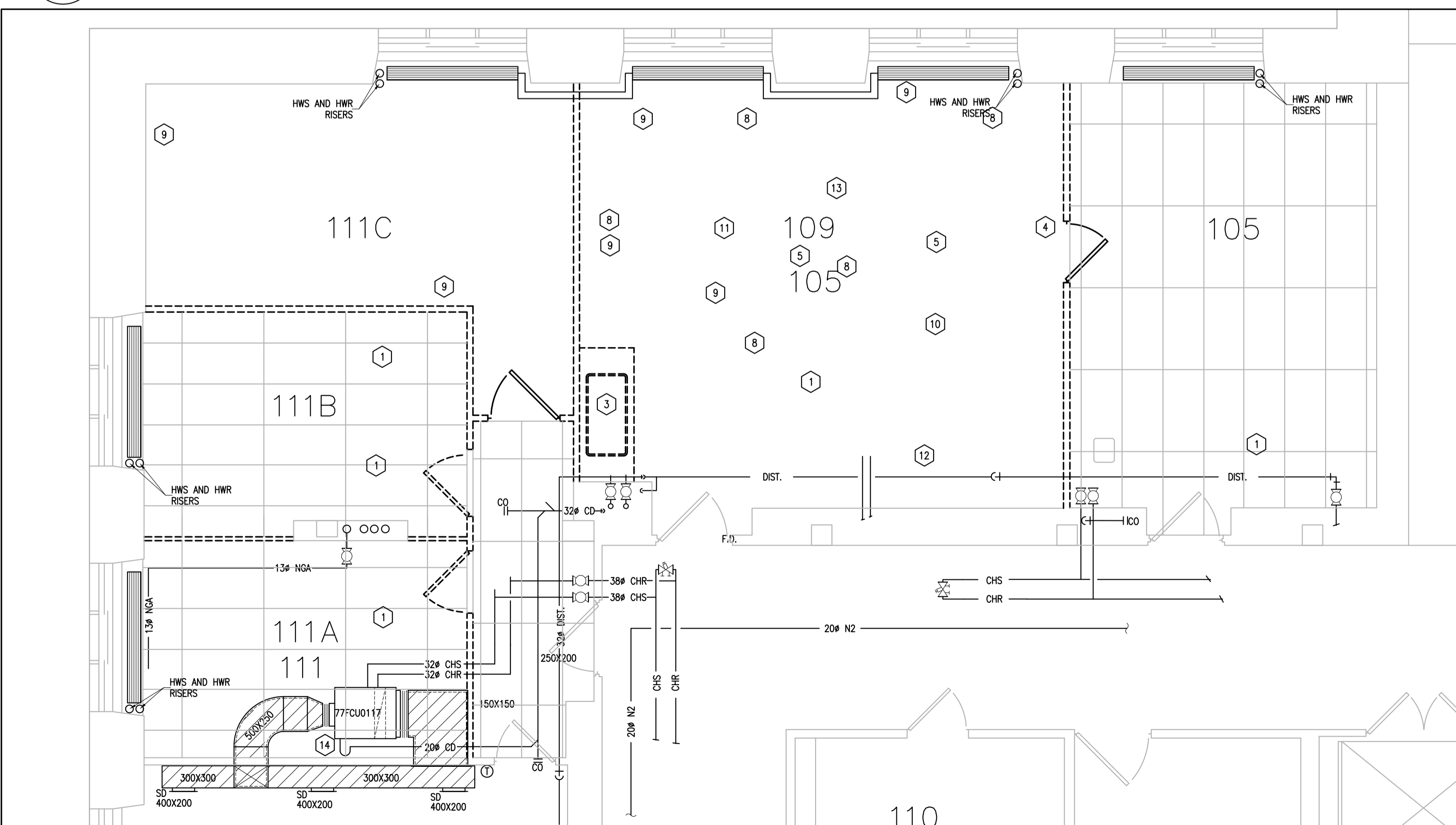


**S-77- PARTIAL BASEMENT PLAN
HVAC- DEMOLITION**

1

M01

SCALE- 1:50



**S-77- PARTIAL BASEMENT PLAN
PLUMBING + UTILITIES- DEMOLITION**

2

M01

SCALE- 1:50

MECHANICAL DEMOLITION: (X)

1. DISCONNECT AND REMOVE EXISTING FAN COIL UNITS, SUPPLY AND RETURN DUCTWORK, CHILLED WATER SUPPLY AND RETURN PIPING AND CONDENSATE PIPING AS INDICATED. DISPOSE OF ALL MATERIAL OFF SITE AS PER SPECIFICATIONS.
2. REMOVE ALL DIFFUSERS AND RETURN AIR GRILLES AS INDICATED.
3. ISOLATE, DISCONNECT AND REMOVE EXISTING SINK S1, ASSOCIATED DOMESTIC HOT WATER (DHW), DOMESTIC COLD WATER (DCW), VENT AND SANITARY PIPING AS INDICATED. CAP AND SEAL ALL UNUSED BRANCH PIPING AS SOURCE.
4. ISOLATE, DISCONNECT AND REMOVE EXISTING SINK S2, ASSOCIATED DOMESTIC HOT WATER, DOMESTIC COLD WATER, VENT AND SANITARY PIPING AS INDICATED.
5. ISOLATE, DISCONNECT AND REMOVE EXISTING LAB SINKS (S3'S), ASSOCIATED DOMESTIC COLD WATER, VENT AND SANITARY PIPING AS INDICATED.
6. REMOVE AND DISPOSE EXHAUST DUCTWORK AS INDICATED. CAP AND SEAL DUCTWORK AT WALL AS INDICATED ON NEW WORK PLAN.
7. REMOVE AND DISPOSE OUTDOOR AIR (OUT) SUPPLY AIR DUCTWORK AS INDICATED.
8. ISOLATE, DISCONNECT AND REMOVE NATURAL GAS PIPING AND GAS OUTLETS AS INDICATED. CAP AND SEAL PIPING AT SOURCE.
9. ISOLATE, DISCONNECT AND REMOVE COMPRESSED AIR PIPING AND COMPRESSED AIR OUTLETS AS INDICATED. CAP AND SEAL ALL UNUSED BRANCH CONNECTIONS AT SOURCE.
10. ISOLATE, DISCONNECT AND REMOVE HOUSE OXYGEN PIPING AND GAS OUTLETS AS INDICATED. CAP AND SEAL PIPING AT SOURCE.
11. ISOLATE AND REMOVE DISTILLED WATER PIPING TO REMOVED LAB SINKS AS INDICATED. CAP AND SEAL AT SOURCE.
12. REMOVE EXISTING SANITARY DRAIN AND CLEAN OUT STUBS FOR PREVIOUSLY REMOVED COLD ROOM. CONNECTIONS TO BE SEALED AT NEW FLOOR LEVEL. COORDINATE ALL CONCRETE REMOVAL WORK WITH FLOORING CONTRACTOR.
13. DISCONNECT, REMOVE AND CAP AT FLOOR SANITARY DRAIN FOR REMOVED LAB SINKS (S3'S).
14. FAN COIL UNIT 77FCU0117 SHALL REMAIN OPERATIONAL THROUGHOUT CONSTRUCTION PERIOD, CONTRACTOR TO ASSURE THAT OUT DOOR AIR SUPPLY TO THIS UNIT IS NOT CONTAMINATED WITH CONSTRUCTION DUST.
15. ISOLATE, DISCONNECT AND REMOVE SPRINKLERS AND ASSOCIATED BRANCH PIPING AS INDICATED. RETAIN SPRINKLERS FOR REUSE AS INDICATED ON NEW WORK PLAN.
16. REMOVE EXISTING PNEUMATIC THERMOSTATS, DDC THERMOSTATS AND ALL ASSOCIATED CONTROL WIRING AND TUBING. CONTROL WORK SHALL BE PERFORMED BY DIRECT ENERGY AND COORDINATED WITH AMERESCO AS PART OF THEIR ONGOING CONTRACT.



GENERAL NOTES

- CONTRACTORS TO CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO DEMOLITION OR CONSTRUCTION AND REPORT ANY ERRORS OR OMISSIONS TO DEPARTMENTAL REPRESENTATIVE.
- CONTRACTORS MUST VISIT THE SITE & FULLY FAMILIARIZE THEMSELVES WITH THE SCOPE OF THE WORK.
- PREVENT THE SPREAD OF DUST & DEBRIS BEYOND THE WORK AREA AND CLEAN ALL SURFACES AT COMPLETION.
- MAKE GOOD ALL SURFACES AFFECTED BY THIS WORK.
- COORDINATE ALL SHUTDOWNS WITH THE DEPARTMENTAL REPRESENTATIVE.
- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWINGS.

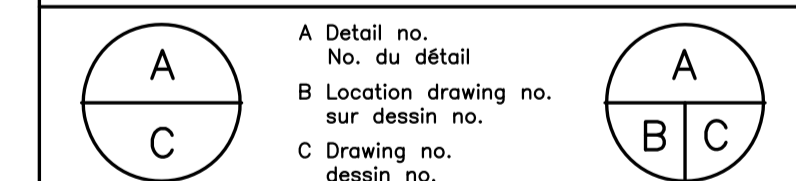
MECHANICAL GENERAL NOTES:

1. INSTALLATION OF ALL DCW, DHW, NEW SANITARY AND VENT PIPING TO BE INSTALLED AS PER NBC STANDARDS.
2. ALL TRADES TO COORDINATE WORK ON SITE TO AVOID ANY CONFLICTS AND/OR INTERFERENCES.
3. ANY WORK REQUIRING THE SHUTDOWN OF ANY BUILDING SYSTEM IS TO BE COORDINATED WITH NRC REPRESENTATIVE AND BUILDING COORDINATOR.
4. SHOP DRAWINGS MUST BE SUBMITTED TO NRC REPRESENTATIVE FOR REVIEW AND APPROVAL. SHOP DRAWINGS TO INCLUDE ALL DESCRIPTIVE DATA FOR MECHANICAL EQUIPMENT AND COMPONENTS AS WELL AS NAME OF PROJECT, CONTRACTOR, NAME OF COMPONENT, MANUFACTURER AND MODEL NUMBER, OVERALL DIMENSIONS AND CLEARANCE DIMENSIONS, WEIGHTS, NOISE LEVELS AND EXTENDED WARRANTY COVERAGE. NOTE: ALL EQUIPMENT TO BE ORDERED QUICK SHIP.
5. OBTAIN AND DISPLAY ALL REQUIRED PERMITS ON WORKSITE AND INCLUDE COPIES OF INSPECTION CERTIFICATES IN OPERATING AND MAINTENANCE MANUALS.
6. KEEP SITE CLEAR OF RUBBISH AND WASTE MATERIAL RESULTING FROM WORK ON DAILY BASIS.
7. BALANCE ALL SYSTEMS TO OPERATE AS DESIGNED.

| No. | Date | Revision | By: |
|-----|----------|-------------------|-----|
| 1 | JAN 2014 | ADDENDUM 1 | JWG |
| 0 | DEC 2013 | ISSUED FOR TENDER | JWG |

Date Printed DD MM YYYY Date imprimée

- Verify all dimensions and site conditions and be responsible for same
- Vérifier toutes les dimensions et l'état des lieux et en assumer la responsabilité



project **BUILDING S-77- FIBRE PHOTONICS LAB RENOVATION** projet

SUSSEX DRIVE

drawing **MECHANICAL DEMOLITION** dessin

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| approved BV | approuvé | W.O.no. 9100024775 | D.T.no. |
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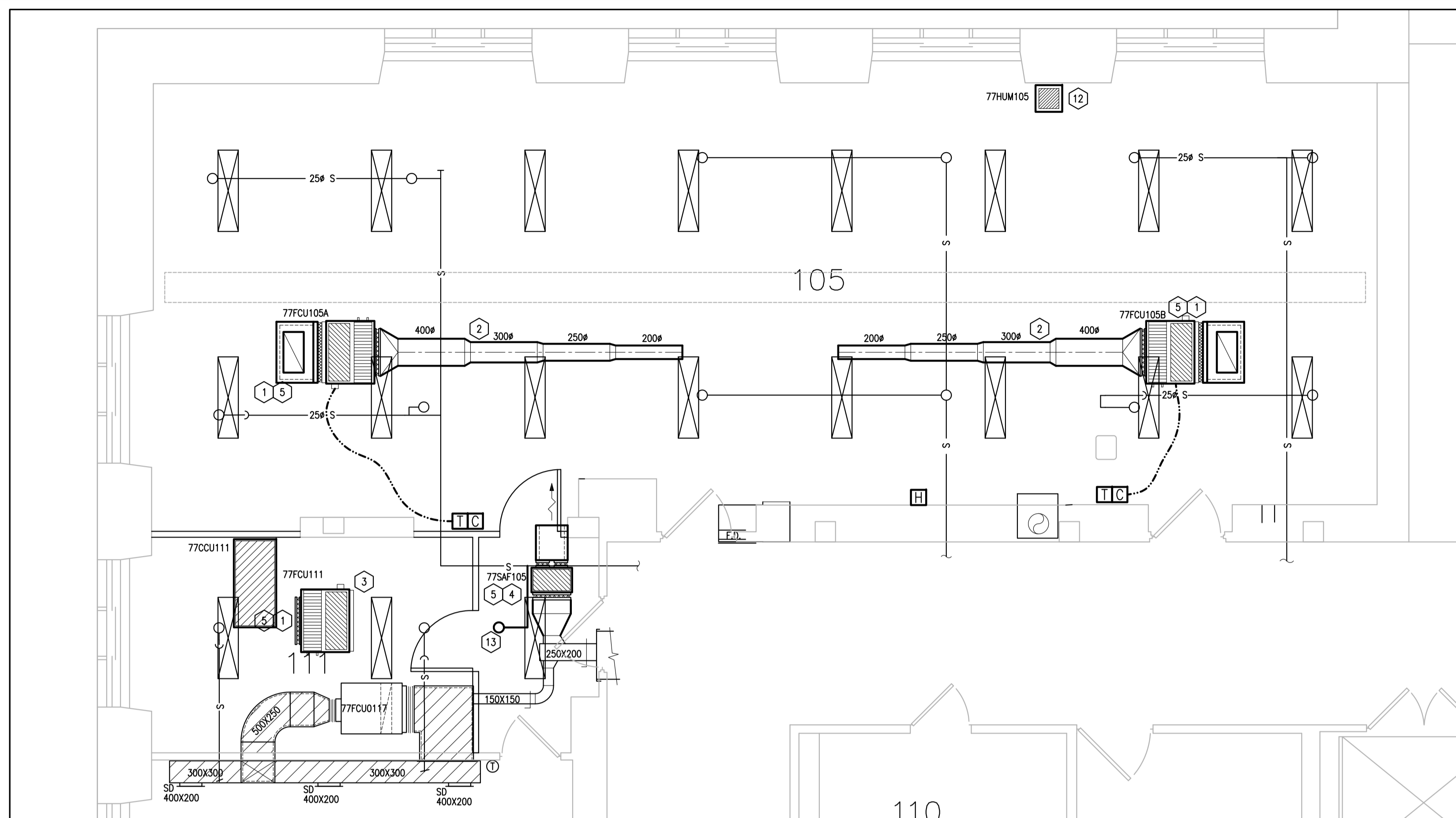


GENERAL NOTES

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- CONTRACTORS MUST VISIT THE SITE & FULLY FAMILIARIZE THEMSELVES WITH THE SCOPE OF THE WORK.
- PREVENT THE SPREAD OF DUST & DEBRIS BEYOND THE WORK AREA AND CLEAN ALL SURFACES AT COMPLETION.
- MAKE GOOD ALL SURFACES AFFECTED BY THIS WORK.
- COORDINATE ALL SHUTDOWNS WITH THE DEPARTMENTAL REPRESENTATIVE.
- PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO FORM A COMPLETE, FUNCTIONAL SYSTEM AS DESCRIBED ON DRAWINGS.

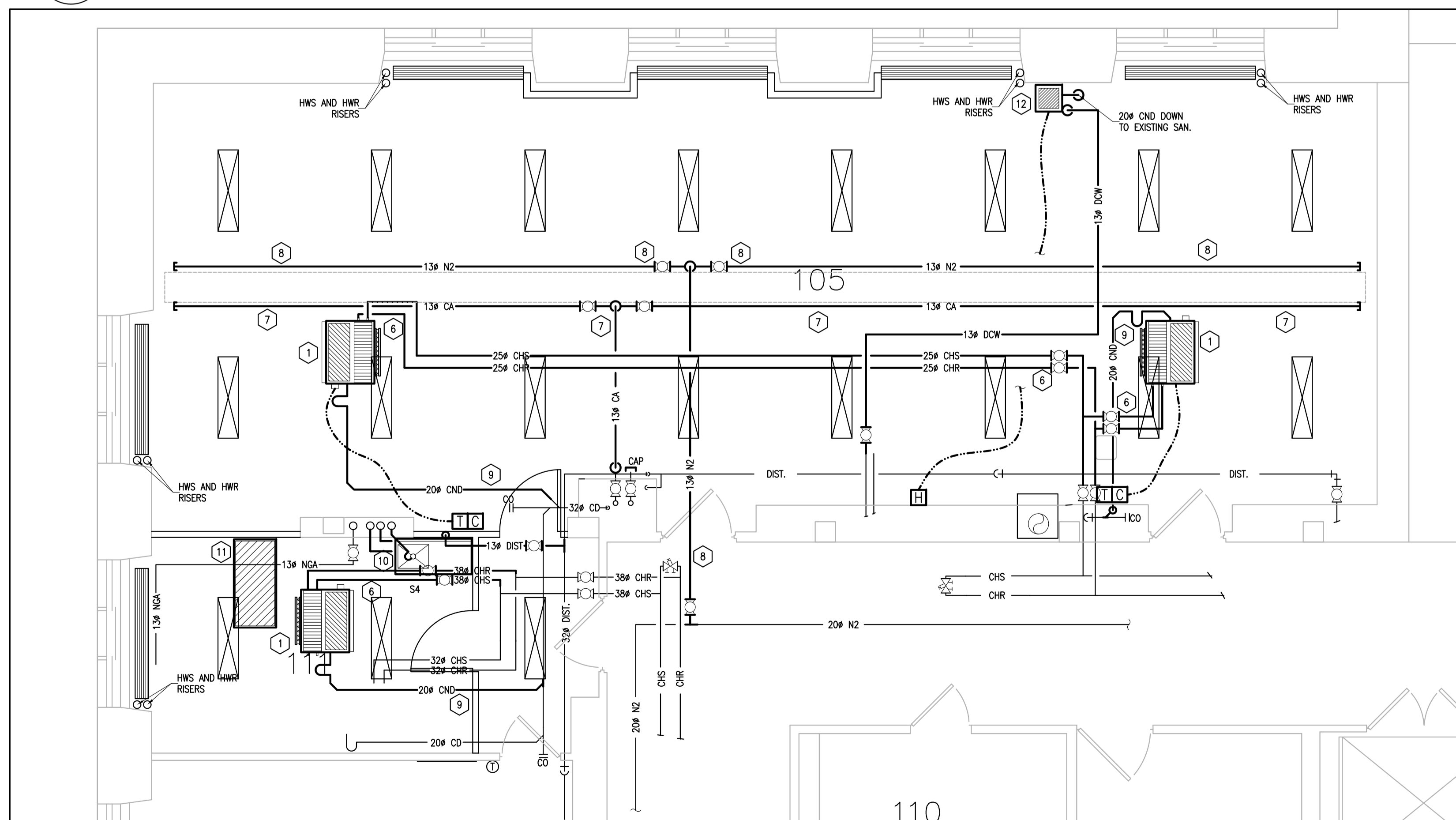
MECHANICAL NEW WORK: (X)

- PROVIDE NEW FAN COIL UNITS (77FCU105A, 77FCU105B AND 77FCU111) ASSOCIATED SUPPLY AND RETURN DUCTWORK (SIZED AS INDICATED), CHILLED WATER SUPPLY AND RETURN PIPING (CHS AND CHR) SIZED AS INDICATED, ISOLATION VALVES AND CONTROLS AS INDICATED. REFER TO SCHEDULE AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.
- PROVIDE NEW PERFORATED DUCTWORK TO ACT AS DIFFUSERS FROM NEW FAN COIL UNITS LOCATED IN "FRED" LASER LAB, SIZED AS INDICATED. SIZE DUCTWORK AND PERFORATIONS TO PROVIDE AIR FLOW AT 94 L/S PER METER.
- PROVIDE AIR FILTERS ON INLET AND OUTLET OF FAN COIL UNIT 77FCU111.
- PROVIDE NEW PRESSURIZATION FAN C/W WITH FILTER ON INLET AND ASSOCIATED DUCTWORK AS INDICATED. FAN IS TO BE CONNECTED TO EXISTING TRANSFER GRILLE AND PROVIDE POSITIVE PRESSURE TO THE LASER ROOM. REFER TO SCHEDULE AND SPECIFICATIONS FOR ADDITIONAL DETAILS.
- TEST ADJUST AND BALANCE NEW FAN COIL UNITS, PRESSURIZATION FAN AND SUPPLY AIR DUCT TO THE AIR FLOWS INDICATED.
- PROVIDE NEW CHILLED WATER SUPPLY (CHS), CHILLED WATER RETURN (CHR) FROM EXISTING TAKE-OFFS TO NEW FAN COIL UNITS AS INDICATED. INSULATE AND LABEL PIPING AS PER SPECIFICATIONS. PROVIDE REQUIRED ISOLATION, CONTROL AND CIRCUIT BALANCING VALVES AS INDICATED.
- PROVIDE NEW COMPRESSED AIR PIPING AND EQUALLY SPACED ISOLATION VALVES SIZED AND LOCATED AS INDICATED. PIPING TO BE RUN ON THE UNDERSIDE OF THE ELECTRICAL TRAY AND HAVE SIX (6) 13# STUBS OUTS COMPLETE WITH BALL VALVES (THREADED ENDS TO 1/2" FNPT) EVERY 3 METERS (6 PER 10FT). APPROXIMATE TOTAL OF 34. VALVES ARE TO BE ALTERNATELY DIRECTED LEFT OR RIGHT TO ALLOW FOR CONNECTIONS FROM EITHER SIDE OF ELECTRICAL TRAY.
- PROVIDE NEW COMPRESSED NITROGEN PIPING AND EQUALLY SPACED ISOLATION VALVES SIZED AND LOCATED AS INDICATED. PIPING TO BE RUN ON THE UNDERSIDE OF THE ELECTRICAL TRAY AND HAVE SIX (6) 13# STUBS OUTS COMPLETE WITH BALL VALVES (THREADED ENDS TO 1/2" FNPT) EVERY 3 METERS (6 PER 10FT). APPROXIMATE TOTAL OF 34. VALVES ARE TO BE ALTERNATELY DIRECTED LEFT OR RIGHT TO ALLOW FOR CONNECTIONS FROM EITHER SIDE OF ELECTRICAL TRAY.
- PROVIDE NEW CONDENSATE PIPING FROM NEW FAN COIL UNITS SIZED AND LOCATED AS INDICATED. CONNECT TO EXISTING CONDENSATE DRAINS AS INDICATED.
- PROVIDE NEW SINK (S4), DOMESTIC COLD WATER (DCW), DOMESTIC HOT WATER (DHW), DE-IONIZED WATER CONNECTION, SANITARY DRAIN AND VENT PIPING AS INDICATED. ALL NEW PIPING TO BE CONNECTED TO EXISTING BUILDING SERVICES AS INDICATED. FIRE STOP ALL OPENINGS AS PER N.B.C. AND TO THE SATISFACTION OF N.R.C. REPRESENTATIVE.
- PROVIDE NEW CHILLER (77CCU111), INTEGRATED CIRCULATING PUMP, CONTROLS AND PIPING AS PER SPECIFICATIONS FOR CLIENT PRECISION HEAT EXCHANGER. REFER TO SCHEDULES AND SPECIFICATIONS FOR ADDITIONAL INFORMATION. CONFIRM CONNECTION SIZES FOR CLIENT EQUIPMENT BEFORE INSTALLATION. EXACT LOCATION TO BE DETERMINED ON SITE WITH CLIENT.
- PROVIDE NEW WALL MOUNTED HUMIDIFIER (77HUM105) C/W BUILT ON BLOWER PACK AND WALL MOUNTED HUMIDISTAT AS INDICATED. REFER TO SCHEDULES FOR ADDITIONAL INFORMATION. PROVIDE INDIRECT CONNECT (HUB DRAIN, MIN 50# DIA) FOR DRAIN FROM HUMIDIFIER.
- RELOCATE RETAINED SPRINKLERS AS INDICATED TO PROVIDE FULL COVERAGE AS PER NFPA 13. NOTE THAT ALL SPRINKLERS ARE TO BE MOUNTED ABOVE LIGHTING LEVEL.



1 S-77- PARTIAL BASEMENT PLAN
 HVAC- NEW WORK

1 M02 SCALE- 1:50



2 S-77- PARTIAL BASEMENT PLAN
 PLUMBING + UTILITIES- NEW WORK

2 M02 SCALE- 1:50

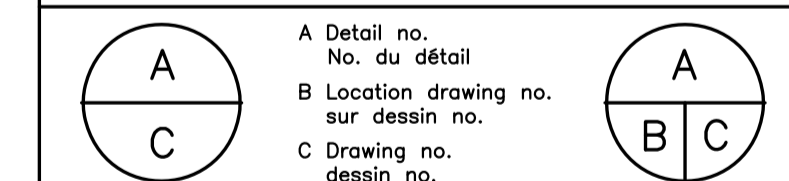
MECHANICAL GENERAL NOTES:

- INSTALLATION OF ALL DCW, DHW, NEW SANITARY AND VENT PIPING TO BE INSTALLED AS PER NBC STANDARDS.
- ALL TRADES TO COORDINATE WORK ON SITE TO AVOID ANY CONFLICTS AND/OR INTERFERENCES.
- ANY WORK REQUIRING THE SHUTDOWN OF ANY BUILDING SYSTEM IS TO BE COORDINATED WITH NRC REPRESENTATIVE AND BUILDING COORDINATOR.
- SHOP DRAWINGS MUST BE SUBMITTED TO NRC REPRESENTATIVE FOR REVIEW AND APPROVAL. SHOP DRAWINGS TO INCLUDE ALL DESCRIPTIVE DATA FOR MECHANICAL EQUIPMENT AND COMPONENTS AS WELL AS NAME OF PROJECT, CONTRACTOR, NAME OF COMPONENT, MANUFACTURER AND MODEL NUMBER, OVERALL DIMENSIONS AND CLEARANCE DIMENSIONS, WEIGHTS, NOISE LEVELS AND EXTENDED WARRANTY COVERAGE. NOTE: ALL EQUIPMENT TO BE ORDERED QUICK SHIP.
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- BALANCE ALL SYSTEMS TO OPERATE AS DESIGNED.

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| 1 | JAN 2014 | ADDENDUM 1 | JWG |
| 0 | DEC 2013 | ISSUED FOR TENDER | JWG |

Date Printed DD MM YYYY Date imprimée

- Verify all dimensions and site conditions and be responsible for same
- Vérifier toutes les dimensions et l'état des lieux et en assumer la responsabilité



project BUILDING S-77- FIBRE PHOTONICS LAB RENOVATION projet

SUSSEX DRIVE dessin

MECHANICAL- NEW WORK

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| dwg.no. | | dessin no. | |

3894-M02



GENERAL NOTES

- CONTRACTORS TO CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO DEMOLITION OR CONSTRUCTION AND REPORT ANY ERRORS OR OMISSIONS TO DEPARTMENTAL REPRESENTATIVE.
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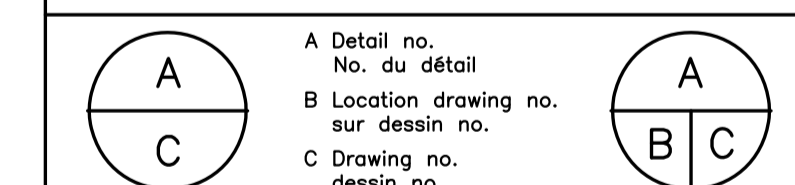
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| 1 | JAN 2014 | ADDENDUM 1 | JWG |
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Date Printed DD MM YYYY Date imprimée

- Verify all dimensions and site conditions and be responsible for same
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project project
BUILDING 9-77- FIBRE PHOTONICS LAB RENOVATION

SUSSEX DRIVE
 drawing dessin
MECHANICAL- DETAILS AND SCHEDULES

designed conçu date date
JWG JAN 2014

drawn dessiné scale échelle
JWG AS INDICATED

checked vérifié sheet of/de 3 feuille
3 of/de 3

approved approuvé W.O.no. D.T.no.
BV 9100024775

dwg.no. dessin no.
3894-M03

| CHILLED WATER HORIZONTAL FAN COIL SCHEDULE | | | | | | | | | | | | | | | | | | | | | | |
|--|----------|-------------------------|-----------|--------|--------|--------|--------|--------|-------------------------|----------------|------|---------|------|--------|--------|------------------|-----------|------------|-------------|-----------|----------|----------------------------|
| TAG | LOCATION | COOLING COIL CAPACITIES | | | | | | | HEATING COIL CAPACITIES | | | | | | | AIR FLOW L/S MAX | S.P. (Pa) | MOTOR (HP) | FLA/MCA/MOC | V/P/HZ | REMARKS | |
| | | T.C. (kW) | S.C. (kW) | EDBT | EWBT | LDBT | E.W.T. | L.W.T. | FLOW RATE (L/M) | S.H.C. (WATTS) | EDBT | P.O. Pa | LDBT | E.W.T. | L.W.T. | | | | | | | FLOW RATE (L/M) |
| 77FCU105A | ROOM 105 | 8.35 | 6.59 | 26.7°C | 19.4°C | 12.8°C | 7.2°C | 12.8°C | 24.2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 376 | 63 | 1/6 | 2.5/--/15 | 120/1/60 | NEW- SEE BELOW FOR DETAILS |
| 77FCU105A | ROOM 105 | 8.35 | 6.59 | 26.7°C | 19.4°C | 12.8°C | 7.2°C | 12.8°C | 24.2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 376 | 63 | 1/6 | 2.5/--/15 | 120/1/60 | NEW- SEE BELOW FOR DETAILS |
| 77FCU111 | ROOM 111 | 12.13 | 9.17 | 26.7°C | 19.4°C | 12.8°C | 7.2°C | 12.8°C | 34.8 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 705 | 63 | 2X 1/6 | 5.0/--/15 | 120/1/60 | NEW- SEE BELOW FOR DETAILS |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |

- NOTE:
 1. NEW UNITS IN ROOM 105 ARE BASED ON ENVIROTECH MODEL HLF 50
 2. NEW UNIT IN ROOM 111 IS BASED ON ENVIROTECH MODEL HLF 60
 3. REFER TO SPECIFICATIONS FOR ADDITIONAL DETAILS

| AIR COOLED CHILLER SCHEDULE | | | | | | | | | | | | | | | | | |
|-----------------------------|----------|-----------|-----------|--------|--------|-----------|------------|-----------------|----------------|---------------|-------------------|-----------------|---------------------------|-------------|-------------|----------|---------|
| TAG | LOCATION | T.C. (kW) | S.C. (kW) | S.W.T. | R.W.T. | PUMP TYPE | S.P. (BAR) | FLOW RATE (L/M) | AMB. HIGH TEMP | AMB. LOW TEMP | PUMP MOTOR (H.P.) | RES. VOLUME (L) | DIMENSIONS L X D X H (MM) | WEIGHT (KG) | FLA/MCA/MOC | V/P/HZ | REMARKS |
| 77CCU111 | ROOM 105 | 10 | --- | 5°C | --- | --- | 4.1 | 75.7 | 32°C | --- | --- | 17.9 | 1327X639X856 | 184 | --/--/15 | 208/3/60 | NEW |

- NOTE:
 1. UNIT 77CCU111 IS BASED ON A NESLAB THERMOFLEX 10000 AND IS USED TO SUPPLY CHILLED WATER TO CLIENT SUPPLIED CHILLERS FOR "RED" LASER.

| SUPPLY FAN SCHEDULE | | | | | | | | | | | |
|---------------------|-----------|------------|----------|-----|-----------|---------|-------|----------|------|-------|---------|
| No. | LOCATION | DRIVE TYPE | FAN TYPE | L/S | S.P. (Pa) | FAN RPM | SONES | VOLTAGE | AMPS | WATTS | REMARKS |
| 77SAF105 | VESTIBULE | DIRECT | CABINET | 347 | 63 | 1100 | 2.0 | 120/1/60 | 1.32 | 350 | NEW |

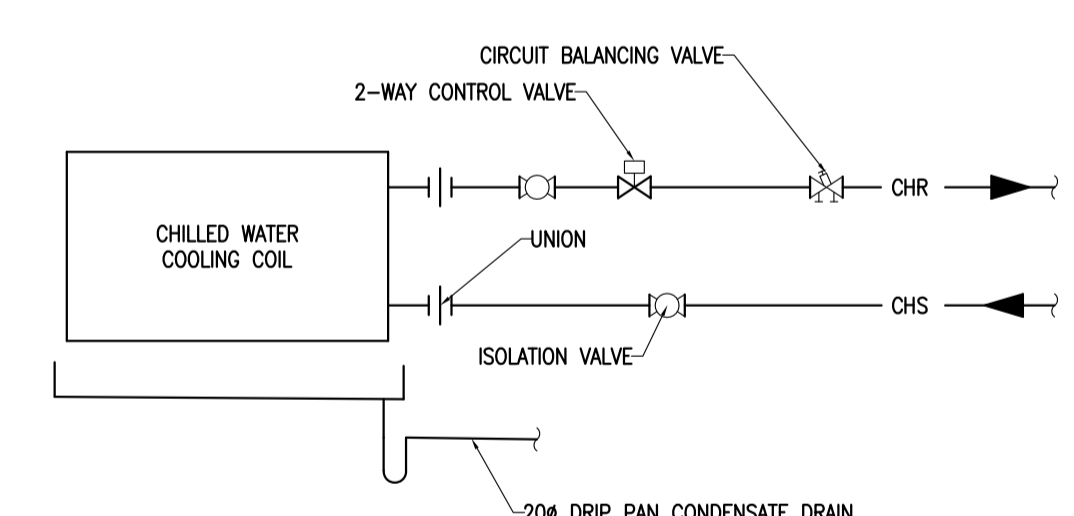
- NOTE:
 1. FAN 77SAF105 BASED ON A GREENHECK CSP-A700 AND IS USED TO PRESSURIZE ROOM 105

| FIXTURE SCHEDULE | | | | | | | |
|------------------|--------------|-----|-----|-----|-----|------|---------|
| TAG | FIXTURE TYPE | DCW | DHW | DW | SAN | VENT | REMARKS |
| S1 | SINK | 13# | 13# | 13# | 38# | 32# | REMOVED |
| S2 | SINK | 13# | 13# | --- | 38# | 32# | REMOVED |
| S3 | LAB SINK | 13# | --- | 13# | 38# | 23# | REMOVED |
| S4 | SERVICE SINK | 13# | 13# | 13# | 38# | 38# | NEW |

- NOTES:
 1. NEW FIXTURES ARE TO BE CONNECTED TO EXISTING DOMESTIC COLD WATER, DOMESTIC HOT WATER, DE-IONIZED WATER, SANITARY DRAIN AND VENT SERVICES. ALL NEW DOMESTIC COLD, DOMESTIC HOT TO BE INSULATED AS PER SPECIFICATIONS.
 2. ALL SANITARY PIPING TO BE SLOPED AS PER NATIONAL BUILDING CODE STANDARDS (NBC).

| ELECTRIC STEAM HUMIDIFIER SCHEDULE | | | | | | | | | |
|------------------------------------|----------|----------|-------------|----------|------------|----------|------|--------------------|---------|
| No. | LOCATION | MOUNTING | DISTRIBUTOR | KG/HR | INPUT (kW) | VOLTAGE | AMPS | NUMBER OF CYLINDER | REMARKS |
| 77HUM105 | ROOM 105 | WALL | BLOWER PACK | 0.9-4.55 | 3.8 | 208/1/60 | --- | 1 | NEW |

- NOTE:
 1. HUMIDIFIER IS BASED ON A NORTEC MODEL NH-EL 10 C/W BUILT ON BLOWER PACK.
 2. ROOM RELATIVE HUMIDITY SHALL BE SET TO 40% RH.



1 FAN COIL PIPING SCHEMATIC- CHILLED WATER
 M03 SCALE: N.T.S.

C