INTERIOR ELEVATIONS LEGENDS, ARCHITECTURAL SCHEDULES AND DETAILS LABORATORY SCHEDULES AND DETAILS MECHANICAL DRAWINGS MECHANICAL LEGEND & SHEET INDEX MECHANICAL SPECIFICATIONS PARTIAL 1ST FLOOR PLUMBING DEMOLITION PLAN PARTIAL 1ST FLOOR HVAC DEMOITION PLAN PARTIAL 1ST FLOOR PLUMBING NEW WORK PLAN PARTIAL 1ST FLOOR HVAC NEW WORK PLAN MECHANICAL SCHEDULES & DETAILS TEMPERATURE CONTROLS M400 TEMPERATURE CONTROLS

1ST FLOOR CHEMISTRY BUILDING - ELECTRICAL KEY PLAN

PARTIAL 1ST FLOOR ELECTRICAL DEMOLITION PLAN

PARTIAL 1ST FLOOR ELECTRICAL NEW WORK PLAN

#### PROFESSIONAL SEALS

**ELECTRICAL DRAWINGS** 

E-004

E-201

ELECTRICAL LEGEND

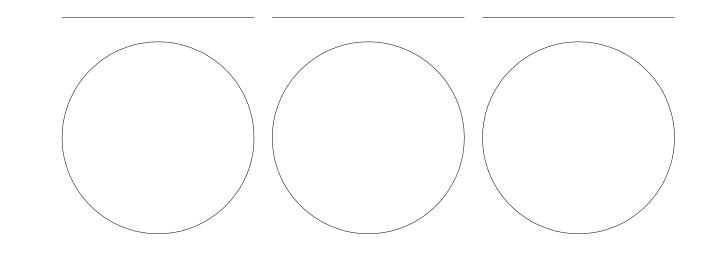
**ELECTRICAL GENERAL NOTES** 

ELECTRICAL RISER DIAGRAM

ELECTRICAL PANEL SCHEDULE

**ELECTRICAL SPECIFICATIONS -**

ELECTRICAL SPECIFICATIONS - 2



## WAYNE STATE UNIVERSITY

5454 Cass Avenue, Detroit, MI 48202

Project Location:

WAYNE STATE UNIVERSITY
CHEMISTRY BUILDING
5101 CASS AVENUE
DETROIT MICHIGAN 48202

CONTACT: ASHLEY FLINTOFF



### iDesign

iDesign Solutions, LLC
Scientific Facilities & Laboratory Design
2531 Ridge Road, Suite 100
White Lake, MI 48383
248-440-7310
info@iDesign-Solutions.info
www.iDesign-Solutions.info



date
10/20/16
10/28/16
11/03/16
11/23/16

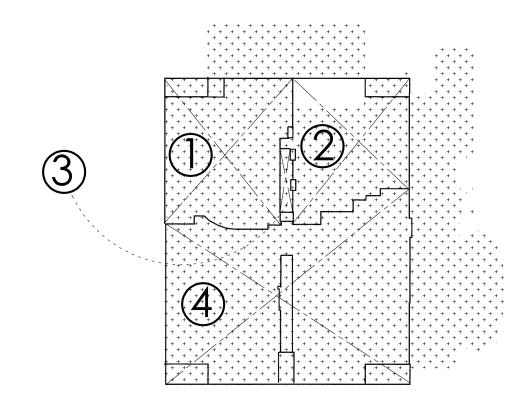


designed by:	LAC
drawn by:	RLB
coordination checked:	RLB
checked:	CTW
approved:	LAC
project:	
CHEMISTRY LAB 150	

project:
CHEMISTRY LAB 150
1st Floor
Modification

sheet title:
Cover Sheet

project number: sheet number: 007-286023 G-00 (1156-7: iDesign project number)





Reference

CODE PLAN LEGEND

NO WORK (NIC)

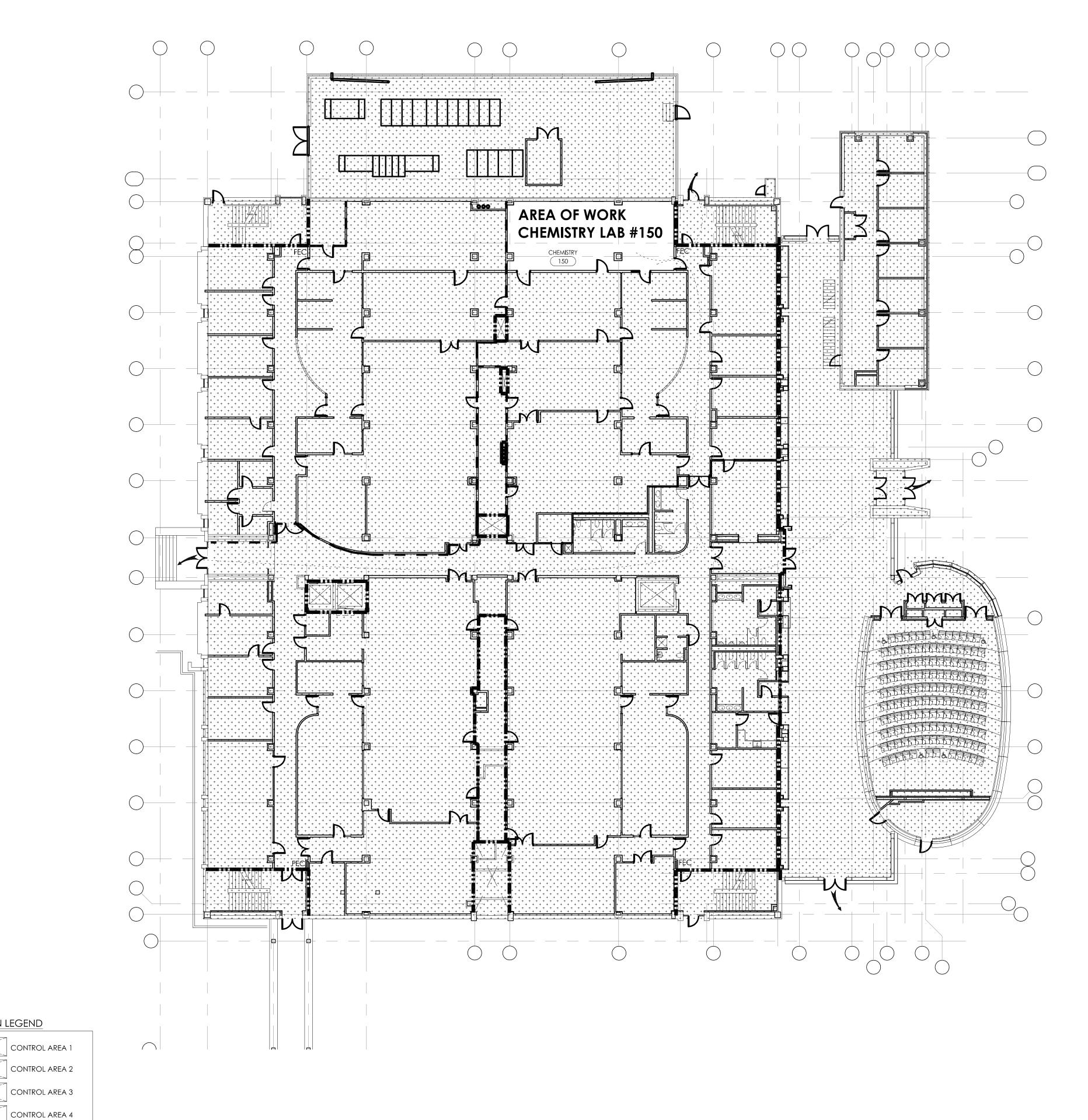
1-HOUR RATED WALL (SEE ARCHITECTURAL)

2-HOUR RATED WALL (SEE ARCHITECTURAL)

**EGRESS ROUTE** 

CODE WORKSHEET
Item

1.	APPLICABLE CODES			
	Michigan Building Code			2012 2012
	Michigan Rehabilitation Building Code Michigan Mechanical Code			2012
	National Electrical Code With Michigan Electrical Code			2012
	Michigan Plumbing Code			2012
	Michigan Uniform Energy Code			2009
	Natl. Fire Protection Assoc. 101 - Life Safety			2012
	ANSI A117.1			2009
. P	Project Description		H 6:1 fl	No a madada a
	The project is for the interior modification of one room totaling Building located on the campus of Wayne State University in The purpose of this project is to modify an existing Chemistry	Detroit Michigan.		·
	the chemistry laboratory.  The room shall be adapted to accommodate the addition of	of (2) new gas cylinder cab	oinets, vacuum pump	cabinet
	(alternate #1), an eye wash, add supporting services and memoves one existing door and includes painting the room a shall continue to utilize existing light fixtures. The demolition is in the Norteast corner. The existing casework and fume hoo emergency shower, general HVAC shall remain in place. The service and equipment exhaust will be modified to support the support the service and equipment exhaust will be modified to support the service and equipment exhaust will be modified to support the support the service and equipment exhaust will be modified to support the service and equipment exhaust will be modified to support the service and equipment exhaust will be modified to support the service and equipment exhaust will be modified to support the service and equipment exhaust will be modified to support the service and exhaust will be modified to support the service and exhaust will be modified to support the service and exhaust will be modified to support the service and exhaust will be modified to support the service and exhaust will be modified to support the service and exhaust will be modified to support the service and exhaust will be modified to support the service and exhaust will be modified to support the service and exhaust will be modified to support the service and exhaust will be modified to support the service and exhaust will be modified to support the service and exhaust will be modified to support the service and exhaust will be modified to support the service and exhaust will be modified to support the service and exhaust will be modified to support the service and exhaust will be modified to support the service and exhaust will be modified to support the service and the serv	is alternate #2. This room has limited to the two interior ds along the perimeter include compressed cylinder gas the new equipment.	nas an existing finished island benches and d luding a sink & fixture ses, house Nitrogen g	d ceiling and a small bench , the as, electrical
	The project does not change the occupancy or use. The wo egress or the building structure.	rk proposed will not alter fi	re separation bound	aries, means d
3. (	Decupancy	Evictic ~	Dravida -	
++	Existing Building - Use Group Business	Existing B	Provided No Change	MBC 304
4. (	Construction Classification	Existing	Provided	
	Type I-B		No Chango	MBC 601
	Fire Suppresion: Partially Supressed (Sprinkler System)		No Change	MBC 601
5.	Allowable Height		15	
	Number of Stories Above Grade	Existing 5	Provided No Change	MBC 503
5. A	Allowable Area		Provided	
	Sub Basement	16,877 sf	No Change	MBC 503
	Basement	35,196 sf	No Change	MBC 503
	First Floor	33,105 sf	No Change	MBC 503
	Second Floor	33,105 sf	No Change	MBC 503 MBC 503
	Third Floor Forth Floor	33,105 sf 33,105 sf	No Change No Change	MBC 503
	Penthouse Floor	11,111 sf	No Change	MBC 503
	Total Area	195,604 sf	No Change	MBC 503
7.	Occupant Load			
	First Floor	Existing 331 (Existing)	Provided No Change	MBC1004.1.
3. E	gress	Existing	Provided	
	Egress Stairs (not req'd to be enclosed)	4 existing	No Change	MBC 1009.3
9. N	Number of Exits and Exit Access	,	,	
	First floor - number of exits	Required 4 (Existing)	Provided No Change	MBC 1021
O. E	ixit Access Travel Distance			
	Dead End Limit - 50'-0" Max	Actual No Change	Provided No Change	MBC 1016.1
	Travel Distance to Exit - 300'-0" Max (Sprinklered)	No Change	No Change	MBC 1016.1
	Common Path of Travel - 100'-0" Max	No Change	No Change	MBC 1018.4
1. F	ire Protection Systems			
	•	Existing Bldg	Provided n gas cabinet to tie ir	nto evist susta:
++	Automatic Sprinkler System  Portable extinguishers - in Common Corridors	Existing new flan Existing	No CHange	
	Fire Alarm System	Existing	No Change	MBC 903
	Accessibility - New Work			
2. I	Comply with Chapter 11, and Appendix E	Existing Bldg	Provided	AADO OL 11
12.		Compliant	Compliant	MBC Ch 11 ADAAG201
12.		elines Compliant	( :\ampliant	I ADAM IN
12.	Comply with Americans w/ Disabilities Act Accessibility Guide	elines Compliant	Compliant	ADAAG201
		elines Compliant	Compliant	ADAAG201
	Comply with Americans w/ Disabilities Act Accessibility Guide	elines Compliant  Allowable	Provided 4 (no change	MBC 414.2



## NORTH

First Floor Chemistry Building
Life Safety Plan
1/16"=1'-0"

TOTAL AREA TO BE MODIFIED = 933 SQUARE FEET

# WAYNE STATE UNIVERSITY

5454 Cass Avenue, Detroit, MI 48202

Project Location:

WAYNE STATE UNIVERSITY
CHEMISTRY BUILDING
5101 CASS AVENUE
DETROIT MICHIGAN 48202

CONTACT: ASHLEY FLINTOFF



#### iDesign

iDesign Solutions, LLC
Scientific Facilities & Laboratory Design
2531 Ridge Road, Suite 100
White Lake, MI 48383
248-440-7310
info@iDesign-Solutions.info
www.iDesign-Solutions.info



issue:	date
OWNER REVIEW	10/20/
OWNER REVIEW	10/28/
OWNER REVIEW	11/03/
BID AND CONSTRUCTION ISSUE	11/23/



designed by:	LAC
drawn by:	RLB
coordination checked:	RLB
checked:	CTW
approved:	LAC

project:
CHEMISTRY LAB 150
1st Floor
Modification

sheet title: Life Safety Plan and Code Review

project number: sheet number: 007-286023 G-01 (1156-7 : iDesign project number)

#### SECTION 01 40 00 QUALITY REQUIREMENTS

#### PART 1 GENERAL

- Quality Monitoring: Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality. Perform quality control procedures and inspections during installation.
- Standards: Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise
- Tolerances: Monitor fabrication and installation tolerance control of products to produce acceptable high quality Work. Do not permit tolerances to accumulate. Comply with manufacturers' tolerances and installation requirements.
- Reference Standards:
- Wayne State University, Construction Design Standards, Second Revision, September, 2012
- 2. Wayne State University Chemistry Building, building standards.
- 3. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- Manufacturer's Field Services: When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to perform the following as applicable, and to initiate instructions when necessary.
- Observe site conditions.
- 2. Conditions of surfaces, surface preparation and installation.
- Quality of workmanship.
- Start-up of equipment.
- Test, adjust and balance of equipment.
- PART 2 PRODUCTS Not Applicable To This Section

#### PART 3 EXECUTION - Not Applicable To This Section END OF SECTION

#### SECTION 02 41 19.16 SELECTIVE INTERIOR DEMOLITION

#### PART 1 GENERAL

- 1.1 SUMMARY Provide demolition activities. Demolition shall not impact the building structure, building enclosure, building core functions or building egress. Demolition shall be limited to select interior elements,
- utilities and finishes 1.2 SUBMITTALS
- Schedule: Submit for approval selective interior demolition schedule, including schedule and methods for capping utilities to be abandoned and maintaining existing utility service.
- 1.3 QUALITY ASSURANCE

1.4 PROJECT CONDITIONS

demolition.

- Codes and Regulations: Comply with governing codes and regulations. Use experienced workers.
- Occupancy: Immediate areas of work will not be occupied during selective interior demolition. Personnel and students may
- Existing Conditions: No responsibility for buildings and structures to be demolished will be assumed by the Owner. C. Salvage and Storage: Review items slated for demolition, such as
- but not limited to casework, fixtures, etc. with Wayne State University Project Manager to identify salvageable items. Coordinate the removal and storage of salvageable items with WSU Project Manager. PART 2 PRODUCTS 2.1 DEMOLITION APPLICATIONS

occupy adjacent areas. Adjacent areas to remain operational during

#### Demolition:

including noise control.

- Application: Salvage of designated items identified in drawings and by WSU Project Manager. Application: Protection of existing structure and adjacent
- assemblies, finishes and materials. 3. Application: Disconnection, capping, and removal of utilities. 4. Application: Pollution control during building demolition,
- Application: Removal and legal disposal of materials. Salvage: Designated items.
- Utilities: Interruption, capping or removal as applicable. 8. Hazardous Materials: Not known to be present.

#### PART 3 EXECUTION 3.1 SELECTIVE DEMOLITION

A. Demolition Operations: Do not damage existing building elements and improvements indicated to remain. Items of salvage value, not included on schedule of salvage items to be returned to Owner/WSU, shall be removed to a storage facility as identified by the Owner/WSU. Storage or sale of items at project site is prohibited.

Utilities: Locate, identify, disconnect, and seal or cap off utilities

- in buildings to be demolished. Occupied Spaces: Do not close or obstruct streets, walks, drives or other occupied or used spaces or facilities without the written permission of the Owner and the authorities having jurisdiction. Do not interrupt utilities serving occupied or used facilities without the written
- permission of the Owner/WSU and authorities having jurisdiction. If necessary, provide temporary utilities. Operations: Cease operations if public safety or remaining
- structures are endangered. Perform temporary corrective measures until operations can be continued properly. Security: Provide adequate protection against accidental
- trespassing. Secure project after work hours. Restoration: Restore finishes of damaged and patched areas to match existing material and finish.

#### END OF SECTION

#### SECTION 07 84 00 FIRESTOPPING

#### PART 1 GENERAL 1.1 SUMMARY

- Provide firestopping at all penetrations through existing fire-rated wall construction as well as all floor penetrations both above and below the area to be renovated. This include all new work as well as filling in any missing firestopping at penetrations by existing to remain.
- Related Sections include the following: 1. Division 9, Section "Gypsum Board Assemblies".
- 2. Division 22 Plumbing.
- Division 23 Heating Ventilating and Air Conditioning.
- 4. Division 26 Electrical. 1.2 SUBMITTALS
- Product Data: Submit manufacturer's product data and installation instructions for each material and product used.
- Submit for approval test reports. 1.3 QUALITY ASSURANCE
- Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with
- manufacturer's instructions B. Fire Performance: UL 2079, ASTM E 814, and local regulations.

#### PART 2 PRODUCTS 2.1 MATERIALS

- Firestopping Systems:
- Manufacturers: 3M Fire Protection Products; e.z. barrier; Henkel Corporation; Specified Technologies Inc..
- Applications as Applicable to Assembly Through-penetrations, fire-resistive joints, perimeter fire containment,
- Types as Applicable to Assembly: Endothermic and intumescent sealants, pillows, putty and wrap strips.

#### PART 3 EXECUTION

- 3.1 INSTALLATION
- obtain approval of installation thicknesses and methods.
- Sequence work to avoid need for removal of firestopping by work of other trades
- Comply with manufacturers' instructions and recommendations. Securely anchor insulation with safing clips. Install firestopping without

Review extent of work with authorities having jurisdiction and

Protect, inspect and repair work until final acceptance.

#### END OF SECTION

#### SECTION 07 90 00

JOINT SEALERS

#### PART 1 GENERAL

- - Provide joint sealers and fillers.
  - B. Related Sections include the following: 1. Division 9, Section "Gypsum Board Assemblies"
  - Division 22 Plumbing.
  - 3. Division 23 Heating Ventilating and Air Conditioning.
- Division 26 Electrical. 1.2 SUBMITTALS

- Product Data: Submit manufacturer's product data and installation instructions for each material and product used. Samples: Submit two representative samples of each material
- specified indicating visual characteristics and finish. Include range samples if variation of finish is anticipated. Include manufacturers full range of color and finish
- options if additional selection is required.

#### 1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

#### PART 2 PRODUCTS

#### 2.1 MATERIALS

- Interior Joints, Limited Movement, Acrylic:
- Manufacturers: 3M, Dupont, Dow Corning, Lexan and GE. Materials: Acrylic-emulsion, ASTM C 834.
- Interior Joints, Moisture and Mildew Resistant Silicone:
- Manufacturers: 3M, Dupont, Dow Corning, Lexan and GE.
- Materials: One-part mildew-resistant silicone sealant, ÅSTM C 920.

#### PART 3 EXECUTION 3.1 INSTALLATION

- Examine substrate; report unsatisfactory conditions in writing. Beginning work means acceptance of substrates.
- Provide sealants in colors as selected from manufacturer's standards.
- C. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections. Clean and prime joints, and install bond breakers, backer rods and sealant as ecommended by manufacturers.
- Depth shall equal width up to 1/2 inch wide; depth shall equal 1/2 width for joints over 1/2 inch wide.
- Cure and protect sealants as directed by manufacturers. Replace or restore damaged sealants. Clean adjacent surfaces to remove spillage.

#### **END OF SECTION**

#### SECTION 09 21 16 GYPSUM BOARD ASSEMBLIES

#### PART 1 GENERAL 1.1 SUMMARY

- A. Provide gypsum board assemblies.
- 1.2 RELATED SECTIONS Section 07 92 00 - Joint Sealers: Perimeter sealant and backup materials.
- Product Data: Submit manufacturer's product data and
- installation instructions for each material and product used. 1.4 QUALITY ASSURANCE
- Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's
- B. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- Tolerances: Not more than 1/16-inch difference in true plane at joints between adjacent boards before finishing. After finishing, joints shall be not be visible. Not more than 1/8 inch in 10 feet deviation from true plane, plumb, level and proper relation to adjacent surfaces
- Fire Resistance for Fire-Rated Assemblies: ASTM E 119.
- Performance: Comply with governing codes and regulations. Meet the requirements of the 2012 Michigan Building Code and local

#### PART 2 PRODUCTS

- 2.1 MATERIALS Gypsum Board:
  - Manufacturers: CertainTeed Gypsum, Inc.
  - Lafarge North America Inc
  - Temple-Inland Forest Products Corp.
- Gypsum Products. e. USG Corporation
- 2. Application: Interior walls, partitions, and ceilings with tape and
- joint compound finish
- 3. Application: Insulation in gypsum board assemblies.
- Material Standard: ASTM C1396. 5. Type: Board for tape and joint compound finish
- Type: Regular, moisture-resistant and fire-rated types as
- Typical Thickness: 5/8 inch. 6. Joint Treatment: ASTM C474 and ASTM C840, 3-coat system, paper or fiberglass tape.
- 7. Auxiliary Materials: Cornerbead, edge trim and control joints.
- Gypsum board screws, ASTM C 1002. Mineral fiber sound attenuation blankets.
- Steel Framing for Walls and Partitions: Manufacturers:
- ClarkWestern Building Systems. Dietrich Metal Framing, Inc.
- 2. Material Standard: ASTM C645.
- 3. Stud Thickness: 20 gauge (.0329 inch). 4. Stud Depth, Typical: 3-5/8 inches.

5. Furring Channel Thickness: 20 aguae (.0329 inc

- 6. Auxiliary Framing Components: Furring brackets, resilient furring channels, Z-furring members, and non-corrosive fasteners. C. Steel Framing for Suspended and Furred Ceilings:
- Manufacturers: a. ClarkWestern Building Systems.
- Dietrich Metal Framing, Inc. Marino.
- 2. Material Standard: ASTM C645. 3. Attachment: Standard.

#### 4. Stud Thickness: 20 gauge (.0329 inch). 5. Accessories: Furring channels, hangers and inserts.

- PART 3 EXECUTION 3.1 INSTALLATION Steel Framing: Install steel framing in compliance with ASTM C 754. Install with tolerances necessary to produce substrate for avosum board assemblies with tolerances specified. Include wall reinforcing
- for casework, wall cabinets, wall mounted shelving, drying racks and water purifier. Provide fire-rated systems where indicated, to maintain an
- existing rating and where required by authorities having jurisdiction. C. Tape and Joint Compound: Install gypsum board for tape and 3-coat joint compound finish in compliance with ASTM C 840 and GA 216, Level 4 finish. Install gypsum board assemblies true, plumb, level
- and in proper relation to adjacent surfaces. Install boards vertically. Do not allow butt-to-butt joints and joints that do not fall over framing members.
- Where new partitions meet existing construction, remove existing cornerbeads to provide a smooth transition. Provide insulation full height and thickness in partitions where
- required. Provide acoustical siliconized acrylic sealant at both faces at top and bottom runner tracks, wall perimeters, openings, expansion and control joints.
- Install trim in strict compliance with manufacturer's instructions and recommendations. Repair surface defects. Leave ready for finish painting or wall treatment

#### END OF SECTION

#### SECTION 09 65 00 RESILIENT FLOORING

#### PART 1 GENERAL

- 1.1 SUMMARY Provide resilient flooring and floor preparation.
- B. Related Sections include the following:
- Division 9, Section "Resilient Base and Accessories" 1.2 SUBMITTALS
- Product Data: Submit manufacturer's product data and installation instructions for each material and product used.
- Samples: Submit two representative samples of each material specified indicating visual characteristics and finish. Include range
- samples if variation of finish is anticipated. Extra Stock: Submit extra stock equal to 2% of total used. 1.3 QUALITY ASSURANCE
- Comply with governing codes and regulations. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

#### building code and local authorities. PART 2 PRODUCTS

- 2.1 MATERIALS
- Vinyl Composition Tile Flooring: Manufacturers: Mannington Commercial, Color Point

Performance: Fire performance meeting requirements of

- Premium Visual Tile.
- Type: Vinyl Composition Tile: ÅSTM F 1066, Class 2 through-pattern.
- Color: To match existing, 641 Natural White.
- Size: 12 by 12 inches.
- Thickness: 1/8 inch. Adhesive: As per manufacturer's recommendations, Henry's 430 is WSU's preferred adhesive

#### Auxiliary Materials Leveling compound.

#### PART 3 EXECUTION

- 3.1 INSTALLATION Comply with manufacturer's instructions and recommendations.
- Install in proper relation to adjacent work. Prepare surfaces by cleaning, leveling and priming as required. Test adhesive for bond before general installation. Level to 1/8' in 10'
- Tile Flooring: Install tile with tight joints and with one-way pattern to match existing pattern.

#### Clean, polish, and protect.

#### SECTION 09 65 13

#### RESILIENT BASE AND ACCESSORIES PART 1 GENERAL

END OF SECTION

- 1.1 SUMMARY
- Provide resilient wall base and accessories. B. Related Sections include the following:
- Division 9, Section "Gypsum Board Assemblies". Division 9, Section "Resilient Flooring".
- 1.2 SUBMITTALS Product Data: Submit manufacturer's product data and installation instructions for each material and product used.
- Samples: Submit two representative samples of each material specified indicating visual characteristics and finish. Include range samples if variation of finish is anticipated.
- C. Submit extra stock equal to 2% of total used. 1.3 QUALITY ASSURANCE
- Comply with governing codes and regulations. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- Performance: Fire performance meeting requirements of building code and local authorities.
- PART 2 PRODUCTS 2.1 MATERIALS Resilient Wall Base
- Manufacturer: Johnsonite. Color: To match existing, 56 Shrimp Bisque.

Thickness: 0.125 inch

Standard: ASTM F 1861. Type: TS (rubber, vulcanized thermoset).

#### Height: 4 inch cove. PART 3 EXECUTION

- 3.1 INSTALLATION A. Comply with manufacturer's instructions and recommendations.
- Install base and accessories to minimize joints. Install base with joints as far from corners as practical.

Clean, polish, and protect.

Install in proper relation to adjacent work.

### **END OF SECTION**

- Provide painting and surface preparation.
- Product Data: Submit manufacturer's product data and
- installation instructions for each material and product used.
- specified indicating visual characteristics and finish. Include range samples if variation of finish is anticipated.
- additional selection is required.
- used in the project
- 1.3 QUALITY ASSURANCE Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in
- manufacturer's instructions.

#### regulations.

- 2.1 MATERIALS
- 1. Manufacturers: Sherwin Williams.
- Application: Interior wall surfaces. Application: Repainting of existing surfaces and painting of
- 4. Primary Coating Type: Low VOC Latex based paints. Primary Paint Systems: Primer plus two finish coats in newly
- 6. Color and Finish: To match existing, SW7003 Toque White.

- 3.1 INSTALLATION
- A. Inspect surfaces, report unsatisfactory conditions in writing; beginning work means acceptance of substrate. Comply with manufacturer's instructions and recommendations

for preparation, priming and coating work. Coordinate with work of

other sections. At existing areas to be repainted, remove blistered or peeling paint to sound substrates. Remove chalk deposits and mildew and wash all surfaces with mild detergent. Perform related minor preparation including caulk and glazing compounds. Spot prime

### END OF SECTION

LABORATORY SAFFTY FOUIPMENT

loss of adhesion. Clean up, touch up and protect work.

bare areas before priming and painting as specified.

#### PART 1 - GENERAL

A. Drawings and general provisions of the Contract, including General and

#### Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

- 1.2 SUMMARY
- A. Extent and types of safety equipment as indicated on Laboratory Equipment drawings.

#### B. Provide safety equipment as specified herein and as indicated on Laboratory Equipment drawings.

- C. Related Sections include the following: 1. Division 11, Section 116622 "Laboratory Accessories"
- and systems.

### 1.3 PERFORMANCE REQUIREMENTS

- A. General Performance: Provide certification that fixtures and fittings have been tested in accordance to and meet the performance
- B. Chemical Resistance: All coating materials shall meet the following tests for chemical resistance:
- discoloration, disintegration or other damage to the coating. 2. Direct Application Test: The test of coated samples shall consist of the direct action of the reagents listed below. This test is to be conducted in such as manner that the test surface is kept wet throughout the entire test period and at a controlled temperature of 77 degrees F +/- 3 degrees F. The test must be conducted for a period of not less than one hour. As a result of the test the coating on the samples shall not rupture or otherwise compromised exposing the base material through erosion, dissolution, cracking, splitting or other damage resulting from reagent exposure. Obvious and significant

#### SECTION 09 91 00

#### PART 1 GENERAL

- 1.1 SUMMARY
- Samples: Submit two representative samples of each material
- Include manufacturers full range of color and finish options if
- Extra Stock: Submit 2 unopened gallons of each paint and color
- satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with
- Regulations: Compliance with VOC and environmental

### PART 2 PRODUCTS

- Painting Walls:
- newly exposed surfaces.
- exposed unfinished areas and one finish coat for existing painted

- PART 3 EXECUTION

Match approved mock-ups for color, texture, and pattern.

Re-coat or remove and replace work which does not match or shows

SECTION 11 53 33

1.1 RELATED DOCUMENTS

This Section includes laboratory safety equipment including emergency eyewashes, showers and other related products.

requirements. 3. Divisions 15 and 16, Sections for final connections to building services

2. Divisions 15 and 16, Sections for plumbing and electrical

- requirements as described in SEFA 7.
- 1. Fume Test: Suspend coated samples in a container at least 6 cubic feet capacity, approximately 12" above open beakers, each containing 100 cc of 70% nitric acid, 94% sulfuric acid and 35% hydrochloric acid, respectively. After exposure to these reagent fumes for 150 hours, the finish on the samples shall show no
- deterioration is not acceptable. However, slight discoloration or temporary softening of the coating is permissible.

- Acetic Acid, 98% Acetone
- Acid Dichromate, 5% Ammonium Hydroxide, 28% Amyl Acetate Amyl Alcohol Benzene Butyl Alcohol
- Calcium Hypochlorite Carbon Disulfide Carbon Tetrachloride Chloroform Chronic Trioxide Acid
- Crude Oil Dichlor Acetic Acid Saturated

Hydrogen Peroxide, 5%

lodine, Tincture of

Isopropyl Alcohol

Sodium Bichromate, Dimethylformanide Sodium Carbonate, 10% Sodium Chloride, 20% Dioxane Distilled Water Sodium Hydroxide, 50% Sodium Hydroxide, Flake

Lactic Acid, 10%

Methyl Alcohol

Methyl Ethyl Ketone

Methylene Chloride

Mono Chlorobenzene

Perchloric Acid, 70%

Phosphoric Acid, 85%

Silver Nitrate, Saturated

Methanol

Mineral Oil

N-Hexane

Sea Water

Naphthalene

Nitric Acid, 70%

- Ethyl Acetate Sodium Hypochlorite Sodium Sulfide, Saturated Ethyl Alcohol Sulfuric Acid, 96% Ethyl Ether Sulfuric Acid 77% & Nitric Formaldehyde, 37% Acid 70%, eq. parts Formic Acid, 90%
- Furfural Trichloroethylene Gasoline Turpentine Glacial Acetic Acid, 99.5% Urea, Saturated Glycerin Hydrochloric Acid, 38% Hydrofluoric Acid, 48% Zinc Chloride, Saturated
- Kerosene 1. Adhesion Test: Corrosion resistant finishes shall meet the standards set forth in "Standard Test Methods for Measuring Adhesion by Tape Test", ASTM D3359-02, "Standard Test Method for Mandrel Bend Test of Attached Organic Coatings", ASTM D522-93a and "Standard Test

Method for Chipping Resistance of Coatings", ASTM D3170-03.

2. Mar and Abrasion Resistance: Coating material shall have a pencil

hardness of 2H-4H with adhesion substantial enough to withstand

both direct and reverse impacts of 160 inch-pounds. Coating shall

have excellent mar resistance and be capable of withstanding scuffing, marring and other ordinary wear. 3. Reparability: Coating material shall be capable of surface repair in the event that a fixture is scratched or a surface rupture occurs. The service fixture manufacturer shall have available an air-drying aerosol

coating, specially formulated to match the existing epoxy coating

color, which may be applied in the field to repair coated surfaces.

for each type of emergency fixture.

- A. Product Data: Submit manufacturer's data and installation instructions
- complies with specified chemical and physical resistance

with fittings and accessories with specified finish.

1. Include independent laboratory certification that applied finish

2. Submit samples when requested by Laboratory Architect, complete

#### A. Provide to Owner a complete touch-up kit for surface repair of

unless specified otherwise.

1.5 EXTRA MATERIALS

in the field to repair coated surfaces. 1.6 QUALITY ASSURANCE A. Single Source Responsibility: All laboratory safety equipment, including

those provided as an integral part of other laboratory equipment such

as fume hoods, shall be the product of one service fixture manufacturer,

emergency fixtures. Provide an air drying aerosol or liquid coating

specially formulated to match the coating color which can be applied

B. All fixtures shall be in accordance with IBC, NFPA and OSHA for the C. All fixtures for water service shall meet the requirements of ASME

A112.18.1-2012/CSA B125.1-12 and be certified by the Canadian

D. All emergency eye wash and shower equipment shall be certified to comply with ANSI Z358.1-2014. E. All fixtures shall comply with the ADA requirements of Section 309.4 of

ANSI/ICC A117.1-2009, where a fixture is to be ADA compliant, the

maximum force required to open or close a manually activated fitting

Standards Association (CSA) under Standard CAN/CSA B.125.M89.

#### PART 2 -PRODUCTS

2.1 APPROVED MANUFACTURERS

shall not exceed 5 lbs.

#### the following: 1. Water Saver Faucet Co.

2. Chicago Faucet

3. Far laboratory Faucets Ltd.

2.2 FABRICATION; GENERAL A. All laboratory service fixtures shall have the construction and shall meet the performance requirements set forth in this specification. Fixture types shall be as indicated in the fixture schedule on the Laboratory Equipment drawings and fixture details as an attachment to this

A. All mechanical laboratory service fixtures shall be the product of one of

- B. Emergency Fixtures: Provide all emergency fixtures factory assembled, including the assembly of all valves, flanges, and other mounting accessories. Individually factory test each fixture and provide all fixtures complete with washers, locknuts, unions, nipples and other accessories.

specification.

## WAYNE STATE UNIVERSITY

5454 Cass Avenue, Detroit, MI 48202

**Project Location:** 

WAYNE STATE UNIVERSITY CHEMISTRY BUILDING 5101 CASS AVENUE

**DETROIT MICHIGAN 48202** 

CONTACT: ASHLEY FLINTOFF



iDesign Solutions, LLC Scientific Facilities & Laboratory Design 2531 Ridge Road, Suite 100 White Lake, MI 48383 248-440-7310

info@iDesign-Solutions.info

issue:

OWNER REVIEW

OWNER REVIEW

OWNER REVIEW

BID AND CONSTRUCTION ISSUE



date:

10/20/16

10/28/16

11/03/16

11/23/16

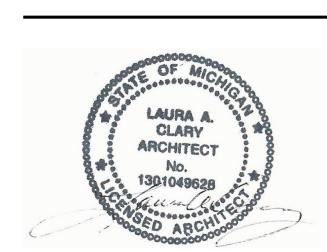
LAC

RLB

RLB

CTW

LAC



Modification sheet title: Architectural

Specifications

**CHEMISTRY LAB 150** 

designed by:

coordination checked:

drawn by:

checked:

approved:

project

1st Floor

project number:

#### 1. Safety equipment as follows:

a. Match existing, Satin Chrome Finish with Clear Epoxy Coating: All components shall be polished and electroplated with one layer of nickel. Exposed surfaces shall then be further polished to an AISI No. 6 brushed finish which is fine-grained and uniform. Components shall then be electroplated with one layer of chrome. Following chrome plating, surfaces to be coated shall be cleaned and degreased. Following plating and cleaning a clear epoxy coating shall be applied to all exposed surfaces and fully baked to permit curing. Surfaces shall have a minimum coating thickness of 2 mils.

#### D. Safety Equipment:

#### 1. Signage: Provide signage identifying eyewash location.

- 2. Provide emergency eye/face wash, drench hose and shower units with spray-type outlet heads to deliver a soft, wide, high volume spray of water. Safety equipment locations are indicated on the Laboratory Equipment drawings. Provide all piping and accessories for a complete installation.
- 3. Dual Purpose Eye Wash/Drench Hose Units: Deck mounted eye wash/drench hose units shall be capable of use as a fixed eye wash with hands-free operation or as a drench hose. Units shall have two Gentle Spray outlet heads mounted parallel and angled forward, each with a self-regulating volume control, reticulated polyurethane filter and removable spray cover. Dust covers shall be hinged swing-away style and shall be permanently attached to the spray head with a stainless steel pin. Units shall be furnished with a deck flange with locator guide to hold the unit facing forward and an 8 ft. reinforced PVC hose.
- 4. Emergency eyewash units shall have the following:
- a. Controlled, low velocity flow completely rinses eyes and face and is not injurious to user.
- b. Hands free stay open ball valve activating within one second or
- c. Eyewash unit must be capable of delivering at least 3.0 gpm for 15 minutes
- d. The nozzles must be protected from airborne contaminants. e. The height from the floor to the nozzles must be between 33
- inches and 45 inches. f. The distance from the wall (or an obstruction) to the nozzles must be a minimum of 6 inches.

#### PART 3 - EXECUTION

#### 3.1 INSTALLATION OF SERVICE FIXTURES

- A. Install in a precise manner in accordance with manufacturer's directions. Adjust moving parts to operate freely without excessive bind.
- B. Follow the manufacturer's recommended test and working pressures for fittings. Testing or using a fitting at pressure for which it is not designed can result in leakage or failure.
- C. Provide all interconnecting conduit, wiring, and devices to junction box for final connection to building systems by Electrical Trades Contractor.

#### 3.2 REPAIRING, CLEANING, AND PROTECTION

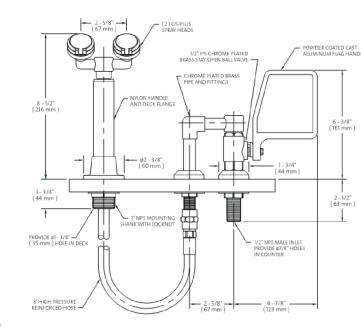
- A. Repairing: Repair or remove and replace defective work as directed upon completion of installation.
- B. Cleaning: Clean shop-finished surfaces, touch-up as required, and remove or refinish damaged or soiled areas, as acceptable to Laboratory Architect.
- C. Protection: Advise Contractor of procedures and precautions for protection of installed laboratory service fixtures from damage by work of other trades.

#### END OF SECTION

#### (EM-1) Emergency Eyewash, Deck Mounted



EW1028VB Eyewash/Drench Hose Unit, Deck Mounted, Ball Valve with Flag Handle, Vacuum Breaker



#### SECTION 11 53 43.10 LABORATORY ACCESSORIES

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS A. Drawings and general provisions of the Contract, including General and

#### 1.2 SUMMARY

to this Section.

#### A. This Section includes the following:

- Service chases. Exhaust snorkels.
- 3. Gas cylinder restraint straps and racks. 4. Overhead Service Carrier and Unistrut framing.

#### B. Related Sections include the following:

1. Division 9, Section "Gypsum Board Assemblies" for sheet metal fastening grounds in gypsum board partitions for anchoring laboratory casework and accessories.

Supplementary Conditions and Division 1 Specification Sections, apply

- 2. Divisions 15 and 16, Sections for plumbing and electrical requirements.
- 3. Divisions 15 and 16, Sections for final connections to building services

#### PERFORMANCE REQUIREMENTS

C. Seismic Performance: Provide assemblies and systems capable of withstanding the effects of earthquake motions determined according to the building code in effect for this Project or ASCE 7, "Minimum Design Loads for Buildings and Other Structures", Section 9, "Earthquake Loads", whichever is more stringent.

#### 1.3 SUBMITTALS

- A. Product Data: Submit product data for manufactured items.
- B. Samples: Submit samples of the following:
- Painted metal finishes.
- C. Shop Drawings: Submit shop drawings for laboratory accessory assemblies that are factory and/or field assembled from manufactured components. Submit shop drawings showing locations, materials, connections and all details of construction and installation.
- Service drops.
- 2. Exhaust snorkel supports.
- Unistrut framing. 4. Gas cylinder restraint straps and racks.
- D. Product Test Reports: Based on tests performed by a qualified independent testing agency, indicate compliance with SEFA 3 and 8 for laboratory casework finishes and countertops with requirements specified for chemical and physical resistance.
- E. Qualification Data: Firms and/or persons specified shall demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Architects and Owners, and other information specified.

#### 1.4 QUALITY ASSURANCE

- A. Coordinate the interface of the laboratory accessories with service, utilities and associated engineering design. Verify and coordinate all requirements for cutouts, attachments, reinforcing, piping, electrical devices, sizes and locations with laboratory casework and other laboratory items.
- B. Manufacturer shall identify a factory representative for on-site supervision and coordination during the installation of laboratory casework and laboratory accessories.
- C. Single Source Responsibility: Laboratory casework manufacturer shall provide and install all laboratory accessories in order to maintain single source responsibility for laboratory fit-up items.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver laboratory accessories until painting, utility roughing-in, and similar operations that could damage, soil, or deteriorate materials or assemblies have been completed in installation areas. If items must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in "Project Conditions" Article below.
- B. Protect finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective covering.

#### 1.6 COORDINATION

A. Coordinate layout and installation of metal framing and reinforcement in gypsum board assemblies for support of laboratory accessories.

#### 1.7 EXTRA MATERIALS

A. Furnish complete touchup kit for each type and color of laboratory accessory provided. Include fillers, primers, paints, fabric patches, and other materials necessary to perform permanent repairs to damaged

#### PRODUCTS

#### 2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements other manufacturers offering products may be incorporated into the Work subject to approval by laboratory architect.

#### 2.2 MATERIALS

- A. Unless specified otherwise under an individual laboratory accessory, provide the following materials.
- 1. Metal: Commercial-quality, cold-rolled, carbon-steel sheet, complying with ASTM A 366 (ASTM A 366M); matte finish; suitable for exposed applications; and stretcher leveled or roller leveled to stretcher-leveled flatness. Minimum 18 ga.
- 2. Stainless Steel: AISI Type 304 with No. 4 satin finish unless otherwise indicated.
- 3. Chemical-Resistant Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard 2-coat, chemical-resistant, baked-enamel finish consisting of prime coat and thermosetting topcoat with a minimum dry film thickness of 1 mil (0.025 mm) for topcoat and 2 mils (0.05 mm) for system.

#### 2.3 (SC-#) SERVICE CHASES

- A. Fabrication: Fabricate and install painted sheet metal service chases in PART 1 GENERAL configurations as detailed on drawings consisting of removable and
- 1. Removable and fixed service chase panels are to fit together flush showing a minimum joint where they join.
- 2. Removable access panels are to have concealed-to-view pins, catches, clips, strikes, etc., that allow removal of panel with an
- 3. Fabricate and install service chase 1" lower than the bottom of light fixture line or ceiling if applicable to facilitate removal of access panel in an upward motion.
- 4. Fixed service chase panels shall be fastened to support unistrut -whichever is applicable. Fixed panels shall be fitted with internal horizontal unistrut spaced vertically at 24 in on center to facilitate the internal fastening and support of mechanical piping and ductwork.
- 5. Welds shall be continuous, ground smooth, and finished to match adiacent surfaces.
- B. Finish: Service chase shall be shop prime painted with corrosion resisting primer and receive shop finish coating. Provide color to match existing painted metal laboratory casework.
- C. Installation: Install service chases plumb, level and true.

#### 2.4(FS-#) EXHAUST SNORKELS

- A. Provide and install exhaust snorkels as specified herein and as indicated on the drawings.
- B. Secure snorkel assemblies to unistrut framing secured to building structure above using manufacturer's standard brackets as detailed on drawings. Provide and install all nuts, bolts, fittings and accessories reauired.
- C. The design standard for this project is the Nederman Inc., Fume Extractor Arms model # CR-2. The following list is to be used as minimum product standards.
- 1. Assemblies providing a maximum reach of 7 foot.
- 2. Standard wall mounting brackets.
- 3. 360° swivel elbow and support flange. 4. Flange adapter accepting 6" dia. exhaust duct.
- 5. Internal adjustable support system. Adjustable damper.

#### 2.5(CR-#) GAS CYLINDER RESTRAINT RACKS AND STRAPS

- A. Fabrication: Fabricate and install gas cylinder storage racks in locations as indicated and detailed on laboratory equipment drawings. Fabricate and install with Unistrut components complete with all nuts, bolts, fittings, and accessories indicated and required.
- B. Finish: Racks shall be shop prime painted with corrosion resisting primer and receive shop applied finish coatings. Provide manufacturer's
- C. Manufacturer: The design standard for cylinder restraints are:
- 1. Steel with 1 ½" wide polypropylene strap light gray.
- 2. Model #: a. 2-cylinder F2 #2283T72 b. 3-cylinder F3 # 2283T17
- D. Installation: Install cylinder restraint racks plumb, level and square to walls unless otherwise indicated on drawings. Brace rack assemblies to walls to prevent sway.

#### 2.6(OSC-#) OVERHEAD SERVICE CARRIER AND (UF-#) UNISTRUT FRAMING

- A. Provide, fabricate and install metal, FRP and stainless steel Unistrut framing as detailed and indicated on drawings.
- B. The following lists Unistrut framing integral with the installation of laboratory service drops, service fittings and accessories.
- 1. Overhead service carriers: Provide stainless steel.
- Pipe and service drop supports.
- 3. Suspended equipment supports. 4. Exhaust snorkel support framing.
- 5. Miscellaneous structures and supports as detailed on drawings. C. Provide unistrut framing as indicated, complete with all nuts, bolts,
- fittings, and accessories as required. D. Metal unistrut framing shall be shop prime painted with corrosion resisting
- primer and receive a shop finish coating. Provide color as listed in the Laboratory Component Finish Schedule on the drawings.
- E. Provide Owner with 12 copies of current parts catalog and price guide.
- F. Install unistrut framing plumb, level and true. Secure framing to structure and walls with fasteners, appropriate for the intended use. Provide engineering data and locations of all fasteners used.

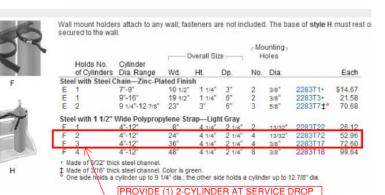
#### PART 3 - EXECUTION

#### 3.1 INSTALLATION AND CLEANING

- A. Install accessories according to approved Shop Drawings and manufacturer's written instructions.
- B. General: Install all items plumb, level, properly aligned, rigid, and securely anchored to building and casework components.
- C. Repair, remove or replace defective work as directed on completion of installation.
- D. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved

#### END OF SECTION

#### (CR-1) CYLINDER RESTRAINT



PROVIDE (2) 3-CYLINDER AT WALL

#### SECTION 11 53 63 COMPRESSED GAS CYLINDER CABINETS

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

1.1 RELATED DOCUMENTS

- A. This Section includes the following:
- 1. Compressed gas cylinder cabinets as indicated on Drawings.
- B. Related Sections include the following:
- 1. Divisions 15 and 16, Sections for plumbing and electrical
- 2. Divisions 15 and 16, Sections for final connections to building services and systems.

#### 1.3 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Provide assemblies and systems capable of withstanding the effects of earthquake motions determined according to the building code in effect for this Project or ASCE 7, "Minimum Design Loads for Buildings and Other Structures", Section 9, "Earthquake Loads", whichever is more stringent.

#### 1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data, installation instructions and cleaning procedures.
- B. Shop Drawings: Submit shop drawings showing locations, materials, connections and all details of construction and installation.
- C. Wiring Diagrams: Submit manufacturer's electrical requirements and wiring diagrams for power supply wiring to units.
- D. Maintenance Data: Submit maintenance data and parts lists. Include product data, shop drawings, record drawings, and wiring diagrams in maintenance manual; in accordance with requirements of Division 1.
- E. Qualification Data: Firms and/or persons specified shall demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Architects and Owners, and other information specified.

#### 1.5 QUALITY ASSURANCE

- A. Coordinate the interface of the cylinder cabinets with the laboratory casework and accessories. Verify and coordinate all requirements for cutouts, attachments, reinforcing, piping, electrical devices, sizes and
- B. CGA Compliance: Fabricate and install compressed gas cylinder cabinets in accordance with CGA Standards (Compressed Gas Association).

locations with laboratory casework and other laboratory items.

C. UL Compliance: Provide electrical components which are UL listed and have UL label affixed.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver compressed gas cylinder cabinets on factory-installed shipping skids; accessories packaged in factory-fabricated fiberboard containers; and pipe/tube with plastic end-cap protectors to prevent pipe-end damage and to eliminate dirt and moisture from entering interior of pipe/tube.
- B. Handle compressed gas cylinder cabinets carefully to avoid damage to components; enclosures and finishes. Do not install damaged equipment; replace and return damaged units to equipment manufacturer.
- C. Store equipment indoors and protect from weather and construction

#### 1.7 COORDINATION

A. Coordinate layout and installation of compressed gas cylinder cabinets with other trades, laboratory casework and accessories.

#### 1.8 EXTRA MATERIALS

A. Furnish complete touchup paint kit. Include fillers, primers, paints, fabric patches, and other materials necessary to perform permanent repairs to damaged items.

#### PART 2 - PRODUCTS 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide
- products by one of the following:
- 1. Cryogenic Gases, Inc. Matheson Gas Products. 3. Air Liquide America Corporation.

#### 2.2 COMPRESSED GAS CYLINDER CABINETS

- A. Provide and install compressed gas cylinder cabinets as indicated on drawings and specified herein. Design standard is Cryogeneric Gases,
- In.c Model # 7200. B. Cylinder cabinets shall provide the following functions:
- 1. Storage and Use:
- a. Containment of hazardous gas in the event of leakage. 1) Flammable - Hydrogen. 2) Toxic - Ammonia.
  - b. 2-Cylinder sized cabinet for one active cylinder and one staging cylinder not in use.

#### 2. Valved and Piped Gas Supply System:

- a. Containment of hazardous gas in the event of leakage. b. Maintenance of gas integrity. c. Automatic shut-off in the event of catastrophic failure.
- d. Effective control of residual gas during cylinder change-out.

#### C. Provide compressed gas cylinder cabinets constructed of minimum 11 gauge, all welded epoxy painted steel including the following:

- 1. Provide with a fusible link damper (in place of louver) will be used to house a 3 valve panel to deliver 30 psig from a single high pressure cylinder. A 3 foot stainless steel flexible pigtail with integral check valve (CGA350) will be installed for connection to cylinder. Only one cylinder will be connected to the panel at a time.
- 2. Self-closing, self-latching, hinged and gasketed door. The door shall include a filtered louvers opening located in the lower area to allow air to enter the cabinet and a sliding 1/4" thick wired glass window and integral face shield, at the top of the door to provide visual and physical access to the valve manifolds.
- 3. An opening at the top for the connection of exhaust ductwork. A gas cabinet will be provided with a 6" exhaust connection and shall
- 4. One 2- cylinder bracket(s) including chain and polypropylene safety
- 5. 120V surface mounted control panel capable of interfacing with gas detection, building energy management system and shutting off
- cylinder gas as indicated in Contract Documents. 6. U.L approved beeswax coated sprinkler head.

be rated for an exhaust flow rate of 250 cfm.

#### 2.3 COMPRESSED GAS VALVE MANIFOLD SYSTEMS

strap, per cylinder cabinet.

- A. Provide compressed gas valve manifold systems, completely preassembled and mounted on a common backboard, installed in the compressed gas cylinder cabinet. Valve manifold systems shall be modular in design and shall include the following components, provided
- B. Provide Three Valve Manifold System for (H2) Hydrogen. Three valve

in materials as specified for the respective piping systems.

will be installed on the outlet of the process line.

- 1. 3 valve panel will use a brass high purity regulator, flash arrestor and a brass CGA connection on the pigtail. All other components will be stainless steel. The panel will provide a 0-30 psig delivery pressure with an on/off process valve. The panel will incorporate a high pressure inlet valve, high pressure vent/purge valve in-line downstream relief valve and a vent line check valve. Additionally a flash back arrestor
- 2. The valving arraignment allows the user to completely isolate the regulator, use the process gas for purging at cylinder change outs and provides downstream protection should the outlet pressure of the regulator rise above 40 psig.

the emergency shut off.

manifolds shall include:

- 3. Safety Devices: a. Excess flow valve - device located at the cylinder connect that will shut down the flow of gas should a catastrophic line failure
- b. Emergency shut off device install at inlet of panel tied to an emergency stop button located on exterior of cabinet and remotely as per electrical drawings. This device will require house
- nitrogen or air at 100 psig as well as electrical connections. c. Gas detection - this system will monitor LEL in the cabinet tied to
- C. Provide Five Valve Manifold System for (NH3) Ammonia. Five valve manifolds shall include: 1. 5 valve panel will use a brass high purity regulator, flash arrestor and a brass CGA connection on the pigtail. All other components will be stainless steel. The panel will provide a 0-30 psig delivery pressure with an on/off process valve. The panel will incorporate a high pressure
- arrestor will be installed on the outlet of the process line. 2. The valving arraignment allows the user to completely isolate the regulator, use the process gas for purging at cylinder change outs and provides downstream protection should the outlet pressure of

inlet valve, high pressure vent/purge valve in-line downstream relief

valve and a low pressure vent valve. Additionally a flash back

#### the regulator rise above 40 psig.

- Safety Devices: a. Excess flow valve - device located at the cylinder connect that will shut down the flow of gas should a catastrophic line failure
- occur. b. Emergency shut off - device install at inlet of panel tied to an emergency stop button located on exterior of cabinet and remotely as per electrical drawings. This device will require house
- nitrogen or air at 100 psig as well as electrical connections. c. Gas detection - this system will monitor LEL in the cabinet tied to

#### the emergency shut off.

#### EXECUTION

3.1 INSTALLATION AND CLEANING

- A. General: Install compressed gas cylinder cabinets in accordance with manufacturer's instructions, at locations indicated on contract drawings. Connect piping and vent lines to cabinet. Connect and balance
- B. General: Install all items plumb, level, properly aligned, rigid, and securely anchored to building.
- C. Repair, remove or replace defective work as directed on completion of installation.

D. Clean finished surfaces, touch up as required, and remove or refinish

damaged or soiled areas to match original factory finish, as approved

exhaust air flow rates. Connect sprinkler heads.

by Architect. END OF SECTION

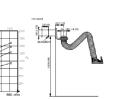
#### FLASH ARRESTOR SERIES 8491 - BRASS

with flammable gases including hydrogen, acetylene, and LPG gases. The design includes a built-in non-ret valve to stop reverse flow and a thermal shut off which flow in the event a of hose or pipe line fire. An easily re-setta pressure control ring (shown at right), no disassembly of the line or special tools are needed. The 8491 Series high flow

(see flow table). Units are U/L listed and meet ISO 5175, EN 73 BS 6158, and AS 4603 standards.







## Description Reach, Airflow, Connection S, Max. furms temperature, Noise level at Waight, Part no. mm /fl. mm /fl. (cfm) mm /fl.

#### (CC-1) GAS CYLINDER CABINE

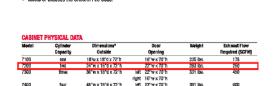
GAS SAFETY STORAGE CABINETS



Texture finish outside, smooth finish on inside of cabinet. Exhaust vent located on top of cabinet is 6" diameter x 3" ngn. 165" F. sprinkler head with bee's wax coating located in cabinet top. Cylinder brackets accommodate 7"-9" diameter cylinders. The brackets can move vertically and horizonfally for precise project augminent.

Self-latching and closing window(s) with 1/4" thick wire glass.

• Naved wholey stables.



HYDROGEN CYLINDER CABINET

HIGH PURITY 1-STAGE REGULATOR Series 3100

Self-latching and closing door(s) with bottom louvers an mounted stainless steel paddle latch(es). Optional keyed

they are rugged and versatile enough for the laboratory of The relative low cost of these units has established them



perating Temp. Range: -40° to +185°F.

Knob: aluminum - black anodized

Frow Coefficient ( $C_V$ ): 0.08 Standard, 0.2 optional \*\* Inlet and Outlet: 1/4" NPT female MATERIALS OF CONSTRUCTION Body: brass Poppet: 316L stainless steel Diaphragm Seal: Teflon<sup>®</sup> Inlet Filter: stainless steel

\_ab Safety Equipmer

Flammable Gas Detector



Toxic and Corrosive Gas Detectors

## WAYNE STATE **UNIVERSITY**

5454 Cass Avenue, Detroit, MI 48202

**Project Location:** 

WAYNE STATE UNIVERSITY CHEMISTRY BUILDING 5101 CASS AVENUE

**DETROIT MICHIGAN 48202** 

CONTACT: ASHLEY FLINTOFF

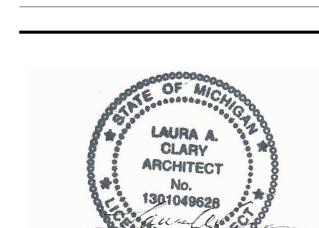


iDesign Solutions, LLC Scientific Facilities & Laboratory Design 2531 Ridge Road, Suite 100 White Lake, MI 48383 248-440-7310

info@iDesign-Solutions.info



date: issue OWNER REVIEW 10/20/16 OWNER REVIEW 10/28/16 11/03/16 BID AND CONSTRUCTION ISSUE 11/23/16



LAC

RLB

RLB

CTW

LAC

checked: approved: project **CHEMISTRY LAB 150** 1st Floor

sheet title: Architectural Specifications

Modification

designed by:

coordination checked:

drawn by:

project number: 007-286023

#### SECTION 12 56 53.13 PAINTED METAL LABORATORY CASEWORK

#### PART 1 - GENERAL

#### 1.1 SUMMARY

A. ALTERNATE #2: This Section includes the following: Painted metal laboratory casework.
1. Provide a vacuum pump cabinet 48" wide x 84" high x 42" deep, consisting of a top and bottom cabinets bolted together.

#### 1.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Provide certification that casework, components and hardware has been tested in accordance to and meet the
- structural performance requirements as described in SEFA 8.

   Structural Performance: Provide metal laboratory casework capable of withstanding the following minimum loads without permanent
- Pull out trays rated for 200lbs
   Floor-Supported Base Cabinets: 250 lb/ft (373 kg/m) along the width of the cabinet.

deformation, excessive deflection, or binding of drawers and doors:

- C. Vacuum Pump Cabinets:
- 1. Provide perforations in the panels between the 2 cabinets to facilitate air flow.
- Louvers in the doors for air flow
- 3. (8) standoff legs.
- 4. (2) 6" duct collars that are split between the 2 cabinets.
- (8) iris grommets.
   (2) pull-out trays.
- 7. Insulation for sound attenuation.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product specified.
- B. Shop Drawings: For metal laboratory casework. Include plans, elevations, sections, details, and attachments to other work.
- Indicate locations of blocking and other supports required for installing casework.
- Indicate locations and types of service fittings, together with associated service supply connection required.
- associated service supply connection required.3. Show adjacent walls, doors, windows, other building components, and other laboratory equipment. Indicate clearances from above
- Include coordinated dimensions for laboratory equipment, fume hoods and laboratory accessories specified in other Sections.
- C. Samples for Verification: 6-inch- (150-mm-) square samples for each type of finish, including top material.
- D. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience.
- E. Product Test Reports: Based on tests performed by a qualified independent testing agency, indicate compliance with SEFA 3 and 8 for laboratory casework finishes and countertops with requirements specified for chemical and physical resistance.
- F. Coordinate shop drawings with other work involved.

#### 1.4 QUALITY ASSURANCE

- A. Single Source Responsibility: Provide laboratory casework with tops, sinks, accessories, fume hoods and service fixtures, manufactured or furnished by same laboratory furniture company for single responsibility.
- B. Product Designations: Drawings indicate sizes and configurations of casework. Manufacturers' of casework of similar sizes, similar door and drawer configurations, and complying with the Specifications may be considered.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

A. surfaces from soiling and damage during handling and installation.

Keep covered with polyethylene film or other protective covering.

#### 1.6 COORDINATION

- A. Coordinate layout and installation of metal framing, reinforcement and sheet metal fastening grounds in gypsum board assemblies for support of metal laboratory casework.
- 1.7 EXTRA MATERIALS
- A. Furnish to Owner complete touchup kit for each type and color of laboratory casework provided. Include fillers, primers, paints, and other materials necessary to perform permanent repairs to damaged casework finish.

#### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- Metal Laboratory Casework:
- a. CiFLab Solutions.b. Labcase.

contractor.

c. Kewaunee Scientific Corp.d. Mott Manufacturing.

0.0359 in (0.9 mm) if reinforced.

 Substitutions: are subject to the review and approval of the Owner and Architect. All products for consideration require documentation of equivalent performance to be submitted by the

#### 2.2 MATERIALS

- A. Metal: Commercial-quality, cold-rolled, carbon-steel sheet, complying with ASTM A 366 (ASTM A 366M); matte finish; suitable for exposed applications; and stretcher leveled or roller leveled to stretcher-leveled flatness
- B. Minimum Metal Thickness: Provide metal laboratory furniture components of the following minimum thicknesses:
- Fixed Panels including sides, ends, backs, bottoms, tops, soffits, and items not otherwise indicated: 18 ga., 0.0478 in (1.2 mm). Except for flammable liquid storage cabinets, bottoms may be 20 ga.,
- Removable access panels, doors, drawer fronts and cabinet bodies, security panels, sloped tops and shelves: 20 ga., 0.0359 in (0.9 mm). For back panels and doors for flammable storage cabinets, use 18 ga., 0.0478 in (1.2 mm) thick metal. For shelves more than 36 in (900 mm) long, use 18 ga., 0.0478 in (1.2 mm) thick metal or provide suitable reinforcement.
- 3. Top, front and intermediate horizontal rails, and vertical stiles (including center double stile): 16 ga., 0.0598 in (1.5 mm).
- C. Insulation: Provide interior cabinet wall and door materials and construction typical of vacuum pump cabinets providing acoustic and sounds absorbing control. Insulation material to be Blachford Conasorb F series open cell foam sound absorbtion.

#### 2.3 FABRICATION

- A. General: Complete assembly and finish work at point of manufacture. Perform assembly on precision jigs to provide units which are square; fully reinforced with angles, gussets, and channels; and integrally framed and welded to form a dirt and vermin-retardant enclosure. Where applicable, reinforce base cabinets for sink support. Maintain uniform clearance around door and drawer fronts of 1/16 to 3/32 inch (1.5 to 2.4)
- B. Toe Space: Provide an adjustable height metal toe space, fully enclosed, adjustable in height from a minimum 4in to a maximum 6 in high set 3 inches (75 mm) back from the face of the cabinet, with no open gaps or pockets. The adjustable height shall provide backing for the resilient base in the event of varying floor elevations.
- C. Base Molding: 4 in high, black rubber or vinyl.
- D. Utilities: Provide space, cutouts, holes and grommets for pipes, ductwork, conduits, and fittings in cabinet bodies to accommodate utility services and their support-strut assemblies.
- E. Service Chase Framing: Manufacturer's standard steel framing units consisting of 2 cold-rolled C-channel uprights, not less than 1-5/8 inches (41 mm) square by 0.10 inch (2.5 mm) thick, connected together at the top and bottom by U-shaped brackets made from 1-1/4-by-1/4-inch (32-by-6-mm) flat bars. Framing units may be made by welding C-channel material specified for uprights into rectangular frames instead of using U-shaped brackets.

#### 2.4 FINISH FOR METAL LABORATORY CASEWORK

- A. Cleaning and Pretreatment: After assembly, thoroughly clean surfaces of grease, dirt, oil, flux, and other foreign matter by physical and chemical means. Treat entire unit with metallic phosphate process, leaving surfaces with uniform, fine-grained, crystalline phosphate coating to provide bond for finish.
- B. Chemical-Resistant Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard 2-coat, chemical-resistant, baked-enamel finish consisting of prime coat and thermosetting topcoat with a minimum dry film thickness of 1 mil (0.025 mm) for topcoat and 2 mils (0.05 mm) for system.
- C. Chemical and Physical Resistance of Finish System: Provide metal laboratory casework with finish system complying with the following requirements for chemical and physical resistance:
- Chemical Resistance, Moisture Resistance, Cold Crack and Adhesion and Flexibility: Compliant testing and performance requirements as outlined by with SEFA 3 and SEFA 8 standards.
- Chemical Resistance: Capable of withstanding application of not less than 5 drops (0.25 mL) of the following reagents applied to finish surface; covered with a watch glass for 60 minutes, rinsed, and dried; with no permanent change in gloss, color, film hardness, adhesion, or film protection.
  - 1) Acetic acid (98%)
  - 2) Acetone3) Acid Dichromate (5%)
  - 4) Ammonium hydroxide (28 %)
  - 5) Amyl Acetate6) Benzene
  - 7) Carbon tetrachloride
  - 8) Chloroform
    9) Chromic Acid (60%)
  - 10) Cresol
  - 11) Dichlor Acetic Acid
  - 12) Dimethylformanide13) Dioxane
  - 14) Ethyl acetate15) Ethyl alcohol
  - 16) Ethyl ether17) Formaldehyde (37 %)
  - 18) Formic acid (90%) 19) Furfural
  - 20) Hydrochloric acid (37 %)21) Hydrofluoric Acid (48%)
  - 21) Hydrofluoric Acid (48%)
    22) Hydrogen peroxide (5%)
  - 23) Iodine
  - 24) Methyl ethyl ketone25) Methylene chloride
  - 26) Mono chlorobenzene
  - 27) Napthhalene 28) Nitric acid (60 %)
  - 28) Nitric acid (60 %) 29) Phenol (90%)
  - 30) Phosphoric acid (85 %)
    31) Potassium hydroxide (40 %)
  - 32) Silver nitrate33) Sodium carbonate (saturated)
  - 34) Sodium chloride (saturated)
  - 35) Sodium hydroxide (40 %)36) Sodium sulfide (saturated)
  - 37) Sulfuric acid (85 %)
  - 38) Toluene 39) Trichloroethylene
  - 40) Xylene41) Zinc chloride (saturated)
- 3. Moisture Resistance: No visible effect when exposed to the
- a. Hot water at a temperature of 190 to 205 deg F (88 to 96 deg C), trickled down the surface at a 45-degree angle for 5 minutes.
- b. Constant moisture using a 2 in x 3 in x 1 in (51 mm x 76 mm x 25 mm) cellulose sponge, soaked with water, in contact with surface for 100 hours.
- change from 20 deg F (minus 7 deg C) for 60 minutes to 125 deg F (52 deg C) for 60 minutes.
  5. Adhesion and Flexibility: No peeling or cracking or exposure of

4. Cold Crack: No effect when subjected to 10 cycles of temperature

- metal when metal is bent 180 degrees over a ½ in (13 mm) diameter mandrel.
- D. Colors: to match existing painted metal casework.

#### 2.5 CASEWORK HARDWARE

- A. Hardware, General: Provide manufacturer's standard satin-finish, commercial-quality, heavy-duty hardware complying with requirements indicated for each type.
- B. Hinges: Stainless-steel, 5-knuckle hinges complying with BHMA 156.9, Grade 1, with antifriction bearings and rounded tips. Provide 2 for doors less than 48 inches (1200 mm) high and 3 for doors more than 48 inches (1200 mm) high.
  C. Pulls: Stainless steel, fastened from back with 2 screws. For sliding doors,
- provide stainless-steel recessed flush pulls. Provide 2 pulls for drawers more than 24 inches (600 mm) wide.D. Door Catches: Nylon-roller spring catch or dual, self-aligning,
- permanent magnet catch with strike. Provide 2 catches on doors more than 48 inches (1200 mm) high.
- E. Partial Extension Interior Drawer Guides: Accuride or equivalent drawer guide all ball bearing, rail mount, clear zinc finish and capable of supporting 200 lbs (90 kg) and extending 28".

#### PART 3 - EXECUTION

#### 3.1 CASEWORK INSTALLATION

- A. Install plumb, level, and true; shim as required, using concealed shims. Where laboratory casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- B. Base Cabinets: Set cabinets straight, plumb, and level. Adjust subtops within 1/16 inch (1.5 mm) of a single plane. Fasten cabinets to utility-space framing, partition framing, wood blocking, or reinforcements in partitions with fasteners spaced 24 inches (600 mm) o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform.
- C. Install hardware uniformly and precisely. Set hinges snug and flat in mortises, unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.
- D. Adjust casework and hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended

#### 3.2 INSTALLATION OF ACCESSORIES

by manufacturer.

A. Securely fasten all casework, service chase frames, shelving, to metal fastening grounds or walls.

- 3.3 CLEANING AND PROTECTINGA. Repair or remove and replace defective work as directed on
- completion of installation.

  B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.
- C. Protection: Provide 6-mil (0.15-mm) plastic or other suitable water-resistant covering over countertop surfaces. Tape to underside of countertop at minimum of 48 inches (1200 mm) o.c.

#### END OF SECTION



## Open Cell Foam

 Conasorb F is a highly effective sound absorber; it is particularly effective in absorbing mid frequencies. It can be used as a decoupler under barrier to add sound transmission loss performance as well.

Applications areas would include commercial, off-highway,

utility, and military vehicles, as well as appliances.

Consists of:

1 Open cell polyurethane ester acoustical foam
(Available in various thicknesses – contact Sales for

FMVSS302 (pass)

Zero Growth (ASTM G21)

Revision Date: 9/9/2/010. KPB

products are responsible for compliance with any legal provisit statement DOES NOT indicate an official UL "Listing" on the n

Revision Date: 9/9/2010, KPB

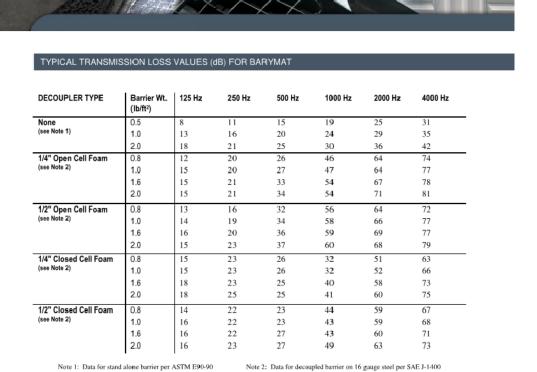
Note: This data sheet provides general information only. All statements and recommendations are offered in good faith but without guarantee. Users of our

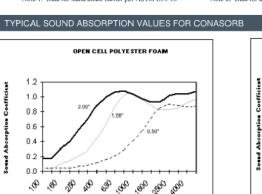
Fax: 630.231.8321

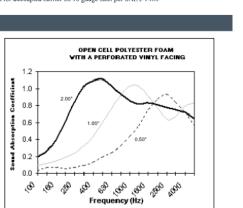
Blachford

naterial. A UL listing will be indicated as "Listed".			
ord Incorporated uclear Drive hicago, IL 60185 USA 630.231.8300 0.231.8321	Blachford RP Corporation 707 Broadview Street Kings Mountain, NC 28086 USA Phone: 704.730.1005 Fax: 704.730.0640	H.L. Blachford Ltd. 2323 Royal Windsor Drive Mississauga, ON L5J 1K5 Can Phone: 905.823.3200 Fax: 905.823.9290	

s including those relating to patent laws and accident prevention. A UL flammability "Pass"







**Blachford** 

## WAYNE STATE I JNIVERSITY

5454 Cass Avenue, Detroit, MI 48202

Project Location:

WAYNE STATE UNIVERSITY
CHEMISTRY BUILDING
5101 CASS AVENUE
DETROIT MICHIGAN 48202

**CONTACT: ASHLEY FLINTOFF** 



iDesign Solutions, LLC
Scientific Facilities & Laboratory Design
2531 Ridge Road, Suite 100
White Lake, MI 48383
248-440-7310
info@iDesign-Solutions.info



issue:	dat
OWNER REVIEW	10/20
OWNER REVIEW	10/28
OWNER REVIEW	11/03
BID AND CONSTRUCTION ISSUE	11/23



designed by:	LAC
drawn by:	RLB
coordination checked:	RLB
checked:	CTW
	1.40

1st Floor Modification

CHEMISTRY LAB 150

project

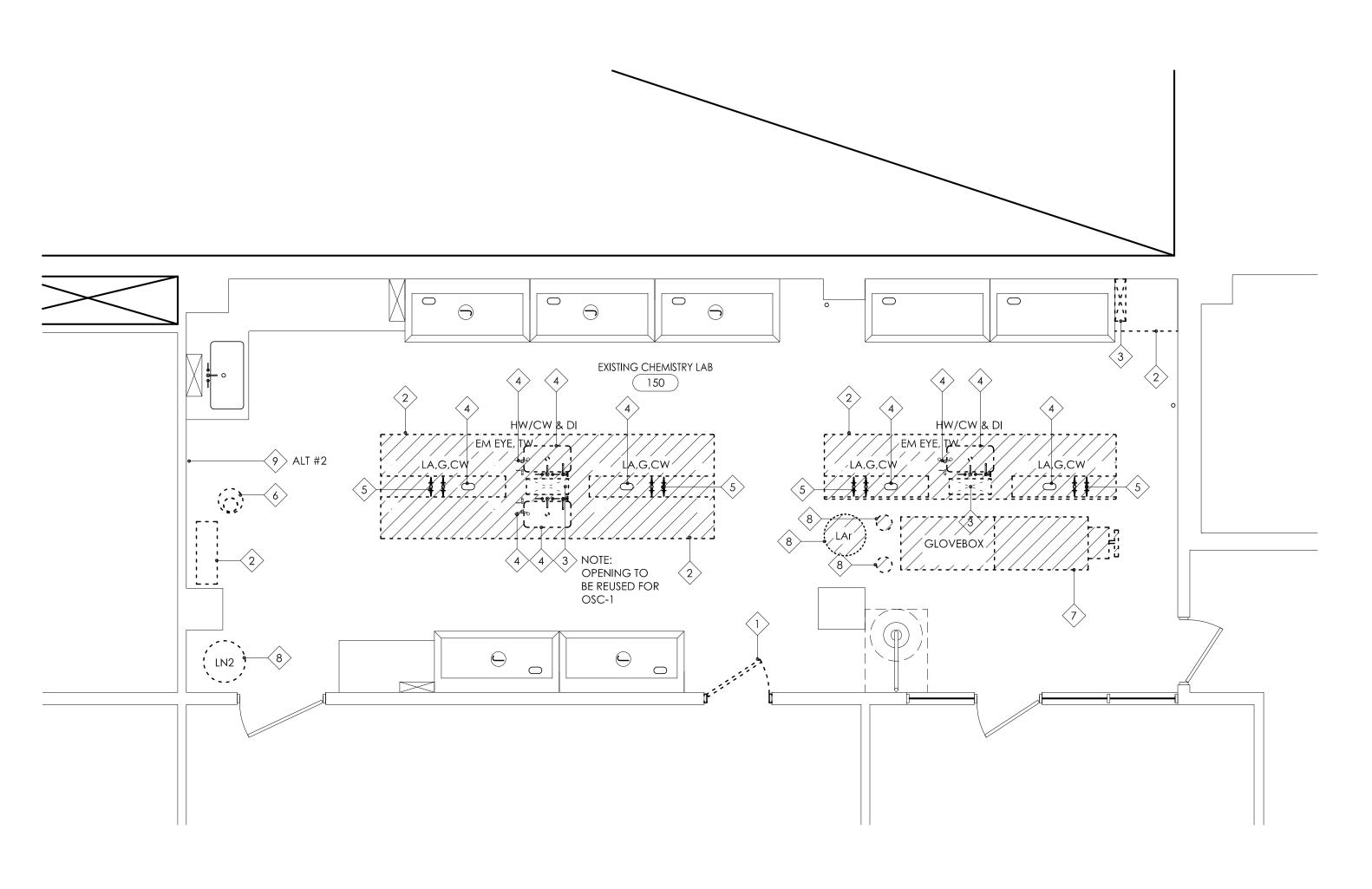
sheet title: Architectural Specifications

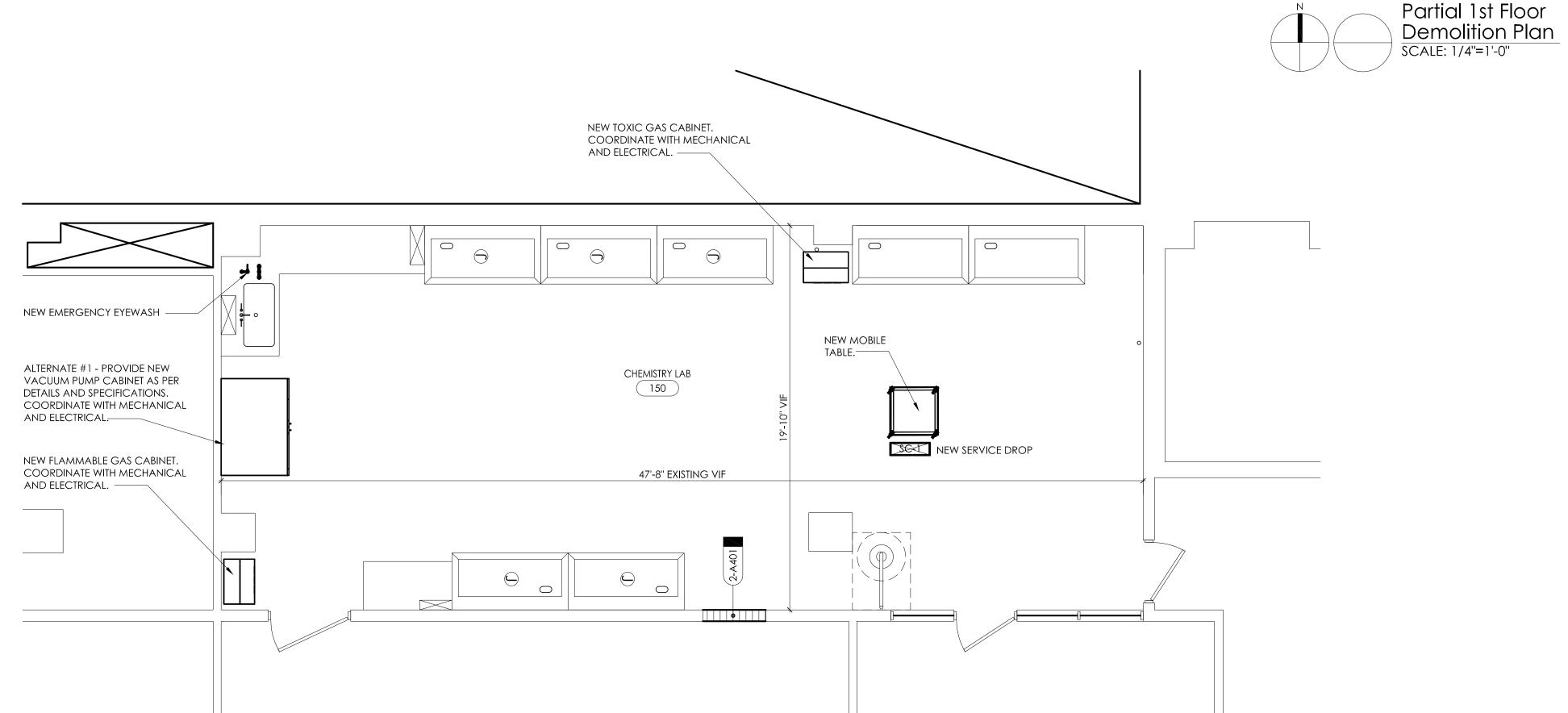
Alternate

project number: 007-286023

(1156-7 : iDesign project number)

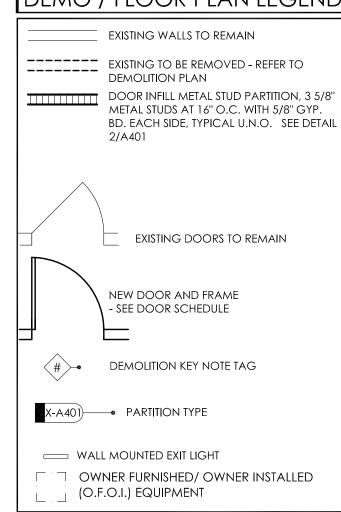
sheet number:

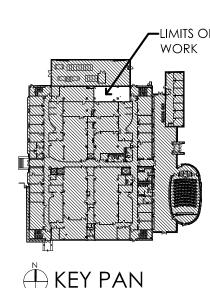






#### | DEMO / FLOOR PLAN LEGEND







**Project Location:** 

**WAYNE STATE UNIVERSITY** CHEMISTRY BUILDING 5101 CASS AVENUE **DETROIT MICHIGAN 48202** 

**CONTACT: ASHLEY FLINTOFF** 



#### **iDesign**

iDesign Solutions, LLC Scientific Facilities & Laboratory Design 2531 Ridge Road, Suite 100 White Lake, MI 48383 248-440-7310 info@iDesign-Solutions.info www.iDesign-Solutions.info



issue:	date
OWNER REVIEW	10/20/16
OWNER REVIEW	10/28/16
OWNER REVIEW	11/03/16
BID AND CONSTRUCTION ISSUE	11/23/16



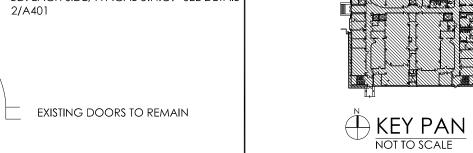
designed by:	LAC
drawn by:	RLB
coordination checked:	RLB
checked:	CTW
approved:	LAC

CHEMISTRY LAB 150 1st Floor

Modification

sheet title: Partial 1st Floor Demo Plan and Partial 1st Floor Architectural Plan

project number: sheet number: 007-286023 (1156-7: iDesign project number)



#### GENERAL CONSTRUCTION NOTES

- FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION, TYPICAL.
- REFER TO TYPICAL PARTITION CONSTRUCTION DETAILS, SHEET A401, FOR WALL/ PARTITION CONSTRUCTION
- REFER TO LABORATORY DRAWINGS FOR LABORATORY CASEWORK COMPONENTS AND EQUIPMENT LOCATIONS
- MAINTAIN EXISTING FLOOR AND WALL RATINGS. REFER TO SHEET G-01.
- PATCH AND REPAIR ANY MISSING FIRESTOPPING OR DAMAGED FLOOR AND WALL CONSTRUCTION AS NECESSARY TO MAINTAIN INTEGRITY OF EXISTING FIRE RATINGS.

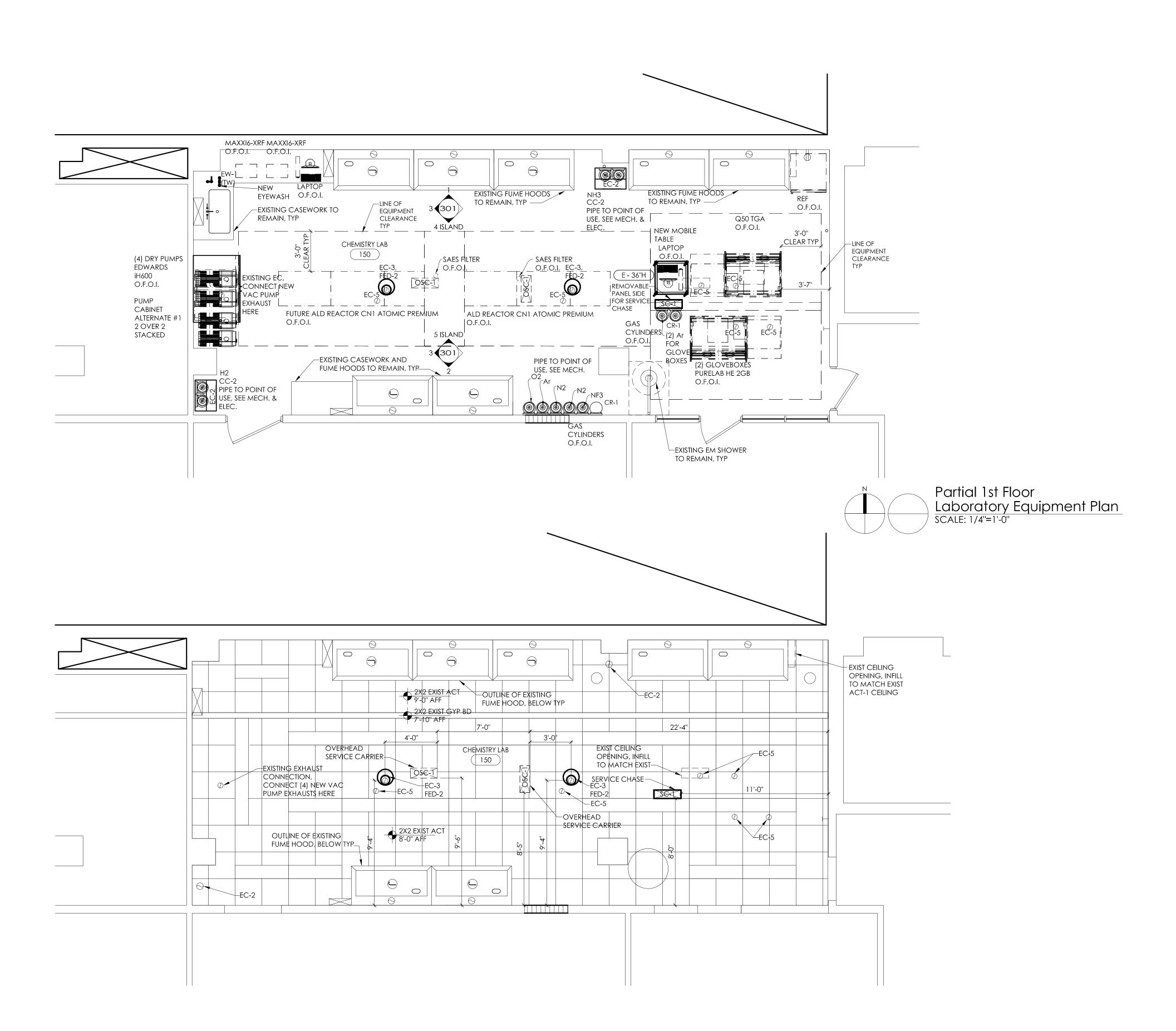
#### DEMOLITION GENERAL NOTES

- REMOVE AND REPLACE EXISTING CONSTRUCTION AS REQUIRED FOR THE EXECUTION OF NEW
- PROTECT EXISTING CONSTRUCTION TO REMAIN AS REQUIRED DURING DEMOLITION.
- REFER TO ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS FOR ADDITIONAL DEMOLITION REQUIREMENTS AND FOR COORDINATION OF WORK.
- DISCONNECT, REMOVE COMPLETELY AND CAP ALL MISCELLANEOUS FEATURES (I.E. ELECTRICAL, MECHANICAL, PLUMBING, ETC.) ASSOCIATED WITH ITEMS TO BE DEMOLISHED (I.E. PARTITIONS, WALLS, CEILINGS, DOORS, CASEWORK ETC.).
- REMOVAL OF ANY MECHANICAL, ELECTRICAL AND MISCELLANEOUS ITEMS WILL REQUIRE PATCH AND REPAIR OF ADJACENT MATERIALS TO REMAIN TO MATCH EXISTING ADJACENT SURFACE.
- REMOVAL OF ANY WALLS, PARTITIONS, DOORS, CASEWORK OR OTHER PERMANENT BUILDING ELEMENTS WILL REQUIRE PATCH AND REPAIR OF ADJACENT WALL, FLOOR, CEILING MATERIALS TO REMAIN TO MATCH EXISTING ADJACENT SURFACE.
- REMOVE EXISTING UNUSED NAILS, SCREWS AND OTHER WALL PROTRUSIONS FROM EXISTING SURFACES TO REMAIN. PATCH AND REPAIR TO MATCH EXISTING ADJACENT SURFACES AS REQUIRED TO RECEIVE NEW FINISHES.
- CONTRACTOR SHALL PROTECT AND PALLETIZE ANY ITEMS OR MATERIALS TO BE SALVAGED AND/OR RETAINED, RELOCATED AND STORED AS DIRECTED BY OWNER.
- REMOVAL OF EXISTING BUILDING MATERIALS CONTAINING ASBESTOS SHALL BE BY THE OWNER'S ABATEMENT CONTRACTOR. CONTRACTOR SHALL COORDINATE THE REMOVAL OF EXISTING MATERIALS REQUIRED FOR REMOVAL OF MATERIALS CONTAINING ASBESTOS.

#### **IDEMOLITION KEY NOTES**

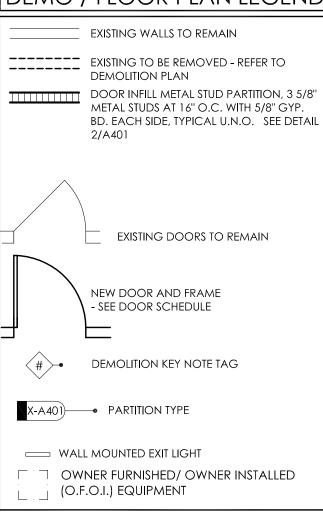
- > remove door, frame and all associated hardware. Salvage, verify and coordinate WITH OWNER MEANS FOR PROTECTING, RELOCATING AND STORAGE OF DOOR AND FRAME.
- > REMOVE LAB CASEWORK. SALVAGE, VERIFY AND COORDINATE WITH OWNER MEANS FOR PROTECTING AND PALLETIZATION OF LAB CASEWORK FOR RELOCATION AND STORAGE.
- > REMOVE LAB SERVICE CHASE. VERIFY AND COORDINATE WITH OWNER MEANS FOR PROTECTING AND PALLETIZATION OF EXISTING LAB SERVICE CHASE FOR RELOCATION AND STORAGE.
- PREMOVE LAB BENCHTOP, SINKS AND SINK FIXTURES, AND EYEWASH. REFER TO ELECTRICAL AND MECHANICAL DRAWINGS FOR ADDITIONAL DEMO REQUIREMENTS AND COORDINATION. VERIFY AND COORDINATE WITH OWNER MEANS FOR PROTECTING AND PACKAGING FIXTURES FOR RELOCATION AND STORAGE.
- REMOVE LAB GAS FITTINGS. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL DEMO REQUIREMENTS AND COORDINATION. VERIFY AND COORDINATE WITH OWNER MEANS FOR PROTECTING AND PACKAGING FIXTURES FOR RELOCATION AND STORAGE.
- 6 REMOVE FLEXIBLE TRUNK SNORKEL. VERIFY AND COORDINATE WITH OWNER MEANS FOR PROTECTING AND PACKAGING FIXTURES FOR RELOCATION AND STORAGE. EXHAUST PORT TO REMAIN AND TO BE REWORKED TO EXHAUST (4) VACUUM PUMP CABINETS. REFER TO MECHANICAL & ELECTRICAL DRAWINGS FOR ADDITIONAL DEMO REQUIREMENTS AND COORDINATION.
- 7  $\rightarrow$  DISCONNECT EXISTING LAB EQUIPMENT EXHAUST, ELECTRICAL AND PIPED CONNECTIONS. COORDINATE WITH OWNER FOR RELOCATION AND STORAGE.
- 8 DISCONNECT AND REMOVE LAB GAS CYLINDERS RESTRAINTS, PIPING, VALVES AND GAGES. COORDINATE WITH OWNER FOR ITEMS TO BE RETAINED PRIOR TO DISPOSAL.
- 9>ALTERNATE #1 REMOVE EXISTING SECTION OF WIREMOLD SO THAT THE NEW VACUUM PUMP CABINET CAN BE SECURED TO THE WALL.

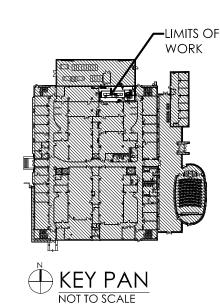


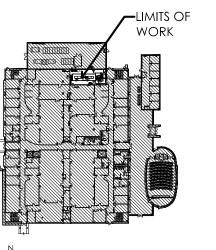












#### **GENERAL CONSTRUCTION NOTES**

- FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION, TYPICAL.
- REFER TO TYPICAL PARTITION CONSTRUCTION DETAILS, SHEET A401, FOR WALL/ PARTITION CONSTRUCTION INFORMATION.
- REFER TO LABORATORY DRAWINGS FOR LABORATORY CASEWORK COMPONENTS AND EQUIPMENT LOCATIONS. MAINTAIN EXISTING FLOOR AND WALL RATINGS. REFER TO SHEET G-01.
- PATCH AND REPAIR ANY MISSING FIRESTOPPING OR DAMAGED FLOOR AND WALL CONSTRUCTION TO MAINTAIN EXISTING FIRE RATINGS.

#### REFLECTED CEILING PLAN LEGEND



#### AIR & GAS LEGEND

- AR ARGON GAS (INERT) CA COMPRESSED AIR (120 PSI)

- NH3 AMMONIA (TOXIC)
- H2 HYDROGEN (FLAMMABLE) N2 NITROGEN (INERT) NF3 NITROGEN TRIFLOURIDE O2 OXYGEN (ÖXIDIZER)



5454 Cass Avenue, Detroit, MI 48202

**Project Location:** 

**WAYNE STATE UNIVERSITY** CHEMISTRY BUILDING 5101 CASS AVENUE **DETROIT MICHIGAN 48202** 

CONTACT: ASHLEY FLINTOFF



#### iDesign

iDesign Solutions, LLC Scientific Facilities & Laboratory Design 2531 Ridge Road, Suite 100 White Lake, MI 48383 248-440-7310 info@iDesign-Solutions.info www.iDesign-Solutions.info



issue:	date:
OWNER REVIEW	10/20/16
OWNER REVIEW	10/28/16
OWNER REVIEW	11/03/16
BID AND CONSTRUCTION ISSUE	11/23/16



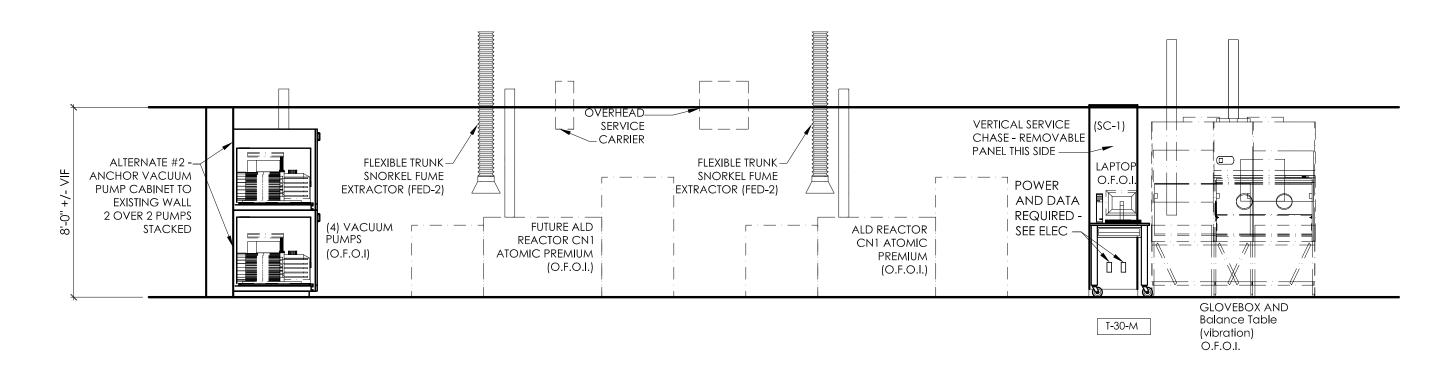
designed by:	LAC
drawn by:	RLE
coordination checked:	RLE
checked:	CTW
approved:	LAC

project CHEMISTRY LAB 150 1st Floor Modification

sheet title:

Partial 1st Floor Laboratory Equipment Plan and Partial 1st Floor Reflected Ceiling Plan

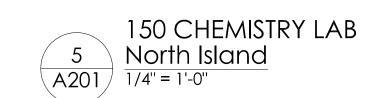
project number: sheet number: 007-286023 A201

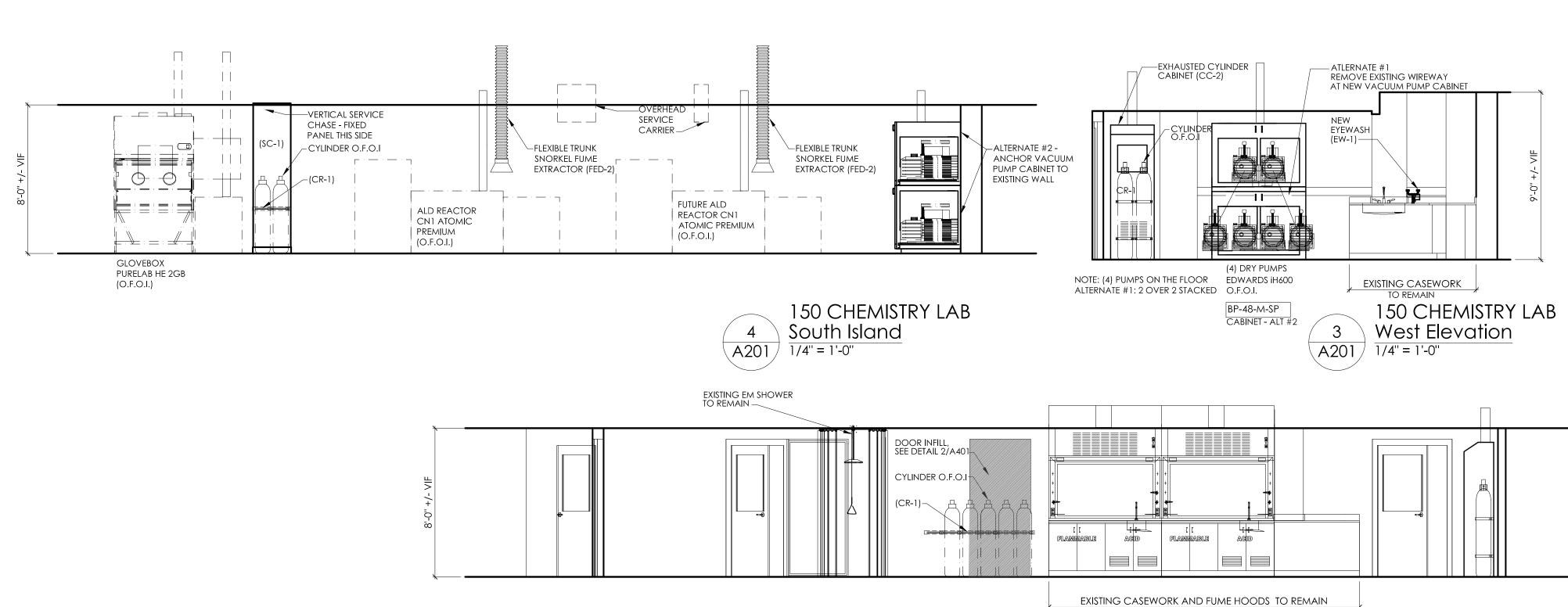


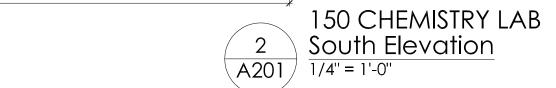
Example of Vacuum Pump Cabinet

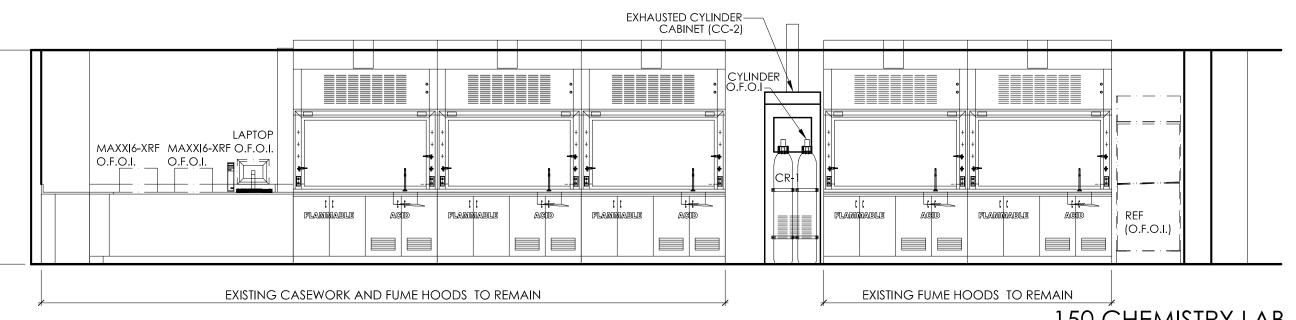
ALTERNATE #2

C:\Users\iDesign\Desktop\Pump Enclosures.jpg









1 North Elevation
1/4" = 1'-0"

# WAYNE STATE UNIVERSITY

5454 Cass Avenue, Detroit, MI 48202

**Project Location:** 

WAYNE STATE UNIVERSITY
CHEMISTRY BUILDING
5101 CASS AVENUE
DETROIT MICHIGAN 48202

CONTACT: ASHLEY FLINTOFF



## iDesign

iDesign Solutions, LLC
Scientific Facilities & Laboratory Design
2531 Ridge Road, Suite 100
White Lake, MI 48383
248-440-7310
info@iDesign-Solutions.info
www.iDesign-Solutions.info



issue:	dat
OWNER REVIEW	10/20/
OWNER REVIEW	10/28/
OWNER REVIEW	11/03/
BID AND CONSTRUCTION ISSUE	11/23/

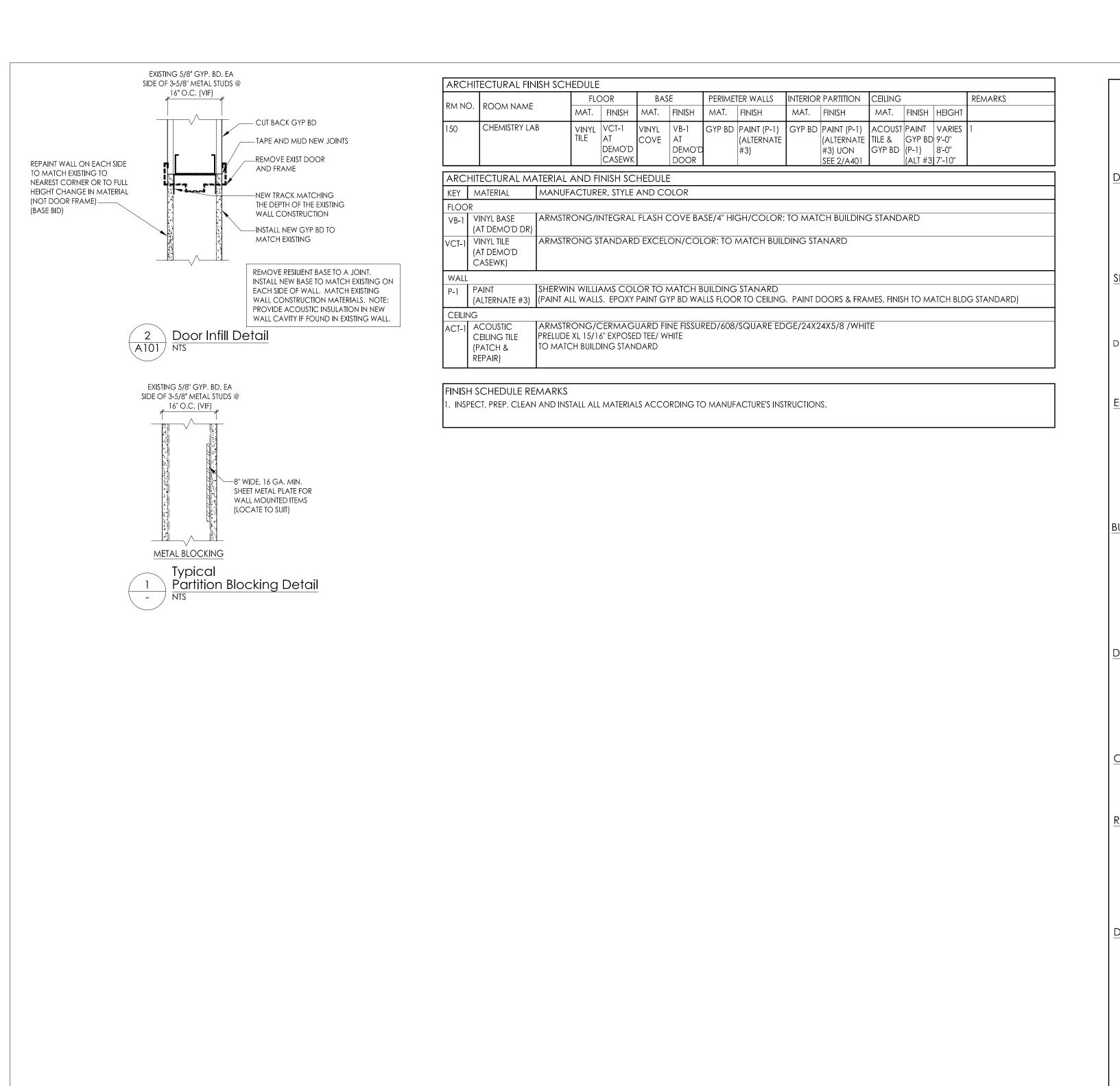


designed by:	LA
drawn by:	RL
coordination checked:	RL
checked:	CT\
approved:	LA

project:
CHEMISTRY LAB 150
1st Floor
Modification

sheet title:
Partial 1st Floor
Interior Elevations

project number: sheet number: 007-286023 A301 (1156-7: iDesign project number)



(W-width)

WALL CABINET

BARRIER FREE/ADA

SINK BASE CABINET

GASSES W/

REGULATOR

MOUNTED GAS

∠DATA

 $\stackrel{\checkmark}{=} \stackrel{\dashv}{=} \stackrel{!}{\downarrow} \text{ WALL or PANEL}$ 

(BSC)

**BIO SAFETY CABINET** 

(OFOI)

POWER/DATA WIREWAY

(SEE ELECTRICAL)—

STANDARD BENCH/

BASE CABINET

36"x48" IDEAL

AREA/----

16" MIN. R —

PEGBOARD DRYING

RACK

8 8 6 8 8 8 8 6 8 8 8 8 8 8 8 8 8 8

 $\leftarrow$  'PANIC BAR' FOR

ACTIVATING EM

EYE/ FACE WASH

**ACTIVATOR PANEL** 

EM EYEWASH PANIC BAR

(LC-1 PART 1)

**COAT RACK** 

COAT HOOKS

"LOW BENCH/

LOW BASE CABINET

CLEAR FLOOR

36"x36" MIN (TYP)

UNOBSTRUCTED

EYEWASH

-SHOWER

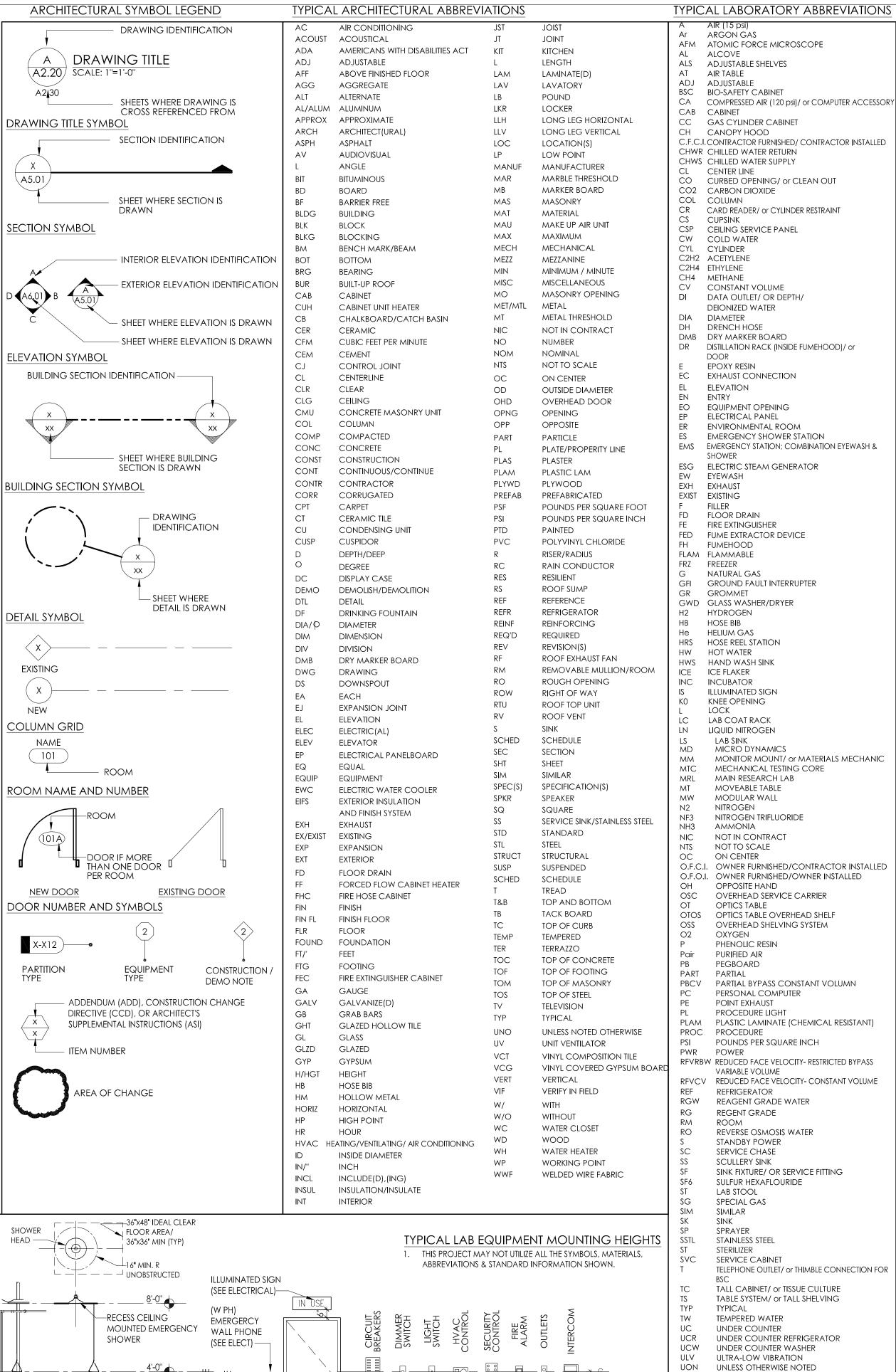
em shower and eyewash

W/ CURTAIN ACCESSORY

RECESS CEILING MOUNTED FIRE EXTINGUISHER (SEE

ARCHITECTURAL)

EM SHOWER



WAYNE STATE UNIVERSITY

5454 Cass Avenue, Detroit, MI 48202

Project Location:

WAYNE STATE UNIVERSITY
CHEMISTRY BUILDING
5101 CASS AVENUE
DETROIT MICHIGAN 48202

**CONTACT: ASHLEY FLINTOFF** 



iDesign Solutions, LLC
Scientific Facilities & Laboratory Design
2531 Ridge Road, Suite 100
White Lake, MI 48383
248-440-7310
info@iDesign-Solutions.info



issue:	date
OWNER REVIEW	10/20/16
OWNER REVIEW	10/28/16
OWNER REVIEW	11/03/16
BID AND CONSTRUCTION ISSUE	11/23/16



designed by:	LAC
drawn by:	RLE
coordination checked:	RLE
checked:	CTV
approved:	LAC

project:
CHEMISTRY LAB 150
1st Floor
Modification

sheet title:
Legends,
Architectural Schedules

project number: sheet number:

007-286023 A401

and Details

UNISTRUT SUPPORT SERVICE CARRIER

WALL-MOUNTED EMERGENCY PHONE

VOLTAGE OR VACUUM

VOICE DATA OUTLET

VENTED GAS CABINET

WALK-IN FUME HOOD

WALL CABINET

WIRE SHELVING

WALL DRAIN

WIRE WAY

VACUUM

VAC

VD

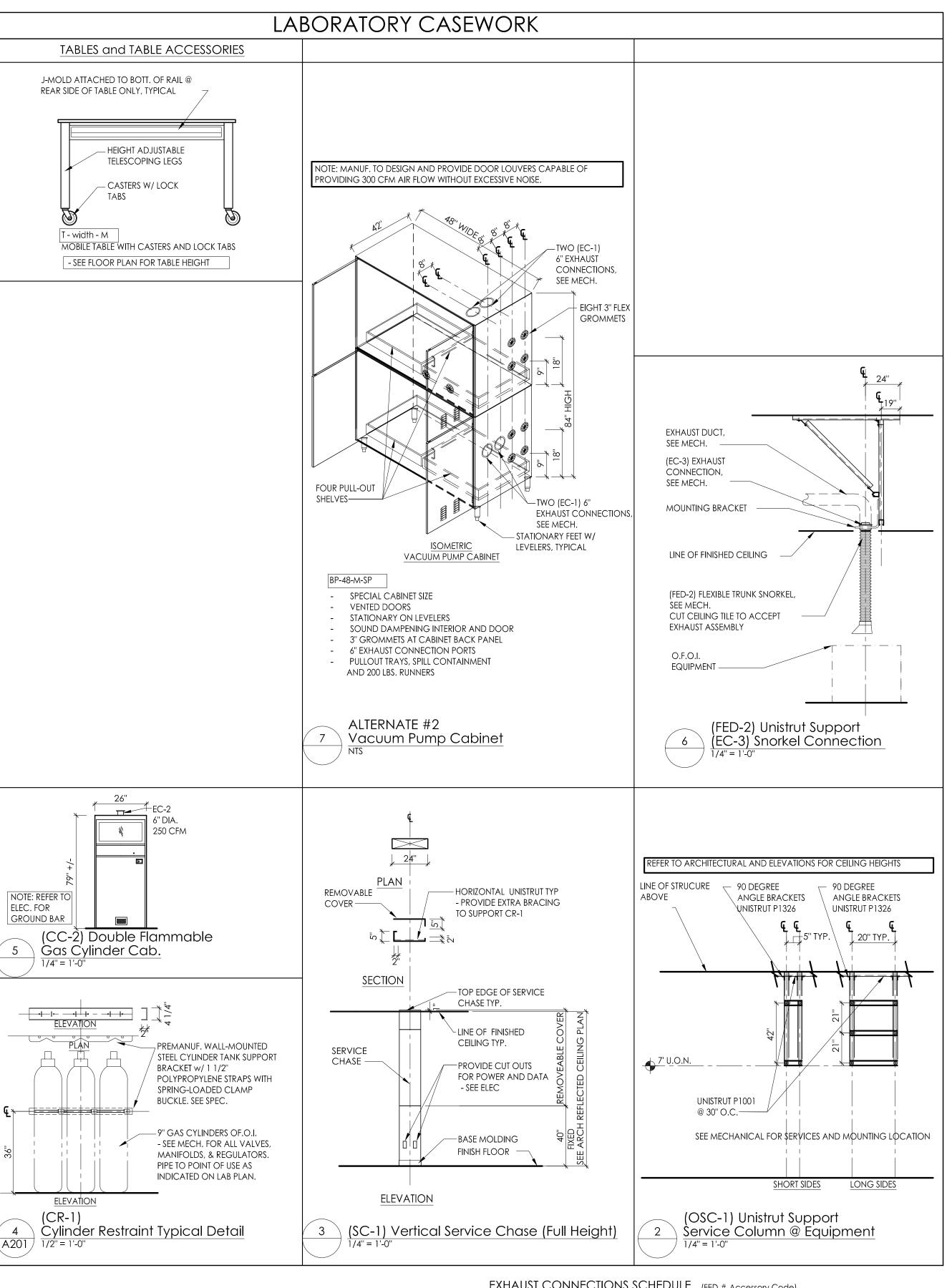
VGC

WD

WIRE

WPH

007-286023 A401 (1156-7: iDesign project number)



EXHAUST CONNECTIONS SCHEDULE (FED-#-Accessory Code)						
<u>ID</u>	FED-1	FED-2	FED-3	FED-4	FED-5	FED-
DESCRIPTION	PORT	FLEXIBLE TRUNK SNORKEL FUME EXTRACTOR		(1824) (1300) TOTAL ARM FUME EXTRACTOR	(3) JOINT ARM FUME EXTRACTOR	TELESCOPING AA FUME EXTRACTOR
SYMBOL						

#### EMERGENCY SAFETY EQUIPMENT FIXTURES SCHEDULE

<u>ID</u>	SYMBOL	<u>DESCRIPTION</u>	<u>'ESCRIPTION</u>			
EM-1			MERGENCY EYE WASH & DRENCH HOSE, DECK MOUNTED (@ SINK)			
VERTIC	ERTICAL SERVICE CHASE SCHEDULE					
<u>ID</u>	SYMBOL	nominal size	LOCATION (REFER TO LAB PLAN FOR ACL LOCATIONS)	CTUAL	<u>DETAIL</u>	
SC-1	$\boxtimes$	24" x 7" DEEP	FULL HEIGHT FLOOR-TO-CEILING		3/A402	

BENCH	HTOP SCHEDULE					
EXAMPLE	E - 36"H RIAL - HEIGHT (inches)	- ALL BENCHTOPS TO BE <u>EPOXY RESIN</u> UNLESS OTHERWISE NOTED ALL BENCHTOPS TO BE <u>30" DEEP</u> UNLESS OTHERWISE NOTED ALL BENCHTOPS TO BE <u>36" HIGH</u> UNLESS OTHERWISE NOTED.				
<u>ID</u>	MATERIAL		THICKNE			
E	EPOXY RESIN		1"			

### NOTES

CASEWORK NOM	ENCLATURE CODE:
CODE EXAMPLE	CODE SYMBOL
(B3D)-(30)-(XS)	B3D-30-XS
(505) (50) (70)	ACCESSORY CODE
	——— CABINET WIDTH (in.)
	CABINET TYPE AND DOOR /
	DRAWER STYLE CODE

#### GENERAL NOTES

1. THIS PROJECT MAY NOT UTILIZE ALL THE SYMBOLS, MATERIALS, ABBREVIATIONS AND STANDARD INFORMATION SHOWN ON THIS SHEET.

2. ALL BENCHTOPS TO BE EPOXY RESIN UNLESS OTHERWISE NOTED ON PLAN.

3. ALL BENCHTOPS TO BE 30" DEEP UNLESS OTHERWISE NOTED ON PLAN.
4. ALL BENCHTOPS TO BE 36" HIGH UNLESS OTHERWISE NOTED.

#### CASEWORK NOTES

1. LABORATORY EQUIPMENT CONTRACTOR IS RESPONSIBLE FOR FURNISHING, INSTALLING AND COORDINATING WITH BUILDING TRADES.

2. ANY DISCREPANCIES OR INTERFERENCE BETWEEN UNISTRUT, SERVICE CARRIERS, BRACES, SERVICE CHASES, FUME HOODS AND EXHAUST DEVICES SHALL BE BROUGHT TO THE LABORATORY ARCHITECT'S ATTENTION.

3. REFER TO ARCHITECTURAL PLANS FOR ROOM DIMENSIONS AND FIELD VERIFY FOR ACTUAL DIMENSIONS PRIOR TO FABRICATION.

4. BENCHTOP LENGTHS SHALL BE DETERMINED BY CASEWORK AND DIMENSIONS INDICATED ON PLANS AND ELEVATIONS. ALL BENCHTOPS SHALL OVERHANG CASEWORK BY 1" AT ALL EXPOSED EDGES U.N.O.

5. ALL EXPOSED EDGES AT BENCHTOPS AND SPLASHES SHALL HAVE AN EASED EDGE & UNDERSIDE DRIP GROVE @ BENCHTOPS.

6. ALL BENCHTOP MATERIAL SEAMS SHALL BE FILLED FLUSH TO PROVIDE AN EVEN SMOOTH SURFACE.

7. BENCHTOPS AND BACK SPLASHES SHALL BE SCRIBED TO WALL TO CONFORM TO IRREGULARITIES OF THE WALL PLANE.

8. ALL BENCHTOPS FLANKED BY FUME HOODS, TALL CABINETS AND SIDE WALLS SHALL HAVE SIDE SPLASHES.

9. LAB EQUIPMENT CONTRACTOR SHALL USE AN ACID-RESISTANT SEALANT AT SPLASHES AND ALL PENETRATIONS THROUGH BENCHTOP.

10. CASEWORK INSTALLATION SHALL BEGIN AT THE HIGH POINT OF THE ROOM FOR EACH RUN OR ISLAND WITH THE LEVELERS SET AS SHORT AS

11. PROVIDE FILLERS, SIDE PANELS, END PANELS, BACK PANELS AND CLOSURE PANELS TO COMPLETE INSTALLATION WITH SAME MATERIAL AND

12. ALL CASEWORK AND FREESTANDING UTILITY SHELVING SHALL BE SECURED TO ADJACENT WALLS.

 ALL INTERSECTIONS BETWEEN FIXED CASEWORK AND ADJACENT SURFACES SUCH AS WALLS ARE TO BE FILLED SOLID WITH ACID-RESISTANT SEALANT.

4. COORDINATE DIMENSIONS OF CASEWORK WITH TABLE STRUCTURE TO ENSURE THAT THE CASEWORK ATTACHED TO TABLE FRAMES SHALL IT AND FUNCTION WITHOUT IMPEADMENT.

15. FUME HOOD AND CONTROLS CONTRACTOR TO COORDINATE AND DOCUMENT ALL INTERFACES BETWEEN FUME HOODS AND CONTROLS
16. FUME HOOD CONTRACTOR TO PROVIDE AND COORDINATE DUCT TRANSITION AND CONNECTION PIECE WITH MECHANICAL TRADES.

#### GENERAL NOTES:

- 1. THIS PROJECT MAY NOT UTILIZE ALL THE SYMBOLS, MATERIALS, ABBREVIATIONS & STANDARD INFORMATION SHOWN ON THIS
- 2. FIELD VERIFY ALL DIMENSIONS PRIOR TO FABRICATION. <u>DO NOT SCALE DRAWINGS</u>.
- 3. REFER TO SHEET A-402 FOR LABORATORY CASEWORK SCHEDULE AND NOTES
- 4. REFER TO SHEET A-402 FOR LABORATORY CASEWORK, FIXTURE AND ACCESSORY DETAILS.
- 5. REFER TO SHEET A-402 FOR LABORATORY EXHAUST AND BENCH SERVICE CHASE EQUIPMENT DETAILS.

Fume Extraction Device Mounting Bracket

- 6. REFER TO SHEET A-402 FOR LABORATORY EQUIPMENT SUPPORT DETAILS.
- . REFER TO FLOOR PLAN FOR ROOM DIMENSIONS.
- ALL DIMENSIONS ARE NOMINAL. COORDINATE VARIATIONS BASED ON MANUFACTURER OR CLOSEST MANUFACTURER STANDARD, SUBJECT TO LAB ARCHITECT'S AND/ OR LABORATORY CONSULTANT'S APPROVAL.
- PROVIDE BLOCKING OR BACKING PLATE FOR WALL REINFORCEMENT AND SUPPORT FOR WALL MOUNTED EQUIPMENT,
- SHELVING AND CABINETS IN SHEET A401.

## LABORATORY ACCESSORY, CASEWORK, FUME HOOD, AND SERVICE FITTING FINISH SCHEDULE I.D. ITEM MATERIAL & FINISH COLOR NOTES DI ACCESSORIES

(ALS-2)	ADJUSTABLE LAB SHELVES	PHENOLIC RESIN	MFR. STD. BLACK	TRESPA TOP LAB (DESIGN STD)	-
	SHELF BRACKETS & SUPPORT STANDARDS	PAINTED METAL	TBD	SLOTTED STANDARD SUPPORT/ STEEL BRACKETS, ADJ. 1" INCREMENTS. SEE SPEC	
(OSC-1)	PREFABRICATED OVERHEAD SERVICE CARRIER WITH UNISTRUT SUPPORTS	PAINTED STEEL	MATCH CASEWORK	FINISH EXPOSED MEMBERS ONLY	2/A402
(SC-1)	SERVICE CHASE (SERVICE DROP)	PAINTED METAL	MATCH CASEWORK		3/A402
	ELECTRICAL RECEPTACLES & SWITCHES	MANUFACTURER STANDARD	STANDARD BLACK	EMERGENCY POWER = RED (SEE ELECTRICAL DOCUMENTS)	-
(CA-1)	KEYBOARD TRAY	MFR. STD.	BLACK	HUMANSCALE, 900- STD KEYBD W/ MOUS (DESIGN STD) SEE SPEC	E CLIP
(CA-2)	CPU HOLDER	MFR. STD.	BLACK	HUMANSCALE, CPU555 (DESIGN STD) SEE	SPEC
(CA-4)	WIRE MANAGEMENT	'J' SHAPE MFR. STD.	BLACK	APPLY ALONG BACK RAIL OF TABLES	
BENC	htops, sinks & cup sinks		•	•	
(E)	epoxy resin	epoxy resin, matte	MFR. STD. BLACK	durcon (design std)	-
			<b>.</b>		

		(E)	EPOXY RESIN	epoxy resin, matte	MFR. STD. BLACK	DURCON (DESIGN STD)	l
	ļ				•		Γ
							Γ
		CASE	work			•	_
			BASE CABINETS	PAINTED METAL, SEMI-GLOSS	SIGMA FLEX IN DOVE GRAY O	R SIM MOTT PAINTED STEEL (DESIGN STD)	
			WALL & TALL CABINETS	PAINTED METAL, SEMI-GLOSS	SIGMA FLEX IN DOVE GRAY O	r Sim Mott Painted Steel (design Std)	Γ
							Г
			FLAMMABLE CABINETS	PAINTED METAL, SEMI-GLOSS	SIGMA FLEX IN DOVE GRAY O	R SIM MOTT PAINTED STEEL (DESIGN STD)	Γ
			acid cabinets	PAINTED METAL, SEMI-GLOSS	SIGMA FLEX IN DOVE GRAY O	r Sim Mott Painted Steel (design Std)	Γ
ON THIS SHEET.	l		INICTOLIAAENIT TARLE EDAAAEC	DAINITED METAL SEMI CLOSS	SICAAA ELEVINI DOVE CDAV O	D SIAA AAOTT DAINITED STEEL (DESIGNI STD)	Т

INSTRUMENT TABLE FRAMES PAINTED METAL, SEMI-GLOSS SIGMA FLEX IN DOVE GRAY OR SIM MOTT PAINTED STEEL (DESIGN STD) 
CASEWORK HARDWARE, DOOR & STAINLESS STEEL, SATIN FINISH NATURAL 
CASEWORK LETTERING PAINTED RED -

EMERGENCY FIXTURES, SINK FIXTURES AND SERVICE FITTINGS

(EM-1) EMERGENCY FIXTURE

CHROME, SATIN FINISH

**EXHAUST CONNECTIONS LEGEND** 

<u>ID</u>	DESCRIPTION NOTE: SEE MECHANICAL DOCUMENTS FOR ALL DUCTWORK AND CONNECTIONS (COORDINATE WITH MECHANICAL)
EC-1	EXHAUST CONNECTION AND DUCTWORK BY MECHANICAL TRADES ROUTED VERTICALLY FROM THE CEILING AND HORIZONTALLY BEHIND CASEWORK TO VENTED BASE CABINETS (BC-#, BV-# & BP-#).
EC-2	EXHAUST CONNECTION AND DUCTWORK BY MECHANICAL TRADES ROUTED VERTICALLY TO VENTED CABINETS (UC-#, UV-# & CC-#).
EC-3	DIRECT VERTICAL EXHAUST CONNECTION TO (FED-1) EXHAUST PORT, (FED-2) FLEX TRUNK SNORKEL AND (FED-6) AA FUME EXTRACTOR.
EC-4	(NOT USED)
EC-5	DEDICATED EXHAUST CONNECTION FOR EQUIPMENT. CONNECTIONS AND DUCTWORK BY MECHANICAL TRADES; SEE MECHANICAL.

NATURAL

WITH CLEAR EPOXY COATING

#### LABORATORY SYMBOL LEGEND

<u>ID</u>	<u>symbol</u>	<u>DESCRIPTION</u>	<u>NOTES</u>
CR-#	0	CYLINDER RESTRAINT	
EC-#	0	EXHAUST CONNECTION	SEE SCHEDULE THIS SHEET, COORDINATE WITH MECHANICAL
FH#-#		FUME HOOD	REFER TO LAB DOCUMENTS FOR LOCATIONS AND DETAILS
FE-#	•	FIRE EXTINGUISHER	REFER TO LAB DOCUMENTS FOR LOCATIONS AND ARCHITECTURAL SPECIFICATIONS
LC-#		LAB COAT RACK	REFER TO LAB DOCUMENTS FOR LOCATIONS, LAB ELEVATIONS FOR WIDTH AND SHEET A401 FOR TYPICAL MOUNTING HEIGHT
PWR		DUPLEX POWER OUTLET	REFER TO ELECTRICAL DOCUMENTS
PWR	Φ 🖸	SPECIAL POWER OUTLET	REFER TO ELECTRICAL DOCUMENTS
VD		VOICE/ DATA OUTLET	REFER TO ELECTRICAL DOCUMENTS
W PH		EM WALL-MOUNTED PHONE	COORDINATE WITH ELECTRICAL DOCUMENTS
СО		CURBED OPENING (BENCHTOP)	REFER TO LAB DOCUMENTS FOR LOCATIONS AND BENCHTOP DETAIL.

# WAYNE STATE UNIVERSITY

5454 Cass Avenue, Detroit, MI 48202

**Project Location:** 

WAYNE STATE UNIVERSITY
CHEMISTRY BUILDING
5101 CASS AVENUE
DETROIT MICHIGAN 48202

CONTACT: ASHLEY FLINTOFF



### iDesign

iDesign Solutions, LLC
Scientific Facilities & Laboratory Design
2531 Ridge Road, Suite 100
White Lake, MI 48383
248-440-7310
info@iDesign-Solutions.info
www.iDesign-Solutions.info



issue:	date
OWNER REVIEW	10/20/16
OWNER REVIEW	10/28/16
OWNER REVIEW	11/03/16
BID AND CONSTRUCTION ISSUE	11/23/16



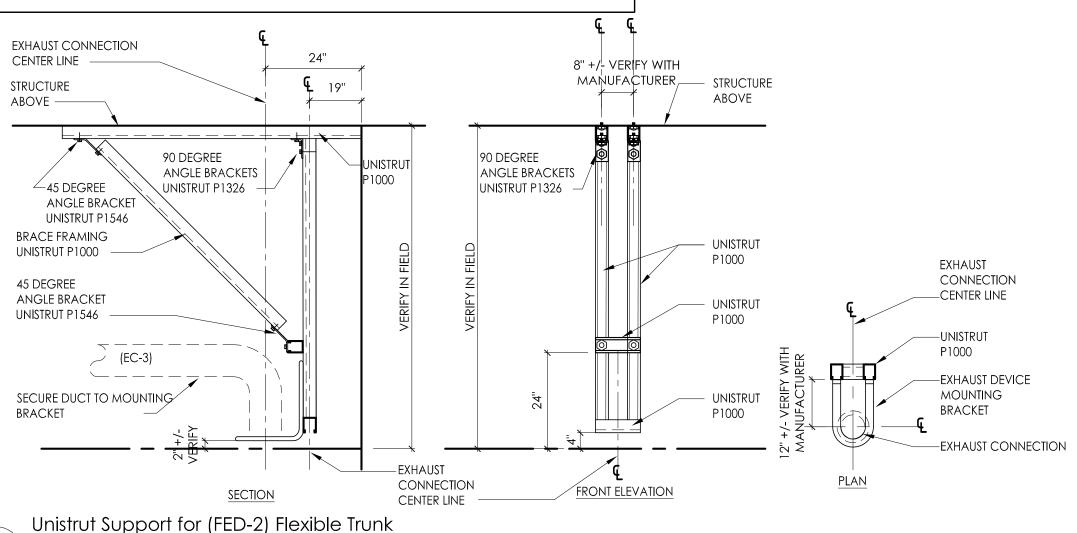
designed by:	LAC
drawn by:	RLB
coordination checked:	RLB
checked:	CTW
approved:	LAC

project:
CHEMISTRY LAB 150
1st Floor
Modification

sheet title:

Laboratory Schedules and Details

project number: sheet number: 007-286023 A402 (1156-7: iDesign project number)



#### **ABBREVIATIONS**

AAV	AUTOMATIC AIR VENT	FP	FIRE PUMP	OD	OUTSIDE DIAMETER
ACC	AIR COOLED CONDENSER	FPB	FAN POWERED BOX	OED	OPEN ENDED DUCT
ACCU	AIR COOLED CONDENSING UNIT	FPI	FINS PER INCH	OF	OVERFLOW
AD	ACCESS DOOR	FPM	FEET PER MINUTE	OS&Y	OUTSIDE SCREW AND YOKE
AFF	ABOVE FINISHED FLOOR	FS	FLOOR SINK	ОХ	OXYGEN
AHU	AIR HANDLING UNIT	FS	FLOW SWITCH	<u>Р</u>	PUMP
AP	ACCESS PANEL	FT	FOOT	PCHW	PROCESS CHILLED WATER
APD	AIR PRESSURE DROP	FTR	FINNED TUBE RADIATION	PCHWR	PROCESS CHILLED WATER PROCESS CHILLED WATER RETURN
ARCH	ARCHITECTURAL	FV	FACE VELOCITY		
		l —	<del></del>	PCHWS	PROCESS CHILLED WATER SUPPLY
ASR	AUTOMATIC SPRINKLER RISER	_   G	NATURAL GAS	PD	PRESSURE DROP
В	BOILER	GA	GAUGE	PPM	PARTS PER MILLION
BAL	BALANCE	GAL	GALLON	PRESS	PRESSURE
BCU	BLOWER COIL UNIT	GPH	GALLONS PER HOUR	PRV	PRESSURE REDUCING VALVE
BFP	BACKFLOW PREVENTER	GPM	GALLONS PER MINUTE	PSI	POUNDS PER SQUARE INCH
BHP	BRAKE HORSEPOWER	GWH	GAS WATER HEATER	PSIA	POUNDS PER SQUARE INCH - ABSOL
	BOTTOM OF DUCT	<u> </u>	<del></del>	PSIG	POUNDS PER SQUARE INCH - GAUGE
BOD		HB	HOSE BIBB		
ВОР	BOTTOM OF PIPE	HC	HEATING COIL	RA	RETURN AIR
BTU	BRITISH THERMAL UNIT	HHW	HEATING HOT WATER	RAT	RETURN AIR TEMPERATURE
BTUH	BRITISH THERMAL UNIT PER HOUR	HHWR	HEATING HOT WATER RETURN	RCP	RADIANT CEILING PANEL
CA	COMPRESSED AIR	- HHWS	HEATING HOT WATER SUPPLY	RD	ROOF DRAIN
CAV	CONSTANT AIR VOLUME	НО	HUB OUTLET	REQ'D	REQUIRED
		HOA	HAND/OFF/AUTO	RF	RETURN FAN
CC	COOLING COIL			RG	RETURN AIR GRILLE
CFH	CUBIC FEET PER HOUR	HP	HEAT PUMP		
CFM	CUBIC FEET PER MINUTE	HP	HORSEPOWER	RH	RELATIVE HUMIDITY
CH	CHILLER	HR	HOUR	RHC	REHEAT COIL
CHW	CHILLED WATER	HTG	HEATING	RL	REFRIGERANT LIQUID
CHWR	CHILLED WATER RETURN	HVAC	HEATING, VENTILATING, AIR CONDITIONING	RPM	REVOLUTIONS PER MINUTE
CHWS	CHILLED WATER SUPPLY	НW	DOMESTIC HOT WATER	RS	REFRIGERANT SUCTION
CO	CLEAN OUT	HWR	DOMESTIC HOT WATER RETURN	RTU	ROOFTOP UNIT
		HX	HEAT EXCHANGER		
CO2	CARBON DIOXIDE			SA	SUPPLY AIR
COND	CONDENSATE	HZ	HERTZ	SA	SOUND ATTENUATOR
CONT	CONTINUATION	ID	INSIDE DIAMETER	SAN	SANITARY WASTE
CRAC	COMPUTER ROOM AIR CONDITIONER	ΙE	INVERT ELEVATION	SAT	SUPPLY AIR TEMPERATURE
СТ	COOLING TOWER	IN	INCHES	SD	SMOKE DETECTOR
CUH	CABINET UNIT HEATER	IR	INFRARED HEATER	SD	SUPPLY AIR DIFFUSER
CW	DOMESTIC COLD WATER	l iw	INDIRECT WASTE	SF	SUPPLY FAN
CWR	CONDENSER WATER RETURN			SH	SHOWER
		_   <u>JC</u>	JANITOR'S CLOSET		
CWS	CONDENSER WATER SUPPLY	KW	KILOWATT	SK	SINK
DB	DRY BULB	KWH	KILOWATT-HOUR	SP	STATIC PRESSURE
DDC	DIRECT DIGITAL CONTROL	LAB	LABORATORY	SPEC	SPECIFICATION
DEG	DEGREE	LAT	LEAVING AIR TEMPERATURE	SS	SERVICE SINK
DFU	DRAINAGE FIXTURE UNITS	LAV	LAVATORY	ST	STORM
DIA	DIAMETER			STK	STACK
DN	DOWN	LBS	POUNDS	STM	STEAM
DWG	DRAWING	LPC	LOW PRESSURE CONDENSATE	STP	STAND PIPE
		_   LPS	LOW PRESSURE STEAM	-	
DWH	DOMESTIC WATER HEATER	LRA	LOCKED ROTOR AMPS	TA	TRANSFER AIR
EA	EACH	LWT	LEAVING WATER TEMPERATURE	TC	TEMPERATURE CONTROL
EA	EXHAUST AIR	MAT	MIXED AIR TEMPERATURE	TD	TRENCH DRAIN
EAT	ENTERING AIR TEMPERATURE	MAU		TEMP	TEMPERATURE
ECUH	ELECTRIC CABINET UNIT HEATER		MAKE-UP AIR UNIT	TEMP	TEMPORARY
EF	EXHAUST FAN	MAX	MAXIMUM	TG	TRANSFER AIR GRILLE
EFF	EFFICIENCY	MBH	1,000 BRITISH THERMAL UNITS PER HOUR	TSP	TOTAL STATIC PRESSURE
		MCA	MEDICAL COMPRESSED AIR	TYP	TYPICAL
EG	EXHAUST GRILLE	MCA	MINIMUM CIRCUIT AMPS		
EHC	ELECTRIC HEATING COIL	MECH	MECHANICAL	UH	UNIT HEATER
ELEC	ELECTRICAL	MEZZ	MEZZANINE	UON	UNLESS OTHERWISE NOTED
ESP	EXTERNAL STATIC PRESSURE	MFR	MANUFACTURER	UR	URINAL
EUH	ELECTRIC UNIT HEATER	MIN	MINIMUM	<u>v</u>	VALVE
EWC	ELECTRIC WATER COOLER	MISC	MISCELLANEOUS	V	VENT
EWH	ELECTRIC WATER HEATER			VAC	VACUUM
EWT	ENTERING WATER TEMPERATURE	MOCP	MAXIMUM OVER-CURRENT PROTECTION	VAV	VACOUM  VARIABLE AIR VOLUME
EX	EXISTING	MV	MANUAL AIR VENT		
		_ MVAC	MEDICAL VACUUM	VD	VOLUME DAMPER
EXH	EXHAUST	N	NITROGEN	VFD	VARIABLE FREQUENCY DRIVE
F	FIRE PROTECTION	N20	NITROUS OXIDE	VOL	VOLUME
<b>'</b> F	DEGREES FAHRENHEIT	NC NC	NOISE CRITERIA	VTR	VENT THROUGH ROOF
F&B	FACE AND BYPASS			w	WASTE
FCO	FLOOR CLEANOUT	NC	NORMALLY CLOSED	WADG	WASTE ANESTHETIC GAS DISPOSAL
FCU	FAN COIL UNIT	NFWH	NON-FREEZE WALL HYDRANT		
		NIC	NOT IN CONTRACT	WB	WET BULB
FD 	FLOOR DRAIN	NK	NECK	WC	WATER CLOSET
FFD	FUNNEL FLOOR DRAIN	NO	NORMALLY OPEN	WC	WATER COLUMN
FHC	FIRE HOSE CABINET	NOM	NOMINAL	WCO	WALL CLEANOUT
FLA	FULL LOAD AMPS	NPW	NON POTABLE WATER	WG	WATER GAUGE
	FLOOR	<del> </del>		WH	WALL HYDRANT
FLR			SUTSIDE AIR	**	**************************************
FLR FM	FLOW MEASURING DEVICE	OA	OUTSIDE AIR OUTSIDE AIR TEMPERATURE	WPD	WATER PRESSURE DROP

	SYMBOL LIST
<u>SYMBOL</u>	DESCRIPTION
	AIR ADMITTANCE VALVE
<u> </u>	AIR VENT - AUTOMATIC
<u></u> 파MV_	AIR VENT - MANUAL
—BFP	BACKFLOW PREVENTER
->>>>>>	BACKFLOW PREVENTER - REDUCED PRESSURE
————	CIRCULATING PUMP
	CIRCULATING PUMP
I	CLEANOUT - FLANGE
FC0 ————	CLEANOUT - FLOOR
WC0	CLEANOUT - WALL
<b></b>	DIRECTION OF FLOW
SLOPE	DIRECTION OF SLOPE - DOWN
o o o o o o o o o o o o o o o o o o o	FIRE DEPARTMENT CONNECTION - FREE STANDING
×	FIRE DEPARTMENT CONNECTION — WALL MOUNTED
<u> </u>	FIRE PROTECTION — SPRINKLER HEAD, PENDANT
	FIRE PROTECTION — SPRINKLER HEAD, UPRIGHT
——————————————————————————————————————	FLOOR DRAIN
	FLOOR DRAIN - FUNNEL
□ FS	FLOW SWITCH
———— НВ	
NFWH	HOSE BIBB
<del></del>	NON-FREEZE WALL HYDRANT
	PIPE - ALIGNMENT GUIDE
<del></del>	PIPE - ANCHOR
	PIPE - CAP OR PLUG
	PIPE - CONCENTRIC REDUCER
	PIPE - ELBOW DOWN
O	PIPE - ELBOW UP
	PIPE - EXPANSION JOINT
	PIPE - FLEXIBLE CONNECTION
	PIPE — TEE DOWN
	PIPE - TEE UP
	PIPE - TRAP
——  —— 	PIPE - UNION
<u> </u>	PRESSURE GAUGE
<u> </u>	PRESSURE/TEMPERATURE TEST PLUG
	VENT THROUGH ROOF
<del>[</del> 0]	ROOF/OVERFLOW DRAIN
T	STEAM TRAP
	STRAINER
	THERMOMETER
	VALVE - ANGLE
——⊗——	VALVE - BALANCING
	VALVE - CHECK
—— ▽ ——	VALVE - GAS
——⋈—— ★	VALVE - ISOLATION
	VALVE - OS&Y
	VALVE - PRESSURE REGULATING
\$	VALVE - RELIEF
<u> </u>	VALVE - THREE-WAY MODULATING CONTROL

VALVE - TWO-WAY MODULATING CONTROL

SYMBOL	DESCRIPTION	DOUBLE LINE D	UCTWORK
	AIR TERMINAL UNIT	SYMBOL	DESCRIPTION
			AIR TERMINAL UNIT
-[	AIR TERMINAL UNIT W/ HEATING COIL		
	DAMPER - VERTICAL FIRE (EXISTING, NEW)		AIR TERMINAL UNIT W/ HEATING COIL
A	DAMPER - HORIZONTAL FIRE (EXISTING, NEW)		DUCT - FLEXIBLE CONNECTION
	DAMPER - COMBINATION FIRE/SMOKE	<u> </u>	DUCT TAKE OFF - RECTANGULAR W/ SHOE TAP
M	DAMPER - MOTORIZED		
	DAMPER - MANUAL VOLUME CONTROL		DUCT TAKE OFF - ROUND CONICAL
	DIFFUSER - SQUARE		ELBOW - RECTANGULAR W/ TURNING VANES
	DIFFUSER — LINEAR SLOT		ELBOW - RECT. RADIUS W/ SPLITTER VANES
	DIFFUSER - ROUND		ELBOW — ROUND
	DUCT CROSS SECTION - SUPPLY		LLBOW - ROUND
	DUCT CROSS SECTION - RETURN OR EXHAUST		ELBOW - RECTANGULAR SMOOTH RADIUS
	DUCT CROSS SECTION — EXHAUST		ELBOW DOWN - RECTANGULAR
<u> </u>	DUCT - FLEXIBLE CONNECTION		ELBOW DOWN — ROUND
<b>///////</b>	DUCT - FLEXIBLE DUCT (5'-0" MAXIMUM)	L	
Ţ	DUCT TAKE OFF - SPIN-IN W/ VOLUME DAMPER	<u> </u>	ELBOW UP — RECTANGULAR
	DUCT TAKE OFF - ROUND CONICAL		ELBOW UP — ROUND
	DUCT TAKE OFF - RECTANGULAR W/ SHOE TAP		HEATING COIL
	ELBOW - RECTANGULAR W/ TURNING VANES	DN	INCLINED DROP IN DIRECTION OF AIRFLOW
	ELBOW - RECTANGULAR/ROUND SMOOTH RADIUS	, , , , ,	
	ELBOW DOWN - RECTANGULAR	↓ UP ↓	INCLINED RISE IN DIRECTION OF AIRFLOW
	ELBOW DOWN — ROUND		TRANSITION - CONCENTRIC
	ELBOW UP - RECTANGULAR		TRANSITION - ECCENTRIC
	ELBOW UP - ROUND		TRANSITION – RECTANGULAR TO ROUND
	HEATING COIL		TRANSITION - RECTANGULAR TO ROUND
DN S	INCLINED DROP IN DIRECTION OF AIRFLOW	TEMPERATURE C	ONTROLS  DESCRIPTION
UP	INCLINED RISE IN DIRECTION OF AIRFLOW	CO2)	CARBON DIOXIDE SENSOR
	GRILLE - DUCTED RETURN OR EXHAUST	(CO)	CARBON MONOXIDE SENSOR  NITROGEN OXIDE SENSOR
	GRILLE - PLENUM RETURN	SD	DUCT SMOKE DETECTOR
	GRILLE - PLENUM RETURN W/ ACOUSTICAL BOOT	(H)	HUMIDISTAT/HUMIDITY SENSOR  THERMOSTAT/TEMPERATURE SENSOR
	GRILLE – TRANSFER	<u>Note:</u> this is	ONLY A PARTIAL LIST OF SYMBOLS, REFER TO ONTROL DRAWINGS FOR A LEGEND OF ADDITIONAL
$(\bigcirc)$	ROOF EXHAUST FAN	SYMBOLS THAT	
——————————————————————————————————————	TRANSITION - CONCENTRIC		
	TRANSITION - ECCENTRIC		
	TRANSITION - RECTANGULAR TO ROUND		

UNIT HEATER

### MECHANICAL SHEET INDEX

MOOO MECHANICAL LEGEND & SHEET INDEX MO01 MECHANICAL SPECIFICATIONS MD101 PARTIAL 1ST FLOOR PLUMBING DEMOLITION PLAN MD201 PARTIAL 1ST FLOOR HVAC DEMOLITION PLAN M101 PARTIAL 1ST FLOOR PLUMBING NEW WORK PLAN M201 PARTIAL 1ST FLOOR HVAC NEW WORK PLAN M300 MECHANICAL SCHEDULES & DETAILS M400 TEMPERATURE CONTROLS M401 TEMPERATURE CONTROLS

#### METHODS OF NOTATION

	POINT OF NEW CONNECTION
	DEMOLITION KEY NOTE
	NEW WORK KEY NOTE
100 ⊸ <sup>0</sup> →	INDICATES 100 CFM OF TRANSFER AIR FLOWING FROM ONE SPACE TO ANOTHER, TYPICALLY UNDER DOORWAYS.
(3 <u>)S-1</u> 12ø NK 450 CFM	INDICATES SUPPLY DIFFUSER, SCHEDULE TYPE <u>S-1</u> TYPICAL OF (3) 12 INCH DIAMETER NECK SIZE BALANCE TO 450 CFM
<u>R-1</u> 12x12 NK 500 CFM	INDICATES RETURN GRILLE, SCHEDULE TYPE <u>R-1</u> 12 INCH BY 12 INCH NECK SIZE BALANCE TO 500 CFM
<u>VAV-1</u> 600/200 1.3 GPM	INDICATES TERMINAL UNIT TYPE (VAV, CAV, FPB, ETC.) MAXIMUM/MINIMUM CFM REHEAT COIL CAPACITY (HOT WATER OR ELECTRIC)
	NEW WORK - HEAVY LINE WEIGHT
	EXISTING WORK - LIGHT LINE WEIGHT
4//////////////////////////////////////	DEMOLITION WORK - DASHED LINE W/ HATCHING
18x6	INDICATES RECTANGULAR DUCT 18 INCHES WIDE AND 6 INCHES DEEP (NET INSIDE DIMENSIONS). SIZE PERTAINS TO THE ENTIRE RUN OF DUCT UNLESS OTHERWISE NOTED.
18x6ø	INDICATES FLAT OVAL DUCT 18 INCHES WIDE AND 6 INCHES DEEP (NET INSIDE DIMENSIONS). SIZE PERTAINS TO THE ENTIRE RUN OF DUCT UNLESS OTHERWISE NOTED.
₹ 12ø }	INDICATES ROUND DUCT 12 INCHES IN DIAMETER (NET INSIDE DIMENSION). SIZE PERTAINS TO THE ENTIRE RUN OF DUCT UNLESS OTHERWISE NOTED.
2 M-601	SECTION VIEW/ENLARGED PLAN TAG, REFER TO DETAIL NUMBER 2 ON SHEET NUMBER M-601 FOR CORRESPONDING SECTION VIEW/ENLARGED PLAN



5454 Cass Avenue, Detroit, MI 48202

**Project Location:** 

**WAYNE STATE UNIVERSITY** CHEMISTRY BUILDING 5101 CASS AVENUE **DETROIT MICHIGAN 48202** 

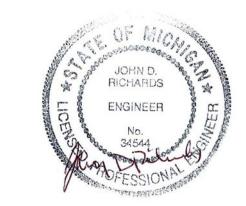
CONTACT: ASHLEY FLINTOFF



iDesign Solutions, LLC Scientific Facilities & Laboratory Design 2531 Ridge Road, Suite 100 White Lake, MI 48383 248-440-7310 info@iDesign-Solutions.info www.iDesign-Solutions.info



issue:	date:
OWNER REVIEW	10/20/16
OWNER REVIEW	10/28/16
OWNER REVIEW	11/03/16
BID AND CONSTRUCTION ISSUE	11/23/16



designed by:	DH
drawn by:	DH
coordination checked:	JR
checked:	JR
approved:	JR

project: CHEMISTRY LAB 150 1st Floor

Modification

sheet title: Mechanical Legend & Sheet Index

project number: sheet number: M000 007-286023 (1156-7 : iDesign project number)

#### MECHANICAL SPECIFICATIONS

MECHANICAL MATERIALS, METHODS AND EXECUTION

#### **WORK INCLUDED:**

FURNISH ALL LABOR AND MATERIAL, APPLIANCES, EQUIPMENT AND SUPERVISION TO PUT IN PLACE A COMPLETE AND FUNCTIONING MECHANICAL INSTALLATION READY FOR OPERATION, AS SPECIFIED HEREIN AND AS INDICATED ON THE DRAWINGS. SYSTEMS SHALL INCLUDE BUT NOT NECESSARILY LIMITED TO THE FOLLOWING MAJOR EQUIPMENT OR OPERATIONS:

- 1. PLUMBING
- 2. HEATING, VENTILATING AND AIR CONDITIONING
- 3. INSULATION
- 4. TEMPERATURE CONTROLS

#### DEFINITIONS:

"PROVIDE": TO FURNISH AND COMPLETELY INSTALL SPECIFIED PRODUCTS AND INCIDENTALS, WHETHER SPECIFICALLY INDICATED OR NOT, NECESSARY FOR A COMPLETE, FUNCTIONAL INSTALLATION. INCLUDES ALL GENERAL AND SPECIALIZED LABOR, EQUIPMENT AND TOOLS NECESSARY TO COMPLETE THE INSTALLATION.

"PIPING": A COMPLETE SYSTEM, INCLUDING PIPE, TUBING, FITTINGS, HANGERS, SUPPORTS, VALVES, AND ALL SPECIALTIES THAT COMPRISE A FULLY FUNCTIONAL PIPING SYSTEM, WHETHER SPECIFICALLY INDICATED OR NOT.

#### CODES, ORDINANCES, AND STANDARDS:

ALL WORK SHALL CONFORM IN ALL RESPECTS TO THE REQUIREMENTS OF THE LATEST ADOPTED FEDERAL, STATE, LOCAL AND UNIVERSITY OF MICHIGAN CODES, ORDINANCES, AND STANDARDS HAVING JURISDICTION OVER THE WORK.

WHERE CONTRACT DOCUMENT REQUIREMENTS EXCEED THE REQUIREMENTS OF THE REFERENCED CODES, ORDINANCES, AND STANDARDS, THE CONTRACT DOCUMENT REQUIREMENTS SHALL BE TAKEN AS MINIMUM.

ALL EQUIPMENT CONTAINING ELECTRICAL WIRING AND/OR ELECTRICAL COMPONENTS SHALL HAVE A UNDERWRITERS LABORATORIES (UL) "PACKAGE" LABEL.

#### PERMITS, FEES AND INSPECTIONS:

SECURE ALL NECESSARY PERMITS, CONNECTION FEES, TAD FEES, LICENSES AND APPROVALS AND ARRANGE FOR ALL INSPECTIONS, INCLUDE ALL RELATED COSTS.

FURNISH CERTIFICATES OF FINAL INSPECTION AND APPROVAL UPON COMPLETION OF PROJECT.

#### **EXAMINATION OF SITE:**

VISIT PROJECT SITE AND BECOME FULLY COGNIZANT OF ALL EXISTING ARCHITECTURAL, MECHANICAL, ELECTRICAL, STRUCTURAL AND SITE CONDITIONS, OR EXISTING CODE VIOLATIONS WHICH MAY AFFECT THE WORK.

NOTIFY ARCHITECT PRIOR TO SUBMITTING BID IF REVISIONS TO CONTRACT DOCUMENTS ARE NECESSARY TO RECTIFY ANY OF THE AFOREMENTIONED EXISTING CONDITIONS.

NO "EXTRAS" TO CONTRACT PRICE WILL BE ALLOWED AFTER RECEIVING BID IN ORDER TO RECTIFY EXISTING CONDITIONS IN ORDER TO MEET THE DESIGN INTENT OF THE CONTRACT DOCUMENTS OR SATISFY CODE REQUIREMENTS.

#### **DEMOLITION:**

DEMOLITION DRAWINGS ARE DIAGRAMMATIC, INTENDED TO CONVEY THE SCOPE OF THE WORK AND INDICATE GENERAL ARRANGEMENT OF EQUIPMENT, DUCTS, PIPING AND APPROXIMATE SIZES AND APPROXIMATE LOCATIONS. DO NOT SCALE DRAWINGS FOR EXACT MEASUREMENTS.

CERTAIN FIELD OBSERVATIONS. EXACT SIZES, LOCATIONS, ARRANGEMENT AND ELEVATIONS OF ALL EXISTING MECHANICAL EQUIPMENT, EXISTING DUCTWORK, EXISTING PIPING AND EXISTING MECHANICAL DEVICES SHALL BE VERIFIED IN THE FIELD.

ALL MECHANICAL WORK SHOWN ON THE DEMOLITION DRAWINGS HAS BEEN TAKEN FROM THE OWNER'S RECORD DRAWINGS AND/OR

THE CONTRACTOR SHALL INCLUDE, IN HIS QUOTE, ALLOWANCES FOR REASONABLE DEVIATIONS BETWEEN WHAT IS SHOWN AND ACTUAL JOB CONDITIONS IN ORDER TO COMPLETE THE WORK IN THE SCOPE INDICATED.

REMOVE, RECONNECT, CAP, PLUG AND REPLACE EXISTING PIPING AND DUCTWORK ONLY WHERE INDICATED IN THE CONTRACT DOCUMENTS.

REMOVE AND/OR REPLACE EXISTING EQUIPMENT, VALVES, CONTROLS, ETC., ONLY WHERE INDICATED IN THE CONTRACT DOCUMENTS.

INTERRUPTION OF EXISTING ACTIVE PIPING: WHERE THE WORK MAKES TEMPORARY SHUT-DOWNS OF SERVICE UNAVOIDABLE, SHUT-DOWN AT TIME AS APPROVED BY THE OWNER, WHICH WILL CAUSE LEAST INTERFERENCES WITH ESTABLISHED OPERATING ROUTINE. ARRANGE TO WORK CONTINUOUSLY, INCLUDING OVERTIME, IF REQUIRED TO MAKE NECESSARY CONNECTION TO EXISTING

UNLESS SPECIFICALLY NOTED TO THE CONTRARY, REMOVED MATERIALS SHALL NOT BE REUSED IN THE WORK. SALVAGE MATERIALS THAT ARE TO BE REUSED SHALL BE STORED SAFE AGAINST DAMAGE AND TURNED OVER TO THE APPROPRIATE TRADE FOR REUSE.

SALVAGED MATERIALS OF VALUE THAT ARE NOT TO BE REUSED SHALL REMAIN THE PROPERTY OF THE OWNER UNLESS POSSESSION RIGHTS ARE WAIVED. THE MATERIALS ARE TO BE REMOVED FROM THE SYSTEMS BY THIS CONTRACTOR AND TURNED OVER TO THE OWNER IN THEIR ORIGINAL CONDITIONS. THE OWNER SHALL MOVE AND STORE THE MATERIALS. WHERE THE OWNER WAIVES POSSESSION RIGHTS, THESE MATERIALS SHALL BECOME THE PROPERTY OF THIS CONTRACTOR, WHO SHALL REMOVE AND LEGALLY DISPOSE OF THE SAME, AWAY FROM THE PREMISES.

#### PROTECTION OF EXISTING SERVICES:

PROTECT FROM ALL DAMAGE, EXISTING SERVICES (I.E., GAS, WATER, ELECTRICAL, ETC.), ENCOUNTERED IN THE WORK, NOT SPECIFICALLY INDICATED TO BE DEMOLISHED. INCLUDE ALL RELATED COSTS.

REPAIR AND/OR REPLACE EXISTING ACTIVE SERVICES INTENDED TO REMAIN IN SERVICE, BUT DAMAGED DURING THE COURSE OF CONSTRUCTION. ABSORB ALL RELATED COSTS. NO "EXTRAS" WILL BE PAID TO RESTORE EXISTING ACTIVE SERVICES DAMAGED DURING CONSTRUCTION.

ARCHITECT WILL DETERMINE COURSE OF ACTION WHEN EXISTING INACTIVE SERVICES ARE DAMAGED DURING COURSE OF CONSTRUCTION. ABSORB ALL COSTS RELATIVE TO ADDITIONAL DEMOLITION, TERMINATION, RELOCATION AND/OR RESTORATION OF EXISTING, DAMAGED INACTIVE SERVICES AS DIRECTED BY ARCHITECT.

#### CUTTING AND PATCHING:

ALL CUTTING AND PATCHING SHALL BE PROVIDED BY THE GENERAL TRADES UNDER THE DIRECTION OF THE MECHANICAL TRADES. COST WILL BE PAID BY THE MECHANICAL TRADE REQUESTING THE WORK.

RESTORED SURFACES SHALL BE OF SAME MATERIALS AND QUALITY AS ADJACENT SURFACES, AND SHALL MATCH SURROUNDING SURFACES, AND/OR BE RESTORED TO PRE-CONSTRUCTION CONDITION.

#### CLEANING AND FINISHING:

PRIOR TO FINAL ACCEPTANCE BY OWNER, THOROUGHLY CLEAN ALL WORK INSIDE AND OUT AS APPLICABLE, AND LEAVE ALL SYSTEMS AND EQUIPMENT IN PERFECT WORKING ORDER. THOROUGHLY CLEAN ALL PLUMBING FIXTURES, EXPOSED PIPING, FLOOR DRAIN GRATES, AND CLEANOUT COVERS AS APPLICABLE.

#### COORDINATION WITH OTHER TRADES:

COORDINATE ALL WORK BEFORE AND DURING CONSTRUCTION WITH ALL OTHER AFFECTED TRADES.

WHERE INTERFERENCES DEVELOP, NOTIFY ARCHITECT FOR RESOLUTION OF CONFLICT.

RELOCATION OF CONFLICTING INSTALLED WORK, DUE TO LACK OF COORDINATION, OR POOR COORDINATION WILL NOT BE CONSIDERED EXTRA WORK.

#### ELECTRICAL WORK:

PROVIDE ALL ELECTRICAL WORK ASSOCIATED WITH, AND NECESSARY TO COMPLETE THIS PROJECT, WHICH IS NOT INCLUDED AS ELECTRICAL TRADES WORK.

PROVIDE ALL ELECTRICAL WORK, AS APPLICABLE, IN ACCORDANCE WITH DIVISION 16 REQUIREMENTS.

CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION (WITH ELECTRICAL TRADES) OF CORRECT VOLTAGES FOR ALL MECHANICAL EQUIPMENT. IN CASE OF DISCREPANCY, NOTIFY ENGINEER IMMEDIATELY AND PRIOR TO SHOP DRAWING SUBMITTALS. FAILURE TO COMPLY WITH THIS REQUIREMENT HOLDS THE CONTRACTOR FULLY RESPONSIBLE FOR ANY SUBSEQUENT PROBLEMS

#### SHOP DRAWINGS:

SUBMIT COMPLETE ELECTRONIC SHOP DRAWINGS FOR ALL MATERIALS AND EQUIPMENT INTENDED FOR USE ON THIS PROJECT.

SHOP DRAWINGS SHALL CLEARLY INDICATE ALL PHYSICAL, PERFORMANCE AND ELECTRICAL CHARACTERISTICS FOR ALL MATERIALS AND FOLIPMENT.

SUBMIT ELECTRONIC COPIES OF ALL SHOP DRAWINGS FOR REVIEW BY ARCHITECT.

NO WORK IS TO BE INSTALLED PRIOR TO RETURN OF ARCHITECT REVIEWED SHOP DRAWINGS.

#### APPROVED MANUFACTURERS:

USE ONLY MATERIALS SPECIFICALLY INDICATED IN CONTRACT DOCUMENTS, OR COMPARABLE MATERIALS BY OTHER LISTED ACCEPTABLE MANUFACTURERS. NOTE THAT "ACCEPTABLE MANUFACTURER" DOES NOT CONSTRUE AUTOMATIC APPROVAL OF SPECIFIC MATERIALS BY ONE OR ALL OF THE LISTED ACCEPTABLE MANUFACTURERS. ARCHITECT AND/OR ENGINEER OF RECORD RESERVES THE RIGHT OF FINAL DETERMINATION OF ACCEPTABILITY OF EACH ITEM.

FURNISHING OF MATERIALS AND MANUFACTURERS OTHER THAN THOSE INDICATED AS ACCEPTABLE IN THE CONTRACT DOCUMENTS WILL BE CONSIDERED VOLUNTARY SUBSTITUTES.

SUBMIT ALL VOLUNTARY SUBSTITUTES TO ARCHITECT FOR REVIEW NO LATER THAN FIFTEEN (15) DAYS PRIOR TO BID DUE DATE. IF ACCEPTABLE, ARCHITECT WILL AUTHORIZE USE OF SUBSTITUTE IN WRITTEN FORM BY LETTER OR ADDENDUM TO CONTRACT DOCUMENTS.

APPROVED VOLUNTARY SUBSTITUTES MUST ONLY BE INDICATED ON FORM OF PROPOSAL WITH APPROPRIATE "ADD" OR "DEDUCT" TO CONTRACT PRICE. DO NOT USE VOLUNTARY SUBSTITUTES FOR BASE BID.

#### **OPERATION AND MAINTENANCE MANUALS:**

UPON COMPLETION OF PROJECT, SUBMIT TWO (2) COMPLETE BOUND SETS AND (2) CD DIGITAL COPIES OF OPERATING AND MAINTENANCE MANUALS FOR ALL EQUIPMENT AND SYSTEMS INSTALLED IN THIS PROJECT.

MANUALS SHALL INCLUDE GUARANTEE(S), COMPLETE OPERATING INSTRUCTIONS, REPAIR PARTS LIST, PREVENTATIVE MAINTENANCE SCHEDULE, BELT AND FILTER SCHEDULE, AND LIST OF ALL SUBCONTRACTORS ASSOCIATED WITH THE WORK, INCLUDING TELEPHONE NUMBER AND CONTACT PERSON.

#### OPERATING AND MAINTENANCE INSTRUCTIONS:

PRIOR TO FINAL ACCEPTANCE BY OWNER, PROVIDE ALL PERSONNEL, EQUIPMENT, AND LABOR AS NECESSARY TO INSTRUCT OWNER'S PERSONNEL IN PROPER OPERATION AND MAINTENANCE OF THE SYSTEMS AND EQUIPMENT INSTALLED IN THIS PROJECT. PROVIDE INSTRUCTIONAL SESSION DURING TIME PERIOD AGREED TO WITH OWNER.

#### <u>GUARANTE</u>

REFER TO ARCHITECTURAL SPECIFICATIONS FOR GUARANTEES, IF NONE EXIST THE FOLLOWING MINIMUM GUARANTEES SHALL BE

PROVIDE A ONE (1) YEAR GUARANTEE COVERING ALL LABOR AND MATERIAL PROVIDED IN THIS PROJECT. FROM DATE OF OWNER ACCEPTANCE GUARANTEE SHALL INCLUDE ALL SHIPPING AND TRANSPORTATION CHARGES NECESSARY TO RETURN DEFECTIVE

MATERIALS TO MANUFACTURER, AS WELL AS LABOR CHARGES NECESSARY TO REMOVE AND REPLACE DEFECTIVE MATERIALS.

DEFECTIVE MATERIALS AND/OR EQUIPMENT MAY BE REPAIRED IN LIEU OF REPLACED WITH PRIOR APPROVAL OF ARCHITECT AND/OR

#### **DOMESTIC WATER PIPING:**

4" PIPE AND SMALLER: ASTM B88, TYPE L, SEAMLESS HARD DRAWN RIGID COPPER WATER TUBE

FITTINGS: ANSI B16.22, WROUGHT COPPER.

JOINTS: ASTM B32-95TA SOLDER JOINT UP TO 2"; BRAZED JOINTS ABOVE 2" OR PRO-PRESS JOINTS.

#### DOMESTIC WATER VALVES:

ISOLATION VALVES (2" PIPE AND SMALLER): CLASS 150 PSI SWP; 600 PSI CWP; TWO-PIECE, REGULAR PORT; BRONZE BODY; BLOW-OUT PROOF STEM; CHROMIUM PLATED BRASS OR BRONZE BALL; TFE SEATS AND PACKING; ADJUSTABLE PACKING GLAND; THREADED ENDS; LEVER HANDLE WITH LOCKABLE FEATURE; STEM EXTENSIONS FOR INSULATED SERVICE., NIBCO, JOSAM, WATTS.

CHECK VALVES: 150 LB., SWP 300 LB., WOG COMPOSITION DISC, THREADED ENDS. MILWAUKEE NO. 510.

### PROCESS CHILLED WATER PIPING:

2" PIPE AND SMALLER: ASTM B88M (B88), TYPE L, HARD DRAWN COPPER

FITTINGS: ASME B16.22, WROUGHT COPPER JOINTS: ASTM B62 SOLDER JOINT

#### PROCESS CHILLED WATER VALVES:

ISOLATION VALVES (2" PIPE AND SMALLER): CLASS 150 PSI SWP; 600 PSI CWP; TWO-PIECE, REGULAR PORT; BRONZE BODY; BLOW-OUT PROOF STEM; CHROMIUM PLATED BRASS OR BRONZE BALL; TFE SEATS AND PACKING; ADJUSTABLE PACKING GLAND; THREADED ENDS; LEVER HANDLE WITH LOCKABLE FEATURE; STEM EXTENSIONS FOR INSULATED SERVICE., NIBCO, JOSAM, WATTS.

CHECK VALVES (2" PIPE AND SMALLER): CLASS 200 PSI SWP. 400 PSI CWP; BRONZE BODY, DISC AND SEAT; REGRINDING; SCREWED END.

BALANCING VALVES: B&G CIRCUIT SETTER OR EQUIVALENT BY ARMSTRONG.

#### COMPRESSED AIR PIPING:

PIPE: ASTM B88, CLEAN MEDICAL GRADE TYPE L, SEAMLESS HARD DRAWN RIGID COPPER TUBE. FITTINGS: ANSI B16.22, WROUGHT COPPER.

JOINTS: BRAZED JOINTS WITH NITROGEN PURGE.

#### COMPRESSED AIR VALVES:

ISOLATION VALVES: CLASS 150 PSI SWP; 600 PSI CWP; TWO-PIECE, REGULAR PORT; BRONZE BODY; BLOW-OUT PROOF STEM; CHROMIUM PLATED BRASS OR BRONZE BALL; TFE SEATS AND PACKING; ADJUSTABLE PACKING GLAND; THREADED ENDS; LEVER HANDLE WITH LOCKABLE FEATURE; STEM EXTENSIONS FOR INSULATED SERVICE., NIBCO, JOSAM, WATTS.

#### VACUUM VENT PIPING:

PIPE: ASTM B88, TYPE L, SEAMLESS HARD DRAWN RIGID COPPER TUBE. FITTINGS: ANSI B16.22, WROUGHT COPPER.

JOINTS: BRAZED JOINTS.

NOTE: PROVIDE FLEXIBLE CONNECTION TO EQUIPMENT.

#### VALVES GENERAL:

PROVIDE ALL VALVES NECESSARY FOR THE PROPER OPERATION AND DRAINAGE OF THE SYSTEMS. PROVIDE DRAIN VALVES AT ALL LOW POINTS IN ALL SYSTEMS.

PROVIDE BALL VALVES AT EACH PIECE OF EQUIPMENT REQUIRING A WATER CONNECTION, IN RISERS AND MAIN BRANCHES AT POINTS OF TAKE—OFF FROM THEIR SUPPLY AND RETURN MAINS, ADJACENT TO CONTROL VALVES AND ALL EQUIPMENT REQUIRING DISCONNECTION FOR REPAIRS.

#### PROVIDE CHECK VALVES WHERE SHOWN OR NECESSARY TO PREVENT BACKFLOW.

PROVIDE BALANCING VALVES IN LINES WHERE IT IS NECESSARY TO REGULATE THE QUANTITY OF WATER FLOWING IN A CIRCUIT.

ALL VALVES SHALL BE LINE SIZE UNLESS OTHERWISE INDICATED.

ALL PRODUCTS THAT CONSTITUTE A PART OF ANY VALVE ASSEMBLY SHALL BE ASBESTOS-FREE.

#### PIPING INSTALLATION:

INSTALL ALL PIPING PARALLEL OR PERPENDICULAR TO BUILDING WALL AND COLUMNS IN LOCATIONS TO AVOID INTERFERENCE WITH DUCTWORK, STRUCTURE, OTHER PIPING, LIGHTING AND ELECTRICAL EQUIPMENT OR OTHER EQUIPMENT.

DO NOT LOCATE PIPING ABOVE OR WITHIN 3 FEET HORIZONTALLY OF ELECTRICAL PANELS OR EQUIPMENT.

FOR PIPING PASSING THROUGH WALLS, PACK VOID BETWEEN PIPE AND STRUCTURE WITH APPROVED, NON-COMBUSTIBLE MATERIAL.

DO NOT ALLOW CONTACT BETWEEN PIPING AND MASONRY OF CONCRETE SURFACES.

PROVIDE ALL THE NECESSARY HANGERS, RODS, SUPPORTS, CHANNELS, ANGLES, STRUCTURAL MEMBERS AND CONCRETE INSERTS TO PROPERLY SECURE PIPING AND RELATED EQUIPMENT. ALL SUPPORTS AND PARTS SHALL CONFORM TO THE LATEST REQUIREMENTS OF ANSI CODE FOR PRESSURE PIPING B31.1. AND MSS STANDARD PRACTICE SP-58.

PROTECT ALL INSULATED PIPE LINES AGAINST INSULATION DAMAGE AT ALL HANGERS BY THE USE OF 1 FOOT LONG, 12 GAUGE STEEL SEMI-CIRCULAR SHIELDS FOR PIPE SIZES WITH 12" OD AND LESS (INCLUDING INSULATION) AND 2 FOOT LONG, 1/2" STEEL SEMI-CIRCULAR SHIELDS FOR PIPE SIZES OVER 12" OD (INCLUDING INSULATION). SECURELY CEMENT ALL SHIELDS TO THE INSULATION. PROVIDE RIGID PIPE INSULATION AT EACH HANGER.

#### PIPING INSULATION:

ALL ADHESIVES, SEALERS AND COATINGS SHALL BE INCOMBUSTIBLE. INSULATION SHALL BE APPLIED BY EXPERIENCED PIPE COVERERS AS PER BEST TRADE PRACTICE. WHERE EXISTING INSULATED PIPING AND SURFACES ARE EXPOSED DUE TO RENOVATIONS, RE-INSULATE EXPOSED SURFACES TO MATCH THE EXISTING INSTALLATION. APPLY INSULATION TO PIPE LINES AND EQUIPMENT ONLY AFTER TESTING AND INSPECTION, AND ALL SURFACES HAVE BEEN THOROUGHLY CLEANED.

#### DOMESTIC COLD, HOT AND HOT WATER RETURN PIPING INSULATION:

1" THICK FIBERGLASS INSULATION. PIPING INSULATION AND COVERING SHALL HAVE FLAME SPREAD RATING OF 25 AND SMOKE DEVELOPED RATING OF 50 AND SHALL BE SIMILAR TO OWENS-CORNING NO. 25ASJ/55L-11. PROVIDE PVC COVERS BY PROTO OR ZESTON AT ALL FITTINGS AND VALVES.

#### PROCESS CHILLED WATER SUPPLY AND RETURN PIPING INSULATION:

1" THICK FIBERGLASS INSULATION. PIPING INSULATION AND COVERING SHALL HAVE FLAME SPREAD RATING OF 25 AND SMOKE DEVELOPED RATING OF 50 AND SHALL BE SIMILAR TO OWENS-CORNING NO. 25ASJ/55L-11. PROVIDE PVC COVERS BY PROTO OR ZESTON AT ALL FITTINGS AND VALVES.

#### PLUMBING/PIPING TESTING AND BALANCING:

TEST AND ADJUST ALL NEW PIPING SYSTEMS INSTALLED IN THIS PROJECT. PROVIDE ALL TESTING INSTRUMENTS, GAUGES, PUMPS AND OTHER EQUIPMENT REQUIRED OR NECESSARY FOR TEST. REPAIR ALL DEFECTS DISCLOSED BY TESTS WITHOUT ADDITIONAL COST TO THE OWNER. REPEAT TESTS AFTER ANY DEFECTS DISCLOSED ARE REPAIRED OR REPLACED, UNLESS WAIVED BY ARCHITECT. ARRANGE AND PAY THE COST OF ALL UTILITIES USED ON TESTS. COMPLETE ALL TESTS BEFORE COVERING IS APPLIED. ISOLATE ALL PIPING SYSTEM COMPONENTS NOT CONSTRUCTED TO WITHSTAND TEST PRESSURES.

#### WATER SYSTEM:

TEST AT 150 PSIG FOR EIGHT (8) HOURS WITH ZERO LOSS IN PRESSURE. CHECK JOINTS AND FITTINGS FOR LEAKS WITH LIQUID SOAP SOLUTION.

#### PIPE IDENTIFICATION:

IDENTIFY ALL NEW PIPING INSTALLED IN THIS PROJECT IN ACCORDANCE WITH ANSI A13.1 1981, OSHA, AND OWNER'S STANDARDS USING COILED PLASTIC MARKERS.

ANALYTICAL LAB GASES: HYDROGEN (H2), NITROGEN (N2), OXYGEN (O2), ARGON (AR), NITROGEN TRIFLUORIDE (NF3), AMMONIA

TUBING

JOINT TYPE (N2, O2, AR, NF3): COMPRESSION

JOINT TYPE (H2, NH3): ORBITALLY WELDED

SIZE: NPS 1/4", 3/8" DN (10)

PRESSURE RATING: 3,300 PSIG

MATERIAL: 316 S.S. ASTM A269 (0.035) IN. WALL THICKNESS

FITTINGS
JOINT TYPE: COMPRESSION
SIZE: NPS 1/4" DN (10)
PRESSURE RATING: 3,300 PSIG
MATERIAL: 316 S.S.

REMARKS: SWAGELOK, CRAWFORD OR HOKE

STRAIGHT POLARITY WELDING TECHNIQUE.

PERFORM ALL WELDING IN COMPLIANCE WITH ASME B31.1.

#### STAINLESS STEEL TUBING:

INSTALL PIPING TO BE COMPLETELY DRAINABLE, PITCHING 16 MM IN 10 METERS (1 INCH IN 50 FEET) TO DRAIN POINTS AND INSTALLING ONLY ECCENTRIC TYPE REDUCERS.

FOR TUBING SIZES UP THROUGH NPS 1 (DN 25), INSTEAD OF FITTINGS, TUBING MAY BE BENT, USING A TUBING BENDER IN

## ACCORDANCE WITH ANSI B11.15 AND ASME B31.1. NSTALL DIAPHRAGM VALVES AND AUTOMATIC FLOW CONTROLS ORIENTED TO PERMIT DRAINAGE PER MANUFACTURER'S

INSTRUCTIONS.

EQUIP LOW POINTS OF PIPING WITH SYSTEM DRAIN VALVES. FOR TUBING SIZES NPS ½ (DN 15) THROUGH NPS 2 (DN 50),

INSTALL NPS ½ (DN 15) VALVES. FOR SIZES NPS 3 (DN 80) AND NPS 4 (DN 100), INSTALL NPS 1 (DN 25) VALVES.

MAKE WELDS WITH TUNGSTEN INERT GAS (TIG) AUTOMATIC WELDING MACHINE, WITHOUT FILLER METAL, USING DIRECT CURRENT,

OBTAIN OWNER'S PRIOR PERMISSION FOR ANY WELDS THAT CANNOT BE MADE BY THE WELDING MACHINE. USE 316L FILLER METAL

FOR OWNER-APPROVED MANUAL WELDS.

BUTT WELD JOINTS WITH INTERNAL AND EXTERNAL ARGON OR HELIUM PURGE GAS, 100 PERCENT PENETRATION WITH GOOD

REMOVE BUTT WELD CONNECTION FROM BALL VALVES BEFORE WELDING IN PLACE.

## SHEET METAL NOTES:

UNITED SHEET METAL, FLINTKOTE.

BLANK-OFF RETURN DUCTWORK IN AREAS OF WORK THAT CREATES DUST TO PREVENT DEBRIS FROM ENTERING MECHANICAL SYSTEM. PROTECT ALL DUCTWORK DURING CONSTRUCTION BY SEALING OPEN ENDS.

DUCTWORK: ALL DUCTWORK AND SHALL BE CONSTRUCTED AND SUPPORTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE LATEST SMACNA'S ISSUE OF DUCT CONSTRUCTION STANDARDS". IN ADDITION, ALL JOINTS AND SEAMS SHALL BE SEALED WITH DUCT SEALANT EQUAL TO FOSTER #32-14. APPROVED SEALANT MANUFACTURERS: 3M COMPANY, BENJAMIN FOSTER COMPANY,

ALL ROUND TAKE-OFFS DOWNSTREAM OF TERMINAL UNITS SHALL BE MADE WITH CONICAL TAKE-OFF SPIN-IN FITTINGS TYPE SM-2DG, WITH FACTORY INSTALLED ADJUSTABLE DAMPER AS MANUFACTURED BY GENERAL ENVIRONMENT CORPORATION, GLENDALE, CALIFORNIA OR EQUAL.

FLEXIBLE CONNECTIONS: AT EACH POINT OF CONNECTION OF DUCTWORK TO FANS, PROVIDE A FLEXIBLE CONNECTION, VENTFABRICS, INC., "VENTGLAS L.A." NOT LESS THAN 12" IN LENGTH AND MADE OF HEAVY GRADE GLASS FABRIC DOUBLE COATED WITH NEOPRENE AND PROVIDED WITH A SUITABLE FRAME AT EACH END ARRANGED FOR BOLTING TO INLET AND OUTLET OF FAN AND DUCTWORK, RESPECTIVELY. PROVIDE EXTERIOR U/V RESISTANT CONNECTIONS OUTDOORS.

VANES AND DEFLECTORS: ALL ELBOWS AND TURNS SHALL BE MADE WITH A RADIUS NOT LESS THE 1-1/2" TIMES THE DUCT DIAMETER OR WIDTH. WHERE BUILDING CONSTRUCTION DOES NOT PERMIT A LONG RADIUS ELBOW OR TURN OR IF SHOWN ON THE CONTRACT DOCUMENTS, ACOUSTICAL TURNING VANES AND DEFLECTORS SHALL BE PROVIDED IN ALL ELBOWS.

FLEXIBLE DUCTWORK: ALL LOW PRESSURE AND HIGH PRESSURE FLEXIBLE DUCT SHALL BE FLEXMASTER USA, INC., TYPE #1M

INSULATED FLEXIBLE DUCT CONSISTING OF A FACTORY FABRICATED ASSEMBLY OF A TRILAMINATE ALUMINUM FOIL, FIBERGLÄSS AND POLYESTER. THE FLEXIBLE DUCT SHALL BE UL LISTED 181 CLASS 1 AIR DUCT AND COMPLY WITH NFPA 90A AND 90B AND HAVE

A FLAME SPREAD OF NOT OVER 25 AND A SMOKE DEVELOPED OF NOT OVER 50. THE FLEXIBLE DUCT SHALL HAVE A MINIMUM

LABORATORY DUCTWORK: PROVIDE POLYVINYL COATED DUCTWORK (PCD) FOR ALL NEW LABORATORY EXHAUST DUCTWORK.

PRESSURE RATING OF 12" WC THROUGH TEMPERATURE RANGE OF -20 DEGREES F. TO + 250 DEGREES F.

BALANCING DAMPERS: CONTINENTAL FAN MODEL IRIS-S, STAINLESS STEEL CALIBRATED DAMPER WITH FLOW MEASURING PORTS.

#### AIR TESTING AND BALANCING:

BALANCE ALL OUTLETS AND TERMINAL BOXES TO WITHIN 10% OF RATED C.F.M IN ACCORDANCE WITH AABC AND NEBB, SUBMIT BALANCING REPORT. INCLUDE BALANCING FOR ENTIRE ROOM 150 AND ALL NEW AND EXISTING DEVICES.

## WAYNE STATE UNIVERSITY

5454 Cass Avenue, Detroit, MI 48202

Project Location:

WAYNE STATE UNIVERSITY
CHEMISTRY BUILDING
5101 CASS AVENUE
DETROIT MICHIGAN 48202

CONTACT: ASHLEY FLINTOFF



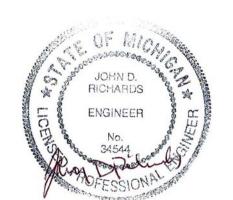
iDesign

**iDesign Solutions, LLC**Scientific Facilities & Laboratory Design 2531 Ridge Road, Suite 100

White Lake, MI 48383 248-440-7310 info@iDesign-Solutions.info



issue:	dat
OWNER REVIEW	10/20/
OWNER REVIEW	10/28/
OWNER REVIEW	11/03/
BID AND CONSTRUCTION ISSUE	11/23/



designed by:	D
drawn by:	D
coordination checked:	·
checked:	·
approved:	·

CHEMISTRY LAB 150

sheet title: Mechanical

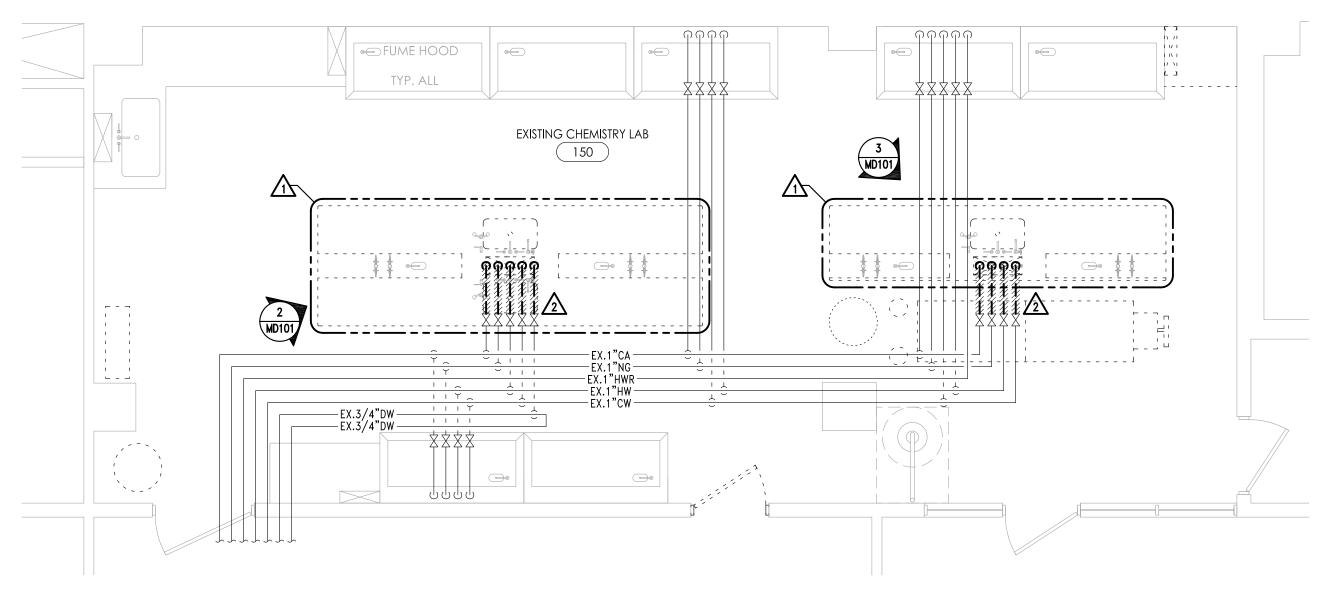
Specifications

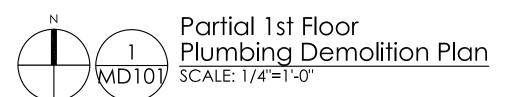
Modification

project

1st Floor

project number: sheet number: 007-286023 M001











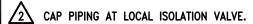
(3) Existing Lab Table Fixtures
SCALE: NONE

#### **DEMOLITION GENERAL NOTES:**

- THE FOLLOWING GENERAL NOTES APPLY TO ALL MECHANICAL DEMOLITION SHEETS INCLUDED WITHIN THIS DOCUMENT SET, EXCEPT WHERE OTHERWISE INDICATED.
- COORDINATE ALL DEMOLITION WORK WITH ARCHITECTURAL AND ELECTRICAL DEMOLITION AND PHASING PLANS, WITH OWNER'S PROJECT REPRESENTATIVE AND WITH OWNER'S FACILITY MANAGER.
- THESE DEMOLITION PLANS ARE DIAGRAMMATIC AND DO NOT FULLY REPRESENT THE EXTENT OF DEMOLITION WORK REQUIRED TO INSTALL NEW WORK. REFER TO ARCHITECTURAL, ELECTRICAL AND MECHANICAL DRAWINGS FOR LOCATIONS OF INCIDENTAL DEMOLITION WORK NOT INDICATED ON THIS PLAN.
- 3. COORDINATE THE USE OF SALVAGED ITEMS AND COMPONENTS THAT ARE TO BE REUSED ON NEW WORK AS INDICATED ON DRAWINGS AND WITHIN SPECIFICATIONS.
- COORDINATE ANY SHUTDOWNS OF EXISTING SERVICES OR EQUIPMENT WITH OWNER. PERFORM SHUTDOWNS AT A SCHEDULED TIME AS TO MINIMIZE DISRUPTION OF BUILDING OPERATIONS.
- 5. REMOVE ALL PIPING, DUCTWORK AND EQUIPMENT COMPLETELY INCLUDING ALL RELATED ITEMS INCLUDING HANGERS, SUPPORTS, CONTROLS AND ACCESSORIES. DISPOSE OF ALL MATERIALS IN A LEGAL MANNER.
- 6. CAP ALL OPEN ENDED PIPING AND DUCTWORK. DO NOT LEAVE ANY ABANDONED PIPING OR DUCTWORK IN THE AREA OF WORK.

#### **DEMOLITION KEY NOTES:**

REMOVE ALL EXISTING LAB TABLE FIXTURES. DEMOLISH ASSOCIATED PIPING, HANGERS, SUPPORTS AND ACCESSORIES. CAP DRAIN WASTE AND VENT PIPING AT



# WAYNE STATE UNIVERSITY

5454 Cass Avenue, Detroit, MI 48202

Project Location:

**WAYNE STATE UNIVERSITY** CHEMISTRY BUILDING 5101 CASS AVENUE **DETROIT MICHIGAN 48202** 

CONTACT: ASHLEY FLINTOFF



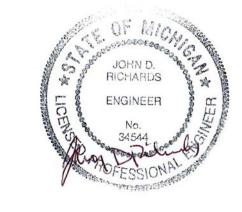
### **i** Design

iDesign Solutions, LLC

Scientific Facilities & Laboratory Design 2531 Ridge Road, Suite 100 White Lake, MI 48383 248-440-7310 info@iDesign-Solutions.info www.iDesign-Solutions.info



issue:	date
OWNER REVIEW	10/20/16
OWNER REVIEW	10/28/16
OWNER REVIEW	11/03/16
BID AND CONSTRUCTION ISSUE	11/23/16



designed by:	DH
drawn by:	DH
coordination checked:	JR
checked:	JR
approved:	JR

project:

CHEMISTRY LAB 150 1st Floor

Modification

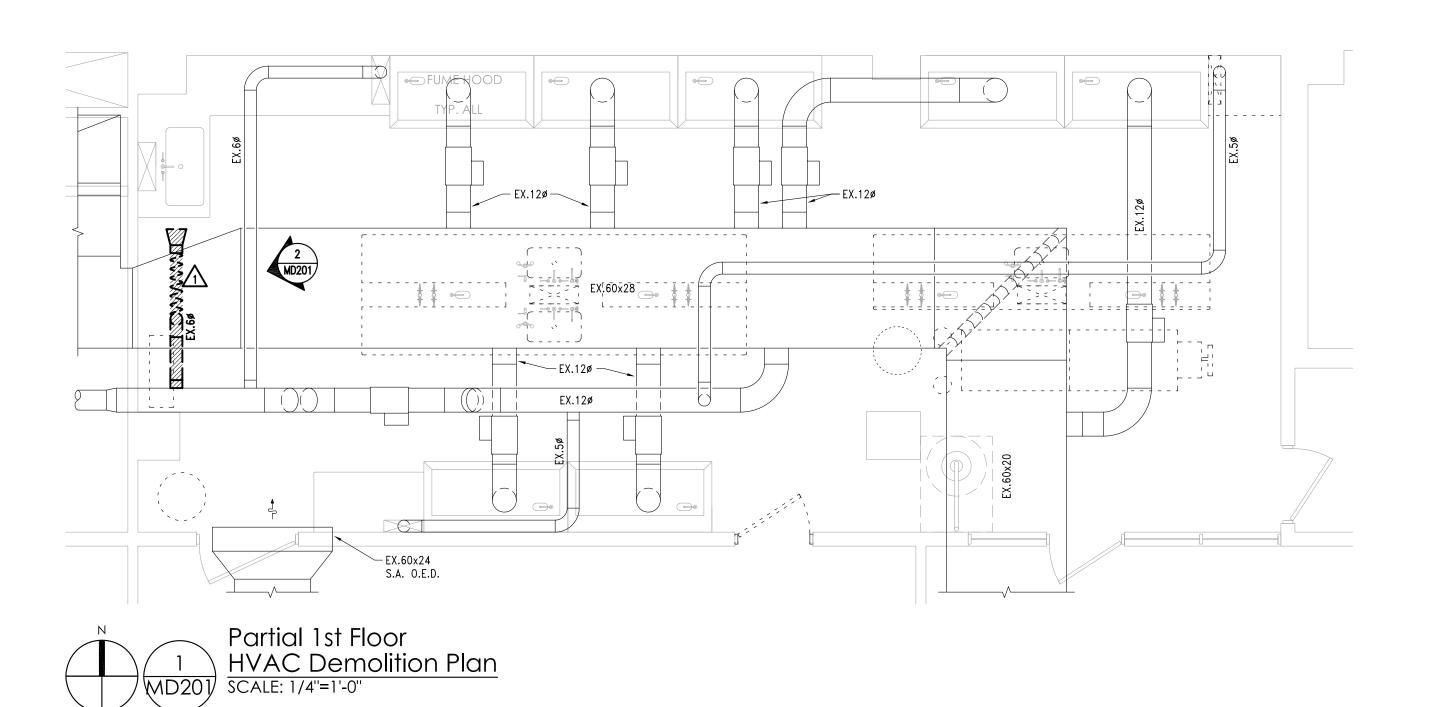
sheet title: Partial 1st Floor Plumbing Demolition Plan

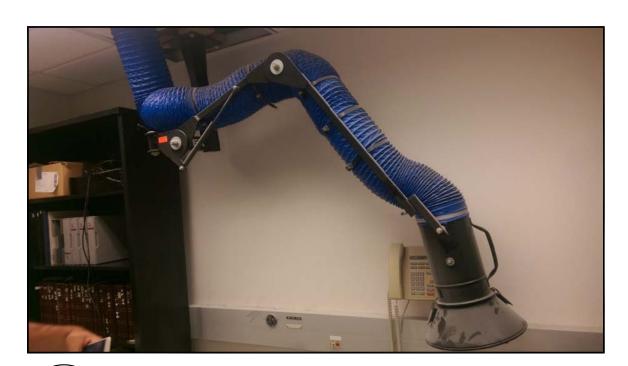
project number:

sheet number: MD101 007-286023

(1156-7 : iDesign project number)

H:\ACAD\FILES\70\70800-WSU Chemistry Lab 150\CAD\MECH\70800-MD101.dwg Wed, 23 Nov 2016 - 2:21pm





(2) Existing Exhaust Snorkel SCALE: NONE

#### **DEMOLITION GENERAL NOTES:**

- THE FOLLOWING GENERAL NOTES APPLY TO ALL MECHANICAL DEMOLITION SHEETS INCLUDED WITHIN THIS DOCUMENT SET, EXCEPT WHERE OTHERWISE INDICATED.
- 1. COORDINATE ALL DEMOLITION WORK WITH ARCHITECTURAL AND ELECTRICAL DEMOLITION AND PHASING PLANS, WITH OWNER'S PROJECT REPRESENTATIVE AND WITH OWNER'S FACILITY MANAGER.
- 2. THESE DEMOLITION PLANS ARE DIAGRAMMATIC AND DO NOT FULLY REPRESENT THE EXTENT OF DEMOLITION WORK REQUIRED TO INSTALL NEW WORK. REFER TO ARCHITECTURAL, ELECTRICAL AND MECHANICAL DRAWINGS FOR LOCATIONS OF INCIDENTAL DEMOLITION WORK NOT INDICATED ON THIS PLAN.
- 3. COORDINATE THE USE OF SALVAGED ITEMS AND COMPONENTS THAT ARE TO BE REUSED ON NEW WORK AS INDICATED ON DRAWINGS AND WITHIN SPECIFICATIONS.
- 4. COORDINATE ANY SHUTDOWNS OF EXISTING SERVICES OR EQUIPMENT WITH OWNER. PERFORM SHUTDOWNS AT A SCHEDULED TIME AS TO MINIMIZE DISRUPTION OF BUILDING OPERATIONS.
- 5. REMOVE ALL PIPING, DUCTWORK AND EQUIPMENT COMPLETELY INCLUDING ALL RELATED ITEMS INCLUDING HANGERS, SUPPORTS, CONTROLS AND ACCESSORIES. DISPOSE OF ALL MATERIALS IN A LEGAL MANNER.
- 6. CAP ALL OPEN ENDED PIPING AND DUCTWORK. DO NOT LEAVE ANY ABANDONED PIPING OR DUCTWORK IN THE AREA OF WORK.

#### **DEMOLITION KEY NOTES:**

REMOVE EXISTING EXHAUST SNORKEL. DEMOLISH ASSOCIATED DUCTWORK, HANGERS, SUPPORTS AND CONTROLS. CAP DUCTWORK AT SOURCE.

# WAYNE STATE UNIVERSITY

5454 Cass Avenue, Detroit, MI 48202

Project Location:

WAYNE STATE UNIVERSITY
CHEMISTRY BUILDING
5101 CASS AVENUE
DETROIT MICHIGAN 48202

CONTACT: ASHLEY FLINTOFF



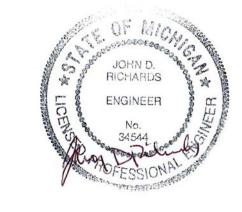
**i** Design

#### iDesign Solutions, LLC

Scientific Facilities & Laboratory Design 2531 Ridge Road, Suite 100 White Lake, MI 48383 248-440-7310 info@iDesign-Solutions.info www.iDesign-Solutions.info



issue:	date:
OWNER REVIEW	10/20/16
OWNER REVIEW	10/28/16
OWNER REVIEW	11/03/16
BID AND CONSTRUCTION ISSUE	11/23/16



designed by:	DH
drawn by:	DH
coordination checked:	JR
checked:	JR
approved:	JR

project:

CHEMISTRY LAB 150 1st Floor

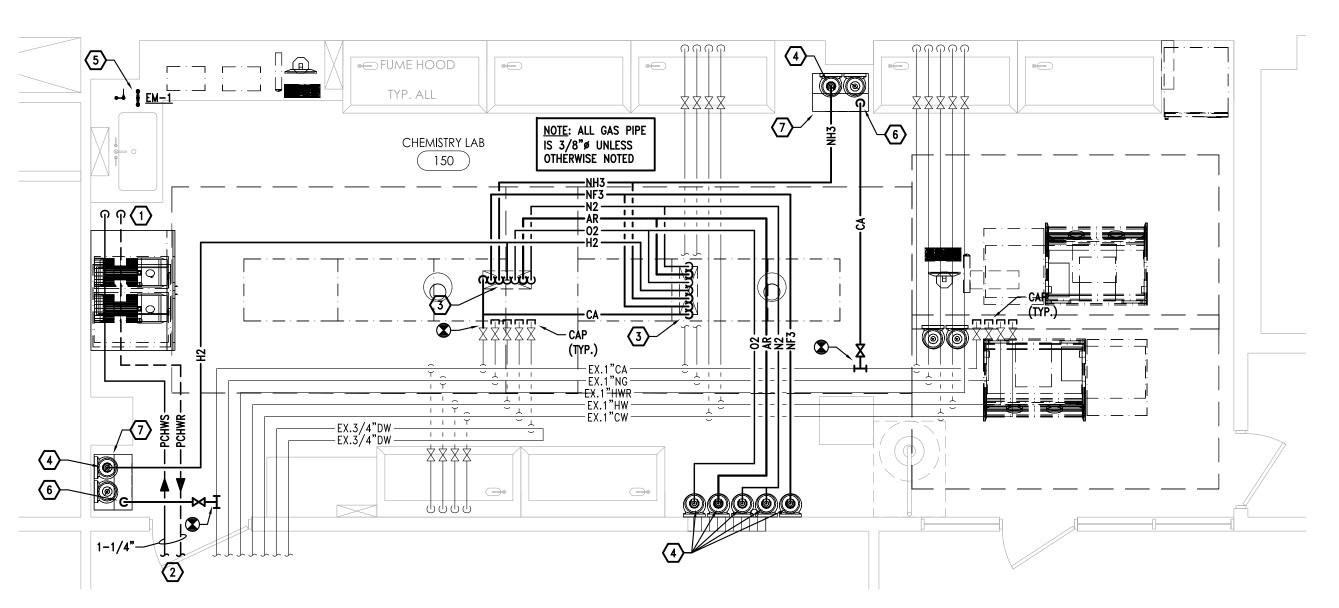
Modification

sheet title:
Partial 1st Floor
HVAC
Demolition Plan

project number:

007-286023 MD201 (1156-7: iDesign project number)

sheet number:



## Partial 1st Floor Plumbing New Work Plan SCALE: 1/4"=1'-0"

#### **PLUMBING GENERAL NOTES:**

- THE FOLLOWING GENERAL NOTES APPLY TO ALL PLUMBING SHEETS INCLUDED WITHIN THIS DOCUMENT SET, EXCEPT WHERE OTHERWISE INDICATED.
- 1. PIPING OFFSETS ARE SHOWN TO PROVIDE INDICATION OF PHYSICAL CONDITIONS WITHIN THE SPACE. IT IS NOT THE INTENT OF THE DRAWINGS TO SHOW ALL REQUIRED OFFSETS. THE CONTRACTOR SHALL FULLY COORDINATE THE MECHANICAL WORK WITHIN ITSELF AND WITH THE WORK OF ALL TRADES TO PROVIDE COMPLETE AND OPERABLE SYSTEMS WITHOUT INTERFERENCES.
- 2. COORDINATE ANY SHUTDOWNS OF EXISTING SERVICES OR EQUIPMENT WITH OWNER. PERFORM SHUTDOWNS AT A SCHEDULED TIME AS TO MINIMIZE DISRUPTION OF BUILDING OPERATIONS.
- 3. ALL NEW PIPING IN FINISHED ROOMS OR SPACES SHALL BE CONCEALED IN A WALL, FURRED CHASE OR SUSPENDED CEILING, UNLESS OTHERWISE NOTED.
- 4. FOR PIPE SIZES TO INDIVIDUAL PLUMBING FIXTURES AND VARIOUS PIECES OF EQUIPMENT, REFER TO SPECIFICATIONS.
- 5. MAINTAIN REQUIRED CLEARANCES IN FRONT OF ELECTRICAL PANELS/EQUIPMENT.
  DO NOT ROUTE PIPING ABOVE ELECTRICAL PANELS/EQUIPMENT.
- 6. THE CONTRACTOR SHALL FURNISH AND INSTALL CLEANOUTS IN ALL SANITARY DRAINAGE PIPING AS REQUIRED BY THE GOVERNING PLUMBING CODE (IN ADDITION TO CLEANOUTS INDICATED ON DRAWINGS).

#### **NEW WORK KEY NOTES:**

- 1-1/4" PROCESS CHILLED WATER SUPPLY AND RETURN DOWN TO VACUUM PUMP CABINET. REFER TO VACUUM PUMP PIPING DETAIL FOR ADDITIONAL INFORMATION.
- EXTEND NEW 1-1/4" PROCESS CHILLED WATER SUPPLY AND RETURN LINES TO EXISTING PROCESS CHILLED WATER LOOP IN BUILDING. ESTIMATE 150 FT.
  DISTANCE TO TIE-IN POINT INCLUDING ISOLATION VALVES AND MAIN SYSTEM SHUTDOWN COSTS.
- ROUTE NEW 1/4" LABORATORY GAS PIPING AND 1/2" COMPRESSED AIR PIPING DOWN THOUGH SERVICE CHASE. REFER TO ALD REACTOR PIPING DETAIL FOR ADDITIONAL INFORMATION.
- ROUTE NEW 3/8" LABORATORY GAS PIPING DOWN TO CYLINDER. PROVIDE REGULATOR AND SHUT-OFF VALVE.
- NEW EMERGENCY EYEWASH WITH MIXING VALVE BELOW COUNTER. CONNECT TO EXISTING SUPPLY LINES SERVING ADJACENT SINK.
- 6 ROUTE NEW 3/8" COMPRESSED AIR PIPING DOWN TO CYLINDER CABINET. TERMINATE WITH THREADED CONNECTION AND CAP.
- EXTEND NEW SPRINKLER LINE FROM EXISTING FIRE PROTECTION SYSTEM DOWN TO SPRINKLER HEAD IN CYLINDER CABINET.

LABORATORY GA	<u>s legend</u>
<u>ABBREVIATION</u>	<u>GAS</u>
AR	ARGON
CA	COMPRESSED AIR (LAB GRADE)
H2	HYDROGEN
N2	NITROGEN
NF3	NITROGEN TRIFLUORIDE
NH3	AMMONIA
02	OXYGEN

## WAYNE STATE UNIVERSITY

5454 Cass Avenue, Detroit, MI 48202

Project Location:

WAYNE STATE UNIVERSITY
CHEMISTRY BUILDING
5101 CASS AVENUE
DETROIT MICHIGAN 48202

CONTACT: ASHLEY FLINTOFF



### **iDesign**

#### iDesign Solutions, LLC

Scientific Facilities & Laboratory Design 2531 Ridge Road, Suite 100 White Lake, MI 48383 248-440-7310 info@iDesign-Solutions.info www.iDesign-Solutions.info



issue:	date:
OWNER REVIEW	10/20/16
OWNER REVIEW	10/28/16
OWNER REVIEW	11/03/16
BID AND CONSTRUCTION ISSUE	11/23/16



designed by:	DH
drawn by:	DH
coordination checked:	JR
checked:	JR
approved:	JR

project

CHEMISTRY LAB 150 1st Floor

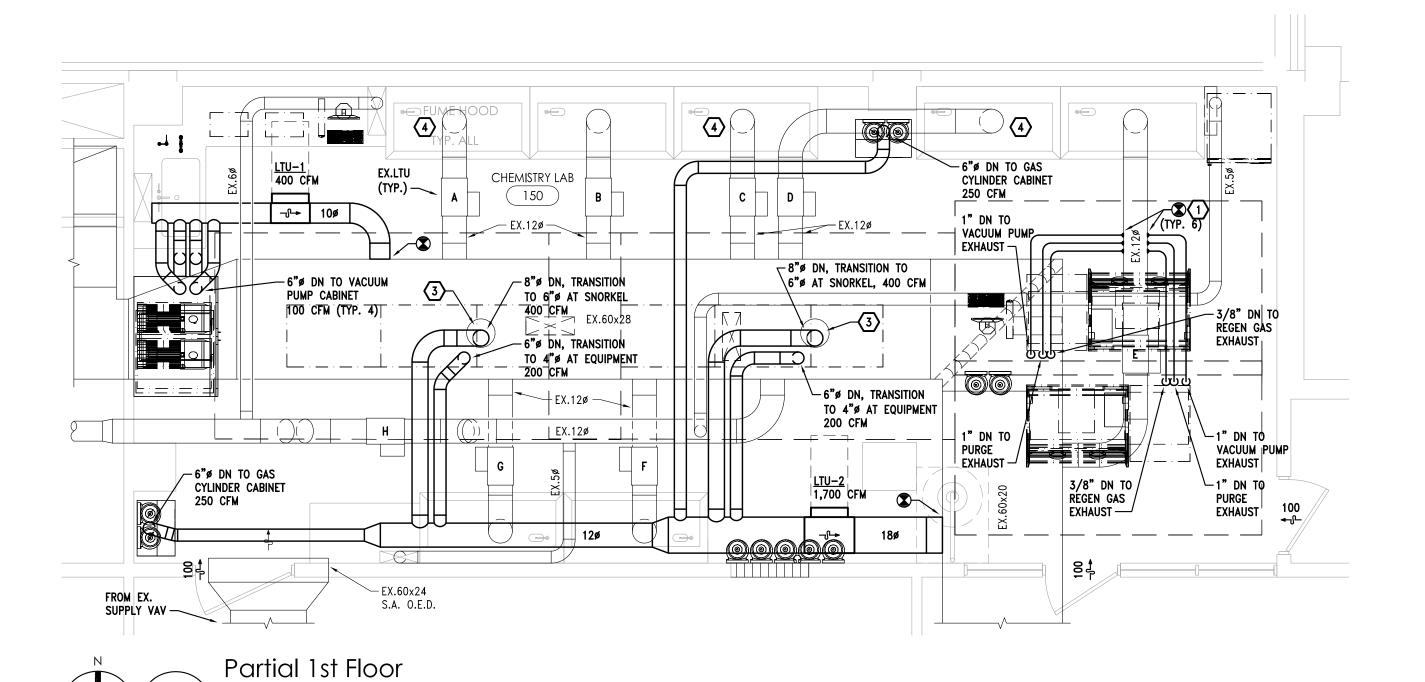
Modification

sheet title:
Partial 1st Floor
Plumbing
New Work Plan

project number: sheet number:

007-286023 M101 (1156-7: iDesign project number)

H:\ACAD\FILES\70\70800-WSU Chemistry Lab 150\CAD\MECH\70800-M101.dwg Wed, 23 Nov 2016 - 2:21pm



**HVAC New Work Plan** 

M201) SCALE: 1/4"=1'-0"

#### **HVAC GENERAL NOTES:**

THE FOLLOWING GENERAL NOTES APPLY TO ALL HVAC SHEETS INCLUDED WITHIN THIS DOCUMENT SET, EXCEPT WHERE OTHERWISE INDICATED.

- NOTE THAT PLENUM SPACE IS EXTREMELY CONGESTED. SHEET METAL OFFSETS AND TRANSITIONS ARE SHOWN TO PROVIDE INDICATION OF PHYSICAL CONDITIONS WITHIN THE SPACE. IT IS NOT THE INTENT OF THE DRAWINGS TO SHOW ALL REQUIRED OFFSETS AND TRANSITIONS. THE CONTRACTOR SHALL FULLY COORDINATE THE MECHANICAL WORK WITHIN ITSELF AND WITH THE WORK OF ALL TRADES TO PROVIDE COMPLETE AND OPERABLE SYSTEMS WITHOUT INTERFERENCES.
- COORDINATE ANY SHUTDOWNS OF EXISTING SERVICES OR EQUIPMENT WITH OWNER. PERFORM SHUTDOWNS AT A SCHEDULED TIME AS TO MINIMIZE DISRUPTION OF BUILDING OPERATIONS.
- 3. COORDINATE GRILLE, REGISTER AND DIFFUSER LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLAN.
- 4. ALL NEW DUCTWORK IN FINISHED ROOMS OR SPACES SHALL BE CONCEALED IN A FURRED CHASE OR SUSPENDED CEILING, UNLESS OTHERWISE NOTED.
- 5. ALL DUCT PENETRATIONS THROUGH FIRE-RATED ASSEMBLIES SHALL BE PROVIDED WITH FIRE DAMPERS AND ACCESS DOORS.
- 6. ALL EXHAUST GRILLES SHALL BE HARD DUCT CONNECTION.
- 7. ALL ROUND DUCT RUNOUTS AND DROPS TO DIFFUSERS SHALL BE THE SAME NOMINAL SIZE AS INDICATED BY THE DIFFUSER TAG ON THE DRAWINGS.
- 8. SUPPLY DUCTWORK PRESSURE CONSTRUCTION SHALL BE 3" W.G. UPSTREAM OF TERMINAL UNITS AND 2" W.G. DOWNSTREAM OF TERMINAL UNITS.
- 9. MAINTAIN REQUIRED CLEARANCES IN FRONT OF ELECTRICAL PANELS/EQUIPMENT. DO NOT ROUTE DUCTWORK ABOVE ELECTRICAL PANELS/EQUIPMENT.
- 10. ACCESS PANELS AND DOORS ARE REQUIRED THROUGHOUT BUILDING CONSTRUCTION ASSEMBLIES SUCH AS WALLS, HARD CEILINGS, PARTITIONS AND FLOORS TO SERVICE AND MAINTAIN TERMINAL UNITS, BALANCING DAMPERS, CONTROL MOTORS, ETC. ACCESS PANELS AND DOORS SHALL BE PROVIDED AND INSTALLED PER ARCHITECTURAL SPECIFICATIONS. MECHANICAL CONTRACTOR SHALL VERIFY THE EXACT QUANTITY, SIZE, FIRE-RATING AND LOCATION OF ACCESS PANELS AND DOORS FOLLOWING INSTALLATION OF SYSTEMS AND COMPONENTS REQUIRING ACCESS, BUT PRIOR TO THE CLOSURE OF THE AFFECTED CEILING AND BUILDING ASSEMBLIES. MINIMUM ACCESS PANEL AND DOOR SIZE SHALL BE 24 INCHES BY 18 INCHES, UNLESS OTHERWISE NOTED.
- WHERE VOLUME DAMPERS OCCUR ABOVE CEILINGS WITHOUT REMOVABLE TILE OR ACCESS PANEL, PROVIDE A FLUSH-MOUNTED CONCEALED DAMPER REGULATOR TO ALLOW FOR DAMPER ADJUSTMENT BELOW CEILING. UNIT TO BE EQUAL TO VENTLOCK NO. 666 IN 1/2" OR 3/8" ROD SIZE.

#### **NEW WORK KEY NOTES:**

- 1) CONNECT NEW EXHAUST PIPING TO EXISTING HOOD EXHAUST DUCT.
- 2 NOT USED.
- REFER TO ARCH SHEET A402 FOR SNORKEL INSTALLATION DETAIL.
- 4 HOOD TO BE DECOMMISSIONED. VERIFY WHICH THREE (3) HOODS TO BE DECOMMISSIONED WITH OWNER. LOCK HOOD IN CLOSED POSITION. DISABLE ALL ASSOCIATED ALARMS. PROVIDE 12x12 PLASTIC LAMINATE SIGN THAT READS "DO NOT USE HOOD, NO EXHAUST AIR".

TAG	INLET SIZE (IN.)	SUPPLY AIRFLOW TO ROOM (MAX.)	EXHAUST AIRFLOW FROM ROOM (MAX.)	NOTES/ACCESSORIES
LTU-1	10	N/A	400	
LTU-2	18	N/A	1,700	
EX.LTU-A	12	N/A	0	A
EX.LTU-B	12	N/A	775	
EX.LTU-C	12	N/A	0	A
EX.LTU-D	12	N/A	0	A
EX.LTU-E	12	N/A	775	
EX.LTU-F	12	N/A	775	
EX.LTU-G	12	N/A	775	
EX.LTU-H	12	N/A	350	В
EX.SUPPLY VAV	24x16	5.250	N/A	С
TOTAL	•	5,250	5,550	
		NOTES AND AC	CCESSORIES DE	SIGNATION
A	HOOD TO BE	DECOMMISSION	<b>IED</b>	
В	EXHAUST AIR	FLOW BASED C	N 50 CFM PEI	R FUME HOOD CABINET
С	BALANCE EXI	STING SUPPLY	VAV BOX MAXI	MUM TO AIRFLOW INDICATED

# WAYNE STATE UNIVERSITY

5454 Cass Avenue, Detroit, MI 48202

Project Location:

**WAYNE STATE UNIVERSITY** CHEMISTRY BUILDING 5101 CASS AVENUE **DETROIT MICHIGAN 48202** 

CONTACT: ASHLEY FLINTOFF



iDesign

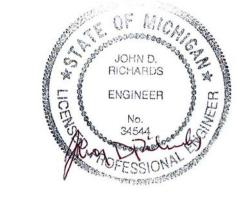
#### iDesign Solutions, LLC

Scientific Facilities & Laboratory Design 2531 Ridge Road, Suite 100 White Lake, MI 48383 248-440-7310 info@iDesign-Solutions.info

www.iDesign-Solutions.info



issue:	date
OWNER REVIEW	10/20/16
OWNER REVIEW	10/28/16
OWNER REVIEW	11/03/16
BID AND CONSTRUCTION ISSUE	11/23/16



designed by:	DH
drawn by:	DH
coordination checked:	JF
checked:	JF
approved:	JF

project.

CHEMISTRY LAB 150

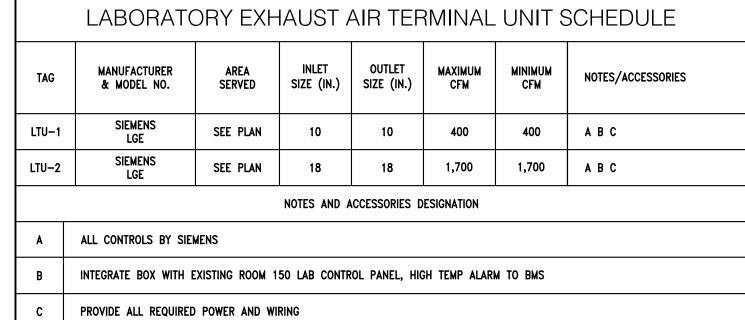
1st Floor

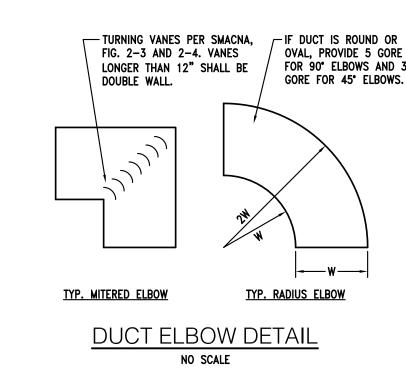
Modification

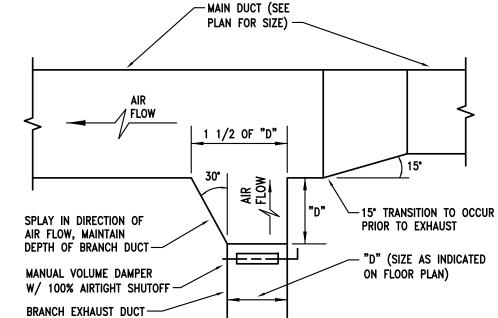
sheet title: Partial 1st Floor HVAC New Work Plan

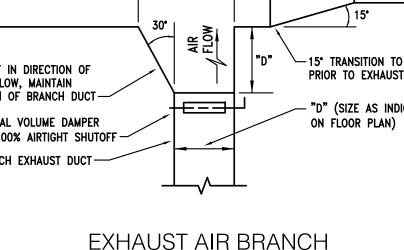
project number:

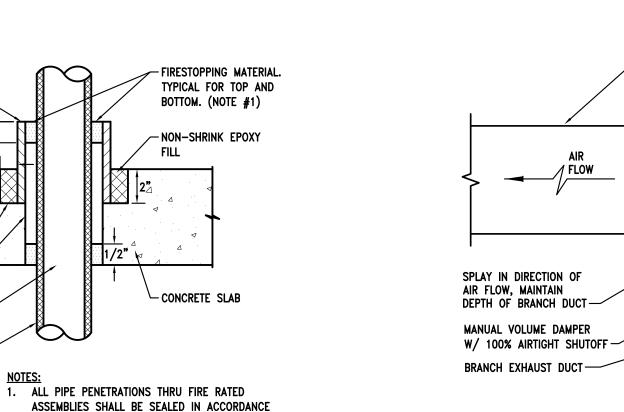
sheet number: M201 007-286023











TERMINATE SLEEVE FLUSH WITH

-PRE-FABRICATED ASTM

A53 SEAMLESS BLACK

SIZE TO PASS PIPE

AND INSULATION

STEEL PIPE SLEEVE OF

-FINISHED ESCUTCHEON

PLATE FLUSH AGAINST

WALL AND OF SIZE TO

COMPLETELY COVER

— PIPING EXPOSED TO VIEW

ASTM A120 SEAMLESS

GALVANIZED STEEL

PIPE SLEEVE ----

**EXISTING** 

FLOOR

(4" MIN.)

CORE DRILLED -

PIPE RISER (BARE

OR INSULATED) —

PIPE INSULATION

(WHERE APPLICABLE) —

WITH AN APPROVED UL LISTED INSTALLATION.

PIPE SLEEVE THRU FLOOR

NO SCALE

FINISHED FL.

FINISHED WALL SURFACES -

SEAL OR CAULK SLEEVES

THRU FIRE/SMOKE WALLS

BARE PIPE OR PIPE WITH

IN SLEEVE - DO NOT

FINISHED WALL SURFACE -

INSULATION TO BE CENTERED

SUPPORT PIPE FROM SLEEVE -

CONCEALED PIPING -

1. ALL PIPE PENETRATIONS THRU FIRE RATED

ASSEMBLIES SHALL BE SEALED IN ACCORDANCE

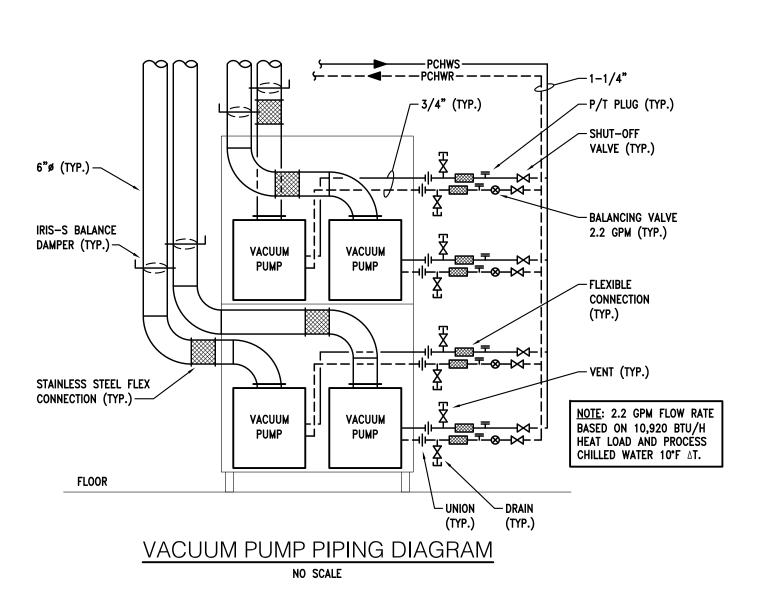
WITH AN APPROVED UL LISTED INSTALLATION.

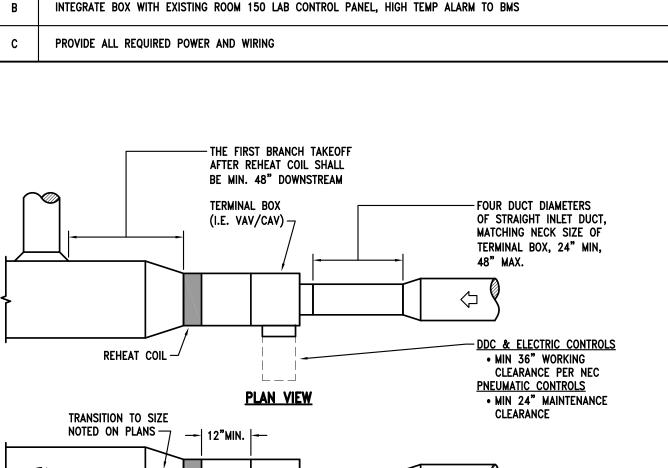
PIPE SLEEVE THRU INTERIOR WALL

NO SCALE

(NOTE #1) —

EXHAUST AIR BRANCH DUCT CONNECTION DETAIL NO SCALE





- TERMINAL EQUIPMENT

PROVIDE INSULATED, DOUBLE

WALL ACCESS DOOR TO ACCESS

FACE OF REHEAT COIL. ACCESS

DOOR SHALL BE AS LARGE AS

POSSIBLE, MIN. 10"x10", AND

CONTRUCTION. SEE NOTE #2.

SHALL MATCH DUCTWORK

CONTROLLER

- WHERE CONNECTION TO

MAIN IS GREATER THAT

48" LONG, TRANSITION TO

BRANCH DUCT, SIZE PER

BRANCH DUCT SHALL BE

PLANS. IF SIZE IS NOT

2" LARGER THAN BOX

NOTED ON PLANS,

INLET NECK.

NOTES:

1. FLEX DUCT IS NOT ALLOWED UPSTREAM OR DOWNSTREAM OF TERMINAL BOXES, EXCEPT IN THE BRANCH CONNECTION DIRECTLY TO DIFFUSER/GRILLES.

SHEET METAL EXTENSION BETWEEN -

TERMINAL BOX DISCHARGE AND

EXTENSION SHALL BE FULL SIZE

OF TERMINAL BOX DISCHARGE &

DUCTWORK CONSTRUCTION. SEE

SHALL MATCH DOWNSTREAM

NOTE #2.

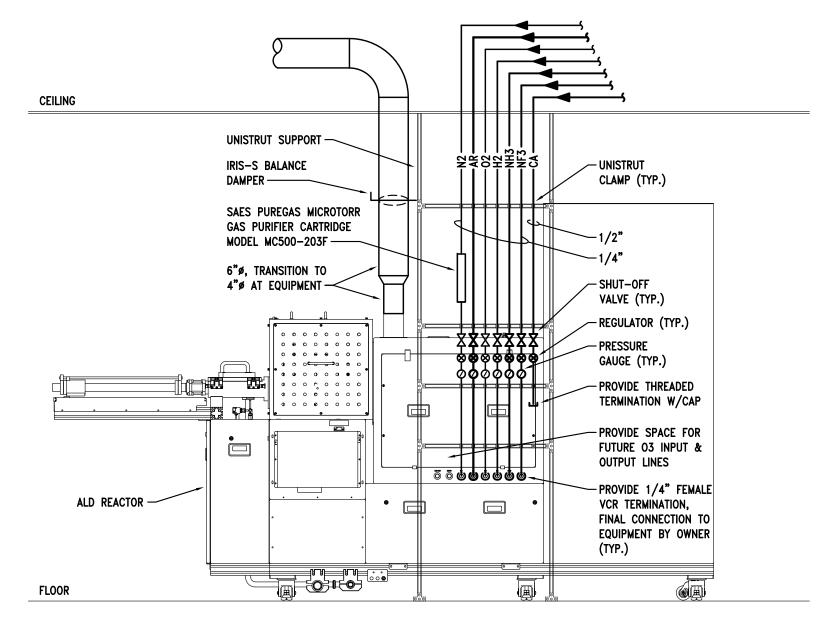
REHEAT COIL, MIN 12" LONG.

2. TERMINAL BOX CONSTRUCTION THAT INCORPORATES A FACTORY PROVIDED ACCESS DOOR IN THE SIDE OF THE BOX CASING ARE ALLOWED TO MOUNT THE REHEAT COIL DIRECTLY TO THE TERMINAL BOX DISCHARGE OPENING AND FOREGO THE SHEET METAL EXTENSION BETWEEN BOX & COIL.

SIDE VIEW

3. TERMINAL BOXES SHALL BE MOUNTED NO HIGHER THAN 2' ABOVE THE CEILING GRID & SHALL BE LOCATED SO AS TO ALLOW CLEAR VERTICAL LADDER ACCESS FOR MAINTENANCE.

TYPICAL TERMINAL BOX INSTALLATION DETAIL NO SCALE



ALD REACTOR PIPING DIAGRAM NO SCALE

# WAYNE STATE UNIVERSITY

5454 Cass Avenue, Detroit, MI 48202

Project Location:

**WAYNE STATE UNIVERSITY** CHEMISTRY BUILDING 5101 CASS AVENUE **DETROIT MICHIGAN 48202** 

CONTACT: ASHLEY FLINTOFF



#### iDesign

iDesign Solutions, LLC

Scientific Facilities & Laboratory Design 2531 Ridge Road, Suite 100 White Lake, MI 48383 248-440-7310 info@iDesign-Solutions.info www.iDesign-Solutions.info



issue:	date
OWNER REVIEW	10/20/1
OWNER REVIEW	10/28/1
OWNER REVIEW	11/03/1
BID AND CONSTRUCTION ISSUE	11/23/1



DH
DH
JR
JR
JR

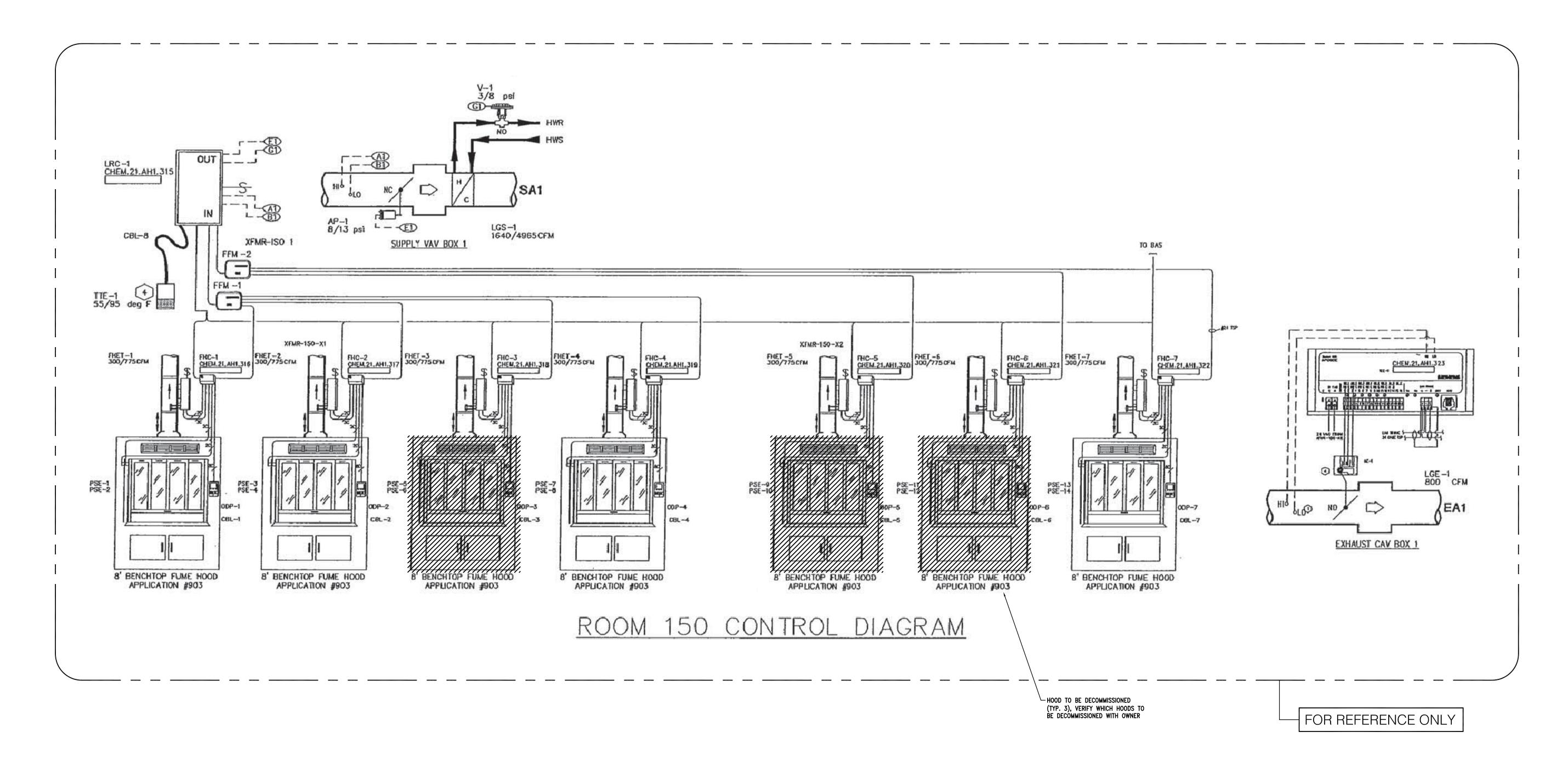
project

CHEMISTRY LAB 150 1st Floor

Modification

sheet title: Mechanical Schedules & Details

sheet number: project number: M300 007-286023 (1156-7: iDesign project number)



#### TEMPERATURE CONTROLS:

NOTE THAT ALL CONTROLS ARE BY SIEMENS FACTORY BRANCH ONLY

MODIFY THE EXISTING ROOM 150 LAB CONTROL SYSTEM TO INCLUDE TWO ADDITIONAL CONSTANT VOLUME EXHAUST BOXES. CONNECT THE EXHAUST BOX CONTROLLERS TO THE EXISTING LAB CONTROL PANEL. WORK WITH THE BALANCING CONTRACTOR TO DEVELOP FINAL AIR VOLUME. THE LAB PANEL SHALL CONTINUE TO PROVIDE THE REQUIRED AIR FLOW DIFFERENTIAL IN THE SPACE AND INCLUDE THE NEW EXHAUST BOXES IN THE ROOM CALCULATION TO MAINTAIN NEGATIVE SPACE PRESSURE RELATIVE TO ADJACENT CORRIDORS. DECOMMISSION THREE (3) EXISTING HOODS. SEE THE ATTACHED EXISTING LAB CONTROL DIAGRAMS FOR REFERENCE.

PROVIDE ALL HARDWARE, WIRING, SOFTWARE AND PROGRAMMING FOR A FULLY FUNCTIONAL LAB CONTROL SYSTEM.

# WAYNE STATE UNIVERSITY

5454 Cass Avenue, Detroit, MI 48202

Project Location:

WAYNE STATE UNIVERSITY
CHEMISTRY BUILDING
5101 CASS AVENUE
DETROIT MICHIGAN 48202

CONTACT: ASHLEY FLINTOFF



**i**Design

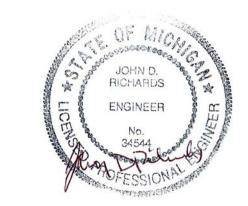
**iDesign Solutions, LLC**Scientific Facilities & Laboratory Design 2531 Ridge Road, Suite 100

248-440-7310 info@iDesign-Solutions.info www.iDesign-Solutions.info

White Lake, MI 48383



issue:	date:
OWNER REVIEW	10/20/16
OWNER REVIEW	10/28/16
OWNER REVIEW	11/03/16
BID AND CONSTRUCTION ISSUE	11/23/16



designed by:	DH
drawn by:	DH
coordination checked:	JR
checked:	JR
approved:	JR

project:
CHEMISTRY LAB 150
1st Floor

Modification

sheet title: Temperature Controls

project number: sheet number: 007-286023 M400

Control Device		Qty	Product Number	Manufacturer	SD Number	Document Number	Description
Field Mo	ounted Devices		•		10		
ΑE	1-2	2	GMA131.1P	SIEMENS.		155 315	3PT SR 24V,62LBIN PLM
AP	1	1	54600020	SIEMENS	•	155 146	AP331 FHCACT 8-13 PSI 2 3/8
CBL	1-7	7	537 773	SIEMENS	S600-64	149 245	CABLE, 25FT MODULAR
CBL	8-9	2	588100B	SIEMENS		149 957	6-WIRE 2-RJ11 RS CABLE 50'PLMN
FFM	1-2	2	54600351	SIEMENS	S600-67	149 318	FUME HOOD FLOW MODULE
FHC	1-7	7	54600555	SIEMENS		149 245	FH CNTLRL DAMPR APPL SASH SE
FHET .	1-7	7	LGEG815R12BAS	SIEMENS			GENEXH 12 GVFL ENC#3LAB AOPS10
LGE	1	1	LGER906R12BAS	SIEMENS			GENEXH 12 SSSL ENCL CYTEC GMA
LGS	1	1	LGSJ820R18ABB0	HART & COOLEY		149 319	SUPSNGL 18 1RRHLRCE #3
LGS	2	1	LGSR916R12ABBO	SIEMENS			SUPSINGL 12 1LRHCV TEC GMA
.RC	1	1	54600360	SIEMENS	S600-67	149 318	LRC - PNEUMATIC ACTUATION
)DP	1-7	7	537 720	SIEMENS-	S600-64	149 245	FUME HOOD ODP W/MTG BRACKET KT
SE	1–14	14	54600488	SIEMENS	3,40	149 269	VERT UNI-TRAK TOP ASSY,36"
EC	1-2	2	540 103	SIEMENS	S600-16	149 177	CONSTANT VOL CTLR ELEC OUT
TE	1-2	2	540 660A	SIEMENS		149 312	TEC RM SNSR-BEIGE
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	221						SEE VALVE SUBMITTAL
FMR ISO	0 1	1	024-024-040-TF	CORE		12-02-012	ISOLATION XFRMR 24V 40VA 1HUB
FMR 150	-X1-150-X2	2	120-24-100CB-TF				

rooms minus fixed offset (transfer under doors).

Fume hood VAV will modulate to maintain 100FPM overage face velocity across the sash opening, as sensed by the sash position sensors. If the face velocity falls below 100FPM average, and/or calculated maximum allowable sash opening is exceeded, then the face velocity monitor will initiate a local alarm. The local alarm mute function will silence the alarm for 15 minutes (adjustable).

Supply air flow will track changes in exhaust air flow to maintain fixed offset via flow tracking for proper room pressurization for each lab unit.

The DDC will modulate the supply air reheat coil control valve to maintain the space temperature set point, as sensed by the room thermostat.

Miscellaneous exhaust devices will be served by constant volume boxes as indicated on the plans.

If the fixed offset between exhaust and supply airflow cannot be maintained, or upon a failure of any device, the control system will initiate a "laboratory control system general fault" alarm at the building management system.

#### ADJACENT SPACE SEQUENCE

The VAV supply air box will modulate to compensate for supply air system pressure variances, to maintain the fixed constant supply airflow to the space. If the fixed space airflow cannot be maintained, a "low airflow" local alarm will be initiated by the BMS.

The DDC will modulate the supply air reheat coil control valve to maintain the space temperature set point, as sensed by the space temperature sensor.

The adjacent space supply air is transferred and utilized for lab make-up air and will not be included in total calculated air to lab.

#### Control Priority

A priority structure applies to the above control applications to ensure that safety is maintained as the highest control priority when HVAC systems or individual components cannot meet all demands placed upon the system.

- FUME HOOD CONTROL is the highest control priority.
- 2. ROOM PRESSURIZATION is the second level of priority.
- 3. ROOM TEMPERATURE CONTROL is the third level of priority.

### SEQUENCE OF OPERATION

The max and min values for each VAV device for the occupied mode are indicated on the HVAC plans. All control valves will utilize air flow measurement sensors and all control components will be DDC. Control system will maintain flow requirements to within  $\pm 1.5\%$  of design CFM.

Total lab exhaust equals measured exhaust at all fume hoods plus constant volume fume hood vented cabinet exhaust plus all constant volume snorkel exhaust devices in lob.

The total supply to the lab equals total measured exhaust in lab minus constant volume make-up air from the adjacent

FOR REFERENCE ONLY

## WAYNE STATE UNIVERSITY

5454 Cass Avenue, Detroit, MI 48202

**Project Location:** 

WAYNE STATE UNIVERSITY
CHEMISTRY BUILDING
5101 CASS AVENUE
DETROIT MICHIGAN 48202

CONTACT: ASHLEY FLINTOFF



iDesign

iDesign Solutions, LLC
Scientific Facilities & Laboratory Design
2531 Ridge Road, Suite 100
White Lake, MI 48383
248-440-7310
info@iDesign-Solutions.info
www.iDesign-Solutions.info



issue:	date
OWNER REVIEW	10/20/1
OWNER REVIEW	10/28/1
OWNER REVIEW	11/03/1
BID AND CONSTRUCTION ISSUE	11/23/1



designed by:	DH
drawn by:	DH
coordination checked:	JR
checked:	JR
approved:	JR

project:
CHEMISTRY LAB 150
1st Floor
Modification

sheet title:
Temperature
Controls

project number: sheet number: 007-286023 M401 (1156-7: iDesign project number)

"A"	FIXTURE TYPE	+©	SYNCHRONIZED CLOCK			FACP	FIRE ALARM CONTROL PANEL
	FLUORESCENT STRIP LIGHTING FIXTURE	Ю	ELECTRIC CLOCK OUTLET			RFAP	REMOTE FIRE ALARM PANEL
	FLUORESCENT LIGHTING FIXTURE	$\nabla$	COMMUNICATIONS OUTLET. REFER TO REQUIREMENTS	TYPICAL (	COMMUNICATIONS OUTLET DETAIL FOR	NACP	NOTIFICATION APPLIANCE CONTROL PANEL
	EMERGENCY FIXTURE (NIGHT LIGHT) UNSWITCHED	▼	PHONE OUTLET SAME AS COMMUNICATION (W: WALL MOUNTED AT +48")	TIONS OUT	TLETS	F	FIRE ALARM RELAY / INPUT TO DOOR HARDWARE OR AUX
7/0	EMERGENCY FIXTURE SAME AS NIGHT LIGHT EXCEPT SWITCHED	WAP	WIRELESS ACCESS POINT - SAME AS ABOVE FINISHED CEILING IN LOCATION	COMMUNI N AS DIRE	ICATIONS OUTLET EXCEPT LOCATE BOX	FS	FIRE ALARM CONNECTORS FOR COMBINATION PNUMATIC FIF CONNECTION TO FIRE ALARM SYSTEM TO SIGNAL DAMPER TO FIRE ALARM SYSTEM TO SIGNAL DAMPER POSITION TO
<u>_</u>	H.I.D.,INCANDESCENT, OR COMPACT FLUORESCENT LTG. FIXTURE	$\square$	CELLULAR ANTENNA			<b>SD</b>	SMOKE DETECTOR
<b>/</b> -	WALL MOUNTED LIGHTING FIXTURE			R WITH P	ILOT LIGHT, LOCKABLE OFF, FOR MOTOR	<b>(DS)</b>	DUCT SMOKE DETECTOR
/ 😣	EXIT LIGHTING FIXTURE (WALL / CEILING MOUNTED) — SHADING INDICATES ILLUMINATED FACE—CHEVRONS AS INDICATED		APPLICATIONS. MANUAL SINGLE PHASE AND WITHOUT OVERLOADS FOR DISCON OVERLOADS AND FOR APPLICATIONS W	MOTOR S NNECT APF HFRF OVF	ILOT LIGHT, LOCKABLE OFF, FOR MOTOR WITCH WITH PILOT LIGHT, LOCKABLE OFF PLICATIONS TO EQUIPMENT NOT REQUIRING RLOADS ARE INTEGRAL TO MOTOR-BASED	Ē	MANUAL FIRE ALARM STATION
<b>∞/4</b>	EMERGENCY LIGHTING UNIT EQUIPMENT				FINISHED SPACES. SURFACE MOUNT IN	FO	FIRE ALARM STROBE
S	SINGLE POLE LIGHT SWITCH, IVORY. HUBBELL HBL1221 OR APPROVED EQUAL	×	MOTOR STARTER			F⋈A	FIRE ALARM AUDIBLE/STROBE, "A" INDICATES AUDIBLE ON
S <sub>2</sub>	DOUBLE POLE LIGHT SWITCH (SAME SERIES AS SINGLE POLE SWITCH)	⊠¹	COMBINATION MAGNETIC FUSIBLE MOTO	OR STARTI	ER	⊕ <sub>A</sub>	FIRE ALARM AUDIBLE/STROBE - CEILING MOUNTED, "A" IN
S <sub>3</sub>	THREE WAY LIGHT SWITCH (SAME SERIES AS SINGLE POLE SWITCH)	ď	FUSIBLE DISCONNECT SWITCH			WF	FIRE ALARM WATER FLOW SWITCH
S <sub>4</sub>	FOUR WAY LIGHT SWITCH (SAME SERIES AS SINGLE POLE SWITCH)	괍	NON-FUSIBLE DISCONNECT SWITCH				
Sĸ	KEY OPERATED SWITCH - MATCH EXISTING KEYING	≪⊠	BUS DUCT PLUG-IN UNIT				WORKING CLEARANCE AROUND ELECTRICAL EQUIPMENT
Sp	SWITCH WITH PILOT LIGHT — FOR EMERGENCY CIRCUITS, RED TOGGLE ILLUMINATED WHEN LIGHTS ARE OFF, HUBBELL HBL 1221ILR OR APPROVED EQUAL	<b>/</b>	MOTOR - SINGLE PHASE				
So	DIMMER SWITCH — LUTRON NOVA T—STAR. FOR INCANDESCENT LOAD PROVIDE LARGE CONTROL, IVORY WITH STAIN NICKEL METAL WALL PLATE. 1500W NT—1503P—IV. FOR	Ø	MOTOR - THREE PHASE			<u> </u>	
	FLUORESCENT OR LED LOADS, COORDINATE SWITCH TYPE WITH SELECTED BALLAST OR DRIVER FOR COMPATIBILITY.	CB	MOLDED CASE CIRCUIT BREAKER - SI	URFACE M	OUNTED IN NEMA ENCLOSURE	— с —	UNDERGROUND TELECOMMUNICATIONS SERVICE CONDUIT
S	DUAL LEVEL SWITCHING — WIRE ONE SWITCH TO OUTER LAMPS AND OTHER SWITCH TO REMAINING INNER LAMP/S. GANG SWITCHES UNDER COMMON FACEPLATE ALONG WITH ANY	CBI	MOLDED CASE CIRCUIT BREAKER - FI	LUSH MOU	INTED IN NEMA ENCLOSURE	—— FA ——	UNDERGROUND FIRE ALARM SERVICE CONDUIT
<b></b>	ADDITIONAL SWITCHES AND DIMMERS.  FACELESS GFCI DEVICE IN SERIES WITH LOCAL SWITCH.	Т	TRANSFORMER				
	GANG IN SAME OUTLET BOX AS SWITCH.		CONTACTOR				
			LIGHTING AND/OR RECEPTACLE PANEL	ı (FIIISH)	/SUDEACE MOUNTED)		
<u>os</u>	CEILING MOUNTED OCCUPANCY SENSOR CONTROL-INDICATES ROOM/SPACE WITH OCCUPANCY		DISTRIBUTION PANEL	L (1 L0311)	SONIACE MOUNTEDY		
<u> </u>	SENSOR LIGHTING CONTROL. PROVIDE SYSTEM DESIGN AND ALL WORK AS SPECIFIED IN MICHIGAN UNIFORM ENERGY CODE. SYMBOL DOES NOT IMPLY QUANTITY, TYPE OR LOCATION OF DEVICES.	<u> </u>		SWITCH S	SIZE (AMPS)/POLES/FUSE SIZE (AMPS)		
<u>os</u>	(CEILING MOUNT SENSOR DEVICES).  WALL MOUNTED OCCUPANCY SENSOR, SINGLE POLE. DUAL TECHNOLOGY (PIR/MICROPHONICS),	—G—	GROUND BUS				
<u>03</u>	120/277V. SENSOR SWITCH WSD-PDT (NO SUBSTITUTIONS). SWITCH IS RATED 800W AT 120V AND 1200W AT 277V, 1/4 HP. IVORY WITH STAINLESS STEEL COVERPLATE FOR NORMAL POWER	——  III	GROUND				
	APPLICATIONS. IVORY WITH RED COVERPLATE FOR CRITICAL POWER APPLICATIONS. PROVIDE SPECIFIED COVERPLATE. FACTORY COLOR-MATCHED PLATE IS NOT ACCEPTABLE.	_			UNLESS OTHERWISE NOTED FOR ONE 20A. O' IN LENGTH. INCREASE CONDUIT AND		
S2	WALL MOUNTED OCCUPANCY SENSOR, TWO-POLE. DUAL TECHNOLOGY (PIR/MICROPHONICS), TWO POLE, 120/277V WITH TWO PUSHBUTTONS FOR INDEPENDENT CONTROL OF TWO LOADS		WIRE SIZE FOR CIRCUITS OVER 100'			_	
	(DUAL-LEVEL SWITCHING). SENSOR SWITCH WSD-PDT (NO SUBSTITUTIONS). SWITCH IS RATED 800W AT 120V AND 1200W AT 277V, 1/4 HP. IVORY WITH STAINLESS STEEL COVERPLATE FOR NORMAL POWER APPLICATIONS. IVORY WITH RED COVERPLATE FOR CRITICAL POWER APPLICATIONS.	_		UP TO 1	UNLESS OTHERWISE NOTED FOR TWO 20A.  OO' IN LENGTH. INCREASE CONDUIT AND		
	PROVIDE SPECIFIED COVERPLATE. FACTORY COLOR—MATCHED PLATE IS NOT ACCEPTABLE.		HOMERUN TO PANEL: 3/4"C, 6#10 &	k 1#10G l	UNLESS OTHERWISE NOTED FOR THREE		
Ф	DUPLEX RECEPTACLE, 20A, IVORY WITH STAINLESS STEEL COVERPLATE UNLESS WEATHERPROOF COVER IS INDICATED. HUBBELL HBL5362 OR APPROVED EQUAL	<b></b>	20A. 1P BRANCH CIRCUITS FOR CIRC AND WIRE SIZE FOR CIRCUITS OVER		TO 100' IN LENGTH. INCREASE CONDUIT ENGTH.		
Фт۷	SAME AS DUPLEX RECEPTACLE EXCEPT MOUNTED AT SAME HEIGHT AS TV OUTLET	—PS-I	PLUG-IN STRIP				
<b>*</b>	QUAD. RECEPTACLE — SAME AS DUPLEX RECEPTACLE EXCEPT TWO DEVICES UNDER COMMON COVERPLATE	⊢SR1 <del>-</del>				_	
₽USB	QUAD. RECEPTACLE - SAME AS USB DUPLEX RECEPTACLE EXCEPT TWO DEVICES UNDER COMMON STAINLESS STEEL COVERPLATE	A .	ABOVE COUNTER				
/	SAME AS DUPLEX RECEPTACLE EXCEPT GROUND FAULT CIRCUIT INTERRUPTER TYPE WITH	A/E	ARCHITECT / ENGINEER	GRS GTD	GALVANIZED RIGID STEEL  GENERATOR TRANSFER DEVICE	_	
<sup>∕</sup> Φ <sub>GFR</sub>	LED TO INDICATE LOSS OF PROTECTION. WIRE FOR SELF PROTECTION AND NOT PROTECTION OF DOWNSTREAM DEVICES. HUBBELL GFR8300HIL OR APPROVED EQUAL	AFF	ABOVE FINISH FLOOR	HG	HOSPITAL GRADE	_	MEN MOTEC
/ <b>_</b>	SAME AS QUAD RECEPTACLE EXCEPT GROUND FAULT CIRCUIT INTERRUPTER TYPE WITH LED	AHJ	AUTHORITY HAVING JURISDICTION		HAND-OFF-AUTOMATIC	_	<u>KEY NOTES</u> :
<sup>∕</sup> ∰ <sub>GFR</sub>	TO INDICATE LOSS OF PROTECTION. WIRE FOR SELF PROTECTION AND NOT PROTECTION OF DOWNSTREAM DEVICES. HUBBELL OR APPROVED EQUAL	ATS AV OR	AUTOMATIC TRANSFER SWITCH	HOA IG	ISOLATED GROUND		WHERE TELECOMMUNICATIONS OUTLETS ARE MOU BLOCK WALLS, PROVIDE SURFACE MOUNTED INST
Ψ	DUPLEX RECEPTACLE ON EMERGENCY POWER (RED DEVICE)	A/V	AUDIO VISUAL		ISOLATED GROOMS		
₽=	QUAD RECEPTACLE ON EMERGENCY POWER (RED DEVICES)	AFCI	ARC FAULT CIRCUIT INTERRUPTER	NIC	NOT IN CONTRACT	_	
ib.	GROUND FAULT INTERRUPTER DUPLEX RECEPTACLE ON EMERGENCY POWER (RED DEVICE) WITH STAINLESS STEEL COVERPLATE	AHU C	AIR HANDLING UNIT  CEILING MOUNTED	NL NL	NIGHT LIGHT	_	
₩:	GROUND FAULT INTERRUPTER QUAD RECEPTACLE ON EMERGENCY POWER (RED DEVICE) WITH STAINLESS STEEL COVERPLATE	DW	DISHWASHER	RT	RAINTIGHT		
<b>.</b>	JUNCTION BOX (P: POWER, D: VOICE/DATA)	EF	EXHAUST FAN	REF	REFRIGERATOR		
⊢ <b>⊙</b> B	OUTLET BOX WITH BLANK COVERPLATE	EG	EQUIPMENT GROUND	(R)	RELOCATE		
<b>●</b> F4	SAME AS TYPE F1, EXCEPT WITH PLUG-IN SERVICE AT FLOOR. PROVIDE DUAL-SERVICE COMBINATION POKE THROUGH, SUB PLATE, AND COVER WITH TWO FLIP-TOP LIDS AND TWO		·	UH	UNIT HEATER	_	
<b>9</b> F 4	RECTANGULAR OPENINGS, ONE WITH GFCI DUPLEX RECEPTACLE AND ONE FOR DATA/TELECOM TO BE FIT OUT BY TELECOMMUNICATIONS INSTALLER.	(E)	EXISTING TO REMAIN	N.O./N.C.			
	TV OUTLET - DOUBLE GANG DEEP OUTLET BOX WITH GROMMETED FACEPLATE AND 1 1/4" EMT CONDUIT TO CABLE TRAY. COORDINATE WITH ARCHITECT FOR MOUNTING LOCATION	(ER)		UON	UNLESS OTHERWISE NOTED	_	
-TV	EMT CONDUIT TO CABLE TRAY. COORDINATE WITH ARCHITECT FOR MOUNTING LOCATION PRIOR TO INSTALLATION. PROVIDE COAXIAL CABLE FROM FACEPLATE TO COMM ROOM. WITH 3' SLACK AT FACEPLATE AND 30' SLACK COILLED IN COMM ROOM.	EWC G	GROUND / EQUIPMENT GROUNDING	VFD			
•		GD	CONDUCTOR  GARBAGE DISPOSAL	WP	WEATHERPROOF - PROVIDE COVER RATED	-	
<b>⊕</b> 	SPECIAL PURPOSE RECEPTACLE	<u> </u>	CHILDROL DIGI COME	WSU	WEATHERPROOF WHILE IN USE WAYNE STATE UNIVERSITY	-	
	PUSH BUTTON STATION  EMERGENCY POWER OFF PUSHBUTTON. PROVIDE CLEAR PLASTIC HINGED COVER. PROVIDE	GFI/GFR	GROUND FAULT CIRCUIT			1	
EPO	ALL WIRING AND COMPONENTS AND CONTROL POWER TRANSFORMERS, CONTACTORS, ETC. TO CONTROL EQUIPMENT ASSOCIATED WITH EPO PUSHBUTTON AND DISCONNECT POWER TO		INTERRUPTER—WIRE GFR RECEPTACLES FOR SELF PROTECTION AND NOT	_			
	THE EQUIPMENT. DO NOT INTERRUPT OTHER LOADS ON SAME CIRCUIT.		DOWNSTREAM PROTECTION OF				

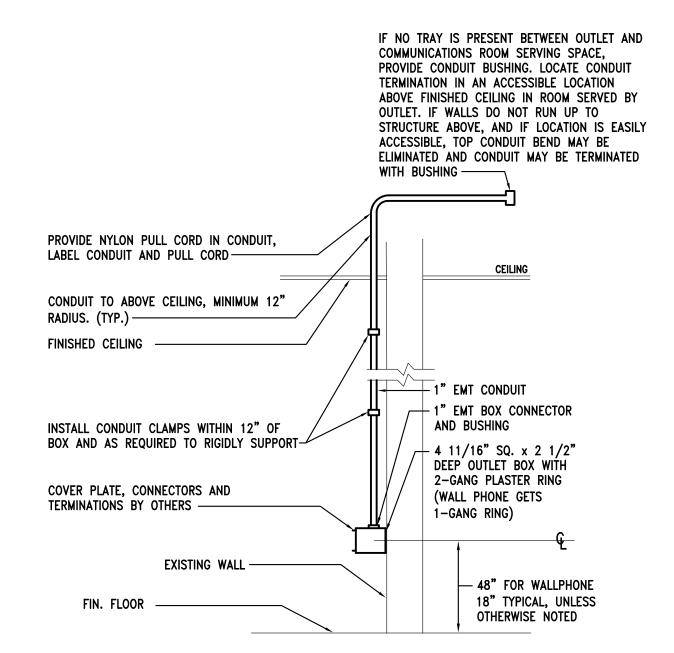
### **KEY NOTES:**

FIRE ALARM RELAY / INPUT TO DOOR HARDWARE OR AUXILIARY SYSTEMS.

FIRE ALARM CONNECTORS FOR COMBINATION PNUMATIC FIRE/SMOKE DAMPER. PROVIDE CONNECTION TO FIRE ALARM SYSTEM TO SIGNAL DAMPER TO CLOSE. PROVIDE CONNECTION TO FIRE ALARM SYSTEM TO SIGNAL DAMPER POSITION TO FIRE ALARM SYSTEM

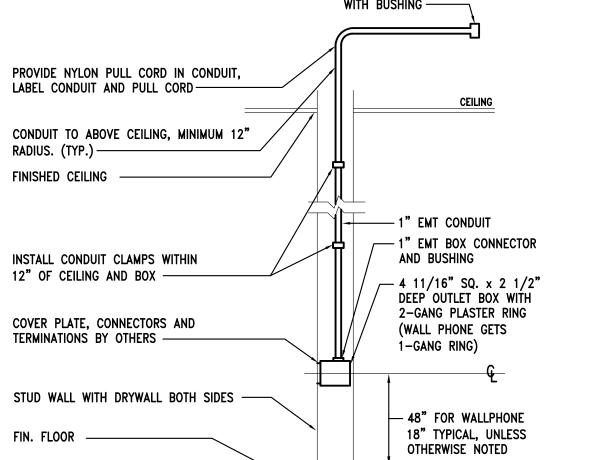
FIRE ALARM AUDIBLE/STROBE - CEILING MOUNTED, "A" INDICATES AUDIBLE ONLY

WHERE TELECOMMUNICATIONS OUTLETS ARE MOUNTED ON EXISTING TO REMAIN BLOCK WALLS, PROVIDE SURFACE MOUNTED INSTALLATION.



## TYPICAL SURFACE MOUNTED COMMUNICATIONS OUTLET DETAIL (1)

IF NO TRAY IS PRESENT BETWEEN OUTLET AND COMMUNICATIONS ROOM SERVING SPACE, PROVIDE CONDUIT BUSHING. LOCATE CONDUIT TERMINATION IN AN ACCESSIBLE LOCATION ABOVE FINISHED CEILING IN ROOM SERVED BY OUTLET. IF WALLS DO NOT RUN UP TO STRUCTURE ABOVE, AND IF LOCATION IS EASILY ACCESSIBLE, TOP CONDUIT BEND MAY BE ELIMINATED AND CONDUIT MAY BE TERMINATED WITH BUSHING ——



## TYPICAL COMMUNICATIONS OUTLET DETAIL (1)

SHUTDOWNS REQUIRED
ELECTRICAL PANELS SERVING AREA OF WORK WHICH MAY REQUIRE SHUTDOWN:
1. DP-1N (AND DOWNSTREAM PANELS)
2. RP-1NE 3. RP-1NF

	ELECTRICAL DRAWING INDEX
SHEET	DESCRIPTION
E000	ELECTRICAL LEGEND
E001	ELECTRICAL GENERAL NOTES
E002	1ST FLOOR CHEMISTRY BUILDING - ELECTRICAL KEY PLAN
E003	PARTIAL ELECTRICAL RISER DIAGRAM
E004	ELECTRICAL PANEL SCHEDULES
ED101	PARTIAL 1ST FLOOR ELECTRICAL DEMOLITION PLAN
E101	PARTIAL 1ST FLOOR ELECTRICAL NEW WORK PLAN
E201	ELECTRICAL SPECIFICATIONS - 1
E202	ELECTRICAL SPECIFICATIONS - 2

5454 Cass Avenue, Detroit, MI 48202

Project Location:

**WAYNE STATE UNIVERSITY** CHEMISTRY BUILDING 5101 CASS AVENUE **DETROIT MICHIGAN 48202** 

CONTACT: ASHLEY FLINTOFF

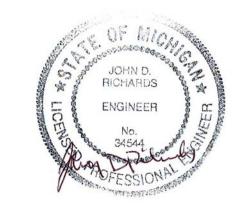


**iDesign** 

iDesign Solutions, LLC Scientific Facilities & Laboratory Design 2531 Ridge Road, Suite 100 White Lake, MI 48383 248-440-7310 info@iDesign-Solutions.info



10/20/16
10/28/16
11/03/16
11/23/16



designed by:	TR
drawn by:	TR
coordination checked:	ES
checked:	ES
approved:	ES

project

CHEMISTRY LAB 150 1st Floor

Modification

sheet title: Electrical Legend

project number:

sheet number:

E000 007-286023 (1156-7: iDesign project number)

H:\ACAD\FILES\70\70800-WSU Chemistry Lab 150\CAD\ELEC\70800-E-000 ELEC LEGEND.dwg Wed, 23 Nov 2016 - 2:13pm

#### ELECTRICAL DEMOLITION GENERAL NOTES :

- A. DEMOLITION GENERAL NOTES APPLY TO ALL ELECTRICAL DEMOLITION PLANS INCLUDED WITHIN THIS DOCUMENT SET.
- B. COORDINATE ALL DEMOLITION WORK WITH MECHANICAL AND ARCHITECTURAL DEMOLITION PLANS, OWNER'S FACILITY MANAGER, AND ALL TRADE CONTRACTORS PERFORMING DEMOLITION.
- C. THESE DEMOLITION NOTES AND PLAN DO NOT FULLY REPRESENT ALL DEMOLITION WORK REQUIRED TO INSTALL NEW WORK IN ACCORDANCE WITH CONTRACT DOCUMENTS, BUT ARE INTENDED TO SERVE AS GENERAL DEMOLITION GUIDELINES. REFER TO ARCHITECTURAL AND MECHANICAL DRAWINGS FOR LOCATIONS OF INCIDENTAL DEMOLITION WORK NOT INDICATED ON THIS PLAN.
- D. WHERE ITEMS ARE REMOVED, PATCH SURFACES TO MATCH ADJACENT SURFACES OR TO RECEIVE NEW FINISHES WHERE SCHEDULED. PATCHING OF NEW OR EXISTING FINISHES SHALL EXTEND TO NEAREST CORNER OR NATURAL TERMINATION FOR A CONSISTENT, SMOOTH, INVISIBLE TRANSITION FINISHES AT THE END OF CONSTRUCTION.
- E. COORDINATE ANY SERVICE SHUTDOWNS WITH OWNER. A MINIMUM OF 7 DAYS NOTICE IS REQUIRED FOR SERVICE SHUTDOWN.
- F. WHERE DEMOLITION IS SPECIFIED OR INDICATED, REMOVE WORK AS NOTED BELOW AND PATCH SURFACE TO MATCH EXISTING OR NEW FINISH AS APPLICABLE. FIRE STOP ALL PENETRATIONS LEFT IN FLOORS AND FIRE/SMOKE-RATED WALLS. POWER, LIGHTING CONTROLS, BLANK OUTLET BOXES: REMOVE WIRING DEVICE. REMOVE WIRING BACK TO SOURCE OR TO THE NEAREST EXISTING TO REMAIN JUNCTION BOX IF CIRCUIT SERVES EXISTING TO REMAIN ACTIVE LOADS. REMOVE OUTLET BOX DO NOT PROVIDE BLANK COVERPLATES. ABANDON CONDUIT CONCEALED IN WALLS. CUT OFF CONDUIT WHERE IT EMERGES FROM WALL ABOVE CEILING AND PLUG OR CAP END. REMOVE CONDUIT BACK TO SOURCE WHERE OTHERWISE ACCESSIBLE, INCLUDING ABOVE FINISHED CEILINGS. PLUG OPENINGS IN PANELS AND BOXES FROM REMOVED CONDUIT. REMOVE FLEXIBLE CONDUIT IN WALLS COMPLETELY.

  TELECOMMUNICATIONS/DATA: IT CONTRACTOR TO DISCONNECT AT SOURCE IN COMMUNICATIONS ROOM AND AT EACH OUTLET. ELECTRICAL CONTRACTOR TO REMOVE CABLE, OUTLET BOX AND CONDUIT AS NOTED FOR POWER AND LIGHTING CONTROLS.
- G. REFER TO DRAWINGS FOR EXISTING BUILDING COMPONENTS TO BE REMOVED, SALVAGED, AND REUSED IN NEW WORK. THE CONTRACTOR IS RESPONSIBLE FOR ALL ITEMS TO BE SALVAGED AND RELOCATED, THROUGHOUT THE CONSTRUCTION PERIOD, INCLUDING SAFE STORAGE OF SAME. UPON DEMOLITION, THE OWNER SHALL RETAIN THOSE ITEMS DEEMED SALVAGEABLE. ITEMS NOT RETAINED SHALL BECOME THE PROPERTY OF THE CONTRACTOR, WHO SHALL LEGALLY DISPOSE OF SAME.

#### ELECTRICAL GENERAL NOTES :

- A. ELECTRICAL GENERAL NOTES APPLY TO ALL ELECTRICAL SHEETS.
- B. WIRING DEVICE COVERPLATES FOR NORMAL POWER SWITCHES, DIMMERS, RECEPTACLES AND MANUAL MOTOR SWITCHES ARE TO BE BRUSHED STAINLESS STEEL. LABEL WIRING DEVICE COVERPLATES (SWITCHES, RECEPTACLES, DIMMERS) WITH PANEL AND BRANCH CIRCUIT NUMBERS USING WATERPROOF CLEAR PLASTIC LETTERED TAPE AND BLACK MACHINE PRINTED LETTERING. LOCATE LABEL CENTERED ON BOTTOM OF COVERPLATE. FOR WEATHERPROOF APPLICATIONS LOCATE LABEL INSIDE WEATHERPROOF COVER. LABEL MOTORIZED DOOR OPERATORS AND HARDWIRED ELECTRICAL UTILIZATION EQUIPMENT IN THE SAME MANNER AS WIRING DEVICE COVERPLATES. TYPICAL FOR ALL NEW, RELOCATED AND EXISTING TO REMAIN WIRING DEVICE COVERPLATES AND EQUIPMENT WITHIN THE AREA OF WORK.

  LABEL OUTLET BOX COVERPLATES SERVING FLEXIBLE WHIPS FOR SYSTEMS FURNITURE, EQUIPMENT, AND FOODSERVICE LOADS WITH PANEL AND CIRCUIT NUMBERS SIMILAR TO WIRING DEVICES. LABEL LIGHTING CONTROLS AND RECEPTACLES (FACTORY AND FIELD—INSTALLED) IN SYSTEMS FURNITURE, EQUIPMENT AND POWER POLES WITH PANEL AND CIRCUIT NUMBERS SIMILAR TO WIRING DEVICES.
- C. PROVIDE IDENTIFICATION AND COLOR CODING OF ELECTRICAL EQUIPMENT AND WORK PER OWNER'S STANDARDS.
- D. ALL NECESSARY ELECTRICAL EQUIPMENT REQUIRED FOR THE WORK PROPOSED SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
- E. REMOVE AND REINSTALL CEILINGS AS REQUIRED TO PERFORM WORK.
- F. MOUNTING HEIGHTS TO CENTER UNLESS OTHERWISE NOTED:
- REFER TO ARCHITECTURAL ELEVATIONS OF ALL AREAS PRIOR TO INSTALLATION OF ELECTRICAL WORK. MOUNT AS INDICATED
  ON ARCHITECTURAL ELEVATIONS. IF ANY DISCREPANCY EXISTS BETWEEN ELECTRICAL AND ARCHITECTURAL ELEVATIONS. THE
  ELEVATIONS TAKE PRECEDENCE.
- RECEPTACLES & VOICE/DATA OUTLETS: 18" AFF UNLESS OTHERWISE NOTED.
- WALL MOUNTED FIRE ALARM VISIBLE ONLY AND AUDIBLE/VISIBLE COMBINATION DEVICES: MOUNT SUCH THAT ENTIRE LENS IS NOT LESS THAN 80" AFF AND NOT GREATER THAN 96" AFF. MOUNT ALL SIMILAR DEVICES AT THE SAME HEIGHT.
- WALL MOUNTED FIRE ALARM AUDIBLE ONLY DEVICES: MOUNT SUCH THAT THE TOP OF THE DEVICE IS A MINIMUM OF 90"AFF
   AND A MINIMUM OF 6" BELOW THE FINISHED CEILING. MOUNT ALL SIMILAR DEVICES AT THE SAME HEIGHT.
- COORDINATE THE LOCATION OF ALL FIRE ALARM DEVICES IN THE AREA OF WORK OF ANY WORK, AND NOTIFY A/E OF ANY
  MOUNTING LOCATION DISCREPANCIES PRIOR TO THE INSTALLATION OF ANY FIRE ALARM WORK.
- SWITCHES AND FIRE ALARM PULL STATIONS: 48" AFF.
- DISCONNECT SWITCHES AND CIRCUIT BREAKERS: MOUNT SUCH THAT THE CENTER OF THE GRIP OF THE OPERATING HANDLE
  OF THE SWITCH OR CIRCUIT BREAKER, WHEN IN ITS HIGHEST POSITION, IS NOT MORE THAN 6 FEET 7 INCHES ABOVE
  FINISHED FLOOR.
- G. UNLESS OTHERWISE NOTED, TYPICAL BRANCH CIRCUIT WIRING IS 3/4"C, 2#12 + 1#12GRD. FOR CIRCUITS UP TO 100 FT. IN LENGTH. PROVIDE #10 WIRE FOR CIRCUITS GREATER THAN 100 FT. IN LENGTH. PROVIDE DEDICATED NEUTRAL CONDUCTORS FOR ALL BRANCH CIRCUITS. PROVIDE RIGID STEEL CONDUIT FOR ALL WORK IN SLAB AND FOR ANY CONDUITS IN CHASES.
- H. CIRCUIT NUMBERS ON PLANS ARE BASED ON FIELD OBSERVATION AND ON THE OWNERS EXISTING DRAWINGS. CIRCUIT TRACE
  TO VERIFY ALL EXISTING BRANCH CIRCUITS IN AREA OF WORK. INDICATE ACTUAL CIRCUIT TRACED BRANCH CIRCUIT NUMBERS
  ON AS-BUILT DOCUMENTS FOR EACH CIRCUIT AFFECTED BY WORK (DEMOLITION, NEW AND RELOCATED).
- I. WHERE EXISTING SPARES OR SPACES IN PANELBOARDS ARE INDICATED FOR USE IN THE PROJECT, REMOVE THE PANEL COVERS PRIOR TO INSTALLING ANY CONDUIT AND WIRING RELATED TO THE PANEL AND CONFIRM THAT SPARES ARE AVAILABLE (NO WIRING TO UNLABELED BREAKERS), AND CONFIRM THAT POSITIONS INDICATED AS SPACES CONTAIN BUSSING SUITABLE FOR THE ADDITION OF BREAKERS. SEND PHOTOGRAPHS TO A/E OF ANY CONDITIONS FOUND WHICH ARE NOT CONSISTENT WITH USABLE SPARES AND SPACES.
- J. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS PRIOR TO BEGINNING WORK OR SUPPLYING MATERIALS OR COMPONENTS.
- K. PROVIDE FLUSH INSTALLATION OF OUTLET BOXES AND CONCEAL CONDUIT FOR ALL SYSTEMS IN FINISHED AREAS WITH GYP WALL CONSTRUCTION UNLESS OTHERWISE INDICATED. WORK MAY BE EXPOSED IN MECHANICAL AND ELECTRICAL SPACES, AND ON EXISTING TO REMAIN BLOCK WALLS. CUT AND PATCH EXISTING SURFACES AS REQUIRED AND REFINISH TO MATCH FINAL ARCHITECTURAL FINISH OF SPACE, UNLESS OTHERWISE INDICATED, OR PRE—CONSTRUCTION CONDITIONS IF NO OTHER ARCHITECTURAL FINISH WORK IS PERFORMED IN THE AREA. REFER TO ARCHITECTURAL DRAWINGS TO DETERMINE LOCATIONS OF INCIDENTAL ADDITIONAL FINISH WORK ASSOCIATED WITH RESTORATION OF EXISTING FINISHES WHERE ALTERED BY ELECTRICAL WORK. FINISH ANY DAMAGED/ALTERED SURFACES PER ARCHITECT'S DIRECTION.
- L. CONTRACTOR IS TO DETERMINE ROUTING OF ALL CIRCUITS ABOVE FINISHED CEILING AS MEANS AND METHODS. FIELD SURVEY TO DETERMINE ROUTING. PROVIDE CONCEALED ROUTING FOR ALL WORK. REMOVE AND REINSTALL CEILING AS REQUIRED TO PERFORM WORK.
- M. PROVIDE A LOCAL DISCONNECTING MEANS FOR ALL EQUIPMENT AND LOADS WHICH ARE NOT CORD-AND-PLUG CONNECTED.
- N. ALL WIRING IS TO BE PERFORMED BY LICENSED ELECTRICIANS.
- O. EXISTING DEVICES/EQUIPMENT TO REMAIN ARE SHOWN WITH LIGHT LINE WEIGHT, NEW DEVICES/EQUIPMENT ARE SHOWN WITH DARK LINE WEIGHT AND DEVICES/EQUIPMENT SHOWN HATCHED ARE TO BE REMOVED.
- P. MAINTAIN INTEGRITY OF ALL EXISTING FIRE RATED PARTITIONS. REFER TO ARCHITECTURAL DOCUMENTS FOR RATINGS.
- U. INSTALL WORK AND EQUIPMENT AS INDICATED ON DRAWINGS, PER NEC, STANDARDS AND DESIGN GUIDELINES.
- V. MAKE FINAL CONNECTION TO ALL EQUIPMENT INDICATED PER MANUFACTURER'S INSTALLATION INSTRUCTION. COORDINATE LOCATION OF SERVICE TO ALL EQUIPMENT WITH APPROVED SUBMITTALS AND WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS PRIOR TO INSTALLATION.

- W. PROVIDE UL LISTED SYSTEM FOR FIRE STOPPING PENETRATIONS THROUGH FIRE RATED ASSEMBLIES. PROVIDE SYSTEM WITH EQUAL OR GREATER RATING THAN ASSEMBLY. REFER TO ARCHITECTURAL DOCUMENTS FOR RATINGS AND LOCATIONS OF ASSEMBLIES. FIRE STOPPING MUST BE INSTALLED BY CERTIFIED PERSONNEL.
- X. EXISTING CONDUIT SIZES NOTED ARE APPROXIMATE ONLY. CONFIRM ACTUAL DIMENSIONS AND MATCH FOR ANY EXTENSION OF CIRCUITS UNLESS OTHERWISE NOTED.
- Y. PROVIDE ACCESS PANELS WHERE REQUIRED FOR ELECTRICAL WORK. PANELS ARE NOT SHOWN. COORDINATE LOCATION WITH ARCHITECT PRIOR TO INSTALLATION OF PANEL AND RELATED ELECTRICAL WORK.
- Z. AT ALL WORKSTATIONS, COORDINATE LOCATION OF POWER AND TELECOMMUNICATIONS OUTLETS WITH APPROVED WORKSTATION/FURNITURE/MILLWORK SUBMITTALS PRIOR TO INSTALLATION OF BOXES AND RACEWAYS. LOCATE OUTLETS IN ACCESSIBLE KNEESPACE OF WORKSTATIONS UNLESS OTHERWISE NOTED. ALSO AVOID INTERFERENCES WITH FILING CABINETS AND WORKSTATION ACCESSORIES SUCH AS COMPUTER LOCATIONS AS APPLICABLE.
- AA. WHERE "TYPICAL" IS NOTED, THE CONDITION APPLIES FOR ALL ROOMS ALL SHEETS IN THE WORK.
- AB. COORDINATE ALL WORK RELATING TO THE FIRE ALARM SYSTEM WITH FIRE ALARM DESIGNER/INSTALLER.
- AC. SYNCHRONIZE ALL EXISTING TO REMAIN AND NEW FIRE ALARM VISUAL DEVICES. ADD SYNCHRONIZATION MODULES/BOOSTER AS
- AD. COORDINATE AND ATTEND A COORDINATION MEETING BETWEEN CONTRACTOR TRADES PRIOR TO CONSTRUCTION. REVIEW AND PLAN EQUIPMENT LOCATIONS AND ROUTING OF MECHANICAL AND ELECTRICAL WORK TO AVOID INTERFERENCES AND MAINTAIN WORKING CLEARANCES. OBTAIN INSPECTOR APPROVAL OF PLANNED INSTALLATION LOCATIONS PRIOR TO INSTALLATION. VERIFY THAT CONDENSER LINES, DUCTWORK AND OTHER MECHANICAL ITEMS DO NOT INTERFERE WITH ELECTRICAL WORKING CLEARANCES.



5454 Cass Avenue, Detroit, MI 48202

Project Location:

WAYNE STATE UNIVERSITY
CHEMISTRY BUILDING
5101 CASS AVENUE
DETROIT MICHIGAN 48202

CONTACT: ASHLEY FLINTOFF



iDesign

iDesign Solutions, LLC

Scientific Facilities & Laboratory Design 2531 Ridge Road, Suite 100 White Lake, MI 48383 248-440-7310 info@iDesign-Solutions.info



 issue:
 date:

 OWNER REVIEW
 10/20/16

 OWNER REVIEW
 10/28/16

 OWNER REVIEW
 11/03/16

 BID AND CONSTRUCTION ISSUE
 11/23/16

MECHANICAL **L**LECTRICAL

200 E. Brown Street

Birmingham, MI 48009



designed by:	TR
drawn by:	TR
coordination checked:	ES
checked:	ES
approved:	ES

CHEMISTRY LAB 150

1st Floor Modification

sheet title:

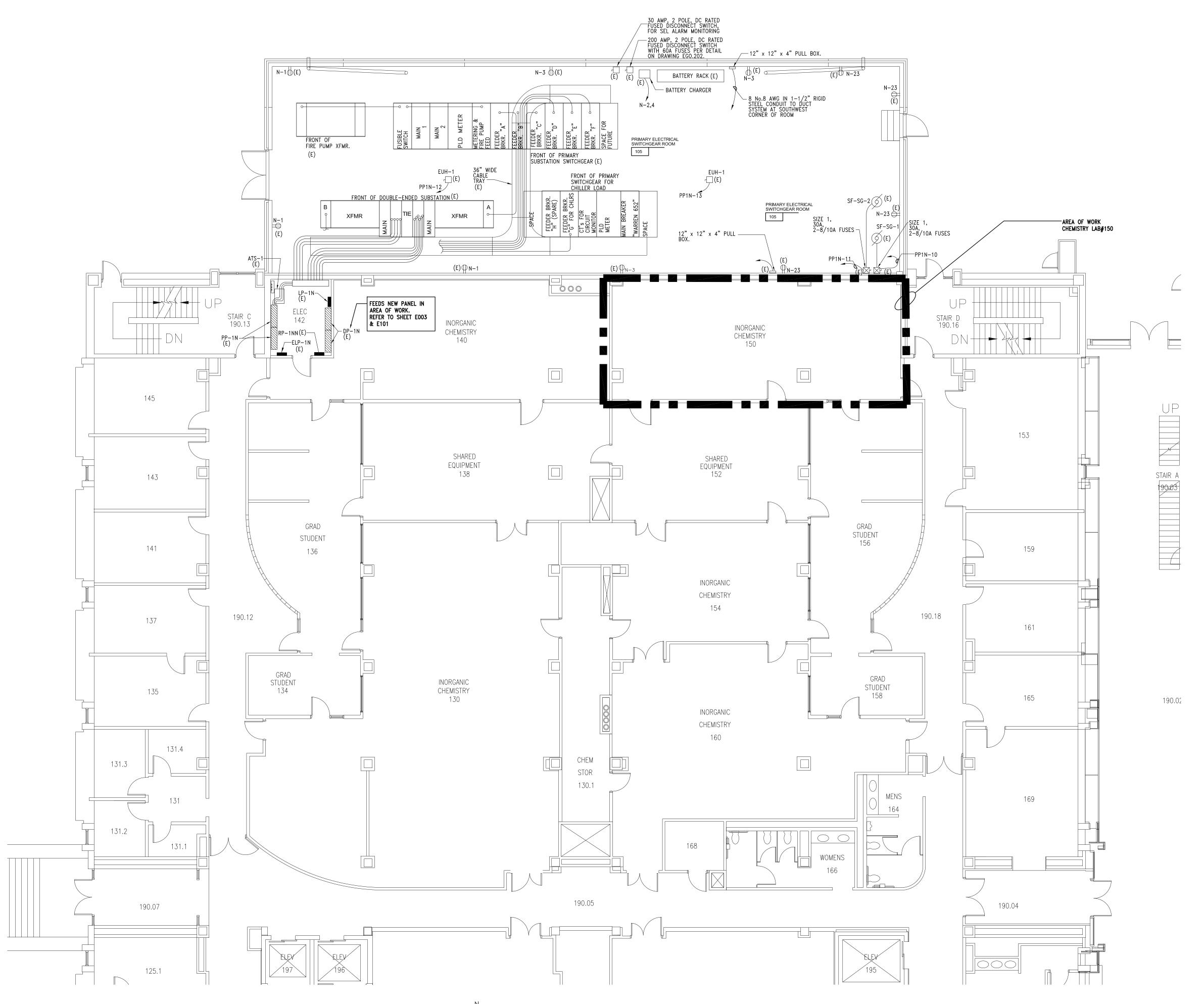
project

Electrical General Notes

project number: sheet number: 007-286023 E001

(1156-7 : iDesign project number)

H:\ACAD\FILES\70\70800-WSU Chemistry Lab 150\CAD\ELEC\70800-E-001 ELEC GENERAL NOTES.dwg Wed, 23 Nov 2016 - 2:13pm





5454 Cass Avenue, Detroit, MI 48202

Project Location:

WAYNE STATE UNIVERSITY
CHEMISTRY BUILDING
5101 CASS AVENUE
DETROIT MICHIGAN 48202

CONTACT: ASHLEY FLINTOFF



### **i** Design

iDesign Solutions, LLC
Scientific Facilities & Laboratory Design
2531 Ridge Road, Suite 100
White Lake, MI 48383
248-440-7310
info@iDesign-Solutions.info
www.iDesign-Solutions.info



OWNER REVIEW	10/20/1
OWNER REVIEW	10/28/1
OWNER REVIEW	11/03/1
BID AND CONSTRUCTION ISSUE	11/23/1



designed by:	TR
drawn by:	TR
coordination checked:	ES
checked:	ES
approved:	ES

project:

CHEMISTRY LAB 150

1st Floor Modification

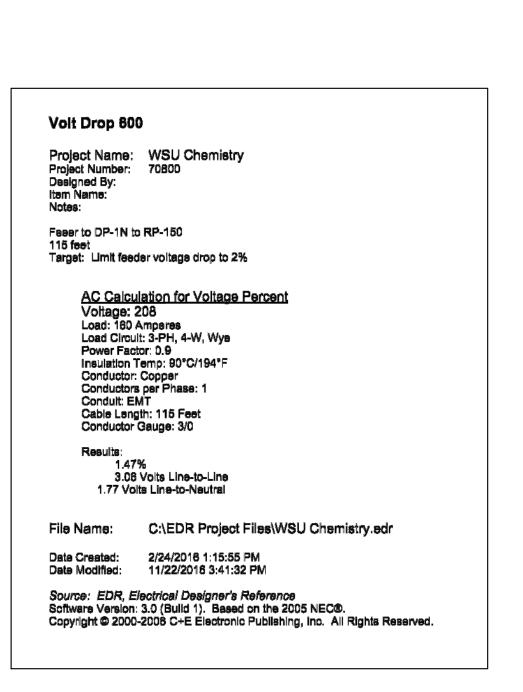
sheet title:

1st Floor Chemistry Building - Electrical Key Plan

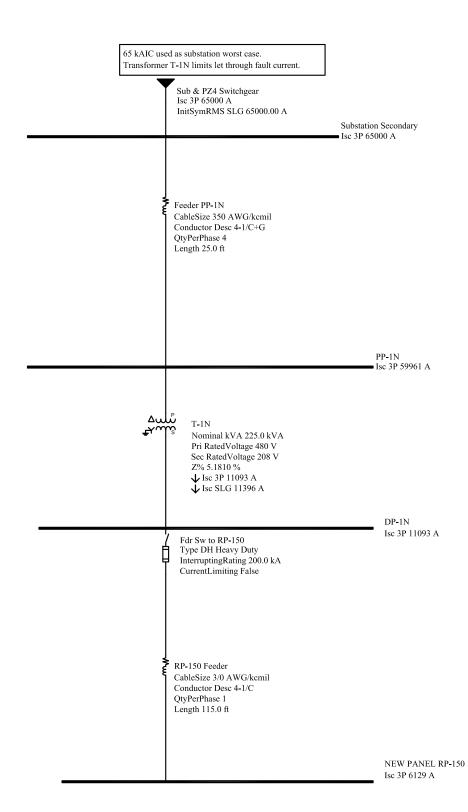
project number: sheet number: 007-286023 E002 (1156-7: iDesign project number)

#### EXISTING SQUARE D DOUBLE ENDED SUBSTATION & PZ4 SWITCHGEAR 480/277V (E) POWER PANEL PP-1N 480/277V, 3ø, 4W 1200A MLO 225KVA 480-208/120V \_\_\_\_ 2"C, 4#3/0, 1#6G - PROVIDE 200A, 3P SWITCH, RP-1NQ RP-1NF RP-1NE FUSED AT 200A RP-150 208Y/120V 3Ø,4W+G 200A MCB 208Y/120V 3Ø,4W+G 125A (E) 208Y/120V 208Y/120V DP-1N 3Ø,4W+G 3Ø,4W+G 208Y/120V 150A MCB 150A MCB 3Ø,4Ŵ+G (E) 800A MLO (E) CORR. LAB 150 LAB 150 CHEMISTRY LAB 150 ELEC RM 142









NEW WORK KEY NOTES:

WSU ELECTRICIAN CONFIRMED SPACE AVAILABILITY IN DP-1N FOR NEW 200A, 3P FUSED SWITCH. CONTRACTOR TO VERIFY OPEN SPACE AND BUSSING PRIOR TO ORDERING. INCLUDE COST IN BID TO RELOCATE EXISTING 200A SWITCH AND EXTEND EXISTING FEEDER IF REQUIRED TO ADD NEW FUSIBLE SWITCH.



## WAYNE STATE UNIVERSITY

5454 Cass Avenue, Detroit, MI 48202

Project Location:

WAYNE STATE UNIVERSITY
CHEMISTRY BUILDING
5101 CASS AVENUE
DETROIT MICHIGAN 48202

CONTACT: ASHLEY FLINTOFF



**iDesign** 

iDesign Solutions, LLC

Scientific Facilities & Laboratory Design 2531 Ridge Road, Suite 100 White Lake, MI 48383 248-440-7310 info@iDesign-Solutions.info www.iDesign-Solutions.info



OWNER REVIEW 11/03	OWNER REVIEW	10/20,
	OWNER REVIEW	10/28,
RID AND CONSTRUCTION ISSUE  11/03	OWNER REVIEW	11/03,
BID AND CONSTRUCTION 1330E	BID AND CONSTRUCTION ISSUE	11/23



designed by:	TF
drawn by:	TF
coordination checked:	ES
checked:	ES
approved:	ES

project:

CHEMISTRY LAB 150

1st Floor Modification

sheet title:

Partial Electrical Riser Diagram

project number: sheet number: 007-286023 E003 (1156-7: iDesign project number)

PAN				STING CONDITION MOUNTING: AS INDIC	ATED		
	VOL			PHASE, 4 WIRE + G			
			150 A MCE				
	LOCA	TION:	LAB 150				
Circ		aker		Load Information		nnected W	
No	Pole	Trip	Location	Description Code	Phase A	Phase B	Phase C
1/		/20/	LAB/150//	//////GENERAL/PURPOSE/RECEPTACLES	540		
3	/1/	20	LAB 150	GENERAL PURPOSE RECEPTACLES	$\chi////$	360	
5	1	30	LAB 150	EQUPMENT			
/1/	/2/		LAB/150//	/////EQUEMENT//////////////			
9		30			X////		
11/	11/	20	LAB 150	GENERAL PURPOSE RECEPTACLES			///728
13	///	20/	LAB 150	GENERAL PURPOSE RECEPTAÇLES	720		
15	1	20	LAB 150	GENERAL PURPOSE RECEPTACLES		720	
17	11	///	LAB 150	GENERAL PURPOSE RECEPTACLES			///720
19	1		LAB 150	EQUPMENT	900		/ / /- 7-
21	1		SPARE		1		
23	1		SPARE				
25	1		SPARE				
27	1		SPARE				
29	1		SPARE				
31	1	20	SPARE				
33	1		SPACE				
35	1		SPACE				
37	1		SPACE				
39	1		SPACE				
41	1		SPACE				
2	1	20	LAB 150	LTS/ALARM			
4	1		LAB 150	GENERAL PURPOSE RECEPTACLES		360	
6	1	20	LAB 151	GENERAL PURPOSE RECEPTACLES			
8	1	20	LAB 152	VAC PUMP	1000	***************************************	
10	1	20	LAB 153	GENERAL PURPOSE RECEPTACLES	manana manana ay man	360	
12	1	20	LAB 154	VAC PUMP			1000
14	1	20	LAB 155	GENERAL PURPOSE RECEPTACLES			
16	1		LAB 156	VAC PUMP	memengaran agama	1000	
18	1		LAB 157	GENERAL PURPOSE RECEPTACLES			360
20	1	20	LAB 158	GENERAL PURPOSE RECEPTACLES			
22	1	20	LAB 159	GENERAL PURPOSE RECEPTACLES		360	
24	1	20	LAB 160	GENERAL PURPOSE RECEPTACLES			
26	1	20	LAB 161	VAC PUMP	1000		
28	1	20	LAB 162	GENERAL PURPOSE RECEPTACLES		360	
30	1	20	LAB 163	VAC PUMP			1000
32	1	20	LAB 164	GENERAL PURPOSE RECEPTACLES			
34	1		SPACE				
36	1		SPACE				
38	1		SPACE				
40	1		SPACE				
42	1		SPACE				
				CONNECTED KW: 11		100	
				CONNECTED AMPS: 32 Phase Watts:	4,160	3,520	3,80
				DEMAND KW: 11		10 to 100 to	
				DEMAND AMPS: 32 27% Loaded	1		

No Por 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Breaker    Die   Trip   20   1   20   2   20   3   20   3   20   3   3   3   3   3   3   3   3   3   3	Location  LAB 150  LAB 150  LAB 150  LAB 150  LAB 150  GRAD STUDENT 156  SPACE  SPACE	GENERAL PURP	COOSE RECEPTACLE  OSE RECEPTACLE	Phase A 720 720 725 720 720 725 720 720 720 720 720 720 720 720 720 720	Phase B	Phase
7 1 5 7 1 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	20	LAB 150  LAB 150  LAB 150  LAB 150  GRAD STUDENT 156  SPACE  SPACE	GENERAL PURP	OSE RECEPTACLE	58 729 58 540 8 58 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8		
7 1 9 1 11 1 13 1 15 1 17 1 19 1 21 1 23 1 25 1 27 1 29 1 31 1 33 1 35 1 37 1	1 20 1 20 1 20 1 20 1 20 1 20 1 20 1 20	LAB 150 LAB 150 LAB 150 GRAD STUDENT 156 SPACE SPACE	GENERAL PURP	OSE RECEPTACLE	5 540 S 540 S S S S S S S S S S S S S S S S S S S	720	
7 1 9 1 11 1 13 1 15 1 17 1 19 1 21 1 23 1 25 1 27 1 29 1 31 1 33 1 35 1 37 1	1 20 1 20 1 20 1 20 1 20 1 20 1 20 1 20	LAB 150  LAB 150  GRAD STUDENT 156  SPACE  SPACE	GENERAL PURP	OSE RECEPTACLE	\$ 540 \$ 540 \$ 5 \$ 5 \$ 5 \$ 5 \$ 5 \$ 5 \$ 5 \$ 5		
7 1 9 1 11 1 13 1 15 1 17 1 19 1 21 1 23 1 25 1 27 1 29 1 31 1 33 1 35 1 37 1	1 20 1 20 1 20 1 20 1 20 1 20 1 20 1 20	LAB 150 GRAD STUDENT 156 SPACE SPACE	GENERAL PURP	OSE RECEPTACLE:	\$ 540 \$ 58 \$ 58 \$ 58 \$ 58 \$ 58 \$ 58 \$ 58 \$ 58		
9 11 11 11 11 11 11 11 11 11 11 11 11 11	1 20 1 20 1 20 1 20 1 20 1 20 1 20 1 20	GRAD STUDENT 156 SPACE SPACE	GENERAL PURP DISPOER	OSE RECEPTACLE:	S S S S S S S S S S S S S S S S S S S		
13 1 15 1 17 1 19 1 21 1 23 1 25 1 27 1 29 1 31 1 33 1 35 1 37 1	1 20 1 20 1 20 1 20 1 20 1 20 1 20 1 20	GRAD STUDENT 156 SPACE SPACE	GENERAL PURP	OSE RECEPTACLE:	S S S S S S S S S S S S S S S S S S S		
15 1 17 1 19 1 21 1 23 1 25 1 27 1 29 1 31 1 33 1 35 1 37 1	1 20 1 20 1 20 1 20 1 20 1 20 1 20 1 20	GRAD STUDENT 156 SPACE SPACE	GENERAL PURP DISPOER	OSE RECEPTACLE: OSE RECEPTACLE: OSE RECEPTACLE: OSE RECEPTACLE: OSE RECEPTACLE: OSE RECEPTACLE:	S S S S S S S S S S S S S S S S S S S		
17 1 19 1 21 1 23 1 25 1 27 1 29 1 31 1 33 1 35 1 37 1	1 20 1 20 1 20 1 20 1 20 1 20 1 20 1 20	GRAD STUDENT 156 CORRI. 103/RM 156 SPACE SPACE	GENERAL PURP DISPOER	OSE RECEPTACLE: OSE RECEPTACLE: OSE RECEPTACLE: OSE RECEPTACLE: OSE RECEPTACLE: OSE RECEPTACLE:	S S S S S S S S S S S S S S S S S S S		
19 1 21 1 23 1 25 1 27 1 29 1 31 1 33 1 35 1 37 1	1 20 1 20 1 20 1 20 1 20 1 20 1 20 1 20	GRAD STUDENT 156 CORRI. 103/RM 156 SPACE SPACE	GENERAL PURP GENERAL PURP GENERAL PURP GENERAL PURP GENERAL PURP DISPOER	OSE RECEPTACLE: OSE RECEPTACLE: OSE RECEPTACLE: OSE RECEPTACLE:	S S S S		
21 1 23 1 25 1 27 1 29 1 31 1 33 1 35 1 37 1 39 1	1 20 1 20 1 20 1 20 1 20 1 20 1 20	GRAD STUDENT 156 CORRI. 103/RM 156 SPACE SPACE	GENERAL PURP GENERAL PURP GENERAL PURP GENERAL PURP DISPOER	OSE RECEPTACLE: OSE RECEPTACLE: OSE RECEPTACLE:	S S S S		
23 1 25 1 27 1 29 1 31 1 33 1 35 1 37 1 39 1	1 20 1 20 1 20 1 20 1 20 1 20 1 1	GRAD STUDENT 156 GRAD STUDENT 156 GRAD STUDENT 156 GRAD STUDENT 156 CORRI. 103/RM 156 SPACE SPACE	GENERAL PURP GENERAL PURP GENERAL PURP DISPOER	OSE RECEPTACLE: OSE RECEPTACLE: OSE RECEPTACLE:	S S S		
25 1 27 1 29 1 31 1 33 1 35 1 37 1 39 1	1 20 1 20 1 20 1 20 1 20	GRAD STUDENT 156 GRAD STUDENT 156 GRAD STUDENT 156 CORRI. 103/RM 156 SPACE SPACE	GENERAL PURP GENERAL PURP DISPOER	OSE RECEPTACLE OSE RECEPTACLE	S S		
27 1 29 1 31 1 33 1 35 1 37 1 39 1	1 20 1 20 1 20 1 20	GRAD STUDENT 156 GRAD STUDENT 156 CORRI. 103/RM 156 SPACE SPACE	GENERAL PURP DISPOER	OSE RECEPTACLE	S		
29 1 31 1 33 1 35 1 37 1 39 1	1 20 1 20 1 1	GRAD STUDENT 156 CORRI. 103/RM 156 SPACE SPACE	DISPOER				
31 1 33 1 35 1 37 1 39 1	1 20	CORRI. 103/RM 156 SPACE SPACE		OSE RECEPTACLES	S		
33 1 35 1 37 1 39 1	1	SPACE SPACE	GENERAL PURP	OSE RECEPTACLE	S		12
35 1 37 1 39 1	1	SPACE					
37 1 39 1		The state of the s					
39 1	1 20	CDADE					
		SPARE					
41 1	1	SPACE					
	1	SPACE					
	1 20	LAB 150	LTS/ALARM				
	1 20	LAB 150		OSE RECEPTACLE		360	
	1 20	LAB 150		OSE RECEPTACLE			
	1 20	LAB 150	VAC PUMP		1000		
	1 20	LAB 150		OSE RECEPTACLE	S	360	
	1 20	LAB 150	VAC PUMP				10
	1 20	LAB 150		OSE RECEPTACLE		1000000	
	1 20	LAB 150	GENERAL PURP	OSE RECEPTACLE	S	360	
55.57.25	1 20	SPARE					
	1 20	SPARE					
	1 20	SPARE					
	1 20	SPARE					
	1 20	SPARE					
	1	SPACE					
	1	SPACE					
	1	SPACE			_		
	1	SPACE					
	1	SPACE					
	1	SPACE			_		
	1	SPACE SPACE			_		

PA	VOL	TAGE:	RP-1NQ EXISITNG MOUNTING: AS INDICATED A MICO.  MOUNTING: AS INDICATED A MICO.  MOUNTING: AS INDICATED A MICO.	ATED		
			ROOM 142			
Circ	Brea	aker	Load Information	Co	nnected W	atts
No	Pole	Trip	Location Description Code	Phase A	Phase B	Phase C
1	1	20	SPARE			
3	1	20	OFFICES 153&159 GENERAL PURPOSE RECEPTACLES			
5	1	20	OFFICE 153 GENERAL PURPOSE RECEPTACLES			
7	1	20	EAST WALL FIRE/SMOKE DAMPER			
9	1	20	SPARE			
11	1	20	SPARE			
13	1		SPACE			
15	1		SPACE			
17	1		SPACE			
19	1		SPACE			
21	1		SPACE			
23	1		SPACE			
25	1		SPACE			
27	1		SPACE			
29	1		SPACE	1		
31	1		SPACE			
33	1		SPACE			
35	1		SPACE			
37	1		SPACE			
39	1		SPACE			
41	1		SPACE			
2	-	20	STAIRWAY GENERAL PURPOSE RECEPTACLES	-	<u> </u>	
4	1					
	_		DOOR 1-3 CONTROLS			
6	1		SPARE CENERAL BURBOOF BEGERTAGUES			
8	1		COMM SPACE GENERAL PURPOSE RECEPTACLES			
10	1		SPARE			
12	1	20	SPARE			
14	1		SPACE			
16	1		SPACE			
18	1		SPACE			
20	1		SPACE			
22	1		SPACE			
24	1		SPACE			
26	1		SPACE			
28	1		SPACE			
30	1		SPACE			
32	1		SPACE			
34	1		SPACE			
36	1		SPACE			
38	1		SPACE			
40	1		SPACE			
42	1		SPACE			
			CONNECTED KW: 0 CONNECTED AMPS: 0 Phase Watts: DEMAND KW: 0	0	0	0
			DEMAND AMPS: 0 0% Loaded			

	LOUP	VIIOIN.	CHEMISTRY	I LAD 130					
Circ		aker		Load Information		desce III		nnected W	
No	Pole	Trip	Location	Description		Code	Phase A	Phase B	Phas
1	3						6000	-0-10-10-1	
3			LAB 150	ALD REACTOR	CN1	50A		6000	
5		65							(
7	3	$\angle$					6000	20000	
9	/		LAB 150	ALD REACTOR	CN1	50A		6000	
11		65							- 6
13	1		SPARE						
15	1		SPARE						ļ
17	1		SPARE						
19	1		SPARE						
21	1		SPARE						
23	1		SPARE						
25	1		SPARE						
27	1		SPARE						
29	1	20	SPARE						
31	1		SPACE						
33 35	1		SPACE SPACE				-		
37	1		SPACE						
39	1		SPACE						
41	1		SPACE						
2	3	-	SPACE				1800		
4	3	$\overline{}$	LAB 150	iQDP80 PUMP		15A	1000	1800	
6		20	LAB 130	IQDF80 F0WF		IJA		1000	
8	3	-20					1800		
10		/	LAB 150	iQDP80 PUMP		15A	1000	1800	
12		20	2.2.100	1421 001 011		1071		1000	
14	1		SPARE						
16	1		SPARE				-		
18	1		SPARE						
20	1		SPARE						
22	1		SPARE						
24	1	20	SPARE						
26	1	20	SPARE						
28	1	20	SPARE						
30	1	20	SPARE						
32	1		SPACE						
34	1		SPACE						
36	1		SPACE						
38	1		SPACE						
40	1		SPACE						
42	1		SPACE						
				CONNECTED KW:	47			7 4 7044	
				CONNECTED AMPS:	130	Phase Watts:	15,600	15,600	15
				DEMAND KW:	47				
				DEMAND AMPS:	130	81% Loaded			1

				W WORK MOUNTING: AS INDIC	AILD		
	VOL			3 PHASE, 4 WIRE + G			
			150 A MCE	3			
	LOCA	ATION:	LAB 150				
Circ	Dro	aker	ı	Load Information	Co	nnected Wat	to.
No	Pole	_	Location	Description Code	Phase A	Phase B	
1	1	_	LAB 150	GENERAL PURPOSE RECEPTACLES		Filase D	riase
3	1		LAB 150	GENERAL PURPOSE RECEPTACLES	-	720	
5	1	30	LAB 150	EQUPMENT		720	
7	2	00	SPARE	EQUI WENT			
9	-	30	OI ALL				
11	3	-					312
13			LAB 150	EDWARDS IH600 DRY PUMP FOR CNI 26A	3120		0.2
15	/	35		201/10 H 10	1	3120	
17	1		SPARE			0.120	
19	1		LAB 150	EQUPMENT	900		
21	1		SPARE	20.000			
23	1		SPARE				
25	1	20	SPARE				
27	1	20	SPARE				
29	1	20	SPARE				
31	1	20	SPARE				
33	1		SPACE				
35	1		SPACE				
37	1		SPACE				
39	1		SPACE				
41	1		SPACE				
2	1	20	LAB 150	LTS/ALARM			
4	1		LAB 150	GENERAL PURPOSE RECEPTACLES		360	
6	1		LAB 151	GENERAL PURPOSE RECEPTACLES	4000		
8	1	20	LAB 152	VAC PUMP	1000	200	
10 12	1		LAB 153 LAB 154	GENERAL PURPOSE RECEPTACLES  VAC PUMP		360	100
14	1		LAB 154 LAB 155	GENERAL PURPOSE RECEPTACLES	+		100
16	1		LAB 156	VAC PUMP		1000	
18	1		LAB 150 LAB 157	GENERAL PURPOSE RECEPTACLES		1000	36
20	1		LAB 158	GENERAL PURPOSE RECEPTACLES			- 50
22	1	20	LAB 159	GENERAL PURPOSE RECEPTACLES		360	
24	1		LAB 160	GENERAL PURPOSE RECEPTACLES			
26	1		LAB 161	VAC PUMP	1000		
28	1	20	LAB 162	GENERAL PURPOSE RECEPTACLES		360	
30	1		LAB 163	VAC PUMP			100
32	1	20	LAB 164	GENERAL PURPOSE RECEPTACLES			
34	1		SPACE				
36	1		SPACE				
38	1		SPACE				
40	1	_	SPACE				
42	1		SPACE				
				CONNECTED KW: 19	y Carlo di malal	120020	
				CONNECTED AMPS: 51 Phase Watts	6,740	6,280	5,48
				DEMAND KW: 19	2 March 2000	72403, 4,20	

	Brea	aker		Load Information	on		Cor	nected Wa	atts
No	Pole	Trip	Location	Description		Code	Phase A	Phase B	Phase C
1	1	20	LAB 150	GENERAL P	URPOSE REC	EPTACLES	180		
3	1	20	LAB 150	Q50 TGA				1000	/
5	1	20	LAB 150	GLOVEBOXI	ES				360
7	1	20	LAB 150	GENERAL PL	JRPOSE REC	EPTACLES	540		
9	1	20	GRAD STUDENT 156	GENERAL PL	JRPOSE REC	EPTACLES			
11	1	20	GRAD STUDENT 156	GENERAL PL	JRPOSE REC	EPTACLES			
13	1	20	GRAD STUDENT 156	GENERAL PL	JRPOSE REC	EPTACLES			
15	1	20	GRAD STUDENT 156		JRPOSE REC				
17	1	20	GRAD STUDENT 156		JRPOSE REC				
19	1	20	GRAD STUDENT 156		JRPOSE REC				
21	1	20	GRAD STUDENT 156		JRPOSE REC				
23	1	20	GRAD STUDENT 156		JRPOSE REC				
25	1	20	GRAD STUDENT 156		JRPOSE REC				
27	1	20	GRAD STUDENT 156		JRPOSE REC	EPTACLES			
29	1	20	GRAD STUDENT 156	DISPOER	100000 000	EDT 401 E0			1200
31	1	20	CORRI. 103/RM 156		JRPOSE REC	EPTACLES		000	
33	1	20	LAB 150	GLOVEBOXI	<b>-</b> S			360	
35	1	20	SPACE						
37	1	20	SPARE						
39 41	1		SPACE SPACE						
2	1	20	LAB 150	LTS/ALARM					
4	1	20	LAB 150		JRPOSE REC	EDTACLES		360	
6	1	20	LAB 150		JRPOSE REC			300	
8	1	20	LAB 150	VAC PUMP	DRFOOL REC	LFIACLES	1000		
10	1	20	LAB 150		JRPOSE REC	EPTACLES	1000	360	
12	1	20	LAB 150	VAC PUMP	ON OOL NEO	LITAGLEG		000	1000
14	1		LAB 150		JRPOSE REC	EPTACLES.			1000
16	1	20	LAB 150		JRPOSE REC			360	
18	3	/			0011120				3120
20			LAB 150 EDWAR	RDS IH600 DRY	PUMP FOR C	NI 26A	3120		
22		35			T. T. (2007) - 120 Total (2007)			3120	
24	1	20	SPARE						
26	1	20	SPARE						
28	1		SPACE						
30	1		SPACE						
32	1		SPACE						
34	1		SPACE						
36	1		SPACE						
38	1		SPACE						
40	1		SPACE						
42	1		SPACE						
			CONNEC	ECTED KW: CTED AMPS: EMAND KW:	16 45 16	Phase Watts:	4,840	5,560	5,68
			U	LIVIAINU KVV.	10		1		

SHADING INDICATES NEW WORK TYPICAL

# WAYNE STATE UNIVERSITY

5454 Cass Avenue, Detroit, MI 48202

Project Location:

**WAYNE STATE UNIVERSITY** CHEMISTRY BUILDING 5101 CASS AVENUE **DETROIT MICHIGAN 48202** 

CONTACT: ASHLEY FLINTOFF



iDesign Solutions, LLC Scientific Facilities & Laboratory Design 2531 Ridge Road, Suite 100 White Lake, MI 48383 248-440-7310

info@iDesign-Solutions.info www.iDesign-Solutions.info



issue:	date:
OWNER REVIEW	10/20/16
OWNER REVIEW	10/28/16
OWNER REVIEW	11/03/16
BID AND CONSTRUCTION ISSUE	11/23/16



designed by:	TR
drawn by:	TR
coordination checked:	ES
checked:	ES
approved:	ES

project:

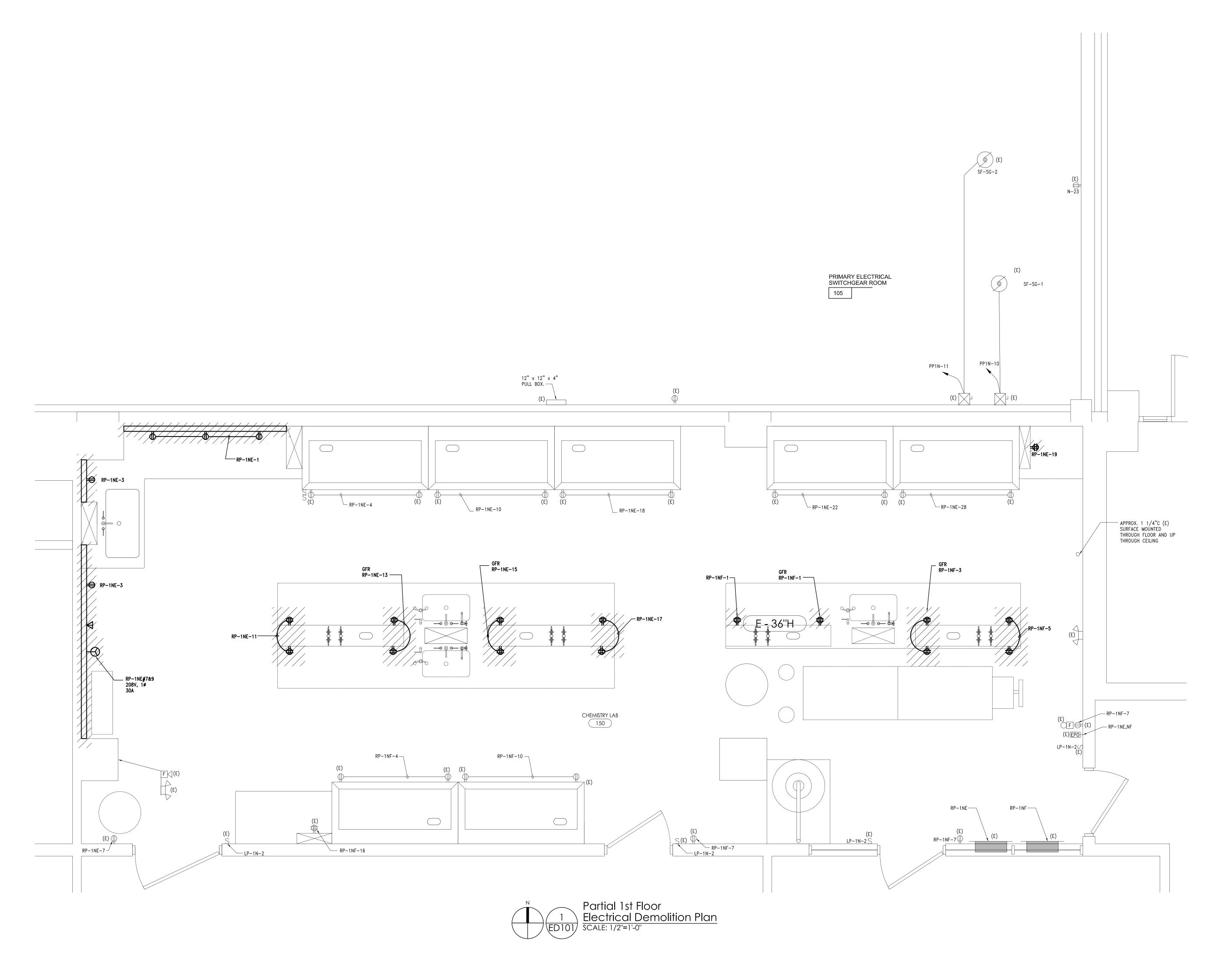
CHEMISTRY LAB 150 1st Floor

Modification

sheet title:

Electrical Panel Schedule

project number: sheet number: E004 007-286023





5454 Cass Avenue, Detroit, MI 48202

**Project Location:** 

**WAYNE STATE UNIVERSITY** CHEMISTRY BUILDING 5101 CASS AVENUE **DETROIT MICHIGAN 48202** 

CONTACT: ASHLEY FLINTOFF

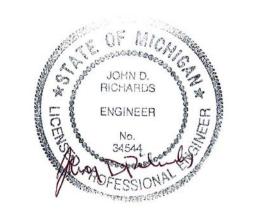


**iDesign** 

iDesign Solutions, LLC
Scientific Facilities & Laboratory Design
2531 Ridge Road, Suite 100 White Lake, MI 48383 248-440-7310 info@iDesign-Solutions.info www.iDesign-Solutions.info



OWNER REVIEW 10/	10/20/1
OWNED DELIEN	11/00/1
OWNER REVIEW 11/	11/03/1
BID AND CONSTRUCTION ISSUE 11/	11/23/1



TR
TR
ES
ES
ES

project:

CHEMISTRY LAB 150 1st Floor

Modification

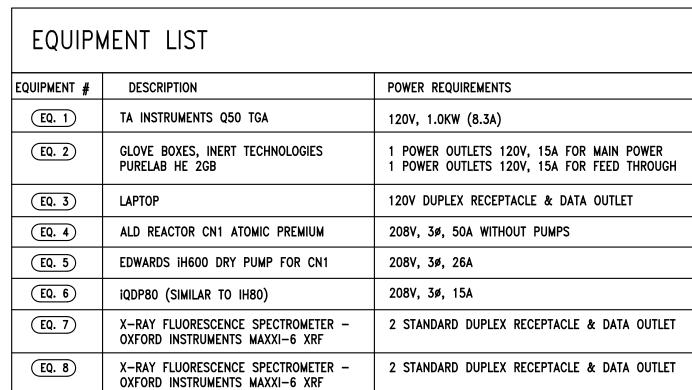
sheet title:

Partial 1st Floor Electrical Demolition Plan

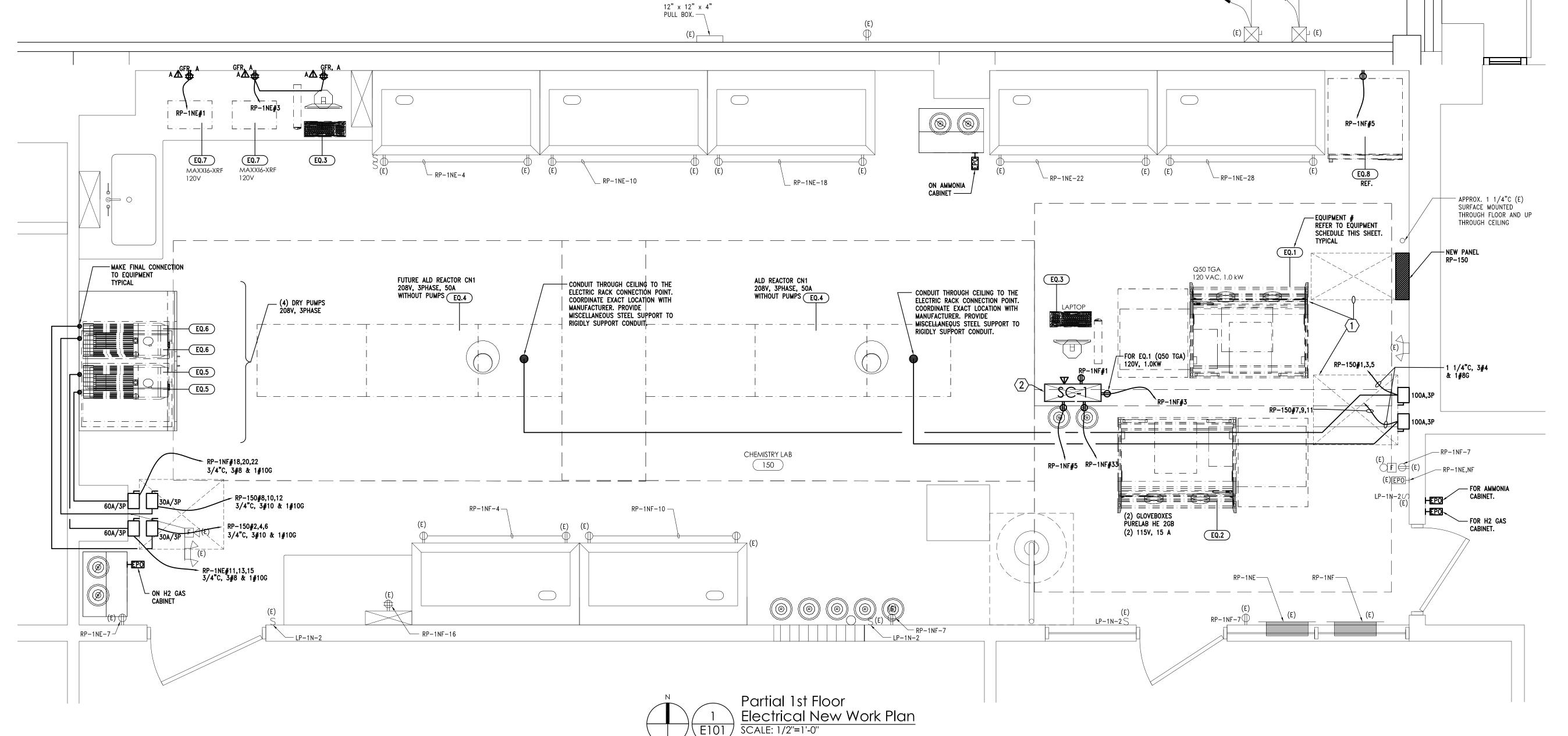
sheet number: project number: ED101 007-286023 (1156-7 : iDesign project number)

#### NEW WORK KEY NOTES:

- COORDINATE WITH EQUIPMENT INSTALLER TO MAINTAIN ADEQUATE EQUIPMENT WORKING CLEARANCE.
- MOUNT OUTLETS IN UTILITY SERVICE COLUMN. COORDINATE WITH ARCHITECT/LAB PLANNER FOR RACEWAY ROUTING AND MOUNTING LOCATIONS.









5454 Cass Avenue, Detroit, MI 48202

Project Location:

WAYNE STATE UNIVERSITY
CHEMISTRY BUILDING
5101 CASS AVENUE
DETROIT MICHIGAN 48202

CONTACT: ASHLEY FLINTOFF



**iDesign** 

#### iDesign Solutions, LLC

Scientific Facilities & Laboratory Design 2531 Ridge Road, Suite 100 White Lake, MI 48383 248-440-7310 info@iDesign-Solutions.info www.iDesign-Solutions.info



issue:	
OWNER REVIEW	
OWNER REVIEW	
OWNER REVIEW	
BID AND CONSTRUCTION ISSUE	



designed by:	TR
drawn by:	TR
coordination checked:	ES
checked:	ES
approved:	ES

project

CHEMISTRY LAB 150 1st Floor

Modification

sheet title:

Partial 1st Floor Electrical New Work Plan

project number: sheet number: 007-286023 E101

#### ELECTRICAL SPECIFICATIONS :

**GENERAL REQUIREMENTS:** 

ALL WORK SHALL BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE, LATEST EDITION, AND ALL LOCAL AND STATE AUTHORITIES HAVING JURISDICTION THEREOF.

IN ADDITION TO THE REQUIREMENTS SPECIFIED AND INDICATED, COMPLY WITH WSU DESIGN GUIDELINES. WHERE REQUIREMENTS OF THE DESIGN GUIDELINES ARE IN EXCESS OF THE CONTRACT DOCUMENTS, THE DESIGN GUIDELINES SHALL GOVERN. PROVIDE PRODUCTS ONLY AS LISTED ON THE WSU PREFERRED MANUFACTURERS LIST.

ALL EQUIPMENT SHALL BE SPECIFICATION GRADE AND SHALL HAVE U.L. LABEL FOR INTENDED USE.

ELECTRICAL SYSTEMS SHALL BE COMPLETE IN EVERY DETAIL, INCLUDING ALL INCIDENTAL ITEMS FOR A PROPER AND FUNCTIONING INSTALLATION SUBJECT TO FINAL APPROVAL OF ARCHITECT/ENGINEER.

ALL REQUIRED PERMIT AND INSPECTIONS SHALL BE OBTAINED BY CONTRACTOR AND SUCH COSTS SHALL BE INCLUDED IN BID PRICE FOR THIS WORK.

PROVIDE UL LISTED SYSTEM FOR FIRE STOPPING PENETRATIONS THROUGH FIRE RATED ASSEMBLIES. PROVIDE SYSTEM WITH EQUAL OR GREATER RATING THAN ASSEMBLY. REFER TO ARCHITECTURAL DOCUMENTS FOR RATINGS AND LOCATIONS OF ASSEMBLIES.

EXAMINATION OF SITE IS MANDATORY. CONTRACTOR IS HEREBY HELD TO HAVE EXAMINED THE SITE AND HAVE INCLUDED IN HIS BID PRICE ALL COSTS DUE TO SITE AND FIELD CONDITIONS.

COMPLETE IDENTIFICATION OF PROJECT ELECTRICAL COMPONENTS IS REQUIRED. IDENTIFY ALL PANELS, DISCONNECTS, CONTROL DEVICES, ETC., WITH THE NOMENCLATURE INDICATED ON THE DOCUMENTS AND WITH POWER SOURCE AND ELECTRICAL RATINGS USING PLASTIC LAMINATE NAMEPLATE. PROVIDE NEW PLASTIC LAMINATE NAMEPLATES FOR ANY WORK TO EXISTING DISTRIBUTION EQUIPMENT. INSTALL TYPEWRITTEN DIRECTORIES OF ALL CIRCUITS ON INSIDE OF PANELS. IDENTIFY WIRING DEVICE COVERPLATES FOR LIGHTING CONTROLS AND RECEPTACLES WITH PANELBOARD AND BRANCH CIRCUIT NUMBER SERVING DEVICE, E.G. "A-15". PROVIDE 1/4" MACHINE-WRITTEN BLACK LETTERING ON CLEAR PLASTIC ADHESIVE TAPE. LOCATE ON BOTTOM FRONT OF COVERPLATE, CENTERED BELOW WIRING DEVICE(S). SUBMIT SAMPLE OF LABELED TAPE WITH WIRING DEVICE/COVERPLATE SUBMITTAL. SAMPLE MAY BE ADHERED TO PAPERWORK IN SUBMITTAL, RATHER THAN TO A COVERPLATE. LABEL EXISTING, RELOCATED AND NEW COVERPLATES IN AREA OF WORK. LABEL EXIT LIGHTS AND DOOR OPERATORS WITH BRANCH CIRCUIT VISIBLE FROM BELOW.

PROVIDE TEMPORARY POWER AND LIGHTING DURING CONSTRUCTION. REMOVE TEMPORARY WIRING UPON COMPLETION OF THE PROJECT. TEMPORARY SERVICES SHALL BE AS REQUIRED, BY N.E.C. AND OSHA.

GROUND CONTINUITY SHALL BE MAINTAINED THROUGHOUT THE ELECTRICAL SYSTEM. INSTALL EQUIPMENT GROUNDING CONDUCTOR WITH EVERY CIRCUIT.

COORDINATE SIZE AND LOCATION OF ANY REQUIRED ACCESS PANELS IN WALLS OR FINISHED CEILINGS WITH ARCHITECT PRIOR TO INSTALLATION.

LICENSED JOURNEYMAN OR REGISTERED APPRENTICE ELECTRICIANS SHALL PERFORM ELECTRICAL WORK. THE NUMBER OF APPRENTICES ON A PROJECT SHALL NOT EXCEED THE NUMBER OF JOURNEYMEN. ELECTRICIANS SHALL CARRY A COPY OF THEIR LICENSE OR REGISTRATION WHILE WORKING ON SITE.

#### WARRANTY.

UNLESS A LONGER PERIOD IS SPECIFIED IN INDIVIDUAL PARAGRAPHS, PROVIDE A MINIMUM OF A ONE YEAR WARRANTY ON ALL ELECTRICAL WORK BEGINNING THE DATE OF FINAL ACCEPTANCE OF THE PROJECT BY THE OWNER.

**SUBMITTALS:** 

SUBMIT SHOP DRAWINGS TO THE A/E.

SUBMIT THE FOLLOWING IN ADDITION TO ANY OTHER SPECIFIED SYSTEMS/EQUIPMENT:

- \* WIRING DEVICES & COVERPLATES
- \* PANELBOARD
  \* IDENTIFICATION

NO APPARATUS OR EQUIPMENT SHALL BE SHIPPED FROM STOCK OR FABRICATED UNTIL SHOP DRAWINGS FOR SAME HAVE BEEN STAMPED 'REVIEWED" OR "REVIEWED AS NOTED". SUBMIT DATA REQUIRED FOR TRANSFORMERS SUCH AS EFFICIENCY, REGULATION, CORE LOSS AND SOUND LEVELS. (SEE APPLICABLE SECTIONS).

SUBMIT SYSTEM COMPONENTS, PRODUCT DATA AND SHOP DRAWINGS COMPLETE FOR EACH SYSTEM UNDER ONE SUBMITTAL. DO NOT BREAK OUT EQUIPMENT FOR ONE SYSTEM BETWEEN MULTIPLE SUBMITTALS.

ALL SHOP DRAWINGS MUST BE CLEARLY MARKED TO SHOW EQUIPMENT SUBMITTED AND ANY DEVIATIONS FROM SPECIFICATIONS SHALL BE NOTED THEREON. DO NOT INCLUDE ONLY MODEL NUMBERS TO INDICATE SUBMITTED EQUIPMENT. STRIKE OUT ANY INFORMATION ON PRODUCT DATA THAT IS NOT PROJECT SPECIFIC, AND EDIT RELEVANT INFORMATION TO SHOW ACTUAL EQUIPMENT SUBMITTED. ELECTRICAL CONTRACTOR MUST SIGN AND APPROVED ALL SHOP DRAWINGS PRIOR TO SUBMITTAL

UNIQUELY NUMBER EACH PAGE IN SUBMITTAL.

IF DIFFERENT SYSTEMS ARE INCLUDED IN ONE SUBMITTAL, CLEARLY SEPARATE INFORMATION AND PROVIDE DIFFERENT SUB-NUMBERING OF SYSTEMS. SHOP DRAWINGS THAT ARE INCOMPLETE, UNSIGNED AND NOT PLAINLY MARKED WILL NOT BE

REMOVE AND REINSTALL CEILINGS, WALLS AND FLOORING, INCLUDING OUTSIDE THE RENOVATION AREAS, AS REQUIRED TO PERFORM WORK. REINSTALL REMOVED SURFACES TO PRE-CONSTRUCTION CONDITION OR BETTER, SUBJECT TO REVIEW AND APPROVAL OF THE ARCHITECT.

**RECORD DRAWINGS:** 

PROVIDE AS-BUILT DOCUMENTS AND INFORMATION IN ACCORDANCE WITH THE OWNER'S DESIGN GUIDELINES: SID-H "CONSTRUCTION DOCUMENTS". THE DRAWINGS SHALL SHOW THE LOCATIONS OF EQUIPMENT, LIGHT FIXTURES, SWITCHES, RECEPTACLES AND JUNCTION BOXES, RISER INFORMATION, THE SIZES OF CONDUITS AND CONDUCTORS, CIRCUIT NUMBERS, AND DEVIATIONS FROM THE DESIGN. BURIED, EMBEDDED AND CONCEALED CONDUITS SHALL BE DIMENSIONED FROM PERMANENT BUILDING FEATURES.

IN ADDITION TO HARD COPY, SUBMIT ON COMPACT DISKS ELECTRONIC VERSIONS OF AS BUILT PANEL SCHEDULES. SUBMIT TO A/E AND TO OWNER'S BUILDING ENGINEER IN MICROSOFT EXCEL FORMAT. MATCH FORMAT OF SCHEDULE USED FOR CONSTRUCTION DOCUMENTS. TEMPLATE FILE IS AVAILABLE TO CONTRACTOR FROM ENGINEER UPON REQUEST.

DEMOLITION AND RENOVATION WORK:

DISCONNECT, REMOVE, RELOCATE, REWIRE OR DISPOSE OF ANY EQUIPMENT INTERFERING WITH NEW CONSTRUCTION OR AFFECTED BY RENOVATION WORK.

ANY ELECTRICAL EQUIPMENT OR SYSTEMS WHICH ARE TO REMAIN, AND ARE AFFECTED BY THIS WORK, SHALL BE IMMEDIATELY RESTORED TO FULL OPERATING CONDITION AND AT NO ADDITIONAL COST TO THE CONTRACT.

EQUIPMENT REMOVED SHALL BE DISPOSED OF AS DIRECTED, EITHER TO STORAGE OR OFF THE PREMISES.

WHERE SERVICES OR CIRCUITS ARE DISCONNECTED OR DISCONTINUED, IT IS MANDATORY THAT ANY EXISTING UNUSED WIRING BE REMOVED TO THE SOURCE UNLESS SPECIFICALLY NOTED ON THE DRAWINGS. IT IS THE INTENT OF THIS ARTICLE TO PERMANENTLY DISCONNECT ALL UNUSED CIRCUITS AT THE MAIN SOURCE WHENEVER POSSIBLE. NO ENERGIZED CIRCUIT SHALL BE TAPED AND ABANDONED IN OUTLET BOXES UNLESS SO SPECIFIED ON DRAWINGS.

CIRCUIT TRACE EXISTING TO REMAIN CIRCUITS AS NECESSARY FOR PROPER IDENTIFICATION, AND AS REQUIRED TO PERFORM WORK. ANY EXISTING PANEL SCHEDULES AND CIRCUITING SHOWN ARE NOT INTENDED TO IMPLY ACTUAL INSTALLED CONDITIONS. EXISTING INFORMATION IS ISSUED FOR REFERENCE ONLY. INFORMATION INDICATED IS TAKEN FROM OWNER'S EXISTING CIRCUIT DIRECTORIES AND DESIGN DRAWINGS, WHICH MAY NOT REFLECT EXISTING CONDITIONS. CONTRACTOR IS TO FIELD VERIFY ALL EXISTING CONDITIONS BY CIRCUIT TRACING PANEL FEEDERS AND ALL BRANCH CIRCUITS PRIOR TO DEMOLITION WORK.

CONTRACTOR IS REQUIRED TO INDICATE ACTUAL CONDITIONS ON AS-BUILT DOCUMENTATION INCLUDING LOADS OF EXISTING TO REMAIN CIRCUITS. WORK INVOLVING EXISTING PANELBOARDS AND DISTRIBUTION EQUIPMENT SHALL BE SUCH THAT, WHEN ALL WORK IS COMPLETED EXISTING PANELS ARE PROVIDED WITH NEW AND UPDATED ACCURATE DIRECTORIES. ALL VACATED CIRCUITS SHALL BE MARKED SPARE. WHEN NEW BREAKERS OR FUSIBLE SWITCHES ARE REQUIRED, THEY SHALL BE INSTALLED IN EXISTING SPACES AND SHALL MATCH THOSE THAT ARE EXISTING.

CONTRACTOR MAY USE EXISTING CONDUITS AND OUTLET BOXES, PROVIDED THEY ARE IN GOOD ELECTRICAL CONDITION. RE-SUPPORT EXISTING TO REMAIN CONDUIT AND BOXES IN RENOVATION AREA IF INADEQUATELY SUPPORTED. PROVIDE SUPPORT AS REQUIRED TO COMPLY WITH NEC AND LOCAL AUTHORITY REQUIREMENTS.

IT IS THE INTENT OF THE OVERALL DESIGN TO CONCEAL ALL WORK IN NEW WALLS AND ABOVE FINISHED CEILING. SURFACE MOUNTING TO EXISTING BLOCK/CONCRETE WALL IS ACCEPTABLE WHERE REQUIRED.

ALL ELECTRICAL OPENINGS THAT ARE ABANDONED IN WALLS, CEILINGS OR FLOOR SHALL BE PROVIDED WITH SUITABLE BLANK COVER PLATES. ABANDONED FLOOR OUTLET SHALL BE PROVIDED WITH .040 BRASS PLATES.

UNLESS OTHERWISE NOTED, WHERE ELECTRICAL OUTLETS AND DATA OUTLETS, SWITCHES AND OTHER WIRING DEVICES ARE REMOVED AND NOT REUSED, REMOVE THE DEVICE, WIRING, BOX AND RACEWAY AS NOTED BELOW AND PATCH SURFACE TO MATCH EXISTING.

\* POWER: REMOVE DEVICE OUTLET BOX AND WIRING BACK TO PANEL, OR TO FIRST JUNCTION BOX ABOVE THE ACCESSIBLE CEILING WHERE CIRCUIT CONTINUES ON TO OTHER EXISTING, ACTIVE LOADS. DO NOT LEAVE CONDUCTORS SPLICED IN OUTLET BOXES IN WALLS WHERE THE BOX CONTAINS NO WIRING DEVICES.

\* TELECOMMUNICATIONS/DATA: IT CONTRACTOR TO DISCONNECT AT SOURCE IN COMMUNICATION ROOM AND AT OUTLET. ELECTRICAL CONTRACTOR TO CAREFULLY REMOVE CABLE.

\* CONCEALED CONDUIT IN WALLS: ABANDON IN PLACE. REMOVE OUTLET, CUT OFF CONDUIT ABOVE CEILING OR WHERE OTHERWISE ACCESSIBLE, AND PLUG OR CAP END. IF CONDUIT IN WALL IS FLEX, IT SHALL BE REMOVED.

\* ACCESSIBLE CONDUIT ABOVE CEILINGS AND IN EXPOSED INSTALLATIONS: REMOVE CONDUIT AND PLUG OPENINGS IN PANELS AND BOXES LEFT FROM REMOVED CONDUIT.

 $\ensuremath{^{\star}}$  Fire stop all holes in floors and in fire walls.

WIRING SHALL BE DISCONNECTED, REMOVED TO THE SOURCE AND PROPERLY DISPOSED OF. THERE SHALL BE NO EXCEPTION TO THIS RULE. DO NOT ABANDON UNUSED WIRING IN RACEWAYS.

UNLESS OTHERWISE NOTED CONDUITS AND OTHER PARTS OF ELECTRICAL SYSTEMS THAT BECOME EXPOSED AS PART OF THE RENOVATION WORK SHALL BE REMOVED IF UNUSED ON RELOCATED IF IN SERVICE TO A POINT WHERE THE EXPOSED PORTION IS TOTALLY CONCEALED.

REPAIR FINISHED SURFACES AROUND REMOVED ELECTRICAL EQUIPMENT TO MATCH FINAL FINISHED CONDITION. COORDINATE WITH ARCHITECT FOR FINISH REQUIREMENTS.

COORDINATE SERVICE SHUTDOWN AND POWER OUTAGES WITH OWNER OR HIS REPRESENTATIVE PRIOR TO ANY WORK ON EXISTING SERVICES IS DONE. SCHEDULE SHALL BE IN WRITING AND SHALL SHOW A DETAILED DESCRIPTION OF THE PROPOSED WORK AND THE DURATION OF OUTAGE.

CONTRACTOR SHALL HAVE SUFFICIENT NUMBER OF WORKERS ON THE JOB TO ACCOMPLISH THE WORK DURING THE ALLOTTED TIME AS PER AGREED UPON SCHEDULE

ALL OUTAGE WORK AND SERVICE MODIFICATION SHALL BE INCLUDED IN BASE BID AND SUBJECT TO THE CONDITIONS IN THE CONTRACT DOCUMENTS. COORDINATE AND SCHEDULE WORK WITH OWNER AND CM/GC TO AVOID DISRUPTIONS TO OTHER BUILDING OCCUPANTS, INCLUDING WORK ON OTHER FLOORS AS REQUIRED. INCLUDE ALL COSTS FOR OVERTIME/PREMIUM TIME WORK AS REQUIRED IN BASE BID.

ALL SURFACES DAMAGED BY THIS CONTRACTOR IN THE COURSE OF PERFORMING WORK SHALL BE RESTORED TO SATISFACTORY CONDITION, AS DIRECTED BY THE ARCHITECT AND ALL COSTS OF REPAIRS SHALL BE PAID FOR BY THE CONTRACTOR

REMOVE SERVICE TO MECHANICAL, ELECTRICAL AND BUILDING EQUIPMENT INDICATED AS REMOVED OR DISCONNECTED. MAINTAIN CIRCUITS TO EXISTING—TO—REMAIN EQUIPMENT. IDENTIFY UNUSED, REMOVED CIRCUITS ON PANEL SCHEDULE AS SPARE. COORDINATE WITH ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS FOR EXISTING TO REMAIN EQUIPMENT AND FOR DEMOLITION WORK. SERVICE SHUTDOWN AND POWER OUTAGES SHALL BE SCHEDULED WITH THE OWNER PRIOR TO PERFORMING ANY WORK ON EXISTING SERVICE. SCHEDULE SHALL BE IN WRITING AND SHALL SHOW A DETAILED DESCRIPTION OF THE PROPOSED WORK AND THE DURATION OF OUTAGE.

WHERE EXISTING SLABS/FLOORS ARE TO BE CUT OR DEMOLISHED THE CONTRACTOR SHALL INSPECT SCAN, TEST, AND PERFORM ALL REQUIRED SCANNING AND INVESTIGATIONS TO IDENTIFY THE PRESENCE OF TELECOMMUNICATION RACEWAYS, ELECTRICAL FEEDERS, BRANCH CIRCUITS AND OR SERVICES WHICH ARE TO BE MAINTAINED IN AND BELOW THE SLAB WHETHER NOTED ON THE DRAWINGS OR NOT, AND TAKE ALL STEPS NECESSARY TO PROTECT AND MAINTAIN THOSE SERVICES.

WHERE PENETRATIONS ARE LEFT IN RATED WALLS, FLOORS AND CEILINGS, SEAL THE PENETRATION TO ACHIEVE A LISTED FIRE/SMOKE RATING WHICH MATCHES THE RATING OF THE EXISTING PENETRATED SURFACE. COORDINATE WITH ARCHITECT FOR RATINGS OF EXISTING SURFACES.

**UTILITY SERVICES (EXISTING BUILDINGS):** 

ELECTRIC SERVICE TO THE SITE IS EXISTING AND SHALL BE UTILIZED AS INDICATED ON THE DRAWINGS.

**ELECTRICAL EQUIPMENT AND DEVICES:** 

SWITCHES AND RECEPTACLES ARE TO CONTAIN SIDE-WIRED SCREW TERMINALS. CONNECT WIRING DEVICES TO BRANCH CIRCUITING WITH SIDE SCREW TERMINALS. DO NOT CONNECT BRANCH CIRCUITING WITH PUSH-IN BACK TERMINALS ON WIRING DEVICE. DO NOT CONNECT BRANCH CIRCUITING WITH MODULAR/SNAP-IN CONNECTORS ON WIRING DEVICE.

WIRING DEVICE COVER PLATES SHALL BE OF TYPE AND NUMBER OF GANGS FOR DEVICES INSTALLED, SMOOTH EDGED 302/304 GRADE BRUSHED STAINLESS STEEL. PROVIDE BRANCH CIRCUIT IDENTIFICATION ON ALL COVERPLATES AS SPECIFIED UNDER "GENERAL REQUIREMENTS". COVERPLATES FOR DEVICES CONNECTED TO THE EMERGENCY SYSTEM SHALL ALSO BE FACTORY LABELED WITH BLACK LETTERING TO READ "EMERGENCY". RECEPTACLES DESIGNATED AS "WP" SHALL BE HOSPITAL GRADE GROUND FAULT CIRCUIT INTERRUPTER TYPE WITH A CAST BOX AND COVER LISTED AS WEATHERPROOF/RAIN TIGHT WHILE IN USE.

GROUND BUS SHALL BE 8" LONG, 2" WIDE AND MINIMUM 1/4" THICK WITH PRE-DRILLED HOLES FOR LUGGING CABLE. WALL MOUNT AS INDICATED. PROVIDE ALL HARDWARE FOR WALL MOUNTING.

CONDUCT

ALL CONDUCTORS SHALL BE SOFT-DRAWN COPPER OF SIZES INDICATED ON THE DRAWINGS. ALL CONDUCTORS SHALL BE INSULATED FOR 600 VOLTS AND WITH 75 DEGREES (CENTIGRADE) CODE GRADE INSULATION.

ALL CONDUCTORS SHALL BE MADE UP OF STRANDED SINGLE CONDUCTOR CABLE. CONDUCTORS SHALL HAVE THWN OR THHN INSULATION AS APPLICABLE. CONDUCTORS IN UNDERGROUND CONDUIT AND FOR SERVICE ENTRANCE CONDUCTOR SHALL HAVE XHHW OR THWN INSULATION.

#12 AWG SHALL BE THE MINIMUM WIRE SIZE ALLOWED EXCEPT #14 AWG MAY BE USED FOR CONTROL WIRING.

TYPICAL BRANCH CIRCUITS FROM 20A, 1-POLE BRANCH OVERRCURRENT DEVICES ARE 3/4"C, 2 #12 AND 1#12G, UNLESS OTHERWISE NOTED.

MC AND AC CABLE ARE NOT APPROVED FOR USE IN PROJECT.

PROVIDE DEDICATED NEUTRALS WITH EACH NEW CIRCUIT.

PROVIDE EQUIPMENT GROUNDING CONDUCTOR WITH EACH CIRCUIT.

FLEXIBLE METAL DUCT MAY BE USED IN WALLS WHICH ARE NOT OTHERWISE BEING OPENED UP FOR OTHER CONSTRUCTION.

STARTERS, SAFETY SWITCHES, FUSES AND HEATERS:

MANUAL MOTOR STARTERS SHALL BE 600V TOGGLE TYPE WITH THERMAL OVERLOAD ELEMENT FOR MOTOR PROTECTION STAINLESS STEEL COVER PLATE AND PILOT LIGHT; FLUSH IN ALL AREAS EXCEPT IN UNFINISHED SPACES. CONTRACTOR TO COORDINATE AND PROVIDE QUANTITY OF POLES AS REQUIRED FOR BRANCH CIRCUIT AND LOAD SERVED. MANUAL MOTOR SWITCHES SHALL BE THE SAME AS MANUAL STARTERS EXCEPT WITHOUT OVERLOADS AND USED AS DISCONNECTING MEANS.

MAGNETIC MOTOR STARTERS SHALL BE 600 VOLT 3-PHASE WITH 3 THERMAL OVERLOAD ELEMENTS, HOA SWITCH AND RESET BUTTON IN COVER AND GREEN RUNNING PILOT LIGHT, NEMA ENCLOSURE AND SIZE AS INDICATED. COMBINATION STARTERS SHALL HAVE BUILT-IN FUSED DISCONNECT. PROVIDE START-STOP PUSH BUTTONS FOR USE IN HAND (MANUAL) MODE.

PROVIDE THERMAL ALLOY MELTING TYPE HEATER ELEMENTS FOR ALL MOTORS BASED ON MOTOR NAMEPLATE DATA.

SAFETY AND DISCONNECT SWITCHES SHALL BE 250 OR 600 VOLTS AS REQUIRED, HEAVY DUTY, TWO OR THREE POLE, "QUICK-MAKE', "QUICK-BREAK" SWITCH MECHANISM AND COVER INTERLOCK. SWITCHES SHALL BE FUSED OR UNFUSED AS INDICATED AND SHALL HAVE PAD LOCK PROVISIONS, WITH NEMA TYPE ENCLOSURE FOR LOCATION USED. SWITCHES SHALL BE SQUARE "D"CLASS 3110 OR APPROVED EQUAL.

PROVIDE ALL NECESSARY FUSES AND REPLACE ALL THOSE BLOWN DURING CONSTRUCTION. ALL FUSES SHALL BE TIME LAG. DUAL ELEMENT. BUSSMAN "LOW PEAK YELLOW" OR EQUAL.

TELECOMMUNICATIONS

PROVIDE OUTLET BOX AND CONDUITS AS INDICATED.



5454 Cass Avenue, Detroit, MI 48202

Project Location:

WAYNE STATE UNIVERSITY
CHEMISTRY BUILDING
5101 CASS AVENUE
DETROIT MICHIGAN 48202

CONTACT: ASHLEY FLINTOFF



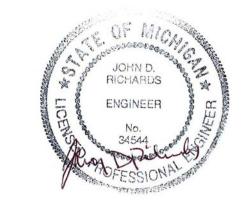
**iDesign** 

www.iDesign-Solutions.info

iDesign Solutions, LLC
Scientific Facilities & Laboratory Design
2531 Ridge Road, Suite 100
White Lake, MI 48383
248-440-7310
info@iDesign-Solutions.info



issue:	date
OWNER REVIEW	10/20/
OWNER REVIEW	10/28/
OWNER REVIEW	11/03/
BID AND CONSTRUCTION ISSUE	11/23/



designed by:	Τ
drawn by:	Т
coordination checked:	E
checked:	Е
approved:	Е

project:

CHEMISTRY LAB 150

1st Floor Modification

sheet title:

Electrical Specifications -

project number: sheet number:

007-286023 E20<sup>2</sup> (1156-7: iDesign project number)

H:\ACAD\FILES\70\70800-WSU Chemistry Lab 150\CAD\ELEC\70800-E-201, E-202 ELEC SPEC.dwg Wed, 23 Nov 2016 - 2:14pm

#### INSTALLATION AND METHODS OF EXECUTION:

ALL WIRING SHALL BE IN CONDUIT OR CODE-APPROVED METAL DUCT. MINIMUM 3/4°C. FLEXIBLE METAL CONDUIT SHALL BE USED FOR SHORT CONNECTION TO MOTORS, FINAL CONNECTION TO RECESSED LIGHTING FIXTURES FROM RIGIDLY MOUNTED OUTLET BOX (NOT BETWEEN FIXTURES), VIBRATING EQUIPMENT, ETC., BUT NEVER LONGER THAN 6 FEET, PROVIDE LIQUID TIGHT FLEXIBLE METAL CONDUIT FOR ALL APPLICATIONS EXPOSED TO WATER OR WEATHER. PROVIDE ANTI-SHORT BUSHINGS FOR ALL FLEXIBLE CONDUIT ARMOR TERMINATIONS. PROVIDE SEPARATE EQUIPMENT GROUND WIRE IN ALL CONDUIT RUNS.

CONDUIT CONCEALED IN CEILING, WALLS OR FURRED SPACES OR EXPOSED IN DRY LOCATIONS SHALL BE EMT, THIN WALL ELECTRIC METALLIC TUBING. EXPOSED CONDUIT AND CONDUIT EXPOSED TO WEATHER, IN CONTACT WITH CONCRETE, BURIED IN SLAB, OR IN HAZARDOUS AREAS, SHALL BE HEAVY WALL, RIGID. ALL CONDUITS SHALL BE HOT DIPPED GALVANIZED STEEL.

PROVIDE AND INSTALL ALL NECESSARY INSERTS, CONDUIT SLEEVES, HANGER BOLTS, ETC., TO HANG EQUIPMENT AND TO RUN CONDUIT THROUGH WALLS, FLOOR SLABS OR FOOTINGS.

HOLES THROUGH WALLS, CEILINGS OR FLOOR SLABS SHALL BE SEALED COMPLETELY IN AN APPROVED MANNER TO FORM A FIRE BARRIER.

FOR PENETRATIONS THROUGH FIRE-RATED ASSEMBLIES, PROVIDE UL LISTED SYSTEM FOR THE PENETRATION, EQUAL TO OR GREATER THAN THE RATING OF THE RATED ASSEMBLY. REFER TO ARCHITECTURAL DOCUMENTS FOR FIRE RATED ASSEMBLY TYPES AND LOCATIONS.

IN ADDITION TO MANUFACTURED SYSTEMS INDICATED (SUCH AS FIRE-RATED POKE-THROUGHS), FIRE STOP COMPONENTS SHALL CONSIST OF PACKER-STYLE RED PILLOWS AND MOLDABLE FIRE-STOP COMPOUND. PACKETS SHALL BE USED WHERE MULTIPLE CABLES PASS THROUGH A FIRE-RATED WALL, CEILING OR FLOOR, SUCH AS DATA AND PHONE CABLE TRAYS. FIRE-STOP COMPOUND SHALL BE USED WHERE INDIVIDUAL CABLES IN CONDUIT/SLEEVES PENETRATE FIRE—RATED WALL, CEILING OR FLOORS.

PROVIDE SLEEVES FOR ALL CONDUITS PENETRATING FLOORS AND CONCRETE/MASONRY WALLS.

ALL WORK IN HAZARDOUS LOCATIONS SHALL BE DONE IN STRICT CONFORMANCE WITH NEC ARTICLE 500.

PLASTIC CONDUIT, PVC-40, SHALL BE USED ONLY AS INDICATED ON THE DRAWINGS. PLASTIC CONDUIT SHALL BE APPROVED FOR UNDERGROUND USE. PVC BURIAL DEPTH SHALL BE 36" MINIMUM BELOW FINISH GRADE. IN PVC CONDUIT SYSTEMS, RISERS ABOVEGROUND SHALL BE RIGID HEAVY WALL STEEL.

CONDUIT RUNS SHOWN ON DRAWINGS ARE DIAGRAMMATIC. EXACT ROUTING OF CONDUIT RUNS SHALL SUIT JOB CONDITIONS. EXPOSED CONDUIT SHALL BE RUN ONLY IN UNFINISHED AREAS SUBJECT TO FINAL APPROVAL OF ENGINEER AND SHALL RUN PARALLEL TO BUILDING LINES, NEVER DIAGONALLY.

PROVIDE CONDUIT TO ABOVE ACCESSIBLE FINISHED CEILING FROM EACH OUTLET / DEVICE BOX. DO NOT RUN CONDUIT HORIZONTALLY IN WALLS BETWEEN BOXES.

CONNECTION TO EQUIPMENT SHALL BE DONE IN ACCORDANCE WITH MANUFACTURER'S SHOP AND INSTALLATION DRAWINGS. REQUIREMENTS GENERALLY VARY FROM ONE MANUFACTURER TO ANOTHER AND CONTRACTOR IS BOUND TO COMPLY AND PROVIDE ALL WORK AS REQUIRED ALTHOUGH CERTAIN DISCREPANCIES MAY EXIST REGARDING THE REQUIREMENT FROM ONE MANUFACTURER TO ANOTHER.

PROVIDE POWER WIRING, DISCONNECTS, AND PROTECTION DEVICES TO ALL MECHANICAL EQUIPMENT AND MAKE FINAL CONNECTIONS, INCLUDING TESTING OF MOTORS FOR PROPER ROTATION.

OUTLET BOXES MAY-BE SURFACE MOUNTED ON EXISTING WALLS (CMU, BRICK OR CONCRETE) WITH SMALLEST SURFACE RACEWAY AS REQUIRED FOR WIRING INSTALLED. PROVIDE FLUSH OUTLET BOXES AND CONDUIT AT NEW CONSTRUCTION WALLS AND AT EXISTING WALLS (ALL TYPES) WHICH ARE NOT CMU, BRICK OR CONCRETE CONSTRUCTION. CUT AND PATCH EXISTING WALLS AS REQUIRED FOR FLUSH INSTALLATION.

PROVIDE 4" TALL CONCRETE HOUSEKEEPING PADS FOR ALL FLOOR MOUNTED ELECTRICAL EQUIPMENT.

PROVIDE U-CHANNEL SUPPORTS AND MISCELLANEOUS STEEL AND HARDWARE AS REQUIRED TO SUPPORT ELECTRICAL WORK. PROVIDE FIBERGLASS/NON FERROUS FOR OUTSIDE / WET APPLICATIONS

ATTACHMENT DEVICES SHALL BE A TYPE RESULTING IN THE LOAD BEING CENTERED ON THE CENTER OF THE MEMBERS.

RIGIDLY SUPPORT ALL ELECTRICAL EQUIPMENT.

SUPPORT ELECTRICAL ITEMS INDEPENDENTLY OF THE SUPPORTS PROVIDED BY OTHER TRADES AND INDEPENDENTLY FROM EXISTING ELECTRICAL SYSTEM SUPPORTS. DO NOT SUPPORT ELECTRICAL ITEMS FROM

ALL BRANCH CIRCUIT WIRING IN PANEL, SHALL BE LABELED AS TO CIRCUIT NUMBER.

AT EACH OUTLET JUNCTION/PULL BOX, NOTE SOURCE PANEL FOR WIRING PASSING THROUGH OR TO, THE BOX. LABEL OUTSIDE COVER ALSO IF BOX IS IN A CONCEALED AREA. LABEL INSIDE COVER IF BOX IS VISIBLE. LABEL WIRES IN OUTLET BOX AS TO CIRCUIT NUMBER.

ALL CONTROL, SIGNAL, FIRE ALARM, SECURITY AND OTHER LIKE SPECIAL SYSTEMS CABLES SHALL BE LABELED IN ALL JUNCTION BOXES, DEVICE LOCATIONS, AND ENCLOSURES.

ALL JUNCTION BOXES SHALL BE LABELED AS TO FUNCTION.

USE PERMANENT MARKERS, AND WRITE FUNCTIONS IN A VISIBLE LOCATION INSIDE THE BOXES, AND ON THE OUTSIDE COVERS WHERE BOX IS IN A CONCEALED AREA. PROVIDE ACCESS PANELS FOR ANY WORK ABOVE IN ACCESSIBLE CEILING.

#### **ACCEPTANCE TESTS**:

THIS GUIDELINE DEFINES THE STANDARD TESTS THAT ALL ELECTRICAL SYSTEMS AND EQUIPMENT MUST PASS PRIOR TO FINAL ACCEPTANCE BY THE WSU. THESE TESTS ARE IN ADDITION TO ACCEPTANCE TESTS SPECIFIED BY EQUIPMENT MANUFACTURERS OR DEFINED IN THE OTHER DESIGN GUIDELINES SECTIONS. OBTAIN PERMISSION THROUGH THE DESIGN MANAGER BEFORE SPECIFYING TESTS LESS THAN OR IN EXCESS OF THESE TESTS. PERFORM COMMISSIONING IN ADDITION TO TESTS SPECIFIED IN THIS SECTION. REFER TO SECTION 01715 - FACILITIES COMMISSIONING. FOR ADDITIONAL REQUIREMENTS.

THE CONTRACTOR SHALL PROVIDE ALL TEST EQUIPMENT, MATERIALS AND LABOR NECESSARY TO PERFORM THE TESTS, AND COORDINATE WITH THE OTHER TRADES FOR NECESSARY SERVICES, SUCH AS SCAFFOLDING AND THE UNCOUPLING OF MOTORS.

TESTS SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE CODES, STANDARDS, AND EQUIPMENT MANUFACTURERS' INSTRUCTIONS.

TESTS SHALL CONSIST OF VISUAL INSPECTIONS, MANUAL OPERATIONS, AND ELECTRICAL TESTING UNDER ALL NORMAL AND EXPECTED ABNORMAL OPERATING CONDITIONS.

THE OWNER SHALL BE NOTIFIED AT LEAST 3 WORKING DAYS IN ADVANCE OF ALL TESTS.

TESTS SHALL BE WITNESSED BY THE OWNER UNLESS SUCH WITNESSING IS WAIVED IN WRITING.

THE OWNER SHALL BE PROVIDED WITH A WRITTEN TEST REPORT, SIGNED AND DATED, FOR ALL TESTS.

MEGGER TESTS SHALL BE PERFORMED AT A DC VOLTAGE OF 1,000 VOLTS FOR 600 VOLT RATED EQUIPMENT, AND AT A DC VOLTAGE OF 500 VOLTS FOR 120-300 VOLT RATED EQUIPMENT.

CONTINUITY CHECKS SHALL BE PERFORMED WITH A LOW VOLTAGE DC METER, LIGHT OR BELL.

TEST INSTRUMENTS SHALL BE CALIBRATED TO NATIONAL STANDARDS TO INSURE ACCURACY OF TESTS. THESE CALIBRATION REPORTS SHALL BE MADE AVAILABLE TO THE OWNER WHEN REQUESTED, DEPENDING UPON FREQUENCY OF USE, THE INSTRUMENTS SHALL BE CALIBRATED AT LEAST EVERY 12-MONTHS.

PRIOR TO MANUAL OPERATION AND ELECTRICAL TESTING, VERIFY THE FOLLOWING: \* THE EQUIPMENT COMPLIES WITH THE CONTRACT DOCUMENTS AND THE SHOP DRAWING SUBMITTALS.

\* THE EQUIPMENT IS COMPLETELY AND PROPERLY INSTALLED ACCORDING TO THE CONTRACT DOCUMENTS AND THE MANUFACTURER'S INSTRUCTIONS.

\* ADEQUATE WORKING SPACE EXISTS AROUND THE EQUIPMENT TO FULLY OPEN DOORS AND ACCESS PANELS, AND TO ACCESS ALL COMPONENTS THAT REQUIRE MAINTENANCE.

\* THE EQUIPMENT IS FREE FROM DAMAGE AND DEFECTS. \* SHIPPING BLOCKS AND RESTRAINTS HAVE BEEN REMOVED.

\* THE EQUIPMENT HAS BEEN ALIGNED.

\* THE EQUIPMENT HAS BEEN LUBRICATED. \* THE VENTILATION LOUVERS ARE OPEN AND UNOBSTRUCTED.

\* ELECTRICAL CONNECTIONS HAVE BEEN TIGHTENED. \* VOLTAGES, PHASES, AND ROTATION HAVE BEEN IDENTIFIED.

\* TERMINATIONS HAVE BEEN IDENTIFIED. \* EQUIPMENT LABELS HAVE BEEN INSTALLED.

\* THE EQUIPMENT HAS BEEN CALIBRATED.

\* THE EQUIPMENT IS READY TO BE ELECTRICALLY TESTED.

PRIOR TO ELECTRICAL TESTING, VERIFY THE FOLLOWING:

\* MECHANICAL COMPONENTS OPERATE SMOOTHLY AND FREELY. \* MECHANICAL STOPS, LIMIT SWITCHES, ETC., ARE PROPERLY ADJUSTED.

PERFORM A CONTINUITY CHECK AND A 1,000 VOLT DC MEGGER TEST ON 600 VOLT POWER CABLES NO. 4 AWG AND LARGER. THE MEGGER TEST SHALL BE PERFORMED BETWEEN EACH PAIR OF CONDUCTORS AND FROM EACH CONDUCTOR TO GROUND. EACH TEST SHALL BE PERFORMED FOR 15 SECONDS OR UNTIL THE INSULATION RESISTANCE VALUE STABILIZES.

THE INSULATION RESISTANCE BETWEEN CONDUCTORS, AND FROM EACH CONDUCTOR TO GROUND, SHALL BE 100 MEGOHMS MINIMUM IN ONE MINUTE OR LESS. IN ADDITION, THE LOWEST INSULATION RESISTANCE VALUE SHALL NOT DIFFER FROM THE HIGHEST VALUE BY MORE THAN 20 PERCENT. IF ALL MEGGER READINGS FOR A GIVEN CIRCUIT OR FEEDER ARE ABOVE 1000-MEGHOMS, THE 20% BALANCE REQUIREMENT MAY BE WAIVED.

PERFORM A CONTINUITY CHECK ON CONTROL AND INSTRUMENTATION WIRING.

TRANSFORMERS, PANELBOARDS, AND MOTOR CONTROL EQUIPMENT

PERFORM A 1,000 VOLT DC MEGGER TEST SHALL BE PERFORMED ON BUSES, MOTOR STARTERS, CIRCUIT BREAKERS, AND DISCONNECT SWITCHES. THIS TEST MAY BE COMBINED WITH THE POWER CABLE MEGGER TEST BY TESTING THE DEVICES AND TERMINATED CABLES TOGETHER.

PERFORM AN OPERATIONAL TEST ON THE MOTOR CONTROLS INCLUDING VARIABLE FREQUENCY DRIVE OPERATION. CHECK MOTOR HEATER SIZES FOR PROPER SIZE.

PERFORM A CONTINUITY CHECK FROM EQUIPMENT GROUND BUS BARS AND GROUND LUGS TO THE GROUND SYSTEM.

LIGHTING FIXTURES SHALL BE CHECKED FOR PROPER ASSEMBLY, PROPER LOUVERS OR LENSES, PROPER LAMPS, PROPER BALLASTS, STRAIGHT ROW ALIGNMENT, PROPER AIMING, AND THE ABSENCE OF LIGHT LEAKS.

BATTERY-BACKED EMERGENCY LIGHTING FIXTURES SHALL BE CHECKED FOR CONTINUOUS OPERATION FOR A MINIMUM OF 90 MINUTES.

#### LIGHTING AND RECEPTACLE PANELBOARDS:

PANELS SHALL BE OF VOLTAGE, PHASE AND SERVICE AS REQUIRED AND FURTHER SPECIFIED HEREIN. ALL PANELS SHALL BE EQUIPPED WITH THERMAL MAGNETIC, TOGGLE TYPE, MOLDED CASE CIRCUIT BREAKERS WITH "QUICK-MAKE", "QUICK-BREAK" OPERATING MECHANISM. BREAKERS SHALL BE RATED 22,000 A.I.C. MINIMUM AT 240 V.A.C. (35,000 A.I.C. AT 277 V.A.C.) AND SINGLE, DOUBLE OR TRIPLE POLE AS INDICATED. COORDINATE AND MODIFY PANEL RATINGS PER SECTION 16315 - SHORT CIRCUIT/PROTECTIVE DEVICE COORDINATION STUDY. SINGLE POLE CIRCUIT BREAKERS, RATED 20 AMPERES OR LESS SHALL BE "SWD" MARKED IN COMPLIANCE WITH NEC ARTICLE 240-83(D).

CABINETS SHALL BE DEAD FRONT CONSTRUCTION, FLUSH OR SURFACE TYPE AS INDICATED, CONSTRUCTED OF CODE GAUGE GALVANIZED STEEL AND WITH 4" WIRING GUTTERS ON ALL SIDES. FRONTS SHALL BE HEAVY GAUGE STEEL, EQUIPPED WITH FLUSH DOORS TO FIT THE CABINET BOXES, HINGED AND SUPPLIED WITH FLUSH KEY LOCKS AND INTERCHANGEABLE KEYS. PANEL DOORS/COVERS ARE TO BE HINGED DOOR-IN-DOOR TYPE ALLOWING FULL OR PARTIAL OPENING OF THE PANEL DOOR, EXPOSING BREAKERS ONLY OR BREAKERS AND BUSSING AND WIRING WITHOUT COVER REMOVAL.

PROVIDE COPPER FOR ALL BUSSING AND 100% RATED NEUTRAL BUS.

PANELS SHALL BE DESIGNED FOR 75 DEGREES C. MINIMUM OPERATING TEMPERATURE.

CABINET FRONTS SHALL BE FINISHED IN MANUFACTURER'S STANDARD COLOR. TOPS OF ALL CABINETS SHALL BE 6'-0" ABOVE FINISH FLOOR. PROVIDE 2 KEYS FOR EACH PANEL. KEY ALL LOCKS ALIKE.

ALL PANELS SHALL BE PROVIDED WITH A DIRECTORY FRAME AND A TYPEWRITTEN DIRECTORY.

WHERE SPACE POSITIONS ARE INDICATED, THE PANEL SHALL BE FULLY EQUIPPED FOR THE SIMPLE ADDITION OF THESE FUTURE BREAKERS.

UPON COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL CHECK EACH PANEL AND PROPERLY BALANCE THE LOAD ON ALL PHASES.

PANELS SHALL BE FACTORY ASSEMBLED, SIMILAR TO SQUARE "D" TYPE "NQOD" FOR 120/208V SERVICE AND TYPE NF FOR 480/277V SERVICE AND AS MANUFACTURED BY SIEMENS, SQUARE D, CUTLER HAMMER OR G.E.

MOUNT MAIN DEVICE, WHEN PRESENT, SEPARATE FROM (ABOVE OR BELOW) AND NOT WITHIN FEEDER DEVICE LOCATIONS.

WHERE INDICATED, PROVIDE SHUNT TRIP CIRCUIT BREAKERS FOR REMOTELY OPERATION (TRIPPING) OF CIRCUIT BREAKERS INDICATED. PROVIDE BREAKERS SUITABLE FOR 120V AC CONTROL COMPATIBLE WITH MOMENTARY OPERATION PUSHBUTTON DEVICE. SHUNT TRIP DEVICE SHALL RESET WHEN CIRCUIT BREAKER IS MANUALLY RESET TO "ON."

PROVIDE ENGRAVED PLASTIC LAMINATE SIGN, PER SECTION 260500 "ELECTRICAL IDENTIFICATION", MOUNTED AT TOP CENTER OF PANELBOARD AND INDICATING THE FOLLOWING INFORMATION:

PANELBOARD DESIGNATION (E.G., "RP-1A")

VOLTAGE, PHASES, WIRES (E.G., "480Y/277V, 3PH, 4W") POWER SOURCE (E.G., "FED FROM PP-A IN ROOM B1-1305") (INCLUDE FLOOR REFERENCE IN ROOM NUMBER).

TYPEWRITE THE LOAD FED BY EACH CIRCUIT ON THE PANELBOARD DIRECTORY CARD USING NOMENCLATURE FROM CONTRACT DOCUMENTS. INCLUDE OWNER'S ROOM NUMBERS (IF DIFFERENT FROM CONTRACT DOCUMENT ROOM NUMBERS) ON DIRECTORY TO INDICATE LOCATION OF LOAD. SUBMIT AS-BUILT DIRECTORIES AS SPECIFIED IN "RECORD DRAWINGS", SECTION 260500.

PROVIDE PERMANENT TYPE-WRITTEN LABEL MOUNTED INSIDE THE PANELBOARD, IDENTIFYING THE NOMINAL VOLTAGE SYSTEM AND COLOR CODING USED FOR EACH UNGROUNDED CONDUCTOR PER NEC ARTICLE 210 (IDENTIFICATION OF UNGROUNDED CONDUCTORS).

COLOR CODE CIRCUIT BREAKERS AND DISCONNECT SWITCHES SERVING FIRE ALARM CIRCUITS (RED).

5454 Cass Avenue, Detroit, MI 48202

Project Location:

WAYNE STATE UNIVERSITY CHEMISTRY BUILDING 5101 CASS AVENUE **DETROIT MICHIGAN 48202** 

CONTACT: ASHLEY FLINTOFF



i Design

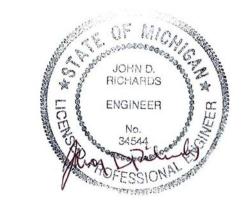
iDesign Solutions, LLC Scientific Facilities & Laboratory Design 2531 Ridge Road, Suite 100

248-440-7310 info@iDesign-Solutions.info www.iDesign-Solutions.info

White Lake, MI 48383



issue:	date
OWNER REVIEW	10/20/16
OWNER REVIEW	10/28/16
OWNER REVIEW	11/03/16
BID AND CONSTRUCTION ISSUE	11/23/16



designed by:	T
drawn by:	Ţ
coordination checked:	Е
checked:	Е
approved:	E
	drawn by: coordination checked: checked:

project:

CHEMISTRY LAB 150

1st Floor Modification

sheet title:

Electrical Specifications - 2

sheet number: project number:

007-286023 (1156-7: iDesign project number)

H:\ACAD\FILES\70\70800-WSU Chemistry Lab 150\CAD\ELEC\70800-E-201, E-202 ELEC SPEC.dwg Wed, 23 Nov 2016 - 2:14pm