



City of Cambridge

(Communication No. 9)

IN CITY COUNCIL

April 6, 1987

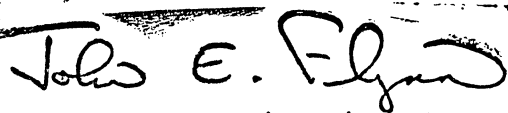
COUNCILLOR WOLF

ORDERED: That the report of the Committee on Environment relative to the Draft Environmental Impact Report & related environmental assessment documents reviewed for the proposed Alewife Center development at the W.R. Grace & Co. property and on the status of Phase VI and Phase VII Separation of Combined Sewerage Systems be and hereby is referred to the City Manager to be used for inclusion in any future discussions with the developer.

In City Council April 6, 1987.
Adopted by the affirmative vote of 8 members.
Attest:- John E. Flynn, Acting City Clerk.

A true copy;

ATTEST:-


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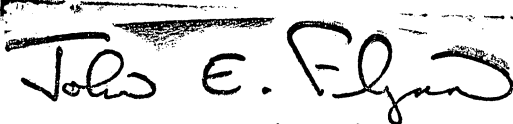
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engineering designs for this project are expected to be completed by June, 1988 with construction slated to begin by December, 1988 with an anticipated completion by March, 1991. The total preliminary estimated construction cost is \$17 million. The City's share of this project is approximately \$6 million with the remainder funded by state dollars.

Councillor Russell at this time questioned Mr. Rossi whether or not the Cambridge Highlands area was to be included in either Phase VI or Phase VII. Mr. Rossi responded that this area was not included but Public Works personnel were looking at alternatives to alleviate drainage problems in this area.

Councillor Wolf questioned at this time the funding source(s) of this project.

Mr. Robert Barrows of C.E. Maguire, a consulting firm hired by the City of Cambridge responded to the chair's question by stating that the preliminary design costs would be subsidized in part by State and City funding. Future funding during the construction stage could include Federal funds through the Clean Water Act as well as State and Local funds.

Mr. Rossi stated that the City will also be doing other minor and emergency construction and reconstruction programs during this time period. Councillor Wolf questioned what is the current operation for dealing with a sewer collapse. Mr. Rossi responded that private contractors are used to remedy the situation.

Councillor Wolf requested the Deputy City Manager to provide the City Council with a listing of the other areas that are under review for repairs. Mr. Rossi responding to this request stated that the listing would be provided during the upcoming City Council budget hearings and that Public Works would be establishing a preventative maintenance plan to be used as an analytical tool for the future.

Environmental Concerns at W.R. Grace Company Development Site:

Councillor Wolf opened this segment of the Public Hearing with a brief synopsis of the history of this development project. The Chair made reference to a City Council action requesting the City Manager to provide for particular consultants to be retained to deal with a wide-range of potential environmental and health issues at this site. At this time the Consultant's Draft Final Report was submitted for review, questions and public comments.

At this time the Committee heard from Melvin H. Chalfen, M.D., Commissioner of Health and Hospitals, on particular studies held to-date and the data received as a result of these studies. The Commissioner stated that considerable progress has been made on significant issues raised by everyone involved in this development project. Some of the issues that were identified included:

- Risk Assessment
- Disposal of Materials during Construction Stage
- Health & Safety Plans during Construction
- Basement Flooding
- Groundwater Flow

At the conclusion of Dr. Chalfen's statement, Councillor Wolf introduced Dr. John D. Spengler, Professor at the Harvard School of Public Health, Department of Environmental Sciences and Physiology for a review of the Draft Final Report in response to the Draft EIR.

Dr. Spengler introduced the other researchers involved in the compilation of this extensive review. (A synopsis and a full report are attached herewith). He then outlined the approach taken by this team of researchers, defined the various sampling techniques that were employed and then issued findings and recommendations to be considered by the City in future dealings with the developer.

Dr. Spengler cited the need for more measurement and additional analysis to assess: sources and concentrations of hazardous chemicals (on-site) and impacts due to development. Dr. Spengler also listed a series of limitations that were found in the draft EIR. Recommendations regarding the limitations included:

- risk assessment
- data collection outside footprint and additional soil-water-sediment samples
- the need to better characterize ground water movement, sources of acetone and emission rates of volatile organic compounds

Councillor Wolf questioned the flow of groundwater as it relates to this development. Mr. Donald Fingleton, one of the researchers, responded that at the present time there is no source of data and that the flow should continue towards the MBTA tunnel. New construction did change the groundwater flow although the pre 1964 flow is not clear.

At this time Councillor Wolf invited questions and comments from the general public regarding this subject matter. Mr. William Morris, 37 Highland Street questioned the sampling technique that was employed citing such examples as the City of Woburn and the Town of Acton which found that different levels of contaminants were found based on the number of samplings performed. Dr. Spengler responded that as the number of samples taken increase the result will be a truer mean value but levels will differ depending on such variables as time and weather conditions.

Peter Cignetti, 5 Theriault Court thought that the opening statement of the Draft Final Report was misleading and that on-site and air-quality monitoring was essential throughout the development process. Dr. Spengler responded that based on the concentrations of the samples provided at this point in time, there

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is no public health concern but there is a need for further testing and analysis.

Following the conclusion of the public testimony, Councillor Wolf invited Mr. Rossi and Dr. Chalfen for any comments regarding the recommendations as presented by the researchers. Mr. Rossi stated that the City manager will require communications to remain open between all city departments and agencies participating in this issue and will work with the DEQE.

The Committee then heard from David Vickery representing Hines Development who stated that his firm is working closely with DEQE and will issue a full response.

At this time, Councillor Russell moved that the recommendation made by the Consultants be forwarded to the City Council and the City Manager for inclusion in future discussion with the Developer.

The motion carried.

The hearing was adjourned at eight o'clock and twenty-five minutes p.m.

For the Committee,



Councillor Alice K. Wolf
Chair

attachments

REVIEW OF THE DRAFT EIR AND RELATED ENVIRONMENTAL ASSESSMENT DOCUMENTS
FOR THE PROPOSED ALEWIFE CENTER DEVELOPMENT AT
THE W.R. GRACE AND CO. PROPERTY
IN CAMBRIDGE, MASSACHUSETTS

* * * DRAFT FINAL REPORT * * *

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FEBRUARY 19, 1987

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I. INTRODUCTION

As part of an ongoing evaluation of the potential environmental and health implications of the proposed Alewife Development Project, the City of Cambridge has retained the services of researchers affiliated with the Energy and Environmental Policy Center (EEPC), Harvard University and with the Harvard School of Public Health (HSPH) to evaluate the draft EIR and related site assessment documents. Harvard staff involved in this effort include individuals experienced in risk assessment, toxicology, hazardous waste management, and air pollution monitoring. The review and assessments were conducted under the direction of Prof. John D. Spengler (HSPH) and managed by Dr. Haluk Ozkaynak (EEPC). Principal scientists working on the project also included Mr. Mark Smith (HSPH) and Mr. Donald J. Fingleton (EEPC).

Harvard's evaluations included the undertaking of two tasks. The first task was the general review of the recent Environmental Assessments documents and the draft EIR for the purposes of outlining a risk assessment study relevant to the proposed commercial development of the former W.R. Grace site near the Alewife Brook Parkway in Cambridge. The second task consisted of the evaluation of recent monitoring and test data and the December 1987 draft EIR prepared by the project proponents and its contractors. Our multidisciplinary review attempts to address the concerns regarding the adequacy of the measurement programs conducted to date as well as the health risk assessments performed by the project consultants.

The following comments summarize an extensive evaluation of the site assessment of the proposed Alewife Development Project. We have focused exclusively on the human and environmental health risks posed by the chemical wastes found on the site and have not considered the potential health risks

associated with other aspects of the development. Our evaluation includes a summary critique of the material presented in Monacelli Associates Inc. draft EIR and the three-volume Haley and Aldrich, Inc. Environmental Assessment report for the proposed Alewife Center Development Project (December 1985). In addition to these primary reports, we have also evaluated the following.

1. Correspondance to Don Smith (EPA) from Greta D. Reade (NUS Corp.) on June 20, 1986 providing review comments on the Haley and Aldrich report "Environmental Assessment for the Alewife Center Master Plan, W.R. Grace and Co., Cambridge, Massachusetts."
2. W.R. Grace and Co. response to comments of Greta D. Reade (NUS Corp.) dated October 27, 1986.
3. Various inter-office correspondances from the City of Cambridge summarizing highlights from project-related meetings with DEQE, the developers and their consultants, and the public.
4. Report on Long-term Chemical Monitoring Program, Alewife Center, Cambridge, Massachusetts by Haley and Aldrich, Inc. (February 1986).
5. Supplemental Soil and Groundwater Data, Draft Environmental Impact Report, Alewife Center, Cambridge, Massachusetts by Haley and Aldrich, Inc. (January 7, 1987).
6. Notice of Responsibility (based on 1985 Haley and Aldrich report), from the Massachusetts Dept. of Environmental Quality Engineering (DEQE) and transmitted to W.R. Grace and Co. on February 9, 1987.

II. SUMMARY OF FINDINGS

Based on our review, we conclude that the draft EIR and associated materials do not provide an appropriate analysis of potential health hazards

posed by this site as it currently exists, or as it will exist during construction or following completion of the proposed project. Therefore, stated claims that development of the site will present no risks to the health and safety of the public are not adequately supported. Furthermore, this draft does not adequately address the concerns voiced in the Certificate of the Secretary of Environmental Affairs on the Environmental Notification Form, regarding hazardous materials, in that it does not summarize nor discuss the EPA evaluation of the site assessment. We recommend additional data collection and formal exposure and risk assessment studies be performed as part of the finalization of the EIR.

III. SITE ASSESSMENT EVALUATION

DEQE's recent Notice of Responsibility, prepared for the proposed development site, addresses the requisite site actions necessary for the evaluation of the potential hazards and the remedial action plans associated with the manufacturing wastes disposed within the former W.R. Grace property. We find all of DEQE's information requests, in terms of gathering additional data and conducting further assessments, quite appropriate. In this section, we discuss a number of issues similar to those raised by DEQE and additional areas of concern regarding the existing information bases, chemical contamination, site hydrogeology and surface waters, risk assessment, and mitigating measures.

III.1 Chemical Contamination: Composition, Concentrations, and Distributions

The site assessment includes an extensive data base generated from numerous samples and detailed chemical analyses of many of these. In general, the chemical analyses performed appear appropriate in light of the past

history and known chemical contamination of soils and groundwater at the site. These analyses clearly indicate the widespread occurrence of a variety of chemical contaminants, in both the groundwater and soils of the site. Unfortunately, the usefulness of much of this data is questioned because, in many instances, chemical analyses were performed on composited samples. In addition, many areas on the site were not covered in adequate detail. The most recent set of samples (i.e., Supplemental Soil and Groundwater Data, Draft EIR, Haley and Aldrich, Inc, January 7, 1987) provide a better coverage of the limited areas tested and detailed chemical analyses of non-composited samples. However, these samples still are restricted to the so-called "footprints" of the development. Although we realize that it is impractical to test all areas of the site, we believe additional sampling is needed to adequately evaluate the nature of and distribution of chemical wastes on the site. In general, we believe that it is appropriate to concentrate detailed sampling to the "footprints" of the development, but we do not believe that it is appropriate to restrict detailed sampling to only these locations. Obviously, excavation of soils and dewatering of the "footprint" areas will pose the greatest possibility of mobilizing chemical wastes from the site. However, construction is very likely to result in significant site alternations and disruptions extending beyond the "footprint" areas. These alterations could result in changes in surface water and groundwater flow as well as mobilization of contaminated soils. Furthermore, the definition of "footprint" areas must be expanded to include utility and sewer line access routes and construction staging areas. Additional comments and specific recommendations regarding additional sampling needed are presented in Section IV.1.

III.2 Site Hydrogeology and Surface Water

The potential for water mediated migration of these chemical wastes from the site needs further evaluation. Although several groundwater flow studies have been completed, the nature of groundwater movement on the site is confusing and requires clarification. Contradictory statements appear to be made between the draft EIR, and the most recent supplementary data provided by Haley and Aldrich. The first reference indicates a northerly flow of groundwater while the second indicates the flow is radially in all directions. This appears to be in conflict with the recent experience of groundwater seepage into the MBTA tunnel. Additional information is needed to evaluate the current situation before attempting meaningful predictions of the impacts of the proposed development on groundwater flow.

Additional consideration of surface water flow also is needed, especially with respect to potential outcomes of flooding on the site which lies on the 100-year flood plain of the Alewife Brook. Impacts of construction, excavation, movement of contaminated soils on-site, and other aspects of the development project on flooding of the site and the potential for flood water mobilization of contaminants should be addressed.

Additional comments and recommendations regarding these issues are given in Sections IV.2 and IV.3.

III.3 Risk Assessment

Volume 3 of the Environmental Assessment: Proposed Alewife Center Development, cited in the draft EIR, presents what is described as a "Risk Assessment" of the health risks posed by development of this site. At best it is a qualitative risk assessment and we are critical of many aspects of this document. A report which lists detailed comments on this assessment will be

made available to the City of Cambridge, Department of Health and Hospitals. In summary, this risk assessment presents an inadequate assessment of potential exposures which might occur at this site before, during, and after construction. This makes it impossible to assess the levels to which the public might be exposed from contaminants found at the site. The document also fails to consider the potential impacts of a number of compounds found at appreciable levels in the soils or groundwater at the site.

A discussion regarding our concerns with this document follows. In the risk assessment, concentration guidelines, or threshold levels, for a number of compounds are derived. These are estimates, of the concentration in water or soil at which no significant hazard to human health is posed. The estimates, however, are not always based on appropriately conservative assumptions when considering the protection of public health. Nonetheless, sample data indicate that four contaminants at this site are found in concentrations exceeding these guidelines. In each instance these findings are said to be insignificant and that no health threat is expected. The author argues that since the guideline values incorporate a safety factor, no significant health risks are posed by concentrations that do not substantially exceed the guideline values. This ignores the rationale behind using safety factors in the first place. Safety factors attempt to account for the uncertainties involved in calculating guideline or threshold values and the existence of sensitive subgroups or individuals in the population (elderly, children, etc.)

In conclusion, we believe an appropriate risk assessment of the site has not been performed. Such an assessment should be required and will be useful in determining how this site should be developed. Specific methodologies for such an assessment should be determined in consultation with

the City of Cambridge, DEQE, and other appropriate groups. We present a number of suggestions for such a study in Section IV.3.

III.4 Mitigating Measures

A variety of mitigating measures, to minimize the potential for adverse health impacts, are proposed in the draft EIR and related documents. It is clear from these proposals that the consultants have identified many of the problems which must be dealt with at this site to insure public safety. However, in many instances, insufficient detail is presented in these documents to evaluate the adequacy of the proposed mitigating efforts. These limitations and recommendations to improve this situation are detailed in Section IV.4.

IV. RECOMMENDATIONS

IV.1 Chemical Contamination: Additional Sampling Requirements

1. The "footprints" of sewer and utility connections must be determined and detailed chemical analyses performed on soil and groundwater samples taken at intervals along these routes. At a minimum this will be needed to determine appropriate disposal alternatives for the materials excavated.
2. Construction staging areas should be specified and detailed chemical analyses performed on soil samples from these areas.
3. Additional surface and sediment samples should be collected and analyzed from Parkway Pond and Jerry's Pond. This is of particular concern if alterations to either pond are undertaken and if these alterations result in movement or mobilization of sediments.
4. Few data from long-term chemical monitoring of surface and groundwater outside the development area indicate the presence of certain volatile organic compounds, some of which are known to be toxic. Additional sampling (spatially and temporally) needs to be undertaken to be able to resolve the sources and pathways of pollutant transport to areas away from contaminated soils.
5. Any soils to be used as fill for any alternations of these ponds should be sampled and subjected to detailed chemical analyses.

6. As a test for contamination of Alewife Brook, a number of surface water samples have been collected from this waterway. However, it is likely that a number of compounds (which might derive from the W.R. Grace site), would be found preferentially bound to bottom sediments. Therefore, we suggest that sediment samples of Alewife Brook be collected and tested. Samples should include controls taken upstream of the site, a sufficient distance to insure that little or no inputs from the site could reach the sample location, and samples immediately downstream from the site.
7. To provide a measure of compounds migrating with the groundwater, it would be useful to sample leachate collected at the MBTA tunnel. The possibility that contaminated groundwater is moving off this site via the tunnel cut needs to be evaluated as well.
8. Surface and groundwater samples from the Russell field area, the site used a staging area during the MBTA station construction, will be useful to examine the potential contribution of other sources to the present soil and groundwater contamination.
9. Additional sampling of former waste lagoon areas should be done to confirm that the wastes previously stored there have, in fact, been adequately removed.
10. Additional sampling outside of the "footprint" areas and those additional locations noted above may be required to characterize the distribution of compounds on the site. As mentioned above, many of the previous samples were composites of materials from a number of locations making it

difficult to identify hotspots of contamination on the site outside of the "footprints." An appropriate sampling regime to identify any such hotspots should be developed in consultation with DEQE. Once a better understanding of groundwater movement on the site is obtained additional groundwater monitoring stations may also be needed.

11. It is very difficult to access, in a clear and comprehensible fashion, the large amount of sample data already existing for this site. It is often difficult and sometimes impossible to correlate sample numbers with sample locations. The consultants to Grace/Hines should be required to summarize this information in a clear fashion including results of previous sample analyses. Acetate overlays of sample locations and levels of contamination, color coded, would be useful. This would allow individuals reviewing the sampling data to determine distributions of compounds on site.
12. Results from other monitoring efforts in this area, in particular those conducted by the MBTA should also be obtained and presented in the EIR.
13. Air sampling for volatile organics compounds (VOCs) should be carried out both before and during the excavation phase of the project. Since it is critical to determine the location and the emission rates of the various contaminants, we recommend exploratory monitoring of VOCs in the excavation pits after a small amount of soil has been removed. Generation of spatial profiles of the concentration of compounds of interest will be helpful in developing empirical ambient emission rates for the toxic compounds that are of concern to the health of workers and

population living nearby. Monitoring plans during the construction should include collecting short-term VOC samples downwind of the site as well as real-time odor detection methods which could be used for implementing immediate work stoppage and/or other actions needed to remedy the source of emissions or odor problems.

IV.2 Site Hydrogeology and Surface Waters

1. The directions and rates of current groundwater and surface water movement on the site must be clarified.
2. Groundwater modeling may be needed to investigate the effects of construction on groundwater flow patterns and rates. Should such modeling be performed it is important that model limitations, rationale for input parameters, and uncertainties be explicitly and clearly presented. Sensitivity analyses should also be included to investigate the effects of differing sets of assumptions on outcomes. Additional consideration of surface flow patterns and rates is also needed.
3. The potential migration of hazardous materials from the site by the above routes requires additional attention. The groundwater modeling effort should be extended to include modeling of pollutant transport in soil, groundwater, and surface waters. Appropriate variables regarding pollutant migration and decay (e.g., distribution coefficients based on fractional organic carbon content, decay constants/hydrolysis rates, infiltration rates, etc.) need to be considered in such model-based evaluations.

4. Possible penetration of neighborhood basements by groundwater originating from the site, potentially carrying hazardous compounds, should receive further consideration. It would be desirable to develop a baseline data set of the current situation, that is, the current prevalence of basement flooding problems in the community surrounding the proposed development. Such a baseline might be obtained through consultation with DEQE and the City of Cambridge. Should additional groundwater work suggest movement towards peripheral communities, additional groundwater sampling, especially of shallow groundwater that might enter basements or reach surfaces, needs to be performed.
5. The possibility that sewer and utility line connections might serve as conduits for the flow of contaminated ground and surface water from the site should be addressed.
6. The possibility that construction on the site may connect shallow groundwater with deeper aquifers beneath the clay layers must be analyzed. Penetration of the natural clay barrier could result in contamination of deeper groundwater.
7. Since the site lies on a 100-year flood plain, possible impacts of flooding (and of development on flooding) on mobilization of contaminants needs consideration.

IV.3 Exposure and Risk Assessment

It is imperative that a comprehensive population-based exposure and

risk assessment study be performed for the Alewife Center Project. The information provided by an exposure and risk analysis may then be used in the regulatory process to decide upon the nature and extent of remedial actions that must be taken at this site prior to, during, and after construction to protect public health. Such a risk assessment must be performed using scientifically acceptable protocols (for example, EPA's exposure and risk assessment guidelines published in the Federal Register within the last 3 years), and should specifically address the technical issues noted in this report, in the DEQE Notice of Responsibility, and the concerns voiced by members of the community near the site. In addition, the assessment should consider the types of information and format of presentation required by or best suited to the various regulatory bodies involved (e.g., DEQE and City of Cambridge).

In the following, we provide the essential elements of an exposure and risk assessment for this commercial development. It is also important to recognize the necessity of explicitly accounting for the sources and, where possible, the magnitudes of the uncertainties associated with the exposure/risk calculations. Additionally, the analysis should identify situations and potential problems that might significantly alter projected health effect estimates, and identify additional data needed.

Components of a recommended exposure and risk assessment

A. Identification of hazardous materials/source terms

1. Identification of the types of hazardous/toxic materials on the site, or potentially on the site, based on sampling and chemical tests as well as information relating to past and current uses of site.

2. Determinations of the concentrations of these compounds on the site
 - a) average concentrations
 - b) maximal concentrations, these may be based on extrapolations from soil to water and the converse, when samples from one media suggest higher concentrations than sampled in the other. Must use appropriate partition coefficients and site conditions.

3. Determination of distribution of compounds on the site

- a) environmental compartment contaminated
- b) areas of maximal concentration-hotspots
- c) gradients of distribution
- d) possible sources of continuing and future contamination-storage tanks, barrels, transfer pipes, etc.
- e) projected effect of development on above

This determination should extend to the entire site not just the area to be built upon. Construction may disturb adjacent areas, may alter runoff and subsurface water flow.

4. Analysis of potential for and possible routes of migration of contaminants off the site since this is very important considering the population density of the area and its proximity to drinking water supplies. Projected effects of development on altering the migration routes and amounts of contaminants from the site.

B. Determination of health effects and risk potency terms

1. Identification of potential health effects of compounds that are either

- found on the site or could be found in the future through mobilization of wastes still buried in the site
- a) initially, this should extend to all compounds found or expected to be found, not just those detected at highest concentration
 - b) should consider carcinogenic and non-carcinogenic health effects of both acute and chronic nature
2. Determination of possible real health effects and their "seriousness" necessitates consideration of potency terms
- a) potencies/exposure limits etc. used, for a site like this, should be the most conservative scientifically defensible. Sources should include reviews of EPA, DEQE, other state lists, and the literature. Limits should involve safety factors, depending upon nature of data used, 10-100x is generally considered advisable in cases where threshold of effects are known to exist.
3. For carcinogens and suspected carcinogens available EPA/CAG potencies supplemented by the NTP bioassay data should be used in developing and using cancer unit risk estimates for oral and inhalation routes. Other federal or state guidelines and standards (e.g., EPA's water quality and Massachusetts' air toxics guidelines) should also be used in selecting and applying risk/potency coefficients or limits for the chemicals studied. In these determinations distribution or range of values for source strengths and concentrations should be used in yielding worst case as well as expected or typical health impact estimates. Finally, for non-carcinogens sources and basis for choosing a certain threshold value should be explicitly and clearly stated.

C. Exposure and dose predictions

1. Consideration of all individuals and populations at risk. Exposure estimates need to be developed for construction workers, neighbors, occupants, and site users after construction, children, and others who presently may have access to the site, and non-neighboring communities which may be affected (e.g., exposed population downstream of Alewife Brook, consumers of well water that might be contaminated, recreational users of the ponds impacted, etc.). All possible exposed groups and not exclusively the major ones should be addressed. The rationale for concluding that some potentially exposed groups will not be exposed should be clearly stated and supported.

2. Consideration of all possible routes of exposure, such as ingestion, inhalation, and through dermal contact, need to be quantified. Determinations must be made about the individual factors that affect time spent in each microenvironment by different populations and age groups. Chemical-specific integrated exposure and dose estimates need to be developed using conservative assumptions about bioavailability, lung deposition, retention, and clearance by the target organs, skin absorption rates, among others. An attempt should be made to develop exposure estimates for various population groups, including sensitive individuals such as the elderly, children, and persons with pre-existing health conditions. Both ambient outdoor and indoor exposures to possible contaminants released from the site should be quantified using monitoring data and acceptable modeling methods. In particular, possible pollutant exposures in homes through airborne releases from wet basements should be evaluated.

3. At a minimum, exposure estimates for the following compounds need to be developed; naphthalene, polyaromatic hydrocarbons (PAH) and phthalates (with complete breakdown), acetone, methylene chloride, carbon disulfide, formaldehyde, cyanide, chlorobenzene, ethylbenzene, benzene, toluene, phenol, styrene, N-nitrosodiphenylamine, acenaphthene, 1,1-dichloroethene, 1,1-dichloroethane, tetrachloroethylene, and all heavy metals.
4. Assuming a worst case situation, estimates of doses received by the members of the groups identified before should be determined. The extent that the construction is expected to alter the exposure patterns and dose estimates must be determined. In addition to worst case and "likely to occur" impact scenarios, sensitivity analysis involving each of the key calculation steps need to be performed.

D. Risk Projections

Based on the estimated doses and the potency factors prediction of risk estimates for (1) the maximum exposed individual, and (2) different groups of affected population. Risk projections should be presented for each exposure pathway as well as based on total exposures. Carcinogenic and non-carcinogenic risks including allergic responses and other sensitization effects should be individually treated. Because of inherent uncertainties in each step of the risk calculation, a proper error analysis including formal statistical error propagation methods should be included. The predicted health outcome probabilities should be contrasted with other non-voluntary (preferably environmental) health risks. An evaluation should be made whether

the predicted risks are significant and/or unacceptable, using criteria employed by EPA and other regulatory agencies such as FDA. Finally, risk estimates should also be developed and analysed for alternatives to the project, in particular, construction versus no construction scenarios.

E. Remedial Measures

It is appropriate to consider various alternatives or remedial measures that might minimize the possible health and odor impacts of the site during and after construction. Even if it is concluded that the likelihood of adverse effects is small, it is still advisable to consider certain mitigative measures to address specific health (and welfare) concerns of the public.

IV.4 Mitigating Measures and Other Recommendations

1. The project proponents should provide more extensive documentation confirming that all chemical storage containers and transfer pipes have been removed from the site or appropriately emptied. The continuing, rather high levels of acetone contamination on certain areas of the site is troubling and raises the possibility of continued acetone inputs to these areas, possibly from unidentified leaking transfer pipes or other containers still buried.
2. Contingency plans should be formulated to deal with unexpected developments during construction. Such events might include the discovery of previously unidentified chemical containers, transfer pipes, or pockets of highly contaminated soils. These plans might include

requirements that any such events be promptly reported to DEQE and the City of Cambridge and that construction activities cease until such time as the materials are safely removed and, if necessary, chemically analyzed.

3. Steps to protect workers during construction need to be specified in greater detail. The consultants to the proponents correctly point out that such measures are needed due to the levels of contamination at the site. They indicate that "the Contractor will be required to provide a comprehensive worker health and safety program" for the site. It would appear that sufficient information exists at this time to address this problem in greater depth. It would be desirable that additional details on the nature of any anticipated risks and possible mitigating measures be presented in the final EIR. It should be noted that measures which appear sufficient to protect worker health, for example, respiratory protective devices, often in fact do not provide adequate protection because compliance by employees during actual working conditions may be difficult or impossible. Because of this, we suggest that worker safety requirements include training/educational sessions be provided to workers to inform them of the chemical hazards at the site and to train them in proper use of any suggested safety devices or procedures. The overall worker safety program should be reviewed and approved prior to the start of construction.
4. Excavation work on the site is likely to result in the generation of significant chemical odors, which are likely to be noticeable in the surrounding community. Although this possibility was correctly

identified in the site assessment documents, no mention of this is made in the draft EIR. Although it is likely that such odors will be predominantly due to the naphthalene contamination on-site, other more toxic volatile compounds may also be released, a possibility which needs additional analysis. In any case, chemical odors are likely to be strong enough to be significantly annoying to the surrounding community, and should be minimized to the extent feasible. Measures to achieve this are identified in the draft EIR but should be addressed in more detail in the final EIR. These measures include limiting the amounts of soil excavated at any one time, promptly covering excavated materials, and limiting excavation to periods of favorable weather conditions. To insure compliance, we also suggest that a mechanism be established whereby complaints from the community regarding noxious odors, dust, and other aspects of the site development can be made and officially registered and investigated.

5. Soil treatment and disposal issues need significant clarification. On-site treatment of contaminated soils is proposed with no elaboration of the approaches to be used. Should these treatment processes involve stripping of the volatile compounds from the soil, additional exposures to airborne contaminants will likely occur. This possibility is not addressed. Off-site disposal and on-site use of contaminated materials as fill are also suggested, but no criteria are presented. Also, how soils will be chosen for the various treatment/disposal options mentioned is much less supported. The determination of disposal options should be based on objective criteria such as chemical analyses of appropriate samples of the excavated materials. Maximum allowable

contaminant limits should be developed for the use of contaminated soils on-site. More detailed guidelines for the use of contaminated materials on-site should also be developed. Contaminated soils should be isolated, to the extent feasible, from the open environment as soon as possible after excavation. Stockpiling of contaminated soils, as suggested in the draft EIR, could lead to their mobilization through wind and water erosion. Given the high water table, contaminated soils could easily be placed into the saturated zone. The developer should be required to keep detailed records of how the contaminated excavated soils are treated or of where they are disposed of both off-site and on-site.

6. Groundwater treatment criteria and methods should be specified in greater detail. Sufficient information on the types and concentrations of contaminants in the groundwater of the region to be dewatered is available to allow for a more detailed analysis of the most suitable treatment techniques. Air or surface water discharges resulting from the proposed treatment process should be considered in the risk assessment for the site. For any treatment process, intermittent, random sampling should be done to determine the levels of compounds in air or surface water discharges.
7. Due to groundwater contamination and the high water table, special care must be taken to avoid entry of noxious chemicals into the buildings once constructed. Watersealing of the foundations may not be sufficient (just about everything waterproof that we have ever dealt with has eventually leaked). We recommend that below grade space be isolated as much as possible from higher floors in the buildings. For example, separate

ventilation systems should be installed. Office or other long-term work space should, if possible, not be placed on these belowgrade floors. If workers will be expected to use this space, additional ventilation may ultimately be required.

8. Should the proposed construction be undertaken in stages, where one or more buildings are occupied while excavations are done on the remaining sites, special work procedures may be needed. These might include prohibiting earth moving activities on the site at certain times of the day. Building occupants might also be advised to restrict outdoor activity at the site until construction is completed.
9. Air quality monitoring should be conducted on-site during construction. Measurements should be made in excavation pits as well as outside to monitor the levels of organics that may be toxic to humans. When concentrations are observed to exceed pre-selected "safe" levels, DEQE and the City of Cambridge health officials need to be informed immediately. In addition, appropriate control measures should be taken while those who may be affected are alerted about the situation.

REVIEW OF THE DRAFT ENVIRONMENTAL IMPACT REPORT
FOR THE PROPOSED ALEWIFE CENTER
BY RESEARCHERS FROM HARVARD UNIVERSITY

Is the proposed development safe?

- o Concentration of chemicals found at the site do not indicate immediate health hazards.
- o Need more measurements and additional analysis, to assess:
 - sources and concentrations of hazardous chemicals
 - impacts due to development

What are the limitations?

- o Need exposure - risk assessment
- o Data outside footprint and additional soil-water-sediment samples
- o Need to better characterize
 - ground water movement (flooding conditions)
 - sources of acetone
 - emission rates of volatile organic compounds (VOCs)
- o Need to consider risks from other compounds found

Recommend tasks prior to construction

- o Additional sampling - beyond the footprint area
- o Resolve groundwater flow - assessment of basements-now
- o Refine emission rates & establish a routine monitoring program for VOCs
- o Improve presentation of data
- o Provide comprehensive risk assessment, for:
 - naphthalene
 - polycyclic aromatic hydrocarbons
 - phthalates
 - acetone
 - methylene chloride
 - carbon disulfide
 - formaldehyde
 - cyanide
 - chlorobenzene

- ethylbenzene
- benzene
- toluene
- phenol
- styrene
- N-nitrosodiphenylamine
- acenaphthene
- 1,1-dichloroethene
- 1,1-dichloroethane
- tetrachloroethylene
- heavy metals

Issues associated with the construction and development stage

- o Contingency plans for unexpected releases
- o Protection and training of workers
- o Staged development and impacts on occupants of development
- o Soil treatment and disposal issues
- o Seepage into buildings of groundwater



CITY OF CAMBRIDGE

CAMBRIDGE, MASSACHUSETTS 02139
TEL. 498-9011

EXECUTIVE DEPARTMENT
ROBERT W. HEALY
City Manager

RICHARD C. ROSSI
Deputy City Manager

March 24, 1987

TO: Robert W. Healy
City Manager

FROM: Richard C. Rossi
Deputy City Manager/Acting Commissioner of Public Works

SUBJECT: Status Report - Phase VI and Phase VII - Separation of
Combined Sewerage Systems Program

As part of the City's on-going program to upgrade its sewerage and storm drainage systems, on June 5, 1986 a request was made to the Commonwealth of Massachusetts, Department of Environmental Quality Engineering, Division of Water Pollution Control (DEQE) for State funds to design sewerage and storm drainage system improvements within the Phase VI and Phase VII project areas indicated on the attached plans. On February 3, 1987 the DEQE offered the City and the City accepted a State Grant in the amount of \$913,617 or about 51% of the total estimated design cost of \$1,801,200 for the project.

This will be the largest single project undertaken by the City since initiation of the improvements program in 1971. It is the intent of this project to eliminate combined sewers, cross connections between sanitary sewers and storm drains, and undersized pipelines within the project areas. Completion of construction is expected to reduce localized flooding during storm conditions and periodic backup of sewers. In addition removal of sanitary wastewater from the storm drainage system will reduce polluted overflows to the Charles River and Alewife Brook. As the project progresses periodic neighborhood meetings will be held to allow residents to participate in the project.

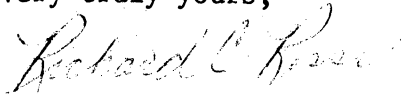
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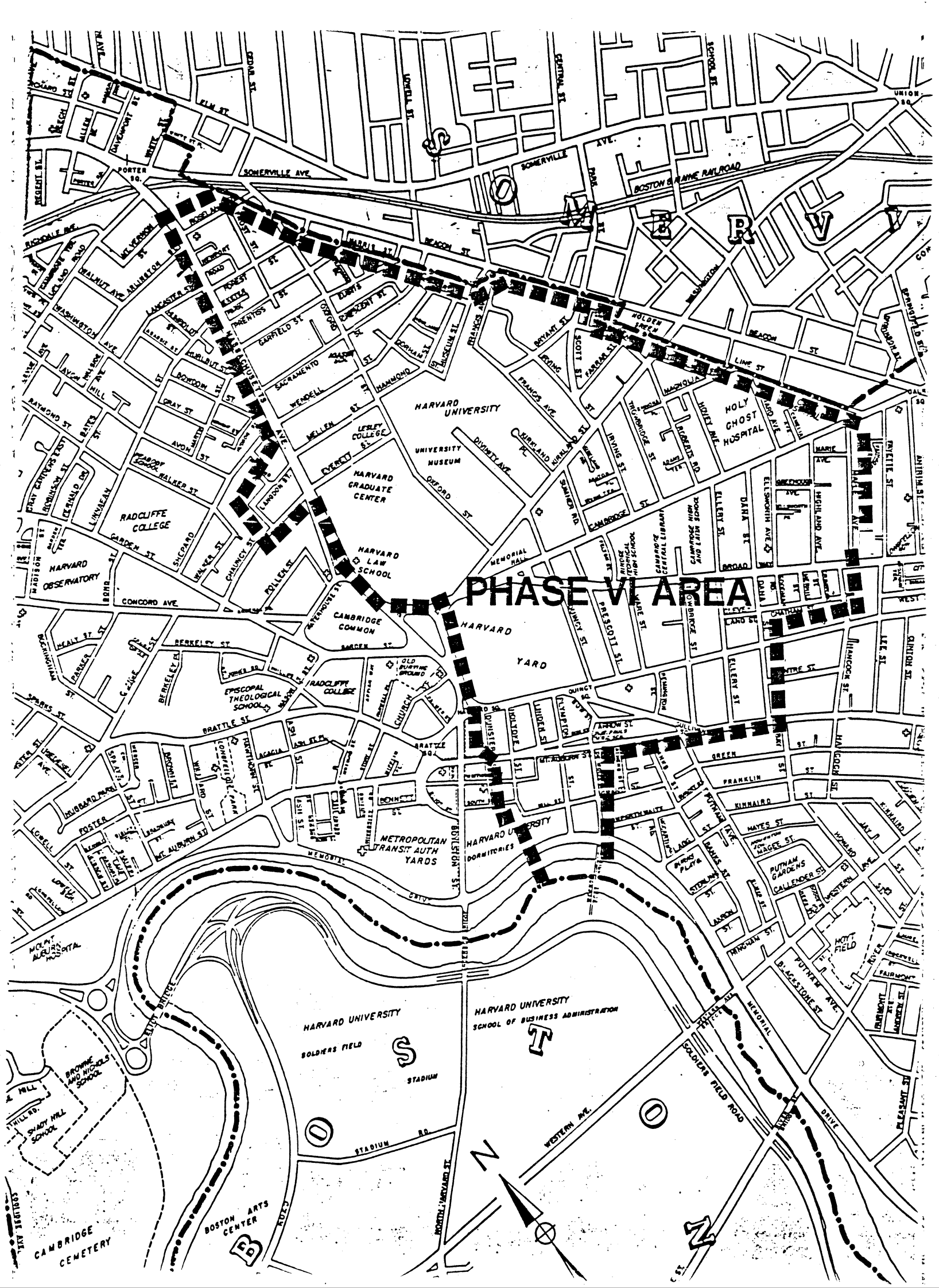
Maps indicating the areas to be covered under phases VI and VII are attached. In addition to the project areas described under Phase VI and VII, the City has instructed the consultants to include a scope of work to alleviate similar problems in the Cherry Street area.

Very truly yours,



Richard C. Rossi
Deputy City Manager/
Acting Commissioner of Public Works

RCR/mbf



PHASE VI AREA

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HARVARD UNIVERSITY
SOLDIERS FIELD
STADIUM

HARVARD UNIVERSITY
SCHOOL OF BUSINESS ADMINISTRATION

CAMBRIDGE
CEMETERY

BOSTON ARTS
CENTER

BROWNE AND
NICHOLS SCHOOL
SHADY MILL
SCHOOL

MOUNT
AUBURN
HOSPITAL

POSTER
SCHOOL

EPISCOPAL
THEOLOGICAL
SCHOOL

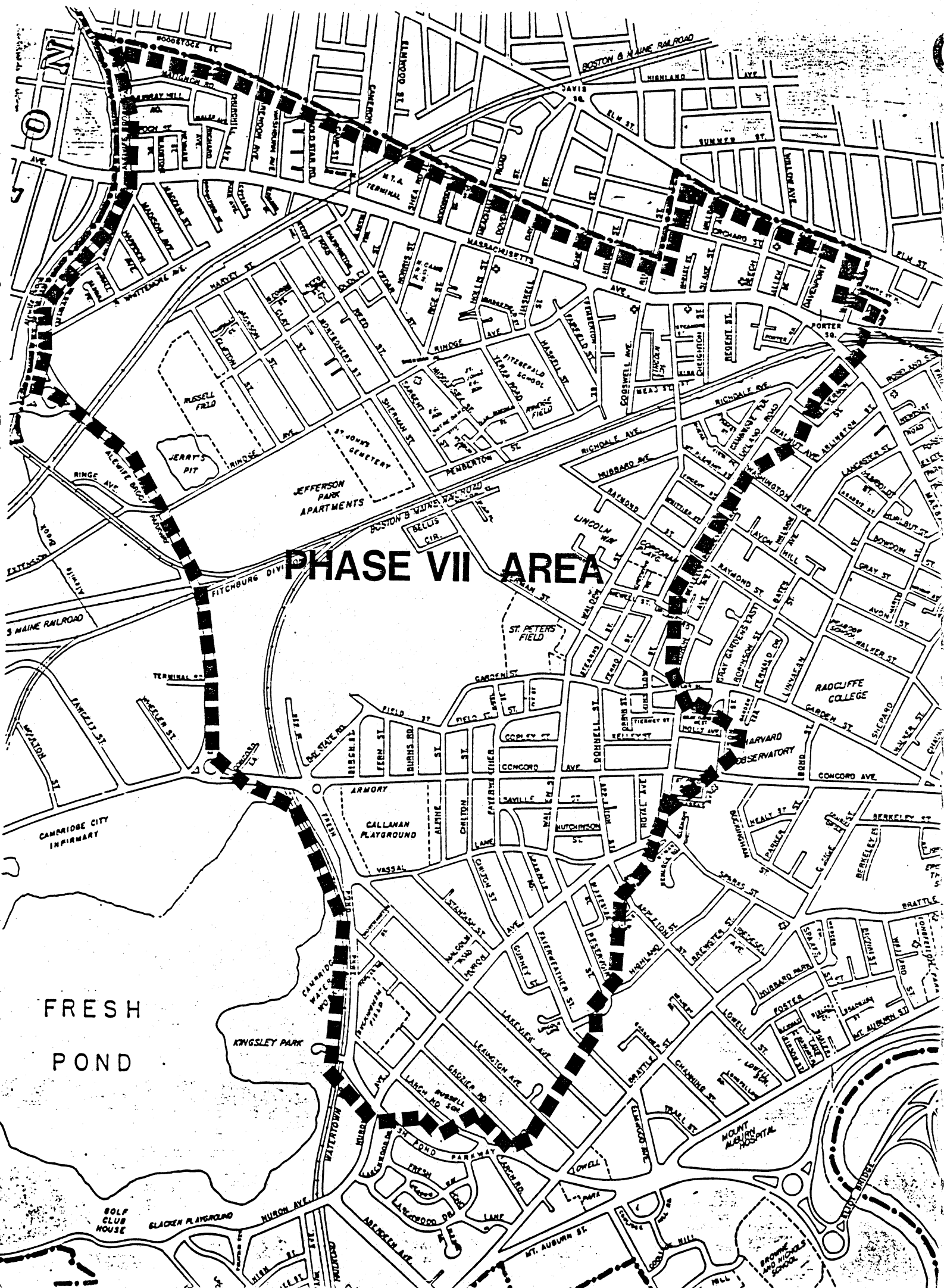
HARVARD
OBSERVATORY

RADCLIFFE
COLLEGE

HARVARD
UNIVERSITY

HARVARD
UNIVERSITY

HARVARD
UNIVERSITY



PHASE VII AREA

FRESH
POND

GOLF CLUB HOUSE
GLACIER PLAYGROUND

KINGSLEY PARK

CALLANAN PLAYGROUND

RADCLIFFE COLLEGE

MOUNT AUGUSTIN HOSPITAL



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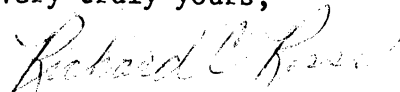
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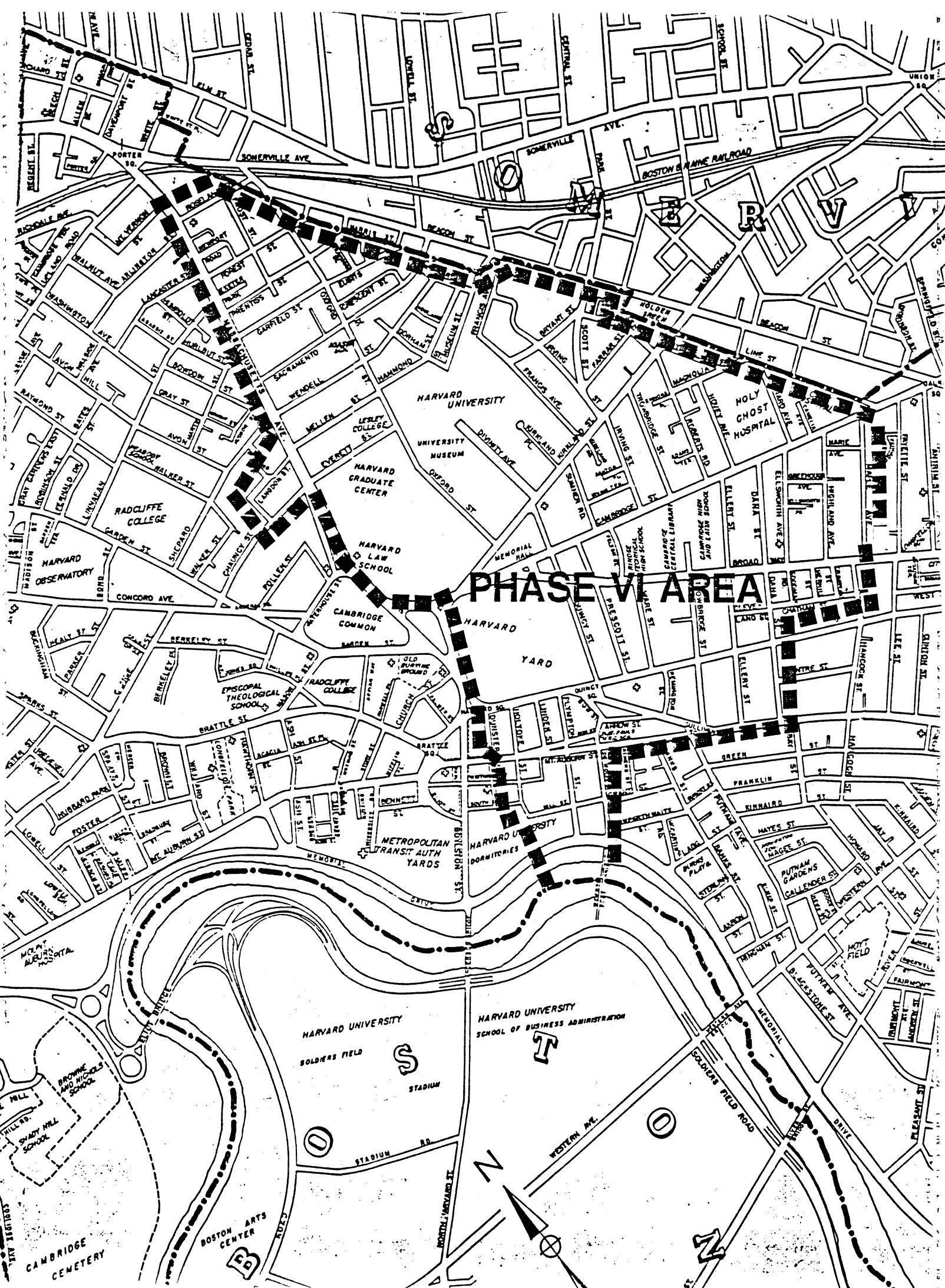
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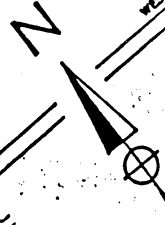


Richard C. Rossi
Deputy City Manager/
Acting Commissioner of Public Works

RCR/mbf



PHASE VI AREA



HARVARD UNIVERSITY
SOLDIERS FIELD
STADIUM

HARVARD UNIVERSITY
SCHOOL OF BUSINESS ADMINISTRATION

CAMBRIDGE
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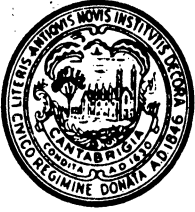
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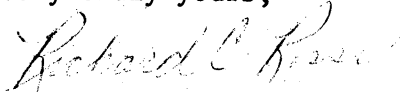
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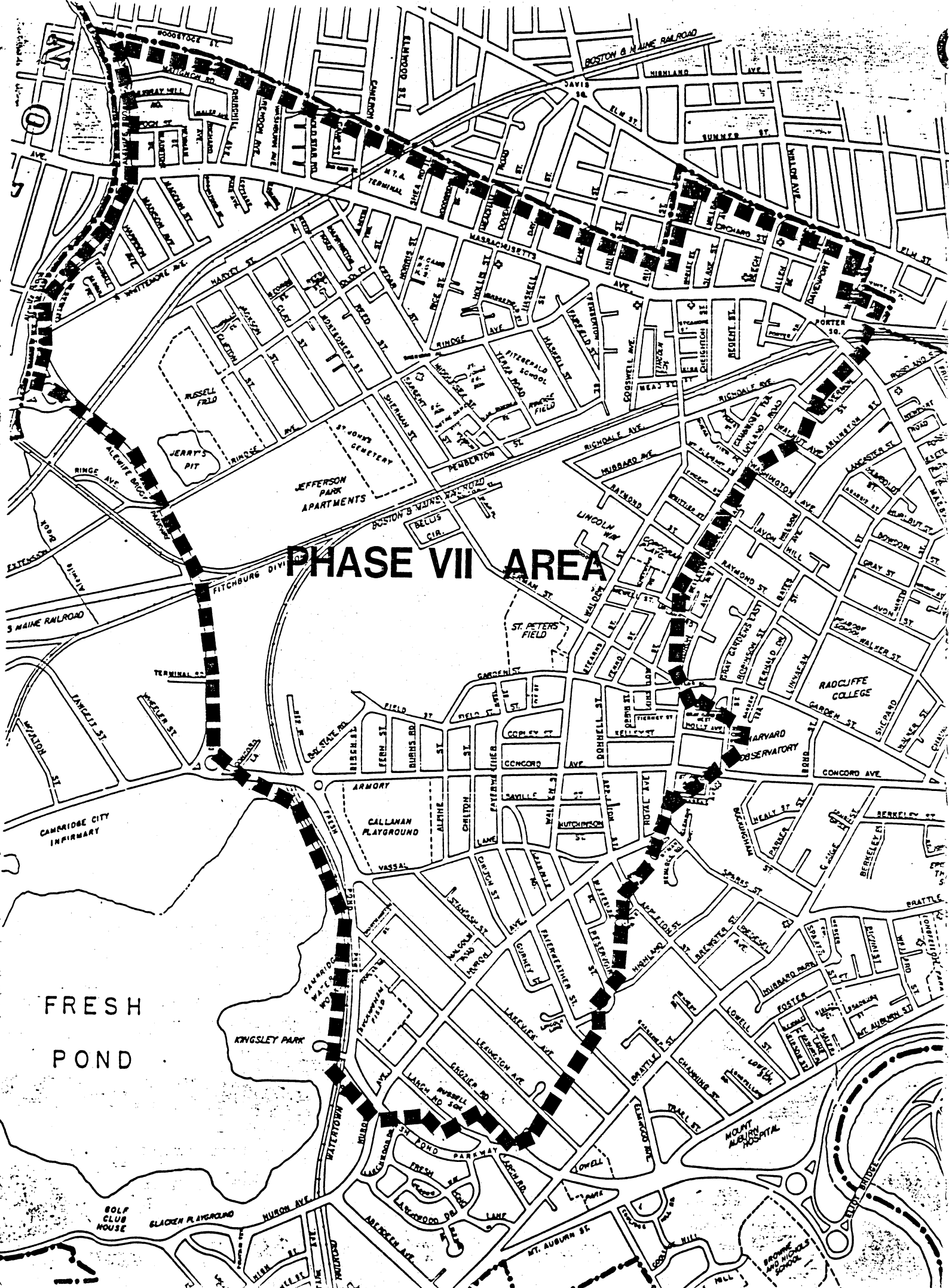
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Richard C. Rossi
Deputy City Manager/
Acting Commissioner of Public Works

RCR/mbf



PHASE VII AREA

FRESH
POND

KINGSLEY PARK

CALLANAN PLAYGROUND

MOUNT AUGUSTIN HOSPITAL

RADCLIFFE COLLEGE

JEFFERSON PARK APARTMENTS

JERRY'S PIT

RUSSELL FIELD

ST. PETER'S FIELD

ARMORY

GOLF CLUB HOUSE

GLACIER PLAYGROUND

ABERDEEN AVE.

MT. AUBURN ST.

CHANNING ST.

BRATTLE

BOSTON & MAINE RAILROAD

S MAINE RAILROAD

FITCHBURG DIVISION

ALLEN ST.

RIDGE AVE.

WATER TOWER

WATER TOWER

WATER TOWER

WATER TOWER

WATER TOWER

WATER TOWER

WATER TOWER

WATER TOWER

City of Cambridge

In City Council..... April 6, 1987

The Environment **Committee** conducted a public hearing on Tuesday, March 24, 1987 beginning at 7:15 p.m. in the cafeteria of the W.R. Grace Company located at 62 Whittemore Avenue.

The purpose of this public hearing was to discuss the review of the Draft Environmental Impact Report (EIR) and related environmental assessment Documents for the proposed Alewife Center Development at the W.R. Grace and Company Property in the City of Cambridge. The Committee also reviewed a status report concerning Phase VI and Phase VII - Separation of Combined Sewerage Systems.

Councillor Alice K. Wolf, chair of the above stated committee convened the hearing at 7:15 p.m. introduced all members present and outlined the agenda for the meeting.

Phase VI and Phase VII - Separation of Combined Sewerage Systems Programs:

At this time, the chair introduced Richard C. Rossi, Deputy City Manager/ Acting Commissioner of Public Works, to update the Committee and the public on the sewerage and storm drainage systems - Phase VI and Phase VII. Mr. Rossi stated that this will be the largest single project undertaken by the City since initiation of the improvements program in 1971. On June 5, 1986, the City made application to the Commonwealth of Massachusetts, Department of Environmental Quality Engineering, Division of Water Pollution Control (DEQE) for State funds to design sewerage and storm drainage system improvements within the Phase VI and Phase VII project areas. On February 3, 1987, the DEQE offered and the City accepted a grant in the amount of \$913,617 or about 51% of the total estimated design cost of \$1,801,200 for the project. (Accompanying this committee report is a map outlining the Phase VI and Phase VII areas). Mr. Rossi further stated that the

REPORT

Committee on Environment

Re: Draft EIR & related environmental assessment documents for the proposed Alewife Center development at the W.R. Grace site & status of Phase VI and Phase VII Separation of Combined Sewerage Systems.

*Copy sent to the City Manager - 4/8/87
(see order adopted within)*

In City Council,

April 6, 1987

**C. WOLF - moved acceptance
of Committee report and
acceptance of Consultant's
recommendation.**

✓✓ 8-0-1-0