Corporation of the City of
NEW WESTMINSTER

NWRFP-22-12

APPENDIX L

MAY 2015 FIRE SPRINKLER SYSTEM REVIEW

Murray Johnson Engineering Ltd.
Specialising in Codes, Fire & Life Safety,
and Fire Protection Systems

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May 20, 2015 Our File No.: 15-203

City of New Westminster
511 Royal Avenue
New Westminster, BC V3L 1H9

Attention: Wayne Werbovetski

Dear Sirs:

RE: SPRINKLER SYSTEM REVIEW - MASSEY THEATRE
735 EIGHTH AVENUE, NEW WESTMINSTER, B.C.

As part of the replacement of the adjacent School, the sprinkler system at Massey Theatre will undergo significant changes. In the following, the Theatre is considered to include the structure that will remain after the School is demolished, including the Massey Theatre itself, the classrooms to the south, and the corridors to the west and north of the Massey Theatre. At the request of the City, Murray Johnson Engineering Ltd. has been retained to review the sprinkler system at the Theatre and make recommendations based on two options:

Option 1 - Minimalist

- New sprinkler valve station (new water service will be required)
- Sprinkler head testing (allowance to replace sprinkler heads if found to be deficient)

Option 2 - More Substantial upgrade

Same scope as Option One but add:
- Revision to sprinkler layout due to deficient coverage under the current Building and Fire Codes

Project Description

The Massey Theatre was originally constructed in the early 1950's and was at least partially (if not fully) sprinkler at that time. It appears to be currently sprinklered in general accordance with NFPA 13(NFPA), the Standard for the Installation of Sprinkler Systems. A musical classroom wing to the south was added more recently and, though not part of the Theatre, will be retained for School use.

The sprinkler system for the Theatre is fed from a water supply coming into the School off 8th St. It follows a rather circuitous route involving some above ground and extensive amounts of underground pipe before reaching the Theatre from the water entry location on 8th St. This feed will be abandoned and a new supply required.

Minimum Code Upgrade requirements

Before going into the Options, a brief review of the requirements of the 2012 British Columbia Building Code is appropriate. Existing conditions are acceptable provided they are not deemed unsafe. When undergoing work on a building, there is usually a sliding scale where more items are upgraded as more work is being done.

While the currently referenced edition of NFPA 13 is the 2013 edition, the system was installed under earlier editions and, while they appear to generally comply with the installation at the time they were installed, there have been revisions to NFPA which the existing system does not comply with. NFPA specifically deems existing systems installed in accordance with the Standard of the time to comply with the current Standard. However, any deviations from the original installation to the current NFPA will be reviewed.

Site Observations:

As noted above, the entire Theatre and coverage is generally excellent throughout. The following are observations based on non-compliant features of the existing system:

1. The basement sprinklers are too close to the cowall in the basement corridor and need to be offset.closer to the centre of the wall. In some cases, it may be possible to use sidewalls to correct this problem.
2. Some of the sprinklers in the stage and workshop areas are old style sprinklers over 50 years old. NFPA 25 (referenced by the Fire Code) as well as NFPA 13 mandate that these sprinklers must be spot tested to confirm adequate operation. While not all sprinklers were counted, it appears that there are between 70 and 100 old style sprinklers.
3. Most sprinklers in the seating and attic areas appear to be dated 1974 so are not within the replacement requirement. Similarly, the classroom area are also newer. Some newer sprinklers were noted in corridors.
4. There is poor sprinkler coverage at the upper balcony area near the old control box.
5. One additional sprinkler is required in the lounge area beside the workshop.
6. A few sprinklers are more than 6" below joists.
7. A single zone protects the entire Theatre, There are no alarm devices in the Theatre.

Fire safety item unrelated to sprinklers:

8. The proscenium fire curtain requires manual action to lower it. A common option if it is desired to replace it is

Option 1 Recommendations

A) A new water entry is required for the Theatre. In reviewing the basement / crawl space area, the water entry location would likely be best in the crawl space under the classroom area SW of the abandoned exit corridor at the SE corner of the Theatre. It is likely that this corridor will be used for the electrical services but the new water connection could also be in this corridor, although the feed to the area appears to be under a raised concrete floor which would make the provision of underground piping more difficult.

B) It is standard for new water connections to be 150 mm in diameter, While a 100 mm connection may work if it can be proven to be sufficient from a hydraulic performance perspective, we recommend that a 150 mm connection be provided for common sprinkler / domestic use. . A double check backflow preventer (DCBP) would be required for the sprinkler system. The domestic connection would take off before the DCBP.

C) At least one floor zone control (FZC) including a flow switch, test and drain valve, and drain (likely to the exterior, possibly under the raised exterior concrete platform) is required.

D) The current Code requires zoning on a storey by storey basis but the stage and seating area are the main floor with mezzanines, and the basement is relatively small. Only a single zone would be provided with this option at this time.

E) A new feed from the new FZC to the existing water supply in the basement area under the crawl space under north corridor is required. This feed appears to be approximately 150 mm in size so unless it can be demonstrated that a smaller size works with hydraulic calculations then the new feed should be 150 mm also. Note that smaller pipes feed the sprinkler system.

F) The Old Style older sprinklers could be tested but we strongly recommend against this. Collection and testing would cost a substantial amount of money and negative test results would necessitate replacement in any event and also require periodic testing throughout the life of the building. We recommend that the old style sprinklers be replaced with modern fast response sprinklers rather than testing.

G) Lines to the gym to the north will have to be removed and capped off.

Option 2

I) Approximately 6 additional or relocated sprinklers would be required for proper coverage.

II) Approximately 10 sprinklers that are slightly more than 6" below the joists would need to be raised. Note that not all areas were closely reviewed.

While not part of the Scope of work:

III) The stage area was installed using a pipe schedule system since hydraulic calculations were not in NFPA when the system was installed. The riser piping feeding it is relatively small and if hydraulic calculations were undertaken it may not work. However, it appears to have complied when originally installed so is deemed to comply now.

IV) While the basement is not zoned separately from the rest of the Theatre, it is very small and, in my opinion, does not warrant a separate zone. The basement is essentially just under the stage; the remaining lower areas are

V) Most of the piping is not seismically braced. There is minimal purpose in upgrading this if the building itself is not seismically capable of withstanding a major earthquake but some consideration about this is warranted depending on the seismic capabilities of the building.

We trust that you find the following in order, but should you have any questions, please do not hesitate to contact our office.

Yours very truly,
Murray Johnson Engineering Ltd.

Per:
Murray Johnson, M.Sc., P.Eng., CP

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