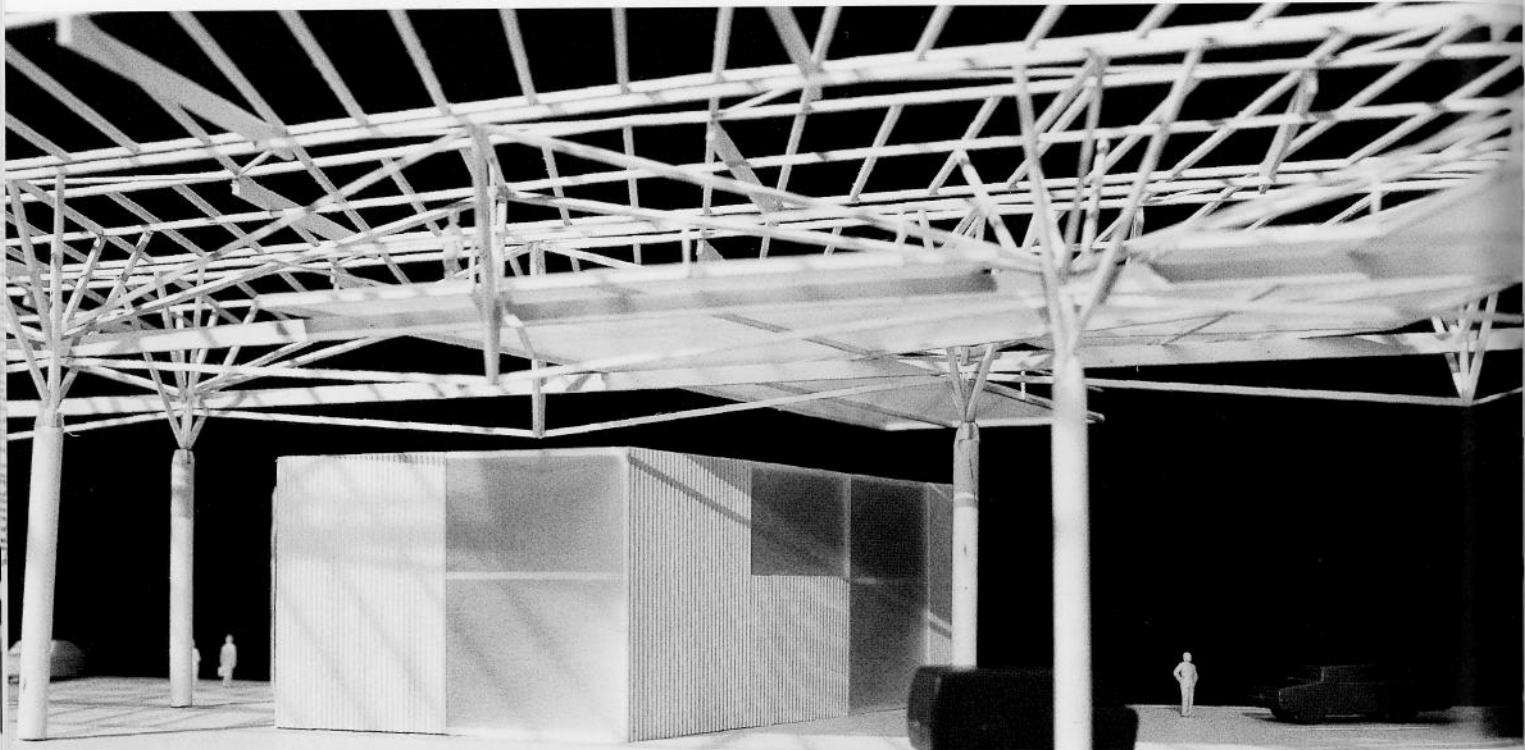


Logistical Activities Zone, Barcelona



COMPETITION, 1996

ARCHITECT: Stan Allen

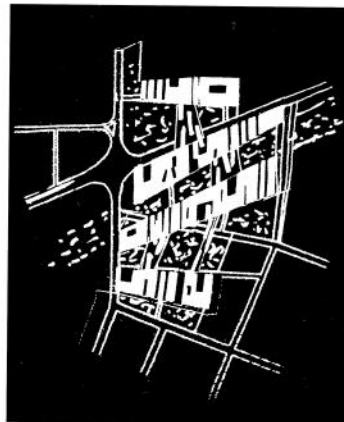
ASSISTED BY: Céline Parmentier, Tsuto Sakamoto,
Adriana Nacheva, and Troels Rugbjerg

User's Manual research and layout by Nona Yehia

The municipality of Barcelona intends to divert the Llobregat River and extend its existing port facilities. An open international competition was held in 1996 for the Logistical Activities Zone (ZAL) adjacent to the new port area. We took this competition as an opportunity to examine the potentials of an infrastructural urbanism. Our design strategy consisted of setting down the traces of an architectural infrastructure that would allow flexible development while maintaining unified identity: a directed field within which the future life of the site could unfold; an architectural means to impose minimal although precise limits on future construction.

Refusing the chaos of the suburban landscape without resorting to nostalgic urban patterns, we sought an order specific to the open zones at the edge of the city. Two prototypical strategies were proposed: a division of land that recognizes the presence of nature and maintains open green space; a continuous architectural infrastructure that will allow flexible development while maintaining unified identity.

Although developed initially by means of conventional representational techniques (plans, sections, and models) the elaboration of the project required new representational strategies. The diagrams, maps, scores, and scripts that anticipate the event structure of the site over time have been compiled into a *User's Manual*. In the infrastructural approach, limits to future development are set materially, and not through codes, zoning, or bureaucratic limits. Hence, the role of the notational schemas collected here is not to set limits but to imagine multiple program scenarios and to



LEFT: Sketch of structure

OPPOSITE: Model: infrastructural roof

chart their interaction. These notations do not so much map an exact correspondence between architecture and activity as articulate a degree of play between form and event, a loose fit of organization and program.

1. SURFACES

Borrowing a concept from landscape ecology, the given surface area of the site is organized into *patches* and *corridors*. *Patches* are defined as nonlinear surface areas—in this case either green areas where a return to indigenous habitat is encouraged or built-up areas to accommodate the new programs.¹ *Corridors* are infrastructural pathways containing movement, services, and function. The superposition of these two systems creates a mosaic of natural and artificial surfaces.

2. MOVEMENT

Boundary and through roads are connected into the present system of urban circulation. To facilitate connection with the ZAL, the primary circulation is on uninterrupted east-west routes. Secondary circulation is by means of local connecting roads aligned with the disjunctive network of patches. Pedestrian movement is at an upper level within the depths of trusses supporting a continuous roof structure.

3. PROGRAM

Four broad programmatic categories are proposed: *work* (workshops and ateliers for artists and artisans); *display* (showrooms and other exhibition facilities), *service* (vehicle services, hotel and office space); and *recreation* (sports facilities and open green spaces for leisure and events). Individual patches are programmed in relation to access, adjacency, and proximity to services.

4. PATCH TYPOLOGIES

Instead of specific design proposals for future occupation of the site, a series of loose organizational typologies are proposed. Depending on density and organization, patches might function as habitat, barrier, filter, source, or sink for future activity. Scale and density of architectural occupation in turn suggests possible programs.

5. INFRASTRUCTURE

The architectural space of the patches is articulated by a continuous roof structure supported on a regular grid of thin steel



LEFT: View of existing site

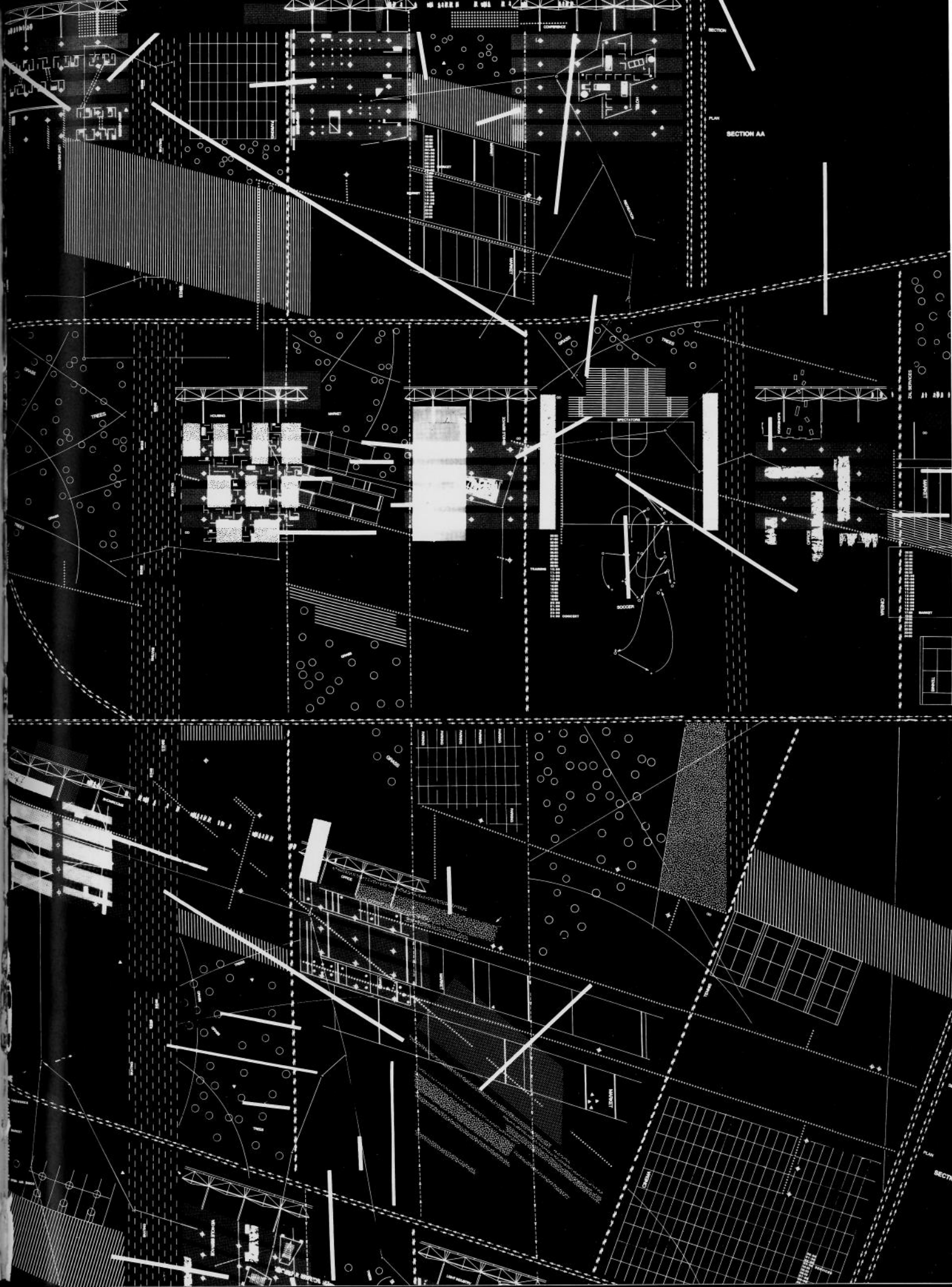
OPPOSITE: Plan: montage of scenarios

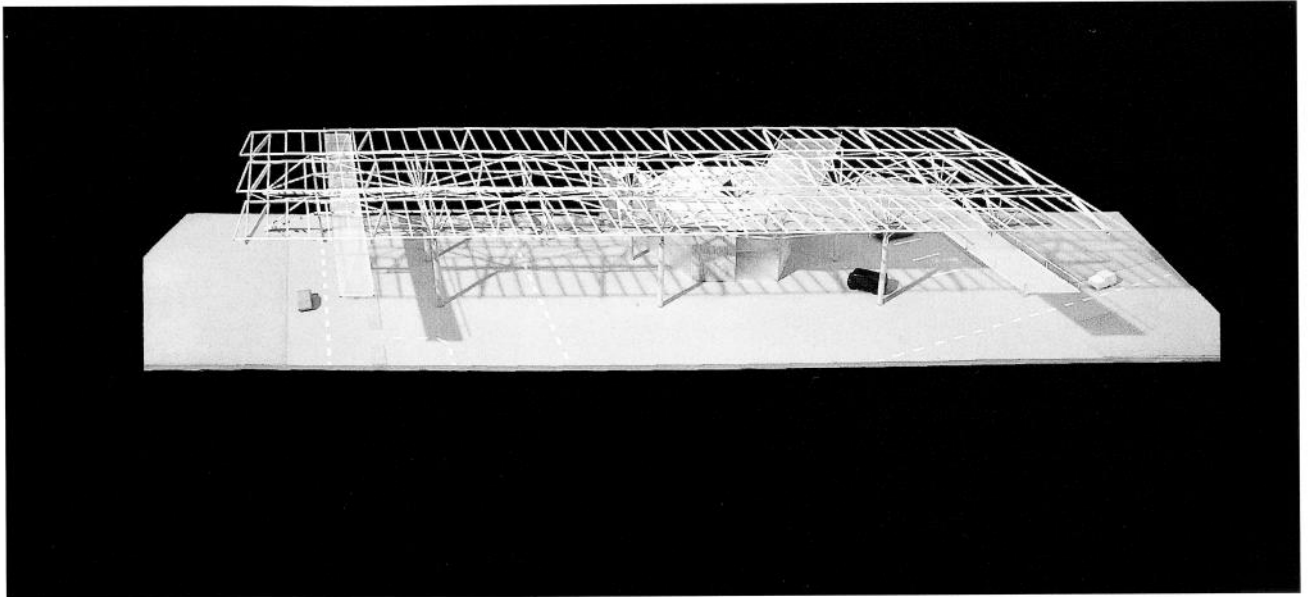
columns. This infrastructural element is adaptable and flexible. A lightweight fabric covering can be added to shelter public spaces or outdoor service areas, and where buildings are proposed it can be integrated into the structural system as sunbreak or service space.

Taking an optimistic view of the future of the site, this project anticipates the participation of different architects, agencies, and individuals in the construction of the site. It seeks to establish a realistic framework within which these collective contributions can be organized and coordinated. Working not with the bureaucratic tools of zoning—regulations or codes—it seeks to establish precise technical and instrumental limits to future construction. By creating a structured field condition that is architecturally specific yet programatically indeterminate, the future life of the site is free to unfold beyond the fixed limits of a masterplan.

NOTES

1. "We may define *patch* as a non-linear surface area differing in appearance from its surroundings....Patches are often embedded in a *matrix*, a surrounding area that has a different species, structure, or occupation." Richard T. T. Forman and Michael Godron, *Landscape Ecology* (New York: Wiley, 1986), 83.

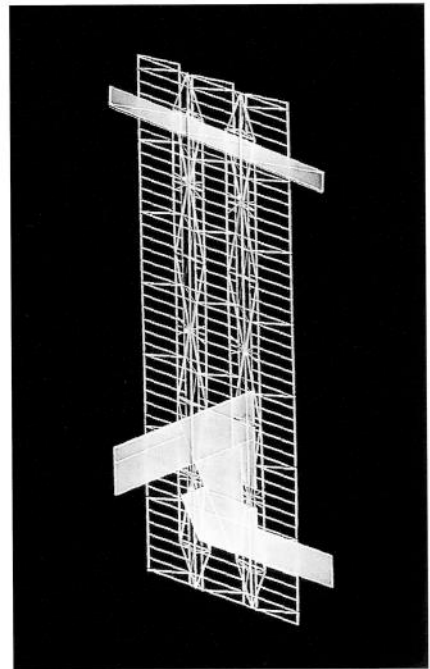




ABOVE: Partial model

RIGHT: Roof from below

OPPOSITE AND FOLLOWING PAGES: *User's Manual*



1 surface

division and allocation of surfaces

- 1A Patches
- 1B Matrix
- 1C Mosaic
- 1D Extent

2 service

provision of services to support future programs

- 2A Pathways
- 2B Program
- 2C Flow / Movement / Exchange
- 2D Service Grids

3 organization

spatial and formal models

- 3A Edges and Boundaries
- 3B Affiliation
- 3C Corridors and Connectivity
- 4D Networks

barcelona manual

4 structure

catalog of tectonic variations

- 4A Infrastructural Roof
- 4B Occupied Structure
- 4C Space / Frame
- 4D Roof Typologies

5 repetition

typologies and programs

- 5A Detail Design Elements
- 5B Patch Typologies 1
- 5C Patch Typologies 2
- 5D Fields - variation / repetition

6 anticipation

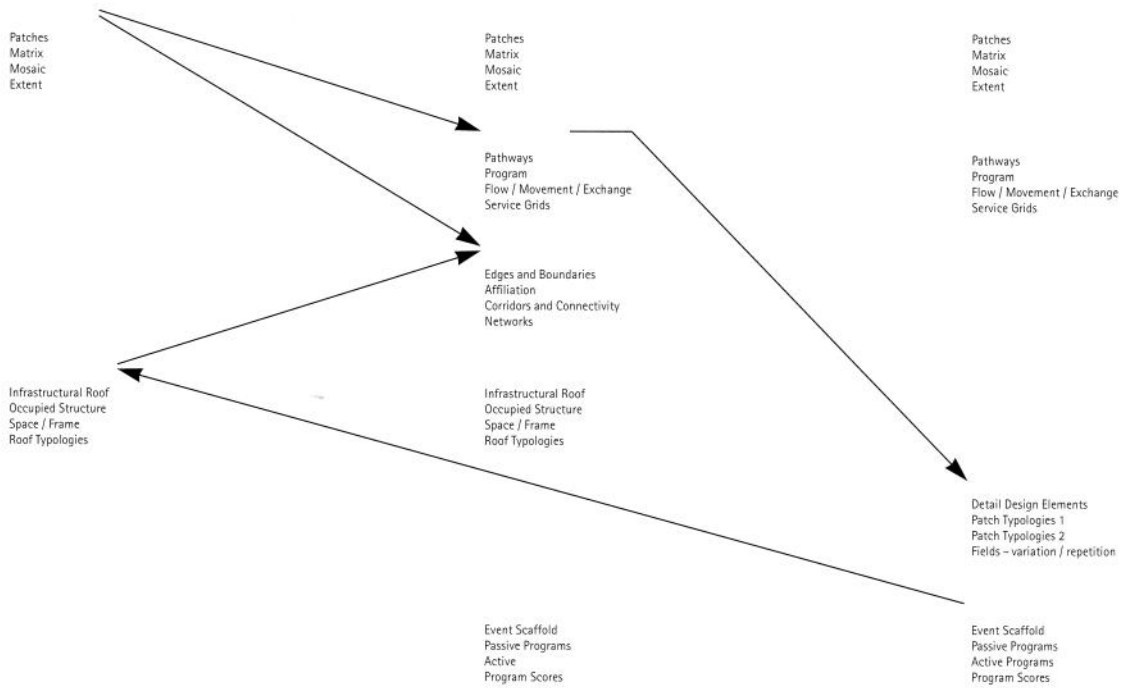
changing life of the site in time

- 6A Event Scaffold
- 6B Passive Programs
- 6C Active
- 6D Program Scores

STRUCTURE

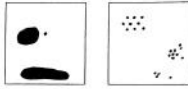
FUNCTIONING

CHANGE

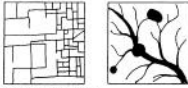


1A SURFACE PATCHES

a. Scattered patch landscapes



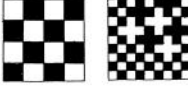
b. Network landscapes



c. Interdigitated landscapes

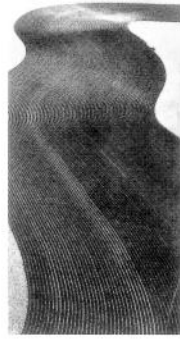


d. Checkerboard landscapes



RICHARD T.T. FORMAN
PATCH TYPOLOGIES

a nonlinear surface area differing in appearance from its surroundings.
 the density of patches, or the fineness of a mosaic;
 an area that has been disturbed within a matrix.
 the rate of appearance and disappearance of patches.
 an area caused by an animal social behavior or by low-intensity, short-lived fluctuations in environmental factors within a matrix.



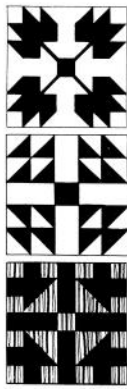
LEGEND
 LOCATION PLAN

1. Infrastructure works not so much to propose specific buildings on given sites, but to construct the site itself. Infrastructure prepares the ground for future building, and creates the conditions for future events. Its primary modes of operation are:

1. The division, allocation and construction of surfaces
2. The provision of services to support future programs
3. The establishment of networks for movement, communication and exchange

Infrastructure's medium is geography.

1B SURFACE MATRIX



QUILTING PATTERNS



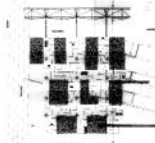
GREEN MATRIX

PATCHES + CORRIDORS

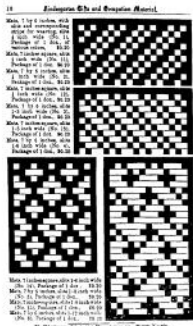
an area that becomes free of disturbance within a chronically disturbed matrix.
 the rate of appearance and disappearance of patches.
 a table of replacement rates over a time period for all landscape elements present
 a landscape with a densely built-up matrix.



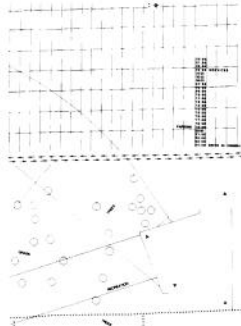
Figure 1-10



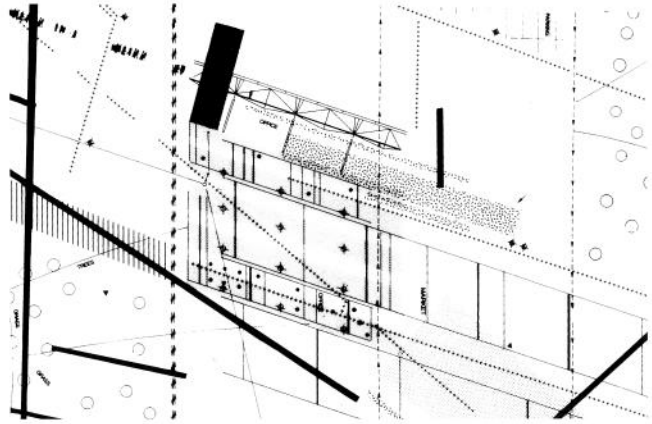
1C SURFACE MOSAIC



FROEBEL PATTERNS



PLAN DETAILS / PROGRAM SCENARIOS
EVENT FIELD



PLAN DETAILS / PROGRAM SCENARIOS
OFFICE PATCH / GREEN SPACE

a tract of patches of different aged trees,
a system exhibiting a pattern of long-term
change along with short-term internal adjustments,
a state of being in equilibrium fluctuating around a
central position, but susceptible to being diverted to
another equilibrium,
methods that concurrently analyze many
factors, plus the relationship among factors.



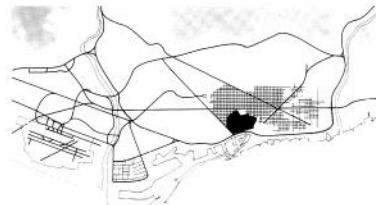
HILBERSEIMER
SITE PLAN OF HYDE PARK

1D SURFACE EXTENT



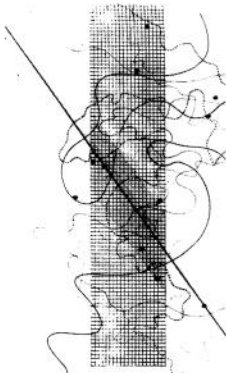
OVERVIEW OF SITE

a pattern where species distributions are related to
the width of a landscape element,
the establishment, and usually defense, of a
certain small area (territory) against intrusions by other
individuals of the same species,
a map that accurately represents a spatial
ordering, but is not proportional to the distance and the
length of time necessary to cover a route. Also, a geometry
dealing with the continuous connections between points
of a figure.



URBAN CONTEXT DIAGRAM

2A SERVICE PATHWAYS



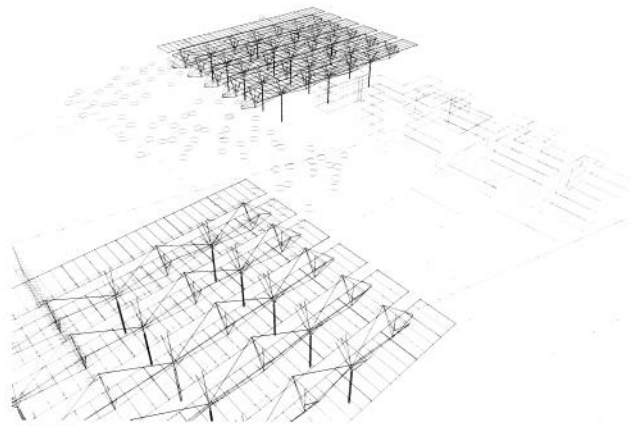
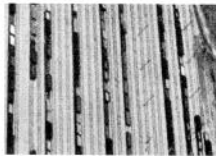
JOHN CAGE'S SCORE FOR FONTANA MIX

NOTATIONS:
Traditional representations presume stable objects and fixed subjects. But the contemporary city is not reducible to an artifact. The city is a place where visible and invisible streams of information, capital and subjects, intersect in complex formations. They form a dispersed field, a network of flows. In order to describe or to intervene in this new field we need representational techniques that engage time and change, shifting scales, mobile points of view and multiple programs. In order to map this complexity, some measure of control may have to be relinquished. To open architectural representation to the score, the map, the diagram and the script could establish a basis for exchange with other disciplines such as film, music and performance. The score allows for the simultaneous presentation and interplay of information in diverse scales, on shifting coordinates and even of differing linguistic codes. The script allows the designer to engage program, event and time on specifically architectural terms. New maps and diagrams might begin to suggest new ways of working with the complex dynamics of the contemporary city.



SCORE FOR STOKER'S ZULUS

the degree to which circuit loops in a network are present.
the combination of network connectivity and continuity.
the degree to which all nodes in a system are linked by links.



AERIAL VIEW

2. Infrastructural work recognizes the collective nature of the city, and allows for the participation of multiple authors. Infrastructures give direction to future work in the city not by the establishment of rules or codes (top-down), but by fixing points of service, access and structure (bottom-up). Infrastructure creates a directional field, where different architects and designers can contribute, but it sets technical and instrumental limits to their work. Infrastructure itself works strategically, but it encourages tactical improvisation.

80

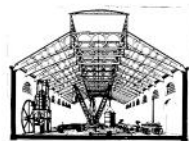
2B SERVICE PROGRAM



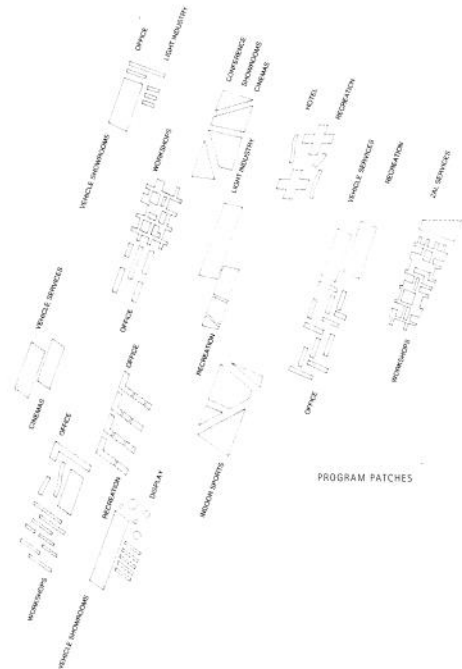
MARKET SERVICES



a measure of how many comparative examples of a characteristic exist at different levels of scale, from the local to the global.
the ability of a system, when subjected to an environmental change or potential disturbance, to withstand or resist variation.



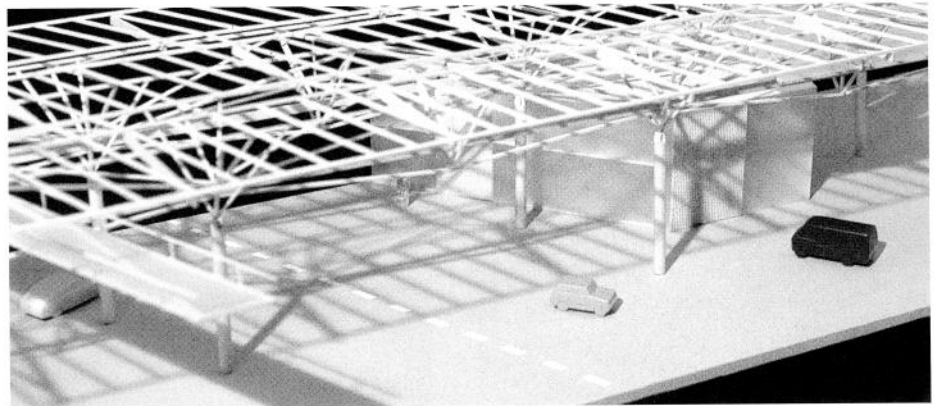
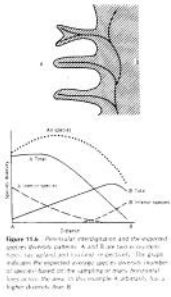
ERECTING SHOP



PROGRAM PATCHES

2C SERVICE

FLOW / MOVEMENT / EXCHANGE



MODEL DETAIL



RAILWAY INTERCHANGE



KAHN FLOW DIAGRAM

2. Although static in and of themselves, infrastructures organize and manage complex systems of flow, movement and exchange. Not only do they provide a network of pathways, they also work through systems of locks, gates and valves - a series of checks that control and regulate flow.

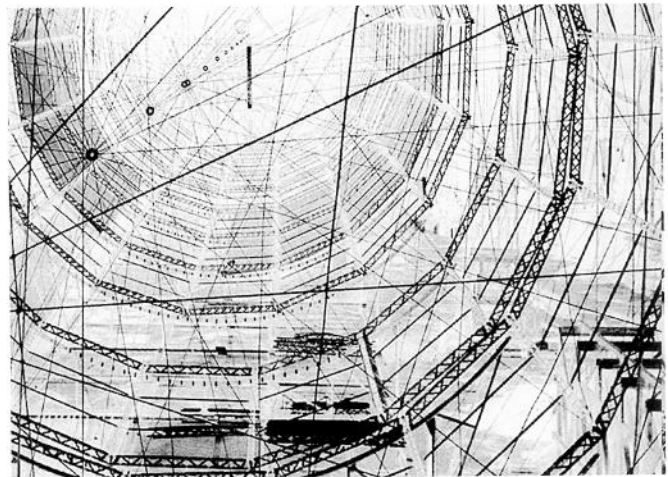
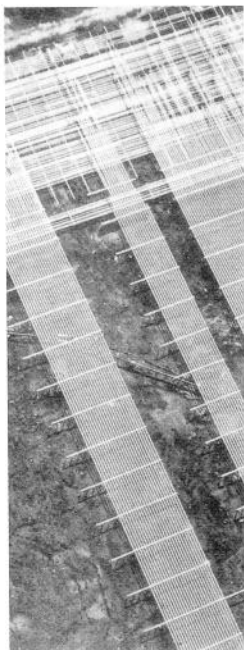
2D SERVICE

SERVICE GRIDS

a process by which objects leave one area and spread to another area.
 a process by which objects extend their area of coverage while continuing to occupy the original position.
 an event or characteristic that has a direct or relatively direct effect on an organism.



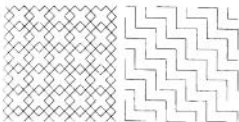
PEDESTRIAN WALKWAY



3A ORGANIZATION

EDGES + BOUNDARIES

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50



QUILTING PATTERNS



4. Crystal pattern, from *Urban Atlas*, Der Kristallbau, A. Juchacz, 1911, in *AG, n. 13*, Phoro, *Journal of Landscape*, Mon van der Balde

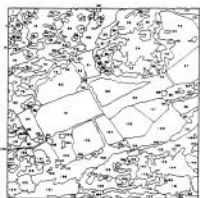
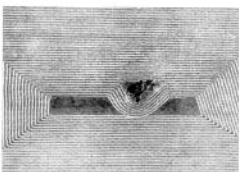


Figure 22. Pieter van der Balde

a distinctive species composition or relative abundance in the same kind of a patch (i.e., different from the species composition or relative abundance of the patch interior), the degree of abruptness between landscape elements, the effect of the edge on flows, analogous to a semipermeable membrane.



AERIAL PHOTOGRAPH OF SITE

3. Infrastructures accommodate local contingency while maintaining overall continuity. In the design of highways, bridges, canals or aqueducts, for example, an extensive catalogue of strategies exist to accommodate irregularities in the terrain (doglegs, viaducts, cloverleaves, switchbacks, etc.) which are creatively employed to accommodate existing conditions while maintaining functional continuity. Infrastructure's default condition is regularity - in the desert, the highway runs straight. Infrastructures are above all pragmatic. Because it operates instrumentally, infrastructural design is indifferent to formal debates. Invested neither in (ideal) regularity or in (disjunctive) irregularity, the designer is free to employ whatever works in the particular conditions.

3B ORGANIZATION

AFFILIATION

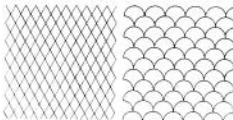
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

PERFORMANCE:

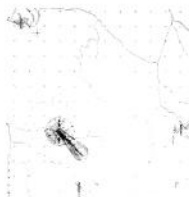
This project marks a shift away from issues of representation to engage architecture as a MATERIAL PRACTICE. Material practices, technology or engineering (for example) do not work primarily with images or meaning but with PERFORMANCE: energy inputs and outputs, the calibration of force and resistance. They are less concerned with what things look like and more concerned with what they can do. Material practices do not attempt to control or predetermine meaning. Instead, they go beyond the paradoxes of the linguistic to examine the effects of signifying practices on performance and behavior. Although these material practices work instrumentally, they are not limited to the direct manipulation of given material. Instead they project transformations of reality by means of abstract techniques such as notation, simulation or calculation.



DRAINAGE DENSITIES

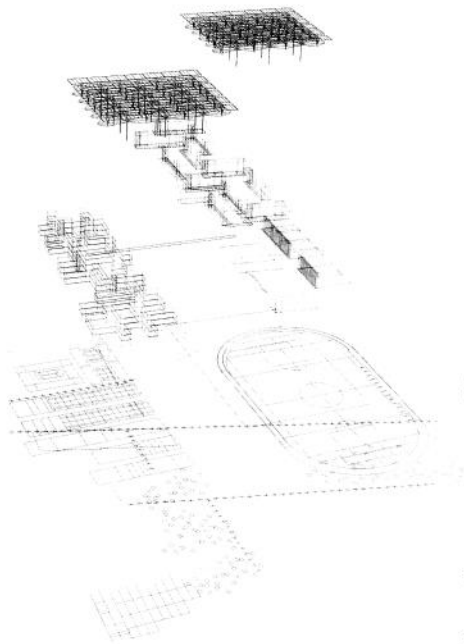


QUILTING PATTERNS



DECENTRALIZATION DIAGRAM

layers or strands of air mixing in parallel fashion, one on top of another, a location where three or more types of landscape elements intersect, a line similar separating two types of landscape elements, thus providing three types in those proximity.



INFRASTRUCTURAL ROOF

PINWHEEL TYPOLOGY: OFFICES

BLOCK TYPOLOGY: LIGHT INDUSTRIAL

MAT TYPOLOGY: ARTISANS HOUSING + WORKSHOPS

SURFACE PATCHES

PARTIAL SITE AXONOMETRIC

3C ORGANIZATION

CORRIDORS + CONNECTIVITY



PAVED SURFACES



MOVEMENT NOTATION

a wide band with a central interior enhancement that contains an abundance of interior species, ecological conditions being modified significantly by the presence of an interconnection of corridors.
 a narrow band essentially dominated throughout by edge species.
 a narrow strip of land that differs from the matrix on either side.
 selective absorption or blocking that prevents objects from crossing a corridor.

11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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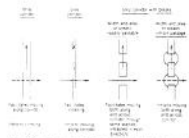
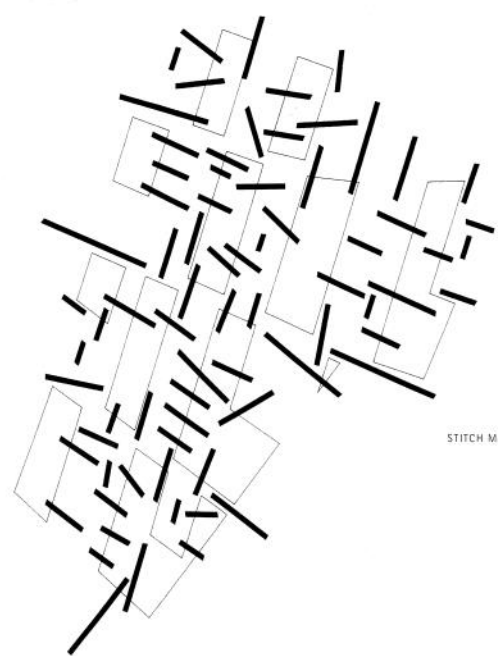


Figure 11.3. Form of junction with directional movement within a network. The shaded area indicates conditions of movement and velocity for the central movement of traffic along from Figure 11.2. (Source: author's design.)



STITCH MAP

3D ORGANIZATION

NETWORK

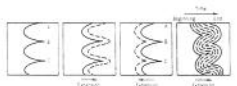


Figure 11.4. Corridor and convex boundaries, as defined on left with (clockwise from top) network boundaries. To change the indicator the size, number of corners in SE groups. (A) Dashed line indicates the two nodes as marked on right panels. (B) Lower line: the circular shape of the spreading element at the facilities corner.

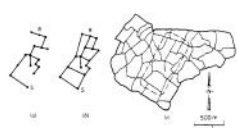
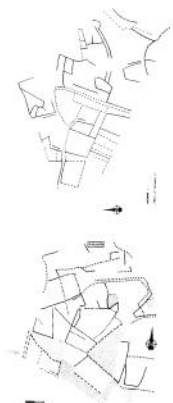


Figure 11.12. Two networks in topological space that differ in both connectivity and density. Scale indices are given in the text for evaluating the amount of both variables that together are a measure of network complexity. Network is represented the dotted area of map c, indicating hedgerow of a medieval field pattern in Devon, England. This form of late Saxon origin is shown in the Domestick Book of 1386, probably as parsonland. The characteristic small and regular fields were created in the following century, adapted from Hodson, 1985.

11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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SITE NETWORKS

the degree to which circuit loops in a network are present.
 the visualization of network connectivity and density.
 the degree to which all nodes in a system are linked by corridors.

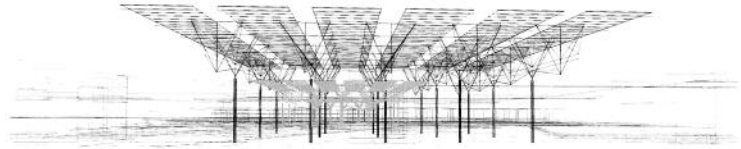
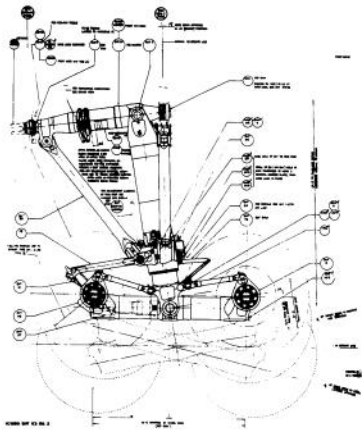


Figure 11.7. TWO NETWORK CATEGORIES: BRANCHING NETWORKS (A) WITHOUT CLOSED LOOPS AND CIRCUIT NETWORKS (WITH CLOSED LOOPS).

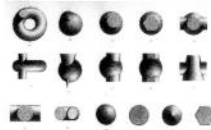
4. Formal description of infrastructural systems: infrastructures tend to be hierarchical and tree-like, however there are effects of scale - a capillary effect when the elements get very numerous and very small - and the effects of synergy, when systems overlap and interchange, both of which tend to produce field conditions that work against an exclusively vectorial organization of infrastructural systems.

4A STRUCTURE

INFRASTRUCTURAL ROOF



A structure composed of linear features that intersect and form circuits or loops, a threshold above which a force destabilizes a system, the intensities, frequencies, and types of perturbations (anthropocentric) characterizing such ecosystem type in a cluster of ecosystem types.

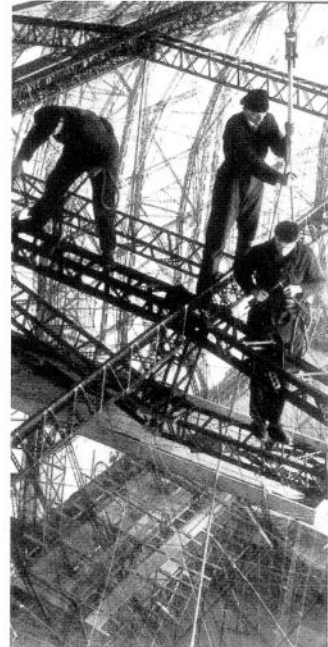
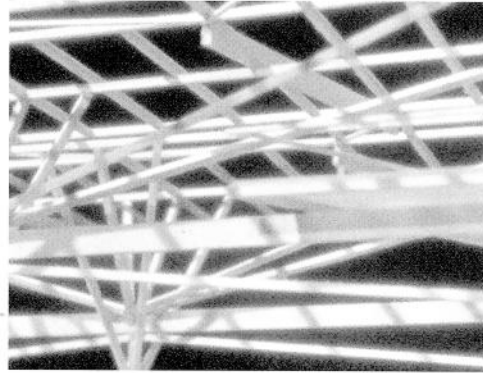
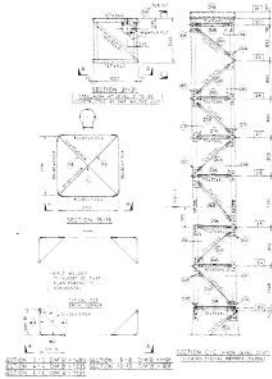


4. Infrastructural systems work like artificial ecologies. They manage the flows of energy and resources on a site, and direct the density and distribution of habitat. They create the conditions necessary to respond to incremental adjustments in resource availability, and modify status of inhabitation in response to changing environmental conditions.

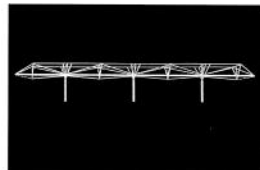
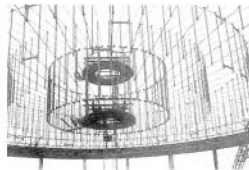
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4B STRUCTURE

OCCUPIED STRUCTURE

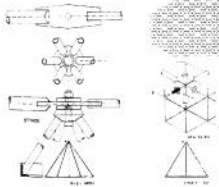
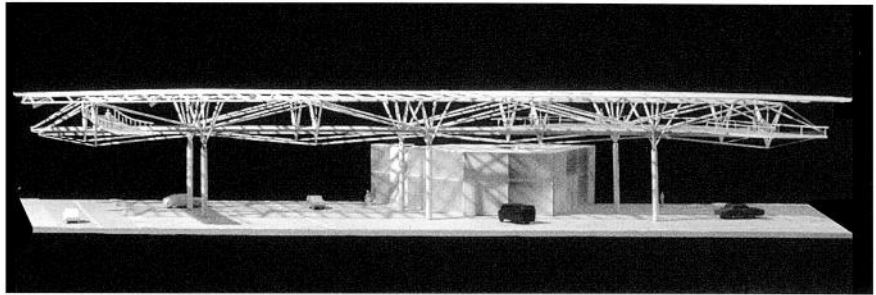
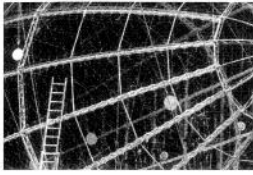


gradually increasing in biomass or structure, the amounts of organic matter, acidity, and results present that affect the aggregation of soil particles, the study of the behavior of, and interactions among components in a model of a complex system, an operation in which the parts or elements of an object are transformed into new forms when combined.

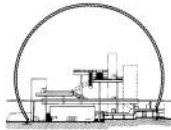


4C STRUCTURE

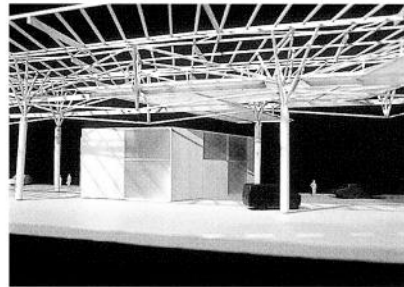
SPACE / FRAME



a patch attached to a conoid, both of the same landscape element type.
an intersection of conoids, and a source or sink of flows of objects



FULLER WORLD EXPOSITION



4D STRUCTURE

ROOF TYPOLOGIES

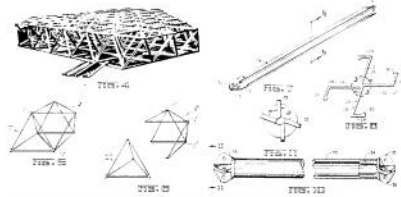


FIG. 1a
FIG. 1b
FIG. 2
FIG. 3
FIG. 4
FIG. 5
FIG. 6
FIG. 7
FIG. 8
FIG. 9
FIG. 10
FIG. 11
FIG. 12

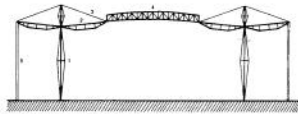
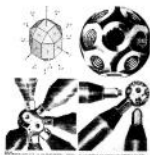
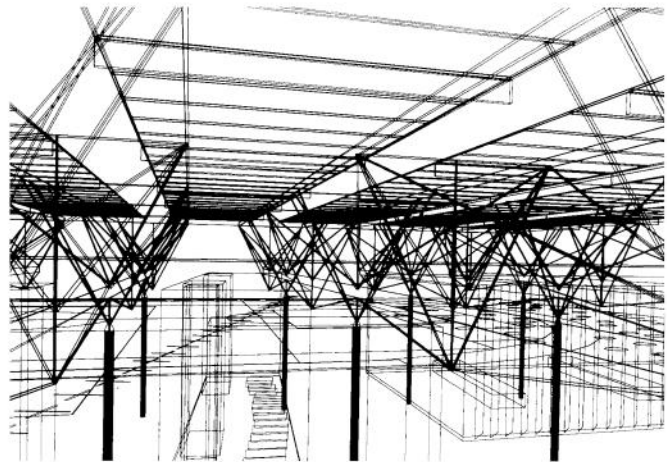


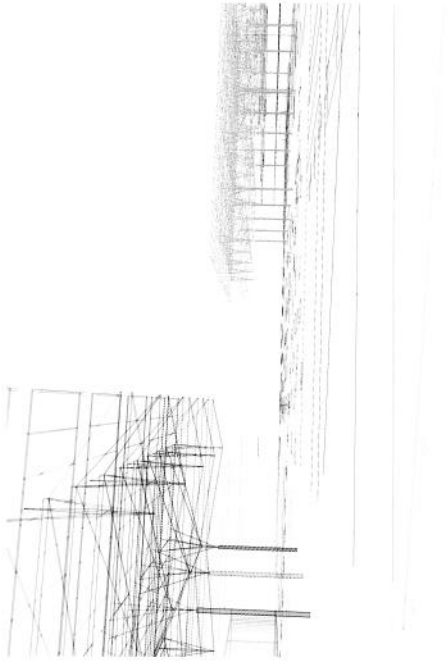
FIG. 13
The construction is interesting from the aspect in which the point where affected elements, roof trusses, arches, and the steel supports by enclosing the entire structure, plus the relationships among the factors.



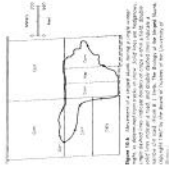
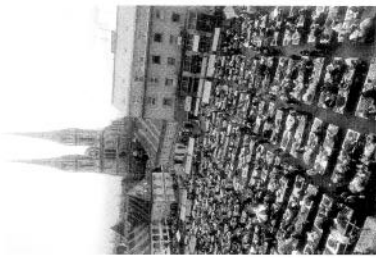
a threshold of force below which a system returns to its original state and above which it is somewhat deformed.
a sequence of sets composed of smaller subsets.
methods that concurrently analyze many factors, plus the relationships among the factors.
a measure of stability, referring to the time period during which a certain characteristic continues to be present at a given level.



6A ANTICIPATION EVENT SCAFFOLD

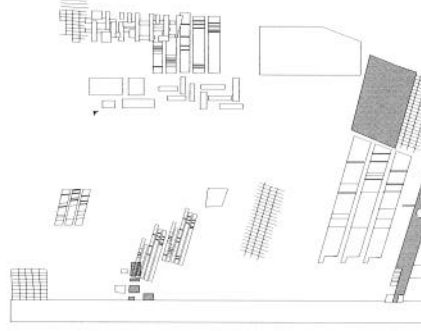


The maximum number of individuals or maximum biomass that a system can support is limited by the amount of resources available. The capacity of a system is only altered if those

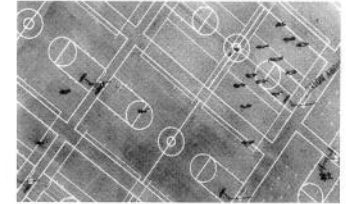


6. Infrastructures are flexible and anticipatory. They work with time and are open to change. By specifying what must be fixed and what is subject to change, they can be precise and indeterminate at the same time. They work through management and cultivation, changing slowly to adjust to shifting conditions. They do not progress toward a predetermined state (as with master planning strategies), but are always evolving within a loose envelope of constraints.

6B ANTICIPATION PASSIVE PROGRAMS



ANTICIPATION: Notations describe a work that is yet to be realized. Even if already performed, the work described is open to interpretation and change on the course of future performance. In a sense, notation is optimistic and anticipatory. Unlike master planning, which prescribes functions do not map or represent already existing objects or systems but anticipate new organizations and specify yet to be realized relationships. Notation is not about interpretation, critique or commentary. These practices utilize mandatory discursive capacities to describe a work that is yet to be realized. Possibility lies in the possibility of proposing alternative realities. Notation's special properties can be exploited by the urban designer to produce a kind of "directed indeterminacy" or proposals that are robust and specific to support multiple interpretations.



6C ANTICIPATION

ACTIVE

PERFORMANCE:

This project marks a shift away from issues of representation, to engage architecture as a material practice. Material practices, (ecology, or engineering for example) do not work primarily with images or meaning but with performance: energy inputs and outputs, the calibration of force and resistance. They are less concerned with what things look like and more concerned with what they can do. Material practices do not attempt to control or predetermine meaning. Instead, they go beyond the paradigms of the linguistic to examine the effects of signifying practices on performance and behavior. Although these material practices work instrumentally, they are not limited to the direct manipulation of given material. Instead they project transformations of reality by means of abstract techniques such as notation, simulation or calculation.

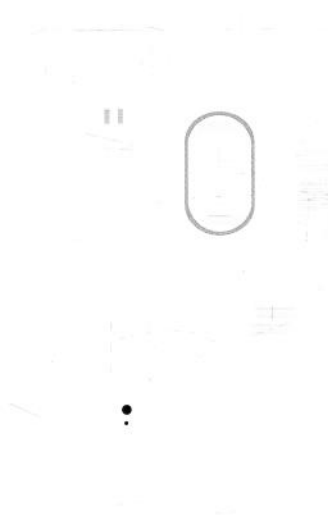


a measure of stability, referring to the time period during which a certain characteristic continues to be present at a given level.

the condition in which a landscape subjected to severe disturbance does not return fully to its previous maximum level.

survival of species with irregular fluctuations because of disturbance or unpredictable historical events.

a process of increasing efficiency or planning for increased efficiency, usually one among several characteristics.



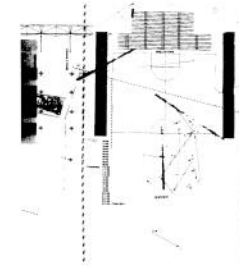
ACTIVE PROGRAMS

6D ANTICIPATION

PROGRAM SCORES

COLLECTIVE:

Notations presume a social context, and shared conventions of interpretation. The score is not a work itself, but a set of instructions for performing a work. A score cannot be a private language. It works instrumentally to coordinate the actions of multiple performers who collectively produce the work as event. As a model for operating in the city, the collective character of notation is highly suggestive. Going beyond transcription and cross-programming, notations could function to map the complex and indeterminate theater of everyday life in the city. The use of notation might provoke a shift from the production of space to the performance of space.

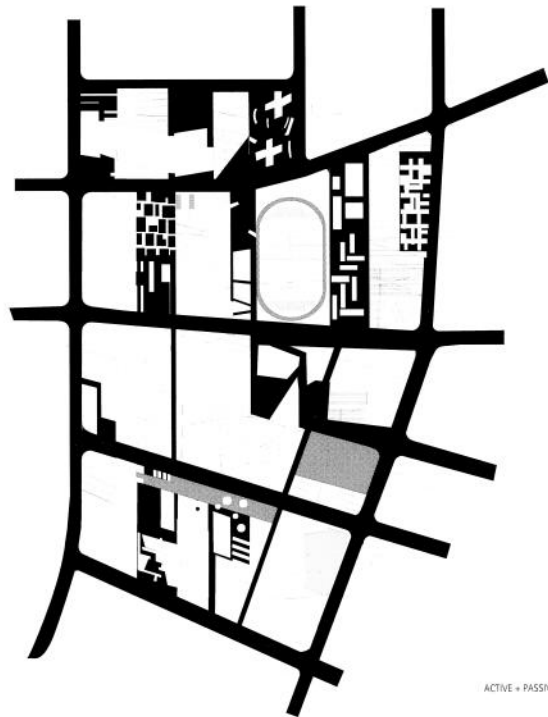


a process of forming a number of cities surrounded by suburbs.

the particular species present, for example in a community.

changes in a community due to colonization, extinction, and population size fluctuation.

generate locally large forms which species come in succession.



ACTIVE + PASSIVE PROGRAMS