

**Report of the Transportation Advisory Committee
to the
Arlington Board of Selectmen**

2 December, 2003

Gray Street/Quincy Street/Fountain Road Intersection

Date Referred: 11 August, 2003

Date Deliberated: 18 November, 2003

Committee Members present: Elisabeth Carr-Jones, Lt. Jim McHugh, Michael Rademacher, John Sanchez, Scott Smith, Ed Starr.

Working Group: Stavroula Bouris (Ottoson Principal), Elisabeth Carr-Jones (Group Leader, neighbor), Amy Cohen (Ottoson Safety Committee, Safe Routes to Schools), Julie Dunn (parent, neighbor), Officer Karen Kelley (APD), Catherine Maccora (neighbor), Lt. Jim McHugh (APD), Ron Santosuosso (DPW), Paul Schlichtman (ASC), Ed Starr (TAC Chair).

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Paul Schlichtman letter of 5 August 2003
Safe Routes to Schools "Intersections near Ottoson School"
TAC "Guidelines for All-Way Stop Installation"
TAC "When should intersections receive stop signs and signals?"
TAC "About Crosswalks"

OVERVIEW AND RECOMMENDATIONS

Gray Street/Quincy Street/Fountain Road Intersection

Overview:

The primary concern with this intersection is over the safety of Ottoson Middle School students. Manual counts indicate that at peak use over 100 students pass through this intersection during both morning and afternoon rush times. During school rush times, Quincy Street traffic forms three lanes at the intersection. During the morning rush, the intersection is used as a secondary drop-off for students. The school is not, however, visible from anywhere in the immediate vicinity of the intersection.

The intersection has three crosswalks, two on Gray Street and one on Fountain Road. There are stop signs on Quincy Street and Fountain Road. A standard roadside school crossing sign is installed on each side of Gray Street in advance of the crosswalks. Gray Street has a sidewalk on the north side only; Quincy Street and Fountain Road have sidewalks on both sides. Visibility along Gray Street is good from both directions; visibility from Quincy Street is somewhat hampered by a hedge on the NE corner and visibility from Fountain Road is hampered by a large street tree just west of the SW corner.

Gray Street is an Urban Collector with average daily traffic of approximately 4,000 vehicles; Quincy Street is a Local Road with average daily traffic of approximately 1,500 vehicles, Fountain Road is a Local Road with less daily traffic than Quincy Street. On this section of Gray Street the mean traffic speeds are approximately 30 mph and 85th percentile speeds are approximately 35 mph; on Quincy Street the mean traffic speeds are approximately 20 mph and the 85th percentile speeds are approximately 25 mph.

Since 1998, there have been three reported crashes at this intersection. One of these involved two students who were struck crossing Gray Street in a heavy rain; both students suffered injuries. A Traffic Supervisor was assigned to the intersection after this crash three years ago, and removed earlier this year.

Recommendations:

1. Install fluorescent yellow-green roadside signs on Gray Street (see Proposed Signs).
2. Install thermoplastic pavement markings on Gray Street crosswalks.
3. Instruct the Town Engineering Department to install a crosswalk on Quincy Street at the time of water main replacement construction (currently scheduled for Fall 2004).
4. Instruct the Town Engineering Department to investigate narrowing Quincy Street at its approach to Gray Street at the time of water main replacement construction.
5. Continue targeted traffic speed enforcement on Gray Street.
6. Instruct the Town Tree Warden not to replace the large street tree just west of the SW corner of the intersection on Gray Street, when it is removed in due course.

GRAY STREET PHOTO

Looking East towards Intersection



PROPOSED SIGNS

Gray Street

Fluorescent yellow-green signs to be installed at initial crosswalk in each direction.



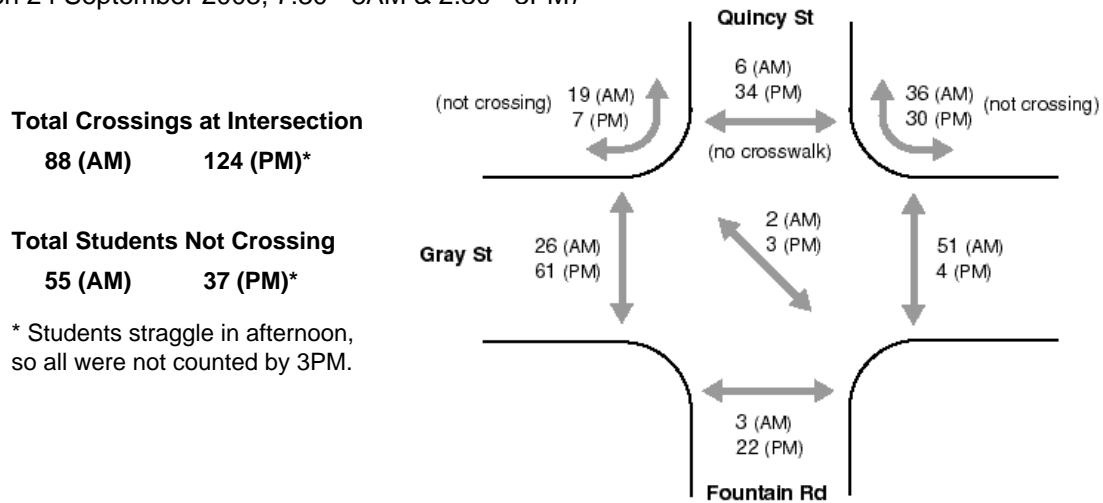
Fluorescent yellow-green sign to be installed in advance of large street tree on eastbound approach to crosswalks.



PEDESTRIAN COUNTS

Gray Street/Quincy Street/Fountain Road

(taken 24 September 2003, 7:30 - 8AM & 2:30 - 3PM)



TRAFFIC DATA

Gray Street and Quincy Street

Gray Street	Westbound	Eastbound	Total
Daily Traffic	1,918	2,034	3,952
AM Peak (6 - 9 AM)	525	301	826
PM Peak (4 - 7 PM)	319	498	817
Mean Speed	29	30	
85th Percentile Speed	33	35	

(count performed 5-8 September 2002 at 321 Gray St, at Robbins Rd)

Quincy Street	Northbound	Southbound	Total
Daily Traffic	698	787	1,485
AM Peak (6 - 9 AM)	125	186	311
PM Peak (4 - 7 PM)	163	169	332
Mean Speed	19	20	
85th Percentile Speed	24	25	

(count performed 17-20 September 2002 at 67 Quincy St, between Farmer & Benjamin)

CRASH HISTORY

Gray Street/Quincy Street/Fountain Road

(recorded between 1 January 1998 and 10 October 2003)

10 April 1990	Motor Vehicle in Traffic
17 December 1995	Motor Vehicle in Traffic
15 September 2000	Pedestrian

PERCEIVED PROBLEMS AND POTENTIAL SOLUTIONS

Gray Street/Quincy Street/Fountain Road

Below is a somewhat prioritized list of perceived problems and potential solutions compiled from the Working Group meeting, Safe Routes to Schools, the Arlington (email) List and discussions with neighbors.

Perceived Problems:

- no Traffic Supervisor (Crossing Guard)
- school not visible from intersection
- traffic speed on Gray Street
- disappearing crosswalk paint
- outdated signage
- no sidewalk on south (uphill) side of Gray Street
- no crosswalk on Quincy Street
- poor visibility pulling out from Quincy Street
- poor visibility pulling out from Fountain Road
- Quincy Street traffic forms 3 lanes during school peaks
- drop-offs & parked cars during morning school peak

Potential Solutions:

- thermoplastic crosswalks
- improved signage on Gray Street
- add crosswalk on Quincy Street
- slightly narrow Quincy Street at intersection
- targeted enforcement
- don't replace large street tree blocking view from Fountain Road

- Traffic Supervisor (Crossing Guard)
- revise instructions from school to parents (to avoid intersection)
- remove hedge on NE corner

- four-way stop
- one-way northbound (downhill) on Quincy Street

- sidewalk on south side of Gray Street (from Oakland to Scituate)
- speed hump on Gray Street
- raised crosswalk or raised intersection
- bump outs on Gray Street
- time-actuated "Reduced Speed when Flashing" beacons on Gray Street
- pedestrian-activated flashing beacons on Gray Street

- in-street pedestrian warning sign
- painted bump-outs at crosswalks on Gray Street
- yellow curbs at corners
- "No Standing" signs at corners
- additional street lighting (add pole at NW corner)

EVALUATION OF POTENTIAL SOLUTIONS

Gray Street/Quincy Street/Fountain Road Intersection

The potential solutions in the previous section have been divided into five groups. The first group includes affordable, non-disruptive items that the Committee feels will be effective in reducing the problems at this intersection. Installing thermoplastic crosswalks and improved crosswalk signs on Gray Street will increase visibility of the school crossing. Installing a crosswalk, and slightly narrowing the roadway entrance on Quincy Street should make crossing safer for pedestrians as well as discourage traffic from forming left and right turn lanes during school rush times. Continuing targeted enforcement on Gray Street will help to prevent any increase in traffic speeds. Not replacing the large street tree that obstructs the views of Gray Street from Fountain Road and the SW entrance to the crosswalk will increase visibility.

The second group of potential solutions includes items that may reduce the problems at this intersection, but over which the TAC has little control. Reinstating the Traffic Supervisor at this intersection has been established as the most preferable solution for those concerned with the safety of Ottoson students. However, the TAC has been informed by the Town's Public Safety Officer and by the School Committee Member who instigated this report that this reinstatement is highly unlikely. Removal of the hedge at the intersection's NE corner will most likely happen in the near future due to the property owner's willingness to participate in the process.

The third group includes items that the Committee feels could be disruptive. A four-way (or all-way) stop may be arguable for this intersection due to the pedestrian traffic generated by the school (see *Guidelines for All-Way Stop Installation*). However, we believe that there are two problems with this solution. First, there is a significant traffic volume discrepancy between Gray Street and both Quincy Street and Fountain Road. Second, there is a relative infrequency to the significant pedestrian traffic. These two conditions may create an environment where motorists will consider the Gray Street stop to be unnecessary. Motorists often ignore signs and signals at intersections where they are not really needed (see *When should intersections receive stop signs and signals?*). It is the Committee's position not to install signs and signals in these situations.

Making Quincy Street one-way northbound (downhill) would eliminate the problem of exiting traffic forming two lanes, but would inconvenience neighbors, increase traffic on surrounding roads and intersections and possibly increase traffic speeds on Quincy Street. Revising the instructions from the Ottoson Middle School to parents, instructing them to avoid the intersection could have a similar shifting-the-problem effect.

The fourth group includes items that the Committee believes would reduce the problems at this intersection, but due to their expense, would only be considered as next steps. Although completing the sidewalk on the south side of Gray Street between Oakland Avenue and Scituate Street would be highly desirable, it is unlikely that funding can be found in the very near future. In the Louis Berger Group's 2002 Assessment Study, sidewalk conditions within a quarter mile radius of Arlington's schools were evaluated. Ottoson Middle School ranked as one of the best.

This section of Gray Street may be an arguable site for a traffic calming device such as a speed hump, raised crosswalk, raised intersection or bump outs. Yet, the Committee will need to investigate any future installation of this sort as an independent town-wide project. Time-actuated "Reduced Speed when Flashing" or pedestrian-activated flashing beacons would be other next step options to be considered.

The fifth group of potential solutions are considered by the Committee to provide limited value. An in-street pedestrian warning sign could not be in place for a significant portion of the school year due to snow plowing. This, coupled with Gray Street's relative narrowness, makes roadside signs more appropriate (see *About Crosswalks*). Painted bump outs, yellow curbing at corners and "No Standing" signs at corners are unlikely to be effective in reducing the number of drop-offs & parked cars at the intersection during morning school rush. Installing additional street lighting might be helpful, but might provide an insignificant improvement since higher wattage street lights at intersections with crosswalks are planned in the near future.

ASSOCIATED MATERIALS

Gray Street/Quincy Street/Fountain Road

August 5, 2003

Kevin Greeley, Chair
Board of Selectmen
Town of Arlington
Town Hall
Arlington, Massachusetts 02476

Dear Mr. Greeley:

I am writing to ask the Board of Selectmen to look at traffic issues at two intersections.

The first intersection is Broadway, Foster Street, and Rawson Road. Earlier this morning, a severe accident occurred at that corner. It has been my experience that parked vehicles on Broadway tend to severely restrict visibility for traffic attempting to cross Broadway from Rawson Road. Many drivers seek to cross Broadway here because of the ease of entering Massachusetts Avenue at the Foster Street signal. Posting a prohibition of parking near the corner may solve the problem, but without constant enforcement this may not be the ideal solution. The Manual of Uniform Traffic Control Devices (MUTCD) permits the installation of an all way stop at "locations where a road user, after stopping, cannot see conflicting traffic and is not able to safely negotiate the intersection unless conflicting cross traffic is also required to stop." This intersection meets this standard.

I would also appreciate your consideration of a four way stop at the corner of Gray Street, Fountain Road, and Quincy Street. There is considerable pedestrian traffic at that location, including a large number of children walking to and from the Ottoson Middle School. The MUTCD permits the installation of an all way stop at locations with the "need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes." This intersection meets this standard.

I would appreciate any and all consideration the Board, and the Traffic Advisory Committee, would provide to these intersections.

Very truly yours,

Paul Schlichtman

Cc: Ed Starr, Chair, Arlington TAC

Intersections near Ottoson School

The following two intersections had Traffic Supervisors (crossing guards) during the 2002-2003 school year. The following assessment and recommendations by Amy Cohen, Ottoson Safety Committee, and Don Eunson, Safe Routes to Schools program, are intended to address the continuing need for student safety at these intersections, which both have hundreds of daily student crossings. Continued presence of Traffic Supervisors would, of course, be the primary safeguard for students. If that is impossible, the following adjustments to the physical intersection will lessen accident risk to students. At an absolute minimum, all intersections that previously warranted Traffic Supervisors should have clearly painted crosswalks and “Yield to Pedestrians in Crosswalk” signs mid street.

Intersection of Gray St. and Quincy St/ Fountain

This intersection is crossed by about 50-70 Ottoson students. Considerable traffic uses Gray as an alternate to avoid Mass Ave. Typically cars appear to be exceeding the posted speed limit at this point, in part because the intersection with Quincy is at the bottom of two hills on which cars pick up speed. Sight lines are basically good. There was an accident at this intersection in Sept 2000 in which two students were hit by a car.

- Paint crosswalks with thermoplastic paint.
- Add pop-up “Yield to Pedestrians in Crosswalk” sign
- At intersection, add flashing yellow light, with pedestrian-activated red capability
- Study the feasibility of making this a raised intersection
- Consider 4-way stop signs

Mass Ave / Appleton St / Appleton St Place

- This intersection is used by 100-200 Ottoson students.
- Existing pedestrian-activated signal button must be hit hard to trigger WALK light. Should be repaired or replaced. In addition, the signal is timed for 17-second response. Should be shortened to 10 seconds or less to improve student compliance.
- Repaint crosswalks with thermoplastic paint.
- Sight lines of students crossing from in front of All Star Dry Cleaners toward Appleton St Place are blocked by Mass Ave parked cars making it difficult to see and be seen by westbound Mass Ave traffic. Build neck down (curb extension) in front of All Star Dry Cleaners for added protection of persons attempting to cross from All Star Dry Cleaners and improved visibility.
- Add “School Zone” signs
- Add crosswalk across Mass Ave west of intersection
- Refresh “signal Ahead” sign (Mass Ave eastbound)
- Add pop-up “Yield to Pedestrians in Crosswalk” sign
- Add “School Zone” sign on light pole in front of #1218 Mass Ave (eastbound) and somewhere in front of #1183 (westbound)
- Add “Caution-School Zone” on Appleton (eastbound)

SAFE ROUTES TO SCHOOLS

AWalkBoston Program

Safe Routes to Schools has received support from: New Balance Corporation | AAA | Robert Wood Johnson Foundation | National Center for Bicycling and Walking | League of American Bicyclists | City of Boston, Department of Public Health | Centers for Disease Control and Prevention | Massachusetts Highway Department | National Park Service, Rivers & Trails Program

**Guidelines for All-Way Stop Installation
Town of Arlington**

These guidelines for the installation of all-way stop control for intersections have been specifically developed for the Town of Arlington. They are based on guidance provided in the Manual on Uniform Traffic Control, field experience, and engineering judgement.

Criterion	Case Under Study
A. Is this an interim measure for a traffic light?	
B. More than 5 crashes in a year?	
C. Both streets have moderate volumes (at least 200 cars/hour on the less traveled street and 500 cars/hour combined)	
D. Criteria A, B <i>and</i> C are all almost met (80%)	
E. Additional criteria: <ul style="list-style-type: none"> - substantial left turn conflicts* - near a major pedestrian generator and the intersection has painted crosswalks - any sight distance less than 125 feet 	

All- way stop should be considered if:

One of A, B, C, or D criteria is satisfied.

May be considered if one among the E criteria is satisfied

* Product of left turns multiplied by opposing turn through-volume larger than 25,000.

When should intersections receive stop signs and signals?

It may surprise you to learn that adding stop signs or traffic signals would not necessarily slow drivers down or increase safety at intersections. In fact, in some cases, especially when the signs or signals do not seem to be needed, some drivers may begin to ignore them. Therefore, officials in your area make careful decisions concerning the use of stop signs and traffic signals. Here are some of the factors they consider:

Too many signs can lead to ineffectiveness

Studies have shown that when stop signs are placed at intersections where they are not really needed, motorists become careless about stopping. Installing traffic signals where they are not needed can also create traffic congestion, add travel time, and frustrate drivers, and these drivers may become impatient and make unsafe maneuvers.

The use of signs and signals should be restricted to locations where they will be effective

Signs and signals are only effective and should only be used when they meet the following four requirements. They should (1) *fulfill a need*, (2) *convey a clear, simple meaning*, (3) *command attention and respect*, and (4) *give adequate time for drivers to respond*.

Two-Way Stop Signs: Locations must have one or more of the following conditions for two-way stop signs to be installed:

- an intersection of a minor and a major road, where the application of the normal right-of-way rule would be hazardous;
- a street enters a highway;
- an un-signalized intersection in a signalized area;
- there is high-speed traffic, it is hard to see, and there is a previous crash record.

Four-Way Stop Signs: Four-way stop signs are often used at the intersection of two roadways that contain similar traffic volumes. At least one of the following conditions should be met:

- a traffic signal is going to be installed and the intersection needs a temporary solution to control the traffic;
- both streets have moderate traffic volumes (at least 200 vehicles/hour on the less traveled street)
- within 12 months at least five crashes have occurred at the intersection that could have been prevented by stop signs.

Four-way stops may also be considered in cases where there are substantial pedestrian volumes or severe visibility limitations that can't otherwise be corrected.

Signals: At least one of 11 conditions must be met for a traffic signal to be installed. The conditions include high vehicle and/or pedestrian volumes, a record of severe crashes, and school crossings where there is not enough of a gap in traffic flow for children to cross safely.

Stop signs and signals can be effective when used appropriately, but can decrease safety when used inappropriately. In many cases, other solutions—for example, a yield sign—should be considered first.

For more information, see <http://www.tac.arlington.ma.us/documents.htm>

Acknowledgement: This handout is adapted from the Iowa State University, Center for Traffic Research and Education, Traffic and Safety Informational Series brochures

About Crosswalks

What are the types of crosswalks?

1. Controlled marked crosswalk. These are marked crosswalks where vehicle traffic is controlled by a stop sign or traffic light. An example is Mass. Ave at Route 60.
2. Uncontrolled marked crosswalk. These are marked crosswalks without stop signs or signals. An example is the crossing of Mass. Ave at Water Street / Library Way
3. Controlled unmarked crosswalk. Vehicle traffic is controlled by a stop sign or traffic light, but the crosswalk is not marked.
4. Uncontrolled unmarked crosswalk. Even though no crosswalk is marked, this is the continuation of a sidewalk across a street, where vehicle traffic is not controlled by a stop sign or traffic light.

When should crosswalk stripes be painted?

In uncontrolled locations, marked crosswalks are not necessarily safer than unmarked crossings. In fact, some studies have shown a higher pedestrian crash rates at marked crosswalks, especially on busy multi-lane streets (1). However, the marking of crosswalks may improve pedestrian mobility, because drivers are legally required to yield to pedestrians in marked crosswalks. Marked crosswalks are appropriate under the following conditions:

- At controlled locations (stop signs or traffic signals) where there is significant pedestrian traffic
- At school zone crossings (with a crossing guard)
- At non-signalized locations where pedestrian volumes are extremely high, such as the Minuteman Bikeway crossings
- At other non-signalized locations where the combination of high vehicle and pedestrian volumes indicate that the crosswalk is helpful for pedestrian mobility.

When are crossing signs needed at a crosswalk?

On our busiest streets, simply marking a crosswalk is not sufficient to ensure reasonable pedestrian mobility or safety. This is especially true on multi-lane streets such as Mass Ave. Other measures may include:

Thermoplastic markings	More expensive than paint, but lasts longer. Seven examples on Mass Ave.
Roadside signs at the crosswalk	Bright yellow-green signs used on streets such as Pleasant and Summer Streets
In-street warning signs	Primarily on wide streets such as Mass. Ave. Their use is limited because they are a high maintenance item (they are often run over).
Curb extensions	Examples appear on Mass Ave. in Arlington Heights. They shorten crossing distances and improve pedestrian-motorist visibility.
Pedestrian traffic signals	Examples appear on Mystic Street and Broadway.
Refuge islands	Pedestrians only have to deal with one direction of traffic at a time. They also shorten crossing distances. Under consideration for parts of Mass. Ave.

For more information

1. Zegeer, Charles, J. Richard Stewart, Herman Huang. Safety Effects of Marked vs Unmarked Crosswalks at Uncontrolled Locations: Executive Summary and Recommended Guidelines (2000)

<http://www.walkinginfo.org/rd/devices.htm#cros1>

2. Zegeer, Charles et al, Pedestrian Facilities Users Guide: Providing Safety and Mobility. Publication FHWA-RD-01-102 (2002) Download from http://www.walkinginfo.org/insight/features_articles/userguide.htm

For more information specific to Arlington, <http://www.tac.arlington.ma.us/documents.htm>