Climate change related urban transformation and the role of cultural heritage

Matthias Ripp & Christer Gustafsson (Eds.)



Foreword by Claire Cave





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Matthias Ripp & Christer Gustafsson Editors





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3. Contestations to a Climate-sensitive heritage: Examining the Negotiations of Cultural Markers along Mumbai's expanding Metropolitan Coast

Shruthi Ramesh¹, Bhagyasshree Ramakrishna²

Abstract

Mumbai's geographical terrain has been historically reshaped and defined by its many rulers and colonising forces, shaping distinct morphologies of socio-cultural markers with the island's spatial territoriality. Throughout this historical timeline of settlements, the coastal edge has been the canvas for defining territorial markers, and thereby redefining the interface between cultural identity and the coast. The linearity of the metropolis has forged intrinsic ties to its coastal edge and imposes unique conditions on its diverse cultural and tourist landmarks along the coast. The colonial practice of land-reclamations has continued into independent India, reinstating distinct coastal-edge meanings. The land reclamation projects introduced new colonial ideals of the coast as a space for leisure, a modality whose replication and continuity into the contemporary master plans has threatened the erasure of natural coastal terrains. The disastrous impact of climate contention is often resolved through concretised manipulations of the coast. The development of the coast, though impacted by Coastal Regulation Zone (CRZ), is a site of coastal manipulations by mega-projects. The chapter argues that Mumbai's kinetic urban development's juxtaposition over its rich, historic, socio-cultural landmarks poses contentions of climate change and there is a need of forging a more symbiotic relationship.

Keywords

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Mumbai Coast; Cultural markers; Coastal contentions; Reclamations; Climate Change; Colonial Rupture

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1. Introduction

Mumbai's edge conditions are an integral part of its developmental narratives (Burte and Krishnankutty, 2006). Throughout its history, beginning as fishing villages within the archipelago of seven islands, inhabited by its original settlers - the *koli* (fisherfolk) community, to its metamorphosis into a colonial entrepôt, its coastal edges have witnessed an accruing integration of cultural markers. The original topography of the islands were a part of the hilly terrain of the western ghats, comprising partially submerged sloped landforms, sand bars, salt-flats and marshy mangroves. Domestic habitations along the coastline began with the *koli* villages, extending into the Portuguese hamlets (1534-1665), and later to the series of land reclamations from 1708 by the British for the creation of a singular 'Presidency' Port Island City.

Nakamura (2014) traces a chronological history of Mumbai from the koli communities and native Buddhists to Hindu Kings and Sultanates, and up until the Portuguese and British colonisers. She illustrates how"these embattled, enmeshed, and accumulated histories have marked the landscape with rock cut caves, temples, mosques, churches, water tanks, forts, and urban forms that now make up the more monumental aspects of the urban landscape of Mumbai." (Nakamura, 2014). The onset of the British reclamations starting from 1708 pushed the edges of the city out, seaward. Conversion of a collection of sand bars, tidal flats, islands and hilly terrain, into a single landmass at the behest of the British was for the creation of the colonial Presidency³ port city (Edwardes and Campbell, 1909).

If the "Victorian Gothic and Art Deco Ensembles of Mumbai" as a UNE-SCO World Heritage Site⁴ represents Mumbai's built heritage, the "Western Ghats"⁵ offers a slice of the erstwhile 'natural heritage' of the region. The act of Anthropocene destruction of the ghats within Mumbai, as part of the extensive land reclamations of the presidency town completely alienated Mumbai from this natural heritage. The current delineation of the western ghats excludes the 'urbanised' Greater Mumbai. Some traces of these mountain ecologies like the verdant Kanheri Hills, or urbanised neighbourhoods like

³ The Bombay Presidency was the administrative boundary of a British Province that included the present Mumbai Metropolitan Region.

⁴ 'Victorian' colonial structures, Indo-saracenic buildings and pre and post-independence Art-Deco buildings inscribed as UNESCO World Heritage site in 2018.

⁵ Inscribed as UNESCO World Heritage site in 2012.

Pali Hill, Malabar Hill etc., remain. In City Adrift, Naresh Fernandes narrates an interesting case, where a British Naval officer found Early Paleolithic Age remains in South Bombay, only to discover that they were originally from hills on the eastern ridge levelled to provide top-filling for reclamation sites (Fernandes, 2013, p.16). There are over 30 protected forts within the Mumbai circle of the ASI (Archaeological Survey of India). The coastal, as well as hill-top Maratha forts⁶, in the Mumbai Metropolitan Region (MMR) offer a syncretism of the 'natural' with the 'built' heritage, especially in folds where the 'urbanising' intrusions are minimal.

Within Mumbai's pre-colonial geography, many heritage markers are associated with the sea and the coastal geography. For instance, the earliest Buddhist heritage structures found on the Elephanta islands (c. 2nd century B.C), the religious landmarks of the Hindu Kings (the Banganga temple tank of Silhara Dynasty) (c.1127 A.D⁷) and the tomb of the Sufi saint, Haji Ali Dargah (c. 1431 A.D). The 'natural' harbour and strategic location w.r.t colonial trade routes led to the region's colonisations by Portuguese, and later by British. Thus, many colonial heritage structures- Portuguese and British Forts, Churches and 'The Gateway of India' archway (c.1924 A.D) came to define the territorialities of the coast. Since its post-independence inception as India's financial capital, the city's domestic cultural geography became largely defined by migration, slums and land-evictions.

"Anthropocene epoch bring our attention to the rapid global consumption and regimes of disposability that characterise capital since the mid-twentieth century." (DeLoughrey, 2019).

In recent times, the global flows of capital and investment in mega-projects of urban development brought in constant change to the coastal environment. Coastal environments in-turn became dominant sites for urban development projects, for instance- the upcoming Coastal Road Project, the upcoming Sewri-Nhava Sheva sea link, the recent Bandra Worli Sea-Link, the Eastern Waterfront Development project etc. The financial capital is overburdened with high population influx, evidenced by its crumbling infrastructure. Due to its stressed mobility systems, extensive layers of public and private transit lines (i.e underground metro lines and sea-reclaimed coastal roads) are being proposed to placate the population's needs. Post-independence, the koli villages

Marathas were regional historic rulers and warrior clans who ruled the Maratha Kingdom across present day Maharashtra from 1674-1818. These forts were built from the 16th century onwards for strategic defence against Mughals and later Colonisers. 7

Destroyed during Portuguese occupation and rebuilt in 1715.

became cultural pockets of 'intangible heritage' enticing tourists, while indistinguishably extending into pockets of coastal slums and contending with mega urban development projects.

The intertwining of culture and religion within urban morphology has created sacred markers at micro-scales within the historical core of the city. They juxtapose and negotiate with the new developments along the liminal spaces of the city (Elison, 2018). These odd juxtapositions of 'coastal heritage' with urban transformation projects, mirrors Mumbai's pro-development ethos and fluxes. The chapter attempts to examine these cultural negotiations that shape and reshape the coast.

2. Research and Theoretical Framework

The chapter examines key socio-cultural markers⁸ (landmarks and historic habitats) along the coastal edge, critically reflecting on its changing narratives against the impacts of rising sea-levels and urban development. A qualitative research framework based on textual research, discourse analysis, analysis of spatial maps, secondary data and observation is applied for the research. Using the lens of urban studies, the impact of urban development on cultural landmarks within the coastal landscape of Mumbai is analysed. The chapter engages with secondary data collected from online archives, newspapers, research papers, books and policy documents. By way of a chronological examination through the lens of urban development, the chapter traces historical and contemporary incidences of the city's land and water relations and their connection to cultural markers.

The key research questions the chapter asks are:

How did culture adapt to the coastal geography of the island? How did the manipulations of the coastline facilitate the reimagination of the urban social-culture? How do heritage and cultural markers now engage with transformative contentions in Mumbai's anthropocentric, pro-development, urbanised setting?

This chapter provides a reading of the coast across specific historical timelines and examines the process, intent and extent of alteration of the natural coastal geography. The research speculates the potential of the new spatial

⁸ We use 'markers' in reference to specific socio-cultural pockets of heritage that are surrounded by an urban environment under constant transformation. A marker is spatially sited in relationship to a surrounding urban landscape in constant flux.

structuring of the coast to allow for socio-cultural and religious phenomenon. At the intersection of the changing nature of the sea, the nature of the human interaction with the sea/coast is examined specific to distinguished socio-cultural markers, using key historical narratives, cultural adaptations and development trends.

3. Historical Built Coastal Markers

Pre-colonisation, or the period prior to arrival of the Portuguese in Bombay (1534 AD), the interface between the sea and the land harboured sacred and ritualistic practices. The cave architecture of earliest settlers, the Buddhists, between the 1st-5th Century BC, were non-invasive, secluded forms of living that were highly integrated into the mountainous topography of the islands. The series of caves etched within the black basalt rock formation of the islands (Kanheri caves, Mahakali caves, Elephanta caves), spatially continued the ideas of non-materialism, societal disassociation and hermeticism within its architectural language and settlement pattern. The rocks were carved into water holding basins, forming a system of cascading cisterns and catchments (Pandit, 2010).

The dominance of the Hindu Kings across the coastal belt of the Konkan region⁹ left prominent morphological markers across the landscape. In 10th Century AD, the Silhara Dynasty's urban settlements emerged with a unique set of spatial patterns that were symbolically composed of the 'temple, tank and tree', nestled within a dense cluster of residential settlements. The characteristic *temple-tank centric¹⁰* urbanism extended to the islands of Bombay, seamlessly integrating with the coastal-hilly terrain geography. The morphological pattern, combined with the unique geography of the islands, led to the emergence of several coastal temple tanks¹¹, specifically south of the main island of Bombay. The tanks were located at the base of the hills and built over natural springs.

The research analyses the interface of the Banganga temple tank and the sea, one of the few coastal temple tanks that has remained relatively intact, shielded from the widespread reclamation projects of the modern era. Banganga is located at Walkeshwar, Malabar Hill, the south-western tip of the

⁹ Linear coastal belt along the western coast of Maharashtra.

¹⁰ Temple-centric urbanism was an identity to the coastal cities in the Konkan region that was later adapted as a secular characteristic by the Islamic/Jewish settlers.

¹¹ The Baboola tank, Gowalia Tank, Mumbadevi temple Tank and Banganga Tank.

main island that tapers narrowly into the sea, and north of the Back Bay (a natural harbour). This geographical positioning of the tank in the narrow island, surrounded by sea on three sides and nestled at the base of the hills generated a unique water tank typology (see figure 1). Banganga is believed to be mythically connected to the Ganga River in the Himalayas and was discovered when Lord Rama's bow struck the ground (*Baan*-arrow, *Ganga*-river). The temple tank was originally constructed in 1127 AD by the Silhara Kings¹². The tank¹³ is built on a natural spring and an outlet valve connects the tank to the sea (Mehrotra and Dwivedi, 2006). The heritage site under the protection of the State Archaeological Department is surrounded by 50 odd Dharamshalas (place of rest for pilgrims) and a Brahmin settlement.



Figure 1: Plan of Banganga water tank and its relation to the Arabian Sea (source: Ramachandran, 1998)

¹³ Banganga tank dimensions: 115 meters long (377 ft.) and 40 meters wide (131 ft.)

¹² The temple was destroyed in the 18th Century by Portuguese invaders, and was later renovated in 1715 along with the Tank.

The water body served as a source of drinking water to the community, and in extension, as a site of cultural rituals and ceremonies (Ramachandran, 1998). The Brahmin community did not engage in fishing activities. The morphology of the settlement surrounds the tank and is inward-looking, dissociated from the coast. A small, natural pond or the religious 'Ram kund' lies along the old sanctorum wall, situated at 200 metres from the tank that is used for crematorial rituals. The association of the community with the sea was thus, indirect and spiritual. The physicality of the tank edge faces inwards, accentuating the introversion to the coast. The proximity to the sea allowed the tank to act as a coastal reservoir during high tide and as a natural (cascading) catchment area.

The subsequent rule of the Sultanate in Bombay accentuated the establishment of direct linkages between the sea and cultural identity. The Haji Ali Dargah (c. 1431 A.D.), an Islamic tomb and mosque dedicated to the Sufi saint Pir Haji Ali Shah Bukhari, was built on an islet in the Arabian Sea offcoast near Worli, and accessed by a 1 km long narrow causeway. The coastal monument and connecting causeway cutting through the sea creates a cultural symbiosis that could be deemed one of the initial acts leading up to the Anthropocene¹⁴. The association of the Dargah with the sea is physical and tangible. The walkway can be accessed during low tide, and submerges into the sea during high tide (Swaminathan, 2014).

4. Colonial Urbanism of the Coast

The Fortified area of the erstwhile British colony, now known as the Fort area, situated at the south-eastern part of the island, was guided by a set of urban codes, disparate from the local Indian town (UDRI, n.d). The intentional 'sanitisation' of the presidency town was orchestrated via land reclamation processes to placate the 'health' and 'sanitation' concerns of the colonisers. The swampy 'malarial' conditions were deemed unfit for 'modern' urban living. During the First World War, the British sea-side became the new site of health, recreation and leisure consumption. The coast, viewed as an escape from the dense industrial urban core, emerged as a new cultural hotspot of leisure exclusively for the societal affluent. The production of coastal culture reshaped an urban geography that was defined by a physical and visual proximity to the shore. The coastline was now an element of urban construction and anthropogenic manipulation.

¹⁴ Though the Anthropocene epoch is believed to have commenced in the mid 20th century, there are centuries of human action prior that set the precedent for anthropocentric coastal reshaping.



Figure 2: Map of the original archipelago of islands of Bombay, and the areas reclaimed. Source: Gazetteer of India, 1987

In 1862, the Fort walls were demolished, and the water tanks were filled (Ramachandran, 1998). The first reclamation by the British colonisers between 1709-1710 began with the closing of 'breaches' or embankments between the original seven islands (see Figure 2). The terms 'breaches' and 'inlets' ascribed to the existing landscape indicated a narrative conducive to land reclamation projects. The Reclamation efforts were made to reduce the dependency of agricultural imports into the island. A significant reclamation project known as the Backbay Reclamation Scheme was initiated in the 1860s. Parts of the project were realised in the 1920s, such as the Marine Drive or the 'Queen's Necklace' (Art Deco District), and Nariman Point (established as the new Business District). The reclamation work to the west of the Oval Maidan was completed by 1929, while the Queen's Necklace of the Marine Drive was completed by 1940 (Riding, 2018).

The implementation of the Back Bay reclamations (although minor in terms of land area), led to significant contributions in altering Mumbai's urbanism. The physicality of the defined arc (Queen's necklace) along the coast, presented unique opportunities to control and reimagine the interface between the sea and the land. In Marine Drive, the process and the outcome of reclamation, resulted in a novel publicly accessible space of leisure, defined by a concrete bench that ran throughout the coastal edge, a 4m wide promenade, and a double-laned carriageway, lined by a series of modern Art Deco buildings. The Art Deco movement in Mumbai sought visionary inspiration from contemporary reclamation work of Miami Beach's Art Deco strip, which represents a spatially segregated, elitist urbanism that prioritised beach-facing urban development (Kumar, 2018).

The Art Deco architectural movement (a continuation from the Parisian Art Nouveau architectural style) reliant on a flat terrain, barrier-free and open-access landscape, characterised by wide streets and promenades, was set against Mumbai's sweeping coastal landscape. The architecture bears semiotic references to the coast and nautical geometry. The Art Deco precinct was built on a new set of urban building control regulations redefining the architectural form and urban setting, and thereby establishing a new sense of cultural and behavioural conditioning (Brandon, 2020). This coastal landscape was defined by architecture of entertainment, theatres, libraries, museums and other prominent institutions, representing an important shift in the city's cultural urbanity.¹⁵

The island of Miami beach was previously a marsh/swamp land, redefined through urban improvements projects affording the contemporary Art Deco strip's tourist potential (Fisher Island Community Association, n,d). The reclamation provided a canvas for the Art Deco movement, directly supported by the presence of a flat, non-pervious terrain. This reference for land transformation with the coast, shaping the sea edges, and creation of a new beach culture is an innate form of the anthropocene, presenting a dichotomy of culture and nature. In Mumbai, the Marine Drive Back Bay reclamation

¹⁵ (Art Deco cinemas (Regal, Eros, Metro), residential: Rajjab Mahal, Soona Mahal, Empress Court), offices (NewIndia Assurance building, LakshmiInsurancebuilding), Hospitals (Breach Candy Hospital, Dr Purandare Maternity and Gynaecological Hospital)

formed a white-enclave, spatially segregated from the local settlements, supported by the introduction of a storm-water drainage network system. This outward-looking architecture, with curved-cuboidal balconies enabling direct visual connection to the sea, became the new model for coastal urbanism (see Figure 3). Banganga in contrast is an example of 'soft thresholds'. A threshold is a space that has 'dual coding' as a point of separation and connection (Mehrotra, 2021). The strategic positioning of the tank created a symbiotic relationship of the community, culture and coastal inundation. The art deco urban environment, far removed from traditional water harvesting systems and disintegrated from the natural geographical terrains of the islands, reduced the sea to solely a visual feature as a composition of the art deco landscape.

Public activism along the coastal interface was foregrounded during a new wave of pre-Independence struggle movements in Mumbai. Communal festival processions became a subaltern form of public projects and displays of patriotism (Elison, 2018). The Ganesh Chaturthi festive processions (for the commemoration of the Hindu God Ganesh), temporarily transforms the public streets to house semi-permanent enclosures for Ganesh idols. The processions culminate with the sea as a final destination for the immersion of the idols (Mehrotra, 2016). The expanse of the coast (Marine Drive) as a vast unified space allows for mass gatherings as a singular form. The mass (populous) immersion events at the coast made possible by the flattening of the coastal terrain, reduced the possibilities of micro-cultural phenomenon. The city-scale immersions threaten the physical infrastructure of the coast, polluting the sea with increases in metallic content (Lokhande, 2019). This finality of the immersion activates the coastal edge to physically hold the large congregations at the water's edge, unmasking the act of the anthropocene, of breaching the boundaries of nature and culture.



Figure 3: Aerial view of the Marine Drive (as part of the Baybay Reclamations) lined by the series of Art Deco Buildings Source: https://www.espncricinfo.com/photo/an-aerial-view-of-mumbai-s-marinedrive-938847

5. Contemporary Climate Contentions

The erstwhile Presidency town was equipped with a 'designed' storm-water drainage system with a capacity of about 25 mm per hour. This system with a dense network in the 'island city' (functional despite being 70+ years old), and a sparse one in the suburbs built post-independence tackle stormwater drainage. Over the past few decades, the cases and scale of urban flooding have increased exponentially. An overhaul of the drainage system proposed in the 1990s by Brihanmumbai Municipal Corporation was rejected considering extreme costs. Mumbai receives heavy rainfall between July and September averaging at 2300 mm, and is also susceptible to cyclones during the Monsoon season¹⁶. High tides coupled with intense rains cause urban flooding and water-logging, predominantly in low-lying 'island city' areas. Urban flooding has become common during monsoons, with the July 2005 floods recorded as a devastating occurrence with 410 deaths and thousands displaced.

¹⁶ Mumbai was subjected to 18 cyclone events between 2011 to 2022 according to India Meteorological Department (Mumbai), as cited in MCAP Summary.

The *koli* community habitats and other informal settlements face extreme flood vulnerabilities. In 2020, the BMC launched 'IFLOWS Mumbai', an Integrated Flood Warning System. The same year, Mumbai joined the C40 Cities Network for fast climate action. The Brihanmumbai Municipal Corporation (BMC) developed the MCAP (Climate Action Plan) in 2022, an evidence-based plan for climate mitigation and adaptation, aiming for a 'net-ze-ro' and 'climate-resilient' Mumbai by 2050 (C40, 2022). Out of three baseline assessments in the MCAP, 'The Climate and Air Pollution Risks and Vulnerability Assessment' evaluates Urban Flooding, Coastal Risks and Landslides¹⁷. Building flood resilient systems and infrastructure, localised water conservation, disaster risk and impact reduction, restoring aquatic ecosystems are some of the action tasks outlined in the MCAP. 'Built-heritage' vulnerabilities are not integrated in the MCAP. Some 'natural heritage' agendas like mangrove and biodiversity conservation are discussed, without explicitly foregrounding 'climate risk to heritage'.

The CRZ notification 2019 (earlier 1991, 2011) determines the permitted 'scale' and 'nature' of development across India's 7516.6 km coastlines. Mumbai has a coastline of approximately 150 kms. During the period 2013-22 WMO (World Meteorological Organisation) reported a global sea level rise of 4.5 mm/yr, citing 'human influence' as a primary driver of increases since at least 1971 (WMO, 2023). According to the UCCRN technical report, Mumbai is amongst the top three cities facing the highest risk of rising sea levels (UCCRN, 2018). Mumbai's methods to combat these rises, while constantly reshaping the edge are discussed in a later section of the chapter. Raising of sea-walls to combat coastal flooding, and RCC underground reservoirs to combat urban flooding, both anthropocentric interventions, are employed to tackle climate change brought on by pro-development neoliberal intentions.

6. Anthropocene Contentions at the Edge

The Draft 2020 CZMP¹⁸ (Coastal Zone Management Plan) of Greater Mumbai is an interesting map resource that delineates the CRZ Zones- the CRZ-I, CRZ -II, CRZ-III - based on the 2019 CRZ Notification. Within the CRZ-I category (ecologically-sensitive areas), which is a strictly no-development zone, the map identifies natural edge-conditions such as nesting grounds

¹⁷ Along with Urban Heat and Air Pollution

¹⁸ The Draft CZMP (provided on the CZMP website) offers a more detailed picture of Mumbai's coastal edge condition than the Approved CZMP(2020). The approved CZMP omits the detail in the draft.

of birds and turtles, mangrove buffers, marine protected areas, corals and coral reefs, reserve forests, salt marshes, sand dunes, mudflats, mangroves, intertidal zones; semi-natural spaces such as beaches and rocky outcrops along Mumbai's urban edge have been distinctly marked. 'Archaeological and Heritage sites' have also been identified as a vertical within this CRZ-I category, but all heritage sites have not been comprehensively incorporated into this vertical. Majority of the heritage sites including Gateway of India, Ensemble of Victorian Neo-Gothic and Art Deco Buildings, Haji Ali etc. have been categorised into CRZ-III no development zones instead. A comprehensive overlaying of the archaeological and heritage sites (including ASI, WHS, natural heritage areas etc), will enable a better understanding of risks from climate-change and coastal contentions.

The 'urbanised' sea-facing western edge as well as the creek-facing eastern edge within the colonial island-city extents) is dominated by tetrapod stabilisation, rocky outcrops and some beaches, intertidal zones, alluding to the heavily urbanised edge. Upto a 500m line, a CRZ-II zone¹⁹ is also delineated along these 'urbanised'/'concretised' edges here. In stark contrast the eastern edge north of Dadar, facing the Thane creek (outside the colonial city extents) is buffered by extensive mangrove cover interspersed with mud-flats (CZMP, 2020). In the northern and north-eastern peripheral regions as well (Manori Creek, Gorai etc), pre-colonial ecologies of salt-pans and mangroves punctuate the coastal edges. Studies have shown that there is an accretion of sediments between 1990-2020 on the eastern edge due to increase in mangrove covers. This has resulted in extensions of the coastline, but also in a shrinking of the Thane creek (MCAP,2022). Detailed scientific studies are warranted to study this 'natural' flux in the coastline and its larger ecological impact. In contrast, the tetrapod edge has not seen much change in the coastal outline between 1990-2020. The 'less' concretised north and north-eastern areas on the western coast (Versova, Juhu etc.) have witnessed some coastal erosion within the same timeline (MCAP, 2022).

Deloghrey (2019) describes "concrete, steel and bitumen of the planet's cities and roads" as 'Anthropocene rocks' holding the record of human civilisation. The globally produced 'imaginary' of Mumbai's coast is replete with the hard edges made of this 'anthropocene rock'- concrete. This 'concretisation' emulates a hyper-globalised urban-edge aesthetics of the Global North, which not only references Western and Gulf countries, but also Asian ones like Japan and South Korea.

¹⁹ Already 'developed areas', where new developments can also be approved conditionally by the MCZMA.

Along the 3.5 km stretch of the Marine Drive, concrete wave-dissipating 'tetrapods' were installed by the PWD in 1998. Records indicate that tetrapods have been used for a 1.2 km stretch of the Marine Drive since 1959 (Danel and Greslou, 1962). The tetrapod is a four-pronged wave dissipating structure developed in France in the 1940s. Tetrapod structures gained extreme popularity in Japan as "armour against the Tsunami", with reports estimating that over 50% of Japan's 35,000 km long coastal edge is covered by these structures or other forms of concrete (Hesse, 2007). According to Hesse (2007), "tetrapods and other types of armoring can cause more damage than they prevent because they alter ocean currents and disrupt the natural cycles of erosion and deposition that naturally form and reshape coasts." Figal (2019) urges to think beyond and deconstruct 'binaries' of 'nature' and 'built environment', observing the adaptation of 'wildlife' and 'human-life' to the tetrapods. He reflects that in Japan, tetrapods "appear naturalised" when sharing coastlines with beach resorts and coral reefs, "within an understanding of nature that accommodates, rather than excludes by definition, humans and their built environments" (Figal, 2019).



Figure 4: The Eastern Waterfront Development Source: Login Mumbai (UDRI) Link: <u>http://www.loginmumbai.org/easternwaterfront.html#</u>

In 2020, The MCZMA (Maharashtra Coastal Zone Management Authority) sanctioned the building of a sea wall at the Gharapuri Island which houses Elephanta caves (Naik, 2020). The Elephanta caves - a rock-cut archaeological site with temples linked to the cult of Shiva (Hindu lineage) (5th and 6th century BC) and buried Buddhist archaeological remains (stupas and caves) from as early as 2nd century BC - was inscribed as a UNESCO World Heritage Site in 1987. The construction of this 3.2 km sea wall with sloped ramps, intent on preventing sea erosion began in 2021, undertaken by the JNPT (Jawahar Nehru Port Trust) at a cost of 37.5 crore INR (Kamble, 2021). Incidentally, the increase in port activities and the proposed widening of the water channel of the JNPT located at Nhava Sheva on the mainland directly east of the island factor into the increased erosion risk. The tourists and the 1500 odd residents (of three villages who probably support this tourism industry) are touted as the beneficiaries of this sea wall, which double-ups as a walk-way for tourists. Here, development-induced climate-risk is de-escalated with the pouring of more impervious 'concrete' vis à vis the sea-walls (i.e in essence more irreversible and non-natural urban development).

The Mumbai coast's liminality comes from multiple waves of urban development and their contentions. Wave upon wave of urban transformation projects have been unleashed on Mumbai's urbanised coastal stretches. In July 2022, according to multiple news reports, residents of two Art Deco buildings complained of earthquake-like tremors as an aftermath of the 'temporary' removal of the tetrapods to facilitate construction of the INR 11,000 crore MCRP (coastal road project) from Nariman Point to Kandhivali. The arbitrariness of the CRZ regulations in the CZMP 2020 (MCZMA, 2021) is evidenced in the crescent-shaped Back Bay area where CRZ-II only applies to the first-row of buildings as opposed to 500m elsewhere²⁰.

The 2004 Indian Ocean earthquake and tsunami marks a critical turning-point in coastal edge transformations across South Asian and South-East Asian borders. Mangrove forests were actively planted in locations across India, to act as a coastal buffer offering resilience against tsunamis (Alongi, 2008). Outside the extends of the colonial delimits, Mumbai's estuarine ecology of creeks and wetlands is intact and replete with 13 of the 35 native mangroves species of India. According to the information of the Conservation Action Trust website (CAT, n.d), continuous cover of mangroves remains lining the Vasai creek, Thane creek, Bandra, Versova, Sewri etc. The significance of mangrove ecologies is significantly demonstrated in India, which

²⁰ The reason for this arbitrariness needs enquiry.

houses the Sunderbans, an extensive mangrove forest and deltaic ecology on the eastern coast of India that became a UNESCO inscribed 'natural heritage' site in 1987.



Figure 5: Urban Transformations near Haji Ali (Above): The Coastal Road under construction (2023). (Below): Alignment and Creative Visualisations of the Coastal Road Project. Source: Google Earth, MCGM official website

Being a land-mass predominantly forged through reclamation places Mumbai at an increased vulnerability to coastal erosion. Coastal armouring through both 'soft' and 'hard' stabilisation have thus become increasingly common, as a compensatory measure to both erosion and rise in water-levels. Within urbanised settings, the 'aestheticised' tetrapod structures and other hard concrete infrastructure such as seawalls increasingly replace the natural coastal interfaces. The concretised edges are also touted as anti-tsunami measures against erosion, strongly influencing current coastal imaginations. Recently, the PWD put-forward proposals for 42 sea-walls along the Maharashtra State coastline (including Mumbai) to the MCZMA (Arora-Desai, 2022). These were mobilised despite the NGT's (National Green Tribunal)²¹ instruction to coastal states to swap "hard stabilisation" proposals with "softer stabilisation" options like beach nourishment, sand bypassing, dune planting, offshore submerged reefs etc. while preparing Shoreline Management Plans. It is critical to note that ecologically rich areas like Gorai and Madh Island, with natural coastal edges were also proposed sites.

These transforming coastal conditions create fluxes within the seas and oceans. Water extraction and damming for consumption purposes along with other demands of high-density coastal living, create extreme coastal conditions. Construction activities, dumping of the "techno-fossil" plastic wastes, sewerage and industrial effluents into the sea have severely disturbed the marine ecology and resulted in rise in sea temperatures. The 'Bombay duck' (*Bombil* fish) and other local fish once intrinsic to Mumbai, have depleted greatly in number.

Experts raise concerns over the destruction of habitats serving as natural fisheries and bird nurseries in the construction of urban transformation projects (Crossland et al, 2005, p.21) such as road causeways (e.g Haji Ali), coastal highways (e.g the coastal road project), shoreline ribbon developments (e.g Art Deco Building), port linked industries (The MbPT Eastern Water-front Development) etc. The neoliberal orderings of space through these transformation projects in Mumbai thus reinforce the extreme ecological ruptures of the coast initiated by the British colonisers. In the backdrop of the Bandra Worli Sea-link, the symbolic meanings of heritage, culture and the seaward connections of both the Bandra and Worli fort have been permanently altered. The historical lineages of the Eastern Waterfront can be traced to the Colonial Port and 19th century Industrial 'estate' (predominantly mills) and dockland ecologies (see figure). The 'Gateway of India', an arched monument in Indo-Saracenic style erected between 1911-1924 at Apollo Bunder to commemorate the visit of King George V and Queen Mary to British Bombay, is placed 'strategically' within this eastern edge, marking the 'gateway' to the entrepôt. The Gateway is a Grade I 'protected monument' under the ASI. Post-independence, the Gateway attained a new symbolism, marking the exit of British colonisers from Bombay, and the area including the Gateway and nearby Taj Hotel became central to Mumbai's tourism (Diekmann, 2022). Placed angularly at the coastal edge on reclaimed land, the Gate-

²¹ The National Green Tribunal is a specialised statutory body that overlooks cases and disputes with regard to environment, forests and other natural resources.

way is subject to coastal contentions. During Cyclone *Tauktae* in May 2021 strong tidal waves hit the Gateway (Ramakrishnan et al., 2022) concerning citizens. The main monument did not suffer damages, but a sea-facing safe-ty wall and iron-gates suffered damages according to news reports (Live Mint, May 2021).

The extremely 'contentious' coastal road project was greenlit by a 2015 amendment to the CRZ notification, and on the recommendation of the MCZMA, making clear the pro-development inclination of the CRZ rules. This amendment made it possible to build the Coastal Road by reclaiming on eco-sensitive intertidal zones (Kadri, 2020). The coastal edge near the Haji Ali Dargah is undergoing extreme urban spatial transformations (see figure 5). There is loss of both visual and spiritual connections with the landmark, traded for a 'car-dominant' urban edge that emulates 'glitzy' neoliberal spaces. The coastal road also became a mechanism for the displacement of the *koli* communities residing in *koliwadas* adjacent to the coast. The easy erasure of these smaller cultural markers of intangible heritage sanctioned by means of urban transformation is disconcerting.

7. Inferences

- 1. Mumbai's topographical transformations are largely denoted with coastal based cultural associations.
- 2. The indigenous coastal markers, reliant on temple water tanks, were inward looking, and did not have a direct connection to the coast, minimising the need to alter the coastal terrain.
- 3. The tomb of the Haji Ali Dargah, as a built form within the sea, is a micro-scale example of the land reclamation and an initial form of the manipulation of the coast. The access to the islet, depending on the tidal currents, allowed for negotiations with the coastal interface.
- 4. The reclamation erased several hills in Mumbai, flattening the terrain and redirecting the tidal currents within impermeable surfaces, setting the canvas for a new cultural landscape. The iconic Art Deco strip lining the public promenade of Marine drive directly relied on the sanitised urban setting that the reclamations provided.
- 5. Post-independence, the neoliberal orderings of space through urban transformation reinforce ecological ruptures created by colonisation.
- 6. The incorporation of heritage (built and natural, largely missing in the Climate Action Plan and CZMP plan is pertinent to the discourse on climate-change and heritage in Mumbai.

- 7. Climate contensions (erosion, flooding) brought on by urban transformation are tackled with further urban development.
- 8. The affinity towards a 'concretised' urbanity, as a direct result of pro-development narratives, alienates heritage and their visual, symbolic, intangible and other relationships. Mumbai's numerous coastal built landmarks are vulnerable to erosion, weathering, rising sea levels and extreme weather events.
- 9. The ambiguity of the CRZ norms has authorised acts of the anthropocene within the coast. Coastal road project's placement in eco-sensitive CRZ-I²² zones demonstrate the pro-development narratives of the city. The project disrupts long-standing cultural and ecological relationships.

8. Conclusion

Mumbai's coastal edge holds tremendous historical value, as a site of distinguished cultural markers. The case of Mumbai's rich and varied cultural history presents an opportunity to comparatively study its land modifications through the lens of cultural variations. The multiculturality ascribed by Mumbai's vivid socio-cultural markers enrich the everyday socio-spatial sphere of the populace. Within the vicissitudes of excessive urban development, one perceives an increased dilution and erasure of the socio-cultural milieu (e.g. the koliwadas). The act of human manipulation to the geographies within the island had historically set up a constant imbalanced duality between anthropocentric cultural habitats and coastal geography. However, post-independence, the city's urban transformations have detached from the burgeoning cultural diversity within its misplaced reclamations. Historically, imperialist, colonialist, and neoliberal ideologies restructured and reshaped the islands' interface with the sea. We posit that the answer to the overarching question of what could be an empathetic anthropocene is found in the construction of a symbiotic relationship between cultural markers and urban transformation (necessary to transcend alienation and anthropogenic ruptures). Sites of culture and sustainability often adapt to new territories, if the construction permits integration, identity and cultural resonance. It is well understood that capital flows and not human desires shape space, from the excessive concretisation of spaces. What 'anthropo' now represents within the 'anthropocene', and the value of humanity is up for contest.

²² No development zone.

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Starting with a systemic understanding of cultural heritage, climate-change related urban transformation processes are analyzed through a multi-disciplinary lens and methods that blend the arts, humanities, and sciences. Governance-specific topics range from relevant cultural markers and local policies to stimulate resilience, to a typology of heritage-related governance and the vulnerability of historic urban landscapes. A variety of contributions from the Americas, Asia, and Europe describe and analyze challenges and potential solutions for climate-change related urban transformation and the role of cultural heritage. Contributions focusing on innovation, adaptation, and reuse introduce the concept of urban acupuncture, adaptive reuse of industrial heritage, and how a historical spatial-functional network system can be related to a smart city approach. The potential role of cultural traditions for resilience is analyzed, as is the integration of sustainable energy production tools in a historic urban landscape. Examples of heritage-based urban resilience from around the world are introduced, as well as the path of medium-technology to address climate adaptation and prevention in historic buildings. The contributions emphasize the need for an updated narrative that cultural heritage can also contribute to climate adaptation and mitigation.

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