26 - 29 may, 2015

Delft University of Technology, The Netherlands

ISBN 9789461865571

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The Design Charette of the DON RIVER WATERSHED has been organised on the occasion of the Dutch trademission to Canada. The Design Charette has been a collaboration between Delft University of Technology, Van Hall Larenstein University of Technology and University of Toronto and the Dutch Consulate in Toronto, and the travel was made possible by the NH Bos foundation.
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INTRODUCTION

On May the 29th the Consulate General of the Kingdom of the Netherlands in Toronto and Waterfront Toronto hosted the Canada – Netherlands Resilient Cities Summit: ‘Planning and Design in a Changing Climate’. Before and in parallel to this summit, a collaborative student design charrette, including students from Delft University of Technology and the University of Toronto took place. The results of this design charrette were presented as part of the Summit program.

In the design charrette the central design questions are how to increase resiliency of the Don river watershed within the dense urban context of Toronto in the light of extreme climate events; and what urban design solutions can lead to climate change mitigation and adaptation? These questions will be explored at three levels of scale, the regional, the local and site specific level. Three locations are the case studies of what the effects of these solutions are on specific sites. The locations are situated upstream, midstream and downstream; all of which have different elevations, urban form and social demographics, and therefore may require different sets of design strategies.

During the design charrette students also considered how solutions for flood management can integrate with, or compliment other aspects of sustainability, including reducing energy use and emissions, providing green and ecological public space, growing food, increasing social diversity and equity.

A design charrette is a focused workshop and planning session where participants come together to collaborate on a vision for a particular area. The French word “charrette” literally refers to a two-wheeled cart. During the 19th century, architecture students at the Paris Ecole-des-Beaux Arts were regularly assigned 24-hour design projects. Proctors would then circulate on schedule in the design studio, pulling a two-wheeled “charrette”, for collecting the many rolls of students’ drawings. Hence the term “en charrette”, which came to define a time-intensive design-exercise, producing tangible results.
Objectives
The design charrette aims to fulfil the following objectives:
a. Finding opportunities to improve the resilience of the city, specifically managing floods, and bridging the gap between times of water surplus (flood) and scarcity (drought).
b. Developing integral spatial design solutions for stacking functionalities of landscape and urban structure in order to meet the major challenges of the city: water management and flood control, decreasing energy use and emissions, food production, social equity, and connectivity.
c. Developing site-specific solutions and priorities for each of the three selected sites based on geographic and social characteristics.

Design questions
1. How can water flow be designed in order to minimize the negative impact on the entire urban region while increasing resiliency? Look for space and means in the public realm for water storage, re-use and treatment, and slow release, and link green uses with water propositions (such as park, leisure, food).
2. What is the role of each case study site related to the regional water system? Incorporate retention, detention and attenuation, meanwhile integrating energy, food and transportation issues.
3. What urban and land-use transformations can occur to optimize environmental performance, to lower carbon footprint and at the same time improve living condition?
4. Design a densification strategy at the scale of the watershed. Taking into account the roles of the different locations in the watershed, which part can these play in densifying the city.

Themes
The intensive studio addresses the following themes:
1. Green infrastructure: water management, flood protection, watersupply, ecological habitat, civic space, recreation and health.
2. Urban densification strategies: high and low densities distributions, interlinked strategies with the position in the water system
3. Mixed-use urban design, social diversity and equity.
4. Food resources: local/urban/regional food production, food security and safety, self-sufficiency, fostering local economy.
5. Energy: energy production in the landscape, reduction of energy use and emissions.
6. Transport, traffic, connections, mobility, accessibility.

The reference point for the design explorations is the record rain event in Toronto’s history as a typical weather pattern of the future, as these types of events are predicted to occur more frequently. This event is the 7 July 2013 event (displayed on the maps).

First in this report the program will be described and all the participants are mentioned. Following some basic information will be provided about the Don River Watershed where after the results of case studies are presented. In the final chapter the overall conclusions are described contributing to the search of solutions for the planning and design in a changing climate.
<table>
<thead>
<tr>
<th>Date, time</th>
<th>Activity</th>
<th>Who</th>
</tr>
</thead>
<tbody>
<tr>
<td>26 May</td>
<td>All day</td>
<td>Field trips to the case study sites in the watershed.</td>
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<tr>
<td></td>
<td></td>
<td>Students and host guides: Lisa Prime (Waterfront Toronto),</td>
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<tr>
<td></td>
<td></td>
<td>Aderonke Akande (Tower and Neighbourhood Revitalization), TRCA</td>
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<tr>
<td>27 May</td>
<td>9-10.30am</td>
<td>Introductory lectures, on the occasion and the design charrette, visit</td>
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<td>roof garden</td>
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<td></td>
<td>10.30am</td>
<td>Break</td>
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<td></td>
<td>11am – 1pm</td>
<td>30-30 exercise. In groups different themes (water &amp; climate, economy, society, urban system/density) will be explored with post its and on maps how the area looked like 30 years ago. Rotation around three or four tables, same with 30 years ahead. Capture findings as analysis and programming for the design process. One of the themes will be water management</td>
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<td></td>
<td></td>
<td>All, in groups</td>
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<tr>
<td></td>
<td>1-2pm</td>
<td>Lunch outside</td>
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<tr>
<td>Time</td>
<td>Activity</td>
<td>Groupwork Type</td>
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<tr>
<td>2-2.45pm</td>
<td>Design/discuss in groups: analysis and problem definition. Schematic drawings of understanding the water system, how the watershed functions, and the position of each of the detailed design sites within that, the volumes during normal, drought, average and extreme storm events and heavy rain. What is the core problem and what is the design task and solutions for the Don River watershed you formulate for your group. Sketching on maps, pushing forward ideas, suggestions, testing them and create the best possible proposals.</td>
<td>Groupwork</td>
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<tr>
<td>2.45-3pm</td>
<td>Brief presentation of core problem (2 min/group. Stickering to identify the commonly felt biggest problem.</td>
<td>Plenary</td>
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<tr>
<td>3-4pm</td>
<td>Sketch session I - Taking into account the defined themes for the workshop (densification, energy, food, transport) from a water system perspective.</td>
<td>Groupwork</td>
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<tr>
<td>4-5pm</td>
<td>Sketch session II – create landscape designs and 3D drawings</td>
<td>Groupwork</td>
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<tr>
<td>5-6 pm</td>
<td>Intermediate presentation of the design proposals for the entire site per group, problem analysis and design ideas</td>
<td>Plenary</td>
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<td>7-9</td>
<td>Dinner</td>
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<td>28 May</td>
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<tr>
<td>9-11 am</td>
<td>Regroup: old groups merge into new groups, with representation of every former group. Each group works on a different detailed design site. In these sessions the combination between water and densities, energy, food and transport will be explored. Integrate findings from thematic groups at lower scale into integrated designs for each site</td>
<td>Groupwork</td>
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<tr>
<td>11am - 1pm</td>
<td>Plasticine modelling</td>
<td>Groupwork</td>
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<td>1-2pm</td>
<td>Lunch outside</td>
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<td>2-3.30pm</td>
<td>Finalise drawings for final presentation. Create and prepare fine drawings and models for the presentation: telling a clear story with drawings, visualisations, powerpoints, prepare 10 min presentation for the panel and 2 min for the plenary (29 May)</td>
<td>Groupwork</td>
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<tr>
<td>3.30-4pm</td>
<td>Prepare presentation</td>
<td>Groupwork</td>
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<td>4-6pm</td>
<td>Present for external review panel</td>
<td>Plenary</td>
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<td>6-8pm</td>
<td>Lecture session</td>
<td>Andy, Nico, Rob, Dirk</td>
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<tr>
<td>8pm</td>
<td>Drinks</td>
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<tr>
<td>29 May</td>
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<tr>
<td>8.30-10.30am</td>
<td>Plenary opening session</td>
<td>All</td>
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<tr>
<td>10.30-12.30</td>
<td>Exhibition set-up at the Brickworks, Breakout sessions (workshops)</td>
<td>All</td>
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<td>12.30</td>
<td>Lunch</td>
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<td>2-3pm</td>
<td>Plenary session</td>
<td>All</td>
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<tr>
<td>3-3.15pm</td>
<td>Presentation of design charette results to His Majesty the King of the Netherlands</td>
<td>All</td>
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<td>3.15-4.30pm</td>
<td>Part of presentation results workshop</td>
<td>All</td>
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<tr>
<td>4.30pm</td>
<td>Wrap up &amp; close</td>
<td>All</td>
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<tr>
<td></td>
<td>Networking reception</td>
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PARTICIPANTS

DUTCH STUDENTS and CANADIAN STUDENTS
DELFt UNIVERSITY OF TECHNOLOGY
UNIVERSITY OF TORONTO

Jordan Duke          Landscape Architecture
Rui Felix            Landscape Architecture
Jasper Flores        Landscape Architecture
Melissa Gerskup      Architecture
Andrew Hooke         Landscape Architecture
Elise Hunchuck       Landscape Architecture
Agate Kalnpure       Landscape Architecture
David Kossowsky      Landscape Architecture
Lena Niel            Urbanism
Jergus Oprsal         Landscape Architecture
Matthew Perotto      Landscape Architecture
Anna Rosen           Landscape Architecture
Raissa Siqueria      Architecture
Koen Steegers        Landscape Architecture
Katie Strang         Landscape Architecture
Veerle de Vries      Architecture
CHARRETTE LEADERS

Liat Margolis, Professor of Landscape Architecture, University of Toronto

Rob Roggema, Professor of Design for Urban Agriculture & Slow Urbanism, VHL University of Applied Sciences and Cittaideale

Frits van Loon, Senior lecturer, Chair of Landscape Architecture, Delft University of Technology

VISITING CRITICS

Julie Bogdanowicz, City of Toronto, City Planning, Urban Designer

Prof. Dr. Ir. Andy van den Dobbelsteen, Climate Design and Sustainability, Faculty of Architecture, Delft University of Technology

Paul Dowsett, Sustainable TO, Principal Architect

Dr. Jennifer Drake, Environmental Engineering, University of Toronto,

Karl Van Es, Sustainable TO, Intern Architect

Prof. Dr. Ir. Anke van Hall, Parallel 52, Nijenrode Businessuniversity, Real Estate and housing Faculty of Architecture, Delft University of Technology

Lisa King, City of Toronto, City Planning, Strategic Initiatives, Policy & Analysis, Senior Planner

Nico Tillie, Chair of Landscape Architecture, Delft University of Technology
One of eight watersheds in Toronto, the Don River watershed covers an area of approximately 36,000 hectares and stretches almost 38 km in length, flowing south from its headwaters on the Oak Ridges Moraine to the Keating Channel, where it empties into Lake Ontario. The Don River watershed is almost entirely urbanized, leaving very little undeveloped land. Almost half of the watershed is dedicated to housing its 1.2 million residents. On average, 35% of the urbanized areas along the Don are paved with impervious surfaces. One of two North-South highways, the Don River Parkway runs along the mid to lower section of the Don River. A system of bike and walking trails makes the Don a heavily used recreational corridor.

Issues & Challenges: Due to the intense urbanization in the Don watershed, hard paved surfaces now increasingly prevent stormwater from slowly seeping into the soil, or from being taken up by vegetation. Therefore, much of the stormwater runs off the surface into the Don River, resulting in streambank erosion and increased flooding during large storm events, particularly from combined sewers. The challenge is to protect and restore the natural heritage features of the watershed, while trying to accommodate the competing recreational demands of a growing number of greenspace users. In addition, a number of serious environmental threats to the watershed have emerged and must be addressed, including global climate change. The major issues and challenges are:

- Ensure the naturalization of the mouth of the Don River is adequately funded to restore the natural heritage features and reclaim vacant industrial lands for parkland and new neighbourhoods.
- Secure stable, long-term funding for infrastructure renewal, watershed management, land acquisition, and regeneration and protection efforts from both public and private sources.
- Manage stormwater to moderate flows in the river and maintain baseflow levels, while minimizing destructive flood conditions and reducing erosion.
- Reduce the flow of contaminants carried into the river by urban runoff, storm sewer and combined sewer outfalls, leaking historic landfills, and other sources, through a mix of pollution incentives, remediation projects, and restrictions on the use of toxic, stable, and bioaccumulative chemicals.
- Protect and enhance natural heritage features when opportunities arise, while planning for urban intensification and increased pressure by multiple recreational uses. Effort must also be made to protect and restore the deteriorating urban tree canopy.
- Stem the spread of invasive terrestrial and aquatic species through the watershed and attempt to control those that have gained a foothold.
upstream Case Study Site
HOGG’S HOLLOW

Geographic location: Hoggs Hollow is located in the Don River Valley and the river runs right thru it. It’s centered on the intersection of Yonge Street and York Mills Road/Wilson Avenue. On the north and east side the slope of the river valley, which is covered with trees, bounds Hoggs Hollow and forms a separation from York Mills. To the south Hoggs Hollow is bounded by the Rosedale Golf Club and Teddingtonpark. In the north it is bounded by the York Mills Road and to the west Yonge Street. Hoggs Hollow was a part of the City of North York until 1998 when that city merged with five other municipalities and a regional government to form the new “City of Toronto”.

Land-use: Hoggs Hollow is a residential area with a great number of detached houses, condo townhouses and condos. recreational areas like the golf course on the south boundary and the York Mills valley Park. But it also has a densely developed business area. It’s one of the most affluent neighbourhoods in Toronto, house listing prices range from C$2,000,000 to C$7,000,000.

It started as a subdivision of the James Hogg estate. The estate was founded on the whiskey distillery and gristmill operated by Joseph Hogg. The subdivision included one hundred and forty-one lots.

The fact that the area consisted mostly of quick sand, swamps and boggs, only a few houses were actually built in 1856, when the estate was subdivided. However the proximity of the historic village of York Mills, which provided the area with a school, a post office, blacksmith and other facilities, attracted Scottish, Irish and English immigrants. The neighbourhood grew in stages and was finally completed in the 1960’s.

Architecture / Urban Design: The present day Hoggs Hollow neighbourhood began to take shape in the 1920’s with the creation of lots, layout of roads, and design of homes reflecting the aesthetic of the English countryside. In this lush landscape, relatively close to its natural state with hills and dales, the roads follow the flowing pattern of the river, rather then submit themselves to the strict pattern of the grid.

Most homes in Hoggs Hollow are within walking distance to York Mills subway and Go Transit station, 5 minute drive to Highway 401 on-ramp and a 20 minute drive to downtown Toronto. Many of the original estate homes and modern movement residences of the early to mid-20th century are being demolished in favour of large new homes. The homes are mainly two or three storey high.
There are some historical landmarks left like the Miller Tavern (circa 1857), located at the bottom of Hoggs Hollow Hill, 3885 Yonge Street, which was only kept after some fierce battles with the developers and municipality.

**Public space:** Blending seamlessly with the quiet charm of the area’s natural foliage, picket fences and painted windows are popular on the sidewalk-free avenues of Hoggs Hollow.

**Stormwater Management:** On October 15 1954, the valley was inundated as a result of Hurricane Hazel. Many attempts have since been made to manage water in the natural watershed of the valley. Still many homes are prone to moisture and flooding from the water table. A large part of the riverbed is not a natural bed, but built of concrete, this way transforming the river into a sewage canal.

The City is currently reconstructing local streets throughout the Hogg’s Hollow neighbourhood. Phase 4 of a multi-phase project will begin in March 2015. Phase 4 works will include reconstruction of streets, installation of storm sewers, curb and gutter and the replacement of the public portion of any substandard water services.

The City studied various options for addressing problems related to storm-water management and road improvements in the Hogg’s Hollow neighbourhood. The study was completed in 2005, and recommended the following:

- Implementation of a series of source control measures on private property through a public education campaign
- Implementation of a long-term road and storm water drainage improvement program, which involves reconstruction of the road network in the area, in conjunction with the installation of a storm sewer system capable of conveying stormwater up to a 100-year storm event, and a storm infiltration system for water quality purposes
- Enhancing the municipal operations and maintenance program for the area

The area is bounded by Yonge Street in the west, York Mills Road to the north, Doncliffe Drive in the south and Highland Crescent / Bayview Ridge and the Rosedale Golf Club in the east. The black line delineates the study boundary.
Demographics: Hoggs Hollow is a neighbourhood known for it’s high number of Korean, Dutch, Japanese, Persian and German speakers. Their jobs vary from arts and culture to recreation and sports to management, business and finance workers. They live close to work, walk there and have a university degree.

Education: In 1925, a two room elementary schoolhouse named the Baron Renfrew School opened to replace an earlier structure at 45 York Mills Road (formerly Mercer Avenue and/or concession road 19) that was destroyed by fire. In 1929, the Loretto Sisters Institute of the Blessed Virgin Mary moved their Motherhouse and Loretto Abbey Catholic Secondary School to the area. Both St. John’s Anglican Church and Baron Renfrew (renamed York Mills Public School) grew in size with various additions added. Nowadays there is only pre-school in Hoggs Hollow.
midstream Case Study Site
THORNCLIFF PARK

Geographic location: Thorncliffe Park is bounded on the east by the Don River, on the west side by Millwood Road, on the north by Wicksteed Avenue and Research Road, and on the northwest by a railway track between Millwood and Wicksteed. However, the official Community Planning Area named Thorncliffe Park includes the neighbourhood to the north of the railway tracks, east of Laird Avenue, south of Eglington Avenue, and west of the Don River.

Land-use: Thorncliffe Park has both an industrial and a residential section. The residential section includes 34 high-rise and low-rise apartment buildings grouped in and around a rough oval with Overlea Boulevard dividing Thorncliffe Park Drive. The residential section was originally designed as a planned community for 12,500 residents, but now houses 30,000. The neighbourhood is heavily served by 24-hour public-transit.

Demographics: Thorncliffe Park has one of the largest immigrant population in the City, Canada’s largest Islamic community, and one of North America’s most diverse neighbourhoods. In 2001, immigrants constituted 66% of the population of the Community Planning Area, and recent immigrants constituted 87%. The most frequent languages spoken are Urdu and Gujarati. The neighbourhood includes a variety of mosques, halal groceries and after school Quranic teaching programs. The neighbourhood is known for its low income and high unemployment.

Education: Built in 1961, Thorncliffe Park Public School, is the only public school in the neighbourhood. Since 2003, it stands at 2,000 students and continues to be the largest elementary school in North America. The nearest middle schools (1,200 students) and high schools are located in a neighbourhood to the east, within a 20-minute walk or 5-minute drive.

Architecture / Urban Design: Thorncliffe Park was a 1950s plan by the Town of Leaside to redevelop a former racetrack overlooking the Don River. Proposed to be the first apartment neighbourhood in Canada, it was recognized internationally as an ambitious antidote to the Toronto’s sprawl. The project was published prominent construction journals worldwide for its construction efficiency. The apartment towers represented ultimate of modernity, with panoramic views of the city, underground parking, indoor pools and other amenities never seen before. The neighbourhood has since undergone prolonged neglect and lack of investment. The public and ecological realm is largely disconnected and in need of communitiespecific programming.
Public space: The neighbourhood is home to one of Toronto’s oldest community gardens. Thorncliffe Park Garden Club is located on hydro land north of Overlea Blvd. and provides garden plots to approximately 100 local residents and their families on a non-profit basis. Gardeners also donate fresh produce to local community agencies such as the Scott Mission.

Stormwater Management: To the east of the site, the three main tributaries of the Don converge, resulting in a significant increase in flow through the site and south into the Lower Don. To the south, the North Toronto Waste Water Treatment Plant treats water collected from combined sewer lines in the area and then releases the treated water back into the Don, contributing 11% of its flow. These factors position Thorncliffe Park at an integral point in the watershed, with great potential to control water flow in the Don during wet weather. Two important factors in monthly flow rates in the Don are snowmelt and vegetation growth. As the snowmelts, flow rates in the Don peak. While precipitation does not change significantly in summer, flow rates are at their lowest during this period because water is taken up by vegetation. Chloride is the main pollutant and therefore late winter and early spring months as the most critical as they contribute most strongly to pollution, flooding, and erosion.

As much as 51% of Thorncliffe Park is covered with impervious surfaces, as compared with the 35% average in the urbanized areas along the Don. This high ratio of impervious surfaces means that during an extreme weather event, runoff can reach up to 150 million litres. For the most part the neighbourhood has dedicated storm-water sewers, and only a small part on the west of the site is still serviced by the combined sewer system of Toronto. Based on the location of the storm drains and their outfalls, the neighbourhood can be divided into 11 regions for storm-water management. Currently, this storm-water from Thorncliffe Park flows directly into the Don, untreated.

Future Plans: The neighbourhood is anticipated to benefit from the new Transit City Plan and proposed Don Mills RT line. The City of Toronto has issued the Wet Weather Flow Management Guidelines, (November 2006) to provide direction on how to manage wet weather flow inside the City’s jurisdiction, as well as the Toronto Green Standard (TGS), performance measures for sustainable site and building design which compliment LEED.

The Port Lands is a 356 hectare (880-acre) district bounded by the Keating Channel/Don River and Lake Shore Boulevard in the north, the Toronto Inner Harbour in the west, Ashbridges Bay in the east and Lake Ontario and Tommy Thompson Park in the south. This extensive, underutilized area presents an unprecedented opportunity for waterfront revitalization. Much of the Port Lands is publicly owned and is within a 30-minute walk of downtown Toronto. The southern portion of the Port Lands is bordered by Lake Ontario and much of it is used formally and informally as recreational space.

The Port Lands are man-made and were created by decades of infilling what was once the largest wetland on the Great Lakes. Beginning in the 1880s, the area was gradually filled in to make more land available for industry and shipping. Much of the area is also in the flood plain of the Don River - 290 hectares of land are at risk due to flooding from the Don River, under a Hurricane Hazel-sized storm event. Waterfront Toronto, Toronto and Region Conservation Authority (TRCA), Toronto Transit Commission (TTC) and City of Toronto has worked collaboratively, and in consultation with a number of agencies and land owners to develop the original 2007 winning design entry by Michael Van Valkenburgh Associates.

The Lower Don Lands is one of 17 founding projects of the global Climate Positive Development Program, a Clinton Climate Initiative (CCI) program. Naturalizing the mouth of the Don River and providing flood protection for the Port Lands were identified as top priorities by all three levels of government when they first established Waterfront Toronto in 2001.

The naturalization of the mouth of the Don River will deliver:
- Over 1,000 m of new river channel
- 13 hectares of new coastal wetland, with a 2 hectare wetland patch adjacent to the Don Roadway connecting to the Ship Channel.
- 4 hectares of terrestrial habitat located within the constructed valley system with additional greenspaces anticipated outside the valley system
- Creation and enhancement of 13 hectares of aquatic habitat

The new Mouth of the Don River will remove the flood risk to 240 hectares of land. The majority of the remaining 50 hectares of land still at risk due to flooding are designed to be flooded as they are located within the Keating Channel and the new naturalized river valley system. The Don Valley Parkway will continue to flood north of Lake Shore Blvd to Eastern Avenue. The only solution to flooding of the DVP would be to rebuild this section of the highway, which is outside the project scope.
CASE STUDY I
FLUCTUATING HOGG’S HOLLOW

PARTICIPANTS
Matthew Perotto
Raissa Siqueria
Katie Strang
Veerle de Vries

Hogg’s Hollow is one of the most affluent residential areas in Toronto. Rather than following the strict grit pattern it’s roads follow the flowing pattern of the river. This on the one hand unique, beautiful position of dwellings alongside the waterfront connecting the neighbourhood directly with the river, on the other hand has caused dangerous situations in case of flooding in the past. A large part of the dwellings is located within the floodline. Another area specific problem is the channelization of the river. This seemed a sufficient engineered solution to guide and control the water flow but also results in loss of biodiversity and natural sedimentation within the river, less water infiltration and high maintenance costs. There’s a shift of thoughts on finding more ecological and sustainable solutions for storm water management in the area.

With this change of mentality in mind the design proposal focuses on how we can address the storm water management in a ecological way, while maintaining the characteristics of the neighbourhood.

Our design proposal focuses on two scales: the Don River watershed and Hogg’s Hollow. On the scale of the Don River watershed we propose a lateral strategy where water is collected, treated and distributed. Water will be collected at intersections, so called nodes, of the vertical river flows and horizontal crossing hydro corridors and infrastructural flows. At these nodes the water will be treated and, in case of storms, stored. Subsequently the water is further distributed from these points. Within these lateral zones opportunities arise for combining water- treatment and storage with other energy systems, social activities and forms of cultivation and ecology.

For Hogg’s Hollow the design proposal is divided in phases with a focus of letting nature run it’s course once again. Phase one consists of creating a more natural, wetland, landscape where the water level can fluctuate due to different seasons and/or storms. A new flood resilient housing typology is introduced to fit within this landscape. Phase two focuses on the connection with the neighbourhood by retrofitting the plateau streets with Green Systems to collect, convey and encourage the infiltration of all surface water. In phase three, similar to the scale of the Don River Watershed, opportunities of combining the wetland landscape with other energy systems, social activities, cultivation and ecology can be investigated.
Regional strategy
FLUCTUATING HOGG’S HOLLOW
Development new flood resilient housing typology in wetland area

Existing location with green and water network

Dwellings located in 100 year floodline
Location phasing strategy
FLUCTUATING HOGG’S HOLLOW

Redevelopment of concrete channels and golfcourse area with new housing typology

Connection with neighbourhood Green Systems in full flood event situation

Situation in spring: managed flood during bird migration
PARTICIPANTS
Koen Steegers
Jordan Duke
Andrew Hooke
Jasper Flores

Case study II proposes a revival of the polluted Don river as a recreational refuge of Toronto city. However, Flood Fingers does not only reconnect Torontonians with the typical Canadian wilderness, but also recycles the riverwater and reduces flooding danger at the same time.

Over the last three decades Toronto’s population grew to more than 5 million people. In the next three decades this will increase even further to almost 7 million people. As a consequence, the Torontonians need to drive three hours by car to flee the city to be able to ease their minds. Simultaneously, the Don river area gives way to urban fabric and functions as Toronto’s drain for its polluted intensifying stormwater runoff.

Flood Fingers proposes a Dutch strategy to use this uncontrollable climatic development to revive the Don river area as a typically Canadian city refuge. Thereby changing the area, and the Canadian relation to water, from back- to frontside.

The steep slopes of the ravines in combination with stormwater runoff are used to generate electricity via enormous water wheels that are propelled by the downward flowing water. The polluted stormwater is captured in freshwater marshlands in between slope and Don river in the valley, where it is purified before it enters the river. When the river area is completely saturated at heavy showers, the excessive water is pumped up into the former stormwater-infrastructure under ground again, as all stormwater runoff flows on groundlevel in the Flood Finger strategy. It is mostly pumped up with the electricity that was generated the weeks/months before by the normal stormwater drainage. Therefore, the Flood Fingers do not only appear regionally as distinctive park-experiences at the ravines, but they are the ends where a new waternetwork of smaller fingers on street level climaxes.
Regional strategy
FLOOD FINGERS

Polluted Don river

Don river area as recreational corridor

Drainage as unique “park” experience

Significant slopes for Flood Fingers

Archaic Canadian experience
Runoff produces electricity on its way down - Storm-/Riverwater purified in marshlands in between slope and Don river - Excess water stored in former stormwater infrastructure

- Green roof irrigation
- Plaza or park can be filled with excess water
- Toilet / shower + other residential greywater use
- Parkland is able to be filled by excess stormwater runoff or returned greywater
- During storm water flows down vegetated swales along streets
- Energy is created by the turbines that resist water as it moves through at high velocity down the ravine
- Grey water returns to system, eliminating need to cross the entire city to be cleaned
- Excess filtered water is stored back beneath the city after storm events
- Don River
- Boardwalk and pathway system
- 100 year flood line
- When there is no snow or storm event, water is pumped from the Don to be cleansed before returning to be filled by excess filtered water

Flood Fingers Thorncliffe

Flood Finger strategy

Inner workings strategy
FLOOD FINGERS
Stormwater and greywater into the underground conveyance system, much of which enters into the Don River.

Turbines generate electricity from the storm runoff.

Greywater is used for gardens, toilets, and industry.

Cleaned and excess stormwater is stored back into the pipes underneath the street, to be stored until used.

Experience terminus Flood Finger

Streetscape redesign

Appearance

FLOOD FINGERS
CASE STUDY III
EMERGENT URBANISM: responsive networks

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Asked to look 30 years into the future, we imagine Toronto as a civic body and landscape that can - and must! - anticipate and respond to ever-increasing climatic events.

Looking to the immediate past of Toronto - of any city - one could select a change in the use of a technology, a change in land-use and in so doing, would be able to trace a cascading series of effects that change the way the city is used, the way it is built.

Thorncliffe Park is a series of towers that was built for 12,500. It now houses over double this number. This population is especially vulnerable to flooding; the design of the residential towers placed mechanical and back-up systems in the parking garages - when flooding occurs, towers are without power. Sometimes, for days.

Instead of resisting the tendencies that are the result of the site - and the city’s - geomorphology, how can we plan ‘unplanned’ spaces to relieve pressure on these sites of intensity?

Before we set out to plan the unplanned, we understand - and believe the city to be - an ecosystem of resources, both human and non human.

At Thorncliffe, the unique confluence of circumstance allows for the leveraging of water management as a way to create awareness, education and to mitigate the pressures of climatic change on the infrastructure and lives of the city and its inhabitants, as each transition from consumers to consuming-producers.

At the scale of the block, of the neighbourhood, the design centers around the re-direction and re-use of black, grey, and storm water as well as their latent energy possibilities and attendant affects. This design is enacted through a simple but resilient set of rules of engagement for property management and development.

THE CHANGE EVENT:
RISE OF THE DRIVERLESS CAR & ONLINE COMMERCE

An increase in both the use of the driverless car and the attendant decrease in the need for parking sees a significant drop in street parking and underground parking.

The simultaneous rise in online commerce and drone delivery sees traditional permanent store fronts shuttering, replaced with stable spaces for informal pop-up shops.
Analysis of the region and the site
EMERGENT URBANISM
Guidelines and perspective
EMERGENT URBANISM
CASE STUDY IV
ERODING TO A NEW FUTURE

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Case study IV focuses on the erosion as a tool that could bring a new perspective to the issues of flood management and the future of rivers in urban context.

Currently there is an ongoing fight against the erosion in the upstream of Don river. The midstream area is vulnerable to flooding, hence it has been channelized to move storm water downstream as fast as possible. Consequently, portlands have the biggest chance of having a serious flood damage. All of these actions are closely tied to each other and the current setting does not prove to be successful.

On contrary to fighting against the nature forces, we exercised the idea of turning them to our advantage. Thus we developed a toolbox that would encourage erosion and weaken the resistance towards it, and speculated on the outcome of such a process.

Phase 1
- Enhancing upstream erosion
- Weakening portland stability

Phase 2
- Portland mobilized and stabilized as islands
- Islands assist in capturing upstream sediment

Phase 3
- Sediment capture strategies implemented

Phase 4
- New islands are grown
- Islands used for residence and food production
Encouraging erosion

ERODING TO A NEW FUTURE
Socio-economical nodes
ERODING TO A NEW FUTURE

View on midstream of Don river with a socio-economical node

Socio-economical nodes
Future transportation network
Floating markets

Water quality/quantity enrichment

HOUSEHOLD WATER
RAIN WATER
SURFACE WATER

SURFACE WATER

TREATMENT
Details of Portland's erosion
ERODING TO A NEW FUTURE
CONCLUSIONS

Case study I
The current shift of thoughts towards a more ecological and sustainable way of managing the storm water provides several opportunities for the redevelopment of Hogg’s Hollow. This proposal shows the results of what can happen when we let nature run it’s course again including Dutch strategies within the design. Removing the concrete channels, redeveloping the golf course area in a ‘fluctuating landscape’ while adding a new flood resilient housing typology will ensure an integrated design with more space for water treatment and storage, biodiversity, social activities and combined energy systems.

Case study II
The ongoing urbanisation of Toronto city at the expense of the Don river area leads to an increasing unhealthy situation regarding stress-relief, ecological values and flood management. Therefore, acknowledging and working with the uncontrollable showers of nature, and thereby switching the emphasis to the Don river system instead of the urban fabric and its feeding infrastructure, leads to a more resilient Toronto city.

Case study III
Instead of resisting the tendencies that are the result of the site - and the city’s - geomorphology, how can we plan ‘unplanned’ spaces to relieve pressure on these sites of intensity? The city is an ecosystem of resources, both human and non human. Therefore, it is necessary to understand the ecosystem as users of the city to reduce the negative effects of climatic change on the city of Toronto. At Thorncliffe, the unique confluence of circumstance allows for the leveraging of water management as a way to create awareness, education and to mitigate the pressures of climatic change on the infrastructure and lives of the city and its inhabitants, as each transition from consumers to consuming-producers.

Case study IV
Embracing the force of erosion could lead various benefits that would not be possible in current situation when erosion is seen as a threat. New means of transportion would relieve and offer an alternative to the existing car-based commute. New urban typologies (socio-economical nodes and residential/food production islands) are examples of an alternative approach to food economy and logistics and resilient living. These interventions have a potential to lead to a better future for Toronto.
Toronto increasingly turned its back to the water as it grew into a megacity, while the traditional water cities in the Netherlands grew towards the water and let it flow through its hearts. Water meant an increase in hygiene, transportation, trade, while today city-water mainly means recreation and water-retention. The four case studies expose how the Dutch deal with climate change, and especially with water-related problems, as they were conducted in a foreign landscape. Case study I shows how renaturalisation of the Don river can result in attractive adaptable housing. Case study II shows how the Don river area can be refitted in the city as an adaptable recreational corridor. Case study III shows how futuristic human - and non human developments can result in spatial values in unplanned spaces. Finally, case study IV shows how erosion of the Don river area can be benefited from by means of the formation of new islands at Toronto’s waterfront for residence and food production.

The case studies depict how Dutch landscape architects, and Dutch spatial designers in general, can contribute to other problematic areas in the world, as a result of this different attitude towards water. Negative spatial developments induced by nature are not seen as an enemy that must be eliminated anymore, but as a stranger with whom a friendship must be obtained. Therefore, the natural causes of these negative developments are the starting point of new spatial designs and that of spatial redesign. The studies show that anthropogenic landscape developments should not be superimposed on the landscape anymore, but derived from it to give it the opportunity to grow as a living system that can evolve with changing climatic conditions in the future.
PHOTO IMPRESSION
WORKSESSIONS