A tale of three beaches:
Profiling seaside neighbourhoods in Natal, Brazil

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Abstract
This paper is part of a research in which nexuses between architecture and society are investigated. At this stage we aim to identify architectural variables that may contribute to more urban vitality and/or social diversity in three beaches located in Natal, Brazil by exploring spatial configuration, land use, building height and modes of interface between private and public spaces. Although beaches in Brazilian cities are perceived as key sites of urban vitality and social diversity, it is common knowledge that certain groups choose certain beaches or even certain areas within certain beaches. Our case studies have appealing natural attributes, public transport and leisure facilities, but distinct built environments that, we believe, relate to varying social interfaces, deemed crucial for choosing or avoiding them. Redinha is viewed as a remote beach favoured by “common people”; Praia do Meio, as a decaying area frequented by “locals”, meaning the poorer residents of the vicinity; Ponta Negra as the beach preferred by the middle-class and the tourists. None of the beaches is sustained by the city’s global integration core, and they all have distinct architectural scenarios. Redinha is topologically the most segregated (although being the most intelligible), and has the less developed built ensemble. Praia do Meio is the most segmented area, in terms of spatial configuration and built form. Ponta Negra is highly accessible at intermediate radii and community uses mix with commercial and tourism facilities. In all areas, uses supporting leisure/tourism gather on the waterfront, and local uses cluster on locally accessible roads. In Ponta Negra and Redinha such uses blend, or are continuous, whereas in Praia da Meio they are clearly separated. Findings so far, suggest there are coincidences between effects that the interplay of the studied variables may have, as described in the literature, and general views concerning (and contrasting) each beach. If the architecture of each of these beaches tells a different tale, what is its corresponding social logic? The next research stage focuses on society, by bringing the observation of social practices and how they are perceived by the local users into investigation, we seek to verify whether the interplay of the examined architectural variables may contribute to foster instances of more tolerant or even inclusive social interfaces.

Keywords
Architecture, society, beaches, spatial configuration, built form.
1. The problem

This research explores nexuses between architecture and society of three seaside neighbourhoods in Natal, Brazil aiming to identify architecture variables that may contribute to more urban vitality and/or social diversity, as approached by other studies relating architecture and society (discussed in the next topic). The objective is to search for architectural attributes and “syntaxes [that contribute to] put together in space what is socially differentiated” as proposed by Hillier and collaborators (Hillier et al., 1976).

In this paper what we mean by “architecture” is in an ampler sense involving spatial configuration, land uses, building height and interfaces between public and private spaces. The investigation of these variables – per se and combined, sets the scene for examining how they may relate to social practices, which will be the research focus in the next stage.

With over eight thousand kilometres of coastal line, a tropical climate and a historically rooted seaside culture, beaches in Brazil are viewed as (and indeed are) important socialization and leisure spaces. They are public spaces held as federal property that cannot be privatised, thus allowing for free access to everyone and giving rise to a general belief that they are exemplary democratic arenas. This circumstance is further strengthened in many towns by the meagre availability and poor maintenance of other public areas appropriate for leisure uses.

Whereas discussions tend to concentrate on their environmental vulnerability and intensity of occupation few studies have related architecture and social practices in urban beaches. Coastal researches address people’s uses and positive perceptions as important for the maintenance of these fragile areas (Breton et al., 1996; Dixon and Durrheim, 2004; Quintela et al., 2012), pointing out access, leisure facilities and cleanliness as important aspects for positive opinions. Sociological studies have addressed the perception of different publics showing diverging views following the desegregation of South African beaches (Dixon and Durrheim, 2003, 2004).

Our beaches were chosen for having comparable natural attributes and urban facilities but strongly contrasting social ethos. They all benefit from an enticing landscape, fine sand, warm bathing and swimmable waters, being well served by public transport and equipped with waterfront promenades dotted with catering facilities (stalls that function as bars/restaurants). On the other hand, the most superficial observation reveals that frequenters of each beach are quite different and so seem to be their modes of social interface. We believe that aspects that vary amongst the beaches, such as their location in the city and neighbourhoods built ensemble, may be related to distinct sociocultural atmospheres. This paper focuses on these aspects – as key research variable and setting for the enquiry on use and perception which will follow.

In the early stages of informal talk with people in various locations about the beaches of Natal it turned out that general views about the beaches that are being investigated here comply with those addressed by the media¹, Redinha is viewed as a far-away (although only 6km north of the town centre, as opposed to Ponta Negra, 14km south of it - Figure 1), and, also, as a beach that has not changed much throughout the years, being favoured by the masses. Praia do Meio is located nearest to the old city centre, and is perceived as a “formerly nice, but decaying beach”: There seems to be tensions amongst three communities related to Praia do Meio: visitors that enjoy the beach; residents in the area that enjoy, work, pass through or hang around the beach; and residents up the hill, mostly in tower blocks who mainly overlook the beach from their vantage point. Ponta Negra is located at the extreme south of Natal, and is viewed as a middle-class beach in a middle-class neighbourhood (poor enclaves are tucked away from dominant views), and as a tourism and leisure centre, with Morro do Careca as its landmark (Figure 8-iii). Both Praia do Meio and Ponta Negra have undergone refurbishment projects on their promenades and have had showers and public toilets put in (from January 2015).

¹ The views appointed earlier about these beaches can also be found at Wikipedia (in Portuguese), e.g.: http://pt.wikipedia.org/wiki/Praia_do_Meio_(Natal).
Beaches in Brazil became important sites of leisure and healthy related activities from the 1920s onwards. In Natal the beaches have been historically segregated from the main urban grid as the city’s initial settlement faced the Potengi River rather than the sea. Up to the 1960s, of the aforementioned beaches, only Praia do Meio was urban. By 1980 the street structure had reached Redinha, across the Potengi River, and Ponta Negra, further down the city’s southern border.

In 2007 a new bridge was built across the Potengi River, completing a North-South coastal route across Natal. As the route passes through Praia do Meio and to Ponta Negra, both areas gained accessibility with it. However, Redinha gained little if any benefit from the route as most of its area lay under the bridge. This outcome bears strong relations to the discourse used to justify politically a controversial and costly construction in financial and environmental terms at the time of its proposal. Being obviously a manoeuvre to complete a coastal route that would serve the interests of tourism and real estate entrepreneurs (Trigueiro and Medeiros, 2003; 2007), the argument stressed in the project presentations was that the bridge would attend to the mobility of workers who live in the Zona Norte (the north sector of town) and daily cross the river to the east and south sectors where most jobs are. These workers are, in great part, the people who enjoy Redinha beach from under the bridge.

2. Background and questions

Stemming from the search for a social logic of space that may encourage fields of co-presence and encounter (B. Hillier, Burdett, Peponis, & Penn, 1987), in public spaces our approach is based in findings linked with our aims. These findings show that space has a leading role on how certain areas are continually used by marginalized groups (Vaughan, 2007), on the location of segregated classes (Parham, 2012), and on how different groups (e.g. locals and visitors) might interact, raising more or less social capital in neighbourhoods (Marcus and Legeby, 2012). Positive correlation between distinct accessibility radii in axial analysis (synergy; intelligibility) identified areas that function as legible urban systems (Medeiros, 2013), addressing “well-working” modes of diversity (Perdikogianni
Angular segment analysis (ASA) integration was found to relate to the movement of visitors, whereas choice to that of locals (Hillier, 2009); high integration/choice correlations revealed areas with more co-presence, presenting a rich mix of land uses and interdependence concerning activities and trips (Vaughan et al., 2013). Strong public/private interface has been deemed important for local street life in various studies (Ferraz, 2008; Mello, 2008; Van Nes, 2009), and the appropriation and regular use of urban waterfronts – which benefit from being well accessible, visible, and better articulated to the city’s grid – was found to be crucial for their preservation (Mello, 2008).

Various studies have related spatial configuration with built transformations in Natal. Areas with high levels of accessibility have suffered continuous alterations, which contributed to reshape, for instance, the building heritage in the old city centre, further affected by the construction of a new bridge whose consequences were predicted years earlier (Trigueiro and Medeiros, 2003). Levels of accessibility coincided strongly with socioeconomic distribution, with well-to-do people occupying most highly accessible areas (Carmo, 2014).

As concerns relations between architecture and society in beach sites (Donegan, 2011; Donegan and Trigueiro, 2012), it has been seen that, in Praia do Futuro, Fortaleza, Brazil, the most accessible areas had larger beach huts, favoured by young people; moderately accessible areas had elaborate buildings with medium capacities, preferred by tourists; and segregated areas had the simplest and smallest facilities, visited by long-term local frequenters, mostly families. Because cities are problems of organized complexity (as proposed by Jacobs, 1992) these findings reinforce the idea that no single spatial variable can “explain” urban vitality and/or social diversity. What interplay of architectural variables might, then, contribute to explain: (i) differences in use among the beaches and, even, within a same beach; and (ii) spaces that work better in terms of urban vitality and/or social diversity (if these exist).

This paper deals with a study stage in which we searched for relations between spatial configuration and built form that might promote and/or enhance more inclusive modes of urban life (as indicated in previous researches). In this sense, we set the mood for the next stage, which will focus on social practices. Here will be assessed: (a) the beaches spatial configuration within the city, in terms of topology (and, to a lesser extent, geometry) considering various radii of syntax analysis and measurements (e.g. choice, integration); (b) the interplay of spatial configuration, land use and built form in each beach; (c) recurrences and divergences in this interplay amongst the beaches.

3. Natal’s spatial performance and the beaches

To address these questions, we analyse the spatial network through axial and angular segment analysis (ASA). Normalized values for choice (NACH) and for integration (NAIN) were also processed within ASA in depthmapX, to compare systems of different sizes (Hillier et al., 2012). The axial system comprises the city’s natural limits: Natal’s municipal boundary, adding the street network whenever, and only when, it is continuous to it, and the route to the new airport (Figure 1). To analyse and compare each beach’s neighbourhood spatial configuration, layers were separated from Natal’s system within the axial and ASA graphs, creating subsystems ranging from 300 to 400 metres from their beaches, corresponding to the surveyed built form. Their sizes in terms of number of lines and number of segments are shown in tables 1, 3 and 4. Redinha is the smallest subsystem, whereas Meio and Ponta Negra are close in terms of number of lines/segments, although Ponta Negra reaches a bigger area (Figure 6 and 7). As discussed by (Medeiros, 2013), who compared a sample of 164 towns around the world (of which 44 were Brazilian), Natal has low levels of global integration (Rn, table 1), complying with his analysis of Brazilian cities as markedly fragmented. The city also presents low synchrony between local and global properties of axial analysis (connectivity, integration topological radii 3, 6, 13 and n - Table 2), including “synergy” and “intelligibility”

^2 Relates to how easily a global attribute might be perceived locally.
### Table 1: Integration levels for axial analysis radii (Natal and subsystems), highlighting top maximum and average levels.

<table>
<thead>
<tr>
<th>System (n. lines)</th>
<th>Rn</th>
<th>R3</th>
<th>R6</th>
<th>R13</th>
<th>Rn</th>
<th>R3</th>
<th>R6</th>
<th>R13</th>
<th>Rn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natal (13251)</td>
<td>0.3333</td>
<td>0.3397</td>
<td>0.2668</td>
<td>0.2002</td>
<td>5.3350</td>
<td>3.1391</td>
<td>1.7714</td>
<td>0.9331</td>
<td>2.1161</td>
</tr>
<tr>
<td>Redinha (44)</td>
<td>0.4224</td>
<td>0.5069</td>
<td>0.4688</td>
<td>0.4171</td>
<td>2.970</td>
<td>1.4020</td>
<td>1.0590</td>
<td>0.5961</td>
<td>1.3790</td>
</tr>
<tr>
<td>Praia do Meio (125)</td>
<td>0.3333</td>
<td>0.5620</td>
<td>0.6750</td>
<td>0.5218</td>
<td>3.5150</td>
<td>2.4810</td>
<td>1.4000</td>
<td>0.8406</td>
<td>1.7800</td>
</tr>
<tr>
<td>Ponta Negra (107)</td>
<td>0.3333</td>
<td>0.4878</td>
<td>0.6768</td>
<td>0.4225</td>
<td>3.4420</td>
<td>2.1018</td>
<td>1.1990</td>
<td>0.7115</td>
<td>1.9230</td>
</tr>
</tbody>
</table>

### Table 2: Correlation between axial analysis radii (Natal and subsystems), highlighting top levels.

<table>
<thead>
<tr>
<th>System (n. lines)</th>
<th>Rn-R3</th>
<th>Rn-Con</th>
<th>R13-R3</th>
<th>R13-Con</th>
<th>R6-Con</th>
<th>R3-Con</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natal (13251)</td>
<td>0.312584</td>
<td>0.036330</td>
<td>0.422124</td>
<td>0.044964</td>
<td>0.109859</td>
<td>0.278159</td>
</tr>
<tr>
<td>Redinha (44)</td>
<td>0.529047</td>
<td>0.329194</td>
<td>0.534299</td>
<td>0.305102</td>
<td>0.515292</td>
<td>0.794986</td>
</tr>
<tr>
<td>Praia do Meio (125)</td>
<td>0.534468</td>
<td>0.292761</td>
<td>0.318232</td>
<td>0.17125</td>
<td>0.332593</td>
<td>0.708675</td>
</tr>
<tr>
<td>Ponta Negra (107)</td>
<td>0.267335</td>
<td>0.126832</td>
<td>0.453511</td>
<td>0.211349</td>
<td>0.362746</td>
<td>0.594235</td>
</tr>
</tbody>
</table>

In both axial analysis and ASA the integration core is located on the old city centre fringes (CA, Figure 2). Few lines cross the Potengi River, polarizing the city into North and Central/South zones. In axial analysis the integration core is more concentrated, whereas in ASA it spreads south-west, reaching the North zone through Igapó Bridge. NACH (normalized choice) values for the city highlight a system constituted by just a few roads that spread from North and South of the city, functioning as the main access to most urban areas (Figure 3). ASA seems more faithful to the actual grid of main roads in the city.

**Figure 2:** Natal’s Segment map showing Normalized Integration (NAIN).
Stemming from the city’s fragmentation and the importance of a few main routes, the beaches are detached from the integration core, and from each other. The coastal route which leads more closely to the beaches is dissociated from Natal’s main urban grid. Although Praia do Meio is metrically very close to the most integrated routes of Natal, it is discontinuous from it following a steep topography: the area is more connected to the coastal route than to the city’s centre. Redinha is also metrically close to the city centre, however topologically faraway: the medium accessibility levels that pass through from the coastal route to the bridge are almost entirely lost when reaching the area, as one has to retrace one’s steps to reach Redinha, which is swept under the new bridge (Figure 2). Both areas are metrically close but topologically distant. On the other hand, Ponta Negra, located in the southern borders of Natal and metrically distant from highly accessible areas, has a stronger continuity to its surroundings and to routes leading to both the city’s integration core and the coastal route, managing to reach medium levels of global accessibility (Rn, NAIN).

![Figure 3: Natal’s Segment map showing Normalized Choice (NACH).](image)

Redinha is remote and not well linked to its surroundings: it is, on average, the most segregated beach in all examined radii (Axial analysis and ASA: tables 1, 3 and 4), reaching lower levels than Natal. When comparing correlations between axial analysis radii, Redinha has high levels throughout (and highest intelligibility), indicating that the area might function well as an independent system (Perdikogianni and Penn, 2005), relating to areas identified as Oases in the Labyrinth by Medeiros (2013): old city centres in Brazilian cities were found to be privileged fractions with more synchrony between local and global properties, being more legible than expansion areas and spatially better perceived. Redinha was an independent settlement later engulfed by Natal’s grid (rather than an expansion area), and built form suggests that it might be easily perceived at a local level (see next topic).

Praia do Meio is, on average, the most integrated on global and higher radii (axial - Rn and R13; ASA – NACH and NAIN), presents high levels of Choice (radii 400m, 1600m and n), and reaches high levels of synergy. The area is segmented by roads important at either a global or local radii. Ponta Negra has, on average, the highest levels of accessibility on intermediate radii (ASA – 3200m, axial – R3 and R6); however it presents the lowest correlations between axial analysis radii, suggesting that this area does not function well as an independent system.
### Table 3: Levels of Normalized Integration in ASA for Natal and subsystems in metric radii, highlighting top maximum and average levels.

<table>
<thead>
<tr>
<th>System</th>
<th>400</th>
<th>1600</th>
<th>3200</th>
<th>n</th>
<th>400</th>
<th>1600</th>
<th>3200</th>
<th>n</th>
<th>400</th>
<th>1600</th>
<th>3200</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natal(40209)</td>
<td>0.4221</td>
<td>0.4150</td>
<td>0.3402</td>
<td>0.3988</td>
<td>4.0737</td>
<td>2.9676</td>
<td>2.5921</td>
<td>1.5177</td>
<td>1.3588</td>
<td>1.227</td>
<td>1.2140</td>
<td>0.9883</td>
</tr>
<tr>
<td>Redinha(72)</td>
<td>0.5626</td>
<td>0.4611</td>
<td>0.4409</td>
<td>0.6858</td>
<td>1.7400</td>
<td>1.2930</td>
<td>1.2810</td>
<td>1.1340</td>
<td>1.2550</td>
<td>0.9068</td>
<td>0.8847</td>
<td>0.9049</td>
</tr>
<tr>
<td>Praia do Meio(330)</td>
<td>0.5347</td>
<td>0.6092</td>
<td>0.6045</td>
<td>0.7056</td>
<td>1.8820</td>
<td>1.5780</td>
<td>1.5810</td>
<td>1.3620</td>
<td>1.2690</td>
<td>1.1130</td>
<td>1.0300</td>
<td>1.0090</td>
</tr>
<tr>
<td>Ponta Negra(285)</td>
<td>0.5922</td>
<td>0.6162</td>
<td>0.6711</td>
<td>0.6424</td>
<td>2.0960</td>
<td>1.7250</td>
<td>1.4820</td>
<td>1.2780</td>
<td>1.2950</td>
<td>1.1890</td>
<td>1.0890</td>
<td>0.9083</td>
</tr>
</tbody>
</table>

### Table 4: Levels of Normalized Choice in ASA for Natal and subsystems in metric radii, highlighting top maximum and average levels.

<table>
<thead>
<tr>
<th>System</th>
<th>400</th>
<th>1600</th>
<th>3200</th>
<th>n</th>
<th>400</th>
<th>1600</th>
<th>3200</th>
<th>n</th>
<th>400</th>
<th>1600</th>
<th>3200</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natal(40209)</td>
<td>0.3027</td>
<td>0.3414</td>
<td>0.3319</td>
<td>0.3146</td>
<td>0.2868</td>
<td>0.2617</td>
<td>0.2293</td>
<td>0.2108</td>
<td>0.1753</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Redinha(72)</td>
<td>0.4316</td>
<td>0.4340</td>
<td>0.3025</td>
<td>0.3269</td>
<td>0.2680</td>
<td>0.2835</td>
<td>0.3111</td>
<td>0.3252</td>
<td>0.3286</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Praia do Meio(330)</td>
<td>0.4541</td>
<td>0.3886</td>
<td>0.3832</td>
<td>0.3904</td>
<td>0.3246</td>
<td>0.2433</td>
<td>0.1649</td>
<td>0.1564</td>
<td>0.1641</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ponta Negra(285)</td>
<td>0.2493</td>
<td>0.3601</td>
<td>0.4116</td>
<td>0.4789</td>
<td>0.4868</td>
<td>0.4908</td>
<td>0.4531</td>
<td>0.1882</td>
<td>0.1173</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As mentioned earlier, high choice/integration correlations suggest areas with more co-presence between locals and visitors (L. S. Vaughan et al., 2013). Ponta Negra reaches the highest levels at intermediate radii (1200-5000m), after which there is a large drop (table 5). On the other hand Redinha has high levels either on very local or very large radii (400, 800, 7000m and n), whereas Praia do Meio only has high correlations on very local radii, from which there is a steady dropout.

### Table 5: Integration/Choice correlation levels for Natal and subsystems in different metric radii, highlighting top levels.

<table>
<thead>
<tr>
<th>System</th>
<th>400</th>
<th>800</th>
<th>1200</th>
<th>2400</th>
<th>3200</th>
<th>5000</th>
<th>7000</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natal(40209)</td>
<td>0.3027</td>
<td>0.3414</td>
<td>0.3319</td>
<td>0.3146</td>
<td>0.2868</td>
<td>0.2617</td>
<td>0.2293</td>
<td>0.2108</td>
</tr>
<tr>
<td>Redinha(72)</td>
<td>0.4316</td>
<td>0.4340</td>
<td>0.3025</td>
<td>0.2869</td>
<td>0.2680</td>
<td>0.2835</td>
<td>0.3111</td>
<td>0.3252</td>
</tr>
<tr>
<td>Praia do Meio(330)</td>
<td>0.4541</td>
<td>0.3886</td>
<td>0.3832</td>
<td>0.3904</td>
<td>0.3246</td>
<td>0.2433</td>
<td>0.1649</td>
<td>0.1564</td>
</tr>
<tr>
<td>Ponta Negra(285)</td>
<td>0.2493</td>
<td>0.3601</td>
<td>0.4116</td>
<td>0.4789</td>
<td>0.4868</td>
<td>0.4908</td>
<td>0.4531</td>
<td>0.1882</td>
</tr>
</tbody>
</table>

Redinha, Meio and Ponta Negra are marked by areas with high local choice (R400m, Figure 4), similar to syntactic characteristics identified in informal settlements and slums, and interpreted as 'working in isolation from the wider city' (Parham, 2012). They are the oldest beach settlements within Natal, and are marked by unplanned, informal settlements. These syntactic characteristics are more prominent in Praia do Meio, complying with it having a large area marked by simple close-knit buildings (see next topic). In Ponta Negra this trend concentrates further south (Ponta Negra’s village).
4. Contrasting profiles and recurrences

We now address the beaches’ built form, searching for recurrences through analysing: (i) Land Use and built height, surveyed for the beaches subsystems areas (i.e. 300 to 400m from their promenades), and (ii) levels of interface between public and private spaces, surveyed for the waterfront buildings. The types of land uses considered studies with similar methodologies (Nascimento, 2011; Perdikogianni and Penn, 2005; Vaughan et al., 2013), separating activities leading to different intensities, frequencies and public profiles. Recurrent types of activities found in these areas were thus separated, related to (i) leisure/tourism: hotels/lodging facilities, catering and leisure (venues with entertainment); (ii) inhabitants: places of worship, education, health and community. The green spaces concern outdoor amenities, open spaces or preservation areas that cannot be built upon, whereas vacant premises concern spaces with no uses, but that can be built upon, and might indicate private areas under speculation.

Redinha is the smallest beach with a simple built assembly (mostly ground floor buildings) and few vacant premises, comprising of: churches, community facilities, school and market (labelled as “Commercial Center”), see Figure 5. Some residences are permanent, some are second homes; this is the only studied neighbourhood that does not have hotels (or lodgings facilities). As a unique trait there are warehouses for boats labelled as “Storage premises” south of the surveyed area, resembling a fishing village. Community facilities and small commerce concentrate on segments with high accessibility levels, especially local (NACH R400m), both at the waterfront and the highlighted area on Figure 5. Most non-residential uses on the waterfront face the river, mixing leisure facilities for visitors (restaurants/bars) with local uses (e.g. school, churches). The beach’s promenade connects to a square with a parking space, a church, a leisure club, and a traditional food market surrounded by restaurants, at the south-end of

Figure 4: Natal’s Segment map showing local Choice (R400m).
the promenade. The stalls are closely located; one group faces the river; another the sea. The waterfront area has the strongest public/private interfaces (no blank walls), and the square, the promenade and the sand areas form a continuous ensemble, with barely any level differences (Figure 8-i).

Figure 5: Redinha’s Land Uses, showing NACH R400m, highlighting cluster of local uses.

Praia do Meio’s built form presents three distinct profiles (Figure 6): (i) hotels, restaurants and medium-rise buildings (of up to six storeys high) distributed on larger blocks closer to the beach promenade, and many vacant premises; (ii) small, low-rise, dense, mostly attached, buildings, located from one to three blocks away from the beach, tucked away on more segregated roads at global and intermediate radii, but locally highly accessible; this area works in isolation from the wider city fabric (following Parham, 2012). This stretch is mainly residential punctuated by small commerce, catering facilities and places of worship (a large amount, when compared to the other beaches). These local uses, as well as community facilities, concentrate on places with high local NACH (R400m), see highlighted area on Figure 6; (iii) high-rise luxurious residences and health institutes located up the hill towards the south-east of the surveyed area; this stretch reaches very high levels of global integration and choice (forming the city’s integration core), and has as a strong magnet the University Hospital, and other healthcare facilities, attracting users on a metropolitan scale. This segmented landscape characterizes Praia do Meio as tripolar. The stalls concentrate in two main groups, corresponding to places at the beach with larger sand banks and better bathing:

The mentioned stalls function as bars/restaurants at the beach promenade and were, originally, part of the 2001 refurbishment project.
one group in the middle of the surveyed area and another up north, as the south of the beach has many rocks. There is a difference in level from the promenade to the sand, marked by fences (Figure 8-ii).

Figure 6: Praia do Meio’s Land Uses, showing NACH R400m, highlighting cluster of local uses.

Praia do Meio is the only beach where the road that accompanies the beach (Av. Pres. Café Filho) has medium integration and medium to high choice levels on a global radius (coastal route), and corresponds to observed intense vehicular movement. This configuration is a recent phenomenon, as the opening of the coastal route dates from 1985 and the new bridge from 2007. The avenue exhibits a fair number of hotels, catering, commerce and vacant premises (corresponding to many blank walls). The main groups of stalls are located in front of buildings with weak private/public interfaces, and host barely any tertiary activities. This suggests that the intense movement through the avenue divides both sides and hinders local life, as pedestrians don’t seem to cross it easily.

Ponta Negra has the longest coastline (3 kilometres) and the largest proportion of non-residential uses: commerce and commercial centres, catering facilities (restaurants and bars), services, vacant premises and many hotels/lodging facilities (Figure 7). Local commerce, community facilities and residences coexist and blend in an overall large sub centre, clustering on segments with high local accessibility (e.g. NACH R400m). These uses show the beach as a Touristic and commercial complex.
Av. Roberto Freire, the most accessible road in global and intermediate radii also exhibits high local accessibility: although there are building restrictions, there are high-rise buildings (reaching 30 storeys) and commercial centres, restaurants, bars and hotels; that attract people movement to the neighbourhood, and coexist with smaller commerce. The avenue follows the coastline, but is located three to four blocks away from it. Addressing interfaces between private and public spaces by the waterfront we can distinguish two areas: (i) a northern stretch with few tertiary activities, and weak interfaces (many blank walls), corresponding to an area where the promenade is solely for pedestrians; (ii) a southern stretch with many bars, restaurants and commerce, with stronger public/private interfaces, corresponding to where Erivan França street accompanies the promenade, which can thus be reached by car. Due to recent sea advances, the promenade has been refurbished and is secured by rocks that separate the sidewalk area from the short sand stretch, at a lower level (Figure 8-iii).

Figure 7: Ponta Negra’s Land Uses, showing NACH R400m highlighting cluster of local uses.
Although the beaches have different profiles, there are recurrences regarding the location of non-residential uses, which concentrate: (i) in front of the promenade and the sea - uses supporting leisure uses (Restaurants, Commerce and Services); (ii) on streets and blocks with high levels of local NACH (400, 800m) - uses catering locals (schools, community facilities, healthcare and small commerce and restaurants). In each area clusters of local communities’ uses were highlighted and are shown in more detail in Figures 5, 6 and 7.

A questionnaire survey was carried out, but is not analysed statistically here. Some aspects explored were: the environmental image of the beaches, mobility, frequency and intensity of uses, activities, public profiles (e.g. age, place of residence, education level) and evaluation of different aspects (cleanliness, public, security, facilities, access, landscape). In order to tackle local spatial characteristics and differences between and within the beaches, two areas within each beach were surveyed.

Figure 8: Beaches views (top-down): (i) Redinha (facing the river); (ii) Praia do Meio; (iii) Ponta Negra (south, facing Morro do Careca).
We now discuss our architectural findings in the light of previous research within the field and of preliminary observations from our fieldwork. We introduce some central ideas/hypotheses, setting the scene for a more detailed analysis of social interfaces in the next stage.

5. Discussion and conclusions

General views about each of the three examined beaches find support in their distinct configuration within Natal’s fragmented spatial system, which may also account for the different social profiles and uses perceived in the beaches.

Ponta Negra’s reputation as a tourism and commercial complex evidenced by the ensemble of non-residential land uses (of varying types and sizes), is also supported by high levels of accessibility and of co-relation between choice and integration at intermediate analysis radii. Redinha, the “remote” beach of local common folk has the most segregated spatial structure (concerning all measures and radii) among the studied cases, with scarce building renewals throughout the years. The area displays the higher intelligibility and correlations between varying radii of axial analysis (table 2). These properties, and also its character of independent settlement, comply with Medeiros’s definition of areas particularly legible that function as Oases in the labyrinth of an otherwise patchwork-like spatial structure. This can be further related to Redinha’s built form: it has the fewest vacant premises, a waterfront with strong public/private interface and a space free from barriers connecting buildings.

Praia do Meio, generally perceived as a “decadent” tension-prone neighbourhood, has the most segmented area in terms of configuration and built form, which seems to account for tensions amongst different groups of users. The stretch with prominent levels of local choice follows Parham’s findings of structures isolated from the wider city, it has simpler dense buildings and community facilities, and is squeezed in between the city’s integration core and the coastal route, which present sparser high-rise buildings. The high level of global accessibility (integration and choice) on its promenade road and weak public/private interface seem to further hinder pedestrian movement and to have a bearing on the place’s vulnerability.

Some aspects found in all the beaches point towards a common spatial logic: (i) leisure activities concentrate on the waterfront; (ii) local community uses follow high local levels of accessibility – clusters of community facilities and local retail gather round medium to highly accessible (NACH R400m) segments; (iii) highly accessible roads at global radii (found at Meio and Ponta Negra, but not in Redinha) concentrate facilities that function as magnets for residents outside the neighbourhood as well as visitors to the city.

Following radii with high co-relation between integration and choice, visitors’ and users’ activities interplay in both Redinha and Ponta Negra. Leisure, commercial and community (school, church) uses mix together in Redinha’s waterfront, whereas in Ponta Negra community uses blend in with commercial and tourism facilities.

All of these activities are present in Praia do Meio but those predominantly designed for locals or for visitors are clearly separated into different areas. The importance of the grid as a mechanism for generating contact (Hillier, 1996) is recurrently stressed in the literature. The promotion of co-presence as well as the multi-functionality of land use can be seen as influenced by the grid through positive choice/integration correlations, which has promoted built-form adaptability through time (Vaughan et al., 2013). Although highly accessible in global terms, Praia do Meio’s spatial segmentation at local level might help explain why people there appear to feel the most vulnerable judging from preliminary observations and media accounts on the theme.

As we believe that in Brazil public spaces not only reflect but mediate an extremely segmented society (beaches being by no means an exception), the leading research questions for the following stage are: which differences and similarities are there in terms of social interfaces amongst the beaches? Up to which point do people mix? How frequently do they visit the beaches? And how do they get there? Do locals and visitors feel differently? How do they evaluate the beaches? If the
spatial form of these beaches tells different tales and the social practices also seem very diverse, is there a social logic of space for each beach? Is there a case in which the interplay of certain variables promotes livelier, more tolerable, easier, more inclusive modes of social practices?

This is, therefore, what we seek to investigate next. Stay tuned!

References


