

## Memorandum

То:	Matt Root, CMS Sustainability Sub-Committee	Date:	11/8/2021
From:	Lorraine Finnegan	Project No.:	19153
Project:	Concord Middle School		
Re:	Value Engineering Questions		
Distribution:	CMS SSC, Project Team (MF)		

The following compiles questions that came up following the review of the value management log at the CSMBC meeting on 11/5/2021. These questions were subsequently distributed by email.

- 1. #6 Enhanced Ventilation ALT 1 (30% increase + Aircuity)
  - a. What is the cfm/person at this 30% increase? It is equivalent to 25 cfm/person.
  - What is the estimated cost for a 25cm/person target?
     From \$860,000 to \$950,000, including the cost of Aircuity.
  - c. What is the cost of the Aircuity system separated out? \$175,000
  - d. Please confirm the base includes some form of distributed CO2 sensors? Yes, CO2 sensors in all densely occupied spaces equivalent to the LEEDv4 enhanced indoor air quality strategies criteria, which by USGBC definition for densely occupied spaces mean classrooms and pretty much all educational spaces.
- 2. #9 Reduce lighting controls from 100% to 60%
  - a. Does the project already comply with three prescriptive items under c406 via a combination of 406.2, 406.3, 406.6, 406.8, 406.9, 406.10?
    Yes, and the advanced lighting controls is one we are including in the 3 C406. The 2 others: reduced light power density and reduced air infiltration. Other C406 are going to be more onerous.

## 3. #10 Diesel Generator

a. Please confirm switching to diesel would eliminate all gas infrastructure?

Yes, this is the only natural gas service.

- 4. #17 (A/B) Light shelf to 10"
  - a. What is the length of the current light shelf? Interior light shelf is 18"
  - B. Roughly how will this impact the current daylighting metrics?
     It will mostly impact the ASE by 5% or so. ASE can be addressed with interior shades.

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- 5. #21-#24 Sunshades at south facing windows
  - a. Is the primary value of the sunshades glare control? Yes as one of the primary value, while they do have considerable impact of daylighting sDA as well, and a minor impact on reducing the heat gain in the cooling season.
  - b. What is the anticipated solar heat gain coefficient of the windows? Between 0.27-0.32, pending on final selection. SHGC does not impact/control glare. "shoulder seasons" are getting warmer and cooling loads will grow over the next decades. Trees from the forested area will block the low winter sun (south exposure). Higher SHGC for "solar passive" measures is not recommended.
- 6. #25 Reduce mechanical screen
  - a. Does any of the current screen face South?
     Yes, the equipment in currently wrapped on three sides. The nearest neighbor is to the south.
  - b. What is the case for noise reduction versus aesthetics? Is it expected that the neighbors will hear the outside units?

All equipment screens were added for noise reduction only. Given the height of the building, tree coverage, and location of units we don't anticipate visible HVAC units from the front of the building. We cannot exceed current sound levels on the site as measured at the property line. Given the pandemic we were not able to complete the study of existing conditions.

c. Should we consider eliminating the entire mechanical screen (what are the savings)? The current design includes approximately 530 linear feet of mechanical screen. The reconciled unit price is approximately \$1,349/LF. We will consider the elimination of this screen when the acoustic assessment can be complete. Once sound levels are understood we will study reducing height and scope of screens.

## 7. #27 Entrance canopy

## a. Could the entrance canopy be replaced with a solar canopy?

This canopy will share structure, foundations, and lighting with the building and is intended to provide cover from snow and rain for student drop off. If we deferred it to solar canopy scope it will not be available until that project is installed. The installation might disrupt school operations. Given the northern exposure, it's unlikely to be a good candidate for energy production and Solar Design Associates might not recommend building it.

- 8. #27 Reduce glass height at connector
  - a. Would the opaque wall be at the top or the bottom? This savings was to target a reduction in glazing as a cost savings. We anticipate a combination of reducing the height to 10'-0" and increasing the sill to 2'-0". Daylighting, interior design, exterior pattern will need to be restudied to verify this assumption is appropriate.

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- 9. #28 Change curtain wall to punched windows
  - a. What are the anticipated performance metrics for the windows versus the curtain wall?

All windows/glazing systems will have the triple glazing performance: IGU 0.14 U-value winter, assembly U-value of 0.23 (must be met by 3 equals)

- 10. #29 Change curtain wall from triple to double
  - a. Roughly what are the energy loads for the glazing of the building? Roughly what would be the EUI impact?

We do not recommend downgrading to double glazing. The New MA Stretch Code (2022) Average U-value calculations, possibly required for permit, will likely require triple glazing. This will impact the EUI 25 goal. In addition, it would have a trickling impact on HVAC equipment sizing and costs, as well as comfort at/near the windows.

- b. Why is it not proposed to switch the punch windows from triple to double pane? We do not recommend downgrading to double glazing, regardless to the type of windows.. The New MA Code's Average U-value calculations, required for permit, will likely require triple glazing. This will impact the EUI 25 goal. In addition, it would have a trickling impact on HVAC equipment sizing and costs, as well as comfort at/near the windows.
- c. It appears the curtain wall area is 6,632 square feet and the window area is 7,978, each totaling about \$1.1M (25% window to wall area).
  25% is the targeted Window to Wall Ratio. The current design meets this target and we do not recommend reducing further. The WWR was reduced in the Feasibility Phase from 30% as a cost savings.
- 11. #30 and #31 Change CMU to Impact Resistant Sheetrock
  - a. What are the durability/life expectancy impacts of this change?
     For the gymnasium the CMU veneer was proposed to be covered for the first 6ft by
     athletic wall padding to protect the students during pe and athletics. The veneer was
     assumed at 14ft tall with drywall above. Impact resistant drywall is commonly used in
     public corridors. Its all about the operation of the space.
     For the back of house area we are proposing 4ft high FRP panels similar to any janitors
     closet to protect the height of the walls that receive the most abuse.
- 12. Under 072100 INSULATION the cost estimate calls for 8" of mineral wool insulation and 3" of fiberglass in the cavity. Could we reduce some of these numbers for savings? The expectation is for a robust air barrier, thermally broken attachment clips (insulation and brick) and the right level of insulation.

We do not recommend reducing the wall insulation levels. The NZE ready criteria strives for R-40. The upcoming 2022 Stretch Code will likely require these levels of insulation (NZE criteria). The EUI 25 will be impacted. In addition, it would have a trickling impact on HVAC equipment sizing, equipment costs and utility costs, if insulation levels are reduced. Insulation is the one material/component that will be there for the next 50 years.



- 13. 230001 HVAC calls for \$35,878 of supplemental electric heat. Where is this located? Can we eliminate it given the high-performance enclosure?This is carried for miscellaneous storage spaces, loading dock door where the use of VRF may be impractical. We recommend this is maintained in the budget.
- 14. Does the sizing for the 242 ton, \$400,000 VRF system account for the high-performance enclosure and represent a reduction from a standard sized system?Yes, the system sizing considers the expected system sizing reduction based on the high-performance envelope. This sizing will be further refined during detailed design.

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