What environmental qualities and design give waterfronts a lively and socially sustainable public realm? Is it their setting, their design, or their programming which make them popular destinations? My objective is to examine three successful Portuguese waterfronts to better understand how both, site design and programming can be used as tools to improve the quality of public life, and to increase direct interaction with water in urban environments. The report first describes the results of the study, and then concludes with drawing lessons from them, which are universally applicable to the planning process of future waterfront public spaces. The conclusions discuss how design and site programming can promote both active and passive social interaction and recreational activity levels. Additionally, they give examples how site elements can potentially encourage users to engage with the waterfront – to stand, to go to the water’s edge, to interact with water, to sit and to dine. The study is done in collaboration with the ReproCity research group of the Technical University of Lisbon and with the Landscape Architecture Department of the University of California at Berkeley. In the study I considered:

- **SOCIAL ACTIVITY:** the use of the space, the life
- **SPATIAL ANALYSIS:** the dimensions of the waterfront’s edge
METHODS

For three weeks, from the end of August into the month of September 2008, field research, data collection, interviews with project stakeholders, and data analysis has taken place for this study. In my site selection process, I sought out waterfronts with diverse public uses. The sites are Cais de Ribeira and GaiaPolis, in Porto, and the Mondego Green Park in Coimbra. The site data collected has been gathered from delineated sections of each waterfront, and, for the purpose of this study, represent the waterfront site at large. Each waterfront, and, for the purpose of this study, represent the waterfront site at large.

WATERFRONT DESCRIPTION I mapped and made observations about the waterfronts’ dimensions and social life, and spoke to local stakeholders about their history and present conditions.

SOCIAL ACTIVITY DATA was gathered by conducting weekend public life/public space stationary activity studies at three times of day: morning, afternoon and evening by foot. It consisted of noting the number of people present, their location on the waterfront, and their stationery activity.

SPATIAL ANALYSIS I studied the dimensions and materiality of the public space along the waterfront; the area between the water and the adjacent buildings. I measured where vertical changes in elevation occur, and have illustrated them through site plan and cross-sectional drawings. In addition, I looked at the surface materiality of the public space and located the points of egress to the water.
Ribeira Porto Waterfront

WATERFRONT DESCRIPTION

The Cais de Ribeira and GaiaPolis waterfront face one another across the Duoro River. Their location, and their history, one of being an aged public space and the other being new, creates grounds for a conversation between one another. The Ribeira waterfront has gradually shifted through time; it has evolved from being a medieval town and international trade center to its present condition, a vibrant, social waterfront.

SOCIAL ACTIVITY

Beyond the entertainment and dining draw of the riverfront’s dramatic setting, the Cais de Ribeira waterfront encourages non-commercial social interaction between its diverse user groups. The series of accessible methods of touching the water encourages people to make contact with it the spontaneously, and to create local traditions. For instance, the Luis I bridge, some 120 meters away from the waterfront’s stairs, has evolved into a bridge jumping place for local children. The proximity of the stairs makes the experience safe since they can swiftly swim ashore. In addition, the materiality of the stairs is stone, on which one does not slip on. The multiple elevational levels of the waterfront provide safe and spacious vantage points for the onlooking crowds of parents and tourists to watch-on. Viewers feel comfortable to sit on the embankment wall’s edge since it is wide, and thus feels safe. The waterfront is also the center of annual holidays and events, such as the Saint John’s Festival and the Red Bull Air Race.
Ribeira Porto Waterfront

SPATIAL ANALYSIS The waterfront of the Ribeira, from the building line to the water’s edge, consists of a series of public spaces at different elevations and slopes: the Cais de Ribeira promenade, the elevated walkway, the tower base, and the steps and ramp down to the water. The elevational complexity allows the user to have more choices - how to view the water, whether they would enjoy more privacy (by being on a higher plane) and how they would like to access the water. It is important to note that there are programmed activities on each level, such as, cafes. In addition, this element of visibility along the waterfront creates a sense of safety for the visitor since, as author Jane Jacobs says, there are “eyes on the street” (Death and Life of Great American Cities, 1961).

Top: Tourists resting on a bench
Below: Sitting on the stairs after a swim

Local bridge jumpers off Luis I Bridge
Platform for tourist and parent to watch kids jump off bridge, 5’ wide ledge
MONDEGO GREEN PARK NORTH AND SOUTH

WATERFRONT DESCRIPTION
Construction of the Mondego Green Park in Coimbra began in 2001, and the park opened in 2007. It is situated approximately half a mile away from the historic gateway into the city, the Largo de Portagem. Designed by Landscape Architect Camilo Cortesão, the project’s vision is to integrate the river with the city, and to give the riverfront a public life. The site is designed with the intent that the nucleus of social activity would be located closest to the city, and for its intensity to decrease as the distance between the park and city increase. Access to the park is primarily vehicular as the pedestrian connection from the city is disrupted by the heavily traffic flow of the Emidio Navarro and Lousa Avenues, and by the light rail line connecting Coimbra to its suburbs to the south.

SPATIAL ANALYSIS
The public space along the waterfront consists of a structural embankment, a thin strip of turf, and a promenade with benches. In this design, there are few opportunities to reach the level of the river. The waterfront, being a recent design, might have had the intention to keep users from directly interacting with the river for safety reasons. Instead, the design of the embankment encourages users sit along the water’s edge from an elevation higher than the river. The embankment is composed of three different edge conditions:

1. A steep embankment (9% slope) rising from the water, and ending at a grass turf terrace with a one-and-half foot high seat wall
2. A set of stair rising from the water, ending with a similar turf terrace and seat wall
3. A series of boulders rising at a (5.8% slope) from the water with a delineated stone terrace above (no seat wall).

The choice of different edge styles allows the users to choose how and where they feel safe / prefer to sit. I noted when people sit along this waterfront; they prefer to have firm ground below their feet. People did not sit on the steep embankment of type 1, but preferred the edge conditions of type 2 and 3.
Two areas, north and south of the Pedonal pedestrian bridge designed by Cecil Balmond and Antonio Adao da Fonseca, are selected for the study. In both areas, the vertical distance from land to water is approximately one foot, and the majority of the edge is soft. To the north, the waterfront consists of an entertainment boardwalk strip of restaurants and cafes with an adjacent playground facility. To the south, the water’s edge is vegetated and has a series of staggering boardwalks cantilevering over the river. Inland, there are 15 meter by 15 meter pavilions programmed to host a lending library, park information, and interactive scientific education centers.
MONDEGO GREEN PARK NORTH

SOCIAL ANALYSIS The waterfront to the north is a highly active zone of large group socializing and play for all ages. Through the course of a day, it transitions from a quiet place to an active public space of dining to play. A series of benches are located between the cafes to provide a non-commercial area to socialize on the boardwalk. Besides being a place to be seen in the local community, the northern waterfront also hosts a series of small, programmed events, such as soccer games, story telling for children, and boat rides.

SPATIAL ANALYSIS The water’s edge on the northern section of the park is both hard and soft scape. The boardwalk provides an opportunity to formally dine or to informally dangle ones at the water’s edge while the soft edge a place to picnic or to gather for group activities, such as story telling. The difference in elevation between the board walk and water surface is one foot. The space created between the building wall to waterfront edge is an intimate scale, yet it allows for large group to gather. On the other hand, the public space on the rooftops of the restaurant row are at large vacant, and this design attempt for a multi elevational experience at the water’s edge is not as successful as at the Cais de Ribeira.
MONDEGO GREEN PARK SOUTH

SOCIAL ANALYSIS The waterfront to the south of the bridge is designed as a place of passive social interaction and experiences with nature and the river. People gather in small groups to interact, or spend time alone. The quietness of the area promotes local residents to fish. The previously mentioned pavilions supplement this ‘passive experience’ design intent through their daily programming, and hosting of reading and learning materials. For instance, the lending library, in addition to providing literature, it gives its users chairs, pillows and mats to take outdoors for their comfort. In addition, the waterfront has interpretive signage describing the vegetation along the banks.

DIMENSION ANALYSIS The design of the water’s edge creates spaces for which encourage solo to small group social interaction. For example, jotting out, perpendicular to the edge, are series of small boardwalk of varied lengths. They cantilever roughly three feet above the surface elevation of the water. With only one bench, these small boardwalks provide an intimate setting for individuals to small groups to sit and stand on. The majority of the bank gently slopes into the water with native vegetation. To control bank erosion, there are stripes of rock wrapped in a galvanized steel mesh, which dually function as informal sitting areas. Due to the topography, their orientation fronts only the river, which promotes socio-pedal interaction.
CONCLUSION

The following set of waterfront design guidelines reflect the spatial and social analysis of my research.

HOW TO DRAW VISITORS + RECREATION
- Design waterfronts as ‘hybrid’ space (ones that host multiple activities throughout the day)
- Host activities without fee
- Host programmed weekly events
- Provide a post occupancy survey to improve programming (fig 5)

HOW TO PROMOTE STOPPING + STANDING
- Include impervious surface material which withstands rain events
- Highlight dramatic views

HOW TO PROMOTE USERS TO GO TO WATER’S EDGE AND INTERACT WITH WATER DIRECTLY
- Minimal vertical distance to water
- Soft edge
- Small-scale site elements
- Slow water flow encourage water interaction
- Multi-level view platforms when there exists a high vertical embankment

HOW TO ENCOURAGE USERS TO SIT
- Presence of both private (ie, cafe) and public seating at prime viewing area
- Provide alternative seating options, such as, pillows and mats encourage passive use
- Site design lays framework for socio-pedal or frugal social interaction
- If seating is on an edge, provide area for user to rest feet

HOW TOENCOURAGE DINING
- Design with knowledge that weather influences outside eating
- Provide economically equitable dining, ie, fine dining to inexpensive choices
- Include a food market for picnic shopping
## FIG 1, SITE: PEOPLE, DESIGN, AND ACTIVITY MATRIX

<table>
<thead>
<tr>
<th></th>
<th>Ribeira</th>
<th>GaiaPolis</th>
<th>Mondego North</th>
<th>Mondego South</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Daily# People:</strong></td>
<td>247</td>
<td>214</td>
<td>252</td>
<td>115</td>
</tr>
<tr>
<td><strong>Morning:</strong></td>
<td>28</td>
<td>16</td>
<td>37</td>
<td>20</td>
</tr>
<tr>
<td><strong>Afternoon:</strong></td>
<td>111</td>
<td>108</td>
<td>92</td>
<td>47</td>
</tr>
<tr>
<td><strong>Evening:</strong></td>
<td>108</td>
<td>90</td>
<td>123</td>
<td>48</td>
</tr>
<tr>
<td><strong>Materiality</strong></td>
<td>100% Stone</td>
<td>90% Stone, 10% turf</td>
<td>50% wood, 50% turf</td>
<td>95% turf, 5% wood</td>
</tr>
<tr>
<td><strong>Avg Vertical Distance to H2O Surface</strong></td>
<td>12 feet</td>
<td>12 feet</td>
<td>1 foot</td>
<td>.5 feet</td>
</tr>
<tr>
<td><strong>Programmed Events</strong></td>
<td>• dining($) • annual festivals • boat rides($)</td>
<td>• dining ($) • port wine tasting ($) • annual festivals • boat rides($) • night clubs ($) • flea market ($)</td>
<td>• dining ($) • storytelling for children • boat rides • bike rentals($)</td>
<td>• lending library • environmental education classes • monthly festivals • soccer games • Events concerts at the Pavilhão Centro de Portugal</td>
</tr>
<tr>
<td><strong>Spontaneous Events</strong></td>
<td>• kids jumping off bridge • picnics • live music • vendors • soccer • nap/rest</td>
<td>• kids swimming • picnicking • live music • nap/rest</td>
<td>• soccer • bird watching • reading • play in play area • picnic • sunbathe</td>
<td>• soccer • play • bird watching • fishing • picnic • sunbathe</td>
</tr>
</tbody>
</table>
METHODOLOGY ASSESSMENT
Overall, my methods were effective. The data collected, site observations, and stakeholder interviews were beneficial to this report. I would hope to improve my process of social stationary activity data collection by repeating it on a weekday to then compare it to the weekend data. In addition, I would seek similar weather conditions between all the sites.

CONSIDERATIONS
Figure 2 illustrates that the number of people at the Ribeira and GaiaPolis waterfronts decreases during rain events. Climate conditions have a direct correlation to the number of people present. In addition, the reader should consider that should the site data have been collected from the Ribeira and GaiaPolis waterfronts under clear weather conditions, the amount of people present would most likely outnumber the those at the Mondego Green Park due to their greater urban population sizes. The population sizes of the cities of Porto and Vila Nova de Gaia are greater than Coimbra’s: Porto has 263,131 residents, Vila Nova de Gaia has 178,255, and Coimbra has 101,069 (População INE 2001, Lista de cidades fluviais, Riprocity, 2006).

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FIG 2

![Graph showing daily number of people present at different locations and times of day.]

FIG 3, POST OCCUPANCY EVALUATION

Online Opinion Survey of Mondego Green Park

- It is excellent 54% (230)
- It is good 25% (106)
- It is innovative 5% (24)
- It is just okay 14% (61)

source: http://www.coimbrapolis.pt/resultados.php?id=4