Aberdeen

MASTER TRANSPORTATION PLAN

VECTOR COMMUNICATIONS

HRGreen

Helms & ASSOCIATES
CIVIL ENGINEERS & LAND SURVEYORS

Aberdeen
Master Transportation Plan

FOR

FHWA, SDDOT, and the City of Aberdeen, South Dakota

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Prepared by: HR Green, Inc.

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Project Manager

Steve Gramm
Data Analysis Engineer
South Dakota Department of Transportation

Study Advisory Team

Lynn Lander, City of Aberdeen
Robin Bobzien, City of Aberdeen
Stu Nelson, City of Aberdeen
Brett Bill, City of Aberdeen
Ken Hubbert, City of Aberdeen
Jim Barringer, Aberdeen Development Corporation
Mark Hoines, Federal Highway Administration
Steve Gramm, South Dakota Department of Transportation
Jeff Senst, South Dakota Department of Transportation
Jeff Brosz, South Dakota Department of Transportation
Wade Dahl, South Dakota Department of Transportation

HR Green, Inc.

Ross Harris – Consultant Project Manager
Jon Wiegand – Traffic Engineer
Ryan Allers – Traffic Engineer
Molly Stewart – Design Engineer
Pete Lovell – GIS Technician
Marcus Coenen – Transportation Planner

Helms & Associates

Terry Helms
Brooke Edgar

Vector Communications

Laurna Godwin
Atia Thurman

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1. Introduction

This section provides an overview of the background, purpose, and process for the study, including an overview of population trends, general context for the transportation plan, and plan goals.

The City of Aberdeen and the South Dakota Department of Transportation (SDDOT), together under the guidance of the Federal Highway Administration (FHWA), have partnered in the development of a Master Transportation Plan. This plan will provide valuable support for transportation system decision-making and investments in the community for the next 20 years. The Master Transportation Plan examines the transportation facility needs and potential solutions in the community and is intended to be a living document that can be used as a blueprint, or "road map" to accommodate the interests or desires of private land developers, elected and appointed local officials, and members of the traveling public.

Aberdeen is South Dakota's third largest city

Primary goals to be achieved by the plan for Aberdeen's transportation system include providing safe, efficient, and convenient facilities and mode choices appropriate for transportation users of all ages and abilities. Its transportation system should be well-coordinated with existing and future land use planning to allow efficient coordination for future plan growth. The development and adoption of the Master Transportation Plan by the City of Aberdeen demonstrates the best way to integrate planned system growth with preservation needs with investment priorities.

Community Background and Demographics


Railroads were very important in the growth in the community's population in the early 1900's. The railroad remains an important transportation system feature in Aberdeen, also known as South Dakota's "Hub City".

Aberdeen's roots as an early rail center earned it the nickname of "Hub City". The prominence of the railroad in the community remains, and now is complemented by a local street and regional highway system that serves local motorists, transit users, and bicyclists/pedestrians. The project study area is illustrated below in Figure 1, and incorporates the City of Aberdeen and an approximate 2 mile growth/future annexation area boundary within Brown County.

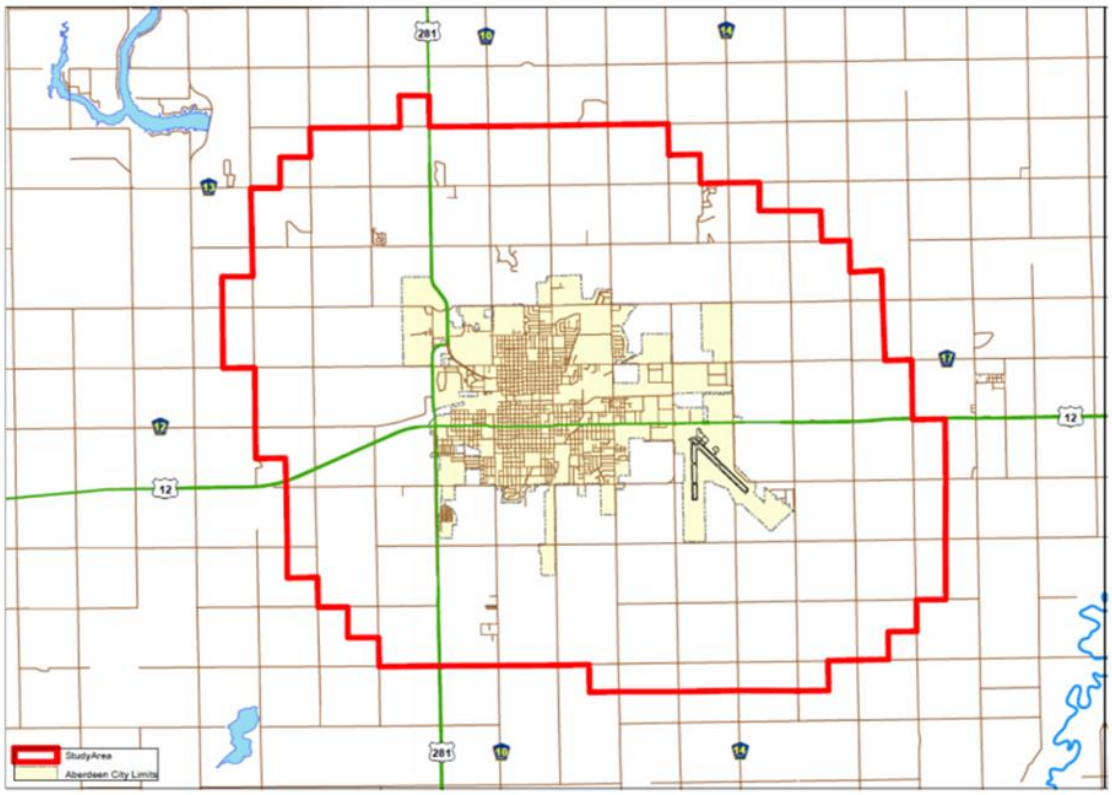

Figure 1 – Study Location

As the third largest incorporated community in South Dakota, Aberdeen has experienced population growth of approximately 4.6 percent since the 1990 US Census. Its regional facilities, such as agribusiness, health care, retail trade, and conventioneering establish the community as a seat of commerce and hub of activity for a larger population in the State.

Table 1 illustrates trends in population growth in Aberdeen, Brown County, and the State of South Dakota based on data and forecasts from the U.S. Census Bureau and Aberdeen Comprehensive Plan (2003).

Table 1 – Demographic Trends since 1990

Jurisdiction	1990 Population	2000 Population	2010 Population	Percent Change, 1990-2010	2020 Population Estimate
Aberdeen	24,927	24,658	26,091	+ 4.6%	26,800
Brown County	35,580	35,460	36,531	+ 2.7 %	36,900
State of South Dakota	696,004	754,844	814,180	+16.9 %	853,000

Sources: U.S. Census Bureau and Aberdeen Comprehensive Plan (2003)

The Role of the Master Transportation Plan in Aberdeen

The Master Transportation Plan examines the transportation facility needs and potential solutions in the community to augment the current Aberdeen Comprehensive Plan and the 2012 Brown County Master Transportation Plan. The Aberdeen Master Transportation Plan is intended to be a living document that

can be used as a blueprint or "road map" to accommodate the interests or desires of private land developers, elected and appointed local officials, and members of the traveling public.

The Aberdeen Master Transportation Plan documents current system deficiencies, identifies future system needs, and ultimately prioritizes the transportation needs for Aberdeen. With limited budgets for transportation infrastructure maintenance and construction, available funding for planning level documents meant to guide future system improvements must be efficiently used to achieve the intended benefit. It is, therefore, very important for the community (and SDDOT) to have up-to-date, reliable (documented) transportation system needs sorted by priority and ability to deliver (costs and other considerations), especially in the competition for available federal and state improvement funding.

As both the City of Aberdeen and its surrounding developing areas in Brown County grow and the economy becomes more diversified, traffic levels and patterns are anticipated to change. Of the many transportation challenges that the City of Aberdeen will need to address, the Master Transportation Plan examines the current and projected state of the City's roadway, railroad, and trails systems, and makes recommendations for the maintenance, safety, capacity, and mobility improvements to each of these components.

Aberdeen Transportation System Profile

The Aberdeen roadway system comprises a well-laid out network of state, county, city, and township roads which distribute trips and provide adequate mobility throughout the City on an established grid system. Although much reconstruction and pavement rehabilitation has taken place in recent years due to poor soils and the need for subsurface explorations prior to construction in many locations, the roadway system is generally in good repair. There are a number of ongoing preservation and expansion needs.

6th Avenue (US Highway 12) at Main Street in Downtown Aberdeen

There are some emerging roadway system capacity and safety issues that have been observed, primarily along US Highway 12 (US 12)/6th Avenue. Traffic queues at signalized intersections result in delays that are approaching unacceptable levels. Several locations around the community, including the Lakewood Mall area, have been identified as experiencing peak congestion due to weekend and holiday shopping trips from local and regional travelers. Through town truck traffic that will be generated by a beef processing plant located near the southern limits of the community will send vehicles carrying rendered byproducts through town, which will produce undesirable conditions as well as heavier truck volumes particularly during periods of peak congestion. Amenities such as local parks and trails and the Aberdeen Community Schools and Northern State University draw more bicyclists and pedestrians to the local street system in this part of the community. The Aberdeen Master Transportation Plan includes a traffic analysis to diagnose safety and operational issues such as these, as well as recommendations for system management and potential access or capacity improvements to reduce points of conflict. The Future Needs Analysis of the Master Transportation Plan identifies deficiencies in roadway capacity, geometry, right-of-way (ROW), and other transportation elements for key roadway routes for the 20-year time frame. The Future Needs Analysis also includes a prioritized list of recommended projects based on expected benefits and costs.

The BNSF Railroad operates with daily trains through Aberdeen

Highway and rail freight transport is of critical importance to the economic vitality of Aberdeen. Freight transportation needs in the community are met by a combination of truck and rail services. The primary routes for intrastate and interstate truck traffic through the County are US 12 and US Highway 281 (US 281). Some trucks also use other state and county roads to access commercial, agricultural, and industrial areas throughout the county.

The BNSF Railroad is the rail freight line that bisects the community north of US 12 stretching along an east-west corridor. Through Aberdeen, the BNSF hauls such products as agricultural commodities, consumer and industrial products, and coal with six to eight trains passing through the community daily. From the Hub City, the line connects northwest to Hettinger, North Dakota, east to Willmar, Minnesota, and south to Mitchell. The BNSF line in Aberdeen also provides main line connections to the Great Lakes/Chicago marketplace; Nebraska; and BNSF operations in the Pacific Northwest, which includes ports and inland operations. Train cars are also switched in the Aberdeen terminal. When other routes such as those through Minot and Mandan, North Dakota, are nearing capacity, overflow traffic can be routed through Aberdeen.

The City of Aberdeen is currently conducting bicycle and pedestrian needs analysis with the update of the community's Trails Master Plan.

The Aberdeen Trail system provides a key connection between local parks and community neighborhoods

Extensive planning and coordination of bicycle and multi-user recreational facilities is needed in order to identify potential needs, opportunities, connectivity gaps, safety problems, and barriers as multimodal issues are addressed. Pedestrian and bicycle travel should also be a consideration for any future expansion of the roadway transportation network and integrated into the Master Transportation Plan where appropriate.

Transit service in Aberdeen is currently provided by Ride Line, which is a City-operated demand response service operating within Aberdeen and a two-and-a-half mile radius of the City limits. Ride Line also provides paratransit services to the community. Other multimodal opportunities for ride sharing and car/van pools and buses are operated by public and private employers in the community, such as Northern State University and Avera Health Care Services. Private taxi service is available through two taxicab providers.

To address perceived needs of potentially underserved local populations needing additional transit services, a coordinated transit system-human services needs analysis was completed in 2013. The study concluded with a number of strategies to improve transit-related issues in the community, including poor public perception of transit, limitations of existing span of service, low levels of service, a general lack of understanding of available transit services, few connections to outlying areas, lack of consumer flexibility and capacity, and a lack of in-town transportation facilities for local students.

General Aviation services are provided at the Aberdeen Regional Airport (ABR) through three fixed-base operators. Commercial passenger service is also offered through Skywest Airlines doing business as Delta Air Lines with daily flights to Aberdeen with regional connections to other small and large hub airports.

The City of Aberdeen has recently completed an updated airport layout plan, safety analyses, and National Environmental Policy Act (NEPA) studies for the decoupling of the Aberdeen Regional Airport's primary and secondary runways, including reconfiguration of taxiways, aprons, and an updated drainage system.

Aberdeen's Regional Airport provides daily commercial and local charter flights

Study Guidance (Study Advisory Team)

The Aberdeen Master Transportation Plan was guided by a Study Advisory Team (SAT) comprised of representatives from the SDDOT, Federal Highway Administration (FHWA), and staff from the City of Aberdeen. The SAT convened five times over the course of the planning study to review study findings and interim and final study deliverables, and plan public meetings. The SAT's function continues after the adoption of the plan as the representatives implement the plan's recommendations in coordination with their own and other jurisdictions.

Helms & Associates provided the local coordination for the project with their knowledge and expertise in the Aberdeen area. They collected all background information from the local stakeholders, assisted with the collection of origin-destination data, and provided supplemental information throughout the study. They also attended and supported all SAT and public information meetings, as well as provided review of study documents.

Goals and Objectives

Under the guidance of FHWA, the SDDOT and City of Aberdeen established the following goals for the Aberdeen Master Transportation Plan:

- Complete a list of transportation issues and needs facing the Aberdeen area.
- Develop feasible solutions to address those issues and needs that meet current design standards and/or traffic level of service expectations under both the current and predicted future traffic conditions, while promoting a livable community that will enhance the economic and social well-being of Aberdeen residents.
- Create final products for use by Aberdeen and the SDDOT which will provide guidance to implement recommended improvements and react to future development plans within the area.

Methods and Assumptions in Completing the Master Transportation Plan

The Master Transportation Plan was completed over a 14-month schedule. There were three phases associated with the project schedule:

Phase 1: Inventory and analysis of existing and future conditions and identification of problems and needs.

Phase 2: Application of the "toolbox" – development of strategies, alternatives, and potential solutions to solve problems and fulfill needs.

Phase 3: Selection of alternatives for further study and development, provide for integration with other investments, and prioritization of planned improvements.

Figure 2 illustrates the three study phases and the overall schedule for the Aberdeen Master Transportation Plan.

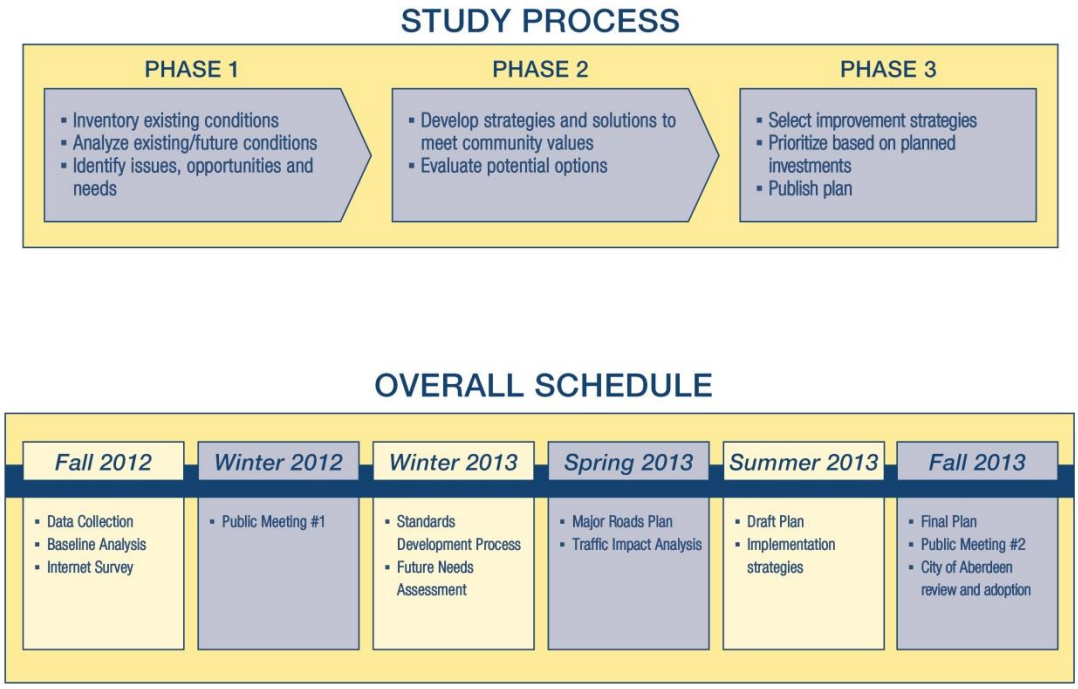

Figure 2 – Study Process and Schedule

Recognition of Previous, Related Studies

Several reference documents were used in the preparation of the Aberdeen Master Transportation Plan. The City of Aberdeen maintains a current library of plans and studies that were used to identify system inventory, needs, and analysis at their respective dates of completion. Locally, the Aberdeen Comprehensive Plan, Aberdeen Trails Master Plan (under development and updating the City's Recreational Master Plan), and Coordinated Public Transit – Human Services Coordination Plan were referenced. The fourth key reference document was the Brown County Master Transportation Plan, completed in June 2012. The Aberdeen Master Transportation Plan is intended to include, and complement, the recommendations set forth in the Brown County Master Transportation Plan.

The Second Street Bridge provides a grade-separated vehicle, bicycle, and pedestrian crossing of the BNSF Railroad between the north side of the community and Downtown Aberdeen

2. Existing Conditions and Needs Assessment

This section highlights the existing conditions of the Aberdeen transportation system and summarizes the needs identified as part of the planning process.

Existing Conditions Inventory

An inventory of the existing conditions for the transportation infrastructure within the City of Aberdeen was completed in order to help identify transportation-related issues and opportunities. This included a review of the existing roadway network, traffic volumes and operations, crash history, non-motorized transportation facilities, transit service, airport, and freight facilities. The following sections summarize the key findings of this review.

Existing Roadway Network

The primary routes for intrastate and interstate traffic that enter or exit the City of Aberdeen include US 12, an east-west route through the center of Aberdeen, or US 281 which traverses along the western urban fringe of the City in a north-south direction. US 12 carries nearly 30,000 vehicles per day on the more central segment within Aberdeen. US 281 carries significantly fewer vehicles, approximately 10,000 vehicles per day on the most highly traveled segments. Additional arterial and collector roadways provide connections between the urbanized Aberdeen area and the surrounding region.

The City of Aberdeen initially developed a major roads plan in 2004, entitled the Tomorrow Plan. Figure 3 graphically depicts the functional roadway classification throughout Aberdeen as presented within the plan. One roadway component within the plan included a potential bypass route traversing outside of the eastern, northern, and southern edges of the Aberdeen urbanized area.

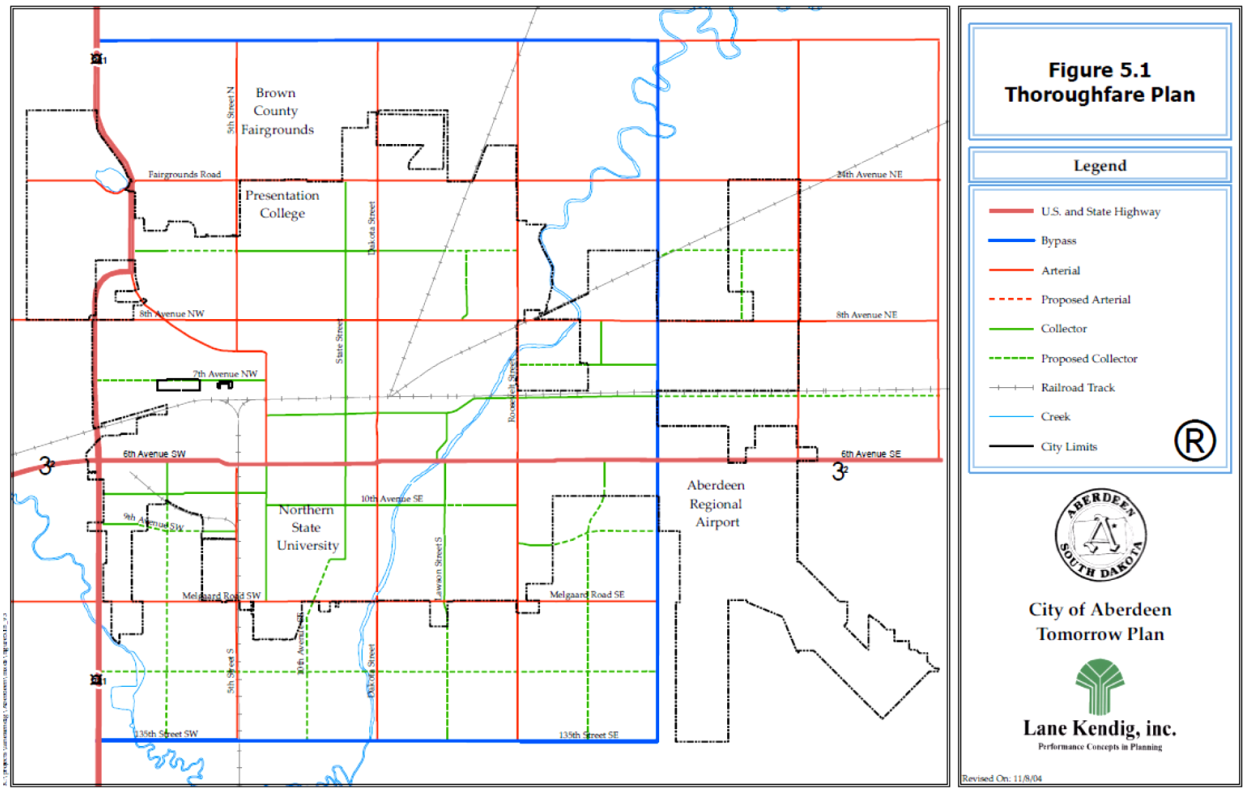

Figure 3 – Existing City of Aberdeen Thoroughfare Plan

(Excerpt from the Aberdeen Tomorrow Plan. Note that it is the intent of this Master Plan to update/revise the existing Major Roads Plan to better serve the traveling public. The proposed Major Roads Plan is presented in Section 3).

The City of Aberdeen has an arterial-collector roadway network laid out in a north-south and east-west grid pattern throughout the City. Arterials are spaced approximately one mile apart in both the east-west and north-south directions. In general, the network is continuous with typical barriers being the railroad corridors, the airport in southeast Aberdeen, and Moccasin Creek.

US 12 (6th Avenue) is the backbone of the arterial system in the east-west direction, providing access to a majority of the commercial and business areas within the City. The multi-lane route also accommodates pass-through trips as the major eastern and western gateways into and out of Aberdeen. Operationally, the corridor is hampered by high vehicular and truck traffic volumes, an at-grade railroad crossing west of the central business district, and the frequent breaks in access.

US 281 currently serves as the western-most arterial within the urbanized area. The multi-lane highway was realigned as a western bypass, with the previous route along the current 2nd Street. US 281 typically maintains access breaks at quarter-mile increments, with only a few deviations. A frontage road parallels US 281 along the western side, providing more direct access to local development.

Traffic Counts

As part of the existing traffic analysis, turning movement counts were collected from 16 intersections identified by the Study Advisory Team as key intersections in Aberdeen. These 16 intersections are as follows:

1. US 12 (6th Avenue) and Melgaard Road S
2. US 12 (6th Avenue) and Roosevelt Street S
3. US 12 (6th Avenue) and Lawson Street S
4. US 12 (6th Avenue) and Dakota Street S
5. US 12 (6th Avenue) and State Street S
6. US 12 (6th Avenue) and Main Street S
7. US 12 (6th Avenue) and 2nd Street S
8. US 12 (6th Avenue) and 5th Street S
9. US 12 (6th Avenue) and US 281
10. Melgaard Road SE and Roosevelt Street S
11. Melgaard Road SW and 5th Street S
12. Melgaard Road SW and US 281
13. 5th Avenue and US 281
14. 5th Avenue and 2nd Street
15. 24th Avenue and Dakota Street
16. US 12 (6th Avenue) and Lamont Street

Traffic turning movement counts were collected on September 26 and 27, 2012 (Wednesday and Thursday). These two days correspond to traffic volumes for a typical weekday, with Northern State University and local schools in session. Data was collected during the AM (7 a.m. to 9 a.m.) and PM (3 p.m. to 6 p.m.) peak periods using Miovision video camera equipment for intersections 1 through 15 listed above. Intersection 16 listed above (US 12 and Lamont Street) was added after the previous 15 intersections were counted. The collected data included car, truck and pedestrian count information.

The turning movement counts were used to establish current year intersection operations and to provide the basis to determine future year intersection operations (presented later in this section). A summary of the turning movement counts is included in the Traffic Data Collection Forecast Technical Memorandum found in Appendix B.

Historic Crash Data Analysis

One method of assessing the performance of an existing roadway network is measuring traveler safety through the review of crash frequency and severity. The objectives are to locate high crash locations and determine safety improvements to reduce severity and number of crashes.

Historical crash data for the most recently available three-year period (2009-2011) for the study area was reviewed (provided by SDDOT). Total number of crashes within the study area, sorted by crash severity, is summarized in Table 2 and shown graphically in Figure 4. The intersections with the greatest number of crashes were identified within the limits of the City of Aberdeen, shown in Table 3

Of the total crashes in Aberdeen, 80 percent resulted in no injury or wild animal hit, 10 percent resulted in an injury, and less than 1 percent (2 total crashes) resulted in a fatality. Both fatal crashes occurred at an intersection and one involved a pedestrian. The other fatal crash occurred on an icy roadway surface. Overall, the crashes were distributed throughout the City, with a significant concentration of crashes occurring along US 12.

Table 2 – Aberdeen Crash History

Aberdeen Crash Severity	# of Crashes
Fatal Injury	2
Incapacitating Injury	33
Non-capacitating Injury	117
Possible Injury	149
Wild Animal Hit	181
No Injury	1,027
Total Crashes	**1,509**

Table 3 – Top Intersection Crash Locations

	Location	# of Crashes
1	US 12 (6th Ave) & Roosevelt St S	37
2	US 12 (6th Ave) & State St S	31
3	US 12 (6th Ave) & 2nd St S	29
4	US 12 (6th Ave) & Lincoln St S	24
5	US 12 (6th Ave) & Centennial St S	22
6	US 12 (6th Ave) & Main St S	18
7	US 12 (6th Ave) & Lamont St S	17
8	US 12 (6th Ave) & Lawson St S	16
9	US 12 (6th Ave) & Dakota St S	16
10	US 12 (6th Ave) & 5th St S	13
11	US 12 (6th Ave) & 1st St S	12
12	Roosevelt St N & 8th Ave NE	11
13	Roosevelt St N & Milwaukee Ave NE	10
14	Roosevelt St S & 3rd Ave SE	9
15	Main St N & 8th Ave NE	9
16	Dakota St S & 1st Ave SE	9

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Figure 4

Crash History (2009 - 2011)

Legend

Injury Severity

- Fatal injury
- Incapacitating
- Non-incapacitating
- No injury
- Possible
- City Limits
- Study Area

N
W E
S

0 3,000 6,000
Feet

1 inch = 5,198 feet

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Eleven of the top 16 intersections are along US 12 (6th Avenue), with the highest being at the intersection of Roosevelt Street S and US 12 experiencing 37 crashes between 2009 and 2011. The following is a summary of the critical factors identified at the top five crash locations.

US 12 (6th Avenue) & Roosevelt Street S – Location 1

Crash patterns at this location show 31 of the 37 crashes occurred during daylight hours, 22 of 37 occurred during dry conditions (10 of 37 in snow/ice conditions), 23 of 37 were rear-end crashes, and 12 of 37 were right-angle crashes. 31 of the 37 crashes either occurred within the intersection or on a US 12 intersection approach. The high number of rear-end crashes can be attributed to the location being a signalized intersection with high traffic volumes. Congestion, long queue lengths, high turning volumes, and signal timing deficiencies are all possible factors associated with the existing conditions. Another contributing cause to over 25 percent of the crashes is snow or ice conditions.

US 12 (6th Avenue) and Roosevelt Street S
Source: Google Earth

US 12 (6th Avenue) & State Street S – Location 2

At the intersection of US 12 and State Street S, a review of the crashes indicated that 26 of the 31 crashes occurred during daylight hours, 16 of 31 occurred during dry conditions (10 of 31 in snow/ice conditions), 17 of 31 were rear-end crashes, and 12 of 31 were right-angle crashes. Similar to the Roosevelt Street S and US 12 intersection, the high number of rear-end and right-angle crashes can be attributed to high traffic volumes at a signalized intersection. Traffic congestion, long queue lengths, high turning volumes, and signal timing deficiencies are all possible factors associated with the existing conditions. Snow and ice conditions contributed to nearly one third of the total crashes at the intersection.

US 12 (6th Avenue) and State Street S
Source: Google Earth

US 12 (6th Avenue) & 2nd Street S – Location 3

The US 12 and 2nd Street S intersection is located on the western fringe of the Aberdeen central business district. Crash patterns at this location show 26 of the 29 crashes occurred during daylight hours, 16 of 29 occurred during dry conditions (10 of 29 in snow/ice conditions), 10 of 29 were rear-end crashes and 19 of 29 were right-angle crashes. The two types of crashes at the intersection are indicative of a congested signalized intersection. Traffic congestion, long queue lengths, high turning volumes, and signal timing deficiencies are all possible factors associated with the existing conditions. Snow and ice conditions contributed to over one third of the total crashes at the intersection.

US 12 (6th Avenue) and 2nd Street S
Source: Google Earth

US 12 (6th Avenue) & Lincoln Street S – Location 4

The US 12 and Lincoln Street S intersection is located in the southeastern fringe of the Aberdeen central business district. This intersection only has three incoming approaches, as the southern leg is a one-way travel-way heading southbound from the intersection. Crash patterns at this location show 22 of the 24 crashes occurred during daylight hours, 12 of 24 occurred during dry conditions (10 of 24 in snow/ice conditions), 12 of 24 were rear-end crashes and 10 of 24 were right-angle crashes. One crash was a sideswipe and another involved a pedal cycle. Similar to the first three locations, rear-end and right-angle crashes were the predominant crash types and indicative of a signalized intersection with high traffic volumes. Traffic congestion, long queue lengths, high turning volumes, and signal timing deficiencies are all possible factors associated with the existing conditions. Snow and ice conditions contributed to over one third of the total crashes at the intersection.

US 12 (6th Avenue) and Lincoln Street S
Source: Google Earth

US 12 (6th Avenue) & Centennial Street S – Location 5

The US 12 and Centennial Street S intersection is located in eastern Aberdeen; within a commercial business area (big box stores, indoor mall, and out-lots). Centennial Street S is stop-controlled in the northbound and southbound directions. From most recently available three years of crash data, 21 of the 22 crashes occurred during daylight hours, 19 of 22 occurred during dry conditions (2 of 22 in snow/ice conditions), and 19 of 22 were right-angle crashes. Only one of the crashes was a rear-end crash. Of the 19 right-angle crashes, 15 involved vehicles traveling in a straight ahead maneuver and four attempting a left-turn. Possible causes based on the identified crash patterns include excessive speed, inadequate signal timing, or large traffic volumes.

US 12 (6th Avenue) and Centennial Street S
Source: Google Earth

Existing Non-Motorized Transportation Network (pedestrian and bicycle facilities)

The City of Aberdeen currently maintains nearly 22 miles (2010) of off-street and sidewalk recreational trails. Since 1991, Aberdeen has focused efforts on improving their trail network, recognizing the health and community benefits a trail system provides. The most recent City of Aberdeen Recreational Trails Master Plan was updated in 2010. The master plan provides information on the existing trail system and its history, as well as providing guidance for future trail development through a prioritization of trail improvements, design guidelines, and potential funding sources.

The existing trail network typically follows the roadway grid pattern of the roadway network, particularly with the sidewalk trails. Off-street recreational trails typically follow old railroad lines or environmental features such as Moccasin Creek. Combined, the existing trail network reaches throughout the City, providing linkage between residential, commercial, industrial and recreational origins and destinations.

A trail committee continuously identifies future projects to improve trail continuity, linkage and reach of the existing network. Based on identified projects, the committee develops a prioritized list of future projects within the City.

Existing and Planned Transit Services and Facilities

The primary transit service provider in Aberdeen is Ride Line, which is a public transportation system that provides advance-reservation transit service to people within 2.5 miles of the Aberdeen city limits. Ride Line also provides Demand Bus Service, which provides a fixed route for persons with disabilities Monday through Friday from 7 a.m. to 7 p.m. A curb-to-curb paratransit service is also available to the public for persons with disabilities. All services are subject to applicable bus fare. A Passenger Handbook, originally dated May 1999 and revised March 2011, provides information to riders regarding Ride Line policies and expectations.

Jefferson Lines provides intercity commercial bus service to Aberdeen, with connections to smaller cities in the central United States and Manitoba, Canada. Connections at larger cities provide access to national bus routes.

A recent study for the City of Aberdeen, Coordinated Public Transit – Human Services Coordination Plan (second draft of the plan dated July 18, 2013), provides additional details about all service providers in the area. This study provides a transit needs assessment, community goals, and a coordination plan for the City of Aberdeen. The study also identifies transit programs and accessibility options available to the community through various programs and organizations.

Existing Airport and Freight Facilities

The Aberdeen Regional Airport provides commercial and fixed-base operator services. Commercial service is currently provided between Aberdeen Regional Airport and Minneapolis/St. Paul International Airport through Skywest Airlines doing business as Delta Air Lines. Three fixed-base operators currently provide service at the airport.

The Aberdeen Regional Airport completed an Airport Master Plan in 2008. The latest airport Capital Improvement Plan, dated November 2011, outlines airport capital improvement projects through 2022. An Environmental Assessment was signed for runway improvements on October 12, 2012, which includes:

- Decoupling of Runway 13/31 and 17/35 at the 13 and 17 ends.
- Runway shifts:
    - Shifting Runway 13/31 to the southeast (overall length of 7,000 feet.)
    - Shifting Runway 17/35 to the south (overall length of 5,500 feet.)
- Removal and construction of new taxiways to accommodate decoupling of runways.
- Removal of a portion of the existing apron.
- Relocation of the Airport Rescue Fire Fighting Road.
- Implementing recommendations from the 2009 Update to the Aberdeen Regional Airport Wildlife Hazard Assessment, completed July 2009.

Freight services are provided through two transportation modes – railroad and roadway. The existing roadway network has been discussed previously, so the focus here is on railroad. Burlington Northern/Santa Fe (BNSF) serves Aberdeen from the east, west, and south. A State of South Dakota-owned line, currently operated by Dakota Missouri Valley & Western Railroad (DMVW), extends to the northeast from Aberdeen (Official South Dakota Rail Map, October 2009). Multiple other lines extending outward from Aberdeen are identified under the Maximum System map, but have since been abandoned.

Based on the most recent SDDOT rail reports, grain and coal are the major commodities shipped by BNSF. The DMVW spur is rarely utilized typically limited to seasonal use.

<u>Railroad Crossing Analysis</u>

Based on a review of SDDOT and USDOT railroad crossing inventory data, the DMVW railroad carries less than one train movement per day, on average. The east-west BNSF route carries six trains per day,

on average, and the line running south from the east-west line carries approximately four trains per day. Switching occurs at various industrial areas throughout the area as well as in the yard on the western side of Aberdeen, near US 281.

The USDOT National Grade Crossing Inventory identifies 45 public railroad grade crossings in or 'near' Aberdeen, with 43 of those being at-grade. The two grade separated crossings are of US 281 and 2nd Street crossing over the east-west BNSF line.

Table 4 lists the 10 busiest crossings in Aberdeen based on vehicle exposures. Vehicle exposure is a common measure of railroad crossing volume which is calculated as a function of average daily train volumes and average daily traffic volumes (i.e., train volumes X traffic volumes), which can be used to prioritize railroad crossing investments. For consistency across all crossings, the SDDOT counts from the most recent Aberdeen traffic flow map were utilized.

Table 4 – At-Grade Railroad Crossing Inventory

Name	Railroad Company	Train/Vehicle Exposures	Crossing Control
Roosevelt Street S	BNSF	86,076	Crossbucks, gates, mast mounted and cantilevered flashing lights, advanced warning
Dakota Street S	BNSF	67,758	Crossbucks, mast mounted and cantilevered flashing lights, advanced warning
Melgaard Road S	BNSF	49,080	Crossbucks, gates, mast mounted and cantilevered flashing lights, raised median, stop bar pavement marking, advanced warning
US Highway 12 (6th Avenue SW)	BNSF	47,580	Crossbucks, mast mounted and cantilevered flashing lights, stop bar and RR Xing pavement marking, advanced warning
State Street S	BNSF	38,232	Crossbucks, mast mounted and cantilevered flashing lights, advanced warning
Main Street S	BNSF	34,206	Crossbucks, gates, mast mounted and cantilevered flashing lights, advanced warning
391 Avenue	BNSF	22,194	Crossbucks, mast mounted and cantilevered flashing lights, advanced warning
Kline Street S	BNSF	20,568	Crossbucks, mast mounted and cantilevered flashing lights, advanced warning
3rd Avenue SW	BNSF	5,075	Crossbucks, mast mounted flashing lights, advanced warning
Melgaard Road SW	BNSF	4,000	Crossbucks, mast mounted and cantilevered flashing lights, stop bar pavement marking, advanced warning

Source: US DOT Grade Crossing Inventory Forms

Through a review of the existing crash data on the US DOT Federal Railroad Administration Office of Safety Analysis, no reported vehicle-train crashes have occurred on a public at-grade crossing in the Aberdeen area since 2006. However, due to the often random-nature of vehicle-train crashes, it is recommended that continual improvements be applied to existing and any new crossings in the future. New proven safety measures and technology improvements are continuously evolving through research and experience. Consideration to frequent causal factors of train-vehicle crashes should be accounted for in future designs, and typically includes deficiencies regarding the following:

- Crossing geometrics: Intersection skew, sight distance, proximity to driveways, etc.
- Crossing control: Gates, flashing lights, cross bucks, etc.
- Pavement markings.
- Pavement condition/crossing condition.

- Excessive vehicle speeds.
- Traffic signal preemption timing.
- Pedestrian crossings.

The impacts to signalized intersections upstream and downstream of at-grade crossing should also be considered in traffic and pedestrian operations and safety. It is recommended that signal preemption accommodate adjustments in traffic flow due to a crossing being blocked, not only at the adjacent signalized intersection, but signals that may be impacted by spillback and intersection/driveway blockages. Additionally, signal timing that safely and effectively redistributes traffic to dissipate congested traffic queues and intersection approaches after the crossing is open is recommended.

Existing Conditions Traffic and Operations Analysis

In order to better understand existing traffic operations within Aberdeen, traffic capacity and operational analyses were conducted using historical average daily traffic (ADT) volumes provided by SDDOT and turning movement counts collected as part of this study. The following is a summary of this analysis.

Existing (2012) Route Volume to Capacity

The ratio of volume to capacity provides a measure of congestion along a stretch of roadway and can help identify where roadway improvements might be needed. Congestion along a roadway is judged to exist when the ratio of traffic volume to roadway capacity approaches or exceeds 1.0. As a route's volume increases and approaches the planning level capacity, traffic operations will deteriorate.

A volume to capacity analysis was completed for select roadway segments. The routes selected for the analysis were those where the SDDOT provided existing ADT data over multiple years. The existing 2012 ADT volumes for selected routes in Aberdeen are shown in Figure 5, with comparisons to the 2032 forecasted volumes further discussed in a later section.

The planning level capacity for a route is determined by the number of lanes along the route, and as the number of lanes on a roadway increase, so does the roadway capacity. Table 5 summarizes the planning level capacity vehicles per day (VPD) based on number of lanes.

Table 5 – Planning Level Traffic Capacity Thresholds

Number of Lanes	Planning Level Capacity (VPD)
2	8,000
3	16,000
4 (without medians)	24,000
4 (with medians)	33,000
5	30,000

Source: South Dakota Road Design Manual

For the existing (2012 base) year only the segment of State Street from 10th Avenue SE to US 12 (6th Avenue) was above the planning level capacity threshold. Two segments of US 12 (6th Avenue) between 2nd Street S and Dakota Street S and between Dakota Street S and Roosevelt Street S are operating in the 80 percent to 100 percent capacity range. The majority of the routes in Aberdeen are operating below 80 percent capacity. These results indicate that the majority of routes experience no roadway capacity deficiencies within Aberdeen, based on existing (2012) traffic volumes. The segment of State Street which has exceeded the planning level capacity is still able to serve the traveling public; however, more unstable conditions will occur including longer queues and delays at intersections and longer travel times through this segment.

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Figure 5
Existing (2012) and Forecast (2032) Year Traffic Volumes

Legend

- City Limits
- Block Line
- Easement
- Lot Line

XX,XXX Existing Average Daily Traffic (ADT) - 2012
(XX,XXX) Forecast Average Daily Traffic (ADT) - 2032

N
W E
S

0 1,400 2,800 Feet

1 inch = 2,800 feet

HRGreen

Existing (2012) Intersection Level of Service

The transportation industry defines the quality of service offered by highway facilitates under specific traffic demands by using Level of Service (LOS) rating. LOS is measured on a scale of A through F, representing the operating conditions of the roadway facility based on speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience measures. LOS A represents traffic that is free flowing on an uncongested roadway while LOS F represents traffic that is creeping or stopped due to a severely congested roadway. Table 6 displays the general definitions of each LOS and the associated delay ranges for signalized, two-way stop controlled and all-way stop controlled intersections. For the purposes of this study, LOS D is considered to be the primary mobility goal.

Table 6 – Level of Service (LOS) Definitions

Level of Service	Operating Conditions	Delay Range for Signalized Intersections	Delay Range for Two way / all way stop Intersections
A	Primarily Free Flow Operations/Exceptional Progression/Short Cycle Length	Less than or equal to 10.0 seconds	Less than or equal to 10.0 seconds
B	Reasonably Unimpeded Operation/Highly Favorable Progression/ Short Cycle Length	10.1 seconds to 20.0 seconds	10.1 seconds to 15.0 seconds
C	Stable Operation/Favorable Progression/Moderate Cycle Length	20.1 seconds to 35.0 seconds	15.1 seconds to 25.0 seconds
D	Less Stable Operation/Ineffective Progression/Cycle Length is Long	35.1 seconds to 55.0 seconds	25.1 seconds to 35.0 seconds
E	Unstable Operation/ Unfavorable Progression/Long Cycle Lengths	55.1 seconds to 80.0 seconds	35.1 seconds to 50.0 seconds
F	Low Speed/Congestion/Poor Progression/Long Cycle Lengths/Unable to Clear Queues	Greater than 80.1 seconds	Greater than 50.1 seconds

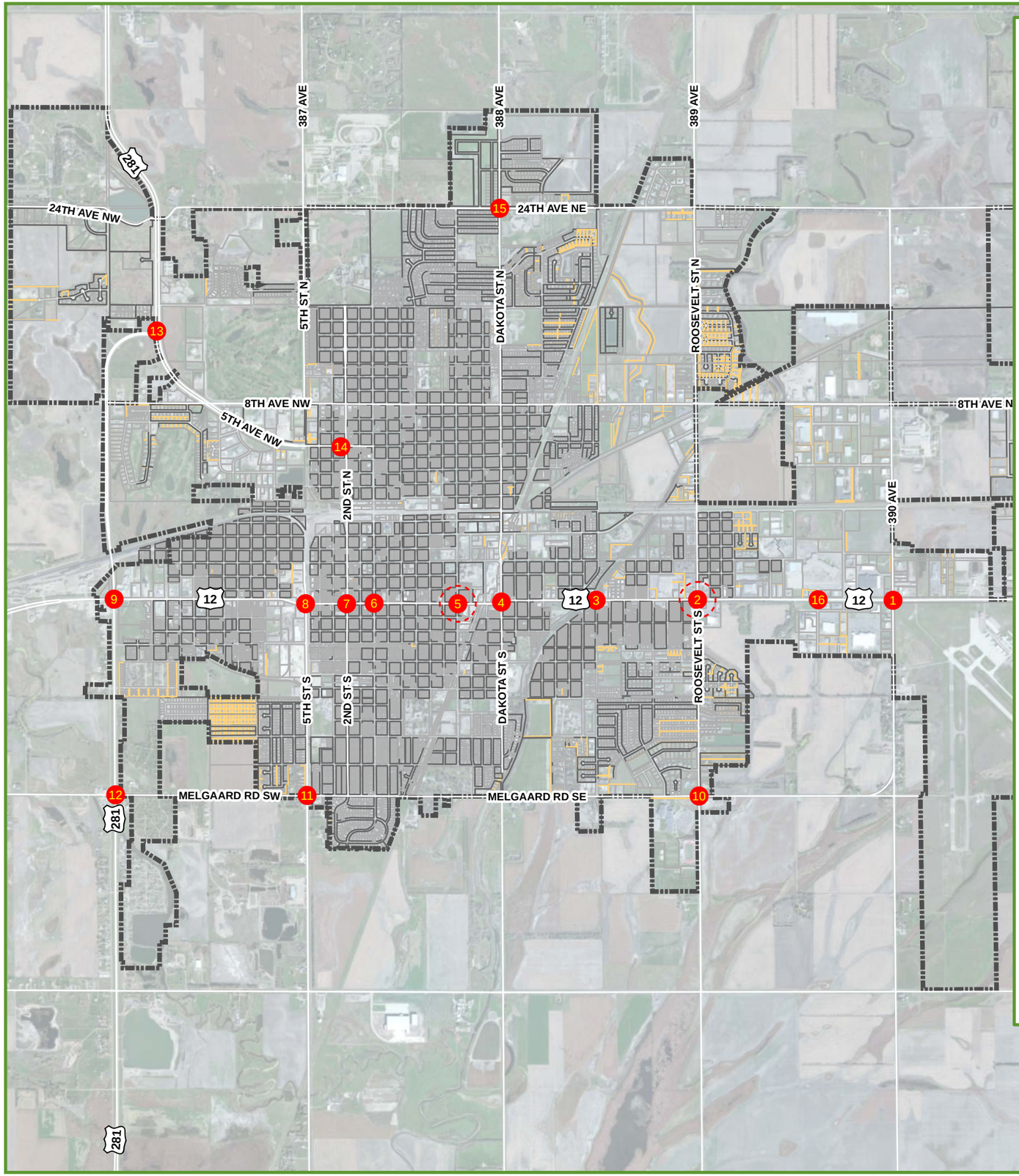
The 16 study intersections were analyzed to determine the delay and LOS under existing conditions (2012). Each of the 16 intersections analyzed had overall operations at a LOS of D or better. See Figure 6 for the results of each individual intersection. The intersections of US 12 (6th Avenue)/Roosevelt Street S and US 12 (6th Avenue)/State Street S have approaches with PM peak hour operations of LOS E. These results indicate most intersections have no operational issues and only two intersections are having an approach experiencing unstable operations with longer delays. The Highway Capacity Software output report sheets are provided in the Traffic Forecast Memorandum found in Appendix B.

Origin – Destination Survey

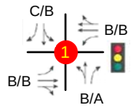
An origin-destination (O-D) survey was completed in September of 2013 to provide additional information of the existing travel patterns into and out of Aberdeen. The goal of the O-D survey was to quantify the amount of traffic passing through Aberdeen. A technical summary of the O-D survey appears in Appendix B. The following is a summary of the survey process and results.

Five locations were selected to collect O-D data, as follows (and shown in Figure 7):

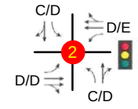
- Location A – US 281 north of Aberdeen, between 129th Street and 128th Street.
- Location B – US 12 west of Aberdeen, east of the US 12/379th Avenue intersection.
- Location C – US 281 south of Aberdeen, north of the US 281/136th Avenue intersection.
- Location D – US 12 east of Aberdeen, east of the US 12/392nd Avenue intersection.
- Location E – Melgaard Road SE between Roosevelt Street S and 390th Avenue.



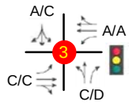
US HWY 12 & Melgaard Road
LOS: B/B



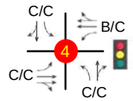
US HWY 12 & Roosevelt St (CR 12S)
LOS: D/D



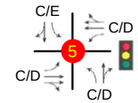
US HWY 12 & Lawson St
LOS: B/B



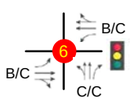
US HWY 12 & Dakota St
LOS: C/C



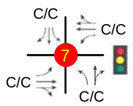
US HWY 12 & State St
LOS: C/D



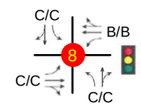
US HWY 12 & Main St
LOS: C/C



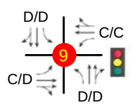
US HWY 12 & 2nd St
LOS: C/C



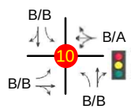
US HWY 12 & 5th St
LOS: C/C



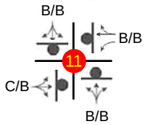
US HWY 12 & US HWY 281
LOS: C/C



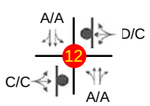
Melgaard Rd & Roosevelt St (CR 12S)
LOS: B/B



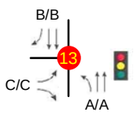
Melgaard Rd & 5th St
LOS: B/B



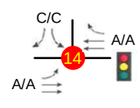
Melgaard Rd & US HWY 281
LOS: NA/NA



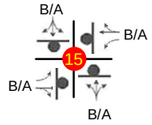
US HWY 281 & 5th Ave
LOS: B/B



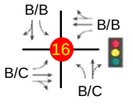
5th Ave & 2nd St
LOS: B/A



24th Ave & Dakota St
LOS: B/A



US HWY 12 & Lamont St
LOS: B/C



Legend

Traffic Signal

Stop Sign

X/X Existing AM/PM Level of Service

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Figure 6

Existing (2012) Year Level of Service

Legend

Intersection

High Traffic Intersection

City Limits
Block Line
Easement
Lot Line

N
W
E
S

0 1,500 3,000 Feet

1 inch = 3,000 feet

HRGreen

Aberdeen
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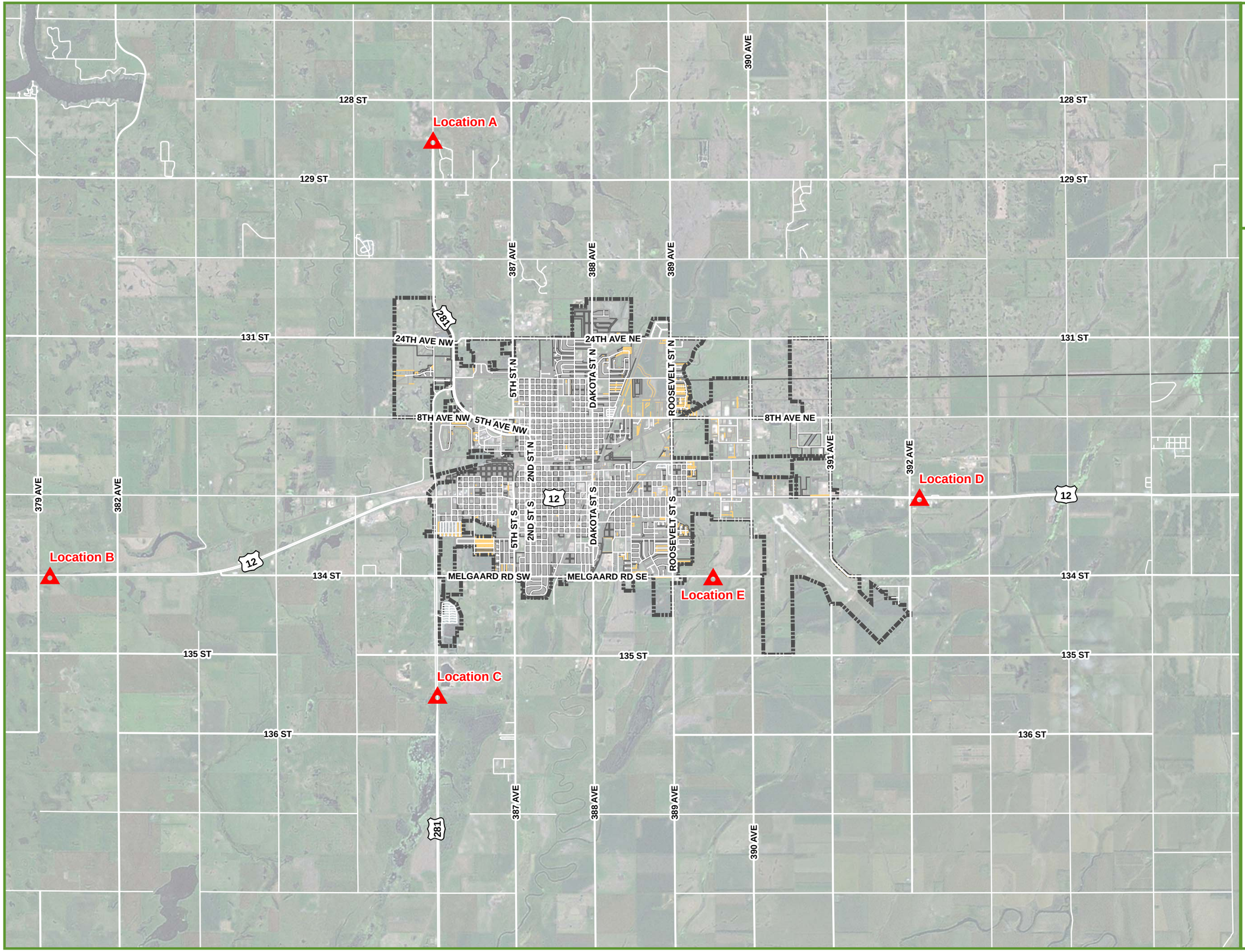
Figure 7

O-D Survey Locations



Legend

- Survey Locations
- City Limits

N
W E
S

0 3,000 6,000 Feet

1 inch = 6,000 feet

HRGreen

Locations A, B, C, D, are the primary highway points of entry into and out of Aberdeen whereas Location E is an internal location in Aberdeen. Location E is the location where travelers most likely would divert from US 12 to bypass the heavily traveled US 12 corridor. Vehicles that entered Aberdeen, passed through Location E, and then exited Aberdeen would likely have crossed through Location E to bypass US 12. However, the data does not identify destinations of vehicles that pass through Location E, so a determination of final destination or route purpose would only be speculative.

License plates were recorded and compared at each data collection location to determine travel patterns into and out of the City of Aberdeen. All vehicles passing through a location were counted and license plate matches were determined to identify pass through routes. From these matches, approximate trip duration was calculated to give an indication of trip purpose, such as a pass-through trip or a trip with a destination within Aberdeen.

Tables 7 through 10 present the percentage of entering matched trips and true pass through trips identified at the four external highway count locations. These percentages represent the number of matched license plates completing the trip against the total number of license plates captured at the origin location. At each location, the trips can be categorized into: Pass Through, Diversion to Melgaard Road (through location E), Enter/Exit at Count Location, and To Aberdeen. True pass through trips are characterized as trips traversing from one external location to another external location in less than 20 minutes, where the motorist likely does not stop in Aberdeen.

Table 7 includes the results from the trips originating north of Aberdeen on US 281, heading southbound through location A with destinations noted.

Table 7 – Summary of O-D License Plate Matches – Location A

Trip Type	Origin Location *US 281 North of Aberdeen*	Destination Location	Percentage of Entering Matched Trips	True Pass Through Trips (of total matched trips)
Pass Through	**A - Southbound**	**B - Westbound**	3.3%	1.0%
	A - Southbound	**C - Southbound**	9.2%	5.8%
	A - Southbound	**D - Eastbound**	5.7% = 18.2% Total	0.7% = 7.5% Total
Diversion to Melgaard Rd	**A - Southbound**	**E - Eastbound**	4.2%	-
Enter/Exit at Count Location	**A - Southbound**	**A - Northbound**	27.0%	-
	A - Northbound	**A - Southbound**	12.6%	-
To Aberdeen	**A - Southbound**	**Aberdeen**	54.7%	-

** Total southbound license plates captured: 1206*

Nearly 18.2 percent of the southbound US 281 vehicles entering count location A were pass through trips (location A to either location B, C, or D) and 81.8 percent were vehicles traveling to Aberdeen. The predominant pass through movement was the southbound US 281 north of Aberdeen to southbound US 281 south of Aberdeen, at nearly 9.2 percent of the identified license plates. Approximately 7.5 percent of the southbound trips were characterized as true pass through trips, traversing southbound through location A and arriving to locations B, C, or D within 20 minutes.

Table 8 presents the results from the trips originating west of Aberdeen on US 12, heading eastbound through location B with destinations noted.

Table 8 – Summary of O-D License Plate Matches – Location B

Trip Type	Origin Location *US 12 West of Aberdeen*	Destination Location	Percentage of Matched Trips	True Pass Through Trips (of total matched trips)
Pass Through	B - Eastbound	A - Northbound	3.1%	1.0%
	B - Eastbound	C - Southbound	3.5%	1.9%
	B - Eastbound	D - Eastbound	8.8% = 15.5% Total	0.7% = 3.5% Total
Diversion to Melgaard Rd	B - Eastbound	E - Eastbound	4.0%	-
Enter/Exit at Count Location	B - Eastbound	B - Westbound	25.3%	-
	B - Westbound	B - Eastbound	15.8%	-
To Aberdeen	B - Eastbound	Aberdeen	59.2%	-

** Total southbound license plates captured: 1506*

Approximately 15.5 percent of the eastbound vehicles recorded on US 12 west of Aberdeen were pass through trips (location B to either location A, C, or D). The remaining 84.5 percent of the trips had a destination in Aberdeen. The predominant pass through movement was the eastbound US 12 west of Aberdeen to eastbound US 12 east of Aberdeen, at 8.8 percent of the identified license plates. Only 3.5 percent of the trips entering this location are true pass through trips.

Table 9 includes the results from the trips originating south of Aberdeen on US 281, heading southbound through location C with destinations noted.

Table 9 – Summary of O-D License Plate Matches – Location C

Trip Type	Origin Location *US 281 South of Aberdeen*	Destination Location	Percentage of Matched Trips	True Pass Through Trips (of total matched trips)
Pass Through	C - Northbound	A – Northbound	5.9%	3.9%
	C - Northbound	B - Westbound	2.6%	1.3%
	C - Northbound	D - Eastbound	4.3% = 12.8% Total	1.1% = 6.2% Total
Diversion to Melgaard Rd	C - Northbound	E - Eastbound	10.8%	-
Enter/Exit at Count Location	C - Northbound	C - Southbound	20.3%	-
	C - Southbound	C - Northbound	14.6%	-
To Aberdeen	C - Northbound	Aberdeen	66.8%	-

** Total southbound license plates captured: 1706*

Based on the results shown in Table 9, 12.8 percent of the northbound US 281 trips entering count location C were pass through trips (entering location C and exiting at either location A, B, or D). The remaining 87.2 percent of the entering northbound trips were traveling to Aberdeen. The predominant pass through movement was from northbound US 281 south of Aberdeen to northbound US 281 north of Aberdeen at 5.9 percent. A total of 6.2 percent of the trips were true pass through trips.

Table 10 provides the results from the trips originating east of Aberdeen on US 12, heading southbound through location D with destinations noted.

Table 10 – Summary of O-D License Plate Matches – Location D

Trip Type	Origin Location *US 12 East of Aberdeen*	Destination Location	Percentage of Matched Trips	True Pass Through Trips (of total matched trips)
Pass Through	D - Westbound	A - Northbound	2.3%	0.7%
	D - Westbound	B - Westbound	3.8%	0.6%
	D - Westbound	C - Southbound	2.1% = 8.1% Total	0.5% = 1.8% Total
Diversion to Melgaard Rd	D - Westbound	E - Westbound	4.0%	-
Enter/Exit at Count Location	D - Westbound	D - Eastbound	25.6%	-
	D - Eastbound	D - Westbound	13.7%	-
To Aberdeen	D - Westbound	Aberdeen	66.3%	-

** Total southbound license plates captured: 1206*

Approximately 8.1 percent of the total trips recorded for westbound US 12, east of Aberdeen at location D, were pass through trips (entering location D and exiting at either location A, B, or C). The remaining 91.9 percent of the entering trips were traveling to Aberdeen. The predominant pass through trip movement was from westbound US 12 east of Aberdeen to westbound US 12 west of Aberdeen. Overall, only 1.8 percent of the trips were true pass through trips.

The results of the origin-destination study provide estimates on the number of vehicles passing through Aberdeen, and those that have an origin or destination within Aberdeen. Overall, the predominant movements include Aberdeen as a destination or origin. From four major highway external origin locations, Aberdeen was the destination for between 55 percent and 70 percent of the vehicles entering one of the four external highway count locations. Trips originating and terminating outside of Aberdeen at the same count location represented approximately 20 percent to 27 percent of the inbound movements.

The numbers of pass through trips are significantly fewer than those having an origin or destination within Aberdeen, representing approximately 8 percent to 18 percent of the entering trips at the four major highway entry locations. Of these trips, the predominant pass through movement remains on the same highway at the entering and exiting locations (i.e. enter on US 281 south of Aberdeen and exit on US 281 north of Aberdeen). A true pass through trip, one that is completed in 20 minutes or less, accounted for approximately 20 percent to 40 percent of the total pass through trips. This equates to nearly 1.8 percent to 7.5 percent of all entering trips being true pass through trips.

The results of the origin-destination study also provide a look into the amount of vehicles diverting off of US 12 and possibly using Melgaard Road as a bypass. While the data set does not differentiate between final destinations of vehicles originating along US 12 and passing through location E along Melgaard Road, the magnitude of the diverted traffic can provide insight to the possible use of this route as a US 12/6th Avenue bypass around Aberdeen. From the western US 12 count location, location B, the eastbound US 12 traffic that diverted to Melgaard Road was approximately 4 percent of the location B eastbound entering traffic. Similarly, 4 percent of the westbound US 12 entering traffic at location D diverted from US 12 to Melgaard Road and passed through location E. It can be concluded that a small percentage of entering traffic from the US 12 external count locations are currently using Melgaard Road as a US 12/6th Avenue bypass.

The results of the origin-destination study show that the City of Aberdeen is a regional trade center where many people travel to for shopping, work, healthcare, education and other services. The City of Aberdeen

is the destination of the majority of trips entering into Aberdeen from the four major entry points. Only a few trips, 8 percent to 18 percent depending on direction of travel, are actual pass through trips.

Future Conditions Traffic Capacity and Operations Analysis

In order to better understand how projected future traffic volumes might impact traffic operations within Aberdeen, a future year traffic operations analysis was conducted based on the forecasted 2032 traffic volumes. The following is a summary of this analysis.

Traffic Forecasts

In order to understand how traffic might operate in the future based on expected increases in traffic volumes, future traffic projections were developed for the selected roadway segments and 16 key intersections included in the traffic analysis. The future traffic projections were developed using a linear regression analysis are based on historical ADT and known future development plans within Aberdeen. Refer to Figure 5 for a comparison of the existing (2012) year and forecast (2032) year traffic volumes, illustrating the anticipated growth over 20 years from the existing year to the forecast year. Appendix B contains additional detail on the development of traffic forecasts.

Projected (2032) Route Volume to Capacity

See Figure 8 for the forecast (2032) year traffic volumes and the planning level volume to capacity ranges for the roadway segments evaluated. Included in Table 11 are the roadway segments in the "above capacity threshold" which means the forecast traffic volume on these segments exceeds the planning level capacity.

Table 11 – Segments Exceeding Planning Level Capacity

Route	From	To
US 12 (6th Avenue)	2nd Street S	Melgaard Road
8th Avenue NW	US 281	5th Street N
5th Street S	Melgaard Road SW	9th Avenue SW
State Street S	10th Avenue SE	US 12 (6th Avenue)
Dakota Street N/S	US 12 (6th Avenue)	8th Avenue NE
Roosevelt Street N	8th Avenue NW	24th Avenue NW
County Highway 19	US 12 (6th Avenue)	8th Avenue NE

Even though these routes have exceeded the planning level capacity threshold, they will still be able to serve the traveling public; however, more unstable conditions will occur including longer queues and delays at intersections and longer travel times through each segment. Additionally, 8 segments are in the 80 percent to 100 percent volume to capacity range and 10 segments are in the 60 percent to 80 percent volume to capacity range. All other roadway segments are below the 60 percent volume to capacity range. These results indicate most routes will be approaching or exceed the planning level capacity in the forecast (2032) year.

Projected (2032) Intersection Level of Service

See Figure 9 for traffic operations analysis for forecast (2032) year. Based on the results of the forecast (2032) year intersection operational analysis indicate the following intersections will have overall operations worse than LOS D in one or both AM and PM peak hours. The intersections are as follows:

- US 12 (6th Avenue) and Melgaard Road S.
- US 12 (6th Avenue) and Roosevelt Street S.
- US 12 (6th Avenue) and State Street S.
- Melgaard Road SW and 5th Street S.
- US 12 (6th Avenue) and Lamont Street S.

Nine of the 16 intersections studied had an approach with operations worse than LOS D in either the AM or PM peak hour. Those 9 intersections are as follows:

- US 12 (6th Avenue) and Melgaard Road S.
- US 12 (6th Avenue) and Roosevelt Street S.
- US 12 (6th Avenue) and Dakota Street S.
- US 12 (6th Avenue) and State Street S.
- US 12 (6th Avenue) and 2nd Street S.
- US 12 (6th Avenue) and 5th Street S.
- Melgaard Road SW and 5th Street S.
- Melgaard Road SW and US 281.
- US 12 (6th Avenue) and Lamont Street S.

All other intersections studied had an approach operating with a LOS of D or better. The Highway Capacity Software output report sheets are provided in the Traffic Forecast Memorandum found in Appendix B.

Traffic Operations Analysis Summary

From a traffic operations and capacity perspective, only 2 of the 16 key intersections and 1 roadway segment studied as part of this analysis will require further study to determine operational and/or capacity improvements for the existing (2012) year. For the forecast (2032) year, 9 intersections and 7 roadway segments are anticipated to require improvements due to operational or capacity issues.

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Figure 8

Forecast (2032) Year Traffic Volumes

Legend

Volume to Capacity Ratio

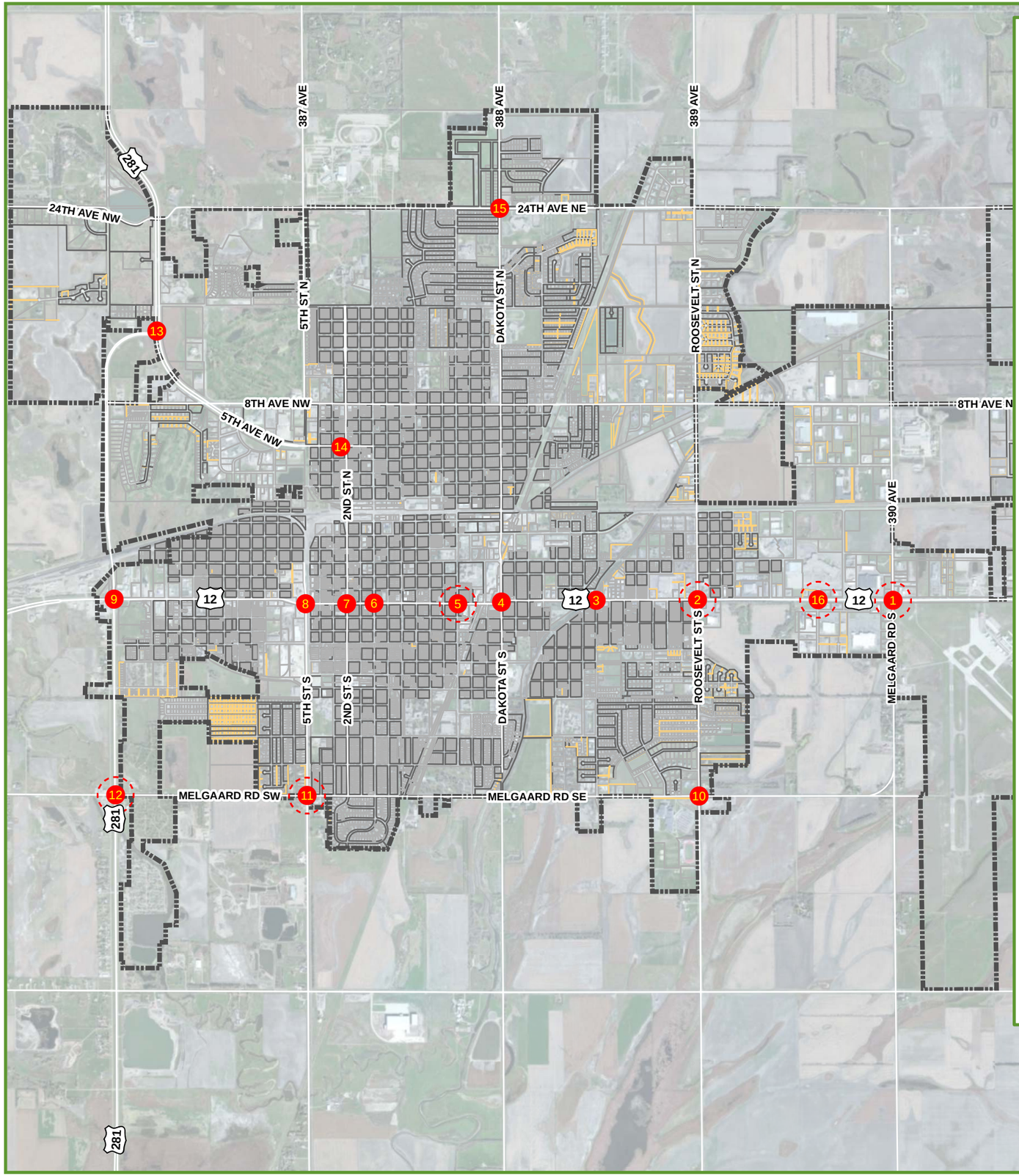
- Above Capacity Threshold (1.0+)
- Between 80% and 100% of Capacity (0.8 - 1.0)
- Between 60% and 80% of Capacity (0.6 - 0.8)
- Below 60% of Capacity (0.0 - 0.6)
- City Limits
- Block Line
- Easement
- Lot Line
- **XX,XXX** Average Daily Traffic (ADT)

N
W E
S

0 1,400 2,800
Feet

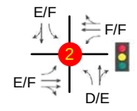
1 inch = 2,800 feet

HRGreen

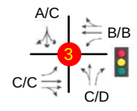


US HWY 12 & Melgaard Road
LOS: D/E

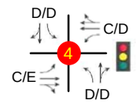
US HWY 12 & Roosevelt St (CR 12S)
LOS: E/F



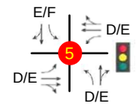
US HWY 12 & Lawson St
LOS: C/C



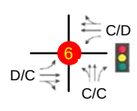
US HWY 12 & Dakota St
LOS: C/D



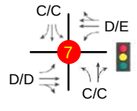
US HWY 12 & State St
LOS: D/E



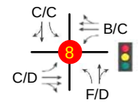
US HWY 12 & Main St
LOS: C/D



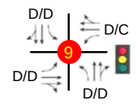
US HWY 12 & 2nd St
LOS: D/D



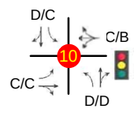
US HWY 12 & 5th St
LOS: D/C



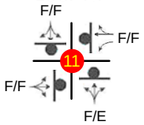
US HWY 12 & US HWY 281
LOS: D/D



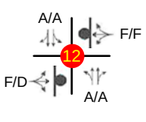
Melgaard Rd & Roosevelt St (CR 12S)
LOS: D/C



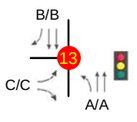
Melgaard Rd & 5th St
LOS: F/F



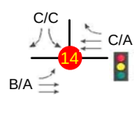
Melgaard Rd & US HWY 281
LOS: NA/NA



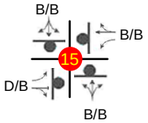
US HWY 281 & 5th Ave
LOS: B/B



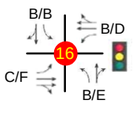
5th Ave & 2nd St
LOS: C/B



24th Ave & Dakota St
LOS: C/B



US HWY 12 & Lamont St
LOS: B/F



Legend

- Traffic Signal
- Stop Sign
- X/X — Existing AM/PM Level of Service

Aberdeen
MASTER TRANSPORTATION PLAN

Figure 9

Forecast (2032) Year Level of Service

Legend

- Intersection
- High Traffic Intersection
- City Limits
- Block Line
- Easement
- Lot Line

N
W E
S

0 1,500 3,000 Feet

1 inch = 3,000 feet

HRGreen

Stakeholder Engagement Summary

A key emphasis in the development of the Aberdeen Master Transportation Plan was to promote effective decision-making by fostering a cooperative spirit among state, regional and local partners, as well as the general public. The stakeholder engagement program included review and comment by Study Advisory Team (SAT) members, two rounds of Aberdeen City Council workshops and public meetings and a comprehensive online travel survey. Refer to Appendices C and D for a detailed memoranda documenting stakeholder engagement in the Aberdeen Master Transportation Plan.

Study Advisory Team (SAT) Discussions

Early in the development of the plan, the SAT convened and discussed areas of concern with respect to potential capacity, safety, and mobility concerns within the existing street, trail, and transit system in the community. A summary of issues as determined by the SAT in fall 2012 follows as Figure 10. The SAT noted particular issues related to existing needs and planned improvements that have been raised locally or with respect to emerging areas of concern.

City Council Workshop and Public Meeting Results

The first workshop for the Aberdeen City Council was held on December 3, 2012, prior to their regular City Council meeting. HR Green provided a brief presentation on the transportation plan, including an overview and status of current project activities. The Council was particularly interested in discussing safety concerns on 6th Avenue. Two intersections (Roosevelt and State Street intersections with 6th Avenue) were reported as being the most congested intersections under study in the community. HR Green reported that traffic patterns on 6th Avenue appeared to be a little unusual in that traffic on 6th Avenue over the noon hour is greater than it is during the morning rush hour, and the traffic remains at a fairly high level throughout the afternoon. The busiest day for traffic on 6th Avenue is Fridays. The counts on a typical Saturday and Sunday are lower than a typical Friday's numbers. The Council also discussed how access management improvements along 6th Avenue have been a topic of concern for many years.

The first public meeting was held the following day on December 4, 2012. Members of the public were invited to review maps and displays, and listen to a brief presentation on the transportation plan being prepared over the coming year. The meeting was lightly attended and those persons providing oral comments at the meeting provided observations from personal experiences related to traffic and safety concerns in Aberdeen.

The second workshop for the Aberdeen City Council was held on December 2, 2013, prior to their regular City Council meeting. HR Green provided a brief presentation on the transportation plan draft, including an overview of the proposed Major Roads Plan and potential projects for implementation. The Council was particularly interested in discussing the possibility of additional projects and the traffic volume data collected for the transportation plan. The Council also discussed concerns and possible projects along the railroad corridors in Aberdeen.

A second public meeting was held the following day on December 3, 2013 at the Eagle's Nest. Members of the public were invited to listen to a brief presentation on the transportation plan draft and provide input on the draft through oral and written comments. The meeting was lightly attended and those persons providing oral comments also submitted written comments. A copy of written comments can be found in Appendix D.

Aberdeen
MASTER TRANSPORTATION PLAN

Figure 10
Issues Discussed by Study Advisory Team
Fall 2012

RECONSTRUCTION/
EXPANSION IN 2013

TURNING TRAFFIC /
MAIN ENTRANCE TO COLLEGE

8TH & OLD US 28
COMPLAINTS FROM RESIDENTS
ALIGNMENT ISSUES

MULTIPLE AT-GRADE
RR XINGS WITH NO GATES

CONGESTION DURING
PEAK PERIODS

PUBLIC CONCERNS OVER
TRAIN HORN NOISE

NORTH BOUND LEFT TURN PROBLEMS
RR TRACK ADDS TO CHALLENGE

FUTURE GRADE -
SEPARATED CROSSING NEEDED?

S 12TH ST
FROM 9TH AVE SW TO
13TH AVE SW IS GRAVEL

NO SIDEWALK

PED CROSSING
TO SCHOOL
CROSSES RAILROAD

ON STREET PARKING,
NORTHERN STATE UNIVERSITY

SEE INSET MAP

MULTIPLE ACCESS POINTS
CAUSE SAFETY AND
OPERATIONAL ISSUES

TRAFFIC SIGNAL
IMPROVEMENTS NEEDED

CENTRAL HIGH
SCHOOL TRAFFIC

FUTURE CONNECTION

TRUCK TRAFFIC -
NORTHERN BEEF
PACKING FACILITY

Recreational / Multimodal Traffic

Aquatic Center

MAP INSET

Legend

- Rail Crossings
- Fire Stations
- Congested Intersections
- Rail Crossing Concerns
- Streams & Rivers
- Utilities
- Railroads
- Lakes
- City Limits

N
W E
S

0 1,600 3,200 Feet

1 inch = 3,200 feet

HRGreen

Internet Survey Results

As part of the existing conditions and needs assessment, the project team surveyed citizens about their travel patterns, Aberdeen transportation needs, and suggestions for improvements. The survey was also distributed to several stakeholders (local and state agencies, schools, and businesses) who were contacted to discuss transportation system issues and concerns. The survey was accessible via the project website and through a flyer sent via email or regular mail for approximately six weeks during late November to the end of December, 2012, during which time 248 surveys were submitted. Some of the key findings from the internet survey included the following:

Respondent Profile

Most of the survey respondents reside in the City of Aberdeen (almost 85%), and more than 250 said that they live in the 57401 zip code. Eighty-one percent indicated that they are employed; the remaining 20% include self-employed citizens, part-time employees, retirees, students, homemakers, caregivers, and unemployed/looking for work. The majority were aged 25 – 59 years and about half do not have children under the age of 18 living in their household. There were 143 male and 105 female respondents (43 did not answer the question).

Getting to Work

- 250 of the respondents work in the Aberdeen study area.
- Almost 100% get to work via personal vehicle.
- For most (223), the commute to work is less than 10 miles (one-way).
- On a typical day, it takes less than 10 minutes for almost 60% of those respondents who work in the Aberdeen area to get to work, as well as to return home (without making any stops along the way); and 10 - 20 minutes each way for another third; only 10 people indicated that their commute time is 30 minutes or more.

Getting to School

- Only 10 people reported that they attend school in the Aberdeen study area; 7 attend Northern State University, 1 attends Aberdeen's Central High School; and 2 did not answer the question.
- Respondents indicated that they get to school via personal vehicle.
- Seven commute 6 or less miles to school each way.
- Travel time to and from school is less than 10 minutes for most (one-way without stops).

Getting Around Aberdeen (Residents)

- In general, most respondents (229) use a personal vehicle for travel; only 2 reported that they walk and 1 chose public transportation.
- The top reasons for travel are: to get to and from work (or for work-related trips); for groceries/food; to shop; and for household errands.
- Most people travel Monday – Friday, between 5:30 – 9:00 a.m. in the morning and 3:30 and 6:00 p.m. in the afternoon/evening.
- On a typical weekday, about half of the respondents make 3 to 4 trips in a day; about a third make 1 to 2 trips per day.

Traveling To/From Aberdeen (Non-residents)

- For those respondents who reside outside of the study area, the top four reasons they travel to Aberdeen are: to get to-and-from work (or for work-related travel), for grocery/food shopping, to shop, and to dine out/patronize restaurants.
- They travel to Aberdeen mostly on weekdays between 5:30 and 9:00 a.m. and 3:30 and 6:00 p.m.

Transportation Needs/Issues

Citizens were asked to identify what they thought were the most pressing transportation needs or issues for the study area. Almost 65% of the respondents answered the question, and the top five issues identified were:

- Conditions and quality of existing roads – the need for regular repair, maintenance, and/or replacement.
- Public transportation/public transit – the need for affordable, reliable public transportation, including service in the evenings and on weekends.
- Signal and stop sign management to improve traffic flow and safety, including additional left-turn signals and the addition or removal of stop signs in certain locations.
- Improvements to 6th Avenue.
- Train traffic delays – issues with congestion and delays caused by train traffic, especially during peak travel times of day.

Transportation Improvements

Each respondent then had the opportunity to choose what they thought were the three most important areas of transportation improvements. Out of 244 responses, the following were most often selected:

- Local roadway network (151).
- Highway 12 access and congestion (125).
- Public transportation system (76).

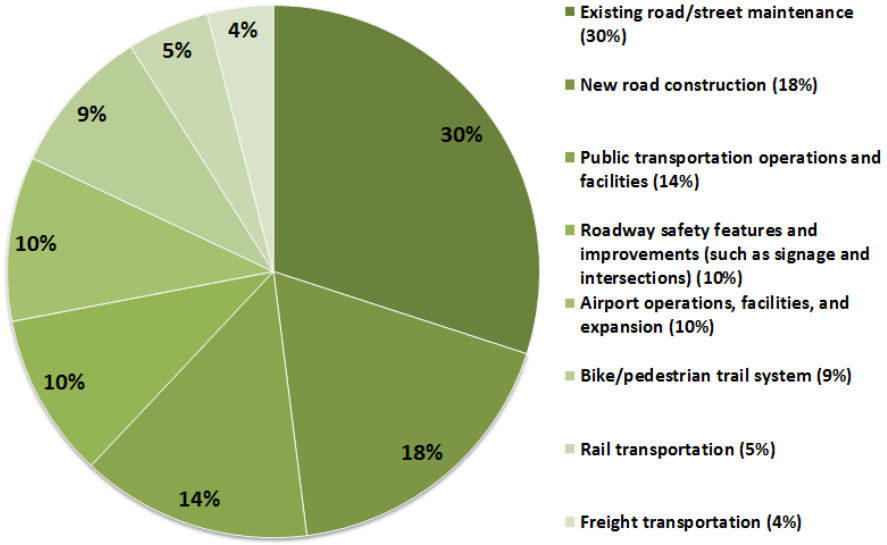
When asked which transportation improvements they thought would be beneficial to Aberdeen in the next 20 – 30 years, about half of the respondents answered, and the following three topics were mentioned most often:

- Public transportation/public transit – improvements to the current system, expansion of services, affordable rates.
- Bypasses – an alternative route around the City and/or a bypass for freight traffic.
- Road maintenance and repair – more frequent/regular resurfacing and/or reconstruction of roads.

Budgeting for Future Improvements

Survey participants were instructed to "spend" $100 on future transportation improvements; 225 respondents completed the task. The pie chart shows how respondents would spend a $100 budget, based on the average amount allocated for each improvement.

See Appendix C for the Internet Survey Summary Report, including full documentation of the survey responses.



Summary of Needs

The following is a brief summary of the critical needs identified as a result of the existing conditions inventory and needs assessment. This list forms the basis for the plan recommendations, including the proposed Major Roads Plan, Roadway Design and Policy Guidance, and Implementation Plan.

- Roadway Network: Aberdeen has a gridded roadway system which is very efficient at distributing trips in the community. However, there are gaps in the grid system and instances where parallel routing of through trips is inconsistent. The gaps and inconsistencies in the roadway network need to be filled in with collector and minor arterial connection segments.

- Crash History: While roadway safety is not a major problem in Aberdeen, there are safety deficiencies at select locations that should be corrected. A majority are located along higher volume roadways, including 6th Avenue (US 12). Typical issues include geometric deficiencies at specific intersections where traffic congestion has created vehicle queues that restrict mobility and functionality of several intersections. Signal timing tests and intersection safety improvements would provide safety, mobility, and capacity improvements needed.

- Non-Motorized Facilities: A significant number of bicycle and pedestrian facilities are planned in the community; however, at the present time, there are significantly underserved areas particularly along the fringes of the community and along collector and minor arterial routes.

- Transit Service: Transit service in Aberdeen is provided by a demand-response system rather than fixed route. Perceptions of need for transit dependent populations and additional multimodal service alternatives involving transit based on needs and feasibility studies will continue to be monitored.

- Airport: The recently completed master plan and environmental documentation for the Aberdeen Regional Airport call for a number of airside facility safety and capacity improvements. Airport expansion and safety improvements will need to be monitored to coordinate with adjacent roadway improvements in the future.

- Railroad Crossings: There is a need for additional study at the busiest uncontrolled crossings to identify potential safety and operational issues, such as vehicle and pedestrian crashes and vehicle delays due to blocked crossings. In addition, maintenance issues related to crossing elevation changes and potential misalignment with City street grades will need to be monitored and addressed with the BNSF Railroad.

- Traffic Operations Analysis: Two of the 16 intersections studied are approaching capacity thresholds although none of the intersections studied are experiencing operational deficiencies.

- Origin-Destination Analysis: The City of Aberdeen is the destination of the majority of trips entering into Aberdeen from the four major entry points. Only a few trips, between 8 to 18 percent depending on direction of travel, are actual pass through trips. The data does not support the construction of a typical highway bypass, but does suggest a need to continue to improve mobility for trips within Aberdeen.

- Connectivity: There are some gaps in the local roadway network that currently limit mobility in the community and route trips to already congested routes, such as 6th Avenue.

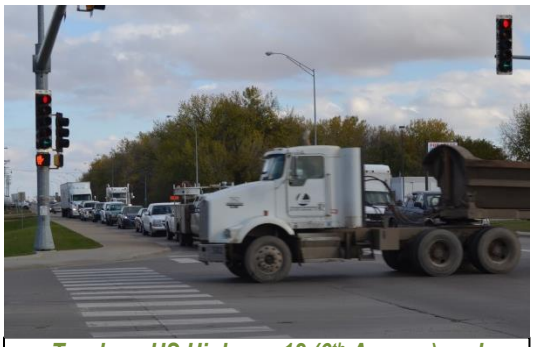
- Growth and Development: Aberdeen is experiencing new commercial, industrial, and residential development trends in the growth areas around the City. It will be important to plan future developments and proposed land use changes with roadway system and multimodal improvements.

3. Major Roads Plan

This section provides an overview of the proposed Major Roads Plan, including a roadway classification hierarchy, roadway system map, and related access management guidelines.

The roadway network in the City of Aberdeen is comprised of an interconnected grid system of highways, including two US highways (US 12 running east-west and US 281 running north-south), urban arterials, and local roads. The arterial network is laid out in one-mile increments typically following the township section line roadways. This facilitates multiple options to travel east-west and north-south within Aberdeen. Several county highways and local and township roads provide additional connectivity between the urban and the surrounding rural area. The primary disruptions to the interconnected grid network are the railroad corridors, Moccasin Creek, airport, and limits of development.

While an existing grid network is setup within the City, a significant number of large Aberdeen traffic generators and activity centers are located along or within close proximity to the US 12 (6th Avenue) corridor. These include, but not limited to, industrial tracts to the west, the central business district, hospital and access to Northern State University within central Aberdeen, and the mall/commercial areas and airport to the east. This corridor not only provides local access to these areas, it also provides regional connectivity into and through Aberdeen. The diversity of vehicle type and trip purpose creates challenges with roadway capacity and safety through the corridor. To help alleviate this congestion and demand, it is important to maintain the attractiveness and mobility along parallel and connecting arterials with the continuing development in Aberdeen.

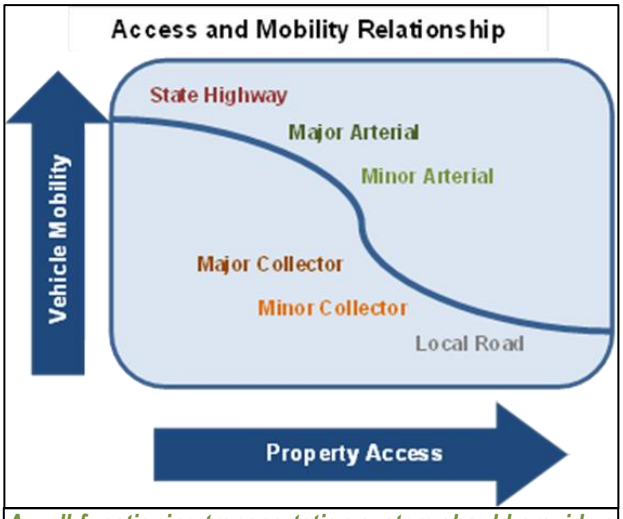


Truck on US Highway 12 (6th Avenue) and Roosevelt Street S

In an effort to address these issues and to promote effective long range planning, the following Major Roads Plan was developed.

Major Roads Plan Classifications

The purpose of the Major Roads Plan is to define a roadway hierarchy to support the collection and distribution of traffic throughout the county and state. The Major Roads Plan is used to guide programming and planning for the more significant roadways within the county and to provide a framework for the development and implementation of a system of standards and guidelines to ensure the maximum utility of roadway investments.



A well-functioning transportation system should provide a balanced network serving both mobility and access needs

As part of the Major Roads Plan, roadways are classified based on their relative function in the roadway network, ranging from an emphasis on regional mobility (i.e., high traffic volumes, high speeds) to serving the local access needs of the community (i.e., lower volumes and speeds). Roadways with a higher classification – state highways and major arterials for example, generally provide for longer trips, place more of an emphasis on mobility, have limited access, and connect larger population centers. Roadways with a lower level classification – such as minor collectors and local roads, generally provide for shorter trips, have lower mobility, have more access points, and connect to

higher functioning roadways. A balance of all roadways functions (i.e., access and mobility) is important to any transportation network.

Example State Highway
US Highway 12 (6th Avenue)

State Highways

In the context of the Major Roads Plan, the State Highway classification consists of Interstate, US, and South Dakota highways. State highways are the highest functioning roadways within Aberdeen and are intended to provide the highest level of speed and mobility, connecting large activity centers across the state and region. Aberdeen has two state highways, which includes US 12 (east-west) and US 281 (north-south).

Major Arterials

Major arterials also emphasize mobility over land access, serving to connect major centers of activity, urban centers and major rural roadways with higher speed routes. These roadways typically serve the highest traffic corridors. Major business concentrations and other important traffic generators are located on major arterial roadways. Major arterials are generally spaced incrementally every one mile in Aberdeen, providing higher functioning routes to connect to the State highway system. These roadways typically maintain multiple lanes of traffic in each direction with a center raised median or turn lane.

Example Major Arterial
8th Avenue NW

Minor Arterials

Minor arterials include all arterials not classified as Major. These roadways serve similar functions as major arterials, emphasizing mobility over land access, but typically carry less traffic and connect smaller activity centers. Minor arterials in Aberdeen are typically spaced incrementally with respect to the Major arterials. In the urbanized fringe areas, the Minor arterials serve as extensions of the Major arterial grid network where traffic volumes have not yet increased to the level of a Major arterial. In the more urbanized core, Minor arterials serve lower volume corridors between Major arterials or as extensions of a Major arterial when route continuity is broken. These roadways may carry a single or multiple lanes of traffic in each direction, typically with dedicated turn lanes to separate turning traffic from through traffic.

Major Collectors

Major collectors are intended to collect traffic from local roads within residential neighborhoods and commercial/industrial areas and connect them to arterials. They supplement the arterial system by emphasizing mobility, but are lower volume roads and provide a higher degree of access than arterials. Major collectors typically have cross road access, but limited private driveway access and medium speeds.

Example Major Collector
10th Avenue SE

Minor Collectors

Minor collector routes provide supplementary interconnection among urban growth centers and connection to major collector and arterial routes. Their emphasis is on land access and because of their location they also carry lower volumes at slower speeds than arterial routes. These roadways typically carry a single lane of traffic in each direction with exclusive turn lanes as warranted.

Local Roads

Local roads provide access to adjacent properties and neighborhoods. Local roads are generally low speed and designed to discourage through traffic. Local roads carry the lowest traffic volume. They are designed to offer connections between commercial, industrial and residential driveways and collector and arterial roadways. These roads are not designed to be a maintenance priority for the city.

Example Local Road
North Lloyd Street

Proposed Major Roads Plan

The proposed Major Roads Plan was developed in partnership with Aberdeen and SDDOT staff, building on the existing Thoroughfare Plan (refer to Figure 3) which was developed as part of the last Aberdeen Transportation Plan update in 2004. The existing plan was updated and expanded as part of this effort to reflect the latest guidance from SDDOT and FHWA, to make logical connections between roadway hierarchies, and to better coordinate with the Major Roads Plan for Brown County in emerging growth areas. Several factors were considered as part of the development process for the proposed Major Roads Plan, including the following:

- The trip length characteristics of the route as indicated by length of route, type and size of traffic generators served (i.e., freight and farm trucks), and route continuity.
- The ability of the route to serve regional population centers, regional activity centers and other traffic generators.
- The spacing of the route to serve different functions (need to provide access and mobility functions for entire county).
- The role of the route in providing mobility or land access (number of access points, access spacing, speed, traffic control, etc.).
- The relationship of the route to adjacent land uses (location of towns, growth areas, industrial areas, and neighborhoods, etc.).

In addition, the federal function classification map and categories for Aberdeen were referenced in order to help bring the county's roadway classification system (Major Roads Plan) closer to the Federal Functional Classification Standards to better align with future funding opportunities.

Given the regional agricultural landscape, existing densities, and the limited types of land development planned in Aberdeen in the future, the road mileage should remain balanced with higher functioning roads such as Major and Minor arterials to lower functioning routes such as Local roads. The interstate and US/State highway network will continue to serve regional trips entering and exiting the county, while the county highways are planned to serve shorter distance trips based on classification in the Major Roads Plan. The proposed Major Roads Plan roadway classification changes can be found in Table 12 and are shown on Figure 11.

Access Management

Access management is the process of providing safe, efficient ways of getting on and off our roads and highways.[1] Access management entails the planning, design and implementation of land use and transportation strategies in an effort to maintain a safe flow of traffic while accommodating the access needs of adjacent development. Management of roadway access, both in terms of cross-street spacing and driveway placement, is a critical means of preserving and enhancing a roadway's intended function and its efficient operation. In addition, providing access management in some form, whether through grade-separated crossings, frontage and backage roads or right-in/right-out access, reduces the number of vehicle conflict points resulting in improved safety. A number of studies have demonstrated a direct relationship between the number of access points and the rate of crashes, showing a positive correlation

[1] *South Dakota DOT Roadway Design Manual, Chapter 17 – Access Management, pg. 17-2*

between access density (access points per mile) and the frequency of crashes (crash rates).[2] Given this relationship, access management is an important roadway safety tool and can provide multiple benefits to the roadway, such as the following:

- Reduce crashes.
- Preserve road capacity and postpone the need for roadway widening or other improvements.
- Improve travel times for the delivery of goods and services.
- Ease movement between destinations.
- Support local economic development.

[2] *FHWA Access Research Report No. FHWA-RD-91-044*

Table 12 – Major Roads Plan – Proposed Changes

ID	Route	Termini		Existing Classification	Proposed Classification	Comments
1	Roosevelt St	Melgaard Rd SE	24th Ave NE	Bypass	Major Arterial	Revised to reflect updated roadway classifications (i.e., "bypass" eliminated for consistency with the Brown County Plan). Provides a direct connection between two east-west arterial routes.
2	1st Ave SE	Roosevelt St	5th St S	Collector	Minor Arterial	Revised for better continuity with the Aberdeen Federal Functional Classification System. Continuous east-west roadway serving the northern portion of the city.
3	3rd Ave SE	Roosevelt St	5th St S	Local Road	Minor Arterial	Revised for better continuity with the Aberdeen Federal Functional Classification System. Continuous east-west roadway serving the northern portion of the city.
4	State St	24th Ave NE	17th Ave SE	Collector	Minor Arterial	Revised for better continuity with the Aberdeen Federal Functional Classification System. Provides a primary north-south connection within the core of the city.
5	15th Ave NW	2nd St N	Dakota St S	Collector	Minor Arterial	Revised for better continuity with the Aberdeen Federal Functional Classification System. Continuous east-west roadway serving the northern portion of the city.
6	Main St	6th St (US 12)	15th Ave NW	Local Road	Minor Arterial	Revised for better continuity with the Aberdeen Federal Functional Classification System. Provides a primary north-south connection within the core of the city.
7	135th St	US 281	Melgaard Rd S	Bypass	Major Collector	Revised to reflect updated roadway classifications (i.e., "bypass" eliminated for consistency with the Brown County Plan). Provides a continuous east-west route serving the southern portion of the city. Could be used as part of a future "bypass" route.
8	5th St S	135th St	Melgaard Rd SE	Arterial	Major Collector	Revised for better continuity with the Aberdeen Federal Functional Classification System. Provides a north-south connection to the city, serving future growth areas.
9	390th Ave	135th St	Melgaard Rd SE	Arterial	Major Collector	Revised for better continuity with the Aberdeen Federal Functional Classification System. Provides a north-south connection to the city, serving future growth areas.
10	130th St	US 281	391st St	Bypass	Major Collector	Revised to reflect updated roadway classifications (i.e., "bypass" eliminated for consistency with the Brown County Plan). Provides a continuous east-west route serving the southern portion of the city. Could be used as part of a future "bypass" route.
11	5th St N	24th Ave NE	130th St	Arterial	Major Collector	Revised for better continuity with the Aberdeen Federal Functional Classification System. Provides a north-south connection to the city, serving future growth areas.
12	Roosevelt St	8th Ave NW	24th Ave NE	Bypass	Major Collector	Revised for better continuity with the Aberdeen Federal Functional Classification System. Provides a north-south connection to the city, serving future growth areas.
13	391st Ave	US 12	130th St	Arterial	Major Collector	Revised to reflect updated roadway classifications (i.e., "bypass" eliminated for consistency with the Brown County Plan). Provides a continuous north-south route serving the southern portion of the city. Could be used as part of a future "bypass" route.
14	392nd Ave	US 12	130th St	Arterial	Major Collector	Revised for better continuity with the Aberdeen Federal Functional Classification System. Provides a north-south connection to the city, serving future growth areas.
15	8th Ave NW	Melgaard Rd S	392nd Ave	Arterial	Major Collector	Revised for better continuity with the Aberdeen Federal Functional Classification System. Continuous east-west roadway serving future growth areas.
16	Kline St N	17th Ave	8th Ave NW	Local Road	Major Collector	Revised for better continuity with the Aberdeen Federal Functional Classification System. Provides a primary north-south connection within the core of the city.

17	10th Ave SE	Roosevelt St S	Melgaard Rd S	New Roadway	Major Collector	Provides system redundancy.
18	Dakota St S	Melgaard Rd SE	US 12	Arterial	Major Collector	Revised for better continuity with the Aberdeen Federal Functional Classification System. Provides a primary north-south connection within the core of the city.
19	7th Ave SE	Roosevelt St S	Melgaard Rd S	New Road	Minor Collector	Provide system redundancy.
20	131st St	Roosevelt St S	392nd Ave	Arterial	Minor Collector	Revised for better continuity with the Aberdeen Federal Functional Classification System. Provides an east-west connection serving a future growth area.
21	Dakota St	Melgaard Rd SW	135th St	Arterial	Minor Collector	Establish a minor collector system to feed higher functioning streets. Provides a north-south connection serving a future growth area.
22	17th Ave SW	2nd St S	Dakota St S	Local Road	Minor Collector	Establish a minor collector system to feed higher functioning streets. Provides an east-west connection serving city core.
23	15th Ave SE	Main St S	State St S	Local Road	Minor Collector	Establish a minor collector system to feed higher functioning streets. Provides an east-west connection serving city core.
24	11th Ave SW	2nd St S	Dakota St S	Local Road	Minor Collector	Establish a minor collector system to feed higher functioning streets. Provides an east-west connection serving city core.
25	Railroad Ave SE	2nd St S	Dakota St S	Local Road	Minor Collector	Establish a minor collector system to feed higher functioning streets. Provides an east-west connection serving city core.
26	Railroad Ave NE	2nd St S	Dakota St S	Local Road	Minor Collector	Establish a minor collector system to feed higher functioning streets. Provides an east-west connection serving city core.
27	3rd Ave SW	15th St S	2nd St S	Local Road	Minor Collector	Establish a minor collector system to feed higher functioning streets. Provides an east-west connection serving city core.
28	15th St S	9th Ave SW	3rd Ave SW	Local Road	Minor Collector	Establish a minor collector system to feed higher functioning streets. Provides an north-south connection serving city core.
29	Washington St	15th Ave SE	Railroad Ave SE	Local Road	Minor Collector	Establish a minor collector system to feed higher functioning streets. Provides an north-south connection serving city core.

Aberdeen
MASTER TRANSPORTATION PLAN

Figure 11

Proposed Major Roads Plan

Legend

- State Highway
- Major Arterial
- Minor Arterial
- Major Collector
- Minor Collector
- Proposed Classification Change

N
W E
S

0 3,000 6,000 Feet

1 inch = 3,000 feet

HRGreen

Aberdeen Access Management Guidelines

Access management guidelines provide a means to balance private property concerns with the need for a safe and efficient transportation system. In addition, standardized guidelines facilitate clear communications between the agencies and individuals involved (developers, agency staff, and landowners) in the process. Transportation agencies regularly receive requests for additional access (e.g. new public streets, commercial driveways, residential and field access points), which are evaluated by numerous agencies. Because of the number of individuals and agencies involved, it is easy to have inconsistent access decisions. This can result in confusion between agencies, developers and property owners as well as long-term safety and mobility problems. Standard access management guidelines can be used to improve communication, enhance safety, and maintain the capacity and mobility of the important transportation corridors. In addition, access management guidelines may be used to respond to access requests and to promote good access practices, such as:

- Aligning access with other existing access points.
- Providing adequate spacing to separate and reduce conflicts.
- Encouraging indirect access (frontage roads, consolidated driveways, etc.) over direct access on high-speed, high-volume arterial routes.

The access spacing guidelines developed as part of this planning process reflect the guidelines adopted by SDDOT as reported in the SDDOT Roadway Design Manual. The SDDOT access management guidelines were expanded for this effort, to address the range of roadway types (i.e., arterials, collectors, etc.) within the urban core and surrounding urban fringe and rural areas of Aberdeen. Through this coordination with the state access management guidelines, access management policies in Aberdeen will be consistent with SDDOT best practices. The following table presents the Aberdeen Access Spacing Guidelines, including direction for signal spacing, intersection spacing, driveway access density, and direct property access.

Table 13 – Aberdeen Access Spacing Guidelines

	Signal Spacing (miles)	Unsignalized Cross Street (feet)*	Access Density	Direct Access
State Highway (freeway)	N/A	N/A	N/A	No
State Highway	1/2	2,640	at half-mile increments	Exception Only
Major Arterial (urban)	1/2	2,640 full 1,320 partial	at quarter-mile increments	Exception Only
Minor Arterial (urban)	1/2	1,320 full 660 partial	1 access/block face, right in/right out preferred	Exception Only
Major Collector (urban)	1/4	1,320 (full/partial)	2 accesses/block face	Yes
Minor Collector (urban)	1/4	1,320 (full/partial)	5 accesses/side/mile	Yes
Major Arterial (urban fringe/rural)	1/4	1,000 (full/partial)	5 accesses/side/mile	Exception Only
Minor Arterial (urban fringe/rural)	1/4	1,000 (full/partial)	5 accesses/side/mile	Exception Only
Major Collector (urban fringe/rural)	1/4	1,000 (full/partial)	5 accesses/side/mile	Yes
Minor Collector (urban fringe/rural)	1/4	1,000 (full/partial)	5 accesses/side/mile	Yes

**'Full' denotes a standard full-movement intersection. 'Partial' denotes a restricted movement intersection (i.e., right-in/right-out).*
Source: Adapted from South Dakota DOT Roadway Design Manual, Chapter 17 – Access Management, Figure 17-1

Access management guidelines and practices should generally be implemented at the county and local levels (cities and townships with active land use planning programs) as these agencies are typically involved at the planning stages of development proposals. However, effective access management requires mutual support and effective communication at all governmental levels. Therefore, it is important to consider how access management guidelines are implemented as part of city planning and development review procedures. The following are key considerations when implementing access management guidelines:

- Access management guidelines apply primarily to routes with a collector functional classification or above; however, the guidelines may also be used on some local roads.
- Access management guidelines should be used as long-term goals, not as absolute rules. Maintaining some flexibility is important in promoting access consolidation. Existing physical barriers or constraints need to be considered.

Access Management Implementation

As discussed in greater detail in the Existing Conditions and Needs Assessment Chapter, Aberdeen is facing increasing development along the urban fringe areas and along the major corridors, particularly along US 12. These development pressures will ultimately lead to requests for new access onto the city and state roadway system. This presents an opportunity to promote good access practices in both the rural and urbanizing areas of the city.

Example of Existing US Highway 12 Access

Implementation of access management practices in rural areas differs from urban areas. Access management efforts in urban areas typically focus on addressing mobility concerns while balancing access needs of local businesses and residents. In these areas, new access points should be minimized while existing access points are consolidated or reduced as development occurs. Developing areas include areas where roadways and services have already been improved to serve current and planned development. Best practices for access management in urban and developing areas include the following:

<u>Access Management Best Practices – Urban and Developing Areas</u>

- Encourage shared driveways and internal circulation plans.
- Restrict turning movements to reduce conflicts.
- Develop good parallel street systems for carrying local traffic.
- Develop proper setbacks for future frontage roads.
- Develop proper secondary street spacing.
- Encourage proper lot layout to minimize access points.
- Encourage connectivity between developments.
- Consider an official map process for important corridors.

<u>Access Consolidation Guidelines – Urban and Developing Areas</u>

- Close driveways.
- Create alternative access ways.
- Create shared driveways.
- Relocating entrances to side streets.
- Promote cross access (access points direction across from each other).
- Turn restrictions from driveway.
- Turn restrictions from roadway.

Roadways in urban fringe (areas positioned for future development) and rural areas typically serve low-density land uses and usually have lower traffic volumes and, therefore, should be treated differently than roadways in urban areas. Access management in these areas should focus on increasing/maintaining safety (i.e., sight distance, number of conflict areas, and severity of crashes when vehicles run off the road) and minimizing operational/maintenance costs such as snow removal, resurfacing and drainage. Access management best practices for these areas should be cognizant of the potential future urbanization and the impacts an access granted today will have on tomorrow. Industry best practices for access management in urban fringe and rural areas include the following:

Urban Fringe Area, Southeast Aberdeen

Access Management Best Practices – Urban Fringe and Rural Areas

- Develop a formal policy that ensures an agency has processes in place to determine the need for and evaluate the use, location, spacing and design characteristics of the requested access points.
- Encourage coordination of roadway access during the zoning and platting process.
- Give access permits for a specific use.
- Encourage adequate spacing of access points.
- Protect the functional area of intersections.
- Ensure adequate sight distance at entrances.
- Avoid offset or dogleg intersections and entrances.
- Encourage development of turn lanes and entrances.
- Consider consolidating access or relocating existing access.
- Encourage good driveway and intersection design characteristics (i.e., driveway width and turning radii, corner clearance, approach grade, intersection alignment/skew, entrance in-slopes and culvert openings, sight triangles, clear zones, etc.).

Newer Commercial and Residential Developments in Aberdeen

4. Roadway Design and Policy Guidelines

This section covers a range of roadway design standards, guidance, and policy. This includes typical sections, pavement standards, maintenance performance standards, pedestrian and bicycle considerations, and guidance on asset management policy.

Typical Roadway Designs (cross sections)

The roadway cross-section standards for the Aberdeen Master Transportation Plan are based on engineering concepts from American Association of State Highway and Transportation Officials (AASHTO) Policy on Geometric Design of Highways and Streets (AASHTO Green Book), AASHTO's Guidelines for Geometric Design of Very Low-Volume Local Roadways, as well as the South Dakota Department of Transportation Road Design Manual, and South Dakota Department of Transportation Local Roads Plan. Typical cross-sections have been developed to ensure roadways are built consistently and in a way that meets the needs of the community. It should be noted that the typical cross-sections are merely a guide, and the designer should use his or her professional judgment when determining the final roadway design.

The cross-section standards for Aberdeen are defined in five categories by major road plan classification: major arterial, minor arterial, major collector, minor collector, and local road. As described in greater detail in the Major Roads Plan (previous section), arterial roadways are designed to serve higher volumes of traffic at higher speeds, while collector and local roadways are designed to provide connectivity between arterial roadways and serve lower volumes at lower speeds. Figures 12a, 12b, and 12c include typical cross sections for each classification. It is noted that US and state highways are outside of the jurisdictional authority of Aberdeen and, therefore, are not represented in the typical cross sections.

According to the SDDOT's Local Roads Plan, the ROW width should not be less than that required for all elements of the design cross sections, utility accommodation, and appropriate border areas. The SDDOT's Local Roads Plan and SDDOT road design manuals provide for flexibility for typical ROW widths. To justify the large ROWs needed (or proposed) on Aberdeen roads in rural areas, and in addition to the pavement for the roadway, ditches for drainage would be needed on one or both sides of the roadway. At a minimum, these ditches would require (if they were one foot deep) 19 feet on both sides of the roadway. Ditches that are two feet deep will require 28 feet of ROW. Adding a trail would require an additional 15 feet of ROW on each side, assuming the inside shoulder of the trail could be in the ditch of the roadway. However, the trail could be added adjacent to the roadway which would then require no inside shoulder for the trail. To avoid having such large right-of-widths, drainage easements could be obtained for ditches outside of the ROW. Additionally, an easement could also be obtained for any trails or sidewalks outside of the ROW.

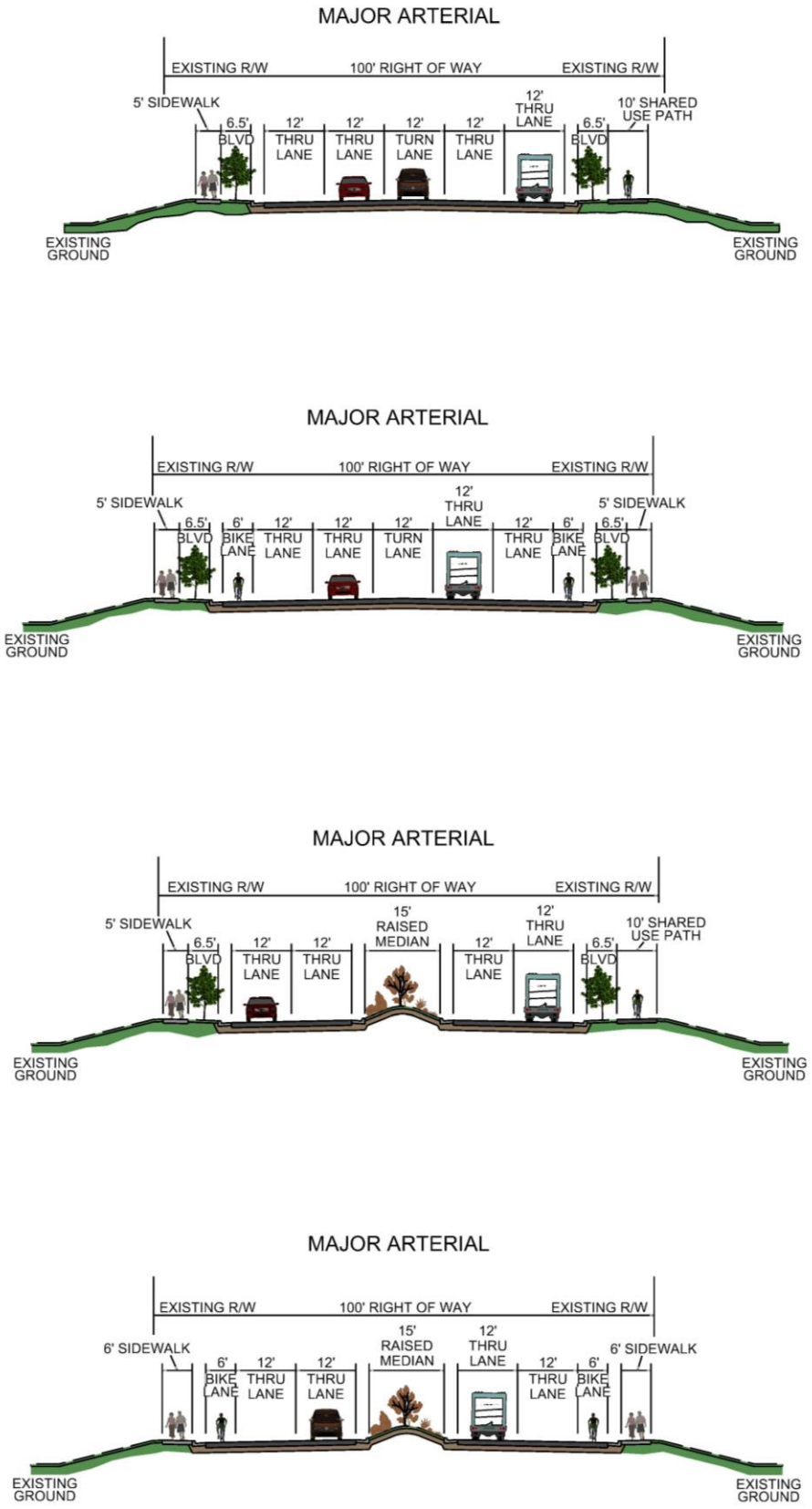


Figure 12a – Typical Cross Sections for Major Roads Plan - Major Arterial

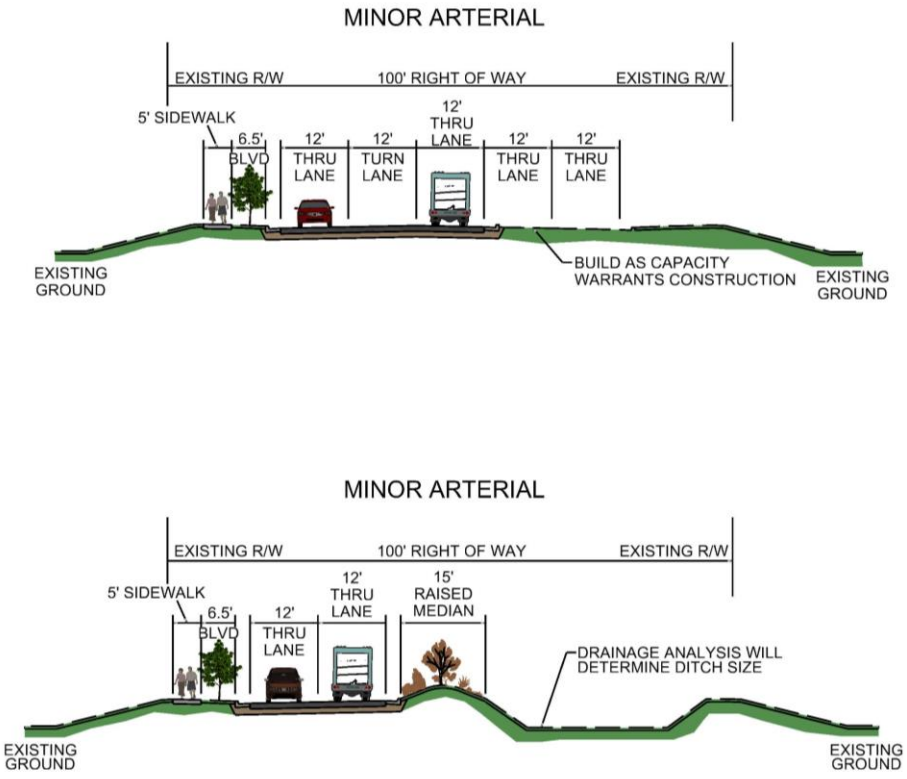


Figure 12b – Typical Cross Sections for Major Roads Plan – Minor Arterial

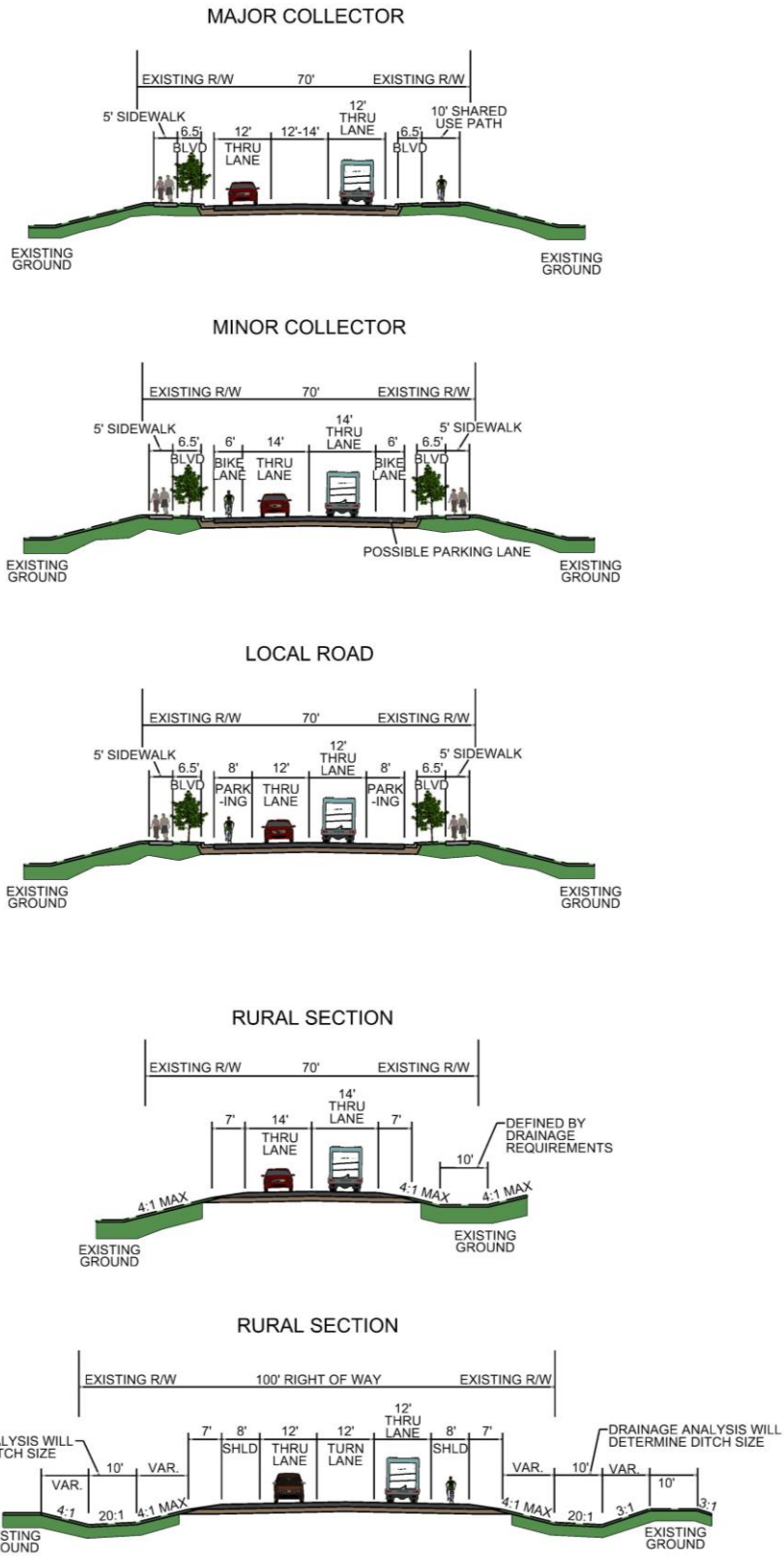


Figure 12c – Typical Cross Sections for Major Roads Plan – Collector, Local and Rural Sections

Pavement Standards

Pavement type should be carefully considered in all roadway construction or reconstruction projects. Typical pavement types used in Aberdeen are Asphaltic Concrete (Bituminous), Portland Cement Concrete (PCC) and Gravel. The following is a description of some key considerations for each:

Asphaltic Concrete (Bituminous) and Portland Cement Concrete (PCC) Roadway Design

Design of pavement thickness for arterial, collector and local roads in both urban and rural areas should be based on AASHTO Guide for Design of Pavement, latest edition. For traffic conditions where the equivalent 18 kip/single axle loading is less than 1,000,000, the low-volume road design method may be used and should be based on AASHTO's Guidelines for Geometric Design of Very Low-Volume Local Roadways.

Design Considerations

There are many factors that should be considered when selecting a roadway pavement section to use for a project. Actual traffic count data and traffic projections should be analyzed along with geotechnical data when determining pavement design for a given project. Truck loading should also be considered. A geotechnical exploration and engineering review should be performed by a qualified geotechnical engineer to establish the soil type in the area and to provide recommendations for pavement section on a project-by-project basis. Geotechnical exploration is especially important for roadway widening or full roadway reconstruction projects.

Table 14 – Minimum Pavement Thickness Requirements

	Local Residential Roads	Commercial, Industrial & Collector Roads	Arterial Roads
Portland Cement Concrete over Aggregate Cushion	6"	8"	8"
Asphaltic Concrete (Bituminous) with Aggregate Base	4" AC 6" Aggregate	6" AC 12" Aggregate	6" AC 12" Aggregate

Traffic Control Criteria and Threshold Checks

The Manual on Uniform Traffic Control Devices (MUTCD) contains the basic principles that govern the design and use of traffic control devices for all streets and highways. The MUTCD should be used to evaluate and design the proper traffic control device for each intersection and each roadway. The SDDOT Road Design Manual provides criteria for traffic signal control and should be used when designing signal control.

Additionally threshold checks should be made to evaluate how well existing traffic control is functioning at intersections and along corridors. The transportation industry defines the quality of service offered by highway facilitates under specific traffic demands by using a Level of Service (LOS) rating. LOS is measured on a scale of A through F, representing the operating conditions of the roadway facility based on speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience measures. LOS A represents traffic that is free flowing on an uncongested roadway while LOS F represents traffic that is creeping or stopped due to a severely congested roadway. Table 15 displays the general definitions of each LOS and the delay ranges used by the Highway Capacity Manual (HCM) for signalized, two-way stop controlled (TWSC) and all-way stop controlled (AWSC) intersections.

Table 15 – Level of Service Operating Conditions

Level of Service	Operating Conditions	SDDOT Delay Range
A	Exceptional Progression/Short Cycle Length	Less than or equal to 5.0 seconds
B	Highly Favorable Progression/ Short Cycle Length	5.1 seconds to 15.0 seconds
C	Favorable Progression/Moderate Cycle Length	15.1 seconds to 25.0 seconds
D	Ineffective Progression/Cycle Length is Long	25.1 seconds to 40.0 seconds
E	Unfavorable Progression/Long Cycle Lengths	40.1 seconds to 60.0 seconds
F	Poor Progression/Long Cycle Lengths/Unable to Clear Queues	Greater than 60.1 seconds

Protected Left-Turning Movements

Several things should be considered when deciding whether to use only protected left-turn phasing, protected-permissive phasing, or permissive only phasing. A separate left-turn phase (protected left turn) reduces the available green time for through traffic and tends to increase total intersection delay. A left-turn only phase should only be considered if the left-turning volume is greater than 100 vehicles per hour (vph) or as indicated in the Institute of Transportation Engineers Manual of Traffic Signal Design.

Turning Lane Warrants

The SDDOT Road Design Manual details when a left- or right-turn lane should be considered. At unsignalized intersections, left-turn lanes should be provided where through and turning volumes create an operational or a potential accident problem. Right-turn lanes help to improve safety and to maximize the capacity of a roadway at unsignalized intersections. Additional a turn lane may be considered if there are special circumstances at the intersection such as railroad crossings or other geometric or safety concerns that would be mitigated with the addition of a turn lane. At signalized intersections, a left-turn lane is always desirable, while a right-turn lane is generally determined based on signal capacity needs.

Roadway System Asset Management Guidelines and Policy Considerations

A system of Asset Management preservation tools will be an important step for Aberdeen to preserve and protect its roadway system investments. It will be important for the county to review existing management tools and create modifications to inventory and classification hierarchy and performance systems. The following key methods can be adopted to implement such an improvement:

1. Asset Management Rating System:
   If not already in place, the county should adopt a condition rating system for like segments of the various elements (i.e. benchmark) such that a minimum target service condition rating can be established, based on functional classification or service level assigned to the roadway facility. For example, a minimum service level of 70 of 100 points for arterial roadways would be assigned as an acceptable level of performance, depending on the standards set for the facility.

2. Systematic Coordination:
   Coordination of GIS system improvements and electronic mapping should occur to develop a systematic means of sorting and organizing future improvements. This approach can then be applied to encourage a systematic means of identifying, prioritizing, and programming improvements associated with the following.
   a. Cost estimating tracking systems.
   b. Source and reliability of funding streams.
   c. Prioritization of improvements.

3. Operations Plan:
   The creation of an Operation and Management Plan (to accompany Capital Improvement Plan) should also be established with the goal of improving and maintaining the system at minimum established thresholds. This should include a well-defined program for pavement maintenance and replacement in order to maximize the lifespan of transportation assets. Periodic pavement maintenance and replacements, when warranted, should be performed to keep the network functioning properly.

   In order to establish an effective maintenance schedule, an up-to-date inventory of all roadways in Aberdeen should be established and maintained. In addition, it is important to understand that each roadway element has a different design life and various roadway elements require periodic maintenance and timely replacement to keep the system in adequate condition. Below are approximate design lives for various roadway elements, based on common industry practice:

   - Bridges and concrete culverts – 75 years.
   - Asphalt pavement – 20 years.
   - Concrete pavement – 30 years.
   - Seal coats – 7 years.
   - Gravel surfacing – 4 to 6 years.
   - Signs – 10 years.
   - Pavement markings – 1 year for paint, 2 to 3 years for plastic.

4. Maintenance Program:
   It is also important to establish an ongoing and sustainable maintenance funding program for the Aberdeen roadway network. While more detailed programming should be completed, the first step towards defining maintenance funding needs is to understand the approximate annual costs associated with maintenance of typical roadway types within the county.

5. Traffic Impact Assessments (TIS)
   In order to ensure future developers in Aberdeen pay an equitable share of the burden they place on transportation infrastructure, the City should require developers to assess their potential traffic impacts to the surrounding roadways. This will allow City staff to determine whether a Traffic Impact Study (TIS) is required prior to development. A TIS is a comprehensive analysis of before and after operational traffic impacts to a road system resulting from proposed development and associated traffic movements and volumes.

Pedestrian and Bicycle Facilities – Policy and Design Guidelines

One objective of the Aberdeen Master Transportation Plan is to ensure safe and efficient movement of people and goods throughout the county. This includes not only traditional automobile and freight mobility, but also non-motorized transportation such as walking and biking. To that end, Aberdeen should actively strive to promote walking and bicycling as viable alternative modes of transportation, in order to enhance the overall transportation network. In Aberdeen, this means supporting the development of a well-connected recreational trail system in rural areas and installing proper pedestrian and bicycle facilities where appropriate in urban areas. In order to achieve this goal, the City should pursue the following:

- Provide an interconnected system of paths, trails, lanes, and routes that are multipurpose, accessible, convenient and connected to activities centers such as residential neighborhoods, parks, schools, workplaces, major open spaces, and other destinations.

- Form mutually beneficial partnerships with and among the public, county, and private sector partners to expand and improve the provision of multimodal services and facilities.

- Sustain and improve the quality condition and attractive appearance of public areas and facilities with an aggressive maintenance program in order to support and encourage multimodal transportation.

Pedestrian and bicycle facilities should also be a consideration in the planning design for all roadway construction and reconstruction projects, and dedicated non-motorized facilities should be included where there is demand. Pedestrians and bicyclist may use shoulders and travel lanes where specific facilities do not exist. However, in many cases the use of shoulders and travel lanes are not appropriate and a designated facility for pedestrians and bicyclists should be considered. Refer to AASHTO's A Policy on Geometric Design of Highways and Streets (AASHTO Green Book), latest edition when designing pedestrian and bicycle facilities. AASHTO's Guide for Planning, Design and Operation of Pedestrian Facilities and Guide for the Development of Bicycle Facilities provide further guidance for designing pedestrian and bicycle facilities, respectively.

Figure 13 includes a typical cross-section for a Shared Use Path and Table 16 presents minimum pavement thickness requirements.

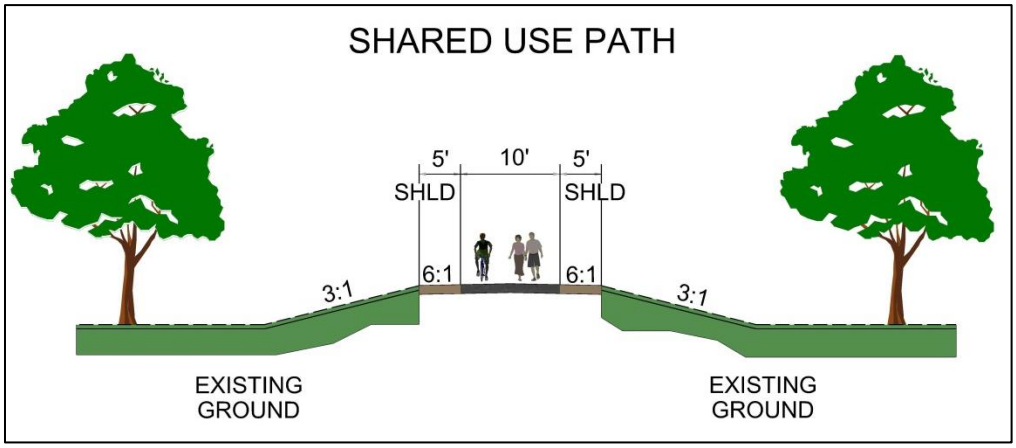


Figure 13 – Shared Use Path Typical Cross Section

Table 16 – Minimum Pavement Thickness Requirements – Shared Use Path

	Shared Use Path
Asphaltic Concrete (Bituminous) with Aggregate Base	2.5" AC 4" Aggregate

5. Implementation Plan

This section provides an overview of the proposed Implementation Plan, including recommended projects organized by type of project and priority of project.

Project Recommendations List

This implementation plan was developed based on stakeholder and public input and the needs analysis completed as part of the planning process. Data sources include SAT input, discussions with local stakeholders (City and township officials, agency representatives, etc.), public comments, and technical data from the traffic and safety evaluations conducted as part of the needs analysis. The goal of this implementation program is to provide recommendations which balance stakeholder needs with regulatory requirements and technical constraints.

The following pages include a series of tables (Tables 17 – 21) summarizing the implementation plan recommendations, as well as maps (Figures 14a and 14b) illustrating the location of the proposed capital projects. The plan includes recommendations organized into the four categories as listed below. Within each category recommendations are tied to a "need" as identified in the needs analysis phase of the planning process. For the purpose of the summary tables herein, the needs are grouped into general categories for each recommendation type. Definitions for the "recommendation" and "need" categories are provided below:

Recommendation Categories and Need Definitions:

A. **Intersection Projects** – Capital projects to address safety and operational issues at a specific location or intersection.

Needs Addressed

a. Geometric Deficiency – Improvements to correct potential safety and operational issues (i.e., intersection skew, sight-lines, etc.).
b. Capacity Constraints – Improvements to improve capacity to enhance operations and minimize congestion (i.e., through lanes, turn lanes, new routes, etc.).
c. Traffic Control – Intersection control improvements to improve safety and operations (i.e., new intersection control, signal timing updates, etc.).

B. **Roadway Segment Projects** – Capital projects to improve roadway safety and mobility along roadway segments.

Needs Addressed

a. Capacity Constraints – Improvements to improve capacity to enhance operations and minimize congestion (i.e., through lanes, turn lanes, new routes, etc.).
b. Connectivity Issues – Improvements to improve local or regional connectivity by enhancing mobility on significant county and local routes (i.e., new through routes, pave gravel road, etc.).

C. **Potential Bridge Projects** – Capital projects to address issues related to bridge crossings over other transportation infrastructure (roads, railroads) or waterways.

Needs Addressed

a. Structural Deficiencies – Improvements to address structural deficiencies, repairs/rehabilitation, or replacement of bridges and approach roadways.

D. **Multimodal Network Enhancement Projects** – Capital projects and planning/policy initiatives to improve safety and mobility for pedestrians and bicyclists.

Needs Addressed

a. Non-motorized Safety, Mobility, and Recreation – Trail and sidewalk improvements, needs analysis and studies, etc.
b. Railroad Crossing Safety – Improvements and studies to identify and correct critical safety issues (i.e., crossing gates, flashing lights, vehicle and pedestrian channelization, etc.
c. Transit Services – Study to determine the feasibility of enhancement transit service and facilities.

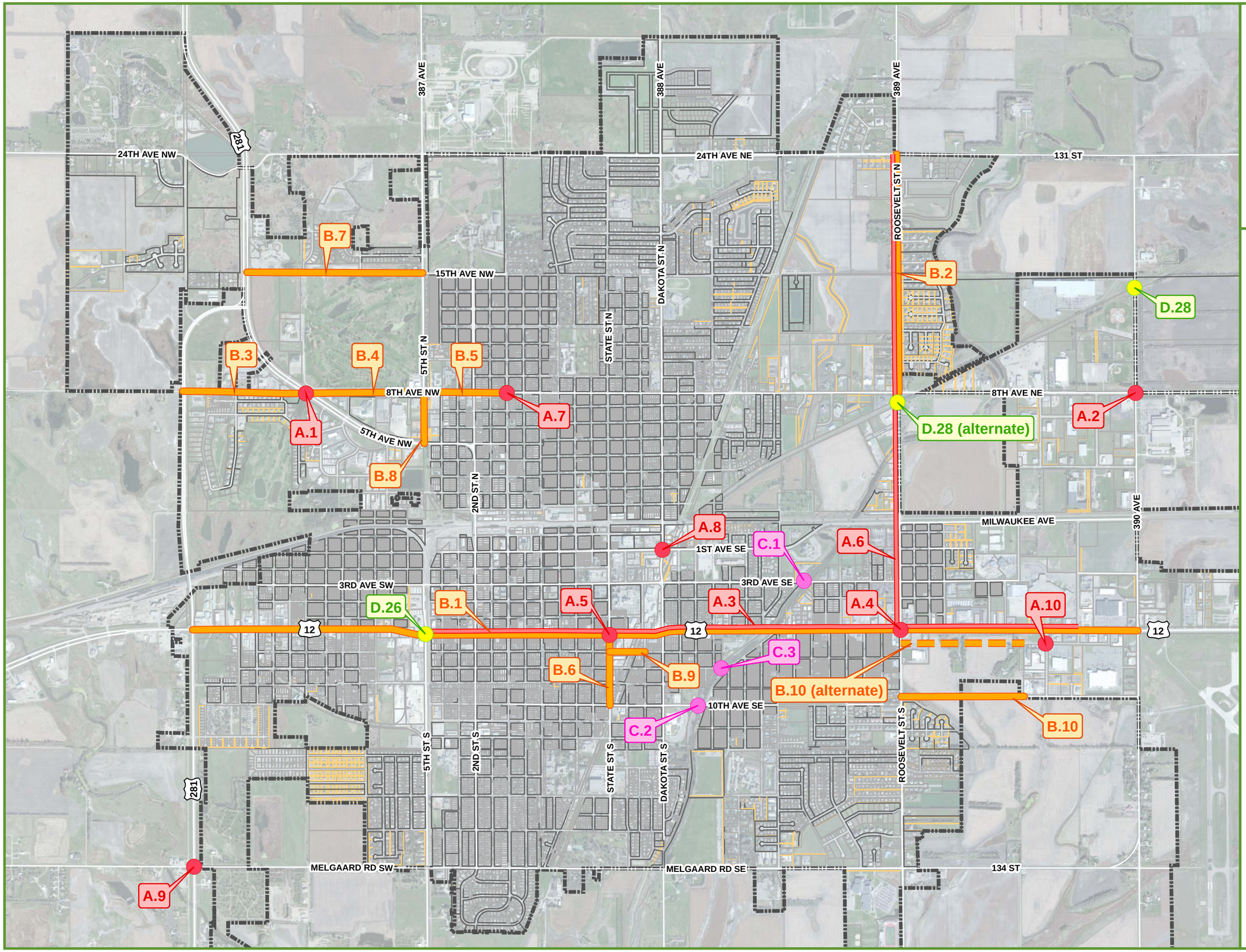
E. **System Management and Policy Recommendations** – Policy level recommendations to identify and prioritize projects and to implement best practices with regard to development policy.

Needs Addressed

a. Funding and Maintenance – Strategies to leverage outside funding opportunities.
b. System Inventory, Prioritization, and Standards – Strategies to improve asset management and capital planning.

The implementation tables include planning level cost estimates are based on SDDOT and Aberdeen input, as well as by gathering estimates from similar projects in other states. Estimated costs have been provided for all projects except those found in the System Management and Policy Recommendations, which are comprised of largely administrative or technical analysis rather than capital projects. Also included is a proposed priority level for each recommendation. The priority levels are defined as follows:

- Short Term (S): 0 – 5 years.
- Medium Term (M): 6 – 10 years.
- Long Term (L): 11 – 20+ years.



Aberdeen
MASTER TRANSPORTATION PLAN

Figure 14a

Implementation Plan

Legend

- Intersection Projects
  - A - (Table 16)
- Intersection Projects
  - A - (Table 16)
- Roadway Segment Projects
  - B - (Table 17)
- Roadway Segment Projects (Alt)
  - B - (Table 17)
- Potential Bridge Projects
  - C - (Table 18)
- Multimodal Projects
  - D - (Table 19)

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W E
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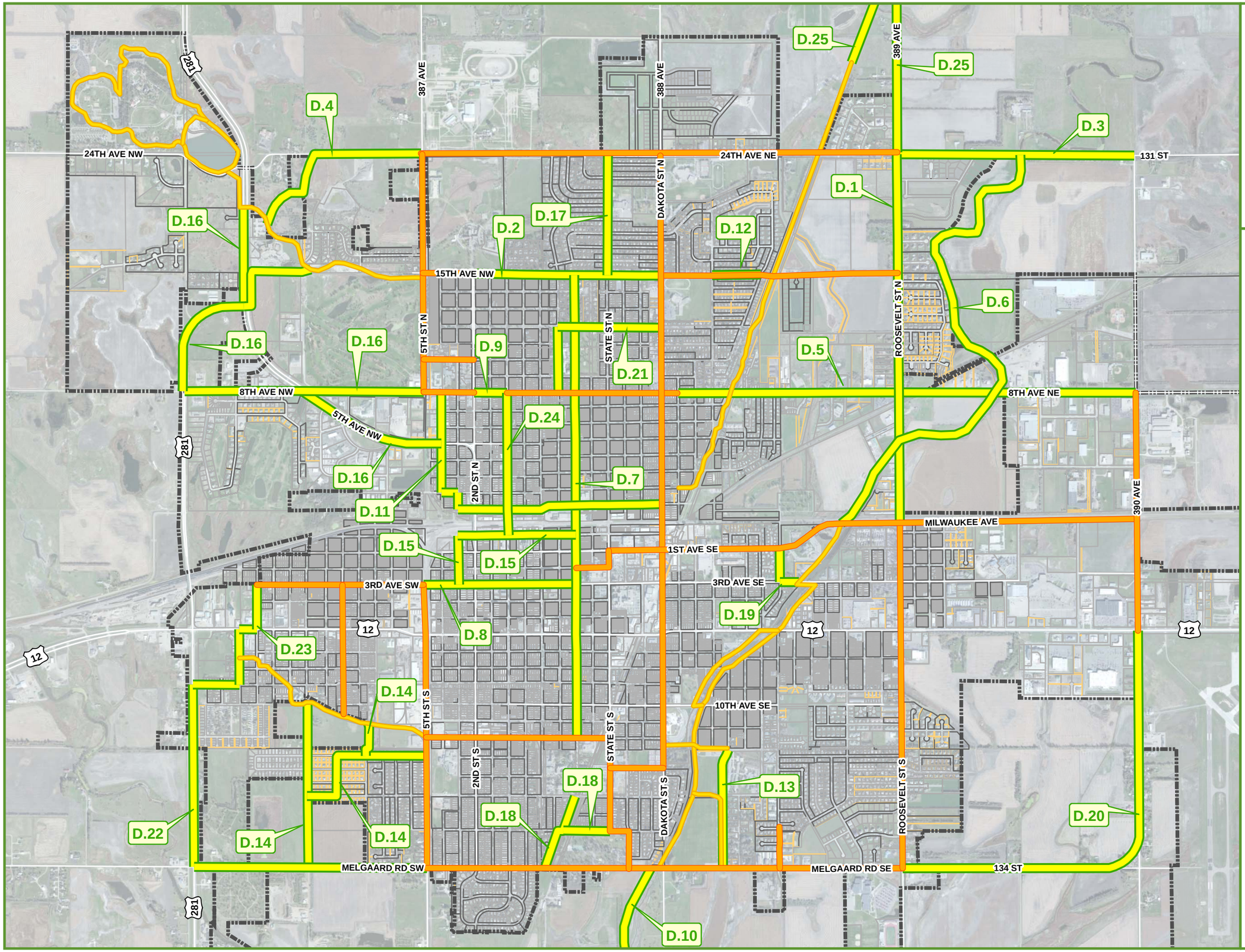
0 1,400 2,800 Feet

1 inch = 2,000 feet

HRGreen



Aberdeen
MASTER TRANSPORTATION PLAN

Figure 14b

Proposed Trail Projects

Legend

Multimodal Network Enhancement Projects

- Proposed Trail Projects
  - **D** - (Table 19)
- Off-Street Recreation Trail
- Sidewalk Recreation Trail

HRGreen

Table 17 – Section A – Intersection Projects

Intersection	Estimated Cost	Priority*	Need Addressed	Description/Comments
1. 8th Avenue NW/5th Avenue NW Intersection	$25,000	S	Geometric Deficiency/Traffic Control	Intersection study to correct geometric deficiencies and improve traffic control. The existing intersection is skewed and signal controlled with less than desirable site lines.
2. 8th Avenue NE/County Highway 19 Intersection Signal Warrant Analysis	$10,000	S	Traffic Control	This was recommended as part of the Brown County Master Transportation Plan to improve safety at the intersection.
3. US Highway 12 corridor study to identify improvement strategies to address high crash locations	$150,000	S	Geometry Deficiency/Traffic Control	Study improvements to correct safety issues at high crash locations. Eleven (11) of the top 16 crash locations are located on US 12 (6th Avenue), from Centennial St to 5th St. This study should be done in conjunction with a signal timing and optimization analysis (see B.1).
4. US Highway 12/Roosevelt Street S Intersection	$50,000	M	Geometry Deficiency/Traffic Control	Improve intersection operations to alleviate congestion. Potential signal phasing/intersection geometric improvements.
5. US Highway 12/State Street S Intersection	$50,000	M	Geometry Deficiency/Traffic Control	Improve intersection operations to alleviate congestion. Potential signal phasing/intersection geometric improvements.
6. Roosevelt Street Corridor Study to identify improvement strategies to address high crash locations	$75,000	M	Geometry Deficiency/Traffic Control	Study improvements to correct safety issues at high crash locations. Three (3) of the top 16 crash locations are located on Roosevelt St, from US 12 to 8th Ave NE. This study should be coordinated with a future capacity expansion project (see B.2).
7. Main Street N/8th Avenue NE Intersection	$1,500,000	L	Geometry Deficiency/Traffic Control	Evaluate potential traffic control change/geometric improvements to enhance safety.
8. Dakota Street S/1st Avenue SE Intersection	$1,500,000	L	Geometry Deficiency/Traffic Control	Evaluate potential traffic control change/geometric improvements to enhance safety.
9. US Highway 281/Melgaard Road SW Intersection	$25,000	S	Geometric Deficiency/Traffic Control	Intersection study to determine capacity needs and potential intersection control improvements.
10. 7th Avenue SE/Lamont Street S	$25,000	S	Geometric Deficiency/Traffic Control	Intersection study to determine capacity deficiencies and potential turning movement improvements.

*S = Short Term (0-5 years) | M = Medium Term (5-10 years) | L = Long Term (10-20+ years)

Table 18 – Section B – Roadway Segment Projects

Route	Termini		Length (miles)	Estimated Cost	Priority*	Need Addressed	Description/Comments
	From	To					
1. US Highway 12 corridor signal timing and optimization analysis	Melgaard Rd S	US 281	4	$100,000	S	Capacity & Operations	Review all signalized intersections along US 12 (6th Avenue) and develop timing plans to provide improved operations. Collect turning movement counts, existing timing plans, signal construction plans and detector locations. Suggest an interconnected and coordinated system. This is a continuous effort between the City of Aberdeen and South Dakota Department of Transportation.
2. Roosevelt Street N Expansion	8th Ave NE	24th Ave NE	1	$4,000,000	S	Capacity Constraint	Expand Roosevelt Street to provide additional capacity between 8th Ave and 24th Ave. (This segment currently has a construction project programmed).
3. 8th Avenue NW expansion	US 281	5th Ave NW	0.5	$3,000,000	S	Capacity Constraint	Expand 8th Avenue N to provide additional capacity between US 281 and 5th Avenue NW. (This segment currently has a construction project programmed). Review/realign 8th Ave-5th Ave intersection to provide better sight lines.
4. 8th Avenue NW expansion	5th Ave NW	5th St N	0.5	$3,000,000	M	Capacity Constraint	Expand 8th Avenue N to provide additional capacity between US 281 and 5th Avenue NW. Review/realign 8th Ave-5th Ave intersection to provide better sight lines.
5. 8th Avenue NW expansion	5th St N	Main St N	0.35	$1,750,000	S	Capacity Constraint	Expand 8th Avenue N to provide additional capacity between US 281 and 5th Avenue NW.
6. State Street S	10th Ave SE	US 12	0.3	$50,000	S	Capacity & Operations	Complete a study of State Street looking at capacity, access management, operations and determine potential solutions. Can combine with the study to improve operations at the US 12/State Street intersection.
7. 15th Avenue NW	5th St N	US 281	0.25	$1,250,000	L	Connectivity Issue	Extend 15th Ave to US 281 in order to connect the grid (provide missing links in the network).
8. 5th Street N	5th Ave NW	8th Ave NW	0.25	$1,250,000	M	Connectivity Issue	Extend 5th St N to 8th Ave in order to connect the grid (provide missing links in the network)
9. 7th Avenue SE	State St S	Penn St S	0.15	$750,000	M	Connectivity Issue	Extend 7th Ave S to connect the grid (provide missing links in the network).
10. 7th Ave SE or 10th Ave SE (Target/Walmart area)	Roosevelt St S	Lamont St S	0.65	$3,250,000	M	Connectivity Issue	Connect 7th Avenue or 10th Avenue to Roosevelt Street to provide reliever route for US 12 (6th Avenue). (provide missing links in the network).

*S = Short Term (0-5 years) | M = Medium Term (5-10 years) | L = Long Term (10-20+ years)

Table 19 – Section C – Potential Bridge Projects

Location	Estimated Cost	Priority*	Need Addressed	Description/Comments
1. 3rd Ave SE (river crossing)	$460,000	S	Structural Deficiency	Potential bridge rehabilitation/replacement project. Identified by SDDOT as a need.
2. 10th Ave SE (river crossing)	$430,000	S	Structural Deficiency	Potential bridge rehabilitation/replacement project. Identified by SDDOT as a need.
3. 8th Ave SE (river crossing)	$460,000	M	Structural Deficiency	Potential bridge rehabilitation/replacement project. Identified by SDDOT as a need.

*S = Short Term (0-5 years) | M = Medium Term (5-10 years) | L = Long Term (10-20+ years)

Table 20 – Section D – Multimodal Network Enhancement Projects (Pedestrian, Bicycle, Transit, and Rail)

Recommendation	Estimated Cost	Priority*	Need Addressed	Description/Comments
1. Pedestrian/Bicycle Facilities - Roosevelt Street N (Milwaukee Ave NE to 24TH Ave NE)	$750,000	S	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.
2. Pedestrian/Bicycle Facilities - 15th Avenue NW/NE (2nd St N to Dakota St N)	$395,000	S	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.
3. Pedestrian/Bicycle Facilities – 24th Avenue NE (Roosevelt St N to County Highway 19)	$490,000	M	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.
4. Pedestrian/Bicycle Facilities - 24th Ave. NW (5th St N to Wylie Park)	$395,000	M	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.
5. Pedestrian/Bicycle Facilities - 8th Avenue NE (Kettering St N to Players/Fossum Fields)	$1,160,000	L	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.
6. Pedestrian/Bicycle Facilities - Moccasin Creek trails (Milwaukee Ave SE to 24th Ave NE)	$980,000	L	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.
7. Pedestrian/Bicycle Facilities – Kline St N/S (12th Ave SE to 15th Ave NE)	$70,000	L	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.
8. Pedestrian/Bicycle Facilities – east/west connection between intersection of 5th St S & 3rd Ave SW and intersection of State St S & 1st Ave SE	$295,000	L	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.
9. Pedestrian/Bicycle Facilities – connection between 2nd St N & Main St N along 8th Ave NW	$80,000	L	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.
10. Kuhnert Arboretum Trail	$515,000	S	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.

Recommendation	Estimated Cost	Priority*	Need Addressed	Description/Comments
11. 4th Street N (8th Ave NW to 2nd Ave NW) 2nd Avenue NW (4th St N to 3rd St N) 3rd Street N (2nd Ave NW to 1st Ave NW) 1st Avenue NW/NE (3rd St N to Dakota St N)	$320,000	S	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.
12. 15th Avenue NE (Harrison St N to North View Lane)	$160,000	M	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.
13. Cochrane Street (Melgaard Rd SE to 12th Ave SE)	$245,000	M	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.
14. 12th Street S (Melgaard Rd SW to 12th Ave SW) 15th Avenue SW (12th St S to HAPI Trail)	$735,000	M	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.
15. 3rd Street S (3rd Ave SW to Railroad Ave SW) Railroad Avenue SW (3rd St S to Kline St S)	$400,000	M	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.
16. US Highway 281 (from existing trail south to 5th Ave NW intersection; north to 15th Ave NW and from intersection of 5th Ave NW to 8th Ave NW) 15th Ave NW (US Highway 281 to existing trails) 8th Ave NW (US Highway 281 North to 5th St N) 5th Ave NW (8th Ave NW to 4th St N)	$1,225,000	S	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.
17. State Street N (24th Ave NE to 15th Ave NE)	$245,000	M	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.
18. Marshall Road/Herret Street (Melgaard Rd SE to 15th Ave SW) 17th Avenue SW (Marshall Rd/Herret St to State St S)	$180,000	L	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.
19. Lancelot Drive S (1st Ave SE/Milwaukee Ave SE to 3rd Ave SE) 3rd Avenue SE (Lancelot Drive S to Moccasin Creek)	$160,000	L	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.
20. Melgaard Road (Roosevelt St S to US 12/6th Ave SE)	$980,000	L	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.
21. Jay Street N (8th Ave NE to 12th Ave NE) 12th Avenue NE (Jay St N to Dakota St N)	$400,000	L	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails:
22. US Highway 281 (9th Ave SW to Melgaard Rd SW) Melgaard Road SW (US Highway 281 to 5th St S)	$735,000	L	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.

Recommendation	Estimated Cost	Priority*	Need Addressed	Description/Comments
23. 9th Ave. S. (US Highway 281 to 16th St. S.) 16th St. S. (9th Ave. S. to 6th Ave. S.) 6th Ave. S. (16th St. S. to 15th St. S.) 15th St. S. (6th Ave to 3rd Ave.)	$400,000	L	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.
24. Main St. N. (1st Ave. n. to 8th Ave. N.)	$360,000	L	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.
25. 389th Ave N. (24th Ave NE to connect with the existing trail near 130th St.)	$635,000	L	Non-Motorized	Bicycle and Pedestrian Facility Connectivity Gaps - Extend and connect off-street trails.
26. Railroad crossing 394866Y (US12/6th Ave SW)	$90,000	S	Railroad Crossing Rehabilitation	Currently programmed project in SDDOT 2014-2017 STIP.
27. Conduct a Study of the at-grade railroad crossings in Aberdeen	$50,000	M	Railroad Crossing Safety	Complete a study of the existing at-grade railroad crossings using the SDDOT and FRA inventory data sets to determine if additional safety improvements are required, and to determine the feasibility of a railroad quiet zone.
28. Grade-Separated Crossing of BNSF Railroad	$8,000,000	L	Railroad Crossing Safety/Connectivity	The eastern side of the community would be better served with a grade separation (overpass or underpass) of a collector or minor arterial route. Candidate street would be CR 19.
29. Transit Needs/Feasibility Study	$50,000	L	Transit Service	Build on the results of the SDDOT Transit Coordination Study currently underway (2013) to evaluate the feasibility of expanded transit services within the City of Aberdeen. This was recommended as part of the Brown County Master Transportation Plan.
30. Transit Stop Facility Planning and Design	$50,000	L	Transit Service	Develop standards for transit stops.

*S = Short Term (0-5 years) | M = Medium Term (5-10 years) | L = Long Term (10-20+ years)

Table 21 – Section E – System Management and Policy Recommendations

Recommendation	Estimated Cost	Priority*	Need Addressed	Description/Comments
1. Asset Management Strategy/GIS coordination	TBD	L	System Inventory, Prioritization, & Standards	Integrates GIS into all data collection and management systems, integrate asset management strategies of roadway engineering/public works decision-making.
2. Design Standardization and Review Procedures	TBD	M	Funding & Maintenance	Typical Sections – when to apply and coordinated with what type of roadway Pavement Standards.
3. Periodic review of signalized intersections	TBD	M	Funding & Maintenance	Set up program to check operations (LOS and delay) of signalized intersections every 3 to 5 years. Conduct turning movement counts and operations analysis.
4. Follow SDDOT Road Design Manual for left-/right-turn lane criteria.	TBD	S	System Inventory, Prioritization, & Standards	SDDOT Road Design Manual provides warrants on when to provide a left-turn lane and a right-turn lane. See Chapter 15.
5. Follow the SDDOT Road Design Manual on when to use separate left-turn signal phasing	TBD	S	System Inventory, Prioritization, & Standards	SDDOT Road Design Manual provides warrants on when a separate left-turn phase should be considered. See Chapter 15.
6. Multimodal safety education	TBD	S	System Inventory, Prioritization, & Standards	Develop a public education program to improve safety awareness for bicycle, pedestrian, and motorist travel.

*S = Short Term (0-5 years) | M = Medium Term (5-10 years) | L = Long Term (10-20+ years)

Appendix A

Methods and Assumptions Technical Memorandum

Aberdeen
MASTER TRANSPORTATION PLAN

Methods & Assumptions

Aberdeen Area Master Transportation Plan

FOR
FHWA
SDDOT
City of Aberdeen

HP5510 (15) 3616 P
Agreement No. 410493
Work Order PD-06-12

October 17, 2012

HRGreen

Stakeholder Acceptance

The undersigned parties concur with the Methods and Assumptions for the Aberdeen Area Master Transportation Plan as presented in this document.[1],[2]

SDDOT:

Signature

Data Analysis Engineer
Title

10-23-2012
Date

FHWA:

Signature

Planning/Civil Rights Specialist
Title

10/25/12
Date

(1) Participation on the Study Advisory Team and/or signing of this document does not constitute approval of the Aberdeen Master Transportation Plan's Final Report or conclusions.

(2) All members of the Study Advisory Team will accept this document as a guide and reference as the study progresses through the various stages of development. If there are any agreed upon changes to the assumptions in this document a revision will be created, endorsed and signed by all the signatories.

TABLE OF CONTENTS

LIST OF FIGURES

I. INTRODUCTION AND PROJECT DESCRIPTION

A. BACKGROUND INFORMATION, NEED FOR STUDY

The goal of a community's transportation system is to provide safe, efficient, and convenient facilities and mode choices appropriate for transportation users of all ages and abilities. The transportation system should be well-coordinated with existing and future land use planning to allow efficient coordination for future plan growth. The development and adoption of a community master transportation plan is the best way to integrate planned system growth with preservation needs and investment prioritization.

Aberdeen's roots as an early rail center and South Dakota's "Hub City" have again established the importance of the community to transportation carriers and industries that will depend on an appropriate combination of intermodal transportation systems to carry the community well into the 21st century. In addition to its importance to commerce and industry, Aberdeen's residents and visitors demand high quality facilities to sustainably deliver the best transportation services to local motorists, transit users, and bicyclists/pedestrians.

Aberdeen has experienced moderate population growth since the 2000 Census, and has been one of only a few South Dakota communities able to retain and attract new opportunities to sustain this growth. Growth is welcomed, but brings new challenges to the community and frequently exacerbates "old problems" that still need solutions, only now more acutely. Our understanding of many of the modal challenges that Aberdeen will need to address in the Master Transportation Plan involve the roadway network, railroads and freight, transit, and pedestrian and bicycle facilities.

The Master Transportation Plan will examine the transportation facility needs and potential solutions in the community to augment the 2004 Aberdeen Comprehensive Plan and the recent Brown County Master Transportation Plan. The Master Transportation Plan is intended to be a living document that can be used as a blueprint, or "road map" to accommodate the interests or desires of private land developers, elected and appointed local officials, and members of the traveling public.

HR Green recognizes the importance of the Aberdeen Master Transportation Plan document in defining current system deficiencies, identifying future system needs, and ultimately prioritizing the transportation needs for Aberdeen. With limited budgets for transportation infrastructure maintenance and construction, available funding for planning level documents meant to guide future system improvements must be efficiently used to achieve the intended benefit. It is therefore very important for the community (and SDDOT) to have up-to-date, reliable (documented) transportation system needs sorted by priority and ability to deliver (costs and other considerations), especially in the competition for available Federal and State improvement funding.

B. STUDY ADVISORY TEAM MEMBERS

Jim Barringer: Aberdeen Development Corporation
Brett Bill: City of Aberdeen – Planning & Zoning
Ken Hubbart:City of Aberdeen – Planning & Zoning
Robin Bobzien: City of Aberdeen- Public Works
Lynn Lander: City of Aberdeen–City Manager's Office

Stu Nelson: City of Aberdeen – Public Works
Mark Hoines: FHWA
Jeff Brosz: SDDOT –Trans. Inventory Management
Steve Gramm: SDDOT – Project Development
Jeff Senst: SDDOT – Aberdeen Region
Wade Dahl: SDDOT – Local Government Assistance

C. STUDY SCHEDULE

The Master Transportation Plan will be substantially completed over a 10-month schedule, with additional "float" time through summer 2013 if needed to resolve outstanding issues or concerns.

There are three phases to the project schedule: 1) Inventory and analysis of existing and future conditions and identification of problems and needs; 2) Application of the "toolbox" – development of strategies, alternatives, and potential solutions to potentially solve problems and fulfill needs; and 3) selection of alternatives for further study and development, provide for integration with other investments, and prioritization of planned improvements.

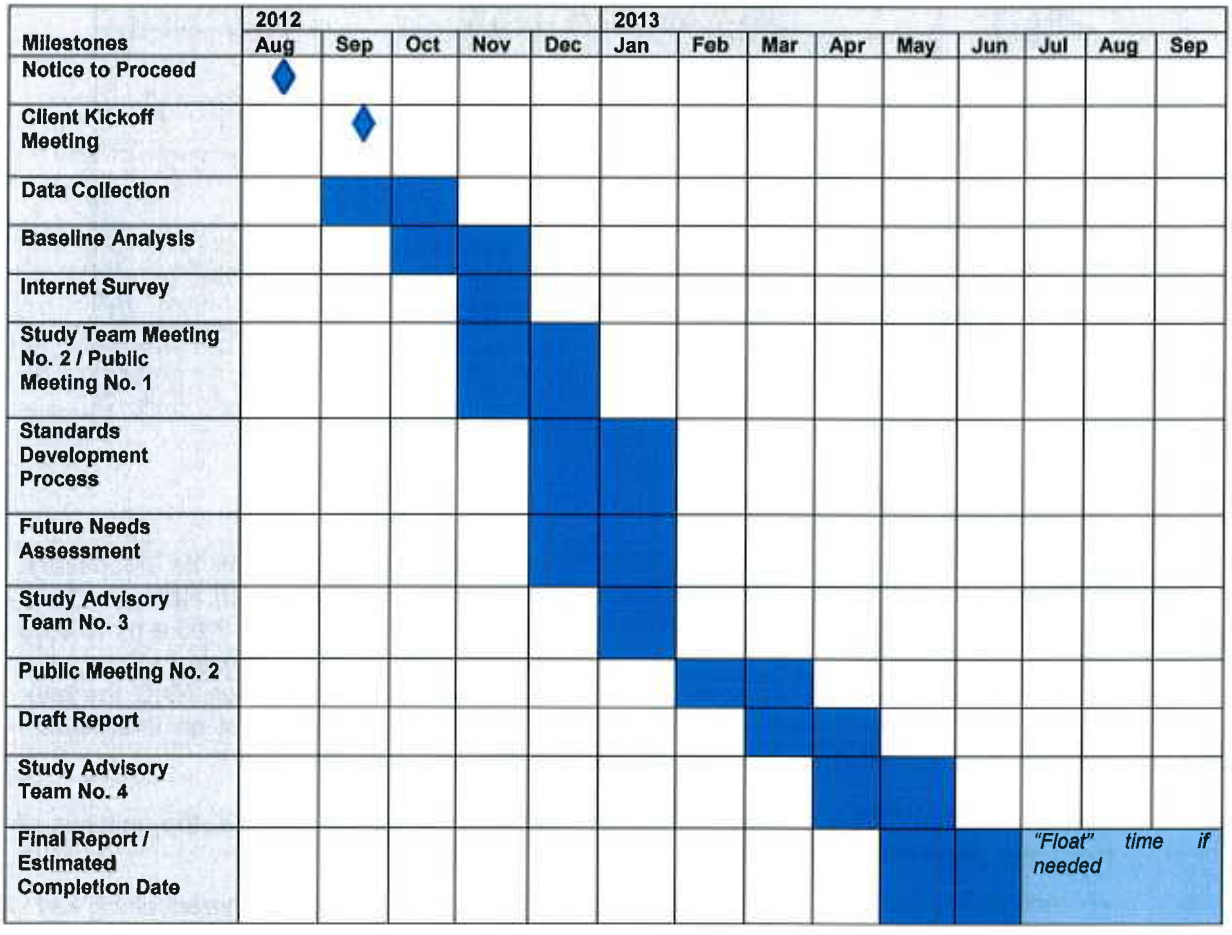


Figure 1 – Study Schedule

D. STUDY AREA

The Study Area includes the urbanized incorporated limits of the City of Aberdeen and a rural area with an approximate 2.5 mile radius of Aberdeen within Brown County. The rural area represents a perimeter growth transition area for Aberdeen and must be considered within long-range planning study needs. The Study Area limits are illustrated in Figure 2.

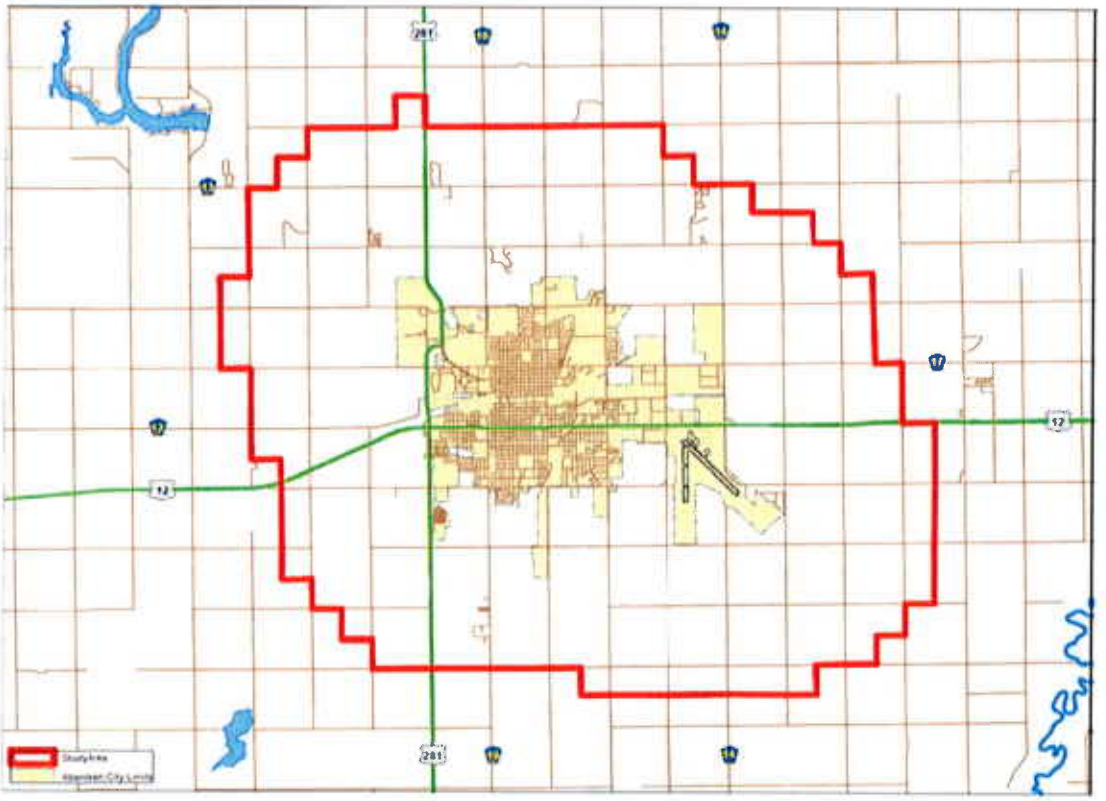


Figure 2 – Study Location

II. ANALYSIS YEARS/PERIODS

Completing intersection traffic counts at fifteen (15) intersections will be necessary. Traffic counts shall occur in September following the start of classes at NSU and local high schools. Traffic counts for each intersection identified will be from 7:00 a.m. to 9:00 a.m. and from 3:00 p.m. to 6:00 p.m. The traffic counts will be completed utilizing the same Miovision cameras being utilized in the Origin-Destination Survey (O-D Survey). The camera records traffic, including pedestrian and bicycle traffic, at an intersection which is then uploaded to Miovision for processing.

Utilizing existing data gathered and the standards development process, the analysis of the future needs can be completed.

- Incorporate changes in forecasted land use to forecast traffic for 20 years along key routes, assuming a base year of 2012 and a forecast year of 2032.

- Establish the future levels of service and operating conditions along key routes and intersections without improvements.
- Identify deficiencies in capacity, geometric, right-of-way, and other transportation elements for key roadway routes for the 20-year timeframe
- Identify roadway, airport, transit, freight, pedestrian, and bicycle transportation needs

III. DATA COLLECTION

Many sources of data are required to establish the current baseline conditions assessment and identify existing issues affecting the transportation system. The data collection effort includes:

- Obtain and review current ordinances and guidelines
- Gather available mapping data from agencies
- Obtain current design standards from agencies
- Obtain existing traffic volumes
- Obtain and inventory existing crash history data
- Obtain and review existing City and County development practices within the County
- Obtain and review existing agencies capital improvement plans for planned roadway improvements
- Inventory Existing Transportation Systems
  - Functionally Classify Existing Roadway Network
  - Identify existing bicycle and pedestrian facilities
  - Identify existing transit systems
  - Identify existing airport capabilities
  - Identify existing freight capabilities
- Complete additional traffic counts at the following intersections (see Figure 3):
  - US Hwy 12 and Melgaard Road
  - US Hwy 12 and Roosevelt Street
  - US Hwy 12 and Lawson Street
  - US Hwy 12 and Dakota Street
  - US Hwy 12 and State Street
  - US Hwy 12 and Main Street
  - US Hwy 12 and 2nd Street
  - US Hwy 12 and 5th Street
  - US Hwy 12 and US Hwy 281
  - Melgaard Road and Roosevelt Street
  - Melgaard Road and 5th Street
  - Melgaard Road and US Hwy 281
  - US Hwy 281 and 5th Avenue NW
  - 5th Avenue NW and 2nd Street North
  - 24th Avenue NE and Dakota Street

While much of this data is expected to be obtained from local government entities, the collection of some data is will occur in the field including intersection turning movement

counts. HR Green will make a site visit to Aberdeen and work with Helms & Associates to complete field data collection activities. Existing traffic counts from 2009 and prior have been obtained from the SDDOT. These counts will be factored up to the base year of 2012 and then analyzed and compared to new counts taken at the same intersections. Several of these existing counts may be valid and able to be utilized for the study. This could allow counts to be taken at intersections other than those identified above. Exact intersections will be coordinated with the Study Advisory Team. The final list will be provided for approval prior to completing the counts. It is estimated that completing intersection traffic counts at fifteen (15) intersections will be necessary. Traffic counts shall occur in September following the start of classes at NSU and local high schools. Traffic counts for each intersection identified will be from 7:00 a.m. to 9:00 a.m. and from 3:00 p.m. to 6:00 p.m. The traffic counts will be completed utilizing the same Miovision cameras being utilized in the Origin-Destination Survey (O-D Survey). The camera records traffic, including pedestrian and bicycle traffic, at an intersection which is then uploaded to Miovision for processing. Figure 3 illustrates the turning movements count and O-D survey locations.

Figure 3 – Turning Movement Count and O-D Survey Locations

The O-D Survey will seek to quantify the percentage of pass-through traffic on the major arterial routes in Aberdeen. HR Green's Miovision camera systems plus additional cameras rented from Miovision will be set-up to capture license plate data, automizing the data collection process.

We will be utilizing fourteen (14) Miovision cameras to capture the required O-D Survey information at five (5) different locations:

- Highway 12 west of town: This camera will be approximately located where the 4-lane divided roadway section converts to a 2-lane section.

- Highway 12 east of town: This location will be at approximately the intersection of Highway 12 and 392nd Avenue or further east if permissible.
- 134th Street (Melgaard Road): Location will be along 134th Street approximately between Melgaard Road and Brown County 12.
- Highway 281 south of town: This location will be at approximately the intersection of Highway 281 and 136th Street.
- Highway 281 north of town: This location will be at approximately where the 4-lane roadway section coverts to a 2-lane section.

Exact locations may vary out in the field depending on available structures to attach the cameras to. Cameras are to be located within 35 feet of the respective survey lane. Rental of tripods is not included.

Internet survey will be used to supplement the results of O-D survey methods identified above. In addition to general travel behavior inventory questions that will be applicable community-wide, internet survey questions will be tailored to obtain specific information relative to travel destinations of survey respondents according to time of day, day of week, and beginning-ending destinations.

IV. TRAVEL OPERATIONS ANALYSIS

HR Green will predominantly use Highway Capacity Software (HCS2010) to complete travel operations analysis. This analysis will maintain compliance with the standard default parameters listed in Chapter 15 of the SDDOT Road Design Manual.

A. VARIABLES TO BE USED

Default values to be used for Highway Capacity Software analysis include:

- Flow Rate = 1,600 vphpl
- Peak Hour Factor = 0.90

V. TRAVEL FORECAST

A regional travel demand model is not available for the Aberdeen area. For this reason, traffic forecasts will be based on trendlines calculated from historical traffic volume data available from the South Dakota DOT. The traffic forecasts will be supplemented by analyzing anticipated growth areas from the City of Aberdeen Future Land Use Map to adjust the 20-year forecast volumes.

VI. SAFETY ISSUES

Crash History data for the most recently available three (3) complete years will be analyzed to identify crash trends at key intersections. Key intersections include those where peak hour traffic counts are being conducted.

VII. SELECTION OF MEASURES OF EFFECTIVENESS (MOE)

The primary measures of effectiveness recorded for key study intersections will include average delay per vehicle and Level-of-Service. Measures of

effectiveness for roadway segments will include arterial Level-of-Service and volume/capacity ratio. The primary mobility goal for the study will be Level-of-Service D.

VIII. DEVIATIONS/JUSTIFICATIONS

There are no known deviations from study standards at this time. If deviations are deemed necessary during the study process, these issues will be documented and presented to the Study Advisory Team.

IX. CONCLUSION

The aforementioned approach to the Aberdeen Master Transportation Plan will accomplish the following goals:

- Complete a list of transportation issues and needs facing the Aberdeen area.
- Develop feasible solutions to address those issues and needs that meet current design standards and/or traffic level of service expectations under both the current and predicted future traffic conditions, while promoting a livable community that will enhance the economic and social well-being of Aberdeen residents.
- Create final products for use by Aberdeen and the SDDOT which will provide guidance to implement recommended improvements and react to future development plans within the area.

Appendix B

Traffic Technical Memoranda

Data Collection and Forecast Technical Memorandum

Origin-Destination Study Technical Memorandum

MEMO

To:	Aberdeen Area Master Transportation Plan Study Advisory Team
From:	Ross Harris, AICP – HR Green Ryan Allers, PE, PTOE, – HR Green
Subject:	Traffic Forecast Memorandum
Date:	September 27, 2013

As part of the Aberdeen Area Master Transportation Plan traffic data was collected to gain an understanding of the existing conditions and determine future conditions. The Study Advisory Team (SAT) provided historical average daily traffic (ADT) volumes dating back to 1998 and up through 2012 for selected roadway segments. HR Green collected turning movement counts at selected intersections determined by the SAT.

Forecast Methodology

For this study only a select portion of roadway segments were analyzed within the City of Aberdeen. The historical ADT volumes were reviewed by roadway segments over the years of available data to check for abnormalities. An abnormality is defined when a roadway segment, with rather consistent volumes, has a year where the volume spikes either high or low and then is followed by more consistent volumes. For this study the spiked year was not included as part of the historical data and was not included in the linear regression analysis. Once these abnormalities were identified and removed, the linear regression trendline equations were calculated using the remaining historical ADT volumes by roadway segment. Using the trendline equation a growth rate was calculated by roadway segment. Some of the roadway segments did not have a minimum of three years of historical ADT information and therefore trendlines could not be calculated. For these roadway segments the average growth rate was used. The average growth rate was determined by averaging the growth rates calculated from each of the trendlines developed for all roadway segments. The average growth rate within the City of Aberdeen for all roadway segments is 2.25 percent.

The calculated growth rates for roadway segments were further refined based on a review of the City's Comprehensive Plan to determine the impacts of the future land use plan and where the development opportunities will most likely occur. The grow rates were adjusted slightly higher in locations where more development is expected to occur and slightly lower in locations already fully developed. The range of growth rates used for this study in the City of Aberdeen is from 0.50 percent to 4.0 percent with the higher growth rates more prevalent in the northeast quadrant of Aberdeen and the lower growth rates more prevalent in the center of Aberdeen.

Existing Analysis

Route Volume to Capacity

As described in the methods and assumptions memorandum the existing year for the purposes of this study is 2012. The most recent year of historical ADT data for a roadway segment was used and if any historical ADT data was not collected in 2012, it was forecasted to 2012 levels. The growth rates determined from the trendline analysis were used and applied to the most recent historical ADT information to forecast 2012 traffic volumes.

The existing (2012 base) ADT volumes for selected roadway segments in the City of Aberdeen are shown in **Figure 1 Existing (2012) Year Traffic Volumes**. Also displayed on the map are planning level volume to capacity ranges for the selected roadway segments. A color coding system is used to display the varying ranges of the volume to capacity ratio by roadway segment. Segments shaded in green are operating below 60 percent planning level capacity, segments shaded in yellow are operating at 60 to 80 percent planning level capacity, segments shaded in orange are operating at 80 to 100 percent planning level capacity and segments shaded in red

are operating above the planning level capacity threshold. As a segment's volume increases and approaches the planning level capacity threshold traffic operations will deteriorate.

The roadway segment planning level capacity is based on criteria set forth in the South Dakota Department of Transportation (SDDOT) Road Design Manual. Shown in **Table 1** below is a summary of the planning level capacity vehicles per day (VPD) based on number of lanes.

Table 1

Number of Lanes	Planning Level Capacity (VPD)
2	8,000
3	16,000
4 (without medians)	24,000
4 (with medians)	33,000
5	30,000

For the existing (2012 base) year US 12 (6th Avenue) has two segments (2nd Street to Dakota Street and Dakota Street to Roosevelt Street) that are in the 80 percent to 100 percent planning level capacity range. For the existing (2012 base) year only one segment (State Street from 10th Avenue South to US 12 (6th Avenue)) was above the planning level capacity threshold (volume to capacity ratio greater than 1).

The segment of State Street that exceeds the planning level capacity is still able to serve the traveling public, however more unstable conditions are occurring including longer queues and delays at intersections and longer travel times through this segment.

Intersection Level of Service

As part of the existing conditions analysis 16 intersections within the city limits of Aberdeen were studied to determine the intersection Level of Service (LOS). The 16 intersections studied are as follows:

1. US 12 (6th Avenue) and Melgaard Road
2. US 12 (6th Avenue) and Roosevelt Street
3. US 12 (6th Avenue) and Lawson Street
4. US 12 (6th Avenue) and Dakota Street
5. US 12 (6th Avenue) and State Street
6. US 12 (6th Avenue) and Main Street
7. US 12 (6th Avenue) and 2nd Street
8. US 12 (6th Avenue) and 5th Street
9. US 12 (6th Avenue) and US 281
10. Melgaard Road and Roosevelt Street
11. Melgaard Road and 5th Street
12. Melgaard Road and US 281
13. 5th Avenue and US 281
14. 5th Avenue and 2nd Street
15. 24th Avenue and Dakota Street
16. US 12 (6th Avenue) and Lamont Street

The turning movement counts were collected over the AM (7am to 9am) and PM (3pm to 6pm) peak periods on September 26th and 27th, 2012 by using Miovision video camera equipment for intersections 1 through 15 listed above. Car, truck and pedestrian count information was collected. The data collection effort for the intersection of US 12 (6th Avenue) and Dakota Street did not capture the southbound right turn movement during the PM peak period as the Miovision camera's view of the intersection was altered. The PM peak period count was supplemented with count data provided by SDDOT from 2009. The 2009 volume had the trendline determined growth rate (2 percent) applied to get the data to 2012 levels. The US 12 (6th Avenue) and Lamont Street intersection (number16 listed above) was added later to the analysis after the initial 15 intersections were counted.

The SDDOT counted the intersection on October 30, 2012 and provided the data for the analysis. The turning movement count data sheets are provided in **Appendix A**.

Using the peak period data, the peak hours for the AM and PM were determined. The peak hour factor and truck percentage information was calculated from the data collected. The intersection configuration and geometry were determined by reviewing internet website aerial mapping. Roadway speed limits and signal phasing were determined by reviewing internet website street views of the intersections. No existing signal timing data was available therefore Synchro was used to determine timing plans for the signalized intersections. All of this data for each intersection was incorporated into and analyzed by using the Highway Capacity Software with the exception of the US 12 (6th Avenue)/Melgaard Road intersection where Synchro was used to determine LOS and delay. For the US 12 (6th Avenue)/Melgaard Road intersection the Highway Capacity Software couldn't analyze the intersection successfully due to the lane configuration and signal phasing on the northbound and southbound legs, therefore Synchro was used instead.

The transportation industry defines the quality of service offered by highway facilitates under specific traffic demands by using a LOS rating. LOS is measured on a scale of A through F, representing the operating conditions of the roadway facility based on speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience measures. LOS A represents traffic that is free flowing on an uncongested roadway while LOS F represents traffic that is creeping or stopped due to a severely congested roadway. **Table 2** displays the general definitions of each LOS and the delay ranges used by the Highway Capacity Manual (HCM) for signalized, two-way stop controlled (TWSC) and all-way stop controlled (AWSC) intersections.

Table 2

Level of Service	Operating Conditions	Delay Range for Signalized Intersections	Delay Range for TWSC/AWSC Intersections
A	Primarily Free Flow Operation/Exceptional Progression/Short Cycle Length	Less than or equal to 10 seconds	Less than or equal to 10 seconds
B	Reasonably Unimpeded Operation/Highly Favorable Progression/ Short Cycle Length	10.1 seconds to 20.0 seconds	10.1 seconds to 15.0 seconds
C	Stable Operation/Favorable Progression/Moderate Cycle Length	20.1 seconds to 35.0 seconds	15.1 seconds to 25.0 seconds
D	Less Stable Operation/Ineffective Progression/Cycle Length is Long	35.1 seconds to 55.0 seconds	25.1 seconds to 35.0 seconds
E	Unstable Operation/ Unfavorable Progression/Long Cycle Lengths	55.1 seconds to 80.0 seconds	35.1 seconds to 50.0 seconds
F	Low Speed/Congestion/Poor Progression/Long Cycle Lengths/Unable to Clear Queues	Greater than 80.1 seconds	Greater than 50.1 seconds

For the purposes of this study LOS D is considered to be the primary mobility goal.

For the existing (2012 base) year the 16 intersections had turning movement counts completed and then analyzed to determine the LOS. See **Figure 2 Existing (2012) Year Level of Service** for the results of all 16 intersections analyzed. Of the 16 intersections analyzed no intersections had operations below the LOS D mobility goal established for this study. The US 12 (6th Avenue)/Roosevelt Street intersection has overall acceptable operations however in the PM peak hour operations of LOS E occur for the westbound traffic. The US 12 (6th Avenue)/State Street intersection has overall acceptable operations however in the PM peak hour operations of LOS E occur for the southbound traffic. All other intersections and their approaches operate at a LOS of D or better. The Highway Capacity Software and Synchro output report sheets are provided in **Appendix B**.

Forecast Analysis

Route Volume to Capacity

The forecast (2032) traffic volumes were determined by taking the existing (2012 base) year ADT volumes and applying the trendline determined growth rate to get the forecast (2032) year volumes. See **Figure 3 Forecast (2032) Year Traffic Volumes**. Also displayed on the map are planning level volume to capacity ranges for the roadway segments for the forecast (2032) year. Of the roadway segments those listed in **Table 3** are in the "above capacity threshold" which means the forecast traffic volume on these segments exceeds the planning level capacity threshold.

Table 3

Roadway	From	To
US 12 (6th Avenue)	2nd Street S	Melgaard Road
8th Avenue N	US 281	5th Street N
5th Street S	Melgaard Road	9th Avenue S
State Street	10th Avenue S	US 12 (6th Avenue)
Dakota Street	US 12 (6th Avenue)	8th Avenue N
Roosevelt Street	8th Avenue N	24th Avenue N
390th Avenue	US 12 (6th Avenue)	8th Avenue N

These roadway segments that have exceeded the planning level capacity threshold will still be able to serve the traveling public, however more unstable conditions will occur including longer queues and delays at intersections and longer travel times through these segments.

2nd Street Focus

A closer look at the 2nd Street forecast traffic volume was requested by the SAT. The trendlines were determined based on the methodology mentioned previously. The historical ADT data ranges from a low of 11,200 ADT to a high of 40,400 ADT along 2nd Street. Based on comments from SDDOT and the City of Aberdeen, any historical data over 16,000 ADT was not accurate. Additional ADT information was collected along this route in 2012 and provided for use in the analysis. Using the existing ADT information that was deemed applicable, a historical linear regression trendline was used to determine the growth rate along 2nd Street. Based on the historical information a growth rate of 2.36% was determined for the 2nd Street segment from 5th Avenue NW to the bridge over the railroad. A growth rate of 2.29% was determined for the 2nd Street segment from the bridge over the railroad to US 12 (6th Avenue). With the historical growth rates determined, adjustments were made to these rates based on the following:

- Surrounding land use as discussed in the Aberdeen Comprehensive Plan
- The surrounding land is already fully developed and is not anticipated as a high growth area
- The overall average traffic growth rate for the city of Aberdeen is at 2.25%, and
- Growth rates for the surrounding roadways to 2nd Street (US 12 (6th Avenue) and 5th Avenue NW)

Based on the items listed, the historical trendline growth rates were reduced from 2.36 % and 2.29% to 2.10% and 2.00% respectively to provide lower growth rates for this already developed area. The existing (2012 base) ADT volumes and the forecast (2032) ADT volumes for 2nd Street are displayed on **Figure 1** and **Figure 3**, respectively.

Intersection Level of Service

In a similar fashion the turning movement counts collected in the fall of 2012 had growth rates applied to get the forecast (2032) turning movement counts. See **Figure 4 Forecast (2032) Year Level of Service** for the results of all 16 intersections analyzed. The growth rates used for the turning movement counts were the same growth rates used for the roadway segments. Where there was an intersection that did not have a segment growth rate for an approach, an average segment growth rate of the other approaches was calculated and used for the approach.

Once the forecast (2032) turning movement count volumes were determined, an operational analysis was completed using the Highway Capacity Software (and Synchro for the US 12 (6th Avenue)/Melgaard Road intersection) to determine the intersection LOS. The only difference between the existing (2012 base) year and the

forecast (2032) year in the operational analysis is the volumes used. Based on the results of the analysis 5 of the 16 intersections studied had overall operations worse than LOS D in one or both of the AM and PM peak hours. Those 5 intersections are as follows:

- US Hwy 12(6th Avenue) and Melgaard Road
- US Hwy 12(6th Avenue) and Roosevelt Street
- US Hwy 12(6th Avenue) and State Street
- Melgaard Road and5th Street
- US Hwy 12(6th Avenue) and Lamont Street

9 of the 16 intersections studied had an approach with operations worse than LOS D in either the AM or PM peak hour. Those 9 intersections are as follows:

- US Hwy 12 (6th Avenue) and Melgaard Road
- US Hwy 12 (6th Avenue) and Roosevelt Street
- US Hwy 12 (6th Avenue) and Dakota Street
- US Hwy 12 (6th Avenue) and State Street
- US Hwy 12 (6th Avenue) and 2nd Street
- US Hwy 12 (6th Avenue) and 5th Street
- Melgaard Road and 5th Street
- Melgaard Road and US 281
- US Hwy 12 (6th Avenue) and Lamont Street

All other intersections studied had an approach and overall intersection operations with a LOS of D or better. The Highway Capacity Software and Synchro output report sheets are provided in **Appendix B**.

The likely causes of some operational issues at these 9 intersections are related to the high amount of turning vehicles at some intersections, the intersection signal phasing, the intersection traffic control, and the intersection lane configuration. The intersections of US 12/Roosevelt Street and US 12/State Street are shown to have some operational issues for the existing (2012 base) year and the operations are expected to worsen in the future.

Summary

A summary figure has been included to compare the existing (2012) year and forecast (2032) year ADT for the roadway segments. See **Figure 5 Existing (2012) and Forecast (2032) Year Traffic Volumes**.

Overall the traffic forecast indicates Aberdeen will experience higher traffic volumes which lead to deteriorating traffic operations and routes reaching or exceeding planning level capacity thresholds. Improvements are required to address future forecast (2032) year conditions and the few existing (2012 base) year conditions.

Aberdeen
MASTER TRANSPORTATION PLAN

Figure 1

Existing (2012) Year Traffic Volumes

Legend

Volume to Capacity Ratio

- Above Capacity Threshold (1.0+)
- Between 80% and 100% of Capacity (0.8 - 1.0)
- Between 60% and 80% of Capacity (0.6 - 0.8)
- Below 60% of Capacity (0.0 - 0.6)
- City Limits
- Block Line
- Easement
- Lot Line

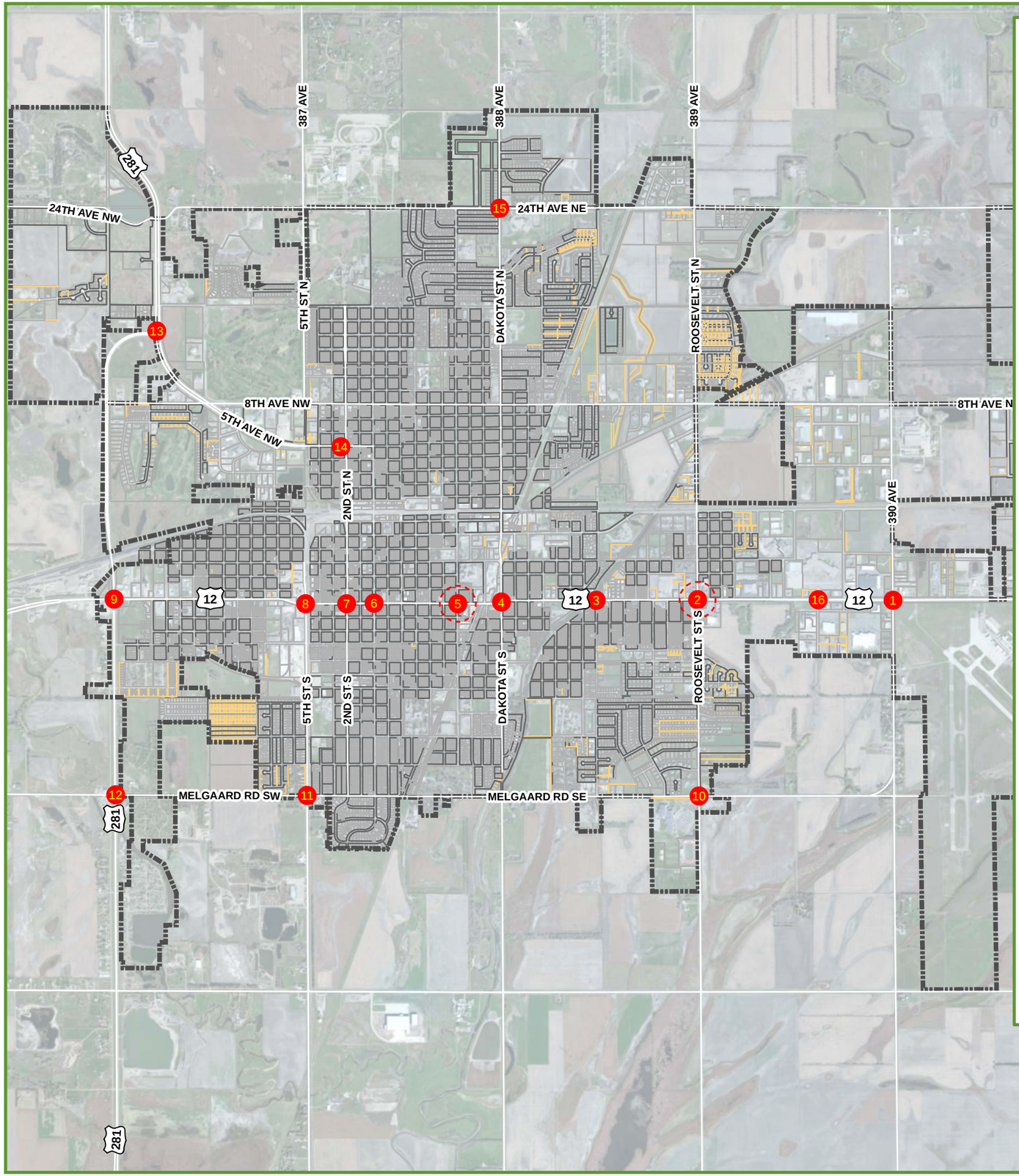
XX,XXX Average Daily Traffic (ADT)

N
W E
S

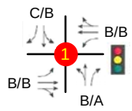
0 1,400 2,800 Feet

1 inch = 2,800 feet

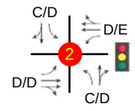
HRGreen



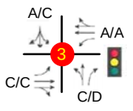
US HWY 12 & Melgaard Road
LOS: B/B



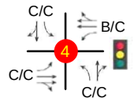
US HWY 12 & Roosevelt St (CR 12S)
LOS: D/D



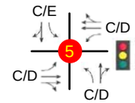
US HWY 12 & Lawson St
LOS: B/B



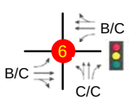
US HWY 12 & Dakota St
LOS: C/C



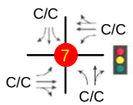
US HWY 12 & State St
LOS: C/D



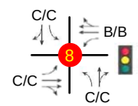
US HWY 12 & Main St
LOS: C/C



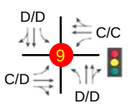
US HWY 12 & 2nd St
LOS: C/C



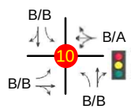
US HWY 12 & 5th St
LOS: C/C



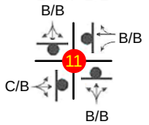
US HWY 12 & US HWY 281
LOS: C/C



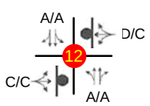
Melgaard Rd & Roosevelt St (CR 12S)
LOS: B/B



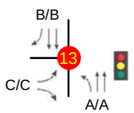
Melgaard Rd & 5th St
LOS: B/B



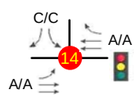
Melgaard Rd & US HWY 281
LOS: NA/NA



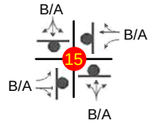
US HWY 281 & 5th Ave
LOS: B/B



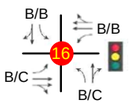
5th Ave & 2nd St
LOS: B/A



24th Ave & Dakota St
LOS: B/A



US HWY 12 & Lamont St
LOS: B/C



Legend

- Traffic Signal
- Stop Sign
- X/X — Existing AM/PM Level of Service

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MASTER TRANSPORTATION PLAN

Figure 2

Existing (2012) Year Level of Service

Legend

- Intersection
- High Traffic Intersection
- City Limits
- Block Line
- Easement
- Lot Line

N
W E
S

0 1,500 3,000 Feet

1 inch = 3,000 feet

HRGreen

Aberdeen
MASTER TRANSPORTATION PLAN

Figure 3

Forecast (2032) Year Traffic Volumes

Legend

Volume to Capacity Ratio

- Above Capacity Threshold (1.0+)
- Between 80% and 100% of Capacity (0.8 - 1.0)
- Between 60% and 80% of Capacity (0.6 - 0.8)
- Below 60% of Capacity (0.0 - 0.6)
- City Limits
- Block Line
- Easement
- Lot Line

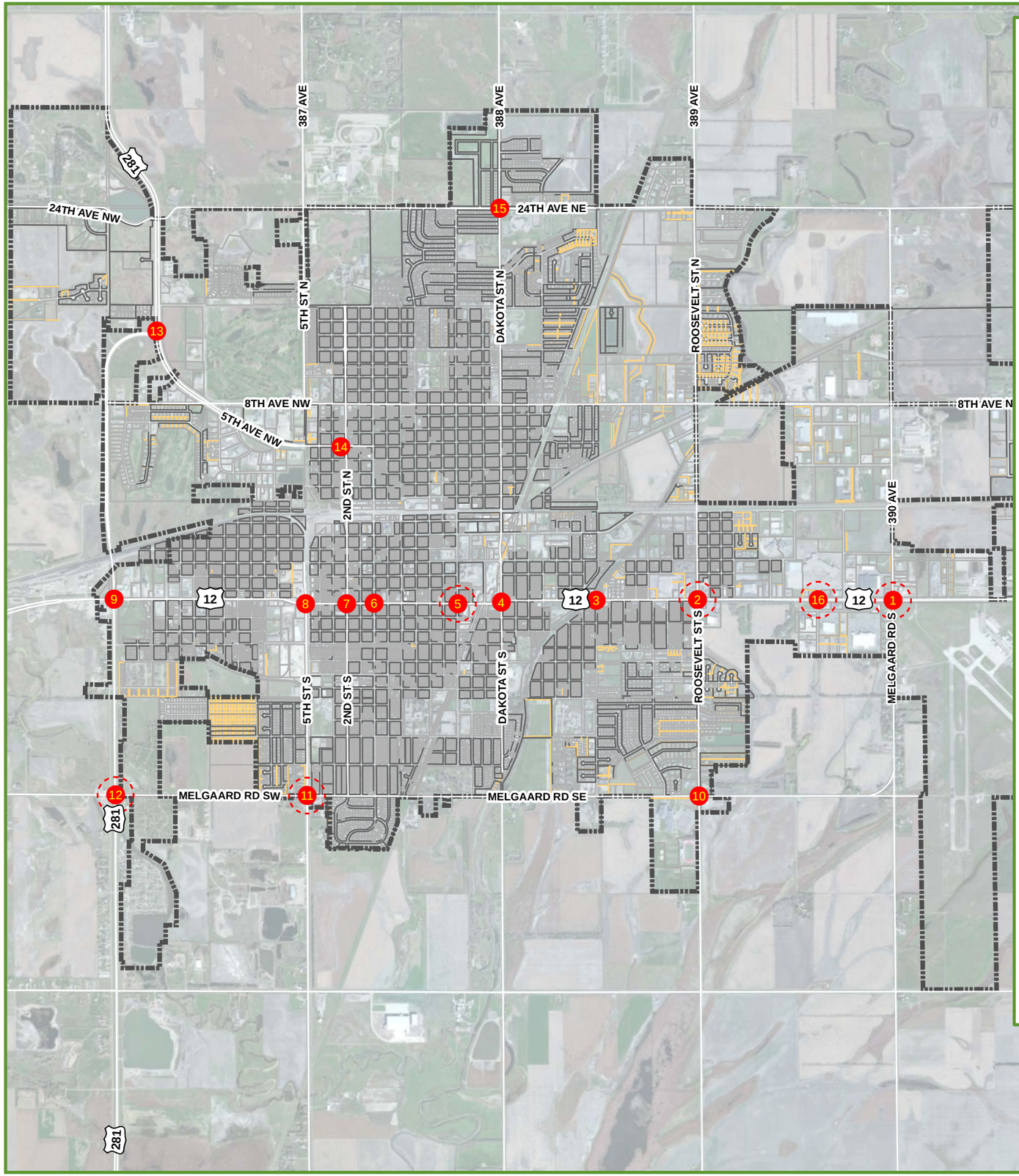
XX,XXX Average Daily Traffic (ADT)

N
W E
S

0 1,400 2,800
Feet

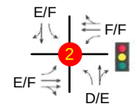
1 inch = 2,800 feet

HRGreen

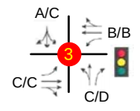


US HWY 12 & Melgaard Road
LOS: D/E

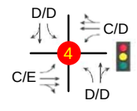
US HWY 12 & Roosevelt St (CR 12S)
LOS: E/F



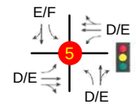
US HWY 12 & Lawson St
LOS: C/C



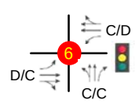
US HWY 12 & Dakota St
LOS: C/D



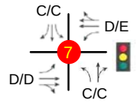
US HWY 12 & State St
LOS: D/E



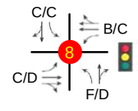
US HWY 12 & Main St
LOS: C/D



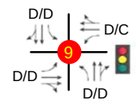
US HWY 12 & 2nd St
LOS: D/D



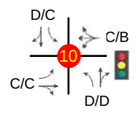
US HWY 12 & 5th St
LOS: D/C



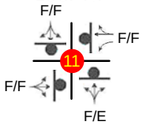
US HWY 12 & US HWY 281
LOS: D/D



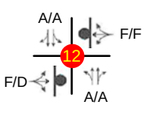
Melgaard Rd & Roosevelt St (CR 12S)
LOS: D/C



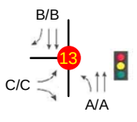
Melgaard Rd & 5th St
LOS: F/F



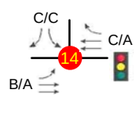
Melgaard Rd & US HWY 281
LOS: NA/NA



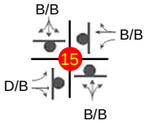
US HWY 281 & 5th Ave
LOS: B/B



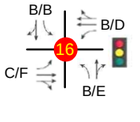
5th Ave & 2nd St
LOS: C/B



24th Ave & Dakota St
LOS: C/B



US HWY 12 & Lamont St
LOS: B/F



Legend

- Traffic Signal
- Stop Sign
- X/X — Existing AM/PM Level of Service

Aberdeen
MASTER TRANSPORTATION PLAN

Figure 4

Forecast (2032) Year Level of Service

Legend

- Intersection
- High Traffic Intersection
- City Limits
- Block Line
- Easement
- Lot Line

N
W E
S

0 1,500 3,000 Feet

1 inch = 3,000 feet

HRGreen

Aberdeen
MASTER TRANSPORTATION PLAN

Figure 5
Existing (2012) and Forecast (2032) Year Traffic Volumes

Legend

- City Limits
- Block Line
- Easement
- Lot Line

XX,XXX Existing Average Daily Traffic (ADT) - 2012
(XX,XXX) Forecast Average Daily Traffic (ADT) - 2032

N
W E
S

0 1,400 2,800 Feet

1 inch = 2,800 feet

HRGreen

APPENDIX A – Turning Movement Counts

APPENDIX B – Highway Capacity Software and Synchro Output Reports

Existing (2012) Year
Future (2032) Year

Location # 1 - US 12 (6th Avenue) and Melgaard Road

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	**Melgaard Road**					**US 12 (6th Avenue)**					**Melgaard Road**					**US 12 (6th Avenue)**				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	16	12	8	0	0	6	37	9	0	0	1	7	15	0	0	13	39	2	0	0
7:15 AM	11	4	1	0	0	15	52	22	0	0	4	18	23	0	0	9	54	1	0	0
7:30 AM	33	8	1	0	0	20	78	18	0	0	6	12	32	0	0	24	90	1	0	0
7:45 AM	40	29	4	0	0	35	100	25	0	0	1	27	28	0	0	23	108	4	0	0
8:00 AM	22	13	30	0	0	19	59	18	0	0	8	15	23	0	0	9	75	3	0	0
8:15 AM	17	8	7	0	0	13	79	14	0	0	6	9	5	0	0	9	49	1	0	0
8:30 AM	17	9	12	0	0	12	69	11	0	0	2	10	8	0	0	13	58	1	0	0
8:45 AM	20	5	3	0	0	9	56	21	0	0	1	6	14	0	0	9	45	0	0	0
3:00 PM	14	35	12	0	0	13	56	7	0	0	6	10	19	0	0	16	65	5	0	0
3:15 PM	19	25	18	0	0	9	55	16	0	0	7	13	16	0	0	12	69	5	0	0
3:30 PM	18	35	29	0	0	15	67	17	0	0	6	29	28	0	0	16	80	7	0	0
3:45 PM	21	18	10	0	0	8	59	17	0	0	9	27	14	0	0	23	77	5	0	0
4:00 PM	27	38	51	0	0	20	76	14	0	0	7	13	13	0	0	19	61	6	0	0
4:15 PM	18	51	23	0	0	11	66	15	0	0	8	17	15	0	0	14	75	7	0	0
4:30 PM	39	55	72	0	0	26	91	24	0	0	9	15	10	0	0	13	66	7	0	0
4:45 PM	20	28	24	0	0	20	83	28	0	0	6	19	13	0	0	9	65	6	0	0
5:00 PM	32	36	19	0	0	24	88	25	0	0	4	19	16	0	0	14	65	8	0	0
5:15 PM	24	29	19	0	0	29	72	21	0	0	12	14	18	0	0	5	73	9	0	0
5:30 PM	19	28	13	0	0	25	86	20	0	0	9	12	17	0	0	22	68	3	0	0
5:45 PM	15	13	11	0	0	22	61	22	0	0	4	12	26	0	0	10	48	7	0	0

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	**Melgaard Road**					**US 12 (6th Avenue)**					**Melgaard Road**					**US 12 (6th Avenue)**				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	0	0	0	0	1	5	0	0	0	0	0	0	0	0	0	5	1	0	0
7:15 AM	1	0	0	0	0	0	4	0	0	0	1	0	3	0	0	0	4	1	0	0
7:30 AM	3	0	1	0	0	6	4	1	0	0	0	0	1	0	0	1	5	0	0	0
7:45 AM	0	1	0	0	0	3	2	0	0	0	1	0	2	0	0	0	3	0	0	0
8:00 AM	2	1	0	0	0	1	6	3	0	0	1	1	1	0	0	2	1	0	0	0
8:15 AM	1	0	0	0	0	2	5	2	0	0	0	1	0	0	0	0	4	0	0	0
8:30 AM	1	0	1	0	0	1	7	1	0	0	0	1	3	0	0	1	5	0	0	0
8:45 AM	4	2	1	0	0	2	6	1	0	0	0	0	3	0	0	0	9	0	0	0
3:00 PM	3	3	0	0	0	1	6	0	0	0	0	1	2	0	0	2	10	0	0	0
3:15 PM	4	0	1	0	0	2	3	0	0	0	0	1	2	0	0	0	4	0	0	0
3:30 PM	3	1	0	0	0	0	1	0	0	0	0	0	3	0	0	1	8	0	0	0
3:45 PM	3	3	0	0	0	1	2	1	0	0	0	1	2	0	0	0	10	0	0	0
4:00 PM	2	1	1	0	0	1	9	4	0	0	0	1	4	0	0	0	0	1	0	0
4:15 PM	1	1	1	0	0	3	4	2	0	0	0	1	0	0	0	0	4	0	0	0
4:30 PM	2	1	0	0	0	2	6	3	0	0	0	2	3	0	0	0	3	0	0	0
4:45 PM	0	2	2	0	0	2	5	1	0	0	0	0	2	0	0	0	6	0	0	0
5:00 PM	2	0	0	0	0	0	3	1	0	0	0	1	1	0	0	0	2	0	0	0
5:15 PM	1	0	0	0	0	1	4	0	0	0	0	2	0	0	0	0	10	0	0	0
5:30 PM	3	1	1	0	0	0	8	1	0	0	0	0	1	0	0	0	8	0	0	0
5:45 PM	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	4	0	0	0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	**Melgaard Road**					**US 12 (6th Avenue)**					**Melgaard Road**					**US 12 (6th Avenue)**				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	16	12	8	0	0	7	42	9	0	0	1	7	15	0	0	13	44	3	0	0
7:15 AM	12	4	1	0	0	15	56	22	0	0	5	18	26	0	0	9	58	2	0	0
7:30 AM	36	8	2	0	0	26	82	19	0	0	6	12	33	0	0	25	95	1	0	0
7:45 AM	40	30	4	0	0	38	102	25	0	0	2	27	30	0	0	23	111	4	0	0
8:00 AM	24	14	30	0	0	20	65	21	0	0	9	16	24	0	0	11	76	3	0	0
8:15 AM	18	8	7	0	0	15	84	16	0	0	6	10	5	0	0	9	53	1	0	0
Peak Hour Total	**118**	**60**	**43**	**0**	**0**	**99**	**333**	**81**	**0**	**0**	**23**	**65**	**92**	**0**	**0**	**68**	**335**	**9**	**0**	**0**
Peak Hour Factor	**0.74**	**0.50**	**0.36**	**0.00**	**NA**	**0.65**	**0.82**	**0.81**	**0.00**	**NA**	**0.64**	**0.60**	**0.70**	**0.00**	**NA**	**0.68**	**0.75**	**0.56**	**0.00**	**NA**
Truck %	**5%**	**3%**	**2%**	**0%**	**NA**	**12%**	**5%**	**7%**	**0%**	**NA**	**9%**	**3%**	**4%**	**0%**	**NA**	**4%**	**4%**	**0%**	**0%**	**NA**
8:30 AM	18	9	13	0	0	13	76	12	0	0	2	11	11	0	0	14	63	1	0	0
8:45 AM	24	7	4	0	0	11	62	22	0	0	1	6	17	0	0	9	54	0	0	0
3:00 PM	17	38	12	0	0	14	62	7	0	0	6	11	21	0	0	18	75	5	0	0
3:15 PM	23	25	19	0	0	11	58	16	0	0	7	14	18	0	0	12	73	5	0	0
3:30 PM	21	36	29	0	0	15	68	17	0	0	6	29	31	0	0	17	88	7	0	0
3:45 PM	24	21	10	0	0	9	61	18	0	0	9	28	16	0	0	23	87	5	0	0
4:00 PM	29	39	52	0	0	21	85	18	0	0	7	14	17	0	0	19	61	7	0	0
4:15 PM	19	52	24	0	0	14	70	17	0	0	8	18	15	0	0	14	79	7	0	0
4:30 PM	41	56	72	0	0	28	97	27	0	0	9	17	13	0	0	13	69	7	0	0
4:45 PM	20	30	26	0	0	22	88	29	0	0	6	19	15	0	0	9	71	6	0	0
Peak Hour Total	**109**	**177**	**174**	**0**	**0**	**85**	**340**	**91**	**0**	**0**	**30**	**68**	**60**	**0**	**0**	**55**	**280**	**27**	**0**	**0**
Peak Hour Factor	**0.66**	**0.79**	**0.60**	**0.00**	**NA**	**0.76**	**0.88**	**0.78**	**0.00**	**NA**	**0.83**	**0.89**	**0.88**	**0.00**	**NA**	**0.72**	**0.89**	**0.96**	**0.00**	**NA**
Truck %	**5%**	**3%**	**2%**	**0%**	**NA**	**9%**	**7%**	**11%**	**0%**	**NA**	**0%**	**6%**	**15%**	**0%**	**NA**	**0%**	**5%**	**4%**	**0%**	**NA**
5:00 PM	34	36	19	0	0	24	91	26	0	0	4	20	17	0	0	14	67	8	0	0
5:15 PM	25	29	19	0	0	30	76	21	0	0	12	16	18	0	0	5	83	9	0	0
5:30 PM	22	29	14	0	0	25	94	21	0	0	9	12	18	0	0	22	76	3	0	0
5:45 PM	15	13	12	0	0	22	64	22	0	0	4	12	26	0	0	10	52	7	0	0

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Location # 2 - US 12 (6th Avenue) and Roosevelt Street

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Roosevelt Street					US 12 (6th Avenue)					Roosevelt Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	8	19	15	0	0	3	51	8	0	0	13	24	11	0	0	16	63	8	0	0
7:15 AM	15	49	16	0	0	3	57	5	0	1	14	47	10	0	1	30	77	14	0	0
7:30 AM	23	109	24	0	0	9	84	7	0	0	32	52	36	0	1	29	133	22	0	0
7:45 AM	15	123	25	0	1	9	117	12	0	1	30	64	21	0	1	40	170	25	0	1
8:00 AM	13	30	18	0	1	8	107	7	0	1	22	41	18	0	1	26	108	13	0	0
8:15 AM	19	16	17	0	0	9	102	8	0	0	13	15	19	0	0	9	95	10	0	0
8:30 AM	17	12	25	0	0	3	110	13	0	0	11	12	13	0	0	19	97	9	0	0
8:45 AM	13	14	20	0	1	9	109	10	0	0	6	20	15	0	0	19	98	6	0	0
3:00 PM	25	40	37	0	0	14	141	14	0	0	10	17	13	0	1	19	133	13	0	0
3:15 PM	28	50	32	0	0	16	134	21	0	0	37	58	18	0	0	28	142	15	0	2
3:30 PM	33	43	30	0	0	22	158	20	0	0	53	105	25	0	0	26	177	13	0	0
3:45 PM	35	47	32	0	0	18	142	18	0	4	26	32	18	0	3	28	147	10	0	1
4:00 PM	38	52	35	0	0	20	188	24	0	1	13	34	27	0	1	25	152	8	0	0
4:15 PM	34	47	38	0	1	17	178	17	0	0	9	36	14	1	0	21	164	18	0	0
4:30 PM	32	63	37	0	2	29	212	22	0	1	16	21	7	0	0	22	139	20	0	0
4:45 PM	31	67	40	0	2	20	194	24	0	0	18	27	21	0	2	31	135	16	0	0
5:00 PM	30	91	51	0	1	35	182	29	0	0	26	48	19	0	0	30	130	13	0	0
5:15 PM	47	85	32	0	0	29	169	27	0	1	21	48	25	0	2	20	177	30	0	0
5:30 PM	38	71	26	0	0	34	185	21	0	0	51	73	34	0	0	23	150	20	0	0
5:45 PM	41	52	34	0	0	24	160	21	0	0	20	39	32	0	0	24	122	30	0	0

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Roosevelt Street					US 12 (6th Avenue)					Roosevelt Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	3	0	0	0
7:15 AM	0	2	0	0	0	1	4	0	0	0	0	0	0	0	0	0	4	0	0	0
7:30 AM	0	0	0	0	0	0	7	0	0	0	1	0	1	0	0	0	6	0	0	0
7:45 AM	0	1	0	0	0	1	6	0	0	0	1	2	0	0	0	0	3	0	0	0
8:00 AM	0	1	0	0	0	0	7	0	0	0	1	1	0	0	0	0	6	1	0	0
8:15 AM	0	1	1	0	0	0	4	1	0	0	0	4	0	0	0	0	9	1	0	0
8:30 AM	0	4	2	0	0	1	9	0	0	0	0	1	1	0	0	0	8	1	0	0
8:45 AM	0	4	1	0	0	1	8	0	0	0	0	3	0	0	0	2	9	0	0	0
3:00 PM	1	2	0	0	0	0	5	0	0	0	0	2	0	0	0	0	6	0	0	0
3:15 PM	0	2	0	0	0	0	4	1	0	0	0	1	0	0	0	3	4	0	0	0
3:30 PM	1	4	1	0	0	0	5	0	0	0	1	3	0	0	0	1	9	0	0	0
3:45 PM	0	2	2	0	0	0	2	0	0	0	0	2	0	0	0	0	3	1	0	0
4:00 PM	0	3	0	0	0	0	8	1	0	0	0	1	0	0	0	0	2	0	0	0
4:15 PM	0	2	0	0	0	0	5	0	0	0	1	3	0	0	0	2	4	0	0	0
4:30 PM	3	3	1	0	0	0	5	1	0	0	1	5	0	0	0	1	2	0	0	0
4:45 PM	1	1	0	0	0	0	6	1	0	0	0	0	0	0	0	1	6	0	0	0
5:00 PM	0	0	1	0	0	0	3	0	0	0	0	2	0	0	0	0	2	0	0	0
5:15 PM	2	0	0	0	0	0	6	0	0	0	0	2	1	0	0	0	7	0	0	0
5:30 PM	0	0	0	0	0	1	8	0	0	0	0	1	0	0	0	0	7	0	0	0
5:45 PM	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	4	0	0	0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Roosevelt Street					US 12 (6th Avenue)					Roosevelt Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	8	19	15	0	0	3	56	8	0	0	13	24	11	0	0	16	66	8	0	0
7:15 AM	15	51	16	0	0	4	61	5	0	1	14	47	10	0	1	30	81	14	0	0
7:30 AM	23	109	24	0	0	9	91	7	0	0	33	52	37	0	1	29	139	22	0	0
7:45 AM	15	124	25	0	1	10	123	12	0	1	31	66	21	0	1	40	173	25	0	1
8:00 AM	13	31	18	0	1	8	114	7	0	1	23	42	18	0	1	26	114	14	0	0
8:15 AM	19	17	18	0	0	9	106	9	0	0	13	19	19	0	0	9	104	11	0	0
Peak Hour Total	**70**	**281**	**85**	**0**	**2**	**36**	**434**	**35**	**0**	**2**	**100**	**179**	**95**	**0**	**3**	**104**	**530**	**72**	**0**	**1**
Peak Hour Factor	**0.76**	**0.57**	**0.85**	**0.00**	**NA**	**0.90**	**0.88**	**0.73**	**0.00**	**NA**	**0.76**	**0.68**	**0.64**	**0.00**	**NA**	**0.65**	**0.77**	**0.72**	**0.00**	**NA**
Truck %	**0%**	**1%**	**1%**	**0%**	**NA**	**3%**	**6%**	**3%**	**0%**	**NA**	**3%**	**4%**	**1%**	**0%**	**NA**	**0%**	**5%**	**3%**	**0%**	**NA**
8:30 AM	17	16	27	0	0	4	119	13	0	0	11	13	14	0	0	19	105	10	0	0
8:45 AM	13	18	21	0	1	10	117	10	0	0	6	23	15	0	0	21	107	6	0	0
3:00 PM	26	42	37	0	0	14	146	14	0	0	10	19	13	0	1	19	139	13	0	0
3:15 PM	28	52	32	0	0	16	138	22	0	0	37	59	18	0	0	31	146	15	0	2
3:30 PM	34	47	31	0	0	22	163	20	0	0	54	108	25	0	0	27	186	13	0	0
3:45 PM	35	49	34	0	0	18	144	18	0	4	26	34	18	0	3	28	150	11	0	1
4:00 PM	38	55	35	0	0	20	196	25	0	1	13	35	27	0	1	25	154	8	0	0
4:15 PM	34	49	38	0	1	17	183	17	0	0	10	39	14	1	0	23	168	18	0	0
4:30 PM	35	66	38	0	2	29	217	23	0	1	17	26	7	0	0	23	141	20	0	0
4:45 PM	32	68	40	0	2	20	200	25	0	0	18	27	21	0	2	32	141	16	0	0
Peak Hour Total	**139**	**238**	**151**	**0**	**5**	**86**	**796**	**90**	**0**	**2**	**58**	**127**	**69**	**1**	**3**	**103**	**604**	**62**	**0**	**0**
Peak Hour Factor	**0.76**	**0.87**	**0.72**	**0.00**	**NA**	**0.85**	**0.94**	**0.88**	**0.00**	**NA**	**0.57**	**0.68**	**0.74**	**0.00**	**NA**	**0.82**	**0.83**	**0.66**	**0.00**	**NA**
Truck %	**2%**	**0%**	**1%**	**0%**	**NA**	**1%**	**3%**	**1%**	**0%**	**NA**	**0%**	**2%**	**1%**	**0%**	**NA**	**1%**	**4%**	**0%**	**0%**	**NA**
5:00 PM	30	91	52	0	1	35	185	29	0	0	26	50	19	0	0	30	132	13	0	0
5:15 PM	49	85	32	0	0	29	175	27	0	1	21	50	26	0	2	20	184	30	0	0
5:30 PM	38	71	26	0	0	35	193	21	0	0	51	74	34	0	0	23	157	20	0	0
5:45 PM	41	52	34	0	0	24	165	21	0	0	20	39	32	0	0	24	126	30	0	0

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Location # 3 - US 12 (6th Avenue) and Lawson Street

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Lawson Street					US 12 (6th Avenue)					Lawson Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	0	0	0	0	7	63	0	0	0	16	0	21	0	0	0	80	4	0	0
7:15 AM	0	0	0	0	2	4	98	0	1	1	36	0	20	0	0	0	128	13	0	0
7:30 AM	0	0	0	0	0	19	129	0	1	0	55	0	47	0	0	0	179	16	0	0
7:45 AM	0	0	0	0	1	9	164	0	2	0	52	0	46	0	0	0	243	17	0	0
8:00 AM	0	0	0	0	0	8	126	0	0	0	25	0	17	0	0	0	154	12	0	0
8:15 AM	0	0	0	0	0	15	138	0	0	0	25	0	17	0	0	0	127	7	0	0
8:30 AM	0	0	0	0	0	14	129	0	0	0	19	0	22	0	0	0	125	5	0	0
8:45 AM	0	0	0	0	0	17	154	0	0	0	18	0	18	0	0	0	125	8	0	0
3:00 PM	1	0	3	0	1	21	187	0	0	3	32	0	22	0	0	1	185	16	0	1
3:15 PM	1	0	1	0	2	17	198	0	0	1	29	0	34	0	0	1	204	23	0	2
3:30 PM	0	0	3	0	6	24	245	0	0	6	32	0	29	0	0	0	214	22	0	0
3:45 PM	1	1	1	0	6	18	190	0	0	10	21	0	22	0	0	1	209	26	0	0
4:00 PM	1	1	2	0	4	34	202	0	0	6	26	0	23	0	0	1	201	21	0	0
4:15 PM	0	0	1	0	3	20	199	0	0	4	38	0	31	0	0	0	204	30	0	0
4:30 PM	0	0	0	0	1	30	248	0	0	0	15	0	23	0	0	1	204	22	0	0
4:45 PM	1	0	2	0	2	27	249	0	0	0	27	0	28	0	0	1	192	27	0	0
5:00 PM	1	0	0	0	2	38	252	0	0	0	27	0	29	0	0	1	194	41	0	0
5:15 PM	0	0	1	0	1	25	202	0	0	1	39	1	25	0	0	2	246	19	0	0
5:30 PM	0	0	0	0	1	36	214	1	0	0	37	1	13	0	0	1	207	18	0	1
5:45 PM	1	2	3	0	1	29	217	0	0	0	38	0	30	0	0	0	176	27	0	1

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Lawson Street					US 12 (6th Avenue)					Lawson Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	5	0	0	0
7:15 AM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	1	0	0
7:30 AM	0	0	0	0	0	1	8	0	0	0	0	0	1	0	0	0	6	1	0	0
7:45 AM	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	5	0	0	0
8:00 AM	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	6	0	0	0
8:15 AM	0	0	0	0	0	0	4	0	0	0	1	0	2	0	0	0	13	0	0	0
8:30 AM	0	0	0	0	0	1	11	0	0	0	1	0	0	0	0	0	10	1	0	0
8:45 AM	0	0	0	0	0	1	9	0	0	0	0	0	0	0	0	0	7	3	0	0
3:00 PM	0	0	0	0	0	0	5	0	0	0	1	0	0	0	0	0	4	0	0	0
3:15 PM	0	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	10	0	0	0
3:30 PM	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	9	1	0	0
3:45 PM	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	4	0	0	0
4:00 PM	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	4	0	0	0
4:15 PM	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	4	0	0	0
4:30 PM	0	0	0	0	0	0	6	0	0	0	0	0	1	0	0	0	4	0	0	0
4:45 PM	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	6	1	0	0
5:00 PM	0	0	0	0	0	0	3	0	0	0	1	0	0	0	0	0	3	0	0	0
5:15 PM	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	7	0	0	0
5:30 PM	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	6	0	0	0
5:45 PM	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	3	0	0	0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Lawson Street					US 12 (6th Avenue)					Lawson Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	0	0	0	0	7	72	0	0	0	16	0	21	0	0	0	85	4	0	0
7:15 AM	0	0	0	0	2	4	101	0	1	1	36	0	20	0	0	0	131	14	0	0
7:30 AM	0	0	0	0	0	20	137	0	1	0	55	0	48	0	0	0	185	17	0	0
7:45 AM	0	0	0	0	1	9	172	0	2	0	52	0	46	0	0	0	248	17	0	0
8:00 AM	0	0	0	0	0	8	134	0	0	0	25	0	17	0	0	0	160	12	0	0
8:15 AM	0	0	0	0	0	15	142	0	0	0	26	0	19	0	0	0	140	7	0	0
Peak Hour Total	**0**	**0**	**0**	**0**	**1**	**52**	**585**	**0**	**3**	**0**	**158**	**0**	**130**	**0**	**0**	**0**	**733**	**53**	**0**	**0**
Peak Hour Factor	**0.00**	**0.00**	**0.00**	**0.00**	**NA**	**0.65**	**0.85**	**0.00**	**0.38**	**NA**	**0.72**	**0.00**	**0.68**	**0.00**	**NA**	**0.00**	**0.74**	**0.78**	**0.00**	**NA**
Truck %	**0%**	**0%**	**0%**	**0%**	**NA**	**2%**	**5%**	**0%**	**0%**	**NA**	**1%**	**0%**	**2%**	**0%**	**NA**	**0%**	**4%**	**2%**	**0%**	**NA**
8:30 AM	0	0	0	0	0	15	140	0	0	0	20	0	22	0	0	0	135	6	0	0
8:45 AM	0	0	0	0	0	18	163	0	0	0	18	0	18	0	0	0	132	11	0	0
3:00 PM	1	0	3	0	1	21	192	0	0	3	33	0	22	0	0	1	189	16	0	1
3:15 PM	1	0	1	0	2	17	201	0	0	1	29	0	35	0	0	1	214	23	0	2
3:30 PM	0	0	3	0	6	24	251	0	0	6	32	0	29	0	0	0	223	23	0	0
3:45 PM	1	1	1	0	6	18	195	0	0	10	21	0	22	0	0	1	213	26	0	0
4:00 PM	1	1	2	0	4	34	209	0	0	6	26	0	23	0	0	1	205	21	0	0
4:15 PM	0	0	1	0	3	20	205	0	0	4	38	0	31	0	0	0	208	30	0	0
4:30 PM	0	0	0	0	1	30	254	0	0	0	15	0	24	0	0	1	208	22	0	0
4:45 PM	1	0	2	0	2	27	256	0	0	0	27	0	28	0	0	1	198	28	0	0
5:00 PM	1	0	0	0	2	38	255	0	0	0	28	0	29	0	0	1	197	41	0	0
5:15 PM	0	0	1	0	1	25	210	0	0	1	39	1	25	0	0	2	253	19	0	0
Peak Hour Total	**2**	**0**	**3**	**0**	**6**	**120**	**975**	**0**	**0**	**1**	**109**	**1**	**106**	**0**	**0**	**5**	**856**	**110**	**0**	**0**
Peak Hour Factor	**0.50**	**0.00**	**0.38**	**0.00**	**NA**	**0.79**	**0.95**	**0.00**	**0.00**	**NA**	**0.70**	**0.25**	**0.91**	**0.00**	**NA**	**0.62**	**0.85**	**0.67**	**0.00**	**NA**
Truck %	**0%**	**0%**	**0%**	**0%**	**NA**	**0%**	**2%**	**0%**	**0%**	**NA**	**1%**	**0%**	**1%**	**0%**	**NA**	**0%**	**2%**	**1%**	**0%**	**NA**
5:30 PM	0	0	0	0	1	36	221	1	0	0	37	1	13	0	0	1	213	18	0	1
5:45 PM	1	2	3	0	1	29	221	0	0	0	38	0	30	0	0	0	179	27	0	1

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Location #4 - US 12 (6th Avenue) and Dakota Street

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Dakota Street					US 12 (6th Avenue)					Dakota Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	8	11	11	0	1	1	74	12	0	1	5	8	5	0	0	8	79	4	0	0
7:15 AM	17	17	14	0	1	5	113	34	0	0	5	23	8	0	0	16	116	5	0	0
7:30 AM	15	35	25	0	1	5	148	26	0	0	16	36	17	0	0	22	162	15	0	1
7:45 AM	26	52	42	0	0	5	191	28	0	0	22	52	20	0	0	31	227	7	0	0
8:00 AM	22	24	12	0	0	5	126	29	0	0	21	30	16	0	0	14	144	11	0	0
8:15 AM	9	13	19	0	0	3	134	17	0	0	8	22	4	0	0	8	119	6	0	0
8:30 AM	26	15	28	0	0	8	114	20	0	0	3	19	7	0	1	16	116	10	0	0
8:45 AM	13	18	32	0	0	3	144	21	0	0	7	14	4	0	0	6	131	4	0	1
3:00 PM	24	29		0	1	6	166	30	0	0	9	28	12	0	0	22	171	18		0
3:15 PM	29	45		0	2	9	196	26	0	0	11	30	8	0	0	19	201	10		0
3:30 PM	21	21		0	1	7	208	33	0	0	12	30	7	0	0	18	221	1		0
3:45 PM	27	26		0	0	6	204	20	0	0	7	23	16	0	0	27	197	12		0
4:00 PM	32	28		0	0	7	197	24	0	2	10	17	7	0	0	21	188	16		0
4:15 PM	23	28		0	0	8	178	29	0	4	7	24	9	0	0	24	208	7		0
4:30 PM	36	35		0	0	8	204	26	0	2	8	18	6	0	0	21	197	18		0
4:45 PM	34	30		0	2	14	219	28	0	0	11	28	11	0	0	15	200	13		0
5:00 PM	31	44		0	1	13	234	28	0	0	9	32	9	0	0	20	220	28		0
5:15 PM	30	51		0	0	13	214	26	0	0	20	26	11	0	0	18	238	15		0
5:30 PM	35	45		0	0	19	202	31	0	0	11	27	10	0	2	26	214	14		0
5:45 PM	22	56		0	0	10	205	30	0	0	19	18	17	0	0	19	185	15		0

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Dakota Street					US 12 (6th Avenue)					Dakota Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	0	0	0	0	0	4	1	0	0	0	0	0	0	0	0	3	0	0	0
7:15 AM	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	4	0	0	0
7:30 AM	0	0	0	0	0	0	7	1	0	0	0	0	0	0	0	0	6	0	0	0
7:45 AM	1	0	0	0	0	0	6	0	0	0	0	0	0	0	0	1	4	0	0	0
8:00 AM	1	0	2	0	0	0	6	1	0	0	0	0	0	0	0	1	5	0	0	0
8:15 AM	1	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	7	0	0	0
8:30 AM	1	0	2	0	0	0	7	0	0	0	0	0	0	0	0	0	9	0	0	0
8:45 AM	1	1	1	0	0	0	10	0	0	0	0	1	1	0	0	1	8	1	0	0
3:00 PM	0	0		0	0	0	6	0	0	0	0	0	0	0	0	0	6	2		0
3:15 PM	1	0		0	0	0	3	0	0	0	0	0	0	0	0	1	9	0		0
3:30 PM	0	0		0	0	0	3	1	0	0	0	1	0	0	0	0	8	0		0
3:45 PM	2	0		0	0	0	5	0	0	0	0	0	0	0	0	0	2	1		0
4:00 PM	0	0		0	0	0	6	0	0	0	0	1	0	0	0	0	5	0		0
4:15 PM	0	0		0	0	0	7	0	0	0	0	0	0	0	0	0	5	0		0
4:30 PM	0	0		0	0	0	2	0	0	0	0	0	1	0	0	1	2	0		0
4:45 PM	0	0		0	0	0	8	0	0	0	0	0	0	0	0	0	7	0		0
5:00 PM	0	0		0	0	0	2	0	0	0	0	1	0	0	0	0	2	0		0
5:15 PM	0	0		0	0	0	8	0	0	0	1	0	0	0	0	0	8	0		0
5:30 PM	0	0		0	0	0	3	0	0	0	0	0	0	0	0	0	6	0		0
5:45 PM	0	0		0	0	0	5	1	0	0	0	0	0	0	0	0	4	0		0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Dakota Street					US 12 (6th Avenue)					Dakota Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	8	11	11	0	1	1	78	13	0	1	5	8	5	0	0	8	82	4	0	0
7:15 AM	17	17	15	0	1	5	116	34	0	0	5	23	8	0	0	16	120	5	0	0
7:30 AM	15	35	25	0	1	5	155	27	0	0	16	36	17	0	0	22	168	15	0	1
7:45 AM	27	52	42	0	0	5	197	28	0	0	22	52	20	0	0	32	231	7	0	0
8:00 AM	23	24	14	0	0	5	132	30	0	0	21	30	16	0	0	15	149	11	0	0
Peak Hour Total	**82**	**128**	**96**	**0**	**2**	**20**	**600**	**119**	**0**	**0**	**64**	**141**	**61**	**0**	**0**	**85**	**668**	**38**	**0**	**1**
Peak Hour Factor	**0.76**	**0.62**	**0.57**	**0.00**	**NA**	**1.00**	**0.76**	**0.88**	**0.00**	**NA**	**0.73**	**0.68**	**0.76**	**0.00**	**NA**	**0.66**	**0.72**	**0.63**	**0.00**	**NA**
Truck %	**2%**	**0%**	**3%**	**0%**	**NA**	**0%**	**4%**	**2%**	**0%**	**NA**	**0%**	**0%**	**0%**	**0%**	**NA**	**2%**	**3%**	**0%**	**0%**	**NA**
8:15 AM	10	13	19	0	0	3	141	17	0	0	8	22	4	0	0	8	126	6	0	0
8:30 AM	27	15	30	0	0	8	121	20	0	0	3	19	7	0	1	16	125	10	0	0
8:45 AM	14	19	33	0	0	3	154	21	0	0	7	15	5	0	0	7	139	5	0	1
3:00 PM	24	29		0	1	6	172	30	0	0	9	28	12	0	0	22	177	20		0
3:15 PM	30	45		0	2	9	199	26	0	0	11	30	8	0	0	20	210	10		0
3:30 PM	21	21		0	1	7	211	34	0	0	12	31	7	0	0	18	229	1		0
3:45 PM	29	26		0	0	6	209	20	0	0	7	23	16	0	0	27	199	13		0
4:00 PM	32	28		0	0	7	203	24	0	2	10	18	7	0	0	21	193	16		0
4:15 PM	23	28		0	0	8	185	29	0	4	7	24	9	0	0	24	213	7		0
4:30 PM	36	35		0	0	8	206	26	0	2	8	18	7	0	0	22	199	18		0
4:45 PM	34	30		0	2	14	227	28	0	0	11	28	11	0	0	15	207	13		0
5:00 PM	31	44		0	1	13	236	28	0	0	9	33	9	0	0	20	222	28		0
5:15 PM	30	51		0	0	13	222	26	0	0	21	26	11	0	0	18	246	15		0
5:30 PM	35	45		0	0	19	205	31	0	0	11	27	10	0	2	26	220	14		0
Peak Hour Total	**130**	**170**	**100***	**0**	**3**	**59**	**890**	**113**	**0**	**0**	**52**	**114**	**41**	**0**	**2**	**79**	**895**	**70**		**0**
Peak Hour Factor	**0.93**	**0.83**	**0.67****	**0.00**	**NA**	**0.78**	**0.94**	**0.91**	**0.00**	**NA**	**0.62**	**0.86**	**0.93**	**0.00**	**NA**	**0.76**	**0.91**	**0.62**		**NA**
Truck %	**0%**	**0%**	**0%*****	**0%**	**NA**	**0%**	**2%**	**0%**	**0%**	**NA**	**2%**	**1%**	**0%**	**0%**	**NA**	**0%**	**3%**	**0%**		**NA**
5:45 PM	22	56		0	0	10	210	31	0	0	19	18	17	0	0	19	189	15		0

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Malfunction with Traffic Camera, movement not counted.

*Peak hour total missing due to malfuction with camera and movement not being counted. To determine peak hour total for 2012, count data from 2009 was obtained from SDDOT and a 2% growth factor was applied to get 2012 data.

**Peak hour factor was calculated using 2009 count data obtained from SDDOT. The peak hour factor for 2009 was used for 2012.

***Truck percent was assumed based on truck percents for other movements.

Location #5 - US 12 (6th Avenue) and State Street

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	State Street					US 12 (6th Avenue)					State Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	7	9	16	0	0	6	63	7	0	0	5	19	10	0	2	11	67	4	0	2
7:15 AM	7	16	14	0	0	11	95	7	0	0	10	26	15	0	0	24	115	7	0	0
7:30 AM	8	37	28	0	0	14	134	13	0	1	21	37	25	0	2	28	179	10	0	2
7:45 AM	38	51	16	0	1	37	181	14	0	1	35	39	22	0	5	31	238	14	0	1
8:00 AM	18	24	29	0	1	18	129	10	0	1	18	25	12	0	0	37	132	8	0	0
8:15 AM	10	14	15	0	1	12	124	12	0	0	20	12	16	0	0	25	113	7	0	0
8:30 AM	9	13	15	0	0	22	106	15	0	0	7	17	11	0	1	29	120	8	0	0
8:45 AM	15	26	18	0	38	24	139	13	0	0	12	26	12	0	0	29	117	7	0	0
3:00 PM	28	46	33	0	0	15	158	21	0	0	23	34	28	0	5	34	156	16	0	2
3:15 PM	23	31	37	0	2	25	178	20	0	3	20	38	26	0	1	32	185	12	0	0
3:30 PM	22	33	42	0	0	20	189	22	0	2	22	43	24	0	7	28	197	13	0	0
3:45 PM	23	38	50	0	2	20	209	16	0	3	22	45	19	0	5	33	191	11	0	1
4:00 PM	28	38	39	0	0	23	171	18	0	1	18	34	20	0	4	38	177	11	0	0
4:15 PM	35	37	38	0	1	18	173	25	0	0	12	42	22	0	3	42	186	9	0	0
4:30 PM	22	32	52	0	2	12	201	26	0	2	14	23	24	0	8	49	199	12	0	0
4:45 PM	24	48	53	0	0	30	200	32	0	2	16	34	26	0	4	33	183	16	0	0
5:00 PM	24	46	45	0	2	35	209	21	0	0	26	42	18	0	0	38	218	14	0	1
5:15 PM	35	62	37	0	1	28	227	26	0	0	29	26	29	0	0	36	212	13	0	0
5:30 PM	28	48	43	0	2	22	177	21	0	0	21	38	26	0	0	39	206	11	0	1
5:45 PM	19	48	44	0	1	29	203	16	0	0	23	30	19	0	0	31	178	11	0	1

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	State Street					US 12 (6th Avenue)					State Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	1	0	0	0	0	4	1	0	0	0	0	1	0	0	0	3	1	0	0
7:15 AM	0	0	0	0	0	1	7	0	0	0	0	0	0	0	0	0	5	0	0	0
7:30 AM	1	0	0	0	0	0	6	2	0	0	0	0	0	0	0	0	5	0	0	0
7:45 AM	0	0	0	0	0	0	6	0	0	0	1	0	0	0	0	0	5	0	0	0
8:00 AM	0	0	2	0	0	0	7	0	0	0	2	0	1	0	0	1	8	0	0	0
8:15 AM	1	1	2	0	0	0	7	0	0	0	1	0	0	0	0	0	3	0	0	0
8:30 AM	2	1	1	0	0	0	9	0	0	0	1	0	0	0	0	0	14	1	0	0
8:45 AM	1	1	0	0	0	0	11	0	0	0	2	0	0	0	0	1	11	2	0	0
3:00 PM	0	1	0	0	0	0	6	0	0	0	1	0	0	0	0	1	6	0	0	0
3:15 PM	0	1	1	0	0	0	4	0	0	0	1	3	0	0	0	0	10	0	0	0
3:30 PM	1	0	2	0	0	0	4	0	0	0	0	1	0	0	0	0	10	0	0	0
3:45 PM	0	1	0	0	0	1	3	0	0	0	1	0	0	0	0	0	4	0	0	0
4:00 PM	1	0	2	0	0	1	8	0	0	0	2	0	0	0	0	1	5	0	0	0
4:15 PM	0	0	1	0	0	0	6	0	0	0	2	1	0	0	0	1	5	0	0	0
4:30 PM	0	1	1	0	0	0	5	1	0	0	0	1	0	0	0	0	3	0	0	0
4:45 PM	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	7	0	0	0
5:00 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	2	2	0	0
5:15 PM	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	10	0	0	0
5:30 PM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	6	0	0	0
5:45 PM	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	4	0	0	0

Total Vehicles and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	State Street					US 12 (6th Avenue)					State Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	7	10	16	0	0	6	67	8	0	0	5	19	11	0	2	11	70	5	0	2
7:15 AM	7	16	14	0	0	12	102	7	0	0	10	26	15	0	0	24	120	7	0	0
7:30 AM	9	37	28	0	0	14	140	15	0	1	21	37	25	0	2	28	184	10	0	2
7:45 AM	38	51	16	0	1	37	187	14	0	1	36	39	22	0	5	31	243	14	0	1
8:00 AM	18	24	31	0	1	18	136	10	0	1	20	25	13	0	0	38	140	8	0	0
8:15 AM	11	15	17	0	1	12	131	12	0	0	21	12	16	0	0	25	116	7	0	0
Peak Hour Total	**76**	**127**	**92**	**0**	**3**	**81**	**594**	**51**	**0**	**3**	**98**	**113**	**76**	**0**	**7**	**122**	**683**	**39**	**0**	**3**
Peak Hour Factor	**0.50**	**0.62**	**0.74**	**0.00**	**NA**	**0.55**	**0.79**	**0.85**	**0.00**	**NA**	**0.68**	**0.72**	**0.76**	**0.00**	**NA**	**0.80**	**0.70**	**0.70**	**0.00**	**NA**
Truck %	**3%**	**1%**	**4%**	**0%**	**NA**	**0%**	**4%**	**4%**	**0%**	**NA**	**4%**	**0%**	**1%**	**0%**	**NA**	**1%**	**3%**	**0%**	**0%**	**NA**
8:30 AM	11	14	16	0	0	22	115	15	0	0	8	17	11	0	1	29	134	9	0	0
8:45 AM	16	27	18	0	38	24	150	13	0	0	14	26	12	0	0	30	128	9	0	0
3:00 PM	28	47	33	0	0	15	164	21	0	0	24	34	28	0	5	35	162	16	0	2
3:15 PM	23	32	38	0	2	25	182	20	0	3	21	41	26	0	1	32	195	12	0	0
3:30 PM	23	33	44	0	0	20	193	22	0	2	22	44	24	0	7	28	207	13	0	0
3:45 PM	23	39	50	0	2	21	212	16	0	3	23	45	19	0	5	33	195	11	0	1
4:00 PM	29	38	41	0	0	24	179	18	0	1	20	34	20	0	4	39	182	11	0	0
4:15 PM	35	37	39	0	1	18	179	25	0	0	14	43	22	0	3	43	191	9	0	0
4:30 PM	22	33	53	0	2	12	206	27	0	2	14	24	24	0	8	49	202	12	0	0
4:45 PM	24	48	53	0	0	30	208	32	0	2	16	34	26	0	4	33	190	16	0	0
5:00 PM	24	46	45	0	2	35	211	21	0	0	26	42	18	0	0	40	220	16	0	1
5:15 PM	35	62	37	0	1	28	236	26	0	0	29	26	29	0	0	36	222	13	0	0
5:30 PM	28	48	43	0	2	22	180	21	0	0	21	38	26	0	0	39	212	11	0	1
Peak Hour Total	**111**	**204**	**178**	**0**	**5**	**115**	**835**	**100**	**0**	**2**	**92**	**140**	**99**	**0**	**4**	**148**	**844**	**56**	**0**	**2**
Peak Hour Factor	**0.79**	**0.82**	**0.84**	**0.00**	**NA**	**0.82**	**0.88**	**0.78**	**0.00**	**NA**	**0.79**	**0.83**	**0.85**	**0.00**	**NA**	**0.92**	**0.95**	**0.88**	**0.00**	**NA**
Truck %	**0%**	**0%**	**0%**	**0%**	**NA**	**0%**	**3%**	**0%**	**0%**	**NA**	**0%**	**0%**	**0%**	**0%**	**NA**	**1%**	**3%**	**4%**	**0%**	**NA**
5:45 PM	19	48	44	0	1	29	208	16	0	0	23	30	19	0	0	31	182	11	0	1

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Location #6 - US 12 (6th Avenue) and Main Street

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Main Street					US 12 (6th Avenue)					Main Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	0	0	0	0	4	65	4	0	0	8	9	16	0	0	1	80	4	0	0
7:15 AM	0	0	0	0	0	12	105	3	0	0	11	9	36	0	0	3	143	8	0	2
7:30 AM	0	0	0	0	0	12	153	10	0	0	18	23	42	0	0	2	191	9	0	0
7:45 AM	0	0	0	0	5	22	182	10	0	0	30	38	60	0	1	11	278	16	0	0
8:00 AM	0	0	0	0	1	15	124	12	0	0	12	23	24	0	3	4	151	10	0	2
8:15 AM	0	0	0	0	1	12	112	10	0	0	12	6	19	0	0	4	140	9	0	0
8:30 AM	0	0	0	0	2	12	93	10	0	1	12	8	14	0	0	9	142	15	0	0
8:45 AM	0	0	0	0	0	16	114	15	0	0	16	18	22	0	0	8	135	14	0	1
3:00 PM	0	0	0	0	0	26	168	20	0	0	26	21	34	0	0	7	155	12	0	0
3:15 PM	0	0	0	0	0	17	183	23	0	1	16	20	37	0	0	13	191	15	0	2
3:30 PM	0	0	0	0	0	28	185	23	0	3	20	23	38	0	1	13	191	15	0	0
3:45 PM	0	0	0	0	4	31	208	20	0	2	19	24	21	0	1	10	178	17	0	1
4:00 PM	0	0	0	0	0	20	185	29	0	0	20	23	25	0	1	6	176	13	0	0
4:15 PM	0	0	0	0	0	19	179	19	0	1	15	16	28	0	0	6	166	11	0	0
4:30 PM	0	0	0	0	1	29	217	26	0	0	14	21	35	0	0	10	164	10	0	0
4:45 PM	0	0	0	0	0	26	211	20	0	0	20	20	22	0	3	14	173	17	0	0
5:00 PM	0	0	0	0	5	35	241	29	0	2	31	32	31	0	1	7	207	25	0	3
5:15 PM	0	0	0	0	5	26	240	14	0	3	17	21	23	0	4	8	179	15	0	0
5:30 PM	0	0	0	0	2	29	193	14	0	0	14	12	35	0	0	9	159	20	0	1
5:45 PM	0	0	0	0	2	21	196	23	0	0	5	22	19	0	0	9	174	10	0	0

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Main Street					US 12 (6th Avenue)					Main Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	6	0	0	0
7:15 AM	0	0	0	0	0	1	5	0	0	0	1	0	0	0	0	0	5	0	0	0
7:30 AM	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	6	0	0	0
7:45 AM	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	5	0	0	0
8:00 AM	0	0	0	0	0	1	4	0	0	0	1	0	0	0	0	0	8	0	0	0
8:15 AM	0	0	0	0	0	0	9	0	0	0	1	0	0	0	0	0	5	2	0	0
8:30 AM	0	0	0	0	0	0	7	1	0	0	1	0	0	0	0	1	10	2	0	0
8:45 AM	0	0	0	0	0	0	12	0	0	0	0	0	1	0	0	0	14	0	0	0
3:00 PM	0	0	0	0	0	0	5	0	0	0	1	0	0	0	0	0	7	1	0	0
3:15 PM	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	11	0	0	0
3:30 PM	0	0	0	0	0	0	5	1	0	0	0	0	1	0	0	0	12	0	0	0
3:45 PM	0	0	0	0	0	0	5	1	0	0	0	0	0	0	0	1	4	0	0	0
4:00 PM	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	5	1	0	0
4:15 PM	0	0	0	0	0	0	6	0	0	0	0	0	1	0	0	0	4	0	0	0
4:30 PM	0	0	0	0	0	0	6	0	0	0	1	1	0	0	0	0	5	0	0	0
4:45 PM	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	1	7	0	0	0
5:00 PM	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	8	0	0	0
5:15 PM	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	12	0	0	0
5:30 PM	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4	0	0	0
5:45 PM	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	4	0	0	0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Main Street					US 12 (6th Avenue)					Main Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	0	0	0	0	4	69	4	0	0	8	9	16	0	0	1	86	4	0	0
7:15 AM	0	0	0	0	0	13	110	3	0	0	12	9	36	0	0	3	148	8	0	2
7:30 AM	0	0	0	0	0	12	159	10	0	0	18	23	42	0	0	2	197	9	0	0
7:45 AM	0	0	0	0	5	22	190	10	0	0	30	38	60	0	1	11	283	16	0	0
8:00 AM	0	0	0	0	1	16	128	12	0	0	13	23	24	0	3	4	159	10	0	2
Peak Hour Total	**0**	**0**	**0**	**0**	**6**	**63**	**587**	**35**	**0**	**0**	**73**	**93**	**162**	**0**	**4**	**20**	**787**	**43**	**0**	**4**
Peak Hour Factor	**0.00**	**0.00**	**0.00**	**0.00**	**NA**	**0.72**	**0.77**	**0.73**	**0.00**	**NA**	**0.61**	**0.61**	**0.68**	**0.00**	**NA**	**0.45**	**0.70**	**0.67**	**0.00**	**NA**
Truck %	**0%**	**0%**	**0%**	**0%**	**NA**	**3%**	**4%**	**0%**	**0%**	**NA**	**3%**	**0%**	**0%**	**0%**	**NA**	**0%**	**3%**	**0%**	**0%**	**NA**
8:15 AM	0	0	0	0	1	12	121	10	0	0	13	6	19	0	0	4	145	11	0	0
8:30 AM	0	0	0	0	2	12	100	11	0	1	13	8	14	0	0	10	152	17	0	0
8:45 AM	0	0	0	0	0	16	126	15	0	0	16	18	23	0	0	8	149	14	0	1
3:00 PM	0	0	0	0	0	26	173	20	0	0	27	21	34	0	0	7	162	13	0	0
3:15 PM	0	0	0	0	0	17	189	23	0	1	16	20	37	0	0	13	202	15	0	2
3:30 PM	0	0	0	0	0	28	190	24	0	3	20	23	39	0	1	13	203	15	0	0
3:45 PM	0	0	0	0	4	31	213	21	0	2	19	24	21	0	1	11	182	17	0	1
4:00 PM	0	0	0	0	0	20	197	29	0	0	20	23	25	0	1	6	181	14	0	0
4:15 PM	0	0	0	0	0	19	185	19	0	1	15	16	29	0	0	6	170	11	0	0
4:30 PM	0	0	0	0	1	29	223	26	0	0	15	22	35	0	0	10	169	10	0	0
4:45 PM	0	0	0	0	0	26	219	20	0	0	20	20	22	0	3	15	180	17	0	0
5:00 PM	0	0	0	0	5	35	244	30	0	2	31	32	31	0	1	7	215	25	0	3
5:15 PM	0	0	0	0	5	26	249	14	0	3	17	21	23	0	4	8	191	15	0	0
Peak Hour Total	**0**	**0**	**0**	**0**	**11**	**116**	**935**	**90**	**0**	**5**	**83**	**95**	**111**	**0**	**8**	**40**	**755**	**67**	**0**	**3**
Peak Hour Factor	**0.00**	**0.00**	**0.00**	**0.00**	**NA**	**0.83**	**0.94**	**0.75**	**0.00**	**NA**	**0.67**	**0.74**	**0.79**	**0.00**	**NA**	**0.67**	**0.88**	**0.67**	**0.00**	**NA**
Truck %	**0%**	**0%**	**0%**	**0%**	**NA**	**0%**	**3%**	**1%**	**0%**	**NA**	**1%**	**1%**	**0%**	**0%**	**NA**	**3%**	**4%**	**0%**	**0%**	**NA**
5:30 PM	0	0	0	0	2	29	197	14	0	0	14	12	35	0	0	9	163	20	0	1
5:45 PM	0	0	0	0	2	21	201	23	0	0	5	22	19	0	0	9	178	10	0	0

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Location #7 - US 12 (6th Avenue) and 2nd Street

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	2nd Street					US 12 (6th Avenue)					2nd Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	16	16	14	0	1	3	52	18	0	0	3	13	4	0	0	22	56	1	0	0
7:15 AM	32	28	32	0	0	2	78	32	0	0	10	23	11	0	0	34	118	3	0	2
7:30 AM	35	67	34	0	0	16	111	29	0	0	14	66	18	0	0	44	161	3	0	0
7:45 AM	42	76	34	0	0	11	112	60	0	1	10	71	26	0	0	43	204	3	0	0
8:00 AM	32	23	19	0	0	3	104	25	0	0	5	24	7	0	0	35	124	1	0	0
8:15 AM	42	13	16	0	0	1	80	33	0	0	5	14	7	0	0	33	107	1	0	0
8:30 AM	35	16	21	0	0	7	74	29	0	0	7	18	4	0	0	24	110	1	0	0
8:45 AM	36	16	17	0	0	4	80	31	0	0	2	17	2	0	0	29	112	3	0	0
3:00 PM	45	33	32	0	2	19	123	45	0	0	9	32	14	0	0	18	72	3	0	0
3:15 PM	42	40	39	0	1	13	145	47	0	0	6	34	21	0	0	30	143	1	0	0
3:30 PM	46	35	39	0	3	6	126	54	0	1	7	33	11	0	1	27	139	2	0	0
3:45 PM	50	28	29	0	2	12	147	57	0	0	6	37	9	0	0	33	130	1	0	0
4:00 PM	54	24	30	0	1	4	144	50	0	0	5	24	5	0	0	29	107	2	0	0
4:15 PM	48	20	30	0	0	14	141	34	0	0	7	20	8	0	0	27	110	4	0	0
4:30 PM	37	39	36	0	0	11	189	34	0	0	2	26	7	0	1	31	116	2	0	0
4:45 PM	42	27	44	0	0	14	158	57	0	0	4	24	11	0	0	37	112	3	0	0
5:00 PM	63	56	63	0	4	19	195	65	0	0	7	31	6	0	0	27	129	5	0	1
5:15 PM	55	47	27	0	0	22	182	65	0	3	4	29	12	0	2	28	134	2	0	0
5:30 PM	49	30	38	0	1	7	155	51	0	0	4	36	10	0	0	18	122	2	0	0
5:45 PM	38	37	31	0	2	13	150	43	0	0	8	15	10	0	0	29	119	8	0	0

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	2nd Street					US 12 (6th Avenue)					2nd Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	2	1	2	0	0	0	6	0	0	0	0	0	0	0	0	1	3	0	0	0
7:15 AM	1	2	0	0	0	0	4	1	0	0	0	1	1	0	0	0	2	0	0	0
7:30 AM	0	0	0	0	0	1	6	2	0	0	0	0	0	0	0	0	6	0	0	0
7:45 AM	2	1	4	0	0	0	8	0	0	0	0	0	0	0	0	0	6	0	0	0
8:00 AM	2	1	1	0	0	0	3	1	0	0	0	0	0	0	0	0	5	0	0	0
8:15 AM	2	1	1	0	0	0	5	3	0	0	0	1	0	0	0	0	6	0	0	0
8:30 AM	2	0	0	0	0	0	5	2	0	0	0	0	0	0	0	3	10	0	0	0
8:45 AM	2	0	2	0	0	0	10	2	0	0	0	1	0	0	0	1	12	0	0	0
3:00 PM	1	0	2	0	0	0	5	2	0	0	0	0	1	0	0	1	4	0	0	0
3:15 PM	0	2	1	0	0	0	7	0	0	0	0	1	0	0	0	1	12	0	0	0
3:30 PM	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	10	0	0	0
3:45 PM	0	0	0	0	0	0	5	1	0	0	0	0	0	0	0	2	2	0	0	0
4:00 PM	0	1	1	0	0	0	8	1	0	0	0	0	0	0	0	1	4	0	0	0
4:15 PM	1	1	0	0	0	0	6	1	0	0	0	0	0	0	0	0	3	0	0	0
4:30 PM	0	0	3	0	0	1	4	0	0	0	0	0	0	0	0	0	5	0	0	0
4:45 PM	2	0	0	0	0	0	8	0	0	0	0	2	0	0	0	0	4	0	0	0
5:00 PM	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	6	0	0	0
5:15 PM	0	0	0	0	0	0	7	1	0	0	0	0	0	0	0	0	4	0	0	0
5:30 PM	0	0	1	0	0	0	2	1	0	0	0	0	0	0	0	0	4	0	0	0
5:45 PM	0	0	1	0	0	0	5	0	0	0	0	0	0	0	0	0	2	0	0	0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	2nd Street					US 12 (6th Avenue)					2nd Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	18	17	16	0	1	3	58	18	0	0	3	13	4	0	0	23	59	1	0	0
7:15 AM	33	30	32	0	0	2	82	33	0	0	10	24	12	0	0	34	120	3	0	2
7:30 AM	35	67	34	0	0	17	117	31	0	0	14	66	18	0	0	44	167	3	0	0
7:45 AM	44	77	38	0	0	11	120	60	0	1	10	71	26	0	0	43	210	3	0	0
8:00 AM	34	24	20	0	0	3	107	26	0	0	5	24	7	0	0	35	129	1	0	0
Peak Hour Total	**146**	**198**	**124**	**0**	**0**	**33**	**426**	**150**	**0**	**1**	**39**	**185**	**63**	**0**	**0**	**156**	**626**	**10**	**0**	**2**
Peak Hour Factor	**0.83**	**0.64**	**0.82**	**0.00**	**NA**	**0.49**	**0.89**	**0.62**	**0.00**	**NA**	**0.70**	**0.65**	**0.61**	**0.00**	**NA**	**0.89**	**0.75**	**0.83**	**0.00**	**NA**
Truck %	**3%**	**2%**	**4%**	**0%**	**NA**	**3%**	**5%**	**3%**	**0%**	**NA**	**0%**	**1%**	**2%**	**0%**	**NA**	**0%**	**3%**	**0%**	**0%**	**NA**
8:15 AM	44	14	17	0	0	1	85	36	0	0	5	15	7	0	0	33	113	1	0	0
8:30 AM	37	16	21	0	0	7	79	31	0	0	7	18	4	0	0	27	120	1	0	0
8:45 AM	38	16	19	0	0	4	90	33	0	0	2	18	2	0	0	30	124	3	0	0
3:00 PM	46	33	34	0	2	19	128	47	0	0	9	32	15	0	0	19	76	3	0	0
3:15 PM	42	42	40	0	1	13	152	47	0	0	6	35	21	0	0	31	155	1	0	0
3:30 PM	46	35	39	0	3	6	130	54	0	1	7	33	11	0	1	27	149	2	0	0
3:45 PM	50	28	29	0	2	12	152	58	0	0	6	37	9	0	0	35	132	1	0	0
4:00 PM	54	25	31	0	1	4	152	51	0	0	5	24	5	0	0	30	111	2	0	0
4:15 PM	49	21	30	0	0	14	147	35	0	0	7	20	8	0	0	27	113	4	0	0
4:30 PM	37	39	39	0	0	12	193	34	0	0	2	26	7	0	1	31	121	2	0	0
4:45 PM	44	27	44	0	0	14	166	57	0	0	4	26	11	0	0	37	116	3	0	0
5:00 PM	64	56	63	0	4	19	197	65	0	0	7	31	6	0	0	28	135	5	0	1
5:15 PM	55	47	27	0	0	22	189	66	0	3	4	29	12	0	2	28	138	2	0	0
Peak Hour Total	**200**	**169**	**173**	**0**	**4**	**67**	**745**	**222**	**0**	**3**	**17**	**112**	**36**	**0**	**3**	**124**	**510**	**12**	**0**	**1**
Peak Hour Factor	**0.78**	**0.75**	**0.69**	**0.00**	**NA**	**0.76**	**0.95**	**0.84**	**0.00**	**NA**	**0.61**	**0.90**	**0.75**	**0.00**	**NA**	**0.84**	**0.92**	**0.60**	**0.00**	**NA**
Truck %	**2%**	**0%**	**2%**	**0%**	**NA**	**1%**	**3%**	**0%**	**0%**	**NA**	**0%**	**2%**	**0%**	**0%**	**NA**	**1%**	**4%**	**0%**	**0%**	**NA**
5:30 PM	49	30	39	0	1	7	157	52	0	0	4	36	10	0	0	18	126	2	0	0
5:45 PM	38	37	32	0	2	13	155	43	0	0	8	15	10	0	0	29	121	8	0	0

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Location #8 - US 12 (6th Avenue) and 5th Street

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	5th Street					US 12 (6th Avenue)					5th Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	2	2	2	0	0	12	55	0	0	0	11	4	26	0	0	1	54	6	0	1
7:15 AM	6	5	0	0	0	24	70	4	0	1	16	11	42	0	1	1	106	7	0	1
7:30 AM	3	12	5	0	0	34	103	2	0	0	18	18	61	0	0	3	150	18	0	0
7:45 AM	2	18	4	0	0	41	93	3	0	3	14	18	70	0	3	1	169	14	0	0
8:00 AM	2	6	2	0	0	32	76	1	0	0	22	9	49	0	0	0	99	11	0	0
8:15 AM	1	12	2	0	0	19	71	1	0	0	7	5	51	0	0	4	90	13	0	0
8:30 AM	2	4	3	0	0	27	65	2	0	0	8	5	42	0	0	1	93	11	0	0
8:45 AM	2	7	1	0	0	26	61	2	0	0	7	4	57	0	0	3	87	9	0	0
3:00 PM	2	13	2	0	0	21	61	2	0	1	15	1	16	0	0	0	57	14	0	0
3:15 PM	5	13	2	0	2	63	143	5	0	1	19	5	50	0	0	0	123	22	0	2
3:30 PM	1	13	5	0	0	46	116	2	0	0	14	10	59	0	0	0	104	11	0	0
3:45 PM	3	16	0	0	0	40	129	1	0	0	11	5	54	0	0	2	104	8	0	0
4:00 PM	1	11	0	0	0	46	116	4	0	0	18	4	50	0	1	1	78	10	0	0
4:15 PM	0	11	0	0	0	48	108	2	0	0	17	6	45	0	0	2	97	12	0	0
4:30 PM	3	7	2	0	0	65	139	4	0	0	13	7	31	0	0	1	111	13	0	0
4:45 PM	2	16	3	0	0	62	125	5	0	0	12	5	50	0	0	2	82	13	0	0
5:00 PM	6	20	2	0	0	86	156	1	0	2	18	8	43	0	3	2	123	10	0	1
5:15 PM	2	8	1	0	0	68	139	3	0	0	18	9	46	0	4	0	106	16	0	0
5:30 PM	3	9	4	0	0	46	123	4	0	3	20	4	40	0	0	1	100	20	0	0
5:45 PM	1	4	0	0	0	46	112	3	0	0	7	8	35	0	2	2	105	19	0	0

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	5th Street					US 12 (6th Avenue)					5th Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	2	0	0	0
7:15 AM	0	0	0	0	0	1	2	0	0	0	4	0	0	0	0	0	2	1	0	0
7:30 AM	0	2	0	0	0	0	4	0	0	0	1	1	1	0	0	0	4	1	0	0
7:45 AM	1	1	1	0	0	2	7	0	0	0	1	0	1	0	0	0	5	0	0	0
8:00 AM	1	0	0	0	0	2	2	0	0	0	1	0	1	0	0	0	3	2	0	0
8:15 AM	1	0	0	0	0	0	5	0	0	0	1	0	1	0	0	0	6	3	0	0
8:30 AM	0	0	0	0	0	3	4	0	0	0	0	1	2	0	0	0	10	0	0	0
8:45 AM	0	1	0	0	0	0	11	0	0	0	2	0	0	0	0	0	9	1	0	0
3:00 PM	1	3	0	0	0	2	3	0	0	0	1	0	1	0	0	1	4	0	0	0
3:15 PM	1	0	0	0	0	0	9	0	0	0	2	1	0	0	0	0	13	0	0	0
3:30 PM	1	0	0	0	0	1	3	0	0	0	1	1	1	0	0	0	9	1	0	0
3:45 PM	0	3	0	0	0	0	5	0	0	0	0	1	2	0	0	0	1	1	0	0
4:00 PM	0	0	0	0	0	3	8	1	0	0	0	4	0	0	0	0	7	2	0	0
4:15 PM	0	0	0	0	0	1	5	0	0	0	2	1	1	0	0	1	3	0	0	0
4:30 PM	0	0	1	0	0	4	3	0	0	0	0	1	1	0	0	0	6	0	0	0
4:45 PM	0	0	0	0	0	2	7	1	0	0	0	0	1	0	0	0	6	0	0	0
5:00 PM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	7	0	0	0
5:15 PM	1	0	0	0	0	1	6	0	0	0	0	0	0	0	0	2	4	0	0	0
5:30 PM	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	4	1	0	0
5:45 PM	0	0	0	0	0	1	5	0	0	0	0	1	0	0	0	0	3	0	0	0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	5th Street					US 12 (6th Avenue)					5th Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	2	2	2	0	0	12	62	0	0	0	11	4	26	0	0	1	56	6	0	1
7:15 AM	6	5	0	0	0	25	72	4	0	1	20	11	42	0	1	1	108	8	0	1
7:30 AM	3	14	5	0	0	34	107	2	0	0	19	19	62	0	0	3	154	19	0	0
7:45 AM	3	19	5	0	0	43	100	3	0	3	15	18	71	0	3	1	174	14	0	0
8:00 AM	3	6	2	0	0	34	78	1	0	0	23	9	50	0	0	0	102	13	0	0
Peak Hour Total	**15**	**44**	**12**	**0**	**0**	**136**	**357**	**10**	**0**	**4**	**77**	**57**	**225**	**0**	**4**	**5**	**538**	**54**	**0**	**1**
Peak Hour Factor	**0.62**	**0.58**	**0.60**	**0.00**	**NA**	**0.79**	**0.83**	**0.62**	**0.00**	**NA**	**0.84**	**0.75**	**0.79**	**0.00**	**NA**	**0.42**	**0.77**	**0.71**	**0.00**	**NA**
Truck %	**13%**	**7%**	**8%**	**0%**	**NA**	**4%**	**4%**	**0%**	**0%**	**NA**	**9%**	**2%**	**1%**	**0%**	**NA**	**0%**	**3%**	**7%**	**0%**	**NA**
8:15 AM	2	12	2	0	0	19	76	1	0	0	8	5	52	0	0	4	96	16	0	0
8:30 AM	2	4	3	0	0	30	69	2	0	0	8	6	44	0	0	1	103	11	0	0
8:45 AM	2	8	1	0	0	26	72	2	0	0	9	4	57	0	0	3	96	10	0	0
3:00 PM	3	16	2	0	0	23	64	2	0	1	16	1	17	0	0	1	61	14	0	0
3:15 PM	6	13	2	0	2	63	152	5	0	1	21	6	50	0	0	0	136	22	0	2
3:30 PM	2	13	5	0	0	47	119	2	0	0	15	11	60	0	0	0	113	12	0	0
3:45 PM	3	19	0	0	0	40	134	1	0	0	11	6	56	0	0	2	105	9	0	0
4:00 PM	1	11	0	0	0	49	124	5	0	0	18	8	50	0	1	1	85	12	0	0
4:15 PM	0	11	0	0	0	49	113	2	0	0	19	7	46	0	0	3	100	12	0	0
4:30 PM	3	7	3	0	0	69	142	4	0	0	13	8	32	0	0	1	117	13	0	0
4:45 PM	2	16	3	0	0	64	132	6	0	0	12	5	51	0	0	2	88	13	0	0
5:00 PM	6	20	2	0	0	86	159	1	0	2	18	8	43	0	3	2	130	10	0	1
5:15 PM	3	8	1	0	0	69	145	3	0	0	18	9	46	0	4	2	110	16	0	0
Peak Hour Total	**14**	**51**	**9**	**0**	**0**	**288**	**578**	**14**	**0**	**2**	**61**	**30**	**172**	**0**	**7**	**7**	**445**	**52**	**0**	**1**
Peak Hour Factor	**0.58**	**0.64**	**0.75**	**0.00**	**NA**	**0.84**	**0.91**	**0.58**	**0.00**	**NA**	**0.85**	**0.83**	**0.84**	**0.00**	**NA**	**0.88**	**0.86**	**0.81**	**0.00**	**NA**
Truck %	**7%**	**0%**	**11%**	**0%**	**NA**	**2%**	**3%**	**7%**	**0%**	**NA**	**0%**	**3%**	**1%**	**0%**	**NA**	**29%**	**5%**	**0%**	**0%**	**NA**
5:30 PM	3	9	4	0	0	46	128	4	0	3	20	4	40	0	0	1	104	21	0	0
5:45 PM	1	4	0	0	0	47	117	3	0	0	7	9	35	0	2	2	108	19	0	0

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Location #9 - US 12 (6th Avenue) and US 281

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	US 281					US 12 (6th Avenue)					US 281					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	11	15	8	0	0	12	31	2	0	0	6	20	16	0	0	3	32	9	0	0
7:15 AM	8	17	9	0	0	4	31	3	0	0	8	15	16	0	0	11	47	14	0	0
7:30 AM	21	34	16	0	0	13	43	11	0	0	9	32	34	0	0	17	60	17	0	0
7:45 AM	20	28	25	0	0	9	50	16	0	0	9	31	41	0	0	13	67	9	0	0
8:00 AM	15	15	11	0	0	17	47	8	0	0	4	21	19	0	0	5	41	6	0	0
8:15 AM	8	10	7	0	0	15	37	11	0	0	7	17	23	0	0	10	44	5	0	0
8:30 AM	5	11	8	0	0	14	22	6	0	0	3	11	15	0	0	5	33	4	0	0
8:45 AM	6	15	9	0	0	17	20	11	0	0	3	12	22	0	0	4	43	4	0	0
3:00 PM	13	21	7	0	0	20	38	14	0	0	5	13	15	0	0	5	35	5	0	0
3:15 PM	8	14	6	0	0	23	44	14	0	0	7	10	20	0	0	12	30	5	0	0
3:30 PM	12	22	3	0	0	36	45	14	0	0	6	18	18	0	0	7	42	5	0	0
3:45 PM	4	15	9	0	0	24	56	19	0	0	10	19	24	0	0	2	42	3	0	0
4:00 PM	3	14	3	0	0	28	56	10	0	0	4	15	19	0	0	14	41	7	0	0
4:15 PM	12	21	6	0	0	30	34	15	0	0	6	15	25	0	0	8	31	5	0	0
4:30 PM	5	14	13	0	0	28	62	18	0	0	2	23	26	0	0	17	42	14	0	0
4:45 PM	5	24	10	0	0	20	50	16	0	0	8	17	21	0	0	10	40	7	0	0
5:00 PM	13	20	14	0	0	46	56	15	0	0	10	17	21	0	0	14	40	11	0	0
5:15 PM	9	26	15	0	0	43	63	13	0	0	11	20	23	0	0	8	41	11	0	0
5:30 PM	7	39	7	0	0	23	46	8	0	0	6	23	10	0	0	16	53	9	0	0
5:45 PM	10	30	14	0	0	35	43	10	0	0	4	21	23	0	0	11	40	8	0	0

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	US 281					US 12 (6th Avenue)					US 281					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	0	1	0	0	1	6	0	0	0	0	2	2	0	0	7	0	0	0	0
7:15 AM	0	3	3	0	0	1	4	0	0	0	2	8	2	0	0	2	2	3	0	0
7:30 AM	1	3	1	0	0	0	2	0	0	0	1	3	0	0	0	5	5	11	0	0
7:45 AM	0	3	7	0	0	5	5	1	0	0	4	2	2	0	0	3	4	0	0	0
8:00 AM	0	2	4	0	0	0	4	1	0	0	4	3	0	0	0	4	3	2	0	0
8:15 AM	0	12	5	0	0	0	3	1	0	0	3	3	0	0	0	2	4	5	0	0
8:30 AM	0	6	5	0	0	0	4	0	0	0	2	6	4	0	0	6	6	2	0	0
8:45 AM	0	2	3	0	0	5	5	2	0	0	4	3	3	0	0	4	6	3	0	0
3:00 PM	0	3	9	0	0	3	0	1	0	0	2	3	2	0	0	2	9	3	0	0
3:15 PM	0	6	1	0	0	4	4	1	0	0	3	3	2	0	0	5	7	2	0	0
3:30 PM	0	3	6	0	0	2	2	1	0	0	2	7	3	0	0	5	6	2	0	0
3:45 PM	0	1	3	0	0	0	8	0	0	0	2	5	0	0	0	4	2	2	0	0
4:00 PM	1	7	3	0	0	1	3	0	0	0	0	4	3	0	0	4	5	4	0	0
4:15 PM	0	5	5	0	0	3	6	1	0	0	2	4	2	0	0	9	5	1	0	0
4:30 PM	2	10	3	0	0	0	3	0	0	0	1	6	1	0	0	3	4	2	0	0
4:45 PM	0	4	3	0	0	1	7	1	0	0	2	3	0	0	0	1	6	2	0	0
5:00 PM	0	4	5	0	0	1	2	0	0	0	3	6	2	0	0	4	5	2	0	0
5:15 PM	0	1	5	0	0	1	5	0	0	0	2	5	2	0	0	5	5	2	0	0
5:30 PM	0	3	6	0	0	0	4	0	0	0	2	2	0	0	0	3	4	0	0	0
5:45 PM	0	3	3	0	6	0	8	0	0	0	2	1	0	0	0	4	1	2	0	0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	US 281					US 12 (6th Avenue)					US 281					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	11	15	9	0	0	13	37	2	0	0	6	22	18	0	0	10	32	9	0	0
7:15 AM	8	20	12	0	0	5	35	3	0	0	10	23	18	0	0	13	49	17	0	0
7:30 AM	22	37	17	0	0	13	45	11	0	0	10	35	34	0	0	22	65	28	0	0
7:45 AM	20	31	32	0	0	14	55	17	0	0	13	33	43	0	0	16	71	9	0	0
8:00 AM	15	17	15	0	0	17	51	9	0	0	8	24	19	0	0	9	44	8	0	0
8:15 AM	8	22	12	0	0	15	40	12	0	0	10	20	23	0	0	12	48	10	0	0
Peak Hour Total	**65**	**107**	**76**	**0**	**0**	**59**	**191**	**49**	**0**	**0**	**41**	**112**	**119**	**0**	**0**	**59**	**228**	**55**	**0**	**0**
Peak Hour Factor	**0.74**	**0.72**	**0.59**	**0.00**	**NA**	**0.87**	**0.87**	**0.72**	**0.00**	**NA**	**0.79**	**0.80**	**0.69**	**0.00**	**NA**	**0.67**	**0.80**	**0.49**	**0.00**	**NA**
Truck %	**2%**	**19%**	**22%**	**0%**	**NA**	**8%**	**7%**	**6%**	**0%**	**NA**	**29%**	**10%**	**2%**	**0%**	**NA**	**24%**	**7%**	**33%**	**0%**	**NA**
8:30 AM	5	17	13	0	0	14	26	6	0	0	5	17	19	0	0	11	39	6	0	0
8:45 AM	6	17	12	0	0	22	25	13	0	0	7	15	25	0	0	8	49	7	0	0
3:00 PM	13	24	16	0	0	23	38	15	0	0	7	16	17	0	0	7	44	8	0	0
3:15 PM	8	20	7	0	0	27	48	15	0	0	10	13	22	0	0	17	37	7	0	0
3:30 PM	12	25	9	0	0	38	47	15	0	0	8	25	21	0	0	12	48	7	0	0
3:45 PM	4	16	12	0	0	24	64	19	0	0	12	24	24	0	0	6	44	5	0	0
4:00 PM	4	21	6	0	0	29	59	10	0	0	4	19	22	0	0	18	46	11	0	0
4:15 PM	12	26	11	0	0	33	40	16	0	0	8	19	27	0	0	17	36	6	0	0
4:30 PM	7	24	16	0	0	28	65	18	0	0	3	29	27	0	0	20	46	16	0	0
4:45 PM	5	28	13	0	0	21	57	17	0	0	10	20	21	0	0	11	46	9	0	0
5:00 PM	13	24	19	0	0	47	58	15	0	0	13	23	23	0	0	18	45	13	0	0
5:15 PM	9	27	20	0	0	44	68	13	0	0	13	25	25	0	0	13	46	13	0	0
Peak Hour Total	**34**	**103**	**68**	**0**	**0**	**140**	**248**	**63**	**0**	**0**	**39**	**97**	**96**	**0**	**0**	**62**	**183**	**51**	**0**	**0**
Peak Hour Factor	**0.65**	**0.92**	**0.85**	**0.00**	**NA**	**0.74**	**0.91**	**0.88**	**0.00**	**NA**	**0.75**	**0.84**	**0.89**	**0.00**	**NA**	**0.78**	**0.99**	**0.80**	**0.00**	**NA**
Truck %	**6%**	**18%**	**24%**	**0%**	**NA**	**2%**	**7%**	**2%**	**0%**	**NA**	**21%**	**21%**	**5%**	**0%**	**NA**	**21%**	**11%**	**16%**	**0%**	**NA**
5:30 PM	7	42	13	0	0	23	50	8	0	0	8	25	10	0	0	19	57	9	0	0
5:45 PM	10	33	17	0	6	35	51	10	0	0	6	22	23	0	0	15	41	10	0	0

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Location #10 - Melgaard Road and Roosevelt Street

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Roosevelt Street					Melgaard Road					Roosevelt Street					Melgaard Road				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	15	14	0	0	2	3	0	0	0	1	6	0	0	0	15	14	1	0	0
7:15 AM	0	32	35	0	0	7	9	2	0	0	19	20	5	0	0	22	33	4	0	0
7:30 AM	0	61	46	0	0	7	29	1	0	0	20	37	8	0	0	25	35	5	0	0
7:45 AM	1	116	44	0	0	12	30	0	0	0	22	45	10	0	0	35	40	14	0	0
8:00 AM	0	38	19	0	0	4	12	3	0	0	19	19	2	0	0	17	21	4	0	0
8:15 AM	2	3	7	0	0	0	13	0	0	0	0	6	0	0	0	15	22	0	0	0
8:30 AM	0	5	11	0	0	2	8	0	0	0	1	2	1	0	0	5	15	1	0	0
8:45 AM	1	6	15	0	0	0	19	0	0	0	5	0	1	0	0	14	19	0	0	0
3:00 PM	0	6	26	0	0	0	35	2	0	0	3	5	0	0	0	17	16	5	0	0
3:15 PM	2	16	45	0	0	0	28	0	0	0	42	51	5	0	0	46	36	16	0	0
3:30 PM	2	6	32	0	0	0	27	4	0	0	49	92	14	0	0	94	61	10	0	0
3:45 PM	3	5	25	0	0	0	28	2	0	0	25	26	11	0	0	21	22	1	0	0
4:00 PM	1	3	24	0	1	2	46	0	0	0	8	8	5	0	0	33	19	0	0	0
4:15 PM	3	6	14	0	0	0	26	2	0	0	13	7	3	0	0	23	20	0	0	0
4:30 PM	0	2	32	0	0	0	44	4	0	0	19	10	0	0	0	25	23	0	0	0
4:45 PM	2	1	30	0	0	4	37	2	0	0	13	27	1	0	0	22	30	1	0	0
5:00 PM	4	8	46	0	0	2	43	3	0	0	6	12	2	0	0	31	20	2	0	0
5:15 PM	2	11	42	0	0	2	50	4	0	0	12	25	3	0	1	30	19	3	0	0
5:30 PM	0	3	31	0	0	0	40	2	0	0	12	25	5	0	0	37	26	0	0	0
5:45 PM	2	3	33	0	1	2	37	0	0	0	10	34	6	0	0	28	28	2	0	0

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Roosevelt Street					Melgaard Road					Roosevelt Street					Melgaard Road				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	1	0	0	0	4	0	0	0	0	1	0	0	0	2	2	0	0	0
7:45 AM	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	3	1	0	0	0
8:00 AM	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	2	0	0	0	0
8:15 AM	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0
8:30 AM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	3	2	0	0	0
8:45 AM	0	1	2	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
3:00 PM	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	2	1	0	0	0
3:15 PM	0	0	3	0	0	0	2	0	0	0	0	0	0	0	0	3	2	0	0	0
3:30 PM	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	1	4	0	0	0
3:45 PM	0	0	3	0	0	0	2	0	0	0	0	0	0	0	0	4	4	0	0	0
4:00 PM	0	0	1	0	0	0	4	0	0	0	0	0	0	0	0	2	4	0	0	0
4:15 PM	0	0	3	0	0	0	2	0	0	0	0	0	0	0	0	3	2	0	0	0
4:30 PM	0	0	1	0	0	0	5	0	0	0	0	0	0	0	0	5	0	0	0	0
4:45 PM	0	1	4	0	0	0	1	0	0	0	1	0	0	0	0	1	1	0	0	0
5:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0
5:15 PM	0	0	3	0	0	0	2	0	0	0	0	0	0	0	0	3	0	0	0	0
5:30 PM	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	1	3	0	0	0
5:45 PM	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Roosevelt Street					Melgaard Road					Roosevelt Street					Melgaard Road				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	15	14	0	0	2	4	0	0	0	1	6	0	0	0	15	17	1	0	0
7:15 AM	0	32	35	0	0	7	9	2	0	0	19	20	5	0	0	22	33	4	0	0
7:30 AM	0	61	47	0	0	7	33	1	0	0	20	38	8	0	0	27	37	5	0	0
7:45 AM	1	116	45	0	0	12	30	0	0	0	23	45	10	0	0	38	41	14	0	0
8:00 AM	0	38	20	0	0	4	15	3	0	0	19	19	2	0	0	19	21	4	0	0
Peak Hour Total	**1**	**247**	**147**	**0**	**0**	**30**	**87**	**6**	**0**	**0**	**81**	**122**	**25**	**0**	**0**	**106**	**132**	**27**	**0**	**0**
Peak Hour Factor	**0.25**	**0.53**	**0.78**	**0.00**	**NA**	**0.62**	**0.66**	**0.50**	**0.00**	**NA**	**0.88**	**0.68**	**0.62**	**0.00**	**NA**	**0.70**	**0.80**	**0.48**	**0.00**	**NA**
Truck %	**0%**	**0%**	**2%**	**0%**	**NA**	**0%**	**8%**	**0%**	**0%**	**NA**	**1%**	**1%**	**0%**	**0%**	**NA**	**7%**	**2%**	**0%**	**0%**	**NA**
8:15 AM	2	3	10	0	0	0	14	0	0	0	0	6	0	0	0	15	24	0	0	0
8:30 AM	0	5	11	0	0	2	10	0	0	0	1	2	1	0	0	8	17	1	0	0
8:45 AM	1	7	17	0	0	0	20	0	0	0	5	0	1	0	0	15	19	0	0	0
3:00 PM	0	6	27	0	0	0	36	2	0	0	4	5	0	0	0	19	17	5	0	0
3:15 PM	2	16	48	0	0	0	30	0	0	0	42	51	5	0	0	49	38	16	0	0
3:30 PM	2	6	35	0	0	0	28	4	0	0	49	92	14	0	0	95	65	10	0	0
3:45 PM	3	5	28	0	0	0	30	2	0	0	25	26	11	0	0	25	26	1	0	0
4:00 PM	1	3	25	0	1	2	50	0	0	0	8	8	5	0	0	35	23	0	0	0
Peak Hour Total	**8**	**30**	**136**	**0**	**1**	**2**	**138**	**6**	**0**	**0**	**124**	**177**	**35**	**0**	**0**	**204**	**152**	**27**	**0**	**0**
Peak Hour Factor	**0.67**	**0.47**	**0.71**	**0.00**	**NA**	**0.25**	**0.69**	**0.38**	**0.00**	**NA**	**0.63**	**0.48**	**0.62**	**0.00**	**NA**	**0.54**	**0.58**	**0.42**	**0.00**	**NA**
Truck %	**0%**	**0%**	**7%**	**0%**	**NA**	**0%**	**7%**	**0%**	**0%**	**NA**	**0%**	**0%**	**0%**	**0%**	**NA**	**5%**	**9%**	**0%**	**0%**	**NA**
4:15 PM	3	6	17	0	0	0	28	2	0	0	13	7	3	0	0	26	22	0	0	0
4:30 PM	0	2	33	0	0	0	49	4	0	0	19	10	0	0	0	30	23	0	0	0
4:45 PM	2	2	34	0	0	4	38	2	0	0	14	27	1	0	0	23	31	1	0	0
5:00 PM	4	8	46	0	0	2	44	3	0	0	6	12	2	0	0	32	21	2	0	0
5:15 PM	2	11	45	0	0	2	52	4	0	0	12	25	3	0	1	33	19	3	0	0
5:30 PM	0	3	31	0	0	0	42	2	0	0	12	26	5	0	0	38	29	0	0	0
5:45 PM	2	3	34	0	1	2	40	0	0	0	10	34	6	0	0	28	29	2	0	0

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Location #11 - Melgaard Road and 5th Street

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	5th Street					Melgaard Road					5th Street					Melgaard Road				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	15	6	0	0	0	8	4	6	0	0	0	13	15	0	0	3	23	1	0	0
7:15 AM	25	6	1	0	0	8	13	23	0	0	0	15	12	0	0	7	41	1	0	0
7:30 AM	41	12	2	0	0	6	29	32	0	0	0	17	29	0	0	8	57	3	0	0
7:45 AM	42	16	2	0	0	12	23	25	0	0	0	34	24	0	0	6	61	3	0	0
8:00 AM	13	15	5	0	0	8	26	21	0	0	0	18	7	0	0	3	18	0	0	0
8:15 AM	9	10	5	0	0	8	20	9	0	0	2	10	9	0	0	3	15	4	0	0
8:30 AM	16	9	6	0	0	5	11	5	0	0	0	14	12	0	0	7	18	2	0	0
8:45 AM	8	11	4	0	0	6	14	16	0	0	4	10	11	0	0	4	25	3	0	0
3:00 PM	36	12	4	0	0	16	21	28	0	0	3	8	3	0	0	4	23	2	0	0
3:15 PM	27	14	8	0	0	19	30	21	0	0	1	17	6	0	0	4	18	0	0	0
3:30 PM	23	7	6	0	0	11	21	42	0	0	1	50	37	0	0	7	20	3	0	0
3:45 PM	23	13	7	0	0	7	25	31	0	0	2	22	20	0	0	1	13	0	0	0
4:00 PM	17	19	9	0	0	7	33	21	0	1	0	21	15	0	0	4	20	1	0	0
4:15 PM	13	13	10	0	0	12	34	24	0	0	4	21	22	0	0	5	15	2	0	0
4:30 PM	13	16	6	0	0	11	25	21	0	0	2	20	22	0	0	5	35	1	0	0
4:45 PM	24	18	8	0	0	8	33	30	0	0	3	15	7	0	0	11	23	0	0	0
5:00 PM	26	32	12	0	0	18	28	31	0	0	1	14	10	0	0	2	22	0	0	0
5:15 PM	17	19	6	0	0	35	32	24	0	0	5	23	15	0	0	3	39	0	0	0
5:30 PM	24	14	11	0	0	22	26	32	0	0	0	29	11	0	0	6	27	1	0	0
5:45 PM	17	19	6	0	0	9	30	35	0	0	0	14	14	0	0	2	24	0	0	0

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	5th Street					Melgaard Road					5th Street					Melgaard Road				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	2	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2	0	0	0	0
7:15 AM	2	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	4	0	0	0	0	2	1	0	0	0	0	0	0	0	1	0	1	0	0
7:45 AM	2	1	0	0	0	1	0	2	0	0	0	2	3	0	0	1	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	2	1	0	0	0	1	0	0	0	0	3	0	0	0	0	0	3	2	0	0
3:15 PM	1	0	1	0	0	2	1	0	0	0	0	1	1	0	0	0	2	1	0	0
3:30 PM	0	0	1	0	0	0	5	1	0	0	0	0	2	0	0	0	2	1	0	0
3:45 PM	1	1	0	0	0	0	2	2	0	0	2	0	4	0	0	0	7	0	0	0
4:00 PM	1	0	0	0	0	2	2	2	0	0	0	1	0	0	0	0	1	0	0	0
4:15 PM	0	0	0	0	0	2	3	1	0	0	1	0	1	0	0	0	3	0	0	0
4:30 PM	0	0	0	0	0	2	1	0	0	0	2	0	0	0	0	0	5	0	0	0
4:45 PM	0	2	1	0	0	2	4	1	0	0	2	2	1	0	0	0	0	1	0	0
5:00 PM	0	1	0	0	0	0	2	0	0	0	2	1	0	0	0	0	4	0	0	0
5:15 PM	0	0	0	0	0	1	3	1	0	0	0	0	0	0	0	1	2	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0	3	0	0	0
5:45 PM	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	2	0	0	0	0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	5th Street					Melgaard Road					5th Street					Melgaard Road				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	17	6	0	0	0	9	4	7	0	0	0	13	15	0	0	5	23	1	0	0
7:15 AM	27	6	2	0	0	8	14	24	0	0	0	15	12	0	0	7	41	1	0	0
7:30 AM	41	16	2	0	0	6	31	33	0	0	0	17	29	0	0	9	57	4	0	0
7:45 AM	44	17	2	0	0	13	23	27	0	0	0	36	27	0	0	7	61	3	0	0
8:00 AM	13	15	5	0	0	8	26	21	0	0	0	18	8	0	0	3	18	0	0	0
Peak Hour Total	**125**	**54**	**11**	**0**	**0**	**35**	**94**	**105**	**0**	**0**	**0**	**86**	**76**	**0**	**0**	**26**	**177**	**8**	**0**	**0**
Peak Hour Factor	**0.71**	**0.79**	**0.55**	**0.00**	**NA**	**0.67**	**0.76**	**0.80**	**0.00**	**NA**	**0.00**	**0.60**	**0.66**	**0.00**	**NA**	**0.72**	**0.73**	**0.50**	**0.00**	**NA**
Truck %	**3%**	**9%**	**9%**	**0%**	**NA**	**3%**	**3%**	**4%**	**0%**	**NA**	**0%**	**2%**	**5%**	**0%**	**NA**	**8%**	**0%**	**13%**	**0%**	**NA**
8:15 AM	9	10	5	0	0	8	20	9	0	0	2	10	9	0	0	3	15	4	0	0
8:30 AM	16	9	6	0	0	5	11	5	0	0	0	14	12	0	0	7	18	2	0	0
8:45 AM	8	11	4	0	0	6	14	16	0	0	4	10	11	0	0	4	25	3	0	0
3:00 PM	38	13	4	0	0	17	21	28	0	0	6	8	3	0	0	4	26	4	0	0
3:15 PM	28	14	9	0	0	21	31	21	0	0	1	18	7	0	0	4	20	1	0	0
3:30 PM	23	7	7	0	0	11	26	43	0	0	1	50	39	0	0	7	22	4	0	0
3:45 PM	24	14	7	0	0	7	27	33	0	0	4	22	24	0	0	1	20	0	0	0
4:00 PM	18	19	9	0	0	9	35	23	0	1	0	22	15	0	0	4	21	1	0	0
4:15 PM	13	13	10	0	0	14	37	25	0	0	5	21	23	0	0	5	18	2	0	0
4:30 PM	13	16	6	0	0	13	26	21	0	0	4	20	22	0	0	5	40	1	0	0
4:45 PM	24	20	9	0	0	10	37	31	0	0	5	17	8	0	0	11	23	1	0	0
5:00 PM	26	33	12	0	0	18	30	31	0	0	3	15	10	0	0	2	26	0	0	0
5:15 PM	17	19	6	0	0	36	35	25	0	0	5	23	15	0	0	4	41	0	0	0
5:30 PM	24	14	11	0	0	22	26	32	0	0	1	29	14	0	0	6	30	1	0	0
Peak Hour Total	**91**	**86**	**38**	**0**	**0**	**86**	**128**	**119**	**0**	**0**	**14**	**84**	**47**	**0**	**0**	**23**	**120**	**2**	**0**	**0**
Peak Hour Factor	**0.88**	**0.65**	**0.79**	**0.00**	**NA**	**0.60**	**0.86**	**0.93**	**0.00**	**NA**	**0.70**	**0.72**	**0.78**	**0.00**	**NA**	**0.52**	**0.73**	**0.50**	**0.00**	**NA**
Truck %	**0%**	**3%**	**3%**	**0%**	**NA**	**3%**	**7%**	**2%**	**0%**	**NA**	**36%**	**4%**	**9%**	**0%**	**NA**	**4%**	**8%**	**50%**	**0%**	**NA**
5:45 PM	17	20	6	0	0	10	30	36	0	0	0	14	14	0	0	4	24	0	0	0

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Location #12 - Melgaard Road and US 281

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	US 281					Melgaard Road					US 281					Melgaard Road				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	11	22	0	0	0	4	1	4	0	0	0	26	17	0	0	2	6	0	0	0
7:15 AM	15	14	2	0	0	7	1	7	0	0	0	29	25	0	0	3	8	0	0	0
7:30 AM	23	28	9	0	0	12	6	8	0	0	0	49	36	0	0	5	17	2	0	0
7:45 AM	27	33	10	0	0	13	8	14	0	0	2	67	21	0	0	6	5	1	0	0
8:00 AM	3	23	5	0	0	16	5	10	0	0	1	23	12	0	0	6	6	1	0	0
8:15 AM	5	15	7	0	0	19	2	4	0	0	0	34	9	0	0	5	5	1	0	0
8:30 AM	12	32	0	0	0	9	1	7	0	0	1	17	13	0	0	4	5	0	0	0
8:45 AM	6	14	2	0	0	10	3	6	0	0	2	32	16	0	0	2	5	0	0	0
3:00 PM	7	39	4	0	0	12	5	7	0	0	0	20	11	0	0	1	7	1	0	0
3:15 PM	6	21	7	0	0	14	6	14	0	0	2	9	13	0	0	4	1	2	0	0
3:30 PM	8	35	3	0	0	13	8	12	0	0	0	26	11	0	0	3	4	0	0	0
3:45 PM	4	28	0	0	0	19	8	6	0	0	0	24	4	0	0	3	4	0	0	0
4:00 PM	13	35	6	0	0	22	9	11	0	0	2	26	10	0	0	7	6	0	0	0
4:15 PM	7	31	8	0	0	22	8	17	0	0	0	33	11	0	0	5	9	0	0	0
4:30 PM	11	30	10	0	0	14	6	9	0	0	1	20	12	0	1	8	18	0	0	0
4:45 PM	10	26	7	0	0	25	12	10	0	0	2	25	14	0	0	7	4	0	0	0
5:00 PM	6	52	13	0	0	23	14	7	0	0	3	28	14	0	0	7	6	1	0	0
5:15 PM	12	47	6	0	0	26	8	11	0	0	1	25	20	0	0	5	14	1	0	0
5:30 PM	10	39	9	0	0	20	3	10	0	0	0	43	13	0	0	3	5	1	0	0
5:45 PM	6	35	1	0	0	23	4	9	0	0	3	29	17	0	0	3	8	0	0	0

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	US 281					Melgaard Road					US 281					Melgaard Road				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
7:15 AM	0	2	0	0	0	1	0	0	0	0	0	2	1	0	0	0	0	0	0	0
7:30 AM	0	9	0	0	0	2	0	0	0	0	0	2	0	0	0	0	1	0	0	0
7:45 AM	2	4	0	0	0	0	0	0	0	0	0	8	1	0	0	0	0	0	0	0
8:00 AM	0	4	0	0	0	1	0	0	0	0	0	5	0	0	0	0	0	1	0	0
8:15 AM	4	7	0	0	0	0	0	1	0	0	0	7	1	0	0	1	0	0	0	0
8:30 AM	0	3	0	0	0	1	0	0	0	0	0	4	0	0	0	0	0	0	0	0
8:45 AM	1	3	0	0	0	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0
3:00 PM	3	7	0	0	0	0	0	2	0	0	0	10	3	0	0	1	0	0	0	0
3:15 PM	1	7	0	0	0	2	0	1	0	0	0	7	1	0	0	0	0	0	0	0
3:30 PM	1	6	0	0	0	4	1	0	0	0	0	4	4	0	0	1	0	0	0	0
3:45 PM	0	5	0	0	0	2	0	2	0	0	0	6	5	0	0	0	0	0	0	0
4:00 PM	0	4	0	0	0	2	0	1	0	0	0	4	1	0	0	0	0	0	0	0
4:15 PM	0	8	1	0	0	3	0	1	0	0	0	9	3	0	0	0	0	0	0	0
4:30 PM	0	3	0	0	0	1	1	1	0	0	0	5	4	0	0	1	0	0	0	0
4:45 PM	2	3	0	0	0	2	1	2	0	0	0	6	0	0	0	0	0	0	0	0
5:00 PM	0	3	0	0	0	1	0	3	0	0	0	2	4	0	0	0	0	0	0	0
5:15 PM	0	4	0	0	0	3	0	0	0	0	0	7	2	0	0	0	0	0	0	0
5:30 PM	2	4	0	0	0	0	1	0	0	0	0	11	1	0	0	0	0	1	0	0
5:45 PM	0	4	0	0	0	0	0	0	0	0	0	3	3	0	0	0	1	0	0	0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	US 281					Melgaard Road					US 281					Melgaard Road				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	11	25	0	0	0	4	1	4	0	0	0	26	17	0	0	2	6	1	0	0
7:15 AM	15	16	2	0	0	8	1	7	0	0	0	31	26	0	0	3	8	0	0	0
7:30 AM	23	37	9	0	0	14	6	8	0	0	0	51	36	0	0	5	18	2	0	0
7:45 AM	29	37	10	0	0	13	8	14	0	0	2	75	22	0	0	6	5	1	0	0
8:00 AM	3	27	5	0	0	17	5	10	0	0	1	28	12	0	0	6	6	2	0	0
8:15 AM	9	22	7	0	0	19	2	5	0	0	0	41	10	0	0	6	5	1	0	0
Peak Hour Total	**64**	**123**	**31**	**0**	**0**	**63**	**21**	**37**	**0**	**0**	**3**	**195**	**80**	**0**	**0**	**23**	**34**	**6**	**0**	**0**
Peak Hour Factor	**0.55**	**0.83**	**0.78**	**0.00**	**NA**	**0.83**	**0.66**	**0.66**	**0.00**	**NA**	**0.38**	**0.65**	**0.56**	**0.00**	**NA**	**0.96**	**0.47**	**0.75**	**0.00**	**NA**
Truck %	**9%**	**20%**	**0%**	**0%**	**NA**	**5%**	**0%**	**3%**	**0%**	**NA**	**0%**	**11%**	**3%**	**0%**	**NA**	**4%**	**3%**	**17%**	**0%**	**NA**
8:30 AM	12	35	0	0	0	10	1	7	0	0	1	21	13	0	0	4	5	0	0	0
8:45 AM	7	17	2	0	0	10	3	9	0	0	2	33	16	0	0	2	5	0	0	0
3:00 PM	10	46	4	0	0	12	5	9	0	0	0	30	14	0	0	2	7	1	0	0
3:15 PM	7	28	7	0	0	16	6	15	0	0	2	16	14	0	0	4	1	2	0	0
3:30 PM	9	41	3	0	0	17	9	12	0	0	0	30	15	0	0	4	4	0	0	0
3:45 PM	4	33	0	0	0	21	8	8	0	0	0	30	9	0	0	3	4	0	0	0
4:00 PM	13	39	6	0	0	24	9	12	0	0	2	30	11	0	0	7	6	0	0	0
4:15 PM	7	39	9	0	0	25	8	18	0	0	0	42	14	0	0	5	9	0	0	0
4:30 PM	11	33	10	0	0	15	7	10	0	0	1	25	16	0	1	9	18	0	0	0
4:45 PM	12	29	7	0	0	27	13	12	0	0	2	31	14	0	0	7	4	0	0	0
5:00 PM	6	55	13	0	0	24	14	10	0	0	3	30	18	0	0	7	6	1	0	0
5:15 PM	12	51	6	0	0	29	8	11	0	0	1	32	22	0	0	5	14	1	0	0
5:30 PM	12	43	9	0	0	20	4	10	0	0	0	54	14	0	0	3	5	2	0	0
Peak Hour Total	**42**	**178**	**35**	**0**	**0**	**100**	**39**	**43**	**0**	**0**	**6**	**147**	**68**	**0**	**0**	**22**	**29**	**4**	**0**	**0**
Peak Hour Factor	**0.88**	**0.81**	**0.67**	**0.00**	**NA**	**0.86**	**0.70**	**0.90**	**0.00**	**NA**	**0.50**	**0.68**	**0.77**	**0.00**	**NA**	**0.79**	**0.52**	**0.50**	**0.00**	**NA**
Truck %	**10%**	**8%**	**0%**	**0%**	**NA**	**6%**	**5%**	**12%**	**0%**	**NA**	**0%**	**18%**	**10%**	**0%**	**NA**	**0%**	**0%**	**25%**	**0%**	**NA**
5:45 PM	6	39	1	0	0	23	4	9	0	0	3	32	20	0	0	3	9	0	0	0

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Location #13 - 5th Avenue and US 281

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	US 281					5th Avenue					US 281					5th Avenue				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM		26	11	0	0					0	0	14		0	0	10		1	0	0
7:15 AM		54	22	0	0					0	0	18		0	0	6		4	0	0
7:30 AM		82	29	0	0					0	0	19		0	0	8		5	0	0
7:45 AM		51	38	0	0					0	1	18		1	0	21		7	0	1
8:00 AM		30	11	0	0					0	4	18		0	0	5		2	0	0
8:15 AM		39	16	0	0					0	0	18		0	0	2		2	0	0
8:30 AM		35	14	0	0					0	1	10		0	0	4		4	0	0
8:45 AM		23	8	0	0					0	1	28		0	0	4		1	1	0
3:00 PM		26	13	0	0					0	1	31		0	0	12		1	0	0
3:15 PM		21	13	0	0					0	2	39		0	0	13		2	0	0
3:30 PM		27	13	1	0					0	2	49		0	0	14		4	0	0
3:45 PM		25	6	0	0					0	3	36		0	0	18		2	0	0
4:00 PM		23	12	0	0					0	1	51		0	0	16		1	0	0
4:15 PM		25	10	0	0					0	4	43		0	0	11		2	0	0
4:30 PM		45	16	0	0					0	4	47		0	0	16		2	0	0
4:45 PM		25	11	0	0					0	1	40		0	0	21		4	0	0
5:00 PM		31	13	0	0					0	3	53		1	0	19		5	0	0
5:15 PM		36	13	0	0					0	5	66		0	0	15		2	0	0
5:30 PM		38	15	0	0					0	1	53		0	0	15		3	0	0
5:45 PM		21	9	0	0					0	2	50		0	0	10		1	0	0

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	US 281					5th Avenue					US 281					5th Avenue				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM		0	2	0	0					0	0	0		0	0	1		0	0	0
7:15 AM		0	3	0	0					0	0	0		0	0	7		1	0	0
7:30 AM		0	6	0	0					0	0	0		0	0	5		0	0	0
7:45 AM		2	3	0	0					0	0	1		0	0	11		0	0	0
8:00 AM		1	4	0	0					0	0	0		0	0	6		0	0	0
8:15 AM		4	8	0	0					0	0	0		0	0	6		0	0	0
8:30 AM		1	8	0	0					0	0	1		0	0	3		1	0	0
8:45 AM		1	4	0	0					0	0	0		0	0	8		0	0	0
3:00 PM		1	9	0	0					0	0	5		0	0	6		0	0	0
3:15 PM		1	12	0	0					0	0	0		0	0	6		0	0	0
3:30 PM		0	9	0	0					0	0	0		0	0	6		0	0	0
3:45 PM		0	7	0	0					0	0	1		0	0	3		0	0	0
4:00 PM		0	7	0	0					0	0	0		0	0	9		0	0	0
4:15 PM		2	5	0	0					0	0	1		0	0	6		0	0	0
4:30 PM		2	8	0	0					0	0	0		0	0	10		0	0	0
4:45 PM		0	5	0	0					0	0	1		0	0	3		0	0	0
5:00 PM		2	10	0	0					0	1	1		0	0	7		1	0	0
5:15 PM		1	4	0	0					0	0	0		0	0	9		1	0	0
5:30 PM		0	6	0	0					0	0	1		0	0	3		0	0	0
5:45 PM		1	6	0	0					0	0	1		0	0	3		0	0	0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	US 281					5th Avenue					US 281					5th Avenue				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM		26	13	0	0					0	0	14		0	0	11		1	0	0
7:15 AM		54	25	0	0					0	0	18		0	0	13		5	0	0
7:30 AM		82	35	0	0					0	0	19		0	0	13		5	0	0
7:45 AM		53	41	0	0					0	1	19		1	0	32		7	0	1
8:00 AM		31	15	0	0					0	4	18		0	0	11		2	0	0
Peak Hour Total		**220**	**116**	**0**	**0**					**0**	**5**	**74**		**1**	**0**	**69**		**19**	**0**	**1**
Peak Hour Factor		**0.67**	**0.71**	**0.00**	**NA**					**NA**	**0.31**	**0.97**		**0.25**	**NA**	**0.54**		**0.68**	**0.00**	**NA**
Truck %		**1%**	**14%**	**0%**	**NA**					**NA**	**0%**	**1%**		**0%**	**NA**	**42%**		**5%**	**0%**	**NA**
8:15 AM		43	24	0	0					0	0	18		0	0	8		2	0	0
8:30 AM		36	22	0	0					0	1	11		0	0	7		5	0	0
8:45 AM		24	12	0	0					0	1	28		0	0	12		1	1	0
3:00 PM		27	22	0	0					0	1	36		0	0	18		1	0	0
3:15 PM		22	25	0	0					0	2	39		0	0	19		2	0	0
3:30 PM		27	22	1	0					0	2	49		0	0	20		4	0	0
3:45 PM		25	13	0	0					0	3	37		0	0	21		2	0	0
4:00 PM		23	19	0	0					0	1	51		0	0	25		1	0	0
4:15 PM		27	15	0	0					0	4	44		0	0	17		2	0	0
4:30 PM		47	24	0	0					0	4	47		0	0	26		2	0	0
4:45 PM		25	16	0	0					0	1	41		0	0	24		4	0	0
5:00 PM		33	23	0	0					0	4	54		1	0	26		6	0	0
5:15 PM		37	17	0	0					0	5	66		0	0	24		3	0	0
Peak Hour Total		**142**	**80**	**0**	**0**					**0**	**14**	**208**		**1**	**0**	**100**		**15**	**0**	**0**
Peak Hour Factor		**0.76**	**0.83**	**0.00**	**NA**					**NA**	**0.70**	**0.79**		**0.25**	**NA**	**0.96**		**0.62**	**0.00**	**NA**
Truck %		**4%**	**34%**	**0%**	**NA**					**NA**	**7%**	**1%**		**0%**	**NA**	**29%**		**13%**	**0%**	**NA**
5:30 PM		38	21	0	0					0	1	54		0	0	18		3	0	0
5:45 PM		22	15	0	0					0	2	51		0	0	13		1	0	0

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Location #14 - 5th Avenue and 2nd Street

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	2nd Street					5th Avenue					2nd Street					5th Avenue				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	29		1	0	1		18	21	0	0					0	2	31		0	1
7:15 AM	72		2	0	0		26	49	0	0					1	0	55		0	0
7:30 AM	110		5	0	0		41	90	0	0					0	3	98		0	0
7:45 AM	110		9	0	0		65	86	0	0					0	1	74		0	0
8:00 AM	55		4	0	0		46	42	0	0					0	1	56		0	0
8:15 AM	37		5	0	0		38	27	0	0					0	2	44		0	0
8:30 AM	29		4	0	0		32	29	0	0					0	2	55		0	0
8:45 AM	34		4	0	0		38	22	0	0					1	1	43		0	0
3:00 PM	43		5	0	0		61	62	0	0					0	3	72		0	0
3:15 PM	56		6	0	0		53	58	0	0					0	2	54		0	0
3:30 PM	41		3	0	0		73	43	0	0					0	1	63		0	0
3:45 PM	45		3	0	0		83	58	0	0					0	6	58		0	0
4:00 PM	45		6	0	0		68	50	0	0					0	3	63		0	0
4:15 PM	33		6	0	0		73	51	0	0					0	2	52		0	0
4:30 PM	54		10	0	0		87	46	0	0					0	5	94		0	0
4:45 PM	48		6	0	0		80	58	0	0					0	5	82		0	0
5:00 PM	63		5	0	0		98	86	0	0					0	7	101		0	0
5:15 PM	38		9	0	0		91	83	0	0					0	5	72		0	0
5:30 PM	40		7	0	0		85	68	0	0					0	4	68		0	0
5:45 PM	58		11	0	0		62	42	0	0					0	5	61		0	0

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	2nd Street					5th Avenue					2nd Street					5th Avenue				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	2		0	0	0		1	1	0	0					0	0	0		0	0
7:15 AM	0		0	0	0		3	4	0	0					0	0	4		0	0
7:30 AM	0		0	0	0		0	0	0	0					0	0	0		0	0
7:45 AM	3		1	0	0		1	0	0	0					0	0	5		0	0
8:00 AM	0		0	0	0		1	6	0	0					0	0	1		0	0
8:15 AM	1		0	0	0		1	0	0	0					0	0	5		0	0
8:30 AM	1		1	0	0		0	0	0	0					0	1	2		0	0
8:45 AM	2		1	0	0		1	2	0	0					0	0	7		0	0
3:00 PM	2		0	0	0		2	4	0	0					0	0	2		0	0
3:15 PM	3		0	0	0		4	3	0	0					0	0	3		0	0
3:30 PM	0		0	0	0		1	2	0	0					0	1	2		0	0
3:45 PM	0		1	0	0		1	0	0	0					0	0	0		0	0
4:00 PM	1		0	0	0		1	3	0	0					0	0	0		0	0
4:15 PM	1		0	0	0		1	1	0	0					0	0	1		0	0
4:30 PM	0		0	0	0		1	0	0	0					0	0	2		0	0
4:45 PM	1		0	0	0		1	0	0	0					0	0	2		0	0
5:00 PM	0		0	0	0		2	0	0	0					0	0	2		0	0
5:15 PM	0		0	0	0		1	1	0	0					0	0	1		0	0
5:30 PM	0		0	0	0		1	1	0	0					0	0	0		0	0
5:45 PM	0		0	0	0		0	0	0	0					0	0	2		0	0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	2nd Street					5th Avenue					2nd Street					5th Avenue				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	31		1	0	1		19	22	0	0					0	2	31		0	1
7:15 AM	72		2	0	0		29	53	0	0					1	0	59		0	0
7:30 AM	110		5	0	0		41	90	0	0					0	3	98		0	0
7:45 AM	113		10	0	0		66	86	0	0					0	1	79		0	0
8:00 AM	55		4	0	0		47	48	0	0					0	1	57		0	0
Peak Hour Total	**350**		**21**	**0**	**0**		**183**	**277**	**0**	**0**					**1**	**5**	**293**		**0**	**0**
Peak Hour Factor	**0.77**		**0.52**	**0.00**	**NA**		**0.69**	**0.77**	**0.00**	**NA**					**NA**	**0.42**	**0.75**		**0.00**	**NA**
Truck %	**1%**		**5%**	**0%**	**NA**		**3%**	**4%**	**0%**	**NA**					**NA**	**0%**	**3%**		**0%**	**NA**
8:15 AM	38		5	0	0		39	27	0	0					0	2	49		0	0
8:30 AM	30		5	0	0		32	29	0	0					0	3	57		0	0
8:45 AM	36		5	0	0		39	24	0	0					1	1	50		0	0
3:00 PM	45		5	0	0		63	66	0	0					0	3	74		0	0
3:15 PM	59		6	0	0		57	61	0	0					0	2	57		0	0
3:30 PM	41		3	0	0		74	45	0	0					0	2	65		0	0
3:45 PM	45		4	0	0		84	58	0	0					0	6	58		0	0
4:00 PM	46		6	0	0		69	53	0	0					0	3	63		0	0
4:15 PM	34		6	0	0		74	52	0	0					0	2	53		0	0
4:30 PM	54		10	0	0		88	46	0	0					0	5	96		0	0
4:45 PM	49		6	0	0		81	58	0	0					0	5	84		0	0
5:00 PM	63		5	0	0		100	86	0	0					0	7	103		0	0
5:15 PM	38		9	0	0		92	84	0	0					0	5	73		0	0
Peak Hour Total	**204**		**30**	**0**	**0**		**361**	**274**	**0**	**0**					**0**	**22**	**356**		**0**	**0**
Peak Hour Factor	**0.81**		**0.75**	**0.00**	**NA**		**0.90**	**0.80**	**0.00**	**NA**					**NA**	**0.79**	**0.86**		**0.00**	**NA**
Truck %	**0%**		**0%**	**0%**	**NA**		**1%**	**0%**	**0%**	**NA**					**NA**	**0%**	**2%**		**0%**	**NA**
5:30 PM	40		7	0	0		86	69	0	0					0	4	68		0	0
5:45 PM	58		11	0	0		62	42	0	0					0	5	63		0	0

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Location #15 - 24th Avenue and Dakota Street

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Dakota Street					24th Avenue					Dakota Street					24th Avenue				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	3	5	0	0	0	1	4	1	0	0	3	1	6	0	0	0	7	3	0	4
7:15 AM	1	20	2	0	0	12	7	1	0	0	8	4	18	0	1	2	20	8	0	2
7:30 AM	1	27	9	0	0	23	9	1	0	0	8	7	34	0	3	4	49	13	0	3
7:45 AM	1	25	17	0	0	20	12	0	0	0	17	4	27	0	0	5	27	19	0	2
8:00 AM	0	9	1	0	0	1	3	0	0	0	4	11	6	0	0	3	12	3	0	0
8:15 AM	2	4	3	0	0	1	5	1	0	0	0	10	2	0	0	0	2	2	0	0
8:30 AM	0	7	1	0	0	5	5	3	0	0	1	2	2	0	0	2	9	3	0	2
8:45 AM	0	6	1	0	0	2	10	2	0	0	7	6	1	0	0	0	6	1	0	1
3:00 PM	1	4	1	0	0	10	12	0	0	0	6	6	10	0	0	9	26	11	0	3
3:15 PM	0	9	4	0	0	10	12	0	0	0	15	15	32	0	0	2	16	2	0	1
3:30 PM	2	3	1	0	0	10	19	2	0	0	7	9	3	0	1	2	8	4	0	4
3:45 PM	4	5	0	0	0	8	13	1	0	0	9	8	4	0	0	2	6	9	0	3
4:00 PM	1	5	1	0	0	7	10	3	0	0	6	6	4	0	0	1	7	3	0	0
4:15 PM	3	15	1	0	0	2	7	3	0	0	2	16	4	0	0	1	10	4	0	6
4:30 PM	1	8	2	0	0	5	21	0	0	0	6	9	1	0	0	4	13	4	0	1
4:45 PM	1	6	2	0	0	4	18	3	0	0	6	10	2	0	0	2	11	6	0	2
5:00 PM	3	10	2	0	0	9	18	1	0	0	10	18	16	0	0	3	19	10	0	4
5:15 PM	1	8	4	0	0	9	14	1	0	0	13	17	26	0	0	4	19	7	0	4
5:30 PM	2	7	1	0	0	23	32	6	0	0	3	19	8	0	0	2	18	5	0	4
5:45 PM	4	11	2	0	0	4	16	2	0	0	4	7	1	0	0	4	11	6	0	7

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Dakota Street					24th Avenue					Dakota Street					24th Avenue				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0
7:15 AM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0
7:30 AM	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	0	2	0	0	0
7:45 AM	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	2	0	0	0
8:00 AM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
8:15 AM	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
8:45 AM	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	5	0	0	0
3:15 PM	0	1	0	0	0	0	3	0	0	0	1	0	0	0	0	0	2	0	0	0
3:30 PM	0	0	0	0	0	1	3	0	0	0	1	0	0	0	0	0	3	0	0	0
3:45 PM	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
4:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
4:45 PM	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0
5:45 PM	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Dakota Street					24th Avenue					Dakota Street					24th Avenue				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	3	5	0	0	0	1	6	1	0	0	3	1	6	0	0	0	8	3	0	4
7:15 AM	1	20	2	0	0	12	9	1	0	0	8	4	18	0	1	2	22	8	0	2
7:30 AM	1	27	9	0	0	23	9	2	0	0	9	7	36	0	3	4	51	13	0	3
7:45 AM	1	25	17	0	0	21	15	0	0	0	17	4	27	0	0	5	29	19	0	2
8:00 AM	0	11	1	0	0	1	3	0	0	0	4	11	6	0	0	3	13	3	0	0
Peak Hour Total	**3**	**83**	**29**	**0**	**0**	**57**	**36**	**3**	**0**	**0**	**38**	**26**	**87**	**0**	**4**	**14**	**115**	**43**	**0**	**7**
Peak Hour Factor	**0.75**	**0.77**	**0.43**	**0.00**	**NA**	**0.62**	**0.60**	**0.38**	**0.00**	**NA**	**0.56**	**0.59**	**0.60**	**0.00**	**NA**	**0.70**	**0.56**	**0.57**	**0.00**	**NA**
Truck %	**0%**	**2%**	**0%**	**0%**	**NA**	**2%**	**14%**	**33%**	**0%**	**NA**	**3%**	**0%**	**2%**	**0%**	**NA**	**0%**	**6%**	**0%**	**0%**	**NA**
8:15 AM	2	4	4	0	0	1	5	2	0	0	0	11	2	0	0	0	2	2	0	0
8:30 AM	0	7	1	0	0	5	5	3	0	0	1	4	2	0	0	2	9	3	0	2
8:45 AM	1	6	2	0	0	3	10	2	0	0	7	6	1	0	0	0	6	1	0	1
3:00 PM	1	4	1	0	0	10	12	1	0	0	6	6	12	0	0	9	31	11	0	3
3:15 PM	0	10	4	0	0	10	15	0	0	0	16	15	32	0	0	2	18	2	0	1
3:30 PM	2	3	1	0	0	11	22	2	0	0	8	9	3	0	1	2	11	4	0	4
3:45 PM	4	6	1	0	0	8	13	1	0	0	9	8	4	0	0	3	6	9	0	3
4:00 PM	1	5	1	0	0	7	11	3	0	0	6	6	4	0	0	1	7	3	0	0
4:15 PM	3	15	1	0	0	2	7	3	0	0	2	16	4	0	0	1	10	4	0	6
4:30 PM	1	8	2	0	0	5	21	0	0	0	6	9	1	0	0	5	13	4	0	1
4:45 PM	1	6	3	0	0	4	19	3	0	0	7	10	2	0	0	2	11	6	0	2
5:00 PM	3	10	2	0	0	9	18	1	0	0	10	18	16	0	0	3	20	10	0	4
5:15 PM	1	8	4	0	0	9	14	1	0	0	13	17	26	0	0	4	19	7	0	4
5:30 PM	3	7	1	0	0	23	33	6	0	0	3	20	8	0	0	2	19	5	0	4
5:45 PM	5	11	2	0	0	5	17	2	0	0	4	7	1	0	0	4	11	6	0	7
Peak Hour Total	**12**	**36**	**9**	**0**	**0**	**46**	**82**	**10**	**0**	**0**	**30**	**62**	**51**	**0**	**0**	**13**	**69**	**28**	**0**	**19**
Peak Hour Factor	**0.60**	**0.82**	**0.56**	**0.00**	**NA**	**0.50**	**0.62**	**0.42**	**0.00**	**NA**	**0.58**	**0.78**	**0.49**	**0.00**	**NA**	**0.81**	**0.86**	**0.70**	**0.00**	**NA**
Truck %	**17%**	**0%**	**0%**	**0%**	**NA**	**2%**	**2%**	**0%**	**0%**	**NA**	**0%**	**2%**	**0%**	**0%**	**NA**	**0%**	**3%**	**0%**	**0%**	**NA**

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Location # 16 - US 12 (6th Avenue) and Lamont Street

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Lamont Street					US 12 (6th Avenue)					Lamont Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	1	0	0	0	0	51	0	0	0	14	0	5	0	0	1	69	9	0	0
7:15 AM	0	0	0	0	0	2	61	0	0	0	17	1	1	0	0	1	104	11	0	0
7:30 AM	0	1	0	0	0	1	72	0	0	0	15	0	5	0	0	2	142	15	0	0
7:45 AM	0	3	1	0	0	0	116	0	0	0	18	1	3	0	0	2	175	33	0	0
8:00 AM	1	2	0	0	0	1	106	1	0	0	18	1	5	0	0	3	99	42	0	0
8:15 AM	1	0	0	0	0	1	110	2	0	0	27	1	2	0	0	1	89	26	0	0
8:30 AM	0	3	1	0	0	2	83	0	0	0	35	1	3	0	0	1	82	20	0	0
8:45 AM	2	2	0	0	0	2	74	3	0	0	26	1	5	0	0	2	101	33	0	0
3:00 PM	1	1	1	0	4	3	16	2	0	0	19	1	0	0	0	9	23	10	0	0
3:15 PM	1	9	12	0	0	2	36	2	0	0	30	5	1	0	1	13	42	16	0	0
3:30 PM	5	6	8	0	0	5	98	2	0	0	77	4	3	0	0	8	122	55	0	0
3:45 PM	4	6	3	0	0	8	113	7	0	1	89	5	2	0	0	12	139	65	0	0
4:00 PM	2	13	4	0	1	2	165	4	0	0	116	6	2	0	0	16	131	45	0	0
4:15 PM	4	13	10	0	0	2	130	3	0	0	89	9	4	0	0	11	121	50	0	0
4:30 PM	5	11	11	0	1	4	137	20	0	0	93	12	4	0	3	14	130	76	0	0
4:45 PM	8	12	8	0	1	6	119	15	0	0	91	8	2	0	0	10	137	67	0	0
5:00 PM	4	19	10	0	0	10	140	6	0	0	123	14	4	0	0	10	124	50	0	0
5:15 PM	5	11	12	0	2	4	152	1	0	0	103	6	5	0	3	12	137	82	0	0
5:30 PM	5	11	11	0	0	9	143	4	0	0	90	16	1	0	0	9	111	57	0	0
5:45 PM	4	17	7	0	0	8	119	12	0	0	99	16	7	0	0	8	121	56	0	0

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Lamont Street					US 12 (6th Avenue)					Lamont Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

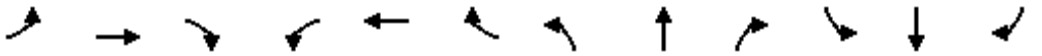
Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Lamont Street					US 12 (6th Avenue)					Lamont Street					US 12 (6th Avenue)				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	1	0	0	0	0	51	0	0	0	14	0	5	0	0	1	69	9	0	0
7:15 AM	0	0	0	0	0	2	61	0	0	0	17	1	1	0	0	1	104	11	0	0
7:30 AM	0	1	0	0	0	1	72	0	0	0	15	0	5	0	0	2	142	15	0	0
7:45 AM	0	3	1	0	0	0	116	0	0	0	18	1	3	0	0	2	175	33	0	0
8:00 AM	1	2	0	0	0	1	106	1	0	0	18	1	5	0	0	3	99	42	0	0
8:15 AM	1	0	0	0	0	1	110	2	0	0	27	1	2	0	0	1	89	26	0	0
Peak Hour Total	**2**	**6**	**1**	**0**	**0**	**3**	**404**	**3**	**0**	**0**	**78**	**3**	**15**	**0**	**0**	**8**	**505**	**116**	**0**	**0**
Peak Hour Factor	**0.50**	**0.50**	**0.25**	**0.00**	**NA**	**0.75**	**0.87**	**0.38**	**0.00**	**NA**	**0.72**	**0.75**	**0.75**	**0.00**	**NA**	**0.67**	**0.72**	**0.69**	**0.00**	**NA**
Truck %	**0%**	**0%**	**0%**	**0%**	**NA**	**0%**	**0%**	**0%**	**0%**	**NA**	**0%**	**0%**	**0%**	**0%**	**NA**	**0%**	**0%**	**0%**	**0%**	**NA**
8:30 AM	0	3	1	0	0	2	83	0	0	0	35	1	3	0	0	1	82	20	0	0
8:45 AM	2	2	0	0	0	2	74	3	0	0	26	1	5	0	0	2	101	33	0	0
3:00 PM	1	1	1	0	4	3	16	2	0	0	19	1	0	0	0	9	23	10	0	0
3:15 PM	1	9	12	0	0	2	36	2	0	0	30	5	1	0	1	13	42	16	0	0
3:30 PM	5	6	8	0	0	5	98	2	0	0	77	4	3	0	0	8	122	55	0	0
3:45 PM	4	6	3	0	0	8	113	7	0	1	89	5	2	0	0	12	139	65	0	0
4:00 PM	2	13	4	0	1	2	165	4	0	0	116	6	2	0	0	16	131	45	0	0
4:15 PM	4	13	10	0	0	2	130	3	0	0	89	9	4	0	0	11	121	50	0	0
4:30 PM	5	11	11	0	1	4	137	20	0	0	93	12	4	0	3	14	130	76	0	0
4:45 PM	8	12	8	0	1	6	119	15	0	0	91	8	2	0	0	10	137	67	0	0
5:00 PM	4	19	10	0	0	10	140	6	0	0	123	14	4	0	0	10	124	50	0	0
5:15 PM	5	11	12	0	2	4	152	1	0	0	103	6	5	0	3	12	137	82	0	0
Peak Hour Total	**22**	**53**	**41**	**0**	**4**	**24**	**548**	**42**	**0**	**0**	**410**	**40**	**15**	**0**	**6**	**46**	**528**	**275**	**0**	**0**
Peak Hour Factor	**0.69**	**0.70**	**0.85**	**0.00**	**NA**	**0.60**	**0.90**	**0.53**	**0.00**	**NA**	**0.83**	**0.71**	**0.75**	**0.00**	**NA**	**0.82**	**0.96**	**0.84**	**0.00**	**NA**
Truck %	**0%**	**0%**	**0%**	**0%**	**NA**	**0%**	**0%**	**0%**	**0%**	**NA**	**0%**	**0%**	**0%**	**0%**	**NA**	**0%**	**0%**	**0%**	**0%**	**NA**
5:30 PM	5	11	11	0	0	9	143	4	0	0	90	16	1	0	0	9	111	57	0	0
5:45 PM	4	17	7	0	0	8	119	12	0	0	99	16	7	0	0	8	121	56	0	0

Data Source: SDDOT - 2012 Count Data

AM Peak Hour

PM Peak Hour

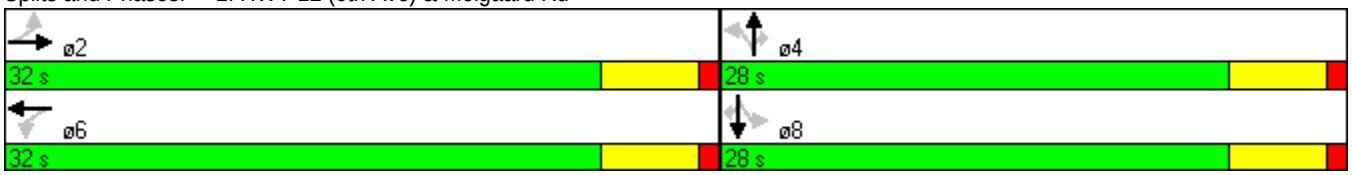


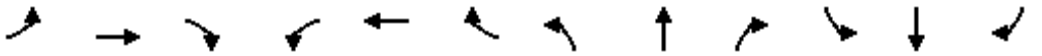
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	68	335	9	99	333	81	23	65	92	118	60	43
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Storage Length (ft)	350		0	0		0	0		180	0		300
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.970				0.850			0.850
Flt Protected	0.950			0.950				0.988			0.972	
Satd. Flow (prot)	1462	2912	0	1357	2798	0	0	1513	1308	0	1493	1333
Flt Permitted	0.466			0.486				0.869			0.745	
Satd. Flow (perm)	717	2912	0	694	2798	0	0	1331	1308	0	1145	1333
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			65				131			119
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		1624			715			525			978	
Travel Time (s)		36.9			16.3			8.9			16.7	
Peak Hour Factor	0.68	0.75	0.56	0.65	0.82	0.81	0.64	0.60	0.70	0.74	0.50	0.36
Heavy Vehicles (%)	4%	4%	0%	12%	5%	7%	9%	3%	4%	5%	3%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	100	463	0	152	506	0	0	144	131	0	279	119
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm			Perm			Perm		Perm	Perm		Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		8
Detector Phase	2	2		6	6		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	20.5	20.5		20.5	20.5		20.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	32.0	32.0	0.0	32.0	32.0	0.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	53.3%	53.3%	0.0%	53.3%	53.3%	0.0%	46.7%	46.7%	46.7%	46.7%	46.7%	46.7%
Maximum Green (s)	26.6	26.6		26.6	26.6		22.6	22.6	22.6	22.6	22.6	22.6
Yellow Time (s)	4.4	4.4		4.4	4.4		4.4	4.4	4.4	4.4	4.4	4.4
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.4	5.4	4.0	5.4	5.4	4.0	5.4	5.4	5.4	5.4	5.4	5.4
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max		None	None		None	None	None	None	None	None
Act Effct Green (s)	30.6	30.6		30.6	30.6			18.6	18.6		18.6	18.6
Actuated g/C Ratio	0.51	0.51		0.51	0.51			0.31	0.31		0.31	0.31

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.27	0.31		0.43	0.35			0.35	0.26		0.79	0.24
Control Delay	20.2	17.6		15.9	9.3			17.2	4.4		34.7	4.3
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	20.2	17.6		15.9	9.3			17.2	4.4		34.7	4.3
LOS	C	B		B	A			B	A		C	A
Approach Delay		18.0			10.8			11.1			25.6	
Approach LOS		B			B			B			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 16.1		Intersection LOS: B	
Intersection Capacity Utilization 55.7%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: HWY 12 (6th Ave) & Melgaard Rd



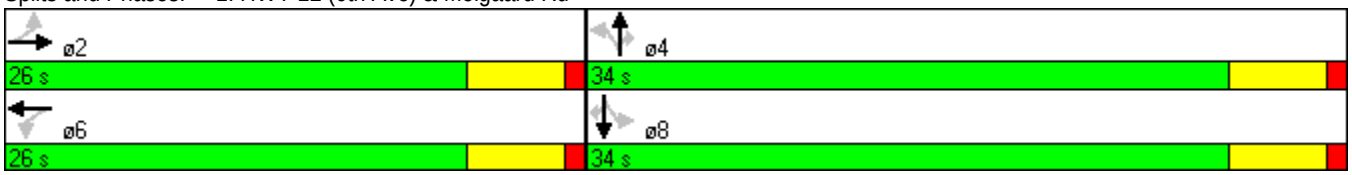


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	280	27	85	340	91	30	68	60	109	177	174
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Storage Length (ft)	350		0	0		0	0		180	0		300
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.988			0.965				0.850			0.850
Flt Protected	0.950			0.950				0.984			0.979	
Satd. Flow (prot)	1520	2863	0	1394	2718	0	0	1513	1183	0	1508	1333
Flt Permitted	0.459			0.546				0.823			0.811	
Satd. Flow (perm)	734	2863	0	801	2718	0	0	1265	1183	0	1250	1333
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			72				68			252
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		1624			715			525			978	
Travel Time (s)		36.9			16.3			8.9			16.7	
Peak Hour Factor	0.72	0.89	0.96	0.76	0.88	0.78	0.83	0.89	0.88	0.66	0.79	0.60
Heavy Vehicles (%)	0%	5%	4%	9%	7%	11%	0%	6%	15%	5%	3%	2%
Adj. Flow (vph)	76	315	28	112	386	117	36	76	68	165	224	290
Shared Lane Traffic (%)												
Lane Group Flow (vph)	76	343	0	112	503	0	0	112	68	0	389	290
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm			Perm			Perm		Perm	Perm		Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		8
Detector Phase	2	2		6	6		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	20.5	20.5		20.5	20.5		20.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	26.0	26.0	0.0	26.0	26.0	0.0	34.0	34.0	34.0	34.0	34.0	34.0
Total Split (%)	43.3%	43.3%	0.0%	43.3%	43.3%	0.0%	56.7%	56.7%	56.7%	56.7%	56.7%	56.7%
Maximum Green (s)	20.6	20.6		20.6	20.6		28.6	28.6	28.6	28.6	28.6	28.6
Yellow Time (s)	4.4	4.4		4.4	4.4		4.4	4.4	4.4	4.4	4.4	4.4
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.4	5.4	4.0	5.4	5.4	4.0	5.4	5.4	5.4	5.4	5.4	5.4
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max		None	None		None	None	None	None	None	None
Act Effct Green (s)	26.0	26.0		26.0	26.0			23.2	23.2		23.2	23.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.43	0.43		0.43	0.43			0.39	0.39		0.39	0.39
v/c Ratio	0.24	0.27		0.32	0.41			0.23	0.14		0.81	0.43
Control Delay	13.9	10.9		17.2	12.6			11.9	3.5		29.1	4.5
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	13.9	10.9		17.2	12.6			11.9	3.5		29.1	4.5
LOS	B	B		B	B			B	A		C	A
Approach Delay		11.5			13.4			8.7			18.6	
Approach LOS		B			B			A			B	

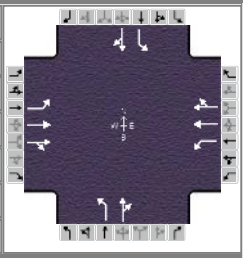
Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 14.4		Intersection LOS: B	
Intersection Capacity Utilization 67.1%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: HWY 12 (6th Ave) & Melgaard Rd



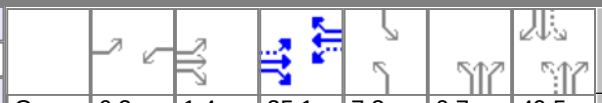
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Nov 14, 2012	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	Roosevelt Street	Analysis Year	2012	Analysis Period	1> 7:00
File Name	Location2_AMpeak.xus				
Project Description	Location #2				

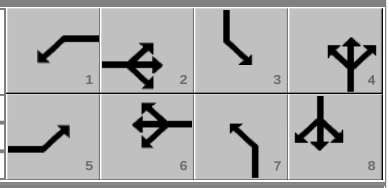


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	104	530	72	36	434	35	100	179	95	70	281	85

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.3	1.4	35.1	7.3	0.7	49.5						
Yellow	3.0	3.0	4.2	3.0	0.0	4.5						
Red	0.0	0.0	1.0	0.0	0.0	1.0						



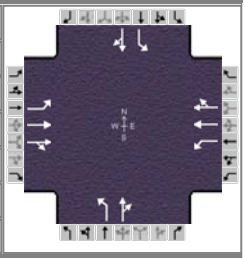
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	7	4	3	8
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	13.7	44.7	9.3	40.3	11.0	55.7	10.3	55.0
Change Period, ($Y+R_c$), s	3.0	5.2	3.0	5.2	3.0	5.5	3.0	5.5
Max Allow Headway (*MAH*), s	3.2	0.0	3.2	0.0	3.2	3.2	3.2	3.2
Queue Clearance Time (g_s), s	8.5		5.2		8.0	21.6	6.4	28.8
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	1.5	0.0	1.5
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	1.00		1.00		1.00	0.00	1.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	116	341	328	40	263	258	111	304		78	407	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1524	1524	1459	1479	1509	1469	1479	1447		1524	1520	
Queue Service Time (g_s), s	5.5	23.2	23.3	2.2	17.9	18.1	5.0	18.6		3.4	25.8	
Cycle Queue Clearance Time (g_c), s	5.5	23.2	23.3	2.2	17.9	18.1	5.0	18.6		3.4	25.8	
Capacity (*c*), veh/h	323	502	480	240	442	430	350	605		440	627	
Volume-to-Capacity Ratio (*X*)	0.358	0.680	0.683	0.167	0.597	0.600	0.318	0.503		0.177	0.649	
Available Capacity (c_a), veh/h	323	502	480	240	442	430	350	605		440	627	
Back of Queue (*Q*), veh/ln (50th percentile)	2.2	9.6	9.3	0.9	7.3	7.2	1.9	6.9		1.3	10.2	
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh	23.2	34.8	34.8	28.0	36.4	36.4	20.3	25.7		19.0	28.3	
Incremental Delay (d_2), s/veh	3.1	7.3	7.7	1.5	5.8	6.1	2.4	3.0		0.9	5.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	26.3	42.0	42.5	29.5	42.2	42.5	22.7	28.7		19.9	33.4	
Level of Service (LOS)	C	D	D	C	D	D	C	C		B	C	
Approach Delay, s/veh / LOS	39.9	D		41.4	D		27.1	C		31.2	C	
Intersection Delay, s/veh / LOS	36.0						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.1	A	1.0	A	1.2	A	1.3	A

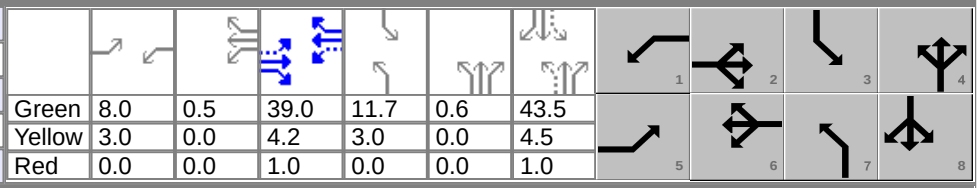
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Nov 14, 2012	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	Roosevelt Street	Analysis Year	2012	Analysis Period	1> 7:00
File Name	Location2_PMpeak.xus				
Project Description	Location #2				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	105	614	79	119	753	102	116	201	100	149	315	150

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	8.0	0.5	39.0	11.7	0.6	43.5
Yellow	3.0	0.0	4.2	3.0	0.0	4.5
Red	0.0	0.0	1.0	0.0	0.0	1.0

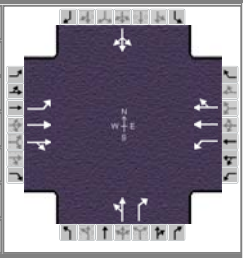
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	7	4	3	8
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	11.0	44.2	11.5	44.7	15.3	49.6	14.7	49.0
Change Period, *(Y+Rc)*, s	3.0	5.2	3.0	5.2	3.0	5.5	3.0	5.5
Max Allow Headway *(MAH)*, s	3.2	0.0	3.2	0.0	3.2	3.2	3.2	3.2
Queue Clearance Time *(g_s)*, s	9.1		9.9		8.8	25.2	11.1	42.8
Green Extension Time *(g_e)*, s	0.0	0.0	0.0	0.0	0.1	1.8	0.0	0.2
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	1.00		1.00		0.72	0.00	1.00	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate *(v)*, veh/h	117	393	377	132	485	465	129	334		166	517	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1509	1538	1477	1509	1553	1487	1524	1479		1494	1510	
Queue Service Time *(g_s)*, s	6.1	27.7	27.8	6.9	36.6	36.6	5.8	22.2		8.1	39.8	
Cycle Queue Clearance Time *(g_c)*, s	6.1	27.7	27.8	6.9	36.6	36.6	5.8	22.2		8.1	39.8	
Capacity *(c)*, veh/h	175	500	480	232	511	489	244	543		396	547	
Volume-to-Capacity Ratio *(X)*	0.665	0.785	0.786	0.569	0.949	0.949	0.528	0.615		0.418	0.944	
Available Capacity *(c_a)*, veh/h	175	500	480	232	511	489	244	543		396	547	
Back of Queue *(Q)*, veh/ln (50th percentile)	3.1	12.0	11.6	3.1	17.9	17.2	2.6	8.6		3.2	18.5	
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	
Uniform Delay *(d_1)*, s/veh	30.2	36.7	36.7	27.6	39.3	39.3	26.0	31.0		22.0	37.1	
Incremental Delay *(d_2)*, s/veh	18.2	11.7	12.3	9.7	29.0	29.8	8.0	5.1		3.2	26.8	
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay *(d)*, s/veh	48.4	48.4	49.0	37.3	68.3	69.1	34.0	36.2		25.2	63.9	
Level of Service (LOS)	D	D	D	D	E	E	C	D		C	E	
Approach Delay, s/veh / LOS	48.7	D		64.9	E		35.6	D		54.5	D	
Intersection Delay, s/veh / LOS	53.6						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.2	A	1.4	A	1.3	A	1.6	A

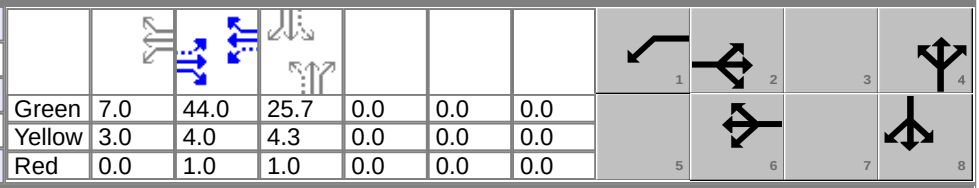
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Nov 14, 2012	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	Lawson Street	Analysis Year	2012	Analysis Period	1> 7:00
File Name	Location3_AMpeak.xus				
Project Description	Location #3				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	0	733	53	52	585	0	158	0	130	0	0	0

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	7.0	44.0	25.7	0.0	0.0	0.0
Yellow	3.0	4.0	4.3	0.0	0.0	0.0
Red	0.0	1.0	1.0	0.0	0.0	0.0

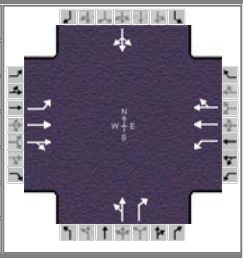
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		4		8
Case Number		6.3	1.0	4.0		7.0		8.0
Phase Duration, s		49.0	10.0	59.0		31.0		31.0
Change Period, *(Y+Rc)*, s		5.2	3.0	5.2		5.3		5.3
Max Allow Headway *(MAH)*, s		0.0	3.2	0.0		3.3		0.0
Queue Clearance Time *(g_s)*, s			4.5			21.1		
Green Extension Time *(g_e)*, s		0.0	0.0	0.0		0.3		0.0
Phase Call Probability			1.00			1.00		
Max Out Probability			1.00			0.40		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate *(v)*, veh/h	0	442	431	58	650	0		176	144		0	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	794	1538	1502	1494	1524	0		799	1329		0	
Queue Service Time *(g_s)*, s	0.0	18.6	18.6	1.5	9.8	0.0		18.1	7.8		0.0	
Cycle Queue Clearance Time *(g_c)*, s	0.0	18.6	18.6	1.5	9.8	0.0		18.1	7.8		0.0	
Capacity *(c)*, veh/h	80	749	731	373	1822			308	380			
Volume-to-Capacity Ratio *(X)*	0.000	0.590	0.590	0.155	0.357	0.000		0.570	0.381		0.000	
Available Capacity *(c_a)*, veh/h	80	749	731	373	1822			308	380			
Back of Queue *(Q)*, veh/ln (50th percentile)	0.0	6.9	6.7	0.5	3.1			4.0	2.8			
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	1.56		0.00	
Uniform Delay *(d_1)*, s/veh	0.0	16.6	16.6	10.4	9.3			29.4	25.8			
Incremental Delay *(d_2)*, s/veh	0.0	3.4	3.5	0.9	0.5	0.0		7.4	2.9		0.0	
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Control Delay *(d)*, s/veh	0.0	20.0	20.1	11.3	9.8			36.9	28.7			
Level of Service (LOS)		C	C	B	A			D	C			
Approach Delay, s/veh / LOS	20.1	C		9.9	A		33.2	C		0.0		
Intersection Delay, s/veh / LOS	18.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.2	A	1.1	A	1.0	A	0.5	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Nov 14, 2012	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Intersection	Lawson Street	Analysis Year	2012	Analysis Period	1> 7:00
File Name	Location3_PMpeak.xus				
Project Description	Location #3				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	5	856	110	120	975	0	109	1	106	2	0	3

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
Green	10.0	46.0	20.7	0.0	0.0	0.0	5	6	7	8
Yellow	3.0	4.0	4.3	0.0	0.0	0.0				
Red	0.0	1.0	1.0	0.0	0.0	0.0				

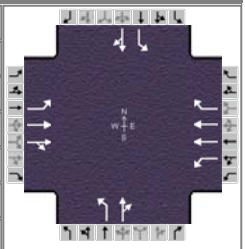
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		4		8
Case Number		6.3	1.0	4.0		7.0		8.0
Phase Duration, s		51.0	13.0	64.0		26.0		26.0
Change Period, *(Y+Rc)*, s		5.2	3.0	5.2		5.3		5.3
Max Allow Headway *(MAH)*, s		0.0	3.2	0.0		3.4		3.4
Queue Clearance Time (g_s), s			6.0			18.9		18.9
Green Extension Time (g_e), s		0.0	0.1	0.0		0.1		0.1
Phase Call Probability			1.00			1.00		1.00
Max Out Probability			0.39			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate *(v)*, veh/h	6	548	526	133	1083	0		122	118		6	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	529	1569	1506	1524	1569	0		689	1343		447	
Queue Service Time (g_s), s	0.5	23.7	23.7	3.0	16.5	0.0		0.2	6.7		0.1	
Cycle Queue Clearance Time (g_c), s	4.0	23.7	23.7	3.0	16.5	0.0		15.9	6.7		15.9	
Capacity *(c)*, veh/h	329	798	766	380	2050			238	309		159	
Volume-to-Capacity Ratio *(X)*	0.017	0.686	0.686	0.351	0.529	0.000		0.514	0.381		0.035	
Available Capacity (c_a), veh/h	329	798	766	380	2050			238	309		159	
Back of Queue *(Q)*, veh/ln (50th percentile)	0.1	9.0	8.6	1.1	5.0			3.0	2.4		0.1	
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	1.37		0.00	
Uniform Delay (d_1), s/veh	12.8	16.7	16.7	11.2	8.3			32.8	29.2		27.7	
Incremental Delay (d_2), s/veh	0.1	4.8	5.0	2.5	1.0	0.0		7.7	3.5		0.4	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Control Delay *(d)*, s/veh	12.8	21.4	21.6	13.7	9.2			40.5	32.8		28.1	
Level of Service (LOS)	B	C	C	B	A			D	C		C	
Approach Delay, s/veh / LOS	21.5	C		9.7	A		36.7	D		28.1	C	
Intersection Delay, s/veh / LOS	17.3						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.4	A	1.5	A	0.9	A	0.5	A

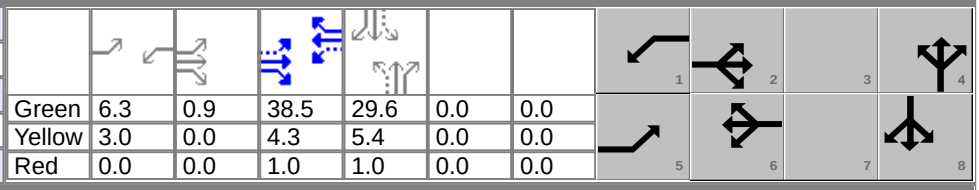
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Nov 14, 2012	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	South Dakota Street	Analysis Year	2012	Analysis Period	1> 7:00
File Name	Location4_AMpeak.xus				
Project Description	Location #4				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	85	668	38	20	600	119	64	141	61	82	128	96

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.3	0.9	38.5	29.6	0.0	0.0
Yellow	3.0	0.0	4.3	5.4	0.0	0.0
Red	0.0	0.0	1.0	1.0	0.0	0.0

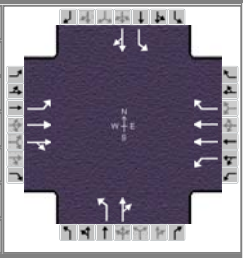
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		4		8
Case Number	1.1	4.0	1.1	3.0		6.0		6.0
Phase Duration, s	10.2	44.7	9.3	43.8		36.0		36.0
Change Period, *(Y+Rc)*, s	3.0	5.3	3.0	5.3		6.4		6.4
Max Allow Headway *(MAH)*, s	3.2	0.0	3.2	0.0		3.4		3.4
Queue Clearance Time (g_s), s	5.9		3.7			20.0		19.6
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0		1.2		1.2
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	1.00		1.00			0.06		0.05

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate *(v)*, veh/h	94	396	389	22	667	132	71	224		91	249	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1494	1553	1523	1524	1465	1329	1148	1518		1152	1484	
Queue Service Time (g_s), s	2.9	17.3	17.3	0.7	15.2	5.7	4.8	10.5		6.1	12.2	
Cycle Queue Clearance Time (g_c), s	2.9	17.3	17.3	0.7	15.2	5.7	17.0	10.5		16.6	12.2	
Capacity *(c)*, veh/h	398	680	667	359	1253	569	302	499		325	488	
Volume-to-Capacity Ratio *(X)*	0.237	0.582	0.583	0.062	0.532	0.233	0.235	0.450		0.281	0.510	
Available Capacity (c_a), veh/h	398	680	667	359	1253	569	302	499		325	488	
Back of Queue *(Q)*, veh/ln (50th percentile)	1.0	6.6	6.5	0.3	5.2	1.8	1.5	4.1		1.9	4.7	
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00	0.00	0.00	0.00	2.32	0.41	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh	12.5	19.1	19.1	13.1	19.1	16.4	31.2	23.8		30.3	24.4	
Incremental Delay (d_2), s/veh	1.4	3.6	3.7	0.3	1.6	1.0	1.8	2.9		2.1	3.8	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay *(d)*, s/veh	13.9	22.7	22.8	13.4	20.7	17.3	33.0	26.7		32.5	28.1	
Level of Service (LOS)	B	C	C	B	C	B	C	C		C	C	
Approach Delay, s/veh / LOS	21.8	C		20.0	B		28.2	C		29.3	C	
Intersection Delay, s/veh / LOS	23.1						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.9	C	2.8	C
Bicycle LOS Score / LOS	1.2	A	1.2	A	1.0	A	1.0	A

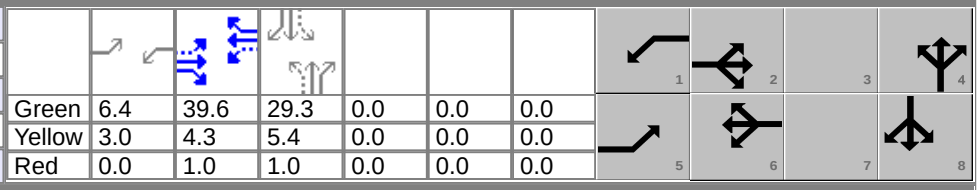
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Nov 14, 2012	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Intersection	North Dakota Street	Analysis Year	2012	Analysis Period	1> 7:00
File Name	Location4_PMpeak.xus				
Project Description	Location #4				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	79	895	70	59	890	113	52	114	41	130	170	100

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.4	39.6	29.3	0.0	0.0	0.0
Yellow	3.0	4.3	5.4	0.0	0.0	0.0
Red	0.0	1.0	1.0	0.0	0.0	0.0

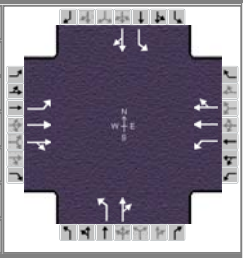
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		4		8
Case Number	1.1	4.0	1.1	3.0		6.0		6.0
Phase Duration, s	9.4	44.9	9.4	44.9		35.7		35.7
Change Period, *(Y+Rc)*, s	3.0	5.3	3.0	5.3		6.4		6.4
Max Allow Headway *(MAH)*, s	3.2	0.0	3.2	0.0		3.4		3.4
Queue Clearance Time *(g_s)*, s	5.7		5.0			22.5		19.9
Green Extension Time *(g_e)*, s	0.0	0.0	0.0	0.0		1.1		1.3
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	1.00		1.00			0.24		0.08

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate *(v)*, veh/h	88	543	529	66	989	126	58	172		144	300	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1524	1553	1513	1524	1493	1356	1074	1511		1231	1498	
Queue Service Time *(g_s)*, s	2.7	27.1	27.1	2.0	24.9	5.1	4.3	7.8		9.1	15.2	
Cycle Queue Clearance Time *(g_c)*, s	2.7	27.1	27.1	2.0	24.9	5.1	19.5	7.8		16.9	15.2	
Capacity *(c)*, veh/h	283	683	666	263	1314	597	248	492		374	488	
Volume-to-Capacity Ratio *(X)*	0.311	0.795	0.795	0.250	0.753	0.210	0.233	0.350		0.386	0.615	
Available Capacity *(c_a)*, veh/h	283	683	666	263	1314	597	248	492		374	488	
Back of Queue *(Q)*, veh/ln (50th percentile)	1.1	11.0	10.8	0.8	8.9	1.7	1.3	3.0		3.0	6.1	
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00	0.00	0.00	0.00	2.08	0.36	0.00		0.00	0.00	
Uniform Delay *(d_1)*, s/veh	15.5	21.7	21.7	15.9	21.1	15.6	33.8	23.1		29.5	25.6	
Incremental Delay *(d_2)*, s/veh	2.8	9.3	9.5	2.3	4.0	0.8	2.2	2.0		3.0	5.7	
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay *(d)*, s/veh	18.3	31.0	31.2	18.2	25.1	16.4	36.0	25.1		32.5	31.3	
Level of Service (LOS)	B	C	C	B	C	B	D	C		C	C	
Approach Delay, s/veh / LOS	30.1	C		23.8	C		27.8	C		31.7	C	
Intersection Delay, s/veh / LOS	27.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.9	C	2.8	C
Bicycle LOS Score / LOS	1.4	A	1.5	A	0.9	A	1.2	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Nov 14, 2012	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	State Street	Analysis Year	2012	Analysis Period	1> 7:00
File Name	Location5_AMpeak.xus				
Project Description	Location #5				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	122	683	39	81	594	51	98	113	76	76	127	92

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
Green	7.0	1.2	34.5	7.0	23.4	0.0	5	6	7	8
Yellow	3.0	0.0	4.3	3.0	4.6	0.0				
Red	0.0	0.0	1.0	0.0	1.0	0.0				

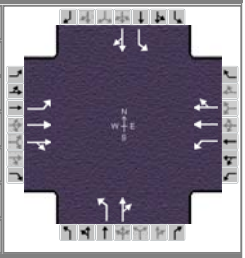
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	7	4	3	8
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	11.2	41.0	10.0	39.8	10.0	29.0	10.0	29.0
Change Period, *(Y+Rc)*, s	3.0	5.3	3.0	5.3	3.0	6.0	3.0	6.0
Max Allow Headway *(MAH)*, s	3.2	0.0	3.2	0.0	3.3	3.3	3.3	3.3
Queue Clearance Time *(g_s)*, s	7.4		6.0		7.8	14.0	6.6	16.3
Green Extension Time *(g_e)*, s	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.6
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	1.00		1.00		1.00	0.04	1.00	0.14

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate *(v)*, veh/h	136	405	397	90	363	353	109	210		84	243	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1509	1553	1523	1524	1538	1494	1465	1487		1479	1470	
Queue Service Time *(g_s)*, s	4.4	19.1	19.2	3.0	17.2	17.2	4.8	11.0		3.6	13.3	
Cycle Queue Clearance Time *(g_c)*, s	4.4	19.1	19.2	3.0	17.2	17.2	4.8	11.0		3.6	13.3	
Capacity *(c)*, veh/h	360	616	604	325	590	573	314	380		349	376	
Volume-to-Capacity Ratio *(X)*	0.377	0.657	0.658	0.277	0.616	0.617	0.347	0.553		0.242	0.648	
Available Capacity *(c_a)*, veh/h	360	616	604	325	590	573	314	380		349	376	
Back of Queue *(Q)*, veh/ln (50th percentile)	1.7	7.6	7.5	1.2	6.7	6.6	1.9	4.5		1.4	5.5	
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.00		0.20	0.00	
Uniform Delay *(d_1)*, s/veh	14.9	22.2	22.2	16.0	22.4	22.4	22.7	29.0		21.9	29.9	
Incremental Delay *(d_2)*, s/veh	3.0	5.4	5.5	2.1	4.8	4.9	3.0	5.7		1.6	8.4	
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay *(d)*, s/veh	17.9	27.6	27.7	18.1	27.2	27.3	25.7	34.7		23.6	38.2	
Level of Service (LOS)	B	C	C	B	C	C	C	C		C	D	
Approach Delay, s/veh / LOS	26.2	C		26.2	C		31.7	C		34.5	C	
Intersection Delay, s/veh / LOS	28.1						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.3	A	1.2	A	1.0	A	1.0	A

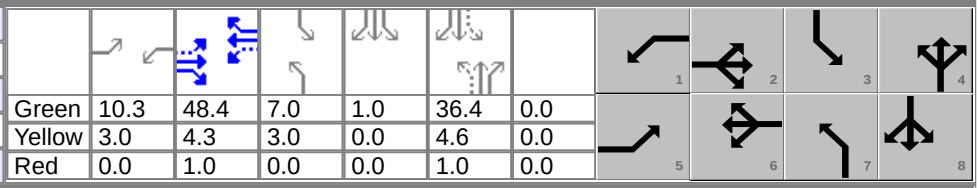
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Nov 14, 2012	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Intersection	State Street	Analysis Year	2012	Analysis Period	1> 7:00
File Name	Location5_PMpeak.xus				
Project Description	Location #5				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	148	844	56	115	835	100	92	140	99	111	204	178

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	10.3	48.4	7.0	1.0	36.4	0.0
Yellow	3.0	4.3	3.0	0.0	4.6	0.0
Red	0.0	1.0	0.0	0.0	1.0	0.0

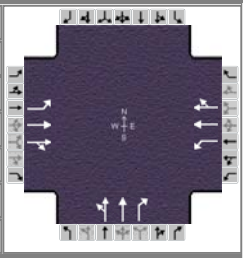
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	7	4	3	8
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	13.2	53.7	13.3	53.8	10.0	42.0	11.0	43.0
Change Period, *(Y+Rc)*, s	3.0	5.3	3.0	5.3	3.0	6.0	3.0	6.0
Max Allow Headway *(MAH)*, s	3.2	0.0	3.2	0.0	3.3	3.3	3.3	3.3
Queue Clearance Time *(g_s)*, s	10.5		8.6		8.5	21.3	9.5	36.6
Green Extension Time *(g_e)*, s	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.1
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	1.00		1.00		1.00	0.01	1.00	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate *(v)*, veh/h	164	506	494	128	530	509	102	266		123	424	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1509	1553	1518	1524	1553	1494	1524	1486		1524	1473	
Queue Service Time *(g_s)*, s	7.5	34.6	34.6	5.6	37.0	37.0	5.5	18.3		6.5	33.6	
Cycle Queue Clearance Time *(g_c)*, s	7.5	34.6	34.6	5.6	37.0	37.0	5.5	18.3		6.5	33.6	
Capacity *(c)*, veh/h	241	627	612	257	628	604	177	446		329	454	
Volume-to-Capacity Ratio *(X)*	0.683	0.807	0.807	0.498	0.843	0.844	0.579	0.596		0.375	0.935	
Available Capacity *(c_a)*, veh/h	241	627	612	257	628	604	177	446		329	454	
Back of Queue *(Q)*, veh/ln (50th percentile)	3.6	14.6	14.3	2.4	15.9	15.4	2.7	7.4		2.7	15.8	
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.54	0.00		0.37	0.00	
Uniform Delay *(d_1)*, s/veh	25.6	31.7	31.7	23.5	32.3	32.3	31.4	35.8		26.7	40.3	
Incremental Delay *(d_2)*, s/veh	14.6	10.7	10.9	6.7	13.0	13.5	13.1	5.8		3.3	28.7	
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay *(d)*, s/veh	40.2	42.4	42.6	30.2	45.4	45.8	44.5	41.6		30.0	69.1	
Level of Service (LOS)	D	D	D	C	D	D	D	D		C	E	
Approach Delay, s/veh / LOS	42.2	D		43.9	D		42.4	D		60.3	E	
Intersection Delay, s/veh / LOS	45.9						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.4	A	1.5	A	1.1	A	1.4	A

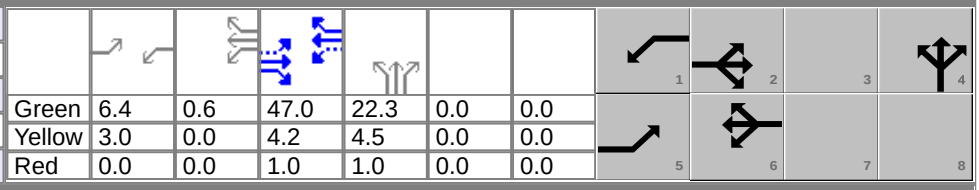
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Nov 14, 2012	Area Type	CBD
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	Main Street	Analysis Year	2012	Analysis Period	1> 7:00
File Name	Location6_AMpeak.xus				
Project Description	Location #6				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	20	787	43	63	587	35	73	93	162			

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.4	0.6	47.0	22.3	0.0	0.0
Yellow	3.0	0.0	4.2	4.5	0.0	0.0
Red	0.0	0.0	1.0	1.0	0.0	0.0

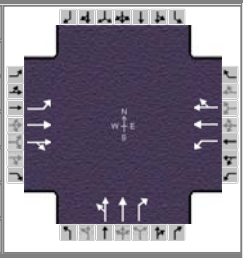
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		4		
Case Number	1.1	4.0	1.1	4.0		11.0		
Phase Duration, s	9.4	52.2	10.0	52.8		27.8		
Change Period, *(Y+Rc)*, s	3.0	5.2	3.0	5.2		5.5		
Max Allow Headway *(MAH)*, s	3.2	0.0	3.2	0.0		3.4		
Queue Clearance Time *(g_s)*, s	3.6		4.9			14.8		
Green Extension Time *(g_e)*, s	0.0	0.0	0.0	0.0		0.5		
Phase Call Probability	1.00		1.00			1.00		
Max Out Probability	1.00		1.00			0.06		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14			
Adjusted Flow Rate *(v)*, veh/h	22	466	457	70	349	342	95	89	180			
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1371	1398	1372	1331	1385	1357	1341	1398	1214			
Queue Service Time *(g_s)*, s	0.6	21.5	21.5	1.9	14.3	14.3	5.2	4.6	11.8			
Cycle Queue Clearance Time *(g_c)*, s	0.6	21.5	21.5	1.9	14.3	14.3	5.2	4.6	11.8			
Capacity *(c)*, veh/h	432	730	716	336	732	718	332	346	301			
Volume-to-Capacity Ratio *(X)*	0.051	0.638	0.638	0.208	0.476	0.477	0.287	0.257	0.598			
Available Capacity *(c_a)*, veh/h	432	730	716	336	732	718	332	346	301			
Back of Queue *(Q)*, veh/ln (50th percentile)	0.2	7.2	7.0	0.6	4.6	4.5	1.9	1.7	4.1			
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Queue Storage Ratio *(RQ)* (50th percentile)	0.03	0.00	0.00	0.09	0.00	0.00	0.00	0.00	2.06			
Uniform Delay *(d_1)*, s/veh	8.6	15.4	15.4	10.4	13.4	13.4	27.4	27.2	29.9			
Incremental Delay *(d_2)*, s/veh	0.2	4.2	4.3	1.4	2.2	2.3	2.2	1.8	8.5			
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Control Delay *(d)*, s/veh	8.9	19.6	19.7	11.8	15.6	15.6	29.6	29.0	38.4			
Level of Service (LOS)	A	B	B	B	B	B	C	C	D			
Approach Delay, s/veh / LOS	19.4	B		15.2	B		33.8	C		0.0		
Intersection Delay, s/veh / LOS	20.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	2.4	B	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.3	A	1.1	A	0.8	A		

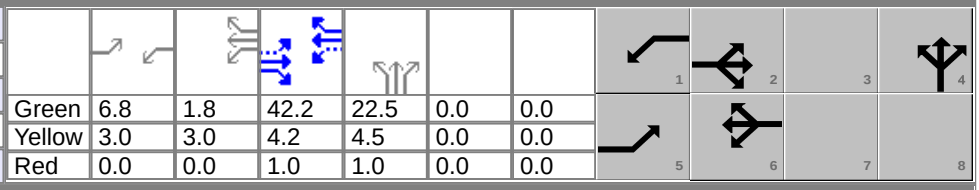
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Nov 14, 2012	Area Type	CBD
Jurisdiction		Time Period	PM Peak	PHF	0.90
Intersection	Main Street	Analysis Year	2012	Analysis Period	1> 7:00
File Name	Location6_PMpeak.xus				
Project Description	Location #6				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	40	755	67	116	935	90	83	95	111			

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.8	1.8	42.2	22.5	0.0	0.0
Yellow	3.0	3.0	4.2	4.5	0.0	0.0
Red	0.0	0.0	1.0	1.0	0.0	0.0

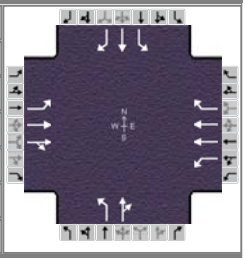
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		4		
Case Number	1.1	4.0	1.1	4.0		11.0		
Phase Duration, s	9.8	47.4	14.6	52.2		28.0		
Change Period, *(Y+Rc)*, s	3.0	5.2	3.0	5.2		5.5		
Max Allow Headway *(MAH)*, s	3.2	0.0	3.2	0.0		3.4		
Queue Clearance Time *(g_s)*, s	4.4		5.9			10.7		
Green Extension Time *(g_e)*, s	0.0	0.0	0.1	0.0		0.6		
Phase Call Probability	1.00		1.00			1.00		
Max Out Probability	1.00		0.06			0.00		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14			
Adjusted Flow Rate *(v)*, veh/h	44	463	450	129	578	561	102	95	123			
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1331	1385	1344	1371	1398	1355	1364	1426	1209			
Queue Service Time *(g_s)*, s	1.4	24.1	24.1	2.9	30.3	30.4	5.5	4.8	7.7			
Cycle Queue Clearance Time *(g_c)*, s	1.4	24.1	24.1	2.9	30.3	30.4	5.5	4.8	7.7			
Capacity *(c)*, veh/h	262	649	630	369	730	707	341	356	302			
Volume-to-Capacity Ratio *(X)*	0.170	0.714	0.714	0.349	0.792	0.793	0.300	0.268	0.408			
Available Capacity *(c_a)*, veh/h	262	649	630	369	730	707	341	356	302			
Back of Queue *(Q)*, veh/ln (50th percentile)	0.5	8.4	8.2	1.3	10.7	10.4	2.0	1.8	2.5			
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Queue Storage Ratio *(RQ)* (50th percentile)	0.07	0.00	0.00	0.18	0.00	0.00	0.00	0.00	1.27			
Uniform Delay *(d_1)*, s/veh	13.7	19.1	19.1	12.3	17.5	17.5	27.4	27.1	28.2			
Incremental Delay *(d_2)*, s/veh	1.4	6.6	6.8	2.6	8.6	8.9	2.2	1.8	4.0			
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Control Delay *(d)*, s/veh	15.1	25.7	25.9	14.9	26.1	26.4	29.6	29.0	32.2			
Level of Service (LOS)	B	C	C	B	C	C	C	C	C			
Approach Delay, s/veh / LOS	25.3	C		25.1	C		30.4	C		0.0		
Intersection Delay, s/veh / LOS	25.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	2.4	B	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.3	A	1.5	A	0.8	A		

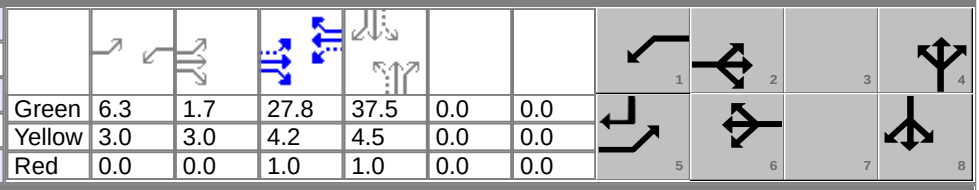
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Nov 14, 2012	Area Type	CBD
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	2nd Street	Analysis Year	2012	Analysis Period	1> 7:00
File Name	Location7_AMpeak.xus				
Project Description	Location #7				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	156	626	10	33	426	150	39	185	63	146	198	124

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.3	1.7	27.8	37.5	0.0	0.0
Yellow	3.0	3.0	4.2	4.5	0.0	0.0
Red	0.0	0.0	1.0	1.0	0.0	0.0

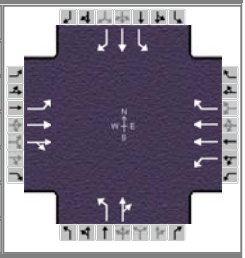
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		4		8
Case Number	1.1	4.0	1.1	3.0		6.0		5.0
Phase Duration, s	14.0	37.7	9.3	33.0		43.0		43.0
Change Period, ($Y+R_c$), s	3.0	5.2	3.0	5.2		5.7		5.7
Max Allow Headway (*MAH*), s	3.2	0.0	3.2	0.0		3.5		3.5
Queue Clearance Time (g_s), s	8.4		3.6			15.3		28.5
Green Extension Time (g_e), s	0.1	0.0	0.0	0.0		2.1		1.7
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	1.00		1.00			0.00		0.17

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	173	354	352	37	473	167	43	276		162	220	138
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1371	1398	1390	1331	1306	1183	1062	1363		980	1412	1173
Queue Service Time (g_s), s	6.4	19.5	19.5	1.6	13.8	10.2	2.7	13.3		13.1	9.7	5.5
Cycle Queue Clearance Time (g_c), s	6.4	19.5	19.5	1.6	13.8	10.2	12.4	13.3		26.5	9.7	5.5
Capacity (*c*), veh/h	379	505	502	268	807	365	405	565		341	585	630
Volume-to-Capacity Ratio (*X*)	0.458	0.702	0.702	0.137	0.587	0.456	0.107	0.488		0.476	0.376	0.219
Available Capacity (c_a), veh/h	379	505	502	268	807	365	405	565		341	585	630
Back of Queue (*Q*), veh/ln (50th percentile)	2.3	7.3	7.3	0.6	4.5	3.2	0.7	4.6		3.5	3.4	1.5
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Queue Storage Ratio (*RQ*) (50th percentile)	0.44	0.00	0.00	0.09	0.00	1.09	0.18	0.00		0.53	0.00	0.00
Uniform Delay (d_1), s/veh	15.5	24.6	24.6	19.1	26.3	25.0	22.6	19.3		29.0	18.3	10.9
Incremental Delay (d_2), s/veh	3.9	7.9	8.0	1.1	3.1	4.1	0.5	3.0		4.7	1.8	0.8
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	19.5	32.5	32.6	20.2	29.4	29.1	23.1	22.3		33.8	20.1	11.7
Level of Service (LOS)	B	C	C	C	C	C	C	C		C	C	B
Approach Delay, s/veh / LOS	30.0	C		28.8	C		22.4	C		22.2	C	
Intersection Delay, s/veh / LOS	26.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.4	B	2.9	C	2.8	C
Bicycle LOS Score / LOS	1.2	A	1.0	A	1.0	A	1.3	A

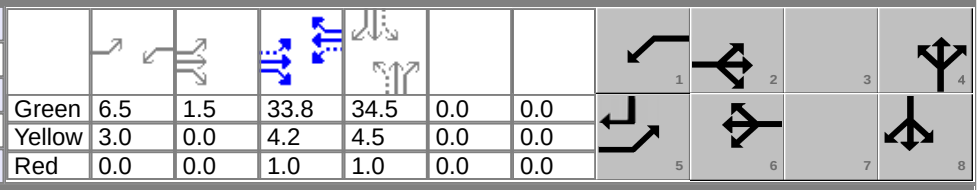
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Nov 14, 2012	Area Type	CBD
Jurisdiction		Time Period	PM Peak	PHF	0.90
Intersection	2nd Street	Analysis Year	2012	Analysis Period	1> 7:00
File Name	Location7_PMpeak.xus				
Project Description	Location #7				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	124	510	12	67	745	222	17	112	36	200	169	173

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.5	1.5	33.8	34.5	0.0	0.0
Yellow	3.0	0.0	4.2	4.5	0.0	0.0
Red	0.0	0.0	1.0	1.0	0.0	0.0

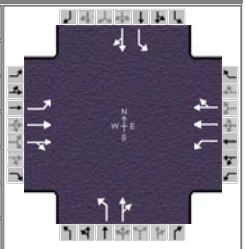
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		4		8
Case Number	1.1	4.0	1.1	3.0		6.0		5.0
Phase Duration, s	11.0	40.5	9.5	39.0		40.0		40.0
Change Period, *(Y+Rc)*, s	3.0	5.2	3.0	5.2		5.7		5.7
Max Allow Headway *(MAH)*, s	3.2	0.0	3.2	0.0		3.5		3.5
Queue Clearance Time (g_s), s	8.1		5.9			12.5		26.9
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0		2.0		1.4
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	1.00		1.00			0.00		0.25

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	138	291	289	74	828	247	19	164		222	188	192
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1358	1385	1373	1358	1331	1215	1091	1352		1093	1440	1193
Queue Service Time (g_s), s	5.1	14.6	14.6	2.9	25.4	14.3	1.1	7.7		16.2	8.4	9.2
Cycle Queue Clearance Time (g_c), s	5.1	14.6	14.6	2.9	25.4	14.3	9.5	7.7		23.9	8.4	9.2
Capacity (*c*), veh/h	257	543	539	352	1000	456	395	515		403	549	561
Volume-to-Capacity Ratio (*X*)	0.536	0.536	0.537	0.212	0.828	0.540	0.048	0.319		0.551	0.342	0.343
Available Capacity (c_a), veh/h	257	543	539	352	1000	456	395	515		403	549	561
Back of Queue (*Q*), veh/ln (50th percentile)	2.0	5.1	5.1	1.0	8.7	4.5	0.3	2.6		4.8	3.0	2.7
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Queue Storage Ratio (*RQ*) (50th percentile)	0.39	0.00	0.00	0.16	0.00	1.50	0.08	0.00		0.71	0.00	0.00
Uniform Delay (d_1), s/veh	18.4	21.0	21.1	15.6	25.5	22.0	23.2	19.6		28.0	19.8	15.1
Incremental Delay (d_2), s/veh	7.8	3.8	3.8	1.4	7.9	4.5	0.2	1.6		5.4	1.7	1.7
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	26.2	24.8	24.9	16.9	33.3	26.6	23.4	21.3		33.4	21.5	16.7
Level of Service (LOS)	C	C	C	B	C	C	C	C		C	C	B
Approach Delay, s/veh / LOS	25.1	C		30.8	C		21.5	C		24.4	C	
Intersection Delay, s/veh / LOS	27.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.4	B	2.9	C	2.8	C
Bicycle LOS Score / LOS	1.1	A	1.4	A	0.8	A	1.5	A

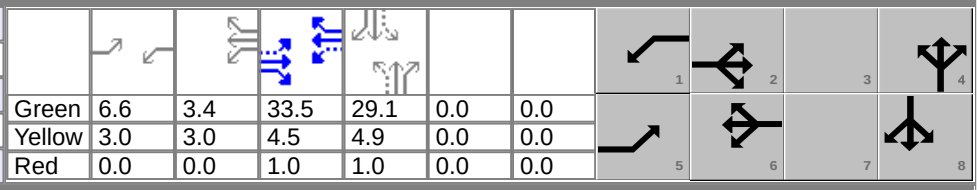
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Nov 14, 2012	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	5th Street	Analysis Year	2012	Analysis Period	1> 7:00
File Name	Location8_AMpeak.xus				
Project Description	Location #8				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	5	538	54	136	357	10	77	57	225	15	44	12

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.6	3.4	33.5	29.1	0.0	0.0
Yellow	3.0	3.0	4.5	4.9	0.0	0.0
Red	0.0	0.0	1.0	1.0	0.0	0.0

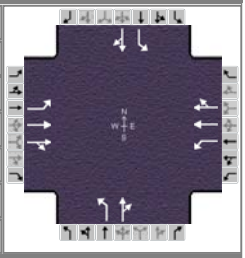
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		4		8
Case Number	1.1	4.0	1.1	4.0		6.0		6.0
Phase Duration, s	9.6	39.0	16.0	45.4		35.0		35.0
Change Period, *(Y+Rc)*, s	3.0	5.5	3.0	5.5		6.1		6.1
Max Allow Headway *(MAH)*, s	3.2	0.0	3.2	0.0		3.4		3.4
Queue Clearance Time (g_s), s	3.2		6.9			21.2		22.6
Green Extension Time (g_e), s	0.0	0.0	0.1	0.0		0.8		0.7
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.56		0.04			0.10		0.21

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate *(v)*, veh/h	6	334	324	151	205	203	86	313		17	62	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1524	1553	1503	1465	1538	1523	1249	1367		957	1440	
Queue Service Time (g_s), s	0.2	15.5	15.5	3.9	7.7	7.7	4.7	18.2		1.4	2.8	
Cycle Queue Clearance Time (g_c), s	0.2	15.5	15.5	3.9	7.7	7.7	7.5	18.2		19.6	2.8	
Capacity *(c)*, veh/h	547	578	559	443	682	675	443	439		194	462	
Volume-to-Capacity Ratio *(X)*	0.010	0.577	0.579	0.341	0.300	0.301	0.193	0.714		0.086	0.135	
Available Capacity (c_a), veh/h	547	578	559	443	682	675	443	439		194	462	
Back of Queue *(Q)*, veh/ln (50th percentile)	0.1	6.1	6.0	1.4	2.8	2.8	1.5	6.9		0.4	1.0	
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.21	0.00	
Uniform Delay (d_1), s/veh	13.9	22.6	22.6	11.5	16.1	16.1	24.3	26.9		35.5	21.7	
Incremental Delay (d_2), s/veh	0.0	4.2	4.3	2.1	1.1	1.1	1.0	9.5		0.9	0.6	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay *(d)*, s/veh	13.9	26.7	26.9	13.6	17.2	17.2	25.3	36.4		36.4	22.3	
Level of Service (LOS)	B	C	C	B	B	B	C	D		D	C	
Approach Delay, s/veh / LOS	26.7	C		16.2	B		34.0	C		25.3	C	
Intersection Delay, s/veh / LOS	24.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.0	A	0.9	A	1.1	A	0.6	A

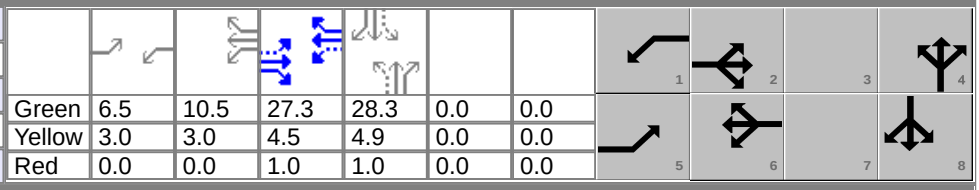
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Nov 14, 2012	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Intersection	5th Street	Analysis Year	2012	Analysis Period	1> 7:00
File Name	Location8_PMpeak.xus				
Project Description	Location #8				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	7	445	52	288	578	14	61	30	172	14	51	9

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.5	10.5	27.3	28.3	0.0	0.0
Yellow	3.0	3.0	4.5	4.9	0.0	0.0
Red	0.0	0.0	1.0	1.0	0.0	0.0

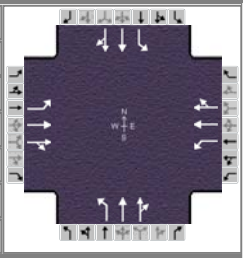
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		4		8
Case Number	1.1	4.0	1.1	4.0		6.0		6.0
Phase Duration, s	9.5	32.8	23.0	46.3		34.2		34.2
Change Period, *(Y+Rc)*, s	3.0	5.5	3.0	5.5		6.1		6.1
Max Allow Headway *(MAH)*, s	3.2	0.0	3.2	0.0		3.4		3.4
Queue Clearance Time (g_s), s	3.4		10.1			15.4		16.5
Green Extension Time (g_e), s	0.0	0.0	0.5	0.0		0.7		0.7
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	1.00		0.01			0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate *(v)*, veh/h	8	280	272	320	330	328	68	224		16	67	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1181	1524	1467	1494	1553	1540	1356	1342		1095	1558	
Queue Service Time (g_s), s	0.4	14.1	14.3	7.1	13.3	13.3	3.4	12.4		1.1	2.8	
Cycle Queue Clearance Time (g_c), s	0.4	14.1	14.3	7.1	13.3	13.3	6.2	12.4		13.5	2.8	
Capacity *(c)*, veh/h	351	462	445	535	704	698	462	419		271	486	
Volume-to-Capacity Ratio *(X)*	0.022	0.607	0.611	0.598	0.469	0.469	0.147	0.535		0.057	0.137	
Available Capacity (c_a), veh/h	351	462	445	535	704	698	462	419		271	486	
Back of Queue *(Q)*, veh/ln (50th percentile)	0.1	5.7	5.6	3.6	4.9	4.9	1.2	4.4		0.3	1.1	
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.17	0.00	
Uniform Delay (d_1), s/veh	17.7	26.8	26.8	13.0	17.1	17.1	24.5	25.6		31.1	22.2	
Incremental Delay (d_2), s/veh	0.1	5.8	6.1	4.9	2.2	2.3	0.7	4.8		0.4	0.6	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay *(d)*, s/veh	17.8	32.6	32.9	17.9	19.3	19.3	25.1	30.4		31.5	22.8	
Level of Service (LOS)	B	C	C	B	B	B	C	C		C	C	
Approach Delay, s/veh / LOS	32.5	C		18.8	B		29.2	C		24.5	C	
Intersection Delay, s/veh / LOS	24.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	0.9	A	1.3	A	1.0	A	0.6	A

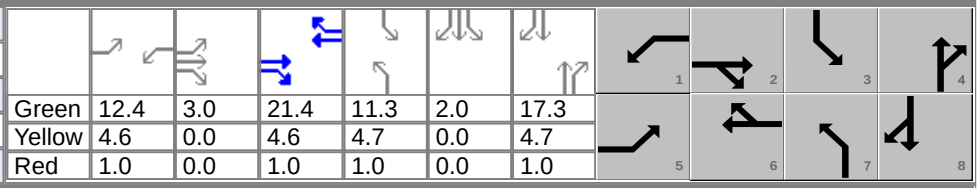
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Nov 14, 2012	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	US 281	Analysis Year	2012	Analysis Period	1> 7:00
File Name	Location9_AMpeak.xus				
Project Description	Location #9				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	59	228	55	59	191	49	41	112	119	65	107	76

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	12.4	3.0	21.4	11.3	2.0	17.3			
Yellow	4.6	0.0	4.6	4.7	0.0	4.7			
Red	1.0	0.0	1.0	1.0	0.0	1.0			

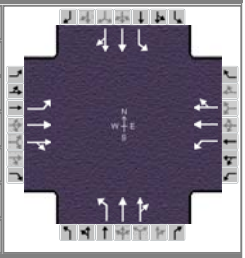
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	7	4	3	8
Case Number	2.0	4.0	2.0	4.0	2.0	4.0	2.0	4.0
Phase Duration, s	21.0	30.0	18.0	27.0	17.0	23.0	19.0	25.0
Change Period, *(Y+Rc)*, s	5.5	5.6	5.6	5.6	5.7	5.7	5.7	5.7
Max Allow Headway *(MAH)*, s	3.2	0.0	3.2	0.0	3.0	3.1	3.0	3.1
Queue Clearance Time *(g_s)*, s	7.2		6.8		6.2	11.7	6.9	9.9
Green Extension Time *(g_e)*, s	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.7
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	0.00		0.03		0.02	0.20	0.01	0.02

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate *(v)*, veh/h	66	160	154	66	136	131	46	124	132	72	119	84
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1229	1495	1396	1411	1495	1391	1181	1455	1233	1494	1345	1139
Queue Service Time *(g_s)*, s	4.2	7.9	8.1	3.8	6.8	7.1	3.2	6.8	8.7	3.9	6.9	5.7
Cycle Queue Clearance Time *(g_c)*, s	4.2	7.9	8.1	3.8	6.8	7.1	3.2	6.8	8.7	3.9	6.9	5.7
Capacity *(c)*, veh/h	212	405	378	194	356	331	148	280	237	221	288	244
Volume-to-Capacity Ratio *(X)*	0.310	0.395	0.408	0.337	0.382	0.396	0.307	0.445	0.558	0.327	0.412	0.346
Available Capacity *(c_a)*, veh/h	212	405	378	194	356	331	148	280	237	221	288	244
Back of Queue *(Q)*, veh/ln (50th percentile)	1.5	3.1	3.0	1.5	2.7	2.7	1.1	2.7	3.1	1.6	2.4	1.7
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.27	0.00	0.00
Uniform Delay *(d_1)*, s/veh	32.6	26.8	26.9	35.1	28.8	28.9	35.8	32.1	32.9	34.3	30.5	30.0
Incremental Delay *(d_2)*, s/veh	3.8	2.9	3.2	4.6	3.1	3.5	5.3	5.1	9.2	3.9	4.3	3.8
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay *(d)*, s/veh	36.3	29.6	30.1	39.7	31.8	32.4	41.1	37.2	42.1	38.3	34.8	33.8
Level of Service (LOS)	D	C	C	D	C	C	D	D	D	D	C	C
Approach Delay, s/veh / LOS	31.0	C		33.6	C		39.9	D		35.4	D	
Intersection Delay, s/veh / LOS	34.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	2.8	C	2.8	C
Bicycle LOS Score / LOS	0.8	A	0.8	A	0.7	A	0.7	A

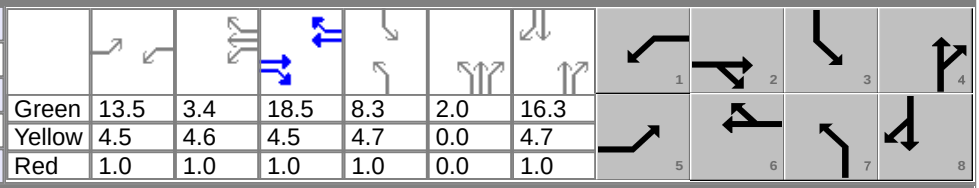
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Nov 14, 2012	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Intersection	US 281	Analysis Year	2012	Analysis Period	1> 7:00
File Name	Location9_PMpeak.xus				
Project Description	Location #9				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	62	183	51	140	248	63	39	97	96	34	103	68

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	13.5	3.4	18.5	8.3	2.0	16.3
Yellow	4.5	4.6	4.5	4.7	0.0	4.7
Red	1.0	1.0	1.0	1.0	0.0	1.0

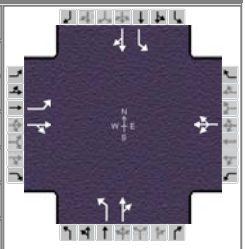
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	7	4	3	8
Case Number	2.0	4.0	2.0	4.0	2.0	4.0	2.0	4.0
Phase Duration, s	19.0	24.0	28.0	33.0	16.0	24.0	14.0	22.0
Change Period, *(Y+Rc)*, s	5.5	5.6	5.6	5.6	5.7	5.7	5.7	5.7
Max Allow Headway *(MAH)*, s	3.2	0.0	3.2	0.0	3.0	3.1	3.0	3.1
Queue Clearance Time (g_s), s	7.4		10.9		5.8	10.5	5.2	9.8
Green Extension Time (g_e), s	0.0	0.0	0.2	0.0	0.0	0.5	0.0	0.5
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	0.01		0.00		0.08	0.04	0.90	0.09

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate *(v)*, veh/h	69	132	128	156	176	169	43	108	107	38	114	76
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1259	1441	1335	1494	1495	1392	1259	1322	1121	1438	1356	1149
Queue Service Time (g_s), s	4.4	7.2	7.6	7.9	8.4	8.7	2.8	6.4	7.5	2.2	6.8	5.2
Cycle Queue Clearance Time (g_c), s	4.4	7.2	7.6	7.9	8.4	8.7	2.8	6.4	7.5	2.2	6.8	5.2
Capacity *(c)*, veh/h	189	295	273	372	455	424	144	269	228	133	246	208
Volume-to-Capacity Ratio *(X)*	0.365	0.449	0.468	0.418	0.388	0.399	0.301	0.401	0.468	0.285	0.466	0.363
Available Capacity (c_a), veh/h	189	295	273	372	455	424	144	269	228	133	246	208
Back of Queue *(Q)*, veh/ln (50th percentile)	1.6	2.9	2.8	3.1	3.2	3.1	1.0	2.3	2.4	0.9	2.5	1.6
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.16	0.00	0.00
Uniform Delay (d_1), s/veh	34.4	31.4	31.5	28.3	24.7	24.8	36.5	31.1	31.6	38.1	33.0	32.3
Incremental Delay (d_2), s/veh	5.4	4.9	5.7	3.4	2.5	2.8	5.3	4.4	6.8	5.3	6.2	4.8
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay *(d)*, s/veh	39.8	36.2	37.2	31.8	27.2	27.6	41.8	35.5	38.3	43.4	39.2	37.1
Level of Service (LOS)	D	D	D	C	C	C	D	D	D	D	D	D
Approach Delay, s/veh / LOS	37.3	D		28.7	C		37.7	D		39.2	D	
Intersection Delay, s/veh / LOS	34.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	2.8	C	2.8	C
Bicycle LOS Score / LOS	0.8	A	0.9	A	0.7	A	0.7	A

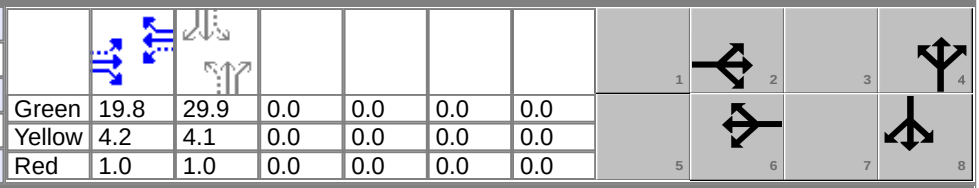
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Nov 14, 2012	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	Melgaard Rd (CR 19)	Analysis Year	2012	Analysis Period	1> 7:00
File Name	Location10_AMpeak.xus				
Project Description	Location #10				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	106	132	27	30	87	6	81	122	25	1	247	147

Signal Information			
Cycle, s	60.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	19.8	29.9	0.0	0.0	0.0	0.0						
Yellow	4.2	4.1	0.0	0.0	0.0	0.0						
Red	1.0	1.0	0.0	0.0	0.0	0.0						

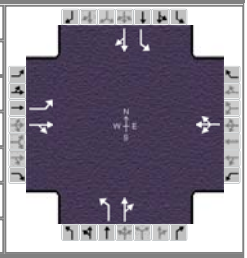
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		4		8
Case Number		6.0		8.0		6.0		6.0
Phase Duration, s		25.0		25.0		35.0		35.0
Change Period, $(Y+R_c)$, s		5.2		5.2		5.2		5.2
Max Allow Headway *(MAH)*, s		0.0		0.0		3.4		3.4
Queue Clearance Time (g_s), s						19.9		15.5
Green Extension Time (g_e), s		0.0		0.0		1.3		1.5
Phase Call Probability						1.00		1.00
Max Out Probability						0.06		0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate *(v)*, veh/h	118	177			137		90	163		1	438	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1189	1522			1230		957	1537		1242	1499	
Queue Service Time (g_s), s	4.9	5.3			0.0		4.4	3.6		0.0	12.5	
Cycle Queue Clearance Time (g_c), s	9.0	5.3			4.1		16.9	3.6		3.6	12.5	
Capacity *(c)*, veh/h	431	502			480		397	763		662	745	
Volume-to-Capacity Ratio *(X)*	0.273	0.352			0.284		0.227	0.214		0.002	0.588	
Available Capacity (c_a), veh/h	431	502			480		397	763		662	745	
Back of Queue *(Q)*, veh/ln (50th percentile)	1.4	1.9			1.4		1.0	1.1		0.0	4.1	
Overflow Queue (Q_3), veh/ln	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00			0.00		0.00	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh	18.2	15.2			14.8		16.7	8.5		9.5	10.7	
Incremental Delay (d_2), s/veh	1.6	1.9			1.5		1.3	0.6		0.0	3.4	
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Control Delay *(d)*, s/veh	19.7	17.2			16.3		18.1	9.1		9.5	14.1	
Level of Service (LOS)	B	B			B		B	A		A	B	
Approach Delay, s/veh / LOS	18.2	B		16.3	B		12.3	B		14.1	B	
Intersection Delay, s/veh / LOS	15.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.1	B	2.2	B
Bicycle LOS Score / LOS	1.0	A	0.7	A	0.9	A	1.2	A

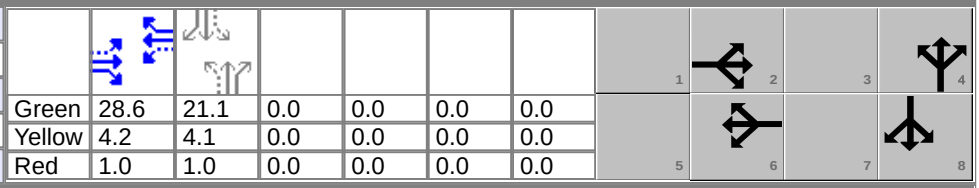
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Nov 14, 2012	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Intersection	Melgaard Rd (CR 19)	Analysis Year	2012	Analysis Period	1> 7:00
File Name	Location10_PMpeak.xus				
Project Description	Location #10				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	204	152	27	2	138	6	124	177	35	8	30	136

Signal Information			
Cycle, s	60.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	28.6	21.1	0.0	0.0	0.0	0.0						
Yellow	4.2	4.1	0.0	0.0	0.0	0.0						
Red	1.0	1.0	0.0	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		4		8
Case Number		6.0		8.0		6.0		6.0
Phase Duration, s		33.8		33.8		26.2		26.2
Change Period, *(Y+Rc)*, s		5.2		5.2		5.2		5.2
Max Allow Headway *(MAH)*, s		0.0		0.0		3.3		3.3
Queue Clearance Time *(g_s)*, s						14.7		10.3
Green Extension Time *(g_e)*, s		0.0		0.0		0.8		1.0
Phase Call Probability						1.00		1.00
Max Out Probability						0.23		0.03

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate *(v)*, veh/h	227	199			162		138	236		9	184	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1184	1429			1479		1217	1554		1163	1393	
Queue Service Time *(g_s)*, s	8.3	5.1			0.0		5.7	7.0		0.4	6.0	
Cycle Queue Clearance Time *(g_c)*, s	12.2	5.1			3.9		11.7	7.0		7.3	6.0	
Capacity *(c)*, veh/h	608	681			766		425	544		392	487	
Volume-to-Capacity Ratio *(X)*	0.373	0.292			0.212		0.324	0.433		0.023	0.378	
Available Capacity *(c_a)*, veh/h	608	681			766		425	544		392	487	
Back of Queue *(Q)*, veh/ln (50th percentile)	2.2	1.6			1.2		1.7	2.6		0.1	2.0	
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00			0.00		0.00	0.00		0.00	0.00	
Uniform Delay *(d_1)*, s/veh	12.8	9.5			9.2		19.0	14.9		17.7	14.6	
Incremental Delay *(d_2)*, s/veh	1.7	1.1			0.6		2.0	2.5		0.1	2.2	
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Control Delay *(d)*, s/veh	14.6	10.6			9.9		21.0	17.4		17.9	16.8	
Level of Service (LOS)	B	B			A		C	B		B	B	
Approach Delay, s/veh / LOS	12.7	B		9.9	A		18.8	B		16.9	B	
Intersection Delay, s/veh / LOS	15.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	2.2	B	2.1	B	2.3	B
Bicycle LOS Score / LOS	1.2	A	0.8	A	1.1	A	0.8	A

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*M.Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/12/2012*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Location #11*
Jurisdiction	
Analysis Year	*2012*

Project ID *40120063*

East/West Street: *Melgaard Road (CR 19)* North/South Street: *5th Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*26*	*177*	*8*	*35*	*94*	*105*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*0*	*86*	*76*	*125*	*54*	*11*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*L*	*TR*	*LTR*		*LTR*	
PHF	*0.74*		*0.67*	*0.78*	*0.64*		*0.75*	
Flow Rate (veh/h)	*284*		*52*	*254*	*252*		*252*	
% Heavy Vehicles	*1*		*3*	*4*	*4*		*5*	
No. Lanes	*1*		*2*		*1*		*1*	
Geometry Group	*4a*		*5*		*2*		*2*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.1*		*1.0*	*0.0*	*0.0*		*0.7*	
Prop. Right-Turns	*0.0*		*0.0*	*0.5*	*0.5*		*0.1*	
Prop. Heavy Vehicle	*0.0*		*0.0*	*0.0*	*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.5*	*0.5*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.7*	*-0.7*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.0*		*0.6*	*-0.3*	*-0.2*		*0.2*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*	*3.20*	*3.20*		*3.20*	
x, initial	*0.25*		*0.05*	*0.23*	*0.22*		*0.22*	
hd, final value (s)	*6.33*		*7.27*	*6.40*	*6.13*		*6.49*	
x, final value	*0.50*		*0.10*	*0.45*	*0.43*		*0.45*	
Move-up time, m (s)	*2.0*		*2.3*		*2.0*		*2.0*	
Service Time, t_s (s)	*4.3*		*5.0*	*4.1*	*4.1*		*4.5*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*526*		*302*	*504*	*502*		*502*	
Delay (s/veh)	*15.60*		*10.82*	*14.33*	*13.71*		*14.87*	
LOS	*C*		*B*	*B*	*B*		*B*	
Approach: Delay (s/veh)	*15.60*		*13.73*		*13.71*		*14.87*	
LOS	*C*		*B*		*B*		*B*	
Intersection Delay (s/veh)	*14.47*							
Intersection LOS	*B*							

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*M.Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/12/2012*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Location #11*
Jurisdiction	
Analysis Year	*2012*

Project ID *40120063*

East/West Street: *Melgaard Road (CR 19)* North/South Street: *5th Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*23*	*120*	*2*	*86*	*128*	*119*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*14*	*84*	*47*	*91*	*86*	*38*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*L*	*TR*	*LTR*		*LTR*	
PHF	*0.81*		*0.60*	*0.91*	*0.82*		*0.76*	
Flow Rate (veh/h)	*178*		*143*	*270*	*176*		*282*	
% Heavy Vehicles	*8*		*3*	*4*	*8*		*2*	
No. Lanes	*1*		*2*		*1*		*1*	
Geometry Group	*4a*		*5*		*2*		*2*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.2*		*1.0*	*0.0*	*0.1*		*0.4*	
Prop. Right-Turns	*0.0*		*0.0*	*0.5*	*0.3*		*0.2*	
Prop. Heavy Vehicle	*0.1*		*0.0*	*0.0*	*0.1*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.5*	*0.5*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.7*	*-0.7*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.2*		*0.6*	*-0.3*	*-0.0*		*0.0*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*	*3.20*	*3.20*		*3.20*	
x, initial	*0.16*		*0.13*	*0.24*	*0.16*		*0.25*	
hd, final value (s)	*6.34*		*6.81*	*5.98*	*6.13*		*5.94*	
x, final value	*0.31*		*0.27*	*0.45*	*0.30*		*0.47*	
Move-up time, m (s)	*2.0*		*2.3*		*2.0*		*2.0*	
Service Time, t_s (s)	*4.3*		*4.5*	*3.7*	*4.1*		*3.9*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*428*		*393*	*520*	*426*		*532*	
Delay (s/veh)	*12.22*		*12.03*	*13.51*	*11.74*		*14.08*	
LOS	*B*		*B*	*B*	*B*		*B*	
Approach: Delay (s/veh)	*12.22*		*12.99*		*11.74*		*14.08*	
LOS	*B*		*B*		*B*		*B*	
Intersection Delay (s/veh)	*12.95*							
Intersection LOS	*B*							

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*M. Stewart*	Intersection	*Location #12*
Agency/Co.	*HR Green*	Jurisdiction	
Date Performed	*11/14/2012*	Analysis Year	*2012*
Analysis Time Period	*AM Peak*		

Project Description *40120063*

East/West Street: *Melgaard Road (CR 19)* | North/South Street: *US 281*

Intersection Orientation: *North-South* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*3*	*195*	*80*	*64*	*123*	*31*
Peak-Hour Factor, PHF	*0.38*	*0.65*	*0.56*	*0.55*	*0.83*	*0.78*
Hourly Flow Rate, HFR (veh/h)	*7*	*300*	*142*	*116*	*148*	*39*
Percent Heavy Vehicles	*0*	--	--	*9*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration	*LT*		*TR*	*LT*		*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*23*	*34*	*6*	*63*	*21*	*37*
Peak-Hour Factor, PHF	*0.96*	*0.47*	*0.75*	*0.83*	*0.66*	*0.66*
Hourly Flow Rate, HFR (veh/h)	*23*	*72*	*8*	*75*	*31*	*56*
Percent Heavy Vehicles	*4*	*3*	*17*	*5*	*0*	*3*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*	*LT*		*LTR*			*LTR*	
v (veh/h)	*7*	*116*		*162*			*103*	
C (m) (veh/h)	*1399*	*1066*		*309*			*283*	
v/c	*0.01*	*0.11*		*0.52*			*0.36*	
95% queue length	*0.02*	*0.37*		*3.17*			*1.69*	
Control Delay (s/veh)	*7.6*	*8.8*		*29.3*			*25.0*	
LOS	*A*	*A*		*D*			*C*	
Approach Delay (s/veh)	--	--	*29.3*			*25.0*		
Approach LOS	--	--	*D*			*C*		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/14/2012*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Location #12*
Jurisdiction	
Analysis Year	*2012*

Project Description *40120063*

East/West Street: *Melgaard Road (CR 19)* | North/South Street: *US 281*

Intersection Orientation: *North-South* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*6*	*147*	*68*	*42*	*178*	*35*
Peak-Hour Factor, PHF	*0.50*	*0.68*	*0.77*	*0.88*	*0.81*	*0.67*
Hourly Flow Rate, HFR (veh/h)	*12*	*216*	*88*	*47*	*219*	*52*
Percent Heavy Vehicles	*0*	--	--	*10*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration	*LT*		*TR*	*LT*		*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*22*	*29*	*4*	*100*	*39*	*43*
Peak-Hour Factor, PHF	*0.79*	*0.52*	*0.50*	*0.86*	*0.70*	*0.90*
Hourly Flow Rate, HFR (veh/h)	*27*	*55*	*8*	*116*	*55*	*47*
Percent Heavy Vehicles	*0*	*0*	*25*	*6*	*5*	*12*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*	*LT*		*LTR*			*LTR*	
v (veh/h)	*12*	*47*		*218*			*90*	
C (m) (veh/h)	*1304*	*1198*		*416*			*383*	
v/c	*0.01*	*0.04*		*0.52*			*0.23*	
95% queue length	*0.03*	*0.12*		*3.20*			*0.92*	
Control Delay (s/veh)	*7.8*	*8.1*		*23.1*			*17.3*	
LOS	*A*	*A*		*C*			*C*	
Approach Delay (s/veh)	--	--	*23.1*			*17.3*		
Approach LOS	--	--	*C*			*C*		

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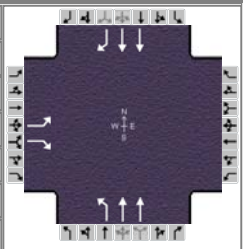
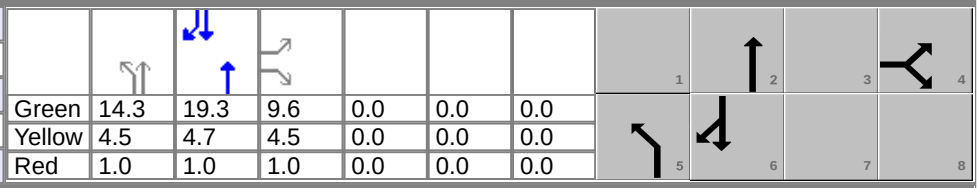
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Nov 14, 2012	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	US 281	Analysis Year	2012	Analysis Period	1> 7:00
File Name	Location13_AMpeak.xus				
Project Description	Location #13				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	69		19				5	74			220	116

Signal Information			
Cycle, s	60.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	14.3	19.3	9.6	0.0	0.0	0.0						
Yellow	4.5	4.7	4.5	0.0	0.0	0.0						
Red	1.0	1.0	1.0	0.0	0.0	0.0						

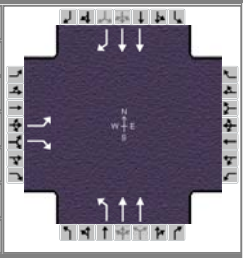
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			5	2		6
Case Number		9.0			2.0	4.0		7.3
Phase Duration, s		15.1			19.8	44.9		25.0
Change Period, ($Y+R_c$), s		5.5			5.5	5.7		5.7
Max Allow Headway (*MAH*), s		3.1			3.0	0.0		0.0
Queue Clearance Time (g_s), s		6.9			3.2			
Green Extension Time (g_e), s		0.1			0.0	0.0		0.0
Phase Call Probability		0.80			1.00			
Max Out Probability		0.00			0.00			

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				5	2			6	16
Adjusted Flow Rate (*v*), veh/h	77		21				6	82			244	129
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1073		1291				1524	1508			1508	1189
Queue Service Time (g_s), s	3.9		0.8				0.2	0.6			3.6	4.9
Cycle Queue Clearance Time (g_c), s	3.9		0.8				0.2	0.6			3.6	4.9
Capacity (*c*), veh/h	173		208				364	1968			971	383
Volume-to-Capacity Ratio (*X*)	0.444		0.102				0.015	0.042			0.252	0.337
Available Capacity (c_a), veh/h	349		420				364	1968			971	383
Back of Queue (*Q*), veh/ln (50th percentile)	0.9		0.2				0.1	0.1			1.1	1.4
Overflow Queue (Q_3), veh/ln	0.0		0.0				0.0	0.0			0.0	0.0
Queue Storage Ratio (*RQ*) (50th percentile)	0.00		0.00				0.01	0.00			0.00	0.00
Uniform Delay (d_1), s/veh	22.8		21.5				17.4	3.7			15.0	15.5
Incremental Delay (d_2), s/veh	0.7		0.1				0.1	0.0			0.6	2.4
Initial Queue Delay (d_3), s/veh	0.0		0.0				0.0	0.0			0.0	0.0
Control Delay (*d*), s/veh	23.4		21.6				17.5	3.8			15.6	17.8
Level of Service (LOS)	C		C				B	A			B	B
Approach Delay, s/veh / LOS	23.0	C		0.0			4.6	A		16.4	B	
Intersection Delay, s/veh / LOS	15.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	0.7	A	2.3	B
Bicycle LOS Score / LOS		F			0.6	A	0.8	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Nov 14, 2012	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Intersection	US 281	Analysis Year	2012	Analysis Period	1> 7:00
File Name	Location13_PMpeak.xus				
Project Description	Location #13				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	100		15				14	208			142	80

Signal Information			
Cycle, s	60.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
Green	13.4	19.3	10.6	0.0	0.0	0.0	5	6	7	8
Yellow	4.5	4.7	4.5	0.0	0.0	0.0				
Red	1.0	1.0	1.0	0.0	0.0	0.0				

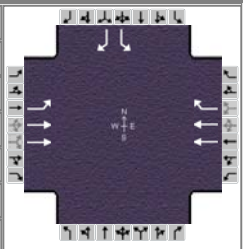
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			5	2		6
Case Number		9.0			2.0	4.0		7.3
Phase Duration, s		16.1			18.9	43.9		25.0
Change Period, ($Y+R_c$), s		5.5			5.5	5.7		5.7
Max Allow Headway (*MAH*), s		3.1			3.0	0.0		0.0
Queue Clearance Time (g_s), s		8.1			3.5			
Green Extension Time (g_e), s		0.1			0.0	0.0		0.0
Phase Call Probability		0.88			1.00			
Max Out Probability		0.00			0.00			

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				5	2			6	16
Adjusted Flow Rate (*v*), veh/h	111		17				16	231			158	89
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1181		1200				1424	1508			1465	1012
Queue Service Time (g_s), s	5.1		0.7				0.5	1.8			2.3	3.9
Cycle Queue Clearance Time (g_c), s	5.1		0.7				0.5	1.8			2.3	3.9
Capacity (*c*), veh/h	208		211				319	1922			943	326
Volume-to-Capacity Ratio (*X*)	0.534		0.079				0.049	0.120			0.167	0.273
Available Capacity (c_a), veh/h	364		370				319	1922			943	326
Back of Queue (*Q*), veh/ln (50th percentile)	1.3		0.2				0.2	0.3			0.7	0.9
Overflow Queue (Q_3), veh/ln	0.0		0.0				0.0	0.0			0.0	0.0
Queue Storage Ratio (*RQ*) (50th percentile)	0.00		0.00				0.02	0.00			0.00	0.00
Uniform Delay (d_1), s/veh	22.5		20.6				18.3	4.3			14.6	15.1
Incremental Delay (d_2), s/veh	0.8		0.1				0.3	0.1			0.4	2.1
Initial Queue Delay (d_3), s/veh	0.0		0.0				0.0	0.0			0.0	0.0
Control Delay (*d*), s/veh	23.3		20.7				18.6	4.4			15.0	17.2
Level of Service (LOS)	C		C				B	A			B	B
Approach Delay, s/veh / LOS	22.9		C	0.0			5.3		A	15.8		B
Intersection Delay, s/veh / LOS	13.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	0.7	A	2.3	B
Bicycle LOS Score / LOS		F			0.7	A	0.7	A

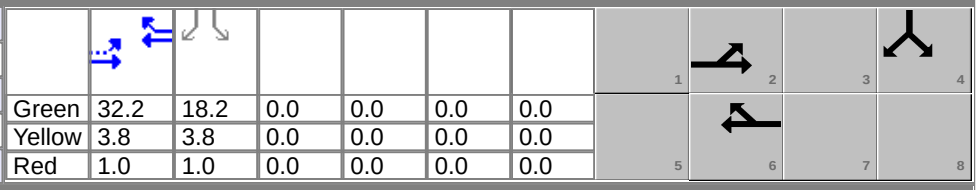
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Nov 14, 2012	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	2nd Street	Analysis Year	2012	Analysis Period	1> 7:00
File Name	Location14_AMpeak.xus				
Project Description	Location #14				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	5	293			183	277				350		21

Signal Information			
Cycle, s	60.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	32.2	18.2	0.0	0.0	0.0	0.0						
Yellow	3.8	3.8	0.0	0.0	0.0	0.0						
Red	1.0	1.0	0.0	0.0	0.0	0.0						

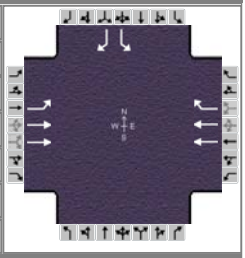
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6				4
Case Number		6.0		7.0				9.0
Phase Duration, s		37.0		37.0				23.0
Change Period, *(Y+Rc)*, s		5.0		5.0				4.8
Max Allow Headway *(MAH)*, s		0.0		0.0				3.2
Queue Clearance Time *(g_s)*, s								17.5
Green Extension Time *(g_e)*, s		0.0		0.0				0.7
Phase Call Probability								1.00
Max Out Probability								0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate *(v)*, veh/h	6	326			203	308				389		23
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1198	1479			1479	1304				1509		1291
Queue Service Time *(g_s)*, s	0.1	3.5			2.1	8.7				14.5		0.8
Cycle Queue Clearance Time *(g_c)*, s	2.2	3.5			2.1	8.7				14.5		0.8
Capacity *(c)*, veh/h	717	1577			1577	695				458		392
Volume-to-Capacity Ratio *(X)*	0.008	0.206			0.129	0.443				0.849		0.060
Available Capacity *(c_a)*, veh/h	717	1577			1577	695				734		628
Back of Queue *(Q)*, veh/ln (50th percentile)	0.0	1.0			0.6	2.4				4.9		0.2
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0			0.0	0.0				0.0		0.0
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00			0.00	0.61				0.00		0.02
Uniform Delay *(d_1)*, s/veh	7.6	7.3			7.0	8.6				19.6		14.8
Incremental Delay *(d_2)*, s/veh	0.0	0.3			0.2	2.0				2.9		0.0
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay *(d)*, s/veh	7.6	7.6			7.2	10.6				22.5		14.8
Level of Service (LOS)	A	A			A	B				C		B
Approach Delay, s/veh / LOS	7.6	A		9.2	A		0.0			22.0	C	
Intersection Delay, s/veh / LOS	13.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.7	A	2.2	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	0.8	A	0.9	A				F

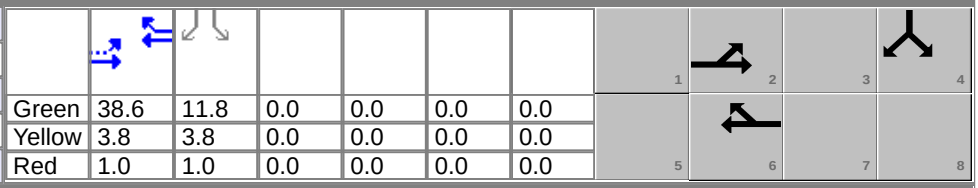
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Nov 14, 2012	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Intersection	2nd Street	Analysis Year	2012	Analysis Period	1> 7:00
File Name	Location14_PMpeak.xus				
Project Description	Location #14				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	22	356			361	274				204		30

Signal Information			
Cycle, s	60.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	38.6	11.8	0.0	0.0	0.0	0.0						
Yellow	3.8	3.8	0.0	0.0	0.0	0.0						
Red	1.0	1.0	0.0	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6				4
Case Number		6.0		7.0				9.0
Phase Duration, s		43.4		43.4				16.6
Change Period, *(Y+Rc)*, s		5.0		5.0				4.8
Max Allow Headway *(MAH)*, s		0.0		0.0				3.2
Queue Clearance Time *(g_s)*, s								11.4
Green Extension Time *(g_e)*, s		0.0		0.0				0.4
Phase Call Probability								0.99
Max Out Probability								0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate *(v)*, veh/h	24	396			401	304				227		33
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	999	1493			1508	1356				1524		1356
Queue Service Time *(g_s)*, s	0.6	3.3			3.3	6.3				8.4		1.2
Cycle Queue Clearance Time *(g_c)*, s	4.0	3.3			3.3	6.3				8.4		1.2
Capacity *(c)*, veh/h	703	1909			1928	867				301		268
Volume-to-Capacity Ratio *(X)*	0.035	0.207			0.208	0.351				0.754		0.125
Available Capacity *(c_a)*, veh/h	703	1909			1928	867				615		547
Back of Queue *(Q)*, veh/ln (50th percentile)	0.1	0.8			0.8	1.5				2.9		0.4
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0			0.0	0.0				0.0		0.0
Queue Storage Ratio *(RQ)* (50th percentile)	0.01	0.00			0.00	0.37				0.00		0.04
Uniform Delay *(d_1)*, s/veh	5.3	4.5			4.5	5.0				22.7		19.8
Incremental Delay *(d_2)*, s/veh	0.1	0.2			0.2	1.1				1.4		0.1
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay *(d)*, s/veh	5.4	4.7			4.7	6.2				24.2		19.9
Level of Service (LOS)	A	A			A	A				C		B
Approach Delay, s/veh / LOS	4.8	A		5.4	A		0.0			23.6	C	
Intersection Delay, s/veh / LOS	8.6						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.7	A	2.2	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	0.8	A	1.1	A				F

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*M.Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/12/2012*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Location #15*
Jurisdiction	
Analysis Year	*2012*

Project ID *40120063*

East/West Street: *24th Avenue (CR 15)* North/South Street: *North Dakota Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*14*	*115*	*43*	*57*	*36*	*3*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*38*	*26*	*87*	*3*	*83*	*29*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*L*	*TR*	*L*	*TR*	*LTR*		*LTR*	
PHF	*0.70*	*0.56*	*0.62*	*0.65*	*0.73*		*0.67*	
Flow Rate (veh/h)	*20*	*281*	*91*	*59*	*206*		*170*	
% Heavy Vehicles	*0*	*4*	*2*	*15*	*2*		*2*	
No. Lanes	*2*		*2*		*1*		*1*	
Geometry Group	*5*		*5*		*2*		*2*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
Prop. Left-Turns	*1.0*	*0.0*	*1.0*	*0.0*	*0.3*		*0.0*	
Prop. Right-Turns	*0.0*	*0.3*	*0.0*	*0.1*	*0.6*		*0.3*	
Prop. Heavy Vehicle	*0.0*	*0.0*	*0.0*	*0.1*	*0.0*		*0.0*	
hLT-adj	*0.5*	*0.5*	*0.5*	*0.5*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.5*	*-0.1*	*0.5*	*0.2*	*-0.3*		*-0.1*	

Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
hd, initial value (s)	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*		*3.20*	
x, initial	*0.02*	*0.25*	*0.08*	*0.05*	*0.18*		*0.15*	
hd, final value (s)	*6.29*	*5.66*	*6.52*	*6.19*	*5.18*		*5.38*	
x, final value	*0.03*	*0.44*	*0.16*	*0.10*	*0.30*		*0.25*	
Move-up time, m (s)	*2.3*		*2.3*		*2.0*		*2.0*	
Service Time, t_s (s)	*4.0*	*3.4*	*4.2*	*3.9*	*3.2*		*3.4*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*270*	*531*	*341*	*309*	*456*		*420*	
Delay (s/veh)	*9.21*	*12.81*	*10.50*	*9.59*	*10.36*		*10.21*	
LOS	*A*	*B*	*B*	*A*	*B*		*B*	
Approach: Delay (s/veh)	*12.57*		*10.14*		*10.36*		*10.21*	
LOS	*B*		*B*		*B*		*B*	
Intersection Delay (s/veh)	*11.10*							
Intersection LOS	*B*							

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*M.Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/12/2012*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Location #15*
Jurisdiction	
Analysis Year	*2012*

Project ID *40120063*

East/West Street: *24th Avenue (CR 15)* North/South Street: *North Dakota Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*13*	*69*	*28*	*46*	*82*	*10*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*30*	*62*	*51*	*12*	*36*	*9*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*L*	*TR*	*L*	*TR*	*LTR*		*LTR*	
PHF	*0.81*	*1.00*	*0.50*	*0.59*	*0.64*		*0.79*	
Flow Rate (veh/h)	*16*	*97*	*92*	*154*	*221*		*71*	
% Heavy Vehicles	*0*	*2*	*2*	*2*	*1*		*4*	
No. Lanes	*2*		*2*		*1*		*1*	
Geometry Group	*5*		*5*		*2*		*2*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*1.0*	*0.0*	*1.0*	*0.0*	*0.2*		*0.2*	
Prop. Right-Turns	*0.0*	*0.3*	*0.0*	*0.1*	*0.4*		*0.2*	
Prop. Heavy Vehicle	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	
hLT-adj	*0.5*	*0.5*	*0.5*	*0.5*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.5*	*-0.2*	*0.5*	*-0.0*	*-0.2*		*0.0*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*		*3.20*	
x, initial	*0.01*	*0.09*	*0.08*	*0.14*	*0.20*		*0.06*	
hd, final value (s)	*6.07*	*5.39*	*5.93*	*5.36*	*4.76*		*5.14*	
x, final value	*0.03*	*0.15*	*0.15*	*0.23*	*0.29*		*0.10*	
Move-up time, m (s)	*2.3*		*2.3*		*2.0*		*2.0*	
Service Time, t_s (s)	*3.8*	*3.1*	*3.6*	*3.1*	*2.8*		*3.1*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*266*	*347*	*342*	*404*	*471*		*321*	
Delay (s/veh)	*8.94*	*9.01*	*9.69*	*9.65*	*9.72*		*8.72*	
LOS	*A*	*A*	*A*	*A*	*A*		*A*	
Approach: Delay (s/veh)	*9.00*		*9.67*		*9.72*		*8.72*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*9.47*							
Intersection LOS	*A*							

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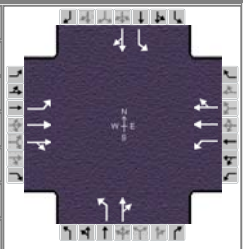
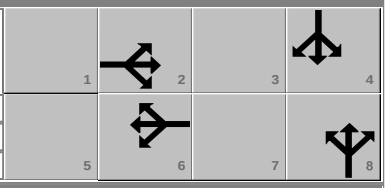
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	11/15/2012	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	Lamont St	Analysis Year	2012	Analysis Period	1> 7:00
File Name	Location16_US 12-Lamont AMpeak.xus				
Project Description	Location #16				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	8	505	116	3	404	3	78	3	15	2	6	1

Signal Information													
Cycle, s	60.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	27.0	22.0	0.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.6	4.4	0.0	0.0	0.0	0.0			
				Red	1.0	1.0	0.0	0.0	0.0	0.0			



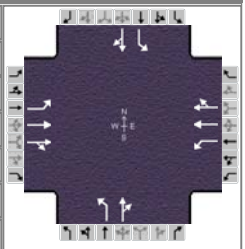
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		6.0		6.0		6.0		6.0
Phase Duration, s		32.6		32.6		27.4		27.4
Change Period, *(Y+Rc)*, s		5.8		5.8		5.4		5.4
Max Allow Headway *(MAH)*, s		0.0		0.0		3.0		3.0
Queue Clearance Time *(g_s)*, s						4.7		2.6
Green Extension Time *(g_e)*, s		0.0		0.0		0.2		0.2
Phase Call Probability						1.00		1.00
Max Out Probability						0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate *(v)*, veh/h	9	356	334	3	226	226	87	20		2	8	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	953	1600	1496	765	1600	1596	1430	1391		1414	1560	
Queue Service Time *(g_s)*, s	0.4	9.5	9.6	0.2	5.5	5.5	2.5	0.6		0.1	0.2	
Cycle Queue Clearance Time *(g_c)*, s	5.8	9.5	9.6	9.7	5.5	5.5	2.7	0.6		0.6	0.2	
Capacity *(c)*, veh/h	459	715	668	340	715	713	640	510		625	572	
Volume-to-Capacity Ratio *(X)*	0.019	0.498	0.500	0.010	0.317	0.317	0.135	0.039		0.004	0.014	
Available Capacity *(c_a)*, veh/h	459	715	668	340	715	713	640	510		625	572	
Back of Queue *(Q)*, veh/ln (50th percentile)	0.1	3.4	3.2	0.0	1.9	1.9	0.7	0.2		0.0	0.1	
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	
Uniform Delay *(d_1)*, s/veh	12.6	11.8	11.8	15.3	10.7	10.7	12.9	12.2		12.4	12.1	
Incremental Delay *(d_2)*, s/veh	0.1	2.5	2.7	0.1	1.2	1.2	0.4	0.1		0.0	0.0	
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay *(d)*, s/veh	12.7	14.3	14.5	15.4	11.9	11.9	13.4	12.4		12.4	12.1	
Level of Service (LOS)	B	B	B	B	B	B	B	B		B	B	
Approach Delay, s/veh / LOS	14.4	B		11.9	B		13.2	B		12.2	B	
Intersection Delay, s/veh / LOS	13.4						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	2.2	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.1	A	0.9	A	0.7	A	0.5	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	11/15/2012	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Intersection	Lamont St	Analysis Year	2012	Analysis Period	1> 4:30
File Name	Location16_US 12-Lamont PMpeak.xus				
Project Description	Location #16				



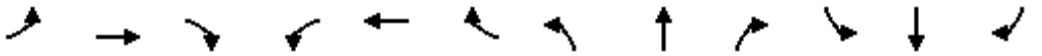
Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	46	528	275	24	548	42	410	40	15	22	53	41

Signal Information					EB			WB			NB			SB		
Cycle, s	60.0	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	27.0	22.0	0.0	0.0	0.0	0.0						
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.6	4.4	0.0	0.0	0.0	0.0						
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.0	0.0	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		6.0		6.0		6.0		6.0
Phase Duration, s		32.6		32.6		27.4		27.4
Change Period, *(Y+Rc)*, s		5.8		5.8		5.4		5.4
Max Allow Headway *(MAH)*, s		0.0		0.0		3.2		3.2
Queue Clearance Time (g_s), s						24.0		4.9
Green Extension Time (g_e), s		0.0		0.0		0.0		1.3
Phase Call Probability						1.00		1.00
Max Out Probability						1.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate *(v)*, veh/h	51	587	306	27	332	324	456	61		24	104	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	790	1600	1356	633	1600	1560	1310	1525		1363	1484	
Queue Service Time (g_s), s	2.9	19.2	9.7	2.3	8.7	8.7	19.1	1.6		0.7	2.9	
Cycle Queue Clearance Time (g_c), s	11.6	19.2	9.7	21.5	8.7	8.7	22.0	1.6		2.3	2.9	
Capacity *(c)*, veh/h	358	715	606	200	715	697	538	559		584	544	
Volume-to-Capacity Ratio *(X)*	0.143	0.821	0.504	0.133	0.464	0.465	0.847	0.109		0.042	0.192	
Available Capacity (c_a), veh/h	358	715	606	200	715	697	538	559		584	544	
Back of Queue *(Q)*, veh/ln (50th percentile)	0.6	7.9	3.0	0.4	3.1	3.0	7.9	0.5		0.2	0.9	
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh	15.6	14.5	11.9	23.9	11.6	11.6	21.2	12.5		13.3	12.9	
Incremental Delay (d_2), s/veh	0.8	10.2	3.0	1.4	2.2	2.2	15.2	0.4		0.1	0.8	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay *(d)*, s/veh	16.5	24.7	14.8	25.3	13.7	13.8	36.5	12.9		13.4	13.7	
Level of Service (LOS)	B	C	B	C	B	B	D	B		B	B	
Approach Delay, s/veh / LOS	21.1	C		14.2	B		33.7	C		13.7	B	
Intersection Delay, s/veh / LOS	21.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	2.2	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.3	A	1.1	A	1.3	A	0.7	A

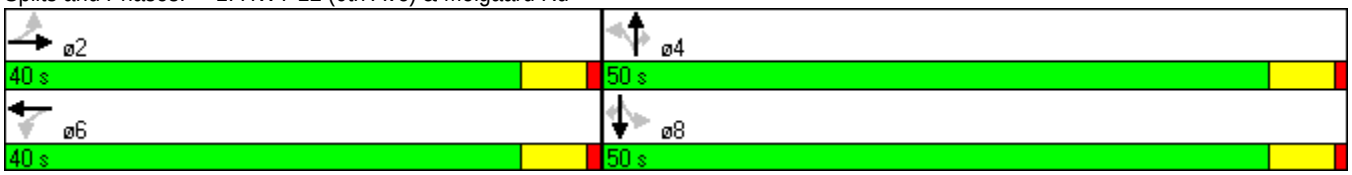


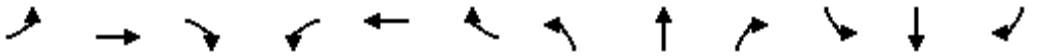
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	102	504	14	120	403	98	38	107	151	259	131	94
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Storage Length (ft)	350		0	0		0	0		180	0		300
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.970				0.850			0.850
Flt Protected	0.950			0.950				0.988			0.972	
Satd. Flow (prot)	1462	2912	0	1357	2798	0	0	1513	1308	0	1493	1333
Flt Permitted	0.339			0.288				0.642			0.673	
Satd. Flow (perm)	522	2912	0	411	2798	0	0	983	1308	0	1034	1333
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			39				108			205
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		1624			715			525			978	
Travel Time (s)		36.9			16.3			8.9			16.7	
Peak Hour Factor	0.68	0.75	0.56	0.65	0.82	0.81	0.64	0.60	0.70	0.74	0.50	0.36
Heavy Vehicles (%)	4%	4%	0%	12%	5%	7%	9%	3%	4%	5%	3%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	150	697	0	185	612	0	0	237	216	0	612	261
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm			Perm			Perm		Perm	Perm		Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		8
Detector Phase	2	2		6	6		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	20.5	20.5		20.5	20.5		20.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	40.0	40.0	0.0	40.0	40.0	0.0	50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	44.4%	44.4%	0.0%	44.4%	44.4%	0.0%	55.6%	55.6%	55.6%	55.6%	55.6%	55.6%
Maximum Green (s)	34.6	34.6		34.6	34.6		44.6	44.6	44.6	44.6	44.6	44.6
Yellow Time (s)	4.4	4.4		4.4	4.4		4.4	4.4	4.4	4.4	4.4	4.4
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.4	5.4	4.0	5.4	5.4	4.0	5.4	5.4	5.4	5.4	5.4	5.4
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max		None	None		None	None	None	None	None	None
Act Effct Green (s)	34.6	34.6		34.6	34.6			44.6	44.6		44.6	44.6
Actuated g/C Ratio	0.38	0.38		0.38	0.38			0.50	0.50		0.50	0.50

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.75	0.62		1.17	0.56			0.49	0.31		1.20	0.34
Control Delay	49.4	25.2		154.9	22.6			19.4	7.9		130.5	4.8
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	49.4	25.2		154.9	22.6			19.4	7.9		130.5	4.8
LOS	D	C		F	C			B	A		F	A
Approach Delay		29.5			53.3			13.9			92.9	
Approach LOS		C			D			B			F	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.20			
Intersection Signal Delay: 52.1		Intersection LOS: D	
Intersection Capacity Utilization 79.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: HWY 12 (6th Ave) & Melgaard Rd





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	83	421	41	103	412	110	49	111	98	239	388	381
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Storage Length (ft)	350		0	0		0	0		180	0		300
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.988			0.965				0.850			0.850
Flt Protected	0.950			0.950				0.984			0.979	
Satd. Flow (prot)	1520	2863	0	1394	2718	0	0	1513	1183	0	1508	1333
Flt Permitted	0.271			0.345				0.534			0.779	
Satd. Flow (perm)	434	2863	0	506	2718	0	0	821	1183	0	1200	1333
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			43				111			113
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		1624			715			525			978	
Travel Time (s)		36.9			16.3			8.9			16.7	
Peak Hour Factor	0.72	0.89	0.96	0.76	0.88	0.78	0.83	0.89	0.88	0.66	0.79	0.60
Heavy Vehicles (%)	0%	5%	4%	9%	7%	11%	0%	6%	15%	5%	3%	2%
Adj. Flow (vph)	115	473	43	136	468	141	59	125	111	362	491	635
Shared Lane Traffic (%)												
Lane Group Flow (vph)	115	516	0	136	609	0	0	184	111	0	853	635
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm			Perm			Perm		Perm	Perm		Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		8
Detector Phase	2	2		6	6		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	20.5	20.5		20.5	20.5		20.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	60.0	60.0	60.0	60.0	60.0	60.0
Total Split (%)	33.3%	33.3%	0.0%	33.3%	33.3%	0.0%	66.7%	66.7%	66.7%	66.7%	66.7%	66.7%
Maximum Green (s)	24.6	24.6		24.6	24.6		54.6	54.6	54.6	54.6	54.6	54.6
Yellow Time (s)	4.4	4.4		4.4	4.4		4.4	4.4	4.4	4.4	4.4	4.4
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.4	5.4	4.0	5.4	5.4	4.0	5.4	5.4	5.4	5.4	5.4	5.4
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max		None	None		None	None	None	None	None	None
Act Effct Green (s)	24.6	24.6		24.6	24.6			54.6	54.6		54.6	54.6

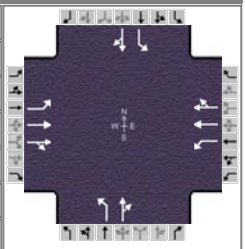
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.27	0.27		0.27	0.27			0.61	0.61		0.61	0.61
v/c Ratio	0.97	0.65		0.99	0.79			0.37	0.15		1.17	0.74
Control Delay	64.8	41.0		109.8	36.6			11.6	2.0		112.4	16.9
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	64.8	41.0		109.8	36.6			11.6	2.0		112.4	16.9
LOS	E	D		F	D			B	A		F	B
Approach Delay		45.3			50.0			8.0			71.6	
Approach LOS		D			D			A			E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.17			
Intersection Signal Delay: 55.3		Intersection LOS: E	
Intersection Capacity Utilization 95.8%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 1: HWY 12 (6th Ave) & Melgaard Rd

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Feb 14, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	Roosevelt Street	Analysis Year	2032	Analysis Period	1> 7:00
File Name	2032_Location2_AMpeak.xus				
Project Description	Location #2				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	127	648	88	54	653	53	164	293	156	113	452	137

Signal Information													
Cycle, s	150.0	Reference Phase	2							1	2	3	4
Offset, s	0	Reference Point	End	Green	6.2	3.8	37.8	9.0	3.0	67.5	5	6	7	8
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.0	3.0	4.2	3.0	3.0	4.5				
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	1.0	0.0	0.0	1.0				

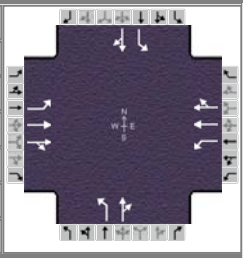
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	16.0	49.8	9.2	43.0	18.0	79.0	12.0	73.0
Change Period, *(Y+Rc)*, s	3.0	5.2	3.0	5.2	3.0	5.5	3.0	5.5
Max Allow Headway *(MAH)*, s	3.2	0.0	3.2	0.0	3.2	3.2	3.2	3.2
Queue Clearance Time *(g_s)*, s	12.1		7.5		13.4	43.3	9.6	65.4
Green Extension Time *(g_e)*, s	0.0	0.0	0.0	0.0	0.1	2.8	0.0	0.8
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	1.00		1.00		1.00	0.00	1.00	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate *(v)*, veh/h	141	418	400	60	397	387	182	499		126	654	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1524	1524	1459	1479	1509	1468	1479	1447		1524	1520	
Queue Service Time *(g_s)*, s	9.1	39.8	39.8	4.5	37.8	37.8	10.4	40.3		6.6	62.4	
Cycle Queue Clearance Time *(g_c)*, s	9.1	39.8	39.8	4.5	37.8	37.8	10.4	40.3		6.6	62.4	
Capacity *(c)*, veh/h	180	453	434	130	380	370	222	709		342	684	
Volume-to-Capacity Ratio *(X)*	0.784	0.922	0.923	0.461	1.045	1.046	0.820	0.704		0.367	0.957	
Available Capacity *(c_a)*, veh/h	180	453	434	130	380	370	222	709		342	684	
Back of Queue *(Q)*, veh/ln (50th percentile)	6.9	18.5	17.9	2.1	20.6	20.1	5.1	15.1		2.7	27.8	
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	
Uniform Delay *(d_1)*, s/veh	36.9	51.0	51.0	43.0	56.1	56.1	39.1	29.8		24.2	39.8	
Incremental Delay *(d_2)*, s/veh	28.1	26.6	27.6	11.3	58.3	59.3	27.6	5.8		3.0	25.3	
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay *(d)*, s/veh	65.0	77.6	78.6	54.4	114.4	115.4	66.7	35.6		27.2	65.2	
Level of Service (LOS)	E	E	E	D	F	F	E	D		C	E	
Approach Delay, s/veh / LOS	76.2	E		110.6	F		43.9	D		59.0	E	
Intersection Delay, s/veh / LOS	74.3						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.3	A	1.2	A	1.6	A	1.8	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Feb 14, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Intersection	Roosevelt Street	Analysis Year	2032	Analysis Period	1> 7:00
File Name	2032_Location2_PMpeak.xus				
Project Description	Location #2				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	128	751	97	179	1132	153	190	329	164	240	507	242

Signal Information			
Cycle, s	150.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
Green	8.0	0.0	46.8	17.0	58.5	0.0	5	6	7	8
Yellow	3.0	3.0	4.2	3.0	4.5	0.0				
Red	0.0	0.0	1.0	0.0	1.0	0.0				

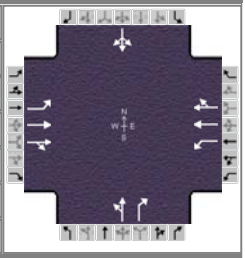
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	11.0	52.0	14.0	55.0	20.0	64.0	20.0	64.0
Change Period, *(Y+Rc)*, s	3.0	5.2	3.0	5.2	3.0	5.5	3.0	5.5
Max Allow Headway *(MAH)*, s	3.2	0.0	3.2	0.0	3.2	3.2	3.2	3.2
Queue Clearance Time *(g_s)*, s	11.0		14.0		17.4	56.8	20.0	61.5
Green Extension Time *(g_e)*, s	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	1.00		1.00		1.00	1.00	1.00	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate *(v)*, veh/h	142	481	461	199	726	702	211	548		267	832	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1509	1538	1476	1509	1553	1487	1524	1479		1494	1510	
Queue Service Time *(g_s)*, s	8.0	46.8	46.8	11.0	49.8	49.8	14.4	53.8		17.0	58.5	
Cycle Queue Clearance Time *(g_c)*, s	8.0	46.8	46.8	11.0	49.8	49.8	14.4	53.8		17.0	58.5	
Capacity *(c)*, veh/h	136	480	461	159	516	494	234	577		244	589	
Volume-to-Capacity Ratio *(X)*	1.046	1.002	1.002	1.254	1.408	1.421	0.902	0.950		1.093	1.413	
Available Capacity *(c_a)*, veh/h	136	480	461	159	516	494	234	577		244	589	
Back of Queue *(Q)*, veh/ln (50th percentile)	3.4	23.5	22.7	13.0	47.2	46.0	6.8	23.9		10.9	53.8	
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	
Uniform Delay *(d_1)*, s/veh	44.9	51.6	51.6	41.8	50.1	50.1	41.5	44.3		40.9	45.8	
Incremental Delay *(d_2)*, s/veh	89.9	41.5	42.4	155.4	194.9	201.1	38.0	26.9		84.8	195.9	
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay *(d)*, s/veh	134.7	93.1	94.0	197.1	245.0	251.2	79.5	71.3		125.7	241.6	
Level of Service (LOS)	F	F	F	F	F	F	E	E		F	F	
Approach Delay, s/veh / LOS	98.9	F		241.8	F		73.5	E		213.5	F	
Intersection Delay, s/veh / LOS	173.1						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.4	A	1.8	A	1.7	A	2.3	B

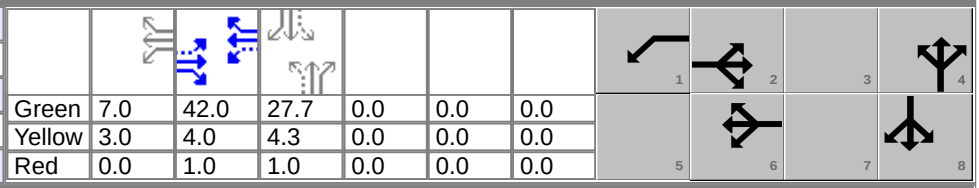
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Feb 14, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	Lawson Street	Analysis Year	2032	Analysis Period	1> 7:00
File Name	2032_Location3_AMpeak.xus				
Project Description	Location #3				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	0	896	65	64	715	0	193	0	159	0	0	0

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	7.0	42.0	27.7	0.0	0.0	0.0
Yellow	3.0	4.0	4.3	0.0	0.0	0.0
Red	0.0	1.0	1.0	0.0	0.0	0.0

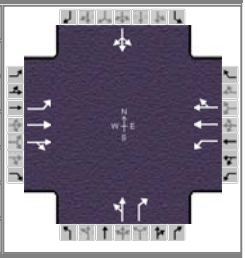
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		4		8
Case Number		6.3	1.0	4.0		7.0		8.0
Phase Duration, s		47.0	10.0	57.0		33.0		33.0
Change Period, *(Y+Rc)*, s		5.2	3.0	5.2		5.3		5.3
Max Allow Headway *(MAH)*, s		0.0	3.2	0.0		3.3		0.0
Queue Clearance Time *(g_s)*, s			4.9			25.8		
Green Extension Time *(g_e)*, s		0.0	0.0	0.0		0.2		0.0
Phase Call Probability			1.00			1.00		
Max Out Probability			1.00			1.00		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate *(v)*, veh/h	0	540	527	71	794	0		214	177		0	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	694	1538	1501	1494	1524	0		799	1329		0	
Queue Service Time *(g_s)*, s	0.0	26.1	26.1	1.9	13.5	0.0		22.8	9.5		0.0	
Cycle Queue Clearance Time *(g_c)*, s	0.0	26.1	26.1	1.9	13.5	0.0		22.8	9.5		0.0	
Capacity *(c)*, veh/h	80	715	697	288	1754			326	409			
Volume-to-Capacity Ratio *(X)*	0.000	0.756	0.756	0.247	0.453	0.000		0.658	0.432		0.000	
Available Capacity *(c_a)*, veh/h	80	715	697	288	1754			326	409			
Back of Queue *(Q)*, veh/ln (50th percentile)	0.0	10.2	10.0	0.7	4.4			5.2	3.4			
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	1.89		0.00	
Uniform Delay *(d_1)*, s/veh	0.0	19.9	19.9	14.0	11.0			29.5	24.9			
Incremental Delay *(d_2)*, s/veh	0.0	7.3	7.5	2.0	0.8	0.0		10.0	3.3		0.0	
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Control Delay *(d)*, s/veh	0.0	27.2	27.4	16.0	11.8			39.4	28.2			
Level of Service (LOS)		C	C	B	B			D	C			
Approach Delay, s/veh / LOS	27.3	C		12.2	B		34.3	C		0.0		
Intersection Delay, s/veh / LOS	22.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.4	A	1.2	A	1.1	A	0.5	A

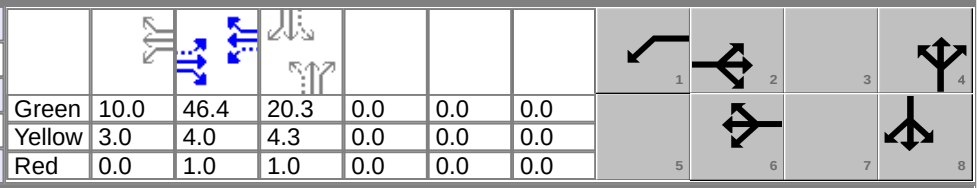
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Feb 14, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Intersection	Lawson Street	Analysis Year	2032	Analysis Period	1> 7:00
File Name	2032_Location3_PMpeak.xus				
Project Description	Location #3				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	6	1047	134	147	1192	0	133	1	130	2	0	4

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	10.0	46.4	20.3	0.0	0.0	0.0
Yellow	3.0	4.0	4.3	0.0	0.0	0.0
Red	0.0	1.0	1.0	0.0	0.0	0.0

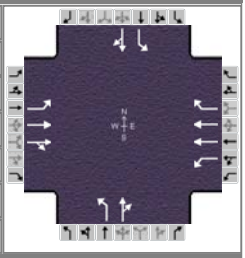
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		4		8
Case Number		6.3	1.0	4.0		7.0		8.0
Phase Duration, s		51.4	13.0	64.4		25.6		25.6
Change Period, (*Y*+R_c), s		5.2	3.0	5.2		5.3		5.3
Max Allow Headway (*MAH*), s		0.0	3.2	0.0		3.4		3.4
Queue Clearance Time (g_s), s			6.7			23.3		23.3
Green Extension Time (g_e), s		0.0	0.1	0.0		0.0		0.0
Phase Call Probability			1.00			1.00		1.00
Max Out Probability			0.90			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	7	668	644	163	1324	0		149	144		7	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	421	1569	1506	1524	1569	0		545	1343		275	
Queue Service Time (g_s), s	0.9	32.5	32.8	3.7	22.5	0.0		0.0	8.4		0.0	
Cycle Queue Clearance Time (g_c), s	10.4	32.5	32.8	3.7	22.5	0.0		20.3	8.4		20.3	
Capacity (*c*), veh/h	251	805	773	313	2064			203	303		115	
Volume-to-Capacity Ratio (*X*)	0.027	0.829	0.833	0.522	0.642	0.000		0.735	0.477		0.058	
Available Capacity (c_a), veh/h	251	805	773	313	2064			203	303		115	
Back of Queue (*Q*), veh/ln (50th percentile)	0.1	13.0	12.7	2.3	7.0			4.5	3.1		0.1	
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	1.76		0.00	
Uniform Delay (d_1), s/veh	16.0	18.6	18.6	16.7	9.1			36.6	30.2		28.6	
Incremental Delay (d_2), s/veh	0.2	9.7	10.3	6.1	1.5	0.0		20.9	5.3		1.0	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Control Delay (*d*), s/veh	16.2	28.2	28.9	22.8	10.7			57.6	35.5		29.6	
Level of Service (LOS)	B	C	C	C	B			E	D		C	
Approach Delay, s/veh / LOS	28.5	C		12.0	B		46.7	D		29.6	C	
Intersection Delay, s/veh / LOS	22.3						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.6	A	1.7	A	1.0	A	0.5	A

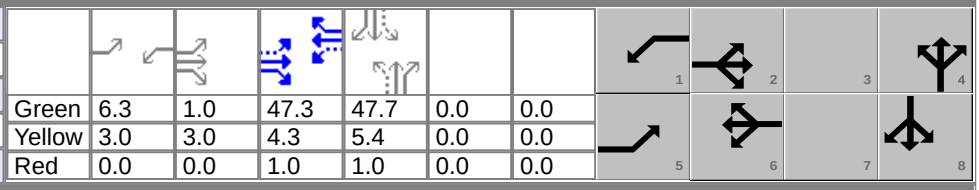
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Nov 14, 2012	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	South Dakota Street	Analysis Year	2032	Analysis Period	1> 7:00
File Name	2032_Location4_AMpeak.xus				
Project Description	Location #4				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	104	817	46	24	734	145	95	210	91	121	189	142

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.3	1.0	47.3	47.7	0.0	0.0
Yellow	3.0	3.0	4.3	5.4	0.0	0.0
Red	0.0	0.0	1.0	1.0	0.0	0.0

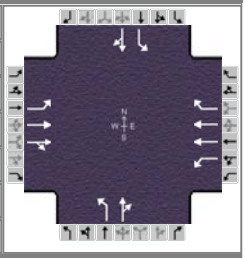
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		4		8
Case Number	1.1	4.0	1.1	3.0		6.0		6.0
Phase Duration, s	13.3	56.6	9.3	52.6		54.1		54.1
Change Period, *(Y+Rc)*, s	3.0	5.3	3.0	5.3		6.4		6.4
Max Allow Headway *(MAH)*, s	3.2	0.0	3.2	0.0		3.5		3.5
Queue Clearance Time (g_s), s	7.6		4.2			37.8		37.2
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0		2.0		2.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	1.00		1.00			0.15		0.13

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate *(v)*, veh/h	116	484	475	27	816	161	106	334		134	368	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1494	1553	1524	1524	1465	1329	1030	1517		1042	1484	
Queue Service Time (g_s), s	4.6	31.1	31.1	1.2	28.1	10.0	11.0	20.4		13.7	23.8	
Cycle Queue Clearance Time (g_c), s	4.6	31.1	31.1	1.2	28.1	10.0	34.8	20.4		34.2	23.8	
Capacity *(c)*, veh/h	295	664	651	240	1155	524	265	603		297	590	
Volume-to-Capacity Ratio *(X)*	0.391	0.729	0.729	0.111	0.706	0.307	0.398	0.554		0.453	0.623	
Available Capacity (c_a), veh/h	295	664	651	240	1155	524	265	603		297	590	
Back of Queue *(Q)*, veh/ln (50th percentile)	1.9	12.7	12.5	0.5	10.4	3.4	3.2	8.1		4.0	9.3	
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00	0.00	0.00	0.00	4.32	0.88	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh	20.1	28.6	28.6	21.9	30.5	25.1	42.9	27.9		41.1	29.0	
Incremental Delay (d_2), s/veh	3.9	6.9	7.0	0.9	3.6	1.5	4.4	3.6		4.9	4.9	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay *(d)*, s/veh	23.9	35.5	35.6	22.8	34.2	26.6	47.3	31.6		46.1	33.9	
Level of Service (LOS)	C	D	D	C	C	C	D	C		D	C	
Approach Delay, s/veh / LOS	34.3	C		32.6	C		35.4	D		37.1	D	
Intersection Delay, s/veh / LOS	34.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.9	C	2.8	C
Bicycle LOS Score / LOS	1.4	A	1.3	A	1.2	A	1.3	A

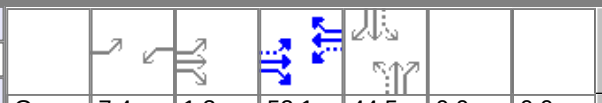
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Feb 14, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Intersection	North Dakota Street	Analysis Year	2032	Analysis Period	1> 7:00
File Name	2032_Location4_PMpeak.xus				
Project Description	Location #4				

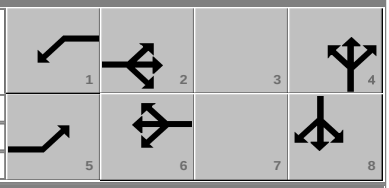


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	97	1094	86	72	1088	138	77	169	61	192	252	148

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	7.4	1.3	52.1	44.5	0.0	0.0
Yellow	3.0	0.0	4.3	5.4	0.0	0.0
Red	0.0	0.0	1.0	1.0	0.0	0.0



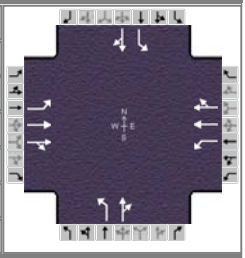
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		4		8
Case Number	1.1	4.0	1.1	3.0		6.0		6.0
Phase Duration, s	11.7	58.7	10.4	57.4		50.9		50.9
Change Period, *(Y+Rc)*, s	3.0	5.3	3.0	5.3		6.4		6.4
Max Allow Headway *(MAH)*, s	3.2	0.0	3.2	0.0		3.5		3.5
Queue Clearance Time (g_s), s	7.3		6.4			45.6		39.3
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0		0.0		1.5
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	1.00		1.00			1.00		0.62

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate *(v)*, veh/h	108	663	648	80	1209	153	86	256		213	444	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1524	1553	1513	1524	1493	1356	941	1511		1141	1499	
Queue Service Time (g_s), s	4.3	49.6	49.9	3.4	46.2	8.7	10.7	15.4		20.9	31.8	
Cycle Queue Clearance Time (g_c), s	4.3	49.6	49.9	3.4	46.2	8.7	42.6	15.4		36.3	31.8	
Capacity *(c)*, veh/h	194	691	673	166	1297	589	159	560		337	556	
Volume-to-Capacity Ratio *(X)*	0.556	0.959	0.962	0.481	0.932	0.260	0.537	0.456		0.633	0.800	
Available Capacity (c_a), veh/h	194	691	673	166	1297	589	159	560		337	556	
Back of Queue *(Q)*, veh/ln (50th percentile)	2.1	23.0	22.7	2.8	18.6	2.9	3.1	6.0		6.7	13.3	
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00	0.00	0.00	0.00	3.67	0.88	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh	26.2	32.2	32.3	27.1	32.3	21.7	52.8	28.6		42.3	33.8	
Incremental Delay (d_2), s/veh	11.0	25.6	26.6	9.6	13.3	1.1	12.4	2.7		8.7	11.5	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay *(d)*, s/veh	37.2	57.8	58.9	36.7	45.6	22.7	65.2	31.2		51.1	45.2	
Level of Service (LOS)	D	E	E	D	D	C	E	C		D	D	
Approach Delay, s/veh / LOS	56.8	E		42.7	D		39.8	D		47.1	D	
Intersection Delay, s/veh / LOS	48.3						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	3.0	C	2.8	C
Bicycle LOS Score / LOS	1.7	A	1.7	A	1.1	A	1.6	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Feb 14, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	State Street	Analysis Year	2032	Analysis Period	1> 7:00
File Name	2032_Location5_AMpeak.xus				
Project Description	Location #5				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	149	835	48	99	726	62	120	138	93	93	155	122

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	13.0	0.6	47.1	12.0	30.4	0.0	1	2	3	4	5	6	7	8
Yellow	3.0	0.0	4.3	3.0	4.6	0.0								
Red	0.0	0.0	1.0	0.0	1.0	0.0								

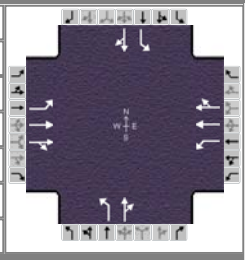
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	7	4	3	8
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	16.6	53.0	16.0	52.4	15.0	36.0	15.0	36.0
Change Period, *(Y+Rc)*, s	3.0	5.3	3.0	5.3	3.0	6.0	3.0	6.0
Max Allow Headway *(MAH)*, s	3.2	0.0	3.2	0.0	3.3	3.3	3.3	3.3
Queue Clearance Time *(g_s)*, s	10.2		7.7		10.8	21.8	8.9	26.9
Green Extension Time *(g_e)*, s	0.1	0.0	0.1	0.0	0.0	0.9	0.0	0.5
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	0.78		0.07		1.00	0.09	1.00	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate *(v)*, veh/h	166	495	486	110	444	431	133	257		103	308	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1509	1553	1523	1524	1538	1494	1465	1486		1479	1465	
Queue Service Time *(g_s)*, s	7.2	33.9	33.9	4.7	29.6	29.6	7.8	18.8		5.9	23.9	
Cycle Queue Clearance Time *(g_c)*, s	7.2	33.9	33.9	4.7	29.6	29.6	7.8	18.8		5.9	23.9	
Capacity *(c)*, veh/h	324	617	605	292	604	587	259	372		311	366	
Volume-to-Capacity Ratio *(X)*	0.511	0.802	0.802	0.376	0.735	0.736	0.514	0.691		0.332	0.840	
Available Capacity *(c_a)*, veh/h	324	617	605	292	604	587	259	372		311	366	
Back of Queue *(Q)*, veh/ln (50th percentile)	3.0	14.3	14.1	1.9	12.1	11.8	3.3	8.0		2.4	10.7	
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.00		0.33	0.00	
Uniform Delay *(d_1)*, s/veh	21.1	32.0	32.0	21.8	31.1	31.1	30.6	40.8		28.9	42.7	
Incremental Delay *(d_2)*, s/veh	5.7	10.6	10.8	3.7	7.8	8.0	7.1	10.1		2.8	20.2	
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay *(d)*, s/veh	26.8	42.6	42.8	25.5	38.9	39.1	37.7	50.9		31.7	62.9	
Level of Service (LOS)	C	D	D	C	D	D	D	D		C	E	
Approach Delay, s/veh / LOS	40.4	D		37.5	D		46.4	D		55.1	E	
Intersection Delay, s/veh / LOS	42.3						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.4	A	1.3	A	1.1	A	1.2	A

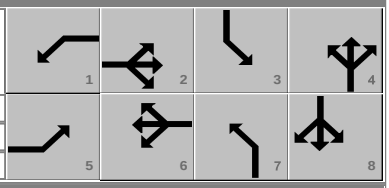
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Feb 14, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Intersection	State Street	Analysis Year	2032	Analysis Period	1> 7:00
File Name	2032_Location5_PMpeak.xus				
Project Description	Location #5				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	181	1032	68	141	1021	122	112	171	121	136	249	218

Signal Information			
Cycle, s	150.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	13.2	0.8	63.7	7.0	1.0	44.4	
Yellow	3.0	0.0	4.3	3.0	3.0	4.6	
Red	0.0	0.0	1.0	0.0	0.0	1.0	

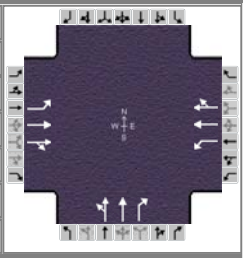
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	7	4	3	8
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	17.0	69.8	16.2	69.0	10.0	50.0	14.0	54.0
Change Period, *(Y+Rc)*, s	3.0	5.3	3.0	5.3	3.0	6.0	3.0	6.0
Max Allow Headway *(MAH)*, s	3.2	0.0	3.2	0.0	3.3	3.3	3.3	3.3
Queue Clearance Time (g_s), s	17.0		11.4		10.0	32.6	12.7	51.0
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	1.00		1.00		1.00	0.06	1.00	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate *(v)*, veh/h	201	618	605	157	646	624	124	324		151	519	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1509	1553	1519	1524	1553	1494	1524	1486		1524	1472	
Queue Service Time (g_s), s	14.0	56.4	56.6	8.4	61.5	61.9	7.0	29.6		9.7	48.0	
Cycle Queue Clearance Time (g_c), s	14.0	56.4	56.6	8.4	61.5	61.9	7.0	29.6		9.7	48.0	
Capacity *(c)*, veh/h	194	668	653	207	660	634	137	436		263	471	
Volume-to-Capacity Ratio *(X)*	1.036	0.925	0.926	0.758	0.980	0.983	0.908	0.744		0.575	1.101	
Available Capacity (c_a), veh/h	194	668	653	207	660	634	137	436		263	471	
Back of Queue *(Q)*, veh/ln (50th percentile)	11.4	25.2	24.8	4.3	28.9	28.2	4.0	12.4		4.3	27.2	
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.00		0.60	0.00	
Uniform Delay (d_1), s/veh	46.6	40.4	40.5	32.8	42.5	42.6	47.6	47.9		33.9	51.0	
Incremental Delay (d_2), s/veh	74.2	20.6	21.1	22.6	30.4	31.8	55.4	11.0		8.9	71.9	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay *(d)*, s/veh	120.8	61.0	61.6	55.4	72.9	74.4	103.1	58.9		42.7	122.9	
Level of Service (LOS)	F	E	E	E	E	E	F	E		D	F	
Approach Delay, s/veh / LOS	69.7	E		71.7	E		71.1	E		104.8	F	
Intersection Delay, s/veh / LOS	76.5						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.9	C	2.8	C
Bicycle LOS Score / LOS	1.7	A	1.7	A	1.2	A	1.6	A

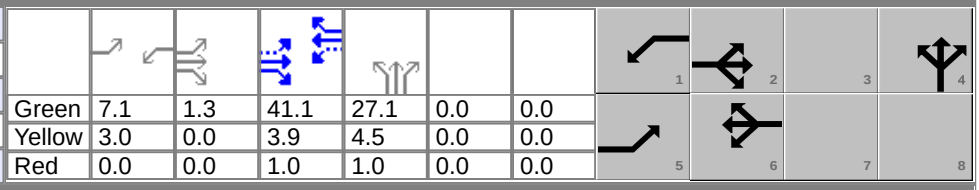
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Feb 14, 2013	Area Type	CBD
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	Main Street	Analysis Year	2032	Analysis Period	1> 7:00
File Name	2032_Location6_AMpeak.xus				
Project Description	Location #6				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	24	962	53	77	718	43	89	114	198			

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	7.1	1.3	41.1	27.1	0.0	0.0
Yellow	3.0	0.0	3.9	4.5	0.0	0.0
Red	0.0	0.0	1.0	1.0	0.0	0.0

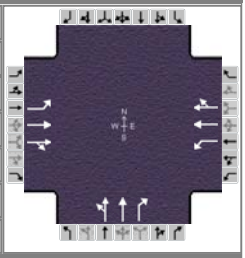
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		4		
Case Number	1.1	4.0	1.1	4.0		11.0		
Phase Duration, s	11.4	47.3	10.1	46.0		32.6		
Change Period, *(Y+Rc)*, s	3.0	5.2	3.0	5.2		5.5		
Max Allow Headway *(MAH)*, s	3.2	0.0	3.2	0.0		3.4		
Queue Clearance Time (g_s), s	3.8		5.9			16.9		
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0		0.8		
Phase Call Probability	1.00		1.00			1.00		
Max Out Probability	0.06		1.00			0.02		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14			
Adjusted Flow Rate (*v*), veh/h	27	569	559	86	427	419	116	109	220			
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1371	1398	1371	1331	1385	1357	1341	1398	1215			
Queue Service Time (g_s), s	0.8	32.9	32.9	2.9	21.9	21.9	6.0	5.3	13.9			
Cycle Queue Clearance Time (g_c), s	0.8	32.9	32.9	2.9	21.9	21.9	6.0	5.3	13.9			
Capacity (*c*), veh/h	333	654	641	230	628	615	404	421	366			
Volume-to-Capacity Ratio (*X*)	0.080	0.870	0.871	0.372	0.680	0.680	0.288	0.259	0.601			
Available Capacity (c_a), veh/h	333	654	641	230	628	615	404	421	366			
Back of Queue (*Q*), veh/ln (50th percentile)	0.3	12.7	12.5	1.1	7.7	7.5	2.1	1.9	4.7			
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Queue Storage Ratio (*RQ*) (50th percentile)	0.04	0.00	0.00	0.16	0.00	0.00	0.00	0.00	2.35			
Uniform Delay (d_1), s/veh	11.8	21.5	21.5	17.4	19.4	19.4	24.1	23.8	26.8			
Incremental Delay (d_2), s/veh	0.5	14.7	15.0	4.5	5.9	6.0	1.8	1.5	7.1			
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Control Delay (*d*), s/veh	12.2	36.2	36.5	22.0	25.3	25.4	25.9	25.3	34.0			
Level of Service (LOS)	B	D	D	C	C	C	C	C	C			
Approach Delay, s/veh / LOS	35.8	D		25.1	C		29.7	C		0.0		
Intersection Delay, s/veh / LOS	30.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	2.4	B	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.4	A	1.3	A	0.9	A		

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Feb 14, 2013	Area Type	CBD
Jurisdiction		Time Period	PM Peak	PHF	0.90
Intersection	Main Street	Analysis Year	2032	Analysis Period	1> 7:00
File Name	2032_Location6_PMpeak.xus				
Project Description	Location #6				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	49	923	82	142	1143	110	101	116	136			

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
Green	6.4	1.0	43.6	22.3	0.0	0.0	5	6	7	8
Yellow	3.0	3.0	4.2	4.5	0.0	0.0				
Red	0.0	0.0	1.0	1.0	0.0	0.0				

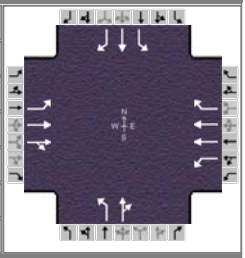
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		4		
Case Number	1.1	4.0	1.1	4.0		11.0		
Phase Duration, s	9.4	48.8	13.4	52.8		27.8		
Change Period, *(Y+Rc)*, s	3.0	5.2	3.0	5.2		5.5		
Max Allow Headway *(MAH)*, s	3.2	0.0	3.2	0.0		3.4		
Queue Clearance Time *(g_s)*, s	4.7		6.8			12.7		
Green Extension Time *(g_e)*, s	0.0	0.0	0.1	0.0		0.6		
Phase Call Probability	1.00		1.00			1.00		
Max Out Probability	1.00		0.63			0.02		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14			
Adjusted Flow Rate *(v)*, veh/h	54	567	550	158	705	687	125	117	151			
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1331	1385	1344	1371	1398	1355	1364	1426	1209			
Queue Service Time *(g_s)*, s	1.7	32.1	32.2	3.8	43.1	43.6	6.8	6.0	9.7			
Cycle Queue Clearance Time *(g_c)*, s	1.7	32.1	32.2	3.8	43.1	43.6	6.8	6.0	9.7			
Capacity *(c)*, veh/h	190	671	651	297	739	716	338	353	299			
Volume-to-Capacity Ratio *(X)*	0.287	0.845	0.845	0.531	0.954	0.959	0.368	0.330	0.505			
Available Capacity *(c_a)*, veh/h	190	671	651	297	739	716	338	353	299			
Back of Queue *(Q)*, veh/ln (50th percentile)	1.3	11.9	11.6	3.8	17.5	17.4	2.5	2.3	3.3			
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Queue Storage Ratio *(RQ)* (50th percentile)	0.20	0.00	0.00	0.54	0.00	0.00	0.00	0.00	1.64			
Uniform Delay *(d_1)*, s/veh	19.3	20.2	20.3	17.4	20.1	20.3	28.0	27.7	29.1			
Incremental Delay *(d_2)*, s/veh	3.8	12.4	12.8	6.7	23.5	25.0	3.1	2.5	6.0			
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Control Delay *(d)*, s/veh	23.0	32.6	33.0	24.0	43.7	45.2	31.1	30.2	35.1			
Level of Service (LOS)	C	C	C	C	D	D	C	C	D			
Approach Delay, s/veh / LOS	32.4	C		42.4	D		32.4	C		0.0		
Intersection Delay, s/veh / LOS	37.3						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	2.4	B	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.5	A	1.8	A	0.8	A		

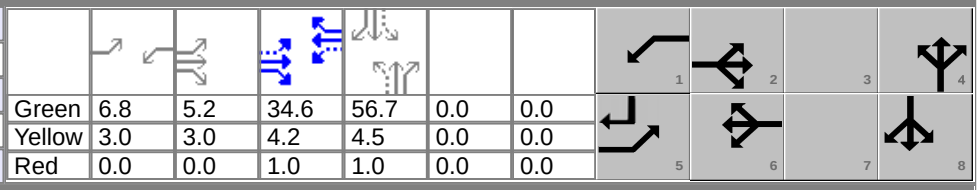
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Feb 14, 2013	Area Type	CBD
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	2nd Street	Analysis Year	2032	Analysis Period	1> 7:00
File Name	2032_Location7_AMpeak.xus				
Project Description	Location #7				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	191	765	12	40	521	183	51	241	82	217	294	184

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.8	5.2	34.6	56.7	0.0	0.0
Yellow	3.0	3.0	4.2	4.5	0.0	0.0
Red	0.0	0.0	1.0	1.0	0.0	0.0

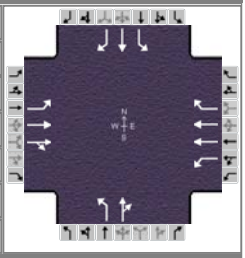
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		4		8
Case Number	1.1	4.0	1.1	3.0		6.0		5.0
Phase Duration, s	18.0	48.0	9.8	39.8		62.2		62.2
Change Period, *(Y+Rc)*, s	3.0	5.2	3.0	5.2		5.7		5.7
Max Allow Headway *(MAH)*, s	3.2	0.0	3.2	0.0		3.6		3.6
Queue Clearance Time (g_s), s	13.0		4.7			26.3		55.9
Green Extension Time (g_e), s	0.1	0.0	0.0	0.0		3.5		0.3
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	1.00		1.00			0.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	212	433	430	44	579	203	57	359		241	327	204
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1371	1398	1390	1331	1306	1183	963	1363		908	1412	1173
Queue Service Time (g_s), s	11.0	34.6	34.6	2.7	24.3	17.7	5.2	22.7		31.2	19.1	10.2
Cycle Queue Clearance Time (g_c), s	11.0	34.6	34.6	2.7	24.3	17.7	24.3	22.7		53.9	19.1	10.2
Capacity (*c*), veh/h	297	499	496	174	753	341	360	642		316	665	699
Volume-to-Capacity Ratio (*X*)	0.715	0.868	0.868	0.255	0.769	0.596	0.157	0.559		0.764	0.491	0.292
Available Capacity (c_a), veh/h	297	499	496	174	753	341	360	642		316	665	699
Back of Queue (*Q*), veh/ln (50th percentile)	5.1	14.2	14.1	1.0	8.5	5.8	1.3	7.9		8.4	6.8	2.9
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Queue Storage Ratio (*RQ*) (50th percentile)	0.99	0.00	0.00	0.17	0.00	1.99	0.33	0.00		1.26	0.00	0.00
Uniform Delay (d_1), s/veh	24.6	36.0	36.0	29.8	39.0	36.7	30.2	22.8		42.1	21.9	11.9
Incremental Delay (d_2), s/veh	13.7	18.2	18.3	3.5	7.4	7.5	0.9	3.5		16.0	2.6	1.1
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	38.4	54.2	54.2	33.3	46.5	44.2	31.1	26.3		58.1	24.4	12.9
Level of Service (LOS)	D	D	D	C	D	D	C	C		E	C	B
Approach Delay, s/veh / LOS	51.1	D		45.2	D		27.0	C		31.9	C	
Intersection Delay, s/veh / LOS	41.5						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.4	B	2.9	C	2.8	C
Bicycle LOS Score / LOS	1.4	A	1.2	A	1.2	A	1.8	A

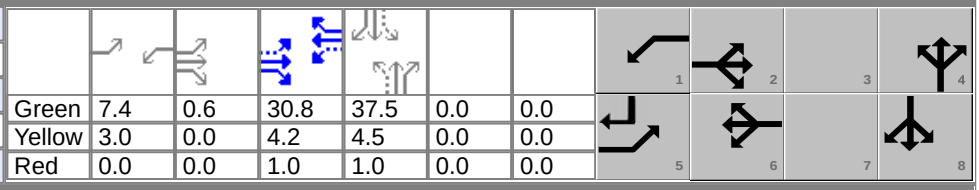
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Feb 14, 2013	Area Type	CBD
Jurisdiction		Time Period	PM Peak	PHF	0.90
Intersection	2nd Street	Analysis Year	2032	Analysis Period	1> 7:00
File Name	2032_Location7_PMpeak.xus				
Project Description	Location #7				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	152	624	15	82	911	271	22	146	47	297	251	257

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	7.4	0.6	30.8	37.5	0.0	0.0
Yellow	3.0	0.0	4.2	4.5	0.0	0.0
Red	0.0	0.0	1.0	1.0	0.0	0.0

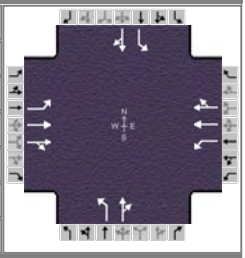
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		4		8
Case Number	1.1	4.0	1.1	3.0		6.0		5.0
Phase Duration, s	11.0	36.6	10.4	36.0		43.0		43.0
Change Period, ($Y+R_c$), s	3.0	5.2	3.0	5.2		5.7		5.7
Max Allow Headway (*MAH*), s	3.2	0.0	3.2	0.0		3.6		3.6
Queue Clearance Time (g_s), s	10.1		6.7			17.3		40.3
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0		3.1		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	1.00		1.00			0.02		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	169	356	354	91	1012	301	24	214		330	279	286
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1358	1385	1373	1358	1331	1215	1005	1352		1045	1440	1193
Queue Service Time (g_s), s	7.1	20.3	20.3	3.7	30.8	19.5	1.6	9.9		27.4	12.7	14.1
Cycle Queue Clearance Time (g_c), s	7.1	20.3	20.3	3.7	30.8	19.5	14.3	9.9		37.3	12.7	14.1
Capacity (*c*), veh/h	201	483	479	274	911	416	355	560		398	597	601
Volume-to-Capacity Ratio (*X*)	0.842	0.738	0.738	0.333	1.111	0.724	0.069	0.383		0.830	0.467	0.475
Available Capacity (c_a), veh/h	201	483	479	274	911	416	355	560		398	597	601
Back of Queue (*Q*), veh/ln (50th percentile)	3.9	7.7	7.7	1.4	17.6	6.6	0.4	3.4		9.1	4.6	4.1
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Queue Storage Ratio (*RQ*) (50th percentile)	0.76	0.00	0.00	0.22	0.00	2.21	0.11	0.00		1.36	0.00	0.00
Uniform Delay (d_1), s/veh	21.6	25.7	25.7	18.5	29.6	25.9	24.3	18.3		31.8	19.1	14.6
Incremental Delay (d_2), s/veh	32.7	9.7	9.8	3.2	65.2	10.5	0.4	2.0		17.9	2.6	2.7
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	54.2	35.4	35.5	21.7	94.8	36.4	24.7	20.3		49.7	21.8	17.3
Level of Service (LOS)	D	D	D	C	F	D	C	C		D	C	B
Approach Delay, s/veh / LOS	39.0	D		77.5	E		20.8	C		30.6	C	
Intersection Delay, s/veh / LOS	51.4						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.4	B	2.9	C	2.8	C
Bicycle LOS Score / LOS	1.2	A	1.6	A	0.9	A	2.0	A

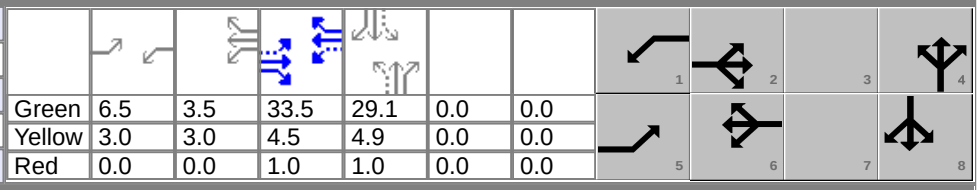
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Feb 14, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	5th Street	Analysis Year	2032	Analysis Period	1> 7:00
File Name	2032_Location8_AMpeak.xus				
Project Description	Location #8				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	6	679	68	166	436	12	117	87	342	20	58	16

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.5	3.5	33.5	29.1	0.0	0.0
Yellow	3.0	3.0	4.5	4.9	0.0	0.0
Red	0.0	0.0	1.0	1.0	0.0	0.0

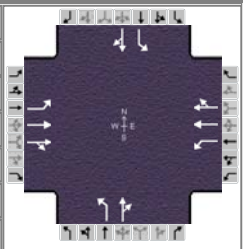
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		4		8
Case Number	1.1	4.0	1.1	4.0		6.0		6.0
Phase Duration, s	9.5	39.0	16.0	45.5		35.0		35.0
Change Period, *(Y+Rc)*, s	3.0	5.5	3.0	5.5		6.1		6.1
Max Allow Headway *(MAH)*, s	3.2	0.0	3.2	0.0		3.5		3.5
Queue Clearance Time (g_s), s	3.2		7.9			31.9		31.9
Green Extension Time (g_e), s	0.0	0.0	0.2	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.81		0.15			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate *(v)*, veh/h	7	422	408	184	250	248	130	477		22	82	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1524	1553	1503	1465	1538	1523	1226	1368		825	1439	
Queue Service Time (g_s), s	0.2	21.1	21.1	4.9	9.7	9.7	7.7	28.9		0.0	3.7	
Cycle Queue Clearance Time (g_c), s	0.2	21.1	21.1	4.9	9.7	9.7	11.4	28.9		28.9	3.7	
Capacity *(c)*, veh/h	498	578	559	381	684	677	423	439		80	462	
Volume-to-Capacity Ratio *(X)*	0.013	0.729	0.730	0.484	0.365	0.366	0.307	1.085		0.278	0.178	
Available Capacity (c_a), veh/h	498	578	559	381	684	677	423	439		80	462	
Back of Queue *(Q)*, veh/ln (50th percentile)	0.1	8.7	8.4	1.9	3.6	3.5	2.4	17.4		0.7	1.4	
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.38	0.00	
Uniform Delay (d_1), s/veh	14.0	24.3	24.3	14.6	16.6	16.6	26.1	30.6		45.0	22.0	
Incremental Delay (d_2), s/veh	0.0	7.9	8.1	4.4	1.5	1.5	1.9	67.9		8.4	0.8	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay *(d)*, s/veh	14.1	32.2	32.5	19.0	18.1	18.1	28.0	98.5		53.4	22.8	
Level of Service (LOS)	B	C	C	B	B	B	C	F		D	C	
Approach Delay, s/veh / LOS	32.2	C		18.3	B		83.4	F		29.3	C	
Intersection Delay, s/veh / LOS	41.7						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.2	A	1.1	A	1.5	A	0.7	A

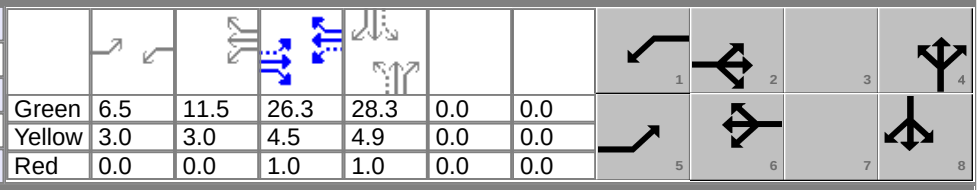
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Feb 14, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Intersection	5th Street	Analysis Year	2032	Analysis Period	1> 7:00
File Name	2032_Location8_PMpeak.xus				
Project Description	Location #8				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	9	562	66	352	707	17	93	46	261	19	68	12

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.5	11.5	26.3	28.3	0.0	0.0
Yellow	3.0	3.0	4.5	4.9	0.0	0.0
Red	0.0	0.0	1.0	1.0	0.0	0.0

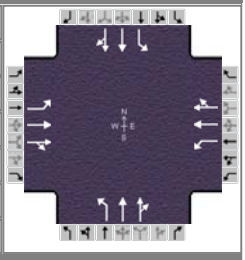
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		4		8
Case Number	1.1	4.0	1.1	4.0		6.0		6.0
Phase Duration, s	9.5	31.8	24.0	46.3		34.2		34.2
Change Period, $(Y+R_c)$, s	3.0	5.5	3.0	5.5		6.1		6.1
Max Allow Headway *(MAH)*, s	3.2	0.0	3.2	0.0		3.4		3.4
Queue Clearance Time (g_s), s	3.5		16.3			24.1		25.9
Green Extension Time (g_e), s	0.0	0.0	0.4	0.0		0.6		0.4
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	1.00		0.37			0.74		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate *(v)*, veh/h	10	355	343	391	404	401	103	341		21	89	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1181	1524	1467	1494	1553	1540	1329	1343		985	1558	
Queue Service Time (g_s), s	0.5	19.3	19.4	13.3	17.3	17.3	5.5	21.1		1.8	3.7	
Cycle Queue Clearance Time (g_c), s	0.5	19.3	19.4	13.3	17.3	17.3	9.3	21.1		22.9	3.7	
Capacity *(c)*, veh/h	305	445	429	485	704	698	440	419		157	486	
Volume-to-Capacity Ratio *(X)*	0.033	0.797	0.800	0.806	0.574	0.574	0.235	0.814		0.135	0.183	
Available Capacity (c_a), veh/h	305	445	429	485	704	698	440	419		157	486	
Back of Queue *(Q)*, veh/ln (50th percentile)	0.1	8.6	8.3	9.9	6.5	6.5	1.9	8.4		0.5	1.5	
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.27	0.00	
Uniform Delay (d_1), s/veh	18.4	29.4	29.4	19.9	18.2	18.2	26.0	28.5		39.1	22.6	
Incremental Delay (d_2), s/veh	0.2	13.8	14.4	13.3	3.4	3.4	1.3	15.8		1.8	0.8	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay *(d)*, s/veh	18.6	43.2	43.9	33.2	21.6	21.6	27.2	44.3		40.9	23.4	
Level of Service (LOS)	B	D	D	C	C	C	C	D		D	C	
Approach Delay, s/veh / LOS	43.2	D		25.4	C		40.3	D		26.8	C	
Intersection Delay, s/veh / LOS	33.3						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.1	A	1.5	A	1.2	A	0.7	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Feb 14, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	US 281	Analysis Year	2032	Analysis Period	1> 7:00
File Name	2032_Location9_AMpeak.xus				
Project Description	Location #9				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	74	285	69	74	241	62	50	137	145	89	147	104

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	15.4	1.4	21.0	11.3	3.0	15.3	1	2	3	4		
Yellow	4.6	0.0	4.6	4.7	0.0	4.7	5	6	7	8		
Red	1.0	0.0	1.0	1.0	0.0	1.0						

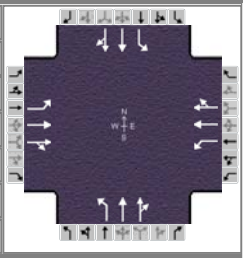
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	7	4	3	8
Case Number	2.0	4.0	2.0	4.0	2.0	4.0	2.0	4.0
Phase Duration, s	22.4	28.0	21.0	26.6	17.0	21.0	20.0	24.0
Change Period, ($Y+R_c$), s	5.5	5.6	5.6	5.6	5.7	5.7	5.7	5.7
Max Allow Headway (*MAH*), s	3.2	0.0	3.2	0.0	3.0	3.1	3.0	3.1
Queue Clearance Time (g_s), s	8.2		7.6		6.9	14.2	8.4	12.9
Green Extension Time (g_e), s	0.1	0.0	0.1	0.0	0.0	0.2	0.1	0.7
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	0.00		0.00		0.10	1.00	0.02	0.29

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	82	201	192	82	172	165	56	152	161	99	163	116
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1229	1495	1395	1411	1495	1391	1181	1455	1233	1494	1345	1139
Queue Service Time (g_s), s	5.2	10.5	10.8	4.6	9.0	9.3	3.9	8.7	11.2	5.4	9.9	8.1
Cycle Queue Clearance Time (g_c), s	5.2	10.5	10.8	4.6	9.0	9.3	3.9	8.7	11.2	5.4	9.9	8.1
Capacity (*c*), veh/h	231	372	347	241	349	325	148	247	210	237	273	232
Volume-to-Capacity Ratio (*X*)	0.356	0.540	0.554	0.341	0.493	0.508	0.375	0.616	0.769	0.417	0.597	0.499
Available Capacity (c_a), veh/h	231	372	347	241	349	325	148	247	210	237	273	232
Back of Queue (*Q*), veh/ln (50th percentile)	1.8	4.3	4.1	1.8	3.6	3.5	1.4	3.7	4.5	2.2	3.7	2.6
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.37	0.00	0.00
Uniform Delay (d_1), s/veh	31.8	29.3	29.4	32.8	29.9	30.0	36.1	34.6	35.7	34.1	32.5	31.8
Incremental Delay (d_2), s/veh	4.3	5.5	6.2	3.8	4.9	5.6	7.1	11.0	23.3	5.3	9.3	7.5
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	36.1	34.9	35.7	36.6	34.8	35.6	43.2	45.6	59.0	39.4	41.8	39.3
Level of Service (LOS)	D	C	D	D	C	D	D	D	E	D	D	D
Approach Delay, s/veh / LOS	35.4	D		35.5	D		51.1	D		40.4	D	
Intersection Delay, s/veh / LOS	40.1						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	2.8	C	2.8	C
Bicycle LOS Score / LOS	0.9	A	0.8	A	0.8	A	0.8	A

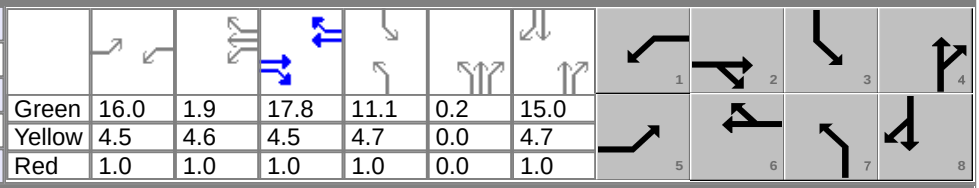
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Feb 14, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Intersection	US 281	Analysis Year	2032	Analysis Period	1> 7:00
File Name	2032_Location9_PMpeak.xus				
Project Description	Location #9				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	78	229	64	177	313	80	48	118	117	47	141	93

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	16.0	1.9	17.8	11.1	0.2	15.0
Yellow	4.5	4.6	4.5	4.7	0.0	4.7
Red	1.0	1.0	1.0	1.0	0.0	1.0

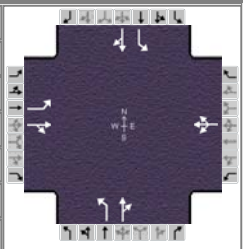
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	7	4	3	8
Case Number	2.0	4.0	2.0	4.0	2.0	4.0	2.0	4.0
Phase Duration, s	21.5	23.3	29.0	30.8	17.0	20.9	16.8	20.7
Change Period, ($Y+R_c$), s	5.5	5.6	5.6	5.6	5.7	5.7	5.7	5.7
Max Allow Headway (*MAH*), s	3.2	0.0	3.2	0.0	3.0	3.1	3.0	3.1
Queue Clearance Time (g_s), s	8.5		13.1		6.5	12.8	6.0	12.8
Green Extension Time (g_e), s	0.1	0.0	0.3	0.0	0.0	0.3	0.0	0.3
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	0.00		0.00		0.05	1.00	0.03	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	87	166	159	197	224	213	53	131	130	52	157	103
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1259	1441	1334	1494	1495	1391	1259	1322	1121	1438	1356	1149
Queue Service Time (g_s), s	5.5	9.4	9.8	10.1	11.4	11.7	3.5	8.2	9.8	3.0	9.8	7.4
Cycle Queue Clearance Time (g_c), s	5.5	9.4	9.8	10.1	11.4	11.7	3.5	8.2	9.8	3.0	9.8	7.4
Capacity (*c*), veh/h	224	283	262	388	419	389	158	223	189	177	226	192
Volume-to-Capacity Ratio (*X*)	0.387	0.587	0.607	0.506	0.535	0.546	0.337	0.587	0.687	0.295	0.693	0.540
Available Capacity (c_a), veh/h	224	283	262	388	419	389	158	223	189	177	226	192
Back of Queue (*Q*), veh/ln (50th percentile)	2.0	3.9	3.8	4.0	4.5	4.4	1.3	3.2	3.5	1.2	4.1	2.5
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.21	0.00	0.00
Uniform Delay (d_1), s/veh	32.7	32.8	33.0	28.4	27.4	27.5	35.9	34.5	35.2	35.9	35.3	34.3
Incremental Delay (d_2), s/veh	5.0	8.6	10.0	4.7	4.8	5.4	5.7	10.8	18.4	4.2	16.1	10.5
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	37.7	41.4	43.0	33.0	32.3	33.0	41.6	45.3	53.6	40.1	51.5	44.8
Level of Service (LOS)	D	D	D	C	C	C	D	D	D	D	D	D
Approach Delay, s/veh / LOS	41.2	D		32.7	C		48.1	D		47.4	D	
Intersection Delay, s/veh / LOS	40.5						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	2.8	C	2.8	C
Bicycle LOS Score / LOS	0.8	A	1.0	A	0.7	A	0.7	A

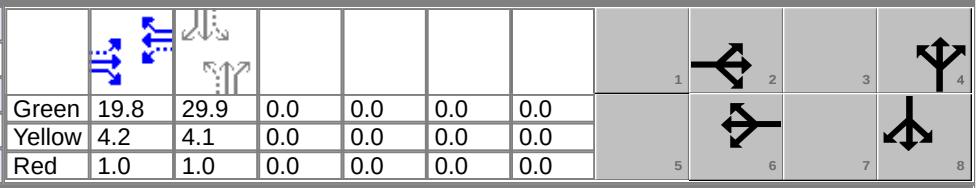
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Apr 23, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	Melgaard Rd (CR 19)	Analysis Year	2032	Analysis Period	1> 7:00
File Name	2032_Location10_AMpeak.xus				
Project Description	Location #10				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	174	216	44	49	143	10	133	200	41	2	405	241

Signal Information			
Cycle, s	60.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	19.8	29.9	0.0	0.0	0.0	0.0						
Yellow	4.2	4.1	0.0	0.0	0.0	0.0						
Red	1.0	1.0	0.0	0.0	0.0	0.0						

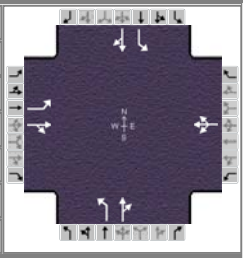
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		4		8
Case Number		6.0		8.0		6.0		6.0
Phase Duration, s		25.0		25.0		35.0		35.0
Change Period, $(Y+R_c)$, s		5.2		5.2		5.2		5.2
Max Allow Headway *(MAH)*, s		0.0		0.0		3.5		3.5
Queue Clearance Time (g_s), s						32.8		30.7
Green Extension Time (g_e), s		0.0		0.0		0.0		0.0
Phase Call Probability						1.00		1.00
Max Out Probability						1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate *(v)*, veh/h	193	289			224		148	268		2	718	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1098	1522			1007		738	1537		1129	1499	
Queue Service Time (g_s), s	7.4	9.4			3.0		2.1	6.4		0.1	27.7	
Cycle Queue Clearance Time (g_c), s	19.8	9.4			12.4		29.8	6.4		6.4	27.7	
Capacity *(c)*, veh/h	256	502			407		145	763		561	745	
Volume-to-Capacity Ratio *(X)*	0.756	0.575			0.552		1.016	0.351		0.004	0.964	
Available Capacity (c_a), veh/h	256	502			407		145	763		561	745	
Back of Queue *(Q)*, veh/ln (50th percentile)	4.0	3.6			2.8		5.2	2.0		0.0	12.8	
Overflow Queue (Q_3), veh/ln	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00			0.00		0.00	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh	27.4	16.6			16.7		29.8	9.2		11.2	14.6	
Incremental Delay (d_2), s/veh	18.7	4.7			5.3		79.0	1.3		0.0	25.3	
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Control Delay *(d)*, s/veh	46.1	21.4			22.0		108.8	10.5		11.2	39.8	
Level of Service (LOS)	D	C			C		F	B		B	D	
Approach Delay, s/veh / LOS	31.3	C		22.0	C		45.5	D		39.7	D	
Intersection Delay, s/veh / LOS	36.7						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.1	B	2.2	B
Bicycle LOS Score / LOS	1.3	A	0.9	A	1.2	A	1.7	A

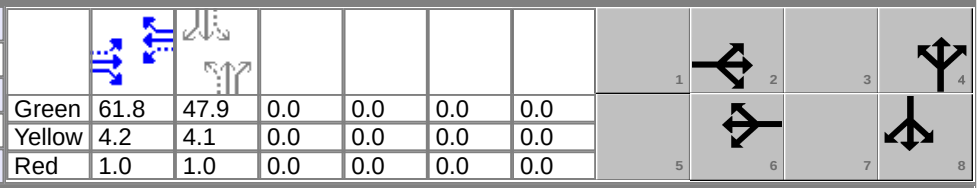
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Feb 14, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Intersection	Melgaard Rd (CR 19)	Analysis Year	2032	Analysis Period	1> 7:00
File Name	2032_Location10_PMpeak.xus				
Project Description	Location #10				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	334	249	44	3	226	10	203	290	57	13	49	223

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	61.8	47.9	0.0	0.0	0.0	0.0						
Yellow	4.2	4.1	0.0	0.0	0.0	0.0						
Red	1.0	1.0	0.0	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		4		8
Case Number		6.0		8.0		6.0		6.0
Phase Duration, s		67.0		67.0		53.0		53.0
Change Period, $(Y+R_c)$, s		5.2		5.2		5.2		5.2
Max Allow Headway *(MAH)*, s		0.0		0.0		3.4		3.4
Queue Clearance Time (g_s), s						47.0		28.2
Green Extension Time (g_e), s		0.0		0.0		0.3		2.3
Phase Call Probability						1.00		1.00
Max Out Probability						1.00		0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate *(v)*, veh/h	371	326			266		226	386		14	302	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1078	1429			1478		1094	1554		1014	1393	
Queue Service Time (g_s), s	37.2	17.2			0.0		23.9	23.8		1.4	20.0	
Cycle Queue Clearance Time (g_c), s	49.9	17.2			12.7		44.0	23.8		25.2	20.0	
Capacity *(c)*, veh/h	501	736			791		313	619		263	555	
Volume-to-Capacity Ratio *(X)*	0.741	0.442			0.336		0.720	0.623		0.055	0.545	
Available Capacity (c_a), veh/h	501	736			791		313	619		263	555	
Back of Queue *(Q)*, veh/ln (50th percentile)	10.8	6.0			4.5		7.6	9.6		0.4	7.2	
Overflow Queue (Q_3), veh/ln	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00			0.00		0.00	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh	31.9	18.3			17.2		44.6	28.9		39.0	27.7	
Incremental Delay (d_2), s/veh	9.5	1.9			1.1		13.3	4.7		0.4	3.8	
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Control Delay *(d)*, s/veh	41.4	20.2			18.3		58.0	33.6		39.4	31.6	
Level of Service (LOS)	D	C			B		E	C		D	C	
Approach Delay, s/veh / LOS	31.5	C		18.3	B		42.6	D		31.9	C	
Intersection Delay, s/veh / LOS	33.3						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.1	B	2.3	B
Bicycle LOS Score / LOS	1.6	A	0.9	A	1.5	A	1.0	A

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*M.Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/14/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Location #11*
Jurisdiction	
Analysis Year	*2032*

Project ID *40120063*

East/West Street: *Melgaard Road (CR 19)* North/South Street: *5th Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*49*	*332*	*15*	*57*	*154*	*172*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*0*	*145*	*128*	*226*	*98*	*20*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*L*	*TR*	*LTR*		*LTR*	
PHF	*0.74*		*0.67*	*0.78*	*0.64*		*0.75*	
Flow Rate (veh/h)	*534*		*85*	*417*	*426*		*457*	
% Heavy Vehicles	*1*		*3*	*4*	*4*		*5*	
No. Lanes	*1*		*2*		*1*		*1*	
Geometry Group	*4a*		*5*		*2*		*2*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.1*		*1.0*	*0.0*	*0.0*		*0.7*	
Prop. Right-Turns	*0.0*		*0.0*	*0.5*	*0.5*		*0.1*	
Prop. Heavy Vehicle	*0.0*		*0.0*	*0.0*	*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.5*	*0.5*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.7*	*-0.7*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.0*		*0.6*	*-0.3*	*-0.2*		*0.2*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*	*3.20*	*3.20*		*3.20*	
x, initial	*0.47*		*0.08*	*0.37*	*0.38*		*0.41*	
hd, final value (s)	*9.97*		*10.53*	*9.63*	*9.57*		*9.98*	
x, final value	*1.48*		*0.25*	*1.12*	*1.13*		*1.27*	
Move-up time, m (s)	*2.0*		*2.3*		*2.0*		*2.0*	
Service Time, t_s (s)	*8.0*		*8.2*	*7.3*	*7.6*		*8.0*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*534*		*335*	*417*	*426*		*457*	
Delay (s/veh)	*905.92*		*16.70*	*289.42*	*314.72*		*537.83*	
LOS	*F*		*C*	*F*	*F*		*F*	
Approach: Delay (s/veh)	*905.92*		*243.25*		*314.72*		*537.83*	
LOS	*F*		*F*		*F*		*F*	
Intersection Delay (s/veh)	*513.67*							
Intersection LOS	*F*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*M.Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/14/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Location #11*
Jurisdiction	
Analysis Year	*2032*

Project ID *40120063*

East/West Street: *Melgaard Road (CR 19)* North/South Street: *5th Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*43*	*225*	*4*	*141*	*210*	*195*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*24*	*141*	*79*	*164*	*155*	*69*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*L*	*TR*	*LTR*		*LTR*	
PHF	*0.81*		*0.60*	*0.91*	*0.82*		*0.76*	
Flow Rate (veh/h)	*334*		*234*	*444*	*296*		*508*	
% Heavy Vehicles	*8*		*3*	*4*	*8*		*2*	
No. Lanes	*1*		*2*		*1*		*1*	
Geometry Group	*4a*		*5*		*2*		*2*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.2*		*1.0*	*0.0*	*0.1*		*0.4*	
Prop. Right-Turns	*0.0*		*0.0*	*0.5*	*0.3*		*0.2*	
Prop. Heavy Vehicle	*0.1*		*0.0*	*0.0*	*0.1*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.5*	*0.5*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.7*	*-0.7*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.2*		*0.6*	*-0.3*	*-0.0*		*0.0*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*	*3.20*	*3.20*		*3.20*	
x, initial	*0.30*		*0.21*	*0.39*	*0.26*		*0.45*	
hd, final value (s)	*9.51*		*9.79*	*8.93*	*9.43*		*8.91*	
x, final value	*0.88*		*0.64*	*1.10*	*0.78*		*1.26*	
Move-up time, m (s)	*2.0*		*2.3*		*2.0*		*2.0*	
Service Time, t_s (s)	*7.5*		*7.5*	*6.6*	*7.4*		*6.9*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*376*		*368*	*444*	*376*		*508*	
Delay (s/veh)	*68.85*		*29.19*	*264.24*	*42.71*		*515.39*	
LOS	*F*		*D*	*F*	*E*		*F*	
Approach: Delay (s/veh)	*68.85*		*183.12*		*42.71*		*515.39*	
LOS	*F*		*F*		*E*		*F*	
Intersection Delay (s/veh)	*232.17*							
Intersection LOS	*F*							

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	
Agency/Co.	*HR Green*
Date Performed	*2/14/2013*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Location #12*
Jurisdiction	
Analysis Year	*2032*

Project Description *40120063*

East/West Street: *Melgaard Road (CR 19)* | North/South Street: *US 281*

Intersection Orientation: *North-South* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*4*	*238*	*98*	*78*	*150*	*38*
Peak-Hour Factor, PHF	*0.38*	*0.65*	*0.56*	*0.55*	*0.83*	*0.78*
Hourly Flow Rate, HFR (veh/h)	*10*	*366*	*174*	*141*	*180*	*48*
Percent Heavy Vehicles	*0*	--	--	*9*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration	*LT*		*TR*	*LT*		*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*32*	*48*	*8*	*118*	*39*	*69*
Peak-Hour Factor, PHF	*0.96*	*0.47*	*0.75*	*0.83*	*0.66*	*0.66*
Hourly Flow Rate, HFR (veh/h)	*33*	*102*	*10*	*142*	*59*	*104*
Percent Heavy Vehicles	*4*	*3*	*17*	*5*	*0*	*3*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*	*LT*		*LTR*			*LTR*	
v (veh/h)	*10*	*141*		*305*			*145*	
C (m) (veh/h)	*1352*	*977*		*186*			*199*	
v/c	*0.01*	*0.14*		*1.64*			*0.73*	
95% queue length	*0.02*	*0.51*		*66.39*			*6.49*	
Control Delay (s/veh)	*7.7*	*9.3*		*1224*			*67.6*	
LOS	*A*	*A*		*F*			*F*	
Approach Delay (s/veh)	--	--	*1224*			*67.6*		
Approach LOS	--	--	*F*			*F*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst		Intersection	*Location #12*
Agency/Co.	*HR Green*	Jurisdiction	
Date Performed	*2/14/2013*	Analysis Year	*2032*
Analysis Time Period	*PM Peak*		

Project Description *40120063*

East/West Street: *Melgaard Road (CR 19)* | North/South Street: *US 281*

Intersection Orientation: *North-South* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*7*	*179*	*83*	*51*	*217*	*43*
Peak-Hour Factor, PHF	*0.50*	*0.68*	*0.77*	*0.88*	*0.81*	*0.67*
Hourly Flow Rate, HFR (veh/h)	*14*	*263*	*107*	*57*	*267*	*64*
Percent Heavy Vehicles	*0*	--	--	*10*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration	*LT*		*TR*	*LT*		*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*31*	*41*	*6*	*188*	*73*	*81*
Peak-Hour Factor, PHF	*0.79*	*0.52*	*0.50*	*0.86*	*0.70*	*0.90*
Hourly Flow Rate, HFR (veh/h)	*39*	*78*	*12*	*218*	*104*	*90*
Percent Heavy Vehicles	*0*	*0*	*25*	*6*	*5*	*12*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*	*LT*		*LTR*			*LTR*	
v (veh/h)	*14*	*57*		*412*			*129*	
C (m) (veh/h)	*1240*	*1130*		*322*			*287*	
v/c	*0.01*	*0.05*		*1.28*			*0.45*	
95% queue length	*0.03*	*0.16*		*56.03*			*2.38*	
Control Delay (s/veh)	*7.9*	*8.4*		*566.1*			*27.7*	
LOS	*A*	*A*		*F*			*D*	
Approach Delay (s/veh)	--	--	*566.1*			*27.7*		
Approach LOS	--	--	*F*			*D*		

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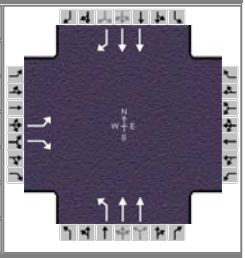
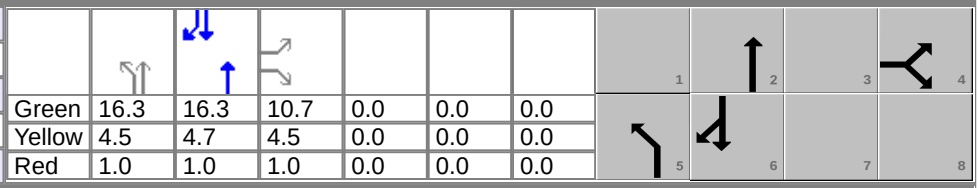
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Feb 14, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	US 281	Analysis Year	2032	Analysis Period	1> 7:00
File Name	2032_Location13_AMpeak.xus				
Project Description	Location #13				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	95		26				8	115			243	128

Signal Information			
Cycle, s	60.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	16.3	16.3	10.7	0.0	0.0	0.0
Yellow	4.5	4.7	4.5	0.0	0.0	0.0
Red	1.0	1.0	1.0	0.0	0.0	0.0

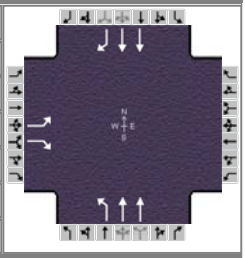
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			5	2		6
Case Number		9.0			2.0	4.0		7.3
Phase Duration, s		16.2			21.8	43.8		22.0
Change Period, ($Y+R_c$), s		5.5			5.5	5.7		5.7
Max Allow Headway (*MAH*), s		3.1			3.0	0.0		0.0
Queue Clearance Time (g_s), s		8.4			3.3			
Green Extension Time (g_e), s		0.2			0.0	0.0		0.0
Phase Call Probability		0.89			1.00			
Max Out Probability		0.00			0.00			

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				5	2			6	16
Adjusted Flow Rate (*v*), veh/h	106		29				9	128			270	142
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1073		1291				1524	1508			1508	1189
Queue Service Time (g_s), s	5.4		1.1				0.3	1.0			4.3	5.9
Cycle Queue Clearance Time (g_c), s	5.4		1.1				0.3	1.0			4.3	5.9
Capacity (*c*), veh/h	192		231				413	1914			820	323
Volume-to-Capacity Ratio (*X*)	0.550		0.125				0.022	0.067			0.329	0.440
Available Capacity (c_a), veh/h	402		484				413	1914			820	323
Back of Queue (*Q*), veh/ln (50th percentile)	1.2		0.3				0.1	0.2			1.4	1.8
Overflow Queue (Q_3), veh/ln	0.0		0.0				0.0	0.0			0.0	0.0
Queue Storage Ratio (*RQ*) (50th percentile)	0.00		0.00				0.01	0.00			0.00	0.00
Uniform Delay (d_1), s/veh	22.4		20.7				16.0	4.2			17.5	18.1
Incremental Delay (d_2), s/veh	0.9		0.1				0.1	0.1			1.1	4.3
Initial Queue Delay (d_3), s/veh	0.0		0.0				0.0	0.0			0.0	0.0
Control Delay (*d*), s/veh	23.4		20.8				16.1	4.3			18.5	22.4
Level of Service (LOS)	C		C				B	A			B	C
Approach Delay, s/veh / LOS	22.8	C		0.0			5.0	A		19.9	B	
Intersection Delay, s/veh / LOS	17.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	0.7	A	2.3	B
Bicycle LOS Score / LOS		F			0.6	A	0.8	A

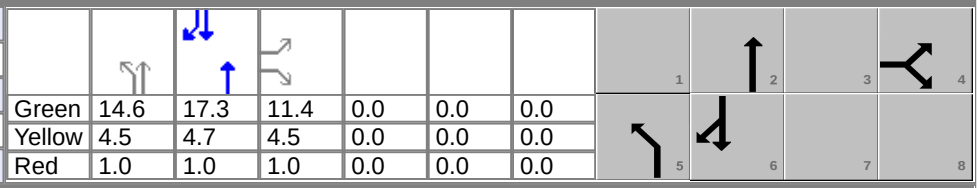
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Feb 14, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Intersection	US 281	Analysis Year	2032	Analysis Period	1> 7:00
File Name	2032_Location13_PMpeak.xus				
Project Description	Location #13				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	137		21				22	325			157	88

Signal Information			
Cycle, s	60.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	14.6	17.3	11.4	0.0	0.0	0.0
Yellow	4.5	4.7	4.5	0.0	0.0	0.0
Red	1.0	1.0	1.0	0.0	0.0	0.0

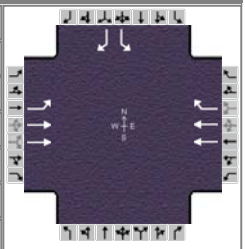
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			5	2		6
Case Number		9.0			2.0	4.0		7.3
Phase Duration, s		16.9			20.1	43.1		23.0
Change Period, ($Y+R_c$), s		5.5			5.5	5.7		5.7
Max Allow Headway (*MAH*), s		3.1			3.0	0.0		0.0
Queue Clearance Time (g_s), s		10.2			3.8			
Green Extension Time (g_e), s		0.2			0.0	0.0		0.0
Phase Call Probability		0.95			1.00			
Max Out Probability		0.00			0.00			

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				5	2			6	16
Adjusted Flow Rate (*v*), veh/h	152		23				24	361			174	98
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1181		1200				1424	1508			1465	1012
Queue Service Time (g_s), s	7.2		1.0				0.8	3.1			2.7	4.6
Cycle Queue Clearance Time (g_c), s	7.2		1.0				0.8	3.1			2.7	4.6
Capacity (*c*), veh/h	224		227				347	1882			845	292
Volume-to-Capacity Ratio (*X*)	0.681		0.103				0.070	0.192			0.206	0.335
Available Capacity (c_a), veh/h	364		370				348	1882			845	292
Back of Queue (*Q*), veh/ln (50th percentile)	1.8		0.2				0.3	0.6			0.8	1.1
Overflow Queue (Q_3), veh/ln	0.0		0.0				0.0	0.0			0.0	0.0
Queue Storage Ratio (*RQ*) (50th percentile)	0.00		0.00				0.03	0.00			0.00	0.00
Uniform Delay (d_1), s/veh	22.6		20.1				17.4	4.8			16.2	16.8
Incremental Delay (d_2), s/veh	1.4		0.1				0.4	0.2			0.6	3.1
Initial Queue Delay (d_3), s/veh	0.0		0.0				0.0	0.0			0.0	0.0
Control Delay (*d*), s/veh	24.0		20.2				17.8	5.0			16.7	19.9
Level of Service (LOS)	C		C				B	A			B	B
Approach Delay, s/veh / LOS	23.5	C		0.0			5.9	A		17.8	B	
Intersection Delay, s/veh / LOS	13.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	0.7	A	2.3	B
Bicycle LOS Score / LOS		F			0.8	A	0.7	A

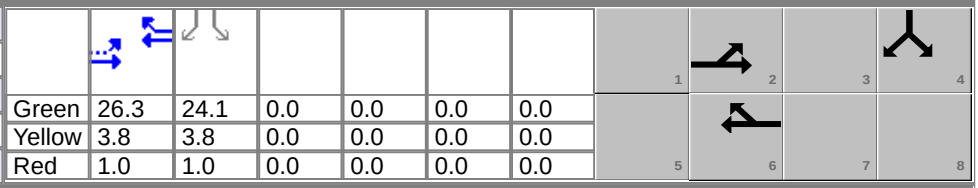
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Feb 14, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	2nd Street	Analysis Year	2032	Analysis Period	1> 7:00
File Name	2032_Location14_AMpeak.xus				
Project Description	Location #14				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	6	376			277	420				488		29

Signal Information			
Cycle, s	60.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	26.3	24.1	0.0	0.0	0.0	0.0						
Yellow	3.8	3.8	0.0	0.0	0.0	0.0						
Red	1.0	1.0	0.0	0.0	0.0	0.0						

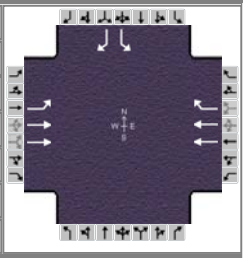
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6				4
Case Number		6.0		7.0				9.0
Phase Duration, s		31.1		31.1				28.9
Change Period, *(Y+Rc)*, s		5.0		5.0				4.8
Max Allow Headway *(MAH)*, s		0.0		0.0				3.2
Queue Clearance Time *(g_s)*, s								23.1
Green Extension Time *(g_e)*, s		0.0		0.0				1.0
Phase Call Probability								1.00
Max Out Probability								0.07

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate *(v)*, veh/h	7	418			308	467				542		32
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1089	1479			1479	1304				1509		1291
Queue Service Time *(g_s)*, s	0.2	5.6			3.9	18.9				20.1		0.9
Cycle Queue Clearance Time *(g_c)*, s	4.2	5.6			3.9	18.9				20.1		0.9
Capacity *(c)*, veh/h	522	1287			1287	567				606		519
Volume-to-Capacity Ratio *(X)*	0.013	0.325			0.239	0.823				0.895		0.062
Available Capacity *(c_a)*, veh/h	522	1287			1287	567				792		678
Back of Queue *(Q)*, veh/ln (50th percentile)	0.1	1.7			1.2	6.7				7.5		0.2
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0			0.0	0.0				0.0		0.0
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00			0.00	1.74				0.00		0.02
Uniform Delay *(d_1)*, s/veh	12.0	11.2			10.7	14.9				16.8		11.0
Incremental Delay *(d_2)*, s/veh	0.0	0.7			0.4	12.7				8.9		0.0
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay *(d)*, s/veh	12.0	11.8			11.1	27.6				25.7		11.0
Level of Service (LOS)	B	B			B	C				C		B
Approach Delay, s/veh / LOS	11.8	B		21.1	C		0.0			24.9	C	
Intersection Delay, s/veh / LOS	20.1						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.7	A	2.2	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	0.8	A	1.1	A				F

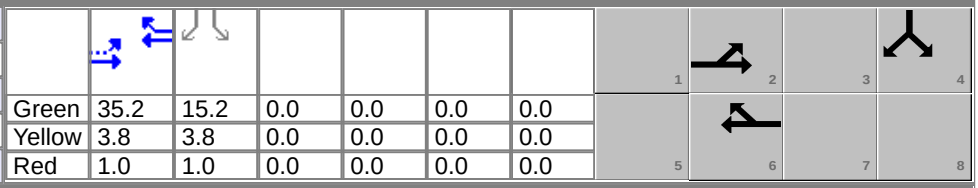
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HR Green			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Feb 14, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Intersection	2nd Street	Analysis Year	2032	Analysis Period	1> 7:00
File Name	2032_Location14_PMpeak.xus				
Project Description	Location #14				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	28	456			547	415				284		42

Signal Information			
Cycle, s	60.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	35.2	15.2	0.0	0.0	0.0	0.0						
Yellow	3.8	3.8	0.0	0.0	0.0	0.0						
Red	1.0	1.0	0.0	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6				4
Case Number		6.0		7.0				9.0
Phase Duration, s		40.0		40.0				20.0
Change Period, *(Y+Rc)*, s		5.0		5.0				4.8
Max Allow Headway *(MAH)*, s		0.0		0.0				3.2
Queue Clearance Time *(g_s)*, s								14.7
Green Extension Time *(g_e)*, s		0.0		0.0				0.5
Phase Call Probability								1.00
Max Out Probability								0.03

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate *(v)*, veh/h	31	507			608	461				316		47
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	826	1493			1508	1356				1524		1356
Queue Service Time *(g_s)*, s	1.2	5.1			6.3	12.9				11.7		1.6
Cycle Queue Clearance Time *(g_c)*, s	7.5	5.1			6.3	12.9				11.7		1.6
Capacity *(c)*, veh/h	515	1742			1760	791				386		343
Volume-to-Capacity Ratio *(X)*	0.060	0.291			0.345	0.583				0.818		0.136
Available Capacity *(c_a)*, veh/h	515	1742			1760	791				589		524
Back of Queue *(Q)*, veh/ln (50th percentile)	0.2	1.3			1.7	3.5				4.1		0.5
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0			0.0	0.0				0.0		0.0
Queue Storage Ratio *(RQ)* (50th percentile)	0.02	0.00			0.00	0.88				0.00		0.05
Uniform Delay *(d_1)*, s/veh	8.5	6.3			6.5	7.9				21.1		17.3
Incremental Delay *(d_2)*, s/veh	0.2	0.4			0.5	3.1				2.9		0.1
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay *(d)*, s/veh	8.7	6.7			7.1	11.0				24.0		17.4
Level of Service (LOS)	A	A			A	B				C		B
Approach Delay, s/veh / LOS	6.8	A		8.8	A		0.0			23.2	C	
Intersection Delay, s/veh / LOS	10.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.7	A	2.2	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	0.9	A	1.4	A				F

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*M.Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/14/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Location #15*
Jurisdiction	
Analysis Year	*2032*

Project ID *40120063*

East/West Street: *24th Avenue (CR 15)* North/South Street: *North Dakota Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*21*	*171*	*64*	*103*	*65*	*5*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*47*	*32*	*108*	*4*	*103*	*36*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*L*	*TR*	*L*	*TR*	*LTR*		*LTR*	
PHF	*0.70*	*0.56*	*0.62*	*0.65*	*0.73*		*0.67*	
Flow Rate (veh/h)	*30*	*419*	*166*	*107*	*254*		*211*	
% Heavy Vehicles	*0*	*4*	*2*	*15*	*2*		*2*	
No. Lanes	*2*		*2*		*1*		*1*	
Geometry Group	*5*		*5*		*2*		*2*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
Prop. Left-Turns	*1.0*	*0.0*	*1.0*	*0.0*	*0.3*		*0.0*	
Prop. Right-Turns	*0.0*	*0.3*	*0.0*	*0.1*	*0.6*		*0.3*	
Prop. Heavy Vehicle	*0.0*	*0.0*	*0.0*	*0.1*	*0.0*		*0.0*	
hLT-adj	*0.5*	*0.5*	*0.5*	*0.5*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.5*	*-0.1*	*0.5*	*0.2*	*-0.3*		*-0.1*	

Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
hd, initial value (s)	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*		*3.20*	
x, initial	*0.03*	*0.37*	*0.15*	*0.10*	*0.23*		*0.19*	
hd, final value (s)	*7.16*	*6.52*	*7.52*	*7.18*	*6.38*		*6.64*	
x, final value	*0.06*	*0.76*	*0.35*	*0.21*	*0.45*		*0.39*	
Move-up time, m (s)	*2.3*		*2.3*		*2.0*		*2.0*	
Service Time, t_s (s)	*4.9*	*4.2*	*5.2*	*4.9*	*4.4*		*4.6*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*280*	*538*	*416*	*357*	*504*		*461*	
Delay (s/veh)	*10.31*	*28.83*	*14.19*	*11.83*	*14.59*		*13.86*	
LOS	*B*	*D*	*B*	*B*	*B*		*B*	
Approach: Delay (s/veh)	*27.60*		*13.26*		*14.59*		*13.86*	
LOS	*D*		*B*		*B*		*B*	
Intersection Delay (s/veh)	*19.08*							
Intersection LOS	*C*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*M.Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/14/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Location #15*
Jurisdiction	
Analysis Year	*2032*

Project ID *40120063*

East/West Street: *24th Avenue (CR 15)* North/South Street: *North Dakota Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*19*	*103*	*42*	*83*	*148*	*18*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*37*	*77*	*63*	*15*	*45*	*11*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*L*	*TR*	*L*	*TR*	*LTR*		*LTR*	
PHF	*0.81*	*1.00*	*0.50*	*0.59*	*0.64*		*0.79*	
Flow Rate (veh/h)	*23*	*145*	*166*	*280*	*275*		*87*	
% Heavy Vehicles	*0*	*2*	*2*	*2*	*1*		*4*	
No. Lanes	*2*		*2*		*1*		*1*	
Geometry Group	*5*		*5*		*2*		*2*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*1.0*	*0.0*	*1.0*	*0.0*	*0.2*		*0.2*	
Prop. Right-Turns	*0.0*	*0.3*	*0.0*	*0.1*	*0.4*		*0.1*	
Prop. Heavy Vehicle	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	
hLT-adj	*0.5*	*0.5*	*0.5*	*0.5*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.5*	*-0.2*	*0.5*	*-0.0*	*-0.2*		*0.0*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*		*3.20*	
x, initial	*0.02*	*0.13*	*0.15*	*0.25*	*0.24*		*0.08*	
hd, final value (s)	*6.74*	*6.06*	*6.38*	*5.80*	*5.47*		*6.01*	
x, final value	*0.04*	*0.24*	*0.29*	*0.45*	*0.42*		*0.15*	
Move-up time, m (s)	*2.3*		*2.3*		*2.0*		*2.0*	
Service Time, t_s (s)	*4.4*	*3.8*	*4.1*	*3.5*	*3.5*		*4.0*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*273*	*395*	*416*	*530*	*525*		*337*	
Delay (s/veh)	*9.75*	*10.72*	*11.73*	*13.23*	*12.37*		*10.04*	
LOS	*A*	*B*	*B*	*B*	*B*		*B*	
Approach: Delay (s/veh)	*10.59*		*12.67*		*12.37*		*10.04*	
LOS	*B*		*B*		*B*		*B*	
Intersection Delay (s/veh)	*11.99*							
Intersection LOS	*B*							

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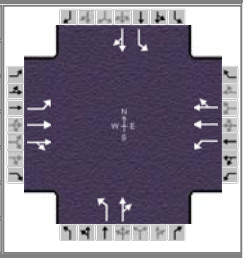
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HRG			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Feb 14, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Intersection	Lamont St	Analysis Year	2032	Analysis Period	1> 7:00
File Name	2032_Location16_US 12-Lamont AMpeak.xus				
Project Description	Location #16				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	12	759	174	5	607	5	117	5	23	3	9	2

Signal Information			
Cycle, s	60.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

								1	2	3	4	
Green	27.2	21.8	0.0	0.0	0.0	0.0						
Yellow	4.4	4.6	0.0	0.0	0.0	0.0						
Red	1.0	1.0	0.0	0.0	0.0	0.0	5	6	7	8		

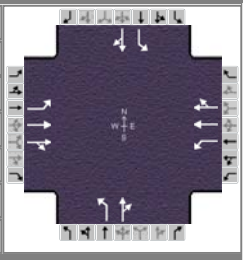
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		4		8
Case Number		6.0		6.0		6.0		6.0
Phase Duration, s		32.6		32.6		27.4		27.4
Change Period, ($Y+R_c$), s		5.4		5.4		5.8		5.8
Max Allow Headway (*MAH*), s		0.0		0.0		3.1		3.1
Queue Clearance Time (g_s), s						6.2		3.0
Green Extension Time (g_e), s		0.0		0.0		0.2		0.3
Phase Call Probability						1.00		1.00
Max Out Probability						0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	13	536	501	6	340	340	130	31		3	12	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	772	1600	1496	553	1600	1595	1424	1394		1400	1549	
Queue Service Time (g_s), s	0.7	16.5	16.5	0.5	8.9	8.9	3.9	0.9		0.1	0.3	
Cycle Queue Clearance Time (g_c), s	9.6	16.5	16.5	17.0	8.9	8.9	4.2	0.9		1.0	0.3	
Capacity (*c*), veh/h	356	725	678	218	725	723	625	502		604	558	
Volume-to-Capacity Ratio (*X*)	0.037	0.739	0.739	0.025	0.469	0.469	0.208	0.062		0.006	0.022	
Available Capacity (c_a), veh/h	356	725	678	218	725	723	625	502		604	558	
Back of Queue (*Q*), veh/ln (50th percentile)	0.1	6.4	6.0	0.1	3.1	3.1	1.2	0.3		0.0	0.1	
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh	14.7	13.5	13.5	20.5	11.4	11.4	13.7	12.6		12.9	12.4	
Incremental Delay (d_2), s/veh	0.2	6.6	7.1	0.2	2.2	2.2	0.8	0.2		0.0	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	14.9	20.1	20.6	20.7	13.6	13.6	14.5	12.8		12.9	12.5	
Level of Service (LOS)	B	C	C	C	B	B	B	B		B	B	
Approach Delay, s/veh / LOS	20.3	C		13.6	B		14.2	B		12.6	B	
Intersection Delay, s/veh / LOS	17.3						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	2.2	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.4	A	1.1	A	0.8	A	0.5	A

HCS 2010 Signalized Intersection Results Summary

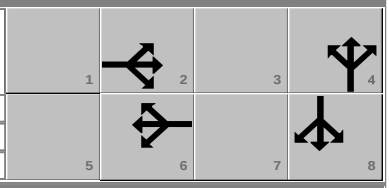
General Information				Intersection Information	
Agency	HRG			Duration, h	0.25
Analyst	M. Stewart	Analysis Date	Feb 14, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Intersection	Lamont St	Analysis Year	2032	Analysis Period	1> 4:30
File Name	2032_Location16_US 12-Lamont PMpeak.xus				
Project Description	Location #16				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	69	794	413	36	824	63	616	60	23	33	80	62

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	32.6	46.4	0.0	0.0	0.0	0.0	
Yellow	4.4	4.6	0.0	0.0	0.0	0.0	
Red	1.0	1.0	0.0	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		4		8
Case Number		6.0		6.0		6.0		6.0
Phase Duration, s		38.0		38.0		52.0		52.0
Change Period, *(Y+Rc)*, s		5.4		5.4		5.8		5.8
Max Allow Headway *(MAH)*, s		0.0		0.0		3.3		3.3
Queue Clearance Time *(g_s)*, s						48.2		7.2
Green Extension Time *(g_e)*, s		0.0		0.0		0.0		2.4
Phase Call Probability						1.00		1.00
Max Out Probability						1.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate *(v)*, veh/h	77	882	459	40	499	486	684	92		37	158	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	580	1600	1356	414	1600	1560	1248	1524		1325	1483	
Queue Service Time *(g_s)*, s	6.6	32.6	29.4	0.0	26.0	26.0	41.0	2.8		1.3	5.2	
Cycle Queue Clearance Time *(g_c)*, s	32.6	32.6	29.4	32.6	26.0	26.0	46.2	2.8		4.1	5.2	
Capacity *(c)*, veh/h	122	580	491	80	580	565	648	782		719	761	
Volume-to-Capacity Ratio *(X)*	0.626	1.522	0.934	0.500	0.861	0.861	1.056	0.118		0.051	0.207	
Available Capacity *(c_a)*, veh/h	122	580	491	80	580	565	648	782		719	761	
Back of Queue *(Q)*, veh/ln (50th percentile)	2.4	51.1	12.8	1.3	12.0	11.7	23.1	0.9		0.4	1.7	
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	
Uniform Delay *(d_1)*, s/veh	43.2	28.7	27.7	45.0	26.6	26.6	27.0	11.3		12.4	11.9	
Incremental Delay *(d_2)*, s/veh	21.8	243.7	27.2	20.6	15.4	15.8	50.9	0.3		0.1	0.6	
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay *(d)*, s/veh	65.0	272.4	54.8	65.6	42.0	42.4	77.9	11.7		12.6	12.5	
Level of Service (LOS)	E	F	D	E	D	D	F	B		B	B	
Approach Delay, s/veh / LOS	190.8	F		43.1	D		70.1	E		12.5	B	
Intersection Delay, s/veh / LOS	108.8						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.7	A	1.3	A	1.8	A	0.8	A

Appendix C

Internet Survey

Executive Summary
Survey Report

The City of Aberdeen, along with the South Dakota Department of Transportation (SDDOT) and the Federal Highway Administration (FHWA), is sponsoring the Aberdeen Master Transportation Study. The study is examining current transportation issues and needs facing the Aberdeen area, and will develop solutions to address them. The study area encompasses the City of Aberdeen as well as the 2-mile rural area surrounding it, which represents a future growth area for Aberdeen.

As part of the study's first phase – to inventory and analyze existing and future transportation needs – the project team surveyed citizens about their travel patterns, Aberdeen's' transportation needs, and suggestions for improvements. The survey was accessible via the project website for approximately five and half weeks during November and December 2012, during which time 289 surveys were submitted.

This document is an executive summary of the full survey report and includes data highlights. Please note that not all respondents answered the survey in its entirety, but most questions had about an 85% or greater response rate.

Respondent Profile

Most of the survey respondents reside in the City of Aberdeen (almost 85%), and more than 250 said that they live in the 57401 zip code. Eighty-one (81) percent indicated that they are employed; the remaining 20% include self-employed citizens, part-time employees, retirees, students, homemakers, caregivers, and unemployed/looking for work. The majority are aged 25 – 59 years and about half do not have children under the age of 18 living in their household. There were 143 male and 105 female respondents (43 did not answer the question).

Getting to Work

- 250 of the respondents work in the Aberdeen study area
- Almost 100% get to work via personal vehicle
- For most (223), the commute to work is less than 10 miles (one-way)
- On a typical day, it takes less than 10 minutes for almost 60% of those respondents who work in the Aberdeen area to get to work, as well as to return home (without making any stops along the way); and 10 - 20 minutes each way for another third; only 10 people indicated that their commute time is 30 minutes or more

Getting to School

- Only 10 people reported that they attend school in the Aberdeen study area; seven attend Northern State University, one attends Aberdeen's Central High School; and two did not answer the question
- Respondents indicated that they get to school via personal vehicle
- Seven commute six or less miles to school each way
- Travel time to and from school is less than 10 minutes for most (one-way without stops)

Getting Around Aberdeen (Residents)

- In general, most respondents (229) use a personal vehicle for travel; only two reported that they walk and one choose public transportation
- The top reasons for travel are: to get to and from work (or for work-related trips); for groceries/food; to shop; and for household errands
- Most people travel Monday – Friday, between 5:30 – 9:00 am in the morning and 3:30 and 6:00 pm in the afternoon/evening
- On a typical weekday, about half of the respondents make three to four trips in a day; about a third make one to two trips per day

Traveling To/From Aberdeen (Non-residents)

- For those respondents who reside outside of the study area, the top four reasons they travel to Aberdeen are: to get to and from work (or for work-related travel), for grocery/food shopping; to shop; and to dine out/patronize restaurants
- They travel to Aberdeen mostly on weekdays between 5:30 and 9:00 am and 3:30 and 6:00 pm

Transportation Needs/Issues

Citizens were asked to identify what they thought were the most pressing transportation needs or issues for the study area. Almost 65% of the respondents answered the question and the top five issues identified were:

- Conditions and quality of existing roads – the need for regular repair, maintenance, and/or replacement
- Public transportation/public transit – the need for affordable, reliable public transportation, including service in the evenings and on weekends
- Signal and stop sign management to improve traffic flow and safety, including additional left turn signals and the addition or removal of stop signs in certain locations
- Improvements to Sixth Avenue
- Train traffic delays – issues with congestion and delays caused by train traffic, especially during peak travel times of day

Transportation Improvements

Each respondent then had the opportunity to choose what they thought were the three most important areas of transportation improvements. Out of 244 responses, the following were most often selected:

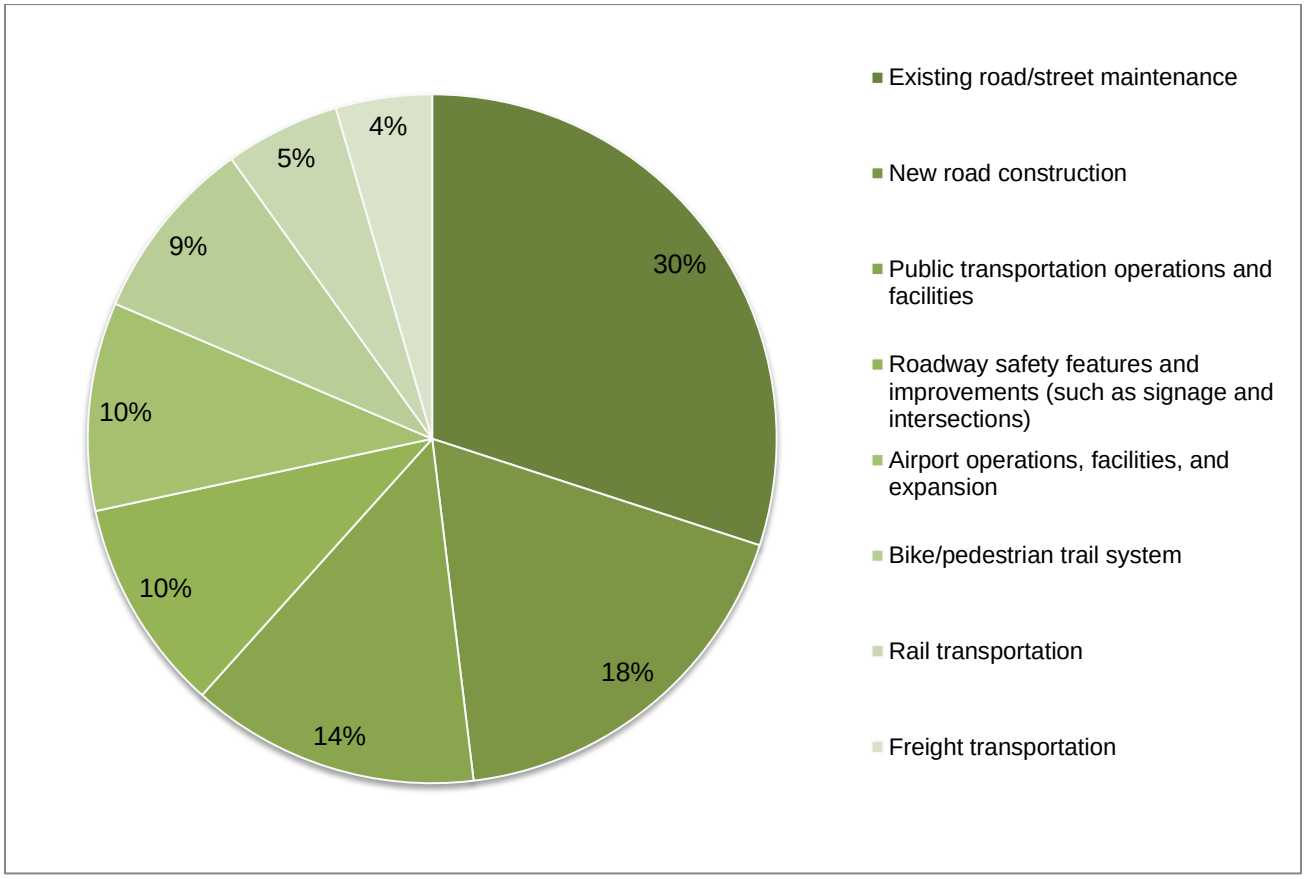
- Local roadway network (151)
- Highway 12 access and congestion (125)
- Public transportation system (76)

When asked which transportation improvements they thought would be beneficial to Aberdeen in the next 20 – 30 years, about half of the respondents answered and the following three topics were mentioned most often:

- Public transportation/public transit – improvements to the current system, expansion of services, affordable rates
- Bypasses – an alternative route around the City and/or a bypass for freight traffic.
- Road maintenance and repair – more frequent/regular resurfacing and/or reconstruction of roads

Budgeting for Future Improvements

Survey participants were instructed to "spend" $100 on future transportation improvements; 225 respondents completed the task. The following pie chart shows how respondents would spend a $100 budget, based on the average amount allocated for each improvement.



Conclusion

Public input is a key component of Aberdeen's master transportation planning study. Data collected via the survey and from the open house will help the project team identify the area's transportation needs and develop strategies and potential solutions to address them.

Overview

The City of Aberdeen, along with the South Dakota Department of Transportation (SDDOT) and the Federal Highway Administration (FHWA), is sponsoring the Aberdeen Master Transportation Study. The study will examine current transportation issues and needs facing the Aberdeen area, and will develop solutions to address them. All ground transportation modes are being studied, including roadways, transit, railroads, freight, and pedestrian and bicycle facilities. The plan will also complement the 2004 Aberdeen Comprehensive Plan and the recently completed Brown County Master Transportation Plan.

The study area encompasses the City of Aberdeen as well as the 2-mile rural area surrounding it, which represents a future growth area for Aberdeen.

The goals of the master planning process are to:

- Define current transportation deficiencies & identify future opportunities and needs;
- Plan for high quality facilities to deliver sustainably the best transportation services to local motorists, transit users, and bicyclists/pedestrians;
- Develop solutions & strategies to meet current and predicted future traffic conditions and promote a livable community that will enhance the economic and social well-being of Aberdeen residents; and
- Create a plan to provide guidance for implementation of recommended improvements.

The study consists of three main phases. The first phase includes an inventory and analysis of existing and future conditions and the identification of transportation needs. The second phase will develop strategies, alternatives and potential solutions that address the identified needs. Because of limited budgets for transportation infrastructure maintenance and construction, costs will be considered when developing alternatives. The third and final phase will select alternatives for further study and prioritize them based on other planned investments for the Aberdeen area.

The final plan is expected to be complete by the summer of 2013. It will outline recommended improvements and provide a guide for implementing them, along with other planned future developments in the study area.

Public Input

Public input is an important component of the study. In order to inform and involve citizens, the project team established a website (aberdeentransportationplan.com), developed an online survey to collect public input, and hosted an open house meeting on December 4, 2012.

Survey

The online survey was developed to obtain information about citizens' travel patterns and destinations, transportation needs, and suggestions for transportation improvements. The survey collected data from both residents and non-residents of the Aberdeen study area. It was accessible from the project's website from Wednesday, November 21, 2012 to December 31, 2012. For a portion of that time, respondents were eligible to enter a drawing to win one of three gift cards, which were donated by the Aberdeen Chamber of Commerce. A total of 289 surveys were submitted.

The master planning study team used the following methods to publicize the survey:

- Ads in the *Aberdeen News* (November 17, 24, and 25, 2012);
- SDDOT press release which resulted in a news brief in the *Aberdeen News;*
- Aberdeen Chamber of Commerce; and
- Outreach to local schools and universities including Northern State University, Presentation College, Aberdeen Central High School and Roncalli Catholic High School.

The remainder of this document summarizes the survey data according to each survey question. A copy of the survey is included in Appendix A.

Survey Results

Section 1: Where I live

Question 1: Are you a resident of the City of Aberdeen? (288 responses)

Yes: 243 (84.4%) No: 45 (15.6%)

Question 2: If you are a resident of the City of Aberdeen, in which quadrant do you live? (266 responses)

Northeast (North of the BNSF rail line and east of Main Street):	87 (32.7%)
Southeast (South of the BNSF rail line and east of Main Street):	76 (28.6%)
Southwest (South of the BNSF rail Line and west of Main Street):	40 (15%)
Northwest (North of the BNSF rail line and west of Main Street):	30 (11.3%)
I am not a resident of the City of Aberdeen:	33 (12.4%)

Question 3: If you are not a resident of Aberdeen, in which community do you live?

Rural Brown County	18	Mina	3
Ipswich	4	Richmond Lake	2
Bath	3	Warner	2

Others (only one response for each):

- Frederick
- Groton
- Hecla
- Hosmer
- Leola
- Mansfield
- Mellette
- Ordway
- Pierre
- Redfield
- Rockham
- Stratford
- Richmond Lake Road (129th Street)

Comments:

- Approximately 1 mile southwest of Aberdeen City Limits
- Just outside of Aberdeen (North)
- About ½ mile past city limits
- We also own property on Mina Lake

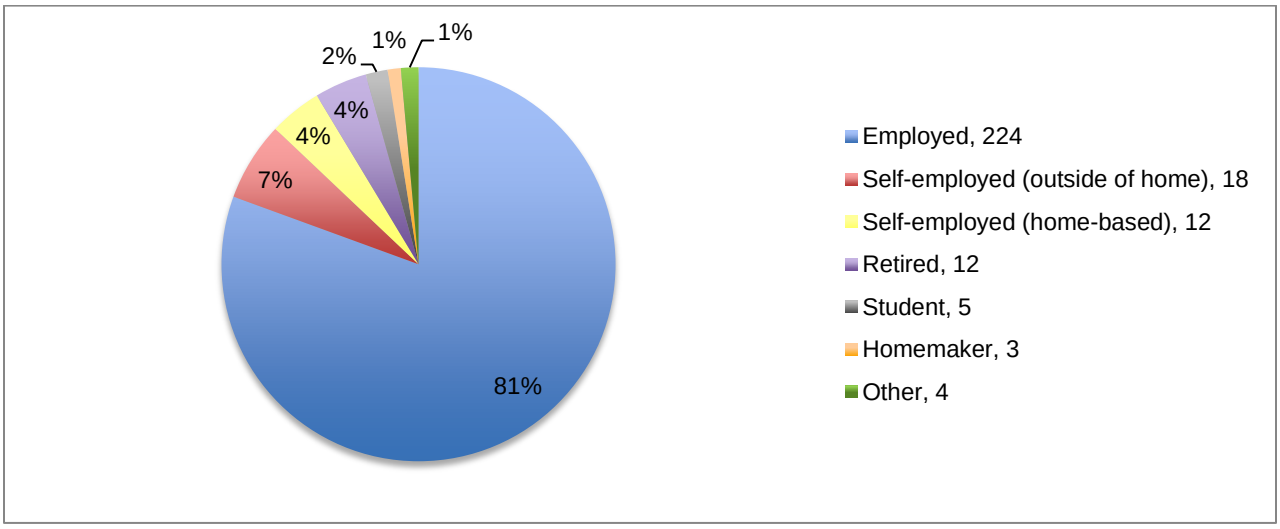
Question 4: Please choose the zip code for where you live:

57401: 253 57451: 7 57427: 4 57479: 2

Others (only 1 response each):

57402	57446	57456	57469	57501
57441	57448	57460	57470	
57445	57449	57461	57474	

Question 5: Which of the following best describes you? Please check one.



The "other" category included one each of the following four stakeholder descriptions:

- Unemployed, looking for work
- Retired/working part-time
- Employed part-time and a student
- Caregiver of someone who is homebound

Section 2: Getting to Work

Question 6: Do you work in the Aberdeen study area? (271 responses)

Yes: 250 (92.3%) No: 21 (7.7%)

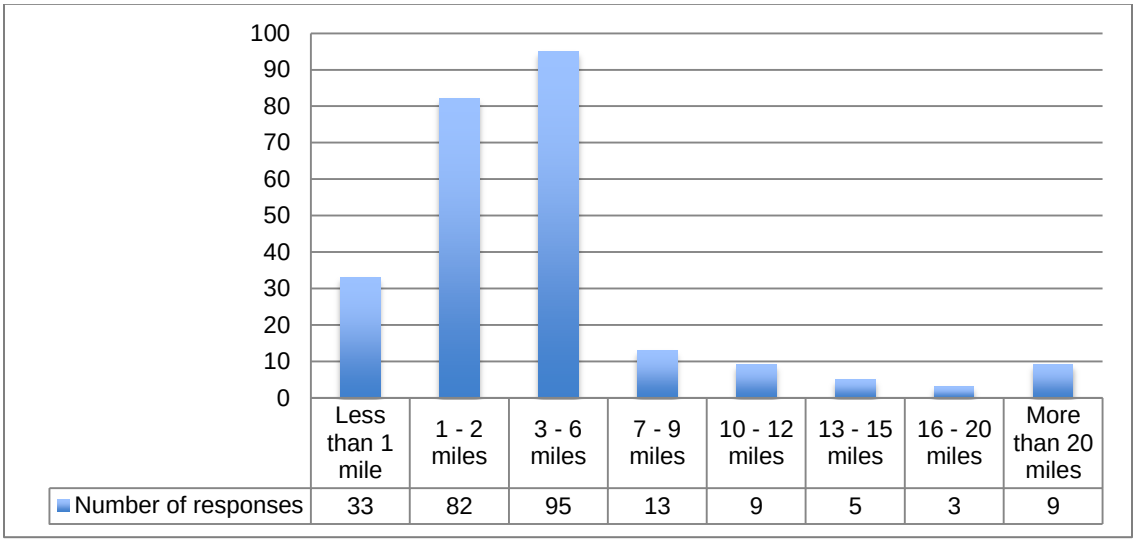
Question 7: In which quadrant of the City is your place of work located? (250 responses)

Southeast (South of the BNSF rail line and east of Main Street):	113 (45.2%)
Northeast (North of the BNSF rail line and east of Main Street):	67 (26.8%)
Southwest (South of the BNSF rail Line and west of Main Street):	41 (16.4%)
Northwest (North of the BNSF rail line and west of Main Street):	28 (11.2%)
I do not work in the City of Aberdeen:	1

Question 8: What means of transportation do you most often use to get to work? (246 responses)

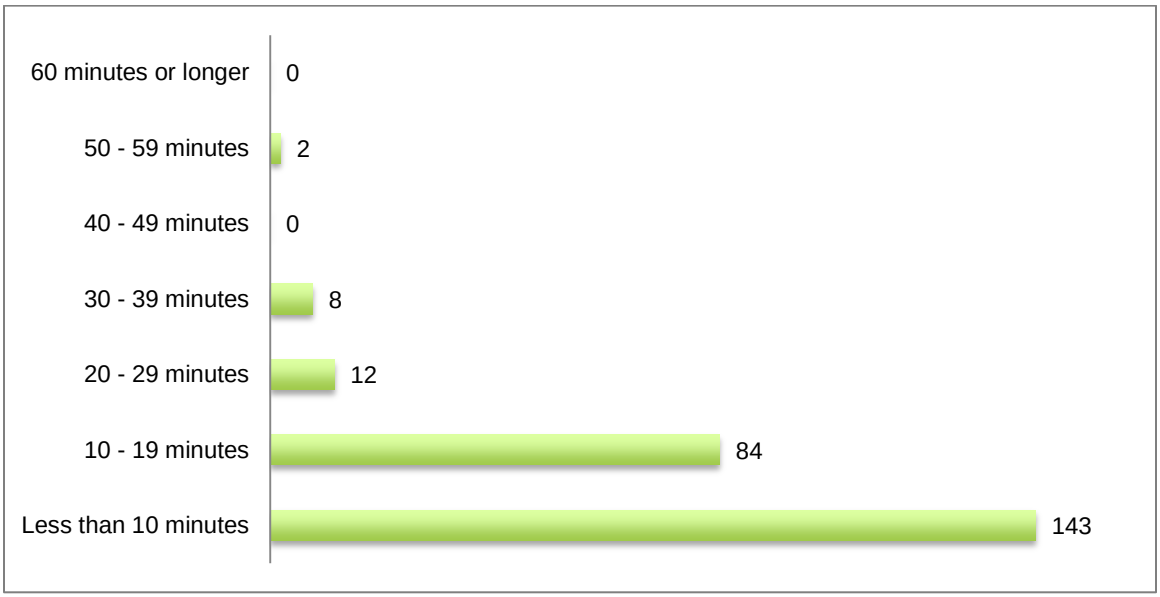
Personal vehicle	244
Walk	2
Other responses: • Business/personal • County vehicle • Company vehicle	3

Question 9: Approximately how many miles is your commute to work (one-way)?



There was only one comment in the "other" category: *It varies. Flooring contractor that has jobs everywhere.*

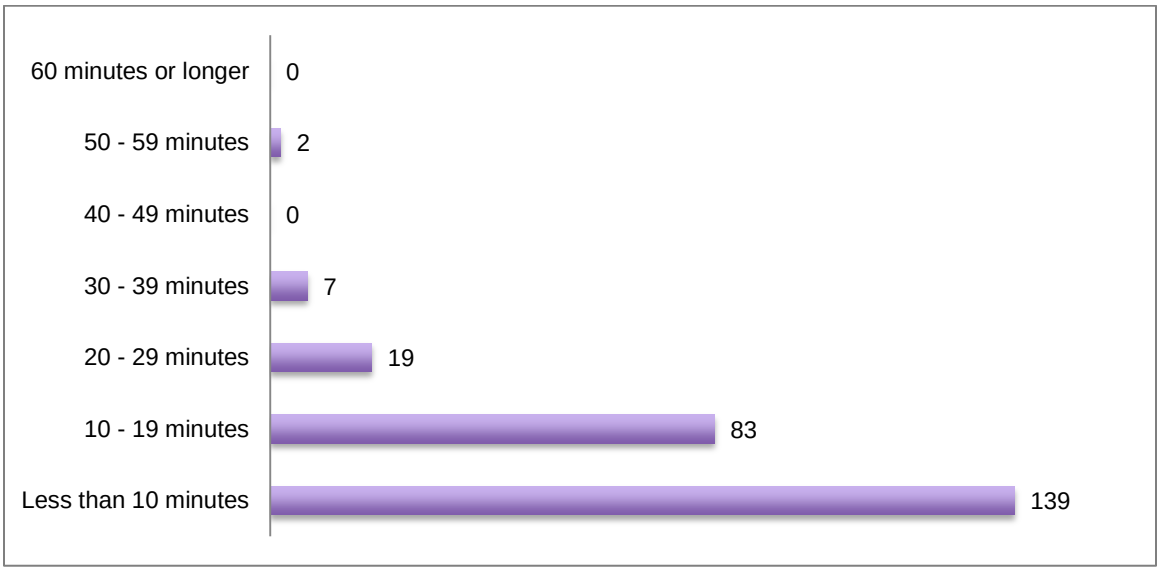
Question 10: On a typical day, how long does it take you to get to work from your home (without making any stops along the way)?



Two respondents provided the following remarks:

- As long as no trains are in the way
- Depends on trains

Question 11: On a typical day, how long does it take you to return home from work (without making any stops along the way)?



Two respondents provided the following remarks:

- Again, as long as the train is not stopped for 15 minutes around 7:00 every work night
- Depends on trains

Section 3: Getting to School

Question 12: Do you attend school in the Aberdeen study area? (251 responses)

Yes: 10 (4%) No: 241 (96%)

Question 13: Please indicate which school you attend:

Northern State University: 7 Aberdeen Central High School: 1

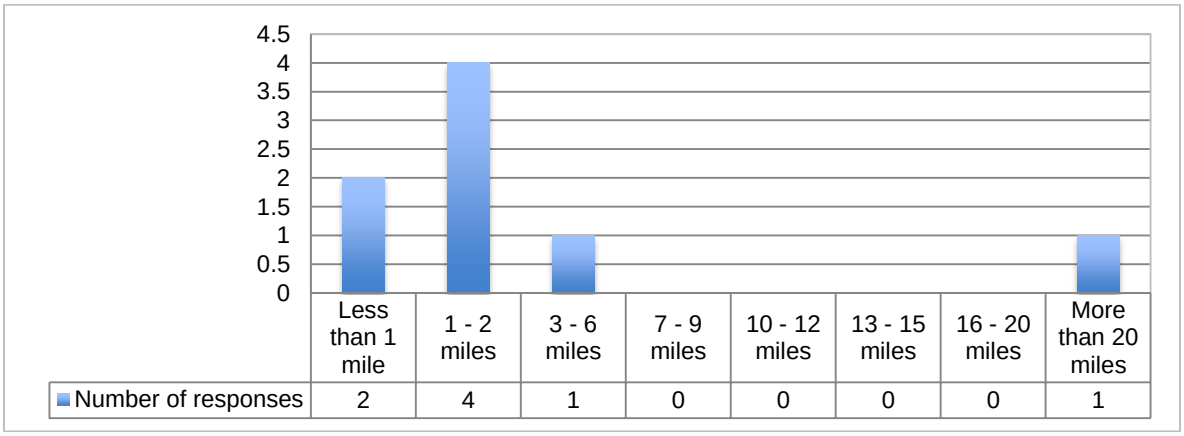
Question 14: Please indicate the type of school that you attend?

College or University: 7 High School: 1

Question 15: What means of transportation do you most often use to get to school/class?

- Personal Vehicle: 8 (100%)

Question 16: Approximately how many miles is your commute to school (one-way)?



Question 17: On a typical day, how long does it take you to get to school from your home (without making any stops on the way)?

Less than 10 minutes	6
10 – 19 minutes	1
50 – 59 minutes	1

Question 18: On a typical day, how long does it take you to return home from school (without making any stops on the way)?

Less than 10 minutes	5
10 -19 minutes	2
50 – 59 minutes	1

Section 4: Getting Around Aberdeen (Residents)

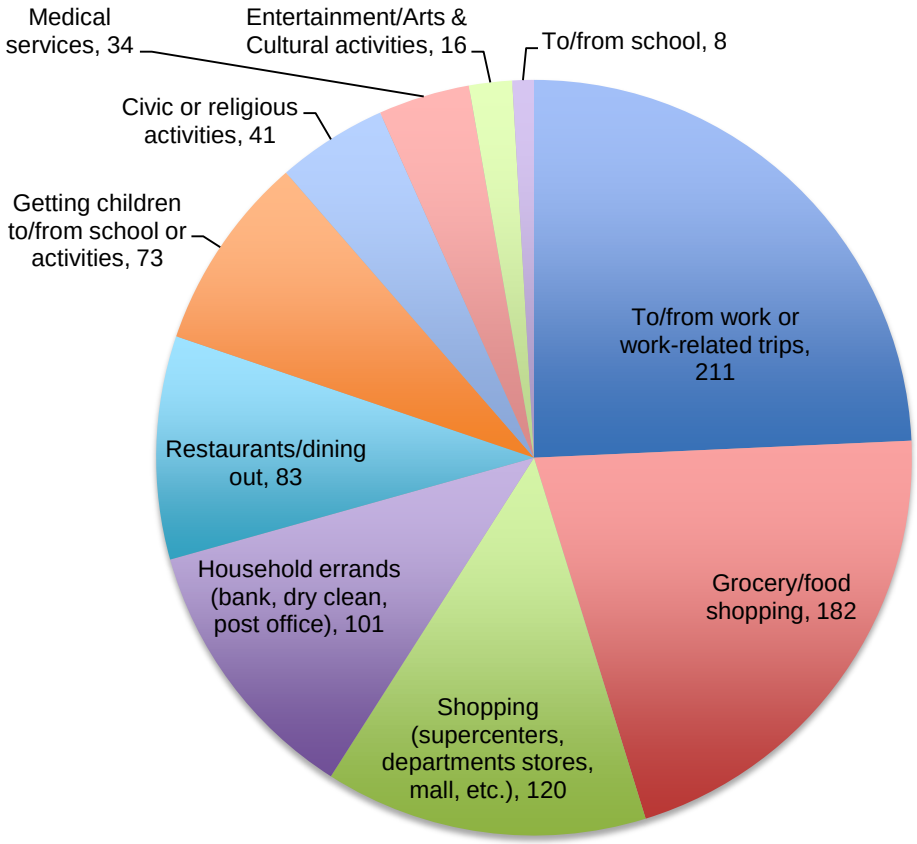
Question 19: Do you live in the Aberdeen study area (City of Aberdeen and area within 2.5 miles of the city limits)? (270 responses)

Yes: 232 (85.9%) No: 38 (14.1%)

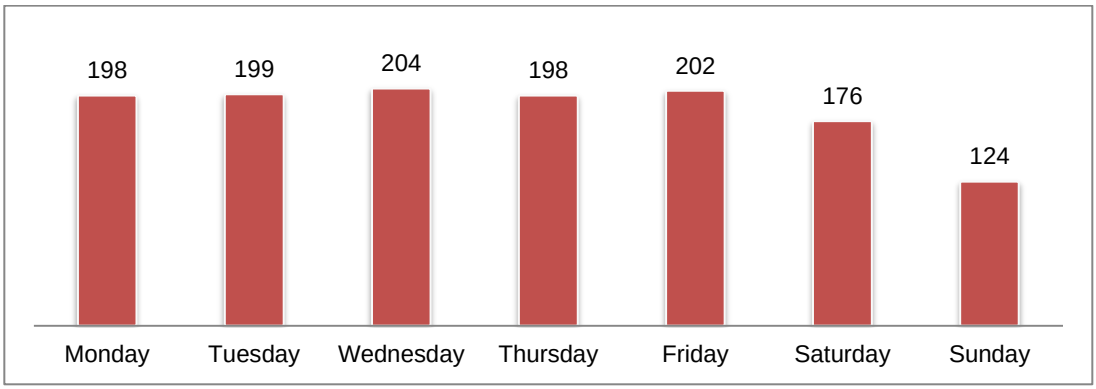
Question 20: In general, what mode of transportation do you most often use for local travel in Aberdeen?

Personal vehicle	229
Walk	2
Public transportation	1
Other responses: • Business/personal • Also use bicycle	2

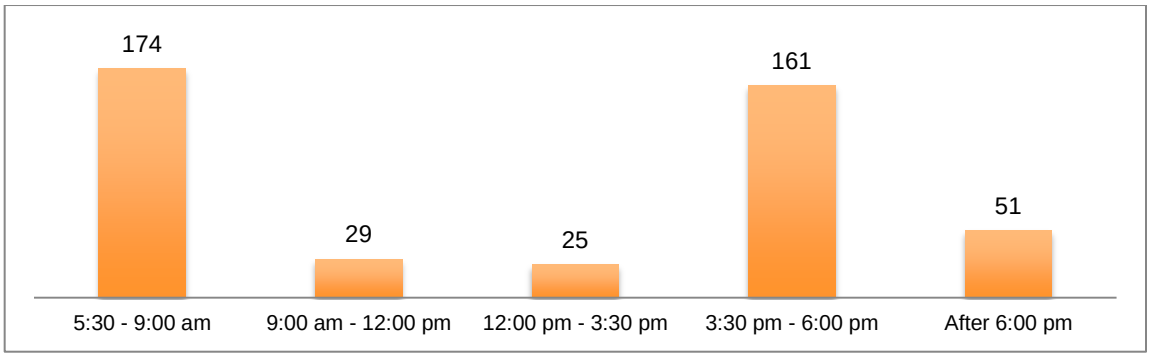
Question 21: As a resident of the Aberdeen study area, on average, what are your primary reasons for local travel within Aberdeen? You may select up to four responses. (233 responses)



Question 22: Which days of the week do you most often travel in and around Aberdeen? Check all that apply. (232 responses)



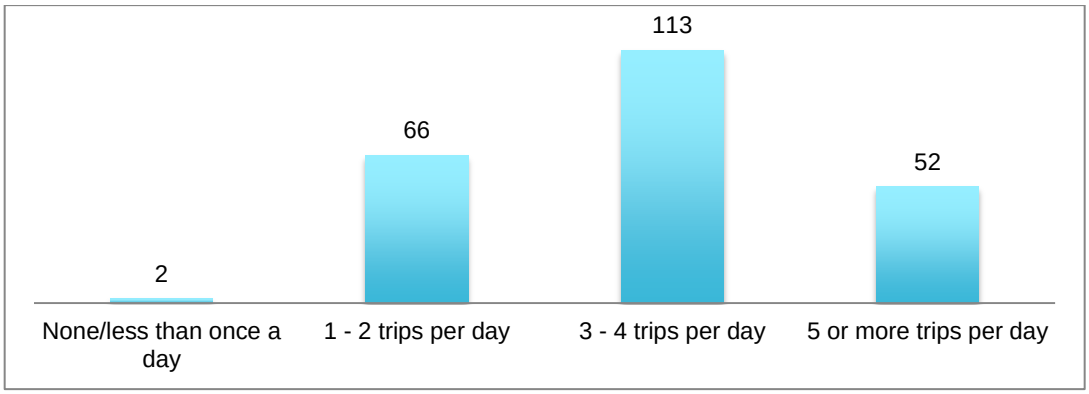
Question 23: What time(s) of day do you most often travel on a typical weekday (Monday – Friday)? You may select up to two responses. (230 responses)



Other responses:

- All hours of the day
- 7 am [to] 7 pm

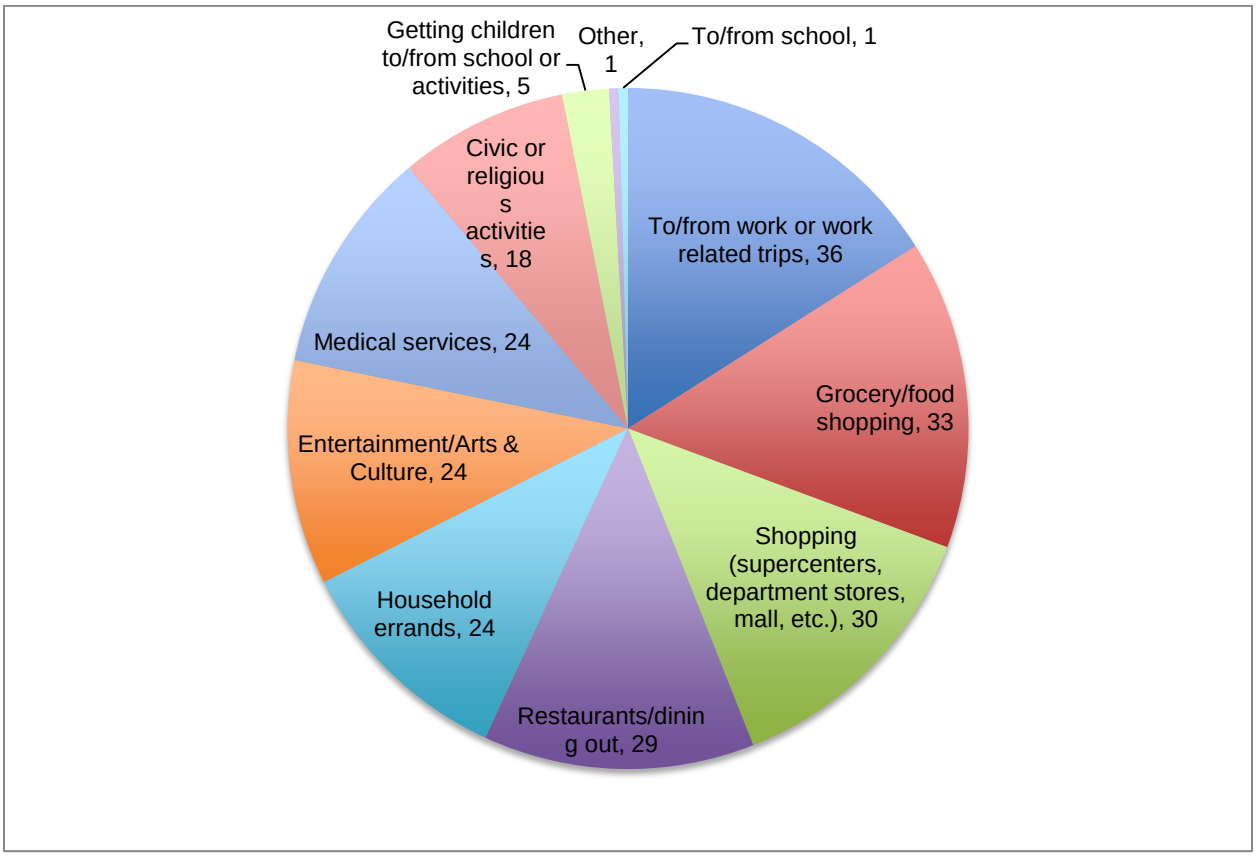
Question 24: How many local trips do you make in and around Aberdeen on a typical weekday (Monday – Friday)? (233 responses)*



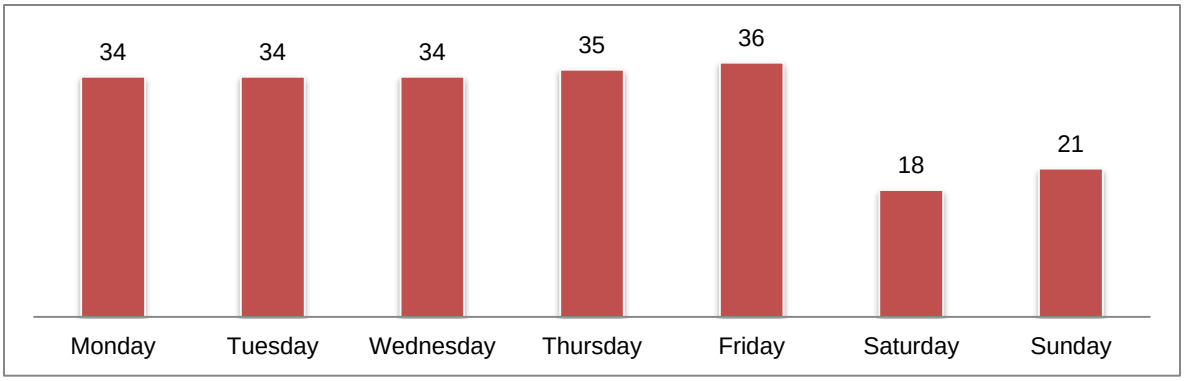
**A trip was defined as travel from one destination to another, including when the respondent first left their home for the day. It did not include leisure or recreational activities performed in the immediate vicinity of their home, such as jogging or walking a dog.*

Section 5: Traveling To/From Aberdeen (Non-Residents)

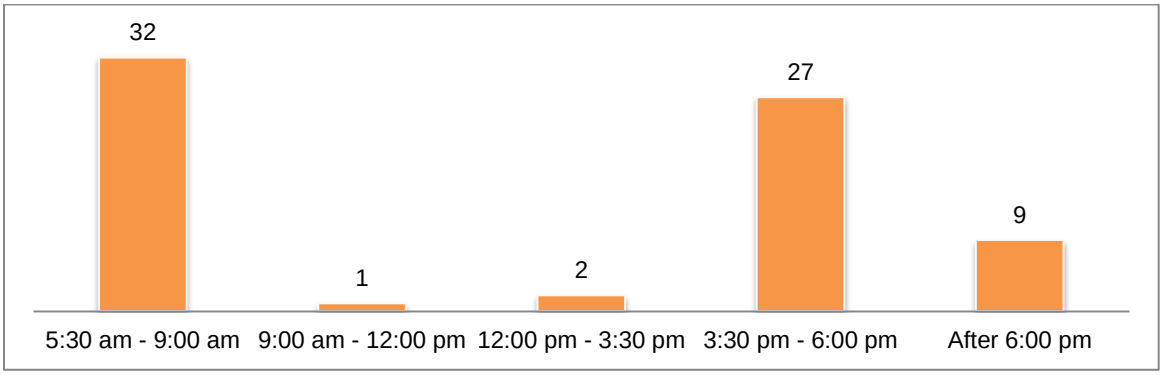
Question 25: If you live outside of the Aberdeen study area, in a typical month, what are your primary reasons for travel to Aberdeen? Check all that apply. (40 responses)



Question 26: If you live outside of the Aberdeen study area, which day(s) of the week do you most often travel to Aberdeen? Check all that apply. (39 responses)



Question 27: If you live outside of the Aberdeen study area, what time(s) of day during a typical weekday (Monday – Friday) do you most often travel to or from Aberdeen? You may select up to two responses. (38 responses)



Other responses:

- All times of day and night
- NA

Section 6: Existing Conditions and Planning for the Future

Question 28: What do you think are the most pressing transportation needs or issues for the study area? (Please note that the study area includes the City of Aberdeen and the surrounding area within 2.5 miles of the City) (187 responses)

Almost 65% of the respondents answered this open-ended question, providing more than 300 comments on key transportation needs and issues.

The top five issues identified were:

- Conditions and quality of existing roads – respondents remarked that roads are in need of regular repair and maintenance, and that some need to be replaced more often.
- Public transportation/public transit – according to respondents, there is a need for affordable, reliable public transportation, including service in the evenings and on weekends.
- Signal and stop sign management to improve traffic flow and safety – citizens often mentioned the need for better signal synchronization, additional left turn signals, and the addition or removal of stop signs in certain locations.
- Improvements to Sixth Avenue – respondents repeatedly identified issues with Sixth Avenue and called for traffic flow improvements along this high-traffic corridor.
- Train traffic delays – respondents pointed out that frequent train traffic through the City causes delays and congestion, especially during peak travel times of day.

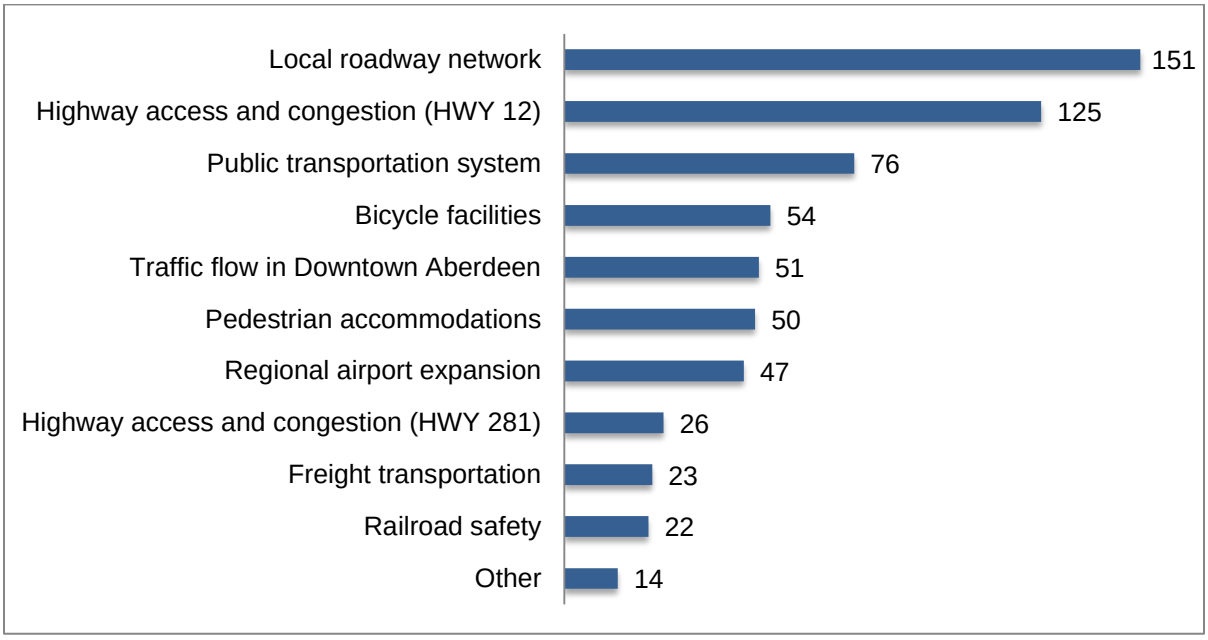
Other issues mentioned include the following (listed in order of frequency, from most-often mentioned to least-often mentioned):

- General increase in traffic congestion and need for improved traffic flow
- Transportation for public school children and measures to improve traffic and safety around schools
- Bicycle and pedestrian accommodations, safety measures for cyclists and pedestrians, additional trails and sidewalks
- Improvements to HWY 12 to address congestion, flow, safety and access
- Airport expansion, additional flights at reasonable costs
- Freight traffic management through and around Aberdeen
- Efficient and adequate snow removal services
- Improved signage and way-finding
- Travel options for getting to other locations in the region, such as rail service to Sioux Falls
- Speed limits raised

Respondents also pointed out several factors they think should be considered in transportation planning:

- Increase in business, operations and traffic at the Northern Beef Packers Plant
- New housing development
- Population without vehicles or those who cannot or no longer drive (children and elderly)

Question 29: What areas of transportation improvements are most important to you? Please choose the three that you think should be given top priority in the transportation master plan. (244 responses)



In addition to choosing their top three choices from among the 10 topics provided, respondents could also supply their own answer, which resulted in the following 14 verbatim comments:

- Road conditions i.e. pot holes
- Do not allow trains to run 7:30 am to 8:30 am
- Timing of traffic lights
- Passenger rail
- Existing city streets should be the priority
- Passenger rail service
- Need a turning lane by Louie's gas station going south on Roosevelt Road
- Snow removal service in city limits is poor, often limiting travel in town and forces working residents to leave their jobs to move vehicles during daytime snow removal. Too much focus on sidewalk snow removal and not enough focus on street snow removal.
- Roads throughout brown county for rural to travel for jobs in Aberdeen Area
- Rail transportation
- Better rural roads to get to Aberdeen for activities
- Bypass
- Signage/way-finding
- Flights to Denver

Question 30: Are there any specific transportation improvements you think would be beneficial to Aberdeen in the next 20 – 30 years? (147 responses)

About 50% of those who completed the survey responded to this question, providing more than 220 suggestions for improvements. The following three topics were mentioned most often:

- Public transportation/public transit – improvements to the current system, expansion of service, affordable rates
- Bypasses – an alternative route around the City and/or a bypass for freight traffic.
- Road maintenance and repair – more frequent/regular resurfacing and/or reconstruction of roads.

Other areas of improvement include:

- Additional overpasses or underpasses so that vehicular traffic can avoid train crossing delays
- Facilities for cyclists – more bike paths, a comprehensive system, safety features such as lighting, signs, and crossings
- Improved traffic flow measures, especially on HWY 12 and along Sixth Avenue
- Better signal coordination and signage/way-finding
- More carriers and flights offered at the regional airport

- Connections between Aberdeen and other regional cities, such as passenger rail service
- Additional lanes/wider lanes
- Pedestrian accommodations such as sidewalk and trails
- Fewer traffic signals and increased speed limits

Question 31: If you had a budget of $100 to spend on future transportation improvements in the Aberdeen area, how much would you spend on the following areas? (225 responses)

The table below displays the response average for each improvement category. The average was determined by dividing the total amount of money allocated to a particular category by the number of respondents that allocated money to that category. The response total is the total amount of money allocated to each improvement.

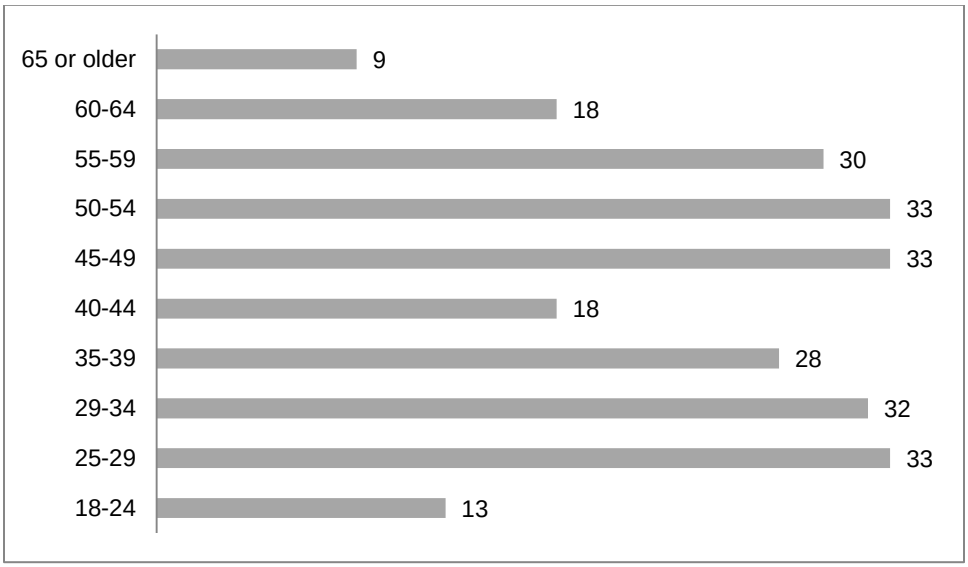
Improvement	Response Average	Response Total
Existing road/street maintenance	45.95	$9,373
New road construction	27.68	$4,540
Public transportation operations and facilities	20.77	$2,492
Roadway safety features and improvements (such as signage and intersections)	15.30	$1,943
Airport operations, facilities, and expansion	14.97	$1,542
Bike/pedestrian trail system	13.30	$1,569
Rail transportation	8.26	$578
Freight transportation	6.91	$463

Section 7: Demographics

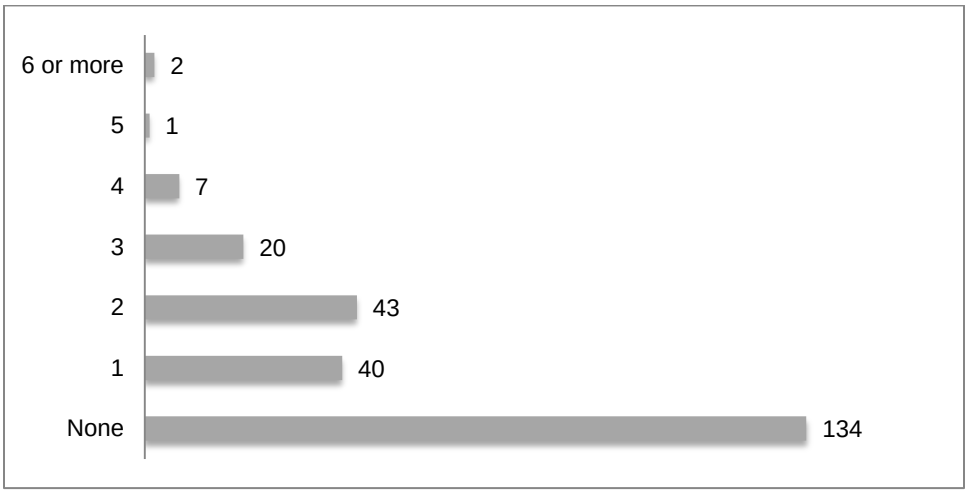
Question 32: What is your gender?

Male: 143 Female: 105

Question 33: What is your age?



Question 34: How many children age 17 or younger live in your household?



Conclusion

Public input is a key component of Aberdeen's master transportation planning study. Data collected via the survey and from the open house will help the project team identify the area's transportation needs and develop strategies and potential solutions to address them.

Appendix D

Public Meeting Summaries

Summary of Public Meeting and City Council Work Session Discussions and Comments Received (December 3, 2012 – December 3, 2013)

Aberdeen City Council Work Session No. 1

A work session of the Aberdeen City Council was held on December 3, 2012, to review the Draft Aberdeen Master Transportation Plan. A short presentation was given to overview the project tasks, results of data collection and analysis to date, and respond to questions. A summary of the presentation and work session discussion is as follows:

1. Preliminary traffic analysis results:
    a. Of the top 16 intersections with the most crashes, eleven are on U.S. Highway 12, or 6th Avenue.
    b. Roadway capacity on 6th Avenue between Second and Roosevelt streets, is nearing capacity. Additional study will be needed to determine if the five lane route is between 80 to 100 percent of capacity of the number of vehicles it can hold.
    c. Traffic patterns on 6th Avenue appear to be a little unusual in that the noon hour is greater than it is during the morning rush hour, and traffic volumes remains at a fairly high level throughout the afternoon.
    d. The busiest day for traffic on Sixth Avenue is Fridays. The counts on Saturday and Sunday are lower than Friday's numbers.
2. Access management is an issue along 6th Avenue and recognized as a long-term improvement need.

Public Meeting No. 1

A public meeting was held on December 4, 2012, at the Brown County, SD, Courthouse, to gather input on issues and concerns to be addressed in the Aberdeen Master Transportation Plan. Approximately 19 persons attended the meeting, including Study Advisory Team members and interested persons from local agencies, the press, and members of the public. A record of meeting attendees is attached to this Appendix D.

The meeting was arranged as an open house, with several stations with boards describing the planning study purpose, schedule, and desirable outcomes. Key topics of discussion included the following:

- Traffic on East Melgaard Road – East Melgaard Road currently serves as a collector for local trips and pass-through traffic. The street is generally residential in character and provides direct access to the largest city park in Aberdeen (Melgaard Park).
    - Issues include increasing volumes of truck traffic, particularly truck trips originating or departing from Northern Beef Packers' processing facility located on 35th Street.
    - School traffic for students and faculty accessing Central High School located at the intersection of E. Melgaard Road and Roosevelt Street (389th Ave.)
    - Intersection traffic control improvement needs at E. Melgaard Road and Roosevelt Street.
- Need for access and capacity improvements on the north-south segment of Melgaard Road (Melgaard Road SE) and intersection with 390th Avenue.
- BNSF Railroad crossing improvements and should a grade-separated crossing be planned for Roosevelt Street North?
- A fixed route transit system is needed in the community to serve current and future needs.

There were no written comments received after the public meeting.

Aberdeen City Council Work Session No. 2

A work session of the Aberdeen City Council was held on December 2, 2013, to review the Draft Aberdeen Master Transportation Plan. A composite summary of the work session discussions is as follows:

1. The Council asked staff if more detail on the types of potential intersection geometric improvements could be provided.
2. The removal of unwarranted traffic signals in the community was discussed. Signals on Harrison Street were noted as examples.
3. The planning study should state that Melgaard Road is used as a diversion route rather than a true bypass for internal trips with destinations at the community facilities and features (i.e. schools and parks) adjacent to it.
4. The Council asked about SDDOT traffic data collection comparisons and where notable increases may have been discovered during the study.
5. Establishment of Railroad Quiet Zones has been discussed in the past. Should they be added as an implementation project along two study corridors (i.e. east-west tracks and north-south track)?

Public Meeting No. 2

A second public meeting was held on December 3, 2013, at the Eagle's Nest – Aberdeen Recreation & Cultural Center, to gather input on the Draft Aberdeen Master Transportation Plan. Study Advisory Team members and interested persons from local agencies, the press, and members of the public attended. A record of the meeting attendees is attached to Appendix D.

Draft Plan Comments Received from Members of the Public (December 2013)

Informal discussions were held with persons attending the meeting as persons in attendance viewed plan exhibits. A thirty-day comment period was observed after the public meeting to gather comments. A summary of the written comments received on the plan and follow-up actions in response to the comments follow.

Written Comments Received and Responses:

From: Bjerke, Kevin <Kevin.Bjerke@northern.edu>
Sent: Tuesday, December 03, 2013 8:06 PM
To: Harris, Ross
Subject: Aberdeen Transportation Plan

Ross, thank you for all the information tonight. It was nice meeting you. Just thought I would express a few comments that I'm sure Amy also touched on with you.

The biggest issue I see that could be addressed pretty economically in regards to pedestrians and recreation is the lack of understanding that many motorists have in regards to cyclists. I believe Aberdeen is a large enough city now to merit bike lanes on major city streets, especially streets that serve as outlets to paved country roads, a destination that most serious cyclists are trying to get to safely. Unfortunately many of these motorists see all the new wide sidewalks we have with "bike route" signs and feel this is where cyclists belong opposed to the roads.

I think there are many major roads that are already plenty wide to accommodate a bike lane, and a bike lane would appropriately inform motorists that it is ok for cyclists to be there instead of agitate them….

8th Ave N (all the way through town, but especially E of the bike path where it turns to 4 lanes. We have had a discussion as a trails committee to turn that into a 3 lane with bike lanes). Also 8th Ave from 5th St W to 281.

1st Ave S/Milwaukee from Dakota to Melgaard/19

Dakota Street (entire length)

Melgaard Road from 281 to Roosevelt (I would say all the way to Walmart but you lose the shoulder at the HS)

Both S and N 5th St through town.

15th Ave N from Lee Park to Bike Path.

3rd Ave S (entire length)

Fairgrounds Road.

Main Street.

State Street.

I do quite a bit of group cycling with sometimes a group of 15-20 cyclists. We do our best to inform everyone proper bike etiquette, but of course when you get a group that big too often, cyclists get a bad rap because someone blows through a stop sign or light, or is riding right in the middle of the road. It is a tough battle to fight and I understand when motorists sometimes get upset.

I think bike lanes would go a long way in terms of recreational enhancement and safety, without the construction costs, and hopefully give avid cyclists good options to get through town… along with commuter cyclist routes.

I would obviously love to see more 'non-sidewalk' trails, but I think there are many great ideas for that proposed and understand it all comes down to funding before those can be implemented.

Thank you for reading my comments!

Kevin Bjerke

Responses:

1. The Transportation Plan will include a new policy recommendation for multimodal safety for bicycle, pedestrian, and motorist travel (Table 20 – Section E – System Management and Policy Recommendations). Cost TBD; Priority (S); Need Addressed – System Inventory, Prioritization, and Standards. Description: Public education program.
2. The plan provides for on-street bike lanes through design standards for arterial and collector roadways. In conjunction with the response to Comment 1 above, and as the City of Aberdeen continues to connect trails though the community, candidate streets will be identified for potential bike lane conversions that can be prioritized according to valid safety concerns and coordinated with future street improvement projects. The City of Aberdeen will also continue to base decisions on connecting multimodal facilities (i.e. on-street or off-street) from identified needs, safety concerns, and community input.

From: Jennifer Slaight-Hansen <jhansen@abe.midco.net>
Sent: Friday, December 06, 2013 11:33 AM
To: Harris, Ross
Subject: Re: Aberdeen Transportation Plan Suggestion

Hi Ross,

Another point in favor of looking at 24th over 15th is that Presentation College is planning to revamp their campus so that the primary entrance is on 24th Avenue instead of the current 15th Avenue entrance.

And I believe that traffic congestion around the Brown County Fair would be better addressed with improvements along the county stretch of 24th Ave.

Thanks,

Jennifer

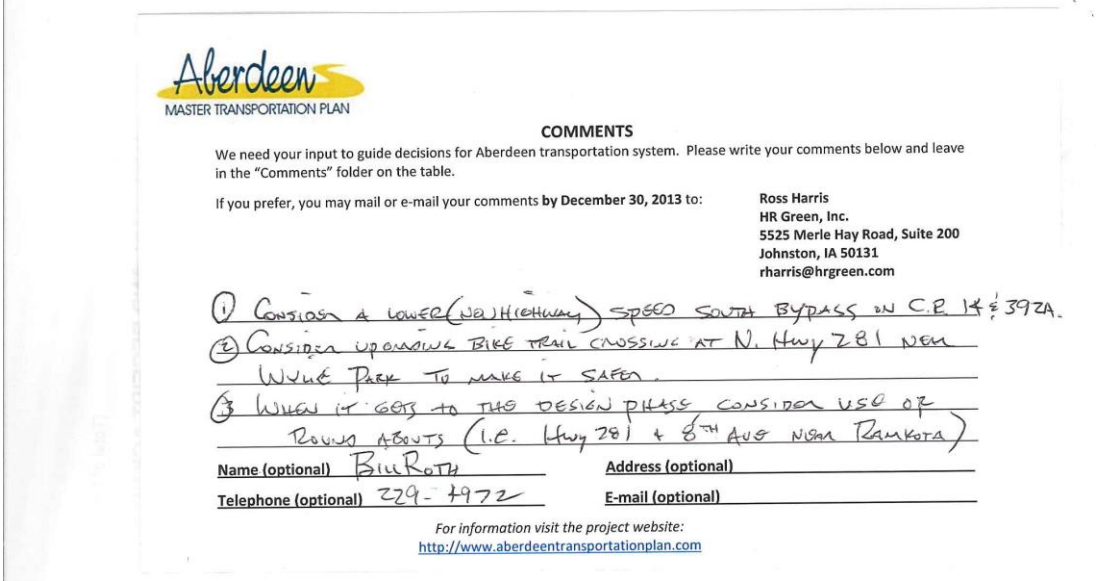
_____
Jennifer Slaight-Hansen | C 605.216.5331 | H 605.226.1361
_____

> Councilor Jennifer Slaight-Hansen
> <jennifer.slaight-hansen@aberdeen.sd.us> wrote:
>
> Hello Ross,
>
> It was nice visiting with you last evening. I'm hoping that the
> weather hasn't caused you too much trouble in returning home. I'm
> writing to reiterate the suggestion I made yesterday that we remove
> the connectivity suggestion B.7 - 15th Avenue North extension - from
> the Aberdeen Master Transportation Plan. Since the entirety of 15th
> Ave is currently residential, I can see no community benefit by
> encouraging highway traffic to use this street as a pass-through
> point.
>
> I suggest that we instead, look into upgrades along 24th Avenue North
> by rebuilding the road and removing the curve between 5th Ave and
> Hwy. 281. While I realize that stretch of asphalt is currently a
> county road, I don't foresee any issues with the county agreeing to
> this idea. I'm certain the county would welcome the city taking over
> that stretch of road.
>
> When you look at a map of our community, you'll see that we currently
> have four roads, each one mile apart - Melgaard Rd, 6th Ave S (Hwy
> 12), 8th Ave N and 24th Ave N - that allow you to travel from East to
> West across the community. I believe that encouraging pass-through
> traffic at these four points is the best use of funds. It's my

> opinion that road efforts on 24th Ave NW will best benefit
> anticipated future growth of the community in the area of our largest
> tourist attraction and one of our major entrances to Aberdeen.
>
> Thank you,
>
> Jennifer Slaight-Hansen

Responses:

1. The designation of 24th Avenue as the east-west connection street (Minor Arterial) was considered by the Brown County Master Transportation Plan. The long term improvement of this street and future intersection improvement at US 281 is recognized as a need by both the City of Aberdeen and the County. However, much of the western segment of this street and its intersection with US 281 will likely remain under the jurisdiction of Brown County for a number of years into the future, and the City of Aberdeen has no immediate plans to annex lands in the area of 24th Avenue in response to growth and development interests. Therefore, as a low priority project for Brown County and given the current connectivity gap in the east-west street grid along 15th Avenue, a future roadway and trail connection may be needed prior to the development of long-term improvements identified by Brown County for 24th Avenue. For this reason, the proposed connection of 15th Avenue will remain in the Aberdeen Master Transportation Plan. Should the City of Aberdeen indicate intentions to pursue the development of the 15th Avenue connection, a traffic impact analysis will be performed to assess the potential for and effects of pass through traffic on local neighborhoods. If it is determined that such impacts would potentially occur, appropriate mitigation will be explored, including traffic management, calming, operations and safety treatments.



Aberdeen
MASTER TRANSPORTATION PLAN

COMMENTS

We need your input to guide decisions for Aberdeen transportation system. Please write your comments below and leave in the "Comments" folder on the table.

If you prefer, you may mail or e-mail your comments **by December 30, 2013** to:

Ross Harris
HR Green, Inc.
5525 Merle Hay Road, Suite 200
Johnston, IA 50131
rharris@hrgreen.com

(1) CONSIDER A LOWER (NIGHTHWAY) SPEED SOUTH BYPASS ON C.R. 14 & 392A.
(2) CONSIDER UPGRADING BIKE TRAIL CROSSING AT N. Hwy 281 NEAR WYLIE PARK TO MAKE IT SAFER.
(3) WHEN IT GETS TO THE DESIGN PHASE CONSIDER USE OF ROUND ABOUTS (I.E. Hwy 281 & 8TH AVE NEAR RAMKOTA)

Name (optional) BILL ROTH
Address (optional)
Telephone (optional) 229-1972
E-mail (optional)

For information visit the project website:
http://www.aberdeentransportationplan.com

Responses:

1. The comment is noted and will continue to be considered in long term planning of the US 12 Corridor in Aberdeen. At this time, there are no plans at SDDOT to consider a highway bypass at the suggested location.
2. Comment noted. The SDDOT and the City of Aberdeen will monitor crossing conditions and public comments, and consider the possible installation of new warning safety equipment, signage, or pavement markings in the future.
3. Roundabouts are becoming more popular based on the multiple opportunities to improve safety and operational efficiency, and provide other benefits. In addition to intersection operations, capacity and safety, SDDOT also considers mobility policies (i.e. maintenance of travel speeds on priority routes) and other performance metrics such as installation costs (including right of way) and maintenance as factors that become part of an intersection improvement evaluation. There are no plans by SDDOT at this time to consider a roundabout at the suggested location; however, the comment is noted and will be considered with long-term planning along the US 281 Corridor in Aberdeen.

From: Julie Johnson [mailto:juliem.johnson@absolutelyaberdeen.com]
Sent: Sunday, December 29, 2013 5:19 PM
To: Harris, Ross
Subject: Aberdeen Transportation Master Plan

Hello! I believe we met in the Aberdeen Transportation Master Plan Open House.

Please accept these comments in the spirit of improving the master plan outcome for Aberdeen and our area.

There seems to be an early conclusion that there is not enough traffic to justify a 'south bypass'.

Yet, I am concerned about when the data for that conclusion was derived.

May 2013 was the date of the major layoff at Northern Beef and July 2013 was the date of the bankruptcy filing. So, any data that does not reflect the dates before those threshhold dates when large numbers of truck traffic were supplying the plant, as well as distributing from the plant, would "color" the outcome of the research.

As you know, these kinds of plans can determine the outcome for many years to come. Given our hope that the NBP plant will reopen in the right hands, we hope that this issue can be revisited when the truck traffic has been restored to and from the plant.

We are also hoping that such a bypass would assist Aberdeen to remove some traffic from Sixth Avenue, including grain, distribution and construction semi-trailers. That kind of traffic today poses a lot of challenges to use of 6th Avenue for other retail and service sector industries.

Thank you for providing this opportunity to provide input!

Respectfully submitted,

Julie M. Johnson

Responses:

1. The comment is noted and will continue to be considered in long term planning of the US 12 Corridor in Aberdeen. Brown County Road 14W, with a functional classification as a Collector Roadway, will enable long-term improvements to be made to accommodate land use changes and future industrial growth opportunities, including the predecessor to Northern Beef. There may be a need to revisit the connections around the packing plant and consider alternative functional classifications of outer parallel roads as densities and types of future land uses warrant; however, there are no plans by SDDOT at this time to consider a US 12 highway bypass at the suggested location.
2. Comment noted. The trip data for the area of concern would have been considered "Destination Aberdeen" as opposed to "through" trips; therefore, no loss of data occurred. The lost trips reinforce the need for arterial roadway improvements throughout the City of Aberdeen and the study area.

3. Comment noted. Congestion from all vehicles, including trucks in the core of the community, will be mitigated with the preservation and development of a well-planned set of parallel routes that are shown in the major roads plan. The City of Aberdeen will monitor truck traffic conditions and public comments, and consider implementing strategies to reduce congestion as warranted.

Attachments:
Public Meeting Announcements
and
Attendance Rosters

SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION
CITY OF ABERDEEN
NOTICE OF PUBLIC INFORMATION MEETING / OPEN HOUSE
FOR
ABERDEEN AREA MASTER TRANSPORTION PLAN

Date: December 4, 2012
Time: 5:30 p.m. to 7:00 p.m.
Place: Brown County Courthouse Community Room
25 Market Street, Aberdeen, SD 57401

The South Dakota Department of Transportation (SDDOT) in conjunction with the City of Aberdeen will hold an open house style public meeting to discuss and receive public input on the development of a Master Transportation Plan for the Aberdeen area. The open house will be informal, with one on one discussion available with SDDOT, City & Consultant staff.

Between 5:30 p.m. and 7:00 p.m., SDDOT, City, & Consultant staff will be available with displays to discuss the proposed options and answer your questions. During this time, you will also have the opportunity to present written comments. A short presentation will be given at approximately 6:00 p.m.

Notice is further given to individuals with disabilities that this open house/public meeting is being held in a physically accessible place. Any individuals with disabilities who will require a reasonable accommodation in order to participate in the open house/public meeting should submit a request to the department's ADA Coordinator at 605-773-3540 or 1-800-877-1113 (Telecommunication Relay Services for the Deaf). Please request the accommodations no later than 2 business days prior to the meeting in order to ensure accommodations are available. For further information regarding the study, contact Steve Gramm at (605) 773-6641 or by email at steve.gramm@state.sd.us.

Published twice at a total approximate cost of $_____

Helms
& ASSOCIATES
CIVIL ENGINEERS & LAND SURVEYORS
221 BROWN CO. HWY. #19
PO BOX 111
ABERDEEN, SD 57402-0111
(605) 225-1212 FAX (605) 225-3189

JOB SIGN IN
SHEET NO _____ OF _____
CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE _____
SCALE _____

NAME	ADDRESS	REPRESENTING
Steve Gramm	700 E. Broadway, Pierre	SDDOT
Randy Grismer	901 4th Ave SE, Aberdeen	AVAL BIW, Self
Viril Colayton	1515 East Melgaard Rd,	Aberdeen, SD 57401
Heidi Appel	103 1/2 S Main St	Aberdeen Downtown
Mike Wilson	123 S. Lincoln St.	Aberdeen City.
LYNN LANDER	" "	City of ABERDEEN
STU NELSON	" "	" " - ENGINEERING
JEFF BAHR		AMERICAN NEWS
Bob Schuchardt	1500 N. main St.	Presentation College
MIKE WEESE	127 4th Ave SW #2 ABERDEEN	BROWN Co Commission
Brenda Moore	10 RR Ave SW	Aberdeen CVB
Terry Helms	PO Box 111, Aberdeen	Helms & Assoc.
Rob Johnson	Box 737 Aberdeen	Dakota Ramp Co.
Holly Wall	416 Production St N Aberdeen	Absolutely! Aberdeen
Jeff Brosz	700 E Broadway Ave Pierre	SDDOT
COBIN BOBZIEN	123 S LINCOLN	CITY OF ABERDEEN

SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

CITY OF ABERDEEN

NOTICE OF PUBLIC INFORMATION MEETING / OPEN HOUSE

FOR

ABERDEEN AREA MASTER TRANSPORTION PLAN

Date: December 3, 2013

Time: 5:30 p.m. to 7:00 p.m.

Place: Eagle's Nest – Aberdeen Recreation & Cultural Center
225 Third Avenue S.E., Aberdeen, SD 57401

The South Dakota Department of Transportation (SDDOT) in conjunction with the City of Aberdeen will hold an open house style public meeting to discuss and receive public input on the preliminary recommendations of a Master Transportation Plan being developed for the Aberdeen area. The open house will be informal, with one on one discussion available with SDDOT, City & Consultant staff. Between 5:30 p.m. and 7:00 p.m., SDDOT, City, & Consultant staff will be available with displays to discuss the proposed options and answer your questions. During this time, you will also have the opportunity to present written comments. A short presentation will be given at approximately 6:00 p.m.	Notice is further given to individuals with disabilities that this open house/public meeting is being held in a physically accessible place. Any individuals with disabilities who will require a reasonable accommodation in order to participate in the open house/public meeting should submit a request to the department's ADA Coordinator at 605-773-3540 or 1-800-877-1113 (Telecommunication Relay Services for the Deaf). Please request the accommodations no later than 2 business days prior to the meeting in order to ensure accommodations are available. For further information regarding the study, contact Steve Gramm at (605) 773-6641 or by email at steve.gramm@state.sd.us.
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PUBLIC OPEN HOUSE

Aberdeen
MASTER TRANSPORTATION PLAN

Name	Address	Email
Amy Blackstone		Amy.Blackstone@northern.edu
Kevin Bjerke	314 N Arch	kevin.bjerke@northern.edu
Jennifer Sandstrom		
Bill Roth	1896 Eisenhower Circle Aberdeen	
Eric Singer		eric@necog.org
Julie M. Johnson	416 Production St. #4 Aberdeen	julie.m.johnson@absentlyaberdeen.com

December 3, 2013