BALANCE 4P - Balancing decisions for urban brownfield regeneration – people, planet, profit and processes

Deliverable 1.5: Final Report Part II

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SNOWMAN NETWORK
Knowledge for sustainable soils

Project No. SN-04/01

BALANCE 4P

Balancing decisions for urban brownfield regeneration – people, planet, profit and processes

Deliverable 1.5: Final Report Part II

Start date of project:
01.10.2013

Project duration:
15/30 months (2013 – 2014/2015)

End date of project: 31.12.2014/01.12.2015

Date of report: 15.11.2015

Project coordinator:

Jenny Norrman

Name of coordinator organisation:

Chalmers University of Technology

Revision:

SAMEN MAKEN WE MORGEN MOOIER

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1 INTRODUCTION

1.1 Background

Land take as a result of urbanization is one of the major soil threats in Europe. One of the key measures to prevent further urban sprawl and additional land take, is redevelopment of urban brownfields: underused urban areas with, in many cases, soil and groundwater pollution. The latter issue can be a bottleneck for redevelopment of brownfields instead of green fields. A difficulty for brownfield redevelopments is that in urban projects the responsibilities, tools and knowledge of subsurface engineering and urban planning and design are not integrated; they depend heavily on each other but work in sectors. The urban designer usually deals with opportunities for socio-economic benefits while the subsoil engineer deals with the technical challenges of the site. Better cooperation between urban developers and soil specialists can accelerate brownfield redevelopment.

1.2 Aim of Balance 4P

The overall aim of BALANCE 4P is to deliver a holistic approach that supports sustainable urban renewal through the redevelopment of contaminated land and underused sites (brownfields). In order to reach the overall aim, the specific project objectives focus on different parts of the holistic approach:

- application and assessment of methods for design of urban renewal/land redevelopment strategies for brownfields that embrace the case-specific opportunities and challenges (WP3);
- sustainability assessment of alternative land redevelopment strategies to evaluate and compare the ecological, economic and social impacts of land use change and remedial technologies (WP4);
- development of a practice for redevelopment of contaminated land in rules and regulations to enable implementations (WP5).

The different parts will be integrated into a framework to support decision-making on urban renewal through the redevelopment of contaminated land and underused sites (WP6). The resulting framework aims to have a strong focus on integrating urban planning and soil issues.

1.3 Project consortium

The project consortium has a wide knowledge and experience base. The following persons have contributed to the project outcomes:

Deltares (NL): Linda Maring, Suzanne van der Meulen, Maaike Blauw
TU Delft (NL): Fransje Hooimeijer, Lidewij Tummers
VITO (BE): Steven Broekx, Kaat Touchant, Alistair Beames

Chalmers (SE): Jenny Norrman, Yevheniya Volchko, Jaan-Henrik Kain, Rita Garção, Lars Rosén
Enveco Environmental Economics Consultancy (SE): Mats Ivarsson
R3 Environmental (UK): Paul Bardos
Municipality of Rotterdam / **Port of Rotterdam (NL):** Maike Akkers, Carel Andriessen, Ignace van Campenhout, Kees de Vette, Joost Martens, and colleagues
Municipality of Göteborg (SE): Hanna Kaplan, Christian Carlsson
HSB/**Balder (SE):** Elisabeth Forsberg
Students from TU Delft (NL): Nirul Ramkisor, Jelle van Gogh, Felix van Zoest, Barbara Bekhof, Sebastiaan Huls, Janneke van der Leer, Lena Niel, Judith Gaasbeek Janzen, Sebastiaan Huls, Mick van der Steeg, Juliska Wijsman, Joop Stuijt, Carmem Felix Aires, Eelco de With, Jan ten Kate, Willard van der Velden
Students from VU Amsterdam (NL): Sien Kok
Students from Chalmers (SE): Rita Garção, Robert Anderson, Amardeep Amarvasai, Ingrid Olofsson, Nathalie Coulho
OVAM (BE): Bert Van Goidsenhoven, Annelies Van Gucht

In addition, several other stakeholders and experts have been involved in the workshops, contributing with their time, knowledge and experience. The project outcome is a result of the joint contributions.

1.4 Overview of deliverables and milestones

Table 1.1 shows an overview of the listed milestones and deliverables in the proposal, and the degree of achievement so far in the project. The milestones and deliverables are further elaborated within the work descriptions in Section 2.

Table 1.1. Overview of deliverables and milestones.

WP	Milestones and deliverables	Achieved
WP1	**Project Management and Co-ordination**	
	D1.1 Consortium agreement	100%
	D1.2 Mid-term report (with contributions of all WPs)	100%
	D1.3 Draft final report (with contributions of all WPs)	100%
	D1.4 Final report Part I (with contributions of WPs 3 – 5 + 6)	100%
	D1.5 Final report Part II (with contributions from WP6)	100%
	M1.1 Consortium agreement	100%
	M1.2 Project kick-off meeting	100%
	M1.3 Meeting with coordinator and the chairman of the relevant Project Board at the beginning of the project	100%
	M1.4 All-projects-kick off meeting	100%
	M1.5 All-projects-workshop at half of the duration of the project: presentation and discussion of interim results of the projects[1]	0%
	M1.6 All-projects-final meeting: present and discuss the final results[2]	100%

[1] This meeting was not realized.

WP2	**Dissemination and Exploitation**	
	D2.1 Internet based dissemination and communication, including project specific webpage and information (project factsheet) and Dropbox platform.	100%
	D2.2 Article for 1) field of spatial planning and 2) environmental sciences (to be published in national magazines in national language)[3]	75%
	D2.3 Participation in national and international workshops and conferences.	100%
	D2.4 Executive summaries of results for web publication.	100%
	M2.1: International stakeholder workshop: will be used to test the interim outcomes of the project and to exchange the information of the cases. This workshop defines the points of attention for the work packages in the remaining period of the project.	100%
WP3	**Application and assessment of methods for design of land redevelopment strategies**	
	D3.1 Methodology for stakeholder analysis and analysis case specific workshops	100%
	D3.2 Advice for the cases (in national language and English)	100%
	M3.1: The workshop methodology and evaluation protocol will determine how we perform the further activities in this work package	100%
	M3.2: The stakeholder analysis will result in a decision about who will be involved in the case studies	100%
	M3.3: The case-specific workshops will result in an overview of potential scenarios for redevelopment of the case areas that will be further elaborated in Task 4.	100%
	M3.4: The advice following assessment of the tools determine the form of the framework of deliverable 6.1	100%
WP4[4]	**Sustainability assessment framework for alternative remediation and redevelopment scenarios**	
	D4.1 Scientific article reviewing existing DSS systems	100%
	D4.2 Review of mapping ESS and system boundaries	100%
	D4.3 Conceptual design of sustainability assessment method, changed to *Application of sustainability assessment methods on the Belgian and Swedish case.*	100%
	D4.4 Recommendations for the application of the sustainability assessment method	100%
	M4.1 Reviewing existing approaches	100%
	M4.2 Indicators and structure of proposed method, changed to *Review indicators and structure of available methods to extend system boundaries.*	100%
	M4.3 Develop conceptual model of sustainability assessment method, changed to *Application of existing sustainability assessment methods*	100%
	M4.4 Application of method and refinement, changed to *Comparing existing methods and how they can be implemented in a planning process*	100%

[2] At the time of this meeting, the project was not completed.

[3] There is an early draft version of a paper in Swedish as a joint effort between Chalmers and the City of Göteborg to be submitted to the national planning magazine “Plan”

[4] The deliverable 4.3 and the milestones 4.2, 4.3 and 4.4 in WP4 have been changed during the course of the project.

WP5	**Implementation of 4P in planning process/project**	
	D5.1 Scientific article on implementation 4P in planning process/project[5]	100%
	M5.1: Understanding the planning systems, urban development and building practice of each country and by comparison have a view on best practice.	100%
	M5.2: Understanding the difference in policies concerning soil conditions in the three countries,	100%
	M5.3: Connection of the context to the projects must result in improving the P4 approach	100%
	M5.4: Out of the box workshop with students to test the P4 approach	100%
WP6	**Integrated decision process framework**	
	D6.1 Scientific article on the integrated decision process framework for sustainable urban planning and regeneration of brownfield sites.[6]	100%
	D6.2 Separate guidance report on the decision process framework.[7]	100%
	M6.1 Workshop for Swedish stakeholder review of the suggested framework. [8]	100%
	M6.2 Workshop for Dutch and Belgian stakeholder review of the suggested framework.	100%

1.5 Scope of final report part II

The report contains summaries of the work carried out in the project, as well as short descriptions of a number of attachments. These attachments are project deliverables and a number of reports with the outcomes of the project.

[5] This is in manuscript form. It was submitted earlier but rejected and need revisions for resubmission.

[6] Submitted Sept 12th to a special issue of STOTEN: Science of the Total Environment. No review comments to date 2015-11-13.

[7] The guidance is incorporated into the main report, see Section 9.3.

[8] M6.1 och M6.2 was carried out as a joint on-line workshop on September 3rd, 2015.

2 DESCRIPTION OF WORK

2.1 WP1. Project coordination

A consortium agreement was delivered to the SNOWMAN network on December 5th, 2013 (D1.1; M1.1). Both a project kick-off meeting was held (in Utrecht in October 2013, M1.2) and the project coordinator (Jenny Norrman, Chalmers) attended the joint kick-off meeting for all call 4 projects in November 2013 in Paris (M1.4). Prior to the kick-off meeting, the project coordinator and the project board chairman (Bert Van Goidsenhoven, OVAM) had a telephone meeting (M1.3). Jenny Norrman also attended the 2015 annual SNOWMAN meeting in Paris in March 25-26th, 2015 and presented results from the project (M1.6). The mid-term report was delivered on June 13th, 2014 (D1.2) and a revised version was delivered on September 8th, 2014. The final report Part 1 (D1.3) was delivered on December 1st, 2014 and a revised version (D1.4) was handed in on January 15th, 2015. This report is the final deliverable in WP1 (D1.5).

Dropbox is being used as platform to share documents and regular (approx. monthly) status meetings were held with one representative from each organisation (Jenny Norrman, Chalmers; Steven Broekx, VITO; Linda Maring, Deltares; Fransje Hooimeijer, TU Delft) via Adobe connect and Skype during the first part of the project (autumn 2013 – 2015). Adobe connect allows screen sharing to promote discussions at the meetings. A planned physical meeting in March 2014 was replaced with a videoconference, which worked very well. Another videoconference was held in April. Each team also organizes their own meetings within the group and with case stakeholders. Table 2.1 show an overview of project communication activities. Internal meetings within the different national research teams are not included in the table, neither are informal/undocumented discussions via Skype or telephone between partners.

Table 2.1. Overview of project internal communication activities.

INTERNAL COMMUNICATION			
Type of activity	**target group**	**date**	**documentation**
Kick-off meeting in Utrecht	Project group	3-4 Oct 2013	Documentation on Dropbox
Dropbox Balance 4P	Project group	October 2013	-
Status meetings (Linda, Fransje, Steven, Jenny + invited persons)	Project group	~monthly	Minutes on Dropbox
Meeting with Project Board Chair Bert van Goidsenhoven (Jenny)	Project group	Nov 2013	Minutes on Dropbox
WP4 discussion meeting	WP4 group	Dec 2014	-
WP4 discussion meeting	WP4 group	Jan 2014	Material posted on Dropbox
Project meeting, videoconference	Project group	March 28th, 2014	Minutes on Dropbox
Discussion meeting, videoconference	Project group	April 28th, 2014	Minutes on Dropbox
Project meeting, Frankfurt	Project group	October 17th, 2014	

2.2 WP2. Dissemination

Several dissemination activities have been carried out. A project web-site, a project folder and the Dropbox platform was set up during the autumn 2013 (D2.1). The project team has attended several national (4) and international/European (6) conferences and seminars to present the project and to disseminate results of the project (D2.3). Another important way to disseminate knowledge has been the smaller workshops with the stakeholders in the cases. In Rotterdam, 3 workshops have been carried out and in Fixfabriken, 2 workshops have been carried out. In addition, one on-line joint international stakeholder workshop has also been carried out (M2.1), where all case holders from Rotterdam, Fixfabriken and Alvat had the chance to see what had been done in the other cases and to exchange experiences. A second on-line international webinar was organised on September 3rd, 2015 to get feedback on the work in WP6 (M6.1 & M6.2). In the Netherlands, an article in a Dutch planning magazine has been published (D.2.2). There is a draft version for an article in a Swedish planning magazine "Plan" as a joint text between Norrman, Kain, Kaplan, Carlsson with a basis in the Swedish case study (D2.2). An executive summary for web publication can be found in Section 5.

A summary of the international stakeholder workshop can be found as an attachment, see Section 4. Table 2.2 lists the main communication and dissemination activities. Discussion and planning meetings with the stakeholders of the different cases are not included in this list.

Table 2.2. Overview of dissemination activities within Balance 4P.

EXTERNAL COMMUNICATION			
Type of activity	**target group*)**	**Date**	**Weblink/documentation**
Summary at the SNOWMAN website	1,3	June 2013	http://www.snowmannetwork.com/main.asp?id=255
Project website (at Chalmers website)	1,2,3,4	Nov 2013	http://www.chalmers.se/en/projects/Pages/Balance-4P.aspx
Posted project on the SNOWMAN landscape	1,3	Nov 2013	http://snowmanlandscape.com/projects/balance-4p-balancing-decisions-for-urban-brownfield-regeneration-people-planet-profit-and-processes/
SNOWMAN knowledge dissemination meeting Paris, presentation (Jenny)	1	Nov 19-20, 2013	http://www.snowmannetwork.com/pagina1kolom.asp?id=69
Project posted on LinkedIn, 14 members	2,4	Nov 2013	-
Publication of article in Dutch (spatial planning) magazine S+RO (Fransje, Linda)	2,3	Dec 2013	Hooimeijer, Fransje, Linda Maring (2013). Ontwerpen met de ondergrond. S+RO 2013/6, pp 52-56 http://repository.tudelft.nl/

			view/ir/uuid%3Ae6f9cbe9-8cc5-4a2e-b706-d32224db2191/
Meeting with Andy Cundy from GREENLAND project (Linda, Fransje, Steven, Jenny)	3	Dec 2013	Dropbox
Abstract to AESOP Association of Schools of Planning (abstracts to Dec 31), Fransje sent abstract, dec 31 2013. *Not accepted.*	2,3	March 7-9	http://www.aesop-planning.eu/
Publication of review paper in STOTEN (Alistair, Steven, Kaat et al.)	3	Feb 2014	http://www.sciencedirect.com/science/article/pii/S0048969713011881
Renare Marks vårmöte 2014, oral presentation (Jenny).	2 (Swedish branch) + 3	April 2 2014	http://www.renaremark.se/filarkiv/konferens/2014/Varmote2014/presentationer/10_Balance_4P%20Jenny%20Norrman%20140402.pdf
Stakeholder workshop Rotterdam I (Linda, Fransje, Kaat, Jenny)	1,2	March 31	Dropbox
Student workshop in Göteborg, Fixfabriken (Jenny, Fransje, Linda, Jaan-Henrik)	1,2	April 24-25	Dropbox
Presentation on Balance 4P to municipality (Urban planning office) of Göteborg (Jenny, Fransje, Linda, Jaan-Henrik)	2	April 25	Dropbox
Presentation of Fixfabriken student workshop results to municipality and developer (Jenny, Fransje, Linda, Jaan-Henrik, Lars, Yevheniya)	1,2	April 25	Dropbox
Web-meeting with the HOMBRE project (Jenny, Linda)	1	April 25	-
Student workshop in Rotterdam (Fransje)	1,2	May 8-9	Dropbox
Stakeholder workshop I Fixfabriken (Jenny, Jaan-Henrik, Yevheniya, Mats)	1,2	May 26	Dropbox
Plandag, coop between B and NL planners, Zaandam. Presentation	1,2	May 22	http://www.plandag.net/2014/
World in Denmark 2014- Nordic Encounters: Travelling Ideas of Open Space Design and Planning, Copenhagen, Oral presentation June 12 (Fransje)	2,3	June 12-13	http://ign.ku.dk/english/outreach-publications/conferences-seminars/world-in-denmark-2014/
URBAN-NEXUS Final Conference. B4P Poster presentation (Maaike Blauw, Deltares)	2,3	June 18	http://www.urban-nexus.eu/www.urban-nexus.eu/
Internship master student TUDelft at VITO	1	May-July	
Individual stakeholder interviews ALVAT case with Ministry of Public Works, Municipality of Buggenhout, Santerra (redeveloper)	1,2	June 26, July 1	
Day of the Urban Underground on the International Architecture Biennale Rotterdam (Fransje)	2,3	July 11th	www.iabr.nl
In Situ Remediation '14, London. Presentation of end results review and poster presentation of project (Alistair, Steven)	2,3	Sept 2-4	http://theadvocateproject.eu/conference/main.html

Sustainable remediation, Italy (parallel with RemTech at same location). Abstract accepted (Jenny) but no one could go!	2,3	Sept 17-19	http://www.surfitaly.it/sustrem2014/index.html
Stakeholder workshop II Rotterdam	1,2	Sept 23	Dropbox
Stakeholder workshop II Fixfabriken (Jenny, Yevheniya, Mats, Rita)	1,2	Oct 13	
CABERNET meeting Frankfurt, 2 abstracts accepted (Fransje + Jenny). Oral presentations Oct 15th (Fransje) and Oct 16th (Jenny)	2,3	14-16 Oct	www.zerobrownfields.eu/
Presentation set up and results at Agentschap Ondernemen	1	Nov 7	
International online stakeholder workshop with the cases (20 attendees) with online questionnaire	1,2,3	Nov 12	Recorded version available on request.
Article " Harmony between surface and subsurface" submitted in: Nordic Encounters theme issue of Nordic Journal of Architectural Research (Fransje)	2,3	Nov 15	http://arkitekturforskning.net/na
Bodembreed symposium, special session submitted (Linda). 2 oral presentations on Balance4P (Fransje, Steven, and Nanna Pluim from the municipality Rotterdam)	2,3	Nov 18	http://bodembreed.nl/herontwikkelen-van-brownfields/
CI:aire's Advocate Bulletin November, summary of review article on sustainability assessment methods by Alistair Beames	2,3	Nov 30	
Presentation of end results for the Alvat case at OVAM	2	Dec 18	
SNOWMAN knowledge dissemination meeting Paris, presentation (Jenny)	1	March 25-26, 2015	http://snowmannetwork.com/?page_id=590
AquaConSoil conference in Copenhagen. Oral presentation (Jenny)	1,2,3	June 9-12, 2015	http://www.aquaconsoil.org/
WEEC – World Environmental Education Conference, Gothenburg, Fransje & Jenny. Oral presentation (Jenny)	3, 4	June 29 – July 2, 2015	http://weec2015.org/ Abstract: https://b-com.mci-group.com/Abstract/Statistics/AbstractStatisticsViewPage.aspx?AbstractID=245733
International online workshop for feedback on framework (13 attendees) with online questionnaire	1,2,3	Sept. 3, 2015	
Submission of manuscript to Special Issue of the Science of the Total Environment (STOTEN)	3	Sept. 12th, 2015	

*) The target groups are defined in the proposal as: 1) the project partners and the "SNOWMAN community", 2) the professional community, 3) the scientific community, and 4) the wider community.

2.3 WP3. Application and assessment of methods for design of land redevelopment strategies

WP3 focused on the application and assessment of methods for designing alternative land redevelopment strategies, embracing case-specific chances and challenges. Many of the tasks were performed in a workshop-setting, in which an active role of the case-holders is

anticipated. There are three cases involved: Merwevierhavens (Rotterdam, The Netherlands), Alvat (Buggenhout, Belgium), Fixfabriken (Gothenborg, Sweden).

In WP3 five tasks were defined. Task 3.1 consists of defining a standardized methodology and evaluation protocol concerning cases (M3.1). This was delivered in the mid-term report (D3.1). In task 3.2 stakeholder analyses (quick scan) were performed for the cases (M3.2). In task 3.3 opportunities and challenges of the cases, emerging from the subsurface were determined in a workshop setting (M3.3). Task 3.4 consisted of giving a more specific advice for cases (D3.2). In task 3.5 we made an overview of applicable tools and evaluated the applied tools (M3.4). The results of this task contributed to the final framework for sustainable redevelopment of brownfields that is developed in WP 6. The results of the practical work within WP3 in cases can be found in the case study report and the theoretical part in the technical report (see Attachments).

2.4 WP4. Sustainability assessment framework for alternative remediation and redevelopment scenarios

The objective of WP4 was to test and develop methods for sustainability assessment of alternative land redevelopment strategies to evaluate and compare the ecological, economic and social impacts of alternative strategies of land use change and remedial technologies. Means of accounting for the spatial planning value gains of brownfield regeneration in terms of soil ecosystem services (ESS), social and economic impacts on a broader urban scale were applied and developed.

The work package started from a review of existing sustainability DSSs and associated indicators, which also is published as a scientific paper (D4.1; M4.1). It continued with a review on relevant sustainability indicators for a larger system boundary with a focus on social aspects and ecosystem services to improve and develop assessment methods (M4.2). Existing sustainability assessment tools were tested and applied on the individual case study areas of Goteborg and Alvat. For Alvat, this includes the OVAM MCA, ecosystem service valuation with the Nature Value Explorer and a biodiversity check. Also, a profitability assessment was performed in combination with the risk assessment. For Goteborg this included a qualitative mapping exercise of ecosystem services and the application of the SCORE tool (M4.3). The work with applying SCORE is presented in a Master's thesis by Rita Garção (D4.3, see Attachments). The method for mapping of ESS that was used in Fixfabriken is presented in a report by Mats Ivarsson (D4.3, see Attachments). Conclusions on the application and how tools fit into an entire planning process were gathered based on stakeholder feedback and on the experiences from the work (M4.4). The results from WT 4.1, 4.2 and 4.4 are presented in the technical report. In addition to the previous mentioned reports by Garção and Ivarsson, the case study reports the results of WT 4.3, see Attachments.

2.5 WP5. Implementation of 4P in planning process/project

This WP studied the planning context, best practice and building process in the three countries. Comparing the countries and especially comparing spatial planning and soil

management is quite difficult since the world of planning is very fluid and information is scattered. We used a method “Commin” to grasp the material and be able to make a comparison (M5.1, M5.2). The final article manuscript (D5.1) is standing on the shoulders of earlier versions that are presented at Plandag 2014, The World in Denmark Copenhagen (12/13 June 2014) and in Frankfurt 15th October CABERNET 2014. The article was submitted to the *Journal of Land Use, Mobility and Environment* and *ICE Urban Design journal* but was not accepted. At present the paper is under revision for submission elsewhere. The comparison resulted in conclusions about input to the holistic approach, i.e. where the subsurface can be lifted forward in the current system (M5.3).

We held 2 student workshops (M5.4), one in Goteborg and Rotterdam. They were very fruitful and we also found out that working with students can be a method in a project: it enforces cooperation between the research partners and between the project team and the clients in the cases. The results of the workshops are more elaborated on: six students were working further on Goteborg and two on Rotterdam. One student was working on the case in Belgium.

2.6 WP6. Integrated decision process framework

The focus of WP6 was to describe a decision process framework which summarises the important findings from all technical WPs and which can give advice on how to plan and execute a process, or parts of a process, to support urban renewal and redevelopment of brownfields. The framework aims to optimize (i) brownfield redevelopment, and (ii) land use, and has a strong focus on integrating urban planning and remediation decisions as being one aspect of subsurface issues.

The framework is (a more concrete) part of the holistic approach as outlined in the technical report, but the holistic view tells us that the framework is only one part of the whole system. It does not operate on its own. Focus in the framework is knowledge exchange between the surface and the subsurface sector and focus on WHO is involved in and HOW this knowledge exchange effectively can take place. Important input to the framework, apart from the more theoretical work in the WPs 3, 4 and 5, are the experiences from the cases and the stakeholders. A manuscript was submitted to the STOTEN journal with the framework as a concluding section (D6.1). The framework is further described in the technical report (see Attachments), and Section 9.3 of the report is meant to be a guidance for working according to the framework (D6.2). An international online workshop for feedback on the framework with 13 attendees was held in September 2015, where attendants were asked to fill in an on-line questionnaire after the workshop (M6.1 + M6.2). However, of the 13 attendants, only 3 attendants were completely new to the project, and thus feedback was limited although in general positive.

3 CASE STUDIES

Before and since the start-up of the Balance 4P project, multiple meetings with case stakeholders have taken place. This resulted in a different set of cases than those described in the proposal participating to the Balance 4P project. Table 3.1 gives an overview of which cases are included and in the following sections, brief descriptions of each contributing case are provided. Since the work in the case studies has been a very important feature of the work, a case study report has been produced which presents the work in detail and outlines the lessons learned from the cases (see Attachments). The work in the cases provided important input to the technical WPs, especially so for WP6.

Table 3.1. The national cases included in Balance 4P.

Country	Mentioned in proposal	Participating in B4P project
Netherlands	Scheveningen Harbour area, The Hague	Merwevierhavens, city harbours Rotterdam
Belgium	Flemish Case SRI Vilvoorde – Machelen	Alvat Buggenhout
Sweden	RiverCity Gothenburg (Centrala Älvstaden)	Fixfabriken Gothenburg

3.1 Merwevierhavens, Rotterdam (NL)

The city harbours of Rotterdam are redeveloped in a large project, on both sides of the river Meuse. The whole area is in transition and will become available for urban functions, while the harbour functions are moving or changing. The objective is to mix urban and harbour activities. At first the idea was to realise a more intensive residential area, but because of the financial crisis and the well-functioning clean tech medical and food activities, the latter is being promoted in the area. For Balance 4P, the area Merwevierhavens (M4H) was chosen as case study. This area is in a vision phase and there are still possibilities to investigate the chances of the subsurface within this vision. The redevelopment is being performed by the municipality and the port of Rotterdam together. There are now three tracks from “aboveground”:

- Mapping “what is there”
- Development strategy, vision for 2035 (5 to 7 years, no regret program that contributes to the final goal for the area.
- Acquisition and area branding (was fruit harbour). The harbour has no future for the current activities. The program bureau for the redevelopment is redeveloping the area in an ‘organic’ way, but prefers to go directly for the final planning and is searching for prominent as far as companies: pioneers, clean tech medical & food, creative industry.

As far as the subsurface concerns, there is a lot of potential for the subsurface. A lot of data is available, but the focus lies mainly on problems. Chances are not yet being explored. The

main questions for the program bureau are: What are innovative possibilities for the subsurface in relation with the aboveground redevelopment? How can we use subsurface in the development strategy?

3.2 Alvat (B)

In agreement with OVAM, Alvat was selected as the Belgian case. The study area was until 1995 owned by ALVAT N.V. The site is now an abandoned and underused industrial area of 4.6 hectares, located in the municipality of Buggenhout along the river ‘Scheldt’ and adjacent to the living area 'Oude Briel' in the North. The site is highly polluted and this is due to the former activities of the company (container reconditioning services and the production of new containers). Activities such as storage of oil products and solvents in tanks and containers, cleaning of containers using these solvents and storage of containers across large parts of the site gave rise to a contamination with BTEX, VOCs, mineral oil, heavy metals, PCB and PAHs. In addition, in February 2008 an industrial landfill was found nearby the railway that consisted of containers (filled with wood, concrete, paint residue etc.) At this landfill, heavy metals, volatile organic hydrocarbons), plastic waste, phenols and cresols, phthalates, halogenated hydrocarbons, mineral oil and methylisobuthylketon were measured.

The redevelopment of the Alvat-site is currently blocked. The major bottlenecks in this project beside the presence of a serious soil contamination are the uncertainty about the future destination and the ownership situation. According to the zoning map (gewestplan) the site is currently planned as industrial area. The municipality of Buggenhout wishes to reclassify the site towards a mix of housing and recreation. Other stakeholders as the province of East Flanders, together with the city of Dendermonde, the POM East Flanders (Development agency of the province of East-Flanders) and Waterwegen en Zeekanaal are working on the redevelopment of an industrial site adjacent to the Alvat site to become a water-bound business park, given its location on the waterfront. The Alvat site could potentially also be a part of this project. Since the bankruptcy of Alvat N.V. the site is under the supervision of a curator. OVAM is the responsible authority for soil contamination and remediation. When a site is seen as a blackfield (location where a marked-based redevelopment is not possible due to contamination) OVAM can acquire the site and finance the remediation so the site can be reused/redeveloped.

The Alvat site was seen as a blackfield, a location where a market-based redevelopment is not possible due the heavy pollution. OVAM already financed a part of the remediation (remediation of the landfill). At this moment a brownfield developer specialized in the purchase and remediation of contaminated grounds is potentially interested in the site. An added value for this research is the combination of expertise in soil research and remediation on the one hand, and spatial planning/sustainability assessments on the other hand.

Based on a stakeholder consultation and a sustainability assessment, more specific designs for alternative visions for this site (industry, residential, recreational area, combinations) are developed and compared with different types of sustainability assessments.

3.3 Fixfabriken (SE)

The Fixfabriken area was chosen because there is at present a large interest in the case and the planning process is on-going and parallel to the Balance 4P project. The main stakeholders had an interest to participate, to contribute and to learn from the planned work within Balance 4P.

The Fixfabriken area is an area located in a popular part of Western Gothenburg. At present, it is mainly an area with industrial use (a factory, buss garage, tram hall and smaller enterprises) but it is now in the planning process for redevelopment into an area with a much more mixed use, i.e. residential housing, commercial buildings and public spaces. The buss garage will move in the coming 5 years and the tram hall is also likely move to another location in the future (10 – 15 years). There are mainly two landowners: the municipality itself and a private developer consisting of two large companies (HSB and Balder). The urban planning office of the municipality is in the process of changing and developing the detailed plan of the area to make it possible to redevelop into different land-uses than the present. Already a number of workshops and meetings have been carried out to explore what the neighbours and the existing companies prioritize and what they find valuable in the area. The potential of the area fits very well into the political objectives of the city: development of this area would not take any virgin ground into account, it is near to public transportation, it could potentially contribute with a good portion of residential housing, there is a possibility to complement the neighbouring area with now missing commercial and social services such as a food store and a sports facility, there is already a mixed use of the site and it is an attractive part of the city. Another prioritised political objective is integration, which delivers some more concern about how to achieve.

The Balance 4P project is involved in the whole area with both land-owners in order to lift forward the subsurface issues and their connection to the redevelopment potential of the area. Contamination is an important feature as there may be chlorinated solvents (DNAPLs) spills from the factory, but geotechnical issues (water + ground settlements) as well as archaeological findings makes the site complex from a subsurface point of view.

The following are main points of attention with regard to the subsurface:

- Contamination – mainly with regard to DNAPLs and the possibility to build residential housing
- Geotechnical issues – mainly with regard to keeping the groundwater level at sufficiently high level to avoid ground settlements (and high costs) in the surrounding
- Archaeological findings – mainly with regard to potential preservation/excavation and how this relates to contamination and geotechnical issues.

3.4 Comments to the cases

All three cases are different with regard to location, planning and remediation systems, in which phase the redevelopment is, landowners and stakeholders. The Alvat case differs somewhat more from the Rotterdam and the Fixfabriken case as it is situated in a more rural area where land pressure is lower than in urban areas. The location of the site contributes to

the site being a blackfield; another more attractive location in an urban area could potentially make a market-based redevelopment possible. Here, pollution is really a bottleneck, whereas this is not the case in Rotterdam or in Fixfabriken. At those sites, contamination must be considered but will not hinder a market-based development. Focus of the Balance 4P project was originally intended to be on urban sites: the drivers for redevelopment in rural and urban areas can be quite different.

4 DESCRIPTION OF ATTACHMENTS

4.1 Technical report of Balance 4P

The final technical report contains the main outcomes of the project with the aim to deliver a stand-alone technical report as a product of the project, it is a revised, improved and further developed version of the previously handed in report. It will be published as a Chalmers report and available on-line.

The technical report contains the following deliverables
D3.1 methodology for stakeholder analysis
D4.2 Review of mapping ESS and system boundaries.
D4.4 Recommendations for the application of the sustainability assessment method.
D6.2 Guidance on the decision process framework.

Norrman J, Volchko Y, Maring L, Hooimeijer F, Broekx S, Garção R, Beames A, Kain J-H, Ivarsson M, Touchant K. 2015, BALANCE 4P: Balancing decisions for urban brownfield redevelopment. Technical report of the BALANCE 4P project of the SNOWMAN Network coordinated call IV. Report 2015:11. Chalmers University of Technology, Gothenburg, Sweden. *(on-line web link will be available when published)*

The report is attached but should not be made available on the web until finally published at Chalmers.

4.2 Case study report of Balance 4P

The case study report presents the work in the three case studies in detail and concludes with lessons learned from the work in case studies. It will be published as a Chalmers report and available on-line.

The case study report contains the following deliverables
D4.3 Application of sustainability assessment methods on the Belgian and Swedish cases.
D3.2 Advice for the cases (in English).

Norrman J, Maring L, Hooimeijer F, Broekx S, Garção R, Volchkco Y, Kain J-H, Ivarsson M, Touchant K, Beames A. 2015, BALANCE 4P: Balancing decisions for urban brownfield redevelopment – case studies. Case study report of the BALANCE 4P project of the SNOWMAN Network coordinated call IV. Report 2015:12, Chalmers University of Technology, Gothenburg, Sweden. *(on-line web link will be available when published)*

The report is attached but should not be made available on the web until finally published at Chalmers.

4.3 D6.1 Scientific article manuscript on the framework

The article was submitted on Sept 12th to the special issue of the journal Science of the Total Environment (STOTEN). The holistic approach is outlined and the framework is described in

a concluding section to support the holistic approach. The manuscript is still under peer review.

The manuscript is attached but should not be made available on the web when under peer review at STOTEN.

4.4 D4.3 Method development and application of ESS mapping at Fixfabriken. Report by Mats Ivarsson, Enveco.

The report describes the basis for and the method itself for ESS mapping in for urban plans. It also describes the application to the Fixfabriken case study.

Ivarsson, M., 2015. Mapping of Eco-System Services in the Fixfabriken area - Method development and case study application. The Balance 4P project of the SNOWMAN Network Coordinated Call IV. Enveco Report 2015:6. Stockholm, Sweden. *(on-line web link will be available when published)*

The report is attached but should not be made available on the web until finally published at Enveco.

4.5 D4.3 Application of SCORE at Fixfabriken. Final published version of the Master thesis by Rita Garção.

The report describes the method and the assumptions used for carrying out a CBA and the full SCORE analysis for the Fixfabriken case study. The report is freely available on the web.

Garção, R., 2015. Assessment of alternatives of urban brownfield redevelopment. Application of the SCORE tool in early planning stages. Master Thesis 2015:15. Chalmers University of Technology, Gothenburg, Sweden. *http://publications.lib.chalmers.se/records/fulltext/219167/219167.pdf*

5 EXECUTIVE SUMMARY FOR WEB PUBLICATION

Land take as a result of urbanization is one of the major soil threats in Europe. One of the key measures to prevent further urban sprawl and additional land take, is redevelopment of urban brownfields: underused urban areas with, in many cases, soil and groundwater pollution. The latter issue can be a bottleneck for redevelopment of brownfields instead of green fields. A difficulty for brownfield redevelopments is that in urban projects the responsibilities, tools and knowledge of subsurface engineering and urban planning and design are not integrated; they depend heavily on each other but work in sectors. The urban designer usually deals with opportunities for socio-economic benefits while the subsoil engineer deals with the technical challenges of the site. A general hypothesis is that the largest (sustainability) gains are achieved early in brownfield redevelopment projects where they are still flexible, which also is the background to the Balance 4P project: better cooperation between urban developers and sub-surface specialists in early phases of the redevelopment process can accelerate brownfield redevelopment and potentially identify more sustainable redevelopment strategies. The overall aim of the Balance 4P project has been to develop a holistic approach that supports redevelopment of brownfields by integrating technical, economic and social aspects, and provide means for clearly communicating challenges and opportunities of site-specific subsurface qualities. An important method for developing the holistic approach has been working with case studies.

The holistic approach according to Balance 4P is a conscious activity of integrating subsurface aspects in the redevelopment process for the purpose of more sustainable land management. The holistic approach is governed by law, regulation, policy, and institutions which set the planning conditions for urban redevelopment. Four spatial planning subjects, in common in the three investigated national planning systems (Netherlands, Belgium - Flanders, Sweden) and possible to expand to subsurface are: heritage, environment, nature and water. The integration of above- and underground aspects can be enhanced in different ways in these four planning subjects: 1) by law and regulation, 2) by policy and vision, 3) by structured knowledge exchange, and 4) in the design/construct process. In order to work towards implementation of a holistic approach, and important part of Balance 4P was to investigate tools that may enhance knowledge exchange between sectors: a) instruments for designing redevelopment strategies taking the chances and challenges of the subsurface into consideration, and b) instruments that assess aspects of sustainability of alternative strategies. In the case studies (Rotterdam harbour in the Netherlands, Alvat in Buggenhout in Belgium, and Fixfabriken in Göteborg in Sweden) different tools have been applied.

The Merwevierhavens area is being redeveloped from harbour activities towards a more mixed use with clean tech medical & food, creative industry and housing. The ‘organic’ redevelopment of the area is being performed by the municipality and the port of Rotterdam together in the program bureau Merwevierhavens. At the moment, a vision for the area is being made. The land is owned by municipality and several private companies. There is a high potential for the subsurface; a lot of data is available, but the focus lies mainly on problems and chances are not yet being explored. The main questions for the program bureau within the Balance 4P project for the redevelopment are: What are innovative possibilities for the subsurface in relation with the aboveground redevelopment? How can we

use subsurface in the development strategy? To obtain answers onto these questions, several activities were carried out: (i) Stakeholder analysis (quick-scan & for workshops), (ii) Stakeholder workshop 1: SEES – System Exploration Environment & Subsurface: Chances and challenges for the whole area (iii) Stakeholder workshop 2: zoom in EON, gasworks, Ferro/Eneco strategies for different subsurface aspects (contamination, civil structures, energy), (iv) An investigation to entering subsurface in “products” for the redevelopment of Merwevierhavens, (v) Student workshops and projects (SEES workshop, Aqua-Terra Urban Design projects, Tool inventory and application (Brownfield Remit/Response (BR2) tool and Brownfield Opportunity Matrix)). The results of these activities were to appoint the specific points of attention and opportunities for the area that can be obtained from subsurface. Tools such as the SEES method can help because they bring experts from aboveground and subsurface together and structure their conversation. Another learning point is to translate the information from subsurface in such a way that is has meaning for the aboveground redevelopment (in terms of costs, or consequences). Also recommendations could be given on how to integrate the subsurface in the process of the redevelopment. Learning by doing is one pf the gains of the projects. Just after the first workshop, the aboveground people started asking questions on “what lies beneath”. Asking the question is what gives you the answers. By integrating subsurface chances and challenges in the “products” needed for redevelopment (vision, tender documents), the developer will take this aspect into account.

The Alvat site in Buggenhout, Belgium, is a small site (4.6 ha) which is heavily polluted due to former container reconditioning services and production of containers on the site. It is considered as a black field which means that market-based redevelopment is very difficult without significant intervention of public authorities. Important discussions for this site relate to the future destination (industry vs. residential) and the ownership situation (finding a potential buyer who is willing to redevelop the site). Within the Balance 4P project, a number of activities was carried out i) a stakeholder analysis (quick-scan) for identifying and individual interviews with key stakeholders; (ii) a risk assessment on the potential health risks caused by the pollution providing insights on the necessity on remediation and how this is influenced by differences in destination; (iii) a student internship which lead to alternative designs for different destinations of the site, the SEES method was also applied; (iv) an economic analysis comparing the potential costs and benefits for the alternative redevelopment scenarios and (v) sustainability assessment of identified redevelopment strategies using different instruments: OVAM MCA (Sustainable Choice of Remediation), ecosystem services (www.natuurwaardeverkenner.be), biodiversity assessment (www.biodiversiteitstoets.be) and a social impact assessment. Important lessons learned from the case study work are: tools can be useful but need to be considered in combination with legal frameworks and existing procedures (zoning plans, environmental impact assessments, location of nature protected areas, maps on water sensitive areas, etc.) that according to the stakeholders already capture a lot of the sustainability aspects. A stakeholder analysis is however considered as crucial. Stakeholders not directly involved in the case indicate a need to perform more integrated planning of surface and sub-surface and across policy domains where sustainability assessments can play an important role. An important challenge still to be considered is how different types of sustainability assessments can fit into the entire planning process and how this can be better integrated in rules and regulation.

The Fixfabriken site in Göteborg, Sweden, will be redeveloped from mainly being an industrial area incorporated into attractive parts of Göteborg, into an area with mixed use, including residential use. The driver for redeveloping the site is a foreseen land-use change, a private developer wants to turn a former industry (the Fixfabriken factory) into a residential area and the municipality in Göteborg decided to consider a larger area in the development of a new detailed plan. The land in the area is owned by the municipality, the large private developer as well as a number of smaller land owners. Within the Balance 4P project, a number of activities was carried out: (i) a student workshop on subsurface issues in urban design and student project works; (ii) a stakeholder analysis (quick-scan) for identifying participants for the first workshop; (iii) a stakeholder workshop 1: SEES – System Exploration Environment & Subsurface; (iv) identification of alternative conceptual redevelopment strategies based on subsurface conditions and stakeholders' views; (v) sustainability assessment of identified redevelopment strategies using three different instruments: SCORE (Sustainable Choice of Remediation), mapping of ecosystem services (ESS) and Social Impact Analysis (SIA); and a second stakeholder workshop where the results of the sustainability assessments were presented and discussed. Important lessons learned from the case study work are: (a) there are challenges with quantitative analyses in early phases where data availability is low, but semi-quantitative analyses and qualitative analyses seem to be applicable and useful; (b) a structured comparison may reveal important information to planners to include in the development of a plan; (c) early planning stages of urban redevelopment need to ensure that the path forward is not fixed towards unsustainable solutions by considering the implementation phase of the plan as well.

There is a multitude of instruments to guide sustainable development both in urban planning as well as in remediation projects. The tools have been developed in different regulatory contexts and with different concepts/ideas of sustainability and for different tasks in the phases of redevelopment and may focus on one or multiple aspects of sustainability and on different phases of redevelopment. For application of any tool the user needs to: be allowed to (managerial approval, e.g. for the time to spent), be able to (necessary resources: data, information, knowledge, stakeholders, organisational power), and want to (to add something extra or special to a project, the right questions need to be asked and the people need to be enthusiastic about it). Redevelopment of brownfields deals with complex systems, and especially so when fully including all subsurface qualities. It was found that all aspects cannot be covered in one type of assessment and instead a combination of instruments should be used to assess sustainability with regard to all pillars. Based on the findings in our cases, we would argue that an instrument that can support the process of communication and knowledge exchange efficiently is good enough if there, at the same time, is a conscious process of ensuring that all relevant aspects are considered, and if not covered by one tool, that additional analyses are carried out.

The Balance 4P project aimed to integrate perspectives on brownfield redevelopment, urban design and planning, and remediation by engaging in an interdisciplinary project. We showed that the sustainable remediation perspective can bring some important instruments into the planning and design sector, and vice versa: the planning and design sector brings with it the complexity of urban planning to include in the redevelopment process. To reach sustainable redevelopment strategies, the triple bottom line (PPP) should be in focus, but the uniqueness of the project itself (the project-specific conditions) and the process itself (WHO and HOW)

becomes important additions. Reaching the holistic approach, where the subsurface is explicitly accounted for in law & regulation, policy & vision, knowledge exchange and design/construct calls for changes on all levels in the planning system.

6 REFLECTIONS

The project team in BALANCE 4P consists of experts and researcher with different backgrounds and knowledge, ranging from economics, soil science, engineering, land management, urban design and urban development. The approaches typically used and applied by the members of team also differ, from quantitative method development to process-oriented approaches.

Further, the processes that lead to decisions are typically rather different in the remediation sector compared to the urban planning sector: in urban planning focus is more on mediating between different interests to reach an optimal solution, whereas often in e.g. soil contamination issues, there are rather strict guideline values to comply with. The decisions related to these different sectors are typically also governed by different regulations. We see it as a strength of this project, to draw on the experiences and knowledge of each member of the team and to learn from each other to reach new insights in the described problem area of brownfield redevelopment and urban planning.

In the cases which we have been investigating and testing different approaches on, are rather different with regard to sub-surface conditions, ownership relations, development visions and governance. Although working with cases takes a lot of efforts with regard to e.g. communication and seeking for information, it gives invaluable input to method development and the possibilities to produce meaningful and relevant conclusions and recommendations. The work in the case studies has also been taken more time and efforts than perhaps foreseen from the start, but also turned out to be rewarding. However, it is of great importance when working with cases, to have key stakeholders on board so that the research project actually can contribute and not only be seen as something which requires resources for no use.

The dissemination plan (and the dissemination that was carried out) was rather ambitious, maybe overly so with regard to the size of the project. But working in cases can be a very effective way of communicating results, primarily to target group 2 (the professional community), if the project can be seen as contributing and not only “costing”. Working with students was also found very productive in this project: as a way of communicating results to a wider community (target group 4) but also as a way of receiving “out of the box” input into the project. As a result, the work with students in the Balance 4P project was also presented at an international environmental education conference this summer.

At the kick-off meeting in Utrecht in 2013 we outlined the main risks of the project. Some of the main risks we saw at that time were: stakeholder engagement, organisation & communication between partners, staff changes/absences, student involvement, scientific paper deliverables, and disputes in the project group due to our very different backgrounds. It was a god exercise to identify and work out risk preventions, and most of the identified risks were managed. However, unforeseen things happen. The delay in the final reporting of the project has been due to changes and absences in staff at Chalmers, both with regard to change of roles (project coordinator to become line manager part time at Chalmers) and leave of absence (sickness in two quite long periods for one important co-worker).