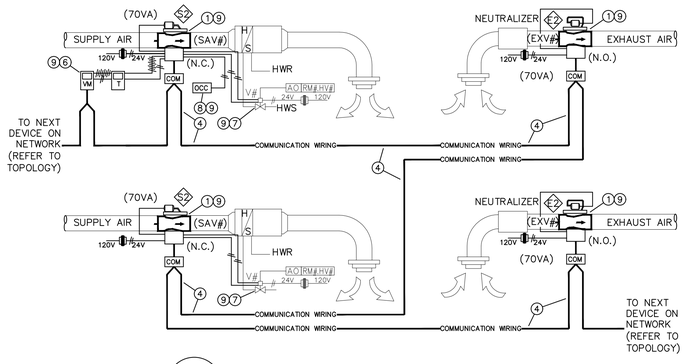
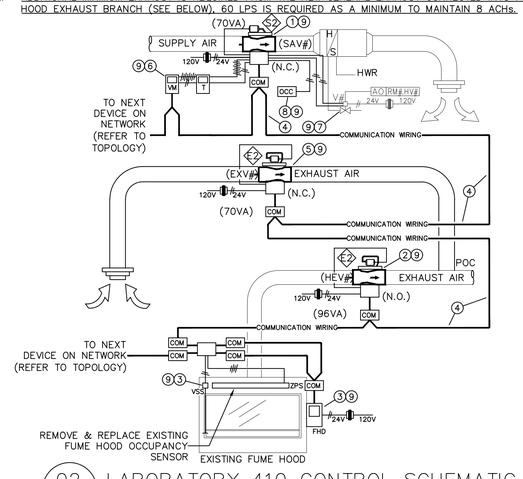
ROOM No. LAB No.	EXHAUST DEVICE	No.	EXHAUST AIR VOLUME/UNIT		TOTAL EXHAUST VOLUME		REMARKS
			MIN.	MAX.	MIN.	MAX.	
409	GENERAL EXHAUST	2	135	250	270	500	MINIMUM EXHAUST AIRFLOW RESULTS IN 8 ACHs.
	TOTAL EXHAUST AIR		MIN = 270		MAX = 500		MINIMUM SUPPLY AIRFLOW MAINTAINS NEGATIVE OFFSET. TWO (2) SUPPLY AIR VALVES.
	TOTAL SUPPLY AIR		MIN = 30		MAX = 260		



01 H9 LABORATORY 409 CONTROL SCHEMATIC
SCALE: N.T.S.

ROOM No. LAB No.	EXHAUST DEVICE	No.	EXHAUST AIR VOLUME/UNIT		TOTAL EXHAUST VOLUME		REMARKS
			MIN.	MAX.	MIN.	MAX.	
410	1200mm FUME HOOD	1	75	285	75	285	MINIMUM EXHAUST AIRFLOW RESULTS IN 25% MINIMUM HOOD FLOW.
	TOTAL EXHAUST AIR		MIN = 75		MAX = 285		MINIMUM SUPPLY AIRFLOW MAINTAINS NEGATIVE OFFSET. ONE (1) SUPPLY AIR VALVE.
	TOTAL SUPPLY AIR		MIN = 85		MAX = 235		

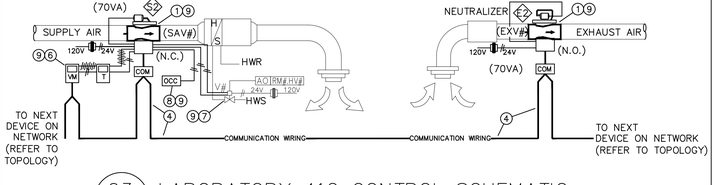
1. SPACE WAS MODIFIED BETWEEN AFTER RECORD DRAWINGS PREPARED. NO UP-TO-DATE TAB REPORT AVAILABLE. AIRFLOW ESTIMATED.
2. ADDITIONAL MINIMUM EXHAUST IS REQUIRED FROM THE NEW GENERAL EXHAUST CONNECTED INTO FUME HOOD EXHAUST BRANCH (SEE BELOW). 60 LPS IS REQUIRED AS A MINIMUM TO MAINTAIN 8 ACHs.



02 H9 LABORATORY 410 CONTROL SCHEMATIC
SCALE: N.T.S.

ROOM No. LAB No.	EXHAUST DEVICE	No.	EXHAUST AIR VOLUME/UNIT		TOTAL EXHAUST VOLUME		REMARKS
			MIN.	MAX.	MIN.	MAX.	
412	GENERAL EXHAUST	1	135	190	135	190	MINIMUM EXHAUST AIRFLOW RESULTS IN 8 ACHs.
	TOTAL EXHAUST AIR		MIN = 135		MAX = 200		MINIMUM SUPPLY AIRFLOW MAINTAINS NEGATIVE OFFSET. ONE (1) SUPPLY AIR VALVES.
	TOTAL SUPPLY AIR		MIN = 75		MAX = 130		

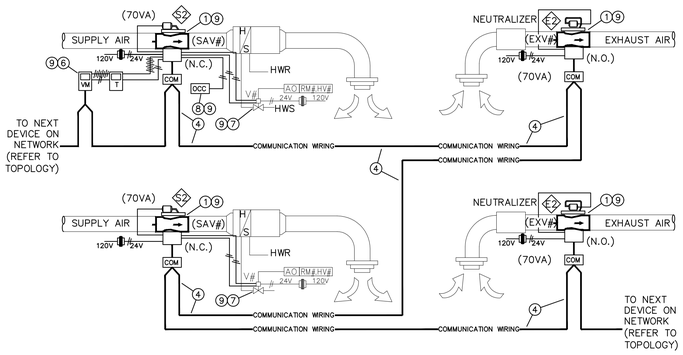
1. SPACE WAS MODIFIED BETWEEN AFTER RECORD DRAWINGS PREPARED. NO UP-TO-DATE TAB REPORT AVAILABLE. AIRFLOW ESTIMATED.



03 H9 LABORATORY 412 CONTROL SCHEMATIC
SCALE: N.T.S.

ROOM No. LAB No.	EXHAUST DEVICE	No.	EXHAUST AIR VOLUME/UNIT		TOTAL EXHAUST VOLUME		REMARKS
			MIN.	MAX.	MIN.	MAX.	
411	GENERAL EXHAUST	2	135	190	270	380	MINIMUM EXHAUST AIRFLOW RESULTS IN 25% MINIMUM HOOD FLOW & 8 ACHs.
	TOTAL EXHAUST AIR		MIN = 270		MAX = 380		MINIMUM SUPPLY AIRFLOW MAINTAINS NEGATIVE OFFSET. TWO (2) SUPPLY AIR VALVES.
	TOTAL SUPPLY AIR		MIN = 150		MAX = 260		

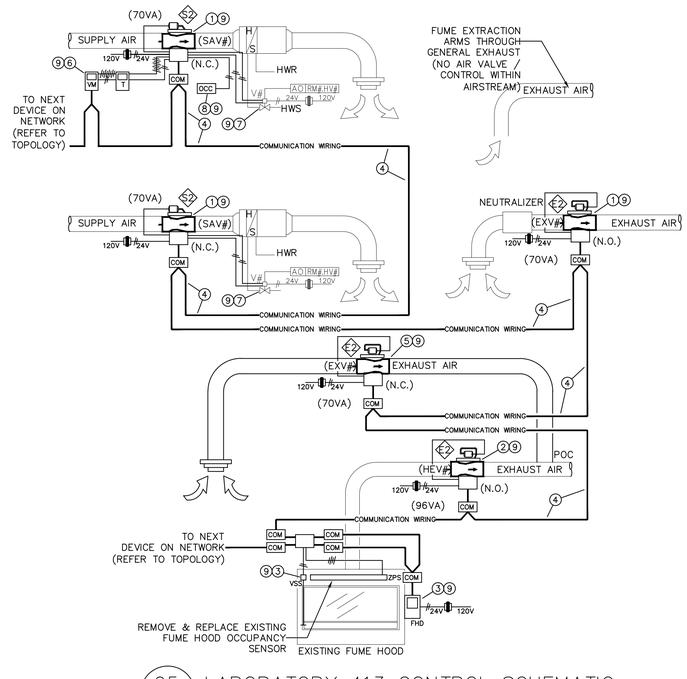
1. SPACE WAS MODIFIED BETWEEN AFTER RECORD DRAWINGS PREPARED. NO UP-TO-DATE TAB REPORT AVAILABLE. AIRFLOW ESTIMATED.



04 H9 LABORATORY 411 CONTROL SCHEMATIC
SCALE: N.T.S.

ROOM No. LAB No.	EXHAUST DEVICE	No.	EXHAUST AIR VOLUME/UNIT		TOTAL EXHAUST VOLUME		REMARKS
			MIN.	MAX.	MIN.	MAX.	
413	1200mm FUME HOOD	1	75	285	75	285	MINIMUM EXHAUST AIRFLOW RESULTS IN 25% MINIMUM HOOD FLOW & 8 ACHs.
	GENERAL EXHAUST	1	190	250	190	250	
							MINIMUM SUPPLY AIRFLOW MAINTAINS NEGATIVE OFFSET. TWO (2) SUPPLY AIR VALVES.
	TOTAL EXHAUST AIR		MIN = 265		MAX = 535		
	TOTAL SUPPLY AIR		MIN = 110		MAX = 380		

1. SPACE WAS MODIFIED BETWEEN AFTER RECORD DRAWINGS PREPARED. NO UP-TO-DATE TAB REPORT AVAILABLE. AIRFLOW ESTIMATED.



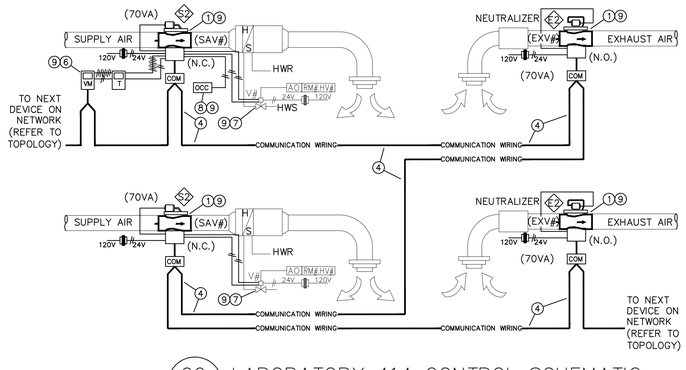
05 H9 LABORATORY 413 CONTROL SCHEMATIC
SCALE: N.T.S.

GENERAL NOTES

1. REMOVE ALL EXISTING 2-POSITION SUPPLY AND GENERAL EXHAUST PNEUMATIC-CONTROLLED AIR VALVES AND REPLACE WITH VARIABLE AIR VOLUME SUPPLY AND GENERAL EXHAUST ELECTRONIC-CONTROLLED AIR VALVES. ACTUATORS SHALL BE ELECTRONIC, FAST-ACTING. ALL COMPONENTS SHALL BE REMOVED AND REPLACED (I.E. NONE OF THE EXISTING COMPONENTS MAY BE RE-USED). REMOVE AND REPLACE EXISTING DUCTWORK TO/FROM AIR VALVE AS REQUIRED TO INSTALL NEW AIR VALVE AS REQUIRED BY MANUFACTURER (I.E. WITH REQUIRED STRAIGHT SECTIONS FOR INLET/OUTLET, ETC.). CONFIRM ALL OTHER REQUIREMENTS, PROVIDE ADDITIONAL COMPONENTS, INCLUDING ALL WIRING, TRANSFORMERS, CONTROLLERS AND ROOM INTEGRATORS, AS NECESSARY TO PROVIDE FULLY FUNCTIONAL SYSTEM. SEE DRAWINGS & SPECIFICATIONS FOR ALL REQUIREMENTS. REMOVE ALL EXISTING PNEUMATIC TUBING ASSOCIATED WITH AIR VALVES TO BE REPLACED, CAP TUBING AT NEARBY MAIN.
2. REMOVE ALL EXISTING 2-POSITION FUME HOOD EXHAUST PNEUMATIC-CONTROLLED AIR VALVES AND REPLACE WITH VARIABLE AIR VOLUME FUME HOOD EXHAUST ELECTRONIC-CONTROLLED AIR VALVES. ACTUATORS SHALL BE ELECTRONIC, FAST-ACTING. ALL COMPONENTS SHALL BE REMOVED AND REPLACED (I.E. NONE OF THE EXISTING COMPONENTS MAY BE RE-USED). REMOVE AND REPLACE EXISTING DUCTWORK TO/FROM AIR VALVE AS REQUIRED TO INSTALL NEW AIR VALVE AS REQUIRED BY MANUFACTURER (I.E. WITH REQUIRED STRAIGHT SECTIONS FOR INLET/OUTLET, ETC.). CONFIRM ALL OTHER REQUIREMENTS, PROVIDE ADDITIONAL COMPONENTS, INCLUDING ALL WIRING, TRANSFORMERS, CONTROLLERS AND ROOM INTEGRATORS, AS NECESSARY TO PROVIDE FULLY FUNCTIONAL SYSTEM. SEE DRAWINGS & SPECIFICATIONS FOR ALL REQUIREMENTS. REMOVE ALL EXISTING PNEUMATIC TUBING ASSOCIATED WITH AIR VALVES TO BE REPLACED, CAP TUBING AT NEARBY MAIN.
3. REMOVE AND REPLACE THE FOLLOWING EXISTING FUME HOOD CONTROL COMPONENTS, INCLUDING ALL OF THEIR ASSOCIATED COMPONENTS AND WIRING, (A) FUME HOOD DISPLAY/MONITOR ("FHD"); (B) VERTICAL SASH MONITOR ("VSS"); AND (C) ZONE PRESENCE / HOOD OCCUPANCY SENSOR ("ZPS"). ALL NEW DEVICES SHALL BE COMPATIBLE WITH NEW VARIABLE AIR VOLUME FUME HOOD EXHAUST AIR VALVES AND CONTROLLERS. CONNECT DEVICES INTO NEW FUME HOOD MONITOR. CONFIRM ALL OTHER REQUIREMENTS, PROVIDE ADDITIONAL COMPONENTS, INCLUDING ALL WIRING, TRANSFORMERS, CONTROLLERS AND ROOM INTEGRATORS, AS NECESSARY TO PROVIDE FULLY FUNCTIONAL SYSTEM. SEE DRAWINGS & SPECIFICATIONS FOR ALL REQUIREMENTS.
4. REMOVE AND REPLACE EXISTING COMMUNICATION WIRING. PROVIDE NEW WIRING AS REQUIRED FOR NEW AIR VALVE AND CONTROLLER REQUIREMENTS. CONTRACTOR TO CONFIRM SPECIFIC REQUIREMENTS OF COMMUNICATION WIRING WITH MANUFACTURER (TO BE EITHER LON, BACNET MS/TP OR BACNET IP BASED COMMUNICATION). REMOVE ALL REDUNDANT EXISTING CONTROL WIRING. REMOVE ALL EXISTING PNEUMATIC TUBING ASSOCIATED WITH AIR VALVES TO BE REPLACED, CAP TUBING AT NEARBY MAIN.
5. PROVIDE NEW GENERAL EXHAUST ELECTRONIC AIR VALVE. CONNECT INTO EXHAUST AIR DUCTWORK DOWNSTREAM OF EXISTING FUME HOOD EXHAUST AIR VALVE (I.E. DO NOT CONNECT BETWEEN THE FUME HOOD AND THE FUME HOOD CONTROL VALVE). REFER TO VENTILATION LAYOUTS FOR LOCATIONS, SIZING AND CONNECTION REQUIREMENTS.
   - PROVIDE NEW FIRE DAMPER (FD) WITHIN NEW DUCTWORK WHERE IT PENETRATES THE WALL BETWEEN THE SERVICE CORRIDOR AND LABORATORY SPACE.
   - CONNECT NEW SERVICES (n) INTO EXISTING SERVICES (e) TO REMAIN INSTALLED, POINT OF CONNECTION (P.O.C.). MODIFY EXISTING TO THE FULL EXTENT REQUIRED TO COMPLETE CONNECTION. CONFIRM AND DETERMINE EXACT LOCATIONS, SIZES AND ELEVATIONS ON-SITE.

   ACTUATORS SHALL BE ELECTRONIC, FAST-ACTING. INSTALL NEW AIR VALVE AS REQUIRED BY MANUFACTURER (I.E. WITH REQUIRED STRAIGHT SECTIONS FOR INLET/OUTLET, ETC.). CONFIRM ALL OTHER REQUIREMENTS, PROVIDE ADDITIONAL COMPONENTS, INCLUDING ALL WIRING, TRANSFORMERS, CONTROLLERS AND ROOM INTEGRATORS, AS NECESSARY TO PROVIDE FULLY FUNCTIONAL SYSTEM. SEE DRAWINGS & SPECIFICATIONS FOR ALL REQUIREMENTS.
6. PROVIDE NEW WALL-MOUNTED VIEW MONITOR / CONTROLLER FOR LABORATORY VENTILATION SYSTEM ("VM"). CONFIRM ALL OTHER REQUIREMENTS, PROVIDE ADDITIONAL COMPONENTS, INCLUDING ALL WIRING, TRANSFORMERS AND CONTROLLERS, AS NECESSARY TO PROVIDE FULLY FUNCTIONAL SYSTEM. REMOVE AND REPLACE EXISTING WALL-MOUNTED THERMOSTATS WITH NEW ELECTRONIC TEMPERATURE THERMOSTAT ("T") COMPLETE WITH TEMPERATURE SENSOR, HUMIDITY SENSOR, DISPLAY, LABORATORY VENTILATION OVERRIDE AND SET-POINT ADJUSTMENT. THERMOSTAT TO BE COMPATIBLE WITH NEW AIR VALVE CONTROLLERS AND CONTROL PACKAGE. MANUFACTURER TO CONFIRM ALL OTHER REQUIREMENTS. PROVIDE ADDITIONAL COMPONENTS AS NECESSARY TO PROVIDE FUNCTIONAL SYSTEM.
7. EXISTING BELIMO MODULATING ZONE REHEAT CONTROL VALVE TO REMAIN. TO BE CONTROLLED VIA THE RESPECTIVE AIR VALVE CONTROLLER. PROVIDE ALL WIRING NECESSARY BETWEEN AIR VALVE CONTROLLER AND CONTROL VALVE. MANUFACTURER TO CONFIRM ALL OTHER REQUIREMENTS. PROVIDE ADDITIONAL COMPONENTS AS NECESSARY TO PROVIDE FUNCTIONAL SYSTEM.
8. PROVIDE NEW ROOM OCCUPANCY FOR EACH ENTRY DOORWAY INTO ROOM. CONNECT INTO LABORATORY VENTILATION SYSTEM. CONFIRM ALL OTHER REQUIREMENTS, PROVIDE ADDITIONAL COMPONENTS, INCLUDING ALL WIRING, TRANSFORMERS, CONTROLLERS AND ROOM INTEGRATORS, AS NECESSARY TO PROVIDE FULLY FUNCTIONAL SYSTEM. SEE DRAWINGS & SPECIFICATIONS FOR ALL REQUIREMENTS.
9. ALL ELECTRICAL (120V) WIRING, INCLUDING CIRCUIT BREAKERS, SHALL BE PROVIDED (I.E. SUPPLIED & INSTALLED) BY THE CONTRACTOR. ALL LOW VOLTAGE (24V) WIRING, INCLUDING 120/24VDC CONTROL TRANSFORMERS, SHALL BE PROVIDED (I.E. SUPPLIED & INSTALLED) BY THE CONTRACTOR. ALL NETWORK/COMMUNICATION WIRING, INCLUDING DATA CONNECTIONS & DROPS, SHALL BE PROVIDED (I.E. SUPPLIED & INSTALLED) BY THE CONTRACTOR.

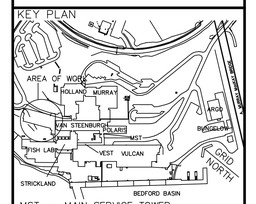
ROOM No. LAB No.	EXHAUST DEVICE	No.	EXHAUST AIR VOLUME/UNIT		TOTAL EXHAUST VOLUME		REMARKS
			MIN.	MAX.	MIN.	MAX.	
414	GENERAL EXHAUST	2	135	250	270	500	MINIMUM EXHAUST AIRFLOW RESULTS IN 25% MINIMUM HOOD FLOW & 8 ACHs.
	TOTAL EXHAUST AIR		MIN = 270		MAX = 500		MINIMUM SUPPLY AIRFLOW MAINTAINS NEGATIVE OFFSET. TWO (2) SUPPLY AIR VALVES.
	TOTAL SUPPLY AIR		MIN = 30		MAX = 260		



06 H9 LABORATORY 414 CONTROL SCHEMATIC
SCALE: N.T.S.

Public Works and Government Services Canada / Travaux Publics et Services gouvernementaux Canada

KEY PLAN



MST – MAIN SERVICE TOWER
VESC – VULCAN EAST SERVICE CORRIDOR

onsa DILLON CONSULTING
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PROFESSIONAL ENGINEER — PROVINCE OF NOVA SCOTIA — DATE JUL 24 2020 — 10453

1	ISSUED FOR TENDER	JUL 24 2020
revisions		date

project / projet

ELLIS LABORATORY VENTILATION UPGRADES BEDFORD INSTITUTE OF OCEANOGRAPHY DARTMOUTH, N.S.

drawing / dessin

CONTROL SCHEMATICS

designed	D.G.I. (conçu)
date	JULY 24, 2020
drawn	D.G.I. (dessiné)
date	JULY 24, 2020
approved	D.G.I. (approuvé)
date	JULY 24, 2020
Tender	Ian Scales 2020.08.25 09:44:10 (Soumission)
PWGSC Project Manager	Administrateur de projets TPSGC

project number / no. du projet: **R.082149.003**

drawing no. / no. du dessin: **H9**

PWGSC B1 (2004)

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