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Northwest Corridor Service Study
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

Cambridge Systematics, Inc.

Ammann & Whitney
Segal/DiSarcina Associates
Energy & Environmental Engineering, Inc.

MEMO TO: Project Coordinating Meeting Participants
FROM: Barry Faulkner, Cambridge Systematics
DATE: April 4, 1984
RE: Summary of analysis to be discussed at April 11 Project
Coordinating Meeting

At the Project Coordinating Meeting to be held on April 11 (3:30 p.m. at the Fox Library in Arlington), we will present a summary of study progress and analysis done since our last meeting of this type. This memorandum presents a summary of some of that technical analysis, to allow you to prepare questions or comments for that meeting. At this point, the MBTA has not done a detailed review of the analysis, endorsed any conclusions, or made any decisions in regard to these matters. This analysis will be used to help formulate recommendations to the MBTA, and should be viewed in that context.

Three separate pieces of analysis are summarized here. The first deals with the issue of fare policy at Alewife; the second looks at the impact on current bus routes from walk-ins and diversions to new rapid transit stations; the third is the narrowing of the routing alternatives into a workable set of the most feasible options. The full (draft) technical reports for each of these analyses will be available some time after the meeting to those who request them.

1. FARE POLICY AT ALEWIFE

At one time, Alewife was designated as a potential Zone 2 station, along with several existing rapid transit stations. Zone 2 fares would mean that passengers boarding at Alewife would pay two tokens; on the return trip, they would only pay the single token when boarding at a downtown station (or other Zone 1 station), for an average fare of 90 cents each way. The MBTA asked that this fare policy be reviewed as part of the Northwest Corridor Service Study.

Zone fares on the rapid transit system have been set on the basis of distance from downtown Boston. Alewife is closer to Boston than several current Zone 1 stations, including: Wollaston, North Quincy, Wonderland, Oak Grove, and Ashmont. The only station currently designated as Zone 2 (Quincy Center) is three miles further from Boston than Alewife. Equity considerations clearly indicate that a Zone 1 designation is appropriate for Alewife.

Further, a Zone 2 fare at Alewife would result in diversions of kiss-ride passengers to Davis, Porter, and Harvard, none of which is as well designed to handle drop-offs. Bus passenger diversions would result in some increase in bus service costs, compared to serving these passengers at Alewife. On the other side, Zone 2 fares at Alewife would produce up to \$1.0 million per year in additional fare revenue compared to Zone 1 fares.

The study team proposes to recommend that Alewife station be designated a Zone 1 station (the same as Harvard, Porter and Davis), on the basis of equity and diversion impacts at Davis, Porter, and Harvard. Other alternatives considered and rejected include Zone 2 fares with reduced fares for bus transfers at Alewife, and Zone 2 fares with reduced fares for local trips.

2. IMPACTS OF NEW STATIONS ON CURRENT ROUTES

When the new rapid transit stations open at Porter, Davis, and Alewife, many people who now ride a bus to Harvard Square or elsewhere will, instead, walk to one of the new stations. Others may get off the bus earlier (i.e. at Davis instead of Lechmere), or change to a route which feeds into one of the new stations. The critical factor in this analysis is the effect on the load profile on each route, particularly the size and location of the peak bus loads, since this affects the amount of service required to meet passenger needs.

This analysis looked at these impacts on current bus routes--that is, assuming no changes to bus or trackless trolley service--to estimate changes in service requirements before any route changes are made. Diversions to new stations were estimated based on improvements in travel time and reduced transfers. While the impact on most routes in the corridor is negligible, the peak load on certain routes which are close to the new stations is reduced by up to 60 percent. The routes which are most impacted are (in order of degree of impact):

- o Route 83, Rindge Avenue to Central Square. Walk-ins to Alewife and Porter Stations result in a 61 percent reduction in the peak load.
- o Route 77A, North Cambridge Trackless Trolley. Walk-ins to Davis, Porter, and to a lesser extent, Alewife, result in a 60 percent reduction in peak load requirements.
- o Route 88, Clarendon Hill to Lechmere via Highland. Walk-ins to Davis, and passengers unloading at Davis, result in a 39 percent reduction in the peak load. The peak load point would be shifted from City Hall to Davis Square.
- o Route 87, Clarendon Hill to Lechmere via Somerville. Walk-ins to Davis and Porter, and passengers unloading at Davis, reduce the peak load on this route by 35 percent. The peak load point is shifted from Union Square to Davis Square. The load on Routes 87 and 88 includes diversions from Route 89, as described below.

- o Route 89, Clarendon Hill to Sullivan via Broadway. A number of Route 89 riders from the Powder House Square area would walk to Davis. Other passengers, who now board between Clarendon Hill and Teele Square, would switch to Routes 87 and 88 in order to go transfer to rapid transit at Davis. The total reduction in the peak load is 33 percent.
- o Route 80, Arlington Center to Lechmere. A small number of riders, from the Powder House Square area, would walk to Davis. A much larger impact occurs from passengers who would switch to Route 96 in order to go to Davis Square. The total reduction in peak load is 31 percent.
- o Route 90, Davis Square to Wellington. Walk-ins at Davis would reduce the peak load on this route by 19 percent, but for this route, this change is not large enough to affect the already infrequent schedule.
- o Route 96, Medford Square to Harvard. Walk-ins at off-loading at Davis result in a reduced load, but diversions from Route 80 almost exactly compensate for this loss. The total impact on peak load is only 2 percent.

Other routes examined, but found to have little net impact, are 77 (Arlington Heights), 76 (Hanscom Field), and 84 (Arlmont). The analysis also considered backtracking to new stations from points inbound of those stations (for example, taking the Route 88 bus outbound from Highland Avenue to Davis Square in order to transfer to rapid transit). This backtracking would have a negligible impact on peak loads.

If service on each of these routes were reduced to the point indicated by the new loads on those routes, the number of peak buses required to provide service would be reduced by 11. This would result in a cost savings of nearly \$1.0 million per year, without any other routing changes in the corridor. Peak headways on Routes 77A and 83 would double (to 15 minutes and 24 minutes, respectively). The number of buses in Davis Square, without any other changes, would be reduced by 20 percent.

3. SCREENING OF ALTERNATIVES

One of the results of the first series of workshops (conducted during January and February) was a list of routing and service alternatives for the corridor. These alternatives included modifications to existing routes, new routes, and various other operating schemes. Some of these alternatives were developed by the study team, while others were suggested by workshop participants, or developed in response to service needs or problems identified during the workshop process.

Each of these alternatives has been examined according to the criteria established at the beginning of the study. The most promising alternatives have been identified for further study, while those which appear to be less promising are being dropped at this point. At this point in the study, the analysis has been relatively qualitative, as opposed to quantitative, although available cost and ridership information has been used where needed.

To this point, analysis has focused on individual routes, although particular attention has been given to the interaction among various route alternatives. From this point forward, alternative subarea schemes, each involving several routes, will be the basis of analysis. The results of analysis to date are summarized below on a route-by-route basis, with new routes (those not associated with any particular current route) listed at the end. In each case, the continuation of the present routing is retained as an option, unless specifically stated otherwise.

Route 61: Waltham Central Square to Lexington Center. The option of rerouting 61 into Alewife (instead of Lexington Center) has been dropped, since it would seriously degrade service for current users. Instead, we will be looking at retaining the current service and adding a new route which would serve Alewife from this area. The prime market would be major employment areas along Hayden Avenue, Spring Street, and Winter Street in Lexington and Waltham.

Route 62: Bedford VA Hospital to Arlington Heights. We have dropped the alternative of routing this to Alewife via Pleasant Street since this loses an important connection with Route 77 at Arlington Heights. We will continue to look at routing this to Alewife via Arlington Heights and Park Avenue. We have also considered, but dropped, options to serve Hartwell Avenue with this route (instead, we will examine Hartwell Avenue service using Route 76).

Route 67: Lexington Five Forks to Arlington Center. The major option for this route is to change it so that it runs from Alewife to Turkey Hill in Arlington. The option of running from Arlington Center to Turkey Hill does not appear practical. The existing route falls short of productivity standards.

Route 71: Watertown to Harvard trackless trolley. At the Watertown end, we will be evaluating an extension to Newton Corner and Oak Square. At the other end, we are looking at operating this route on Mt. Auburn Street (its pre-construction routing), or on Huron Avenue (with Route 73 serving Mt. Auburn).

Route 73: Waverly to Harvard trackless trolley. The only option being considered for this route would return it to Mt. Auburn Street, as it ran before construction began. The option of routing it via Huron has been dropped, since routing 71 via Huron would provide a better balance of service, and would minimize transfers.

Route 74: Belmont Center to Harvard. The option extending 74 into Alewife has been dropped. This would provide no benefit to current users on Concord Avenue, and potential new users would be better served by a new cross-town route, also being considered (see below). The option of dropping the Harvard Square end of the route (in conjunction with extending service to Alewife) is also being dropped, since it results in a serious disbenefit to users, without any cost savings, and only minor impact on the number of buses in Harvard Square. We will continue to look at routing Belmont Center buses to Harvard via Huron Avenue in conjunction with the appropriate alternatives for Routes 71, 72, 73, and 78.

Route 75: Mt. Auburn Shuttle. This service area will be adequately covered by other service options (Route 73), so it is proposed to eliminate this shuttle as a separate route once construction on the Red Line is completed.

Route 76: Hanscom Field to Harvard. We are evaluating the option of terminating this route at Alewife, instead of Harvard. The base case (existing routing) has been changed to include a stop at Alewife, on the way to Harvard. At the other end, we will be evaluating options to loop some or all trips down Hartwell Avenue (on the way to Hanscom Field) to serve employment areas there.

Route 77: Arlington Heights to Harvard. We are dropping the options of routing this line into Alewife via Pleasant Street or Lake Street. The Pleasant Street routing does not cover a large enough service area, compared to other options. The Lake Street routing would experience some serious traffic and delay problems. In neither case is the advantage of a Route 2 approach to Alewife likely to be large enough to justify these options. The option of routing some service from Arlington Heights to Alewife via Alewife Brook Parkway will be fully evaluated, along with local service on Mass Avenue from Harvard to Arlington Center or Arlington Heights. The option of routing 77 to Davis Square has been dropped, since Davis is not equipped to handle the bus volumes which would be involved.

Route 77A: North Cambridge trackless trolley. The options of extending trackless trolley service to Arlington Center or Arlington Heights involve a considerable capital investment, and the placement of overhead wires has been opposed by Arlington residents and officials. However, these options will be retained for further analysis, so that the cost and service implications of these extensions can be documented for future consideration. A trackless trolley extension to Alewife has been dropped from consideration. The current Route 77A service will be severely impacted by diversions of passengers to new rapid transit stations. A number of scheduling strategies will be evaluated for this route.

Route 78: Park Circle to Harvard. The option of routing 78 into Alewife has been dropped, since this service would be provided by a rerouted 84, and no adequate alternative exists to serve Blanchard Road. The option of terminating service at Pleasant Street (i.e., running from Harvard to Pleasant Street and back) will be evaluated in conjunction with routing Route 84 into Alewife. The final option is a combination of two schemes discussed during the workshop (A and D). This combination would include Route 78 operating between Arlmont and Harvard all day (the current off-peak routing of Route 78, which includes part of the route covered by Route 84). During peak hours, additional service would operate from Arlington Heights to Alewife via Park Circle (coordinated with less frequent through service to Bedford VA Hospital).

Route 80: Arlington Center to Lechmere. Two options are being considered for this route (in addition to the existing routing). One would add a loop between Powderhouse Square and Davis Square (buses would serve the current route, with each bus making a loop down College Avenue to Davis Square).

This would be considered only in conjunction with the rerouting of Route 96 via Winthrop Street. The second option which would change the outer end of the route to go from West Medford via Arlington Center to Davis (then to Powderhouse and Lechmere along the current routing), would be considered only in conjunction with retaining Route 96 service on Boston Avenue.

Route 83: Rindge Avenue to Central Square. No changes are being considered for the routing of this bus. The schedule for this route may be altered in response to the diversion of passengers to rapid transit stations.

Route 84: Arlmont to Harvard. The major option still under consideration for this route is to terminate it at Alewife. Off peak service would be through routed with Route 76 (the option which would allow through-routing with Route 62 has been dropped). The second option is to replace 84 and 78 with a Harvard-Arlmont route and an Alewife-Arlington Heights (via Park Circle) route. These options will be evaluated in conjunction with Route 78 options.

Route 87: Clarendon Hill to Lechemere via Somerville Avenue. The option of extending this route to Arlington Center is being retained for evaluation. This will be considered in connection with other route options which would serve the Arlington-Davis market (Routes 80 and 350). Because of load characteristics on Routes 87 and 88, the Arlington Center service may operate only as far as Davis. The option of changing the Teele Square to Davis portion of this route to go via Broadway and College is being dropped. The area which would be served by this diversion is largely within walking distance of Davis, and this would put a lot of additional bus service on College Avenue, which is less suited to handling this traffic than Holland Street.

Route 88: Clarendon Hill to Lechmere via Highland Avenue. The outer portion of this route (beyond Davis Square) is identical to Route 87, and the options considered for 87 would also apply to Route 88. The decision on whether Route 87 or Route 88 should be extended to Arlington Center (if either of these routes) will be based on which route better matches the serve needs of this extension, based on bus frequencies and loads.

Route 89: Clarendon Hill to Sullivan via Broadway. The option of rerouting this route via Davis (Powderhouse to Teele via College Avenue and Holland instead of Broadway) is being dropped. This option was to be paired with rerouting 87 or 88 to Davis via Broadway. This would lead to significant delays on each route with minimal service benefits. For similar reasons, the option of terminating this route at Davis has been eliminated. Only the existing routing, then, is still being considered for this route. It should be noted, however, that diversions to Davis will have an impact on the schedule frequency of this bus.

Route 96: Medford Square to Harvard. Two questions are being examined on this route: whether to terminate at Davis or Harvard; and whether to reroute the outer portion of this route via Winthrop and George Streets or to continue to run on Boston Avenue and High Street. The evaluation will be coordinated as follows: Medford Square to Davis (or Harvard) via George and

Winthrop will be examined with the option of continuing Route 80 on Boston Avenue; Medford Square to Davis (or Harvard) via Boston Avenue will be looked at along with the option of rerouting 80 from West Medford to Lechmere via Arlington Center and Davis. In addition, we will look at a combination which would include service between Medford Square and Harvard via George and Winthrop, and service between Winchester/West Medford and Davis via Boston Avenue.

Route 134: North Woburn to Wellington. The short loop version of this route between Playstead Road and Wellington (designated 134M on the schedule) would not be affected. The option of routing the North Woburn service into Davis has been changed. Under the revised option, the North Woburn route would terminate at Medford Square, where it could be through-routed with Route 96 to Davis.

Route 326: West Medford-Boston via I-93 (Express). No changes to this route are being contemplated.

Route 350: Burlington to Boston Limited. The option of rerouting this from Arlington Center to Alewife via Pleasant Street has been dropped, since no safe and practical location for stopping buses in Arlington Center is available for this routing. Also dropped is the option of rerouting to Davis via Chestnut and Warren, since this does not provide for the needed transfer with Route 77, and because of stop location problems. Remaining options include, in addition to the present routing: rerouting into Alewife via the Alewife Brook Parkway, and rerouting into Davis via Franklin and Broadway. Both of these options have significant cost saving potential. At the workshops, it was suggested that this route terminate at Porter Square. Examination of this option reveals no advantage over the Davis and Alewife options, at a higher operating cost.

Route 352: Burlington-Boston Express. No change is contemplated in this route.

Route 353/354: Burlington Industrial Area/Woburn to Boston Express. No changes are contemplated to these routes.

New Belmont Crosstown Route. This route, if implemented, would connect Waverly Square and Belmont Center, continuing on to Alewife Station. Also being examined is the possibility of extending to Watertown Square via Lexington and Orchard Streets. Between Alewife and Belmont Center, the route would use Route 2 and either Cross Street or Pleasant Street. Between Belmont Center, buses would use Common and Trapelo (i.e., through Cushing Square) or Waverly Street. Routing buses between Cushing Square and Watertown via Common has been eliminated because of street geometry and because it would miss a significant transit-dependent population near Waverly Square. Extending the route beyond Watertown Square to the Arsenal Mall has been dropped, as it results in a very long route and would be a duplication of service (mall-bound passengers could transfer at Watertown Square). A loop or extension from Waverly to Mill Street (to serve an elderly population there) could not be operated with full-sized MBTA buses. Mini-bus service will be examined as an option.

New Route, Maynard-Burlington. This does not appear feasible as an MBTA route because of cost and administrative problems. This will be considered as a possible private carrier route.

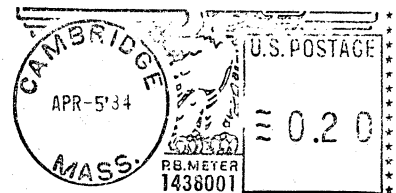
New express routes to Alewife serving Concord, Bedford, Burlington and Waltham. Service to Waltham is being considered in connection with Route 61 alternatives (see above). For other destinations, there are several factors which negatively affect the practicality of express service to Alewife at this time, including: competition with existing MBTA service, lack of park-and-ride facilities, and the difficulty of coordinating Alewife station access and service to Alewife-area employers (because of bridge restrictions). However, because of local interest in these routes, these constraints will be documented for future planning consideration.

New Alewife Area Circulator. Alternative ways to provide a mini-bus circulator in the Alewife area will be examined.

The reduced list of route alternatives will be evaluated on an area-by-area basis, rather than a route-by-route basis. Within each area, several schemes, each involving a number of routes, will be evaluated. These area schemes will be presented at the April 11 meeting.

FIRST CLASS
MAIL

Northwest Corridor Service Study
238 Main Street, Room 310
Cambridge, Massachusetts 02142



FIRST CLASS
MAIL

Cambridge City Council
c/o City Clerk
Cambridge City Hall
795 Massachusetts Ave
Cambridge Mass 02139

Comm. from Barry Faulkner, Cambridge Systematics, Inc., Northwest Corridor Service Study, transmitting a summary of analysis to be discussed at the April 11, 1984 Project Coordinating meeting to be held on at the Fox Library in Arlington at 3:30 p.m.

In City Council,

April 9, 1984

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Placed on file