The Resilient Urban River

A New Image of the City

by Stephen Bourke
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For most the heart of the city of Chicago is the loop district, the central business district where by all the different city transit lines meet in a loop fifteen foot above one’s head.

For me it is a place much more detached from, yet completely surrounded by the city, the confluence, the point at which the three branches of the river meet. With my back against the ten to fifteen foot corrugated steel river wall, bobbing gently in my kayak, the essence of an extraordinarily vibrant city can be felt. From here, the three branches of the river meet like an upside down letter Y placed out in front of you and flattened. Behind me I can hear the great Metra on its final approach into the city’s ‘Union Station’ as it completes its journey from the far outer reaches of the greater Chicago area. On my right, the bare aluminium skin of the red-line, transit train is glistening in the sun as it crosses the ‘Lake Street Bridge’ over the southern branch of the river. From that bridge panning left toward the direction of the bow of my kayak is the main stem of this great river. Throughout the day a parade of endless water taxis, tour boats and recreational boats, head towards this confluence of river branches and either go south, under ‘Lake Street’ bridge to my right, or north towards my left under what Chica-goans would call ‘Viagra’ bridge, the name being a touch of humour towards its current state in a permanent upright position. Its monumental state is paying tribute toward the industrial age of Chicago where the train was of vital importance to its prosperity, the bridge being the last physical piece of evidence of a past infrastructure.

All of this added to the sound of cars in rush hour traffic is a vibrancy of transport infrastructure any city would thrive upon. Although, completely forgetting the canyons of glass and steel towering left and right of the river, adding a whole other layer of fabric to a feeling of wonder and awe just bobbing in the water.

Submerged in City
The places from which we experience our city or rather the way we experience, affect the way we inhabit and relate to its entirety. What is important is the awareness of the fact that not everyone experiences places in the same way. Some people find intrigue in alley ways, the in between spaces of city blocks, the more organic forming, mish mash -so to speak- crevices of our canyons of glass, steel and concrete. Others love the overpowering feeling one gets on the path ways beneath the sometimes towering constructs of our finely crafted urban fabric and in contrast many seek an existence of humanity, the presence of nature spilling into our streets from parks and edges.

All of these together create a collection of experiences that give our cities character. More commonly than not the platform by which we navigate and comprehend our cities is that of streets, paths and bridge ways. They are the public realm, the transitional space between one place/medium and another, the base of our city. It is from this platform that everything extends outwards and upwards. However, in cities like Venice, Dhaka -Bangladesh- and Wuzhen -China- the canals and rivers are considered the foundation layer from which the city grows, operates and circulates, for their canals and flood planes are their streets. In earlier centuries the main transport routes through cities like Limerick, Chicago and London were

their rivers, they were a thoroughfare for commerce as well as acting as a place for interaction between the common person and the upper class, a city image clearly visible and hardly existent today.

Kevin Lynch in the Image of the city argues the importance of identity, meaning and individuality in a city. His notion that identity requires finding a distinction of something from other things that becomes of personal meaning is intriguing, for not everyone will find meaning in the same things or discover understanding of one’s city or place from the same physical or non-physical viewpoint. Although, the discovery of one’s personal relationship and meaning to a surrounding area evokes a deeper sense of connection to that space, it is also important to note that it is through shared collective experience that we are also able to recognise one’s self as more than just the individual, as part of society, this is also where meaning emerges. For myself, usually a place of observation and meaning is found in the overlap between nature at a human scale of interaction and the super human that is our cities. Nature gives a sense of something that cannot be completely controlled, a sense of vulnerability, that combined with the presence of something planned, designed and sculpted, a visual existence of man’s ability to control the physical environment we inhabit leaves me with that feeling of identity and meaning. It is the investigation into an image of the city that allows “meaning to develop without our direct guidance” that is most interesting.

In most cities the person at the human scale as an individual may seem irrelevant to the existence of the city, unless an experience of identity is uncovered beneath the numerous layers. Identity is difficult to achieve – and I use this word ‘achieve’ because finding a sense of identity within a city can be such a struggle that it genuinely feels like an achievement when it is found – in cities where the movement through them feels more like a transition than a true experience of that place. It is the moments in places between these transitional movements that offer contrasting perspectives of understanding within our cities that enable people to feel part of that place. People are consistently focusing on the negative aspects of our cities rather than seeking the beneficial aspects of them. They are more interested in complaining about traffic, dirt and congestion rather than seeking out places which evoke the opposite feeling in our surroundings. We cannot expect to design and plan spaces and experiences in our cities that will appeal to the entire collective, for

not everyone will share the same experience or image of a city. However, a group of people may share a common image of the city. Therefore, if we take into account smaller shared images of the city and thrive to apply them gradually then not only do you eliminate a monotonous singular image but create a city with a collective few, more individual images, creating a diverse more interactive and meaningful experience of one’s place.
Rivers and Water

Situations of observation enable a greater sense of one’s place. They are created from places of interest, places that allow for perspective and dynamic range, two of the most important parts of a city’s diversity, a kind of quality that enables a deep sense of awareness in one’s surroundings. What keeps a person interested in a place more than most is the changeability/adaptability of that place. People are not interested in sameness, we are always looking for new and interesting routes to take through our towns and cities, seeking a new perspective from the previous one furthering our better understanding and appreciation for that place. For what is more subject to change than nature itself, more specifically our rivers and more locally the Shannon River through Limerick city. What differentiates this river from great city rivers like the Chicago River is its tidal quality. The Chicago River is gentle, almost imperceptible in its movements throughout the days, weeks and seasons. Its common flat glass-like qualities enable the observer to appreciate the surrounding city qualities whilst being gently supported by the river from below the base of one’s boat or kayak at this level of the city. Being on the rivers surface is a much more human scale to such a super human city.

The Shannon River not only takes the form

of a slow moving glass like surface of water—depending on the conditions of the weather—but rages just as much as it can creep. Some days you can hear the ferocious rush of the water a hundred metres from its edge, drawing you toward it, tempting you to observe its power, to use the words of Simon Schama, “where they would be the captives, rather than the masters, of waters.” People in an attempt to understand rivers have tried to control its direction but of course soon find out that a slight control is all that is possible for a river’s destination is inevitable regardless of its changing route and that the inescapable flow of a river is as constant as the passing of time.

A particular quality the ‘River Shannon’ holds which I believe to be more revealingly interesting than this is its ability to uncover what’s below the surface in the stages of its rise and fall with the tide. It reveals small mounds of stones, tufts of reeds, simply a character of river bed, platforms for observations, offering new perspectives. These perspectives are not constant however, but are subject to change in a very short amount of time, so utilize while you can. In many cases of rivers passing through cities, by the time they have reached the city they have built up so much mass from all the tributaries, that the

sheer depth of the water regardless of low tide, with those affected by tidal change permanently hides whatever geological character the river’s bed holds. In this sense they therefore lack an almost mysterious quality of concealing and revealing the Shannon River offers Limerick city. All of this of course is different for a kayaker, this small vessel enables endless positions of perspective and places of observation. There is something beautiful however, about having to wait for these perspectives to be uncovered under the right conditions for “what the river could authorize it could also take away.”

There are many ways by which people experience our rivers that offer contrasting perspectives from it. In the context of the city we can understand that it is from the viewpoint of our streets and bridges that only one disposition is reached from above. It is an attitude usually leaning towards that of admiration, rather than consideration of it as a potential platform from which to re-experience our cities at a completely different, more human scale. The only time we truly get close to experiencing the river in many cities, especially in recent years is when it is in flood, when its water truly effects the way we navigate our streets and homes in these conditions, however this experience is one

of a truly negative nature today. Then there are those with a more suburban/rural experience of rivers when the river’s edge is less defined and the transition from ground to water is more gentle sloping than sheer. The narrow width enables a greater sense of connection between nature and life at one side of the river to the other. Rivers through cities in their tendency to be wide can create a sense of alienation of one side from the other, almost unreachable or rather undesirable effect of experiencing the other side of the water. This more suburban scale, less dense more wild character of river, when the experience of the city is no longer available gives one a greater experience with nature. The embankments are not as elevated and separated from the river as opposed to those in the city scale. Therefore one gets the draw to “follow the stream, to walk along its banks in the right direction of the flowing water, the water that leads life towards the next village.”

The experience of rivers much further upstream is in one sense a somewhat opposite experience than that of cities. It is clear that in our built up cities we seek out signs of nature in order to ground ourselves in a place completely carved, sculpted and controlled. However, it seems in walks along the Shannon River surrounded by dense flora, trees and wildlife, we almost seek out an existence of humanity, that of the human hand. We find ourselves in awe of the gradual appearance of a fisher man’s hut consumed almost by overgrowth around it, peering out of nature so as to almost kiss the river’s edge. Further along one might see an old long, thin, wooden fishing boat full of water but remembering it has been anchored there in that state for a couple of years untouched. The sound of birds and the rippling of water reassuring you that “perspective and dynamic range are the two most important component parts of this valuable soundscape, not the absence of sound.” The river’s bed is much lower than the city especially in periods of time when rainfall is much less. The flow of water although minimal passes through a landscape which evokes strong sensual characters of sound and sight which can be most enchanting. Further upstream in these areas away from cities like Limerick, the river height is no longer affected by the tidal effect of salt water meeting fresh water -evident in Limerick city-, this quality of water passing over rocks consistently throughout the day, surrounded by the growth of trees, plants, reeds, grass, weeds gives a much more vibrant sense of nature. In many cities one must travel further upstream to experience this lower more sensual experience of water passing through and around rock, rather than the flat unchar-


acteristic quality it usually has. However, in Limerick we are lucky enough that when the tide is lowest and the rain is slight, the river unlocks qualities usually not present in a city but rather in areas much more consumed by nature rather than building.

Water in general has a strong psychological effect on people, be it their very bodies floating or bobbing at its surface, allowing “the current to pulse through them rather than around”9, or sitting in a kayak or canoe with the perception of one’s displacement, truly evoking a feeling of being part of it. Even the very sound of moving waters passing over rock or dropping in level, or the simple sight of it in the distance moving ever so slowly so as to mirror the sky in its glass like state. We have always been drawn to water by its somewhat magnetic effect; people and life are drawn to it. One could wonder if our brief first existence in the state of suspense in the womb has been subconsciously imprinted on the ego and the self. The very primitive awareness of one’s displacement in water or liquid could possibly be the almost obligatory drive to understand water and to further control it. Even the very first sounds to our ears were passed through the medium of a liquid and not air. “Barlow knew that to see a river was to be swept up in a great current of


People have “imagined themselves as inventors of a new world when in reality they were tied by nature to the relics of antiquity.” When engaging the conversations, thoughts and work on the deep future, nature has always had this ability to ground us into the deep past almost forcing us to question the very importance of our decisions today, for they will soon become a past. In the twentieth century the car influenced the way in which town planning was established, it seems water is going to do the same for the twenty first century. Currently since hurricane sandy, large cities like New York have been proven vulnerable and once the citizens realise that it doesn’t matter how great and powerful a city they hide behind, nature’s course is inevitable and its potential destruction and power is something to be respected and (if not prepared for) feared. The majority of planning for the future of these extreme events, is in terms of sea level rises as well as protecting and preparing an infrastructure for hits by hurricanes. Studies and data produced by Met Eireann about the levels of Carbon dioxide in the environment today and the changes in weather as a result of this, is proving that global warming is no longer a hypothetical or mythical thing being speculated about. Already we are seeing aggressive changes in our weather; the west coast of Ireland is taking a heavy beat-
ing through the winter period, our rivers are seeing a much higher volume of water passing through them, breaking their banks and flooding our streets. Water is going to affect the way we think about architecture and infrastructure. Whether they become floodable spaces, buildings that float or are on piles, cities are beginning and need to think about their future relationship to water and their rivers.

Since there is an interest here in the image of one’s city along and from rivers and nature, there is a drive towards a response to sea level rises of course, but also storm surges of water in our cities from excessive rain draining from our lands into our rivers, rather than that of a coastal response. In order to create an identity with a river in the city that is now becoming more subject to excessive surges of storm water, it is important to step back and consider what the primary vision for a city’s identity with its river is.

At the moment all across Ireland the immediate quick response has become that of a barrier to this flooding. Green spaces and public spaces along the river are being blocked by flood gates in order to join up with the river wall, creating an infrastructural barrier. On the one hand we are getting a quick fix to the minor amount of flooding (in comparison with the predicted flooding amount), keeping the river water off our streets, but on the other we are losing access to our green spaces for almost a total of four months out of the year. That is a third of the year we are barricading ourselves against the potential of a mere half meter rise in water. By creating a physical barrier to the river there is an immediate negative sociological and physiological attitude towards the river and water. It becomes this temperamental thing in nature whose personality can change overnight and affect the lives of many. Therefore why would anyone strive to associate with these arteries of nature in a positive light?

It is crucial for the future of our towns and cities that we adopt early on a clear sense of whether we are going to become nationally and globally, a society that operates through resistance or resilience with nature and this changing climate. Met Eireann has outlined in their recent publication ‘Ireland in a Warmer World’ the predictions of weather in Ireland within the next century. Autumn and winter seasons are to become wetter, with increases in the range of 15-25% as well as an increase in ocean surge height between 100cm and 200cm towards the end of this century. Sea levels are also rising at an average rate of 3.5cm per de-
cade which by the middle of this century with the inclusion of surges an increase in sea level during autumn and winter of up to 125cm and 250cm by the end of the century. The major problem of course with all of this is that with the increase in sea level at its greatest during winter in surge events, the increase of up to 25% rain fall once it reaches the river and its surrounding planes, has nowhere to go since the river will no longer be able to drain into the sea during the extreme events. Therefore the future of our villages, towns and cities depends on a very clear, immediate response to how we wish to deal with this inevitable condition of our current and future environment. What is key in the understanding about adapting to future conditions is that adaptation be considerate of the context area that is affected. “A successful set of adaptation options may work in one region but may not be applyable in another”.

In negotiating the importance of society’s adaptation to be able to better cope with the impacts that climate change will have, it is important to note that there is only a certain amount of climatic prediction that can be made. It is crucial that the uncertainties in a world of flux can be absorbed by whatever regimes and systems stand in place for these weather events. In investigating the conditions of the region of Ireland, what has always been clear about its weather is that it is, (much like Scottish weather) a very unpredictable compilation of shifting conditions. Although, the whole world is to be effected by climate change it is clear that Ireland will be lucky in the global sense of change. Its climate will see a shift yes, but not as severe as most of mainland Europe, North America Asia and other such regions and continents around the globe. Our winters will become wetter and colder and our summers dryer in a general sense. Therefore, we must now cater for region who’s weather is going to have a much greater contrast between winter and summer.

Resistance versus Resilience

In comparing resistance versus resilience it is important to have a clear understanding of the two in engaging any sort of speculative argument about the future of our towns and cities along rivers. It is imperative that any of the changes being made today are fully conscience of which strategy they are employing, be it one of resistance or resilience, for if a clear awareness and understanding is not outlined, an overall clear image of a city is lost.

The word resilience is being thrown around a lot quite loosely since disasters have become more common, but the very concept is much more in-depth than a mere statement. Resilience in the basic sense first is the ability of something to absorb the forces of nature in a very gradual non-damaging sense and the ability to recover reasonably quickly from its effects. A city becomes more resilient when the systems in place are designed to quickly adapt to changing conditions and requirements. An engineering resilience would also be the ability to rapidly return to the original state when relaxed from stress. An example of a resilient system would be that of flood plains, the take flood water, and store it in the land with some of it soaking into the ground and the rest of it sitting there until the weather event is over and it can all release. In an ecological re-
sillience concept, any change within the regime is normal because the systems are inherently dynamic\textsuperscript{12}.

Resistance, is the first instinct of human nature to a threat or potential disaster, to potentially press back with an equal or great force. However, what if the force of nature is greater than the system in place to resist this force? The effect would be a catastrophic failure. Resistance usually consists of a piece of solid, usually static infrastructure to block out the forces of nature. This system only works for a very measured amount of resistance and can end in a catastrophic failure if breached. If you imagine a flood barrier for a moment, on one side there is the city and on the other rising water. So far, the barrier had been resisting against the water which was overflowing off the land due to excessive rain. Although, once a storm hit of an unpredictable magnitude which caused the barrier to fail, (and since everything on the other side on the other side was un-prepared and ill equipped) the sudden rush of water caused structures to fail. If there had been no barrier all along yes the streets and building would have flooded but at a slower rate. However, a sudden failure in the system can unleash a greater force of water which would do more damage than having no barrier at all. This is in a sense the characteristics of resistant infrastructure.

At the moment the strategy in Ireland has been to resist; to barricade against flooding, redirect water to somewhere else by building walls and sealing off all gaps with barriers against rivers. However, cities that resist against flooding through infrastructure can only cater for a particular, calculated magnitude of flood water. In listening to the conversations of politicians in Ireland some of the plans to deal with excessive amount of water entering our rivers is to construct large concrete containers in the ground for water storage. Although, what is not being considered is if in an extreme weather event these tanks become full then what other means are there to deal with the excess, since tanks have a limit. Flood control infrastructure puts a city into a very black and white situation, they are either dry and secure or suffering by catastrophic disaster as a result of infrastructural failure. If an entire city is reliant on a few barriers and storage tanks and everything behind these barriers is ill-equipped to deal with flood water, then once the barrier is breached (which it would be) a potential unrecoverable destruction could occur, as experienced by New Jersey and many towns and cities along the east coast of the United States during hurricane sandy. In

its primal sense nature is possibly the most adaptable system that exists. As a people we have only been capable of infrastructural means for a few thousand years and it is almost ignorant of us to think that we are capable of fully resisting the potential disasters nature can inflict. Whereas, nature being a vast contained, complex system in itself, it is the only thing that can truly bounce back and adapt to all of its potential disastrous elements within that system. Therefore, cities are unprepared for flooding (by infrastructural means) exceeding capacity, which are clearly expected to increase by a severe amount within this century.

The real challenge globally is how to activate a transformation from resistant to resilient cities. This automatic assumption that cities cannot coincide with flooding is an archaic notion and a lack of imagination. Urban resilience with flooding needs to be concerned with two things; ensuring the safety of its citizens and creating a dynamic situation a city can be based on that can welcome flooding in a controlled way, solidifying the identity of the city within a potentially hazardous weather event. We have become accustomed to the kind of built environment not accustomed flooding, with a re-imagining of planning and design cities can weed out flood control infra-

structure and begin to live with floods. By becoming accustomed to consistent small amounts of flooding in our cities and retrofitting the built environment to allow for flexibility and diversity, when a major flood event occurs we will have become accustomed to dealing with it and bounce back much quicker at a much lower cost to the city, both financially and socially.

Instead of creating walls, banks and levees to quicken the flow of rivers out of our flood plains on further down river to flood someplace else, we should strive to slow down our rivers so as to store flood water in our flood plains in an ecological system prepared for such events. The vegetation on these plains would be of a rough nature so as to slow the speed of the flood water over the plain reducing any sort of dramatic surges, encouraging the water to soak into the plains. What would be the architecture of these plains? Would they float or be risen onto stilts and what would its connection be with the ground and water? There is a potential for a much more dynamic urban fabric which could encourage diversity within a city.
Conclusion

What is important however, is that in considering the future of our city’s relationship to water, that the river edge does not solely become an infrastructural barrier to water. Already in the midst of October Limerick is seeing its green spaces by the River Shannon become permanently blocked off by flood barriers. It is not desirable or understandable for our city’s public spaces to become temporarily dormant due to a certain minor change in rain fall and therefore river’s volume. Limerick City is luckily effected today only by minor flooding if we compare to places in the tropics and Japan where flooding can completely destroy entire towns and cities. It is understandable that a quick short term solution is needed however, these temporary solutions should only stay temporary for we should not and cannot see our rivers as something to be feared but rather experience in a collective urban way. Our near and distant future here in Ireland is to see a rise in water levels an expected 15 to 20mm of hourly rain in winter and early spring. What if our cities were allowed to flood? How floodable would we allow them to become? Urban resilience is defined by flood ability and reorganisation, not flood resistance and recovery. Although, water has always been drawn away from the city through pipes, it is about keeping the water in our cities in a controlled way and using it as an asset, as a floodplain, as a feature of the urban fabric by which we experience our cities in a new more dynamic and ever changing way.
Site Research

Since there is an interest here in cities and their rivers, specifically the Shannon River and Limerick city, an investigation into flood levels along the Shannon River was of primary interest. In projects past that have investigated flooding in the urban context, speculative data seemed to be the only thing produced from these investigations. The area researched was really only limited by the data from which could be gathered.

A vast expanse of limerick city area surrounding the Shannon, is the area of Limerick from which Lydar data was gathered. This data produced offered a point dot every half a meter apart in plan which gave an x, y, z surface reference. Putting together all of the ground surface points to create one mesh surface in 3d of Limerick From this the first true accurate contours of Limerick could be extracted. Countours of half meter intervals were pulled from this data to give me a more accurate reference of what lowerlying areas would be effected by future flooding in Limerick. Since the 2100 prediction for storm water levels in Limerick were to be an increase of two and a half metres it was of importance for the investigation into a site to see what areas on the newlt created contours would be effected.
Designation of flood planes into flood resilient, absorbant landscapes
Urban and Suburban connections between flood planes by a green edge
Urban and Suburban edges sacrified for a new green edge in response to the future condition of frequent flooding.
Natural river channels are generally comprised of meandering reaches interspersed with lengths of straight channels. In the lower extents of river basins where the gradient is shallow, sinuous or meandering reaches characterize the platform. This is significant because it is in these shallower reaches that floodplains become active and attenuation effects impact on the flow. Single stage channels with meanders or sinuous platforms have more complex flow patterns than straight channels, and are characterized by an additional resistance to flow induced by a spiral motion in bends; the strength of which is defined as the ratio of the kinetic energy of lateral currents to the kinetic energy of the total flow. The complexity continues to increase when the flow exceeds the bank-full level and inundates the floodplain.

Energy lost to internal fluid friction from transverse circulation, boundary resistance associated with transverse shear and also from eddy losses results from flow separation in sharp bends and from sudden jumps occurring at high Froude numbers.

The effect of the interaction between the main channel and floodplain flows and flow mechanisms are further described as consisting principally of a large
secondary current cell at bends and water plunging from the floodplain into the main channel near the centre-line of the floodplain system.

In the context of the Shannon through Limerick City, it is important when considering a new river edge to encompass flooding that embracing the river’s natural tendencies, and therefore much more viable than merely fighting against them. On the outside edge of the rivers bend where the most intense velocity and spiral erosion occurs, a solid edge is important to deflect the motion of the water around the bend preventing erosion and protecting the land. It is also significant to realise that it is on this erosion edge that the neighbouring land is at risk of flood, this bank would most likely be the first to break. It would almost be like a car moving too fast around the outside of a bend it would lose control and either slide out of control or topple over. The same applies to flood water, the forces on the outside bend/edge of the river would be so great the water would break this edge. However, on the inside edge in the same section of the rivers bend the water’s velocity is at its least and deposits of silt and soil carried by the water is dropped. It may be plausible to consider this edge of the rivers bend to be fractured and embrace the slower
motion of the water allowing the city to penetrate the water’s edge.

Whilst investigating flood plains and their effect on the flow of rivers it is important to understand what changes on a river’s course and flow magnitude when flood plains become active.

In the diagrams to the right a variation of simulated velocity in a meandering channel with rough flood plains, smooth flood plains is represented. As mentioned about the greater complexity of flow patterns in meandering channels than in straight, flood planes have a greater role to play in flood alleviation and in sustainable flood management and are known to decrease the speed of flood wave propagation down a channel, enhancing flood storage and reducing the magnitude of downstream flood peaks.

Therefore where at all possible in flood plains surrounding Limerick City it would be advisable to densely vegetate with trees and other more durable ecologies that could create a rough path on these planes from which flood water would have to pass through. By generating rough planes, the river and flood water would be forced to slow down encouraging a storage of water in the land. Currently far too many of these planes are open fields which are encouraging the opposite.
Eddy currents have a huge role in the deposition along a river or silt and material carried by the strong flow of its water. Through understanding eddies we as architects, planners and engineers can truly realise the potential of what can and cannot be effectively built on rivers.

Outlined earlier, in a meandering river, the flow of its waters is at its highest on the outside of its bend and at its slowest on the inside. Similarly with eddies there is a fast flow in stark contrast to a still like or slight flow. Eddies are the reverse flow of water once the water passes around an object, with regards to rivers these are more commonly than not a boulder in the way of the river’s course or a change in the river’s edge due to a protrusion of ground or rock. The water flows around this object and in its flow a circulation or spiralling of water behind the object interrupts the river’s carried energy and slows it down causing a more clam still like condition or water.

Eddies create still moments along a river’s course which create a potential for spaces of interaction with water and/or a break in the river’s edge.
Initial Strategic Master Plan

In the creating of the first master plan or vision for Limerick’s river edge and flood plains what was most important was that the entire conception read as one series of connections.

First there are the flood plains which once become more active through this proposal, should be connected back to the city. However, this connection could not simply be of a singular road or path network, it was of importance that it be a green connection. This green connection would be a significant portion of river edge that would activate an strong sense of ecology and activity along the river between these flood plains through the city, that the city could have the potential to identify itself more with nature and allow itself space to truly connect with the river’s edge in a way that is not has harsh and abrupt as it is today.

There was also an interest early on with the potential of the canal design itself. The canal like most is a very straight and direct course and so the water has the potential to pick up speed for the only true purpose of a canal is to provide a direct waterway between one bend of the river and another. Here, by meandering the canal more aggressively every rise in half a meter it creates a condition at flood level to slow the water down and allow it to store itself in the land. This inherently reduces the flow and flood magnitude of the river before it enters the city itself.
The potential fracturing of the river edge at the Curragower falls, creates multiple opportunities of access to the river by the public.

The sharp edges cutting into the river would create adequate eddy lines, pools of calm water for the public to utilize in recreation like fishing and launch points for kayaks and small boats. The creation of more eddies along the river through the city would also enable better environments for ecological growth, clam spots for fish, ducks, swans...etc.

Instead of the existence of one continuous hard edge, multiple fractured edges on a meandering river offer an opportunity for the river in flood to slow down at the eddies and soak into the green urban edge, storing more water in the land rather than redirecting and forcing it somewhere else.

These edges would be characteristically mash lands that would consist of simple connections across these lands. These wetlands, expect flooding and allow a buffer between the river and the built environment.

Breaking Down The River Edge
The final master plan consists of two bridge connections which between these green edges collectively connects the tree main land masses of Limerick. One between the Ennis Road and Georgey Quay and the other between Shannon Street and Clanmaurice Avenue.

The area of focus to act as a precedent for the rest of the project is between Sarsfield Bridge and Shannon Bridge. Which is divided in plan by a pedestrian bridge between Shannon Street and Clanmaurice Ave. The East Bank describes itself as an open wetland that is connected across by a board walk with two moments along its length where it filters out into the land rising and falling so as to either create access right down to the marshland itself or rise up to offer opportunities for seating or great vantage point for view. The edge towards Sarsfield Bridge is fractured gaining access to the water and breaking down this notion of one continuous edge, which is now defined by the rise and fall of the river bleeding out into the land.

The opposite bank more densely populated by trees due to the more residential nature of the area, contains a relatively narrower wetland in comparison to the opposing bank but steps up a total of three metres to meet with the existing contours of the land. This creates a great opportunity for local residents to quietly filter out form their estates through the trees and along this stepped hillside which offers views of the river, ecology and city across the water, all connected across by further boardwalks along and between the upper and lower aspects of the site.
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