



**Transport  
Canada**

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**Mont-Joli Airport, Quebec  
Former Building H-3, Former Coal Depot and Former Landfill**

**Remediation Plan**

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**Final Version**





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Normand Lalonde, CESA  
Project Leader



## WORK TEAM

### **Groupe-conseil Entraco Inc.**

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<sup>(1)</sup> CEA stands for Certified Environmental Auditor, and CESA stands for Certified Environmental Site Assessor (Association québécoise de vérification environnementale).

<sup>(2)</sup> Expert: Member of the list of experts of the Centre d'expertise en analyse environnementale du Québec (MDDEP).

## LIST OF ABBREVIATIONS

AQVE	Association québécoise de vérification environnementale [Quebec association of environmental verification]
BTEX	Benzene, toluene, ethylbenzene and xylenes
CEA	Certified Environmental Auditor (AQVE)
CEAEQ	Centre d'expertise en analyse environnementale du Québec [Quebec centre of expertise in environmental analysis]
CESA	Certified Environmental Site Assessor (AQVE)
ELS	Engineered landfill site
Entraco	Groupe-conseil Entraco Inc.
Expert	Member of the list of experts of the CEAEQ (MDDEP)
LPRR	<i>Land Protection and Rehabilitation Regulation</i> (c. Q-2, r. 18.1.01)
MAH	Monocyclic aromatic hydrocarbon
MDDEP Policy	MDDEP Soil Protection and Contaminated Sites Rehabilitation Policy
MDDEP	Ministère du Développement durable, de l'Environnement et des Parcs du Québec [Quebec department of sustainable development, environment and parks]
PAH	Polycyclic aromatic hydrocarbon
PWGSC	Public Works and Government Services Canada
RRBCS	<i>Regulation Respecting the Burial of Contaminated Soils</i> (c. Q-2, r. 6.01)
SSWIS	MDDEP quality criteria for groundwater seepage into surface water or infiltration into sewers
TC	Transport Canada

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## 1. INTRODUCTION

### 1.1 BACKGROUND

Ownership of the Mont-Joli Airport was transferred, several years ago, to the of the Régie intermunicipale de l'aéroport de Mont-Joli (the Régie). The Régie plans to transfer certain surplus land parcels to the Municipality of Mont-Joli in the near future. As part of this planned transfer, remediation work must be performed on these sites. To that end, Groupe-conseil Entraco Inc. (Entraco) was commissioned by Transport Canada (TC) to prepare a remediation plan for the following three sectors:

- Former building H-3
- Former coal depot
- Former landfill

The remediation plan for these sites takes into account the requirements set out in section IV.2.1 of Quebec's *Environment Quality Act* (L.R.Q., c. Q-2), as well as the Manuel de l'expert (Expert Manual) on land protection and remediation (2008-05-01) and directives for experts produced by the Centre d'expertise en analyse environnementale du Québec (CEAEQ). The applicable MDDEP guidance documents were also taken into consideration.

In addition, in accordance with the recommendations of a recent addendum (February 2011) related to a Phase I environmental assessment conducted by LVM in 2009, a targeted soil and groundwater characterization program was incorporated into the remediation plan. The characterization program was for a lot that encompasses the sector of the former building H-3.

### 1.2 LIMITATION CLAUSES

The comments set out in this report are based solely on information provided by persons interviewed or contacted, the analysis of available documents, observations made during field work, and the interpretation data collected, as well as sampling and analytical results (see Appendix 1 for detailed limitation clauses).

### 1.3 CONFIDENTIALITY

All Entraco employees involved in this study were informed of their obligation to treat as confidential all information related to this mandate.

## 2. SITE LOCATIONS AND DESCRIPTIONS

Table 2.1 provides details on the locations of the sectors to be remediated (see figures 2.1 to 2.4).

Table 2.1 Characteristics of the sectors to be remediated

Sector	Former Building H-3	Former Coal Depot	Former Landfill
Owner	Régie intermunicipale de l'aéroport de Mont-Joli		
Address	875 Jacques Cartier Boulevard, Mont-Joli		
Geographic Coordinates (ScoPQ system, NAD83, Zone 6) Centre of Sites	N 5385353, E 253112	N 5385197, E 253295	N 5385729, E 253514
Lot Numbers – Land Register	4 015 674 in the Land Register of Quebec	Part of lot 706-1 of the parish of Sainte-Flavie	Part of lot 706-1 of the parish of Sainte-Flavie
Area to be Remediated	176 m <sup>2</sup>	1,295 m <sup>2</sup>	35 m <sup>2</sup>
Current Occupancy	Vacant	Vacant	Vacant
Buildings/Infrastructure	Presence of concrete foundation walls from former building H-3	None	None

The boundaries of lot 4 015 674 in the Land Register of Quebec are indicated in Figure 1 of Appendix 3; this figure was taken from the LVM, 2011, study.

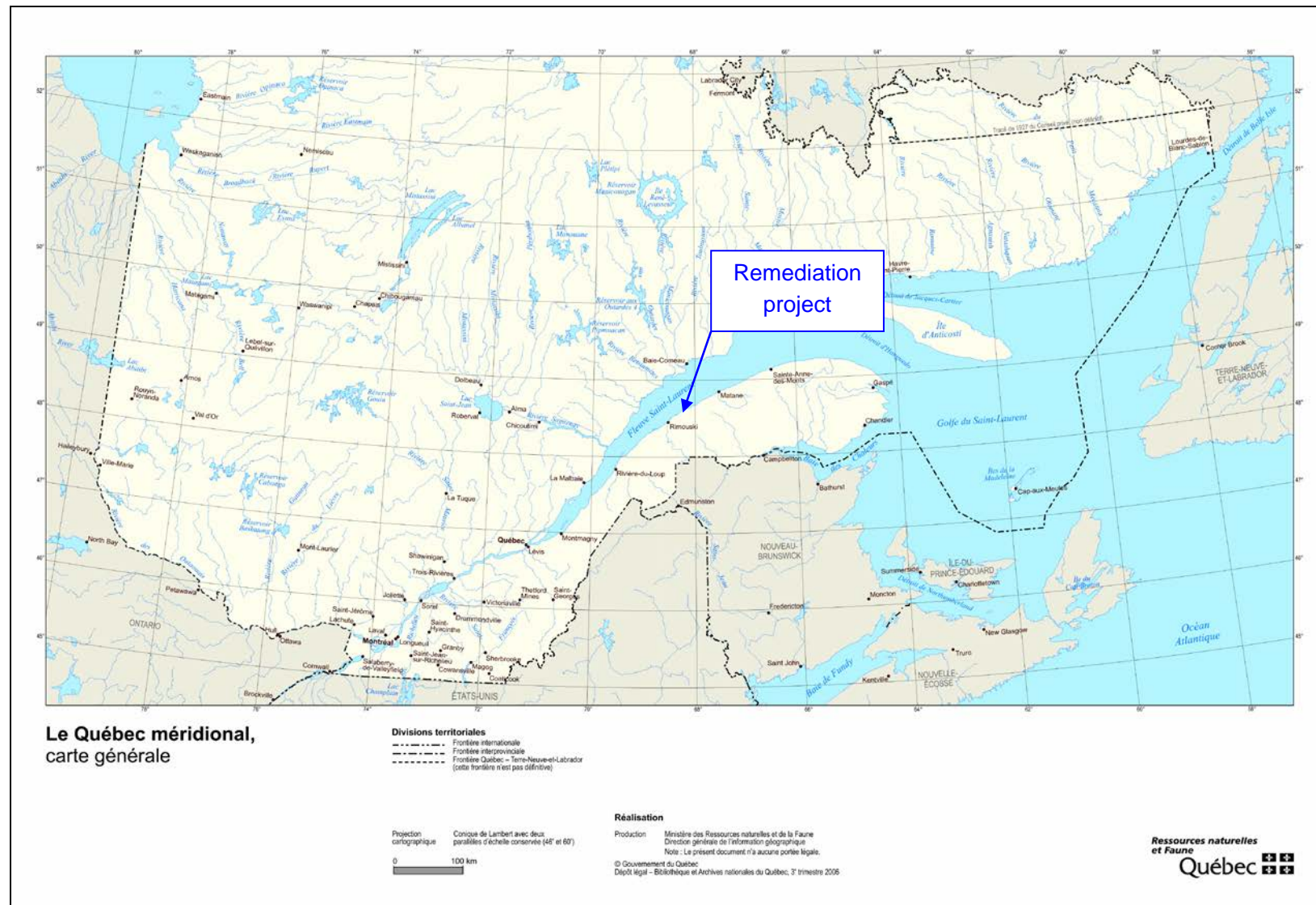


Figure 2.1 Location of remediation project – map of southern Quebec

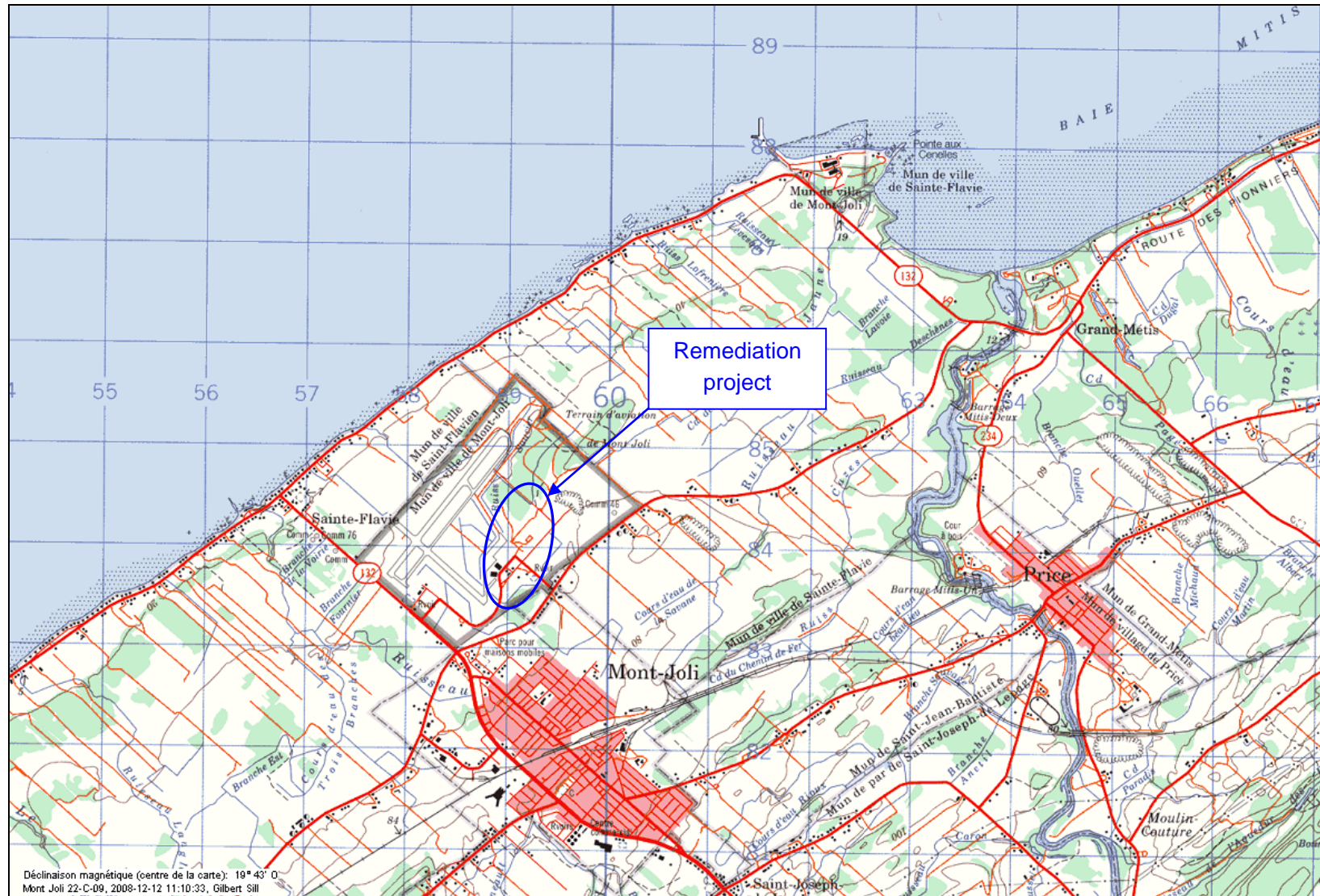
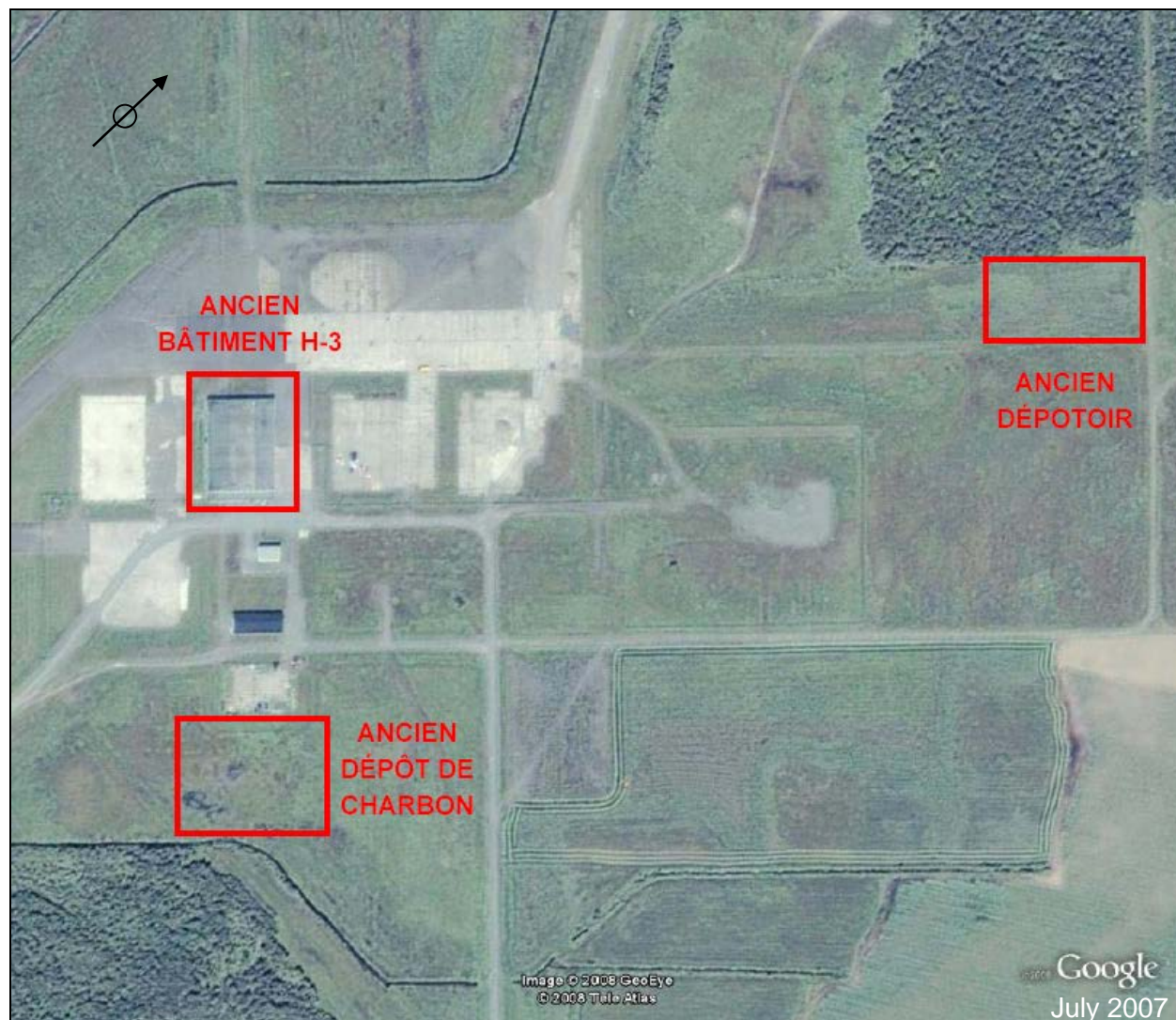


Figure 2.2 Location of remediation project – 1:50 000 scale map



Figure 2.3 General layout of the sectors to be remediated



Note: Building H-3, visible in the photo, was demolished in 2008.

Figure 2.4 Aerial photograph of the area containing the sectors to be remediated

#### TRANSLATION KEY

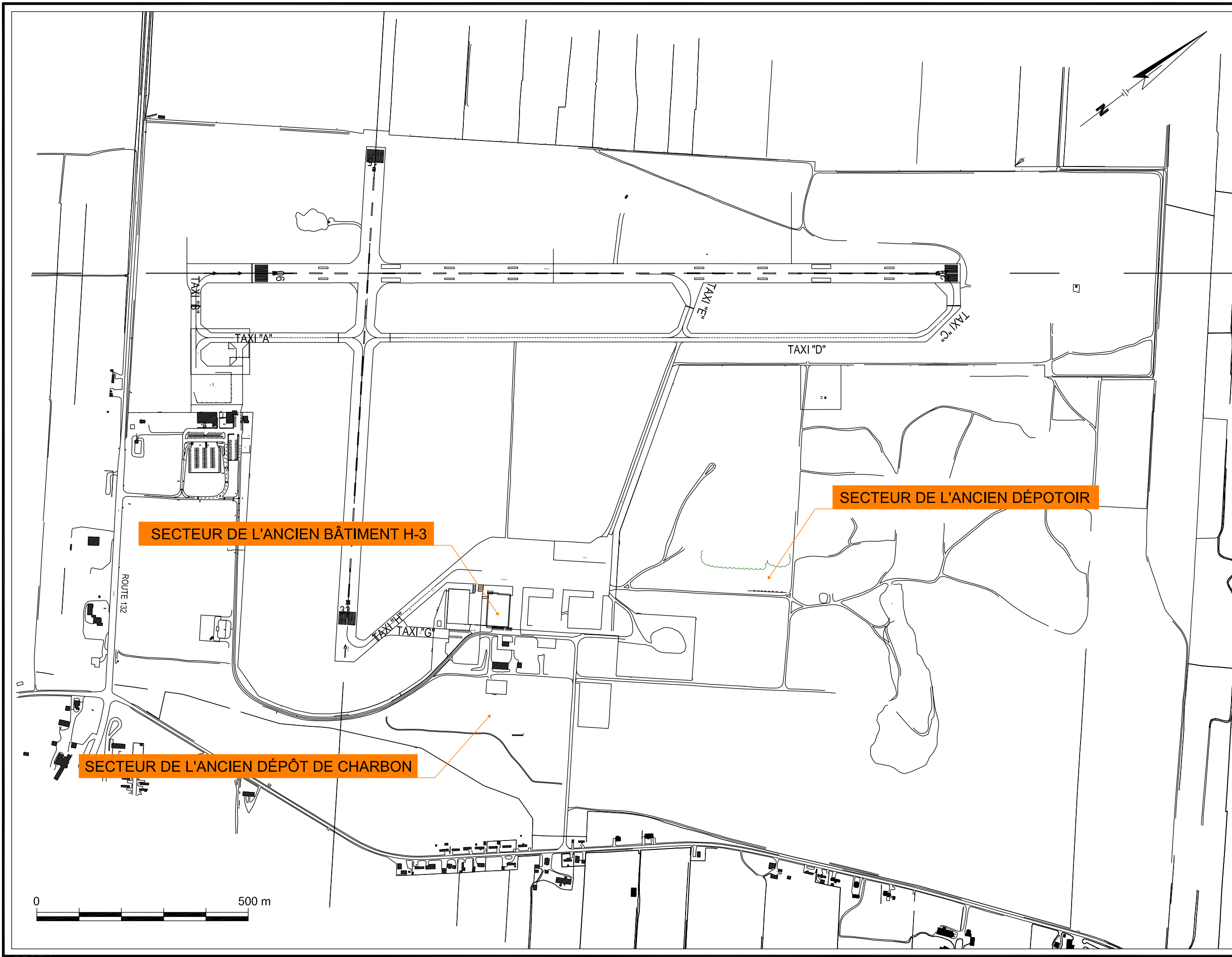
Ancien bâtiment H-3 = Former building H-3

Ancien dépotoir = Former landfill

Ancien dépôt de charbon = Former coal depot



Figure 2.3 Global plan of the sectors the be remediated



SOURCE : Plan dessiné par TPSGC  
(C00pg01.dwg)

Rév.	Description	Par/By	Date
-	-	-	-
-	-	-	-



Dossier / File:  
**AÉROPORT DE MONT-JOLI**  
Plan de réhabilitation  
Ancien bâtiment H-3, ancien dépôt de charbon  
et ancien dépotoir

Dessin / Drawing:  
**FIGURE 2.3**  
Plan d'ensemble des secteurs à réhabiliter

Conçu par / Designed by:	Date
N.L.	04-10-2010
Dessiné par / Drawn by:	Date
É.L.F./N.L.	10-10-2010
Vérifié par / Verified by:	Date
N.L.	09-02-2011
Approuvé par / Approved by:	Date
-	-

No. dossier / File no.:	Échelle / Scale:
P0922	Graphique
No. dessin / Drawing no.:	Page / Page:
	7



### 3. ENVIRONMENTAL ISSUES, REMEDIATION OBJECTIVES AND SUMMARY OF ACTIVITIES

The following information is presented for each of the three sectors to be remediated:

- A summary of previous studies, primarily taken from the study conducted by Entraco<sup>1</sup> in 2008-2009; the relevant information related to these studies is provided in figures 3.1 to 3.3.
- Environmental concerns, meaning issues related to the presence of contaminants at levels exceeding the regulatory limit values for the planned use of the site or issues related to the presence of residual materials.
- The remediation objective according to the planned use of the site and the municipal zoning.
- A brief description of the remediation work.

#### 3.1 FORMER BUILDING H-3 SECTOR

##### 3.1.1 Summary of previous studies and activities

The former building H-3 sector has been subject to a number of characterization studies and remediation initiatives for hydrocarbon-contaminated soil (see Figure 3.1). The contamination observed was primarily related to the presence of tanks near the southwest<sup>(2)</sup> and southeast corners of the building, as well as near the south wall.

Residual hydrocarbon contamination (exceeding the C criteria established by MENV, former Quebec department of the environment) was detected along the foundation walls in two areas:

- near the southwest (P-15 and P-58) and southeast (P-10, P-52 and P-70) corners of the building: mineral oil and grease and/or BTEX contamination, following remediation work performed in 1995
- near the centre of the south wall (P-1, P-3 and P-5): PH C<sub>10</sub>-C<sub>50</sub> and PAHs contamination following the removal of a waste oil tank in 2003

This residual contamination primarily affected the sides of the walls along the building. This soil had been left in place to preserve its bearing capacity near the foundation. In addition, in 2008,

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(1) Groupe-conseil Entraco Inc., March 2009. Aéroport de Mont-Joli – Ancien bâtiment H-3, ancien dépôt de charbon et ancien dépotoir – Caractérisation des sols. File P0891. 64 p. + appendices.

(2) To make it easier to geographically locate the elements, north was assumed to be at the top of the figures.

following the demolition of the building, surface (0–50 cm) PAH contamination was detected in a trench near the former south wall of the foundation (MUR SUD PA-1).

In 2008, Entraco was commissioned to conduct a characterization study in order to provide a status update on the residual contamination. No contamination above the MDDEP soil criteria, level C, was detected near the southwest corner (area restored in 1995) or near the zone at the centre of the south wall (where a waste oil tank had been removed in 2003). Near the southeast corner, BTEX and PAH contamination exceeding the MDDEP soil criteria, level C was detected in a trench adjacent to the foundation of the east wall (T-6:260-280); specifically, a horizon approximately 20 to 30 cm thick located in a saturated zone at a depth of more than 2.6 m.

The residual contamination observed in 1995 during the remediation work near the southwest corner was not intercepted in 2008, despite the following precautions (taken during the site characterization):

- Placement of exploratory trenches along the sides where the contaminated soil had been detected in 1995. In most cases, the excavations were made larger than usual in an attempt to maximize interception of the contaminated horizons from 1995.
- Visual and olfactory examination of the excavated soil, of the remaining soil (walls and bottoms of the excavations) and of the samples collected.
- VOC measurements of the remaining soil on site and the samples using a MiniRAE 2000 photoionizer.

It is possible that this residual contamination was not intercepted in 2008 because it was confined to a very small band of soil along the foundation walls at a distance of more than 1 m (outside the exploratory trenches excavated in 2008) or because it degraded over time, following the removal of the source of the contamination (related to the former storage tanks) and with favorable in-situ conditions that promoted contaminant biodegradation (addition of clean soil with the contaminated soil, and natural oxygenation). Note that residual contamination by C<sub>10</sub>-C<sub>50</sub> hydrocarbons in the B-C range was detected in trench T-2.

The residual contamination found in 1995 near the southeast corner of the building was intercepted in 2008 near the axis of the foundation. The contamination does not seem to cover a large surface area, as it was intercepted in only one trench and was not intercepted in the other trenches less than 10 m away.

The surface contamination found in 2008 by Inspec-Sol near the south wall of the former building was not detected during the characterization study conducted by Entraco in 2008. During the latter study, no organoleptic indicators were observed, and the VOC concentrations measured in two surface samples collected along the south wall were below 1 ppm. However, no surface samples were analyzed. Note that exploratory trench T-4 was excavated

perpendicular to the former site of the concrete wall in order to reach the backfill added following the removal of the underground storage tank.

### **3.1.2 Environmental issues**

As noted above, the hydrocarbon contamination (exceeding the MDDEP C criteria) observed in 1995 by Écosite (BTEX and mineral oil and grease) and in 2008 by Entraco (BTEX and PAHs) near the southeast corner of the former building H-3 is confined to the area along the east foundation wall (see 3.1, zone 1.1). The estimated contaminated surface area is 140 m<sup>2</sup> (7 m by 20 m); most of this area (100 m<sup>2</sup>) is located within the foundations of the former building, but approximately 40 m<sup>2</sup> is located outside the foundations (to include the soil left in place along the foundation in 1995). It is a sand and gravel horizon approximately 30 cm thick located at a depth ranging from 1.8 m at the south end to 2.8 m at the north end. The estimated volume of contaminated soil is 42 m<sup>3</sup>, assuming an average thickness of 30 cm.

As for the surface PAH contamination detected by Inspec-Sol in 2008 along the south wall (zone 1.2), we have estimated a surface area of approximately 36 m<sup>2</sup> (12 m by 3 m); we estimate that the volume of soil contaminated by PAHs is 18 m<sup>3</sup>, assuming a thickness of 50 cm.

### **3.1.3 Remediation objective**

Given the planned land use (commercial), the remediation objective is to attain the level C of the MDDEP Soil Protection and Contaminated Sites Rehabilitation Policy, i.e. the values set out in Schedule II to the *Land Protection and Rehabilitation Regulation* (LPRR).

### **3.1.4 Brief description of the remedial work**

The contaminated soil (above of the MDDEP soil criteria, level C), located at the southeast corner of the former building, will be excavated and disposed of it at a treatment site authorized by MDDEP (see Table 3.1, zone 1.1).

As for the contaminated soil along the former south wall of the building (zone 1.2), it is recommended that it be excavated, placed in piles and characterized in order to determine the appropriate management method.

**Table 3.1 Characteristics of the zones to be remediated in the former building H-3 sector**

Zone	Issue	Area (m <sup>2</sup> )	Depth (cm)	Average Thickness (cm)	Volume (m <sup>3</sup> )	Selected Action
1.1	Soil contaminated by hydrocarbons	140	Between 180 and 280	30	42	Excavation and disposal
1.2	Soil potentially contaminated by hydrocarbons	36	Between 0 and 50	50	18	Excavation and characterization
Total		176			60	

### 3.2 FORMER COAL DEPOT SECTOR

#### 3.2.1 Summary of previous studies

A former coal storage area was characterized as part of an environmental characterization study conducted by LVM Technisol in 2007. The soil was sampled in exploratory trenches at three locations where coal had been observed at the surface (see Figure 3.2). Arsenic contamination (above the MDDEP soil criteria, level C) was found in one excavation (PE-22). In the characterization study by Entraco in 2008, no exceedance of the MDDEP soil criteria level C, was observed in the 14 exploratory trenches. An arsenic concentration equal to level C was detected in one sample (T14:22-30), and arsenic concentrations in the B-C range were detected in seven exploratory trenches located in a coal accumulation zone.

An analysis of the carbon content of the black particles showed that the particles consisted of coal, not anthracite. These residual materials (black coal particles) present in the former coal depot sector are therefore not considered hazardous materials within the meaning of subsection 1(21) of the *Environment Quality Act*.<sup>(2)</sup>

<sup>2</sup> Section 1(21) (L.R.Q., c. Q-2): “hazardous material”: a material which, by reason of its properties, is a hazard to health or to the environment and which, within the meaning of a regulation under this Act, is explosive, gaseous, flammable, poisonous, radioactive, corrosive, oxidizing or leachable or is designated as a hazardous material, and any object classed by regulation as a hazardous material.”

The relatively high sulphur content (above the MDDEP soil criteria, level C) in a number of samples appears to be proportional to the percentage of coal observed during sampling. Analyses performed on backfill material containing varying proportions of coal showed that the acidogenic potential is negative. As a result, with regards to sulphur, it is not necessary to apply the recommendations of the MDDEP for the management of excavated contaminated soil.

### 3.2.2 Environmental issues

Under section 9.1 of the MDDEP Policy,<sup>(1)</sup> contaminated soil with a residual material content of more than 50% is considered residual material. In accordance with section 66 of the *Environment Quality Act*,<sup>(2)</sup> areas where residual materials (coal) had accumulated were delineated (see Figure 3.2, zones 2.1, 2.2 and 2.3); this includes all of the surfaces and exploratory trenches where coal was observed at a percentage greater than 50% at the soil surface or along the trench walls.

The estimated total surface area residual materials containing coal at a percentage greater than 50% of the matrix was 1,295 m<sup>2</sup>, and the estimated volume was 260 m<sup>3</sup>. This area is smaller than that estimated by Entraco (2009), which was calculated as 2,115 m<sup>2</sup> using the half-distance principle. The selected area of 1,295 m<sup>2</sup> represents an initial figure that could rise depending on observations made during the remediation work. The re-assessment of the area takes into account the results of observations and soundings conducted by Entraco with a GPS in the fall of 2010; the purpose of the survey was to calculate the area where coal was visible at the surface. The characteristics of each zone are described in detail in Table 3.2.

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(1) Section 9.1 of the MDDEP Policy (excerpt): "Excavated contaminated soils mixed with residual materials that cannot be segregated shall be considered contaminated soils and managed using the policy grid if they contain more than 50% soil. They shall be managed as residual materials if they contain less than 50% soil."

(2) Section 66 (L.R.Q., c. Q-2): "No one may deposit or discharge residual materials or allow residual materials to be deposited or discharged at a place other than a site at which the storage, treatment or elimination of residual materials is authorized by the Minister or the Government pursuant to the provisions of this Act and the regulations."

A zone of materials that may contain coal, but below 50% of the total matrix, borders the previous zone to the north, east and south. Coal was observed in a few locations in that area, primarily at the surface. The area contains some coal-free zones, but it is possible that there are zones with higher coal content.

With regard to arsenic contamination (see Figure 3.2, zone 2.4), considering the results of the 2007 study (trench PE-22, C-D range), we estimate that the volume of contaminated soil is 65 m<sup>3</sup>, that is a surface area of 100 m<sup>2</sup> and an average thickness of 65 cm below the horizon of residual materials (coal).

### **3.2.3 Remediation objectives**

Given the planned use (commercial), the contaminated soil remediation objective is to attain level C of the MDDEP Policy, i.e. the values set out in Schedule II to the LPRR.

Furthermore, owing to the presence of residual materials (coal) in the surface soil, a second remediation objective is presented for the areas where residual material (coal) content was observed above 50% in the soil: soil with a residual material (coal) content of 50% or more will have to be removed and disposed of at an authorized site.

### **3.2.4 Brief description of the work**

The potentially contaminated soil (exceeding the MDDEP soil criteria, level C) around trench P-22 (LVM 2007) will be excavated and characterized in piles (zone 2.4).

The proposed work also includes excavating the horizons where the percentage of coal is above 50% (zones 2.1, 2.2 and 2.3) and disposing of it at a site authorized by MDDEP, i.e. an engineered landfill site (ELS). We do not recommend systematically removing materials from the areas where the coal percentage is below 50% (generally below 5%); rather, we suggest inspecting the entire zone to identify areas of major accumulation (coal content above 50%) and restoring them in the same manner as the main accumulation zone. The characteristics of each zone are described in detail in Table 3.2.

Table 3.2 Characteristics of the zones to be remediated in the former coal depot sector

Zone	Issue	Area (m <sup>2</sup> )	Depth (cm)	Variation in Thickness (cm)	Average thickness (cm)	Volume (m <sup>3</sup> )	Selected Action
2.1	Residual material content above 50%	850	Between 0 and 30	Between 1 and 20	20	170	Excavation and disposal
2.2	Residual material content above 50%	270	Between 0 and 30	Between 8 and 25	25	70	Excavation and disposal
2.3	Residual material content above 50%	175	Between 0 and 10	Between 3 and 10	10	20	Excavation and disposal
<b>Subtotal</b>		<b>1295</b>				<b>260</b>	
2.4	Soil potentially contaminated by arsenic	100	Between 16 and 80		65	65	Excavation and characterization
<b>Subtotal</b>		<b>100</b>				<b>65</b>	
<b>Total</b>		<b>1395</b>				<b>325</b>	

Note: The volumes for zones 2.2 and 2.3 are rounded.

### 3.3 FORMER LANDFILL SECTOR

#### 3.3.1 Summary of previous studies

An environmental characterization study conducted by LVM Technisol in 2007 detected the presence of buried residual materials. Furthermore, metals contamination was detected in trenches PE-9 (above the MDDEP soil criteria, level C) and PE-14 (above the MDDEP soil criteria level "D", i.e. the values presented in Schedule I to the *Regulation Respecting the Burial of Contaminated Soils* (RRBCS)). In the study by Entraco (2009), no exceedances of the level C were observed in the 10 exploratory trenches, and all soil sample concentrations were below the level B, with the exception of one sample, (T-34:45-55) containing manganese (B-C range). Sampling was performed in a manner that made it possible to segregate the horizon with residual material from the soil horizons above and below it.

A residual material accumulation zone was delineated based on field observations; it coincides with the contaminated area identified by LVM Technisol (PE-9 and PE-14) and encompasses trenches T-32, T-33 and T-34.

This area was split in two for management purposes: one section where the percentage of residual materials is above 50% (sounding T-34), and one where the percentage is below 30% (soundings T-32, T-33, PE-9 and PE-14).

#### 3.3.2 Environmental issue

In accordance with section 66 of the *Environment Quality Act*, a zone of residual material accumulation (more than 50% of the matrix) was delineated (see Figure 3.3, zone 3.1). This zone covers an area of 35 m<sup>2</sup> (5 m by 7 m). The estimated volume of waste is 7 m<sup>3</sup>, assuming

an average thickness of 20 cm. The depth of the waste accumulation horizon is variable and is located approximately 45 cm below the soil surface (between 45 and 55 cm in trench T-34).

When considering the heavy metal contamination (C-D and >D) detected in 2007 in excavations PE-9 and PE-14, the volume of potentially contaminated soil in these two areas has been estimated at 93 m<sup>3</sup>; that is 44 m<sup>3</sup> near trench PE-9 (zone 3.2) and 49 m<sup>3</sup> near trench PE-14 (zone 3.3). These volumes will have to be confirmed by characterizing the piles of excavated soil. The characteristics of each area are described in Table 3.3.

### **3.3.3 Remediation objectives**

Given the planned land-use (commercial), the contaminated soil remediation objective is to attain the level C of the MDDEP Policy, i.e. the values set out in Schedule II to the LPRR.

Furthermore, due to the presence of residual materials in the surface soil, there is a second remediation objective for the areas where residual materials (coal) were observed in the soil above 50%. Consequently, soil containing residual materials at 50% or more will have to be removed and disposed of at an authorized site.

### **3.3.4 Brief description of the work**

The horizon of buried residual materials in zone 3.1 (residual material above 50%), i.e. between 40 and 60 cm deep, will be excavated and disposed of the residual materials at an ELS.

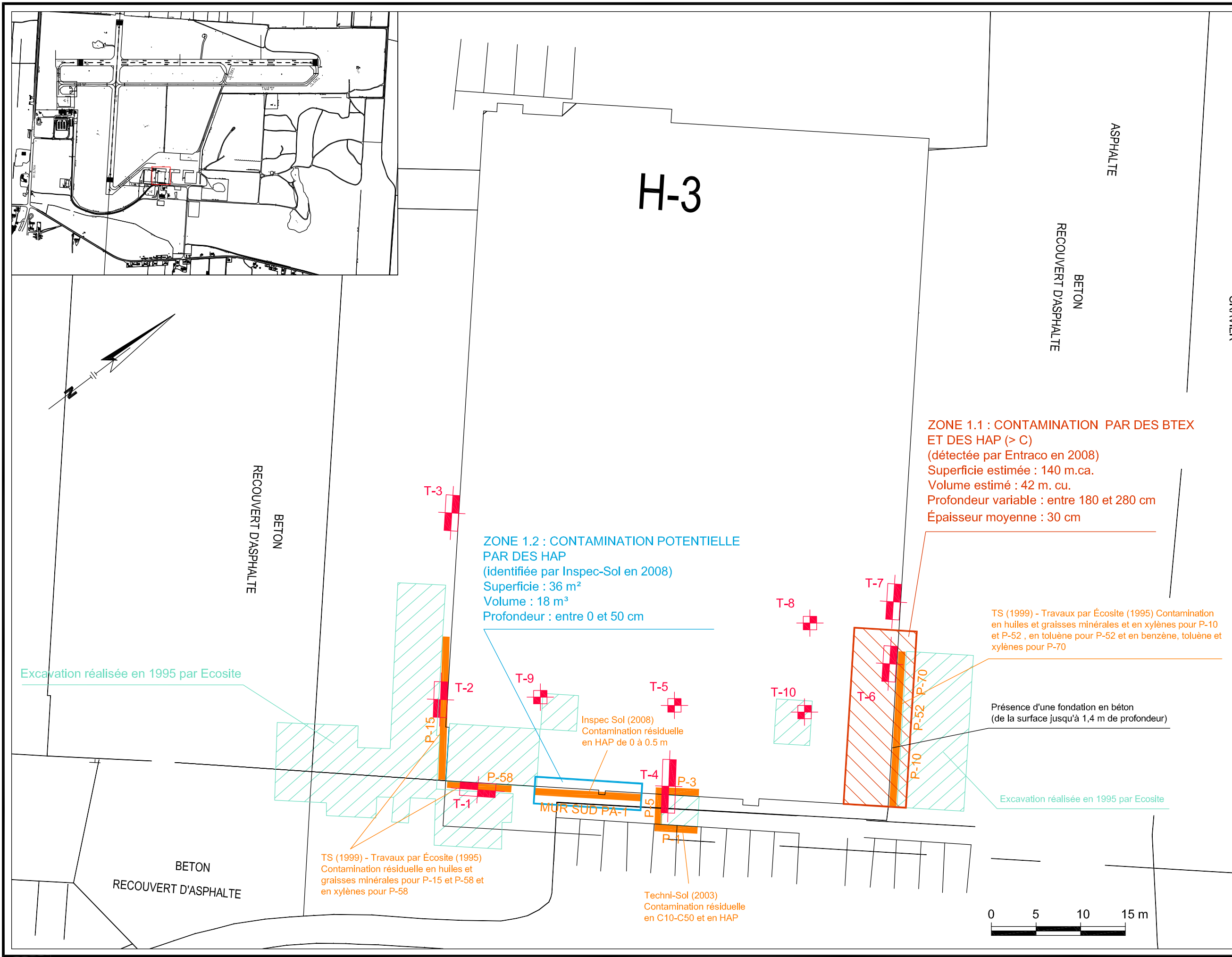
Taking into account the heavy metal contamination detected in 2007 in trenches PE-9 and PE-14, the following work is planned (see Figure 3.3, zones 3.2 and 3.3):

- near trench PE-9 (zone 3.2): excavate the potentially contaminated soil, store it temporarily and characterize it to determine the appropriate management method.
- near trench PE-14 (zone 3.3): excavate the potentially contaminated soil, store it temporarily and characterize it to determine the appropriate management method.

Table 3.3 Characteristics of the zones to be remediated in the former landfill sector

Zone	Issue	Area (m <sup>2</sup> )	Depth (cm)	Average Thickness (cm)	Volume (m <sup>3</sup> )	Selected Action
3.1	Residual material content above 50%	35	Between 40 and 60	20	7	Excavation and disposal
<b>Subtotal</b>		<b>35</b>			<b>7</b>	
3.2	Soil potentially contaminated by metals	37	Between 0 and 100 to 130	120	44	Excavation and characterization
3.3	Soil potentially contaminated by metals	35	Between 0 and 130 to 150	140	49	Excavation and characterization
<b>Subtotal</b>		<b>72</b>			<b>93</b>	
<b>Total</b>		<b>107</b>			<b>100</b>	

Figure 3.1 Summary of data related to the former building H-3



LÉGENDE

- T-11 Tranchée d'exploration\_Entraco 2008
- T-25 Tranchée d'exploration allongée\_Entraco 2008
- Zone contaminée à restaurer identifiée par Entraco
- Secteur potentiellement contaminé identifié par Inspec-Sol en 2008
- Zone restaurée antérieurement
- Contamination supérieure au critère C

SOURCE : Plan dessiné par TPSGC  
(C00pg01.dwg)

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Dossier / File:  
AÉROPORT DE MONT-JOLI

Plan de réhabilitation  
Ancien bâtiment H-3, ancien dépôt de charbon  
et ancien dépotoir

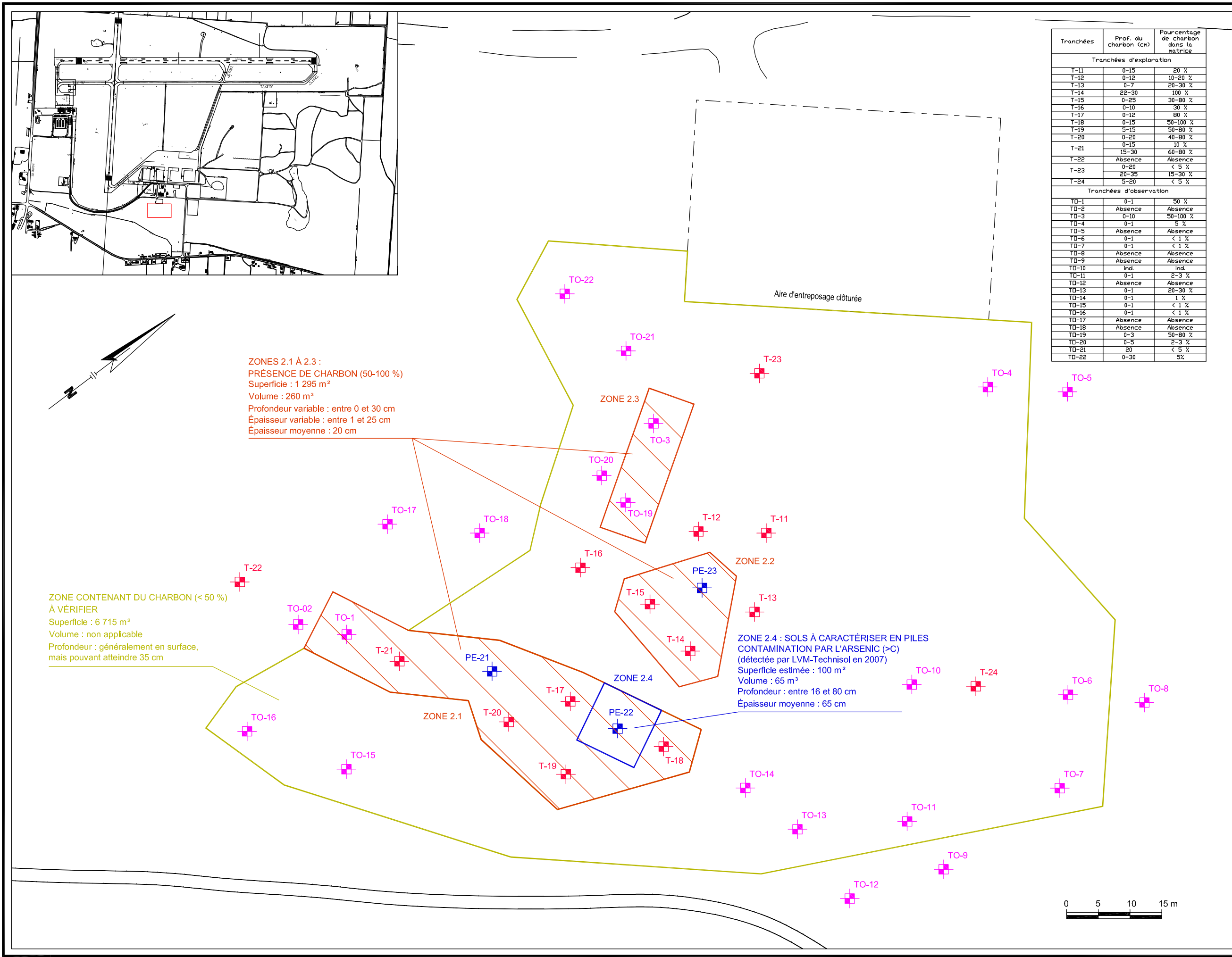
Dessin / Drawing:  
FIGURE 3.1  
Synthèse des données  
Secteur de l'ancien bâtiment H-3

Conçu par / Designed by:	Date
N.L.	04-10-2010
Dessiné par / Drawn by:	Date
É.L.F./N.L.	04-01-2011
Vérifié par / Verified by:	Date
N.L.	18-03-2011
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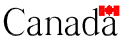
Figure 3.2 Summary of data related to the former coal depot




Tranchées	Prof. du charbon (cm)	Pourcentage de charbon dans la matrice
Tranchées d'exploration		
T-11	0-15	20 %
T-12	0-12	10-20 %
T-13	0-7	20-30 %
T-14	22-30	100 %
T-15	0-25	30-80 %
T-16	0-10	30 %
T-17	0-12	80 %
T-18	0-15	50-100 %
T-19	5-15	50-80 %
T-20	0-20	40-80 %
T-21	0-15	10 %
T-22	15-30	60-80 %
T-23	Absence	Absence
T-24	0-20	< 5 %
T-25	20-35	15-30 %
T-26	5-20	< 5 %
Tranchées d'observation		
TO-1	0-1	50 %
TO-2	Absence	Absence
TO-3	0-10	50-100 %
TO-4	0-1	5 %
TO-5	Absence	Absence
TO-6	0-1	< 1 %
TO-7	0-1	< 1 %
TO-8	Absence	Absence
TO-9	Absence	Absence
TO-10	ind.	ind.
TO-11	0-1	2-3 %
TO-12	Absence	Absence
TO-13	0-1	20-30 %
TO-14	0-1	1 %
TO-15	0-1	< 1 %
TO-16	0-1	< 1 %
TO-17	Absence	Absence
TO-18	Absence	Absence
TO-19	0-3	50-80 %
TO-20	0-5	2-3 %
TO-21	20	< 5 %
TO-22	0-30	5%




Transports  
Canada  
Région du Québec




### LÉGENDE

**PE-21**


Tranchée d'exploration\_LVM-Technisol 2007  
(localisation approximative)

**T-11**


Tranchée d'exploration\_Entraco 2008

**TO-1**


Tranchée d'observation\_Entraco 2008



Zone estimée des matières résiduelles  
(présence de charbon entre 50 et 100 %)



Zone de présence potentielle de charbon (< 50 %)




Zone potentiellement contaminée\_LVM 2007

NOTE IMPORTANTE : La localisation des stations est approximative ; elle a été réalisée par chaînage en utilisant la clôture de l'aire d'entreposage située au nord. Les coordonnées relevées par GPS n'ont pas été utilisées parce que les points de référence ne concordaient pas avec le plan.

SOURCE : Plan dessiné par TPSGC  
(C00pg01.dwg)

Rév.	Description	Par/By	Date
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ENTRACO  
Conseillers en environnement

Dossier / File:

Plan de réhabilitation  
Ancien bâtiment H-3, ancien dépôt de charbon  
et ancien dépotoir

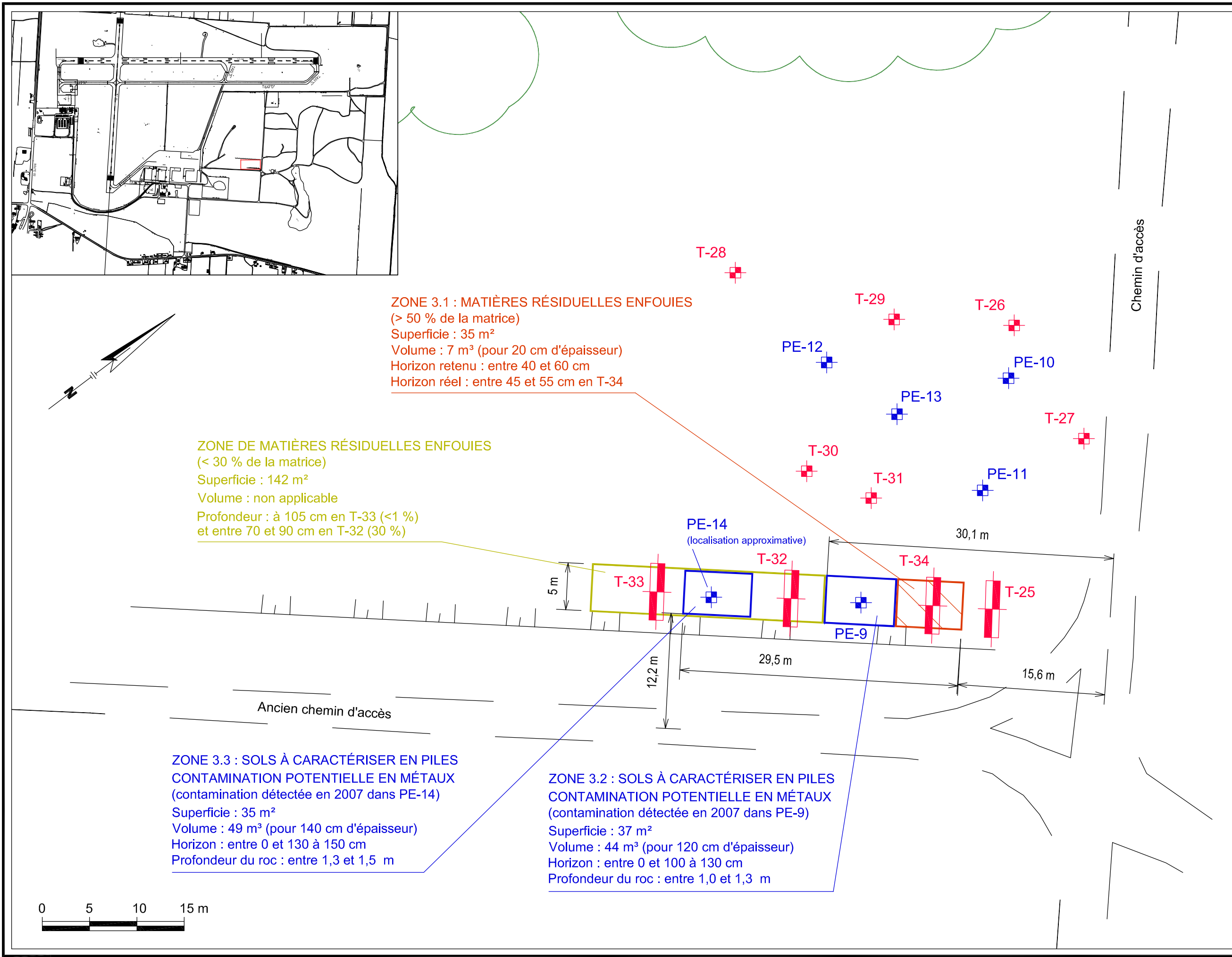
Dessin / Drawing:

FIGURE 3.2  
Synthèse des données  
Secteur de l'ancien dépôt de charbon

Conçu par / Designed by:		Date
N.L.		4-10-2010
Dessiné par / Drawn by:		Date
É.L.F./N.L.		04-01-2011
Vérifié par / Verified by:		Date
N.L.		18-03-2011
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Figure 3.3 Summary of data related to the former landfill



LÉGENDE

- PE-21 Tranchée d'exploration\_LVM 2007 (localisation approximative)
- T-11 Tranchée d'exploration\_Entraco 2008
- T-25 Tranchée d'exploration allongée\_Entraco 2008
- Matières résiduelles (> 50 %) Zone à restaurer
- Matières résiduelles (< 30 %) Aucune intervention
- Zone potentiellement contaminée Caractérisation des sols

SOURCE : Plan dessiné par TPSGC (C00pg01.dwg)

Rév.	Description	Par/By	Date
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AÉROPORT DE MONT-JOLI  
Plan de réhabilitation  
Ancien bâtiment H-3, ancien dépôt de charbon  
et ancien dépotoir

Dessin / Drawing:  
FIGURE 3.3  
Synthèse des données  
Secteur de l'ancien dépotoir

Conçu par / Designed by:	Date
N.L.	4-10-2010
Dessiné par / Drawn by:	Date
É.L.F./N.L.	04-01-2011
Vérifié par / Verified by:	Date
N.L.	18-03-2011
Approuvé par / Approved by:	Date
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## 4. REMEDIATION WORK

### 4.1 EXCAVATION AND STORAGE

#### 4.1.1 Former building H-3 sector

In zone 1.1 (see Figure 4.1), i.e. at the southeast corner of the former building, it is planned to excavate the contaminated soil (above the MDDEP soil criteria level C) and dispose of it at a treatment site authorized by MDDEP. The remediation work will have to include, but not be limited to, the following activities:

- Excavate the surface soil until the contaminated soil horizon is reached (start excavating at the south end, where the contaminated horizon is between 1.8 m to 2.1 m below grade, and follow the contaminated horizon, which descends to a depth of approximately 2.6 m to 2.8 m). Store the soil temporarily and characterize it to determine the appropriate management method (see section 4.2). During the excavation, use a VOC detector to confirm the absence of contaminants and to identify when the contaminated horizon is reached. The clean soil should be stored on a polyethylene tarp and covered with another of the same kind.
- Dismantle the concrete foundations and transport the concrete waste to an authorized site (see section 5.2).
- Excavate the contaminated soil horizon located between approximately 1.8 m and 2.1 m below grate at the south end and 2.6 m and 2.8 m below grate at the north end. Use a VOC detector to determine when the contaminated horizon is reached; the start of the contaminated horizon corresponds roughly to the start of the saturated horizon. The contaminated materials consist of gravel, pebbles and some sand and are resting on a dense layer of silt. The excavation of the contaminated soil must reach the dense silt layer; excavate 10 cm into the dense silt.
- Perform quality control sampling on the soil in place (see section 4.3).
- Following the quality control sampling, if the contaminant concentrations in samples taken from the walls and/or bottoms of the excavations exceed the level C, continue excavating and sampling the bottoms and sides of the excavations until the soil in place meets level C.
- Manage the impacted soil in accordance with the MDDEP Policy (see section 5.1).
- Once the remediation objectives have been met, backfill the excavation with the original surface soil set aside (provided that the soil quality is adequate—see section 5.3) and/or with clean backfill material. Compact this material in layers of approximately 30-cm thick.

In zone 1.2, i.e. along the former south wall of the building, the surface soil will be excavated and stored into piles. The remediation work will include, but not be limited to, the following activities:

- Excavate the surface soil to a depth of 50 cm, store it in piles, and characterize the piles to determine the appropriate management method (see section 4.2). The soil must be placed on a polyethylene tarp and covered with another of the same kind.
- Apply the quality control measures to the remaining soil (see section 4.3)
- Following the quality control sampling, if the concentrations in samples taken from the walls and/or bottoms of the excavations exceed the MDDEP's C criteria, continue excavating the remaining soil and, subsequently verifying the soil quality until the criteria are met. .
- If applicable, manage the affected soil in accordance with the MDDEP Policy (see section 5.1).
- Once the remediation objectives have been achieved, backfill the excavation with the original material (provided that the soil quality is adequate—see section 5.3) and/or with clean borrow material; compact this material in approximately 30-cm layers.

#### **4.1.2 Former coal depot sector**

##### ***Residual materials***

In areas which have accumulated residual material (coal content above 50%), that is in zones 2.1, 2.2 and 2.3 (see Figure 4.2), the remediation work will include, but not be limited to, the following activities:

- Excavate the affected materials (coal and soil with a coal content of more than 50%); the approximate depths to be excavated are indicated in Figure 4.2. As the materials are excavated, verify the percentage of residual materials in the soil from the walls and bottom to determine whether excavation should continue or cease. Note that in certain zones, the affected materials are covered by a thin layer of soil with a coal content of less than 50% that, for technical reasons, must also be excavated and managed with the underlying materials that have a coal content of more than 50%. If the horizon is more than 10 cm thick, excavate the soil, place it in temporary pile and characterize it to determine the appropriate management method. The soil must be stored on a polyethylene tarp and covered with another of the same kind.
- Perform quality control sampling on the remaining soil (see section 4.3).
- Following the quality control sampling, if the concentrations in samples taken from the walls and/or bottoms of the excavations exceed level C, continue excavating the soil and verifying the soil quality until the target criteria is attained.
- If applicable, manage the impacted soil in accordance with the MDDEP Policy (see section 5).
- Once the remediation objectives have been attained, backfill the excavation with clean borrow material. Compact this material in approximately 30-cm layers.

In the area surrounding zones 2.1, 2.2 and 2.3 (observed quantity of coal below 50%), the work will should include, but not be limited to, the following activities:

- Conduct a visual inspection using exploratory trenches to identify coal accumulation zones.
- Where the percentage of coal in the matrix is above 50%, remediate the affected surface by performing the same activities as are applicable to zones 2.1 to 2.3.

### ***Contaminated soil***

In zone 2.4, the following activities are planned in order to take into consideration the arsenic contamination (in the C-D range) detected in 2007 in excavation PE-22:

- Following the removal of the residual materials, excavate the underlying soil to a depth of 80 cm, place it in piles and characterize it to determine the appropriate management method (see section 4.2); the soil must be stored on a polyethylene tarp and covered with another of the same kind.
- Perform quality control samples on the remaining soil (see section 4.3).
- Following the quality control sampling, if the concentrations in samples taken from the walls and/or bottoms of the excavations exceed level C, continue excavating the soil and verifying the soil quality until the target criteria is attained.
- If applicable, manage the affected soil in accordance with the MDDEP Policy (see section 5.1).
- Once the remediation objectives have been achieved, backfill the excavation with the original material (if applicable and provided that the soil quality is adequate—see section 5.3) and/or with clean borrow material. Compact this material in approximately 30-cm layers.

### **4.1.3 Former landfill sector**

#### ***Residual materials***

In zone 3.1 (see Figure 4.3), excavate the horizon of buried residual materials around station T-34 (residual material content above 50%) and dispose of the materials at an ELS. The remediation work will should include, but not be limited to, the following activities:

- Excavate the surface soil within an area of 35 m<sup>2</sup> until the horizon of buried waste is reached (depth of approximately 45 cm at T-34) and store it temporarily). The soil must be stored on a polyethylene tarp and covered with another of the same kind.
- Excavate the buried residual materials and dispose them at an authorized site. If hazardous residual materials are detected, segregate these materials and dispose them at a site authorized by MDDEP.
- Perform quality control sampling on the remaining soil (see section 4.3), paying special attention to the western wall of the excavation (near excavation PE-9).

- Following the quality control sampling, if the concentrations in samples taken from the walls and/or bottoms of the excavation exceed level C, continue excavating the soil and verifying the soil quality until the target criteria is attained.
- If applicable, manage the impacted soil in accordance with the MDDEP Policy (see section 5.1).
- Characterize the excavated surface soil to ensure that it does not contain contaminants concentrations above level C; if an exceedance is detected, manage the affected soil in accordance with the MDDEP Policy.
- Once the remediation objectives have been met, backfill the excavation with the original material (provided that the concentrations in the original material are below the MDDEP C criteria, as demonstrated by the soil characterization) or with clean borrow material (see section 5.3). Compact this material in approximately 30-cm layers.

### **Contaminated soil**

The following activities are planned in order to take into account the heavy metal contamination detected in 2007 in excavations PE-9 and PE-14 (see Figure 4.3):

- In zone 3.2, around excavation PE-9:
  - Excavate the potentially contaminated soil, i.e. a surface area of 37 m<sup>2</sup> and an average thickness of 120 cm; store it in piles and characterize it to determine the appropriate management method (see section 4.2); the soil must be stored on a polyethylene tarp and covered with another of the same kind.
  - Perform quality control sampling on the remaining soil (see section 4.3).
  - Following the quality control sampling, if the concentrations in samples taken from the walls and/or bottoms of the excavation exceed the MDDEP's level C, continue excavating the soil and verifying the soil quality until the target criteria is attained.
  - If applicable, manage the impacted soil in accordance with the MDDEP Policy (see section 5.1).
  - Once the remediation objectives have been met, backfill the excavation with the original material (provided that the concentrations in the original material are below the MDDEP level C, as demonstrated by the soil characterization) or with clean borrow material (see section 5.3). Compact this material in approximately 30-cm layers.
- In zone 3.3, around excavation PE-14:
  - Excavate the potentially contaminated soil, i.e. a surface area of 35 m<sup>2</sup> and an average thickness of 140 cm store it in piles and characterize it to determine the appropriate management method (see section 4.2). The soil must be stored on a polyethylene tarp and covered with another of the same kind.
  - Perform quality control sampling on the remaining soil (see section 4.3).
  - Following the quality control sampling, if the concentrations in samples taken from the walls and/or bottoms of the excavation exceed the MDDEP level C, continue excavating the soil and verifying the soil quality until the target criteria is attained.

- If applicable, manage the affected soil in accordance with the MDDEP Policy (see section 5.1).
- Once the remediation objectives have been met, backfill the excavation with the original material (provided that the concentrations in the original material are below the MDDEP C criteria, as demonstrated by the soil characterization) or with clean backfill material (see section 5.3). Compact this material in approximately 30-cm layers.

## 4.2 SOIL PILE CHARACTERIZATION

The sampling of the soil piles must comply with the requirements of the *Cahier 5 – Échantillonnage des sols Guides d'échantillonnage à des fins d'analyses environnementales (Environmental Analysis Sampling Guide - Book 5 – Soil Sampling)*. Considering the characteristics of the areas to be remediated shown in figures 4.1 to 4.3, the components of the soil pile characterization program are presented in Table 4.1. This program will have to be adapted to the work realized on site, for example, in the event that additional excavations are conducted.

## 4.3 QUALITY CONTROL OF THE EXCAVATIONS

The walls and bottoms of all excavations will be characterized, regardless of whether contaminated soil or residual materials are being excavated. The sampling methods must comply with the requirements presented in *Cahier 5 – Échantillonnage des sols Guides d'échantillonnage à des fins d'analyses environnementales (Environmental Analysis Sampling Guide - Book 5 – Soil Sampling)*.

Considering the characteristics of the zones to be remediated shown in figures 4.1 to 4.3, as a reference, the components of the quality control program are indicated in Table 4.2. This program will have to be adapted to the work as it is performed, for example, in the event that additional excavations are required that what was previously planned.

The analyses should be conducted by a CEAEQ accredited laboratory. The selected parameters to be analysed are those which have exceeded the MDDEP level C criteria for soils, in previous studies.

Table 4.1 Soil pile characterization program

Site	Zone <sup>(1)</sup>	Issue	Estimated Volume (m <sup>3</sup> )	Number of samples	Parameters			
					Metals <sup>(2)</sup>	PH C <sub>10</sub> -C <sub>50</sub>	BTEX <sup>(3)</sup>	PAHs <sup>(4)</sup>
Former building H-3	Zone 1.1	Surface soil (clean) - BTEX and PAHs contamination of underlying soil (exceedance of C criteria)	800 <sup>(5)</sup>	8 <sup>(6)</sup>			√	√
	Zone 1.2	PAHs soil contamination (exceedance of C criteria)	18	1		√		√
Former coal depot	Zone 2.4	Potential contamination (exceedance of C criteria) of soil by metals	65	3	√			
Former landfill	Zone 3.1	Surface soil (clean) - underlying residual waste	14	1	√			
	Zone 3.2	Potential contamination (exceedance of C criteria) of soil by metals	44	2	√			
	Zone 3.3	Potential contamination (exceedance of C criteria) of soil by metals	49	2	√			
TOTAL			990	15	n/a	n/a	n/a	n/a

## NOTES

- (1) The locations of the zones are shown in figures 4.1 to 4.3.  
 (2) Metals: Arsenic, cadmium, chromium, copper, tin, manganese, nickel, lead, zinc.  
 (3) BTEX: Benzene, toluene, ethylbenzene and xylenes.  
 (4) PAHs: Polycyclic aromatic hydrocarbons.  
 (5) The estimated volume takes into account the need to enlarge the top of the excavation so that the walls slope at a ratio of 1 to 1.  
 (6) Samples from zone 1.1 collected for BTEX analysis must be grab samples.  
 n/a Not applicable.

Table 4.2 Quality control program for the excavations

Site	Zone <sup>(1)</sup>	Issue	Number of samples		Parameters			
			Walls	Bottom	Metals <sup>(2)</sup>	PH C <sub>10</sub> -C <sub>50</sub>	BTEX <sup>(3)</sup>	PAHs <sup>(4)</sup>
Former building H-3	Zone 1.1	BTEX and PAHs soil contamination (exceedance of C criteria)	4 <sup>(5)</sup>	1 <sup>(5)</sup>			√	√
	Zone 1.2	Potential contamination of soil by PAHs	4	1		√		√
Former coal depot	Zone 2.1	Presence of residual materials (above 50%) in soil; potential contamination of soil by metals	11	5	√			
	Zone 2.2	Presence of residual materials (above 50%) in soil; potential contamination of soil by metals	6	1	√			
	Zone 2.3	Presence of residual materials (above 50%) in soil; potential contamination of soil by metals	4	1	√			
	Zone 2.4	Potential contamination of soil by metals	4	1	√			
Former landfill	Zone 3.1	Potential contamination of soil by metals	4	1	√			
	Zone 3.2	Potential contamination of soil by metals	7 <sup>(6)</sup>	1	√			
	Zone 3.3	Potential contamination of soil by metals	8 <sup>(7)</sup>	1	√			
TOTAL <sup>(8)</sup>			52	13	n/a	n/a	n/a	n/a

## NOTES

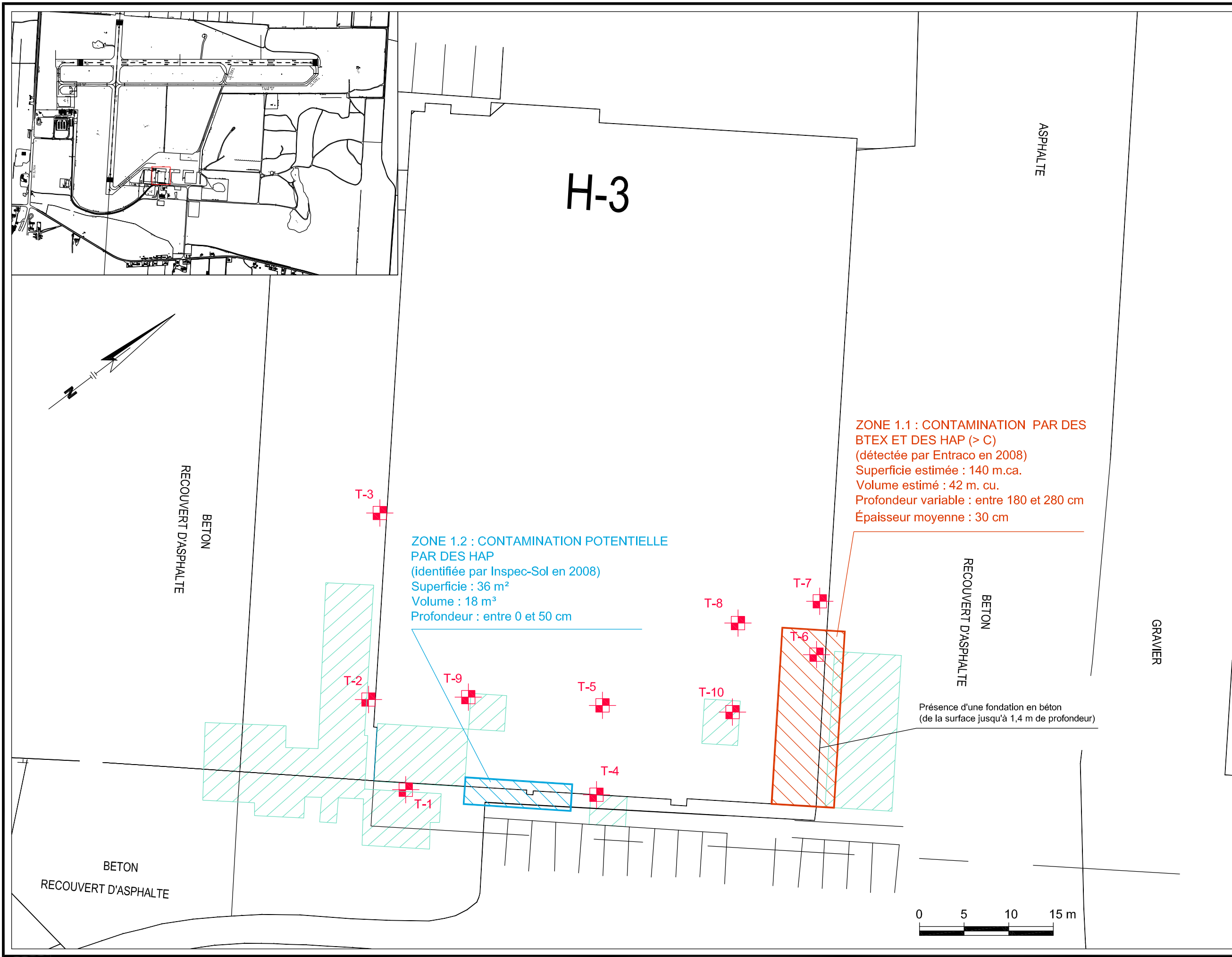
- (1) The locations of the zones are shown in figures 4.1 to 4.3.
- (2) Metals: Arsenic, cadmium, chromium, copper, tin, manganese, nickel, lead, zinc.
- (3) BTEX: Benzene, toluene, ethylbenzene and xylenes.
- (4) PAHs: Polycyclic aromatic hydrocarbons.
- (5) In zone 1.1, samples collected for BTEX analysis from excavation walls and bottoms must be grab samples.
- (6) Two samples per wall of approximately 1.2 m high; only one sample from the eastern wall (between 60 and 120 cm, following the excavation of zone 3.1 between 0 and 60 cm in depth).
- (7) Two samples per wall of approximately 1.4 m high.
- (8) Does not include field duplicates (minimum of 10%).
- n/a Not applicable.

#### 4.4 FIELD QUALITY CONTROL AND ASSURANCE PROGRAM

During the sampling work (sides, bottoms and piles), the instruments used must be cleaned in accordance with the requirements of the *Site Characterization Guide* and the *Environmental Analysis Sampling Guide (Book 1 – General and Book 5 – Soil Sampling)*.

Field duplicates must be collected to represent a minimum of 10% of the total number of samples collected for each parameter analyzed. However, a minimum of one duplicate per batch of samples sent for analysis must be respected regardless of the total number of samples collected in a sampling campaign. The parameters analyzed must be the same as those selected for the original samples.

Figure 4.1      Location of zones to be remediated in the former building H-3 sector



LÉGENDE

- T-11 Tranchée d'exploration\_Entraco 2008
- Zone contaminée à restaurer identifiée par Entraco
- Secteur potentiellement contaminé identifié par Inspec-Sol en 2008
- Zone restaurée antérieurement

SOURCE : Plan dessiné par TPSGC  
(C00pg01.dwg)

Rév.	Description	Par/By	Date
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AÉROPORT DE MONT-JOLI  
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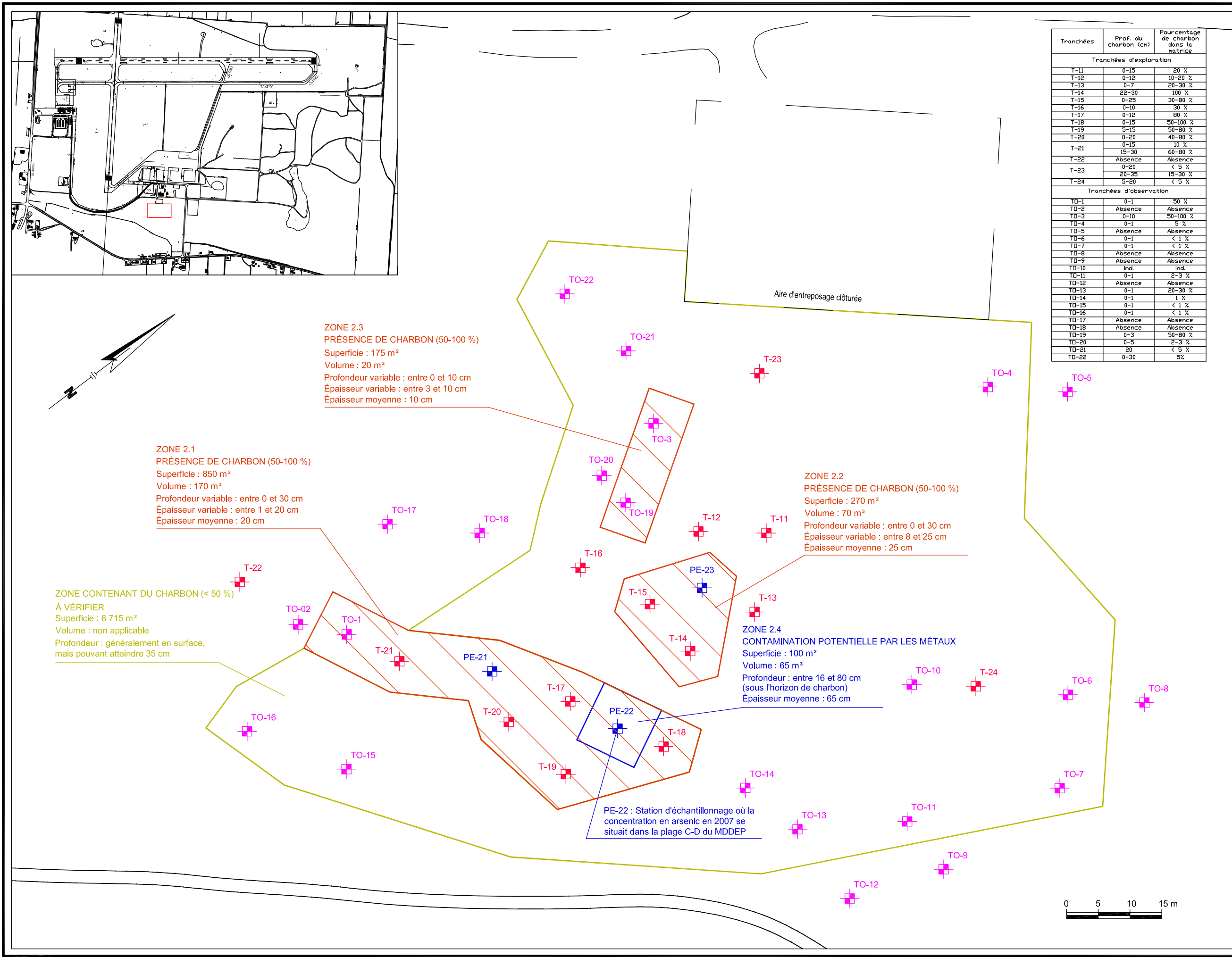
Dessin / Drawing:  
FIGURE 4.1  
Localisation des zones d'intervention  
Secteur de l'ancien bâtiment H-3

Conçu par / Designed by:	Date
N.L.	4-10-2010
Dessiné par / Drawn by:	Date
É.L.F./N.L.	15-12-2010
Vérifié par / Verified by:	Date
N.L.	18-03-2011
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Figure 4.2 Location of zones to be remediated in the former coal depot sector



Tranchées	Prof. du charbon (cm)	Pourcentage de charbon dans la matrice
Tranchées d'exploration		
T-11	0-15	20 %
T-12	0-12	10-20 %
T-13	0-7	20-30 %
T-14	22-30	100 %
T-15	0-25	30-80 %
T-16	0-10	30 %
T-17	0-12	80 %
T-18	0-15	50-100 %
T-19	5-15	50-80 %
T-20	0-20	40-80 %
T-21	0-15	10 %
T-22	15-30	60-80 %
T-23	Absence	Absence
T-24	0-20	< 5 %
T-25	20-35	15-30 %
T-26	5-20	< 5 %
Tranchées d'observation		
TO-1	0-1	50 %
TO-2	Absence	Absence
TO-3	0-10	50-100 %
TO-4	0-1	5 %
TO-5	Absence	Absence
TO-6	0-1	< 1 %
TO-7	0-1	< 1 %
TO-8	Absence	Absence
TO-9	Absence	Absence
TO-10	ind.	ind.
TO-11	0-1	2-3 %
TO-12	Absence	Absence
TO-13	0-1	20-30 %
TO-14	0-1	1 %
TO-15	0-1	< 1 %
TO-16	0-1	< 1 %
TO-17	Absence	Absence
TO-18	Absence	Absence
TO-19	0-3	50-80 %
TO-20	0-5	2-3 %
TO-21	20	< 5 %
TO-22	0-30	5%

LÉGENDE

- PE-21 Tranchée d'exploration\_LVM Technisol 2007 (localisation approximative)
- T-11 Tranchée d'exploration\_Entraco 2008
- TO-1 Tranchée d'observation\_Entraco 2008
- Zone estimée des matières résiduelles (présence de charbon entre 50 et 100 %)
- Zone de présence potentielle de charbon (< 50 %)
- Zone potentiellement contaminée (Arsenic) (selon LVM Technisol 2007)

NOTE IMPORTANTE : La localisation des stations est approximative ; elle a été réalisée par chaînage en utilisant la clôture de l'aire d'entreposage située au nord. Les coordonnées relevées par GPS n'ont pas été utilisées parce que les points de référence ne concordaient pas avec le plan.

SOURCE : Plan dessiné par TPSGC (C00pg01.dwg)

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Plan de réhabilitation  
Ancien bâtiment H-3, ancien dépôt de charbon  
et ancien dépotoir

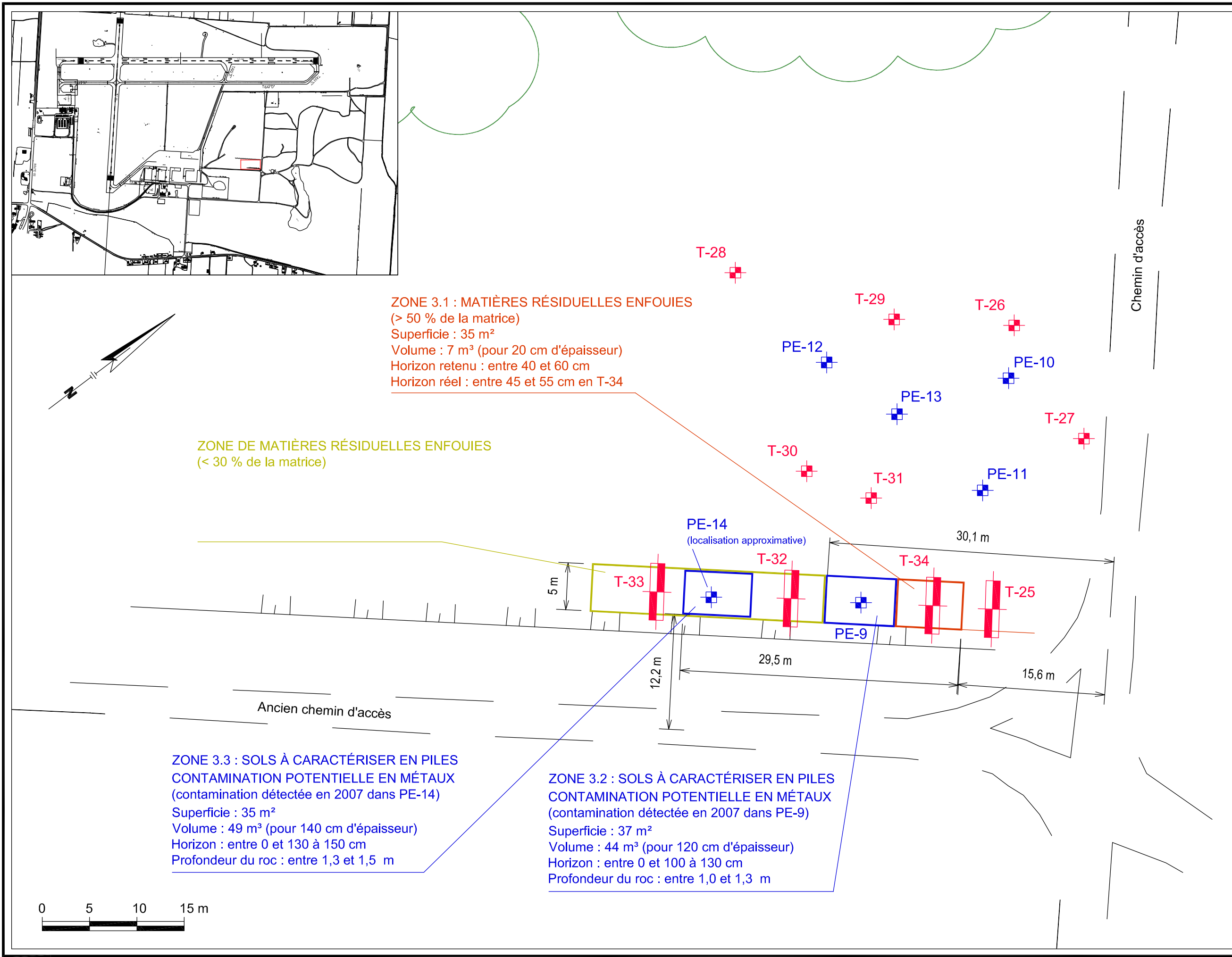
Dessin / Drawing:  
FIGURE 4.2  
Localisation des zones d'intervention  
Secteur de l'ancien dépôt de charbon

Conçu par / Designed by:	Date
N.L.	4-10-2010
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É.L.F./N.L.	15-12-2010
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N.L.	18-03-2011
Approuvé par / Approved by:	Date
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Figure 4.3 Location of zones to be remediated in the former landfill sector



## LÉGENDE

- PE-21 Tranchée d'exploration\_LVM 2007 (localisation approximative)
- T-11 Tranchée d'exploration\_Entraco 2008
- Matières résiduelles (> 50 %)  
Zone à restaurer
- Matières résiduelles (< 30 %)  
Aucune intervention
- Zone potentiellement contaminée  
Caractérisation des sols

SOURCE : Plan dessiné par TPSGC  
(C00pg01.dwg)

Rév.	Description	Par/By	Date
-	-	-	-
-	-	-	-



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**AÉROPORT DE MONT-JOLI**  
Plan de réhabilitation  
Ancien bâtiment H-3, ancien dépôt de charbon  
et ancien dépotoir

Dessin / Drawing:  
**FIGURE 4.3**  
Localisation des zones d'intervention  
Secteur de l'ancien dépotoir

Conçu par / Designed by:	Date
N.L.	4-10-2010
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É.L.F./N.L.	05-01-2011
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	39



## 5. MANAGEMENT OF SOIL, RESIDUAL MATERIALS AND BACKFILL

### 5.1 SOIL MANAGEMENT

Soil excavated as part of the remediation work must be managed in accordance with the *Interim Management Grid for Excavated Contaminated Soils* of the MDDEP Policy. The management procedures to be applied in each area are described in detail in Table 5.1. The off-site soil disposal facilities must be facilities authorized by MDDEP.

### 5.2 RESIDUAL MATERIALS MANAGEMENT

Three types of residual materials have been observed in the three sectors to be remediated:

- former building H-3 sector, specifically zone 1.1: concrete waste from the partial demolition of a concrete foundation wall (approximately 10 m<sup>3</sup>);
- former coal depot sector: presence of coal mixed with soil in varying proportions; materials with a coal content above 50% will be considered non-hazardous residual waste; note that Entraco (2009), demonstrated that these residual materials (black particles) consisted of coal and not anthracite; these materials are concentrated at the surface of the soil in a horizon varying from 1 to 30 cm thick;
- former landfill sector: various debris mixed with soil in varying proportions, primarily consisting of glass, metal and plastic; matrix with a debris content above 50% will be considered non-hazardous waste;<sup>(1)</sup> these materials are concentrated in a horizon approximately 10 cm thick located at a depth of approximately 45 cm.

The management procedures to be applied in each zone are described in detail in Table 5.1. The off-site soil disposal facilities must be sites authorized by MDDEP.

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<sup>(1)</sup> If hazardous materials are detected during the work, they must be recovered by an authorized service provider.

### 5.3 MANAGEMENT OF BACKFILL MATERIAL

Backfill for the excavations must be material excavated at the site (surface soil, i.e. soil overlying a contaminated horizon, or soil to be characterized with concentrations below the MDDEP C criteria) and/or borrow material from known external sources (soil quality below the MDDEP A criteria). The origin and quantity of the fill material are specified in Table 5.1.

Table 5.1 Management procedures for soil, residual material and backfill material

Site	Zone <sup>(1)</sup>	Description of Materials	Soil Management			Residual Material Management			Origin of Fill Material	
			Estimated Volume (m <sup>3</sup> )	To Be Characterized	Recommended Destination	Estimated Volume (m <sup>3</sup> )	To Be Characterized	Recommended Destination	Estimated Volume (m <sup>3</sup> )	Origin
Former building H-3	Zone 1.1	Soil contaminated with BTEX and PAHs (C-D range)	42	No	Authorized treatment site	n/a	n/a	n/a	42	Recognized borrow pit
		Surface soil ( not contaminated)	800	Yes	If contaminated: treatment site or engineered landfill site	n/a	n/a	n/a	800	Surface soil (if uncontaminated) or recognized borrow pit
		Concrete waste from the foundation	n/a	n/a	n/a	10	No	Recycled aggregate producer	10	Recognized borrow pit
	Zone 1.2	Soil potentially contaminated by PAHs	18	Yes	If contaminated: treatment site or engineered landfill site	n/a	n/a	n/a	18	Excavated soil (if uncontaminated) or recognized borrow pit
Former coal depot	Zone 2.1	Presence of residual materials (above 50%) in the soil; potential contamination of the soil by metals	n/a	n/a	n/a	170	No	Engineered landfill site	170	Recognized borrow pit
	Zone 2.2	Presence of residual materials (above 50%) in the soil; potential contamination of the soil by metals	n/a	n/a	n/a	70	No	Engineered landfill site	70	Recognized borrow pit
	Zone 2.3	Presence of residual materials (above 50%) in the soil; potential contamination of the soil by metals	n/a	n/a	n/a	20	No	Engineered landfill site	20	Recognized borrow pit
	Zone 2.4	Soil potentially contaminated by metals	65	Yes	If contaminated: engineered landfill site or contaminated soil disposal facility	n/a	n/a	n/a	65	Excavated soil (if uncontaminated) or recognized borrow pit
Former landfill	Zone 3.1	Presence of residual materials (above 50%) in the soil; potential contamination of the soil by metals	n/a	n/a	n/a	7	No	Engineered landfill site	7	Recognized borrow pit
		Surface soil (not contaminated)	14	Yes	If contaminated: engineered landfill site or contaminated soil disposal facility	n/a	n/a	n/a	14	Surface soil (if uncontaminated) or recognized borrow pit
	Zone 3.2	Soil potentially contaminated by metals	44	Yes	If contaminated: engineered landfill site or contaminated soil disposal facility	n/a	n/a	n/a	44	Excavated soil (if uncontaminated) or recognized borrow pit
	Zone 3.3	Soil potentially contaminated by metals	49	Yes	If contaminated: engineered landfill site or contaminated soil disposal facility	n/a	n/a	n/a	49	Excavated soil (if uncontaminated) or recognized borrow pit

## NOTE

n/a Not applicable



## 6. CHARACTERIZATION PROGRAM

### 6.1 BACKGROUND

Between 2009 and 2011, the following reports were produced by LVM for the City of Mont-Joli:

- LVM Technisol, November 2009. *Propriété industrielle vacante – 875, boulevard Jacques-Cartier, Mont-Joli (Québec) – Évaluation environnementale de site phase I.* (Ref.: 073-P016127-0153-EN-0001-00)
- LVM Technisol, February 2011. *Addenda à l'évaluation environnementale de site phase I – Propriété industrielle vacante – 875, boulevard Jacques-Cartier à Mont-Joli.* (Ref.: 073-P038375-0140-EN-0001-00)
- LVM Technisol, February 2011. *Résumé de l'étude – Ville de Mont-Joli – Évaluation environnementale de site phase I – 875, boulevard Jacques-Cartier, Mont-Joli (Québec).* (Ref.: 073-P038375-0140-EN-0002-00)

This Phase I environmental site assessment was carried out by LVM on lot 4 015 674 of the Land Registry of Quebec, as part of the transfer of the lot to the Municipality of Mont-Joli. It included a summary of the characterization studies carried out since 1995. In light of the observations regarding soil quality, it was recommended that a complementary soil characterization be conducted in the following two sectors (see Figure 1 in Appendix 3):

- a former pump island connected to two aboveground diesel tanks (approximately 30 m southeast of former building H-3)
- two former septic tanks (approximately 100 m northwest of former building H-3)

Regarding the groundwater quality, a contaminant plume (exceeding the MDDEP groundwater quality criteria for seepage into surface water or infiltration into sewers (SSWIS)) was detected northeast of former building H-3. However, its northern boundary is approximate as there are no monitoring wells in this part of the site.

In response to the conclusions and recommendations of this study and to address the needs of the Régie, and considering the transfer of lot 4 015 674 to the City of Mont-Joli, TC decided to include a soil and groundwater characterization program for the sectors identified by LVM in its remediation plan. Details on the recommended activities are provided below.

## 6.2 CHARACTERIZATION PROGRAM

### 6.2.1 Soil characterization

The soil characterization for each of the two sectors should include the following elements (see Table 6.1):

- excavation of two exploratory trenches to a depth of approximately 2.5 m or until bedrock is reached;
- soil sampling in accordance with the recommendations of the *Site Characterization Guide* and the *CEAEQ Sampling Guide for Environmental Analysis (Book 1 – General and Book 5 – Soil Sampling)*; and
- analysis of the soil samples by a CEAEQ accredited laboratory; the parameters to be analyzed are indicated in Table 6.1.

### 6.2.2 Groundwater characterization

The characterization of the groundwater in the area of the contaminant plume should include the following elements (see Table 6.1):

- Installation of three new monitoring wells in the northern portion of the plume. The placement of these wells will be specified in the field following the identification and inspection of the existing wells. Before the wells are installed, their placement will have to be approved by TC.
- Groundwater sampling in accordance with the recommendations of the *Site Characterization Guide* and the *CEAEQ Sampling Guide for Environmental Analysis (Book 1 – General and Book 3 – Groundwater Sampling)*; wells to be sampled, excluding the three new wells to be installed, include: F-11, F-12, F-13, F-14, F-15, F-16, F-18, F-26-2000, F-27-2000, F-28-2000, F-29-2000 and PO-4.

### 6.2.3 Field quality control and assurance program

For the purposes of quality control and assurance of the analytical program, field duplicates must be collected to represent a minimum of 10% of the total number of samples collected for each parameter analyzed. However, a minimum of one duplicate per batch of samples sent for analysis must be respected regardless of the total number of samples collected in a sampling campaign. The parameters analyzed must be the same as those selected for the original samples.

Table 6.1 Soil and groundwater characterization program

Site		Soil Characterization		Groundwater Characterization		Parameters				
#	Description	Exploratory Trenches	Samples <sup>(1)</sup>	Monitoring Wells to be Dug	Samples <sup>(2)</sup>	Metals <sup>(3)</sup>	PH C <sub>10</sub> -C <sub>50</sub>	MAHs	PAHs	Phenols
1	Location of former septic tanks (including septic field)	2	10	n/a	n/a	√	√	√	√	√
2	Location of former aboveground storage tanks (including pump islands)	2	4	n/a	n/a		√		√	
3	Contaminant plume northeast of building H-3	n/a	n/a	3	14	√	√	√	√	
Total		4	14	3	14	n/a	n/a	n/a	n/a	n/a

## NOTES:

- (1) Estimated quantity of samples to be collected, taking into account the approximate depth of the trenches (in relation to the bedrock), i.e. 2.5 m at site 1 and 1.0 m at site 2.
- (2) 3 new wells and 11 existing wells will be sampled.
- (3) Metals: Cd, Cr, Cu, Ni, Pb and Zn.
- (4) Does not include field duplicates (10% minimum)

### 6.3 ADDITIONAL CHARACTERIZATION AND COMPLEMENTARY REMEDIATION PLAN

If contaminants are detected in the soil above the MDDEP level C, a complementary soil characterization will be performed to assess the extent of the contamination. The characterization plan will be developed based on the results of the initial characterization and in accordance with the CEAEQ characterization guides (see section 6.2.1).

A complementary remediation plan will be prepared based on the results of all of the characterization work and will be submitted to MDDEP for short term approval (during the remediation activities). Following the approval by MDDEP, the complementary remediation work will be incorporated into this existing remediation plan. The final remediation report will include all of the contaminated sectors, i.e. the sectors identified in the current remediation plan (see section 6) and any new sectors identified during the complementary characterization.

## 7. TIMELINE

The remediation work will begin in the spring of 2011. The start and end dates for the work have not yet been determined, but the duration is estimated at approximately two months. The remediation work will be conducted by a private contractor following a tendering process to be launched by Public Works and Government Services Canada (PWGSC). Environmental monitoring of the work will be carried out by a private consultant selected by PWGSC.



## **Appendix 1**

### **Limitation Clauses**



## **LIMITATION CLAUSES**

This remediation plan, prepared by Entraco, is based solely on the available data, visual observations and relevant information provided by representatives of Transport Canada and Public Works and Government Services Canada. The data in this plan are not scientific certainties, but rather probabilities based on professional judgment. The data interpretations of, comments and recommendations in this remediation plan are based, to the best of our knowledge, on the regulations in force and on the applicable policies, codes, guides or other documents.

The descriptive data and observations on the site characteristics relate to the conditions observed during the preparation of this plan and therefore do not take into account site conditions or changes that could not have been observed or assessed. The recommendations, based on the available information, were developed by qualified professionals according to a recognized methodology. Entraco reserves the right to amend any recommendation that was based on information provided by a third party or client that is discovered to be incorrect or to have been incorrectly presented or if additional information that was not initially disclosed becomes available. Entraco accepts no responsibility for any deficiency, erroneous statement or inaccuracy contained in this remediation plan that is the result of erroneous statements, omissions or false statements made by personnel or other entities that provided information to Entraco during its preparation of this study.

Entraco prepared this remediation plan for use by Transport Canada and Public Works and Government Services Canada. Any use of this remediation plan by a third party, as well as any decision based on this remediation plan, is the sole responsibility of that third party. Entraco cannot be held responsible for any potential damages, losses, claims or damages suffered by a third party that directly or indirectly result from the use of this remediation plan or a decision made or based on this remediation plan.



## **Appendix 2**

### **List of previous studies**



## LIST OF PREVIOUS STUDIES

- A/ LVM Technisol, February 2011. *Résumé de l'étude - Ville de Mont-Joli – Évaluation environnementale de site phase I – 875, boulevard Jacques-Cartier, Mont-Joli (Québec)*. (Ref.: 073-P038375-0140-EN-0002-00)
- B/ LVM Technisol, February 2011. *Addenda à l'évaluation environnementale de site phase I – Propriété industrielle vacante – 875, boulevard Jacques-Cartier à Mont-Joli*. (Ref.: 073-P038375-0140-EN-0001-00)
- C/ LVM Technisol, November 2009. *Propriété industrielle vacante – 875, boulevard Jacques-Cartier, Mont-Joli (Québec) – Évaluation environnementale de site phase I*. (Ref.: 073-P016127-0153-EN-0001-00)
- D/ Entraco, 2009. *Aéroport de Mont-Joli (Québec) – Ancien bâtiment H-3, ancien dépôt de charbon et ancien dépotoir – Caractérisation des sols*. (Ref.: P0891)
- E/ Inspec-Sol, March 20, 2008. *Aéroport de Mont-Joli – Travaux de déconstruction du hangar H3 – Échantillonnage environnemental des sols*. (Ref.: Q021051-E2)
- F/ LVM Technisol, November 23, 2007. *Projet de parc industriel – Aéroport de Mont-Joli – Caractérisation environnementale préliminaire*. (Ref.: P016127.0150)
- G/ Technisol Environnement, April 28, 2003. *Aéroport de Mont-Joli – Surveillance de travaux de décontamination*. (Ref.: TP34909-221)
- H/ Groupe Conseil TS, June 1999. *Aéroport de Mont-Joli – Suivi environnemental de réhabilitation – Hangars et aire d'entraînement des pompiers*. (Ref.: TP54707-163)
- I/ Groupe Conseil TS, October 22, 1998. *Aéroport de Mont-Joli – Caractérisation environnementale complémentaire*. (Ref.: TP74599-112)
- J/ Entraco, May 1995. *Aéroport de Mont-Joli – Projet de décontamination des sols*. (Ref.: P33 440.2 / 453)
- K/ Biogénie, March 1994. *Étude de caractérisation aux hangars H-2 et H-3 de l'aéroport de Mont-Joli*. (Ref.: 827)



## **Appendix 3**

**Figure 1 taken from the LVM study (February 2011)**



