

## Supplemental data

### Appendix A. Teams and companies involved in the competition

- Designteam AIM (Helsingborg) and Onix Sweden AB (Helsingborg) with advisors/consultants Noema Culture & Place Mapping (London), Atkins (Malmö) and Farawaysoclose/Apokalyps Labotek (Malmö)
- Bjarke Ingels Group (Copenhagen), Spacescape (Stockholm), Testbedstudio (Stockholm), Topotek 1 & Man Made Land (Berlin) and Resource Vision (Stockholm)
- BSK Arkitekter AB (Stockholm), MVRDV (Rotterdam) and Grontmij in Sweden AB (Stockholm)
- COBE Aps (Copenhagen) with advisors Kragh & Berglund (Copenhagen and Stockholm), Moe & Brødsgård (Rødovre), Yngve André Konsult AB (Stockholm) and Boris Broman Jensen (Århus)
- Ecosistema Urbana (Madrid), Arkitekt Kristine Jensens Tegnesteue (Århus), 700N arkitektur AS (Tromsø), Ljusarkitektur (Stockholm) and Atkins (Stockholm)
- KCAP Architect & Planners (Rotterdam) and CaseStudio (Göteborg)
- Norconsult Byplan (Sandvika), Norconsult landskapsarkitekt (Sandvika), Fantastic Norway (Oslo) and 0047 International AS (Oslo)
- Tham och Videgård Arkitekter (Stockholm), Territorial Agency (London) and a\_zero environmental architects (London)
- Tovatt Architects & Planners (Stockholm), Atelier Dreiseitl (Überlingen), Urban Think Tank Architects LLC (Zürich) and Wenanders (Stockholm)
- White arkitekter AB (Stockholm), Ghilardi + Hellsten (Oslo), Spacescape (Stockholm), Vectura Consulting AB (Solna) and Evidens BLW AB (Stockholm)

## Appendix B. Questions asked in the questionnaire used in this study

Please select the one answer that best applies.

### 1 In which country do you primarily work?

- Denmark* ☐
- Ireland* ☐
- Norway* ☐
- Switzerland* ☐
- Spain* ☐
- Sweden* ☐
- The Netherlands* ☐
- United Kingdom* ☐
- Other (please specify)* ☐ \_\_\_\_\_

### 2 Are you male or female?

- Male* ☐
- Female* ☐

### 3 When were you born?

*A list of years (1930–1990)*

### 4 What is your main profession?

- Architect* ☐
- Designer* ☐
- Engineer* ☐
- Landscape architect* ☐
- Politician* ☐
- Urban planner* ☐
- Other (please specify)* \_\_\_\_\_

### 5 What formal education do you have?

- High school graduate or less* ☐
- University 1 year* ☐
- University 2 years* ☐
- University 3 years* ☐
- University 4 years* ☐
- University 5 years or more* ☐
- PhD* ☐

### 6 What role did you have in the Kiruna project?

- Competitor* ☐
- Jury member* ☐
- Jury advisor* ☐

*If the answer to question 6 is competitor, please answer questions 7, 8 and 9:*

### 7 As a competitor, what was your main responsibility?

- Administration* ☐
- Design* ☐
- Business executive or CEO* ☐
- Leading the group* ☐
- Production of drawings/blue prints* ☐
- Production of illustrations* ☐
- Production of text* ☐
- Other (please specify)* \_\_\_\_\_ ☐

**8 How many employees work at your company?**

- 1–4 employees ☐  
5–9 employees ☐  
10–29 employees ☐  
30–49 employees ☐  
50–100 employees ☐  
101–200 employees ☐  
201 or more employees ☐

**9 How many people were involved in your competition team in the Kiruna competition?**

- 1–4 people ☐  
5–9 people ☐  
10–25 people ☐  
30–49 people ☐  
50 or more people ☐

**10 How would you judge your individual possibility to influence the final competition proposal?**

**My possibility to influence was:**

*Very small    Small    Moderate    Large    Very large*

**11 How would you judge your individual possibility to influence the following environmental aspects of the final competition proposal?**

	<i>Very small - Small - Moderate - Large - Very large</i>				
• Emissions from electricity and heat production	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Emissions from transport	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Energy efficient infrastructure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Energy efficient buildings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Protection of non-developed land	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Protection of existing flora and fauna	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Protection of existing ecosystem services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Reduction of storm water run-off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Reduction of cold and windy microclimate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Good daylight conditions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Reduction of construction activity pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Decreased use of potable water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Improving wastewater treatment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Decreased environmental impact from materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Reuse and recycling of materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Minimizing use of toxic substances	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Treatment of waste from inhabitants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**12 How much responsibility for the project's total environmental impact, today and in the future, do you think the following actors have?**

	<i>Very small</i>	<i>Small</i>	<i>Medium</i>	<i>Large</i>	<i>Very large</i>
• <i>Kiruna inhabitants</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Kiruna politicians</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Local representatives at municipality level</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Regional authorities</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>State government authorities</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>You, as a professional</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>The winning competition team</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>The other competition teams</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Jury members</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>The jury reference group</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>People performing the detailed planning of the project</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>People working with implementing the project</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>People working with the financing of the project</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Contractors and entrepreneurs</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Construction workers</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Companies producing building products</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Non-governmental organizations</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>The company LKAB</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Other – please specify _____</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**13 When working with urban planning projects like the Kiruna project, in your opinion, how large is your personal responsibility regarding the following negative environmental impacts that the project might affect?**

**My responsibility is:**

	<i>Very large</i>	<i>Large</i>	<i>Medium</i>	<i>Small</i>	<i>Very small</i>
• <i>Emissions from electricity and heat production</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Emissions from transport</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Emissions from infrastructure energy use</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Emissions from buildings energy use</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Use of non-developed land</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Destruction of existing flora and fauna</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Destruction of existing ecosystem services</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Polluted storm water run-off</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Cold and windy microclimate</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Lack of daylight</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Construction activity pollution</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Waste from construction work</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Depletion of potable water resources</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Impact from wastewater</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Environmental impact from materials</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Use of toxic substances</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Waste from inhabitants</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**14 Kiruna wants to become a sustainable model city. How important do you think the following environmental impacts are in the Kiruna city center project?**

	<i>Extremely important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Slightly important</i>	<i>Not at all important</i>
• <i>Emissions from electricity and heat production</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Emissions from transport</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Emissions from infrastructure energy use</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Emissions from buildings energy use</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Use of non-developed land</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Destruction of existing flora and fauna</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Destruction of existing ecosystem services</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Polluted storm water run-off</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Cold and windy microclimate</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Lack of daylight</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Construction activity pollution</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Waste from construction work</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Depletion of potable water resources</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Impact from wastewater</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Environmental impact from materials</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Use of toxic substances</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <i>Waste from inhabitants</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note: Questions 15–25 in the original survey are purposely omitted here. Those questions probed factors relating to the drivers for environmental design, ecological world views and use of environmental assessment tools for buildings and neighborhoods. As this paper does not explore this territory, these questions are omitted from this appendix.