

THE PRESERVATION OF BUILDINGS FOR EDUCATION:  
A Case Study in Lower Roxbury

by

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B.A. Washington University (1976)

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## Abstract

This thesis focusses on the use of buildings with historic qualities for education and neighborhood stabilization. The study centers around the re-use of a site in Lower Roxbury, the John Eliot Burying Ground District, by Boston 350, an education group interested in incorporating a program to teach students preservation and renovation construction skills into the Boston public school system. The intent of the thesis is to explain the value of existing, albeit abandoned, buildings and to illustrate, through the Burying Ground District, how the use of such buildings can be phased to accommodate educational programs, community facilities and housing and new growth in a neighborhood.

Part I, The Role of Preservation in Education, briefly describes current preservation methodologies and how they could be changed to allow for more public education regarding the evolution of American history. Part II, Case Study: John Eliot Burying Ground District, discusses past and present events which have impacted the development of the site, and future events which could evolve based on previous interest and history. The case study format of Part II is meant to illustrate issues that could be addressed in any educational program focussing on existing buildings. The Appendix, Building Analysis and Repair, further explains a method for technical and historical evaluation of buildings to be used as an aid in teaching.

Thesis Advisor: Henry Millon, Professor of Architecture



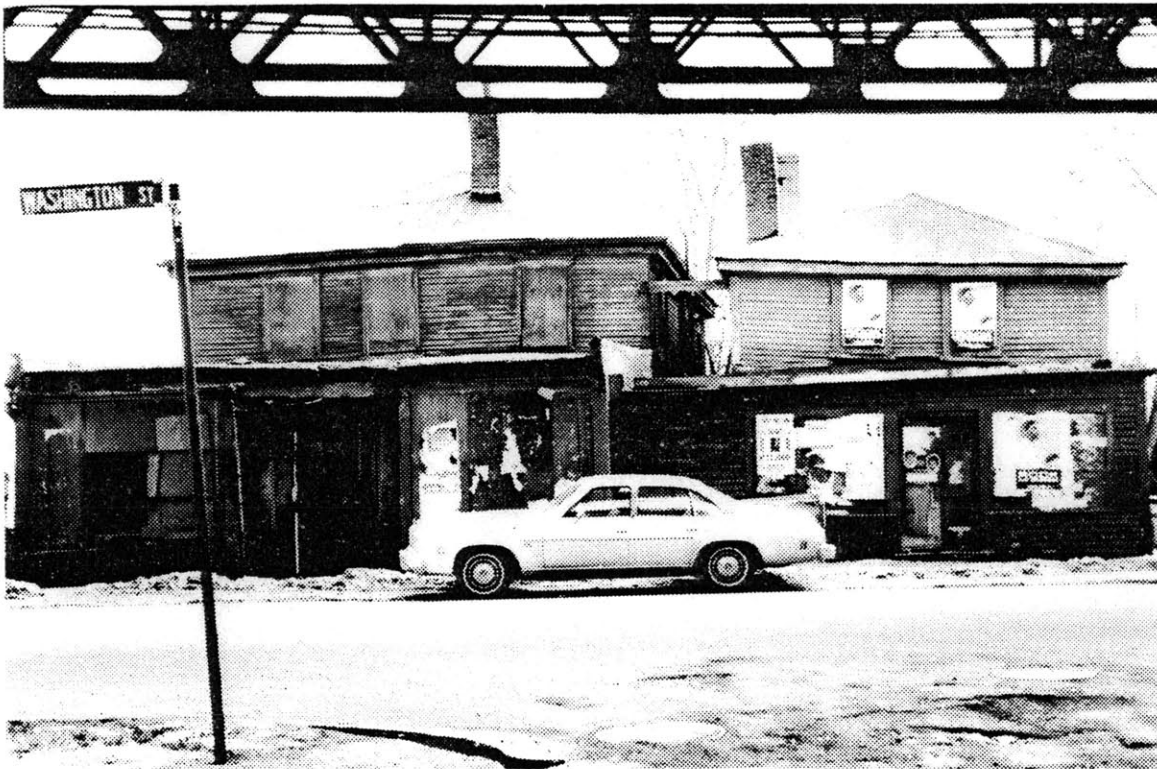
# Acknowledgments

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I. The Role  
of Preservation  
in Education



## Introduction

There are many old buildings with historic characteristics left in urban areas that are not affluent enough, not historic enough or not potentially developable enough to encourage their preservation or re-use. These buildings are a wasted resource; they are either actively demolished or demolished through neglect, without consideration for the record of past technology and city development that they harbor. By abandoning these buildings, we leave areas of the city open to dumping, vandalism and general neglect.

Alternatively, we could greatly improve the image and possibly the vitality of these delapidated areas by using old buildings as a resource for education. Kevin Lynch suggests in his book, What Time is This Place (1), that these "city attics" be left open for public study and "rummaging" before they are discarded. Perhaps a more structured program to dissect and examine the buildings and their historical context could be developed in order to bring people to better understand the evolution of our society. This type of program could act much like an archeological dig: the structures could be analyzed for construction techniques, picked apart for information of the history of those who once used the buildings and the events which shaped the site and compared with other buildings of similar age while also visibly portraying interest in the site and celebrating the value of the old buildings.

Unfortunately, public opinion toward the re-use of such "semi-historic" structures has been meager, even lacking. It has long been the attitude of those interested in old buildings that buildings of great aesthetic value or sites of significant historical events be preserved; even those criteria have been attacked by groups more interested in the

potential for income-producing development rather than the historical value of a building's remains.

The turnover of buildings with cities is usually a spontaneous process motivated by the prospect of increasing profits. If more money can be made out of a piece of land by tearing down what is there ... the pressures to do so are very strong. (2)

That such abandoned buildings even exist is only an indication of how economically unrewarding city agencies, developers, and financial institutions consider the building sites and neighborhoods. The principle problem in preserving such buildings - representative of the "stuff-of-life" to far greater degree than the historic or architectural monuments - is in finding a valid use for them which will restore their role in the community.

This problem is two-fold. First, to convince people to include these city attics in their consideration of the valid history of a city which will affect their attitudes toward the building's re-use or demise. And second, to determine how and why these sites developed and what they can contribute in their current state. These circumstances rely very much on one another since our estimation of the value of a building or neighborhood is dependent upon its image, which in turn is created by how the far and recent past of an area is perceived.

## Development of the Preservation Movement

The preservation movement has developed in two stages: the first at aiming to protect materials of an early date and the second at saving the aesthetic of old buildings. The first plea was a static approach: if a building were no longer suitable for its purpose, it should not be altered, but preserved as a monument of bygone art while a new building be constructed to house the new function. The second approach was more dynamic: save the architectural style of old buildings and re-adapt it for new purposes.

In the first instance, we ran the risk of justifiably saving only monuments; in the second we run the risk of saving only examples suitable for lucrative development. This larger pattern was determined by three reoccurring elements in the movement.

The first element is that American preservation has basically been a grass-roots, "amateur" phenomenon. This has caused two major repercussions in the movement: selection of material for preservation has been indigenous to regional influences, and most preservation has been the result of middle and upper class efforts. Consequently, buildings that have been saved reflect the history selected by those who could most afford the time and investment to study and lobby for the preservation of buildings near their homes.

Secondly, since the mid-nineteenth century, preservation has been dominated by a romantic image. Most of the efforts of preservationists have been to develop a visible American tradition by recalling past periods of success - sites from the Revolutionary War represent the birth of the country; monuments to Veterans of Foreign Wars, military might; public buildings from the 1800's, aesthetic triumphs. To recall these events and qualities, preservationists first considered it essential to restore the architecture to its original or "ideal" form (not necessarily the same in the case of Victorian Preservationists). Eventually, "ruins" became an acceptable romantic or nostalgic notion which led to thoughts on preserving buildings in their current, often ruinous, state. More recently, the romantic tradition has blossomed into a tourist attraction, providing economic motivation for preservation. Because of the desire to preserve a romantic image of history rather than a more honest history riddled with mistakes, many old structures are excluded from preservation efforts - particularly buildings with histories too recent for nostalgia - and destroyed before their historic value is established.

Thirdly, the criteria used for selecting particular buildings for preservation has followed many changes in social thought. Reform, education of the public and national pride were re-occurring reasons for preservation. In the 1850's reformers thought disunion could be cured by greater regard for sacrifices of our founding fathers; at the turn of the century, many thought old buildings would be an important tool for the "Americanization" of immigrant children; in the 1920's, they declared that an appreciation of beauty and harmony could be gained from old homes; and during the twentieth century wars, preservationists were confident that visits to historic sites would magnify patriotic feelings. (3)

The cumulative effect of this pattern is that only the most expensive, most imposing or most symbolic is preserved, leaving a distorted view of the past. This history should be balanced by filling in between the peaks of achievements. Where old structures cannot support present functions or do not have exceptional aesthetic or historic value, their remains should be re-used to enhance our sense of past identity while complimenting present needs.

## Preservation Methods

There are several ways of saving a piece of an old environment: by removing the pieces from imminent destruction, by restoring a building to its original appearance, by repairing or rebuilding a structure using modern day replacements for obsolete pieces, or by preserving a structure. Preferences of historical societies rank these methods in order of least to most disturbance, that is from preservation to removal.

The wide spectrum of restoration techniques has only one common thread running through it: each restoration was an effort on the part of one individual or group to make an old building more useful and more accurate as a representation of the past. (4)

Moving building fragments to museums or other locations is generally the last resort in an effort to save a building. It removes the structure from its context, therefore subtracting not only the historical context of the area from the story of the building, but also the comparative value of the building with its neighbors, be they old or new. However, it is sometimes preferable to save pieces of the building in this manner rather than to lose them forever.

Restoration techniques were developed in Victorian times as an effort to make old buildings an "ideal" (i.e. non-contradictory) representation of the past. Criticized by Ruskin as being "a false description of what was destroyed", Victorian restoration often stripped the "time" - the dirt, eclectic designs and additions - from the building in order to stylistically purify the architectural past.

Rebuilding a structure is a more honest attempt at restoration. The effort accepts what is existing and repairs what is missing using currently available materials and techniques, although the architectural style of the fragment to be rebuilt is maintained.

The notion of preservation was first introduced by the Society for the Protection of New England Antiquities (SPNEA) when, in the early 1900's, they presented the idea that buildings did not need to be restored; they could be suitably marked as historic pieces and then be left to take care of themselves. By stabilizing a structure in its existing state to prevent further deterioration, preservation halts the history of a building in the present, rather than at a past moment in time.

It is also possible to "save" a structure with an archeological approach. This is a more analytical method of separating out and documenting patterns in geological, technological and social change represented by the site. This process will often destroy the original building - it can be paced to coincide with new development - although the essential information would be documented.

With the large number of available options for remembering a piece of the old environment, it is important to ask precisely what we hope to accomplish by saving buildings. Part of the cost of any method of environmental preservation or renewal is a loss of potential information. We can minimize such losses by explicitly deciding on the motives for preservation, and documenting the information we expect to destroy.

I am reminded of the preservation of the Washington Square Methodist Church in New York City (done by Ann M. Beha, Boston). The Church has had a long history of outspoken positions on political and social issues. During the Vietnam War, Church members painted the front doors of the church red, in protest of the unnecessary blood shed in the war. The Church is now involved in many programs for mental health, drug rehabilitation and gay rights, and was willing to restore the doors to their original paint color. At first I considered this a needlessly selective destruction of history, but I am now convinced that there is little reason to prolong the protest of the war and the current social programs are not symbolized by repainting the doors red. The records of the church, and the spirit of the congregation will serve as memories for the red doors.

For preservation should not be simply the saving of old things. It should be based on the knowledge and values of the present, and it should change as our knowledge and values change. Preservation has the potential to present conflicting views of history - such as the black slaves, northern progressives and southern plantation owners views of the Civil War - in an orderly, educational manner. By attempting to explain a full picture of our history, we will find it essential to utilize more of our "stuff-of-life" stock of old buildings.

## Funding

The critical determinant for utilizing such pieces is, of course, the availability of funds. To use old buildings for educational rather than developmental motives requires direct funding through non-profit or government agencies, or incentive to tie education programs to private development. Government policy has been to leave decisions for funding to local historical commissions who have not been in a position, either because of small budgets or conservative administration, to sponsor inovative use of their allocations. For sites with potential for development, seed money, construction loans or subsidies could be linked to established archeological programs which study the existing structures or land. For sites in depressed areas not bound for immediate redevelopment, educational class - elementary, secondary, vocational, adult-ed or college level - could use the old buildings as case study classrooms.

If we are to implement a program to learn from our past, we must use all our old resources to provide us with information describing historic patterns. We should not abandon buildings and sites because they are no longer economically useful, but fill them with temporary educational uses until they are economically viable again.



II. Case Study:  
John Eliot Burying  
Ground District



## Introduction

The following case study is of a group of buildings in Lower Roxbury around the John Eliot Burying ground. The site is located at the corner of Washington and Eustis Streets and includes the John Eliot Burying Ground, two 18th century wood frame houses, a 19th century wood frame house, the Eustis Street Firehouse and a 19th century mill building. A group called Boston 350, comprised of members from the Afro-American Museum, the Boston Technical Trades School, Roxbury area residents and Boston area professionals, is interested in developing a training program for students of the Trades School and from the Roxbury community to learn organizational and physical skills for the rehabilitation and preservation of buildings. Boston 350 started their efforts in 1978 as an urban archeological summer program on the John Eliot Burying Grounds and the wood frame houses, and would like to develop and implement an educational program that could be used at similar sites in Roxbury and Dorchester. Boston 350 is concerned that the site be useful not only as a "classroom" but eventually as a location to support a source for job opportunities or housing.

The case study is organized so that the reader can follow the past, present and future value of the site.

1. Past Events: History of the Area - a brief history of geological, technical, social, economic and political events which directly influence the development of the site.
2. Current Events: Existing Context of the Site - a description of the current condition of the site and its surrounding neighborhood.
3. Future Events: Strategy for Site Use - a three phase description for using the site based on

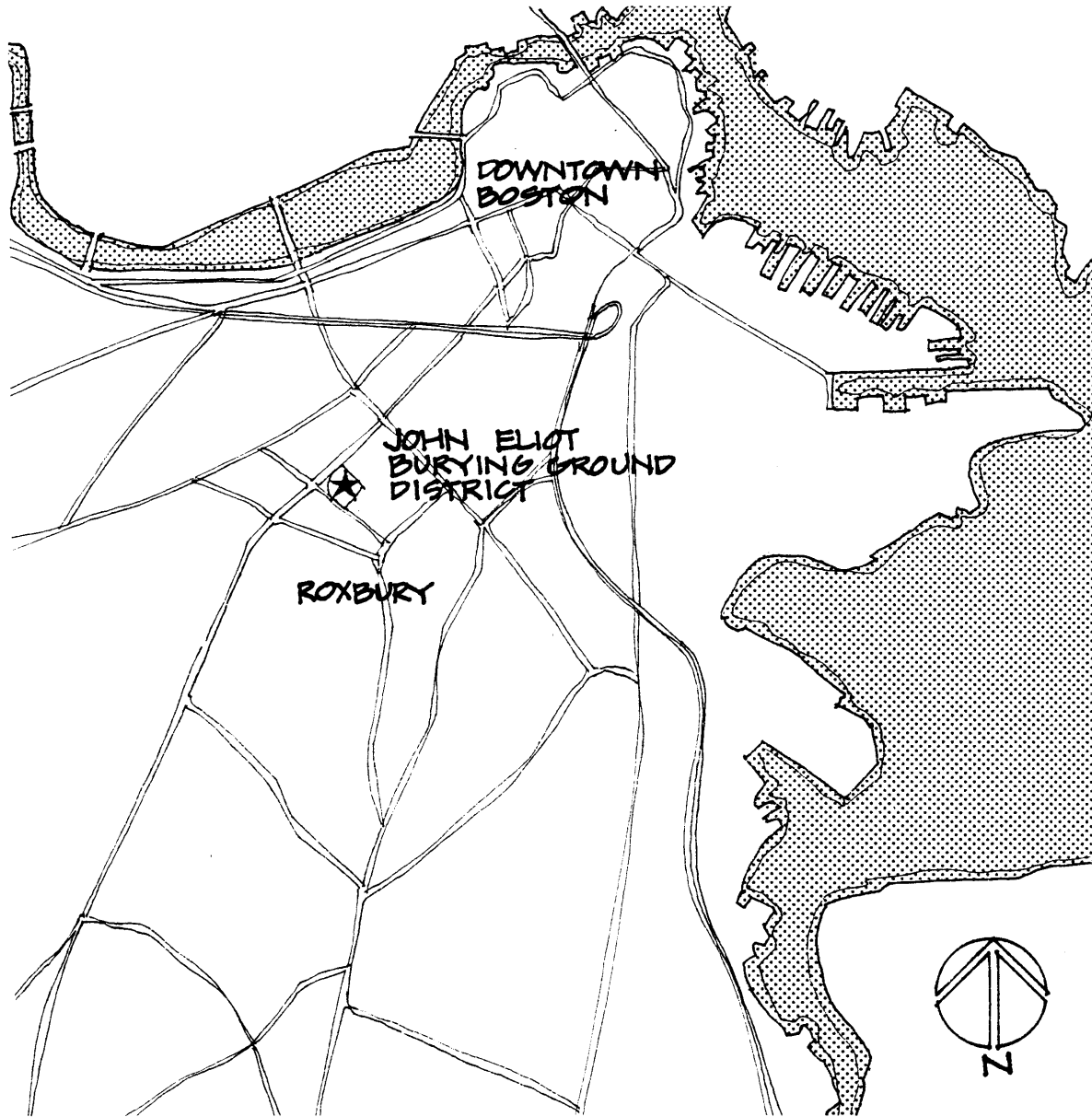
planned changes in the neighborhood. The first phase uses the buildings for education; the second phase furthers the renovation of the existing buildings for housing and community use; and the third phase adds new buildings to the site to expand the housing potential of the area.

### A Note about Case Studies...

The case study method offers a somewhat different approach to education than traditional classroom teaching. The specific nature of a case brings up peripheral issues that can be elaborated or dropped depending on the emphasis of an educator. Thus in a case study of existing buildings, discussions on how building patterns are effected by geology, social or economic development, architectural style, technological advancement, etc. can become quite general while the existing buildings illustrate how these parameters interrelate.

Traditional education methods tend to separate issues into specialized courses, under the assumption that more in-depth research can be covered when isolating a subject from other related areas. This approach is no doubt appropriate in some instances, although such specialized research is often uncritisized and unchecked because so few people outside the field can understand its jargon or value outside of its microcosm.

The case study method attempts to organize a study of trades (i.e. the physical production aspects) with a variety of issues, by presenting a common base to reference the inter-relatedness of such issues.



LOCATION OF THE JOHN ELIOT BURYING GROUND DISTRICT IN BOSTON

# History of the Area

## Geology

The general physical characteristics of Roxbury - good farming soil, heavily wooded terrain for lumbering, drinkable water sources, and a land configuration that could permit adequate defense measures - attracted Roxbury's original settlers. The geography of the area separated development of Roxbury into two distinct parts: the Highlands Area, in the hilly region south of Dudley Street, and Lower Roxbury, the marshlands and tidal flood plains between Dudley Street and Boston.

The Highland Area, because of its hilly nature, could be protected from invaders and floods, and was the location of the original town and subsequent desirable residential development.

The lowlands, Lower Roxbury, were subject to floods, disease spread through the marshes and easily accessibility by boat, and consequently were used for grazing animals until the Industrial Revolution, when factories occupied the area, supported by the water of Stoney Brook and the docking facilities of South Bay.

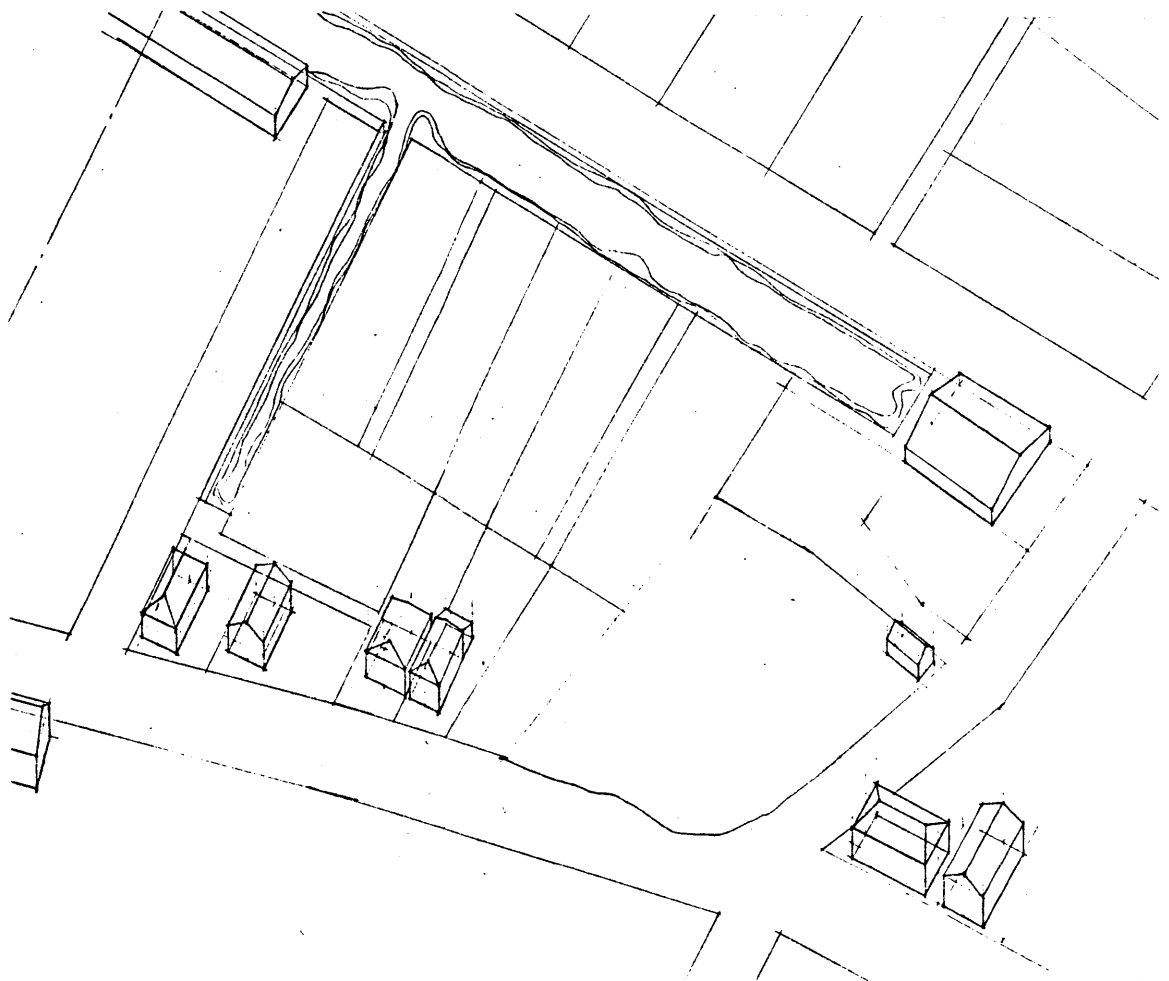
The original town developed as a village cluster along a ridge of land which connected Boston to the mainland over a narrow strip called "The Neck". The Neck acted as the only road between Boston and Roxbury, consequently some commercial ventures established themselves at the base of the Neck; most residential buildings and farm houses were located on higher ground to avoid frequent flooding.

After the Revolutionary War, Roxbury citizens made an effort to utilize the marshland area for development. A series of land fill operations began in 1780, partially filling lower Roxbury and dredging usable waterways into the area. However, land in Lower Roxbury remained inexpensive due to its wet nature, and grew as a predominately industrial area. During the 1800's, many of the poor of Roxbury lived along the edges of unfilled marshland, drawn by the cheapness of the land and the proximity to the manufacturing plants where they worked.

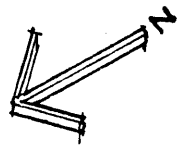
Periodic flooding continued to plague Lower Roxbury well into the late 1800's. The persistent need for expensive sewers to alleviate the water problem eventually lead to many Roxbury citizens' petitions for annexation to Boston with hopes that the City would be able to provide much needed funds. In 1868 Roxbury joined Boston, although due to the Depression of 1873, it took until the 1890's to finally install adequate sanitary facilities in Lower Roxbury.

## Technology

Although there was an abundance of wood, the first buildings in Roxbury were reminiscent of the conservative attitude of English housewrights. The first houses were one story, of waddle and daub construction and roofed with poles or thatch. This construction style was soon found impractical, for the clay or mud infill crumbled after expansions and contraction caused by the severe weather changes of New England. A second type of house emerged of wood frame construction, covered with clapboards. This second building type grew hand in hand with the development of saw mills which produced component wood pieces. (5) Although houses became larger and house styles changed slightly after the Revolutionary War, no new demands were



John Eliot Burying Ground District  
1795  
Information Approximate



made on conventional structural theories or traditional American techniques, and no important solutions to problems in heating, ventilating, lighting or acoustics were uncovered.

Until the Industrial Revolution, American popular taste in buildings relied on craftsmanship, i.e. the soundness of the buildings. Little ornamentation embellished the wood structures; the chief significance was in the buildings ability to accomodate both home and work uses. From 1870 on, coinciding with the development of industrialized methods for building pieces, such as cornices or door frames, American homes took on rich ornaments in an effort to attract what had switched from an artisan to a consumer market.

Industrialization also inspired the typology for factory buildings. Because large scale manufacturing could not be done in the home, utilitarian structures located near transportation and water works were built to accomodate the work place. Many of the early factories in Lower Roxbury were built of wood, probably because of the familiarity and availability of the material; as industrial methods required more heat and created heavier impacts on the factory structure, brick and stone became the common building material.

The crowded conditions and precarious juxtaposition of wooden tenements in industrial areas of Boston (including its annexed areas) inspired the institution of building and health standards. In 1907, Boston limited the building of wooden tenements to three stories with a minimum of six feet from any other building unless separated by a brick firewall; by 1912, the Tenement Housing Act limited wood tenements to two and a half stories with only two units to a dwelling (6). Despite these regulations, wood continued to be the most widely used construction material for Lower Roxbury tenements - its inexpensiveness and easy assembly made it attractive to speculative developers.



John Eliot Burying Ground District  
1868  
Information Approximate

## Economic Development

Roxbury existed as a farming village providing a self-sufficient supply of food and building parts until the immigration of industry in the 1830's. The young town's economy was dependent on its crops and artisan trade; the small number of town residents managed to live off of Roxbury's fine farming land and prime location on the route to and from Boston, although they had little money for public improvements. As the Industrial Revolution progressed, Roxbury's population exploded with immigrant workers, (see table 1, page 30), and the town economy relied more heavily on revenues gained through taxing manufacturers. The relative imbalance between the population of the town and available public funds eventually forced Roxbury residents to vote to annex the town to Boston in order to gain access to more money for badly needed public improvement.

Land costs significantly impacted the activities of private development. As previously mentioned, the non-marshland of Lower Roxbury was predominately for animal grazing until the 1800's. As industry started to invade the area, the land owners, many of whom were family kin to the original proprietors, divided and sold their land inexpensively since it no longer had grazing value. Because of its swampy characteristics, this land was not bought by the housing developers who constructed the sturdy single family homes of the Highland Area, suburban Jamaica Plain and West Roxbury, but by city developers who saw no incompatibility between residential and industrial uses based on their experience in Boston working class areas (7). Consequently, development in Lower Roxbury was mixed. Textile mills, rope walks, a piano factory, clock companies, lumber

and stone yards appeared between the Dudley Street and Boston line. During the years between 1830 - 1850, large numbers of wooden tenements for workers were built in amongst the factories.

The rate of industrial development was highly dependent on the availability of water and on the land fill projects. During the initial filling of South Cove in 1795, South Bay and the Roxbury Canal were formed. This network provided a convenient source of transportation to and from the docks in Boston Harbor, consequently instigating many businesses to locate near the Canal (which followed a path similar to the present day Harrison Ave). As overland connections to Boston improved with the filling of the South End and Back Bay, newer industries, such as the Chickering Piano Factory, located along the roads. By 1820 water transportation became obsolete, South Bay and the Canal were slowly filled, and many of the older industries along the Canal eventually collapsed. Most of the old wood factories were torn down and replaced with tenement houses to provide residences in close proximity to the new industries, which relied on a much larger, although unskilled, labor force.

## Social Development

The population characteristics of Roxbury changed significantly between 1820 and 1840. Prior to 1820, Roxbury was a community with a homogenous population, basically farmers and artisans of English decent. By 1840 Irish immigrants had started to locate their homes in Lower Roxbury in an attempt to escape the dark, dirty street of the downtown tenements. The population of Roxbury in 1820 was 4,100, by 1840 it was 9,100; the additional inhabitants being mostly of Irish descent (8) (see Table 1).

Another trend by 1840 was the move of middle class workers to suburban areas of Boston which, at that time,

included the Highland Area of Roxbury. The separation of the home from the workplace, and the improvements in public transportation, starting with the introduction of the horse trolley in 1852 (9), encouraged families to seek larger homes with private yards - oases from the industrial city. This, in turn, instigated developers to build such homes in the more desirable and distant areas of Roxbury. By the 1850's class distinctions of Roxbury residents were portrayed in the physical plan and buildings of the town. Lower Roxbury with its cramped wood tenements and haphazard planning had become the poor area - by 1800 the slum area - of Roxbury. The middle class moved to successively further suburbs so that the Highland Area was known as the preferred residential area in the 1850's; by 1900 the middle class moved further out along public transportation lines to Jamaica Plain and West Roxbury.

## Decline

Neighborhoods deteriorate when people can no longer afford to pay enough to justify upkeep on the housing, when the informed network of friends, family and community groups are no longer there to afford protection or security; when there is little ability to effect or influence that community; when there is no longer individual motivation when the community leaders leave; when the residents become dependent on others for the upkeep and maintenance. (10)

Most middle and lower income districts undergo periods of decline and revitalization; Lower Roxbury started its decline in the late 1800's with prematurely forced spots of revitalization (in the guise of urban renewal). The process of change depends upon movements of the population in or out of the city, growth or cost of transportation, pressures of new needs. That process of change in Lower Roxbury was accelerated by three causes working in parallel with the main lines of evolution; the decided change in character of the local industries, the type of building in



John Eliot Burying Ground District  
1932  
Information Approximate



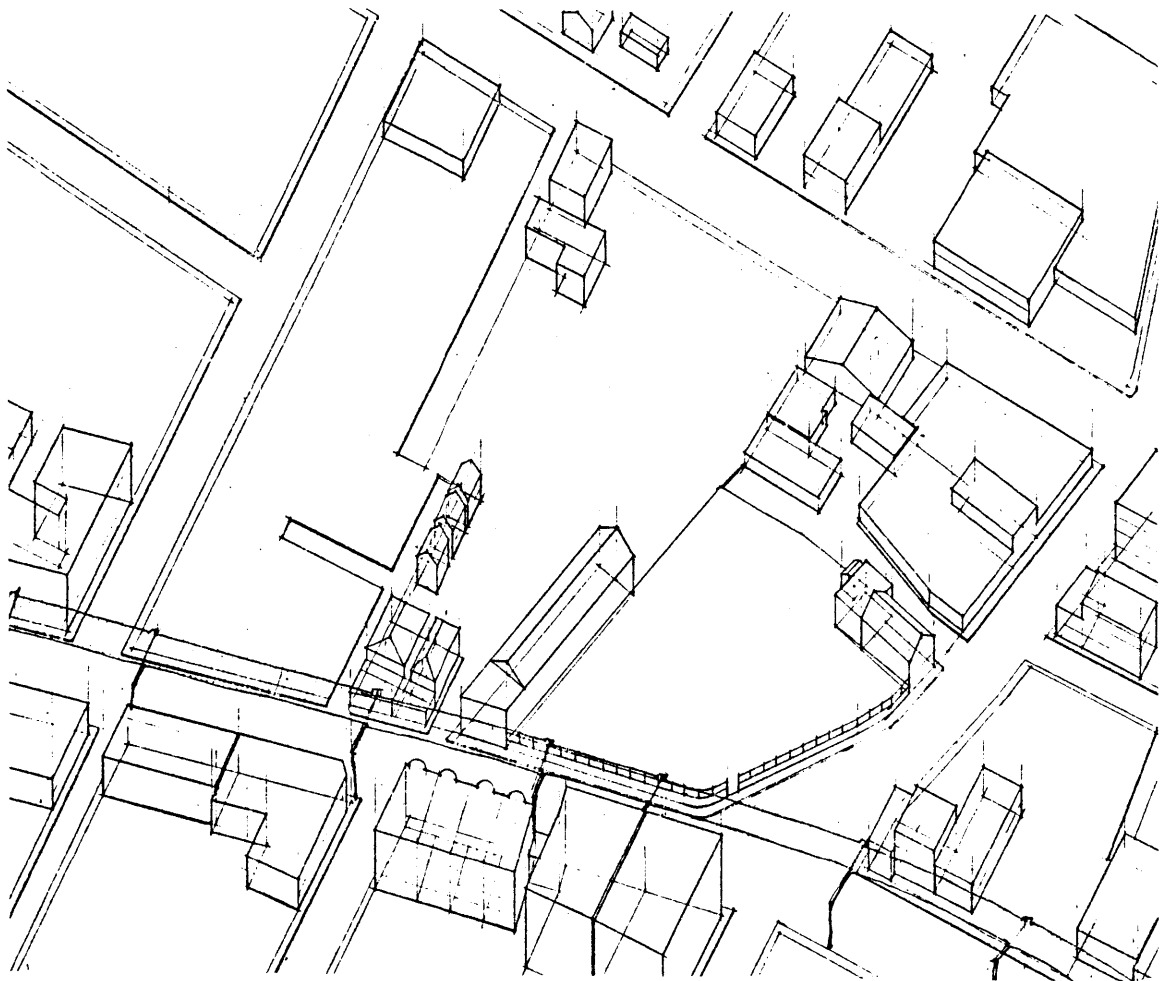
the area and the character of the local political leadership (11).

Woods and Kennedy attribute the disintegration of life in Lower Roxbury predominately to the change in local industrial character at the turn of the twentieth century. Prior to 1900, a number of local factories employed men for skilled processes which paid good wages. By 1915, several of the industries had either been absorbed into large corporations who then discontinued the local plant, or moved or closed on account of labor troubles, expenses in production or less expensive locations in suburbs. The loss of this industry, employing a large number of local residents, serverely impacted the community.

Between 1890 and 1900 a considerable number of buildings were erected in Lower Roxbury, in part to provide housing for workers and in part as a response to the commercial market provided by the new transit terminal, Dudley Station. The tenements southeast of Washington Street were erected rapidly and in relatively dense configurations, so that in comparison with the older, more sturdy housing constructed along Dudley Street and Tremont Ave., these wooden tenements were disorderly and poorly constructed. The commercial buildings and residential hotels and lodging houses built along Washington Street north of Dudley Station, apparently attracted unorganized crime and gambling. Coupled with the low morale of the unemployed or under paid workers, these establishments further aided in the decline of the area.

The changes which grew out of the failure of industry also threw a considerable number of single family cottages on the market. These were either divided into two or more tenements or allowed to run down, making them affordable for lesser income renters and greatly increasing the crowding and generally poor image of Lower Roxbury.

A third cause for Lower Roxbury's decline can be



John Eliot Burying Ground District  
1965  
Information Approximate

traced to the controlling political figures of the district. Much of the worst tenement property was owned by leading politicians who made little effort to improve their properties. This, in combination with the poor quality of housing and industry, encouraged many community residents to take advantage of suburbs further from the industrial areas of Boston, leaving much of Lower Roxbury to poorer families who did not have the means, nor the impetus to maintain the community.

## Public Housing

In 1934 the city initiated a housing program in an effort to "bring better housing to all Boston residents" (12). A great number of the wooden tenements and houses existing in 1935 were torn down prior to the Boston Redevelopment Authority's urban renewal plan of 1965, and replaced by public housing projects constructed by the Boston Housing Authority (BHA). The early Roxbury projects (1939-1946) - Lenox Street, Mission Hill, Orchard Park and Heath Street - were constructed not necessarily to fulfill pressing housing needs, but because they fit BHA determinates. The land could be purchased at an average square foot price not to exceed \$1.50; the closing of streets would allow the development of desirable super-blocks (sic) and eliminate through traffic; the area of the project was residential; and the development would not interfere with future city plans (sic) (13). the "future city plans" were referred to later in the report as the Roxbury Crosstown Highway.

## Early Expressway Schemes

The City Planning Board employed Robert Whitten in 1930 to prepare a master plan for a thoroughfare for Boston

(14). The Roxbury Crosstown Highway section of the thoroughfare was designed to lighten traffic on Massachusetts Avenue and Dudley Street by introduction of a major belt centered between the two existing streets, effectively cutting Lower Roxbury in half. Nothing ever came of the project since it was proposed immediately before the Great Depression. However, the City did not give up the expressway plans; nothing constructed from 1930 until 1948 lay in the right-of-way of the proposed road.

In 1948 the firm of C.A. Maguire and Associates was commissioned to design another master highway plan (15). The proposal included plans for the Southeast Expressway as it exists, and an inner-belt, known as the Southwest Expressway, to connect the eastern expressway with I-95, once again cutting through Lower Roxbury. The Roxbury portion of the expressway was again postponed, and housing demolition and construction maintained the right-of-way for the extension.

## Urban Renewal

In 1965 the Boston Redevelopment Agency introduced the Greater Neighborhoods Renewal Plan for Roxbury and North Dorchester. The figures presented in the plan reported that 88% of all structures in Lower Roxbury, excluding the Washington Park Urban Renewal Area, were unsafe and should be demolished (16) (see table 2). In 1966 the Department of Public Works announced its plan to clear land for the Southwest Expressway as proposed in 1948, and much of the housing that stood in the path of the highway was quickly destroyed. There was a great deal of opposition to the housing clearance - many of the long time local residents were relocated and had no voice in the development of new housing - and to the proposed expressway, since it

threatened to physically divide the neighborhood. In 1972, the Southwest Expressway project was halted, however 100 acres along its route had been cleared in anticipation of its construction.

## Southwest Corridor Development

In 1973, a Southwest Corridor Development Coordinator took responsibility for planning the development of transportation in the area. The new Crosstown Street has replaced plans for the Expressway and, although it is not meant to carry the highspeed traffic of its predecessor, it too will divide Roxbury much the same way Massachusetts Avenue divides the South End. The Corridor plan also relocates the Orange Line from the elevated tracks on Washington Street to a depressed track aligning the Penn Central tracks somewhat west of Washington Street. This will remove most commuting traffic from Dudley Station, jeopardizing the livelihood of businesses in the area, although the coordinator hopes to avoid this by introducing a transportation loop from the new Orange Line to the Dudley Area.

TABLE 1

(from An Analysis of the Population of the City  
of Boston as Shown in the State Census of May 1885.  
Carroll D. Wright)

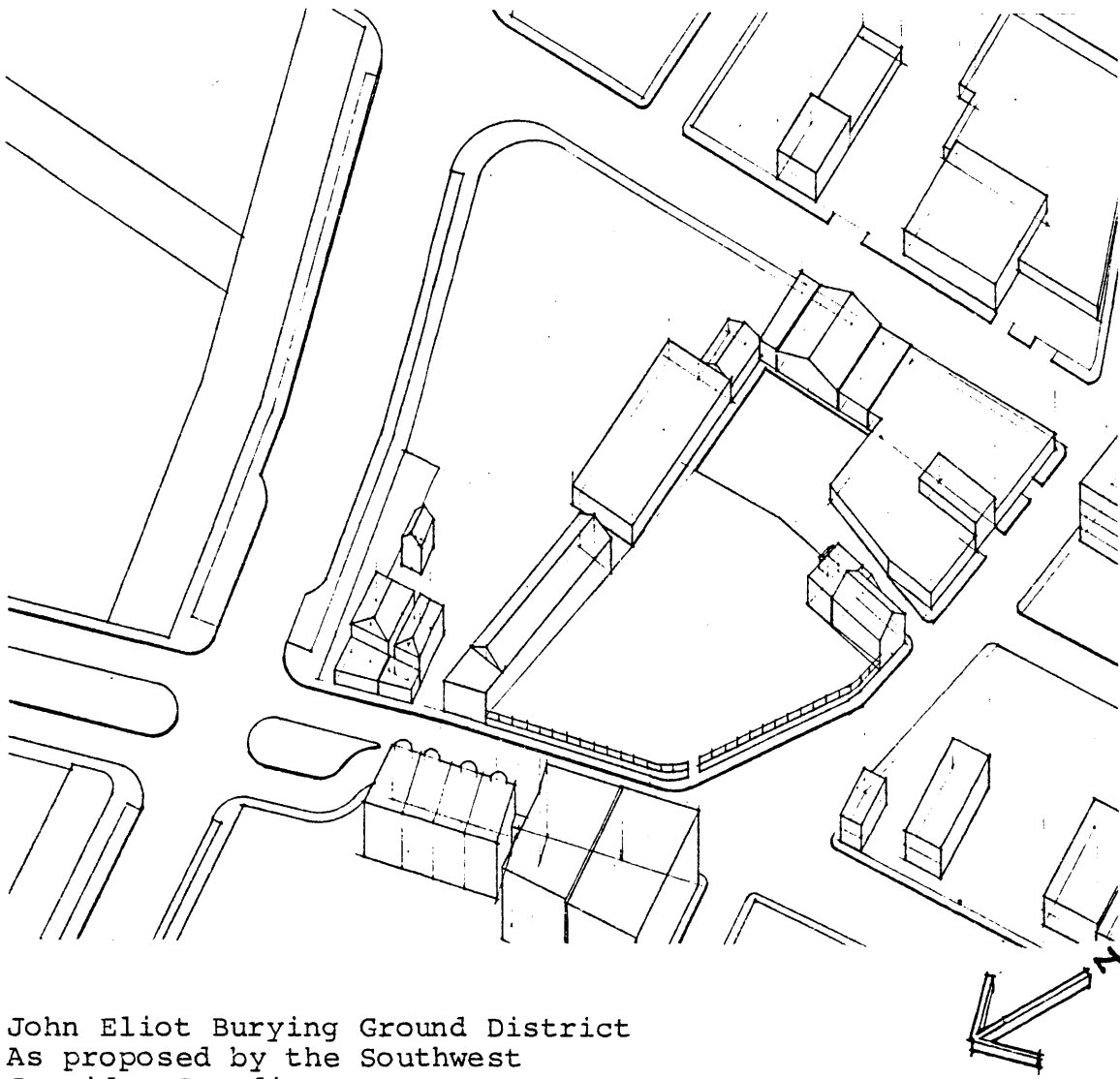
| year | number of people |
|------|------------------|
| 1765 | 1,487            |
| 1776 | 1,433            |
| 1781 | 1,650            |
| 1784 | 2,150            |
| 1790 | 2,226            |
| 1800 | 2,765            |
| 1810 | 3,669            |
| 1820 | 4,135            |
| 1830 | 5,247            |
| 1840 | 9,089            |
| 1850 | 18,364           |
| 1860 | 25,137           |
| 1865 | 28,426           |
| 1870 | 34,753           |
| 1875 | 50,429           |
| 1880 | 57,123           |
| 1885 | 64,965           |

TABLE 2

(From the Greater Neighborhood Renewal Program for  
Roxbury and North Dorchester)

Present Character  
and Condition

|                          |           |          |      |
|--------------------------|-----------|----------|------|
| Total acres              | 326.3     | 100%     |      |
| Residential              | 44.8      | 14%      |      |
| Commercial               | 28.6      | 9%       |      |
| Public and Institutional | 24.6      | 7%       |      |
| Streets                  | 85.2      | 26%      |      |
| Vacant                   | 58.4      | 18%      |      |
| <br>Total Buildings      | <br>1,279 | <br>100% |      |
| Satisfactory             | 71        | 6%       |      |
| Minor repair             | 539       | 42%      |      |
| Extensive repair         | 507       | 40%      |      |
| Major repair             | 162       | 12%      |      |
| <br>Residential          | <br>857   | <br>100% |      |
| With deficiencies        | 818       | 95%      |      |
| <br>Non-residential      | <br>422   | <br>100% |      |
| With deficiencies        | 390       | 92%      |      |
| <br>Total dwellings      | <br>2,455 | <br>100% |      |
| Vacant units             | 518       | 21%      |      |
| Occupied units           | 1,937     | 79%      | 100% |
| owner-occupied           | 250       | 13%      |      |
| renter-occupied          | 1,687     | 87%      |      |
| <br>Population           | <br>5,870 | <br>100% |      |
| White                    | 1,760     | 30%      |      |
| Non-white                | 4,110     | 70%      |      |
| <br>Total structures     | <br>1,280 | <br>100% |      |
| Clearance                | 1,128     | 88%      |      |
| Rehabilitation           | 152       | 12%      |      |



John Eliot Burying Ground District  
As proposed by the Southwest  
Corridor Coordinator

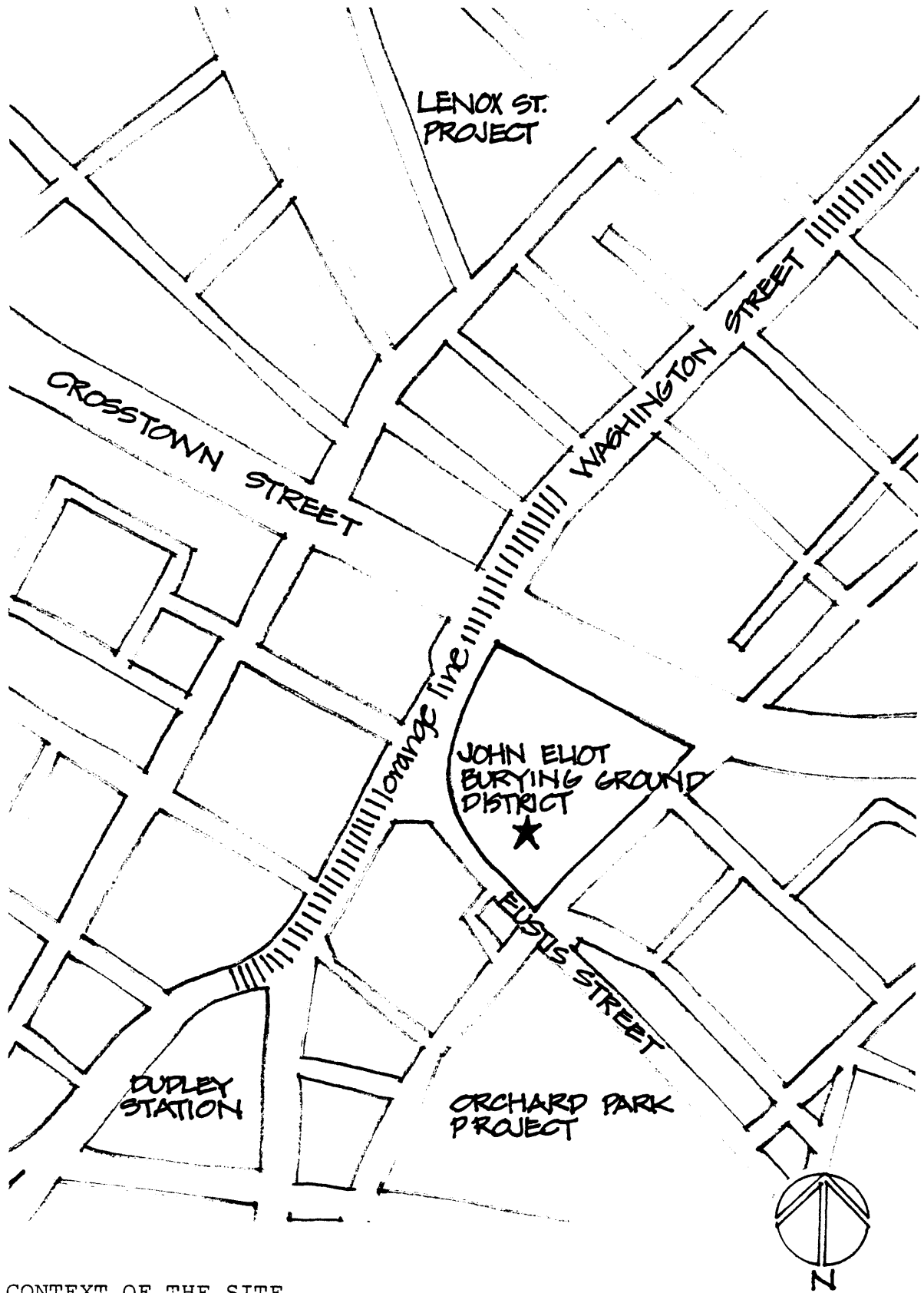
# Existing Context of the Site

## Commercial Uses

The John Eliot Burying Ground District is located in the Dudley Square area of Roxbury - a busy commercial and transit area during the day and a mostly deserted area by night. Commercial establishments string along Washington Street between the Burying Ground and Dudley Station, on Blue Hill Avenue and on Dudley Street also near the transit station. Small groceries, speciality shops, furniture stores, clothing stores, a Woolworths and real estate offices rent spaces on the first floor of the Dudley area buildings. A few buildings are occupied by bars or night clubs which would indicate some night activity. The upper floors of buildings which are more than one story are generally used for light manufacturing or storage, or are abandoned, particularly in buildings bordering the elevated Orange Line track.

## Transportation

Dudley Station is a major transportation stop for many MBTA bus routes and the MBTA Orange Line subway. Current planning of the Southwest Corridor Development Coordinator targets 1985 for the relocation of the Orange Line underground some 1/4 mile west of Washington Street. The new plan suggests a bus or train loop for service to the Dudley area from the relocated line with a transit stop at the Northwest corner of the Washington Street - Crosstown



CONTEXT OF THE SITE

Street intersection.

There is, currently, heavy automobile traffic in the Dudley area. Parking is predominately on-street in the shopping area, although lots exist in nearby locations. Parking lots and streets not bordered by commercial establishments are generally not used for short term parking (i.e. shoppers); streets bordered by shops are usually parked full, often with cars double parked for brief periods of time.

## Public Services

A new police headquarters and fire department is located on Dudley Street just east of Dudley Station. Social services are sprinkled in buildings around Roxbury, many of them located near John Eliot Square, approximately 1/4 mile South of Dudley Station. Madison Park High School and Boston Vocational High School draw some high school age students from the Lower Roxbury area, although others are bussed to schools outside of Roxbury.

## Existing Residential Area

The area around the John Eliot Burying Ground District is not currently a residential one. A large BHA housing project, Orchard Park, is in the immediate vicinity of the Burying Grounds; however, it is nearly 21% vacant (17). A few abandoned buildings are occupied by single people. LRCC (Lower Roxbury Community Corporation) has developed a small number of new units west of Dudley Station off of Ruggles Street, and plan on expanding that project in the near future. It appears likely that more housing development will start along the Roxbury edge of the new Crosstown Street when that road is completed.



John Eliot Burying Ground

## Site Description

The John Eliot Burying Ground District is located in Lower Roxbury at the intersection of Washington and Eustis Streets. The recently excavated Crosstown Street forms the northeast boundary of the site and elevated MBTA tracks running above Washington Street form the northwest boundary. Although much of the land in Lower Roxbury was created through a series of land fill projects in the nineteenth century, the site is located on bedrock and consequently has a long history of use dating back at least as far as the 1620's, when the first settlers arrived in Roxbury.

The 3/4 acre site is currently comprised of six structures, dating from 1784-1888, and the John Eliot Burying Ground, dating from 1630. The structures include: the brick Eustis Street Firehouse (1859) with its wood addition (1868); the small brick Davenport Office Building (c. 1873) located adjacent to the firehouse on the south-east edge of the Burying Ground; the brick Owen Nawn Factory (1869) located at the north edge of the Burying Ground facing Washington Street; the wood Josiah Cunningham House (1784) with a one story wood storefront addition (1867); the Jesse Doggett House and Tavern (c. 1788) with a similar storefront addition (c. 1888); and a small wood house (c. 1868) to the southeast of the Cunningham and Doggett pair. The Burying Ground and the Firehouse are on the National Register of Historic Places and respectively under the domain of the City Parks Department and Department of Real Properties; the houses and factory are under the jurisdiction of the Department of Public Works. None of the buildings have legal occupants, although one resident has occupied the small wood house for many years and acts as caretaker of the site. The buildings are in dilapidated condition; however, all the buildings could be made structurally sound and re-used.

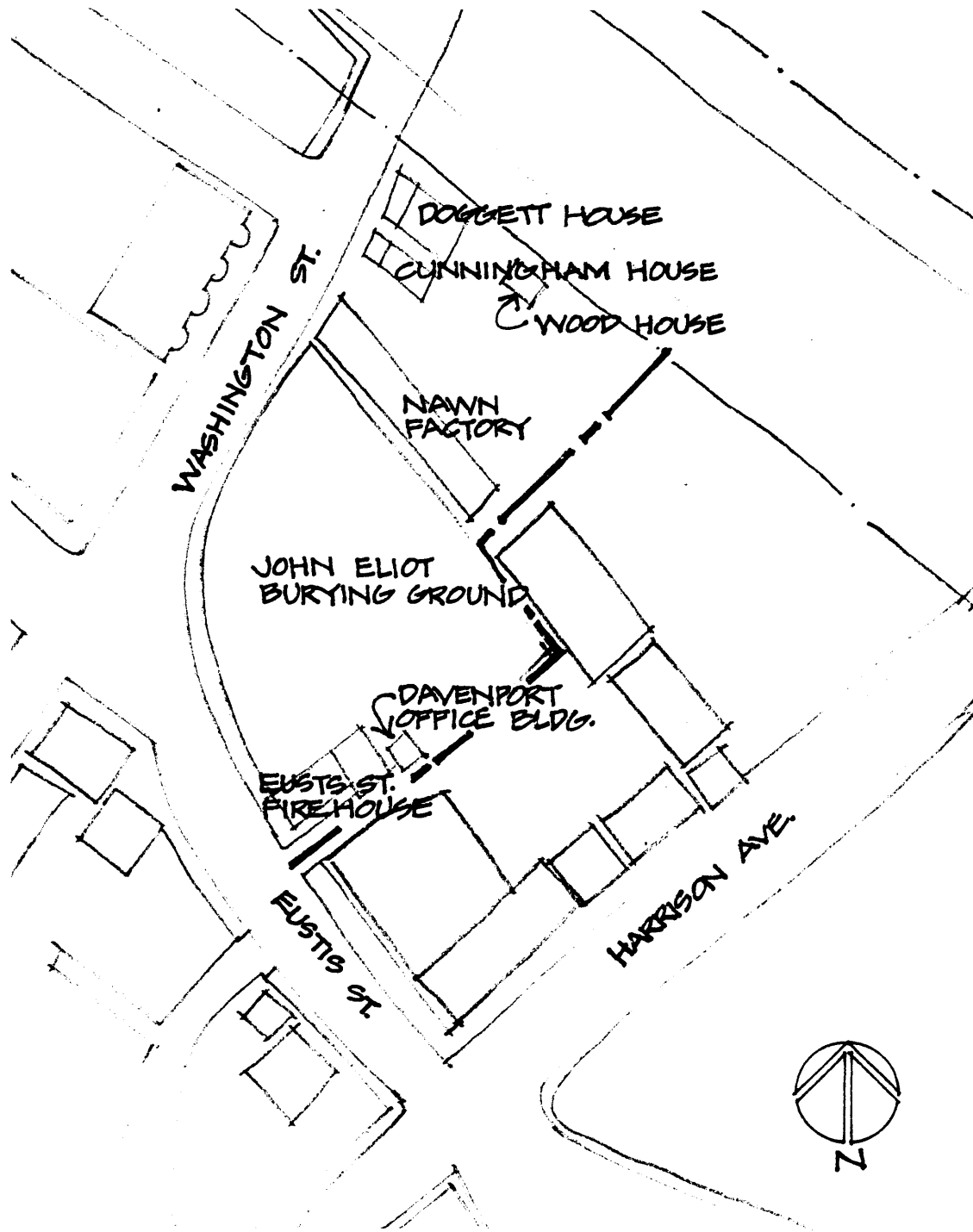
The site is a unique collection of buildings and grounds which represent changes in the evolution of Roxbury from a small, busy New England town, to a deteriorated section of a post-industrial city. Their significance is in their location at the "new" Roxbury line, in their history, in their survival, and in their educational value, and eventually, in their re-use. The site occupies what will be the "entrance" to Roxbury when traveling south on Washington Street from Boston. The Crosstown Street places Cunningham and Doggett Houses in a prominent visual position since they are located just 20 feet from the new street right-of-way on a corner that can be seen by people traveling in either direction on Washington or the Crosstown Street. The proposed transit loop is planned to stop

at the corner diagonally across from the Doggett House.

The Cunningham and Doggett houses are good examples of late eighteenth century houses and the transitions from rural to more urban growth in Roxbury. Their close proximity suggests a dense configuration of buildings; maps from the turn of the century indicate other lots with buildings adjacent to the Cunningham and Doggett lots. The Nawn Factory and Eustis Street Firehouse are examples of mid-nineteenth century buildings; the factor representing the industrialization of the area and the firehouse representing public improvements that were required by the dense arrangements of Lower Roxbury as well as amenities provided in the area to incite further growth. The Burying Ground is a lasting reminder of past residents of Roxbury and their contributions to the development of America.

Although the site has also been the location of buildings that no longer exist, the Burying Ground District remained reasonably in tact during are demolition for urban renewal. This is probably for two reasons: the site bordered the expressway path rather than blocked it, and second, because of the sacred nature of the Burying Grounds, the site could not be assembed as a housing project to fit BHA criteria. The Department of Public Works did propose to demolish the Eustis Street Firehouse in 1969, however community protest was strong against demolition. Consequently the firehouse and the Burying Ground were included on the National Register of Historic Places.

As an educational case study, the buildings of the District offer not only a long history of use, but also a large range of construction methods to be learned through creative demolition and repair. Ann M. Beha and Associates (75 Revere Street, Boston, MA) (18) have prepared an in-depth analysis of the history of the buildings and the particular skills required for their repair. The remainder of this study focusses on the re-use of the site.



EXISTING BUILDINGS ON THE SITE

# Strategy for Site Use

Re-use of the existing buildings and development of the site should be phased to coincide with the interests of Boston 350 and with other building activities in the area. The intent of this section is twofold:

1. to provide Boston 350 with a proposal that accommodates immediate work on the site by students, while describing a possible scenario for the future of the site; and
2. to offer a phasing of the proposal that will depict a steady growth in the re-use of the site rather than sudden re-development.

Phase 1 offers a program for the rebuilding and re-use of the Cunningham and Doggett Houses for community space. Phases 2 and 3 develop the potential for housing on the site; phase 2 focussing on the renovation of the existing buildings and phase 3 suggesting future development of townhouses to increase the number of dwelling units.

# Phase 1

The first phase of this project is to start immediately. Its general intentions are educational with three specific goals: to develop a program for students to learn construction techniques; to allow community residents to view and learn from activities on the site; and to quickly mobilize the use of the site.

The efforts in this phase focus mainly on creatively disassembling and rebuilding the existing buildings on the site. To make the site more accessible to the general community, walkways should be repaired and benches and information kiosks should be added.

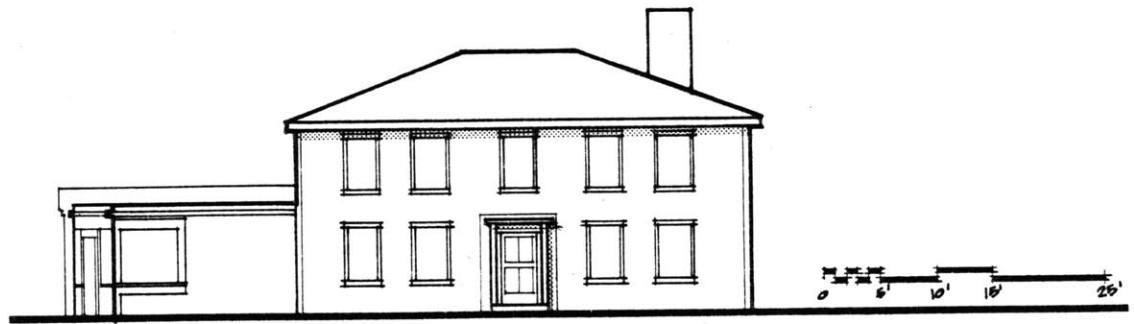
The work done in this first phase should be implemented in a way that will support the work to be done in phase 2. Building stabilization and repair should reflect future use of the buildings (e.g. if the roof of a building is to be used for outdoor gardening, the roof structure should be strengthened to support larger loads during its repair). Landscaping for phase 2 could be cultivated during phase 1. Overlapping planning for the future use of the site with the analysis of the past of the buildings will implicate the further evolution of the site.



WASHINGTON ST. ELEVATION (AS BUILT)



Washington Street Elevation



CUNNINGHAM HOUSE SOUTHWEST ELEVATION (EXISTING)

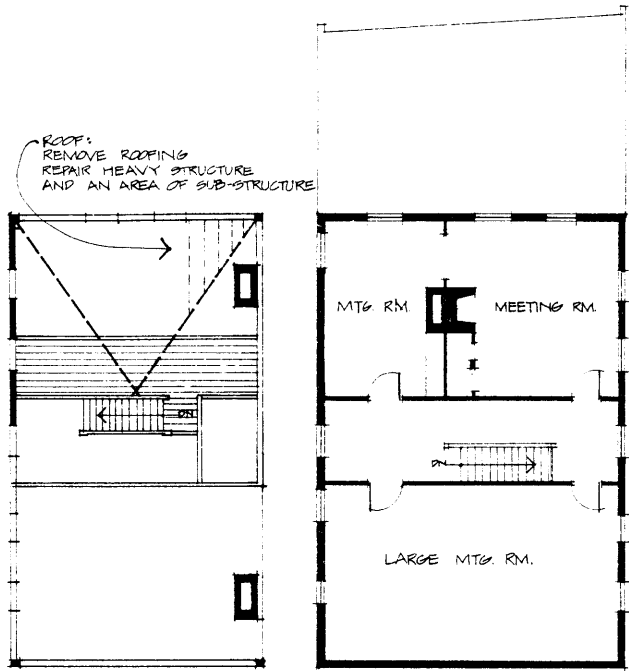
# Cunningham and Doggett Houses

As an example of results that could be expected from phase 1, the following drawings illustrate the educational re-use of the Cunningham and Doggett Houses. Because the Cunningham House is in significantly poorer condition than the Doggett House, it is used as "practice" facility - the house is taken apart so that students can study structural systems, layers of materials and sequences in construction, and then partially rebuilt, familiarizing students with construction skills needed to repair the Doggett House. The remaining "ruins" of the Cunningham House should be preserved from weather damage to illustrate the process of rebuilding the site.

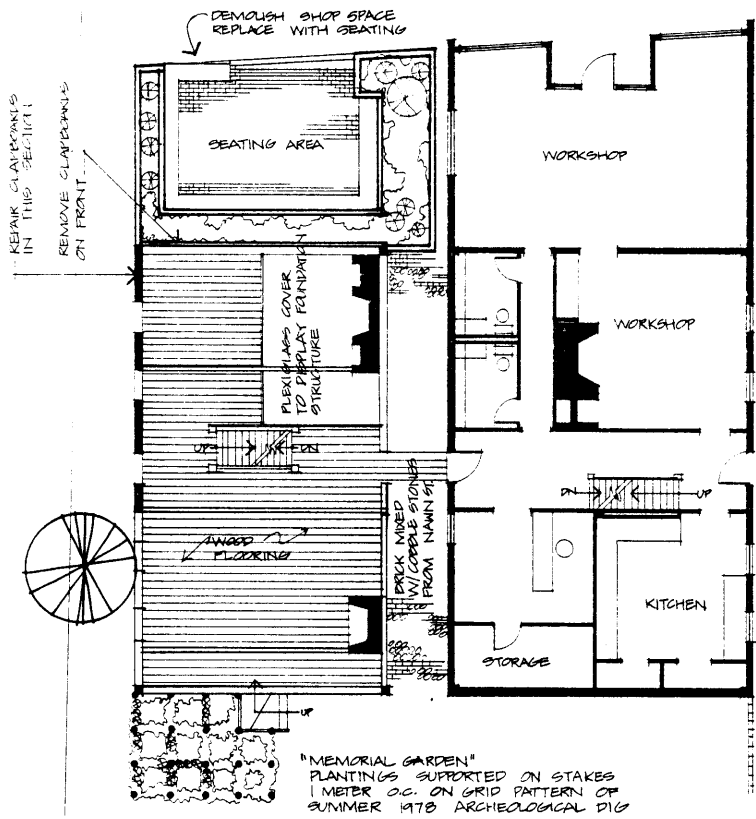
Students would then have the necessary expertise to renovate the Doggett House for community workshop use. Pieces saved from the Cunningham House should be used for repairing the Doggett House. After the Doggett House renovation, the pair of houses would rather successfully symbolize the change of the buildings through the education of the students, as well as serve as useful function in the community as space for meetings, classes, crafts or social services.



Doggett House; Northeast elevation

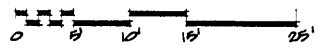


SECOND FLOOR PLAN



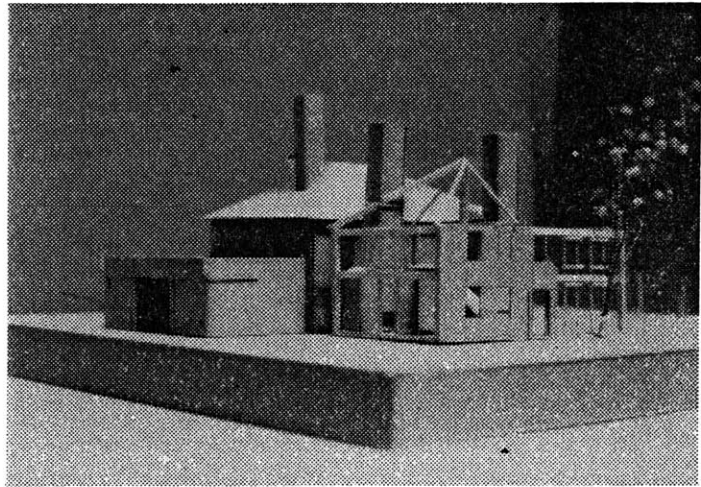
FIRST FLOOR PLAN  
CUNNINGHAM  
HOUSE

DOGGETT  
HOUSE

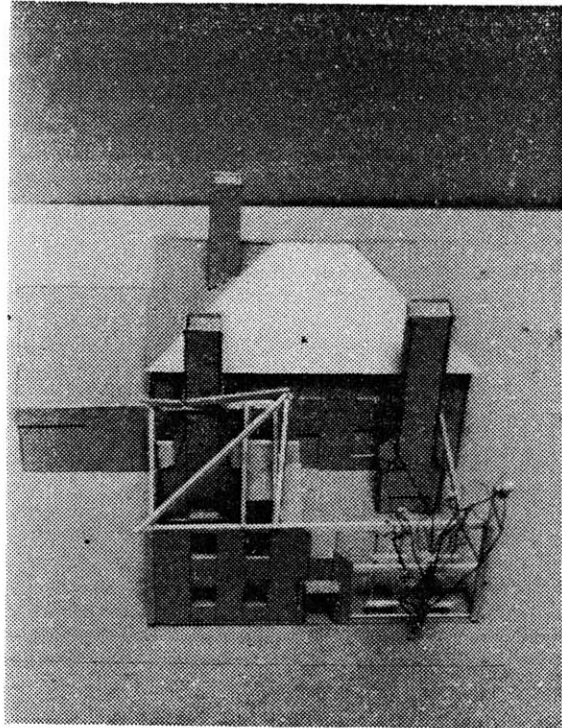




WASHINGTON ST. ELEVATION (PROPOSED)



Study model for Cunningham and Doggett Houses





# Phase 2

Phase 2 would occur when sufficient funds are acquired to develop the existing buildings on the site. The intent is to re-use the buildings in a way that is sympathetic to both community needs and the history of the site.

Good housing is in great shortage in Roxbury and government subsidizes have recently been ear-marked for renovation of existing buildings rather than new construction, which would be appropriate for the conversion of the buildings in the Burying Grounds District to housing. (With the impending removal of the orange line, it is assumed that the site would become more desirable for housing.) The Cunningham and Doggett Houses would remain as completed in phase 1 which should help maintain the image of a housing cluster springing up in a healthy segment of the community.



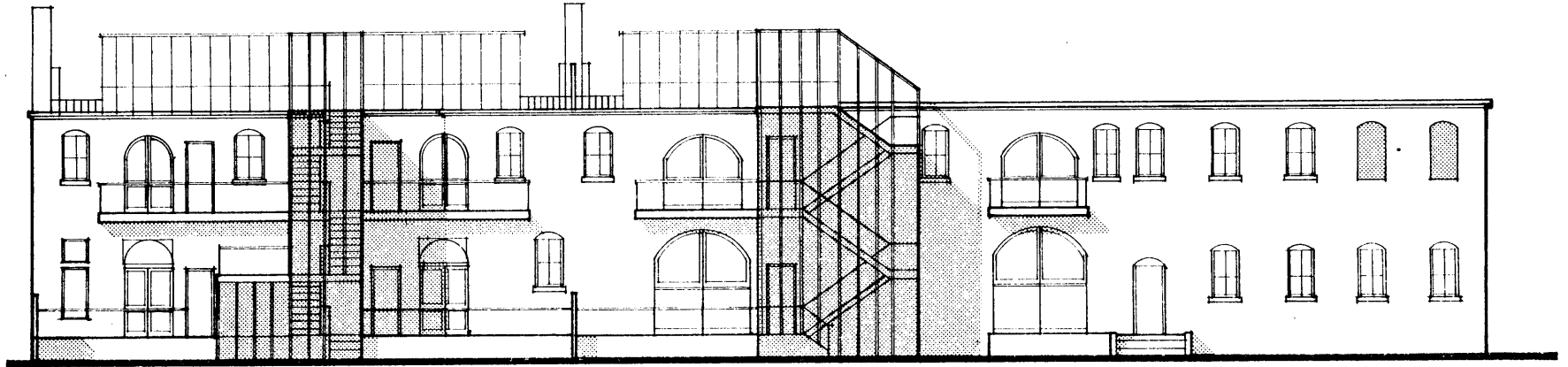
Owen Nawn Factory

# Nawn Factory

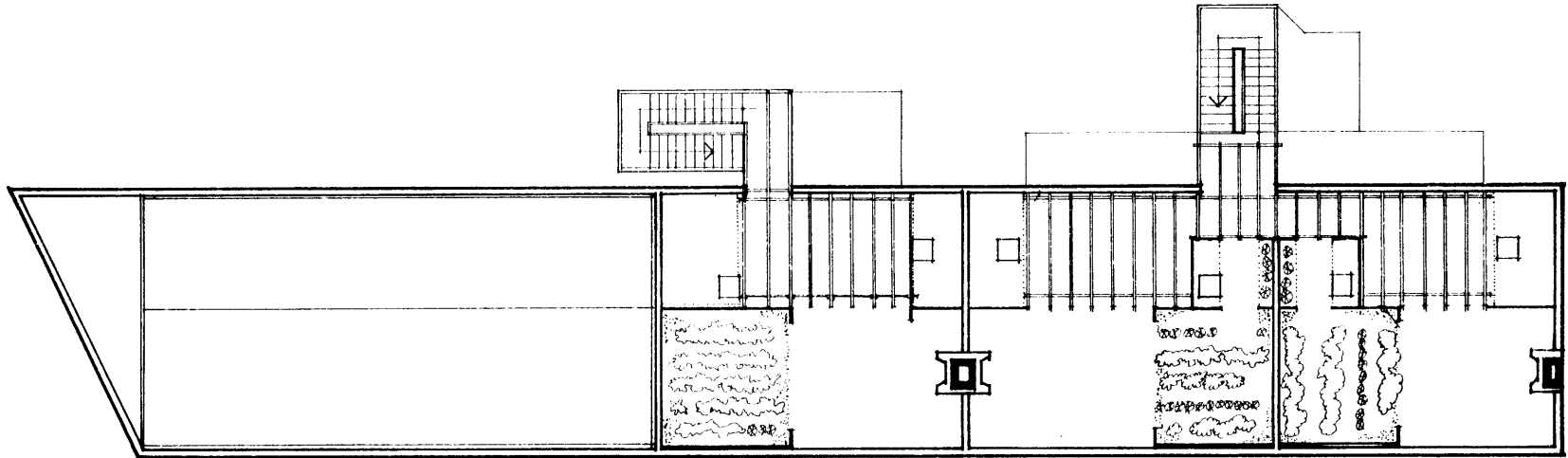
The Nawn Factory provides space easily adapted to housing. The scheme includes six one-bedroom and one three-bedroom apartments, and a commercial space fronting on Washington Street.

The apartments have separate entry ways from Nawn Street except for one pair on the second floor which share a stair. One bedroom apartments on the ground floor have outdoor space fronting on Nawn Street, those on the second floor have outdoor roof space. All the apartments overlook both Nawn Street and the Burying Ground.

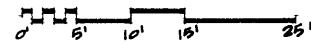
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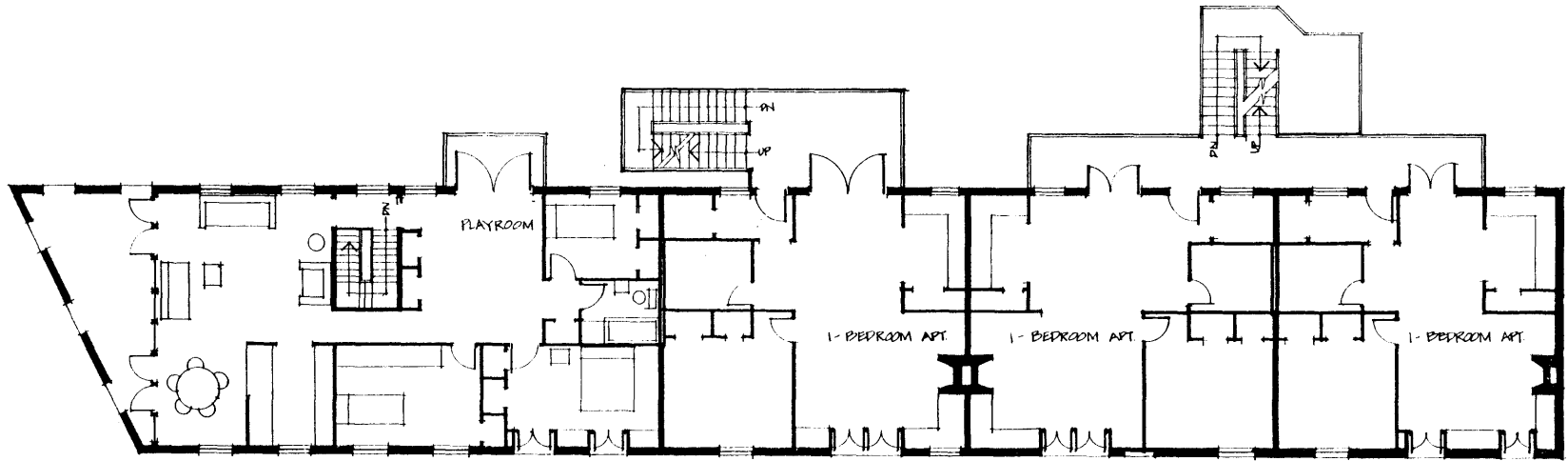


NAWN STREET ELEVATION

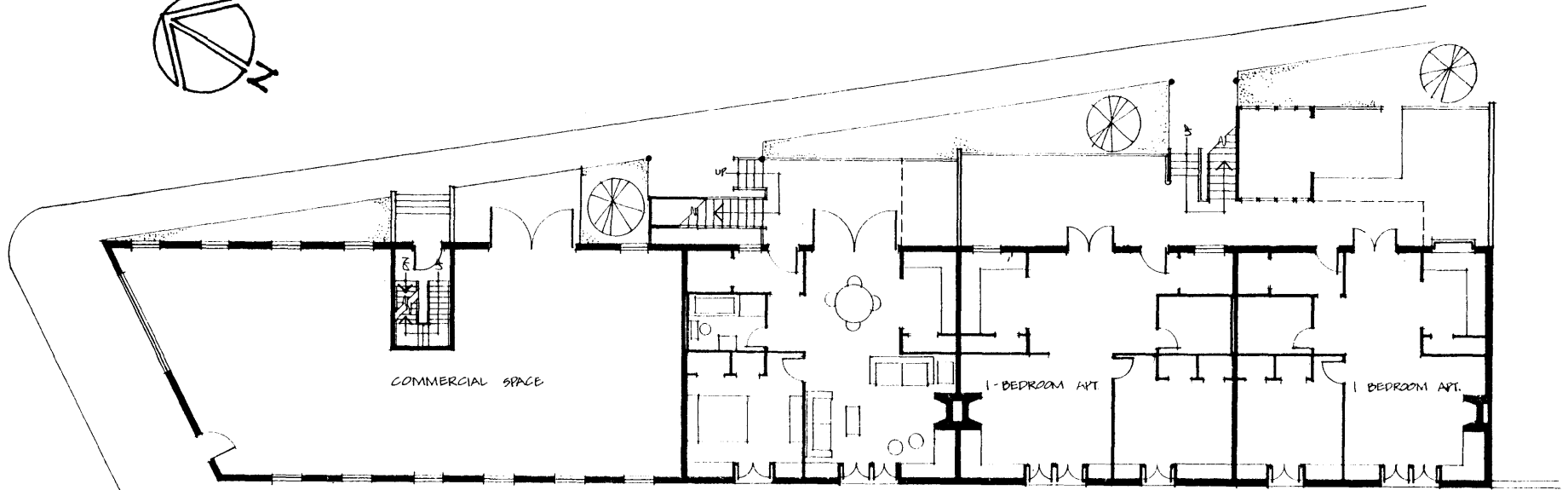
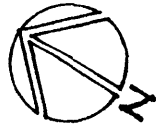


ROOF PLAN

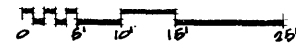


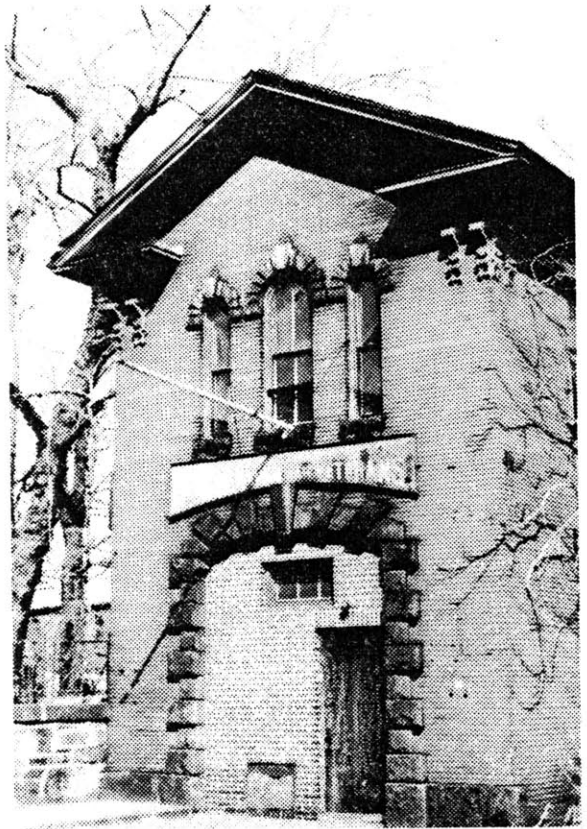


SECOND FLOOR PLAN



FIRST FLOOR PLAN





Eustis Street Firehouse



Davenport Office Building

# Eustis Street Firehouse

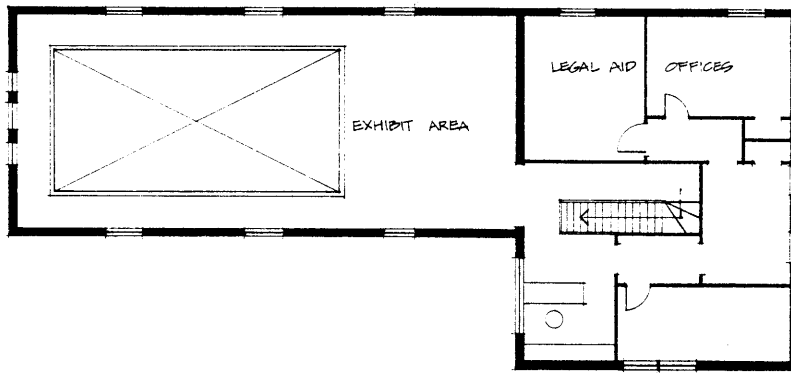
Two schemes for the re-use of the firehouse are presented: one for social services and another for 2 large housing units. Because of the historic designation of the building, it seems more apt to use the building for services of a public nature, so that more people will have access to the landmark. However, it is conceivable that housing would be a more necessary use especially in early re-development of housing in Lower Roxbury when sturdy buildings adaptable to housing would have to be converted in order to attract residents for a cohesive neighborhood.

The scheme for social services include space for a health clinic, legal aid and social workers as well as exhibit area for work done on by the Roxbury community.

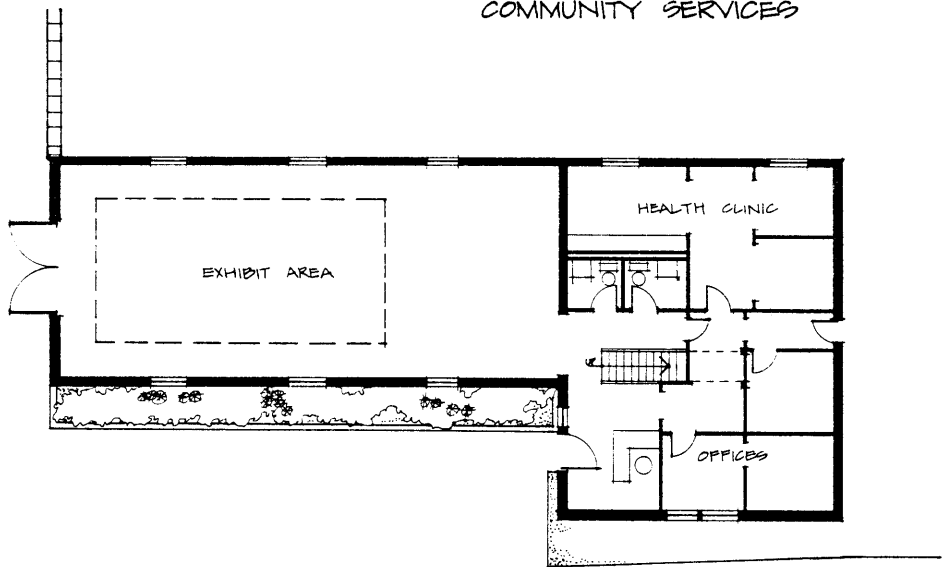
The housing scheme converts the firehouse into a 5-bedroom unit in the brick section of the building and a 4-bedroom unit in the wood addition.



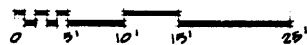
EUSTIS STREET ELEVATION

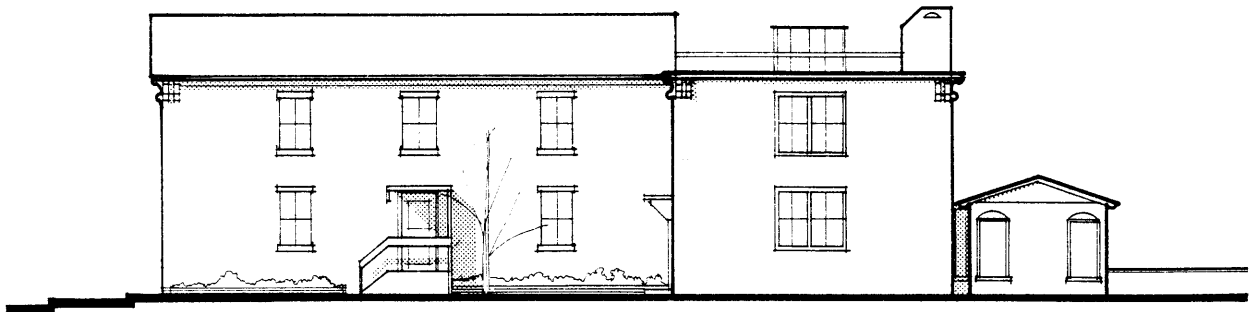


SECOND FLOOR PLAN  
COMMUNITY SERVICES

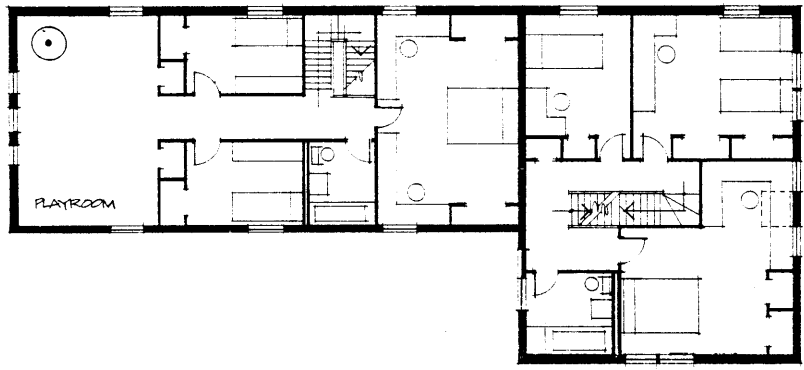


FIRST FLOOR PLAN  
COMMUNITY SERVICES



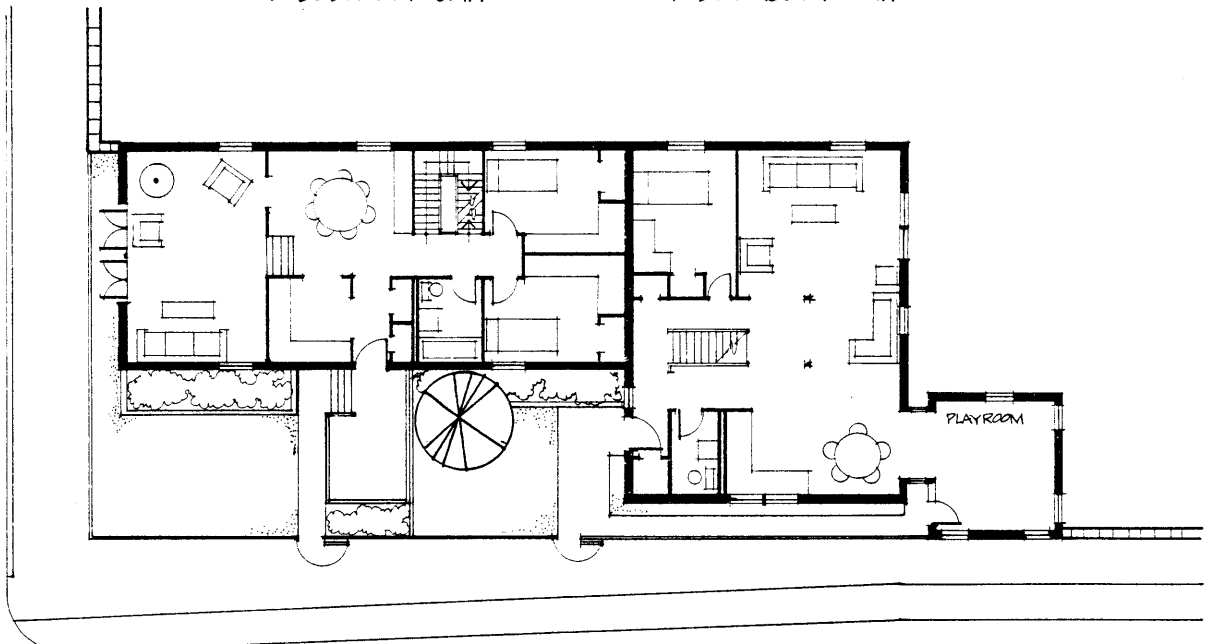


SOUTH EAST ELEVATION



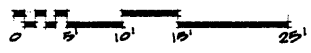
5-BEDROOM UNIT

SECOND FLOOR PLAN  
4-BEDROOM UNIT



5-BEDROOM UNIT

FIRST FLOOR PLAN  
4-BEDROOM UNIT





# Phase 3

Phase 3 attempts to integrate the historic site into a larger residential community.

It is not likely that such development would occur until other housing development are planned or constructed in other areas of Lower Roxbury or until subsidies become more available for new construction.

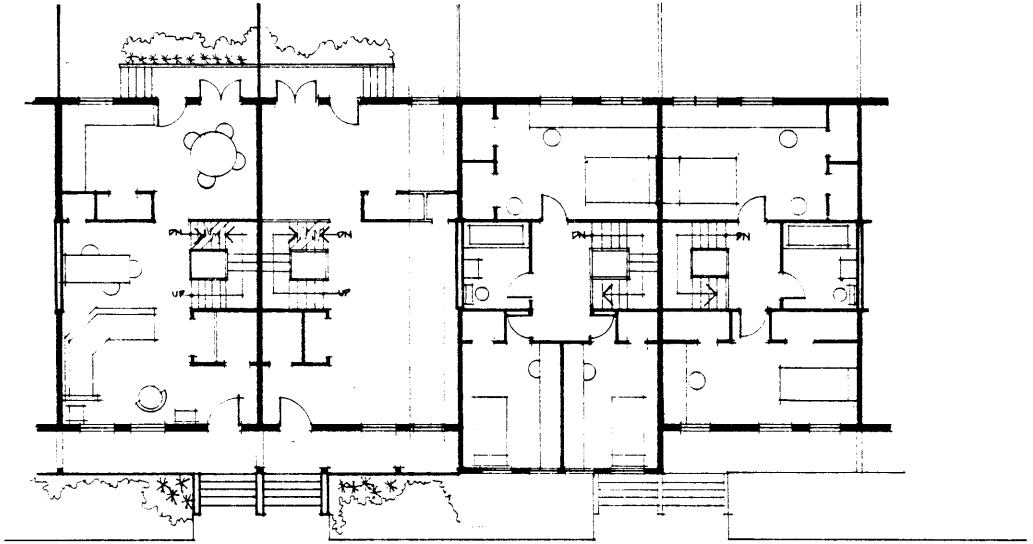
The following proposal extends over the entire block bounded by Washington Street, Crosstown Street, Harrison Ave. and Eustis Street. The historic buildings (the Firehouse and the Cunningham and Doggett Houses) are at the entrances of the site, so that visitors and residents will be reminded of the history of the block as they drive or walk through the area. New low scale units line the streets to form a community of 60 units including units in the Nawn Factory and 16 new 3-bedroom townhouse units, 13 new 2-bedroom townhouse units and 24 new 1-bedroom apartments.

Nawn Street runs southwest-northeast following the old path of Nawn Street; the southeast-northwest street runs adjacent to an existing open lot which has appeared on maps of the area since 1800 southeast of the Burying Ground. Sixty-two (62) parking spaces are provided along Nawn Street, around the perimeter of the site on Harrison Ave. and Eustis Street and in a small lot on the northeast edge of the site adjacent to Crosstown Street. In order to buffer some of the noise of the Crosstown Street, parking is cut into earth berms along the street edge.

Townhouse Unit

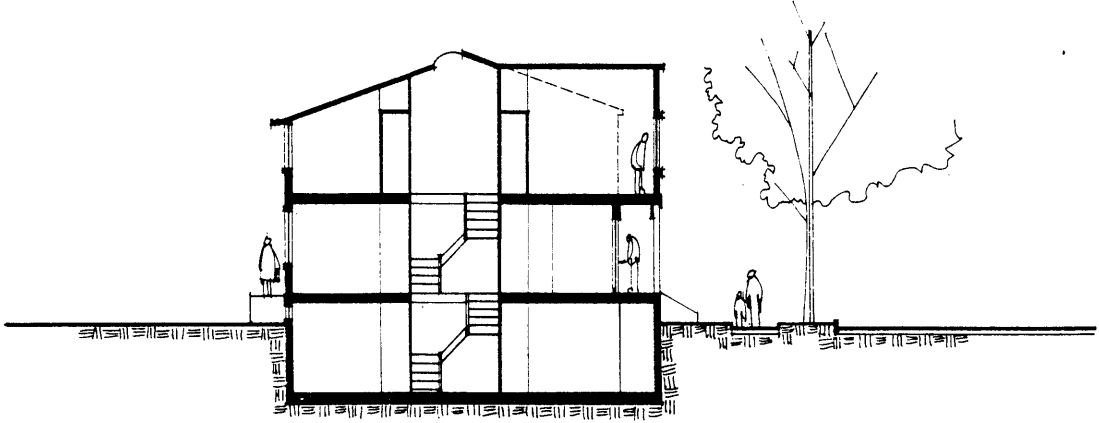


TYPICAL STREET ELEVATION



FIRST FLOOR PLAN

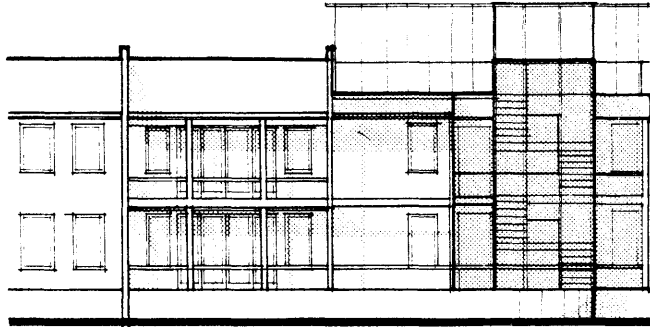
SECOND FLOOR PLAN  
3-BEDROOM 2-BEDROOM



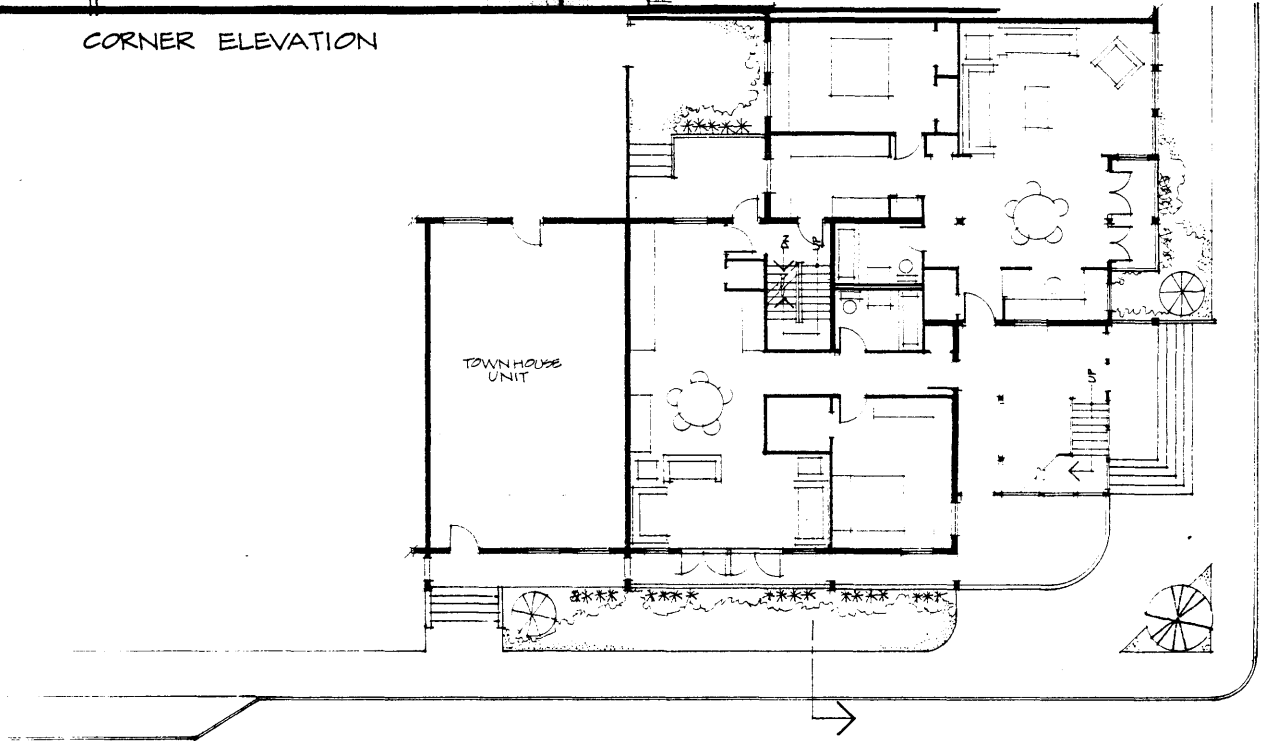
SECTION



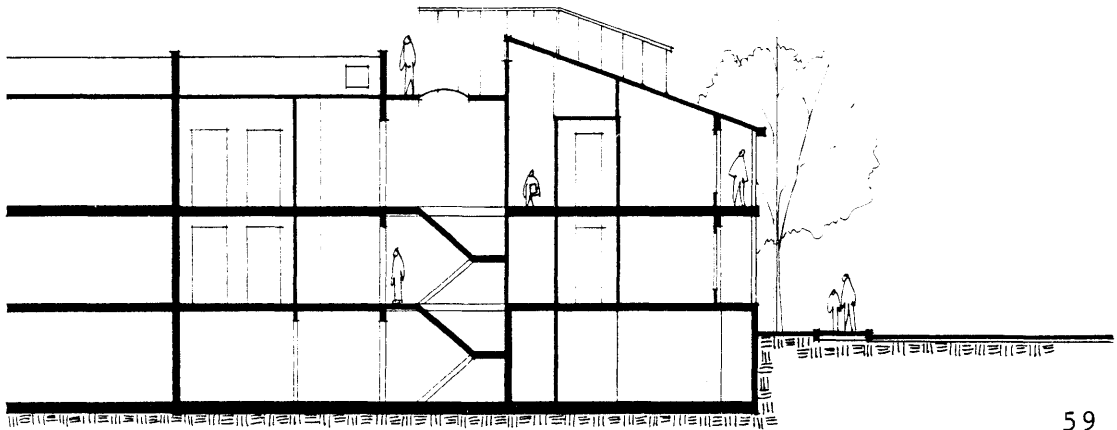
# Corner Unit Apartments



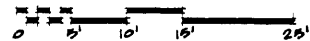
CORNER ELEVATION

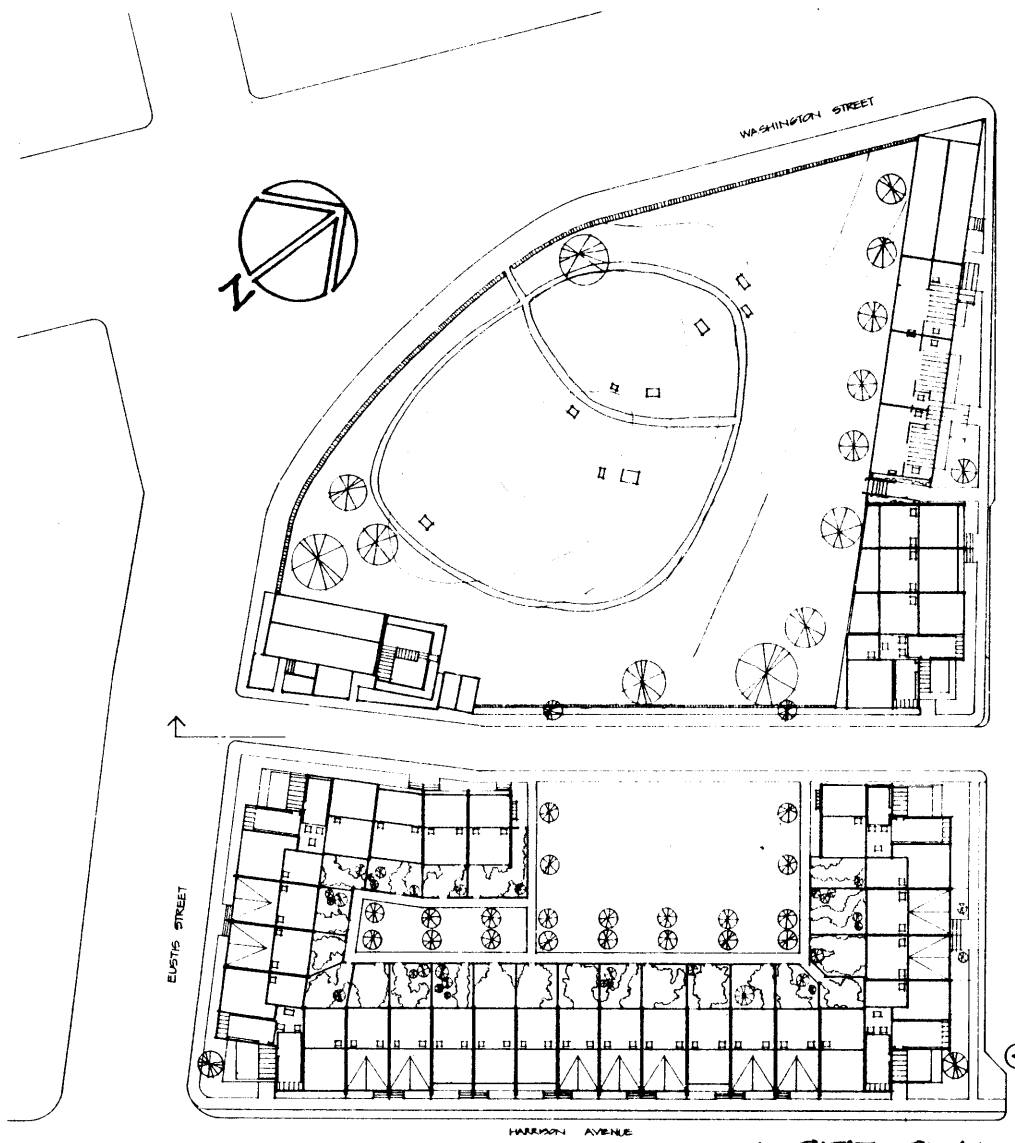


FIRST FLOOR PLAN (TYPICAL UNIT)

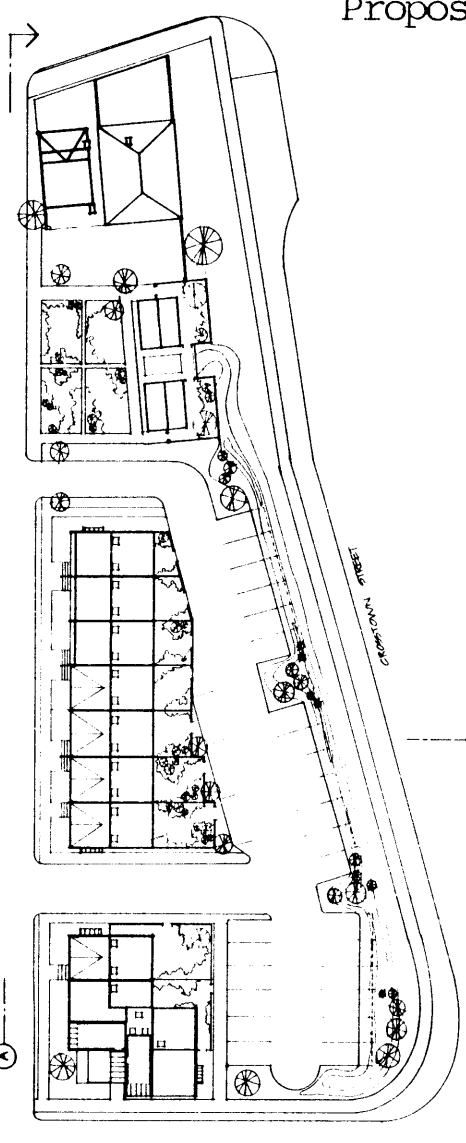


SECTION

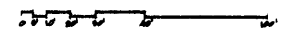




SITE PLAN



Proposed Plan





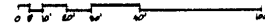
SITE SECTION

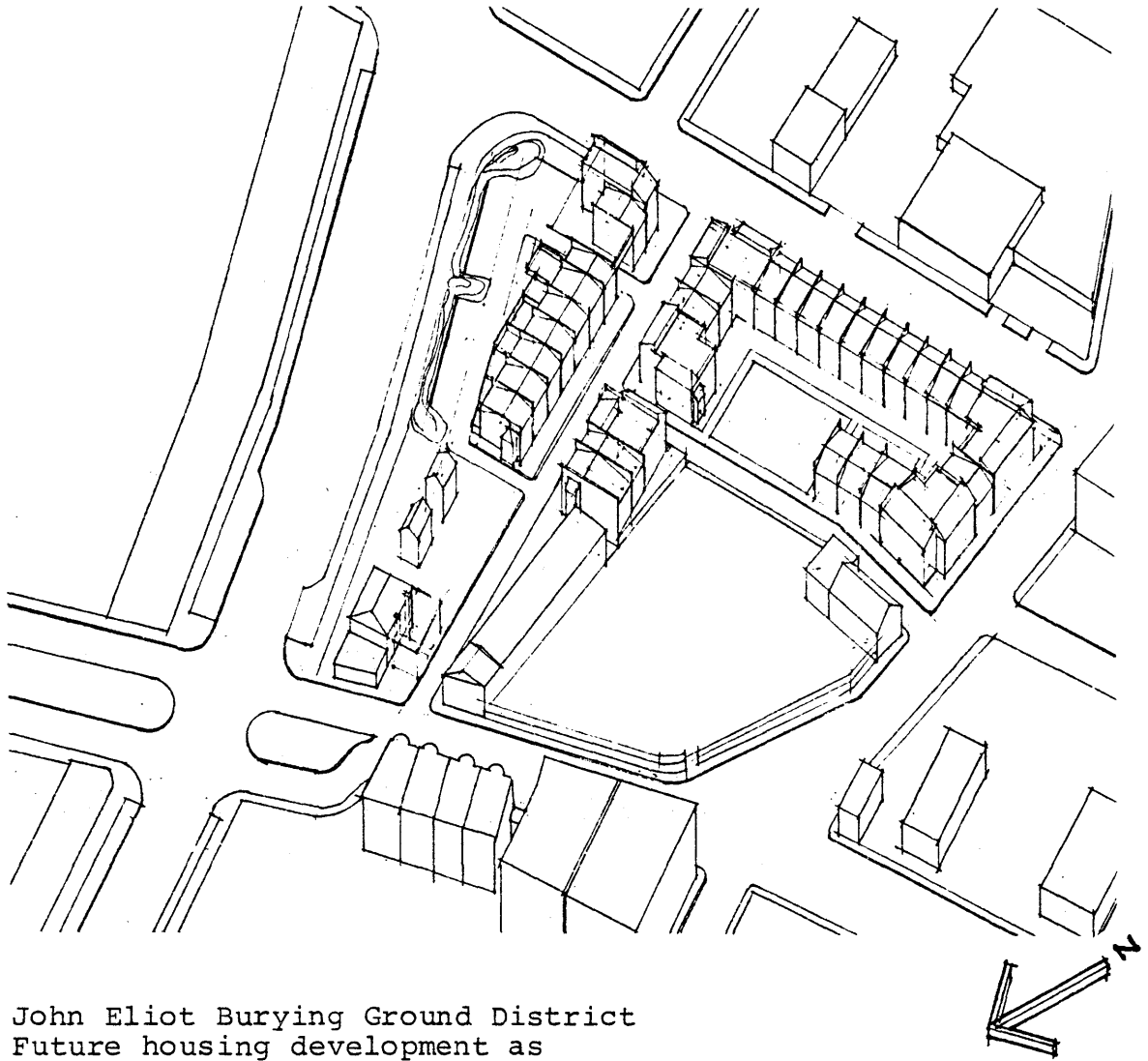
(A)



SITE SECTION

(B)





John Eliot Burying Ground District  
Future housing development as  
proposed in this study

### III. Conclusions

04

Boston 350's effort not only puts abandoned buildings to use, but also trains young community members in skills that will generally benefit the entire Roxbury community. Whether or not the site is re-used for housing, or added upon for a larger development, the old buildings will have served a purpose as a classroom to teach skills that can be applied to buildings perhaps not as old, or in areas more suitable for housing, or on less dilapidated projects that require repair to save the existing building stock. It is not unthinkable that crumbling buildings can generate such new life in deteriorating areas - that one generation of buildings can live on not as ruins or as examples of historic architecture, but in the spirit of younger buildings revitalized because of construction skills learned by practicing on the old buildings.

Such an idealistic program is of course wrought with legal and economic ramifications. If the old buildings are not to be re-used then trade-offs must be made between the amount of time spent on structural repairs done to stabilize the building (i.e. to meet OSHA requirements) and time spent on learning a variety of skills other than structural repairs. Conflicts between code compliance, expenditures and education become more complex if the buildings are to be re-used: rehabilitation to meet building code requirements is a costly effort and would not only narrow the scope of the education but also funds available for teaching skills or issues not directly related to code compliance. Re-use projects would be open to criticism from labor unions who could view student work as an impingement on the construction job market. There are inherent problems with teacher selection: current educators in city

schools are not experienced with construction techniques and construction workers are not experienced in teaching.

However, the largest stumbling block to a program that utilizes abandoned buildings for education is gaining access to such buildings. It is difficult for owners, be it private or government ownership, to admit that a building is no longer economically productive and, further, that it occupies land that is not viable for redevelopment. To turn such a property over to educational groups is an acknowledgement of the lack of economic potential of the site and therefore, an owner can claim only gain on the building (which would probably be realized as a tax loss at best).

We obviously cannot save everything; our cities would be piles of buildings disassembled and re-assembled without any indication of new growth in our society. However, we cannot afford to waste buildings since they are worth so much for learning skills, history, and patterns in any evolution. Public funds should be made available to implement a methodical program to evaluate and practice construction skills on old buildings prior to their demolition. English historian Robin Winks criticizes the American attitude towards its past:

The ways in which people view their past are reflected in those objects that they choose to preserve as reminders of themselves ... For Americans there has always been far more future than there has been past. (19)

It is not necessary to sacrifice the future for the past, only to recognize the worth of our history and fully utilize the remains to our best advantage. To invest the past in the future and to display them side by side can only increase our awareness of our role in the evolution of time.

## IV. Appendix



# Building Analysis and Repair

A number of authors have published methods of documenting and evaluating historic buildings. The detailed analysis they suggest might prove too specialized or time consuming for students of "city attics". However, the general methodology for approaching an old building can be taught on an elementary as well as a more technical level of expertise. This section outlines a method which utilizes skills that could be taught in adjunct with the building analysis and repair.

## Researching a Building

Researching the history of a building should surface information about the origins and changes in the use of a building. The researcher's report should include:

- . the name of the structure
- . its location and address
- . its current owner
- . its occupancy and present use
- . the physical history of the building including (if possible) the name of original and subsequent owners, date of erection, the architect, builder and supplier, description of the original plan, descriptions of additions and alterations (with dates, architects and builders)
- . historical events and persons associated with the structure
- . sources for the collected information
- . and the name of the researchers and the date of research completion.

## A. Sources for Information

### 1. On Land and Buildings:

- . Deeds (starting with the current owner and looking back to subsequently previous owners)
- . Maps
- . Building Permits
- . Newspapers, Publications
- . The Building: study the structure, remnants in the building, finishes on the exterior and interior. Notice where doors or windows have been filled in. Changes in style of construction often indicate later additions.

### 2. On Owners:

- . City Census data
- . Obituaries
- . Biographies
- . Newspapers, publications.

### 3. In General:

- . Other buildings in the neighborhood (how do they compare in age, style of architecture, use)
- . Oral histories
- . Photographs or drawings of similar buildings, buildings in the neighborhood.

Try to relate the construction of the buildings with an event or development in history which will frequently link the building to many comparable buildings (such as boom towns constructed after the discovery of precious metals or oil).

## B. Required Skills

Research skills teach how to use the library and conduct a variety of searches through government documents and records.

## Documentation

Documentation of a building should include its history, the existing condition and the work in progress. The information should be compiled in an expandable notebook so that material can be added as it is accumulated.

### A. Photographic Record

#### 1. Exterior Photographs

Photograph all sides of the building (preferably at an angle which allows more than one side to be viewed in a photograph so that the edge conditions can be studied) and any outstanding features (doorways, trim, decorations). Photographs of places in need of repair can often aid in explaining necessary procedures and, when accumulated from a number of buildings, can act as a "text book" of building problems.

#### 2. Interior Photographs

Some authors (Portland Landmarks) suggest that photographs of each room, door and window be taken. This provides a complete record although it is probably sufficient to select typical arrangements and details along with any outstanding or unusual configurations.

#### 3. Work in Progress

Do not neglect to photograph the process of the analysis or construction since these are additions to the history of the building.

#### 4. Required Skills

Photography can aid an inexperienced person to observe details, shadows, composition as well as to learn simple technical skills for developing and printing film. Inexpensive cameras (such as "Diana" cameras which run about \$4.00 each and require 20mm film) allow much flexibility and experimentation with the film.

## B. Measuring the Building

### 1. Tools

- . 50 foot measuring tape
- . 6 foot folding rule with an extension for measuring ceilings
- . graph paper, medium grade pencils, a sharpener and an eraser for drawing.

### 2. Procedure

a) Sketch the building plan at a reasonable scale (1/4" = 1'-0", 1/2" = 1'-0") on the graph paper. Draw the perimeter of the building first, then the rooms and stairs, then the windows and doors taking care to note where walls and openings line up to form regular shapes. Careful sketching will considerably aid in measuring; most people will have to sketch the plans two or three times. Note all projections and recesses and door swings. Sketch interior room elevations to note locations of windows, doors, mouldings, fireplaces, etc.

b) Measuring the building is easiest in a team of three people; two people to measure and one person to record the information on the sketch. Measure overall dimensions before measuring openings and details. Only record necessary measurements; too many numbers on a sketch will become confusing.

### 3. Checklist for Measuring

#### a) Plans:

Measure the exterior of the building including the roof; the interior rooms, wall to wall; the depth of closets and window sills; thickness of the walls. Note locations of heating vents, chimney stacks and plumbing pipes.

Measure each floor including the basement and attic (if accessible); locate structural members (such as piers, foundation walls and roof rafters) and measure their spacing. This will aid in drawing walls and openings since the framing will determine their location.

b) Elevations and Sections:

Measure exterior conditions such as windows and door heights and dimensions, corners, overhangings and exposed foundations. Measure interior locations of openings and correlate them with the exterior drawings using a convenient notation system. Measure heights of floor to ceiling, floor to floor, doors, window sills and heads, mouldings. In the stairs note their width, the number of steps, the size of the tread and rise. Sketch how the stairs are construction.

4. Required skills

Measuring and sketching develop skills in estimating size relationships between objects and accuracy in measuring and recording.

C. Measured Drawings

To complete the documentation of the building it is necessary to accurately draft the sketch and measurements made in the field. This requires laying out the structure of the building at a particular scale (e.g. 1/4" = 1'-0") and then drawing the building using the structure as a measurement reference point. Once again start with the perimeter, then the rooms and stairs, then the details. Make the drawings on reproducible paper, use pencil or some erasable medium pencil to ease the process.

1. Tools

- . Straight edge such as T-square or parallel bar
- . right triangle
- . accurate scale rule
- . reproducible paper (unless drawing size is small enough for xeroxing)
- . drawing implement (pencil, pen) and eraser.

2. Required Skills

Drafting develops organizational skills and neat working habits along with the obvious technical training.

## Structural Analysis

A structural analysis should document the existing conditions of the building and indicate places which need repair. The following areas should be analyzed; many of the books indicated in the bibliography offer more elaborate suggestions on repair and maintenance.

### A. Foundations

Foundations will generally be of masonry bearing walls or piers. In areas of the country where the water table is high, some buildings (those built prior to 1940) will be constructed on wood piers.

Failure generally occurs in the mortar as a result of cracking caused by movement of the building, or crumbling, generally due to water or chemical damage. Mortars were generally made of lime and sand; replacement mortar should be the same, although small amounts of cement may be added for strength. The surface of the masonry may also be decayed from water or air borne salts and chemicals; stones or bricks that are crumbling should be replaced or cut back to their solid portion and rebuilt with concrete.

### B. Floors

Floors in residential scale buildings and in early industrial buildings are generally of wood with wood supporting members. Later industrial or public buildings usually have concrete or stone floors (marble) with metal supporting members.

Failure occurs in missing, sagging, broken or rotted structural members. These must be replaced or supported with additional members near the dilapidated one. Missing floor boards in wooden construction can often be replaced by boards found in the attic floor, particularly in colonial structures, since floor boards were considerably thicker at that time than now available.

### C. Exterior Walls

Exterior walls have been made of many types of materials: wood frame with clapboard finish, masonry bearing, or wood frame with non-bearing masonry infill are popular early construction methods.

Failure occurs in masonry walls as it would occur in masonry foundations. Wood structures will sag or rot most likely due to water damage or insect infestation. The problem must be alleviated along with the structure repair.

### D. Roof

Roof structures are most often of the same system as the floor structure. Flat roofs are covered with tar and gravel, pitched roofs are either slate or wood (or if recent, asphalt) shingles or corrugated metal (generally in warehouses or as replacement of an early roof covering).

Structural failure occurs similar to failure of the floors: water damage is the primary cause of failure; leaks in the roof covering are frequently found and roof flashing is often missing or damaged.

### E. Mechanical, Plumbing and Electric Systems

#### 1. Heat

Until the mid-1800's, fireplaces governed the plan of houses and meeting halls. Cooking and heating stoves came into general use between 1840 and 1860; central heating was developed at the end of the 18th century although used only in public buildings until the very late 19th century.

#### 2. Plumbing Systems

Indoor plumbing was not an issue until dense tenement conditions and requirements for water and sewage systems for industry necessitated the development of plumbing systems in the mid to late 19th century.

#### 3. Lighting

Light was provided through large windows and by burning oil or gas lamps until the early 20th century. Wide spread use of electricity in homes did not occur until after World War I.

Problems with sub-systems made of metal generally are due to corroded metal or plugged or poorly connected joints. Plumbing or electrical systems installed prior to 1940 generally do not meet current building code standards and might have to be replaced if the building will be re-used. Fireplaces are subjected to problems similar to masonry foundations as well as plugged or closed stacks. Check all systems carefully before using them.

#### F. Finishes

If the interior of an old building is finished, it usually is done with plaster on lathe with either a painted or, less frequently, a paper surface. There is little evidence of paint prior to 1725 although by 1770's paint was used extensively in urban areas. Pigments were made from earths or synthetic metal compounds, and either stenciled or brushed onto a wall, ceiling or, sometimes, floor. A white-wash undercoat made of chalk powder (lime and water with whiting or glue sizing) was frequently used on plaster walls and ceilings; if the whitewash is still remaining, oil base paint must be used in refinishing since water base paint will not adhere to the chalk powder. Wall paper was hand printed until the 1850's. Date paper before it is removed in case it is original.

#### G. Hardware

Hardware remaining in old buildings generally requires cleaning and oiling. Pre-19th century hardware is difficult to copy, it is often more reasonable, economically and functionally, to use currently available hardware for replacement.

Hardware can be cleaned with paint remover and light rubbings with steel wool. Soaking the hardware in a mild acid - such as tomato juice and water - and heating it for an hour or so also will remove old paint and varnish.

## Repair of Structures

To avoid duplicating work efforts, repairs on a building should follow a sequence to first repair the structure, followed closely with servicing the building with plumbing, electrical and HVAC systems, then exterior repairs and, lastly, interior repairs. There are, of course, overlaps and situations that do not require such organization. For buildings not to be re-used and are for study only, an imaginative program based on skills to be learned (depending upon student knowledge and desire) should substitute this more straight-forward one.

A. Excavation

Dig to clear the site and to check foundations, utilities and drainage. Repair and replace necessary pipes.

B. Demolition

Remove any unwanted portions of the building.

C. Utilities

Bring in necessary lines.

D. Foundation Repair

E. Sub-systems

Servicing (plumbing, electrical, HVAC) can begin whenever foundations are sturdy enough to bring equipment into the building.

F. Structural Repairs

Repair or replace any rotted, broken or crumbled roof, wall and floor members. When doing structural repairs it is often easier to repair interior structures room by room, and structural roof members concurrent with the repair of the roof surface.

G. Exterior Work

Weather tight the building. Start at the roof and work down. Repair roof flashing and surface, exterior siding,

door and window frames and trim work. Finish work on the exterior can begin when repairs are complete.

#### H. Interior Work

Repair ceilings, walls, window and door frames, floor surface, trim and hardware. Finish after repairs including plastering, painting, sanding the floors, etc.

#### I. Clean-up and Landscaping

Start clean-up with the completion of heavy interior work. Landscaping is seasonal; plan accordingly.

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