VIMC – Circuit Extension

Building Servicing Report
June 14, 2019
JE Anderson File #88804

Prepared for:
VIMC
1.0 INTRODUCTION

Vancouver Island Motorsports Circuit (VIMC) is planning an Experience Center related to their new circuit. The Circuit will be located on Section 4, Range 1, Somerenos District at the end of Drinkwater Road. The site is 42 hectares, and is presently zoned I2 – Heavy industrial.

We assume the new Experience Center will be the same size and material as the Experience Center constructed in 2016 at the existing circuit.

This design brief outlines the expected off-site services that will be required related to the new Experience Center construction.

2.0 ROADS

The Experience Center will be accessed via Drinkwater Road.

Existing Road

A gravel road to Municipality of North Cowichan (MNC) Industrial Road Standards was constructed along with the new watermain constructed in 2016.

Within the lot, a gravel road was constructed to the end of the watermain.

Proposed Municipal Road

The Municipal Road through the site will have to be completed to MNC Standards. This will include:

- Relocating power poles;
- Adjusting road location once power poles are moved;
- Ditch completion
- Pave half road to MNC Industrial Road Standards (additional gravel, grading, 75mm asphalt). See Appendix A for Typical Section;
- Fire truck access minimum 6m wide;
- It is likely that minimum 6m asphalt width will be required; and
- Suitable turn around at the end of the MNC road.

Private Road

The private road to the Experience Center will have to be minimum 6m wide, accessible via fire truck, complete with a fire truck turn around.
3.0 DRAINAGE
A drainage report is provided separately.
An oil water separator / sump will be required for the new Experience Center parking drainage.

4.0 SEWER
A sewage disposal system will be required, design by a qualified practitioner / Professional Engineer.

5.0 WATER
Existing Water
A 300mm watermain was extended in 2016 along Drinkwater Road to provide water to the existing Circuit Experience Center. A single domestic booster pump and a fire pump (a temporary installation) were installed to service the existing Experience Center. A chlorination system was also installed. The watermain was sized for a future reservoir and a future fire flow of 12,000 L/min. The domestic booster pump and fire pump were sized for the existing Experience Center.
The existing fire pump is not yet operational.

Water Calculations
Calculations provided in Appendix A assuming a new Experience Center lower floor elevation of 127.5 metres indicate the following:

- Domestic water flow volumes and pressures are marginal. A small reservoir with booster pump may be desirable;
- Fire flows are available from the existing fire pump once operational; and
- A future reservoir with minimum bottom reservoir elevation 158m, and top water level 164m would be reasonable for this site (assuming a 300mm watermain).

Proposed Water
The proposed water system is expected to include the following:

- A 50mm domestic service c/w 38 to 59mm meter setter and meter c/w dual check valve;
- A 200mm fire water service c/w 150mm Double Detector Check Valve Assembly;
- On site domestic water service size 50 to 100mm;
- On site 200mm line to a fire hydrant; and
- A domestic water tank and booster pump if necessary. Ensure a sufficient volume in tank to absorb peak flow fluctuations. Domestic flows into the tank may have to be restricted to ensure sufficient flows to the existing Experience Center.
Future Reservoir

The new water system will have to accommodate a future reservoir. Any tank and booster pump at the new Experience Center will have to be easily removable.

The new Experience Center may have to contribute costs to the future booster pump and reservoir. Any contribution requirements will have to be determined in discussion with MNC.

A reservoir location between Bings Creek West and East is under consideration, with Aquaparlan Environmental and Ryzuk Geotechnical indicating that the location is reasonable. Preliminary information indicates a reservoir base at 158 metres, and a 670m length of road, watermain, and power supply to the site. This elevation will be suitable to provide service to the new Experience Center.

6.0 ELECTRICAL, TELEPHONE, CABLE, GAS, STREETLIGHTING

The existing utility poles along the recently extended portion of Drinkwater Road will have to be relocated to supply the new Experience Center and circuit. Three phase power is expected to be required.

Streetlights are not required based on the MNC Industrial Road Typical Section R6.

Fortis gas service is not proposed at this time.

7.0 SUMMARY

The existing Experience Center can be serviced with MNC Roads and Water, and BC Hydro, Telus and Cable. All will require off-site improvements.

The water supply will be temporary, and contributions toward a long term water supply system will have to be coordinated with MNC. Special on site water supply considerations may be required.

Drainage will be directed to Menzies Creek with no increase in flow for the 5, 25, and 200 year events.

Sewer will be disposed of via an on-site sewage disposal field.

Yours Truly,
JE Anderson and Associates

[Signature]

Jim Buchanan, P. Eng.
Appendix A

Servicing Report Information and Calculations

Industrial Road Typical Section
Water Supply Calculations
FUS Fire Flow Calculations
Domestic Flow Booster Pump Curve
Fire Pump Curve
20 m (MIN.) ROAD ALLOWANCE

R.

VARIES

4.0 m

4.0 m

VARIES

C.

SLOPE 1\(\frac{1}{2}\) : 1 MIN.

0.3

1\(\frac{1}{2}\)

1.8

MIN.

3 %

3 %

75 mm OF ASPHALT PAVING

100 mm OF 20 mm MINUS CRUSHED GRAVEL BASE

300 mm OF 75 mm MINUS PIT RUN GRAVEL SUB-BASE ON APPROVED SUBGRADE

APPROVED SUBGRADE

This information has been provided subject to the federal Copyright Act and in accordance with the provincial Freedom of Information and Protection of Privacy Act.
WATER SUPPLY CALCULATIONS

Existing Information
Existing Booster Pump Pipe Elevation 104.3
Existing Reservoir Water Level 109m (assumed), Overflow Elevation 111m
Existing Experience Center Main Floor Elevation 107.15
Proposed Experience Center Main Floor Elevation 127.5m
200mm watermain length 100m equivalent
250mm watermain length 260m
300mm watermain length 1370m
200mm watermain length to existing Experience Center 500m
Fire Pump Curve Attached (5 L/s, 300 L/min at 75 psi)
Domestic Booster Pump Curve Attached
Building Fire Flow requirements 6,000 L/min Attached.

Fire Flow Pressure Remaining at 6,300 L/min
Head loss through 100m of 200mm, 260m of 250mm and 1370m of 300mm at Chw = 135 is 18m.
Pressure at existing Hydrant at Elevation 122m will be:
109m reservoir + 50.6m fire pump head - 18m pipe loss - 122m hydrant elevation = 19m (27 psi)
This would drop to 14.1m (20 psi) at the Experience Center main floor elevation.
The required 140 kPa (20 psi) residual in the main at the fire hydrant will be met.

Booster Pump Pressure at New Experience Center at 5.0 L/s
Head loss through 32mm orifice, 20m of 50mm, 75m of 200mm, 260m of 250mm and 1370m of 300mm at Chw = 135 is 7m.
Pressure at Experience Center main floor elevation 127.5m will be:
109m reservoir + 52.7m domestic pump head - 7m pipe loss - 127.5 building elev. = 27.2m (38.7 psi).
This pressure is marginal.
The 5.0 L/s will support 300 BCBC Fixture units. However, it is likely that the two Experience Centers combined will have fewer than 300 fixture units.
The existing booster pump will be close to sufficient, but a small reservoir with booster pump on site may be desirable.
The existing MNC domestic booster pump has only one pump and no backup generator, so loss of water flow during pump breakdown and power outages is expected.
It should be possible to work with the present domestic booster pump for the new Experience Center.
Future Reservoir

A future reservoir is proposed at elevation +/- 158m. Assume water level 161m. It will be located approximately 670m up the hill from the watermain (assume 300mm waterline).

Pressure remaining at the new Experience Center at 9,000 L/min (allows for future domestic flows)

Head loss 670m of 300mm + 650m of 300 mm with Chw = 135 is 17m.

Pressure at Fire Hydrant (Elev 122) will be:

\[161 - 17 - 122 = 22\text{m (31.3 psi)}\]

This would drop to 16.5m (23 psi) at the Experience Center elevation.

The required 140 kPa (20 psi) residual in the main at the fire hydrant will be met.

Note: The 9,000 L/s is based on a fire flow of 6,000 L/min plus future Max Day Domestic Demand (MDDD). Future MDDD was assumed to be 3,000 L/min. A 3,000 person population at 1,364 L/c/d (0.94 L/min) translates to a max day demand of 3,000 x 0.94 = 2,820 L/min. A 3,000 L/min MDDD is conservative. The December, 2015 estimate was 2,200 people, MDDD 2,100 L/min.

Domestic Flows assuming 3000 L/min

Head loss 670m of 300mm + 650m of 300mm with Chw = 135 is 2.5m.

Pressure at new Experience Center site floor elevation 127.5 will be approximately:

\[161 - 2.5 - 127.5 = 31\text{m (44psi)}\]

Minimum 40 psi pressures will be met.

A reservoir at floor elevation 158m will be suitable to provide domestic and fire flows to the Experience Center at elevation 127.5m.
FIRE UNDERWRITERS SURVEY
A SERVICE TO INSURERS AND MUNICIPALITIES

FIRE FLOW ESTIMATE

City: MUNICIPALITY OF NORTH COWICHAN

Date: MAY 30/19
Eng.: JIM BUCHANAN

Previous Fire Flow No. __________
Fire Flow No. __________

Address (name of occupant if prominent)
VIMC PHASE 2 EXPERIENCE CENTER

Type Dist. __________

Fire Area Considered

Types of Construction: CONCRETE

Ground Floor Area 721
No. of Stories 2

Total Floor Area (if needed) 1442

Fire Flow From Table: 0.8 x 220 x √1442 = 6700 L/min gpm(a)

Occupancy: EXPERIENCE CENTER Add or Subtract -10 % 700

Sub Total 6000 gpm(b)

Automatic Sprinklers: NO Subtract % x b = 0

Sub Total 6000

Exposures: Distance Exposure

1. Front ________________ Add 0 %
2. Left ________________ 0 %
3. Rear ________________ 0 %
4. Right ________________ 0 %

Total %

Notes and/or Calculations:

Use % x b = + 0

Draw Sketch on other side if needed.