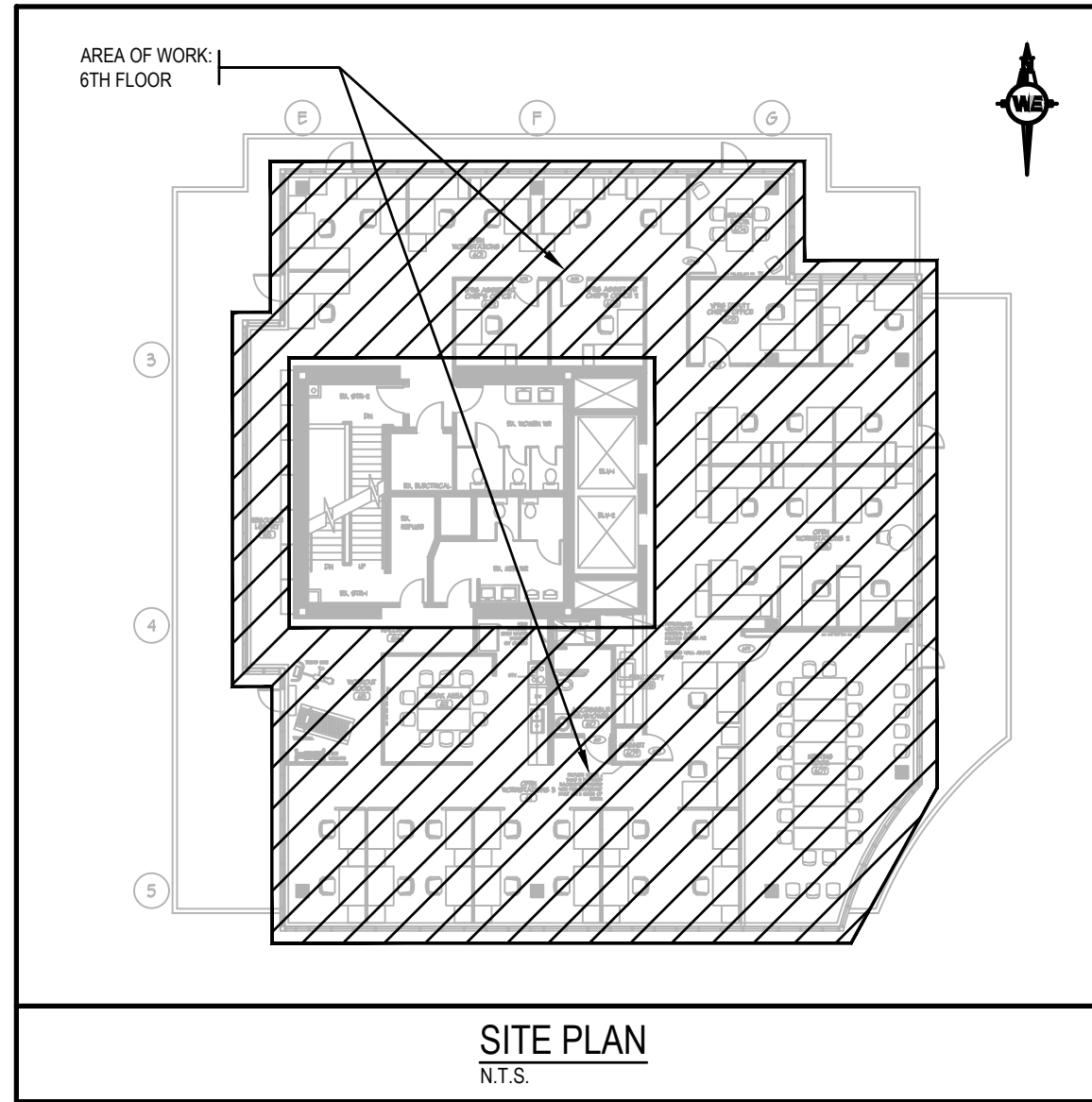
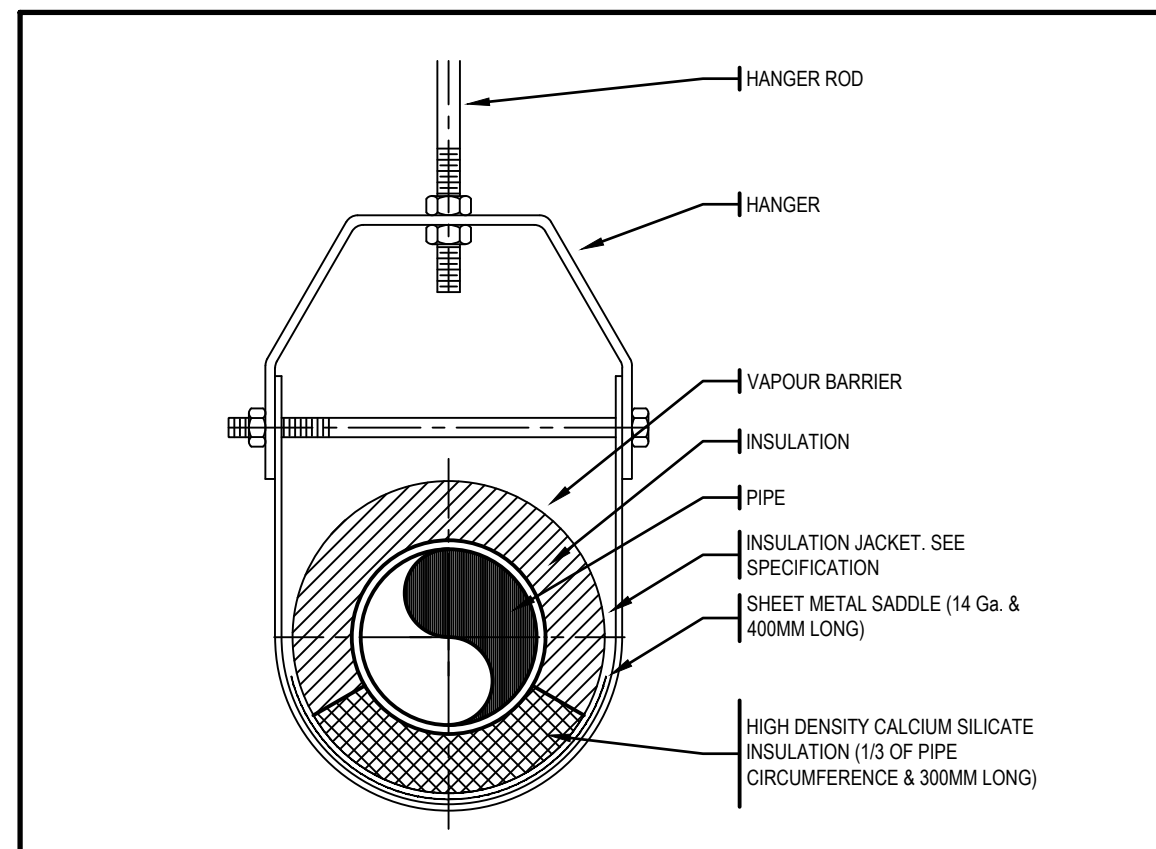


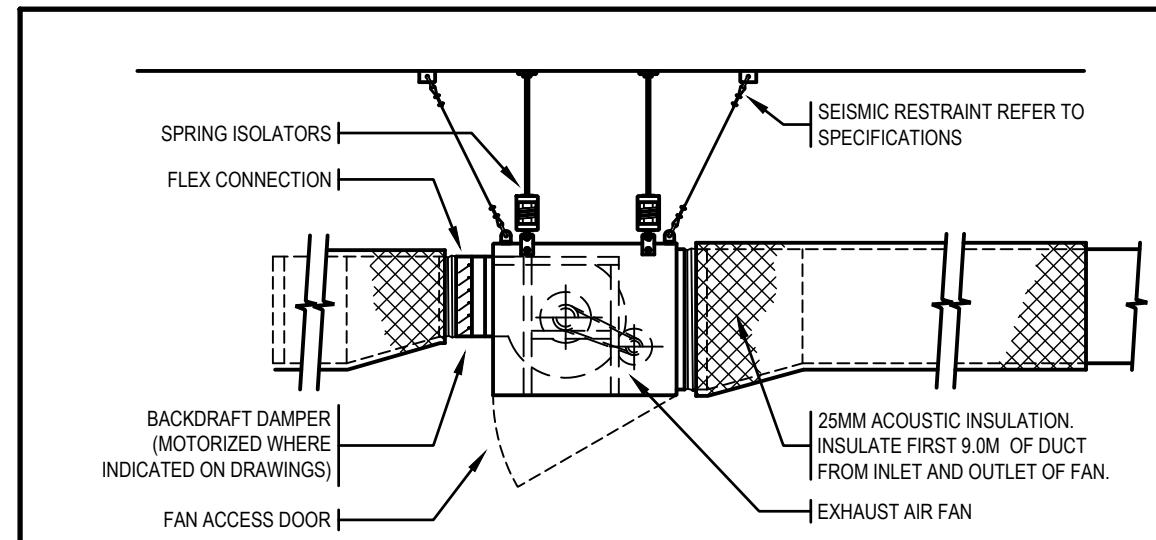
TRAP SEAL PRIMER DETAIL
N.T.S.



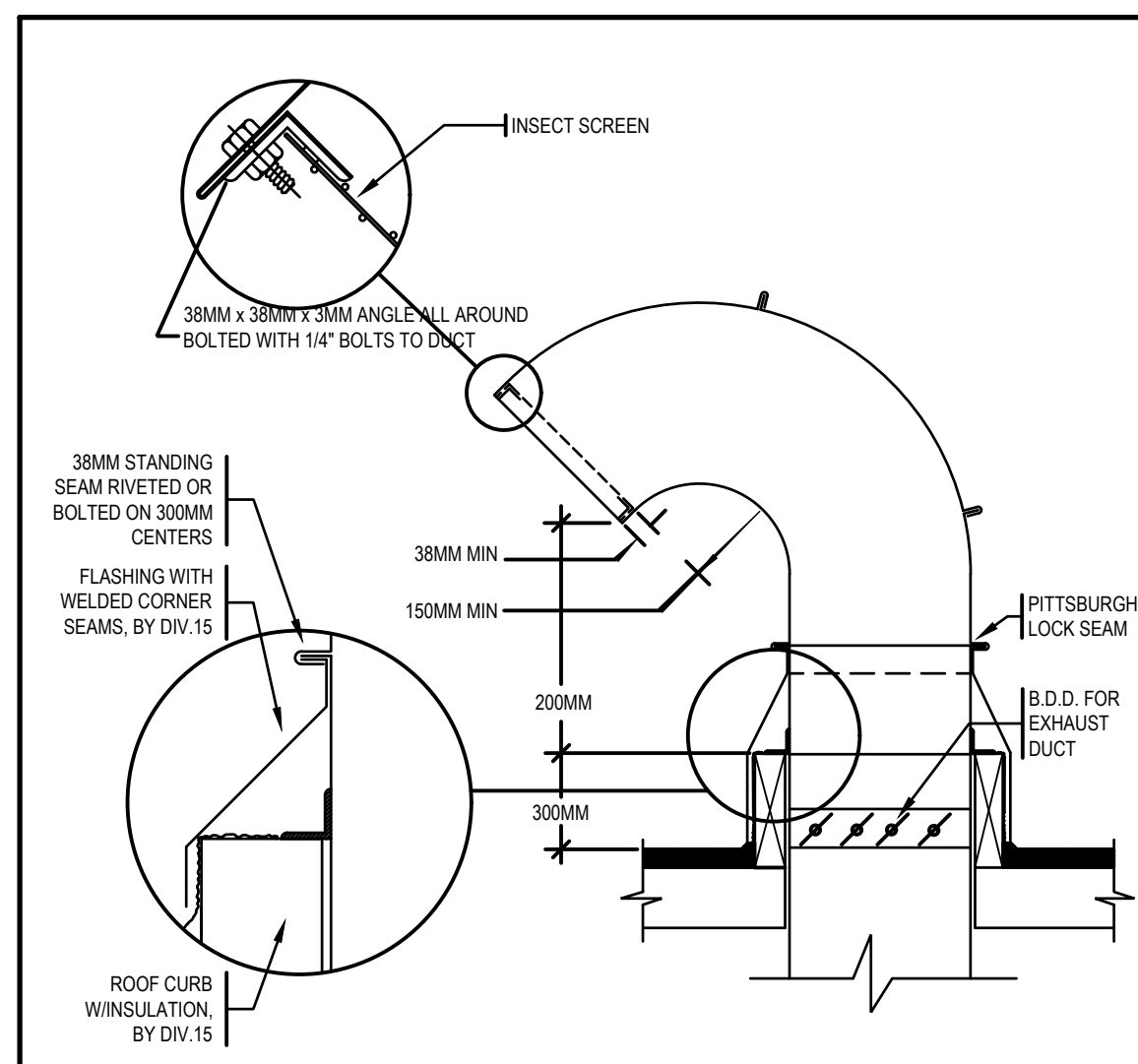
SITE PLAN
N.T.S.



INSULATED PIPE HANGER DETAIL
N.T.S.

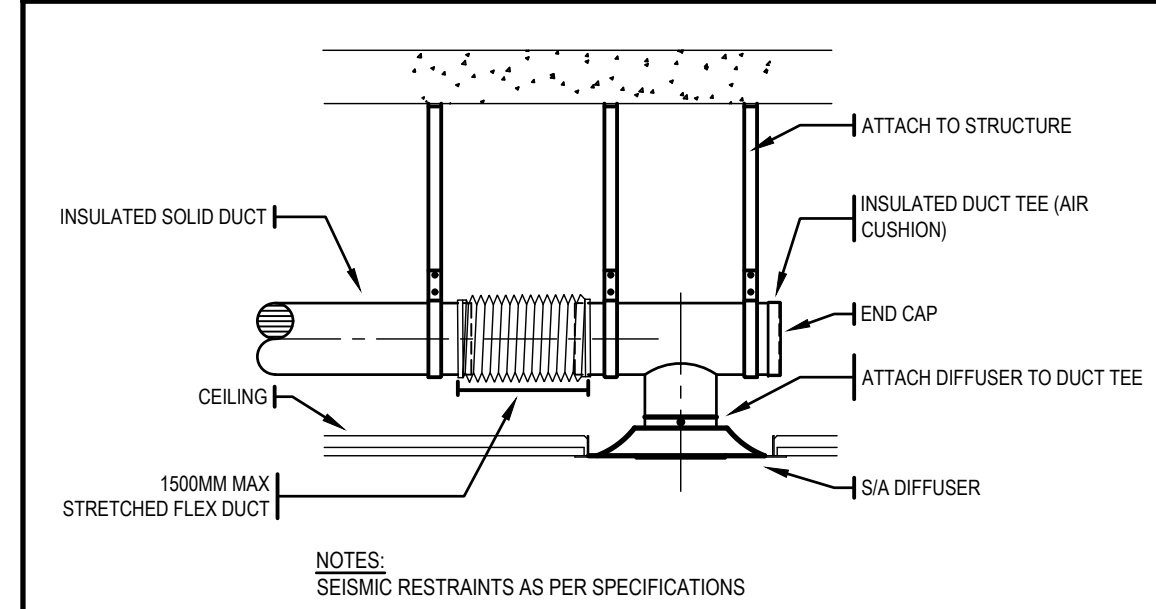


EXHAUST FAN DETAIL
N.T.S.

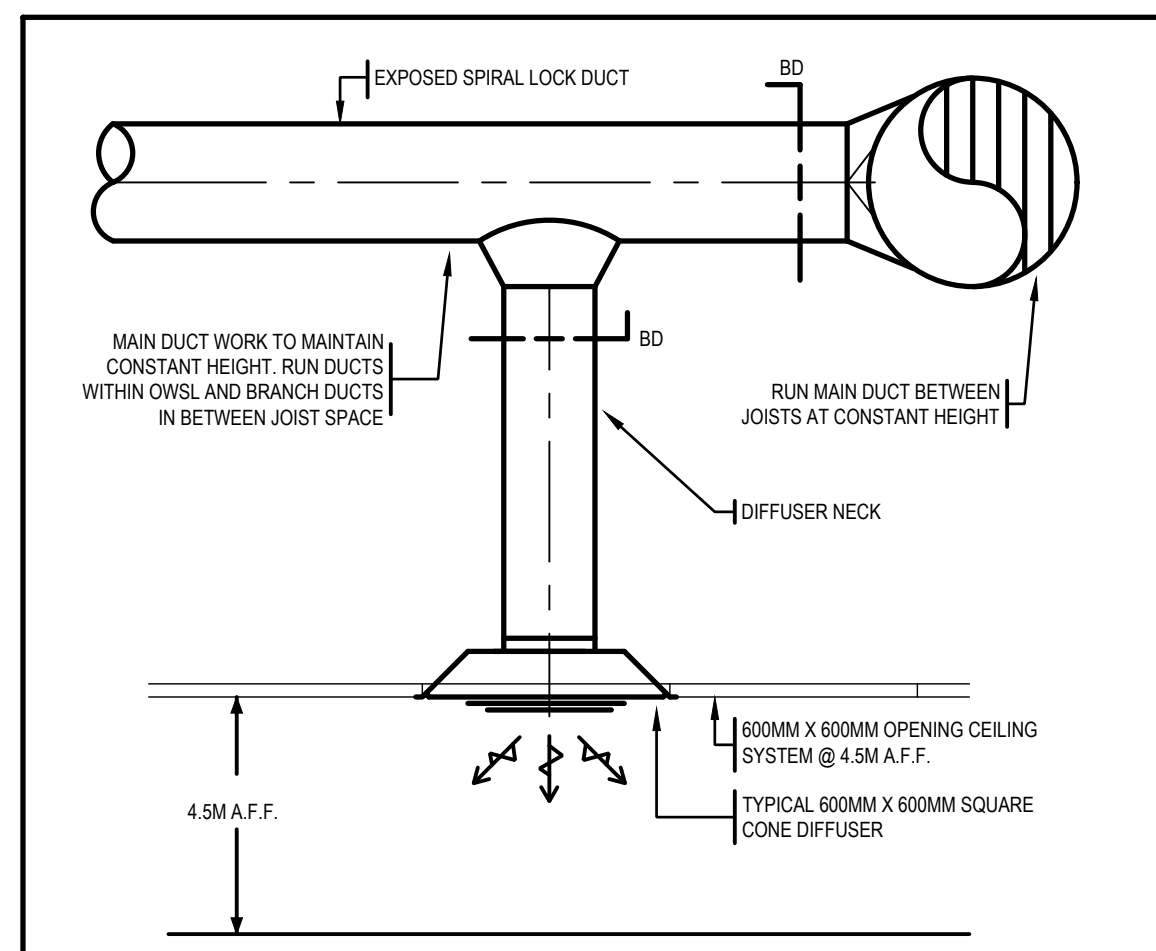


GOOSENECK TERMINATION DETAIL
N.T.S.

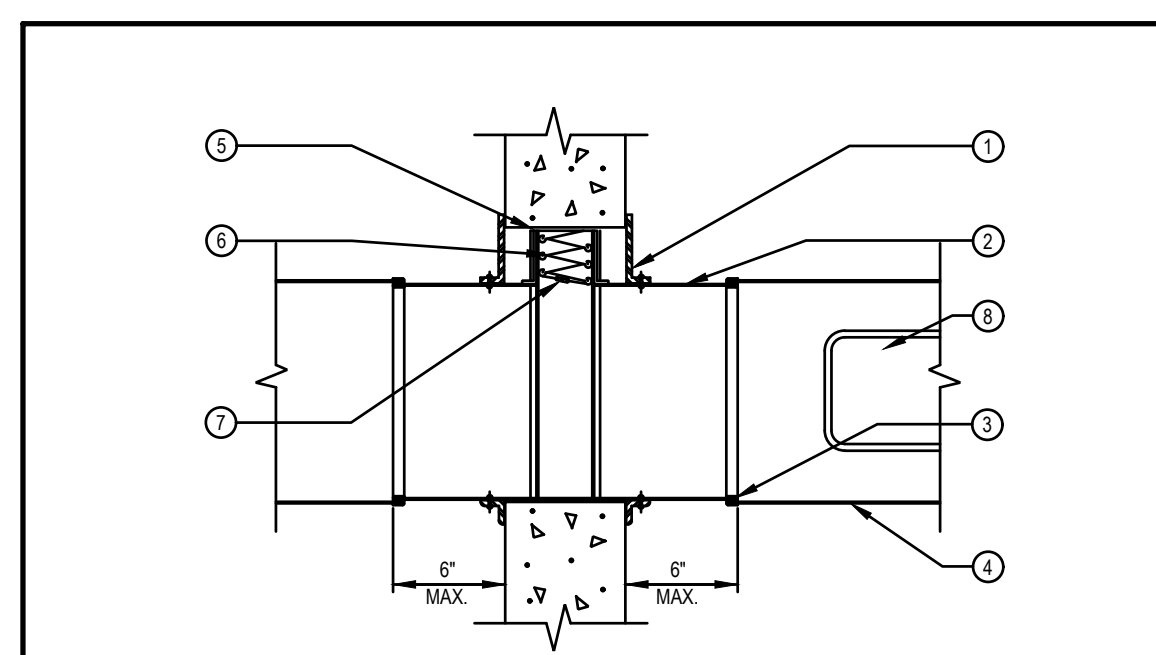
DRAWING LIST		
DRAWING NUMBER	DESCRIPTION	SCALE
M-1.0	6TH FLOOR SITE PLAN, DETAILS & GENERAL NOTES	NTS
M-1.1	6TH FLOOR MECHANICAL SCHEDULES	NTS
M-2.0	6TH FLOOR PLUMBING DEMOLITION PLAN	1:75
M-2.1	6TH FLOOR MECHANICAL DEMOLITION PLAN	1:75
M-3.0	6TH FLOOR NEW PLUMBING PLAN	1:75
M-3.1	6TH FLOOR NEW MECHANICAL PLAN	1:75
M-3.2	6TH FLOOR NEW & EXISTING FIRE SUPPRESSION PLAN	1:75
M-4.0	6TH FLOOR MECHANICAL SPECIFICATIONS	NTS



SUPPLY AIR DIFFUSER DETAIL
N.T.S.



BRANCH TAKE-OFF DUCT TO DIFFUSER DETAIL
N.T.S.



TYPICAL VERTICAL FIRE DAMPER (TYPE B)
N.T.S.

MECHANICAL SYMBOLS SCHEDULE			
	SUPPLY/OUTSIDE AIR DUCT UP		DOMESTIC COLD WATER (DCW)
	SUPPLY/OUTSIDE AIR DUCT DOWN		DOMESTIC HOT WATER (DHW)
	RETURN AIR DUCT UP		DOMESTIC HOT WATER RECIRC. (DHWRC)
	RETURN AIR DUCT DOWN		SANITARY VENT
	EXHAUST AIR DUCT UP		SANITARY ABOVE GRADE
	EXHAUST AIR DUCT DOWN		SANITARY BELOW GRADE
	ROUND DUCT UP		P-TRAP
	ROUND DUCT DOWN		SANITARY VENT UP
	ROUND DUCT TEE DOWN		FLOOR CLEANOUT
	TURNING VANES		END OF LINE CLEANOUT
	ROUND DUCT BREAK		OPEN DRAIN
	SQUARE DUCT BREAK		STANDARD FLOOR DRAIN
	DUCT CAP OFF		DIRECTION OF FLOW
	BALANCING DAMPER		PIPE DUCT SLOPE DIRECTION
	BACK DRAFT DAMPER		PIPE ELBOW DOWN
	FIRE DAMPER		PIPE ELBOW UP
	MOTORIZED DAMPER		PIPE TEE DOWN
	SMOKE DAMPER		PIPE TEE UP
	SINGLE LINE DUCT TAKE-OFF		PIPE TEE
	ACOUSTIC INSULATION		PIPE BREAK
	DEMOLISH HATCH (REMOVE EXISTING)		PIPE CAP/PLUG
	AIRFLOW DIRECTION		PIPE REDUCER
	SQUARE SUPPLY DIFFUSER		UNION CONNECTION
	ROUND SUPPLY DIFFUSER		FLANGE CONNECTION
	LINEAR SUPPLY DIFFUSER		CONNECTION TO EXISTING
	CEILING SUPPLY GRILLE		BALL VALVE
	CEILING RETURN GRILLE		CHECK VALVE
	CEILING EXHAUST GRILLE		PRESSURE REDUCING VALVE
	SIDEWALL SUPPLY GRILLE		BALANCING VALVE
	SIDEWALL RETURN/EXHAUST GRILLE		2-WAY ELECTRIC CONTROL VALVE
	DOOR GRILLE		3-WAY ELECTRIC CONTROL VALVE
	DOOR UNDERCUT		TRIPLE DUTY VALVE
	SUPPLY/EXHAUST FAN		BACKFLOW PREVENTOR
	CONTROL WIRING		STRAINER
	THERMOSTAT		WATER HAMMER ARRESTOR
	REVERSE ACTING THERMOSTAT		TRAP SEAL PRIMER
	TEMPERATURE SENSOR		NEW PENDANT SPRINKLER
	CONNECT TO EXISTING		NEW CONCEALED PENDANT SPRINKLER
			RELOCATE EXISTING SPRINKLER
			WALL MOUNTED FIRE EXTINGUISHER
			SEMI-RECESSED FIRE EXTINGUISHER
			EQUIPMENT/FIXTURE TAG
			AIR TERMINAL TAG
			TERMINAL UNIT TAG
			DRAWING KEYNOTE
			DRAWING KEYNOTE
			REVISION TAG
			DETAIL TAG
			CONNECT TO EXISTING

GENERAL NOTES		
1. PROVIDE OPENINGS IN NEW FULL-HEIGHT WALLS FOR EXISTING DUCTWORK, PIPES AND CONDUIT TO PASS THROUGH. SEAL AROUND PENETRATIONS FOR SOUND ATTENUATION AND SMOKE SEPARATION AS REQUIRED.	13. CONTRACTOR TO INVESTIGATE EXISTING PLUMBING LINES IN THE RELOCATED SPACE AND COORDINATE WITH BUILDING MAINTENANCE TO TIE INTO NEW PLUMBING LINES.	26. ALL WORK IN THE SCOPE OF THIS PROJECT SHALL BE COMPLIANT WITH ASHRAE 90.1-2010 ENERGY STANDARDS.
2. LOCATIONS OF EXISTING EQUIPMENT, DUCTS & PIPES SHOWN ON THIS DRAWING ARE FOR INFORMATION ONLY. CONTRACTOR SHALL REVIEW AND CHECK THE EXACT LOCATION, SIZE, ELEVATION AND INVERT OF ALL EXISTING EQUIPMENT ON SITE PRIOR TO COMMENCING WORK.	14. CONTRACTOR TO PROVIDE FLEX CONNECTIONS AT ALL EQUIPMENT CONNECTION POINTS TO DUCTS AND PIPES.	
3. LIGHTING LOCATION TAKE PRECEDENCE OVER MECHANICAL SERVICES OR PIPES/DUCTS. ALLOW TO RELOCATE NEW OR EXISTING TO SUIT.	15. PROVIDE COMPLETE AIR BALANCING OF THE RENOVATED FLOOR. THIS INCLUDES ALL NEW AND EXISTING AIR OUTLETS, MECHANICAL UNITS AND FANS ON THE FLOOR.	
4. PATCH AND MAKE GOOD DAMAGED CEILING/WALL FOR NEW MECHANICAL WORK.	16. CONTRACTOR TO VERIFY THE OPERATION OF ALL MECHANICAL UNIT CONTROLS AND CONTROLLER. REPORT DEFICIENCIES TO BUILDING OPERATOR.	
5. ALL CONTROLS WORK SHALL BE BY BASE BUILDING APPROVED CONTRACTOR.	17. THE INDICATED SPRINKLER HEADS ARE FOR REFERENCE ONLY. FINAL LAYOUT AND QUANTITIES MEETING NFPA 13 REQUIREMENTS SHALL BE CONSIDERED AS PART OF THE CONTRACT. PROVIDE SCHEDULE B AND C-B FROM B.C. REGISTERED SPRINKLER ENGINEER.	
6. BRANCH DUCT SIZE TO MATCH THAT OF DIFFUSER AND DIFFUSER AIR PLENUM NECK SIZE.	18. MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE ARCHITECTURAL AND ELECTRICAL DRAWINGS. REPORT ANY DISCREPANCY TO CONSULTANT DURING PRICING.	
7. BALANCE DIFFUSERS TO INDICATED AIR VOLUME (L/S). CONTRACTOR TO SUBMIT AIR BALANCING REPORT.	19. NOTIFY THE BUILDING OPERATORS OF ANY ACTIVITY THAT MAY AFFECT THE FIRE ALARM SYSTEM (EG. WELDING, GRINDING OR SOLDERING) 48 HOURS IN ADVANCE.	
8. MODIFY THE SIZE AND ROUTING OF NEW DUCTWORK AS REQUIRED TO SUIT THE SITE CONDITION WITHOUT EXTRA COST TO THE OWNER. PROVIDE ADEQUATE OFFSETS, AND TRANSITIONS ON NEW DUCTWORK AS REQUIRED TO SUIT SITE CONDITIONS.	20. PROVIDE FIRE EXTINGUISHERS AS PER NFPA-10.	
9. PROVIDE NEW BALANCING DAMPER TO EACH TAKE OFF AT EACH EXISTING AND NEW FROM SIA MAIN TO AIR OUTLETS AND BALANCE AIR FLOW TO DESIGN RATE SHOWN ON DRAWING.	21. PROVIDE SEISMIC RESTRAINTS FOR ALL NEW AND RELOCATED EQUIPMENT (DIFFUSERS, FANS, INDOOR UNITS, HWT, ETC). PROVIDE ENGINEER SCHEDULE B AND CB FOR SEISMIC RESTRAINTS AT THE END OF JOB.	
10. ALL NEW MECHANICAL UNITS TO BE TESTED BY QUALIFIED HVAC TECHNICIANS FOR PROPER CONTROLLED OPERATION. DEFICIENCIES TO BE REPORTED IN WRITING TO LANDLORD.	22. PROVIDE INSULATION ON NEW AND EXISTING SIA AND OIA DUCTWORK IN RENOVATED SPACE.	
11. CONTRACTOR SHALL REVIEW THE MECHANICAL DRAWINGS & SITE CONDITIONS PRIOR TO CONSTRUCTION.	23. TURN OVER TO LANDLORD ALL UNUSED EQUIPMENT (DIFFUSERS, CONTROLS, ETC).	
12. ALL NEW AND RELOCATED T-STATS SHALL BE CALIBRATED AND CALIBRATION REPORT SUBMITTED PRIOR TO PROJECT COMPLETION.	24. VERIFY ACTUAL LOCATION AND SIZE OF EXISTING BUILDING SANITARY DRAIN, DOW AND DHW CONNECTIONS PRIOR TO LAYING OR INSTALLING ANY NEW RELATED PIPING.	
13. CONTRACTOR TO CO-ORDINATE THERMOSTAT LOCATION WITH INTERIOR DESIGNER TO AVOID INSTALLATION OVER DAMPER SWITCHES OR HEAT EMITTING DEVICES PRIOR TO INSTALLATION.	25. ALL DUCTWORK AND PLENUMS SHALL BE CONSTRUCTED TO SEAL CLASS A AS REQUIRED TO MEET THE REQUIREMENTS OF ASHRAE 90.1 2010 SECTION 6.4.4.2.2.	
14. FLEXIBLE DUCT SHALL BE NO MORE THAN 1.5 METERS STRETCHED IN LENGTH.		

PROJECT TITLE		
TENANT FIT-OUT FOR ECHELON CENTRE		
6F-575 W 8TH AVE VANCOUVER, BC		
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No.	DATE	ISSUED FOR:
3	08/08/18	TENDER
2	02/08/18	BUILDING PERMIT
1	23/07/18	REVIEW & COORDINATION

PROJECT TITLE		
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SHEET TITLE		
6TH FLOOR SITE PLAN, DETAILS, & GENERAL NOTES		
PROJECT No.	0030278.00	
DRAWN	VR	
CHECKED	JL	
SCALE	NTS	
DATE	JULY 2018	
PRINTED	JULY 2018	

SHEET TITLE		
6TH FLOOR SITE PLAN, DETAILS, & GENERAL NOTES		

SHEET TITLE		
6TH FLOOR SITE PLAN, DETAILS, & GENERAL NOTES		

DRAWING No.		
M-1.0		

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110-1281 WEST GEORGIA, VANCOUVER, B.C. V6E 3J5
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PLUMBING FIXTURE SCHEDULE

UNIT NUMBER	DESCRIPTION	MANUFACTURER	MODEL		LOCATION	COLOR	ACCESSORIES
			DESCRIPTION	#			
SK-1	KITCHEN SINK	KINDRED	DOUBLE BOWL, UNDER COUNTER, STAINLESS	QDUA1831/8	KITCHEN SINK	STAINLESS	2,27,28
	TRIM	AMERICAN STANDARD	SINGLE HANDLE FAUCET	COLONY SOFT 4175.300.002		CHROME	3,4,29,30,31
	WASTE	REFER TO I.D. DOCUMENTS	BASKET & TAILPIECE				2
	TRAP	MCGUIRE	CAST BRASS W/ CLEAN OUT	8912CB		CHROME	5
	SUPPLIES	MCGUIRE	1/4 TURN BALL VALVES, FLEXIBLE RISERS	LFBV170		CHROME	5
	MIXING VALVE	LAWLER	MECHANICAL THERMOSTATIC MIXING VALVE	TMM-1070		BRASS	14
LAV-1	BARRIER FREE LAVATORY	TOTO	VITREOUS CHINA, UNDERCOUNTER MOUNT	LT587#01	LAVATORY	WHITE	
	TRIM	TOTO	HELIX M ECO POWER, SINGLE HOLE	TEL125-D10E		CHROME	6,7,8,9,10
	WASTE	MCGUIRE	OFFSET LAVATORY GRID STRAINER	155A		CHROME	5
	TRAP	MCGUIRE	CAST BRASS W/ CLEAN OUT	8872C		CHROME	5
	SUPPLIES	MCGUIRE	1/4 TURN BALL VALVES, FLEXIBLE RISERS	LFH170BVRB		CHROME	5
	MIXING VALVE	LAWLER	MECHANICAL THERMOSTATIC MIXING VALVE	TMM-1070		BRASS	16
WC-1	BARRIER FREE WATER CLOSET	AMERICAN STANDARD	CADET PRO RIGHT HEIGHT, FLOOR MOUNTED	215AA.074.020	WATER CLOSET	WHITE	12,13,25,26
	BOWL	AMERICAN STANDARD	ELONGATED				
	SUPPLIES	MCGUIRE	1/4 TURN BALL VALVE, FLEXIBLE RISER	LFH172BV			5
	SEAT	CENTOCO	ELONGATED, OPEN FRONT W/ COVER	820STS			11
SH-1	TRIM	AMERICAN STANDARD	FLOWISE COMMERCIAL SHOWER KIT	1662211	SHOWER	CHROME	3,20,21,22,23,24
	DRAIN	WATTS DRAINAGE	FLOOR DRAIN, ROUND STRAINER, 50MM PIPE	FD-102-NH-C-A5-1			15,16,17,18
FD-1	FLOOR DRAIN	WATTS DRAINAGE	FLOOR DRAIN, ROUND STRAINER, 75MM PIPE	FD-103NH-A5-1-5	WASHROOM		15,16,17,18,19
TSP-1	TRAP SEAL PRIMER	PRECISION PLUMBING PRODUCTS	PRESSURE DROP ACTIVATED TRAP PRIMER	PR-500	WASHROOM		1

REMARKS:

- | | | |
|-----------------------------------|--|---|
| 1. WALL ACCESS PANEL | 13. FLOOR FLANGE, BRASS BOLTS, RUBBER GASKET | 25. LINED TANK |
| 2. CRUMB CUP & STRAINER | 14. TEE, ADAPTORS AND FLEX COPPER TUBING | 26. BOLTED TANK COVER |
| 3. 8.3 L/MIN FLOW | 15. EPOXY COATED CAST IRON | 27. GRADE 18-10 20 GA. TYPE 302 |
| 4. METAL LEVER HANDLE | 16. REVERSIBLE MEMBRANE CLAMP | 28. MOUNTING KIT |
| 5. CHROME PLATED ESCUTCHEONS | 17. PRIMARY & SECONDARY WEEPHOLES | 29. PULL DOWN SPRAY WITH ADJUSTABLE SPRAY |
| 6. 0.31 L/S AERATED FLOW | 18. 1/4" THICK NICKEL BRONZE STRAINER | 30. BRAIDED FLEXIBLE SUPPLY HOSE |
| 7. MICRO SENSOR | 19. TRAP PRIMER CONNECTION | 31. POLISHED CHROME FINISH |
| 8. CONTROL BOX, MOUNTING HARDWARE | 20. 3-FUNCTION HAND SHOWER | |
| 9. SINGLE HOLE MOUNT | 21. SHOWER VALVE AND TEMPERATURE CONTROL | |
| 10. HYDROPOWERED | 22. VACUUM BREAKER | |
| 11. STAINLESS STEEL HARDWARE | 23. 1500MM METAL SHOWER HOSE | |
| 12. 6.0 L/PF | 24. 914MM SLIDE BAR | |

GRILLES & DIFFUSER SCHEDULE

UNIT	MANUFACTURER	MODEL	SERVICE	NOMINAL SIZE	CONNECTION SIZE	FINISH	MOUNTING	REMARKS
XS-1	EXISTING	SQUARE CONE	SUPPLY	EXISTING	EXISTING	EXISTING	T-BAR	EXISTING SQUARE CONE DIFFUSER, CLEAN REUSED DIFFUSERS
XR-1	EXISTING	EGGCRATE	RETURN	EXISTING	EXISTING	EXISTING	T-BAR	EXISTING EGGCRATE RETURN GRILLE
R-2	E.H. PRICE	80 / F	RETURN	SEE DWG	SEE DWG	POWDER	T-BAR	EGG CRATE, T-BAR LAYIN, B12 WHITE
E-1	E.H. PRICE	80 / F	EXHAUST	SEE DWG	SEE DWG	POWDER	T-BAR	EGG CRATE, T-BAR LAYIN, B12 WHITE, CONNECT TO DUCT

FAN SCHEDULE

UNIT NUMBER	MANUFACTURER	MODEL	LOCATION	CAPACITY (L/S)	E.S.P. (PA)	MOTOR				WEIGHT (KG)	REMARKS
						RPM	AMP	POWER	V/PH/Hz		
TF-1	GREENHECK	CSP-A510	MEETING ROOM	165	87.00	1,070	-	146 W	115/1/60	17	1,3,4
TF-2	GREENHECK	CSP-A110	IT CLOSET	47	62.00	950	-	19 W	115/1/60	8	2,3,4
EF-1	BROAN	CRSH130SS	BREAK ROOM	118	-	-	1.4 A	-	120/1/60		5,6

REMARKS:

- | | |
|------------------------------|--|
| 1. TIME CLOCK | 4. VARIABLE SPEED CONTROL (MOUNTED ON FAN) |
| 2. REVERSE ACTING THERMOSTAT | 5. ROUND DUCT CONNECTION W/DAMPNER |
| 3. VIBRATION ISOLATORS | 6. SPARE GREASE FILTERS |

EXISTING HEAT PUMP SCHEDULE

UNIT	MANUFACTURER	MODEL	DUTY	NOM. CAP. (KW)	SUPPLY			ELEC. HEAT CAP. @208V (KW)	ELECTRICAL DATA			SHIP WEIGHT (KG)	REMARKS
					AIRFLOW (L/S)	E.S.P. (PA)	SOUND @ HI SPD. (dBA)		LOAD	MCA	V/PH/Hz		
XHP-01	EXISTING	EXISTING	OPEN WORKSTATION 1	8.80	472	EX	EX	EX	EX	EX	EX	EXISTING	
XHP-02	EXISTING	EXISTING	VFRS ASSISTAN OFFICE	8.80	472	EX	EX	EX	EX	EX	EX	EXISTING	
XHP-03	EXISTING	EXISTING	OPEN WORKSTATION 1	5.28	283	EX	EX	EX	EX	EX	EX	EXISTING	
XHP-04	EXISTING	EXISTING	VFRS DEPUTY CHIEF OFFICE	2.64	142	EX	EX	EX	EX	EX	EX	EXISTING	
XHP-05	EXISTING	EXISTING	OPEN WORKSTATION 2	8.80	472	EX	EX	EX	EX	EX	EX	EXISTING	
XHP-06	EXISTING	EXISTING	OPEN WORKSTATION 2	3.52	189	EX	EX	EX	EX	EX	EX	EXISTING	
XHP-07	EXISTING	EXISTING	OPEN WORKSTATION 2	5.28	283	EX	EX	EX	EX	EX	EX	EXISTING	
XHP-08	EXISTING	EXISTING	MEETING ROOM	2.64	142	EX	EX	EX	EX	EX	EX	EXISTING	
XHP-09	EXISTING	EXISTING	MEETING ROOM	5.28	283	EX	EX	EX	EX	EX	EX	EXISTING	
XHP-10	EXISTING	EXISTING	BREAK ROOM, PRINT COPY	12.30	661	EX	EX	EX	EX	EX	EX	EXISTING	
XHP-11	EXISTING	EXISTING	OPEN WORKSTATION 3	10.55	566	EX	EX	EX	EX	EX	EX	EXISTING	
XHP-12	EXISTING	EXISTING	OPEN WORKSTATION 3	7.03	378	EX	EX	EX	EX	EX	EX	EXISTING	
XHP-13	EXISTING	EXISTING	WORKOUT ROOM	7.03	378	EX	EX	EX	EX	EX	EX	EXISTING	
XHP-14	EXISTING	EXISTING	RESOURCE LIBRARY	8.80	472	EX	EX	EX	EX	EX	EX	EXISTING	

REMARKS:

1. ALL HEAT PUMPS ARE EXISTING

NORTH

3	08/08/18	TENDER
2	02/08/18	BUILDING PERMIT
1	23/07/18	REVIEW & COORDINATION
No.	DATE	ISSUED FOR:
	(dd/mm/yy)	

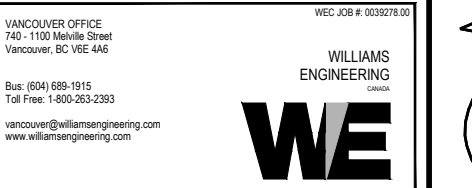
PROJECT TITLE

TENANT FIT-OUT FOR ECHELON CENTRE

6F-575 W 8TH AVE VANCOUVER, BC

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SHEET TITLE

6TH FLOOR MECHANICAL SCHEDULES

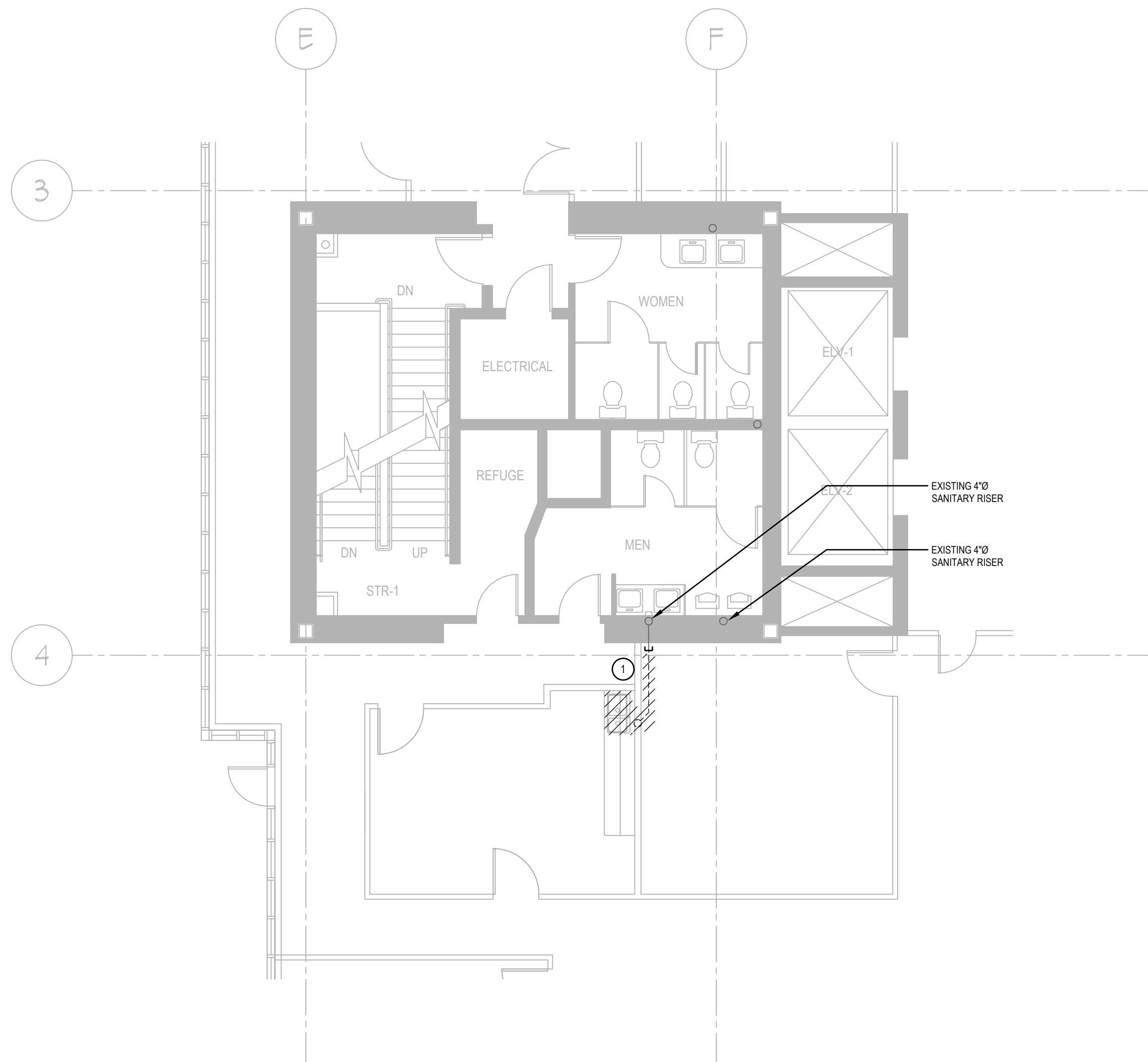
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DATE	JULY 2018
PRINTED	JULY 2018

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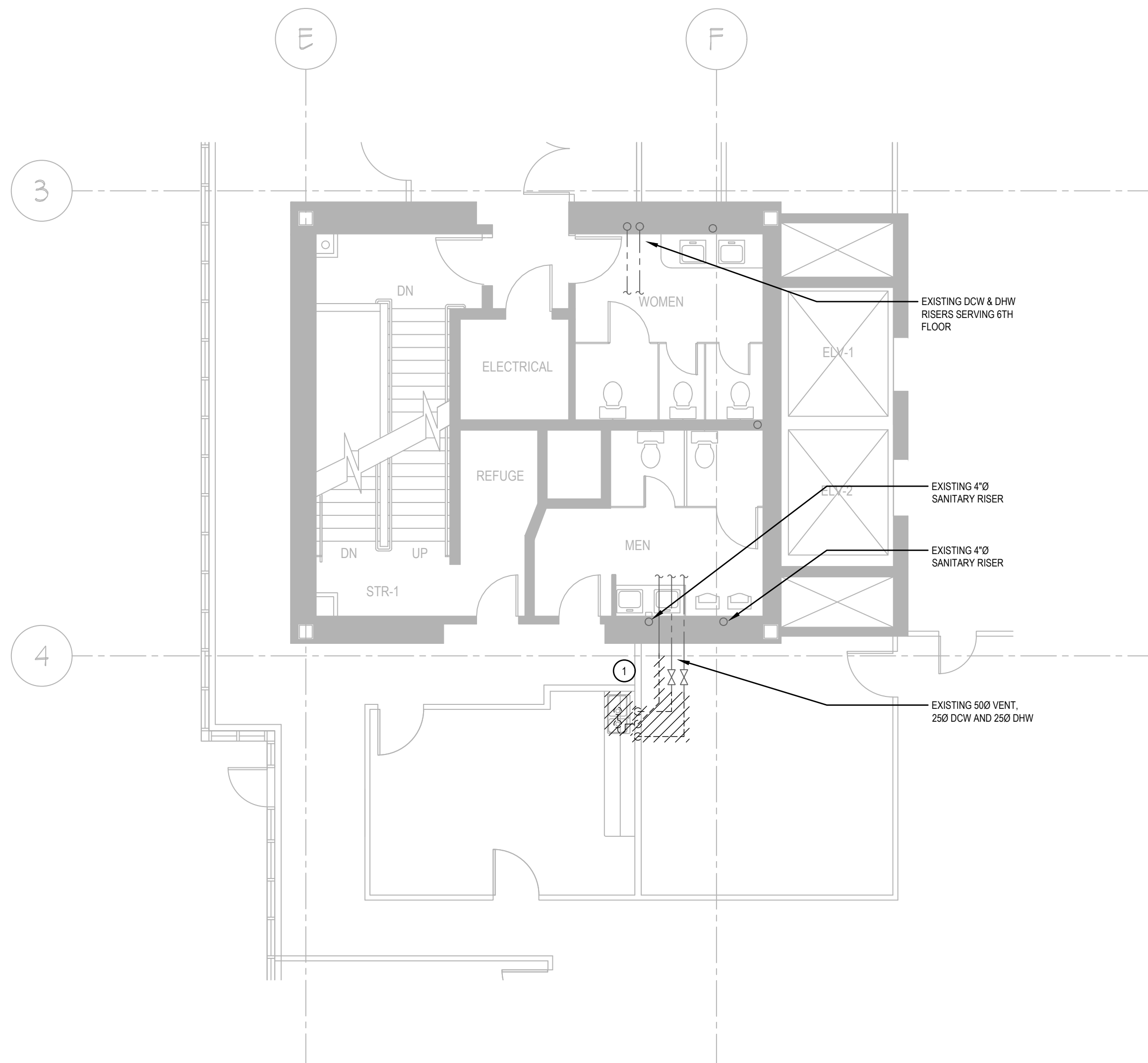
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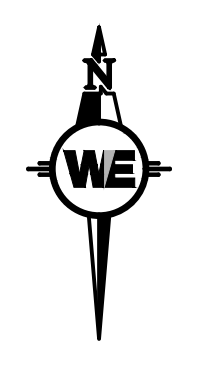
A SANITARY DEMOLITION PLAN (FLOOR BELOW)
M-2.0 SCALE = 1:75



B PLUMBING DEMOLITION PLAN
M-2.0 SCALE = 1:75

SPECIFIC NOTES

1 DISCONNECT AND REMOVE KITCHEN SINK AND FAUCET. REMOVE AND CAP OFF SANITARY PIPE AND RETAIN VENT PIPE FOR REUSE. REMOVE EXISTING DOMESTIC WATER PIPES WHERE INDICATED HATCHED AND RETAIN EXISTING FOR REUSE.



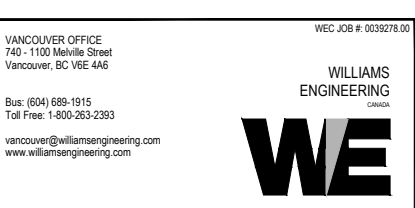
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No.	DATE	ISSUED FOR:
	04/08/18	

PROJECT TITLE

TENANT FIT-OUT FOR ECHELON CENTRE
6F-575 W 8TH AVE
VANCOUVER, BC

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SHEET TITLE

6TH FLOOR
PLUMBING
DEMOLITION PLANS

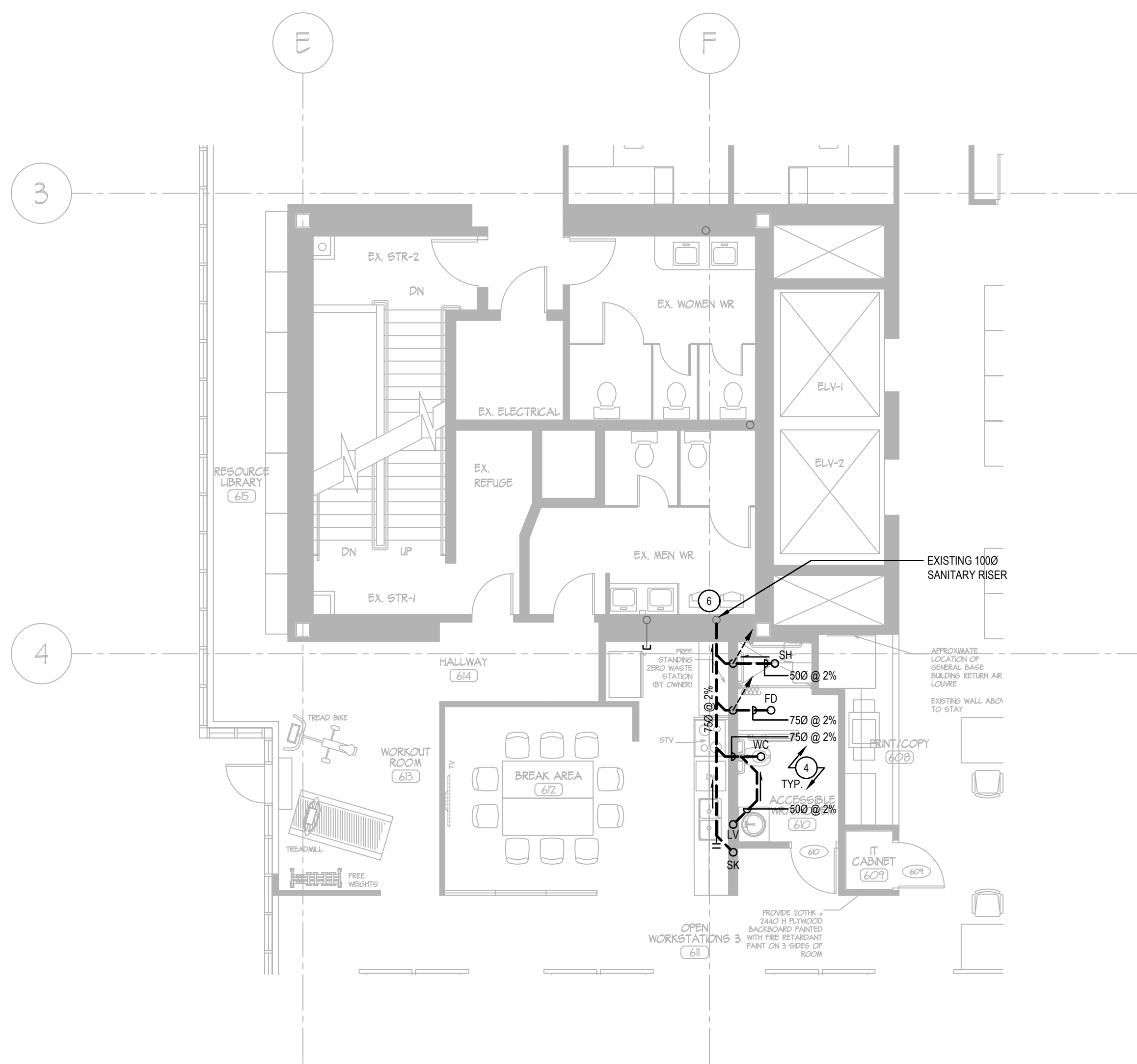
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DATE JULY 2018
PRINTED JULY 2018

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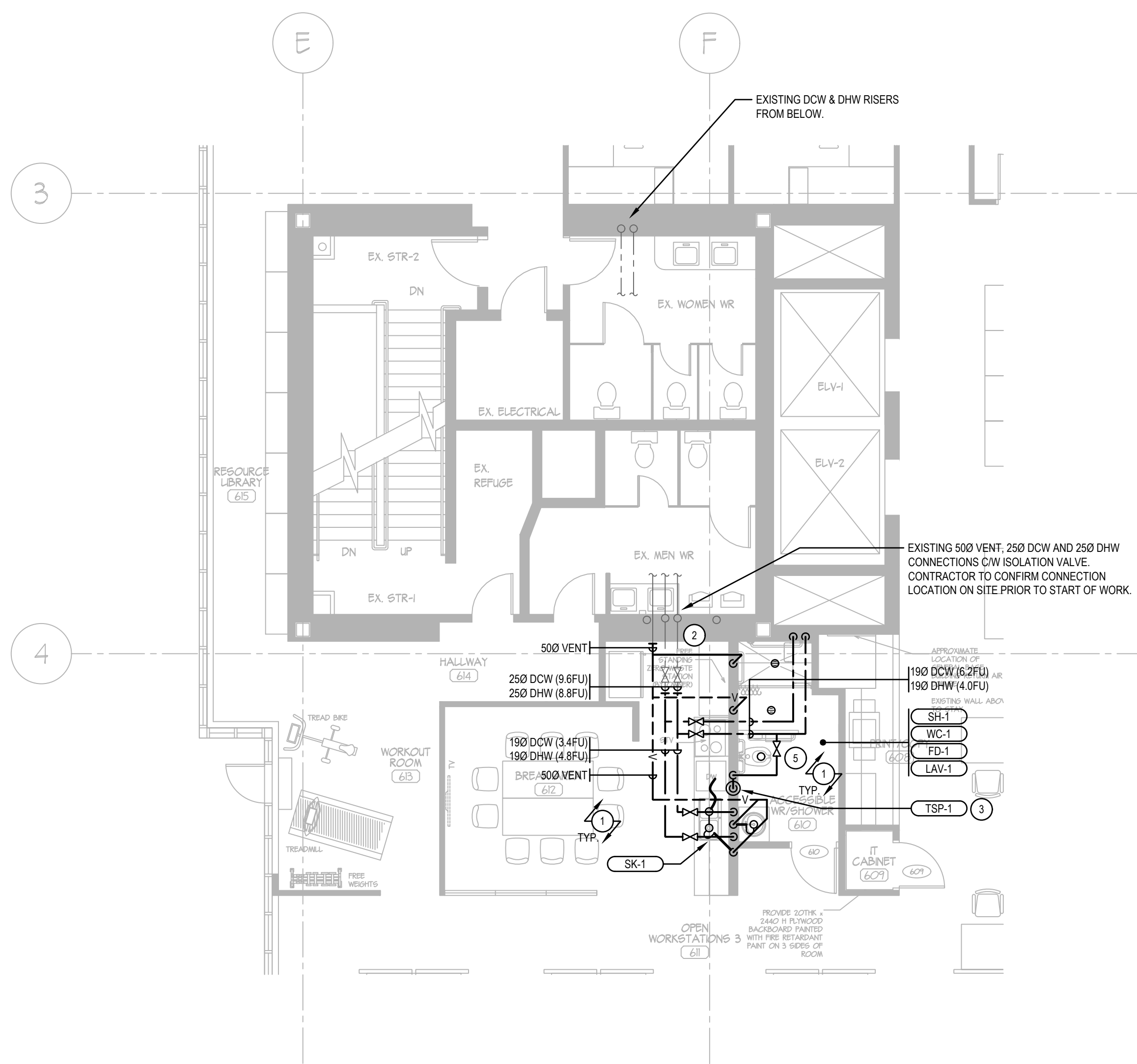
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A NEW SANITARY PLAN (FLOOR BELOW)
M-3.0 SCALE = 1/75



A NEW PLUMBING PLAN
M-3.0 SCALE = 1/75

- SPECIFIC NOTES**
- 1 PROVIDE NEW DCW, DHW, VENT AND SANITARY PIPES AND CONNECT TO NEW PLUMBING FIXTURES AS INDICATED.
 - 2 CONNECT NEW PIPES TO EXISTING. CONTRACTOR TO CONFIRM ON SITE LOCATIONS OF VENT, DCW, AND DHW CONNECTIONS PRIOR TO START OF WORK.
 - 3 INSTALL NEW TRAP SEAL PRIMER ON BRANCH LINE TO WATER CLOSET AND CONNECT TO FLOOR DRAIN. REFER TO TRAP PRIMER DETAIL AND MANUFACTURER'S INSTALLATION REQUIREMENTS.
 - 4 PROVIDE AND INSTALL NEW SANITARY DRAIN PIPES BELOW SLAB. CONNECT TO EXISTING 2000 SANITARY RISER.
 - 5 INSTALL WATER HAMMER ARRESTOR ON DCW PIPE TO WATER CLOSET.
 - 6 CONTRACTOR TO VERIFY EXISTING SANITARY STACK IN MEN'S WASHROOM AND ALLOW FOR PENETRATION THROUGH THE CONCRETE CORE FOR NEW 750 SANITARY LINE.

PLUMBING FIXTURE UNITS & MINIMUM PIPE CONNECTIONS

FIXTURE	TAG	QTY	CW	HW	SAN	VENT	COLD FU	HOT FU	COMBINE	TOTAL FU	SAN FU
LAVATORY	LAV-1	1	130	130	380	500	2.0	2.0	2.0	2.0	1.5
WATER CLOSET (FLUSH TANK)	WC-1	1	130	--	750	380	2.2	--	2.2	2.2	4.0
SHOWER	SH-1	1	130	130	500	380	4.0	4.0	4.0	4.0	1.5
KITCHEN SINK	KS-1	1	130	130	380	380	1.4	1.4	1.4	1.4	1.5
DISHWASHER	DW-1	1	130	130	2"0	--	--	1.4	1.4	1.4	--
TRAP SEAL PRIMER	TSP-1	1	130	--	--	--	--	--	--	--	--
FLOOR DRAIN	FD-1	1	--	--	750	--	--	--	--	--	3.0

PLUMBING LINES ARE DESIGNED BASED ON A DETAILED ENGINEERING DESIGN METHOD AS PER THE VANCOUVER BUILDING BY-LAW 2014

NORTH

WE

3	08/08/18	TENDER
2	02/08/18	BUILDING PERMIT
1	23/07/18	REVIEW & COORDINATION
No.	DATE	ISSUED FOR:
	04/08/18	

PROJECT TITLE

TENANT FIT-OUT FOR ECHELON CENTRE

6F-575 W 8TH AVE
VANCOUVER, BC

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1000-1100-1100-1100
1100-1100-1100-1100
1100-1100-1100-1100

WILLIAMS ENGINEERING INC.

WE

SHEET TITLE

6TH FLOOR NEW PLUMBING PLANS

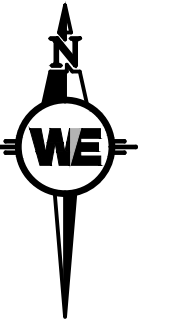
PROJECT No. 0030278.00
DRAWN VR
CHECKED JL
SCALE 1/75
DATE JULY 2018
PRINTED JULY 2018

DRAWING No.

M-3.0

110-1281 WEST GEORGIA, VANCOUVER, B.C. V6E 3J5
TELEPHONE (604) 669-9460 FAX (604) 683-7684

CHERNOFF THOMPSON ARCHITECTS

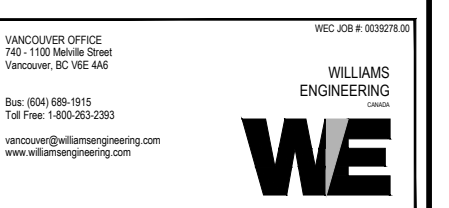


NORTH

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PROJECT TITLE
TENANT FIT-OUT FOR ECHELON CENTRE
 6F-575 W 8TH AVE
 VANCOUVER, BC

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SHEET TITLE
6TH FLOOR
NEW MECHANICAL PLAN

PROJECT No. 0330278.00
 DRAWN VR
 CHECKED JA
 SCALE 1/75
 DATE JULY 2018
 PRINTED JULY 2018

DRAWING No.
M-3.1

110-1281 WEST GEORGIA, VANCOUVER, B.C. V6E 3J5
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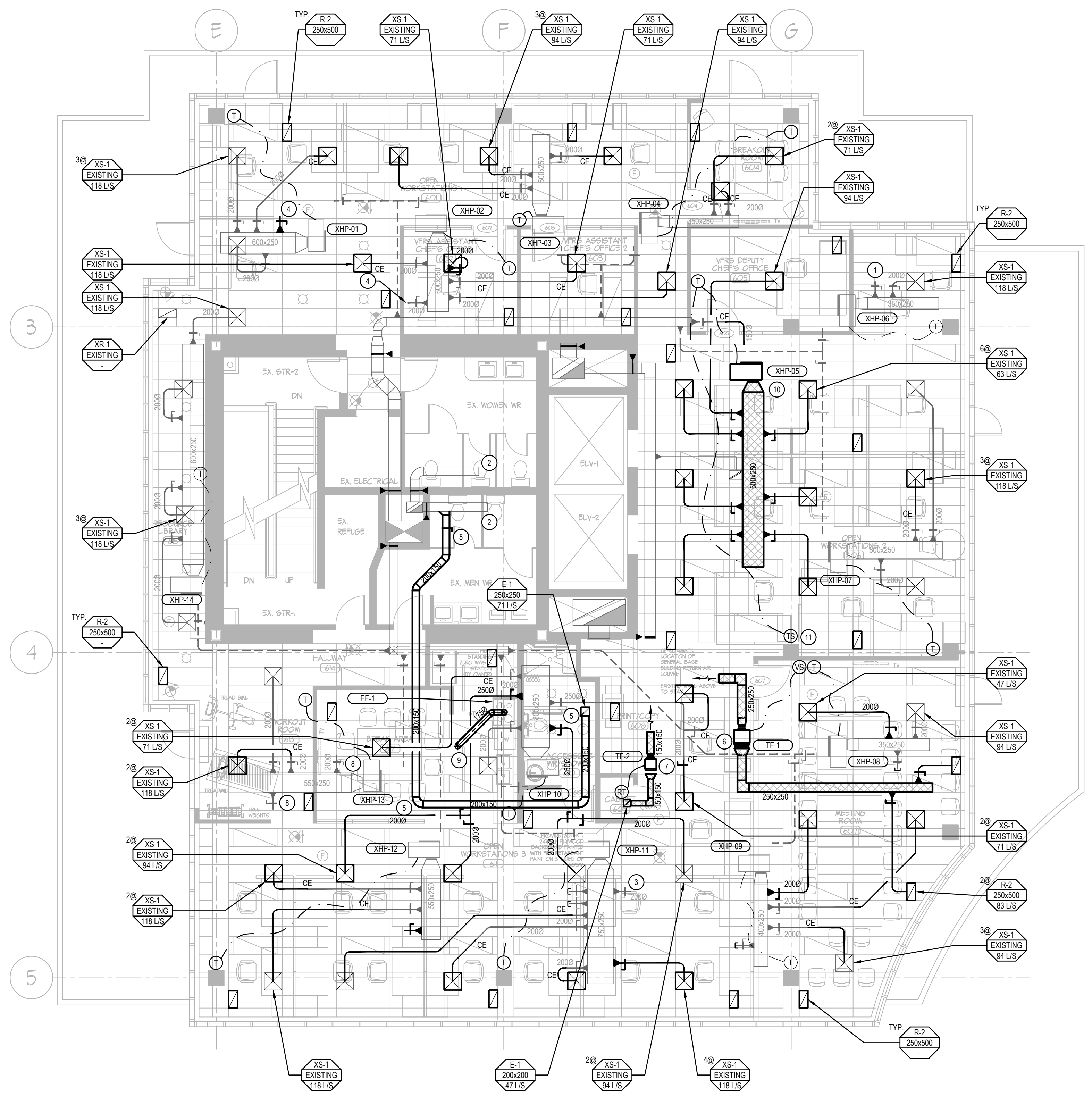
CHERNOFF THOMPSON ARCHITECTS

- DRAWING NOTES**
- COORDINATE MECHANICAL INSTALLATIONS WITH ALL OTHER TRADES PRIOR TO COMMENCEMENT OF WORK.
 - SUPPLY AIR DIFFUSERS SHOWN AS NEW ARE REUSED DIFFUSERS FROM DEMOLITION. CLEAN DIFFUSERS PRIOR TO INSTALLATION. CONTRACTOR TO RECORD QUANTITY OF REUSED DIFFUSERS. PROVIDE NEW DIFFUSERS TO MATCH EXISTING WHERE QUANTITY OF REUSED IS LESS THAN REQUIRED.
 - EXTEND SUPPLY AIR BRANCH DUCT WHERE INDICATED C/W INSULATION AND SUPPORTS AS PER SPECIFICATIONS AND EXISTING SIZE. EXTENDED DUCT FROM EXISTING SHALL BE HARD DUCT. PROVIDE FLEXIBLE CONNECTION TO DIFFUSER.
 - PROVIDE NEW SUPPLY AIR BRANCH DUCT WHERE INDICATED C/W INSULATION, BALANCE DAMPER AND SUPPORTS AS PER SPECIFICATIONS.
 - ALL FLEXIBLE DUCT CONNECTIONS TO DIFFUSERS SHALL HAVE A MAXIMUM STRETCHED LENGTH OF 1500MM.
 - PROVIDE AND INSTALL NEW SUPPLY AIR DUCTS FROM EXISTING MAINS. DUCTS, DIFFUSERS AND HVAC EQUIPMENT SHALL BE INSTALLED ACCORDING TO SMACNA STANDARDS.
 - SEISMICALLY SECURE ALL NEW HVAC EQUIPMENT.
 - ALL INTERNALLY INSULATED DUCTS SIZES ARE INTERNALLY CLEAR DIMENSIONS.
 - BALANCE DIFFUSERS AND GRILLES TO NOTED AIR VOLUMES.
 - PROVIDE BALANCE DAMPERS ON BRANCH DUCTS TO DIFFUSERS. ENSURE BALANCE DAMPERS ARE ACCESSIBLE.
 - ALL NEW DUCT JOINT SEAMS SHALL BE SEALED ALL AROUND WITH MEDIUM PRESSURE DUCT SEALANT.
 - RELOCATE EXISTING THERMOSTATS TO NEW LOCATION SHOWN. MOUNT THERMOSTAT AT 60" ABOVE FINISHED FLOOR.
 - CONTRACTOR TO INSULATE ALL NEW AND EXISTING DUCT WORK WHERE NOT CURRENTLY INSULATED. CONTRACTOR TO CONFIRM ON SITE.
 - BALANCE OUTDOOR AIR DUCTS TO BACK OF HEAT PUMP UNIT TO NOTED VOLUMES IN OUTDOOR AIR SCHEDULE.

- SPECIFIC NOTES**
- BALANCE OPEN DUCT TO 24 L/S.
 - CONTRACTOR TO REBALANCE EXHAUST AIR IN CORE WASHROOMS.
 - BALANCE OPEN DUCT TO 94 L/S.
 - BALANCE OPEN DUCT TO 118 L/S.
 - INSTALL NEW WASHROOM EXHAUST DUCT AND CONNECT TO BASE BUILDING EXHAUST. CONTRACTOR TO COORDINATE DUCT ROUTE ON SITE PRIOR TO INSTALLATION. ALLOW FOR REFERENCE OF THE EXISTING CEILING IN ORDER TO INSTALL NEW DUCTWORK.
 - PROVIDE NEW TRANSFER AIR FAN IN CEILING SPACE FOR MEETING ROOM. INTERNALLY INSULATE DUCT WORK FOR SOUND ATTENUATION.
 - PROVIDE NEW TRANSFER AIR FAN IN CEILING SPACE FOR IT CLOSET. INTERNALLY INSULATE DUCT WORK FOR SOUND ATTENUATION. INSTALL REVERSE ACTING THERMOSTAT ON WALL OF IT CLOSET.
 - BALANCE OPEN DUCT TO 71 L/S.
 - PROVIDE EXHAUST DUCT FOR BREAK ROOM RANGE HOOD AND PENETRATE THROUGH ROOF. TERMINATE EXHAUST DUCT WITH GOOSENECK FITTING. REFER TO GOOSENECK TERMINATION DETAIL.
 - CONTRACTOR TO RE AND RE ALL SEISMIC SUPPORTS, CONDENSER WATER PIPES, CONTROLS AND ASSOCIATED ACCESSORIES TO SUIT RELOCATED HEAT PUMP. COORDINATE WITH ELECTRICAL TRADE FOR ELECTRICAL REVISIONS.
 - INSTALL NEW AVERAGING TEMPERATURE SENSOR ON WALL AND CONNECT WITH XHP-05 THERMOSTAT. COORDINATE INSTALLATION LOCATION WITH FURNITURE PLAN.

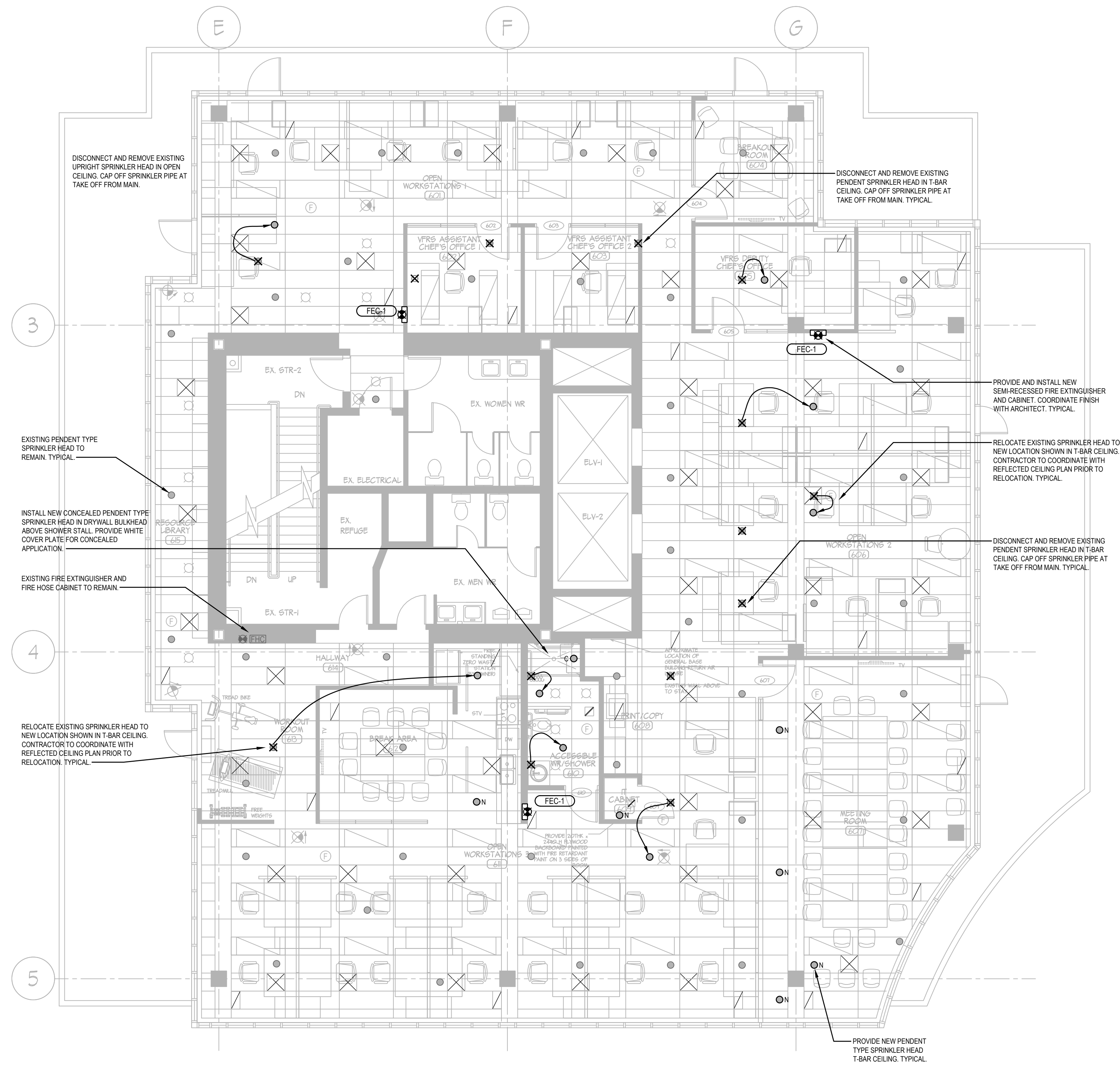
OUTDOOR AIR VENTILATION

UNIT	OUTDOOR AIR REQUIREMENT
XHP-01	38 L/S
XHP-02	29 L/S
XHP-03	38 L/S
XHP-04	29 L/S
XHP-05	48 L/S
XHP-06	29 L/S
XHP-07	38 L/S
XHP-08	70 L/S
XHP-09	70 L/S
XHP-10	57 L/S
XHP-11	38 L/S
XHP-12	38 L/S
XHP-13	38 L/S
XHP-14	38 L/S

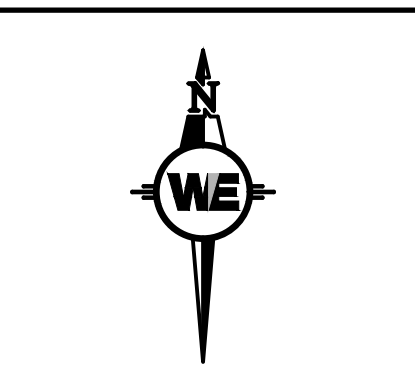


A
M-3.1
NEW MECHANICAL PLAN
 SCALE = 1/75

- DRAWING NOTES**
1. ALL SPRINKLER WORK AND REVISIONS SHALL BE PERFORMED BY BASE BUILDING APPROVED SPRINKLER CONTRACTOR.
 2. COORDINATE SPRINKLER INSTALLATIONS AND PROPOSED LAYOUT WITH HVAC AND LIGHTING LAYOUT PRIOR TO START OF WORK. FINAL LAYOUT AND QUANTITIES MEETING NFPA 13 REQUIREMENTS SHALL BE CONSIDERED AS PART OF THE CONTRACT. PROVIDE SCHEDULES B & C-B FROM B.C. REGISTERED SPRINKLER ENGINEER.
 3. RELOCATE EXISTING SPRINKLER HEAD TO NEW LOCATION SHOWN. CONTRACTOR TO COORDINATE WITH REFLECTED CEILING PLAN PRIOR TO RELOCATION.
 4. ALL NEW SPRINKLER HEADS SHALL BE SEMI-RECESSED TYPE WITH ESCUTCHEON PLATES FOR AREAS WITH T-BAR CEILING TO MATCH EXISTING.
 5. CONTRACTOR SHALL COORDINATE ALL SPRINKLER PIPE ROUTING AND REVISIONS SO AS TO NOT IMPEDE EQUIPMENT OR CODE REQUIRED SERVICE ACCESSES OR CLEARANCES.
 6. DIFFUSERS AND GRILLES SHOWN FOR REFERENCE ONLY. REFER TO MECHANICAL PLANS FOR HVAC DETAILS.
 7. PROVIDE NEW SEMI-RECESSED FIRE EXTINGUISHER CABINET (FEC-1) TO LOCATIONS SHOWN. FIRE EXTINGUISHER CABINET TO BE NATIONAL FIRE EQUIPMENT MODEL 102RS. COMPLETE WITH SLB ABC FIRE EXTINGUISHER. CONTRACTOR TO COORDINATE FINISH WITH ARCHITECT. INSTALL FIRE EXTINGUISHERS WITH MAXIMUM HEIGHT OF 1500MM FROM FINISHED FLOOR TO TOP OF EXTINGUISHER. TEST AND TAG ALL FIRE EXTINGUISHERS.



A NEW & EXISTING FIRE SUPPRESSION PLAN
M-3.2 SCALE = 1:75

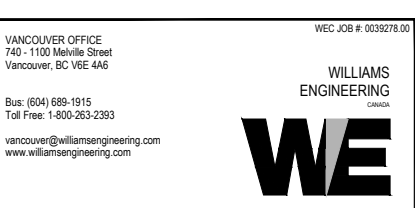


NORTH

3	08/08/18	TENDER
2	02/08/18	BUILDING PERMIT
1	23/07/18	REVIEW & COORDINATION
No.	DATE	ISSUED FOR:
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PROJECT TITLE
TENANT FIT-OUT FOR ECHOLON CENTRE
6F-575 W 8TH AVE
VANCOUVER, BC

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SHEET TITLE
6TH FLOOR
NEW & EXISTING FIRE
SUPPRESSION PLAN

PROJECT No.	0330278.00
DRAWN	VR
CHECKED	JA
SCALE	1:75
DATE	JULY 2018
PRINTED	JULY 2018

DRAWING No.
M-3.2

CHERNOFF THOMPSON ARCHITECTS

110-1281 WEST GEORGIA, VANCOUVER, B.C. V6E 3J5
TELEPHONE (604) 689-9460 FAX (604) 683-7684

1. GENERAL	1.16. OPERATING AND MAINTENANCE MANUALS	2.10. SIZE ROUND DUCTS, INSTALLED IN PLACE OF RECTANGULAR DUCTS, FROM ASHRAE TABLE OF EQUIVALENT RECTANGULAR AND ROUND DUCTS, NO VARIATION OF DUCT CONFIGURATION OR SIZES PERMITTED EXCEPT BY PERMISSION FROM ENGINEER.	6.2. PLUMBING FIXTURES
1.1. INTENT	1.16.1. REFER TO DIVISION 1.	2.11. EXPOSED ROUND DUCTWORK TO BE SPIRAL LOCK SEAM TYPE ONLY.	6.2.1. PLUMBING FIXTURES AND TRIM
1.1.1. THE INTENT OF THIS SPECIFICATION AND THE DRAWINGS IS TO PROVIDE A COMPLETE AND FULLY OPERATING MECHANICAL SYSTEM IN COMPLETE ACCORD WITH APPLICABLE CODES. THE MECHANICAL CONTRACTOR SHALL MAKE PROVISIONS FOR LABOUR, MATERIAL, AND EQUIPMENT NECESSARY TO COMPLETE THE MECHANICAL WORK.	1.16.2. SECURE AND ASSEMBLE ALL NECESSARY LITERATURE DESCRIBING THE OPERATION AND MAINTENANCE OF ALL EQUIPMENT PROVIDED. COMPLETE AND TRANSMIT DOCUMENTATION FOR REVIEW TO ENGINEER TWO (2) MONTHS PRIOR TO FINAL REVIEW.	2.11.2. PROVIDE DUCT HANGERS AND SUPPORTS IN ACCORDANCE WITH SMOKE MANUALS.	6.2.1.1. ALL PLUMBING FIXTURES AND TRIM SHALL BE MECHANICAL ENGINEER APPROVED.
1.1.2. DRAWINGS AND SPECIFICATIONS ARE COMPLEMENTARY TO EACH OTHER AND WHAT IS CALLED FOR IN ONE IS BINDING AS IF CALLED FOR BY BOTH SHOULD ANY DISCREPANCY APPEAR BETWEEN DRAWINGS AND SPECIFICATIONS THAT LEAVES DOUBT AS TO THE TRUE INTENT AND MEANING, OBTAIN A RULING FROM THE ENGINEER TEN (10) DAYS BEFORE SUBMITTING TENDER. FAILING THIS, ALLOW FOR MOST EXPENSIVE ALTERNATIVE.	1.16.3. PROVIDE FOUR (4) 8.5 IN. X 11 IN. CAPACITY, EXPANDING SPINE CATALOGUE BINDERS, BOUND WITH HEAVY FABRIC, HOT STAMPED LETTERING FRONT AND INDEX.	2.11.3. IDENTIFY DUCTWORK AS PER THE BASE BUILDING STANDARDS. CONFIRM THESE PRIOR TO SUBMITTING TENDER.	6.2.1.2. REFER TO PLUMBING FIXTURE SCHEDULE FOR REQUIRED FIXTURE DESCRIPTION.
1.1.3. CONTRACT DOCUMENTS ARE DIAGRAMMATIC ONLY. THEY ARE TO ESTABLISH SCOPE, MATERIAL, AND QUALITY. THEY ARE NOT DETAILED INSTALLATION DRAWINGS. MAJOR DETAILS USUALLY NOT SHOWN OR SPECIFIED AND ANY INCIDENTAL ACCESSORIES REQUIRED FOR PROPER INSTALLATION OF THE SYSTEM ARE TO BE INCLUDED IN THE WORK.	1.16.4. SNIPE BINDER ACCORDING TO THE FOLLOWING SYSTEM: 1.16.4.1. TAB-1 OF MECHANICAL SYSTEMS: TITLE PAGE WITH CLEAR PLASTIC PROTECTION COVER 1.16.4.2. TAB-1 LIST OF MECHANICAL DRAWINGS. 1.16.4.3. TAB-1 SYSTEM DESCRIPTIONS: PROVIDE COMPLETE DESCRIPTION OF THE OPERATING SEQUENCE FOR ALL SYSTEMS. INCLUDE DETAILED SYSTEM DESCRIPTION, WITH INDIVIDUAL COMPONENTS DESCRIBED. EXPLANATION OF HOW COMPONENTS INTERFACE WITH OTHERS AND TO THE COMPLETE SYSTEM, LOCATION OF THERMOSTATS, CONTROLLERS OR OPERATING VARIANCES, AND CONTROLLER OPERATING SET POINTS.	2.2. LOW VELOCITY DUCTWORK 2.2.1. DUCTWORK SHALL BE GALVANIZED STEEL. THE MINIMUM SHEET METAL THICKNESS FOR DUCTS INCLUDING FITTINGS, ACCESS DOORS, AND OTHER ACCESSORIES SHALL BE AS PER SMACNA DUCT MANUAL FOR LOW VELOCITY DUCTWORK. 2.2.2. LOW VELOCITY INSULATED FLEXIBLE DUCTWORK SHALL BE EQUAL TO THERMAFLEX TYPE M-K. 2.2.3. CONNECT DIFFUSERS OR TROFFER BOOTS TO LOW PRESSURE DUCTS WITH 3/8" 90° MM MAXIMUM LENGTH OF STRETCHED FLEXIBLE DUCT. HOLD IN PLACE WITH CAULKING COMPOUND AND STRAP OR CLAMP. DO NOT USE FLEXIBLE DUCT TO CHANGE DIRECTIONS. 2.2.4. WHERE LOW PRESSURE DUCTS ARE CONNECTED TO FAN EQUIPMENT, TERMINAL BOXES OR ANY OTHER APPARATUS, A SCREWED OR BOLTED FLEXIBLE GASKETED JOINT SHALL BE PROVIDED BETWEEN THE DUCTWORK AND THE EQUIPMENT.	6.2.2. WATER HAMMER ARRESTERS 6.2.2.1. FIT WATER SUPPLY TO EACH FIXTURE OR GROUP OF FIXTURES WITH AN AIR CHAMBER. PROVIDE AIR CHAMBERS SAME SIZE AS SUPPLY LINE OR 20 MM 3/4 IN. MINIMUM AND MINIMUM 450MM 18 IN. LONG. 6.2.2.2. INSTALL STAINLESS STEEL BELLOWS TYPE WATER HAMMER ARRESTERS ON WATER LINES CONNECTED TO SOLENOID VALVES [FLUSH VALVES] AND TO FIXTURE OR GROUP OF FIXTURES) COMPLETE WITH ACCESSIBLE ISOLATION VALVE.
1.1.4. CONTRACTOR IS TO ENSURE THAT ALL INTENDED EQUIPMENT WILL FIT WITHIN GIVEN SPACES. MAKE REFERENCE TO THE ELECTRICAL, MECHANICAL, ARCHITECTURAL AND STRUCTURAL DRAWINGS, WHEN SETTING OUT WORK AND BEFORE ORDERING EQUIPMENT.	1.16.4.4. TAB-1.3 OPERATING DIVISION: PROVIDE COMPLETE AND DETAILED OPERATION OF MAJOR COMPONENTS AND SYSTEMS. 1.16.4.4.1. PROVIDE LOCATION OF COMPONENTS, HOW TO EMERGE SWITCHES AND CONTROLS, HOW COMPONENTS INTERFACE WITH OTHER COMPONENTS, OPERATION OF CONTROLS INCLUDING OPERATIONAL SEQUENCE, OPERATIONAL CHANGES FOR SUMMER OR WINTER OPERATION, HOW TO ACCOMPLISH THE CHANGE-OVER, COMPLETE TROUBLE SHOOTING SEQUENCE, EMERGENCY OPERATING SEQUENCES IN EVENT OF MAJOR COMPONENT FAILURE, AND SAFEGUARDS TO INDICATE IF EQUIPMENT GOES OFF-LINE. 1.16.4.5. TAB-1 MAINTENANCE AND LUBRICATION DIVISION: 1.16.4.5.1. PROVIDE GENERAL MAINTENANCE AND LUBRICATION SCHEDULE FOR MAJOR COMPONENTS TO INCLUDE DAILY, WEEKLY, MONTHLY, SEMI-ANNUAL AND YEARLY CHECKS AND TASKS. 1.16.4.5.2. EXPLAIN HOW TO EXECUTE MAINTENANCE TASKS REQUIRED FOR TYPICAL EQUIPMENT SUCH AS BEARINGS, DRIVES, MOTORS, AND FILTERS. 1.16.4.5.3. COMPLETE THIS INFORMATION FOR EQUIPMENT AND SEPARATE FROM SHOP DRAWINGS. 1.16.4.6. TAB-1.5 LIST OF EQUIPMENT SUPPLIERS AND CONTRACTORS: PROVIDE LIST OF EQUIPMENT SUPPLIERS AND CONTRACTORS, INCLUDING ADDRESS AND TELEPHONE NUMBERS, OUTLINE PROCEDURES FOR PURCHASING PARTS AND EQUIPMENT. 1.16.4.7. TAB-CERTIFICATION (2.0 2.1.) INCLUDE COPY OF TEST DATA ON DEGREASING AND FLUSHING OF HEATING SYSTEM. ANALYSIS OF SYSTEM WATER TAKEN AT TIME SYSTEM WAS PUT INTO OPERATION. HYDROSTATIC OR AIR TESTS PERFORMED ON PIPING SYSTEMS, EQUIPMENT ALIGNMENT CERTIFICATES, COPY OF BALANCING DATA FOR AIR AND WATER SYSTEMS, COPY OF VALVE TAG IDENTIFICATION AND PIPE COLOUR CODE, INSPECTION APPROVAL CERTIFICATES FOR PLUMBING SYSTEM, HEATING AND VENTILATION SYSTEMS AND IDENTIFICATION TESTS ON OIL-FIRED EQUIPMENT. 1.16.4.8. TAB-SHOP DRAWINGS AND MAINTENANCE BULLETINS (3.0 3.1.) 1.16.4.8.1. PROVIDE MATERIALS RECEIVED IN COMPLIANCE WITH CLAUSE "SHOP DRAWINGS".	2.3. DUCT SEALING 2.3.1. ALL SUPPLY, RETURN AND EXHAUST DUCT JOINTS, LONGITUDINAL AS WELL AS TRANSVERSE, SHALL BE SEALED USING: 2.3.1.1. LOW PRESSURE DUCTWORK: 2.3.1.1.1. SLIP JOINTS APPLY HEAVY BRUSH-ON HIGH PRESSURE DUCT SEALANT. APPLY SECOND APPLICATION AFTER THE FIRST APPLICATION HAS COMPLETELY DRIED OUT. WHERE CLEARANCE EXCEEDS 1/16" USE HEAVY MASTIC TYPE SEALANT. 2.3.1.1.2. FLANGED JOINTS: SOFT ELASTOMER BUTYL OR EXTRUDED FORM OF SEALANT BETWEEN FLANGES FOLLOWED BY AN APPLICATION OF HEAVY BRUSH-ON HIGH PRESSURE DUCT SEALANT. 2.3.1.1.3. OTHER JOINTS: HEAVY MASTIC TYPE SEALANT. 2.3.1.2. MEDIUM AND HIGH PRESSURE DUCTWORK: 2.3.1.2.1. COMBINATION OF WOVEN FABRICS AND SEALING COMPOUND FOLLOWED BY AN APPLICATION OF HIGH PRESSURE DUCT SEALANT. 2.3.1.2.2. DUCT TAPES AS SEALING METHOD ARE NOT PERMITTED. 2.3.1.2.3. SURFACES TO RECEIVE SEALANT SHOULD BE FREE FROM OIL, DUST, DIRT, MOISTURE, RUST AND OTHER SUBSTANCES THAT INHIBIT OR PREVENT BONDING. 2.3.1.2.4. DO NOT INSULATE ANY SECTION OF THE DUCTWORK UNTIL IT HAS BEEN REVIEWED AND APPROVED OF DUCT SEALANT APPLICATION BY THE ENGINEER.	6.3. DOMESTIC WATER SYSTEMS 6.3.1. PROVIDE FOR CLEANING AND DISINFECTING OF ALL DOMESTIC HOT & COLD WATER SYSTEMS. 6.3.1.1. THOROUGHLY FLUSH PIPING TO ENSURE IT IS FREE FROM SCALE, SEDIMENT, CONSTRUCTION DEBRIS, ETC. 6.3.1.2. CHLORINATE WITH SODIUM HYPOCHLORITE TO AWWA C-601 SPECIFICATIONS. 6.3.1.3. LET STAND FOR 24 HOURS. 6.3.1.4. THOROUGHLY FLUSH UNTIL WATER MEETS AWWA STANDARDS. 6.3.1.5. PROVIDE COPY OF REPORT CONFIRMING SAME. 6.3.2. DURING SYSTEM FLUSHING ENSURE THAT ALL CONTROL VALVES AND OTHER SYSTEM VALVES ARE IN THE FULL OPEN POSITION. 6.3.3. PROTECT ALL PUMPS WITH STRAINERS, PERMANENT OR TEMPORARY. CLEAN ALL STRAINERS AFTER FLUSHING THE SYSTEM. 6.3.4. IF SYSTEM PUMPS ARE USED FOR CLEANING, PROVIDE AND INSTALL NEW SET OF SEALS AFTER INSPECTION. 6.3.5. PROVIDE FOR CLEANING AND CHEMICAL TREATMENT OF ALL CHILLED WATER AND HEATING WATER SYSTEMS.
1.2. CODE COMPLIANCE	1.2.1. ALL WORK SHALL CONFORM TO CURRENT EDITION OF NATIONAL, PROVINCIAL AND MUNICIPAL CODES, STANDARDS AND ACTS; AND WILL MEET THE REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.	3. PIPING 3.1. PIPE MATERIAL 3.1.1. ALL PIPE MATERIAL SHALL MEET FLAME AND SMOKE RATING OF 2550. 3.1.1. SERVICE: SANITARY AND STORM DRAINAGE, AND VENT (ABOVE GRADE); MATERIAL: DWV COPPER, CAST IRON, XFR PVC. 3.1.2. SERVICE: DOMESTIC WATER (ABOVE GRADE INSIDE BUILDING); MATERIAL: TYPE "L" HARD COPPER, ALL SIZES. 3.1.3. SERVICE: CONDENSATE, PUMP/ CONDENSATE; MATERIAL: STEEL SCHEDULE 80, A120. 3.1.4. SERVICE: FIRE PROTECTION; MATERIAL: PER NFPA 13 FOR SPRINKLER SYSTEMS; PER NFPA 14 FOR STANDPIPE SYSTEMS. 3.2. PIPE CONNECTIONS 3.2.1. AIR AND GAS SYSTEMS: SCREWED JOINT STEEL PIPING UP TO AND INCLUDING 2" MM. WELD PIPING 2 1/2" AND LARGER INCLUDING BRANCH CONNECTIONS. USE DIELECTRIC TYPE COUPLINGS WHEN JOINING DISSIMILAR METAL PIPES. 3.2.2. USE LEAD FREE SOLDER FOR SOLDERING DOMESTIC WATER COPPER PIPE. BRAZE PIPING 2 1/2" AND LARGER, OR WELD IS USING SCHEDULE 10 STAINLESS STEEL. 3.3. PIPE HANGERS AND SUPPORTS 3.3.1. ALL PIPING SHALL BE FIRMLY SUPPORTED AND SECURELY BRACED. PROVIDE COPPER PLATED HANGERS AND SUPPORTS FOR COPPER PIPING AND GALVANIZED HANGERS AND SUPPORTS FOR GALVANIZED PIPING. 3.3.2. USE OF PERFORATED STRAPS IS NOT PERMITTED FOR PIPE HANGERS. 3.3.3. PROVIDE RING TYPE HANGERS FOR PIPING UP TO 1 1/2" AND CLEVIS TYPE HANGERS FOR PIPING OVER 1 1/2". 3.4. PIPE SUPPORT SPACING 3.4.1. ALL PIPING SHALL BE SUPPORTED AS REQUIRED BY PLUMBING CODE SECTION 2.3.4, INCLUDING TABLE 2.3.4.5 FOR NOMINALLY HORIZONTAL PIPING. 3.5. EXPANSION COMPENSATION 3.5.1. PROVIDE EXPANSION COMPENSATORS, GUIDE AND ANCHORS WHERE REQUIRED AND WHERE INDICATED.	7. FIRE PROTECTION 7.1. FIRE SPRINKLERS 7.1.1. CONTRACTOR SHALL RETAIN A PROFESSIONAL ENGINEER, REGISTERED IN THE PROVINCE TO PRACTICE SPRINKLER DESIGN, TO PERFORM HYDRAULIC CALCULATIONS AND GENERATE COMPLETE SPRINKLER DESIGN. 7.1.2. ALL MATERIAL SHALL BE LISTED BY UL OR APPROVED FOR SPRINKLER/STANDPIPE USE. PIPE SIZING BY HYDRAULIC CALCULATIONS. 7.1.3. PROVIDE 3 SETS OF SIGNED AND SEALED BLACK LINE SHOP DRAWINGS AND HYDRAULIC CALCULATIONS TO THE ENGINEER FOR REVIEW PRIOR TO COMMENCEMENT. 7.1.4. SPRINKLER HEAD LOCATION SHALL BE SUBJECT TO APPROVAL BY THE ARCHITECT. PROVIDE HEADS UNDER OBSTRUCTION TO MEET CODE. 7.1.5. THE WATER SUPPLY INFORMATION (WHEN SHOWN) IS FOR THE ENGINEER'S USE ONLY. CONTRACTOR IS RESPONSIBLE FOR OBTAINING WATER SUPPLY INFORMATION AND PREPARING HYDRAULIC CALCULATIONS ACCORDINGLY. ALLOW 10% WATER LINE SIZE REQUIRED BY HYDRAULIC CALCULATION BEFORE WATER CONNECTION APPLICATION AND INSTALLATION OF ANY ON SITE PLUMBING. 7.1.6. CONTRACTOR TO PERFORM TESTING IN PRESENCE OF THE CONSULTANT AND SUBMIT NFPA TESTING CONTRACTORS CERTIFICATE. 7.1.7. PROVIDE SPARE SPRINKLER HEADS FOR SYSTEM (LESS THAN 300 HEADS, PROVIDE 6 AND UP TO 1000 HEADS PROVIDE 12), AND TURN OVER TO OWNER AT THE END OF CONSTRUCTION. 7.1.8. RUN ALL PIPING CONCEALED. PIPING SUBJECT TO FREEZING TO BE INSULATED AND HEAT TRACED. 7.1.9. COVERED BALCONIES ATTACHED TO BUILDING, STARWELLS AND BALCONIES TO BE SPRINKLERED AS PER NFPA 13. PROVIDE SPRINKLER HEADS UNDER OVERHEAD GARAGE DOORS. 7.1.10. PROVIDE SPRINKLER HEAD ASSEMBLY TO PROTECT GLASS AREAS AS REQUIRED BY THE LOCAL MUNICIPALITY. IN THE ABSENCE OF SPECIFIC REQUIREMENTS, PROVIDE HEADS AT 4 CENTERS OVER GLASS WINDOW/WALL IN RATED SEPARATIONS. USE COPPER PIPES WHEN EXPOSED. 7.1.11. DESIGN STANDARDS 7.1.11.1. OFFICE: NFPA-13 ORDINARY HAZARD GROUP 1. 7.1.11.2. HYDRAULICALLY CALCULATED SPRINKLER DESIGN SHALL NOT INCLUDE VELOCITY PRESSURES IN THE CALCULATIONS. 7.1.11.3. THE MAXIMUM VELOCITY PERMITTED IN PIPING IN THE AUTOMATIC SPRINKLER SYSTEM IS 25 FEET PER SECOND. 7.1.12. PROVIDE PORTABLE FIRE EXTINGUISHER SLB ABC TYPE WITH LOCKABLE GLASS FRONT CABINET AS PER BC FIRE CODE REQUIREMENTS. 7.1.13. SUPPLY & INSTALL FOLLOWING FOR DIV. 16 FIRE ALARM/TROUBLE SUPERVISION. 7.1.13.1. VALVE MOVEMENT SUPERVISORY SWITCH. 7.1.13.2. LOW WATER PRESSURE SWITCH. 7.1.13.3. LOW AIR PRESSURE SWITCH FOR DRY SYSTEM. 7.1.4. PROVIDE TESTING AS REQUIRED BY APPLICABLE CODES. ENSURE TESTING IS WITNESSED BY THIS CONSULTANT. 7.1.5. PROVIDE ALL REQUIRED CERTIFICATION AS NECESSARY. 7.1.6. REFER TO REQUIREMENTS OF CODE ANALYSIS REPORT (COPY OF REPORT AVAILABLE FROM ARCHITECT/CONSULTANT AT REQUEST).
1.3. LIABILITY	1.3.1. ASSUME RESPONSIBILITY FOR LAYOUT OF WORK; AND FOR ANY DAMAGE CAUSED TO THE OWNER OR OTHER TENANTS BY IMPROPER EXECUTION OF WORK. 1.3.2. PROTECT FINISHED AND UNFINISHED WORK FROM DAMAGE. 1.3.3. TAKE RESPONSIBILITY FOR CONDITION OF MATERIALS AND EQUIPMENT SUPPLIED AND PROTECT UNTIL WORK IS COMPLETED AND ACCEPTED. COORDINATE DELIVERIES WITH THE GENERAL CONTRACTOR.	4. VALVES 4.1. DOMESTIC HOT AND COLD WATER SYSTEM VALVES 4.1.1. BALL VALVES UP TO 2"; BRONZE BODY, CHROME PLATED, BRONZE BALL, THREADED OR SOLDER ENDS, TFE SEAT AND PACKING, 600 PSI NON SHOCK W.O.G. RATING, ENKINS FIG. 201A, 902A.	7.2. FIRE STOPPING AND SMOKE SEALS 7.2.1. SCOPE 7.2.1.1. FURNISH ALL LABOUR, MATERIAL, EQUIPMENT AND SERVICES NECESSARY TO SUPPLY AND INSTALL FIRESTOPPING AND SMOKE SEALS AROUND MECHANICAL SERVICE PIPING AND DUCT PENETRATIONS THROUGH FIRE RATED WALL AND FLOOR ASSEMBLIES, AS INDICATED AND AS SPECIFIED. 7.2.1.2. CONFORM TO MANUFACTURERS RECOMMENDED TEMPERATURES, RELATIVE HUMIDITY AND SUBSTRATE MOISTURE CONTENT FOR APPLICATION AND CURING OF FIRESTOPPING MATERIALS. 7.2.1.3. USE ASBESTOS-FREE MATERIALS AND SYSTEMS CAPABLE OF MAINTAINING AN EFFECTIVE BARRIER AGAINST FLAME, SMOKE AND GASES IN COMPLIANCE WITH REQUIREMENTS OF CAN4-S115-1486, OR UL 1471 AND ASTM 814, AND NOT TO EXCEED OPENING SIZES FOR WHICH THEY ARE INTENDED. 7.2.1.4. FIRE RESISTANCE RATING OF INSTALLED FIRESTOPPING ASSEMBLY SHALL BE NOT LESS THAN THE FIRE RESISTANCE RATING OF SURROUNDING FLOOR AND WALL ASSEMBLY AS INDICATED. 7.2.1.5. INSPECT ALL SURFACES TO BE FIRESTOPPED. REPORT ANY UNSUITABLE OR UNSATISFACTORY CONDITIONS TO THE CONTRACTOR. IN WRITING PRIOR TO COMMENCEMENT. ESTABLISH CORRECT THICKNESSES AND INSTALLATION OF MATERIALS. ENSURE THAT SUBSTRATED AND SURFACES ARE DRY AND FROST FREE. 7.2.1.6. INSTALL FIRESTOPPING AND SMOKE SEAL MATERIAL AND COMPONENTS IN ACCORDANCE WITH ULC CERTIFICATION AND MANUFACTURERS INSTRUCTIONS TO PROVIDE A TEMPERATURE AND FLAME RATED SEAL, NOT LESS THAN THE FIRE RESISTANCE RATING OF THE SURROUNDING WALL OR FLOOR ASSEMBLY. 7.2.1.7. SEAL HOLES OR VOIDS MADE BY THROUGH-PENETRATIONS, POKE-THROUGH TERMINATION DEVICES, AND UNPENETRATED OPENINGS OR JOINTS TO ENSURE CONTINUITY AND INTEGRITY OF FIRE SEPARATION ARE MAINTAINED. MINIMUM THICKNESS OF SEALANT SHALL BE 12MM. 7.2.1.8. WHERE PRE-FORMED MINERAL WOOL PIPE INSULATION IS USED, THE MINERAL WOOL SHALL BE COMPRESSED TO 50% OF LOOSE RESTING VOLUME. 7.2.1.9. TOOL OR TROWEL EXPOSED SURFACES TO A HEAT FINISH. REMOVE EXCESS COMPOUND PROMPTLY AS WORK PROGRESSES AND UPON COMPLETION, DO NOT COVER UP MATERIALS UNTIL PROPER CURING HAS TAKEN PLACE. 7.2.1.10. PROVIDE FT RATING OF PIPING PENETRATIONS BETWEEN THE RETAIL SPACE AND THE RESIDENTIAL SPACES. FT RATING ASSEMBLY SHALL BE UL LISTED FOR THE APPROPRIATE F AND R RATING OF THE SEPARATION AND PIPING MATERIAL. SEE CODE CONSULTANT REPORT FOR RATING REQUIREMENTS.
1.4. CERTIFICATES	1.4.1. GIVE NOTICES, OBTAIN PERMITS AND APPROVALS, AND PAY FEES SO WORK SPECIFIED MAY BE CARRIED OUT. FURNISH CERTIFICATES IF REQUESTED, AS EVIDENCE THAT WORK CONFORMS WITH LAWS AND REGULATIONS OF THE AUTHORITIES HAVING JURISDICTION. 1.5. CUTTING AND PATCHING 1.5.1. ALL WORK SHALL BE CO-ORDINATED WITH OTHER TRADES ESPECIALLY THAT RELATED TO CUTTING AND PATCHING OF REQUIRED OPENINGS, AND LOCATIONS AND INSTALLATION OF SLEEVES, INSERTS, SUPPORT, CURBS, FRAMES AND ACCESS DOORS.	5. INSULATION 5.1. DUCT AND BREECING INSULATION 5.1.1. EXPOSED RECTANGULAR DUCTS: RIGID FIBROUS GLASS INSULATION, "K" VALUE AT 24°C 75°F MAXIMUM 0.035 W/M°C 0.24 BTU IN/FTH°R" WITH FACTORY APPLIED REINFORCED ALUMINUM FOL VAPOUR BARRIER. 5.1.2. ROUNDED DUCTS AND CONCEALED RECTANGULAR DUCTS: FLEXIBLE FIBROUS GLASS INSULATION, "K" VALUE 24°C 75°F MAXIMUM 0.035 W/M°C 0.24 BTU IN/FTH°R" WITH FACTORY APPLIED REINFORCED ALUMINUM FOL VAPOUR BARRIER. 5.1.3. ACOUSTIC LINING: FIBROUS INSULATION WITH "K" VALUE AT 24°C 75°F MAXIMUM 0.035 W/M°C 0.24 BTU IN/FTH°R" ABSOLUTE ROUGHNESS OF EXPOSED SURFACE NOT TO EXCEED 0.025 IN/58 MM COATED TO PREVENT FIBRE EROSION AT AIR VELOCITIES UP TO 254 M/5000 FPM, 24 KG/CU M 1.5 LB/CU FT MINIMUM DENSITY FOR DUCTWORK AND 75 KG/CU M 4.7 LB/CU FT FOR FLEXIBLES. 5.1.4. RECOVERY JACKETS: ULC LABELLED THERMOCANVAS. 5.1.5. ENSURE SURFACE AND INSULATION IS CLEAN AND DRY PRIOR TO AND DURING INSTALLATION. 5.1.6. ENSURE INSULATION IS CONTINUOUS THROUGH INSIDE PARTITIONS. 5.1.7. FINISH AND SEAL INSULATION NEATLY AT HANGERS, SUPPORTS, ACCESS DOORS, FIRE DAMPERS AND OTHER PROTRUSIONS. 5.1.8. RECOVER ALL INSULATION EXCEPT IN CEILING SPACES, AND MECHANICAL SHAFTS. 5.1.9. INSULATION INSTALLATION THICKNESS SPECIFIED. 5.1.9.1. INSULATION THICKNESS DUCT & EQUIPMENT MM (IN) OUTSIDE AIR INTAKE, COMBUSTION AIR, AND RELIEF DUCT 50 (2) EXHAUST DUCTS WITHIN 3000 MM 10 FT OF EXTERIOR PENETRATION, WHETHER EXTERIOR OR INTERIOR, AND EVERY 50 FT THEREAFTER 25 (1) SUPPLY DUCTS 25 (1) ACOUSTIC LININGS (WHERE INDICATED) 50 (2)	8. CONTROL SYSTEM ELECTRIC 8.1. GENERAL 8.1.1. PROVIDE COMPLETE CONTROL SYSTEM FOR ELECTRICAL CONTROLS AS SPECIFIED HEREIN. 8.1.2. THE MOTOR LIST AND WORK STATED THERE ON FORMS PART OF THE CONTRACT DOCUMENT. 8.1.3. DIV 16 TO PROVIDE WIRING TO 120V/1 PHASE MOTOR & ALSO THE WIRING BETWEEN SUCH MOTOR & ITS CONTROL DEVICE SUCH AS THERMOSTAT AND TIME CLOCK. ALL OTHER WIRING TO BE PROVIDED BY DIV 15 THE MOTOR LIST SCOPE OF WORK SHALL BE FOLLOWED. 8.1.4. ALL DIV 15 WIRING & CONDUIT REQUIREMENTS TO FOLLOW DIV 16 SPECIFICATIONS FOR THIS PROJECT. THIS SHALL INCLUDE LOW-VOLTAGE WIRING. 8.1.5. MOUNTING OF CONTROL DEVICES. 8.1.5.1. BY ELECTRICAL CONTRACTOR - MOUNTING AND WIRING THERMOSTATS CONTROLLING SINGLE PHASE MOTOR. WIRING OF AQUASTATS AND TIMERS CONTROLLING SINGLE PHASE MOTORS. 8.1.5.2. BY MECHANICAL CONTRACTOR - MOUNTING OF ALL IN-LINE PIPING DEVICES (WELL, VALVES, PRESSURE SWITCHES, ORIFICES, ETC.), MOUNTING OF AQUASTATS AND ALL CONTROL DEVICES. 8.1.5.3. BY SHEET METAL CONTRACTOR - MOUNTING OF DAMPERS, BAFFLING IN MIXED AIR PLENUM TO CONTROL CONTRACTOR REQUIREMENTS, ACCESS DOOR FOR DUCT OR UNIT MOUNTED CONTROLS.
1.6. ALTERNATIVE MATERIALS AND EQUIPMENT	1.6.1. CONTRACT PRICE SHALL BE BASED ON MATERIALS AND EQUIPMENT SPECIFIED. APPROVAL BY ENGINEER OF EQUIPMENT SUBMITTED BY THE MECHANICAL TRADE AS EQUAL TO THAT SPECIFIED DOES NOT RELIEVE THE MECHANICAL TRADE OF ANY RESPONSIBILITY. 1.6.2. REVISIONS REQUIRED TO ADAPT ACCEPTED EQUALS AND ALTERNATIVES SHALL BE INCLUDED IN THE CONTRACT PRICE. NO INCREASE IN THE CONTRACT PRICE WILL BE CONSIDERED TO ACCOMMODATE THE USE OF EQUIPMENT OTHER THAN THAT SPECIFIED. 1.6.3. CERTAIN ITEMS OF EQUIPMENT AND ITEMS OF WORK (SUCH AS BALANCING, WATER TREATMENT) MAY NOT HAVE AN APPROVED EQUAL DUE TO THE NEED TO HAVE A CONSISTENT TYPE OR SOURCE OF MAINTENANCE. REFER TO SPECIFIC CLAUSES IN THIS SPECIFICATION.	6. PLUMBING 6.1. PLUMBING GENERAL 6.1.1. INSTALL VACUUM BREAKERS, TRAP PRIMERS AND BACKFLOW PREVENTERS ON PLUMBING LINES AS REQUIRED BY CODE. 6.1.2. CHECK INVERT ELEVATIONS PRIOR TO SANITARY AND DRAINAGE CONNECTIONS. 6.1.3. GRADE DRAINAGE LINES 2% PER FOOT, UNLESS NOTED OTHERWISE. 6.1.4. PROVIDE HEAT TRAP LOOP IN DOMESTIC HOT WATER SUPPLY PIPING AT THE DOMESTIC HOT WATER STORAGE TANK.	9. STANDARD OF MATERIALS AND WORKMANSHIP 9.1. MAKE AND QUALITY OF MATERIALS USED ARE SUBJECT TO APPROVAL BY THE ENGINEER. REMOVE UNACCEPTABLE MATERIALS AND INSTALL SUITABLE MATERIALS IN THEIR PLACE. 9.2. MATERIALS SHALL BE NEW AND OF UNIFORM PATTERN THROUGHOUT, UNLESS NOTED OTHERWISE. 9.3. EMPLOY ONLY TRADESMEN PROPERLY LICENSED TO PERFORM THE SPECIFIC WORK. 9.4. PROVIDE THE FOLLOWING WHEN REQUIRED: 9.4.1. ITEM APPROVED MANUFACTURER ACCESS DOORS AJCUDOR, E.H. PRICE, MAXAM, STEEL, BROTHERS, MILCOR AUTOMATIC AIR VENT HOFFMAN, BRAUKMAN, SARCO, ARMSTRONG, MAID-O-MIST BACKFLOW PROTECTION WATTS, FEBCO, CLAYTON, BECCO, WILKINS CONTROLS (ELECTRIC) APPROVED BASE BUILDING CONTROLS CONTRACTOR DAMPER - LOW LEAKAGE AMERICAN WARMING, TAMCO DUCT SEAM SEALER DURO DINE S-2, ROSSONS DUCT SEAL DUCT SPIRAL AND FITTINGS UNITED SHEET METAL, B.C. VENTILATING, SPIRO-LOK EXPANSION JOINTS FLEXONICS, HYSPLAN, UNIROVAL, KEROL, MASON, GOODALL FANS DELHI, GREENHECK, ACME, LAU, PENN, CARSON FILTERS FARR, CONTINENTAL, CAMBRIDGE, AAF FIRE DAMPERS CANADIAN ADVANCED AIR, MAXAM, RUSKIN, CONTROLLED AIR, NAJOR-HART FIRE PROTECTION - SPRINKLERS APPROVED BASE BUILDING SPRINKLER CONTRACTOR FLEXIBLE AIR DUCT THERMOFLEX, WIREMOLD, FLEXMASTER GLASS, DIFFUSERS AND REGISTERS E.H. PRICE, KRUEGER, TITUS, CARNES INSULATION - DUCTPIPING FIBERGLAS, KNAUF, JOHNS-MANVILLE, ATLAS, PFG, MANSON, ARMSTRONG, ARMAFLEX JACKETING MATERIALS CHILDERS, FIBERGLAS, JOHNS-MANVILLE PIPE FITTINGS AND FLANGES CRANE, GRINNELL, JENKINS, VICTAULIC PIPE SUPPORTS AND HANGERS CRANE, UNISTRUT, MYATT, L.E. TAYLOR, GRINNELL, SARCO PLUMBING DRAINAGE ACCESSORIES SMITH, ENPOCO, ZURN, ANCON PLUMBING TRIM AMERICAN STANDARD, CRANE, CAMBRIDGE, KOHLER, ELJER, ALSONS BRADLEY, POWERS, SYMONS, MOEN, DELTA BRASSCRAFT, T&S BRASS, EMCO, ACOPI, LEONARD, BRIGGS KNORED, FRANK COMMERCIAL, CRANE, K.I.L., FIAT, KOHLER, ELJER AMERICAN STANDARD, WILLIAMS HANS, ARISTANERMAN, ELKAY, AQUARIUS, JUCUZZI, SUNROC, WESTERN SWAN, BRADLEY, SPEAKMAN, VALLEY, HYTEC, WATROUS, BRIGGS SOUND ATTENUATION I.A.C., VIBRON, VIBRO ACOUSTICS STRAINERS RED & WHITE, CRANE, SARCO, ARMSTRONG, KITZ, MUELLER, PLENTY TESTING & BALANCING AGENTS K.O. ENGINEERING, WESTERN MECHANICAL SERVICES, WAMCO, M.D.T., H.V.A.C. BALANCING TOILET SEATS CENOCO, BENEKE, BEMIS, OLSONITE, MOLDER, SPERZE VALVES - BALL RED & WHITE, GRINNELL, WATTS, HILLS MCCANNAN WATER TREATMENT DEARBORN, CALGON, IPAC, PACE WATER PRESSURE REDUCING VALVES WILKINS, SLINGER, WATTS, CLAYTON, BERMAID
1.7. SHOP DRAWINGS	1.7.1. SUBMIT ELECTRONIC (PDF) SHOP DRAWINGS TO ENGINEER FOR ALL EQUIPMENT SPECIFIED IN THE SPECIFICATION OR DRAWINGS FOR ENGINEER'S REVIEW. DO NOT ORDER EQUIPMENT OR MATERIALS UNTIL ENGINEER HAS REVIEWED SHOP DRAWINGS.	6.2. PLUMBING 6.2.1. PROVIDE BALANCING DAMPERS WHERE DUCTS CROSS FIRE SEPARATIONS. FIRE DAMPERS SHALL BE ULC LISTED AND CONSTRUCTED IN ACCORDANCE WITH ULC STANDARD 112. FIRE DAMPERS' FLEXIBLE LINGS SHALL BE CONSTRUCTED TO ULC STANDARD 555. 6.2.2. PROVIDE BALANCING DAMPERS WHERE DUCTS INDICATED ON DRAWINGS AND AT POINTS ON LOW PRESSURE SUPPLY, RETURN AND EXHAUST DUCTS WHERE BRANCHES ARE TAKEN FROM LARGER DUCTS. 6.2.3. PROVIDE ADEQUATELY SIZED ACCESS PANELS FOR DAMPERS, EQUIPMENT, FIRE DAMPERS, VALVES, RADIATION VALVES, AND ANY OTHER EQUIPMENT REQUIRING SERVICING. 6.2.4. PROVIDE RETURN AIR OPENINGS AND/OR INSULATED SOUND TRAPS WHERE INDICATED. 6.2.5. PROVIDE ACOUSTICAL SEAL AROUND DUCTS AND SOUND TRAPS AT PENETRATION THROUGH SOUND Baffles. 6.2.6. MODIFY CEILING SYSTEM WHERE REQUIRED TO ACCOMMODATE GRILLES AND DIFFUSERS.	10. OWNER SUPPLIED EQUIPMENT 10.1. PROVIDE ROUGH-IN FOR AND MAKE ALL CONNECTIONS TO EQUIPMENT SUPPLIED BY OTHERS. 10.2. MAKE ALL MECHANICAL CONNECTIONS TO EQUIPMENT SUPPLIED BY OTHERS UNDER THIS CONTRACT. THIS SHALL INCLUDE ALL WATER, DRAIN, GAS, EXHAUST, TRAPS, DUCTWORK AND SIMILAR CONNECTIONS REQUIRED. PROVIDE ISOLATION VALVES, UNIONS, FLANGES AND TRAPS AS REQUIRED FOR A COMPLETE INSTALLATION. 10.3. CHANGE TO ROUGH-IN OF SERVICES OR FINAL EQUIPMENT CONNECTIONS DUE TO A CHANGE IN THE MAKE OF EQUIPMENT FROM THAT SPECIFIED SHALL BE MADE AT NO EXTRA COST TO THE OWNER, PROVIDED THAT PROPER SHOP DRAWINGS ARE AVAILABLE FOR ROUGH-IN, PRIOR TO COMMENCING INSTALLATION OF ROUGH-IN FOR THE EQUIPMENT, COORDINATE WITH THE FINAL REVISED EQUIPMENT SHOP DRAWINGS AND WITH THE MANUFACTURER. 10.4. EXPOSED PIPING SHALL BE PAINTED AS PER ARCHITECT'S INSTRUCTIONS. 10.5. ARRANGE PIPING CONNECTIONS TO ALLOW FOR EQUIPMENT REMOVAL.
1.8. GUARANTEE	1.8.1. PROVIDE THE OWNER WITH A WRITTEN GUARANTEE THAT THE EQUIPMENT INSTALLED AND WORK PERFORMED SHALL REMAIN IN SERVICEABLE CONDITION FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE BY THE OWNER. THE WARRANTY SHALL COVER MATERIAL, AS WELL AS LABOUR.	10.6. RECORD DRAWINGS 10.6.1. KEEP ON SITE AN EXTRA SET OF WHITE PRINTS AND SPECIFICATIONS, RECORDING CHANGES AND DEVIATIONS DAILY. 10.6.2. UPON COMPLETION OF WORK, SUBMIT FINAL RECORD DRAWINGS TO THE ENGINEER. THESE MUST BE SUBMITTED WITHIN TWO (2) WEEKS AFTER ACCEPTANCE OF WORK. FAILURE TO SUBMIT DRAWINGS WILL RESULT IN THE WORK BEING DONE BY THE OWNER AND THE COST DEDUCTED FROM THE FINAL PAYMENT. 10.6.3. AT SUBSTANTIAL COMPLETION, EMPLOY A COMPETENT (CADD) DRAFTS PERSON TO TRANSFER ALL DEVIATIONS, INCLUDING THOSE CALLED UP BY ADDITION, REVISIONS, CLARIFICATIONS, SHOP DRAWINGS, AND CHANGE ORDERS, ON A COPY OF TENDER CADD FILES, FROM THESE FILES PLOT A SET OF AS-BUILT MYLARS. DRAFTING QUALITY SHALL BE SAME AS ORIGINAL DRAWINGS. 10.6.4. THE CADD DISKS MAY BE BORROWED FROM THE ENGINEER. EACH "AS-BUILT" MYLAR SHALL BEAR THE CONTRACTORS IDENTIFICATION, THE DATE OF RECORD AND THE NOTATION "WE HEREBY CERTIFY THAT THESE DRAWINGS REPRESENT THE AS-BUILT RECORD OF CONSTRUCTION." THE CONTRACTORS SIGNATURE AND COMPANY SEAL SHALL BE PLACED BELOW THAT NOTATION.	10.7. SUBSTANTIAL COMPLETION REVIEW 10.7.1. ADVISE ENGINEER FIVE (5) DAYS PRIOR TO THE DATE REVIEW IS DESIRED. ALL SYSTEMS TO BE FULLY OPERATIONAL AND ANY DEFICIENCIES SHOULD BE NOTED TO THE ENGINEER. 10.7.2. ALL DEFICIENCIES SHALL BE COMPLETELY WITHIN TWO (2) WEEKS AFTER SUBSTANTIAL COMPLETION AND LETTER SUBMITTED TO ENGINEER WITHIN THE TIME ADVISING THAT THE WORK IS COMPLETE. FAILURE TO COMPLETE WORK WILL RESULT IN WORK BEING DONE BY THE OWNER AND THE COSTS DEDUCTED FROM FINAL PAYMENT.
1.9. STANDARD OF MATERIALS AND WORKMANSHIP	1.9.1. MAKE AND QUALITY OF MATERIALS USED ARE SUBJECT TO APPROVAL BY THE ENGINEER. REMOVE UNACCEPTABLE MATERIALS AND INSTALL SUITABLE MATERIALS IN THEIR PLACE. 1.9.2. MATERIALS SHALL BE NEW AND OF UNIFORM PATTERN THROUGHOUT, UNLESS NOTED OTHERWISE. 1.9.3. EMPLOY ONLY TRADESMEN PROPERLY LICENSED TO PERFORM THE SPECIFIC WORK. 1.9.4. PROVIDE THE FOLLOWING WHEN REQUIRED: 1.9.4.1. ITEM APPROVED MANUFACTURER ACCESS DOORS AJCUDOR, E.H. PRICE, MAXAM, STEEL, BROTHERS, MILCOR AUTOMATIC AIR VENT HOFFMAN, BRAUKMAN, SARCO, ARMSTRONG, MAID-O-MIST BACKFLOW PROTECTION WATTS, FEBCO, CLAYTON, BECCO, WILKINS CONTROLS (ELECTRIC) APPROVED BASE BUILDING CONTROLS CONTRACTOR DAMPER - LOW LEAKAGE AMERICAN WARMING, TAMCO DUCT SEAM SEALER DURO DINE S-2, ROSSONS DUCT SEAL DUCT SPIRAL AND FITTINGS UNITED SHEET METAL, B.C. VENTILATING, SPIRO-LOK EXPANSION JOINTS FLEXONICS, HYSPLAN, UNIROVAL, KEROL, MASON, GOODALL FANS DELHI, GREENHECK, ACME, LAU, PENN, CARSON FILTERS FARR, CONTINENTAL, CAMBRIDGE, AAF FIRE DAMPERS CANADIAN ADVANCED AIR, MAXAM, RUSKIN, CONTROLLED AIR, NAJOR-HART FIRE PROTECTION - SPRINKLERS APPROVED BASE BUILDING SPRINKLER CONTRACTOR FLEXIBLE AIR DUCT THERMOFLEX, WIREMOLD, FLEXMASTER GLASS, DIFFUSERS AND REGISTERS E.H. PRICE, KRUEGER, TITUS, CARNES INSULATION - DUCTPIPING FIBERGLAS, KNAUF, JOHNS-MANVILLE, ATLAS, PFG, MANSON, ARMSTRONG, ARMAFLEX JACKETING MATERIALS CHILDERS, FIBERGLAS, JOHNS-MANVILLE CRANE, GRINNELL, JENKINS, VICTAULIC CRANE, UNISTRUT, MYATT, L.E. TAYLOR, GRINNELL, SARCO SMITH, ENPOCO, ZURN, ANCON AMERICAN STANDARD, CRANE, CAMBRIDGE, KOHLER, ELJER, ALSONS BRADLEY, POWERS, SYMONS, MOEN, DELTA BRASSCRAFT, T&S BRASS, EMCO, ACOPI, LEONARD, BRIGGS KNORED, FRANK COMMERCIAL, CRANE, K.I.L., FIAT, KOHLER, ELJER AMERICAN STANDARD, WILLIAMS HANS, ARISTANERMAN, ELKAY, AQUARIUS, JUCUZZI, SUNROC, WESTERN SWAN, BRADLEY, SPEAKMAN, VALLEY, HYTEC, WATROUS, BRIGGS I.A.C., VIBRON, VIBRO ACOUSTICS RED & WHITE, CRANE, SARCO, ARMSTRONG, KITZ, MUELLER, PLENTY K.O. ENGINEERING, WESTERN MECHANICAL SERVICES, WAMCO, M.D.T., H.V.A.C. BALANCING CENOCO, BENEKE, BEMIS, OLSONITE, MOLDER, SPERZE RED & WHITE, GRINNELL, WATTS, HILLS MCCANNAN DEARBORN, CALGON, IPAC, PACE WILKINS, SLINGER, WATTS, CLAYTON, BERMAID	10.8. VIBRATION ISOLATION 10.8.1. PROVIDE VIBRATION ISOLATION FOR ALL MOTOR DRIVEN EQUIPMENT. TO MAINTAIN NOISE CRITERIA LEVELS AT OR BELOW ASHRAE RECOMMENDED LEVELS. 10.8.2. PROVIDE SPRING ISOLATOR FOR ALL MOTOR DRIVEN EQUIPMENT LARGER THAN 1/2 H.P. FOR EQUIPMENT 1/2 H.P. AND LESS NEOPRENE ISOLATORS MAY BE USED. 10.8.3. ALL ISOLATORS PROVIDED SHALL INCORPORATE SEISMIC RESTRAINTS. ISOLATORS FOR BASE MOUNTED EQUIPMENT SHALL BE SEISMIC ISOLATORS. 10.8.4. PROVIDE HORIZONTAL LIMIT SPRINGS ON ALL FANS (EXCEPT VERTICAL DISCHARGE) IN EXCESS OF 0.3" STATIC PRESSURE. 10.8.5. ALL FLOOR MOUNTED NON ISOLATED EQUIPMENT (IE. BOLTERS, TANKS, AIR HANDLING UNITS) SHALL BE BOLTED TO STRUCTURE AND BE DESIGNED FOR A 2G APPLIED HORIZONTAL FORCE. 10.8.6. SUBMIT SHOP DRAWINGS OF ISOLATOR WHICH ARE NOT SUPPLIED BY THE EQUIPMENT MANUFACTURER. 10.8.7. ALL ELECTRICAL CONNECTIONS TO EQUIPMENT TO BE PROVIDED WITH FLEXIBLE CONNECTORS AND CABLE WITH A MINIMUM 30 DEG. BEND OR FLEXIBLE CONDUIT. 10.8.8. PROVIDE FLEXIBLE DUCTWORK AND PIPING CONNECTIONS TO ALL EQUIPMENT WHICH INCORPORATES VIBRATION ISOLATIONS. 10.9. SOUND CONTROL 10.9.1. MAINTAIN MINIMUM 1/2" CLEARANCE AROUND PIPES. USE PLASTIC SLEEVE AT HORIZONTAL PENETRATION OF STUDS, WHERE CLEARANCE IS MINIMAL. USE RESILIENT INSULATION (ARMAFLEX) TO AVOID CONTACT BETWEEN PIPES (TO REDUCE RATTLING). DO NOT JAMB BX CABLE BETWEEN PIPE AND DRYWALL. DO NOT USE FOAM SPRAY ON PRODUCTS FOR INSULATION. 10.9.2. ISOLATE TOILETS ON WHITE 18" THICK NEOPRENE PADS, 40 DIAMETER (AVAILABLE DIE CUT FROM CUSTOM GASKETS 604-263-1426). PRIOR TO INSTALLATION, ENSURE FLOOR IS FLAT UNDER TOILET BASE. CENTRALLY LOCATE HOLD DOWN BOLTS IN TOILET CLEARANCE HOLES. USE NEOPRENE WASHER PROVIDED BY TOILET MANUFACTURER UNDER HOLD DOWN NUT ASSEMBLY AND DO NOT OVERTIGHTEN. 10.9.3. ENSURE THAT FIRST TOILET INSTALLED HAS ACCEPTABLE SUPPORT PRIOR TO CALLING AND INSTALLING REMAINDER OF TOILETS. 10.9.4. MEET ALL APPLICABLE CODES, INCLUDING SEISMIC. USE CABLE RESTRAINTS ONLY ON ISOLATED PIPING AND EQUIPMENT. DO NOT BRIDGE ISOLATION ELEMENTS. 10.9.5. AVOID ALL CONTACT BETWEEN PLUMBING AND FRAMING/DRYWALL. FRAME ALL PLUMBING CHASES AND DROP CEILING PLUMBING CAVITIES AT LEAST 1" LARGER THAN MAXIMUM INSULATED COLLAR SIZE OF PIPING IN CAVITY. LOOSELY INSULATE CAVITY WITH RUL ON EACH SIDE OF PIPE. IF REQUIRED FOR AIR QUALITY, WRAP INSULATION WITH 2 MIL VAPEX. AVOID COMPRESSION OF INSULATION BETWEEN PIPING AND DRYWALL. SEPARATE INSULATION ON EACH SIDE OF PIPE, WHERE PLUMBING CHASES ARE IN BEDROOMS OR LIVING ROOMS. PROVIDE TWO LAYERS OF DRYWALL.	
1.10. OWNER SUPPLIED EQUIPMENT	1.10.1. PROVIDE ROUGH-IN FOR AND MAKE ALL CONNECTIONS TO EQUIPMENT SUPPLIED BY OTHERS. 1.10.2. MAKE ALL MECHANICAL CONNECTIONS TO EQUIPMENT SUPPLIED BY OTHERS UNDER THIS CONTRACT. THIS SHALL INCLUDE ALL WATER, DRAIN, GAS, EXHAUST, TRAPS, DUCTWORK AND SIMILAR CONNECTIONS REQUIRED. PROVIDE ISOLATION VALVES, UNIONS, FLANGES AND TRAPS AS REQUIRED FOR A COMPLETE INSTALLATION. 1.10.3. CHANGE TO ROUGH-IN OF SERVICES OR FINAL EQUIPMENT CONNECTIONS DUE TO A CHANGE IN THE MAKE OF EQUIPMENT FROM THAT SPECIFIED SHALL BE MADE AT NO EXTRA COST TO THE OWNER, PROVIDED THAT PROPER SHOP DRAWINGS ARE AVAILABLE FOR ROUGH-IN, PRIOR TO COMMENCING INSTALLATION OF ROUGH-IN FOR THE EQUIPMENT, COORDINATE WITH THE FINAL REVISED EQUIPMENT SHOP DRAWINGS AND WITH THE MANUFACTURER. 1.10.4. EXPOSED PIPING SHALL BE PAINTED AS PER ARCHITECT'S INSTRUCTIONS. 1.10.5. ARRANGE PIPING CONNECTIONS TO ALLOW FOR EQUIPMENT REMOVAL.	11. SEISMIC RESTRAINTS 11.1. PROVIDE SEISMIC RESTRAINT ON ALL PIPING, DUCTWORK AND EQUIPMENT TO SATISFY ALL CODES AND AUTHORITIES HAVING JURISDICTION. 11.2. SUBMIT SHOP DRAWINGS OF ALL SEISMIC RESTRAINT DETAILS PREPARED AND SEALED BY A PROFESSIONAL ENGINEER, PRIOR TO SUBSTANTIAL COMPLETION. THIS PROFESSIONAL ENGINEER FOR SEISMIC DESIGN SHALL VISIT THE SITE TO VERIFY SEISMIC RESTRAINT INSTALLATION AND PROVIDE A LETTER OF CONFORMANCE IN ACCORDANCE WITH THE APPLICABLE BUILDING CODE. 11.2.1. PIPING DUCTWORK AND EQUIPMENT SHALL BE RESTRAINED IN ACCORDANCE WITH THE LATEST EDITION OF THE SEISMIC RESTRAINTS MANUAL FOR MECHANICAL SYSTEMS PRODUCED BY SMACNA, AND THE LATEST EDITION OF THE ASHRAE APPLICATION HANDBOOK CHAPTER 49, SEISMIC RESTRAINTS. 11.2.2. THE CONTRACTOR SHALL OBTAIN APPROVAL FOR THE LOCATION OF ALL RESTRAINT FIXING POINTS FROM THE STRUCTURAL ENGINEER, ON SITE, PRIOR TO INSTALLATION. 11.2.3. WHERE EQUIPMENT IS MOUNTED ON SPRING OR R.I.S. MOUNTS FOR VIBRATION ISOLATION IT SHALL BE THE RESPONSIBILITY OF THE MANUFACTURER OF THE MOUNT TO INCORPORATE SEISMIC RESTRAINT. 11.2.4. THESE RESTRAINTS SHALL BE MULTIDIRECTIONAL AS DESCRIBED IN THE GUIDELINES SPECIFIED ABOVE. 11.2.5. PROVIDE STEEL FRAME BASES WHERE NECESSARY TO ACHIEVE THIS AND ALSO AVOID OVERTIGHTENING. 11.2.6. THE MANUFACTURER SHALL SUPPLY CERTIFICATES, SIGNED BY A PROFESSIONAL ENGINEER REGISTERED WITHIN THE JURISDICTION, VERIFYING THE DESIGN OF THE SEISMIC RESTRAINTS IN ACCORDANCE WITH THIS SECTION. 11.2.7. WHERE EQUIPMENT IS LOCATED WITHOUT VIBRATION ISOLATION FITTINGS ALL SUCH EQUIPMENT SHALL BE RIGIDLY FIXED WITH HOLDING DOWN BOLTS OF SUFFICIENT STRENGTH TO RESTRAIN SEISMIC ACTION. 11.2.8. HOLDING DOWN BOLTS SHALL BE PACKED WITHIN SLOTS TO PREVENT MOVEMENT PRIOR TO RESTRAINT COMMENCING. 11.2.9. BOLTS SHALL BE OF SUFFICIENT STRENGTH TO WITHSTAND OVERTURNING OF THE EQUIPMENT DURING SEISMIC DISTURBANCE.	11. CONTROL SYSTEM ELECTRIC 11.1. GENERAL 11.1.1. PROVIDE COMPLETE CONTROL SYSTEM FOR ELECTRICAL CONTROLS AS SPECIFIED HEREIN. 11.1.2. THE MOTOR LIST AND WORK STATED THERE ON FORMS PART OF THE CONTRACT DOCUMENT. 11.1.3. DIV 16 TO PROVIDE WIRING TO 120V/1 PHASE MOTOR & ALSO THE WIRING BETWEEN SUCH MOTOR & ITS CONTROL DEVICE SUCH AS THERMOSTAT AND TIME CLOCK. ALL OTHER WIRING TO BE PROVIDED BY DIV 15 THE MOTOR LIST SCOPE OF WORK SHALL BE FOLLOWED. 11.1.4. ALL DIV 15 WIRING & CONDUIT REQUIREMENTS TO FOLLOW DIV 16 SPECIFICATIONS FOR THIS PROJECT. THIS SHALL INCLUDE LOW-VOLTAGE WIRING. 11.1.5. MOUNTING OF CONTROL DEVICES. 11.1.5.1. BY ELECTRICAL CONTRACTOR - MOUNTING AND WIRING THERMOSTATS CONTROLLING SINGLE PHASE MOTOR. WIRING OF AQUASTATS AND TIMERS CONTROLLING SINGLE PHASE MOTORS. 11.1.5.2. BY MECHANICAL CONTRACTOR - MOUNTING OF ALL IN-LINE PIPING DEVICES (WELL, VALVES, PRESSURE SWITCHES, ORIFICES, ETC.), MOUNTING OF AQUASTATS AND ALL CONTROL DEVICES. 11.1.5.3. BY SHEET METAL CONTRACTOR - MOUNTING OF DAMPERS, BAFFLING IN MIXED AIR PLENUM TO CONTROL CONTRACTOR REQUIREMENTS, ACCESS DOOR FOR DUCT OR UNIT MOUNTED CONTROLS.
1.11. RECORD DRAWINGS	1.11.1. KEEP ON SITE AN EXTRA SET OF WHITE PRINTS AND SPECIFICATIONS, RECORDING CHANGES AND DEVIATIONS DAILY. 1.11.2. UPON COMPLETION OF WORK, SUBMIT FINAL RECORD DRAWINGS TO THE ENGINEER. THESE MUST BE SUBMITTED WITHIN TWO (2) WEEKS AFTER ACCEPTANCE OF WORK. FAILURE TO SUBMIT DRAWINGS WILL RESULT IN THE WORK BEING DONE BY THE OWNER AND THE COST DEDUCTED FROM THE FINAL PAYMENT. 1.11.3. AT SUBSTANTIAL COMPLETION, EMPLOY A COMPETENT (CADD) DRAFTS PERSON TO TRANSFER ALL DEVIATIONS, INCLUDING THOSE CALLED UP BY ADDITION, REVISIONS, CLARIFICATIONS, SHOP DRAWINGS, AND CHANGE ORDERS		