

Waterscape in Hjari Veraldar: The ‘Last Habitable Edge of the Earth’

Samaneh Sadat Nickayin

Agricultural University of Iceland - Faculty of Planning and design, Iceland.
samaneh@bhi.is

Abstract

Iceland is a geologically active land and home to some of the world's most active volcanoes and the largest glaciers in Europe. Due to its harsh environmental circumstances, its inhabitants' living conditions are unpredictable. Icelanders live in a sort of 'rescue mood', ready to face a variety of natural disasters, such as avalanches, flooding, heavy storms, eruptions, landslides and earthquakes.

In this northern sea island, water is the most influential element in culture, language, economy, leisure, landscape, planning strategy, and islanders' everyday life. Water comes in all forms, both as a provider and a threat. Based on this premise, this commentary is a synthesis image of the forms of water from an outlander point of view, reading an alien landscape in which the forms of water are one of the most enchanting interpretation experiences in the landscape. This anecdote is a narration of the forms of water concerning urbanisation, land and human in different subtle layers of Icelandic culture, economy and landscape design.

L'Islanda è una terra geologicamente dinamica e ospita sia alcuni dei vulcani più attivi del mondo sia i più grandi ghiacciai d'Europa. A causa delle dure condizioni ambientali, la vita dei suoi abitanti è imprevedibile. Gli islandesi vivono in una sorta di 'rescue mood', pronti ad affrontare una grande varietà di disastri naturali, come valanghe, inondazioni, forti tempeste, eruzioni, frane e terremoti.

In quest'isola nel mare settentrionale, l'acqua è l'elemento più influente nella cultura, nella lingua, nell'economia, nel tempo libero, nel paesaggio, nella strategia di pianificazione e nella vita quotidiana delle persone. L'acqua si presenta in tutte le forme, sia come risorsa che come minaccia. Sulla base di questa premessa, questo articolo propone un'immagine sintetica delle forme dell'acqua da un punto di vista esterno, ossia da parte di una straniera, e lo fa leggendo il paesaggio islandese come un paesaggio alieno in cui le forme dell'acqua sono una delle esperienze di interpretazione più incantevoli. Questa storia è una narrazione dell'acqua riguardante l'urbanizzazione, la terra e l'uomo attraverso i diversi strati della cultura islandese, dell'economia e della progettazione del paesaggio

Keywords

Waterscape, Geothermal energy, Iceland, Placemaking, Hazard protection

Waterscape, Energia geotermica, Islanda, placemaking, protezione dai rischi

Living in the ‘Last Habitable Edge of the Earth’

One of the fascinating synonyms of Iceland is *Hjari Veraldar*, translated as ‘last livable/habitable edge of the Earth’, a remote island in the northern sea. Paradisiacal, utopian, dystopian, heterotopian – islands hold an incredibly mysterious and alluring place in our geographical imagination. Islands have their own rules, their own stories, their own characters, their own ecologies, their own functions, and their own forms. Differentiated from their contexts and as much myth as reality, *Hjari Veraldar* describes how the adventurous and courageous islanders have been dealing with mysterious natural disasters, the real worriers who never left their land since the first Viking settlers lodged the island.

Islands are figures of otherness and difference in proximity to what surrounds them, water. The inception of all human lives starts by immersing in the womb’s water; by leaving it, we become a creature of land made up of 60 percent of water (Ívarsdóttir, 2021). The connection to water within humans is vigorous, and Iceland demonstrates a unique case of such a link.

The indirect connection to the forms of water is palpable in the Icelandic language and the culture of islanders. Water shapes the land and creates different forms of carving landscapes: lake, island, gulf, peninsula, bay, cape, strait, isthmus, archipelago,

and meander. However, one of the unique bodies of water visible in the Scandinavian countries is Fjord. Fjord comes from the Norse *fjörðr* that has become a common word in the international vocabulary of almost all languages. Fjord accurately describes those parts of the land which are long, narrow inlets with steep sides or cliffs, created by a glacier and connected to the ocean. Almost all of the places in Iceland take their names after the name of the fjord (fjörður) in which they are located: Borgarfjörður, Ísafjörður, Grundarfjörður, Seyðisfjörður, etc. Due to the central mountains of Iceland, the population is spread between shorelines and the highlands. Icelanders from different villages use the expression *Milli Fjalls og fjord* (Between the mountains and the fjord) to say, «we all come from the same place», a solitary expression that resonates with the coalition and alliance of a nation who come together to encounter the challenges of the inhospitable nature.

Icelandic is a rich language that allows for much freedom in expressing different forms of nature with extremely accurate words. For instance, there are countless colours and colour combinations for Icelandic horses or different nouns for exact types of birds’ tails.

The forms of water in Icelandic weather vocabulary are astonishing. Such precision is more noticeable in

describing the type of snow. Local claims that Iceland has over a hundred words for snow, although this may sound exaggerated, the snow-related vocabulary is vibrant; depending on when the snow land, weather conditions and how much of it falls, Icelanders use a variation of terms¹.

Another form of water and land is geyser. The word is derived from the Icelandic verb *geysa*, which means gush. The term geyser, from the placename *Geysir* in the Haukadalur valley, became popular and has been used for similar hydrothermal features worldwide. While artificial and decorative fountains, with the most sophisticated design and technologies, are part of the landscape design realm, the nature-made *geysir* is a well-known tourist attraction spot to admire the natural *Jet d'Eau*, of an eruptive water spring.

Although the beauty of these places creates economic opportunities in tourism, designing the infrastructures with low impact on the surrounding areas is the key challenge for landscape designers in Iceland.

Mystic forms of Waterscape: Fog, Fire, Ice

Water is the only common substance that is naturally found as a solid, liquid or gas. In the Icelandic landscape, water flows, freezes and evaporates; waterfalls, glaciers, and hot geothermal waters are the main features of water that are apparent in the Icelandic landscape. The fog is one of those mystic waters form; the Icelandic *dalaþæða* is an elusive natural phenomenon of fog waterfalls. In the areas close by Vestmannaeyjar, it is common to see *dalaþæða* crawls along a valley and bumping into obstructions, flowing over rocks and tumbling down the mountain tops, plunging into the sea. Such a bizarre weather phenomenon creates an enchanting view for visitors (Fig. 1).

Solid water, such as ice and glaciers, is part of the Icelandic landscape. Several glacier tours allow one to experience the ethereal blue world of glacial ice.

There are precisely 269 named glaciers in Iceland, which is a lot for such a small land mass. Iceland's glaciers make up about 11% of the entire country. The main important glaciers, such as Vatnajökull, Langjökull and Snæfellsnes, are protected in Iceland National Parks. Other delightful spots in Iceland are the 'floating iceberg' in Jökulsárlón Glacier Lagoon and Dimond Beach, where the small icebergs wash up on shore (Fig. 2, 3, 4, 5).

Þúfur (thufur) is a mesmerizing natural wonder of how the frost forms a unique landscape. Þúfur is the result of frost heaving and frost expansion of the vegetated ground. Soil in Iceland contains a lot of water. In winter, the soil gradually freezes to a certain depth. First the needle ice is formed, which then merges and can form an ice sheet.

When the water freezes, it expands in the soil and creates a so-called hollow layer. During this frost expansion, the vegetation cover rises a little, but then does not manage to fall in the same way again when it thaws, as fine-grained material manages to crawl into the air. The frost expansion causes not only heaving of the soil but also pressure to the sides with the result that a bulge is formed in the soil. Gradually, the continuous repetition of freezing and thawing will lead to the formation of Þúfur. Aside from its natural beauty, Þúfur also holds cultural and historical significance. It has been a source of inspiration for local artists, photographers, and writers who have sought to capture its grandeur in their works.

Every year, all mentioned 'non-designed waterscapes' attract tourists and investors to benefit from the generosity of the mystic forms of waters in Iceland to establish a new form of leisure or economy. The way in which globalisation in terms of economy, tourism and wellness is affecting the Icelandic landscape is the core of design challenges for recreational spaces and functional infrastructures. Unlike other European landscape public space design, Icelandic landscape design is not *per se* design-

Fig. 1 - The elusive natural phenomenon of fog waterfalls called *Dalalæða*. (Photo: courtesy Kjartan Gunnsteinsson)



Fig. 2a, 2b – Floating iceberg in Jökulsárlón Glacier Lagoon (top) & Diamond Beach (bottom). (Photo: Samaneh Sadat Nickayin).

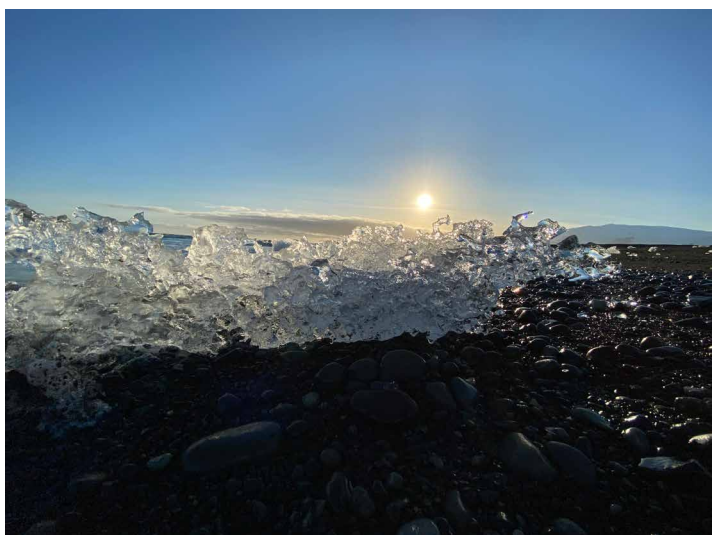




Fig. 3 – The Vatnajökull Glacier. (Photo: Samaneh Sadat Nickayin).



Fig. 4a, 4b – The Seljalandsfoss Waterfall (left), Geysir (right). (Photo: Samaneh Sadat Nickayin).

ing a new public space; it is a minimalistic touch on nature to display the unique emotion that merges within a specific natural arena.

Wealth in forms of Waterscape: Economy and Leisure

Water is a resource, and as expected in most islands, fishing is the economy's primary source (Landsbankinn, 2018); most urban settlements were built around the rich fishing resources along the 5000 kilometres of coastline. Dwelling with water is the origin of Icelandic urbanity, which relies on naval resources and waterworks. Anna María Bogadóttir (2021) highlights that the root of the history

of Icelandic urban development is analogous to the changing type of vessels sailing to the island, and the forms of urban settlements have been directly affected by the type of vessels, from Viking ships to industrial trawlers and tourist ferries.

The structures of piers, mainly in wood, became later streets in built landscapes. The main street of commerce and recreation in Reykjavík today, called Laugardalur, the 'valley of hot springs', was initially formed as the path between the hot springs and the urban core of the harbour. The leading pathways from the harbours are the gate to the villages around Iceland. In 1854, fishing exports increased in Reykjavík, and as a result, the first stone pier was

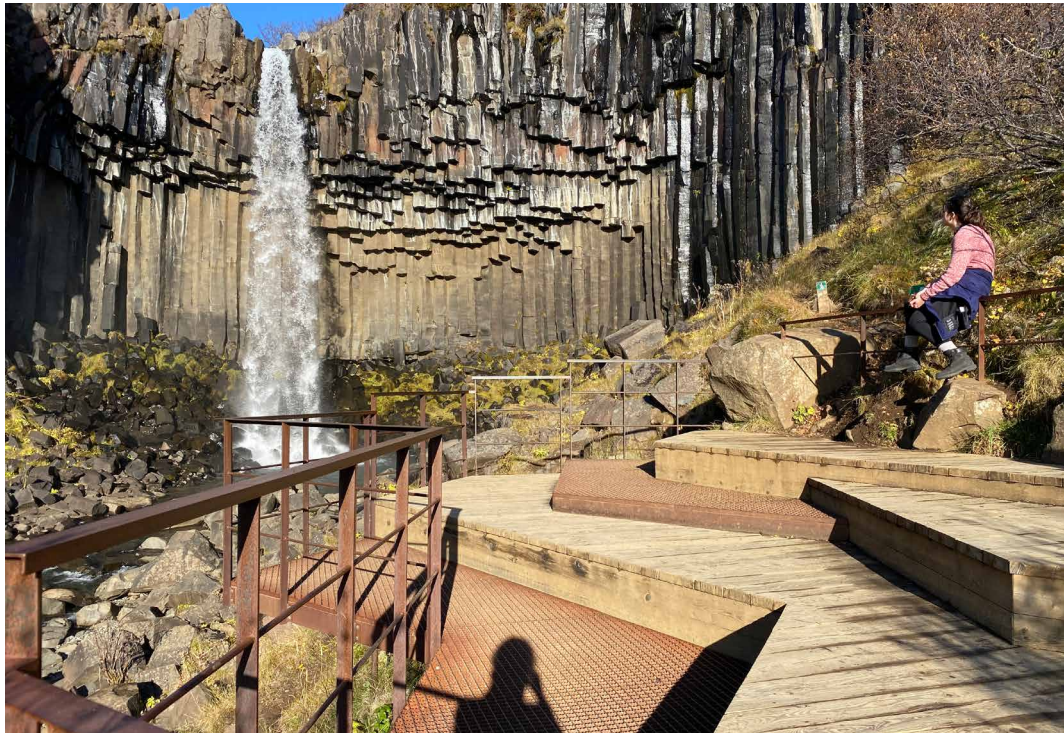


Fig. 5a, 5b – The Svartifoss Waterfall (top) and Þúfur landscape (bottom). (Photo: Samaneh Sadat Nickayin).



Fig. 6a, 6b – Geothermal Pipelines and land reclamation at ON Energy company (before and after). (Photo: courtesy Magnea Magnúsdóttir).

constructed during the 1880s (Lindal, 1982). Following the motorised fishing vessels, from 1913 to 1917, the first harbour was built in Reykjavík (Bogadóttir, 2021). The revolution in the fishing industry led to the need for city planning and preparation of the infrastructures, such as water and sewage systems and heating and bathing infrastructures.

After the independence of Iceland from Denmark Kingdom in 1918, the first call for national planning legislation was carried out by a planning committee of three members². The committee was in charge of the planning for Reykjavík and villages with 500 or more inhabitants (Theódórsdóttir & Svavarsson, 2016), the committee's main priority for planning was based on garden city movement and mental/physical well-being. According to the new land categories planning, the industrial fishing area of the harbour has been separated from residential areas, and extensive development in recreational facilities, such as Botanical Garden, indoor sporting arena, the national stadium, and swimming pool, have been implemented into Reykjavík (Bogadóttir, 2021). The urbanisation development commenced a new chapter of energy production in Iceland, thanks to abundant water. A century ago, Icelanders used imported coal, kerosene for heating and cooking, and the traditional national peat. The burgeoning of urbanisation has led to the construction of new facil-

ities, such as hydroelectricity and geothermal heating infrastructures, harnessing the natural and abundant geothermal heat and hydropower sources for heating and electricity generation.

The first Icelandic hydropower station started operating in Hafnarfjörður, near the capital, in 1904. Reykjavík in 1921 and Akureyri in northern Iceland got electricity from hydropower stations in the early 1920s.

The first years of the 20th century also marked the beginning of geothermal harnessing in Iceland. Icelanders had for centuries used natural geothermal springs for bathing and washing, but in 1908 the geothermal hot water began to be harnessed for heating individual homes. Furthermore, geothermal water is used as a heat source in swimming pools, for snow melting³, fish farming, greenhouses, and industry usage (Orkustofnun, 2020).

In the 1930's, local authorities started showing interest in geothermal heating and tried harnessing Iceland's immense hydropower. Water has been the central engine of industry in Iceland. Due to the abundance of Hydropower and Geothermal Energy generation, different multinational companies with high electricity demand have been based in Iceland. Aluminium smelting is the most crucial power-intensive industry in Iceland.

Such energy power plants create a significant im-



ARÍD

1843 HENGIGJÖRÐIN



Úr heimildarmyndinni SUNDIÐ eftir Jón Karl Helgason.
Smíð í Bíla Paradís rok. 2012.

Í Sundreglum Fjölnismanna er að finna lýsingar á ýmsum aðferðum til að kenna fólki sundtökin. „Hengigjörðin er ein þeirra. Undirbúningur í hengigjörðinni fer fram á þurru landi, áður en farið er að synda í vatninu. Hann er nauðsynlegur þar sem eigi eru til heiltar laugar til að læra sundið í. Hengigjörðin er svo til búin, að teknar eru þrjár gjarðir eða gjarðarhólkar og liggur sín taug úr hverri þeirra og binda menn þær upp um bita eða

slá, þar sem þykir haganlegast. Ein er stærst og á að girða hana um brjóstið en hinar tvær minni og hafðar sín um hvort læri. Bringugjörðin á að vera nokkru hærri en hinar, svo líkaminn hallist heldur upp að framan þegar í þær er lagst. Vidvæningnum er vant að ganga best að læra sundtökin, ef þeim er skipt niður í þrjú kafla, og fyrst er reyndur einsamall fótburðurinn, þá handaburðinn og loksins öll sundtökin í einu.“

Fig. 7 – Teaching swimming on land from the movie of *Sundið*.
(Photo: courtesy Jón Karl Helgason).

pact on the landscape. Land reclamation and systematic work on the restoration of natural vegetation and the environment after the disturbance have been among the central policy of energy companies. Interestingly, the supervision of good finishing and landscaping of the power plant areas with the aim of restoring the landscape and vegetation, like the pre-construction landscape, is the domain of expertise of Icelandic Landscape Designers⁴. The layer of vegetation is removed accurately to be placed again after the construction work; methods such as tillage, seeding, spreading moss, and moving turf have been adopted to have good results (Fig. 6).

Public space and Waterscape: Survival, Leisure and well-being

Geothermal is not only the source of energy production but also creates the beating heart of urban social life in all Icelandic towns. Being an island, swimming has been considered a survival skill in Icelandic culture. In the movie *Sundið* - Swim for Life (2012) - the director Jón Karl Helgason illustrates the cultural background of swimming in Iceland back to the Viking times. As the first settlers were fugitives, the skill of swimming died out over the centuries; until the 19th century, during the new era of Icelandic urbanisation, Iceland became one of the first countries to pass legislation enabling municipalities to introduce swimming as an obligatory part of its school curriculum⁵ (Fig. 7).



Fig. 8a, 8b – The Blue Lagoon.
(Photo: courtesy Francesca Perrone).



Anna María Bogadóttir (2021) highlights that in the latest version of the elementary school physical curriculum *Aðalnámskrá Grunnskóla 2007*, each student should at least complete 20 hours of swimming every year. The reasons for such a choice are due to the security issues of islanders (as fishing is the core of society), Icelandic cultural heritage, and the promotion of public health.

Although most of the public spaces in landscape design refer to green space, in Iceland, swimming

pools are public venues for social dialogue and recreational spaces for relaxing and physical exercises (Bogadóttir 2021). Such urban bathing culture attracts millions of visitors annually to enjoy recreational activities offered in Iceland's fancy and expensive spas. The 'wellness industry and spa culture' are breaking ground in Iceland. The design of swimming pools and hot tubs became a complex task to accommodate a large number of visitors and to guarantee the user's safety and hygiene accord-

Fig. 9a, 9b – The Sky Lagoon.
(Photo: courtesy Dimitra Theochari).



ing to the regulations for natural bathing sites (Umhverfis-og auðlindaráðuneyti, 2015).

The Blue Lagoon and Sky Lagoon are two design prototypes for wellness industry spas. The former is the result of an accidental by-product of the Svartsengi geothermal plant power opening in 1976. The surplus of water from geothermal plants has been led into the lava field, as water cannot be recycled because of its mineral concentration. The lagoon is covered by soft white mud at the bottom due to

the high concentration of silica, which is considered healing for psoriasis (Olafsson,1996). The Blue Lagoon has grown incredibly over the last forty years (Fig. 8). In 2012, the National Geographic published a list of Wonders of the World⁶, including the Blue Lagoon in the Water category and shared this recognition with the esteemed company, including Australia's Great Barrier Reef, the Norwegian fjords, Lake Baikal in Siberia, and Victoria Falls in southern Africa. The title of Wonders of the World outlines



Fig. 10 – The Guðlaug Bath in Akranes. (Photo: Samaneh Sadat Nickayin).

the crucial role of “Calibrated and perceptive architectural, wellness, and hospitality design” (Bogadóttir, 2021, p.115) that reveals the potential of geothermal water as a recreational open space that emancipates through global promotion.

In 2020, the construction of a new competitor of Blue Lagoon, started at Kársnes Harbour, Kópavogur, an industrial area south of downtown Reykjavík: Sky Lagoon. The spa opened in 2021 as an incredible ocean-fronted geothermal lagoon. The design was inspired by the Icelandic tradition of *torfbærir* (turf house) and *Klömbruhleðsla* (turf wall). These techniques involved cutting pieces of heavy swamp turf and stacking them tightly to create well-insulated accommodations and warm shelter through snow and volcanic eruptions. The Sky Lagoon is the testimony of recognising and

honouring Icelandic landscape and cultural traditions in modern spa design (Fig. 9).

To highlight the importance of bathing culture and its global promotion, it is alluring to mention that the Sky Lagoon is considered one of the last decade's most significant developments in Icelandic tourism, costing over 50 million USD, adding that the whole construction occurred during 15 months of complete lockdown. One of the most challenging elements of the build-out regards the two-and-a-half-ton glass pan of the sauna, as the most oversized window in all of Iceland to guarantee the view over the North Atlantic Ocean.

Open sea bathing and ocean swimming are popular activities in Icelandic tradition as a way of living with water. Several geothermal baths are located on shorelines as a gathering point for ocean swimmers.

Fig. 11a, 11b – The Nauthólsvík Geothermal Beach. (Photo: courtesy David Christian Finger).



Guðlaug Bath in Akranes (Fig. 10), and Vök Baths in Egilsstaðir, designed by Basalt Architects, are prominent examples of how design could adhere to the *genius loci* of space and culture.

However, globalisation has influenced the *genius loci* of some Icelandic public spaces. Thanks to the geothermal engineering technology, a ‘Golden Sand Oasis’ has been designed a couple of minutes from downtown Reykjavík, the artificial Nauthólsvík Geothermal Beach. A bizarre sensation of being in the

middle of the North Atlantic and Arctic oceans, coupled with the glistening golden Moroccan sand, to indulge in some summertime frolicking, enjoying the best of both worlds, Icelandic intricacies with Mediterranean *bonanza*. The bay of Nauthólsvík has a Blue Flag certificate, an award conferred to environmentally sustainable beaches with high eco-friendly standards (Fig. 11).

The geothermal water is not only limited to the outdoor public space design of hot tubs and swimming



Fig. 12a,12b – The Friðheimar Greenhouse. (Photo: courtesy, Þórunn Edda Bjarnadóttir)

pools, it is essential for local food security and production in Iceland. It has been utilized for horticultural practices for centuries to prolong growing seasons for outdoor crop as well as growing vegetables and nurturing tree saplings under controlled conditions in greenhouses (Garðarsdóttir, et al., 2021). Today, greenhouses are part of indoor public space realm, for instance, Friðheimar Greenhouse is a restaurant where geothermal heating technology makes indoor horticulture possible. Friðheimar is a gratifying indoor public space, that demonstrates the art of 'placemaking' where the hidden hot water pipelines flourish the fragrant tomato plants, and the users can enjoy the feast of tomato soup with freshly baked bread (Fig. 12, 13).

The geothermal pipelines sprawl across the Icelandic mossy landscape. The most visible infrastructure that reminds the description of "The city of Armilla" in the novel book of "Invisible Cities" by Italo Calvino:

It has nothing that makes it seem a city except the water pipes that rise vertically where the houses

should be and spread out horizontally where the floors should be: a forest of pipes that end in taps, showers, spouts, overflows... You would think that the plumbers had finished their job and gone away before the bricklayers arrived; or else their hydraulic systems, indestructible, had survived a catastrophe, an earthquake, or the corrosion of termites.

Abandoned before or after it was inhabited, Armilla cannot be called deserted. At any hour, raising your eyes among the pipes, you are likely to glimpse a young woman, or many young women, slender, not tall of stature, luxuriating in the bathtubs or arching their backs under the showers suspended in the void, washing or drying or perfuming themselves, or combing their long hair at a mirror. In the sun, the threads of water fanning from the showers glisten, the jets of the taps, the spurts, the splashes, the sponges' suds. (Calvino, 1972, p. 49-50)

The hot streams of Icelandic water channelled in the pipes, accustomed to traveling along ground veins, find the new aquatic realm in landscape design, to burst from multiple swimming pools, to melt the snow on the pedestrian line, to gush as geyser jet,

Fig. 13a,13b – A Greenhouse in Reykir with banana plantation. (Photo: Samaneh Sadat Nickayin).



to warm the ‘fake’ Moroccan beach, to play new ways of enjoying the water, to make public space (Fig. 14).

Waterscape and Hazards: Reactionary Planning

The driving force behind most landscape design projects, take into account the different type of risks that water presents in urban areas. At the core of these hazards urban flood management is

the main priority. Chinese flood management approach Sponge City, Australian stormwater treatment design Water Sensitive Urban Design (WSUD) and Dutch river flood protection Room for River are among the most successful method that has been adopted worldwide.

However, in the land of ‘Ice and Fire’, the risk of cloudburst, is less discussed compared to other water related catastrophic events such as snow ava-



Fig. 14a,14b – The Geothermal pipelines and land reclamation at ON Energy company (before reclamation on top, and after below). (Photo: courtesy Magnea Magnúsdóttir).

lanches, landslides, and volcanogenic flood⁷, which have caused injury, death, and destroyed villages and infrastructure during the history of Iceland. Catastrophic avalanches in Sðavík and Flateyri in Westfjords, landslide in Seyðisfjörður, eruption of Eyjafjallajökull in 2010 that led to volcanogenic flood, the eruption of Grímsvötn in 2011 that caused disruption for 900 flights are only few of such natural hazards.

Due to such vulnerability, different protection structures have been implemented, which had a great impact on the surrounding landscapes. Anna María Bogadóttir (2021) point out most of the protection structures represent mere functional solutions and design part of 'placemaking' has been lacked, she emphasises while part of the challenges is to adopt and integrate the structures into the landscape, the structures can also act as potential placemaking elements designed to function as recreational areas. Recent projects display examples of mere functional structures - like the Avalanches Protection Wall in Flateyri - as well as multifunctional protection structures, such as in Siglufjörður. Here, the protection structure merges with pedestrian paths, viewing points, and traced water passages that end in a small pond, providing new spaces for social and outdoor activities such as hikes, picnics, and concerts (Bogadóttir, 2021, p.122).

In the urban areas, the implementation of blue/green infrastructure is the main part of city planning⁸.

For instance, the redesign of Reykjavík's Oðinstorg Square- with permeable surface and ponds, and Urriðaholt neighbourhood⁹, within the catchment area of Urriðavatn lake with emphasis on sustainable drainage solutions that mimic natural processes in the treatment of surface water to feed the lake naturally from the rainfall, are two examples of how placemaking, and sustainable drainage solutions can be combined using a comprehensive, interdisciplinary approach.

Icelandic waterscape is distinct compared to the rest of Europe. Icelandic waterscape is rooted in culture of 'survival', make 'habitable' the 'last edge of the earth'. Water represents the ground for democracy; in the swimming pool; Ívarsdóttir mentions "you find politicians, artists, pensioners, and children engaged in dialogue about current issues, all in an equal manner. In the hot tub, we are all equals stripped of our daily costumes and social status. That is what make bathing culture so important in the Icelandic daily life. A public, socially equal space, the hot tub is our Italian square" (2021, p.129).

The Icelandic design aims to make the best out of a complex and unexpected situation. Icelanders did not fight against the nature and the existing reality; they built a new model. Icelandic water landscape design aims to be 'gentle design' that prioritizes creating environments, and experiences that are soothing the forms of water; comforting the needs of human beings within the landscape - a soft touch on the existing nature.

The Icelanders react gently when the nature is hostile. Icelandic planning it is "responsive rather than proactive", and many projects testimony the examples of "reactionary" planning (Ívarsdóttir, 2021). As the water flows into the unexpected places, cracks, the Icelandic design is a fluid approach that find new methods to get the best out of a complex inherited nature. It is a demonstration of the Icelandic ingenuine attitude of *þetta reddast* (it will all work out).

Note

¹ *Snjór* and *Snær* are very generic words for snow. *Mjöll* means the snow that has just fallen. *Hjarn* means frozen snow, icy snow. *Kafsnjór/kafaldi/kafald* means deep snow or a heavy snowfall that creates huge piles of snow. *Bleytuslag* means wet, deep snow. *Él/moldél* means hailstorm or a snowfall that suddenly happens without a warning. *Hundslappadrífa* translated as “snowflakes big as a dog’s paws”, a calm weather snowfall with unusually large snowflakes, other variations are *skæðadrífa* and *logndrífa*. *Hríð* means snowfall with a considerable amount of wind, also translates as a snowstorm. *Fukt* is a very small amount of snow. *Bylur* means a severe snowstorm. *Skafrunningur* refers to drifting snow. *Slydda* means type of the snow that is so wet that could be raining. The list is very long and here is the list of most common Icelandic words for snow and snowfall: *Snjór*, *Hríð*, *Aska*, *Ofankoma*, *Mugga*, *Éljagangur*, *Hundslappadrífa*, *Snjóhula*, *Áfreði*, *Skafrunningur*, *Blindöskjubylur*, *Bylur*, *Flyksumjöll*, *Snjódyngja*, *Ofankafald*, *Muggukafald*, *Snjóakk*, *Fannburður*, *Drífa*, *Snjófukt*, *Snjóhald*, *Skafi*, *Él*, *Maldringur*, *Fannfergi*, *Skæðadrífa*, *Snjóburður*, *Mulla*, *Kafaldsbylur*, *Fjúk*, *Slydda*, *Fök*, *Frostleysusnjór*, *Fönn*, *Slabb*, *Kófvíðri*, *Krap*, *Mjöll*, *Moksturskafald*, *Hraglandi*, *Snjóalög*, *Hryðja*, *Lausamjöll*, *Skafelgur*, *Nýsnævi*, *Hret*, *Slitringur*, *Hjarn*, *Hríðarkóf*, *Leysing*, *Grjónabylur*, *Snjóreykur*, *Snjóhenja*, *Kóf*, *Pos*, *Skafmold*, *Kafald*, *Haglél*, *Harðfenni*, *Klessingur*, *Logndrífa*, *Snjócoma*, *Hreytingur*, *Hálka*, *Kafaldsbylur*.

² The committee was composed by: Guðmundur Hannesson, a physician who published a book on planning in 1916: *Um Skipulag bæja*; Guðjón Samúelsson, the first Icelandic Architect, and engineer Geir Zoëga, who has been appointed as the Head of State Roads in 1917.

³ Geothermally heated streets and sidewalks are common in Iceland, using the plastic tubing underneath the pavements at 30°C to melt snow and ice.

⁴ See ON Energy Company Land reclamation methods: <https://www.on.is/en/environment/land-reclamation/>

⁵ See the law nr.39/1925 *Íþróttalög*, Sports Legislation, and law nr.25/1940, *Um heimild fyrir sýslu- og bæjarstjórnir til að Skyla unglinga til sundnáms* (Legislation on the authorisation of districts and municipalities to introduce obligatory swimming education for teenagers).

⁶ The official word of National Geographic Wonders of the World 2012, to describe the wonder for the water of Blue Lagoon is: “Iceland straddles the Mid-Atlantic Ridge, where the North American and Eurasian tectonic plates are pulling apart. Upwelling magma built the island and heats its vast reservoirs of water, creating a geothermal paradise. First among the country’s many simmering geothermal pools is the Blue Lagoon, a turquoise vision in a

black basaltic moonscape. The geothermal spa is fed by seawater 6,500 feet (1,981 m) beneath the surface, where it reaches a searing 464 F (240 C). Capturing silica and other minerals on its way to the surface, it emerges from the ground at a balmy 100 F (38 C), just right for pampering visitors.”

⁷ Such floods result from the interaction of hot freshly erupted lava, tephra or hot gases with glacier ice and snow on the slopes of volcanos.

⁸ The following laws and regulations are considered for the implementation of blue-green surface water solutions in Iceland (Reykjavíkurborg, 2020): Planning Act no. 123/2010/Planning Regulation no. 90/2013/ Building Regulation no. 112/2012/ Act no. 160/2010 on structures/ Administrative Law no. 37/1993/ Act no. 9/2009 on the construction and operation of sewers/ Regulation no. 798/1999 on sewers and sewage/ Regulation no. 884 on the prevention of oil pollution from on-shore operations/ Act no. 7/1998 on hygiene and pollution prevention/ Regulation no. 796/1999 on protection against water pollution/ Regulation no. 797/1999 on the prevention of groundwater pollution/ Act no. 33/2004 on the prevention of marine and coastal pollution/ Act no. 32/1986 on the prevention of marine pollution/ Act on nature conservation no. 60/2013/ Act on water management no. 36/2011/ Regulation no. 550/2018 on emissions from business operations and pollution control ⁹ is the first in Iceland that receives eco-certificate according to the Building Research Establishment Environmental Assessment Method (BREEAM) Communities certification system.

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