Interreg North-West Europe NWE-REGENERATIS

European Regional Development Fund

01 March 2021

WP T 1. D1.2. Benchmark report of existing inventories structures in NWE regions, in the fields of brownfields, landfills, mines

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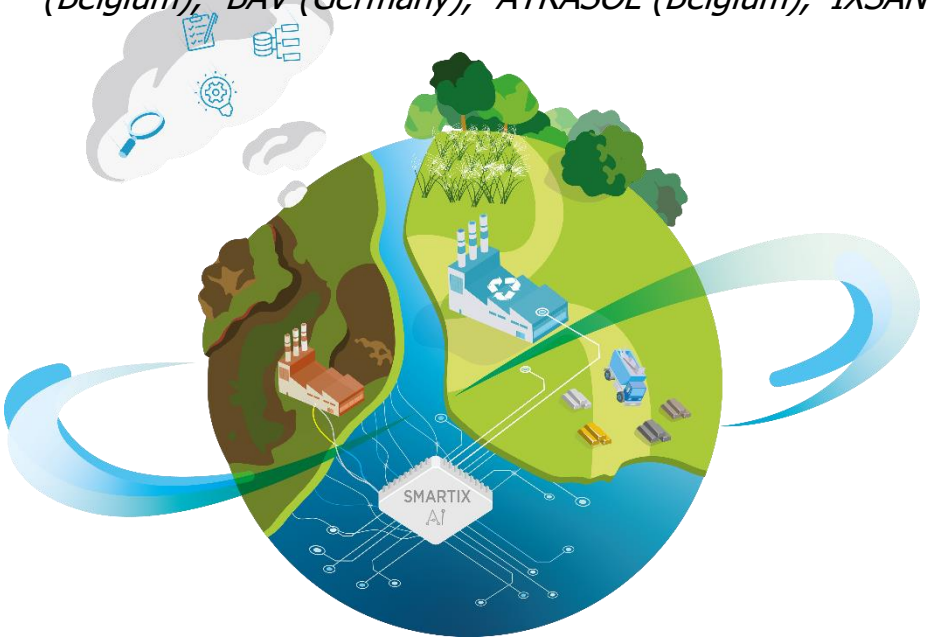

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1 INTRODUCTION

A number of databases and inventories exist across Europe relating to brownfields, landfill sites and former mining sites. Previous efforts have collated some information together under past EU-funded projects (e.g. SMART GROUND and RAWFILL), these inventories are specific and do not combine all information together into one single user-friendly database.

This report provides an overview of the existing inventories relevant to the REGENERATIS project, covering nation-specific sources for the north-west Europe countries and EU-wide databases.

2 EU-WIDE DATABASES AND INVENTORIES

2.1 OVERVIEW AND RELEVANCE TO REGENERATIS

Key EU-wide databases and inventories include:

1. SMART GROUND
2. RAWFILL
3. European Pollutant Release and Transfer Register (E-PRTR)

The SMART GROUND project was funded under Horizon 2020 (H2020-Waste 2014-4c, grant agreement No 641988), running from October 2015-March 2018. The project developed an interactive databank featuring data from available inventories and from pilot studies at sites from partner nations (UK, Italy, Hungary and Finland). The web-based databank (http://smartground.atosresearch.eu/home) covers landfill and mining sites as a potential source of secondary raw materials. Figure 1 illustrates the map feature of the databank and Figure 2 provides an example of a data point, in this case a closed UK landfill site. In principle, users are able to search specific materials (e.g. copper, cobalt etc).

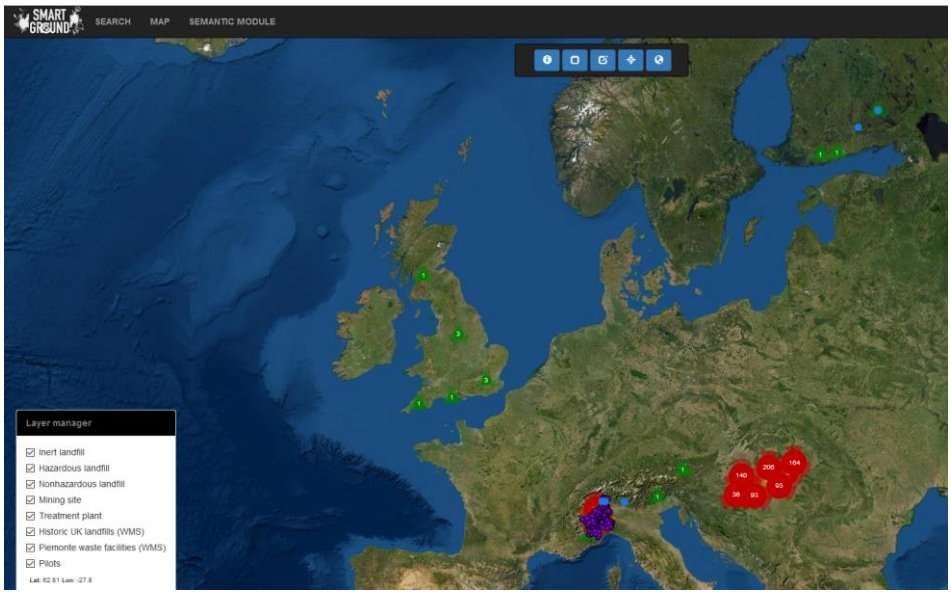


Figure 1. SMART GROUND map interface.

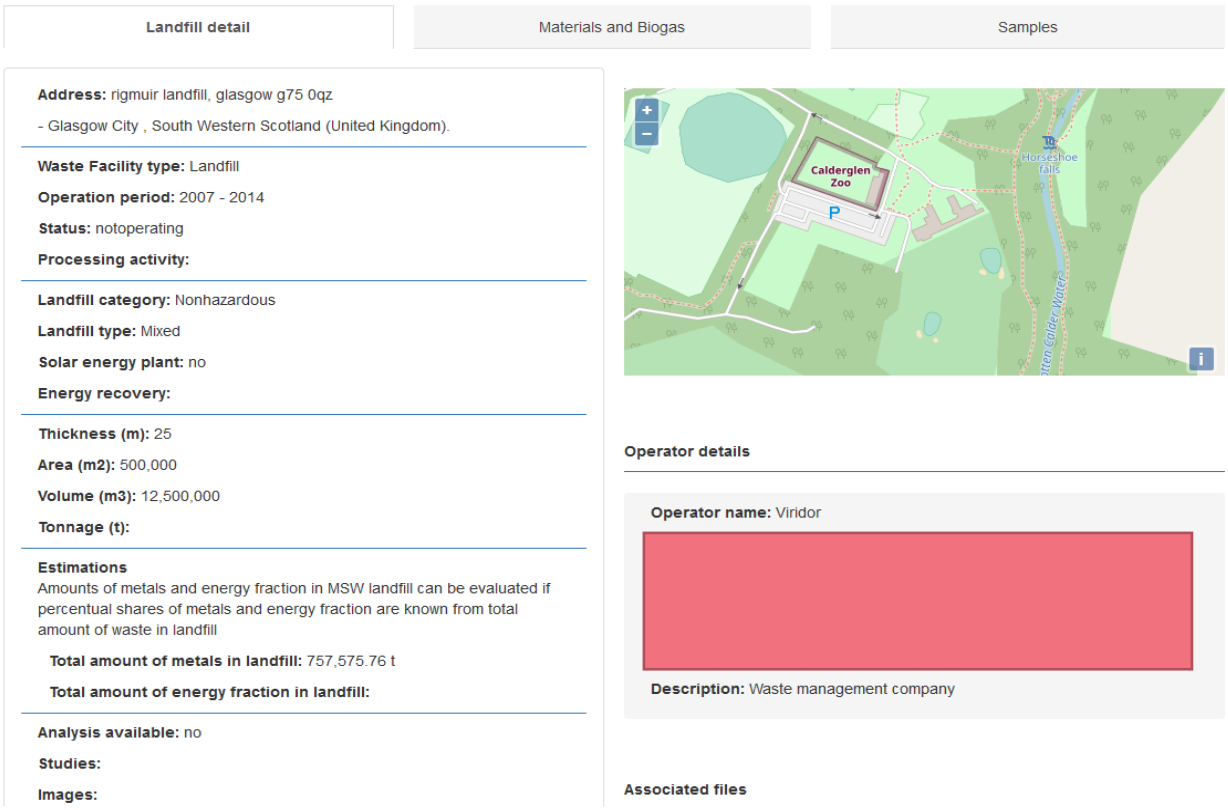


Figure 2. Example SMART GROUND search result.

The RAWFILL project[1] (Supporting a new circular economy for RAW materials recovered from landFILLs) is funded under the Interreg North West Europe Programme (grant agreement No 377), and was initially running from March 2017 – to March 2020. An extension has now been granted to September 2021, due to the COVID19 pandemic. The project involves partners come from UK, Germany, France, Wallonia, and Flanders. The project developed an Enhanced Landfill Inventory Framework (ELIF), whose specificity is to integrate numerous fields related to the opportunities of launching landfill mining (or enhanced landfill mining) operations based on the quantity and quality of secondary raw materials lying in the sites, the value of the recovered volume, the land planning interest (Figure 3). An additional extension to the tool is currently being developed allowing to consider interim uses (i.e. when a given landfill is currently not suitable for re-exploitation). The purpose of ELIF is to feed a decision support tool allowing to rank landfills regarding their mining opportunities.

ELIF is divided into 4 sections and includes a Resource Distribution Model (RDM) describing the landfill as a stack of homogeneous zones with similar waste qualities regarding possible mining (Figure 3).

ELIF does not contain any field data yet. It has been developed for now as a spreadsheet with import/export tables in order to communicate or to be integrated in existing large databases.

1 https://www.nweurope.eu/projects/project-search/supporting-a-new-circular-economy-for-raw-materials-recovered-from-landfills/

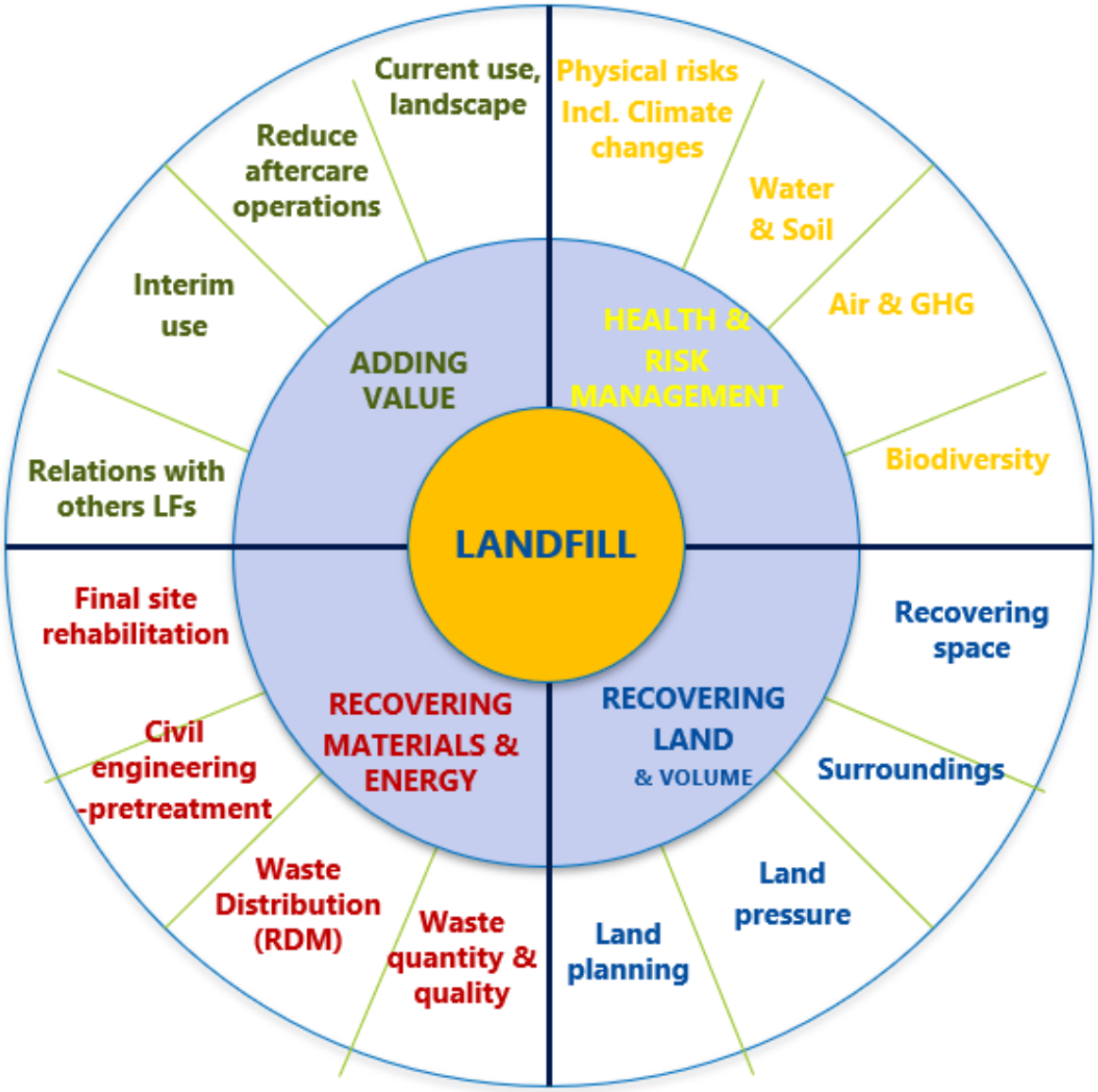


Figure 3. ELIF main information available

E-PRTR is an EU-wide database which provides the location and nature of a significant number of sites across EU member states, including landfills, mining sites and brownfields. This is illustrated in Figure 4 with example results shown in Figures 5 and 6. The portal provides data on pollutant release, thus will not be a definitive source of information for REGENERATIS, as the data does not indicate the quantity of potentially recoverable metals. The portal covers all industrial sectors, including metallurgy and chemical activities.

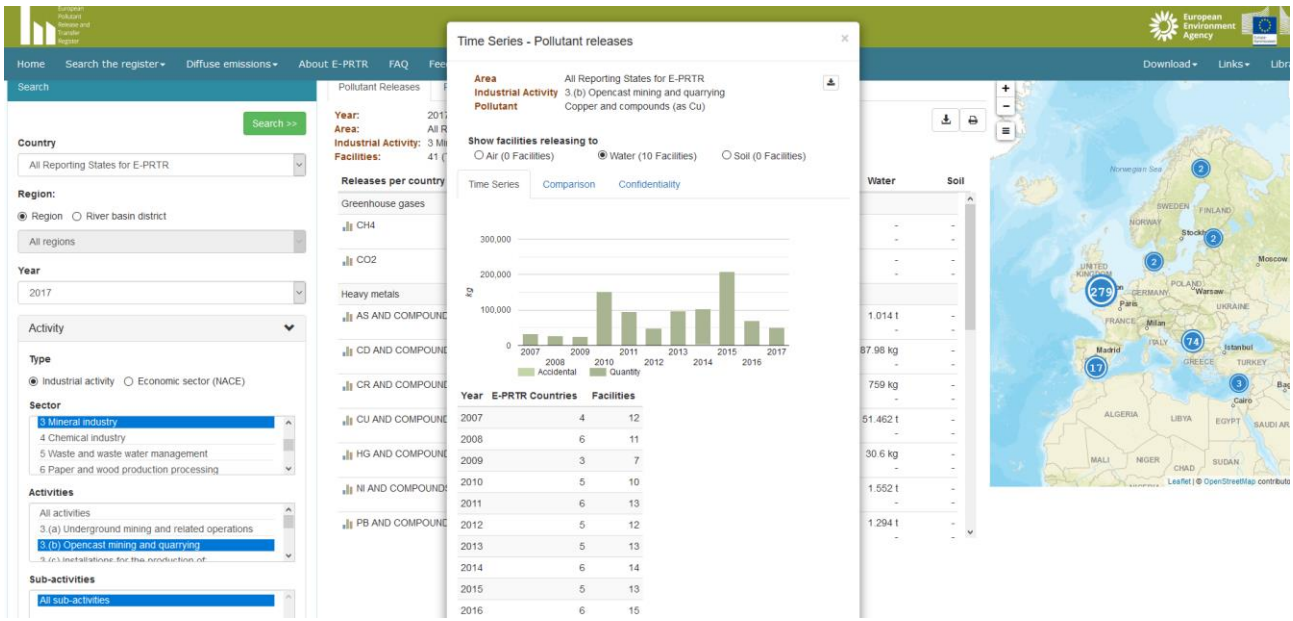


Figure 4. E-PRTR interface showing copper pollutant release.

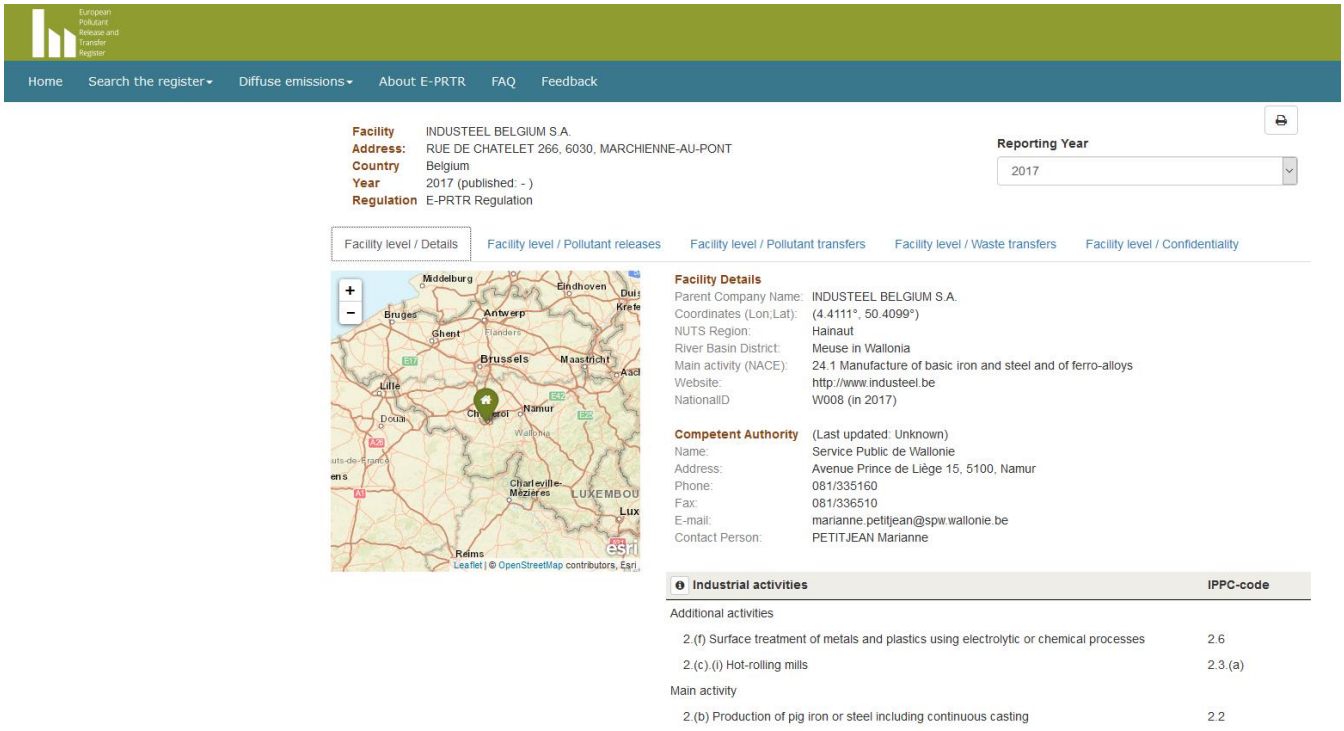
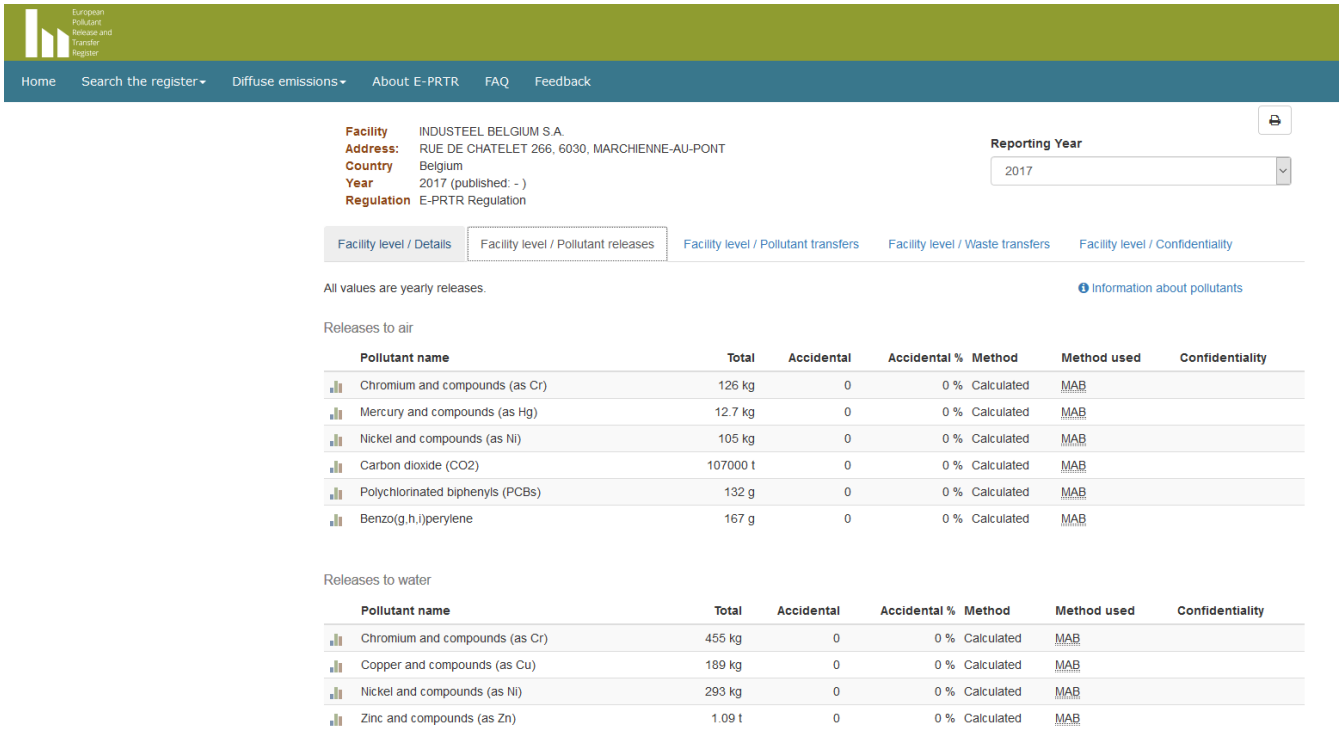


Figure 5. Example result from E-PRTR showing site details



European Pollutant Release and Transfer Register

Home | Search the register | Diffuse emissions | About E-PRTR | FAQ | Feedback

Facility INDUSTEEL BELGIUM S.A.
Address: RUE DE CHATELET 266, 6030, MARCHIENNE-AU-PONT
Country Belgium
Year 2017 (published: -)
Regulation E-PRTR Regulation

Reporting Year 2017

Facility level / Details | Facility level / Pollutant releases | Facility level / Pollutant transfers | Facility level / Waste transfers | Facility level / Confidentiality

All values are yearly releases. Information about pollutants

Releases to air

Pollutant name	Total	Accidental	Accidental %	Method	Method used	Confidentiality
Chromium and compounds (as Cr)	126 kg	0	0 %	Calculated	MAB	
Mercury and compounds (as Hg)	12.7 kg	0	0 %	Calculated	MAB	
Nickel and compounds (as Ni)	105 kg	0	0 %	Calculated	MAB	
Carbon dioxide (CO2)	107000 t	0	0 %	Calculated	MAB	
Polychlorinated biphenyls (PCBs)	132 g	0	0 %	Calculated	MAB	
Benzo(g,h,i)perylene	167 g	0	0 %	Calculated	MAB	

Releases to water

Pollutant name	Total	Accidental	Accidental %	Method	Method used	Confidentiality
Chromium and compounds (as Cr)	455 kg	0	0 %	Calculated	MAB	
Copper and compounds (as Cu)	189 kg	0	0 %	Calculated	MAB	
Nickel and compounds (as Ni)	293 kg	0	0 %	Calculated	MAB	
Zinc and compounds (as Zn)	1.09 t	0	0 %	Calculated	MAB	

Figure 6. Metal pollutant releases from site shown in Figure 4

2.2 LIMITATIONS

Many of the databases have been assembled using modelling and assumptions, due to the required data not being available for various reasons (in-depth sampling required, limited data recording, confidentiality etc). Databases such as the SMART GROUND databank and the European Pollutant Release and Transfer Register (E-PRTR) provide significant details on the locations and nature of the sites from across the EU, however the details at site level ranges from highly detailed to minimal information (site owner and activity).

The main limitation common across all platforms is that data and information arises from a number of sources, the quality of which is itself variable. These sources are not linked; thus a number of assumptions have to be made in order to compile a usable inventory.

3 NATIONAL DATABASES AND INVENTORIES

3.1 OVERVIEW AND RELEVANCE TO REGENERATIS

3.1.1 United Kingdom

Organisations of the UK government retain information regarding landfill sites (historic, closed and operational) and brownfield sites. There is no centralised database of all historic and permitted landfill sites for the whole of the UK, nor does one exist for brownfields and contaminated land.

The inventories for historic and permitted landfills sites in the UK are summarised in Table 1.

Table 1. Landfill databases for the United Kingdom.

Regulator	Nation	Dataset	Link
Environment Agency (via the Department for Environmental, Food and Rural Affairs, DEFRA)	England	Historic landfill sites	https://data.gov.uk/dataset/17edf94f-6de3-4034-b66b-004ebd0dd010/historic-landfill-sites
Environment Agency (via the Department for Environmental, Food and Rural Affairs, DEFRA)	England	Permitted landfill sites	https://data.gov.uk/dataset/ad695596-d71d-4cbb-8e32-99108371c0ee/permitted-waste-sites-authorised-landfill-site-boundaries
Natural Resources Wales	Wales	Historic landfill sites	https://data.gov.uk/dataset/b5d8eaa4-638c-436b-a66c-a6bd1a25f0df/historic-landfill-sites
Natural Resources Wales	Wales	Permitted landfill sites	https://naturalresources.wales/evidence-and-data/maps/find-details-of-permitted-waste-sites/?lang=en
Scottish Environmental Protection Agency [SEPA]	Scotland	Permitted landfill sites	https://www.sepa.org.uk/data-visualisation/waste-sites-and-capacity-tool/ https://lle.gov.wales/catalogue/item/HistoricLandfillSites/?lang=en
Northern Ireland Environment Agency	Northern Ireland	Permitted landfill sites	https://data.gov.uk/dataset/4c9ae0a2-0238-459e-8b4d-1172bec9dc3c/niea-authorised-waste-sites-treatment-storage

The information provided includes the site location, waste types accepted and, in some cases, the operational years. No information is provided regarding the composition of the material in each site, however the permitted use enables an estimation. The inventories exist as maps, therefore spatial information is provided. The information is limited in most cases; for example, historic landfill data for Wales provides the location, area and operational years (Figure 7) whereas the permitted waste sites for Wales simply provides the location and site owner (Figure 8).

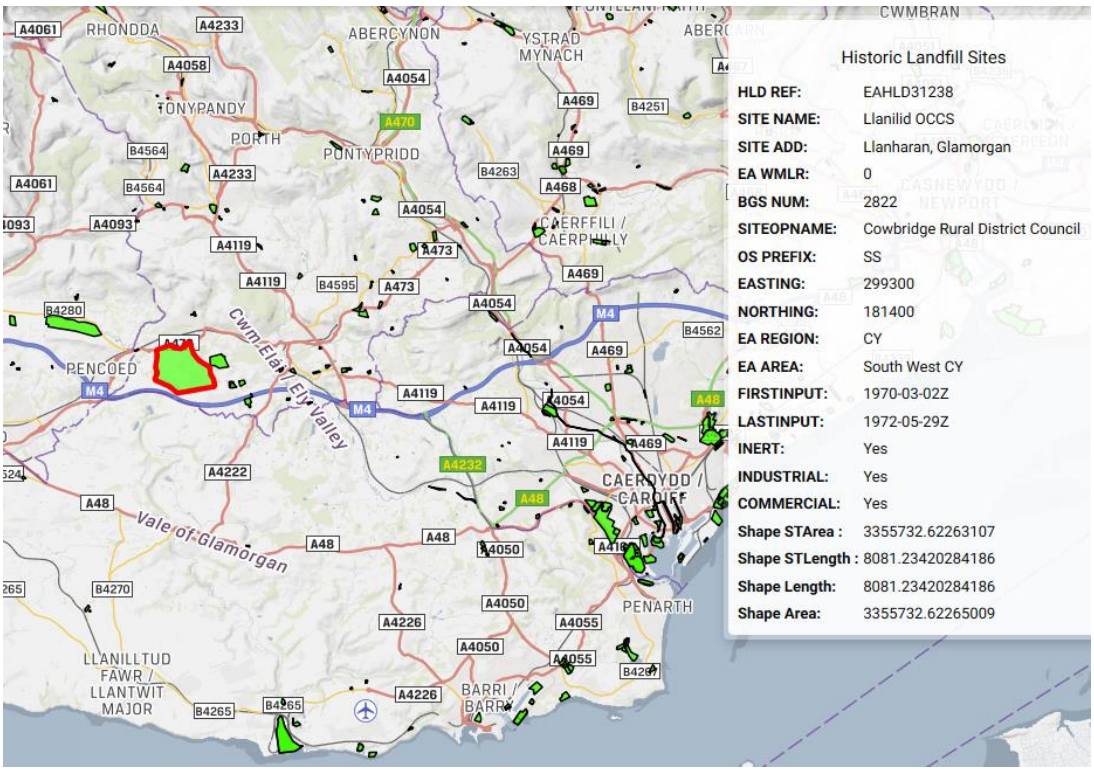


Figure 7. Screenshot of historic landfill site map for Wales (source: Lle.gov.wales)

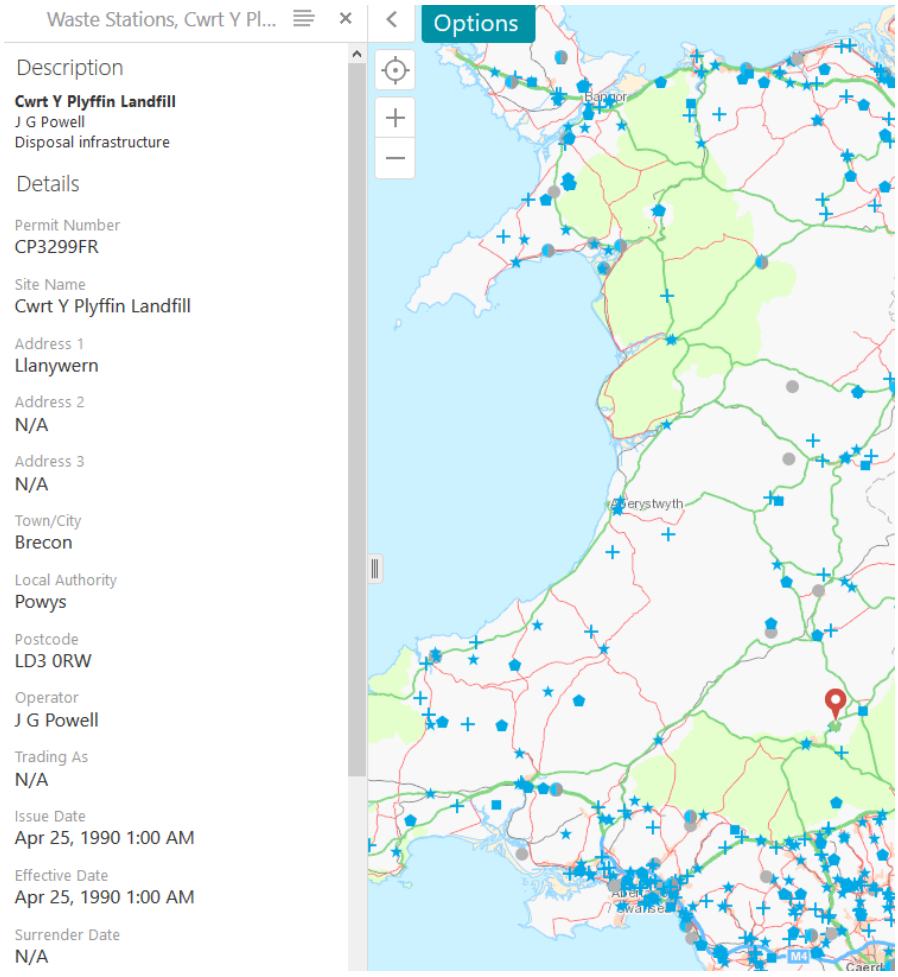


Figure 8. Screenshot of data available for permitted sites in Wales (source: Natural Resource Wales)

The brownfields inventory is not centrally managed, however each respective local authority in England maintains a register of sites within their boundaries. A recent project by the National Housing Federation[2] (2018) mapped all brownfield sites across England (Figure 9).

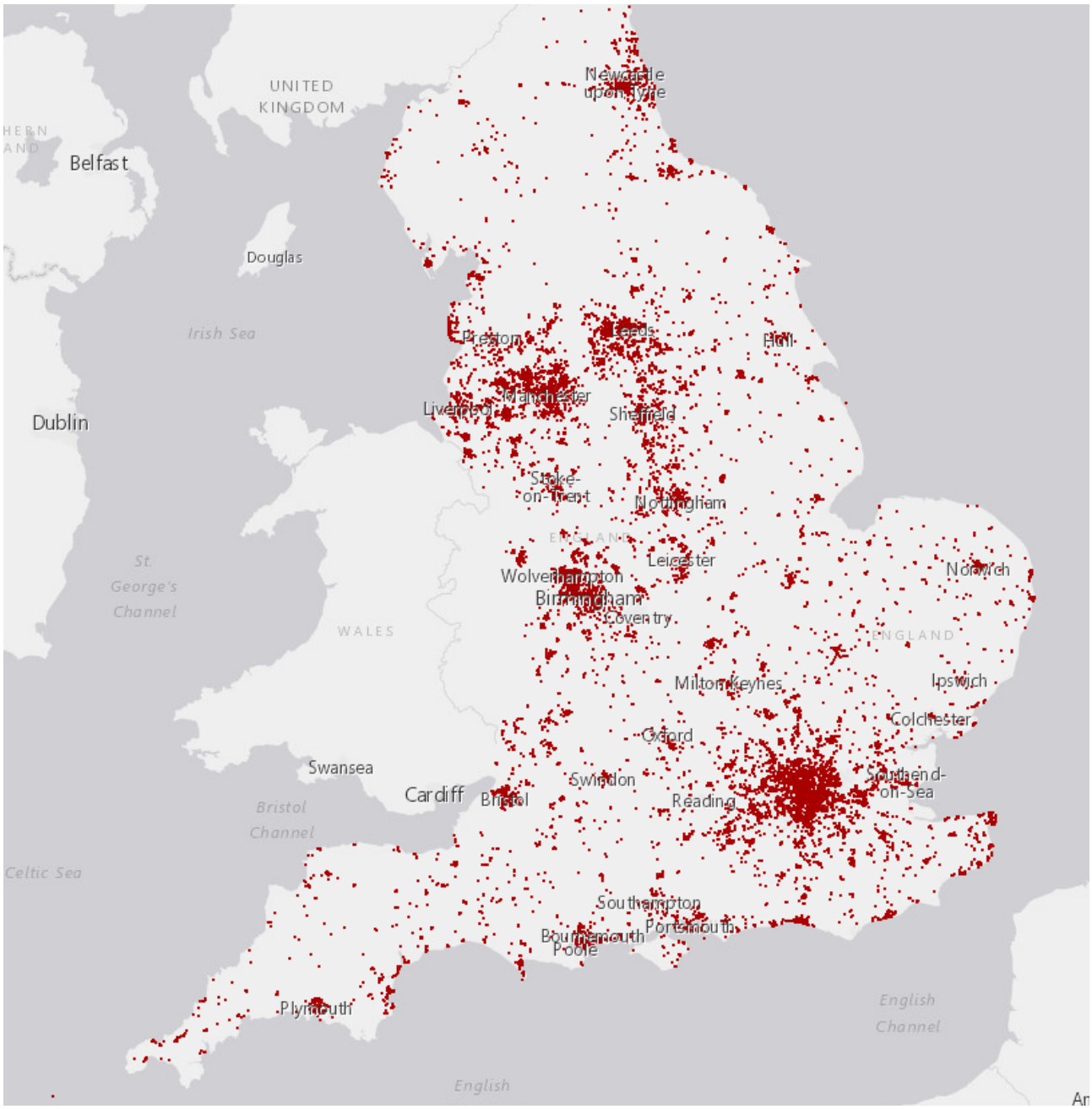


Figure 9. Brownfield sites in England (National Housing Federation, 2018).

The England brownfield map provides information relevant to housing developments, thus focuses on the size of the site and the estimated dwellings capacity.

Historic land use information is available for Northern Ireland[3], however no such inventory is available for Scotland or Wales.

[2] https://www.housing.org.uk/resources/housing-sites-brownfield-land-map/
[3] https://www.daera-ni.gov.uk/publications/historical-landuse

3.1.2 France

In France, the policy for the management of sites and soils polluted or likely to be polluted was initially based on a significant initial census work. Then, following the progress of other countries in this area, the site rehabilitation and treatment policy shifted at the end of the 1990s towards a risk management policy based on usage. Based on the examination and management of risk, more than on the level of intrinsic pollution, this policy requires keeping the memory of the pollution and the rehabilitation actions implemented, but also to fix land uses compatible with the pollution after treatment of the site.

Under the authority of the French Ministry in charge of Environment and Energy, three databases have been compiled and are available on the Web. Those sites are identified in an open website:

- https://www.georisques.gouv.fr/risques/pollutions-sols-sis-anciens-sites-industriels

These three databases are called:

- BASIAS[4]: French historical regional inventories of former sites of industrial and service activities likely to be contaminated.

- BASOL[5]: French database of contaminated or potentially contaminated sites and soils calling for administrative action for prevention or remediation. At the beginning of 2017, BASOL database contained 6 478 contaminated sites and soils. BASOL is a living and evolving database updated regularly at the regional level by the regional authorities for environment, spatial planning and housing.

- SIS[6]: Soil information areas (SIS) are sites (piece of land) where the state is aware of soil pollution that justifies, in particular in the event of a change in land use, that soil studies are carried out and if needed that pollution management measures are implemented to preserve health and the environment. They are made available to the public after consultation with the town halls and information to the owners.

All these databases are managed by BRGM under supervision by the French Ministry in charge of environment.

3.1.2.1 BASIAS database

France was one of the first European countries to conduct inventories of sites that are polluted or likely to be so in a systematic way (first inventory in 1978). The main objectives of these inventories are:

- make a comprehensive and systematic inventory of all industrial sites, whether abandoned or not, liable to cause environmental pollution;
- preserve the memory of these sites;
- provide useful information to those involved in town planning, land, and environmental protection.

[4] https://www.georisques.gouv.fr/risques/basias/donnees#/
[5] https://www.georisques.gouv.fr/articles-risques/basol
[6] https://www.georisques.gouv.fr/articles-risques/secteurs-information-sols

The realization of Regional Historical Inventories (RHI) of industrial sites and service activities, active or not, was accompanied by the creation of the national database BASIAS.

The inventories are carried out at the departmental scale and to the precision of 1:25,000 maps, which vary according to the quality of the sometimes very old archive plans. They can be supplemented by historical urban inventories (UHI) carried out by certain Municipalities and Agglomerations at the cadastral plot scale and with better exhaustiveness.

In July 2020, the BASIAS database contains around 322,400 former industrial sites and service activities listed on French territory.

This BASIAS database also aims to help, within the limits of the information collected, notaries and site owners, current or future, for all real estate transactions. It should be noted that the registration of a site in the BASIAS database does not prejudge any possible pollution in its place.

BASIAS thus received a favorable opinion from the National Commission on Computing and Liberties (CNIL) in September 1998. The creation of BASIAS and the principles for its use are defined in the ministerial decree of December 10, 1998 published on April 16, 1999, as well as in two ministerial circulars, dated April 26, 1999, addressed to the Prefects and to the Regional Directors of the Environment, Planning and Housing (DREAL).

Article 173 of the ALUR law (law n ° 2014-366 of March 24, 2014 for access to housing and renovated town planning) and the implementing decree 2015-1353 of October 26, 2015 mention that the State publishes the Map of Former Industrial Sites and Service Activities (CASIAS). The town planning certificate will indicate whether the land is concerned by a former industrial or service site inventoried and located on the map. The CASIAS card is produced from the national BASIAS database.

Practically, the RHI is led by administrative Department. It is set up, monitored and controlled by a steering committee which defines the framework of the operation (period covered by the census, nature of the activities sought) and adapts the national methodology according to the specificities of the department concerned. The information is sought in the files kept mainly in the Departmental and Prefectural Archives centers and sometimes supplemented by rapid visits and/or by surveys of the town halls concerned by the sites inventoried in the archives.

The results of the regional historical inventory are stored in the BASIAS database. The periods covered since the end of the 18th century: types of activities, methodologies followed and specific features are summarized in the departmental preambles accompanying the data listed (accessible as soon as a department is selected on the "Access to data" page).

The search page (in French) is accessible on the following link (Figure 10):

- https://www.georisques.gouv.fr/risques/basias/donnees#/

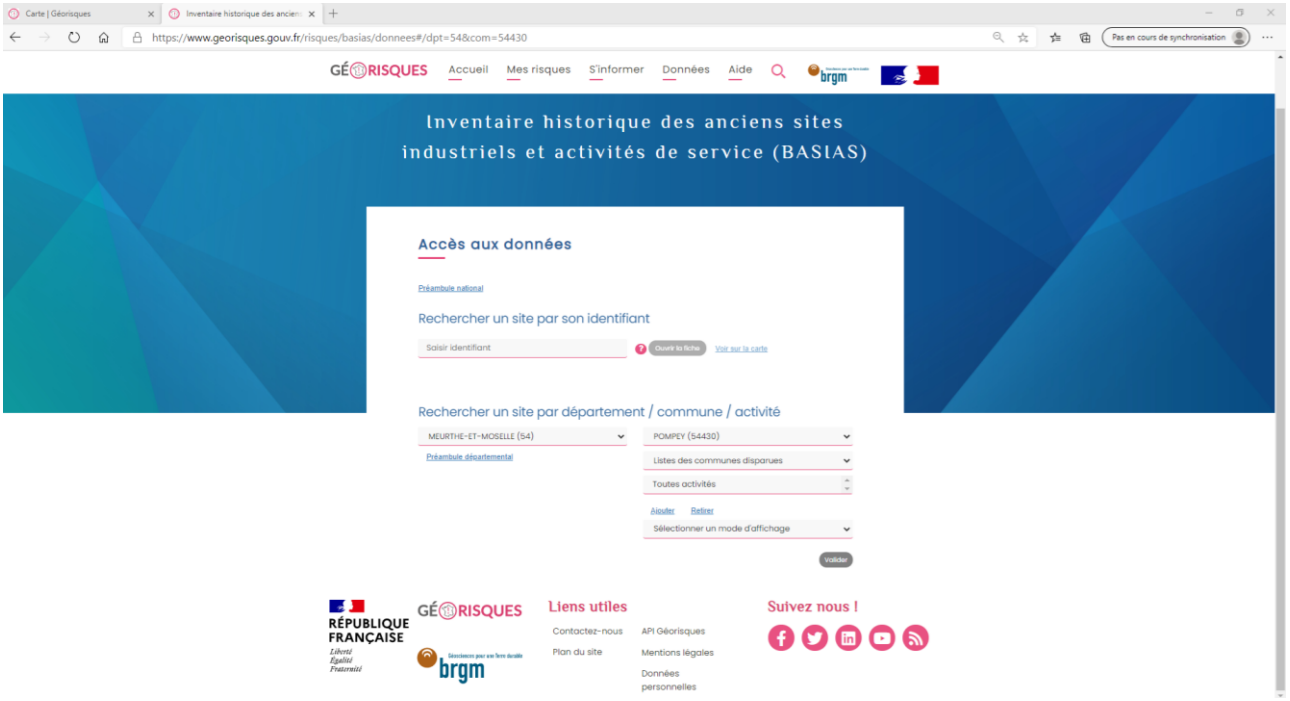


Figure 10: Search page in the BASIAS database (example of the commune of Pompey)

Then it gives access to a list or map of former or active industrial sites (Figure 11).

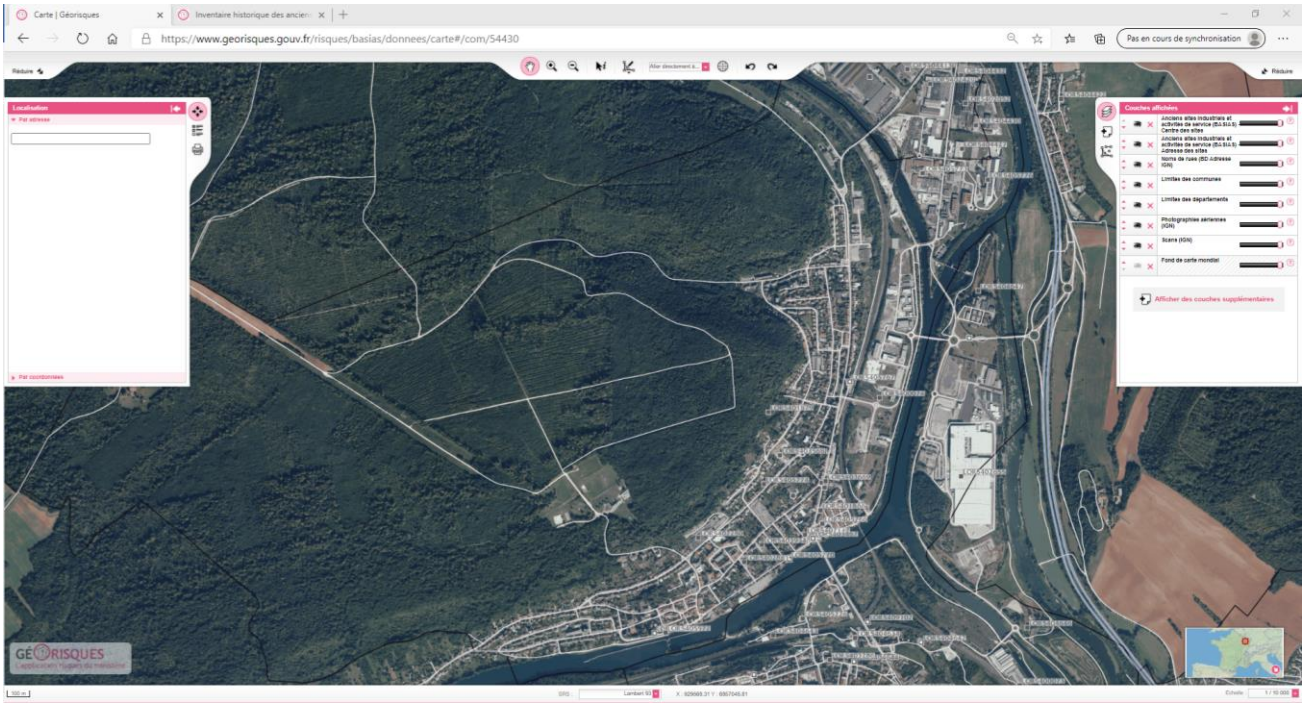


Figure 11: Map over Pompey showing the present and past industrial activities. Each site is recorded with a specific code.

Each site is identified with a specific code. For example, the site of Pompey used in REGENERATIS has the code LOR5400074. The associated document gives the following description (Appendix 1):

- Site identification (owner or former owners)

- Localization
- Present and/or past activities
- Geological and hydrogeological environment
- Environmental studies (e.g. pollution diagnostics)
- References

3.1.2.2 BASOL database

Different situations can be the cause of the suspicion of pollution of a site and its registration in BASOL. It may be a chance discovery, during work on land that formerly hosted industrial activities. A site may also be brought to light following action by the administration as part of its control and monitoring missions of industrial sites. Accidental pollution can also give rise to the creation of a site in BASOL.

BASOL sites are generally associated with soil diagnostics carried out within the framework of the cessation of activity of an installation classified for the protection of the environment (ICPE), with historical documentary research, works, transactions or changes in use of the site or development project, and, at the request of the administration, to water quality analyses (drinking water supply catchments, wells, surface water) and finally to actions incurred during accidental pollution. The action of the public authorities is then triggered, to characterize the pollution of the site and control the risks.

New contaminated sites and soils are included in BASOL when there is a suspicion of pollution requiring action on the part of the public authorities. The information contained in the historical regional inventories of former sites of industrial and service activities likely to be contaminated (Basias, since 1998) (issuing mainly from departmental and prefectural administrative archives) can provide useful indication of former and successive activities on a site, and on the types of substances and pollutants likely to have been used there. Conversely, sites are deleted from the BASOL inventory as soon as they are treated and cleared of any restriction. They are then transferred to the Basias database in order to keep a trace of them. Therefore, the eldest polluted site addressed in the BASOL database goes back to 1994 and not to 1990. The main categories of polluting activities considered in the BASOL database include:

- mechanical, electrical, electronic, surfaces treatments,
- iron and steel industry, metallurgy, coking,
- waste and wastewater collection, treatment,
- chemical, pharmaceutical, rubber, plastics,
- petroleum industry, natural gas,
- warehousing, transport, trade (including petrol stations),
- textile, leather and hides,
- wood, paper and cardboard,
- mineral industries,
- non-hydrocarbon extractive industries,
- energy,
- agri-food and beverages,
- other industries, services and miscellaneous.

The main categories of polluting activities considered in the Basias database include:

- agriculture, hunting, forestry and fishing,
- mining and quarrying,
- manufacturing industry,

- production and distribution of electricity, gas, steam and air-conditioning,
- water production and distribution; sanitation, waste management and
- decontamination,
- construction,
- transportation and warehousing,
- real estate activities,
- specialised, scientific and technical activities,
- human health and social work,
- other collective or private activities and services; storage of products.

Those databases are used by local administration in charge of the Environment to define the sites that must be declared as Soil information areas (SIS).

While BASOL identifies the sites, or old industrial sites, polluted or potentially polluted requiring action by the public authorities, for preventive or curative purposes, known from the State, the data cannot however be considered as exhaustive. However, it constitutes the state of knowledge on the sites listed in a process of transparency. A sheet on BASOL contains the information that was available to the administration at the time the sheet was written.

In January 2021, BASOL databases contains 9137 records. The search page provides an inventory per communes:

https://www.georisques.gouv.fr/risques/sites-et-sols-pollues/donnees#/type=instructions.

For example, in Orleans, 8 records are found (Figure 12).

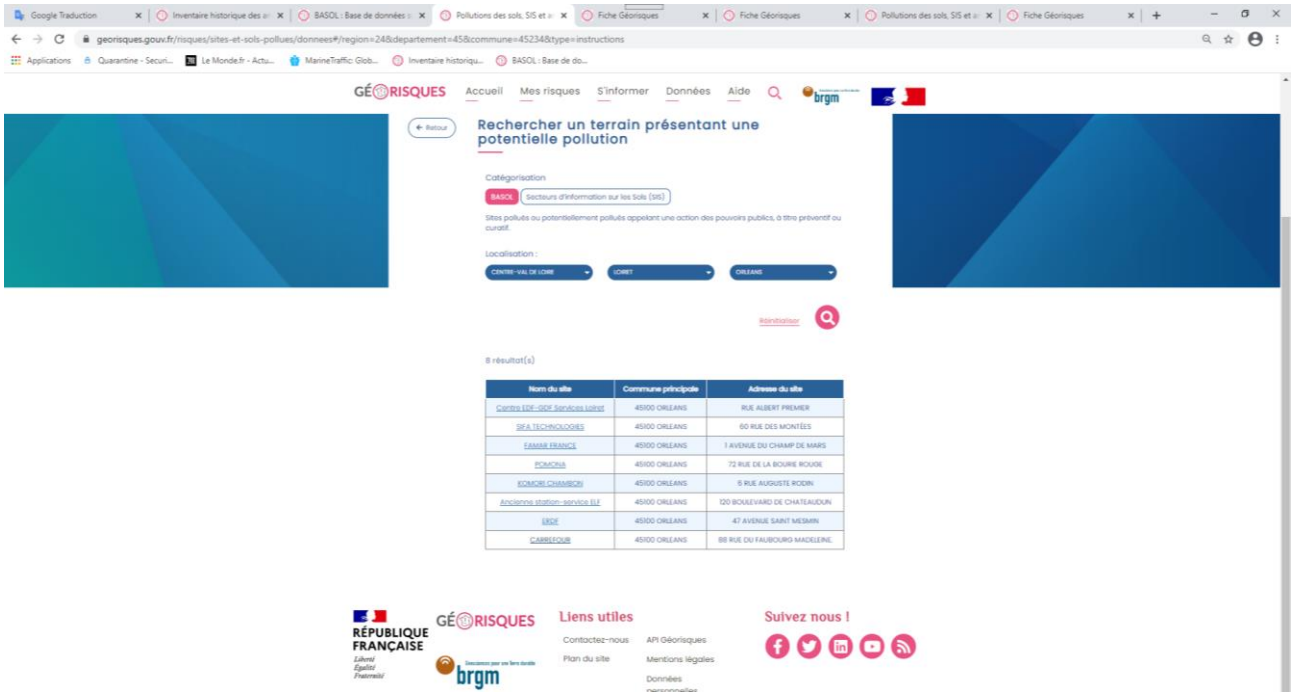
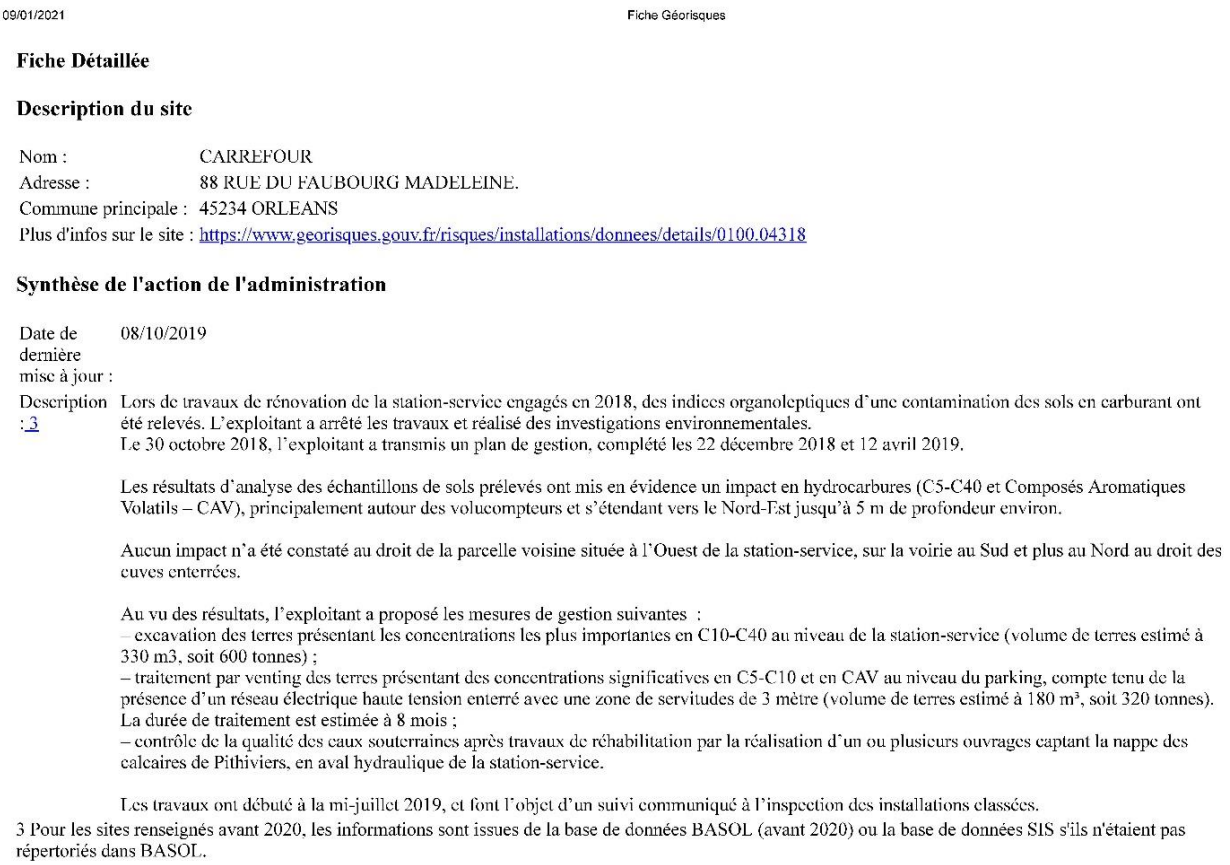


Figure 12: Example of BASOL records in the commune of Orleans.

The record "CARREFOUR" shows the following document in French (Figure 13).



09/01/2021 Fiche Géorisques

Fiche Détaillée

Description du site

Nom : CARREFOUR
Adresse : 88 RUE DU FAUBOURG MADELEINE.
Commune principale : 45234 ORLEANS
Plus d'infos sur le site : https://www.georisques.gouv.fr/risques/installations/donnees/details/0100.04318

Synthèse de l'action de l'administration

Date de dernière mise à jour : 08/10/2019

Description :3 Lors de travaux de rénovation de la station-service engagés en 2018, des indices organoleptiques d'une contamination des sols en carburant ont été relevés. L'exploitant a arrêté les travaux et réalisé des investigations environnementales.
Le 30 octobre 2018, l'exploitant a transmis un plan de gestion, complété les 22 décembre 2018 et 12 avril 2019.

Les résultats d'analyse des échantillons de sols prélevés ont mis en évidence un impact en hydrocarbures (C5-C40 et Composés Aromatiques Volatils – CAV), principalement autour des volucompteurs et s'étendant vers le Nord-Est jusqu'à 5 m de profondeur environ.

Aucun impact n'a été constaté au droit de la parcelle voisine située à l'Ouest de la station-service, sur la voirie au Sud et plus au Nord au droit des cuves enterrées.

Au vu des résultats, l'exploitant a proposé les mesures de gestion suivantes :
– excavation des terres présentant les concentrations les plus importantes en C10-C40 au niveau de la station-service (volume de terres estimé à 330 m3, soit 600 tonnes) ;
– traitement par venting des terres présentant des concentrations significatives en C5-C10 et en CAV au niveau du parking, compte tenu de la présence d'un réseau électrique haute tension enterré avec une zone de servitudes de 3 mètre (volume de terres estimé à 180 m³, soit 320 tonnes). La durée de traitement est estimée à 8 mois ;
– contrôle de la qualité des eaux souterraines après travaux de réhabilitation par la réalisation d'un ou plusieurs ouvrages captant la nappe des calcaires de Pithiviers, en aval hydraulique de la station-service.

Les travaux ont débuté à la mi-juillet 2019, et font l'objet d'un suivi communiqué à l'inspection des installations classées.

3 Pour les sites renseignés avant 2020, les informations sont issues de la base de données BASOL (avant 2020) ou la base de données SIS s'ils n'étaient pas répertoriés dans BASOL.

Figure 13: Example of record on a pollution detected in the Gas Station CARREFOUR in Orleans.

3.1.3 Belgium

As a result of the constitutional state reforms, the 3 regions (Brussels capital, Flanders and Wallonia) became the responsible authorities for environmental issues such as contaminated land management and brownfields. Each region has specific policies and regulations.

3.1.3.1 Flanders

The Public Waste Agency of Flanders or OVAM is a public environmental agency founded by the law of 2 July 1981 after the Belgian state reform of 8 August 1980. OVAM is the responsible authority for waste, materials and soil remediation management for the entire region.

On 22nd February 1995, the Flemish government has ratified a specific law on soil remediation, the **Soil Remediation Act**. This Act has five key-issues and data management on contaminated land is an important element. This Decree was revised in 2006 and regained a broader perspective (soil remediation and soil protection in relation to sustainable land management). This Act was ratified by the Flemish government on 27th October 2006.

Information about the investigated land plots (Figure 14) were initially gathered in an alphanumeric database. In pursuance of the soil remediation decree of 1995, OVAM has developed a Register of Contaminated Land, after the legislative reform of 2006 defined as the **Land Information Register (LIR)**.

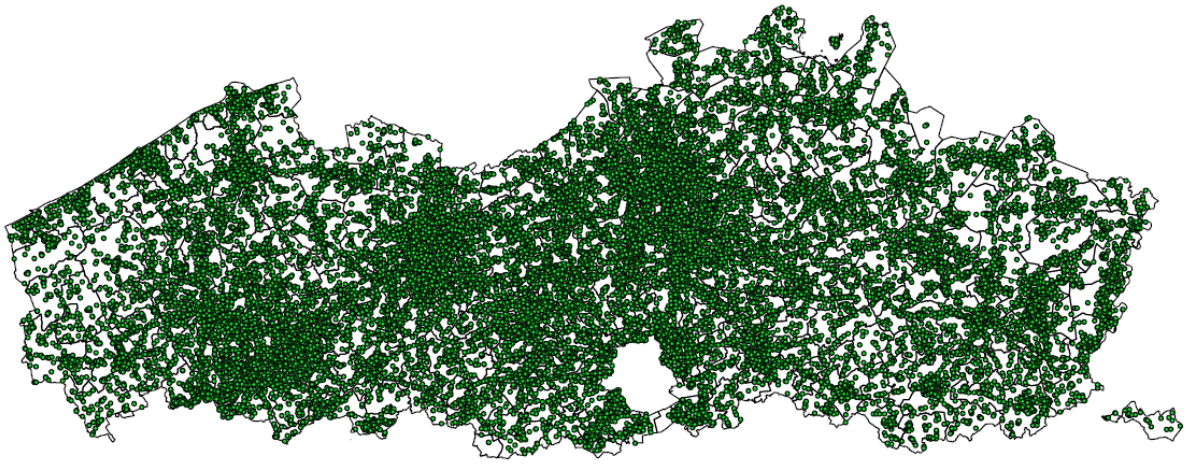


Figure 14. Records of investigated sites in Flanders-Belgium (OVAM, 2020).

This OVAM-database, called MISTRAL[7] (Figure 15), contains data on soil quality and the former or on-going operations. The meta-data description allows a digital upload. Moreover 43.000 records were introduced, each containing the findings of the investigation reports, the results of the remedial actions and monitoring. Alphanumerical as well as geographical data are collected according the predefined formats: XML and GML[8]. These standards allow OVAM web-based access to digital reports and large scale querying on administrative and environmental parameters.

[7] MISTRAL is the acronym that refers to 'Environmental Information System' and the wind of change on data management (Mistral).

[8] Detailed information on these XMLs and GMLs is available on the following link: https://services.ovam.be/webloket-bodem/bsd/publicViews/referenceLists.seam?conversationId=174.

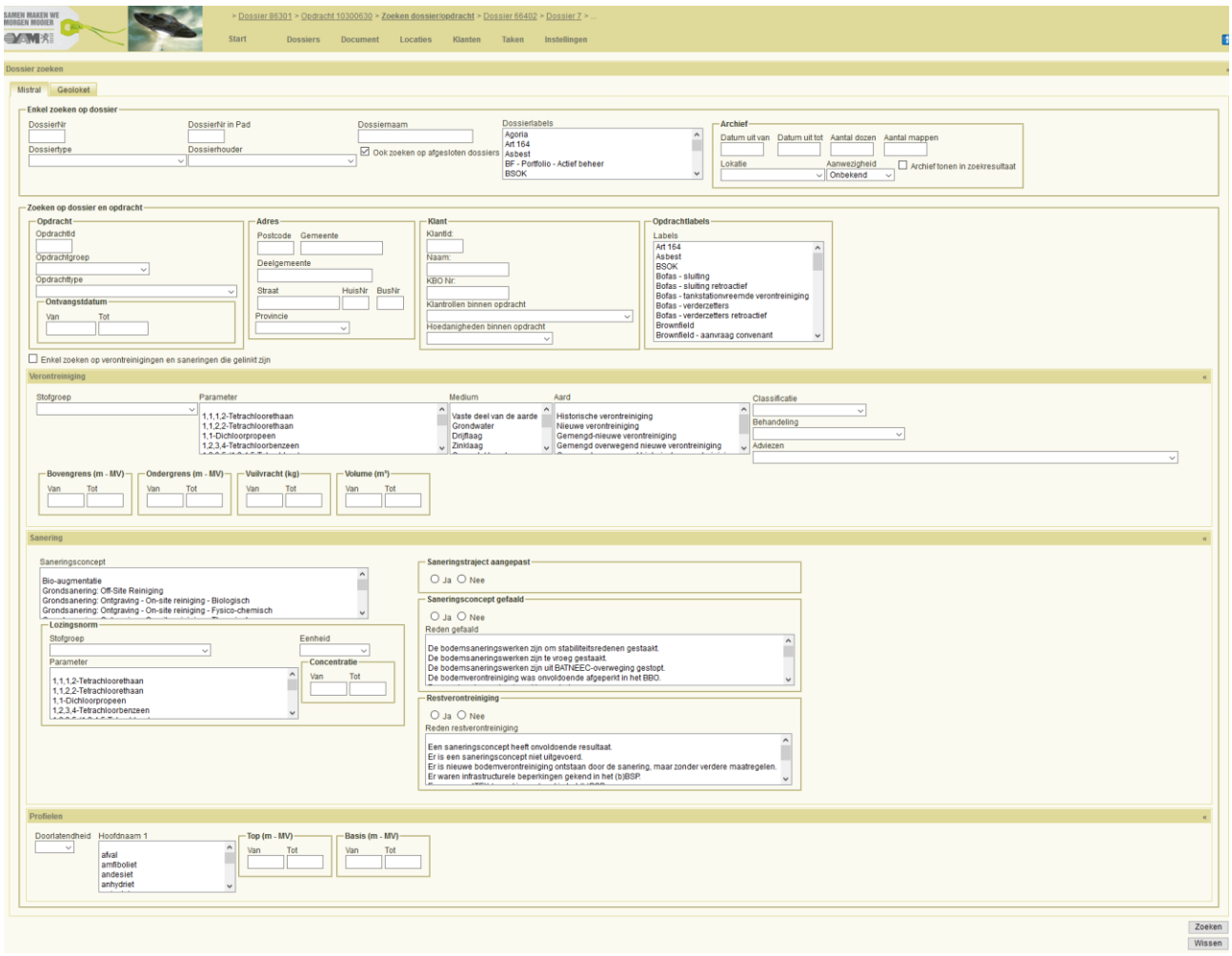


Figure 15. Dashboard of the MISTRAL-application.

The information stored in the LIR can be consulted by every citizen. There is a specific procedure to obtain site specific information on the soil quality. At demand, the OVAM delivers extracts of its database and these documents are soil certificates which are needed at every transfer of property. A web-based application is operational and the accessibility is open to the public (Figure 16).

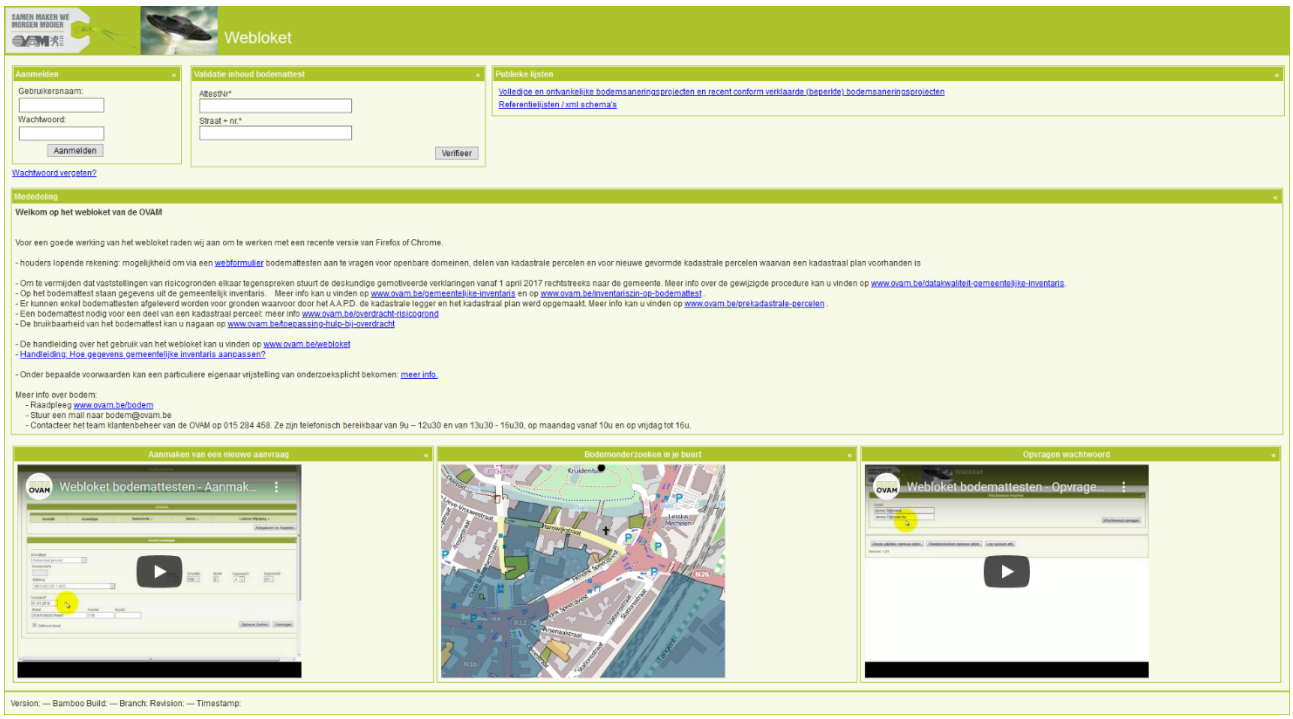


Figure 16. Homepage of Web-based application.

However, full access is limited to OVAM-collaborators and more detailed access is also provide to professional experts. The Geoloket-application provides a geographical overview of all investigated sites reported at OVAM. Each site is characterised by an identification number referring to the underlying reports and uploaded data (Figures 17 and 18).

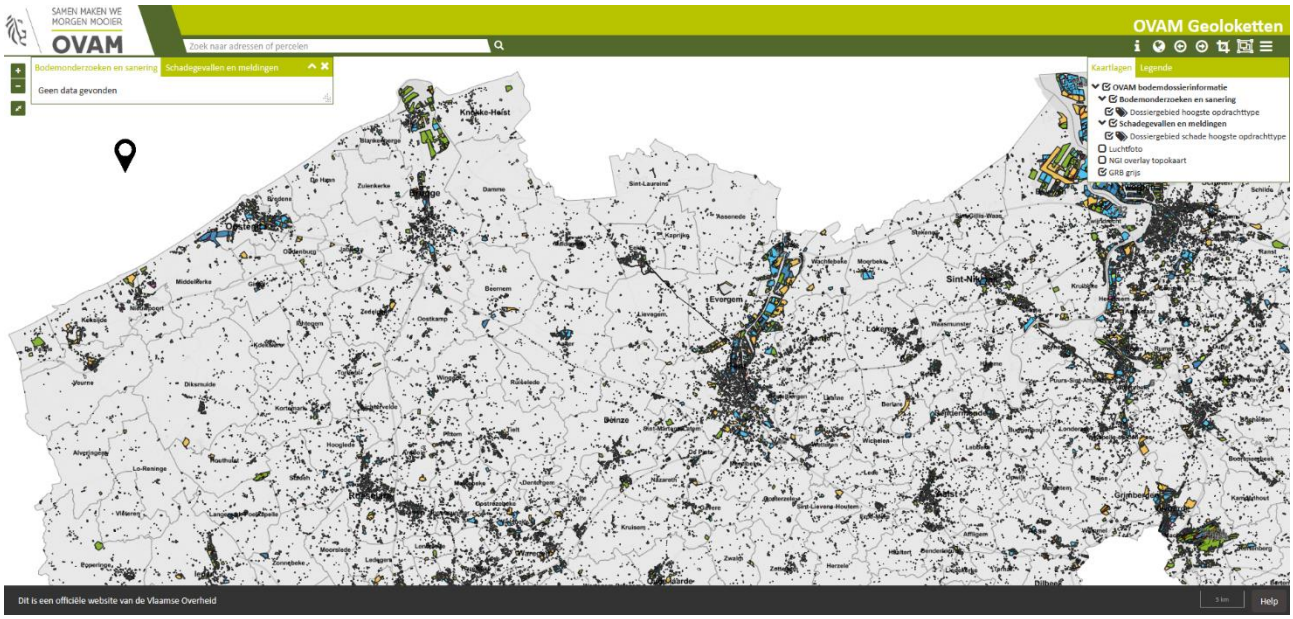


Figure 17. Wide graphical overview of results from Geoloket application.

The colour of the polygons refers to the type of report (preliminary investigation, detailed investigation, remediation project, remedial actions, monitoring etc). A zoom-function and coupling with other maps provides more detail of the locations.

Figure 18. Zoomed graphical overview of results from Geoloket application.

Most of the soil pollution is directly linked to the (industrial) operations at the site. The probability of the impact depends on the kind of executed activities (underground storage tanks, landfilling, refining etc.) and risk-based operations are listed in the legislation. A specific database **(Municipal register)** contains these data. OVAM collects these different kind of data and has full authority on the management.

Specific types of contaminated land can be labelled in MISTRAL (gasworks, landfills, petrol service stations etc.) and about 700 sites were identified as **Brownfields** (OVAM, 2020). Figure 19 provides an overview of brownfield sites in the Flanders region.

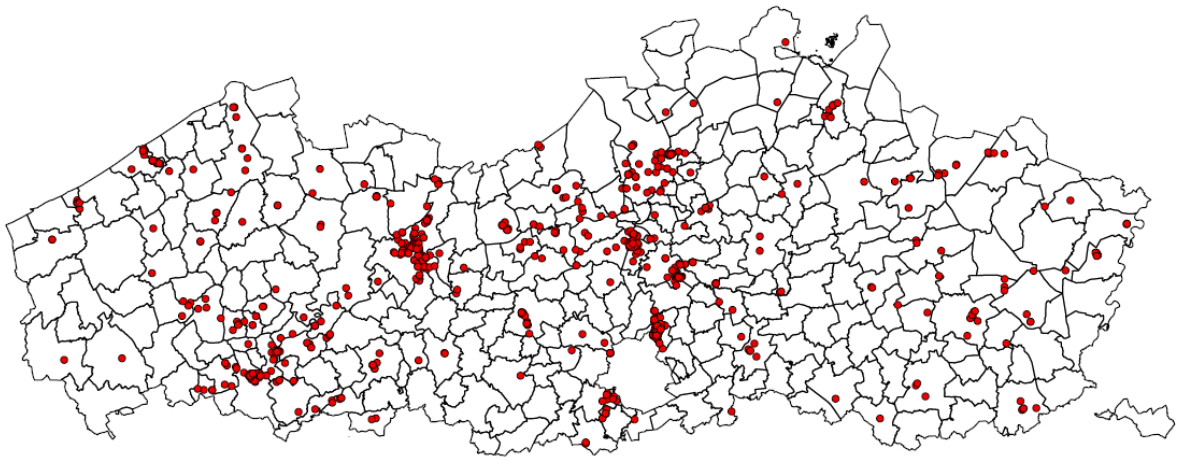


Figure 19. Sites labelled as brownfields in Flanders (OVAM, 2020)

According to the Brownfield Act of 22 March 2007, developers have the opportunity to sign a contract with the Flemish Government and other responsible public authorities about the realization of a brownfield project. In 2008, the Flemish government launched a first call for proposals. Mid 2020, 101 projects have been approved by the Flemish government. More information is available at the following link: https://www.vlaio.be/nl/begeleiding-advies/bedrijfshuisvesting/brownfield-

herontwikkeling/getekende-brownfieldconvenanten. Each project has a file on the characteristics of the site, the redevelopment plan and the agreements as stipulated in the covenant. An extended database is only accessible by the appointed representatives of governmental departments/agencies, the members of the Brownfield committee and the official negotiators.

Information on **landfills** is available in databases at several governmental agencies as mentioned in Table 2. Detailed access is often limited to public authorities but queries on demand are optional.

Table 2. Landfill databases for the region of Flanders.

Regulator	Nation	Dataset	Link
Department of Environmental Affairs	Flanders	Operational and permitted landfills	Web-based application only accessible for public authorities.
DOV (Database Subsoil Flanders)	Flanders	General maps on soil characteristics. General info at: https://www.dov.vlaanderen.be/sites/default/files/pfiles_files/20191107_paper_Oorts%20et%20al_final.pdf	https://www.dov.vlaanderen.be/themas https://www.dov.vlaanderen.be/kaarten
OVAM	Flanders	Permitted landfill sites. Overview.	https://www.ovam.be/tarieven-en-capaciteiten-voor-storten-en-verbranden
OVAM	Flanders	Reported historic and operational landfill sites (part of LIR)	Limited access. Overview at : https://services.ovam.be/ovam-geoloketten/#/bodemdossier?x=140410&y=198535&z=10
OVAM	Flanders	Permitted former and current landfills (part of MR).	Limited access. Overview at: https://www.ovam.be/webloket

OVAM has made an extract of the reported landfill records and these data are used in decision support tools and geospatial analyses as shown in Figure 20.

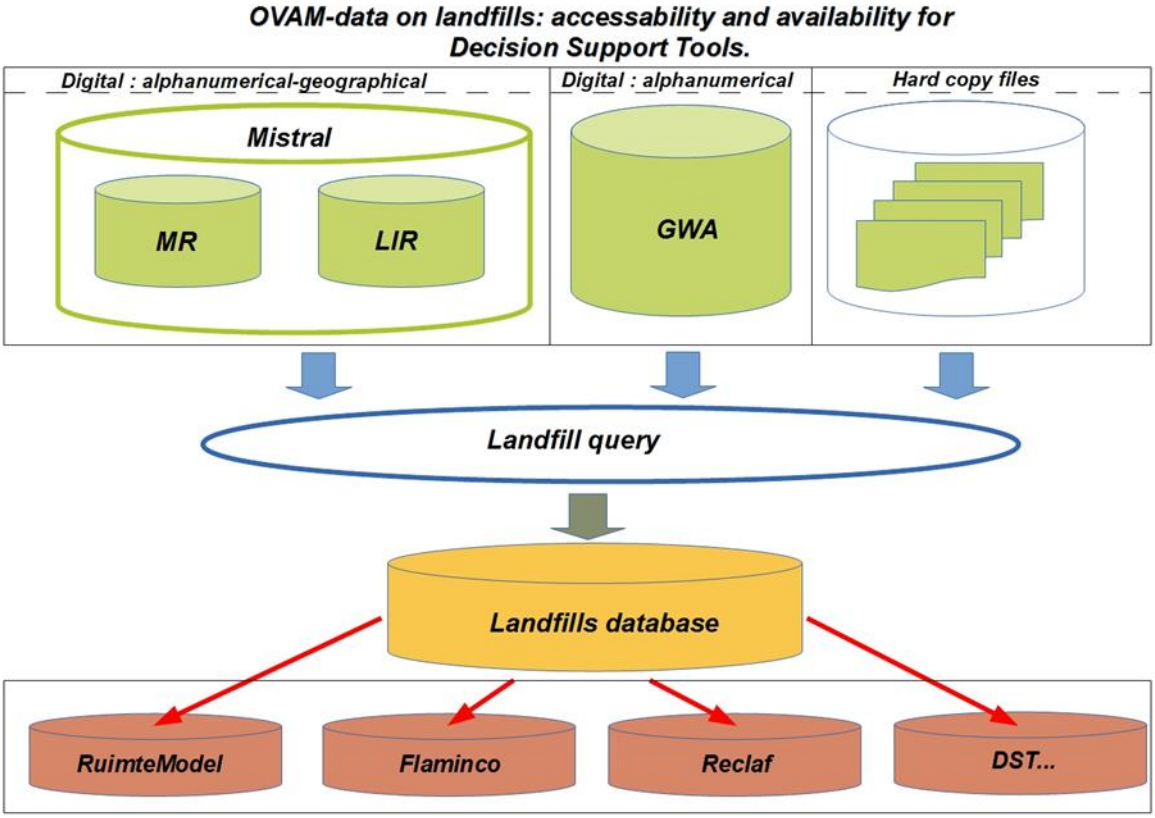


Figure 20. Data collection, extraction and management on landfills (OVAM, 2020).

3.1.3.2 Wallonia

- BDES

In Wallonia, the soils are considered as an essential resources. A decree related to the soil management and soil remediation was ratified on the 5th of December, 2008 by the Walloon government. A revised version of the decree, including additional remediation obligations, was adopted on the 1st of March 2018.

Within the legal provisions taken into place following this decree, a database for the state of the sols (BDES – Acronym for Banque de Données de l'Etat des Sols) was implemented. With this platform, all the citizens can have access to the information related to the state of the soils in Wallonia. It also delivered soil conformity certificates which are required for some administrative procedure (for instance, real estate transaction).

In the BDES, available data regarding the potential presence of soil pollution (past or present) as well as the presence of activities susceptible to generate pollution are compiled for each land plots. These data have been provided by the Walloon region, public interest companies (e.g. SPAQuE) and research centers. The BDES has a SIG interface, which can provide instantaneously the information for the selected land plot.

Two types of information are available within the BDES. On the map, the blue lavender color (e.g. Fig. 21) indicates land plots where there is a suspicion of soil pollution. This suspicion is mostly based on historical documents and previous activities implemented on site. The citizens are informed that the land plots might be polluted but there is at this stage no obligation to investigate and/or to remediate the site (i.e. no activation of the act. 19 of the soil Decree). Less than 1% of the land plots in Wallonia are concerned. By contrast, the peach color (e.g. Fig. 21) shows the land plots

where soil pollution have been identified or where investigations should be done due to the potential presence of soil pollution. For these parcels, administrative procedures should be performed as required by the Soil Decree (Art. 19, 23-28). However, all land plots in peach are not necessary polluted or should not be the object of a soil remediation. For some of them, soil remediation have been already done. For others, soil remediation is not mandatory but additional protective measures on site should be implemented instead. In that case, the administration will delivered a soil control certificate. In the soil Decree (art. 29 and 30), derogations to the legal requirements mentioned in the soil decree can be obtained. Less than 3% of the land plots in Wallonia are concerned (Sols et déchets en Wallonie, 2021).

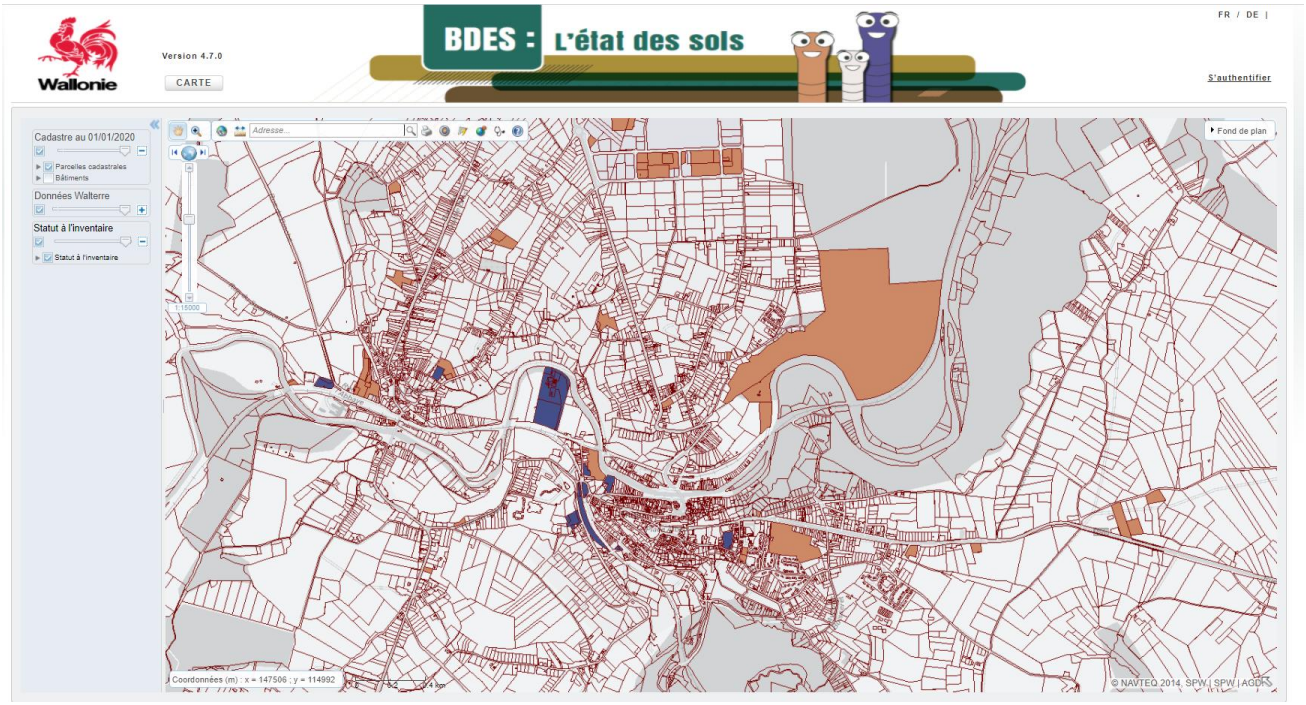


Figure 21 – View of the BDES database.

BDES is shown in Figures 21 and 22. Each land plot where there is a suspicion of soil pollution is represented in blue lavender. The peach color highlights where soil pollution has been assessed or where site investigation is required. The following information is provided:

- Current situation in the inventory of Walloon polluted soil (data provided by SPAQuE);
- Source (e.g. historical documents, investigations) ;
- References of available documents. In some case, the documents can be also consulted online.
- Progress report concerning potential administrative procedure (if any).

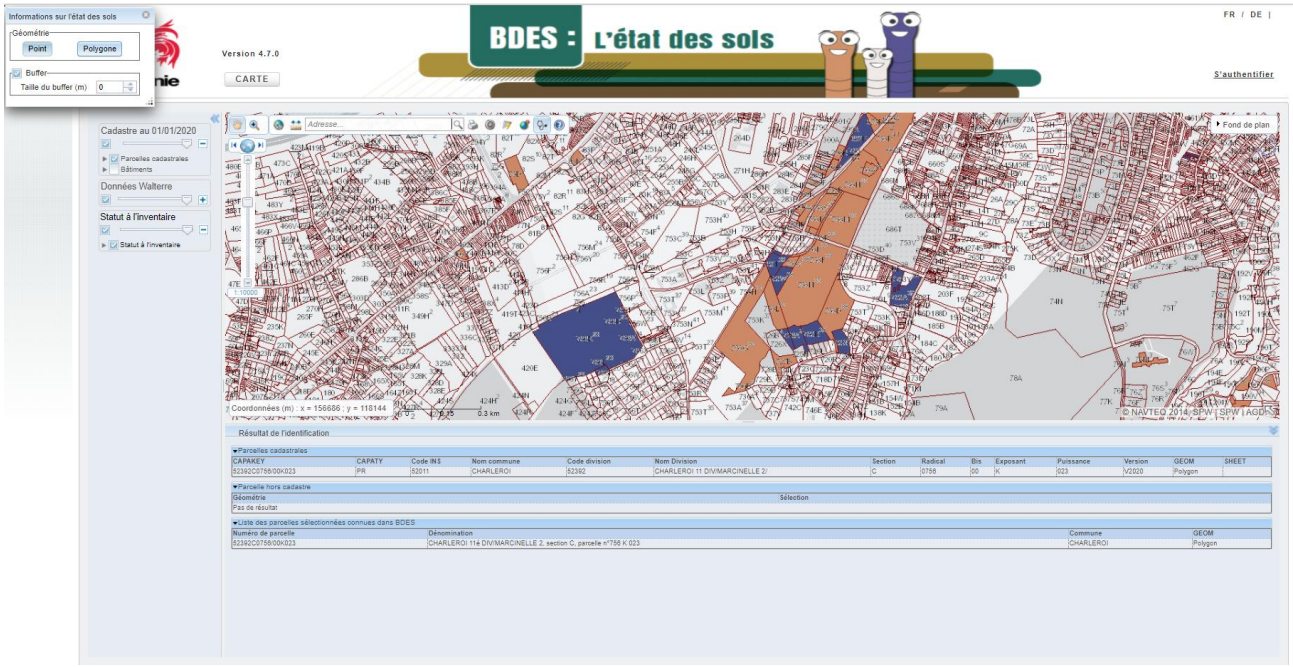


Figure 22 – Alternative view of the BDES database.

The BDES is regularly fed with new information, especially regarding the results of investigation studies.

Basic information are available for everybody. However, the access to some information such as online documents and administrative procedures required an authentication.

- Walsols

Althrough SPAQuE provides some information to feed the BDES, SPAQuE has its own brownfield and landfill database: Walsols. Walsols (Fig. 23) is a web-based application combining a SQL database as well as GIS database containing all the spatial data needed for SPAQuE. The spatial data have been either import from the Walloon region geoportal (WalOnMap) or directly draw by SPAQuE geomatic department using ArcGIS software. This database is only available for SPAQuE's employees.

The database contains approximatively 5400 brownfields and 1320 landfills which are categorized following their level of management (Fig. 24):

- **Inventory level:** the perimeter of the brownfield site is drawn based on known past activities, aerial photography and site visit.
- **History level:** the perimeter of the brownfield site is defined based on a detailed historical study.
- **Investigation level:** investigation study was performed. Soil samples were taken on site and its surroundings, and were analysed in order to assess the presence of soil pollution and its impact on the surface and groundwater. If necessary, the boundary of the site is refined.
- **Remediation level:** the site is partially or entirely remediated.

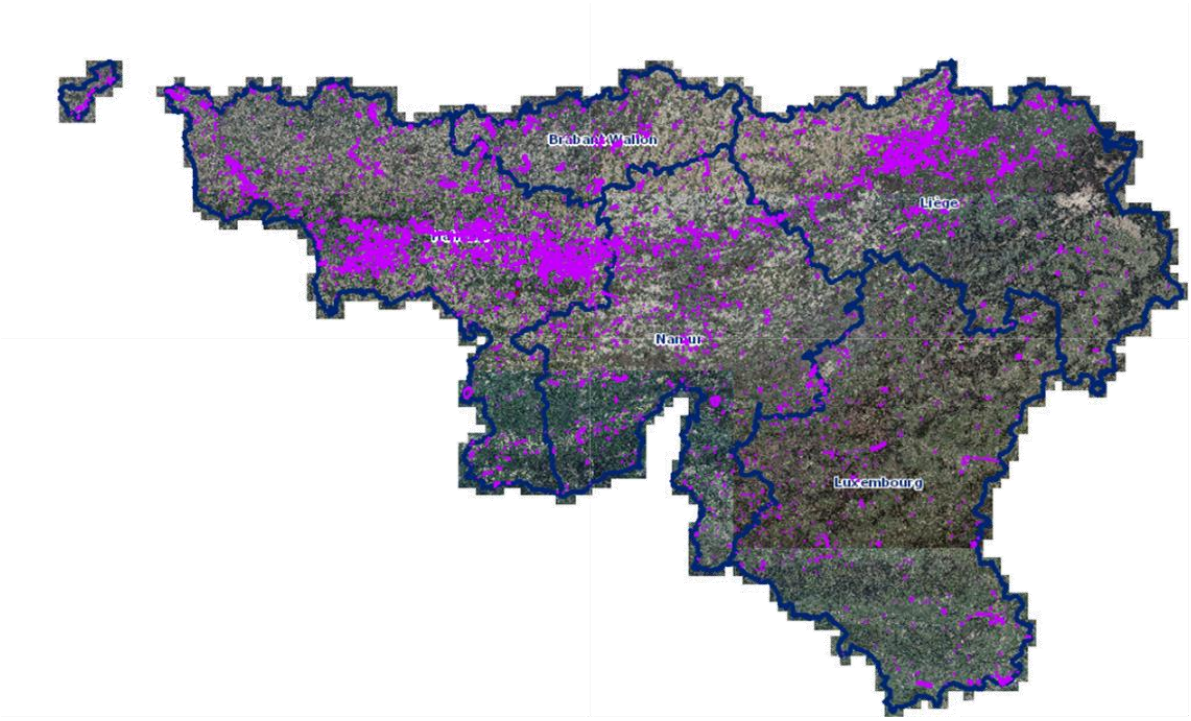


Figure 23 – Presentation of the SPAQuE's geoportal – General overview.

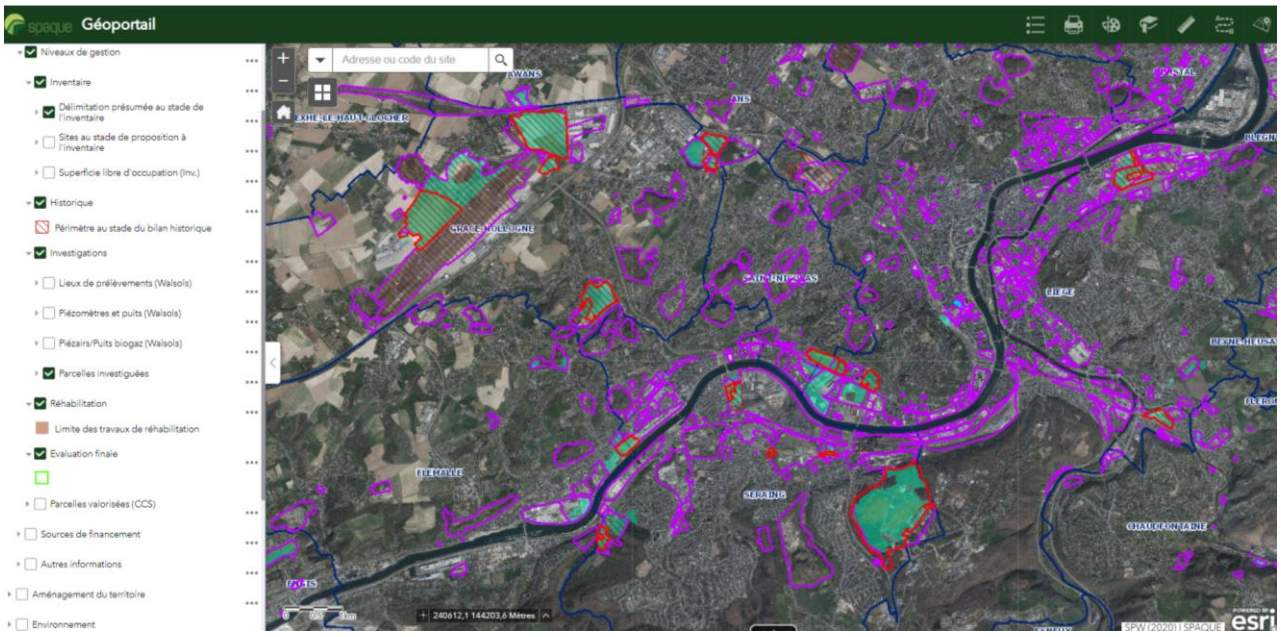


Figure 24 - Presentation of the SPAQuE's geoportal – Level of management: inventory (purple), history (red hatching lines), investigation (light green), remediation (brown).

Each site is linked to a database. To access to the site ID, the user can either click on the selected site on the geoportal (Fig. 25) or search for a site directly in the database. For the second option, site can be searched either by name or by SPAQuE's code. Sites can be also selected based on the type of site (e.g. brownfield, landfill, engineered landfills), their level of management and their location (Fig. 26).

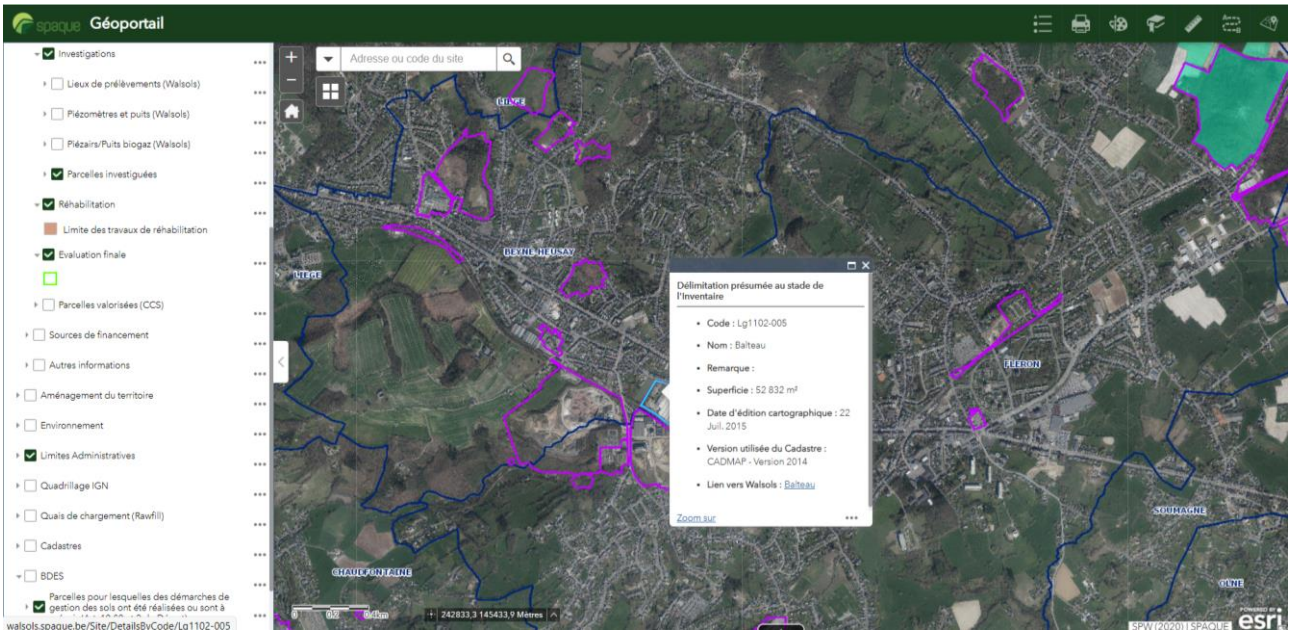


Figure 25 - Presentation of the SPAQuE's geoportal – Generic information available for each site.

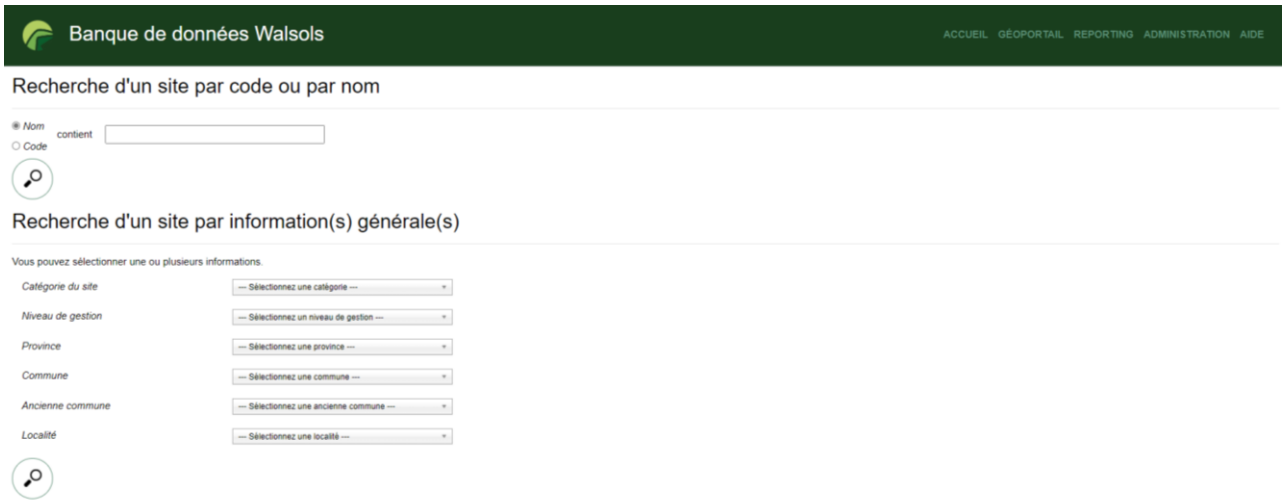


Figure 26 – Overview of the search engine of Walsols database.

Information regarding each site contained in Walsols database is divided into seven categories:

1. General information
2. Geographic data
3. Site description
4. Historical activities
5. Investigation on site
6. Site remediation
7. Contact person

The categories are described in details in Table 3. Caption of walsols database are presented in Figures 27 and 28. In addition to these categories, important internal documents related to the site can be consulted online. Regarding the samples taken on site, results of the lab analysis are automatically encoded into the database in order to facilitate the process of the results.

Table 3 – Categories and data present in the Walloon database – Walsols.

1. General information	2. Geographic data	3. Site description
• SPAQuE reference • Name of the site • Address • Municipality • Province • Other names (if any) • Other references in other database (if any) • Type of site (e.g. brownfield, landfill) • Site surface (for each level of management) • Administrative data • Data visible on the BDES • Opportunity (regarding the redevelopment of the site).	• Link to the geoportal of SPAQuE • Land plots ○ for each level of management (*update each year*) • Land planning ○ Surface of the site affected to the different type of land planning (residential, industrial, economical, green space forest…) ○ Percentage of the site affected to the different type of land planning (residential, industrial, economical, green space forest…)	• Site visit ○ Description of the site ○ Built surface area (m²) ○ Comment on the building present on site ○ Is there any technical defects? ○ Comment on the technical defects ○ Date of the last site visit ○ Is a second site visit is needed? ○ Comment on the site visit • Problematic • Environment ○ Neighborhood ○ Is there any historic interest? ○ Is there any patrimonial interest? ○ Protective status - Groundwater - Surface Water ○ Is there any public safety risk? ○ Comment on the public safety risk • Waste
4. Historical activities	**5. Investigations on site**	**6. Site remediation**
• Description ○ Start date ○ End date	• Fieldwork ○ Name of the fieldwork ○ Level of management ○ Start date – sampling ○ End date – sampling ○ Number of sampling locations ○ Number of samplings • Sampling design plan • Sampling location ○ Reference ○ Type of sample ○ Start date ○ End date ○ Project manager ○ Subcontractor (if any ○ Type of equipment ○ Geographic coordinates (X, Y and Z in Lambert 1972 referential) ○ Depth ○ Depth of the water table • Piezometers/piezairs ○ Reference ○ Type ○ Status	• Remediation work ○ Start date ○ End date • Soil valorisation • Maintenance ○ Type of maintenance ○ Start date ○ End date

	○ Water table ○ Coordinates (X and Y in Lambert 1972 referential) • Summary of the sampling results	
7. Contact person		
• Project Manager • Name of the organism(s) involved		

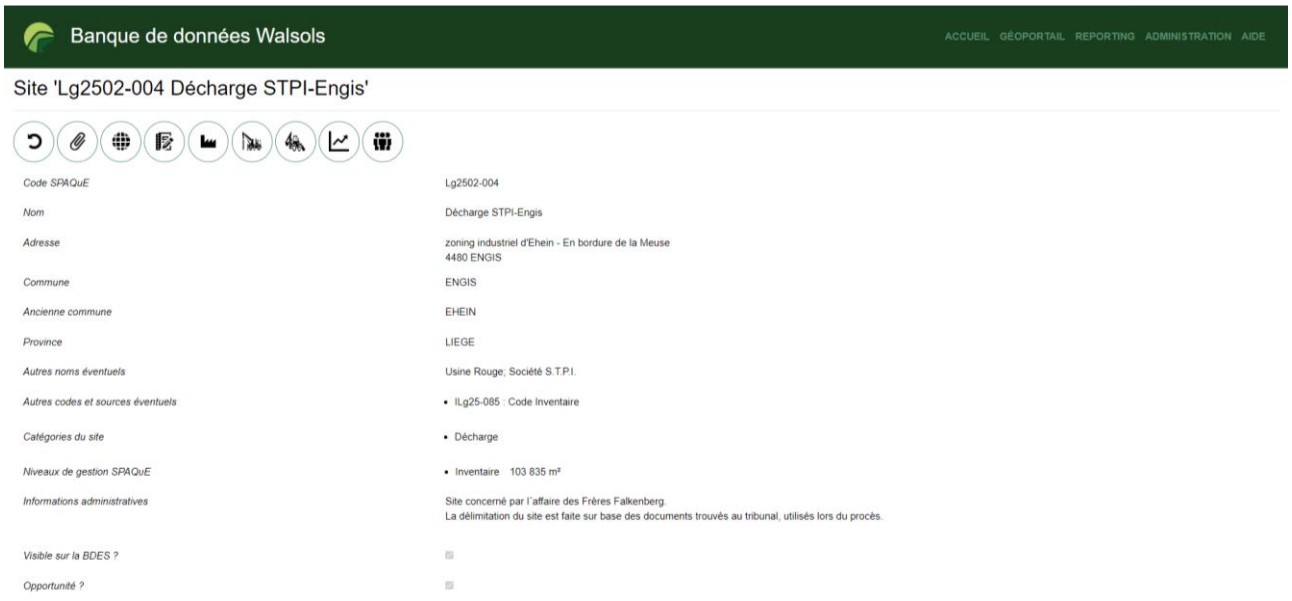


Figure 27 – Walsols database – site ID.

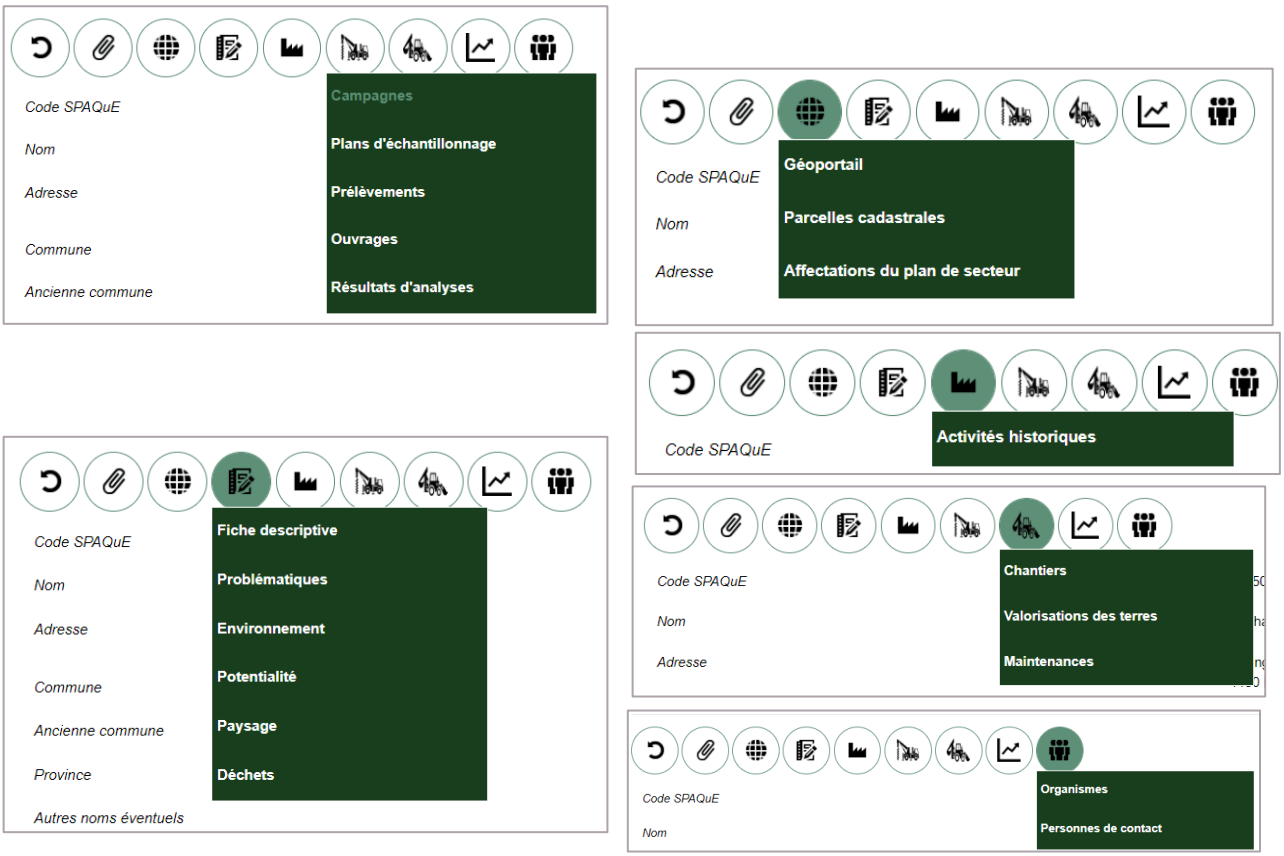


Figure 28 – Overview of the categories present in the Walsols database.

SPAQuE is currently working on the coupling between Walsols and the ELIF developped within the RAWFILL project (see Appendix 2 for more information regarding the ELIF).

3.1.3.3 Brussels

Environmental issues of Brussels Capital Region, including waste, are managed by Brussels-Environment Agency.

Some old dumps were created in the past[9] until 1980s, when landfilling in the region has been banned. As most of the area is heavily urbanised, some of the dumps have been removed totally or partially and the waste transported to Walloon landfills.

An inventory of the old landfills, authorized or illegal, has been realised in December 1993 by University of Brussels – IGEAT to measure their potential environmental risks. 68 landfills have been identified, based on historical investigations and analysis of geotechnical maps, whose are useful to locate backfilling areas and old quarries. Repartition is:

- 7 sites where presence of waste is suspected but not proven
- 35 domestic waste landfills, which can also contain some industrial and construction waste
- 3 industrial waste landfills

Landfills have been located on the 1/25000 Brussels map.

The fields of the database, whose is not publicly available, are the following ones:

[9] Investigations went from 1800 to 1980s

- Approximate location (based on streets)
- Landfill type (public landfill, industrial landfill, backfill, deposits of materials)
- Waste type (domestic waste, urban sludges, industrial waste)
- Quantity (most of the time, unknown)
- Activity period
- Bibliography (list of books and articles where the site is mentioned)
- Memorandum (historical information and 1/25000 maps)
- Information sources (including people testimonies)
- Contact person
- Current use (built – houses, industry, schools – and not built)
- Existing projects
- Priority (necessary to take action or not)
- Available analyses

This inventory is not exhaustive, as some small landfills were completely hidden and not known by local authorities.

The inventory is now integrated in the "Inventaire de l'état des sols" (inventory of soil status, mainly polluted soils) from which generic data are public and specific information as investigation reports are reserved to soil experts and real estate professionals. Map and site overview are provided in Figures 29 and 30. Classification is made based on cadastral parcels. Extracting a list of landfills from the database can be done only by authorities.

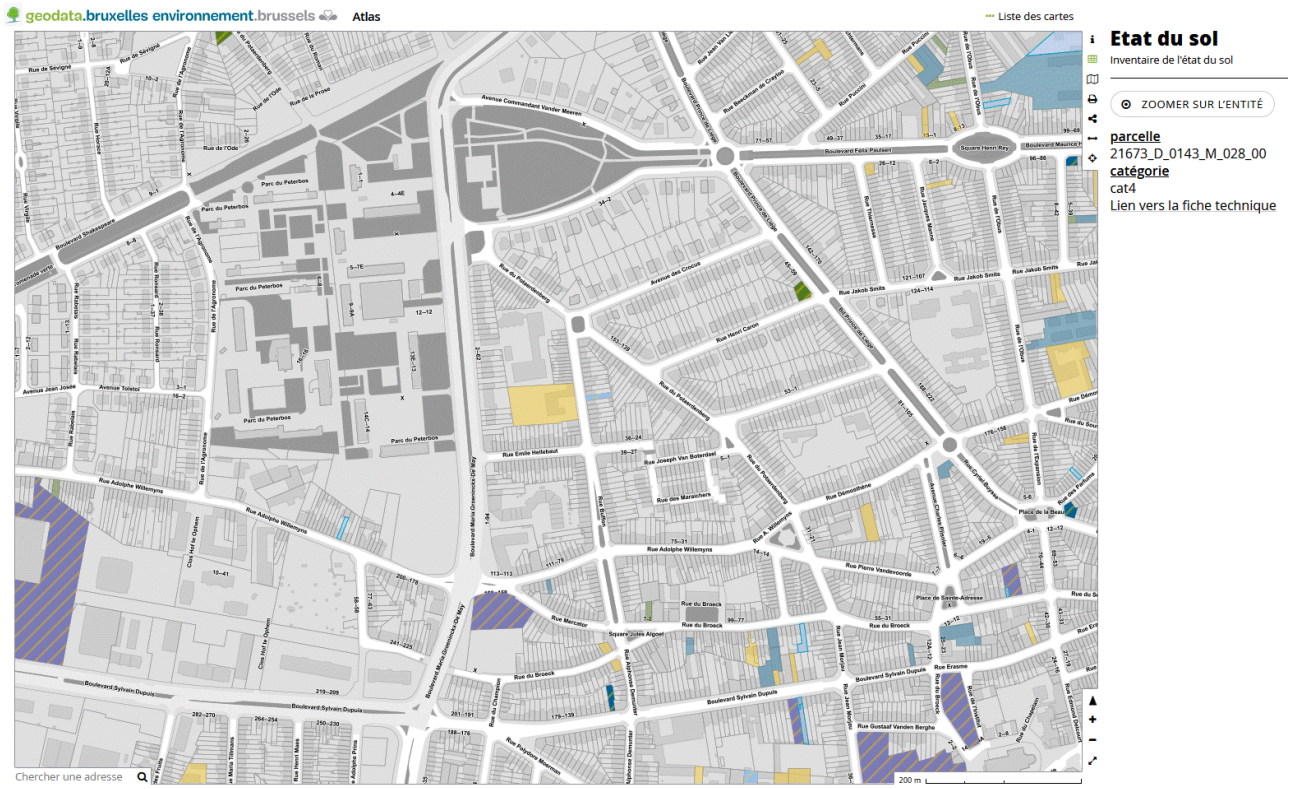
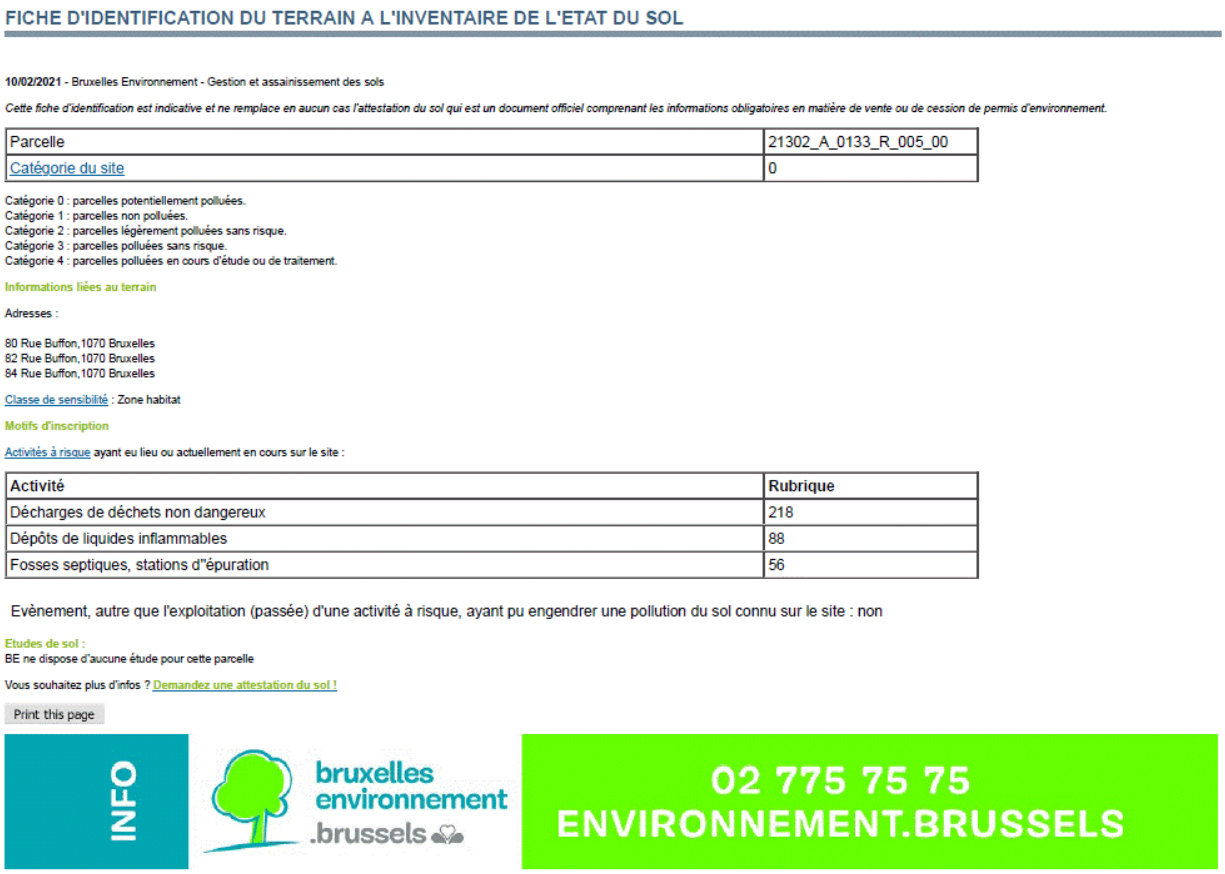


Figure 29. Inventory of soil status, public part, 2021.



FICHE D'IDENTIFICATION DU TERRAIN A L'INVENTAIRE DE L'ETAT DU SOL

10/02/2021 - Bruxelles Environnement - Gestion et assainissement des sols

Cette fiche d'identification est indicative et ne remplace en aucun cas l'attestation du sol qui est un document officiel comprenant les informations obligatoires en matière de vente ou de cession de permis d'environnement.

Parcelle	21302_A_0133_R_005_00
Catégorie du site	0

Catégorie 0 : parcelles potentiellement polluées.
Catégorie 1 : parcelles non polluées.
Catégorie 2 : parcelles légèrement polluées sans risque.
Catégorie 3 : parcelles polluées sans risque.
Catégorie 4 : parcelles polluées en cours d'étude ou de traitement.

Informations liées au terrain

Adresses :

80 Rue Buffon,1070 Bruxelles
82 Rue Buffon,1070 Bruxelles
84 Rue Buffon,1070 Bruxelles

Classe de sensibilité : Zone habitat

Motifs d'inscription

Activités à risque ayant eu lieu ou actuellement en cours sur le site :

Activité	Rubrique
Décharges de déchets non dangereux	218
Dépôts de liquides inflammables	88
Fosses septiques, stations d''épuration	56

Evènement, autre que l'exploitation (passée) d'une activité à risque, ayant pu engendrer une pollution du sol connu sur le site : non

Etudes de sol :
BE ne dispose d'aucune étude pour cette parcelle

Vous souhaitez plus d'infos ? Demandez une attestation du sol !

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Figure 30. ID card of a parcel known as old landfill and urban sludge deposit (landfill = "rubrique 218", urban sludges = "rubrique 56").

3.1.4 Germany

In North-Rhine Westphalia, Germany the State Office for Nature, Environment and Consumer Protection North Rhine-Westphalia (LANUV) is responsible for inventories structures regarding brownfields and landfills.

ADDISweb[10] is the data information system of North-Rhine Westphalia on landfills, illustrated in Figure 31. This inventory structure was also included in the EU-wide inventory of RAWFILL.

The information system ADDISweb - waste landfill data information system for landfill self-monitoring, is accessible since 2011 and landfill operators in North Rhine-Westphalia are obliged to fill the inventory of ADDISweb with relevant data on landfill monitoring on a yearly basis.

The information provided includes:

- general information on the landfill,
- inventory of waste,
- quantity of received wastes,
- remaining volume,
- subsoil and bottom sealing,

[10] https://www.addis.nrw.de/spring/deponie

- surface sealing,
- re-cultivation,
- water process line and analysis (landfill leachate, surface water, groundwater),
- landfill gas extraction and deformation of the landfill body.

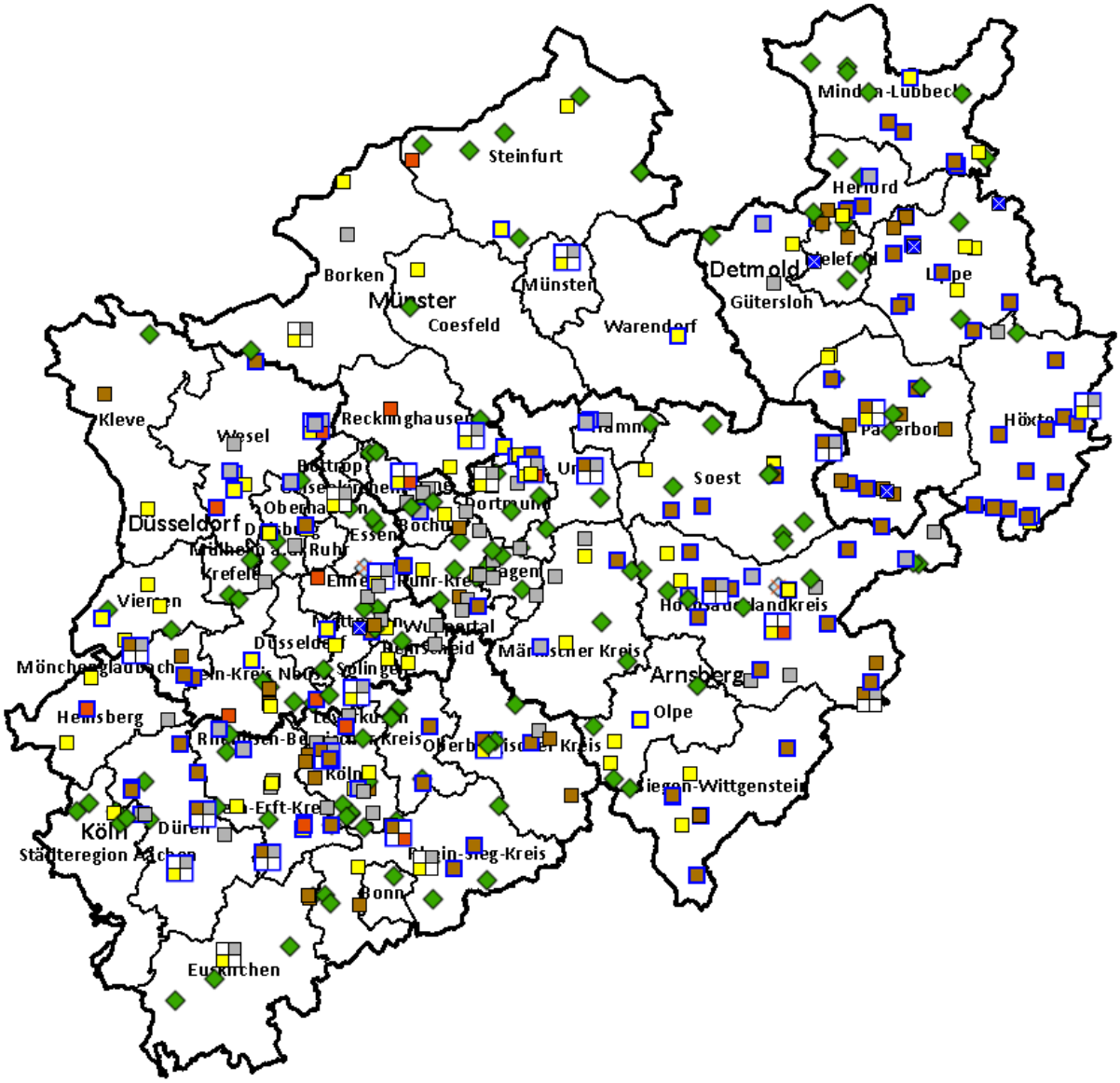

Figure 31. Landfill sites in North-Rhine Westphalia extracted from ADDISweb, 2020.

Due to the long industrial and mining history of many parts of North Rhine-Westphalia, the number of sites suspected of being contaminated and contaminated sites is particularly high.
The change in the economic structure means that numerous mining, industrial and traffic wastelands that are suspected of being contaminated with old sites are required for new use. Specific contaminated site problems also arise with military properties that have been and are released to a considerable extent for other uses.

Therefore, North Rhine-Westphalia took up contaminated site issues at an early stage and has since linked a large number of measures and initiatives to form a comprehensive concept.

The main focus of the state concept is on supporting the districts, independent cities and municipalities belonging to the district. The municipal administrations are faced with major requirements in two respects: on the one hand, they have to carry out the majority of the enforcement in order to ward off dangers that arise from contaminated sites. On the other hand,

the land-use planning and the approval of building projects represent municipal tasks that are inextricably linked to contaminated site issues, especially when it comes to reactivating land.

The state therefore offers the municipalities targeted assistance tailored to the respective problem, in particular suitable legal instruments, financial relief and detailed technical support.

Regarding brownfields, there are two inventory structures in North-Rhine Westphalia.

3.1.4.1 FIS StoBo NRW – Specialized information system on soil pollution

In the information system on soil pollution (FIS StoBo), data on the soil pollution in North-Rhine Westphalia is brought together. It currently comprises approx. 75,000 sample data from approx. 60,000 locations with point-related information about substance contents in soils. Data on toxicologically relevant heavy metals and poorly degradable organic compounds are primarily recorded. www.stobo.nrw.de

In the FIS StoBo (Figure 32) it is possible to:

a) Find out about the locations of soil tests,
b) Obtain an overview of the substance contents in soils for defined sample collectives by selecting certain criteria (e.g. land use, depth of extraction, analysis method, etc.),
c) Present data in cartographic or tabular form,
d) Access background information on the examination programs,
e) Extract data output for further processing as a download.

The information set is accessible in a simple but well-founded manner without in-depth knowledge of GIS or database. The selection of data can be individually defined and the results can then be visualized in tabular or cartographic form. In addition, the FIS StoBo offers the possibility of data downloads in order to work on further relevant questions. Frequently required standardized evaluations of the FIS StoBo can also be used by integrating offered geoservices into local geographic information systems.

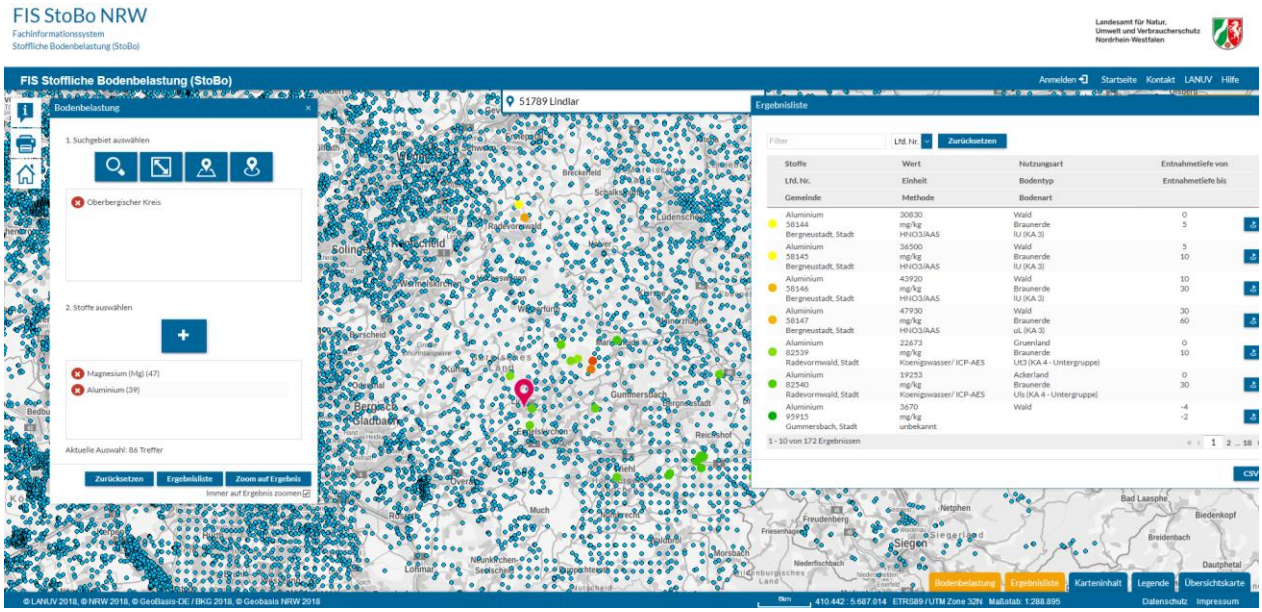

Figure 32. Exemplary map of contaminated sites with aluminium and magnesium in the district of "Oberberg" in North-Rhine Westphalia with a table showing the heavy metal concentration.

3.1.4.2 FIS AlBo – Specialized information system "Contaminated sites and harmful soil changes"

This information system is only available for the authorities in North-Rhine Westphalia.

According to § 9 LbodSchG (regional soil protection act), it is the task of the LANUV to maintain the country-wide file on areas suspected of being contaminated, contaminated sites, suspected areas and harmful soil changes (FIS AlBo). The FIS AlBo specialist information system was fundamentally revised from 2017. The database has been available to the responsible districts and independent cities in North Rhine-Westphalia since the beginning of 2019 as a web GIS application on the state intranet for the new entry of data and the processing of data migrated from the old system. The new FIS AlBo was introduced by the Ministry of the Environment on January 21, 2019.

The individual case data are collected by the lower soil protection authorities of the districts and independent cities in NRW and kept in their cadastre. Basic data specified by the LANUV and the Ministry of the Environment must be entered in FIS AlBo or uploaded via an interface. The database is operated and maintained by IT.NRW.
The scope of mandatory data to be transmitted by the districts and independent cities depends on the processing status of the respective areas in accordance with the upload interface description.

FIS AlBo enables:

a) the structured storage of the collected data, facts and knowledge of a large number of recorded areas suspected of being contaminated by old sites, contaminated sites, suspected areas and harmful soil changes,
b) efficient data transmission and a comparison with municipal IT systems and
c) an exchange with other environmental databases via the map view of the central groundwater database of the state of North Rhine-Westphalia – HygrisC. Note: HygrisC can be used by state and municipal institutions in North Rhine-Westphalia with reference to water and environmental data as well as the water associations, as long as there is IT access to the state administration network.

FIS AlBo serves the following purposes in particular:

a) First information basis for the lower soil protection authorities and authorities listed in § 10 LbodSchG (regional soil protection act)
b) Data basis for statistical evaluations, in particular determining the status of the work
c) Exchange of information and gaining knowledge for enforcement (e.g. details of the rehabilitation procedures used)
d) Information basis for brownfield recycling
e) Basis for national and EU reporting.

The new FIS AlBo was created in coordination with the users of the system after approval by the state municipal cooperation committee AIV. FIS AlBo is accessed either directly from the state administration network or for the municipalities from the DOI network.

3.1.5 Netherlands

In the National Environmental Policy Plan of 1998 (Nationaal Milieubeleidsplan – NMP-3), an initiative was included to provide a Nationwide image on soil contamination (Landsdekkend beeld bodemverontreiniging – LDB). The purpose of this initiative was to map the entire extent of soil contamination in the Netherlands. By 2004, this initiative resulted in an extensive inventory on soil

contamination of approximately 425.000 potentially contaminated sites. This number includes all locations that require a soil investigation or a remediation strategy. In 2012, the inventory was reduced to approximately 250,000 sites as soil investigations or remediations were performed (Compendium voor de Leefomgeving, 2015).

The basis for the development of this inventory was the Historic soil document (Historisch bodem bestand – Hbb). This document was compiled by municipalities and provinces in the second half of the 1990's, in order to get an impression on the amount of possible contaminated locations. The Hbb was based on information found in permit-archives, registrations of the Chambre of Commerce and interpretations of aerial photos (Balder, 2015).

Figure 33 describes the current dataflow in the Netherlands, concerning soil information. Within this dataflow, the national supply of data (DINO-BLK database), forms the central database which gathers the relevant information from the responsible authorities (provinces or municipalities). Soil Protection Act (Wet bodembescherming, Wbb) municipalities are those who were, according to the Resolution of 12 December 2000, designated for the implementation of the Law on Soil protection on an equal level as the provinces. Hence, they are responsible for the data management on soil contamination as well. For non-Wbb municipalities, the provinces have the authority and deliver the data to the central system. From this central database, specific data elements are distributed towards several (public) web based applications. Data regarding soil contamination and quality can be found at bodemloket.nl (Bodemplus, 2020).

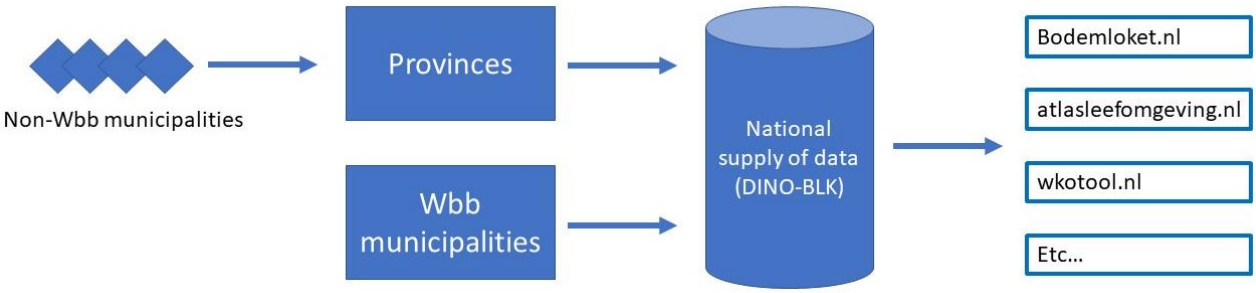

Figure 33. Current dataflow on information regarding contaminated sites in the Netherlands. Source : Modified from Bodemplus, 2020

Bodemloket.nl is a website that provides insights in the status of soil contamination and quality, in a geographical way. Figure 34 provides a screenshot of this web page, visualizing the different regions that are participating to this data format. The orange regions are not participating to the bodemloket application, yet. However, they do publish the same kind of data on their own websites. Only for some small regions (in light yellow) no online information is available.

When zooming in on the map, information appears on the status of the soil investigation (Figure 35). The colours of the polygon markings refer to the following categories:

- Information present, status unknown
- Remediation activity
- Investigation/remediation completed
- Investigation activity
- History of the site unknown

Another important category of contaminated sites are landfills. In the Netherlands, a site specific overview of all sanitary landfills (permitted) can be found on the website of Bodemplus[11]. However,

[11] https://www.bodemplus.nl/onderwerpen/bodem-ondergrond/verwerking-grond/stortplaatsen/

this website only provides information on the address, operator, operational status and whether hazardous waste was landfilled.

Besides these sanitary landfills, also many former landfills are present in the Netherlands. Currently, estimations point at an amount of approximately 6000 sites. Around 1998, the NAVOS (Nazorg Voormalige Stortplaatsen or Aftercare Former Landfills) project was initiated and all provinces started with an exploratory investigation of these former landfills. This included the development of inventories of the locations of all former landfills as well as analysis of the quality of the groundwater, the thickness and quality of the cover layer (Interprovinciale werkgroep nazorg, 2020). According to Lieten (2018), more detailed information should be available. However, this information is not centralised, but is available and managed by the individual authorities (provinces and municipalities) in specific soil information systems or GIS applications. Only a few provinces provide this data publicly on the website of the National Georegister. Other authorities shared the information by means of their own (provincial) GIS portals. Hence, data regarding former landfills is decentralised in the Netherlands.

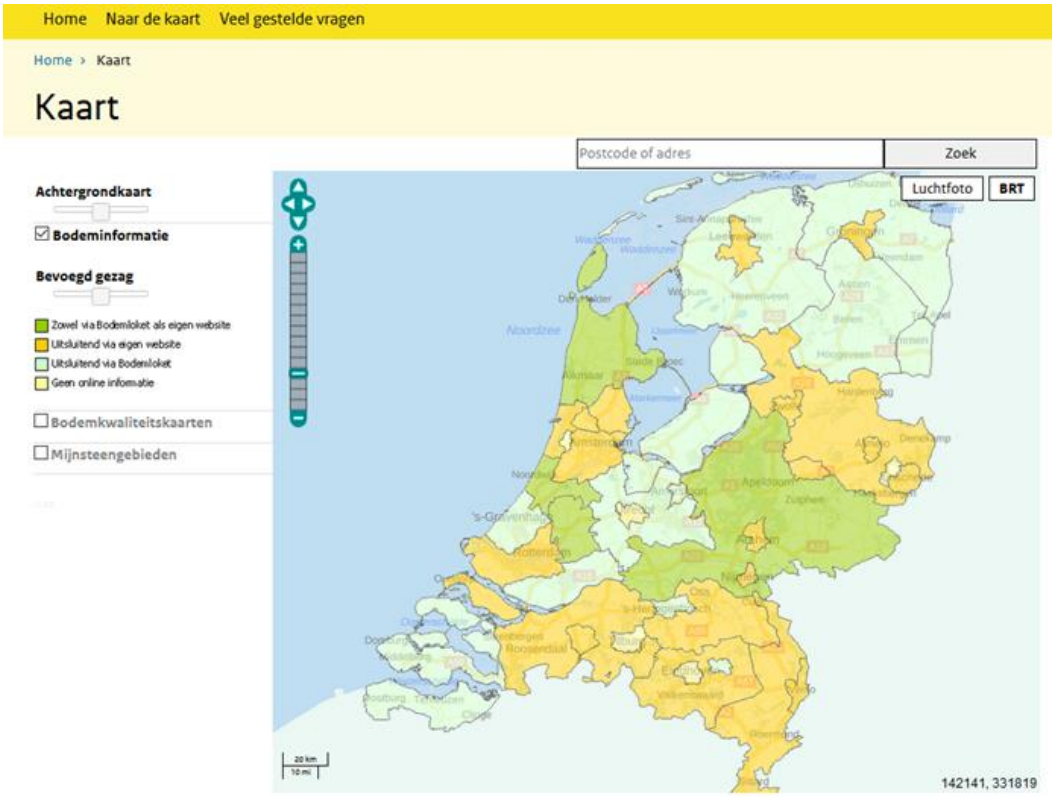

Figure 34. Screenshot of the web page bodemloket.nl, visualising the different regions that are participating to this data format.

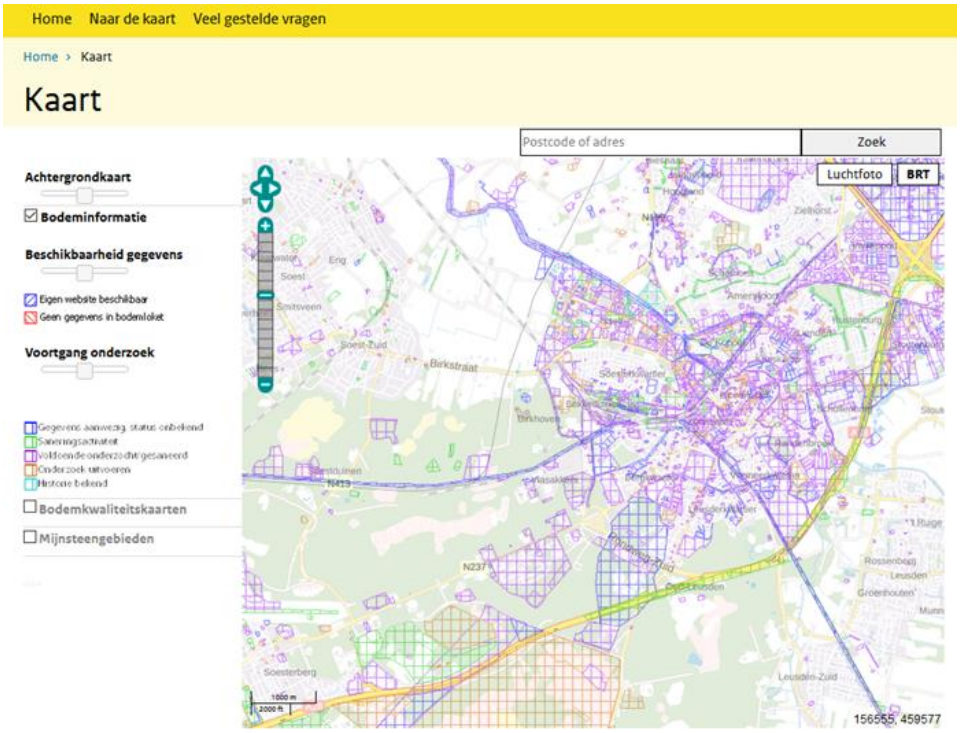

Figure 35. Screenshot of the web page bodemloket.nl, visualising information on the status of the soil investigation.

3.2 LIMITATIONS

Data availability for former industrial sites/brownfields and sites of significant interest for resource recovery, regeneration and reuse is variable and not consistent in classifications. There are often several categories used in the individual registers and some further specify whether or not the sites are abandoned or operating while other databases don't provide this level of information. The number of registered sites may be indicated, and furthermore the estimated total number of sites after completion of the inventory; again, in other databases and inventories this level of information is not provided and/or available. The information available demonstrates that individual countries are at different levels of progress within this process, likely due to placing greater importance on the future monitoring, management or development of brownfield sites. Consequently, figures on the number of suspected or contaminated sites do not represent the complete scale of the problem, rather only providing a snapshot of how much effort has already been made in this area.

Whilst countries discussed within this deliverable report maintain comprehensive inventories for former industrialised sites/brownfield or contaminated sites, there are still discrepancies in the way data is collected, treated and stored. Some countries do have central national data inventories, while others, especially Belgium, Germany, Greece, Italy and Sweden, manage their inventories at the regional level. Almost all inventories include information on polluting activities, potentially contaminated sites and contaminated sites. However, there is little opportunity for interrogating data for bespoke activities, developing scenario based to assess the potential value recovery. Data is available in a rather static manner, not readily enabling dynamic assessment.

Soil and land development are indeed subject to the subsidiarity principle. Thus, it has been a challenge to establish a common European contaminated sites policy and indeed does not exist yet. This fact influences the establishment of a European data collection framework in the way that it has to respect the national differences, and can only be based on voluntary commitments. Perhaps the new initiative on the soil framework directive and the green deal would help achieving some harmonisation.

4 SUMMARY TABLE

Inventory name	Nation	Classification				Information provided						Link(s)
		General	Brownfield	Landfill	Mining	Location	Size	Dates	Materials	Metals	Hazards	
SMART GROUND	EU-wide	Metal resources	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	http://www.smart-ground.eu/
RAWFILL (ELIF)	EU-wide		No (but could be used for)	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	https://www.nweurope.eu/projects/project-search/supporting-a-new-circular-economy-for-raw-materials-recovered-from-landfills/
InfoTerre	France	Geoscience	Yes									http://infoterre.brgm.fr/
Gis Sol	France	Soil data and extractable metals	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	https://webapps.gissol.fr/geosol/ https://www.gissol.fr/
Georisques	France	Geo-hazards and past industrial sites	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	http://www.georisques.gouv.fr/
UK Government and local authorities	UK (England)	Brownfields register (specific to each local authority)	Yes	No	Yes	Yes	Yes	No	No	No	Yes	https://www.gov.uk/guidance/brownfield-land-registers
Department of Agriculture, Environment and Rural Affairs [DAERA]	UK (Northern Ireland)	Brownfields register (historical site use)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	https://www.daera-ni.gov.uk/publications/historical-landuse
European Pollutant Release and Transfer Register (E-PRTR)	EU-wide	Industrial	Yes	Yes (some)	Yes	Yes	No	No	Yes	Yes	Yes	https://prtr.eea.europa.eu/#/home
European Soil Data Centre (ESDAC)	EU-wide	Soil data	Yes	No	No	Yes	No	No	No	No	Yes	https://esdac.jrc.ec.europa.eu/resource-type/datasets

Environment Agency/ Department of Environment, Food and Rural Affairs [DEFRA]	UK (England)	Historic landfill site database	No	Yes	No	Yes	Yes	Yes	Yes	No	No	https://data.gov.uk/dataset/17edf94f-6de3-4034-b66b-004ebd0dd010/historic-landfill-sites http://apps.environment-agency.gov.uk/wiyby/37829.aspx
Environment Agency/ Department of Environment, Food and Rural Affairs [DEFRA]	UK (England)	Permitted landfill site database	No	Yes	No	Yes	Yes	Yes	Yes	No	No	https://data.gov.uk/dataset/ad695596-d71d-4cbb-8e32-99108371c0ee/permitted-waste-sites-authorised-landfill-site-boundaries
Scottish Environmental Protection Agency [SEPA]	UK (Scotland)	Permitted landfill site database	No	Yes	No	Yes	Yes	Yes	Yes	No	No	https://www.sepa.org.uk/environment/waste/waste-data/waste-data-reporting/waste-site-information/
Natural Resources Wales	UK (Wales)	Historic landfill site database	No	Yes	No							https://data.gov.uk/dataset/b5d8eaa4-638c-436b-a66c-a6bd1a25f0df/historic-landfill-sites
Natural Resources Wales	UK (Wales)	Permitted landfill site database	No	Yes	No	Yes	No	Yes	No	No	No	https://naturalresources.wales/evidence-and-data/maps/find-details-of-permitted-waste-sites/?lang=en
Northern Ireland Environment Agency	UK (Northern Ireland)	Historic and Permitted landfill sites	No	Yes	No	Yes	No	No	Yes	Yes	Yes	https://data.gov.uk/dataset/4c9ae0a2-0238-459e-8b4d-1172bec9dc3c/niea-authorised-waste-sites-treatment-storage
ADDISweb	Germany (NRW)	Landfill sites	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	https://www.addis.nrw.de/spring/deponie
FIS StoBo	Germany (NRW)	Soil data	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	www.stobo.nrw.de
FIS AlBo	Germany (NRW)	Brownfield data	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Available only for authorities
LIR OVAM	Belgium (Flanders)	Soil data	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Limited access for non-governmental actors: https://services.ovam.be/ovam-geoloketten/#/bodemdossier?x=140410&y=198535&z=10; https://www.ovam.be/webloket

MR OVAM	Belgium (Flanders)	Permits	Yes	No	No	Yes	Yes	Yes	No	No	No	Limited access for non-governmental actors
Brownfields Vlaio	Belgium (Flanders)	Brownfield covenant data	Yes	No	No	Yes	Yes	Yes	No	No	No	Full access: https://www.vlaio.be/nl/begeleiding-advies/bedrijfshuisvesting/brownfield-herontwikkeling/getekende-brownfieldconvenanten.
DOV	Belgium (Flanders)	Soil data										Several types of soil maps: https://www.dov.vlaanderen.be/themas https://www.dov.vlaanderen.be/kaarten
BDES	Belgium (Wallonia)	Soil data										http://bdes.spw.wallonie.be/portal/
WALSOLS	Belgium (Wallonia)	Brownfield and landfill database	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Limited access for non-governmental actors
Bodemloket	Netherlands	Soil data (availability, investigation status and soil quality)	No	No	No	Yes	Yes	Yes	No	No	Yes	www.bodemloket.nl
Bodemplus	Netherlands	Permitted landfill site database	No	Yes	No	Yes	No	No	No	No	Yes	https://www.bodemplus.nl/onderwerpen/bodem-ondergrond/verwerking-grond/stortplaatsen/

5 REFERENCES

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Lieten, S.H,2018. Landfill Management in the Netherlands, Cocoon project Interreg Europe

Sols et déchets en Wallonie. 2021. Banque de données de l'état des sols wallons (BDES). Consulted on the 16th of March 2021 via https://sol.environnement.wallonie.be/bdes.html

6 APPENDIX

APPENDIX 1: EXAMPLE OF BASIAS RECORD

LOR5400074

Fiche Détaillée

Pour connaitre le cadre réglementaire et la méthodologie de l'inventaire historique régional, consultez le préambule départemental.

1 - Identification du site

Unité gestionnaire : LOR

Date de création de la fiche : (*) 21/10/1996

Nom(s) usuel(s) : Aciéries, Dépôt de liquide inflammable, Sidérurgie, Découpage des métaux, four creuset et électrique

Raison(s) sociale(s) de l'entreprise :

Raison sociale	Date connue (*)
SA des Hauts Fourneaux, Forges et Aciéries de Pompey, Société nouvelle des Aciéries de Pompey (SA)	

Siège(s) social(aux) de l'entreprise :

Siège social	Date connue
61 rue de Monceau, Paris, (ex 48 rue de la Boétie), (ex Immeubles Elysées, la Défense Paris la Défense)	01/01/1111

Etat de connaissance : Pollué connu

Sous surveillance : ?

Visite du site : Oui, site localisé

Date de la visite : (*) 29/06/2007

Autre(s) identification(s) :

Numéro	Organisme ou BD associée
7627	BRGM
1776	BRGM
7286	BRGM
0230-1X-S009	BRGM
9297	BRGM
54.0007	BASOL
9800	BRGM
11 576	BRGM
6606	BRGM
5380	BRGM
11 572	BRGM
2264	BRGM

Commentaire : Dans ces anciennes installations sidérurgiques exploitées jusqu'en 1986, deux bassins à boues ont été comblés. Le bilan des études géochimiques réalisées en 1986 établit l'absence de pollution des sols . site à traiter. Suites du Noms usuels du site: Dépôt de gaz, Dépôt d'acétylène, Stockage et utilisation de substances radioactives

2 - Consultation à propos du site

Consultation des services déconcentrés de l'Etat ou collectivités territoriales :

Nom du service	Consultation du service	Date de consultation du service (*)	Réponse du service	Date de réponse du service (*)
MAIRIE	Oui	06/04/2007	Oui	12/07/2007

3 - Localisation du site

Localisation : Aciéries Pompey. Lieu dit "Prairies de Custines" "Ban la Dame". Ex 78 rue Ste Anne

Code INSEE : 54430

Commune principale : POMPEY (54430)

Zone Lambert initiale : Lambert II étendu

Projection	L.zone (centroïde)	L2e (centroïde)	L93 (centroïde)	L2e (adresse)
X (m)	879 054	879 054	930 159	
Y (m)	2 426 093	2 426 092	6 857 072	

Altitude (m) : 190

Carte géologique :

Carte	Numéro carte	Huitième
NANCY	230	1

Autre(s) commune(s) concernée(s) :

Code INSEE	Nom	Arrondissement
54215	FROUARD	
54150	CUSTINES	

4 - Propriété du site

Propriétaires :

Nom (raison sociale)	Date de référence (*)	Type	Exploitant
EPML	08/08/1988	Organisme national parapublic ou son représentant	
ACIERIES DE POMPEY	27/03/1963	Entreprise privée ou son représentant	Oui
SNAP	25/11/1970	Entreprise privée ou son représentant	Oui
ACIERIE DE POMPEY	12/08/1964	Entreprise privée ou son représentant	Oui
ACIERIES DE POMPEY	13/11/1972	Entreprise privée ou son représentant	Oui

Nombre de propriétaires actuels : ?

5 - Activités du site

Etat d'occupation du site : Activité terminée
Date de première activité : (*) 01/01/1900
Date de fin d'activité : (*) 15/11/1989
Origine de la date : DCD=Date connue d'après le dossier
Historique des activités sur le site :

N° activité	Libellé activité	Code activité	Date début (*)	Date fin (*)	Importance	groupe SEI	Date du début	Ref. dossier	Autres infos
1	Sidérurgie	C24.1	01/01/1900		Autre	1er groupe	DCD=Date connue d'après le dossier	EPML	
2	Dépôt de liquides inflammables (D.L.I.)	V89.03Z	24/08/1920		Autorisation	1er groupe	AP=Arrêté préfectoral	AD54 5 M 215	
3	Traitement et revêtement des métaux (traitement de surface, sablage et métallisation, traitement électrolytique, application de vernis et peintures)	C25.61Z	21/09/1927		Autre	1er groupe	DCD=Date connue d'après le dossier	AD54 5 M 215	
4	Dépôt de liquides inflammables (D.L.I.)	V89.03Z	19/11/1931		Autorisation	1er groupe	AP=Arrêté préfectoral	AD54 5 M 215	
5	Dépôt de liquides inflammables (D.L.I.)	V89.03Z	30/06/1947		Autre	1er groupe	DCD=Date connue d'après le dossier	AD 54 W 268 5129-5142; AD54 W 268 5408-5428; AD54 704 W 13; AD54 1586 W 225	
6	Dépôt de liquides inflammables (D.L.I.)	V89.03Z	31/03/1948		Autorisation	1er groupe	AP=Arrêté préfectoral	AD54 268 W 86	
7	Sidérurgie	C24.1	01/03/1950		Autorisation	1er groupe	AP=Arrêté préfectoral	AD54 1434 W 38; AD54 1434 W 114; AD54 1035 W 58; AD54 1035 W 63; AD54 1043 W 84; AD54 1639 W 59; AD54 1639 W 101; AD54 1639 W 260	
8	Dépôt ou stockage de gaz (hors fabrication cf. C20.11Z ou D35.2)	V89.07Z	20/03/1957		Autorisation	3ième groupe	AP=Arrêté préfectoral	AD54 W 1639 20	9 000 Kgs de gaz combustibles liquifiés
9	Fonderie d'acier	C24.52Z	27/03/1963		Autorisation	1er groupe	AP=Arrêté préfectoral	AD54 W 1639 62	
10	Dépôt ou stockage de gaz (hors fabrication cf. C20.11Z ou D35.2)	V89.07Z	12/08/1964		Autorisation	3ième groupe	AP=Arrêté préfectoral	AD54 W 1639 72	12 000 Kgs

N° activité	Libellé activité	Code activité	Date début (*)	Date fin (*)	Importance	groupe SEI	Date du début	Ref. dossier	Autres infos
11	Dépôt ou stockage de gaz (hors fabrication cf. C20.11Z ou D35.2)	V89.07Z	25/11/1970		Autorisation	3ième groupe	AP=Arrêté préfectoral	AD54W 1639 223;	
12	Utilisation de sources radioactives et stockage de substances radioactives (solides, liquides ou gazeuses)	C24.47Z	13/11/1972		Autorisation	3ième groupe	AP=Arrêté préfectoral	AD54 1434 W 38; AD54 1434 W 114; AD54 1035 W 58; AD54 1035 W 63; AD54 1043 W 84; AD54 1639 W 59; AD54 1639 W 101; AD54 1639 W 260	

Exploitant(s) du site :

Nom de l'exploitant ou raison sociale	Date de début d'exploitation (*)	Date de fin d'exploitation (*)
SA DES HAUTS FOURNEAUX, FORGES ET ACIERIES DE POMPEY	24/08/1920	
Société nouvelle des Aciéries de Pompey	24/08/1920	15/11/1989
Aciéries de Pompey	21/09/1927	
SA DES HAUTS FOURNEAUX ET ACIERIES DE POMPEY	31/03/1948	
Sté des Aciéries de Pompey	20/03/1957	
aciéries de Pompey	27/03/1963	
ACIERIE DE POMPEY	12/08/1964	
SNAP	25/11/1970	
Sté Nouvelle des Aciéries de Pompey	13/11/1972	

Commentaire(s) : Aciéries et usine métallurgique. (Voir Synthèse Historique)

6 - Utilisations et projets

Nombre d'utilisateur(s) actuel(s) : Multiple
Surface totale : 134 (en ha)
Site en friche : Non
Site réaménagé : Oui
Réaménagement sensible : ?
Projet de réaménagement : Zones d'activités (80 ha), espaces publics naturels
Commentaire : Des entreprises, des espaces verts, aménagement des berges pour piétons. Construction d'un espace petite enfance (crèche, halte-garderie)

7 - Utilisateurs

Utilisateurs :

Nom utilisateur	Type d'utilisateur	Statut utilisateur
Novasep	Entreprise privée ou son représentant	
Saga	Entreprise privée ou son représentant	
MS Techniques	Entreprise privée ou son représentant	
STBC	Entreprise privée ou son représentant	
FPEI	Entreprise privée ou son représentant	
BSL	Entreprise privée ou son représentant	
Bugge	Entreprise privée ou son représentant	
Aqua Air	Entreprise privée ou son représentant	
BT Est	Entreprise privée ou son représentant	
Apte	Entreprise privée ou son représentant	

8 - Environnement

Milieu d'implantation :	Industriel
Captage AEP :	Non
Formation superficielle :	Remblais
Substratum :	Sable/grès
Type de nappe :	Libre
Nom de la nappe :	Alluviale de la Moselle
Type d'aquifère :	Poreux
Code du système aquifère :	303
Nom du système aquifère :	MOSELLE
Commentaire(s) :	Cette ancienne usine sidérurgique était implantée au milieu de la confluance de la Moselle et de la meurthe. En conséquence les risques portent sur les eaux superficielles.

9 - Etudes et actions

Type	Date (*)	Nature	Décision
Diagnostic initial B (avant 2008)		1	Déchet de goudrons et d'éléments de dépoussièrage Sites à pollutions multiples (friches industriels avec des sols pollués et des décharges internes,...)

Etude(s) connue(s) ? : Oui

Requalification paysagère connue ? : Non

Sélection des sites	Test de sélection des sites	Date de première étude connue (*)	Nature de la décision
Diagnostic initial B :	Déchet de goudrons et d'éléments de dépoussièrage Sites à pollutions multiples (friches industriels avec des sols pollués et des décharges internes,...)		

10 - Document(s) associé(s)

11 - Bibliographie

Source d'information :	EPML; AD54 5 M 215; AD54 1682 W 174; AD54 1434 W 38; AD54 1434 W 114; AD54 1035 W 58; AD54 1035 W 63; AD54 1043 W 84; AD54 1639 W 59; AD54 1639 W 101; AD54 1639 W 260; AD54 W 1639 20; AD54 5 M 215; AD 54 W 268 5129-5142; AD54 W 268 5408-5428; AD54 704 W 13; AD54 1586 W 225; AD54 268 W 86; AD54 W 1639 62; AD54 W 1639 72; AD54W 1639 223; AD54 W 1639 261
Chronologie de l'information :	AP 13/11/1972, 14- 16/07/1975, AP 04/08/1981, AP 01/03/1985
Donnée(s) complémentaire(s) :	Fabrication de fer, fonte, acier, bronze - Arrêté pour prescriptions supplémentaires et complétant le précédant AP du 1/3/50 n° 5427 - Déchets éliminés dans les conditions de la loi du 15.7.75 : entreposés avant leur évacuation et sélectionnés;Plus déchets polluants sur décharge SNAP - Campagne de mesure ds environnement des hauts fourneaux des retombées de poussières, SO2, NOX, acidité forte ... S2 : Utilisation, dépôt stockage substances radioactives - liste ds dossier 14081 - S7 : DLI; Station Nord : 2 R 100 m3 chacun, 2 R 175 m3 chacun, Station Sud : 2 R 175 m3, 1 R 69 m3, 6 R 28 m3, 1 R 40 m3 (RA sans doute) + 1 RS 20 m3 (citerne en béton à même le sol) Total du dépôt : 1 253 000 l DLI 2e cat - S3 : Four recuit & trait thermique;19 m3 DLI (mazout), en cuve, elle-même en fosse étanche en béton - S2 : Fab. Acier au convertisseur, four Martin, four électrique, fab fonte, décapage métaux par acides, meulage des métaux, atelier d'épaillage - plan avec emplacement terrils ...

12 - Synthèse historique

Historique : AP du 06/08/1986 autorise remise en Etat du site au fur et a mesure de l'arrêt de l'installation. Prescriptions : Matériaux, matériels poillués, produits (huiles, pyralène) dirigés vous des centres d'élimination ou de retraitement. Crassiers M. Et Meurthe est nivelés, excavation cablées par des produits ou sous produits sidérurgiques non pollués ou polluant. Installations de 2 piézomètres pour le 01/01/1987, analyse des paramètres suivants : - Sulfates, chlorures, alcalins. Mise en état du site devra être achevée avant 30/06/1989. Lutilisation ultérieure du site devra être compatible avec la présence de déchets industriels dans le sols et ne devra en acun cas remttre en cause la stabilité, fabrique chimique des crassiers. EPML, par acte notarié, devenu le 05/08/1988 propriétaire des lieux. Le 29/06/1989, Travail d'inspection sur le site de la SNAPP par JC. Robert L'ensembles des obligations de l'exploitation est respectées.

13 - Etudes et actions Basol

(*) La convention retenue pour l'enregistrement des dates dans la banque de données BASIAS est la suivante :
- si la date n'est pas connue, le champ est saisi ainsi : 01/01/1111, ou sans date indiquée.
- si les dates ne sont pas connues mais qu'une chronologie relative a pu être établie dans une succession d'activités, d'exploitants, de propriétaires, ...etc., les champs "date" sont successivement :

- - 01/01/1111,
- - 01/01/1112,
- - 01/01/1113,
- - ou sans date indiquée,

APPENDIX 2: ELIF PRESENTATION

ELIF indicators

This section describes and defines the ELIF indicators. The indicators are divided into subcategories : Generic information, Regulatory information, Landfill ID Card, Surroundings, Landfill morphology, Landfill waste materials.

Generic information

ELIF datasheet responsible: name and position of the person responsible for the validation of the datasheet.

- Name - *Text*
- Position – *Text*

Creation date: date of the datasheet creation.

- *Date (dd/mm/year)*

Date of updating: date of last updating of the data sheet. "Updating" means either completion of the data sheet with missing information or modification of existing data. We assume that regular backups ensure that all previous versions of the data sheets still exist somewhere. This way allows to avoid to keep log files.

- *Date (dd/mm/year)*

Regulatory information

This section gathers all local/regional/national regulatory information applicable for the landfill described in the data sheet, when it has an impact of a potential ELFM project. The goal is not to be very detailed, but to mention the existence of relevant information that the stakeholder can consult.

Regional policy encouraging ELFM: list of public policies applicable in the region covered by the database, having an impact on a potential ELFM project. Here are some examples: green policies, circular economy and specific recycling policies, end-of-waste, declassification of buried waste that are not more seen as production residue, geolocation of the trucks, waste traceability…

- *Text*

Regional incentives encouraging ELFM: list of public incentives for ELFM projects. Example: tax exemption or tax reduction for approved ELFM projects.

- *Text*

Dates of landfill ban: dates of regional landfill restriction for some specific waste streams. A restriction can be a limitation (examples: increasing taxes or beginning a selective collection with sufficient coverage) or a total ban (no more organic waste in domestic landfills from a given time).

- Name of the stream (metals, organics, hazardous waste, EOL vehicles…):
  - *Text*
- Regional code of the restricted stream:

    - *Text*
- Date of applicability of the restriction:
    - *Date (dd/mm/year)*
- Type of restriction:
    - *Multiple choice: Restriction/Ban*

Site specific ELFM facilitation procedures: name and reference of legislative systems that can encourage ELFM operational projects on this particular landfill site, with their expiration date. Examples: a brownfield covenant signed with local government (Flanders), a soil management covenant (Wallonia).

- Reference :
    - *Text*
- Signature date :
    - *Date (dd/mm/year)*
- Expiration date :
    - *Date (dd/mm/year)*
- Summary :
    - *Text*

Regional authorization for in-situ relandfilling: reference of legislative text authorizing/forbidding relandfilling of ultimate waste in the same landfill.

- *Text*

Regional authorization for relandfilling at another landfill: reference of legislative text authorizing/forbidding landfilling of ultimate waste coming from this landfill in other landfills. Conditions (nature of waste, tax level, tax exemption) must be specified.

- *Text*

Landfill ID card

This section gathers all administrative information related to the landfill described in the data sheet.

Landfill name: usual name of the landfill or the place where it is located. As the landfill may appear under various names in various documents, all known denominations must be described in order to facilitate historical searches.

- Main denomination - *Text*
- Other name 1- *Text*
- Other name 2- *Text*
- Other name 3- *Text*

Landfill reference: identification of the landfill in its original database or file.

- *Text*

Landfill coordinates: geographical coordinates taken at the center of the landfill (WGS 84).

- X - *Text*
- Y - *Text*

Administration in charge: identification of the public administrative unit in charge of the follow-up of this landfill (permitting, control, monitoring, post-management/aftercare period). Example in Wallonia: if the landfill is still under operation, SPW - DGO3 is in charge. Otherwise, if the landfill is abandoned, SPAQuE is in charge.

- *Text*

Ownership: name of the current owner(s) of the landfill and his (their) legal status. This information is important to evaluate the complexity of developing an ELFM project. Details of the ownership are not described in this field, only the name of the owners.

- Name of owner 1
  - *Text*
- Status 1:
  - *List (Public, Private, Both, Unknown)*
- Name of owner 2
  - *Text*
- Status 2:
  - *List (Public, Private, Both, Unknown)*
- Name of owner 3
  - *Text*
- Status 3:
  - *List (Public, Private, Both, Unknown)*
- Name of owner 4
  - *Text*
- Status 4:
  - *List (Public, Private, Both, Unknown)*
- Name of owner 5
  - *Text*
- Status 5:
  - *List (Public, Private, Both, Unknown)*

Landfill operator(s): name of the operator(s) of the landfill with the date of his (their) intervention. Up to 5 operators are allowed. Operators may operate successively or simultaneously.

- Name of operator 1 - *Text*
  - Date of beginning – *Date (dd/mm/year)*
  - Date of end – *Date (dd/mm/year)*
- Name of operator 2 - *Text*
  - Date of beginning – *Date (dd/mm/year))*
  - Date of end – *Date (dd/mm/year)*
- Name of operator 3 - *Text*
  - Date of beginning – *Date (dd/mm/year)*
  - Date of end – *Date (dd/mm/year)*
- Name of operator 4 - *Text*
  - Date of beginning – *Date (dd/mm/year)*
  - Date of end – *Date (dd/mm/year)*
- Name of operator 5 - *Text*
  - Date of beginning – *Date (dd/mm/year)*
  - Date of end – *Date (dd/mm/year)*

Legal status of the landfill: legal status, for which we propose the following classification: legal covered by a permit, legal but without any permit, illegal, unknown or specific (in case of special status).

- *List (Legal covered by a permit/Legal but without any permit/Illegal/Unknown/ Specific)*

Permits: list of permits and authorisations with their dates and references. No more detail regarding permits are given here.

- Reference - *Text*
- Date of authorisation - *Date (dd/mm/year)*
- Expiration date - *Date (dd/mm/year)*
- Nature of permit - *Text*

Landfill type: landfill classification according to EU Directive (Hazardous, Non-hazardous, Inert) when it is applicable. Please note that the main types of waste that will be encountered in the landfill are described below in more details.

- *List (Hazardous/Non Hazardous/Inert/Not applicable)*

Landfill status and dates: current status of the landfill, with dates of begin and end. Several answers are possible, i.e. a landfill can be controlled (construction respecting legal requirements: watertightness, drainage, etc.) and still in operation or closed.

- Main period of landfilling activities - *List (<1955/1955-1980/1980-1999/>1999)*
- Legal status - *List (Controlled/Wild dump)*
- Usage status - *List (Abandoned/Still in operation at data sheet date)*
- Rehabilitation status - *List (Rehabilitated/Necessary to rehabilitate/Not rehabilitated)*
- Begin of landfill operation - *Date (dd/mm/year)*
- End of landfill operation - *Date (dd/mm/year)*
- Begin of rehabilitation - *Date (dd/mm/year)*
- End of rehabilitation - *Date (dd/mm/year)*
- Begin of aftercare period - *Date (dd/mm/year)*
- End of aftercare period - *Date (dd/mm/year)*

Landfill monitoring: information about the monitoring of the landfill by a public or private body. When monitored, the landfill can be either under operation or closed.

- Monitored at the data sheet date - *List (Monitored/Not monitored at data sheet date)*
- Company in charge of the monitoring - *Text*
- Date: begin of monitoring - *Date (dd/mm/year)*
- Date: end of monitoring - *Date (dd/mm/year)*

Fence/site protection: information about the access of the landfill, in order to identify risks from exposure to waste, biogas or leachate or risk of wild dumping by people who can access the site for various reasons.

- *List (Already protected/Not protected)*

Buried Volume: evaluation of the waste volume buried in the landfill at the date of the ELIF completion. Specify how the volume, which is a very important information, was measured or simply estimated.

- Total volume of the waste deposits (m^3) - *Number*
- Volume (m^3) - *List (Less than 100 000 m^3 of waste deposits/100 000 m^3 to 500 000 m^3 of waste deposits/More than 500 000 m^3 of waste deposits)*
- Measured/estimated - *List (Measured/Estimated/Unknown)*

- Method used for obtaining the volume - *Text*

Remaining Volume: estimation of volume available to receive new waste (i.e. ultimate waste from another ELFM project) or materials (i.e . soil for shaping the final landfill after ELFM operations).

- Volume (m³) - *Number*
- Measured/estimated - *List (Measured/Estimated/Unknown)*
- Method used for obtaining the volume - *Text*

LFM costs (waste excavation and remediation costs): estimation of rehabilitation costs in € at the date of the ELIF completion. Rehabilitation can be temporary or final, so the given estimation must cover both of them.

- *Number (€ excluding taxes, VAT, etc.) : – if unknown: 1*

Annual aftercare costs: estimation of annual post-management costs in € at the date of the ELIF completion.

- *Number (€ excluding taxes, VAT, etc.) - if unknown: 1*

Warranties given: warranties given for rehabilitation and aftercare costs in € at the date of the ELIF completion. Note that this data can be usually found in the permits.

- *Number (€ excluding taxes, VAT, etc.) – if unknown: 1*

Studies: list of available studies related to the landfill, with references, date of completion and author. Specify if the study is public or confidential. Specify where the studies can be consulted. Studies can include press articles, pictures, maps, advice of official bodies, environmental documents, among others.

- Reference - *Text*
- Title - *Text*
- Date *(dd/mm/year)*
- Main author(s) - *Text*
- Confidentiality - *List (Public/Confidential)*

Sampling: list of waste samples extracted from the landfill, with references, date of completion and author. Specify the origin of the samples (from surface, small or large boreholes, trenches, pits) and describe the type of analysis performed (chemical, physical, material-recovery oriented).

- Reference - *Text*
- Date (*dd/mm/year*)
- Author - *Text*
- Sampling method - *Text*
- Analysis - *List (Chemical/Physical/Material-recovery oriented)*

Surroundings

This section is related to the surroundings of the landfill, mainly its physical environment and sustainability aspects. It also gathers some relevant information for launching an ELFM project.

Land planning: official land use of the landfill and the immediate surroundings (1 km away from the site borders) regarding the national/regional legislation (industrial, agricultural, residential).

- *Text*

Current use: current use of the site of the landfill, regardless its official use.

- Current use - *List (Residential use/Commercial use/Recreational use/Natural reforestation with added value/Natural reforestation without added value/Cultivation (crop, biomass)/Use for renewable energies/LF in operation/zone included in LF in operation/Others)*
- Specifications - *Text*

Tourism: presence of a touristic area nearby.

- Presence of a touristic area nearby - *List (Yes/No*)

Territorial strategy aspects: interest of the landfill site for the territorial development (i.e. located in an area affected by a territorial tool implemented or planned). In addition to the regional tools, each city or town can develop its own tools for redevelopment of the territory. Specify the references of the tools, if a redevelopment project of the area is planned and when it is expected to be realized. Example: urban redevelopment plan around the landfill from 2025.

- *List (Existence of a redevelopment project nearby/No project)*

Surroundings: list the various types of land use of land within a radius of 50 m around the landfill center.
Natural – *Check box (Present/Potential)*
Agricultural – *Check box (Present/Potential)*
Forest – *Check box (Present/Potential)*
Residential – *Check box (Present/Potential)*
Recreational/touristic – *Check box (Present/Potential)*
Economic/services – *Check box (Present/Potential)*
Industrial – *Check box (Present/Potential)*

Land pressure: estimation of the development potential of the landfill area. Local estimated land price if possible. Criteria: Price of housing, prices of the land, average income per capita, population density, unemployment rates, demographic predictions… Land pressure may be high, even if no specific territorial strategy exist.

- Land pressure text: *List (High land pressure/Medium land pressure/Low land pressure)*

General Risk evaluation: assessment of the main specific potential hazard presented by the landfill. Please note that flooding may be evaluated regarding climate changes aspects. Risk related to groundwater are described hereunder in a specific field "Groundwater vulnerability".

- Flood: Is the landfill located in flooding area? Did flooding already occurred at the landfill site? – *Check box.*
- Flooding Risk Level: Low risk: low risk or 50-year return event, Medium: medium risk or 20-year return event, High: high risk or <10-year return event - *List (Low/Medium/High).*
- Risk of landfill's collapse: Is there a risk of collapse related to the instability of the waste pile? – *Check box.*
- Person accident: Related to the risk of people being injury due to the lack of site protection (e.g. fence), the configuration of the site or the presence of dangerous/injuring waste deposits. – *Check box.*
- Direct exposition to waste, (bio)gas and/or leachate: Is there a risk of exposition to waste, (bio)gas or leachate for the neighborhood or other receptors? - *Check box.*

- Other: - *Check box.*
- Unknown: - *Check box.*

Environmental issues: known environmental issues associated with the existence of the landfill.

- Specific environmental issue (not related to water and geology)
    - Description of the Specific Environmental Issue - *Text*
    - Impact of the ELFM project - *List (Yes(positive)/Yes(negative)/No)*
- Surface water contamination
    - Surface Water - *List (Contaminated (estimated)/Contaminated (measured)/High risk of contamination/Medium risk of contamination/Low risk of contamination/No risk of contamination/Unknown)*
    - Analysis availability - *List (Available/Not available)*
    - Description - *Text*
- Geological context
    - Permeability - *List (Highly permeable soil or rocks/Medium/Low)*
- Groundwater vulnerability
    - Average level of upper groundwater table - *Text*
    - Groundwater type - *List (Exploited/Not exploited)*
    - Contamination or risks - *List (Contaminated groundwater (estimated)/Contaminated groundwater (measured/High risk of contamination/Medium risk of contamination/Low risk of contamination/No risk of contamination/Contaminated/Not contaminated groundwater)*
    - Description - *Text*
    - Include in a catchment protection zone - *List (Yes -close protection zone/Yes - extended protection zone/No)*

Erosion: Is there a proven erosion problem or a risk of landfill erosion?

- Erosion - *List (None/Weak/Severe/Potential)*

Social support: identification of wishes of local residents or associations to see the landfill removed or reduced. Information can be found through press releases, blogs, publications, etc.

- Social support - *List (Yes/No)*
- Description - *Text*

Biodiversity: is there a specific biodiversity to protect on the landfill site?

- Valuable biodiversity on site - *List (Yes/No)*
- Description - *Text*
- Site in Natura 2000 zone - *List (Yes/No)*

Access for landfill mining operations: evaluation of the accessibility conditions (for trucks and equipment) to the landfill. Distances are real distances (by road) and not as the crow flies.

- Paved road - *List (Yes/No)*
- Heavy trucks - *List (Yes/No/An access can be arranged)*
- Distance to main road (m) - *List (<5000 m/>=5000 m)*
- Distance to nearest harbour (m) - *List (<20000 m/>=20000 m)*
- Distance to waterways (m) - *Number*
- Distance to rail station (m) - *Number*

Facilities for landfill mining operations: distance to a waste treatment unit or another operational landfill that can receive ultimate waste from an ELFM project.

- Incineration plant - *List (No facilities identified/On site/<30 km/30 to 50 km/50 to 100 km/>100 km)*
- Cement factories - *List (No facilities identified/On site/<30 km/30 to 50 km/50 to 100 km/>100 km)*
- Waste treatment plant (in general*) - List (No facilities identified/On site/<30 km/30 to 50 km/50 to 100 km/>100 km)*
- Landfill for hazardous waste - *List (No facilities identified/On site/<30 km/30 to 50 km/50 to 100 km/>100 km)*
- Landfill for non-hazardous waste - *List (No facilities identified/On site/<30 km/30 to 50 km/50 to 100 km/>100 km)*
- MBT plant - *List (No facilities identified/On site/<30 km/30 to 50 km/50 to 100 km/>100 km)*

Leachates treatment plant on site: description of the leachate treatment plant related to the landfill.

- *List (Exists and operational/Exists and not operational (to be rehabilitated)/Does not exist/Unknown)*

Leachates treatment plant nearby: distance of the nearest operational treatment plant that could receive leachates from the landfill.

- *List (<10 km/10 to 20 km/20 to 50 km/>=50 km)*

Landfill producing leachates: Is the landfill generated leachates?

- *List (Yes/No/Unknown)*

Landfill geometry

Regardless the nature of waste, this section describes the geometry of the landfill and the associated construction elements that can be found on it.

Landfill Morphology: shape of the landfill and its integration in the surrounding area.

- *List :*
    - *Mound/heap/hill*
    - *Depression/quarry*
    - *Open dump*
    - *50% aboveground/50 underground*
    - *Slope/along a valley*
    - *Lagoon/pond*

Surface state: Description of the landfill surface.

List:

- *Grass*
- *Rough*
- *Shrubs*
- *Trees*
- *Other*

Surface: we distinguished here the area occupied by waste deposits and the parcels of the landfill site that can be quite different. Origin of the data and the way it has been evaluated are important for further analysis.

- Total surface of the site (m²) - *Number*
- Origin of the data - *Text*
- Total surface occupied by waste (m²) - *Number*
- Origin of the data - *Text*

Waste heights/depth: evaluation of the depth/height of the landfill from surface to natural ground. The number is positive (+) if above ground (height) and negative (-) if under the ground level (depth). Origin of the data and the way it has been evaluated is important for further analysis.

- Maximal (m) - *Number*
- Minimal (m) - *Number*
- Average thickness of the waste pile (m) - *Number*

Fragmentation: this field is related to the waste fragmentation: are they located in one single place or spread in several locations?

- *List (In one place/Spread in several locations)*

Stability of the waste mass: this information is related to the probability to encounter any issue related to the stability of the whole mass of waste. "Slope" and "water table" can be measured physically while "risk" will be an appreciation hanging on the nature and age of waste, their thickness, their slope, the presence of water, field observations and experience of similar cases

- Slopes - *List (Steep slopes (more than 15° from horizontal)/Gentle slopes (less than 15° from horizontal)/No slope)*
- Water table - *List (Water table within the landfill (<5 m depth)/Water table within the landfill (<10 m depth)/No water table within the landfill/No information about the water table)*
- Risk appreciation for future excavation works - *List (High risk/Medium risk/Low risk)*

Top layer: type and composition of the top layer of the landfill:

- Watertightness - *List (Presence of a watertightness layer/No specific watertightness layer)*
- Rainwater drainage - *List (Presence of a rainwater drainage/No specific rainwater drainage layer)*
- Gas drainage - *List (Presence of a gas drainage/No specific gas drainage layer)*
- Type of cover – *List (Geomembrane, soil, waste, mineral cover)*

Bottom layer: type and composition of the bottom layer of the landfill:

- Watertightness - *List (Presence of watertightness (clay/geomembrane)/No specific watertightness layer)*
- Leachate drainage - *List (Presence of leachate drainage layer/No specific leachate drainage layer)*

Air Emission: existence of (bio)gas and/or dust emissions.

- *List (Yes/No/Unknown)*

Biogas aerial collection system: information related to gas collection system placed in the landfill, especially if aerial system can hinder geophysics works.

- Presence - *List (Yes/No)*

- Description - *Text*
- Pipes - *List (running in surface/Pipe buried/No pipes)*
- Status - *List (To be decommissioned/In operation/In stanby)*
- Start date - *Date (dd/mm/yy)*
- End date - *Date (dd/mm/yy)*
- Valorisation system - *List (Flare/engine/No valorisation system)*

Landfill Waste materials

This section gathers all suitable information about the waste materials buried in the landfill.

Dates: begin/end of landfill operations/rehabilitation.

- Beginning of landfilling - *Date (dd/mm/yy)*
- End of landfilling - *Date (dd/mm/yy)*
- Beginning of rehabilitation operations - *Date (dd/mm/yy)*
- End of rehabilitation operations - *Date (dd/mm/yy)*
- Beginning of gas collection - *Date (dd/mm/yy)*
- End of gas collection - *Date (dd/mm/yy)*

Main waste type: main known waste stream according to common definitions.

- *List :*
    - *Municipal - household - domestic waste*
    - *Inert waste (construction waste)*
    - *Inert waste (industrial waste)*
    - *Industrial Waste*
    - *Military waste/UXOs*
    - *Mixed waste*

Monolandfill: is the landfill a monolanfill (only one homogeneous waste stream)?

- *List (Yes/No)*

Specific waste stream: specific waste streams as Dredging sludges/ Water purification sludges / Gypsum/ Fly ash / Asbestos / Slags/ Mining waste/ Lime/ Contaminated soils/ Others (free field). Specify the EWC (European waste code) if applicable and the percentage of the total volume of the landfill occupied by this specific stream. Specify how this percentage has been fixed (measured/estimated).

- Dredging sludges
    - Name: Name of the waste stream -Text
    - EWC : (European waste code) - *Text*
    - Percentage : percentage of the total volume of the landfill occupied by this specific stream - *Number*
    - Specification : Specify how this percentage has been assessed – *List (Measured/Estimated)*
- Construction waste
    - Name: Name of the waste stream -*Text*
    - EWC : (European waste code) – *Text*
    - Percentage : percentage of the total volume of the landfill occupied by this specific stream - *Number*

    - Specification : Specify how this percentage has been assessed – *List (Measured/Estimated)*
- Water purification sludges
    - Name: Name of the waste stream - *Text*
    - EWC : (European waste code) - *Text*
    - Percentage : percentage of the total volume of the landfill occupied by this specific stream - *Number*
    - Specification : Specify how this percentage has been assessed – *List (Measured/Estimated)*
- Gypsum
    - Name: Name of the waste stream - *Text*
    - EWC : (European waste code) - *Text*
    - Percentage : percentage of the total volume of the landfill occupied by this specific stream - *Number*
    - Specification : Specify how this percentage has been assessed – *List (Measured/Estimated)*
- Fly ash
    - Name: Name of the waste stream - *Text*
    - EWC : (European waste code) - *Text*
    - Percentage : percentage of the total volume of the landfill occupied by this specific stream - *Number*
    - Specification : Specify how this percentage has been assessed – *List (Measured/Estimated)*
- Asbestos
    - Name: Name of the waste stream - *Text*
    - EWC : (European waste code) - *Text*
    - Percentage : percentage of the total volume of the landfill occupied by this specific stream - *Number*
    - Specification : Specify how this percentage has been assessed – *List (Measured/Estimated)*
- Slags
    - Name: Name of the waste stream - *Text*
    - EWC : (European waste code) - *Text*
    - Percentage : percentage of the total volume of the landfill occupied by this specific stream - *Number*
    - Specification : Specify how this percentage has been assessed – *List (Measured/Estimated)*
- Mining waste
    - Name: Name of the waste stream - *Text*
    - EWC : (European waste code) - *Text*
    - Percentage : percentage of the total volume of the landfill occupied by this specific stream - *Number*
    - Specification : Specify how this percentage has been assessed – *List (Measured/Estimated)*
- Lime
    - Name: Name of the waste stream - *Text*
    - EWC : (European waste code) - *Text*

    - Percentage : percentage of the total volume of the landfill occupied by this specific stream - *Number*
    - Specification : Specify how this percentage has been assessed – *List (Measured/Estimated)*
- Contaminated soils
    - Name: Name of the waste stream - *Text*
    - EWC : (European waste code) - *Text*
    - Percentage : percentage of the total volume of the landfill occupied by this specific stream - *Number*
    - Specification : Specify how this percentage has been assessed – *List (Measured/Estimated)*

- Others
    - Name: Name of the waste stream - *Text*
    - EWC : (European waste code) - *Text*
    - Percentage : percentage of the total volume of the landfill occupied by this specific stream - *Number*
    - Specification : Specify how this percentage has been assessed – *List (Measured/Estimated)*

Hazardous waste: this field describes the probability to encounter hazardous waste materials in the landfill.

- *List (Assessed/Possible/None/Unknown)*

Radioactive waste: this field describes the probability to encounter radioactive waste[12] in the landfill.

- *List (Assessed/Possible/None/Unknown)*

Hazardous hospital waste: this field describes the probability to encounter hazardous hospital or medical waste in the landfill.

- *List (Assessed/Possible/None/Unknown)*

Hazardous military waste: this field describes the probability to encounter hazardous military waste deposits in the landfil. The presence of UXO (unexploded ordnance) presenting a tremendous risk must also be precised. UXO (grenades, bombs, etc.) comes from warfare, military exercises and dumping of ammunitions. The risk is always at least possible for the landfill older than 1945.

- *List (Assessed/Possible/None/Unknown)*

Asbestos: this field describes the probability to encounter free asbestos in the landfill.

- *List (Assessed/Possible/None/Unknown)*

Main physical state: this field specifies main physical state of the waste.

- *List (Solid waste/Powdered waste/Sludge/Liquid)*

Leachates: indicates presence of leachates within the landfill.

[12] Sources may be medical radioactive elements, or some lightning rods with a head containing Radium 226 or Americium 241, produced in the 80s.

- *List (Yes/No/Unknown)*

Daily cover: this field specifies if a daily cover was used during landfill operation, the type of cover (geomembrane, mineral cover, soil, waste) and its thickness.

- Use of daily cover - *List (Yes/No)*
- Type of cover - *List (Geomembrane/Mineral cover/Soil/Waste)*
- Origin of cover products -*Text*
- Percentage: percentage of the waste volume occupied by the cover (0 if synthetic) : *Number*

Waste composition: we assume that the landfill can be described with maximum five contrasted layers, following the RDM "resource distribution model" designed by RAWFILL historical and geophysical survey. A 2D or 3D map should be included to identify the different zones for which a lot of properties are precised.

For each zone :

- Zone name : name of the homogeneous zone - *Text*
- Height (m): average height of the layer (m) - *Number*
- Volume (m³) : volume of the layer (m³) - *Number*
- Density (T/m³): average density of the waste in the layer (T/m³) - *Number*
- Tons buried (T) - *Number*
- Physical State : main physical state – *List (Solid/Powdered/Sludge/Liquid)*
- Homogeneity (macro): see below – *List (Homogeneous/Non homogeneous)*
- Homogeneity (micro): see below - *List (Only one stream/More than one stream)*
- Percentage of Fines : % fine materials (%) (i.e. materials having a grainsize diameter lower than 40 or 50 mm) - *Number*
- Main type : main type of waste - *Text*
- Gas content (%) : average gas content(%) - *Number*
- Water content (%) : average water content (%) - *Number*
- T° (°C) : average T° (°C) - *Number*
- Presence of a water table : presence of a water table within the landill - *List(Yes/No)*
- Begin landfilling – *Date (dd/mm/yy)*
- End landfilling – *Date (dd/mm/yy)*
- Estimated composition - *Text*
- Recyclibality potential : estimated recyclability potential (free text) - *Text*

Waste homogeneity: this field specifies if each layer can be considered as homogeneous or heterogeneous, following the definition given in the RAWFILL SWOT analysis deliverable.

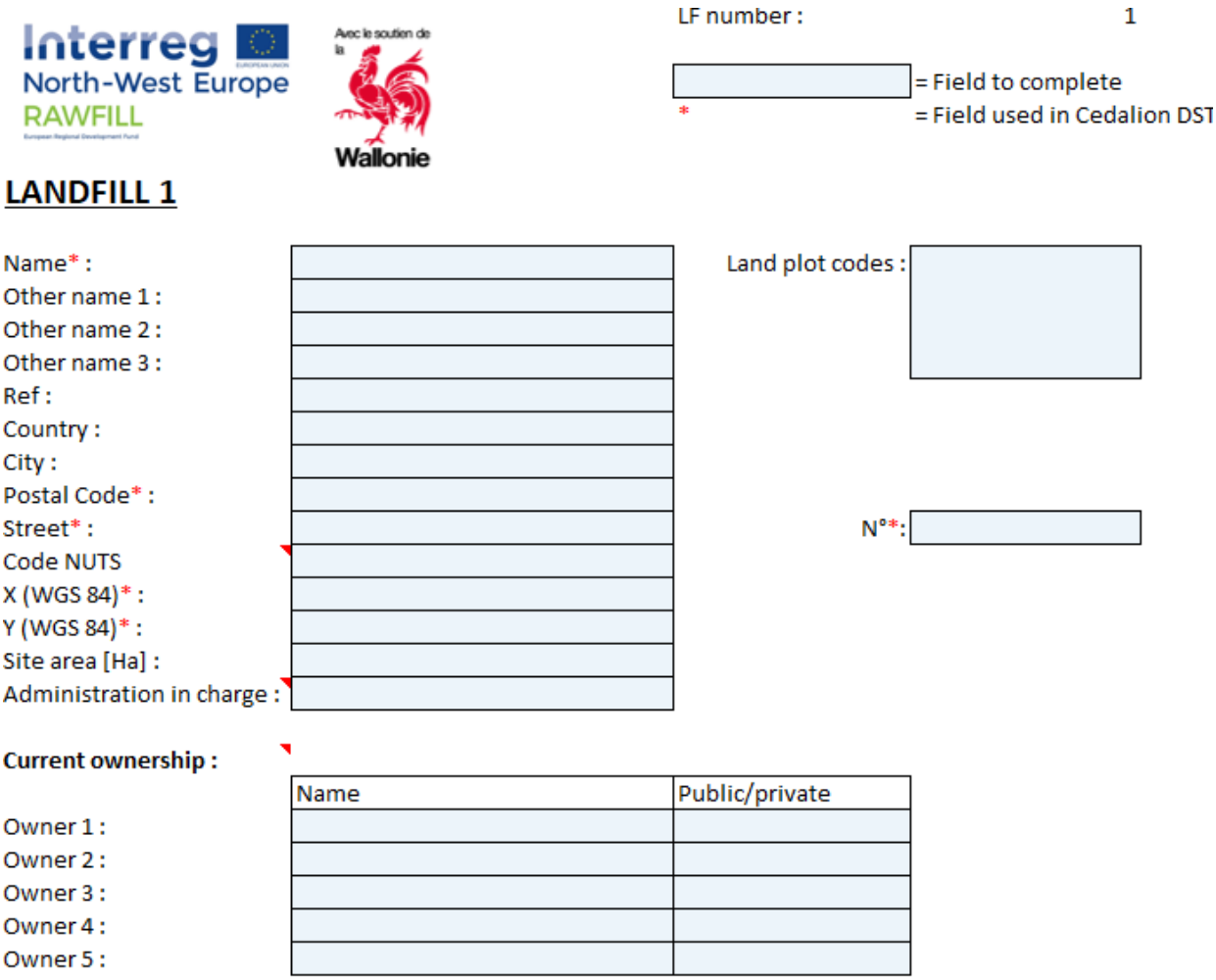
	Homogeneous	Heterogeneous
At large scale (macro)	Only one layer of waste can be distinguished: - One single waste stream (monolandfill) - Several waste streams, totally mixed Any taken sample will have a similar composition.	More than one layer of waste can be distinguished, each layer has a relatively homogeneous composition.

At small scale (micro)	Only one waste stream can be found in any sample.	More than one waste stream can be found in any sample.

Screenshots of ELIF tool

LF description

The sheet of the ELIF tool, called "LF description", allows the user to encode general administrative information about the landfill.



Interreg North-West Europe RAWFILL

Avec le soutien de la Wallonie

LF number : 1

= Field to complete

* = Field used in Cedalion DST

LANDFILL 1

Name* :		Land plot codes :	
Other name 1 :			
Other name 2 :			
Other name 3 :			
Ref :			
Country :			
City :			
Postal Code* :			
Street* :		N°*:	
Code NUTS			
X (WGS 84)* :			
Y (WGS 84)* :			
Site area [Ha] :			
Administration in charge :			

Current ownership :

	Name	Public/private
Owner 1 :		
Owner 2 :		
Owner 3 :		
Owner 4 :		
Owner 5 :		

Waste description

The waste description tabs is design to encode information about the waste within the landfill. Depending on the level of information, it is possible to use a simplified waste description tabs, or a detailed waste description tabs. This sheet is also used to insert information about the main waste type, the specific waste stream, the presence of hazardous waste, the main physical state, the daily cover and the waste homogeneity.

Interreg North-West Europe RAWFILL — Avec le soutien de la Wallonie

Legend
= Desactivated fields
= Field to complete
* = Field used in Cedalion

Reset Waste Description form

Total surface of the site* :		m²	Data source :	
Surface occupied by waste :		m²	Data source :	
Total Waste Volume* :		m³		
Type of waste description :	Simplified waste description		**Value of the waste materials :**	**0 €**

Simplified waste description

Waste	Weight (T)	Cost (-) or Benefit (+) per tonne (€/T)	Total	User's notes
Construction waste			0 €	
Municipal solid waste			0 €	
			0 €	
			0 €	
			0 €	
			0 €	
			0 €	
			0 €	
			0 €	
			0 €	
			0 €	
			0 €	
			0 €	
			0 €	

Reset User's notes

	Valuable Void created [m³]	Void Value /m³	Total	User's notes
Relandfill/void space value			0,00 €	
		Total	**0,00 €**	

Detailed waste description

Waste	% (weight)	Volume (m³)	Density (T/m³)	Total weight (T)	Recovery factor (%)	Tonnes recovered	€ per tonne recovered (€/T)	Evacuation cost / tonne (€/T)	Cost (-) or Benefit (+) / tonne (€/T)	Total
Ferrous metals	5	500	3	1500	75	1125	50	10	40	45.000 €
Nonferrous metals	5	100	22	2200	75	1650	20	40	-20	-33.000 €
Cardboard/paper	0			0		0			0	0 €
Plastics	0			0		0			0	0 €
Glass/ceramic	0			0		0			0	0 €
Stone/concrete	0			0		0			0	0 €
Rubber	0			0		0			0	0 €
Textile	0			0		0			0	0 €
Wood	0			0		0			0	0 €
Organic	0			0		0			0	0 €
Hazardous waste	0			0		0			0	0 €
Fine matrix	0			0		0			0	0 €
Other waste 1 :	0			0		0			0	0 €
Other waste 2 :	0			0		0			0	0 €
Other waste 3 :	0			0		0			0	0 €
Other waste 4 :	0			0		0			0	0 €
Space		**Volume (m³)**							**Void value /m³**	**Total**
Relandfill/void space value										0 €
TOTAL	**10,00%**						**TOTAL**			**12.000 €**

Main waste type* :	
Monolandfill* :	

Specific waste stream	%	Data quality
Dredging sludge* :		
Construction waste* :		
Water purification sludge* :		
Gypsum :		
Fly ash* :		
Asbestos* :		
Slags* :		
Mining waste* :		
Lime* :		
Contaminated soils :		
Other : ...		
Total	**0,00%**	

Hazardous waste	
Radioactive waste* :	
Hazardous hospital waste* :	
Hazardous military waste*:	
Asbestos* :	
Other hazardous waste :	

Main physical state :	

Daily cover	
Use of daily cover :	
Cover Type :	
% of the waste volume occupied by the cover :	
Origin of cover product :	

Environmental form

The environmental form describes the impact of the landfill and a potential landfill mining project on the environment. It includes indicators about general risk evaluation, specific environmental issues, surface and ground water vulnerability, air emission, biodiversity, soil contamination and erosion.

ENVIRONMENTAL ASPECT

General Risk Evaluation

Assessment of the main specific potential hazard presented by the landfill. Please note that flooding may be evaluated regarding climate changes aspects. Risk related to groundwater are described hereunder in a specific field "Groundwater vulnerability".

Flood* :	☐	Flooding Risk level :
Fire :	☐	
Risk of landfill's collapse :	☐	
Person accident :	☐	
Direct exposition to waste, (bio)gas and/or leachate :	☐	
Other :	☐	
Unknown :	☐	

Specific Environmental Issue :

Description of the Specific Environmental Issue

Impact of the LFM project

Surface Water :

Analysis :

Description :

Geological context :

Permeability

Groundwater vulnerability

Groundwater type (factor) :

Groundwater contamination :

Landfill include in a catchment protection zone* :

Average level of upper groundwater table [meter below ground level]:

Short description of the issue :

Landfill producing leachates :

Air emission (e.g., biogas, industrial gas, dust) :

Biodiversity

Valuable biodiversity on site :

Description of the valuable biodiversity :

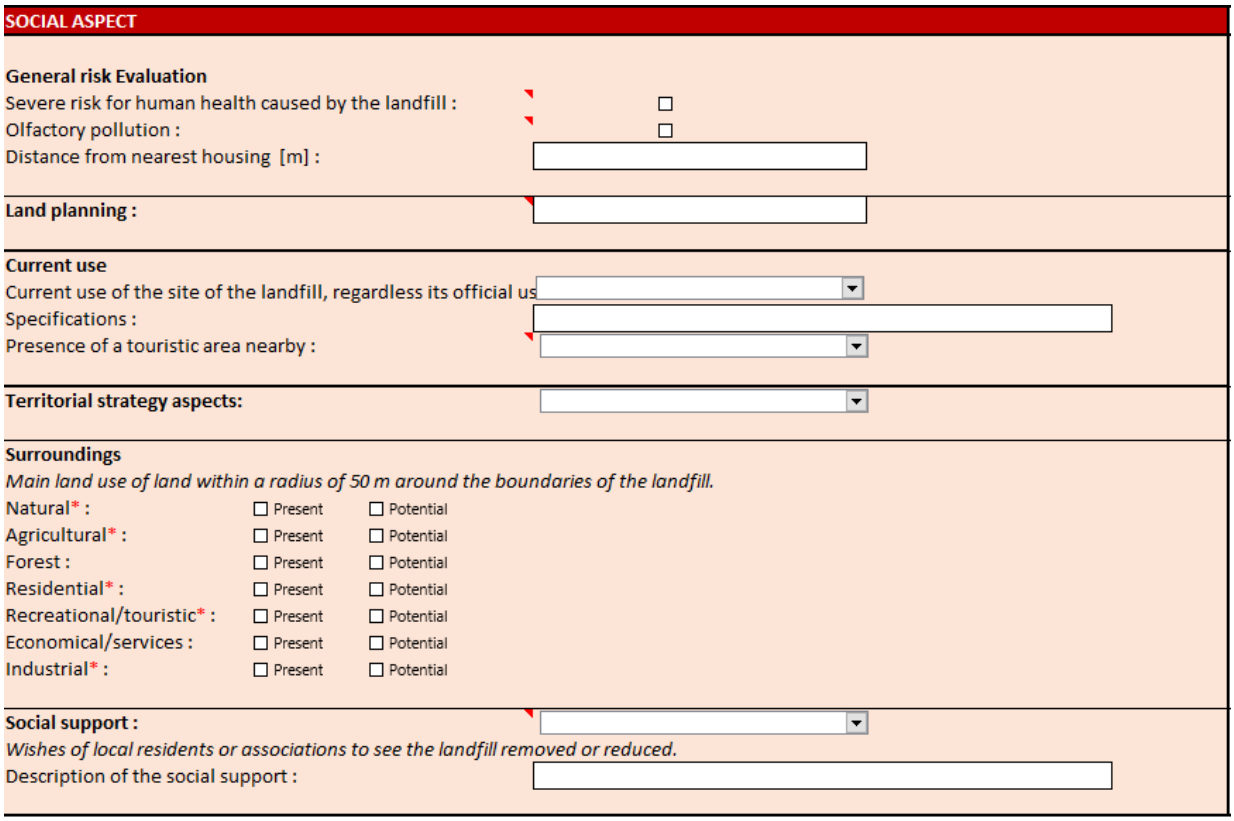
Site located in Natura 2000 zone* :

Soil contamination :

Erosion * :

Social form

The social form describes the landfill on a social point of view. It provides answers to the following questions: Is there a risk for the neighbourhood linked to the landfill? Is there some Olfactory pollution? What is the use of the landfill and the surroundings? Is there a land planning that includes the landfill zone or a social support for removing the landfill?



Technical form

The technical form includes indicators that reflects the level of technical difficulty encountered to perform a landfill mining project. It contains indicators about status and dates, sampling, leachate treatment, biogas aerial collection system, landfill morphology, waste height/depth, stability the waste mass, as well as the characteristics of top and bottom layers of the landfill.

TECHNICAL ASPECT

Landfill status and dates

Main period of landfilling activities * :

Rehabilitation status :

Sampling :

Leachates treatment plant on site :

Description of the leachate treatment plant related to the landfill :

Leachates treatment plant nearby :

Description of the nearest operational treatment plant that could receive leachates from the landfill (<10, < 20, <50 Km) :

Biogas aerial collection system :

All information about a gas collection system placed in the landfill, especially if the aerial system can hinder geophysics surveys.

Pipes :

Status :

Start date :

End date :

Valorisation :

Description (number of boreholes, trenches, lines of pipes, etc.) :

Landfill Morphology :

Shape of the landfill and its integration in the surrounding area

Surface state* :

Waste height/depth :

Average thickness of the waste deposit [m] :

Maximal height of the waste deposit *(above ground level [m])* :

Maximal depth of the waste deposit *(below ground level [m])* :

Stability of the waste deposit

This information is related to the probability to encounter any issue related to the stability of the whole waste mass.

General slope* :

Water table :

Risk of collapse during future excavation works :

Top layer

Watertightness layer :

Rainwater drainage :

Gas drainage :

Type of cover* :

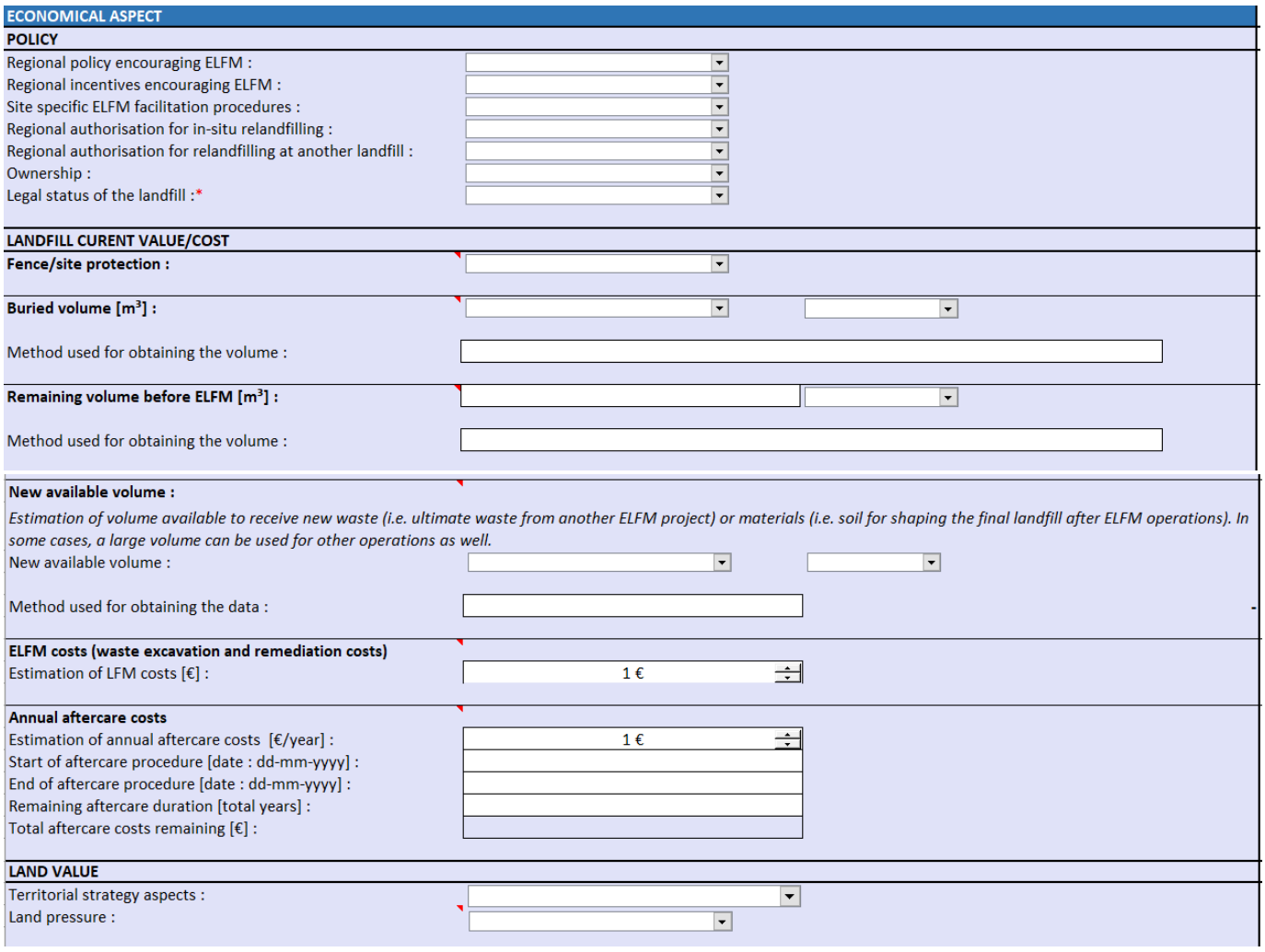
Bottom layer

Watertightness :

Leachate drainage layer :

Economical form

The economical form includes the indicators used to calculate the profitability of a landfill mining project. It considers the regional policy, the current value in terms of remaining space or the cost (landfill mining operations costs, aftercare costs, remediation costs), the land value and the landfill value content. Some indicators completed in the waste description form and used as economic indicators are automatically filled in the economical form to avoid completing the field twice.



LANDFILL MINING COSTS

Evaluation of the accessibility conditions (for trucks and equipment) to the landfill. Distances are real distances and not as the crow flies.

Access for landfill mining operations

Paved roads* :	
Heavy truck access (> 30T)* :	
Distance to the main road :	
Distance to the nearest harbour :	
Distance to the nearest waterways [m]* :	
Distance to the nearest train station [m]* :	

Facilities for landfill mining operations

Distance to a waste treatment unit or another operational landfill that can receive ultimate waste from an ELFM project.

Incineration plant :	
Cement factories :	
Waste treatment plant (in general) :	
Landfill for hazardous waste :	
Landfill for non hazardous waste :	
Mechanical biological treatment plant :	

Leachates

Leachates treatment plant on site :	
Leachates treatment plant nearby :	
Landfill producing leachates :	

Fragmentation :

WASTE

Main waste type :

Specific waste stream	%	Data quality
Dredging sludge* :	0	
Construction waste*:	0	
Water purification sludge* :	0	
Gypsum :	0	
Fly ash* :	0	
Asbestos* :	0	
Slags* :	0	
Mining waste* :	0	
Lime* :	0	
Contaminated soil :	0	
Other : ...	0	
Total	**0,00%**	

Hazardous waste

Radioactive waste* :	
Hazardous hospital waste* :	
Hazardous military waste*:	
Asbestos* :	
Other hazardous waste :	

Main physical state :

Daily cover

Use of daily cover :	
Cover Type :	
% of the waste volume occupied by the cover :	
Origin of cover product :	

Waste composition (from table)

12.000,00 €

Waste homogeneity (for each layer)		**Homogeneity**	**Volume of the layer/landfill volume [%]**
Layer 1			20,00%
Layer 2	☐		10,00%
Layer 3	☐		10,00%
Layer 4	☐		0,00%
Layer 5	☐		0,00%
		Total	**0,00%**

Additional Information

The additional information sheet is used to encode additional information that are not directly related to the evaluation of the landfill mining potential but are useful either for dynamic landfill management or to perform a landfill mining project. It includes a series of administrative information: data about who was responsible for the filling of the ELIF file, regulatory context, historic, permits, studies and analysis.

Interreg North-West Europe RAWFILL

Avec le soutien de la Wallonie

Additional information

Reset this form

GENERIC INFORMATION

ELIF datasheet responsible
Name: Function :

Creation date [dd-mm-yyyy] :

Date of updating [dd-mm-yyyy] :

REGULATORY INFORMATION

Regional policy encouraging ELFM:

Regional incentives encouraging ELFM:

Dates of landfill ban:

Name of the stream (metals, organics, hazardous waste, EOL vehicles…)	Regional code of the restricted stream (when it exists)	Date of applicability of the restriction	Type of restriction:

Site specific ELFM facilitation procedures
Reference :
Signature date :
Expiration date :
Summary :

Regional authorisation for in-situ relandfilling:

Regional authorisation for relandfilling at another landfill :

Landfill ID card

Permits

Reference	Date of autorisation	Expiration date	Nature of permit	Permit Holder

Landfill operator(s)

	Name	Start date	End date
Operator 1 :			
Operator 2 :			
Operator 3 :			
Operator 4 :			
Operator 5 :			

Landfill type (EU Directive) :

Landfill status and dates

Usage status :

Landfill operation :

Start date : End date :

Rehabilitation

Start date : End date :

Aftercare period

Start date : End date :

Landfill monitoring

Monitored :

Company in charge of the monitoring :

Start date : End date :

Warranties given

Cost *(€ excluding taxes, VAT, etc.)* :

Studies

Reference	Title	Date	Main author(s)	Confidentiality

Sampling

Reference	Date	Author	Sampling method	Analysis

Historical Information

Date	Historical activities/Description/Historical data

Resource Distribution Model

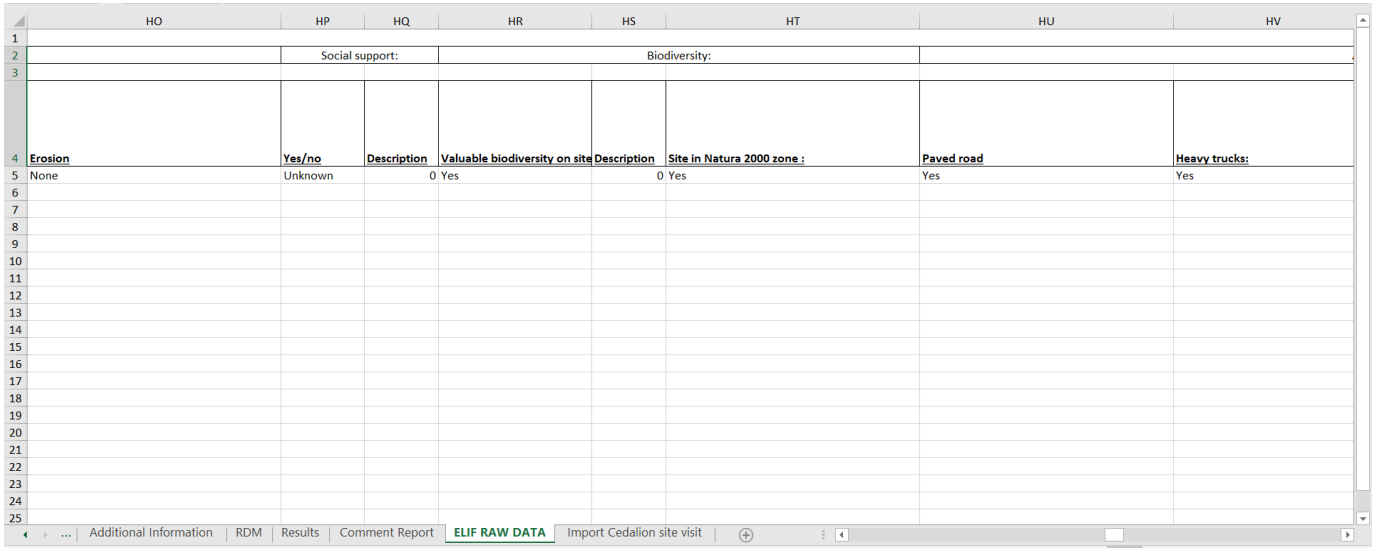
A dedicated sheet is used for the resource distribution model (see **Chapter** Erreur ! Source du renvoi introuvable.) for more information). The resource distribution module helps to describe the different homogeneous waste layer identified by the RAWFILL characterization methodology.

Comment Report

In the comment report sheet, the button *"Generate a User's note report"* creates a report containing all the user's notes of the 11 sheets.

ELIF RAW DATA

The ELIF RAW DATA tabs summarizes all the information of the *RAWFILL LF#.xlsm* file in a single table. This table can then be exported to an existing database. To export data about multiple landfills (i.e. more than one *RAWFILL LF#.xlsm* file*),* the user should instead use the ELIF RAWDATA sheet of the *RAWFILL ELIF.xlsm* file.

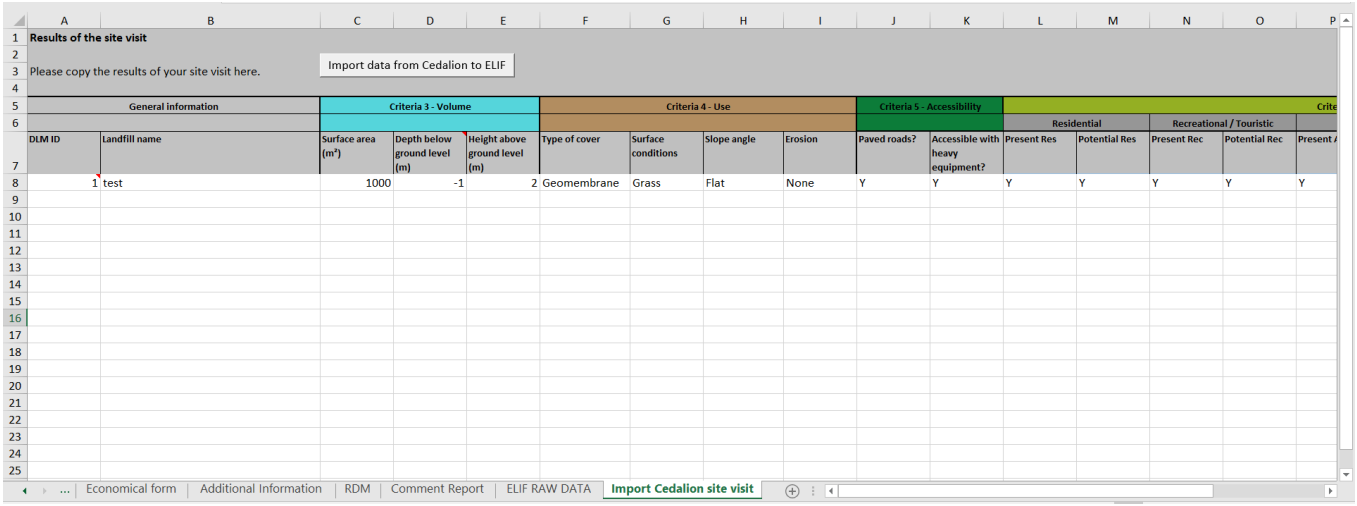


	HO	HP	HQ	HR	HS	HT	HU	HV
1								
2		Social support:		Biodiversity:				
3								
4	Erosion	Yes/no	Description	Valuable biodiversity on site	Description	Site in Natura 2000 zone :	Paved road	Heavy trucks:
5	None	Unknown	0	Yes	0	Yes	Yes	Yes
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

... | Additional Information | RDM | Results | Comment Report | ELIF RAW DATA | Import Cedalion site visit

Import Cedalion site visit

ELIF can be automatically filled with the site visit report of the field tool of DST1- Cedalion. In order to do that, the user can copy/past the result of the field visit in this sheet and click on the button *"Import data from Cedalion to ELIF"*. **Caution:** this process may overwrite previously encoded data.



Results of the site visit

Please copy the results of your site visit here.

Import data from Cedalion to ELIF

General information		Criteria 3 - Volume			Criteria 4 - Use				Criteria 5 - Accessibility		Residential		Recreational / Touristic		
DLM ID	Landfill name	Surface area (m^2)	Depth below ground level (m)	Height above ground level (m)	Type of cover	Surface conditions	Slope angle	Erosion	Paved roads?	Accessible with heavy equipment?	Present Res	Potential Res	Present Rec	Potential Rec	Present
1	test	1000	-1	2	Geomembrane	Grass	Flat	None	Y	Y	Y	Y	Y	Y	Y

Economical form | Additional Information | RDM | Comment Report | ELIF RAW DATA | Import Cedalion site visit

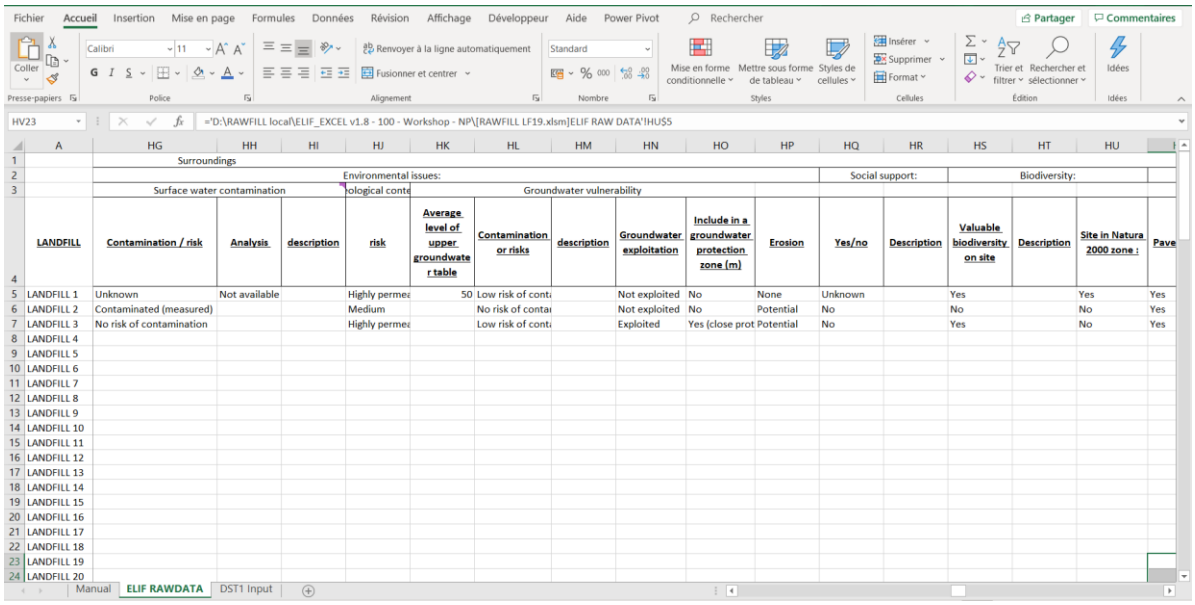
2. RAWFILL ELIF file

The *RAWFILL ELIF.xlsm* file consists of three sheets:

1. Manual: this page describes how to use the tool.
2. ELIF RAW DATA
3. DST1 INPUT

ELIF RAW DATA

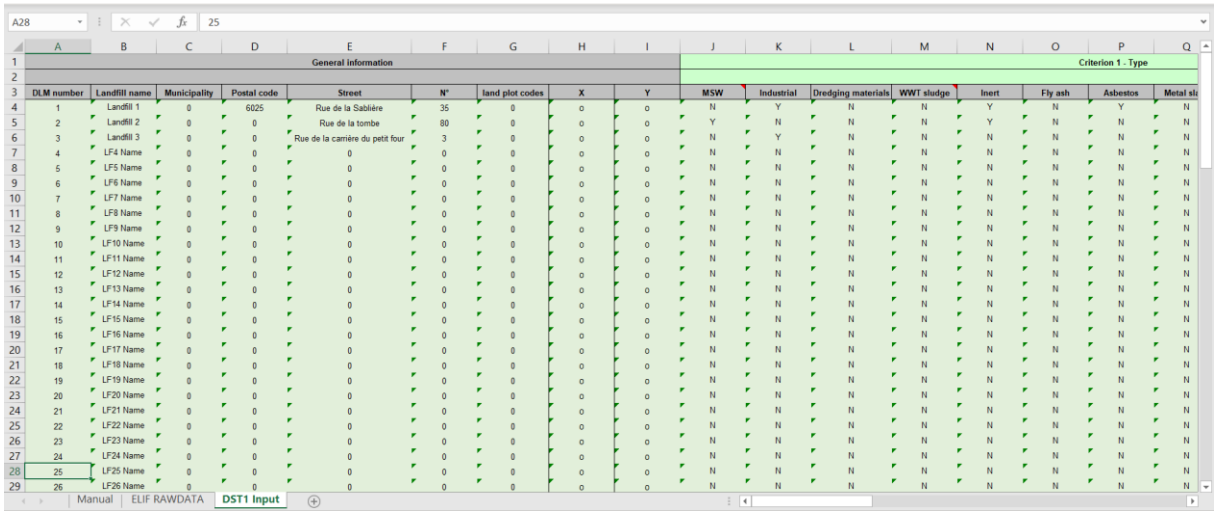
The ELIF RAW DATA sheet contains a table that summarizes the information of all *RAWFILL LF#.xlsm files.* This table can then be exported to an existing database.



	LANDFILL	Contamination / risk	Analysis	description	risk	Average level of upper groundwater table	Contamination or risks	description	Groundwater exploitation	Include in a groundwater protection zone (m)	Erosion	Yes/no	Description	Valuable biodiversity on site	Description	Site in Natura 2000 zone :	Pave
1		Surroundings															
2		Environmental issues:										Social support:		Biodiversity:			
3		Surface water contamination			ological conte	Groundwater vulnerability											
5	LANDFILL 1	Unknown	Not available		Highly permea	50	Low risk of conta		Not exploited	No	None	Unknown		Yes		Yes	Yes
6	LANDFILL 2	Contaminated (measured)			Medium		No risk of conta		Not exploited	No	Potential	No		No		No	Yes
7	LANDFILL 3	No risk of contamination			Highly permea		Low risk of conta		Exploited	Yes (close prot	Potential	No		Yes		No	Yes
8	LANDFILL 4																
9	LANDFILL 5																
10	LANDFILL 6																
11	LANDFILL 7																
12	LANDFILL 8																
13	LANDFILL 9																
14	LANDFILL 10																
15	LANDFILL 11																
16	LANDFILL 12																
17	LANDFILL 13																
18	LANDFILL 14																
19	LANDFILL 15																
20	LANDFILL 16																
21	LANDFILL 17																
22	LANDFILL 18																
23	LANDFILL 19																
24	LANDFILL 20																

DST1 Input

The DST1 input sheet converts the RAWFILL ELIF table into a table that can be directly copy/past into DST 1 – Cedalion (another tool developed by the RAWFILL project). The DST 1 - Cedalion is then used to provide a quick ranking and select the best use for each landfill.



	DLM number	Landfill name	Municipality	Postal code	Street	N°	land plot codes	X	Y	MSW	Industrial	Dredging materials	WWT sludge	Inert	Fly ash	Asbestos	Metal sl
	General information									Criterion 1 - Type							
4	1	Landfill 1	0	6025	Rue de la Sablière	35	0	0	0	N	Y	N	N	Y	N	Y	N
5	2	Landfill 2	0	0	Rue de la tombe	80	0	0	0	Y	N	N	N	Y	N	N	N
6	3	Landfill 3	0	0	Rue de la carrière du petit four	3	0	0	0	N	Y	N	N	N	N	N	N
7	4	LF4 Name	0	0	0	0	0	0	0	N	N	N	N	N	N	N	N
8	5	LF5 Name	0	0	0	0	0	0	0	N	N	N	N	N	N	N	N
9	6	LF6 Name	0	0	0	0	0	0	0	N	N	N	N	N	N	N	N
10	7	LF7 Name	0	0	0	0	0	0	0	N	N	N	N	N	N	N	N
11	8	LF8 Name	0	0	0	0	0	0	0	N	N	N	N	N	N	N	N
12	9	LF9 Name	0	0	0	0	0	0	0	N	N	N	N	N	N	N	N
13	10	LF10 Name	0	0	0	0	0	0	0	N	N	N	N	N	N	N	N
14	11	LF11 Name	0	0	0	0	0	0	0	N	N	N	N	N	N	N	N
15	12	LF12 Name	0	0	0	0	0	0	0	N	N	N	N	N	N	N	N
16	13	LF13 Name	0	0	0	0	0	0	0	N	N	N	N	N	N	N	N
17	14	LF14 Name	0	0	0	0	0	0	0	N	N	N	N	N	N	N	N
18	15	LF15 Name	0	0	0	0	0	0	0	N	N	N	N	N	N	N	N
19	16	LF16 Name	0	0	0	0	0	0	0	N	N	N	N	N	N	N	N
20	17	LF17 Name	0	0	0	0	0	0	0	N	N	N	N	N	N	N	N
21	18	LF18 Name	0	0	0	0	0	0	0	N	N	N	N	N	N	N	N
22	19	LF19 Name	0	0	0	0	0	0	0	N	N	N	N	N	N	N	N
23	20	LF20 Name	0	0	0	0	0	0	0	N	N	N	N	N	N	N	N
24	21	LF21 Name	0	0	0	0	0	0	0	N	N	N	N	N	N	N	N
25	22	LF22 Name	0	0	0	0	0	0	0	N	N	N	N	N	N	N	N
26	23	LF23 Name	0	0	0	0	0	0	0	N	N	N	N	N	N	N	N
27	24	LF24 Name	0	0	0	0	0	0	0	N	N	N	N	N	N	N	N
28	25	LF25 Name	0	0	0	0	0	0	0	N	N	N	N	N	N	N	N
29	26	LF26 Name	0	0	0	0	0	0	0	N	N	N	N	N	N	N	N