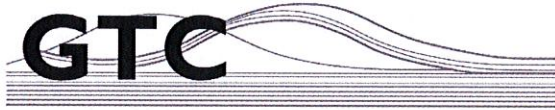


City of Bainbridge Island

NOV 16 2016

Planning and
Community Development



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MADISON GROVE TRAFFIC IMPACT ANALYSIS

Jurisdiction: City of Bainbridge Island

November 2016



GTC #16-276

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1. INTRODUCTION

Gibson Traffic Consultants (GTC) has been retained to complete a traffic impact analysis for the proposed Madison Grove development in the City of Bainbridge Island. This report addresses the development's trip generation and impacts to surrounding intersections. Brad Lincoln, responsible for the traffic analysis and report, is a licensed professional engineer (Civil) in the State of Washington and a current member of the Washington State section of ITE.

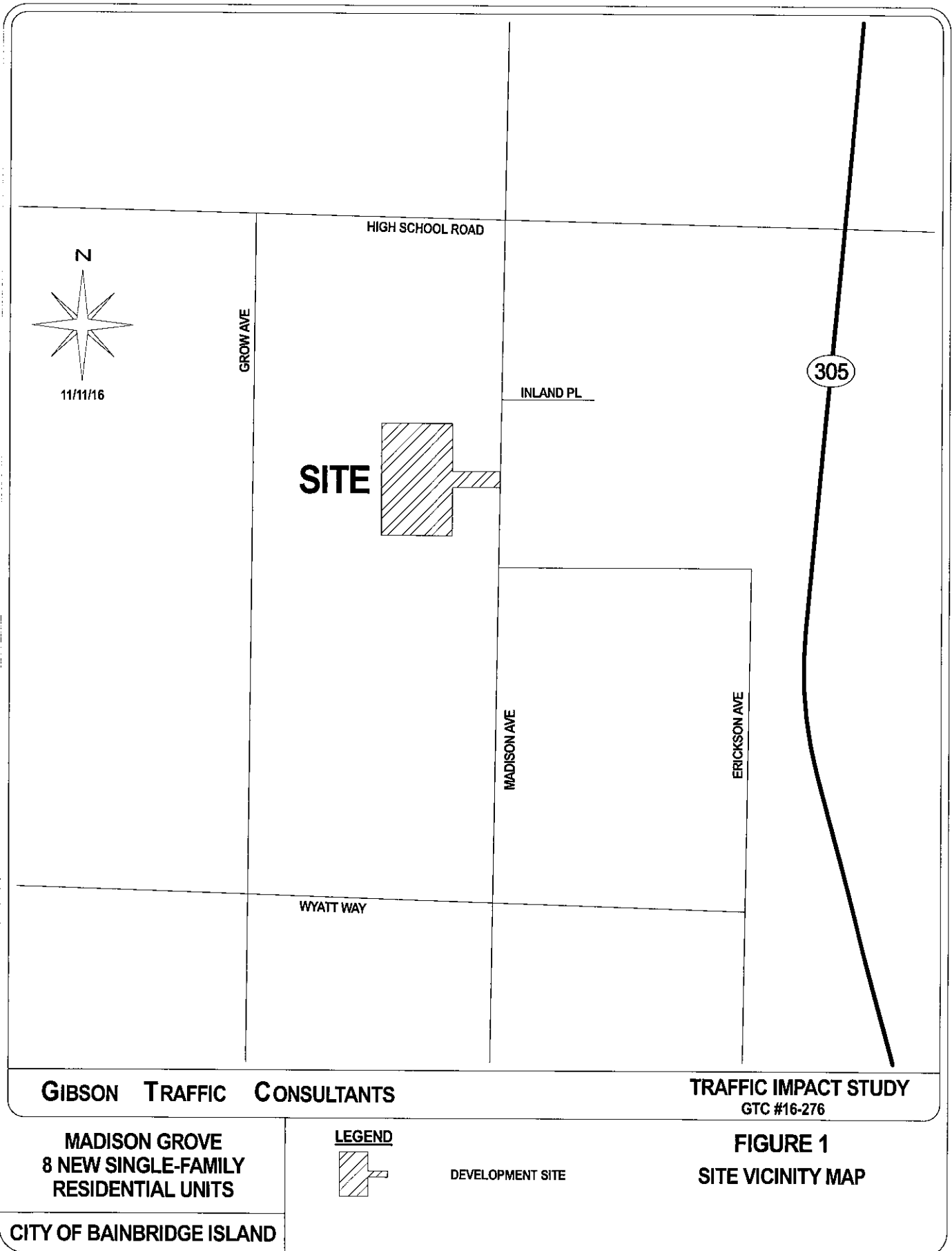
2. PROPOSED SITE DEVELOPMENT & ACCESS

The Madison Grove development is located along the east side of Madison Avenue, south of Inland Place NE. A site vicinity map is included in Figure 1. The development is proposed to consist of 9 total single-family residential units. There is one existing unit on the site that will be removed and therefore the development will result in 8 new single-family residential units. The development is proposed to have one access to Madison Avenue in the middle of the limited frontage along Madison Avenue. The development is scheduled for occupancy by the year 2019.

3. METHODOLOGY

The trip generation calculations for the Madison Grove development are based data contained in the Institute of Transportation Engineers' (ITE) *Trip Generation Manual, 9th Edition (2012)*. The distribution of trips generated by the Madison Grove development is based on the approved distributions for similar developments in the site vicinity, specifically the plat of Ashbury, known as Wyatt Hill, and the Astir at Bainbridge Island development.

The Madison Grove development is only anticipated to impact any of the surrounding intersections, other than the site access, with 6 PM peak-hour trips. The impacts to the surrounding intersections have been evaluated based on the information published in the City of Bainbridge Island *Island Wide Transportation Plan*.



4. TRIP GENERATION

The trip generation calculations for the Madison Grove development are based on the average trip generation rates for ITE Land Use Code 210, Single-Family Detached Housing. The trip generation of the 11 new single-family units of the development is summarized in Table 1.

Table 1: Trip Generation Summary

8 New Single-Family Residential Units	Average Daily Trips			AM Peak-Hour Trips			PM Peak-Hour Trips		
	Inbound	Outbound	Total	Inbound	Outbound	Total	Inbound	Outbound	Total
Generation Rate	9.52 trips per unit			0.75 trips per unit			1.00 trips per unit		
Splits	50%	50%	100%	25%	75%	100%	63%	37%	100%
Trips	38	38	76	1	5	6	5	3	8

The Madison Grove development is anticipated to generate 76 new average daily trips with 6 new AM peak-hour trips and 8 new PM peak-hour trips.

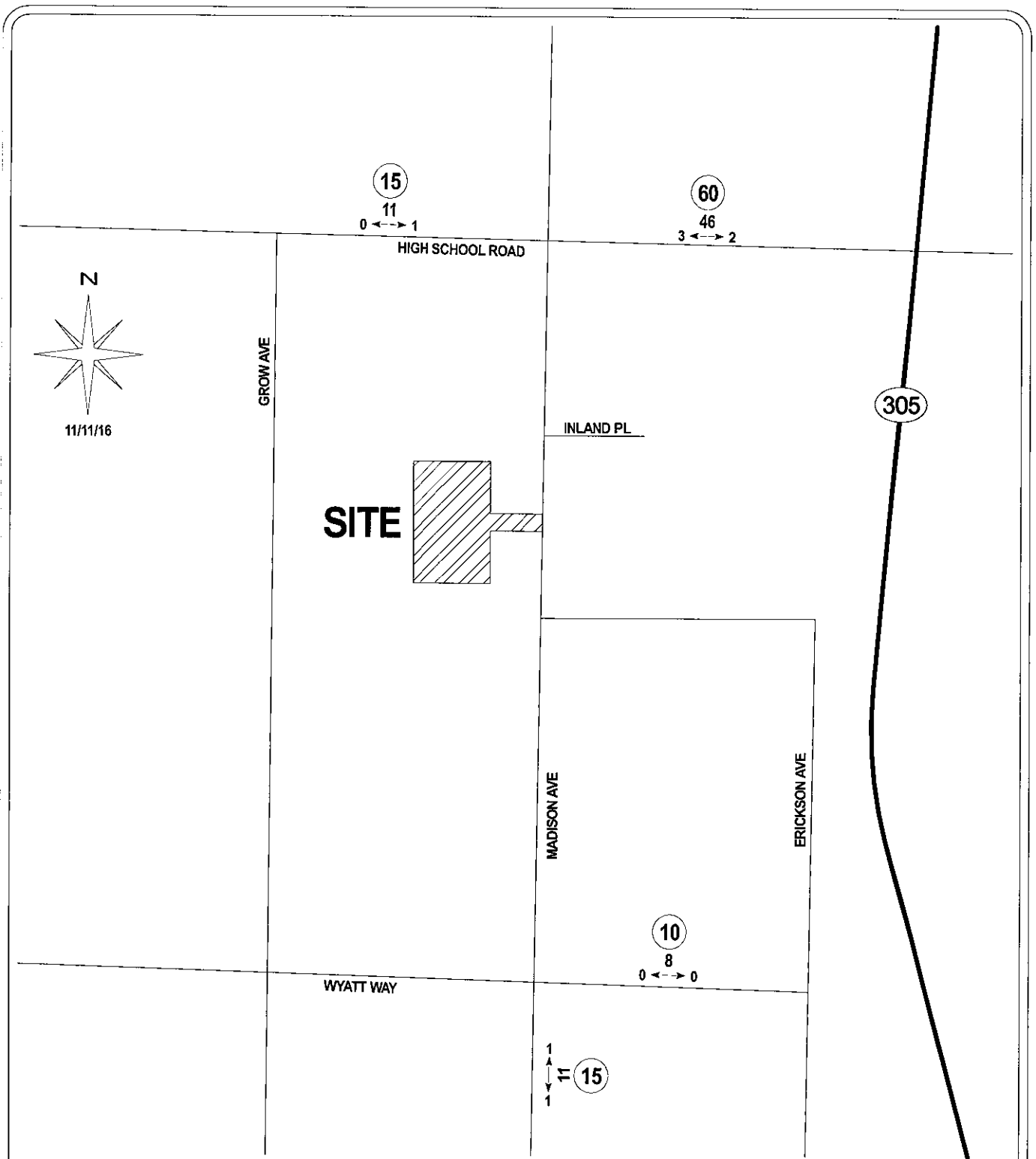
5. TRIP DISTRIBUTION

The distribution of trips generated by the Madison Grove development is based on the previously approved trip distributions in the site vicinity. It is estimated that 75% of the development's trips will travel along High School Road, fifteen percent to and from the west and sixty percent to and from the east. Approximately 15% of the development's trips are anticipated to travel to and from the south along Madison Avenue, south of Wyatt Way. The remaining 10% of the development's trips are anticipated to travel to and from the east along Wyatt Way. The detailed trip distribution is shown in Figure 2 for the PM peak-hour.

6. INTERSECTION LEVEL OF SERVICE ANALYSIS

The two intersections, other than the site access, impacted by the most trips from the Madison Grove development are Madison Avenue at High School Road and Madison Avenue at Wyatt Way. Both of these intersections were analyzed as part of the *Island Wide Transportation Plan*.

The intersection of Madison Avenue at High School Road is a roundabout and was shown to operate at LOS B under the 2015 existing conditions and remain at acceptable LOS C under the 2021 and 2035 future conditions. The 6 PM peak-hour trips added by the Madison Grove development are not anticipated to push the intersection beyond acceptable LOS D, especially since it has been shown to operate at LOS C for a 20-year horizon period.



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #16-276

MADISON GROVE
8 NEW SINGLE-FAMILY
RESIDENTIAL UNITS

LEGEND

AWDT
PM ← PEAK

NEW DAILY TRIPS
NEW PM PEAK-HOUR TRIPS

XX
TRIP DISTRIBUTION %

FIGURE 2
TRIP DISTRIBUTION
PM PEAK-HOUR

CITY OF BAINBRIDGE ISLAND

The intersection of Madison Avenue at Wyatt Way is an all-way stop-controlled intersection and was shown to operate at LOS E under the 2015 existing, 2021 future and 2035 future conditions. Improvements for the intersection, which could include signalization or a roundabout, are included as part of the City of Bainbridge Island *Capital Improvement Plan* (CIP). The impact of the Madison Grove development to this intersections will be mitigated by the payment of standard traffic mitigation fees, which will help fund the improvements.

7. COLLISION ANALYSIS

Collision data was collected from WSDOT for the section of Madison Avenue between Ihland Place NE and Wallace Way NE for the period from January 1, 2010 to nearly the end of the year 2015. This period represents approximately 5.75 years of collision data.

The data shows that there have been 5 collisions during the study period between these two intersections. This equates to less than 1 collision per year in the vicinity of the development. The data shows that 3 of the collisions are rear-end, one was a right-turning vehicle and one was a collision with a pedestrian. None of the collision involved a fatality.

This collision history should not be considered a significant collision history since there is less than 1 collision per year without any fatalities.

8. ACCESS ANALYSIS

The access to the Madison Grove development has been analyzed to ensure there is adequate sight distance and to determine if channelization would be warranted at the access.

8.1 Sight Distance Analysis

The available sight distance at the was evaluated using guidelines identified in the American Association of State Highway and Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets* (2011). Based on GTC's site evaluation, there appears to be at least 400 feet of available stopping and intersection sight distances in both directions. This allows for adequate sight distance of at least a 35 mph design speed. This is 10 mph above the posted 25 mph speed limit. Therefore, the available stopping and intersection sight distances at the access should be considered adequate.

8.2 Channelization Analysis

The trip generation and trip distribution shows that the development is anticipated to generate 9 total PM peak-hour trips, which does not include credit for the existing unit on the site. There would be a maximum of 2 northbound left-turns into the site and 4 southbound right-turns into the site. These volumes would not warrant either left-turn or right-turn channelization since typical WSDOT thresholds are closer to 20 trips for a right-turn lane and channelization has not been required for much larger developments in the site vicinity.

9. MITIGATION

The Madison Grove development will be impacting the intersection Madison Avenue at Wyatt Way, which is shown to be operating at a deficient level of service in the *Island Wide Transportation Plan*. Improvements to this intersection are included as part of the CIP and payment of the standard traffic mitigation fees will mitigate the impacts of the Madison Grove development on this intersection.

10. CONCLUSIONS

The Madison Grove development is proposed to include 9 total units with one existing unit being removed. The 8 new units are anticipated to generate 76 new average daily trips with 6 new AM peak-hour trips and 8 new PM peak-hour trips. Payment of standard traffic mitigation fees will mitigate the impacts of the Madison Grove development on surrounding intersections and help fund improvements at surrounding intersections.

Island Wide Transportation Plan References

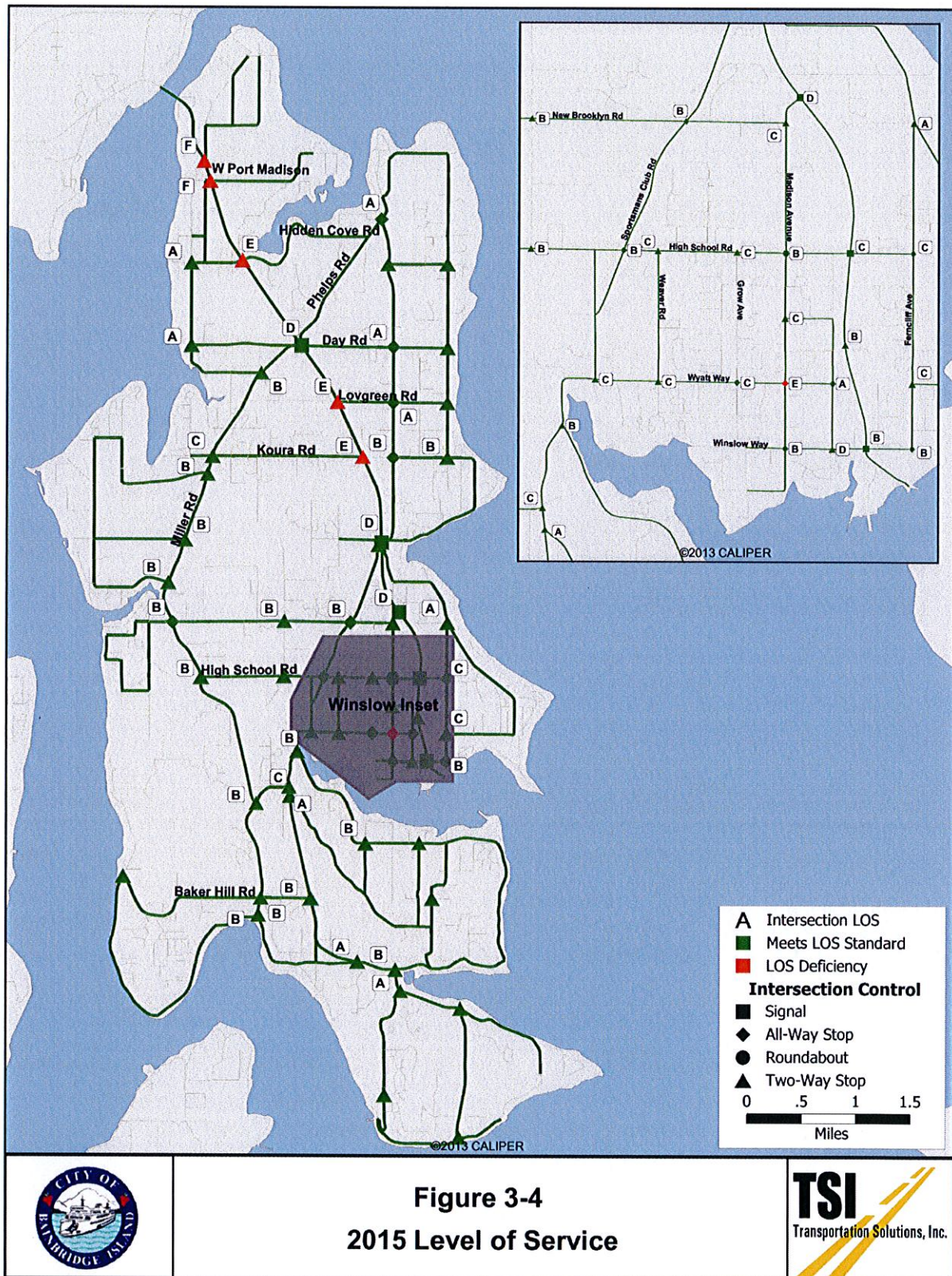




Table 3-6. Intersections PM Peak Hour LOS Deficiencies – 2014 Baseline

Intersection	Control Type ¹	Delay ² (s/veh)	LOS
Madison Ave N / Wyatt	AWSC	38.5	E
SR 305 / Koura Rd	TWSC	37.3	E
SR 305 / Lovgreen Rd	TWSC	38.9	E
SR 305 / NE Hidden Cove Rd	TWSC	48.3	E
SR 305 / Port Madison	TWSC	>180	F
SR 305 / Agatewood Rd	TWSC	>180	F

¹TWSC = Two-Way Stop Control; AWSC = All-Way Stop Control; RAB = Roundabout; Signal = Signalized

²Average control delay for all movements. For TWSC, delay is reported for the movement with the highest delay.

Future Traffic Conditions

This section identifies the land use forecast methodology and results used to identify the future needs and deficiencies of the transportation system. Two time periods were studied: 2021, representing the six-year short-term planning period, and 2035, representing the 20-year long-term planning period. 2035 matches the long-term planning horizon of Puget Sound Regional Council (PSRC), the region's major planning entity.

Land Use Forecast

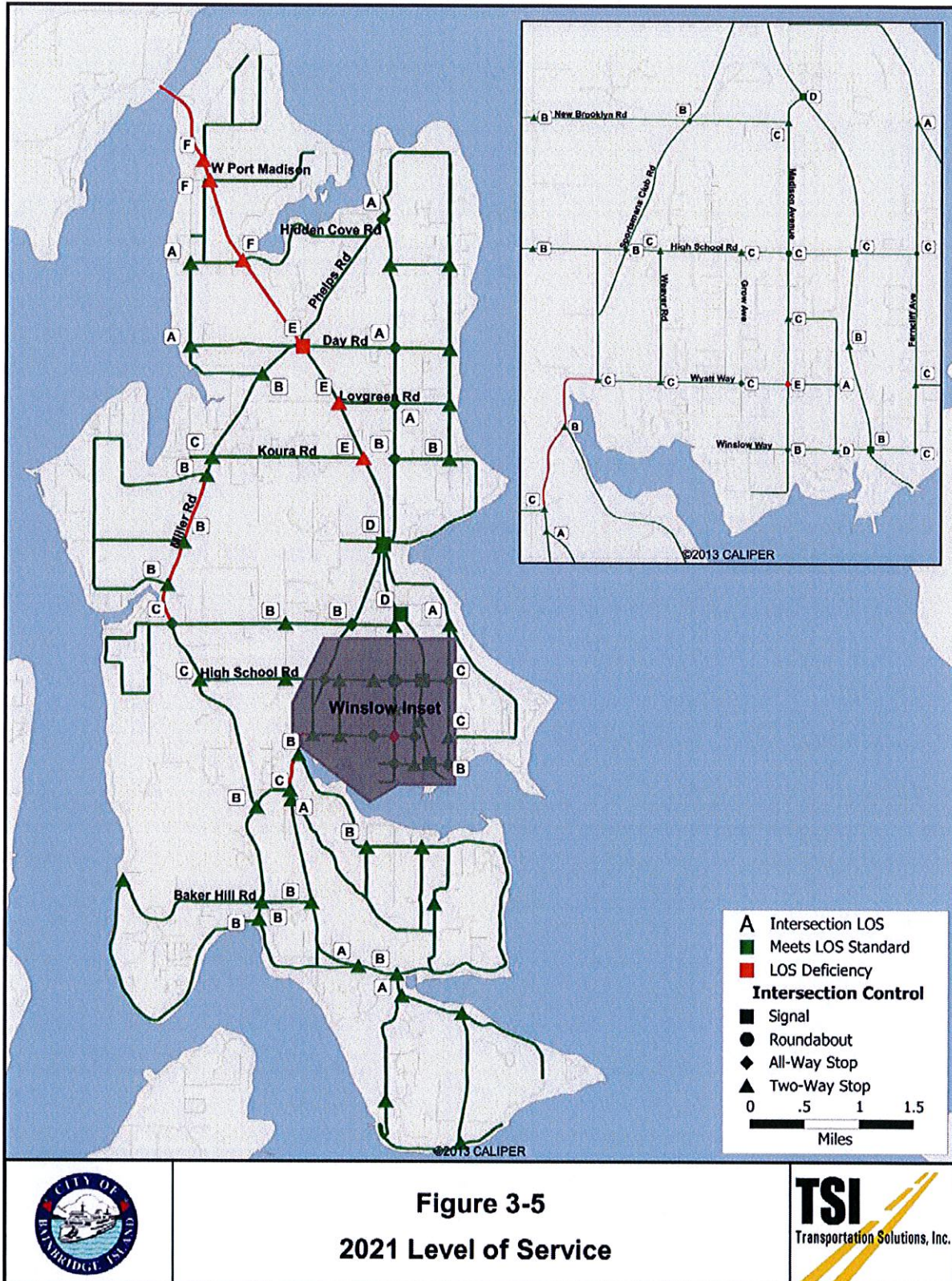
The transportation model used PSRC and Kitsap County land use forecasts to determine future PM peak hour trip growth by transportation analysis zone (TAZ). Trip growth forecasts were distributed and assigned to the future roadway network to generate expected future traffic growth citywide.

Determination of Base Year Land Use

Base year land use was provided by Kitsap County in the form of GIS-based tax parcel data. These data were refined based on recent satellite and street-level photography, then categorized according to the following modeled land use types:

- Single-Family Housing
- Multi-Family Housing
- Senior/Assisted/Retirement Housing
- Retail
- General Office
- Industrial and Manufacturing
- Warehouse/Utility/Storage
- Hotel
- Hospital/Nursing Home
- Park and Ride
- School
- Recreation/Entertainment
- Church

Land use data were subsequently aggregated to create 241 transportation analysis zones (TAZs), with each TAZ representing a distinct geographical trip generating unit in the travel





2016-2021 Mitigation

Each intersection and roadway segment identified as below the minimum LOS standard in 2021 was studied to see if mitigation actions could improve the intersection LOS to the minimum standard. Targeted roadway improvements can correct an intersection or roadway that fails to meet the minimum LOS standard.

City Mitigation

For intersections in the City's roadway system where the expected LOS is below the minimum standard, the following mitigation is proposed:

- *Madison Avenue/ Wyatt Way* – An intersection control improvement such as a signal or a roundabout would improve the intersection to LOS B. The intersection will be studied to determine what specific improvement should be constructed. A round-about may be one alternative. An improvement project is currently programed in the City's CIP for Wyatt Way, including the intersection.
- *Eagle Harbor Drive from Wyatt to Blakely* - Shoulder improvements for non-motorized users are recommended. An improvement project is currently programed in the City's CIP.
- *Miller Road from New Brooklyn to Arrow Point* – Shoulder improvements for non-motorized users are recommended. An improvement project is currently programed in the City's CIP for this segment.

WSDOT Mitigation

Six SR 305 intersections and roadway segments north of Day Road currently fail to meet LOS and will continue to deteriorate. Refer to chapter 4 of this Plan for recommendations.

Table 3-9 Intersections PM Peak Hour LOS Deficiencies – 2021 Forecast

Intersection	Control Type ¹	2021 Delay ² (s/veh)	2021 LOS	Possible Mitigation
Madison Ave N / Wyatt	AWSC	44.2	E	Roundabout or signal
SR 305 / Koura Rd	TWSC	43.5	E	SR 305 Corridor Improvements
SR 305 / Lovgreen Rd	TWSC	39.4	E	
SR 305 / Day Rd	Signal	60.1	E	
SR 305 / Hidden Cove Rd	TWSC	>180	F	
SR 305 / Port Madison	TWSC	>180	F	
SR 305 / Agatewood Rd	TWSC	>180	F	

¹TWSC = Two-Way Stop Control; AWSC = All-Way Stop Control; RAB = Roundabout; Signal = Signalized

²Average control delay for all movements. For TWSC, delay is reported for the movement with the highest delay.

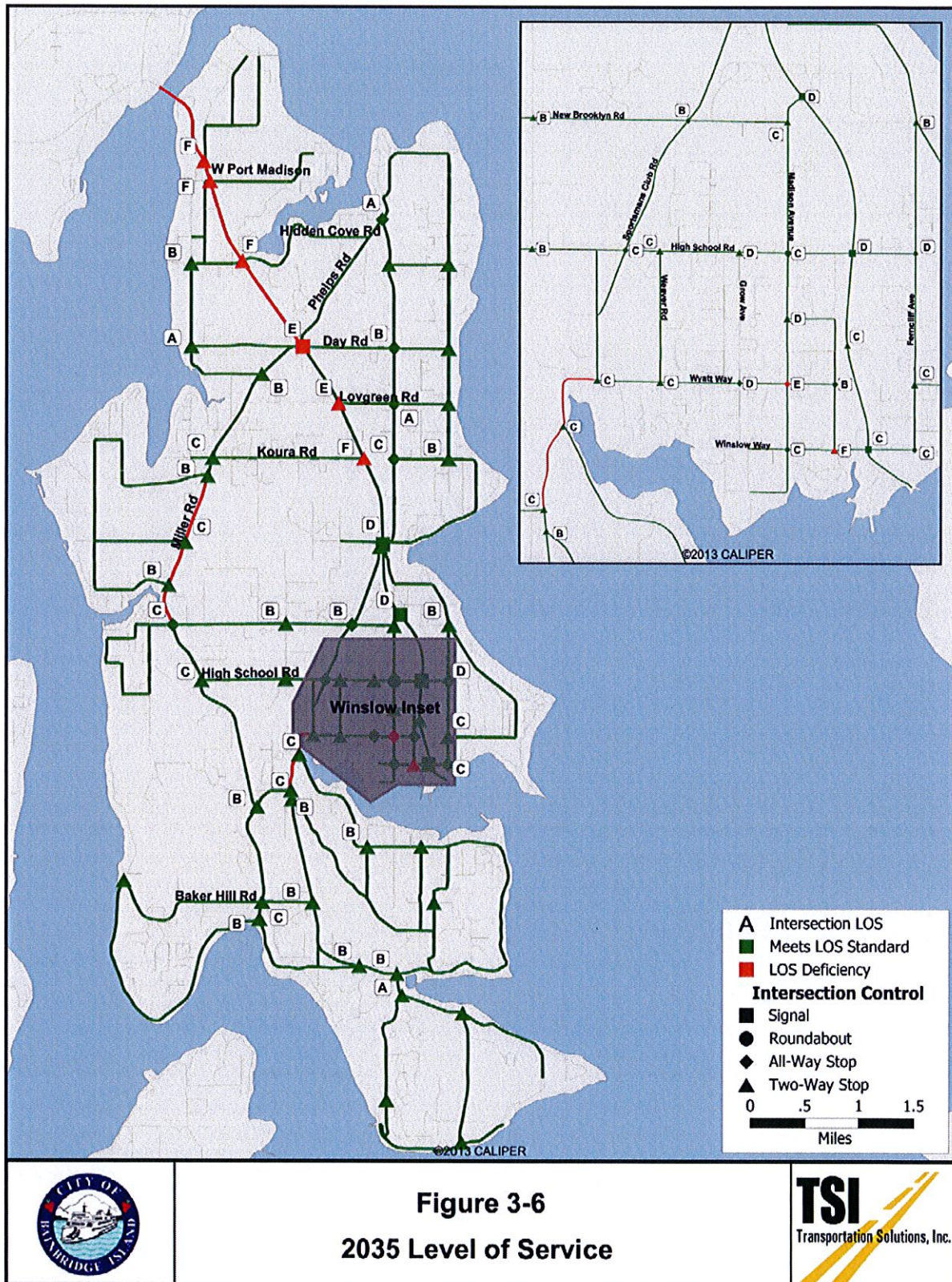




Table 3-11. Intersections PM Peak Hour LOS Analysis – 2035 Forecast

Intersection	Control Type ¹	2035 Delay ² (s/veh)	2035 LOS	Possible Mitigation
Madison Ave N / Wyatt	AWSC	42.9	E	Roundabout or signal
Winslow Way / Erickson Ave	TWSC	64.4	F	Access restrictions / RIRO
SR 305 / Koura Rd*	TWSC	51.2	F	SR 305 Corridor Improvements ³
SR 305 / Lovgreen Rd ⁴	TWSC	45.1	E	
SR 305 / Day Rd	Signal	78.7	E	
SR 305 / Hidden Cove Rd ⁴	TWSC	>180	F	
SR 305 / Port Madison	TWSC	>180	F	
SR 305 / Agatewood Rd	TWSC	>180	F	

¹TWSC = Two-Way Stop Control; AWSC = All-Way Stop Control; RAB = Roundabout; Signal = Signalized

²Average control delay for all movements. For TWSC, delay is reported for the movement with the highest delay.

³Specific corridor improvements identified below

⁴Alternative access to SR 305 is provided for locations w/ right-in and right-out (RIRO) access during PM peak hour:

- Koura Rd access via Miller Rd
- Lovgreen Rd access via N Madison Ave or Miller Rd
- Hidden Cove access via Phelps Rd, Seabold Rd or Day Rd

Table 3-12. Street Segment PM Peak Hour LOS Analysis – 2035 Forecast

Segment	From	To	V/C	LOS
SR305	Day Rd	Hidden Cove Rd	0.95	E
SR305	Hidden Cove Rd	Seabold Church Rd	1.03	F
SR305	Seabold Church Rd	Seabold/W Port Madison	1.01	F
SR305	Seabold/W Port Madison	Agatewood Rd	1.05	F
SR305	Agatewood Rd	Reitan Rd	1.04	F
Bucklin Hill Rd	Blakely Ave	Eagle Harbor Dr	0.86	D
Miller Rd	New Brooklyn Rd	Battle Point Dr	0.97	E
Miller Rd	Battle Point Dr	Tolo Rd	0.81	D
Miller Rd	Tolo Rd	Arrow Point Dr	0.82	D
Eagle Harbor Dr	Bucklin Hill Rd	Finch Rd	0.85	D

2021-2035 Mitigation

Mitigating the LOS for the City intersections would require minor improvements which can be programmed into the City's future transportation improvements program. The increased traffic volume expected to use SR 305 in 2035 would overwhelm the existing facility, resulting in a situation that cannot easily be mitigated.

Collision Data

OFFICER REPORTED CRASHES THAT OCCURRED ON ALL ROADS IN THE CITY OF BAINBRIDGE ISLAND
1/1/2010 - available 2015 (2015 data is partial and preliminary)

UNDER 23 UNITED STATES CODE - SECTION 409, THIS DATA CANNOT BE USED IN DISCOVERY OR AS EVIDENCE
 AT TRIAL IN ANY ACTION FOR DAMAGES AGAINST THE WSDOT, OR ANY JURISDICTIONS INVOLVED IN THE DATA

PRIMARY TRAFFICWAY	INTERSECTING TRAFFICWAY	DIST FROM REF POINT	COMP DIR FROM REF POINT	REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	FIRST COLLISION TYPE / OBJECT STRUCK											
								# J T H S L	# I F A E D A	# V E H I C L E S	# P E D E S T R I A N S	# P E D E S T R I A N S							
MADISON AVE N	WALLACE WAY NE	95	F	N	E369352	10/29/2014	18:45	Serious Injury	1	0	1	1	0	Vehicle going straight hits pedestrian					
MADISON AVE N	WALLACE WAY NE	30	F	S	2722424	2/28/2011	15:38	No Injury	0	0	2	0	0	From same direction - both going straight - both moving - rear-end					
MADISON AVE N	IHLAND WAY NE				E142067	12/6/2011	18:38	No Injury	0	0	2	0	0	From same direction - both going straight - one stopped - rear-end					
MADISON AVE N	WALLACE WAY NE				3508385	10/10/2011	15:11	No Injury	0	0	2	0	0	From same direction - one right turn - one straight					
MADISON AVE N	WALLACE WAY NE				3508383	10/5/2011	13:50	No Injury	0	0	2	0	0	From same direction - both going straight - one stopped - rear-end					