SCHEDULE 3.1

[en. B.C. Reg. 13/2019, s. 12.]

SCHEDULE 3.1 – PART 1

MATRIX 1 - NUMERICAL SOIL STANDARDS[1]
ANTHRACENE (CHEMICAL ABSTRACT SERVICE NUMBER 120-12-7)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	25 000	25 000	10 000	25 000	10 000	25 000	75 000	> 1 000 mg/g	3
Groundwater used for drinking water	NS	NS	NS	NS	NS	NS	NS	NS	4
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	1.5	2.5	2.5	2.5	2.5	30	30	30	5
Livestock ingesting soil and fodder			NS						6
Major microbial functional impairment			NS						6
Groundwater flow to surface water used by aquatic life	NS	NS	NS	NS	NS	NS	NS	NS	4
Groundwater used for livestock watering			NS						6
Groundwater used for irrigation			NS	NS	NS	NS			6

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.

2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
3. Intake pathway of exposure modelled is inadvertent ingestion of soil.
4. NS – no standard. Soil to groundwater transport model predicts applicable water use standard for the substance will not be exceeded at the point of receptor exposure.
5. AL, PL CL and IL standard s are set equal to the corresponding 2010 Canadian Council of Ministers or the Environment (CCME) soil quality criteria. WL_N standard is derived by dividing the 2010 CCME parkland soil quality criterion by the Protocol 28, "2016 Standards Derivation Methods", Wildlands divisor. WL_R standard is set equal to the 2010 CCME parkland soil quality criterion. RL_{LD} standard is set equal to the 2010 CCME residential soil quality criterion. RL_{HD} standard is set equal to the 2010 CCME commercial soil quality criterion.
6. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard or no appropriate standard, guideline or criterion exists to develop a soil quality standard.

MATRIX 2 - NUMERICAL SOIL STANDARDS[1]
ARSENIC (CHEMICAL ABSTRACT SERVICE NUMBER 7440-38-2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	40	40	20	40	20	40	150	400	3,4
Groundwater used for drinking water	10	10	10	10	10	10	10	10	5
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	15	25	25	25	25	40	40	40	
Livestock ingesting soil and fodder			25						
Major microbial functional impairment			NS						6
Groundwater flow to surface water used by aquatic life									
Freshwater	10	10	10	10	10	10	10	10	5
Marine	10	10	10	10	10	10	10	10	
Groundwater used for livestock watering			10						5
Groundwater used for irrigation			10	10	10	10			5

Notes
1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated

from time to time, a director's protocol or alternate methods acceptable to a director.

2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
3. Intake pathway of exposure modelled is inadvertent ingestion of soil.
4. Standards have been adjusted using the 2012 US EPA OSWER Directive 9200.1-113 default Relative Bioavailability Factor (0.6) for arsenic in soil.
5. Standards have been adjusted based on 2016 reference Provincial background soil concentration for the substance.
6. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard or no appropriate standard, guideline or criterion exists to develop a soil quality standard.

MATRIX 3 - NUMERICAL SOIL STANDARDS[1]
BARIUM (CHEMICAL ABSTRACT SERVICE NUMBER 7440-39-3)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	15 000	15 000	8 500	15 000	8 500	15 000	50 000	> 1 000 mg/g	3
Groundwater used for drinking water	350	350	350	350	350	350	350	350	
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	350	700	700	700	700	1 500	1 500	1 500	
Livestock ingesting soil and fodder			400						
Major microbial functional impairment			NS						4
Groundwater flow to surface water used by aquatic life									
Freshwater	3 500	3 500	3 500	3 500	3 500	3 500	3 500	3 500	
Marine	1 500	1 500	1 500	1 500	1 500	1 500	1 500	1 500	
Groundwater used for livestock watering			NS						4
Groundwater used for irrigation			NS	NS	NS	NS			4

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time

to time, a director's protocol or alternate methods acceptable to a director.

2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
3. Intake pathway of exposure modelled is inadvertent ingestion of soil.
4. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard or no appropriate standard, guideline or criterion exists to develop a soil quality standard.

MATRIX 4 - NUMERICAL SOIL STANDARDS[1]
BENZENE (CHEMICAL ABSTRACT SERVICE NUMBER 71-43-2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	350	350	150	350	150	350	1 000	6 500	3
Groundwater used for drinking water	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	35	100	100	100	100	250	250	250	
Livestock ingesting soil and fodder			NS						4
Major microbial functional impairment			NS						4
Groundwater flow to surface water used by aquatic life									
Freshwater	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
Marine	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	
Groundwater used for livestock watering			NS						4
Groundwater used for irrigation			NS	NS	NS	NS			4

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time

to time, a director's protocol or alternate methods acceptable to a director.

2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
3. Intake pathway of exposure modelled is inadvertent ingestion of soil.
4. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard or no appropriate standards, guideline or criterion exists to develop a soil quality standard.

MATRIX 5 - NUMERICAL SOIL STANDARDS[1]
BENZO(A)PYRENE (CHEMICAL ABSTRACT SERVICE NUMBER 50-32-8)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	10	10	5	10	5	10	30	50	3
Groundwater used for drinking water	NS	NS	NS	NS	NS	NS	NS	NS	4
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	15	20	20	20	20	70	70	70	5
Livestock ingesting soil and fodder			NS						6
Major microbial functional impairment			NS						6
Groundwater flow to surface water used by aquatic life	NS	NS	NS	NS	NS	NS	NS	NS	4
Groundwater used for livestock watering			NS						6
Groundwater used for irrigation			NS	NS	NS	NS			6

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.

3. Intake pathway of exposure modelled is inadvertent ingestion of soil.
4. NS – no standard. Soil to groundwater transport model predicts applicable water use standard for the substance will not be exceeded at the point of receptor exposure.
5. AL, PL CL and IL standards are set equal to the corresponding 2010 Canadian Council of Ministers or the Environment (CCME) soil quality criteria. WL_N standard is derived by dividing the 2010 CCME parkland soil quality criterion by the Protocol 28, "2016 Standards Derivation Methods" , Wildlands divisor. WL_R standard is set equal to the 2010 CCME parkland soil quality criterion. RL_{LD} standard is set equal to the 2010 CCME residential soil quality criterion. RL_{HD} standard is set equal to the 2010 CCME commercial soil quality criterion.
6. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard or no appropriate standard, guideline or criterion exists to develop a soil quality standard.

MATRIX 6 - NUMERICAL SOIL STANDARDS[1]
BERYLLIUM (CHEMICAL ABSTRACT SERVICE NUMBER 7440-41-7)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	150	150	85	150	85	150	500	15 000	3
Groundwater used for drinking water									
pH < 5.5	1	1	1	1	1	1	1	1	4,5
pH 5.5 - < 6.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	4
pH 6.0 - < 6.5	4	4	4	4	4	4	4	4	4
pH 6.5 - < 7.0	20	20	20	20	20	20	20	20	4
pH 7.0 - < 7.5	150	150	150	150	150	150	150	150	4
pH 7.5 - < 8.0	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	4
pH ≥ 8.0	2 500	2 500	2 500	2 500	2 500	2 500	2 500	2 500	4
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	75	150	150	150	150	350	350	350	
			NS						6
Livestock ingesting soil and fodder			NS						6
Major microbial functional impairment									
Groundwater flow to surface water used by aquatic life									
Freshwater									
pH < 6.5	1	1	1	1	1	1	1	1	4,5
pH 6.5 - < 7.0	4	4	4	4	4	4	4	4	4

pH 7.0 - < 7.5	30	30	30	30	30	30	30	30	4
pH 7.5 - < 8.0	250	250	250	250	250	250	250	250	4
pH ≥ 8.0	500	500	500	500	500	500	500	500	4
Marine									
pH < 5.0	85	85	85	85	85	85	85	85	4
pH 5.0 - < 5.5	100	100	100	100	100	100	100	100	4
pH 5.5 - < 6.0	200	200	200	200	200	200	200	200	4
pH 6.0 - < 6.5	550	550	550	550	550	550	550	550	4
pH 6.5 - < 7.0	2 500	2 500	2 500	2 500	2 500	2 500	2 500	2 500	4
pH 7.0 - < 7.5	20 000	20 000	20 000	20 000	20 000	20 000	20 000	20 000	4
pH 7.5 - < 8.0	150 000	150 000	150 000	150 000	150 000	150 000	150 000	150 000	4
pH ≥ 8.0	350 000	350 000	350 000	350 000	350 000	350 000	350 000	350 000	4
Groundwater used for livestock watering									
pH < 5.0			8.5						4
pH 5.0 - < 5.5			10						4
pH 5.5 - < 6.0			20						4
pH 6.0 - < 6.5			55						4
pH 6.5 - < 7.0			250						4
pH 7.0 - < 7.5			2 000						4
pH 7.5 - < 8.0			15 000						4
pH ≥ 8.0			35 000						4
Groundwater used for irrigation									
pH < 5.0			8.5	8.5	8.5	8.5			4
pH 5.0 - < 5.5			10	10	10	10			4
pH 5.5 - < 6.0			20	20	20	20			4
pH 6.0 - < 6.5			55	55	55	55			4
pH 6.5 - < 7.0			250	250	250	250			4
pH 7.0 - < 7.5			2 000	2 000	2 000	2 000			4
pH 7.5 - < 8.0			15 000	15 000	15 000	15 000			4
pH ≥ 8.0			35 000	35 000	35 000	35 000			4

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol, or alternate methods acceptable to a director.

2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
3. Intake pathway of exposure modelled is inadvertent ingestion of soil.
4. The pH is the pH of the soil at a site.
5. Standards have been adjusted based on 2016 reference Provincial background soil concentration for the substance.
6. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard or no appropriate standard, guideline or criterion exists to develop a soil quality standard.

MATRIX 7 - NUMERICAL SOIL STANDARDS[1]
CADMIUM (CHEMICAL ABSTRACT SERVICE NUMBER 7440-43-9)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	Wildlands Natural (WL_N)	Wildlands Reverted (WL_R)	Agricultural (AL)	Urban Park (PL)	Residential Low Density (RL_{LD})	Residential High Density (RL_{HD})	Commercial (CL)	Industrial (IL)	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	40	40	20	40	20	40	150	3 500	3
Groundwater used for drinking water									
pH < 7.0	1	1	1	1	1	1	1	1	4,5
pH 7.0 - < 7.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4
pH 7.5 - < 8.0	30	30	30	30	30	30	30	30	4
pH ≥ 8.0	70	70	70	70	70	70	70	70	4
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	15	30	30	30	30	75	75	75	
Livestock ingesting soil and fodder			10						6
Major microbial functional impairment			55						
Groundwater flow to surface water used by aquatic life									
Freshwater									
pH < 7.0	1	1	1	1	1	1	1	1	4,5,7
pH 7.0 - < 7.5	3	3	3	3	3	3	3	3	4,7
pH 7.5 - < 8.0	20	20	20	20	20	20	20	20	4,7
pH ≥ 8.0	50	50	50	50	50	50	50	50	4,7
Marine									
pH < 5.5	1	1	1	1	1	1	1	1	4,5
pH 5.5 - < 6.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	4

pH 6.0 - < 6.5	2	2	2	2	2	2	2	2	4
pH 6.5 - < 7.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4
pH 7.0 - < 7.5	15	15	15	15	15	15	15	15	4
pH 7.5 - < 8.0	95	95	95	95	95	95	95	95	4
pH ≥ 8.0	200	200	200	200	200	200	200	200	4
Groundwater used for livestock watering									
pH < 5.0			4.5						4
pH 5.0 - < 5.5			6						4
pH 5.5 - < 6.0			8.5						4
pH 6.0 - < 6.5			10						4
pH 6.5 - < 7.0			20						4
pH 7.0 - < 7.5			75						4
pH 7.5 - < 8.0			500						4
pH ≥ 8.0			1 000						4
Groundwater used for irrigation									
pH < 7.0			1	1	1	1			4,5
pH 7.0 - < 7.5			4.5	4.5	4.5	4.5			4
pH 7.5 - < 8.0			30	30	30	30			4
pH ≥ 8.0			70	70	70	70			4

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol, or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
3. Intake pathway of exposure modelled is inadvertent ingestion of soil.
4. The pH is the pH of the soil at a site.
5. Standards have been adjusted based on the 2016 reference Provincial background soil concentration for the substance.
6. Standard is set equal to 1999 Canadian Council of Ministers of the Environment, "Nutrient and energy cycling check value".
7. Standard varies with receiving water hardness (H). H = 150 to < 210 mg/L as $CaCO_3$ is assumed. Consult director for further advice.

MATRIX 8 - NUMERICAL SOIL STANDARDS[1]
CHLORIDE ION (CHEMICAL ABSTRACT SERVICE NUMBER 16887-00-6)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	> 1 000 mg/g	> 1 000 mg/g	> 1 000 mg/g	> 1 000 mg/g	> 1 000 mg/g	> 1 000 mg/g	> 1 000 mg/g	> 1 000 mg/g	3
Groundwater used for drinking water	100	100	100	100	100	100	100	100	4
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	200	350	350	350	350	2 500	2 500	2 500	
Livestock ingesting soil and fodder			NS						5
Major microbial functional impairment			NS						5
Groundwater flow to surface water used by aquatic life	600	600	600	600	600	600	600	600	4,6
Groundwater used for livestock watering			250						4
Groundwater used for irrigation			40	40	40	40			4

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.

3. Intake pathway of exposure modelled is inadvertent ingestion of soil.
4. Standard varies with Kd for chloride ion in the soil of a site. Standard is appropriate to a chloride:soil Kd range of 0 to 0.1 mL/g. Consult a director for further advice.
5. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard or no appropriate standard, guideline or criterion exists to develop a soil quality standard.
6. Standard to protect freshwater aquatic life.

MATRIX 9 - NUMERICAL SOIL STANDARDS[1,2]

CHROMIUM (CHEMICAL ABSTRACT SERVICE NUMBER 7440-47-3)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	3
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	250	250	100	250	100	250	750	20 000	4,5
Groundwater used for drinking water	60 > 1 000 mg/g	60 > 1 000 mg/g	60 > 1 000 mg/g	60 > 1 000 mg/g	60 > 1 000 mg/g	60 > 1 000 mg/g	60 > 1 000 mg/g	60 > 1 000 mg/g	6,7 8
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	100	200	200	200	200	250	250	250	5
Livestock ingesting soil and fodder			150 60						6 7,8
Major microbial functional impairment			60						7,9
Groundwater flow to surface water used by aquatic life									
Freshwater	60 300 000	60 300 000	60 300 000	60 300 000	60 300 000	60 300 000	60 300 000	60 300 000	6,7 8
Marine	60 > 1 000 mg/g	60 > 1 000 mg/g	60 > 1 000m g/g	60 > 1 000 mg/g	60 > 1 000 mg/g	60 > 1 000 mg/g	60 > 1 000 mg/g	60 > 1 000 mg/g	6,7 8
Groundwater used for livestock watering			60 150 000						6,7 8

Groundwater used for irrigation			60 15 000	60 15 000	60 15 000	60 15 000			6,7 8

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol, or alternate methods acceptable to a director.
2. Analytical results for chromium (all species) in soil may be used to demonstrate compliance with the standards of this matrix. Where the standards cannot be met based on analytical results for chromium (all species), determination of chromium, trivalent and chromium, hexavalent concentrations in soil may be necessary.
3. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
4. Intake pathway of exposure modelled is inadvertent ingestion of soil.
5. Standard is based on chromium (all species).
6. Standard is for chromium, hexavalent.
7. Standard has been adjusted based on 2016 reference Provincial background soil concentration for the substance.
8. Standard is for chromium, trivalent.
9. Standard is set equal to 1999 Canadian Council of Ministers of the Environment, "Nutrient and energy cycling check value".

MATRIX 10 - NUMERICAL SOIL STANDARDS[1]
COBALT (CHEMICAL ABSTRACT SERVICE NUMBER 7440-48-4)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	25	25	25	25	25	25	75	2 000	3,4
Groundwater used for drinking water	25	25	25	25	25	25	25	25	5
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	25	45	45	45	45	200	200	200	
Livestock ingesting soil and fodder			250						
Major microbial functional impairment			NS						6
Groundwater flow to surface water used by aquatic life	25	25	25	25	25	25	25	25	5
Groundwater used for livestock watering			150						
Groundwater used for irrigation			25	25	25	25			5

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol, or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
3. Intake pathway of exposure modelled is inadvertent ingestion of soil.

4. Some standards have been adjusted based on 2016 reference Provincial background soil concentration for the substance.
5. Standards have been adjusted based on 2016 reference provincial background soil concentration for the substance.
6. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to use to develop a soil quality standard.

MATRIX 11 - NUMERICAL SOIL STANDARDS[1]
COPPER (CHEMICAL ABSTRACT SERVICE NUMBER 7440-50-8)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	7 500	7 500	3 500	7 500	3 500	7 500	25 000	700 000	3
Groundwater used for drinking water									
pH < 5.0	250	250	250	250	250	250	250	250	4
pH 5.0 - < 5.5	500	500	500	500	500	500	500	500	4
pH 5.5 - < 6.0	2 000	2 000	2 000	2 000	2 000	2 000	2 000	2 000	4
pH 6.0 - < 6.5	10 000	10 000	10 000	10 000	10 000	10 000	10 000	10 000	4
pH 6.5 - < 7.0	50 000	50 000	50 000	50 000	50 000	50 000	50 000	50 000	4
pH ≥ 7.0	100 000	100 000	100 000	100 000	100 000	100 000	100 000	100 000	4
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	85	150	150	150	150	300	300	300	
Livestock ingesting soil and fodder			150						
Major microbial functional impairment			350						5
Groundwater flow to surface water used by aquatic life									
Freshwater									
pH < 5.5	75	75	75	75	75	75	75	75	4,6,7
pH 5.5 - < 6.0	100	100	100	100	100	100	100	100	4,7
pH 6.0 - < 6.5	700	700	700	700	700	700	700	700	4,7
pH 6.5 - < 7.0	3 000	3 000	3 000	3 000	3 000	3 000	3 000	3 000	4,7

pH 7.0 - < 7.5	6 500	6 500	6 500	6 500	6 500	6 500	6 500	6 500	4,7
pH ≥ 7.5	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	4,7
Marine									
pH < 6.0	75	75	75	75	75	75	75	75	4,6
pH 6.0 - < 6.5	150	150	150	150	150	150	150	150	4
pH 6.5 - < 7.0	650	650	650	650	650	650	650	650	4
pH ≥ 7.0	1 500	1 500	1 500	1 500	1 500	1 500	1 500	1 500	4
Groundwater used for livestock watering									
pH < 5.0			75						4,6
pH 5.0 - < 5.5			100						4
pH 5.5 - < 6.0			400						4
pH 6.0 - < 6.5			2 500						4
pH 6.5 - < 7.0			10 000						4
pH 7.0 - < 7.5			20 000						4
pH ≥ 7.5			25 000						4
Groundwater used for irrigation									
pH < 5.5			75	75	75	75			4,6
pH 5.5 - < 6.0			300	300	300	300			4
pH 6.0 - < 6.5			1 500	1 500	1 500	1 500			4
pH 6.5 - < 7.0			6 500	6 500	6 500	6 500			4
pH ≥ 7.0			15 000	15 000	15 000	15 000			4

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
3. Intake pathway of exposure modelled is inadvertent ingestion of soil.
4. The pH is the pH of the soil at a site.
5. Standard is set equal to 1999 Canadian Council of Ministers of the Environment, "Nutrient and energy cycling check value".
6. Standards have been adjusted based on 2016 reference Provincial background soil concentration for the substance.
7. Standard varies with receiving water hardness (H). H ≥ 200 mg/L as $CaCO_3$ is assumed. Consult a director for further advice.

MATRIX 12 - NUMERICAL SOIL STANDARDS[1,2]
CYANIDE (CHEMICAL ABSTRACT SERVICE NUMBER 57-12-5)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	3
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	50	50	25	50	25	50	150	4 000	4
Groundwater used for drinking water	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	2	3	3	3	3	10	10	10	
Livestock ingesting soil and fodder			11						5
Major microbial functional impairment			NS						6
Groundwater flow to surface water used by aquatic life									
Freshwater	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
Marine	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	
Groundwater used for livestock watering			NS						6
Groundwater used for irrigation			NS	NS	NS	NS			6

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from

time to time, a director's protocol or alternate methods acceptable to a director.

2. Samples for cyanide in soil must be analyzed using the appropriate "Cyanide Weak Acid Dissociable (WAD)" analytical method as specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time.
3. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
4. Intake pathway of exposure modelled is inadvertent ingestion of soil.
5. Standard is set equal to the 1997 CCME agricultural soil & food ingestion criterion.
6. NS – No standard. Insufficient acceptable scientific data exists to calculate a standard or no appropriate standard, guideline or criterion exists to develop a soil quality standard.

MATRIX 13 - NUMERICAL SOIL STANDARDS[1,2]
DICHLORODIPHENYLTRICHLOROETHANE, TOTAL [DDT]
(CHEMICAL ABSTRACT SERVICE NUMBER not applicable**)**

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	3
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	40	40	20	40	20	40	150	1 000	4
Groundwater used for drinking water	NS	NS	NS	NS	NS	NS	NS	NS	5
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	0.45	0.7	0.7	0.7	0.7	10	10	10	6
Livestock ingesting soil and fodder			NS						7
Major microbial functional impairment			NS						7
Groundwater flow to surface water used by aquatic life	NS	NS	NS	NS	NS	NS	NS	NS	5
Groundwater used for livestock watering			NS						5
Groundwater used for irrigation			NS	NS	NS	NS			5,7

Notes
1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.
2. Standards are for the sum of DDT (2,4' + 4,4' isomers), DDD (2,4' + 4,4" isomers) and DDE (2,4' + 4,4' isomers).
3. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land

use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.

4. Intake pathway of exposure modelled is inadvertent ingestion of soil.
5. NS – no standard. No appropriate soil to groundwater model is available to predict the subsurface fate and transport of complex mixtures.
6. AL and PL standards are set equal to the corresponding 1999 Canadian Council of Ministers or the Environment (CCME) secondary consumer soil & food ingestion criteria. CL and IL standards are set equal to the corresponding 1999 CCME soil contact criteria. WL_N standard is derived by dividing the 1999 CCME parkland secondary consumer soil & food ingestion criterion by the Protocol 28, "2016 Standards Derivation Methods", Wildlands divisor. WL_R standard is set equal to the 1999 CCME parkland secondary consumer soil & food ingestion criterion. RL_{LD} standard is set equal to the 1999 CCME residential secondary consumer soil & food ingestion criterion. RL_{HD} standard is set equal to the 1999 CCME commercial soil contact criterion.
7. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to develop a soil quality standard.

MATRIX 14 - NUMERICAL SOIL STANDARDS[1]
DIISOPROPANOLAMINE [DIPA] (CHEMICAL ABSTRACT SERVICE NUMBER 110-97-4)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	30 000	30 000	15 000	30 000	15 000	30 000	100 000	> 1 000 mg/g	3
Groundwater used for drinking water	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	4
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	600	750	750	750	750	1 000	1 000	1 000	
Livestock ingesting soil and fodder			NS						5
Major microbial functional impairment			NS						5
Groundwater flow to surface water used by aquatic life	6	6	6	6	6	6	6	6	4
Groundwater used for livestock watering			15						4
Groundwater used for irrigation			15	15	15	15			4

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
3. Intake pathway of exposure modelled is inadvertent ingestion of soil.

4. Standards apply to a site used for an industrial or commercial purpose or activity as set out in Schedule 2 as item F2, F3, F7 or F10.
5. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to develop a soil quality standard.

MATRIX 15 - NUMERICAL SOIL STANDARDS[1]
ETHYLBENZENE (CHEMICAL ABSTRACT SERVICE NUMBER 100-41-4)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	8 500	8 500	4 000	8 500	4 000	8 500	25 000	700 000	3
Groundwater used for drinking water	15	15	15	15	15	15	15	15	
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	100	200	200	200	200	650	650	650	
Livestock ingesting soil and fodder			NS						4
Major microbial functional impairment			NS						4
Groundwater flow to surface water used by aquatic life									
Freshwater	200	200	200	200	200	200	200	200	5
Marine	200	200	200	200	200	200	200	200	5
Groundwater used for livestock watering			NS						4
Groundwater used for irrigation			NS	NS	NS	NS			4

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from

time to time, a director's protocol or alternate methods acceptable to a director.

2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
3. Intake pathway of exposure modelled is inadvertent ingestion of soil.
4. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to develop a soil quality standard.
5. Standard has been adjusted based on a modelled leachate concentration equivalent to the substance solubility limit for use in the soil to groundwater transport model.

MATRIX 16 - NUMERICAL SOIL STANDARDS[1]
ETHYLENE GLYCOL (CHEMICAL ABSTRACT SERVICE NUMBER 107-21-1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	150 000	150 000	85 000	150 000	85 000	150 000	500 000	> 1 000 mg/g	3
Groundwater used for drinking water	10	10	10	10	10	10	10	10	4
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	3 000	4 000	4 000	4 000	4 000	6 000	6 000	6 000	
Livestock ingesting soil and fodder			NS						5
Major microbial functional impairment			NS						5
Groundwater flow to surface water used by aquatic life	700	700	700	700	700	700	700	700	
Groundwater used for livestock watering			NS						5
Groundwater used for irrigation			NS	NS	NS	NS			5

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.

3. Intake pathway of exposure modelled is inadvertent ingestion of soil.
4. Standards have been adjusted based on 2016 British Columbia Environmental Laboratory Technical Advisory Committee reference analytical detection limit for the substance.
5. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to develop a soil quality standard.

MATRIX 17 - NUMERICAL SOIL STANDARDS[1]
FLUORANTHENE (CHEMICAL ABSTRACT SERVICE NUMBER 206-44-0)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	3 500	3 500	1 500	3 500	1 500	3 500	10 000	300 000	3
Groundwater used for drinking water	NS	NS	NS	NS	NS	NS	NS	NS	4
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	30	50	50	50	50	200	200	200	5
Livestock ingesting soil and fodder			NS						6
Major microbial functional impairment			NS						6
Groundwater flow to surface water used by aquatic life	NS	NS	NS	NS	NS	NS	NS	NS	4
Groundwater used for livestock watering			NS						6
Groundwater used for irrigation			NS	NS	NS	NS			6

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.

3. Intake pathway of exposure modelled is inadvertent ingestion of soil.
4. NS – no standard. Soil to groundwater transport model predicts applicable water use standard for the substance will not be exceeded at the point of receptor exposure.
5. AL, PL CL and IL standards are set equal to the corresponding 2010 Canadian Council of Ministers or the Environment (CCME) soil quality criteria. WL_N standard is derived by dividing the 2010 CCME parkland soil quality criterion by the Protocol 28, "2016 Standards Derivation Methods", Wildlands divisor. WL_R standard is set equal to the 2010 CCME parkland soil quality criterion. RL_{LD} standard is set equal to the 2010 CCME residential soil quality criterion. RL_{HD} standard is set equal to the 2010 CCME commercial soil quality criterion.
6. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to develop a soil quality standard.

MATRIX 18 - NUMERICAL SOIL STANDARDS[1]
LEAD (CHEMICAL ABSTRACT SERVICE NUMBER 7439-92-1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	120	120	120	120	120	120	150	4 000	3
Groundwater used for drinking water									
pH < 5.5	120	120	120	120	120	120	120	120	4,5
pH 5.5 - < 6.0	150	150	150	150	150	150	150	150	4
pH 6.0 - < 6.5	800	800	800	800	800	800	800	800	4
pH 6.5 - < 7.0	3 500	3 500	3 500	3 500	3 500	3 500	3 500	3 500	4
pH 7.0 - < 7.5	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	4
pH ≥ 7.5	8 500	8 500	8 500	8 500	8 500	8 500	8 500	8 500	4
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	400	550	550	550	550	1 000	1 000	1 000	
Livestock ingesting soil and fodder			350						
Major microbial functional impairment			700						6
Groundwater flow to surface water used by aquatic life									
Freshwater									
pH < 5.0	200	200	200	200	200	200	200	200	4,7
pH 5.0 - < 5.5	350	350	350	350	350	350	350	350	4,7
pH 5.5 - < 6.0	1 500	1 500	1 500	1 500	1 500	1 500	1 500	1 500	4,7
pH 6.0 - < 6.5	8 500	8 500	8 500	8 500	8 500	8 500	8 500	8 500	4,7
pH 6.5 - < 7.0	35 000	35 000	35 000	35 000	35 000	35 000	35 000	35 000	4,7

pH 7.0 - < 7.5	80 000	80 000	80 000	80 000	80 000	80 000	80 000	80 000	4,7
pH ≥ 7.5	90 000	90 000	90 000	90 000	90 000	90 000	90 000	90 000	4,7
Marine									
pH < 5.5	120	120	120	120	120	120	120	120	4,5
pH 5.5 - < 6.0	300	300	300	300	300	300	300	300	4
pH 6.0 - < 6.5	1 500	1 500	1 500	1 500	1 500	1 500	1 500	1 500	4
pH 6.5 - < 7.0	6 500	6 500	6 500	6 500	6 500	6 500	6 500	6 500	4
pH ≥ 7.0	15 000	15 000	15 000	15 000	15 000	15 000	15 000	15 000	4
Groundwater used for livestock watering									
pH < 5.0			150						4
pH 5.0 - < 5.5			350						4
pH 5.5 - < 6.0			1 500						4
pH 6.0 - < 6.5			8 000						4
pH 6.5 - < 7.0			35 000						4
pH 7.0 - < 7.5			75 000						4
pH ≥ 7.5			85 000						4
Groundwater used for irrigation									
pH < 5.0			350	350	350	350			4
pH 5.0 - < 5.5			650	650	650	650			4
pH 5.5 - < 6.0			3 000	3 000	3 000	3 000			4
pH 6.0 - < 6.5			15 000	15 000	15 000	15 000			4
pH 6.5 - < 7.0			65 000	65 000	65 000	65 000			4
pH ≥ 7.0			150 000	150 000	150 000	150 000			4

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol, or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
3. Intake pathway of exposure modelled is inadvertent ingestion of soil. Standards for: WL_N, WL_R, AL, PL, RL_{LD} and RL_{HD} have been adjusted based on 2016 reference Provincial background soil concentration for the substance.
4. The pH is the pH of the soil at a site.
5. Standards have been adjusted based on 2016 reference Provincial background soil concentration for the substance.

6. Standard is set equal to 1999 Canadian Council of Ministers of the Environment, Nutrient and energy cycling check value.
7. Standard varies with receiving water hardness (H). H = 200 to < 300 mg/L as $CaCO_3$ is assumed. Consult director for further advice.

MATRIX 19 - NUMERICAL SOIL STANDARDS[1]
MANGANESE (CHEMICAL ABSTRACT SERVICE NUMBER 7439-96-5)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	10 000	10 000	6 000	10 000	6 000	10 000	35 000	> 1 000 mg/g	3
Groundwater used for drinking water	2 000	2 000	2 000	2 000	2 000	2 000	2 000	2 000	4,5,6
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	2 000	2 000	2 000	2 000	2 000	2 000	2 000	2 000	6
Livestock ingesting soil and fodder	NS	NS	NS	NS	NS	NS	NS	NS	7
Major microbial functional impairment			NS						7
Groundwater flow to surface water used by aquatic life			NS						7
Groundwater used for livestock watering			NS						7
Groundwater used for irrigation			2 000	2 000	2 000	2 000			4,5,6

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
3. Intake pathway of exposure modelled is inadvertent ingestion of soil.

4. Standards apply to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as
   (a) item B1,
   (b) item C1, C3 or C4,
   (c) item D2, D3, D5 or D6,
   (d) item E4, or
   (e) item H3 or H14.
5. Standards apply to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item H11 or H20 but only if the site was used for that purpose or activity in conjunction with or as a result of the site also being used for at least one of the purposes or activities set out in Note 4.
6. Standards have been adjusted based on 2016 reference Provincial background soil concentration for the substance.
7. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to use to develop a soil quality standard.

MATRIX 20 - NUMERICAL SOIL STANDARDS[1,2]
MERCURY (CHEMICAL ABSTRACT SERVICE NUMBER 7439-97-6)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	3
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	25	25	10	25	10	25	75	2 000	4
Groundwater used for drinking water	NS	NS	NS	NS	NS	NS	NS	NS	5
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	25	40	40	40	40	75	75	75	
Livestock ingesting soil and fodder			0.6						
Major microbial functional impairment			20						6
Groundwater flow to surface water used by aquatic life	NS	NS	NS	NS	NS	NS	NS	NS	5
Groundwater used for livestock watering			NS						5
Groundwater used for irrigation			NS	NS	NS	NS			5

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.
2. Analytical results for mercury (all species) in soil may be used to demonstrate compliance with the standards of this matrix.
3. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.

4. Intake pathway of exposure modelled is inadvertent ingestion of soil.
5. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to use to develop a soil quality standard.
6. Standard is set equal to 1999 Canadian Council of Ministers of the Environment, "Nutrient and energy cycling check value".

MATRIX 21 - NUMERICAL SOIL STANDARDS[1]
METHANOL (CHEMICAL ABSTRACT SERVICE NUMBER 67-56-1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	40 000	40 000	20 000	40 000	20 000	40 000	150 000	> 1 000 mg/g	3
Groundwater used for drinking water	3	3	3	3	3	3	3	3	
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	750	1 000	1 000	1 000	1 000	1 500	1 500	1 500	4
Livestock ingesting soil and fodder			NS						5
Major microbial functional impairment			NS						5
Groundwater flow to surface water used by aquatic life	NS	NS	NS	NS	NS	NS	NS	NS	5
Groundwater used for livestock watering			NS						5
Groundwater used for irrigation			NS	NS	NS	NS			5

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.

3. Intake pathway of exposure modelled is inadvertent ingestion of soil.
4. AL, PL, CL and IL standards are set equal to the corresponding 2016 Draft Canadian Council of Ministers of the Environment (CCME) soil quality criteria. WL_N standard is derived by dividing the 2016 CCME parkland soil quality criterion by the Protocol 28, "2016 Standards Derivation Methods", Wildlands divisor. WL_R standard is set equal to the 2016 Draft CCME parkland soil quality criterion. RL_{LD} standard is set equal to the 2016 Draft CCME residential soil quality criterion. RL_{HD} standard is set equal to the 2016 Draft CCME commercial soil quality criterion.
5. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to develop a soil quality standard.

MATRIX 22 - NUMERICAL SOIL STANDARDS[1]
MOLYBDENUM (CHEMICAL ABSTRACT SERVICE NUMBER 7439-98-7)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	400	400	200	400	200	400	1 500	35 000	3
Groundwater used for drinking water	15	15	15	15	15	15	15	15	
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	60	80	80	80	80	150	150	150	
Livestock ingesting soil and fodder			NS						4
Major microbial functional impairment			NS						4
Groundwater flow to surface water used by aquatic life	650	650	650	650	650	650	650	650	
Groundwater used for livestock watering			3.5						
Groundwater used for irrigation			3	3	3	3			5,6

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.

3. Intake pathway of exposure modelled is inadvertent ingestion of soil.
4. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to develop a soil quality standard.
5. Standards have been adjusted based on the 2016 reference Provincial background soil concentration for the substance.
6. Water standard for irrigation water (IW) used in the soil to groundwater transport model to derive the groundwater used for irrigation soil standard varies with crop, soil drainage and Mo:Cu ratio. An IW standard of 10 µg/L was assumed in deriving the groundwater used for irrigation soil standards. Consult a director for further advice.

MATRIX 23 - NUMERICAL SOIL STANDARDS[1]
NAPHTHALENE (CHEMICAL ABSTRACT SERVICE NUMBER 91-20-3)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	1 500	1 500	850	1 500	850	1 500	5 000	150 000	3
Groundwater used for drinking water	100	100	100	100	100	100	100	100	4
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	0.4	0.6	0.6	0.6	0.6	20	20	20	5
Livestock ingesting soil and fodder			NS						6
Major microbial functional impairment			NS						6
Groundwater flow to surface water used by aquatic life	75	75	75	75	75	75	75	75	
Groundwater used for livestock watering			NS						6
Groundwater used for irrigation			NS	NS	NS	NS			6

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.

3. Intake pathway of exposure modelled is inadvertent ingestion of soil.
4. Standard has been adjusted based on a modelled leachate concentration equivalent to the substance solubility limit for use in the soil to groundwater transport model.
5. AL, PL, CL and IL standards are set equal to the corresponding 1997 Canadian Council of Ministers of the Environment (CCME) provisional soil quality criteria. WL_N standard is derived by dividing the 1997 CCME parkland provisional soil quality criterion by the Protocol 28, "2016 Standards Derivation Methods", Wildlands divisor. WL_R standard is set equal to the 1997 CCME parkland provisional soil quality criterion. RL_{LD} standard is set equal to the 1997 CCME residential provisional soil quality criterion. RL_{HD} standard is set equal to the 1997 CCME commercial provisional soil quality criterion.
6. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to develop a soil quality standard.

MATRIX 24 - NUMERICAL SOIL STANDARDS[1]
NICKEL (CHEMICAL ABSTRACT SERVICE NUMBER 7440-02-0)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	900	900	450	900	450	900	3 000	80 000	3
Groundwater used for drinking water									
pH < 7.5	70	70	70	70	70	70	70	70	4,5
pH 7.5 - < 8.0	250	250	250	250	250	250	250	250	4
pH ≥ 8.0	500	500	500	500	500	500	500	500	4
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	100	150	150	150	150	250	250	250	
Livestock ingesting soil and fodder			250						
Major microbial functional impairment			150						6
Groundwater flow to surface water used by aquatic life									
Freshwater									
pH < 5.0	90	90	90	90	90	90	90	90	4,7
pH 5.0 - < 5.5	100	100	100	100	100	100	100	100	4,7
pH 5.5 - < 6.0	150	150	150	150	150	150	150	150	4,7
pH 6.0 - < 6.5	200	200	200	200	200	200	200	200	4,7
pH 6.5 - < 7.0	300	300	300	300	300	300	300	300	4,7
pH 7.0 - < 7.5	900	900	900	900	900	900	900	900	4,7
pH 7.5 - < 8.0	5 000	5 000	5 000	5 000	5 000	5 000	5 000	5 000	4,7
pH ≥ 8.0	9 500	9 500	9 500	9 500	9 500	9 500	9 500	9 500	4,7

Marine									
pH < 7.5	70	70	70	70	70	70	70	70	4,5
pH 7.5 - < 8.0	250	250	250	250	250	250	250	250	4
pH ≥ 8.0	500	500	500	500	500	500	500	500	4
Groundwater used for livestock watering									
pH < 5.0			70						4,5
pH 5.0 - < 5.5			80						4
pH 5.5 - < 6.0			100						4
pH 6.0 - < 6.5			150						4
pH 6.5 - < 7.0			200						4
pH 7.0 - < 7.5			600						4
pH 7.5 - < 8.0			3 500						4
pH ≥ 8.0			6 500						4
Groundwater used for irrigation									
pH < 7.0			70	70	70	70			4,5
pH 7.0 - < 7.5			100	100	100	100			4
pH 7.5 - < 8.0			650	650	650	650			4
pH ≥ 8.0			1 500	1 500	1 500	1 500			4

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol, or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
3. Intake pathway of exposure modelled is inadvertent ingestion of soil.
4. The pH is the pH of the soil at a site.
5. Standards have been adjusted based on 2016 reference Provincial background soil concentration for the substance.
6. Standard is set equal to 2015 Canadian Council of Ministers of the Environment, Nutrient and energy cycling check value.
7. Standard varies with receiving water hardness (H). H > 180 mg/L as $CaCO_3$ is assumed. Consult director for further advice.

MATRIX 25 - NUMERICAL SOIL STANDARDS[1,2]
NONYLPHENOL AND NONYLPHENOL ETHOXLATES
(CHEMICAL ABSTRACT SERVICE NUMBER 84852-15-3)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	3
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	400	400	200	400	200	400	1 000	35 000	4
Groundwater used for drinking water	20	20	20	20	20	20	20	20	5
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	3.5	5.5	5.5	5.5	5.5	15	15	15	6
Livestock ingesting soil and fodder			NS						7
Major microbial functional impairment			NS						7
Groundwater flow to surface water used by aquatic life									
Freshwater	4	4	4	4	4	4	4	4	5
Marine	3	3	3	3	3	3	3	3	5
Groundwater used for livestock watering			NS						7
Groundwater used for irrigation			NS	NS	NS	NS			7

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.
2. Nonylphenol includes related nonylphenolic and octylphenolic compounds, including ethoxylates and ethoxycarboxylates. Consult a director for further advice.
3. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
4. Intake pathway of exposure modelled is inadvertent ingestion of soil.
5. Standards apply to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as
   (a) item A6, A8, A10 or A12,
   (b) item H11, H18 or H19, or
   (c) item I2 or I3.
6. AL, PL, CL and IL standards are set equal to the corresponding 2002 Canadian Council of Ministers of the Environment (CCME) soil quality criteria. WL_N standard is derived by dividing the 2002 CCME parkland soil quality criterion by the Protocol 28, "2016 Standards Derivations Methods", Wildlands divisor. WL_R standard is set equal to the 2002 CCME parkland soil quality criterion. RL_{LD} standard is set equal to the 2002 CCME residential soil quality criterion. RL_{HD} standard is set equal to the 2002 CCME commercial soil quality criterion.
7. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to develop a soil quality standard.

MATRIX 26 - NUMERICAL SOIL STANDARDS[1]
PENTACHLOROPHENOL [PCP] (CHEMICAL ABSTRACT SERVICE NUMBER 87-86-5)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	200	200	90	200	90	200	550	900	3
Groundwater used for drinking water									
pH < 5.0	300	300	300	300	300	300	300	300	4,5
pH 5.0 - < 5.5	200	200	200	200	200	200	200	200	4,5
pH 5.5 - < 6.0	75	75	75	75	75	75	75	75	4
pH 6.0 - < 6.5	9	9	9	9	9	9	9	9	4
pH 6.5 - < 7.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	4
pH ≥ 7.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	4
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	10	25	25	25	25	55	55	55	
Livestock ingesting soil and fodder			NS						6
Major microbial functional impairment			NS						6
Groundwater flow to surface water used by aquatic life									
pH < 5.0	300	300	300	300	300	300	300	300	4,5,7
pH 5.0 - < 5.5	150	150	150	150	150	150	150	150	4,7
pH 5.5 - < 6.0	2	2	2	2	2	2	2	2	4,7
pH 6.0 - < 6.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	4,7
pH ≥ 6.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	4,7

Groundwater used for livestock watering									
pH < 5.0			300						4,5
pH 5.0 - < 5.5			200						4,5
pH 5.5 - < 6.0			65						4
pH 6.0 - < 6.5			4.5						4
pH 6.5 - < 7.0			1.5						4
pH ≥ 7.0			0.75						4
Groundwater used for irrigation			NS	NS	NS	NS			6

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol, or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
3. Intake pathway of exposure modelled is inadvertent ingestion of soil.
4. The pH is the pH of the soil at a site.
5. Standard has been adjusted based on a modelled leachate concentration equivalent to the substance solubility limit for use in the soil to groundwater transport model.
6. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to develop a soil quality standard.
7. Water standard for aquatic life (AW) used in the soil to groundwater transport model to derive the groundwater flow to surface water used by aquatic life soil standards varies with the temperature of the surface water used by aquatic life. A surface water temperature of $20^{\circ}C$ was assumed in deriving the groundwater flow to surface water used by aquatic life soil standard. Consult a director for further advice.

MATRIX 27 - NUMERICAL SOIL STANDARDS[1]
PERFLUOROOCTANE SULFONATE [PFOS] (CHEMICAL ABSTRACT SERVICE NUMBER 1763-23-1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	2.5	2.5	1	2.5	1	2.5	7.5	200	3
Groundwater used for drinking water	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	4
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	40	70	70	70	70	150	150	150	
Livestock ingesting soil and fodder			NS						5
Major microbial functional impairment			NS						5
Groundwater flow to surface water used by aquatic life	9	9	9	9	9	9	9	9	4,6
Groundwater used for livestock watering			NS						5
Groundwater used for irrigation			NS	NS	NS	NS			5

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
3. Intake pathway of exposure modelled is inadvertent ingestion of soil.

4. Standards apply to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as
   (a) item A4,
   (b) item C3,
   (c) item E10, or
   (d) item G1.
5. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to develop a soil quality standard.
6. Standard has been adjusted based on a modelled leachate concentration equivalent to the substance solubility limit for use in the soil to groundwater transport model.

MATRIX 28 - NUMERICAL SOIL STANDARDS[1]
PHENOL (CHEMICAL ABSTRACT SERVICE NUMBER 108-95-2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	25 000	25 000	10 000	25 000	10 000	25 000	75 000	> 1 000 mg/g	3
Groundwater used for drinking water	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	80	150	150	150	150	200	200	200	
Livestock ingesting soil and fodder			NS						4
Major microbial functional impairment			NS						4
Groundwater flow to surface water used by aquatic life	15	15	15	15	15	15	15	15	
Groundwater used for livestock watering			NS						4
Groundwater used for irrigation			NS	NS	NS	NS			4

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
3. Intake pathway of exposure modelled is inadvertent ingestion of soil.

4. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to develop a soil quality standard.

MATRIX 29 - NUMERICAL SOIL STANDARDS[1,2]
POLYCHLORINATED BIPHENYLS, TOTAL [PCBs]
(CHEMICAL ABSTRACT SERVICE NUMBER 1336-36-3)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	3
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	10	10	5	10	5	10	35	900	4
Groundwater used for drinking water	NS	NS	NS	NS	NS	NS	NS	NS	5
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	0.8	1.5	1.5	1.5	1.5	35	35	35	6
Livestock ingesting soil and fodder			NS						5
Major microbial functional impairment			NS						5
Groundwater flow to surface water used by aquatic life	NS	NS	NS	NS	NS	NS	NS	NS	5
Groundwater used for livestock watering			NS						5
Groundwater used for irrigation			NS	NS	NS	NS			5

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.
2. PCBs, total in soil represent the sum of Aroclors 1016, 1221, 1232, 1242, 1248, 1254, 1260, 1262, and 1268. Dioxin-like polychlorinated biphenyls must also be evaluated as polychlorinated dioxins and furans.
3. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land

use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.

4. Intake pathway of exposure modelled is inadvertent ingestion of soil.
5. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to develop a soil quality standard.
6. AL and PL standards are set equal to the corresponding 1999 Canadian Council of Ministers of the Environment (CCME) tertiary consumer soil & food ingestion criteria. CL and IL standards are set equal to the corresponding 1999 CCME soil contact criteria. WL_N standard is derived by dividing the 1999 CCME parkland tertiary consumer soil & food ingestion criterion by the Protocol 28, "2016 Standards Derivations Methods", Wildlands divisor. WL_R standard is set equal to the 1999 CCME parkland tertiary consumer soil & food ingestion criterion. RL_{LD} standard is set equal to the 1999 CCME residential tertiary consumer soil & food ingestion criterion. RL_{HD} standard is set equal to the 1999 CCME commercial soil contact criterion.

MATRIX 30 - NUMERICAL SOIL STANDARDS[1,2]
POLYCHLORINATED DIOXINS AND FURANS, TOTAL [PCDDs AND PCDFs]
(CHEMICAL ABSTRACT SERVICE NUMBER 1746-01-6)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	3
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	0.0002	0.0002	0.000095	0.0002	0.000095	0.0002	0.0006	0.015	4
Groundwater used for drinking water	NS	NS	NS	NS	NS	NS	NS	NS	5
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	0.00065	0.001	0.00001	0.001	0.001	0.0025	0.0025	0.0025	6
Livestock ingesting soil and fodder			NS						5
Major microbial functional impairment			NS						5
Groundwater flow to surface water used by aquatic life	NS	NS	NS	NS	NS	NS	NS	NS	5
Groundwater used for livestock watering			NS						5
Groundwater used for irrigation			NS	NS	NS	NS			5

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.
2. Polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) expressed as 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) toxicity equivalent includes those substances for which 2005 World Health Organization, International Programme on Chemical Safety, 2,3,7,8-TCDD Toxicity Equivalency Factors (IPCS-TEFs) are provided below:

WHO, 2005 2,3,7,8-TCDD Toxicity Equivalency Factors (IPCS-TEFs) for Dioxins, Furans and Dioxin-like Polychlorinated Biphenyls (PCBs)			
Polychlorinated dibenzo-p-dioxins	**IPCS-TEF**	**Polychlorinated dibenzofurans**	**IPCS-TEF**
2,3,7,8-T_4CDD	1.0	2,3,7,8-T_4CDF	0.1
1,2,3,7,8-P_5CDD	1.0	1,2,3,7,8-P_5CDF	0.03
1,2,3,4,7,8-H_6CDD	0.1	2,3,4,7,8-P_5CDF	0.3
1,2,3,6,7,8-H_6CDD	0.1	1,2,3,4,7,8-H_6CDF	0.1
1,2,3,7,8,9-H_6CDD	0.1	1,2,3,6,7,8-H_6CDF	0.1
1,2,3,4,6,7,8,-H_7CDD	0.01	1,2,3,7,8,9-H_6CDF	0.1
O_8CDD	0.0003	2,3,4,6,7,8-H_6CDF	0.1
		1,2,3,4,6,7,8-H_7CDF	0.01
		1,2,3,4,7,8,9-H_7CDF	0.01
		O_8CDF	0.0003
Non-*ortho* substituted PCBs	**IPCS-TEF**	**Mono-*ortho* substituted PCBs**	**IPCS-TEF**
3,3',4,4'- T_4CB (PCB 77)	0.0001	2,3,3',4,4'-P_5CB (PCB 105)	0.00003
3,4,4',5- T_4CB (PCB 81)	0.0003	2,3,4,4',5-P_5CB (PCB 114)	0.00003
3,3',4,4',5-P_5CB (PCB 126)	0.1	2,3',4,4',5-P_5CB (PCB 118)	0.00003
3,3',4,4',5,5'-H_6CB (PCB 169)	0.03	2',3,4,4',5-H_6CB (PCB 123)	0.00003
		2,3,3',4,4',5-H_6CB (PCB 156)	0.00003
		2,3,3',4,4',5'-H_6CB (PCB 157)	0.00003
		2,3',4,4',5,5'-H_6CB (PCB 167)	0.00003
		2,3,3',4,4',5,5'-H_7CB (PCB 189)	0.00003

3. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
4. Intake pathway of exposure modelled is inadvertent ingestion of soil.
5. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to develop a soil quality standard.
6. AL, PL, CL and IL standards are set equal to the corresponding 1991 Canadian Council of Ministers of the Environment (CCME) interim soil quality criteria. WL_N standard is

derived by dividing the 1991 CCME interim parkland soil quality criterion by the Protocol 28, "2016 Standards Derivations Methods", Wildlands divisor. WL_R standard is set equal to the 1991CCME interim parkland soil quality criterion. RL_{LD} standard is set equal to the 1991 CCME interim residential soil quality criterion. RL_{HD} standard is set equal to the 1991 CCME interim commercial soil quality criterion.

MATRIX 31 - NUMERICAL SOIL STANDARDS[1]
SELENIUM (CHEMICAL ABSTRACT SERVICE NUMBER 7782-49-2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	400	400	200	400	200	400	1 500	35 000	3
Groundwater used for drinking water	1	1	1	1	1	1	1	1	4
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	1.5	1.5	1.5	1.5	1.5	2	2	2	
Livestock ingesting soil and fodder			2						
Major microbial functional impairment			NS						5
Groundwater flow to surface water used by aquatic life	1	1	1	1	1	1	1	1	4
Groundwater used for livestock watering			1						4
Groundwater used for irrigation			1	1	1	1			6

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol, or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.

3. Intake pathway of exposure modelled is inadvertent ingestion of soil.
4. Standards have been adjusted based on 2016 reference Provincial background soil concentration for the substance.
5. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to use to develop a soil quality standard.
6. Standard applies where irrigation water is used for continuous or intermittent irrigation of crops.

MATRIX 32 - NUMERICAL SOIL STANDARDS[1]
SODIUM ION (CHEMICAL ABSTRACT SERVICE NUMBER 17341-25-2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	> 1 000 mg/g	> 1 000 mg/g	> 1 000 mg/g	> 1 000 mg/g	> 1 000 mg/g	> 1 000 mg/g	> 1 000 mg/g	> 1 000 mg/g	3
Groundwater used for drinking water	15 000	15 000	15 000	15 000	15 000	15 000	15 000	15 000	
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	150	200	200	200	200	1 000	1 000	1 000	
Livestock ingesting soil and fodder			NS						4
Major microbial functional impairment			NS						4
Groundwater flow to surface water used by aquatic life	NS	NS	NS	NS	NS	NS	NS	NS	4
Groundwater used for livestock watering			NS						4
Groundwater used for irrigation			NS	NS	NS	NS			4

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated FROM time to time, a director's protocol or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
3. Intake pathway of exposure modelled is inadvertent ingestion of soil.

4. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to develop a soil quality standard.

MATRIX 33 - NUMERICAL SOIL STANDARDS[1]
SULFOLANE (CHEMICAL ABSTRACT SERVICE NUMBER 126-33-0)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	800	800	400	800	400	800	2 500	70 000	3
Groundwater used for drinking water	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	4,5
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	250	350	350	350	350	500	500	500	
Livestock ingesting soil and fodder			NS						6
Major microbial functional impairment			NS						6
Groundwater flow to surface water used by aquatic life	200	200	200	200	200	200	200	200	4
Groundwater used for livestock watering			5.5						4
Groundwater used for irrigation			3	3	3	3			4

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.

3. Intake pathway of exposure modelled is inadvertent ingestion of soil.
4. Standards apply to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item F2, F3, F7 or F10.
5. Standard has been adjusted based on the 2016 British Columbia Environmental Laboratory Technical Advisory Committee reference analytical detection limit for the substance.
6. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to develop a soil quality standard.

MATRIX 34 - NUMERICAL SOIL STANDARDS[1]
TETRACHLOROETHYLENE (CHEMICAL ABSTRACT SERVICE NUMBER 127-18-4)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	500	500	250	500	250	500	1 500	40 000	3
Groundwater used for drinking water									
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	6	15	15	15	15	30	30	30	
Livestock ingesting soil and fodder			NS						4
Major microbial functional impairment			NS						4
Groundwater flow to surface water used by aquatic life	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
Groundwater used for livestock watering			NS						4
Groundwater used for irrigation			NS	NS	NS	NS			4

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.

3. Intake pathway of exposure modelled is inadvertent ingestion of soil.
4. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to develop a soil quality standard.

MATRIX 35 - NUMERICAL SOIL STANDARDS[1]
TOLUENE (CHEMICAL ABSTRACT SERVICE NUMBER 108-88-3)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	6 500	6 500	3 500	6 500	3 500	6 500	20 000	550 000	3
Groundwater used for drinking water	6	6	6	6	6	6	6	6	
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	90	150	150	150	150	450	450	450	
Livestock ingesting soil and fodder			NS						4
Major microbial functional impairment			NS						4
Groundwater flow to surface water used by aquatic life									
Freshwater	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Marine	200	200	200	200	200	200	200	200	
Groundwater used for livestock watering			NS						4
Groundwater used for irrigation			NS	NS	NS	NS			4

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.

2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
3. Intake pathway of exposure modelled is inadvertent ingestion of soil.
4. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to develop a soil quality standard.

MATRIX 36 - NUMERICAL SOIL STANDARDS[1]
TRICHLOROETHYLENE (CHEMICAL ABSTRACT SERVICE NUMBER 79-01-6)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	40	40	20	40	20	40	150	3 500	3
Groundwater used for drinking water									
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	8	15	15	15	15	25	25	25	
Livestock ingesting soil and fodder			NS						4
Major microbial functional impairment			NS						4
Groundwater flow to surface water used by aquatic life	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
Groundwater used for livestock watering									
Groundwater used for irrigation			NS	NS	NS	NS			4

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
3. Intake pathway of exposure modelled is inadvertent ingestion of soil.

4. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to develop a soil quality standard.

MATRIX 37 - NUMERICAL SOIL STANDARDS[1]
URANIUM (CHEMICAL ABSTRACT SERVICE NUMBER 7440-61-1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	250	250	100	250	100	250	750	20 000	3
Groundwater used for drinking water	30	30	30	30	30	30	30	30	
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	300	500	500	500	500	2 000	2 000	2 000	4
Livestock ingesting soil and fodder			35						5
Major microbial functional impairment			NS						6
Groundwater flow to surface water used by aquatic life	150	150	150	150	150	150	150	150	
Groundwater used for livestock watering			300						
Groundwater used for irrigation			15	15	15	15			

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.

3. Intake pathway of exposure modelled is inadvertent ingestion of soil.
4. AL, PL, CL and IL standards are set equal to corresponding 2007 Canadian Council of Ministers of the Environment (CCME) soil contact criteria. WL_N standard is derived by dividing the 2007 CCME parkland soil contact criterion by the Protocol 28, "2016 Standards Derivation Methods", Wildlands divisor. WL_R standard is set equal to 2007 CCME parkland soil contact criterion. RL_{LD} standard is set equal to the 2007 CCME residential soil contact criterion. RL_{HD} standard is set equal to the 2007 CCME commercial soil contact criterion.
5. Standard is set equal to the 2007 CCME agricultural soil & food ingestion criterion.
6. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to develop a soil quality standard.

MATRIX 38 - NUMERICAL SOIL STANDARDS[1]
VANADIUM (CHEMICAL ABSTRACT SERVICE NUMBER 7440-62-2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	400	400	200	400	200	400	1 500	35 000	3
Groundwater used for drinking water	100	100	100	100	100	100	100	100	4
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	100	150	150	150	150	300	300	300	
Livestock ingesting soil and fodder			NS						5
Major microbial functional impairment			250						6
Groundwater flow to surface water used by aquatic life	NS	NS	NS	NS	NS	NS	NS	NS	5
Groundwater used for livestock watering			350						
Groundwater used for irrigation			350	350	350	350			

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
3. Intake pathway of exposure modelled is inadvertent ingestion of soil.

4. Standards have been adjusted based on the 2016 reference Provincial background soil concentration for the substance.
5. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to develop a soil quality standard.
6. Standard is set equal to 1997 Canadian Council of Ministers of the Environment, "Nutrient and energy cycling check value".

MATRIX 39 - NUMERICAL SOIL STANDARDS[1]
XYLENES (CHEMICAL ABSTRACT SERVICE NUMBER 1330-20-7)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	15 000	15 000	8 500	15 000	8 500	15 000	50 000	> 1 000 mg/g	3
Groundwater used for drinking water	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	100	150	150	150	150	600	600	600	
Livestock ingesting soil and fodder			NS						4
Major microbial functional impairment			NS						4
Groundwater flow to surface water used by aquatic life	20	20	20	20	20	20	20	20	
Groundwater used for livestock watering			NS						4
Groundwater used for irrigation			NS	NS	NS	NS			4

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
3. Intake pathway of exposure modelled is inadvertent ingestion of soil.

4. NS – no standard. Insufficient acceptable scientific data exists to calculate a standard, or no appropriate standard, guideline or criterion exists to develop a soil quality standard.

MATRIX 40 - NUMERICAL SOIL STANDARDS[1]
ZINC (CHEMICAL ABSTRACT SERVICE NUMBER 7440-66-6)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	Note
Site-specific Factor	**Wildlands Natural (WL_N)**	**Wildlands Reverted (WL_R)**	**Agricultural (AL)**	**Urban Park (PL)**	**Residential Low Density (RL_{LD})**	**Residential High Density (RL_{HD})**	**Commercial (CL)**	**Industrial (IL)**	2
HUMAN HEALTH PROTECTION									
Intake of contaminated soil	25 000	25 000	10 000	25 000	10 000	25 000	75 000	> 1 000 mg/g	3
Groundwater used for drinking water									
pH < 5.0	200	200	200	200	200	200	200	200	4
pH 5.0 - < 5.5	250	250	250	250	250	250	250	250	4
pH 5.5 - < 6.0	300	300	300	300	300	300	300	300	4
pH 6.0 - < 6.5	450	450	450	450	450	450	450	450	4
pH 6.5 - < 7.0	600	600	600	600	600	600	600	600	4
pH 7.0 - < 7.5	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	4
pH 7.5 - < 8.0	3 000	3 000	3 000	3 000	3 000	3 000	3 000	3 000	4
pH ≥ 8.0	5 500	5 500	5 500	5 500	5 500	5 500	5 500	5 500	4
ENVIRONMENTAL PROTECTION									
Toxicity to soil invertebrates and plants	300	450	450	450	450	450	450	450	
Livestock ingesting soil and fodder			200						
Major microbial functional impairment			200						5
Groundwater flow to surface water used by aquatic life									
Freshwater									
pH < 6.0	150	150	150	150	150	150	150	150	4,6,7
pH 6.0 - < 6.5	250	250	250	250	250	250	250	250	4,7
pH 6.5 - < 7.0	350	350	350	350	350	350	350	350	4,7

pH 7.0 - < 7.5	600	600	600	600	600	600	600	600	4,7
pH 7.5 - < 8.0	1 500	1 500	1 500	1 500	1 500	1 500	1 500	1 500	4,7
pH ≥ 8.0	3 000	3 000	3 000	3 000	3 000	3 000	3 000	3 000	4,7
Marine									
pH < 8.0	150	150	150	150	150	150	150	150	4,6
pH ≥ 8.0	200	200	200	200	200	200	200	200	4
Groundwater used for livestock watering									
pH < 5.5			150						4,6
pH 5.5 - < 6.0			200						4
pH 6.0 - < 6.5			300						4
pH 6.5 - < 7.0			400						4
pH 7.0 - < 7.5			750						4
pH 7.5 - < 8.0			2 000						4
pH ≥ 8.0			3 500						4
Groundwater used for irrigation									
pH < 6.0			150	150	150	150			4,6
pH 6.0 - < 6.5			300	300	300	300			4
pH 6.5 - < 7.0			400	400	400	400			4
pH 7.0 - < 7.5			2 000	2 000	2 000	2 000			4
pH 7.5 - < 8.0			5 000	5 000	5 000	5 000			4
pH ≥ 8.0			9 000	9 000	9 000	9 000			4

Notes

1. All values in µg/g unless otherwise stated. Substances must be analyzed using methods specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time, a director's protocol, or alternate methods acceptable to a director.
2. The site-specific factors of human intake of contaminated soil and toxicity to soil invertebrates and plants specified in this matrix apply at all sites. The high density residential land use standards of this matrix assume the prohibition of the use of the land (a) to grow plants for human consumption, and (b) as a children's playground, sports field, picnic area or any other use that promotes frequent contact by children. Consult a director for further advice.
3. Intake pathway of exposure modelled is inadvertent ingestion of soil.
4. The pH is the pH of the soil at a site.
5. Standard is set equal to 1999 Canadian Council of Ministers of the Environment, Nutrient and energy cycling check value.
6. Standards have been adjusted based on 2016 reference Provincial background soil concentration for the substance.
7. Standard varies with receiving water hardness (H). H = 200 to < 300 mg/L as $CaCO_3$ is assumed. Consult director for further advice.