

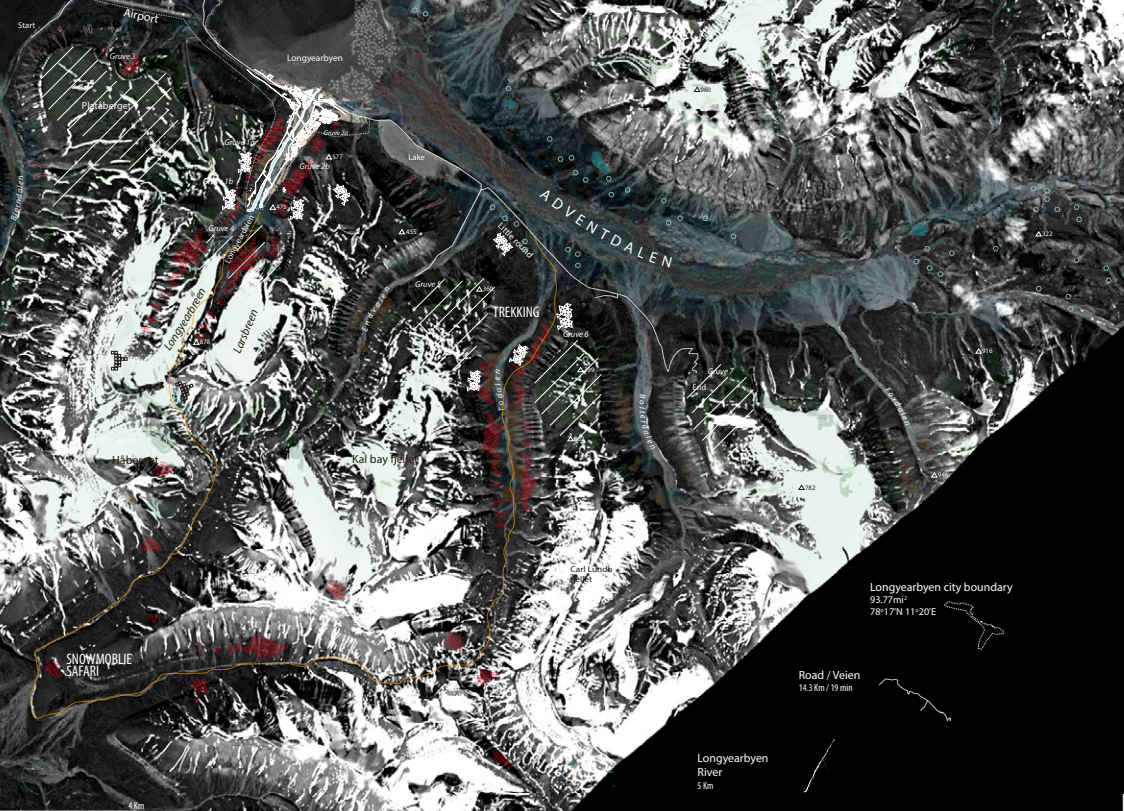
ISFJORDEN

15°20' E 15°40' E 16°20' E

ADVENTDFJORDEN

CRUISE  
BERGEN 2022 Km  
TROMSØ 958 Km  
AROUND SPIRITSBERG

TOURISM  
OSLO 2042 Km  
TROMSØ 958 Km

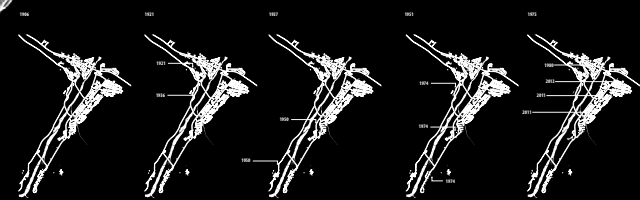


Longyearbyen city boundary  
92.77mi²  
78°17'N 11°20'E

Road / Veien  
14.3 Km / 19 min

Longyearbyen  
River  
5 km

Longyearbyen Historical Development



Scientific research

Road - side slushs  
subsequent erosion

Mining

Mine 7, main power generator in Longyearbyen

Tourism

Cruiase Snowmobile Canoe Trekking Ski Northlightes kayaking Camping

Slush Risks

Road - side slushs  
subsequent erosion

River bank erosion

Seasonal river bank erosion  
subsequent erosion

Avalanche Types

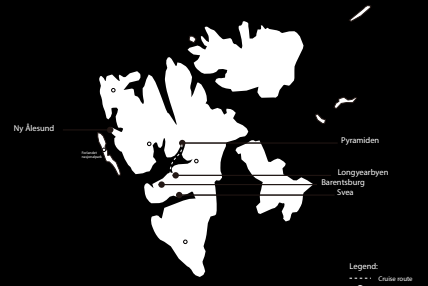
Sub-avalanches Loose snow  
Cornice fall avalanches Icefall flow  
Cornice fall / slab and loose snow avalanches

Geological Patterns

- broken down by processes of weathering and erosion
- river deposits, recent
- a landform along a body of water
- Marine Beach material
- subsequent erosion
- Talus cones
- relatively flat terrain
- raised significantly above the surrounding area
- Mountain Plateaus
- soft, consolidated up to 70 metres, in height, 600 m in diameter
- Flings
- glacially formed accumulation of unconsolidated glacial debris
- terminal moraine
- range from 5-50 m in diameter
- ice-wedged polygons
- cone-shaped deposit of sediment eroded and built up by streams
- Aluvial fans

Svalbard Archipelago

3,919 km (2,435 mi)



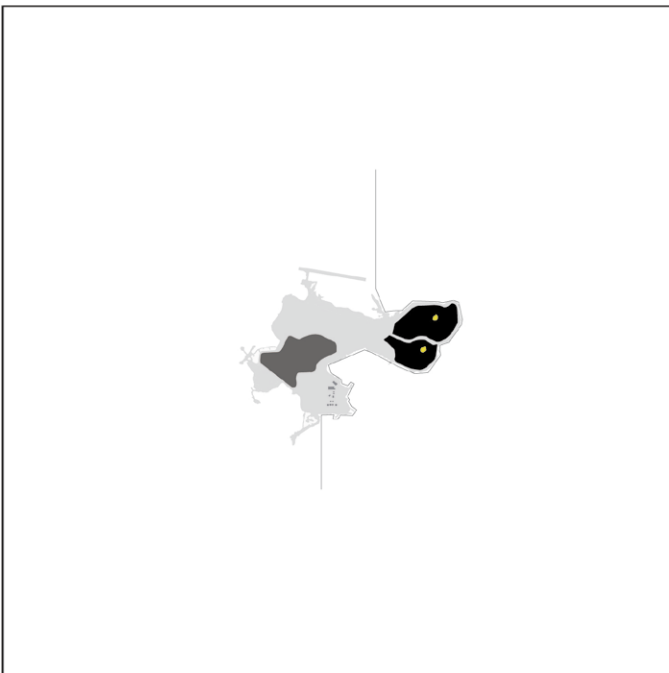
Legend:  
Coastal roads  
City / Town  
National Park



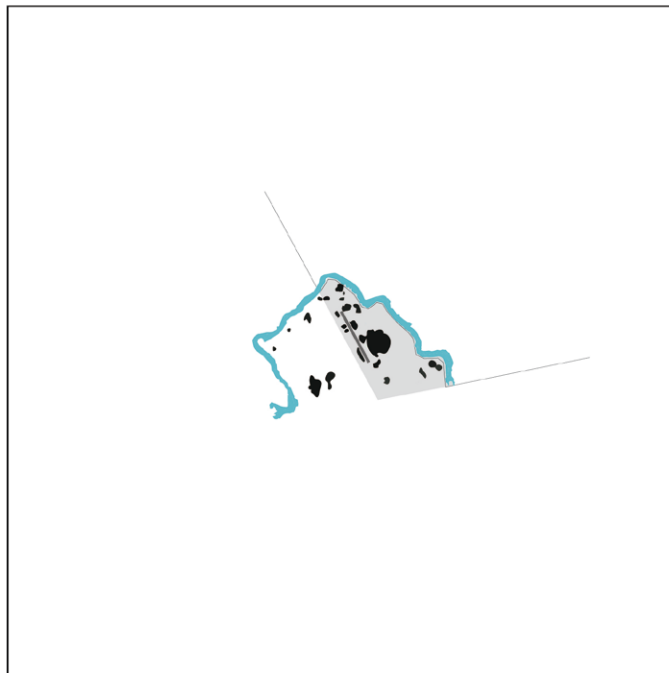
**KIRUNA**  
Sweden, White / Ghilardi+Hellsten Arkitekter AS  
Relocation



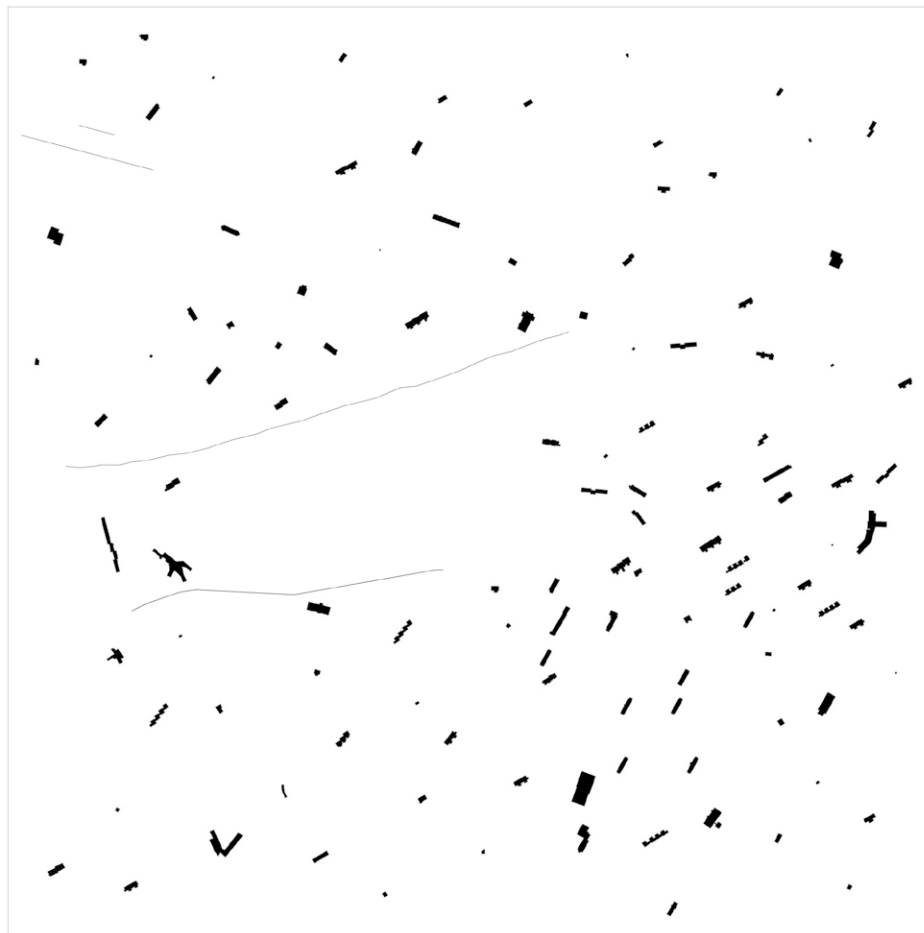
**HEIMAËY ISLAND**  
Iceland, Lava-Cooling Operations  
Defence



**DIIVIK DIAMOND MINE**  
Canada, Huge water retention dikes were constructed to safeguard mining facilities and accommodations.  
Reinforcement



**NEWTOK**  
Alaska, Coastal Erosion  
Abandon



**Tomorrow is not promised**

Abstraction

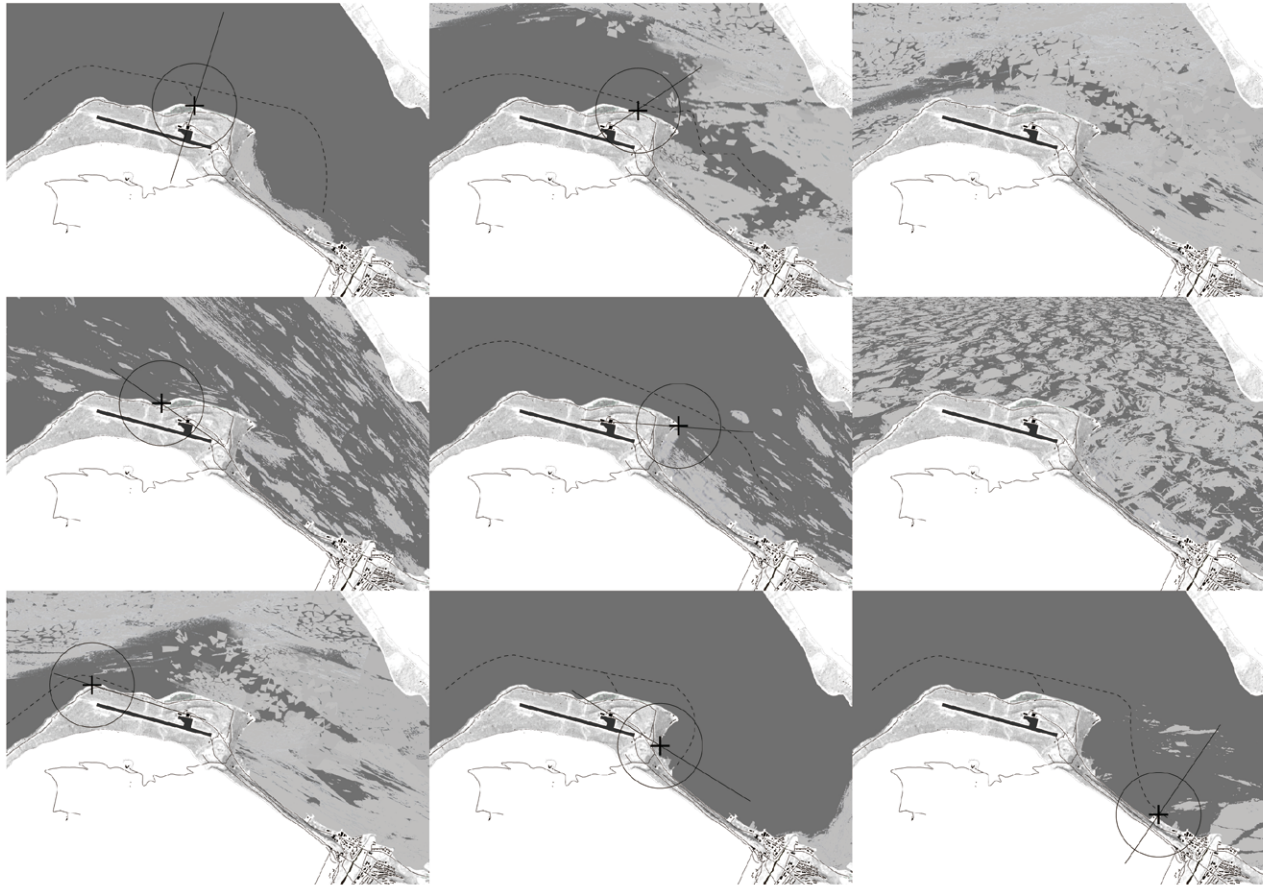
*vulnerable Houses and roads*

78°13'N 15°33'E

Month	Activity	% of total	Determination of Existing ADPM
January	3000	2,58%	Peak month activity = 16,000 Average day activity = 516.129 (16,000 / 31 days)
Febuary	6000	5.17%	
March	12,000	10.34%	
April	12,000	10.34%	<b>Determination of Forecast ADPM</b> Forecast annual activity = 20,800  Forecast peak month activity = 27,580 (20,800 x 13.79%)  Forecast average day activity = 671 (20,800 / 31 days)
May	14,980	12.91%	
June	12,000	10.34%	
July	12,000	10.34%	
August	16,000	13.79%	
September	10000	8.62%	
October	8000	6.89%	
November	6000	5.17%	
December	4000	3.44%	
Anual total	115.980	100%	

**Terminal capacity calculation**

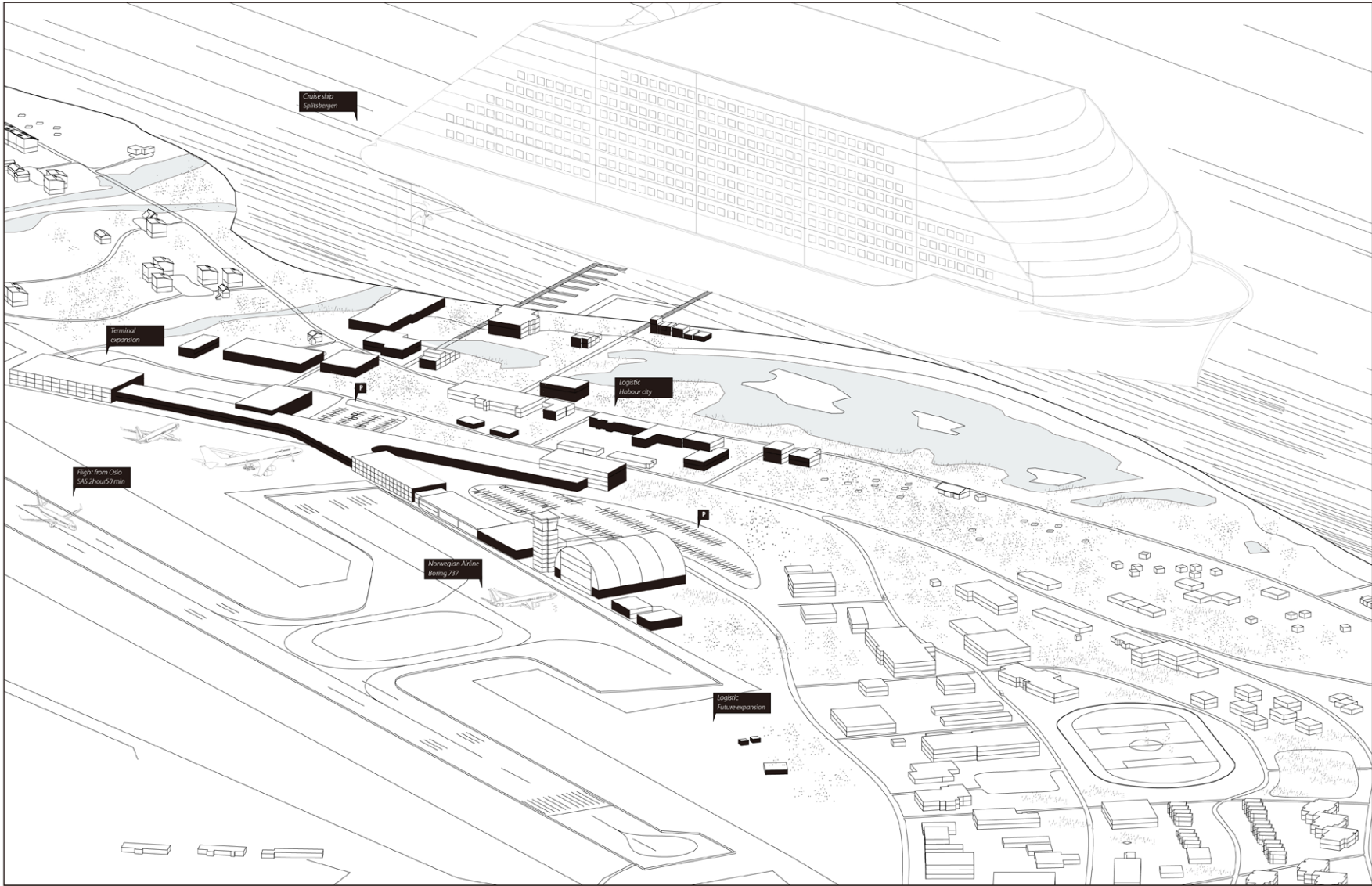
Annual activity can be used to determine order-of-magnitude facility requirements



#### ICE BREAK PATTERNS AND HARBOUR SITUATIONS

In the winter time, the isford will frozen from the inner side of the longrearbyen vally. different ice frozen and break situations, configuration and formation shows the ideal location for future harbour, ensuring all year round cruising activities.





**HABOUR - TERMINAL, SUMMER TIME**  
HIGHLY INTERCHANGE



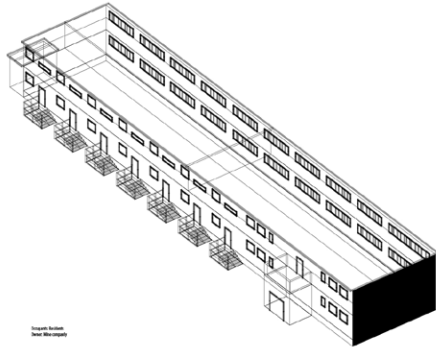
**TOS**

69°40'53"N 018°55'04"E

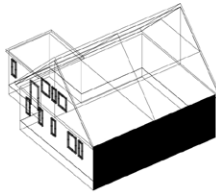
Passengers 2,009,146  
 Aircraft movements 42,444  
 Cargo (tonnes) 2,758  
 Runways/m 2,447

- Terminal areas
- Airport perimeter
- Reserve
- Parking
- Airport support services
- Aircraft maintenance
- Freight
- Non-aviation
- Landside development

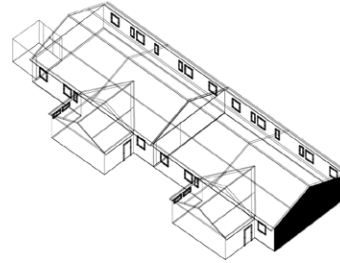




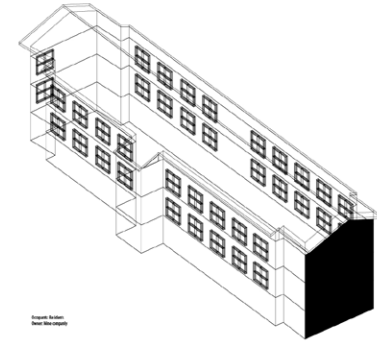
Isometric Section  
Small Block Capacity



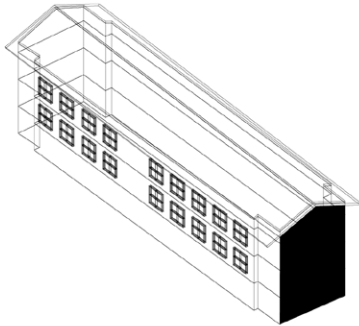
Isometric Section  
Small Block Capacity



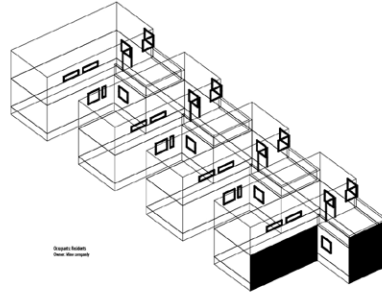
Isometric Section  
Small Block Capacity



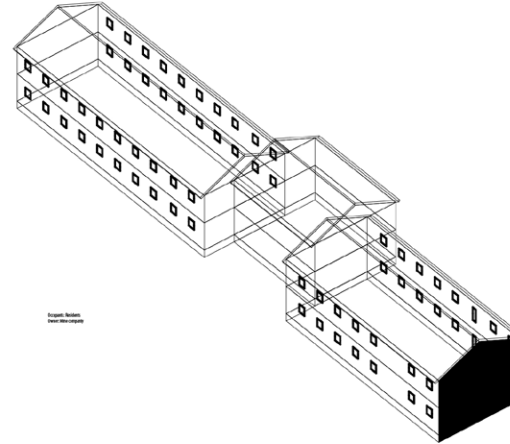
Isometric Section  
Small Block Capacity



Isometric Section  
Small Block Capacity

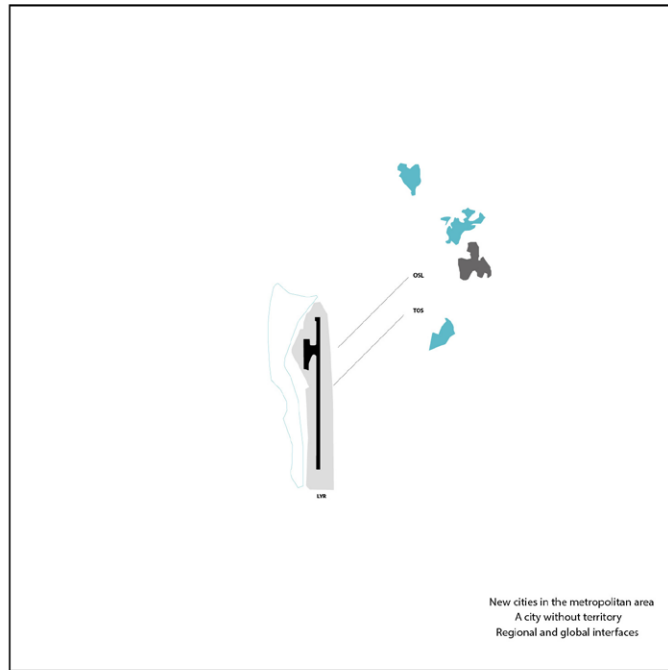
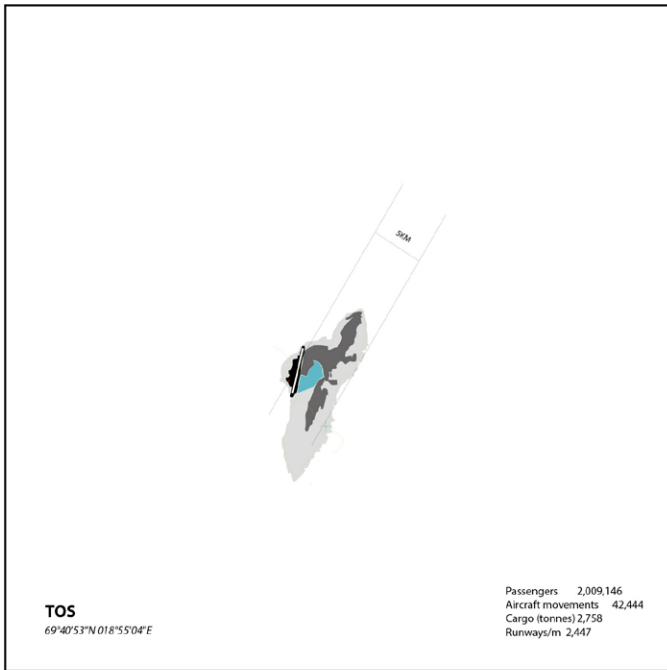
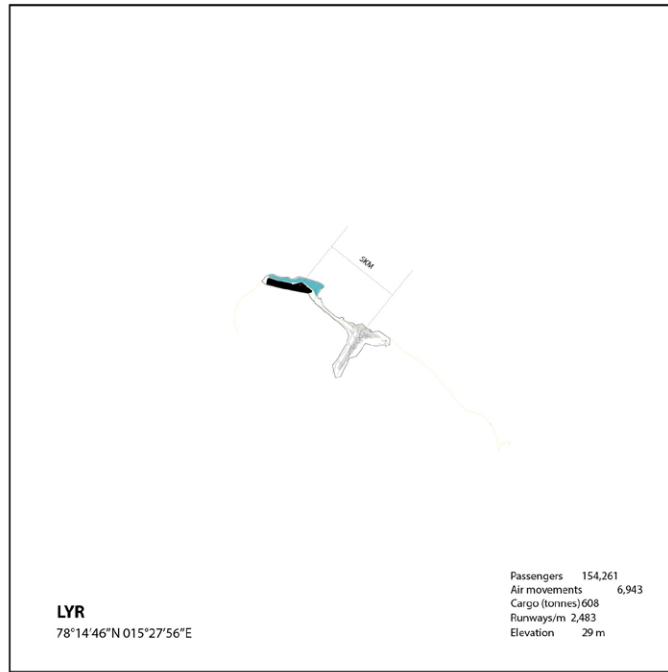
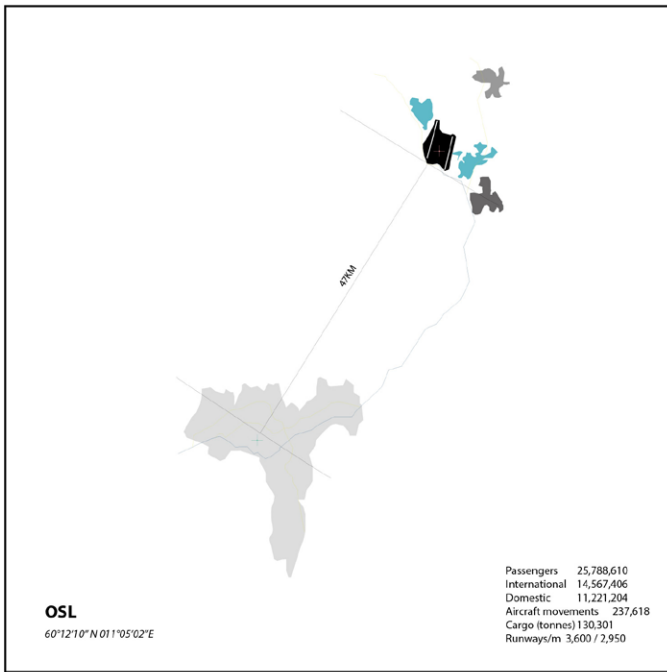


Isometric Section  
Small Block Capacity



Isometric Section  
Small Block Capacity

**INSIGHT OF BUILDINGS**  
REVEALS RESIDENTIAL HOUSING  
CRISIS





**ZRH**

Dispers non-operational area  
 Low accessibility  
 Island(Remote) terminal



**LGW**

Dispers non-operational area  
 Airport cities around the Airfield



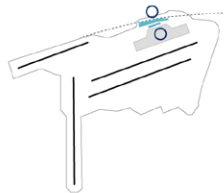
**OSL**

Terminal dominated by airfield  
 Airport city confined by airfield  
 Transit within terminal



**VIE**

Alternative development of runway  
 Linear airport city  
 Transit within terminal



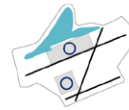
**FRA**

Highly interchange  
 AirRail Terminal  
 Sky city



**AMS**

Distributed across territory  
 Distributed over several site of the platform



**BCN**

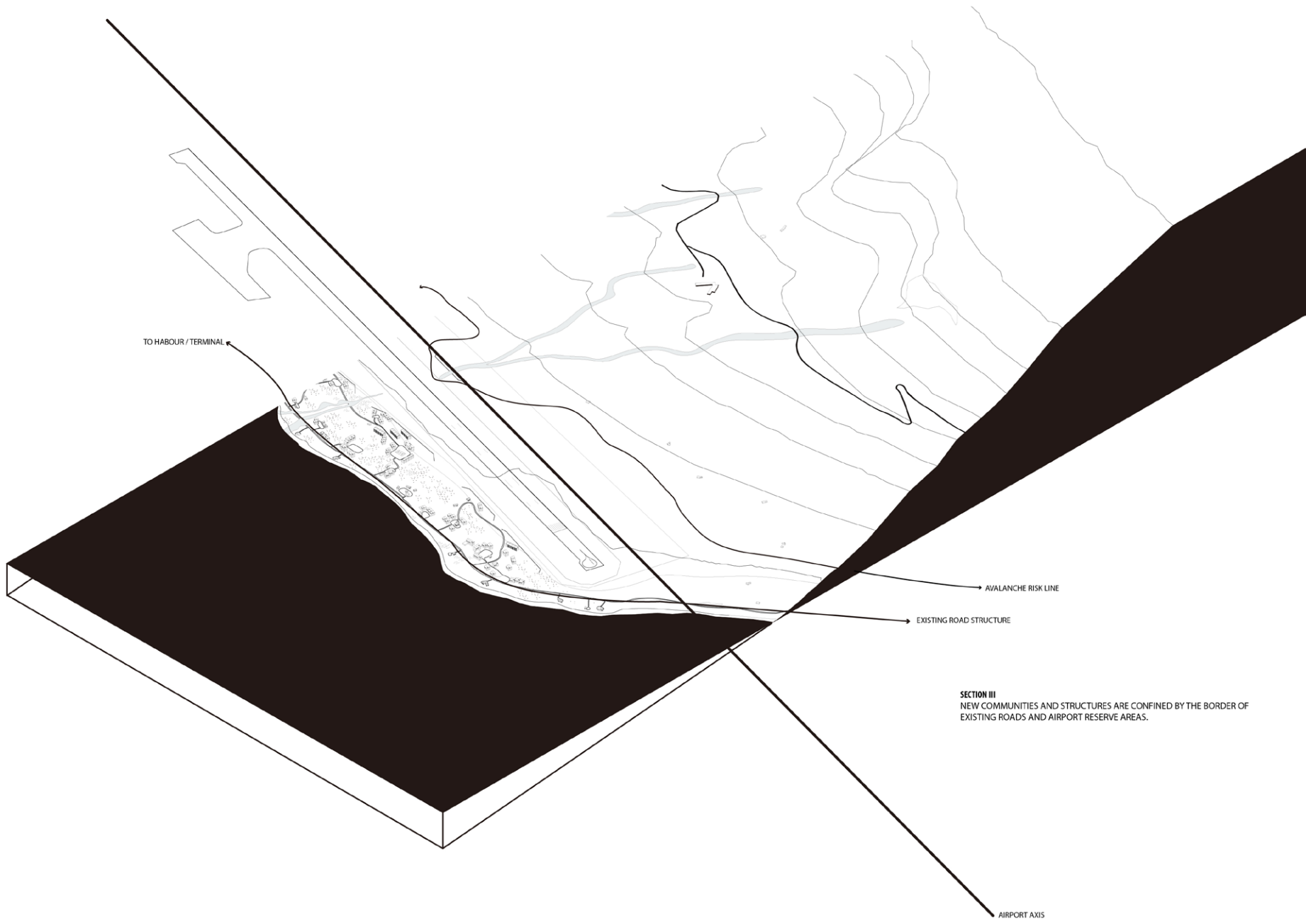
Compact Airport city  
 Compact and concentrated



**ARN**

Designated logistic area  
 Areas for airport-related logistic and business activities  
 Being developed with collaboration

**AIRPORT CITY PATTERNS**



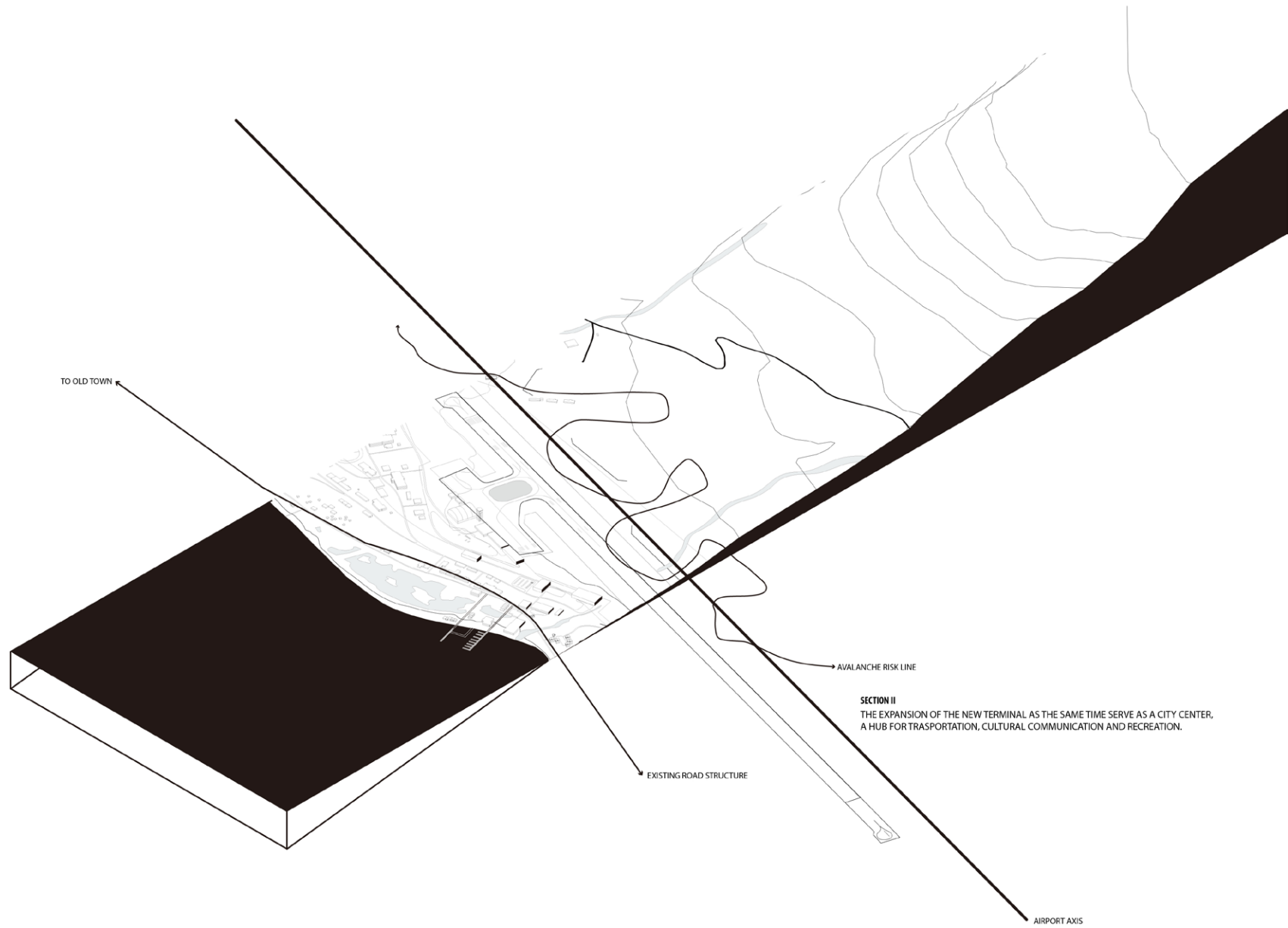
TO HARBOUR / TERMINAL

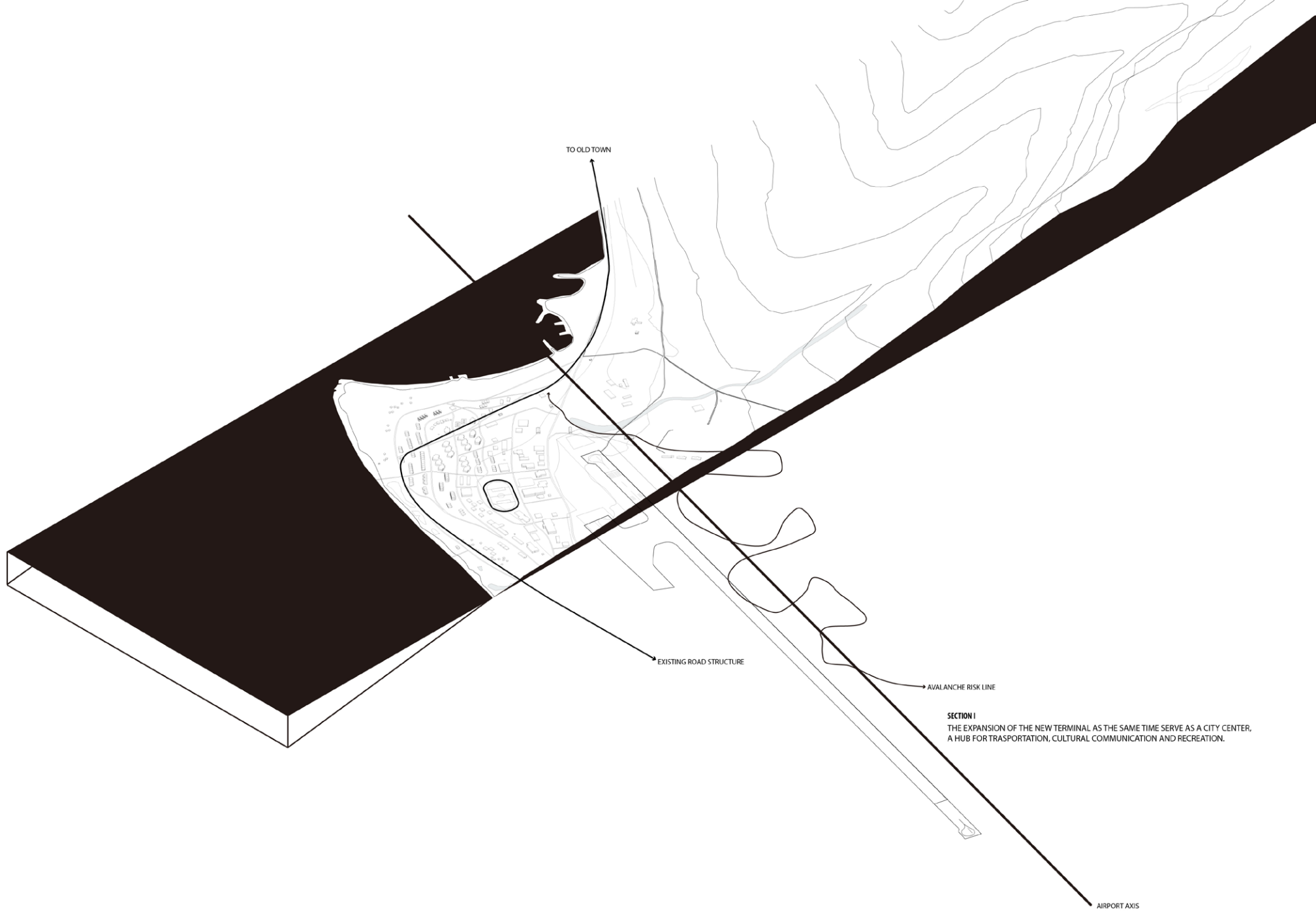
AVALANCHE RISK LINE

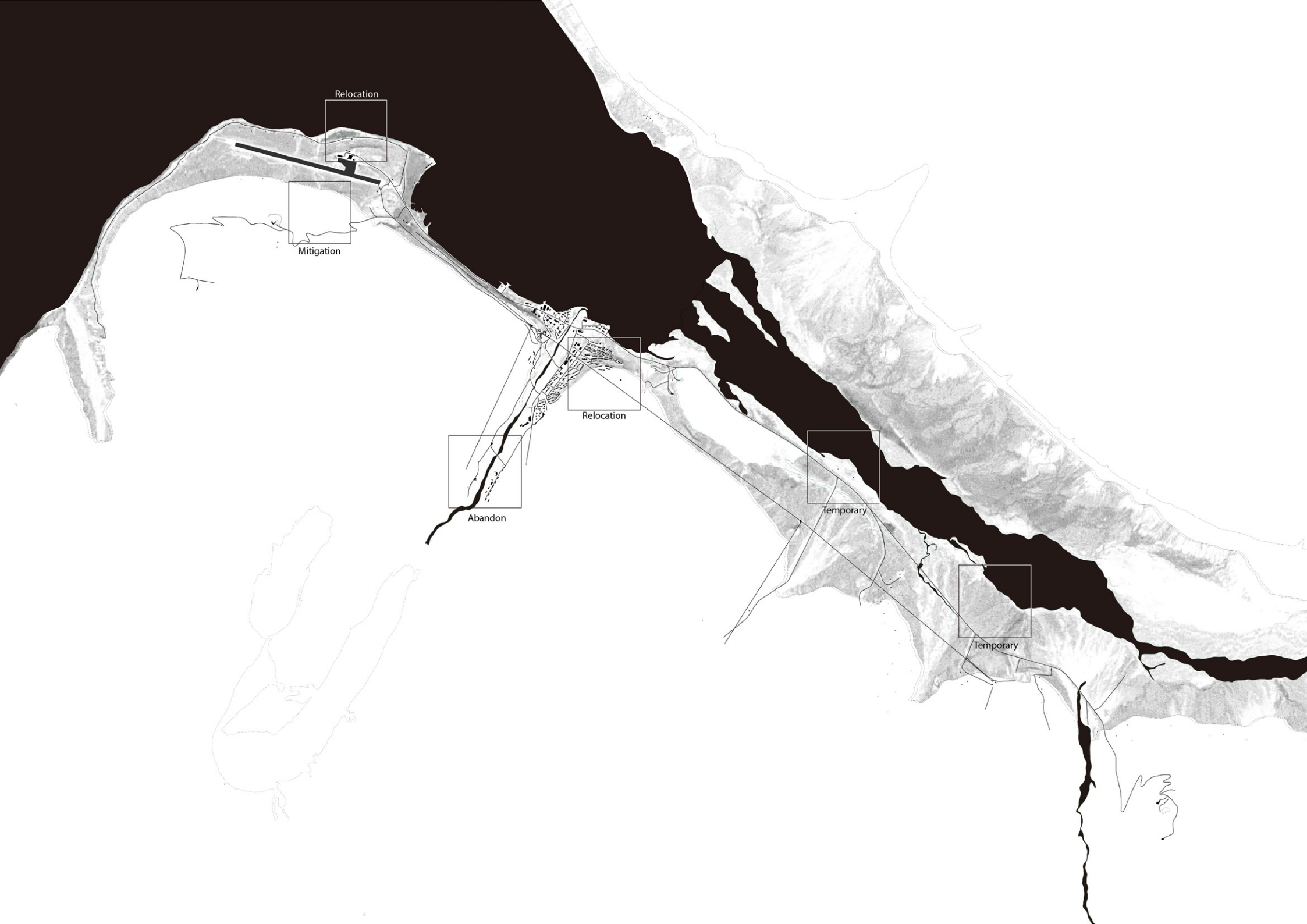
EXISTING ROAD STRUCTURE

**SECTION III**  
NEW COMMUNITIES AND STRUCTURES ARE CONFINED BY THE BORDER OF  
EXISTING ROADS AND AIRPORT RESERVE AREAS.

AIRPORT AXIS







Relocation

Mitigation

Relocation

Abandon

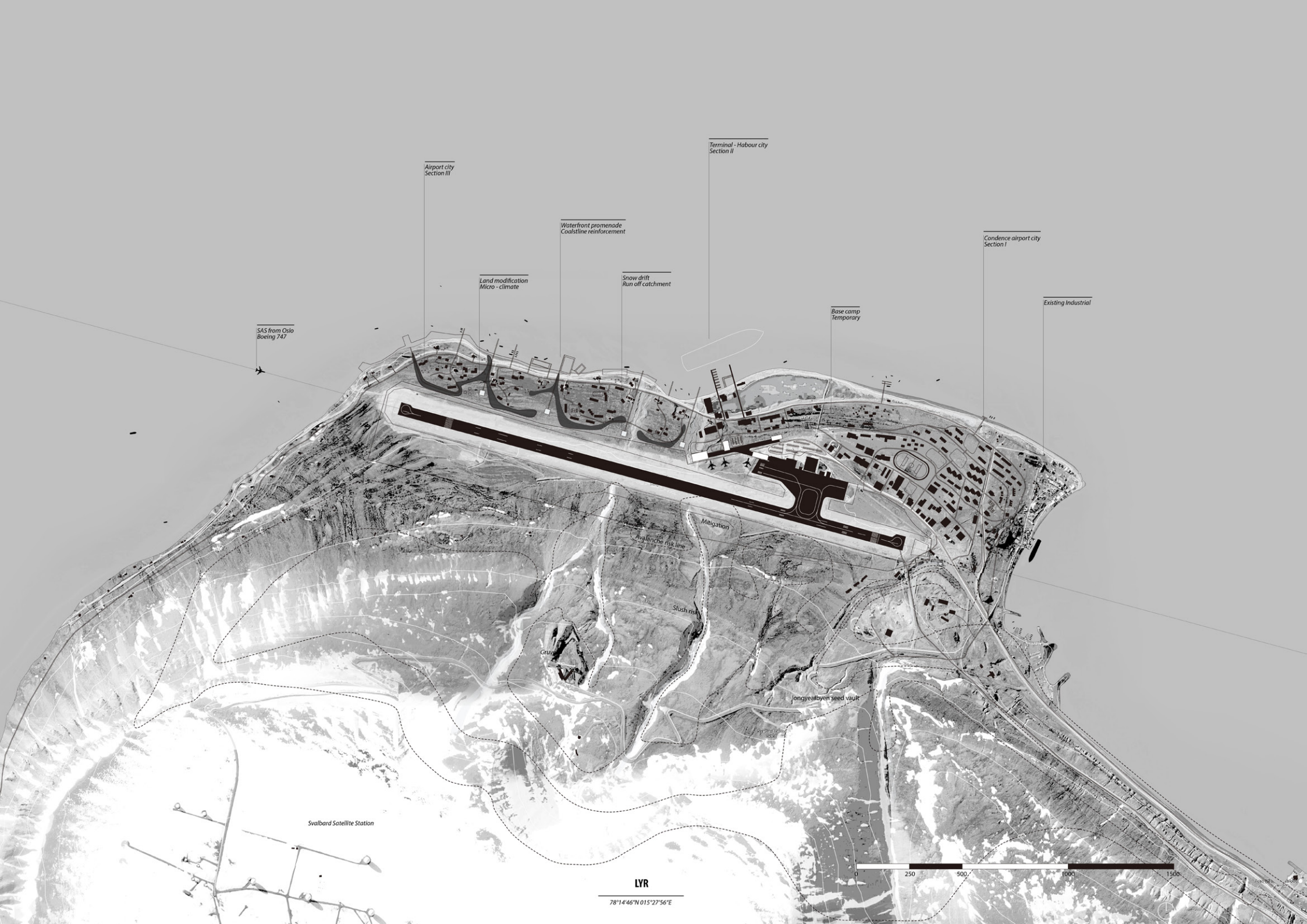
Temporary

Temporary

*Handwritten scribble or signature*







SAS from Oslo  
Boeing 747

Airport city  
Section III

Terminal - Harbour city  
Section II

Condence airport city  
Section I

Existing Industrial

Base camp  
Temporary

Snow drift  
Run off catchment

Waterfront promenade  
Coalstline reinforcement

Land modification  
Micro - climate

Svalbard Satellite Station

Gruu

Avalanche risk line

Slush risk

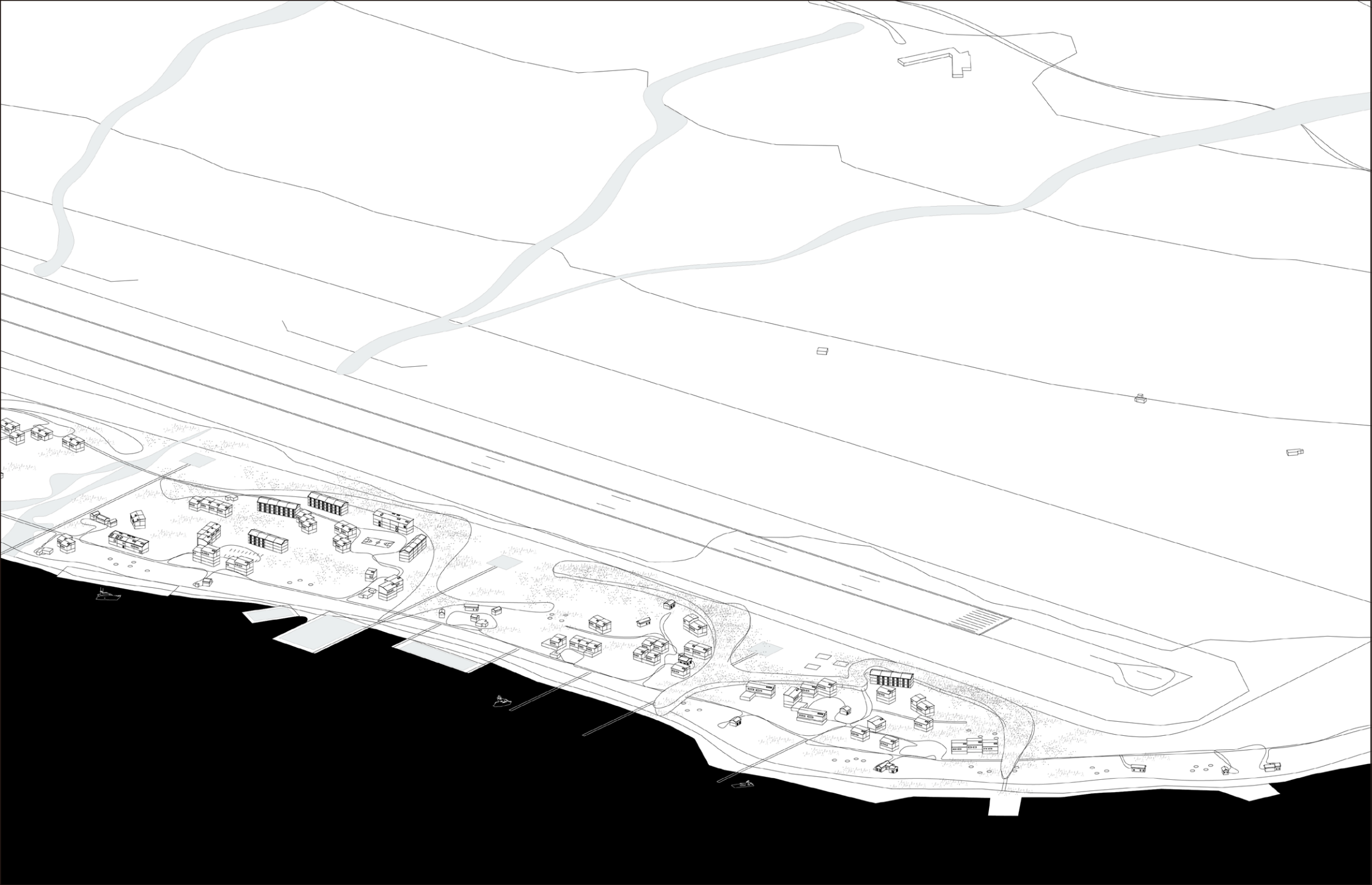
Mitigation

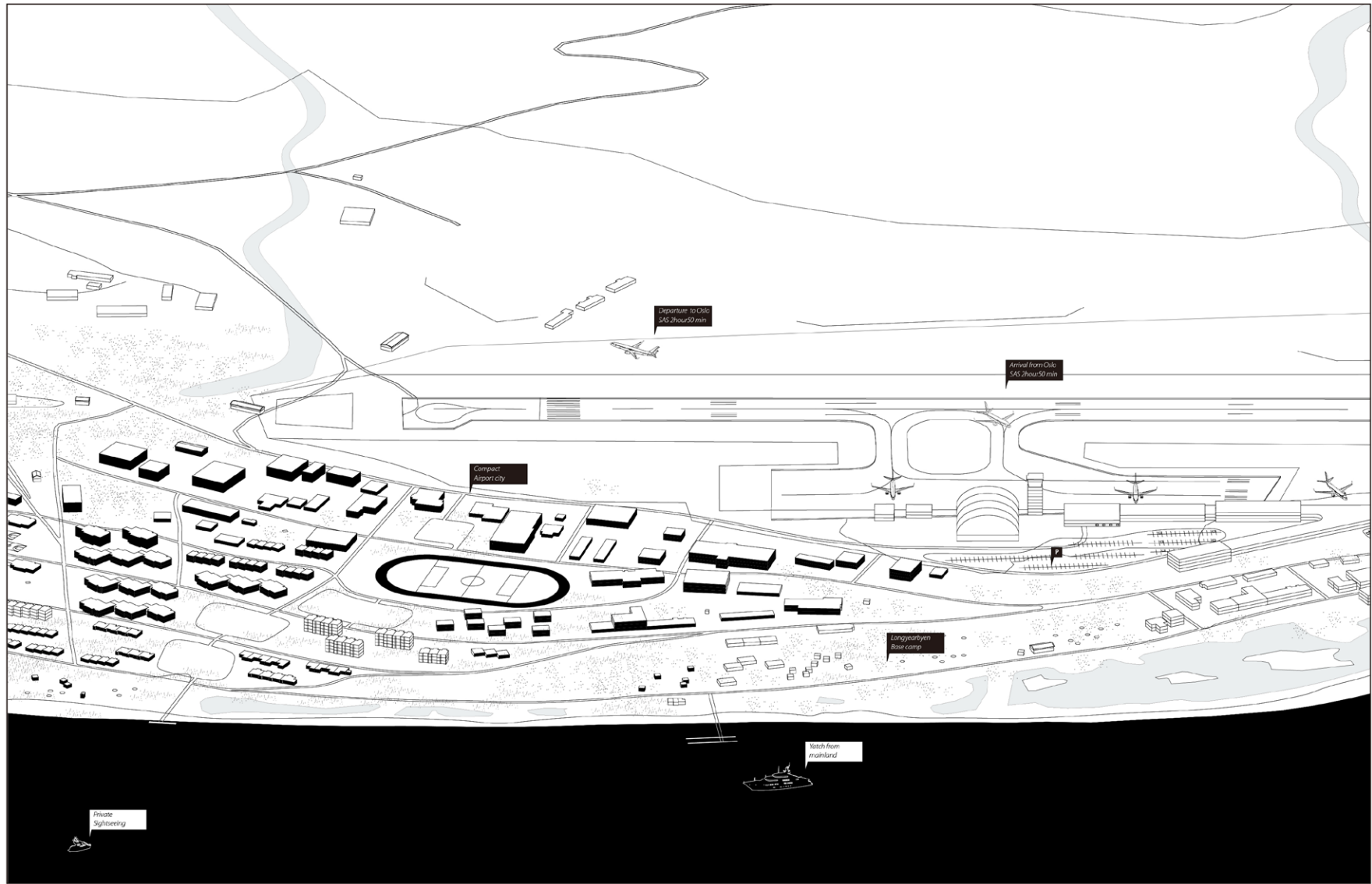
longyearbyen seed vault

LYR

78°14'46"N 015°27'56"E







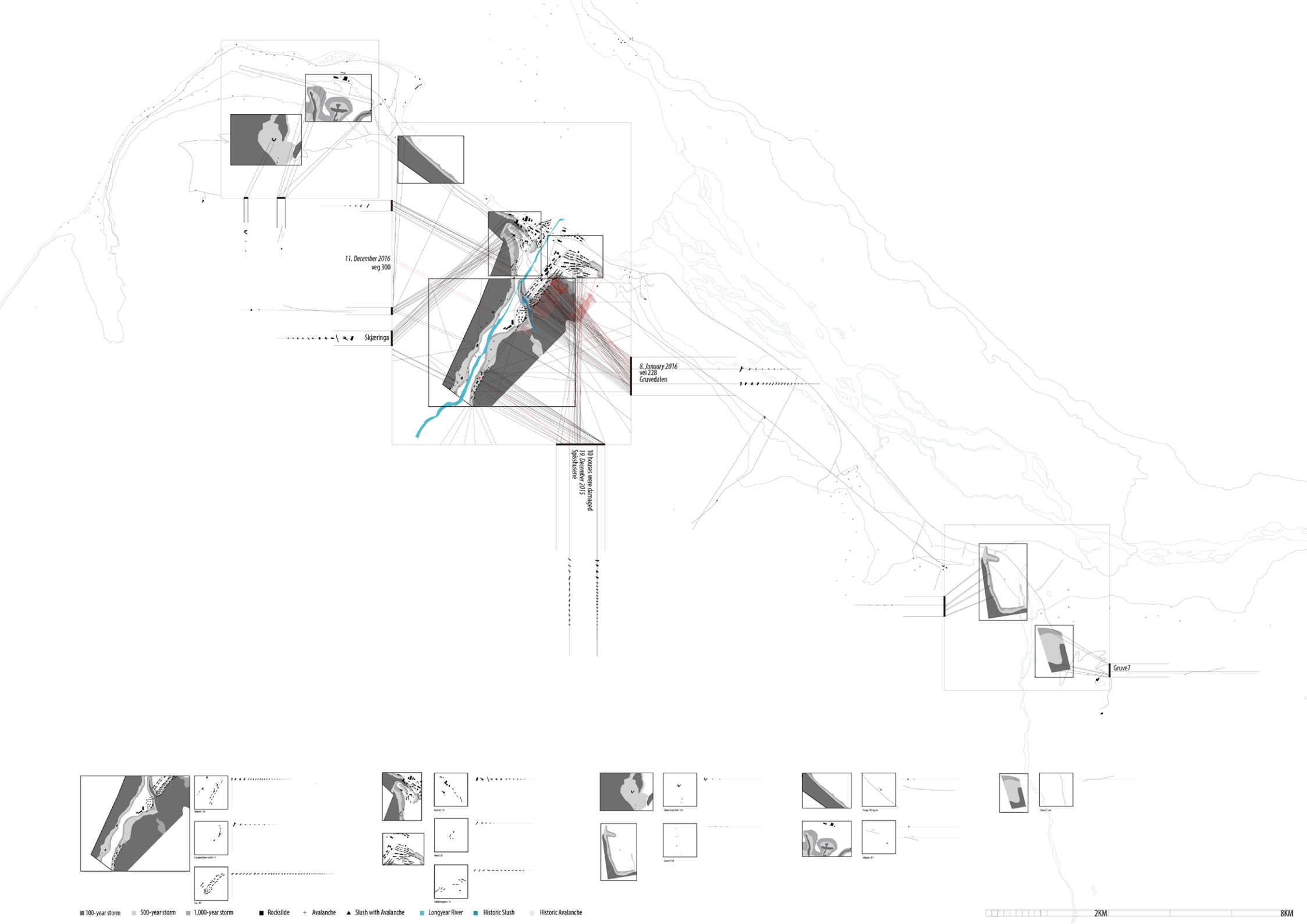


**OSL**

60°12'10" N 011°05'02" E

Passengers 25,788,610  
 International 14,567,406  
 Domestic 11,221,204  
 Aircraft movements 237,618  
 Cargo (tonnes) 130,301  
 Runways/m 3,600 / 2,950

- Terminal areas
- Airport perimeter
- Reserve
- Parking
- Airport support services
- Aircraft maintenance
- Freight
- Non-aviation
- Landside development



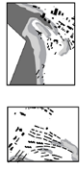
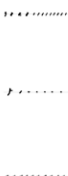
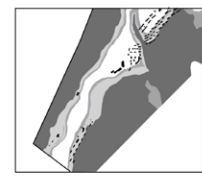
11. Desember 2016  
veg 300

Skjeringa

8. January 2016  
vei 228  
Gruvedalen

10 houses were damaged  
19. Desember 2015  
Spishuene

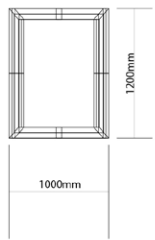
Gruve?



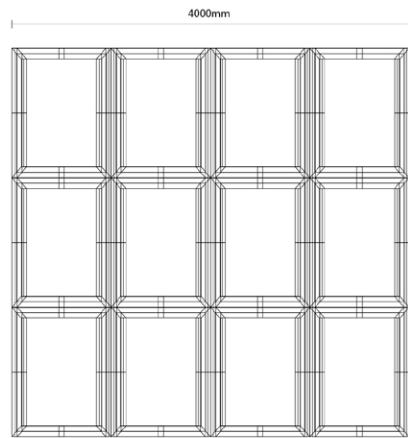
- 100-year storm
- 500-year storm
- 1,000-year storm
- Rockslide
- + Avalanche
- ▲ Slush with Avalanche
- Longyear River
- Historic Slush
- Historic Avalanche



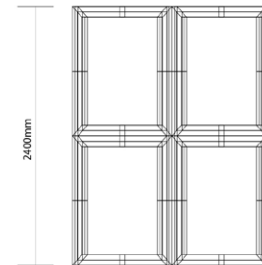
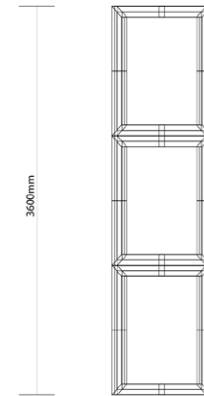
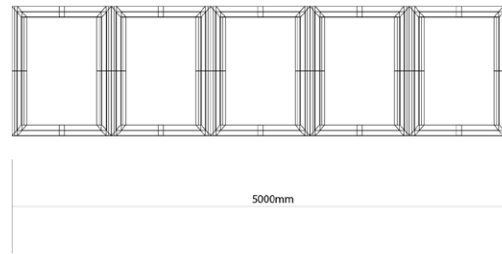
# Windows



= 1.2 m<sup>2</sup> window facade

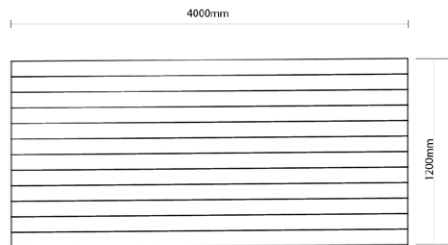
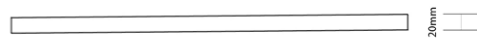
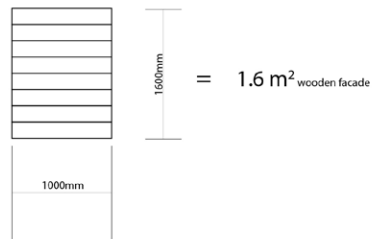


Material usage for 1.2m<sup>2</sup> of recycled window facade  
generic example of setup for calculation purpose.



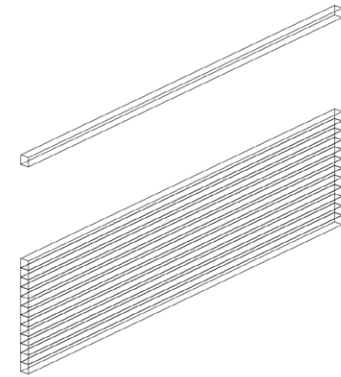
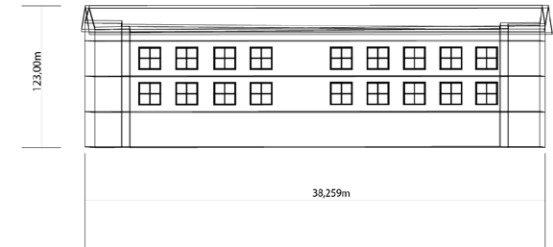
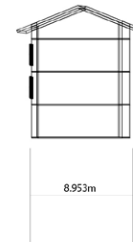
Different combination

## Wooden facade



## Built Component reuse

Material usage for 1.2m<sup>2</sup> of recycled wooden facade  
generic example of setup for calculation purpose.



Nybyen housing unit