
**SECTION 106 – DETERMINATION OF ADVERSE EFFECT RIDGE/CHURCH/DAVIS
TRAFFIC SIGNAL MODIFICATION PROJECT**

I. DESCRIPTION OF UNDERTAKING

The Ridge/Church/Davis Traffic Signal Modification project involves 21 intersections in the City of Evanston along Ridge Avenue and on Church and Davis Streets to the east and west of where they intersect Ridge. Ridge Avenue is a north/south residential arterial. Most of Ridge Avenue lies within the Ridge Avenue Historic District. Church Street and Davis Street are one-way east/west arterials that intersect Ridge Avenue. Both streets pass through residential areas to the west of Ridge and through commercial areas in the downtown Evanston area, to the east of Ridge.

A. Purpose and Need

The City of Evanston has determined that there is a need to improve the traffic flow on Ridge Avenue, Church Street, and Davis Street within the project area by coordinating existing traffic signals. Many of these signals were installed 30 to 40 years ago and are in need of replacement, The signal controllers are obsolete, hardware is rusting, and the underground cables are at the end of their useful life. None of the controllers can be coordinated in their current condition. The signals operate on the same timing plan 24-hours a day, seven days a week. To obtain the most efficient operation, a system which adjusts the timing to the actual traffic volumes is needed. A “closed loop” signal system is one way of accomplishing this.

Ridge Avenue currently has an estimated daily traffic volume of approximately 20,000 cars. During high traffic periods, 7 a.m. to 9 a.m., 11:30 a.m. to 1 p.m., and 4:30 p.m. to 6:30 p.m., traffic often backs up at traffic signals, causing delays and increased air pollution. By interconnecting and synchronizing the signals, the signals can better respond to traffic conditions and these delays can be reduced.

B. History of the Project

In early 2000, the City of Evanston applied for a federal grant under the Congestion Mitigation and Air Quality Improvement Program (“CMAQ”) to provide funds for a “closed loop” signal system project that would include 21 intersections along Ridge Avenue and on Church and Davis Streets to the east and west of where they intersect Ridge. *See Figure 1* for a Project Map.

The project application was approved and the Illinois Department of Transportation (“IDOT”) was designated to administer the grant. Plans and specifications for the project were approved as submitted by the City’s engineering consultant, Metro Transportation, on June 29, 2001. Bids were opened by IDOT, and Home Town Electric, which was the low bidder, was awarded a contract for the project on August 23, 2001.

The total cost of the project is \$1.86 million. The CMAQ program is to fund 80% of this amount, or

\$1.488 million. The City of Evanston is to fund the remaining 20%, or \$372,000.

C. The Current Design of the Project

The project includes coordination and timing optimization at 21 intersections. All of these intersections currently have traffic signals. The existing design of the project is as follows:

- All 21 intersections would be interconnected by fiber optic cable laid in underground conduit, and new controllers would be installed at each intersection that would allow all signals in the project area to be coordinated and synchronized.
- In addition to the coordination of the signals, all 21 intersections would be equipped with emergency vehicle pre-emption detectors, which are activated by Evanston fire trucks and ambulances, as well as by the ambulances of several other local communities which transport to Evanston hospitals.
- Existing post-top signals mounted at the corners of 12 of the intersections would be replaced with mast-arm signals located over the streets. *See Figure 2* for a Drawing of the Proposed Mast-Arm Fixture. *See Figure 3* for a Photograph of the Proposed Mast-Arm Fixture. All of these 12 intersections are on Ridge Avenue and 8 of the 12 are located within the Ridge Historic District.
- The remaining nine signals, which already have mast-arm type signals, would have their control equipment upgraded so that they can be interconnected with the system.

D. Nature of the Current Controversy

Work on the project began in April 2002. When residents along Ridge Avenue inquired about the excavation work on the parkways in front of their homes, they learned that new mast-arm signals were to be installed. While not opposing the City's goal of synchronizing traffic flow and reducing delays on Ridge Avenue, residents expressed concern that the replacement of post-top with mast-arm signals would "commercialize" their residential neighborhood and destroy the historic canopy effect of the trees along Ridge Avenue. These concerns were raised in telephone calls, faxes and emails to aldermen and state and federal representatives, as well as petitions signed by several hundred residents asking that work on the project be stopped.

On May 6, 2002, an overflow crowd attended a regular meeting of the City of Evanston's Planning and Development Committee, at which the project was discussed. City staff made a presentation explaining the rationale and the history of the project, noting that they had been advised by IDOT, the administrator of the grant, that mast-arm signals were required on all projects, like this one, that involve roads over which IDOT has jurisdiction within IDOT's Area 1, which includes Chicago and its suburbs. Staff also reported on a meeting they had held earlier that same day with IDOT and the Illinois Historic Preservation Agency ("IHPA"), at which IHPA was advised for the first time that the project would have an adverse effect on the Ridge Historic District within the meaning of Section 106 of the National Historic Preservation Act. During the public comment portion of the meeting, a large number of Evanston residents spoke in opposition to the plan to install new mast-arm signals. The Planning and Development Committee requested that a special meeting of the Evanston Preservation Commission be held to review and comment on the project. The Committee also recommended that a special meeting of the City Council address the controversy surrounding the project.

On May 9, 2002, IDOT wrote to IHPA, formally advising IHPA that, due to installation of mast-arm

signals, the project “will have an adverse effect on the Ridge Historic District in Evanston.” IDOT proposed to “mitigate” these adverse effects by using “a single horizontal arm” in a bronze tone color (in lieu of aluminum truss-type arms) and by adding ornamental bases. (May 9, 2002 letter from M. Hine to A. Haaker.)

On May 16, 2002, the Evanston Preservation Commission met to consider the project. Once again, an overflow crowd of concerned residents attended. Meeting in open forum, the Commission unanimously voted to oppose the installation of any type of mast-arm signal along Ridge Avenue, citing the project’s failure to satisfy seven of the standards set forth in the Evanston preservation ordinance. The proposed traffic light modernization project as currently designed, does not meet Standard 1, in terms of height as not being visually compatible. The mast arms would stand at the height of the top of peoples’ second floor bedroom windows. The traffic light should not have the proportion and height of a residence. The project does not meet Standard 5, regarding the rhythm of spacing and structures on the street. Because there is a traffic light every two blocks, the size of the fixtures, in such close proximity will adversely affect the area. It does not meet Standard 6, because of the projections (mast-arms) that would not be consistent in scale with other things over the public ways in the area. The way the fixtures read visually is in contradiction to the rest of the flow of the street in the neighborhood. Standard 7, regarding texture was not met. The fixtures are too modern and sleek. Standard 10, regarding scale of structure was not met. The new light fixtures would overshadow everything that is out there in scale, in height, in presence on the street, in how they march down the street as opposed to the current location of existing fixtures. It did not meet Standard 12, regarding distinguishing qualities or character. The structures being proposed are not consistent with the historic character of the street and the surrounding houses. The mast-arm fixtures are so out of character with the neighborhood, the street, the houses on it, that they do, in fact, affect certain qualities of the historic district. Standard 17, regarding signs was not met.

The Commission unanimously voted to have the City halt work on the entire project; explore the feasibility of new wiring and controls, with repair and restoration of existing poles and replacement when necessary; explore alternative funding for such a project. If necessary, and, if the project is approved at other levels, that the Commission be involved in suggesting the type or workmanship and the configuration of whatever project is approved.

On May 20, 2002, the Evanston City Council held a meeting devoted solely to the controversy surrounding the installation of mast-arm traffic signals along Ridge Avenue. Once again, every seat in the Council chamber was filled with concerned residents, a number of whom spoke in opposition to the project. The Council voted to postpone any further construction on the project and directed City staff to seek waivers from IDOT’s requirements (1) that the new signals be mast-arm as opposed to post-top, and (2) that any new post-top signals must be set back at least four feet from the curb.

On May 23, 2002, the City of Evanston wrote IDOT formally requesting waiver of IDOT’s requirement of mast-arm signals and a four-foot setback for new post-top signals. (*See* May 23, 2002 letter from K. Fujihara to N. Magnus.) A week later, on May 30, 2002 IDOT responded in writing rejecting the City’s request. (*See* May 30, 2002 letter from N. Magnus to K. Fujihara.)

On June 3, 2002, the Federal Highway Administration determined that a Section 106 proceeding was required to attempt to mitigate the adverse effects of the project on the Ridge Avenue Historic District. By letters dated June 21, 2002. Three Evanston residents, Congresswoman Schakowsky’s office and the Evanston Historic Preservation Commission were granted consulting party status in the Section 106 proceeding. An initial meeting of all consulting parties, including the Federal Highway Administration, the City of Evanston, IDOT, IHPA, a representative from Congresswoman Jan Schakowsky’s office, two representatives from Evanston’s Historic Preservation Commission and the three community representatives, was held in Evanston on July 1, 2002. At that meeting it was agreed that the City of

Evanston, working in consultation with the Special Consultants, would draft a report pursuant to Section 106 describing the project and its adverse effects on the Ridge Historic District and recommending a plan to mitigate or eliminate those adverse effects.

II. DESCRIPTION OF HISTORIC PROPERTIES AFFECTED BY UNDERTAKING AND THE UNDERTAKING'S EFFECT ON THOSE PROPERTIES

A. Ridge Avenue Historic District

The Ridge Avenue Historic District was added to the National Register of Historic Places in 1983. *Figure 4* shows the boundaries of the district, which runs from Main Street on the south to Church Street on the north. The Application for the Ridge Historic District to be included in the National Registry of Historic Landmarks is presented in its entirety in the Appendix.

Ridge Avenue reflects the historic character of the City of Evanston, and many Evanston citizens consider Ridge Avenue to be the heart and soul of the City. "The Ridge" is distinguished by large homes dating back a century or more, historic streetlights, historic traffic signals and a beautiful tree canopy enveloping the street. This unique canopy dates back to the late 1800's, when the street was planted on both sides with elm trees and Ridge Avenue was first referred to as "the Cathedral of Elms." As early as 1890, Ridge Avenue was designated as a pleasure drive, and funeral corteges and certain other uses deemed inconsistent with a pleasure drive were forbidden.

Although Ridge Avenue was subsequently converted from a two-lane street with parking on both sides to a four-lane street, it retains its original width of only 36 feet. Century-old trees lining both sides of the avenue, as well as recently-restored limestone retaining walls on portions of the west side of the street, prevented widening of the street even before its historic landmark designation in 1983.

The unique character of Ridge Avenue and the Ridge Historic District is the result of the development of the highest land in Evanston -- the so-called "Ridge" along which Ridge Avenue runs -- first by the pioneers and subsequently by families of the professional, merchant, and manufacturing classes. The strong visual impact of residences of generous size and architecturally significant design is enhanced by parkways lined with mature shade trees and gracious ornamental lights designed by Evanston resident Thomas Eddy Tallmadge and installed throughout the city in 1931. The craftsmanship of the buildings in the District and their ornamentation has become more evident over time as houses are restored and painted in ways that highlight their individuality. Of 397 structures and sites in the Evanston Ridge Historic District (excluding secondary structures), 129 are of architectural and/or historic significance, and another 136 contribute to the overall historic character of the district. And, of the 77 single-family homes directly lining Ridge within the project area, 27 have been designated landmarks, and an additional 25 residences are contributing structures within the District.

Although Ridge Avenue south of Main Street is not included within the Ridge Historic District, it nevertheless contains many landmark structures and has many of the attributes associated with the Ridge Historic District. There is a condominium building on the corner of Oakton and Ridge that is a national landmark. Accordingly, City staff, the Evanston Preservation Commission and the Evanston City Council have all expressed the view that the same type of traffic signals should be used for all intersections on Ridge Avenue within the project area, and that whatever is decided for the Ridge Historic District should also apply to Ridge Avenue south of the Historic District.

B. Description of Effects

The City of Evanston's Preservation Commission has concluded that the current design of the project, insofar as it includes mast-arm signals, is fundamentally incompatible with the historic and residential nature of the Ridge Historic District and would seriously undermine the historic preservation of this District in contravention of the National Historic Preservation Act and Evanston's Historic Preservation Ordinance. The Commission's view is shared by Evanston residents both within and outside the District and their elected representatives, both on the City Council, in the Illinois State Legislature, and in Congress.

The adverse effects to the District flow principally from two aspects of the project as currently designed. First, the mast arms themselves, whether they are "quarter" mast arms that extend over one lane of traffic or "half" mast arms that extend over two lanes of traffic, would seriously interrupt the tree canopy that is a key element of the District's unique historic character. Pursuant to IDOT's requirements, the bottom of mast-arm signals must be a minimum of 16-18 feet above the pavement, and typically extend to a height of 20-22 feet above the pavement. Given their mass and their height, they will become a dominant and unsightly visual presence along the street, seriously degrading the aesthetic quality of the District.

Second, installation of mast-arm signals will result in a proliferation of poles and pedestrian signals clustered at each of the affected intersections. This is due to the fact that mast-arm poles, unlike the existing post-top signals, typically are not suitable for pedestrian and cross-street signals, which will have to be separately installed. Thus, under the current design, there will be 64 separate traffic signal posts at the ten intersections along Ridge Avenue within the Historic District, or an average of 6.4 signal posts per intersection. This represents an almost 50% increase over the 44 existing signal posts at these intersections. In addition, 33 of the 64 new signal posts under the current design will be massive, large-diameter posts sufficient to support mast-arms ranging in length from 22 to 44 feet. This proliferation of signal posts, mast-arm poles, and other hardware will likewise become a dominant and unsightly visual presence, further degrading the aesthetic quality and detracting from the natural beauty and historic character of the District.

III. SAFETY CONSIDERATIONS

Although the project was initiated to coordinate and improve traffic flows (and thereby reduce air pollution as contemplated by the CMAQ program), IDOT and the City's traffic engineering staff believe that including new mast-arm signals as part of the project would reduce accidents and improve traffic safety at the intersections in question.

Several traffic studies have concluded that replacement of post-top with mast-arm signals results in a reduction in the number of accidents. Traffic engineers generally believe that this is due to increased visibility of signals located over the roadway, as opposed to the side of the roadway, particularly in wide, multilane streets and highways. Although IDOT has not conducted any studies of the safety of mast-arm signals as compared to post-top signals, in performing cost-benefit analyses of proposed traffic improvements IDOT assumes a 25% reduction in frequency of accidents from installing mast-arm signals. (*See* January 16, 2002 memorandum from B. Dinkheller to R. Meyer re "Benefit/Cost Methodology for Proposed FY 2002 HE Projects.")

The City of Evanston's engineering staff has assembled data concerning two intersections in Evanston that they believe support IDOT's assumption that mast-arm signals reduce accidents. The Asbury-Dempster signal was changed from post-top to mast-arm signals ten years ago. Prior to the change, this

intersection experienced an average of 19.0 accidents per year. After the change, the average number of accidents declined to 9.1 accidents per year, a 52% decrease. However, other improvements were made to this intersection at the same time, including the addition of left-hand turning lanes and turn signals. In an attempt to account for this, staff pulled out all left turn accidents both before and after the change and determined that a 36% reduction was realized. Mast-arm signals were also installed at Ridge and Noyes, north of the project area, and a 40% reduction in accidents occurred.

Nevertheless, the City’s engineering staff acknowledges that post-top signals are a safe and viable form of signalization, and that post-tops meet the criteria set forth in the Federal Highway Administration’s Manual on Uniform Traffic Control Devices (“MUTCD”). Pertinent sections of the MUTCD are included in the Appendix.

The City’s engineering staff has also assembled the following data concerning the average number of accidents per year at 12 intersections affected by the project during the nine-year period from January 1, 1993-December 31, 2001:

Intersection	Accidents Per Year
Ridge-Mulford	7.0
Ridge-Hull	3.3
Ridge-Oakton	11.8
Ridge-Monroe	2.9
Ridge-Main	13.4
Ridge-Greenleaf	11.6
Ridge-Dempster	12.5
Ridge-Lake	13.3
Ridge-Davis	10.3
Ridge-Church	13.3
Asbury-Davis	1.7
Asbury-Church	3.7

Additional information concerning accidents at these intersections derived from accident reports is included in the supplemental report of community residents designated as consulting parties. (*see* discussion, *infra*, at 15.)

Although it does not appear that any of these prior accidents have involved children at school crossings, Ridge Avenue has five intersections included in the City’s Safe Walk Route Plan at which children cross twice a day to get to and from school. Three of these intersections are included in the project area.

IV. DESCRIPTION AND EVALUATION OF ALTERNATIVES

The City, working in consultation with Congresswoman Schakowsky, the Evanston Historic Preservation Commission and community representatives, has considered a number of alternatives with respect to mitigating or eliminating the adverse effects of the project on the Ridge Historic District. These alternatives are examined below. Each was evaluated with regard to historic preservation, safety,

cost, delay in implementation of the project, and tree preservation. The goal of this exercise was to identify those alternatives that would allow the City to achieve the scope and objectives of the project (i.e., reducing traffic delays, improving traffic flows, and minimizing pollution) without compromising safety and while minimizing or eliminating adverse effects on the Ridge Historic District.

A. No Build

Although this alternative would have no impact on the Ridge Historic District or any of the structures or elements that contribute to the historic nature of this National Register of Historic Places neighborhood, it is not acceptable to the City because it fails to meet the scope and objectives of the project, which are to allow coordination of traffic signals in the project area.

B. Replace Wiring and Controls Only

The Preservation Commission unanimously approved this alternative. It would accomplish the goal of timing the lights and controlling the traffic. It would also accomplish the wishes of the public in having the lights, themselves, stay the way they are. Some of the poles have some surface rust that would need to be scraped and painted and there are two or three poles that need total replacement due to severe rusting through. How to control the traffic flow during construction has been cited as a reason this is not acceptable, but during the time the contractors needed to remove the poles to do the work, temporary poles with suspended lights could be erected for the duration of the work. This alternative would have no impact on the Ridge Historic District or any of the structures or elements that contribute to the historic nature of this National Register of Historic Places neighborhood and it would meet the scope and objectives of the project, which are to allow coordination of traffic signals in the project area.

The engineering staff have concluded that the existing poles and heads are not wired for the new controllers. Also, rewiring of the existing heads eliminates the safety of utilizing the larger lenses. If the poles and heads become part of the project, then plans would need to be submitted. IDOT has previously informed the City that this will then require a 4 foot setback which becomes prohibitive due to the tree loss.

C. Post-Top Design

The post-top design alternative would replace the existing post-top signals along Ridge Avenue with new post-top signals and controllers, which would allow interconnection and synchronization with other signals in the project area and thereby accomplish the goals and objectives of the project. It would also eliminate the adverse effects on the Historic District from the installation of new mast-arm signals. (*Figure 5* is a photograph of a post-top signal typically used in Evanston, after which the new post-top signals would be modeled.)

While City engineering staff believe that the current mast-arm design is superior from a safety standpoint, installation of new post-top signals would still result in a significant improvement over the status quo from a safety perspective. Such signals would include larger and more visible 12-inch-diameter signal lights (instead of the existing 8-inch lights), and would be illuminated by brighter and more visible LED fixtures (in lieu of the current incandescent bulbs). In addition, the safety of these signals can be further improved through tree trimming (some of these signals are currently obscured) and by placing warning signs approximately 200 feet before the intersection stating "Signal Ahead." Finally, City staff believes that due to Ridge Avenue's narrow (36-foot) width, post-top signals will have the same visibility as post-top signals on two-lane streets with parking on each side, where post-top

signals are the norm.

Nevertheless, to date IDOT has refused to allow post-top signals on this project. It has maintained that it has a policy of requiring mast-arms for all new signalization projects in its District 1, which includes the Chicago area. (The IDOT representatives who attended the initial Section 106 meeting on July 1, 2002 did not know whether this same policy is followed in any other IDOT districts.) At the July 1 meeting, there was some confusion as to whether this policy has been consistently followed by District 1. For example, the community representatives inquired about the recent reconstruction of Michigan Avenue in Chicago, where post-top signals were used despite the fact that Michigan Avenue is a major arterial highway with seven lanes of traffic, significant bus traffic, and traffic volume exceeding that in the project area.

After a further inquiry by Congresswoman Schakowsky's office on July 16, 2002, IDOT subsequently confirmed in an August 15, 2002 email that even though Michigan Avenue is an IDOT road, at the request of the City of Chicago, IDOT had approved the use of post-top signals at all but one of the intersections along Michigan Avenue from Oak Street south to Congress Parkway. (See July 16, 2002 email from R. Joy to J. Hooker; August 15, 2002 email from J. Hooker to R. Joy.) IDOT has stated that it does not have records sufficient to determine whether it has approved other post-top installations in District 1.

Apart from the need for a variance from IDOT such as that granted to the City of Chicago and possibly others, the principal concern with this alternative is its effect on trees. The effect of new post-top signals on trees, in turn, depends on where the signals are placed -- four feet from the curb or two feet from the curb. Each of these alternatives is described below.

1. Four Feet From Curb

According to IDOT, traffic signals should be placed a minimum of four feet behind the curb. The problem with this alternative is the impact it would have on the tree canopy within the Ridge Historic District. The four-foot setback alternative would require removal of ten trees on Ridge Avenue, one tree on Asbury Street, and six trees on side streets. This alternative would also require major trimming of 33 trees and minor trimming of 43 trees. Major trimming is defined as removing between one quarter or more of a tree's limbs. While it is likely these numbers could be reduced through careful positioning of signals and other steps, this alternative is not favored by the City, Congresswoman Schakowsky or the community representatives because of its adverse effect on the tree canopy within the Ridge Historic District.

In addition, given the narrow parkway along several portions of Ridge, a four-foot setback would put traffic signals in the middle of sidewalks, where they would interfere with and pose a danger to pedestrian traffic, particularly that of handicapped pedestrians.

According to IDOT's "District One Traffic Signal Design Guideline" (page 195), mast-arm signal posts require a six-foot setback from the curb. The current design does not satisfy this IDOT standard, which was apparently waived by IDOT. The City, Congresswoman Schakowsky, and the community representatives believe that IDOT should likewise waive its four-foot setback for post-top signals with respect to this project.

2. Two Feet From Curb

Although IDOT standards require a four-foot setback, Federal standards require that traffic signals be placed a minimum of two feet from the curb. This alternative analyzes the possibility of an IDOT variance to allow the City to use such a two-foot setback to accomplish this project.

This alternative would require removal of only one tree on a side street. It would also require major trimming of 18 trees and minor trimming of 46 trees. Ten of the 18 trees requiring major trimming are on Ridge Avenue.

The two-foot setback would avoid placing signal posts where they would interfere with pedestrian traffic and movement of handicapped pedestrians on the sidewalks. The two-foot setback alternative would also minimize the adverse effects of installing new post-top signals on the Historic District, and is strongly favored by the City, Congresswoman Schakowsky, The Evanston Historic Preservation Commission, and the four community representatives.

In view of IDOT's requirements of a four-foot setback and mast-arm signals, the post-top alternative would require that IDOT either (a) grant an exception to these requirements, or (b) transfer jurisdiction over Ridge Avenue back to the City.

a. Variance

IDOT has approved variances from both of these requirements on other projects within its District 1. Indeed, as to the setback requirement, IDOT has apparently already allowed a variance *on this project*. Thus, IDOT requires a six foot setback for the large poles that hold up mast-arm signals. Yet, that requirement was not followed on the current design of the project. As to post-top signals, Michigan Avenue in the City of Chicago is one highly visible recent project in which IDOT approved post-top signals, even though the lanes traveling in just one direction on Michigan Avenue are wider than all of Ridge Avenue and the volume of traffic on Michigan Avenue is greater than Ridge Avenue. There is no reason why a similar variance should not be approved.

b. Jurisdictional Transfer

A second alternative is for IDOT to jurisdictionally transfer Ridge Avenue to the City of Evanston. IDOT has informed the City that it would approve such a transfer and that if a transfer occurred, it would allow the use of post-top signals, as long as MUTCD requirements were met, and would assist the City in seeking continued CMAQ funding for the project. Indeed, such a transfer of jurisdiction already had been contemplated by the City as soon as the planned and long-overdue resurfacing of Ridge Avenue, including installation of new curbs and a new drainage system, was completed, just as jurisdiction over Green Bay Road in north Evanston was transferred by IDOT to the City after a similar reconstruction project was completed by IDOT a few years ago.

The only issue with respect to this alternative is ensuring IDOT funding since jurisdiction would be transferred before the reconstruction project is completed. The City does not have sufficient local funds to complete this reconstruction work, which is estimated to cost \$4 million. The City has advised IDOT that it would accept a transfer of jurisdiction before the reconstruction project is completed, provided IDOT commits in writing to provide funding for the project within the next five years. IDOT is currently investigating funding for this alternative.

While post-top signals cost significantly less than mast-arm signals, the City engineering staff estimates that the installation of new post-top signals at the nine intersections in question would add \$310,000 to the cost of the project. This is attributable to the costs of engineering redesign, restocking charges, costs for manufactured equipment no longer needed, tree trimming/removal, and engineering construction inspections. This cost could be substantially reduced if the unused mast-arms called for by the current

design are resold or reused in other City signalization projects.

It is estimated that the redesign of the project would take three months, approval two months, and delivery of post-top signals another 2-1/2 months. If this alternative is adopted, this work would begin in the winter of 2002-2003 with installation in the summer of 2003.

The City, Congresswoman Schakowsky, the Evanston Historic Preservation Commission, and the four community members designated as consulting parties strongly support the post-top design alternative. Provided a two-foot setback were approved, replacement of the old signals with new post-top signals would eliminate the adverse effects to the Historic District from mast-arm signals.

D. Alternative Mast-Arm Designs

The current design calls for half-mast arms at the intersections along Ridge Avenue both on Ridge and on the side streets intersecting Ridge. The City has considered two alternatives to this design that would still utilize mast-arms: (1) mast arms only on Ridge, with post-top signals on the side streets where they intersect Ridge; and (2) quarter-mast arms. Each of these alternatives is addressed below.

1. Mast-Arms on Ridge With Post-Tops on Side Streets

This alternative has been approved by IDOT, provided all signal posts are set back four feet from the curb. Of course, the problem with this alternative is that it does not eliminate or reduce the adverse effects of mast-arm signals along Ridge Avenue. The only mitigation it would provide is a limited reduction in the number of traffic signal posts at certain intersections, since the side street traffic signals in some cases could be combined with pedestrian signals on the same posts.

This alternative would require removal of one tree, major trimming of 8 trees, and minor trimming of 19 trees in the Historic District.

The additional cost for this alternative is estimated to be \$210,000. This includes the cost of new post-top signals, ornamental bases, tree trimming, redesign, and restocking. This cost could be reduced if unused mast-arms could be resold or used in other signalization projects.

The City's engineering staff estimates that redesign work associated with this alternative would take two months, approval 1-1/2 months, and delivery of post-tops 2-1/2 months.

2. Quarter-Mast Arm

IDOT has also approved this alternative, in which mast arms would be placed to allow one signal head between the two right-hand lanes and the other along the curb line. The post and arm would be the bronze colored unitube system.

While IDOT and the City engineering staff believe quarter-mast arms are slightly less visible than half-mast arms, they still provide good visibility of the traffic signals to approaching vehicles and protrude into the tree canopy less than the half-mast arm alternative.

There are two alternatives for quarter-mast arms utilizing the unitube design. Alternate A utilizes quarter-mast arms on the main street and post-top signals on the side streets. Alternate B utilizes quarter-mast arms on both the main and side streets.

Alternate A would remove one tree from the project area, with 8 trees needing major trimming and 27 trees needing minor trimming. The additional cost for Alternate A would be \$260,000.

This additional cost would include new post-top signals, ornamental bases, tree trimming, redesign cost, construction inspections, signal maintenance and restocking. Alternate A would require approximately 2-1/2 months for redesign and 1-1/2 months for approvals. It would then require an additional 3 months for delivery of the quarter-mast arms and post-top signals.

Alternate B would not remove any trees from the project area, with 5 trees needing major trimming and 18 trees needing minor trimming. The additional cost for Alternate B would be \$100,000 for ornamental bases and some restocking costs. Alternate B would require approximately 1-1/2 months for redesign and 1 month for approvals. It would then require an additional 3 months for the quarter-mast arm delivery.

3. Quarter-Mast Arm With Decorative Post

This alternative is the same as the Quarter-Mast Arm alternative, except the mast-arm posts would be patterned after the ones used for the existing street lights. All pedestrian crossing signals would also have the same posts. *See Figure 6* for a drawing of an existing street light. *Figure 7* is a photograph of an existing street light. The signals would be painted the same dark green as the street lights.

This alternative would give the mast arms a more historic look. However, it would still interrupt the tree canopy within the Historic District.

The additional cost for this alternative is \$450,000. This additional cost is for the ornamental signal posts, ornamental pedestrian signals, tree trimming, redesign cost and restocking charges.

This alternative would require the same time periods as regular quarter-mast arms. However, the time period for fabrication would increase from 3 to 4 months.

* * *

While each of the foregoing mast-arm designs would result in some improvement over the current mast-arm design, they do not eliminate or reduce the adverse effects of mast-arm signals on the Ridge Historic District. Whether the mast-arms are half- or quarter-mast, or have decorative posts or bases, they will still seriously interrupt the tree canopy that is a key element of the District's historic character. They would still become a dominant and unsightly visual presence along the street, seriously degrading the aesthetic quality of the District. And, they would still result in an increase in the number of signal posts and signals clustered at each of the affected intersections.

D. SUMMARY OF RECOMMENDED ALTERNATIVES

The alternative recommended by the City, Congresswoman Schakowsky, the Evanston Historical Preservation Commission, and the four community representatives is post-top signals with a two foot setback. The City believes that, with the proper design, this alternative is a safe choice that meets all of the original objectives of the project.

As discussed above, this alternative would require that IDOT either allow a variance from its policies requiring mast-arms and a four foot setback or jurisdictional transfer over Ridge Avenue to the City of Evanston. The City is willing to accept such a transfer provided IDOT agrees to provide funding for the resurfacing of Ridge Avenue during the next five years.

V. DESCRIPTION OF MITIGATION MEASURES

The recommended alternative of post-top traffic signals with a two-foot setback does not require mitigation from an historic preservation viewpoint. The removal/trimming of trees is of minor concern and will be further studied during the design process. Alternate pole locations will be thoroughly investigated. The trees will be trimmed for full visibility of signals from the proper stopping distance and signage will be used to warn motorists of up-coming signals. It is felt that through these steps any safety concerns can be fully addressed.

Quarter-mast arms utilizing bronze colored unitube construction would help to mitigate the adverse effects of the industrial-type silver colored mast-arms normally seen on state highways. Such bronze colored posts and arms would more naturally blend into the tree canopy and aid in mitigation. However, reducing the length and changing the color of the mast-arms would not eliminate the adverse effects to the Ridge Historic District of replacing the historic post-top signals with mast-arms.

Quarter-mast arms with decorative posts identical to the historic lamp posts currently used in Evanston would further reduce, but not eliminate, the adverse effects of mast-arm signals.

VI. SUPPLEMENTAL STATEMENT OF COMMUNITY REPRESENTATIVES

We largely concur with the recommendations in the foregoing report prepared by City staff, and we appreciate the willingness of City staff to consider our views in making their recommendations. We write to address two issues where we either disagree with staff's conclusions or believe that important information was omitted from their report: (1) the relative safety of post-top and mast-arm signals as applied to Ridge Avenue; and (2) the frequency of accidents on Ridge Avenue and the absence of data suggesting that lack of traffic signal visibility caused or contributed to those accidents.

A. The Relative Safety of Post-Top and Mast-Arm Signals

While we do not dispute that mast-arm signals appear to be safer than post-top signals in certain applications, we do dispute that they would be safer in the specific context of Ridge Avenue. This is due in part to the narrow width of Ridge, which, at 36 feet, is no wider than many two-lane streets with parking, where post-top signals are the accepted norm. In the case of Ridge, unlike the wide, multiple lane state roads and major highways where mast-arm signals are typically used, post-top signals are in motorists' direct line of forward vision; they are not several yards to the side of the motorist, where visibility may be an issue. City staff and IDOT have not cited (and we cannot find) any study that concludes that mast-arm signals are safer than post-tops in this type of setting.

The studies that the City's engineering staff and IDOT cite in which mast-arm signals were found to reduce the number of accidents appear to have involved major intersections in commercial, industrial, or rural areas -- not narrow streets in residential areas with significant pedestrian traffic, like Ridge. These studies do not focus on, or even separately break out, accidents involving pedestrians. We are concerned that with a street like Ridge that runs through an exclusively residential area with significant pedestrian traffic, mast-arm signals, which focus the driver's attention on a signal 18-20 feet above the middle of the street, might actually cause an increase in pedestrian accidents as compared to post-top signals, which force a driver to focus at the height and location on the side of the streets where pedestrians are likely to be located.

In our discussions on this issue, the City's engineering staff has principally relied on (1) a March 2001 report written by Iowa State University and sponsored by the Iowa Department of Transportation

entitled, "Effectiveness of Roadway Safety Improvements," and (2) an October 1991 article in the ITE Journal entitled, "Impact of Mast-Mounted Signal Heads on Accident Reduction."^[1]

Of these sources, by far the most comprehensive is the 2001 Iowa State study, which examined the effects of seven types of highway modifications, including replacing post-top with mast-arm signals, at 94 Iowa intersections. It concluded that installing mast-arm signals resulted in a 29-36% overall reduction in the number of accidents (although there was a 34% increase in left-turn collisions). However, at least 53, or 56%, of these 94 intersections were on Interstate ramps, U.S. highways, or numbered Iowa state highways. We also spoke with one of the principal investigators who confirmed that this study covered intersections on major highways and thoroughfares and, to his knowledge, did not include any intersections on narrow streets in strictly residential areas, like Ridge Avenue.

The October 1991 ITE Journal article reported on the replacement of post-top with mast-arm signals and the addition of one second all-red intervals at five intersections in Kansas City, Missouri in 1989. The total number of accidents was reduced at three intersections, showed no change at a fourth intersection, and increased at a fifth intersection. Overall, there was a 25% reduction, although, once again, left-turn collisions increased by 35%. The study was not able to determine the effect of the addition of mast-arms as opposed to one-second all-red intervals on these results. More importantly, this study was likewise confined to wide, multi-lane highways (a minimum of two lanes, and in most cases three or four lanes in each direction). Thus, the article concluded that "installing mast-mounted signals *on wide streets* and installing all-red intervals . . . reduces the number of accidents at intersections." The article noted that this condition was consistent with the prevailing view "that, *on wide streets*, replacing post-mounted signal heads with mast mounted signal heads results in a reduction in accidents."

The City's engineering staff also cites the decline in the number of accidents at the intersection of Asbury and Dempster after mast-arm signals were installed ten years ago. However, as staff concedes, these results are confounded by other changes that were made at the same time, including the addition of left-turn lanes and signals. Staff attempted to roughly account for these other changes by pulling out all left-turn accidents, but the addition of left-turn lanes and signals likely reduced more than simply left-turn accidents; they also likely reduced the number of rear-end, side-swipe, and other types of accidents.

B. The Frequency of Accidents on Ridge Avenue

The City's engineering staff also cites the frequency of accidents at the various intersections in question on Ridge Avenue. However, they omit any analysis of the causes of these accidents or the relative frequency of accidents at these intersections as compared to other, comparable intersections with mast-arm signals.

Table 1 is an analysis of accident reports for the nine-year period January 1, 1993-December 31, 2001 for each intersection on Ridge Avenue within the project area, both those with traffic signals and those without. It shows the number of accidents broken down into the eight categories that the City uses in its accident reports -- side swipe-opposite, side swipe-same, right angle, rear end, fixed object, unknown, head on, and no collision. Of these eight categories, only one appears to be potentially related in any meaningful way to the visibility of traffic signals -- right angle. (In most cases, side swipes, rear end, fixed object, and head on collisions would not appear to be the result of a failure to see a traffic signal.) But as to that category, accidents were actually less prevalent on a percentage basis at intersections with traffic signals (41% of total accidents) than they were at intersections without traffic signals (67% of total accidents). More importantly, there is no way to determine in which of these right angle collisions, if any, visibility of the signal was a factor. What we can say is that signal visibility does not appear to be even a potential factor in at least 60% of the accidents at these intersections.

The Staff's Report also fails to put the number of accidents at intersections on Ridge Avenue into context, by comparing them to the number of accidents at (1) other intersections on Ridge without signals, and (2) intersections on other streets with comparable or less traffic volume and mast-arm signals.

Table 1 shows that more than twice as many accidents occurred at the intersections on Ridge with signals, which staff reports, than intersections on Ridge without signals, which are omitted from Staff's report -- 701 at the ten intersections within the project area with signals (an average of 10 accidents per intersection per year) vs. 439 at the eleven intersections within the project area without signals (an average of 4.4 accidents per year).

We have also obtained information concerning the number of accidents at the intersection of Dempster and Dodge, where mast-arm signals were installed in 1986, and compared them to the intersection at Dempster and Ridge, which had post-top signals throughout this period and an equal if not greater volume of traffic. There were twice as many accidents during the 1993-2001 period at the Dempster/Dodge intersection (226), which had mast-arm signals, than at Dempster-Ridge (113), which had post-top signals throughout that period.

In sum, neither the studies that have been cited nor the data concerning accidents on Ridge Avenue support the City staff's and IDOT's assumption that mast-arm signals would reduce the number of accidents on Ridge Avenue. To the contrary, a careful review shows that both the studies and the data, as well as common sense, suggest that visibility of post-top signals is not a problem with respect to streets like Ridge, where post-top signals appear at every other intersection like a string of pearls directly in the motorist's forward line of vision.

In any event, we agree with Staff's conclusion that the installation of new post-top signals on Ridge Avenue will result in an improvement over the status quo from a safety standpoint. Such signals would include larger, more visible 12-inch-diameter signal lights (instead of the current 8-inch lights), and brighter LED fixtures (instead of the current incandescent bulbs). Finally, the safety of these signals will be further enhanced through tree trimming and the placement of warning signs 200 feet before each intersection stating "Signal Ahead."

Table 1**Ridge Avenue Accident Evaluation By Type
Nine Years (1/1/93 - 12/31/01)**

Accident Key
SSO=side swipe-opposite
SSS=side swipe-same
RA=right angle
RE=rear end
FO=fixed object
UN=unknown
HO=head on
NC=no collision

INTERSECTIONS WITH TRAFFIC SIGNALS									
Intersection	Total	SSO	SSS	RA	RE	FO	UN	HO	NC
Mulford	63	2	11	24	21	4	1	0	0
Hull	30	1	4	8	15	0	1	1	0
Oakton	105	4	17	16	59	5	3	1	0
Monroe	26	0	4	12	7	1	2	0	0
Main	121	2	11	36	63	4	4	1	0
Greenleaf	110	2	6	62	19	2	14	5	0
Dempster	113	5	13	46	45	1	3	0	0
Lake	120	3	15	58	28	2	8	6	0
Davis	93	3	15	45	22	1	5	1	1
Church	120	3	17	63	26	2	6	3	0
TOTAL	901	25	113	370	305	22	47	18	1
% OF TOTAL		2.77%	12.54%	41.07%	33.85%	2.44%	5.22%	2.00%	0.11%

INTERSECTIONS WITH NO TRAFFIC SIGNALS									
Intersection	Total	SSO	SSS	RA	RE	FO	UN	HO	NC
Austin	40	2	6	19	12	0	1	0	0
South Blvd.	20	1	4	10	5	0	0	0	0
Seward	8	0	2	3	3	0	0	0	0
Reba Place	5	0	0	3	1	1	0	0	0
Cleveland	6	0	1	4	1	0	0	0	0
Madison	43	1	5	26	8	1	1	1	0
Washington	29	0	3	13	12	0	0	0	0
Lee	28	0	0	21	5	0	1	1	0
Crain	39	0	3	25	5	0	3	3	0
Greenwood	109	0	10	91	3	2	3	0	0
Grove	112	1	10	79	12	1	7	2	0
TOTAL	439	5	44	294	67	5	16	7	0
% OF TOTAL		1.14%	10.02%	66.97%	15.26%	1.14%	3.64%	1.59%	0.00%

Figure 5
Comparison of Proposed and Existing Traffic Signals on Ridge Avenue

<u>Intersection</u>	<u>Proposed</u>	<u>Total Posts Proposed</u>	<u>Existing Posts</u>	<u>Increase</u>
Mulford/Ridge	30 ft. Mast - 1 28 ft. Mast - 1 18 ft. Post - 1 14 ft. Post - 2	5	4	1
Hull/Ridge	30 ft. Mast - 1 28 ft. Mast - 1 18 ft. Post - 1 14 ft. Post - 3	6	4	2
Oakton/Ridge	44 ft. Mast - 1 32 ft. Mast - 1 30 ft. Mast - 1 26 ft. Mast - 1 14 ft. Post - 3	7	8	-1
Monroe/Ridge	34 ft. Mast - 1 30 ft. Mast - 1 28 ft. Mast - 1 14 ft. Post - 2 10 ft. Post - 1	6	4	2
Main/Ridge	34 ft. Mast - 2 30 ft. Mast - 1 28 ft. Mast - 1 14 ft. Post - 1	5	4	1
Greenleaf/Ridge	36 ft. Mast - 1 28 ft. Mast - 2 24 ft. Mast - 1 14 ft. Post - 3	7	4	3
Dempster/Ridge	34 ft. Mast - 1 32 ft. Mast - 2 30 ft. Mast - 1 14 ft. Post - 3	7	4	3
Lake/Ridge	32 ft. Mast - 3 28 ft. Mast - 1 14 ft. Post - 4	8	4	4
Davis/Ridge	44 ft. Mast - 1 34 ft. Mast - 1 32 ft. Mast - 1 14 ft. Post - 2	5	4	1
Church/Ridge	38 ft. Mast - 1 36 ft. Mast - 1 22 ft. Mast - 1 14 ft. Post - 2 10 ft. Post - 1	6	4	2
Total Posts		64	44	20

^[1] Relevant excerpts from these publications are included in the Appendix. City staff have also cited two additional sources. The first, an article in the October 1991 ITE Journal entitled “Comprehensive Safety Program Produces Dramatic Results,” involved 65 safety improvement projects, only one of which involved installing mast-arm signals, at one intersection. It includes no analysis and it is not clear what type of intersection, road or area was involved. The second is a one-paragraph excerpt from a manual entitled Traffic Safety Toolbox. Although it cites a reduction of accidents when mast-arms were added in addition to the existing post-tops in Atlanta at certain unspecified intersection(s), this paragraph likewise does not include any analysis or disclose how many intersections were involved or in what type of setting.

^[2] Staff also cites a reduction of accidents at the intersection of Ridge and Noyes, although the basis for this calculation has not been explained and the underlying data has not been provided.