MECHANICAL Permit

City of Edmonds
121 5th Ave N, Edmonds WA 98020
www.edmondswa.gov / 425.771.0220

PERMIT NUMBER
BLD2020-0304

Type: **MECHANICAL** Owner/ Business: **BARC PROPERTIES LLC** Status: **ISSUED**

Subtype: **COMMERCIAL MECHANICAL**

Parcel No: **00373600501902**	Site Address: **8401 MAIN ST EDMONDS,WA 98026-6919**		Applied: **3/11/2020**
Subdivision: **003736, 006474, 006377**		Lot: **0**	Issued: **3/24/2020**
Fire Sprinklers:	Lot Area:	Zoning: **BN**	Final:
Valuation: **$0.00**	Occupancy Type:	Construction Type:	Expiration Date: **9/20/2020**
Code Edition: **0**	No. Stories: **0**	# of Dwelling Units: **0**	Issued by: **NED**

Scope of Work: **BARC- MECHANICAL**

WA State Contractor L & I #: JOHANMI173PK City of Edmonds Business License #: 602454996-001-0001

CONTACTS

NAME TYPE	NAME	ADDRESS	PHONE	EMAIL
APPLICANT	JOHANSEN MECHANICAL	20109 144th AVE, WOODINVILLE WA 98072	(425)481-2266	bids-submittals@johansenmech.com
CONTRACTOR	JOHANSEN MECHANICAL	20109 144th AVE, WOODINVILLE WA 98072	(425)481-2266	bids-submittals@johansenmech.com
OWNER	BARC PROPERTIES LLC	23200 EDMONDS WAY, EDMONDS WA 98026-8623		

FEE INFORMATION

DESCRIPTION	ACCOUNT	AMOUNT	PAID	PAID DATE	RECEIPT #
1 - BASE FEE FOR MECHANICAL PERMITS	001.000.322.10.000.00	$50.00	$50.00	3/24/20	R4587
AIR CONITIONING SYSTEM OR HEAT PUMP - 1.75 BTU OR LESS	001.000.322.10.000.00	$50.00	$50.00	3/24/20	R4587
CITY TECHNOLOGY FEE CHARGED PER PERMIT	001.000.321.99.100.00	$40.00	$40.00	3/24/20	R4587
FAN CONNECTED TO SINGLE DUCT	001.000.322.10.000.00	$90.00	$90.00	3/24/20	R4587
MECHANICAL PLAN REVIEW FEE	001.000.345.83.000.00	$165.00	$165.00	3/24/20	R4587
	TOTALS:	$395.00	$395.00		

CONDITIONS

CONDITION TYPE	STATUS	NOTES

2020-0304

MECHANICAL Permit

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ALL BUILDING PERMITS	FOR INFORMATION	1- HOLD HARMLESS - Applicant on behalf of his or her spouse heirs assigns and successors in interests, agrees to indemnify defend and hold harmless the City of Edmonds, Washington, its officials, employees, and agents from any and all claims for damages of whatever nature, arising directly or indirectly from the issuance of this permit. Issuance of this permit shall not be deemed to modify, waive or reduce any requirements of any City ordinance nor limit in any way the City's ability to enforce any ordinance provision. 2 - PERMIT DISCLOSURE - Any request for alternate design, modification, variance or other administrative deviation from adopted codes ordinances or policies must be specifically requested in writing and be called out and identified. Processing fees for such requests shall be established by Council and shall be paid upon submittal and are nonrefundable. 3- SOUND OR NOISE - Sound/Noise originating from temporary construction sites as a result of construction activity are exempt from the noise limits of ECC Chapter 5.30 only during the hours of 7:00am to 6:00pm on weekdays and 10:00am to 6:00pm on Saturdays, excluding Sundays and Federal Holidays. At all other times the noise originating from construction sites/activities must comply with the noise limits of Chapter 5.30, unless a variance has been granted pursuant to ECC 5.30.120. 4 - OCCUPANCY - Final approval on a project or final occupancy approval must be granted by the Building Official prior to use or occupancy of the building or structure. Check the job card for all required City inspections including final project approval and final occupancy inspections.
ELECTRICAL PERMIT	FOR INFORMATION	Obtain Electrical Permit from State Department of Labor and Industries 425-290-1309.
MANUFACTURER SPECS	FOR INFORMATION	Installation, use and maintenance of equipment and components shall be per manufacturers specifications, installation instructions, and applicable state codes. Provide manufactures installation instructions on site for Building Inspector.

INSPECTIONS

SEQID	INSPECTION TYPE	INSPECTOR	COMPLETED DATE	RESULT	NOTES
	X-0 MECH FINAL**				
	B-3 MECH EQUIP ATTACHMENT				
	B-3 MECH ROUGH IN				
	B-7 BUILDING OTHER INSP				

BLD2020-0304

BUILDING PERMIT APPLICATION

Development Services
Building Division
121 5th Ave N / Edmonds, WA 98020
425.771.0220

For handouts, submittal requirements, permit status and inspection scheduling information go to: www.edmondswa.gov.

PLEASE NOTE: Intake appointments are required for *New* Single Family Residences, *Large* Additions, ADU's, *New* Commercial, and *Major* Tenant Improvement application submittals. If plans are prepared by a professional, electronic files are requested in addition to the hard copies. Please bring electronic files on a flash drive or coordinate for electronic transfer.

Please call 425-771-0220 to schedule an intake appointment!

JOB SITE INFORMATION/LOCATION: (Where the work is taking place)

Job Site Address: 8401 Main St

Parcel: 00373600501902

Lot /Unit/Suite #: _____ Subdivision: _____

PROPERTY OWNER:

Name: BARC Properties LLC

Mailing Address: 8401 Main St

City/State/Zip: Edmonds WA 98026

Phone #: _____

Email: _____

OWNER INSTALLATION: *If yes, read and sign*

Will work be performed by the property owner? ☐ Yes ☒ No

I own, reside in, or will reside in the completed structure. This installation is being made on property that I own which is not intended for sale, lease, rent, or exchange according to RCW 18.27.090.

Owner Signature: _____

APPLICANT / CONTACT INFORMATION:

Name of Applicant: Johansen Mechanical Inc.

Mailing Address: 20109 144th Ave

City/State/Zip: Woodinville WA 98072

Phone #: (425) 481-2266

E-mail: bids-submittals@johansenmech.com

GENERAL CONTRACTOR: (If different from applicant)

General Contractor: Johansen Mechanical Inc.

Mailing Address: 20109 144th Ave

City/State/Zip: Woodinville WA 98072

Phone #: (425) 481-2266

E-mail: bids-submittals@johansenmech.com

STATE UBI #: 600-495-164

CITY OF EDMONDS BUSINESS LICENSE #: NR-026070

WA STATE CONTRACTOR L & I #: (CCB) & EXPIRATION DATE:
JOHANMI173PK

Office Use Only

Permit #: 2020-0304

TYPE OF PERMIT (Provide Details on Page 2)

☐ Accessory Structure/ Detached Garage	☐ Addition
☐ Demolition	☒ Mechanical
☐ New Single Family / Duplex	☐ Plumbing
☐ Fire Sprinkler	☐ Remodel
☐ New Commercial/ Mixed Use	☐ Re-Roof
☐ Signs	☐ Tank
☐ Tenant Improvement	☐ Other _____

Remodel Permit fees are based on:

The value of the work performed. Indicate the value (rounded to the nearest dollar) of all equipment, materials, labor, overhead, and the profit for the work indicated on this application.

Valuation: $41,000

PROPOSED NEW SQUARE FOOTAGE FOR THIS APPLICATION

Basement sq ft:	Finished ☐ Unfinished ☐
1st Floor, sq ft:	
2nd Floor, sq ft:	
Garage/Carport:, sq ft:	
Deck/Covered Porch/Patio:	
Other sq ft:	

PROJECT DESCRIPTION

Install new ductwork from existing rooftop units to serve exam rooms and CT scan areas. Install new rooftop unit with ductwork to serve operating room

I certify that the information I have provided on this form/application is true, correct and complete, and that I am the property owner or duly authorized agent of the property owner to submit a permit application to the City of Edmonds.

Print Name: Andrew Johansen

Signature: _____ **Date** 3/10/2020

GENERAL COMMERCIAL DATA

Occupancy Group(s):	Occupant Load(s):
Type(s) of Construction:	Fire Sprinklers: Yes ☐ No ☐

WA STATE ENERGY CODE: If your project affects the building envelope, mechanical systems, and/or lighting, you must complete the appropriate WSEC forms.

DEFERRED SUBMITTALS: All commercial building permits that will require associated plumbing, mechanical, fire sprinkler, and/or fire alarm permits are applied for separately.

TI / CHANGE OF USE / NEW BLDG: Include TRAFFIC IMPACT worksheet

MECHANICAL EQUIPMENT COUNTS (New and Relocated)

	BTUs	Gas / Elec / Other	Qty
A/C Unit /Compressor			
Air Handler /VAV			
Boiler			
Dryer Duct			
Exhaust Fans			7
Fireplace			
Furnace			
Heat Pump Unit			
Hydronic Heating			
Roof Top Unit (Provide elevations if a Commercial Bldg)			1
Other:			

PLUMBING FIXTURE COUNTS (New, Relocated or re-piped)

	Qty		Qty
Clothes Washer		Tub/ Showers	
Dishwasher		Backflow Device (RPBA, DCDA, AVB)	
Drinking Fountain		Pressure Reduction/ Regulator Valve	
Floor Drain/Sink		Refrigerator Water Supply	
Hose Bibs		Water Heater - Tankless? Y or N	
Hydronic Heat		Water Service Line	
Sinks		Other:	
Toilets		Other:	

GAS/FUEL CONNECTION COUNTS (New, Relocated or re-piped)

	BTUs	Qty		BTUs	Qty
A/C Unit			Outdoor BBQ / Fire pit		
Boiler			Stove/Range/Oven		
Dryer			Water Heater		
Fireplace/ Insert			Other:		
Furnace			Other:		

MEDICAL GAS, AIR VACUUM COUNTS (New, Relocated or re-piped)

	Qty		Qty
Carbon Dioxide		Nitrous Oxide	
Helium		Oxygen	
Medical Air		Other:	
Medical - Surgical Vacuum		Other:	

DEMOLITION

Type of structure to be demolished:

Square footage of structure to be demolished:

AHERA Survey done? Y / N	PSCAA Case #:

Critical Areas Determination:
Study Required ☐ Conditional Waiver ☐ Waiver ☐

TANK

Fill in Place ☐ Fill Material: _____

Removal ☐	Size of Tank (Gallons) _____

Critical Areas Determination:
Study Required ☐ Conditional Waiver ☐ Waiver ☐

GRADE/FILL/EXCAVATE

Grading: Cut _____ cubic yards

Fill _____ cubic yards

Cut / Fill in Critical Area: Yes ☐ No ☐

GENERAL PROVISIONS

APPLICATIONS: Applications are valid for a maximum of 1 year. ESLHA Applications, 2 years.

LICENSING: All contractors and subcontractors are required to be licensed with Washington State Department of Labor & Industries and have a current City of Edmonds Business License.

Mechanical Summary — MECH-SUM

2015 Washington State Energy Code Compliance Forms for Commercial Buildings including R2 & R3 over 3 stories and all R1 — Revised January 2017

Project Information

Project Title:	**BARC Vet Clinic**
Date	**3/3/2020**
Applicant Information. Provide contact information for individual who can respond to inquiries about compliance form information provided.	For Building Dept. Use
Company Name:	**Johansen Mechanical Inc**
Company Address:	**20109 144TH Ave NE - Woodinville, WA 98072**
Applicant Name:	
Applicant Phone:	**425-481-2266**

Project Description

Briefly describe mechanical systems in the text box provided

☐ Total Bldg Performance (TBP)

This path includes all mandatory provisions per C401.2 Option 2. MECH-SUM, MECH-CHK, and C407 Energy Analysis forms required.

☐ New Building ☐ Building Addition ☑ Tenant Improvement ☐ System Retrofit ☐ No System Changes

Install new ductwork from existing rooftop units to serve exams rooms and CT scan areas. Install new rooftop unit with ductwork to serve operating room.

Design Load Calculations

☑ Load calculation summary ☐ MECH-LOAD-CALC Form

Provide design load calculations for all mechanical systems and equipment serving the building heating, cooling or ventilating needs. If a load calculation summary is provided with the permit documents that includes all applicable compliance information then the MECH-LOAD-CALC form is not required.

Mechanical Schedules

☑ Mechanical Plans ☐ MECH-EQ Forms (TBD)

Indicate location of equipment compliance information. If provided on plans then MECH-EQ forms are not required, however, include on plans all applicable compliance information listed in MECH-EQ tables.

Dedicated Outdoor Air System Requirements and High Efficiency VAV Alternate

☐ DOAS is required per C403.6 effective July 1, 2017 (office, retail, education, library and fire station occupancies)

All occupied, conditioned areas shall be served by a DOAS that delivers required ventilation air in a manner that does not require space conditioning fan operation. Space conditioning fans cycled off when no heating or cooling is required.

- ☐ Ventilation provided via natural ventilation per 2015 IMC in lieu of DOAS (C403.6, Exception 1)
- ☐ Ventilation and space conditioning provided by a HEVAV system per C403.7 in lieu of DOAS (C403.6, Exception 2)

☐ DOAS included in project, although not required (occupancy not office, retail, education, library or fire station)

☐ DOAS related allowances included in project:

- ☐ Prescriptive vertical fenestration maximum area allowance increased to 40% per C402.4.1.4 with 100% of conditioned floor area in building served by DOAS.
- ☐ Exception to air economizer per C403.3 Exception 1, include MECH-ECONO form.

Fan Power

☑ Project includes HVAC air distribution systems that provide heating and/or cooling

If yes, provide a MECH-FANSYS -SUM form.

☐ For one or more systems, the total fan motor nameplate hp of all fans in HVAC system exceeds 5hp.

If yes, provide a seperate MECH-FANSYS form for each HVAC system exceeding the 5 horsepower threshold. Refer to Section C403.2.11 and MECH-FANSYS-DOC for requirements and exceptions.

HVAC Hydronic Systems

☐ Hydronic chilled water ☐ Water-loop heat pump ☑ No hydronic systems

☐ Hydronic heating water ☐ Geothermal

C406 Additional Efficiency Options - Mechanical

☐ C406.2 More efficient HVAC equipment and fan systems

Requires 90% of heating and cooling capacity to be equipment listed in tables C403.2.3(1)-(9) or air-to-water heat pumps and heat recovery chillers. All equipment listed in tables C403.2.3(1)-(7) must be 15% more efficient than minimum requirements. All stand alone supply, return, and exhaust fans over 1hp must have FEQ ≥ 71 and must be selected within 10% of maximum total or static pressure.

☐ C406.6 Dedicated outdoor air system (DOAS)

Requires 90% of conditioned floor area to be served by a DOAS per C403.6 that delivers required ventilation air in a manner that does not require space conditioning fan operation.

☐ C406.7 Reduced energy in service water heating

Requires 90% of floor area be in occupancy types listed in C406.7.1 and that 60% of annual hot water energy use be provided by heat pump, waste heat recovery or solar water-heating systems.

BLD2020-0304

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BUILDING

Mechanical Summary, pg. 2 — MECH-SUM

2015 Washington State Energy Code Compliance Forms for Commercial Buildings including R2 & R3 over 3 stories and all R1 — Revised January 2017

Service Water Heating Systems

Equipment Type (s)

- ☐ Hot water heating tank(s)
- ☐ Instantaneous
- ☑ No service water systems
- ☐ Dedicated boiler
- ☐ Heat exchange from space heat boiler or central hot water/steam

Distribution Type (s)

- ☐ Circulation System
- ☐ On-demand

Commissioning

Commissioning is required for:

- ☐ Mechanical systems per C408.2
- ☐ Service water heating systems per C408.4

If required, commissioning shall be performed for all applicable systems regardless of individual equipment capacity.

Exceptions to commissioning requirements:

- ☐ Total output capacity of all mechanical space conditioning systems in the building do not exceed 240,000 Btu/h cooling or 300,000 Btu/h heating. Mechanical systems commissioning not required.
- ☐ Capacity of largest service water heating system in building does not exceed 200,000 Btu/h. Service water heating systems commissioning not required.

Low Energy and Semi-Heated Spaces (Note 6 and 7)

Space Type	Location in Plan(s)	Space(s) Served	Area Served, square feet	Heating Capacity, Btu/h (Note 4)	Cooling Capacity, Btu/h (Note 5)	Peak Space Conditioning Capacity, Btu/h-sf	Compliance Check	Notes

Note 4 - Provide total installed heating output capacity of systems serving Low Energy or Semi-Heated space(s) in btuh.
Note 5 - Provide total installed cooling capacity of system serving Low Energy space(s) in Btu/h. Not allowed for semi-heated spaces. Enter 0 if no cooling.
*Note 6 - Refer to Section C402.1.1 Low Energy Building. Intalled peak space conditioning capacity, heating or cooling, may not exceed 3.4 Btu/h*sf.*
*Note 7 - Refer to Section C402.1.1.1 and Semi-Heated Space definition in Chapter 2. Total heating output capacity may not exceed 8 Btu/h*sf. Only systems without electric resistance heating and no cooling are eligible for the wall insulation exception under semi-heated.*

Mechanical Permit Plans Checklist — MECH-CHK

2015 Washington State Energy Code Compliance Forms for Commercial Buildings including R2 & R3 over 3 stories and all R1 — Revised January 2017

Project Title:	BARC Vet Clinic	Date	3/3/2020

The following information is necessary to check a permit application for compliance with the mechanical systems and equipment requirements of the Washington State Energy Code, Commercial Provisions.

Applicable (yes,no,na)	Code Section	Code Provision	Information Required - *Must be in permit documents*	Location in Documents	Building Department Notes
Equipment - Sizing, Performance and Type					
NA	C403.1	Exempt process equipment	Identify equipment to be used in manufacturing, industrial or commercial processes that do not provide space conditioning; identify provisions applicable to this equipment per C403.1 exception		
yes	C403.2.1	Load calculations	Provide load calculations performed per ASHRAE Std 183 or equivalent, using design parameters per C302 and Appendix C; include load adjustments to account for energy recovery	load calc sheets	
yes	C403.2.2	Equipment and system sizing	Indicate that output capacities of heating and cooling equipment and systems are no greater than the smallest available equipment size that exceeds the calculated loads; note exceptions taken	M1.0, M2.0	
yes	C403.2.3 C403.2.3.2 C403.2.13.1	HVAC equipment performance requirements (efficiency)	Provide equipment schedules on plans or complete MECH-EQ forms indicating type, capacity, rated and WSEC minimum efficiencies for all heating and cooling equipment; include supply and OSA cfms and operating hours for all air systems; identify heating and cooling equipment that does not have a corresponding WSEC minimum efficiency (manufacturer rated)	M1.0, M2.0	
na	C405.8 C403.2.14	Electric motor efficiency	List all motors ≥ 1/12 hp (that are not integral to a rated piece of equipment) in the mechanical or electrical equipment schedules on plans; indicate hp, rpm, number of poles and rated efficiency, or exception applied		
			For fractional hp motors (1/12 - 1 hp), indicate whether they are an electronically commutated motor, have rated efficiency of at least 70%, or exception taken		
na	C403.2.11.1	Fan power limitation	For all HVAC fan systems that provide heating and / or cooling, provide system total nameplate hp in MECH-FANSYS-SUM form		
			For all applicable HVAC systems with total fan motor hp > 5hp, verify fan system motor hp or bhp complies with fan power limits per equations in Table C403.2.11.1(1), provide MECH-FANSYS form for each system		
na	C403.2.11.2	Motor nameplate hp	For all applicable HVAC systems with total fan motor hp > 5hp, indicate fan motors specified are the smallest available motor hp size greater than fan bhp, note exceptions taken		
na	C403.2.11.3	Fan efficiency	For all applicable HVAC systems with total fan motor hp > 5hp, identify in equipment schedule all fans required to comply with fan efficiency grade and indicate rated FEG is ≥ 67, or exception taken; indicate these fans are sized so total efficiency is within 15% of the fan maximum total efficiency		
na	C403.2.11.4	Group R occupancy exhaust fan efficacy	For all exhaust fans < 400 cfm in Group R occupancies, indicate in equipment schedule the fan flow rate and efficacy (cfm/watt), or exception taken; refer to Table C403.2.11.4 (CE-57)		
na	C403.2.13	Variable flow capacity - fans	For fan motors ≥ 7.5 hp, indicate method of variable flow control (VSD or equivalent method) in equipment schedule, or exception taken; for equivalent method for an HVAC system refer to HVAC System Controls for additional requirements		
na	C403.2.3	Maximum air cooled chiller capacity	For chilled water plants and buildings with > 500 tons of cooling capacity, indicate air-cooled chiller capacity is ≤ 100 tons, or exception taken		
na	C403.4	Large capacity cooling systems	For buildings with ≥ 300 tons of cooling capacity, indicate method of multi-stage or variable capacity control (VSD, multiple staged compressors, or max capacity of any single unit < 66% of the total)		
na	C403.2.3.1	Non-standard water-cooled centrifugal chillers	For water-cooled centrifugal chillers not designed for operation at standard conditions, provide calculations documenting maximum full load and part load rated equipment performance requirements		
na	C403.2.13.1 C403.4.3.2	Centrifugal fan open-circuit cooling towers	For open-circuit centrifugal fan cooling towers with ≥ 1,100 gpm capacity, indicate cooling towers comply with efficiency requirements for axial fan open circuit cooling towers		
na	C403.4.2 C403.4.2.5	Large capacity boiler systems	For single boilers with > 500,000 Btu/h capacity, indicate multi-stage or modulating burner		
			For boiler system (single or multiple) with > 1,000,000 Btu/h capacity, indicate turndown ratio per Table C403.4.2.5 and method (multiple single input boilers, modulating boilers, or combination)		
na	C403.2.13	Variable flow capacity - pumps	For pump motors ≥ 7.5 hp, indicate method of variable flow control (VSD or equivalent method) in equipment schedule, or exception taken; for equivalent method for a hydronic system refer to Hydronic System Controls for additional requirements		
na	C403.2.3	Gas and oil-fired forced air furnace and unit heaters	For forced air furnaces with capacity ≥ 225,000 Btu/h and all unit heaters, indicate in equipment schedule intermittent ignition or IID, flue or draft damper, and rated jacket loss		
na	C403.2.4.8	Combustion heating equipment	For combustion heating equipment with output capacity > 225,000 Btu/h, indicate modulating or staged combustion control		
na	C403.2.3.3	Packaged electric heating / cooling equipment	Verify all packaged electric equipment with > 6,000 Btu/h cooling capacity and any amount of heating is a heat pump; include in equipment schedules		
na	C403.2.12	Heating outside a building	Indicate systems providing heating in non-enclosed outdoor occupied spaces are radiant systems; refer to HVAC System Controls for additional requirements		
na	C403.2.7.1	Kitchen exhaust hoods	Indicate on plans the type, duty and exhaust air rate of each kitchen hood, refer to HVAC System Controls for additional requirements		
Yes	C403.2.4.3	Outdoor supply air, exhaust and relief dampers	Indicate locations of OSA intake, and exhaust and relief outlet dampers on plans; indicate whether dampers are Class 1 motorized, or gravity and exception taken (include leakage rating, cfm/sf); refer to HVAC System Controls for additional requirements for OSA dampers		
na	C403.2.4.3	Return air dampers	Indicate locations of return air dampers that are integral to economizer operation; verify dampers are motorized; indicate whether dampers are Class 1, or within packaged equipment eligible for leakage rating exception (include leakage rating, cfm/sf)		

Mechanical Permit Plans Checklist

MECH-CHK

2015 Washington State Energy Code Compliance Forms for Commercial Buildings including R2 & R3 over 3 stories and all R1

Revised January 2017

Project Title:	**BARC Vet Clinic**	Date	3/3/2020

The following information is necessary to check a permit application for compliance with the mechanical systems and equipment requirements of the Washington State Energy Code, Commercial Provisions.

Applicable (yes,no,na)	Code Section	Code Provision	Information Required - *Must be in permit documents*	Location in Documents	Building Department Notes
na	C403.2.4.3	Stairway and shaft vent dampers	Indicate location of stairway and shaft vent dampers on plans; verify dampers are Class 1 motorized; refer to HVAC System Controls for additional requirements		
na	C403.2.4.4	Zone isolation dampers	For systems serving areas > 25,000 sf or spanning more than one floor, that include areas that are expected to be occupied non-simultaneously; identify isolation zone areas on plans and locations of associated isolation dampers in HVAC distribution system; refer to HVAC System Controls for additional requirements		
na	C403.2.3.4	Humidification	For cooling systems with humidification equipment that are also required to have air economizer, indicate humidifier is adiabatic (direct evaporative or fog atomization), or exception taken		
Additional Efficiency Package Option, More Efficient HVAC Equipment & Fan Performance - Must comply with all 3 provisions to be eligible					
na	C406.2.1 C403.2.3	HVAC system selection	To comply with additional efficiency package option, calculate the percentage of heating and cooling equipment in the project (based on output capacity) that do not have a corresponding WSEC listed efficiency; shall be less than 10% to comply		
na	C406.2.2 C403.2.3	Minimum equipment efficiency	To comply with additional efficiency package option, indicate that all listed heating and cooling equipment have a rated efficiency that exceeds WSEC listed efficiency by at least 15%		
na	C406.2.3 C403.2.11.3	Minimum fan efficiency	To comply with additional efficiency package option, indicate rated FEG of stand alone fans is ≥ 71; indicate these fans are sized so the fan efficiency at design conditions is within 10% of the maximum total or static efficiency		
HVAC System Controls					
yes	C403.2.4.1	Thermostatic controls (thermostats and humidistats)	Indicate locations of thermostatic and humidity control devices and the zones they serve on plans, including perimeter system zones	M2.0	
			Where adjacent (neighboring) zones are controlled by separate thermostats (including perimeter systems used to offset heat gain or loss), and are connected by permanent openings > 10% of either zone sf area, indicate controls configured to prevent adjacent zones from operating in conflicting modes (one in heat, other in cool); applies to adjacent perimeter zones, adjacent nonperimeter zones, and adjacent perimeter and nonperimeter zones		
			If applying Exception 2 to nonperimeter zones adjacent to perimeter zones, indicate that setpoints and deadband settings in these zones are coordinated so cooling in a nonperimeter zone does not occur until the temperature in that zone is 5°F higher than the adjacent perimeter zone temperature in heating		
na	C403.2.4.1.1	Heat pump supplementary heat	Indicate staged heating operation with compression as the first stage of heating and supplemental heating controlled with outdoor lock-out temperature set to 40°F or less		
Yes	C403.2.4.1.2	Deadband	Indicate zone thermostatic controls configured with 5°F minimum deadband for systems that control both heating and cooling	M1.0	
na	C403.2.4.1.3	Setpoint overlap restriction (thermostats)	If separate heating and cooling systems with separate thermostatic control devices are used to serve a zone, indicate locations of both thermostatic control devices and the zone they serve on plans		
			Indicate a limit switch, mechanical stop or DDC control with programming to prevent simultaneous heating and cooling		
NA	C403.2.4.2 C403.2.4.2.1 C403.2.4.2.2	Automatic setback and shutdown	Indicate zone thermostatic controls configured with required automatic setback and manual override functions, setback temperatures, and control method (automatic time clock or programmable controls); note exceptions taken		
na	C403.2.4.2.3	Automatic (optimum) start	Indicate system controls that adjust equipment start time required to bring each area served up to design temperature just prior to scheduled occupancy		
na	C403.2.4.3	Outdoor supply air dampers	Indicate automatic controls configured to close OSA damper during unoccupied equipment operation; not including economizer cooling, night flush or IMC required OSA / exhaust		
na	C403.2.4.3	Stairway and shaft vent dampers	Indicate method of activation of stairway and shaft vent dampers (fire alarm or interruption of power)		
na	C403.2.4.4	Zone isolation controls	For systems serving areas > 25,000 sf or spanning more than one floor, that include areas that are expected to be occupied non-simultaneously; indicate controls that allow for independent space conditioning of isolation zones; or exception taken		
na	C403.2.12	Heating outside a building	Indicate occupancy sensing or timer switch controls configured to automatically shut off heating system when area served is unoccupied		
na	C403.2.4.5	Snow melt systems	Indicate automatic controls configured to shut off system when pavement temperature exceeds 50°F and no precipitation is falling, and when outdoor air temperature exceeds 40°F		
na	C403.2.4.6	Freeze protection system controls	Indicate automatic controls to shut off system when outdoor temperature exceeds 40°F, or conditions protect fluid from freezing		
na	C403.2.4.9	Group R1 hotel / motel guest rooms	For hotels and motels with over 50 guest rooms, indicate automatic controls serving guest rooms that are capable of setback (heating) and set-up (cooling) of temperature setpoint by at least 5°F; indicate control method - activated by room entry or occupancy sensor		

Mechanical Permit Plans Checklist — MECH-CHK

2015 Washington State Energy Code Compliance Forms for Commercial Buildings including R2 & R3 over 3 stories and all R1 — Revised January 2017

Project Title: **BARC Vet Clinic** — Date 3/3/2020

The following information is necessary to check a permit application for compliance with the mechanical systems and equipment requirements of the Washington State Energy Code, Commercial Provisions.

Applicable (yes,no,na)	Code Section	Code Provision	Information Required - *Must be in permit documents*	Location in Documents	Building Department Notes
na	C403.2.4.10 C403.2.4.11	Group R2 / R3 dwelling units, Group R2 sleeping units	For primary space conditioning system, indicate 5-2 programmable thermostats capable of two setback periods per day; for all thermostats indicate purpose (heating only, cooling only, or both), required temperature range and at minimum a 10°F deadband; or exception taken		
Yes	C403.2.6 C403.2.11.4	Ventilation	Indicate method of ventilation air delivery (natural or mechanical) for each zone	M1.0	
			If mechanically delivered, indicate that systems are configured to provide not more than 150% of, but at least the minimum required volume of outdoor air to each zone per IMC, ASHRAE 62.1 or other applicable code (WAC, OSHA, etc); or exception taken		
			If delivered via natural ventilation, identify required elements per IMC including minimum openable area to the outdoors or qualifying adjoining spaces		
na	C403.2.6.2	Demand controlled ventilation	Identify spaces > 500 sf with occupant load > 25 people/1,000 sf per IMC; for each space indicate whether it is served by an HVAC system with total design OSA > 3,000 cfm, and / or the system has airside economizer or automatic modulating OSA damper; indicate OSA controls are configured to provide demand controlled ventilation or provide supporting documentation for applied exception		
na	C403.2.6.3	Occupancy sensors	For gyms, classrooms, auditoriums and conference rooms > 500 sf, indicate occupancy-based OSA control when space is unoccupied and method (closes OSA damper or shuts-off equipment); or alternate means provided to automatically reduce OSA when space is partially occupied		
na	C403.2.6.4 C403.2.6.4.1	Enclosed loading dock ventilation	For enclosed loading docks, indicate ventilation / exhaust system method of activation (gas detection system for CO and NO2, or occupancy sensors), and control method (staged or modulating)		
na	C403.2.6.4 C403.2.6.4.2	Enclosed parking garage ventilation	For enclosed parking garages, indicate ventilation / exhaust system activated by gas detection system for CO and NO2, and control method (staged or modulating); or exception taken		
na	C403.2.7.1	Kitchen exhaust hoods	Provide calculations that show a balanced accounting of total kitchen exhaust (include all hoods) with % of: supply air, transfer air from adjacent spaces, and make-up air; if applicable, indicate that direct make-up air to each hood does not exceed 10% of hood exhaust		
			For kitchens with total hood exhaust exceeding 2,000 cfm, indicate exhaust air rate per Table C403.2.7.1 and compliance method (DCV, energy recovery, or transfer air that would otherwise be exhausted)		
na	C403.2.7.2	Laboratory exhaust systems	Refer to Systems Requiring Energy Recovery for requirements		
na	C403.2.13	Variable flow capacity - HVAC system fans	For HVAC fan motors ≥ 7.5 hp, indicate method of variable flow control (VSD, or equivalent control method that reduces design air volume by 50% at 1/3 static design pressure); note exception taken		
na	C403.3.1	DX air handler variable cooling control (Under Integrated Economizer)	For DX air handlers with economizer and cooling capacity ≥ 65,000 Btu/h, indicate number of cooling stages provided and method (multiple compressors and / or variable speed compressors); indicate minimum displacement (capacity reduction) as % of full load		
			Indicate control method (cooling capacity controlled in response to space temperature, space temperature controlled by modulating supply airflow, or both)		
na	C403.2.11.5	Fan airflow control	For DX air handling units with cooling capacity ≥ 65,000 Btu/h and evaporative and chilled water air handling units with fan ≥ 0.25 hp, indicate whether system is single zone or multiple zone and related control method (cooling capacity controlled in response to space temperature, space temperature is controlled by modulating supply airflow, or both)		
			For mechanical cooling systems (includes DX and chilled water coils) that control cooling capacity in response to space temperature - Provide a minimum of two stages of fan control; indicate minimum fan speed is ≤ 66% of full speed drawing ≤ 40% of full speed fan power during periods of low cooling or ventilation only		
			For other mechanical cooling systems (includes DX and chilled water coils) that control space temperature by modulating airflow (in lieu of, or in addition to, controlling capacity in response to space temperature) - Provide fan controls for modulating supply airflow; indicate minimum fan speed is ≤ 50% of full speed drawing ≤ 30% of full speed fan power during periods of low cooling or ventilation only; or exception taken		
na	C403.2.4.12	DDC system capabilities	Provide central and zone level DDC controls as required based on system application, capacity or size thresholds and other qualification per Table C403.2.4.12.1		
			Identify all DDC system input / output control points; indicate capability for trending and graphical display		
Ducting Systems					
yes	C403.2.8.1 C403.2.8.3	Duct construction	Indicate on plans that all ductwork is constructed and sealed per IMC	M1.0	
			For OSA ductwork, also indicate on plans that ductwork meets air leakage requirements per C402.5 and vapor retarder requirements per the IBC		
na	C403.2.8.3	Duct pressure classifications	Identify location of low, medium and high pressure ductwork on plans		
NA	C403.2.8.3.3	High pressure duct leakage test	Indicate high pressure duct leakage testing requirements on plans; provide test results to jurisdiction when completed		

Mechanical Permit Plans Checklist

MECH-CHK

2015 Washington State Energy Code Compliance Forms for Commercial Buildings including R2 & R3 over 3 stories and all R1

Revised January 2017

Project Title:	**BARC Vet Clinic**	Date	3/3/2020

The following information is necessary to check a permit application for compliance with the mechanical systems and equipment requirements of the Washington State Energy Code, Commercial Provisions.

Applicable (yes,no,na)	Code Section	Code Provision	Information Required - *Must be in permit documents*	Location in Documents	Building Department Notes
yes	C403.2.8.1 C403.2.8.2	Duct insulation	For supply and return ductwork located in unconditioned space or outdoors, indicate R-value of insulation on ductwork on plans; identify climate zone; note exceptions taken	M1.0	
			For supply ductwork located in conditioned space, identify if design supply temperature is < 55°F or > 105°F and indicate R-value of insulation on this ductwork on plans; note exception taken		
			For OSA ductwork, shafts and plenums, indicate R-value of insulation on these elements on plans per Table C402.1.3 for steel-framed walls; note exception taken		
Piping Systems					
na	C403.2.9	Piping insulation	Indicate design temperature range of fluid conveyed in piping and thickness of insulation (in inches) on hydronic piping plans; or exception taken		
na	C403.2.9.1	Piping insulation exposed to weather	Indicate method of protection of pipe insulation from damage / degradation on hydronic piping plans		
Economizers					
na	C403.3	Air economizer required	Identify in equipment schedules on plans or in MECH-EQ forms all cooling systems requiring air economizer controls	NA	
			Provide MECH-ECONO form indicating systems utilizing air economizer exceptions, including those with water-side economizer in lieu of air economizer; indicate on plans eligible exception(s) taken and measures to comply with exception(s)		
na	C403.3.1	Integrated economizer operation - air and water	Indicate air and water-side economizers are configured for partial cooling operation even where additional mechanical cooling is required to meet the load		
na	C403.3.2	Economizer heating system impact - air and water	Verify control method of HVAC systems with economizers does not increase building heating energy usage during normal operation		
na	C403.3.3.1	Air economizer capacity	Indicate modulating OSA and return air dampers are configured to provide up to 100% OSA for cooling		
na	C403.3.1 C403.3.3.2	Integrated air economizer	Verify mechanical cooling controls are interlocked with air economizer controls so the outside air damper remains in 100% open position when mechanical cooling is also required to meet the cooling load, until the leaving air temperature is < 45°F		
			For systems with cooling capacity ≥ 65,000 Btu/h, verify that control of economizer dampers is not based only on mixed air temperature; or exception taken		
na	C403.3.3.3	Air economizer high limit controls	Indicate high limit shut-off control method and required high limit per Table C403.3.3.3		
na	C403.3.4.1	Water economizer capacity	For eligible systems where water-side economizer may be provided in lieu of air economizer, indicate system is capable of 100% design cooling capacity at 50°F db / 45°F wb OSA temperatures		
na	C403.3.4.2	Water economizer maximum pressure drop	Indicate pressure drop across precooling coils and heat exchangers in water economizer system do not exceed pressure drop limit		
na	C403.3.1	DX air handling equipment control	For DX air handlers with economizer and cooling capacity ≥ 65,000 Btu/h, refer to HVAC System Controls for requirements		
na	C403.2.4.7	DX equipment economizer fault detection and diagnostics	For DX air handlers with economizer and cooling capacity ≥ 54,000 Btu/h, provide a fault detection and diagnostics (FDD) system to monitor economizer system operation and report faults		
Systems Requiring Energy Recovery					
na	C403.5.1	Energy recovery (ER) - ventilation / exhaust systems	For systems with design OSA > 5,000 cfm, or design supply air cfm and % OSA exceeding the values in Tables C403.5.1(1) or (2), indicate exhaust air ER method; or exception taken with supporting calculations		
			For rooms served by multiple systems with aggregate design OSA > 5,000 cfm, or aggregate design supply air cfm and % OSA exceeding the values in Tables C403.5.1(1) or (2), indicate exhaust air ER method; or exception taken with supporting calculations		
			Indicate ER rated effectiveness that increases OSA enthalpy by ≥ 50% based on delta between OSA and return air enthalpies at design conditions		
na	C403.2.7.2	Laboratory exhaust systems (energy recovery)	For buildings with total lab exhaust > 5,000 cfm, indicate method of energy recovery used to pre-condition laboratory make-up air; ER effectiveness (min 25°F); or alternative method per exception (VAV exhaust, semi-conditioned makeup, or CERM calculation)		
na	C404.10.4 (under C404.11)	Pools and permanent spas exhaust systems (energy recovery)	For buildings with pools or spas with water surface area > 200 sf, indicate exhaust air ER method and use of waste heat (preheat ventilation air, pool water or service hot water); or exception taken		
			Indicate ER system has the rated effectiveness and is configured to decrease the exhaust air temperature at design conditions by ≥ 36°F		
na	C403.5.2	Energy recovery - steam condensate systems	For buildings with on-site steam heating systems, indicate condensate water ER		
			For buildings that use off-site generated steam where condensate is not returned to the source, indicate on-site condensate water ER		

Mechanical Permit Plans Checklist — MECH-CHK

2015 Washington State Energy Code Compliance Forms for Commercial Buildings including R2 & R3 over 3 stories and all R1 — Revised January 2017

Project Title: **BARC Vet Clinic** — Date 3/3/2020

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Applicable (yes,no,na)	Code Section	Code Provision	Information Required - *Must be in permit documents*	Location in Documents	Building Department Notes
na	C403.5.3	Energy recovery - cooler / freezer condensers	For buildings with food service, meat or deli departments that have ≥ 500,000 Btu/h of remote refrigeration capacity for coolers / freezers, indicate condenser ER and use of captured energy (service water heating, space heating, or dehumidification reheating)		
			For buildings with ≥ 40,000 sf conditioned floor area and with ≥ 1,000,000 Btu/h of remote refrigeration capacity for coolers / freezers, indicate condenser ER and use of captured energy for service water heating and also for space heating, or dehumidification reheating		
na	C403.5.4	Energy recovery - condenser systems	For buildings with 24-hour operation and with > 1,500,000 Btu/h of heat rejection capacity and design service hot water load > 250,000 Btu/h, indicate condenser ER to pre-heat service water; or exception taken. Provide calculations showing the amount of recovered heat that is utilized (60% of peak heat rejection load or pre-heat service water to 85°F).		
Hydronic System Controls					
na	C403.2.13 C403.4.2.7	Variable flow control - hydronic system pumps	For hydronic system pump motors ≥ 7.5 hp, indicate method of variable flow control (VSD or equivalent method that requires ≥ 30% design wattage at 50% design fluid flow); note exception taken		
			Identify whether hydronic coils have DDC controls and associated manner of pump speed control (differential pressure, zone hydronic demand, etc)		
na	C403.2.5 C403.4.2.4	Hydronic system setback and part load controls	For boilers that provide building heating, indicate controls that provide heating water temperature setback based on outdoor temperature		
			For heating and chilled water systems ≥ 300,000 Btu/h, indicate systems are configured to automatically reset supply water temperature based upon demand; or exception taken. If system pump motor hp ≥ 3 hp, also indicate controls automatically reduce flow by ≥ 50%.		
			For chilled water systems (≥ 300,000 Btu/h, pump motor hp ≥ 3 hp) that serve water-cooled unitary air conditioners, indicate VSD or staged pumps in chilled water system and heat rejection loop that reduce pump flow so that one control valve is nearly wide open, or to maintain a minimum differential pressure; or exception taken		
na	C403.4.2	Boiler sequencing	Indicate automatic controls that sequence operation of multiple boilers		
na	C403.4.6	Hot gas bypass limitation	For cooling equipment with hot gas bypass, provide either multiple step unloading or continuous capacity modulation; indicate bypass capacity per Table C403.4.6		
na	C403.4.2.2	Two-pipe changeover systems	Indicate changeover deadband (min 15°F), heating / cooling mode scheduling and changeover temperature range (limit 30°F)		
na	C403.4.2.6	Chiller / boiler plant pump isolation	Indicate controls are configured to automatically reduce overall plant flow and shut-off flow through individual chillers and boilers when not in use		
na	C403.2.13.1.1 C403.4.3.1.1 C403.4.3.1.2	Heat rejection equipment - variable flow control	For cooling towers with fan motors ≥ 7.5 hp, indicate VSD and method to adjust fan speed (adjusted based on leaving fluid temperature or condenser temperature / pressure of heat rejection device)		
			For multiple-cell heat rejection equipment with VSD, indicate controls that ramp all fans in unison		
na	C403.4.3.3	Heat rejection equipment - cooling tower flow turndown	Indicate open-circuit cooling towers with multiple pumps or VSD control are designed so all cells can be run in parallel		
na	C403.4.2.3.1	Water loop heat pump - deadband	Indicate capability of central equipment to provide minimum 20°F water supply temperature deadband between heat rejection and heat addition modes; or exception taken		
na	C403.4.2.3.2.1	Water loop heat pump - heat rejection equipment, Zone 4	Indicate type of cooling tower (open- or closed-circuit) in equipment schedule; indicate method used to limit system heat loss when heat rejection is not needed		
na	C403.4.2.3.2.2	Water loop heat pump - heat rejection equipment, Zone 5	For open- or closed-circuit cooling towers, provide a heat exchanger that separates the cooling tower and heat pump loop		
na	C403.4.2.3.3	Water loop heat pump - isolation valves	For hydronic heat pump systems with total system power > 10 hp, indicate 2-way isolation valves on each heat pump and variable flow system control		
Dedicated Outdoor Air Systems (DOAS) - Optional through 6/30/16, Prescriptive 7/1/2016					
na	C403.6 C403.6.3	Dedicated outdoor air systems	For buildings with office, retail, education, library and fire station spaces, identify these spaces on plans; indicate that ventilation air in each occupied space is provided via a DOAS system; or document compliance with C403.6.3 Impracticality; or exception taken (buildings complying with C402.4.1.4 or C406.6 may not utilize exceptions)		
na	C403.6.1	Energy recovery ventilation with DOAS	For all DOAS systems, indicate exhaust air ER method; or exception taken with supporting calculations. Indicate ER rated effectiveness that increases OSA enthalpy by ≥ 50% based on delta between OSA and return air enthalpies at design conditions.		
na	C403.6.2	Heating / cooling system controls with DOAS	Indicate equipment associated with the delivery of zone level heating and cooling (fans, hydronic pumps, primary air dampers, etc) are configured to shut off, and central equipment is configured to turn down, when there is no call for heating or cooling in the zone they serve		
			If applying Exception to heating / cooling fans used for air mixing in the space during deadband periods, include fan watts per cfm in equipment schedule		

Mechanical Permit Plans Checklist — MECH-CHK

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Applicable (yes,no,na)	Code Section	Code Provision	Information Required - *Must be in permit documents*	Location in Documents	Building Department Notes
na	C402.4.1.4 C403.6	Increased prescriptive maximum vertical fenestration area with DOAS	Indicate that all occupied, conditioned spaces are served by a DOAS per C403.6		
Additional Efficiency Package Option, Dedicated Outside Air Systems (DOAS)					
na	C406.6	Building provided with DOAS	To comply with additional efficiency package option, indicate that 90% or more of all occupied, conditioned spaces are served by a DOAS per C403.6		
Multiple Zone Air Systems					
na	C403.4.4	Air systems serving multiple zones	Identify supply air systems serving multiple zones and the zones they serve on plans; indicate whether system is VAV and method of primary air control; or provide supporting documentation for applied exception to VAV		
na	C403.4.4	VAV systems serving multiple zones	Provide equipment schedules on plans or MECH-EQ form that list all VAV air terminals and types		
			For each air terminal include: maximum airflow rates for primary supply air during zone peak heating and zone peak cooling; maximum airflow during reheating, recooling or mixing; minimum airflow rate to maintain required ventilation, and the basis for these values; if IMC or ASHRAE 62.1 multiple zone equation is basis for minimum flow rates, provide calculation on plans		
na	C403.4.4.1	Single duct VAV terminal units	Indicate single duct terminal units are configured to reduce primary supply air before reheating or recooling		
	C403.4.4.2	Dual duct systems - terminal units	For systems with separate warm air and cool air ducts, indicate terminal units are configured to reduce the flow from one duct to minimum before mixing with air from the other duct		
na	C403.4.1.1 C403.4.1.2	VAV system static pressure sensors - sensors and DDC set points	Indicate locations of duct static pressure sensors on plans; include at least one sensor per major duct branch; verify controller setpoint pressure at each sensor is ≤ 1.2 inch w.g.		
			For systems with zone level DDC, indicate controls are configured to monitor zone damper positions and reset static pressure setpoint based on the zone requiring most pressure; include control logic that automatically detects and generates an alarm if any zone excessively drives reset logic, and allows building operators to exclude zones from reset logic		
na	C403.4.4.3	Multiple-zone VAV system ventilation optimization controls	For systems with zone level DDC controls, indicate controls are configured to automatically reduce outdoor airflow in response to changes in system ventilation efficiency; or exception taken		
	C403.4.4.4	VAV system supply air reset	Indicate controls automatically reset supply air temperature in response to building loads or outdoor air temperature; or exception taken		
Multiple Zone HVAC Systems, High Efficiency VAV - Required for systems utilizing C403.6 DOAS Exception 2, must comply with all 16 provisions					
na	C403.7, Item 1	Air economizer	Indicate system is configured for 100% air economizer operation and complies with all related economizer requirements per C403.3 (without economizer exceptions)		
na	C403.7, Item 2	Direct digital controls (DDC)	Provide DDC controls for all components of system; identify all DDC system input / output control points; indicate capability for trending and graphical display		
na	C403.7, Item 3	Outdoor airflow measurement and reduction	For systems with minimum OSA > 2,500 cfm, indicate outdoor airflow monitoring station that measures OSA intake under all load conditions; indicate control sequence that increases or reduces system OSA cfm based on VAV terminal feedback of ventilation efficiency (per C403.4.4.3 without exceptions) or DCV (per C403.2.6.2)		
na	C403.7, Item 4	Supply airflow measurement	For systems with minimum OSA > 2,500 cfm, indicate supply airflow monitoring station capable of measuring supply air delivered to VAV terminals under all load conditions		
na	C403.7, Item 5	Zone isolation and maximum area served	Verify maximum area served by a single HEVAV system is ≤ 50,000 sf, or one entire floor, whichever is greater; in addition if a system serves > 25,000 sf, that includes areas that are expected to be occupied non-simultaneously, indicate zone isolation controls per C403.2.4.4		
na	C403.7, Item 6	Interior / exterior zone design supply air temperature	Verify that VAV terminals serving interior cooling driven loads are sized per design supply air temperature that is 5°F higher than VAV terminals serving exterior zones		
na	C403.7, Item 7	Maximum air terminal inlet velocity	Identify air terminals with minimum primary airflow setpoints > 50% of maximum setpoint in equipment schedule or MECH-EQ form; indicate air terminal inlet velocity does not exceed 900 fpm		
na	C403.7, Item 8	Sequence of operation	Indicate DDC system sequences of operation are designed and configured per ASHRAE GPC 36		
na	C403.7, Item 9	Maximum allowable system brake horsepower	Verify fan system bhp is ≤ 90% of the bhp limit per Option 2 equation in Table C403.2.11.1(1), provide MECH-FANSYS form for each system		
na	C403.7, Item 10	Fan-powered terminal unit motor and control	Indicate all series and parallel terminal fans have electronically commutated motors; indicate DDC control system is configured to vary air terminal fan speed as a function of the load; indicate fan speed during periods of low heating, low cooling, or ventilation only is ≤ 66% of peak design air flow or provide supporting documentation for applied exception		

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na	C403.7, Item 11	Application of single duct and fan-powered terminal units	Indicate VAV terminal types on plans; verify fan-powered terminal units only serve perimeter zones with envelope loads; verify all other zones are served by single duct terminal units		
na	C403.7, Item 12	Fan-powered terminal unit primary air reset	Indicate DDC controls are configured to automatically reset the primary supply air cfm setpoint of all fan-powered terminal units to the minimum required to maintain ventilation during occupied heating or deadband, based upon the VAV air handling unit OSA ventilation fraction		
na	C403.7, Item 13	High occupancy space controls	For spaces > 150 sf with occupant density ≥ 25 people / 1000 sf, indicate space is served by a dedicated terminal unit with DCV control that resets terminal unit ventilation setpoint; also indicate occupancy sensor control that automatically reduces minimum ventilation to zero and sets back room heating and cooling setpoints by ≥ 5°F		
na	C403.7, Item 14	Dedicated HVAC systems	For server, electronic equipment, telecom or similar spaces with cooling loads > 5 W/sf, indicate spaces are served by independent HVAC systems that are separate from HPVAV systems serving rest of building; indicate dedicated HVAC systems have air economizer controls or energy recovery per C403.3 Exception 9		
na	C403.7, Item 15	Central plant efficiency	Indicate whether systems are served by a high efficiency heating water plant, or a high efficiency chilled water plant		
			If complying via high efficiency heating water plant: Indicate all VAV terminals have hydronic heating coils served by heating water system with either gas-fired boiler(s) with thermal efficiency ≥ 90%, air-to-water heat pumps, or heat recovery chillers		
			If complying via high efficiency chilled water plant: Indicate all VAV air handlers have cooling coils served by chillers with rated IPLV efficiency that exceeds WSEC listed IPLV by at least 25% per Table C403.2.3(7) (note water-cooled IPLV is max, all others are min); indicate smallest chiller or compressor in plant is ≤ 20% of total plant capacity, or provide thermal storage sized for ≤ 20% of total plant capacity		
na	C403.7, Item 16	Fault detection and diagnostics	Indicate DDC system includes a fault detection and diagnostics (FDD) system configured to monitor operation and provide fault reporting of required parameters for all VAV air handlers and VAV air terminal units in the HPVAV system		
HVAC Equipment Energy Use Metering					
na	C409.3.1	HVAC equipment energy use metering	For new buildings > 50,000 sf and building additions > 25,000 sf, verify energy use metering of all equipment used to provide space heating and cooling, dehumidification and ventilation will be provided per C409; indicate equipment eligible for exception		
Documentation and System Specific Requirement To Support Commissioning					
Yes	C408.2	Scope of mechanical systems commissioning	Indicate that all mechanical systems, equipment, and controls for which the WSEC requires control functions and / or configuration to perform specific functions are required to be commissioned;	M1.0	
			For buildings with ≥ 240,000 Btu/h total output cooling capacity or ≥ 300,000 Btu/h total output heating capacity, indicate that all mechanical systems regardless of individual capacity are required to be commissioned; or provide building heating / cooling capacity calculation demonstrating eligibility for exception		
Yes	C403.2.10 C408.1.1 C408.1.2 C408.1.4.2 C103.6	Commissioning requirements in construction documents	Indicate in plans and specifications that Cx per C408 is required for all applicable mechanical systems;	M1.0	
			Include general summary with at a minimum of Items 1 thru 4 of the Cx plan per C408.1.2 including: narrative description of activities, responsibilities of the Cx team, schedule of activities including verification of project close out documentation per C103.6, and conflict of interest plan (if required);		
			Include in general summary that a Cx project report or Compliance Checklist (Figure C408.1.4.2) shall be completed by the Certified Cx Professional and provided to the owner prior to the final mechanical inspection.		
Yes	C408.2.2	Air system and hydronic system balancing	Indicate in plans that air and fluid flow rates shall be tested and balanced within the tolerances defined in the specifications; indicate systems shall be balanced in a manner to first minimize throttling losses, then adjusted to meet design flow conditions	M1.0	
Yes	C408.2.2.1	Air system balancing devices	Indicate devices that provide the capability to balance all supply air outlets, zone terminals and air handling equipment requiring system balancing	M2.0	
na	C408.2.2.2	Hydronic system balancing devices	Indicate devices that provide the capability to isolate, balance and measure flow across all hydronic equipment requiring system balancing including heating and cooling coils and pumps		
Yes	C408.2.3	Functional performance testing criteria	Identify in plans and specifications the intended operation of all equipment and controls during all modes of operation, including interfacing between new and existing-to-remain systems	M1.0	
Project Close Out Documentation					
Yes	C103.6	Documentation and project close out submittal requirements	Indicate in plans that project close out documentation and training of building operations personnel is required for all mechanical components, equipment and systems governed by this code; indicate close out documentation shall include: record documents, O&M manuals, applicable WSEC compliance forms and calculations	M1.0	

Mechanical Fan System Power Allowance MECH-FANSYS-SUM

2015 Washington State Energy Code Compliance Forms for Commercial Buildings including R2 & R3 over 3 stories and all R1 Revised January 2017

Project Title: BARC Vet Clinic	Date 3/3/2020
	For Building Dept. Use

HVAC Air Distribution System Schedule

List all HVAC systems that have the capability to provide heating and/or cooling to the spaces they serve.

System or Primary Supply Fan ID	Speed Control (Note 1)	Description (Note 2)	System Total Nameplate HP (Note 3)	Fan Power Calculation Required (Note 4)
AC-1	**CV**	**Rooftop unit**	**0.5**	**No**
SF-1	**CV**	**Supply fan**	**0.25**	**No**
EF-1	**CV**	**Exhaust fan**	**0.25**	**No**
EF-2	**CV**	**Exhaust fan**	**0.25**	**No**
EF-3	**CV**	**Exhaust fan**	**0.25**	**No**
EF-4	**CV**	**Exhaust fan**	**0.25**	**No**
EF-5	**CV**	**Exhaust fan**	**0.25**	**No**
EF-6	**CV**	**Exhaust fan**	**0.25**	**No**

Note 1 - Constant Volume (CV), Variable Air Volume (VAV), or Hospital/Lab CV system that qualifies for VAV budget per C403.2.11.1 Exception 1. Single zone VAV systems shall comply as CV.

Note 2 - Describe system type and list all fans (or groups of fans) associated with the delivery and removal of conditioned air by the system. Include all supply, return/relief, exhaust and exhaust hoods (>1 hp), make-up air, dedicated outside air (DOAS), booster fans, and series fan-powered terminals. VAV parallel fan-powered terminals and economizer relief fans do not need to be included if the fans do not operate at peak conditions.

Note 3 - Enter the total nameplate hp of all fans associated with the delivery and removal of conditioned air by the system.

Note 4 - This form automatically identifies whether a MECH-FANSYS form is required to demonstrate compliance with the fan power allowance (Yes), or this information is not required because the system has a combined total nameplate motor hp that is 5 hp or less (No)

MECH-FANSYS Forms

A MECH-FANSYS form shall be provided for each system with total nameplate hp greater than 5 hp. Select (Add Fan System Form) to generate an additional form. Added forms can be deleted with button in cell E32 of the added form.

ROOFTOP GAS ELECTRIC EQUIPMENT SCHEDULE

TAG	LOCATION	SERVES	NOM. TONS	TYPE	ECON?	FAN PERFORMANCE CFM	FAN PERFORMANCE ESP (IN WG)	FAN PERFORMANCE HP	TC (a) (MBH)	SC (a) (MBH)	SEER OR EER	HEAT INPUT (MBH)	HEAT OUTPUT (MBH)	AFUE (%)	MIN OSA CFM	ELECTRICAL DATA V/PH/HZ	ELECTRICAL DATA FLA	ELECTRICAL DATA MCA	ELECTRICAL DATA CIRCUIT AMPS (b)	SOUND RATING (DBA)	WEIGHT (LBS) (c)	BRAND	MODEL	NOTES
AC-1	ROOF	SURGERY 130	2	VERT	N	800	0.5	0.5	23.0	18	14.0	40	33	81	200	208/1/60	13.1	15.2	20	73	325	CARRIER	48VL-E240403	1

Footnotes - (a) Total cooling & sensible cooling rated at 80F db/67F wb indoor entering & 95F outdoor ambient.
(b) Circuit breaker or MOCP amps. (c) Includes unit curb.

Notes:
1. Factory manual outside air hood with barometric relief & factory roof curb. NO economizer - surgery room must maintain positive pressure difference.

TAG EQUIPMENT SCHEDULE

AF-1 AIR FILTER PACKAGE, extended surface, 12" deep filters. Pre-filter: 1 @ 24x24x2 filters (Camfil 30/30), MERV 8 efficiency ASHRAE. Final-filter: 1 @ 24x24x12 filters (Viledon MV-95), MERV 16 efficiency ASHRAE. Include Camfil Farr MultiTrack 25 Filter Housing. Include air filter gauge - molded plastic manometer, Dwyer Mark II model 25, complete with red oil, tubing and filter flags.

SF-1 SUPPLY FAN, Inline direct drive, mixed flow type. 600 cfm @ 0.75" SP, Include solid state speed control, mounted at fan for air balancing. Fantech FKD12 Electrical data: 115/1/60, 5 amps.

EF-1 THRU EF-6 EXHAUST FAN, Ceiling type, 150 cfm @ 1/8" SP, 1.5 sones, Operate thru wall switch in room. Broan L150. Electrical data: 120/1/60, 1.3 amps.

CONTROLS

T1 SEVEN DAY PROGRAMMABLE THERMOSTAT, two stage, Honeywell TB8220.

CONTROL NOTE: System capable of minimum 5 degree deadband, seven day programmable for each day per week, outside air dampers close automatically when system is off or upon power failure, interlocked to prevent simultaneous heating and cooling. Mount thermostat or sensor 60 inches above floor.

CONTROL SEQUENCE

AC-1 OPERATION - SURGERY 130
Maintain positive pressure difference in room during occupied hours.

Occupied Hours
AC-1 fan and SF-1 fan operate together, continuous. Outside air damper on AC-1 is set for about 200 to 300 cfm (~25-30%). AC-1 cycles heating or cooling mode based on calls from thermostat. Return air is adjusted using volume damper to about 600 cfm to provide positive pressure difference. Field verify.

Unoccupied Hours
AC-1 cycles based on calls for heating or cooling from thermostat. SF-1 runs whenever AC-1 fan runs.

SYSTEM DESCRIPTION

mprovement of Veterinary Clinic. New dedicated rooftop unit with k to serve operating room. Install new ductwork to existing rooftop units new exam rooms and CT scan room.

VICINITY MAP
SCALE: NONE

LOCAL MAP
SCALE: NONE

TAG GRILLE AND LOUVER SCHEDULE

SUPPLY:

A Square Ceiling Diffuser, Modular core, T-bar frame, 24x24 face, Shoemaker 700MA.

B Perforated Ceiling Diffuser, surgery type, Surface frame type, with air balance damper built-in. Precision Air Products, Lami-vent model - C.

C Louvered, Double deflection, with OBD. Shoemaker 904.

D Not Used.

RETURN/EXHAUST:

E Eggcrate, aluminum grid 1/2", T-bar frame, Shoemaker 600T.

F Standard fixed blade - 45 deg. NO OBD. Shoemaker 905.

G Not Used.

ROOF CAPS AND WALL VENTS:

H Roof cap, globe style vent with birdscreen, round galvanized, FAMCO #GBV

J Wall vent, galvanized, screened, Columbia Venting CVP-SWV or equal, see drawing for size.

GENERAL GRILLE NOTES:

1. All steel construction, standard white finish, except as noted.
2. Or approved equal.

HVAC GENERAL NOTES

1. VERIFY site conditions.
2. THERMOSTAT LOCATIONS: Verify all wall mounted control locations with architect.
3. CODES: Comply with all local & state governing codes.
4. COORDINATE ductwork and grille locations with lighting and other related trades with architect approval. Verify clearances & ceiling elevations before installation.
5. DRAWINGS are schematic in some areas and may not show exact routing or every offset which may be required. Provide a complete & properly working system with all necessary items.
6. SEISMIC BRACING: Provide to meet local code requirements. Refer to the ASHRAE standards "Practical Guide to Seismic Restraint", 1999.
7. PIPING INSULATION: Provide thermal insulation as required on HVAC piping. For exterior piping include protection from weather and damage. WSEC, sec. C403.2.9
8. TEST, ADJUST, & BALANCE: Provide proper system testing, adjusting, and balancing on both air and water according to NEBB & ASHRAE standards, including written reports. Use only technicians qualified & trained in TAB work.
   Include System Commissioning: Functional testing of sequences of operation to ensure they operate in accordance with the mechanical plans.
   (WSEC, Sec C408).
9. OPERATION & MAINTENANCE BOOKLET: Provide O & M manual to owner. Include cut sheets on main equipment and controls, maintenance instructions, and marked up as built drawing (record drawings per WSEC, Sec C408).
10. WALK-THRU instruction: Provide on site walk-thru for customer to demonstrate operation of system and answer questions.
11. GUARANTEE: Contractor shall warrant the completed system from defects for one year from date of final start up.
12. ELECTRICAL: All equipment to have a positive means of disconnect adjacent to and in sight from equipment served. Provide a 120 volt receptacle located within 25 feet of equipment for service & maintenance purposes (IMC sec. 301.10). Line voltage work by others.
13. ROOFTOP UNITS ON CURBS: SEAL holes and cracks between duct and roof deck inside factory roof curb for noise control.
14. EXHAUST FAN TERMINATION: Shall not be less than 3 feet from a property line or openings into a building, e.g., operable windows and doors.
    IMC, Sec. 501.3.1, item #3.

DUCT NOTES

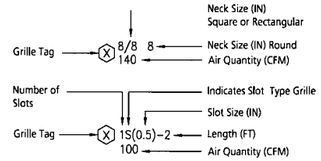
1. DUCT CONSTRUCTION and installation per latest SMACNA Standards and the IMC as required by the local code. Provide metal duct, except as noted.
2. BALANCING DAMPERS: Provide on all supply grille run out ducts up stream of grille.
3. DUCT INSULATION: Manville fiberglass duct wrap, type 75, FSK aluminum foil facing or equal. Outside air ducts in conditioned space = R-7 with vapor barrier; Supply & return: in unconditioned space = R-6, outside building envelope = R-8, EXCEPTIONS: No insulation required where the design temperature difference between interior and exterior of the duct does not exceed 15°F. Supply ducts which convey supply air at temperatures less than 55°F or greater than 105°F shall be insulated with min. R-3.3 insulation where located within conditioned space. WSEC sec. C403.2.8
4. DUCT SEALING-GENERAL: 0 to 2" static pressure - seal all seams and joints on all ducts. Higher static pressures - refer to the IMC for additional requirements. Inside build: DuroDyne "DDS-181" gray or approved equal per UL 181 A-M, 181B-M listed. Outside: Polyurethane, Mameco Vulkem 116. OR approved equal. WSEC sec. C403.2.8
5. TURN VANES: Provide single thickness turn vanes (see detail) in all major square duct elbows, tees, or turns with inside radius less than 3/4 duct width. Square branch duct taps shall be 45 degree type per SMACNA standard.
6. FLEX DUCT (Insulated): For grille run outs up to 6 ft. long, except as noted. Provide adjustable metal elbows on all turns, unless a smooth full radius turn is made. Secure core with approved nylon or metal worm drive clamps. NO duct tape joints & screws allowed.
7. SOUND LINER: Provide sound lined metal supply & return ducts as shown on plans. Johns Manville Linacoustic RC flexible fiberglass liner with Permacote acrylic surface treatment or equal. Fabricate and install per duct liner standard of North American Insulation Manufacturer's Assoc.
8. FLEX CONNECTORS: Provide on all duct hook-ups to isolate air handling equipment (Neoprene coated fiberglass fabric type).
9. DUCT SIZE CHANGES: Round galvanized ducts may be substituted for rectangular ducts that are NOT LINED. Provide circular equivalent of rectangular duct. Other equivalent rectangular duct sizes may be substituted to better fit space.
10. TEMPORARY DUCT CLOSURE: Seal off ductwork during construction to keep out construction dust, especially floor boots and low wall openings.

HVAC DRAWING INDEX

HVAC LEGEND

SYMBOL	ABBV.	DESCRIPTION
T1		Control
AH-1		Equipment
A		Grille/Louver
		Supply Duct
		Return/Exhaust Duct
		Duct under slab (Underground)
		Flex Duct, insulated, inside diameter
		Metal Duct
	SL	Soundlined Duct
	VD	Volume Damper
	FC	Flex Connector
	TV	Turning Vanes
		End Cap
		Change in duct size
		Surface Mount Supply Grille
		T-bar Supply Grille
		Round Supply Grille
		Return/Exhaust Grille
		Sidewall Supply/Makeup Grille
		Sidewall Return/Exhaust Grille
	FD	Floor Drain
	AFF	Above Finished Floor
	AT	Air Transfer
	BS	Birdscreen
	OSA	Outside Air
	RA	Return Air
	SA	Supply Air
	(E)	Existing

GRILLE CALL OUT LEGEND



Air Pattern - indicated by arrows for ceiling grilles.
No Arrows indicated four way pattern.

DUCT CALL OUT LEGEND

(Example call-out shown)

14/10-1	Lined metal duct, outside duct size given. Number after dash is liner thickness (in.).
14/10	Metal duct size.
14	Round metal duct.
14/10 FO	Flat oval duct.
	1 1/2 HR. "UL" Dynamic Fire Damper. UL 555. Ruskin DIBD2 or equal.
R	"UL" Ceiling Fire Damper for up to 3 hr. rating. UL 555C. Ruskin CFD or equal.
	1 1/2 HR. "UL" Combination Fire-Smoke Damper with 115 volt connection to smoke detection system. Class II, 250°F. UL 555 & UL 555S. Ruskin FSD36 or equal.
C	1 HR. "UL" Corridor Combination Fire-Smoke Damper with 115 volt connection to smoke detection system. Class II, 250°F. UL 555 & UL 555S. Ruskin FSD36-C or equal.
S	Smoke Damper, "UL" rated, with 115 volt connection to smoke detection system. Class II, 250°F. UL 555S. Ruskin SD36 or equal.
G	1 1/2 HR. "UL" Combination Fire-Smoke Damper with grille access and 115 volt connection to smoke detection system. Class II, 250°F. UL 555 & UL 555S. Ruskin FSD36GA or equal.

NOTE: All fire/smoke dampers to be installed per manufacturer's 'UL' instructions and shall have permanently labeled access door per 2015 IMC sec. 607.4.

DRAWING DISCREPANCIES

Contractor to alert Franklin Engineering of any discrepancies found on the drawings, such as missing data, typos, or any other items that do not make good sense.

CODES

2015 Washington State Energy Code
2015 Washington State Building Code
2015 International Mechanical Code
2015 International Building Code

FRANKLIN ENGINEERING
MECHANICAL CONSULTING
635 FOURTH AVE
SUITE 202
KIRKLAND, WA 98033
TEL 425/821-3324
FAX 425/821-6252
www.franklineng.com

CLIENT:
Johansen Mechanical Inc.
(425) 481-2266
www.johansenmech.com

BARC VET CLINIC
8401 Main Street
Edmonds, WA 98026

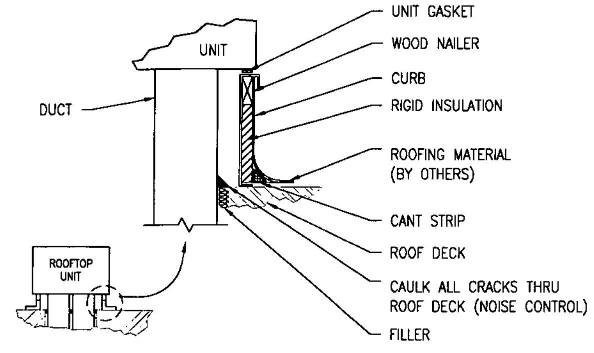
HVAC Schedules & Legends

3-4-2020	PERMIT SET
3-10-2020	REVISED PERMIT SET

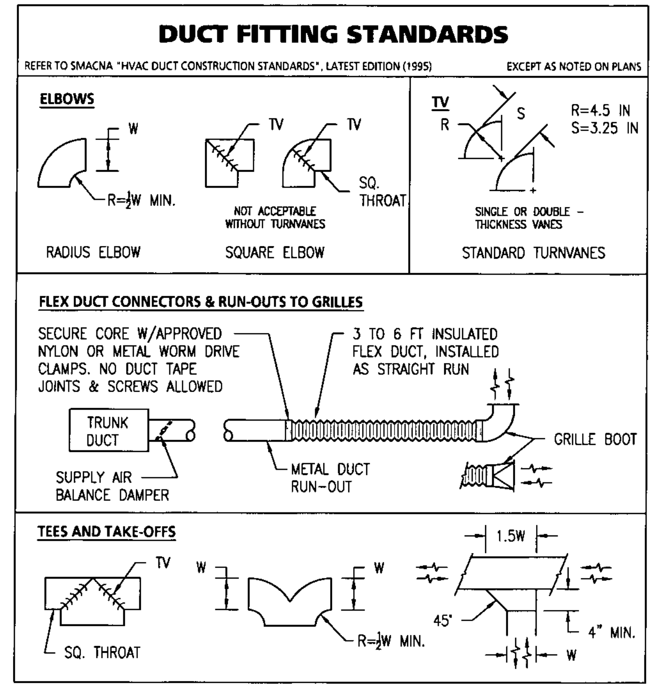
DRAWN: NMT
DESIGN: PFE

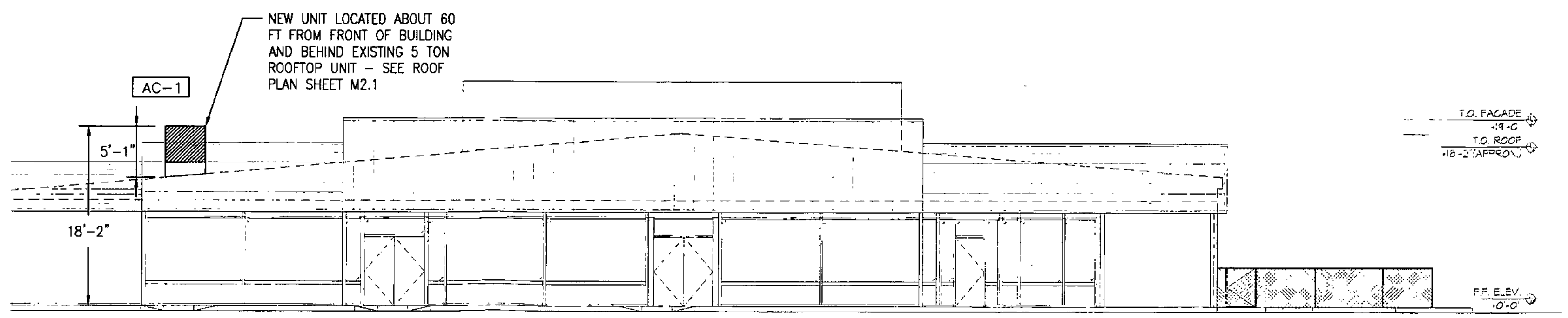
JOB NO. 00201

SHEET M1.0



1 **STANDARD CURB DETAIL**
SCALE: NONE





FRONT ELEVATION - SW
SCALE: 1/8"=1'-0"

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SUITE 202
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CLIENT:
JMI Johansen Mechanical Inc.
(425) 481-2266
www.johansenmech.com

BARC VET CLINIC
8401 Main Street
Edmonds, WA 98026

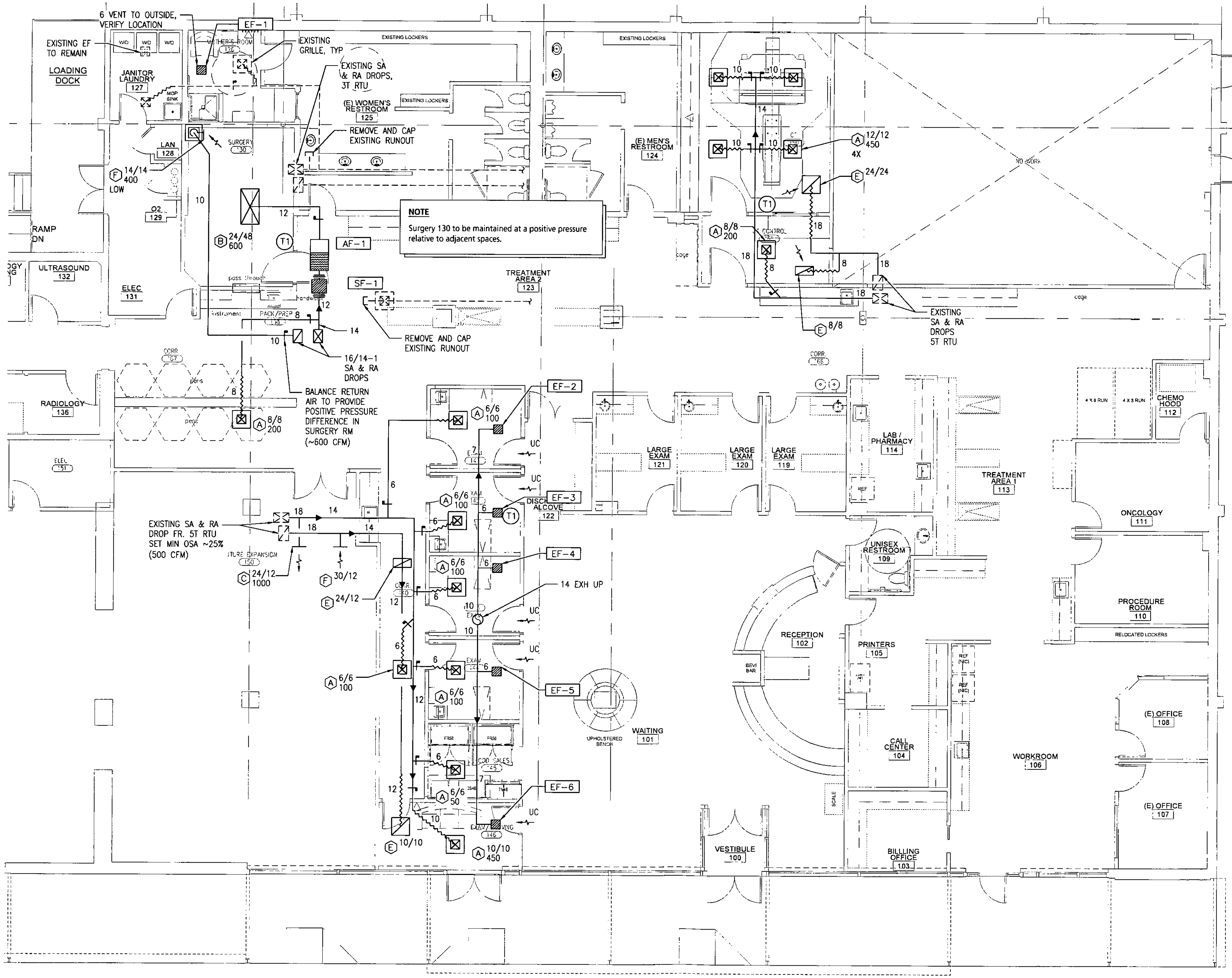
HVAC Elevation & Details

3-4-2020	PERMIT SET
3-10-2020	REVISED PERMIT SET

DRAWN: NMT
DESIGN: PFE

JOB NO. 00201

SHEET **M1.1**



HVAC FLOOR PLAN

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

FRANKLIN ENGINEERING
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KIRKLAND, WA 98033
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CLIENT: JMI Johansen Mechanical Inc.
(425) 481-2266
www.johansenmech.com

BARC VET CLINIC
8401 Main Street
Edmonds, WA 98026

HVAC Floor Plan

3-4-2020	PERMIT SET
3-10-2020	REVISED PERMIT SET

DRAWN: NMT
DESIGN: PFE

JOB NO. 00201

SHEET M2.0

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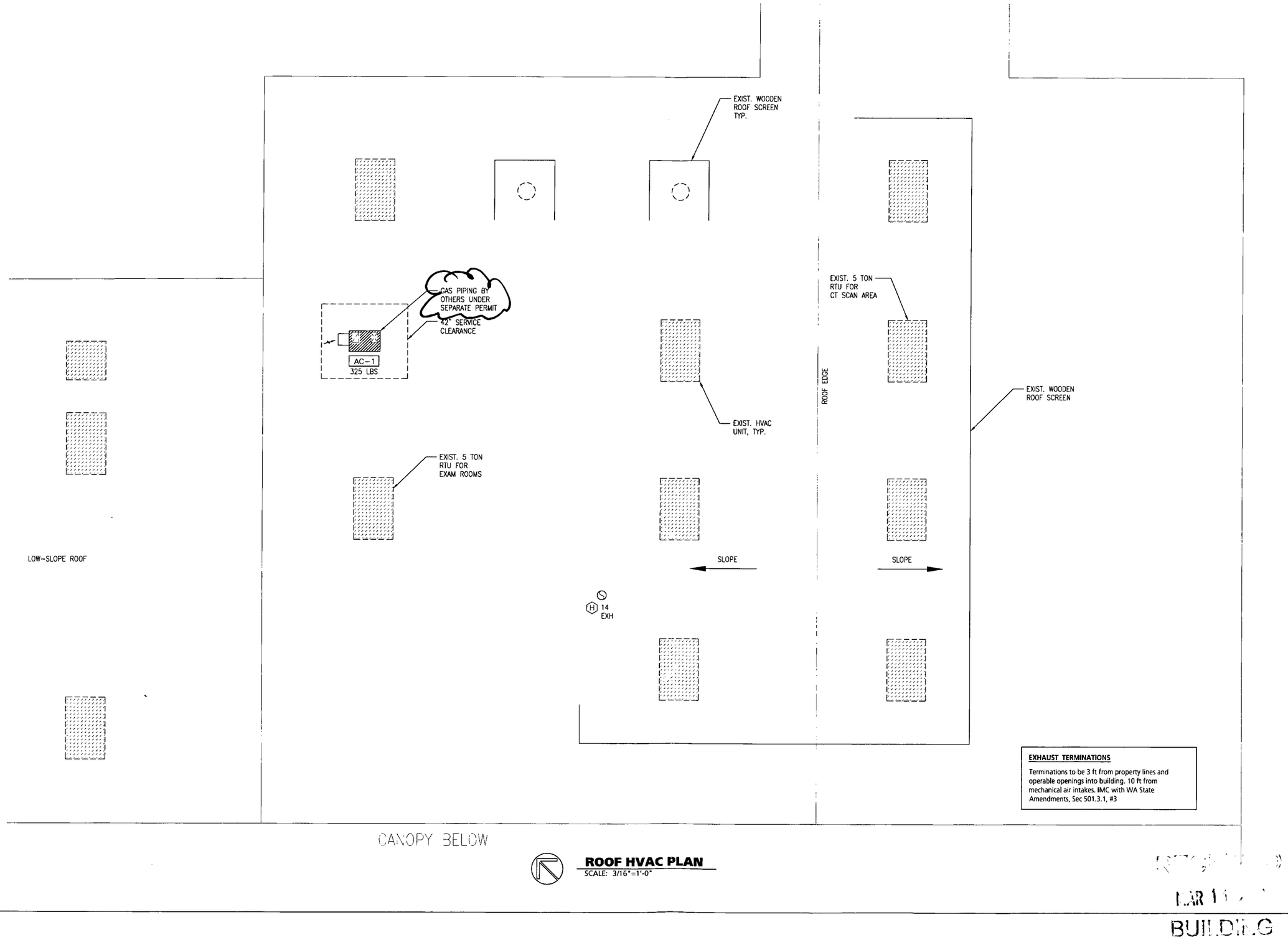

EXHAUST TERMINATIONS

Terminations to be 3 ft from property lines and operable openings into building. 10 ft from mechanical air intakes. IMC with WA State Amendments, Sec 501.3.1, #3

ROOF HVAC PLAN
SCALE: 3/16"=1'-0"

BUILDING

625 FOURTH AVE
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BARC VET CLINIC
8401 Main Street
Edmonds, WA 98026

Roof HVAC Plan

3-4-2020	PERMIT SET
3-10-2020	REVISED PERMIT SET

DRAWN: MAT
DESIGN: PFE

JOB NO. 00201

SHEET **M2.1**

K:\00201 BARC Vet Clinic\00201M2.1.dwg, 3/10/2020 2:58:37 PM

APPROVED BY PLANNING
M. Luptak 3/13/2020

CITY OF EDMONDS
BUILDING DEPARTMENT
WORK Mechanical
ADDRESS 8401 Main ST
OWNER BARC
APPROVED DATE: 3/24/2020
BLDG. OFFICIAL:

PERMIT NUMBER
BLD2020-0304

CITY COPY

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BUILDING

Mechanical Summary — MECH-SUM

2015 Washington State Energy Code Compliance Forms for Commercial Buildings including R2 & R3 over 3 stories and all R1 — Revised January 2017

Project Information

Project Title:	**BARC Vet Clinic**
Date	**3/3/2020**
Applicant Information. Provide contact information for individual who can respond to inquiries about compliance form information provided.	For Building Dept. Use
Company Name:	**Johansen Mechanical Inc**
Company Address:	**20109 144TH Ave NE - Woodinville, WA 98072**
Applicant Name:	
Applicant Phone:	**425-481-2266**

Project Description

Briefly describe mechanical systems in the text box provided

☐ Total Bldg Performance (TBP)

This path includes all mandatory provisions per C401.2 Option 2. MECH-SUM, MECH-CHK, and C407 Energy Analysis forms required.

☐ New Building ☐ Building Addition ☑ Tenant Improvement ☐ System Retrofit ☐ No System Changes

Install new ductwork from existing rooftop units to serve exams rooms and CT scan areas. Install new rooftop unit with ductwork to serve operating room.

Design Load Calculations

☑ Load calculation summary ☐ MECH-LOAD-CALC Form

Provide design load calculations for all mechanical systems and equipment serving the building heating, cooling or ventilating needs. If a load calculation summary is provided with the permit documents that includes all applicable compliance information then the MECH-LOAD-CALC form is not required.

Mechanical Schedules

☑ Mechanical Plans ☐ MECH-EQ Forms (TBD)

Indicate location of equipment compliance information. If provided on plans then MECH-EQ forms are not required, however, include on plans all applicable compliance information listed in MECH-EQ tables.

Dedicated Outdoor Air System Requirements and High Efficiency VAV Alternate

☐ DOAS is required per C403.6 effective July 1, 2017 (office, retail, education, library and fire station occupancies)

All occupied, conditioned areas shall be served by a DOAS that delivers required ventilation air in a manner that does not require space conditioning fan operation. Space conditioning fans cycled off when no heating or cooling is required.

- ☐ Ventilation provided via natural ventilation per 2015 IMC in lieu of DOAS (C403.6, Exception 1)
- ☐ Ventilation and space conditioning provided by a HEVAV system per C403.7 in lieu of DOAS (C403.6, Exception 2)

☐ DOAS included in project, although not required (occupancy not office, retail, education, library or fire station)

☐ DOAS related allowances included in project:

- ☐ Prescriptive vertical fenestration maximum area allowance increased to 40% per C402.4.1.4 with 100% of conditioned floor area in building served by DOAS.
- ☐ Exception to air economizer per C403.3 Exception 1, include MECH-ECONO form.

Fan Power

☑ Project includes HVAC air distribution systems that provide heating and/or cooling

If yes, provide a MECH-FANSYS -SUM form.

☐ For one or more systems, the total fan motor nameplate hp of all fans in HVAC system exceeds 5hp.

If yes, provide a seperate MECH-FANSYS form for each HVAC system exceeding the 5 horsepower threshold. Refer to Section C403.2.11 and MECH-FANSYS-DOC for requirements and exceptions.

HVAC Hydronic Systems

☐ Hydronic chilled water ☐ Water-loop heat pump ☑ No hydronic systems

☐ Hydronic heating water ☐ Geothermal

C406 Additional Efficiency Options - Mechanical

☐ C406.2 More efficient HVAC equipment and fan systems

Requires 90% of heating and cooling capacity to be equipment listed in tables C403.2.3(1)-(9) or air-to-water heat pumps and heat recovery chillers. All equipment listed in tables C403.2.3(1)-(7) must be 15% more efficient than minimum requirements. All stand alone supply, return, and exhaust fans over 1hp must have FEQ ≥ 71 and must be selected within 10% of maximum total or static pressure.

☐ C406.6 Dedicated outdoor air system (DOAS)

Requires 90% of conditioned floor area to be served by a DOAS per C403.6 that delivers required ventilation air in a manner that does not require space conditioning fan operation.

☐ C406.7 Reduced energy in service water heating

Requires 90% of floor area be in occupancy types listed in C406.7.1 and that 60% of annual hot water energy use be provided by heat pump, waste heat recovery or solar water-heating systems.

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Mechanical Summary, pg. 2 — MECH-SUM

2015 Washington State Energy Code Compliance Forms for Commercial Buildings including R2 & R3 over 3 stories and all R1 — Revised January 2017

Service Water Heating Systems

Equipment Type (s)

- ☐ Hot water heating tank(s)
- ☐ Instantaneous
- ☑ No service water systems
- ☐ Dedicated boiler
- ☐ Heat exchange from space heat boiler or central hot water/steam

Distribution Type (s)

- ☐ Circulation System
- ☐ On-demand

Commissioning

Commissioning is required for:

- ☐ Mechanical systems per C408.2
- ☐ Service water heating systems per C408.4

If required, commissioning shall be performed for all applicable systems regardless of individual equipment capacity.

Exceptions to commissioning requirements:

- ☐ Total output capacity of all mechanical space conditioning systems in the building do not exceed 240,000 Btu/h cooling or 300,000 Btu/h heating. Mechanical systems commissioning not required.
- ☐ Capacity of largest service water heating system in building does not exceed 200,000 Btu/h. Service water heating systems commissioning not required.

Low Energy and Semi-Heated Spaces (Note 6 and 7)

Space Type	Location in Plan(s)	Space(s) Served	Area Served, square feet	Heating Capacity, Btu/h (Note 4)	Cooling Capacity, Btu/h (Note 5)	Peak Space Conditioning Capacity, Btu/h-sf	Compliance Check	Notes

Note 4 - Provide total installed heating output capacity of systems serving Low Energy or Semi-Heated space(s) in btuh.
Note 5 - Provide total installed cooling capacity of system serving Low Energy space(s) in Btu/h. Not allowed for semi-heated spaces. Enter 0 if no cooling.
*Note 6 - Refer to Section C402.1.1 Low Energy Building. Intalled peak space conditioning capacity, heating or cooling, may not exceed 3.4 Btu/h*sf.*
*Note 7 - Refer to Section C402.1.1.1 and Semi-Heated Space definition in Chapter 2. Total heating output capacity may not exceed 8 Btu/h*sf. Only systems without electric resistance heating and no cooling are eligible for the wall insulation exception under semi-heated.*

Mechanical Permit Plans Checklist — MECH-CHK

2015 Washington State Energy Code Compliance Forms for Commercial Buildings including R2 & R3 over 3 stories and all R1 — Revised January 2017

Project Title: **BARC Vet Clinic** — Date 3/3/2020

The following information is necessary to check a permit application for compliance with the mechanical systems and equipment requirements of the Washington State Energy Code, Commercial Provisions.

Applicable (yes,no,na)	Code Section	Code Provision	Information Required - *Must be in permit documents*	Location in Documents	Building Department Notes
Equipment - Sizing, Performance and Type					
NA	C403.1	Exempt process equipment	Identify equipment to be used in manufacturing, industrial or commercial processes that do not provide space conditioning; identify provisions applicable to this equipment per C403.1 exception		
yes	C403.2.1	Load calculations	Provide load calculations performed per ASHRAE Std 183 or equivalent, using design parameters per C302 and Appendix C; include load adjustments to account for energy recovery	load calc sheets	
yes	C403.2.2	Equipment and system sizing	Indicate that output capacities of heating and cooling equipment and systems are no greater than the smallest available equipment size that exceeds the calculated loads; note exceptions taken	M1.0, M2.0	
yes	C403.2.3 C403.2.3.2 C403.2.13.1	HVAC equipment performance requirements (efficiency)	Provide equipment schedules on plans or complete MECH-EQ forms indicating type, capacity, rated and WSEC minimum efficiencies for all heating and cooling equipment; include supply and OSA cfms and operating hours for all air systems; identify heating and cooling equipment that does not have a corresponding WSEC minimum efficiency (manufacturer rated)	M1.0, M2.0	
na	C405.8 C403.2.14	Electric motor efficiency	List all motors ≥ 1/12 hp (that are not integral to a rated piece of equipment) in the mechanical or electrical equipment schedules on plans; indicate hp, rpm, number of poles and rated efficiency, or exception applied		
			For fractional hp motors (1/12 - 1 hp), indicate whether they are an electronically commutated motor, have rated efficiency of at least 70%, or exception taken		
na	C403.2.11.1	Fan power limitation	For all HVAC fan systems that provide heating and / or cooling, provide system total nameplate hp in MECH-FANSYS-SUM form		
			For all applicable HVAC systems with total fan motor hp > 5hp, verify fan system motor hp or bhp complies with fan power limits per equations in Table C403.2.11.1(1), provide MECH-FANSYS form for each system		
na	C403.2.11.2	Motor nameplate hp	For all applicable HVAC systems with total fan motor hp > 5hp, indicate fan motors specified are the smallest available motor hp size greater than fan bhp, note exceptions taken		
na	C403.2.11.3	Fan efficiency	For all applicable HVAC systems with total fan motor hp > 5hp, identify in equipment schedule all fans required to comply with fan efficiency grade and indicate rated FEG is ≥ 67, or exception taken; indicate these fans are sized so total efficiency is within 15% of the fan maximum total efficiency		
na	C403.2.11.4	Group R occupancy exhaust fan efficacy	For all exhaust fans < 400 cfm in Group R occupancies, indicate in equipment schedule the fan flow rate and efficacy (cfm/watt), or exception taken; refer to Table C403.2.11.4 (CE-57)		
na	C403.2.13	Variable flow capacity - fans	For fan motors ≥ 7.5 hp, indicate method of variable flow control (VSD or equivalent method) in equipment schedule, or exception taken; for equivalent method for an HVAC system refer to HVAC System Controls for additional requirements		
na	C403.2.3	Maximum air cooled chiller capacity	For chilled water plants and buildings with > 500 tons of cooling capacity, indicate air-cooled chiller capacity is ≤ 100 tons, or exception taken		
na	C403.4	Large capacity cooling systems	For buildings with ≥ 300 tons of cooling capacity, indicate method of multi-stage or variable capacity control (VSD, multiple staged compressors, or max capacity of any single unit < 66% of the total)		
na	C403.2.3.1	Non-standard water-cooled centrifugal chillers	For water-cooled centrifugal chillers not designed for operation at standard conditions, provide calculations documenting maximum full load and part load rated equipment performance requirements		
na	C403.2.13.1 C403.4.3.2	Centrifugal fan open-circuit cooling towers	For open-circuit centrifugal fan cooling towers with ≥ 1,100 gpm capacity, indicate cooling towers comply with efficiency requirements for axial fan open circuit cooling towers		
na	C403.4.2 C403.4.2.5	Large capacity boiler systems	For single boilers with > 500,000 Btu/h capacity, indicate multi-stage or modulating burner		
			For boiler system (single or multiple) with > 1,000,000 Btu/h capacity, indicate turndown ratio per Table C403.4.2.5 and method (multiple single input boilers, modulating boilers, or combination)		
na	C403.2.13	Variable flow capacity - pumps	For pump motors ≥ 7.5 hp, indicate method of variable flow control (VSD or equivalent method) in equipment schedule, or exception taken; for equivalent method for a hydronic system refer to Hydronic System Controls for additional requirements		
na	C403.2.3	Gas and oil-fired forced air furnace and unit heaters	For forced air furnaces with capacity ≥ 225,000 Btu/h and all unit heaters, indicate in equipment schedule intermittent ignition or IID, flue or draft damper, and rated jacket loss		
na	C403.2.4.8	Combustion heating equipment	For combustion heating equipment with output capacity > 225,000 Btu/h, indicate modulating or staged combustion control		
na	C403.2.3.3	Packaged electric heating / cooling equipment	Verify all packaged electric equipment with > 6,000 Btu/h cooling capacity and any amount of heating is a heat pump; include in equipment schedules		
na	C403.2.12	Heating outside a building	Indicate systems providing heating in non-enclosed outdoor occupied spaces are radiant systems; refer to HVAC System Controls for additional requirements		
na	C403.2.7.1	Kitchen exhaust hoods	Indicate on plans the type, duty and exhaust air rate of each kitchen hood, refer to HVAC System Controls for additional requirements		
Yes	C403.2.4.3	Outdoor supply air, exhaust and relief dampers	Indicate locations of OSA intake, and exhaust and relief outlet dampers on plans; indicate whether dampers are Class 1 motorized, or gravity and exception taken (include leakage rating, cfm/sf); refer to HVAC System Controls for additional requirements for OSA dampers		
na	C403.2.4.3	Return air dampers	Indicate locations of return air dampers that are integral to economizer operation; verify dampers are motorized; indicate whether dampers are Class 1, or within packaged equipment eligible for leakage rating exception (include leakage rating, cfm/sf)		

Mechanical Permit Plans Checklist

MECH-CHK

2015 Washington State Energy Code Compliance Forms for Commercial Buildings including R2 & R3 over 3 stories and all R1

Revised January 2017

Project Title:	**BARC Vet Clinic**	Date	3/3/2020

The following information is necessary to check a permit application for compliance with the mechanical systems and equipment requirements of the Washington State Energy Code, Commercial Provisions.

Applicable (yes,no,na)	Code Section	Code Provision	Information Required - *Must be in permit documents*	Location in Documents	Building Department Notes
na	C403.2.4.3	Stairway and shaft vent dampers	Indicate location of stairway and shaft vent dampers on plans; verify dampers are Class 1 motorized; refer to HVAC System Controls for additional requirements		
na	C403.2.4.4	Zone isolation dampers	For systems serving areas > 25,000 sf or spanning more than one floor, that include areas that are expected to be occupied non-simultaneously; identify isolation zone areas on plans and locations of associated isolation dampers in HVAC distribution system; refer to HVAC System Controls for additional requirements		
na	C403.2.3.4	Humidification	For cooling systems with humidification equipment that are also required to have air economizer, indicate humidifier is adiabatic (direct evaporative or fog atomization), or exception taken		
Additional Efficiency Package Option, More Efficient HVAC Equipment & Fan Performance - Must comply with all 3 provisions to be eligible					
na	C406.2.1 C403.2.3	HVAC system selection	To comply with additional efficiency package option, calculate the percentage of heating and cooling equipment in the project (based on output capacity) that do not have a corresponding WSEC listed efficiency; shall be less than 10% to comply		
na	C406.2.2 C403.2.3	Minimum equipment efficiency	To comply with additional efficiency package option, indicate that all listed heating and cooling equipment have a rated efficiency that exceeds WSEC listed efficiency by at least 15%		
na	C406.2.3 C403.2.11.3	Minimum fan efficiency	To comply with additional efficiency package option, indicate rated FEG of stand alone fans is ≥ 71; indicate these fans are sized so the fan efficiency at design conditions is within 10% of the maximum total or static efficiency		
HVAC System Controls					
yes	C403.2.4.1	Thermostatic controls (thermostats and humidistats)	Indicate locations of thermostatic and humidity control devices and the zones they serve on plans, including perimeter system zones	M2.0	
			Where adjacent (neighboring) zones are controlled by separate thermostats (including perimeter systems used to offset heat gain or loss), and are connected by permanent openings > 10% of either zone sf area, indicate controls configured to prevent adjacent zones from operating in conflicting modes (one in heat, other in cool); applies to adjacent perimeter zones, adjacent nonperimeter zones, and adjacent perimeter and nonperimeter zones		
			If applying Exception 2 to nonperimeter zones adjacent to perimeter zones, indicate that setpoints and deadband settings in these zones are coordinated so cooling in a nonperimeter zone does not occur until the temperature in that zone is 5°F higher than the adjacent perimeter zone temperature in heating		
na	C403.2.4.1.1	Heat pump supplementary heat	Indicate staged heating operation with compression as the first stage of heating and supplemental heating controlled with outdoor lock-out temperature set to 40°F or less		
Yes	C403.2.4.1.2	Deadband	Indicate zone thermostatic controls configured with 5°F minimum deadband for systems that control both heating and cooling	M1.0	
na	C403.2.4.1.3	Setpoint overlap restriction (thermostats)	If separate heating and cooling systems with separate thermostatic control devices are used to serve a zone, indicate locations of both thermostatic control devices and the zone they serve on plans		
			Indicate a limit switch, mechanical stop or DDC control with programming to prevent simultaneous heating and cooling		
NA	C403.2.4.2 C403.2.4.2.1 C403.2.4.2.2	Automatic setback and shutdown	Indicate zone thermostatic controls configured with required automatic setback and manual override functions, setback temperatures, and control method (automatic time clock or programmable controls); note exceptions taken		
na	C403.2.4.2.3	Automatic (optimum) start	Indicate system controls that adjust equipment start time required to bring each area served up to design temperature just prior to scheduled occupancy		
na	C403.2.4.3	Outdoor supply air dampers	Indicate automatic controls configured to close OSA damper during unoccupied equipment operation; not including economizer cooling, night flush or IMC required OSA / exhaust		
na	C403.2.4.3	Stairway and shaft vent dampers	Indicate method of activation of stairway and shaft vent dampers (fire alarm or interruption of power)		
na	C403.2.4.4	Zone isolation controls	For systems serving areas > 25,000 sf or spanning more than one floor, that include areas that are expected to be occupied non-simultaneously; indicate controls that allow for independent space conditioning of isolation zones; or exception taken		
na	C403.2.12	Heating outside a building	Indicate occupancy sensing or timer switch controls configured to automatically shut off heating system when area served is unoccupied		
na	C403.2.4.5	Snow melt systems	Indicate automatic controls configured to shut off system when pavement temperature exceeds 50°F and no precipitation is falling, and when outdoor air temperature exceeds 40°F		
na	C403.2.4.6	Freeze protection system controls	Indicate automatic controls to shut off system when outdoor temperature exceeds 40°F, or conditions protect fluid from freezing		
na	C403.2.4.9	Group R1 hotel / motel guest rooms	For hotels and motels with over 50 guest rooms, indicate automatic controls serving guest rooms that are capable of setback (heating) and set-up (cooling) of temperature setpoint by at least 5°F; indicate control method - activated by room entry or occupancy sensor		

Mechanical Permit Plans Checklist — MECH-CHK

2015 Washington State Energy Code Compliance Forms for Commercial Buildings including R2 & R3 over 3 stories and all R1 — Revised January 2017

Project Title:	**BARC Vet Clinic**	Date	3/3/2020

The following information is necessary to check a permit application for compliance with the mechanical systems and equipment requirements of the Washington State Energy Code, Commercial Provisions.

Applicable (yes,no,na)	Code Section	Code Provision	Information Required - *Must be in permit documents*	Location in Documents	Building Department Notes
na	C403.2.4.10 C403.2.4.11	Group R2 / R3 dwelling units, Group R2 sleeping units	For primary space conditioning system, indicate 5-2 programmable thermostats capable of two setback periods per day; for all thermostats indicate purpose (heating only, cooling only, or both), required temperature range and at minimum a 10°F deadband; or exception taken		
Yes	C403.2.6 C403.2.11.4	Ventilation	Indicate method of ventilation air delivery (natural or mechanical) for each zone	M1.0	
			If mechanically delivered, indicate that systems are configured to provide not more than 150% of, but at least the minimum required volume of outdoor air to each zone per IMC, ASHRAE 62.1 or other applicable code (WAC, OSHA, etc); or exception taken		
			If delivered via natural ventilation, identify required elements per IMC including minimum openable area to the outdoors or qualifying adjoining spaces		
na	C403.2.6.2	Demand controlled ventilation	Identify spaces > 500 sf with occupant load > 25 people/1,000 sf per IMC; for each space indicate whether it is served by an HVAC system with total design OSA > 3,000 cfm, and / or the system has airside economizer or automatic modulating OSA damper; indicate OSA controls are configured to provide demand controlled ventilation or provide supporting documentation for applied exception		
na	C403.2.6.3	Occupancy sensors	For gyms, classrooms, auditoriums and conference rooms > 500 sf, indicate occupancy-based OSA control when space is unoccupied and method (closes OSA damper or shuts-off equipment); or alternate means provided to automatically reduce OSA when space is partially occupied		
na	C403.2.6.4 C403.2.6.4.1	Enclosed loading dock ventilation	For enclosed loading docks, indicate ventilation / exhaust system method of activation (gas detection system for CO and NO2, or occupancy sensors), and control method (staged or modulating)		
na	C403.2.6.4 C403.2.6.4.2	Enclosed parking garage ventilation	For enclosed parking garages, indicate ventilation / exhaust system activated by gas detection system for CO and NO2, and control method (staged or modulating); or exception taken		
na	C403.2.7.1	Kitchen exhaust hoods	Provide calculations that show a balanced accounting of total kitchen exhaust (include all hoods) with % of: supply air, transfer air from adjacent spaces, and make-up air; if applicable, indicate that direct make-up air to each hood does not exceed 10% of hood exhaust		
			For kitchens with total hood exhaust exceeding 2,000 cfm, indicate exhaust air rate per Table C403.2.7.1 and compliance method (DCV, energy recovery, or transfer air that would otherwise be exhausted)		
na	C403.2.7.2	Laboratory exhaust systems	Refer to Systems Requiring Energy Recovery for requirements		
na	C403.2.13	Variable flow capacity - HVAC system fans	For HVAC fan motors ≥ 7.5 hp, indicate method of variable flow control (VSD, or equivalent control method that reduces design air volume by 50% at 1/3 static design pressure); note exception taken		
na	C403.3.1	DX air handler variable cooling control (Under Integrated Economizer)	For DX air handlers with economizer and cooling capacity ≥ 65,000 Btu/h, indicate number of cooling stages provided and method (multiple compressors and / or variable speed compressors); indicate minimum displacement (capacity reduction) as % of full load		
			Indicate control method (cooling capacity controlled in response to space temperature, space temperature controlled by modulating supply airflow, or both)		
na	C403.2.11.5	Fan airflow control	For DX air handling units with cooling capacity ≥ 65,000 Btu/h and evaporative and chilled water air handling units with fan ≥ 0.25 hp, indicate whether system is single zone or multiple zone and related control method (cooling capacity controlled in response to space temperature, space temperature is controlled by modulating supply airflow, or both)		
			For mechanical cooling systems (includes DX and chilled water coils) that control cooling capacity in response to space temperature - Provide a minimum of two stages of fan control; indicate minimum fan speed is ≤ 66% of full speed drawing ≤ 40% of full speed fan power during periods of low cooling or ventilation only		
			For other mechanical cooling systems (includes DX and chilled water coils) that control space temperature by modulating airflow (in lieu of, or in addition to, controlling capacity in response to space temperature) - Provide fan controls for modulating supply airflow; indicate minimum fan speed is ≤ 50% of full speed drawing ≤ 30% of full speed fan power during periods of low cooling or ventilation only; or exception taken		
na	C403.2.4.12	DDC system capabilities	Provide central and zone level DDC controls as required based on system application, capacity or size thresholds and other qualification per Table C403.2.4.12.1		
			Identify all DDC system input / output control points; indicate capability for trending and graphical display		
Ducting Systems					
yes	C403.2.8.1 C403.2.8.3	Duct construction	Indicate on plans that all ductwork is constructed and sealed per IMC	M1.0	
			For OSA ductwork, also indicate on plans that ductwork meets air leakage requirements per C402.5 and vapor retarder requirements per the IBC		
na	C403.2.8.3	Duct pressure classifications	Identify location of low, medium and high pressure ductwork on plans		
NA	C403.2.8.3.3	High pressure duct leakage test	Indicate high pressure duct leakage testing requirements on plans; provide test results to jurisdiction when completed		

Mechanical Permit Plans Checklist

MECH-CHK

2015 Washington State Energy Code Compliance Forms for Commercial Buildings including R2 & R3 over 3 stories and all R1

Revised January 2017

Project Title: **BARC Vet Clinic** | Date 3/3/2020

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Applicable (yes,no,na)	Code Section	Code Provision	Information Required - *Must be in permit documents*	Location in Documents	Building Department Notes
yes	C403.2.8.1 C403.2.8.2	Duct insulation	For supply and return ductwork located in unconditioned space or outdoors, indicate R-value of insulation on ductwork on plans; identify climate zone; note exceptions taken	M1.0	
			For supply ductwork located in conditioned space, identify if design supply temperature is < 55°F or > 105°F and indicate R-value of insulation on this ductwork on plans; note exception taken		
			For OSA ductwork, shafts and plenums, indicate R-value of insulation on these elements on plans per Table C402.1.3 for steel-framed walls; note exception taken		
Piping Systems					
na	C403.2.9	Piping insulation	Indicate design temperature range of fluid conveyed in piping and thickness of insulation (in inches) on hydronic piping plans; or exception taken		
na	C403.2.9.1	Piping insulation exposed to weather	Indicate method of protection of pipe insulation from damage / degradation on hydronic piping plans		
Economizers					
na	C403.3	Air economizer required	Identify in equipment schedules on plans or in MECH-EQ forms all cooling systems requiring air economizer controls	NA	
			Provide MECH-ECONO form indicating systems utilizing air economizer exceptions, including those with water-side economizer in lieu of air economizer; indicate on plans eligible exception(s) taken and measures to comply with exception(s)		
na	C403.3.1	Integrated economizer operation - air and water	Indicate air and water-side economizers are configured for partial cooling operation even where additional mechanical cooling is required to meet the load		
na	C403.3.2	Economizer heating system impact - air and water	Verify control method of HVAC systems with economizers does not increase building heating energy usage during normal operation		
na	C403.3.3.1	Air economizer capacity	Indicate modulating OSA and return air dampers are configured to provide up to 100% OSA for cooling		
na	C403.3.1 C403.3.3.2	Integrated air economizer	Verify mechanical cooling controls are interlocked with air economizer controls so the outside air damper remains in 100% open position when mechanical cooling is also required to meet the cooling load, until the leaving air temperature is < 45°F		
			For systems with cooling capacity ≥ 65,000 Btu/h, verify that control of economizer dampers is not based only on mixed air temperature; or exception taken		
na	C403.3.3.3	Air economizer high limit controls	Indicate high limit shut-off control method and required high limit per Table C403.3.3.3		
na	C403.3.4.1	Water economizer capacity	For eligible systems where water-side economizer may be provided in lieu of air economizer, indicate system is capable of 100% design cooling capacity at 50°F db / 45°F wb OSA temperatures		
na	C403.3.4.2	Water economizer maximum pressure drop	Indicate pressure drop across precooling coils and heat exchangers in water economizer system do not exceed pressure drop limit		
na	C403.3.1	DX air handling equipment control	For DX air handlers with economizer and cooling capacity ≥ 65,000 Btu/h, refer to HVAC System Controls for requirements		
na	C403.2.4.7	DX equipment economizer fault detection and diagnostics	For DX air handlers with economizer and cooling capacity ≥ 54,000 Btu/h, provide a fault detection and diagnostics (FDD) system to monitor economizer system operation and report faults		
Systems Requiring Energy Recovery					
na	C403.5.1	Energy recovery (ER) - ventilation / exhaust systems	For systems with design OSA > 5,000 cfm, or design supply air cfm and % OSA exceeding the values in Tables C403.5.1(1) or (2), indicate exhaust air ER method; or exception taken with supporting calculations		
			For rooms served by multiple systems with aggregate design OSA > 5,000 cfm, or aggregate design supply air cfm and % OSA exceeding the values in Tables C403.5.1(1) or (2), indicate exhaust air ER method; or exception taken with supporting calculations		
			Indicate ER rated effectiveness that increases OSA enthalpy by ≥ 50% based on delta between OSA and return air enthalpies at design conditions		
na	C403.2.7.2	Laboratory exhaust systems (energy recovery)	For buildings with total lab exhaust > 5,000 cfm, indicate method of energy recovery used to pre-condition laboratory make-up air; ER effectiveness (min 25°F); or alternative method per exception (VAV exhaust, semi-conditioned makeup, or CERM calculation)		
na	C404.10.4 (under C404.11)	Pools and permanent spas exhaust systems (energy recovery)	For buildings with pools or spas with water surface area > 200 sf, indicate exhaust air ER method and use of waste heat (preheat ventilation air, pool water or service hot water); or exception taken		
			Indicate ER system has the rated effectiveness and is configured to decrease the exhaust air temperature at design conditions by ≥ 36°F		
na	C403.5.2	Energy recovery - steam condensate systems	For buildings with on-site steam heating systems, indicate condensate water ER		
			For buildings that use off-site generated steam where condensate is not returned to the source, indicate on-site condensate water ER		

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na	C403.5.3	Energy recovery - cooler / freezer condensers	For buildings with food service, meat or deli departments that have ≥ 500,000 Btu/h of remote refrigeration capacity for coolers / freezers, indicate condenser ER and use of captured energy (service water heating, space heating, or dehumidification reheating)		
			For buildings with ≥ 40,000 sf conditioned floor area and with ≥ 1,000,000 Btu/h of remote refrigeration capacity for coolers / freezers, indicate condenser ER and use of captured energy for service water heating and also for space heating, or dehumidification reheating		
na	C403.5.4	Energy recovery - condenser systems	For buildings with 24-hour operation and with > 1,500,000 Btu/h of heat rejection capacity and design service hot water load > 250,000 Btu/h, indicate condenser ER to pre-heat service water; or exception taken. Provide calculations showing the amount of recovered heat that is utilized (60% of peak heat rejection load or pre-heat service water to 85°F).		
Hydronic System Controls					
na	C403.2.13 C403.4.2.7	Variable flow control - hydronic system pumps	For hydronic system pump motors ≥ 7.5 hp, indicate method of variable flow control (VSD or equivalent method that requires ≥ 30% design wattage at 50% design fluid flow); note exception taken		
			Identify whether hydronic coils have DDC controls and associated manner of pump speed control (differential pressure, zone hydronic demand, etc)		
na	C403.2.5 C403.4.2.4	Hydronic system setback and part load controls	For boilers that provide building heating, indicate controls that provide heating water temperature setback based on outdoor temperature		
			For heating and chilled water systems ≥ 300,000 Btu/h, indicate systems are configured to automatically reset supply water temperature based upon demand; or exception taken. If system pump motor hp ≥ 3 hp, also indicate controls automatically reduce flow by ≥ 50%.		
			For chilled water systems (≥ 300,000 Btu/h, pump motor hp ≥ 3 hp) that serve water-cooled unitary air conditioners, indicate VSD or staged pumps in chilled water system and heat rejection loop that reduce pump flow so that one control valve is nearly wide open, or to maintain a minimum differential pressure; or exception taken		
na	C403.4.2	Boiler sequencing	Indicate automatic controls that sequence operation of multiple boilers		
na	C403.4.6	Hot gas bypass limitation	For cooling equipment with hot gas bypass, provide either multiple step unloading or continuous capacity modulation; indicate bypass capacity per Table C403.4.6		
na	C403.4.2.2	Two-pipe changeover systems	Indicate changeover deadband (min 15°F), heating / cooling mode scheduling and changeover temperature range (limit 30°F)		
na	C403.4.2.6	Chiller / boiler plant pump isolation	Indicate controls are configured to automatically reduce overall plant flow and shut-off flow through individual chillers and boilers when not in use		
na	C403.2.13.1.1 C403.4.3.1.1 C403.4.3.1.2	Heat rejection equipment - variable flow control	For cooling towers with fan motors ≥ 7.5 hp, indicate VSD and method to adjust fan speed (adjusted based on leaving fluid temperature or condenser temperature / pressure of heat rejection device)		
			For multiple-cell heat rejection equipment with VSD, indicate controls that ramp all fans in unison		
na	C403.4.3.3	Heat rejection equipment - cooling tower flow turndown	Indicate open-circuit cooling towers with multiple pumps or VSD control are designed so all cells can be run in parallel		
na	C403.4.2.3.1	Water loop heat pump - deadband	Indicate capability of central equipment to provide minimum 20°F water supply temperature deadband between heat rejection and heat addition modes; or exception taken		
na	C403.4.2.3.2.1	Water loop heat pump - heat rejection equipment, Zone 4	Indicate type of cooling tower (open- or closed-circuit) in equipment schedule; indicate method used to limit system heat loss when heat rejection is not needed		
na	C403.4.2.3.2.2	Water loop heat pump - heat rejection equipment, Zone 5	For open- or closed-circuit cooling towers, provide a heat exchanger that separates the cooling tower and heat pump loop		
na	C403.4.2.3.3	Water loop heat pump - isolation valves	For hydronic heat pump systems with total system power > 10 hp, indicate 2-way isolation valves on each heat pump and variable flow system control		
Dedicated Outdoor Air Systems (DOAS) - Optional through 6/30/16, Prescriptive 7/1/2016					
na	C403.6 C403.6.3	Dedicated outdoor air systems	For buildings with office, retail, education, library and fire station spaces, identify these spaces on plans; indicate that ventilation air in each occupied space is provided via a DOAS system; or document compliance with C403.6.3 Impracticality; or exception taken (buildings complying with C402.4.1.4 or C406.6 may not utilize exceptions)		
na	C403.6.1	Energy recovery ventilation with DOAS	For all DOAS systems, indicate exhaust air ER method; or exception taken with supporting calculations. Indicate ER rated effectiveness that increases OSA enthalpy by ≥ 50% based on delta between OSA and return air enthalpies at design conditions.		
na	C403.6.2	Heating / cooling system controls with DOAS	Indicate equipment associated with the delivery of zone level heating and cooling (fans, hydronic pumps, primary air dampers, etc) are configured to shut off, and central equipment is configured to turn down, when there is no call for heating or cooling in the zone they serve		
			If applying Exception to heating / cooling fans used for air mixing in the space during deadband periods, include fan watts per cfm in equipment schedule		

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na	C402.4.1.4 C403.6	Increased prescriptive maximum vertical fenestration area with DOAS	Indicate that all occupied, conditioned spaces are served by a DOAS per C403.6		
Additional Efficiency Package Option, Dedicated Outside Air Systems (DOAS)					
na	C406.6	Building provided with DOAS	To comply with additional efficiency package option, indicate that 90% or more of all occupied, conditioned spaces are served by a DOAS per C403.6		
Multiple Zone Air Systems					
na	C403.4.4	Air systems serving multiple zones	Identify supply air systems serving multiple zones and the zones they serve on plans; indicate whether system is VAV and method of primary air control; or provide supporting documentation for applied exception to VAV		
na	C403.4.4	VAV systems serving multiple zones	Provide equipment schedules on plans or MECH-EQ form that list all VAV air terminals and types		
			For each air terminal include: maximum airflow rates for primary supply air during zone peak heating and zone peak cooling; maximum airflow during reheating, recooling or mixing; minimum airflow rate to maintain required ventilation, and the basis for these values; if IMC or ASHRAE 62.1 multiple zone equation is basis for minimum flow rates, provide calculation on plans		
na	C403.4.4.1	Single duct VAV terminal units	Indicate single duct terminal units are configured to reduce primary supply air before reheating or recooling		
	C403.4.4.2	Dual duct systems - terminal units	For systems with separate warm air and cool air ducts, indicate terminal units are configured to reduce the flow from one duct to minimum before mixing with air from the other duct		
na	C403.4.1.1 C403.4.1.2	VAV system static pressure sensors - sensors and DDC set points	Indicate locations of duct static pressure sensors on plans; include at least one sensor per major duct branch; verify controller setpoint pressure at each sensor is ≤ 1.2 inch w.g.		
			For systems with zone level DDC, indicate controls are configured to monitor zone damper positions and reset static pressure setpoint based on the zone requiring most pressure; include control logic that automatically detects and generates an alarm if any zone excessively drives reset logic, and allows building operators to exclude zones from reset logic		
na	C403.4.4.3	Multiple-zone VAV system ventilation optimization controls	For systems with zone level DDC controls, indicate controls are configured to automatically reduce outdoor airflow in response to changes in system ventilation efficiency; or exception taken		
	C403.4.4.4	VAV system supply air reset	Indicate controls automatically reset supply air temperature in response to building loads or outdoor air temperature; or exception taken		
Multiple Zone HVAC Systems, High Efficiency VAV - Required for systems utilizing C403.6 DOAS Exception 2, must comply with all 16 provisions					
na	C403.7, Item 1	Air economizer	Indicate system is configured for 100% air economizer operation and complies with all related economizer requirements per C403.3 (without economizer exceptions)		
na	C403.7, Item 2	Direct digital controls (DDC)	Provide DDC controls for all components of system; identify all DDC system input / output control points; indicate capability for trending and graphical display		
na	C403.7, Item 3	Outdoor airflow measurement and reduction	For systems with minimum OSA > 2,500 cfm, indicate outdoor airflow monitoring station that measures OSA intake under all load conditions; indicate control sequence that increases or reduces system OSA cfm based on VAV terminal feedback of ventilation efficiency (per C403.4.4.3 without exceptions) or DCV (per C403.2.6.2)		
na	C403.7, Item 4	Supply airflow measurement	For systems with minimum OSA > 2,500 cfm, indicate supply airflow monitoring station capable of measuring supply air delivered to VAV terminals under all load conditions		
na	C403.7, Item 5	Zone isolation and maximum area served	Verify maximum area served by a single HEVAV system is ≤ 50,000 sf, or one entire floor, whichever is greater; in addition if a system serves > 25,000 sf, that includes areas that are expected to be occupied non-simultaneously, indicate zone isolation controls per C403.2.4.4		
na	C403.7, Item 6	Interior / exterior zone design supply air temperature	Verify that VAV terminals serving interior cooling driven loads are sized per design supply air temperature that is 5°F higher than VAV terminals serving exterior zones		
na	C403.7, Item 7	Maximum air terminal inlet velocity	Identify air terminals with minimum primary airflow setpoints > 50% of maximum setpoint in equipment schedule or MECH-EQ form; indicate air terminal inlet velocity does not exceed 900 fpm		
na	C403.7, Item 8	Sequence of operation	Indicate DDC system sequences of operation are designed and configured per ASHRAE GPC 36		
na	C403.7, Item 9	Maximum allowable system brake horsepower	Verify fan system bhp is ≤ 90% of the bhp limit per Option 2 equation in Table C403.2.11.1(1), provide MECH-FANSYS form for each system		
na	C403.7, Item 10	Fan-powered terminal unit motor and control	Indicate all series and parallel terminal fans have electronically commutated motors; indicate DDC control system is configured to vary air terminal fan speed as a function of the load; indicate fan speed during periods of low heating, low cooling, or ventilation only is ≤ 66% of peak design air flow or provide supporting documentation for applied exception		

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na	C403.7, Item 11	Application of single duct and fan-powered terminal units	Indicate VAV terminal types on plans; verify fan-powered terminal units only serve perimeter zones with envelope loads; verify all other zones are served by single duct terminal units		
na	C403.7, Item 12	Fan-powered terminal unit primary air reset	Indicate DDC controls are configured to automatically reset the primary supply air cfm setpoint of all fan-powered terminal units to the minimum required to maintain ventilation during occupied heating or deadband, based upon the VAV air handling unit OSA ventilation fraction		
na	C403.7, Item 13	High occupancy space controls	For spaces > 150 sf with occupant density ≥ 25 people / 1000 sf, indicate space is served by a dedicated terminal unit with DCV control that resets terminal unit ventilation setpoint; also indicate occupancy sensor control that automatically reduces minimum ventilation to zero and sets back room heating and cooling setpoints by ≥ 5°F		
na	C403.7, Item 14	Dedicated HVAC systems	For server, electronic equipment, telecom or similar spaces with cooling loads > 5 W/sf, indicate spaces are served by independent HVAC systems that are separate from HPVAV systems serving rest of building; indicate dedicated HVAC systems have air economizer controls or energy recovery per C403.3 Exception 9		
na	C403.7, Item 15	Central plant efficiency	Indicate whether systems are served by a high efficiency heating water plant, or a high efficiency chilled water plant		
			If complying via high efficiency heating water plant: Indicate all VAV terminals have hydronic heating coils served by heating water system with either gas-fired boiler(s) with thermal efficiency ≥ 90%, air-to-water heat pumps, or heat recovery chillers		
			If complying via high efficiency chilled water plant: Indicate all VAV air handlers have cooling coils served by chillers with rated IPLV efficiency that exceeds WSEC listed IPLV by at least 25% per Table C403.2.3(7) (note water-cooled IPLV is max, all others are min); indicate smallest chiller or compressor in plant is ≤ 20% of total plant capacity, or provide thermal storage sized for ≤ 20% of total plant capacity		
na	C403.7, Item 16	Fault detection and diagnostics	Indicate DDC system includes a fault detection and diagnostics (FDD) system configured to monitor operation and provide fault reporting of required parameters for all VAV air handlers and VAV air terminal units in the HPVAV system		
HVAC Equipment Energy Use Metering					
na	C409.3.1	HVAC equipment energy use metering	For new buildings > 50,000 sf and building additions > 25,000 sf, verify energy use metering of all equipment used to provide space heating and cooling, dehumidification and ventilation will be provided per C409; indicate equipment eligible for exception		
Documentation and System Specific Requirement To Support Commissioning					
Yes	C408.2	Scope of mechanical systems commissioning	Indicate that all mechanical systems, equipment, and controls for which the WSEC requires control functions and / or configuration to perform specific functions are required to be commissioned;	M1.0	
			For buildings with ≥ 240,000 Btu/h total output cooling capacity or ≥ 300,000 Btu/h total output heating capacity, indicate that all mechanical systems regardless of individual capacity are required to be commissioned; or provide building heating / cooling capacity calculation demonstrating eligibility for exception		
Yes	C403.2.10 C408.1.1 C408.1.2 C408.1.4.2 C103.6	Commissioning requirements in construction documents	Indicate in plans and specifications that Cx per C408 is required for all applicable mechanical systems;	M1.0	
			Include general summary with at a minimum of Items 1 thru 4 of the Cx plan per C408.1.2 including: narrative description of activities, responsibilities of the Cx team, schedule of activities including verification of project close out documentation per C103.6, and conflict of interest plan (if required);		
			Include in general summary that a Cx project report or Compliance Checklist (Figure C408.1.4.2) shall be completed by the Certified Cx Professional and provided to the owner prior to the final mechanical inspection.		
Yes	C408.2.2	Air system and hydronic system balancing	Indicate in plans that air and fluid flow rates shall be tested and balanced within the tolerances defined in the specifications; indicate systems shall be balanced in a manner to first minimize throttling losses, then adjusted to meet design flow conditions	M1.0	
Yes	C408.2.2.1	Air system balancing devices	Indicate devices that provide the capability to balance all supply air outlets, zone terminals and air handling equipment requiring system balancing	M2.0	
na	C408.2.2.2	Hydronic system balancing devices	Indicate devices that provide the capability to isolate, balance and measure flow across all hydronic equipment requiring system balancing including heating and cooling coils and pumps		
Yes	C408.2.3	Functional performance testing criteria	Identify in plans and specifications the intended operation of all equipment and controls during all modes of operation, including interfacing between new and existing-to-remain systems	M1.0	
Project Close Out Documentation					
Yes	C103.6	Documentation and project close out submittal requirements	Indicate in plans that project close out documentation and training of building operations personnel is required for all mechanical components, equipment and systems governed by this code; indicate close out documentation shall include: record documents, O&M manuals, applicable WSEC compliance forms and calculations	M1.0	

Mechanical Fan System Power Allowance MECH-FANSYS-SUM

2015 Washington State Energy Code Compliance Forms for Commercial Buildings including R2 & R3 over 3 stories and all R1 Revised January 2017

Project Title: BARC Vet Clinic	Date 3/3/2020
	For Building Dept. Use

HVAC Air Distribution System Schedule

List all HVAC systems that have the capability to provide heating and/or cooling to the spaces they serve.

System or Primary Supply Fan ID	Speed Control (Note 1)	Description (Note 2)	System Total Nameplate HP (Note 3)	Fan Power Calculation Required (Note 4)
AC-1	CV	Rooftop unit	0.5	No
SF-1	CV	Supply fan	0.25	No
EF-1	CV	Exhaust fan	0.25	No
EF-2	CV	Exhaust fan	0.25	No
EF-3	CV	Exhaust fan	0.25	No
EF-4	CV	Exhaust fan	0.25	No
EF-5	CV	Exhaust fan	0.25	No
EF-6	CV	Exhaust fan	0.25	No

Note 1 - Constant Volume (CV), Variable Air Volume (VAV), or Hospital/Lab CV system that qualifies for VAV budget per C403.2.11.1 Exception 1. Single zone VAV systems shall comply as CV.

Note 2 - Describe system type and list all fans (or groups of fans) associated with the delivery and removal of conditioned air by the system. Include all supply, return/relief, exhaust and exhaust hoods (>1 hp), make-up air, dedicated outside air (DOAS), booster fans, and series fan-powered terminals. VAV parallel fan-powered terminals and economizer relief fans do not need to be included if the fans do not operate at peak conditions.

Note 3 - Enter the total nameplate hp of all fans associated with the delivery and removal of conditioned air by the system.

Note 4 - This form automatically identifies whether a MECH-FANSYS form is required to demonstrate compliance with the fan power allowance (Yes), or this information is not required because the system has a combined total nameplate motor hp that is 5 hp or less (No)

MECH-FANSYS Forms

A MECH-FANSYS form shall be provided for each system with total nameplate hp greater than 5 hp. Select (Add Fan System Form) to generate an additional form. Added forms can be deleted with button in cell E32 of the added form.

ROOFTOP GAS ELECTRIC EQUIPMENT SCHEDULE

TAG	LOCATION	SERVES	NOM. TONS	TYPE	ECON?	FAN PERFORMANCE			TC (a) (MBH)	SC (a) (MBH)	SEER OR EER	HEAT INPUT (MBH)	HEAT OUTPUT (MBH)	AFUE (%)	MIN OSA CFM	ELECTRICAL DATA				SOUND RATING (DBA)	WEIGHT (LBS) (c)	BRAND	MODEL	NOTES
						CFM	ESP (IN.WG)	HP								V/PH/HZ	FLA	MCA	CIRCUIT AMPS (b)					
AC-1	ROOF	SURGERY 130	2	VERT	N	800	0.5	0.5	23.0	18	14.0	40	33	81	200	208/1/60	13.1	15.2	20	73	325	CARRIER	48VL-E240403	1

Footnotes - (a) Total cooling & sensible cooling rated at 80F db/67F wb indoor entering & 95F outdoor ambient.
(b) Circuit breaker or MOCP amps. (c) Includes unit curb.

Notes:
1. Factory manual outside air hood with barometric relief & factory roof curb. NO economizer - surgery room must maintain positive pressure difference.

TAG EQUIPMENT SCHEDULE

AF-1 AIR FILTER PACKAGE, extended surface, 12" deep filters. Pre-filter: 1 @ 24x24x2 filters (Camfil 30/30), MERV 8 efficiency ASHRAE. Final-filter: 1 @ 24x24x12 filters (Viledon MV-95), MERV 16 efficiency ASHRAE. Include Camfil Farr MultiTrack 25 Filter Housing. Include air filter gauge - molded plastic manometer, Dwyer Mark II model 25, complete with red oil, tubing and filter flags.

SF-1 SUPPLY FAN, Inline direct drive, mixed flow type. 600 cfm @ 0.75" SP, Include solid state speed control, mounted at fan for air balancing. Fantech FKD12
Electrical data: 115/1/60, 5 amps.

EF-1 THRU EF-6 EXHAUST FAN, Ceiling type, 150 cfm @ 1/8" SP, 1.5 sones, Operate thru wall switch in room. Broan L150.
Electrical data: 120/1/60, 1.3 amps.

CONTROLS

T1 SEVEN DAY PROGRAMMABLE THERMOSTAT, two stage, Honeywell TB8220.

CONTROL NOTE: System capable of minimum 5 degree deadband, seven day programmable for each day per week, outside air dampers close automatically when system is off or upon power failure, interlocked to prevent simultaneous heating and cooling. Mount thermostat or sensor 60 inches above floor.

CONTROL SEQUENCE

AC-1 OPERATION - SURGERY 130
Maintain positive pressure difference in room during occupied hours.

Occupied Hours
AC-1 fan and SF-1 fan operate together, continuous. Outside air damper on AC-1 is set for about 200 to 300 cfm (~25-30%). AC-1 cycles heating or cooling mode based on calls from thermostat. Return air is adjusted using volume damper to about 600 cfm to provide positive pressure difference. Field verify.

Unoccupied Hours
AC-1 cycles based on calls for heating or cooling from thermostat. SF-1 runs whenever AC-1 fan runs.

TAG GRILLE AND LOUVER SCHEDULE

SUPPLY:

A Square Ceiling Diffuser, Modular core, T-bar frame, 24x24 face, Shoemaker 700MA.

B Perforated Ceiling Diffuser, surgery type, Surface frame type, with air balance damper built-in. Precision Air Products, Lami-vent model - C.

C Louvered, Double deflection, with OBD. Shoemaker 904.

D Not Used.

RETURN/EXHAUST:

E Eggcrate, aluminum grid 1/2", T-bar frame, Shoemaker 600T.

F Standard fixed blade - 45 deg. NO OBD. Shoemaker 905.

G Not Used.

ROOF CAPS AND WALL VENTS:

H Roof cap, globe style vent with birdscreen, round galvanized, FAMCO #GBV

J Wall vent, galvanized, screened, Columbia Venting CVP-SWV or equal, see drawing for size.

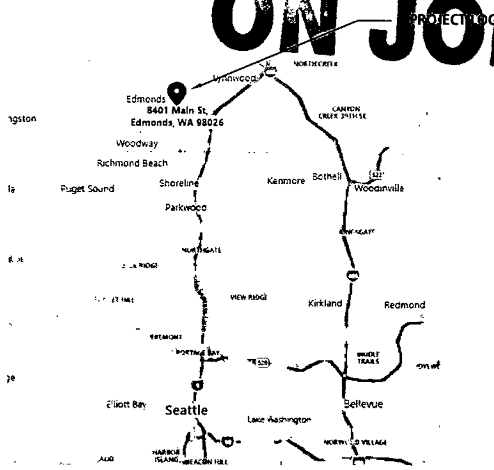
GENERAL GRILLE NOTES:

1. All steel construction, standard white finish, except as noted.
2. Or approved equal.

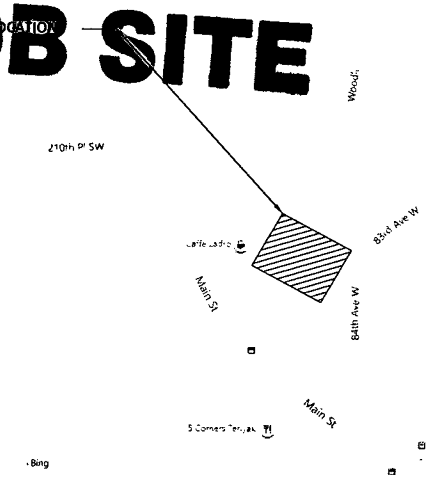
APPROVED PLANS MUST BE ON JOB SITE

SYSTEM DESCRIPTION

Tenant Improvement of Veterinary Clinic. New dedicated rooftop unit with [illegible]work to [illegible] operating room. Install new ductwork to existing rooftop units [illegible] new exa[illegible] [illegible]an room.



VICINITY MAP
SCALE: NONE



LOCAL MAP
SCALE: NONE

HVAC GENERAL NOTES

1. VERIFY site conditions.
2. THERMOSTAT LOCATIONS: Verify all wall mounted control locations with architect.
3. CODES: Comply with all local & state governing codes.
4. COORDINATE ductwork and grille locations with lighting and other related trades with architect approval. Verify clearances & ceiling elevations before installation.
5. DRAWINGS are schematic in some areas and may not show exact routing or every offset which may be required. Provide a complete & properly working system with all necessary items.
6. SEISMIC BRACING: Provide to meet local code requirements. Refer to the ASHRAE standards "Practical Guide to Seismic Restraint", 1999.
7. PIPING INSULATION: Provide thermal insulation as required on HVAC piping. For exterior piping include protection from weather and damage. WSEC, sec. C403.2.9
8. TEST, ADJUST, & BALANCE: Provide proper system testing, adjusting, and balancing on both air and water according to NEBB & ASHRAE standards, including written reports. Use only technicians qualified & trained in TAB work.
Include System Commissioning: Functional testing of sequences of operation to ensure they operate in accordance with the mechanical plans.
(WSEC, Sec C408).
9. OPERATION & MAINTENANCE BOOKLET: Provide O & M manual to owner. Include cut sheets on main equipment and controls, maintenance instructions, and marked up as built drawing (record drawings per WSEC, Sec C408).
10. WALK-THRU instruction: Provide on site walk-thru for customer to demonstrate operation of system and answer questions.
11. GUARANTEE: Contractor shall warrant the completed system from defects for one year from date of final start up.
12. ELECTRICAL: All equipment to have a positive means of disconnect adjacent to and in sight from equipment served. Provide a 120 volt receptacle located within 25 feet of equipment for service & maintenance purposes (IMC sec. 301.10). Line voltage work by others.
13. ROOFTOP UNITS ON CURBS: SEAL holes and cracks between duct and roof deck inside factory roof curb for noise control.
14. EXHAUST FAN TERMINATION: Shall not be less than 3 feet from a property line or openings into a building, e.g., operable windows and doors.
IMC, Sec. 501.3.1, item #3.

DUCT NOTES

1. DUCT CONSTRUCTION and installation per latest SMACNA Standards and the IMC as required by the local code. Provide metal duct, except as noted.
2. BALANCING DAMPERS: Provide on all supply grille run out ducts up stream of grille.
3. DUCT INSULATION: Manville fiberglass duct wrap, type 75, FSK aluminum foil facing or equal. Outside air ducts in conditioned space = R-7 with vapor barrier; Supply & return: in unconditioned space = R-6, outside building envelope = R-8. EXCEPTIONS: No insulation required where the design temperature difference between interior and exterior of the duct does not exceed 15°F. Supply ducts which convey supply air at temperatures less than 55°F or greater than 105°F shall be insulated with min. R-3.3 insulation where located within conditioned space. WSEC sec. C403.2.8
4. DUCT SEALING-GENERAL: 0 to 2" static pressure - seal all seams and joints on all ducts. Higher static pressures - refer to the IMC for additional requirements. Inside build: DuroDyne "DDS-181" gray or approved equal per UL 181 A-M, 181B-M listed. Outside: Polyurethane, Mameco Vulkem 116. OR approved equal. WSEC sec. C403.2.8
5. TURN VANES: Provide single thickness turn vanes (see detail) in all major square duct elbows, tees, or turns with inside radius less than 3/4 duct width. Square branch duct taps shall be 45 degree type per SMACNA standard.
6. FLEX DUCT (Insulated): For grille run outs up to 6 ft. long, except as noted. Provide adjustable metal elbows on all turns, unless a smooth full radius turn is made. Secure core with approved nylon or metal worm drive clamps. NO duct tape joints & screws allowed.
7. SOUND LINER: Provide sound lined metal supply & return ducts as shown on plans. Johns Manville Linacoustic RC flexible fiberglass liner with Permacote acrylic surface treatment or equal. Fabricate and install per duct liner standard of North American Insulation Manufacturer's Assoc.
8. FLEX CONNECTORS: Provide on all duct hook-ups to isolate air handling equipment (Neoprene coated fiberglass fabric type).
9. DUCT SIZE CHANGES: Round galvanized ducts may be substituted for rectangular ducts that are NOT LINED. Provide circular equivalent of rectangular duct. Other equivalent rectangular duct sizes may be substituted to better fit space.
10. TEMPORARY DUCT CLOSURE: Seal off ductwork during construction to keep out construction dust, especially floor boots and low wall openings.

HVAC DRAWING INDEX

HVAC LEGEND

SYMBOL	ABBV.	DESCRIPTION
(T1)		Control
AH-1		Equipment
(A)		Grille/Louver
		Supply Duct
		Return/Exhaust Duct
		Duct under slab (Spunstrand)
		Flex Duct, insulated, inside dimension
		Metal Duct
	SL	Soundlined Duct
	VD	Volume Damper
	FC	Flex Connector
	TV	Turning Vanes
		End Cap
		Change in duct size
		Surface Mount Supply Grille
		T-bar Supply Grille
		Round Supply Grille
		Return/Exhaust Grille
		Sidewall Supply/Makeup Grille
		Sidewall Return/Exhaust Grille
	FD	Floor Drain
	AFF	Above Finished Floor
	AT	Air Transfer
	BS	Birdscreen
	OSA	Outside Air
	RA	Return Air
	SA	Supply Air
	(E)	Existing

ALL WORK SUBJECT TO FIELD INSPECTION FOR CODE COMPLIANCE

GRILLE CALL OUT LEGEND

Grille Tag — (X) 8/8 8 / 140
- Neck Size (IN) Square or Rectangular
- Neck Size (IN) Round
- Air Quantity (CFM)

Grille Tag — (X) 1S(0.5)-2 / 100
- Number of Slots
- Indicates Slot Type Grille
- Slot Size (IN)
- Length (FT)
- Air Quantity (CFM)

Air Pattern - indicated by arrows for ceiling grilles.
No Arrows indicated four way pattern.

DUCT CALL OUT LEGEND

(Example call-out shown)

14/10-1	Lined metal duct, outside duct size given. Number after dash is liner thickness (in.).
14/10	Metal duct size.
14	Round metal duct.
14/10 FO	Flat oval duct.
	1 1/2 HR. "UL" Dynamic Fire Damper. UL 555. Ruskin DIBD2 or equal.
R	"UL" Ceiling Fire Damper for up to 3 hr. rating. UL 555C. Ruskin CFD or equal.
	1 1/2 HR. "UL" Combination Fire-Smoke Damper with 115 volt connection to smoke detection system. Class II, 250°F. UL 555 & UL 555S. Ruskin FSD36 or equal.
C	1 HR. "UL" Corridor Combination Fire-Smoke Damper with 115 volt connection to smoke detection system. Class II, 250°F. UL 555 & UL 555S. Ruskin FSD36-C or equal.
S	Smoke Damper, "UL" rated, with 115 volt connection to smoke detection system. Class II, 250°F. UL 555S. Ruskin SD36 or equal.
G	1 1/2 HR. "UL" Combination Fire-Smoke Damper with grille access and 115 volt connection to smoke detection system. Class II, 250°F. UL 555 & UL 555S. Ruskin FSD36GA or equal.

NOTE: All fire/smoke dampers to be installed per manufacturer's 'UL' instructions and shall have permanently labeled access door per 2015 IMC sec. 607.4.

DRAWING DISCREPANCIES

Contractor to alert Franklin Engineering of any discrepancies found on the drawings, such as missing data, typos, or any other items that do not make good sense.

CODES

2015 Washington State Energy Code
2015 Washington State Building Code
2015 International Mechanical Code
2015 International Building Code

NATALIE MARIE THROWER, STATE OF WASHINGTON, REGISTERED PROFESSIONAL ENGINEER, 38477

FRANKLIN ENGINEERING
MECHANICAL CONSULTING
625 FOURTH AVE
SUITE 202
KIRKLAND, WA 98033
TEL 425/827-3324
FAX 425/827-6252
www.franklineng.com

CLIENT: JMI Johansen Mechanical Inc.
(425) 481-2266
www.johansenmech.com

BARC VET CLINIC
8401 Main Street
Edmonds, WA 98026

HVAC Schedules & Legends

3-4-2020	PERMIT SET
3-10-2020	REVISED PERMIT SET

DRAWN: NMT
DESIGN: PFE

JOB NO. 00201

SHEET M1.0

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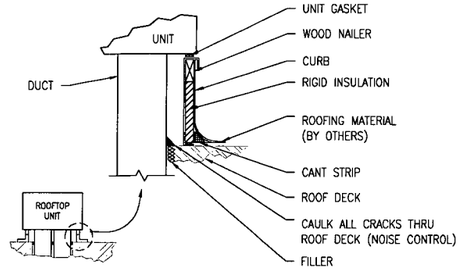
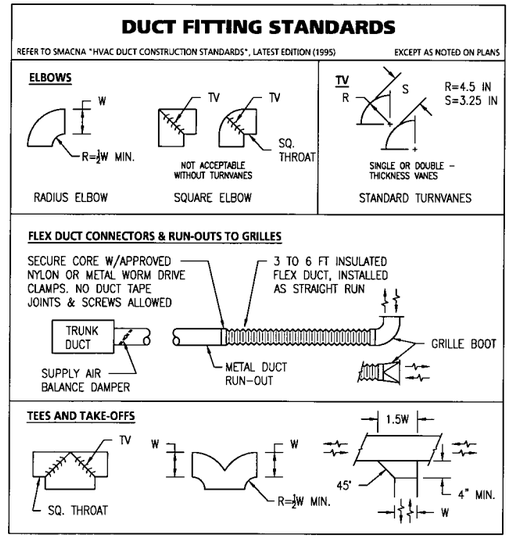
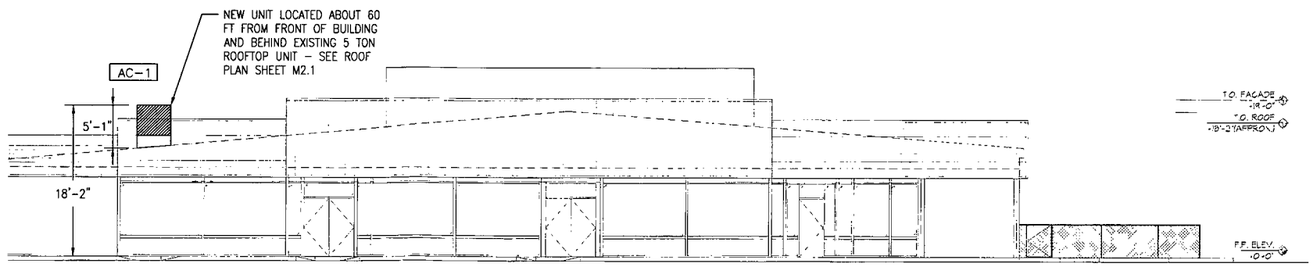


1 STANDARD CURB DETAIL
SCALE: NONE

DUCT FITTING STANDARDS

REFER TO SMACNA "HVAC DUCT CONSTRUCTION STANDARDS", LATEST EDITION (1995) EXCEPT AS NOTED ON PLANS





FRONT ELEVATION - SW
SCALE: 1/8"=1'-0"

FRANKLIN ENGINEERING
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CLIENT:
Johansen Mechanical Inc.
(425) 481-2266
www.johansenmech.com

BARC VET CLINIC
8401 Main Street
Edmonds, WA 98026

HVAC Elevation & Details

3-4-2020	PERMIT SET
3-10-2020	REVISED PERMIT SET

DRAWN: MMT
DESIGN: PFE

JOB NO. 00201

SHEET **M1.1**

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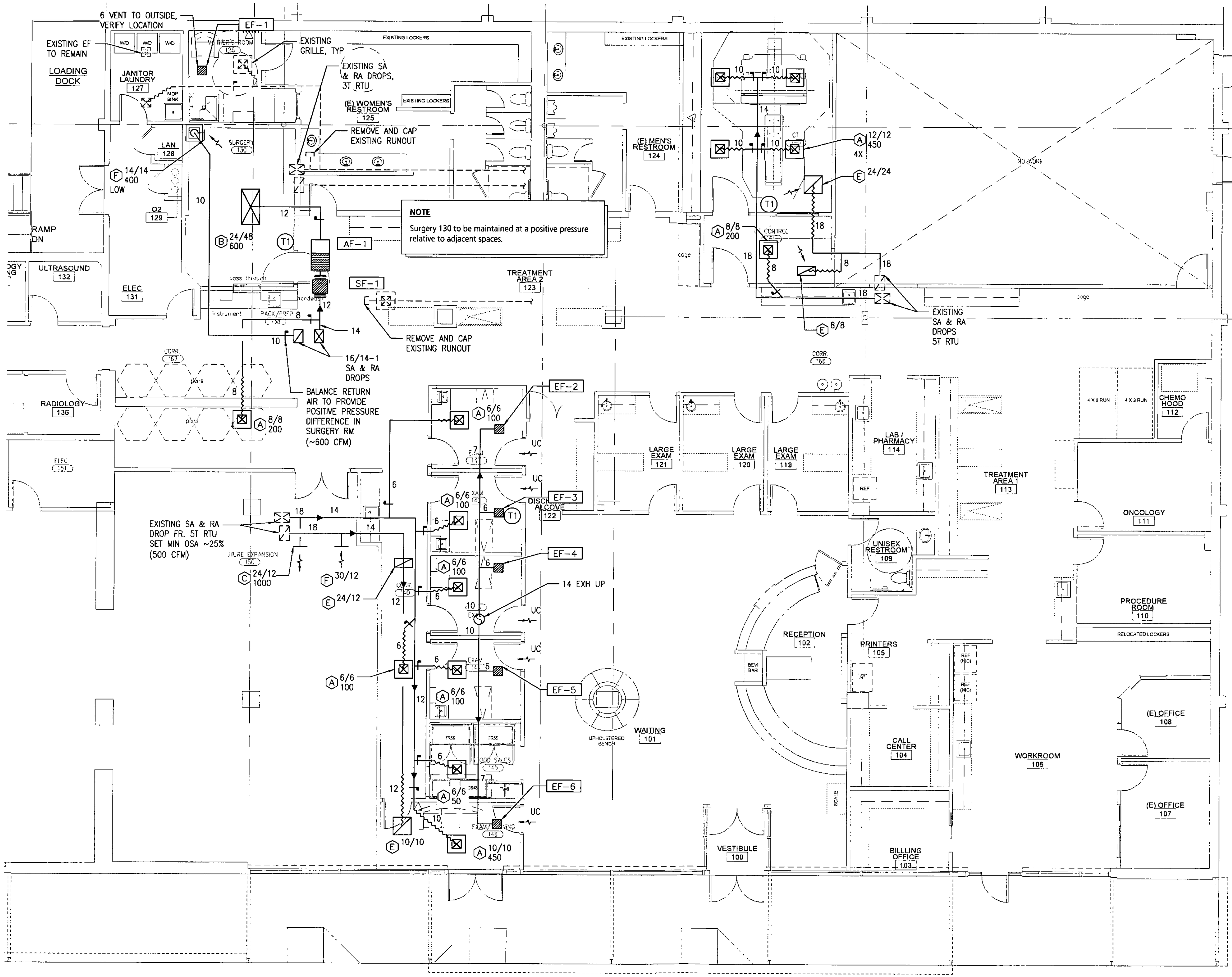

HVAC FLOOR PLAN

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

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625 FOURTH AVE SUITE 202 KIRKLAND, WA 98033 TEL 425/821-3324 FAX 425/821-6252 www.franklineng.com

CLIENT: JMI Johansen Mechanical Inc. (425) 481-2266 www.johansenmech.com

BARC VET CLINIC
8401 Main Street
Edmonds, WA 98026

HVAC Floor Plan

3-4-2020	PERMIT SET
3-10-2020	REVISED PERMIT SET

DRAWN: NMT
DESIGN: PFE

JOB NO. 00201

SHEET M2.0

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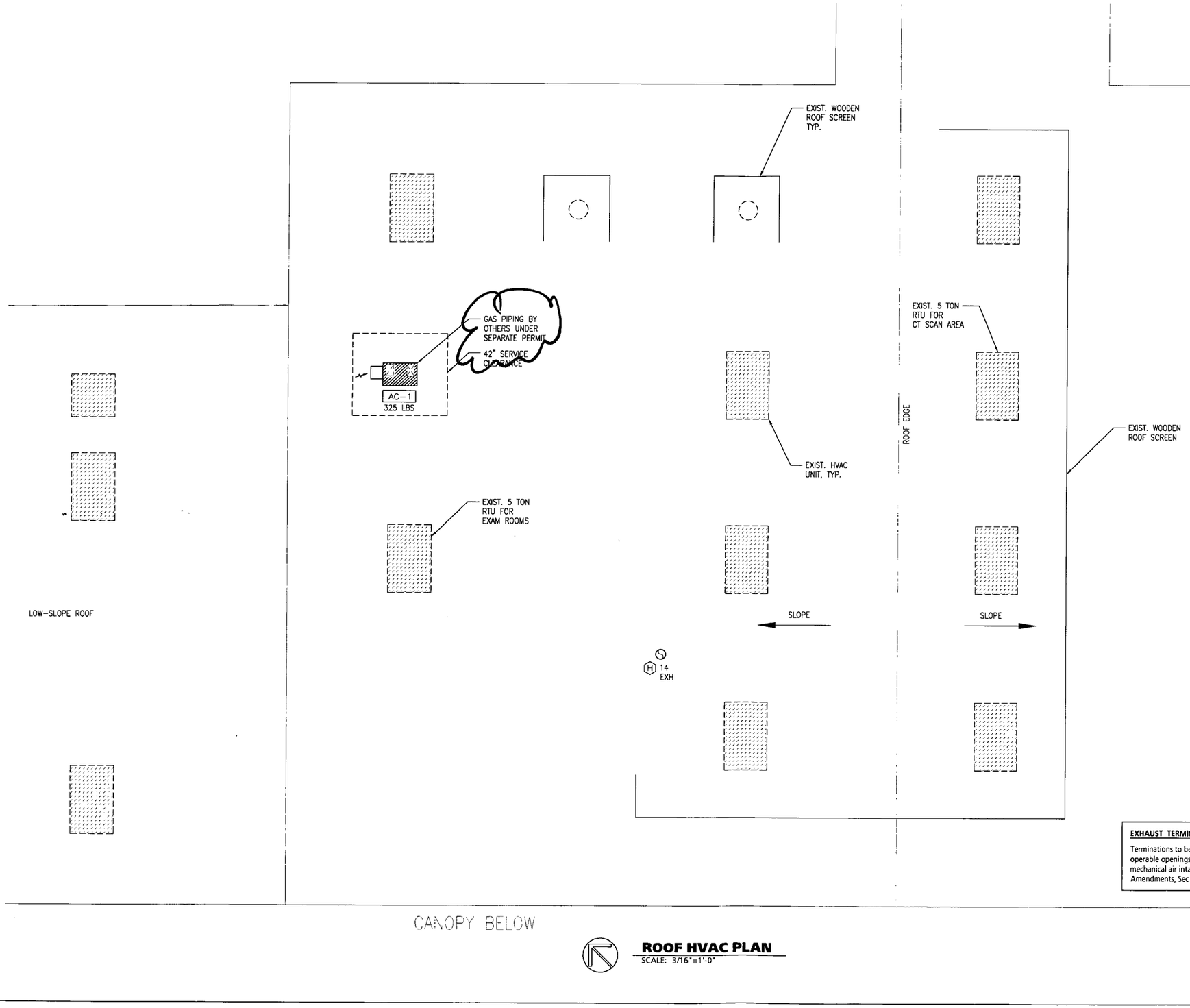

EXHAUST TERMINATIONS

Terminations to be 3 ft from property lines and operable openings into building. 10 ft from mechanical air intakes. IMC with WA State Amendments, Sec 501.3.1, #3

ROOF HVAC PLAN
SCALE: 3/16"=1'-0"

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Edmonds, WA 98026

Roof HVAC Plan

3-4-2020	PERMIT SET
3-10-2020	REVISED PERMIT SET

DRAWN: NMT
DESIGN: PFE

JOB NO. 00201

SHEET **M2.1**

K:\00201 BARC Vet Clinic\00201M2.1.dwg, 3/10/2020 2:58:37 PM

APPROVED BY PLANNING
M. Luyster 3/13/2020

CITY OF EDMONDS
BUILDING DEPARTMENT
WORK mechanical
ADDRESS 8401 MAIN ST
OWNER BARC
APPROVED DATE: 3/24/2020
BLDG. OFFICIAL
PERMIT NUMBER
BLD2020-0304

RECEIVED
MAR 17 2020
BUILDING