EXPRESSWAYS AND URBAN SHORELINES:

CONSIDERATIONS FOR THEIR VISUAL DESIGN

by

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ABSTRACT

EXPRESSWAYS AND URBAN SHORELINES: CONSIDERATIONS FOR THEIR VISUAL DESIGN

Michael Trivitt Ryland

Submitted to the Department of City and Regional Planning on May 18, 1962 in partial fulfillment of the requirement for the degree of Master in City Planning

This thesis investigates the visual pattern of urban shorelines and waterfronts as seen from the express and/or limited access highway. The shore was studied both for its pattern immediate to the automobile and for its contribution to city image.

A field survey was conducted along three Boston Routes to gain an understanding of the consequences of present highway - water treatment. Photographs, tape recordings, diagrams, and sketches were used to compile a record of visual relationships. Roads studied were: Routes #1A and #C1 from Lynn to Boston, Soldier's Field Road and Storrow Drive from Brighton to Boston, and the Southeast and Fitzgerald Expressways from Neponset to Boston. Differences in highway construction and areal use permitted the study of a range of natural and man-made conditions.

From the analysis it was concluded that the expressway - shoreline relationship can be made a meaningful contributor to city image. Management of road, water, and adjacent development can bring about the desired visual result without the need for construction and design methods which hinder the expressway movement function.

Thesis Supervisor: Kevin Lynch

Title: Associate Professor of City Planning

ACKNOWLEDGMENTS

The author would like to acknowledge the help and inspiration of Professor Kevin Lynch. His comments and suggestions were invaluable in the preparation of this thesis.

Other individuals have also helped make this thesis possible through the loan of mechanical equipment and services.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

Man marks the earth with ruin, - his control
Stops with the shore...

Childe Harold's Pilgrimage
Lord Byron

STUDY PURPOSE

Modern emphasis upon the automobile as a prime human mover over physical distance provides an increased potential for total quantity of visual experience during time. One can see a wider range at fifty miles per hour during his twice daily commute than he was formerly able to at the three to ten mile-per-hour pace of walking or in-town bus service.

This hour long trip, much of which may take place on an express highway, may provide a highly diversified visual pattern and range of scale not otherwise found during the day. Range at the home end of the drive is quite likely limited to one predominant residential type, a predominant street pattern, etc. Variety is at the small scale and similar to the office or plant which may not allow vision beyond its own structure. In comparison the journery to and from work often provides a full range of large and small scale visual interest with a greater chance for contemplation than is found either at home or work.

It is the purpose of this thesis to study one aspect of the automobile trip i.e. the express highway as it pertains to visual experience found in conjunction with water bodies, their associated functions, and land masses. Not only is there need to consider the commuter and his need for a pattern which shows daily variation, but also at the same time it is essential that variety of scene does not become hectic and a visual chaos to the transient. For his benefit emphasis should be upon the handling at a large scale with a meaningful unfolding and sequence of excitement representative of the

character of the particular urban area. It is the interplay of large and small expressway - shoreline scales and their relationship to individual city aspect which is the concern of this thesis and its purpose of increasing visual experience.

Walter Whitehill(1) says the following in regard to the modern highway's effect upon the driver and Boston's water image in particular.

> Only residents of Essex County and Maine and New Hampshire, traveling by car, approach Boston with any decency. From the upper deck of the Mystic River Bridge, particularly in the early morning, a marvelous panorama of the city in Monet-like blues and grays unfolds itself. Great bridges are one of the few indisputable triumphs of twentieth-century America, yet their builders - so skillful in spans and stresses - seem to take a perverse delight in placing guard rails so exactly at eye level that the traveler is almost invariably denied even a glimpse of the river or bay that he is crossing. This is doubtless deliberate. Pedestrians are prohibited by numerous signs on many bridges; so is parking or even stopping, for the great bridge is part of a tacit conspiracy to get the motorist out of one state into another before he has a chance to determine the difference, if any, between them.

It is hoped that some portions of this thesis may prove of significant value in improving the modern trend of bridge and highway construction as related to water bodies in general.

THE THREE BOSTON STUDY ROUTES

As a source of background material and general knowledge of existing patterns, three highway - water relationships were surveyed within the Boston area. These routes were chosen not only for their general theme, but also because of differences within and among each other. (Map 1).

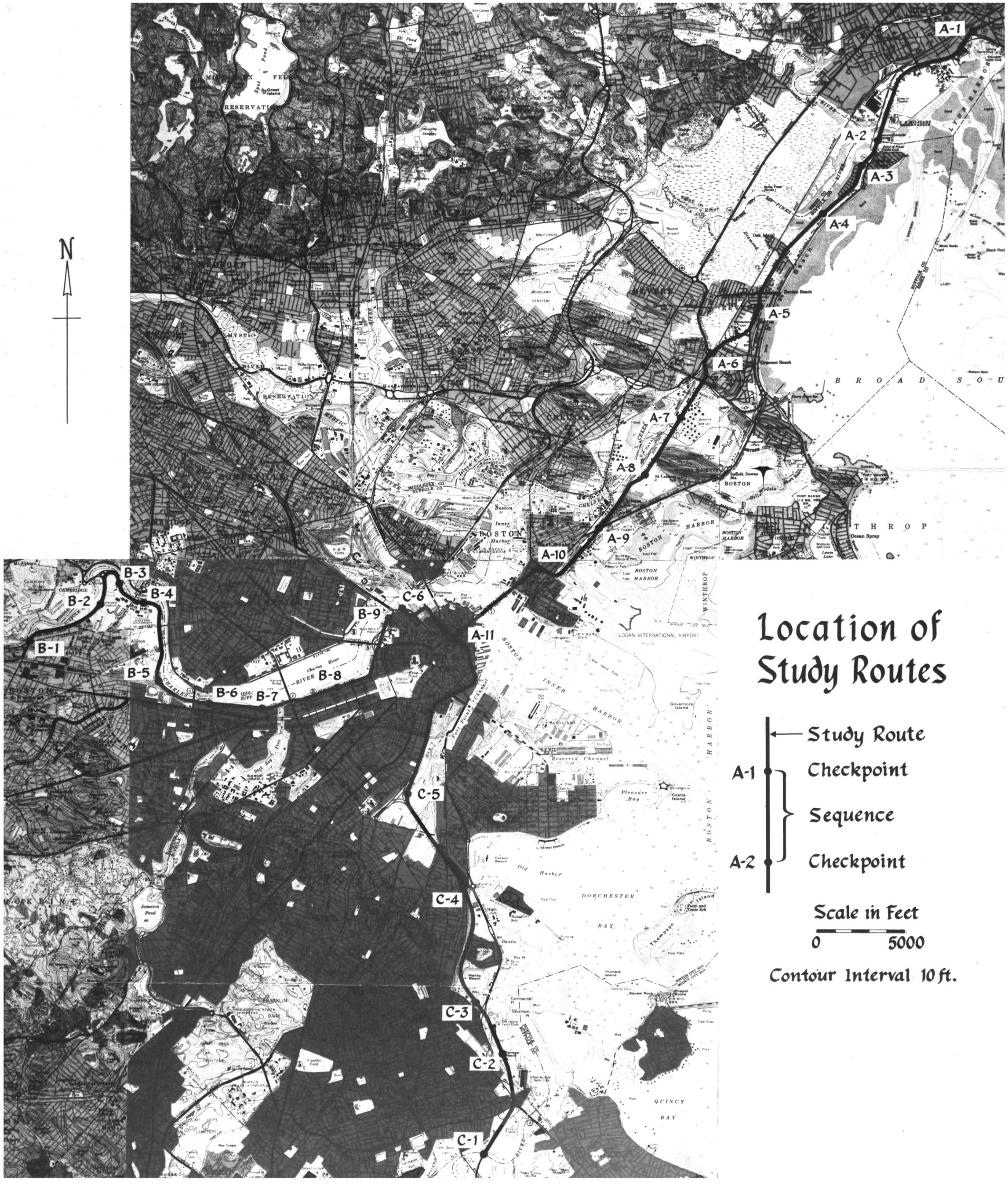
The first relationship studied was that of highways #1A and #C1 from the head of Lynn Harbor south through areas of differentiated functions and activity levels, finally terminating adjacent to the Boston entrance of the Callahan Tunnel. Secondly, the meandering Charles River was selected in the portion from the intersection of Arsenal Street and Soldier's Field Road in Brighton to the Charles River Dam. The third Route is that of the Southeast and Fitzgerald Expressways from the vicinity of the Neponset River heading north and passing over downtown Boston to the Charles River Dam. For purposes of clarification these routes will be referred to as follows:

Northern Route - Routes #1A and #C1 from Lynn through the Callahan Tunnel (Maps 1 and 2)

Western Route - Soldier's Field Road and Storrow Drive from Arsenal Street to Charles River Dam (Maps 1 and 3)

Southern Route - Southeast Expressway and Fitzgerald Expressway from Neponset River to Charles River Dam (Maps 1 and 4)

The Northern Route is primarily a major road with local street access from Lynn to its junction with Route #C1 south of Wonderland Race Track. Much of the area to the east is devoted to recreation and summer homes adjacent to the shore. In contrast, the land to the


N
A-1
A-2
A-3
A-4
A-5
A-6
A-7
A-8
A-9
A-10
A-11
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B-3
B-4
B-5
B-6
B-7
B-8
B-9
C-1
C-2
C-3
C-4
C-5
C-6
Location of Study Routes
Study Route
A-1 Checkpoint
Sequence
A-2 Checkpoint
Scale in Feet
0 5000
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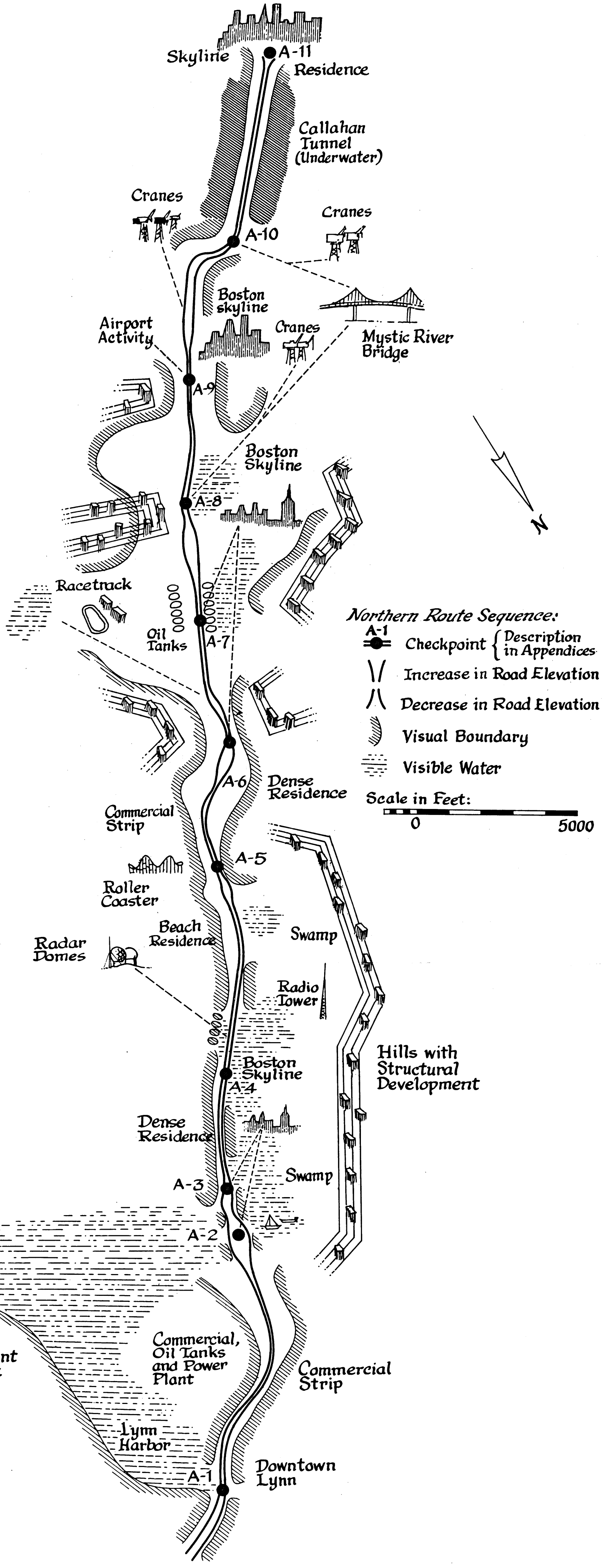
west is often covered by tidewater swamps. As will be discussed later, these swamp areas such as the junction of the Saugus and Pine Rivers contribute significantly to the water image of Boston. They are more readily observed than the eastern bays which although equidistant from the highway are obscured by structural development.

As this same Route approaches Boston the intensity of structures and activity increases markedly. This consequence of human development patterns plus an increase in number and elevation of natural hills intervenes between water and highway blocking direct vision. In some sections the highway - water relationship is maintained by specialized structures such as loading cranes symbolizing the water body.

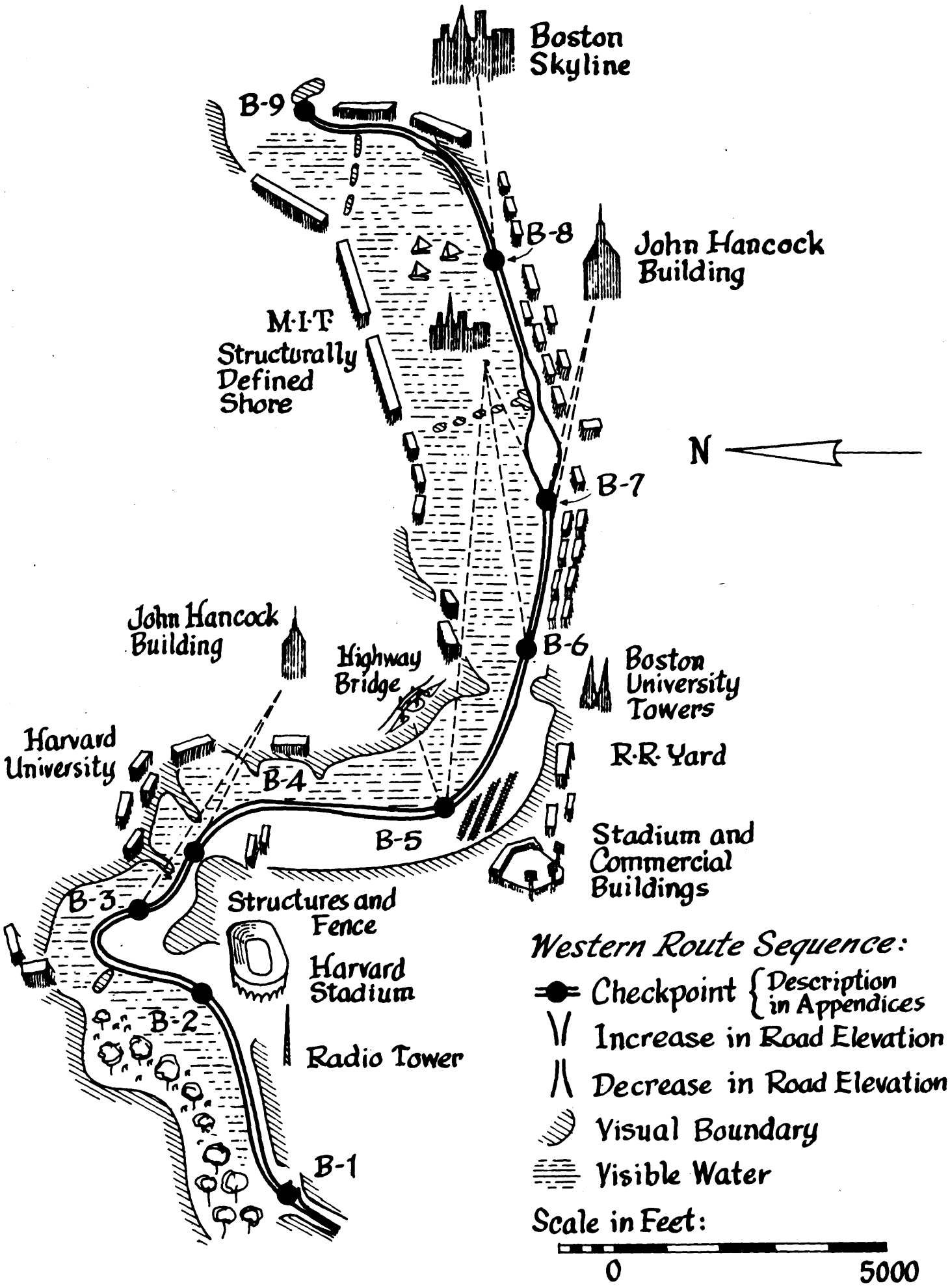
The second or Western Route is of significant constrast to the first. Its entire length is limited access; however, at the western end there is considerable access to and from the road by private industries and other enterprises rather than public streets. Another point of marked difference is the land ownership along the strip between shore and highway. Landholdings along the Northern Route consist of thousands of small plots owned by private individuals for business and/or residence. The pattern along the Charles River adjacent to the Western Route is totally different in that the land is under the direct control of one public agency, the Metropolitan District Commission. Not only the shore adjacent to the highway is under such control, but also the opposite shore with the result that the one often visually complements the other. The image is a managed or controlled one with little diversification and a slowly unfolding


Skyline
A-11
Residence
Callahan Tunnel (Underwater)
Cranes
Cranes
A-10
Boston skyline
Airport Activity
Cranes
Mystic River Bridge
A-9
Boston Skyline
A-8
N
Racetrack
Oil Tanks
A-7
Northern Route Sequence:
A-1
Checkpoint { Description in Appendices
Increase in Road Elevation
Decrease in Road Elevation
Visual Boundary
Visible Water
Scale in Feet:
0
5000
A-6
Dense Residence
Commercial Strip
A-5
Roller Coaster
Beach Residence
Swamp
Radar Domes
Radio Tower
Hills with Structural Development
Boston Skyline
A-4
Dense Residence
Swamp
A-3
A-2
Commercial, Oil Tanks and Power Plant
Nahant Neck
Commercial Strip
Lynn Harbor
A-1
Downtown Lynn

pattern.

Equally important are the differences between the associated water bodies. The Charles River, especially in its upper end of the Route, is composed of a series of meanders contained by edges reflecting the river pattern. In many sections the water - shore edges are poorly defined as such but reinforced by the bounding highways which follow the river. The water and its space are defined at small to medium scale by either or both natural and man-made boundaries. Along the Northern Route water is usually at a large scale and not contained within a shape. Horizon may regulate the space as may distant outlying landmasses and structures whose visual influence can often depend upon weather conditions. Basically then, a considerable difference occurs in the scale relationships of the water bodies associated with each Route. This does not mean that there is no variety of scale experience to be found along each but rather that different scales predominate.

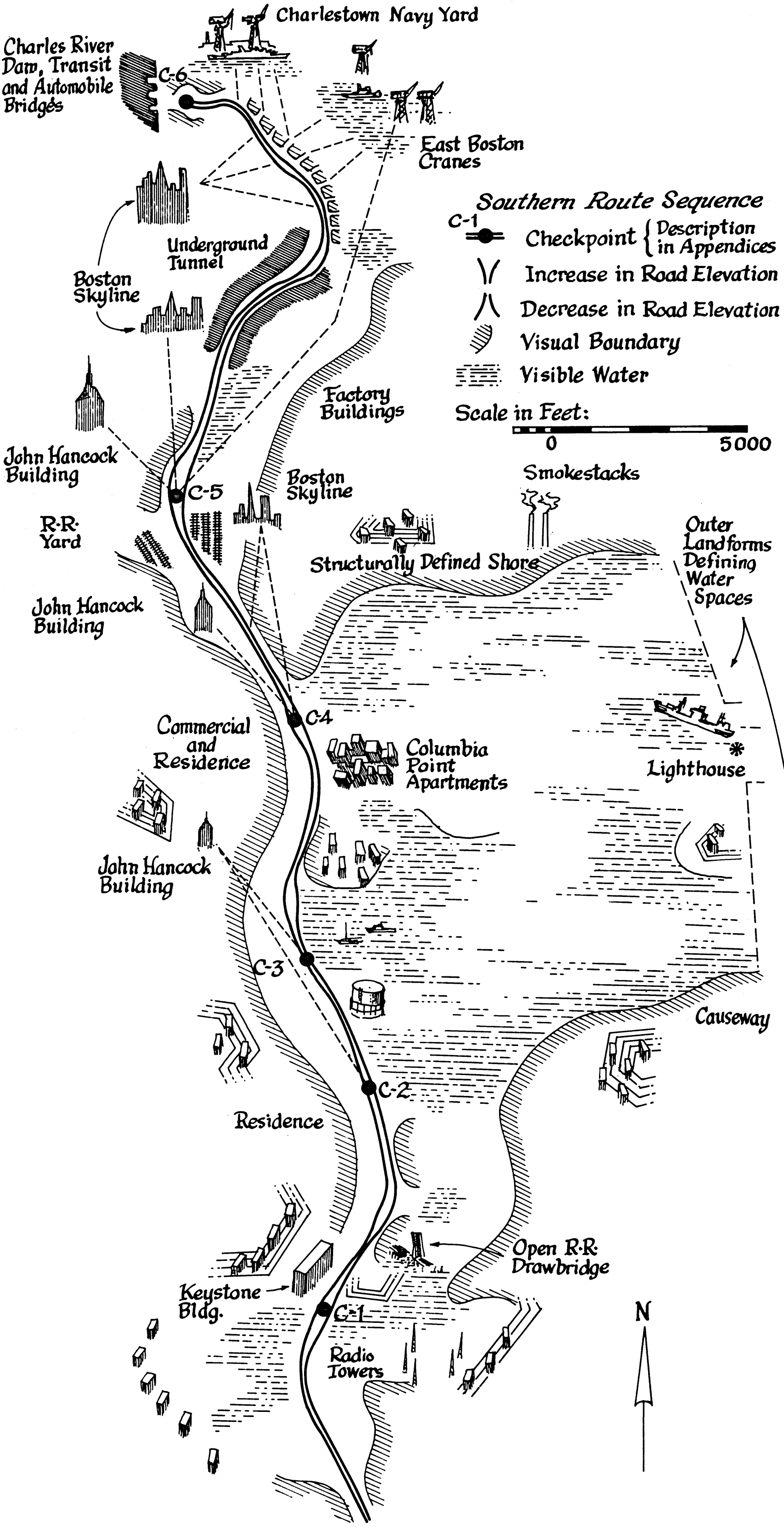
The last or Southern Route is unique among the three in that its study section is of modern expressway design, construction, and materials. Human activity and function combined to force its path along the shore where presumably its location would have minimum effect upon pre-existing business and residence. In some sections it has been elevated above the general ground level offering the advantage of elevation for visual experience of contiguous and distant water. Unfortunately much of this potential is not realized as the engineering necessity of elevation is hindered visually by guard rails and other structural considerations.


Boston Skyline
B-9
B-8
John Hancock Building
M·I·T·
Structurally Defined Shore
N
B-7
B-6
John Hancock Building
Highway Bridge
Boston University Towers
Harvard University
B-4
R·R· Yard
B-5
Stadium and Commercial Buildings
B-3
Structures and Fence
Harvard Stadium
B-2
Radio Tower
B-1
Western Route Sequence:
Checkpoint { Description in Appendices
Increase in Road Elevation
Decrease in Road Elevation
Visual Boundary
Visible Water
Scale in Feet:
0
5000

Along this Route there is great diversification of land ownership not only among myriad private individuals but also various levels of state and local government. Many of the outlying land masses, islands, necks, peninsulas, and points are likewise varied in tenure. There is little control or management of waterside development other than that which results from zoning and subdivision controls within the governing municipality.

Scale relationships associated with this highway sequence are many and of varied scope. Physical features have established a hierarchical system which allows a differentiated system of water spaces. In one instance a small scale bay with sailboats is enclosed and contiguous with the Route while at the same time the larger space is defined by land masses four miles from the main shore. Complementing this large scale space are the shipping activities visible in the vicinity of the Boston lighthouse at the outer harbor limits. Beyond this an even larger scale can be perceived.

A point of major difference between this and the previously mentioned Routes is the visual relationship of downtown Boston and the water. Almost from its beginning the Northern sequence gave the impression of Boston being a city built among shallow tidal creeks and swamps with the city appearing inland of the Route and relatively removed from deep water. The Western Route pictures the city as being one with a large river estuary at its foot, the city appearing to sit atop a regulated waterbody and abutting park strip. In contrast the Southern Route shows the city to be an inland one not contiguous with


Charlestown Navy Yard
Charles River Dam, Transit and Automobile Bridges
C-6
East Boston Cranes
Underground Tunnel
Boston Skyline
Factory Buildings
John Hancock Building
C-5
Boston Skyline
Smokestacks
R·R· Yard
Structurally Defined Shore
Outer Landforms Defining Water Spaces
John Hancock Building
C-4
Commercial and Residence
Columbia Point Apartments
Lighthouse
John Hancock Building
C-3
Causeway
C-2
Residence
Open R·R· Drawbridge
Keystone Bldg.
C-1
Radio Towers
N
Southern Route Sequence
C-1
Checkpoint { Description in Appendices
Increase in Road Elevation
Decrease in Road Elevation
Visual Boundary
Visible Water
Scale in Feet:
0
5000

a water body. Unlike the preceding cases water does not appear to run up to the city and reach its climax in structures. The city can be seen as weakly related to water but not abutting it.

Probably the most common element of the Routes is their weak end point. Each has a sequence leading the viewer to believe that his trip will be concluded by a true visual sense of Boston, but the final reward is a confusion and chaos much unlike that expected. Water plays a relatively minor role as a contributor to the sense of having arrived due to its dwindling into nothing. Even the trip through the Callahan Tunnel reveals no purposeful connection; one might well be passing under buildings and structures rather than the Boston Inner Harbor.

Both the Northern and Southern Routes have relatively large areas of adjacent open land available for development. Along the Northern Route nearly all of this same land lies inland of the highway in the swamp areas contributing to Boston's water image. The Western Route is almost totally occupied by public park land between river and road with a mixture of uses, predominantly institutional, south of the Route. In recent years there has been some office construction at the western extreme; however, this land is now almost totally occupied. Little open land remains except the railroad yards in Allston.

The highways themselves have different uses but are common since all three are heavily used during morning and evening rush hours. They function as main feeders for suburban residents from the north, south, and west of Boston. During other periods the North and South Routes are important channels for vacation traffic to the beaches and

recreation areas of Boston, Maine, New Hampshire, and Cape Cod. Storrow Drive does not function in a similar manner but nevertheless has considerable traffic due to its use as a method of reaching Boston's circumferential highway, Route 128 and the Massachusetts Turnpike. Storrow Drive and Soldier's Field Road carry heavy volumes of traffic from the western sections of the state, Connecticut, and New York.

Briefly then, although all three Routes are common in that they are related to water, each has its own individuality. Age, construction methods, design, adjacent land uses, elevation, function, activity, orientation to Boston skyline, scale, etc. contribute in different proportions to each allowing a range of highway - water relationships to be evaluated.

STUDY ASSUMPTIONS

In order that this thesis might have a common core and be of some possible future use it was necessary to set forth the following basic assumptions:

(1) These shore areas and their highway routes are similar to others in existing and future patterns.

(2) Future uses of these areas will not be greatly different from those of the present; however, market and population growth factors will result in the introduction of some new functions at a moderate scale.

(3) The urban shoreline and waterfront can be utilized as unique and strong contributors to city image.

(4) Local, state, and federal control over highways allow a reasonable opportunity for placing some stress on the visual aspects in future highway construction.

(5) Man is interested in his environment and specifically the role of water as a source of constantly changing visual excitement viewed from the automobile.

The shoreline and waterfront of Boston are undergoing a transition of the type found in most United States ports. Waterfronts are generally inadequate in that they have not kept their facilities in step with other transportation advances; so tonnage is declining in and out of these older cities. Those ports which have improved their facilities e.g. Baltimore, which has shown a steady increase in tonnage with few exceptions (2), have been controlling much of the

trade which previously went elsewhere. Visually this tonnage reduction has considerable impact since activity level and functional variety are reduced. There is less to be seen both in range and in volume. Where this is occurring the role of water and its edges may become increasingly important as visible natural phenomena. One order of interest should replace another.

The second assumption has been touched upon in the previous discussion but needs further clarification. In view of declining port activity many waterfront oriented activities will become obsolete and close down allowing new functions to replace them where feasible. Waterfront housing could well replace some of the present warehouse structures. In other sections clearance will make land available for active and passive recreation. The change will not appear as a radical one because the shrinkage will be a gradual process making time differences difficult to compare and contrast.

Third, the use of water to strengthen city image is based upon the belief that residents have the ability to break the city down into its memorable parts. This analytical capability is matched by the designer's skill in manipulating these components through spatial definition, symbolism, path connections, etc. in order that they become increasingly legible and coherent.

Public control over highway construction allows a regulation which would not be possible if ownership were private. Not only can the right-of-way be controlled but also scenic easements can be utilized on the abutting lands: "it is common for highway departments to buy or condemn scenic easements over private property abutting the

right of way".(3) Such legal procedures allow the public to regulate construction and design and assure that visual design considerations will not be obliterated by billboards, gas tanks, drive-in movie theater screens etc. A road might well have certain vertical and/or horizontal curves designed and built to emphasize some particular view or image which would be preserved over time by use of a legally based scenic easement.

The final assumption is by far the most important as the preceding would be of no value without it. It would make little sense to embark upon a program of visual optimum if its significance were inconsequential to the people for whom it was intended. This thesis presumes that man's power of observation is important to him and that there is true worth in attempting to maximize the possible range of visual experience. Water bodies are relatively large scale mediums on which constant changes in appearance can occur. The properly designed expressway - shoreline relationship provides a relatively simple method of providing such opportunities for observation by a large number of people.

FIELD STUDY METHODS

As much of this thesis is based on the field observations of one individual, and the attempt was a relatively pioneering one with no existing data for comparison, much of the material is highly subjective. A brief description of the study methods may enable the reader to sift through the material at a more objective level.

Basically, all observations were made along the Routes themselves from the driver's seat of a compact size automobile. The essential tool of the study was a set of 1: 24000 scale Geological Survey Maps from the U. S. Department of Interior on which an overlay was placed. This overlay was then divided into a series of highway checkpoints and sequences for each Route. These checkpoints were chosen in such a way that it is hoped all ranges of highway - water relationship were evaluated in order to give differentiation not only between the Routes but along their length of travel.

After further refinement and determination of checkpoint and sequence locations the actual field data collection was begun. These methods were employed:

(1) Verbal recording by use of a battery operated tape recorder in the automobile

(2) Quick sketches and notations

(3) At each checkpoint a photograph or set of photographs was taken as a means of some form of objective control and record to compare with the preceding methods

The tape recorder was used to register reactions to highway - water relationships both at checkpoints and during driving sequences

between the points and later transcribed on to paper for a more permanent record. (Appendix A) In the initial stage written notations were heavily relied upon to supplement the recorded material; however, as the method was refined greater stress was placed on the recorder. Quite possibly the tape gave a candid view more closely paralleling true subjective reactions than was possible with the more definite pencil and paper. Throughout the duration of the field study it was found helpful to use quick sketches which later served as reminders of physical relationships. The 4" x 5" photographs served as a form of objective check upon the relatively subjective recordings, notations, and sketches.

Some of the basic information which was noted by this use of recordings, notations, sketches, and photographs is as follows:

(1) Water and Land Activity and Function

(2) Shape and Hierarchy of Water Spaces

(3) Shore Edges

(4) Seasonal Influences

(5) Attention Getters

(6) Physical Expressway - Shore Relationships and Their Visual Consequences

(7) Boston's Apparent Water Orientation

It is felt that while both the methods and the information sought do not encompass all that is possible they are sufficient for an initial study of expressway - shoreline relationships. They are a subjective preliminary which hopefully can serve as a background for more sophisticated, advanced, and objective methods at a later time.

FIELD OBSERVATIONS

The three field methods were used to compile information concerning the seven previously mentioned classifications. This material has been related (Maps 2, 3, and 4) to form a system of sequential experiences along the Routes into Boston. In addition, analyses of individual points with visual orientation to downtown Boston have been made on the same maps and in Appendix B. Both sequences and specific locations can be pinpointed on the composite of the Routes (Map 1).

The following is an analysis of the classifications considered most important in the visual expressway - shoreline relationship existing along the Routes.

Water and Land Activity and Function

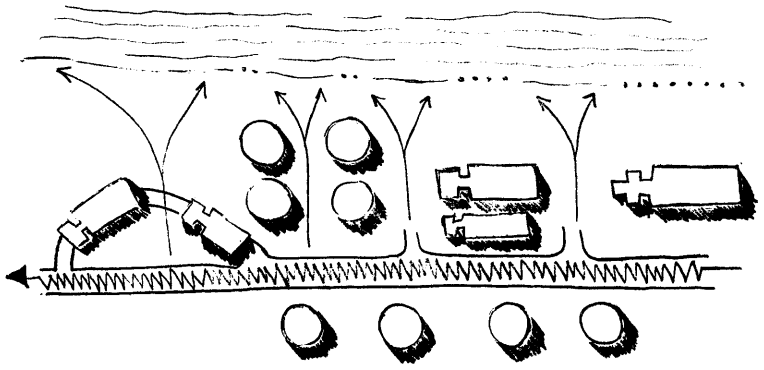
For study purposes "Activity" was considered as a measure of level of movement or action and "Function" as the particular type. Thus a highway strip development would most probably be a highly active commercial area with a sense of constant movement.

Since various functions require different structures and land use intensity the consequence of activity type greatly effects expressway - shoreline relationships. Function should be considered not only for the land in proximity to the highway but also upon the highway itself as cars and trucks are structures in themselves which block water view and perception. The approach to Boston along the Northern Route is on the inland lanes of a divided highway. Many sections of this road are lost from view when trucks are moving on the lanes adjacent to the shore. On the Southern Route vehicles do

little to disturb visual experience as related to water because the approach to Boston is on the side of the road nearest to the harbor.

An interesting section where function and activity level of highway and surrounding land affects expressway - shore relationship is the "Oil Farm" section between and extending north-south of Checkpoints A-7 and A-8. This is a petroleum distribution point with constant movement of oil trucks along the main road and in loading areas adjacent to the highway (Figure #1). Both oil tanks and parked trucks reduce a sense of the water edge of Chelsea Creek. Cylindrical oil tanks cause a merging of forms which in many respects results in a greater sense of continuous structure than the more frequent roadside pattern of gas stations, supermarkets, roadhouses, and residence with their more definite angular shapes. The trucks give rise to a feeling of visual doubt, when one experiences the area more than once, resulting from the high mobility of these forms. One movement through the sequence may find the lots almost empty allowing a relatively strong water image; while a sequence an hour later may present a pattern which permits a view only between the permanent oil tanks. In addition to parked vehicles, the trucks which have either been loaded or are to be loaded are normally in the outside lane further restricting

(Fig. #1)



vision. Finally, at the southern extreme where visual release could be expected, a "go right to turn around" road has been provided for drivers wishing to head north after refueling. More often than not one or two oil trucks are waiting at this point for the light to change and the opportunity for visual release is blocked.

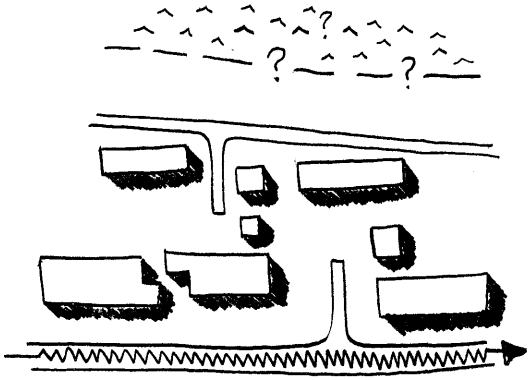
The section of the Southern Route flanking downtown Boston's waterfront is a prime example of the effects of function and activity level on highway design methods and resulting water orientation. As the floor of the area was occupied by existing uses the road was raised to allow cross movement of people and goods below. Unfortunately the visual potential of this elevated expressway was not realized due to distance from water and height of loft buildings and warehouses between road and water. Reduction of building height, clearance areas for view slots, or route location adjacent to the waterfront might well have resulted in a visual sequence as interesting but of smaller scale than New York City's West Side Drive where highway and ship structures are adjacent. Ship hulls and loading activities are a function unto themselves. There is no other part of a city where structures of such considerable size are in a state of movement and change; however, along the Southern Route one obtains only a glimpse and hint of this unique character. The piers of East Boston, Jeffries Point, the Charlestown Naval Yard, and the smaller boats and activities of the three or four block distant Boston waterfront are lost.

The selected Routes presented an overall picture of the effect of development types as related to the subject matter. Differences

were evident both between type classifications and within each category e.g. residential types and their density.

Probably the most basic result of human development was the visual block resulting from the building of structures. This can take several forms, the strongest of which is the strip development along the highway such as occurs along the Northern Route just east of Revere Beach at Checkpoint A-5. Paralleling the Route is an area of mixed commercial use behind which is a composite of summer homes. The strip itself gives a feeling of continuity punctured only by slots down the intersecting street; however, most of these residential intersectors do no carry all the way through to the next highway either visually or functionally. They end halfway through the block (Figure #2)

(Fig. #2)



with vision of the water and shore obscured by a strip of mixed residential and commercial uses inland of the outer drive along the beach. This same road allows a fine continuity of water and shore to be seen during periods of low beach activity. It was constructed as a scenic drive but has been greatly weakened in its original intent during the busy summer months by the large number of automobiles parked along the shoulder between road and shore. Parked cars plus turning and backing movements resulting from them do not allow more than a harried experience.

In the Point of Pine sections (Checkpoint A-3) the consequence

of structures has brought about an entirely different result from that mentioned above. Here they act again as a block, but their location results in a satisfying visual reorientation. Immediately before arriving there was a release from strip development constriction which emphasized a concentration upon the large scale outlying water bodies and Nahant Neck. After reaching the top of the bridge horizontal alignment is to the right, i.e. more inland with visual field rotation to the left. At the same time intense summer and year around housing on the east forces one to look to the right, an open swamp area quite in contrast to the just previously experienced large water scale. In this instance the block of development has shut out one relationship but more than added to the total picture by strengthening contrast. Unfortunately this impression soon weakens and continuity disappears.

A very evident consequence of development is the role of structure as indicators of shoreline shape and/or location. Two results were evident:

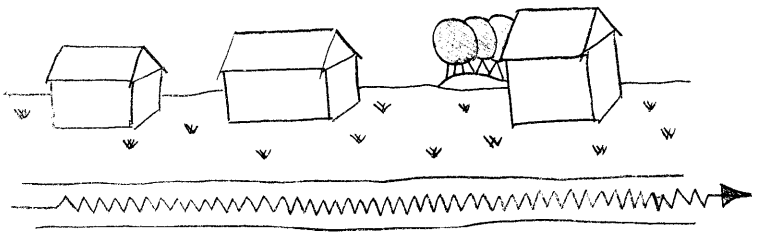
(1) The structure filled in information that would otherwise have been lacking in regard to shoreline shape and location

(2) The water edge was strengthened by the structures

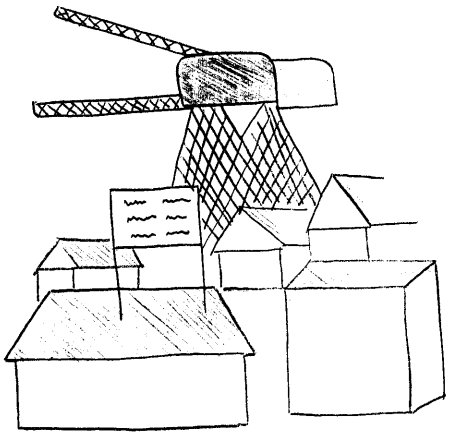
Checkpoint A-4 is a prime example of shape indication by symbolic structures which the density of residences between road and shore plus an intervening sand dune would normally not allow to be perceived. The shoreline is located easily enough by previous views and relationships as well as apparent beach type house construction;

however, shape sense would be all but lacking if it were not for the location and functional structure of the Fort Heath radar domes at the end of Winthrop Highlands. (Figure #3). Although the residences are a definite block there are two or more points where gaps between them allow a view of the towers and a chance for the mind to fill in the relationship between the road parallel to the shore and the distant point upon which the radar symbols must stand.

(Fig. #3)



Structural indication of water location is most strongly evident within the more central parts of Boston where water is often obscured by warehouses. Loading cranes, large bridge, and vessel superstructure are some of the prime denoters. Approaching the Callahan Tunnel on the Northern Route the Charlestown Naval Yard cranes give an immediate reference to the junction of the Mystic and Charles Rivers. The Mystic River Bridge, at this point and others along the sequence from which it was evident, denotes a large river or body of water. The ability of the eye and mind to see what they want allows these symbolic structures to assume an image which is out of all proportion to their actual size. The scene portrayed in Figure #4 is a composite of the apparent dominance of the structures over their surroundings. An objective measuring device such as a camera shows the crane structures to be relatively insignificant in size and mass, but the eye does not. Another example is the view down the Fort Point



(Fig. #4)

Channel from Checkpoint C-5. This view consists of a small water body, visually fluctuating with the tide and bordered by large structures and road systems. Although the continuity of this water cannot be seen it is indicated by the cranes of East Boston in the Jeffries Point area two and one quarter miles distant. When one looks for an answer as to where the Channel goes the structures greatly exceed measured reality and become an indication of the answer. They are a definite aid in the establishment of perceived water connection but do not provide a complete answer as they indicate only location and not shape.

Along all three Routes human development was found in proximity to open spaces. Sometimes it complemented these spaces but more often it violated them. The major area of linear open space complemented by development scale, form, and intensity was found to occur along the Western Route on both banks of the Charles River. In the upper sections there is a jump from developed to natural open space and back again, but as the sequence continues the area becomes more developed in the form of a park. There is pleasing interplay of natural space in the form of scrub deciduous trees and developed park at Checkpoint B-2. Here, natural growth is on the distant bank forming a backdrop for the river and grass of the near shore. Further downstream, where both shores are open park, the contrast of water to shore

is weak and unsatisfactory with one merging into the other except where the edge has been strengthened by riprap and other alien materials.

The largest natural open space was found in the vicinity of Checkpoint A-4 and the Pines River - Saugus River area. At A-4 the road is contiguous with the water, and natural space terminates with the residential and commercial development of East Saugus, Cliftondale, Linden, and Revere. A railroad and the Salem Turnpike traverse the area but do not limit or terminate it. Spatial definition is brought about instead by the combination of western hills and structural development on them. The true value of this area lies in its natural change and highway proximity which allow small and large scale interest. Much of the swamp is subject to twice daily tidal inundation so that unlike the Charles River, where weather and season mean change, there is the overall influence of tide. This fluctuation effects not only general appearance and scale relationships, but also the movement of wildlife. An even stronger tidal differentiation can be seen at Checkpoint C-1 where bridge elevation allows a more vertical view of the water. Here, meander patterns of the tidal streams are strongly evident by the contrasting very straight and functionally correct WVDA and WMEX radio towers.

Unfortunately both areas of Checkpoints A-4 and C-1 are being reduced as visually important natural open spaces by man's activity and need for waste disposal. At C-1 a landfill operation and large teepee burner, cone shaped incinerator with wire mesh top, have broken water continuity by introducing a man-made peninsula which disrupts

both the adjacent small scale picture and relationship to the bay beyond. The interest of the Pines-Saugus River area is likewise diminished by similar alien functions; however, the introduction of a new land use has introduced a new and constant level of activity in the form of scavenging seagulls. When the area is distant and obscured by structures its location can be ascertained by the movement of these birds.

As this thesis deals with both water and land the role of water activity is an important one which often makes strong contributions to the highway - water relationship in one or both of the following ways:

(1) Enrichment of the water scene at all levels of scale

(2) Where water is not visible from the highway, activities taking place over its surface often help in sensing water location

The addition of activity to the water occurred both as natural and man-made. Natural activity in the form of wildlife was generally found to be weak with the exception of seagulls adjacent to dumps. Human activity was primarily in the form of ships and boats. Sailing dinghies on the lower Charles River were especially strong and helped in seeing a continuity of water when viewed through the Massachusetts Avenue Bridge at Checkpoint B-7. An extremely important relationship was that of size of activity as compared with water scale. Four racing shells abreast between B-1 and B-6 added excitement to the river picture. East of B-6 the shells gradually diminished in

importance as river width and open water enlarged until at B-8 the shells are completely inconsistent with the water body, and their low silhouette on the horizon reduces them to nothing.

The same was found to be true of most boating activity on the lower Charles with the exception of sailboats, whose vertical white sails susceptible to up-and-down motions and heeling prevent their becoming lost upon the relatively large waterbody. At intermittent points along Storrow Drive these same sails allowed a highway - water relationship to be perceived which otherwise would have been obscured by banks, guardrails, planting, etc.

Relatively large ships played an important part in perceiving water location in areas of dense land strutures and other contributors to visual limitation. The northwest view at A-10 locates water by the dominance of a destroyer's radar mast sticking up from behind a complex of buildings and automobiles. Ship structures as seen from the Fitzgerald Expressway within Boston proper likewise locate the waterfront through their specific funtional form.

In the outlying sections, e.g. the sequence between Checkpoints A-1 and A-2 water is denoted by nature in the form of waterfowl and more specifically seagulls picking shellfish from sandbars, bringing them to the shore, and dropping them on the rocks to open them. Commercial strip density along this section halts the visible highway-water relationship although the particular diving and wheeling movement of the gulls denotes the edge of water and shore. This is a rather subtle indicator and not readily apparent to anyone unfamiliar with the sea, but it does contribute to the overall visual connection at a small scale.

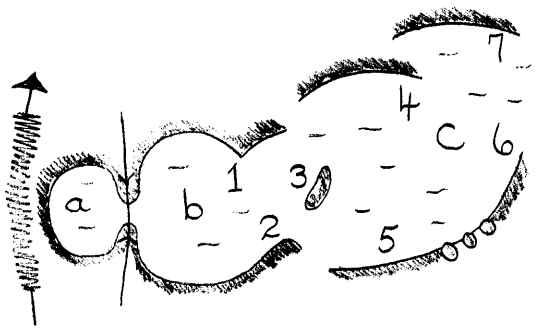
Water - land activity and function serve to define the general expressway - shoreline relationship. In Boston they were found to do this in a wide range of unique patterns resulting from scale, form, intensity, etc. differences. Unfortunately the uniqueness of character did not guarantee its having a beneficial quality. Those sections with the most unsatisfying character were generally found to occur between intensively developed and natural open areas. Oftentimes scale differences proved unsatisfactory when viewed at close range but did have definite value in defining gross shapes and making sections of the travel sequence memorable.

Shape and Hierarchy of Water Space

A major contribution to the understandable differentiation of sequence components was found resulting from Boston's outlying land masses as shapers of form and establishers of water space hierarchy.

The importance of these land masses e.g. points, islands, and peninsulas, is best observed along the Southern Route during the Sequence from Checkpoints C-2 to C-4. Between these points the prime example of influence of land masses upon water space is the view to the northeast from C-3 (Figure #5). The first space, Malibu Bay (a) is defined by two points with a connecting bridge. Dorchester Bay (b), the next scale level of space, is defined by Castle Island

(Fig. #5)



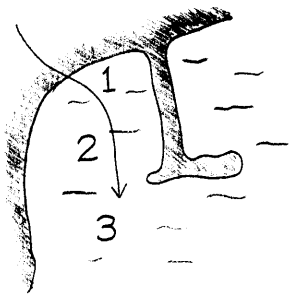
Point (1), Squaw Rock (2), and Thompson Island (3) acting as a terminator. Beyond is another level, Boston Harbor (c), which is defined by the peninsula of Logan Airport (4), Moon Island (5), Long Island (6), and finally Deer Island (7). Between Deer and Long Island there is a lighthouse structure evident from C-4 which enforces the connection of (6) and (7) and outer water space.

Although this sytem of spaces does present a false picture in that the overlap of masses does not allow a visual connection to the Inner Harbor to be made, it does present a defined pattern representative of the intricacies of Boston's Outer Harbor. There is a related idea of the whole which makes sense while at the same time presenting a range of scales. A further benefit results from the location of the Boston shipping lane between Deer and Long Islands which provide a funnel of activity and function for ships entering and leaving.

Many of these outlying masses and peninsulas sit at a relatively low level in the water especially during periods of high or flood tides. Fortunately their visibility is sharpened by a number of natural and man-made additions and modifications. The presence of snow in the winter is perhaps the strongest of these influences as not only does the whiteness contrast sharply with the grey winter sea, but also the apparent distance to the masses is shortened. In addition most of the points and islands have large watertowers which aid in identification of parts and differentiation from the waterbody. Compact residential structures result in the same effect as do power plants and large institutional buildings.

Another example of shaping is brought about by Nahant Neck as seen from Checkpoint A-1; however, in this case definition is only on one side (Figure #6). The result is a lack of differentiation between Lynn Harbor (1), Broad Sound (2) and Massachusetts Bay (3) and loss of scale satisfaction and water hierarchy such as that visible from C-3. It is the presence or absence of this hierarchy which governs the degree of visual attractiveness brought about by the shaping effects of these outlying land masses.

(Fig. #6)



During the night hours the pattern of the Boston Harbor is still a readable part of the Route sequence due to lights within structures on the masses, movement of automobile headlights along connecting causeways, street and commercial lights, and the functionally and visually important navigation beacons which are most evident on the smaller points and islands where residential, automobile, and commercial illumination do not obscure them. They are particularly helpful in gaining both a sense of location and establishing a hierarchy of land bodies and water between. Without this pattern of normal and navigational lights the night trip sequence from Checkpoint C-2 to C-4 would most likely appear as a blank and sterile area excepting those sections where headlights from the expressway illuminate adjacent portions of the water and inner landforms.

Unfortunately water activity during the study period was at a relatively low level. It is felt, however, that boat movement in

navigation channels during the summer would definitely form spaces with a hierarchy gained from vessel size, i.e. the smaller boats would normally be found in areas near shore while the larger would be found in the more removed spaces. The smoke from ships below the horizon was observed as contributing somewhat to spatial definition beyond the land mass defined limits of the Outer Harbor and within Massachusetts Bay.

The role of structures in the system of hierarchies and shapes is an important one; a prime example being the automobile causeway between Moon Island (5) and Long Island (6) as indicated in Fig. #5. Here the bridge-like structure fills a void which would otherwise occur between the two land masses and weaken the spatial image. Similar instances, but at a smaller scale, were found along all Routes. Frequently however, these structures had a visual overlap between space shape and shore edge definition or strength.

Shore Edges

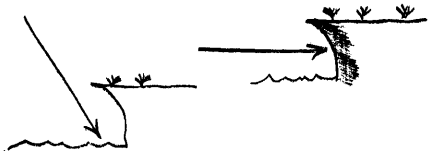
Along the study routes the water edge or joining place of water and land was generally considered to be at one of three levels, i.e. strong, intermediate, or weak. A large degree of this differentiation was due to the influence of man's development as indicated in the following edge description:

(1) Weak - most often found in tidal swamp situations where water, vegetation, and mud colors are about the same e.g. Pines River and Saugus River junction

(2) Intermediate - a managed shoreline with water normally at a constant level e.g. Charles River

(3) Strong - usually an edge which has been accentuated by man's introduction of alien materials e.g. the riprap embankment of the Southern Route which dictates the shape of the western shore of Malibu Bay

With both weak and intermediate edge types the observer's elevation above water level and distance from edge are of primary importance. A view from above was frequently found to soften the edge where water and grass color were about the same. As the edge came closer to eye level it was strenthened by darker coloration of the undercut banks (Figure #7).



The importance of tides as related to edges was strongest in tidal swamps where the edge moved up and down the scale of differentiation. At high tide the edge becomes confused as water and grass join, but as it falls there is a strengthening from the undercut banks. This weakens again when water level dwindles on to the mudflats. During this period it is difficult to locate the edge. Water and mud appear as almost the same color. It is this natural change and relatively small scale differentiation which sets these areas apart from the others in regard to visual interest. Unfortunately Boston is fast losing her tidal swamps to landfill and dump operations.

The strong edge is one which maintains itself despite water level

changes and is generally visible as a contrast despite vertical and horizontal road alignment. About all that is necessary is that it be visible in order to assert itself. Nahant Neck from Checkpoint A-2, a distance of one and one quarter miles, is an example of such a strong edge. It is marked by large flat stones introduced to diminish wave action. Without this facing the edge would be a weak one if visible at all.

Not only the material of the edge itself, but also the structures or lack of structures along it contribute to the strength. The views across and down the Charles River east of Checkpoint B-6 give a strong feeling of where water ends and land begins. Along the Cambridge shore this definition results both from stone facing of the banks and buildings; however, the larger scale downstream view of Boston proper shows an edge strongly marked by structures alone. In this instance a relationship is resolved in a complementary manner which otherwise might have detracted from the comprehensive Boston water image as led up to by the travel sequence.

Activity and function were found to have readily observable effects upon edge quality. The riprap border of Malibu Bay is further distinguished by its linearly associated express highway with high level of vehicle movement. East Boston's waterfront is made more visible by virtue of its special purpose piers, pilings, and wharves. The perceived edge of the wharves is at their foot although the water carries under them and up on to the land. In beach sections the necessary sand cover distinguishes type as do the grass and vegetation of parks and natural open spaces.

Frequently function adjacent to the edge greatly increases its differentiation from surrounding sections by virtue of unique building character or other development types. The summer residence construction at Checkpoint A-4 helps to indicate an edge which is not directly visible. Parked cars on the east bank of the Charles River downstream from B-5 result in a quality change varying with time of day and week. On workdays the area is filled with the automobiles of people from nearby factories, but during the weekend the lot is relatively empty except when the weather is good for car washing or boat landing from small trailers. The result is a continuous natural edge when few cars are there compared with a broken natural - developed-natural edge when the area functions as a busy parking lot. Unfortunately this contrast is not a visually beneficial one as a result of scale inconsistency between natural grass and steel forms.

Parked automobiles along Nahant Neck do not result in the same degree of inconsistency due to size relationships of large grey seawall stones and automobiles. Here the parking function helps to define the edge and make it more pleasingly visible at the large scale such as exists across Lynn Harbor.

Another important influence upon edge quality is the effect of season which will be discussed in the following section.

Seasonal Influences

As the total study was not constant throughout a year, but was limited to winter and early spring, only gross observations can be made. Seasonal effects were found to be of three types:

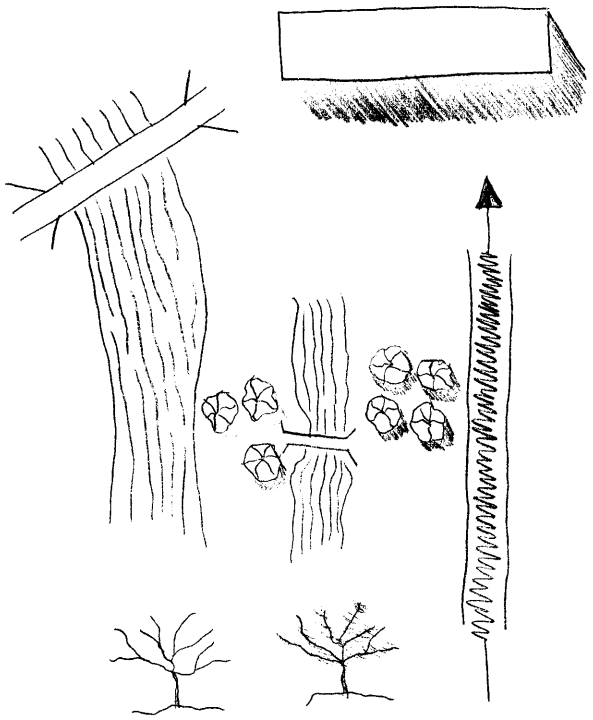
(1) An increase in masking by vegetation consistent with new spring growth

(2) Changes in water color and texture

(3) Differences in ground color resulting from ice and snow

The first of the above is most marked at Checkpoint B-8 and during Sequence B-7 to B-8 where an island parallels the bank of the Charles River (Figure #8). At right angles to the highway and on an axis with a water footbridge is a relatively dense planting of deciduous trees, whose many stems branch out at a low level. During the winter months lack of foliage allows a relationship of large scale water, the Charles River, and the small scale inner lagoon to the Boston skyline. With spring the new vegetation increasingly defines the trees which begin to blot out the skyline; consequently there is a diversion of attention to the smaller scale of the foreground. Fortunately the reorientation is a rewarding one as the seasonal change has resulted in a higher pedestrian activity along the lagoon providing further interest.

(Fig. #8)



Texture and color changes in the water are extremely subtle and influenced by any number of factors resulting not only from time of year but also hour of day and weather. The arrival of spring most generally resulted in the addition of life to the water. With decrease in grey cloud cover the water became more blue and reflection of light increased apparent wave activity. During winter months a strong northeast wind forming whitecaps was needed to give the water a sense of life as compared with spring when reflected sunlight exaggerated the wave facets resulting from a ten miles-per-hour breeze. This same change in apparent life was observed to have its effects upon natural and man-made edge types. Grass cover became intensively green with water correspondingly changing from grey to green to blue. As a result natural edges remained consistent in their definition despite seasonal variations of water and shore; however, the developed stone edge sharpened due to the water increasing in brilliance while riprap remained a consistent grey.

An important seasonal consequence was the change brought about by snow cover and ice as related to edges and distant shoreline shapes. The presence of snow accentuated border qualities so long as the water itself was not ice covered. When there was snow on the Charles River banks and ice on its own surface the open space presented might well have been a field, yet if one preceded the other the edge strengthened as river or shore increased contrast in brilliance and color. Snow on the outlying landforms of Boston's Outer Harbor was important in that it greatly influenced the hierarchy of open water spaces by increasing structural shape and visibility. Bare ground and grey ocean

relationships which previously had not been evident were now strongly recognizable from the Southern Route. Unfortunately it was not possible to analyze fall foliage, but it is expected that the yellows and reds would accentuate definition and contrast of edges and forms at the large scale while making water itself a more interesting object. Such increased small scale interest might result from reflected vegetation colors and the wind movement of fallen leaves over the water surface.

Attention Getters

During many portions of the visual trip sequence along the three Routes the driver's attention was diverted from the water by something which offered greater excitement due to function, activity level, structure, form, or unique quality.

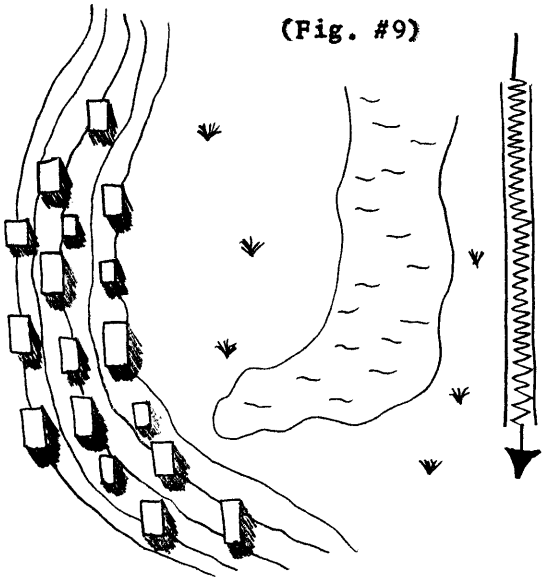
In some sections e.g. the Northern and Western Routes the diversion of attention by the Boston skyline weakened the immediate image but strengthened the overall picture of the downtown area and its water orientation. Buildings, signs, and natural features were the most common attention getters. A marked example of this is the General Electric sign between A-9 and A-10. This sign, advertising light bulbs, is illuminated throughout the day and attracts one directly to it. Visible water is minimum at this point, but the importance of this unfamiliar element can be ascertained somewhat by its ability to make one forget the Logan Airport activity adjacent to the highway.

The single structure with strongest attraction was found to be

the John Hancock Building. Disassociated from the remainder of the skyline it falsely orients the view in regard to downtown and the harbor. It is interesting to speculate upon the visual consequences of the twice as high Prudential Tower presently under construction. In all probability its position even further to the west and great height will do much to confuse mental relationship of city and shoreline.

Boston's many hills, most covered by heavy development, provide an interesting background for the small and intermediate scales. This backdrop competes with water at higher travel speeds when small activities are blurred. In Figure #9 the natural open space appears sterile above forty miles per hour, so emphasis shifts to the surrounding hills occupied by structures. The eye looks at the water but passes over it quickly in favor of an area with greater strength.

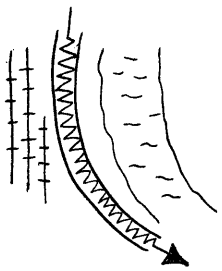
(Fig. #9)



Modern transportation has resulted in a strong competition, the jet airplane with its vapor trails. Frequently along all three Routes interest was quickly shifted by a jet departing or landing at Logan International Airport. In other instances the trail left behind was the diverter, especially during late afternoon periods when sun reflection angles resulted in the most marked patterns.

A functional competition is found in the railroad yards adjacent to Checkpoint B-5 on the Western Route (Figure #10). At this point the constant theme of small scale water and activity has become one of boredom and railroad switching movements to the right introduce a new variety. A large degree of choice is presented between the two as horizontal road alignment and rotation of visual field allow either one to be appreciated without the need for strong visual effort. More choices of the type between water and land would most certainly be beneficial to the general visual pattern.

(Fig. #10)



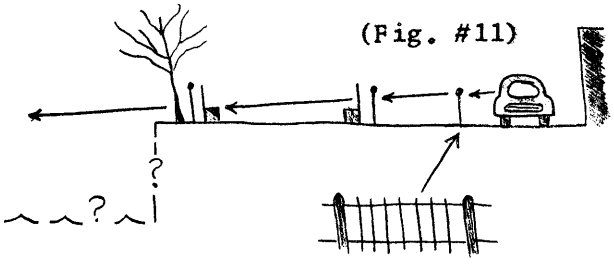
Although many objects, such as those just mentioned, detract from the water relationship there were points along the Routes where attention was diverted and attracted to the water due to some unique characteristic. Crew races on the upper Charles, sailing dinghy races on the lower Charles, night illumination, shipping activity, storms, and a backdrop of city silhouette all served to focus the eye on the river, harbor, or bay. During storm periods the water surface allows strong patterns of shape, color, and direction which do not show so strongly upon structures. The importance of city silhouette as a backdrop can be strongly recognized during the sequence from Checkpoints B-6 to B-9 where the city of Boston appears to sit on the river. One cannot help but look at the building mass without seeing the water and vice versa. There is not a competition but rather each complements the other and forms a very memorable image

strengthened by horizontal road alignment allowing a sequence approach to the visual goal.

Physical Expressway - Shore Relationships and Their Visual Consequences

Maximum elevation of road above studied water was approximately eighty feet, while minimum at some underpasses along Storrow Drive was below water level. Horizontal distance showed a far greater range in that one part, midway between Checkpoints C-4 and C-5, was approximately 3,500 feet from water. At others such as C-3 the highway is contiguous with the water and forms a very marked border.

The mere proximity of water and/or marked elevation above it do not guarantee a satisfactory visual relationship. Checkpoint A-3 is an example of this lost potential when one considers the land and shore to the east. Here the road is above roof level of the houses with bay water about 1,500 feet from the road. Rotation of visual field, neighboring development, horizontal road alignment, and form of outlying land masses result in a pattern which shifts the emphasis elsewhere. The Western Route at B-9 has a distance to water of less than two hundred feet; nevertheless the river cannot be seen but must be sensed. At this point the Charles River is obscured by a complex of three similar open iron fences (Figure #11). One serves as a highway median divider and the other two as playground limiters. Park benches with horizontal slat backs



(Fig. #11)

further confuse the vertical fences. Fortunately vegetation is sparse and has no great effect other than the vertical trunk lines as the trees have been pruned to a relatively high level. Water image is further defeated by constancy of vertical level terminating in a strong wall. The traveler looks above the water and the little which can be perceived is not associated with the highway.

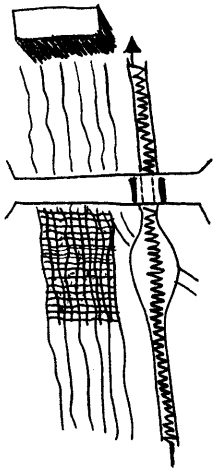
The strongest combination of distance and elevation is at Checkpoint C-3 where highway forms water edge and the vertical is only about twenty-five feet. The embankment is sharp and not apparent at immediate right angles to the vehicle; however, the horizontal curve, reflecting the bay shape, allows the edge to be observed as a sweep. Although elevation here is not great it is exaggerated by water proximity and lack of intervening development except a below line-of-sight guard rail. The result is a meaningful sequence portion which shows contrast at small and large scales, the compact Malibu Bay as opposed to the more open Dorchester Bay beyond.

Water along the Routes was observed to have distinctly different appearances as influenced by angle of vision. A vantage point well above the surface allowed an evidence of color and horizontal current-wind patterns not distinguished when water was almost at eye level, but eye or horizon level presented the vertical height of wave action which was not otherwise so visible.

This difference of changeable or vertically viewed water versus horizon water can best be seen during Sequence B-7 to B-8 on the Western Route. At B-7 itself the Charles appears as a sheet continuous under the Massachusetts Avenue Bridge and up to the foot of the

Boston skyline and Beacon Hill. Between this point and the Massachusetts Avenue Bridge, Storrow Drive climbs to cross an underpass, descends under a bridge, and climbs back again to the level of the river bank. Water sequence is that of sheet to skyline on the flat, variegated and changing patterns at the crossover, complete block under the bridge, and a final sheet view of water and skyline (Figure #12).

(Fig. #12)



This sequential change in elevation allows a beneficial shift from large to small and back to large scale after ascending from the blackout of the bridge underpass. This final exit is dramatized by road elevation in the underpass being at or below water level.

Malibu Bay is an example of the differences in horizon and changeable water being seen at one point. Road elevation allows vertical surface study of the adjacent bay while the larger space of Dorchester Bay can be seen vertically at the shore while becoming increasingly horizon with horizontal distance from the highway. There are few other examples along the Routes where this relative change can be so easily perceived.

A strong visual effect of highway paralleling shore can be experienced along the Southern Route. Much of this expressway has been built above ground level with underpasses for local roads. Many sections of the shore have now been blocked in their visual and functional connections back to the interior. The results are pieces of detached land or islands surrounded by water on three sides and road

on one. Storrow Drive between Checkpoints B-6 and B-9 has greatly affected the view from the shore. Although it still exists, the sequence of riprap bank to open park to brick residence is no longer experienced by the pedestrian walking the shore. Intervening traffic now causes one to contemplate the open water rather than the total relationship of river, park, and city.

Intensified traffic movement during rush hours was found to change relative visual connection. Increased number of vehicles blocked much of the visual expressway - shoreline relationship while at the same time making it increasingly difficult to look at water. More emphasis was needed to watch traffic ahead, behind, and to the sides. This is very strongly felt along the expressway of the Southern Route where even the outside breakdown lane is used by commuters. It would seem advisable to construct a wide shoulder defined by a curb or loose gravel acting as a deterrent to use of this lane as a movement channel. Such a shoulder would aid visual relationship by allowing the sightseer to travel in the outermost paved lane without the worry of having another vehicle pass between highway and water.

Visual satisfaction at different speeds was found to vary considerably with type of water viewed e.g. large natural, small man-made, etc. The tidal swamp at Checkpoint C-4, which has both large and small scales with horizon - changeable, appear at speeds above forty miles-per-hour as a relatively sterile area with little function or activity. In an effort to find something of interest the eye wanders over the area and fixes itself upon the backdrop of developed hills, but with a speed decrease natural activity can be

seen in the form of wildlife, and the adjacent changeable water surface provides a high level of interest. Unfortunately, as on the Southeast Expressway, the movement of relatively heavy traffic inconsistent with highway size does not allow a manner of driving conducive to small scale contemplation. This experience was also found on many other stretches such as the Soldier's Field Road - Storrow Drive sequence although there was fortunately a subtle enlargement of visual scale here which coincided with increased traffic intensity and speed.

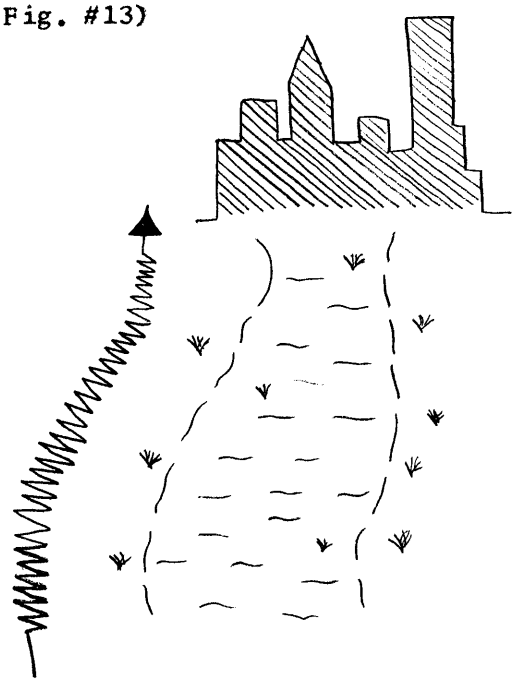
Another significant consequence of speed was noted in connection with guard rails, fences, trees, and other structures along the roadside. With increased speed their pattern of spaces accelerated and was seen as a continuum. At thirty miles-per-hour along the intown portion of the Southern Route, structures remained separated between streets acting as visual alleys to the waterfront; however, as the vehicle goes faster the structures are perceived as a mass. Above fifty the waterfront is no longer visible but is occasionally perceived by symbols and functional structures.

All water related sections of the Routes had patterns interesting at both low and intermediate speeds, but in developed areas building type, color, or material was often repetitive and monotonous with a lack of recognizable and memorable parts. Unfortunately these sections of the trip sequence often terminated the visual connection of highway, water, and city.

Boston's Apparent Water Orientation

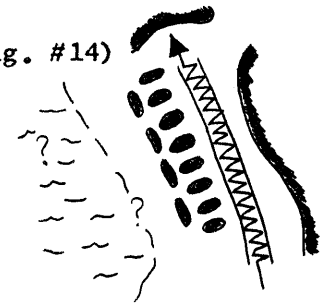
Boston does not appear to be related to the ocean through a continuity of water bodies as seen from any of the three selected city approaches or Routes. The most general image is that the city is related to water at a small scale. An example occurs at Checkpoint A-2 where at the mid-point of the General Edwards Bridge the downtown skyline can be seen (Figure #13) with the tidal water of the Pines River apparently running up to its feet. This image is repeated in similar fashion during the Sequence A-6 to A-7 with Chelsea Creek serving as the water medium. After this the water relationship diminishes until it dies out completely at the entrance to the Callahan Tunnel which completely lacks water association of any sort.

(Fig. #13)



The Western Route along the Charles River shows a defined relationship which builds up and reaches a climax where water expanse is physically at its greatest i.e. between Checkpoints B-6 and B-9. This is very definitely a strengthening image or impression which unfortunately withers to nothing (Figures #2 and #14) in the final stages; however, the general sequential experience is a pleasing one. Unfortunately the Charles River is not the functional part of Boston's waterfront, and this part of Boston's past and present history is not evident to

(Fig. #14)



those arriving from the western suburbs and Massachusetts Turnpike.

The Southern sequence presents Boston as a city removed from its water. Shape of land masses make the harbor appear to be terminated on the north by a continuity of land between Castle Island and Deer Island; Boston seems to come no closer to the water than the two and one quarter mile distance from Old Harbor at Columbus Park (Checkpoint C-4). As the driver heads north from this point there is evidence of the city's water activity and function from the head of the Fort Point Channel at Checkpoint C-5. Passing the mouth of the Channel shows further proof of the relatively active waterfront as do the limited slot views between structures adjacent to the Fitzgerald Expressway. These slots allow a sense of the water, but unfortunately their width and generally obtuse angle of intersection allow only a glimpse over the shoulder during periods of light traffic. As compared with the other two approach sequences however, this has portrayed the truest picture of Boston's water image in the final stages. The potential exists but it has only been partially realized.

Field Study Conclusions

1. Even without conscious design effort a number of strong and highly satisfactory relationships exist. These and other visual potentials might be sharpened and accomplished without the use of construction and design methods hindering the movement function.
2. The natural and man-made should each complement the other through scale connections. Provisions for sightseers in

the form of special travel lanes would allow small scale natural activity to be observed at the needed low speed.

3. A system of water space hierarchy and definition through use of land masses, structures, and boating activity was observed as the most satisfactory means of presenting a sequence with a readable image and interrelated system. The role of illumination is important in preserving these connections through the night.

4. Water - land activity and function offer visual explanation as to the use of different portions of the sequence. It is necessary that these clarifiers do not become obscured by new development which is areally incongruent.

5. Structures can serve or defeat the purpose of water image either by diverting attention inland or by locating water, indicating shore activity, and defining edges.

6. Tide fluctuations increase the small scale interest of marshlands. Landfill operations and damming to maintain constant water level result in visual sterility of these areas.

7. Waterfront ship movements to and from the docks present a daily change in shape and color which is unique. No other section of the city has such a fluidity in its large structures.

8. Some relationships of water to land which are unsatisfactory at one distance often appear beneficial at another. The components may offer little in themselves but be invaluable in helping to determine and construct total city - water image in the mind.
9. Edges vary in quality as a result of strength, activity, and function. The role of structures and symbols is important in locating and defining these borders of water and shore during portions of the sequence when they are not directly visible.
10. Seasonal contrasts were not as marked as might be expected. Changes occurred in the total visual framework and not just within particular parts of the picture.
11. Attention can be shifted to or diverted from the water by objects of relatively small size. Introduction of something new to the sequence often quickly shifts the point of interest providing variety but still allows choice of visual scene.
12. Observable textural effects and colors on the water surface increase with road elevation. Unfortunately such elevations were usually accompanied by an intensification of safety railings and guards whose design or level blocked the view.
13. Elevation and proximity to water do not guarantee a pleasing and meaningful water connection. At many points a relationship perceivable directly after expressway

construction has been diminished by later adjacent development acting as a visual boundary.

14. Apparent orientation of a city to its water can be extremely misleading. The movement sequence ought to reveal city association with the water. The downtown arrival climax should result in an explanation of the city and its waterfront as suggested by the stages leading up to it.

With these general conclusions and the material pertaining to specific categories, a program for future application can be undertaken.

FUTURE APPLICATIONS

The preceding material and conclusions drawn can be applied to similar cities desiring stress upon city - water image and utilizing the expressway - shoreline relationship as a visual tool.

Within the Boston Area shorelines were generally found to be one or a composite of these types:

(1) Natural and Open

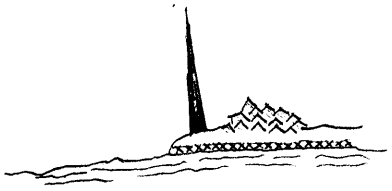
(2) Residential and Mixed Use

(3) Shipping and Other High Intensity Waterfronts

The following discussion will for the most part adhere to the form of the above types. Each is a section of the trip sequence from hinterland to downtown and requires a defined handling in order that it may be a readable and meaningful contributor to gross city image. It is recognized that this categorization is both arbitrary and rigid, but it is felt that this limitation was necessary in order that an effective program be presented.

In the natural and open shoreline areas the major visual problem is scale discrepancy. Although the natural can occur as both large and small, there is need for a relationship to the man-made which does not reduce these areas to insignificance.

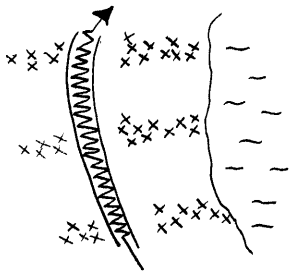
Space definition and hierarchy should be stressed at the large scale. Landforms, structures, shipping lanes, night lighting, sharpened edges, and compacted building groups emphasizing natural feature variations within the form are real means of achieving this emphasis. (Figure #15)



Movement through these sections will normally be at speeds exceeding fifty miles-per-hour. To make the pattern legible an abstracted, not detailed, pattern is required.

There are occasions however, when water is not accompanied by landforms or other features which aid in defining its extent. Road and open shore may parallel for a mile or more uninterrupted by development or balanced by outlying masses. The sweep is at first an awesome one but soon becomes sterile through lack of points of interest and visual goal indicating distance and speed. A choice of scene introduced by development along the inland side of the road would be desirable, but provision should be made not only for the contrast of man on the left and nature on the right but also for variety within the opposing sides.

Vegetation planted at right angles to shore and road would be one method of dividing the sequence into a series (Figure #16).



Rhythm could be changed or held constant by manipulation of the distances between the plantings. High points in the road should be introduced as vantage points presenting water surface differences of color and texture and serving as contrasts with the predominant horizon water scene. Horizontal and vertical alignment can be used singly or as a coordinated system allowing variety to the left, right, and straight ahead. This variety would be further enhanced by a coordination with vegetation, structures, and attention getters. The result could be a rhythm of views consisting of blocked sea and

orientation inland, opening up to the sea and strong attraction to it by dominant elements, clearly defined contrast of inland and sea, and finally the complete blocking of the sea view once again. Used in conjunction with vegetation - shore - vegetation sequence, the high points give a grasp of overall pattern, destination sense, and study of water surface. Low points allow more detailed study of the small vegetation and/or structurally defined spaces whose scale gradually merges with the horizon.

Small natural areas require an entirely different handling in order that their scale of life be enjoyed. Detail is important and requires low speeds; otherwise the result is a feeling of sterility and lack of movement and life within the areas themselves. Separate view lanes and safe stopping points are two design alternatives to be emphasized. It is important that elevation not be used except at entrance points where a general direction and city relationship is desired. After these points the highway should remain at minimum height in order to emphasize the relatively low silhouette of the more common forms of life. An elevated view flattens these out and reduces edge definition by obscuring the color of undercut banks.

In much the same way that open water spaces can be manipulated, marshes and swamps can be defined by structures, activity, hills, and other features around their boundaries. Where these are not available definition could take the form of filled railroad beds and highways with gaps to establish a visual connection between horizon of sky and water.

Relative degree of openness of these areas at all scales allows

the long range view of the city and its silhouette. This is the stage during which orientation to the city and its connection patterns should be introduced. In the more developed areas to follow, the movement path and its relationships may become obscured and no longer perceptible. To offset this loss a system of memorable routes related to the downtown should be indicated through easily recognizable symbols such as the Mystic River Bridge showing the path from a distance. Such symbols also allow a sense of continuity during subsequent portions of the sequence.

The residential and mixed use shores occur as an intermediate stage between natural shorelines and high intensity waterfronts contiguous with the downtown. Their variety of function and activity level require a scale lying between abstraction and detail in order that they be meaningful.

Highways in these sections generally follow development and have their vertical alignment dictated by it. This elevation is a visual potential within these areas. First, it increases the distance which can be seen assuming an open plain. Secondly, it offers an opportunity to see above some of the structural development. Normally the potential is not realized as the road is constructed to just that height which permits cross-movement underneath. Unfortunately this minimum is not sufficient for visibility from the highway, and at the same time it limits the visual continuity from inland sections to the shore. Increased elevation with these visual considerations in mind would benefit both the view from the expressway and the interior by permitting vision beneath.

The recognition of shore structures and symbols is essential in order that there be a perceived connection of shore to highway and area to city. Once again the value of elevation above surrounding buildings and signs is apparent. Where this is not feasible provision should be made for view slots through condemnation of obsolete structures and acquisitions of scenic easements revealing water relationships and the general range of city functions. These functions are usually buried within city background. Easements on the water side ought to be used in conjunction with inland building mass and vegetation and coordinated with horizontal alignments which allow the view slot to rotate across the field of vision. A strong symbol or water attention getter is needed to offset the interest of the buildings and vegetation. Preferably, the automobile would head for the slot presenting an axial view instead of a framed picture upon which activities cross briefly and reveal no sense of direction or connection. Sharp banking in the road is an additional means of limiting the field of vision and giving it a particular direction

At night the view slots could be emphasized through use of artificial light both within the slot and upon its adjacent water. It is possible for such lighting to have a purpose other than the purely attention getting one. A striking and pleasing effect produced by large illuminated advertisements can be observed in the Charles River Basin below the Boston University Bridge. The light is just sufficient to locate the water and enhance its texture without the burlesque of an illuminated Niagra Falls.

This stage in the trip sequence is an intermediate one during which no single aspect dominates. Water is not perceived as being a strong natural phenomenon and its function and activity have little effect upon surrounding land uses. Normally, pollution does not allow much use of the water except for small boats whose structures are not sufficiently large to make them individually strong. In many instances the established use pattern will not permit view slots, elevation, curves, etc. to give a visual connection. An alternative to be applied under these conditions is an increased dependence upon strong symbolism initially presented in the natural and open sections of the sequence.

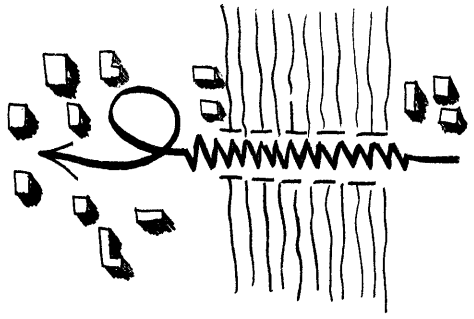
Where these limitations do occur as a consequence of development, primary emphasis should be upon continuity of the overall expressway - shoreline relationship from peripheral open shore to downtown waterfront. Horizontal alignment ought to be in accordance with the visual climax and its symbols as seen from this sequence portion. Relatively high travel speeds of sixty or seventy miles-per-hour shorten the apparent physical distance, merge detail, and focus attention toward the visual goal whose rate of apparent change is slower than that of the field adjacent to the automobile. A constantly increasing rate of speed stresses the apparent pull of the destination. Where actual increases are not possible a similar effect might be achieved by decreasing spaces between vertical elements such as fence or light posts.

Whether or not water can be emphasized during this part of the trip, the role of the city and its waterfront need to be visually

announced. Skyline or silhouette should serve as a point of orientation and be coupled with waterfront indicators. It is important that this area be treated as a connected portion of the sequence. This is the time when cranes, bridges, and ship structures begin to become meaningful both in themselves and in their city functions.

In comparison with the natural and mixed use shorelines, the active waterfront is the most significant in that it concludes the highway - water sequence. As a visual end it should present a climax consistent with the change in function and activity.

Boston's Northern Route exemplifies a highway leading toward an undefined and visually inconsistent terminus. This end lacks explanation as to what has happened to the waterfront previously presented and expected through a succession of views and symbols locating water edge. The Callahan Tunnel originates and exits in areas where the harbor is within three blocks but not visible. Where a tunnel must be used to permit movement across a waterbody, provision should be made for explanation of what has been crossed and the role of this waterbody as related to the city. The 360° turn accompanied by a change in elevation, such as is found at the New Jersey entrance to the Lincoln Tunnel, is an extremely effective method of stressing the connections (Figure #17). Unfortunately the Lincoln Tunnel rotation occurs on the wrong side of the river resulting in a premature climax. Preferably the scene from the far shore would be concerned



with symbolism leaving the dramatic rotation and elevation change for the final exit. Then, travel sequence, its relation to the city, and the downtown - water connection would come to a more logical conclusion. Since many waterfront expressways are elevated the vertical clearances and connections necessary for such a 360° turn would not be impossible to engineer and construct. Mere existence of such a turn is not sufficient to guarantee a vista. Guard rails and other accessories should be of such design and level that they do not detract or obscure in a fashion similar to that found along the Mystic River Bridge.(1)

The tunnel entrance itself could be strongly water-related by use of a ramp leading down to the mouth which is directly in sight of water or possibly surrounded by it as a natural or man-made island. An alternative is the use of structures above the entrance which are symbolic of waterfront activity. An interior tile pattern depicting the water above or even depth-below-water-level marks would allow a sense of the tunnel's raison d'être. At present the Callahan Tunnel might just as well be under the ground as the harbor. This is a contrast with the Lincoln Tunnel where water is viewed prior to entry, and one senses the pressure of water above while passing under the Hudson River. The passage is not a sequence void but rather a section with its own perceived water relationship.

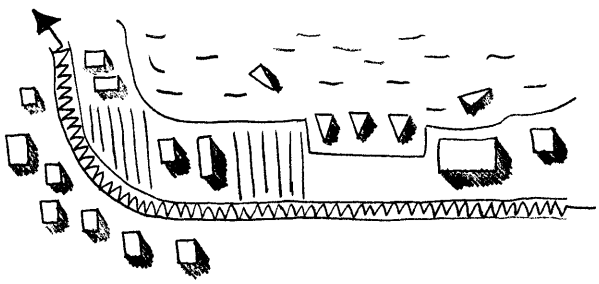
A unique visual potential of the waterfront is its mass and dominance of functional form. Unlike the majority of city structures, ships are dynamic in that they are capable of physical movement. A vessel docks, unloads, reloads, and departs within a matter of days.

Her place is then taken by a variation in shape, size and color. Loading cranes are also capable of motion although relatively fixed in location. Life, movement, dominant size, and superstructure colors, predominantly lighter than those of surrounding buildings, all combine to attract the eye. Road alignment and view openings are important tools for allowing this interest potential to be visible from the highway.

Points of maximum road elevation at waterfront entrances allow the total shipping pattern to be seen assuming a minimum of visual blocks. A gradual descent from these physical high points results in ship structures becoming increasingly dominant as they begin to tower over the automobile. This can be sensed along New York's West Side Drive when one leaves the highway by a ramp system. Unfortunately much of the continuity and dominance is lost when the ramps are fed by inside lanes which disappear beneath the overhead structure. Ramps and local roads between shore and elevated highway would be physical design alternatives presenting a more comprehensive visual sense.

As water functions in this sequence portion are large and quite easily identified, they may be abstracted by high speed and still appear meaningful. Provision of sightseer parking sections along the elevated expressway would seem to be useless. The detail for study is so complex that it requires an on-the-ground view to be satisfactorily understood. Such parking areas would increase the bulk of the road without being of any real benefit. Quite likely they would detract and limit the abstracted scene while in motion.

Cities which are undergoing a decline in shipping functions require a combining of still active facilities if the pattern is to remain or become a more perceptible one. Obsolete docks, piers, warehouses, etc. could be demolished allowing large scale views of the waterfront, movements within the harbor , and the enjoyment of water as a natural open space adjacent to the intensively developed downtown. (Figure #18) These openings and concentration of activities would benefit water space visibility and interest both from the expressway and from within the city.



With each shoreline type or composite there is need to recognize position within a larger context. Present development practices usually dictate a pattern of intensified activity corresponding to decreased distance from city center. The trip passes from natural to intermediate to highly active areas. Each may contribute its own character to a composite pattern. As parts, the sequence portions should have an individual identity which at the same time contributes to the whole of the city. Portions related to water can have this connection clarified by type of shore edge, symbolism, road design and construction, building type, etc. The major concern, i.e. how best to show city - water relationship, should govern each of these individual design considerations. Resort cities may have their functional water climax in the outlying sections. This should be emphasized through visually

maximizing water use at these points. The expression of water must be congruent with its actual role during the different portions of the sequence.

While a particular city may need special emphasis upon one section of the expressway - shoreline sequence, a comprehensive city - water form must first be envisioned. Each part must then be related to the other in order that the total sequence be a meaningful one which achieves the desired image.

COMMENTS AND SUGGESTIONS FOR FURTHER RESEARCH

This thesis investigated the visual relationship of expressways and shorelines in Boston. It may serve as a pilot study for further work in this area. The following are some suggestions for possible paths for future research.

(1) The Observer: This thesis was based on the observations of one individual who, because of his general training and biases, could not be considered representative of the general population. Since it would be interesting to consider the effect of visual stimuli on the average motorist, a further study might investigate the observations of such drivers and their passengers comparing them with those of a trained observer.

(2) Case Examples: Only three Routes in Boston were examined in this study. More highways need to be investigated within a specific city and/or more cities could be sampled. Either of these approaches would enable comparisons to be made and yield information as to the generality of the Boston pattern found in this thesis.

(3) Depth Study: Seven classifications were used to analyze the visual expressway - shoreline relationships existing along the selected Routes. Further work might focus with greater detail on one or two of the classifications. For example, if one wanted to study Shore Edges more fully, one could either select a greater number of

examples or follow each example over a larger period of time.

(4) Sequences: Since this thesis concentrated upon examining Checkpoints, it was not possible to fully ascertain the effect of visual sequences. An attempt was made to include sequences, but still pictures and the limitations of tape recording curtailed full study. In addition, traffic problems required the driver to stop and integrate his observations causing natural breaks in the pattern. Further analysis might enlarge upon the present study by making a record of uninterrupted trip sequences showing the interrelationships between the separate Checkpoints. This research might use continuous tape recordings and scanning motion picture cameras.

The author believes that this thesis, despite its shortcomings, has been of value both to himself and those interested in the subject. Gross generalizations have been made which may be weak in themselves, but they do serve as a point of departure for more advanced and specific studies.

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APPENDIX A

TAPE TRANSCRIPTS FROM FIELD ANALYSIS

Checkpoint A-1

after coming down the hill from Lynn one hits the traffic circle at the end of Lynn Harbor and can see water for the first time/ the traffic circle cuts up the possibility of seeing much of the water/ traffic unfortunately at the checkpoint/ the level of the road is below that of one closer to the water so there is also the problem of vision here/ parked cars near a Chevrolet dealer adjacent to the water very effective in stopping the view/ Nahant Neck which goes out into the bay into the ocean helps to enclose the water, and at this point the water appears more confined and like a lake than a bay/ the near edge of the water cannot be observed instead one must rely upon various cranes, marine gas signs, and bait and tackle shops to reach conclusion as to where the edge of the water is/ at this point there is no relationship between the water and Boston proper/ Boston proper is not evident/ the buildings and structures although detracting from the overall appearance do not compete with the bay and its water for attention/ one's impression is that this body of water is a welcome relief from the rather poor dirty development surrounding the head of the bay/ the water here as a natural phenomenon is a welcome treat and something that one looks for/ as the water is almost at eye level not much difference in texture, color etc. can be observed although the brilliant sunlight of today does show itself in strong patches/ there is little activity on the water at this time of year/ however one might suspect that the Volunteer Yacht Club and Lynn Yacht Club in the summer would certainly increase this activity/ present activity amounts to the seagulls and birdlife which can be seen over the water/ a possible potential or improvement visually in this area might be brought about by an increase in road elevation with a gradual slope down to the water's edge with heavy emphasis on the water as a natural thing

Sequence A-1 to A-2

after passing the checkpoint the driver enters into a long commercial development, strip gas stations, some old plants, gas tanks, discount stores etc.; close grouped large and rather sprawling they allow only small slot views of the water and their apparent lack of relationship to waterfront activities helps to detract from the feeling that this is a road in close proximity to a shore line/ the Edison Power plant with some coal-loading structures gives a hint that the water might be beyond/ there's some use of the water or harbor in advertising, one spot known as the Harbor Auto Sales/ as one goes further south in the sequence there is some opening up and reduction in building height/ open spaces but water level is too far below road level to be evident/ as before there is indication of water by seagull activity/ some vegetation cattails, savannah grass, etc. in the larger open spaces indicate salt water/ ahead one sees the General Edwards Bridge with its pepper pot structures, but up until the time that one actually begins to ascend the bridge water is not evident although Nahant Neck can be seen and one knows that there is water in between

Checkpoint A-2

the General Edwards Bridge increases in elevation here both on the bridge itself and on the road leading up to it give a definite view of Nahant Neck the Bay and a good chance for observing textural changes in the water due to view from above/ shore line edge itself is very evident/ as at Checkpoint A-1 activity at this time of year is low but an existing yacht club and boat yard on the south side of the bridge would increase small boating activity/ once again the seagulls/ the water view here is not resticted solely to the bay but also to the Pine and Saugus Rivers/ the Saugus River view is comparatively short in that it is crossed by a railroad bridge beyond which it is difficult to see water/ the contrast between the deeper water of the bay and the swamp of the interior is a welcome one/ the swamp area in the vicinity of the railroad tracks crossing the Saugus

River has large brick industrial structures and white painted cement block structures which are reminiscent of some of the development of the New Jersey swamps/ there is a great contrast between the browns of the natural grass and these rather overpowering buildings/ unfortunately views on the bridge are restricted by safety rails and fences, the ramps leading up to the central part are guarded by cement walls with small holes which look like bow slots on medieval castles, it's hard to establish a continuous picture/ fortunately in the middle section of the bridge the safety rail is an open ironwork which allows a much fuller view/ from the middle section of the bridge elevation allows a full view of Lynn Harbor, the Bay, and over Lynn Beach and Nahant Neck to the more open water of the ocean beyond/ descending the bridge southward into Boston attention is diverted to the right/ on the left there are mixed summer and year round converted beach houses which block water view/ attention is focused upon downtown Boston and specifically the Hancock Building/ the Pines River at this point appears to lead up to downtown Boston and there is a strong connection here between the downtown and water, this connection is influenced greatly by tides which at one point in time make the city appear to be perched on water and at another time to be built on swamp

Sequence A-2 to A-3

sequence A-2 to A-3 is a short one consisting of a dip between two bridges, one over a road, and one over water view to the right over the Pines River but no visual connection to Lynn Harbor and Broad Sound

Checkpoint A-3

a road bridge with high green steel sides extending above eye level/ a sharp angle with the bridge pointing inland, that is a change of direction from parallel to the shore to almost right angles from the shore/ vision impossible except straight ahead until one comes to the

end of the bridge and begins to descend where boatyard and the Pines River are very much in evidence and the skyline of Boston appears/ the west view is very similar to that at the cental part of the General Edwards Bridge, the feeling here is almost the same/ after descending from the bridge and road leading down from it one enters a mixed use area of summer and year round conversion homes, small stores etc./ relationship to water is weak

Sequence A-3 to A-4
an area of mixed use/ water can only be seen to the right down relatively narrow residential streets/ one knows there is a shore to the left as one can see summer house construction/ an apparent dune or rise up from behind the unseen shore line, the houses are sort of half built into the dune and one knows there is a large space beyond and due to prior views know that it is water not a large land space

Checkpoint A-4
on the left along the non visible shore line are the summer homes behind which there is swamp vegetation/ the road itself goes through a swamp/ to the right is a tidal swamp and flat area large in size, unrelated visually to Boston but rather to East Saugus/ no activity within the water area/ tidal mud flats give a rather undefined edge with the brilliant sun reflecting on both water and mud it is not easy to tell where one begins and the other leaves off/ thousands of seagulls scavenging on a nearby dump/ a railroad bridge points out the direction in which the bay heads inland but it restricts any further view, shows you where the water goes but doesn't allow one to see how far/ this is an area for water observation at a small scale/ no connection with downtown Boston/ although this might be a pleasureable spot for small scale observation of water and wild life activities no provision has been made for such, and stopping even in the accident lane or breakdown lane is hazardous/ cement posts with wire strands between are along both sides of the road and do not block

vision at all/ at about mid point of the area there is a rather incongruous development of signs, billboards, boat yard, laundry etc. which does not lend itself to the natural surroundings/ as in many salt water swamp areas man has managed to detract from them; large dumps, painted cinder block buildings contrasting with the dead grass color of the vegetation do not fit in with the surroundings/ a radio tower in the center however does not appear to detract but rather gives some feeling of a central point within the natural open space/ although at this point one cannot see the distant shore line of Revere Beach, radar towers are a symbol for or give a feeling of shoreline shape at large scale although it cannot be seen/ this view of the towers is apparent only for a very brief period, the enlarged rounded shape reflecting the sun is a very strong symbol of the shore line shape and elevation for height of top of hill from the water line

Sequence A-4 to A-5

after leaving the swamp area of Check A-4 the road bends gradually, one knows that it parallels the shore by the ever present summer cottage string along the shore/ this pattern is diluted in strength as the marsh land in back of there becomes more filled in the vicinity of Revere Beach and the water form or shape, surface etc. is lost to the auto passenger/ there is a swamp area on the right but it is relatively dry even in periods of high tide and there is no water pattern/ summer houses to the left, swamp to the right and a gradual increase in commercial activities as one comes closer to Revere Beach/ billboards, gas stations, etc. give a close feeling

Checkpoint A-5

at this point one must rely solely upon structures signs etc. to know that one is near the waterfront and resort area/ very evident is the Revere Beach Amusement Park, which type of development one normally associates with beaches and related resort areas/ the houses east of

the road have a more summer-like character than those west of the road and this helps to orient one's thinking in relation to the beach/ at this time of year there is very little activity related to the water but in summer one would certainly suspect that there would be large numbers of bathing suit clad persons crossing the road which would increase the feeling of water proximity and direction/ views down the roads to the left do not allow any scene of the water but there is a definite sand dune shape which suggests that the shore line is there/ the whole feeling is that one knows one is close to the water in an area which is related in function to the water but lacking visual connections

Sequence A-5 to A-6
the road gradually turns to the west or southwest and heads away from the functionally apparent shore/ attention is diverted from the beach area to the left by the large Wonderland Race Track, large both in structure and in developed open space i. e. parking lots/ there is a rotary almost directly opposite the track/ rotary in this case does not shift orientation radically/ after passing the track the road heads almost directly west on a level elevation, and then rises, heads more to the south/ this rise in elevation contributes nothing to the water view but rather sort of tilts one up looking at the sky/ the road climbs and then flattens as it crosses over a railroad track after crossing the track bridge a large rotary

Checkpoint A-6
a large rotary with a junction of four roads/ upon first entering the rotary one can see the downtown skyline of Boston but no relationship of this skyline to its waterfront or swamp developments/ the feeling here is that one has left the water and is now heading inland away from the water/ the rotary greatly confuses one's visual relationship with the water interior etc./ everything becomes mixed up, traffic is heavy, and the driver is more concerned with looking at the car on his left, right, front, and back rather than looking at any view which might be apparent

Sequence A-6 to A-7

after surviving the rotary one heads toward Boston seeing the skyline on the right/ views are blocked here and there by structures, autos, etc. until one straightens out and begins to descent a hill known as Young's Hill, this hill once again gives a picture of the Boston skyline/ the skyline appears much larger than it actually is, it almost looks like dowtown New York/ the view of Chelsea Creek is revealed and an oil tanker is moored on the west shore side of the creek/ after descending the hill one enters an area known as "Oil Farm Truck Area" as designated by signs/ the descent of Young's Hill offers probably the strongest visual relationship so far experienced between Boston and the water and some of its waterfront activities and functions

Checkpoint A-7

this area described by road signs as "Oil Farm Truck Area" sits in a hollow between two hills, Young's Hill on the north and Orient Heights to the south/ there is a visual and psychological connection to water on both sides and the feeling that arises is that this area is reclaimed land/ mud sand and swamp grass type of growth in the oil tank areas all point out visually this area was at one time under or at water level/ unfortunately visual water connections now are very weak the only really evident one being to the right where one catches a glimpse of Chelsea Creek as a waterbody and the pilings, docks and Texaco tanker moored to it/ directly ahead one can see a change in elevation in the road skirting Orient Heights/ the functions activities etc. along the sides of roads are not what attracts attention rather one is directed to look ahead and wonders what happens when the road does cross over the hill/ in this area one must search for signs of water, they are there/ the Atlantic Gas Co. sign, "Marine Terminal" leaves one feeling a bit empty, the water activity would not seem to rate this importance of being called "Marine Terminal"

Sequence A-7 to A-8

no water connection to the left but Chelsea Creek and ship tankers to the right/ Tide Water Oil Co. sign seems to apply as adjacent to tidewater Chelsea Creek/ after crossing the oil farm area one ascends a hill which on the way up gives a better view of the surface of Chelsea Creek and the surrounding swamp land/ Mystic River Bridge is very evident and one can see that there must be a body of water to be crossed in that vicinity/ descending south side of Orient Heights hill water of Chelsea Creek leads

into Boston/ foot of hill one gets brief view to the left side of the shore, water can only be seen for a brief second but outlying snow accentuated land areas delimit the bay for a longer period of time/ much evidence of filled in land/ water of Chelsea Creek very still almost stagnant

Checkpoint A-8

at this point the Mystic River Bridge is extremely evident, both upper and lower levels traffic can be observed/ the pattern of Chelsea Creek seems to lead in the direction of the Mystic Bridge and perhaps one wonders why such a large bridge might cross such a small creek/ the junction point with the Mystic River is not evident/ the cranes of the Boston Naval Station can be seen as can other cranes which are used for loading unloading etc.; one can sense that there is water there although one cannot see it if one has a knowledge of the function of these structures/ some of the downtown Boston buildings are evident specifically the Customs House Tower and Court House/ once again the vegetation and uncovered soil leads one to believe that this land was filled in at one point/ the interior river pattern leads one to believe that Boston is an island city/ large amount of open space owing to the U.S. Naval Reservation but high link fences with barbed wire on top restrict one's thinking of this as an open space, more like a restricted open space/ double curve in road plus heavy traffic at high speed do not allow one to contemplate the water pattern/ here there is a need for self preservation/ the Mystic Bridge is probably the greatest attention getter, it has an aura of mystery about its purpose/ other than natural grass golden rod etc. there is little natural vegetation and the seasonal change would not seem to be great/ only can see water edge in a few places, and in those spots the pollution of the water and the mud flats make a sharp separation difficult

Sequence A-8 to A-9

sharp bend in road ends one's orientation towards the John Hancock

building/ Chelsea Creek on the right crossed by auto bridge which ends the creek visually/ begin to ascend hill/ water cut off by large metal structural building on right/ ahead another rise in road/ any view of water cut off on left by residence, three decker, and right by oil tanks/ if water were evident the attention would nevertheless be directed to the Boston skyline straight ahead with strong orientation to the Customs House Tower

Checkpoint A-9
at this point there is three decker residence on the east, oil tanks and a brick building to the right/ this is a flat area with a hill directly ahead on the expressway/ from the bottom of the hill one has no visual connection with the water/ Boston appears as an inland city with no water at its feet/ nothing to attract attention to water or make one think about it/ attention focused on the rising road ahead and those parts of the skyline which are evident

Sequence A-9 to A-10
ascending the hill on the expressway water view on the right blocked by oil tanks/ the skyline appears disappears and reappears when one reaches the top/ the Mystic River Bridge to the right is a very handsome sight, and Chelsea Creek can be seen heading in that direction/ to the left one sees filled in swamp areas near the airport/ most attention is devoted to the Customs Tower, Court House, and John Hancock building, those alone seem to content/ constant series of dips and rises in the road with a G. E. electric bulb sign illuminated in the daylight flashing on and off which appears rather strange/ as one comes up the first rise the airport can be seen to the left and much of the shipping and related functions to the southeast in the vicinity of Jeffries Point, Commonwealth, Fish and other piers of east and south Boston/ a large curve in the road leading towards the tunnel focuses one's attention upon the naval yard cranes and Mystic Bridge/ one descends and finds oneself in a residential and

mixed land use area, a general hodge podge of activity/ as sequence continues the relationship to the shore front diminishes due to the change in direction to the west despite the almost direct path to the Mystic River Bridge

Checkpoint A-10
the entrance to the Callahan and Sumner Tunnels area/ after making the sharp westerly turn on the expressway aiming at the Mystic Bridge thinking that one is going up the river along the interior water one sees sudden turn to the south towards Boston and the tunnel/ appears no relationship to the city or rhyme or reason for the tunnel being there, a great big hole which visually seems to lead nowhere/ from the Checkpoint itself one cannot see the water or any of its functions other than the Mystic Bridge and a radar superstructure on a small destroyer escort at the East Boston piers/ there is potentially a good view of the docks but a long structure which is just low enough to block off the superstructure of the ship excluding any high antennas/ there is no relation between the tunnel and water/ there is no evidence that the tunnel goes under water, one can see that it goes down but what it goes under or its reason for being lacks visual connection/ the structure which blocks off the destroyer escort is an Elm Farm Super Market, one story brick

Sequence A-10 to A-11
one descends down into the tunnel and heads under a red brick ventilator building/ the tunnel appears to have been built to go underneath the structures of the city and not the river itself/ there is an odd feeling at not having been connected visually or having seen any links or a minimum of signs which would give any indication of what the tunnel does, where it goes etc./ a name such as the Mystic River Bridge allows one to know that the bridge is crossing over a water body even if the fog were thick and one could not see the water one would probably know from the names on the signs that one

was crossing over a river; however, in the case of the tunnel there is no indication what the tunnel is passing under: just a sign, perhaps a mosaic pattern along the tiles or a depth below water level indication, might give one a relationship which would be beneficial/ ahead the strong sunlight at the end of the tunnel/ a small bridge/ a larger bridge/ the Parker House sign from the back and the Court House; however, nothing to give evidence of the water/ one knows at the end of the tunnel that one has arrived in almost the center of Boston/ the Customs House tower which previously has been a visual goal from other points along the road has now been reached/ from the prior views one expected water to be seen and crossed before reaching the goal the tunnel denies this/ the driver knows he's in Boston but he doesn't know how it's been done

Checkpoint A-11

this is the end part of the tunnel where it comes out in the vicinity of the Inner Belt or John Fitzgerald Expressway/ there is a feeling of mystery as to how one has reached this point/ one went from a mixed use area on one side of the river, went below ground for no apparent reason, reappeared on the other side in a warehouse residential, retail, mixed up area, cut up by roads and express highways/ even if one figures that the tunnel went below a water body looking back gives no evidence of the water/ the area here appears to have no functional relationship to water or water activities/ there is a large amount of activity in the area, both auto and pedestrian/ quite a bit of street life/ one gets a glimpse of this at the corner of the North End/ if one is acquainted with the history of Boston the Customs House Tower may serve as some form of visual relationship to water, the relationship being not one of proximity but rather of past function

Checkpoint B-1

commercial development on east side of Charles River, open space

park on left or western shore/ at this point road dips and one sees water to the left as a pool rather than a continuous river/ despite heavy traffic the view of the water when approaching Boston is good/ one looks down on top of the water allowing textural change to be seen/ no view of Boston/ no water activity or functions related to the water are evident/ water appears as a natural thing with modifications in the vegetation along the shore probable from season to season/ Mount Auburn Tower is a landmark behind the water pool/ landscape development of New England Merchants National Bank seems to be continuous with the open space along the river despite road intervening/ heavy industrial activities of Watertown e.g. rubber plants detract somewhat from first impression and attract attention to the west but as one progresses the visual orientation is towards the natural water/ MDC structure and parked cars along the shore block vision somewhat/ road harmful in that diminishes amount of available space on east side/ Coolidge Avenue along west side is not visible although it can be located by tops of moving vehicles

Sequence B-1 to B-2

the road follows the general configuration of the river/ the open space is obstructed as is the river by MDC parking lot and small structures on the left/ at the foot of the hill the river disappears behind a bend and then reappears once more/ the visual impression is that this is a series of pools or ponds/ after rounding the bend there is a rather fine backdrop of western Cambridge sitting atop one of these river pools/ in a small picnic area the MDC has constructed picnic benches which appear in front of the water in fact they seem to be almost in it and detract from the natural appearance/ the road here follows the natural meandering of the river/ a large parking lot in front of the Boston Arts Center would block vision of the water when filled with cars/ the Center Building itself, a modern structure, oblong, is built on stilts and allows one to have a rather intriguing view of the river beneath it/ between this Arts

Center or Institute of Contemporary Art building and the Eliot Bridge the river appears once again as a pool

Checkpoint B-2

at this point the river is a pool/ the Eliot Bridge, brick, with open arches allows the continuity of the water when the angle of vision is correct/ obvious natural open landscape on the west/ coming down Soldiers Field Road towards Boston it appears that one would cross over the Eliot Bridge/ hard to tell whether river turns to the east west or somehow comes to an end at the foot of two apartment houses behind the bridge/ boat house behind the bridge and another in front of it; an area of sculling practice, a relatively unique activity to some/ would be beneficial if there were some continuity of water but traffic circle at bridge does not allow this/ obvious contrast between water edge and water itself although there is not a sharp change in elevation stone embankment etc./ the edge is a natural one of grass and mud/ Harvard Stadium to the right attracts one away from the shore somewhat/ no relationship to Boston

Sequence B-2 to B-3

one feels that the road will cross over the Eliot Bridge but as one comes closer to the circle and the river seems to come to an unexplained end the road to the right can be seen/ road alignment and structures on opposite shore give a relationship to water although not seeable/ coming around the bend the water cannot be seen at all but the open space informs one that it is there/ steel guard rails block the view of water/ one cannot see water as such until the turn in the road is completed and the Anderson Bridge and its arches can be seen/ this could be a handsome turn if the water were allowed to be seen by different handling of guard rails and a change in elevation or perhaps pitch in road which would allow a connection

Checkpoint B-3

at this point there is the first connection with downtown Boston, the Hancock Building can be prominently seen/ the river appears as a pool/ arches of the Andersen Bridge allow a continuity of vision but a further bend in the river makes the water appear to come to an end, there is no indication of directional turn/ small boat activity especially crew practice from Harvard Boat House/ elevation of road allows some textural change to be seen/ interesting shadow and wind pattern under bridge/ MTA parking lot cars and trackless trolley section does not seem to fit in with the other natural open space, park grass, apartments brick buildings of the University etc./ one has an idea here that this river will run through the central part of Boston/ leaves in summer would block much view of Cambridge and would probably direct one to look more down the river to Boston/ bend ahead in the road diverts one's attention away from the river itself

Sequence B-3 to B-4

in the sequence the river appears as a pool/ some continuity under the Andersen Bridge/ river disappears behind boat house then reappears/ interest wanders to the Harvard Stadium/ interesting change in axis of both the highway and footbridge/ shadows under the highway bridge on the water/ dip under the approach from the west, water vision lost/ Harvard Business School buildings on the right/ come up the rise, water reappearing on left with continuity under the foot bridge/ Harvard backdrop on the east side

Checkpoint B-4

a pool between two bridges with small continuity under the foot bridge/ grass areas down to water intermediate edge/ boat house activity/ arches of bridges give interesting wind effects on water/ water and road, especially road, separate two sections of the University/ luncheon and pedestrian activities on Cambridge shore/

intermediate elevation above water allowing slight textural patterns and wind effects etc./ John Hancock can be seen but not related to water/ intensification of structures and development downstream, water appearing to be lost among them/ road has discouraged pedestrian activity from crossing the river on the foot bridge/ road requires an extra foot bridge/ at this point one knows that he is in Cambridge in an institutuional area, the river lends a distinctive air and the red brick buildings point this out as a university center, the river and its open space add greatly to the image of the area

Sequence B-4 to B-5

the road here follows the meander stream and passes under the John Weeks foot bridge where the banking road does not allow vision of the water/ one turns/ the large power plant on the left/ no water to be seen but the far bank of the river is very evident/ as one approaches the tunnel under the road bridge the water becomes evident but is blocked substantially by a steel guard rail/ dip in the road to go under the bridge ramp/ a rise/ a very small view of the river to the left/ guard rail blocks vision/ dip under another auto bridge where the water can be seen briefly/ the dips are rather a mystery/ coming out of the dip the gradual turn to the right and the road sinks more water can be seen, a large expanse/ commercial development and large structures, railroad yard, football stadium, BU etc. begin to cut down on the open space/ ahead is the Cottage Farm and railroad bridges, rather complex/ Hancock Building off to the left/ river now looks as if it will pass through south of Hancock Building

Checkpoint B-5

railroad yards and Boston University football stadium on right/ some small open park space on the left or east bank of river/ car washing at Magazine Beach/ very confusing complex at the BU Bridge angle of the railroad and auto highway/ river appears as if it should

pass to the south of Boston/ boat launching at Magazine Beach small boat trailers boats etc./ much of downtown Boston obscured by vegetation in the summer/ football stadium attracts attention from water as do swithching movements in railroad yards/ near edge of water sharper than distant edge i.e. edge on west side or southwest side sharper than that on east side which is more natural, the west side has a higher bank/ this is the largest body or pool of water in the sequence so far/ minimum of rails, signs, etc. to block view of water/ can see definite relationship between where one is going on road and water; although some confusion as railroad bridge appears not to cross river but rather to go along the southeast bank/ where road surface cannot be seen road can be located by moving cars/ bridge on east bank makes it appear as if water body joins Charles River at this point and there is need for such bridge to cross this supposed other water/ no relationship of the river at this point to any larger body of water or the Boston waterfront and activities in general

Sequence B-5 to B-6

road curves following the river/ continuity under the Cottage Farm railroad and auto bridge/ railroad bridge can now be seen to cross from one shore to the other and not parallel south shore/ many cars on left bank/ water now can be seen under the bridges leading directly up to the foot of Boston; Hancock Building, 330 Beacon Street, Court House, Customs House Tower, State House etc./ Harvard Bridge can be seen/ utter confusion beneath the two bridges but an interesting play of light and shadow on the water/ after passing under the bridges slight increase in elevation followed by descent which reveals more and more of the water and its change in direction to the northeast/ one can see a very marked relationship between downtown Boston and the Charles

Checkpoint B-6

at this point the Boston skyline from Hancock to the new West End can be seen visually connected with water/ the city sits on water Mass.

Ave. Bridge allows a continuity of water beneath/ at present this water from approximately 200 yards above the bridge is frozen with ice, upstream of that point the water is cleared and the contrast which can be seen by virtue of elevation is a distinct one/ the brick buildings of Polaroid, RCA Victor, Whirlpool, and Jordan Marsh block any view of Cambridge/ the MIT dome and remainder of buildings appear as a small structure with an insignificant hump on top/ the direction of the river cannot be seen as such but the green color and traffic movement of the Pepper Pot Bridge give a hint as to which way the river turns/ one can ascertain that the river now passes north of the city/ an iron fence between the road and water parallel bars about nine inches apart does not radically block the view but interesting changes with speed/ one's attention here is directly down river to the skyline of Boston/ boating activity by virtue of MIT and the BU boat houses/ few vegetation changes with season/ road appears to go into downtown Boston and not follow the river bank

Sequence B-6 to B-7

descent of hill/ water gradually becomes at eye level/ bank on left blocks off quite a bit/ wooden pedestrian bridge cuts up/ attention diverted to Hancock Building/ difficult to see water, high bank two feet above road level cuts down on vision/ another foot bridge/ small sliver or sheet of water, one can feel the shoreline shape by the structures rather than by seeing the shore itself

Checkpoint B-7

the elevation here allows only a slight view of the river/ bank to the left is not quite at eye level, blocks off shoreline/ farther shoreline on Cambridge side is sharp contrast between stone of wall and water and ice/ downtown sits on water/ lack of pedestrian activity on both shores/ shoreline appears to have been managed in its shape/ Hancock Building attracts one's attention from water/ elevation increase in road possible, two level road with outer lane less than inner would allow further appreciation of the Charles River area/ structures on

Cambridge side strengthen edge of shore/ shoreline identified by sky-line and structures/ traffic really too heavy for full appreciation/ no activity on water, boats of crew appear lost here as compared with further up Charles where banks were closer, a small scale activity here has been imposed upon a large scale scene/ highway has cut off residents from park, cutting off has reduced residences appreciation of the river but heavy traffic flow allows many more people to see it in a given period of time

Sequence B-7 to B-8
road continues at level elevation/ Y in road with one branch going to Kenmore Square and one to the downtown/ there is increase in elevation to pass over highway turnoff, natural inclination is to look back up the river/ a mixture of guard rails walls and the Mass. Ave. Bridge/ small continuity of water from Fenway with Charles River/ dip as one goes under Mass. Ave. Bridge, comes out aimed at State House with gradual turn in road change to Court House orientation/ Pepper Pot Bridge, water passes underneath can see activity beyond, shoreline etc.

Checkpoint B-8
close and/or large scale water/ an island off main shore/ water coming close to the out of town lane/ comparison at both scales/ pedestrian bridge over small island body and larger Pepper Pot Bridge/ definite edge due to structures and stone reinforcements on Cambridge side/ marina on Cambridge side, dock and large white boats/ in the summer when the MIT Yacht Club and Charles River Yacht Clubs are used this is an area of great sailing activity, sails help to locate the water which due to lack of elevation is not easy to find/ road cutting residents from shore/ strung out open space with little depth/ change in Boston relationship to water/ downtown can now be seen as not being at the foot of the river but somewhat inland/ summer vegetation in shore part would obscure one half of Pepper Pot through West End Project and almost to Customs House Tower

Sequence B-8 to B-9

road parallels shore to foot bridge then begins descent into the tunnel passing under crossroad/ tunnel appears at first to head for the downtown, ahead the curve in tunnel seems to make one think of the curves in river in the vicinity of Harvard/ a sunlight pattern/ rise/ Shell on the left, Pepper Pot Bridge and water beneath on left/ large and small scale due to island and boating area, high activity in summer/ head for Pepper Pot, pass under and see water beyond/ water disappears as come out from under bridge/ Museum of Science, overpasses, general confusion of parked cars for hospital area/ emerge from underpass cannot see water except brief glimpse of water slightly in back Pepper Pot vicinity/ Charles River Park on the right attracts attention away from water/ extremely difficult to orient oneself to water; much confusion of roads, traffic, Museum of Science, playground, park, merging lanes, etc./ this is the beginning of confusion, a relationship which had been so strong further upstream has now been lost

Checkpoint B-9

Charles River Park or West End on right, Museum of Science on left, child's playground left/ fence between water and playground, playground and road, and between opposite lanes of road; three fences in all to peer through at water/ rotary ahead backs up and confuses traffic, changes organization to river, one does not really care about water but rather how to get through the rotary/ water goes off somewhere but no directional indication/ very difficult to see any water activity if it were taking place/ few if any seasonal effects/ traffic is the attention getter/ relationship to Boston forgotten

Checkpoint C-1

single and two family residence on northwest side of river/ Keystone Movie Camera plant between residence and highway/ east side swamp, dump, filled in land etc./ opened bridge downstream shows shape or direction of river/ some flat view of Dorchester Bay between C-1 and Castle Island no textural effects; water horizon/ no view of open

water beyond/ lack of water related functions and activities other than present pattern of land fill and garbage dumps with smoking tee-pee burner/ some small boat facilities on east can be seen with close scrutiny but would not be normally visible at this point while in motion/ no seasonal effects/ lack of vegetation of any significance other than natural grasses/ interesting water meander patterns in swamp, changeable with tide/ undefined water edge due to similarity in quality of land and water/ low banks except on northeast where filled dump/ no orientation either road or water with Boston/ lack of attention getters to or away from water/ elevation not significant to allow view to northeast over billboards structures drive-in theaters etc./ curve in road gives visual build up but doesn't reward, i.e. one expects more than can see/ land fill in dump has ruined much of natural area to the east and increased elevation has not allowed continuity between the river and the bay/ drive-in movie theater, wooden board fence, and new motel do not allow view of bridges other than the previous mentioned open railroad bridge which indicates direction of water flow

Sequence C-1 to C-2

road passes over bridge/ view of bay to the northeast/ smokestacks of South Boston to the left/ heavy residence to west/ some water to right, almost at right angles/ small boat yard can now see outer railroad and car bridges over Neponset River/ curve to the northwest/ guard rail stops some of view/ Customs House Tower, Court House and Hancock Building far to left/ Columbia Point on right/ small scale Manhattan skyline of some sort/ open water in front of Columbia Point/ connection of Neponset River to the Bay/ old piers/ a nice hierarchy of enclosed water, islands, penninsulas etc./ road now headed just to left or west of Hancock Building

Checkpoint C-2

Old Colony Yacht Club, boat houses, buoys or channel markers, boat yards/ an area of pleasure boat activity launchings etc./ Castle

Island and prison (Deer Island) apparent northern limits of Boston Harbor/ handsome with water appearing both as an horizon and from above at shorter range/ no water apparent with Boston downtown/ land fill at the end of Columbia Point where burning, dumping etc. detracts somewhat/ jets taking off from Logan are attention getter, as is the Hancock Building/ large gas tank to northwest of Old Colony Yacht Club is outstanding and blocks orientation with downtown/ this area gives one a view of the intricate Boston Harbor complex (natural physical features)

Sequence C-2 to C-3
gas tank really blocks view/ rise with some water to right/ heavy residence to left/ turn to left, and then a wide view of small bay and then larger bay/ small bay has much small boat activity with yacht club pilings etc./ road bridge separates from the outer bay, arches allow some vision through/ road turns again to northeast

Checkpoint C-3
this view has two scales, small scale of Malibu Bay with its boating activities and facilities plus the beach itself and small beach area with hot dog stands etc./ silvered piling, floats and markers terminated on east by road bridge with concrete arches allowing some continuity horizon water beyond/ Savin Hill to the north of Malibu Beach/ heavy residence, three decker/ good large scale view; once again the pattern of the Boston intricate harbor (physical elements) islands bays etc. but no connection with downtown Boston and Boston waterfront proper/ water edge strong immediate to road due to bank and facing materials, diminishes in contrast with vegetation and sand of Malibu Beach/ one doesn't know whether to look at what is close at hand or what is beyond/ Malibu Bay area is almost a lake or pond/ at the large scale the causeway out to the Home for the Aged is a great attention getter as are the structures,water towers on many of the islands in the bay used for institutional pruposes/ curve in the road winds to northeast of Hancock Building which is only downtown Boston building

visible, others blocked by Savin Hill and surrounding three decker residences

Sequence C-3 to C-4

road curves following shape of smaller bay/ yacht club activity of great interest, boats up on the hard in yacht club parking lot/ very clean sand on north shore sweeping around to road bridge/ then enter area of residence with some cut on right at Savin Hill, high concrete retaining wall/ car bridge, slight increase in elevation, Telegraph Hill straight ahead, some of it obscured by State Street Bank billboard/ Boston Globe building and Columbia Point block water to east/ large power plant structures to northeast/ now can see whole of downtown Boston/ no view of water except some slight to rear or southeast/ see bay north of Columbia Point/ shore defined by residential structures on north/ lack of visual connection between downtown and the bay

Checkpoint C-4

almost directly ahead the Hancock Building/ at right angles to road is Old Harbor, half way between Old Harbor and Hancock Building is the Customs House Tower/ downtown seems to be more involved with the water than previously/ shore of Old Harbor, Carson Beach L Street Beach, etc. is a sweep of sand which continues around to the L Street Beach where bath house structures and breakwaters discontinue the beach as a whole/ beyond L Street Beach the shore line is not so rigid or marked, and point south of Castle Island seems to gradually merge into the water/ towers and structures on outlying land masses accentuate them/ the State House dome just visible, one third distance from Hancock Building to Customs House Tower/ water here almost entirely at large scale/ no apparent boating activity/ traffic confusion between Columbus Circle, Morrissey Blvd. etc. disturbs view and relationship to water/ Castle Point and Deer Island make water appear as if it does not extend north but rather directly to the east, with lighthouse between Deer Island and Long Island as a landmark (watermark)

ocean beyond visible/ snow on islands brings some of them closer than measured distance/ Boston apparently inland/ probable large scale shipping activity in lighthouse vicinity to Boston waterfront/ Columbia Point incongruous/ Columbus Park is nice open space to water and appears continuous with it; some obscuring of water edge by vegetation in park

Sequence C-4 to C-5

Hancock west of road/ Customs House Tower well to east/ road dips after passing head of bay and curves to west or northwest / at foot of hill enter cut passing under one highway bridge, Hancock out of view, reappears, enter second bridge, Hancock disappears and reappears to east of main highway/ large railroad yards to left/ visual chaos and disorder with little orientation except to Hancock Building which is rotation to left as road curves east/ to the right the downtown area of the Customs House Tower/ no water seen on any side/ curving northeast now and can see very western end of Fort Point Channel/ channel appears as insignificant body of water not well connected to the bay/ much confusion, high enbanked auto bridge and roads cut off view down channel to Boston waterfront/ heavy pollution and stagnant appearance of water which is a body by itself

Checkpoint C-5

Hancock north northwest/ South Boston, Gillette Factory, and railroad yards etc. block view to harbor/ some water between two bridges, but cut up and fragmented by angles/ no life or activity on water/ appears stagnant/ can see some of shipping activities in East Boston around Jeffries Point and south of Camp Hill down the Fort Point channel/ most of these activities are brought to attention by cranes high towers structures etc., cannot see activity going on but know it occurs from these things

Sequence C-5 to C-6

road heading to center of large downtown structures/ some small water

to right/ large railroad yards/ passing Kneeland Street exit heading into tunnel/ no water visible except small sheet to right/ loading cranes of East Boston south shore can be seen/ Customs House Tower to northeast when entering tunnel/ tunnel one which appears to pass under structures, curve and curve back on itself makes one think of natural feature reminiscent of Storrow Drive along Charles River where follows river pattern/ emerge from tunnel at Atlantic Avenue and Northern Avenue exit into sunlight/ ahead vision blocked by large warehouse, brick/ turn to northwest, some view of water and bridge at end of Fort Point Channel/ climbing, guard rail obscuring/ airport jets evident/ reach top can see across to East Boston loading cranes naval ships and shipping freighters etc./ slots before Clinton Street exit give view to East Boston/ curve, can see Commercial Wharf with residence/ Callahan Tunnel exit/ view blocked for most part by North End/ passing Causeway Street exit/ can see Bunker Hill Monument and loading ramps and cranes of Charlestown but not the U.S.S. Constitution/ taking Back Bay - Storrow Drive exit/ climbing, reaching top see naval yard ships/ downhill, water of Charles ahead small and mysterious, lost amidst bridges ramps guard rails which block/ joined by road from Mystic River Bridge/ sharp curve/ visually constricting rails and descent/ exit to North Station down on to flat/ in flat area all view of water lost but functions and activities can be located and recognized by facilities/ sea gulls over Charles River which can't be seen/ sand loading facilities in B&M railroad yards at water's edge/ no hint as to where the Charles will go and no hint to its attractiveness up river

Checkpoint C-6

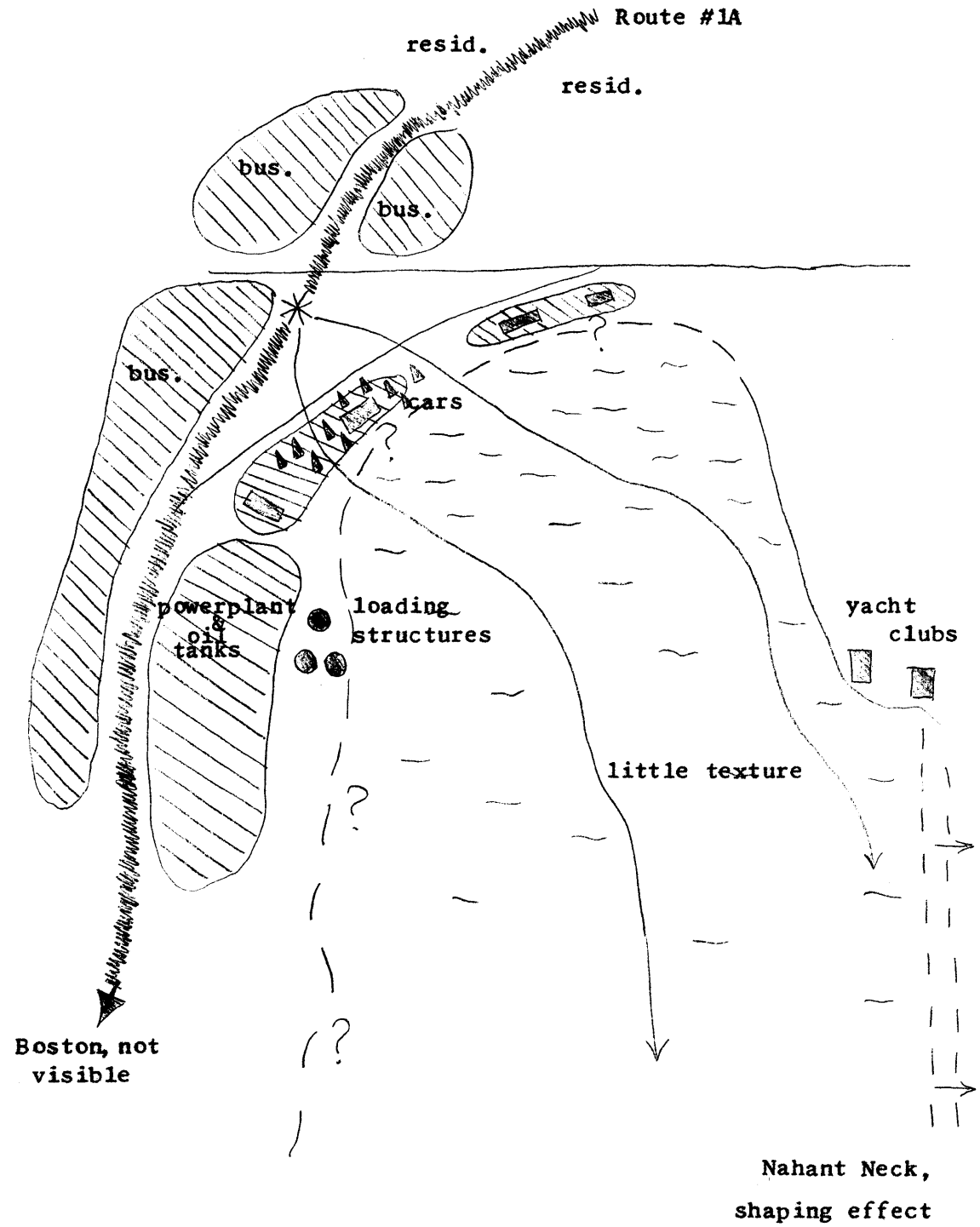
at this point water is lost and must be located by activity/ Museum of Science á landmark of the Charles River Dam/ parking lot for state employees blocks view of Charles water/ wheeling sea gulls and stone embankment give some indication of river channel/ water view has petered out/ heavy traffic diverts attention from anything else/ rapid transit bridge appears to cross nothing

APPENDIX B

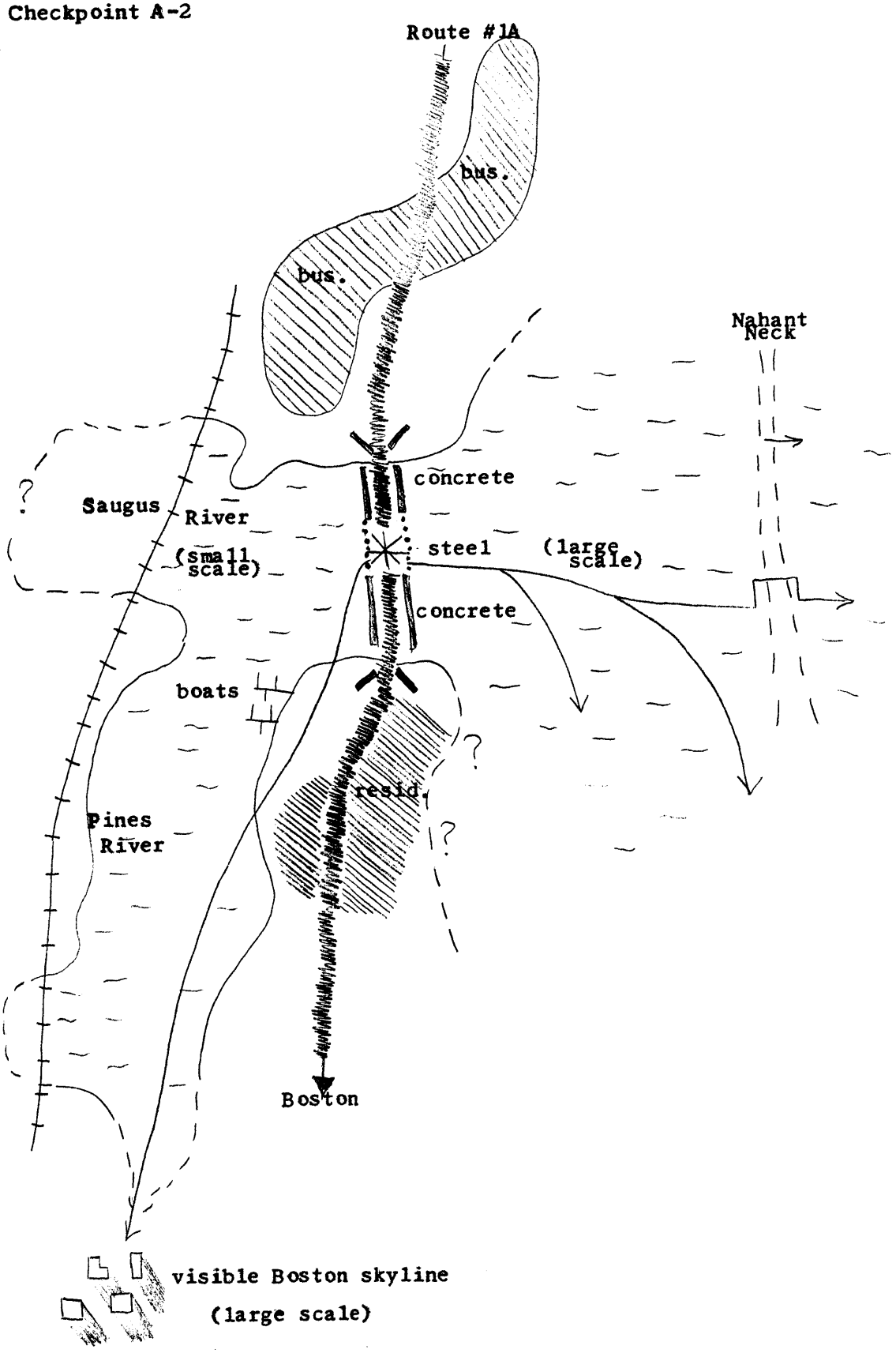
CHECKPOINT

DIAGRAMS

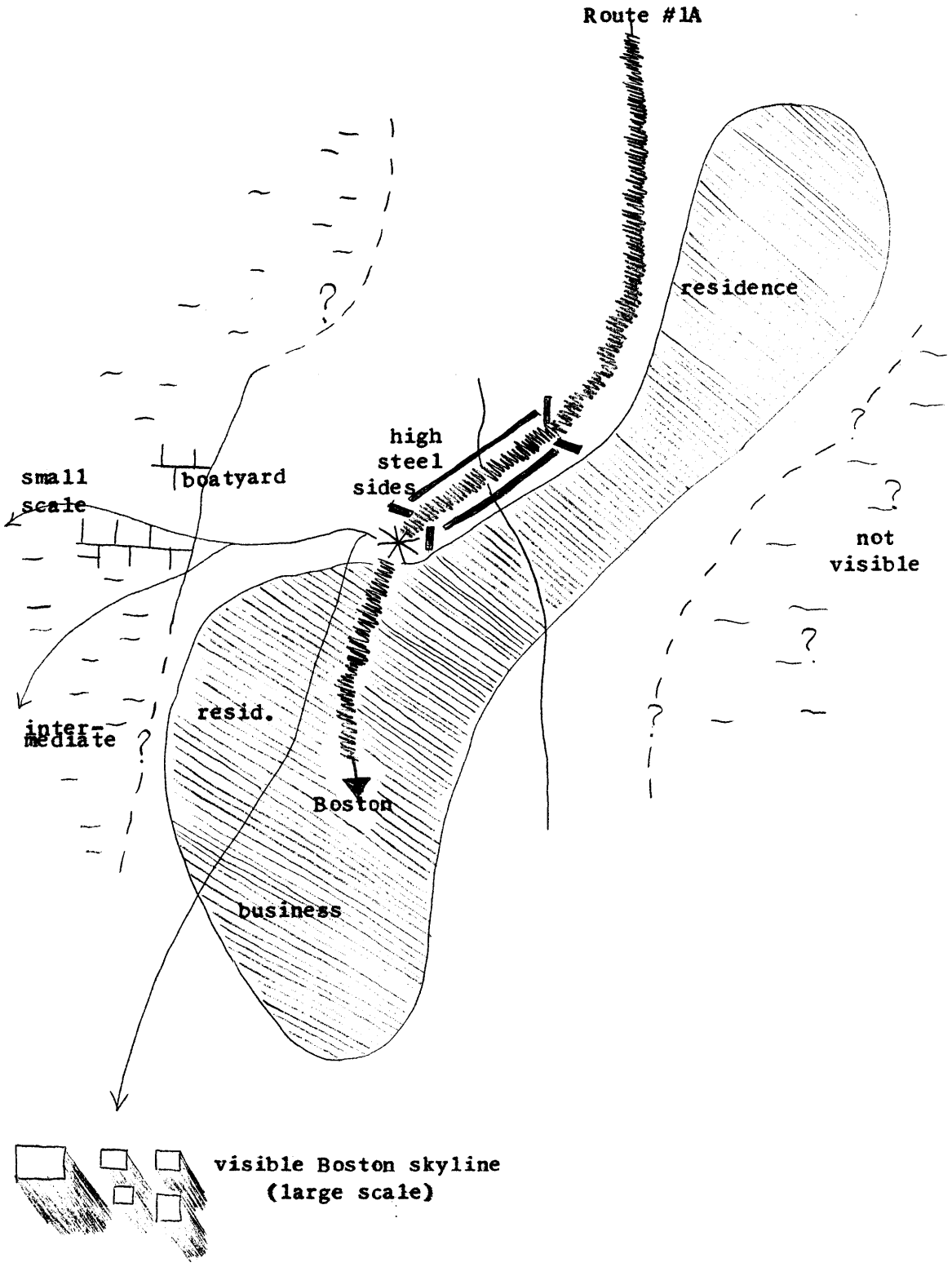
Checkpoint A-1



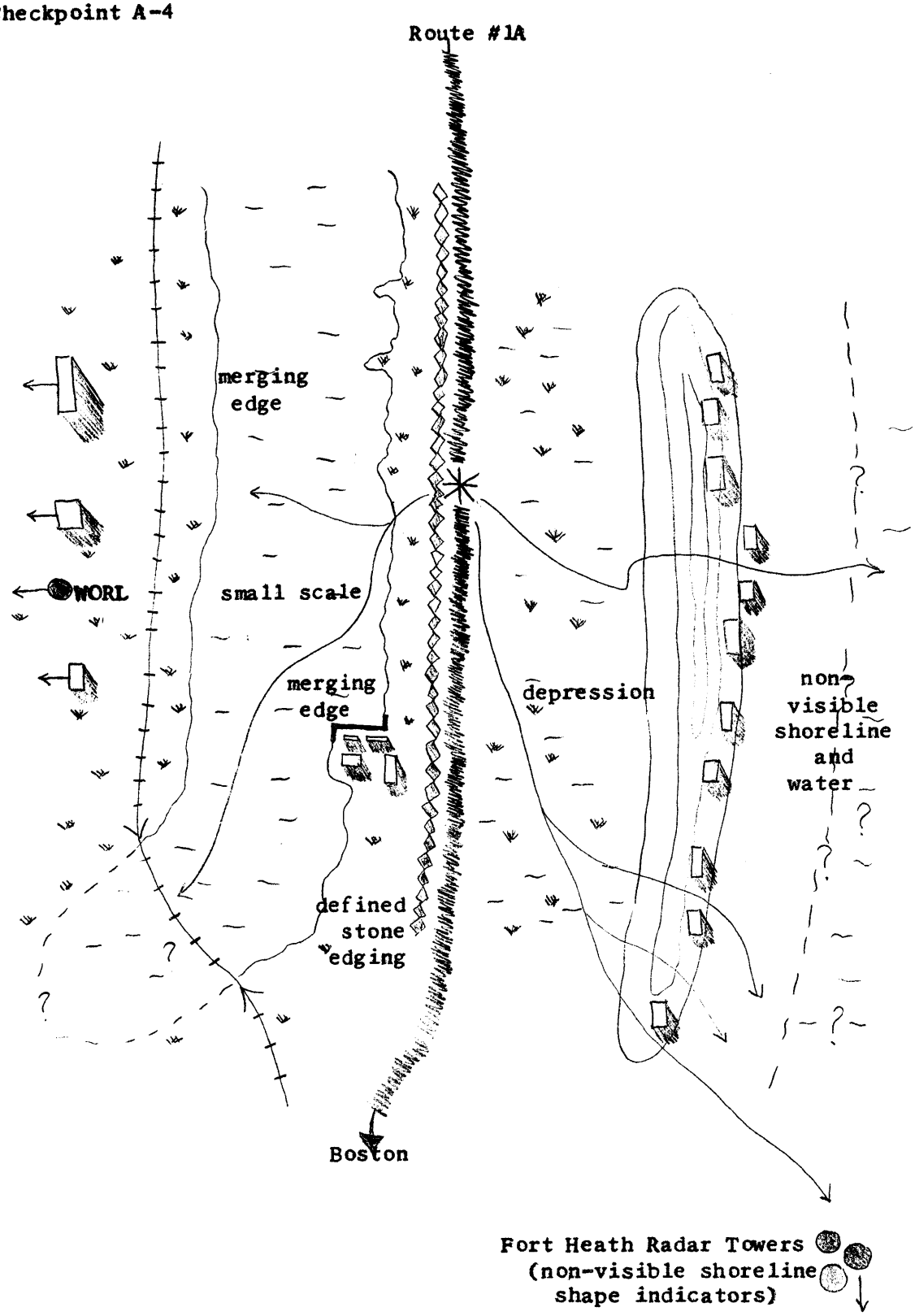
Checkpoint A-2



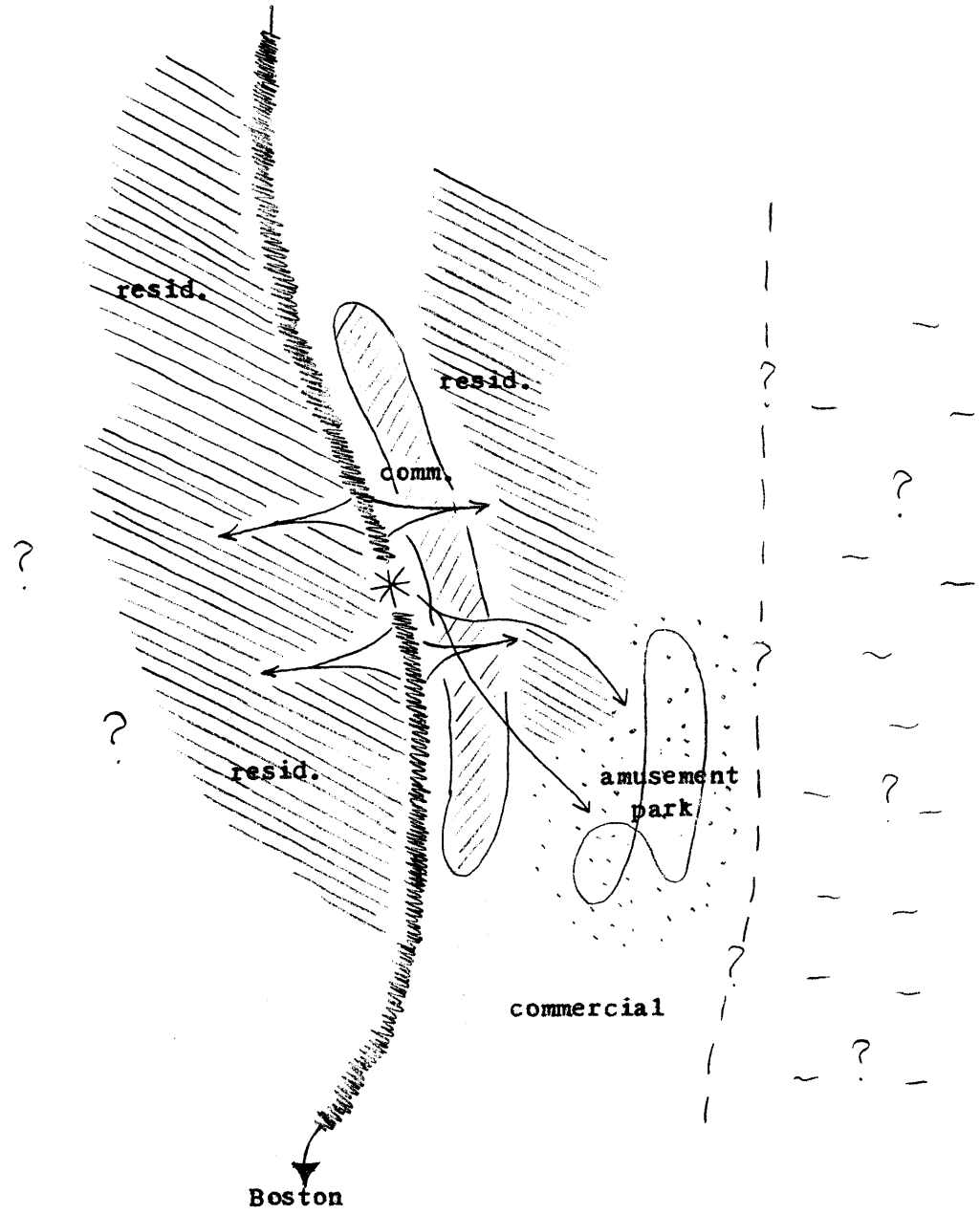
Checkpoint A-3



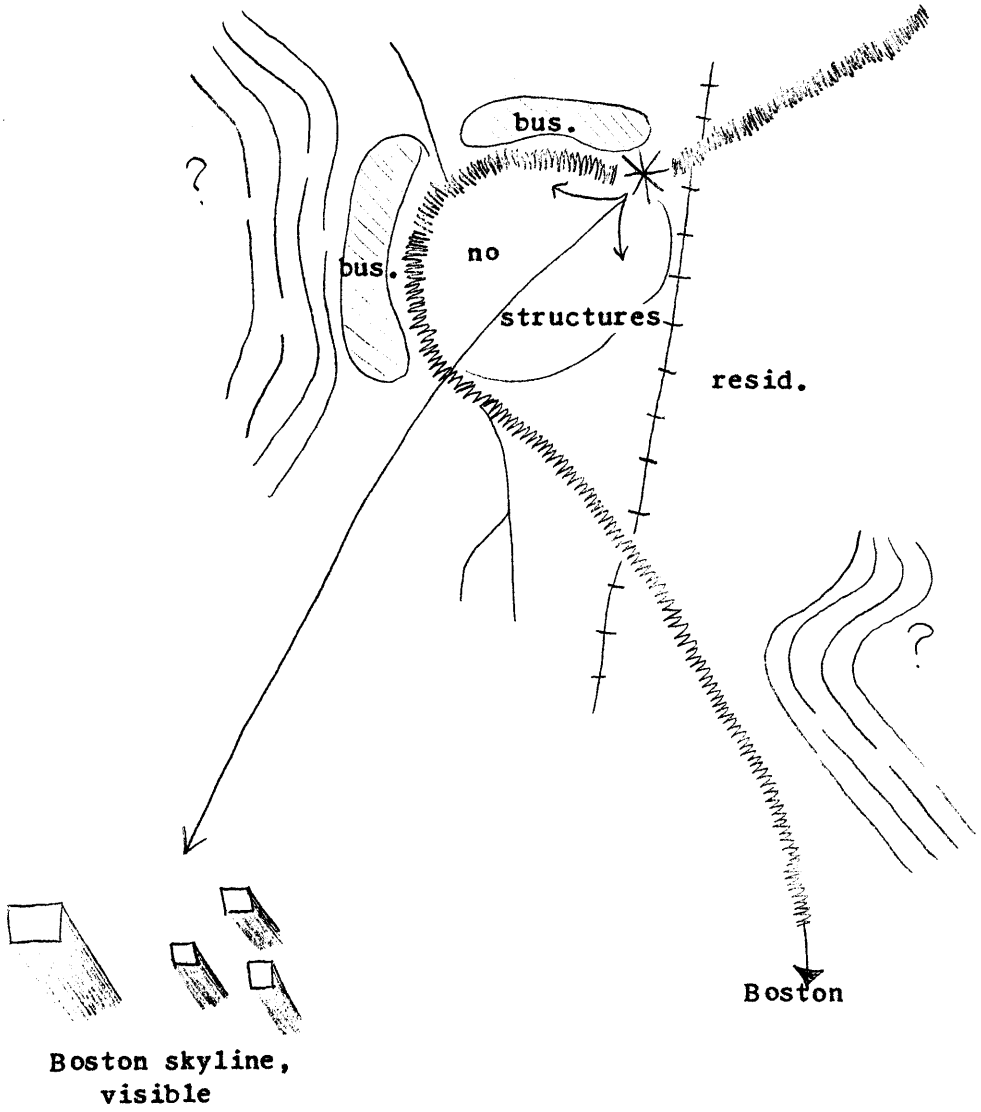
Checkpoint A-4



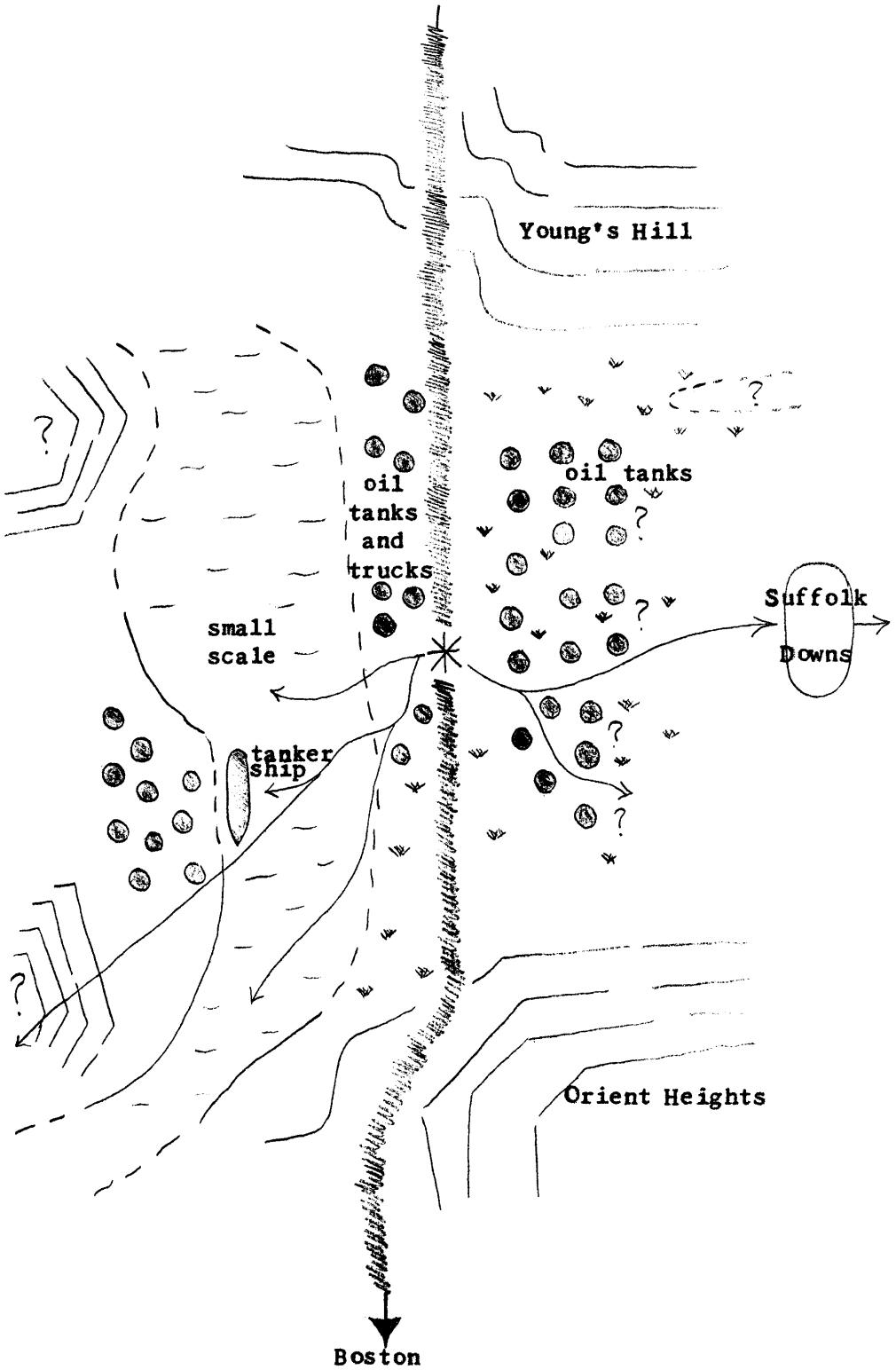
Checkpoint A-5

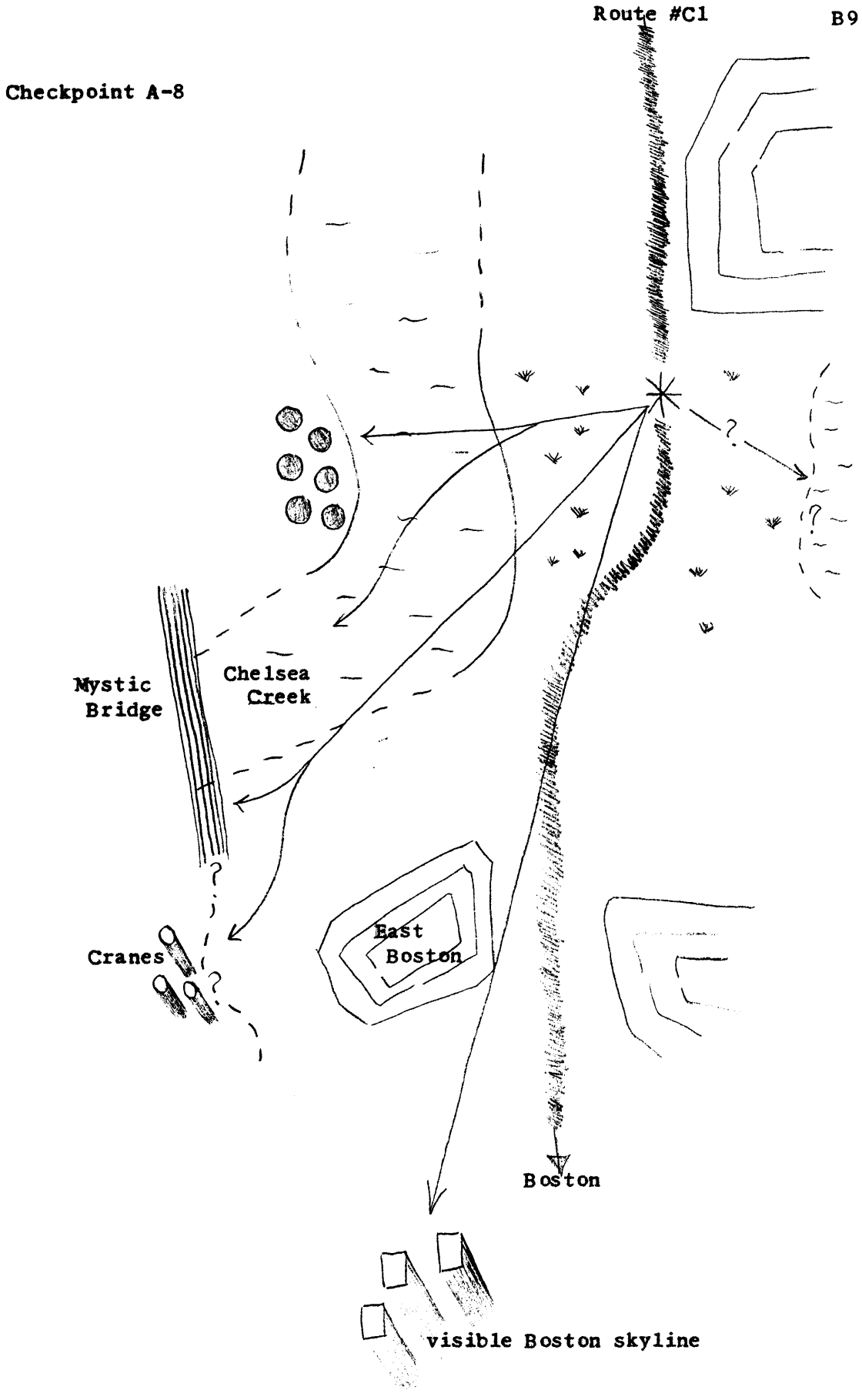


Checkpoint A-6

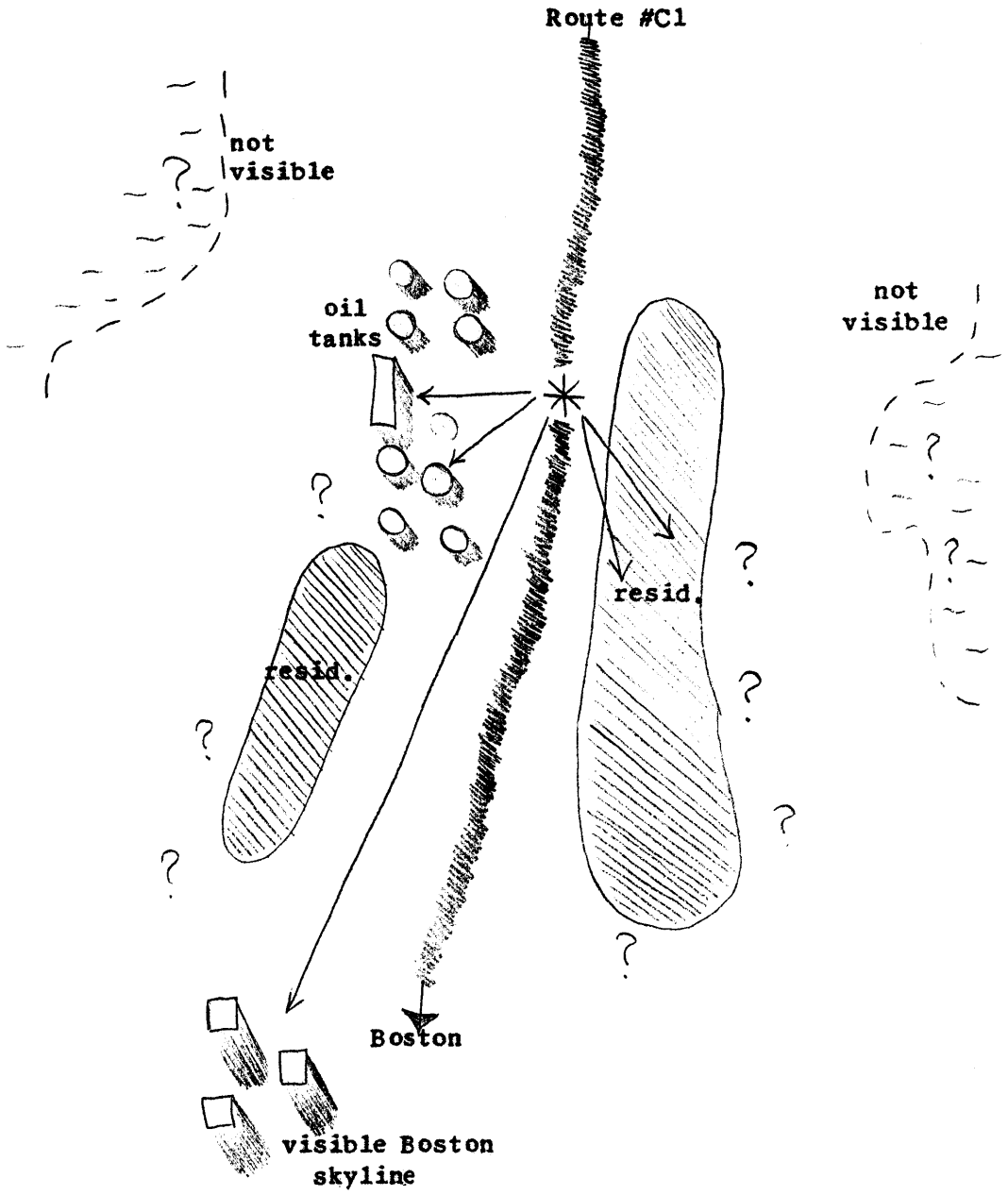


Checkpoint A-7

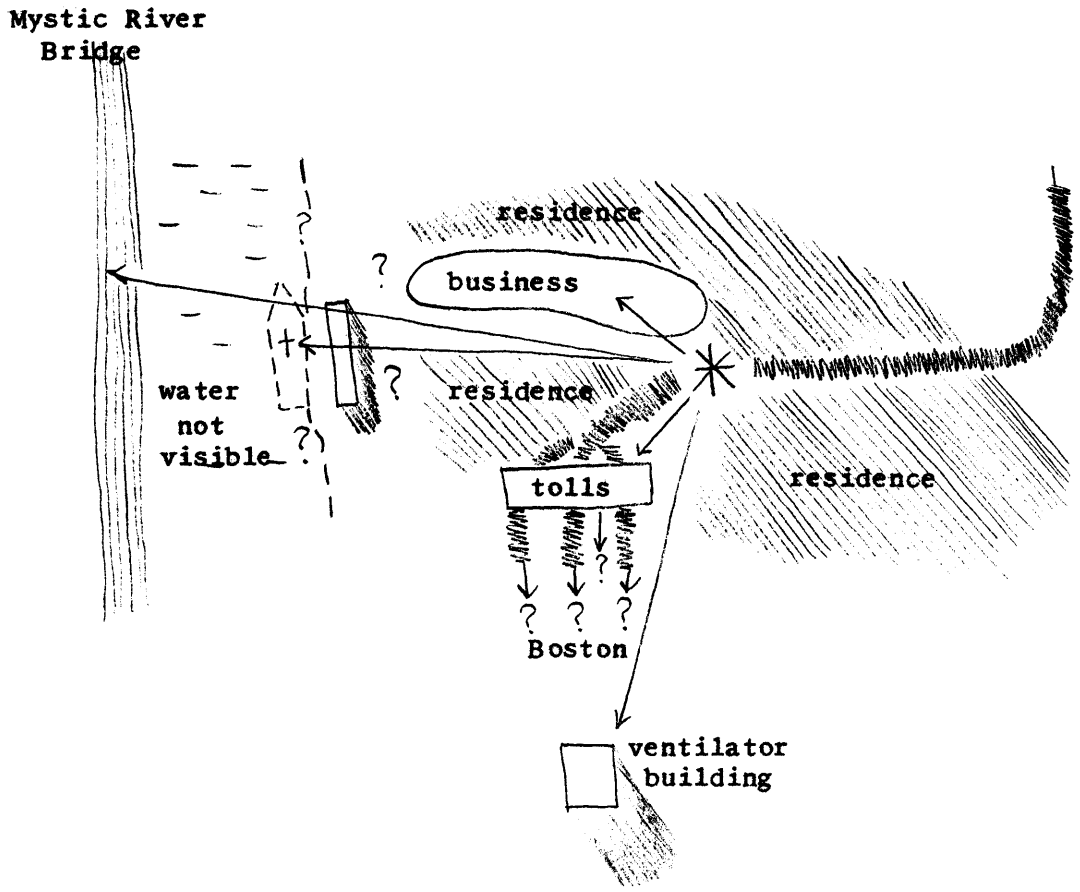



Route #C1
Checkpoint A-8
Mystic Bridge
Chelsea Creek
Cranes
East Boston
Boston
visible Boston skyline

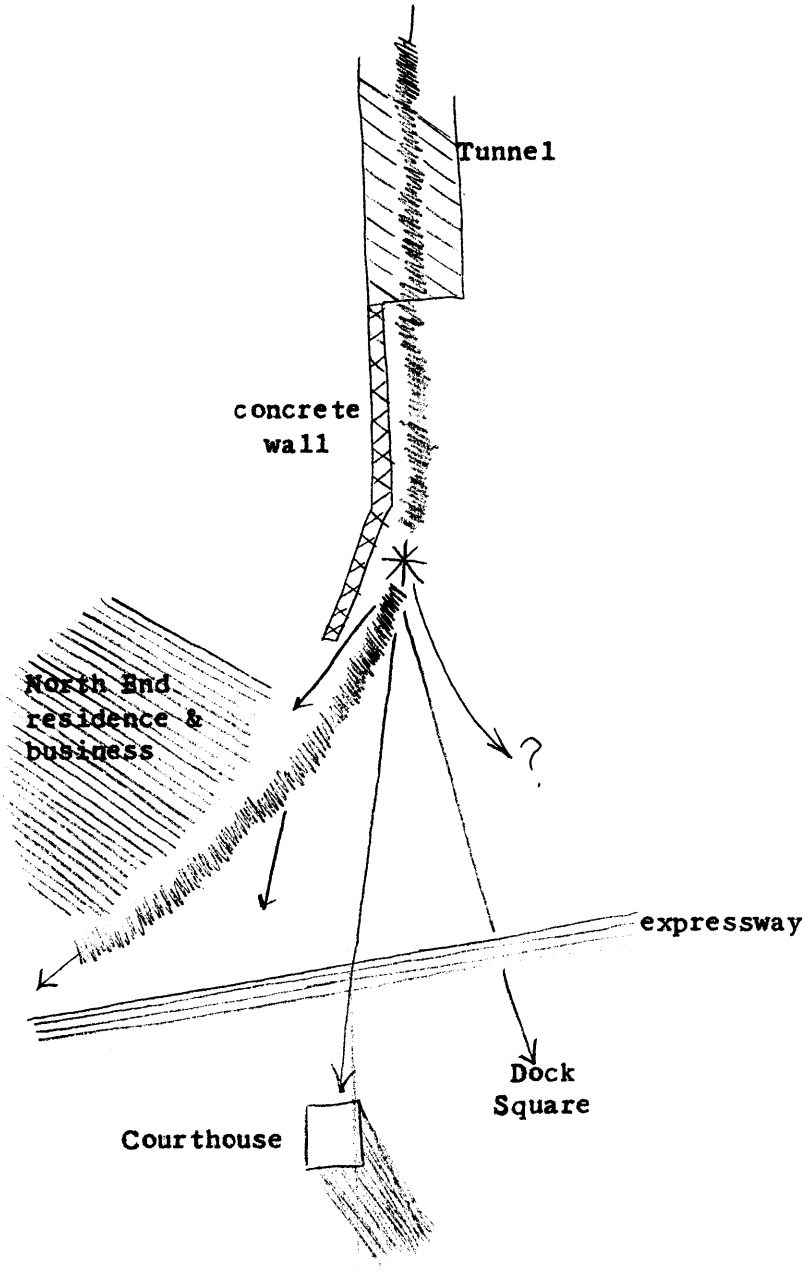
Checkpoint A-9



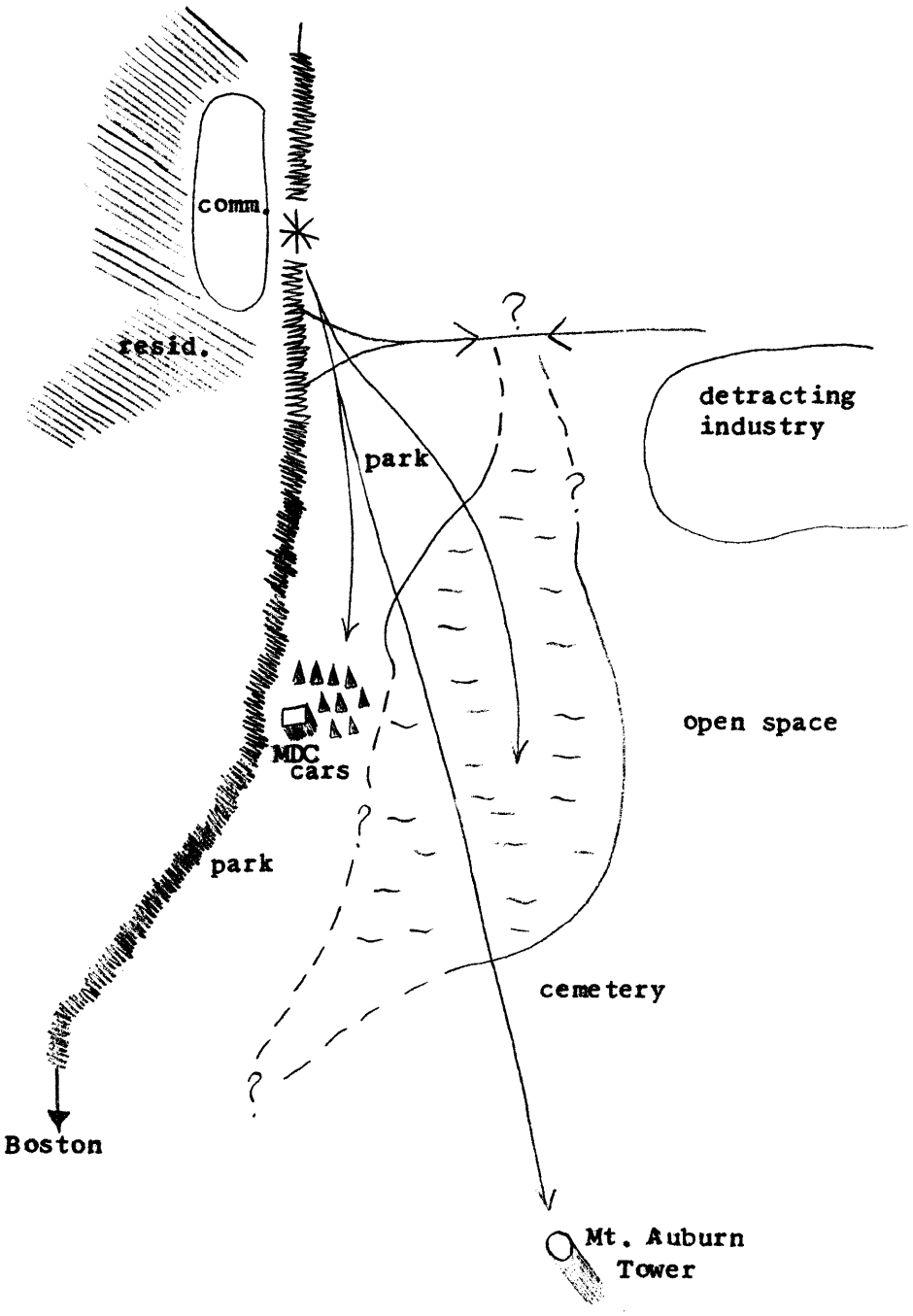
Checkpoint A-10



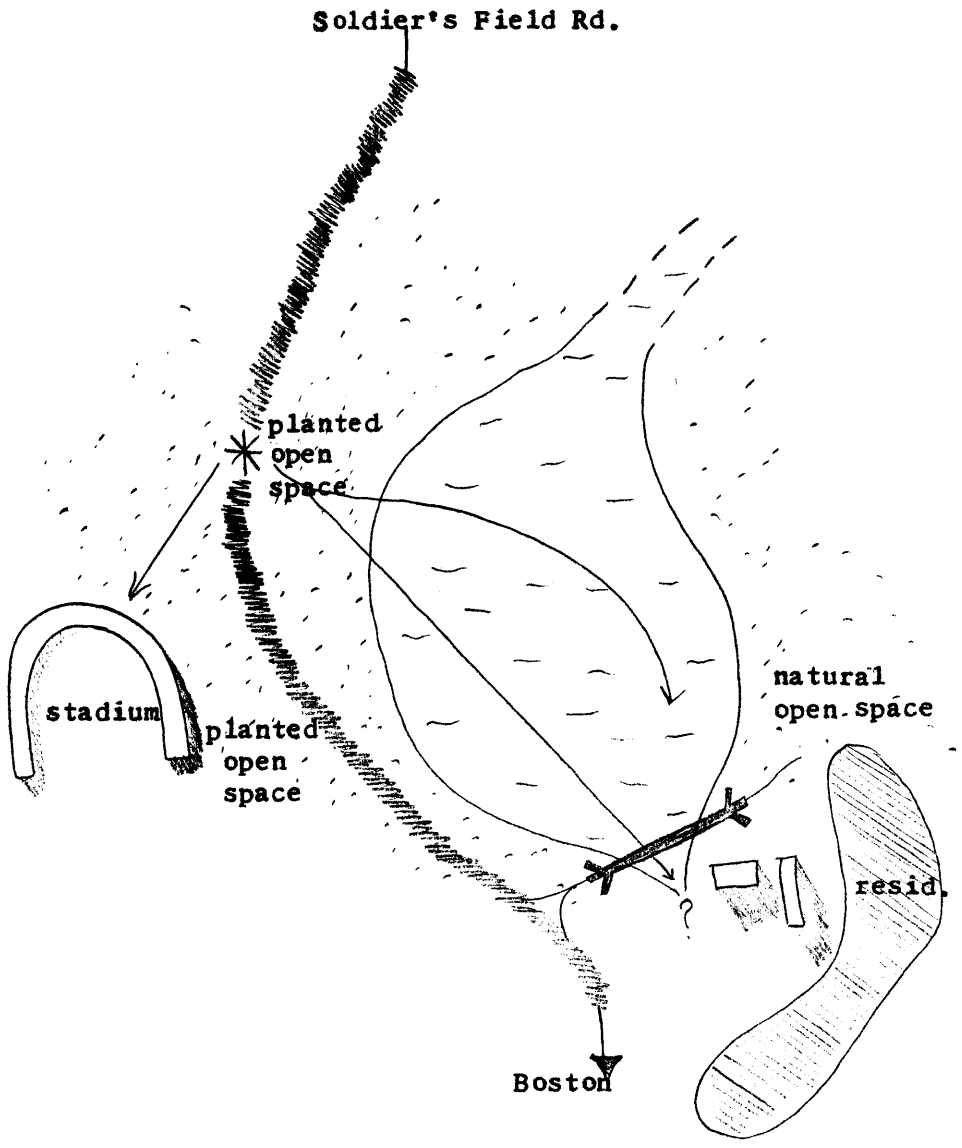
Checkpoint A-11



Checkpoint B-1



Checkpoint B-2



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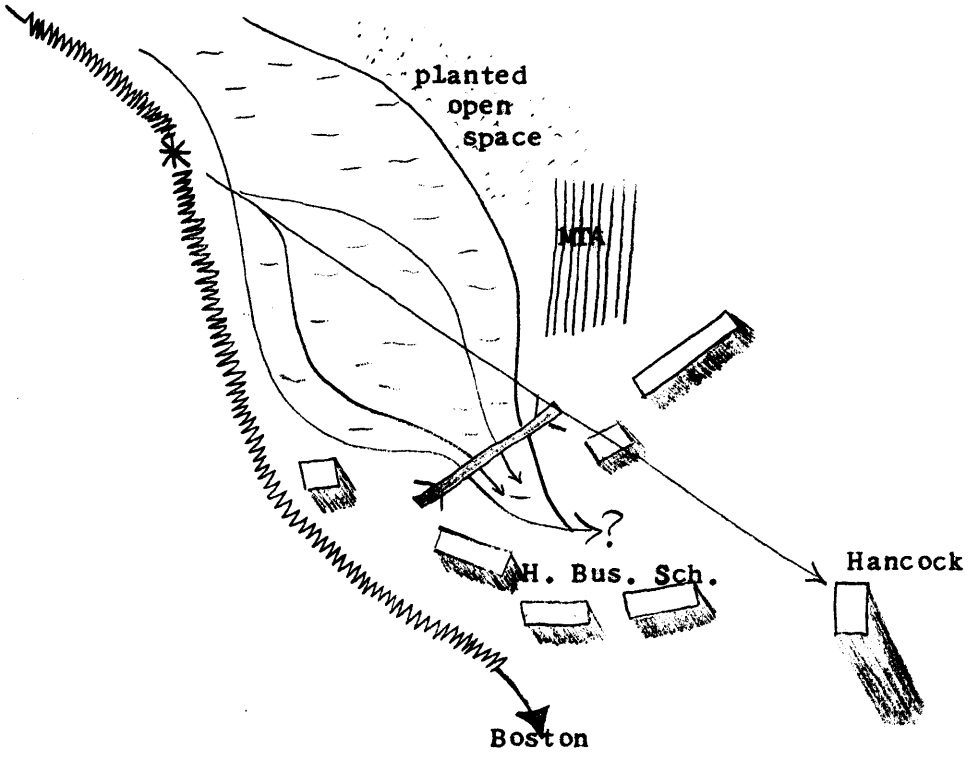
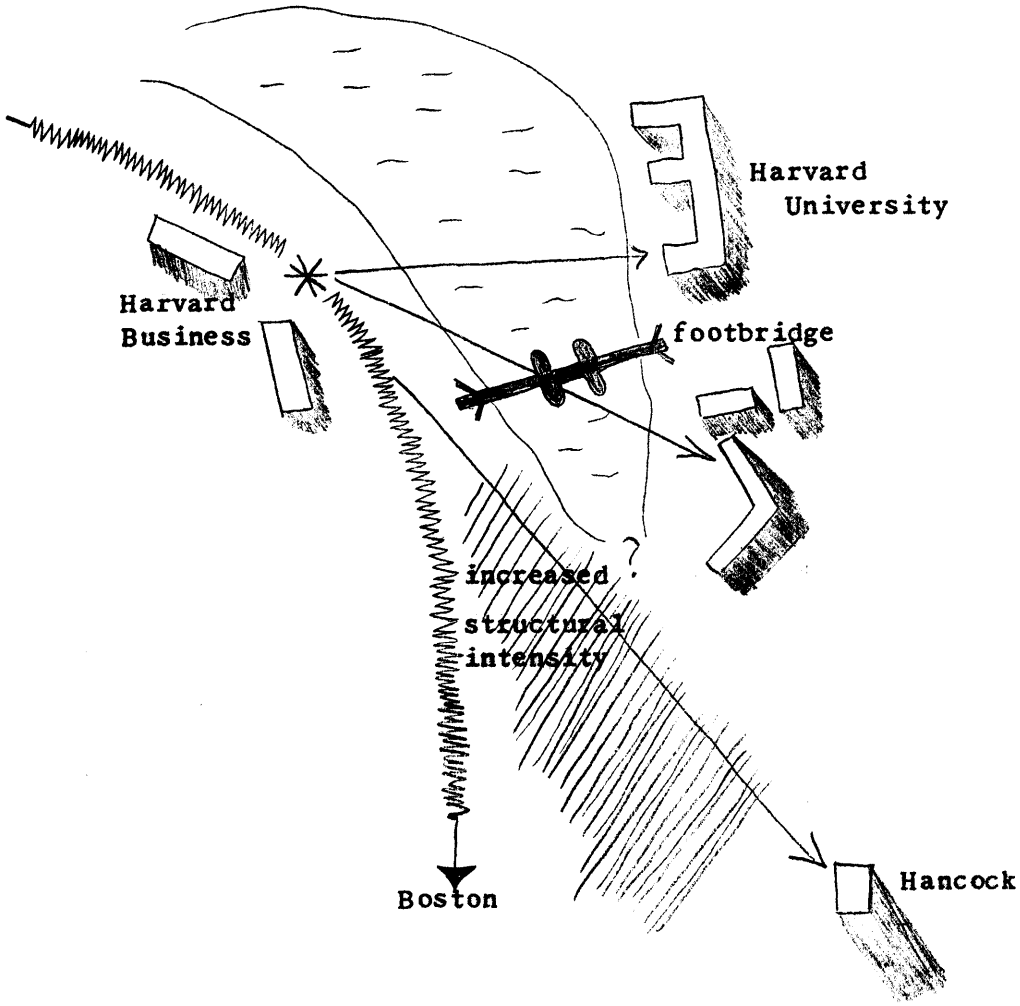


Checkpoint B-4



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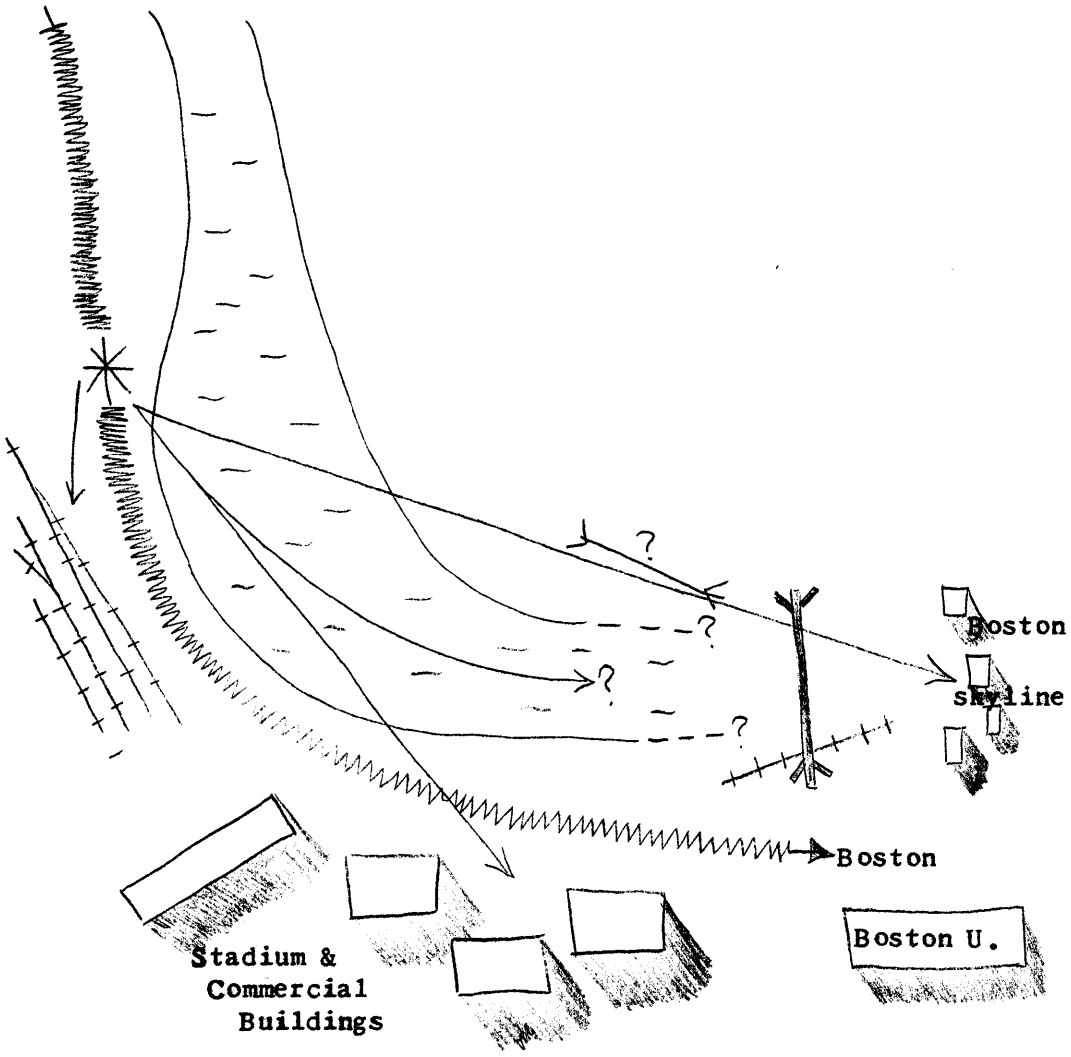
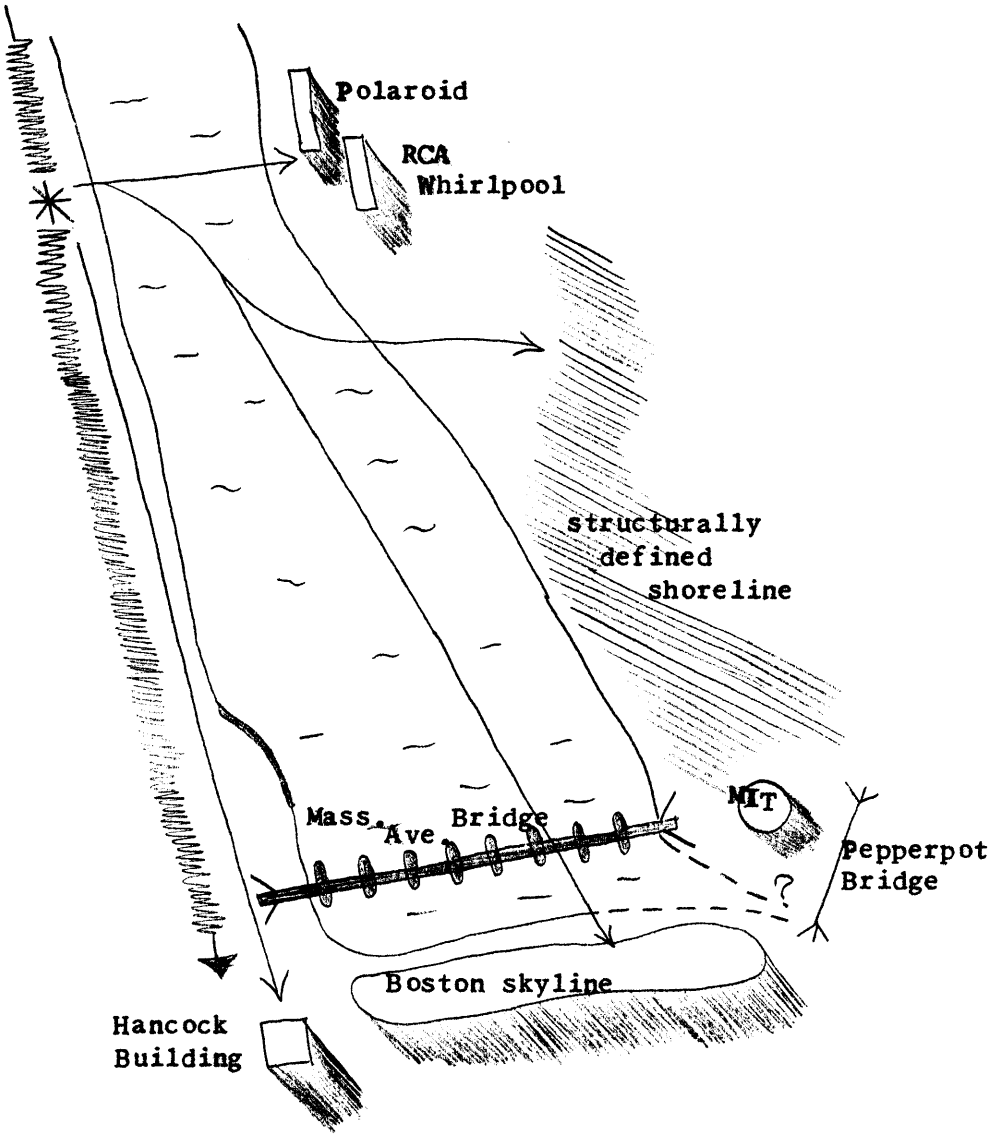
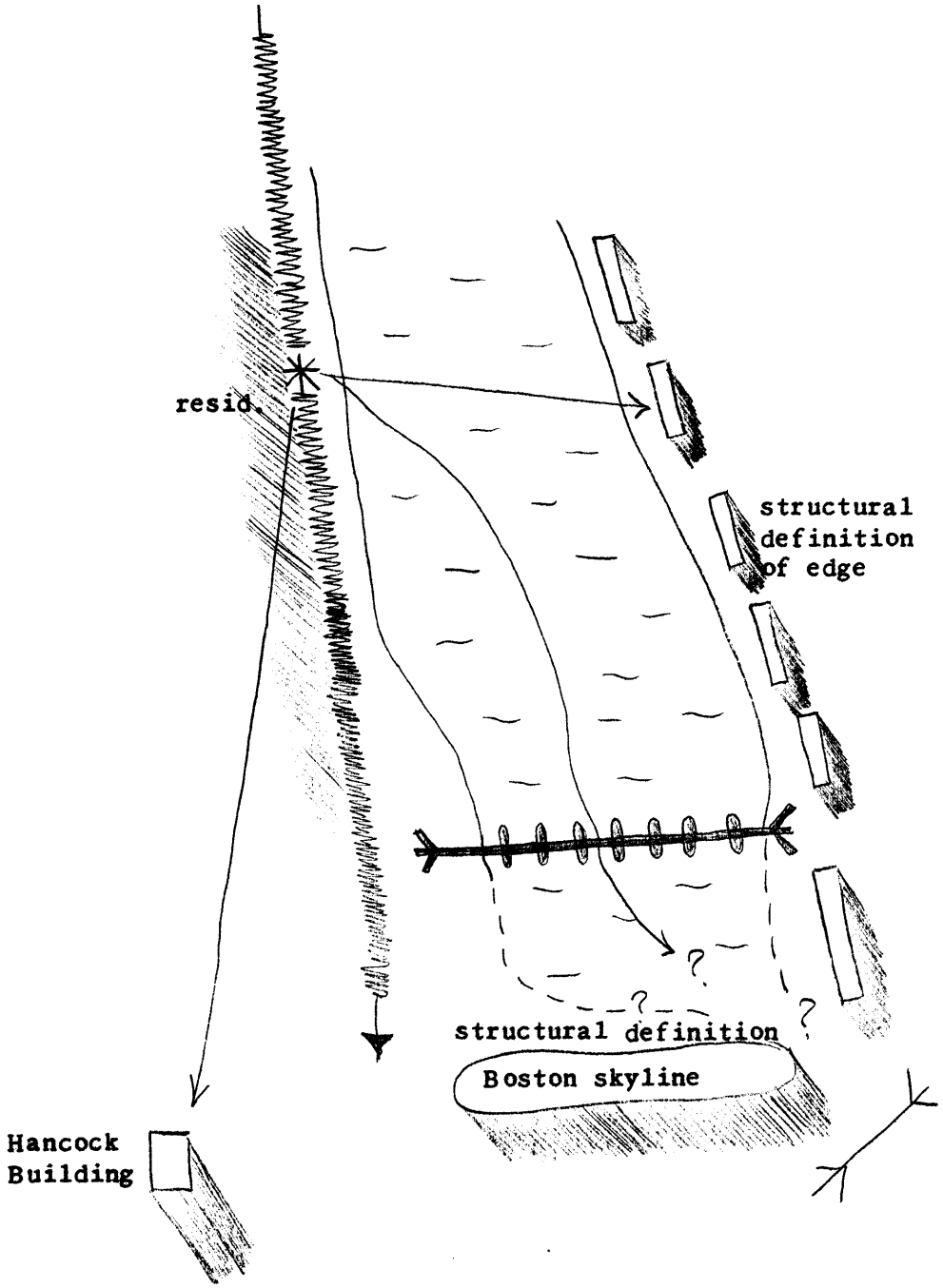


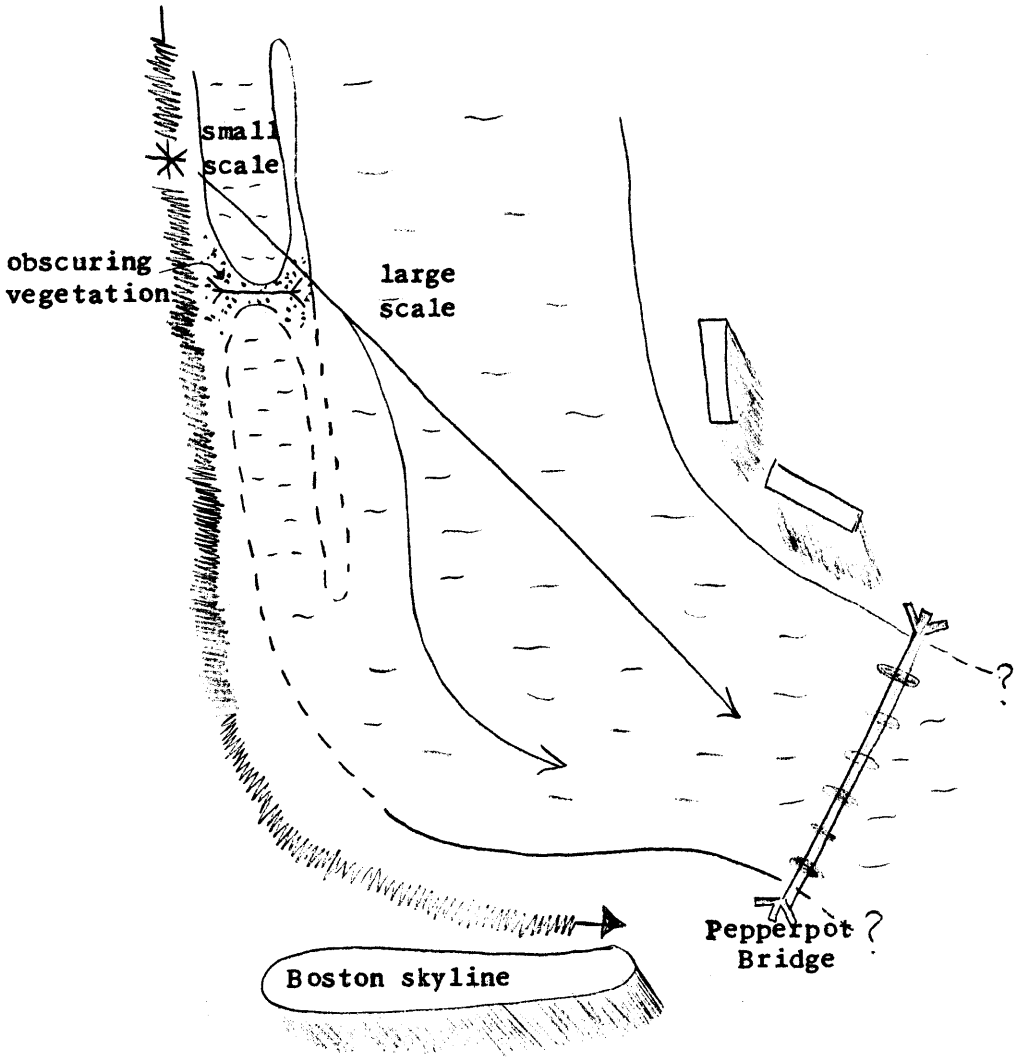
Checkpoint B-6



Checkpoint B-7



Checkpoint B-8



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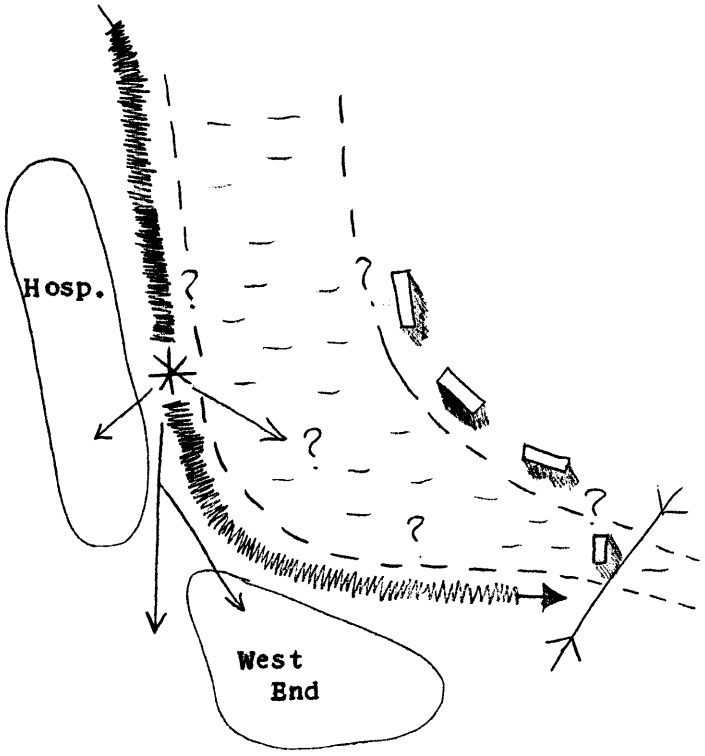
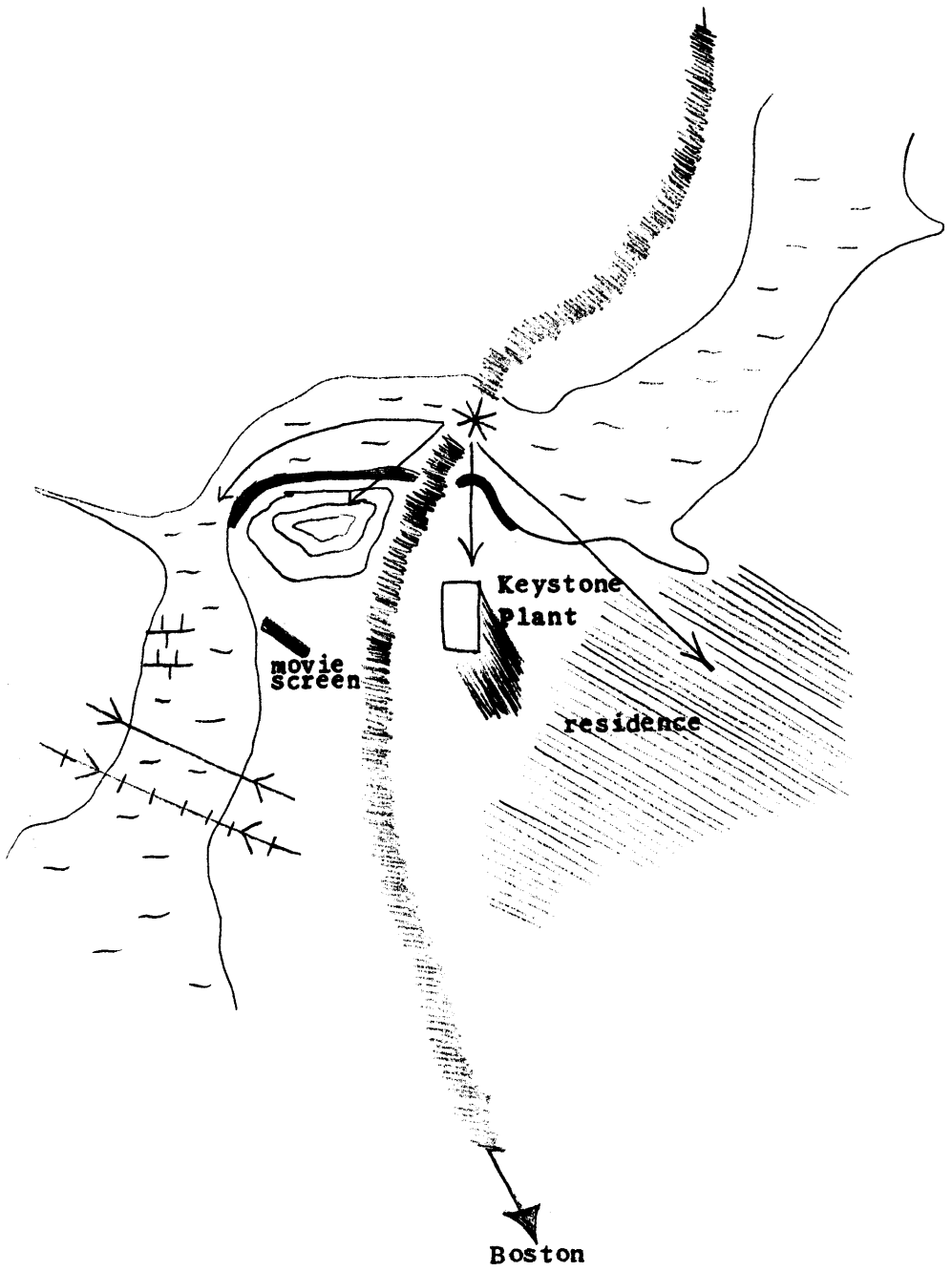
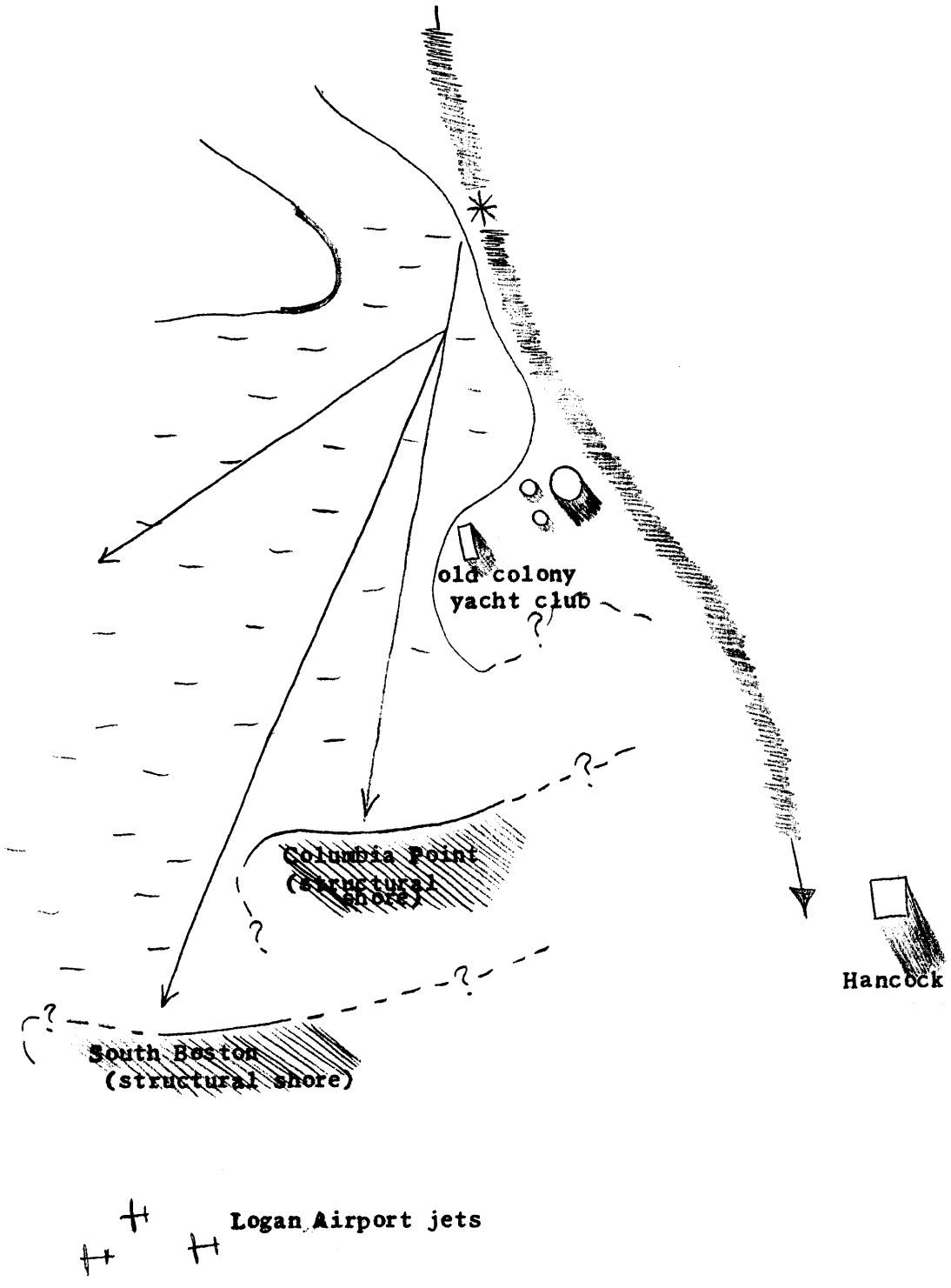
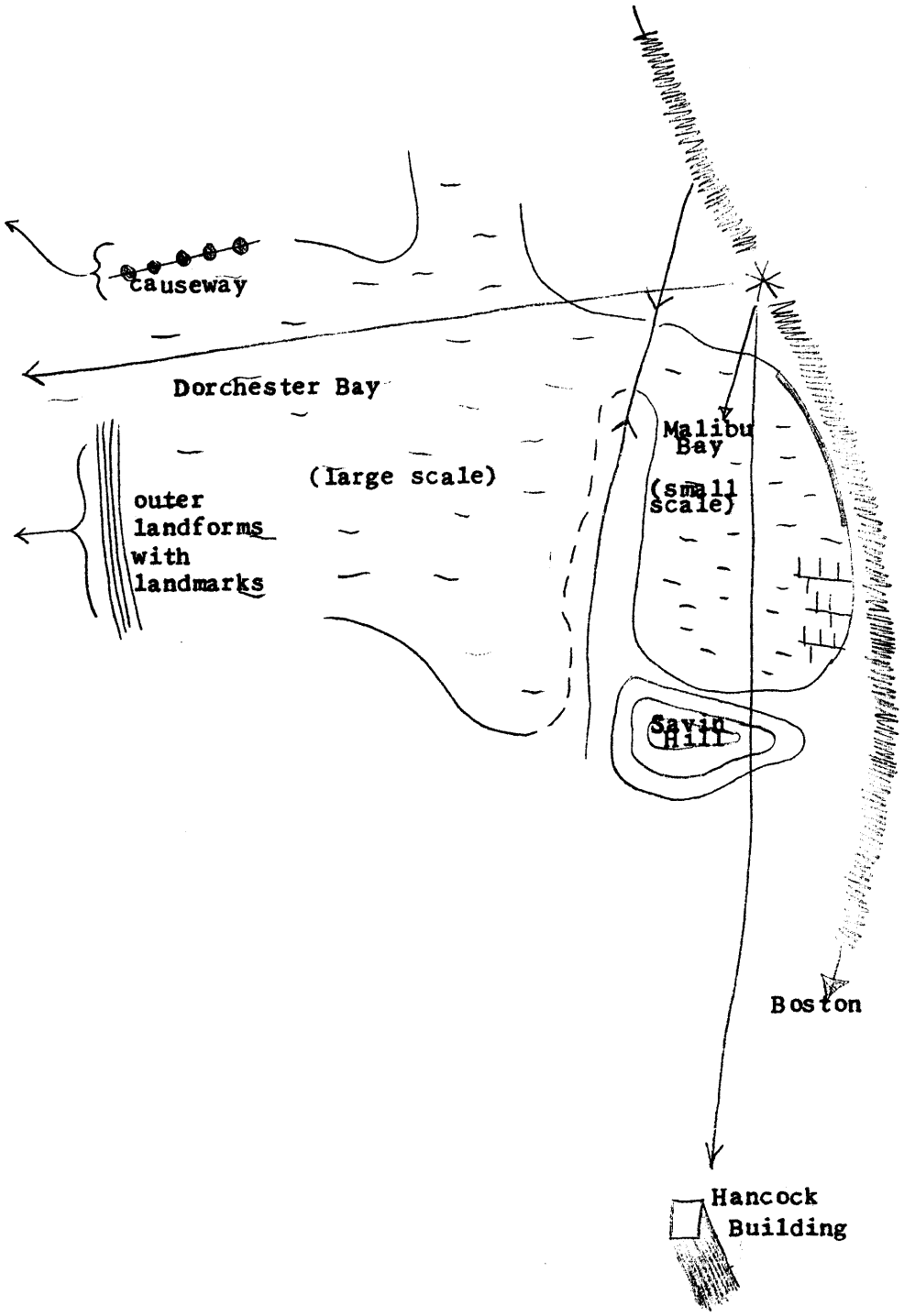



Keystone
Plant
movie
screen
residence
Boston

Checkpoint C-2



Checkpoint C-3



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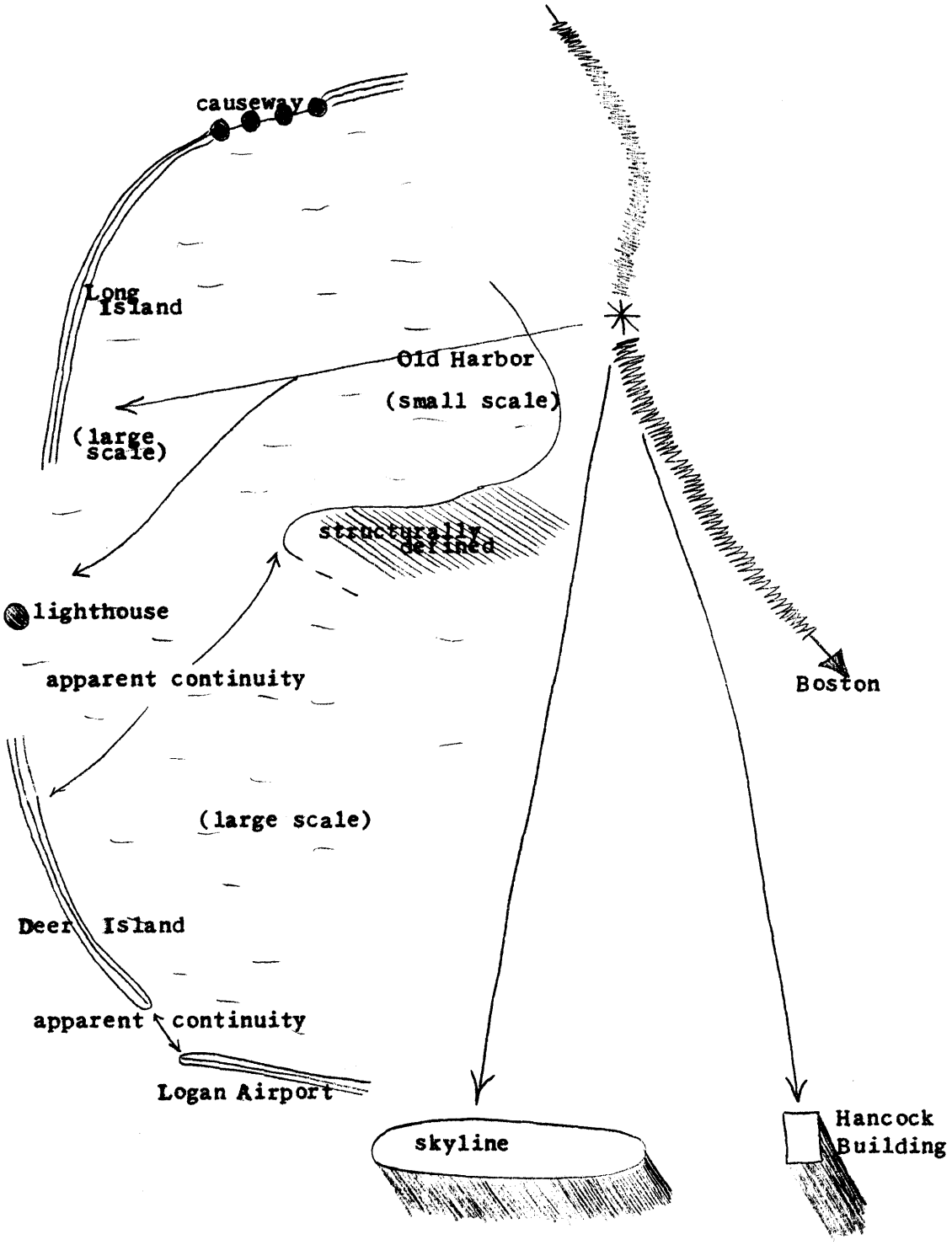

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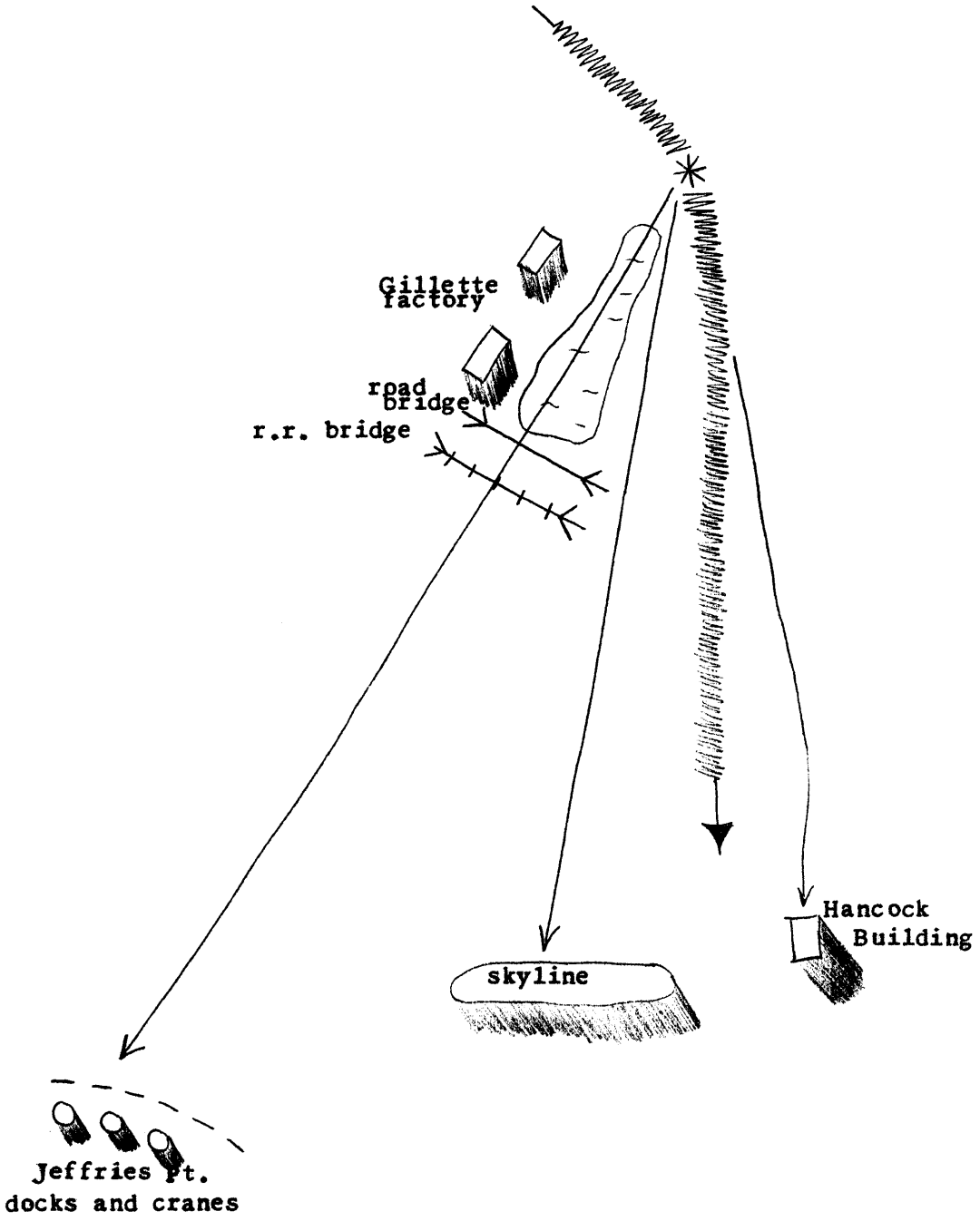

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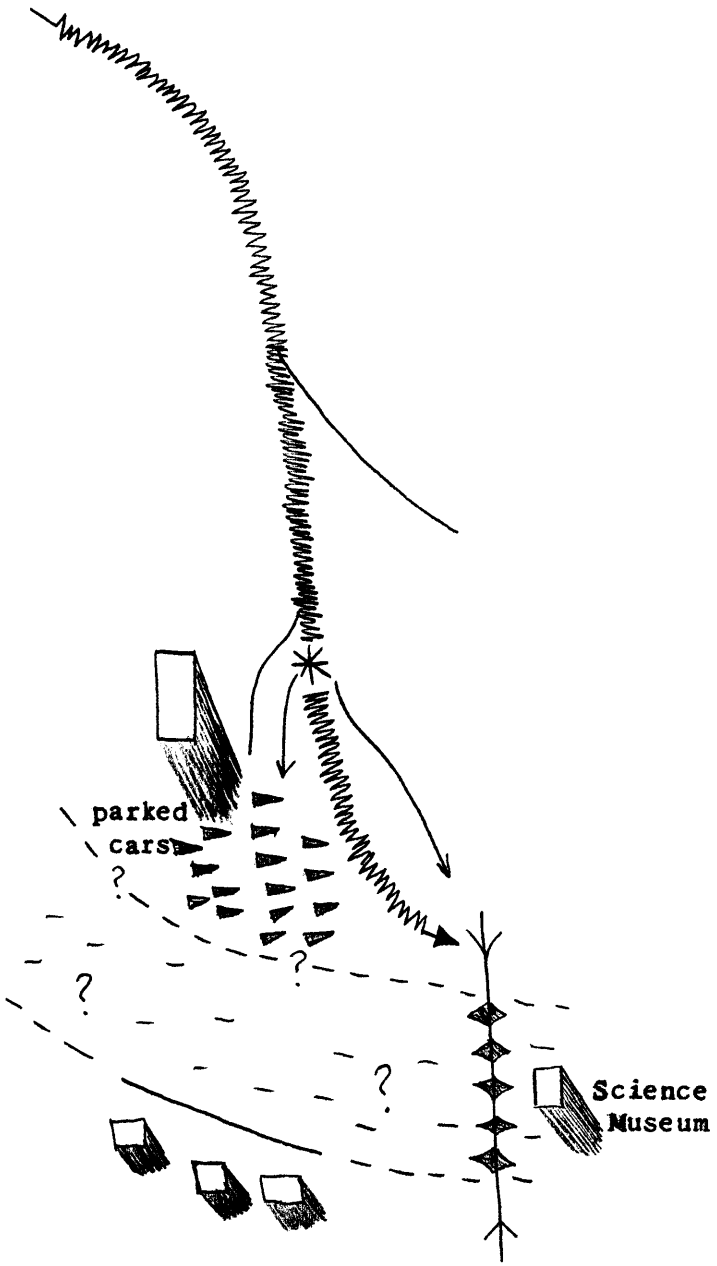

APPENDIX B

CHECKPOINT PHOTOGRAPHS

Checkpoint A-1

Checkpoint A-2 (east)

Checkpoint A-2 (west)

Checkpoint A-3

Checkpoint A-4 (east)

Checkpoint A-4 (west)

Checkpoint A-5

Checkpoint A-6

Checkpoint A-7

Checkpoint A-8

Checkpoint A-9

Checkpoint A-10

Checkpoint A-11

Checkpoint B-1

Checkpoint B-2

Checkpoint B-3

Checkpoint B-4

Checkpoint B-5

Checkpoint B-6

Checkpoint B-7

Checkpoint B-8

Checkpoint B-9

Checkpoint C-1

Checkpoint C-2

Checkpoint C-3 (north)

Checkpoint C-3 (northeast)

Checkpoint C-4

Checkpoint C-5

Checkpoint C-6