North Sea: Landscapes of Coexistence
Transitional Territories Studio
2018-2019

Appendix II
Building Technology
Drawing Set

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The State of Speculation:
Underlying Mechanisms of Built Environment Procurement
Index

1. General Arrangement .......................................................... p. 5
2. Climate Strategy ............................................................... p. 23
3. Structural Strategy ............................................................ p. 33
4. Details ................................................................................. p. 41
1. General Arrangement
Hyper Individual Cells Plan
15 Level 1 USD
The primary climate concept is to utilise the two programs, the botanic garden and the swimming pool, to generate a condition that is relatively stable in the living quarters throughout the year. This objective is achieved by utilising the botanic garden on the roof as a solar collector. The glazed structure traps heat from the sun and, with heat exchangers, is used to heat up water that can be circulated throughout the concrete building such that the building mass stores this heat is slowly emits it throughout the day. The pool acts as a coolant in the summer, excess heat in the building and from the sun is used to heat up the pool for regular use (water used by the solar collector and the pool do not cross-contaminate to avoid the spreading of chlorine) and any further excess heat is transferred via heat exchangers to a separate liquid system that stores the energy in deep geothermal piles underground.

Fresh air is drawn in via ventilation shutters that are placed in each unit that has an external facing window. This air is controlled using a combination of underfloor liquid heating and liquid coolants in the ceiling. These elements are strategically placed to encourage the movement of air. Exhaust air is predominantly channel into the corridor space where it is cooled before it enters internal living units. The air leaves the floor via the central atrium space inducing the stack effect for efficient air exchange. The atrium directly connected to the botanic garden where the carbon-heavy exhaust air is cleaned.
Heat Exchanger

Ceiling coolant

Fanlight Window

Botanic Garden

Exhaust Atrium

Exhaust Air via boxed out column

Cold, fresh air in from windows

Swimming Pool exhaust regulation

Heat exchanger to transfer excess heat to piles
Heat Exchanger

Underfloor heating connected to botanic garden

Ceiling coolant

Botanic Garden

Exhaust Atrium

Exhaust fans at pool edge to remove gaseous chlorine

Swimming Pool exhaust regulation

Seasonal heat storage utilised in winter

Exhaust Air via boxed out column

Climate Strategy Winter
Climate Strategy
Type 1

Fresh air inlets throughout whole facade

Exhaust Air to service column to Atrium

Exhaust Air to From Room Heat Up Common Space

Underfloor Heating only in rooms and partial lower level common space

Underfloor Heating Arrangement aiming to reduce thermal loss
Climate Strategy
Type 2

- Fresh air inlets throughout whole facade
- Exhaust Air to Atrium
- Exhaust Air to From Room Heat Up Common Space
- Underfloor Heating only in rooms
- Underfloor Heating Arrangement aiming to reduce thermal loss
Climate Strategy
Type 3

- Exhaust Air to Atrium
- Fresh air inlets throughout whole façade
- Cooled air enters internal units
- Exhaust Air to corridor where it is cooled
- Underfloor Heating only in rooms
- Underfloor Heating Arrangement aiming to reduce thermal loss
3. Structural Strategy

The structure is primarily a concrete frame tower that sits on a series of concrete arches that provide the necessary open floor plan for the program of a swimming pool. The structure is stabilised at four corners with a circulation core to the north and shear walls in the three other corners, these shear walls also form the machine space for electric and water circulation. At the top of the tower sits a botanic garden that is covered by a lightweight glazed steel structure. Flanking the primary building is large covered lobby space whose primary structural principle is based on portal frames, due to its low height, stability is only provided at the centre in the form of a large core.
Circulation Core #1
Circulation Core #2
Shear Walls
Lobby
Botanic Garden
Swimming Pool structure
Swimming Pool Structure Breakdown

1 Precast 600mm RC arch elements to be assembled on site @max 7.5m c/c
2 Precast 500mm RC beam elements to be joint by cast and bracket/bolts to arch elements
3 Precast 250mm RC slabs to be topped with 100mm in-situ structural concrete once laid
4 In-situ 350mm RC slabs to form box element supporting the erection of each arch. Structure to become changing room floors
5 1250x800mm RC Ring beam connecting each arch
6 2000x800mm RC beams to tie ends of arches together to prevent splaying
7 600mm Bored piles to sit the surrounding the footprint of arch element, forming a T-shape
8 Retaining walls
Typical Floor Structure Breakdown

1 Precast RC 150mm slab to be topped with 100mm in-situ structural concrete once laid
2 Shear wall element at all four corners of building for stability
3 Precast RC 200x200mm column with cast in steel studs to be bolted to connecting plate @max 5.4m c/c
4 Elevator shaft acting as shear wall element
5 Precast RC 300x400mm beam element with cast in loops to join with column tie bar
4. Details
1. 2 x 13mm gypsum plasterboard
   Suspended coolant pipes
   140mm cavity for services
   250mm reinforced concrete slab
   Underfloor heating on 30mm XPS sheeting
   5mm impact-sound insulation
   23mm Douglas fir flooring

2. 18mm external stone decking
   90-160mm air gap/pedestals
   50mm gravel bed
   Two layer bituminous roofing
   20mm rigid foam plastic sheeting
   100-40mm insulation finished to falls
   2 x 100mm extruded polystyrene thermal insulation
   50mm rock-wool thermal insulation
   128mm trapezoidal-section metal sheeting
   Vapour barrier
   250mm reinforced concrete slab
   140mm cavity for services
   Suspended coolant pipes
   2 x 13mm gypsum plasterboard

3. 500mm Gravel bed
   Protective, anti-moisture layer
   Double layer covering with membrane
   100mm extruded polystyrene thermal insulation
   50mm rock-wool thermal insulation
   Vapour Barrier
   250mm reinforced concrete slab
4. 2 x 13mm gypsum plasterboard
   Vapour barrier
   45/45mm aluminium channel framing with 45mm rock-wool thermal insulation
   145/45mm steel channel framing with 145mm rock-wool thermal insulation
   9mm wood fibreboard as windbreak
   100mm XPS thermal insulation
   30mm ventilated cavity formed by Z-frame to support prefabricated brick slips
   Corium brick slip tiles on HPS200 Corium rails with pump mortar in between tiles

5. Two layer bituminous roofing
   9mm wood fibreboard as windbreak
   145/45mm steel channel framing with 145mm rock-wool thermal insulation
   100mm XPS thermal insulation
   30mm ventilated cavity formed by Z-frame to support prefabricated brick slips
   Corium brick slip tiles on HPS200 Corium rails with pump mortar in between tiles
1. 500mm Gravel bed
   Protective, anti-moisture layer
   Double layer covering with membrane
   100mm extruded polystyrene thermal insulation
   50mm rock-wool thermal insulation
   Vapour Barrier
   250mm reinforced concrete slab
2. 2 x 13mm gypsum plasterboard
145/45mm steel channel framing
with 145mm rock-wool thermal
insulation
50mm XPS insulation
Enamelled insulated aluminium panel
RAL 8000
Anodised aluminium sill, natural
colour
1. 2 x 13mm gypsum plasterboard
   Vapour barrier
   45/45mm aluminium channel framing with 45mm rock-wool thermal insulation
   145/45mm steel channel framing with 145mm rock-wool thermal insulation
   9mm wood fibreboard as windbreak
   100mm XPS thermal insulation
   30mm ventilated cavity formed by Z-frame to support prefabricated brick slips
   Corium brick slip tiles on HPS200 Corium rails with pump mortar in between tiles
2. 210mm precast fair-faced reinforced concrete slab to be casted with 200mm in-situ structural concrete
65mm air gap to form drainage channel
Stone decking
1. 2 x 13mm gypsum plasterboard
   145/45mm steel channel
   framing with 145mm rock-wool
   thermal insulation
   Vapour barrier

2. Corium brick slip tiles on rails
   hung by Z-frame
   100mm XPS thermal insulation
   50mm prefabricated reinforced
   concrete slab as formwork
   200m structural concrete
   poured in-situ
   Underfloor heating on 30mm
   XPS sheeting
   5mm impact-sound insulation
   23mm Douglas fir flooring

3. 210mm precast fair-faced
   reinforced concrete slab to
   be casted with 200mm in-situ
   structural concrete
   65mm air gap to form drainage
   channel
   Stone decking
1. 2 x 13mm gypsum plasterboard  
   Vapour barrier  
   45/45mm aluminium channel framing with 45mm rock-wool thermal insulation  
   145/45mm steel channel framing with 145mm rock-wool thermal insulation  
   9mm wood fibreboard as windbreak  
   100mm XPS thermal insulation  
   30mm ventilated cavity formed by Z-frame to support prefabricated brick slips  
   Corium brick slip tiles on HPS200 Corium rails with pump mortar in between tiles
2. Aluminium glazed door system with ventilation shutter where shown

3. Aluminium glazed window system with ventilation shutter where shown