

SERRES FARM ANNEXATION TRAFFIC IMPACT STUDY

OREGON CITY, OREGON

DATE:
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EXPIRES: 12/31/17



**LANCASTER
ENGINEERING**



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EXECUTIVE SUMMARY

1. A 35.65-acre property located on the north side of Holcomb Boulevard between S Oak Tree Terrace and S Winston Drive is proposed for annexation into the City of Oregon City. Upon annexation, the property will be rezoned to R-10 zoning in conformance with the city's Comprehensive Plan.
2. Based on a comparison of the allowed uses under the existing and proposed zoning of the subject property, the proposed annexation could result in up to 91 additional trips during the morning peak hour, with 22 entering and 69 exiting the site. During the evening peak hour 121 additional site trips are projected, with 76 entering and 45 exiting the site.
3. Based on the detailed review of crash history at the study area intersections, the intersections of Highway 213 at Redland Road and Redland Road at Holcomb Boulevard/Abernethy Road are currently operating acceptably with respect to safety.
4. The intersection of Highway 213 at Beavercreek Road was found to be among the top ten percent of high-crash intersections in the State of Oregon, with the vast majority of the reported crashes being rear-end collisions. One potential safety mitigation would be installing flashing warning signs that alert drivers to the potential for stopped queues ahead. These warning signs are most appropriate for the high-speed approaches on Highway 213, and particularly the southbound approach which has uninterrupted flow for 2.5 miles. This project is already included as a "likely to be funded" project for near-term implementation in the city's Transportation System Plan. Since the proposed annexation and zone change will not significantly impact either operation or safety of this intersection, no specific mitigation is recommended in conjunction with the currently-proposed land use action.
5. Based on the operational analysis, the study area intersections are not projected to meet the relevant operational standards of Oregon City and ODOT under year 2035 traffic conditions either with or without the addition of site trips from the proposed annexation and zone. Although the intersection of Highway 213 at Beavercreek Road is not projected to experience a change in operation as a result of the proposed annexation and zone change, the intersections of Highway 213 at Redland Road and Redland Road at Holcomb Boulevard are projected to experience further degradation in performance upon development within the subject property. Potential mitigations include the addition of an eastbound right-turn lane on the Abernethy Road approach to Redland Road and providing three eastbound left-turn lanes from Redland Road onto Highway 213.
6. Based on the Transportation Planning Rule analysis, the city may find that the proposed annexation and zone change will not significantly effect an existing or planned transportation facility since the city's acknowledged Transportation System Plan already accounted for development under the proposed zoning. Alternatively, conditions of development or a development agreement may be implemented to ensure that no development can occur except as permitted under the existing zoning until refinement plans for the impacted intersections are prepared to address future capacity concerns, or proportionate mitigation is provided concurrent with development to offset the actual traffic impacts of the development.



PROJECT DESCRIPTION

INTRODUCTION

A 35.65-acre property located on the north side of Holcomb Boulevard between S Oak Tree Terrace and S Winston Drive is proposed for annexation into the City of Oregon City. The proposed annexation will also result in a zone change from the existing Clackamas County zoning to R-10 zoning on conformance with Oregon City's Comprehensive Plan.

The purpose of this study is to assess the potential impacts of the proposed annexation and address the transportation analysis requirements of Oregon City, the Oregon Department of Transportation (ODOT), and Oregon's Transportation Planning Rule. The report will identify the potential net increase in traffic and examine the transportation impacts of the added trips at the planning horizon. The report will include level of service calculations and volume-to-capacity calculations for existing conditions as well as year 2035 traffic conditions both with and without the proposed annexation. The analysis will also include a detailed examination of crash history at the study intersections.

Detailed information on traffic counts, crash data, and level of service calculations are included in the appendix to this report.

LOCATION DESCRIPTION

The subject property is located on the north side of Holcomb Boulevard east of S Oak Tree Terrace and west of S Winston Drive. It is also located immediately east of the Holcomb Elementary School site. The subject property has frontage along Holcomb Boulevard, which will ultimately provide access to the future development within the site.

Based on discussions with Oregon City and ODOT staff, three intersections were identified as requiring analysis. These consisted of Redland Road at Holcomb Boulevard/Abernethy Road, Highway 213 at Redland Road, and Highway 213 at Beaver Creek Road. These intersections were examined during the morning and evening peak hours.

It should be noted that the need for analysis of other intersections was discussed with both Oregon City and ODOT staff and determined not to be necessary. In particular, the intersection of Highway 213 at Washington Street/Clackamas River Drive and Highway 213 at I-205 was determined not to be critical for analysis, since it was recently improved and has significant residual capacity. Similarly, the intersections of Highway 213 at the I-205 ramps were determined not to require analysis. Other intersections such as I-205 at Highway 99E will experience traffic increases far below the levels at which Oregon City and ODOT would require analysis to determine whether there is a significant effect from the proposed annexation and zone change (20 peak-hour trips and 400 daily trips, respectively).

Highway 213 is classified by ODOT as a District Highway. Its cross-section varies between four and six through lanes between I-205 and Molalla Avenue. The posted speed varies between 35 mph and



55 mph and additional left and right turn lanes are provided at intersections along this segment of Highway 213. Sidewalks are partially provided along this roadway south of Beavercreek Road and north of Clackamas River Drive. Bicycle facilities are provided along both sides of this roadway.

Redland Road is classified by Oregon City as a Minor Arterial. The segment of Redland Road between Highway 213 and Abernethy Road/Holcomb Road has a roadway cross-section of five lanes, which consists of through, left-turn, and right-turn lanes. South of Holcomb Road the roadway consists of one through lane in each direction. It has a posted speed of 45 mph. Sidewalks extend south of the intersection of Redland Road at Abernethy Road for approximately 450 feet. Bike lanes are available along both sides of Redland Road.

Abernethy Road is classified by Oregon City as a Minor Arterial. This roadway has one through lane in each direction and a shared left turning median lane with a posted speed of 35 mph. Sidewalks are provided on the southern side of the roadway and partially on the northern side. Bike lanes are in place along both sides of the roadway near the vicinity of Redland Road.

Holcomb Boulevard is classified by Oregon City as a Minor Arterial. The roadway has one through lane in each direction with a posted speed of 40 mph. Partial sidewalks and bike lanes are in place on both sides of the roadway.

Beavercreek Road is classified by Oregon City as a Major Arterial east of Molalla Avenue. It has two through lanes in each direction, with additional left-turn and right-turn lanes provided at intersecting roads. The posted speed is 35 mph. Sidewalks and bike lanes are provided on both sides of the roadway.

INTERSECTION DESCRIPTIONS

The intersection of Highway 213 at Redland Road is a T-intersection controlled by a traffic signal. The eastbound approach has two left-turn lanes and one right-turn lane. The southbound approach has two through lanes and one right-turn lane. The northbound approach has two through lanes and one left-turn lane operating with protected signal phasing. The eastbound and northbound approaches have marked crosswalks with pedestrian signals in place.

The intersection of Redland Road at Abernethy Road and Holcomb Boulevard is a 4-way intersection controlled by a traffic signal. The eastbound and northbound approaches each have a left-turn lane operating with protected signal phasing and a shared through/right-turn lane. The westbound approach has a left-turn lane operating with protected signal phasing, one through lane, and one shared through/right-turn lane. The southbound approach has one left-turn lane operating with protected signal phasing, one through lane, and one right-turn lane. All four approaches have marked crosswalks with pedestrian signals in place.

The intersection of Highway 213 at Beavercreek Road is a 4-way intersection controlled by a traffic signal. The eastbound approach has two left-turn lanes operating with protected signal phasing, one through lane, and one shared through/right-turn lane. The westbound and southbound approaches have two left-turn lanes operating with protected signal phasing, two through lanes, and one right-turn lane. The northbound approach has one left-turn lane operating with protected signal phasing,



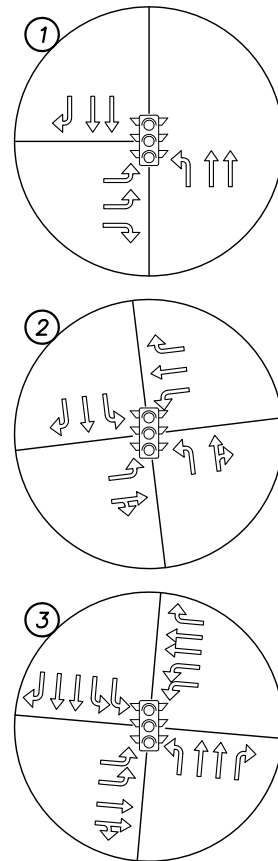
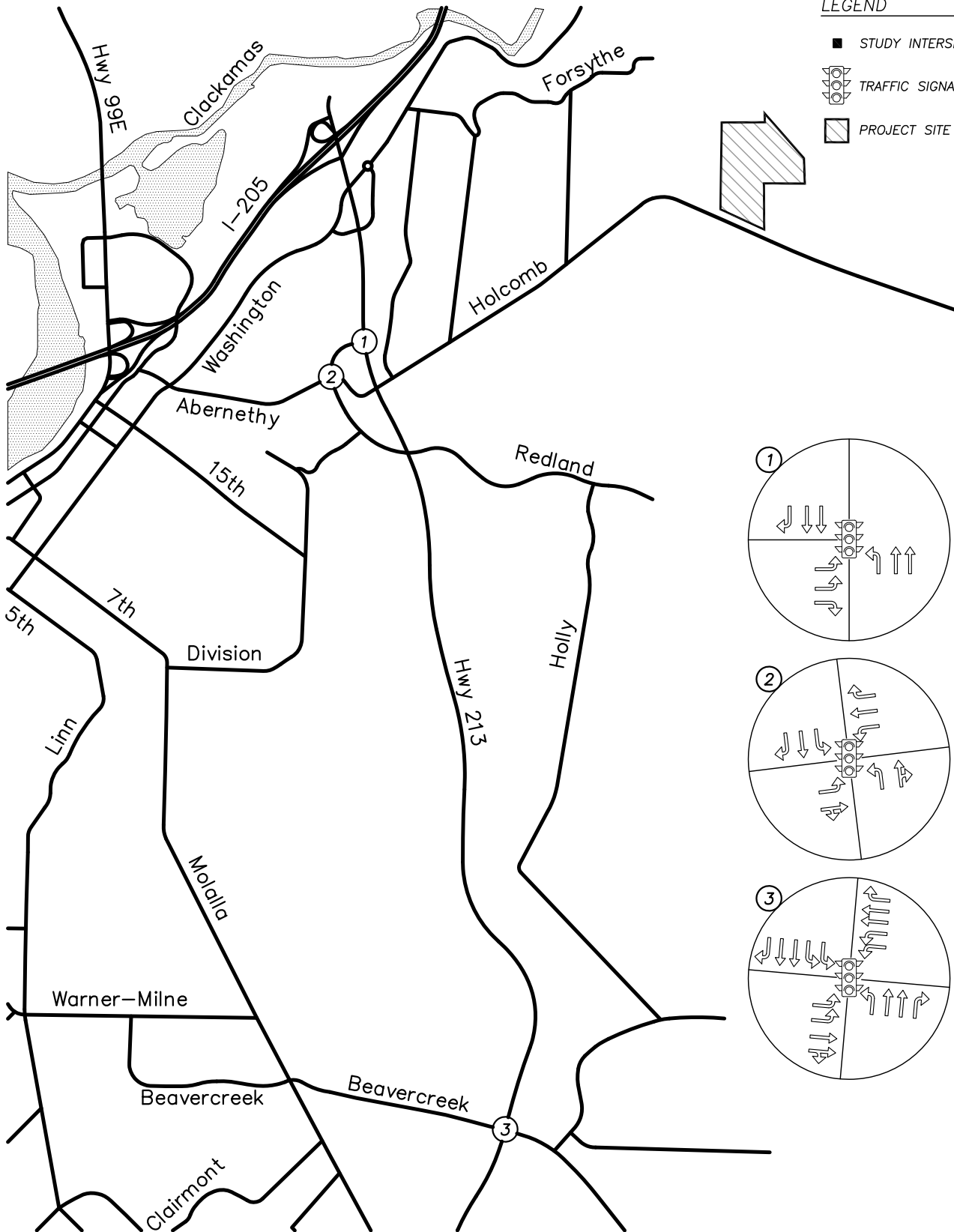
two through lanes, and one right-turn lane. All four approaches have marked crosswalks with pedestrian signals in place.

Manual turning movement counts were made at the study intersections during January 2017 from 7:00 to 9:00 AM and from 4:00 to 6:00 PM. The peak hours occurred from about 7:10 to 8:10 AM and from 4:30 to 5:30 PM. Detailed traffic count data is included in the appendix to this report.

Figure 1 on page seven shows the project study area and the location of the site. Figure 2 on page eight shows the existing traffic volumes at the study area intersections.

LEGEND

- STUDY INTERSECTION
-  TRAFFIC SIGNAL
-  PROJECT SITE

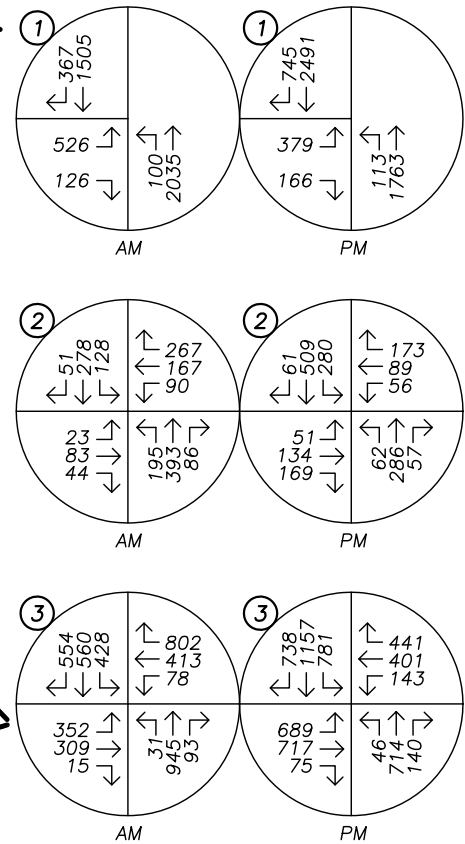
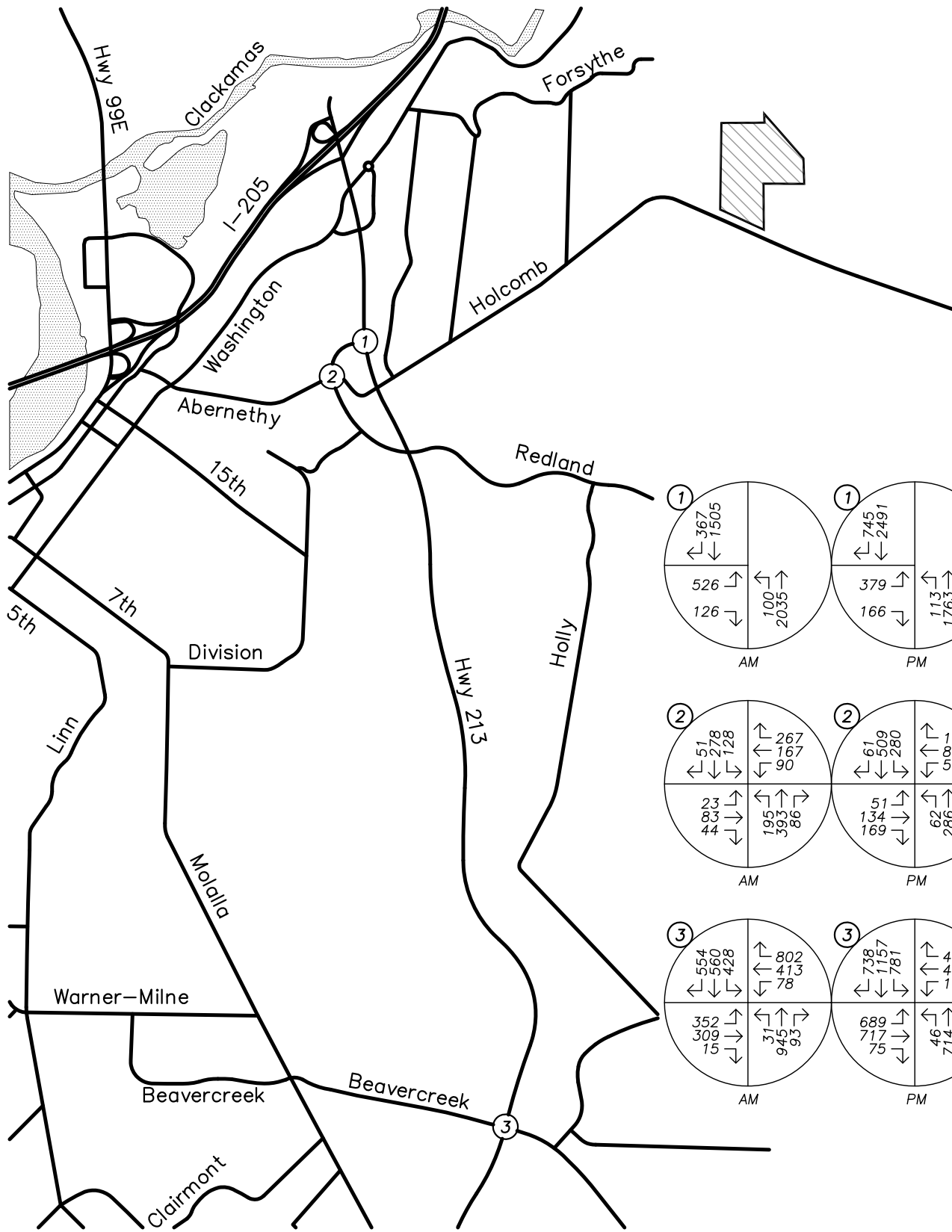


VICINITY MAP



FIGURE 1

PAGE 7



TRAFFIC VOLUMES
2017 Existing Conditions
AM & PM Peak Hours



TRIP GENERATION & DISTRIBUTION

TRIP GENERATION

The subject property consists of 35.65 acres currently zoned Future-Use 10-acre minimum (FU-10) by Clackamas County. Upon annexation of the property into the City of Oregon City, the property will be rezoned for residential use with a minimum lot size of 10,000 sf (R-10).

Under the existing Clackamas County zoning, the property can be developed with up to 3 lots with each lot having an area of at least 10 acres. Each lot may be developed with a single-family home.

Under the proposed zoning, the property can be developed with up to 124 lots of at least 10,000 square feet. Again, each lot may be developed with a single-family home.

Based on the comparison between the existing and proposed zonings, annexation of the subject property would be expected to result in the addition of up to 121 new homes within the subject property.

To estimate the number of trips that could be generated under the existing and proposed zonings, trip generation data from the Trip Generation Manual, 9th Edition, published by the Institute of Transportation Engineers was used. The trip data was drawn from land use 210, *Single-Family Detached Housing*, and is based on the number of dwelling units.

The calculations indicate that the proposed annexation and zone change could result in up to 91 additional trips during the morning peak hour, with 22 entering and 69 exiting the site. During the evening peak hour, 121 additional trips could be expected, with 76 entering and 45 exiting the site. A daily increase of 1,152 trips is projected, with half entering and half exiting the site.

A summary of the trip generation calculation is provided in the table below. Detailed trip generation worksheets are included in the attached technical appendix.

TRIP GENERATION SUMMARY									
	AM Peak Hour			PM Peak Hour			Daily Trips		
	<u>Enter</u>	<u>Exit</u>	<u>Total</u>	<u>Enter</u>	<u>Exit</u>	<u>Total</u>	<u>Enter</u>	<u>Exit</u>	<u>Total</u>
3 Single-Family Homes	1	1	2	2	1	3	14	14	28
124 Single-Family Homes	23	70	93	78	46	124	590	590	1180
Net New Site Trips	22	69	91	76	45	121	576	576	1,152

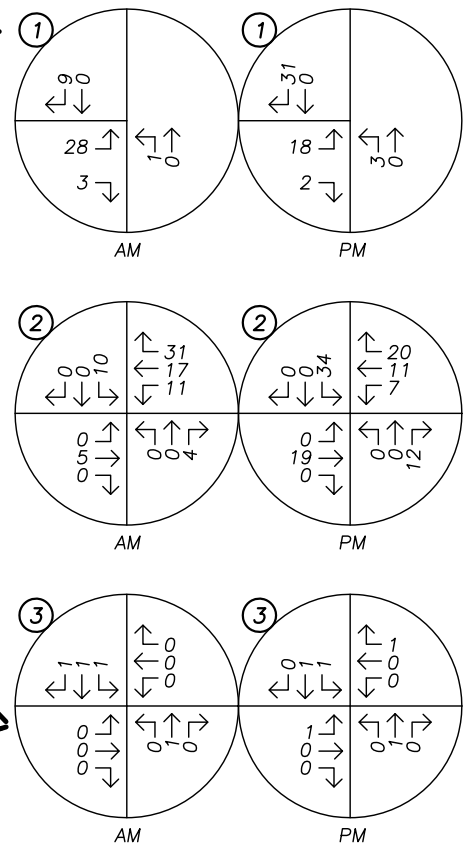
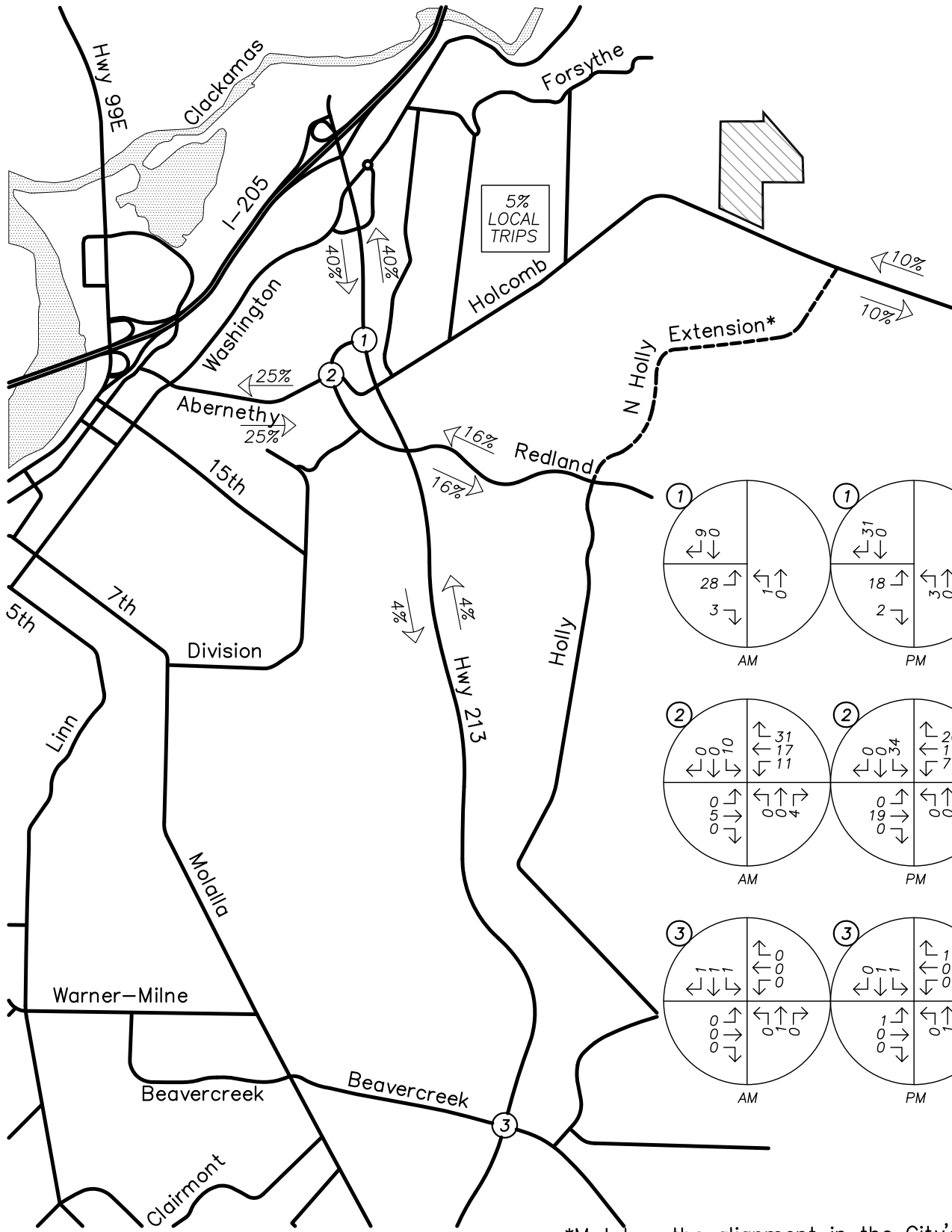
TRIP DISTRIBUTION

The distribution of site trips was determined based on existing travel patterns in the site vicinity. Approximately 85 percent of site trips are projected to travel to and from the west through the intersection of Redland Road at Holcomb Boulevard/Abernethy Road. The remaining 15 percent of site trips are projected to travel either to and from the east along Holcomb Boulevard or to destinations east of Redland Road along Holcomb Boulevard, such as other homes in the site vicinity, Holcomb Elementary School, Steve's Marketplace and the Quick Stop Market.

It should be noted that Holly Lane is planned for an extension from its current terminus at Redland Road to Holcomb Boulevard. Upon completion of this extension, it is expected that some trips currently traveling west along Holcomb Boulevard and then south on Redland Road to Holly Lane will divert to the new street connection. Some site trips from the proposed development will likewise divert to this new travel path, thereby bypassing the intersection of Redland Road at Holcomb Boulevard/Abernethy Road.

A detailed diagram showing the distribution and assignment of site trips is provided on the following page. Based on the existing travel patterns in the site vicinity, 16 percent of site trips are projected to travel to and from the south along Redland Road, 25 percent of site trips are projected to travel to and from the west along Abernethy Road, 40 percent of site trips are projected to travel to and from the north along Highway 213, and 4 percent of site trips are projected to travel to and from the south along Highway 213.

The trip distribution patterns and trip assignment for the net increase in site trips associated with the proposed development are shown in Figure 3 on page 10.



*Matches the alignment in the City's TSP



SITE TRIP DISTRIBUTION & ASSIGNMENT
 Zone Change Site Trips
 AM & PM Peak Hours





SAFETY ANALYSIS

CRASH HISTORY

In order to identify any existing safety hazards in the site vicinity, a three-year crash history was obtained from ODOT's Crash Analysis and Reporting Unit. The data covered the period from January, 2013 through December 2015.

A brief discussion of crashes is provided for each of the study area intersections. In addition to the crash descriptions, calculated crash rates were determined for each location. Examination of the crash rate, expressed as the number of crashes per million entering vehicles (CMEV), allows intersections with widely different traffic volumes to be compared on the basis of relative crash risk. Based on ODOT data for signalized intersections in urban areas throughout the state, the intersections were evaluated to determine whether the crash history may be indicative of design deficiencies.

The intersection of Redland Road at Holcomb Boulevard/Abernethy Road had 11 reported crashes during the three-year analysis interval. These included 6 rear-end collisions, 4 turning-movement collisions and 1 angle collision. The crashes resulted in 2 non-incapacitating injuries and 2 reports of a "possible injury/complaint of pain". The crash rate for the intersection was calculated to be 0.54 crashes per million entering vehicles. This crash rate is below the 90th percentile crash rate for signalized 4-legged intersections in the State of Oregon (0.860 CMEV). Based on the crash rate and crash severity, no significant safety hazards were identified and no specific safety mitigation is recommended.

The intersection of Highway 213 at Redland Road had had 27 reported collisions during the three-year analysis period. The crashes included 22 rear-end collisions, 4 turning-movement collisions, and 1 sideswipe-overtaking collision. The crashes resulted in no significant injuries or fatalities; however, there were 27 reports of a "possible injury/complaint of pain". The crash rate for the intersection was calculated to be 0.46 crashes per million entering vehicles. This crash rate is below the 90th percentile crash rate for signalized 3-legged intersections in the State of Oregon (0.509 CMEV). Based on the crash rate and crash severity, no significant safety hazards were identified and no specific safety mitigation is recommended.

The intersection of Highway 213 at Beavercreek Road had 80 reported collisions during the three-year analysis period. These included 70 rear-end collisions, 5 turning-movement collisions, 3 sideswipe-overtaking collisions, 1 angle collision and 1 backing collision. The crashes resulted in 6 non-incapacitating injuries and 41 reports of a "possible injury/complaint of pain". The crash rate for the intersection was calculated to be 1.27 crashes per million entering vehicles. This crash rate is above the 90th percentile crash rate for signalized 4-legged intersections in the State of Oregon (0.860 CMEV), indicating that the intersection is among the top 10 percent of high crash intersections in the State of Oregon. The intersection is also noted as a high-crash location in the city's Transportation System Plan.

It should also be noted that a fatal collision occurred at this intersection in September, 2011, prior to the most recent three years for which data is available. The fatality occurred when an eastbound



driver entered the intersection against the red indication and was struck by a southbound vehicle. Alcohol was determined to be a contributing factor in the collision.

Based on the detailed review of crash history at the intersection of Highway 213 and Beavercreek Road, the number of crashes occurring at the intersection is higher than would be expected for a typical intersection with similar characteristics. The vast majority of the reported crashes (87.5%) were rear-end collisions. However, the rear-end collisions were distributed evenly among the intersection approaches, with 18 on the northbound approach, 18 on the southbound approach, 21 on the westbound approach and 10 on the eastbound approach. (The remaining two rear-end collisions were noted as “unknown” with respect to travel direction.) Since the rear-end collisions are occurring with similar frequency on the approaches, it is unlikely that the crashes result from any specific deficiency of the intersection design.

Based on the detailed crash data, no specific safety mitigations are recommended for the intersections of Highway 213 at Redland Road and Redland Road at Holcomb Boulevard/Abernethy Road.

For the intersection of Highway 213 at Beavercreek Road, it is recommended that consideration be given to installing flashing warning signs that alert drivers to the potential for stopped queues ahead. These warning signs are most appropriate for the high-speed approaches on Highway 213, and particularly the southbound approach since the nearest traffic signal to the north is approximately 2.5 miles away at Redland Road. It should be noted that such a system is included in the city’s Transportation System Plan (project D14), which will install a queue warning system for southbound drivers on OR 213 which includes a variable message sign. The project is within the “likely to be funded” list and is designated for near-term implementation.



OPERATIONAL ANALYSIS

BACKGROUND TRAFFIC

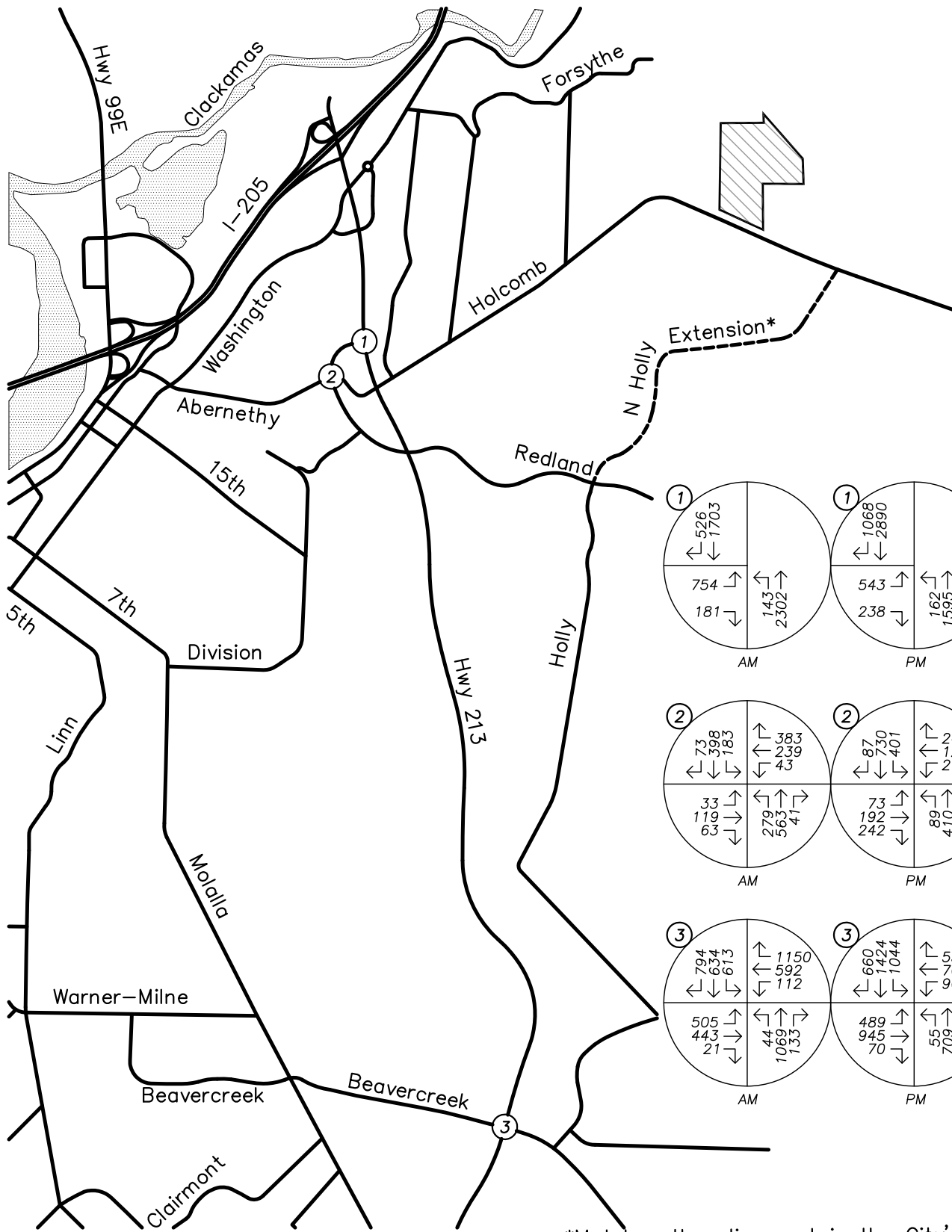
In order to assess the impacts of the proposed annexation on traffic conditions at the planning horizon, the existing traffic volumes at the study area intersections were increased to account for anticipated growth through year 2035. Growth for other facilities within Oregon City was estimated based on in conformance with growth data from the 2013 Transportation System Plan, which shows an overall growth from 33,012 trips during the evening peak hour in 2010 to 54,461 trips during the evening peak hour in 2035. This equates to an exponential growth rate of 2.02 percent per year, which was applied to all intersection movements except the through movements along Highway 213. Traffic volume growth along Highway 213 was estimated using data from ODOT's Future Volume Tables, which show a projected linear growth rate of 0.73 percent per year.

For the intersection of Highway 213 at Beavercreek Road, Oregon City's 2013 Transportation System Plan included projected year 2035 volumes for the PM peak hour. In order to ensure consistency with the city's TSP, these volumes were used for this intersection's evening peak hour analysis scenario. Additionally, traffic volumes along Highway 213 were balanced between the Beavercreek and Redland Road intersections to ensure that the Redland Road intersection analysis was also consistent with the TSP.

In addition to the increase in traffic volumes within the site vicinity, completion of the North Holly Lane Extension is expected to result in some re-distribution of existing traffic volumes in the site vicinity. Specifically, it is anticipated that approximately two thirds of the trips between Holcomb Boulevard and Redland Road south of Holcomb Boulevard will utilize the new Holly Lane extension, since this route will provide a more direct connection between these roadways. It is also anticipated that some site trips between Holcomb Boulevard and Highway 213 south of Redland Road will divert to the new North Holly Lane extension, since this route will provide a good connection between Holcomb Boulevard and destinations such as Oregon City High School and the Berry Hill Shopping Center.

The background conditions analysis volumes include all city-identified projected development through the 2035 planning horizon, with the exception of the Serres Farm property. Omission of this property from the background conditions allows for a meaningful comparison between future background conditions without approval of the proposed zone change and the 2035 "zone change" conditions, which include the addition of site trips from the Serres Farm property.

Figure 4 on page 15 shows the year 2035 background traffic volumes at the study intersections. Figure 5 on page 16 shows the year 2035 background traffic with addition of potential site trips from the proposed annexation and zone change.



*Matches the alignment in the City's TSP

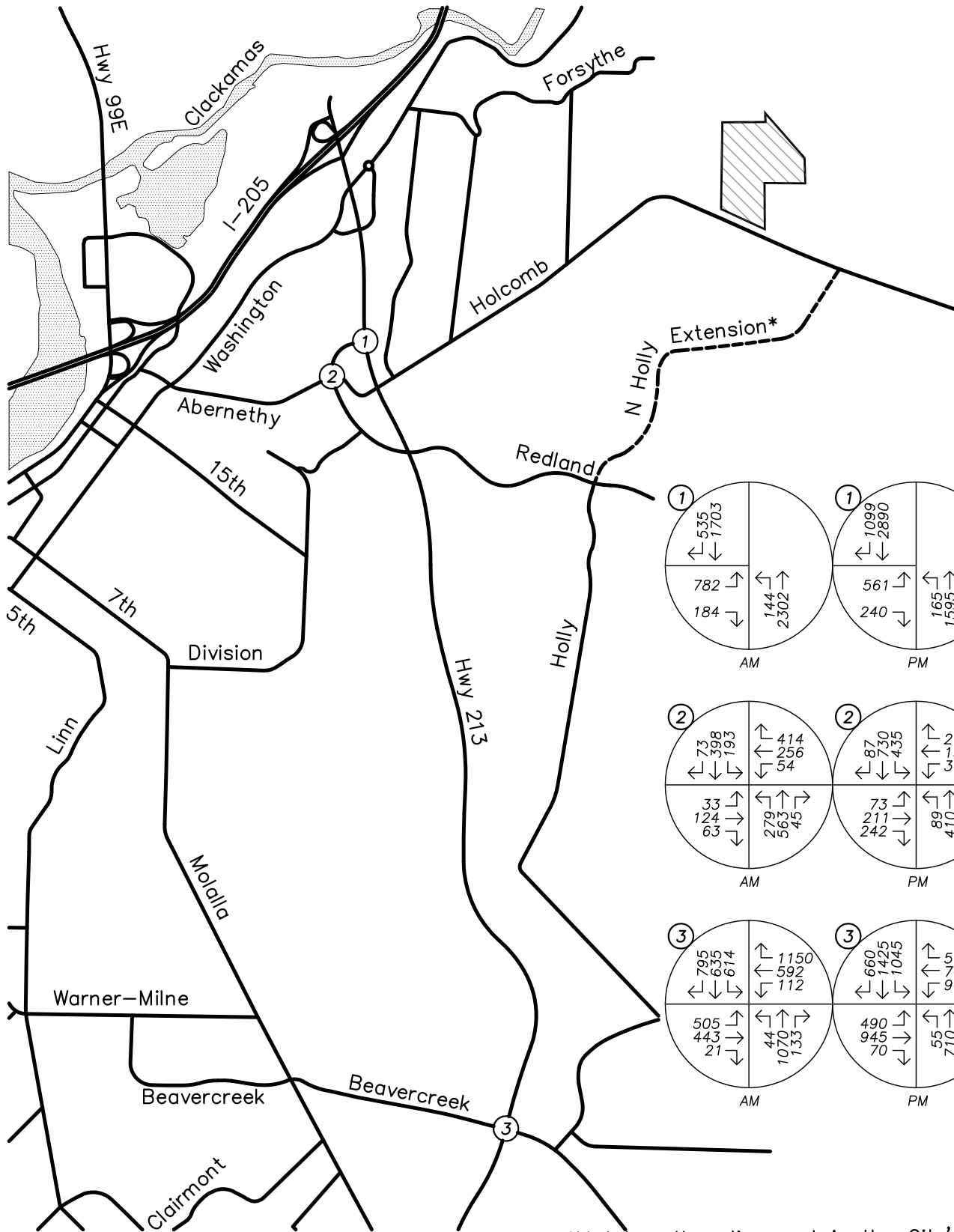


TRAFFIC VOLUMES
Year 2035 Background Conditions
AM & PM Peak Hours



FIGURE
4

PAGE
15



*Matches the alignment in the City's TSP



TRAFFIC VOLUMES
Year 2035 Background Plus Zone Change
AM & PM Peak Hours



FIGURE
5

PAGE
16



CAPACITY ANALYSIS

To determine the level of service at the study intersections, a capacity analysis was conducted. The analysis was conducted according to the signalized intersection analysis methodologies in the *HIGHWAY CAPACITY MANUAL* (HCM) published by the Transportation Research Board. Level of service can range from A, which indicates little or no delay, to F, which indicates a significant amount of congestion and delay. Oregon City has recently established new operational standards for intersection performance. Intersections outside the Regional Center but designated on the Arterial and Throughway Network are required to operate with a v/c ratio of 0.99 or less. Signalized intersections outside the boundaries of the Regional Center and not on the Arterial and Throughway Network are required to operate at level of service “D” or better and with no approach operating at worse than LOS “E” and with a v/c ratio not higher than 1.0 for the sum of the critical movements.

The intersection of Redland Road at Holcomb Boulevard/Abernethy Road is currently operating with a v/c ratio of 0.87 during the morning peak hour and 1.01 during the evening peak hour. Under year 2035 background conditions, the intersection is projected to operate with a v/c ratio of 1.04 during the morning peak hour and 1.23 during the evening peak hour. With the addition of site trips from the proposed annexation and zone change, the intersection is projected to operate with a v/c ratio of 1.05 during the morning peak hour and 1.24 during the evening peak hour. If the eastbound approach was converted to have two dedicated left-turn lanes and a shared left/right lane, intersection operation would improve to a v/c ratio of 1.00 during the morning peak hour and 1.22 during the evening peak hour. This potential mitigation is sufficient to offset the impacts of the proposed annexation and zone change; however, it should be noted that a more comprehensive solution will be necessary to restore acceptable operation of the intersection. The city’s Transportation System Plan includes unfunded improvements to the intersection such as converting the northbound and southbound approaches to have three through lanes in each direction.

The intersection of Highway 213 at Redland Road currently operates at level of service C with a v/c ratio of 0.76 during the morning peak hour and at level of service C with a v/c ratio of 0.78 during the evening peak hour. Under year 2035 background conditions the intersection is projected to operate at level of service D with a v/c ratio of 0.88 during the morning peak hour and level of service E with a v/c ratio of 1.07 during the evening peak hour. With the addition of site trips from the proposed annexation and zone change, the intersection is projected to operate at level of service D with a v/c ratio of 0.90 during the morning peak hour and at level of service E with a v/c ratio of 1.11 during the evening peak hour. If an eastbound right-turn lane is added to the intersection, it is projected to operate at level of service D or better and with a v/c ratio of 0.95 or less under all year 2035 scenarios.

The Synchro operational analysis for the intersection of Highway 213 at Beavercreek Road indicates that the westbound right-turn movement is currently operating with volumes far in excess of capacity during the morning peak hour. Since the count data demonstrates that all observed vehicles were able to make this turning movement during the morning peak hour, it is clear that the operational analysis is inaccurate with respect to the westbound right-turn movement. Accordingly, the Synchro model was modified to remove this yield-controlled movement from the analysis and obtain accurate analysis with respect to the other intersection movements. It should be noted that this analysis approach

inherently acknowledges that the westbound right-turn movement is operating near capacity and will require some form of capacity enhancement in the near future.

Based on the analysis, the intersection of Highway 213 at Beavercreek Road is currently operating with a v/c ratio of 0.79 during the morning peak hour and 0.92 during the evening peak hour. Under year 2035 traffic conditions, the intersection is projected to operate with a v/c ratio of 1.04 during the morning and evening peak hours either with or without the addition of site trips from the proposed annexation and zone change. Since the proposed land use action will not significantly affect operation of the intersection, no mitigation is proposed in conjunction with the Serres Farm Annexation.

The results of the capacity analysis, along with the Levels of Service (LOS) and delay are shown in the table on the following page. Detailed capacity analysis results are included in the appendix to this report.

LEVEL OF SERVICE SUMMARY						
	AM Peak Hour			PM Peak Hour		
	<u>LOS</u>	<u>Delay</u>	<u>V/C</u>	<u>LOS</u>	<u>Delay</u>	<u>V/C</u>
<i>Highway 213 at Redland Road</i>						
2017 Existing Conditions	C	22	0.87	D	38	1.01
2035 Background	D	39	1.04	F	84	1.23
2035 Bkgd plus Zone Change	D	41	1.05	F	85	1.24
2035 Bkgd plus ZC Mitigated ¹	C	33	1.00	F	82	1.22
<i>Redland Road at Holcomb Boulevard/Abernethy Road</i>						
2017 Existing Conditions	C	27	0.76	C	29	0.78
2035 Background	D	40	0.88	E	57	1.07
2035 Bkgd plus Zone Change	D	44	0.90	E	69	1.11
2035 Bkgd plus ZC Mitigated ²	D	44	0.90	D	52	0.95
<i>Highway 213 at Beavercreek Road</i>						
2017 Existing Conditions	D	39	0.79	D	49	0.92
2035 Background	E	66	1.04	E	64	1.04
2035 Bkgd plus Zone Change	E	66	1.04	E	64	1.04
LOS = Level of Service						
Delay = Average Delay per Vehicle in Seconds						
V/C = Volume-to-Capacity ratio						

¹ Eastbound approach has 2 exclusive left-turn lanes and a shared left/right lane.

² Eastbound approach has a left-turn lane, a through lane and a right-turn lane.

Although specific mitigation sufficient to offset the impacts of future development following the proposed annexation and zone change on the subject property, it should be noted that there may be other mitigations that would equally or better serve the needs of the development, Oregon City, and the Oregon Department of Transportation.

In particular, the mitigation described for the intersection of Highway 213 at Redland Road is sufficient to ensure there is no further degradation to performance of the intersection as a result of development within the subject property; however additional mitigation would be required to restore the intersection to acceptable operation per ODOT and Oregon City standards. It is therefore advisable that a more comprehensive study be conducted for the intersection which accommodates the anticipated traffic volumes at the planning horizon and results in acceptable intersection operation.

The applicant is not currently proposing to make any physical improvements at any area intersections in conjunction with the proposed zone change. Rather, the improvements listed were included as suggestions of possible mitigation. The currently-proposed mitigation for the requested annexation and zone change consists of conditions of approval pursuant to OAR 660-012-0060(2)(d), as described in the Transportation Planning Rule Analysis portion of this report on pages 20-22.

TRANSPORTATION PLANNING RULE ANALYSIS

The Transportation Planning Rule (TPR) is in place to ensure that the transportation system is capable of supporting the potential increase in traffic intensity that could result from changes to adopted plans and land use regulations. The applicable portions of the TPR are quoted in *italics* below, with responses directly following.

660-012-0060

(1) If an amendment to a functional plan, an acknowledged comprehensive plan, or a land use regulation (including a zoning map) would significantly affect an existing or planned transportation facility, then the local government must put in place measures as provided in section (2) of this rule, unless the amendment is allowed under section (3), (9) or (10) of this rule. A plan or land use regulation amendment significantly affects a transportation facility if it would:

(a) Change the functional classification of an existing or planned transportation facility (exclusive of correction of map errors in an adopted plan);

The proposed zone change will not necessitate changes to the functional classification of existing or planned transportation facilities. Accordingly, this section is not triggered.

(b) Change standards implementing a functional classification system; or

The proposed zone change will not change any standards implementing the functional classification system. Accordingly, this section is also not triggered.

(c) Result in any of the effects listed in paragraphs (A) through (C) of this subsection based on projected conditions measured at the end of the planning period identified in the adopted TSP. As part of evaluating projected conditions, the amount of traffic projected to be generated within the area of the amendment may be reduced if the amendment includes an enforceable, ongoing requirement that would demonstrably limit traffic generation, including, but not limited to, transportation demand management. This reduction may diminish or completely eliminate the significant effect of the amendment.

(A) Types or levels of travel or access that are inconsistent with the functional classification of an existing or planned transportation facility;

(B) Degrade the performance of an existing or planned transportation facility such that it would not meet the performance standards identified in the TSP or comprehensive plan; or

(C) Degrade the performance of an existing or planned transportation facility that is otherwise projected to not meet the performance standards identified in the TSP or comprehensive plan.

In this instance the proposed zone change would be expected to degrade the performance of the intersections of Highway 213 at Redland Road and Redland Road at Holcomb Boulevard/Abernethy Road. Both intersections are projected not to meet the relevant performance standards of Oregon City and the Oregon Department of Transportation.

The proposed zone change is not projected to degrade the performance of the intersection of Highway 213 at Beaver Creek Road since the annexation and zone change would be projected to result in no more than five additional peak-hour trips or 50 additional daily trips through the intersection. The Oregon Highway Plan's Policy 1.F.5 specifically indicates that "a small increase in traffic does not cause 'further degradation' of the facility" and defines a "small increase in traffic" as "Any proposed amendment that does not increase the average daily trips by more than 400."

Since the proposed zone change does not result in an increase in the intersection v/c ratio and is defined as a small increase in traffic under the Oregon Highway Plan, no mitigation is necessary or recommended for the intersection of Highway 213 at Beaver Creek Road in conjunction with the proposed annexation and zone change.

Having determined that the proposed annexation and zone change may result in a significant effect on operation of the intersections of Highway 213 at Redland Road and Redland Road at Holcomb Boulevard/Abernethy Road, the Transportation Planning Rule also includes the following language:

- (9) *Notwithstanding section (1) of this rule, a local government may find that an amendment to a zoning map does not significantly affect an existing or planned transportation facility if all of the following requirements are met.*
- (a) *The proposed zoning is consistent with the existing comprehensive plan map designation and the amendment does not change the comprehensive plan map;*
 - (b) *The local government has an acknowledged TSP and the proposed zoning is consistent with the TSP; and*
 - (c) *The area subject to the zoning map amendment was not exempted from this rule at the time of an urban growth boundary amendment as permitted in OAR 660-024-0020(1)(d), or the area was exempted from this rule but the local government has a subsequently acknowledged TSP amendment that accounted for urbanization of the area.*

In this instance, the proposed zoning is consistent with the Comprehensive Plan map designation, Oregon City has an acknowledged Transportation System Plan that accounted for future development under the proposed zoning, and the area was not exempted from the rule at the time of the urban growth boundary amendment. Accordingly, the city may find that the proposed annexation and zone change is consistent with the city's adopted plans and does not significantly effect an existing or planned transportation facility.

Alternatively, if it is determined that mitigation may be required for the proposed annexation and zone change, the requirements of the Transportation Planning Rule are as follows:

- (2) *If a local government determines that there would be a significant effect, then the local government must ensure that allowed land uses are consistent with the identified function, capacity, and performance standards of the facility measured at the end of the planning period identified in the adopted TSP through one or a combination of the remedies listed in (a) through (e) below, unless the amendment meets the balancing test in subsection (2)(e) of this section or qualifies for partial mitigation in section (11) of this rule. A local government using subsection (2)(e), section (3), section (10) or section (11) to approve an amendment recognizes that additional motor*

vehicle traffic congestion may result and that other facility providers would not be expected to provide additional capacity for motor vehicles in response to this congestion.

- (a) Adopting measures that demonstrate allowed land uses are consistent with the planned function, capacity, and performance standards of the transportation facility.*
- (b) Amending the TSP or comprehensive plan to provide transportation facilities, improvements or services adequate to support the proposed land uses consistent with the requirements of this division; such amendments shall include a funding plan or mechanism consistent with section (4) or include an amendment to the transportation finance plan so that the facility, improvement, or service will be provided by the end of the planning period.*
- (c) Amending the TSP to modify the planned function, capacity or performance standards of the transportation facility.*
- (d) Providing other measures as a condition of development or through a development agreement or similar funding method, including, but not limited to, transportation system management measures or minor transportation improvements. Local governments shall, as part of the amendment, specify when measures or improvements provided pursuant to this subsection will be provided.*
- (e) Providing improvements that would benefit modes other than the significantly affected mode, improvements to facilities other than the significantly affected facility, or improvements at other locations, if:*
 - (A) The provider of the significantly affected facility provides a written statement that the system-wide benefits are sufficient to balance the significant effect, even though the improvements would not result in consistency for all performance standards;*
 - (B) The providers of facilities being improved at other locations provide written statements of approval; and*
 - (C) The local jurisdictions where facilities are being improved provide written statements of approval.*

In this instance, option (d) would allow conditions of development or a development agreement to be adopted for the subject property to mitigate any potential traffic impacts. Appropriate conditions of approval could consist either of requirements to construct mitigation sufficient to offset traffic impacts at the intersections of Highway 213 and Redland Road as well as Redland Road at Holcomb Boulevard or a requirement to delay development until the city's Transportation System Plan is amended to specifically address operation of these intersections.

Since site development is not currently proposed and it is anticipated that refinement plans will be developed by Oregon City in conjunction with the Oregon Department of Transportation, a condition of approval is proposed which will limit development within the subject property to levels permissible under the existing zoning until a refinement plan including financially constrained projects and alternative mobility standards is completed for the intersection of Highway 213 at Redland Road. Similarly, for the Redland Road at Holcomb Road intersection, either proportional mitigation or adoption of alternative mobility standards will be required.

CONCLUSIONS

The intersection of Highway 213 at Beavercreek Road was found to be among the top ten percent of high-crash intersections in the State of Oregon, with the vast majority of the reported crashes being rear-end collisions. One potential safety mitigation would be installing flashing warning signs that alert drivers to the potential for stopped queues ahead. These warning signs are most appropriate for the high-speed approaches on Highway 213, and particularly the southbound approach which has uninterrupted flow for 2.5 miles. This project is already included as a “likely to be funded” project for near-term implementation in the city’s Transportation System Plan. Since the proposed annexation and zone change will not significantly impact either operation or safety of this intersection, no specific mitigation is recommended in conjunction with the currently-proposed land use action.

Based on the operational analysis, the study area intersections are not projected to meet the relevant operational standards of Oregon City and ODOT under year 2035 traffic conditions either with or without the addition of site trips from the proposed annexation and zone. Although the intersection of Highway 213 at Beavercreek Road is not projected to experience a change in operation as a result of the proposed annexation and zone change, the intersections of Highway 213 at Redland Road and Redland Road at Holcomb Boulevard are projected to experience further degradation in performance upon development within the subject property. Potential mitigations include the addition of an east-bound right-turn lane on the Abernethy Road approach to Redland Road and providing three east-bound left-turn lanes from Redland Road onto Highway 213.

Based on the Transportation Planning Rule analysis, the city may find that the proposed annexation and zone change will not significantly effect an existing or planned transportation facility since the city’s acknowledged Transportation System Plan already accounted for development under the proposed zoning. Alternatively, conditions of development or a development agreement may be implemented to ensure that no development can occur except as permitted under the existing zoning until refinement plans for the impacted intersections are prepared to address future capacity concerns, or proportionate mitigation is provided concurrent with development to offset the actual traffic impacts of the development.

2e

APPENDIX



LEVEL OF SERVICE

Level of service is used to describe the quality of traffic flow. Levels of service A to C are considered good, and rural roads are usually designed for level of service C. Urban streets and signalized intersections are typically designed for level of service D. Level of service E is considered to be the limit of acceptable delay. For unsignalized intersections, level of service E is generally considered acceptable. Here is a more complete description of levels of service:

Level of service A: Very low delay at intersections, with all traffic signal cycles clearing and no vehicles waiting through more than one signal cycle. On highways, low volume and high speeds, with speeds not restricted by other vehicles.

Level of service B: Operating speeds beginning to be affected by other traffic; short traffic delays at intersections. Higher average intersection delay than for level of service A resulting from more vehicles stopping.

Level of service C: Operating speeds and maneuverability closely controlled by other traffic; higher delays at intersections than for level of service B due to a significant number of vehicles stopping. Not all signal cycles clear the waiting vehicles. This is the recommended design standard for rural highways.

Level of service D: Tolerable operating speeds; long traffic delays occur at intersections. The influence of congestion is noticeable. At traffic signals many vehicles stop, and the proportion of vehicles not stopping declines. The number of signal cycle failures, for which vehicles must wait through more than one signal cycle, are noticeable. This is typically the design level for urban signalized intersections.

Level of service E: Restricted speeds, very long traffic delays at traffic signals, and traffic volumes near capacity. Flow is unstable so that any interruption, no matter how minor, will cause queues to form and service to deteriorate to level of service F. Traffic signal cycle failures are frequent occurrences. For unsignalized intersections, level of service E or better is generally considered acceptable.

Level of service F: Extreme delays, resulting in long queues which may interfere with other traffic movements. There may be stoppages of long duration, and speeds may drop to zero. There may be frequent signal cycle failures. Level of service F will typically result when vehicle arrival rates are greater than capacity. It is considered unacceptable by most drivers.



*LEVEL OF SERVICE CRITERIA
FOR SIGNALIZED INTERSECTIONS*

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-20
C	20-35
D	35-55
E	55-80
F	>80

*LEVEL OF SERVICE CRITERIA
FOR UNSIGNALIZED INTERSECTIONS*

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-15
C	15-25
D	25-35
E	35-50
F	>50

Total Vehicle Summary

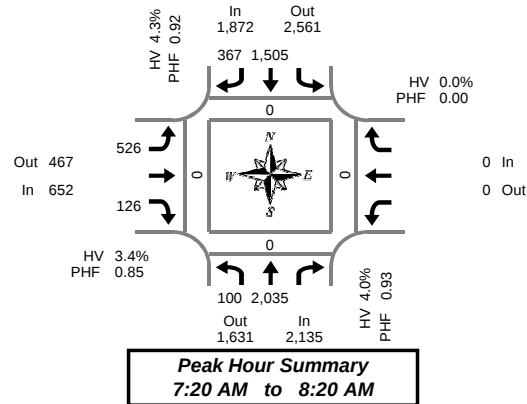


Clay Carney
(503) 833-2740

Hwy 213 & Redland Rd

Wednesday, January 25, 2017

7:00 AM to 9:00 AM



5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 213			Southbound Hwy 213			Eastbound Redland Rd			Westbound Redland Rd			Interval Total	Pedestrians Crosswalk			
	L	T	Bikes	T	R	Bikes	L	R	Bikes			Bikes		North	South	East	West
7:00 AM	8	139	0	75	17	0	55	18	0			0	312	0	0	0	0
7:05 AM	7	183	0	100	24	0	49	6	0			0	369	0	0	0	0
7:10 AM	0	164	0	93	16	0	43	17	0			0	333	0	0	0	0
7:15 AM	7	154	0	105	26	0	67	15	0			0	374	0	0	0	0
7:20 AM	10	197	0	125	40	0	34	12	0			0	418	0	0	0	0
7:25 AM	4	189	0	116	35	0	40	18	0			0	402	0	0	0	0
7:30 AM	4	172	0	109	29	0	58	16	0			0	388	0	0	0	0
7:35 AM	14	179	0	112	31	0	48	12	0			0	396	0	0	0	0
7:40 AM	10	178	0	168	35	0	33	9	0			0	433	0	0	0	0
7:45 AM	7	169	0	116	32	0	50	10	0			0	384	0	0	0	0
7:50 AM	13	149	0	132	26	0	45	13	0			0	378	0	0	0	0
7:55 AM	8	160	0	149	25	0	32	4	0			0	378	0	0	0	0
8:00 AM	6	148	0	121	30	0	35	9	0			0	349	0	0	0	0
8:05 AM	7	154	0	90	31	0	62	10	0			0	354	0	0	0	0
8:10 AM	8	181	0	119	31	0	41	4	0			0	384	0	0	0	0
8:15 AM	9	159	0	148	22	0	48	9	0			0	395	0	0	0	0
8:20 AM	6	132	0	89	41	0	58	13	0			0	339	0	0	0	0
8:25 AM	3	137	0	112	25	0	32	4	0			0	313	0	0	0	0
8:30 AM	6	141	0	148	33	0	40	14	0			0	382	0	0	0	0
8:35 AM	5	142	0	106	15	0	40	8	0			0	316	0	0	0	0
8:40 AM	11	154	0	128	33	0	53	9	0			0	388	0	0	0	0
8:45 AM	9	129	0	147	21	0	41	8	0			0	355	0	0	0	0
8:50 AM	4	143	0	118	26	0	43	4	0			0	338	0	0	0	0
8:55 AM	12	123	0	124	18	0	49	11	0			0	337	0	0	0	0
Total Survey	178	3,776	0	2,850	662	0	1,096	253	0			0	8,815	0	0	0	0

15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 213			Southbound Hwy 213			Eastbound Redland Rd			Westbound Redland Rd			Interval Total	Pedestrians Crosswalk			
	L	T	Bikes	T	R	Bikes	L	R	Bikes			Bikes		North	South	East	West
7:00 AM	15	486	0	268	57	0	147	41	0			0	1,014	0	0	0	0
7:15 AM	21	540	0	346	101	0	141	45	0			0	1,194	0	0	0	0
7:30 AM	28	529	0	389	95	0	139	37	0			0	1,217	0	0	0	0
7:45 AM	28	478	0	397	83	0	127	27	0			0	1,140	0	0	0	0
8:00 AM	21	483	0	330	92	0	138	23	0			0	1,087	0	0	0	0
8:15 AM	18	428	0	349	88	0	138	26	0			0	1,047	0	0	0	0
8:30 AM	22	437	0	382	81	0	133	31	0			0	1,086	0	0	0	0
8:45 AM	25	395	0	389	65	0	133	23	0			0	1,030	0	0	0	0
Total Survey	178	3,776	0	2,850	662	0	1,096	253	0			0	8,815	0	0	0	0

Peak Hour Summary

7:20 AM to 8:20 AM

By Approach	Northbound Hwy 213			Southbound Hwy 213			Eastbound Redland Rd			Westbound Redland Rd			Total	Pedestrians Crosswalk			
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total		North	South	East	West
Volume	2,135	1,631	3,766	1,872	2,561	4,433	652	467	1,119	0	0	0	4,659	0	0	0	0
%HV	4.0%			4.3%			3.4%			0.0%			4.1%				
PHF	0.93			0.92			0.85			0.00			0.96				

By Movement	Northbound Hwy 213			Southbound Hwy 213			Eastbound Redland Rd			Westbound Redland Rd			Total
	L	T	Total	T	R	Total	L	R	Total			Total	
Volume	100	2,035	2,135	1,505	367	1,872	526	126	652			0	4,659
%HV	4.0%	4.0%	NA	4.5%	3.5%	4.3%	3.4%	NA	3.2%	3.4%	NA	NA	4.1%
PHF	0.81	0.91	0.93	0.90	0.88	0.92	0.87	0.68	0.85			0.00	0.96

Rolling Hour Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 213			Southbound Hwy 213			Eastbound Redland Rd			Westbound Redland Rd			Interval Total	Pedestrians Crosswalk			
	L	T	Bikes	T	R	Bikes	L	R	Bikes			Bikes		North	South	East	West
7:00 AM	92	2,033	0	1,400	336	0	554	150	0			0	4,565	0	0	0	0
7:15 AM	98	2,030	0	1,462	371	0	545	132	0			0	4,638	0	0	0	0
7:30 AM	95	1,918	0	1,465	358	0	542	113	0			0	4,491	0	0	0	0
7:45 AM	89	1,826	0	1,458	344	0	536	107	0			0	4,360	0	0	0	0
8:00 AM	86	1,743	0	1,450	326	0	542	103	0			0	4,250	0	0	0	0

Heavy Vehicle Summary



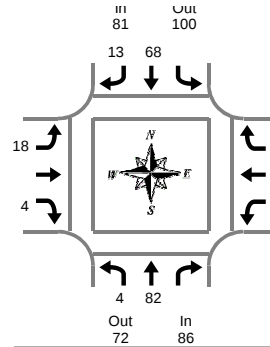
Clay Carney
(503) 833-2740

Hwy 213 & Redland Rd

Wednesday, January 25, 2017

7:00 AM to 9:00 AM

Out 17
In 22



Peak Hour Summary
7:20 AM to 8:20 AM

Heavy Vehicle 5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 213			Southbound Hwy 213			Eastbound Redland Rd			Westbound Redland Rd			Interval Total
	L	T	Total	T	R	Total	L	R	Total			Total	
7:00 AM	1	5	6	9	2	11	1	2	3			0	19
7:05 AM	1	5	6	1	0	1	3	2	5			0	12
7:10 AM	0	10	10	3	0	3	4	0	4			0	17
7:15 AM	2	7	9	8	2	10	4	1	5			0	24
7:20 AM	1	6	7	4	0	4	1	0	1			0	12
7:25 AM	0	8	8	10	0	10	3	0	3			0	21
7:30 AM	0	3	3	5	0	5	1	1	2			0	10
7:35 AM	0	5	5	0	2	2	2	0	2			0	9
7:40 AM	0	2	2	8	0	8	2	0	2			0	12
7:45 AM	1	12	13	7	2	9	4	0	4			0	26
7:50 AM	0	9	9	4	2	6	1	0	1			0	16
7:55 AM	0	11	11	3	2	5	1	1	2			0	18
8:00 AM	1	10	11	4	1	5	0	2	2			0	18
8:05 AM	0	3	3	6	0	6	1	0	1			0	10
8:10 AM	0	6	6	8	4	12	1	0	1			0	19
8:15 AM	1	7	8	9	0	9	1	0	1			0	18
8:20 AM	0	5	5	8	2	10	2	2	4			0	19
8:25 AM	0	5	5	12	3	15	5	0	5			0	25
8:30 AM	0	7	7	3	4	7	3	1	4			0	18
8:35 AM	1	13	14	4	4	8	2	0	2			0	24
8:40 AM	0	8	8	9	0	9	2	0	2			0	19
8:45 AM	0	6	6	4	1	5	1	1	2			0	13
8:50 AM	0	7	7	15	2	17	0	0	0			0	24
8:55 AM	0	5	5	9	3	12	1	0	1			0	18
Total Survey	9	165	174	153	36	189	46	12	58			0	421

Heavy Vehicle 15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 213			Southbound Hwy 213			Eastbound Redland Rd			Westbound Redland Rd			Interval Total
	L	T	Total	T	R	Total	L	R	Total			Total	
7:00 AM	2	20	22	13	2	15	8	3	11			0	48
7:15 AM	3	21	24	22	2	24	8	1	9			0	57
7:30 AM	0	10	10	13	2	15	5	1	6			0	31
7:45 AM	1	32	33	14	6	20	6	1	7			0	60
8:00 AM	1	19	20	18	5	23	2	2	4			0	47
8:15 AM	1	17	18	29	5	34	8	2	10			0	62
8:30 AM	1	28	29	16	8	24	7	1	8			0	61
8:45 AM	0	18	18	28	6	34	2	1	3			0	55
Total Survey	9	165	174	153	36	189	46	12	58			0	421

Heavy Vehicle Peak Hour Summary

7:20 AM to 8:20 AM

By Approach	Northbound Hwy 213			Southbound Hwy 213			Eastbound Redland Rd			Westbound Redland Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	86	72	158	81	100	181	22	17	39	0	0	0	189
PHF	0.65			0.75			0.69			0.00			0.79

By Movement	Northbound Hwy 213			Southbound Hwy 213			Eastbound Redland Rd			Westbound Redland Rd			Total
	L	T	Total	T	R	Total	L	R	Total			Total	
Volume	4	82	86	68	13	81	18	4	22			0	189
PHF	1.00	0.64	0.65	0.74	0.54	0.75	0.56	0.33	0.69			0.00	0.79

Heavy Vehicle Rolling Hour Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 213			Southbound Hwy 213			Eastbound Redland Rd			Westbound Redland Rd			Interval Total
	L	T	Total	T	R	Total	L	R	Total			Total	
7:00 AM	6	83	89	62	12	74	27	6	33			0	196
7:15 AM	5	82	87	67	15	82	21	5	26			0	195
7:30 AM	3	78	81	74	18	92	21	6	27			0	200
7:45 AM	4	96	100	77	24	101	23	6	29			0	230
8:00 AM	3	82	85	91	24	115	19	6	25			0	225

Peak Hour Summary

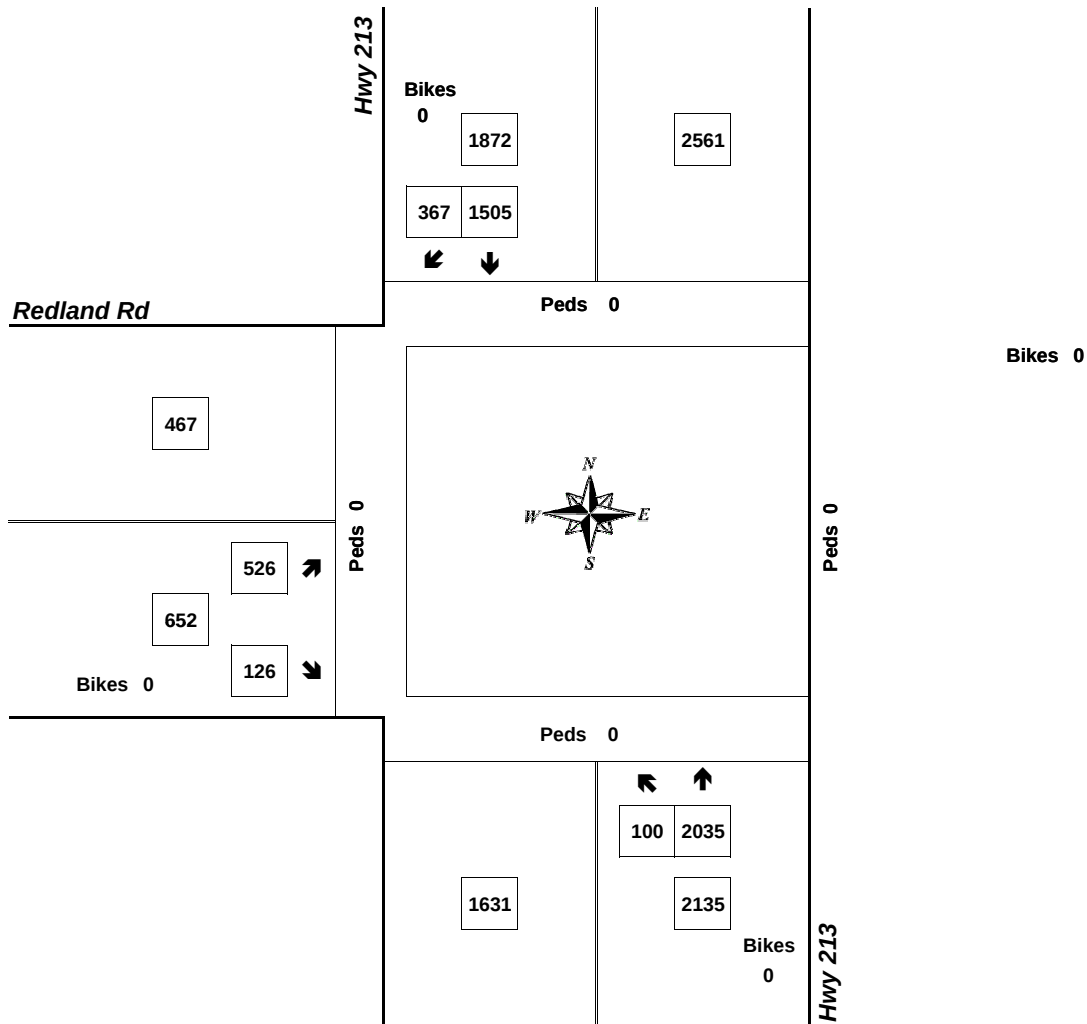


Clay Carney
(503) 833-2740

Hwy 213 & Redland Rd

7:20 AM to 8:20 AM

Wednesday, January 25, 2017



Approach	PHF	HV%	Volume
EB	0.85	3.4%	652
WB	0.00	0.0%	0
NB	0.93	4.0%	2,135
SB	0.92	4.3%	1,872
Intersection	0.96	4.1%	4,659

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

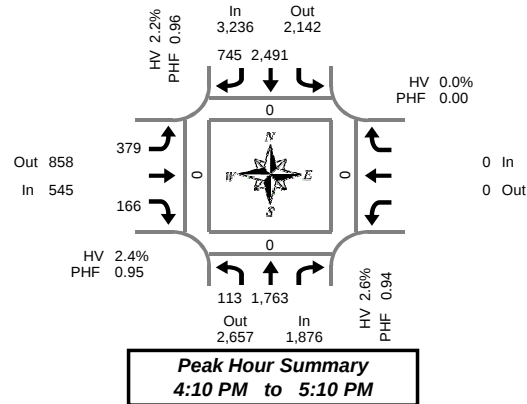


Clay Carney
(503) 833-2740

Hwy 213 & Redland Rd

Tuesday, January 24, 2017

4:00 PM to 6:00 PM



5-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 213			Southbound Hwy 213			Eastbound Redland Rd			Westbound Redland Rd			Interval Total	Pedestrians Crosswalk			
	L	T	Bikes	T	R	Bikes	L	R	Bikes			Bikes		North	South	East	West
4:00 PM	11	148	0	204	67	0	26	6	0			0	462	0	0	0	0
4:05 PM	7	140	0	216	54	0	28	12	0			0	457	0	0	0	0
4:10 PM	9	160	0	187	58	0	42	15	0			0	471	0	0	0	0
4:15 PM	14	153	0	202	63	0	26	12	0			0	470	0	0	0	0
4:20 PM	11	151	0	207	65	0	32	13	0			0	479	0	0	0	0
4:25 PM	6	113	0	216	57	0	34	10	0			0	436	0	0	0	0
4:30 PM	14	128	0	194	60	0	34	15	0			0	445	0	0	0	0
4:35 PM	8	140	0	232	74	0	29	15	0			0	498	0	0	0	0
4:40 PM	3	157	0	228	51	0	30	9	0			0	478	0	0	0	0
4:45 PM	12	147	1	181	61	0	42	18	0			0	461	0	0	0	0
4:50 PM	8	144	0	221	71	0	24	10	0			0	478	0	0	0	0
4:55 PM	8	169	0	223	68	0	30	10	0			0	508	0	0	0	0
5:00 PM	15	148	0	178	54	0	31	20	0			0	446	0	0	0	0
5:05 PM	5	153	0	222	63	0	25	19	0			0	487	0	0	0	0
5:10 PM	11	144	0	226	46	0	32	11	0			0	470	0	0	0	0
5:15 PM	11	130	0	198	56	0	44	8	0			0	447	0	0	0	0
5:20 PM	17	148	0	194	44	0	28	4	0			0	435	0	0	0	0
5:25 PM	6	127	0	229	69	0	26	6	0			0	463	0	0	0	0
5:30 PM	6	114	0	205	58	0	25	17	0			0	425	0	0	0	0
5:35 PM	14	137	0	177	58	0	32	9	0			0	427	0	0	0	0
5:40 PM	8	134	0	217	63	0	21	4	0			0	447	0	0	0	0
5:45 PM	7	148	0	220	60	0	18	8	0			0	461	0	0	0	0
5:50 PM	8	129	0	177	62	0	32	6	0			0	414	0	0	0	0
5:55 PM	9	115	0	197	40	0	19	9	0			0	389	0	0	0	0
Total Survey	228	3,377	1	4,951	1,422	0	710	266	0			0	10,954	0	0	0	0

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 213			Southbound Hwy 213			Eastbound Redland Rd			Westbound Redland Rd			Interval Total	Pedestrians Crosswalk			
	L	T	Bikes	T	R	Bikes	L	R	Bikes			Bikes		North	South	East	West
4:00 PM	27	448	0	607	179	0	96	33	0			0	1,390	0	0	0	0
4:15 PM	31	417	0	625	185	0	92	35	0			0	1,385	0	0	0	0
4:30 PM	25	425	0	654	185	0	93	39	0			0	1,421	0	0	0	0
4:45 PM	28	460	1	625	200	0	96	38	0			0	1,447	0	0	0	0
5:00 PM	31	445	0	626	163	0	88	50	0			0	1,403	0	0	0	0
5:15 PM	34	405	0	621	169	0	98	18	0			0	1,345	0	0	0	0
5:30 PM	28	385	0	599	179	0	78	30	0			0	1,299	0	0	0	0
5:45 PM	24	392	0	594	162	0	69	23	0			0	1,264	0	0	0	0
Total Survey	228	3,377	1	4,951	1,422	0	710	266	0			0	10,954	0	0	0	0

Peak Hour Summary

4:10 PM to 5:10 PM

By Approach	Northbound Hwy 213			Southbound Hwy 213			Eastbound Redland Rd			Westbound Redland Rd			Total	Pedestrians Crosswalk			
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total		North	South	East	West
Volume	1,876	2,657	4,533	3,236	2,142	5,378	0	545	858	1,403	0	0	5,657	0	0	0	0
%HV	0.0%	2.6%		2.2%			2.4%			0.0%			2.4%				
PHF		0.94		0.96			0.95			0.00			0.98				

By Movement	Northbound Hwy 213			Southbound Hwy 213			Eastbound Redland Rd			Westbound Redland Rd			Total
	L	T	Total	T	R	Total	L	R	Total			Total	
Volume	113	1,763	1,876	2,491	745	3,236	379	166	545			0	5,657
%HV	0.0%	2.8%	NA	2.2%	2.1%	2.2%	2.4%	NA	2.4%	NA	NA	0.0%	2.4%
PHF	0.83	0.94	0.94	0.95	0.93	0.96	0.94	0.85	0.95			0.00	0.98

Rolling Hour Summary

4:00 PM to 6:00 PM

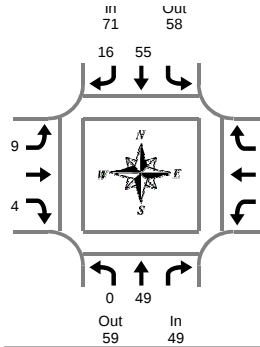
Interval Start Time	Northbound Hwy 213			Southbound Hwy 213			Eastbound Redland Rd			Westbound Redland Rd			Interval Total	Pedestrians Crosswalk			
	L	T	Bikes	T	R	Bikes	L	R	Bikes			Bikes		North	South	East	West
4:00 PM	111	1,750	1	2,511	749	0	377	145	0			0	5,643	0	0	0	0
4:15 PM	115	1,747	1	2,530	733	0	369	162	0			0	5,656	0	0	0	0
4:30 PM	118	1,735	1	2,526	717	0	375	145	0			0	5,616	0	0	0	0
4:45 PM	121	1,695	1	2,471	711	0	360	136	0			0	5,494	0	0	0	0
5:00 PM	117	1,627	0	2,440	673	0	333	121	0			0	5,311	0	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740

Out 16
In 13



Peak Hour Summary
4:10 PM to 5:10 PM

Hwy 213 & Redland Rd

Tuesday, January 24, 2017

4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 213			Southbound Hwy 213			Eastbound Redland Rd			Westbound Redland Rd			Interval Total
	L	T	Total	T	R	Total	L	R	Total			Total	
4:00 PM	0	4	4	4	3	7	1	0	1			0	12
4:05 PM	1	8	9	8	0	8	1	3	4			0	21
4:10 PM	0	7	7	5	0	5	1	1	2			0	14
4:15 PM	0	4	4	9	1	10	1	0	1			0	15
4:20 PM	0	5	5	8	1	9	0	0	0			0	14
4:25 PM	0	4	4	4	3	7	0	0	0			0	11
4:30 PM	0	4	4	2	1	3	2	0	2			0	9
4:35 PM	0	3	3	11	2	13	2	0	2			0	18
4:40 PM	0	6	6	0	1	1	0	1	1			0	8
4:45 PM	0	3	3	4	1	5	0	1	1			0	9
4:50 PM	0	2	2	4	4	8	0	0	0			0	10
4:55 PM	0	3	3	4	1	5	1	0	1			0	9
5:00 PM	0	4	4	2	1	3	1	0	1			0	8
5:05 PM	0	4	4	2	0	2	1	1	2			0	8
5:10 PM	0	4	4	4	1	5	0	0	0			0	9
5:15 PM	0	1	1	6	0	6	1	0	1			0	8
5:20 PM	1	3	4	3	0	3	1	0	1			0	8
5:25 PM	0	2	2	3	1	4	0	1	1			0	7
5:30 PM	0	2	2	3	2	5	1	0	1			0	8
5:35 PM	0	3	3	5	0	5	1	0	1			0	9
5:40 PM	0	3	3	2	1	3	0	0	0			0	6
5:45 PM	0	3	3	6	0	6	0	1	1			0	10
5:50 PM	0	1	1	5	1	6	2	0	2			0	9
5:55 PM	0	2	2	1	2	3	0	0	0			0	5
Total Survey	2	85	87	105	27	132	17	9	26			0	245

Heavy Vehicle 15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 213			Southbound Hwy 213			Eastbound Redland Rd			Westbound Redland Rd			Interval Total
	L	T	Total	T	R	Total	L	R	Total			Total	
4:00 PM	1	19	20	17	3	20	3	4	7			0	47
4:15 PM	0	13	13	21	5	26	1	0	1			0	40
4:30 PM	0	13	13	13	4	17	4	1	5			0	35
4:45 PM	0	8	8	12	6	18	1	1	2			0	28
5:00 PM	0	12	12	8	2	10	2	1	3			0	25
5:15 PM	1	6	7	12	1	13	2	1	3			0	23
5:30 PM	0	8	8	10	3	13	2	0	2			0	23
5:45 PM	0	6	6	12	3	15	2	1	3			0	24
Total Survey	2	85	87	105	27	132	17	9	26			0	245

Heavy Vehicle Peak Hour Summary

4:10 PM to 5:10 PM

By Approach	Northbound Hwy 213			Southbound Hwy 213			Eastbound Redland Rd			Westbound Redland Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	49	59	108	71	58	129	13	16	29	0	0	0	133
PHF	0.77			0.68			0.65			0.00			0.77

By Movement	Northbound Hwy 213			Southbound Hwy 213			Eastbound Redland Rd			Westbound Redland Rd			Total
	L	T	Total	T	R	Total	L	R	Total			Total	
Volume	0	49	49	55	16	71	9	4	13			0	133
PHF	0.00	0.77	0.77	0.63	0.67	0.68	0.56	0.50	0.65			0.00	0.77

Heavy Vehicle Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 213			Southbound Hwy 213			Eastbound Redland Rd			Westbound Redland Rd			Interval Total
	L	T	Total	T	R	Total	L	R	Total			Total	
4:00 PM	1	53	54	63	18	81	9	6	15			0	150
4:15 PM	0	46	46	54	17	71	8	3	11			0	128
4:30 PM	1	39	40	45	13	58	9	4	13			0	111
4:45 PM	1	34	35	42	12	54	7	3	10			0	99
5:00 PM	1	32	33	42	9	51	8	3	11			0	95

Peak Hour Summary

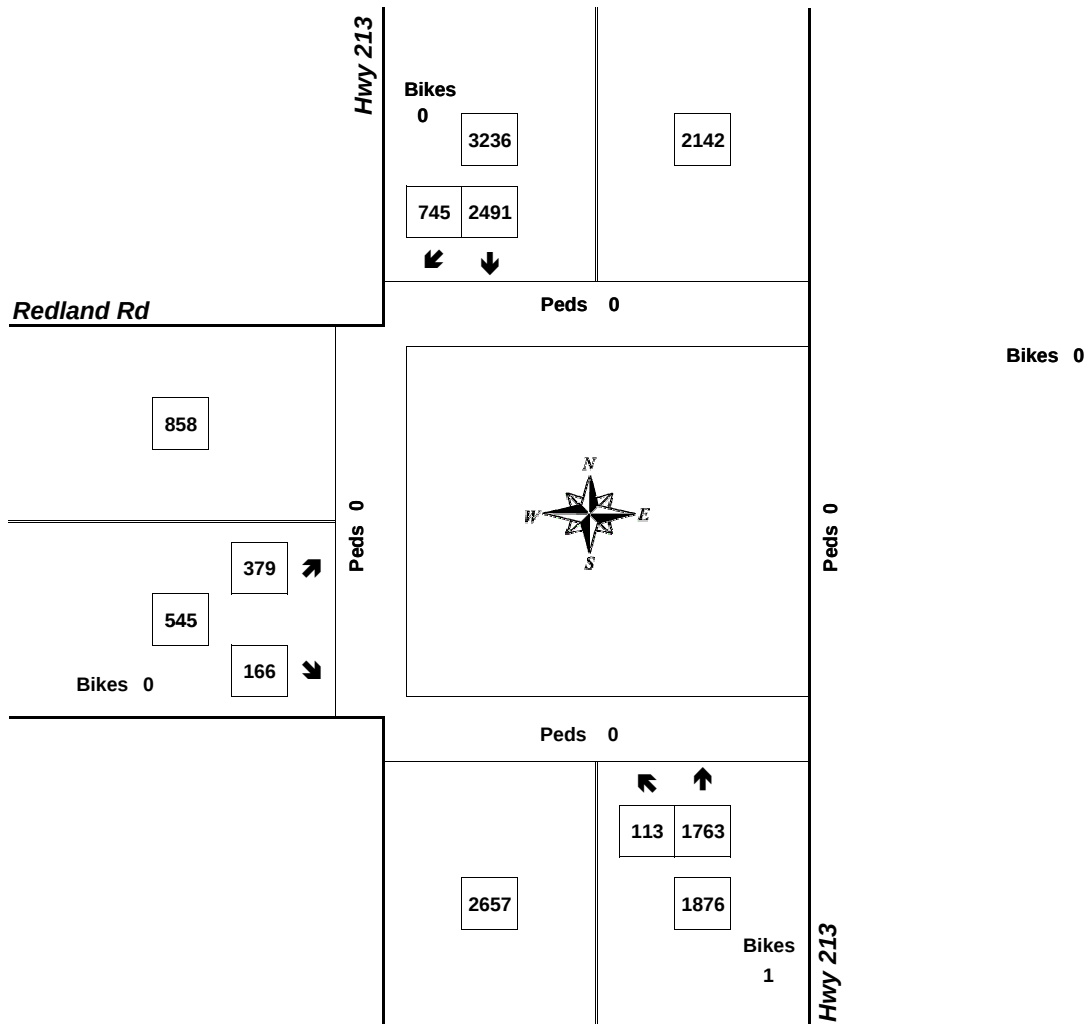


Clay Carney
(503) 833-2740

Hwy 213 & Redland Rd

4:10 PM to 5:10 PM

Tuesday, January 24, 2017



Approach	PHF	HV%	Volume
EB	0.95	2.4%	545
WB	0.00	0.0%	0
NB	0.94	2.6%	1,876
SB	0.96	2.2%	3,236
Intersection	0.98	2.4%	5,657

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

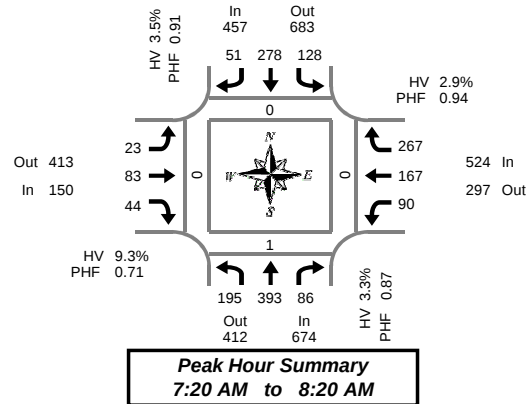


Clay Carney
(503) 833-2740

Redland Rd & Holcomb Blvd

Wednesday, January 25, 2017

7:00 AM to 9:00 AM



5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Redland Rd				Southbound Redland Rd				Eastbound Holcomb Blvd				Westbound Holcomb Blvd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	12	29	1	0	6	13	4	0	0	6	0	0	4	11	27	0	113	0	0	0	0
7:05 AM	15	37	3	0	8	15	4	0	0	2	2	0	4	5	20	0	115	0	0	0	0
7:10 AM	12	38	0	0	6	13	4	0	2	3	1	0	4	15	34	0	132	0	0	0	0
7:15 AM	16	29	1	0	14	17	3	0	2	3	7	0	1	10	30	0	133	0	0	0	0
7:20 AM	22	28	2	0	12	20	7	0	1	6	3	0	6	11	21	0	139	0	0	0	0
7:25 AM	16	37	6	0	6	28	3	0	1	7	5	0	8	16	26	0	159	0	0	0	0
7:30 AM	18	42	4	0	11	28	2	0	4	3	4	0	7	12	25	0	160	0	0	0	0
7:35 AM	22	35	10	0	11	24	5	0	0	9	2	0	2	14	23	0	157	0	0	0	0
7:40 AM	16	32	15	0	9	28	5	0	3	12	5	0	4	17	23	0	169	0	0	0	0
7:45 AM	9	30	13	0	9	25	9	0	7	7	4	0	10	17	19	0	159	0	0	0	0
7:50 AM	18	26	10	0	17	19	1	0	0	12	3	0	8	17	17	0	148	0	0	0	0
7:55 AM	12	27	7	0	8	28	2	0	0	10	2	0	8	17	22	0	143	0	0	0	0
8:00 AM	13	27	2	0	18	14	4	0	1	5	1	0	5	7	23	0	120	0	0	0	0
8:05 AM	12	28	5	0	12	22	4	0	1	5	5	0	7	17	25	0	143	0	0	0	0
8:10 AM	18	34	6	0	8	22	5	0	1	4	6	0	16	9	24	0	153	0	1	0	0
8:15 AM	19	47	6	0	7	20	4	0	4	3	4	0	9	13	19	0	155	0	0	0	0
8:20 AM	8	25	5	0	8	21	8	0	3	7	4	0	5	8	22	0	124	0	1	0	0
8:25 AM	21	22	8	0	10	24	1	0	4	4	3	0	7	4	15	0	123	0	0	0	0
8:30 AM	15	34	2	0	11	18	5	0	3	4	7	0	10	6	27	0	142	0	0	0	0
8:35 AM	14	27	1	0	8	22	3	0	1	8	3	0	6	6	13	0	112	0	0	0	0
8:40 AM	14	39	9	0	12	17	5	0	0	5	9	0	6	5	21	0	142	0	0	0	0
8:45 AM	14	37	6	0	17	14	3	0	0	8	3	0	3	12	20	0	137	0	0	0	0
8:50 AM	16	34	6	0	13	15	6	0	1	8	4	0	2	13	11	0	129	0	0	0	0
8:55 AM	5	27	4	0	7	12	10	0	3	9	8	0	8	8	25	0	126	0	0	0	0
Total Survey	357	771	132	0	248	479	107	0	42	150	95	0	150	270	532	0	3,333	0	2	0	0

15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Redland Rd				Southbound Redland Rd				Eastbound Holcomb Blvd				Westbound Holcomb Blvd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	39	104	4	0	20	41	12	0	2	11	3	0	12	31	81	0	360	0	0	0	0
7:15 AM	54	94	9	0	32	65	13	0	4	16	15	0	15	37	77	0	431	0	0	0	0
7:30 AM	56	109	29	0	31	80	12	0	7	24	11	0	13	43	71	0	486	0	0	0	0
7:45 AM	39	83	30	0	34	72	12	0	7	29	9	0	26	51	58	0	450	0	0	0	0
8:00 AM	43	89	13	0	38	58	13	0	3	14	12	0	28	33	72	0	416	0	1	0	0
8:15 AM	48	94	19	0	25	65	13	0	11	14	11	0	21	25	56	0	402	0	1	0	0
8:30 AM	43	100	12	0	31	57	13	0	4	17	19	0	22	17	61	0	396	0	0	0	0
8:45 AM	35	98	16	0	37	41	19	0	4	25	15	0	13	33	56	0	392	0	0	0	0
Total Survey	357	771	132	0	248	479	107	0	42	150	95	0	150	270	532	0	3,333	0	2	0	0

Peak Hour Summary

7:20 AM to 8:20 AM

By Approach	Northbound Redland Rd				Southbound Redland Rd				Eastbound Holcomb Blvd				Westbound Holcomb Blvd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	674	412	1,086	0	457	683	1,140	0	150	413	563	0	524	297	821	0	1,805	0	1	0	0
%HV	3.3%				3.5%				9.3%				2.9%				3.7%				
PHF	0.87				0.91				0.71				0.94				0.93				

By Movement	Northbound Redland Rd				Southbound Redland Rd				Eastbound Holcomb Blvd				Westbound Holcomb Blvd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	195	393	86	674	128	278	51	457	23	83	44	150	90	167	267	524	1,805
%HV	2.1%	3.6%	4.7%	3.3%	6.3%	1.8%	5.9%	3.5%	26.1%	7.2%	4.5%	9.3%	4.4%	3.0%	2.2%	2.9%	3.7%
PHF	0.87	0.86	0.57	0.87	0.74	0.87	0.67	0.91	0.58	0.67	0.73	0.71	0.70	0.82	0.90	0.94	0.93

Rolling Hour Summary

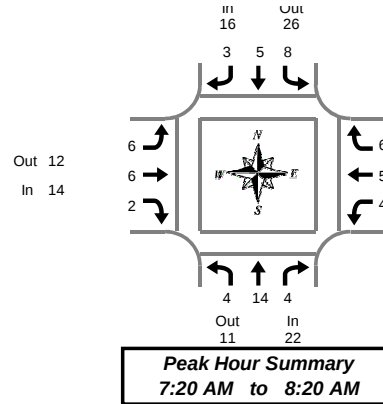
7:00 AM to 9:00 AM

Interval Start Time	Northbound Redland Rd				Southbound Redland Rd				Eastbound Holcomb Blvd				Westbound Holcomb Blvd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	188	390	72	0	117	258	49	0	20	80	38	0	66	162	287	0	1,727	0	0	0	0
7:15 AM	192	375	81	0	135	275	50	0	21	83	47	0	82	164	278	0	1,783	0	1	0	0
7:30 AM	186	375	91	0	128	275	50	0	28	81	43	0	88	152	257	0	1,754	0	2	0	0
7:45 AM	173	366	74	0	128	252	51	0	25	74	51	0	97	126	247	0	1,664	0	2	0	0
8:00 AM	169	381	60	0	131	221	58	0	22	70	57	0	84	108	245	0	1,606	0	2	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Redland Rd & Holcomb Blvd

Wednesday, January 25, 2017

7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Redland Rd				Southbound Redland Rd				Eastbound Holcomb Blvd				Westbound Holcomb Blvd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	2
7:05 AM	0	2	0	2	1	1	0	2	0	1	0	1	1	0	3	4	9
7:10 AM	0	2	0	2	1	0	0	1	1	0	0	1	1	1	1	3	7
7:15 AM	1	4	0	5	2	1	0	3	0	0	0	0	0	1	1	2	10
7:20 AM	0	2	0	2	0	0	2	2	0	0	0	0	0	0	0	0	4
7:25 AM	0	5	0	5	0	0	0	0	0	1	0	1	0	0	0	0	6
7:30 AM	0	0	0	0	0	0	0	0	2	1	0	3	0	0	1	1	4
7:35 AM	0	1	0	1	1	0	0	1	0	2	0	2	0	0	0	0	4
7:40 AM	0	2	1	3	1	0	0	1	0	0	0	0	0	0	0	0	4
7:45 AM	0	0	1	1	2	1	0	3	4	1	0	5	1	0	1	2	11
7:50 AM	2	1	0	3	1	0	0	1	0	0	0	0	0	0	0	0	4
7:55 AM	2	1	0	3	0	2	0	2	0	0	0	0	0	2	2	4	9
8:00 AM	0	1	0	1	2	0	0	2	0	1	0	1	0	1	1	2	6
8:05 AM	0	0	2	2	0	0	0	0	0	0	1	1	1	2	0	3	6
8:10 AM	0	1	0	1	1	2	0	2	0	0	1	1	2	0	0	2	6
8:15 AM	0	0	0	0	1	0	1	2	0	0	0	0	0	0	1	1	3
8:20 AM	0	1	0	1	2	0	0	2	2	0	1	3	1	0	1	2	8
8:25 AM	0	3	0	3	1	0	0	1	1	0	1	2	0	0	0	0	6
8:30 AM	0	3	1	4	2	2	0	4	0	0	2	2	1	0	2	3	13
8:35 AM	0	0	0	0	0	4	2	6	0	1	1	2	0	1	0	1	9
8:40 AM	0	0	0	0	0	1	0	1	0	1	1	2	0	2	1	3	6
8:45 AM	0	2	0	2	1	1	0	2	0	0	2	2	0	0	0	0	6
8:50 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	2	0	2	3
8:55 AM	0	1	0	1	0	2	2	4	0	0	2	2	0	1	0	1	8
Total Survey	5	33	5	43	19	18	7	44	10	9	12	31	8	13	15	36	154

Heavy Vehicle 15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Redland Rd				Southbound Redland Rd				Eastbound Holcomb Blvd				Westbound Holcomb Blvd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	5	0	5	3	1	0	4	1	1	0	2	2	1	4	7	18
7:15 AM	1	11	0	12	2	1	2	5	0	1	0	1	0	1	1	2	20
7:30 AM	0	3	1	4	2	0	0	2	2	3	0	5	0	0	1	1	12
7:45 AM	4	2	1	7	3	3	0	6	4	1	0	5	1	2	3	6	24
8:00 AM	0	2	2	4	2	2	0	4	0	1	2	3	3	3	1	7	18
8:15 AM	0	4	0	4	4	0	1	5	3	0	2	5	1	0	2	3	17
8:30 AM	0	3	1	4	2	7	2	11	0	2	4	6	1	3	3	7	28
8:45 AM	0	3	0	3	1	4	2	7	0	0	4	4	0	3	0	3	17
Total Survey	5	33	5	43	19	18	7	44	10	9	12	31	8	13	15	36	154

Heavy Vehicle Peak Hour Summary

7:20 AM to 8:20 AM

By Approach	Northbound Redland Rd			Southbound Redland Rd			Eastbound Holcomb Blvd			Westbound Holcomb Blvd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	22	11	33	16	26	42	14	12	26	15	18	33	67
PHF	0.79			0.67			0.50			0.42			0.70

By Movement	Northbound Redland Rd				Southbound Redland Rd				Eastbound Holcomb Blvd				Westbound Holcomb Blvd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	4	14	4	22	8	5	3	16	6	6	2	14	4	5	6	15	67
PHF	0.25	0.50	0.50	0.79	0.50	0.42	0.38	0.67	0.38	0.38	0.25	0.50	0.33	0.25	0.50	0.42	0.70

Heavy Vehicle Rolling Hour Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Redland Rd				Southbound Redland Rd				Eastbound Holcomb Blvd				Westbound Holcomb Blvd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	5	21	2	28	10	5	2	17	7	6	0	13	3	4	9	16	74
7:15 AM	5	18	4	27	9	6	2	17	6	6	2	14	4	6	6	16	74
7:30 AM	4	11	4	19	11	5	1	17	9	5	4	18	5	5	7	17	71
7:45 AM	4	11	4	19	11	12	3	26	7	4	8	19	6	8	9	23	87
8:00 AM	0	12	3	15	9	13	5	27	3	3	12	18	5	9	6	20	80

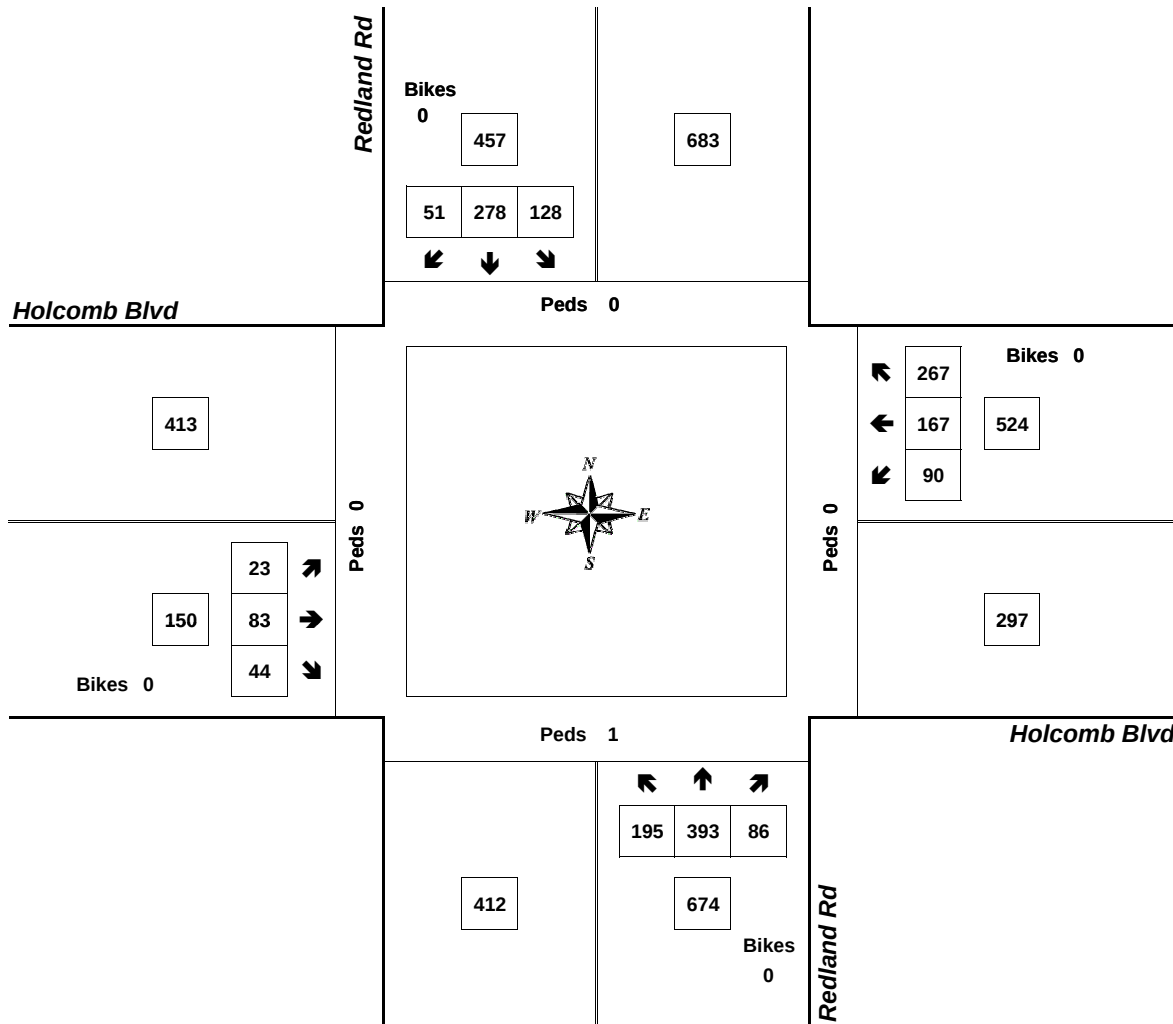
Peak Hour Summary



Clay Carney
(503) 833-2740

Redland Rd & Holcomb Blvd

7:20 AM to 8:20 AM
Wednesday, January 25, 2017



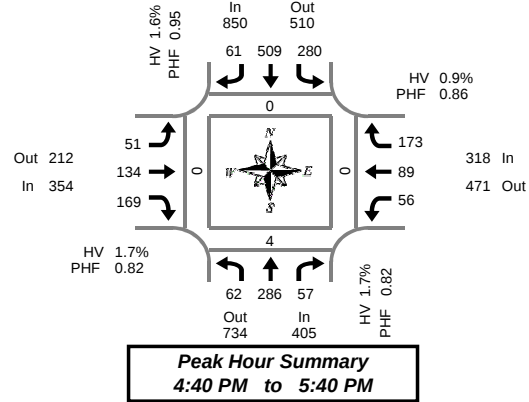
Approach	PHF	HV%	Volume
EB	0.71	9.3%	150
WB	0.94	2.9%	524
NB	0.87	3.3%	674
SB	0.91	3.5%	457
Intersection	0.93	3.7%	1,805

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Clay Carney
(503) 833-2740



Redland Rd & Holcomb Blvd

Tuesday, January 24, 2017

4:00 PM to 6:00 PM

5-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Redland Rd				Southbound Redland Rd				Eastbound Holcomb Blvd				Westbound Holcomb Blvd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	4	24	7	0	28	38	4	0	5	10	3	0	8	6	18	0	155	0	0	0	0
4:05 PM	4	20	7	0	23	34	3	0	5	13	9	0	1	9	17	0	145	0	0	0	0
4:10 PM	3	29	4	0	26	40	5	0	1	10	7	0	6	11	21	0	163	0	0	0	0
4:15 PM	6	19	2	0	27	43	7	0	2	14	10	0	0	10	18	0	158	0	0	0	0
4:20 PM	9	24	4	0	23	39	4	0	2	10	11	0	4	10	20	0	160	0	0	0	0
4:25 PM	8	25	2	0	28	40	6	0	0	7	9	0	0	11	11	0	147	0	0	0	0
4:30 PM	5	22	5	0	15	49	3	0	2	16	14	0	1	9	20	0	161	0	0	0	0
4:35 PM	4	25	4	0	26	43	7	0	3	11	4	0	5	6	21	0	159	0	0	0	0
4:40 PM	4	27	2	0	16	39	6	0	5	11	11	0	7	8	18	0	154	0	0	0	0
4:45 PM	8	27	5	0	30	47	4	0	3	7	11	0	1	5	15	0	163	0	1	0	0
4:50 PM	2	22	3	0	21	46	5	0	6	11	9	0	2	8	13	0	148	0	0	0	0
4:55 PM	8	21	4	0	18	45	6	0	1	9	14	0	8	7	18	0	159	0	0	0	0
5:00 PM	4	25	4	0	29	44	10	0	6	10	9	0	5	5	14	0	165	0	0	0	0
5:05 PM	9	32	5	0	23	43	0	0	8	12	8	0	4	9	22	0	175	0	1	0	0
5:10 PM	5	28	7	0	20	42	2	0	5	18	18	0	5	9	17	0	176	0	0	0	0
5:15 PM	6	26	5	0	22	34	8	0	2	9	21	0	5	9	7	0	154	0	0	0	0
5:20 PM	4	23	4	0	30	39	6	0	0	6	16	0	4	6	11	0	149	0	0	0	0
5:25 PM	3	19	8	0	20	44	2	0	3	11	21	0	3	9	9	0	152	0	0	0	0
5:30 PM	7	17	5	0	19	43	8	0	8	10	18	1	8	9	18	0	170	0	2	0	0
5:35 PM	2	19	5	0	32	43	4	0	4	20	13	0	4	5	11	0	162	0	0	0	0
5:40 PM	5	17	5	0	22	54	1	0	3	11	16	0	1	7	8	0	150	0	0	0	0
5:45 PM	5	25	3	0	27	34	3	0	3	14	18	0	3	5	8	0	148	0	0	0	0
5:50 PM	7	15	2	0	26	45	5	0	2	4	14	0	2	4	8	0	134	0	0	0	0
5:55 PM	5	18	2	0	21	32	1	0	2	18	16	0	2	8	10	0	135	0	0	0	0
Total Survey	127	549	104	0	572	1,000	110	0	81	272	300	1	89	185	353	0	3,742	0	4	0	0

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Redland Rd				Southbound Redland Rd				Eastbound Holcomb Blvd				Westbound Holcomb Blvd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	11	73	18	0	77	112	12	0	11	33	19	0	15	26	56	0	463	0	0	0	0
4:15 PM	23	68	8	0	78	122	17	0	4	31	30	0	4	31	49	0	465	0	0	0	0
4:30 PM	13	74	11	0	57	131	16	0	10	38	29	0	13	23	59	0	474	0	0	0	0
4:45 PM	18	70	12	0	69	138	15	0	10	27	34	0	11	20	46	0	470	0	1	0	0
5:00 PM	18	85	16	0	72	129	12	0	19	40	35	0	14	23	53	0	516	0	1	0	0
5:15 PM	13	68	17	0	72	117	16	0	5	26	58	0	12	24	27	0	455	0	0	0	0
5:30 PM	14	53	15	0	73	140	13	0	15	41	47	1	13	21	37	0	482	0	2	0	0
5:45 PM	17	58	7	0	74	111	9	0	7	36	48	0	7	17	26	0	417	0	0	0	0
Total Survey	127	549	104	0	572	1,000	110	0	81	272	300	1	89	185	353	0	3,742	0	4	0	0

Peak Hour Summary

4:40 PM to 5:40 PM

By Approach	Northbound Redland Rd				Southbound Redland Rd				Eastbound Holcomb Blvd				Westbound Holcomb Blvd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	405	734	1,139	0	850	510	1,360	0	354	212	566	1	318	471	789	0	1,927	0	4	0	0
%HV	1.7%				1.6%				1.7%				0.9%				1.6%				
PHF	0.82				0.95				0.82				0.86				0.93				

By Movement	Northbound Redland Rd				Southbound Redland Rd				Eastbound Holcomb Blvd				Westbound Holcomb Blvd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	62	286	57	405	280	509	61	850	51	134	169	354	56	89	173	318	1,927
%HV	1.6%	2.1%	0.0%	1.7%	0.4%	1.2%	11.5%	1.6%	0.0%	2.2%	1.8%	1.7%	0.0%	1.1%	1.2%	0.9%	1.6%
PHF	0.74	0.83	0.79	0.82	0.97	0.92	0.73	0.95	0.67	0.82	0.73	0.82	0.82	0.82	0.80	0.86	0.93

Rolling Hour Summary

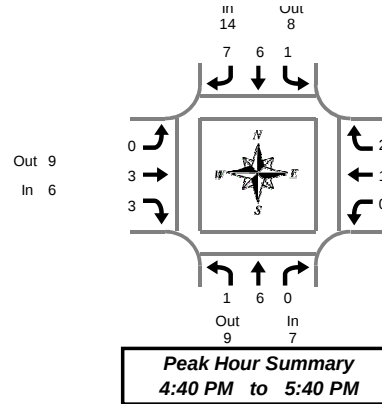
4:00 PM to 6:00 PM

Interval Start Time	Northbound Redland Rd				Southbound Redland Rd				Eastbound Holcomb Blvd				Westbound Holcomb Blvd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	65	285	49	0	281	503	60	0	35	129	112	0	43	100	210	0	1,872	0	1	0	0
4:15 PM	72	297	47	0	276	520	60	0	43	136	128	0	42	97	207	0	1,925	0	2	0	0
4:30 PM	62	297	56	0	270	515	59	0	44	131	156	0	50	90	185	0	1,915	0	2	0	0
4:45 PM	63	276	60	0	286	524	56	0	49	134	174	1	50	88	163	0	1,923	0	4	0	0
5:00 PM	62	264	55	0	291	497	50	0	46	143	188	1	46	85	143	0	1,870	0	3	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Redland Rd & Holcomb Blvd

Tuesday, January 24, 2017

4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Redland Rd				Southbound Redland Rd				Eastbound Holcomb Blvd				Westbound Holcomb Blvd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	1	0	1	0	2	0	2	0	0	0	0	1	1	1	3	6
4:05 PM	0	0	0	0	0	0	1	1	3	0	1	4	0	1	2	3	8
4:10 PM	1	1	0	2	1	0	0	1	0	0	0	0	1	0	1	2	5
4:15 PM	0	0	0	0	0	1	0	1	0	1	2	3	0	1	0	1	5
4:20 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:25 PM	0	1	0	1	2	1	0	3	0	0	1	1	0	0	0	0	5
4:30 PM	0	1	0	1	0	1	0	1	0	2	1	3	0	0	0	0	5
4:35 PM	0	1	0	1	0	1	0	1	0	0	0	0	1	0	1	2	4
4:40 PM	0	1	0	1	0	0	2	2	0	0	0	0	0	0	1	1	4
4:45 PM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
4:50 PM	0	0	0	0	0	3	1	4	0	0	0	0	0	0	0	0	4
4:55 PM	0	0	0	0	0	0	1	1	0	1	1	2	0	0	0	0	3
5:00 PM	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0	0	2
5:05 PM	1	1	0	2	0	0	0	0	0	1	0	1	0	1	1	2	5
5:10 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:20 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:25 PM	0	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0	2
5:30 PM	0	0	0	0	0	0	2	2	0	0	1	1	0	0	0	0	3
5:35 PM	0	1	0	1	1	0	0	1	0	0	1	1	0	0	0	0	3
5:40 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:45 PM	0	1	0	1	1	1	0	2	0	0	0	0	0	0	0	0	3
5:50 PM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2	2	3
5:55 PM	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0	0	2
Total Survey	2	12	0	14	5	16	9	30	3	7	8	18	3	4	9	16	78

Heavy Vehicle 15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Redland Rd				Southbound Redland Rd				Eastbound Holcomb Blvd				Westbound Holcomb Blvd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	1	2	0	3	1	2	1	4	3	0	1	4	2	2	4	8	19
4:15 PM	0	1	0	1	2	3	0	5	0	1	3	4	0	1	0	1	11
4:30 PM	0	3	0	3	0	2	4	6	0	2	1	3	1	0	2	3	13
4:45 PM	0	1	0	1	0	4	2	6	0	1	1	2	0	0	0	0	9
5:00 PM	1	1	0	2	0	2	0	2	0	2	0	2	0	1	1	2	8
5:15 PM	0	2	0	2	0	0	1	1	0	0	0	0	0	0	0	0	3
5:30 PM	0	1	0	1	1	1	2	4	0	0	2	2	0	0	0	0	7
5:45 PM	0	1	0	1	1	2	1	4	0	1	0	1	0	0	2	2	8
Total Survey	2	12	0	14	5	16	9	30	3	7	8	18	3	4	9	16	78

Heavy Vehicle Peak Hour Summary

4:40 PM to 5:40 PM

By Approach	Northbound Redland Rd			Southbound Redland Rd			Eastbound Holcomb Blvd			Westbound Holcomb Blvd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	7	9	16	14	8	22	6	9	15	3	4	7	30
PHF	0.88			0.50			0.38			0.38			0.75

By Movement	Northbound Redland Rd				Southbound Redland Rd				Eastbound Holcomb Blvd				Westbound Holcomb Blvd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	1	6	0	7	1	6	7	14	0	3	3	6	0	1	2	3	30
PHF	0.25	0.75	0.00	0.88	0.25	0.38	0.58	0.50	0.00	0.25	0.38	0.38	0.00	0.25	0.50	0.38	0.75

Heavy Vehicle Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Redland Rd				Southbound Redland Rd				Eastbound Holcomb Blvd				Westbound Holcomb Blvd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	1	7	0	8	3	11	5	19	3	4	6	13	3	3	6	12	52
4:15 PM	1	6	0	7	2	11	4	17	0	6	5	11	1	2	3	6	41
4:30 PM	1	7	0	8	0	8	5	13	0	5	2	7	1	1	3	5	33
4:45 PM	1	5	0	6	1	7	5	13	0	3	3	6	0	1	1	2	27
5:00 PM	1	5	0	6	2	5	4	11	0	3	2	5	0	1	3	4	26

Peak Hour Summary

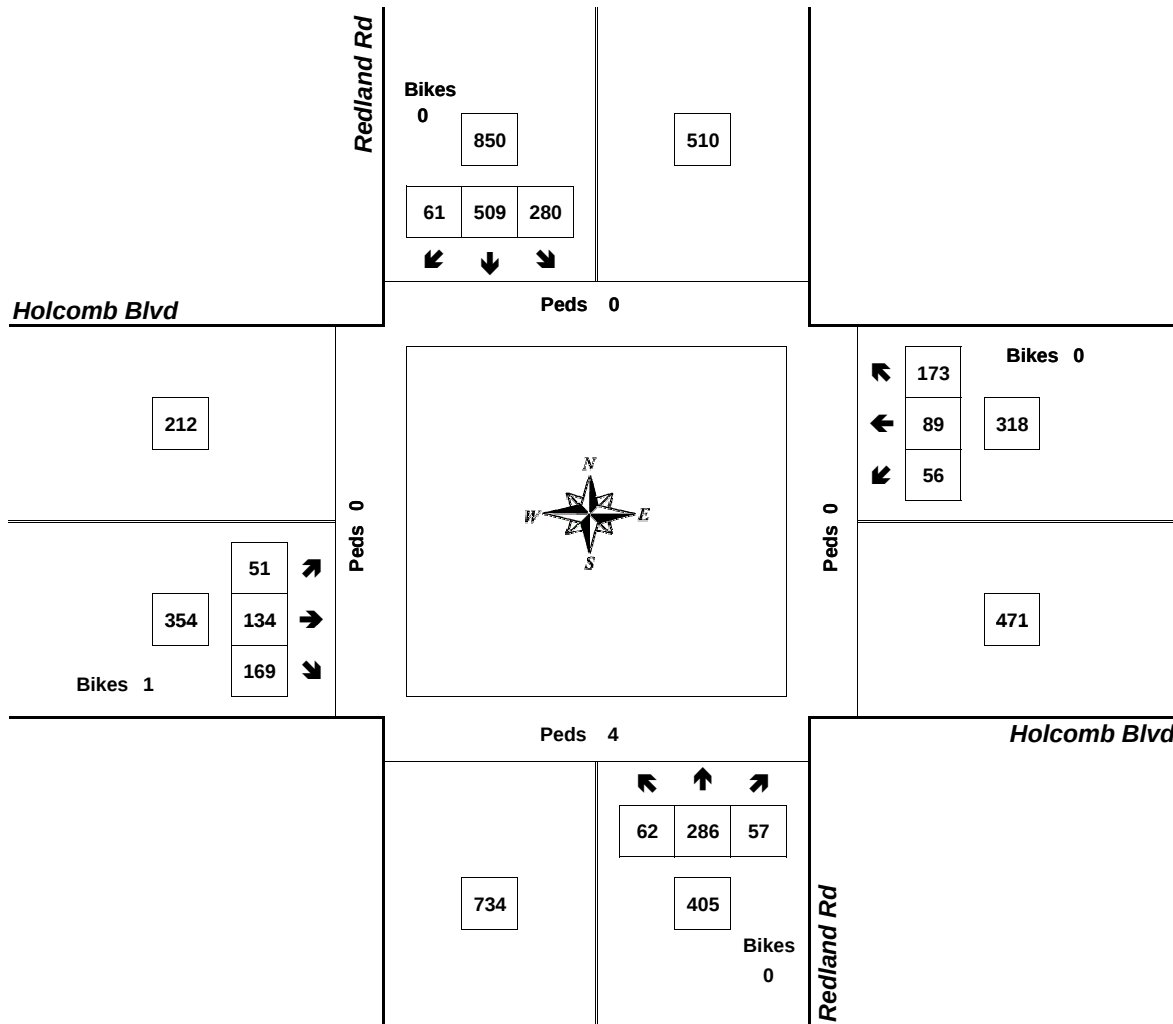


Clay Carney
(503) 833-2740

Redland Rd & Holcomb Blvd

4:40 PM to 5:40 PM

Tuesday, January 24, 2017



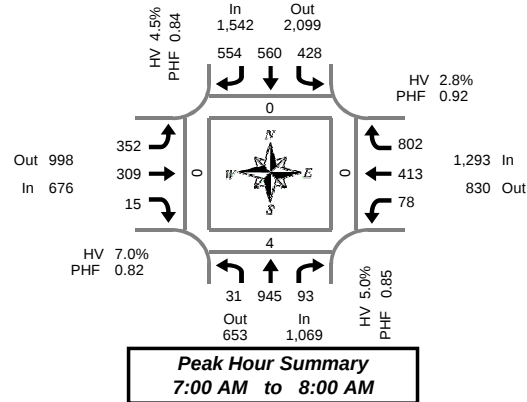
Approach	PHF	HV%	Volume
EB	0.82	1.7%	354
WB	0.86	0.9%	318
NB	0.82	1.7%	405
SB	0.95	1.6%	850
Intersection	0.93	1.6%	1,927

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Clay Carney
(503) 833-2740



Hwy 213 & Beaver Creek Rd

Wednesday, January 25, 2017

7:00 AM to 9:00 AM

5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 213				Southbound Hwy 213				Eastbound Beaver Creek Rd				Westbound Beaver Creek Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	4	71	11	0	27	28	50	0	26	20	2	0	6	25	67	0	337	0	0	0	0
7:05 AM	2	64	7	0	28	34	46	0	32	27	2	0	3	35	58	0	338	0	0	0	0
7:10 AM	1	80	9	0	33	32	35	0	29	33	2	0	9	32	66	0	361	0	1	0	0
7:15 AM	3	93	10	0	34	32	36	0	24	35	1	0	5	31	73	0	377	0	0	0	0
7:20 AM	4	91	10	0	44	48	54	0	36	31	1	0	10	37	65	0	431	0	0	0	0
7:25 AM	5	90	8	0	38	49	40	0	25	53	1	0	5	39	71	0	424	0	0	0	0
7:30 AM	1	78	8	0	32	49	39	0	31	28	0	0	10	34	69	0	379	0	0	0	0
7:35 AM	2	81	4	0	31	56	53	0	30	23	2	0	6	44	72	0	404	0	1	0	0
7:40 AM	1	83	8	0	37	57	41	0	32	18	2	0	5	28	71	0	383	0	1	0	0
7:45 AM	3	64	6	0	54	64	51	0	26	13	2	0	7	32	68	0	390	0	0	0	0
7:50 AM	3	71	5	0	38	50	52	0	27	12	0	0	8	32	60	0	358	0	1	0	0
7:55 AM	2	79	7	0	32	61	57	0	34	16	0	0	4	44	62	0	398	0	0	0	0
8:00 AM	4	69	7	0	21	45	55	0	24	13	2	0	11	21	54	0	326	0	0	0	0
8:05 AM	4	75	6	0	34	49	63	0	18	15	0	0	9	18	57	0	348	0	0	0	0
8:10 AM	6	73	7	0	15	38	42	0	25	14	5	0	6	24	66	0	321	0	0	0	0
8:15 AM	3	65	14	0	23	38	47	0	38	19	2	0	7	32	38	0	326	1	0	0	0
8:20 AM	4	54	14	0	40	53	66	0	27	18	0	0	3	27	43	0	349	0	2	0	2
8:25 AM	6	75	10	0	23	45	42	0	25	11	2	0	9	20	30	0	298	0	1	0	0
8:30 AM	2	48	3	0	34	51	53	0	27	13	3	0	6	33	65	0	338	0	0	0	0
8:35 AM	3	70	5	0	25	47	48	0	27	20	2	0	6	27	44	0	324	0	0	0	0
8:40 AM	2	51	8	0	39	72	33	0	34	18	4	0	7	27	44	0	339	0	1	0	0
8:45 AM	1	84	6	0	30	58	40	0	23	10	6	0	14	48	45	0	365	0	0	0	0
8:50 AM	3	60	7	0	40	48	51	0	37	32	1	0	4	36	38	0	357	0	0	0	0
8:55 AM	9	56	7	0	33	57	46	0	14	16	1	0	4	31	39	0	313	0	0	0	0
Total Survey	78	1,725	187	0	785	1,161	1,140	0	671	508	43	0	164	757	1,365	0	8,584	1	8	0	2

15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 213				Southbound Hwy 213				Eastbound Beaver Creek Rd				Westbound Beaver Creek Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	7	215	27	0	88	94	131	0	87	80	6	0	18	92	191	0	1,036	0	1	0	0
7:15 AM	12	274	28	0	116	129	130	0	85	119	3	0	20	107	209	0	1,232	0	0	0	0
7:30 AM	4	242	20	0	100	162	133	0	93	69	4	0	21	106	212	0	1,166	0	2	0	0
7:45 AM	8	214	18	0	124	175	160	0	87	41	2	0	19	108	190	0	1,146	0	1	0	0
8:00 AM	14	217	20	0	70	132	160	0	67	42	7	0	26	63	177	0	995	0	0	0	0
8:15 AM	13	194	38	0	86	136	155	0	90	48	4	0	19	79	111	0	973	1	3	0	2
8:30 AM	7	169	16	0	98	170	134	0	88	51	9	0	19	87	153	0	1,001	0	1	0	0
8:45 AM	13	200	20	0	103	163	137	0	74	58	8	0	22	115	122	0	1,035	0	0	0	0
Total Survey	78	1,725	187	0	785	1,161	1,140	0	671	508	43	0	164	757	1,365	0	8,584	1	8	0	2

Peak Hour Summary

7:00 AM to 8:00 AM

By Approach	Northbound Hwy 213				Southbound Hwy 213				Eastbound Beaver Creek Rd				Westbound Beaver Creek Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	1,069	653	1,722	0	1,542	2,099	3,641	0	676	998	1,674	0	1,293	830	2,123	0	4,580	0	4	0	0
%HV	5.0%				4.5%				7.0%				2.8%				4.5%				
PHF	0.85				0.84				0.82				0.92				0.93				

By Movement	Northbound Hwy 213				Southbound Hwy 213				Eastbound Beaver Creek Rd				Westbound Beaver Creek Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	31	945	93	1,069	428	560	554	1,542	352	309	15	676	78	413	802	1,293	4,580
%HV	9.7%	5.1%	2.2%	5.0%	3.0%	7.0%	3.1%	4.5%	8.5%	4.5%	20.0%	7.0%	2.6%	3.9%	2.2%	2.8%	4.5%
PHF	0.65	0.86	0.80	0.85	0.83	0.79	0.87	0.84	0.95	0.65	0.63	0.82	0.78	0.88	0.95	0.92	0.93

Rolling Hour Summary

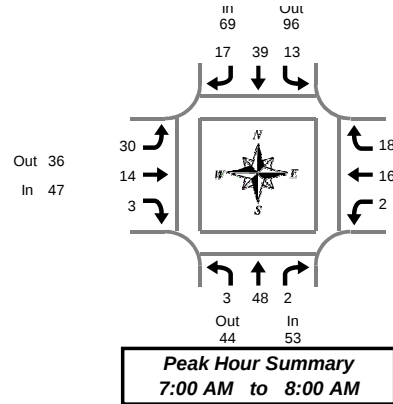
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 213				Southbound Hwy 213				Eastbound Beaver Creek Rd				Westbound Beaver Creek Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	31	945	93	0	428	560	554	0	352	309	15	0	78	413	802	0	4,580	0	4	0	0
7:15 AM	38	947	86	0	410	598	583	0	332	271	16	0	86	384	788	0	4,539	0	3	0	0
7:30 AM	39	867	96	0	380	605	608	0	337	200	17	0	85	356	690	0	4,280	1	6	0	2
7:45 AM	42	794	92	0	378	613	609	0	332	182	22	0	83	337	631	0	4,115	1	5	0	2
8:00 AM	47	780	94	0	357	601	586	0	319	199	28	0	86	344	563	0	4,004	1	4	0	2

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Hwy 213 & Beaver Creek Rd

Wednesday, January 25, 2017

7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 213				Southbound Hwy 213				Eastbound Beaver Creek Rd				Westbound Beaver Creek Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	1	1	1	3	2	1	0	3	0	4	0	4	0	1	1	2	12
7:05 AM	0	5	0	5	2	3	4	9	2	2	0	4	0	5	2	7	25
7:10 AM	0	10	0	10	0	2	0	2	3	1	1	5	1	3	2	6	23
7:15 AM	0	3	0	3	0	4	1	5	2	2	0	4	0	2	0	2	14
7:20 AM	1	2	0	3	1	5	4	10	4	0	1	5	1	4	1	6	24
7:25 AM	0	4	0	4	0	6	1	7	1	2	0	3	0	1	2	3	17
7:30 AM	0	5	1	6	3	2	1	6	0	1	0	1	0	0	0	0	13
7:35 AM	1	1	0	2	0	3	2	5	2	0	0	2	0	0	0	0	9
7:40 AM	0	5	0	5	0	2	0	2	4	0	1	5	0	0	2	2	14
7:45 AM	0	3	0	3	2	4	1	7	6	1	0	7	0	0	2	2	19
7:50 AM	0	5	0	5	3	3	3	9	3	1	0	4	0	0	1	1	19
7:55 AM	0	4	0	4	0	4	0	4	3	0	0	3	0	0	5	5	16
8:00 AM	0	1	1	2	0	2	2	4	1	0	0	1	0	0	2	2	9
8:05 AM	1	6	1	8	2	3	1	6	1	1	0	2	0	1	0	1	17
8:10 AM	0	5	2	7	2	4	1	7	2	0	1	3	2	0	3	5	22
8:15 AM	0	4	0	4	1	6	1	8	1	1	0	2	1	1	0	2	16
8:20 AM	0	3	1	4	1	3	5	9	5	0	0	5	1	1	0	2	20
8:25 AM	0	2	1	3	2	8	1	11	1	0	0	1	0	2	0	2	17
8:30 AM	0	8	0	8	2	7	2	11	3	0	1	4	1	1	4	6	29
8:35 AM	1	8	0	9	0	2	0	2	2	1	0	3	0	0	0	0	14
8:40 AM	0	5	0	5	0	6	3	9	1	2	1	4	0	0	1	1	19
8:45 AM	0	4	0	4	0	4	2	6	0	0	0	0	0	0	2	2	12
8:50 AM	0	3	0	3	0	2	3	5	2	0	0	2	0	2	2	4	14
8:55 AM	0	1	0	1	1	13	3	17	0	0	0	0	0	0	0	0	18
Total Survey	5	98	8	111	24	99	41	164	49	19	6	74	7	24	32	63	412

Heavy Vehicle 15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 213				Southbound Hwy 213				Eastbound Beaver Creek Rd				Westbound Beaver Creek Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	1	16	1	18	4	6	4	14	5	7	1	13	1	9	5	15	60
7:15 AM	1	9	0	10	1	15	6	22	7	4	1	12	1	7	3	11	55
7:30 AM	1	11	1	13	3	7	3	13	6	1	1	8	0	0	2	2	36
7:45 AM	0	12	0	12	5	11	4	20	12	2	0	14	0	0	8	8	54
8:00 AM	1	12	4	17	4	9	4	17	4	1	1	6	2	1	5	8	48
8:15 AM	0	9	2	11	4	17	7	28	7	1	0	8	2	4	0	6	53
8:30 AM	1	21	0	22	2	15	5	22	6	3	2	11	1	1	5	7	62
8:45 AM	0	8	0	8	1	19	8	28	2	0	0	2	0	2	4	6	44
Total Survey	5	98	8	111	24	99	41	164	49	19	6	74	7	24	32	63	412

Heavy Vehicle Peak Hour Summary

7:00 AM to 8:00 AM

By Approach	Northbound Hwy 213			Southbound Hwy 213			Eastbound Beaver Creek Rd			Westbound Beaver Creek Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	53	44	97	69	96	165	47	36	83	36	29	65	205
PHF	0.74			0.75			0.73			0.60			0.83

By Movement	Northbound Hwy 213				Southbound Hwy 213				Eastbound Beaver Creek Rd				Westbound Beaver Creek Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	3	48	2	53	13	39	17	69	30	14	3	47	2	16	18	36	205
PHF	0.75	0.67	0.50	0.74	0.65	0.65	0.71	0.75	0.58	0.50	0.38	0.73	0.25	0.40	0.56	0.60	0.83

Heavy Vehicle Rolling Hour Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 213				Southbound Hwy 213				Eastbound Beaver Creek Rd				Westbound Beaver Creek Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	3	48	2	53	13	39	17	69	30	14	3	47	2	16	18	36	205
7:15 AM	3	44	5	52	13	42	17	72	29	8	3	40	3	8	18	29	193
7:30 AM	2	44	7	53	16	44	18	78	29	5	2	36	4	5	15	24	191
7:45 AM	2	54	6	62	15	52	20	87	29	7	3	39	5	6	18	29	217
8:00 AM	2	50	6	58	11	60	24	95	19	5	3	27	5	8	14	27	207

Peak Hour Summary

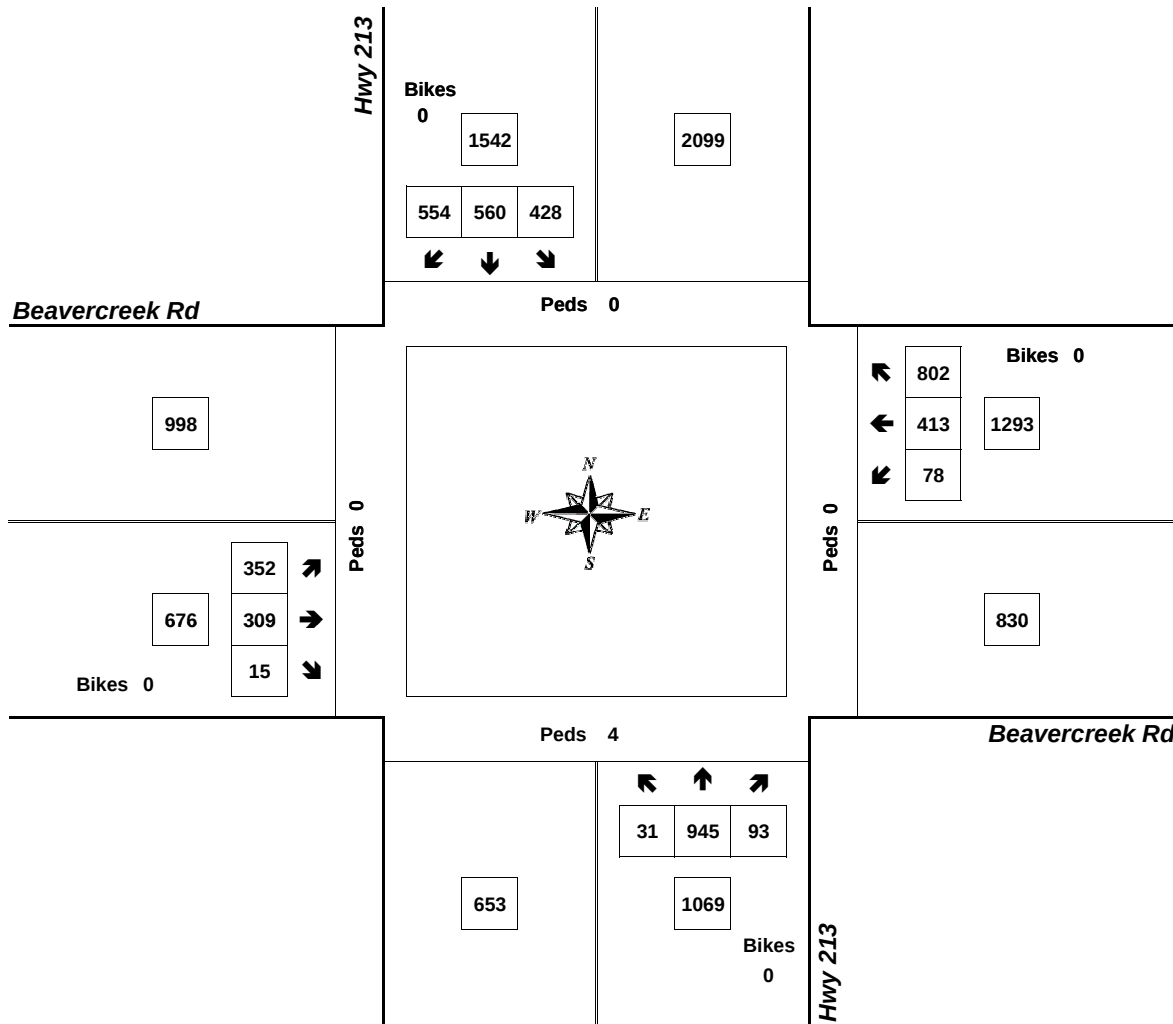


Clay Carney
(503) 833-2740

Hwy 213 & Beavercreek Rd

7:00 AM to 8:00 AM

Wednesday, January 25, 2017



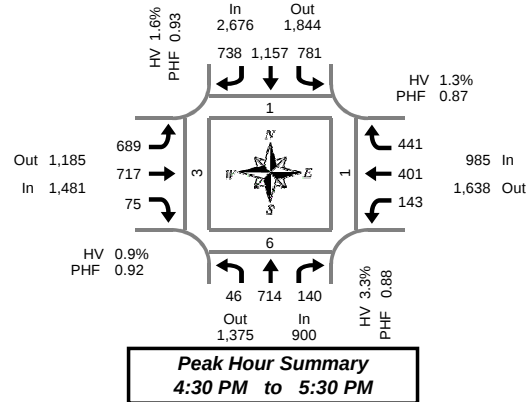
Approach	PHF	HV%	Volume
EB	0.82	7.0%	676
WB	0.92	2.8%	1,293
NB	0.85	5.0%	1,069
SB	0.84	4.5%	1,542
Intersection	0.93	4.5%	4,580

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Clay Carney
(503) 833-2740



Hwy 213 & Beaver Creek Rd

Tuesday, January 24, 2017

4:00 PM to 6:00 PM

5-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 213				Southbound Hwy 213				Eastbound Beaver Creek Rd				Westbound Beaver Creek Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	6	48	10	0	76	94	49	0	57	69	4	0	9	33	29	0	484	0	0	0	0
4:05 PM	2	69	15	0	56	88	54	0	62	54	4	0	11	37	35	0	487	0	0	0	0
4:10 PM	8	67	7	0	47	90	82	0	55	58	8	0	10	39	38	0	509	0	0	0	0
4:15 PM	4	67	8	0	40	91	78	0	48	36	3	0	7	42	45	0	469	0	0	0	0
4:20 PM	0	46	7	0	61	69	66	0	59	62	4	0	9	36	36	0	455	0	2	0	0
4:25 PM	1	51	21	0	53	91	56	0	26	59	8	0	13	45	29	0	453	3	1	0	2
4:30 PM	5	69	9	0	63	115	66	0	59	39	2	0	15	33	29	0	504	0	0	0	0
4:35 PM	2	68	12	0	60	105	72	0	65	67	4	0	6	20	33	0	514	0	0	0	0
4:40 PM	4	45	10	1	72	101	64	0	63	63	7	0	15	42	39	0	525	1	1	1	0
4:45 PM	3	56	10	0	74	102	58	0	61	60	6	0	17	37	40	0	524	0	0	0	2
4:50 PM	2	53	15	0	46	74	56	0	66	65	12	0	8	38	46	0	481	0	1	0	0
4:55 PM	3	75	18	0	46	86	64	0	59	62	5	0	12	36	42	0	508	0	0	0	0
5:00 PM	6	70	9	0	75	94	64	0	51	47	6	0	14	36	39	0	511	0	1	0	0
5:05 PM	5	61	8	0	59	107	61	0	41	55	7	0	19	33	45	0	501	0	1	0	1
5:10 PM	4	66	14	0	74	103	80	0	56	52	9	0	10	20	33	0	521	0	0	0	0
5:15 PM	2	59	10	0	78	97	47	0	66	68	5	0	8	32	29	0	501	0	1	0	0
5:20 PM	5	38	13	0	70	84	60	0	61	72	5	0	8	41	34	0	491	0	0	0	0
5:25 PM	5	54	12	0	64	89	46	0	41	67	7	0	11	33	32	0	461	0	1	0	0
5:30 PM	1	32	12	0	60	88	55	0	71	58	6	0	10	34	35	0	462	0	0	0	0
5:35 PM	7	48	15	0	78	100	58	0	57	66	4	0	10	29	32	0	504	0	0	0	0
5:40 PM	1	63	10	0	54	64	45	0	64	63	7	0	8	37	33	0	449	0	1	0	0
5:45 PM	0	43	16	0	76	101	46	0	66	54	5	0	9	36	32	0	484	0	2	0	1
5:50 PM	4	48	11	0	93	83	55	0	33	61	8	0	6	32	37	0	471	0	0	0	0
5:55 PM	4	52	6	0	53	78	52	0	47	65	4	0	16	36	35	0	448	0	0	0	0
Total Survey	84	1,348	278	1	1,528	2,194	1,434	0	1,334	1,422	140	0	261	837	857	0	11,717	4	12	1	6

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 213				Southbound Hwy 213				Eastbound Beaver Creek Rd				Westbound Beaver Creek Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	16	184	32	0	179	272	185	0	174	181	16	0	30	109	102	0	1,480	0	0	0	0
4:15 PM	5	164	36	0	154	251	200	0	133	157	15	0	29	123	110	0	1,377	3	3	0	2
4:30 PM	11	182	31	1	195	321	202	0	187	169	13	0	36	95	101	0	1,543	1	1	1	0
4:45 PM	8	184	43	0	166	262	178	0	186	187	23	0	37	111	128	0	1,513	0	1	0	2
5:00 PM	15	197	31	0	208	304	205	0	148	154	22	0	43	89	117	0	1,533	0	2	0	1
5:15 PM	12	151	35	0	212	270	153	0	168	207	17	0	27	106	95	0	1,453	0	2	0	0
5:30 PM	9	143	37	0	192	252	158	0	192	187	17	0	28	100	100	0	1,415	0	1	0	0
5:45 PM	8	143	33	0	222	262	153	0	146	180	17	0	31	104	104	0	1,403	0	2	0	1
Total Survey	84	1,348	278	1	1,528	2,194	1,434	0	1,334	1,422	140	0	261	837	857	0	11,717	4	12	1	6

Peak Hour Summary

4:30 PM to 5:30 PM

By Approach	Northbound Hwy 213				Southbound Hwy 213				Eastbound Beaver Creek Rd				Westbound Beaver Creek Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	900	1,375	2,275	1	2,676	1,844	4,520	0	1,481	1,185	2,666	0	985	1,638	2,623	0	6,042	1	6	1	3
%HV	3.3%				1.6%				0.9%				1.3%				1.7%				
PHF	0.88				0.93				0.92				0.87				0.97				

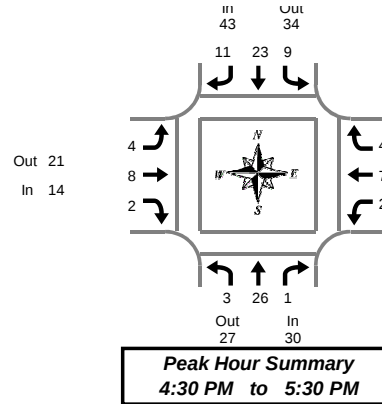
By Movement	Northbound Hwy 213				Southbound Hwy 213				Eastbound Beaver Creek Rd				Westbound Beaver Creek Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	46	714	140	900	781	1,157	738	2,676	689	717	75	1,481	143	401	441	985	6,042
%HV	6.5%	3.6%	0.7%	3.3%	1.2%	2.0%	1.5%	1.6%	0.6%	1.1%	2.7%	0.9%	1.4%	1.7%	0.9%	1.3%	1.7%
PHF	0.77	0.87	0.81	0.88	0.88	0.90	0.90	0.93	0.91	0.87	0.75	0.92	0.79	0.86	0.86	0.87	0.97

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 213				Southbound Hwy 213				Eastbound Beaver Creek Rd				Westbound Beaver Creek Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	40	714	142	1	694	1,106	765	0	680	694	67	0	132	438	441	0	5,913	4	5	1	4
4:15 PM	39	727	141	1	723	1,138	785	0	654	667	73	0	145	418	456	0	5,966	4	7	1	5
4:30 PM	46	714	140	1	781	1,157	738	0	689	717	75	0	143	401	441	0	6,042	1	6	1	3
4:45 PM	44	675	146	0	778	1,088	694	0	694	735	79	0	135	406	440	0	5,914	0	6	0	3
5:00 PM	44	634	136	0	834	1,088	669	0	654	728	73	0	129	399	416	0	5,804	0	7	0	2

Heavy Vehicle Summary



Hwy 213 & Beaver Creek Rd

Tuesday, January 24, 2017

4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 213				Southbound Hwy 213				Eastbound Beaver Creek Rd				Westbound Beaver Creek Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	1	6	0	7	3	6	0	9	3	0	0	3	0	1	0	1	20
4:05 PM	0	4	0	4	1	2	3	6	0	2	1	3	0	1	1	2	15
4:10 PM	0	1	0	1	3	2	5	10	2	2	0	4	0	0	0	0	15
4:15 PM	1	2	0	3	3	2	1	6	1	1	0	2	0	0	1	1	12
4:20 PM	0	3	0	3	1	4	1	6	3	0	0	3	0	1	1	2	14
4:25 PM	0	1	1	2	3	2	1	6	2	2	6	0	0	0	0	0	14
4:30 PM	0	1	0	1	0	0	2	2	0	0	0	0	0	1	1	2	5
4:35 PM	0	6	0	6	1	3	3	7	1	1	0	2	0	0	0	0	15
4:40 PM	0	0	0	0	3	3	0	6	0	0	0	0	0	0	0	0	6
4:45 PM	1	2	0	3	1	2	0	3	2	0	0	2	0	1	0	1	9
4:50 PM	0	2	0	2	1	1	1	3	0	1	1	2	0	1	0	1	8
4:55 PM	0	3	0	3	0	3	0	3	0	0	1	1	0	1	0	1	8
5:00 PM	0	2	0	2	0	3	0	3	0	1	0	1	0	1	1	2	8
5:05 PM	1	3	0	4	2	1	0	3	0	1	0	1	0	0	1	1	9
5:10 PM	0	1	1	2	0	1	0	1	0	0	0	0	0	0	0	0	3
5:15 PM	0	2	0	2	0	1	2	3	0	1	0	1	1	0	0	1	7
5:20 PM	0	3	0	3	1	3	2	6	1	2	0	3	0	1	1	2	14
5:25 PM	1	1	0	2	0	2	1	3	0	1	0	1	1	1	0	2	8
5:30 PM	0	1	0	1	1	1	0	2	0	0	0	0	0	0	1	1	4
5:35 PM	0	0	0	0	1	3	1	5	1	0	1	2	0	0	0	0	7
5:40 PM	0	2	0	2	1	0	0	1	2	0	0	2	0	0	1	1	6
5:45 PM	0	1	0	1	1	2	1	4	1	0	0	1	0	0	0	0	6
5:50 PM	0	0	0	0	3	0	2	5	0	0	0	0	0	1	1	2	7
5:55 PM	1	2	0	3	1	2	1	4	0	0	0	0	0	0	0	0	7
Total Survey	6	49	2	57	31	49	27	107	19	15	6	40	2	11	10	23	227

Heavy Vehicle 15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 213				Southbound Hwy 213				Eastbound Beaver Creek Rd				Westbound Beaver Creek Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	1	11	0	12	7	10	8	25	5	4	1	10	0	2	1	3	50
4:15 PM	1	6	1	8	7	8	3	18	6	3	2	11	0	1	2	3	40
4:30 PM	0	7	0	7	4	6	5	15	1	1	0	2	0	1	1	2	26
4:45 PM	1	7	0	8	2	6	1	9	2	1	2	5	0	3	0	3	25
5:00 PM	1	6	1	8	2	5	0	7	0	2	0	2	0	1	2	3	20
5:15 PM	1	6	0	7	1	6	5	12	1	4	0	5	2	2	1	5	29
5:30 PM	0	3	0	3	3	4	1	8	3	0	1	4	0	0	2	2	17
5:45 PM	1	3	0	4	5	4	4	13	1	0	0	1	0	1	1	2	20
Total Survey	6	49	2	57	31	49	27	107	19	15	6	40	2	11	10	23	227

Heavy Vehicle Peak Hour Summary

4:30 PM to 5:30 PM

By Approach	Northbound Hwy 213			Southbound Hwy 213			Eastbound Beaver Creek Rd			Westbound Beaver Creek Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	30	27	57	43	34	77	14	21	35	13	18	31	100
PHF	0.83			0.67			0.70			0.65			0.83

By Movement	Northbound Hwy 213				Southbound Hwy 213				Eastbound Beaver Creek Rd				Westbound Beaver Creek Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	3	26	1	30	9	23	11	43	4	8	2	14	2	7	4	13	100
PHF	0.75	0.81	0.25	0.83	0.45	0.72	0.55	0.67	0.33	0.50	0.25	0.70	0.25	0.58	0.50	0.65	0.83

Heavy Vehicle Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 213				Southbound Hwy 213				Eastbound Beaver Creek Rd				Westbound Beaver Creek Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	3	31	1	35	20	30	17	67	14	9	5	28	0	7	4	11	141
4:15 PM	3	26	2	31	15	25	9	49	9	7	4	20	0	6	5	11	111
4:30 PM	3	26	1	30	9	23	11	43	4	8	2	14	2	7	4	13	100
4:45 PM	3	22	1	26	8	21	7	36	6	7	3	16	2	6	5	13	91
5:00 PM	3	18	1	22	11	19	10	40	5	6	1	12	2	4	6	12	86

Peak Hour Summary

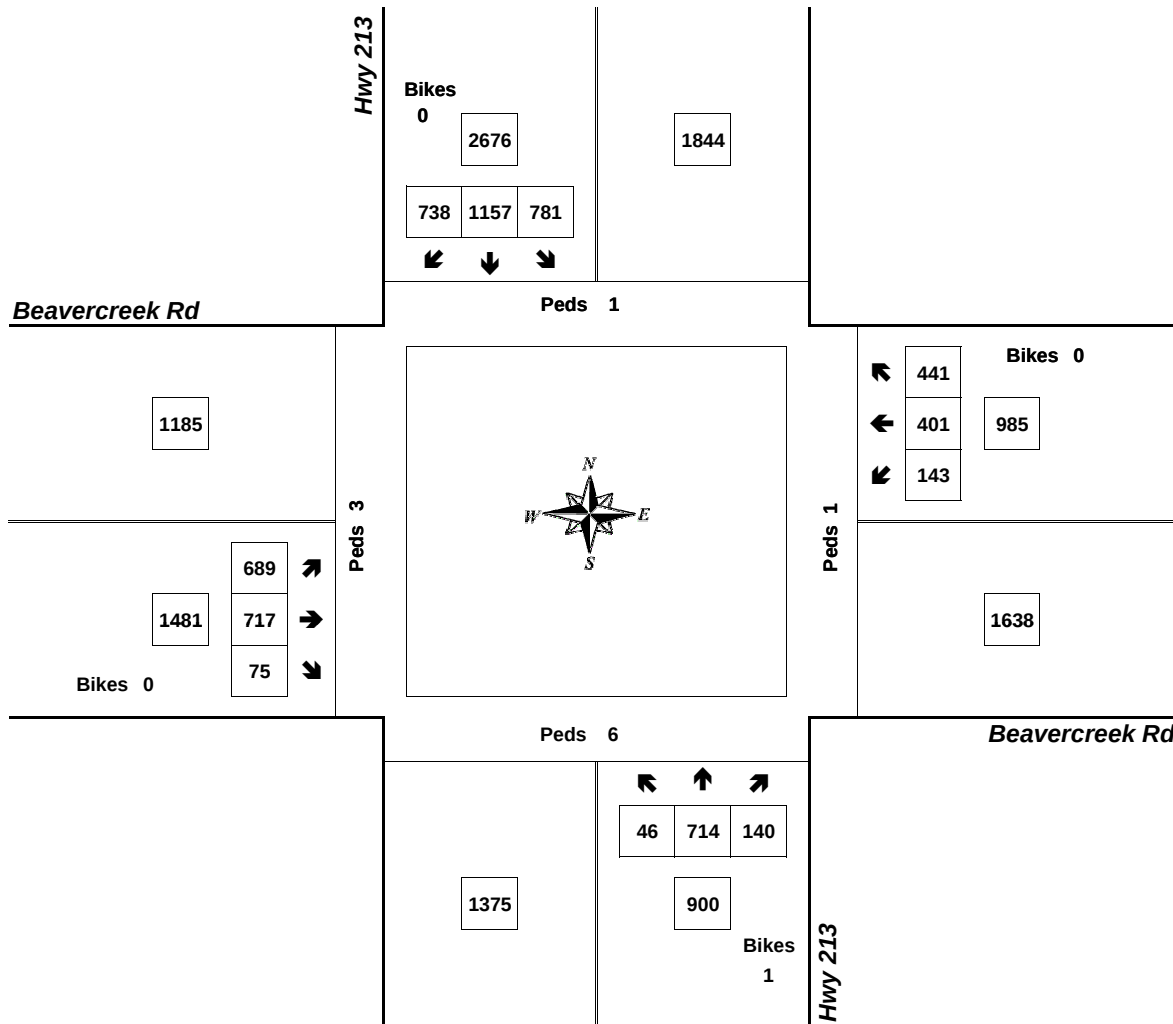


Clay Carney
(503) 833-2740

Hwy 213 & Beavercreek Rd

4:30 PM to 5:30 PM

Tuesday, January 24, 2017



Approach	PHF	HV%	Volume
EB	0.92	0.9%	1,481
WB	0.87	1.3%	985
NB	0.88	3.3%	900
SB	0.93	1.6%	2,676
Intersection	0.97	1.7%	6,042

Count Period: 4:00 PM to 6:00 PM



TRIP GENERATION CALCULATIONS

Land Use: Single-Family Detached Housing
Land Use Code: 210
Variable: Dwelling Units
Variable Value: 3

AM PEAK HOUR

Trip Rate: 0.75

	Enter	Exit	Total
Directional Distribution	25%	75%	
Trip Ends	1	1	2

PM PEAK HOUR

Trip Rate: 1.00

	Enter	Exit	Total
Directional Distribution	63%	37%	
Trip Ends	2	1	3

WEEKDAY

Trip Rate: 9.52

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	14	14	28

SATURDAY

Trip Rate: 9.91

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	15	15	30

Source: TRIP GENERATION, Ninth Edition



TRIP GENERATION CALCULATIONS

Land Use: Single-Family Detached Housing
Land Use Code: 210
Variable: Dwelling Units
Variable Value: 124

AM PEAK HOUR

Trip Rate: 0.75

	Enter	Exit	Total
Directional Distribution	25%	75%	
Trip Ends	23	70	93

PM PEAK HOUR

Trip Rate: 1.00

	Enter	Exit	Total
Directional Distribution	63%	37%	
Trip Ends	78	46	124

WEEKDAY

Trip Rate: 9.52

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	590	590	1,180

SATURDAY

Trip Rate: 9.91

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	614	614	1,228

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01/18/2017

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

URBAN NON-SYSTEM CRASH LISTING

REDLAND RD at CASCADE HY SOUTH, city of Oregon City, Clackamas County, 01/01/2013 to 12/31/2015

CITY OF OREGON CITY, CLACKAMAS COUNTY

Total crash records: 27

SER#	INVEST	D C S I L K TIME	CLASS	CITY STREET	RD CHAR	INT-TYPE (MEDIAN)	INT-BEL LEGS	OFFRD	WTHR	CRASH	SPCL USE TLR QTY	MOVE	FROM	PRTC	INJ	A S	P#	TYPE	SVRTY	E X RES	LOC	ERROR	ACT EVENT	CAUSE
01593	N N N	05/08/2013	14	CASCADE HY SOUTH	INTER	3-LEG	N	N	CLR	S-1STOP	01 NONE	0	STRGHT	01 DRIVER	NONE	27 F	OR-Y	OR<25			016,026	000	00	27,07
NO RPT		WE 12P		REDLAND RD	06	0		N	DRY	REAR	PRVTE	PSNGR CAR	N -S									000	00	27,07
								N	DAY	INJ	02 NONE	0	STOP	01 DRIVER	NONE	63 F	OR-Y	OR<25			000	000	00	00
								N	WET	REAR	PRVTE	PSNGR CAR	N -S									000	00	00
04034	Y N N	10/22/2013	14	CASCADE HY SOUTH	INTER	3-LEG	N	N	CLR	S-1STOP	01 NONE	0	STRGHT	01 DRIVER	INJC	57 F	OR-Y	OR<25			047,043,026	000	00	01,07
CITY		TU 8P		REDLAND RD	06	0		N	DRY	REAR	PRVTE	PSNGR CAR	N -S									000	00	00
								N	DAY	INJ	02 NONE	0	STOP	01 DRIVER	INJC	57 F	OR-Y	OR<25			000	000	00	01,07
								N	DAY	INJ	02 NONE	0	STOP	01 DRIVER	NONE	16 M	OR-Y	OR<25			000	000	00	00
								N	DAY	INJ	02 NONE	0	STOP	01 DRIVER	NONE	16 M	OR-Y	OR<25			000	000	00	00
04654	N N N	11/17/2014	14	CASCADE HY SOUTH	INTER	3-LEG	N	N	CLR	S-1STOP	01 NONE	0	STRGHT	01 DRIVER	NONE	60 M	OTH-Y	N-RES			026	000	00	29
NONE		MO 12P		REDLAND RD	06	0		N	DRY	REAR	PRVTE	PSNGR CAR	N -S									000	00	00
								N	DAY	INJ	02 NONE	0	STOP	01 DRIVER	NONE	66 F	OR-Y	OR<25			000	000	00	00
								N	DAY	INJ	02 NONE	0	STOP	01 DRIVER	NONE	66 F	OR-Y	OR<25			000	000	00	00
								N	DAY	INJ	02 NONE	0	STOP	01 DRIVER	NONE	66 F	OR-Y	OR<25			000	000	00	00
								N	DAY	INJ	02 NONE	0	STOP	01 DRIVER	NONE	66 F	OR-Y	OR<25			000	000	00	00
01056	N N N	03/26/2015	14	CASCADE HY SOUTH	INTER	3-LEG	N	N	CLR	S-1STOP	01 NONE	0	STRGHT	01 DRIVER	INJC	61 F	OR-Y	OR<25			000	000	00	00
NONE		TH 2P		REDLAND RD	06	0		N	DRY	REAR	PRVTE	PSNGR CAR	N -S									000	00	29
								N	DAY	PDO	02 NONE	0	STOP	01 DRIVER	NONE	53 F	OR-Y	OR<25			026	000	00	29
								N	DAY	PDO	02 NONE	0	STOP	01 DRIVER	NONE	53 F	OR-Y	OR<25			026	000	00	29
								N	DAY	PDO	02 NONE	0	STOP	01 DRIVER	NONE	53 F	OR-Y	OR<25			026	000	00	29
								N	DAY	PDO	02 NONE	0	STOP	01 DRIVER	NONE	53 F	OR-Y	OR<25			026	000	00	29
02925	N N N	07/20/2015	14	CASCADE HY SOUTH	INTER	3-LEG	N	N	CLR	S-1STOP	01 NONE	0	STRGHT	01 DRIVER	NONE	35 F	OR-Y	OR<25			026	000	00	29
NONE		MO 3P		REDLAND RD	06	0		N	DRY	REAR	PRVTE	PSNGR CAR	N -S									000	00	00
								N	DAY	PDO	02 NONE	0	STOP	01 DRIVER	NONE	35 F	OR-Y	OR<25			026	000	00	29
								N	DAY	PDO	02 NONE	0	STOP	01 DRIVER	NONE	35 F	OR-Y	OR<25			026	000	00	29
								N	DAY	PDO	02 NONE	0	STOP	01 DRIVER	NONE	35 F	OR-Y	OR<25			026	000	00	29
00947	N N N	03/19/2013	14	CASCADE HY SOUTH	INTER	3-LEG	N	N	RAIN	S-1STOP	01 NONE	0	STRGHT	01 DRIVER	NONE	19 M	OR-Y	OR<25			000	000	00	07
NONE		TU 1P		REDLAND RD	S 06	0		N	WET	REAR	UNKN	S -N	S -N									000	00	07
								N	DAY	PDO	02 NONE	0	STOP	01 DRIVER	NONE	00 M	OR-Y	UNK			026	000	00	07
								N	DAY	PDO	02 NONE	0	STOP	01 DRIVER	NONE	00 M	OR-Y	UNK			026	000	00	07
								N	DAY	PDO	02 NONE	0	STOP	01 DRIVER	NONE	00 M	OR-Y	UNK			026	000	00	07
								N	DAY	PDO	02 NONE	0	STOP	01 DRIVER	NONE	00 M	OR-Y	UNK			026	000	00	07
								N	DAY	PDO	02 NONE	0	STOP	01 DRIVER	NONE	00 M	OR-Y	UNK			026	000	00	07

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

URBAN NON-SYSTEM CRASH LISTING

REDLAND RD at CASCADE HY SOUTH, City of Oregon City, Clackamas County, 01/01/2013 to 12/31/2015

Total crash records: 27

[illegible]

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

CDS380
01/18/2017

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

URBAN NON-SYSTEM CRASH LISTING

CITY OF OREGON CITY, CLACKAMAS COUNTY

REDLAND RD at CASCADE HY SOUTH, city of Oregon City, Clackamas County, 01/01/2013 to 12/31/2015

Total crash records: 27

SER#	INVEST	NONE	P R S W			CLASS	CITY STREET	RD CHAR	INT-TYPE			SPCL USE			MOVE	FROM	PRTC	INJ	A S	G E LICNS	PED	LOC	RES	E X	SVRTY	PH	TYPE	DRVR	NONE	32	M	OR-Y	OR<25	ERROR	ACT_EVENT	CAUSE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
			TU	SA	5P				FIRST STREET	DIRECT	INT-REL	OFFRD	WTHR	CRASH																							TRLR QTY	OWNER	TO	N -W	01	DRVR	NONE	50	M	OR-Y	OR<25	000	000	08																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
02177	NO RPT	N N N	06/06/2015	14	CASCADE HY SOUTH	REDLAND RD	W	06	INTER	3-LEG	N	TRF SIGNAL	N	CLR	ANGI-STP	TURN	PDO	N	DAY	0	STOP	W -E	PSNGR CAR	02	NONE	0	STOP	W -E	01	DRVR	NONE	50	M	OR-Y	OR<25	000	012	000	00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	

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CITY OF OREGON CITY, CLACKAMAS COUNTY

REDLAND RD at CASCADE HY SOUTH, city of Oregon City, Clackamas County, 01/01/2013 to 12/31/2015

URBAN NON-SYSTEM CRASH LISTING

Total crash records: 27

SER#	INVEST	D C S L K TIME	FROM	CLASS	CITY STREET	RD CHAR	INT-TYPE (MEDIAN)	INT-BEL	OFFRD	WTHR	CRASH	SPCL USE		MOVE	FROM	PRTC	INJC	A S	E X RES	LOC	ERROR	ACT EVENT	CAUSE
												TRLR QTY	OWNER										
03843	N N N	10/09/2013	0	16	CASCADE HY SOUTH	INTER	3-LEG	N	N	CLR	S-1STOP	01 NONE	0	STRGHT	E -W	01 DRVR	INJC	22 M	OR-Y	OR<25	026	000	07
NONE		WE			REDLAND RD	06	0	TRF SIGNAL	N	DAY	INJ	PRVTE	PSNGR CAR									000	00
		9A										02 NONE	0	STOP	E -W	01 DRVR	NONE	56 F	OR-Y	OR<25	000	012	00
												PRVTE	PSNGR CAR								000	000	00
04583	N N N	11/25/2013	0	16	CASCADE HY SOUTH	INTER	3-LEG	N	N	CLR	S-1STOP	01 NONE	0	STRGHT	W -E	01 DRVR	NONE	00 M	OTH-Y	N-RES	026	000	07
NONE		NO			REDLAND RD	06	0	TRF SIGNAL	N	DAY	INJ	PRVTE	PSNGR CAR									000	00
		4P										PSNGR CAR										000	07
00188	N N N	01/14/2014	0	16	CASCADE HY SOUTH	INTER	3-LEG	N	N	CLR	S-1STOP	01 NONE	0	STRGHT	W -E	01 DRVR	NONE	00 M	OR-Y	OR<25	026	000	07
NONE		TU			REDLAND RD	06	0	TRF SIGNAL	N	DAY	PDO	PRVTE	PSNGR CAR									000	00
		4P										02 NONE	0	STOP	W -E	01 DRVR	NONE	37 F	OR-Y	OR<25	000	011	00
												PRVTE	PSNGR CAR									000	00
												02 NONE	0	STOP	W -E	02 PSNG	NO<5	01 M		OR<25	000	011	00
												PRVTE	PSNGR CAR								000	000	00
04409	N N N	11/02/2014	0	16	CASCADE HY SOUTH	INTER	3-LEG	N	N	UNK	S-1STOP	01 NONE	0	STRGHT	W -E	01 DRVR	NONE	61 M	OR-Y	OR<25	026	000	29
NONE		SU			REDLAND RD	06	0	TRF SIGNAL	N	DAY	INJ	PRVTE	PSNGR CAR									000	00
		9A										PSNGR CAR										000	29
												02 NONE	0	STOP	W -E	01 DRVR	INJC	35 M	OR-Y	OR<25	000	011	00
												PRVTE	PSNGR CAR									000	00
												02 NONE	0	STOP	W -E	02 PSNG	INJC	12 F		OR<25	000	011	00
												PRVTE	PSNGR CAR								000	000	00
04081	Y N N	Y 10/25/2013	14	14	CASCADE HY SOUTH	INTER	3-LEG	N	N	CLD	S-STRGHT	01 NONE	0	STRGHT	S -N	01 DRVR	NONE	54 M	OR-Y	OR<25	045,047,026	007	13,01,07
STATE		FR			REDLAND RD	CN	0	TRF SIGNAL	N	WET	SS-O	PRVTE	TRUCK									000	00
		7A				04			N	DAWN	PDO											000	13,01,07
												02 LOG	0	STRGHT	S -N	01 DRVR	NONE	60 M	OTH-Y	N-RES	000	006	00
												PRVTE	BOBTAIL									000	00
												03 NONE	0	STOP	S -N	01 DRVR	NONE	58 F	OR-Y		011	000	00
												PRVTE	PSNGR CAR								000	000	00

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CDS380
01/18/2017

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

URBAN NON-SYSTEM CRASH LISTING

REDLAND RD at ABERNATHY RD, City of Oregon City, Clackamas County, 01/01/2013 to 12/31/2015

CITY OF OREGON CITY, CLACKAMAS COUNTY

Total crash records: 1

S P E R E I N V E S T		D R A G S I C K		S W A Y T I M E		CLASS	DIST	CITY STREET		RD CHAR	INT-TYPE (MEDIAN)		INT-REL	OFFRD	WTHR	CRASH	SPCL USE		MOVE	FROM	PRTC	INJ	A	S	E	L	C	N	S	P	ED	LOC	ERR	ACT	EVENT	CAUSE			
SER#	INVEST	D	C	S	I	K	TIME	FROM	SECOND STREET	LOCN	CROSS	TRF SIGNAL	DRVWY	DRVWY	LIGHT	SURF	COLL	SVRTY	V#	TYPE	OWNER	TRLR	QTY	USE	TO	P#	TYPE	SVRTY	E	X	RES	LOC	ERR	ACT	EVENT	CAUSE			
00995	N N N	03/11/2014	0	16	ABERNATHY RD	INTER	CROSS	N	TRF SIGNAL	N	CLR	ANGL-OTH	01	NONE	0	STRGHT	SE-NW	01	DRVR	NONE	62	F	OR-Y	OR-25	01	DRVR	NONE	00	F	UNK	UNK	000	000	00	04				
NONE		TU							REDLAND RD	CN	0		N	DAY	DRY	ANGL	FOO	PSNGR	CAR															000	000	00	04		
		2P											N																						000	000	00	00	
													N																							000	000	00	00

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OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

CDS380
01/18/2017

URBAN NON-SYSTEM CRASH LISTING
REDLAND RD at HOLCOMB BLVD, City of Oregon City, Clackamas County, 01/01/2013 to 12/31/2015
Total crash records: 10

CITY OF OREGON CITY, CLACKAMAS COUNTY

S P E S E R # INVEST	D A T E T I M E 3P	C L A S S F R O M	C I T Y S T R E E T F I R S T S T R E E T S E C O N D S T R E E T	R D C H A R D I R E C T L O C T N	I N T - T Y P E (M E D I A N) L E G S (#L A N E S)	O F F R E D R I V E R N O N E	W E T H E R D R Y D A Y	C R A S H S U R F L I G H T P D O	S P C I A L Q U E R Y T R A P - L E G S (#L A N E S)	M O V E F R O M T O	P R I C I N J U R Y N O N E	A S S E S S M E N T E X P O S U R E	P E D L O C A T I O N	E R R O R	A C T E V E N T	C A U S E		
02812 NONE	N N N 07/12/2015 SU 5P	16 0	HOLCOMB BLVD REDLAND RD	INTER NW 06	CROSS 0	N TRF SIGNAL	N CLR DAY	S-1STOP REAR PDO	01 NONE PRVTE PSNGR CAR	STOP NW-SE	01 DRIVER NONE	40 F NONE	OR-Y OR<25	000 000	026 000	00 00	00 00	07
03648 STATE	N N N N 09/28/2013 SA 8P	16 0	HOLCOMB BLVD REDLAND RD	INTER CN 01	CROSS 0	N L-GRN-SIG	N RAIN WET DLIT	O-1 L-TURN TURN INJ	01 NONE PRVTE PSNGR CAR	STRTGHT NW-SE	01 DRIVER NONE	52 M OR-Y	OR<25	000 000	000 000	00 00	04	
05202 NONE	N N N 12/07/2015 MO 7A	16 0	HOLCOMB BLVD REDLAND RD	INTER CN 01	CROSS 0	N TRF SIGNAL	N RAIN WET DAY	O-1 L-TURN TURN INJ	02 NONE PRVTE PSNGR CAR	TURN-L SE-SW	01 DRIVER NONE	18 F NONE	OR-Y OR<25	000 000	028,004,003 000	00 04	02	
									02 NONE PRVTE PSNGR CAR	TURN-L S -W	01 DRIVER INJC	30 M OR-Y	OR<25	000 000	028,004 000	00 00	02	

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OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

CDS380
01/18/2017

URBAN NON-SYSTEM CRASH LISTING

S BEAVERCREEK RD at CASCADE HY SOUTH, City of Oregon City, Clackamas County, 01/01/2013 to 12/31/2015

Total crash records: 80

CITY OF OREGON CITY, CLACKAMAS COUNTY

SER#	INVEST	D C S L K TIME	N N N	11/29/2014	CLASS	CITY STREET	RD CHAR	INT-TYPE (MEDIAN)	INT-BEL (LEGS)	OFFRD	WTHR	CRASH	SPCL USE	MOVE	PRTC	INJ	A S	P#	TYPE	SVRTY	E X RES	LOC	ERROR	ACT EVENT	CAUSE
04839	NO RPT	SA	UNK	UNK	14	S BEAVERCREEK RD CASCADE HY SOUTH	INTER 06	CROSS 3	N TRF SIGNAL	N N	UNK UNK	S-1STOP REAR PDO	01 NONE 0 PRVTE PSNGR CAR	STRGHT UN-UN	01 DRIVER	NONE	39 F	OR-Y OR<25					026	000 000	29
00662	CITY	NO	6P	UNK	14	S BEAVERCREEK RD CASCADE HY SOUTH	INTER 06	CROSS 3	N TRF SIGNAL	N N	CLR SNO UNK	O-1STOP BACK PDO	01 NONE 0 PRVTE PSNGR CAR	BACK S -N	01 DRIVER	NONE	34 F	SUSP OR<25					011	000 000	10 10
02051	NONE	MO	12P	UNK	14	S BEAVERCREEK RD CASCADE HY SOUTH	INTER 06	CROSS 3	N TRF SIGNAL	N N	CLR DRY DAY	S-1STOP SS-O PDO	01 NONE 0 PRVTE PSNGR CAR	STRGHT N -S	01 DRIVER	NONE	18 F	OR-Y OR<25					080	000 000	10 10
02085	NONE	WE	10A	UNK	14	S BEAVERCREEK RD CASCADE HY SOUTH	INTER 06	CROSS 3	N TRF SIGNAL	N N	UNK DAY	S-1STOP REAR PDO	01 NONE 0 PRVTE PSNGR CAR	STRGHT N -S	01 DRIVER	NONE	87 F	OR-Y OR<25					011	000 000	00 00
03700	NONE	TU	1P	UNK	14	S BEAVERCREEK RD CASCADE HY SOUTH	INTER 06	CROSS 3	N TRF SIGNAL	N N	CLR DRY DAY	S-1STOP REAR PDO	01 NONE 0 UNKN PSNGR CAR	STRGHT N -S	01 DRIVER	NONE	00 F	UNK UNK					011	000 000	00 00
04798	CITY	WE	8P	UNK	14	S BEAVERCREEK RD CASCADE HY SOUTH	INTER 06	CROSS 3	N TRF SIGNAL	N N	FOG DRY DLIT	S-1STOP REAR INJ	01 NONE 0 PRVTE PSNGR CAR	STRGHT N -S	01 DRIVER	NONE	64 M	OR-Y OR<25					026	000 000	07 07
01637	NO RPT	TU	UNK	UNK	14	S BEAVERCREEK RD CASCADE HY SOUTH	INTER N	CROSS 3	N TRF SIGNAL	N N	CLR DRY	S-1STOP REAR	01 NONE 0 PRVTE PSNGR CAR	STRGHT N -S	01 DRIVER	INJC	58 M	OR-Y OR<25					011	000 000	29 00

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OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

CDS380
01/18/2017

CITY OF OREGON CITY, CLACKAMAS COUNTY
URBAN NON-SYSTEM CRASH LISTING
S BEAVERCREEK RD at CASCADE HY SOUTH, City of Oregon City, Clackamas County, 01/01/2013 to 12/31/2015
Total crash records: 80

S D		P R S W		E A U C O DATE		CLASS		CITY STREET		RD CHAR		INT-TYPE (MEDIAN)		INT-REL		OFFRD		WTHR		CRASH		SPCL USE		MOVE		A S		E L I C N S		P E D		C A U S E	
SER#	INVEST	D C S I L K	T I M E	FROM	DIST	FIRST STREET	SECOND STREET	LOC	DIRECT	LEG	TRAP-	CONT	DRVTY	DAY	SURF	COLL	OWNR	V#	TYPE	SVRTY	PH	TYPE	SVRTY	E X RES	LOC	ERROR	ACT	EVENT	CAUSE	07			
								06	3																								

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OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

URBAN NON-SYSTEM CRASH LISTING

CITY OF OREGON CITY, CLACKAMAS COUNTY

S BEAVERCREEK RD at CASCADE HY SOUTH, City of Oregon City, Clackamas County, 01/01/2013 to 12/31/2015

Total crash records: 80

SER#	INVEST	D C S L K TIME	WE	P R S W	E A U C O DATE	CLASS	CITY STREET	RD CHAR	INT-TYPE			SPCL USE			MOVE	FROM	A S	PED	CAUSE											
									DIST	FROM	LEG	INT-REL	OFFRD	WTHR						CRASH	TLR QTY	OWNER	V# TYPE	N -S	PH TYPE	SVRTY	E X RES	LOC	ERROR	ACT_EVENT
00193	N N N	01/17/2013	TH 10A			14	S BEAVERCREEK RD CASCADE HY SOUTH	INTER NE 0.9	CROSS YIELD 3	N	CLR DRY DAY	S-1STOP REAR PDO	01 NONE PRVTE PSNGR CAR	0	STRGHT SE-NW				07											
NONE																			00											
																			00											
																			00											
00296	N N N	01/25/2013	FR 7A			14	S BEAVERCREEK RD CASCADE HY SOUTH	INTER NE 0.9	CROSS YIELD 3	N	UNK WET DLIT	S-1STOP REAR INJ	01 NONE PRVTE PSNGR CAR	0	STRGHT SE-NW				07											
NONE																			00											
																			00											
																			00											
03686	N N N	03/27/2013	WE 9A			14	S BEAVERCREEK RD CASCADE HY SOUTH	INTER NE 0.9	CROSS YIELD 3	N	CLR DRY DAY	S-1STOP REAR INJ	01 NONE PRVTE PSNGR CAR	0	STRGHT SE-NW				07											
NONE																			00											
																			00											
																			00											
01343	N N N	04/10/2013	WE 5P			14	S BEAVERCREEK RD CASCADE HY SOUTH	INTER NE 0.9	CROSS YIELD 3	N	CLR DRY DAY	S-1STOP REAR INJ	01 NONE PRVTE PSNGR CAR	0	STRGHT SE-NW				07											
NONE																			00											
																			00											
																			00											
01405	N N N	04/24/2013	WE 1P			14	S BEAVERCREEK RD CASCADE HY SOUTH	INTER NE 0.9	CROSS YIELD 3	N	CLR DRY DAY	S-1STOP REAR INJ	01 NONE PRVTE PSNGR CAR	0	STRGHT SE-NW				27,07											
CITY																			00											
																			00											
																			00											

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CITY OF OREGON CITY, CLACKAMAS COUNTY

S BEAVERCREEK RD at CASCADE HY SOUTH, City of Oregon City, Clackamas County, 01/01/2013 to 12/31/2015

URBAN NON-SYSTEM CRASH LISTING

Total crash records: 80

S D P R S W			INT-TYPE										SPL USE										A S										CAUSE	
SER#	INVEST	D C S L K TIME	CLASS	CITY STREET	RD CHAR	INT-REL	OFFRD	WTHR	CRASH	COLL	MOVE	PRTC	INJ	SURTY	E X RES	PED	LOC	ERROR	ACT EVENT	CAUSE														
14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14														
01782	NONE	N N N	05/21/2013	14	S BEAVERCREEK RD	INTER	CROSS	N	CLR	S-1STOP	STRGHT	01	NONE	0	SE-NW	01	DRVR	NONE	50	F	OR-Y	026	000	00	07									
			TU		CASCADE HY SOUTH	NE	09	3	YIELD	N	DAY	DRY	PSNGR CAR	02	NONE	0	STOP																	
			7A																															
02276	NONE	N N N	06/27/2013	14	S BEAVERCREEK RD	INTER	CROSS	N	CLR	S-1STOP	STRGHT	01	NONE	0	SE-NW	01	DRVR	NONE	00	M	UNK	026	000	00	07									
			TH		CASCADE HY SOUTH	NE	09	3	YIELD	N	DAY	DRY	PSNGR CAR	02	NONE	0	STOP																	
			10A																															
03212	CITY	N N N	08/29/2013	14	S BEAVERCREEK RD	INTER	CROSS	N	RAIN	S-1STOP	STRGHT	01	NONE	0	SE-NW	01	DRVR	NONE	19	M	OR-Y	026	000	00	07									
			TH		CASCADE HY SOUTH	NE	09	3	TRF SIGNAL	N	DAY	WET	PSNGR CAR	02	NONE	0	STOP																	
			11A																															
03276	CITY	N N N	09/01/2013	14	S BEAVERCREEK RD	INTER	CROSS	N	CLR	S-1STOP	STRGHT	01	NONE	0	SE-NW	01	DRVR	NONE	62	M	OR-Y	043.026	000	00	07									
			SU		CASCADE HY SOUTH	NE	09	3	YIELD	N	DAY	DRY	PSNGR CAR	02	NONE	0	STOP																	
			12P																															
03531	NONE	N N N	09/21/2013	14	S BEAVERCREEK RD	INTER	CROSS	N	CLR	S-1STOP	STRGHT	01	NONE	0	SE-NW	01	DRVR	NONE	00	M	UNK	026	000	00	07									
			SA		CASCADE HY SOUTH	NE	09	3	YIELD	N	DAY	DRY	PSNGR CAR	02	NONE	0	STOP																	
			9A																															
																			</															

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OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

CDS380
01/18/2017

URBAN NON-SYSTEM CRASH LISTING
S BEAVERCREEK RD at CASCADE HY SOUTH, City of Oregon City, Clackamas County, 01/01/2013 to 12/31/2015

CITY OF OREGON CITY, CLACKAMAS COUNTY

Total crash records: 80

S P E S R # INVEST	D A U C O D E L G H R D A Y K T I M E	C L A S S D I S T F R O M	C I T Y S T R E E T F I R S T S T R E E T S E C O N D S T R E E T	R D C H A R D I R E C T L O C T N	I N T - T Y P E (M E D I A N) L E G S (L A N E S)	I N T - R E L T R A F - C O N T I	O F F R D R N D B T D R V W Y	W T H R S U R F L I G H T	C R A S H C O L L S U R T Y	S P C I A L U T I L I T Y T R A F O W N E R	M O V E F R O M T O	P E T R C I N J S U R T Y	A S L I C E N S E X R E S	E R R O R	A C T E V E N T	C A U S E																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																

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OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

CDS380
01/18/2017

CITY OF OREGON CITY, CLACKAMAS COUNTY
URBAN NON-SYSTEM CRASH LISTING
S BEAVERCREEK RD at CASCADE HY SOUTH, City of Oregon City, Clackamas County, 01/01/2013 to 12/31/2015
Total crash records: 80

SER#	INVEST	D C S L K TIME	FROM	CLASS	CITY STREET	RD CHAR	INT-TYPE (MEDIAN)	INT-BEL	OFFRD	WTHR	CRASH	SPCL USE	TRLR QTY	OWNER	MOVE	PRTC	INJ	A S	P#	TYPE	SVRTY	E X RES	LOC	ERROR	ACT EVENT	CAUSE
		4P			FIRST STREET	DIRECT	3	CONTL	N	DAY	PDO	PSNGR CAR	0	PRVTE	STOP	01	DRVR	NONE	00	F	OR-Y	LOC	026	000	29	
					SECOND STREET	LOCN	09		N	DAY	PDO	PSNGR CAR	02	NONE	STOP	01	DRVR	NONE	58	F	OR-Y	LOC	000	011	00	
04182	N N N	09/14/2015	14		S BEAVERCREEK RD	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE	0	STRGHT	01	DRVR	NONE	00	F	OR-Y	LOC	000	011	00	
NONE		MO 12A			CASCADE HY SOUTH	NE	09	YIELD	N	DRY	REAR	PRVTE	PSNGR CAR	01	DRVR	NONE	00	F	UNK	N-RES	LOC	026	000	29		
00577	N N N	02/19/2013	16		S BEAVERCREEK RD	INTER	CROSS	N	N	RAIN	S-1STOP	01	NONE	0	STRGHT	01	DRVR	NONE	53	M	OR-Y	LOC	043,026	000	07	
CITY		TU 6A			CASCADE HY SOUTH	NE	09	YIELD	N	WET	REAR	PRVTE	PSNGR CAR	01	DRVR	NONE	00	F	UNK	N-RES	LOC	026	000	29		
01893	N N N	05/30/2013	14		S BEAVERCREEK RD	INTER	CROSS	N	N	CLD	ANGL-STP	01	NONE	1	TURN-R	01	DRVR	NONE	29	M	OR-Y	LOC	017	017	00	
CITY		TH 2P			CASCADE HY SOUTH	E	06	TRF SIGNAL	N	DRY	TURN	PRVTE	SEMI TOW	01	DRVR	NONE	00	F	OR-Y	LOC	026	000	011	000	00	
00120	N N N	01/09/2014	14		S BEAVERCREEK RD	INTER	CROSS	N	N	RAIN	ANGL-OTH	01	NONE	0	TURN-R	01	DRVR	NONE	48	F	OR-Y	LOC	000	012	00	
NONE		TH 5P			CASCADE HY SOUTH	E	03	TRF SIGNAL	N	WET	TURN	PRVTE	PSNGR CAR	01	DRVR	NONE	00	F	OR-Y	LOC	028	000	011	000	00	
01893	N N N	04/20/2015	14		S BEAVERCREEK RD	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE	0	STRGHT	01	DRVR	NONE	17	F	OR-Y	LOC	026	000	29	
NONE		MO 3P			CASCADE HY SOUTH	E	06	TRF SIGNAL	N	DRY	REAR	PRVTE	PSNGR CAR	01	DRVR	NONE	00	F	OR-Y	LOC	026	000	011	000	00	
04437	N N N	10/27/2015	14		S BEAVERCREEK RD	INTER	4-LEG	N	N	CLR	S-STRGHT	01	NONE	0	STRGHT	01	DRVR	NONE	17	M	OR-Y	LOC	042	000	29	
NONE		TU 5P			CASCADE HY SOUTH	E	06	TRF SIGNAL	N	DRY	REAR	PRVTE	PSNGR CAR	01	DRVR	NONE	00	F	OR-Y	LOC	042	000	011	000	00	

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OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

URBAN NON-SYSTEM CRASH LISTING

S BEAVERCREEK RD at CASCADE HY SOUTH, City of Oregon City, Clackamas County, 01/01/2013 to 12/31/2015

CITY OF OREGON CITY, CLACKAMAS COUNTY

Total crash records: 80

SER#	INVEST	D C S L K TIME	FROM	DIST	CLASS	CITY STREET	RD CHAR	INT-TYPE (MEDIAN)	INT-REL	OFFRD	WTHR	CRASH	SPLD QTY		MOVE	PRIC	INJ	A S	E X RES	LOC	ERROR	ACT EVENT	CAUSE
													LOCN	LOC									
00483	N N N	02/06/2014	14			S BEAVERCREEK RD	INTER	CROSS	N	N	SNOW	S-STRGHT	01 NONE	0	STRGHT	01 DRVR	NONE	59 F	OR-Y	OR<25	000	011	00
						CASCADE HY SOUTH	SE	3	YIELD	N	SNO	REAR	UNKN	PSNGR CAR	SW-NE	01 DRVR	NONE	00 M	UNK	UNK	042	000	07
										N	DLIT	PDO	02 NONE	0	STRGHT								
													PRVTE	PSNGR CAR	SW-NE	01 DRVR	NONE	18 M	OR-Y	OR<25	000	006	00
																					000	00	
01591	N N N	04/26/2014	14			S BEAVERCREEK RD	INTER	CROSS	N	N	CLR	S-1STOP	01 NONE	0	STRGHT	01 DRVR	NONE	28 M	OR-Y	OR<25	026	000	29
						CASCADE HY SOUTH	SE	3	YIELD	N	DRY	REAR	PRVTE	PSNGR CAR	SW-NE	01 DRVR	NONE	00 M	OR-Y	OR<25	000	000	00
										N	DAY	PDO	02 NONE	0	STOP								
													PRVTE	PSNGR CAR	SW-NE	01 DRVR	NONE	69 M	OR-Y	OR<25	000	011	00
																					000	00	
00664	N N N	02/20/2015	14			S BEAVERCREEK RD	INTER	CROSS	N	N	CLR	S-1STOP	01 NONE	0	STRGHT	01 DRVR	NONE	46 M	OR-Y	OR<25	026	000	29
						CASCADE HY SOUTH	SE	3	YIELD	N	DRY	REAR	PRVTE	PSNGR CAR	SW-NE	01 DRVR	NONE	00 M	OR-Y	OR<25	000	000	00
										N	DAY	PDO	02 NONE	0	STOP								
													PRVTE	PSNGR CAR	SW-NE	01 DRVR	NONE	17 F	OR-Y	OR<25	000	011	00
																					000	00	
00930	N N N	03/15/2015	14			S BEAVERCREEK RD	INTER	CROSS	N	N	RAIN	S-1STOP	01 NONE	0	STRGHT	01 DRVR	NONE	20 M	OR-Y	OR<25	026	000	29
						CASCADE HY SOUTH	SE	3	YIELD	N	WET	REAR	PRVTE	PSNGR CAR	SW-NE	01 DRVR	NONE	00 M	OR-Y	OR<25	000	000	00
										N	DAY	PDO	02 NONE	0	STOP								
													PRVTE	PSNGR CAR	SW-NE	01 DRVR	NONE	00 M	UNK	UNK	000	011	00
																					000	00	
03411	N N N	09/13/2013	14			S BEAVERCREEK RD	INTER	CROSS	N	N	CLR	S-1STOP	01 NONE	0	STRGHT	01 DRVR	NONE	63 F	OR-Y	OR<25	026	000	07
						CASCADE HY SOUTH	S	3	TRF SIGNAL	N	DRY	REAR	PRVTE	PSNGR CAR	S -N	01 DRVR	NONE	00 M	UNK	UNK	000	000	00
										N	DAY	PDO	02 NONE	0	STOP								
													PRVTE	PSNGR CAR	S -N	01 DRVR	NONE	00 M	UNK	UNK	000	011	00
																					000	00	
03520	N N N	09/20/2013	14			S BEAVERCREEK RD	INTER	CROSS	N	N	CLR	S-1STOP	01 NONE	0	STRGHT	01 DRVR	NONE	37 M	OR-Y	OR<25	026	000	07
						CASCADE HY SOUTH	S	3	TRF SIGNAL	N	DRY	REAR	PRVTE	PSNGR CAR	S -N	01 DRVR	NONE	00 M	UNK	UNK	000	000	00
										N	DAWN	INJ	02 NONE	0	STOP								
													PRVTE	PSNGR CAR	S -N	01 DRVR	INJC	29 M	OR-Y	OR<25	000	011	00
																					000	00	

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TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

CDS380
01/18/2017

CITY OF OREGON CITY, CLACKAMAS COUNTY
URBAN NON-SYSTEM CRASH LISTING
S BEAVERCREEK RD at CASCADE HY SOUTH, City of Oregon City, Clackamas County, 01/01/2013 to 12/31/2015
Total crash records: 80

SER#	INVEST	P E S E L G H R D A Y F R I D A Y S U N D A Y	CLASS	CITY STREET	RD CHAR	INT-TYPE (MEDIAN)	INT-REL	OFFRD	WTHR	CRASH	SPCL USE	MOVE	FROM	PRIC	INJ	A	S	PED	LOC	ERROR	ACT EVENT	CAUSE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

CDS380
01/18/2017

CITY OF OREGON CITY, CLACKAMAS COUNTY
URBAN NON-SYSTEM CRASH LISTING
S BEAVERCREEK RD at CASCADE HY SOUTH, City of Oregon City, Clackamas County, 01/01/2013 to 12/31/2015
Total crash records: 80

S P E R E L D I N V E S T	D A T E T H T I M E	C L A S S	C I T Y S T R E E T	R D C H A R	I N T - T Y P E (M E D I A N)	O F F R D	W T H R	C R A S H	S P C I A L U S E	M O V E	P R I C E	I N J	A S E L I C N S	P E D	C A U S E																																																																																																																																																																																																												
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CITY OF OREGON CITY, CLACKAMAS COUNTY

S BEAVERCREEK RD at CASCADE HY SOUTH, City of Oregon City, Clackamas County, 01/01/2013 to 12/31/2015

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[illegible]

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HCM Signalized Intersection Capacity Analysis

1: OR-213 & Redland Road

02/12/2017



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	526	126	100	2035	1505	367
Future Volume (vph)	526	126	100	2035	1505	367
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3400	1568	1736	3471	3471	1553
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3400	1568	1736	3471	3471	1553
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	548	131	104	2120	1568	382
RTOR Reduction (vph)	0	18	0	0	0	61
Lane Group Flow (vph)	548	113	104	2120	1568	321
Confl. Peds. (#/hr)			2			
Heavy Vehicles (%)	3%	3%	4%	4%	4%	4%
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Actuated Green, G (s)	23.6	34.7	11.1	87.4	71.8	95.4
Effective Green, g (s)	23.6	34.7	11.1	87.4	71.8	95.4
Actuated g/C Ratio	0.20	0.29	0.09	0.73	0.60	0.80
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	668	512	160	2528	2076	1292
v/s Ratio Prot	c0.16	0.02	0.06	c0.61	0.45	0.05
v/s Ratio Perm		0.05				0.16
v/c Ratio	0.82	0.22	0.65	0.84	0.76	0.25
Uniform Delay, d1	46.2	32.4	52.6	11.4	17.7	3.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.0	0.2	9.1	3.5	2.6	0.1
Delay (s)	54.1	32.6	61.7	14.9	20.3	3.2
Level of Service	D	C	E	B	C	A
Approach Delay (s)	50.0			17.1	16.9	
Approach LOS	D			B	B	
Intersection Summary						
HCM 2000 Control Delay			21.6		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.87			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	13.5
Intersection Capacity Utilization			78.8%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Redland Road & Abernethy Road/Holcomb Boulevard

02/12/2017



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	83	44	90	167	267	195	393	86	128	278	51
Future Volume (vph)	23	83	44	90	167	267	195	393	86	128	278	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1656	1640		1752	1845	1568	1736	1778		1752	1845	1568
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1656	1640		1752	1845	1568	1736	1778		1752	1845	1568
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	25	89	47	97	180	287	210	423	92	138	299	55
RTOR Reduction (vph)	0	27	0	0	0	192	0	11	0	0	0	37
Lane Group Flow (vph)	25	109	0	97	180	95	210	504	0	138	299	18
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	9%	9%	9%	3%	3%	3%	4%	4%	4%	3%	3%	3%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8	1	5	2		1	6	7
Permitted Phases						8						6
Actuated Green, G (s)	2.9	12.1		4.1	13.3	21.1	11.3	21.6		7.8	18.1	21.0
Effective Green, g (s)	2.9	12.1		4.1	13.3	21.1	11.3	21.6		7.8	18.1	21.0
Actuated g/C Ratio	0.05	0.19		0.06	0.21	0.33	0.18	0.34		0.12	0.28	0.33
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	75	312		112	385	631	308	603		214	525	628
v/s Ratio Prot	0.02	0.07		c0.06	c0.10	0.02	c0.12	c0.28		0.08	0.16	0.00
v/s Ratio Perm						0.04						0.01
v/c Ratio	0.33	0.35		0.87	0.47	0.15	0.68	0.84		0.64	0.57	0.03
Uniform Delay, d1	29.4	22.3		29.5	22.0	14.9	24.5	19.4		26.6	19.4	14.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.6	0.7		45.8	0.9	0.1	6.1	9.8		6.5	1.4	0.0
Delay (s)	32.0	23.0		75.3	22.9	15.1	30.6	29.2		33.1	20.8	14.4
Level of Service	C	C		E	C	B	C	C		C	C	B
Approach Delay (s)		24.4			27.9			29.6			23.6	
Approach LOS		C			C			C			C	

Intersection Summary

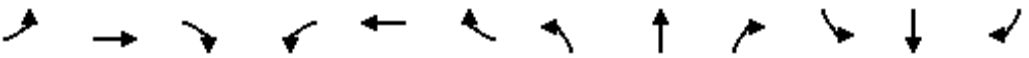
HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	63.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: OR-213 & Beaver Creek Road

02/12/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↕↔		↔↔	↕↕	↗	↗	↕↕	↗	↔↔	↕↕	↗
Traffic Volume (vph)	352	309	15	78	413	0	31	945	93	428	560	554
Future Volume (vph)	352	309	15	78	413	0	31	945	93	428	560	554
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.95		0.97	0.95		1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3273	3348		3400	3505		1719	3438	1538	3335	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3273	3348		3400	3505		1719	3438	1538	3335	3438	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	378	332	16	84	444	0	33	1016	100	460	602	596
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	62	0	0	235
Lane Group Flow (vph)	378	345	0	84	444	0	33	1016	38	460	602	361
Confl. Peds. (#/hr)			4									
Heavy Vehicles (%)	7%	7%	7%	3%	3%	3%	5%	5%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	17.5	31.2		5.8	19.5		4.0	45.4	45.4	19.6	61.0	61.0
Effective Green, g (s)	17.5	31.2		5.8	19.5		4.0	45.4	45.4	19.6	61.0	61.0
Actuated g/C Ratio	0.15	0.26		0.05	0.16		0.03	0.38	0.38	0.16	0.51	0.51
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	477	870		164	569		57	1300	581	544	1747	781
v/s Ratio Prot	c0.12	0.10		0.02	c0.13		0.02	c0.30		c0.14	0.18	
v/s Ratio Perm									0.02			0.24
v/c Ratio	0.79	0.40		0.51	0.78		0.58	0.78	0.07	0.85	0.34	0.46
Uniform Delay, d1	49.5	36.6		55.7	48.2		57.2	32.9	23.8	48.7	17.6	19.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.8	0.3		2.7	6.9		13.5	4.7	0.2	11.6	0.5	2.0
Delay (s)	58.3	36.9		58.4	55.0		70.6	37.6	24.0	60.3	18.1	20.9
Level of Service	E	D		E	E		E	D	C	E	B	C
Approach Delay (s)		48.0			55.6			37.4			30.8	
Approach LOS		D			E			D			C	
Intersection Summary												
HCM 2000 Control Delay			39.0			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			74.8%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: OR-213 & Redland Road

02/13/2017



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	379	166	113	1763	2491	745
Future Volume (vph)	379	166	113	1763	2491	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3400	1568	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3400	1568	1770	3539	3539	1583
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	387	169	115	1799	2542	760
RTOR Reduction (vph)	0	5	0	0	0	20
Lane Group Flow (vph)	387	164	115	1799	2542	740
Heavy Vehicles (%)	3%	3%	2%	2%	2%	2%
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Actuated Green, G (s)	17.6	26.4	8.8	93.4	80.1	97.7
Effective Green, g (s)	17.6	26.4	8.8	93.4	80.1	97.7
Actuated g/C Ratio	0.15	0.22	0.07	0.78	0.67	0.81
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	498	403	129	2754	2362	1348
v/s Ratio Prot	c0.11	0.03	c0.06	0.51	c0.72	0.08
v/s Ratio Perm		0.07				0.39
v/c Ratio	0.78	0.41	0.89	0.65	1.08	0.55
Uniform Delay, d1	49.3	40.1	55.1	6.0	20.0	3.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.5	0.7	47.8	1.2	42.9	0.5
Delay (s)	56.8	40.8	102.9	7.2	62.8	4.2
Level of Service	E	D	F	A	E	A
Approach Delay (s)	51.9			13.0	49.4	
Approach LOS	D			B	D	

Intersection Summary

HCM 2000 Control Delay	37.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	97.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Redland Road & Abernethy Road/Holcomb Boulevard

02/13/2017



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	134	169	56	89	173	62	286	57	280	509	61
Future Volume (vph)	51	134	169	56	89	173	62	286	57	280	509	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.92		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1681		1787	1881	1599	1770	1817		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1681		1787	1881	1599	1770	1817		1770	1863	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	55	144	182	60	96	186	67	308	61	301	547	66
RTOR Reduction (vph)	0	62	0	0	0	109	0	10	0	0	0	35
Lane Group Flow (vph)	55	264	0	60	96	77	67	359	0	301	547	31
Confl. Peds. (#/hr)			4									
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8	1	5	2		1	6	7
Permitted Phases						8						6
Actuated Green, G (s)	3.7	15.3		2.6	14.2	28.3	3.8	18.1		14.1	28.4	32.1
Effective Green, g (s)	3.7	15.3		2.6	14.2	28.3	3.8	18.1		14.1	28.4	32.1
Actuated g/C Ratio	0.05	0.22		0.04	0.21	0.42	0.06	0.27		0.21	0.42	0.47
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	96	377		68	392	770	98	482		366	776	850
v/s Ratio Prot	0.03	c0.16		c0.03	0.05	0.02	0.04	0.20		c0.17	c0.29	0.00
v/s Ratio Perm						0.03						0.02
v/c Ratio	0.57	0.70		0.88	0.24	0.10	0.68	0.75		0.82	0.70	0.04
Uniform Delay, d1	31.4	24.3		32.6	22.5	12.1	31.6	22.9		25.8	16.4	9.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	8.0	5.8		69.4	0.3	0.1	17.9	6.2		13.8	2.9	0.0
Delay (s)	39.4	30.1		102.0	22.8	12.2	49.5	29.1		39.6	19.3	9.7
Level of Service	D	C		F	C	B	D	C		D	B	A
Approach Delay (s)		31.4			30.9			32.2			25.3	
Approach LOS		C			C			C			C	

Intersection Summary

HCM 2000 Control Delay	28.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	68.1	Sum of lost time (s)	18.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: OR-213 & Beaver Creek Road

02/13/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	689	717	75	143	401	441	46	714	140	781	1157	738
Future Volume (vph)	689	717	75	143	401	441	46	714	140	781	1157	738
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3467	3516		3467	3574	1577	1752	3505	1546	3433	3539	1555
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3467	3516		3467	3574	1577	1752	3505	1546	3433	3539	1555
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	710	739	77	147	413	455	47	736	144	805	1193	761
RTOR Reduction (vph)	0	6	0	0	0	319	0	0	109	0	0	308
Lane Group Flow (vph)	710	810	0	147	413	136	47	736	35	805	1193	453
Confl. Peds. (#/hr)			6			1			1			3
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	3%	3%	3%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	25.7	35.9		7.7	17.9	17.9	4.7	29.0	29.0	29.4	53.7	53.7
Effective Green, g (s)	25.7	35.9		7.7	17.9	17.9	4.7	29.0	29.0	29.4	53.7	53.7
Actuated g/C Ratio	0.21	0.30		0.06	0.15	0.15	0.04	0.24	0.24	0.24	0.45	0.45
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	742	1051		222	533	235	68	847	373	841	1583	695
v/s Ratio Prot	c0.20	c0.23		0.04	0.12		0.03	c0.21		c0.23	0.34	
v/s Ratio Perm						0.09			0.02			0.29
v/c Ratio	0.96	0.77		0.66	0.77	0.58	0.69	0.87	0.09	0.96	0.75	0.65
Uniform Delay, d1	46.6	38.3		54.9	49.1	47.5	56.9	43.7	35.3	44.7	27.6	25.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	22.8	3.5		7.2	6.9	3.4	26.1	11.7	0.5	21.0	3.4	4.7
Delay (s)	69.4	41.8		62.1	56.1	51.0	83.1	55.4	35.8	65.7	31.0	30.5
Level of Service	E	D		E	E	D	F	E	D	E	C	C
Approach Delay (s)		54.7			54.6			53.8			41.0	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			48.5		HCM 2000 Level of Service					D		
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			120.0		Sum of lost time (s)					18.0		
Intersection Capacity Utilization			87.9%		ICU Level of Service					E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: OR-213 & Redland Road

02/13/2017



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	754	181	143	2302	1703	526
Future Volume (vph)	754	181	143	2302	1703	526
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3400	1568	1736	3471	3471	1553
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3400	1568	1736	3471	3471	1553
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	785	189	149	2398	1774	548
RTOR Reduction (vph)	0	9	0	0	0	28
Lane Group Flow (vph)	785	180	149	2398	1774	520
Confl. Peds. (#/hr)			2			
Heavy Vehicles (%)	3%	3%	4%	4%	4%	4%
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Actuated Green, G (s)	28.5	39.9	11.4	82.5	66.6	95.1
Effective Green, g (s)	28.5	39.9	11.4	82.5	66.6	95.1
Actuated g/C Ratio	0.24	0.33	0.10	0.69	0.55	0.79
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	807	580	164	2386	1926	1288
v/s Ratio Prot	c0.23	0.03	0.09	c0.69	0.51	0.10
v/s Ratio Perm		0.09				0.24
v/c Ratio	0.97	0.31	0.91	1.01	0.92	0.40
Uniform Delay, d1	45.4	29.8	53.8	18.8	24.3	3.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	25.0	0.3	44.2	19.6	8.8	0.2
Delay (s)	70.3	30.1	98.0	38.4	33.1	4.0
Level of Service	E	C	F	D	C	A
Approach Delay (s)	62.5			41.9	26.2	
Approach LOS	E			D	C	
Intersection Summary						
HCM 2000 Control Delay			39.1		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.04			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	13.5
Intersection Capacity Utilization			92.6%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Redland Road & Abernethy Road/Holcomb Boulevard

02/13/2017



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	119	63	43	239	383	279	563	41	183	398	73
Future Volume (vph)	33	119	63	43	239	383	279	563	41	183	398	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1656	1640		1752	1845	1568	1736	1808		1752	1845	1568
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1656	1640		1752	1845	1568	1736	1808		1752	1845	1568
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	35	128	68	46	257	412	300	605	44	197	428	78
RTOR Reduction (vph)	0	26	0	0	0	126	0	3	0	0	0	51
Lane Group Flow (vph)	35	170	0	46	257	286	300	646	0	197	428	27
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	9%	9%	9%	3%	3%	3%	4%	4%	4%	3%	3%	3%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8	1	5	2		1	6	7
Permitted Phases						8						6
Actuated Green, G (s)	3.8	16.1		2.8	15.1	23.9	13.9	25.6		8.8	20.5	24.3
Effective Green, g (s)	3.8	16.1		2.8	15.1	23.9	13.9	25.6		8.8	20.5	24.3
Actuated g/C Ratio	0.05	0.23		0.04	0.21	0.34	0.19	0.36		0.12	0.29	0.34
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	88	370		68	390	624	338	649		216	530	633
v/s Ratio Prot	0.02	0.10		c0.03	c0.14	0.06	c0.17	c0.36		0.11	0.23	0.00
v/s Ratio Perm						0.13						0.01
v/c Ratio	0.40	0.46		0.68	0.66	0.46	0.89	1.00		0.91	0.81	0.04
Uniform Delay, d1	32.6	23.8		33.8	25.7	18.6	27.9	22.8		30.9	23.6	15.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.9	0.9		23.5	4.0	0.5	23.3	33.9		37.8	8.8	0.0
Delay (s)	35.6	24.7		57.3	29.7	19.2	51.2	56.7		68.7	32.4	15.7
Level of Service	D	C		E	C	B	D	E		E	C	B
Approach Delay (s)		26.4			25.4			54.9			40.7	
Approach LOS		C			C			D			D	

Intersection Summary

HCM 2000 Control Delay	40.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	71.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: OR-213 & Beaver Creek Road

02/13/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	505	443	21	112	592	0	44	1069	133	613	634	794
Future Volume (vph)	505	443	21	112	592	0	44	1069	133	613	634	794
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.95		0.97	0.95		1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3273	3347		3335	3438		1719	3438	1538	3335	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3273	3347		3335	3438		1719	3438	1538	3335	3438	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	543	476	23	120	637	0	47	1149	143	659	682	854
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	95	0	0	220
Lane Group Flow (vph)	543	496	0	120	637	0	47	1149	48	659	682	634
Confl. Peds. (#/hr)			4									
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	18.9	31.2		8.3	20.6		4.2	40.0	40.0	22.5	58.3	58.3
Effective Green, g (s)	18.9	31.2		8.3	20.6		4.2	40.0	40.0	22.5	58.3	58.3
Actuated g/C Ratio	0.16	0.26		0.07	0.17		0.04	0.33	0.33	0.19	0.49	0.49
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	515	870		230	590		60	1146	512	625	1670	747
v/s Ratio Prot	c0.17	0.15		0.04	c0.19		0.03	c0.33		c0.20	0.20	
v/s Ratio Perm									0.03			0.41
v/c Ratio	1.05	0.57		0.52	1.08		0.78	1.00	0.09	1.05	0.41	0.85
Uniform Delay, d1	50.6	38.6		53.9	49.7		57.4	40.0	27.5	48.8	19.8	27.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	54.8	0.9		2.1	60.4		47.5	27.2	0.4	51.2	0.7	11.6
Delay (s)	105.3	39.5		56.1	110.1		105.0	67.2	27.9	99.9	20.5	38.5
Level of Service	F	D		E	F		F	E	C	F	C	D
Approach Delay (s)		73.8			101.5			64.3			51.4	
Approach LOS		E			F			E			D	
Intersection Summary												
HCM 2000 Control Delay			66.1			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			92.8%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: OR-213 & Redland Road

02/13/2017



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	543	238	162	1595	2890	1068
Future Volume (vph)	543	238	162	1595	2890	1068
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3400	1568	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3400	1568	1770	3539	3539	1583
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	554	243	165	1628	2949	1090
RTOR Reduction (vph)	0	2	0	0	0	9
Lane Group Flow (vph)	554	241	165	1628	2949	1081
Heavy Vehicles (%)	3%	3%	2%	2%	2%	2%
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Actuated Green, G (s)	19.5	28.0	8.5	91.5	78.5	98.0
Effective Green, g (s)	19.5	28.0	8.5	91.5	78.5	98.0
Actuated g/C Ratio	0.16	0.23	0.07	0.76	0.65	0.82
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	552	424	125	2698	2315	1352
v/s Ratio Prot	c0.16	0.04	c0.09	0.46	c0.83	0.13
v/s Ratio Perm		0.11				0.55
v/c Ratio	1.00	0.57	1.32	0.60	1.27	0.80
Uniform Delay, d1	50.2	40.7	55.8	6.3	20.8	5.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	39.2	1.8	189.2	1.0	126.8	3.4
Delay (s)	89.4	42.4	245.0	7.3	147.5	9.2
Level of Service	F	D	F	A	F	A
Approach Delay (s)	75.1			29.2	110.2	
Approach LOS	E			C	F	

Intersection Summary

HCM 2000 Control Delay	84.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	115.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Redland Road & Abernethy Road/Holcomb Boulevard

02/13/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	192	242	27	128	248	89	410	27	401	730	87
Future Volume (vph)	73	192	242	27	128	248	89	410	27	401	730	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.92		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1680		1787	1881	1599	1770	1846		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1680		1787	1881	1599	1770	1846		1770	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	77	202	255	28	135	261	94	432	28	422	768	92
RTOR Reduction (vph)	0	60	0	0	0	77	0	3	0	0	0	48
Lane Group Flow (vph)	77	397	0	28	135	184	94	457	0	422	768	44
Confl. Peds. (#/hr)			4									
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8	1	5	2		1	6	7
Permitted Phases						8						6
Actuated Green, G (s)	4.0	18.4		1.9	16.3	31.9	4.0	19.5		15.6	31.1	35.1
Effective Green, g (s)	4.0	18.4		1.9	16.3	31.9	4.0	19.5		15.6	31.1	35.1
Actuated g/C Ratio	0.05	0.25		0.03	0.22	0.43	0.05	0.27		0.21	0.42	0.48
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	96	421		46	417	792	96	490		376	789	854
v/s Ratio Prot	c0.04	c0.24		0.02	0.07	0.05	0.05	0.25		c0.24	c0.41	0.00
v/s Ratio Perm						0.07						0.02
v/c Ratio	0.80	0.94		0.61	0.32	0.23	0.98	0.93		1.12	0.97	0.05
Uniform Delay, d1	34.3	27.0		35.4	23.9	13.1	34.7	26.3		28.9	20.7	10.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	36.6	29.7		20.7	0.5	0.2	84.1	24.9		83.9	25.4	0.0
Delay (s)	70.9	56.7		56.1	24.4	13.2	118.8	51.2		112.8	46.2	10.3
Level of Service	E	E		E	C	B	F	D		F	D	B
Approach Delay (s)		58.7			19.6			62.6			65.5	
Approach LOS		E			B			E			E	
Intersection Summary												
HCM 2000 Control Delay			56.7									HCM 2000 Level of Service E
HCM 2000 Volume to Capacity ratio			1.07									
Actuated Cycle Length (s)			73.4									Sum of lost time (s) 18.0
Intersection Capacity Utilization			89.8%									ICU Level of Service E
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: OR-213 & Beaver Creek Road

02/13/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	489	945	70	90	700	559	55	709	130	1044	1424	660
Future Volume (vph)	489	945	70	90	700	559	55	709	130	1044	1424	660
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3467	3532		3467	3574	1577	1752	3505	1546	3433	3539	1555
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3467	3532		3467	3574	1577	1752	3505	1546	3433	3539	1555
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	504	974	72	93	722	576	57	731	134	1076	1468	680
RTOR Reduction (vph)	0	4	0	0	0	396	0	0	105	0	0	184
Lane Group Flow (vph)	504	1042	0	93	722	180	57	731	29	1076	1468	496
Confl. Peds. (#/hr)			6			1			1			3
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	3%	3%	3%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	16.8	35.2		5.1	23.5	23.5	4.0	26.2	26.2	35.5	57.7	57.7
Effective Green, g (s)	16.8	35.2		5.1	23.5	23.5	4.0	26.2	26.2	35.5	57.7	57.7
Actuated g/C Ratio	0.14	0.29		0.04	0.20	0.20	0.03	0.22	0.22	0.30	0.48	0.48
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	485	1036		147	699	308	58	765	337	1015	1701	747
v/s Ratio Prot	c0.15	c0.29		0.03	0.20		0.03	c0.21		c0.31	0.41	
v/s Ratio Perm						0.11			0.02			0.32
v/c Ratio	1.04	1.01		0.63	1.03	0.59	0.98	0.96	0.09	1.06	0.86	0.66
Uniform Delay, d1	51.6	42.4		56.5	48.2	43.8	58.0	46.3	37.4	42.2	27.6	23.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	51.4	29.3		8.6	42.8	2.8	111.4	23.3	0.5	45.6	6.1	4.6
Delay (s)	103.0	71.7		65.1	91.0	46.7	169.4	69.7	37.9	87.8	33.7	28.4
Level of Service	F	E		E	F	D	F	E	D	F	C	C
Approach Delay (s)		81.9			70.9			71.2			50.7	
Approach LOS		F			E			E			D	
Intersection Summary												
HCM 2000 Control Delay			64.1									HCM 2000 Level of Service E
HCM 2000 Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			120.0									Sum of lost time (s) 18.0
Intersection Capacity Utilization			97.7%									ICU Level of Service F
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: OR-213 & Redland Road

02/13/2017



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	782	184	144	2302	1703	535
Future Volume (vph)	782	184	144	2302	1703	535
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3400	1568	1736	3471	3471	1553
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3400	1568	1736	3471	3471	1553
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	815	192	150	2398	1774	557
RTOR Reduction (vph)	0	9	0	0	0	28
Lane Group Flow (vph)	815	183	150	2398	1774	529
Confl. Peds. (#/hr)			2			
Heavy Vehicles (%)	3%	3%	4%	4%	4%	4%
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Actuated Green, G (s)	28.5	39.9	11.4	82.5	66.6	95.1
Effective Green, g (s)	28.5	39.9	11.4	82.5	66.6	95.1
Actuated g/C Ratio	0.24	0.33	0.10	0.69	0.55	0.79
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	807	580	164	2386	1926	1288
v/s Ratio Prot	c0.24	0.03	0.09	c0.69	0.51	0.10
v/s Ratio Perm		0.09				0.24
v/c Ratio	1.01	0.31	0.91	1.01	0.92	0.41
Uniform Delay, d1	45.8	29.9	53.8	18.8	24.3	3.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	34.1	0.3	45.9	19.6	8.8	0.2
Delay (s)	79.9	30.2	99.7	38.4	33.1	4.0
Level of Service	E	C	F	D	C	A
Approach Delay (s)	70.4			42.0	26.1	
Approach LOS	E			D	C	

Intersection Summary

HCM 2000 Control Delay	40.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	93.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: Redland Road & Abernethy Road/Holcomb Boulevard

02/13/2017



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	124	63	54	256	414	279	563	45	193	398	73
Future Volume (vph)	33	124	63	54	256	414	279	563	45	193	398	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1656	1642		1752	1845	1568	1736	1807		1752	1845	1568
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1656	1642		1752	1845	1568	1736	1807		1752	1845	1568
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	35	133	68	58	275	445	300	605	48	208	428	78
RTOR Reduction (vph)	0	25	0	0	0	125	0	4	0	0	0	52
Lane Group Flow (vph)	35	176	0	58	275	320	300	649	0	208	428	26
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	9%	9%	9%	3%	3%	3%	4%	4%	4%	3%	3%	3%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8	1	5	2		1	6	7
Permitted Phases						8						6
Actuated Green, G (s)	3.8	16.6		2.8	15.6	24.4	13.9	25.6		8.8	20.5	24.3
Effective Green, g (s)	3.8	16.6		2.8	15.6	24.4	13.9	25.6		8.8	20.5	24.3
Actuated g/C Ratio	0.05	0.23		0.04	0.22	0.34	0.19	0.36		0.12	0.29	0.34
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	87	379		68	400	631	336	644		214	526	628
v/s Ratio Prot	0.02	0.11		c0.03	c0.15	0.06	c0.17	c0.36		0.12	0.23	0.00
v/s Ratio Perm						0.14						0.01
v/c Ratio	0.40	0.47		0.85	0.69	0.51	0.89	1.01		0.97	0.81	0.04
Uniform Delay, d1	32.9	23.8		34.3	25.9	18.9	28.2	23.1		31.4	23.9	15.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.0	0.9		60.8	4.9	0.6	24.4	37.4		53.2	9.4	0.0
Delay (s)	35.9	24.7		95.1	30.7	19.6	52.6	60.5		84.6	33.2	16.0
Level of Service	D	C		F	C	B	D	E		F	C	B
Approach Delay (s)		26.4			29.1			58.1			46.3	
Approach LOS		C			C			E			D	

Intersection Summary

HCM 2000 Control Delay	43.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	71.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: OR-213 & Beaver Creek Road

02/13/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↕↔		↔↔	↕↕	↕	↔	↕↕	↕	↔↔	↕↕	↕
Traffic Volume (vph)	505	443	21	112	592	0	44	1070	133	614	635	795
Future Volume (vph)	505	443	21	112	592	0	44	1070	133	614	635	795
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.95		0.97	0.95		1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3273	3347		3400	3505		1719	3438	1538	3335	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3273	3347		3400	3505		1719	3438	1538	3335	3438	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	543	476	23	120	637	0	47	1151	143	660	683	855
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	95	0	0	220
Lane Group Flow (vph)	543	496	0	120	637	0	47	1151	48	660	683	635
Confl. Peds. (#/hr)			4									
Heavy Vehicles (%)	7%	7%	7%	3%	3%	3%	5%	5%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	18.9	31.3		8.2	20.6		4.2	40.0	40.0	22.5	58.3	58.3
Effective Green, g (s)	18.9	31.3		8.2	20.6		4.2	40.0	40.0	22.5	58.3	58.3
Actuated g/C Ratio	0.16	0.26		0.07	0.17		0.04	0.33	0.33	0.19	0.49	0.49
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	515	873		232	601		60	1146	512	625	1670	747
v/s Ratio Prot	c0.17	0.15		0.04	c0.18		0.03	c0.33		c0.20	0.20	
v/s Ratio Perm									0.03			0.41
v/c Ratio	1.05	0.57		0.52	1.06		0.78	1.00	0.09	1.06	0.41	0.85
Uniform Delay, d1	50.6	38.5		54.0	49.7		57.4	40.0	27.5	48.8	19.8	27.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	54.8	0.9		1.9	53.6		47.5	27.6	0.4	51.7	0.7	11.6
Delay (s)	105.3	39.3		55.9	103.3		105.0	67.6	27.9	100.4	20.5	38.7
Level of Service	F	D		E	F		F	E	C	F	C	D
Approach Delay (s)		73.7			95.8			64.7			51.6	
Approach LOS		E			F			E			D	
Intersection Summary												
HCM 2000 Control Delay			65.5			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			92.9%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: OR-213 & Redland Road

02/13/2017



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	561	240	165	1595	2890	1099
Future Volume (vph)	561	240	165	1595	2890	1099
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3400	1568	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3400	1568	1770	3539	3539	1583
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	572	245	168	1628	2949	1121
RTOR Reduction (vph)	0	2	0	0	0	8
Lane Group Flow (vph)	572	243	168	1628	2949	1113
Heavy Vehicles (%)	3%	3%	2%	2%	2%	2%
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Actuated Green, G (s)	19.5	28.0	8.5	91.5	78.5	98.0
Effective Green, g (s)	19.5	28.0	8.5	91.5	78.5	98.0
Actuated g/C Ratio	0.16	0.23	0.07	0.76	0.65	0.82
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	552	424	125	2698	2315	1352
v/s Ratio Prot	c0.17	0.04	c0.09	0.46	c0.83	0.13
v/s Ratio Perm		0.11				0.57
v/c Ratio	1.04	0.57	1.34	0.60	1.27	0.82
Uniform Delay, d1	50.2	40.7	55.8	6.3	20.8	6.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	48.0	1.9	198.6	1.0	126.8	4.2
Delay (s)	98.2	42.6	254.4	7.3	147.5	10.3
Level of Service	F	D	F	A	F	B
Approach Delay (s)	81.6			30.4	109.7	
Approach LOS	F			C	F	

Intersection Summary

HCM 2000 Control Delay	85.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	116.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

2: Redland Road & Abernethy Road/Holcomb Boulevard

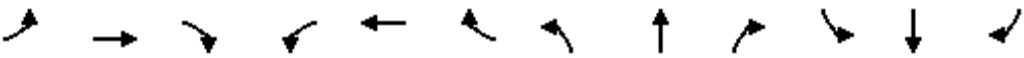
02/13/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	211	242	34	139	268	89	410	39	435	730	87
Future Volume (vph)	73	211	242	34	139	268	89	410	39	435	730	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.92		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1688		1787	1881	1599	1770	1839		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1688		1787	1881	1599	1770	1839		1770	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	77	222	255	36	146	282	94	432	41	458	768	92
RTOR Reduction (vph)	0	55	0	0	0	76	0	4	0	0	0	48
Lane Group Flow (vph)	77	422	0	36	146	206	94	469	0	458	768	44
Confl. Peds. (#/hr)			4									
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8	1	5	2		1	6	7
Permitted Phases						8						6
Actuated Green, G (s)	3.9	18.2		2.9	17.2	32.8	3.9	19.5		15.6	31.2	35.1
Effective Green, g (s)	3.9	18.2		2.9	17.2	32.8	3.9	19.5		15.6	31.2	35.1
Actuated g/C Ratio	0.05	0.25		0.04	0.23	0.44	0.05	0.26		0.21	0.42	0.47
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	93	414		69	436	803	93	483		372	783	844
v/s Ratio Prot	c0.04	c0.25		0.02	0.08	0.05	0.05	0.25		c0.26	c0.41	0.00
v/s Ratio Perm						0.07						0.02
v/c Ratio	0.83	1.02		0.52	0.33	0.26	1.01	0.97		1.23	0.98	0.05
Uniform Delay, d1	34.8	28.0		35.0	23.7	13.0	35.1	27.1		29.3	21.2	10.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	42.7	49.2		6.9	0.5	0.2	96.3	33.2		125.4	27.3	0.0
Delay (s)	77.6	77.2		41.9	24.2	13.2	131.4	60.3		154.7	48.5	10.6
Level of Service	E	E		D	C	B	F	E		F	D	B
Approach Delay (s)		77.2			18.9			72.1			82.8	
Approach LOS		E			B			E			F	
Intersection Summary												
HCM 2000 Control Delay			69.4				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			1.11									
Actuated Cycle Length (s)			74.2				Sum of lost time (s)			18.0		
Intersection Capacity Utilization			93.4%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: OR-213 & Beaver Creek Road

02/13/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↕↔		↔↔	↕↕	↔	↔	↕↕	↔	↔↔	↕↕	↔
Traffic Volume (vph)	490	945	70	90	700	560	55	710	130	1045	1425	660
Future Volume (vph)	490	945	70	90	700	560	55	710	130	1045	1425	660
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3467	3532		3467	3574	1577	1752	3505	1546	3433	3539	1555
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3467	3532		3467	3574	1577	1752	3505	1546	3433	3539	1555
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	505	974	72	93	722	577	57	732	134	1077	1469	680
RTOR Reduction (vph)	0	4	0	0	0	396	0	0	105	0	0	183
Lane Group Flow (vph)	505	1042	0	93	722	181	57	732	29	1077	1469	497
Confl. Peds. (#/hr)			6			1			1			3
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	3%	3%	3%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	16.7	35.1		5.1	23.5	23.5	4.0	26.3	26.3	35.5	57.8	57.8
Effective Green, g (s)	16.7	35.1		5.1	23.5	23.5	4.0	26.3	26.3	35.5	57.8	57.8
Actuated g/C Ratio	0.14	0.29		0.04	0.20	0.20	0.03	0.22	0.22	0.30	0.48	0.48
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	482	1033		147	699	308	58	768	338	1015	1704	748
v/s Ratio Prot	c0.15	c0.29		0.03	0.20		0.03	c0.21		c0.31	0.42	
v/s Ratio Perm						0.12			0.02			0.32
v/c Ratio	1.05	1.01		0.63	1.03	0.59	0.98	0.95	0.09	1.06	0.86	0.66
Uniform Delay, d1	51.6	42.5		56.5	48.2	43.9	58.0	46.2	37.3	42.2	27.6	23.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	54.0	30.1		8.6	42.8	2.9	111.4	22.9	0.5	45.9	6.0	4.6
Delay (s)	105.7	72.5		65.1	91.0	46.7	169.4	69.1	37.8	88.2	33.6	28.3
Level of Service	F	E		E	F	D	F	E	D	F	C	C
Approach Delay (s)		83.3			70.9			70.8			50.7	
Approach LOS		F			E			E			D	
Intersection Summary												
HCM 2000 Control Delay			64.4									HCM 2000 Level of Service E
HCM 2000 Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			120.0									Sum of lost time (s) 18.0
Intersection Capacity Utilization			97.8%									ICU Level of Service F
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: OR-213 & Redland Road

02/13/2017



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	←←←		←	↑↑	↑↑	→
Traffic Volume (vph)	782	184	144	2302	1703	535
Future Volume (vph)	782	184	144	2302	1703	535
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5	4.5	4.5	4.5
Lane Util. Factor	0.94		1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.97		1.00	1.00	1.00	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	4857		1736	3471	3471	1553
Flt Permitted	0.96		0.95	1.00	1.00	1.00
Satd. Flow (perm)	4857		1736	3471	3471	1553
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	815	192	150	2398	1774	557
RTOR Reduction (vph)	35	0	0	0	0	29
Lane Group Flow (vph)	972	0	150	2398	1774	528
Confl. Peds. (#/hr)			2			
Heavy Vehicles (%)	3%	3%	4%	4%	4%	4%
Turn Type	Prot		Prot	NA	NA	pm+ov
Protected Phases	4		5	2	6	4
Permitted Phases						6
Actuated Green, G (s)	25.0		11.5	86.0	70.0	95.0
Effective Green, g (s)	25.0		11.5	86.0	70.0	95.0
Actuated g/C Ratio	0.21		0.10	0.72	0.58	0.79
Clearance Time (s)	4.5		4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1011		166	2487	2024	1287
v/s Ratio Prot	c0.20		0.09	c0.69	0.51	0.09
v/s Ratio Perm						0.25
v/c Ratio	0.96		0.90	0.96	0.88	0.41
Uniform Delay, d1	47.0		53.7	15.6	21.3	3.9
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	19.6		42.9	11.4	5.7	0.2
Delay (s)	66.6		96.6	27.0	27.0	4.1
Level of Service	E		F	C	C	A
Approach Delay (s)	66.6			31.1	21.5	
Approach LOS	E			C	C	
Intersection Summary						
HCM 2000 Control Delay			33.4		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			1.00			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	13.5
Intersection Capacity Utilization			89.9%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Redland Road & Abernethy Road/Holcomb Boulevard

02/13/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	124	63	54	256	414	279	563	45	193	398	73
Future Volume (vph)	33	124	63	54	256	414	279	563	45	193	398	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1656	1743	1449	1752	1845	1568	1736	1807		1752	1845	1568
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1656	1743	1449	1752	1845	1568	1736	1807		1752	1845	1568
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	35	133	68	58	275	445	300	605	48	208	428	78
RTOR Reduction (vph)	0	0	52	0	0	125	0	4	0	0	0	52
Lane Group Flow (vph)	35	133	16	58	275	320	300	649	0	208	428	26
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	9%	9%	9%	3%	3%	3%	4%	4%	4%	3%	3%	3%
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8	1	5	2		1	6	7
Permitted Phases			4			8						6
Actuated Green, G (s)	3.8	16.6	16.6	2.8	15.6	24.4	13.9	25.6		8.8	20.5	24.3
Effective Green, g (s)	3.8	16.6	16.6	2.8	15.6	24.4	13.9	25.6		8.8	20.5	24.3
Actuated g/C Ratio	0.05	0.23	0.23	0.04	0.22	0.34	0.19	0.36		0.12	0.29	0.34
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	87	402	335	68	400	631	336	644		214	526	628
v/s Ratio Prot	0.02	0.08		c0.03	c0.15	0.06	c0.17	c0.36		0.12	0.23	0.00
v/s Ratio Perm			0.01			0.14						0.01
v/c Ratio	0.40	0.33	0.05	0.85	0.69	0.51	0.89	1.01		0.97	0.81	0.04
Uniform Delay, d1	32.9	23.0	21.5	34.3	25.9	18.9	28.2	23.1		31.4	23.9	15.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.0	0.5	0.1	60.8	4.9	0.6	24.4	37.4		53.2	9.4	0.0
Delay (s)	35.9	23.5	21.5	95.1	30.7	19.6	52.6	60.5		84.6	33.2	16.0
Level of Service	D	C	C	F	C	B	D	E		F	C	B
Approach Delay (s)		24.7			29.1			58.1			46.3	
Approach LOS		C			C			E			D	
Intersection Summary												
HCM 2000 Control Delay			43.6									D
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			71.8									18.0
Intersection Capacity Utilization			75.7%									D
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: OR-213 & Redland Road

02/13/2017



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	←←←		←	↑↑	↑↑	←
Traffic Volume (vph)	561	240	165	1595	2890	1099
Future Volume (vph)	561	240	165	1595	2890	1099
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5	4.5	4.5	4.5
Lane Util. Factor	0.94		1.00	0.95	0.95	1.00
Frt	0.96		1.00	1.00	1.00	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	4800		1770	3539	3539	1583
Flt Permitted	0.97		0.95	1.00	1.00	1.00
Satd. Flow (perm)	4800		1770	3539	3539	1583
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	572	245	168	1628	2949	1121
RTOR Reduction (vph)	64	0	0	0	0	8
Lane Group Flow (vph)	753	0	168	1628	2949	1113
Heavy Vehicles (%)	3%	3%	2%	2%	2%	2%
Turn Type	Prot		Prot	NA	NA	pm+ov
Protected Phases	4		5	2	6	4
Permitted Phases						6
Actuated Green, G (s)	18.5		8.5	92.5	79.5	98.0
Effective Green, g (s)	18.5		8.5	92.5	79.5	98.0
Actuated g/C Ratio	0.15		0.07	0.77	0.66	0.82
Clearance Time (s)	4.5		4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	740		125	2727	2344	1352
v/s Ratio Prot	c0.16		c0.09	0.46	c0.83	0.13
v/s Ratio Perm						0.58
v/c Ratio	1.02		1.34	0.60	1.26	0.82
Uniform Delay, d1	50.8		55.8	5.8	20.2	6.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	37.5		198.6	1.0	119.8	4.2
Delay (s)	88.2		254.4	6.8	140.0	10.3
Level of Service	F		F	A	F	B
Approach Delay (s)	88.2			30.0	104.3	
Approach LOS	F			C	F	
Intersection Summary						
HCM 2000 Control Delay			82.4		HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio			1.22			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	13.5
Intersection Capacity Utilization			116.0%		ICU Level of Service	H
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Redland Road & Abernethy Road/Holcomb Boulevard

02/13/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	211	242	34	139	268	89	410	39	435	730	87
Future Volume (vph)	73	211	242	34	139	268	89	410	39	435	730	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1539	1787	1881	1599	1770	1839		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1539	1787	1881	1599	1770	1839		1770	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	77	222	255	36	146	282	94	432	41	458	768	92
RTOR Reduction (vph)	0	0	198	0	0	79	0	4	0	0	0	46
Lane Group Flow (vph)	77	222	57	36	146	203	94	469	0	458	768	46
Confl. Peds. (#/hr)			4									
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8	1	5	2		1	6	7
Permitted Phases			4			8						6
Actuated Green, G (s)	3.8	16.0	16.0	1.8	14.0	29.7	3.8	19.7		15.7	31.6	35.4
Effective Green, g (s)	3.8	16.0	16.0	1.8	14.0	29.7	3.8	19.7		15.7	31.6	35.4
Actuated g/C Ratio	0.05	0.22	0.22	0.03	0.20	0.42	0.05	0.28		0.22	0.44	0.50
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	94	418	345	45	369	768	94	508		390	826	887
v/s Ratio Prot	c0.04	c0.12		0.02	0.08	0.06	0.05	0.25		c0.26	c0.41	0.00
v/s Ratio Perm			0.04			0.07						0.03
v/c Ratio	0.82	0.53	0.17	0.80	0.40	0.26	1.00	0.92		1.17	0.93	0.05
Uniform Delay, d1	33.4	24.3	22.2	34.5	24.9	13.6	33.7	25.0		27.8	18.7	9.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	40.4	1.3	0.2	63.7	0.7	0.2	92.8	22.4		102.3	16.5	0.0
Delay (s)	73.7	25.6	22.5	98.2	25.6	13.8	126.5	47.4		130.1	35.3	9.3
Level of Service	E	C	C	F	C	B	F	D		F	D	A
Approach Delay (s)		30.8			24.1			60.5			66.4	
Approach LOS		C			C			E			E	
Intersection Summary												
HCM 2000 Control Delay			51.7									D
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			71.2									18.0
Intersection Capacity Utilization			78.8%									D
Analysis Period (min)			15									
c Critical Lane Group												