THE PARCEL C-2: DESIGN FOR CHANGE

by

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ABSTRACT

Parcel C-2, Design for Change


The subject of this thesis is the relationship of building design and technology to the process of change to which every building, in a fixed location, is subject. Part I will examine the relationship of building structure to mechanical services, and to a number of other building elements, and attempt to identify both those parts of the building most subject to change, and those which have relatively fixed requirements over time. Part II is an evaluation of an existing group of warehouse buildings on B.R.A. Parcel "C-2" in the North End of Boston, with particular emphasis on both the changing and fixed physical requirements of the buildings as the area's needs change over time. Part III is a design proposal for this site, using a general B.R.A. program with special emphasis on the ability of the buildings to adapt to the changes mentioned in Part I.

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Introduction

One of the more traditional roles of the architect in society has been to express the goals and desires of man in a built environment which transcends his mortal term. As we are endowed with ever more lasting materials and improved techniques, this aspiration in building can easily be realized, and yet the architect has assumed another role, that of satisfying in his building the ever changing needs and requirements of his client. There are two reasons why I would like to examine this conflict: the first being I do not think we can afford to produce buildings by present methods, of a life span less than their material capability and still pursue an environmentally sound policy toward the growth or supply of the requisite resources. Wood, metal, and even sand, are either a limited resource or damage other resources in their use and extraction. Concrete, plastic, and other synthetics are impossible to recycle, and are a permanent non-useable refuse, in any other than their original form. About the only ecologically sound building material, given a building life span of forty years, is paper.

The other reason is more related to the traditional role of the architect, in that he must provide buildings that
are not only useable, and satisfy their immediate needs, but express a continuity of society and culture for which his client may not care, much less finance. Not only must he analyze the existing needs of his clients, but the needs of the society which must either use or dispose of his buildings. He has the responsibility of making buildings and spaces which may acquire values beyond their use, and therefore must adapt both to these uses, and be able to retain the associations of place and the non-physical values which are ascribed to them.

In order to examine some of these issues I have selected a site in the North End, designated by the B.R.A. as Parcel C - 2. After examining some of the general aspects of change, I will evaluate both the existing buildings on the site, and various options for new construction. It is my hope that these designs will resolve some of the issues which I explore in the first part, and will perhaps indicate further solutions, and ultimately develop a way of designing, which in its attitude toward change, will resolve the paradox of fixed form, and changing human requirements.
ASPECTS OF CHANGE (1)

The process of change and renewal in urban architecture has always been carried out on an ad-hoc basis. In the past, a natural disaster in the form of fire or flood, or man-made war and destruction, or simply neglect would ensure that growing and shifting populations would always be able to fashion the urban environment most suited to their needs. Fortunately, these needs had, in those times, changed at a glacial pace, whereas we now find that these traditional methods of neglect are no longer quick enough, or that natural disasters are no longer as serious as they once were in order to accommodate a growing mobility and propensity for change. The architect is confronted with an extreme dilemma: how on the one hand to accommodate to the rapidly changing social and physical needs caused by rampant technology, and at the same time to utilize this technology to produce ever more permanent and lasting buildings.

In certain building types, these changes are felt more rapidly than in other. Hospitals, for example, are required to respond to continual advances and changes in medical technology and practice which schools are required to reflect the most recent developments in educational theory.
Commercial, office, and factory buildings must respond to economic needs, and, even in the past, have always outlasted the particular need for which they were intended. Large, undefined spaces, modular services, and moveable partitions are all techniques for providing flexibility, but only in a given area's limited confines. By further integrating the services required, and defining more specialized functions, buildings become by and large less adaptable than before, and yet are built of longer lasting, more durable materials. In order to resolve this paradox, I will try to identify some of those elements which tend to define a particular building's use, and separate these from the architectural features which are common to all building types.

The most obvious and far-reaching impact of technology in building has been in the provision of mechanical and electrical services. Every building is provided with services in relation to its use, primarily to satisfy certain basic human needs. Anything that is required to satisfy these needs of light, air, water, and heat can be included in the term services. In relatively recent times, nearly every structure built in this country has been supplied with some kind of heating system, gas, electricity, running water, and sanitary waste facilities. Many buildings
have centralized air conditioning and elevators. While the immediate impact of this technology was to render existing building forms more habitable and convenient, there is a more long-range effect. By using sufficient services and environmental controls, the interior environment of the building is no longer dependent on its relation to exterior conditions of light and air, or to individual sources of water and power. Since all these needs can be supplied to any area of a building, regardless of its edge condition, it is possible to make any interior space in a building habitable and useful for human beings. Overall building dimensions and heights are no longer limited, and a whole new range of spatial relationships are now possible. Complex programs and density requirements tend to govern building form to a greater degree now that the servicing of the building by natural means is no longer necessary.

There has been a massive proliferation of rather specific "building types", from offices and residential buildings to more specialized school and industrial buildings. Each one of these has evolved its own particular form, based on constantly changing requirements. In the pre-industrial urban building, a place of business was often one's residence, and only rarely did a specific type of industrial building
evolve. Even in the early industrial age, mill buildings had the dimensions of residential buildings, and even utilized residential decorative elements, as if to make their presence more acceptable.

Except in cases where the gross building size and structure becomes inordinately large, these requirements of varying building types are met to a large degree by the variations in mechanical services provided. Levels of lighting and air conditioning, and location of plumbing, will vary from an office building to an apartment; a factory may have very specific services; hospitals and schools may have different requirements from one year to the next. In short, the long term utility of the building shell, which makes up 75% of the total cost, is severely hampered by its ability to adapt to changing needs by its mechanical systems.

Assume that the requirements for the mechanical systems, in terms of performance and distribution, do not change significantly. There are two other factors effecting their life span which also have little relation to the utility of the building shell: these are economic obsolescence, in terms of operating costs, and deterioration.

In the first case, either all or part of the system may be effected. It is possible to replace a coal fired
furnace with oil, but for optimal performance all the radiators should be replaced, with the newer, smaller tube design. In air conditioning systems, one could easily have to replace the entire system to allow for more efficient operation. While the actual quality of performance would not be effected, it becomes economically more feasible to replace the system (or the building) than to operate it.

Deterioration of a mechanical system is particularly common in residential and small office structures, where requirements and functional changes are not important, and the system remains economical. Moreover, it is often a deteriorated pipe or faulty electrical insulation which causes water or fire damage to an otherwise sound building. This damage may effect not only finish but structure. On the other hand, given the experience of many rehabilitation projects, it is usually possible to find sound structure and finishes, only to have to refinish the interiors to replace and conceal the mechanical and electrical service.

There are a number of architectural implications for the physical provision of mechanical systems which grow out of all these various considerations. One alternative is to provide temporary buildings, designed only to last the economic lifetime of its shortest-lived component. Another would be to
assume the most intensive use imaginable, and design to fit all the contingencies. The third, and by far the most practical, is to develop some sort of awareness of the range of needs, present, past and future for any particular site, and to consider as separate design elements those systems most likely to require change. In terms of mechanical systems, the function of the various elements should elicit positive attitudes toward their form and relation to the more static portions of the structure. At the same time, the rapidly changing nature of the mechanical services should dictate a conscious separation of services from other elements of structure and finish. Certain of the ideas of Louis Kahn, with regard to services, show a realization of this need, but do not reflect the changing nature of mechanical services themselves, where he regards them as contained in static elements, having a fixed relation to the building spaces. Not only is the nature of mechanical spaces and services different from the use space of the building, but it is constantly changing both in its aspect and its relation to other elements.

Consider, for example, the provision of services in the early 19th century buildings. The only integrated service elements as we define them were chimneys and windows. Light and ventilation were provided around the periphery by window
exposure, and heat was provided by a central chimney core with a fireplace in each room. Moveable, sometimes decorative elements such as chamber pots, pitchers, lanterns, candles and Franklin stoves, provided additional services but were entirely separate, self contained elements. Plumbing services and very often the kitchen were separate buildings entirely, and water was provided from a localized well. The separation of services was thus articulated in very clear terms, with an innate feeling for the differing functional requirements. The nature of the house itself remained much the same, while the various outbuildings could be altered at will.

The same attitude could be manifested today, both by self-contained servicing units, and by the treatment of core and peripheral services. By limiting the location of built-in services, to easily accessible areas, and by providing additional portable servicing elements, the dependence of a building's life span on its services could be minimized practically to nil and the overall quality of the service be constantly improved.
ASPECTS OF CHANGE (2)

In the same period that building services and environmental controls have come into widespread use, the number and character of building materials have changed also. As well as the traditional materials of stone, brick, wood, and plaster, metal, concrete, synthetics, and countless other new materials are available, and, in some cases have entirely replaced those traditionally used, even though the form and structure might remain the same. Metal studs, for example, are now used in the same way as wood; aluminum siding and asphalt shingles are applied in much the same way as their wood or slate counterparts. Not only are these newer materials often cheaper and easier to use, but in many cases have a longer life in terms of durability, or are more resistant to natural phenomena which destroy traditional materials, such as rot, fire, or moisture. Deterioration of buildings due to structural defects are also less common today, on account of standards and codes to which most builders adhere. Rule-of-thumb has given way to precise practice and we may rest assured that fewer buildings will collapse or settle into oblivion in the future. Codes also provide for increasing fire protection, and the specter of ravaging conflagrations has nearly vanished from
the urban scene.

The resulting dilemma for designers is that as materials and techniques for providing spaces and buildings improve, the needs of those spaces are changing more rapidly than ever before. Not only in terms of building mechanical services, but in the nature and location of many other building elements are these changes manifested.

I do not visualize this problem as being solved by current building and architectural practice. It will rather become more acute. In every type of building, it is possible to see how changing use patterns and technology have required different architectural treatments. While there are always specialized requirements that any building in a time or place will have to meet, perhaps there are certain elements of that building which specify its use more than others. How exactly do certain of the elements which make up a building vary in nature and location from one use to the next, or from one century to another? At every level of building, it is clear that the character of the floors, walls, stairs, windows, etc., are subject to different requirements. To the extent that we can identify the function of one of these elements, we can examine the changed to which it is subject. We have seen how mechanical systems, nearly unknown 100 years ago, have become
taken for granted, but there have been more subtle but just as profound changes and variations in certain other ways that building elements are used, and in the form that they take. By examining two major building elements, windows and stairs, I would hope to show what factors influence the form and distribution of these elements, and how, by using certain concepts of design and technology, these elements can allow the building to adapt more readily to the changed to which each of them are subject. The same sort of reasoning could be applied to all non-structural, use-defining elements such as partitions, finishes, entries, roof structures and so forth, whereby the propensity for change, and hence the physical characteristic of these elements could be determined in a more rational way.

Windows have traditionally performed a number of functions for a building. At first they were necessary for light and ventilation. More recently they have become increasingly important for view, as light and ventilation can both be artificially supplied. In the past, they tended to occupy a minimum of area, because they were non-structural. Now, for that same reason, they can cover as much or as little of the building skin as desired. In larger buildings, the need for natural light and ventilation is nil, so that windows
have become primarily a form of cladding. While they also offer a view, they are not required for this purpose. Even in smaller buildings, window function has changed somewhat, with more emphasis being placed on view, and on orientation and with greater variations in size, as structural systems change.

Similarly, the proportional amount of glass in a wall will change with the nature and location of a building. A school building will tend to have more windows than an apartment building, because of increased lighting needs, and varying privacy requirements. Windows on the south side of a building should either be smaller or have some sort of sun break. Windows often will require bars or screens to prevent vandalism.

By these and other changed in requirements, the number and form of the windows may change markedly over time or with use. The degree to which the exterior wall can accept these variations is a major factor in determining the adaptability of the building. By adding and removing bays, balconies, sun screens, etc. the entire character of the building changes.

By developing a set of interchangeable window and balcony units, certain other objectives of user selection and preference become a reality. Not only is it possible to change
the units easily as they wear out, but the actual form and
carer of the exterior wall can be altered to meet changing
requirements. Ultimately, as sealants and other materials
become more durable, the units can be reused where they
would be appropriate.

The second major element is the vertical circulation-
stairs and elevators. The change in emphasis since the devel-
openment of elevators has been responsible to a large degree
for this tendency, but there are many other factors which
effect the location, size, and configuration of stairs.

Since in many building stairs are both a primary
means of access often for different tenants, they must be
provided with a separate enclosure. Coincidentally, they are
required by most codes to be enclosed and fireproofed. As an
older building, or house, is converted for multi-unit apartment
or office space, the stairs must usually be modified to insure
privacy. In public buildings especially the stairs must
conform to regulations, and provide egress in a number of
specific locations. The degree to which this may require
major changes in the vertical circulation was clearly demon-
strated in the renovation of the Old Boston City Hall, where
a "grand staircase" was entirely removed and replaced by
elevators and fireproof enclosures. As the new spatial
configuration of each floor was devised, an entirely new set of circulation requirements came into being.

While certain building changes may require increased vertical circulation, it is often possible to remove and eliminate redundant stairs. In converting adjacent row houses, or in combining a number of adjacent small buildings into continuous spaces it is often possible to combine the vertical circulation or to replace a number of stairs with an elevator corridor. It is often required, in fact, that offices have a certain square footage on the same floor, and that this be largely uninterrupted. Changing use patterns have rendered small, multi-story buildings unsuited for many commercial uses, and indicated a need for more alternatives for horizontal as well as vertical circulation.

There are certain aspects of stairs that do not change. The actual form and function of the stair itself has not changed appreciably for centuries; neither does the floor-to-floor distance in many building types change over time. In addition, stairs are generally conceived and built as separate elements, requiring only some kind of floor penetration, and are a fairly high expense in any new building. All of these factors, coupled with the need for a certain flexibility, indicate that stair structures, in much the same
way as window units, could be made separately from the building itself, and affixed to it in some way as to be easily removed and transferred, either in the same or to another building. One approach is to create separate stair towers and structures, as Louis Kahn has done in several projects, but these are often relatively permanent elements, and have no ability in themselves to service the space in any other than the way in which they were conceived. Rather than suggest different ways in which the building can adapt over time, the fixed stair limits severely the alternate uses, and becomes a major factor in determining its useful life.

In some way it is possible to determine for each element of a building how that particular element, designed as it is for a specific program in time, has a useable life which may bear no relation to that of other parts of the building. Consider briefly the relation of furniture to a building. Designed as it is to satisfy rather specific human functions, and based on certain human dimensions, it is rather common for furniture to outlast the building which it serves. Only by its ability to be transferred in time and place does furniture endure. It would be possible, as I have mentioned, to examine roof structures, entries, interior partitions and finishes in this way. It is clear, though,
that each in its own way can either be fixed, or can adapt to a range of uses, depending on its design. For every building in a place or time, the range of alternatives is clear. For each instance there is a non-specific program for change, by which the building may outlast its creators, and acquire a life of its own, depending on its ability to change and adapt. The only degree of permanency that we can create is by our willingness to provide at this time for change, and to make it a conscious part of the building process.
ASPECTS OF CHANGE (3)

The propensity for change and flux must be considered in terms of those elements that are fixed. It is possible to provide forms that have a certain relevance for human beings independent of their specific use, and that these forms and spaces, given the proper services and access, will satisfy a number of human needs. In the same way that furniture endures as it meets the needs and dimensions of the human body, certain aspects of the building also must relate to human dimensions, if it is to be useable over time. All of the more profound architectural theorists, from Da Vinci to Le Corbusier, have been intensely concerned with human proportions a basis for building. Only by understanding this relationship can we begin to develop fixed and meaningful forms, not only in building elements, but in building relationships and urban scale.

Certain building requirements are based not on human needs but on natural phenomena: the forces which conspire to destroy the building. Foundations and structure fall into this group. Given a certain building configuration, and site, a foundation is infinitely adaptable for numerous different uses.

By being entirely below ground, it does not in any way
FOUNDATIONS

STRUCTURE

WALLS

FLOORS

SPATIAL LIMITATION OF ELEMENTS
limit either physical or visual continuity, and has no impact, by itself, on human activity. In conjunction with the ground, it must have the capacity to support a given load, and may thereby limit the extent of use imposed on it. By and large, however, its only function is to see that a certain portion of the building load is transferred to solid ground, and this function is a constant for a wide range of human uses.

The structural support, consisting of either columns or bearing walls, is, like the foundation, subject to a fairly constant demand for a wide range of uses. The structural requirements for vertical supports depends primarily on building height, and secondarily on floor loading. While most building heights are limited by codes, or the expense of elevators, wide variations exist in floor loadings. It is unlikely, however, that a public space, carrying 100 lbs/sq. ft., would be required above the ground floor and that the difference in a column or bearing wall for a 40 and a 60 lb./sq. ft. load would be insignificant in a low building.

The spacing and bay size for structure is a more complex problem, particularly with bearing walls. Each dimension seems to have its particular advantages, but certain dimensions, particularly for residential use, seem to recur. A bay size of 20-22 feet was used commonly for row houses,
of floors begins to limit the flexibility of the system. Just as column bay sizes can be derived from certain constants and human needs, so also can a minimum practical floor coverage. The primary limitation for residential use, given the range of room sizes appropriate, is that every major room should have exterior exposure for light and ventilation. This was a limitation for all building types up until the advent of artificial light and mechanical ventilation, and for certain types of buildings is not how an appropriate measure. Given a maximum room dimension for living units of 20', the largest dimension which allows light to two such rooms is 40'. Since certain interior spaces do not require such light and exposure, this can be enlarged up to 60', but beyond that becomes clearly impractical for residences. Where this is a minimum dimension, the maximum dimension, given a row configuration, becomes infinitely extendable, depending on larger site and circulation requirements.

From the most restrictive use, therefore, it is possible to make certain decisions on how building materials and design can best be provided in order to facilitate a constant renewal process. Insofar as certain constants of human needs seem to exist, it is possible to satisfy these needs, utilizing the most durable materials at our disposal.
The physical elements which must adapt to less constant needs have to be recognized with some regard to this capability, in their material, their form or both.

To ignore these concepts in building design at this point brings up a very real question of how people relate to buildings; not only in how they are used, but how they are perceived as elements on the landscape, or cityscape.

Traditionally, a fine building or house was an attempt to provide an enduring monument to one's self or one's ideas. While it is currently out of fashion to build monuments, there are certain characteristics of buildings and the spaces they define that are acquired only after a certain amount of time. They may be associations with one's self, or with generations past, or simply operational cues, but together they give a building meaning far beyond its actual design, function, or physical appearance. The ability of a building to change and adapt over time can preserve and enhance all of these cultural and social associations, whereas the physical replacement of it requires a while new set of values to be attached to the new structure. This can, obviously, be a positive influence, but only in context. We have the opportunity to use time and process as the fourth dimension, to provide a far richer environment, by providing
a range of those elements which can endure, and those which accept the inexorable process of change.
SITE EVALUATION (1)

The C - 2 Parcel proper consists of approximately 3 1/2 blocks adjacent to the North End of Boston. It is bounded on the Northwest by the Callahan Tunnel, Richmond St., and Fulton St.; on the Northeast by Lewis St. and Commercial Wharf West; on the Southwest by Mercantile and Commercial Streets; and to the Southwest by Cross St. Its area is 4.2 acres. The area is essentially flat; the average elevation being 16 feet above sea level.

The entire area was created out of land fill in Boston Harbor beginning about 1800. Up to Commercial St. was filled before 1806, with a portion of the area behind Mercantile St., upon which rests the Mercantile Wharf building, being completed before 1855.

For many years, then, until the filling to Atlantic Avenue in 1868, Commercial St. in this area was the waterfront. This same period witnessed the phenomenal growth and decline of Boston as a major East Coast port, servicing both Packet and Clipper ships through the 1860's. It is fairly easy to pinpoint the date at which the area ceased to be waterfront, although its loss of importance for that use had probably begun somewhat earlier. The buildings were originally
intended as warehouses, holding in storage all manner of goods awaiting shipment. There were doubtless many related uses to which they were put toward the end of the last century, but up until 1960, the area was used almost entirely for food processing and wholesale markets.

The buildings themselves are, with few exceptions, a standard type. The width of the lots, and hence the bay size, is 20 to 22 feet, with some as small as 15 feet. The Mercantile Wharf building has bays of 24 feet in width. The depth varies from 40 feet on the south side of Fulton St., to 100 feet in the Mercantile building. Most of the buildings are around 60 feet deep.

The structure is brick bearing party walls, from 1 to 1 1/2 feet thick. Floor beams are usually 4 x 12 s 18 inches on centers, resting on corbelling from the wall. Stairs and other openings are framed with headers picked up by 6 x 12 s at each end, all the load being carried to the bearing party wall. In several of the newer buildings, larger bays occur, with one or two lines of columns and beams in the place of the bearing wall.

The original buildings had pitched roofs, the ridge line running parallel to the street, usually with a dormer
in the center. The structure of the roof was 4 x 12 purlins about 9 feet on centers with 3" x 4" rafters 18" on centers. The roof structure rested on individual corbelling at each purlin beam. Often the fifth floor; i.e. that immediately below the roof, had a structure similar to that of the roof, rather than the typical floor. Also, the space between the eave and the first beam would be left open.

From the location of the header beams, it appears that each building had its own stairs, running in straight flights along one party wall. The usual layout was for the stair to start at the first floor front of the building, go for two flights with a landing at the second floor, and return to the front at the third floor. Often the fifth floor had only a ladder up to it.

The exterior walls are non-bearing brick about one foot thick. The first floor front is granite post and lintel, three or four bays per building. The original buildings still on the site all have three windows on each floor front and rear, with one exception, i.e. the 15' bay which has two. The central window in the rear is larger than the rest giving an opening of about 5' x 6' square. The remainder are, typically, 3' x 5' on each floor.
The brick buildings are, for all intent, devoid of decoration, except for the cornice. The face brick is continuous between buildings, and they would, except for the added dormers and roof structures, be perceived as a continuous building. Except at points where newer buildings have been added, there are surprisingly few indications of a change, either in the window line or brick finish.

The two granite-faced buildings, the Commercial Block (1846) and the Mercantile Wharf Building (1857), are slightly more decorative, with corners and bays articulated in the masonry. The system of raised wall differentiations in the Commercial Block is actually quite complex, not always corresponding to the party wall. The cornice in these buildings is also heavier, and continues around the corners, giving both of them a rather monolithic aspect. It is possible that the brick addition on the top of the Commercial Block replaced a hip roof similar to that on the Mercantile Building, thus making the cornice that much stronger.

The other major non-typical buildings lie along the west side of Richmond St. These are six story brick, with flat roofs, of a later date than the standard warehouse. That on the corner of Commercial St. has two rows of columns, corresponding to the bearing walls, and an enclosed metal
stair. The floor beam system, and even the floor levels, are similar to the adjoining older buildings. The first floor granite street front is also similar.

Several of the single-bay buildings have been replaced with newer, sheet metal-and-glass facades, and in some cases increased floor-to-floor heights. The essential bearing-wall nature of the structure, however, is not altered in any of these cases.

Modifications to the existing buildings are evident in most cases, except in the newer structures mentioned. The most evident from the outside is the addition of dormers and a flat roof across the full width of about half the buildings. In other cases either one or several of the upper floors have been removed, most likely as the result of a major fire. The East end of Commercial and Fulton Streets has several adjoining buildings with this condition. Other changes evident from the exterior are elevator towers in the roofs, and new exterior brick facades, with altered window shapes.

While the double-hung windows in the buildings had probably been replaced more than once, some had been replaced by steel casements and frames. Others had been bricked up, particularly in the rear. Many steel shutters in the rear
are still in place. The central window in the rear is typically larger, and with a lower sill than the others, and was probably used originally as an exterior hoistway from the alley.

Interior modifications encountered range from the rebuilding of floors and connection of buildings to a range of wall treatments. In general, these changes were related to the most recent use, i.e. food processing and wholesale. In general, the first floors had several partitioned offices and either a plaster or wood tongue-in-groove wall finish. On the second and third floor the walls were also often finished, and the floor was either wood or brick tile. The top floor was generally less finished, reflecting more the original conditions, with exposed brick walls and timber construction. The stairs, where retained, were usually in the original location, although in one case a new stair with winders was installed on the opposite wall. When two or more buildings were used by the same establishment, the stairs were often removed altogether from one building. Nearly all the buildings, or groups of them, had some sort of interior lift or shaftway.

As well as connections through the firewall, a number of buildings at the East end of Fulton and Commercial
Streets were connected through the rear walls, often resulting in a change of floor level at the intersection. The block at this point becomes 100 feet wide, and the alley which occurs at the other end of the block does not continue. The exact nature of the changes to these buildings is more difficult to determine, since they may at one point have had back walls moved out, then taken out completely as the buildings merged.

Buildings seriously damaged by fire prior to 1960 had either been fully repaired, or have one or more missing floors, with a new, lower roof. In an other case a floor was found to be raised by short wood posts about a foot above its corbelling. This condition was also found in the Quincy Market buildings, and probably occurs in other places. In one building the rear section of one floor had been replaced by a masonry vaulted floor on steel angles.

In spite of these numerous changes wrought on the buildings, the site as a whole, particularly the two blocks between Commercial and Fulton Streets, remains remarkably intact, both in its form and materials. Perhaps the most outstanding feature of the site is its continuity at the scale of the city block, giving it an identity of its own. This was probably the first area in Boston to be planned and built up in this way, and still retain much of its
original quality. The change in the character of the blocks and streets from that of the older North End makes apparent at a glance that this area represented the introduction into Boston of the typical 19th century block pattern, and has the same quality found in later land-fill areas of the South End, Back Bay, and so forth. The site and its buildings represented a new approach to site planning and building: that of commerce, industry, and hard-nosed utility. The whimsy and haphazardness of the 17th and early 18th century had fully run its course.
SITE EVALUATION (2)

The present condition of the site is the result of both the economic decline of the markets and the acquisition of buildings by the B.R.A. The only present tenants are a few remaining small food wholesalers, and their operations are confined by and large to the first floor of various buildings. As the upper floors, and many of the ground floors were vacated, the structures began to deteriorate beyond the state they had been in when occupied.

Since most of the buildings are of the same type, both in finish and structure, it is possible to identify different states and degrees of decline over the entire site. The primary difficulty in evaluating the conditions and suitability for rehabilitation of the site as a whole is the number of major structural changes and alterations done from time to time on many buildings. These additions vary widely in both their range of materials and quality.

The most obvious exterior deterioration, and that which indicated most obviously the interior condition, was the degree of window breakage. Out of the 70 buildings on the two blocks between Commercial and Fulton streets, 32 had more than half the windows broken or missing, and were substantially
open. The remaining buildings off Fulton St. were also open.

The exterior masonry and bearing walls are all in place, with no instances of collapsed walls and some evidence of settlement. The most serious settlement apparently from the exterior is in the newer building at 114-124 Commercial St. Other settlement cracks were evident at no. 125-127 Commercial St., with the storefront lintel at 149-151 Commercial St. broken.

The exterior brick itself is in fairly good condition with a number of buildings having been painted. All of the buildings, with two exceptions are in need of pointing, and often the face brick will have separated from the back-up. In both the exterior and interior bearing walls, the condition of the mortar varies widely. Many walls would require extensive rebuilding due to moisture damage.

The typical condition of the roofs are, although they are structurally sound, nearly all are in poor condition, and leak extensively. The buildings at 7 - 9 Fulton Place have extensive portions of roof boards missing, but this is the only case of serious damage. The fact that most of the buildings do leak, though, aggravates the moisture problem resulting from the broken windows.
Of the five and six story buildings, 12 have sheet metal dormers or mansards above the fourth floor. The condition of these facades is fair to poor, with all of them visibly deteriorated or actually rusting. None have been recently painted, although they may be sound. Other exterior details such as flashing and metal shutters, skylights and vents are in universally poor condition.

Dormers, storefronts and other masonry additions: chimneys and hoistways are in variable enough condition so that each would have to be treated as a separate case. Sealed windows and storefronts could be reopened, but the removal of roof structures would require roofs to be rebuilt. Since they were added at different times, and under various conditions and while some are in fair shape, others notably at 146-152 Commercial St. have deteriorated to a greater extent than the original buildings. On the other hand, certain facades, notably at 170 - 172 Commercial St. are obviously new and in relatively good condition.

Interior conditions, from the dozen or so buildings actually examined, vary as widely as the exterior, and it may be true that the buildings still in use are in better shape than those which are more open. Aside from those buildings actually damaged by fire, the major cause of deterioration
is water damage, caused by leaks, broken windows, and basement flooding.

In several different buildings, one or more of the floors had been covered with a brick finish. One of these floors had collapsed, and others were visibly sagging, despite the floor structure. Some of the other floor finishes were rough wood, in various stages of rot, with frequent holes in the more open buildings. Few of the floors would require entirely new planking, but extensive patching would be needed. One floor with hardwood finish had warped and buckled, and any other finish floors, such as vinyl, were in poor condition.

Walls and ceilings were typically finished in the lower floors, and there are partitions of varying types for offices, cold storage, etc. These wall finishes are either plaster or tongue-in-groove vertical siding, in universally poor condition. The upper floors have had fewer modifications, and hence show as finish the actual bearing walls and floors.

The floor beams themselves are in generally fair condition, although some are obviously rotted. The first floor beams are more liable to be badly rotted, insofar as the basements in the area are subject to flooding up to street level. The more open buildings north of Fulton St. also have more evidence of rotted beams than others.
The existing stairs are often perfectly sound, and in many cases are newer than the floor structure. The older stairs often have open risers and are steeper than would be suitable for most uses. The buildings at 72 and 179 Fulton St. have new stairs with plaster enclosers, but in all other cases the stairs were open to the floor space. In some buildings which had been joined through the firewall, the stair had been removed altogether, and in one case a new stair on the ground floor was on the opposite side from those above. The extent of all these various non-typical conditions would seem to make most of the stairs, however sound, too much of a determinant in the design to be re-used successfully.

The condition of the interior bearing walls, as mentioned, is that the mortar has deteriorated to varying degrees. Most of the exposed walls have been painted at one point, making the exact conditions more difficult to assess. The basement walls and areas were subject to continual flooding, and would require a more extensive survey. One may assume, though, that the timber pilings on which the buildings rest are in fair condition, and will remain so unless the water table drops.

Short of describing each building as a separate case, it is possible to evaluate conditions on the site as seriously
deteriorated, but in most cases not beyond the point of salvage for at least the masonry and structural timber. The general exception would be the area north of Fulton St., which is in substantially worse condition generally. The eastern end of the site, although it has been modified severely, appears to be as sound as the remainder of the site. Individual, burned out buildings, and those with severe interior conditions, could be rehabilitated economically if the cost were distributed and balanced by those buildings in better shape.

The essential decision, therefore, to rehabilitate the buildings would have to recognize that there is not a great deal of economic value in the buildings as they stand, and probably less as they are allowed to deteriorate farther. In all the economic proposals submitted to the B.R.A., the average cost of the rehabilitated unit was slightly less than that of the comparative new unit, but maintenance costs would be greater. The more important factor in the decision would have to be the suitability of the buildings and the spaces for the new use, and inherent quality of the original scheme in terms of its urban physical and historical context.
SITE EVALUATION (3)

The parcel C - 2 was included in the Waterfront/Faneuil Hall Urban Renewal Project of 1965. At the time, the area was seen as severely blighted, run-down, and yet possessing great potential for development. Private developments on Long and Commercial Wharves, and later in the Prince Building, were showing great success; the Aquarium was being built, yet at the same time the industry in the area was unable to maintain itself.

The Urban Renewal Plan called for the relocation of this industry outside of the area, and proposed new housing and recreational uses, with certain amounts of office, commercial and parking facilities, for the entire waterfront. The C - 2 Parcel was to be almost entirely demolished, and rebuilt with new, low rise garden-type apartments. The plan showed extensive changes in street layouts, but encouraged access to the waterfront, and recognized the importance of the area as a link between both downtown, the North End, and the waterfront.

As the potential of the area became clear, many groups began to show an interest in the parcel, and in the summer of 1970 advertisements were published for the disposition of the parcel.
About forty groups bought the "developer's kit," which suggested guidelines for the submissions, and the BRA objectives for the area. The program remained basically the same: housing, to augment the severe shortage in the North End, retail businesses to service the community, and public facilities. Various regulations for parking, building height and type, open spaces, and so forth, were set down in the Kit.

The major objectives were to develop Richmond Street as a link between the North End and the proposed waterfront park, and to "retain the flavor" of the North End, with its unique character and street life. The means to this end was not made clear. Other objectives were to retain as many original buildings as possible, which seemed to be a reversal of the 1965 concept. The proposed parcel delivery plan shows a few more than half the buildings retained under priorities "1" and "2", not including the buildings previously demolished. For those buildings retained, the plan suggested such treatments as the restoration of the original roof line, removal of exterior fire escapes, and the use of brick and slate to match the original materials.

Other requirements in the plan were a limitation of floor area ratio to 2.0, and a ratio of parking spaces to

1 Boston Redevelopment Authority, Developer's Kit, Parcel C - 2, September 1970, p. 10.
units of 0.7, all to be off-street. Individual ownership of the units after development was encouraged, but not required, and commercial and community facilities along Richmond Street were suggested strongly.

Five developers submitted proposals before the deadline in April 1971. These were, along with their architects:

- North Cove Development Corp.
  North Cove Association (Anderson-Notter)
- Piemonte Family Trust, PARD Team
- North Front Community Development Corp., John Sharratt and Assoc.
- North Boston Corp.; Gerard Cugini Assoc.
- Jack Curry; Stifter and Baum.

These proposals varied quite substantially, both in their actual design, and in their interpretation of the requirements of the program.

Referring to the diagrams of each plan, one can see the range of the proposals. The North Cove group, whose architect had rehabilitated the Old City Hall, as well as apartments in the Prince Building and on Long Wharf, proposed a total rehabilitation of the existing buildings, with a small amount of new infill over some of the lower buildings. Their plan was for 409 units, with a garage for 450 cars over Cross and Tunnel Streets.
The P.A.R.D. Team proposal had two alternative schemes one of which contains 303 units, with 167 rehabilitated and 136 new. An alternative scheme called for all but 32 of these to be new units, in a plan similar to that of the BRA in 1965. The proposal contained a parking garage for 328 cars.

The North Front Corp. with John Sharratt as designer, proposed 245 rehab units, and about 200 new units, some of these on land not actually included in parcel C-2. This proposal included a plan both for the Mercantile Wharf Building and parcels D-1 and D-2, along new Atlantic Avenue. A portion of sub-area "A" was to have been a combination parking garage for 200 cars and vocational High School, built by the City.

The North Boston Corporation, a group of North End businessmen, proposed 372 units to be sold as condominiums. 174 of these were rehab, 198 new. A garage for about 300 cars was located in sub-area "A".

Stifter and Baum's proposal continued 233 units: 112 rehab and 121 new, with a rather large open space along Commercial Street, and a garage for 280 cars.

Several of these proposals provided novel solutions to some of the problems inherent in the site, such as the
alley spaces, building height, and street front relationships. The North Cove proposal contained four elevator locations on the two blocks between Fulton and Commercial Streets, servicing "sky streets" which connected the buildings on that block in the alley. This would become the primary means of access to the block, and assure that the alley became a lively and well-used semi-public pedestrian area. Stifter and Baum proposed to widen the alley by demolishing all the buildings on one side and replacing them with lower and less deep buildings, each having a raised, private terrace along the sidewalk, to give both a sense of privacy and life to the street. The North Front proposal had provision for an Italian-style piazza facing on the Commercial Block and Mercantile building, linked with a pedestrian walk over Atlantic Avenue to the waterfront park.

The primary difficulty facing the BRA with regard to these proposals, and the reason for their ultimate rejection, appears to have been political, rather than incompetence on the part of the participants. The Piemonte Family Trust, although submitting its proposal, soon made it clear that they were no longer interested in the designation, on account of possible charges of conflict of interest levelled against Mr. Piemonte, a North End resident and
City Council member. North Cove backer Graham Gund and his architect, J. Timothy Anderson, were well known, and somewhat resented by the North End Community for attracting young and affluent "outsiders" to the area, and forcing rents out of reach of the indigenous Italian population. The North Front proposal was drawn up with a larger degree of community backing than the others, but was also rejected for political reasons, and perhaps also because it tried to go beyond the scope of the offering. The remaining two projects seemed to fall within the BRA requirements, and possibly could have been selected as compromise solutions, but lacked a combination of community support and backing at City Hall to be selected. It seems also that the BRA was holding back on awarding the project because a sixth developer, with more influence in the administration, was interested in the parcel but had not submitted a proposal on time.

Architecturally, the solutions submitted showed a rather wide range of treatments despite the BRA's list of building priorities. Both the North Cove and North Front proposals indicated rehabilitation for buildings in sub-parcels "A" and "E", and others slated for demolition. Ed Baum, on the other hand showed several priority "1" rehab buildings along Fulton St. replaced with new. Other proposals showed
PARCEL C-2
PROPOSAL OF CLUGHIN ASSOC.

LEGEND

- NEW CONSTRUCTION
- REHABILITATION

PARKING

RICHMOND ST.

CHAIR ALLEY

FULTON ST.

COMMERCIAL ST.
various treatments of streets, open spaces, and parking. While most parking was in relatively confined structures in Sub-Area "A", the North Cove proposal shows a garage which is actually outside the parcel limit, over Cross St., and impinging on the air rights of the tunnel. The North Front proposed a school in this area, and a relatively greater proportion of community facilities. While most of the projects had a fairly standard two bedroom arrangement for the rehabilitation, the North Cove and PARD Team proposals, which were all rental units, had central access points, and buildings connected by corridors. In the other cases, buildings had individual access or were served from the adjacent building in pairs, allowing for individual or condominium ownership on a smaller scale.

For most of the rehabilitation there was a surprising number of different layouts for any given building type. These included duplexes, apartments through to connecting buildings, as well as the standard, walk-up solution. Most of the designs found little difficulty dealing with the existing buildings in a wide range of ways, with varying degrees of success, but all with a minimum amount of change to the floor or masonry structure. Given the bay depth and width, a large member of alternatives are possible,
and were exploited in these project.

It would be difficult, without doing a more detailed structural survey of the buildings, to gauge the degree to which these proposals came to grips with the problems of rot, settlement, and so forth which are evident even on the surface. There are enough sound buildings to make the rehabilitation economically feasible, and even to remedy the individual structural problems in certain cases. Parts of sub-area "A", however, were found to be totally unsound, according to an engineering report done for Cugini Associates, and yet the North Cove proposal shows practically all these buildings as rehabilitated. Perhaps the additional cost of bringing them up to standard could be distributed over the rest of the project and the continuity of the site preserved.

What is apparent both from the designs and from the economic proposals submitted with each project, is that the rehabilitated units, even given the condition of the buildings, were universally cheaper to build than the equivalent new unit. In a project of this scale, with some 90 buildings of all the same type and structure, the economics of scale usually found only in new construction begin to have an effect. Where it is possible to institute a system into rehabilitation, and to operate within a known range of conditions and building
types, many of the uncertainties inherent in these projects can be eliminated.

The decisions made in all of these proposals, with regard to the existing buildings, indicates also some quality inherent in them, resulting from the conditions and assumptions by which they were built. We can find, by a closer examination of this aspect of the site, just what qualities those are, and what assumptions with regard to materials, services, and urban form, were made which allow us to re-use these buildings, using a totally different set of criteria for performance.
I have outlined some of the forces which produced the C - 2 parcel and its present condition in previous chapters. Now I would like to examine specifically those physical aspects of the site which govern present attitudes toward it, and the original assumptions which created them.

The order of the site itself -- the street layout, individual building access, and open space -- were designed in such a way as to conform to the linear nature of the dock space and the requirements of material storage. Each building had a front and back, with different types of access at each. The front, with its wider street, open vistas and open storefronts was given over to the interaction of people with materials -- with the goods of the waterfront. The back side, the alley, was devoted to the movement of goods with relation to the building; hence the large openings and hoists along the back wall. The relation of depth to alley or street front was controlled by two factors: the minimum useful dimension along the edge, in order to maximize the number of participants, and the maximum distance of the interior building space from that edge, which was the sole supply of materials, people, light and air which allowed the building to function. The
limitations, of the block which resulted were, on the short dimension, the depths of two such buildings and the rear access, or about 140 feet; the length of the block was controlled by the through access requirements between streets; in this case, reaching up to twenty buildings.

The bay size was governed on the one hand by the structural system used, on the other hand by the need to maximize the number of establishments. That dimension in this case is about twenty two feet. The depth of the building, limited by the need to service the interior with light and air from outside, grew as large as 60 feet. What has happened is that the interior space has been made as large as the technology of the time would allow, for an efficient warehouse, and the same time the perimeter streets and walls have been reduced to a minimum.

The height of the buildings was four stories, with an attic under the pitch roof. This limit was set by the lack of elevators. The resulting form was, in plan, a series of rectangles, with the long sides common, and in section four rows of close-packed rectangles. In terms of efficient use of land and materials, for a given amount of floor space, the form is unsurpassed.
There are a number of reasons why these buildings remain useable as housing today. The first is that the space of each floor conforms very nearly to that of a standard, two or three bedroom living unit, and, for the most part, is unobstructed by partitions and services that would have to be removed. All the original building services, such as light, ventilation, hoistways, etc., were provided in such a way as not to impinge on the basic floor area, or not provided at all by the building. The necessity for all spaces to be lighted assures sufficient exposure to meet modern standards for living spaces; the span of the structure allows ample space and flexibility for a useable layout. Even the structural wall provides sound and fire isolation consistent with modern needs. By answering in a straight-forward way the requirements for which they were built, the warehouse buildings satisfy requirements that have little relation on the face, to modern needs. What needs they do satisfy are a number of basic human needs: of light, of building height, or finite space and privacy, of access, which do not change. The attitudes toward services and materials which were born out of necessity in the last century have turned out to produce forms which are adaptable to the most demanding human needs. We can identify those elements which define the building
space, of walls, floors, and roofs, and provide those elements of services, partitions, and stairs needed to make it habitable.

With every architectural decision there is a statement of some degree of permanency which, as materials and techniques improve, is based almost solely on the validity of that decision in the long term. If the design of the building is based on a series of short-term assumptions, it will survive only so long as those assumptions hold true. I have pointed out a few examples of the changes to which these buildings have been subject, and their capability of adapting to them. It is my belief that this adaptability, at all levels of the built environment, produces a range of experience and juxtaposition which can make the urban environment richer and more the result of a constant human process. The only way to achieve any degree of fixity, and the rational evolution of form, is through a realization of the process of change.
References:

Books:


Pamphlets:


Downtown Waterfront - Faneuil Hall Urban Renewal Plan, Boston Redevelopment Authority, April, 1964.

Downtown Waterfront - Faneuil Hall Urban Renewal Plan, Boston Redevelopment Authority, Developer Kit, Parcel C - 2.

Also; numerous reports, proposals, evaluations, newsletters, etc. prepared by the following groups:

- North Front Community Development Corp.
- North Boston Corporation
- North Cove Development Corp.
- Jack Curry
- Piemonte Family Trust
- Boston Redevelopment Authority
FLOOR PLANS R 452-49
PARCEL C-2
TYPICAL WAREHOUSE STRUCTURE & FRAMING

0 4' 8' 16'
PARCEL C - 2
BUILDING TYPE U - 1
SCALE 0'
8'
16'
PARCEL C-2
BUILDING TYPE N 3(U4)
SCALE

0' 4' 8' 16'