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The challenge of urban design in securing post-event legacies of Olympic Parks

Latuf de Oliveira Sanchez, R

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Abstract

Olympic Parks demand a very distinctive built environment in order to function for their primary purpose, namely to host major sporting competitions. These spaces, however, require substantial reconfiguration in the post-event mode to ensure viable, mixed use and liveable places. This paper evaluates the challenges of transforming Olympic Parks, using evidence from four past hosts: Munich (1972), Sydney (2000), London (2012) and Rio de Janeiro (2016). The discussion raises questions about retaining the ceremonial focus of the Olympic Park and whether a more decentralised model might make the associated urban design and planning legacies more deliverable for future host cities.

KEY WORDS: Mega-events; Olympic Games; Legacy; Post-event use; Planning.

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Introduction

Mega events, such as the Olympic Games, are often lauded as a catalyst of urban transformation and legacy in the cities that host the competition (Zimbalist, 2015). Unsurprisingly, these legacies are contested, largely dependent on the perspectives and interests of those undertaking the evaluation. While the positive outcomes for economic opportunities, urban regeneration, national pride, increased sports participation and international prestige might be emphasised by a ‘coalition of beneficiaries’ (Grix, *et al.*, 2017), the negative or unintended consequences of mega events, such as financial and democratic accountability and the displacement and gentrification of local communities, are equally significant (Coaffee, 2013). An increasingly standardised model of Olympic preparation, which Roche (2000, p.135) has labelled as the ‘Olympic city theme park’, and an uncritical and prescriptive transfer of approaches from host to host, which pays insufficient attention to the contextual differences between cities, are contributory factors to this situation (Moore, *et al.*, 2017; Raco, 2013; Coaffee, 2013).

One of the most universal and difficult challenges of these mega events in urban design and spatial planning terms is the post-event use of Olympic Parks (Smith, 2014). The ability of planners and urban designers to convert the monumental, spectacular and functional spaces of an Olympic Park, created especially to stage the Games, into a more ordinary, human scale, compact, mixed use, integrated and ‘healthy’ urban reality, for the long term, is a fundamental pre-condition for securing legacy. As Searle (2002, p. 201) argues, such a transformation is essential to capture the full economic and real estate value of an Olympic site and its associated infrastructure. Without such a transformation, the legacy prospects for an Olympic Park can be to remain nothing more than a ‘ruptured space’ within the urban fabric of the host city. A

critical comparative review of the approaches employed to secure a transition from spaces designed for a short-term mega event into successful long-term uses is therefore an important contribution to the understanding of legacy design and planning.

This paper has three aims, which also act to structure the discussion. First, the key characteristics of Olympic Parks in event mode are examined using the International Olympic Committee's (IOC) technical specifications. Second, the challenges presented in reconfiguring these spaces for a post-event mode are evaluated with reference to established theories of urban design. Third, the planning and urban design strategies adopted to transform Olympic Parks and create viable legacies are assessed in four host cities: Munich (1972), Sydney (2000), London (2012) and Rio de Janeiro (2016). The analysis emphasises that, unless the post-event use is similar to its event mode or there is a clear legacy plan from the outset, the problems of retrofitting event spaces and changing economic and political circumstances can delay or devalue the urban design legacies that can be realistically secured. A more decentralised model for staging the Olympic Games might enable the legacy of the event to be more deliverable for future host cities.

Urban design specifications for an Olympic Park in event and post-event modes

As the scale and global interest in the Olympic Games has grown, the staging of the event has moved from a loose collection of venues, as in many of the early Olympiads, to a clearly defined ceremonial focus containing sports venues, athlete accommodation and public space. Although the creation of an 'Olympic Park' has never been specified explicitly by the International Olympic Committee (IOC) in its manuals for cities bidding for the Olympic Games, it is implied in the imperative that "the geographical area occupied by the sports installations ... should be as compact as possible" (IOC, 1992, in Shirai, 2009, pp.5-6). Besides

creating a ceremonial focus for the Games, which is important for promoting the host city's image worldwide, a compact site facilitates logistics and security benefits for constituent groups: athletes, sports federations, media staff and spectators. The IOC manuals stipulate exacting and prescriptive specifications for competition venues, including front and back of house spaces for security screening and ticket checking; the composition of the Olympic Village (for 16,000 athletes and team officials); the International Broadcast Centre (at least 55,000m²); and the Media Press Centre (at least 40,000m²) (IOC, 2000; 2005 a, b & c; 2015).

Characterised as large, single use spaces, with coarse-grained buildings designed to accommodate major sporting events and large peaks of spectators, Olympic Parks contradict the principles of sustainable and liveable urban design espoused by Jan Gehl (1987), Jane Jacobs (1961), Gordon Cullen (1961) and Kevin Lynch (1960) (see Table 1). Their theories emphasise the importance of a human scale, open facades, interesting detail at eye-level, mixed-use environments (residences, commerce, leisure, services), reasonable walking distances between places with legibility and permeability, good quality public spaces (squares, pedestrianised streets), and fine-grained buildings to create diversity and interest. These are challenging specifications to fit retrospectively within an Olympic Park and it is clear that the scale and complexity of staging an Olympic Games will bequeath urban spaces that can be hugely difficult to adapt successfully in the post-event mode.

<Insert Table 1 about here>

These challenges have been further accentuated by the new role that urban design and architecture have assumed as a tool of urban economic development in the new globalised inter-urban competitive milieu (Beriatos and Gospodini, 2004). New spaces and buildings, such as for the Olympic Games, must serve to strengthen the host city's global status through

the creation of lifestyle amenities for visitors and residents as well as by enhancing its image and ‘hard-branding’ (Ren, 2008). There is a risk that these new spaces become socially exclusive and aesthetically homogeneous because of the realities of economic viability within the regeneration process. In these circumstances, Olympic legacies can become irrelevant and inaccessible to the majority of the population. The theory of the place-shaping continuum proposed by Carmona (2014) is relevant here as it represents an integrated framework to analyse the contexts, processes and power relationships that mould public space over time through the phases of design, development, use and management. Indeed, Davis (2014) argues that a less future-determining and more responsive approach to master-planning (‘the Open City’ concept) is advocated to allow changing community and user needs to be accommodated within emerging urban frameworks.

The history of the Olympic Games has been littered with examples of over-extravagant facilities, which subsequently became redundant once the Games are over (Boykoff, 2014). As a result, the number of cities willing to bid for the Games since about 2012 has reduced and arguably threatened the future of the event (Lauermann and Vogelpohl, 2017). The IOC has attempted to rein back on the scale of the event. The Olympic Games Study Commission in 2003 established new principles for shared and temporary facilities when post-event use could not be guaranteed. Furthermore, the promotion of positive legacies after staging the event was newly added as a duty in the Olympic Charter in 2007. The Olympic Agenda 2020, agreed in 2014, changed the host city selection process from the form of a tender (with specified requirements) to an open dialogue and negotiation to ensure that the scale of Olympic-related development was aligned with the host city’s long-term development trajectory (IOC, 2015).

These measures represent an attempt to address the legacy issue, but do not alter the fundamental urban design challenge faced by host cities of transforming event spaces into usable daily spaces for communities. This paper therefore seeks to evaluate how this fundamental urban design challenge has been resolved by previous host cities. In particular, the potential contribution of legacy master planning as advocated by the IOC since 2003 is critically assessed, especially given the effect of constantly changing economic conditions and private sector interest on the realisation of post-event visions over long-timescales. Given the apparent intractability of these problems, it is argued that a radically different configuration of venues for the Olympic event is required to secure realistic legacies.

Selection of case studies

Each city selected for the analysis in this paper represented a different configuration of legacy based on the post-event utilisation of land and the pre- or post-event planning of these long-term outcomes. Munich was one of the first hosts to mention a post-event use of venues and spaces in its initial plans, which led to a cohesive Olympic Park almost unaltered since completion. Sydney, on the contrary, did not implement their legacy plans from the outset and went through a number of revisions to its masterplan in order to achieve a more dynamic post-event use of the site. London was the first host city to be affected by the IOC's 2003 agenda, which aimed to reduce preparation costs and maximize long-term benefits. The Rio 2016 Games was assessed because of the uncertain basis of its legacy outcomes resulting from changing conditions of economic viability for the private sector developers and investors. Other Olympic cities have been excluded from this analysis, either because their legacy outcomes have been well researched, as in the case of Barcelona (1992), or because there were limited legacies, as in the case of Athens (2004). The analysis utilised a detailed examination and review of the key published documentary evidence, including organizing committees' reports

and critical commentaries about the Olympic Parks. As a methodological template, the focus was on the pre-Olympic status of the Olympic Park, the original design for the event and, where relevant, the post-event transformation (including land use, density, connectivity and appearance), and local governance arrangements. Comparable scaled maps were produced to highlight the strategies used in each of the host cities.

Analysis of case study Olympic Parks

Munich

The Olympic Park in Munich was developed on a 280 ha brownfield site, Oberwiesenfeld, consisting of a former airfield and municipal refuse dump situated about four kilometres away from the city centre. Although the word ‘legacy’ was not used, the original architectural competition in 1967 specified that the post-Olympic use of buildings and open spaces of the Olympic Park should be as a public leisure and sports park (Landeshauptstadt München, 2008, p.14). This decision enabled the configuration of the Olympic Park for the event itself to be broadly similar with its post-event use, albeit with an intensification of development within the broad ‘zones’ (Figure 1). The Olympic Park and Stadium retained its coarse-grained form and spectacular setting in its post-event mode for public enjoyment and future events; the media and press centre became a sports facility for the local University; and the Olympic Village became a popular residential area integrated into the surrounding land uses. The residential and educational uses created active and mixed use across the site, which, together with good external transport connections, internal connectivity and active governance and management, ensured that the Park was well used and popular. The Munich Olympic Park, therefore, established clear and viable legacies because of the close alignment not only between its event and post-event modes, but also with the city’s development plans and trajectory. It

demonstrates continuity between the four phases of Carmona's (2014) place-shaping continuum.

<Insert Figure 1 about here>

The design competition winners, Stuttgart architectural practice, *Behnisch und Partner*, worked together with landscape architect, Günther Grzimek, to transform the derelict site into an informal, light and cheerful natural green open space for citizens to relax (following Grzimek's 'democratization of the green') and to convey an avant-garde and democratic image of Germany (Schiller and Young, 2010). Originally somewhat flat and dull, the site was re-shaped and contoured to create interest and diversity in a newly fashioned landscape – centred on Olympiaberg ('Olympic Hill') with a lake alongside – which references the surrounding Alpine scenery (Figure 2). The decision to partially bury large-scale venues guaranteed integration with the landscape, and placed the avant-garde transparent tensile roofs of the Olympic venues, designed by Frei Otto, closer to eye-level. Traffic and pedestrians were separated through a network of walks and sensorial experiences, together with integrated connections into the surrounding urban fabric (Landeshauptstadt München, 2011, p.10 & 12). Visitors were encouraged to walk freely anywhere across the parkland (Schiller and Young, 2010).

<Insert Figure 2 about here>

The original design strategies led the park to become a very popular place for leisure, sports and recreation in the city, as well as for events. In 2016, the space hosted around 4.1 million visitors (Olympiapark München GmbH, undated), and more than 10,000 events have taken place in the Park since its opening (Landeshauptstadt München, 2011, p.23). Although guiding principles of the landscape design and venues are very well preserved, it has been argued that some of the original landscape intentions, such as the views across the park and the elevation

of the Olympic Hill, have been lost over the years because of the inevitable growth of vegetation (Landeshauptstadt München, 2011, p.22).

In terms of architecture, alterations of original uses, modernization of venues, and new construction, as a response to changing market conditions, have helped the Park to maintain its appeal and economic viability. Some of the most significant changes in the Park have been the underground expansion of the 'Kleine Olympiahalle'; the opening of the 'Sea Life Center' Aquarium in 2004; and the renovation of the Olympic Tower in 1999, with a museum dedicated to rock music installed on one of its higher floors in 2004. Furthermore, BMW built a museum on the edge of the park in 1973 and opened the multi-use, exhibition/entertainment venue, BMW Welt in 2008, which helped to broaden the locality's visitor appeal while maintaining the parkland landscape.

The Olympic Village has become a popular residential area because of its proximity to the city centre, good public transport connections, and privileged location in one of the city's largest green areas (Figure 3). Criticized after the 1972 Games as a 'concrete jungle', due to the immature vegetation on the terraces and surroundings against the rather stark buildings, it matured into a pleasant environment with the growth of trees and bushes. In 1972, the bungalows of the 'Frauendorf' (accommodation for female athletes) were handed over to Münchner Studentenwerk, an institution that manages the site as student rental accommodation. From 2007 to 2010, these units were demolished and rebuilt in order to improve infrastructural issues, as well as to provide more apartments. As a result, 1,052 units replaced the original 800. The colourful and unique façades, painted by student occupants since the 1970s, were returned to plain grey, but were gradually decorated again by their new inhabitants, encouraged by Studentenwerk's supplies of free paint.

<Insert Figure 3 about here>

The notable success of Munich's Olympic Park as a legacy is attributable not only to its original design conception, but also to particularly effective local governance. After the 1972 Games, the Olympic Park Company merged with the Olympiapark München GmbH, a private company owned by the City, to manage, maintain and operate the whole park, except the Olympic Swimming Pool, which is maintained by Stadtwerken München (SWM). In 1992, a partnership of high profile, international business enterprises, called Meeting Point Olympic Park, was created to attract events to the park and improve its infrastructure to meet market demands. In 2017, the partnership included leading companies such as Adidas, BMW Niederlassung München, HypoVereinsbank and Coca-Cola.

Sydney

Sydney's Olympic Park for the 2000 Summer Games took place on the site of Homebush Bay, a 760 ha degraded area that accommodated the State Abattoir and State Brickworks until the 1980s, and had also been used for waste landfill during the 1960s and 1970s. The Olympics was the culmination of over a decade of regeneration planning for the area that envisaged precincts for major sporting facilities and a mixture of industrial, parkland and housing uses on largely publicly owned land (Searle, 2002). The design of Sydney's Olympic Park was, therefore, envisaged as an additional stage in the long-term regeneration of a larger site.

In 1994, the Structure and Master Plan for the Olympic Park at Homebush Bay recognised two 'development modes' for the area: the 'Olympic Mode' and the 'Post Olympic Mode'. The post-Olympic mode was, however, neglected in the clamour to prepare the site for the Games in 2000 (Davidson and McNeill, 2012; Freestone and Gunasekara, 2017, p. 322). The plans for

the event mode emphasised the concepts of ‘sustainability’ and a ‘compact’ Games, which would provide “a large range of sporting, recreational, commercial and residential facilities all within walking distance of each other” (NSW, 1994, p.2) (Figure 4). However, once the event had been staged, the challenge of creating a living and working environment in a space occupied by low-density, coarse-grained buildings flanked by broad boulevards set in single land-use zones each separated by swathes of open space was acute (Figure 5).

<Insert Figure 4 and 5 about here>

The legacy agenda re-emerged with the establishment of the Sydney Olympic Park Authority in 2001 as an attempt to capitalize on the success of the event and secure a long-term future for the site (Cashman, 2003). Three main visions for the legacy planning for the Olympic Park emerged: the ‘Master Plan 2002’ (SOPA, 2002), the ‘Vision 2025’ (SOPA, 2004) and the ‘Master Plan 2030’ (SOPA, 2010; 2016). These plans proposed the retrospective conversion of the built environment into smaller urban units, with narrower streets, denser blocks and mixed use conducive to the creation of a new suburb with a resident population of 14,000 and a daily population of 31,500 workers together with 15,000 visitors (SOPA, 2016; Lochhead, 2005). The Masterplans proposed the development of a ‘town centre’ incorporating commercial and retail activities around the Olympic Park Railway Station; new residential areas in the Central and Parkview precincts and along the parkland frontages; new employment and retail space; an educational campus on the eastern side of the Park; and the retention of the major sporting and entertainment venues (SOPA, 2016, pp.22 & 24). In clear contrast to Munich, the legacy configuration of the Sydney Olympic Park has depended too much on retrofitting usable features into spaces for which they were not designed and has therefore taken longer to deliver. The place-shaping continuum for the Olympic Park in Sydney has been too

disjointed, especially between the design and development stages, although modifications from the subsequent use and management of the site have still to manifest themselves.

The Olympic Village, located in Newington on the edge of the Olympic Park, was a sprawling single use, low-density and low-rise configuration, similar to many other Sydney suburbs. The Mirvac Lend Lease Village Consortium comprising of Mirvac, Lend Lease, Civil & Civic, ANZ and Westpac built 900 townhouses and 700 apartments in a 90 ha area, as well as nearly 300 modular homes. Intended as a 'model for eco-sensitive urban design' (Chalkley and Essex, 1999, p.304), the development comprised solar panels and water recycling facilities, although its credentials have been somewhat undermined by its high dependency on the motor car.

London

London's Olympic Park for 2012 was developed on a 280 ha contaminated and brownfield area in the east of London, incorporating the boroughs of Waltham Forest, Newham, Hackney Wick, Tower Hamlets and Greenwich. Having been a polluted and poorly connected site for over a century, the Olympics presented a valuable opportunity to regenerate the site as one complete unit. The routing of the High Speed Rail Line from the Channel Tunnel through the eastern corridor, rather than the original proposal through south London, was the initial impetus for change. In 1997, London and Continental Rail, landowners of the then future site of the Olympic Park, appointed development partners, Stanhope PLC and Chelsfield, to develop a regeneration proposal for the site, under the 'brand' of 'Stratford City'. The Masterplan for Stratford City was developed by the core design team of ARUP Associates, Fletcher Priest Architects and West 8 (Lowe and Smith, 2005) and, despite changes by subsequent masterplans after the successful Olympic bid in 2005, many of the original ideas remained and were

implemented (in contrast to the situation in Sydney). Crucially, the use of compulsory purchase for the Olympics enabled the planning and redevelopment of the site as a single coherent unit.

The preparations for the London Olympics were the first to be influenced by the IOC's legacy agenda of 2003, which required post-event use to be planned from the outset. Three masterplans were prepared for London's Olympic Park: one for the Games mode, one for the period of transition after the Games, and one for the legacy. The Olympic Delivery Authority (2006-2014) was responsible for the construction of the Olympic Park for the event, while the London Legacy Development Corporation (2012-) leads the post-event transformation of the space as the Queen Elizabeth Olympic Park. The Olympic Park in Games-mode adopted the IOC's preference for a compact site, with the main venues clustered in a relatively small area and within walking distance of a central concourse and surrounded by open spaces (Figure 6). Four permanent stadia were built to act as 'anchors': the Olympic Stadium, the Aquatics Centre, the Velodrome and the Copper Box Arena. Temporary sports facilities, such as the Basketball Arena and the hockey stadia, together with temporary seating at the Olympic Stadium and the Aquatics Centre, helped to ensure viability in the post-Games mode.

<Insert Figure 6 about here>

The spectator concourse running along the spine of the Olympic Park to connect the various stadia, following the watercourses (River Lea and canals), was designed to accommodate a flow of 140,000 people during Games-mode (Allies and Haigh, 2014, p.198) (Figure 7). As in Munich, the creation of a three-dimensional landscape enabled alternative pedestrian routes to be established for both event- and post-event modes, which increased the capacity of the site in Games-mode and created a more visually interesting environment for post-event mode. In the post-event legacy mode, temporary arenas have been transformed into public parkland or

new development sites. A new tenant, West Ham Football Club, has been found for the stadium, which created significant additional visitors and spending in the Olympic Park from August, 2016. The stadium will also continue to stage athletics competitions and act as a concert venue. The ‘Copper Box’ Arena and the Velodrome also remain as permanent sports venues.

<Insert Figure 7 about here>

The Olympic Village (now East Village), located within the Park’s boundaries, has a perimeter block configuration, which was a constant design feature in all versions of the masterplan. In order to ensure a variety of styles and approaches, a different architect designed each residential area (ODA, 2014). Environmental concerns were also integral to the design strategies, with water being reused for landscaping and toilet flushing, wetlands preservation, and the creation of ecological habitats for bird, bats and bees. The East Village was the first neighbourhood to be delivered as a legacy within the Park. All residential units went through an intense renovation process after the Games, including repairs, the building of community facilities (such as the Sir Ludwig Guttman Health and Wellbeing Centre), primary and secondary schools (including the Chobham Academy), and 10 ha of new parks and open space (ODA, 2014). Through the recent opening of retail units on the ground floor of residential buildings, the village is becoming a more dynamic and diverse urban environment (Figure 8). The Village housed 17,000 athletes and officers during the Olympics, but was converted to offer 2,818 housing units of two types of ordinary residential configurations in the post-event mode: apartments (1-4 bedrooms) and traditional townhouses. The Government sold these units to two joint ventures, now having responsibility for their future long-term maintenance: Triathlon Homes LLP (1,379 units for social housing) and Delancey/Qatari Diar Property Development (which operates under the name ‘Get Living London’ and administers the rental of 1,439 units). The first occupants moved in during November 2013, only a year after the Games. The ‘Legacy

Communities Scheme' consisting of five new neighbourhoods, each designed to have a distinct character, will shape a new urbanity within the Olympic Park. Nevertheless, the redevelopment of former social housing estates, such as Carpenters Lane, have been controversial because the potential for regeneration is perceived to be related to the proximity of the Olympic Park (Bernstock, 2014; Watt, 2013).

<Insert Figure 8 about here>

Among the most challenging structures for adaptation for future use proved to be the International Broadcast Centre and Media Centre. At first, the IBC was designed as multiple isolated blocks with some connecting bridges; the latter capable of removal after the Games. Such a configuration was thought to offer good prospects for varied uses of the buildings in post-event mode. However, the original design was deemed too expensive compared with the costs of the conventional, unified pavilion ultimately adopted. The IBC was therefore built as a huge coarse-grained, shed-like structure (Allies, pers.comm, 2016). Nevertheless, since the Games, the IBC, now called 'Here East', is serving as a campus for creative businesses and high-technology/digital industries. As a much-valued asset in legacy occupation, the Press Centre transformation will feature a terrace on the first floor to provide vistas to London's skyline. The Media Centre, measuring almost 80,000 m² and home for 200 television studios during the Games, has been converted into flexible workspaces, retail units and large-scale studios, including the BT Sport studios, and a postgraduate centre for Loughborough University (Figure 9).

<Insert Figure 9 about here>

Since the Games, two further developments have emerged for London's 2012 Olympic Park. First, the new International Quarter (IQ), a joint venture between Lend Lease and London

Continental Railways, located next to the Aquatics Centre and Westfield Shopping Mall, comprises a new commercial centre of 371,000 m² and two residential towers. The IQ was the first development to receive the DELOS Well Building Standard, which promotes human health and wellness through building design (Delos, 2016). Second, the ‘Olympicopolis’ was announced as a new cultural and educational district in 2013 by the then Mayor of London, Boris Johnson. The vision proposes using two sites in the Olympic Park: UCL East, as an additional campus of University College London; and the Stratford Waterfront, with various educational, cultural, commercial, retail and residential uses, including a new campus of University of the Arts London, a Sadler’s Wells 600-seat dance theatre, a new Victoria and Albert Museum and possibly a branch of the American Smithsonian Museum (Goldstone, 2015). The first University buildings are planned for completion by 2019, and the first buildings at Stratford Waterfront by 2021. These developments are beginning to infill more of the open spaces within the Olympic Park, which is having the effect of integrating the parkland with the surrounding urban fabric (Figure 6). This case illustrates both continuity and flexibility between the design and legacy use phases of the place-shaping continuum to accommodate changing economic circumstances and opportunities.

Rio de Janeiro

The first South American Olympic Games were located in Rio de Janeiro in 2016. For Brazil, the event represented a unique opportunity to boost its economy through investments and “positive, enduring transformations, maximizing the social, economic, sports and environmental benefit of the Games” (Rio 2016, 2013, p. 9). Although the 2016 Games were staged in four clusters in Rio de Janeiro, the city’s main Olympic site was located in the region of Barra da Tijuca (120 ha), which had been developed using modernist principles in the 1960s. With one of the largest development rates of the city, it is characterised by many high-end

residential and commercial developments. Unlike other Olympic sites, Barra da Tijuca was not therefore a problematic area for the city in need of regeneration. The competition-winning masterplan for Rio's Olympic Park (AECOM with Daniel Gusmão) proposed a mixed-use urban quarter, with the sports venues integrated into a more traditional urban fabric with residential, commercial, retail and leisure uses (Figure 10). These venues were connected by a long, sinuous pedestrian path that crossed the whole park, called "Olympic Way", directly referencing the famous Copacabana sidewalks (Figure 11).

<Insert Figure 10 and 11 about here>

The construction of the Olympic Park was completed by a public-private-partnership, in the form of an administrative concession for a period of 15 years. The consortium was composed of Brazilian contractors, Odebrecht Infraestrutura, Carvalho Hosken and Andrade Gutierrez, and was divided into two private companies: Rio Mais (responsible for building all infrastructure and some venues - Cariocas Arenas, IBC, Media Press Center and the Media Hotel) and Lagoa da Barra (responsible for the further real estate development of the area in the post-event mode).

The Olympic Village was also delegated to the private sector. Built close to the Olympic Park, the Village, 'Ilha Pura', occupies 20.6 ha. During the Games, it accommodated around 18,000 people, including 11,000 athletes. A total of 3,600 units (from 77m² to 230m²) were constructed in 31 seventeen-storey exclusively residential towers, each with different characteristics in their communal areas and finishing materials. The complex comprises more than ten kinds of buildings, with 11 different apartment plans (Figure 12).

<Insert Figure 12 about here>

The legacy mode of Rio's Olympic Park has been largely determined by the private sector, who have been granted concessions in return for assuming part of the construction risk for the Games mode. The original conception of legacy in the Olympic Park was as an urban grid of plots and streets, echoing the traditional urban form of South Rio de Janeiro, with perimeter block occupation and a fine grain of streets and squares. However, these aspirations have been altered by pressure from the private sector, reflecting the influence of power relationships within the place-shaping continuum. The Alignment Plan, approved by Rio de Janeiro's local government in November, 2012, presented enlarged plot sizes and a more formal grid. Similarly, one of the original urban design concepts of a 'democratization of the view', whereby lower-rise buildings would be located along the shore with increases in height towards the core of the area so that all properties might have privileged views from their windows, can also be rescinded (Gusmão, pers.comm, 2014). Current urban legislation allows the consortium to build up to 18 floors on each plot. Ilha Pura (Olympic Village) has also taken advantage of these legal urban parameters, and has been composed of high-rise and isolated towers from the outset, which reiterates the ongoing model of urban development in Barra da Tijuca. Swapping the location of the temporary Aquatics Stadium and the permanent Velodrome enabled further use of land facing Jacarepaguá Lagoon, thereby potentially attracting more lucrative estate developments. These proposals have been interpreted as enhancing the economic viability of the project for the developers. It has been speculated that these changes were 'sold' to the IOC as a means of increasing land value and, therefore, of generating greater profitability as a legacy (Mattos and Konchinski, 2016). Due to Brazilian current economic crisis and lack of investors, the public sector has assumed maintenance and post-event use of some of the venues through the establishment of a legacy agency (AGLO) and future developments on the Olympic Park might take longer to realise. The full legacy of the Rio Olympics is, therefore, yet to emerge at the time of writing.

Discussion and Conclusion

In order to stage global sporting events, Olympic Parks clearly require a very distinctive built environment comprising substantial stadia as venues; large open spaces to accommodate the movement of spectators; good internal and external accessibility and connectivity; and a degree of iconic architecture to promote and symbolize the place-marketing aspirations of the host city. While such characteristics are paramount for the duration of the event itself, their importance diminishes immediately after the Games close. The need to provide for a whole range of post-event activity, requiring very different forms of urban space related to mixed use, then becomes critical. Host cities, including the ones that have formed the case studies discussed in this paper, have demonstrated a range of potential solutions to this significant urban design and planning challenge, which amply demonstrate the operation of Carmona's place-shaping continuum (Table 2). It is also apparent that knowledge transfer does not always occur: either because lessons from the most recent Games are too late to be accommodated in the planning phase of the next event or because hosts must respond to local circumstances rather than adopt 'cookie-cutter' patterns.

<Insert Table 2 about here>

Comparative analysis of the four cities assessed in this paper reveal some important insights. First, the planning and design challenges of a more substantive transformation faced in other host cities were ingeniously side-stepped in Munich, where there was continuity between the pre- and post-event configurations of the Olympic Park. Munich's approach secured a lasting legacy for the city in the form of a highly attractive and popular urban park, which has been retained as the monumental and spectacular setting for the stadia, and as a residential area and university campus, which has been able to absorb an intensification of these uses over time. As

an urban park within the fabric of the city, connectivity to the surrounding areas, especially in relation to the built environments of the Olympic Village and University campus, evolved much more easily than the peripheral and more disconnected Olympic Parks on the edges of other host cities. Internal connectivity and permeability was achieved through the road network and the policy adopted for open public access across the parkland.

While Sydney had given the ‘post-Olympic’ mode some consideration in its preparations, these were side-lined against the pressing urgency of actually staging the Games. Consequently, the legacy mode had to be undertaken through retrofitting a denser and more fine-grained grid structure around the railway station in four nodes of activity: namely, commercial and employment activities, residential areas, an educational campus and the retention of sporting and entertainment venues. Masterplans for the post-event configuration of the Olympic Park went through three iterations and took nearly ten years to finalize, thus seriously eroding confidence in the venture. The slow development of a residential neighbourhood and commercial centre on the Olympic Park constrained its emergence as a new suburb within the city, with its own life and community. This characteristic was accentuated by the isolated and peripheral location of the Olympic Park, which made it over-dependent on the railway connection to the city centre, and weakened its distinctiveness and identity.

In London, because of the IOC’s much-expanded legacy agenda, the post-event configuration of the Olympic Park was comprehensively planned from the outset. Substantial progress was therefore achieved in the first five years after the event. London’s Olympic Park was conceived in a set of three masterplans: one for the Games mode, one for the period of transition after the Games, and one for the legacy. Temporary sports venues have been removed to create spaces for public parkland or new residential neighbourhoods under the Legacy Communities Scheme

around the remaining ‘anchor’ Olympic stadia and facilities. Consequently, the tracts of broad open spaces have been reduced considerably. The development of the new neighbourhoods has begun to form fine-grained, more intimate and human-scale spaces, which are assisting the integration with the surrounding urban fabric. The London case clearly shows that planning for post-event configurations is best incorporated into the development at the initial stage and as one unit, rather than attempting to make adjustments retrospectively, as has been Sydney’s experience.

Planning and designing Rio’s Olympic Park was heavily influenced by London’s experience, although Rio’s original conceptions have been modified because of economic viability concerns regarding the post-event transformation. As a concession, or reward, for its heavy investment in the Olympic facilities, the private sector has been permitted to lead post-event developments. However, Rio’s entrustment of post-event development to the private sector appears already to have presented risks for the delivery of long-term legacies. While, the original legacy vision for the Olympic Park was an urban grid of plots and streets sympathetic to the traditional layouts to be found in the south of the city, in order to enhance the economic viability of the project for developers, plot sizes have been enlarged, the grid made more formalized, and building heights standardized. While the private sector may reduce costs to the national exchequer, there can be no guarantee that wider design and social benefits will be delivered, especially in changing economic circumstances.

The debate about the pros and cons of having a ceremonial focus for the Olympic Games on an Olympic Park raises the question of whether a more dispersed model would spread any related legacies across an entire city or country and reduce the urban design challenges. While such a proposal might contravene the ethos of the Olympics in bringing people together and

uniting nations through sport, there would potentially be greater long-term benefits in creating new infrastructure across a much wider area. The bid prepared by the Dutch for the 2028 Olympic Games, and withdrawn in 2012 on the grounds of cost, proposed a more decentralised event across the Netherlands as a whole (Het Ministerie van VROM, 2008). While this concept was, at the time, contrary to the IOC's policy for a ceremonial focus for the Games, the declining interest amongst potential host cities in staging the event might well make such models more acceptable in the future. These debates would suggest that the organisers of Olympic Games should foresee legacy uses in a more integrated and comprehensive way than they have in the past, commit to such planning well ahead of framing their bid, and perhaps seriously consider different formats for staging the event.

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Table 1. Characteristics of Olympic Parks in event mode and post-event mode to highlight the challenges facing urban designers and planners in the transformation of urban spaces

Criteria	Event mode	Post-event mode
Scale and architecture	Monumental, spectacular, large-scale buildings and spaces. Spectacular and iconic permanent structures by starchitects. Temporary venues. Single use zones or precincts. Low diversity of uses and activities (sports).	Creation of urban spaces around the permanent structures which are of a human scale, a fine grain, more intimate and integrated into daily needs. Mixed use. High diversity of uses and activities (vibrant, inclusive and liveable).
Density	Low density: very large open spaces for high volume of spectators. Coarse grained.	High density: open spaces provide space for development (to create vibrant mixed use) and for amenity/quality of life for residents. Fine grained.
Users	Extraordinary, special events. Spectators, visitors, athletes, press and volunteers.	Ordinary, everyday activity. Residents, customers, visitors/tourists, workers, inward investors.
Internal connectivity/public transport linkages	Low connections between venues. Long walking distances. Not permeable. Public transport to site.	High connectivity. Walking distances. Permeability. Public transport across site.
External connectivity/public transport linkages	Isolated, 'ruptured' from surrounding urban fabric.	Connected, integrated into surrounding urban fabric ('stitching'). Need to create 'ambiguous' boundaries.
Public spaces: open and green spaces	Large spaces. Designed for movement of spectators rather than encounter (except 'Live' sites). 'Live' site: gathering space.	Smaller, human scale spaces. Designed for permanence and encounter. Different gathering spaces spread across the neighbourhood.
Vistas	Vistas emphasize venues.	Vistas must connect to the surrounding urban fabric.
Legibility	Less important as temporary.	Clear districts, nodes, pathways.
Athletes Village	Close relation to sports venue cluster. Apartments for multiple athletes. Communal spaces outside apartments (dining halls etc). Accessibility for Paralympic athletes.	Apartments for ordinary residents/families. Apartments with full facilities. Conversion for residents' needs.

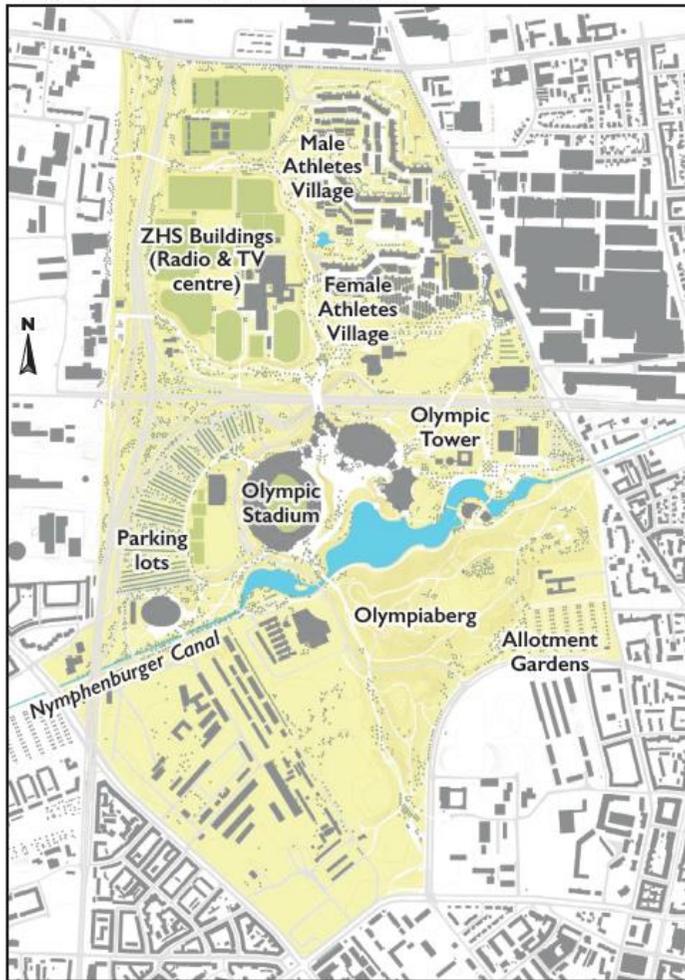
Sustainable design elements	Adoption of innovative sustainable design elements to promote the environmental credentials of the Olympic Park.	Continued importance of environmental credentials, but problems of maintenance and retro-fitting.
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Table 2. Application of Carmona’s (2014) place-shaping continuum to the urban design process of Olympic Parks

Olympic host city	Design	Development	Space in use	Management
Munich (1972)	Brownfield site (280ha). Clear vision for Olympic park as a public amenity, with University sports facilities, major venues and residential area. Planned as a coherent unit. Green open space and a three-dimensional landscape to convey a democratic image of the country.	Venues, facilities and open spaces delivered according to vision. Olympic venues partially buried in the landscape, but with distinctive tensile roofs.	Event and post-event configuration of the Olympic Park were aligned. Popular destination (4.1m visitors by 2016). New visitor attractions and refurbishment of existing facilities have been undertaken to maintain the appeal of the park.	Continuity: Olympic Park Company merged with private company owned by city (Olympiapark München GmbH) to manage the Olympic Park.
Sydney (2000)	Brownfield site (760ha). Post-Olympic mode recognised in preparations, but not implemented due to tight deadline for event.	Development created event spaces for the Olympic Games. Stadia, wide concourses and public transport links.	Retrofitting new uses into event spaces took time, with three Masterplans produced in 2002, 2004 and 2010/16). Legacy agenda took nearly a decade to finalise and affected confidence in regeneration.	Discontinuity: Homebush Bay Development Corporation built Olympic infrastructure, 1992-2001. Sydney Olympic Park Authority created in 2001 to manage post-event legacy.
London (2012)	Brownfield site (280ha). Post-event use planned from outset due to IOC Legacy Agenda. Planned as a single coherent unit associated with High Speed Rail Line	Event space built with permanent and temporary venues. Three-dimensional landscape to create interest and increased visitor capacity.	Olympic Stadium became home for West Ham Football Club. ‘Copper Box’ Arena and Velodrome retained as sports venues.	Continuity. Olympic Delivery Authority (2006-14) constructed the Olympic Park, while the London Legacy Development Corporation (2012-) lead the post-event

	to Channel Tunnel and the 'Stratford City' project. Three masterplans formulated: Games mode, Transition, and Legacy.	Olympic Village built for 17,000 athletes and officials.	Spaces vacated by temporary venues became development sites or left as open spaces in post-event mode. Olympic Village became one of five new residential neighbourhoods, with community facilities. IBC/MPC became digital and creative industries hub. Post-event adaptation: IQ and Olympicopolis incorporated to enhance activity.	transformation of the Queen Elizabeth Olympic Park.
Rio de Janeiro (2016)	Not a brownfield or derelict site, but an area of high-end residential and commercial investment (120ha). Event and post-event legacy plans devised. Olympic park intended as new neighbourhood echoing traditional urban form of the south of the city with a public park.	Main Olympic site at Barra da Tijuca (120ha) consisted of venues connected by a sinuous path 'The Olympic Way'. The Olympic Village at Ilha Pura (20.6ha) accommodated 18,000 people.	Private sector secured concessions to increase building heights, increase plot sizes and changed uses in post-event plan. Post-event reconfiguration is on-going at the time of writing.	Discontinuity: Construction of Olympic Park by a public-private partnership. Legacy mode delegated to private sector. Public legacy agency established to maintain Olympic Park's arenas (2017) and stage events in light of economic crisis in Brazil.

MUNICH: EVENT MODE (1972)



MUNICH: POST-EVENT MODE (2009)

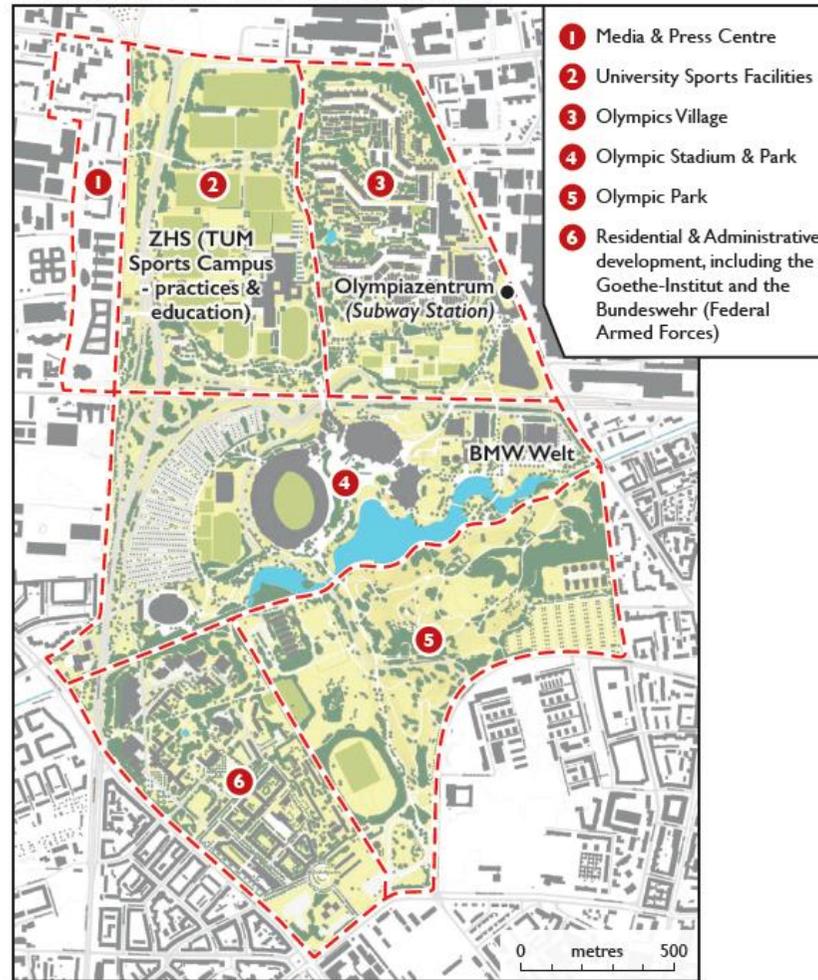


Figure 1. The event and post-event modes for the Munich Olympic Park (1972). Despite some intensification of development on the Olympic Park by 2009, the original allocation and design of land uses remains evident in the layout of the area. (Based on original plans by Mahl Gebhard Konzepte and Sauerbruch Hutton, in Landeshauptstadt München, 2011, pp. 24-25). Used with permission.

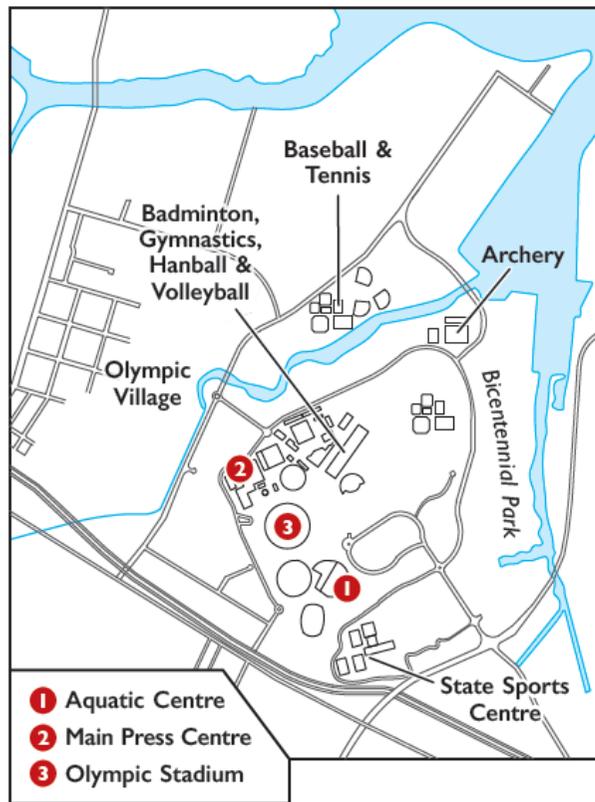


Figure 2. The main sports stadia of Munich Olympic Park as taken in 2016. The original design for the Olympic Park, involving the integration of structures into a flowing landscape, remains clearly evident. (Photo: R. Sanchez).



Figure 3. The Munich Olympic Village (1972) as taken in 2016. It has become a popular residential area and benefits from good connectivity with the rest of the city and proximity to the open recreational spaces of the Olympic Park. (Photo: R. Sanchez).

SYDNEY: EVENT MODE (AS PLANNED IN 1994)



SYDNEY: POST EVENT MODE (2002)



SYDNEY: LEGACY MASTERPLAN (2030)



Figure 4. The event and evolving post-event modes for the Sydney Olympic Park (2000). Three main visions for the legacy planning for the Olympic Park emerged: the ‘Master Plan 2002’; the “2025 Vision” (2004); and the ongoing ‘Master Plan 2030’ (2010). These strategies have attempted to address the conversion of broad, open spaces characteristic of mega-events into smaller urban units, which are likely to be more appropriate for the everyday human and pedestrian scale.

(Based on NSW, 1994, p.22; SOPA, 2002, p.24; SOPA, 2010, p.23)



Figure 5. The main Sydney Olympic Stadium (2000) as taken in 2008. The wide open-spaces of the Olympic Boulevard, required to accommodate the movement of spectators in event-mode, illustrate the challenge of creating an active and vibrant urban precinct outside of such major events. (Photo: S. Essex).

LONDON: EVENT MODE (2012)



LONDON: POST-EVENT MODE (LEGACY)

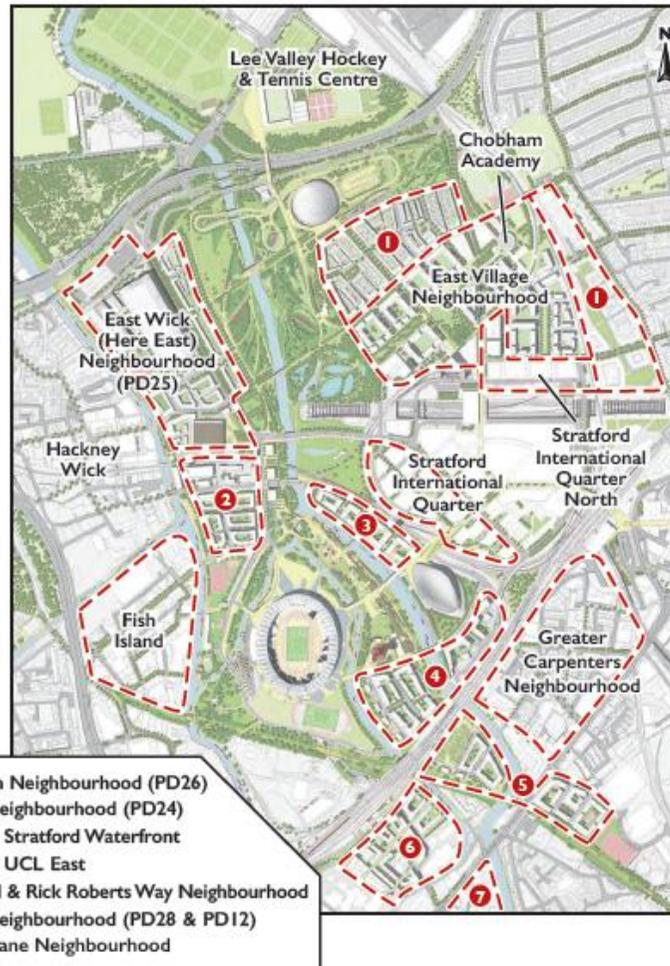


Figure 6. The event and post-event modes for the London Olympic Park (2012). The event mode illustrates the ‘anchor’ stadia, the temporary stadia and the pedestrian connectivity across the site. The post-event mode shows the removal of the temporary stadia and the creation of new residential neighbourhoods and public open space and parkland. (Based on LLDC. 2013, pp.177 & 181). Used with permission.



Figure 7. The importance of open spaces to facilitate spectator movement between competition venues in the event-mode is illustrated in this photograph of the London Olympic Park during the event itself in 2012. (Photo: S. Essex).



Figure 8. The London Olympic Village in legacy mode. The configuration was based on perimeter blocks and, in order to ensure a variety of styles and approaches, a different architect was appointed to design each residential block. (Photo: R. Sanchez).



Figure 9. The London Olympic Broadcast Centre has become ‘Here East’ district: a new high-technology and digital industry hub. The building is capable of expansion through the addition of extensions (as was occurring at the time of this photograph in May, 2016). (Photo: R. Sanchez).

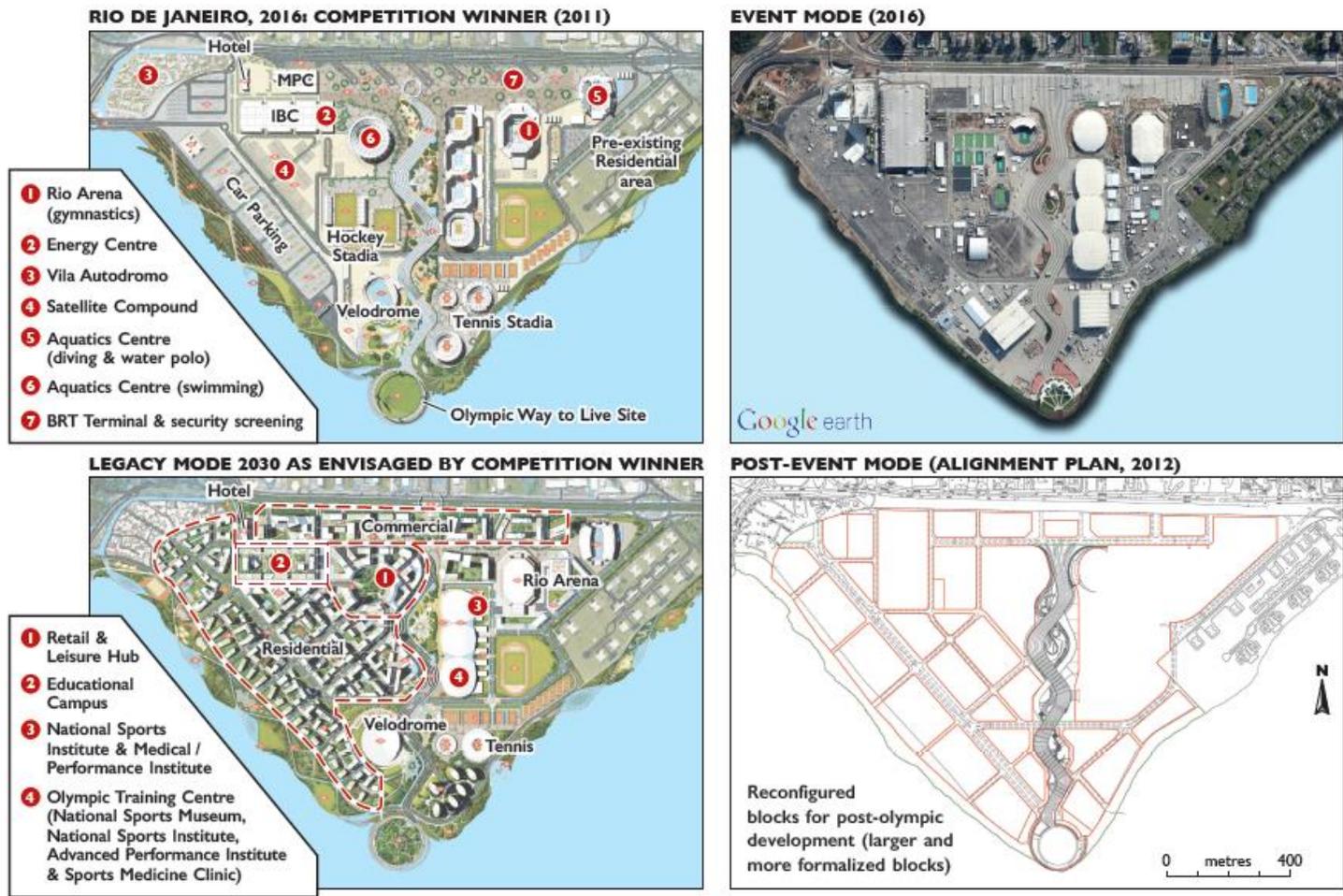


Figure 10. The event and post-event modes for the Rio Olympic Park (2016). The original vision underwent a number of adjustments, including the location of particular sports venues and the reconfiguration of the residential blocks on the west of the site. (Based on original images by AECOM available at IAB website, 2013; Google Earth; & Municipal Government of Rio de Janeiro, 2012). Used with permission.



Figure 11. The Olympic Way, designed to accommodate the movement of thousands of spectators on the Rio Olympic Park (2016), illustrates the challenge of creating an active and vibrant urban precinct outside of an event. (Photo: R. Sanchez).



Figure 12. The Ilha Pura Olympic Village. Concessions to the private developers in order to enhance the development economics and its viability have encouraged dated urban design strategies that might be counterproductive to a more inclusive, mixed-use urban environment. (Photo: R. Sanchez).