

METABOLIC URBANISM: CITY AS PROCESS

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ABSTRACT

Metabolic Urbanity presents ongoing research and speculative propositions for the Frontier Closed Area, (FCA), a buffer zone in Hong Kong on the border between the former British colony and Shenzhen, a frontier town in Southern China. Created by the British in 1951 to stem migration and control illegal activities from the Mainland as a reaction to the 1949 Communist revolution, the buffer zone has remained unchanged for the past 60 years. The FCA has operated predominantly as a demilitarized zone separating two very different ideologies, economies and governments complete with surveillance forts, barbed fencing and heavily secured border control points. Despite this physical separation, the relationship between Hong Kong and Shenzhen has changed significantly since China's economic reformation was initiated by Deng Xiao Peng in 1978. China's opening up and the creation of the Shenzhen Special Economic Zone (SEZ) has fuelled economic exchange and increased financial dependency for the mutual benefit of both cities. With 1997's hand-over, Hong Kong is also undertaking its own process of gradually opening up moving towards seamless integration with the motherland by 2047. As part of this process the erasure of the border is being incrementally managed through a series of operations: policies that promote joint collaboration; economic incentives from Shenzhen's status as a Special Economic Zone; cross-border infrastructural projects; and changes in planning status of the border region itself. A critical component of this assimilation is the opening up and planning of the Frontier Closed Area. In 2010 its outer boundary line will be redrawn releasing 2,400 hectares of land for potential development. The present condition reflects a critical juncture in the future development of both cities as well as a unique and unparalleled opportunity to test a planning strategy that could offer an alternative to the normative development model predicated on

infrastructural and economic lead urbanization¹. This paper will propose a conceptual framework for the FCA comprised of an inter-connected network of *metabolic urban cycles* attributed to the mutual benefit of both HK and SZ. The intent is to invert the relationship of the border as a separator, (between political ideologies, economies, cultures), and consider it as a connector. This stitched border acts as an urban ecology that is adaptable to its dynamic context and allows for evolution, as the political and economic systems move toward unification.

KEYWORDS

Metabolic urban development, Synthetic ecologies, Ecological urbanism, Urbanisation in China

EXCLUSIONS AND EXCLUSION ZONES

The extraordinary status of the FCA as an under-developed buffer between Hong Kong and Shenzhen, has generated an environment that is part contingent on natural processes; including bird migration, mangrove and mudflat ecologies and watershed ecosystems, and in part by the massive urban growth and human settlement and the consequent emissions and degradations of air quality and water quality largely on the Shenzhen side of the FCA.

It can be defined as an *Exclusion Zone*: an interstitial space that falls outside of normative regulatory frameworks and through having such status, offers alternatives to predominant modes of development, inhabitation and occupation.

The architectural theorist Ignasi de Solà-Morales has referred to such zones as *terrain vague*, a term he uses to conceptualise obsolete or abandoned areas, spaces and buildings that are undefined or which are in a liminal state; “*strange places*” that “*exist outside the city’s effective circuits and productive structures.*”² Such places often resist reintegration or re-incorporation back into the productive logic of the city and may in Solà-Morales terms have a series of ill-defined values that are contrary to the dominant value system. Others have offered similar definitions: In the 1990s Mark Brearley offered a term called ‘slack space’ to

¹ According to Un-Habitat, investment in transport infrastructure accounts for 44% of the drivers of city growth in Asian cities, *State of the World’s Cities 2008/2009*, Earthscan, London, 2008

² Solà-Morales, Ignasi, “*Terrain Vague.*” *Anyplace*. Ed. Cynthia Davidson. Cambridge: MIT Press, 1995, p120

describe the urban post-industrial wastelands in London. More recently, Keller Easterling-³ writing about emerging relationships between architecture and transnational globalisation updated the concept of the exclusion zone to include the development of sweat shop factory enclaves, corporate campuses and logistics hubs defined as:

“Spatial products that incubate in several species of zone-outlaw enclave formations or ‘parks’ ...[focused] on the instrumentality of duplicity, the preference for manipulating both state and non-state sovereignties-for alternately releasing and laundering power and identity to create the most advantageous political or economic climate. It follows transnational forces as they seek out relaxed extra-jurisdictional forces (SEZs, FTZs, EPZs etc.) while also massaging legislation in the various states they occupy (NAFTA, GATT). Various enclave forms with various legal parameters, merge and hybridize to create new legal habitats like free trade knowledge villages and special economic tourist zones. They are the aggregate unit of many new global conurbations and the mechanism for a mongrel form of exception.”⁴

Due to its inherent difference and often contradictory nature, the exclusion zone is seen on the one hand as a zone of open ended potential; one that represents an underdeveloped possibility to be maintained and extended from within its delimited borders, and at the other extreme as a site of dangerous or unregulated difference. This difference may over time become a kind of contested territory in which conflicting desires and plans compete. As such, with some exceptions where these zones are actively established or tolerated (military zones, buffer zones, border controls, wildlife sanctuaries to name a few), cities and territories will usually try to re-incorporate these spaces and territories back into their regulatory and ordered reality through a variety of redevelopment strategies. The alternative is to attempt to maintain the fragile balance or unstable condition of the exclusion zone as an enduring and dynamic entity as a political, economic, cultural or social space of difference.

In such environments we can find the seeds for different modes of development and organization of space that re-order pre-existent patterns, separations and divisions. The exclusion zone by nature of its disconnection from the surrounding urban fabric overtime

³ Easterling, Keller, “Enduring Innocence: global architecture and its political masquerades,” 2005, MIT Press Cambridge MA.

⁴ Easterling, Keller, Underfire blog: <http://underfire.eyebear.org/?q=node/461>, 2007.

begins to develop or rather evolve at its own rate or speed according to its own specific balances, inputs and outputs. This means that the differences across the boundaries separating the exclusion zone will increase. To the extent that what can seem to be the unplanned within an exclusion zone might in fact be a very subtle rebalancing across boundaries of extreme difference.⁵

The types of spatial organisation within an exclusion zone such as the FCA often appear to have emergent properties, as if they have come about or evolved in symbiosis with their environment rather than having being designed or imposed. Luc Levesque has written:

*“More specifically, it is also possible to approach the interstitial condition of the ‘terrain vague’ as an urban resurgence of the wild. At the confluence of modern brutality (industrial infrastructure, dominance of roads and highways, real estate tabula rasa, etc.), ruderal colonization (flora and fauna), and urbanity (collective appropriations, user-friendly, local practices, etc.), urban wilderness confronts us with raw environments that embody the troubling contradictions that societies tend to repress or mask elsewhere. They are remnants that speak, in many cases, of the violence and irresponsibility of a world devoted to breakneck production, but also of the adventurous, tenacious forms of life that emerge, strengthened, by these hostile environments.”*⁶

From our point of view, this has significant implications. If the exclusion zone has permitted a type of artificial wilderness to occur, over time its metabolism, or its balance between input, output, natural and the man-made may begin to find a symbiosis or synthetic balance. This provides a different nuance from those driving sustainable urban development as it implies using robust emergent metabolic conditions to generate an ecosystem. As such it is a concept that is more closely allied to the concept of anthropogenic metabolism (itself derived from material and energy cycle or flow analysis)⁷ in opposition to the linear throughput systems that characterize most cities and urban settlements.

⁵ For further definition of conditions of extreme difference operating within cities in the Pearl River Delta see Koolhaas, Rem; Chung, Judy Chuihua; Inaba, Jeffrey eds. Great Leap Forward: Harvard Design School Project on the City, Taschen 2003 1st Edition.

⁶ Lévesque, Luc. “The ‘Terrain Vague’ as Material-Some Observations.”
http://www.amarrages.com/textes_terrain.html

⁷ See “Anthropogenic Metabolism and Environmental Legacies,” Paul H Brunner and Helmut Rechberger, Volume 3, Causes and consequences of global environmental change, pp 54–72, Ed. Ian Douglas, in Encyclopedia of Global Environmental Change, John Wiley & Sons, Ltd, Chichester, 2002

SYNTHETIC ECOLOGY

Through its development as an Exclusion Zone the FCA has developed into a synthetic ecology. An ecology has been left surprisingly un-tampered by the frenzied development of Shenzhen. Despite the vast pollution that has accompanied this urbanization linked to industrialisation, bio-diversity and of the region has remained intact. Ninety percent of the FCA is currently a mixed landscape of mountains (33%), agricultural land (28%), wetlands, (24%), woodlands (3%) and mangroves (2%). This ranges from the protected wetland RAMSAR site at Mai Po⁸ (Fig.1) receiving a winter influx of 60,000 migratory birds, to zones of designated *Special Scientific Interest* protecting specific species of newts, bats and freshwater fish, (Fig.2).



Figure 1 Mai Po Wetland, credit: Joshua Bolchover

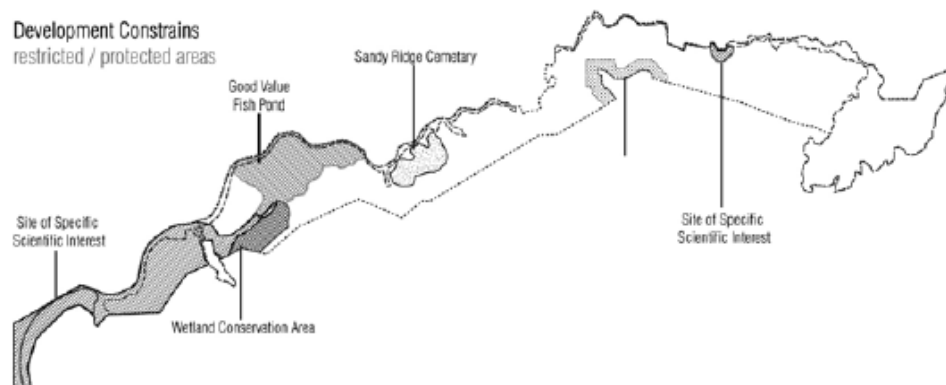


Figure 2 Development Constraints

⁸ On September 4th 1995, HKSAR designated 1500 hectares as a “Wetland of International Importance” under the RAMSAR convention.

In the case of Mai Po, damage limitation has been managed through the controlled flow of water into the wetland, as well as the micro-dynamics of the local ecology. The greatest threat to the wetlands is through increased sedimentation due to reclamation and dredging work as Shenzhen expands its land into the sea, just as Hong Kong has done ever since 1859. This increased deposition of sand onto the mudflat shifts the estuary's equilibrium towards the formation of drier ground through the seeding of trees, grasses and mangroves. The example indicates the fragility of the ecology towards the ramifications of urbanisation but also its dependency on human intervention as a managing agent. In this sense, human and natural forces are intertwined into a *synthetic balance* between artifice and nature. The closed or exclusion zone condition of the FCA has enabled these contradictory forces to find a level of equilibrium and for the bio-diversity, cultural-diversity and spatial-diversity of the area to flourish.

As a counterpoint the village settlements that comprise a mere 9% of the area have remained landlocked and unable to take advantages of their geographical location adjacent to a border region that witnesses vast flows of people, (over 160 million cross-border trips were recorded in 2006)⁹, traffic, goods, and with it, the potential for economic rewards. In clear view from their village, the villagers of Lin Ma Hang can look toward the towering real estate that has emerged from a context not unlike their own; a local fishing village, (Fig. 3).



Figure 3 Lin Ma Hang, credit: Joshua Bolchover

⁹ HKSAR planning Department report:

http://www.pland.gov.hk/pland_en/p_study/comp_s/hk2030/eng/finalreport/pdf/E_7.pdf. Also in 2009,

66.8million HK residents people crossed the border from the Hong Kong side alone,

http://www.censtatd.gov.hk/FileManager/EN/Content_807/transport.pdf

In Shenzhen's case these local farmer's have become immensely rich through a possibly intentioned, loophole in the planning system that allows rural citizens to manage the development rights of village owned, collective land a profit from leasing the land to developers, become developers themselves or are compensated for the land if it is to be developed by the government. In contrast, the villages in Hong Kong have remained agricultural and no doubt are hopeful that the opening of the closed area will signify future prosperity.

INCORPORATION AND PLANNING

In view of these conditions the HKSAR government is in the process of creating a Recommended Development Plan of the Frontier Closed Area¹⁰ with a separate study being developed in conjunction with the Shenzhen Planning Bureau for the site of the Lok Ma Chau Loop¹¹. These plans will incorporate the exclusion zone status of the FCA into the larger body of HK and its territories, and can be seen to represent a desire to normalize the status of the FCA within a regulatory framework.

"We need not worry about the new competitive landscape. With an open mind, pioneering spirit, and full preparation, we can break new ground together." Donald Tsang¹²

Underpinning these plans is the 2010 Policy Address of the Chief Executive of Hong Kong, Donald Tsang and *Hong Kong 2030: Planning Vision and Strategy*. Both these documents indicate the desire for continued re-integration with the Mainland. Hong Kong's autonomy and extreme difference from the Mainland has been eroded through the increased economic exchange brought about through China's economic reformation. This cemented Hong Kong's position as a key node in an evolved network model of globalised industrial production, mediating flows of money and business co-operation within Shenzhen and the Pearl River Delta Region. The current model suggests that Hong Kong itself will have to undergo a

¹⁰Land Use Planning for the Closed Area- Feasibility Study, July 2010, HKSAR Planning Department and ARUP Engineers, HK.

¹¹Planning and Engineering Study on Development of Lok Ma Chau Loop, Stage 1 Public Engagement Digest, November 2010.

¹²Donald Tsang is the present Chief Executive and President of the Executive Council of the Government of Hong Kong. <http://www.policyaddress.gov.hk/09-10/eng/highlights.html>

further process of opening up in order to sustain its own economic development and that long term, its position as a Special Administrative Region (SAR) will no longer be tenable or even preferred. Hong Kong's population growth is effectively stagnant with an aging population and low birth rate and is dependent on mainland migration for growth. The economy is increasingly inter-connected with that of the Mainland through policies such as the Closer Economic Partnership Arrangement, (CEPA), and the fluidity between cities is being invested heavily in through infrastructural projects such the Hong Kong-Shenzhen-Zhuhai-Macau Bridge, Guangzhou-Shenzhen-Hong Kong Express Rail Link, and a new border crossing at Liantang. In essence, the two cities are moving towards an aggregated metropolis with a joint population by 2025 topping 18 million placing the city in 11th position of the projected global mega-cities¹³.

The HK 2030 vision plan has initiated a series of further studies generating recommended planning documents. These indicate a re-orientation of development towards the border region. They include planning for new settlement areas in the North West of the territory adjacent to the Shenzhen Bay bridge, "Hung Shui Kiu Gateway Town" for 160,000 people, and in the North East, close to the border control point at Lo Wu in the Development Areas of Kwu Tung North, Fanling North, Ping Che, and Ta Kwu Ling accommodating a further 130,000 people. The opening of the Liantang Border Control Point in 2018 and investment in development corridors located close to the existing border control points at Lok Ma Chau and Man Kam To will further development opportunities at the border. This figure is probably understated as other researchers have shown. The Recommended Development Plan of HK Planning Department for the Land Use Planning of the FCA sets out a land use plan that is the penultimate stage prior to the document becoming a statutory legal plan. The document systematically maps the existing land uses, protected areas, constraints and potentials; provides an infrastructural plan; and visualizes patches of development for an eco-lodge in Mat So Lung and low rise development in Kong Nga Po. This process is also subject to a public consultation process and to the unique specificity of the Hong Kong top down governance model. Of note is that public pressure for green or more sensitive developments

¹³UN-Habitat 2008, State of the World's Cities 2008/09, Harmonious Cities, UN Habitat, Earthscan, 2008.

often seems to run counter to the Government's wishes for larger scale infrastructural biased developments.

SPACE OF DESIRE

Within this emerging metropolis the future of the border region is clearly a critical and pivotal hinge within the complex interaction between these cities. Its future planning will be a decisive moment in the further stitching of the two cities and will set the tone for future developments. As a physical space, as a vessel for future inhabitation, the 28km² of the FCA could fulfill the following demands of the growing metropolis:

Education: if HK and SZ adopt the preferred low pupil-teacher class ratio the FCA could accommodate the entire short-fall of primary (1274), secondary (934) and tertiary institutions (31), (Fig. 4)

Energy: if the FCA becomes an energy cell packed with the same ratio of coal power plants, nuclear reactors and wind farms as HK, it could generate enough energy to support 45 times HK's current peak energy demand

Food: if the FCA became a food farm based on the current consumption patterns of Hong Kong people it could support approximately 40,000 people per year

Health: if the FCA became a site to provide healthcare for the 6.7 million people who are not entitled to public healthcare in HK and SZ it could accommodate the required 98 new hospitals

Waste: if the FCA became a landfill for the joint waste of HK and SZ it would produce a waste mountain with a peak of approx.57m and generate enough gas to power HK and SZ's joint electricity consumption for 4 years.

Sports: if HK and SZ hosted the Olympics in the FCA all the necessary facilities could be located in one third of the available area. (Fig. 5)

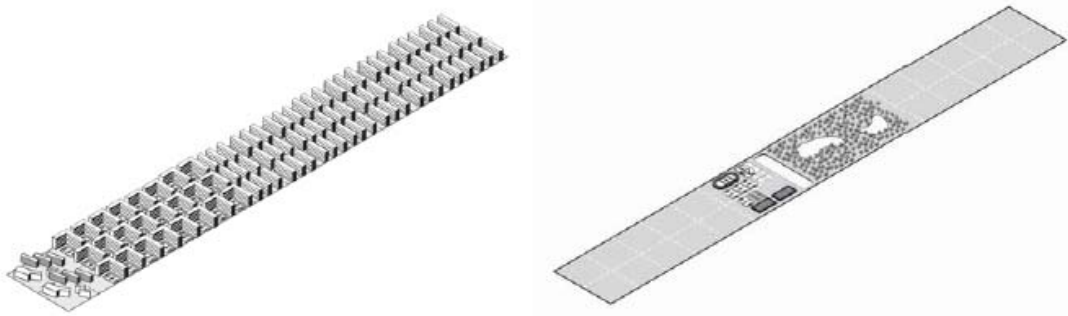


Figure 4 Education Scenario

Figure 5 FCA as host for the Olympic Games

These scenarios are indicative of the forces and desires pressurizing planning decisions on both sides of the border. Purely as a space of unoccupied land – a rarity in both cities - it has incipient value. The nature of these incorporation pressures, despite the comprehensive planning and public consultation process, will in all likelihood generate developments that will not take into account some of the more profound metabolic and environmental conditions of the FCA.

LOOPS AND LOOPHOLES

The contradictory nature of the FCA overlaid on an existing geography and regional culture has meant that a number of spatial and planning loopholes have developed or evolved over time. These anomalies have produced ambiguous territories.

The Lok Ma Chau Loop, formed by the straightening of the Shenzhen River in 1992 to alleviate flooding in the rapidly developed urban areas of Shenzhen is one such anomaly. Subject to contested legal and planning status, having been formerly a part of Shenzhen, the Lok Ma Chau Loop itself has been designated a “Knowledge Exchange and Technology Zone” and is being planned for “mutual benefit” with Shenzhen. Another example is the river meander on the SZ side adjacent to Yu Min Cun village, which has the opposite condition: a piece of Hong Kong territory that is under Shenzhen’s jurisdiction, (Fig. 6).



Figure 6 Shenzhen Loophole, copyright, Google images 2010

The insertion and prioritisation of these loops and exclusion zones within the government plan can offer the potential for the construction of an alternate urban model. These exclusion zones attempt to provide other forms of urbanity not typically associated with formal plans.

For example: the engagement of multiple actors and stakeholders; temporal programming allowing for obsolescence and replacement; a diverse and potentially conflicting range of programs; and a loose regulatory framework to allow for adaptability and evolution. Our position is that such loopholes, being a product of the inherent nature of the exclusion zone offer unique potentials for the development of new forms of urbanity, particularly when taking into account their inherent metabolism and environmental specificity. With respect to the current detailed planning processes presently being implemented, our point of departure is to focus on what gets left out, in terms of territory, existing context or in programming. These missing patches or lacunae reside in the unresolved territorial spaces that sit within neither Hong Kong nor Shenzhen such as the Lok Ma Chau Loop.

FEEDBACK LOOPS AND METABOLIC CYCLES

By instrumentalising metabolic processes- dynamic cycles of exchange - whereby the output of one cycle feeds the input of another a potential tool of planning can be created that could in principle maintain its diversity and some aspects of the synthetic ecology existing on the site. These processes require feedback loops in order to regulate or self-regulate a local metabolic cycle, and these loops can feed into other loops as part of a wider metabolic system. Examples of these are currently operating within the border region demonstrating the potential mutually beneficial synergy between natural and artificial processes.

Dispersed across the entire closed area are traditionally formed fishponds and Gei Wai –tidal shrimp ponds. Chinese immigrants brought knowledge and expertise of the traditional practice to Hong Kong in the 1940s. Water channels are dredged and sluiced to control inflow and outflow of brackish water from the estuary. The shrimp or fish thrive off microbes and organic matter from mangrove leaves and are harvested up to 80 times per year. During winter the ponds are drained and migrating birds feed off the remains.

Often this practice is combined with silkworm farming and the plantation of Mulberry trees. The leaves are the sole food source of the silk worm and the fruits and decaying leaves are eaten by fish and shrimp. The bark of the tree is also be used in Chinese medicine. The interaction between these different cycles produces a constant supply of different outputs that generate either economy or feedback into the system to supply another cycle. It demonstrates the potential for human stewardship within natural processes to generate productive and sustained cycles, (Fig. 7).

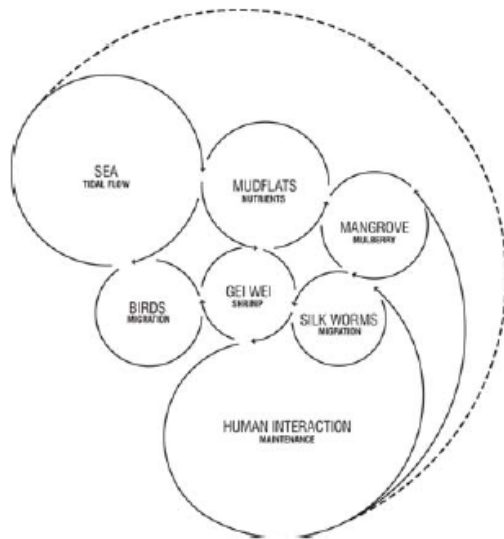


Figure 7 Gei Wai Metabolic Cycle

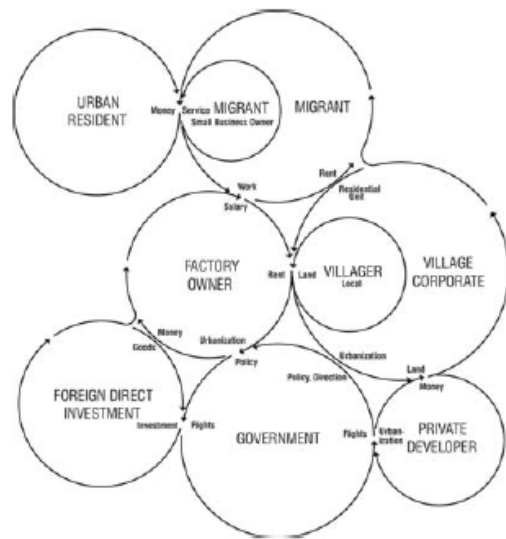


Figure 8 Urban Village Metabolic Cycle

In contrast, the urban-village phenomenon in Shenzhen also exhibits cycles of exchange that can be determined as metabolic, (Fig. 8). The loop-hole created by the difference between urban-hukou and rural-hukou residential status enabled the land-rights of local village farmers to construct extremely dense accommodation for rent to migrant workers that flocked to Shenzhen to work in factories. These factories were built on land leased to Hong Kong or other foreign investors, taking advantage of the financial incentives offered by the Special Economic Zone. As the system evolved, migrants in turn set up local businesses such as restaurants, stores, markets and in some cases prostitution rings, fake goods markets and other illegal activities. Its further development has seen the village collective operating as a business, investing in other parts of the Pearl River Delta, or leasing land to real estate developers, (Fig 9).



Figure 9 Urban Village Transformation, 1980, 2000, 2008

Nonetheless the creation of this enclave condition has produced a form of urbanity not typically associated with formal top-down planning of the majority of Shenzhen, through the creation of a diversity of programs, a multiplicity of actors and stakeholders, the formation of small scaled public spaces, and temporal uses.

The flows of economy also interrupt typical hierarchical systems allowing village collectives to mediate across the border and to wider global flows. The urban-village manifests the potential of an exclusion zone to develop as a catalytic seed within a loose regulatory framework to produce an urban exception – one that is contradictory, heterogeneous, incomplete, and textured.

METABOLIC URBANISM: CITY AS PROCESS

The two examples of metabolic processes, one more based on natural systems and the other on artificial mechanisms, offer the potential to link and combine through the addition of further loop cycles to create programmatic entities that facilitate an exchange between natural ecology and human economy. As a planning tool that would instrumentalise these existing cycles as well as augmenting and supplementing them with new programs, a sustained urban system that is robust yet adaptable to economic or environmental pressures could be created. This can generate and maintain a diverse series of environments, border or boundary conditions and a wide range of functional and cultural spaces able to derive a complex balance between the parts. A further potential is that the FCA conceived as metabolic urbanism could regulate future developments within its boundaries.

The Metabolist Movement in Japan in the 1960's pioneered these concepts to develop an approach to re-conceptualize and radically reconfigure the urbanization of industrial cities in Japan. As Zhongjie Lin writes:

“At the root of Metabolist urban utopias was a particular notion of “city as process.” This idea stood in opposition to the modernist paradigm of city design and led to such radical design concepts as artificial land, urban structuring, marine civilization and metabolic cycle..... They approached the city as a living organism consisting of elements with different metabolic cycles: some are persistent while others tend to be ephemeral. To accommodate a city’s growth and regeneration, Metabolists advanced transformable technologies based on prefabricated components and the replacement of obsolete parts according to varying life cycles. This notion of growth and change at the scale of a city

ultimately overthrew traditional theories of city planning and demanded a redefinition of several critical relationships in design: order / chaos, permanence / transience, collective / individual and planning / spontaneity¹⁴.”

In the context of the emerging aggregated metropolis Shenzhen-Hong Kong or its extended Pearl River Delta agglomeration including Guangzhou, Dongguan, Longgang, Forshan, Zhuhai and Macau, the FCA is one of the most significant areas to remain undeveloped. Its geographic position, historic context and symbolic nature as the separation zone between “One country Two Systems” mean that it is politically charged. Additionally all future developments in the area, including the ones planned by the Government’s regulatory changes and planning guidelines need to take into account the current needs, future desires and gradual reintegration of the two systems. This clearly implies that all developments need to be adaptable, reactive and flexible to future changes. However if current planning processes either side of the border are indicative of the future developments then the likelihood is that the outcome will be in structure, operation, form and mode of development indistinguishable from current development trends. In particular HK and SZ’s adopted model of infrastructure lead development seems at present inflexible to other ways of planning.

Rather than compete with the government’s current plan we see our plan as one that could dovetail and integrate with the formal proposal, but instead prioritises zones of exception, exclusion, or simply zones that cannot be categorised within normative planning techniques as land-use, plot ratios or area zoning.

The urban village example demonstrates the potential of an exclusion zone to act as a catalytic seed initiating the formation of an *urban outcrop*¹⁵ that has value outside of formal planning methods. As catalysts, these exclusion zones could be incrementally phased and strategically linked to critical stages in the formal plan, for example: the completion of the border control point at Liantang in 2018, or Fanling North New Development Area by 2030.

¹⁴ Zhongjie Lin, Kenzo Tange and the Metabolist Movement: Urban Utopias of Modern Japan, Routledge, NY2010, p2.

¹⁵ Peter Cook in describing the approach of the Japanese Metabolists uses the term urban outcrop in the following way: “...buildings can be fragmented into systems of connection and urban outcrop which are expressions of a single metabolism, even though individual building types can be identified within.” Peter Cook, Experimental Architecture, Studio Vista, London, 1970, p77.

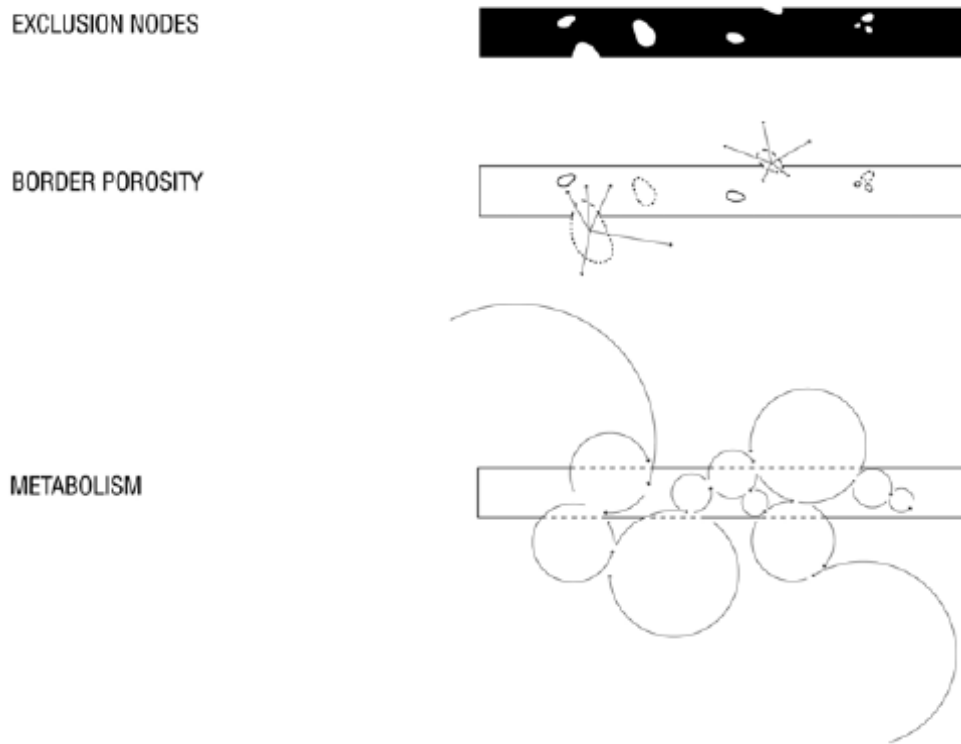


Figure 9 Urban metabolism

These zones of exception, described and programmed as metabolic entities, could inter-link across the entire FCA to form a networked ecology and sustained urban model. Through setting up mutual beneficial relationships between clusters of program, these micro-ecologies, could feed into and support larger flows of inputs and outputs of the entire border territory. The FCA presents a critical opportunity for a radically different type of urban development, premised on metabolic factors. The exclusion zone characteristic of the FCA provides an opportunity to extract and apply new strategies for the FCA in a type of development that could be a model condition for other cities in the region.

“Through its form and operation it provides a test bed condition for large scale peculiar ‘imbalanced’ urbanistic development” - Cedric Price¹⁶

ACKNOWLEDGEMENT

¹⁶Cedric Price, “Life Conditioning”, Architectural Design, October 1966 in reference to Potteries Thinkbelt, quoted in The Square Book, Wiley-Academy, Great Britain, 2003

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