



City of
Peterborough

To:	Members of the Committee of the Whole
From:	W.H. Jackson, Director of Utility Services
Meeting Date:	November 30, 2015
Subject:	Report USTR15-016 Request for Pedestrian Signal on Armour Road at Whitaker Street

Purpose

A report to update Council on the results of the review of the Pedestrian Signal request on Armour Road at Whitaker Street and to recommend the installation of Pedestrian Ahead warning signs on Armour Road between Spencley's Lane and Whitaker Street.

Recommendation

That Council approve the recommendation outlined in Report USTR15-016 dated November 30, 2015, of the Director of Utility Services, as follows:

That Pedestrian Ahead warning signs be installed on Armour Road between Spencley's Lane and Whitaker Street.

Budget and Financial Implications

The implementation of Pedestrian Ahead warning signs on Armour Road will cost approximately \$2,000 funds for which are available in the 2015 Capital Budget for New Traffic Control Signs Ref 5-13.03.

Background

At the Committee of the Whole meeting on June 23, 2014 under “Other Business”, a petition was submitted from Armour Road and Whitaker Street residents requesting a pedestrian activated traffic signal be installed at the intersection of Armour Road and Whitaker Street.

Intersection Pedestrian Signals (IPS) and Mid-block Pedestrian Signals (MPS) are pedestrian activated traffic signals designated solely to provide a gap in traffic to assist pedestrians in safely crossing a major roadway. The City has established criteria to determine when the traffic and pedestrian volumes on a roadway are high enough that a traffic signal is required to provide safe gaps for pedestrians to cross. The City of Peterborough currently has eleven IPS/MPS throughout the City.

In response to previous requests for an all-way stop and a traffic signal at this location, staff conducted a review in 2011 and 2012. Results of these studies found there was no technical justification to support the installation of these traffic control devices, however, it was noted that a bend in the road just north of Whitaker Street reduced the sight line distance. Accordingly it was recommended that a hidden intersection sign and a vehicle speed driver feedback sign be installed to help reduce vehicle speed and enhance the visibility of the intersection.

Site Details

Armour Road is an arterial road with a 50km/h speed limit that extends from Maria Street in the south to Nassau Mills Road in the north (see Appendix A). Armour Road in the vicinity of Whitaker Street is a two-lane road with a sidewalk on the west side of the street. The total two-way traffic volume on Armour Road is approximately 8,000 vehicles per day.

Whitaker Street is a two-lane local road with a 50km/h speed limit that serves three condominium properties: Earlsgate Condominium to the east; and Whitaker Mills Condominium and Auburn Retirement Village to the west. Whitaker Street has no sidewalks and is terminated by a cul-de-sac at each end of the street. There are two transit stops located on the southeast and northwest corner of Armour Road and Whitaker Street that are served by the Nicholls Park transit route. The total two-way traffic volume on Whitaker Street is approximately 500 vehicles per day.

Traffic Study

The traffic study focused on the collection and analysis of traffic data necessary to determine the need for an IPS at the intersection of Armour Road and Whitaker Street. The data collected included:

- Pedestrian Counts (Number of pedestrians crossing Armour Road at various times in the day),
- Gap Study (Number of safe gaps or crossing opportunities in traffic on Armour Road),
- Collision History, and
- Sight Line Review.

Gap Study:

A gap study records the number of safe gaps that exist in the traffic flow that would allow the average pedestrian to safely cross the road. The average time required for a pedestrian to cross Armour Road from curb-to-curb is 14.28 seconds, based on the width of the roadway, an average walking speed of 1.07 m/sec, plus a 4 second reaction time.

Based on traffic counts taken during periods of peak pedestrian activity and the required crossing time, the total number of safe gaps in traffic to cross Armour Road was recorded as follows:

A.M. Peak hour (8:30 A.M. – 9:30 A.M.) – 65 gaps

Mid Day Peak hour (10:30 A.M. – 11:30 A.M.) – 80 gaps

P.M. Peak hour (2:00 P.M. – 3:00 P.M.) – 64 gaps

Pedestrian Counts:

Data on pedestrian crossing demand was collected during the peak pedestrian times and converted to Equivalent Adult Units (EAU) which adjusts the actual pedestrian counts higher to account for slower walking speeds and reaction times for vulnerable pedestrians. The adjusted pedestrian crossing demand is shown below:

A.M. Peak hour (8:30 A.M. – 9:30 A.M.)

Adults	1	x	1	=	1.0
Children	0	x	2	=	0.0
Disabled	0	x	2	=	0.0
Senior	4	x	1.5	=	6.0

Total EAU's	7.0
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Noon Peak hour (10:30 A.M. – 11:30 A.M.)

Adults	0	x	1	=	0.0
Children	0	x	2	=	0.0
Disabled	0	x	2	=	0.0
Senior	4	x	1.5	=	6.0

Total EAU's	6.0
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P.M. Peak hour (2:00 P.M. – 3:00) P.M.

Adults	0	x	1	=	0.0
Children	0	x	2	=	0.0
Disabled	0	x	2	=	0.0
Senior	3	x	1.5	=	4.5

Total EAU's	4.5
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The pedestrian count and gap study data collected was analyzed using the City of Peterborough Intersection Pedestrian Signal Warrant (Appendix B) which compares the availability of safe crossing opportunities to the adjusted crossing demand to determine if pedestrians need traffic control measures (such as a signal) to provide enough safe gaps in traffic to cross the road. Based on this review, the small number of pedestrians crossing Armour Road at this location have sufficient gaps in traffic to safely cross the road.

Collision History / Sight Lines

There have been zero reported collisions within the past five years at the intersection of Armour Road and Whitaker Street involving pedestrians crossing Armour Road. The measured stopping sight distance exceeds the minimum requirements set out by the Transportation Association of Canada (TAC) design guidelines and sight lines are unobstructed to the south. As noted previously, a "Hidden Intersection" warning sign and a vehicle speed driver feedback sign were installed for southbound motorists on Armour Road to raise awareness of the intersection and improve driver compliance to the posted speed limit.

Results of the Traffic Study

The warrant criterion for the installation of an IPS on Armour Road at Whitaker Street was not met indicating that there are sufficient crossing opportunities on Armour Road to accommodate the pedestrian crossing demand.

Review of Corridor Crossing Demand

During the review of the Armour Road / Whitaker Street intersection additional pedestrian crossing activity was observed further to the south on Armour Road. With the closest controlled pedestrian crossing located at the traffic signals at Armour Road and Parkhill Road, about 900 metres south, staff broadened the context of the review to determine if there is a need for an IPS between Parkhill Road and Whitaker Street.

Pedestrian generators on Armour Road between Parkhill Road East and Whitaker Street include a variety of apartments, condominiums, residential houses, Auburn Bible Chapel and Auburn Mills Plaza, containing a Law Office, Hair Salon, Dental Clinic and Convenience Store. Focusing on this area, (see Appendix C) staff collected pedestrian and vehicle volume data at Moir Street, Franmor Drive and Spencley's Lane to quantify the overall pedestrian crossing activity in the area to determine if there is a need for an IPS within this segment of Armour Road. Study details and results of the investigation are outlined in Appendix D.

A thorough review of the pedestrian counts revealed only a small number of pedestrians crossing Armour Road at Franmor Drive and Moir Street throughout the day with the peak pedestrian activity occurring between 3:00 P.M. and 4:00 P.M. in the vicinity of Spencley's Lane. This location is one of the few areas on Armour Road where sidewalks are provided on both sides of the street and a concentration of residential development to the east. Based on the study results, the warrant criterion for the implementation of an IPS at Franmor Drive, Moir Street and Spencley's Lane was also not met.

Recognizing that the implementation of an IPS may draw pedestrians from the surrounding area to cross at a central location, staff combined all of the pedestrian counts between Spencley's Lane and Franmor Drive during the peak 3:00 P.M. to 4:00 P.M. period to determine if there was sufficient pedestrian activity to generate the need for a centralized IPS. The combined pedestrian count increased the crossing demand from 28 to 35.5 pedestrians/hour (EAU). This data was analysed using the City of Peterborough Intersection Pedestrian Signal Warrant and the results showed the warrant criterion for the installation of an intersection pedestrian signal on Armour Road within the corridor was still not met.

Discussion of Study Findings

Results of the review show there is no technical justification for the installation of an IPS on Armour Road at Whitaker Street nor is there technical justification for one on Armour Road between Spencley's Lane and Franmor Drive at this time. The study findings identified higher levels of pedestrian activity on Armour Road in the vicinity of Spencley's Lane, although the current vehicle volume on Armour Road provides sufficient gaps in traffic for safe pedestrian crossing opportunities. It is recognized that there is potential for additional growth in traffic in the future from new development to the north, the new arena complex at Trent, and the proposed Trent Research and

Innovation Park. To increase driver awareness of this pedestrian activity, it is proposed to install Pedestrian Ahead signs (Wc-7) for northbound and southbound traffic on Armour Road between Parkhill Road and Whitaker Street. Staff will continue to monitor development growth, traffic volume trends, and pedestrian activity in the area and report back to Council when a pedestrian signal is warranted on Armour Road.

Summary

In response to a petition submitted from Armour Road and Whitaker Street residents requesting a pedestrian activated traffic signal at the intersection of Armour Road and Whitaker Street, staff undertook a comprehensive review of the pedestrian crossing activity at the key intersections along Armour Road. While the technical criteria to justify the installation of an Intersection Pedestrian Signal or Mid-Block Pedestrian Signal have not yet been met, it is recommended that pedestrian ahead signs be installed on Armour Road to increase driver awareness of the pedestrian activity in the area.

Submitted by,

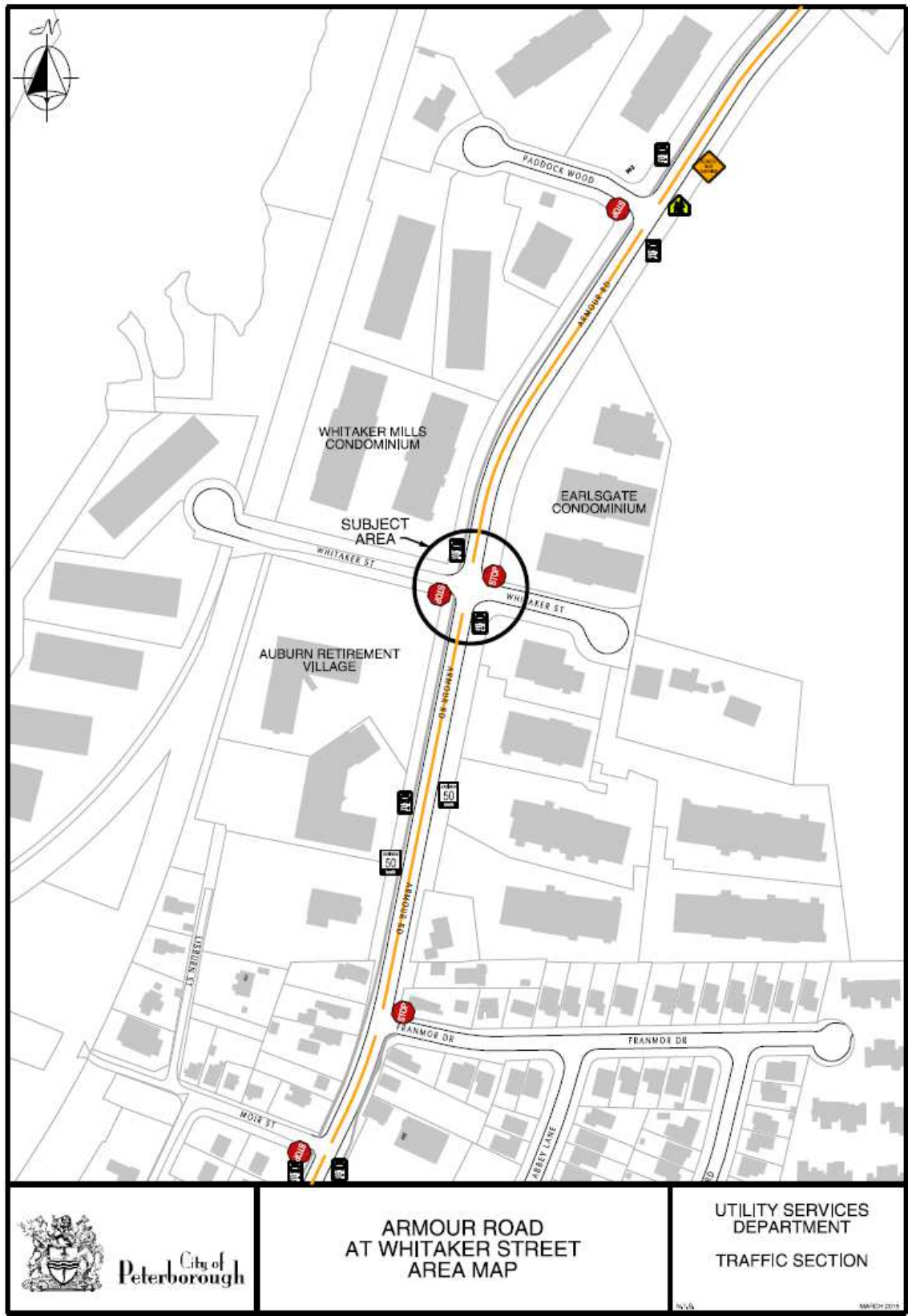
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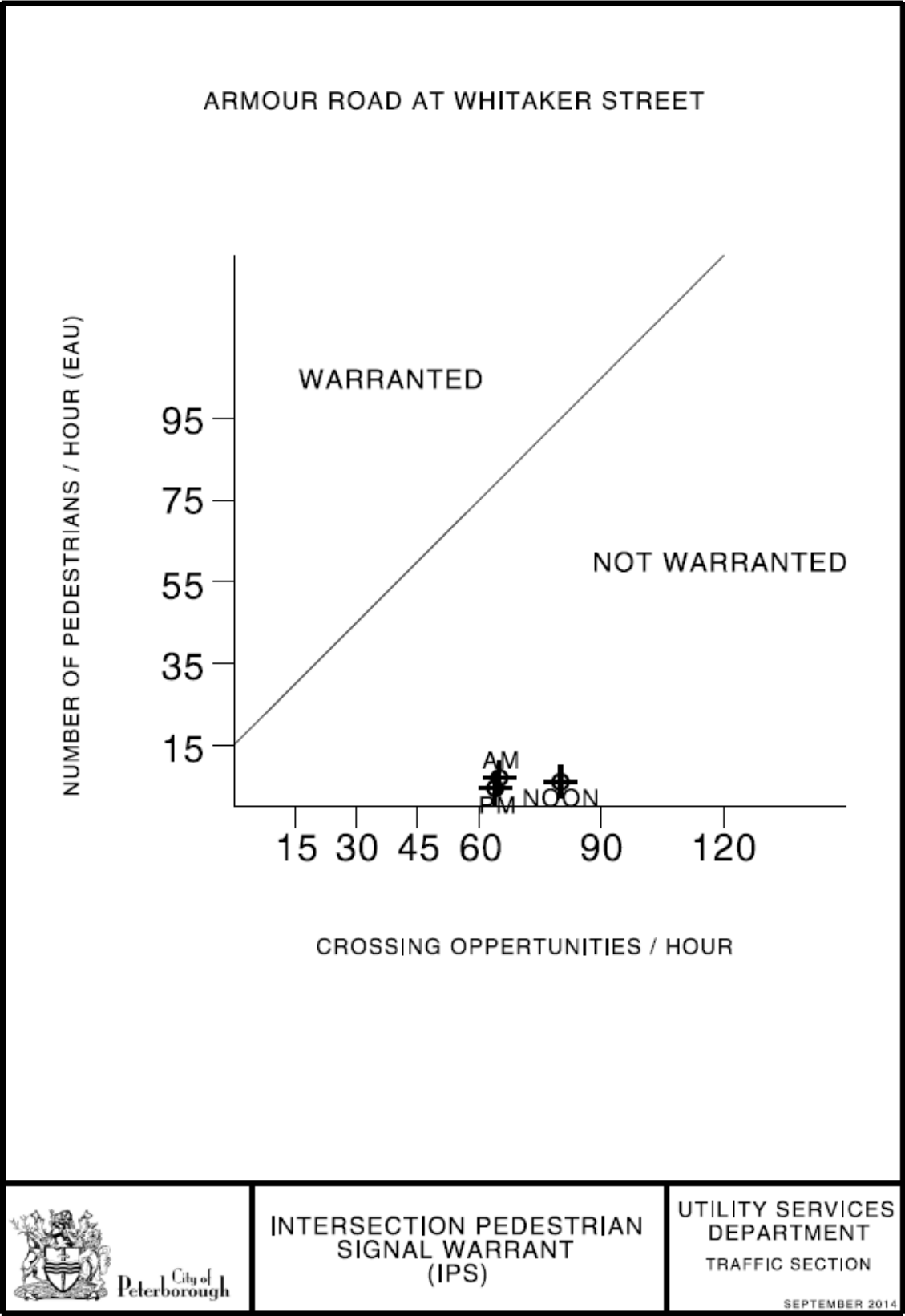
Attachments:

- Appendix A: Armour Road / Whitaker Street, Area Diagram
- Appendix B: Intersection Pedestrian Signal Warrant, Armour Road / Whitaker Street
- Appendix C: Spencley's Lane –Franmor Drive, Area Diagram
- Appendix D: Spencley's Lane – Franmor Drive, Study Details, Gap Study, Pedestrian counts and Intersection Pedestrian Warrant
- Appendix E: Combined Intersection Pedestrian Signal Warrant, Armour Road / Spencley's Lane to Franmor Drive (Peak Pedestrian Time 3:00 P.M. to 4:00 P.M.)

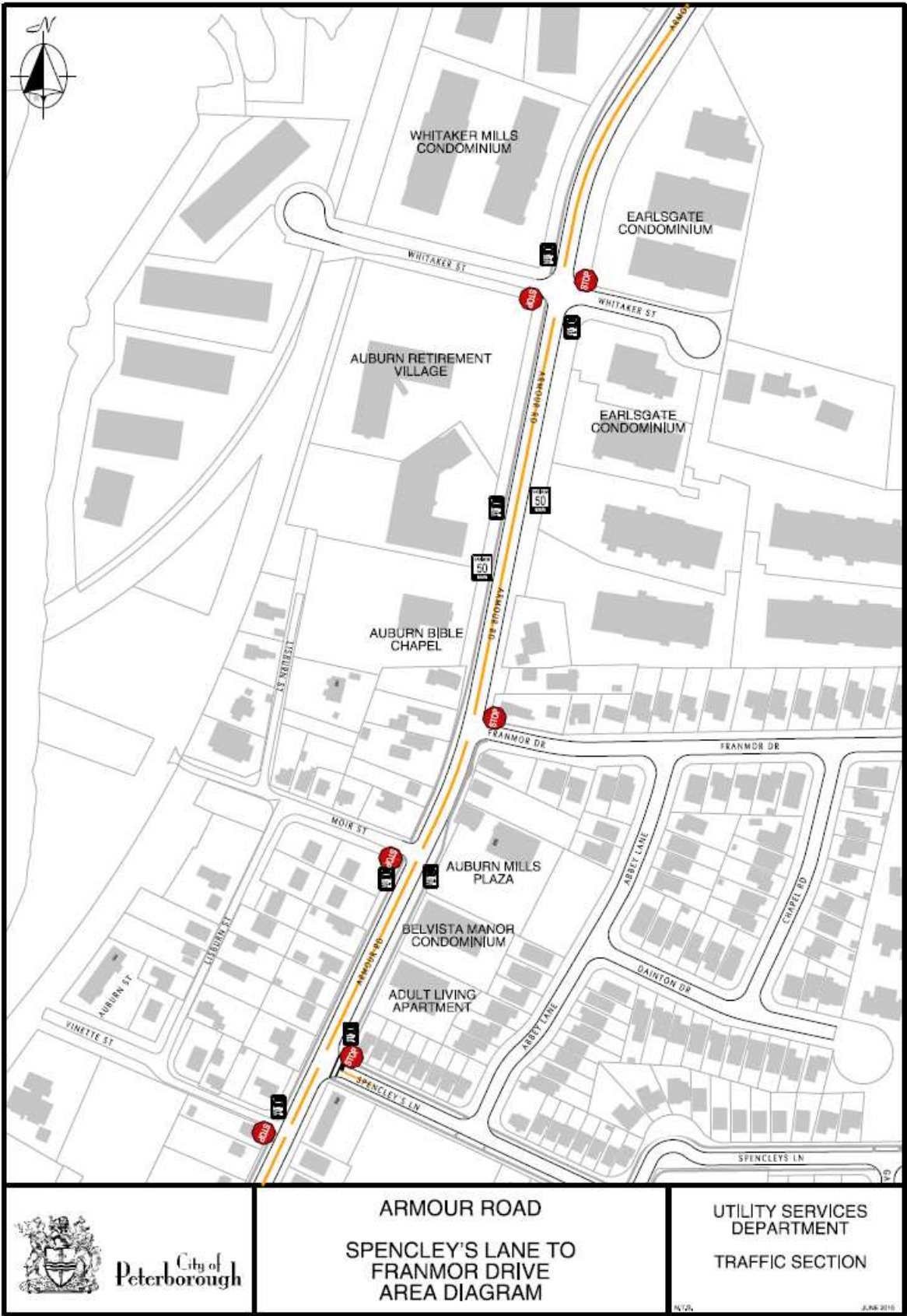
Appendix A: Armour Road / Whitaker Street, Area Diagram



Appendix B: Intersection Pedestrian Signal Warrant, Armour Road / Whitaker Street



Appendix C: Spencley's Lane – Franmor Drive, Area Diagram



Appendix D: Spencley's Lane – Franmor Drive, Study Detail

Site Details

Moir Street and Franmor Drive are a two lane local roads with a 50km/h speed limit. Both streets serve residential properties and have no sidewalks.

Spencley's Lane is a two lane local road with a 50km/h speed limit. Spencley's Lane was reconstructed in 2009 and brought up to an urban city standard with sidewalks on both sides of the street. Spencley's Lane serves residential properties and Roland Glover Park.

Traffic Study (Spencley's Lane to Franmor Drive)

A traffic operational review was undertaken on Armour Road between Spencley's Lane and Franmor Drive. This review included:

- Pedestrian Counts
(Number of Pedestrians Crossing Armour Road at various times in the day),
- Gap Study (Number of Safe Gaps or Crossing Opportunities in traffic),
- Vehicle Speed Study,
- Collision History, and
- Sight Line Measurements.

Vehicle Speed

Analysis of the vehicle speed study on Armour Road between Spencley's Lane and Whitaker Street revealed the 85th percentile speed for northbound vehicles to be 61 km/h and the average speed to be 54 km/h. The 85th percentile speed for southbound vehicles is 59 km/h and the average speed is 53 km/h. The results of the vehicle speed study indicate that the operating speed on Armour Road is typical of an arterial road within the City of Peterborough.

Collision History

There have been zero reported collisions within the past five years on Armour Road between Spencley's Lane and Whitaker Street related to pedestrians crossing Armour Road.

Sight Lines:

Sight stopping distances were measured for vehicles traveling on Armour Road and the sight line distances for vehicles on Franmor Drive, Moir Street and Spencley's Lane. The sight stopping distance for vehicles traveling on Armour Road at the posted speed exceed the minimum requirements set out by The Transportation Association of Canada (TAC) design guidelines.

Gap Study:

A gap study records the number of safe gaps that exist in the traffic flow that would allow the average pedestrian to safely cross the road. The average time required for a pedestrian to cross Armour Road is 14.28 seconds, based on the width of the roadway, an average walking speed of 1.07 m/sec, plus a 4 second reaction time.

Based on traffic counts taken during periods of peak pedestrian activity, the total number of safe gaps in traffic to cross Armour Road was recorded as follows:

Based on traffic counts taken during periods of peak pedestrian activity, the total number of safe gaps in traffic to cross Armour Road was recorded as follows:

Armour Road at Franmor Drive

A.M. Peak hour (8:15 A.M. – 9:15 A.M.) – 23 gaps

Mid Day Peak hour (12:00 Noon – 1:00 P.M.) – 47 gaps

P.M. Peak hour (5:00 P.M. – 6:00 P.M.) – 37 gaps

Armour Road at Moir Street

A.M. Peak hour (9:10 A.M. – 10:00 A.M.) – 55 gaps

Mid Day Peak hour (11:30 A.M. – 12:30 P.M.) – 37 gaps

P.M. Peak hour (3:45 P.M. – 4:45 P.M.) – 47 gaps

Armour Road at Spencley's Lane

A.M. Peak hour (8:00 A.M. – 9:00 A.M.) – 18 gaps

Mid Day Peak hour (12:00 Noon – 1:00 P.M.) – 47 gaps

P.M. Peak hour (3:00 P.M. – 4:00 P.M.) – 28 gaps

Pedestrian Counts:

Data on pedestrian crossing demand was collected during the peak pedestrian times and converted to Equivalent Adult Units (EAU) which accounts for slower walking speeds and reaction times for vulnerable pedestrians. The adjusted pedestrian crossing demand is shown below:

Armour Road at Franmor Drive**A.M. Peak hour (8:15 A.M. – 9:15 A.M.)**

Adults	2	x	1	=	2.0
Children	0	x	2	=	0.0
Disabled	0	x	2	=	0.0
Senior	0	x	1.5	=	0.0

Total EAU's	2.0
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Noon Peak hour (12:00 Noon – 1:00 P.M.)

Adults	2	x	1	=	2.0
Children	0	x	2	=	0.0
Disabled	0	x	2	=	0.0
Senior	0	x	1.5	=	0.0

Total EAU's	2.0
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P.M. Peak hour (5:00 P.M. – 6:00 P.M.)

Adults	3	x	1	=	3.0
Children	0	x	2	=	0.0
Disabled	0	x	2	=	0.0
Senior	0	x	1.5	=	0.0

Total EAU's	3.0
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Armour Road at Moir Street

A.M. Peak hour (9:10 A.M. – 10:00 A.M.)

Adults	9	x	1	=	9.0
Children	0	x	2	=	0.0
Disabled	0	x	2	=	0.0
Senior	0	x	1.5	=	0.0

Total EAU's	9.0
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Noon Peak hour (11:30 A.M. – 12:30 P.M.)

Adults	14	x	1	=	14.0
Children	0	x	2	=	0.0
Disabled	0	x	2	=	0.0
Senior	0	x	1.5	=	0.0

Total EAU's	14.0
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P.M. Peak hour (3:45 P.M. – 4:45 P.M.)

Adults	3	x	1	=	3.0
Children	0	x	2	=	0.0
Disabled	0	x	2	=	0.0
Senior	5	x	1.5	=	7.5

Total EAU's	10.5
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Armour Road at Spencley's Lane

A.M. Peak hour (8:00 A.M. – 9:00 A.M.)

Adults	3	x	1	=	3.0
Children	1	x	2	=	2.0
Disabled	0	x	2	=	0.0
Senior	0	x	1.5	=	0.0

Total EAU's	5.0
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Noon Peak hour (12:00 Noon – 1:00 P.M.)

Adults	8	x	1	=	8.0
Children	0	x	2	=	0.0
Disabled	0	x	2	=	0.0
Senior	0	x	1.5	=	0.0

Total EAU's	8.0
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P.M. Peak hour (3:00 P.M. – 4:00 P.M.)

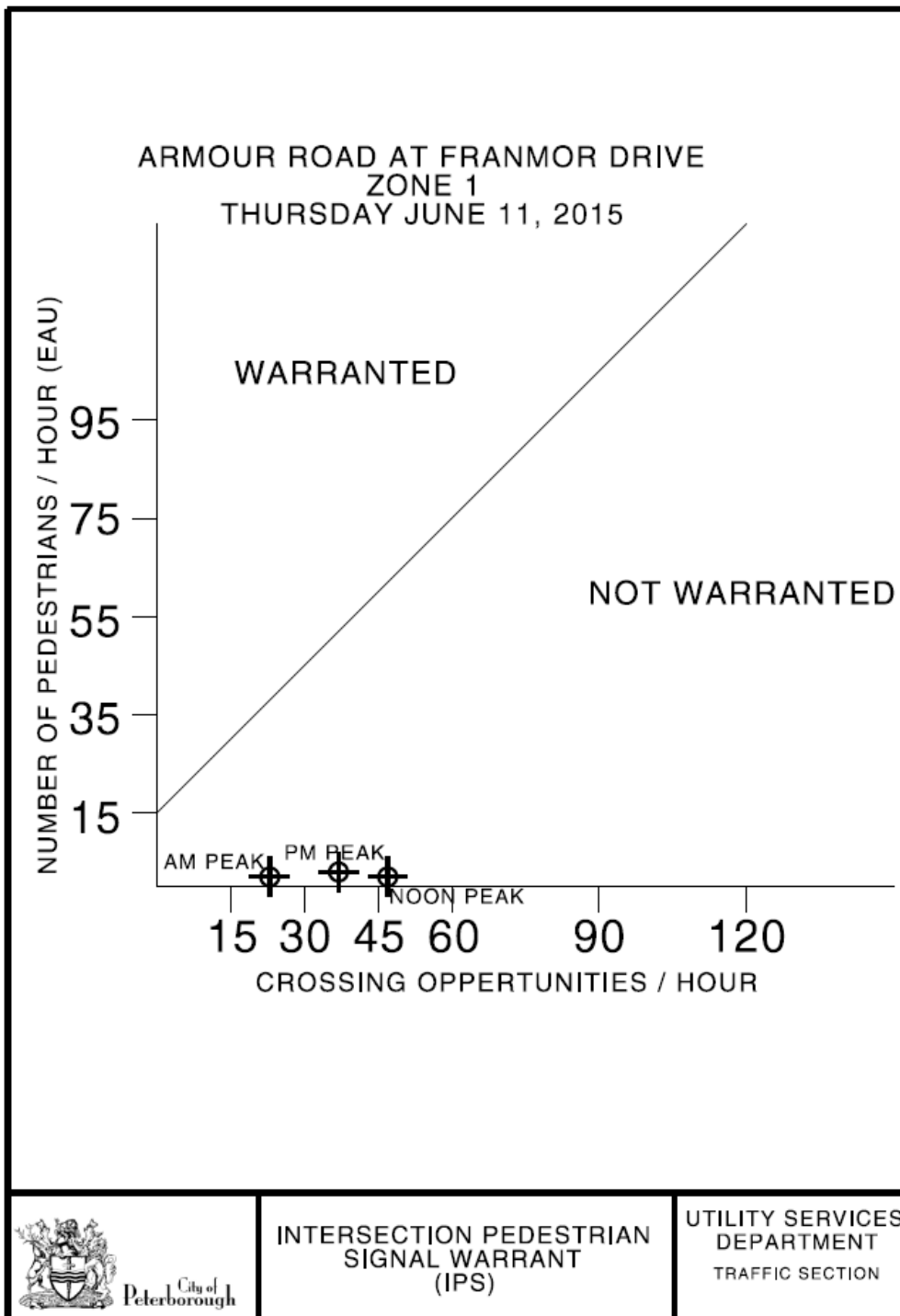
Adults	15	x	1	=	15.0
Children	5	x	2	=	10.0
Disabled	0	x	2	=	0.0
Senior	2	x	1.5	=	3.0

Total EAU's	28.0
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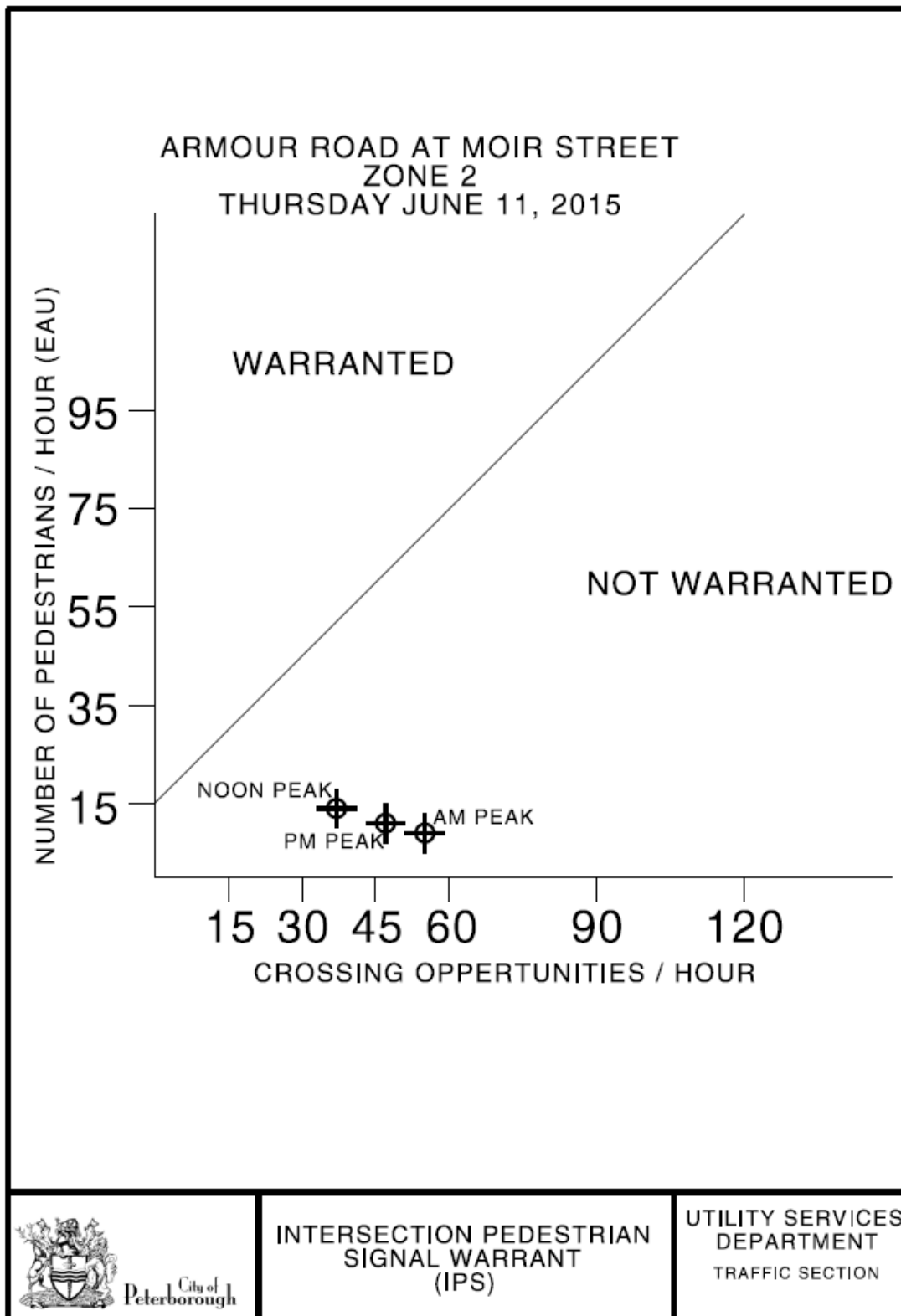
The pedestrian count and gap study data collected was analyzed using the City of Peterborough Intersection Pedestrian Signal Warrant below, which compares the availability of safe crossing opportunities to the adjusted crossing demand to determine if pedestrians need traffic control measures to find enough safe gaps in traffic to cross the road. The results show a small number of pedestrians crossing Armour Road at each location and there are large number gaps in traffic to safely cross the road.

The minimum technical criteria required for the installation of an Intersection Pedestrian Signal on Armour Road at Spencley's Lane, Moir Street and Franmor Drive was not met.

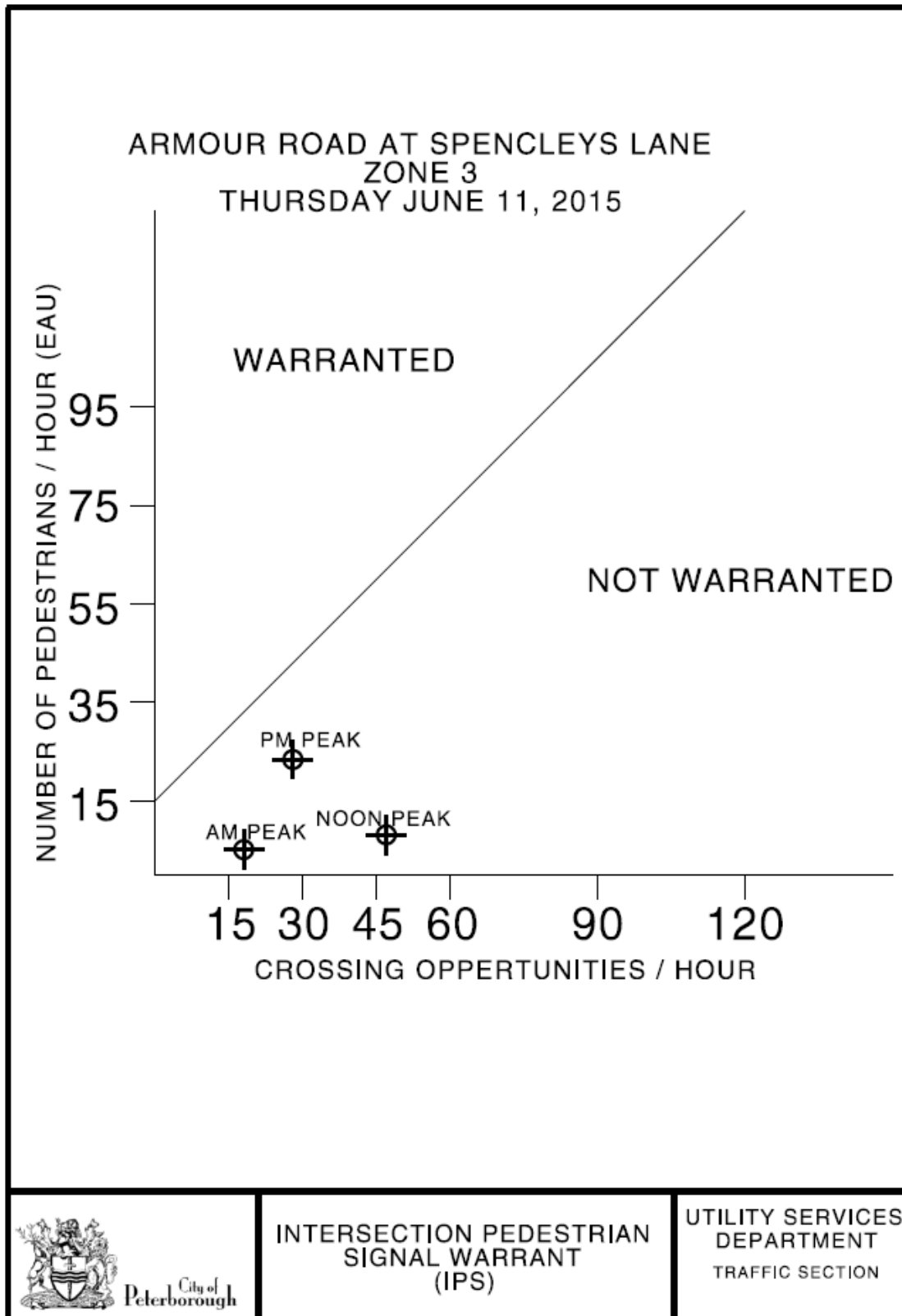
Intersection Pedestrian Signal Warrant, Armour Road / Franmor Drive



Intersection Pedestrian Signal Warrant, Armour Road / Moir Street



Intersection Pedestrian Signal Warrant, Armour Road / Spencley's Lane



Appendix E: Combined Intersection Pedestrian Signal Warrant, Armour Road / Spencley's Lane to Franmor Drive (Peak Pedestrian Time: 3:00 P.M. – 4:00 P.M.)