

APPENDIX A

**Table A-1: Results of Hazard
Screening and Preliminary GARP
Assessment, Railway Wells**

Table A-1: Results of Hazard Screening and Groundwater at Risk of Containing Pathogens (GARP) Assessment
Railway Well Field, City of Parksville, BC

| Railway #1: Well Tag No.: 107055; Plate ID No.: 13765 | | | |
|---|---------------------|--|---|
| Results of Hazard Screening and Assessment ² | | | |
| Category | Hazard ¹ | Hazard Screening ³ | Hazard Assessment ⁴ Comments |
| Water Quality Results | No. | | |
| | A1 | Microbiological Test Results | N |
| | A2 | Turbidity | N |
| | B1 | Setbacks from Sources of Contamination | N |
| | B2 | Flood Risk | N |
| Well Location | B3 | Hydraulic Connection to Surface Water | N |
| | B4 | Viruses | Y |
| | C1 | Surface Sealing | Y |
| | C2 | Well Caps and Covers | N |
| | C3 | Floodproofing of Wells | N |
| Well Construction | C4 | Wellhead Protection | Y |
| | D1 | Shallow Wells | N |
| | D2 | Vulnerable Aquifer | N |
| | D3 | Karst | N |
| SUMMARY: Hazards B4, C1 and C4 were screened as being present for Railway #1. The septic systems that are located on residential properties within 300 m of the well represent a potential source of viruses (i.e., the well is At Risk for Hazard B4). Although the casing stickup of 0.25 m is less than the minimum requirement of 0.3 m that is specified in the GWPR ⁵ , the wellhead completion in a secured kiosk within a fenced, locked compound are considered to provide adequate protection and the well is At Low Risk for Hazard C4. There is insufficient information to confirm if the well was installed with a surface seal. Therefore, it is conservatively assumed that the well is At Risk for Hazard C1. | | | |

Notes: MPN/100 mL = most probable number per 100 millilitres (mL); m bgs = metres below ground surface; n/a = not applicable

- Hazard criteria identified in BC Ministry of Health (2017) Guidance Document for Determining Groundwater at Risk of Containing Pathogens (GARP) Version 3; GARP Guidance Document
- Hazard Screening and Assessment consisted of Level 1 investigation (Existing Records and Field Inspection), supplemented with capture zone analysis that is consistent with Level 2 or 3 investigation in GARP Guidance Document
- Y/N = Yes/No Hazard is/is not present according to criteria outlined in GARP Guidance Document
- Hazards that were considered present were further assessed for the likelihood of being considered "At Risk" (i.e., water source potentially GARP) or "At Low Risk"
- HHR = BC Health Hazards Regulation (BC Reg 216/2011); GWPR = BC Groundwater Protection Regulation (BC Reg 39/2016); DWPA = BC Drinking Water Protection Act; EHO = Environmental Health Officer; BC ENV = BC Ministry of Environment and Climate Change Strategy

Table A-1: Results of Hazard Screening and Groundwater at Risk of Containing Pathogens (GARP) Assessment
Railway Well Field, City of Parksville, BC

| Railway #2: Well Tag No.: 107041; Plate ID No.: 13758 | | | | Results of Hazard Screening and Assessment ² | |
|---|----------------------------|--|--------------------------------|---|---|
| Category | Hazard ¹ No. | Description | Hazard Present ³ | Hazard Assessment ⁴ | Comments |
| Water Quality Results | A1 | Microbiological Test Results | N | | Pacific Hydrology Consultants Ltd. (1996) reported that samples collected from Railway #2 were "free from coliform bacteria"; however, the laboratory report was not available for review. Samples collected from Railway #2 in October 2010 and August 2018 were reported with total coliforms and <i>E. coli</i> at concentrations of <1.0 MPN/100 mL (Table G-1, APPENDIX G). |
| | A2 | Turbidity | N | | Samples collected from Railway #2 in October 2010 and August 2018 were reported with turbidity values of 0.25 and 0.40 NTU, respectively (Table G-1, APPENDIX G); these values were reported by the analytical laboratory. |
| | B1 | Setbacks from Sources of Contamination | N | | Railway #2 is situated at distances greater than the setback requirements specified in the HHR ⁵ from sources of probable contamination, private dwellings, cemetery and dumping grounds. A search of the BC Environmental Remediation Site database identified no records at the Railway Well Field and the City of Parksville has no records of spills or contamination in the area. |
| | B2 | Flood Risk | N | | The top of the well screen for Railway #2 is at a depth of 26.2 m bgs (i.e., > 15 m bgs) according to the engineering drawing provided in APPENDIX E. The well is not within the natural boundary of a surface water body, with the nearest surface water body located over 600 m south from the well field (Shelley Creek 2; Figure 2). The City indicated that the well field area is not prone to flooding and water does not pond near the wellhead, consistent with observations during 6 April 2023 Site visit. |
| Well Location | B3 | Hydraulic Connection to Surface Water | N | | The well intake depth of Railway #2 of 26.2 m bgs is >15 m bgs (well log and engineering drawing, APPENDIX E). The Railway Well Field is estimated to be over 600 m from the nearest surface water body (Figure 2) and is not located within 150 m of any drainage ditch or ponded water (permanent or intermittent). |
| | B4 | Viruses | Y | At Risk | Railway #2 is located within approximately 100 m (i.e., < 300 m) of private residential properties to the south, along Wildgreen Way. As presented on Figure 3, the 200-day time-of-travel zone for Railway #2 extends into the area of these residential properties. The individual septic systems that service these properties may represent a potential source of enteric viral contamination to the aquifer. Although surficial deposits at Railway #2 were described by the driller as comprising brown silty sand and gravel to a depth of 3.6 m bgs and an unsaturated thickness of approximately 8.6 m, may provide some protection to groundwater quality, there is uncertainty regarding the thickness, composition and extent of the deposits throughout the area. Other wells that are identified on the WELLS database as being present in the vicinity of the Railway Well Field could provide a preferential pathway for migration of contaminants to the aquifer if they were not closed properly. |
| | C1 | Surface Sealing | Y | At Low Risk | The well log for Railway #2 (APPENDIX E) indicates that a surface seal was installed to a depth of 4 m bgs. The seal does not comply with the minimum length of 5 m that is specified in Part 3, Division 3 of the GWPR ⁵ ; however, the seal extends through deposits that are described by the driller as silty sand and gravel, and are inferred to be confining. The kiosk that covers Railway #2 and grading away from the immediate area of the kiosk also provide protection to the well. |
| | C2 | Well Caps and Covers | N | | The distribution pipe that is bolted to a steel flange that is securely attached to the top of the well casing and sealed with a gasket (Photo B-11, APPENDIX B) is interpreted to prevent persons, animals, foreign matter and water from entering the well and, therefore, meets the requirements of Part 4 of the GWPR ⁵ . |
| Well Construction | C3 | Floodproofing of Wells | N | | Railway #2 is located in a locked kiosk that prevents unauthorized access to the well and migration of surface water to the wellhead (concrete slab floor of the kiosk is approximately 0.08 m [3-inch] above surrounding grade). Within the kiosk, the concrete floor is graded towards a drain that is located approximately 0.3 m (12.5-inch) from the well casing. The City did not provide detailed records for Railway #2, but the wellhead is inferred to be similar to Railway #4 and #7; the drawings for these wells indicate that the floor drains discharge to daylight, likely behind the concrete pad. Therefore, Railway #2 is interpreted to meet the floodproofing requirements outlined in Part 7, Section 63 of the GWPR ⁵ and Section 16 of the DWPA ⁵ . |
| | C4 | Wellhead Protection | Y | At Low Risk | The casing stick-up of Railway #2 is not reported on the engineering drawing (APPENDIX E), but was measured to be approximately 0.25 m (10-inch) above the concrete floor of the kiosk during the site visit. Although a minimum casing stickup of 0.3 m is required in the GWPR ⁵ , the casing stick-up and well's location inside the secured kiosk are interpreted to provide adequate protection to the wellhead. As indicated above, the floor of the kiosk is graded towards a drain that is inferred to daylight behind the concrete pad. Therefore, the wellhead conditions for Railway #2 are interpreted to satisfy the requirements outlined in Part 3, Division 5 and Part 7 of the GWPR ⁵ and prevent surface water and foreign matter from entering the well. |
| | D1 | Shallow Wells | N | | With the top of the well screen reported on the well log and engineering drawing (APPENDIX E) to be 26.2 m bgs, the well intake for Railway #1 is >15 m bgs. |
| | D2 | Vulnerable Aquifer | N | | Aquifer 216 is classified by BC ENV ⁶ as IIB, indicating a moderate vulnerability to contamination from surface sources. Although the aquifer is reported by ENV (1996) as being unconfined in the southern portion of the aquifer, south of the railway, the well logs for the Railway wells suggest that confining deposits are present in the area of the well field. |
| Aquifer Type and Setting | D3 | Karst | N | | n/a: Quadra Sands Aquifer 216 is not a karst bedrock aquifer. |
| | | | N | | At Railway #2, Hazards B4, C1 and C4 were screened as being present. Septic systems that are located on residential properties within 300 m of the well represent a potential source of viruses and the well is therefore At Risk for Hazard B4. The casing stick-up of 0.25 m above the floor of the kiosk and surface seal length of 4 m are less than the minimum requirements of 0.3 m and 5 m, respectively, specified in the GWPR ⁵ ; however, the current wellhead conditions are inferred to protect the well from contamination at ground surface and Railway #2 is considered to be At Low Risk for Hazards C1 and C4. |
| | | | | | Therefore, based on the results of the Hazard Screening and Assessment, Railway #2 is considered to be GARP-viruses only. |
| | | | | | SUMMARY: |

Notes: MPN/100 mL = most probable number per 100 millilitres (mL); m bgs = metres below ground surface; n/a = not applicable

- Hazard criteria identified in BC Ministry of Health (2017) Guidance Document for Determining Groundwater at Risk of Containing Pathogens (GARP) Version 3; GARP Guidance Document
- Hazard Screening and Assessment consisted of Level 1 investigation (Existing Records and Field Inspection), supplemented with capture zone analysis that is consistent with Level 2 or 3 investigation in GARP Guidance Document
- Y/N = Yes/No Hazard is/ is not present according to criteria outlined in GARP Guidance Document
- Hazards that were considered present were further assessed for the likelihood of being considered "At Risk" (i.e., water source potentially GARP) or "At Low Risk"
- HHR = BC Health Hazards Regulation (BC Reg 216/2011); GWPR = BC Groundwater Protection Regulation (BC Reg 39/2016); DWPA = BC Drinking Water Protection Act; EHO = Environmental Health Officer; BC ENV = BC Ministry of Environment and Climate Change Strategy

Table A-1: Results of Hazard Screening and Groundwater at Risk of Containing Pathogens (GARP) Assessment
Railway Well Field, City of Parksville, BC

| Railway #3: Well Tag No.: 107046; Plate ID No.: 13767 | | | | Results of Hazard Screening and Assessment ² | |
|---|--|--|-----------------------------|---|---|
| Category | Hazard ¹ | Hazard Description | Hazard Present ³ | Hazard Assessment ⁴ | Comments |
| Water Quality Results | A1 | Microbiological Test Results | N | | Pacific Hydrology Consultants Ltd. (1996) reported that samples collected from Railway #3 were "free from coliform bacteria"; however, the laboratory report was not available for review. Samples collected from Railway #3 in November 2013, October 2016 and February 2020 were reported with total coliforms and <i>E. coli</i> at concentrations of <1.0 MPN/100 mL (Table G-1, APPENDIX G). |
| | A2 | Turbidity | N | | City of Parksville records indicate that samples collected from Railway #3 in November 2011, October 2016 and February 2020 were reported with turbidity values of 0.32, 0.12 and 0.14 NTU, respectively (Table G-1, APPENDIX G); these values were reported by the analytical laboratory. |
| | B1 | Setbacks from Sources of Contamination | N | | Railway #3 is situated at distances greater than the setback requirements from sources of probable contamination, private dwellings, cemetery and dumping grounds, as outlined in the HHR ⁵ . No records were identified on the BC Environmental Remediation Site database at the Railway Well Field and the City of Parksville has no records of spills or contamination in the area. |
| | B2 | Flood Risk | N | | The top of the well screen (i.e., intake depth) for Railway #3 is > 15 m bgs, at a depth of 20.6 m bgs (see well log and engineering drawing provided in APPENDIX E). The area around Railway #3 is not prone to flooding and the well is not within the natural boundary of a surface water body. Shelley Creek 2 is the nearest surface water body, located over 600 m south from the well field (Figure 2). No standing water was observed near the wellhead during the precipitation event on 6 April 2023, and the City indicated that water does not pond near the wellhead. |
| Well Location | B3 | Hydraulic Connection to Surface Water | N | | Top of well screen is >15 m bgs, at a depth of 20.6 m bgs (well log provided in APPENDIX E). No drainage ditches or ponded water (permanent or intermittent) are reported to be located within 150 m of Railway #3 and, as indicated on Figure 2 the well field is over 600 m from the nearest surface water body (Shelley Creek 2). |
| | B4 | Viruses | Y | At Risk | Railway #3 is located less than 100 m (i.e., < 300 m) of private residential properties along Wildgreen Way (south of well). The 200-day time-of-travel zone for Railway #3 extends into the area of the residential properties to the south and west of the well (Figure 3). The individual septic systems that service these private residences may represent a potential source of enteric viral contamination to the aquifer. Although surficial deposits at Railway #3 that were described by the driller as comprising silt and gravel to a depth of 3.6 m bgs and an unsaturated thickness of approximately 15.1 m may provide some protection to groundwater quality, there is uncertainty regarding the thickness, composition (i.e., confining properties) and extent of the deposits throughout the area. Other wells that are identified on the WELLS database as being present in the vicinity of the Railway Well Field could provide a preferential pathway for migration of contaminants to the aquifer if they were not closed properly. |
| | C1 | Surface Sealing | Y | At Low Risk | Railway #3 was installed with a surface seal to a depth of 4 m bgs (see well log in APPENDIX E), less than the minimum length of 5 m that is specified in Part 3, Division 3 of the GWPR ⁶ . It is noted that the seal extends through deposits described by the driller as silty sand and gravel to a depth of 3.6 m bgs and are inferred to be confining. Railway #3 also receives some protection from the kiosk that covers the wellhead and the area immediately around the kiosk is graded away from the wellhead. |
| | C2 | Well Caps and Covers | N | | Railway #3 is completed with a distribution pipe that is bolted to a steel flange that is securely attached to the top of the well casing and sealed with a gasket. This wellhead completion is interpreted to prevent persons, animals, foreign matter or water from entering the well, thereby meeting the requirements of Part 4 of the GWPR ⁶ . |
| Well Construction | C3 | Floodproofing of Wells | N | | The locked kiosk that prevents unauthorized access to Railway #3 also prevents migration of surface water to the wellhead, as the concrete slab floor of the kiosk is approximately 0.08 m (3-inch) above surrounding grade. The concrete floor within the kiosk is graded towards a drain that is located approximately 0.29 m (11.5-inch) from the well casing. Based on available detailed drawings for Railway #4 and #7, the drain is inferred to discharge to daylight, likely behind the concrete pad. Railway #3 is interpreted to meet the floodproofing requirements outlined in Part 7, Section 63 of the GWPR ⁶ and Section 16 of the DWPA ⁵ . |
| | C4 | Wellhead Protection | Y | At Low Risk | Although the engineering drawing for Railway #3 (APPENDIX E) does not indicate the casing stick-up, it was measured during the site visit to be approximately 0.25 m (10-inch) above the floor of the kiosk. The casing stick-up is less than the 0.3 m minimum required in the GWPR ⁶ ; however, the casing stick-up of 0.25 m, the well's location inside the secured kiosk and grading of the kiosk floor away from the wellhead towards the drain are interpreted to provide protection to the wellhead. Therefore, the wellhead conditions for Railway #3 are interpreted to satisfy the requirements outlined in Part 3, Division 5 and Part 7 of the GWPR ⁶ and prevent surface water and foreign matter from entering the well. |
| | D1 | Shallow Wells | N | | Based on the well log and engineering drawing provided in APPENDIX E, the top of the well screen (i.e., well intake) for Railway #3 is 20.6 m bgs, a depth greater than 15 m bgs. |
| | D2 | Vulnerable Aquifer | N | | Aquifer 216 is classified by BC ENV ⁷ as IIB, indicating a moderate vulnerability to contamination from surface sources. Although the aquifer is reported by ENV (1996) as being unconfined in the southern portion of the aquifer, south of the railway, the well logs for the Railway wells suggest that confining deposits are present in the area of the well field. |
| Aquifer Type and Setting | D3 | Karst | N | | n/a: Quadra Sands Aquifer 216 is not a karst bedrock aquifer. |
| | <p>Railway #3 was screened with Hazards B4, C1 and C4 as being present. Railway #3 is At Risk for Hazard B4 based on the septic systems on residential properties that represent a potential source of viruses within 300 m of the well. It is noted that although the casing stick-up of 0.25 m above the floor of the kiosk and length of the surface seal (4 m) are less than the minimum requirements of 0.3 m and 5 m that are specified in the GWPR⁶, respectively; however, the wellhead conditions, including the kiosk and locked fenced compound, are inferred to provide adequate protection and the well is considered to be At Low Risk for Hazards C1 and C4.</p> <p>SUMMARY: Railway #3 is, therefore, considered to be GARP-viruses only.</p> | | | | |

Notes: MPN/100 mL = most probable number per 100 millilitres (mL); m bgs = metres below ground surface; n/a = not applicable

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- Hazard Screening and Assessment consisted of Level 1 investigation (Existing Records and Field Inspection), supplemented with capture zone analysis that is consistent with Level 2 or 3 investigation in GARP Guidance Document
- Y/N = Yes/No Hazard is/is not present according to criteria outlined in GARP Guidance Document
- Hazards that were considered present were further assessed for the likelihood of being considered "At Risk" (i.e., water source potentially GARP) or "At Low Risk"
- HHR = BC Health Hazards Regulation (BC Reg 216/2011); GWPR = BC Groundwater Protection Regulation (BC Reg 39/2016); DWPA = BC Drinking Water Protection Act; EHO = Environmental Health Officer; BC ENV = BC Ministry of Environment and Climate Change Strategy

Table A-1: Results of Hazard Screening and Groundwater at Risk of Containing Pathogens (GARP) Assessment
Railway Well Field, City of Parksville, BC

| Railway #4: Well Tag No.: 107092; Plate ID No.: 13760 | | | |
|---|--|-----------------------------|---|
| Results of Hazard Screening and Assessment ² | | | |
| Category | Hazard ¹ | Hazard Present ³ | Hazard Assessment ⁴ |
| Water Quality Results | A1 Microbiological Test Results | N | Pacific Hydrology Consultants Ltd. (1996) reported that samples collected from Railway #4 were "free from coliform bacteria"; however, the laboratory report was not available for review. City of Parksville records indicate that samples collected from Railway #4 in November 2014 and September 2022 were reported with total coliforms and <i>E. coli</i> at concentrations of <1.0 MPN/100 mL (Table G-1, APPENDIX G). |
| | A2 Turbidity | N | Samples collected from Railway #4 in November 2014 and September 2022 were reported with turbidity values of <0.1 and 0.14 NTU, respectively (Table G-1, APPENDIX G); these values were reported by the analytical laboratory. |
| | B1 Setbacks from Sources of Contamination | N | Railway #4 is situated at distances greater than the setback requirements specified in the HHR ⁵ from sources of probable contamination, private dwellings, cemetery and dumping grounds. |
| | B2 Flood Risk | N | The well log for Railway #4 (APPENDIX E), indicates that the top of the well screen is at a depth of 17.9 m bgs (i.e., > 15 m bgs). Railway #4 is not located within the natural boundary of a surface water body, as the nearest surface water body (Shelley Creek) is located over 600 m south from the well field. The area is not expected to be prone to flooding based on information from the City and observations during precipitation event on 6 April 2023 when a Site visit was conducted. |
| Well Location | B3 Hydraulic Connection to Surface Water | N | The well intake depth for Railway #4 is >15 m bgs (the top of well screen is 17.9 m bgs per well log provided in APPENDIX E). The Railway Well Field is over 600 m from Shelley Creek (Figure 2), the nearest surface water body (i.e., >150 m away), and no drainage ditches or ponded water (permanent or intermittent) are reported to be located within 150 m of Railway #4. |
| | B4 Viruses | Y | Railway #4 is located less than 100 m (i.e., < 300 m) of private residential properties to the east (along Maple Crescent) and less than 150 m of properties to the south (Wildgreen Way). As presented on Figure 3, the 200-day time-of-travel zone for Railway #4 extends into the area north of the well field; however, it is noted that groundwater is predicted to be drawn from the areas of the residential properties by the Railway wells. Therefore, the individual septic systems on these properties represent a potential source of enteric viral contamination to the aquifer, and the wells in the Railway Well Field. |
| | | | The well log and engineering drawing for Railway #4 (APPENDIX E) indicates deposits of silty sand and gravel to a depth of 6.4 m bgs, underlain by compact silt to interbedded silty sand to a depth of 11 m bgs. These deposits, and an unsaturated thickness of approximately 15.3 m, may provide some protection to groundwater quality; however, there is uncertainty regarding the thickness, composition (i.e., confining properties) and extent of the deposits throughout the area. The WELLS database identifies other wells as being present in the vicinity of the Railway Well Field. If these wells were not closed properly, they could provide preferential pathways for migration of contaminants to the aquifer. |
| | C1 Surface Sealing | Y | The well log for Railway #4 (APPENDIX E) indicates that a surface seal was installed through deposits described by the driller as silty sand and gravel to a depth of 4.1 m bgs. The seal does not comply with the minimum length of 5 m that is specified in Part 3, Division 3 of the GWPR ⁵ . The secure kiosk and drainage direction away from the wellhead also provide protection to Railway #4. |
| Well Construction | C2 Well Caps and Covers | N | Railway #4 is completed with a distribution pipe that is bolted to a steel flange that is securely attached to the top of the well casing and sealed with a gasket (Photo B-9, APPENDIX B). This completion is interpreted to prevent persons, animals, foreign matter and water from entering the well and, therefore, meets the requirements of Part 4 of the GWPR ⁵ . |
| | C3 Floodproofing of Wells | N | Railway #4 is located in a locked kiosk that prevents unauthorized access and provides protection from flood water. The concrete slab floor of the kiosk is approximately 0.08 m (3-inch) above surrounding grade and the floor inside the kiosk is graded to direct surface water away from the well (Photo B-9, APPENDIX B) and into a floor drain that is located 0.2 m (8-inch) from the well casing. The drain is reported on detailed drawings to discharge to daylight, at a location inferred to be behind the concrete slab. Railway #4 is therefore interpreted to meet the floodproofing requirements outlined in Part 7, Section 63 of the GWPR ⁴ and Section 16 of the DWPA ⁴ . |
| | C4 Wellhead Protection | Y | An engineering drawing for Railway #4 was not provided. The casing stick-up was measured during the site visit to be approximately 0.27 m (10.75-inch) above the floor of the kiosk. Although a minimum casing stickup of 0.3 m is required in the GWPR ⁵ , the casing stick-up and well's location inside the secured kiosk are interpreted to provide adequate protection to the wellhead. Also, as indicated above, water drains away from the wellhead towards a drain in the kiosk floor. Therefore, the wellhead conditions for Railway #4 are interpreted to satisfy the requirements outlined in Part 3, Division 5 and Part 7 of the GWPR ⁴ and prevent surface water and foreign matter from entering the well. |
| | D1 Shallow Wells | N | Top of well screen is reported on the well log (APPENDIX E) as being at a depth of 17.9 m bgs (i.e., > 15 m bgs). |
| Aquifer Type and Setting | D2 Vulnerable Aquifer | N | Aquifer 216 is classified by BC ENV ⁶ as with a moderate vulnerability to contamination from surface sources (i.e., IIB). Although the aquifer is reported by ENV (1996) as being unconfined in the southern portion of the aquifer, south of the railway, the well logs for the Railway wells suggest that confining deposits are present in the area of the well field. |
| | D3 Karst | N | n/a: Quadra Sands Aquifer 216 is not a karst bedrock aquifer. |
| | SUMMARY: The Hazard Screening identified Hazards B4, C1 and C4 as being present for Railway #4. The Hazard Assessment indicated that the well is At Risk for Hazard B4 based on the potential for viruses from septic systems at residential properties within 300 m of the well. Although the casing stickup of 0.25 m and surface seal length of 4.1 m are less than the minimum requirements of 0.3 m and 5 m, respectively, specified in the GWPR ⁵ , the wellhead completion in a secured kiosk within a fenced, locked compound are considered to provide adequate protection and the well is At Low Risk for Hazards C1 and C4. Therefore, based on the results of the Hazard Screening and Assessment, Railway #4 is considered to be GARP-viruses only. | | |

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WSP Canada Inc.

Table A-1: Results of Hazard Screening and Groundwater at Risk of Containing Pathogens (GARP) Assessment
Railway Well Field, City of Parksville, BC

| Railway #5: Well Tag No.: 107094; Plate ID No.: 13761 Results of Hazard Screening and Assessment ² | | | |
|--|--|--|--|
| Category | Hazard ¹ No. | Description | Hazard Present? ³ Hazard Assessment ⁴ Comments |
| Water Quality Results | A1 | Microbiological Test Results | N |
| | A2 | Turbidity | N |
| | B1 | Setbacks from Sources of Contamination | N |
| | B2 | Flood Risk | N |
| Well Location | B3 | Hydraulic Connection to Surface Water | N |
| | B4 | Viruses | Y |
| | C1 | Surface Sealing | Y |
| | C2 | Well Caps and Covers | N |
| Well Construction | C3 | Floodproofing of Wells | N |
| | C4 | Wellhead Protection | N |
| | D1 | Shallow Wells | N |
| | D2 | Vulnerable Aquifer | N |
| Aquifer Type and Setting | D3 | Karst | N |
| | SUMMARY: Hazards B4 and C1 were screened as being present for Railway #5. The well was assessed as being At Risk for Hazard B4 based on potential for viruses from the septic systems at residential properties with in 300 m of Railway #5. Although the length of the surface seal (4.6 m) is less than the 5 m requirement specified in the GWPR ⁵ , it is inferred that the current wellhead conditions provide adequate protection for the well from contamination at ground surface. Railway #5 is, therefore, considered to be GARP-viruses only. | | |

Notes: MPN/100 mL = most probable number per 100 millilitres (mL); m bgs = metres below ground surface; n/a = not applicable

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- Hazard Screening and Assessment consisted of Level 1 investigation (Existing Records and Field Inspection), supplemented with capture zone analysis that is consistent with Level 2 or 3 investigation in GARP Guidance Document.
- Y/N = Yes/No Hazard is/is not present according to criteria outlined in GARP Guidance Document
- Hazards that were considered present were further assessed for the likelihood of being considered "At Risk" (i.e., water source potentially GARP) or "At Low Risk"
- HHR = BC Health Hazards Regulation (BC Reg 216/2011); GWPR = BC Groundwater Protection Regulation (BC Reg 39/2016); DWPA = BC Drinking Water Protection Act; EHO = Environmental Health Officer; BC ENV = BC Ministry of Environment and Climate Change Strategy