

Pepperell Building Committee

Meeting Minutes

Wednesday, July 20, 2022

1.0 Call to order

The meeting was called to Order by C. Lundeen at 6:32 pm via ‘Go to Meeting.’

2.0 Attendees

2.1 Present

Catherine Lundeen, Brian Borneman, Taya Dixon Mullane, David Stairs, Andrew MacLean, David Querze

Project Team: Bryan Fors (Vertex), Rebecca Hopkins & Jeff MacGilvary (Techton) Ashley Keller (CES), Brad Park (CES)

2.2 Absent

Joe LoBuono, David Scott, Lea Gavrilov

3.0 Action Items

A. MEP

Review 2 options for HVAC System (B. Park & A. Keller)

System selection criteria – maintenance, reliability, IAQ, Energy Efficiency, First Cost, Occupant Thermal Comfort, Acoustics

System 1 - Air Source Variable Refrigerant Flow (VRF) vs. 4 pipe fan coil units (FCUs)

Air Source VRF

- Dedicated outside air
- Air cools VRF Heat Pumps, Refrigerant FCUs

4 pipe FCUs

- Dedicated Outside Air
- 4 pipe and chiller water

Dedicated Outdoor Air – directed ducted ventilation and exhaust, smaller ductwork, energy recovery; greatest available outdoor air for better fresh air circulation

Variable Refrigerant Flow – Roof mounted condensing units, indoor AHUs, refrigerant piping; pros: smaller piping, lower first cost, high efficiency; cons: more condensers = more maintenance, newer & proprietary; controls – integrated into building management system (BMS), but need to keep with original manufacturer and settings; “commercial” version of ductless (mini-splits) heat pumps. Largest downside – if need to replace component, need to get the equipment from the same manufacturer because it is a proprietary system. Quiet and efficient. Have heat recovery option for this system, but need to be designed to support that approach. Shoulder season can require heating and cooling in different parts of the building. Groups of rooms have controls (ie. groups of offices, etc). Maintenance required on 3 – 5 condensing units on roof or at grade. FCU in each room that requires filter changes (Preventative maintenance contract for system is typically entered into). Future refrigerant type – current refrigerant will be phased out (R-410). Can get reclaimed refrigerant, but after 10-15 years cannot get a refrigerant – would need new piece of equipment. Each VRF has its own condensate pump. A MacLean – does the location of the units on the roof affect the ability to locate solar on the roof? B. Park – no, it doesn’t take up a lot of room on the roof. B. Fors – lower long term life cycle cost compared to other option, and up front cost less.

4 pipe FCU system – dedicated outdoor air; air cooled chiller gas fired boilers or heat recovery chiller with back up boiler reduced fossil fuels option; Multiple indoor hot water/chilled water FCUs; hot and chilled water piping and pumps. Pros: easier maintenance, longer useful life, similar efficiency as VRF; cons: higher up front costs to install the system greater (greater labor costs); possible 10% added up front costs. Pro: Copper piping will last longer; chiller can be replaced as needed without propriety system. Location of chiller - chiller goes on roof or at grade; one unit. A little louder than the condensers – need to locate correctly to avoid noise and vibration. Installation utilizes the Propress system.

A MacLean – what is the flexibility of the system to supporting heating and cooling at the same time? B. Park – typically have a seasonal shutdown of the system (often October) to turn off the chiller and drain it. Have the ability to control it. There could be some cost increases associated with the chiller. Dispatch will be on its own unit – one unit in the building and condenser on the roof – redundant system to enable 24 hour operation. Similar redundant system in the IT rooms. Detention areas – would not be a VRF unit in these spaces for security reasons – ventilation air is higher by code than a typical office space and must be separate. Apparatus bays also have separate systems.

B. Fors – how does it integrate into the BMS system? Are there more points for the 4 pipe vs. the VRF? Controller for VRF is from the manufacturer. Do have a BMS system – pull manufacturer information into the BMS but a limited amount can be pulled in. Can adjust BMS, but often need a tech to make modification. For 4 pipe system, more pipes to control the valves but can be controled by a central BMS. B. Borneman – VRF is all electric. How does the 4 pipe system work with the fuel? B. Park - VRF systems are robust in heating capabilities; 4 pipe requires hot water – can be gas fired boiler (high efficiency); heating hot water piping

and pumps; radiant in floor heat in apparatus bays. Can use a heat pump to make hot water, gas condensing boilers as back up; don't heat to the level that VRF does during very low temp days (single digit). Can reduce fossil fuel consumption by 95%. There is a generator that will also support the building – can support the back up boiler vs. VRF. Greater up front cost for the heat pump approach. Larger generator required to support an all electric system. Boiler can support the domestic hot water and use the heat pump as back up. Solar will feed back to the grid, but not store it on site. B. Borneman – would not have a second back up boiler. B. Park – could have a secondary boiler. A. MacLean - do you have a cost analysis for the two systems? B. Park – there is a premium to pay to heat with electricity. A. MacLean – paying 17 cents kW. B. Park – can run the analysis on costs based on electrical and gas. B. Fors – need the info to make the decision and explanation for the town. B. Park – apparatus bay radiant in floor heating (do not typically cool apparatus bay); helps to also dry the floor after emergency response, and an efficient way to heat the apparatus bays with hot water. Also keeps the heat where the occupants are – don't lose heat due to the high ceilings. Epoxy flooring together with the in floor heating can sometimes be value engineered out of the project due to the cost of the piping in the slab. Hot water would be coming from boiler and/or heat pump, and produces slightly lower water temperature for the radiant floor heating.

Option for Geothermal – 500' bore wells (approx. 40 required - \$20-25k each); 20- 25' radius around each well; piping and pumps; heat pumps to produce heating and cooling; can be paired with either mechanical system option. Pros: reduce fossil fuel consumption by 100%, highest efficiency; cons: first costs are high. Long return on investment (can be decades). Can put wells under the parking area.

B. Fors - \$2.5M typical costs for the mechanical system for a building of this size. \$60/SF for mechanical system. Operating the fire station during construction can also affect the construction schedule if decide on geothermal, as one well a day can be dug. D. Querze - are there ledge issues? B. Park – can drill thru ledge and clay. Would do test bores to understand the soils – may need fewer wells with clay soils vs. sand. B. Borneman – any concerns with well head or environmental considerations. B. Park - would need to look into all of these items if want to consider this approach. B. Fors – does the committee wants to explore this? If, yes, further study is needed.

Photovoltaic options - install infrastructure now than assume all future install or alternate bids for panels. Need conduits and electrical infrastructure to support it now or in the future. Power Purchase Agreement (PPA) is a possibility. Could include in the panel install in the project. Structural engineer would need to determine what is needed to accommodate loads. Re. Hopkins – will study orientation of the building and what SF is available. Will also consider ground mounted solar, but need to consider the stormwater management systems required for the area. Will not get enough PV to support the electric load of the building. A. MacLean – state building code will require all electric in this century – some members of the community would want this. B. Fors – could PV support domestic water heater? B. Park – if

trying to reduce fossil fuels = can use the heat pump and store water on site. Can have stand alone electric or gas hot water heaters as well.

A. MacLean – dedicated outside air - does the outside air system work in all areas of the building? B. Park - At the return side – pulling air out of the building – not recirculating air around the building. Most public safety buildings have this, and a MERV 8 is typical for the pre-filter – least expensive and removes typical contaminants; MERV 13 filter deeper into the building for smaller particles.

B Park – consideration of VRF for environmental issues – will need to get new refrigerant with less harmful properties to the environment in the future. Could be many years into the future.

B. Borneman – can the existing Jersey Street Station support PV? B. Park - Could possibly do that – would need to look at structural capacity.

D. Stairs – 4 pipe system seems like a better system; B. Borneman – long term, system replacement costs could be high. B. Park – if repairs needed, need to get reclaimed refrigerant to make the repair.

R. Hopkins – we will review alternative energy strategies; may have another meeting on sustainability.

B. Fors – what decision is needed? Do you need more information to make decision? What is the engineer's recommendation? B. Park – would recommend 4 pipe system because of long term operations and costs. Best long term reliability and lower operational costs.

B. Park – decision on 4 pipe system vs. VRF – affects the design. Don't have to make a decision on the energy source (boiler, heat pump, PV, etc). R. Hopkins – want system selection before DD set sent to cost estimator. Estimate on month of October.

C. Lundeen – agrees 4 pipe system is best

T. Dixon Mullane - agrees 4 pipe system is best

D. Querze – agrees 4 pipe system is best

A. MacLean – Made a motion to recommend 4 pipe system; seconded by B. Borneman; all voted in favor including D. Querze by voice vote (remote participant)

R. Hopkins – Sustainability discussion next - looking of building envelope options (stretch code, etc). Will share information on options and how they compare. Looking at orientation for solar. Also discussion future electric vehicle charging station – possibly for public and town apparatus/vehicles. T. Dixon Mullane – question on resiliency planning? Rebecca – will be part of a future discussion; J. McGilvery – not currently looking at any LEED certifications. R. Hopkins – but will look into the LEED checklist. J. McGilvery – Other options include Well

Building Standards. Will need direction at the next meeting. A. MacLean – State asked Green Communities to consider being a “climate leader” – Select Board asked to look into it. Will get direction from Select Board, likely within the month.

B. Tecton Updates

B. Fors - Meeting on Monday w/ Tecton; will get a schedule of the working group meetings. (meeting will be remote)

C. Monthly Meetings

B. Borneman – D. Scott – requests Monday or Tuesday meetings for evening meetings. A. MacLean – Select Board and Planning Board meetings on Mondays, so Tuesdays are better. B. Fors– can schedule meetings once a month for Building Committee starting in August.

D. Building Committee Scope Changes

Revised Building Committee Charge - Change in scope to allow Building Committee to have authority to make decisions on certain aspects of the design. Certain elements that the Building Committee cannot make – ie; changing the site selection; but can make design decisions, ie. MEP, building envelope. Select Board – should make decisions on energy efficiency direction. D. Stairs – does the Select Board put a target on the overall cost of the project? A. MacLean – no one has asked this yet, but will need to include a base scope plus alternates. B. Fors – information will explain how the Building Committee is being financially responsible. D. Stairs – good to have the Committee able to make the decisions. A. MacLean – Committee can provide quarterly updates, but will also include a Town Administrator update on the project status at Select Board meetings.

4.0 Approval of Minutes

Motion to approve the minutes of 6/10/21 by B. Borneman; second by D. Stairs. All voted in favor including D. Querze who accepted via remote; Motion to approve minutes of 4/6/22 by B. Borneman; second by D. Stairs. All voted in favor including D. Querze who accepted via remote; Motion to approve minutes of 4/20/22 by B. Borneman; second by D. Stairs. All voted in favor including D. Querze who accepted via remote

5.0 Adjournment

Meeting adjourned by D. Stairs at 8:43pm; seconded by B. Borneman. Unanimously approved by Committee. D. Querze – approved motion by remote vote.