Template for "Risk Assessment Reports Based Entirely on Use of the Approved Model" Version 1.1 – November, 2011

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Template for "Risk Assessment Reports Based Entirely on Use of the Approved Model" Version 1.1

Purpose and Use

This template is intended for use by Qualified Persons (QPs) who want to use the Modified Generic Risk Assessment Model (the "Approved Model") for a Risk Assessment (RA) to determine property specific standards (PSS) for their site. If the QP wishes to use the Approved Model in some other way, this template does not apply.

Please note that the review timeline for the Modified Generic Risk Assessment (MGRA) will be eight (8) weeks as with all Limited Scope Risk Assessments (LSRA) defined in Ontario Regulation (O.Reg. 153/04).

For additional information on the usage of the "Approved Model" and submitting an RA using this template, please refer to the following publications available on the following website: http://www.ene.gov.on.ca/environment/en/subject/brownfields/STDPROD_075745.

- Technical Update - Use of the Modified Generic Risk Assessment (MGRA) Spreadsheet "Approved Model" in Risk Assessments and Submission of MGRA Under the Record of Site Condition Regulation (O.Reg. 153/04) – June, 2011
- User Guide – Modified Generic Risk Assessment Model – June, 2011
- Rationale for the Development of Soil and Ground Water Standards for Use At Contaminated Sites in Ontario – April 15, 2011
- Modified Generic Risk Assessment Model – April 15, 2011

Please note that there are certain conditions which would prohibit an RA report on use of the Approved Model, these include:

• The soil at the RA property has a pH value of <5 or >9 for surface soil; or soil at the RA property has a pH value of <5 or >11 for sub-surface soil; or the RA property is within an area of natural significance, or includes or is adjacent to such an area or part of such an area (Please refer to O.Reg. 153/04 as amended for definition of "area of natural significance").

• The human health receptor characteristics described in the document Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act, Ontario Ministry of the Environment, April 15, 2011 included in the human health risk assessment are not adequately represented by those included in the modified generic model.

• Exposure to contaminants to receptors at the site is expected to be greater than that described in Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act, Ontario Ministry of the Environment, April 15, 2011.

• The proponent is choosing to use Toxicity Reference Values that are different from those described in Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act, Ontario Ministry of the Environment, April 15,

2011.

- The ecological receptor characteristics for generic valued ecosystem components (VECs) described in the document Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act, Ontario Ministry of the Environment, April 15, 2011 included in the ecological risk assessment are not adequately represented by those included in the modified generic model.

- The hazard assessment for the ecological receptor is different from those documented in Modified Ecological Protection option of the MGRA or the generic exposure model documented in Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act, Ontario Ministry of the Environment, April 15, 2011.

- Risk management measures apart from those designed by the ministry in the Modified Generic "Approved Model" were used in the RA.

It is strongly recommended that the QP_{RA} carefully read over the following sections prior to completing the report:

- Section 1.(e) Risk Management Requirements;
- Section 4.(b)(i) Receptor Characteristics;
- Section 4.(b)(iii) Exposure Estimates;
- Section 4.(c)(i) Nature of Toxicity (Hazard Assessment);
- Section 4.(d)(iii) Special Considerations;
- Section 5.(b) Receptor Characteristics;
- Section 5.(c)(ii) Exposure Estimates;
- Section 5.(d) Hazard Assessment; and
- Section 5.(e)(iii) Special Considerations.

TEMPLATE FOR

"RISK ASSESSMENT REPORTS BASED ENTIRELY ON USE OF THE APPROVED MODEL" VERSION 1.1

Checklist of Mandatory Appendices and Supporting Documents

☐ **Location** Pre-submission form
☐ **Location** Legal plan of survey
☐ **Appendix** Resumes for the risk assessment team
☐ **Appendix** List of the documents relied upon in preparation of RA report
☐ **Appendix** Summary of phase one & two environmental site assessment (ESA) reports, including:

i. justification for the sampling program used in undertaking the phase two environmental site assessment,
ii. summary of quality assurance and quality controls used for the sampling program and analysis of the samples,
iii. assessment of whether the sampling program is sufficient for the purposes of the RA and if not, a description of further site investigations conducted to support the RA, and
iv. rationale for and description of any hydrogeological and geological interpretations which differ from assumptions on which the Soil, Ground Water and Sediment Standards are based.

☐ **Appendix** The portion of the review and evaluation section of the phase two ESA report headed "phase two conceptual site model" (Schedule E, Table 1, Section 6. (x)).

And if applicable:

☐ **Appendix** The appendix to the phase two ESA report that reports on requirements in a phase two ESA in support of a MGRA (Schedule E, Table 1, Section 10. (d) Appendices – MGRA).
Note: *This appendix is required if the RA modifies an assumed value associated with an assumption category in Table 4 of Schedule E from the assumed value used by the Ministry to develop the full depth generic site condition standards.*

☐ ***Appendix*** A copy of the written notice of intention to conduct a risk assessment that assumes a non-potable ground water condition in preparing a risk assessment for the property given under Schedule C, Section 4, subsection (5), if applicable, and a copy of any response the municipality has given to the notice.

☐ **Appendix** A copy of any reports documenting further site investigations conducted to support the risk assessment, if applicable.

☐ **Location** Certificate of Status or equivalent [document name]

Note: All Excel spreadsheet cell references contained in this report may be found on the first tab ("Tier 2 Input") of the Modified Generic Risk Assessment (MGRA) Model (the "approved model"), which is available at: http://www.ene.gov.on.ca/environment/en/subject/brownfields/STDPROD_075745.

1 Summary of Recommendations and Findings

1.(a)Risk Assessment Objectives and Approach

The risk assessment objective is to develop standards for all Contaminants of Concern (COCs) listed in Table 1-1 (Section 1.(c)) for a current property use of Agricultural or Other and a proposed property use of Residential/Parkland/Institutional using the conceptual model and equations described in the MOE publication *Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, April 15, 2011 except as specified in this report. The applicable generic site condition standards (SCS) for the property are Table[1] [Applicable Table of SCS] for Residential/Parkland/Institutional and Coarse textured soils.

A Modified Generic risk assessment approach according to Schedule C, Section 7 has been used for this assessment. All property specific standards (PSS) developed in the risk assessment use the "approved model" made available by the Ministry of Environment online dated [insert model date] .

1.(b) Deviations from Pre-submission Form

There are no deviations from the Pre-Submission Form (PSF).

[1] *The table selected must match that shown in the approved model* ***[Cells B69-D69].***

1.(c)Risk Assessment Standards

The following property specific standards are proposed for the risk assessment site:

Table 1-1: Proposed Standards for Residential/Parkland/Institutional Property Use

Environ-mental Medium (Soil or GW)	Contaminant of Concern*	Maximum** Measured Concentration	Units	Applicable Generic SCS***	Recommended Property Specific Standard (PSS)****	Is PSS Based on REM§?	Dominant Exposure Pathway†	Pathway Modifiers‡	Potential to Exceed Applicable SCS at Nearest Off-Site Receptors?
						Y ☐			Y ☐ N ☐
						Y ☐			Y ☐ N ☐
						Y ☐			Y ☐ N ☐
						Y ☐			Y ☐ N ☐
						Y ☐			Y ☐ N ☐
						Y ☐			Y ☐ N ☐
						Y ☐			Y ☐ N ☐
						Y ☐			Y ☐ N ☐
						Y ☐			Y ☐ N ☐
						Y ☐			Y ☐ N ☐

** These COCs must match the COCs selected in the approved model **[Cells A56-65].***

*** These values must match the values used in the approved model **[Cells I56-J65].***

**** These values are the applicable site condition standards (SCSs), found in the relevant table of Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (April 15, 2011).*

***** These values must match the values used in the approved model **[Cells B72-D81].***

§ *"REM" is "reasonable estimate of maximum measured concentration (as entered in **[Cells K56-L65]**)*

† *These values must match the values found in the approved model **[Rows 5 and 6** of **"Table of Drivers – Soil" or "Table of Drivers – Water" tab]** for the relevant table number, soil texture, and COC; values generated* with *Pathway Modifier(s) applied.*

‡ *These Pathway Modifiers must match the values contained in the approved model **[Cells A30-B36].***

1.(d) Risk Assessment Assumptions

The assumptions used in this risk assessment are described in *Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, April 15, 2011 for a Residential/Parkland/Institutional property use with the following exceptions:

Table 1-2: Risk Assessment Assumptions

Site Specific Characteristic Modified**	Generic Value	Site Specific Value Used
Distance from source centre to downgradient water body **[Cell B12]**	36.5 m	*or* ☐ No change from default
Fraction of organic carbon (FOC) – water table to soil surface (COARSE Soil Setting) **[Cell B16]**	0.005 g/g	*or* ☐ No change from default
Fraction of organic carbon (FOC) – water table to soil surface (MEDIUM/FINE Soil Setting) **[Cell C16]**	0.005 g/g	*or* ☐ No change from default
Fraction of organic carbon (FOC) – in upper 0.5 m (COARSE Soil Setting) **[Cell B17]**	0.01 g/g	*or* ☐ No change from default
Fraction of organic carbon (FOC) – in upper 0.5 m (MEDIUM/FINE Soil Setting) **[Cell C17]**	0.035 g/g	*or* ☐ No change from default
Minimum depth below soil surface to the highest annual water table **[Cell B18]**	300 cm	*or* ☐ No change from default
Soil Type‡ – vadose zone (COARSE Soil Setting = **[Cell B19];** MEDIUM/FINE Soil Setting = **[Cell C19]**)	Not Applicable (N/A)	☐ Coarse ☐ Medium/Fine
Soil Type‡ – capillary fringe (COARSE Soil Setting = **[Cell B20];** MEDIUM/FINE Soil Setting = **[Cell C20]**)	N/A	☐ Coarse ☐ Medium/Fine
Number of frozen ground days per year **[Cell B21]**	100 days	*or* ☐ No change from default
Aquifer horizontal hydraulic conductivity **[Cell B22]**	0.00003 m/sec	*or* ☐ No change from default
Aquifer hydraulic gradient **[Cell B23]**	0.003 m/m	*or* ☐ No change from default
Aquifer dry bulk density **[Cell B24]**	1.81 g/cm^3	*or* ☐ No change from default
Aquifer fraction organic carbon **[Cell B25]**	0.0003 g/g	*or* ☐ No change from default

***The values in this table must be identical to property wide values in the "Tier 2 Input" page of the Approved model (spreadsheet version); values for soil vapour screening level calculations are recorded in Section 4.*

‡ Soil Type here refers to Property Soil Type (not the Area Soil Type required for soil vapour screening).

Modified assumptions are based on results from site investigation works which have been undertaken by a qualified person for environmental site assessment (QP_{ESA}). The qualified person for risk assessment (QP_{RA}) also considered these appropriate for use in an assessment of risk and development of property specific standards for the property.

1.(e)Risk Management Requirements

☐None, ***or***

☐ The following risk management measures have been selected (approved model **[Cells A31-B34]**). Check all that apply.

Caps (Barriers):

☐ Hard cap ☐ Fill cap ☐ Shallow soil cap

Building Controls:

☐ No enclosed buildings ☐ Storage garage ☐ Ground level non-residential use

Note: The minimum monitoring and maintenance requirements are described in the approved model (spreadsheet version, "RMM Descriptions" tab).

2 Risk Assessment Team Membership

The technical team which considered the applicability of the approach, assumptions, data input and risk management measures for the approved model included the following members:

Table 2-1: Risk Assessment Team Membership

Team Member:	**Area of Expertise:** QP_{RA}
Relevant Qualifications or Rationale for Omission:	
Team Member:	**Area of Expertise:** Human Health
Relevant Qualifications or Rationale for Omission:	
Team Member:	**Area of Expertise:** Ecology
Relevant Qualifications or Rationale for Omission:	
Team Member:	**Area of Expertise:** Geoscience/Hydrogeology
Relevant Qualifications or Rationale for Omission:	
Team Member:	**Area of Expertise:** Engineer
Relevant Qualifications or Rationale for Omission:	
Team Member:	**Area of Expertise:** Other
Relevant Qualifications or Rationale for Omission:	

3 Property Information, Site Plan and Geological Interpretation

3.(a)Property Information – Property Location and Ownership

Table 3-1: Property Location and Ownership

Property Location
Property Ownership
General Physical Characteristics of the Property (including size of property):
Past Uses of the Property:
Current Uses of the Property:
Past and Current Uses of the Adjacent Properties :
Off-Site Sources of Contaminants of Concern and Receptors:
Proposed Uses of the Property:

3.(a)Property Information – Other

The risk assessment property characteristics are estimated in the generic conceptual model described in the *Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, April 15, 2011. Site specific characteristics considered in this risk assessment are presented in Table 1-2: Risk Assessment Assumptions.

3.(b) Site Plan and Hydrogeological Interpretation of RA Property

Figures illustrating the geoscience conceptual site model are presented in attached documents listed below in: ☐ hard copy format ☐ electronic format.

Table 3-2: List of Documents Relied Upon in the Preparation of the Risk Assessment

Document	**Author**	**Date**

The hydrogeological interpretation of the RA property is based primarily on site plans and cross-sections of the RA property showing existing and historical sources of contaminants, surface and sub-surface structures that affect contaminant distribution and transport and location of where samples were taken for the assessment, and are contained in the documents above.

3.(c)Contaminants of Concern

Contaminants of concern are listed in Table 1-1.

3.(c)(i) Sampling Programs

The sampling program which supports this risk assessment is provided in the document Insert Title of the Phase Two ESA Report. Additionally, (**check if this applies**):

☐ All Environmental Site Assessment (ESA) requirements in Sections 41, 42 and Table 4 of Schedule E of O.Reg. 153/04 were followed.

Additionally, appendices to this risk assessment report include (**check if this applies**):

☐ The appendix to the phase two ESA report that reports on requirements in a phase two ESA in support of an MGRA (Schedule E, Table 1, Section 10. (d) Appendices – MGRA).

Note: *This appendix is required if the RA modifies an assumed value associated with an assumption category in Table 4 of Schedule E from the assumed value used by the Ministry to develop the full depth generic site condition standards.*

4 Human Health Risk Assessment (HHRA)

4.(a)Problem Formulation

4.(a)(i) Human Health Conceptual Site Model

The human health conceptual site model, without any RMMs applied to the site, is that described in *Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, April 15, 2011 (See Figure 1.1). The human health conceptual site model, with RMMs applied to the site, is the same as above, with the exception(s) that the measures listed in Section 1.(5) under "Risk Management Requirements", have been applied. Property information and geological interpretation as described in Section 3 have been incorporated and relied upon for the human health conceptual site model.

Table 4-1: Approved Model Input Parameters affecting Human Health Component Values

Approved Model Input * (Site Specific Characteristics or Pathway Modifiers) which affect Human Health Component Value Calculations**
See examples below

******This table must be consistent with values in the "Tier 2 Input" page of the Modified Generic Risk Assessment Model (spreadsheet version)* ***[Cells A12-C25]*** or ***[Cells A31-B36]****.*
***Appendix 3: Chart to identify which Tier 2 input parameters affect which pathways" will be useful in identifying these site specific characteristics, found in the User Guide. For example, soil vapour screening level (groundwater to indoor air (GW2) pathway multiplied by 100) or fraction of organic carbon (water table to surface).*

4.(a)(ii) Risk Assessment Objectives

The human health risk assessment objective is to develop standards for the COCs listed in Table 1-1 for current property use of Agricultural or Other and a proposed property use of Residential/Parkland/Institutional (this property use must match the use selected in the approved model **[Cell B3]**) using the conceptual site model and equations described in the MOE publication *Rationale for the Development of Soil and Ground Water Standards for Use*

under Part XV.1 of the Environmental Protection Act, Ontario Ministry of the Environment, April 15, 2011 except as specified in this report.

The human receptors assessed and exposure pathways evaluated include:

Table 4-2: Human Receptors Included and Exposure Pathways Evaluated in the Risk Assessment

Property Use*	Receptor**	Pathway***
☐ Residential/ Parkland/ Institutional (R/P/I) Land Use	Toddler (0.5 – 4 years)	Soil Ingestion Dermal Contact Dermal adsorption following Contact Inhalation of soil particles Inhalation of indoor and outdoor air contaminated by subsurface vapour intrusion** Ingestion of groundwater as drinking water source
	Composite receptor (exposed from infancy through to and including adulthood)	
☐ Industrial/ Community/ Commercial (I/C/C) Land Use	Adult (20 or more years)	Soil Ingestion Dermal Contact Dermal adsorption following Contact Inhalation of soil particles Inhalation of indoor and outdoor air contaminated by subsurface vapour intrusion** Ingestion of groundwater as drinking water source
	Adult indoor worker (long-term)	Inhalation of indoor and outdoor air contaminated by subsurface vapour intrusion** Ingestion of groundwater as drinking water source
	Adult outdoor worker (long-term)	Soil Ingestion Dermal Contact Ingestion of groundwater as drinking water source
	Adult subsurface worker (short-term)	Soil Ingestion Dermal adsorption following Contact Inhalation of soil particles Ingestion of groundwater as drinking water source
☐ Agricultural or Other Land Use	Toddler (0.5 – 4 years)	Soil Ingestion Dermal Contact Dermal adsorption following Contact Inhalation of soil particles Inhalation of indoor and outdoor air contaminated by subsurface vapour intrusion** Ingestion of groundwater as drinking water source
	Composite receptor (exposed from infancy through to and including adulthood)	

The property use (column 1) must match the use selected in the approved model **[Cell B3].*
*** The Approved Model uses the lowest of the R/P/I and I/C/C values for the "inhalation of indoor air contaminated by subsurface vapour intrusion from groundwater" pathway (GW2) for all land uses. The model only generates one number (using R/P/I receptors) for the "inhalation of outdoor air" pathway (S-OA), and uses it for all land uses.*
****Exposure pathways considered (column 3) are in the absence of risk management measures (RMMs) to be implemented on-site.*

The ministry's approved model has been used to develop standards using a quantitative approach.

Site characterization information has been collected, as described in Section 3. (4) (1)

"Sampling Programs" section, above. The data used for the human health risk assessment is sufficient to meet the objectives of the assessment, for the reasons described below. Either:

☐ All Environmental Site Assessment (ESA) requirements in Sections 41, 42 and Table 4 of Schedule E of O.Reg. 153/04 were followed.

OR

☐ [Rationale to be provided by the qualified person for risk assessment, in accordance with Schedule C, Table 1, Section 4 "Risk Assessment Objectives" of the Regulation]

Variability in the modified input (site specific characteristics or pathway modifiers) will be reflected in uncertainty regarding risk estimates. The variability is considered acceptable for meeting the data quality objectives for a modified generic risk assessment.

4.(b) Exposure Assessment

4.(b)(i) Receptor Characteristics

Human health receptor characteristics are described in the document *Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, 2011 for the receptors included in the human health risk assessment and identified in Table 4-2 ("Human Receptors included in the Risk Assessment"), above.

I consider the receptors at the property to be adequately represented by those included in the modified generic model.

4.(b)(ii) Pathway Analysis

Exposure pathways are described in the document *Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, April 15, 2011 as listed in Table 4-2.

The following pathways (specific to human receptors) have been modified:

☐ None, ***or***

☐ Due to soil vapour screening:
- ☐ Soil source (soil to indoor air pathway, S-IA); ***and/or***
- ☐ Ground water source (ground water to indoor air pathway, GW2).

Table‡ 4-3: Soil Vapour Screening Levels and Measured Soil Vapour Levels

Source Area ID:	**Area Soil Type:**			**Source Type: Soil**
Sampling Location ID:				
Depth below soil surface to soil vapour measurement [Cell B26]: cm				
Contaminant of Concern (Volatile COCs)*	**Soil Vapour Screening Level****	**Maximum Measured Soil Vapour Concentration**	**Units**	**Number of samples**

‡ *The number of tables equals the number of sampling locations (there may be one or more sampling location for each source area).*
** Insert the volatile COCs that have been modified based on soil vapour measurements **[Cells A42-A47]**.*
*** These values are found in **[Cells B42-47]**.*

And, or:

☐ The following pathways (specific to human receptors; corresponding to risk management measures selected in approved model **[Cells A31-B34]**) have been modified due to risk management:

Table 4-4: Pathways Modified Based on Selected Risk Management Measures

Risk Management Measure Selected	Medium	Pathway Controlled	Exposure Reduction
☐ Hard Cap	Soil	Soil to Nose	100% (Complete reduction)
		Direct soil contact	100% (except adult subsurface worker: 0%)
☐ Fill Cap	Soil	Soil to Nose	100% (Complete reduction)
		Direct soil contact	100% (except adult subsurface worker: 0%)
☐ Shallow Soil Cap*	Soil	Soil to Nose	100% (Complete reduction)
		Direct soil contact	100% (except adult subsurface worker: 0%)
☐ No Enclosed Buildings	Soil; Groundwater	Soil to Indoor Air;	100 x
		GW2 (Groundwater to Indoor Air)	100 x
☐ Building with Storage Garage	Soil; Groundwater	Soil to Indoor Air;	100 x
		GW2 (Groundwater to Indoor Air)	100 x
☐ Building with Ground Level Non-Residential**	Soil; Groundwater	Soil to Indoor Air;	Industrial/Commercial/ Community exposure assumed at Residential/ Parkland/Institutional sites.
		GW2 (Groundwater to Indoor Air)	

** Applicable only if proposed property use is Industrial/Commercial/Community (ICC).*
*** Applicable only if proposed property use for ground level and levels below grade is Industrial/Commercial/Community (ICC).*

4.(b)(iii) Exposure Estimates

Estimates of exposure for the relevant receptors are the same as, or lower than, exposures estimated in the generic exposure model (with respect to relative frequency and duration of relative magnitude of exposures) documented in *Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, April 15, 2011. Uncertainty in the exposure estimates will be reflected in uncertainty regarding risk estimates. They have been considered acceptable by the MOE as meeting data quality objectives for a modified generic risk assessment.

4.(c)Toxicity Assessment

4.(c)(i) Nature of Toxicity (Hazard Assessment)

The relevant adverse health effects, dose response assessment and basis for selection of TRV's are provided in the document *Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, April 15, 2011.

The hazard assessment for the relevant receptors is the same as documented in *Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, April 15, 2011.

4.(c)(ii) Dose Response Assessment

All Toxicity Reference Values have been evaluated by the MOE as described in the document *Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, April 15, 2011. Uncertainty in the toxicity assessment will be reflected in uncertainty regarding risk estimates. They have been considered acceptable by the MOE as meeting data quality objectives for a modified generic risk assessment.

4.(d) Risk Characterization

4.(d)(i) Interpretation of Health Risks

The following table lists the estimated risk of an adverse health effect due to exposure to the maximum concentration of each COC identified on the property. In cases for which the maximum measured COC concentration is less than or equal to the value generated by the "Approved Model" without any risk management measures (RMMs) selected, the risk is less than or equal to that intended by the generic standards and is not calculated. In cases for which a RMM is required to reduce exposure to the human receptor(s), the risk associated with the maximum measured COC without the presence of the RMM is reported below [*Note*: For human receptors, once the maximum concentrations have been entered into cells **I56-L65**, these values can be found in cells **N56-AO65** of the "Approved Model", available at http://www.ene.gov.on.ca/environment/en/subject/brownfields/STDPROD_075745].

Table 4-5: Calculated Risk Levels in the Absence of Selected Risk Management Measures

☐Residential/ Parkland/ Institutional ***or*** ☐Industrial/ Commercial/ Community

***Note**: QP_{RA}, ensure you have all RMMs un-selected (i.e. **Cell B30-B36** checked as "N") before completing this table.*

Threshold (Non-Cancer)	**Non-Threshold (Cancer)**
Hazard Quotient	**Risk Level**
Eg: Benzene: 0.082...	Eg: Benzene: 2.9 E-5...

For all properties (with or without shallow soil conditions) **(Cells R51-Y65)**	
Soil:	Soil:
For properties **without** *shallow soil conditions* **(Cells Z51-AG65)**	
Ground water:	Ground water:
For properties **with** *shallow soil conditions* **(Cells AH51-AO65)**	
Ground water:	Ground water:

4.(d)(ii) Quantitative Interpretation of Human Health Risks

Based on the most sensitive risk estimate, the following soil and groundwater concentrations have been identified as standards for protection of human health:

Table 4-6: Proposed Human Health Standards with Risk Management in Place:

***Note**: Ensure all relevant RMMs are selected in the approved model before completing this table.*

Risk Management Measure(s)‡				
☐Hard Cap and/*or* ☐Fill Cap *or* ☐Shallow Soil Cap*	☐No Enclosed Building *or* ☐Building with Ventilated Storage Garage *or* ☐Building with Ground Level Non-Residential*			
Environmental Medium (Soil or GW)	**Contaminant of Concern****	**Applicable SCS**	**Recommended Standard for Protection of Human Health**	**Dominant Exposure Pathway†**

** For all caps, the modified exposure route is direct surface soil contact; For all building restrictions, the modified exposure route is inhalation of indoor air.*
***This table must contain all COCs listed in Table 1-1: "Proposed Standards".*
*†To determine the human health standard, see the "Tables of Drivers" tabs of the MGRA Model (spreadsheet version). For each COC, take the lowest value from the cell related to the following column headings (human health components): †**["Soil Contact S1", "Soil Leaching S-GW1", "Indoor Air S-IA", "Indoor Air Odour", "Outdoor Air", Groundwater Ingestion "GW1", "GW1 Odour", Groundwater to Indoor Air "GW2", "GW2 Odour"]**.*
‡ If both a cap and a building restriction are selected in the approved model, all applicable RMMs must be checked off in Table 4-6.

4.(d)(iii) Special Considerations

The assessment of risk undertaken using the approved model considered parameters

relating to human health risk exposure and pathways such as area of natural significance and pH of the soil at the property, which the QP_{RA} considered might result in designating the property as requiring special considerations. All values used in the approved model assumptions were based on information gathered from the Phase Two ESA and are listed in Table 1-2. A review of the generic and/or modified assumptions has been undertaken by the QP_{RA} and they are considered to be appropriate and applicable to the property.

4.(d)(iv) Interpretation of Off-Site Health Risks

In my opinion, the proposed human health standards

☐ will likely (see details in Table 4-7: Off-site Receptors below) *or*

☐ will likely NOT

result in an exceedance of the applicable full depth Site Condition Standard at the nearest off-site human receptor.

Table 4-7: Off-site Receptors

Environ-mental Medium (Soil or GW)	Contaminant of Concern	Applicable SCS at location of nearest off-site receptor	Location of nearest off-site Receptor	Description of Receptor

The following actions are being taken on the RA property to address possible off-site exceedances of the applicable full depth Site Condition Standard:

4.(d)(v) Discussion of Uncertainty

Risk Assessments are, by their very nature, attended by many areas of uncertainty. These include the inherent uncertainty used in the mathematical models and/or equations used to derive the component values, as explained in the *Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, April 15, 2011 document, which formed the basis for the “approved model” used in this MGRA.

Variability in these assumptions will be reflected in uncertainty regarding risk estimates.

The variability is considered acceptable for meeting the data quality objectives for a modified generic risk assessment.

In the risk characterization section of this MGRA, information generated in both the exposure assessment and the hazard assessment sections has been used to generate risk levels or hazard quotients. As such, the risk characterization values are influenced by the level of uncertainty that is proportional to the uncertainty identified in the exposure and toxicity input values.

These uncertainties have been described and, to the extent possible, quantified separately in each of the aforementioned sections.

Some of the exposure and hazard uncertainties could result in over-as well as under-estimations of exposure or hazard values. Likewise, the use of the exposure and hazard values in quantifying risk will reflect these uncertainties. However, in general, cautious assumptions were applied in order to ensure that exposure would not be underestimated. Therefore, the risks provided in this report can be taken as an upper bound of the potential for an adverse effect.

5 Ecological Risk Assessment (ERA)

5.(a)Problem Formulation

5.(a)(i) Ecological Conceptual Site Model

The conceptual site model is that described in *Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, April 15, 2011 with the exceptions listed in Section 1 under "Risk Assessment Assumptions", above.

Table 5-1: Approved Model Inputs Affecting VEC Component Values

Site Specific Characteristic Modified * (specific to Valued Ecosystem Component (VEC) exposure) **
See example below

This table must be consistent with values in the "Tier 2 Input" page of the Modified Generic Risk Assessment Model (spreadsheet version)* *[Cells A12-C25]*** or ***[Cells A30-B34]****.*
*** Also refer to Appendix 5 of the User Guide – Modified Generic Risk Assessment Model to determine the affected VEC Component Values. E.g. Distance to surface water (affects the groundwater to aquatic life (GW3) pathway)*

5.(a)(ii) Risk Assessment Objectives

The ecological risk assessment objective is to develop standards for the COCs included in Table 1-1 for a current property use of Agricultural or Other and a proposed property use of Residential/Parkland/Institutional (this property use must match the use selected in the approved model **[Cell B3]**) using the conceptual model and equations described in the MOE publication *Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, April 15, 2011 except as specified in this report.

The ecological receptors assessed include:

Table 5-2: Ecological Receptors Included in the Risk Assessment

Valued Ecosystem Components Included in the Risk Assessment**	
Property Use*	**Receptors**
☐ Residential/Parkland/ Institutional Land Use	Plants and soil-dwelling organisms‡
	Aquatic biota (contaminant specific) Mammals and birds: • American woodcock (*Scolopax minor*) • Meadow vole (*Microtus Pennsylvanicus*) – also called field mouse • Red-tailed hawk (*Buteo jamaicensis*) • Red-winged blackbird (*Agelarius phoeniceus*) • Red fox (*Vulpes vulpes*) • Short tailed shrew (*Blarina brevicauda*)
☐ Industrial/Community/ Commercial Land Use	Plants and soil-dwelling organisms‡
	Aquatic biota (contaminant specific)
	Mammals and birds: • American woodcock (*Scolopax minor*) • Meadow vole (*Microtus Pennsylvanicus*) – also called field mouse • Red-tailed hawk (*Buteo jamaicensis*) • Red-winged blackbird (*Agelarius phoeniceus*) • Red fox (*Vulpes vulpes*)
☐ Agricultural or Other Land Use	Plants and soil-dwelling organisms‡
	Aquatic biota (contaminant specific) Mammals and birds: • American woodcock (*Scolopax minor*) • Meadow vole (*Microtus Pennsylvanicus*) – also called field mouse • Sheep (*Ovis aries*) • Red-tailed hawk (*Buteo jamaicensis*) • Red-winged blackbird (*Agelarius phoeniceus*) • Red fox (*Vulpes vulpes*) • Short tailed shrew (*Blarina brevicauda*)

** The property use (column 1) must match the use selected in the approved model **[Cell B3]**.*
*** All VECs are described fully in the Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act,* Ontario Ministry of the Environment, April 15, 2011.
‡Level of protection depends on property use.

The ministry's modified generic risk assessment model (the "Approved Model") has been

used to develop standards using a quantitative approach.

Site characterization information has been collected, as described in Section 3. (d) (i) "Sampling Programs", above. The data used for the ecological risk assessment are sufficient to meet the objectives of the assessment, for the reasons described below. Either:

☐ All Environmental Site Assessment (ESA) requirements in Sections 41, 42 and Table 4 of Schedule E of O.Reg. 153/04 were followed.

OR

☐ [Rationale to be provided by the qualified person for risk assessment, in accordance with Schedule C, Table 1, Section 4 "Risk Assessment Objectives" of the Regulation]

Variability in the modified input (site specific characteristics or pathway modifiers) will be reflected in uncertainty regarding risk estimates. The variability is considered acceptable for meeting the data quality objectives for a modified generic risk assessment.

5.(b) Receptor Characterization

Ecological receptor characteristics for generic VECs are described in the document *Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, April 15, 2011 for the receptors identified in Table 5-2 ("Ecological Receptors included in the Risk Assessment"), above.

5.(c)Exposure Assessment

5.(c)(i) Pathway Analysis

Exposure pathways are described in the document *Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, April 15, 2011.

The following pathways (specific to ecological receptors) have been modified:

☐ None, ***or***

☐ The following pathways (corresponding to risk management measures (RMMs) or Modified Ecological Potential (MEP) selected in approved model **[Cells A30-B34]**) have been modified:

Table 5-3: Pathways Modified Based on Selected Risk Management Measures

Pathway Modifier (RMMs and MEP)	Medium	Pathway Controlled	Exposure Reduction

☐ Hard Cap	Soil	Plants	1000 x Industrial level
		Mammals and Birds	1000 x
☐ Fill Cap	Soil	Plants	1000 x Industrial level
		Mammals and Birds	1000 x
☐ Shallow Soil Cap*	Soil	Plants	1.9 x Industrial level
		Mammals and Birds	1000 x
☐ Modified Ecological Potential (MEP)	Soil	Plants	1.9 x Industrial level
		Mammals and Birds	1000 x

** Applicable only if proposed property use is Industrial/Commercial/Community (ICC).*

5.(c)(ii) Exposure Estimates

Estimates of exposure for the relevant receptors are the same as, or lower than, exposures estimated in the generic exposure model (with respect to frequency and duration of exposures) documented in *Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, April 15, 2011.

5.(d) Hazard Assessment

The relevant adverse ecological effects are provided in the document *Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, April 15, 2011.

The hazard assessment for the relevant receptors is:

☐ the same as documented in *Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, April 15, 2011; ***or:***

☐ modified in accordance with the Modified Ecological Protection (MEP) option (as described in Appendix 4 of the User Guide to the Modified Generic Risk Assessment Model, found at: http://www.ene.gov.on.ca/environment/en/subject/brownfields/STDPROD_075745).

Variability in the hazard assessment will be reflected in uncertainty regarding risk estimates. The variability is considered acceptable for meeting the data quality objectives for a modified generic risk assessment.

5.(e)Risk Characterization

5.(e)(i) Interpretation of Ecological Risks

The following table lists the estimated risk of an adverse ecological effect to VECs due to exposure to the maximum concentration of each Contaminant of Concern (COC) identified on the property. In cases for which the maximum measured COC concentration is less than or equal to the value generated by the “Approved Model” without any risk management measures (RMMs) or Modified Ecological Protection

(MEP) selected, the risk is less than or equal to that intended by the generic standards and is not calculated. In cases for which a RMM is required to reduce exposure to the VEC(s), the risk associated with the maximum measured COC without the presence of the RMM is reported below, for all ecological receptors [*Note*: For ecological receptors, once the maximum concentrations have been entered into cells **I56-L65**, these values can be found in cells **AQ56-AV65** of the "Approved Model", available at http://www.ene.gov.on.ca/environment/en/subject/brownfields/STDPROD_075745].

Table 5-4: **Calculated Risk Levels in the Absence of Selected Risk Management Measures**

☐Residential/ Parkland/ Institutional ***or*** ☐Industrial/ Commercial/ Community

Plants & Soil Invertebrates (Cells AQ51-AT65)	**Mammals & Birds (Cells AU51-AV65)**
Hazard Quotient	**Hazard Quotient**
☐ Coarse ***or*** ☐ Medium/Fine Eg: Benzene: 0.082...	(Not dependent on soil type)

☐ Not Applicable at the site (as there were no COCs in soil)

5.(e)(ii) Quantitative Interpretation of Ecological Risks

Based on the most sensitive risk estimate, the following soil and groundwater concentrations have been identified as standards for protection of VECs:

Table 5-5: Proposed Ecological Standards with Pathway Modifiers in Place:

Pathway Modifiers (RMMs *or* MEP)*	
☐Hard Cap and/*or* ☐Fill Cap *or* ☐Shallow Soil Cap	☐MEP

Environ-mental Medium (Soil or GW)	**Contaminant of Concern****	**Applicable SCS**	**Recommended Standard for Protection of VECs†**	**Dominant Exposure Pathway†**

** For all caps and MEP, the modified exposure route is direct soil contact (Plants & Soil Invertebrates) or soil and food ingestion (Mammals & Birds).*
***This table must contain all COCs listed in Table 1-1: Proposed Standards".*
† *To determine the ecological standard, see the "Tables of Drivers" tabs of the MGRA Model (spreadsheet version). For each COC, take the lowest value from the cell related to the following column headings (ecological components):* ***†["Plants & Soil Org", "Mammals & Birds", "Soil Leaching S-GW3", Groundwater to Surface Water/Aquatic Life "GW3"].***

5.(e)(iii) Special Considerations

The assessment of risk undertaken using the approved model considered parameters relating to human health risk exposure and pathways such as area of natural significance and pH of the soil at the property, which the QP_{RA} considered might result in designating the property as requiring special considerations. All values used in the approved model assumptions were based on information gathered from the Phase Two ESA and are listed in Table 1-2. A review of the generic and/or modified assumptions has been undertaken by the QP_{RA} and they are considered to be appropriate and applicable to the property.

5.(e)(iv) Interpretation of Off-Site Ecological Risks

In my opinion, the proposed ecological standards:

☐ will likely (see details in Table 5-6: Off-site Receptors below) *or*
☐ will likely NOT

result in an exceedance of the applicable full depth Site Condition Standard at the nearest off-site ecological receptor.

Table 5-6: Off-site Receptors

Environ-mental Medium (Soil or GW)	Contaminant of Concern	Applicable SCS at location of nearest off-site receptor	Location of nearest off-site Receptor	Description of Receptor

The following actions are being taken on the RA property to address possible exceedances of the applicable full depth Site Condition Standard at the nearest off-site receptor:

5.(e)(v) Discussion of Uncertainty

Risk Assessments are, by their very nature, attended by many areas of uncertainty. These include the inherent uncertainty used in the mathematical models and/or equations used to derive the component values, as explained in the *Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, April 15, 2011 document, which formed the basis for the "approved model" used in this MGRA.

Variability in these assumptions will be reflected in uncertainty regarding risk estimates. I consider the variability acceptable for meeting the data quality objectives for a modified generic risk assessment.

In the risk characterization section of this MGRA, information generated in both the exposure assessment and the hazard assessment sections has been used to generate risk levels or hazard quotients. As such, the risk characterization values are influenced by the level of uncertainty that is proportional to the uncertainty identified in the exposure and toxicity input values.

These uncertainties have been described and, to the extent possible, quantified separately in each of the aforementioned sections.

In addition, there are uncertainties related to the assumptions that have been made throughout the assessment due to data gaps, environmental fate complexities, or in the generalization of receptor characteristics.

In recognition of these uncertainties, cautious assumptions are generally used throughout the assessment to ensure that the potential for an adverse effect would not be underestimated.

As some of the exposure and hazard uncertainties could result in over-as well as under-estimations of exposure or hazard values, likewise, the use of the exposure and hazard values in quantifying risk will reflect these uncertainties. However, in general, cautious assumptions were applied in order to ensure that exposure would not be underestimated. Therefore, the risks provided in this report can be taken as an upper bound of the potential for an adverse effect.

Although uncertainties exist in the ecological assessment due to the assumptions of the relevant exposure pathways, there is expected to be minimal exposure to the ecological receptors due to the RMMs selected and/or site specific characteristics. As such, minimal risks are expected to be posed to the ecological receptors and so the uncertainties are not expected to have a significant effect on the outcome of the qualitative risk assessment values.

6 Conclusions and Recommendations

6.(a)(i) Recommended Standards

The property specific standards found in Table 1-1 are based on the lower of the appropriate human health and ecological standards (i.e. according to property use, potability and soil depth); however, the standards are not permitted to be below reporting limits (RLs) stipulated in the *Rationale for the Development of Soil and Ground Water Standards for Use At Contaminated Sites in Ontario*, Ontario Ministry of the Environment, April 15, 2011 or generic background values (Table 1 Full Depth Background Site Condition Standards) from the *Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, April 15, 2011, *or* above any of the half-solubility (in groundwater), the free phase product formation thresholds (in soils) or the reasonable estimate of maximum site concentrations.

Assumptions in this risk assessment are consistent with generic assumptions contained in the document *Rationale for the Development of Soil and Ground Water Standards for Use under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, April 15, 2011 with the exception of site characteristics specified in Section 3 of this report and any modifications to ecological habitat specified in Section 5 of this report. Variability in these assumptions will be reflected in uncertainty regarding risk estimates. I consider the variability acceptable for meeting the data quality objectives for a modified generic risk assessment.

6.(a)(ii) Special Considerations for Ground Water Standards

No standard generated by the modified generic risk assessment model will generate a property specific standard for ground water that is greater than the highest of a) 50% of the solubility limit; b) the Reporting Limit; and c) background levels.

7 Risk Management Plan (if applicable)

7.(a)Risk Management Plan

7.(a)(i) Risk Management Performance Objectives

☐ No risk management measures will be used on the property, ***or***
☐ The following risk management measure(s) (corresponding to risk management measures selected in approved model **[Cells A31-B34]**) is/are proposed leading to a modification of the pathways as described below.

Table 7-1: Risk Management Measures

Risk Management Measure Selected	Medium	Pathway Controlled	Exposure Reduction
☐ Hard Cap	Soil	Soil to Nose	100% (Complete reduction)
		Plants	1000 x Industrial level
		Mammals and Birds	1000 x
		Direct soil contact	100% (except adult subsurface worker: 0%)
☐ Fill Cap	Soil	Soil to Nose	100% (Complete reduction)
		Plants	1000 x Industrial level
		Mammals and Birds	1000 x
		Direct soil contact	100% (except adult subsurface worker: 0%)
☐ Shallow Soil Cap*	Soil	Soil to Nose	100% (Complete reduction)
		Plants	1.9 x Industrial level
		Mammals and Birds	1000 x
		Direct soil contact	100% (except adult subsurface worker: 0%)
☐ No Enclosed Buildings	Soil; Groundwater	Soil to Indoor Air;	100 x
		GW2 (Groundwater to Indoor Air)	100 x
☐ Building with Storage Garage	Soil; Groundwater	Soil to Indoor Air;	100 x
		GW2 (Groundwater to Indoor Air)	100 x
☐ Building with Ground Level Non-Residential**	Soil; Groundwater	Soil to Indoor Air;	Industrial/Commercial/ Community exposure assumed at Residential/ Parkland/Institutional sites.
		GW2 (Groundwater to Indoor Air)	

** Applicable only if proposed property use is Industrial/Commercial/Community (ICC).*
*** Applicable only if proposed property use for ground level and levels below grade is Industrial/Commercial/Community (ICC).*

7.(a)(ii) Risk Management Measures

The Risk Management Measures specified in Table 7-1 must be implemented at the RA property/site.

7.(a)(iii) Duration of Risk Management Measures

The conclusions of this risk assessment assume that the Risk Management Measures will be maintained indefinitely.

7.(a)(iv) Requirements for Monitoring and Maintenance

Monitoring and Maintenance may be necessary for the RA property. Monitoring and maintenance measures may be included in a CPU issued by the Ministry, and will be undertaken in accordance with any CPU issued.

8 Public Communication Plan (if applicable)

8.(a)Public Communication Plan

8.(a)(i) Optional Communication Plans

[List any communication activities undertaken voluntarily. Provide a description of the plan, summary of comments received during consultation, and describe how comments were considered as part of the risk assessment process]

8.(a)(ii) Required Communication Plans For RA Properties in Wider Area of Abatement

[List any mandatory public communication activities if the Approved model was used in a risk assessment for a property located within a wider area of abatement as identified by the MOE District Office. Provide a summary of comments received, describe how th]

APPENDIX A

MANDATORY CERTIFICATIONS – Part A

1. I have conducted or supervised a risk assessment report in accordance with the regulation.

2. I am a qualified person, as defined in section 168.1 of the Act, and have the qualifications required by section 6 of the regulation.

3. I have in place an insurance policy that satisfies the requirements of section 7 of the regulation.

4. The risk assessment team included members with expertise in all of the disciplines required to complete the risk assessment in accordance with the regulation.

5. The opinions expressed in the risk assessment are engineering or scientific opinions made in accordance with generally accepted principles and practices as recognized by members of the environmental engineering or science profession or discipline practising at the same time and in the same or similar location.

6. To the best of my knowledge, the certifications and statements in this risk assessment are true as of [insert date of completion of risk assessment report].

7. By making these certifications in this risk assessment report, I make no express or implied warranties or guarantees.

QP_{RA} signature: _____Date: _____

MANDATORY CERTIFICATIONS – Part B

1. As of [insert date of completion of risk assessment report], it is my opinion that based on the phase one environmental site assessment and the phase two environmental site assessment and other relevant property information, the approach taken in the conduct of the risk assessment,

i. is appropriate to evaluate human health and ecological risks from the contaminants of concern at the concentrations proposed as the standards specified in the risk assessment and assuming no measures have been taken at the RA property which have the effect of reducing the risk from the contaminants, and

ii. is consistent with the approach set out in the pre-submission form with the exception of those deviations listed in section 1 of the report under the heading "Deviations from Pre-Submission Form".

2. As of [insert date of completion of risk assessment report], it is my opinion that, taking into consideration the assumptions specified in the risk assessment report, including the use of the property specified in report section 3 (Property Information, Site Plan and Geological Interpretation) of the risk assessment, and any risk management measures recommended in the report, as long as the RA property satisfies those assumptions and meets the standards specified in the risk assessment report, the contaminants of concern are unlikely to pose a human health or ecological risk greater than the level of risk that was intended in the development of the applicable full-depth site condition standards for those contaminants.

3. As of [insert date of completion of risk assessment report], it is my opinion that, (**pick the applicable statement below**),

☐ i. no risk management plan is necessary for a contaminant of concern addressed in the risk assessment report to prevent, eliminate or ameliorate any adverse effect from that contaminant to the human or ecological receptors addressed in the report and located on the RA property, **or**

☐ ii. the implementation of the risk management plan described in Report Section 7 (Risk Management Plan) of the risk assessment report is necessary for a contaminant of concern addressed in the risk assessment report to prevent, eliminate or ameliorate any adverse effect from that contaminant to the human or ecological receptors addressed in the report and located on the RA property and is sufficient to address the current and potential future transport and exposure pathways.

4. As of [insert date of completion of risk assessment report], the risk assessment report completely and accurately reflects the risk assessment assumptions and conclusions and all pertinent information has been included in the report and the appendices to the report.

If Clause 5(3) of Schedule C applies,

☐ As of the submission date, it is my opinion that, taking into consideration the assumptions specified in the risk assessment report including any risk management measures recommended in the report, as long as the RA property satisfies those assumptions and meets the standards specified in the report, the applicable full depth site condition standards will likely be met at the nearest off-site ecological and human receptors identified in the report.

QP_{RA} signature: _____Date: _____

ADDITIONAL QP_{RA} STATEMENT(S)

It is my opinion, based on the phase one environmental site assessment and the phase two environmental site assessment of the property and other relevant information respecting the property, that the assumptions I used in applying the approved model, to the extent that those assumptions differed from the assumptions on which the Soil Ground water and Sediment Standards are based, are appropriate.

QP_{RA} signature: _____Date: _____