

PROTEST



SHOWING OFF

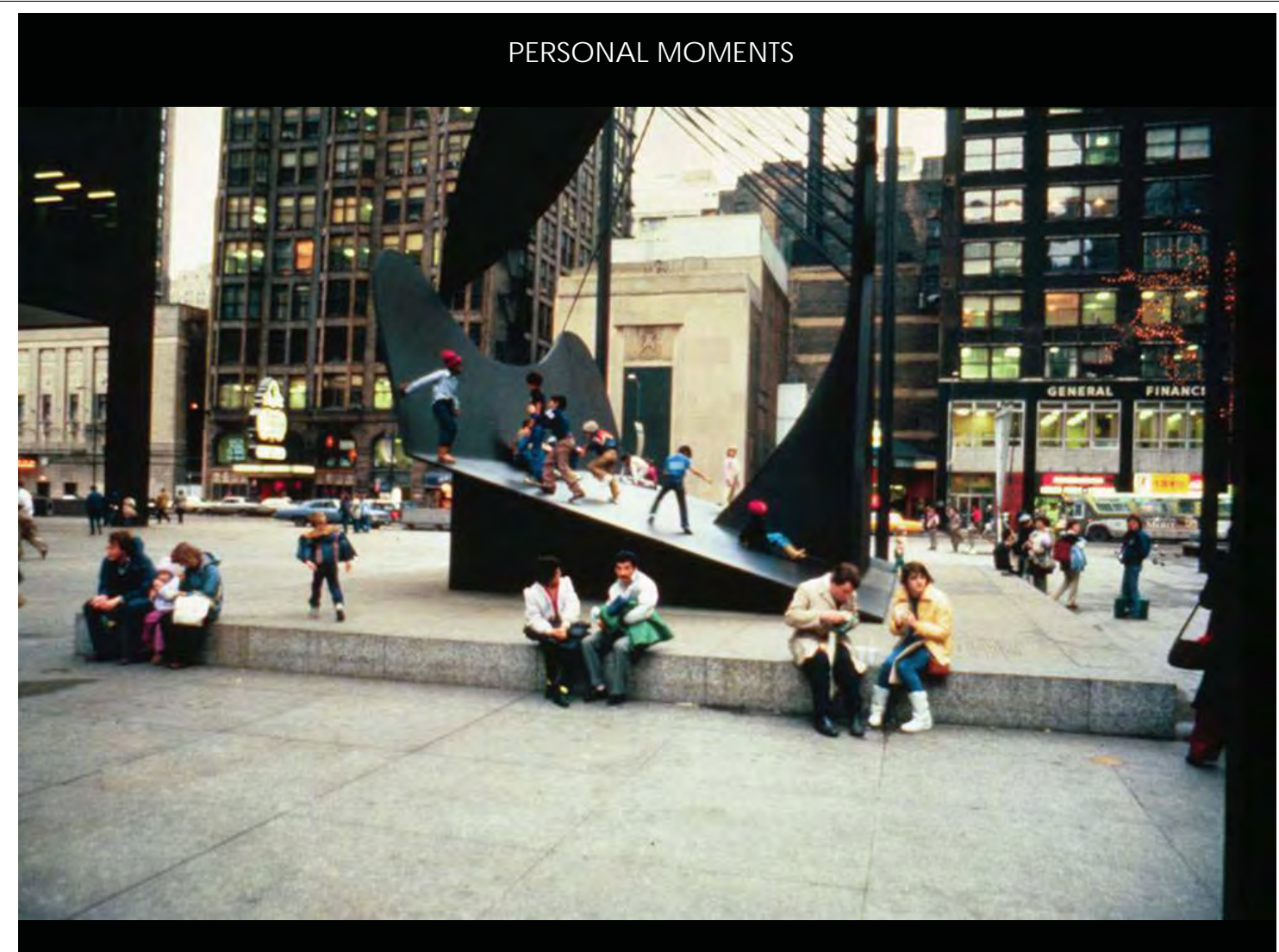
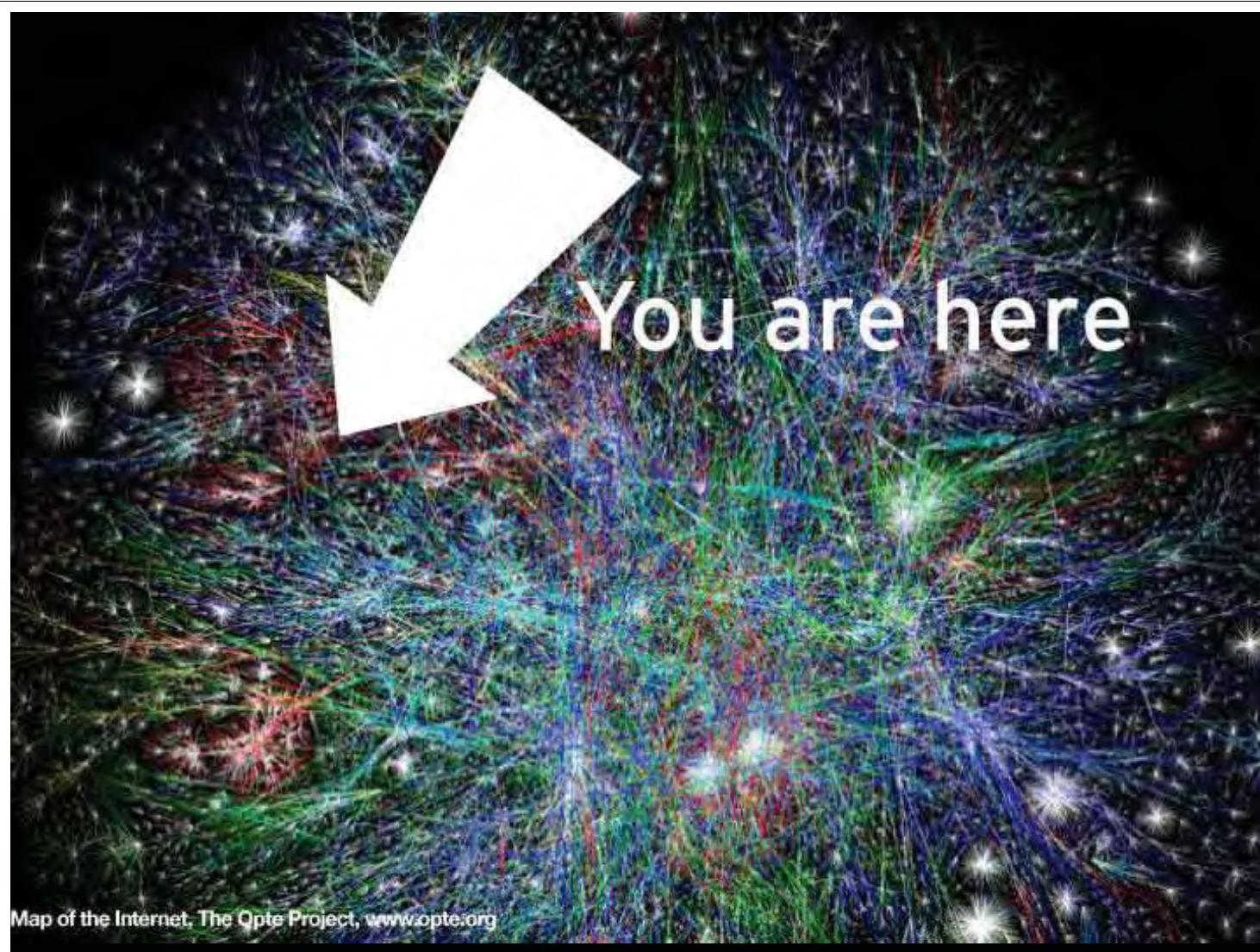


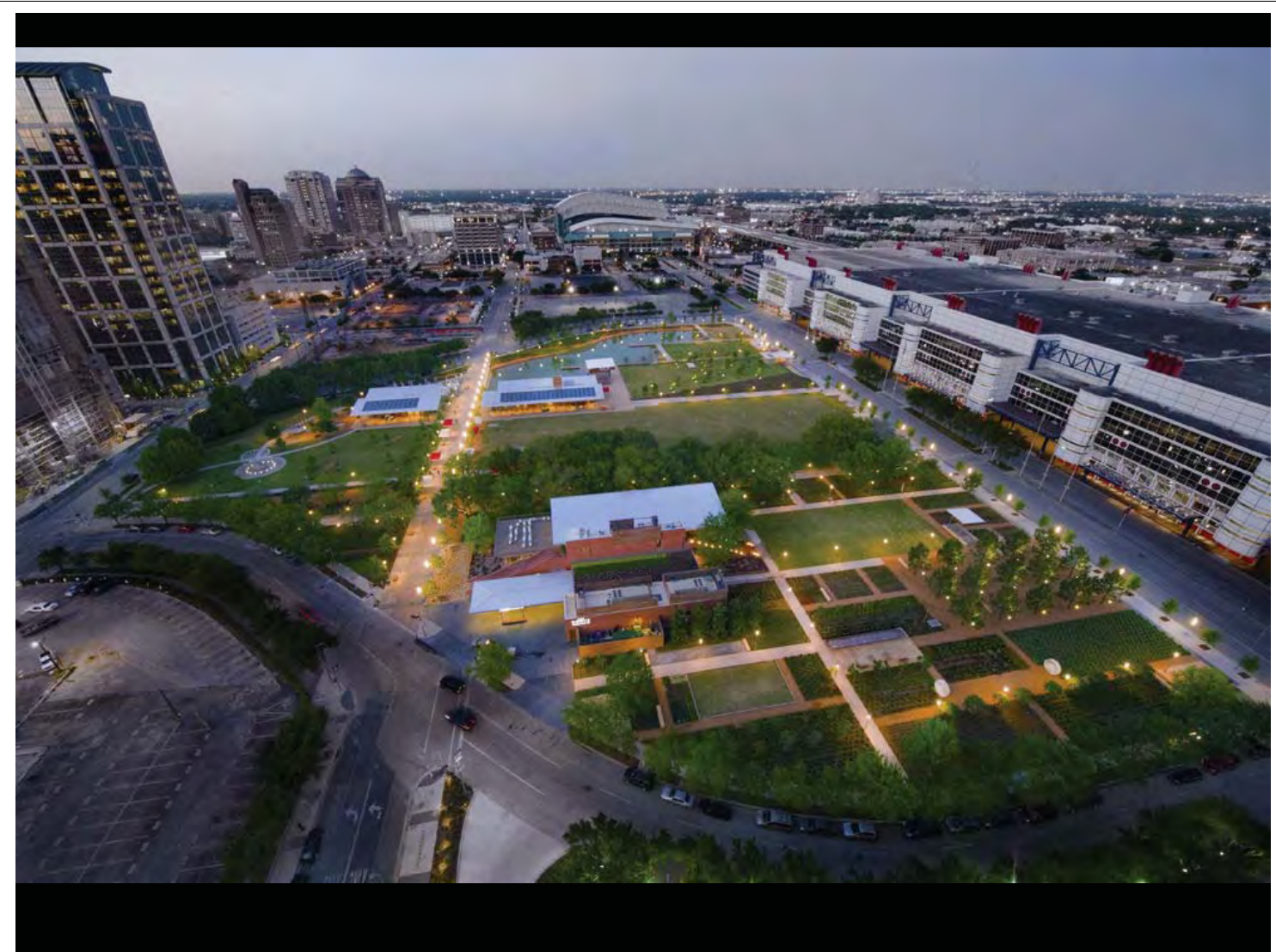
RITUAL

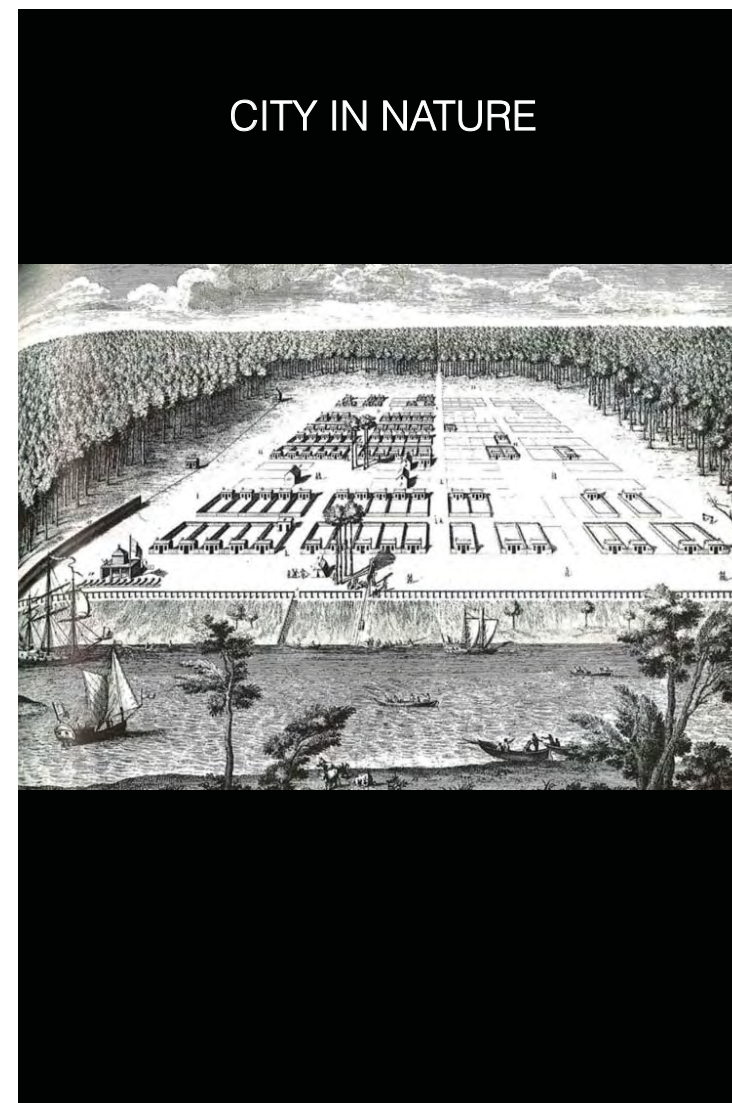
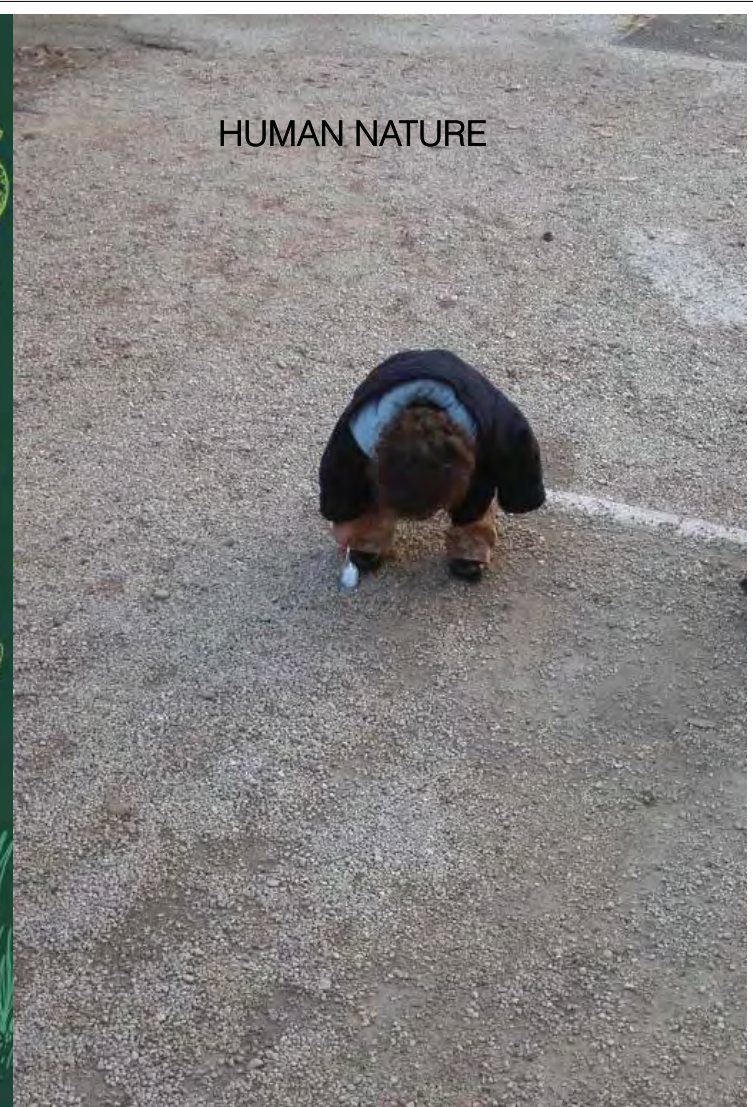
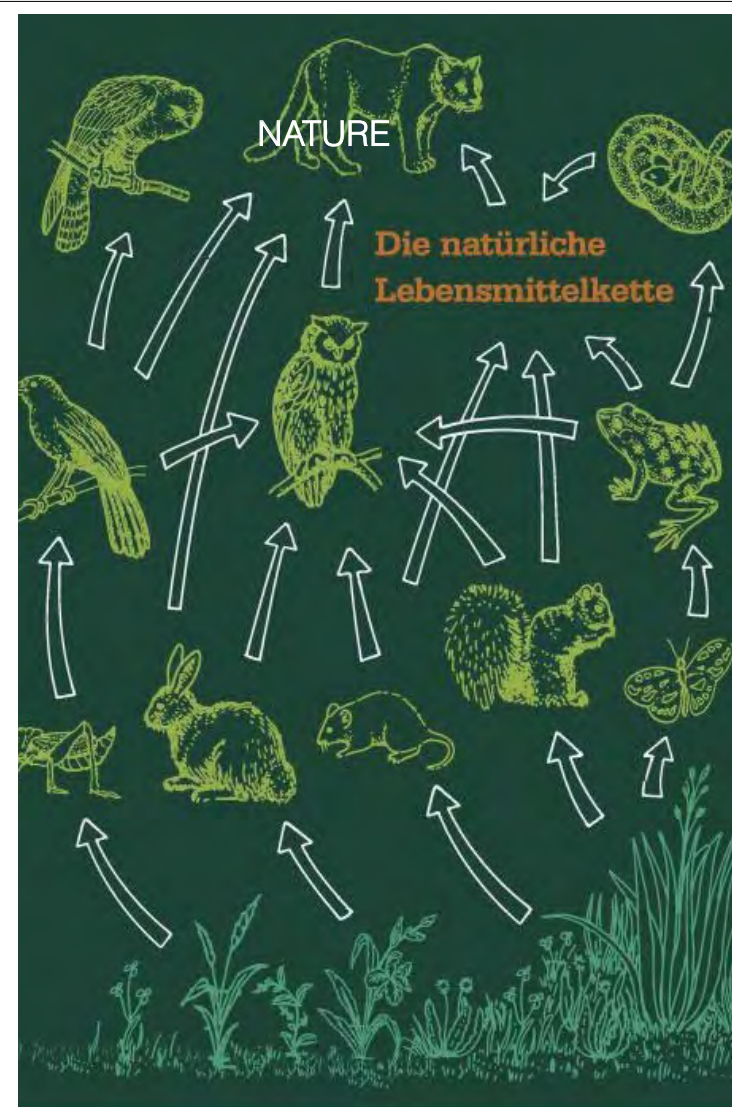


DOING / WATCHING

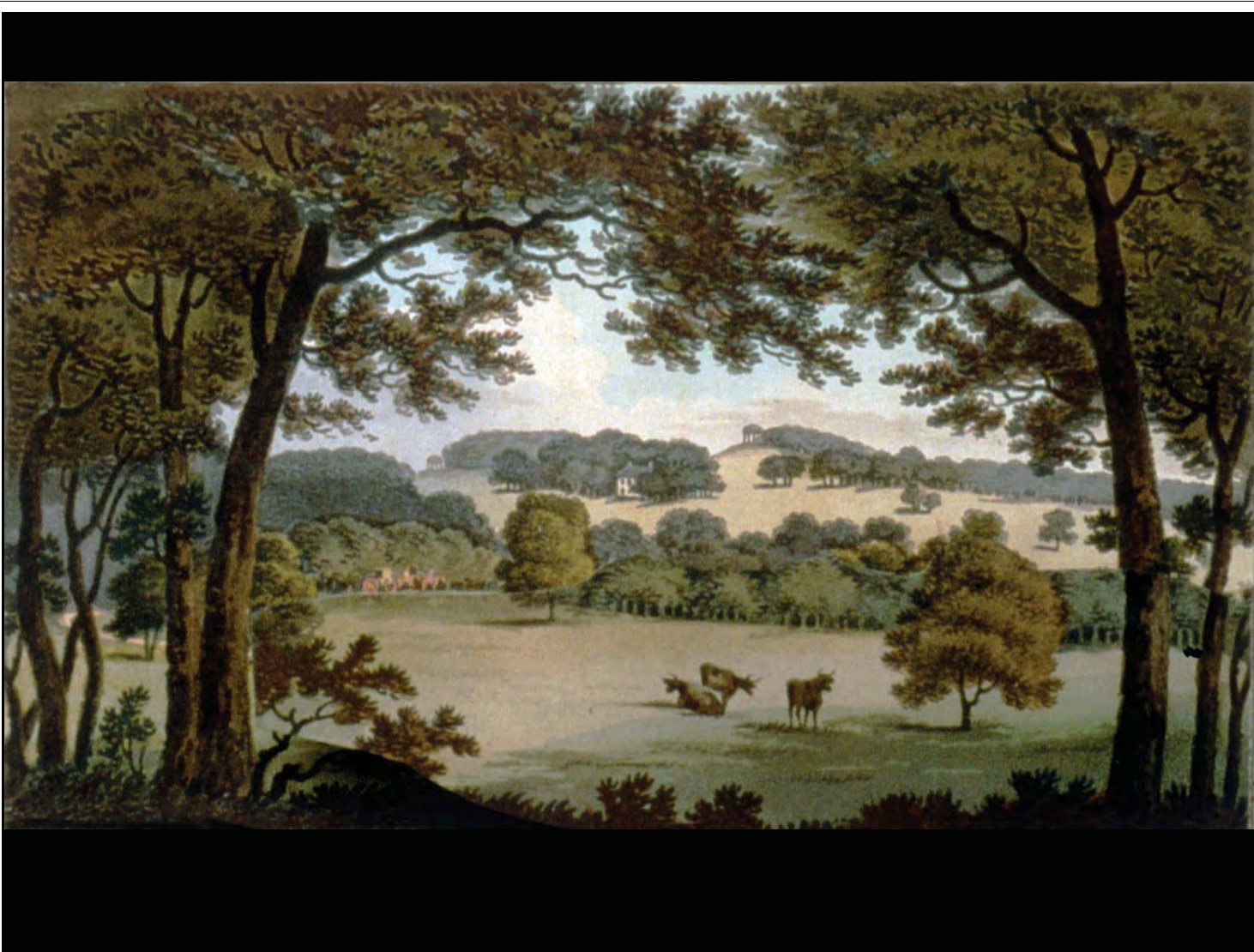








HYDE PARK
Park as Respite



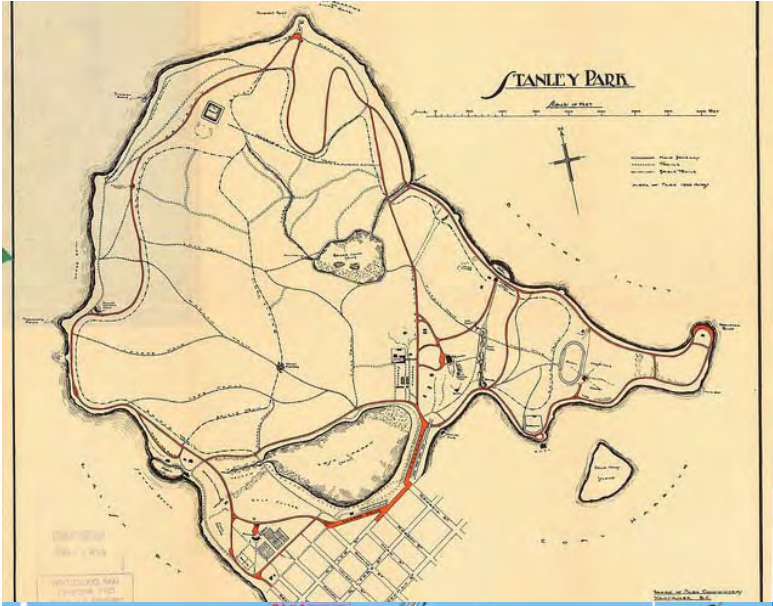




STANLEY PARK

Park as Nature

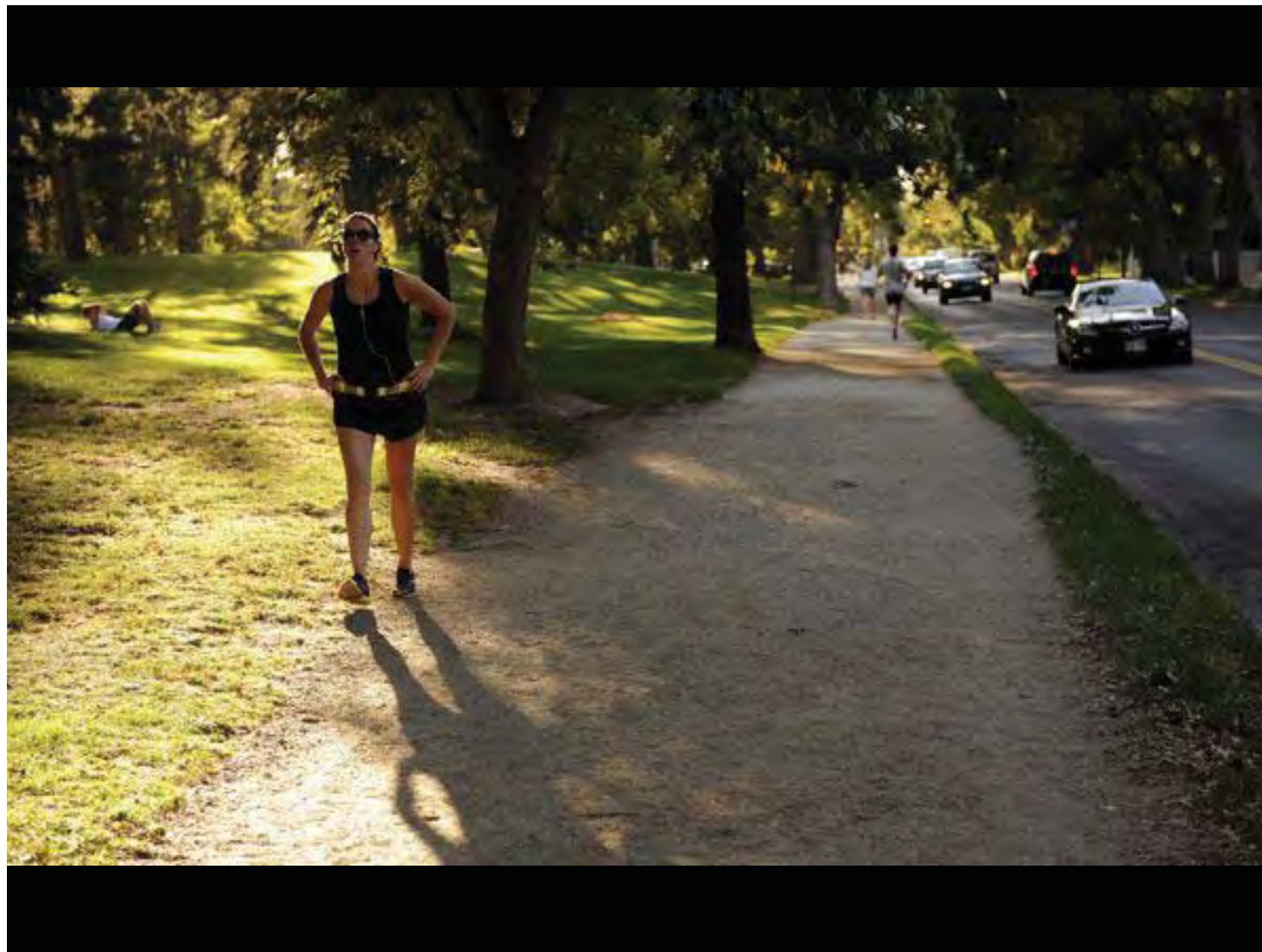




WASHINGTON PARK

Park as Fitness Venue





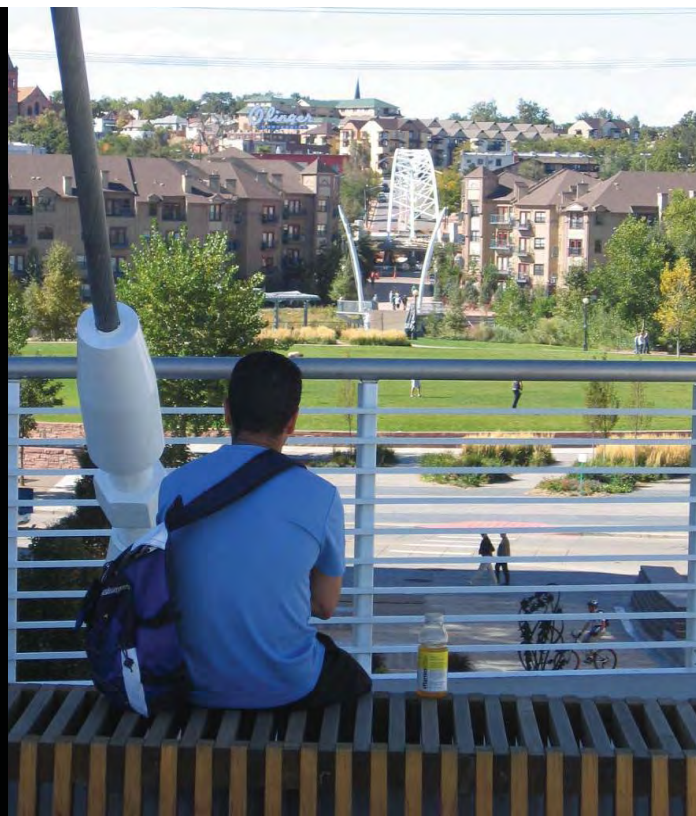
COMMONS PARK

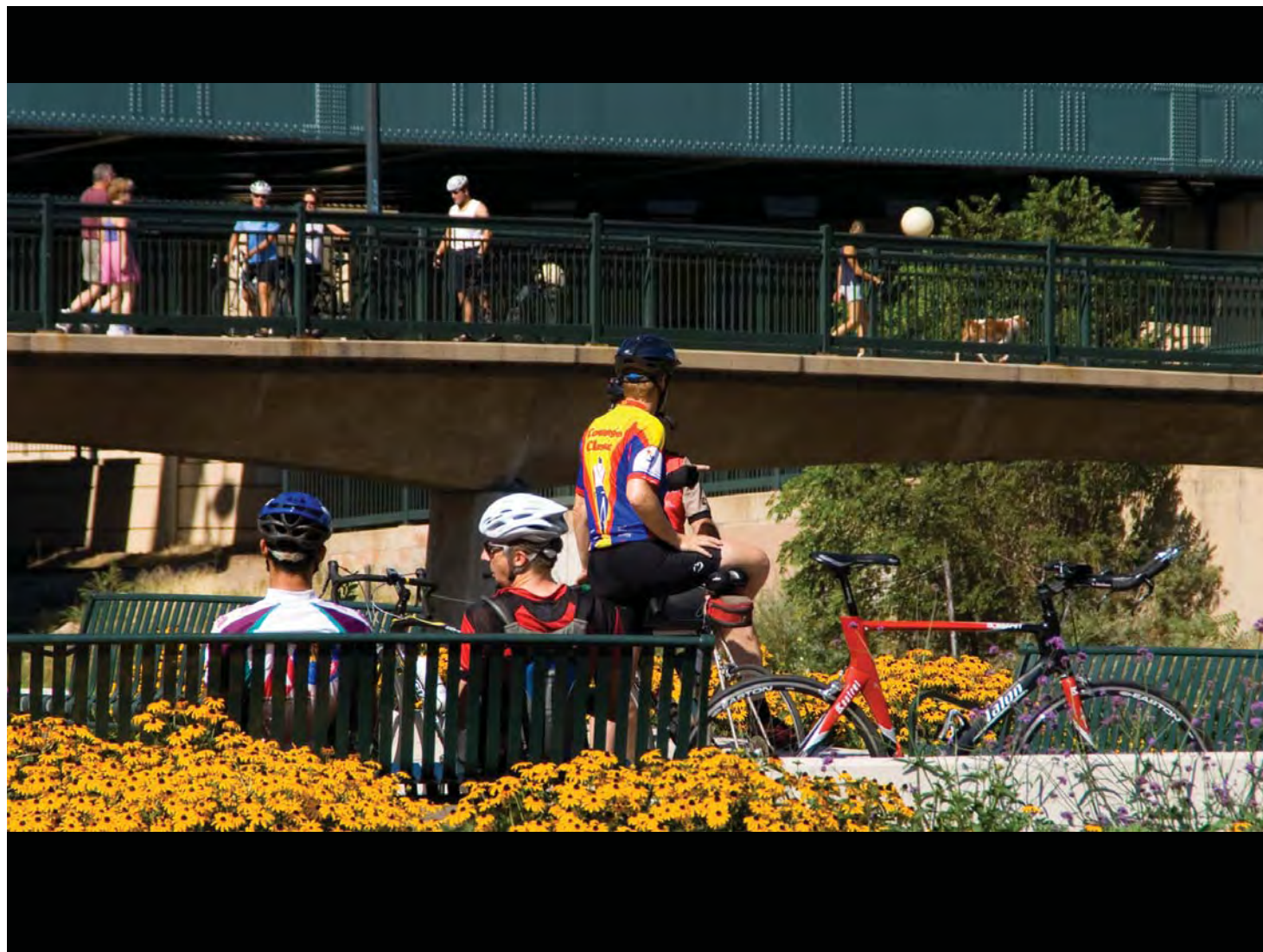
Park as Multi-Use Destination

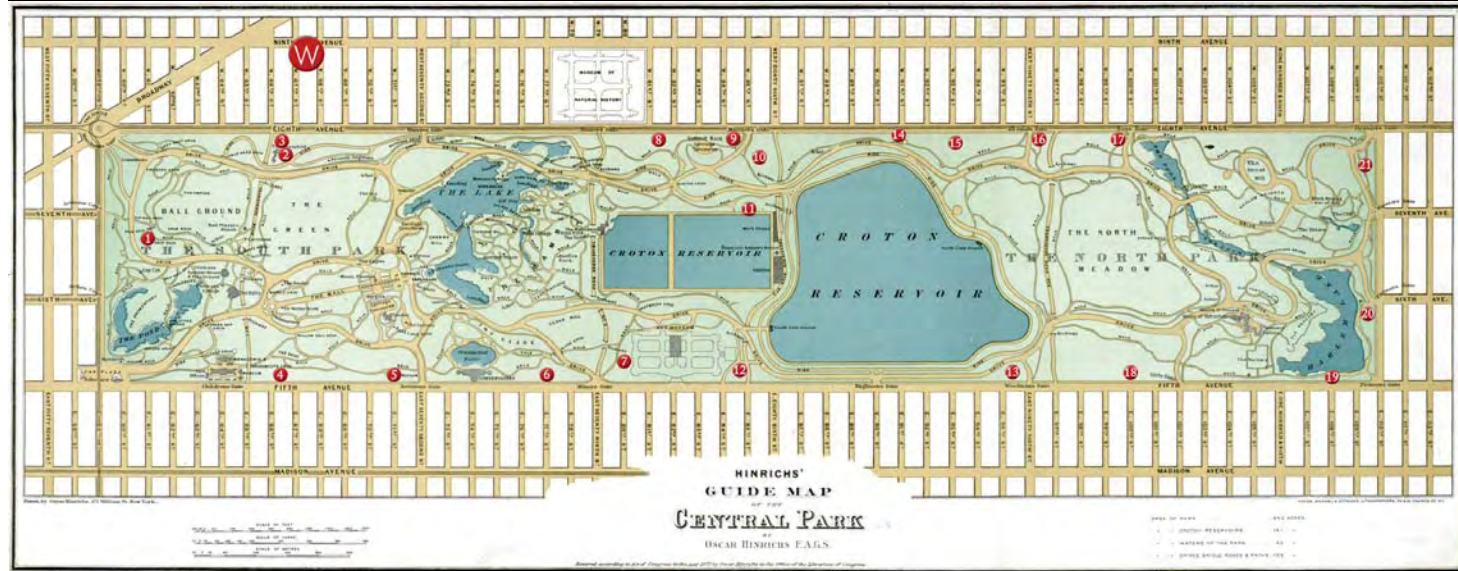






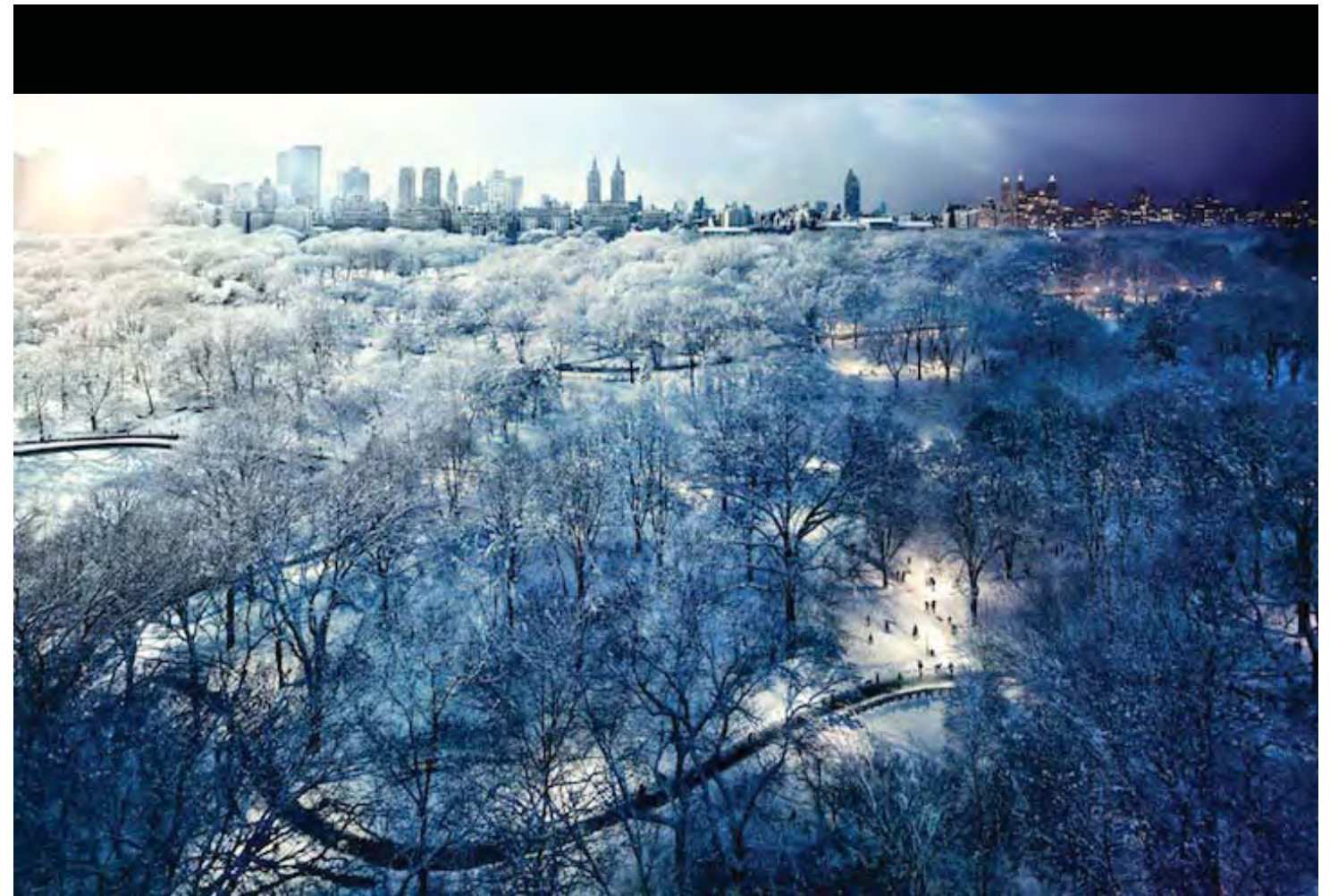
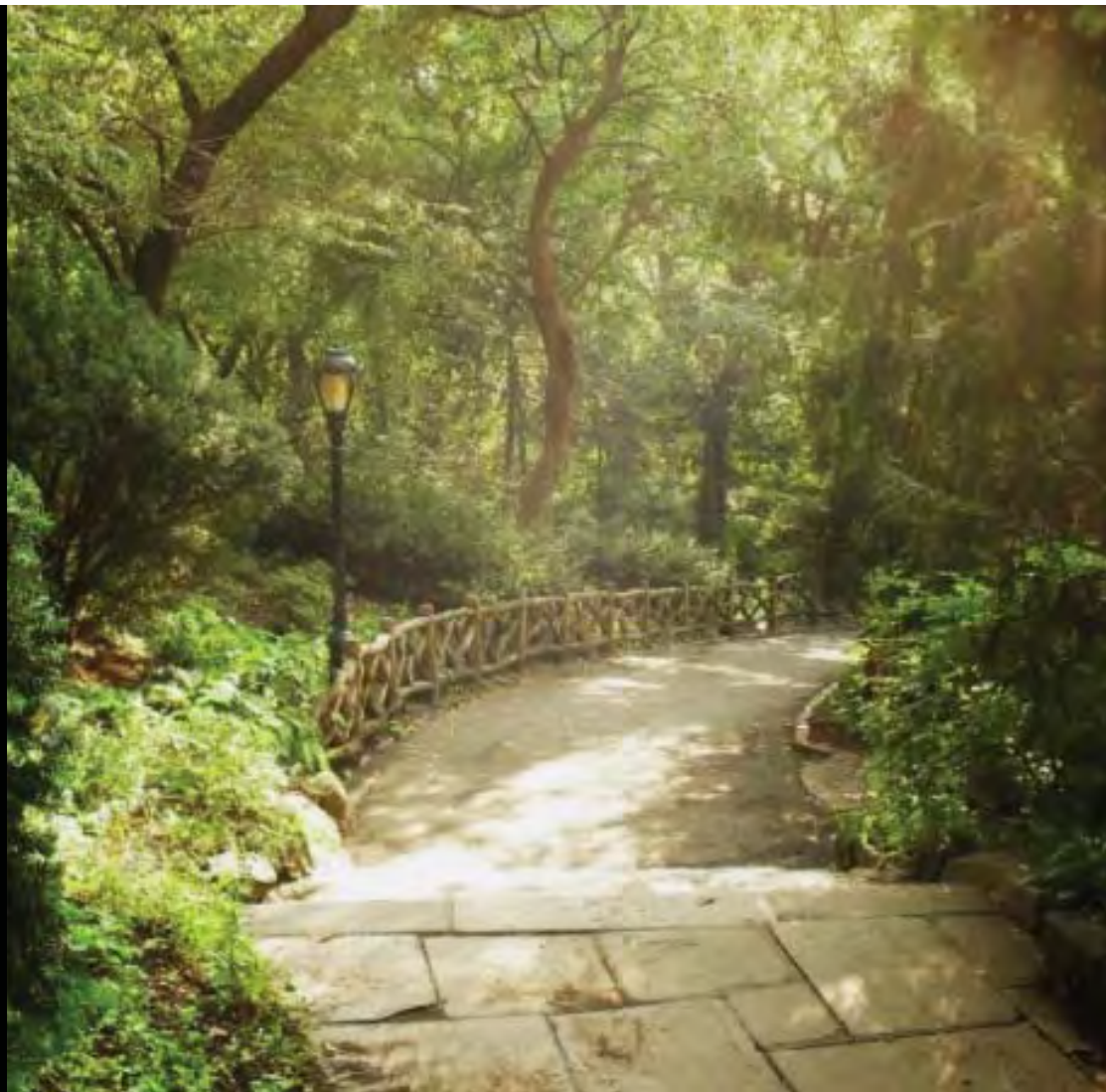


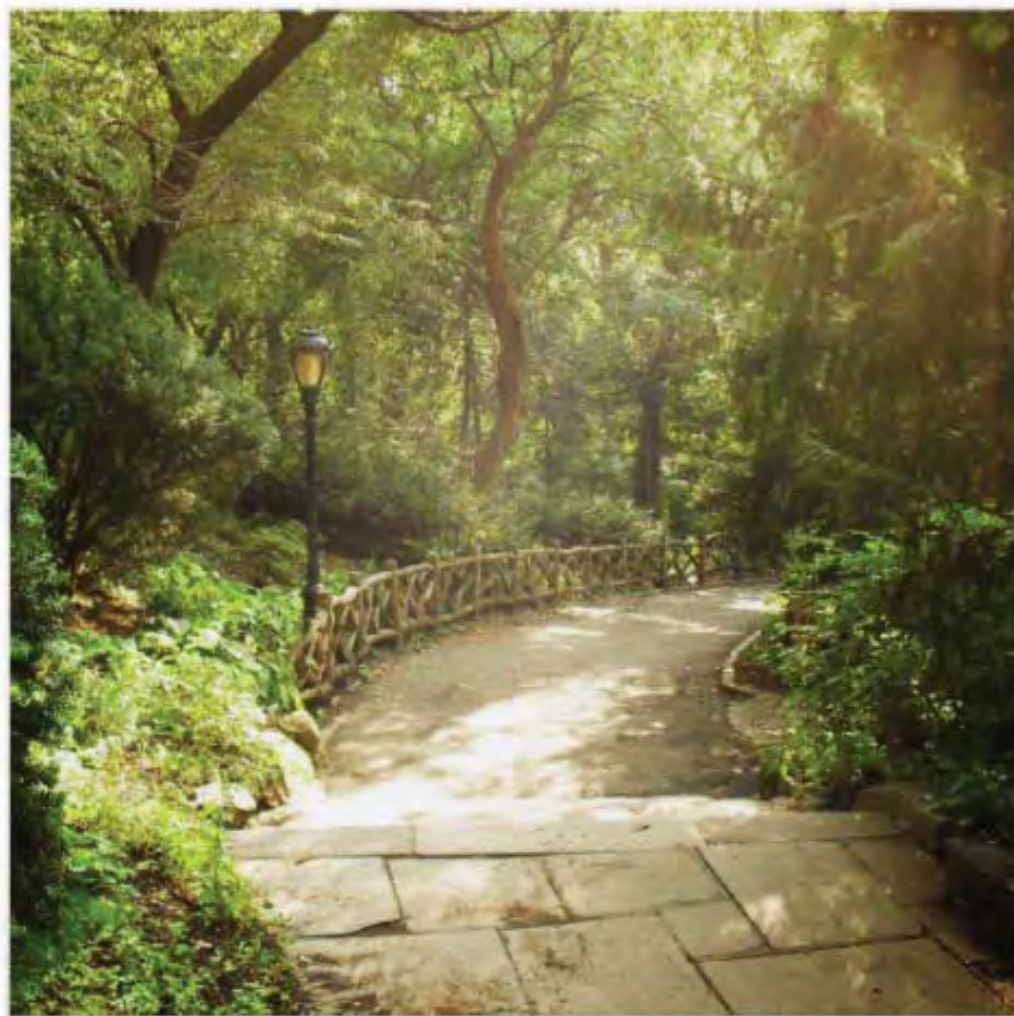




CENTRAL PARK

Park as Heart and Soul

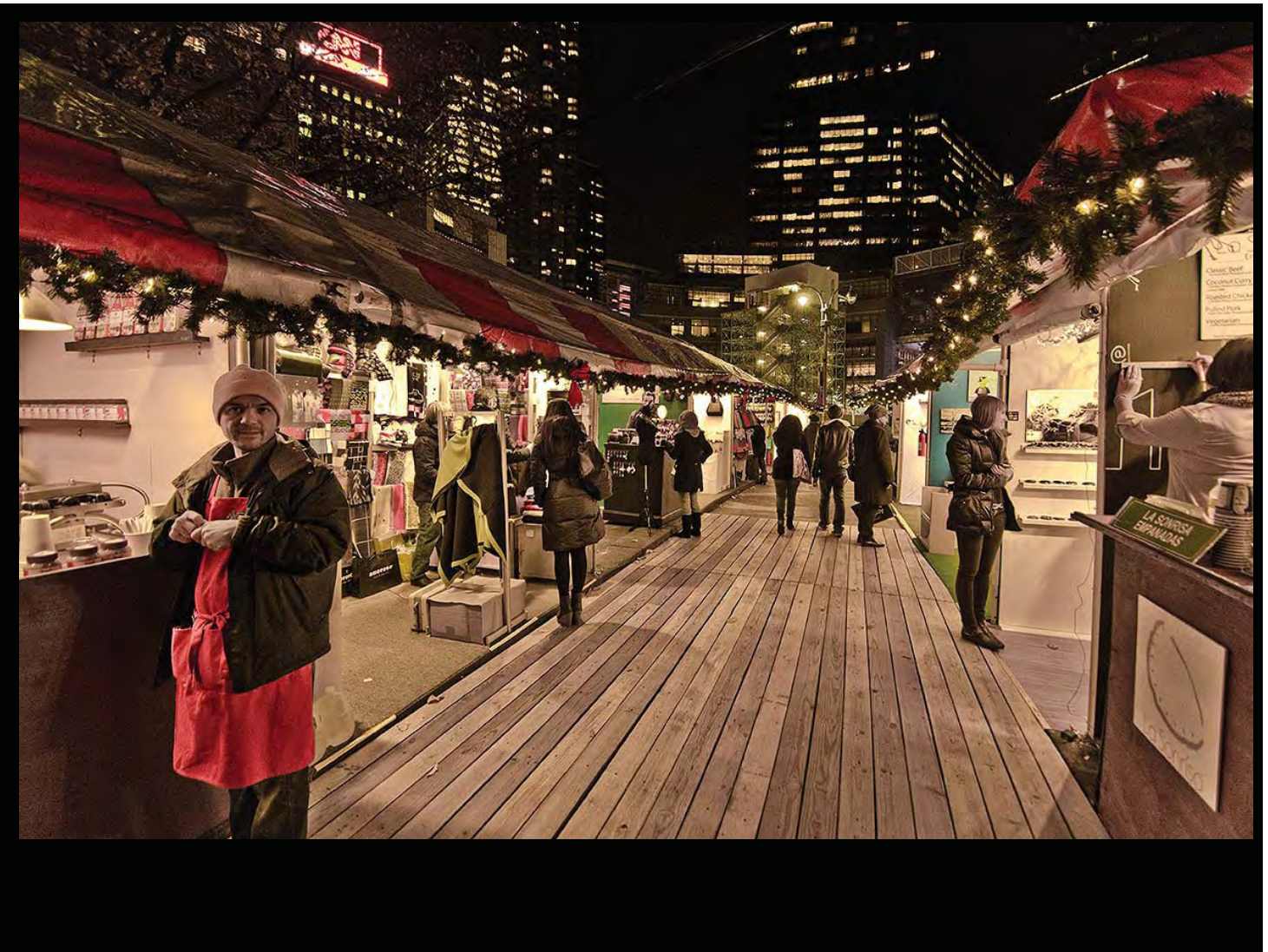
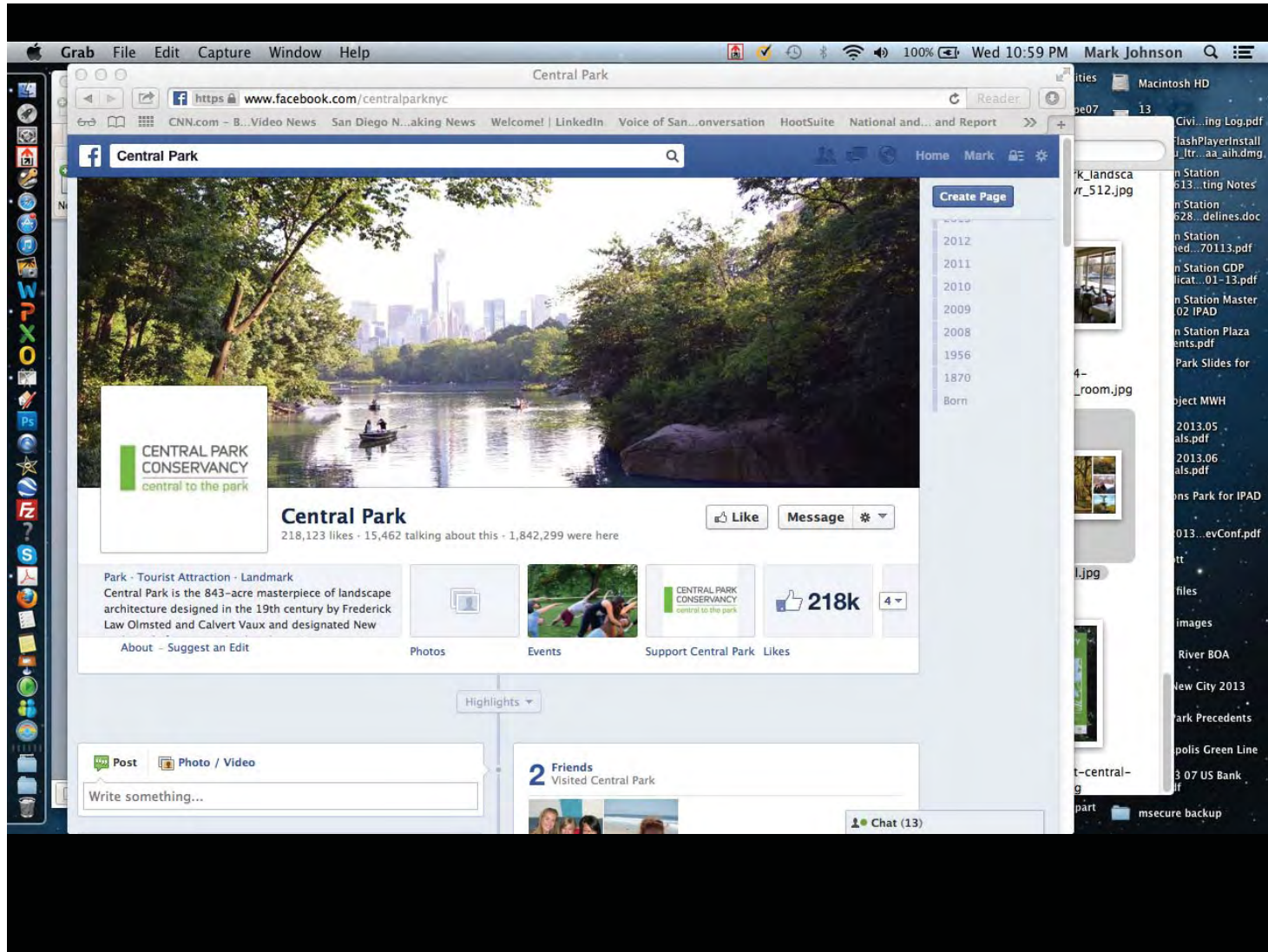












BRYANT PARK

Park as Event Venue









BALBOA PARK

Park as Cultural Destination

14,000,000 Visitors Annually

425 ha

23 Museums

San Diego Zoo

National Historic Landmark District





PARTICIPANTS

- Balboa Park Committee
- Park & Recreation Board's Design Review Committee
- Historical Resources Board Design Assistance Subcommittee
- Park and Recreation Board
- Planning Commission
- Neighborhoods (7)
- Park Institutions (24)
- US Navy
- Special Interest Stakeholders (50+)
- 200+ Public Meetings in 8 Years



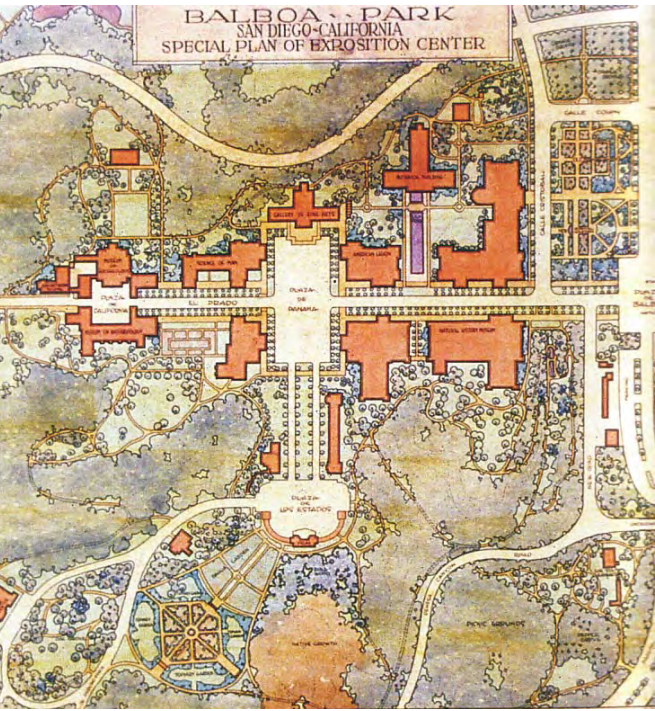
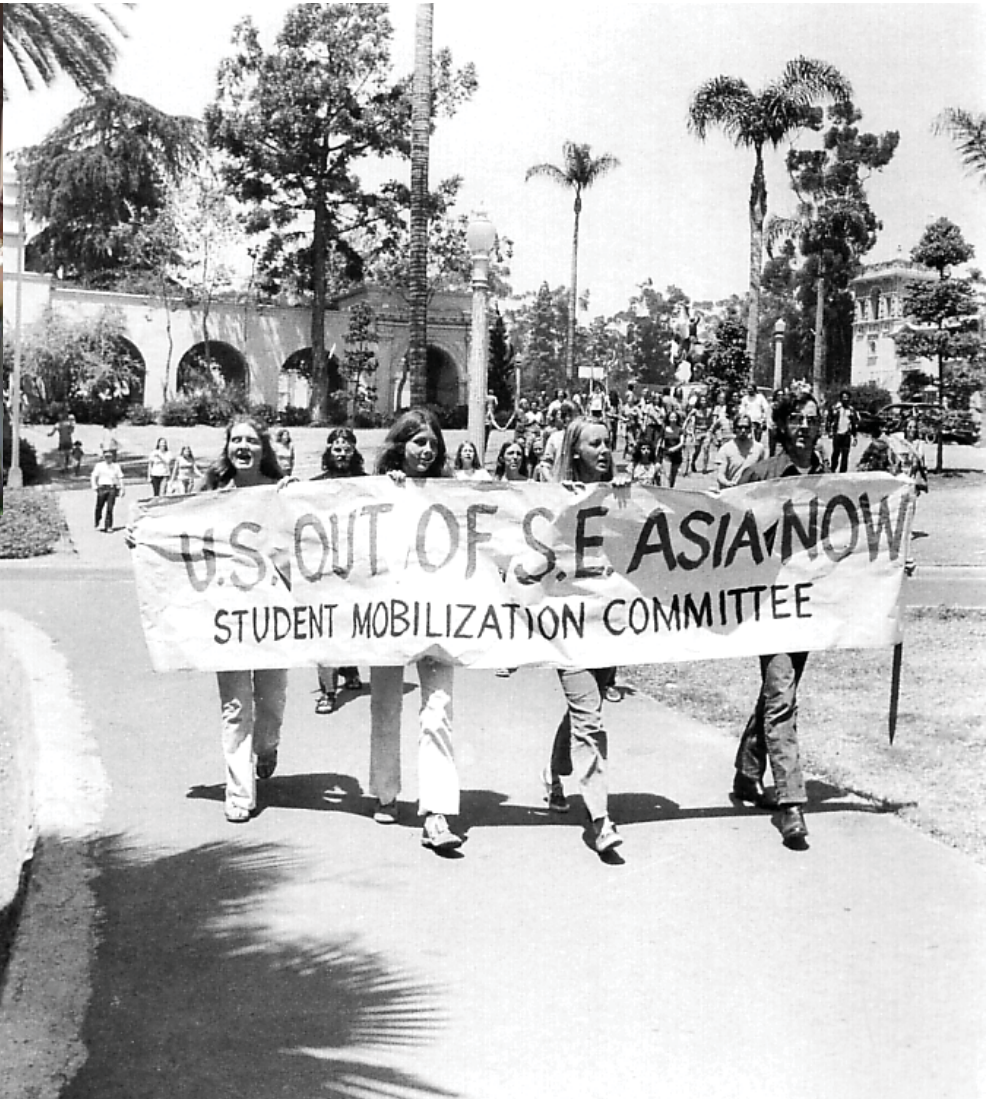
Balboa Park has been a place for celebration, recreation, events, culture and pleasure for generations.



One grand event put the city and the park on the map and in the minds of San Diegans



The park has come to be a meaningful place for a range of activities



And that legacy remains the core of the park today.



Access and movement are key aspects
Of how the park works



And a place for recreation in many forms

Principles for Balboa Park

Reclaim and Conserve Parkland

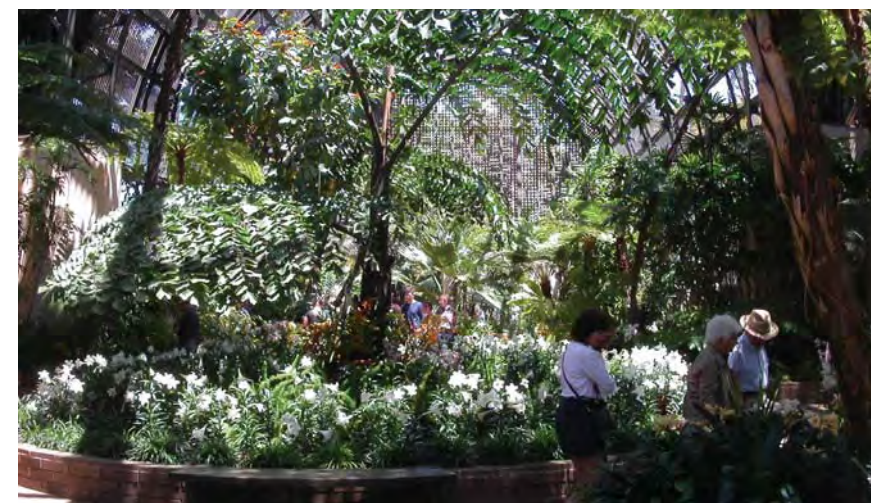
Protect and Enhance Historic Resources

Promote Health of Institutions and Park
Elements

Improve Parking Management
Provide Appropriate Parking

Implement Transit and Shuttle

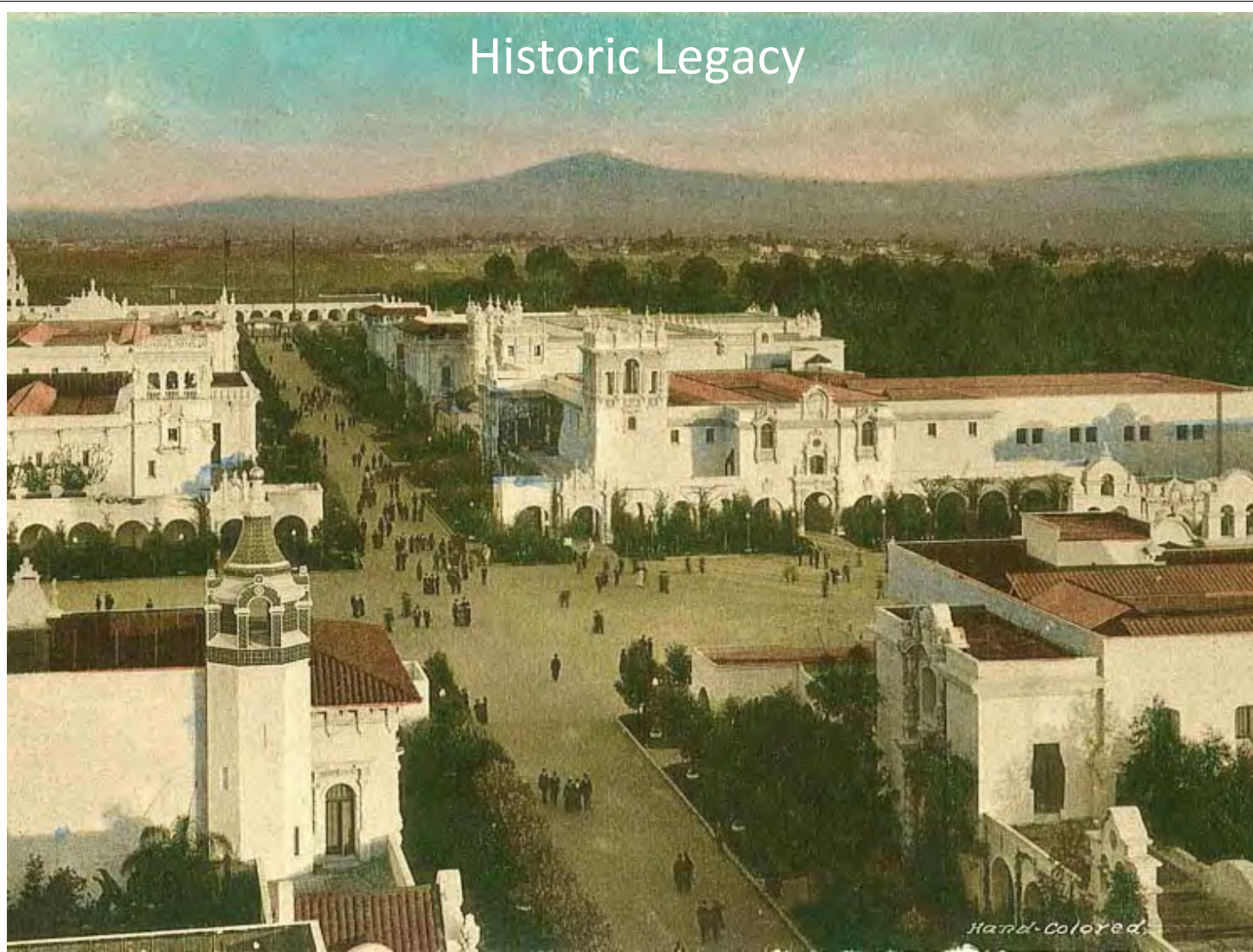
Distribute Costs and Benefits Fairly



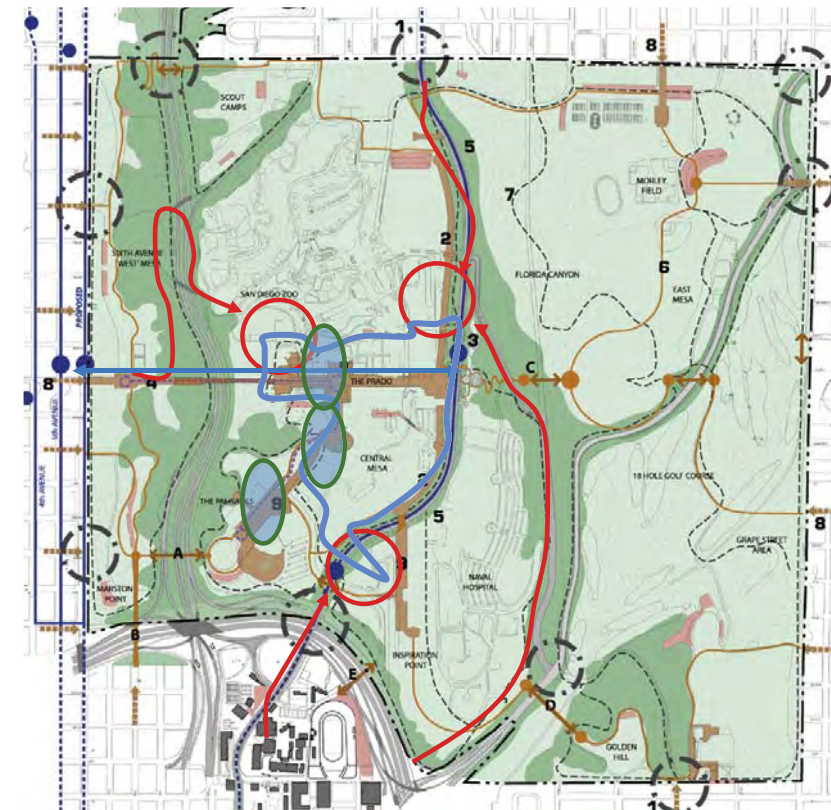
Gardens of many kinds are central to the park
experience and many organized groups



Historic Legacy

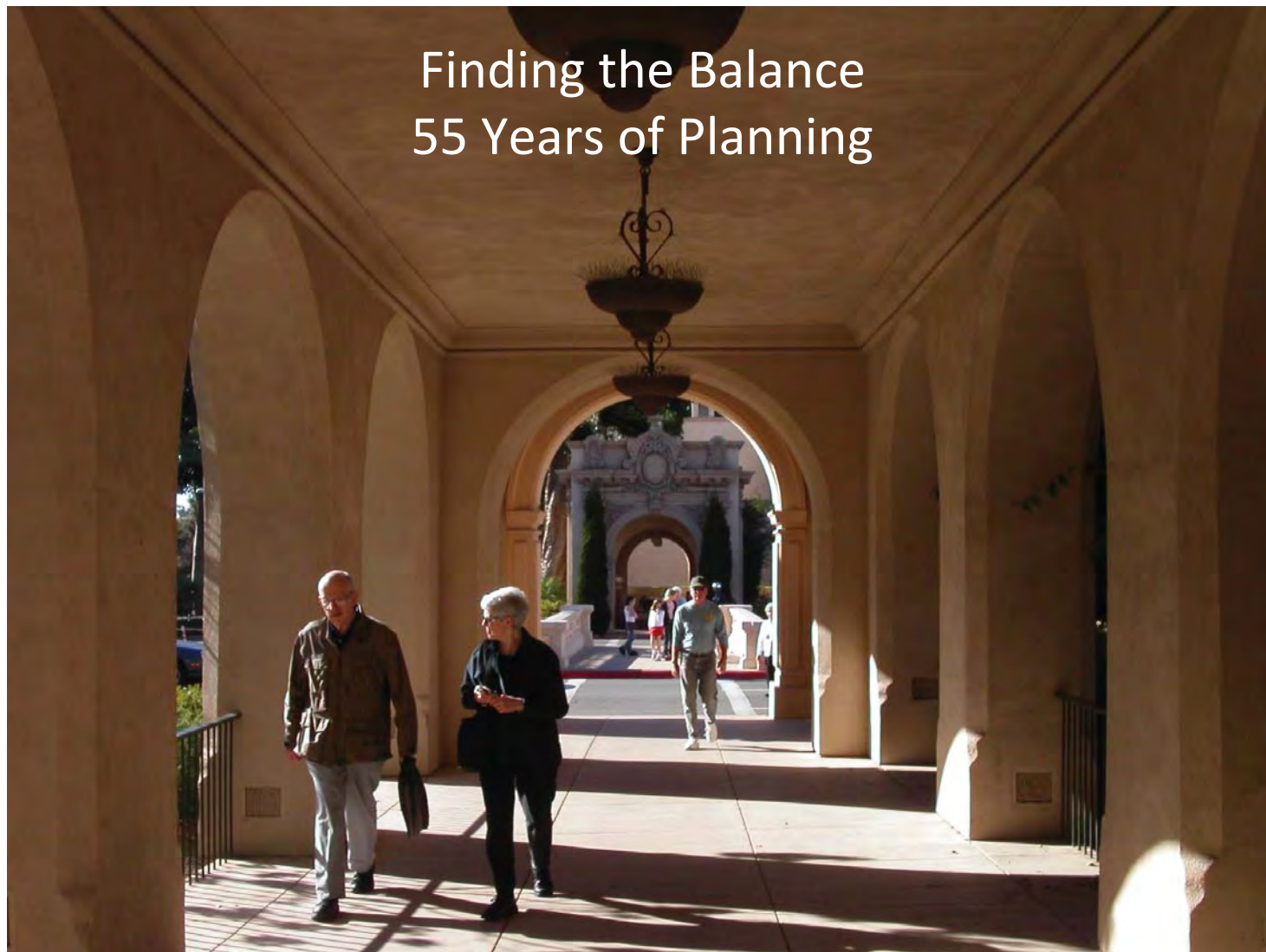


Plan Concept



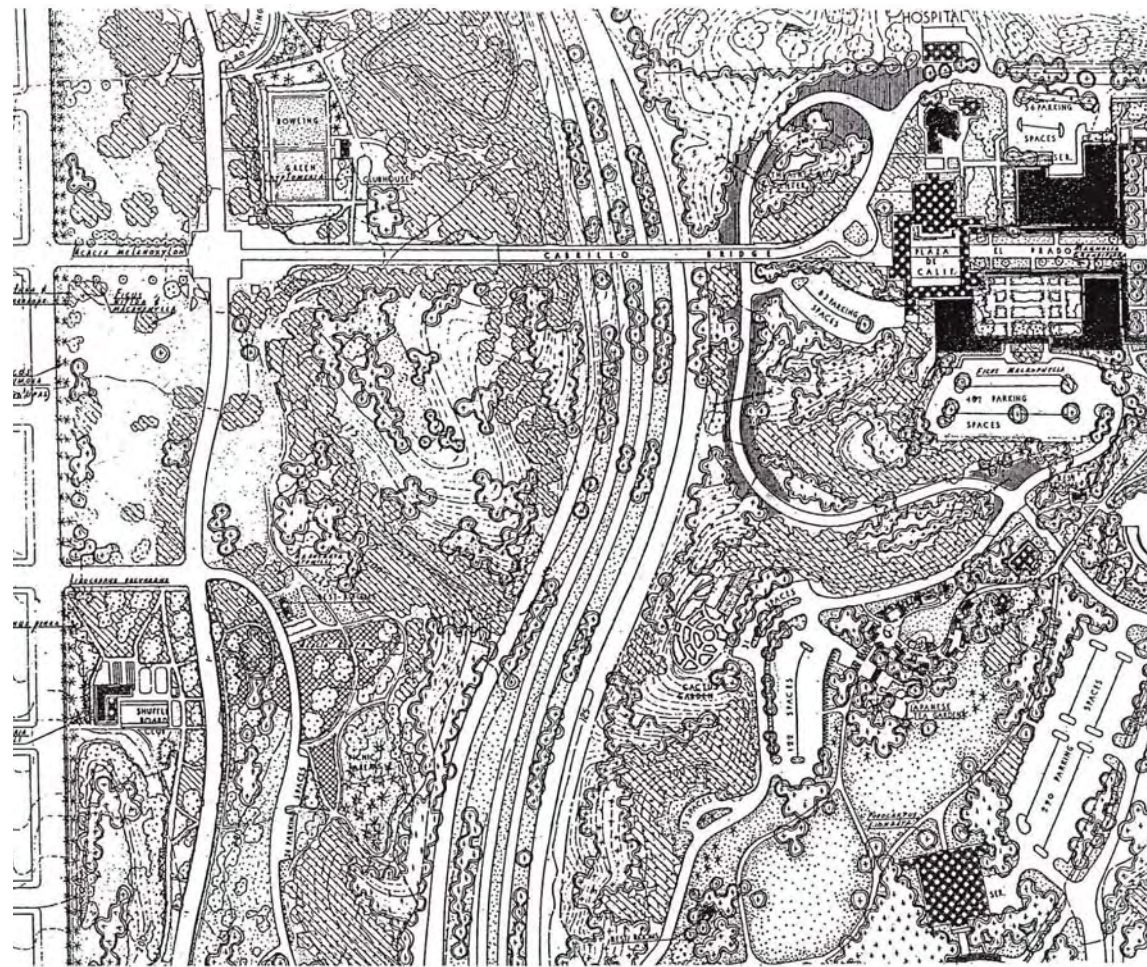
1. Manage Parking to Make Close-in Spaces Available for Visitors
2. Establish Shuttles to Link Parking and Destinations
3. Reclaim Existing Parking Lots to Restore Park Land
4. Relocate Parking and Access to Reduce Congestion in the Core of the Central Mesa. Establish up to 3 Locations for Parking Structures
5. Establish a Maximum Number for Total parking Allowed in the Park.
6. Study the Design, Cost and Operational Issues for Each Structure and the Shuttle System
7. Determine the Proper Size for Each Structure After Study of All Three Locations

Finding the Balance 55 Years of Planning



Illustrative Plan

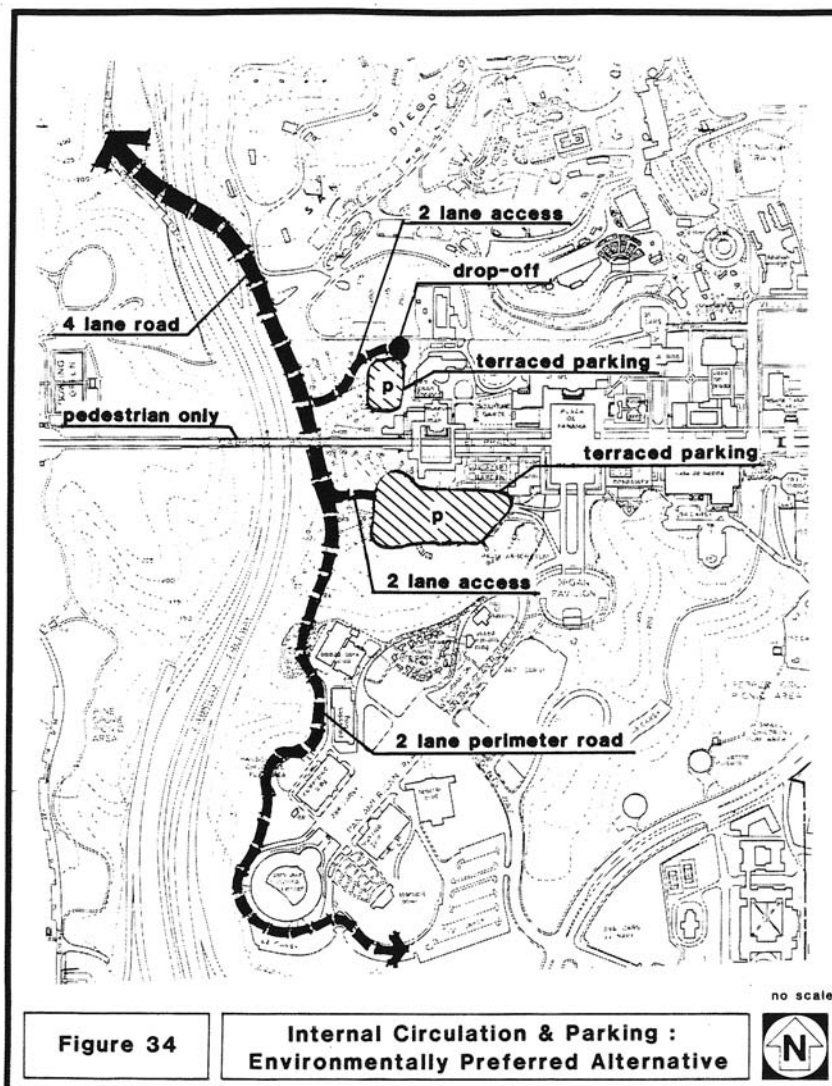
Bartholomew Plan 1960



PICTURE OF PARK IN DISREPAIR IN 50's



Master Plan Alternatives Environmentally Preferred



1953 World Progress Exposition

California WORLD PROGRESS Exposition

With a background of the exciting growth and progress of the West, our Century of the Pacific will be a show window in which we can demonstrate the values of our American way of life and its advantages over any other system in the world. We shall demonstrate these values through a central theme based on:

THE RIGHT TO COVET . . . to want that which is better or more useful.

THE RIGHT TO CREATE . . . to create something better that is coveted by the majority and can be sold for profit.

THE RIGHT TO PRODUCE . . . to mass produce desired goods or products in order that the majority may satisfy the right to possess that which is available only to a minority in other countries.

THE RIGHT TO DISTRIBUTE . . . to distribute freely and widely a better product, mass produced, to satisfy the demands of the majority.

THE RIGHT TO USE . . . to freely use those goods and products coveted by the majority and made available by those who exercise the freedom to produce and distribute under a system of free and competitive enterprise.

THE RIGHT TO DISCARD . . . the unrestricted right to discard goods, products or ideas that fail to keep pace with our dynamic system of creative production and competitive use and distribution.

These economic freedoms of choice embody all the fundamentals of American Democracy.

They insure our Designs for Freedom and Better Living.

OFFICERS AND EXECUTIVE COMMITTEE

CALIFORNIA WORLD PROGRESS EXPOSITION
Officers & Executive Committee
 G. Aubrey Davidson, Honorary Chairman
 Guilford H. Whitney, Chairman of Board
 Ewart W. Goodwin, President
 Clyde M. Vandenburg, Executive Vice President
 Billy Rose, Consulting Director
 Walter Ames, Secretary
 Allen J. Sutherland, Treasurer
 J. L. Hough, V.P. and Chairman of Finance Committee
 Edmund T. Price, V.P.
 Harold B. Starkey, V.P.
 Hal G. Hotchkiss, V.P.
 John A. Kennedy, V.P.
 Sam E. Mason, V.P.
 George A. Scott, V.P.
 William F. Shea, V.P.
 C. O. Taylor, V.P.

CALIFORNIA World Progress EXPOSITION

CENTURY OF THE PACIFIC

San Diego

1953

ADVISING ADT STD. NO. 40-412 SOUTH-ERN TITLE BLDG. SAN DIEGO 1-2170-10
 This is a **NE-24-8**

Facts Preview

of the first of
a new cycle of
EXPOSITIONS

The California World Progress Exposition — Century of the Pacific — will be the first in a new cycle of Expositions. It will mean much to every person in San Diego.

The Panama-California Exposition in 1915 and the California Pacific International Exposition in 1935 were tremendous factors in San Diego's growth.

As a result of these Expositions, San Diego has a \$30,000,000 facility — Balboa Park — in which to house and stage the 1953 World Fair.

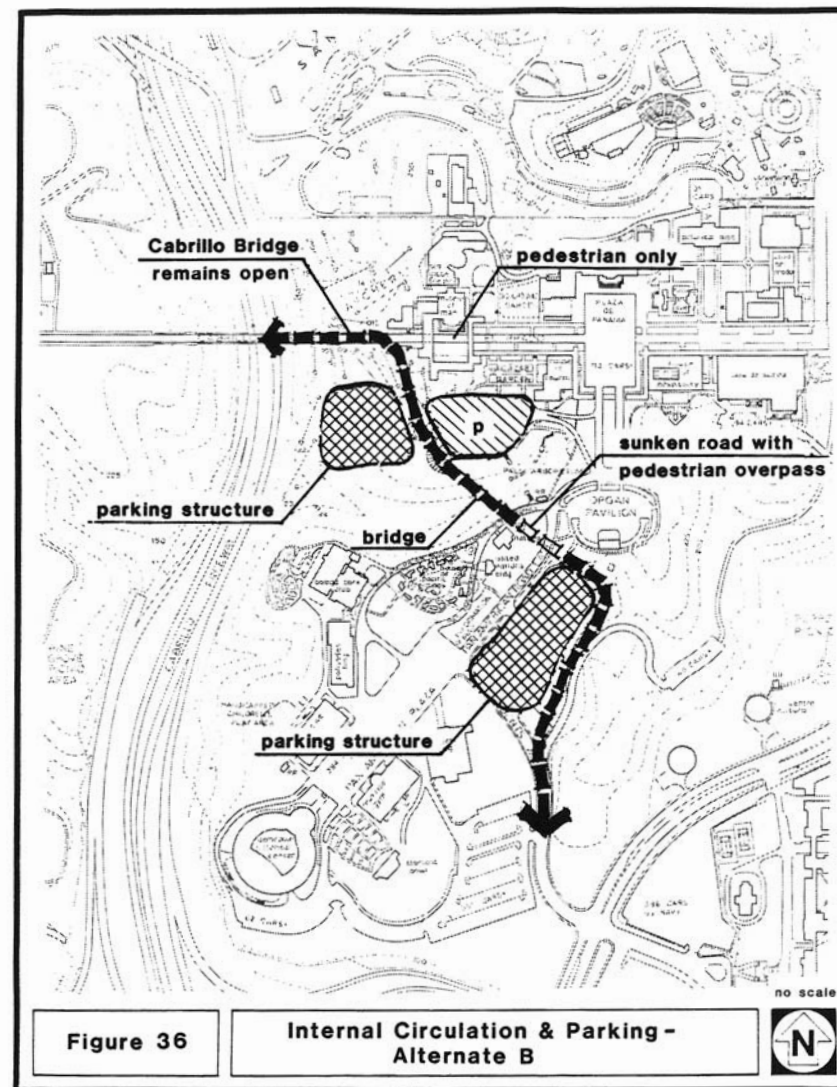
The California World Progress Exposition in 1953 will mean new income . . . it will bring new money to encourage our economy.

Our Century of the Pacific will attract investments of many millions by exhibitors and add permanent assets to the cultural, business and industrial life of San Diego.

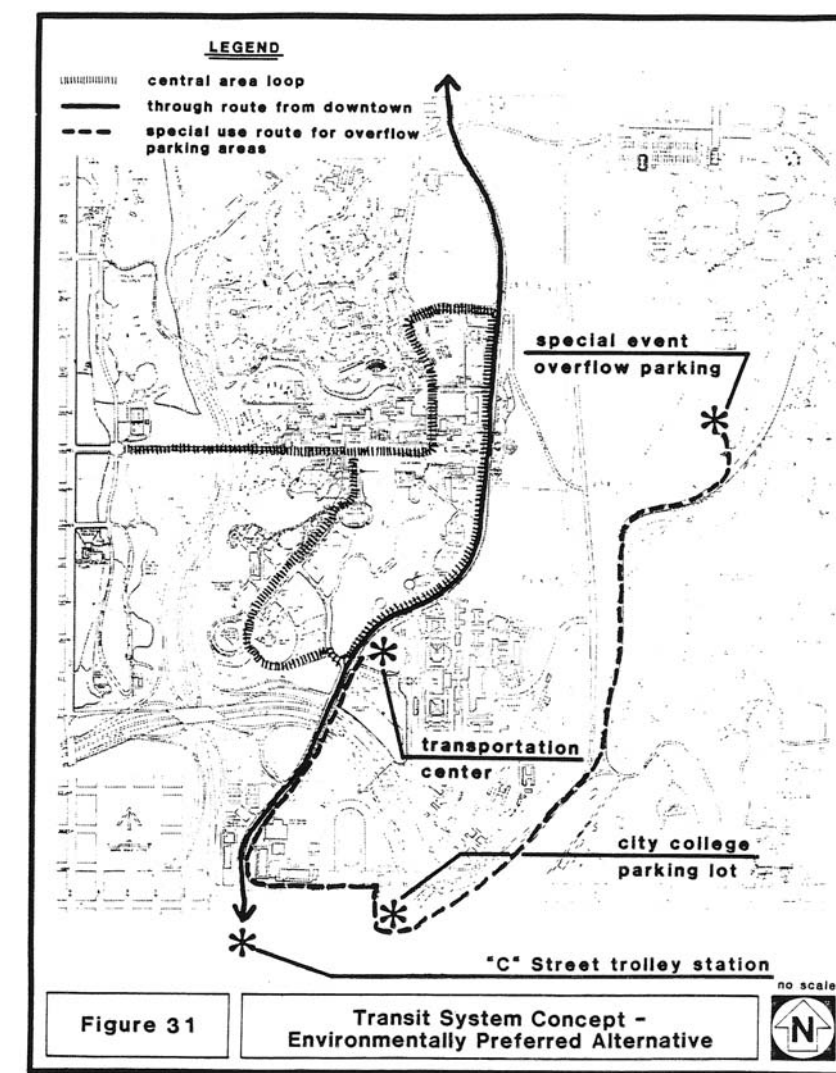
Direct all inquiries to
 Clyde M. Vandenburg, Executive Vice President
 Administration Building, Balboa Park,
 San Diego, California

The California World Progress Exposition will demonstrate a Design for Freedom and Better Living.

Master Plan Alternatives A & B

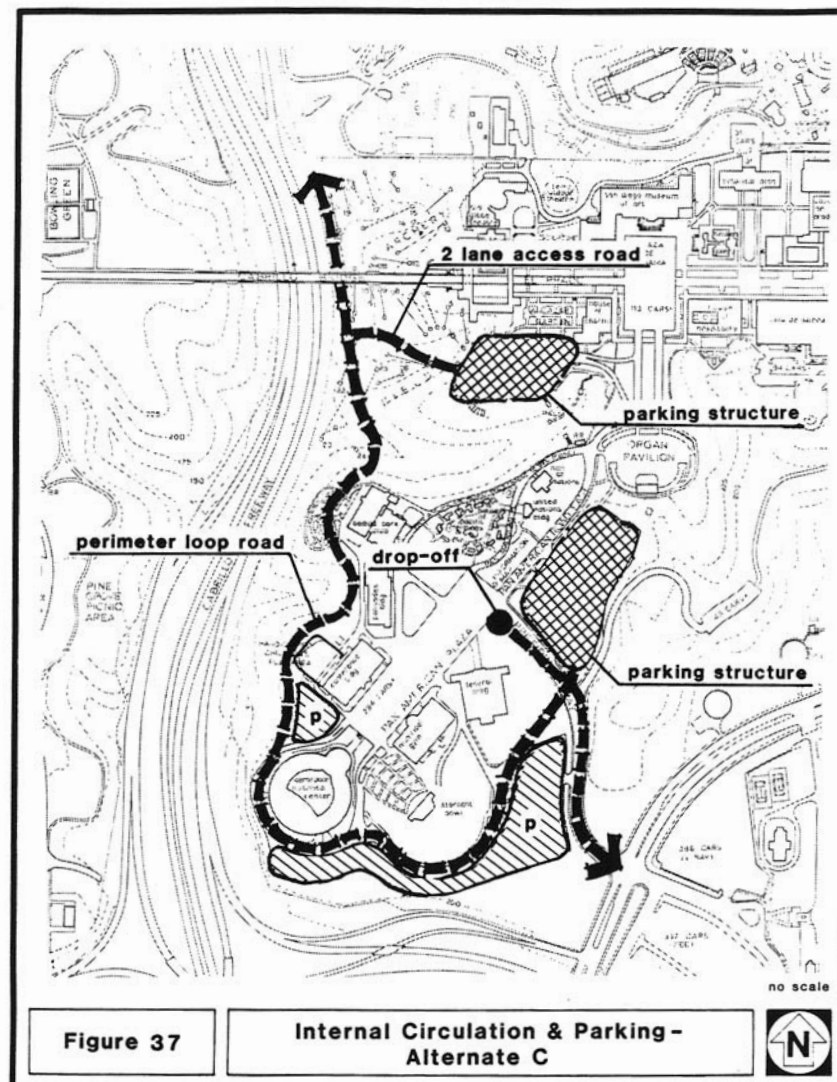


Master Plan Alternatives Environmentally Preferred

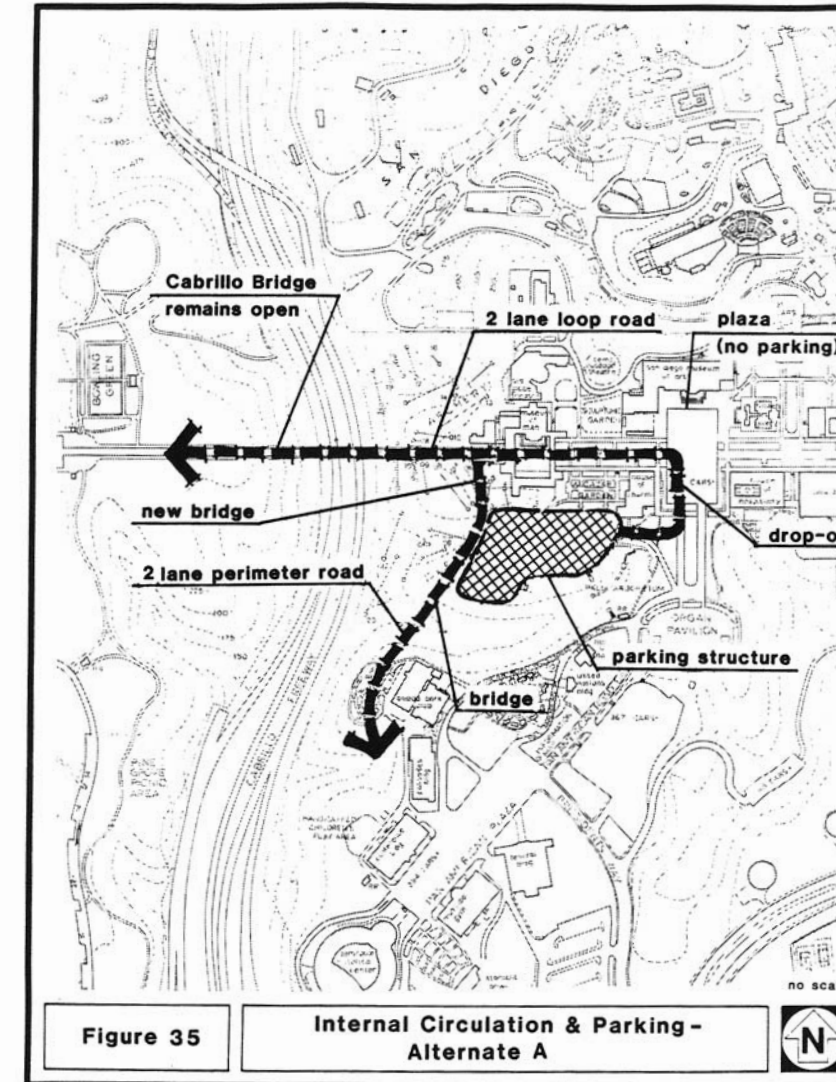


-178-

Master Plan Alternative C



Master Plan Alternatives A & B



Existing Condition



Land Use, Circulation & Parking Plan 2004

	Jan-00	Feb-00	Mar-00	Apr-00	May-00	Jun-00	Jul-00	Aug-00	Sep-00	Oct-00	Nov-00	Dec-00	Total 00
Aerospace Museum	13,542	12,894	15,540	14,213	12,259	16,854	2,168	15,545	10,746	11,146	9,533	11,254	145,694
Automotive Museum	8,106	8,552	9,422	8,209	5,116	9,144	10,744	9,118	5,911	6,078	5,683	15,283	101,366
Centro Cult. de la Raza	1,130	816	1,615	1,750	821	1,492	850	1,465	1,036	1,092	1,646	1,045	14,758
Hall of Champions	3,334	2,667	2,816	2,567	1,885	2,011	4,707	3,448	1,922	2,158	2,723	2,039	32,277
House of Hospitality	23,192	28,636	36,523	33,834	30,921	48,707	50,072	60,230	39,395	38,805	37,569	36,367	464,251
Japanese Garden	3,384	3,557	4,832	4,549	4,773	4,850	4,443	424	3,135	3,651	2,551	2,994	43,143
Marston House	309	277	418	322	270	298	374	332	276	490	298	1,061	4,725
Mingei Museum	8,034	6,824	9,624	6,612	6,724	7,289	6,426	615	7,025	6,461	6,584	16,706	88,924
Museum of Art	35,148	24,824	24,764	22,828	31,479	19,719	1,961	36,656	26,535	20,373	86,403	130,287	460,977
Museum of Man	11,739	9,690	11,174	10,308	9,497	20,550	25,733	25,179	18,660	18,384	17,460	37,605	215,979
Photographic Arts	Remodeling		10,561	5,007	5,863	5,690	6,921	7,227	7,200	5,241	5,181	5,493	64,384
Natural History	12,520	12,110	45,805	45,805	36,323	34,290	43,280	35,659	17,417	8,453	11,767	11,398	314,827
Old Globe Theatre	1,208	18,143	15,525	25,003	6,988	28,210	26,700	21,170	19,055	20,372	15,442	28,177	225,993
Fleet Space Theatre	28,353	31,437	51,824	53,824	42,362	47,682	57,791	53,388	28,800	31,572	30,778	31,202	489,013
Historical Society	4,146	3,977	1,117	2,873	2,639	3,185	4,060	4,299	2,860	1,933	2,176	12,395	45,660
Model Railroad	8,970	7,821	9,240	9,677	7,614	9,220	11,433	12,096	9,825	6,860	8,541	8,376	109,673
Serra Museum	1,113	1,359	1,668	1,147	1,315	1,399	1,924	1,173	563	736	706	810	13,913
Timken Art Gallery	9,928	10,236	11,417	10,256	8,746	9,225	10,642	10,702		8,246	12,818	17,907	120,123
Veterans Center	1,210	2,010	2,800	2,900	3,850	3,960	3,950	4,010	3,900	3,980	4,020	4,020	40,610
Villa Montezuma	476	923	1,300	905	825	913	1,274	1,197	952	2,021	539	966	12,291
World Beat Center	1,023	900	3,500	1,200		1,500	2,100	1,000	8,000	1,500	1,500	1,500	23,723
Totals:	176,865	187,653	271,485	263,789	220,270	276,188	277,553	304,933	213,213	199,552	263,918	376,885	3,032,304
Institution Provided Growth Expectations													
Source: Balboa Park Cultural Partnership, TDA Inc.													

Design Proposal



Land Use, Circulation & Parking Plan 2004

LOCATION	EXISTING TODAY ¹	EXISTING PER MASTER PLAN ²	PROPOSED PER MASTER PLAN ²	EXISTING PER PRECISE PLANS	PROPOSED PER PRECISE PLANS ³	PROPOSED PER PARK BLVD. PROM. PLAN ⁴
Parking Lots					LOW HIGH ⁶	LOW HIGH ⁶
Zoo Lot/Structure ¹⁰	2,831 ⁹	3,145 ⁹	3,145	3,361	3,016	3,200 4,800 ¹²
North Carousel Lot ¹¹	103	101	101	99	91	0
South Carousel Lot ¹¹	215	203	203	220	234	0
Natural Hist. Museum Lot ¹¹	101	101	101	101	102	0
Botanical Building Lot	29	31	31	29	0	0
Plaza de Panama Lot ¹⁰	78 ⁹	123 ⁹	0	74	0	0
Alcazar Garden Lot ¹⁰	118 ⁹	137 ⁹	137	141	137	137
Casa de Balboa Lot	95	93	93	92	119	119
Fleet Space Theater Lot	176	176	176	168	167	167
Pepper Grove Lot	118	115	115	118	125	125
Organ Pavilion Lot ¹⁰	367 ⁹	387 ⁹	1,500	323	1,000 1,500	1,000 1,500
Pan American Plaza Lot	302	296	0	294	0	0
Federal/Aerospace Lot	519	523	523	533	531	531
Gold Gulch Lot	44	55	55	54	38	38
Inspiration Pt. Lot/Structure ¹¹	1,090 ⁹	1,239 ⁹	1,239	1,232	1,241	1,241
Centro/World Beat Lot ¹⁰	10	10	0	10	11	11
Archery Range Structure ⁷	0	0	0	0	0	0
War Memorial Building Lot ¹³	0	0	0	0	0	99
Zoo Employee Parking Lot ⁷	0	0	0	0	0	450
Subtotal Parking Lots	6,196	6,735	7,419	6,849	6,812 7,312	7,118 9,218 ¹²

1989 6,196 Cars

2004 9,218 Cars

30 Years of Increasing Parking Capacity Without a Solution



Plaza de Panama







CURRENT PARK ISSUES

Parks for Nature / Parks for Action

Formal Places / Performance Strategies

Venerated Histories / New Expectations

Parks for Special Use / Parks for Multiple Use

Competing Forms of Access

Whose Park is This?

Who is in Charge? -- Layered Governance



CURRENT PARK THEMES

Heritage and Conservation

Diversity and Social Equity

Individual Choice

Shared Use Strategies

Healthy Living

Authentic Experience

APPENDIX F: TREE MASTERPLAN (EARTHSCAPE)



EARTHSCAPE HORTICULTURAL SERVICES
Arboricultural, Horticultural and Landscape Consultants

ABN 36 082 126 027

TREE MASTER PLAN

CENTENNIAL PARK MASTERPLAN 2040

November 2013

Prepared for: Centennial Park and Moore Park Trust
c/- BVN Donovan Hill
PO Box N646
GROSVENOR PLACE NSW 1220

Ph:- 02 8297 7200

Prepared by: Andrew Morton
Dip. (Arboriculture) [AQF Level 5]
B. App. Sci. (Horticulture)
A. Dip. App. Sci. (Landscape)

EARTHSCAPE HORTICULTURAL SERVICES
Ph: - 0402 947 296

*Member of Arboriculture Australia
Member International Society of Arboriculture - Australian Chapter (ISAAC)
Member Local Government Tree Resources Association (LGTRA)*



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1 INTRODUCTION

1.1 The Importance of Trees in Centennial Park

- 1.1.1 Trees are the single most important element defining the visual character of the landscape within the Park, and are therefore of critical importance in maintaining its identity and enduring sense of place.
- 1.1.2 Whilst the Park has evolved using a variety of species planted over successive time periods creating an overlay of planting styles, the species and patterns of trees seen today (avenues, rows, belts and groves) appear as a cohesive landscape. The critical component of these planting patterns is the uniform size and the consistent form and habit of the trees. Many individual species used (including the Araucarias and Palms), also have their own distinctive visual character and contribute to the sense of place. Some species are strongly associated with the identity of the Park, particularly Moreton Bay Figs and Port Jackson Figs. Whilst fairly typical of other parks within Sydney developed during the late 19th and early 20th Century, Centennial Park is considered a relatively intact and rare example of this landscape type.

1.2 Issues affecting Future Management

- 1.2.1 Given the age of the existing plantings, natural attrition of trees is inevitable due to decline in health and condition, disease, storm damage and death of trees over time, which has the potential to alter the visual character of the place. Planned and proactive replacement strategies are therefore a key element of management of the Park. Given the timeframe of planting, many of the plantings are expected to senesce around the same time. The wholesale loss of trees within critical avenues, groves and belts would have a significant impact on the visual character and amenity of the place. Some of these have a purely aesthetic purpose; others are more functional in mitigating prevailing winds and providing shade and shelter for park users.
- 1.2.2 Replacement planting is a challenge given the ecological and cultural values of the trees, especially those growing in close proximity to one another within formal avenues and rows. These values may be in conflict with asset management and risk management strategies. Loss of trees within these uniform patterns can compromise the visual integrity of the whole planting unit. Lack of species diversity is also a significant issue in terms of potential losses due to disease.

2 PLANNED PROACTIVE MAINTENANCE

2.1 Asset Management

- 2.1.1 A holistic (whole of life cycle) and proactive approach to the planting, maintenance, management, protection, removal and replacement of trees, is vital to the management of Urban Forests. Trees are biological and structural organisms that adapt and change to the prevailing environmental conditions in the situation in which they are growing. Trees are significant community assets and may be the most valuable asset in monetary terms within the Park. Like other 'assets', trees have a finite lifespan, but it is not as predictable as some other physical assets, such as plant and equipment, infrastructure and buildings. Unlike built assets which depreciate over time, trees appreciate in value as they grow and develop to maturity. Trees begin to decline and senesce as they suffer the cumulative impacts of injury and disease, diminishing their value and sometimes creating potential risk. Estimating the remaining Safe Useful Life Expectancy (SULE) for trees is not an exact science, but is a helpful tool in the proactive management of trees.

2.2 Risk Management

- 2.2.1 Trees may pose a risk to safety and can lead to property damage or injury as a result of structural defects, damage and disease (leading to structural failure). The interaction between trees and other infrastructure can also lead to hazards for pedestrians and property damage. Public safety is a priority in terms of the management of trees within the Park. To minimise the potential risk of harm or damage, trees, like any other asset, must be monitored and managed proactively. A proactive approach to management ensures that preventative action is taken before failure or damage occurs wherever possible.
- 2.2.2 Centennial Park Trust (CPT) has a Duty of Care to take reasonable steps to mitigate reasonably foreseeable risks, such as nuisance, damage and potential hazards caused by trees. A proactive approach to risk management can reduce exposure to liability. CPT has developed a system of regular monitoring and inspection, record keeping and programmed maintenance of tree assets to minimise risk to acceptable levels and comply with statutory requirements using the 'Streets Ahead' tree management system. Such a system demonstrates due diligence provided that it is regularly updated. This system has allowed the Trust to significantly reduce insurance premiums for public liability. This system also allows CPT to satisfy NSW Treasury reporting requirements for Total Asset Management (TAM) and planned infrastructure expenditure (capital and maintenance).

2.3 Information database

- 2.3.1 To ensure that the system is an effective management tool, a regular audit of the tree resource is undertaken about every 5 years. This involves a systematic visual assessment of trees and recording data captured into the Tree Inventory (database). Over the last decade or so, CPT has progressively populated the Streets Ahead database with almost 15,000 trees. Combined with aerial photography of the Park, this provides a powerful analytical and management tool. Changes in status as a result of preventative and reactive maintenance works, new plantings and tree removals are made by maintenance staff as works are undertaken. The database can be interrogated to provide information on the size of the tree population, composition of species and remaining SULE, which then provides useful information for long-term planning. This facilitates prioritization and efficient use of available resources, development of budgets and maintenance programming. The system is currently used to produce the annual works and maintenance program.
- 2.3.2 New technologies, such as Toughbook computers and wireless communications, are improving the efficiency of data collection. Future investment in these technologies and the collection and storage of data in the asset database are essential in ensuring proper asset management and reducing risk. Experience in the Park has shown that the regular update of the database requires a balance to be struck between the amount of information that is desirable to collect and that which is realistic and useful to collect and maintain.

2.4 Key Strategies

- Explore the use of current technologies for data capture to minimise costs associated with regular update of the tree information database. Panasonic Toughbooks are currently being used. However, data recording would be made more efficient using wireless technology to upload new data from the field directly to the database.
- Integrate Streets Ahead database with a Geographic Information System (GIS) and up-to-date aerial photography (Google Earth, NearMap or similar) to improve spatial analysis of

data. It would also be useful to integrate access to historical aerial photography. This has been achieved by a number of Local Councils, including Sutherland Shire Council. Integrating Streets Ahead with GIS would permit linkage with photos, schedules, documents and other information, making the database an even more effective management tool.

- Continue to undertake a full tree health and condition audit (key information fields) every 5 years to maintain the database up to date.

3 REPLACEMENT PLANTING

3.1.1 The replacement of trees in public landscapes is a complex problem and requires a long-term strategy. Many trees planted in Sydney during the nineteenth century and early part of the twentieth century are now entering senescence.¹ A large number of the trees within the Park are in the mature to senescent age category and are in a state of reduced vigour and decline. In 2002, an estimated 10% of the total tree population had an estimated SULE of less than 15 years and 67% had a SULE of less than 40 years. Aside from natural attrition due to senescence, trees may need to be removed due to storm damage, structural defects, excessive nuisance or significant damage to structures or services. They may also die or decline prematurely due to disease or pest infestation.

3.1.2 This means that a large number of trees will decline and need to be removed over the next few decades, potentially dramatically altering the visual character of the Park. An on-going replacement planting program is therefore essential to maintain the tree population and the distinctive visual character of the place. However, there are many practical issues with replacing trees in an established landscape situation that must be considered.

3.2 Practical Implications

3.2.1 There are complications with replacing new trees in amongst large old trees, due to competition for resources and available space (above and below ground). The competition for light and space can create stunted, misshapen trees which take significantly longer to establish. These rarely grow into stately well-formed trees characteristic of those removed. New trees need adequate space and resources to develop into well-formed structurally sound trees at maturity.

3.2.2 Wholesale removal and replacement of avenues and groves or even individual large trees can have a significant short term effect on amenity and visual character. As such, this approach is rarely popular with the community without intensive community consultation. Wholesale removal and replacement of large areas also results in a significant drain on financial resources. However, given that consistency and uniformity of size and form are important in defining the distinctive visual character of the place, new avenues and groves need to be planted at the same time or at least within a relatively short time frame.

3.2.3 The avenue in Grand Drive represents a peculiar situation in terms of replacement strategy. The avenue was designed by JH Maiden using a particular combination and sequence of species (Norfolk Island Pine, Port Jackson Fig and Holm Oak). The combination and sequence is repeated around the Drive, with some subtle changes (refer to **Figure 1**). The performance of the trees also varies considerably due to the underlying soil and drainage conditions. Some sections of the avenue are located on deeper soil profiles filled during road construction; others are on shallow soil profiles created by excavations for road construction. Some areas also exhibit mixed layers of fill. All of these factors result in variable growth responses around the Drive, meaning senescence and natural attrition will also be variable, despite the small number of species used.

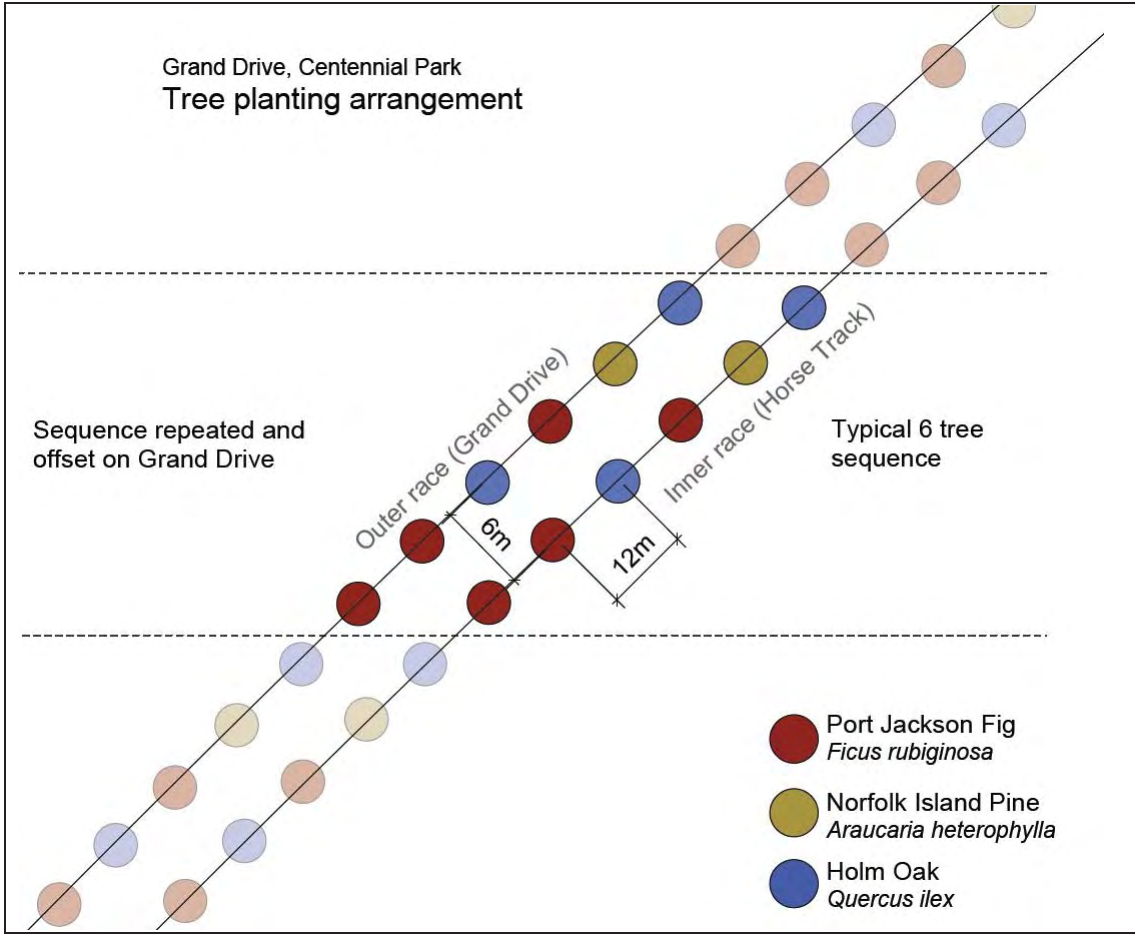


Figure 1 – Showing general planting sequence and arrangement around Grand Drive

3.2.4 Replacement of individual specimen trees also has its challenges. Whilst there are open areas where new tree planting could take place to replace older senescent trees nearby, these may be constrained by important view corridors, potential shading of playing fields, proximity to underground services or the like.

3.3 Potential Strategies

3.3.1 As some age diversity in the tree population is helpful in spreading out the costs and practical problems associated with an even aged tree population, it makes sense to stage new tree plantings over several decades in different areas of the Park. In recognition of this, CPT has implemented a replacement planting program over the last 15 years and this program extends into the future.

3.3.2 To date, most replacement planting strategies within the Park have been based on incremental and gradual replacement according to natural attrition. Experience at the Park has shown that even with a relatively high percentage of natural attrition within an avenue or grove, it can still retain some visual integrity. The loss of every second or third tree is disguised to an extent as the adjacent trees continue to grow and fill in the spaces left between. At some point, however, the visual integrity of the avenue or row will be lost.

3.3.3 SULE has *not* been a very helpful model in dictating exactly when replacement should occur, as it is not sufficiently accurate to make such a determination. Notwithstanding this, it is

acknowledged that considerable lead time is required for effective replacement planting programs. A minimum of 5 years is needed to grow plant stock of the right species to acceptable dimensions prior to planting (longer for some slower growing species, such as Holm Oak). The timeframe for senescence can also vary by a considerable amount between trees in the same avenue or row as influenced by cumulative damage, disease, storm damage underlying soil or drainage conditions, or other factors that result in variable growth and response.

3.4 Block Removal and Progressive Block Removal

- 3.4.1 ‘Block Removal’ and replacement has been trialled in some areas of Australia, with good success. However, this approach tends to be unpopular with the community as it may involve the removal of trees that still make a fairly positive contribution to amenity. Even where block removal can be undertaken progressively (removing a portion of the block over several successive years), it requires a long term management commitment and tends to be an unpopular approach. However, block removal is considered the best method of re-establishing uniform avenues and groves within the same position as those existing.
- 3.4.2 Some difficulties with the block removal strategy include determining the size of the ‘blocks’, the timeframe over which the whole unit will be replaced and when and where replacement will commence, securing long-term funding to support the whole of the work and obtaining and maintaining public and political support for the program from the beginning to the end (which for some projects like Grand Drive, could extend over several decades).

3.5 Visual Integrity

- 3.5.1 Rather than determine when replacement in rows and avenues should occur based on a fixed point in time using a SULE analysis, replacement could be considered based on an assessment of visual integrity. This would not make replacement fixed in time, but could be implemented based on a percentage natural attrition at which visual integrity is or will be lost. For example, if the visual integrity of an avenue or row (or grove) is lost following the removal of 70% of trees due to natural attrition, at that point replacement of the avenue or row (or a selected portion of it) would occur. This would be reasonably predictable within a 5 to 10 year time window, allowing sufficient forecasting to procure replacement plant stock. The only difficulty with this methodology is arriving at the percentage of acceptable loss, which would be highly subjective. The size of the blocks would need to be a factor of economic and practical feasibility of replacement and the total size of the planting unit.

3.6 Parallel Planting

- 3.6.1 Parallel Planting may be feasible where sufficient space exists within an area in proximity to a row or avenue. This has been undertaken in Moore Park adjacent the avenue of Moreton Bay Figs in Anzac Parade. The intention of this strategy is to permit an adjacent row of new trees to reach maturity in anticipation of the demise of the original avenue, to provide a visual buffer to loss of amenity. This should be a successful strategy, but has limited possibilities for implementation. Parallel planting has been considered for Grand Drive (on the inside of the horse trail) but is not feasible due to the constraints within the potential area for replanting.

3.7 Stock Quality

- 3.7.1 Tree planting represents a substantial long-term investment. Good quality plant stock is imperative to ensure the best chance of survival, reduce establishment time and minimise the potential for formation of growth defects. NATSPEC has produced a guideline for specifying and

auditing the quality of plant stock called “Specifying Trees – A Guide to assessment of Tree Quality”.² This guide is currently used by CPT to specify tree stock quality in supply contracts and for auditing the quality of nursery stock to ensure compliance with reasonable standards. Specifying and insisting on good quality plant stock is a critical component of the replacement planting program.

3.8 Advanced Procurement

- 3.8.1 Lead time for the procurement of advanced plant stock is also a critical element to success of any replacement planting program. The further ahead procurement can be planned, the more successful the planting. Whilst tree stock can be obtained from commercial nurseries via the open market, it is often difficult to source material of the desired species or cultivated variety, size, quality or quantity required at short notice. Pre-ordering and contract growing of tree stock is currently integrated with the Annual Planting Program to ensure timely delivery of the correct stock at the right size. With this method, plant stock quality can not only be specified, but also monitored throughout the growing process.

3.9 Funding

- 3.9.1 Advanced procurement requires a commitment to long term funding. Fortunately there is considerable interest in the community in relation to providing specific donations for tree planting within Centennial Park (Dedicated Trees Program), particularly within the more prominent spaces and avenues. Unfortunately there is less interest in funding for replacement of groves and copses around the periphery of the Park. Corporate funding of larger peripheral groves could be explored as a way of funding more extensive tree planting.

3.10 Community consultation

- 3.10.1 The removal of trees in public landscapes is a highly emotive issue for many people. Whilst it is valid that the community should be involved in decision making concerning tree removal and replacement, there are difficulties in achieving a consensus in opinion due to the diverse range of views. There are often conflicting views and perceptions about the values of trees to the community. The largest and oldest trees are usually those most revered by the community and the decision to remove them often initiates community concern and debate. Nevertheless, informing the community as to the nature of the issues affecting tree management are integral in tree replacement programs and essential in terms of community understanding and ownership.

3.11 Key strategies

- Develop specifications for supply of advanced tree stock based on NATSPEC Guidelines and Standard Tree Stock Procurement Contract.
- Undertake regular inspection and testing of nursery stock in accordance with Natspec Guidelines.
- Consider options for encouraging corporate (rather than individual) funding for tree grove or copse planting in the outer ring.
- Determine a percentage of acceptable loss of visual integrity for Grand Drive and other key avenues, rows and groves. Determine the appropriate size of the ‘blocks’ for block removal based on practical and economic considerations (particularly in Grand Drive).

- Determine where parallel planting can be successfully undertaken in light of existing constraints.
- Develop an Annual Tree Planting Program for the next ten year time frame.
- Explore ways of encouraging community consultation in tree replacement and replanting strategies (workshops, focus groups, working groups, forums).

4 SPECIES SELECTION

- 4.1.1 It is imperative that a balanced approach be taken to the selection of tree species for use in the Park. There is no perfect tree; in every selection there may be some compromise between positive and negative values. Appropriate plant selection must be based on a firm set of principles which establish the function and design intent that the selection should conform to, then rigorous selection criteria which enable the species with the most desirable and appropriate characteristics to be selected, no matter what their origin or type. The selection of appropriate species is critical to successful establishment and important in minimizing any future risk. Good plant selection also assists in reducing maintenance costs associated with canopy and root pruning (to control size or interference). This should not deter experimentation, but rather encourage the planting of ‘the right tree for the right place’.
- 4.1.2 The palette of plant species that can be used within the site is fairly limited due to the difficult environmental conditions within the site. However, experimentation with new species is considered valid and has a historical precedent. In fact, most of the early planting was based on trial and error, with those species enduring the harsh conditions the ones that have survived to maturity and continue to thrive. Some of the limiting factors of the soil environment may have been imposed by successive layering of different soil materials over time and not necessarily relative to the original site soils. One of the most significant limiting factors is the moisture holding capacity of the soils within the site, as well as periodic waterlogging of low lying areas.

4.2 Planting trials

- 4.2.1 Historically Centennial Park has been used as an experimental ground to trial the performance of various species. This tradition of experimentation was promoted by JH Maiden and has continued through successive decades of management. Some species have excelled and others have performed poorly. It is important that the traditions of experimentation are able to continue into the future, rather than be locked in to a defined species palette.
- 4.2.2 Whilst some species are known to perform well and can continue to be used, others have resulted in a raft of management problems over time and their use should be discontinued. In some instances the general characteristics of these trees, such as brilliant mid-winter flowering of Coral Trees, is a distinctive element of the Park. However, this species has proved to be structurally poor and mature trees are subject to frequent failures. The replacement with an alternate species that provides similar characteristics without the inherent structural flaws is appropriate in this instance. Likewise, the demise of Canary Island Palms due to Fusarium Wilt has necessitated the cessation of this species and the trial and planting of alternatives with similar visual characteristics.
- 4.2.3 Information on both the success and failure of species trials is important in guiding the future management of the Park. As such, planting trials should be appropriately documented and results recorded.

4.3 Key Strategies

- Monitor and record the performance of species trials using the Streets Ahead database where possible. Consider collecting data such as growth rates (measuring dimension of a percentage of trees over successive time periods), issues with pests and diseases, plant losses & failures & general performance. As this data collection may be relative labour intensive, consider developing relationships with key educational institutions to undertake research and data collection.
- Develop plant selection criteria for the Park and a master species list with species characteristic and performance.
- Plan future species trials.
- Map existing site constraints, especially view corridors, underground services, setbacks to sporting facilities and playing fields etc.
- Develop planting specifications based on the Park unique set of environmental conditions.
- Develop a schedule of current species and potential alternative species with similar characteristic for trials.

5 PEST AND DISEASE MANAGEMENT

- 5.1.1 Significant plant pests and pathogens can lead to the decimation of large areas of the Urban Forest, resulting in substantial costs associated with tree removal, pest control and replacement planting. There may also be substantial short and long term impacts on local amenity. Diseases such as Phytophthora, Dutch Elm Disease, Fusarium Wilt and Armillaria Root Rot are just a few that have caused widespread destruction of urban trees. New threats such as Thaumastocorids, Sycamore Lace Bug and Myrtle Rust may also result in significant impacts in Australia. To keep these problems in check, constant vigilance is required. Regular monitoring can assist in the early detection and containment of these types of risks.

5.2 Integrated Pest Management

- 5.2.1 As chemical treatments are often impractical control measures for large trees in urban areas, consideration should be given to an Integrated Pest Management approach using a variety of biological, non-chemical and chemical controls where appropriate. This predicates ongoing monitoring by trained staff to initiate timely and appropriate responses. The Tree Inventory is an integral tool in this process.

5.3 Species Diversity

- 5.3.1 Within Centennial Park, Broadleaved Paperbarks and Maritime Pines make up 56% of the total tree population. The loss of either one of these species from disease would result in a significant impact on the local landscape. Planning for a diversity of tree species is therefore important to reduce the potential impacts severe pest infestations or disease outbreaks, by spreading the risk of potential loss of whole species or genera.
- 5.3.2 Whilst species diversity within a row or avenue may not create visual uniformity, some diversity can create visual interest. Too much diversity can create visual confusion and lack of uniformity. However, many avenues within the Park, even Grand Drive, are made up of a variety of a small

number of species, distributing the risk of potential loss of one. The site is large enough to support stands of monocultures, whilst still allowing diversity over the broader landscape.

5.3.3 Increased variety and diversity in species also lends itself to the implementation in the peripheral areas of the Park ('Wild Outer Ring'), whereas more uniform, formal plantings of single or few species may be more appropriate to the central areas of the Park ('Cultivated Inner Ring'). Greater species diversity is typical in natural forest and woodland communities, and so lends itself to this theme.

5.4 Key Strategies

- Determine the current mix of species and genera from the tree inventory. Analyse potential risks of whole species failure.
- Set goals for minimising the risk of loss through disease –e.g. no more than 20% of one genera, no more than 10% of an individual species.
- Undertake regular monitoring to detect any new outbreaks of pests and diseases. Record issues in the Tree Inventory.

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