District Crossing Mechanical and Electrical Warranty Review

Prepared for:	RDH Building Engineering Ltd www.rdhbe.com Vancouver, BC
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Project:	District Crossing Warranty Review
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1.0 Terms of Reference

RDH Building Engineering retained Besant and Associates Engineers Ltd. ("BAE") to conduct a review of the mechanical and electrical systems in the District Crossing located at 1673, 1677, 1679 Lloyd, North Vancouver, BC.

The Buildings are 4 and 5 story multi-unit residential wood frame buildings. The buildings share electrical, fire suppression and detection, communication, domestic water and domestic hot water equipment.

Throughout this report "we" refers to BAE.

Photo 1.1––Roof level view looking north

Photo 1.2––Elevation showing commercial suites on Marine Drive

2.0 Acknowledgments

We wish to thank Darienne Deans and the on-site building manager for their assistance in preparing this report.

3.0 Scope of Services

The survey included the following tasks:

- Visually review the mechanical systems including the following elements: plumbing, drainage, heating, ventilation, and fire suppression systems.
- Visually review the electrical systems including the following elements: power distribution, lighting, grounding, fire detection and telecommunications. We have also provided non-specialist comments on the elevator systems based upon a visual review.

The goal of this work was to identify deficiencies with the installation of the mechanical and electrical systems.

4.0 Analysis Method

Jeff Besant of BAE visited the Building on 11 July 2013 to review the mechanical and electrical systems.

From this review, we developed this report which contains:

Section 1	A description of the mechanical and electrical systems,
Section 2	Deficiencies noted during our survey are summarized in this report,
Section 3	We have included some generic maintenance guidelines for the mechanical and electrical systems.

We did not have drawings, maintenance manuals or any documentation to review for this survey.

5.0 Mechanical Systems

Domestic Water Systems

Photo 5.1 –– Main domestic water line showing the pressure reducing valves on water supply and the backflow preventers. The incoming pressure is 110 psi and the supply pressure to building is 50 psi.

There is a combined domestic water supply to the sprinkler system (6 inch) and domestic water system (4 inch) inside a parking level mechanical room.

The sprinkler system, the domestic water and the irrigation system all have backflow preventers. The domestic water has a water meter and a high flow and low flow pressure reducing valves. The main piping runs are made of ductile iron pipe however the distribution throughout the building appears to be copper and cross-link-polyethylene tubing (PEX).

The domestic water supply piping running through the parking garage was insulated and heat traced.

As a cautionary note, we should state that domestic water piping is susceptible to failure in BC because the water in the lower mainland is considered to be aggressive. This is the result of low pH and the softness of our water. This was identified as problem in the early 90s by the Association of Professional Engineers of BC (APEGBC). At that time, recommended addressing the problem with "aggressive" water by ensuring water velocities are maintained below certain thresholds.

We typically find that the piping lasts about 20 years before problems develop. Even plastic piping systems may be affected by water chemistry. There is evidence to suggest that our water conditions will lead to embrittlement of the plastic pipe. That said, we are relying upon our own experience with this problem and not comprehensive statistical data. Also, there are many factors that affect the operating life of domestic water piping including water velocity.

When domestic water piping systems get replaced is a judgment decision. It may be satisfactory to fix leaks as and if they occur, however this approach may also pose an unacceptable risk for the owners and tenants.

There are a number of options for addressing problems with domestic water piping. One method is to add minerals to the water to mitigate the damage caused by the low pH and softness (Hytec Water Management Ltd, richard@hytecwater.com .ca and 604-628-2421 (office) has this kind of system).

Domestic Hot Water Systems

Photo 5.2 –– Main domestic hot water storage tanks and expansion tank. Temperature noted to be 120ºF.

Domestic hot water is provided from three gas fired high efficiency boilers (Laars, 95.8% combustion efficiency, 399,000 BTUH input).

The boilers supply hot water to four Ruud hot water

storage tanks (Photo 5.2) each have a storage capacity of 115 US Gallons. The thermometers on each tank show the storage temperature to be approximately 135ºF. There is an expansion tank on the hot water system and fractional horsepower re-circulation pumps controlled by aquastats.

Photo 5.3 –– Main domestic hot water storage tanks and expansion tank. Temperature noted to be 135ºF.

The domestic hot water storage tanks will also remain in service for much longer with a water treatment system employed for this building.

Drainage Systems

Photo 5.4–– Interceptor on storm drainage system in parking garage

The purpose of the sanitary drainage system is to remove effluent discharged from plumbing fixtures and other equipment to an approved point of disposal.

A sanitary drainage system generally consists of horizontal branches, vertical stacks, a building drain inside the building, and a building sewer from the building wall to the point of disposal.

A stack is considered a main vertical pipe that carries away discharge from within a facility of water closets and urinals (soil stack) or other clear water waste from equipment and non-sanitary fixtures (waste stack). Flow in the drain empties into the vertical stack fitting, which may be a long-turn tee-wye or a short-turn or sanitary tee.

The drainage systems was only partially visible for our review. The elements we could see were constructed of cast iron and copper.

Normally, the components (such as large diameter pipes) will last the life of the structure without requiring repairs. However, if a repair is required, the cost can be very high because the work requires extensive excavation. Because of this, it is difficult to predict the need or magnitude of repairs for these parts of the mechanical system with high levels of accuracy.

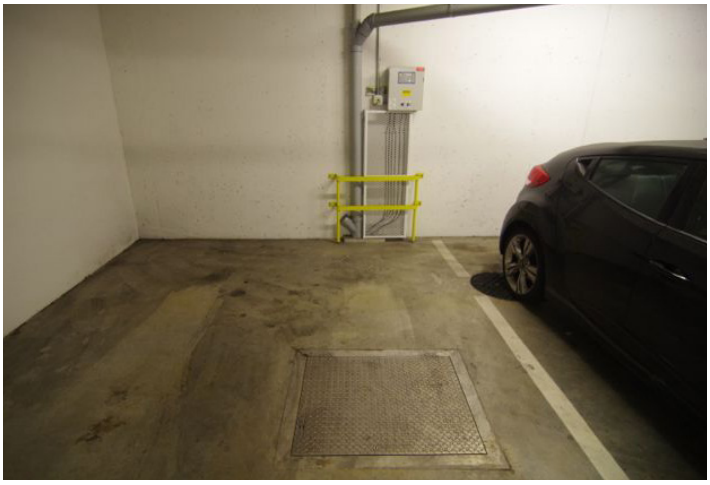

Photo 5.5–– Sump pump controller for storm drainage sump pumps

We noted that there are three sump pumps with sump pump controllers by Northwest Tech-Con Systems Ltd. for the drainage system. The controllers are mounted in the parking garage (2 x 1-1/2 horsepower pumps for the storm drainage system and 1 x 1-1/2 horsepower sump for the sanitary drainage system). The pumps are located in confined space so we could not inspect them.

Heating Systems

Photo 5.6–– Force flow unit heater in storage room

The heating system electric force flow heaters and electric baseboards.

Cooling Systems

Photo 5.7 –– An air cooled condensing unit in parking garage serving the commercial units. The hot gas and liquid lines run across the ceiling of the parking garage to the fan coil units.

Only the commercial units have air conditioning. The condensing units are mounted in the parking garage.

Ventilation Systems

Photo 5.8–– Roof mounted make-up air unit.

Outside air is provided to the occupied areas of the buildings by four roof-mounted gas fire make-up air units. The nominal capacity of the units ranges between 1,260 cubic feet per minute (CFM) and 2,115 CFM with an input between 100,000 and 200,000 BTUH.

Photo 5.9 –-Sidewall exhaust fan in parking garage.

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In addition, there are number side-wall propeller exhaust fans and box style exhaust fans used in the parking garage and storage rooms.

Photo 5.10–- Gas detection system mounted on column in parking garage.

The fans in the parking garage are controlled by a gas detection system. All of the equipment appeared functional and properly installed.

6.0 Electrical Systems

Central Distribution

Photo 6.1–- Load break switch, main transformer and Central Distribution Panel in electrical room.

The main electrical equipment is housed in an electrical room off the parking garage. There are also electrical closets on each level of the residential building.

BC Hydro provides single 12.5 kV circuit feeding a 1,250 KVA 3 phase, air cooled dry type transformer mounted in the main electrical room. The transformer steps the voltage down to 120/208 Volts.

The transformer supplies power to a 4,000 Amp central distribution panel board that provides power to the meter centres, the house loads and the mechanical systems.

Each suite has a revenue meter with a 100 two pole breaker.

Lighting Systems

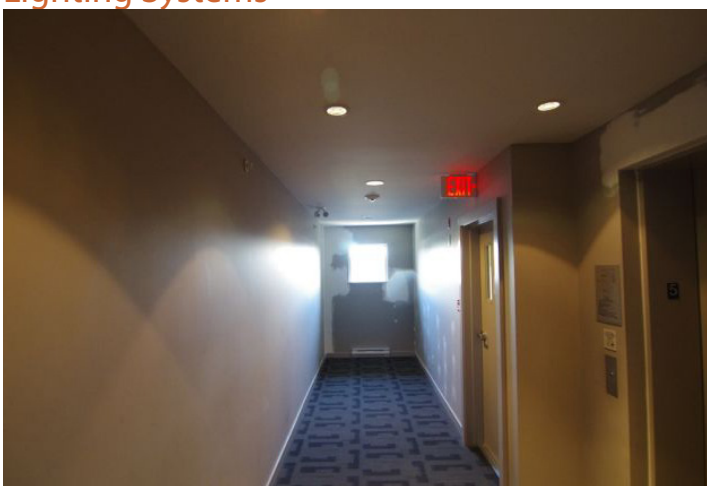

Photo 6.2–– Hallway lights in interior of residential building (compact fluorescent pot lights) and MR-16 pot lights.

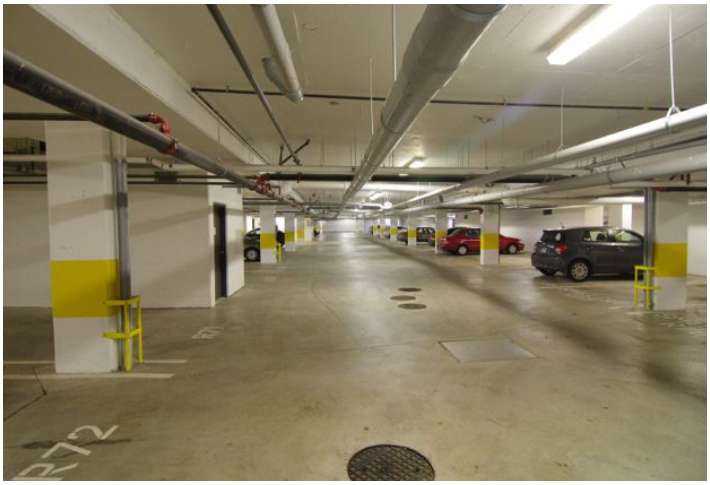

Photo 6.3–– Surface mounted T-8 lightings in parking garage.

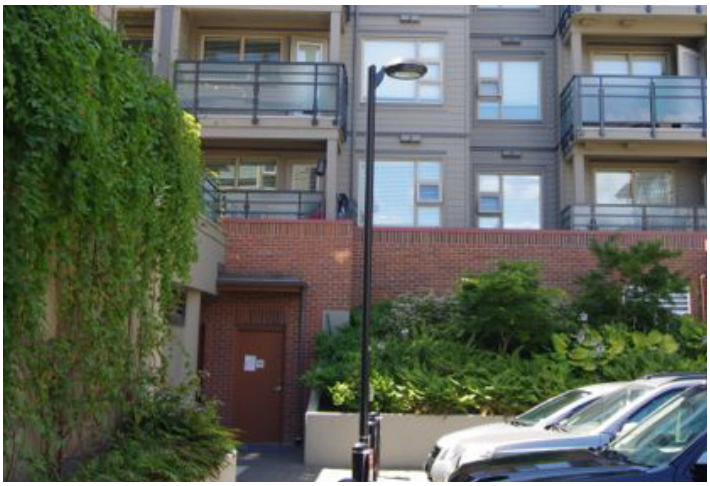

Photo 6.4–– Decorative pole mounted light fixture in parking area.

The lighting system consists of the following fixtures:

- Parking garage: 4 foot, 2 and 1 lamp T8 fluorescent fixtures
- Residential building: M-16 halogen pot lights, surface mounted compact fluorescent fixtures and T8 fluorescent surface mounted lights in service rooms and stairwells.
- LED decorative lights in lobbies
- Outside: pole mounted metal halide fixtures around the perimeter of the buildings.
- Emergency lighting is provided by battery backed fixtures located throughout all of the buildings.

The ownes should be aware the LED lighting systems are becoming more economical and more commonplace. Consideration should be given to looking a retrofit options over next few years.

Elevator Systems

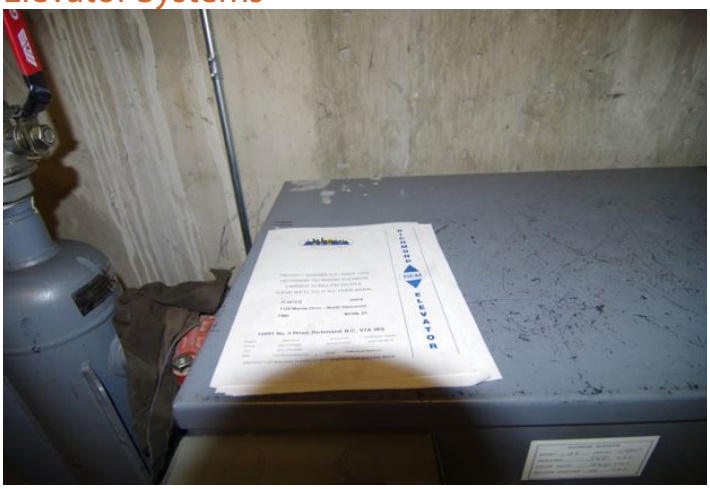

Photo 6.5–– Photo shows the hydraulic pump for an elevator.

The residential building has 3 x 2,100 pound hydraulic elevators that travel from the parking garage to the upper floor of each residential block. The elevators travel 125 feet per minute. The elevators have infrared door edges and hands free phones.

There is a service contract in place for the elevator system. The log book showed that the elevators were working properly.

Security Systems

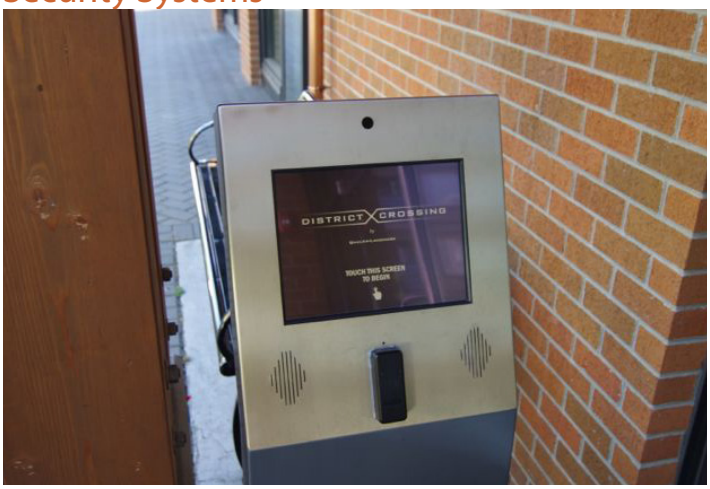

Photo 6.6–– Security Panel in main communication room

The security system consists of key fobs and key pads at the various entrance to the building and parking garage. There are controllers mounted in the communication room for this system.

Since this is electronic equipment a visual review does not reveal much about the operation of the equipment. We noted that hardware was properly installed and free of physical damage.

Communication Systems

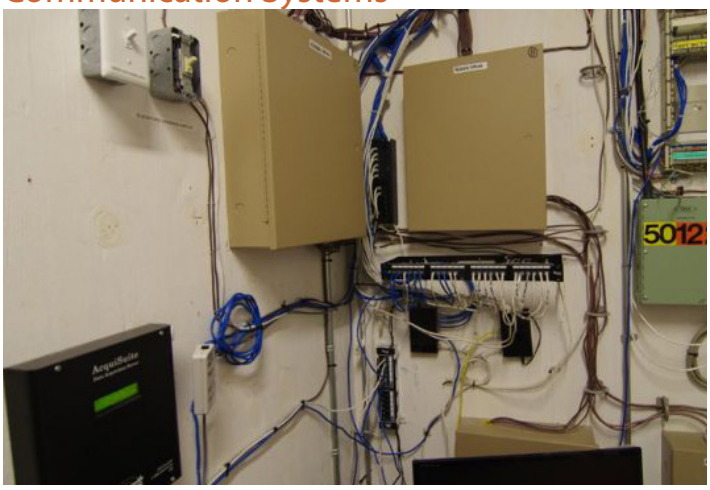

Photo 6.7–– Fibre optic demarcation cabinet and cable systems

Telus provides fibre optic cable into the building. There is also a cable equipment. This is equipment is housed in communication room on the parking level.

7.0 Life Safety Systems

Fire Suppression System

Photo 7.1–– Dry valve and flow switch on fire suppression system

The fire suppression system consists of a wet sprinkler system (Light Hazard) throughout the occupied areas and a dry sprinkler system (Ordinary Hazard) throughout the parking garage. There is one flow switch for the wet system and 2 dry valves for the dry system. The dry system employs a 3/4 horsepower compressor.

The domestic water system is separated from the sprinkler system by a back-flow preventer.

The system is inspected annually by Mircom Engineered Systems. The next inspection is schedule for July 2013.

No operational problems were noted or reported.

All of the valves had up to date inspection tags, the piping was properly supported and the sprinkler heads reviewed for this report were properly installed. There were spare heads available in the service room.

In addition, there are hand-held fire extinguishers throughout the occupied areas of the buildings

Fire Detection System

Photo 7.2–– Main Fire Alarm Control Panel in Communication Room

There is an Mircom multi-zone Fire Alarm Control Panel in the main communication room. There are pull stations at the exits, there are speakers throughout the building and alarm bells on each level. In addition, there smoke detectors in stairwells and service areas as required by the Building Code.

There is an annunciator panels located the entrance to each building.

Since this is electronic equipment, a visual review does not reveal very much about its working condition.

We noted that the equipment was properly installed and free of physical damage.

Mircom Engineered Systems conducts annual inspections of this equipment as required by the Building Code.

Please contact the undersigned should you have questions on this report.

Best regards,

Besant and Associates Engineers Ltd.

Jeff Besant, P.Eng.

Section 2 Deficiencies

Table 2.1 Heating, Ventilation and Air Conditioning Systems

Item #	Title	Discussion	Location	Photo Ref #
M.1	No balancing report available for our review.	A balancing report should be available on site to determine how much outside air is being delivered to the corridors.		
M.2	Water-proofing missing on cable penetration on make-up air unit	The cable penetration through the roof is not adequately water-proofed. Ideally, this penetration should be caulked and have a neoprene boat connected to the conduit.	Roof Level 1673 Lloyd Ave	**A**

Table 2.2 Plumbing Systems

Item #	Title	Discussion	Location	Photo Ref #
P.1	No commissioning report available for our review.	We were not able to determine if all of the alarms were functional. For example, we don't know if the sump pump audible alarm has been tested.		
P.2	It appears that there is insulation missing from the trap primer piping in the parking garage.	It is good practice to insulate all fittings where there is a risk of freezing.	Parking garage	**B**
P.3	There is soil erosion around a storm drain common area patio.	Soil erosion evident on around emenity area patio	2nd floor amenity area	**C**

Table 2.3 Electrical Systems

Item #	Title	Discussion	Location	Photo Ref #
E.1	Evidence of electrical problems in 1679 Lloyd	Building manager and electrician report problems with lighting. Fixtures require constant attention because lamps fail regularly.	Throuhout 1679 including parking garage and occupied areas.	**D**

Photo A –– Make-up Air Unit mounted on roof. Note the lack of caulking at roof penetration for electrical wiring.

Photo B ––What appears to be un-insulated copper piping for trap primers at the entrace to the parking garage..

Photo C –– Soil erosion around storm drain on amenity patio area.

Photo D –– Problems with light fixtures throughout building. Lamps are failing far too frequently.