

Row house with new annex in Oslo NO

PROJECT SUMMARY

Housing renovation and
new annex with
Passive House components

Private owner

SPECIAL FEATURES

Ground to water heat pump
Nearly doubled living space

ARCHITECT

Karin Anton and
Walter Unterrainer

OWNER

Karin Anton and
Sven Støvne



IEA – SHC Task 37

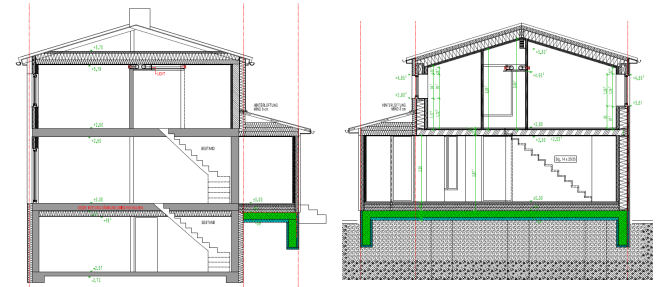
Advanced Housing Renovation with Solar & Conservation

Before



BACKGROUND

Typical row house in the end of a three unit row, constructed in 1962, with poor insulation and thermal bridges. Two storeys and cellar, about 100 m² heated by electricity and wood stove. The owner family wants to enlarge the living space and on this occasion improve the energy efficiency of the existing building.



Section: existing row house after renovation (left) and new annex (seen in reverse)

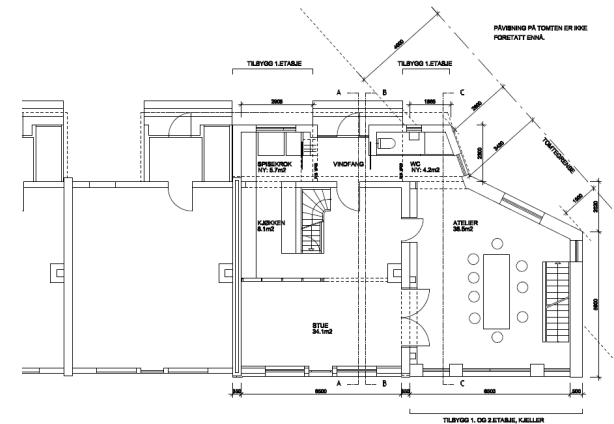
SUMMARY OF THE RENOVATION

- Establish an air tight layer
- Additional insulation of the hole building envelope (walls: external on porous concrete north wall and cellar walls; internal on strut frame south wall and neighbouring wall)
- Passive House windows and doors
- New entrance
- New annex in prefabricated wooden elements
- Compact unit for ventilation, heating and DHW with integrated ground to water heat pump
- Heated net floor area included annex: 179 m²



Variante 4.0

After



Ground floor redesigned with annex



Existing south-facing facade with wooden panels; same type for the new annex (south-facing)

CONSTRUCTION

Attic construction *U-value: 0.10 W/(m²·K)*

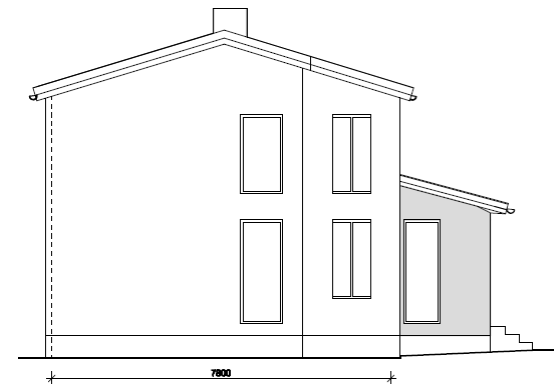
Existing roof + vapour permeable membrane	
Mineral wool insulation	330 mm
Wooden beams (exist.)/min. wool (repl.)	150 mm
Wooden panels (existing)	10 mm
Airtight sheet	
Lathing	20 mm
Fibrous plaster sheet	18 mm
Total	528 mm

Wall construction north *U-value: 0.10 W/(m²·K)*

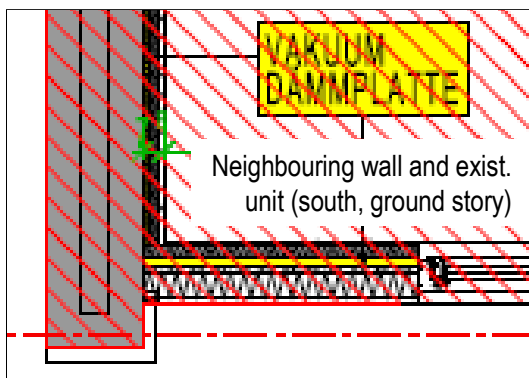
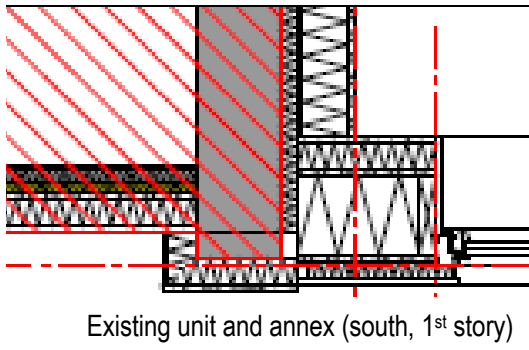
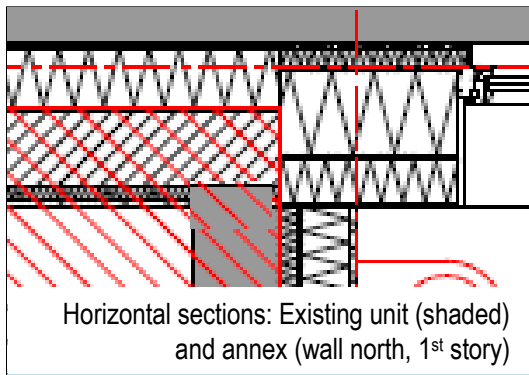
Wooden panels (replaced)	12 mm
Lathing (replaced)/wood fibre or flax	50 mm
Airtight sheet	
Porous concrete brick (existing)	250 mm
Plaster (existing)	15 mm
Mineral wool	200 mm
External plaster	15 mm
Total	542 mm

Basement ceiling *U-value: 0.10 W/(m²·K)*

Parquet (existing)	24 mm
Lathing (existing)	40 mm
Wooden beams (existing)/cellulose fibre	200 mm
"Living board" (OSB without adhesive)	18 mm
Lathing/cellulose fibre	200 mm
Fibrous plaster sheet	18 mm
Total	500 mm



Existing east-facing gable with plaster; similar solution for the new annex (east- and north-facing)



Summary of U-values $W/(m^2 \cdot K)$

	Before	After
Attic floor	0.34	0.10
Wall north*	0.66	0.10
Wall south*	0.57	0.10
Basement ceiling	0.33	0.10
Windows	2.6	0.80

The south-facing facade must keep the original appearance. Therefore, the owners decided to use vacuum insulation panels on the inside of the existing stud-frame wall. Additional internal vacuum insulation will also be used on the new ground story north wall in order to save space.

BUILDING SERVICES

A compact unit for ventilation with 85 % heat recovery provides heating and domestic hot water. The remaining heat demand will be covered by a ground to water heat pump supplying a low temperature wall heating system.

RENEWABLE ENERGY USE

Integrated ground to water heat pump. The heat will be collected by a brine heat exchanger with an 80 m deep vertical pipe.

ENERGY PERFORMANCE

Before: measured total delivered energy
150 kWh/m² + wood stove

After: calculated demand for space heating*
20 kWh/m²

Reduction: Roughly 80 % (space heating)
*PHPP

INFORMATION SOURCES

Karin Anton, owner and architect
Walter Unterrainer (details and PHPP-calculations)

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