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March 24, 2012

VIA E-MAIL

C.C.C. #81
370 Dominion Avenue
Ottawa, Ontario
K2A 3X4

ATTENTION: MS. CATHARINE BRIEGER, PRESIDENT

Dear Madame:

**SUBJECT: 370 DOMINION AVE. CCC #81
BUILDING HEATING INVESTIGATION
& REPORT FOLLOW-UP
OUR PROJECT NO. 2012-194**

The following is our response to the questions submitted on Monday, March 19, 2012.

Q1Q - what would the Construction Cost Estimates be if CCC #81 were to implement only the MUA (Make-up Air Unit), versus implementing suite heating as well?

Answer to Q1Q:

The following is an estimate of the cost to implement natural gas heating for the MUA (Make-up Air Unit only):

Construction Cost Estimate

• One (1) boiler.....	\$ 50,000.00
• Installation.....	\$ 15,000.00
• Natural gas piping & regulator.....	\$ 10,000.00
• Penthouse piping / pumps.....	\$ 12,000.00
• Heating coil & heat exchanger	\$ 10,000.00
• Electrical	\$ 5,000.00
• Controls	\$ 3,000.00
• Sub-total	<u>\$ 105,000.00</u>
• Consulting.....	\$ 15,000.00
• Contingency.....	<u>\$ 20,000.00</u>
• Total.....	\$ 140,000.00

Note: excludes applicable taxes and project management fees.

The original cost estimate for the implementation of natural gas for both MAU heating and residence heating was estimated at \$258,000.00



Q2Q - what would the future cost consequences be if we were to implement just corridor heating (MUA) at this time, intending to follow up with suite heating in the future?

Answer to Q2Q:

Having the project sub-divided will add additional cost due to trade mobilization during construction. The following is an estimated breakdown for the second phase of construction (suite heating):

• One (1) boiler.....	\$ 50,000.00
• Installation.....	\$ 10,000.00
• Natural gas piping & regulator.....	\$ 3,000.00
• Penthouse piping.....	\$ 5,000.00
• Electrical	\$ 5,000.00
• Controls	<u>\$ 30,000.00</u>
• Sub-total	\$ 103,000.00
• Consulting (15%).....	\$ 15,000.00
• Contingency.....	\$ 20,000.00
• Total Cost	<u>\$ 138,000.00</u>

Note: excludes applicable taxes and project management fees.

The overall premium to split up the project is estimated at approximately \$15,000.00.

Q3Q - do the estimated cost savings of \$59,000.00 (in the GWA report 2011-328) include the MUA savings, or represent just the suite savings?

Answer to Q3Q:

The estimated annual energy cost savings of \$59,000.00 included both heating for suites and MUA heating.

Q4Q - please explain (or provide web-links explaining) the differences between the type of gas boiler we have for our DHW boilers (Domestic Hot Water, 84% efficiency, subject to "blow-out" when there are wind gusts), and the type proposed for our project ("fully condensing", 97% efficient). Would fully-condensing boilers be immune to "blow out" and not require manual attention?

Answer to Q4Q:

It is unclear why the existing DHW boilers are sensitive to wind gusts. Properly locating the exhaust vents and calibrating the boiler equipment are key to proper operation. The investigation into the existing DHW boilers was not part of our original scope of work. Further investigation is required to determine if the venting for the existing equipment is properly installed.

There have been many successful installations of new boilers in similar conditions to your high-rise building and which to our knowledge are operating properly. It is our opinion that if the new equipment is properly installed, vented, and calibrated, it should not be susceptible to windy conditions.

**OUR PROJECT NO. 2012-194
MARCH 24, 2012**

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Q5Q - could you comment on the energy impact of suite window replacement on a suite's heating requirement, i.e.: installing low-e windows as an alternative to hydronic heating?

Answer to Q5Q:

Low-e glazing comes in several varieties from high Solar Heat Gain (SHG) to low SHG. There are different construction methods and thermal insulating properties available on the market. It is difficult to estimate the impact of installing new windows without additional information on the new window and performing a simulation on the whole building. Lower SHG coefficient windows will increase the heating demand as it will block the benefits of the sun. It will, however reduce the summer cooling load. We would be happy to offer our services to review the benefits of installing new windows.

Q6Q - Some owners have asked about use of natural gas heating for the parking garages. The report GWA 2011-328 appears silent on this possibility. Would heating of the garages with gas be permitted, without the provision of a CO monitoring and exhaust control system?

Answer to Q6Q:

In order to introduce natural gas heating to the parking garage, the area will need to be brought up to most recent codes and standards as discussed in our report. The benefit of having the electrical room heat exhausted into the parking garage will be lost as it will have to be routed to the exterior. The payback period for this construction project will be long and will likely result in the project being uneconomical.

Yours very truly,

GOODKEY, WEEDMARK & ASSOCIATES LIMITED



Alex Samousevitch, B.Eng., E.I.T.
AS/kr

Enclosure: Questions from C.C.C. #81