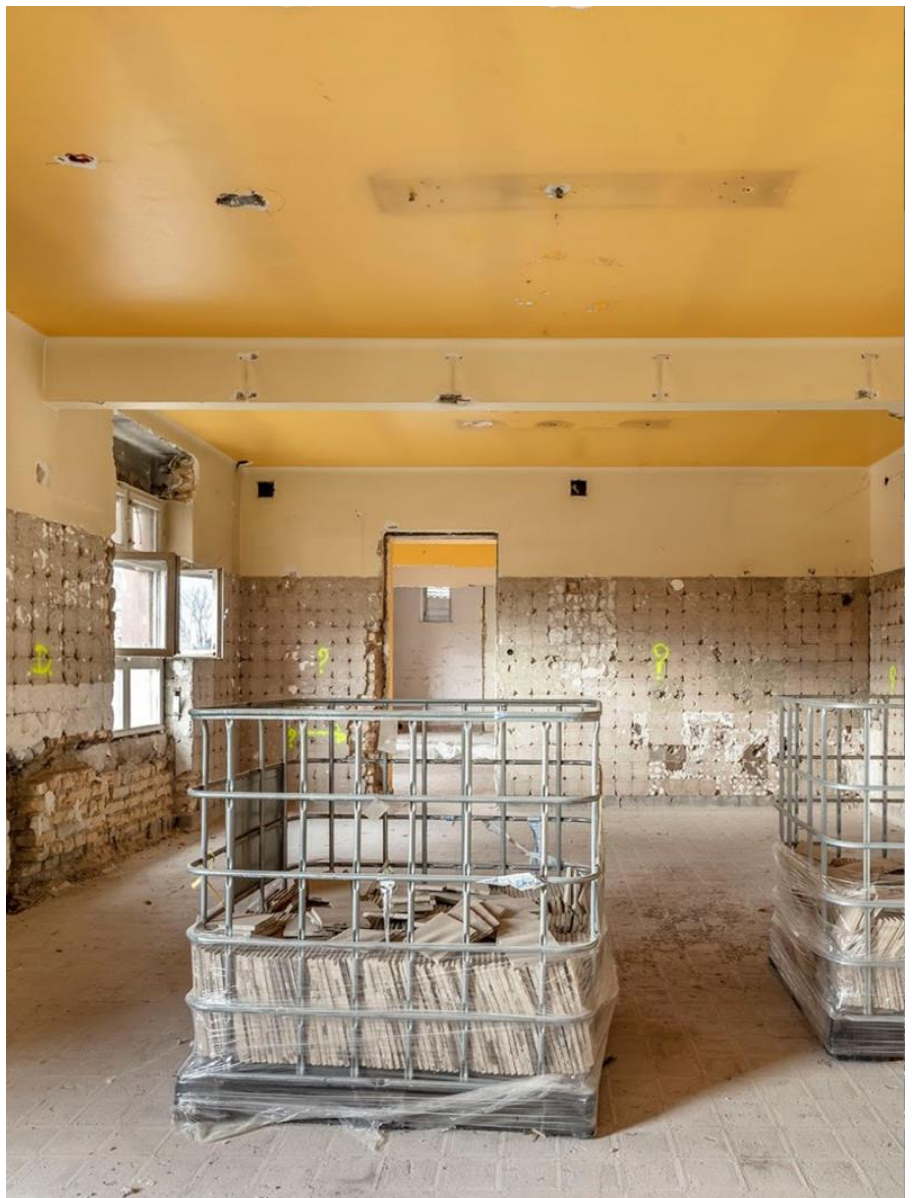


FCRBE Pilot Operations

37 case studies on reclaiming and reusing
building elements



Authors

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With cooperation from Salvo, the Belgian Construction Federation and Brussels Environment

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Introduction

This summary report was produced as part of the [Interreg NWE-project: Facilitating the Circulation of Reclaimed Building Elements - FCRBE](#). The objective of the FCRBE project is to increase by +50% (in mass) the amount of reclaimed building elements in circulation on the northern half of France, Belgium and the UK by 2032.

The project has developed various tools: Besides many other instruments, the most important ones are:

- [Opalis](#), an online directory that richly documents more than 1500 specialised reuse operators,
- A [guide](#) for identifying the reuse potential of construction products,
- A [guide](#) for facilitating the integration of reclaimed building materials in large-scale projects and public tenders,

These tools have been tested and promoted through 37 pilot operations taking place in large (de)construction projects, whereby elements are or will be reused. Effective communication efforts facilitates a smooth integration of these outputs into field practices and policies.

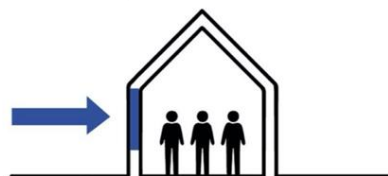
This summary report gives an overview of the pilot operations. For each pilot project, there is also a Fact sheet available that documents the operation individually.

What is a pilot operation? A test operation aims at extracting or integrating a reused material in a demolition, rehabilitation or construction site, relying on the offer and services of the existing reuse sector. To achieve this objective, the methodology consists in assisting the stakeholders of the construction industry (including public authorities), by providing them with the tools developed by the project and documenting the steps that allowed the circulation of the reused material flow(s).

These test operations have been carried out with the help of public or private actors having the ambition to pursue reuse objectives in their project. The test operations aim to constitute a representative panel of the current built landscape. There is therefore no requirement in terms of surface, program, or type of operation (public, private). They must be replicable in order to serve as a reference for future projects.

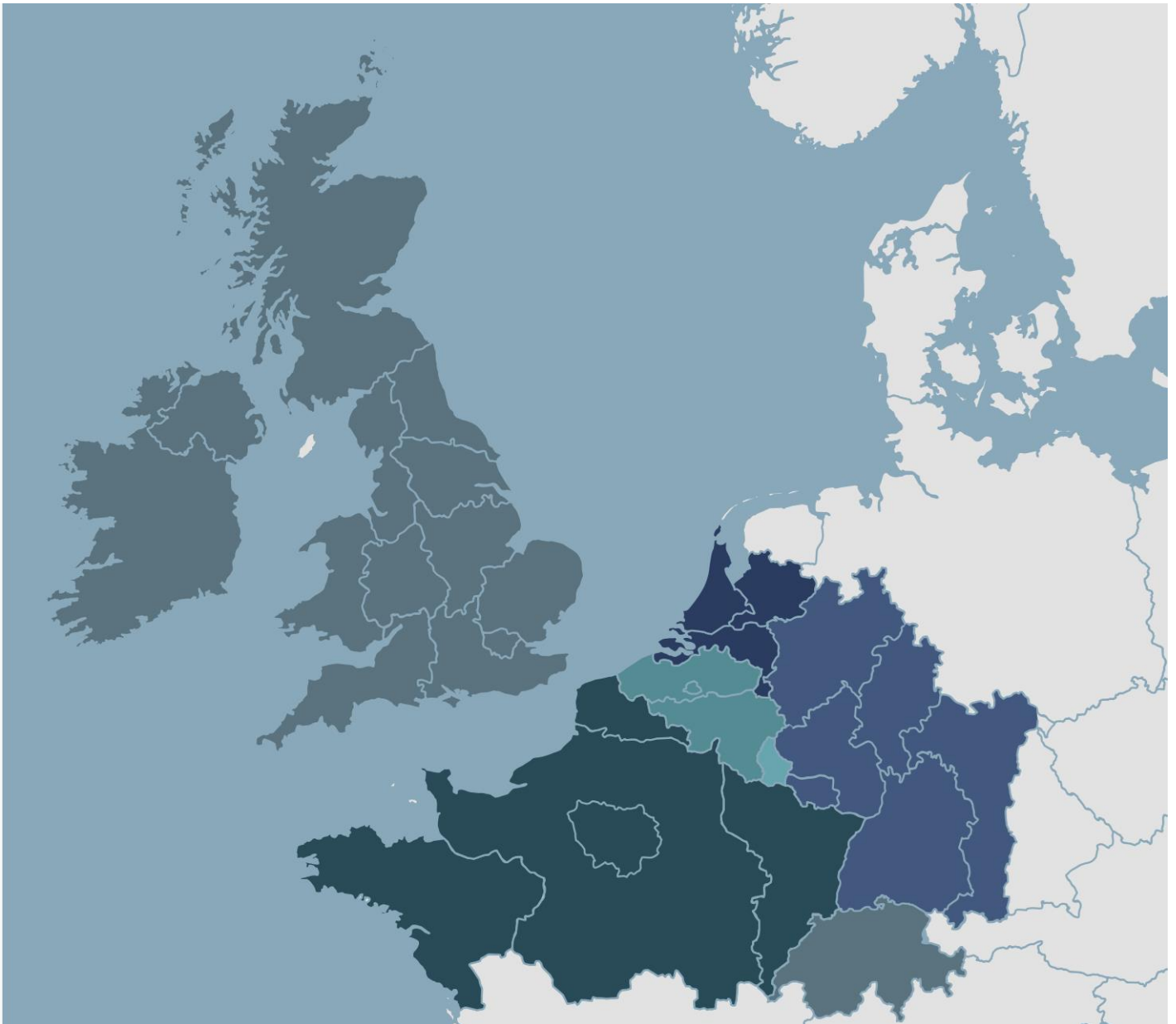


Extracting a batch of materials from a demolition site towards reuse sectors.



Integrating a reused building element in a construction or rehabilitation project.



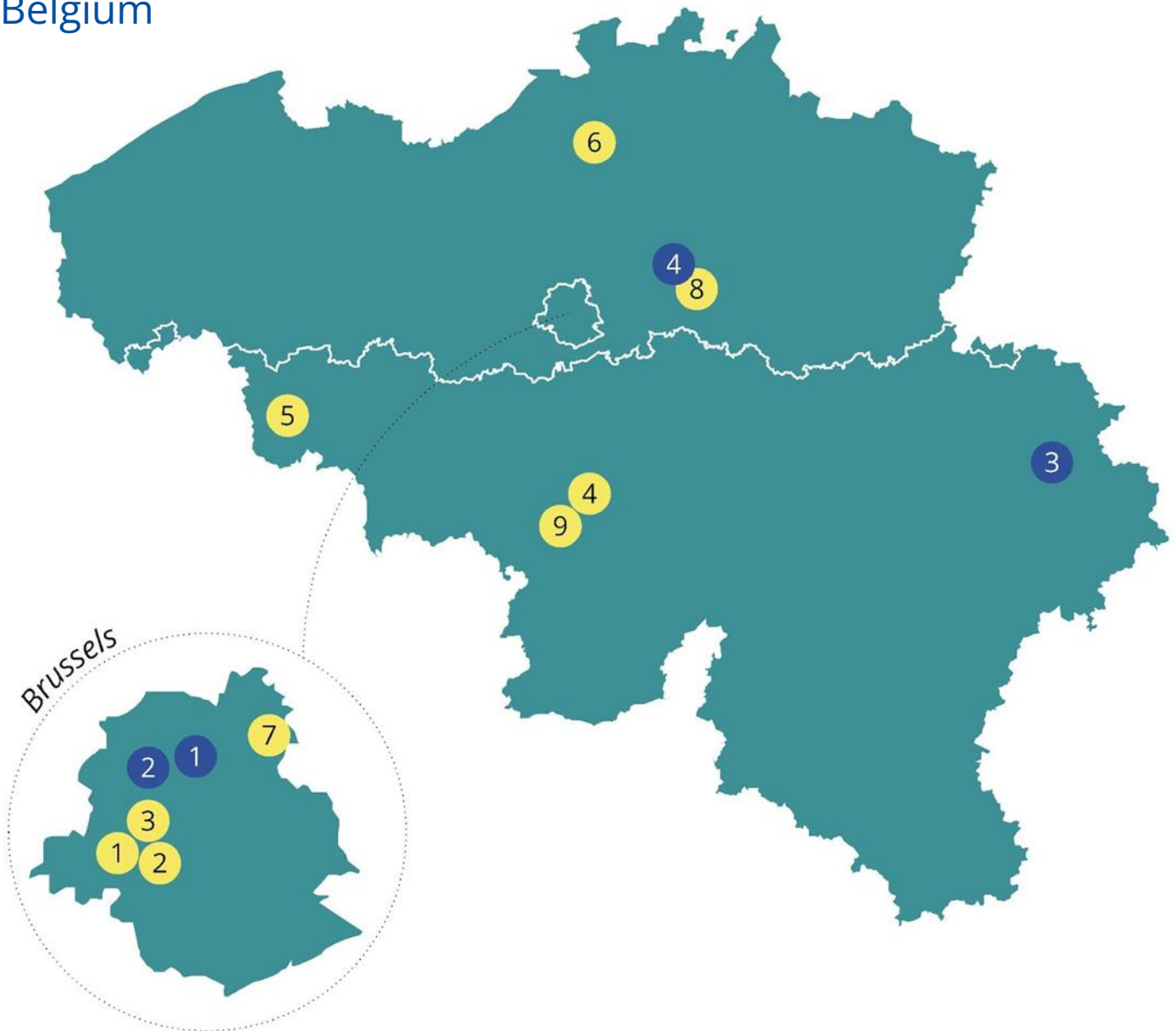


16 pilots on integration & 21 on extraction were executed throughout the NWE region

Many companies and organisations received support: Public and private developers, architecture offices, (de)construction companies & organisations, contractors, engineers ...

Many buildings elements were moved during the projects: Interior and exterior finishings (wall and floor tiles or stones, wood panels, partition walls,...), technical and sanitary elements, structural concrete and steel, bricks, carpentry, roof tiles, windows and doors, lighting,...

Belgium



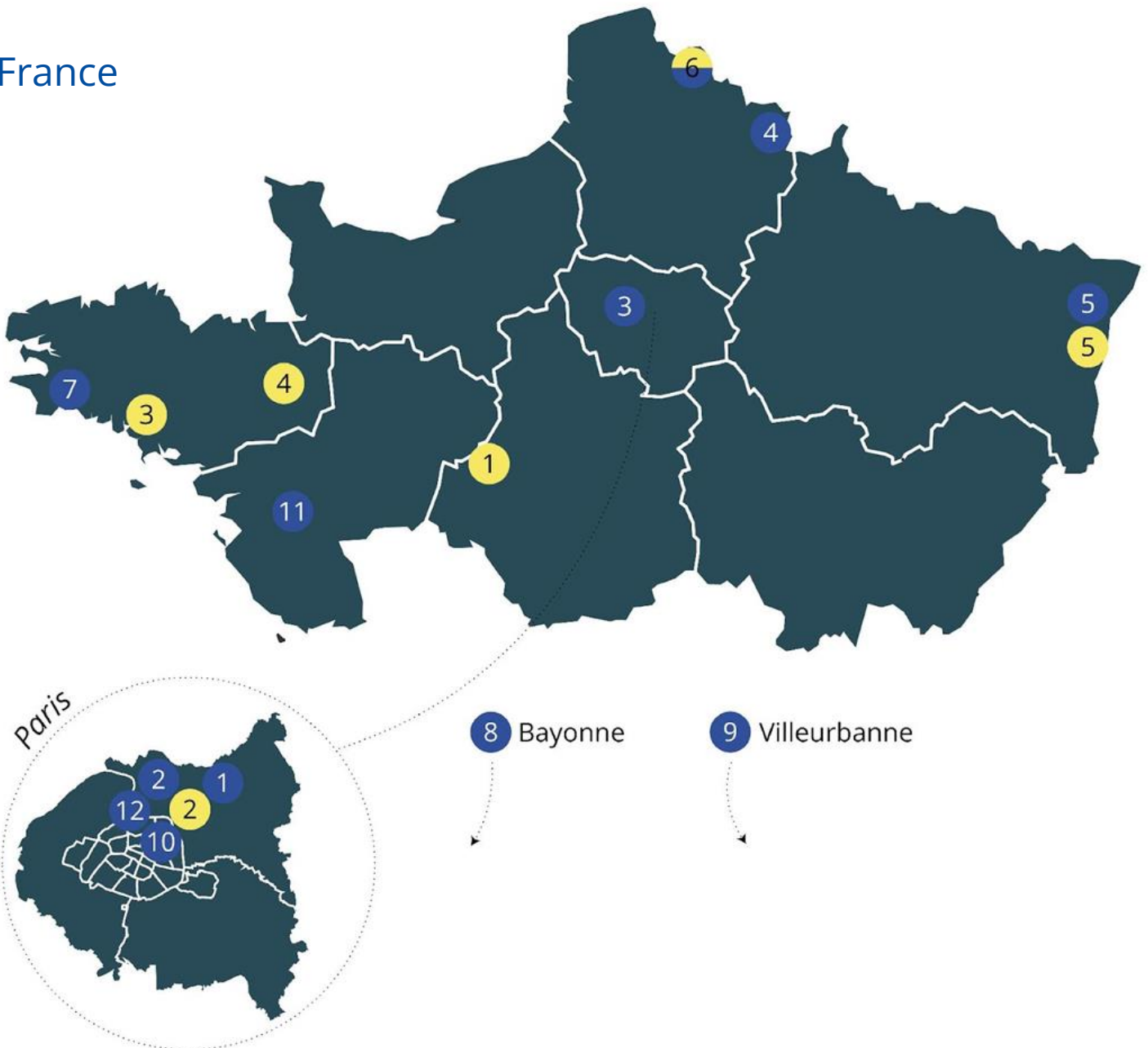
Pilots on extraction

- 1 Petite Île - Reconversion of an industrial site, Brussels
- 2 Belgrade - Tram workshop, Brussels
- 3 KeyWest - Warehouse, Brussels
- 4 Charleroi football stadium - Deconstruction, Charleroi
- 5 Cimenterie Delwart - Housing in an old plant, Tournai
- 6 Ideale woning - Demolition of a social housing block, Lint
- 7 Jules Bordet - Deconstruction of an office building, Evere
- 8 Hertogensite - Renovation of an institute, Leuven
- 9 SWCS - Renovation of an head office, Charleroi

Pilots on integration

- 1 Greenbizz II - Sustainable business incubator, Brussels
- 2 Pavillon - Renovation & extension of a park pavilion, Brussels
- 3 SPW Malmédy - Extension of an office building, Malmédy
- 4 Fonteinstraat - Renovation of social housing, Leuven

France



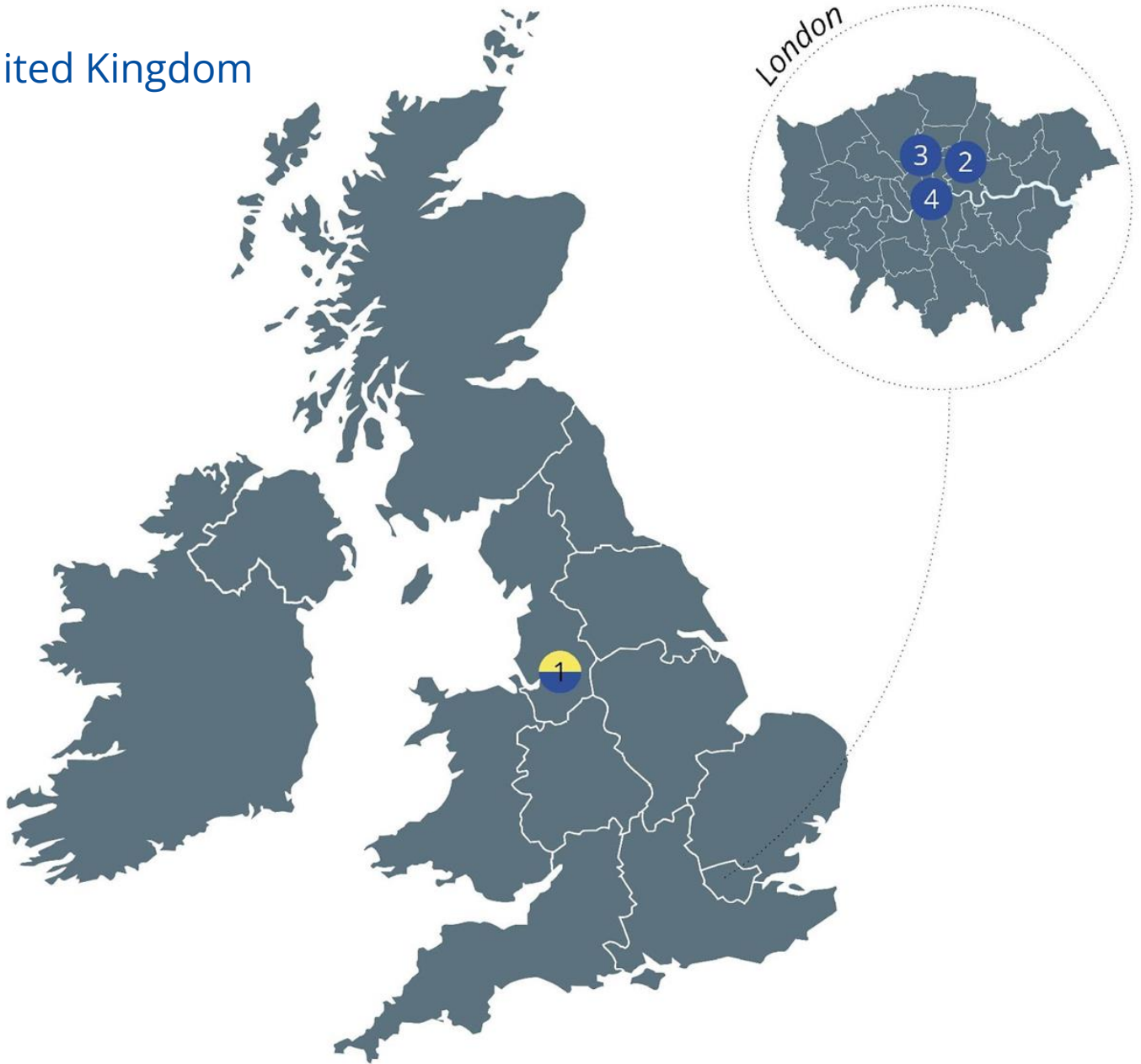
Pilots on extraction

- 1 Sanitas - Deconstruction of apartment buildings, Tours
- 2 CNAP - Office building deconstruction, Pantin
- 3 Lanester - Social housing deconstruction, Lanester
- 4 Elan Bâtitseur - Offices, Rennes
- 5 Nextmed - Hospital, Strasbourg
- 6 La Fabrique des Quartiers - Housing renovation, Lille

Pilots on integration

- 1 DEREKOM - Concrete modules, Seine-Saint-Denis
- 2 Port Chemin Vert - New social housing block, Aubervilliers
- 3 Dance center - Interior design of a dance center, Paris
- 4 Fourmies - Third space in an old supermarket, Fourmies
- 5 Manufacture des tabacs - Factory conversion, Strasbourg
- 6 La Fabrique des Quartiers - Housing renovation, Lille
- 7 Quimper Station - 2 pilots on the station, Quimper
- 8 Patxa'Ma - Deconstruction of an eco village, Bayonne
- 9 L'Autre Soie - Development project, Villeurbanne
- 10 La Maison des Canaux - Heritage building retrofit, Paris
- 11 La SAMOA - Urban public spaces, Nantes
- 12 La Chapelle - Housing renovation, Paris

United Kingdom



Pilots on extraction

- 1 Our Town Hall - *Public town hall restoration, Manchester*

Pilots on integration

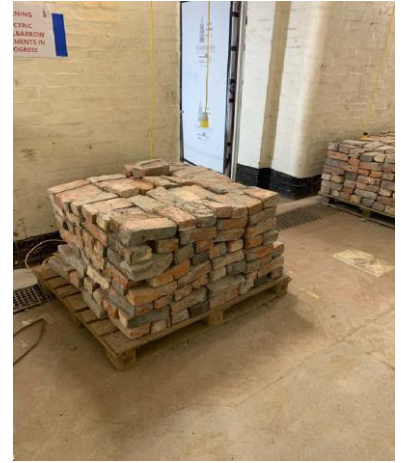
- 1 Our Town Hall - *Public town hall restoration, Manchester*
- 2 Slight house - *Construction of a private house, London*
- 3 Spencer rise - *Renovation of a private house, London*
- 4 Grosvenor - *Refurbishment project, London*

Some fact sheets highlights

Pilot on integration and extraction

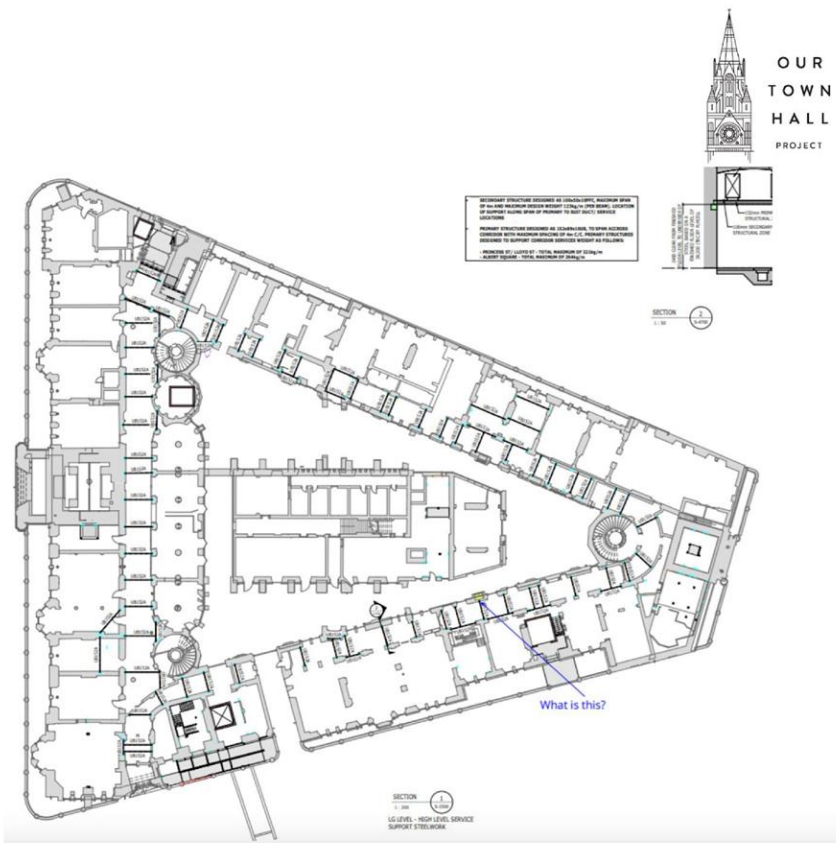
186 tonnes of materials were reused on site or in other projects of the city: bricks, timber, steel, granite setts.

Implementation of a reuse strategy to improve material circularity between the building projects of the city



Pilot Operations FCRBE

SALVO interreg North-West Europe FCRBE



Our Town Hall

Same-site reuse in historic public town hall

About - Lendlease employed the FCRBE project in becoming a testbed opportunity to disseminate material reuse across the company portfolio. It aims to shape a reuse strategy to indoctrinate widespread reuse practices, future proof existing reclaimed material stock and regulate material circularity between its building projects.

Challenges - Lendlease highlighted that contractor resistance and uncompromising programming were prevalent challenges that impact the regular use of reclaimed materials across their building portfolio. It was, therefore keen to explore suitable reclamation pathways for identified materials and with the support of the dealer network and FCRBE toolkit, look to same-site and inter-site reuse wherever possible.

Materials involved - brick, steel, timber

MANCHESTER - UK - 2021

Project Size : XL - Type of procurement : Public
 Interreg FCRBE partner : [SALVO](#) - Project Owner :
[Manchester City Council](#) - Project Manager :
[Lendlease](#)

Some fact sheets highlights



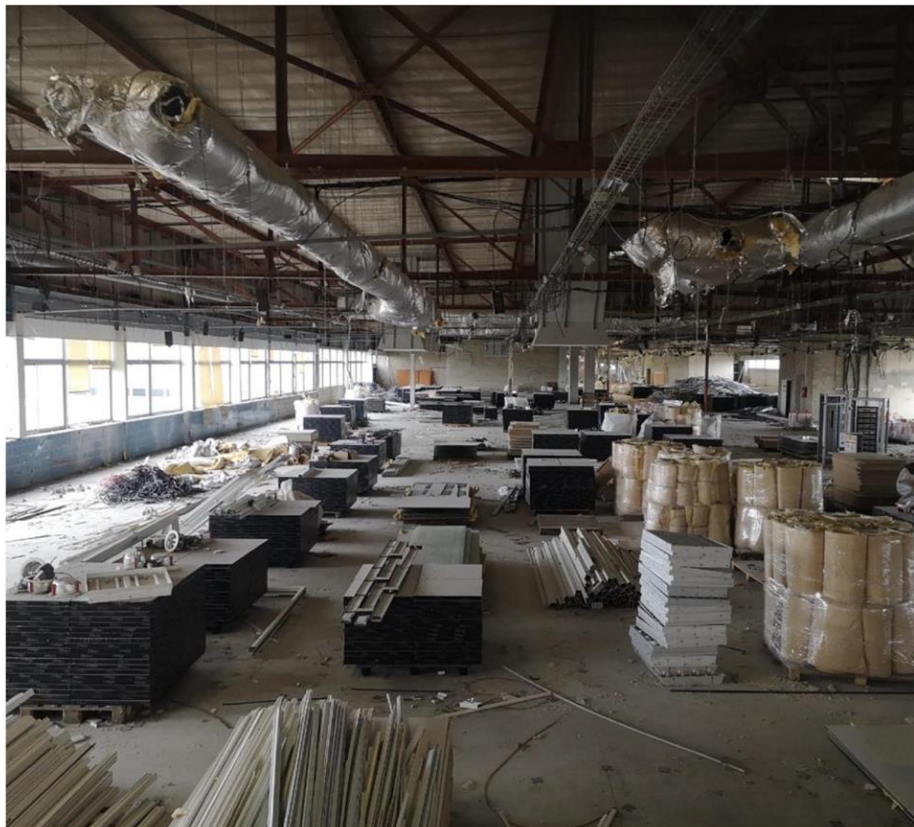
Pilot on extraction

140 tonnes of materials were dismantled to be reused off site: technical floors, modular partitions, insulation panels, interior doors, carpet tiles, sanitary facilities...



Inventory and survey of the reuse market to achieve reuse objectives

Pilot Operations FCRBE



CNAP

Dismantling interior elements of an office building for off-site reuse

About - A look back at a dismantling operation dealing with interior finishings of an office building. In order to allow their dismantling for reuse, an inventory and a collection of the market's marks of interest is carried out, so that reuse can be included in the demolition works contract.

Challenge - Which batches of materials are of interest to the reuse market ? How to set a reuse target in the works contract ?

Materials involved - technical floors, modular partitions, insulation panels, interior doors, carpet tiles, sanitary facilities...

PANTIN - FR - 2021 - public procurement -
Surface : 4 600 sq.m - FCRBE coordinator :
[Bellastock](#) - delegated project manager :
[Opérateur du Patrimoine et des Projets Immobiliers de la Culture \(OPPIC\)](#) - company in charge of dismantling and reuse : [Réavie](#)

Some fact sheets highlights

| domaine d'emploi | affectation | potentiel produit réemploi | quantité nécessaire au projet | U | E ou O | performance réemploi | quantité réemploi calculée |
|--------------------------|-------------|----------------------------|-------------------------------|----------------|--------|----------------------|----------------------------|
| Revêtement de sol (int.) | | (2) | 870 (1) | m ² | E | (3) | |
| | sanitaires | carrelage céramique | 500 | m ² | E | 75% | 375 |
| | horeca | plancher /parquet bois | 300 | m ² | E | 75% | 225 |
| | bureaux | dalles de moquette | 70 | m ² | O | n.a. | |

Pilot on integration

127 tonnes of reused materials are targeted: exterior floor covering, interior finishing (technical) floor/ wall finishing, sanitary

Implementation of a strategy for the specification of reused materials

Pilot Operations FCRBE



GREENBIZZ II

Encourage diversity

About - [Citydev's](#) Design & Build procurement for the development of GREENBIZZ II. The goal is to encourage bidders to take the initiative, integrating reclaimed building materials in the project beyond a pre-determined minimum.

Challenges - Implementation of the strategy to include minimum reuse requirements in the call for tenders and awarding extra points for tenders that exceed this minimum, while making use of targeted (specific) objectives within the context of a Design & Build contract.

Materials involved - A variety of construction products for different fields of application.

BRUSSELS - BE - 2021 - Public procurement

Project size : +/- 4.500 m²

Interreg FCRBE partner:

[Brussels Environment](#) with the support of [BBRI](#)

Project developer : [Citydev](#)

◀ Pictures: © Opalis



Barriers and opportunities

The lessons learned from the pilot operations are numerous and their dissemination aims to organize and structure the practice of reuse in order to make it widespread.

In addition to being a source of inspiration, these pilots provide practical and organizational keys to the various stakeholders wishing to integrate reuse ambitions into their own projects.

The technical indications collected on the studied materials have been capitalized in the FCRBE Reuse Toolkit.

Whether it is in the need for commitment of the project actors, in the flexibility to be granted in the design of reuse projects, in the way of defining objectives in terms of reuse, of prescribing reuse materials, of organizing the extraction or the supply of reuse materials, the good practices but also the issues encountered on the pilot sites have been documented and are summarized in this chapter.

Defining objectives in terms of reuse of construction elements

- An ambitious first project in terms of reuse is challenging and may not achieve 100% of its objectives. It is therefore a testing ground for a larger-scale approach, which will serve as an example but above all will equip the actors involved for the realization of their future projects. Thus, the urban community of Quimper-Bretagne Occidentale has developed its future circular economy strategy in parallel with the pilot operation. The Agence Ter design team has built up a network in the reuse sector that it will continue to call upon in its future projects.
- It is useful to clearly establish one's ambitions and translate them into clear objectives from the project brief. This ensures that all stakeholders are oriented towards the same goal and that complementary ambitions do not compete.
- For an organization that manages a large built estate, it is interesting to try to systematize the tools useful for reuse.
- A determined project management can have a significant impact on the development of local sectors: stimulating demand, contributing to the development of new services, ensuring the transmission of expertise, etc.
- A strategy of considering minimum requirements for reuse and rewarding practices that exceed the minimum requirement, while using targeted objectives, can stimulate innovation.

Commitment of project actors

- Motivation from all stakeholders remains an essential ingredient for achieving reuse ambitions. This aspect comes into play during the selection of partners.
- Reuse requires specific knowledge and expertise that need to be built up gradually and over time.
- The design team plays a decisive role, studying the possibilities of reuse and adapting its design as it goes along. The project owner can also have a strong influence on the progress of the project, by activating his network and by adapting the administrative clauses of his contract. Indeed, the introduction or adjustment of certain clauses will contribute to the involvement of the construction companies throughout the project.
- Some material suppliers can intervene in different ways in a project: in addition to supplying materials, they can also take care of the acquisition, the preparation of materials for reuse, but also give advice or even supervise other stakeholders.

Barriers and opportunities

Organizing the extraction

- Having an inventory of reusable materials can help to organize these operations and to distribute the tasks between all the participants ("who is in charge of what for which batch?")
- Professional suppliers should be consulted to confirm the reuse potential of the lots.
- For batches with confirmed potential, setting salvage rates ensures the company's good cooperation.
- The salvage for re-use should appear explicitly in the market of the demolition works, if not, there's a risk of limiting the effective possibilities during the deconstruction.

Specifying reuse materials

- Asking firms to provide both "new" and "reuse" options can create a bias against reuse. If the reuse option has been well studied, it is often more interesting to make it a technical specification.
- Once ambitions are set, they should be kept on the agenda during the work, for example through regular meetings specific for reuse.
- A framework contract requires a certain stability of supply. In terms of reuse, this implies a thorough study of reuse channels to anticipate the stability and capacity of stocks and choose materials accordingly. When study deadlines are restricted, the most reliable materials are to be preferred.
- Although the framework contract has a very rigid format, with prices determined in advance for a long period of time, it actually allows interesting experiments in reuse. It is possible to ask companies to submit a price for each material in its reused and new version, without having to make a definitive choice at the design or award stage. The decision will be made when each purchase order is issued, based on the capabilities of the reuse channels (or other potential sources). This approach requires the involvement of the company, which must maintain a monitoring protocol throughout the project. But it also leaves to the company the possibility of activating other sources of reuse, in particular the neighboring building sites. The contract must therefore lay the foundations for a trusting dialogue and a thoughtful methodology on the issues of reuse.
- The companies sometimes have difficulties to fix prices for reuse lots. Planning negotiations (when possible) and studying the market beforehand helps to mitigate this risk. The transmission of known information on the reuse sectors also allows to provide the companies with tools for the drafting of their offer. At present, this work requires an additional effort from the tenderers, which can disadvantage the smallest companies.
- In practice, the aim of framework contracts is to allow for very rapid execution, but the logic of re-use often benefits from having time. This factor must be taken into account in the offers and will require careful monitoring by the project owner, an investment that must also be anticipated.
- The requirements for public buildings demand that certain material characteristics be clearly established. While some suppliers are able to deliver the expected information and guarantees (e.g. lighting fixtures), others do not (yet). In theory, specific work to demonstrate fitness for use is always possible. In practice, it is not always justified in the context of a small project.
- Awareness of the technical performances required and the means of their justification allows to give the necessary possibilities to the implementation of reused materials while meeting the fundamental requirements.
- Separating the supply from the installation and maintaining some flexibility in the supply allows for the expansion of supply sources to include reuse market opportunities. If the execution has to be started when all the conditions cannot be determined completely, it is possible to have recourse to reimbursement and to consider alternatives.
- The adaptation of standard and replicable technical specifications to the particularities of reuse can be done after prior consultation with various suppliers of reuse materials in order to study the recurrence of certain characteristics of the market concerned.

Barriers and opportunities

Allow for flexibility in the design of reused features

- The type of issues raised by reuse vary greatly from one material to another. Therefore, they should be studied on a case-by-case basis.
- The prescription of reused materials is best left a little margin on the characteristics that allow it, in order to meet the available offer. The fact of remaining open to localized evolutions in its design allows to seize great opportunities.
- Splitting large lots into smaller ones allows to accommodate what is actually available on the reuse market.
- Composing from more heterogeneous lots (in terms of color, texture...) requires more work but also allows to develop more original and specific solutions.
- Starting from a project imagined in new materials and looking for alternatives of reuse is a procedure that can lead to good results. The advantage is that the general requirements of the project are known, which is a useful guide for the research. The disadvantage is that the reuse alternatives found may require some adaptations, which should be anticipated.

Sourcing reused materials

- If on-site reuse is becoming a reflex for some project owners, the principle of using established channels remains less systematic. However, both approaches should be considered together: they are perfectly complementary!
- The fact of having to source from several suppliers and possibly having to combine reused parts with new accessories can be prohibitive for some contractors - particularly in small-scale projects where economies of scale are not always possible.
- The issue of cost is often central to the decision-making process. As such, it is useful to consider it in depth for items planned for reuse.

More generally

- Pay more attention to the potential of the existing building stock, its cultural value and material heritage, before designing new buildings to be disassembled.
- Emphasize in new construction the meanings and skills upon which reused elements are based.
- Consider reuse and renovation as alternatives to deconstruction.
- Allowing time for the slow pace required by the practice of reuse.
- Go beyond the counter-culture image and patina celebrated by some salvage practices.

37 case studies on reclaiming and reusing building elements



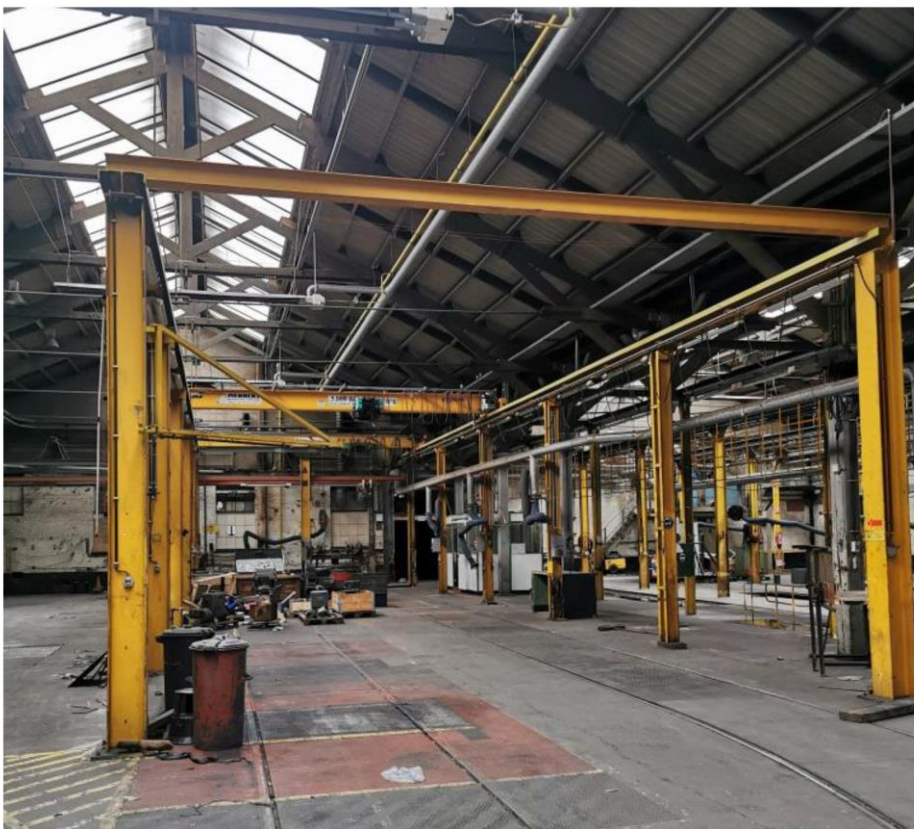
Petite Île - City Gate II

A decommissioned industrial site to be reanimated into a lively neighbourhood

About – This site, formerly dedicated to various industrial activities, will be brought back to life to host a neighbourhood with a high social and programmatic diversity. The site developers have a high target regarding circular economy issues and aim at using as much materials from the former buildings to be demolished into the new ones.

Challenges – How to take into account the site history wherein seemingly homogenous buildings were actually built and modified at different periods with different materials? How to ensure that the inventory reflects this reality in order to estimate the actual quantity of materials that can be reused? How to implement this issue into the deconstruction process?

BRUSSELS - BE - 2021 – Public procurement -
 Project Size : XL
 Interreg FCRBE partner : [CCBC](#)
 Project Owner : [SLRB](#)
 Project Manager : [noAarchitecten](#)



BELGRADE

A tram workshop as a basis to develop a company-wide practice

About – This former tram workshop, owned by the Brussels public transports company STIB, is to be refurbished for mixed purposes, with mainly technical, sanitary and heating equipment to be evacuated. The loose schedule with works starting in 2024 enables to explore various potential solutions for the reuse of these materials and to take the time to learn from the experience to replicate the process on future works on other sites.

Challenges – Is there a potential for internal reuse for the specific technical equipment? How to find potential buyers or recipients for the equipment which cannot be reused internally? How to transform the knowledge and experience from a pilot operation into a company-wide practice applied on all refurbishment projects?

BRUSSELS - BE - 2021 – Public procurement
 Project Size : L
 Interreg FCRBE partner : [CCBC](#) - [BBRI](#)
 Project Owner : [STIB](#)



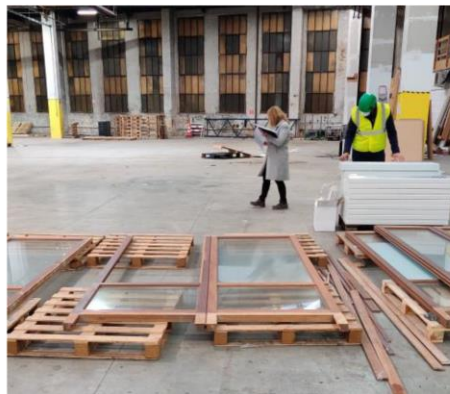
KeyWest

Learning through comparison

About – This industrial warehouse is to be deconstructed with the intent to have as much construction materials circulated as possible. An inventory was already established by a reuse operator. The double goal for this pilot was to compare the results from the operator with an inventory performed with the FCRBE, and to have the project owner experiment the method for future use on other sites.

Challenges – How to make the FCRBE methodology relevant compared with the practical way of working from an experienced operator? What are the opportunities when the project owner and the project contractor are both subsidiaries from the same group?

BRUSSELS - BE - 2021 - Private procurement -
 Project Size : M
 Interreg FCRBE partner : [CCBC - BBRI](#)
 Project Owner : [BPI](#)
 Reuse operator : [Batiterre](#)



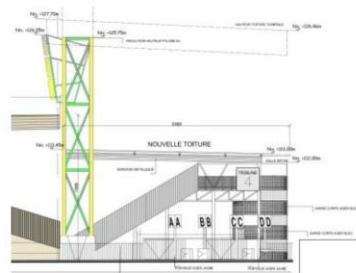
Charleroi football stadium

A reuse inventory to support its ultimate transformation

About – Reuse scenarios of elements from a football stadium that has existed for more than 80 years and is part of the cultural and social heritage of the city. A new stadium will be built out of town in order to meet new standards and minimise disturbance. The current stadium has been extended and converted many times and is made up of a large amount of materials from different periods of time.

Challenges - The city of Charleroi is not certain about the future of the stadium. The assessment of potentially reusable materials allows the involvement of stakeholders and provides a tool that can be used by the city to establish specifications for the design of a future project on the site or in the neighbourhood, in line with the revitalisation of the city.

CHARLEROI – BE – 2021
 Project Size: L
 Interreg FCRBE partner :
[Construction Confederation](#) with the support of [BBRI](#)
 Associate partner :
[Architectural and Urban Engineering](#)
[Department of the Polytechnic Faculty of the University of Mons](#)





DELWART CEMENT PLANT

Contributing to heritage conservation in new housing

About – In the context of the construction of modern and comfortable flats on a century-old industrial site (Delwart cement plant), analysis of the possible reuse of materials existing on site, in particular bricks and natural stone elements. Carrying out an inventory and making integration proposals.

Challenges - To identify and integrate reuse elements in a large-scale real estate project, led by a "Bouwteam" bringing together the promoter, the project designers and the demolition and construction companies. Quickly identify reusable brick batches in a building that has undergone numerous transformations and adaptations over the last century, with variations in materials and methods used.

TOURNAI – BE – 2021 – Private
 Echelle du projet : L
 Interreg FCRBE partner : [Confédération Construction](#) with support of [BBRI](#)
 Associate partner : [BAM GALERE](#)
 Project owner : Duka Immo
 Architect : [Atelier d'architecture Meunier-Westrade srl](#)



De Ideale Woning

Feasibility study of reuse of bricks and roof tiles

About – Social housing organization [De Ideale woning](#) is demolishing 28 houses. The houses will make way for a park, but after a few years new social housing and private houses will be built within a new complex. The houses were built in different periods and are in poor condition. The amount of material is high but the quality of the bricks is uncertain.

Challenges – Is it interesting for the developer to carefully disassemble, stock the materials for a long period of time, test their quality and recondition them in order to reuse them in the new buildings? Can these materials pass the quality tests and offer the same guarantee as new ones? Can all these operations compete with the very low price of new materials? How to take into account the uncertainty of the future site planning?

LINT - BE - 2021 - Public procurement
 Project Size : L
 Interreg FCRBE partner : [Confederatie Bouw-BBRI](#)
 Project Owner : [De Ideale woning](#)
 Project Manager : [De Ideale woning](#)
 Dismantling company : [Van Loo Projects](#)





JULES BORDET

Reallocating of office furnishings and materials

About - An office building will be renovated into new residences and multifunctional spaces. Together with the project developer we are searching for new uses for materials coming out of the building, either within other projects of the developer or by finding the right outlets, resellers and alternative destinations.

Challenges - De large quantities of specific materials makes it interesting for Democo to reuse them in other projects in the same region. Timing, costs and finding the right (sub)contractor are a challenge. It is hard to find interested parties for the other materials (in pristine condition).



EVERE - BE - 2021/22 - Privé opdracht
 Project Size : XL
 Interreg FCRBE partner : [Confederatie Bouw-BBRI](#)
 Project Owner : [Democo](#)
 Reuse operator : [Democo](#)



HERTOGENSITE

Renovation buildings of the former institute of Pathology and surgery

About - The renovation of the buildings of the former institute of Pathology and surgery is part of a large redevelopment project of the city of Leuven. The historical archive of UZ Leuven will turn the buildings into a museum. Together with the head contractor Resiterra we searched for outlets for the materials in good condition.

Challenges - A large variety of materials with reuse potential: Tiles, sinks, radiators, glass bricks ... for which finding a reseller or outlet in the area tended to be very difficult. Timing: The renovation/demolition had to accelerate because of the world championship cycling passing.



LEUVEN - BE - 2021 - Public procurement
 Project Size : XL
 Interreg FCRBE partner : [Confederatie Bouw - BBRI](#)
 Project Owner : [Resiterra](#)
 Project Manager : [Resiterra](#)
 Dismantling company : [Aclagro](#)



SWCS

Late adaptation of the tender specifications to introduce on- and off-site reuse

About – As part of the renovation of “Société Wallonne du Crédit Social” head office, adaptation of the tender specifications in order to give to the successful bidder an obligation to reuse some materials from the site, whether on or off site. Carrying out an inventory and adaptation of the tender documents.

Challenges – With the late introduction of reuse ambitions, successfully engaging the architects and changing their initial approach to the project. Highlight the potential for reuse in a building that at first glance does not lend itself to it, and adapt the tender specifications in a very short timeframe to allow companies to submit an offer accordingly.

CHARLEROI – BE – 2021 – Public

Project size: S

Interreg FCRBE partner :

[Confédération Construction](#) with support of [BBRI](#)

Project owner :

[Société Wallonne du Crédit Social](#)

Assistant to the project owner :

[Intercommunale pour la Gestion et la Réalisation d'Etudes Techniques et Economique](#)

| DONNÉES DE BASE | | | | | | | | | |
|-----------------|--|----------|------------|-------|--------|-------|-----------------------|-------------|---|
| Identifications | Photo | Quantité | Dimensions | | | Masse | Localisation sur site | Etat | Remarques(s) |
| | | | long | large | épais | | | | |
| 1 | Gaine ventilation | 32 | 30 | | | | Parking-1 | Bon | Autres gânes dans les niveaux RDC et 1er étage, non utilisables - diamètre Dimension + diamètre |
| 2 | Coude gaine ventilation Allonge de coude | 2 | 5 | 2 | 30 | | Parking-1 | Bon | Dimension + diamètre |
| 3 | Gânes ventilation rectangle | 3 | | | | | Parking-1 | Moyen | Gaine d'extraction |
| 4 | Luminaires | 33 | | | 800/30 | | RDC, Anvoies | Fonctionnel | Lot |
| 5 | Panneaux plafond rectangle | 62 | | | 800/30 | | RDC, Anvoies | Bon | Panneaux perforés |



SANITAS

Deconstruction of apartment buildings for reuse in multiple sites

About - A look back at the deconstruction of several social housing for off-site reuse. To enable reuse, work was carried out to bring together local players.

Challenges - Which batches of materials are of interest to the reuse market ? How to find partners and outlets in order to anticipate the future reuse of the dismantled materials ?

Materials involved – cut stone blocks, slate bricks, stone steps, gravel, metal grills, interior doors, sanitary facilities, wooden elements.

Tours - FR - 2021 – public procurement -

Surface :

16 000 sq.m – FCRBE coordinator : [Bellastock](#) -

project manager : [Tours Habitat](#) – demolition

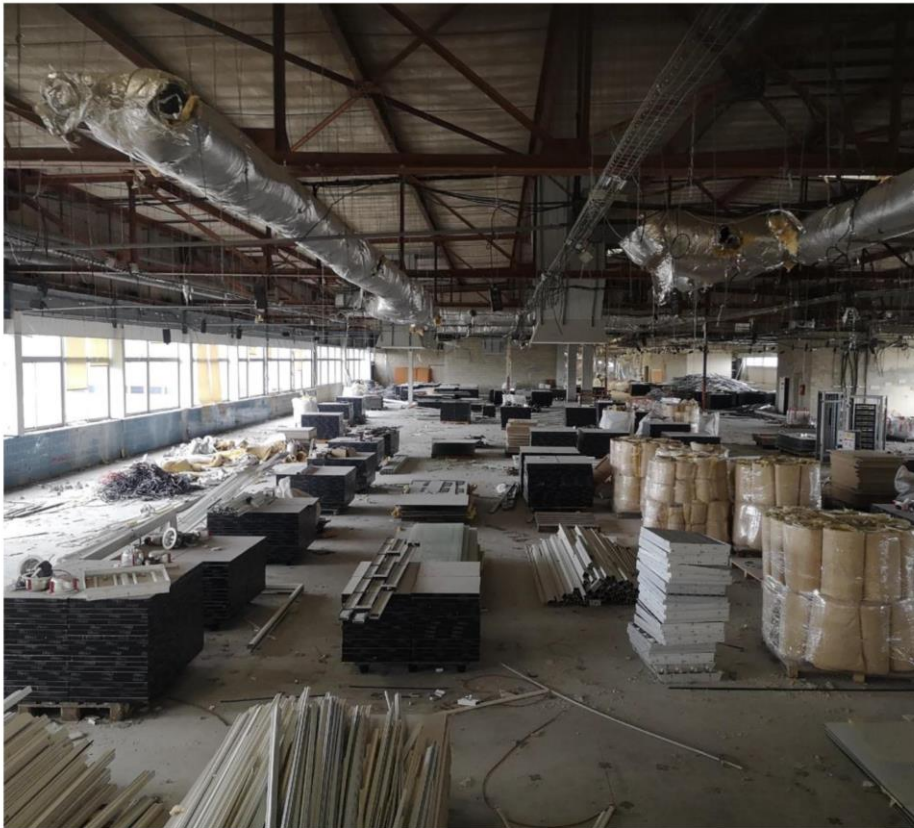
contractor : [Occamat](#) – dismantling tests : [La](#)

[pierre de Jadis](#) – compagnies in charge of reuse :

[Petit Œuvre](#) + [Nexity](#), [Parallèle architecture](#) +

[Telim](#), [180° Architecture](#) + [la SET](#), [Val Touraine](#)

[Habitat](#), [August Architecte](#).



CNAP

Dismantling interior elements of an office building for off-site reuse

About - A look back at a dismantling operation dealing with interior finishings of an office building. In order to allow their dismantling for reuse, an inventory and a collection of the market's marks of interest is carried out, so that reuse can be included in the demolition works contract.

Challenge - Which batches of materials are of interest to the reuse market? How to set a reuse target in the works contract?

Materials involved - technical floors, modular partitions, insulation panels, interior doors, carpet tiles, sanitary facilities...

PANTIN - FR - 2021 - public procurement - Surface : 4 600 sq.m - FCRBE coordinator : [Bellastock](#) - delegated project manager : [Opérateur du Patrimoine et des Projets Immobiliers de la Culture \(OPPIC\)](#) - company in charge of dismantling and reuse : [Réavie](#)



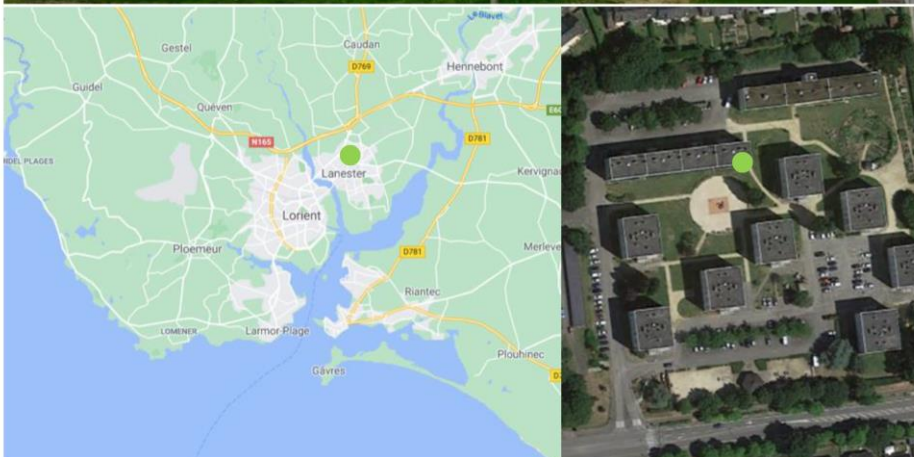
Lanester

Simple and efficient

About - The project takes place in Lanester, in the region of Brittany. The public building owner and the project manager had never done any reuse in their project; but they showed a great motivation for the approach. The pilot operation relates to a 40 housing building demolition.

Challenges - Extract materials for future reuse by finding the good balance between the ambitions of the project and the capacities of the local reclamation sector. Initiate a reuse process and increase the skills of the stakeholders in order to accelerate the change in the regional area.

LANESTER - FR - 2021 - public procurement - FCRBE coordinator : [Bellastock](#) - Project Owner : [Bretagne Sud Habitat](#) - Reuse assistant : [Armoën Nepsen Bretagne](#) Dismantling company : on going





ELAN BÂTISSEUR

Interacting with a demolition contractor to reclaim building elements

About - This operation explored how to step in a building site stripping to reclaim construction elements : by subcontracting with the demolition company, with a free site access to dismantle specific batches, or by organizing the collect of building elements dropped by the contractor. Each procedure led to different ways of reuse : donation, sales and internal reuse.

Challenges - Organizing the access to the materials without being formally involved.

Materials involved - partition walls (glazed and solid ones), doors, suspended ceilings, lights, tilt and turn windows, sanitarities, steel radiators, furniture.

Rennes - FR - 2021 - Private procurement
 Project size : >3000 sqm - FCRBE partner : [Rotor asbl](#) - Project Owner : [Neotoa](#) - Deconstruction contractor : [Elan Bâtitseur](#) - Conception : [10i2ja](#) - Other actors : demolition contractor.

Warehouse view © Rotor

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NEXTMED

Reclaiming early XXth building components popular in the reuse market

About - During the renovation process of a former hospital building, a dismantling operation is set up to extract materials with a good reuse potential. This work is based on an inventory and a survey to collect the interest of the reclamation market. The dismantling operations are included in the demolition works contract.

Challenges - Identifying the reusable batches and finding takers. Including the careful dismantling in the demolition works contract.

Materials involved - ceramic tiles, framework wood, washbasins, cast iron radiators.

Strasbourg - 2020 - Public procurement - Project size : 6.200 sqm (flooring) - FCRBE partners : [Rotor asbl](#) - Project Owner : [SERS](#) - Conception: [Richter Architects](#) - Other actors : Demolition and clearing contractor : [Lingenheld](#), environmental advisor : [Relais Chantiers](#)

Dismantled tiles, packed for transport © Luc Boegly

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LA FABRIQUE DES QUARTIERS

Small scale reuse operations with a high potential of reproducibility

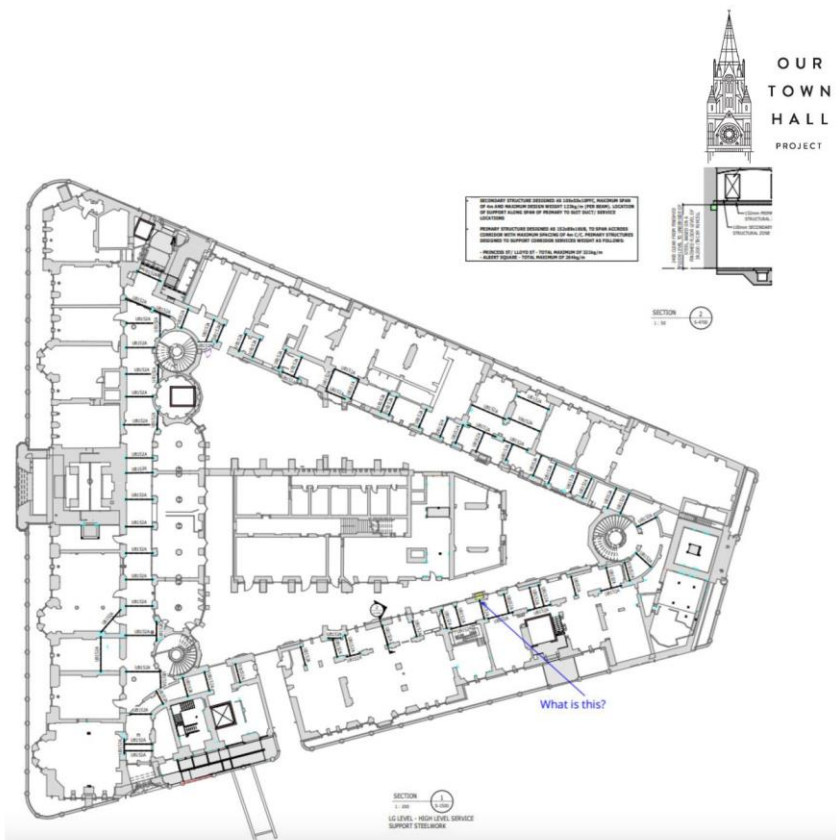
About - The company La Fabrique des Quartiers regenerates ancient housing in a former worker neighbourhoods in Lille metropole.

Challenges - Rethinking the management of the buildings' end of life. Encouraging the development of the reuse sector. Improving construction practice by developing tools through case studies.

Materials involved - Ceramic tiles, cast iron radiators interior doors, chimney slabs, washbasins.

Lille - FR - 2020/2021 - Public procurement
 Project size : Maisons de ville - FCRBE partner : [Rotor asbl](#) - Project Owner : [La Fabrique des Quartiers](#) - Tiles supplier : [Antique déco](#) - Reinsertion company : [La Fabrique de l'Emploi](#) - Conception for the project on Sainte Aldegonde street : [Atelier Nicolas Pereira](#)

Recovering of bricks from a demolition work © La Fabrique des Quartiers



Our Town Hall

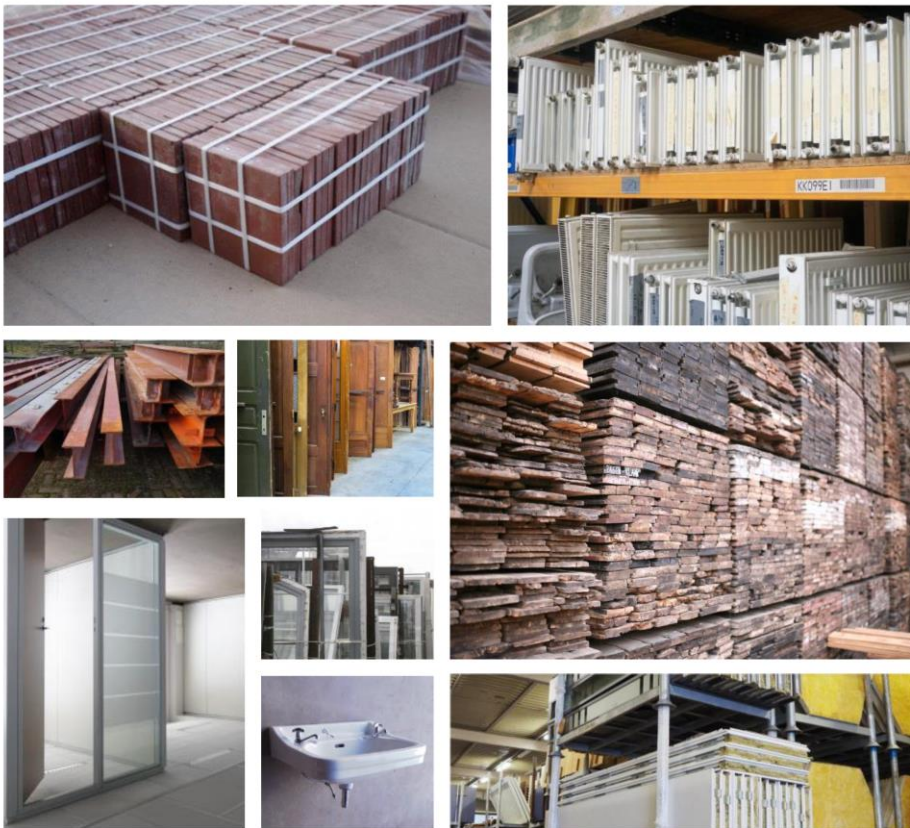
Same-site reuse in historic public town hall

About - Lendlease employed the FCRBE project in becoming a testbed opportunity to disseminate material reuse across the company portfolio. It aims to shape a reuse strategy to indoctrinate widespread reuse practices, future proof existing reclaimed material stock and regulate material circularity between its building projects.

Challenges - Lendlease highlighted that contractor resistance and uncompromising programming were prevalent challenges that impact the regular use of reclaimed materials across their building portfolio. It was, therefore keen to explore suitable reclamation pathways for identified materials and with the support of the dealer network and FCRBE toolkit, look to same-site and inter-site reuse wherever possible.

Materials involved - brick, steel, timber

MANCHESTER - UK - 2021
 Project Size : XL - Type of procurement : Public Interreg FCRBE partner : [SALVO](#) - Project Owner : [Manchester City Council](#) - Project Manager : [Lendlease](#)



GREENBIZZ II

Encourage diversity

About - [Citydev's](#) Design & Build procurement for the development of GREENBIZZ II. The goal is to encourage bidders to take the initiative, integrating reclaimed building materials in the project beyond a pre-determined minimum.

Challenges - Implementation of the strategy to include minimum reuse requirements in the call for tenders and awarding extra points for tenders that exceed this minimum, while making use of targeted (specific) objectives within the context of a Design & Build contract.

Materials involved - A variety of construction products for different fields of application.

BRUSSELS - BE - 2021 - Public procurement

Project size : +/- 4.500 m²

Interreg FCRBE partner:

[Brussels Environment](#) with the support of [BBRI](#)

Project developer : [Citydev](#)

◀ Pictures: © Opalis



PAVILLON

Describing an unknown batch in a work contract

About - Joint work contract between Brussels Environment and the municipality of Koekelberg for the renovation and extension of an existing pavilion. The goal is to integrate one or more batches of reclaimed construction products in the work contract.

Challenges - Implementation of the strategy of adapting a standard technical clause to the particularities of reuse for a construction product replicable in Brussels Environment's future developments. Implementation for a batch of interior design materials.

Materials involved - Reclaimed tiles for floor covering.

BRUSSELS - BE - 2021(22) - Public procurement

Project size : +/- 300 m²

Interreg FCRBE partner:

[Brussels Environment](#) with the support of [BBRI](#)

Project developer: [Brussels Environment](#) and [Municipality of Koekelberg](#)

Architect: [V+](#)

Picture credit: [V+](#)



SPW Malmedy

Late introduction of reused elements in the context of a constrained public tender.

About - Increase of the re-use rate in the context of the transformation and extension project of an office building owned by the Public Service of Wallonia, Department of Agriculture, Branch of Malmedy. Preservation of the existing building structure and construction of new buildings to significantly increase the capacity, comfort and accessibility of the offices.

Challenges - The project was developed without the ambition of reuse. The search for ways to extract and reuse materials on site, or to integrate elements available on the market, comes late in the process. It is necessary to find a way to concretise this new ambition, in a rather constrained public market context, and although the potential for reuse on site seems low.

MALMEDY – BE - 2021 - Public
 Project size: S
 Interreg FCRBE partner : [Confédération Construction](#) with support of [BBRI](#)
 Project Owner : [SPW](#)



FONTEINSTRAAT

Upgrading of 3 social housing apartments

About AGSL renovates 3 studio apartments with a limited budget in a social housing apartment complex at Fonteinstraat. In cooperation with the architect, reuse possibilities of the available materials were looked for in order to integrate them in the project of renovation. Insulation and ventilation is foreseen for the complex and 3 different approaches were planned for the apartments: from Low key to High key, based on the intensity of the spatial redesign and the reuse intensity.

Challenges - How to create a quality home responding to today's standards with a limited budget? How to find sites where to reuse the extracted materials of very low value? How to take into account the existing structure, technical equipment and facade of the apartment complex? How to respond to the ambitions of the developer and architects regarding circular economy within the economic constraint?

LEUVEN - BE - 2021 - Public procurement
 Project Size : Small
 Interreg FCRBE partner : [Confederatie Bouw-BBRI](#)
 Project Owner : [Autonomo Gemeentebedrijf Stadsontwikkeling Leuven](#)

DERECOM

Deconstruction and reconstruction of modular concrete elements

About – A social landlord initiate a process of deconstruction of concrete structural modules for internal reuse in new housing buildings.

Challenge – In order to prepare the construction project, it was necessary to organize an adapted works contract as well as a technical assesment procedure.

Material involved – reinforced concrete

Seine-Saint-Denis (93) - FR - 2021 –
 Public procurement – Surface : 550 sq.m –
 FCRBE coordinator : [Bellastock](#) + [CSTB](#) –
 Project manager : [Seine-Saint-Denis Habitat](#)
Lucas.Colombies@seinesaintdenishabitat.fr



Port Chemin Vert

1% réemploi

A propos – Dans le cadre d'un projet de construction de bâtiments de logements sociaux, le maître d'ouvrage et son maître d'œuvre ont pour objectif de dédier 1% du budget total des travaux à la fourniture de matériaux en réemploi.

Défis – Quels sont les scenari pour atteindre l'objectif de 1% réemploi ? Comment identifier des sources d'approvisionnement ? Comment adapter la conception au réemploi ?

Matériaux – divers

Aubervilliers (93) - FR - 2021 – marché public –
 Surface : 4 437 m² – coordinateur FCRBE :
[Bellastock](#) – Maître d'ouvrage : [Immobilière 3F](#) –
 architecte : [ITAR](#) – Aménageur : [Plaine Commune](#)





DANCE CENTER

Reused hardware for a small interior design project.

About - In this project, a storage space in the ground floor of a Parisian building is converted into a dance center. This is an opportunity for the architect to experiment reuse practice in their design for the first time.

Challenges - Finding the right way to provide a small scale project with reused hardware. Setting proper goals for a first experience. Meeting the needs of a public programme (ERP) .

Materials involved - Lights and doors handles.

Paris - FR - 2021 - Private procurement

Project size : 350 sqm - FCRBE partner : [Rotor asbl](#)
 - Project Owner : Private - Conception : [Louise Morin](#) - Supplier : [Rotor Déconstruction](#)

Before-after © Louise Morin Architecte



FOURMIES

Setting up a framework allowing contractors to be active in the reuse process

About - The city hall of Fourmies wants to turn an old supermarket into a third place and take this as an opportunity to encourage circular economy. The upgrade of existing elements is prioritized and reused materials are integrated in the new designs.

Challenges - Grasping the opportunities that will show up during the construction work.

Materials involved - Stone cobblestones and borders, concrete industrial slabs.

Fourmies - FR - 2021 - Public procurement

Project size : 1700 sqm (living area)
 FCRBE partner : [Rotor asbl](#) - Project Owner : [Ville de Fourmies](#) - Conception : [Atelier 9.81](#)
 Other actors : Design offices : [Nortec Ingénierie](#), [Polyexpert Environnement](#), [Etudes Bois du Barrois](#), [Alpes Contrôles](#)

Projected view © Atelier 9.81



MANUFACTURE DES TABACS

A reused wood panelling for a public project

About - The architects integrated reused materials in this refurbishment project of the former tobacco factory in Strasbourg.

Challenges - Identifying reused materials which are suitable for interior wall cladding. Describing the material and its use in the specifications.

Materials involved - scenography flooring wood panels, Steenschotten wood panels, washbasins, toilets.

Strasbourg - FR - 2020/2021 - Public procurement

Project size : 1600m2- FCRBE partner : [Rotor asbl](#)
 - Project Owner : [SERS](#) - Conception: [La Générale](#) et [Atelier Matthieu Buisson](#)

Projected interior view © Générale et Atelier Matthieu Buisson



QUIMPER STATION

Large scale reuse for a public square project

About - The Gare-Parc urban planning project aims to redesign the train station of Quimper and the surrounding pedestrian area. The public authorities wish to include circular economy in the development of the project.

Challenges - Identifying suppliers able to provide sufficient quantities of reused materials for a long-term design process (2 years). Adapting to the unforeseeable reclamation market supplies in a large-scale project.

Materials involved - Cobblestones, borders, granite lintels, patio wood.

Quimper - FR - 2021 - Public procurement

Project size : < 40.000 sqm - FCRBE partner : [Rotor asbl](#) - Project Owner : [QUBO \(Quimper Bretagne Occidentale\)](#) - Conception : [Agence Ter](#) - Cultural urbanism : [Cuesta](#)

Projected view © Agence Ter

Patxa'Ma

A collective effort

About – A reclaim dealer needs to develop a tailor-made technical protocol to facilitate the reuse of electrical switchboards. In this purpose, the dealer triggers a collective work gathering many actors : a reclamation dealer, a reuse expert, an electrical controller, a technical center and a lawyer specialized in construction law.

Challenges – How to develop an appropriate technical protocol in order to get a product warranty ? Without this warranty, the product cannot be accepted.

Materials involved – electrical switchboards

BAYONNE - FR – 2021 – private procurement –
Surface : 1900 sq.m –
FCRBE coordinator : [Bellastock](#) + [CSTB](#) –
reclaim dealer : [Patxa'Ma](#)



L'Autre Soie

Integrating reuse on a district scale

About – Within the framework of a multi-actor development project, the project owner plans the integration of reuse in the various real estate operations (new constructions, renovations, demolitions) and the development of public spaces in the district.

Challenge – How can reuse be integrated at the scale of a city district?

Materials involved – bricks, paving stones, tiles, metal walkways, cast iron radiators, parquet floors, interior doors, sanitary facilities, carpets, concrete walls, etc.

VILLEURBANNE - FR - 2021 – public procurement – Surface : 23 400 sq.m – FCRBE coordinator : [Bellastock](#) – project manager: [SAS L'Autre Soie Est Métropole Habitat](#) – reuse assistant : [Eodd, Mineka](#)





La Maison des Canaux

Maximum reuse

About – Among its many environmental and social objectives, the renovation project of La Maison des Canaux, a 19th-century building, aims to integrate a maximum of reclaimed materials.

Challenge – Search for reclaimed materials for almost all the batches - meet the technical and insurance challenges of a public contract for specific batches (metal structures) - ensure the traceability of materials on the site.

Matériaux – Focus : structure métallique
Autres matériaux : bois, pierres, isolants, luminaires, carrelage, textile, palissade de chantier.

PARIS - FR - 2021 – public tender –
Surface : 1009 sq.m – project manager : [Ville de Paris](#) – architect : [Grand 8](#) – FCRBE coordinator : [Bellastock](#) – steel construction contractor : [General Metal](#) – supply of the steel structure : [Sequano / Bondy / Est-Ensemble](#) – deconstruction contractor : [Bouvelot TP](#)

Crédits : Benoit Florencon



Fresco on the site fence describing the project's reuse approach.
Crédits : Bellastock



LA SAMOA

Rationalise the reuse of road materials within a framework agreement

About - In 2021, urban planning organization SAMOA is implementing for the second time a framework agreement for upgrading the public areas in Nantes island. On that occasion, the organization would like to complete the process by integrating further reused materials.

Challenges - Identifying the reuse sectors able to supply in a constant way important quantities of materials for many years. Incorporating enough flexibility to be able to deal with the unforeseeable aspects of reuse practice in a quite rigid contract. Extending the practices of in-situ reuse to an ex-situ reuse, at an advanced stage of the design process.

Materials involved - Stone and concrete cobblestones, stone lintels, concrete slabs, wood for furniture.

Nantes - FR - 2021 - Public procurement
Project size : Ile de Nantes (337 Hectares) - FCRBE partner : [Rotor asbl](#) - Project Owner : [La Samoa](#) - Conception : [Jacqueline Osty & associés](#)

Projected view © Atelier Jacqueline Osty



LA CHAPELLE

Reusing an uncommon material on the reclamation market

About - This is not architect Camille Salomon's first experience with reuse. This operation of housing refurbishment in Paris is an opportunity to go further by integrating a quite uncommon material on the second-hand market : decorative high pressure laminate panels (HPL).

Challenges - Finding batches of HPL in sufficient quantities in the industry. Composing with heterogeneous batches.

Materials involved - Decorative high pressure laminate panels.

Paris - FR - 2021 - Public procurement
 Project size : 1500 sqm - FCRBE partner : [Rotor asbl](#) - Project Owner : [Paris Habitat](#) - Conception : [Camille Salomon & Valentin Cordebar architectes](#)

Projected view © Camille Salomon Architecte



SLIGHT HOUSE

Creative bonding with reclaimed bricks for a new private house

About - As an alternative to the use of new materials, Studio Bark architects opted for reclaimed bricks to clad the façade of a Londonian private house. These bricks are largely available on the reclamation market and were integrated into the design process.

Challenges - Finding the right type of reclaimed brick and how to install it.

Materials involved - Bricks

London - UK - 2021 - Private procurement
 Project Size : 87 sqm - FCRBE partner : [Rotor asbl](#) - Project Owner : private - Project Manager : [Studio Bark](#) - Brick supplier: [London Reclaimed Brick Merchants](#) - Contractor: [ASAP Construction](#)

Projected facade and mockup © Studio Bark



SPENCER RISE

Reuse driving the design on residential project

About - A domestic renovation project where architect and property owner David Kohn sought a radical approach to reclaiming building materials and was happy for reuse to drive forward the design.

Challenges - DKA was committed to making Spencer Rise an exemplar project to expand the practice's interest and experience in reclaiming traditional and modern building materials. The challenge was to overcome the logistical barriers and learn how to navigate the reclamation trade.

LONDON - UK - 2021/22 - PRIVATE

Project Size : S - Interreg FCRBE partner : [SALVO](#) - Project Owner : [David Kohn Architects](#) - Project Manager : [David Kohn Architects](#) - Reuse operator : Multiple London Dealers - Dismantling company: n/a

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GROSVENOR

Talking reuse with a large real estate company

About - As part of a refurbishment project in London, real estate company Grosvenor brought together different consultants to study reuse possibilities. Their findings have been communicated to the designers. The consultants pursued their research and enlarged their scope to include more general questions about reuse in the construction industry. They shared their results through guidebooks and webinars.

Challenges - Introduce a major real estate developer to the reuse of building materials. Guide design offices and consultants in their research. Start from a small-scale project to think about how to implement large-scale strategies.

Materials involved - Bricks, steel structure, roof slates, cast iron radiators, floor tiles, wooden floors.

London - UK - 2021 - Private procurement

Project Size : 400m2 - FCRBE partner : [Rotor asbl](#) Project Owner : [Grosvenor](#) Consultants, architects and engineering offices: [Arup](#) - [Orms](#) - [Elliott Wood](#) - [HETA](#) - [ReLondon](#)

Covers of the guides published by the various consultants © Elliott Wood, Orms, Heta, ReLondon, Arup

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Thank You

to all the FCRBE project partners involved and all the companies and organisations who have contributed in a considerable manner to the pilot operations by putting in their efforts, time, money, brainwork and a lot of motivation to make reclaiming and reusing materials a reality.

Interreg EUROPEAN UNION

North-West Europe

FCRBE

European Regional Development Fund



University of Brighton

