City of Portland
Stevens Avenue Traffic Calming Report
Final Monitoring Report

May 1998

Prepared for:

City of Portland

Prepared by:

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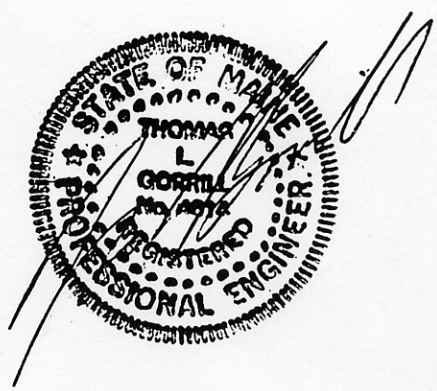

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I. EXECUTIVE SUMMARY

Project Background

DeLuca-Hoffman Associates, Inc. was retained by the City of Portland to monitor the traffic calming measures on Stevens Avenue which were installed in October 1997 between Forest Avenue and Brighton Avenue. The project was initiated in 1993 by the City of Portland at the request of neighborhood residents who were concerned about pedestrian safety on Stevens Avenue. This concern was highlighted on January 7, 1992 when a crossing guard in a crosswalk was struck by a vehicle which failed to yield.

Stevens Avenue passes through a densely developed residential neighborhood which includes numerous public and private schools, accommodating approximately 2,500 students, an elderly housing complex, churches, and a local central business district. These users place upon Stevens Avenue a considerable vehicular and pedestrian demand which is compounded by the presence of cross-town through traffic.

Stevens Avenue is classified as a minor arterial roadway and varies from 40 to 48 feet in width. Stevens Avenue carries a designation as State Route 9 from Congress Street to Walton Street. The posted speed is 30 mph with a reduction to 15 mph in three school zones marked by overhead signs with flashers.

Description of Traffic Calming Measures Installed

The initial data collection program was developed and completed in 1993 to quantify concerns expressed by community representatives. A comprehensive data base which included vehicular, bicycle and pedestrian volumes was developed to establish the actual demands upon Stevens Avenue. Additional types of data were collected in response to expressed concerns. Once the concerns were verified by data collection and observations, the consultant team worked with the community, City Staff and an advisory committee to develop a mitigation plan. This mitigation plan consisted of several measures implemented along Stevens Avenue so that their effectiveness can be evaluated prior to committing to more expensive permanent construction. Temporary construction was to consist of bituminous curb placed on existing pavement with island areas filled and paved. Measures which were to be implemented temporarily and monitored were generally as follows:

- Stripe bike lane from Forest Avenue to Pleasant Avenue
- Entrance treatment at Forest Avenue
- Medians between Forest Avenue and Poland Street
- Roadway weaving along Evergreen Cemetery
- Neck-downs from Clinton Street to Orkney Street at the following locations:
  - Both corners of Clinton Street
  - Both corners of Brentwood Street
  - Both sides of Stevens Avenue from Pleasant Avenue to the north end of Longfellow School
  - Five crosswalks from Longfellow School to south of Orkney Street
- Raised intersection at Pleasant Avenue
- One textured crosswalk at Longfellow Elementary School

Construction of these temporary improvements began in July 1997 and immediately raised significant concern in the neighborhood. After two public meetings during which little support was expressed for the project and significant opposition centered in large part on the neck-downs, medians and roadway weaving, the City Council stopped construction on the project and directed the Public Safety Committee to work with the consultant to develop a revised plan which would have less impact on the roadway. A revised plan was developed by the Committee and included the following measures:

- 8-inch edge of travelway stripe 8 feet off the curb line on both sides of the roadway. This clearly delineated the travelway and resulted in a 28-foot travelway (one 14-foot lane in each direction of travel) along the corridor
- Raised crosswalk north of Orkney Street
- Flush crosswalk with thermoplastic marking north of Tremont Street
- Raised crosswalk south of Concord Street
- Raised intersection at Pleasant Avenue and Stevens Avenue
- Flush crosswalk with thermoplastic marking north of Hartley Street
- Raised crosswalk south of Percival Street
- Speed table at Evergreen Cemetery
- Installation of a traffic signal at the intersection of Walton Street and Stevens Avenue
- Installation of electronic signs advising motorists to stop for pedestrians in crosswalks
- Installation of a speed table north of College Street (Actually installed south of College due to neighborhood concerns)

The measures were approved by the City Council following a public hearing in August and were installed in the fall with construction fully completed in early November. Reduced plans illustrating these measures are contained in Appendix B.

This report presents the results of the monitoring program which was reflective of the initial data collection effort prior to the implementation of the temporary improvements. Data was collected by DeLuca-Hoffman Associates, Inc. primarily during the week of May 4, 1998. A summary of the concerns initially expressed by some neighborhood residents to the City Council and the effect of the traffic calming project in addressing these concerns is summarized below.

- **"Vehicle speeds are high":**

  Findings

  The posted speed along the entire length of Stevens Avenue is 30 miles per hour except during arrival and departure times from schools, when it is 15 mph. Speed data was obtained in pairs at four locations along Stevens Avenue with the following results:

- The average speed traveled by all vehicles in front of Deering High prior to the project was approximately 35 mph including school zone flasher "on" periods. This has been reduced to 21 mph, a reduction of 14 mph.
- In the school zone speed of 15 miles per hour in front of Deering High, the average speed was approximately 27 mph prior to the project. The average speed obtained in May 1998 was 17 mph.

- **"Drivers fail to yield to pedestrians":**

  Findings

  Pedestrian conflict evaluation and delay studies were performed along Stevens Avenue and observations were made during the data collection to evaluate driver behavior in the presence of pedestrians. These studies/observations showed the following:

  - Prior to the project, the average delay for a pedestrian to cross Stevens Avenue at uncontrolled (no signal or crossing guard) locations was 6.5 seconds with one direction of traffic yielding in most cases. The results of the May 1998 study showed an average delay of 1.4 seconds.
  - Prior to the project approximately 20% of all crossings involved a conflict where the pedestrian ran to cross or a vehicle braked abruptly to yield to a crossing pedestrian. The results of the May 1998 study showed approximately 5% of crossings involved a conflict.
  - Prior to the project, testing and observation by staff showed a general unwillingness on the part of drivers to yield to pedestrians. Observations by the same staff and the crossing guards showed that drivers are generally now yielding to pedestrians.

- **"Pedestrians do not use crosswalks":**

  Findings

  Figure 1 of Appendix A shows the peak hour counts including crosswalk locations. Data for these peak hours revealed that:

  - 44% of all crossings on Stevens Avenue from Ludlow to Pleasant Street occurred outside of marked crosswalks prior to the project. Following the project 16% of the crossings between Ludlow Street and Pleasant Avenue occurred outside the marked crosswalks.

- **"Bicyclist do not observe rules-of-the-road":**

  Findings

  The following observations were made during the traffic counts in 1993 prior to the project:

  - Bicyclists use both the roadway and pedestrian areas (sidewalks and crosswalks)

- Some bicyclists failed to observe the rules-of-the-road (riding on the wrong side of the road).
- Parking on both sides of Stevens Avenue makes bicycling difficult.
- There is no bicycle lane or signage on Stevens Avenue.

Following the project, all of the same observations were made with the bicyclists' behavior primarily unchanged.

- **"Through traffic volumes on Stevens Avenue are a major contribution to problems":**

Findings

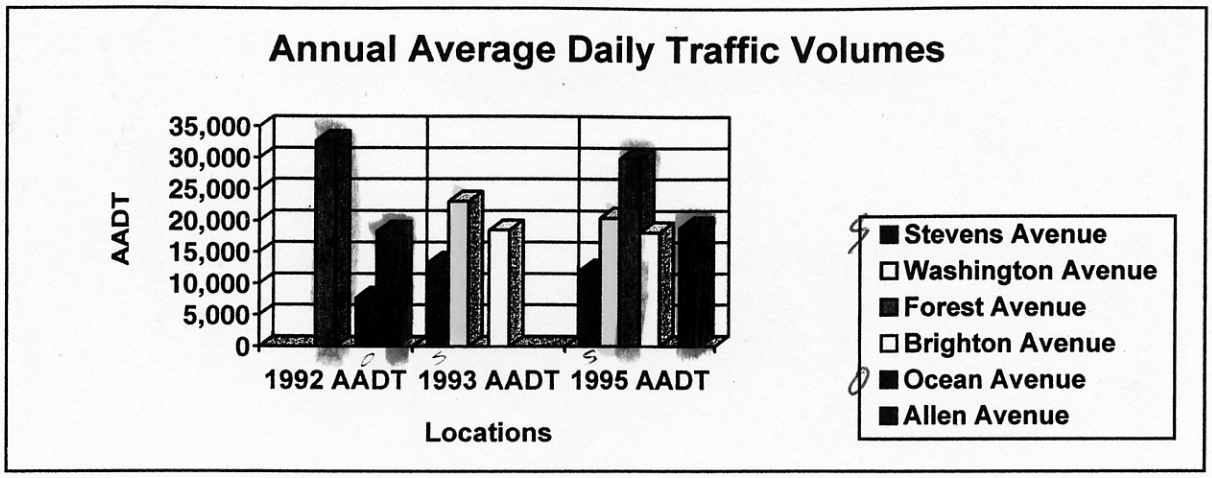
A license plate study was conducted along Stevens Avenue to determine the percent through traffic during peak pedestrian times and accident reports were studied with the following results:

- Approximately 20% of northbound traffic was through vehicles prior to the project. Following the project approximately 13% of the northbound traffic was through vehicles.
- Approximately 35% of southbound traffic was through vehicles between Walton and Woodfords Streets. Following the project, approximately 20% of the southbound traffic was through traffic.
- In the 5 months following the installation of the traffic calming project, there were 5 accidents reported from Woodfords Street to Brentwood Street. This yields an accident rate of 1 accident per month. Prior to the project there were 39 accidents in this same area in 4 years. This yields an accident rate of 0.65 accidents per month. None of the 5 accidents appeared to be related in any way to the traffic calming measures.

- **"How do Stevens Avenue existing traffic volumes and growth compare with other city streets?":**

Findings

MDOT data was researched and counts were conducted to obtain comparative annual average daily traffic (AADT) volumes as shown in Figure 3 of Appendix A. The AADT for Stevens Avenue and other City streets is as follows:



As the above bar chart indicates, there appears to be a trend of decreasing AADT from 1992 and 1993 to 1995. Allen Avenue is the only one that increased with four locations decreasing. The sixth location, Ocean Avenue, did not have available 1995 data.

- Was traffic diverted to other streets as a result of the project?

  Based on a review of the pre and post project AADTs, the volume of traffic on Stevens Avenue has decreased approximately 10% to 17% since the 1993 study. However, the side street AADTs show little to no increase which indicates that traffic did not divert to these streets from Stevens Avenue. This may indicate that the total decrease in AADT on Stevens Avenue is not entirely due to diverted traffic or that diverted traffic is finding alternate routes other than the immediate side streets.

- How was the air quality affected by the project?

  Based on the air quality analysis, it appears the traffic calming measures generated no significant improvement in air quality.

- Was the number of accidents reduced after implementation of the project?

  As indicated previously the accident rate per month has increased from 0.65 to a 1.0. However, 5 months is not an adequate time span to calculate an accident rate and data for a minimum of 12 to 36 months is generally preferred. A review of the 5 accidents does indicate that none were related to the new traffic calming measures. DeLuca-Hoffman Associates, Inc. recommends ongoing review of accidents within the study area to address any issues as they arise.

- How will emergency vehicles be affected by the project?

  City staff and DeLuca-Hoffman Associates, Inc. staff interviewed Chief Thomas of the Fire Department regarding the effect of the project on emergency response time. Chief Thomas stated his personnel are avoiding Stevens Avenue when possible. However, he also stated that he could not document that the delay after the installation had increased over that experienced previously due to traffic congestion prior to the project. The Fire Department also completed tests which showed speeds above 20 mph are too rough on both equipment and personnel. This study is included in Appendix C. A letter from the Police Department is included in Appendix D.

- What will be the effect of the project on the safety of school children?

  Interviews were completed with the crossing guards who said that based on their observations traffic has slowed down and is now more likely to yield to pedestrians. A letter from the School Department is included in Appendix E.

- What will be the effect of the project on maintenance and winter plowing?

  Bruce Bell of the Public Works Department submitted a letter which is included in Appendix F. Mr. Bell concludes that the traffic calming measures have had no negative impact on the winter equipment. However, the pedestrian crossing barrels are somewhat of an inconvenience for the employees.

- How will the project affect residents of Stevens Avenue and through traffic?

  700 questionnaires were distributed to residents, drivers and pedestrians along the corridor. A detailed summary of their responses to date is included in Appendix G. Of the 700 questionnaires distributed 154 were returned. Of these, 84 favored the project and 46 were not in favor of the traffic calming project. The remaining 24 either wanted some of the measures or did not care either way.

Conclusions and Recommendations

The following table summarizes the criteria used to determine if the implementation of the traffic calming measures along Stevens Avenue has been effective:

Traffic Calming Analysis			
Item	**Criteria to be Effective**	**Results from 1998 Monitoring**	**Criteria Met**
Traffic Diversion	• Less than 20% reduction on Stevens Avenue • Less than 20% increase on Leland or side streets	• 10 to 17% decrease on Stevens Avenue • Minimal to no increase on Leland and side streets	Yes Yes
Pedestrian Crosswalk Use	• Increase use in marked crosswalks from 56% to 75% • Any increase in pedestrians or bicyclists	• Crosswalk use was increased to 84% • Both overall volumes of pedestrians and bicycles decreased from 1993 to 1998.	Yes No
Vehicle Speeds	For 85th percentile speeds: • For 30 mph posted: 30 mph • For 15 mph speed reduction: 25 mph	• Weekday daily average: 29 mph • AM and PM average: 24 mph	Yes Yes
Through Traffic	• Less than a 20% reduction in through traffic	• Through traffic reduced by approximately 40%	No
Gap Study	• Increase in acceptable gaps per hour for 4.0 and 2.5 fps	• Acceptable gaps increased from 50 and 20 to 64 and 26 respectively	Yes
Delay Study	• Decrease in pedestrian delay	• Pedestrian delay decreased from 6.5 to1.4 seconds	Yes
Pedestrian Conflicts	• Conflict occurrence reduced to less than 5%	• Conflict occurrence was reduced to 5%	Marginal
Bicycles	• Any increase in bicycle volumes	• Overall bicycle volumes decreased	No
Air Quality	• Increase in air quality	• Air quality not significantly increased	No

After preliminary review of the above criteria analysis it can be seen that the traffic calming measures appear to have had an overall positive effect on the Stevens Avenue corridor with most of the "criteria to be effective" being met. Based on the above summary, DeLuca-Hoffman Associates, Inc. recommends the continuing use of the existing traffic calming measures and that they be re-evaluated in another year when more information, particularly accident data, is available. DeLuca-Hoffman Associates, Inc. also recommends the existing traffic calming measures such as raised crosswalks, striping and signage be properly maintained on a regular basis. However, concerns which arise should be evaluated immediately and corrective action taken if warranted.

II. INTRODUCTION

Project Background

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Description of Traffic Calming Measures Installed

The initial data collection program was developed and completed in 1993 to quantify concerns expressed by community representatives. A comprehensive data base which included vehicular bicycle and pedestrian volumes was developed to establish the actual demands upon Stevens Avenue. Additional types of data were collected in response to expressed concerns. Once the concerns were verified by data collection and observations, the consultant team worked with the community, City Staff and an advisory committee to develop a mitigation plan. This mitigation plan consisted of temporary measures implemented along Stevens Avenue so that their effectiveness can be evaluated prior to committing to more expensive permanent construction. Temporary construction will consist of bituminous curb placed on existing pavement with island areas filled and paved. Measures to be implemented temporarily and monitored are generally as follows:

- Stripe bike lane from Forest Avenue to Pleasant Avenue
- Entrance treatment at Forest Avenue
- Medians between Forest Avenue and Poland Street
- Roadway weaving along Evergreen Cemetery
- Neck-downs from Clinton Street to Orkney Street at the following locations:
  - Both corners of Clinton Street
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Construction of these temporary improvements began in July 1997 and immediately raised significant concern in the neighborhood. After two public meetings during which little support was expressed for the project and significant opposition centered in large part on the neck-downs, medians and roadway weaving, the City Council stopped construction on the project and directed the Public Safety Committee to work with the consultant to develop a revised plan which would have less impact on the roadway. A revised plan was developed by the Committee and included the following measures:

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This report presents the results of the monitoring program which was reflective of the initial data collection effort prior to the implementation of the temporary improvements. Data was collected by DeLuca-Hoffman Associates, Inc. primarily during the week of May 4, 1998.

III. DATA COLLECTION

The Phase 1 Data Collection and Problem Identification report was completed in September 1993. The monitoring program was developed to replicate that initial data collection in both methodology and time of year the data is collected. In addition to replicating the data collected during Phase 1, the following additional data was collected to further address the effect of the traffic calming project:

- Additional side street counts to determine if traffic was diverted to other streets as a result of the project.
- Maintenance Issues:
  - Ease of snow removal
  - Drainage
  - Concrete paver crosswalk
- Emergency response issues:
  - Effect of measures on response time
  - Effect of measures on public safety
  - General concerns
- Public questionnaires

Data collection was completed in accordance with the Manual of Traffic Engineering Studies, 4th Edition, published by the Institute of Transportation Engineers. Additionally, conflict data was collected in the format specified by the Federal Highway Administration publication "Traffic Conflict Techniques for Safety and Operations – Engineers Guide." The resultant program was as follows:

1. Traffic Volumes

   a. Automatic Traffic Recorders – Automatic traffic recorders were placed at the following locations from approximately Sunday, May 3rd through Sunday, May 10th.

      - Stevens Avenue North of New Street
      - Stevens Avenue North of Woodfords Street
      - Leland Street between Ludlow and Pleasant
      - Lawn Avenue between Tremont and Orkney
      - Forest Avenue between Walton and Hartley
      - Walton Street between Forest and Stevens
      - Pleasant Avenue between Stevens and Forest
      - Woodfords Street between Stevens and Forest

      These recorders were set up to record directional volumes in 15-minute intervals and to record vehicle classification.

      The 1993 ATRs were collected from Monday, May 3rd through Sunday, May 9th.

b. The original turning movements counts were collected from 7:15 AM – 9:15 AM, 11:15 AM – 12:45 PM and 1:45 PM – 3:30 PM on Friday, May 7th at the following seven intersections on Stevens Avenue:

- Brighton Avenue (Route 25)
- Woodfords Street
- Ludlow/Higgins Streets
- Pleasant Avenue
- Brentwood Street
- Walton Street (Route 9)
- College/Waverly Streets

These were collected by approximately 40 persons consisting of community volunteers, temporary agency personnel, PACTS staff and DeLuca-Hoffman Associates, Inc. employees. In DeLuca-Hoffman Associates, Inc.'s and City staff opinions, this extensive turning movement classification count was not necessary in the monitoring program. Only the intersections of Pleasant Avenue with Stevens and Walton with Stevens were recounted. During the count the following information was collected:

- Vehicles with classification of buses, single unit trucks and trucks.
- Pedestrians with classification of pedestrians as children, adult, elderly or handicapped.
- Bicycles with notation of on-street or sidewalk use.
- Violation of right-turn-on-red restriction.

2. Pedestrian Volumes

The 1993 data collection program counted pedestrian crossings for all of the 1.2 mile section of Stevens Avenue between Brighton Avenue and Forest Avenue. In DeLuca-Hoffman Associates, Inc.'s opinion, the pedestrian count for the monitoring program did not need to be as extensive. The most complete installation of improvements occurred in the vicinity of Longfellow Elementary and Deering High Schools. This provided a good opportunity for evaluating pedestrian use of crosswalks. These counts were performed for the same time periods specified for turning movement counts above and were done at the same time as the conflict evaluation.

The pedestrian counts included the following:

- Classification of all pedestrians as Child, Adult, Elderly, or Handicapped.
- Crossing counts in conjunction with vehicular turning movement counts at the two intersections listed above.
- Complete pedestrian counts for all crossings of Stevens Avenue between Ludlow and Pleasant with notification of crosswalk or non-crosswalk use.

Pedestrian/vehicular conflicts were monitored for the morning arrival and discharge at the Lincoln Middle School and Deering High School. (Longfellow is not particularly of issue since the crossing is closely controlled by a guard.)

3. Bicycle Volumes

DeLuca-Hoffman Associates, Inc. recorded bicycles during the three turning movement counts at the two intersections and during the pedestrian study. We noted whether they rode on the sidewalk or used the crosswalks, or whether they rode on the road, particularly at raised crosswalk locations.

4. License Plate Study

The purpose of this study was to establish the percentage of through vehicles in the traffic stream. Additionally, vehicles stopping to drop-off or pick up students were noted. The license plate study was conducted to match plates entering one end of the study to those exiting the opposite end. Matches occurring significantly out-of-sequence were not counted as that vehicle was considered to have had a destination within the Stevens Avenue corridor. Counts were completed from 7:15 AM to 9:15 AM and 1:45 PM to 3:30 PM on May 8th at the following locations:

- Northbound:
  1. Between Woodfords and Higgins
  2. Between Arbor and Forest
- Southbound:
  1. Between Woodfords and Higgins
  2. South of Walton Street

The locations of the stations at the north end of the study area were varied for northbound and southbound traffic to estimate the amount of traffic attributable to Walton Street (State Route 9). These locations and times corresponded to the 1993 study.

5. Speed Study

Speed data was collected for weekdays and weekend hours during the school year. Data was collected to allow comparison of speeds immediately prior to school zones and within school zones. Additionally, data was evaluated for the morning and afternoon periods when the reduced speed flashers are operational. The flashers function for the elementary and middle schools only. The City-wide periods for the flashers to operate are as follows:

School	Flasher Periods	Classes Begin	Classes End
Deering High School	7:30 AM – 9:15 AM 11:20 AM – 12:40 PM 2:30 PM – 3:30 PM	7:55 AM	2:00 PM
Lincoln Middle School	7:30 AM – 8:30 AM 2:15 PM – 3:15 PM	8:05 AM	2:30 PM
St. Joseph School	7:30 AM – 8:45 AM 11:20 AM – 12:20 PM 2:15 PM – 3:30 PM	8:15 AM	2:55 PM
Longfellow Elementary	7:30 AM – 9:15 AM 11:20 AM – 12:40 PM 2:30 PM – 3:30 PM	9:00 AM	3:00 PM

Automatic speed recorders were placed to obtain data as follows:

Location	Description	Direction of Traffic Recorded
N/O Lincoln	North of Lincoln Middle School	Southbound
Lincoln	Within Lincoln Middle School Zone	Southbound
S/O Longfellow	South of Longfellow Elementary School	Northbound
Longfellow	Within Longfellow School Zone	Northbound

These times and locations corresponded with the 1993 study. This data was also collected during spring break.

In addition to this data, DeLuca-Hoffman Associates, Inc. collected speeds approaching and departing the raised crosswalks and speed tables. The speed data was collected at approximately 100 feet, 200 feet and 500 feet from the crosswalk in both directions during the same time periods specified in the above paragraph. The data was collected at each of the raised crosswalks at the following locations:

- North of Orkney Street
- South of Concord Street
- At Pleasant Avenue
- South of Percival Street
- At Evergreen Cemetery

6. Pedestrian Crossing Studies

Three types of studies were completed in 1993 to help quantify the pedestrian operational environment. The studies were completed during arrival and discharge times at Deering High and Lincoln Middle Schools. DeLuca-Hoffman Associates, Inc. will complete similar studies during the week of May 4th during a clear day.

Gap study:

This is a determination of the number of acceptable gaps which exist in the two-way traffic stream that would allow a pedestrian to safely cross without vehicles yielding the right-of-way. All gaps greater than 5 seconds are recorded and "acceptable" gaps determined on the basis of pedestrian walking speeds and an effective crossing width of 30'. Healthy adults including middle and high school students are

assumed to walk at 4 feet per second, while the elderly and young children are assumed to cross at 2.5 feet per second.

Delay study:

This study involves timing the delay to pedestrians from the time that they initially begin looking to cross the street until the maneuver is actually completed.

Conflict Evaluation:

The interaction between pedestrians and vehicles was evaluated on Stevens Avenue between Ludlow Street and Orkney Street during the previous study as well as between Hartley and Percival Streets. Two 20-minute observations were conducted at each location with one during student arrival and one during student discharge. The total number of pedestrian crossings was noted as was the number of crossings involving conflicts. A "conflict" was defined as a pedestrian stopping abruptly or running to cross, or a vehicle braking rapidly as opposed to simply yielding the right-of-way.

7. Accident Analysis

The accident information for the last year was reviewed. This task was done by the City of Portland and furnished to DeLuca-Hoffman Associates, Inc. who completed the following work:

- Prepare a collision diagram.
- Classify accidents as school or non-school hours.
- Classify operators as City residents or non-residents.

8. Right Turn on Red Violations

This was recorded during the previous study but in the opinion of DeLuca-Hoffman Associates, Inc. and City staff it was not necessary for the update.

9. Video Documentation

DeLuca-Hoffman Associates, Inc. recorded video during arrival and discharge times at Longfellow, Lincoln, and Deering schools. The video was made during the following times:

	Time	
School	**Arrival**	**Departure**
Lincoln	7:30 – 8:15	2:15 – 2:40
Deering	7:15 – 8:15	1:45 – 2:30

10. Interviews

Input will be solicited from community members, crossing guards, and school staff. Those people with long-term experience on Stevens Avenue can provide a good qualitative assessment of the impact of mitigation measures.

11. Survey Questionnaire

A survey of 200 travelers (100 drivers, 100 pedestrians) was done to obtain a qualitative assessment of the effectiveness of the temporary measures constructed. The questionnaire is addressed to the pedestrian or driver operating on Stevens Avenue. Questionnaires were also distributed to 500 residents.

Data Collection Periods

The primary data collection effort for the initial study was performed on Friday, May 7, 1993. The weather was overcast with occasional light rain throughout the day. Brief interviews conducted with parents picking up children and a crossing guard revealed that pedestrian and vehicular volumes appeared to be normal. The data was collected by approximately 40 persons consisting of community volunteers, temporary agency personnel, PACTS staff and DeLuca-Hoffman Associates, Inc. employees. Data collected on May 7, 1993 included all vehicular and pedestrian turning movements as well as the license plate study and automatic traffic recorder counts. This provided overlapping data which allowed for checking and adjustment of volumes along the corridor.

The primary data collection effort for this follow-up monitoring program was performed primarily on Friday, May 8, 1998. The weather was also overcast with occasional light rain throughout the day. The data was collected by DeLuca-Hoffman Associates, Inc. and Accurate Counts. Additional volume data was collected by the City of Portland.

IV. DATA SUMMARY AND ANALYSIS

Physical Environment

The portion of Stevens Avenue from Brighton Avenue to Forest Avenue runs through a heavily developed residential area which also includes 3 public schools, 2 private schools, Westbrook College, Westbrook College Children's Center, Park Danforth (elderly housing), an armory and Deering Center (a local central business district). Additionally, a link of the Portland Trails system crosses Stevens Avenue in the vicinity of Evergreen Cemetery. The pedestrian presence on Stevens Avenue is driven by the enrollment of approximately 2500 students at the various educational institutions indicated above. Pedestrian demand is noted to persist during non-school periods due to various recreational facilities offered on the school grounds and the presence of local businesses.

This portion of Stevens Avenue is approximately 1.2 miles in length. Stevens Avenue is classified as a minor arterial for the entire 1.75 miles, and is designated as State Route 9 from Congress Street to Walton Street. This two-lane roadway is 43.5 feet wide from Brighton Avenue to Pleasant Avenue; and is 48 feet wide from Pleasant Avenue to Forest Avenue. There are sidewalks on both sides of Stevens Avenue. Stevens Avenue, known as the "County Road" early in the region's history, has a section between Morrill's Corner and Pleasant Avenue built on a site known as Stevens Plain. Thus, the horizontal alignment is straight with the exception of a gentle curve through the Brentwood Street area. The vertical geometry is also fairly flat with no deficiencies noted. The posted speed limit is 30 mph with a reduction to 15 mph when school children are present. School Zones are marked by large overhead signs with flashers to indicate times of the speed reduction.

Unrestricted parking is generally allowed on both sides of the roadway except directly in front of Deering High School and Longfellow Elementary School where "No Stopping or Standing" signs have been posted. Parking restrictions are also in place near most intersecting streets; however, the sight lines afforded for exiting vehicles are marginal in some instances particularly where vans and trucks park in the corner spaces.

Traffic Volumes

Intersection vehicular and pedestrian turning movement counts at the intersections of Stevens and Pleasant and Stevens and Walton and pedestrian mid-block counts are summarized based upon the pedestrian peak hour for the morning and afternoon study periods. The peak hour volumes are shown in Figure 1 of Appendix A. Vehicles were classified as buses, single unit trucks, and trucks. Pedestrians were classified as child, adult, elderly (subjective) or handicapped (anyone who had difficulty crossing due to physical impairment). Annual Average Daily Traffic (AADT) volumes determined using mechanical counters are shown in Figure 3 of Appendix A. This figure also includes AADT information for other City roadways as a basis for comparison. The following is a brief summary of collected volume data for pre and post project conditions:

- Unadjusted Vehicle Volumes

	Approximately At Evergreen Cemetery			North of Woodfords		
	Pre	Post	% Increase/ Decrease	Pre	Post	% Increase/ Decrease
Average Weekday Traffic	15,485	12,771	-18%	14,963	12,769	-15%
Average Daily Traffic	14,414	11,997	-17%	13,958	12,481	-11%
Percentage of heavy vehicles (Buses and Trucks)	4.9% S.B.	3.9% SB	-1.0%	5.0% NB	3.9% NB	-1.1%

- Average annual growth on City streets in the vicinity of Stevens Avenue has been the following:

	1993 Study	1998 Study
- Forest Avenue South of Allen Avenue	(1981-1992) + 2.7%	(1992-1995) - 3.1%
- Allen Avenue East of Forest	(1998-1992) - 0.5%	(1992-1995) +1.1%
- Stevens Avenue South of Brighton	(1991-1993) +1.3%	(1993-1995) - 1.6%

Evaluation Criteria

The purpose of these counts was to determine if traffic diversion occurred as a result of the mitigation program. The counts at Evergreen Cemetery provide a measure for diversion from Stevens Avenue to other City arterials. The greatest potential for this occurrence is the use of Leland Street behind Lincoln Middle, Longfellow Elementary and Deering High Schools to avoid the stretch of Stevens Avenue in front of these schools. Diversion could also occur to Lawn Avenue which parallels Stevens Avenue to the east from Pleasant Avenue to Woodfords Street. However, the objective of proposed mitigation measures is to "calm" existing traffic, not divert traffic to other streets. The Leland Street counts provide a measure of diversion to Leland from Stevens via New Street. The following measures were used to evaluate the effect of the mitigation upon trip diversion:

- 20% reduction on Stevens Avenue
- 20% increase on Leland Street

The volumes collected during the monitoring program show Stevens Avenue traffic volumes did decrease from 1993 to 1998. However, as can be seen from Figure 3 in Appendix A, the side street volumes had little to no increase in traffic volumes. This may indicate that either the decrease in traffic volume on Stevens Avenue was not primarily due to traffic diversion caused by this project or that the traffic is being diverted on a greater scale to other than the immediate adjacent streets.

The following criteria were utilized to evaluate the turning movement counts:

- Change in peak hour traffic volumes with a 20% reduction considered to be a concern for traffic diversion occurring.

As can be seen from Figure 1 in Appendix A, the overall turning movement volumes for the AM and PM peak hours did not significantly change. The following table summarizes the results of the peak hour turning movement counts as shown on Figure 1:

Intersection of Stevens Avenue and Pleasant Avenue						
	AM		% Increase/	PM		% Increase
Approach	Pre	Post	Decrease	Pre	Post	Decrease
Northbound	403	366	- 9%	518	535	+ 3%
Southbound	536	496	- 7%	558	471	- 16%
Eastbound	141	129	- 9%	126	111	- 12%
Westbound	107	131	+ 22%	115	99	- 14%
Total Entering Volume	**1,187**	**1,122**	**- 5%**	**1,317**	**1,216**	**- 8%**

Pedestrian Volumes

Component	Pre (1993) Total for AM and PM Peak Pedestrian Hours	Post (1998) Total for AM and PM Peak Pedestrian Hours
Total crossings of Stevens Avenue between Ludlow and Pleasant	533	566
Children (High School or younger)	83%	79%
Adults	11%	21%
Elderly (Subjective evaluation 65+)	1%	0%
Handicapped (Person with any physical impairment which caused difficulty in crossing)	0%	0%
Unclassified	5%	0%
In crosswalks	56%	84%

Evaluation Criteria

These counts provided a measure of effectiveness for the percentage of pedestrians using crosswalks. The targets for the program to be considered successful were as follows:

- Increase in use of marked crosswalks from 56% to 75%.
- Any increase in the number of pedestrians or bicyclists.

The results of the monitoring program showed that the number of pedestrian crossings on Stevens Avenue from Ludlow to Pleasant during the combined AM and PM peak hours increased by 6% with an increase in crosswalk use from 56% to 84%. The AM and PM peak hour volumes are shown on Figure 1 in Appendix A. The total volume of pedestrians for the AM and PM peak hours including the Pleasant Avenue and Walton Street intersections shows an overall decrease in pedestrian volume. The number of bicyclists for the combined three time periods counted decreased 8% from the 1993 study to this study. These counts are shown on Figure 2 in Appendix A.

Vehicle Speeds

The posted speed limit along the entire length of Stevens Avenue is 30 miles per hour. Speed data was collected for weekdays and weekend hours during the school year and also during school vacations both before and after the project. Data was collected to allow comparison of speeds immediately prior to school zones and within school zones. Additionally, data was evaluated for the morning and afternoon periods when the reduced speed flashers were operational. The flashers function for the elementary and middle schools only. The periods for the flashers to operate are currently as follows:

Hours of Flasher Operations		
St. Joseph's School	**Longfellow Elementary**	**Lincoln Middle School**
7:30 - 8:45 AM	7:30 - 9:15 AM	7:30 - 8:30 AM
11:20 - 12:20 PM	11:20 - 12:40 PM	2:15 - 3:15 PM
2:15 - 3:30 PM	2:30 - 3:30 PM	

However, during the initial data collection effort, the flashers were set up to operate at a uniform time throughout the City as follows:

Hours of Flasher Operation During Initial Data Collection
7:45 - 9:05 am
11:25 - 11:45 am
12:20 - 12:40 PM
2:30 - 3:10 PM

School Hours				
School	**Classes Begin**		**Classes End**	
	Pre	**Post**	**Pre**	**Post**
Deering High School	8:00 AM	7:55 AM	2:00 PM	2:00 PM
Lincoln Middle School	8:30 am	8:05 AM	2:30 PM	2:30 PM
Longfellow Elementary	9:00 am	9:00 AM	3:00 PM	3:00 PM

Automatic speed recorders were placed to obtain data as follows (See Appendix II for speed data):

85th Percentile Speeds* - Miles Per Hour								
	Southbound Traffic				**Northbound Traffic**			
Time/Location	**N/O Lincoln**		**Lincoln**		**S/O Longfellow**		**Longfellow**	
	Pre	**Post**	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**
Weekday	43	32	38	27	33	33	38	25
Weekend	--	33		28	33	24	38	26
School Day (7:15-3:30)	43	31	38	25	33	22	38	23
Flasher On AM	38	29	33	24	28	21	33	23
Flasher On PM	38	29	33	24	33	21	28	23
Summertime AM**	--	34	28	28	--	25	38	26
Summertime PM**		33	28	28		23	43	25

*85th percentile speed is the speed at which 85% of vehicles travel at or below and is the basis for evaluating conformance to the speed limit.

**Speeds during April school vacation for "post" condition.

The above data and the charts on the following pages show that the speed limit of 30 mph on Stevens Avenue and particularly school zone speed reductions were generally not observed prior to the installation. There was a 5 mph reduction in speed for traffic passing through the school zones except the northbound morning traffic passing through the Longfellow school zone which showed a 5 mph increase in speed. The summertime speed in the Lincoln school zone was below that of the school time speed. The reason for this was not apparent.

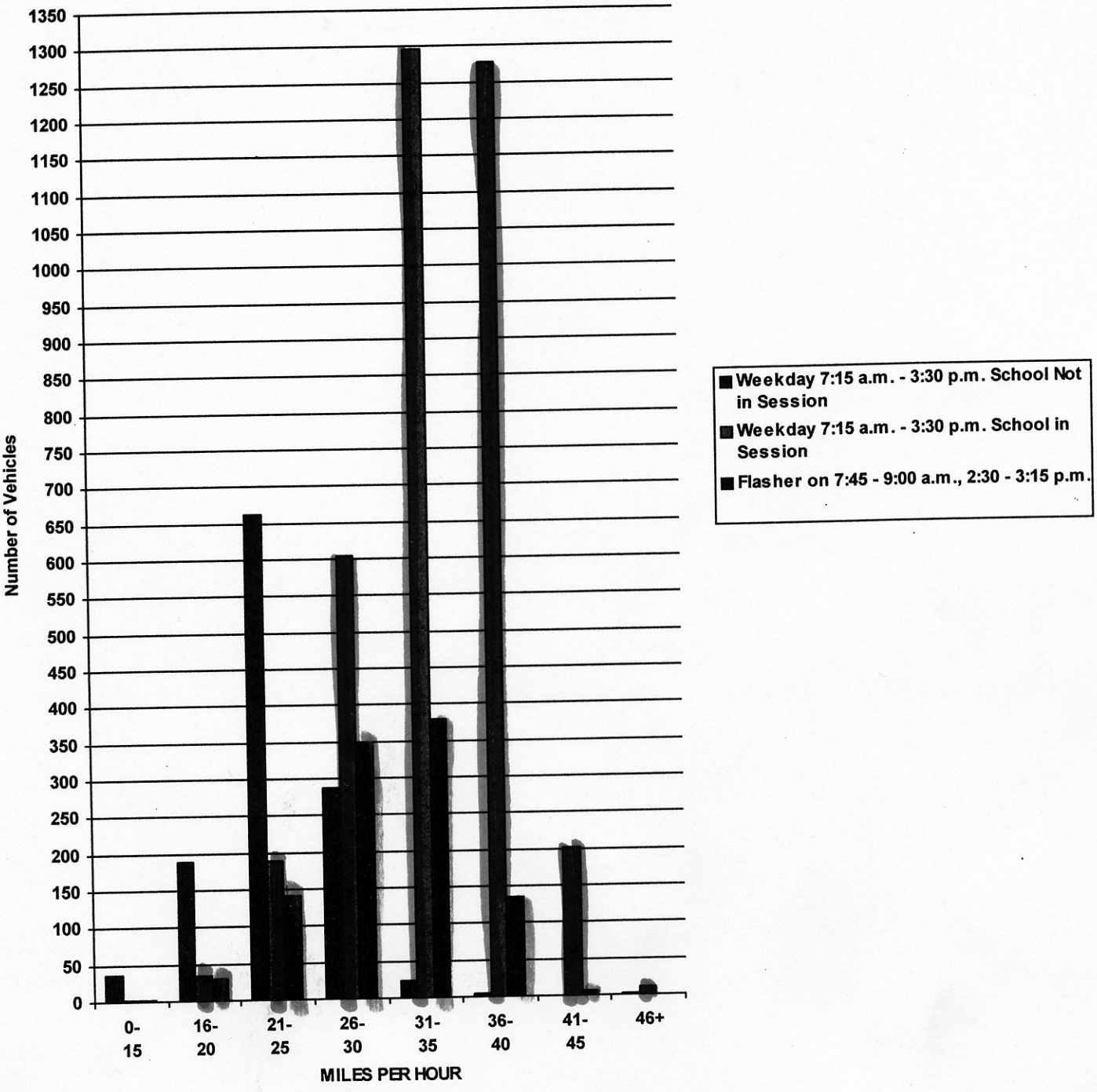
Evaluation:

The intent of the program was to reduce overall speeds along Stevens Avenue and particularly improve compliance with school zone speed reductions. The following were set as 85th percentile speed targets which must be met for post-construction speed for the program to be successful:

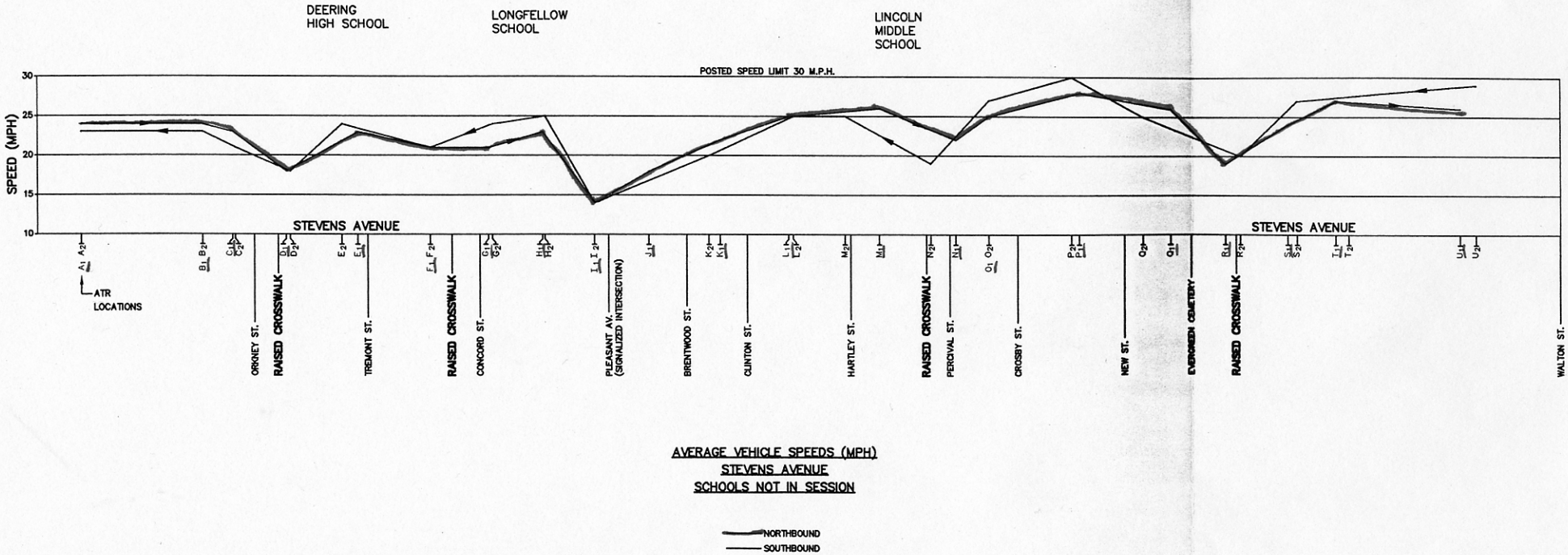
- For 30 mph posted speed: 33 mph
- For 15 mph speed reduction: 25 mph

The results of the monitoring program shows that the overall 85th percentile weekday speed at the four locations identified in the previous table was an average of 29 mph which is 4 mph less than the target speed. During the AM and PM flasher time periods, the 85th percentile speed was an average of 24 mph which is 1 mph less than the target speed.

OVERALL VEHICLE SPEEDS
MILES PER HOUR
LINCOLN MIDDLE SCHOOL (SB)



STEVENS AVENUE
SPEED STUDY



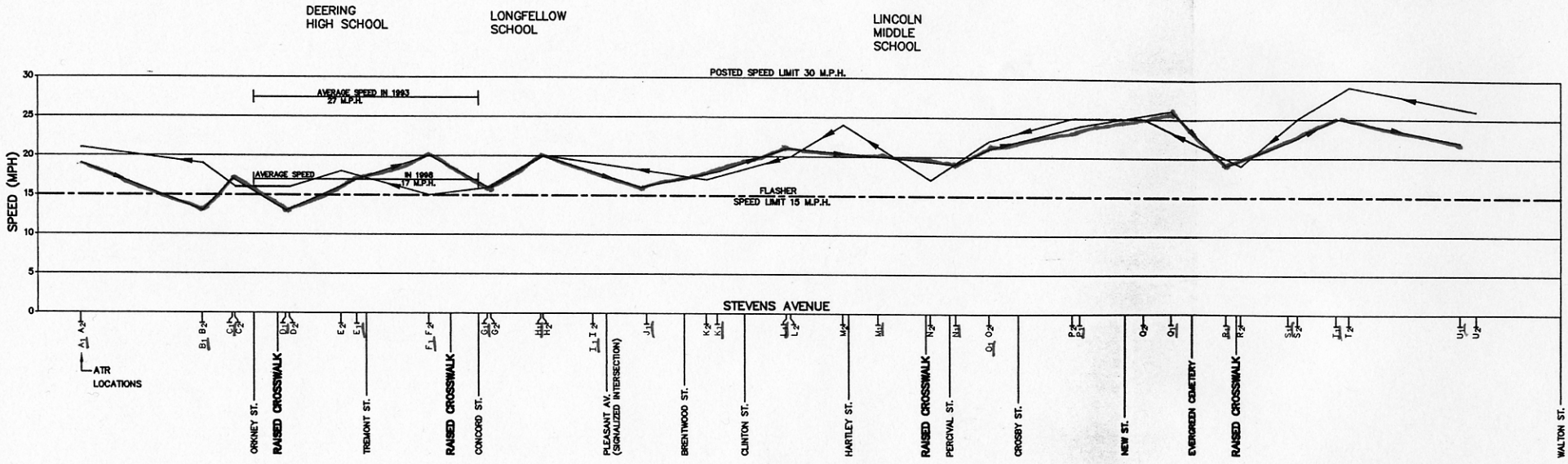
AVERAGE VEHICLE SPEEDS (MPH)
STEVENS AVENUE
SCHOOLS NOT IN SESSION

NORTHBOUND
SOUTHBOUND

DATA COLLECTED
WEEK OF APRIL 20, 1998

G:\1269\1269IST.dwg Tue May 26 13:46:11 1998 CAVE

STEVENS AVENUE
SPEED STUDY



AVERAGE VEHICLE SPEEDS (MPH)
STEVENS AVENUE
SCHOOLS IN SESSION

AVERAGE FOR AM(7:30–8:30) AND PM(2:15–3:15)
FLASHER OPERATION TIMES

——— NORTHBOUND
——— SOUTHBOUND

DATA COLLECTED
WEEK OF MAY 4, 1998

Accident Data

As part of the data collection process prior to installation of the traffic calming project, five years of accident data was obtained from the Maine Department of Transportation (MDOT). This data showed a total of 341 accidents were recorded for the period of 1987 through 1991 for Stevens Avenue between Brighton Avenue and Forest Avenue. This represents an average of 5.68 accidents per month over the 60 month period. Accident data has been obtained by the City of Portland for the period of November 1997 to March 1998 which is the period since the traffic calming project was installed. During this 5 month period there were 5 accidents or an average of 1.0 accidents per month from Woodford Street to Brentwood Street, inclusive. A review of the pre-project accidents showed 39 accidents for the same area with an average accident rate of 0.65. A comparison of the type of accident prior to and after implementation of the project is made below:

Accident Summary		
Category	**Pre Project**	**Post Project**
Occurring while school in session (7:15 AM – 3:30 PM)	62%	80%
Involving non-residents of Portland	62%	60%
Non-residents at fault	41%	40%
No. of Pedestrian Accidents	4	0
No. of Bicycle Accidents	0	0

Evaluation:

Valid conclusions cannot be reached from this data since accident statistics generally are derived for longer periods. The purpose of the analysis is to determine if there is occurrence of accidents attributable to the traffic calming measures and if the traffic calming measures have had an effect on the overall accident rate. Based on the very limited data to date there appears to be an increase in accident rate with an increased percentage of accidents occurring while school was in session. Since school has been in session, i.e., no summer vacation, since November, this percentage would be expected to decrease given 12 months worth of data.

License Plate Study

The purpose of this study was to establish the percentage of through vehicles in the traffic stream. A license plate study was conducted to match plates entering one end of Stevens Avenue to those exiting the opposite end of the study area. Matches occurring significantly out-of-sequence were not counted as that vehicle was considered to have had a destination within the Stevens Avenue corridor. Count stations were established from 7:15 am to 9:15 am and 1:45 PM to 3:30 PM at the following locations:

- Northbound:
  1. Between Woodfords and Higgins
  2. Between Arbor and Forest

- Southbound
    1. Between Woodfords and Higgins
    2. South of Walton Street

The locations of the stations at the north end of the study area were varied for northbound and southbound traffic to estimate the amount of traffic attributable to Walton Street (State Route 9). Results of this study were as follows:

Stevens Avenue Through Traffic				
	AM		PM	
	Pre Project	Post Project	Pre Project	Post Project
Northbound north of Woodfords to north of Arbor	19%	11%	22%	15%
Southbound south of Walton to north of Woodfords	34%	19%	35%	20%

Evaluation:

The purpose of these counts is to determine if traffic diversion is occurring as a result of the traffic calming program. A 20% reduction in through traffic was used to evaluate the effect of the mitigation on trip diversion.

The data collected before the project indicates that approximately one-third of the traffic on Stevens Avenue is through trips with 13-15% potentially attributable to Walton Street. This may have been slightly high since accessing Stevens Avenue to proceed southbound is considerably easier than proceeding through Morrill's Corner northbound from Stevens Avenue. Therefore southbound through traffic could be expected to be slightly higher than northbound through traffic.

The data collected after the traffic calming project shows that the through traffic has considerably decreased since the pre-project study with 5-8% of the through trips potentially attributable to Walton Street. This may indicate potential diversion of traffic to side streets, however the change in side street AADTs does not indicate this diversion is taking place.

Pedestrian Crossing Studies

Three types of studies were performed along Stevens Avenue to help quantify the pedestrian operational environment. The studies were conducted during arrival and discharge times at Deering High and Lincoln Middle Schools. The studies and results are described below:

Gap Study:

This is a determination of the number of acceptable gaps which exist in the two-way traffic stream that would allow a pedestrian to safely cross without vehicles yielding the right-of-way. All gaps greater than 5 seconds were recorded and "acceptable" gaps determined on the basis of pedestrian walking speeds and an

effective crossing width of 30'. Healthy adults including middle and high school students were assumed to walk at 4 feet per second, while the elderly and young children were assumed to cross at 2.5 feet per second. This resulted in the following acceptable gaps as recorded in the vicinity of Deering High School and Lincoln Middle School during both the pre project and post project studies.

Two-way Gaps on Stevens Avenue			
Walking Speed	Required Gap Length (seconds)	Number of Gaps per Hour	
		Pre Project	Post Project
4.0 fps	7.5	50	64
2.5 fps	12.0	20	26

Evaluation:

The pre project data indicates that average delays of up to 3 minutes could occur if a child or elderly person were to wait for an adequate two-way gap prior to crossing. The data collected after the project shows the acceptable gaps per hour increased in both the 4.0 and 2.5 feet per second categories.

Delay Study:

This study involved timing the delay to pedestrians from the time that they initially begin looking to cross the street until the maneuver is actually performed. The collected data is summarized below:

	Pre Project	Post Project
Crossings Noted	58	153
Seconds of Average Delay	6.5	1.4

Evaluation:

The pre project data seemingly contradicts the gap data previously presented. However, most of these crossings involved traffic yielding in at least one direction. Delay could be expected to be longer for pedestrians who do not exercise some aggressiveness in attempting to cross Stevens Avenue. The post project data shows the average delay for pedestrians crossing the street has decreased.

Conflict Evaluations:

The interaction between pedestrians and vehicles was evaluated on Stevens Avenue between Ludlow Street and Orkney Street as well as between Hartley and Percival Streets. Two 20 minute observations were conducted at each location with one during student arrival and one during student discharge for each location. The total number of pedestrians crossings was noted as was the number crossings involving conflicts. A "conflict" was defined as a pedestrian stopping abruptly or running to cross, or a vehicle braking rapidly as opposed to simply yielding the right-of-way. Collected data is summarized below:

	Pre Project	Post Project
Crossings Counted	145	407
One-direction Conflicts Noted	25	21
Crossings Involved Conflicts	17%	5%

Evaluation:

The following measures were used to assess whether the traffic calming project was successful in reducing conflict evaluations:

- Conflict occurrence reduced to less than 5% of all crossings:
- Qualitative measure of drivers' awareness to stop for pedestrians at crossings.

The pre project data showed the conflict rate was likely in excess of 20% for two direction conflicts. The post project data showed a rate of 5% for pedestrian crossings involving conflicts.

Pedestrians have the right-of-way upon entering a roadway at a marked crosswalk and motorists are required by law to yield. For this right to be properly exercised, the pedestrian must first step off of the curb at a time when an approaching driver will have ample opportunity to react and yield as necessary. Furthermore, drivers in the far lane are not required to yield until such time as the pedestrian approaches the roadway centerline. The pedestrian should at all times ensure that approaching motorists have adequate time to yield prior to entering the vehicles' path.

Observations while conducting the data collection effort and testing of motorist compliance by project staff prior to the project indicated a general disregard on the part of motorists to yield to pedestrians. There was a definite mix of attitudes among motorists with some willing to stop once the pedestrian first steps from the curb while others waited for the pedestrian to approach more closely to the vehicle path. However, as noted, the most common attitude appeared to be that of stopping only if absolutely necessary. Pedestrians also showed a lack of compliance with laws by crossing at mid-block locations when marked crosswalks were readily available at each end of relatively short blocks. Pedestrians crossed Stevens Avenue from between parked cars and in the Deering Center area near Brentwood Street were observed crossing amongst cars stopped in traffic.

Following the project the pedestrian conflicts observed were significantly reduced. The pedestrians showed more of a willingness to use the available crosswalks and obey crossing guidelines with vehicles yielding more often with less hesitation.

Bicycles

Bicycle volumes were recorded by both the pedestrian counters and the vehicle counters at Pleasant Avenue which was the highest area of pedestrian activity

prior to the project. Bicyclists were observed behaving as vehicles on the roadway proper as well as using the sidewalks and crosswalks. During the 5½ hour count a total of 27 bicycles were recorded passing through that intersection prior to the project with 26 after the project. A summary of the bicycle counts is presented in Figure 2 of Appendix A.

Evaluation:

Any increase in bicycle volumes was considered to be a success for the traffic calming project. The data showed an overall decrease in bicycle volume by approximately 8%.

Comments from City Departments:

DeLuca-Hoffman Associates, Inc. solicited comments from the following City Departments:

Police
Fire/Rescue
School
Public Works

Letters from each of these departments commenting on the project are included in Appendices C through G. A brief synopsis of their comments is summarized below:

Police: Sergeant Peter Wentworth of the Portland Police Department submitted a letter which is included in Appendix D. Mr. Wentworth states that, "To date, the above project has had no perceptible effect on the ability of the Portland Police Department to respond to emergency situations." He goes on to say, however, that an overabundance of similar projects could have a negative impact on responding to emergencies in a timely manner.

Fire/Rescue: In an interview by City staff and DeLuca-Hoffman Associates, Inc., Chief Thomas stated his personnel are avoiding Stevens Avenue when possible. The Fire Department also completed tests which showed speeds above 20 mph are too rough on both equipment and personnel. This study is included in Appendix C. Chief Thomas also said that he could not document that the delay after the installation had increased over that experienced due to traffic congestion prior to the project.

School: Donn Davis from the Portland Public School department submitted a letter which is included in Appendix E. Mr. Davis concludes after consultation with the principals of Deering, Longfellow and Lincoln Middle Schools, as well as the School Department Transportation Director, that the traffic calming measures along Stevens Avenue have improved both driver and pedestrian safety; however, it is still felt that speeding is an issue.

Public Works: Bruce Bell of the Public Works Department submitted a letter which is included in Appendix F. Mr. Bell concludes that the traffic calming

measures have had no negative impact on the winter equipment. However, the pedestrian crossing barrels are somewhat of an inconvenience for the employees.

Survey Questionnaires:

A survey of 200 travelers (100 drivers, 100 pedestrians) was done in an effort to obtain a qualitative assessment of the effectiveness of the traffic calming program. Additionally, 500 questionnaires were mailed directly to residents. Of the 200 questionnaires, 154 were returned and a tabulation of the results is presented in Appendix G.

Air Quality:

In general, NOx (nitrogen oxides) increase with speed and volatile organic compounds (VOC's) decrease with speed. In a letter to Mr. Brian Peterson, a resident of Prospect Street, from Ron Severance of the Maine Department of Environmental Protection (MeDEP) dated November 5, 1997, the optimum speed to minimize both pollutants would be 25 mph. However, this does not consider the emission impacts of any increased braking and acceleration associated with the raised crosswalks or any reduced trips which may occur because of increased pedestrians or bicycling. A copy of the MeDEP letter is included in Appendix H.

DeLuca-Hoffman Associates, Inc. evaluated the impact of the project on air quality based on the following information:

- Average travel speed reduction on Stevens Avenue of 14 mph.
- The AADT on Stevens Avenue is approximately 11,382 vehicles per day.
- The diversion of traffic from Stevens Avenue to other streets is estimated to be 1,252 vpd on average based upon the average reduction in through traffic.
- The number of pedestrians utilizing the project area has decreased.
- The number of bicycles utilizing the project area has decreased.
- The number of local trips has not been reduced - no increase in pedestrian and bicycle traffic.
- The truck traffic has been reduced by 1%, but has not resulted in a net air quality benefit since it is assumed they were diverted to other streets.
- Length of Study Area = 1.2 miles.
- Graphs of emission factors versus speed of a vehicle for NOx and VOC's contained in the MeDEP letter to Mr. Peterson.

Estimated impact on VOC emissions:

Estimated impact due to reduction in average travel speed:

Pre Project Average Speed of 35 mph = 2.3 grams/mile/vehicle
Post Project Average Speed of 21 mph = 2.9 grams/mile/vehicle

These emission factors were determined by averaging the MeDEP graphs for January and July.

Volume of traffic which would occur without the project:

11,382 AADT + 0 (pedestrian increase) + 0 (bicycle increase) = 11,382

Volume of traffic which is occurring with the project:

11,382 AADT

The base AADT traffic was taken as the same for both pre and post conditions to negate the influence of diverted trips. Trips diverted from Stevens Avenue which are estimated to be 1,252 vpd on average based on this study have reduced emissions on Stevens, but these emissions have been displaced to other areas resulting in no net improvement.

Pre Project VOC emissions:

13,193 vpd x 2.3 grams/mile/vehicle (35 mph) x 1.2 miles = 36,413 grams of VOC

Post Project VOC emissions:

11,382 vpd x 3.9 grams/mile/vehicle (21 mph) x 1.2 miles = 53,268 grams of VOC

Thus the project shows an increase in VOCs.

Estimated impact on NOx emissions:

Pre Project NOx emissions:

13,193 vpd x 3.0 grams/mile/vehicle (35 mph) x 1.2 miles = 47,495 grams of NOx

Post Project NOx emissions:

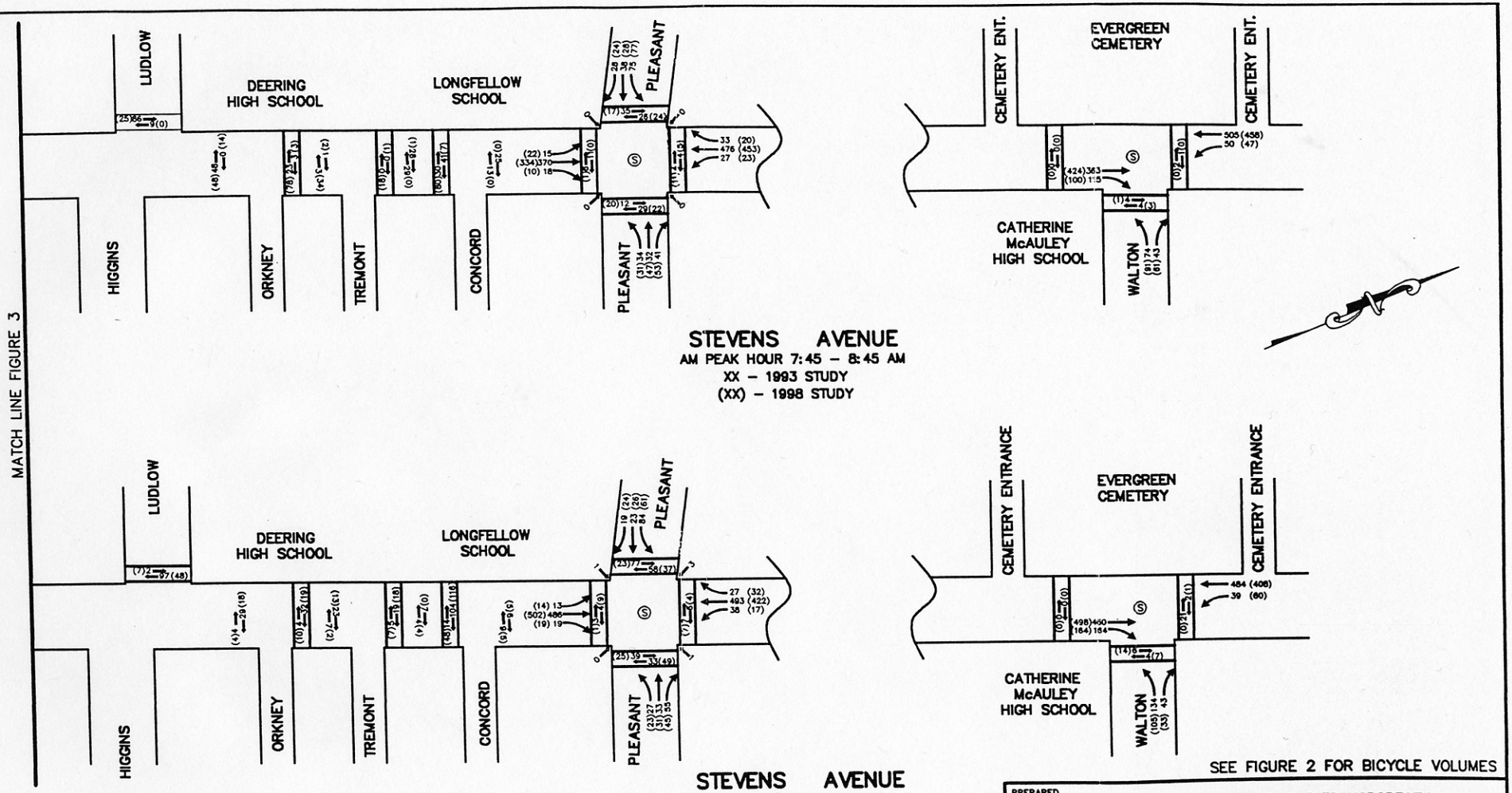
11,382 vpd x 2.9 grams/mile/vehicle (21 mph) x 1.2 miles = 39,609 grams of NOx

Thus the project shows a decrease in NOx.

As previously pointed out, these estimates do not consider the potential effect of accelerating and braking associated with the raised crosswalks. A comparison of the speed profile through the project area for both pre project and post project conditions was previously discussed in this report under the speed discussion. Examination of this Figure shows that the overall speed along the corridor has decreased from pre to post conditions.

APPENDIX A

FIGURES



SEE FIGURE 2 FOR BICYCLE VOLUMES

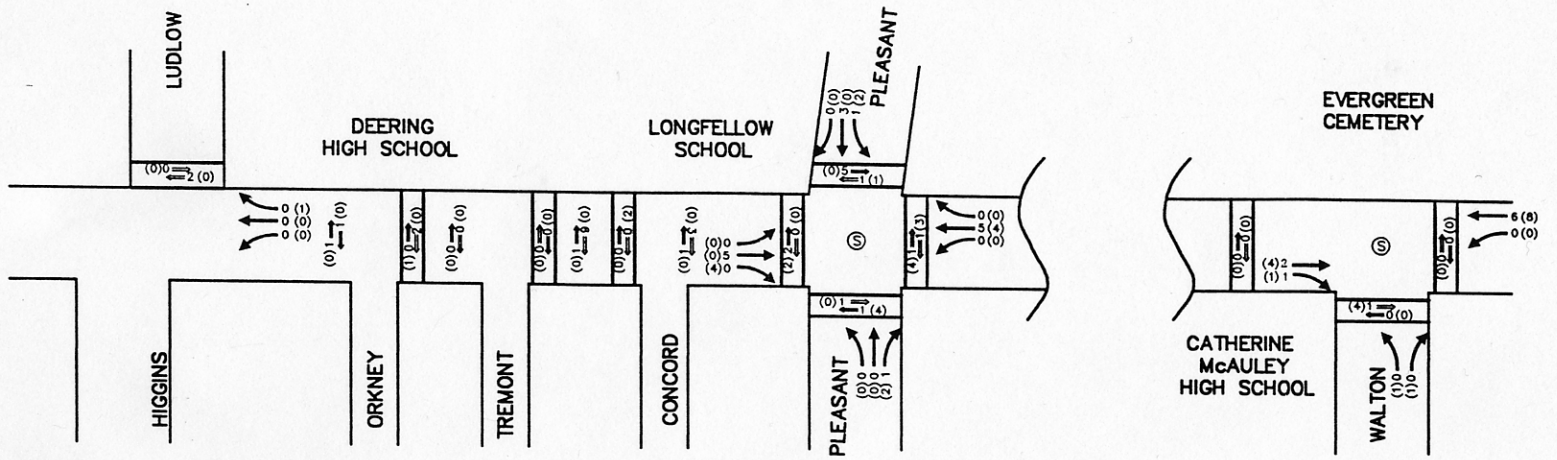
PREPARED FOR: PORTLAND AREA COMPREHENSIVE TRANSPORTATION STUDY

PROJECT: STEVENS AVENUE PEDESTRIAN STUDY
— PEDESTRIAN PEAK HOURS
COUNTED FRIDAY MAY 7, 1993
AND MAY 8, 1998

DeLuca-Hoffman Associates, Inc.
Consulting Engineers
778 Main Street
South Portland, Maine 04106
207-775-1121

FIGURE 1

G:\1269\1269ped.dwg Thu May 14 12:02:43 1998 JCD



1993 Total Bicycles = 44
1998 Total Bicycles = 30

1993 Total Bicycles = 9
1998 Total Bicycles = 19

STEVENS AVENUE

XX = 1993 STUDY
(XX) = 1998 STUDY

LEGEND

→ BICYCLES ON STREET
⇉ BICYCLES IN CROSSWALKS / SIDEWALKS
Ⓢ SIGNALIZED INTERSECTON

ALL – DAY BICYCLE SUMMARY
(7:15 – 9:15 AM, 11:15 – 12:45, 1:45 – 3:30 PM)
COUNTED FRIDAY MAY 7, 1993
AND MAY 8, 1998.

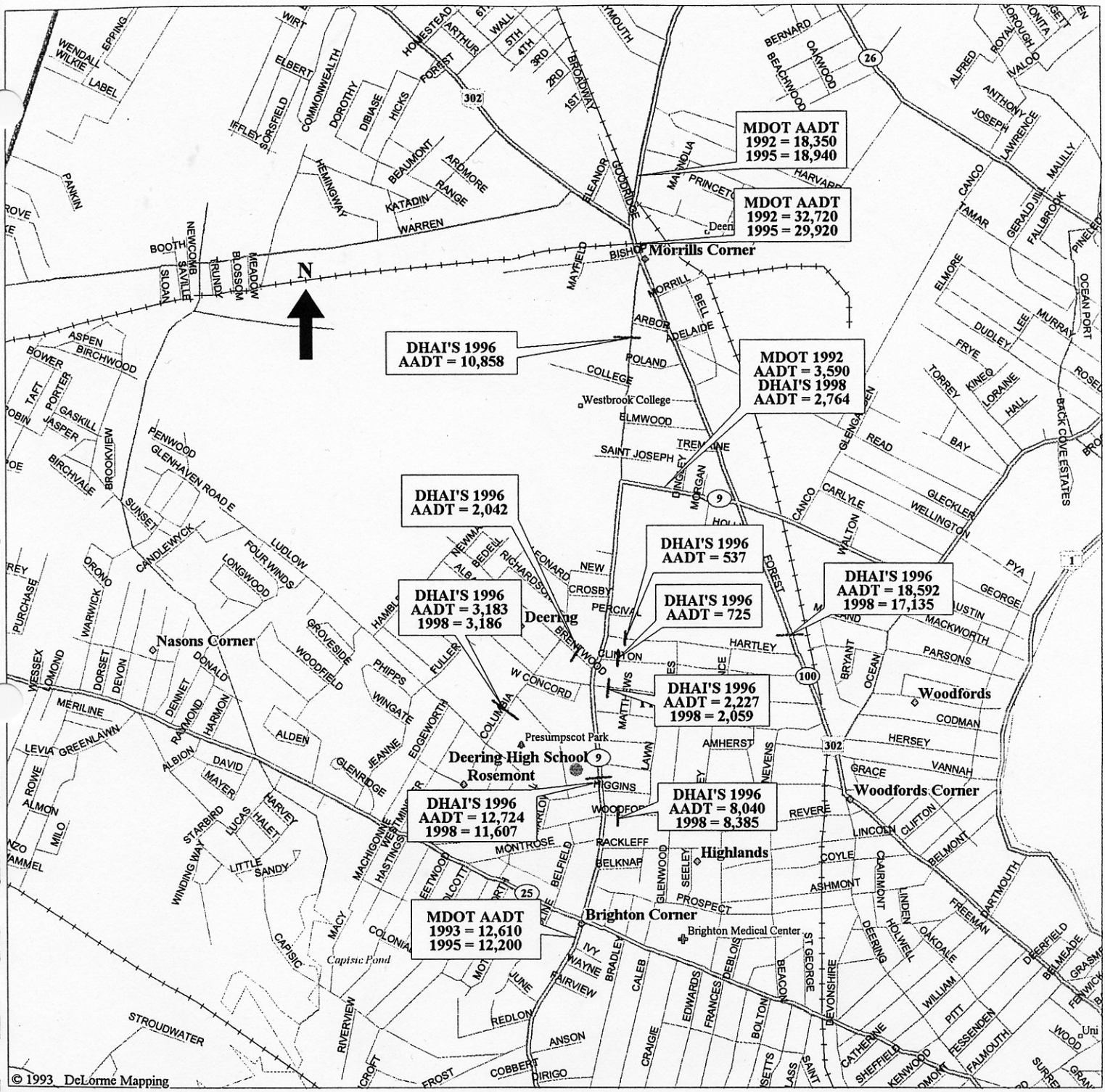
PREPARED FOR: PORTLAND AREA COMPREHENSIVE TRANSPORTATION STUDY

PROJECT:
STEVENS AVENUE PEDESTRIAN STUDY
ALL – DAY BICYCLE SUMMARY

DeLuca–Hoffman Associates, Inc.
Consulting Engineers
778 Main Street
South Portland, Maine 04106
207–775–1121

FIGURE 2

G:\1269\1269bicy.dwg Thu May 14 13:15:35 1998 JCD



LEGEND

- State Route
- Geo Feature
- Town, Small City
- Park
- US Highway
- Population Center
- Street, Road
- Major Street/Road
- Interstate Highway
- State Route
- US Highway
- Railroad
- River
- Open Water

Scale 1:18,750 (at center)

2000 Feet

500 Meters

Mag 15.00
Wed May 27 08:18:06 1998

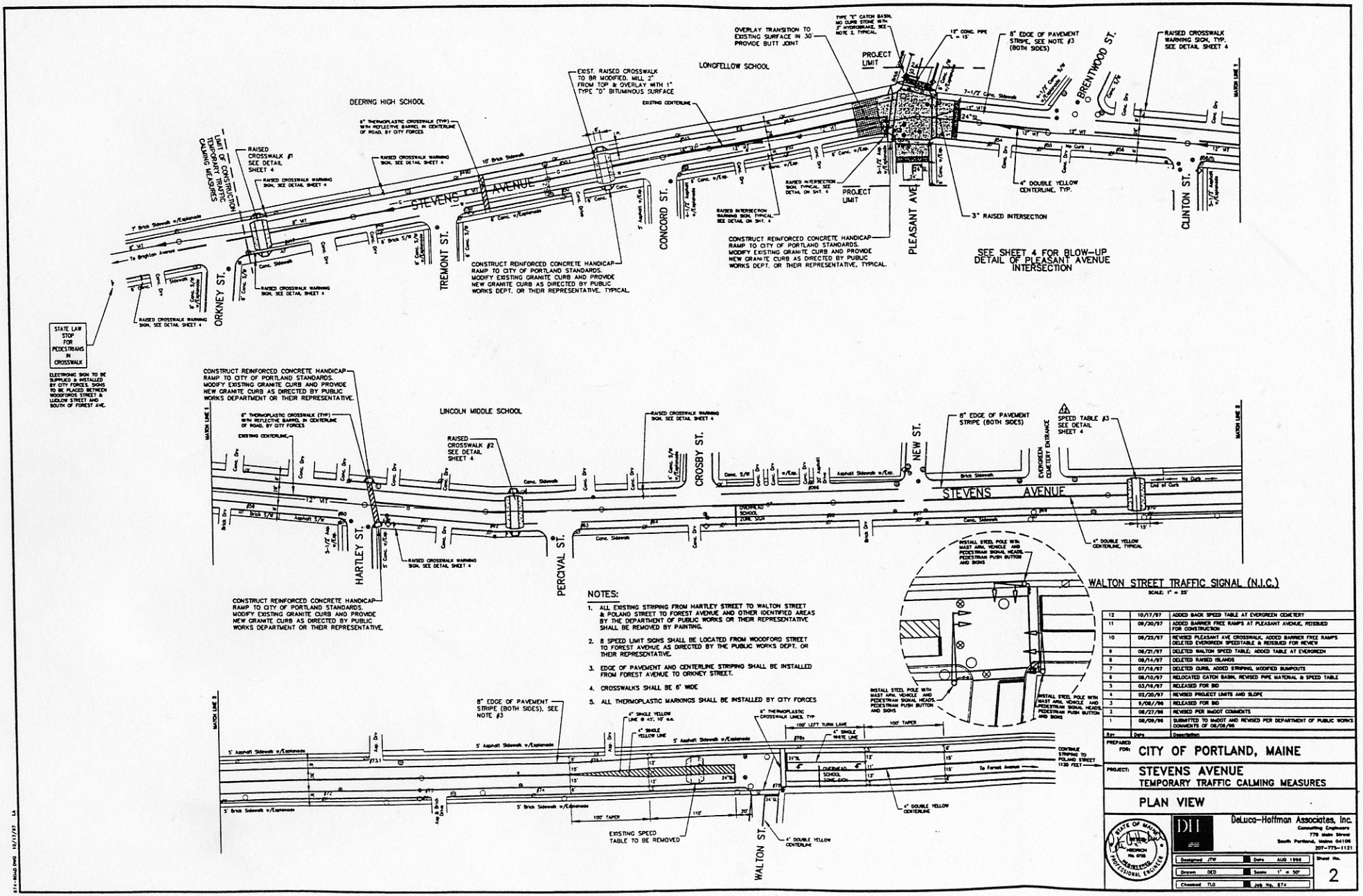
AADT MAP
Portland, Maine

DeLUCA-HOFFMAN ASSOCIATES, INC.
CONSULTING ENGINEERS
778 MAIN STREET
SUITE 8
SOUTH PORTLAND, MAINE 04106
TEL. 207-775-1121
FAX 207-879-7896

FIGURE 3

APPENDIX B

TRAFFIC CALMING PLANS



NOTES:

1. ALL EXISTING STRIPING FROM HARTLEY STREET TO WALTON STREET & POLAND STREET TO FOREST AVENUE AND OTHER IDENTIFIED AREAS BY THE DEPARTMENT OF PUBLIC WORKS OR THEIR REPRESENTATIVE SHALL BE REMOVED BY PAINTING.
2. 8 SPEED LIMIT SIGNS SHALL BE LOCATED FROM WOODFORD STREET TO FOREST AVENUE AS DIRECTED BY THE PUBLIC WORKS DEPT. OR THEIR REPRESENTATIVE.
3. EDGE OF PAVEMENT AND CENTERLINE STRIPING SHALL BE INSTALLED FROM FOREST AVENUE TO ORKNEY STREET.
4. CROSSWALKS SHALL BE 6' WIDE
5. ALL THERMOPLASTIC MARKINGS SHALL BE INSTALLED BY CITY FORCES

Rev.	Date	Description
12	10/17/97	ADDED BACK SPEED TABLE AT EVERGREEN CEMETERY
11	09/30/97	ADDED BARRIER FREE RAMPS AT PLEASANT AVENUE, REISSUED FOR CONSTRUCTION
10	09/25/97	REVISED PLEASANT AVE CROSSWALK, ADDED BARRIER FREE RAMPS DELETED EVERGREEN SPEED TABLE & REISSUED FOR REVIEW
9	08/21/97	DELETED WALTON SPEED TABLE; ADDED TABLE AT EVERGREEN
8	08/14/97	DELETED RAISED ISLANDS
7	07/16/97	DELETED CURB, ADDED STRIPING, MODIFIED BUMPOUTS
6	06/10/97	RELOCATED CATCH BASIN, REVISED PIPE MATERIAL & SPEED TABLE
5	03/16/97	RELEASED FOR BID
4	02/20/97	REVISED PROJECT LIMITS AND SLOPE
3	9/08//96	RELEASED FOR BID
2	08/27/96	REVISED PER MaDOT COMMENTS
1	08/09/96	SUBMITTED TO MaDOT AND REVISED PER DEPARTMENT OF PUBLIC WORKS COMMENTS OF 08/08/96

PREPARED FOR: CITY OF PORTLAND, MAINE

PROJECT: STEVENS AVENUE
TEMPORARY TRAFFIC CALMING MEASURES

PLAN VIEW

DeLuca-Hoffman Associates, Inc.
Consulting Engineers
778 Main Street
South Portland, Maine 04106
207-775-1121

Designed	JTW	Date	AUG 1996
Drawn	DED	Scale	1" = 50'
Checked	TLG	Job No.	874

Sheet No. 2

874-ROAD.DWG 10/17/97 LA

Fire Department

Joseph E. Thomas, Jr.
Chief of Department

CITY OF PORTLAND

May 6, 1998

Mr. Thomas Gorrill, P.E.
DeLuca Hoffman Associates, Inc.
778 Main Street
Suite Eight
So. Portland, ME 04106

Dear Mr. Gorrill,

Attached, please find the results obtained by the Portland Fire Department regarding our tests of the speed tables located on Stevens Avenue. Since our discussion, I had the Department Training Captain conduct a test of fire apparatus and ambulance experience passing over a speed bump at various speeds. These tests were conducted by traveling over the speed bump at an ordinary speed and then three progressively faster speeds.

As a result of these experiences, it appears that the fifteen mile per hour rate is the most consistent and common denominator experienced by both types of vehicles. We have also video-taped the testing process in an effort to be able to illustrate the activity of each vehicle experience at the various speeds. If you should have a need for a copy of this video, I will be happy to provide you with a copy.

If I can be of further assistance to you in this matter, please feel free to contact me at Fire Headquarters.

Yours truly,

Joseph E. Thomas, Jr.

Joseph E. Thomas, Jr.
Chief Of Department

PORTLAND FIRE DEPARTMENT

Training Memo

To: Chief Thomas

From: Capt. Wassick

Date: May 5, 1998

Re: Steven's Ave.

As per your request I ran some tests on the Steven's Ave speed tables on Monday May 27th at 1300 hours. I used Engine 3 and Medcu 4 as the apparatus and used the table on Steven's near New St. The weather was fair, road dry and traffic was normal during the period.

I instructed the drivers of each apparatus to approach the tables as they normally would at what they felt was their ordinary speed. Each apparatus then ran 3 progressively faster tests until they felt they were at an uncomfortable speed.

	Speed(mph)			
Medcu 4	15	20	27	32
Engine 3	12	18	20	25-28

I have talked to many of the drivers of both the engine and the ambulance and they all said that the tables vary and that some are worse than others. The one that I used at New St. is probably one of the "smoothest" and the one in front of Longfellow and the one in front of Deering are probably the "harshest". This is by no means a scientific test and should be used only as general information.

Engine 3 drivers stated that they average between 12 - 15 mph when they travel over them and Medcu drivers stated somewhere between 15 - 20 mph for their travel speeds. They all said that once you get much over 20 mph that it was too rough on both the equipment and the personnel.

The video shows the 4 trials run at the above speeds in order. If you have any other questions feel free to call.

FIRE APPARATUS INFORMATION

ENGINE THREE	180 inch wheelbase Overall vehicle length = 31 feet 7 inches Road clearance = 10 5/8 inches
MEDCU FOUR	158 inch wheelbase

MEMO

To: Larry Ash-Traffic Engineer
From: Sgt. Peter Wentworth
Subject: Stevens Ave Traffic Calming Project
Date: May 19, 1998

To date, the above project has had no perceptible effect on the ability of the Portland Police Department to respond to emergency situations. But, an unlimited proliferation of such projects, could possibly have some negative impact on the Department's ability to respond in an efficient an timely manner to emergency situations

Portland Public Schools

Administrative Offices
331 Veranda Street, Portland, Maine 04103-5599
207-874-8100

May 18, 1998

City of Portland
Public Works Department
Larry Ash, Traffic Engineer
55 Portland Street
Portland ME 04101

Dear Mr. Ash,

Tom Gorrill, of Deluca-Hoffman, has asked me to communicate to you on behalf of the School Department regarding our position relative to the Stevens Avenue traffic calming initiative.

After consulting with the principals of Deering High School, Longfellow Elementary and Lincoln Middle School, as well as the School Department Transportation Director, it is our belief that the traffic calming initiative has enhanced the safety of both drivers and pedestrians (especially school-age children) who utilize Stevens Avenue for travel purposes. However, one comment that we would like to make is that speeding on Stevens Avenue continues to be problematic, and we would respectfully request that enforcement activity be considered.

If you have any questions or seek further clarification, please feel free to contact me.

Sincerely,

D. Davis

Donn S. Davis

DSD:mac

cc: David Ripley, School Committee Chair
Mary Jane McCalmon, Superintendent of Schools
Brenda Roy, Principal, Deering High School
Joanne Fiore, Principal, Longfellow Elementary School
Kathi Rossi, Principal, Lincoln Middle School
Kevin Mallory, Transportation Director

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From: Bruce A. Bell OPERATIONS MANAGER.
To: LWA, DPB, SGE, JPR, JEP, KPN, RAC, JRD
Date: 5/13/98 8:55am
Subject: Steven's Avenue -Reply

The following is in reference to your request relating to - What effect did the Stevens Ave traffic carming had on winter maintenance operations this past winter?
To my knowledge the traffic carming devices on Steven Ave had no negitive effect on the winter equipment. The barrels which are placed in the center of the street do cause inconvenence to both the plow trucks and the traveling public when plow trucks or field checkers have to stop and move them.
During high amounts of snow fall the barrels are not moved (for saiety reasons to employees) which leave an unplowed section through cross walk locations in the center of the street. If the general public can live with this condition I feel our employees can live with this inconvenence.
I would also ask if any other staff person has comments concerning Larry's request to also give him your concerns in writting

Sample

STEVENS AVENUE TRAFFIC CALMING
TEST PROGRAM QUESTIONNAIRE

Thank you for taking your time to give us your reactions to the various traffic calming measures that have been installed along Stevens Avenue. As you may know, the City of Portland received a grant in 1995 to improve pedestrian safety along the Avenue. Over the past 6 months, the City has installed temporary measures to test their effectiveness. Please respond to the following questions to help us evaluate the effectiveness of these measures.

1. In what City or Town do you live?

   Portland

2. If you live in Portland, on what street do you live?

   Clinton

3. What is your overall view of the Stevens Avenue traffic calming project?

   ☑ Strongly Support ☐ Support ☐ Neutral ☐ Opposed ☐ Strongly Opposed

4. As a pedestrian, since these measures were installed, have you found crossing Stevens Avenue to be :

   ☐ Much Easier ☑ Easier ☐ Same ☐ Harder ☐ Much Harder

5. As a motorist on Stevens Avenue, have you been inclined to:

   ☑ Drive Slower ☐ Drive Faster ☐ No Difference

6. As a motorist, have you been inclined to:

   ☐ Avoid Stevens Avenue because of the measures.
   ☐ Use it more frequently
   ☑ No difference

7. Have you noticed that traffic:

   ☑ Generally moves slower
   ☐ No Change
   ☐ Generally moves faster

8. As a user of Stevens Avenue, how has the testing program affected your feeling of safety using the roadway?

Safer As a	Less Safe	No Change
	SAFER	LESS SAFE NO CHANGE
Pedestrian	☑	☐ ☐
Bicyclist	☑	☐ ☐
Driver	☑	☐ ☐

9. From a pedestrian's viewpoint, please evaluate the helpfulness of the measures that were tested:

Not Helpful ⟷ Very Helpful						No Opinion
Raised Crosswalks	1	2	3	(4)	5	☐
Raised Intersection	1	2	(3)	4	5	☐

10. From a driver's point of view, please evaluate the impact of the measures that were tested:

Negative Impact ⟷ No Impact						No Opinion
Raised Crosswalks	1	2	3	(4)	5	☐
Raised Intersection	1	2	3	(4)	5	☐

11. From a bicyclist's point of view, please evaluate the bicycle safety aspects of the measures which were implemented:

Created a Hazard ⟷ Improved Safety						No Opinion
Raised Crosswalks	1	2	3	(4)	5	☐
Raised Intersection	1	2	3	(4)	5	☐

12. If you own a business, has this had an impact on your business?

☐ Yes, business increased ☐ No, business has decreased ☐ Not sure

Comments: _____

_____

_____

13. Have winter driving conditions become:

☐ Worse ☑ Better ☐ No Change ☐ Not Sure

14. Do you think traffic calming projects are a worthwhile use of tax payers money?

☑ Yes ☐ No ☐ Not Sure

15. What age group are you in?

☐ Student under 18 ☐ 18-25 ☐ 26-45 ☑ 46-64 ☐ 65 or Older

16. How do you spend most of your time on Stevens Avenue?

☐ As a Driver ☐ As a Cyclist ☑ As a Pedestrian ☐ Other, Please Specify _____

17. Would you like the temporary traffic calming measures to become permanent?

☑ YES
☐ NO
☐ SOME (Please list)

18. Other comments are greatly appreciated!

I feel traffic has definately slowed down & people in cars are more likely to stop for pedestrians. The placement however of the raised crosswalks are not where people usually cross Overall, it's been successful!

Please return this form to:

Mr. Larry Ash
City of Portland
55 Portland Street
Portland, Maine 04101

JN1259/Survey

STEVENS AVENUE TRAFFIC CALMING QUESTIONNAIRE

1.City	Portland	Falmouth	Scarborough	Gorham	Biddeford	Standish	Westbrook	Freeport	Windham	S. Cartland	Saco	S. Portland	Hollis	W. Buxton	Cape Elizabeth
	117	3	4	1	1	1	1	1	4	1	1	4	1	1	1
	Parsons Fiel	Cumberland	"Out of Town"	<-(From Already Recorded Data, Nonspecific.)											
	1	1	8												
2. Street	Kenwood	Hicks St.	Waverly St.	Alice Ave	Allen Ave. & Ext.	Deering Ave.	Curtis Rd.	Wayside Rd.	Prospect St.	Poland St.	Westbrook	Craigie	Stroudwater	Canco Rd.	Braddish Ct.
	1	1	5	2	1	1	1	2	1	1	1	1	1	1	1
	Highland St.	Cyprus St.	W. Kidder	Webb St.	Brosrside Rd.	Read St.	Northwood Dr.	Birchvale Dr.	Epping St.	Birchvale	Rustic Ln.	Codman St.	Forest Ave.	E. Commonwealth Dr.	Capisic
	1	1	1	3	1	2	1	1	1	1	2	1	1	1	1
	Rackleff St.	Montrose Ave.	Aldworth St.	Prospect St.	Groveside Rd.	Walton St.	Rackleff St.	Montrose Ave.	Aldworth St.	Prospect St.	Groveside Rd.	Walton St.	Hillis St.	Higgins St.	Longwood Dr.
	1	1	1	1	1	2	1	1	1	1	1	2	1	3	1
	Stevens Ave.	Hartley St.	Pleasant Ave.	Clinton St.	Orkney St.	Brentwood St.	St. Joseph St.	Crosby St.	Concord St.						
	13	5	8	7	3	4	1	2	3						
92/14/42 3	SS	S	N	O	SO										
	38	54	14	21	26										
72/52/10 4	ME	E	S	H	MH										
	19	54	52	7	3										
5	DS	DF	ND												
	93	4	39												
6	Avoid	Use More	ND												
	37	4	109												
11 7	Slower	NC	Faster												
	100	42	3												
8		Safer	Less Safe	NC	This question was misunderstood by a few, due to a printing mistake. Data could be a little off.										
	Pedest.	61	14	54											
	Bicicle.	34	16	39											
	Driver	55	33	55											
9/12/66/15 9	(NH-VH)	1	2	3	4	5	NO								
	RC	27	16	15	28	38	15								
	RI	37	15	24	23	22	17								
10	(NI-NoI)	1	2	3	4	5	NO	*This question commonly regarded as unclear.							
	RC	44	13	33	21	36	4								
	RI	37	16	36	18	26	6								
11	(CH-IS)	1	2	3	4	5	NO								
	RC	17	10	17	10	18	52								
	RI	15	9	22	7	16	53								
11 12	Increase	Decrease	Not Sure	No Impact											
	1	5	9	3											
13	Worse	Better	NC	NS											
	34	28	70	14											
14	Yes	No	Not Sure												
	80	54	18												
15	-18	18-25	26-45	46-64	65 +										
	3	5	51	52	19										
16	Driver	Cyclist	Pedest.	Other											
	129	8	47	2											
17	Yes	No	Some:	Raised X-Walks	No Raised Intersection		Neutral:								
	84	46	18	3	1		2								
18 On O. Doc															

Question 12

1. With the raised crosswalks its ok-with the islands-people had a hard time turning down the side streets.
2. *(Steven's Ave Resident) One: Causing nervous Bottlenecks. Do you want the measures to become permanent? Two: No, recycle them. Three: Nadus Raiders spread fears use common sense.
3. The islands were a menace but the raised island (crosswalks) seem to be OK.
4. Some people found coming up side streets avoids the speed bumps.
5. (Clinton St. Resident) The impact for business has created the need for extended parking on all side streets off of Stevens Ave which was never needed before. Now I have people parking all day in front of my house. Also, many more delivery trucks up and down Clinton St.
6. Being near a raised intersection, the sound of vehicles hitting the raised intersection makes a lot of noise (especially large trucks). We are losing customers.
7. No Diff!
8. No change, no impact.
9. Safety of Kids is more important than business impact.

Question 18:

1. I am a parent of 2 which attend St. Joseph's School.
2. I especially feel that the speed bumps should continue down towards St. Joseph's school + the college!
3. The new smaller raised walks are not as effective as the first ones were-"just watch" one day and you'll see.
4. (Same respondee as #3) The first raised pedestrian crosswalks were more effective to slow traffic. The new lower ones are jokes people see no reason to slow down. And please remember you have schools and children from McCauley High School all the way down to Westbrook College. Children at St. Josephs' can get hurt by fast drivers just the same as Deering High School Student can. I feel it'd discriminating on your part not to show St. Joseph's the same safety as the other schools.
5. Should have left Stevens Ave. the way it was. -
6. Raised Intersections very dangerous.
   Raised intersection -
   Raise X walks at school crossings +
   Would like to see one at St. Joseph School
7. More traffic calming measures should be implemented. More calming for McAuley H.S., St. Joseph's School., Stevens Ave Co-Op Nursery School, Westbrook College and Nursery School. There are children and adults affected by this traffic, and their needs and concerns have been overlooked.
8. Raised sidewalks in front of ALL schools including St. Joseph's + McAuley. Also a return of the blinking school zone light at Walton St. before St. Joseph's to slow motorists down in the school zone.
9. Crossing the street is still bad, especially near the schools.
10. I would also appreciate it if the city would clear the snowbanks blocking the St. Joseph school crosswalk-I've called about the problem and I am greatly concerned that someone will be injured or killed trying to scale the banking to get into the crosswalk that leads to the schoolyard! Thank you
11. I am a parent of a child at St. Josephs + daily attendee at St. Joseph's Church. I am nervous about Stevens Ave when I cross the crosswalks in front of St. Joseph's school & church. I'm not sure motorists will stop. I am very nervous when driving by the public schools. The students seem unheedful of traffic. Often, it seems, a student (s) will suddenly "pop up" crossing the road. The entire area near schools + commercial establishments is very nerve-wracking due to jay walkers.
12. (Spouse of commentor #11) If traffic calmers can damage cars, I am against them because I think its far more important to keep your attention on pedestrians while driving on Stevens. How about using those meters that show you how fast you are going?
13. I use Steven's Ave. daily because I walk on Stevens Ave at the UNE

14. Traffic calming measures have seemed to make some drivers extremely impatient-I see a lot of "road rage" ever since these measures implemented! It is not a worthwhile effort-it is dangerous for both motorists & pedestrians!
15. I would like these traffic calming measures to become permanent: 1.) either slightly smaller roadbumps or more warning about upcoming roadbumps. 2.) make ALL of Steven's stretch 15 mph so constant braking isn't necessary.
16. Traffic only slows at speed bumps.
17. *(Comment by Steven's Ave. Resident) Add more calming measures, especially raised crosswalks or speed bumps. The narrowing design was a failure, do not try again! Many drivers do not slow down until right at the raised section, some even race over the speed bumps. We either need more or better patrolling by police to issue speeding tickets.
18. *(Hartley resident,) An emphatic NO! If you want to improve safety and spend money where it will so some good, try re-striping the lanes on Forest Ave. in the area where Forest Ave. Marginal Way and the Deering Oaks road all intersect. And repaint the sides of the "traffic calming" medians near Oakhurst so they can be seen on a rainy night. Then stripe all of Forest Ave. You've applied 7-day a week, 24 hour a day solutions to a problem that existed only during the school year for a few hours in the morning and a few hours in the afternoon. And in the process you've created the potential for other danger. Try having a car behind you who doesn't know the neighborhood. I've nearly been hit a couple of times when I slowed down for your "traffic calming" but the car behind me did not. I paid taxes yet the police are too busy to show up a couple of times a month. That would be just as effective and less costly than "traffic calming" and certainly safer for all involved. It is done on the road I work on in South Portland and it works! And, in the course of doing all this you've taken what once was an aesthetically pleasing area, reminiscent of Portland's finest days, and given it the look and feel of approaching urban blight. At best, the Avenue looks like a rodeo put up for a barrel race. And how I love dodging those barrels when they blow over! The only good measure was the light at Stevens and Walton. Everything else should be returned to the way it was. And take down that hideous flashing "Stop for Pedestrians" signal and put it on downtown Congress where it is needed.
    By the way, will you survey the emergency vehicles that now have to bounce along the avenue?
19. * (Pleasant Ave. Resident) The last effort made so much more sense than the first fiasco of last summer! Simple is always better in the long run for John Q. Public.
20. Would like to see a more aesthetically pleasing design to the traffic calming features on Steven's Ave.
21. I approve of it, though it would be nice if drivers simply obeyed posted speed limits. The traffic-calming measures make Stevens Ave look as though it's preparing for a parade or two-seems like too much has been done. It's such a scene now. Maybe one fewer raised crosswalk/intersection. 2. I approve if

you take away one speed bump. p.s. please please please paint some new lines on Forest Ave and other roads of Portland /S. Portland where paint is completely faded!! IT IS SO HARD TO DRIVE around here, and it's got to be worse and more of a hazard for tourists who don't know whether roads are one, two or three lanes. Thank you!

22. *(Clinton Resident) 2. Winter driving is better because people drive slower. 3. It is much safer for all people including children & senior citizens. I'm surprised someone hasn't been hit or killed before your traffic calming measures. Keep up the good work!
23. "Brighton Ave"- needs calming projects- the worst roadway in the city- speedway
24. And is the city going to pay for new shocks on cars as I know they had to on fire trucks using these speed bumps? Leave the avenue alone-no deaths in over 62 yrs. I know of.
25. Other than the intersection, things should remain as is.
26. *(Higgins St. Resident) Need to slow down drivers who just don't care, about the speed limit, in the school zone. MORE RAISED CROSSWALKS.
27. I have seen more accidents- I have nearly been hit by a car due to driver inattention to other cars slowing down. I would be interested to see if accidents have increased. I do not like the neighborhood side streets being used by traffic wanting to avoid Stevens Ave.
28. I think traffic calming projects are a good use of taxpayers money, but not on Steven's Ave. I think better enforcement of speed limits by police would be a more sensible job of dealing with speed limits on city streets.
29. I find that the raised intersections/crosswalks have not had a significant effect on traffic speeds during those hours (schools in/out) when it is important to slow traffic down. People, I find, generally slowed down anyway when children were out. The only exception, I think, is in the area of Lincoln Middle School, where the kids tend to travel in large groups and cross the street without paying much attention to traffic. (I travel Stevens Avenue several times each day and have for the past 10 yrs. I frequently walk from Morrills's Corner to Brighton Avenue intersection and I have a daughter who attends McAuley High School.
30. People speed between speed bumps to make up for lost time going over them. SUV's and Trucks speed to 40 or 50 and go over for fun. Waste of time, money and manpower. Dig them up!!
31. Movement as a driver is slower, more +. complete negative feelings re raised crosswalks. Slows traffic greatly. When not needed except perhaps when children are walking to or from school. More pollutants in the air-EPA won't be happy. More gasoline used in low gear. Put a policeman on the avenue. Different places, different hours. Once the street gets a reputation as well-supervised, people will not risk speeding tickets.
32. Remove obstructions and put police on Stevens if there is a speed problem like Portland did on Washington for Sock School.

33. *(Pleasant Ave. Resident) Repaint cross walk near Clinton Ave. Provide a policeman in busy hours/school hours. That's the only real deterrent. Stop messing up a lovely street with systems that don't work-they just annoy. People still do not obey 15 m/h speed limit when flashing-a few tickets should change that. Enforce existing law-don't make a mess worse.
34. Since these measures have been in place the kids seem to cross Stevens Ave anywhere they want (not the crosswalks) and you have to be ready to stop quick. Many times they will step out between parked cars and not even look and keep walking straight across, thinking they have the right of way no matter what!! I think that the way it is set up is great, it slows the cars down which makes a driver more alert but I also feel that the kids need to use what is there for crossing, because you pay a lot more attention to crosswalks than parked cars!!
35. The speed bumps are often dangerous to the underside and shock absorbers and springs of cars. Many don't see the bumps till right on top of them and I see them "hit bottom." Pedestrians were not in real danger before; often it's greater now as drivers focus on the speed bumps. Those things are a real irritant and unnecessary. Only a few people wanted this. I heard some initial discussion which revolved around "what if!," not what is. Certainly they can be reduced by about 4. Leave one at Deering High maybe. What an incredible waste of funds for the hysteria of a few people who became squeeky wheels over "what ifs" that have never happened. You've not done this on any other street except one at Allen Ave. where lots of people were concerned, and there are no sidewalks. Please don't "fix things that aren't broke"! as you have on Stevens Ave. Thanks for asking! It helps to get lots of opinions.
36. *(Stevens Ave Resident) The first traffic calming measures were awful-the ones in use now very good
37. (Hartley St. Resident) I firmly believe more Secure Center crosswalk warning "Its the Law" would have some impact on crossings. Light at Walton Great. It's not easy perhaps a caution stand with a blinking orange light.
38. (Orkney St. Resident) Traffic calming measures are absolutely necessary on Stevens Avenue because it runs past so many schools and through residential and neighborhood business areas. Pedestrians must feel safe crossing this street. One problem with the painted crosswalks is that not all drivers know they have to stop for pedestrians in the crosswalks. More signs and blinking lights at the painted crosswalks would help. Also, the crosswalks need to be visible to both pedestrians and drivers. Some of them are faded. why?
39. (Stevens Ave Resident) Take them out!
40. (Brentwood Ave Resident) Take the bumps out of the 10-minute mile!
41. As a pedestrian/runner, I find it no easier to cross Stevens Ave. Cars still rarely (at best) stop when I'm in a crosswalk-raised or unraised. I think the money would be better spent having a police sit at crosswalks and ticket people who don't stop. That will make people much more aware-if it hits their own pocketbook.

42. (St. Joseph's St. Resident) I have relatives and friends from most states who visit me, and in every case they detest those raised areas, and see no benefit from them-just a waste of taxpayers money and a nuisance in general.
43. There has never been a problem, so what are we fixing. Another example of big government protecting us from ourselves!! By the way, bathtub accidents are up, may be helmets in and for all people wishing to use one. Mandatory of coarse.
44. (Crosby St. Resident) Before spending money starting a project and then tearing it out-send notices to citizens asking for ideas. The project first started on Stevens Ave of islands and extending side walkways out into the avenue was one of the poorest designs I have ever seen. It would have created more problems then preventing them, I.E. Emergency vehicles. Sidewalks in this area need to be fixed for safe walking and so people won't feel they have to walk in the streets. They don't need to be extended blocking free flowing traffic.
45. (Stevens Ave Resident) To obey the laws we must stop at crosswalks for pedestrians=30mph. speed limit <u>if enforced</u> should be safe for all.
46. (Stevens Ave Resident) Drivers slow down for the crosswalks then speed up. It does more to piss off drivers than to get them to slow down.
47. I do not understand the purpose of the dual traffic light going northbound, at Walton. Is this intended to be 2 lanes? It is not marked as such. Very pleased with raised crosswalks. Some drivers disregard and do not decrease speed, but most do. There is a problem with people parking <u>in</u> the crosswalk opposite and in front of Pat's Market-Blocking the crosswalk is frequent there and should be addressed by ticketing.
48. I find people walking with children are using the raised crosswalks as if they are sure to stop traffic. I think they have actually let down their safety skills. I am also concerned about emergency vehicles using this street. I saw a fire truck have to completely stop going over the speed bumps. I would be extremely concerned if I need a fire truck. Get rid of all this crap and have the police make more stops. I always drove 15 mph during school hours and people were always passing me on the right side.
49. (Listed these as the measures he would like kept) Lower speed limit to 25, raised intersection, Stevens and Pleasant Ave, Light at Walton and Stevens. I do not like to have to use my brakes as frequently as I have to at the raised crosswalks.
50. People still do not stop for Pedestrians in the crosswalk-I wish there were better enforcement. I worry for my children walking home from school less now about crossing Stevens Ave (they use the crossing guard) but find more impatient drivers turn down side streets to avoid the slowing traffic, creating a huge and dangerous hazard for children who need to cross these side streets to get home. I find as I walk my children home that MANY of these drivers do not even look for children as they race to make up time.
51. I feel the raised sidewalks are a better means of slowing down traffic than the median strip. I felt the median strip was dangerous as a driver and a pedestrian.

I t confused drivers, cyclists, and walkers. The raised sidewalks and intersection slow the traffic down. The light at Walton street is another help. I was quite upset to receive this survey on the street. I am a teacher at St. Joseph's School and we were never consulted about any of the projects. Even though we are a Catholic School we still have children cross Stevens Ave. daily. It would be nice if the committee asked people about the traffic who use it on a daily basis than the ones who use it once a week-a concerned citizen.

52. I think a police cruiser should be out randomly to apprehend speeders. After a while you wouldn't need those speed bumps.
53. (Stevens Ave Resident) Said wanted these changes to become permanent: only raised crosswalks if necessary with barrels in front of schools. If we had only the barrels (like the ones on Allen Ave. by Northfield Green & Forest Ave. by Deering Pavilion) think it could do the same- without the cost. Also easier for all emergency vehicles. I've watched many times when these vehicles have had to come to nearly a complete stop when they approach these speed bumps. Six times as they try to get up Stevens Ave they have to practically stop . I watch every day as students from Lincoln Middle cross the street. If there are students waiting to cross-cars stop. If no students are there they keep even speed over the bumps. Before the barrels, nobody stopped for anyone to cross the street. When I walk down to Deering Center and try to cross the street, all cars stop, if I'm by the crosswalks. I actually believe that people had to be educated, made aware, that you had to stop for pedestrians on crosswalks. They do now! The law needed to be enforced.
54. Want Police Presence.
55. As a parent of children who ride bikes and walk Stevens Ave. and a teacher concerned for student safety, I am highly in favor of this project.
56. (Pleasant Ave Resident) I am in favor of this project, but not anything like what was tried the first time!!
57. (Pleasant Ave Resident) I appreciate the effort on the part of everyone involved to achieve this test period. Many residents, elderly and children in particular, depend on us to have one vision and perseverance to make this street as safe as we can for all.
58. (Hartley St. Resident) The installation of the traffic light at Walton St. is helpful. The raised crosswalks and intersections have a slight positive impact on safety.
59. (Resident of Clinton St.) I really see no need in keeping the speed bumps or raised intersections because I don't feel that they are making Stevens Ave. any safer. I have lived on Clinton St. all my life and I have never had a problem crossing the street before. With the new traffic calming test I do not feel any safer. It backs up traffic, people try to fly over the bumps and especially in winter there's an even bigger mess because the plows have to go up and down instead of just straight plowing. I think that the city could have found something more worthwhile to put the money into. I would like to see the street returned to normal.

60. (Stevens Ave. Resident) We are in danger of cars running into us as we slow for the raised walks!
61. The prior calming effort (narrowing the road) was ill conceived, misguided and not too bright! Please don't do that on any other streets. The addition of a traffic light at the R & G intersection has been the best change. However, I do have some concerns regarding the intersection of Forest Ave. and Warren Ave. Formerly traffic could proceed in both directions simultaneously when the green arrow to Warren Ave. was not lit. Now traffic can proceed intown only. It seems to make no sense to have the northbound lane (toward Windham) stopped when it does not interfere with the southbound (intown) traffic. A simple red arrow would stop left turns across traffic. Also, the lights in Marello Corner at Bishop St. make no sense. A left turn from Stevens onto Bishop is prohibited, even though there frequently is no on-coming traffic. Yet a left turn -against traffic- is permitted from Forest Ave. Also, the light from Bishop St. is barely long enough for 2 cars to proceed safely. Please rethink this situation. The current set up encourages people to ignore the turn sign and run the red light.
62. Please consider the increased noise that raised intersections and crosswalks create.
63. Monitoring not conducted as originally indicated- winter conditions poor but not observed by committee - traffic diversion heavy.
64. I strongly support permanent use of the traffic calming (as it is now), but I also support police enforcement.
65. I support the raised area, but definitely not the created obstructions intruding into the street. I was very glad to see those removed. The no left turn Bishop St. from Stevens is STUPID. I can't believe that arrangement. Stevens Ave. is a beautiful street, any traffic calming shouldn't affect the beauty.
66. The problem that we have is that when no kids are around it is impossible to go the speed limit. It would help a lot to <u>visibly</u> mark the existing crosswalks.
67. I think you should also look into a pedestrian overpass in front of the schools similar to that used near the Stevens and high school in Westbrook. I travel Stevens Ave. Mon-Fri, and still see a lot of fast paced motorists who do not stop for children trying to cross the street. I would be in favor of more raised walks in front of Catherine McAuley High also.
68. We must not forget about Elmwood St. off of Stevens Ave; paralell w/ St. Joseph's parish school. That st. is an accident waiting to happen. Cars continue to speed on this very narrow st. and either a child will get hit or there will be a car collision. Please consider the safety of St. Joseph's school children as well.
69. 1-Just don't narrow the road! 2-I still see speeders in front of St. Josephs School, generally from the direction of the other schools where there is a straight-away. Coming from the south (?) where there is a flashing light and raised crosswalk there are fewer speeders.
70. Do what you have to do to keep our youngsters safe!
71. Some: One in front of each school.

72. I've been dropping off my children at St. Joseph's school for 12 years thus far. It has slowed some drivers in front of the school for the most part, with the help of our school guard. But there still seems to be the "speeders" that cannot read or who wish not to. They speed until they get to McCauley's area coming in from Northgate area to Town.
73. Please remove the raised speed bumps, but the lights at Walton are a big plus!
74. (Concord St. Resident) 17: Some: One or two speed bumps by school.
75. 17: Some: Remove the raised bumps please! The traffic lights at the intersection of Walton St. is good I teach at St. Joseph's school, Stevens Ave.
76. (Steven's Ave. Resident) I grew up going first to Roosevelt Elementary, Longfellow, Lincoln and then Deering. And now my children go to St. Josephs ad it appears that this school was overlooked. Should we wait until another child is killed in front of St. Joseph's Parish School.
77. The children from the High School and Jr. High. do not use crosswalks and they most often walk out between cars into traffic. Children and young adults should be taught to be careful as well as drivers.
78. (Steven's Ave. Resident) There has been a decrease in heavy tractor trailer traffic which is a welcome change. The decrease has also improved the amount of heavy trucks making turns onto side streets such as Elmwood at hours inappropriate for the residential areas of this part of town.
79. (Pleasant Ave. Resident) More raised speed tables would be useful on Pleasant Ave. and in front of St. Joseph's. People drive way too fast on Pleasant Ave.
80. Let's not forget abut the areas near St. Joseph's school, college of New England and Catherine McAuley High School.
81. Slowing down traffic around the schools is very important. This seems like a good solution.
82. I only used Stevens Avenue to bring my child to St. Joseph's school during the past two years, I will have no need to use this street once she graduates this year. Since this area is a School Zone drivers should be driving slower or at the posted speeds if not, they should be ticketed by the police. There really should not be special speed bumps on the road. There should be speed traps for the unsafe drivers who are dangerous to the children who use this road to attend the schools.
83. I think that with so many schools on Stevens Ave. we need to slow the traffic down. The calming measures and new traffic lights were needed.
84. This has been a big waste. Raised tables, etc, distract motorists. Work on Stevens Ave. has encouraged drivers to speed around side streets like ours [Higgins St.] which makes it dangerous for neighborhood children. Why didn't you spend the money on a few more hours for police patrols and a few more stop signs? Why aren't there "stop for pedestrian" signs at crosswalks like the one by Pat's Market?
85. People seem to speed more on side streets. Speed bumps on Stevens have increased speeding and traffic on side streets which makes them more dangerous. Have you considered less speed bumps on Stevens and some on the side streets off Stevens on the Forest Ave. side.

86. As a pedestrian, I am for them. As a driver, I am not. But over time, one gets used to them.
87. (Concord St. Resident) The elements of Traffic Calming being rated appear to be very effective. I run along Stevens every day and find the traffic moving much slower- at a safe speed. The measures are effective! These measures should be made permanent. No need for additional measures as were contemplated in earlier plan.
88. (Concord St. Resident) One of the things that was stressed with raised crosswalks by the schools-was to put up no-parking signs by the crossing (which was there by Longfellow School) but nothing has happened and with more people driving and parking vans it is impossible to see people on the sidewalk wanting to cross!
89. (Hartley St. Resident) Drivers are not considerate of the pedestrians on Stevens Ave, specifically around Pomeo's, Pat's and The Quality Shop. If you are waiting in a crosswalk, cars do not stop for you! Commuting drivers are in a hurry to get home after work, so they really do not care about those living in this area. If you folks are really sincere about helping those of us who shop locally, then install some crossing lights!!
90. (Steven's Ave Resident) Living on Stevens Ave, the rate of pulse of most drivers has slowed down. I still think more presence by police officers would also be effective. Thank you
91. (Orkney St. Resident) Traffic in Portland has become horrendous. Everything and anything done to correct this will benefit us all.
92. (Steven's Ave. Resident) Safety and speed factors seem to be slightly better - I hope they continue with time and continuance of the calming measures.
93. (Pleasant Ave. Resident) Appreciate the Walton Street Light! I was in the minority when the signal changes were put in place-and then removed. I like it! I am, however, satisfied with the current situation as I find it safer for my school-age children and myself when walking.
94. Something needs to be done in the area of St. Joseph's School/Church and Catherine McAuley. Drivers use that stretch to make up time. More raised crosswalks needed.
95. What about a raised crosswalk in front of St. Joseph's Church or School?!? We could really use one!
96. (Clinton St. Resident) I feel traffic has definitely slowed down and people in cars are more likely to stop for pedestrians. The placement however of the raised crosswalks are not where people usually cross. Overall, it's been successful!

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

ANGUS S. KING, JR.
GOVERNOR

EDWARD O. SULLIVAN
COMMISSIONER

November 5, 1997

Brian Peterson
229 Prospect St
Portland, ME 04103

Dear Mr. Peterson:

This letter is in response to the questions you posed in your letter dated October 15 concerning the Stevens Avenue "traffic calming" project.

At your request we have run the emission factors (grams per mile) versus speed of a vehicle (miles per hour) for two pollutants nitrogen oxides (NOx) and volatile organic compounds (VOCs). In addition I have provided two runs: summer and winter as emissions can vary depending on temperature. NOx and VOCs are the primary pollutant precursors in the formation of ground-level ozone.

As I stated on our phone call, in general NOx increase with speed and VOCs decrease with speed. You can see from the attached graphs that this holds true. Looking at the summer graph, the optimum speed to minimize VOCs appears to be about 55 mph and the optimum speed to minimize NOX appears to be about 20 mph. The optimum speed to minimize both pollutants would be the point where the two curves intersect. This speed appears to be about 25 mph. Therefore, the statement of air quality benefits from reducing the speed of vehicles on Stevens Avenue from 34 mph to 25 mph appears to be true when addressing both pollutants. This analysis does not consider the emission impacts of increased braking and acceleration nor does it consider any reduced trips that may occur because of increased pedestrians or bicycling.

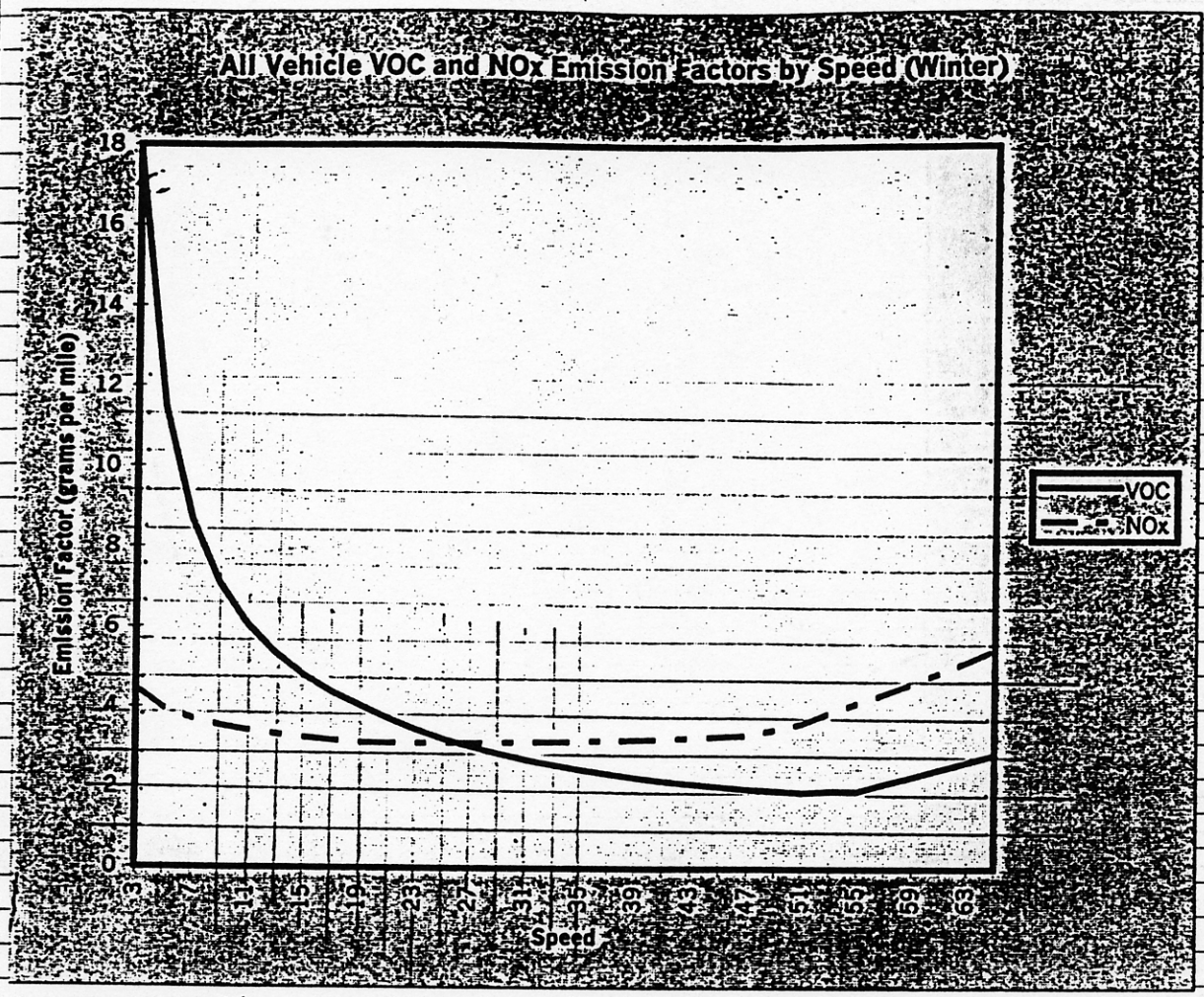
Although the Department is no longer on the CMAQ project evaluation team, a review of our CMAQ file shows that the Department was on the evaluation team that reviewed and approved the proposed Stevens Avenue project. The air quality analysis conducted on the proposal was deemed adequate and conducted using the best available information.

I hope this information will alleviate your concerns on the air quality benefits associated with the Stevens Avenue project. If you have any questions on the analysis feel free to give me a call at 287-7039.

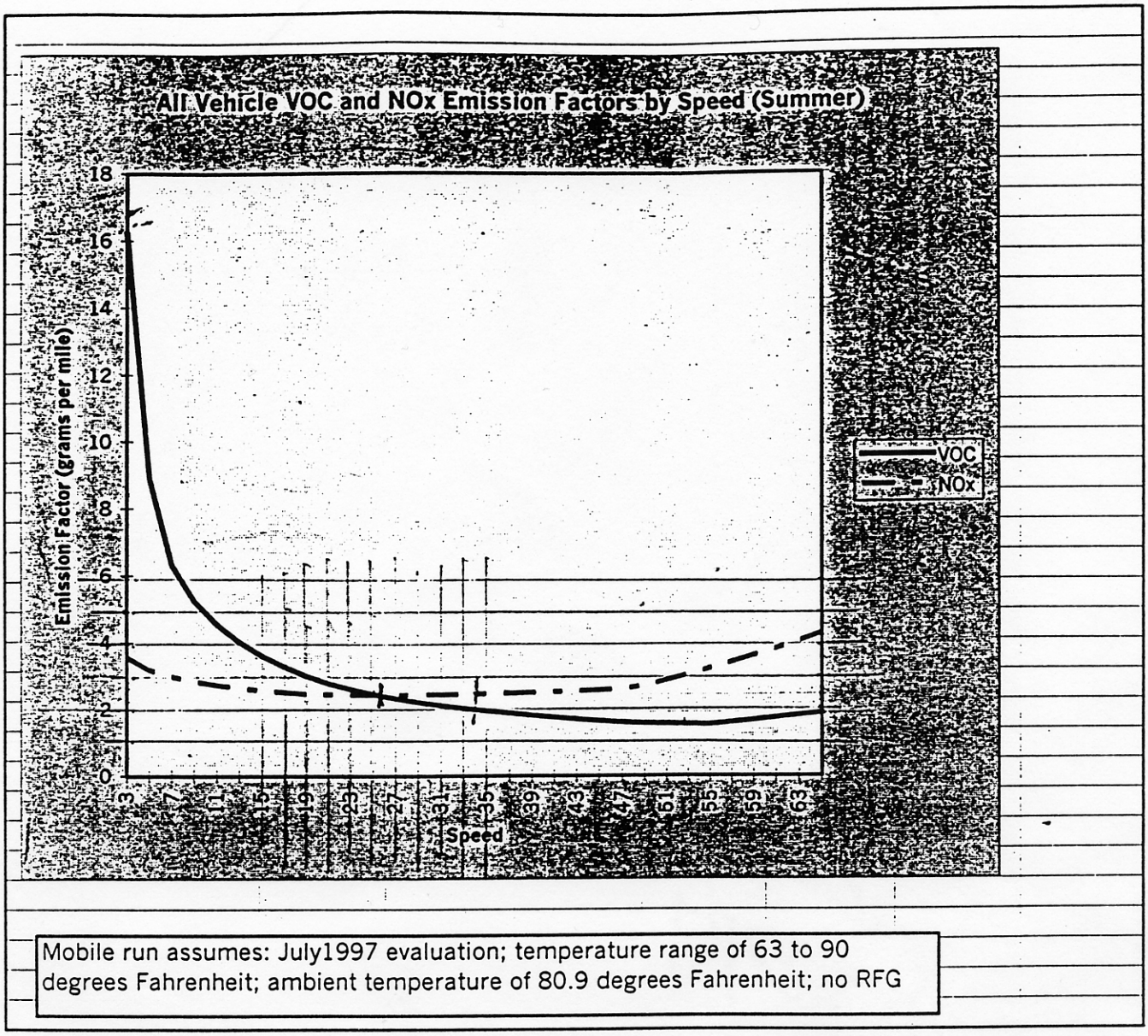
Sincerely;

Ron Severance
Bureau of Air Quality

CC. Dean Lassard, DOT
James Brooks, DEP BAQ



Mobile run assumes: January 1997 evaluation date; Temperature range of 5 to 32 degrees Fahrenheit; ambient temperature of 24 degrees Fahrenheit; no RFG



Mobile run assumes: July1997 evaluation; temperature range of 63 to 90 degrees Fahrenheit; ambient temperature of 80.9 degrees Fahrenheit; no RFG