

MEMORANDUM

April 12, 2016

TO: Mayor and Council

CC: Sadhu Johnston, City Manager
Paul Mochrie, Deputy City Manager
Janice MacKenzie, City Clerk
Lynda Graves, Manager, Administrative Services, City Manager's Office
Rena Kendall-Craden, Director, Communications
Mike Magee, Chief of Staff, Mayor's Office
Kevin Quinlan, Deputy Chief of Staff, Mayor's Office
Katie Robb, Director of Communications, Mayor's Office
Emma Lee, Director of Community Relations, Mayor's Office
Doug Smith, Acting Director, Sustainability Group
Jane Pickering, Acting General Manager, Planning and Development Services

FROM: Anita Molaro, Assistant Director of Planning, Urban Design

SUBJECT: Heritage Designation and Heritage Revitalization Agreement - 22 East 5th Avenue - Cemco Electrical Manufacturing Company Factory (RTS:11347)

The purpose of this memorandum is to respond to the following motion passed by Council at the March 8, 2016 Public Hearing:

THAT the application "HERITAGE DESIGNATION AND HERITAGE REVITALIZATION AGREEMENT (HRA): 22 East 5th Avenue (Cemco Electrical Manufacturing Company Factory)", be referred to the Regular Council meeting on April 5, 2016, as Unfinished Business;

FURTHER THAT staff provide further technical analysis on the impact to the adjacent solar panels under the existing zoning and through the proposed building.

Staff have completed further analysis of the proposed development and the potential impacts on the solar panels installed at 31 East 5th Avenue. This work includes further shadow analysis of the proposed development in the early spring and late fall at noon and 2 pm; an assessment of the potential power which could be generated by solar panels over the course of a year; and an assessment of the potential impact if adjacent properties were developed under outright height provisions of the existing I-1 zoning.

1. Shadow Analysis

As noted in the staff report the outright permitted height in the I-1 Zoning District Schedule is 60 feet. The application for 22 East 5th Avenue proposes a height of 83 feet although this will be required to be reduced to 78 feet as a condition of approval of the development permit. A comparative analysis of a building at the outright (60 feet) and proposed (78 feet) heights and the resultant shadow impacts on the site at 31 East 5th has been completed.

1.a. Noon Shadow

Diagram 1 shows the impact of shadowing on daylight reaching the solar panels at noon throughout a typical year. There is no shadowing between February 1st and November 6th for a 60 foot or 78 foot building. The 78 foot proposal begins to shadow the solar panels on November 6th whereas the outright 60 foot building begins to shadow the solar panels on November 23rd. Shadowing increases to the shortest day on December 21st when the 78 foot building's shadow completely covers the panels (100%) and the 60 foot building's shadow covers 68% of the panels. The 60 foot building ceases to shadow the solar panels on January 23rd and the 78 foot proposal would cease shadowing the panels on February 1st. In total, a 78 foot building results in additional shadowing for 17 days in the late autumn and 9 days in the late winter, a total of 26 more days per year compared to a 60 foot building. Shadow diagrams for the reference points noted above are located in Appendix A.

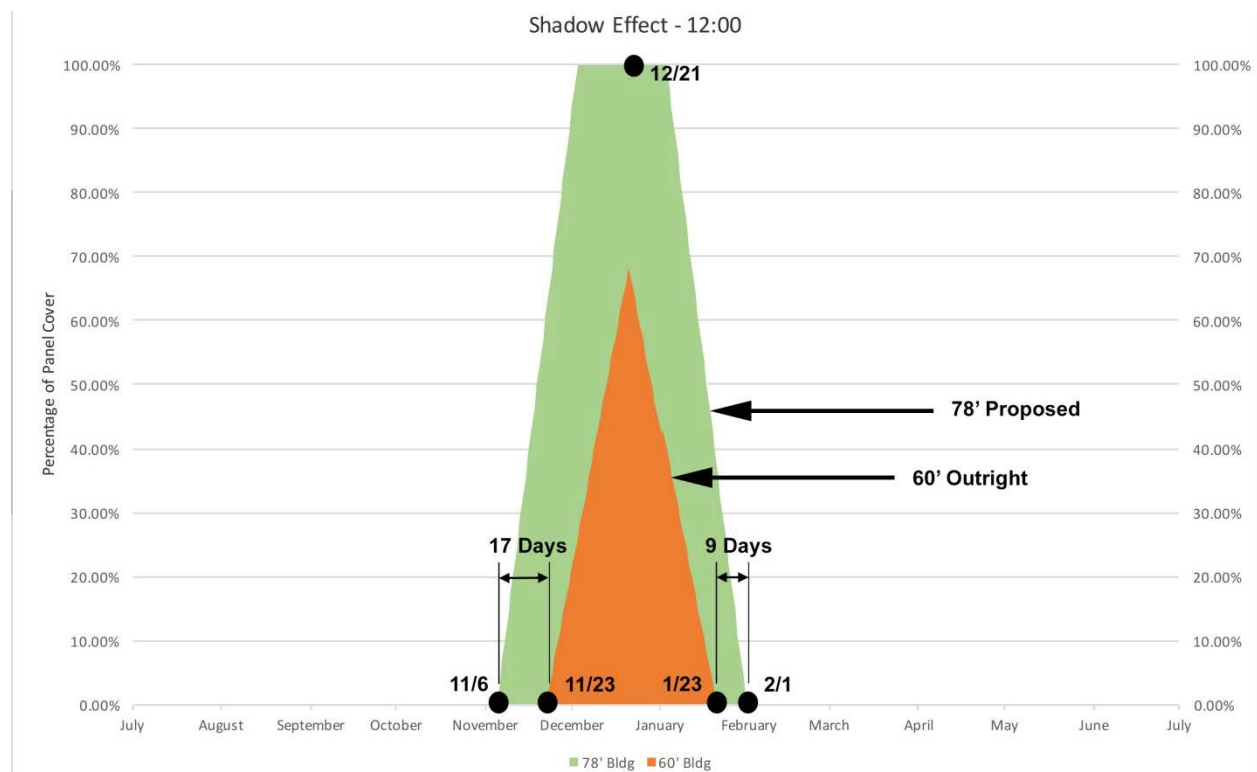


Diagram 1: Daylight Shadowing Impact on the Solar Panels at 31 East 5th Avenue at Noon

The results are summarized in Table 1:

Table 1: Summary of Impact on Daylight Access per Annum

| Condition | Estimated Daylight Exposure Measured at Noon |
|------------------|--|
| No shadow | 100% |
| 60 foot building | 96 % |
| 78 foot building | 89% |
| Difference | -7% |

The study shows that over the course of a year a building of 78 feet in height compared to a building of 60 feet would decrease the total number of daylight hours at noon, by approximately 7% with the impact occurring during the winter months.

1.b. Potential Power Generation at noon

Analysis measuring the impact on the “Photovoltaic Potential” or “PV Potential” of a solar panel system, which can be simply stated as the potential power generated by any solar panel system for a given geographic location over the course of a year was also completed (based on reference material available through the National Research Council of Canada). The data takes into account average weather conditions and atmospheric conditions as well as the seasonal amount of solar energy exposure. The performance is higher in the summer and lower in the winter months.

Diagram 2 shows the potential energy performance of the solar panels at 31 East 5th Avenue and the impact of the two different building heights.

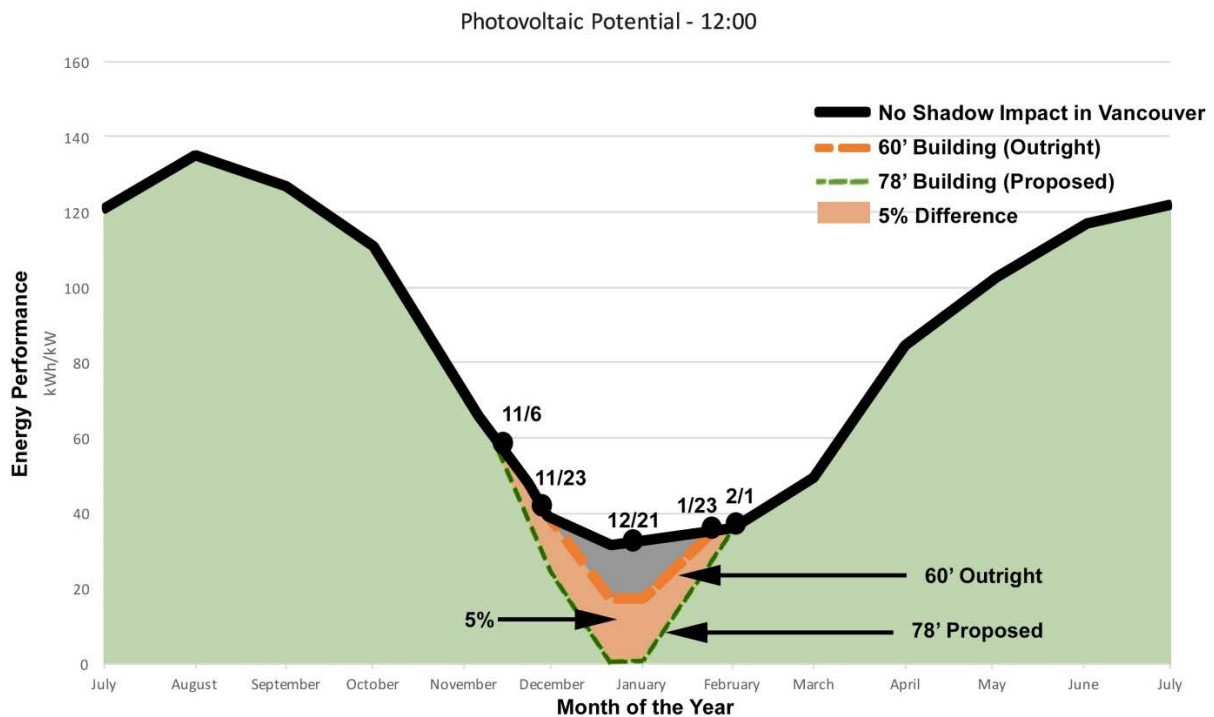


Diagram 2: Impact on Power Generation Potential - Noon

The results are summarized in Table 2:

Table 2: Impact on Solar Power Generation Potential at 31 East 5th Avenue

| Condition | Estimated Impact on Solar Power Potential |
|------------------|---|
| No shadow | 100% |
| 60 foot building | 98 % |
| 78 foot building | 93 % |
| Difference | -5% |

The 5% difference in performance is close to the 7% difference in daylighting as shown in Table 1. The impact is less than in Table 1 most likely because performance is affected by other factors such as cloud cover.

Staff have concluded that over the course of a year, measured at noon, the 78 foot proposal would likely result in approximately 5% reduction in performance of the solar panels at 31 East 5th Avenue compared to an outright 60 foot building, all of this occurring in winter when solar energy access is at its lowest.

1.c. 2 pm Shadow

An identical analysis was done for shadow impacts at 2 pm. Diagram 3 shows the impact of shadowing on daylight reaching the solar panels at 2 pm throughout a typical year. There is no shadowing between February 22nd and October 16th for a 60 foot or 78 foot building. The 78 foot proposal begins to shadow the solar panels on October 16th whereas the outright 60 foot building begins to shadow the solar panels on October 28th. Shadowing increases to the shortest day on December 21st when both the 60 and 78 foot building completely shadow the panels. The 60 foot building ceases to shadow the solar panels on February 9th and the 78 foot proposal would cease shadowing the panels on February 22nd. In total, a 78 foot building results in additional shadowing for 12 days in the late autumn and 13 days in the late winter, a total of 25 more days per year compared to a 60 foot building.

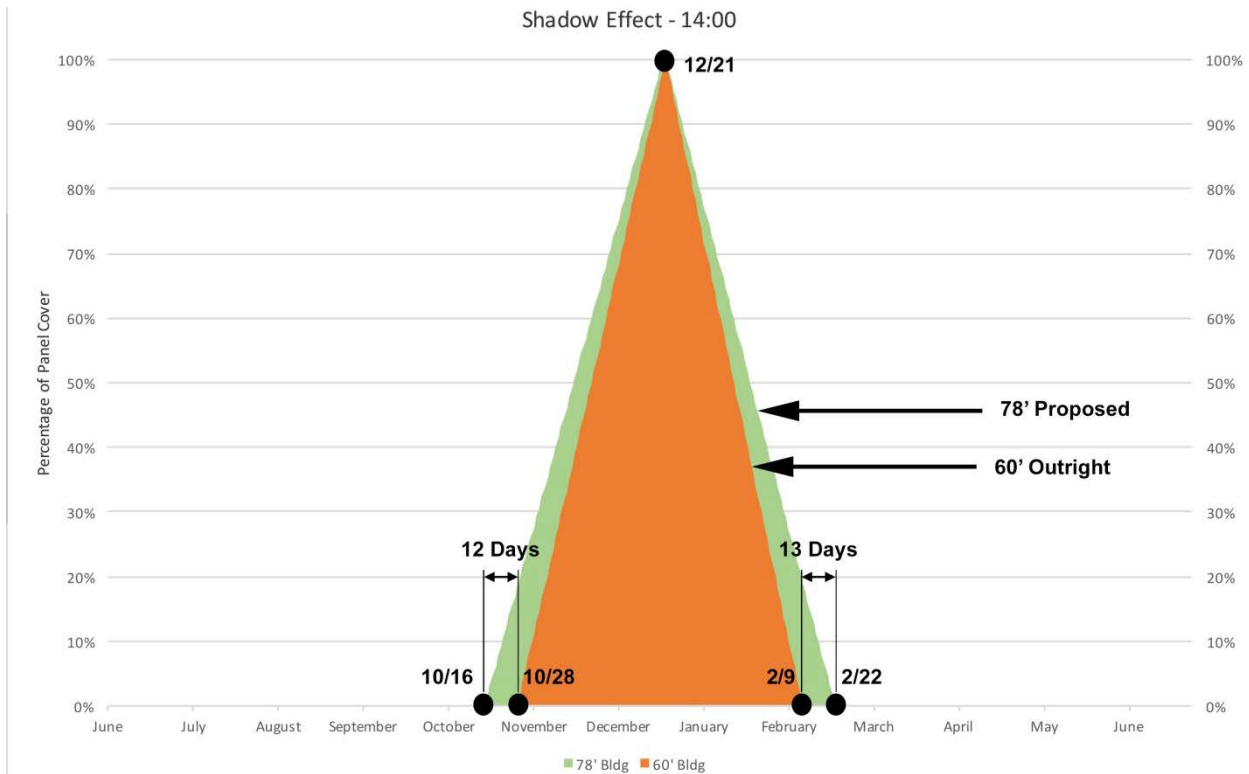


Diagram 3: Daylight Shadowing Impact on the Solar Panels at 31 East 5th Avenue at 2pm

The results are summarized in Table 3:

Table 3: Summary of Impact on Daylight Access in Percentage Per Annum

| Condition | Estimated Daylight Exposure Measured at 2 pm |
|------------------|--|
| No shadow | 100% |
| 60 foot building | 90 |
| 78 foot building | 88 |
| Difference | -2% |

The study shows the that a building of 78 feet in height compared to a building of 60 feet would decrease total number of daylight hours at 2 pm by approximately 2%.

1.d. Potential Power Generation at 2 pm

An identical analysis was done for potential power generation at 2 pm. Diagram 4 shows the potential energy performance of the solar panels at 31 East 5th Avenue and the impact of the two different building heights.

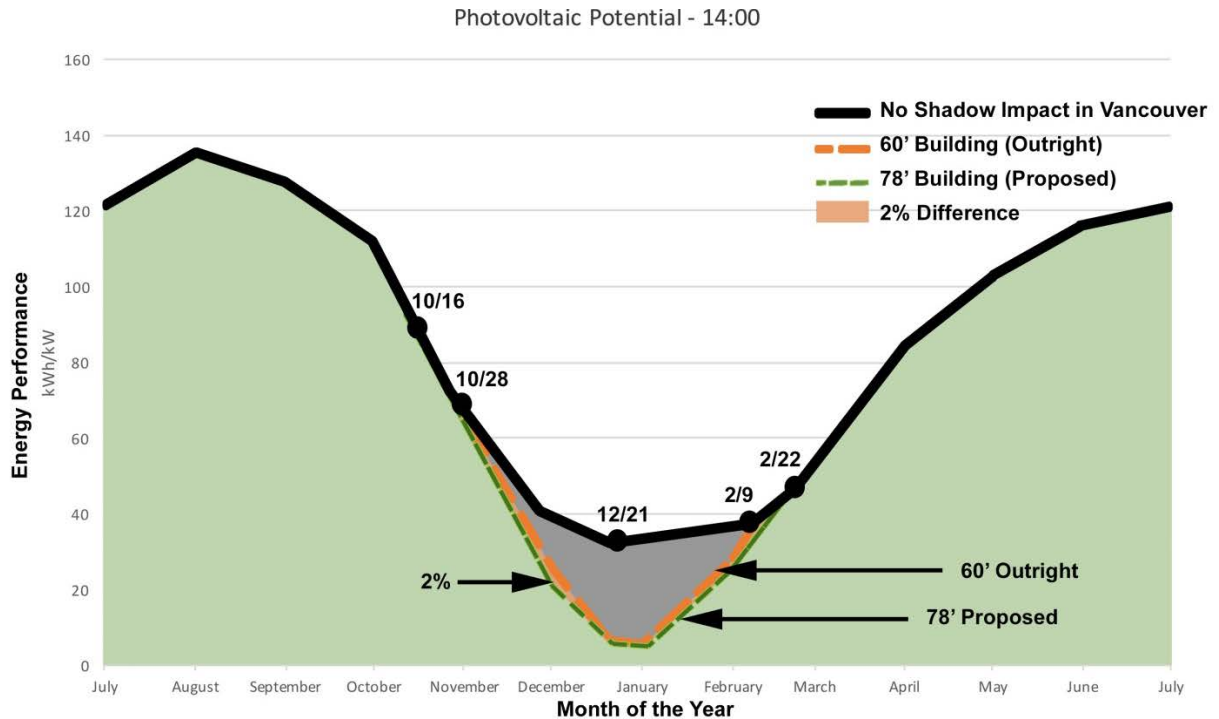


Diagram 4: Impact on Power Generation Potential - 2pm

The results are summarized in Table 4:

Table 4: Impact on Solar Power Generation Potential at 31 East 5th Avenue

| Condition | Estimated Impact on Solar Power Potential |
|------------------|---|
| No shadow | 100% |
| 60 foot building | 94 % |
| 78 foot building | 92 % |
| Difference | -2% |

Staff have concluded that over the course of a year, measured at 2 pm, the 78 foot proposal would likely result in approximately 2% reduction in performance of the solar panels at 31 East 5th Avenue compared to an outright 60 foot building, all of this occurring in winter when solar energy access is at its lowest.

2. Build Out Under Existing Zoning

Over time, development will likely occur around the property at 31 East 5th Avenue (where the solar panels are located) up to the outright height of 60 feet. The existing building at 31 East 5th Avenue is two storeys in height therefore the solar panels are estimated to be at 20-25 feet in height. This is lower than the outright permitted height of 60 feet and therefore would be impacted if neighbouring sites are developed to the maximum permitted height. A shadow analysis based on new outright development in the immediate context is shown in Appendix B. The shadow impact is greater due to 60 foot buildings being located on either side of the solar panels, as well as across the street, resulting in additional shadowing in the morning and afternoon. PV Performance graphs showing the impact for an outright 60 foot

build out at noon and 2 pm over the course of a year is also included, illustrating that the solar performance would decrease in the summer months as well (Diagrams 5 and 6).

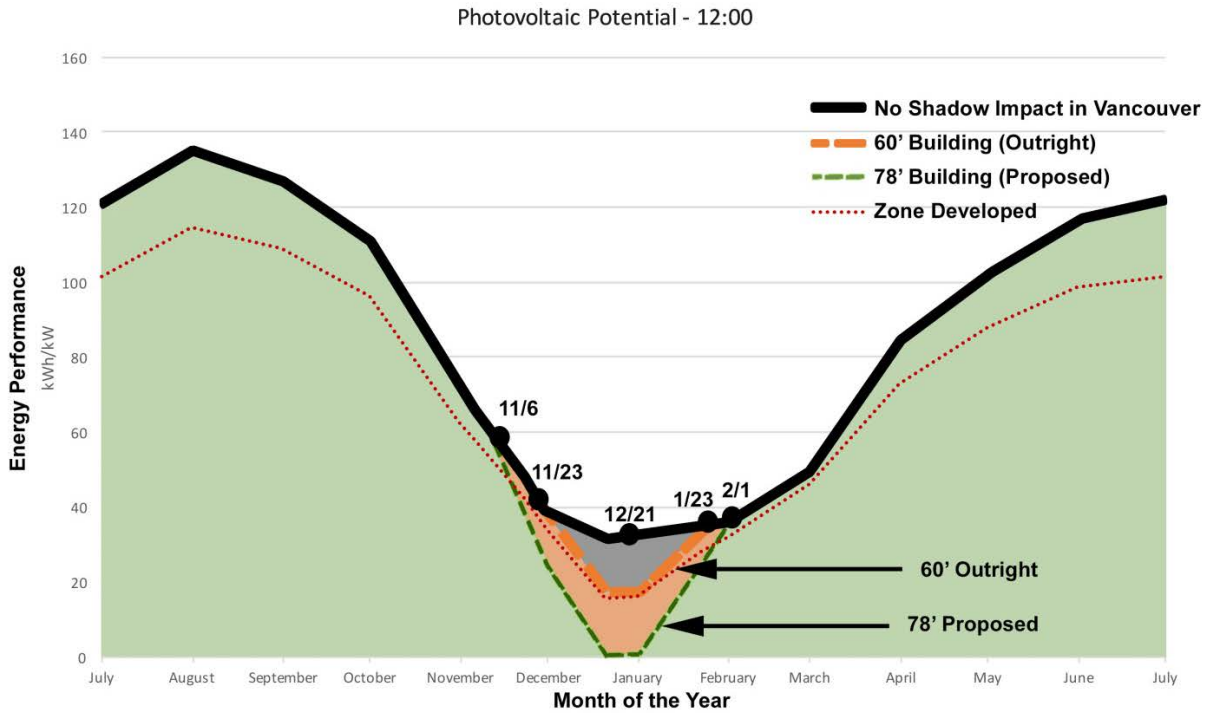


Diagram 5: Impact on Power Generation Potential - Noon

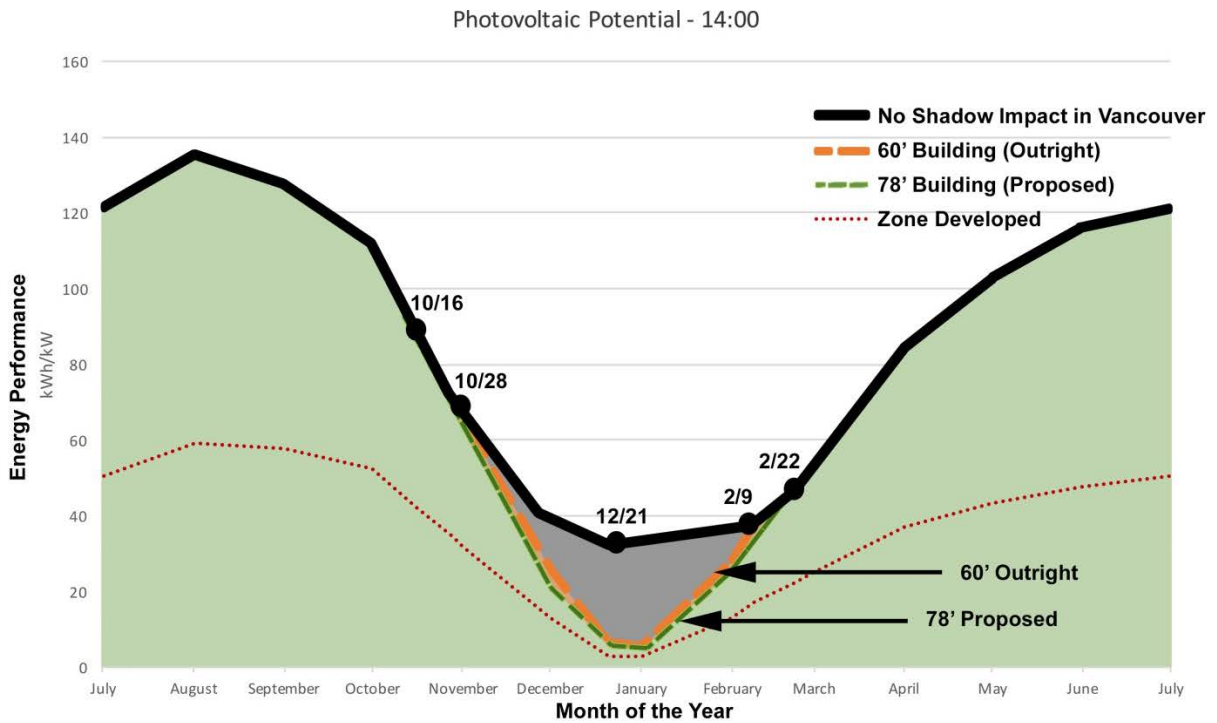


Diagram 6: Impact on Power Generation Potential - 2pm

In conclusion, further shadowing analysis demonstrates the following:

- The proposal at 22 East 5th Avenue, with the required reduction in height to 78 feet, will only nominally impact solar panels installed on the two storey building at 31 East 5th Avenue (approximately 5% more than an outright building at 22 East 5th Avenue measured at noon, and 2% more when measured at 2 pm); and
- Outright development which will likely occur beside and around the building at 31 East 5th Avenue will have a considerable impact on these solar panels well in excess of that created by the project at 22 East 5th Avenue.

Staff will provide additional information at the April 19th meeting regarding the heritage value of the site and policies related to the I-1 industrial area.

Staff in Urban Design and the Sustainability Group are developing guidelines for installing roof top solar panels to provide guidance on placement of the panels.

I trust that this memo provides clarity on the impact of the building on the property at 31 East 5th Avenue and on the other matters raised. Staff will be available to answer questions on April 19, 2016, when Council considers the approval of the recommendations of the Policy Report.



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AM/md

12pm - Noon



1 DECEMBER 21ST 12PM
NTS

Diagram A - 3: 60 ft. building shadowing on December 21st (maximum shadowing)



1 DECEMBER 21ST 12PM
NTS

Diagram A - 4: 78 ft. building shadowing on December 21st (maximum shadowing)

12pm - Noon



Diagram A - 5: 60 ft. building ceases shadowing on January 23rd



Diagram A - 6: 78 ft. building ceases shadowing on February 6th

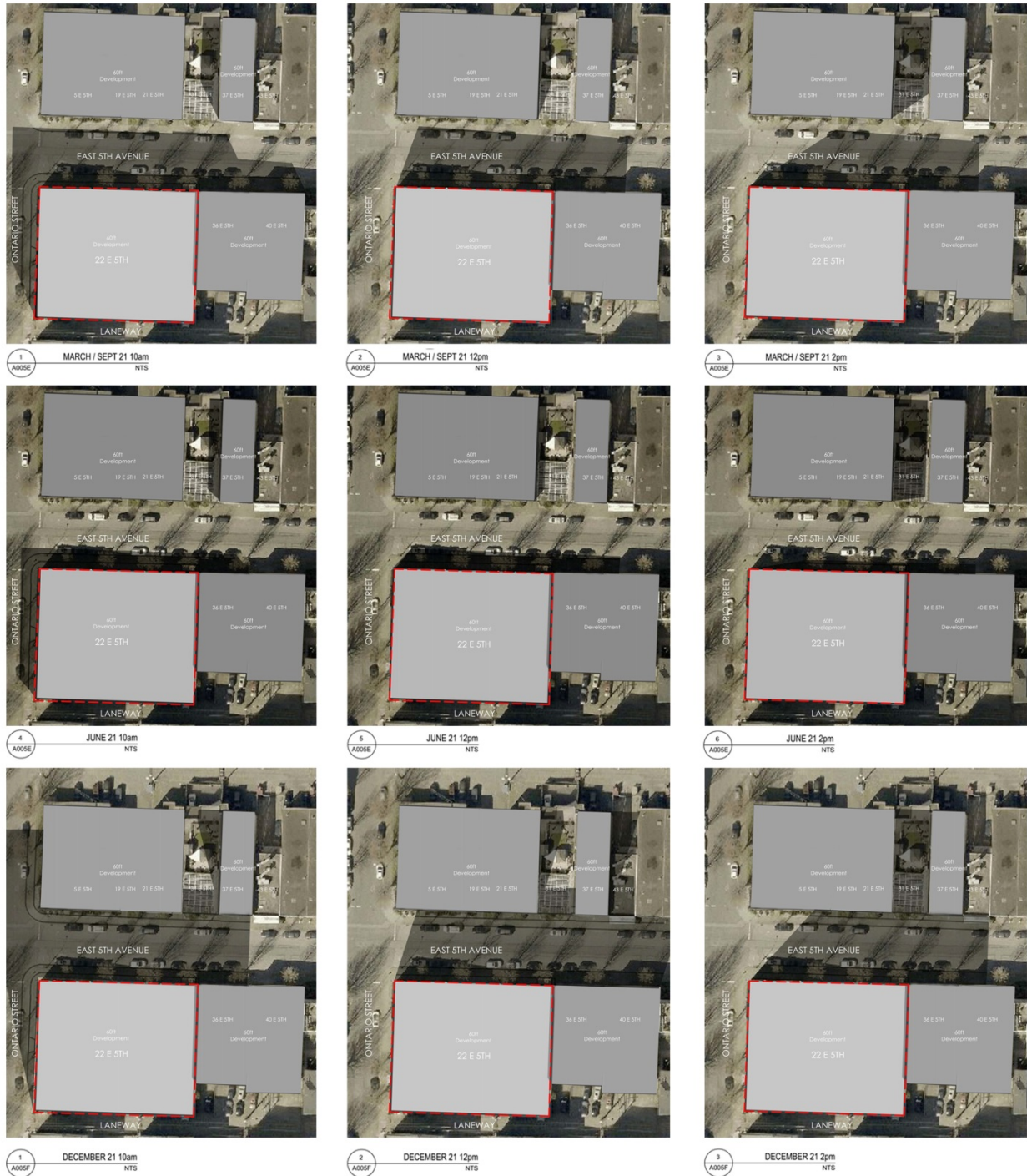


Diagram C - 1: Detailed Shadow Study of Neighbouring Buildings Redeveloped to 60 ft.