

August 14, 1998

Ms. Trudy Coxe, Secretary  
Executive Office of Environmental Affairs  
100 Cambridge Street, 20<sup>th</sup> Floor  
Boston, MA 02202

Attention: MEPA Unit

RE: Salem-Beverly Transportation Project - EOE # 0756  
Bridge Street By-Pass, Salem

Dear Secretary Coxe:

I am writing to notify you of a change in the Bridge Street By-Pass portion of the Salem-Beverly Transportation Project. The Massachusetts Highway Department (MassHighway) has decided to change the alignment of the Bridge Street By-Pass as the City of Salem requested. Accordingly, we are filing this Notice of Project Change with you.

The new alignment would cross the Parker Brothers site and connect with Bridge Street near St. Peter Street. A new, signalized intersection would be required where the By-Pass connects with Bridge Street; signals would be added at the existing St. Peter Street - Bridge Street intersection; and a new 3-way signalized intersection at Washington and Bridge Streets would be created to replace the existing rotary. This is in contrast with the conceptual design submitted in the 1991 Salem-Beverly Transportation Project EIR in which the By-Pass was located on the western edge of the Parker Brothers site along the railroad tracks. The By-Pass would have terminated at Washington Street, replacing the existing rotary at Washington and Bridge Streets with a signalized 4-way intersection.

A Comparative Analysis of Terminus Alignments Final Report is enclosed. The report concludes that the two terminus alignments both provide an acceptable improvement over existing traffic conditions and function as adequate roadway and intersection improvements. This report has been mailed to the distribution list and all the commenters on the EIR. The Technical Appendix has been provided to agencies and notice of its availability has been mailed to the other commenters.

Please contact Diane Madden at 973-7477 if you have any questions.

Sincerely,



Gregory H. Prendergast  
Deputy Chief Engineer  
Environmental Division



## NOTICE

A separately bound technical appendix of supporting data was prepared to backup the traffic analysis section of the enclosed report.

The table of contents of the technical appendix lists the following items:

- Automatic Traffic Recorder Counts
- Turning Movement Counts
- Trip Generation and Distribution
- Signal Warrant Analysis
- Capacity Analysis
- Yellow and Red Clearance Calculations
- Queue Analysis
- Simulation Output
- Bridge Street By-Pass Traffic Forecasts - Feb. 27, 1990, CTPS

Copies of this approximately 200 page technical appendix may be obtained by calling Robert Joseph at Edwards and Kelcey, Inc. (617) 242-9222.

**BRIDGE STREET BY-PASS  
COMPARATIVE ANALYSIS OF TERMINUS ALIGNMENTS**

**FINAL REPORT**

Prepared for:

**Massachusetts Highway Department**

Prepared by:

**EDWARDS AND KELCEY, INC.**

August 1998

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## 1. Introduction

This traffic analysis and final report was prepared to accompany the Notice of Project Change submitted to MEPA. The report compares the original MassHighway By-Pass connection to Washington Street, for which conceptual design was included in the Salem-Beverly Transportation Project EIR completed in 1991, with an alternative connection to Washington Street proposed by the City of Salem and adopted by MassHighway as the preferred alternative.

The MassHighway original design included a By-Pass terminus and connection to Washington Street which would have eliminated the existing rotary at Washington and Bridge Streets and replaced it with a signalized 4-way intersection.

The preferred alternative would be a substantial revision that would realign the proposed By-Pass so that it connects with Bridge Street near St. Peter Street. The preferred alternative would require a new signalized intersection as it connects with Bridge Street, the addition of signals at the existing St. Peter Street-Bridge Street intersection and a new 3-way signalized intersection at Washington and Bridge Streets to replace the existing rotary. Figure 1 shows both the original MassHighway and preferred by-pass terminus alignments.

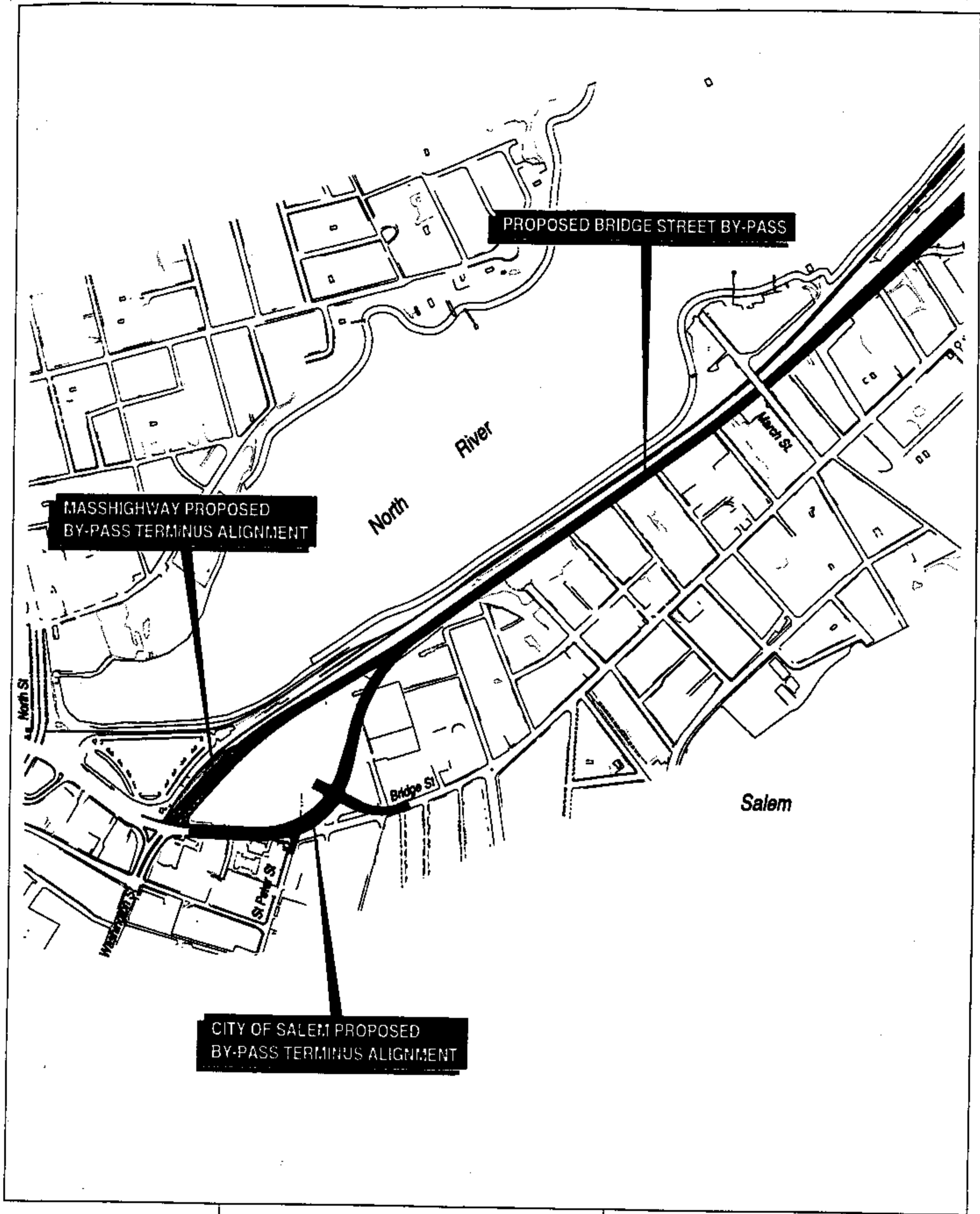
This report presents the results of several comparative analyses of the two alignments. In addition to traffic level of service, the two alternatives are compared on the basis of pedestrian convenience and construction cost. Potential right-of-way costs are also discussed as well as environmental review requirements of the two alternative alignments.

In addition to this report, a separately bound technical appendix was prepared that includes automatic traffic recorder counts, turning movement counts, trip generation and distribution data, signal warrant analysis and various analysis outputs to backup the traffic analysis.

## 2. Background and Recent History of the Proposed Bridge Street By-Pass

The proposed Bridge Street By-Pass, with its connection to Washington Street, was developed as a conceptual design in 1989 and illustrated as a schematic design as part of the Salem Beverly Transportation Project EIR completed in June, 1991. A design contract to prepare final design plans for the By-Pass was awarded in April, 1995 to Edwards and Kelcey, Inc.

In the fall of 1996, Hasbro Corp. began the demolition of the Parker Brothers Site and the site was completely cleared of structures by early 1997 (Photo 1). During the preliminary Design Public Hearing, held in January 1997, several people spoke of new opportunities presented by the clearance of the Parker Brothers Site.



Approx. Scale: 1" = 675'



**BRIDGE STREET BY-PASS  
TERMINUS ALIGNMENTS**

FIGURE 1



Photo 1. The promotional material, shown above, was prepared for Hasbro Corp. to help market the Parker Brothers Site. The picture shows the site cleared after demolition of all site structures. The preferred alignment would cut across the cleared site. The original MassHighway alignment would be on the north side of the site next to the MBTA commuter rail line.

After the Design Public Hearing, meetings between the City of Salem and MassHighway were held to discuss the By-Pass alignment. In April 1998, MassHighway made a decision to adopt the City's proposed alignment as the MassHighway preferred alignment.

### 3. Description of Alternatives

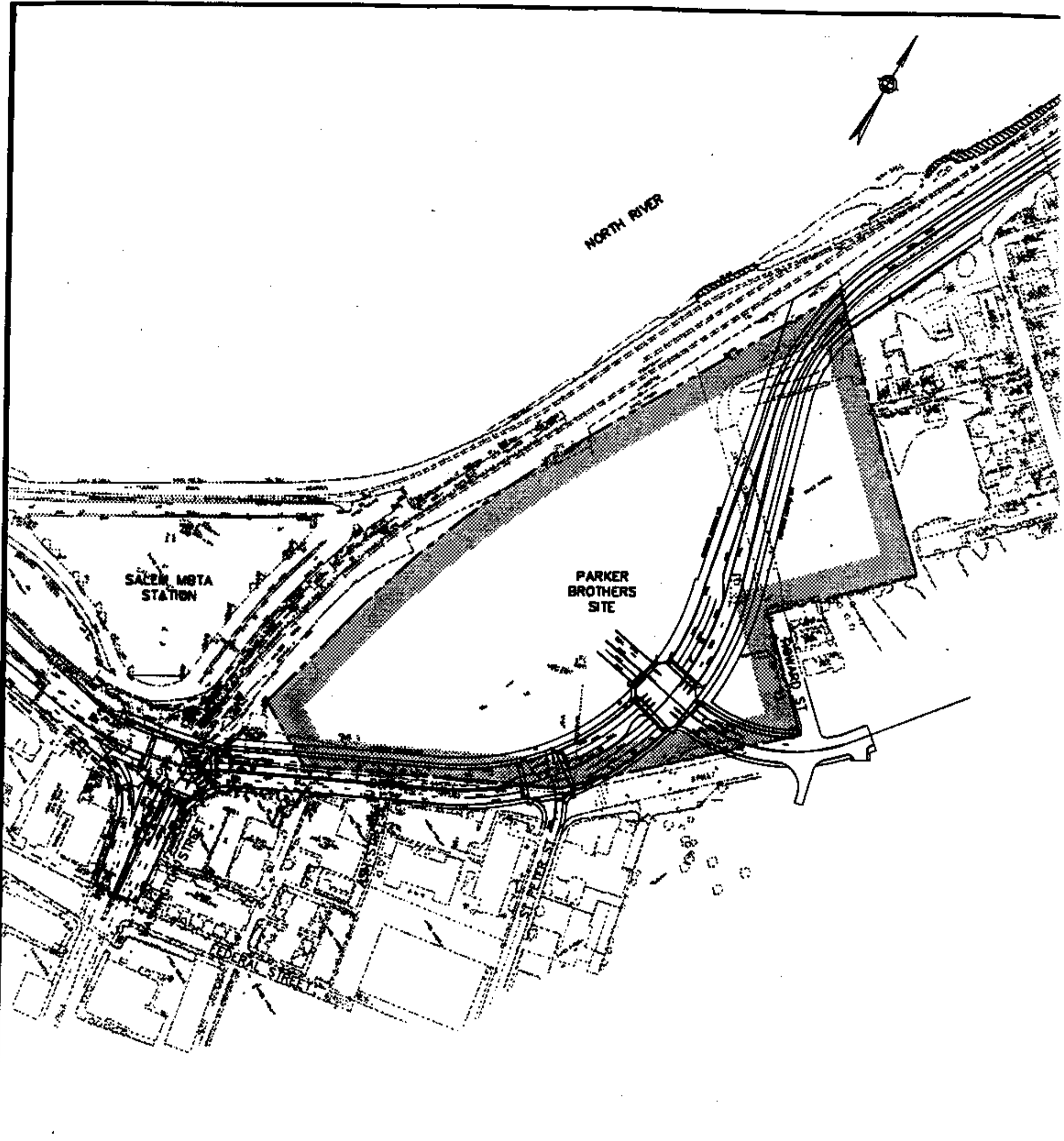
#### 3.1 Existing Intersection

The existing Washington Street and Bridge Street intersection is essentially a T intersection with a small elliptical shaped traffic circle. The circle is quite small and the intersection functions more closely to a T intersection than a rotary. The Washington Street leg of the intersection is separated by a narrow raised median with parking against both sides of the median. The Bridge Street legs of the intersection have no parking lanes. Photos 2 and 3 show the existing conditions of the intersection. The intersection operates generally as an unsignalized intersection but there is a pedestrian activated signal. When there are no pedestrians, all approaches receive a flashing amber signal. During the pedestrian phase, all approaches receive a steady red signal with the exception of the Washington Street northbound right turn approach which receives a green right turn arrow.

#### 3.2 MassHighway Preferred Alignment

The MassHighway preferred alignment is shown in Figure 2. It is different from the original MassHighway alignment in that the By-Pass would cut across the Parker Brothers Site and become part of Bridge Street near St. Peter Street. Bridge Street near Howard Street would bend to form a new 4-way signalized intersection with the By-Pass. A leg of this intersection would be a new site driveway entrance to the Parker Brothers Site. The unsignalized intersection with St. Peter Street would become signalized. The Washington Street and Bridge Street intersection and rotary would be redesigned to be a 3-way signalized intersection.

The preferred alignment would require approximately 4.2 acres of the 15 acre Parker Brothers site and would divide the property with about 1.8 acres of the parcel lying to the east of the By-Pass. This 1.8 acre parcel would not have access via the By-Pass and would have to be accessed via Howard Street. The balance on the site, approximately 9 acres of the 15 acre site, would be open to the west of the By-Pass. The sliver taking from the condo complex at the corner of Washington and Bridge Street that is required for the original MassHighway alternative is not required under the preferred alternative. The newsstand in the median of Washington Street could be retained but would decrease the efficiency of the intersection.



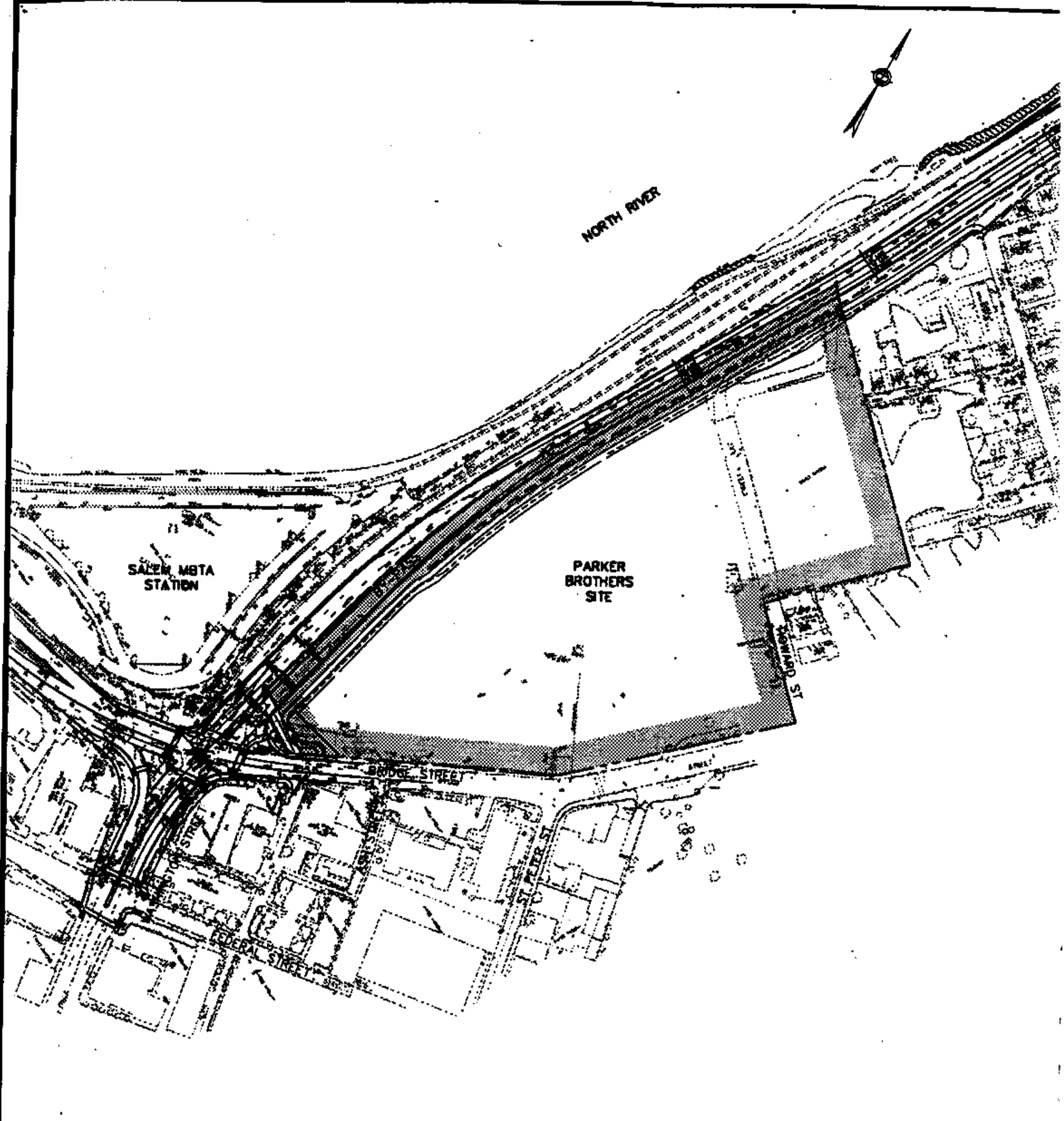
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<b>SALEM - BEVERLY TRANSPORTATION PROJECT</b>	
<b>BRIDGE STREET BY-PASS MASSHIGHWAY PREFERRED ALIGNMENT</b>	
SCALE: 1" = 250'	MARCH, 1998
Prepared By	
<b>EDWARDS AND KELCEY, INC.</b> <small>THE BROADWAY OFFICE 200 WEST STREET, SUITE 200 NEWARK, NEW JERSEY 07102-3000</small>	
FIGURE 2	

### 3.3 Original MassHighway Alignment

The original MassHighway Alignment of the By-Pass would change the existing Washington and Bridge Street intersection to a four-way intersection. The existing small rotary would be removed and all movements through the intersection would be controlled by signals. Figure 3 is a plan of the original MassHighway alternative showing lane arrangements, signalization and crosswalks.

The original MassHighway alternative would be located on the Parker Brothers Site but would be on the northern side of the site immediately adjacent to the MBTA rail line. This alternative would take 3.4 acres of the 15 acre Parker Brothers Site, the retail building on Bridge Street next to the railroad tracks and a small sliver from the condominium complex on Washington Street. This alternative would also require the relocation of the newsstand located in the median of Washington Street.



<b>SALEM - BEVERLY TRANSPORTATION PROJECT</b>	
<b>BRIDGE STREET BY-PASS ORIGINAL MASSHIGHWAY ALIGNMENT</b>	
SCALE: 1" = 250'	MARCH, 1998
Prepared By <b>EDWARDS AND KELCEY, INC.</b> 	

C:\BASES\FIG3.DWG 8-10-98 2:44:15 pm EST

FIGURE 3

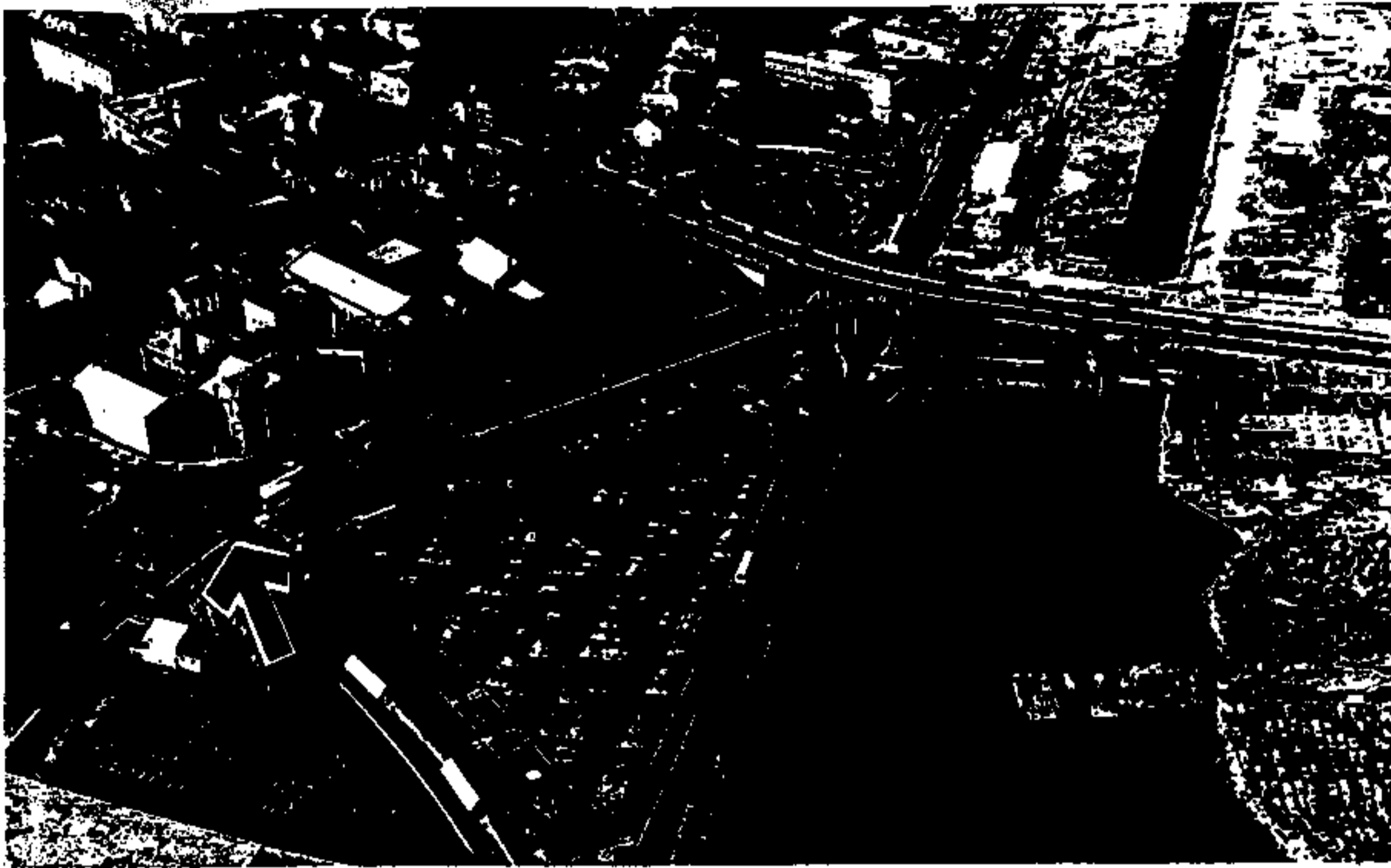


Photo 2. Arrow on aerial photo locates the small rotary at the intersection of Washington and Bridge Streets.



Photo 3. Small rotary at the Bridge Street/Washington Street intersection looking toward Washington Street.

#### **4. Traffic Distribution, Traffic Counts and Traffic Analysis Methodology**

In 1990, traffic counts, traffic projections, and analysis for the Bridge Street By-Pass were completed by the Central Transportation Planning Staff (CTPS) as part of the Environmental Impact Report for the Salem Beverly Transportation Project. CTPS produced a specific traffic distribution for the Bridge Street By-Pass. Traffic counts for the CTPS analysis were obtained from various consultant studies in Salem and Beverly and from CTPS counts taken in Peabody and Danvers during June, July and August of 1989.

The current comparative analysis of the original MassHighway and preferred By-Pass alignments was carried out using the well respected CTPS distribution model from the 1990 traffic report, with current traffic count data. The traffic counts are automatic traffic recorder (ATR) counts and turning movement counts conducted in June, 1997 by Rizzo Associates, design consultants to the City of Salem for the Bridge Street Improvement Project. In addition, Edwards and Kelcey conducted an ATR count on St. Peter Street and a 1 hour peak period turning movement count at the St. Peter/Bridge Street intersection on February 25, 1998. These counts are included in a technical appendix bound as a separate report.

The 1997 counts were approximately 10% higher than the CTPS count data from 1989. The 1997 and 1998 counts appear to confirm a relatively low growth in traffic of about 1% a year. MassHighway maintains a long term count station on Bridge Street and data from that count station between the year 1988 and 1997 confirm a growth in traffic of approximately 1% a year.

#### **5. Traffic Level of Service Analysis**

Traffic engineers have developed criteria for evaluating the operating characteristics of existing, as well as proposed roadways and intersections. This measure is called the Level of Service (LOS).

Level of Service is defined as a composite effect of speed and travel time, traffic interruption, freedom to maneuver, safety, driving comfort and convenience, and operating costs. Six Levels of Service are identified, ranging from the best operating condition (A) to the worst (F), which form a qualitative ranking of operating conditions.

The tables below show the delays associated with the several levels of service for both unsignalized and signalized intersections.

**Table 1 Level of Service for Unsignalized Intersections**

Level of Service	Average Total Delay (Seconds/Vehicle)
A	0 to 5
B	5 to 10
C	10 to 20
D	20 to 30
E	30 to 45
F	Over 45

Reference: 1994 Highway Capacity Manual, Special Report 209,  
Third Edition, TRB

**Table 2 Level of Service for Signalized Intersections**

Level of Service	Stopped Delay per Vehicle (Seconds)
A	0 to 5
B	5 to 15
C	15 to 25
D	25 to 40
E	40 to 60
F	Over 60

Reference: 1994 Highway Capacity Manual, Special Report 209,  
Third Edition, TRB

Currently, the small rotary at the Washington Street and Bridge Street intersection operates at LOS F during AM and PM hours.

Under the original MassHighway alternative, the rotary would be replaced by a signalized 3-way intersection. This intersection would provide a Level of Service of D in both AM and PM peak periods in the year 2017. The preferred alternative would also require signals to be installed at the St. Peter Street intersection with Bridge Street, and a new 4-way signalized intersection would be required just east of the St. Peter Street intersection. One leg of this new 4-way intersection would provide a driveway entrance for the Parker Brothers Site. This 4-way intersection would function at LOS C in both AM and PM peak periods for the year 2017. The St. Peter Street signalized intersection would function at LOS B in both AM and PM peak periods for the year 2017.

The original MassHighway alternative for the By-Pass connection to Washington Street would be a 4-way intersection. This intersection is projected to function at LOS E in the AM peak period and LOS F in the PM peak period for the year 2017.

Average delay is another way of looking at level of service and is presented in Table 3 to address the fact that the predominant traffic movements (north to south in AM and south to north in PM) must be made through three signalized intersections in the preferred alignment and only one signalized intersection in the original MassHighway alignment.

In the AM peak period, average delay to pass through the three intersections of the preferred alignment would be very similar to the time it would take to pass through the intersection of the original MassHighway alternative. In the PM period, average delay would be nearly identical for both alternatives.

The level of service for each of the 3 signalized intersections in the preferred alternative is better than the one intersection in the original MassHighway design, but when the average delay of the 3 intersections are cumulatively added, the alternatives are identical in terms of average delay for through movements.

## 6. Pedestrian Movements

The preferred alternative provides for pedestrian crosswalks so that pedestrians can cross to and from all locations.

The original MassHighway alternative allows the same pedestrian movements over nearly identical crosswalks with one exception. The original MassHighway alternative does not provide for a pedestrian movement between the MBTA Station and the Parker Brothers Site.

In general it would be fair to say that the preferred alignment is more pedestrian friendly than the original MassHighway alignment. The original MassHighway alignment results in a busy 4-way intersection located close to the relatively heavy pedestrian movement between the MBTA Commuter Rail station and downtown Salem. In the preferred alignment, the intersections are spread out and much of the turning traffic movements are located east of the heavy pedestrian moves.

## 7. Project Cost

### 7.1 Construction Cost

The construction cost estimate at the 75% design submission for the original MassHighway alignment was approximately \$15,000,000. The estimated construction cost of the preferred alignment is \$12,400,000. The major areas of cost reduction associated with the preferred alternative include elimination of the bridge structure (\$2.9 million) and special retaining walls (\$1.0 million).

The preferred alternative would involve some additional cost items, including a pedestrian bridge, two intersections and 600 feet of additional roadway. These additional items total \$1,300,000 so that net construction cost savings of the preferred alternative would be approximately \$2.6 million.

### 7.2 Right-of-Way (ROW) Costs

The original MassHighway alignment would require 3.41 acres of the 15 acre Parker Brothers Site. The taking would be along the northerly boundary of the site adjacent to the MBTA rail line. A purchase and sale agreement for the 15 acres is about to be signed by the owner and a developer. The purchase price is \$4,150,000.

Using the total purchase price to achieve the unit cost per acre yields a potential land cost of \$267,670 per acre or a total of \$943,400 for the 3.41 acres required for the MassHighway alternative.

The preferred alternative would require taking 4.2 acres of the 15 acre site. Using the unit cost of \$267,670 per acre, the total land taking can be estimated at \$1,124,200 for the preferred alternative.

## 8. Environmental Review

Pursuant to 301 CMR 11.17 of the Massachusetts Environmental Policy Act Regulations, a Notice of Project Change (NPC) would be required if a new alignment of the proposed Bridge Street By-Pass differs from what was discussed in the Environmental Impact Report/Statement (EIR/EIS). A NPC provides for a public comment period during which all potential impacts of the project are open to review.

The preferred By-Pass alignment through the Parker Brothers Site would bring the new By-Pass closer to two national register properties: the First Universalist Church at 211 Bridge Street and the Bessie Monroe House at 7 Ash Street. This may require a review of the Memorandum of Agreement (MOA) under Section 106 of the National Historic Preservation Act. The local Historical Commission, however, has

indicated support of the preferred alternative (see attached letter) and has requested mitigation in the form of repair/replacement of the deteriorated stone wall of the 1801 Howard Street Burial Ground. Further coordination on the request for repair/replacement of the wall will occur as part of the Section 106 process. The preferred alignment would not change any other aspects of the findings of the Final Supplemental EIS/EIR or permits for this project.

**Table 3 Summary Comparative Analysis**

**Bridge Street By-Pass Terminus Alignments**

	<b>Preferred MassHighway Alternative</b>	<b>MassHighway Original Alternative</b>
<b>Traffic Analysis</b> •Level of Service: Washington Street Intersection •Average Delay (seconds) (through movement)	AM            PM D              D Year 2017 50              44	AM            PM E              F Year 2017 54              43
Number of Signalized Intersections	3	1
Pedestrian Movement	Crosswalks for all moves	Crosswalks for most moves
<b>Project Costs</b> •Construction Cost •Estimated ROW Cost <b>Potential Total Cost</b>	\$12,400,000 <u>\$1,124,200</u> \$13,524,200	\$15,000,000 <u>\$943,000</u> \$15,943,000
Environmental Review	<ul style="list-style-type: none"> <li>•MEPA Notice of Project Change</li> <li>•Potential Revisit of Section 106</li> <li>•Permit Notification</li> </ul>	<ul style="list-style-type: none"> <li>•MEPA Review Complete</li> <li>•All Permits Obtained</li> <li>•No Action Required</li> </ul>

**9. Conclusion**

Either alternative would provide an acceptable improvement over existing traffic conditions and both alignments would function as adequate roadway and intersection improvements. MassHighway has adopted the preferred alternative because of its better level of service, lower cost, and strong support from the City of Salem.



# *Salem Historical Commission*

ONE SALEM GREEN, SALEM, MASSACHUSETTS 01870  
(978) 745-9595 EXT. 311 FAX (978) 740-0404

August 6, 1998

Gregory H. Prendergast  
Deputy Chief Engineer  
Environmental Division  
Massachusetts Highway Department  
10 Park Plaza  
Boston, MA 02116

RE: Bridge Street By-Pass

Dear Mr. Prendergast:

At its regular meeting of August 5, 1998, the Salem Historical Commission reviewed conceptual plans provided by the Salem Planning Department for an alternative alignment of the Bridge Street By-Pass in order to determine its impact on nearby historic resources.

The Commission determined that while the roadway in front of the two nearby National Register properties will be widened, thus potentially increasing the generation of noise, pollution and vibration and decreasing access, the elimination of the previously proposed viaduct which would have larger visual impact is an improvement for the community as a whole. In addition, the alternative alignment will provide an opportunity for a coordinated development of the Parker Brothers site and proposed new MBTA garage. This coordination of development in itself would have a mitigating effect for the historic properties.

The one issue raised by the Commission was the concern for the stone wall of the 1801 Howard Street Burial Ground. The stone wall is already in a state of deterioration and additional pollution and vibration could increase the rate of deterioration. The Commission proposes that the repair and/or replacement of the stone wall be made part of this project as mitigation effort to protect this historic resource.

Thank you for your consideration.

Sincerely,

Helen Sides  
Chair

Cc: Craig L. Wheeler