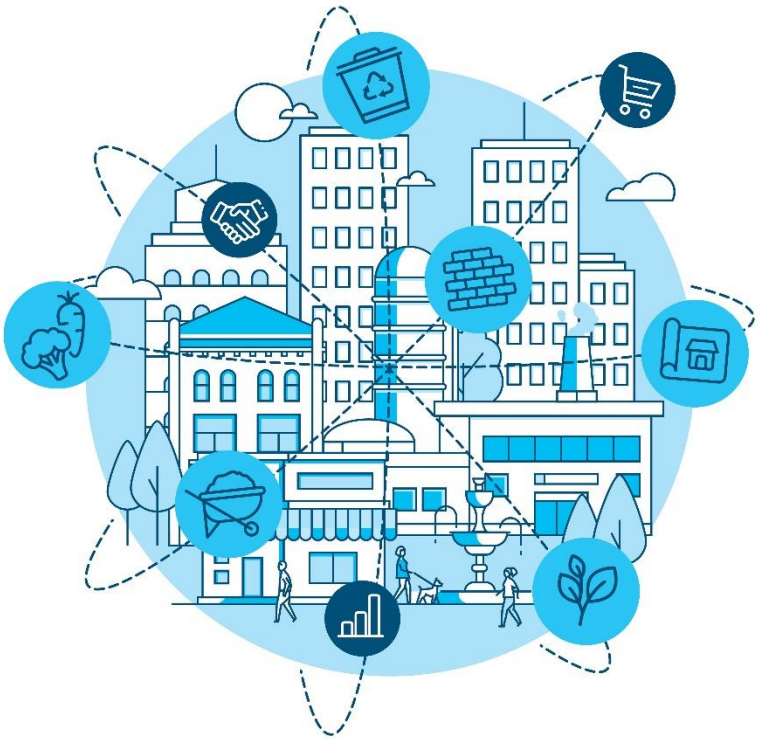
Bodø

Optimised Implementation Plan – CDW

Bodø Municipality



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Abstract	This Optimised Implementation Plan explains how Bodø Municipality will implement the tools and processes developed in the project preparation phase in its demonstration actions, and how relevant local stakeholders and CityLoops project partners will be involved.
Keywords	Demonstration; implementation; plan
License	

A Circular process towards building a New City and New Airport

In Bodø an old military airport will be demolished, and a new part of the city will be built in this area. In another area, a new airport will be built. This large scale urban development project is called 'New Airport / New City'. Bodø wants to influence the material and mass handling of the process: Less waste, more reuse and repurposing of structures. The 5 000 000 m^2 land currently occupied by the air-force has to be cleaned up regarding soil, CDW and other infrastructure. The CityLab platform will help facilitate participatory decision processes related to demolition, recirculation and repurposing of a large number of military surface and underground structures and infrastructures. On-site soil treatment and reuse will be demonstrated, reducing the net mass deficit in the new airport area. At the new airport area, there will be on-site circular demonstration actions related to reuse, repurposing and recycling of infrastructure (CDW, soil) facilitated by the CityLab platform and the 3D visualisation and planning tool. Bodø has developed a CDW management plan for the whole project.

1. Demo Action 1: Demolish the military airport with circular material management processes

1.1. Short description

With such large scale and complexity, it's important to have general requirements for selective demolition, establish a central recycling plant and logistics facility to prepare the CDW to be delivered to new constructions, and establish a marketplace for reused and recycled materials. The focus in the planning is to reduce demolitions and waste as much as possible by renovating and repurposing buildings and integrating circular thinking into all procurement for the New Airport / New City project.

Tenders and procurement

Bodø will use circular procurement and strategic demands through CityLoops demonstrations. A national tender was sent out challenging the design for the new city. One selection criterion was to make it as circular as possible. Early in the project phase, Bodø also communicated to suppliers the substantial weighting of circularity in supplier selection.

Bodø have scanned their tenders, establishing a baseline that represents how circular the previous tender has been. The findings of this scan have been communicated internally in the municipality together with the findings in the CityLoops Circular Procurement Recommendations for Bodø (D5.1). The municipality has now hired a new employee that will solely work with improving tenders and framework agreements and following up suppliers. Data from CityLoops will be an important source of information for this employee.

Mapping structures and masses and assessing quality and pollution

The amounts of different materials have been assessed and soil pollution on the old airport site has been mapped. Next, the quality of all materials in existing structures must be assessed to determine potential for reuse. This will be done in mid-2021, and the data will be incorporated into the 3D visualisation tool.

Intermediate storage and treatment facilities

In Norway, you can keep CDW and soil from demolition sites outside the waste stream only if you are able to utilise these resources in another project. As this demonstration considered materials from a demolition site to the construction of the new city, both of which are publicly owned, it is allowed to reuse the materials and keep them on-site in intermediate storage. Data gathered to prove cleanliness and qualities of these materials and masses is crucial to allow for their storage.

Bodø has evaluated the business case in establishing a local mass treatment plant. The calculations show that doing this locally would not be economically advantageous. The majority of masses are not that polluted, and only the heavily polluted masses will have to be trucked to IRIS waste management facility 19 km away, where they can be cleaned and then sent back to the site.

Transformation: Selective demolition and prolonging of lifetime

Around 30 structures need to be demolished and over 250 000 tonnes of masses need to be freed in order to get the space needed to build the new civil airport – these materials will be reused and recycled when building the new city part. Not all structures need to be demolished, and Bodø will prolong their lifetime by reusing and repurposing both the structures and the area. The existing buildings are being assessed mid-2021 in relation to the necessary facilities for the future city to see if they can be kept and transformed, e.g. into a sports centre or a school.

1.2. Activities

Activities	Timeline	Responsible partner
Preparation: developing the platform and data tools, the CDW management plan and tendering the project	Oct 2019 to March 2021	Bodø Municipality
Mapping structures and masses	Masses: First half of 2020 Structures: Mid-2021	Bodø Municipality, NGI, NorConsult, IRIS
Assessing material and mass quality and pollution	Mass quality: Jan - June 2020 Air pollution: Jan – June 2021 Structures: July – Dec 2021	Bodø Municipality, IRIS
Tendering and procurement strategy development	July – Dec 2021	Bodø Municipality
Screening of structures and buildings - identify recycling/reuse potential	Mid-2021	Bodø Municipality, IRIS
Procurement of demolition contractor	July – Dec 2021	Bodø Municipality
Establish intermediate storage and logistics	Jan 2022	Bodø Municipality
Demolish structures of the old military airport: selective demolition, separating into material streams and preserving for direct reuse as much as possible	July 2021-Sept 2023	Bodø Municipality, IRIS
Transformation of materials – store clean ones in storage onsite and transform polluted ones at nearby treatment facility for reuse	July 2021-Sept 2023	Bodø Municipality, IRIS

1.3. CityLoops tools/processes tested

Life Cycle Assessment for demolition and renovated sites

The CityLoops LCA tool will be used to quantify the CO2 emissions savings by keeping soil and CDW on-site. The LCA tool will be used in the 3D visualisation tool to simulate this.

Screening procedures and tool for selective demolition

Screening procedures and guidelines for selective demolition will be used for chosen buildings on the old military airport site. It will be included in tendering for demolition contractors. The specific buildings have not been identified yet. It will be done in collaboration with the New Airport / New City team. They will help identify best practice in circularity in the demolition context in order to reuse materials and masses, and focus on methods for how to demolish military shelters.

Construction material passport, databank and digital market place for recovered materials

Bodø has its own databank up and running and will engage and challenge contracted development partners to use the materials the municipality has on hand. The data will also be used to identify which materials may be subject for reuse and recycling. The databank will be used to bookkeep the demolished materials' specifications and location and to keep track of holdings and incoming and outgoing materials in the storage facility. Material passports will be integrated in this solution to keep track of where the different materials are located and their characteristics.

Bodø will exchange experiences with Mikkeli and Apeldoorn who have developed the CityLoops tools 8 and 9 for material passport, databank and digital marketplace.

3D GIS-based visualisation tool for monitoring and planning

This tool uses existing 3D technology in new, innovative ways for monitoring and planning the handling of masses and construction materials. The available data is used for mapping the masses and their degree of pollution and visualizing this using PowerBI and Augment City (software solution).

The next step is to use the tool to plan which buildings should be kept or demolished, to simulate how a building may be demolished in order to reuse/ recycle maximum amount of materials, and how to utilize the freed space and material. The visualisation tool will also be used to simulate material and waste flows.

The tools can be seen here: *CityLoops Tool Factsheets*

2. Demo Action 2: Involve stakeholders and citizens in city development using innovative tools

2.1. Short description

The large “New City / New Airport” project has three main actors: the military, Avinor airport and the municipality. The citizens are a large interest group. Bodø has included the stakeholders in the transformation of the airport and the new city from the beginning. They want the professional stakeholders (e.g. construction consultants, entrepreneurs, architects) to engage in dialogue on practices of screening and selective demolition. Bodø has involved both professional stakeholders and citizens in a dialogue on how to repurpose and prolong the lifetime of existing buildings and materials when designing the new city.

2.2. Activities

Activities	Timeline	Responsible partner
Establish internal alliances and strategy between departments of environment, urban planning and communication in Bodø Municipality	Oct 2019 – March 2021	Bodø Municipality
Engage citizens and ask them what they want to see in the new city through awareness campaigns and events.	Mid-2020: The Reuse Loop event Mid-2021: New City Festival	Bodø Municipality
Convene and facilitate a local circular economy ecosystem of business, industry, civil society organizations, research entities and public actors - including Ministry of Defence, Avinor and NorKonsult	Jan - June 2021	Bodø Municipality

2.3. CityLoops tools/processes tested

CityLab (ByLap) stakeholder engagement platform at Bodø town hall

The CityLab is a municipal platform to inform, activate and involve citizens. Bodø has already had some CityLab arrangements regarding the development of a new part of the city. Different architect companies have presented their construction and city plan suggestions, and everyone and anyone in the city is invited to participate in this planning. The plan is to keep arranging these meetings, but also possibly arrange additional CityLab meetings exclusively for professional and particularly relevant stakeholders.

Young people and children have been invited to demonstrate how they would develop the new part of the city using the materials we have identified on site at the Reuse Loop event in mid-2020.

3D GIS-based visualisation tool

This visualisation tool will be used to show future scenarios to citizens of different visions of the new city development. It can also be used to raise awareness of climate and circular issues, like emissions and waste generation in the city, by presenting it in a visual, captivating way that is easily accessible for citizens. Sustainability indicators will be displayed across the city map.

The tools can be seen here: *CityLoops Tool Factsheets*

3. Demo Action 3: Embed circular strategies into the planning of a new city district

3.1. Short description

Given the timespan of CityLoops, it is not likely that the new city will be constructed within the timeframe of the project. This action focus on circular city planning – addressing questions such as: *How is the new city part going to look, and how could we build it in a circular way? How can we plan for specific recycling and reuse from demolishing of the old airport? How do we prepare and select materials to be used?* CityLoops is a part of the planning of the new city development project. Establishing circular procurement policies in the municipality is one of the initiatives from CityLoops. Furthermore, the tools and concepts developed in CityLoops will be put to use in the project.

3.2. Activities

Activities	Timeline	Responsible partner
Establish circular strategies for new city development. Overall environmental program for the new city: • Mass handling • Materials circularity • Energy • Nature conservation	June 2020 – July 2021	Bodø Municipality
Use power of procurement to influence circularity in new city - include circular criteria in the procurement for the city development • Use components from selective demolished structures • Use non-virgin masses • Use masses stored at demonstration site • Zero-emission machinery • Minimise transport of masses and materials	July - Dec 2021	Bodø Municipality
Use 3D tool for visualizing circular flows and construction	Jan - June 2021	Bodø Municipality
Selecting and preparing materials for reuse or recycling	Jan 2022	Bodø Municipality
Transforming buildings, prolonging their lifetime	Jan 2022	Bodø Municipality

3.3. CityLoops tools/processes tested

3D modelling tool for monitoring and planning

The tool will be used to design hypothetical constructions in the new city part that is to be developed. The tool can visualise how it may be possible to incorporate recovered materials and freed masses from the old military airport site to construct new structures. The tool will also serve as a city planning tool to spatially plan for the adequate amount and location of public services and infrastructure. It can show data related to construction works, including emissions or energy consumption.

Construction material passport, databank and digital market place for recovered materials

Bodø's databank will serve as an inventory of available secondary materials that can be included for new uses in the new city development. The necessary information about the materials (quality, quantity, location) will be accessible to the right actors so that they can plan for using them in new city projects. Bodø will exchange experiences with Mikkeli and Apeldoorn.

CityLab (ByLap) stakeholder engagement platform at Bodø town hall

For the new city development, specifically, the CityLab will be used for:

- Soliciting suggestions on how existing structures and solutions may be repurposed, and how materials and masses can be upcycled.
- CityLab arrangements regarding the development of a new part of the city involving both professional stakeholders and citizens.

The tools can be seen here: *CityLoops Tool Factsheets*

4. Expected outcomes & evaluation

CityLoops will substantially increase the reuse rate in the urban area and build new capacity and knowledge of circular use of complex structures. The use of CityLab and the 3D tool to map, monitor, visualise and control the mass and material stocks and flow will lead to cost savings and efficiency gains for scenario-based green urban planning. The project will lead to reduced transport costs, reduced virgin material use and reduced landfill costs. Results will also be:

- Two demonstration construction projects applying the new planning approaches and tools (Demolition of military airport and New city development project)
- CityLab stakeholder platform developed and tested
- 3D GIS-based visualisation planning tool developed and tested
- Reuse, repurposing and recycling of infrastructure above and below ground in the military airport area (e.g. CDW, structures, underground pipe system, on-site soil)
- Improved circular procurement procedures

Further information on Bodø's demonstrations can be seen at:
https://cityloops.eu/cities/bodoe

5. Planning & Decision Making Guidelines

Bodø has developed a CDW management plan for the whole New City / New Airport project. Experiences from this plan and the demonstration projects on mapping, testing, tendering, reuse and recycling will feed into the CityLoops Planning and decision making guidelines. The Guidelines will later be used in the future planning of the New City construction projects.

Factsheet for Planning and Decision Making Guidelines

6. Business Cases

The business case development will use pre-procurement value chain dialogue as input and help form a basis for circular procurement in the demonstration phase. We aim to influence how tenders are made, and make sure that sustainability/circularity is weighted consequently. This will feed into the procurement guidelines being developed in CityLoops.

Circular procurement in CityLoops

In Bodø the business case will particularly focus on managing legal, logistical and technical (including treatment processes and soil analysis) issues related to on-site recycling and reuse of soil. An important business case is assessing the amount and quality of the masses and evaluating if there is sufficient need to justify investment in building a PFAS cleaning facility locally.

Factsheet for Business Cases

7. Risks

Potential risk	Mitigation approach
CityLoops unable to influence towards circularity as the New Airport / New City project is so big and complex	Gain control of the project's activities. Evaluate which activities are the most relevant for CityLoops to be involved in and prioritise involvement in those. Demonstrate the CityLoops activities value-added for the project overall. Secure a place in the decision-making board of the project for CityLoops' representatives.

Citizens not interested or engaged in new city development	Awareness campaigns will be carried out and supported by the 3D visualisation tool and CityLab platform. Visualise and demonstrate the importance of circularity to citizen's daily lives (e.g. air pollution, environmental quality). Demonstrate future scenarios that represents what may happen if Bodø keeps extracting virgin resources in the same pace.
Financial risk - Changing the traditional way of practising CDW-management, city development, and demolition also involves an element of uncertainty. Costs and incomes may be less predictable	Gather data on price models, transport costs, demolition and building cost, CDW-costs and make realistic business cases when circularity are taken into consideration in the treatment. Focus on making data-driven decisions rather than making decisions based on assumptions.

CITYLOOPS

CityLoops is an EU-funded project focusing on construction and demolition waste (CDW), including soil, and organic waste (OW), where seven European cities are piloting solutions to be more circular.

Høje-Taastrup and Roskilde (Denmark), Mikkeli (Finland), Apeldoorn (the Netherlands), Bodø (Norway), Porto (Portugal) and Seville (Spain) are the seven cities implementing a series of demonstration actions on CDW and OW, and developing and testing over 30 new tools and processes.

Alongside these, a sector-wide circularity assessment and an urban circularity assessment are to be carried out in each of the cities. The former, to optimise the demonstration activities, whereas the latter to enable cities to effectively integrate circularity into planning and decision making. Another two key aspect of CityLoops are stakeholder engagement and circular procurement.

CityLoops runs from October 2019 until September 2023.

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