

**20646 AND 20666 S. HIGHWAY 213 ZONE CHANGE
TRAFFIC IMPACT STUDY**

CLACKAMAS COUNTY, OREGON

DATE:
July 21, 2016

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EXPIRES: 12/31/17



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EXECUTIVE SUMMARY

1. A zone change from RRFF-5 (Residential Farm/Forest 5 Acres) to RI (Rural Industrial) is proposed for properties with a total area of 8.15 acres along the east side of S. Highway 213 south of S. Henrici Road in Clackamas County.
2. Under the proposed zoning, development of the subject property could result in an increase of 174 net new site trips during the morning peak hour and 213 trips during the evening peak hour as compared to the permitted uses under the existing RRFF-5 zoning.
3. Based on the most recent five years of crash data, the study area intersections are currently operating acceptably with respect to safety. No safety mitigations are recommended.
4. Upon any future development resulting in an increase in site trips on the subject property, the existing site access driveways should be closed and a new driveway should be constructed at a location providing a minimum of 610 feet of intersection sight distance in each direction. Additionally, a southbound left-turn lane should be constructed on Highway 213 to serve traffic entering the site.
5. In conjunction with any future development proposals on the subject property a proportionate share of project costs for the necessary improvements at Highway 213 and Henrici Road should be collected for the development.
6. If at any point the site trip generation associated with a proposed development on the subject property is projected to exceed 154 total trips during the evening peak hour, a westbound left-turn lane should be constructed to serve the site.
7. If the trip generation for the subject property is projected to exceed 186 total trips during the evening peak hour, the highway should be reconstructed to accommodate two-stage left turns at the site access.
8. Conditions of approval requiring the above improvements at the identified times are sufficient to meet the requirements of Oregon's Transportation Planning Rule. No further mitigations are recommended in conjunction with the proposed zone change.

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PROJECT DESCRIPTION

INTRODUCTION

This updated traffic impact study is written to provide information related to the proposed zone change at 20646 and 20666 S Highway 213 in Clackamas County, Oregon. In order to avoid potential confusion associated with updating the original TIS as well as the two supplementary analysis addendum letters previously prepared for the project, this revised study incorporates information and updates that were previously provided in both addendum letters dated February 3, 2014 and February 25, 2014. Additionally, the study was updated to include requested revisions to the “background” conditions analysis, which is now based on traffic volumes associated with allowed uses under the current zoning rather than assuming that the current non-conforming site uses will continue.

The project site is currently zoned Rural Residential Farm/Forest 5 Acres (RRFF-5), and is proposed to be rezoned to Rural Industrial District (RI). The subject property includes tax lots 1000, 1001, 1100 and 1101, with a total area of 8.15 acres.

The purpose of this study is to assess the traffic impact of the proposed relocation on the nearby street system and to recommend any required mitigative measures. The analysis will include level of service calculations, queuing analysis and an evaluation of left-turn lane warrants.

In accordance with Oregon’s Transportation Planning Rule, the analysis will examine the “reasonable worst-case” development levels under the existing and proposed zoning to determine whether the proposed zone change will require mitigations or a trip cap in order to proceed.

Detailed information on traffic counts, trip generation calculations, and level of service calculations is included in the appendix to this report.

LOCATION DESCRIPTION

The subject property includes tax lots 1000, 1001, 1002, 1100 and 1101, with a total area of 8.15 acres. Lot 1000 (3.71 acres) and 1100 (4.17 acres) form the majority of the site. The site takes access via two driveways on Highway 213, immediately north of S Quail Crest Lane. Under existing conditions, the site is home to Hal’s Construction and two single-family homes. A parking area in the rear of the site is more than large enough to accommodate the trucks, trailers and equipment associated with Hal’s Construction. There is also a separate area for employee and visitor parking.

Clackamas County and the Oregon Department of Transportation have expressed concerns about the operation of the nearby intersection of S. Highway 213 at Henrici Road. Accordingly, traffic count data was collected during the morning and evening peak hours for this intersection to facilitate preparation of a detailed operational analysis. The analysis was prepared for existing conditions, year 2035 background conditions and year 2035 background plus zone change conditions.

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S. Highway 213 (S. Molalla Avenue) operates under the jurisdiction of the Oregon Department of Transportation and is classified as a District Highway. It generally has a two-lane cross-section with a posted speed limit of 45 mph in the site vicinity. The roadway widens in the vicinity of S. Henrici Road to provide dedicated turn lanes.

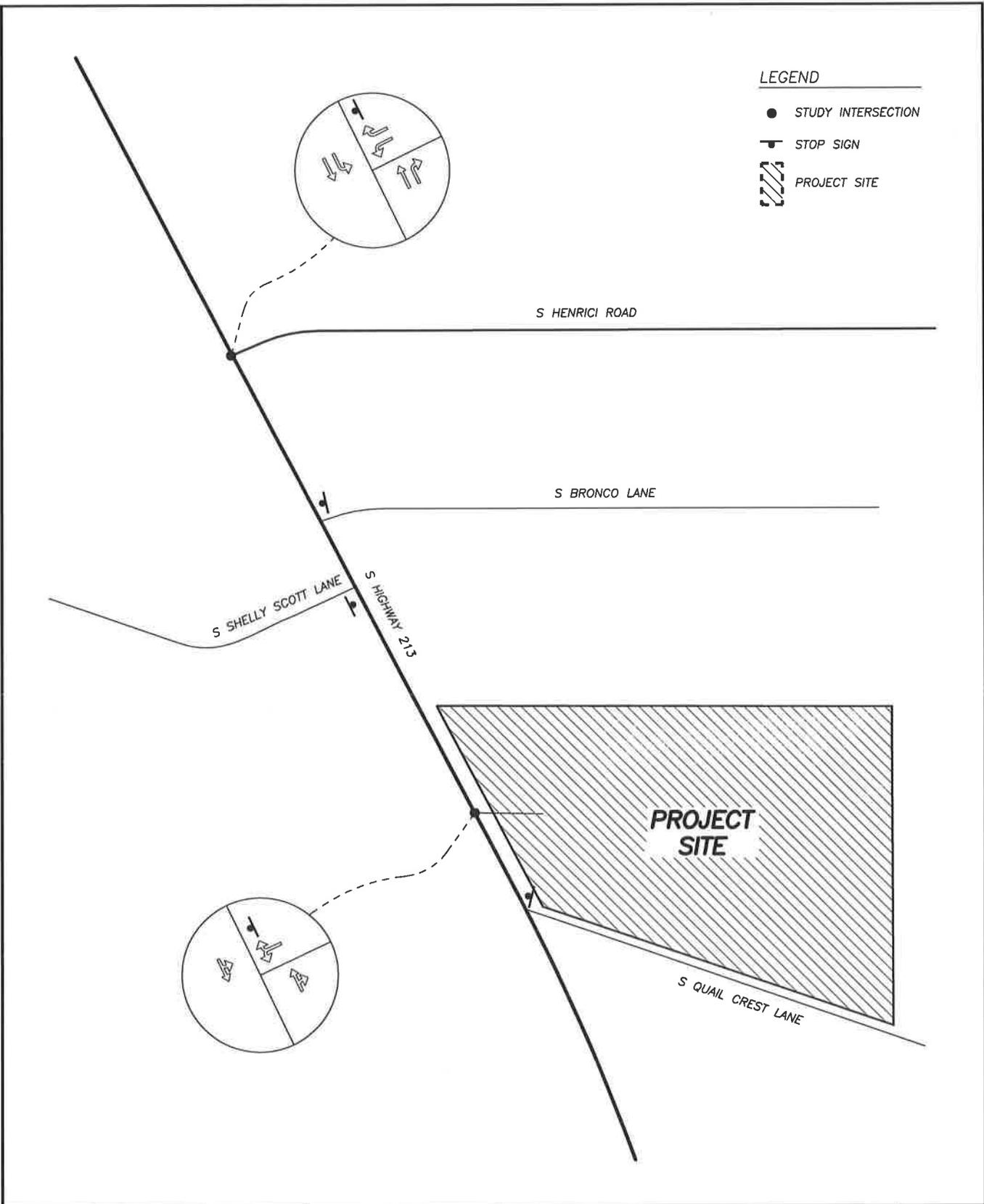
S. Henrici Road operates under the jurisdiction of Clackamas County. It is classified as a Minor Arterial with a posted speed limit of 40 mph in the vicinity of Highway 213. It has a two-lane cross section with centerline and fog line striping.

The intersection of S. Highway 213 at S. Henrici Road is a “T” intersection controlled by a stop sign on the westbound Henrici Road approach. Through traffic travelling along Highway 213 is free-flowing. The westbound approach has a left-turn lane and a right-turn lane. The northbound approach has an exclusive through lane and a dedicated right turn lane. The southbound approach has a left-turn lane and an exclusive through lane. A striped median is in place in the center of Highway 213 immediately south of Henrici Road, but the intersection is not currently designed to accommodate two-stage left turn movements from Henrici westbound to Highway 213 southbound.

The subject property is located on the east side of S. Highway 213 approximately 1,000 feet south of S. Henrici Road.

Manual turning movement counts were conducted at the intersection of S. Highway 213 and S. Henrici Road during August 2013 from 7:00 to 9:00 AM and from 4:00 to 6:00 PM. The peak hours occurred from 7:00 to 8:00 AM and from 4:30 to 5:30 PM. Detailed traffic count data is included in the appendix to this report.

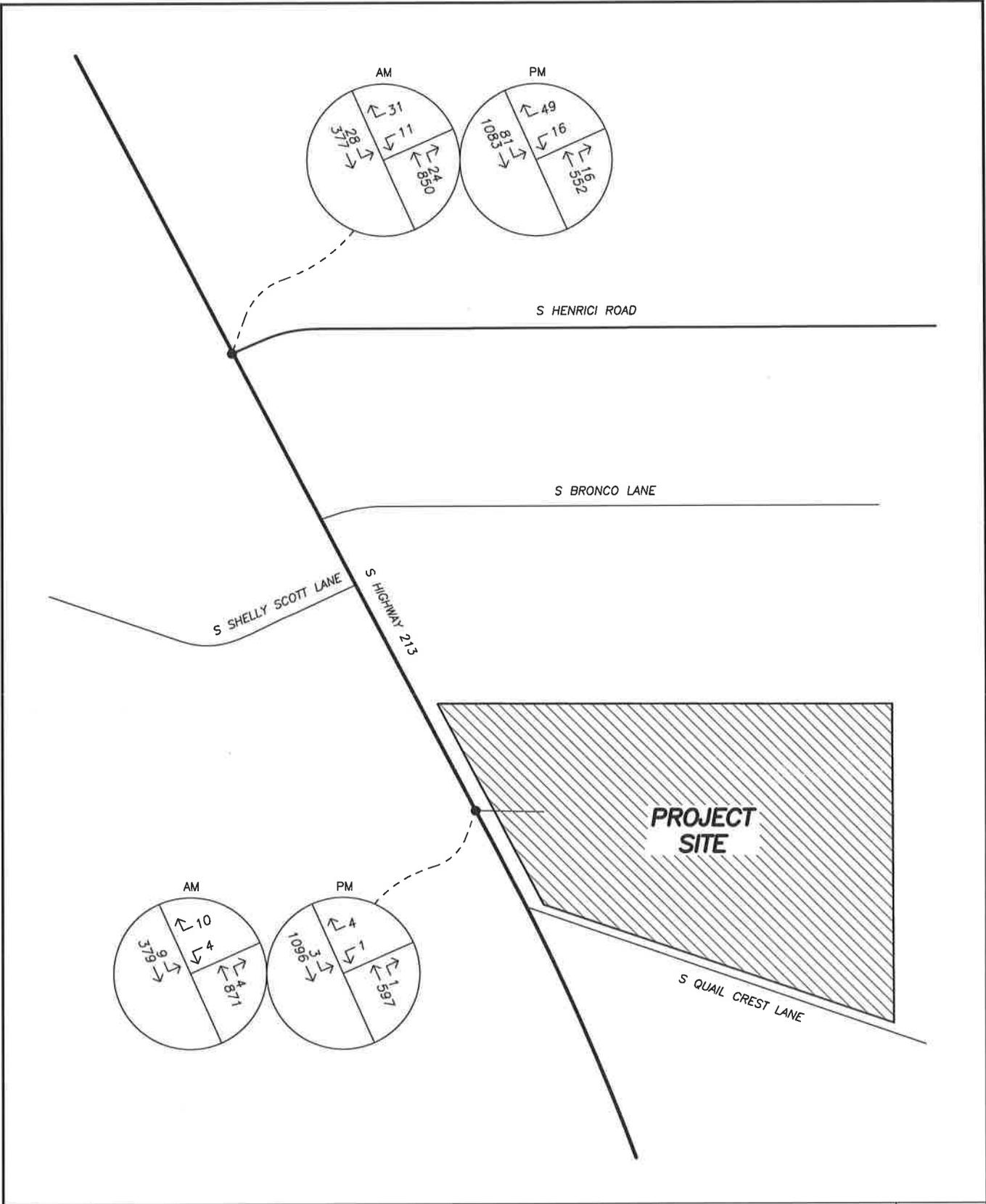
Figure 1 on page six shows the project study area and the location of the site. Figure 2 on page seven shows the existing traffic volumes at the study area intersection.



VICINITY MAP



FIGURE
1
PAGE
6



TRAFFIC VOLUMES
Existing Conditions
AM and PM Peak Hours



FIGURE
2
PAGE
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TRIP GENERATION & DISTRIBUTION

TRIP GENERATION

To estimate the number of trips that could be generated following approval of the proposed zone change, the uses allowed by Clackamas County for the RI (Rural Industrial) zoning were examined. Potential site uses included various light industrial uses typical of industrial-park developments as well as automobile, truck and motorcycle repair, veterinary hospitals and indoor recreational facilities. The zoning specifically allows “Storage, sales, repair and servicing of equipment and materials associated with farm and forest uses, logging, road maintenance, mineral extraction, construction, or similar rural activities”, which describes the existing historical non-conforming use of the property.

Many of the allowed uses described for the RI zoning could not reasonably utilize a significant portion of the 8.15-acre site. For instance, trip data for animal hospital/veterinary clinic land uses ranges from 10,000 to 15,000 square feet, which would result in minimal utilization of the site. Similarly, automobile care centers range from 10,000 to 40,000 square feet, which would represent only three to eleven percent of the total site area. Accordingly, these uses alone were determined not to represent a “reasonable worst case” development scenario for future development under the proposed zoning. However, a mix of such uses could potentially be implemented within the proposed zoning. Accordingly, the “reasonable worst case” development scenario analyzed consists of a mix of several uses.

Considering the mix of allowed uses within the site, the maximum possible development level was determined to consist of a 15,000 square foot veterinary office, a 40,000 square foot auto care center, 2.64 acres of industrial park, and 5,000 square feet of accessory retail sales (analyzed using shopping center trip rates). Based on this mix of uses, the subject property could generate up to 176 trips during the morning peak hour and 215 trips during the evening peak hour.

Under the existing RRF-5 zoning, the two parcels are each permitted to accommodate one single-family home. Based on data from the ITE Trip Generation Manual, Ninth Edition, the two homes would be projected to generate two trips during the morning peak hour, two trips during the evening peak hour, and 20 daily trips.

Since the retail uses within the site would be ancillary to the primary uses, it is likely that a very high portion of trips to and from the retail uses would be shared trips visiting other portions of the site. However, to maintain a conservative analysis, no internal trip reductions were taken. A 34 percent pass-by trip reduction was taken for the retail trips. No reductions were taken for transit use.

A summary of the trip generation calculations for the proposed zone change is provided in the table on the following page. Detailed trip generation calculation worksheets for the uses analyzed under the existing and proposed zoning are provided in the attached technical appendix.

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TRIP GENERATION SUMMARY
20646 and 20666 S. Highway 213 Zone Change

	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Auto Care Center (40,000 sf)	59	31	90	52	56	108
Veterinary Clinic (15,000 sf)	44	17	61	28	43	71
Shopping Center (5,000 sf)	3	2	5	9	10	19
-Pass by trips (34%)	-1	-1	-2	-3	-3	-6
Industrial Park (2.64 acres)	18	4	22	5	18	23
Total "RI" Zoning Trips	123	53	176	91	124	215

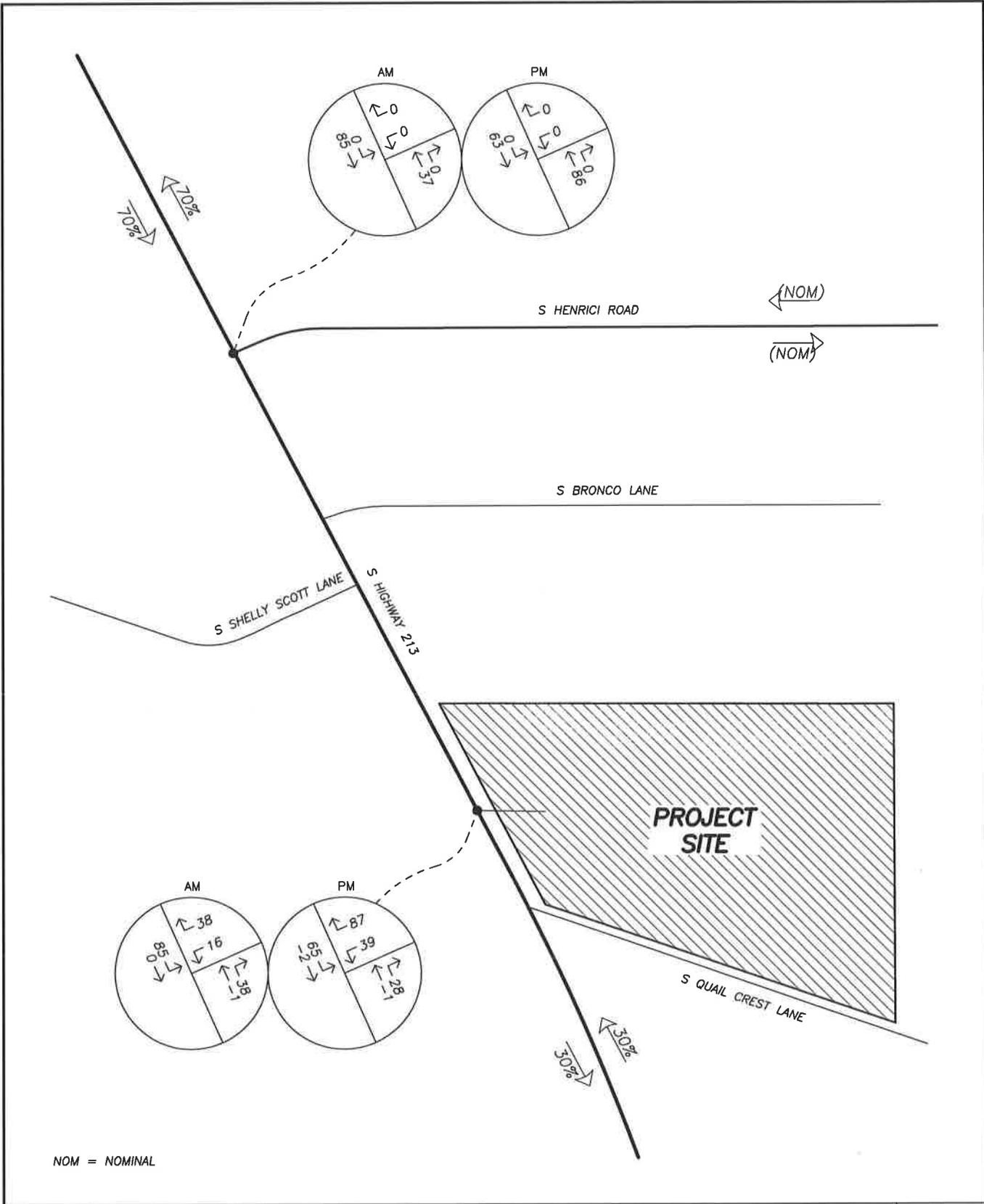
	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
2 Homes (Existing "RRFF-5" Zoning)	1	1	2	1	1	2

Based on the trip generation comparison between the existing and proposed zoning, the proposed zone change could result in an increase of up to 174 net new site trips during the morning peak hour and 213 additional trips during the evening peak hour, as compared to the existing zoning.

TRIP DISTRIBUTION

The distribution of site trips from future development within the subject property was estimated based on existing travel patterns in the site vicinity as well as the locations of nearby population centers and major transportation routes from which site trips would be expected to originate. Overall, it was assumed that 70 percent of future site trips will travel to and from the north on Highway 213, while the remaining 30 percent of site trips will travel to and from the south on Highway 213.

Figure 3 on page 10 shows the trip distribution and assignment for the projected increase in traffic associated with the proposed zone change.



SITE TRIP DISTRIBUTION AND ASSIGNMENT
 Net Increase in Site Trips Under RI Zoning
 AM and PM Peak Hours



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SAFETY ANALYSIS

SIGHT DISTANCE

Sight distance measurements were made at the existing Hal's Construction site access intersections along Highway 213. Required intersection sight distance was calculated from the equations given in *A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS*, published in 2010 by the American Association of State Highway and Transportation Officials (AASHTO). The measurements are based on a driver's eye height of 3.5 feet above the roadway and an object height of 3.5 feet, with the driver's eye 15 feet behind the edge of the near side travel lane. Based upon the measured 85th percentile speed of speed of 54 mph on Highway 213 a design speed of 55 mph was selected and the intersection sight distance required is 610 feet in each direction.

Intersection sight distance to the north is very favorable, with available sight distances well in excess of 1,000 feet from both access locations. Sight distance to the south is limited by a crest vertical curve south of the subject property. Intersection sight distance was measured to be 455 feet to the south from the southerly site access driveway and 578 feet to the south from the northerly site access driveway. Neither of the existing access driveways currently has adequate sight distance for the identified design speed. If the south driveway is closed and the north driveway is moved approximately 100 feet to the north, it is anticipated that adequate sight distance will be available. This potential access location is approximately 95 feet south of the site's north property line.

Based on the sight distance analysis, it is recommended that upon future development within the subject property the existing site access driveways be closed, and a new driveway be constructed that provides a minimum of 610 feet of intersection sight distance in each direction from a position 15 feet behind the edge of the traveled way. No other sight distance mitigations are recommended.

LEFT-TURN LANE WARRANTS

To determine whether a southbound left-turn lane on S Highway 213 at the subject property is necessary or may become necessary with full development under the proposed RI zoning, a left-turn lane warrant analysis was conducted. A left-turn lane, or left-turn "refuge" is primarily a safety consideration for the major street, removing left-turning vehicles from the through traffic stream.

The left-turn lane warrant analysis methodology used was the method described in the Oregon Department of Transportation's Analysis Procedures Manual, which is based on curves developed by the Texas Transportation Institute. This methodology determines the need for a left-turn lane based upon the volume of traffic on the major street, the number of lanes on the major street, travel speeds along the major street and the volume of left-turning traffic. A speed of 45 mph was used for the analysis since the posted speed on S Highway 213 is 45 mph.

The warrant analysis shows that a southbound left-turn lane is not currently needed since the site serves fewer than 10 southbound left-turning vehicles under existing conditions. However following

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any site expansion that will increase the number of inbound trips during the morning peak hour it is anticipated that a southbound left-turn lane will become warranted. Additional left-turn lane warrant information is included in the attached appendix.

CRASH HISTORY

In order to determine whether there are existing safety deficiencies in the site vicinity, crash data was obtained from the Oregon Department of Transportation's Crash Analysis and Reporting Unit. The crash analysis was based on the most recent five years of crash data for the intersection of Highway 213 at Henrici Road and the segment of Highway 213 on which the site takes access. The crash data obtained was for the period between January 1, 2008 and December 31, 2012.

In addition to evaluation of the specific historical crashes at the study area locations, a crash rate was calculated for the intersection of Highway 213 at Henrici Road. Crash rates allow comparison of relative crash risks between intersections with widely differing traffic volumes by accounting for both the number of crashes occurring and the number of vehicles passing through the intersection. Crash rates are expressed as the number of crashes per million entering vehicles (CMEV). Crash rates in excess of 1.0 CMEV may be indicative of safety deficiencies and therefore require detailed analysis of the crash patterns at the intersection to determine whether there are contributing design factors.

During the five-year analysis period, there were a total of eleven reported crashes near the intersection of Highway 213 and Henrici Road. These included eight rear-end collisions, one turning movement collision, one sideswipe meeting collision and one animal-related collision. The crashes resulted in three incapacitating injuries, three non-incapacitating injuries and five reports of "possible injury/complaint of pain". The incapacitating injuries occurred during two separate crashes, both of which were rear-end collisions. The crash rate for the intersection was calculated to be 0.34 CMEV.

The segment of Highway 213 on which the site fronts had a total of six reported crashes during the five-year analysis period, four of which were also included in the crash data report for the intersection of Highway 213 at Henrici Road. The additional two crashes reported were rear-end collisions near the intersection of Highway 213 and Quail Crest Lane. There were no resulting injuries.

Based on the detailed crash analysis, no significant safety hazards were identified in the site vicinity, and no mitigation is recommended.

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OPERATIONAL ANALYSIS

BACKGROUND TRAFFIC

In order to determine whether the proposed development may have a significant effect on the surrounding transportation system as defined under Oregon's Transportation Planning Rule, a 20-year planning horizon analysis was prepared for the study area intersections.

Background year 2035 traffic volumes for the evening peak hour were taken from Clackamas County's Transportation System Plan. In order to determine the year 2035 morning peak hour traffic volumes, the existing year 2013 traffic volumes were adjusted to account for seasonal traffic variations as well as growth over time.

The seasonal adjustment was calculated to be 1.1 percent, following the procedure described in ODOT's Analysis Procedures Manual. This adjustment accounts for the fact that count data was collected in late August, while the annual peak traffic volumes are typically observed during the middle of August.

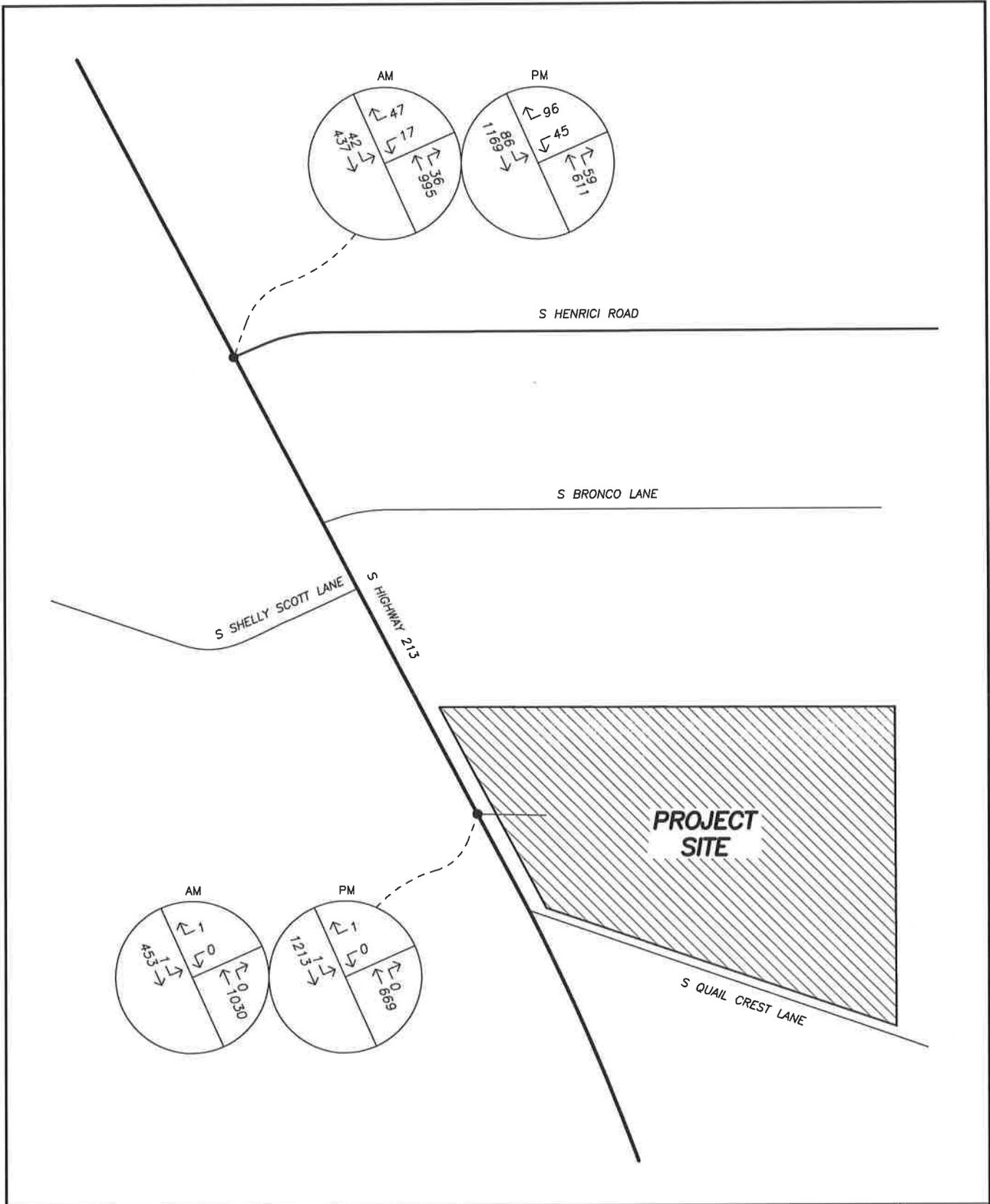
Growth in through traffic volumes along Highway 213 was projected based on data from ODOT's Future Volume Table. This table provides model data showing year 2010 and projected year 2031 traffic volumes for a location approximately 100 feet north of Henrici Road. Based on the data, a growth rate of 0.8 percent per year (linear) was calculated for this segment of Highway 213. In conjunction with the 1.1 percent seasonal adjustment this results in an increase of 18.9 percent over the existing year 2013 traffic volumes to account for anticipated growth through 2035.

Traffic volumes on Henrici Road may be subject to more variation than those on Highway 213. Accordingly, an exponential growth rate of 2.0 percent per year was applied to the existing Henrici Road traffic volumes. In conjunction with the 1.1 percent seasonal adjustment this results in an increase of 56 percent over the existing year 2013 traffic volumes.

No specific developments have been identified near the site that will contribute to the planning horizon traffic volumes at the study area intersections.

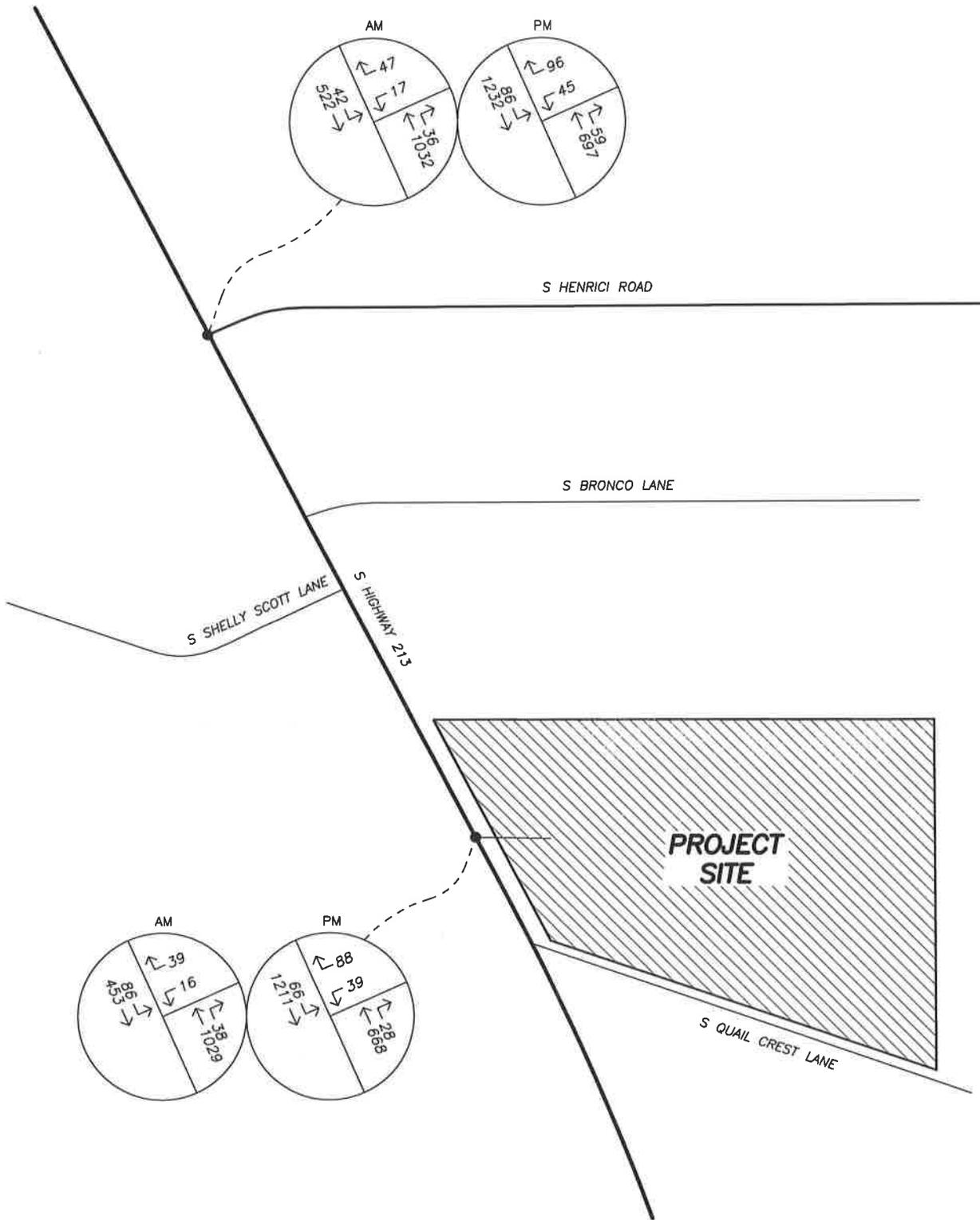
Since the outright permitted uses under the existing RRFF-5 zoning result in fewer site trips than are currently present, for the background conditions the turning movements at area intersections were adjusted to reflect a change to operation with just two single-family homes on the subject property.

Figure 4 on page 14 shows the projected year 2035 background conditions volumes under the existing zoning. Figure 5 on page 15 shows the year 2035 traffic volumes with the addition of site trips from the "reasonable worst-case" development under the proposed zoning.



TRAFFIC VOLUMES
 Year 2035 Background Conditions
 AM and PM Peak Hours





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



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CAPACITY ANALYSIS

To determine the level of service at the study intersections, a capacity analysis was conducted. The analysis was conducted according to the unsignalized intersection analysis methodologies in the *HIGHWAY CAPACITY MANUAL* (HCM) published by the Transportation Research Board.

Both study intersections operate under the jurisdiction of the Oregon Department of Transportation. The applicable minimum operational standards are established under the Oregon Highway Plan and are based on the volume-to-capacity ratio (v/c).

Based on the location of the study intersections in a developed rural area outside the urban growth boundary and the classification of Highway 213 as a District Highway, the maximum permissible v/c ratio is 0.75.

The intersection of Highway 213 at Henrici Road currently operates with a v/c ratio of 0.52 during the morning peak hour and 0.66 during the evening peak hour. Under year 2035 background traffic conditions, the intersection is projected to operate with a v/c ratio of 0.60 during the morning peak hour and 0.90 during the evening peak hour. With full development of the subject property under the proposed RI zoning, the intersection is projected to operate with a v/c ratio of 0.63 during the morning peak hour and 1.13 during the evening peak hour. If a center two-way left-turn lane is constructed within Highway 213 to allow two-stage left turns at the intersection, it is projected to operate with a v/c ratio of 0.63 during the morning peak hour and 0.75 during the evening peak hour with full development of the subject property under the proposed zoning.

The intersection of Highway 213 at the Hal's Construction site access currently operates with a v/c ratio of 0.54 during the morning peak hour and 0.37 during the evening peak hour. Under year 2035 background traffic conditions, the intersection is projected to operate with a v/c ratio of 0.64 during the morning peak hour and 0.41 during the evening peak hour assuming development with only two single-family homes. With full development of the subject property under the proposed RI zoning, the intersection is projected to operate with a v/c ratio of 0.66 during the morning peak hour and 1.47 during the evening peak hour. If a center two-way left-turn lane is constructed within Highway 213 to provide a southbound left-turn refuge for vehicles entering the site and allow for two-stage left turns from the driveway onto Highway 213 southbound, it is projected to operate with a v/c ratio of 0.66 during the morning peak hour and 0.60 during the evening peak hour with full development of the subject property under the proposed zoning.

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

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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 Henrici Road</i>						
Existing 2013 Conditions	C	20	0.52	D	27	0.66
2035 Background	D	26	0.60	F	80	0.90
2035 Bkgd. Plus Zone Change	D	30	0.63	F	184	1.13
2035 Zone Change Mitigated*	C	21	0.63	C	22	0.75
<i>Highway 213 at Site Access</i>						
Existing 2013 Conditions	C	22	0.54	C	21	0.37
2035 Background	C	20	0.64	B	14	0.41
2035 Bkgd. Plus Zone Change	F	56	0.66	F	322	1.47
2035 Zone Change Mitigated*	D	27	0.66	D	35	0.60

LOS = Level of Service

Delay = Average Delay per Vehicle in Seconds

V/C = Volume-to-Capacity ratio

* With center two-way left-turn lane on Highway 213 for two-stage left turns.

As shown in the table above, the study intersections currently operate acceptably. Under year 2035 traffic conditions assuming only levels of development permissible under the current residential (RRFF-5) zoning of the subject property, the site access would be projected to operate acceptably; however the intersection of Highway 213 at Henrici Road would be projected to operate with a v/c ratio of 0.90, well above the target of 0.75. With the addition of maximum development under the proposed RI zoning, both study intersections would be projected to operate acceptably during the morning peak hour but with volumes exceeding capacity during the evening peak hour. If a center two-way left-turn lane is provided within Highway 213 to allow vehicles to make two-stage left turns at both study intersections, operation is projected to be acceptable either with or without the addition of site trips from maximum development under the proposed zoning. No other operational mitigations are necessary or recommended.

TRANSPORTATION PLANNING RULE ANALYSIS

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

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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);*
 - (b) *Change standards implementing a functional classification system; or*
 - (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 case, subsections (a) and (b) do not apply, since the proposed zone change will not change the functional classification of any facilities, and will not change standards implementing the functional classification system. However subsection (c) does apply, since the performance of the study inter-sections is projected to be degraded by the proposed zone change and is not projected to meet the performance standards established by the Oregon Department of Transportation in the Oregon Highway Plan. Accordingly, the zone change could result in a significant effect as defined under Oregon's Transportation Planning Rule. Accordingly, a remedy for this potential significant effect will be required.

- (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 vehi-*

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cle 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 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.*

In this instance, the proposed remedy for the significant effect is to provide minor transportation improvements per subsection (d) above. Specifically, the necessary mitigation consists of constructing a center two-way left-turn lane within Highway 213 to allow two-stage left-turns to be made from the side-street approaches that would otherwise operate with volumes exceeding capacity. This mitigation is sufficient to meet the performance standards established under the Oregon Highway Plan and therefore is projected to fully mitigate the impact of the proposed zone change. Notably, this improvement will be required for the intersection of Highway 213 at Henrici Road to operate acceptably either with or without the addition of site trips from the proposed zone change.

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PROPOSED MITIGATION SUMMARY

Based on the operational and safety analysis for the proposed zone change on the Hal's Construction site, the following recommendations are made:

- 1) Upon any future development resulting in an increase in site trips, the existing site access driveways should be closed and a new driveway should be constructed at a location providing a minimum of 610 feet of intersection sight distance in each direction. Additionally, a southbound left-turn lane should be constructed to serve traffic entering the site.
- 2) Operation of the intersection of Highway 213 at Henrici Road is projected not to meet ODOT's performance standards either with or without the addition of site trips from the proposed zone change. With improvements to accommodate two-stage left turns, intersection operation is projected to be acceptable. Accordingly, it is recommended that in conjunction with any future development proposals on the subject property a proportionate share of project costs for the necessary improvements at Highway 213 and Henrici Road be collected for the development.
- 3) If at any point the site trip generation associated with a proposed development on the subject property is projected to exceed 154 total trips during the evening peak hour, a westbound left-turn lane should be constructed to serve the site.
- 4) If at any point the trip generation for the subject property is projected to exceed 186 total trips during the evening peak hour, the highway should be reconstructed to accommodate two-stage left turns at the site access.

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CONCLUSIONS

Based on the most recent five years of crash data, the study area intersections are currently operating acceptably with respect to safety. No safety mitigations are recommended.

Upon any future development resulting in an increase in site trips on the subject property, the existing site access driveways should be closed and a new driveway should be constructed at a location providing a minimum of 610 feet of intersection sight distance in each direction. Additionally, a southbound left-turn lane should be constructed on Highway 213 to serve traffic entering the site.

In conjunction with any future development proposals on the subject property a proportionate share of project costs for the necessary improvements at Highway 213 and Henrici Road should be collected for the development.

If at any point the site trip generation associated with a proposed development on the subject property is projected to exceed 154 total trips during the evening peak hour, a westbound left-turn lane should be constructed to serve the site.

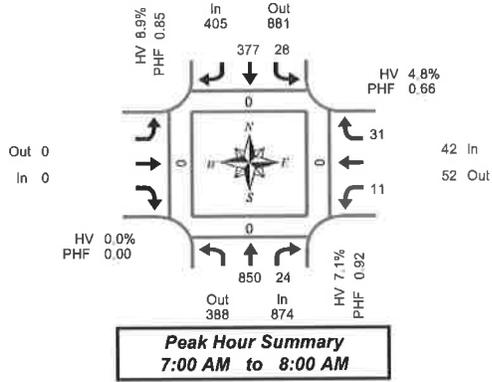
If the trip generation for the subject property is projected to exceed 186 total trips during the evening peak hour, the highway should be reconstructed to accommodate two-stage left turns at the site access.

Conditions of approval requiring the above improvements at the identified times are sufficient to meet the requirements of Oregon's Transportation Planning Rule. No further mitigations are recommended in conjunction with the proposed zone change.

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APPENDIX

Total Vehicle Summary



Hwy 213 & Henrici Rd

Tuesday, August 27, 2013
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 Henrici Rd		Westbound Henrici Rd			Interval Total	Pedestrians Crosswalk			
	T	R	Bikes	L	T	Bikes		Bikes	L	R	Bikes		North	South	East	West
7:00 AM	76	3	0	0	27	0		0	0	4	0	110	0	0	0	0
7:05 AM	89	1	1	2	22	0		0	2	4	0	120	0	0	0	0
7:10 AM	66	2	0	2	33	0		0	0	6	0	109	0	0	0	0
7:15 AM	71	0	0	1	31	0		0	0	2	0	105	0	0	0	0
7:20 AM	83	2	0	2	21	0		0	0	1	0	109	0	0	0	0
7:25 AM	67	1	0	3	33	0		0	0	3	0	107	0	0	0	0
7:30 AM	66	0	0	1	38	0		0	1	1	0	107	0	0	0	0
7:35 AM	69	0	0	2	33	0		0	1	0	0	105	0	0	0	0
7:40 AM	72	4	0	7	38	0		0	3	1	0	125	0	0	0	0
7:45 AM	67	3	0	1	33	0		0	1	4	0	109	0	0	0	0
7:50 AM	60	2	0	2	32	0		0	3	3	0	102	0	0	0	0
7:55 AM	64	6	0	5	36	0		0	0	2	0	113	0	0	0	0
8:00 AM	54	1	0	2	37	0		0	2	1	0	97	0	0	0	0
8:05 AM	43	0	0	3	22	0		0	0	1	0	69	0	0	0	0
8:10 AM	55	0	0	2	26	0		0	2	2	0	87	0	0	0	0
8:15 AM	49	0	0	6	32	0		0	1	5	0	93	0	0	0	0
8:20 AM	58	2	0	5	22	0		0	3	4	0	94	0	0	0	0
8:25 AM	50	1	0	3	21	0		0	0	4	0	79	0	0	0	0
8:30 AM	59	1	0	5	38	0		0	0	1	0	104	0	0	0	0
8:35 AM	49	0	0	2	30	0		0	1	6	0	88	0	0	0	0
8:40 AM	57	0	0	2	23	0		0	2	3	0	87	0	0	0	0
8:45 AM	66	1	0	3	35	0		0	0	7	0	112	0	0	0	0
8:50 AM	54	0	0	4	30	0		0	3	6	0	97	0	0	0	0
8:55 AM	52	1	0	4	43	0		0	1	1	0	102	0	0	0	0
Total Survey	1,496	31	1	69	736	0		0	26	72	0	2,430	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 Henrici Rd		Westbound Henrici Rd			Interval Total	Pedestrians Crosswalk			
	T	R	Bikes	L	T	Bikes		Bikes	L	R	Bikes		North	South	East	West
7:00 AM	231	6	1	4	82	0		0	2	14	0	339	0	0	0	0
7:15 AM	221	3	0	6	85	0		0	0	6	0	321	0	0	0	0
7:30 AM	207	4	0	10	109	0		0	5	2	0	337	0	0	0	0
7:45 AM	191	11	0	8	101	0		0	4	9	0	324	0	0	0	0
8:00 AM	152	1	0	7	85	0		0	4	4	0	253	0	0	0	0
8:15 AM	157	3	0	14	75	0		0	4	13	0	266	0	0	0	0
8:30 AM	165	1	0	9	91	0		0	3	10	0	279	0	0	0	0
8:45 AM	172	2	0	11	108	0		0	4	14	0	311	0	0	0	0
Total Survey	1,496	31	1	69	736	0		0	26	72	0	2,430	0	0	0	0

Peak Hour Summary 7:00 AM to 8:00 AM

By Approach	Northbound Hwy 213				Southbound Hwy 213				Eastbound Henrici Rd				Westbound Henrici 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	874	388	1,262	1	405	881	1,286	0	0	0	0	0	42	52	94	0	0	0	0	0	
%HV	7.1%				8.9%				0.0%				4.8%				7.6%				
PHF	0.92				0.85				0.00				0.66				0.97				

By Movement	Northbound Hwy 213			Southbound Hwy 213			Eastbound Henrici Rd		Westbound Henrici Rd			Total
	T	R	Total	L	T	Total	Total	L	R	Total		
Volume	850	24	874	28	377	405	0	11	31	42	1,321	
%HV	NA	6.9%	12.5%	7.1%	0.0%	9.5%	NA	0.0%	NA	6.5%	4.8%	7.6%
PHF	0.92	0.55	0.92	0.70	0.86	0.85	0.00	0.39	0.55	0.66	0.97	

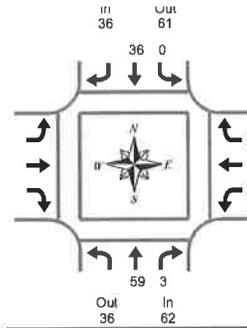
Rolling Hour Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 213			Southbound Hwy 213			Eastbound Henrici Rd		Westbound Henrici Rd			Interval Total	Pedestrians Crosswalk			
	T	R	Bikes	L	T	Bikes		Bikes	L	R	Bikes		North	South	East	West
7:00 AM	850	24	1	28	377	0		0	11	31	0	1,321	0	0	0	0
7:15 AM	771	19	0	31	380	0		0	13	21	0	1,235	0	0	0	0
7:30 AM	707	19	0	39	370	0		0	17	28	0	1,180	0	0	0	0
7:45 AM	665	16	0	38	352	0		0	15	36	0	1,122	0	0	0	0
8:00 AM	648	7	0	41	359	0		0	15	41	0	1,109	0	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Out 0
In 0

Hwy 213 & Henrici Rd

Tuesday, August 27, 2013
7:00 AM to 9:00 AM

Peak Hour Summary
7:00 AM to 8:00 AM

Heavy Vehicle 5-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 213			Southbound Hwy 213			Eastbound Henrici Rd			Westbound Henrici Rd			Interval Total
	T	R	Total	L	T	Total	Total	Total	L	R	Total		
7:00 AM	7	0	7	0	2	2	0	0	0	0	0	9	
7:05 AM	1	0	1	0	2	2	0	0	0	0	0	3	
7:10 AM	3	0	3	0	8	8	0	0	0	0	0	11	
7:15 AM	5	0	5	0	2	2	0	0	0	0	0	7	
7:20 AM	2	0	2	0	1	1	0	0	0	0	0	3	
7:25 AM	2	0	2	0	1	1	0	0	1	1	1	4	
7:30 AM	8	0	8	0	3	3	0	0	0	0	0	11	
7:35 AM	8	0	8	0	3	3	0	0	0	0	0	11	
7:40 AM	9	1	10	0	5	5	0	0	1	1	1	16	
7:45 AM	5	0	5	0	2	2	0	0	0	0	0	7	
7:50 AM	6	1	7	0	4	4	0	0	0	0	0	11	
7:55 AM	3	1	4	0	3	3	0	0	0	0	0	7	
8:00 AM	3	0	3	0	4	4	0	0	0	0	0	7	
8:05 AM	2	0	2	0	2	2	0	0	1	1	1	5	
8:10 AM	4	0	4	0	3	3	0	0	0	0	0	7	
8:15 AM	2	0	2	1	1	2	0	0	0	0	0	4	
8:20 AM	1	0	1	1	0	1	0	1	0	1	1	3	
8:25 AM	2	0	2	0	2	2	0	0	0	0	0	4	
8:30 AM	2	0	2	0	1	1	0	0	0	0	0	3	
8:35 AM	2	0	2	0	2	2	0	0	1	1	1	5	
8:40 AM	1	0	1	0	5	5	0	0	0	0	0	6	
8:45 AM	2	0	2	0	3	3	0	0	0	0	0	5	
8:50 AM	5	0	5	0	4	4	0	0	2	2	2	11	
8:55 AM	4	0	4	0	3	3	0	0	0	0	0	7	
Total Survey	89	3	92	2	66	68	0	1	6	7	167		

Heavy Vehicle 15-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 213			Southbound Hwy 213			Eastbound Henrici Rd			Westbound Henrici Rd			Interval Total
	T	R	Total	L	T	Total	Total	Total	L	R	Total		
7:00 AM	11	0	11	0	12	12	0	0	0	0	0	23	
7:15 AM	9	0	9	0	4	4	0	0	1	1	1	14	
7:30 AM	25	1	26	0	11	11	0	0	1	1	1	38	
7:45 AM	14	2	16	0	9	9	0	0	0	0	0	25	
8:00 AM	9	0	9	0	9	9	0	0	1	1	1	19	
8:15 AM	5	0	5	2	3	5	0	1	0	1	1	11	
8:30 AM	5	0	5	0	8	8	0	0	1	1	1	14	
8:45 AM	11	0	11	0	10	10	0	0	2	2	2	23	
Total Survey	89	3	92	2	66	68	0	1	6	7	167		

Heavy Vehicle Peak Hour Summary 7:00 AM to 8:00 AM

By Approach	Northbound Hwy 213			Southbound Hwy 213			Eastbound Henrici Rd			Westbound Henrici Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	62	36	98	36	61	97	0	0	0	2	3	5	100
PHF	0.60			0.75			0.00			0.50			0.66

By Movement	Northbound Hwy 213			Southbound Hwy 213			Eastbound Henrici Rd			Westbound Henrici Rd			Total
	T	R	Total	L	T	Total	Total	Total	L	R	Total		
Volume	59	3	62	0	36	36	0	0	0	2	2	100	
PHF	0.59	0.38	0.60	0.00	0.75	0.75	0.00	0.00	0.50	0.50	0.66		

Heavy Vehicle Rolling Hour Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 213			Southbound Hwy 213			Eastbound Henrici Rd			Westbound Henrici Rd			Interval Total
	T	R	Total	L	T	Total	Total	Total	L	R	Total		
7:00 AM	59	3	62	0	36	36	0	0	0	2	2	100	
7:15 AM	57	3	60	0	33	33	0	0	0	3	3	96	
7:30 AM	53	3	56	2	32	34	0	1	2	2	3	93	
7:45 AM	33	2	35	2	29	31	0	1	2	2	3	69	
8:00 AM	30	0	30	2	30	32	0	1	4	4	5	67	

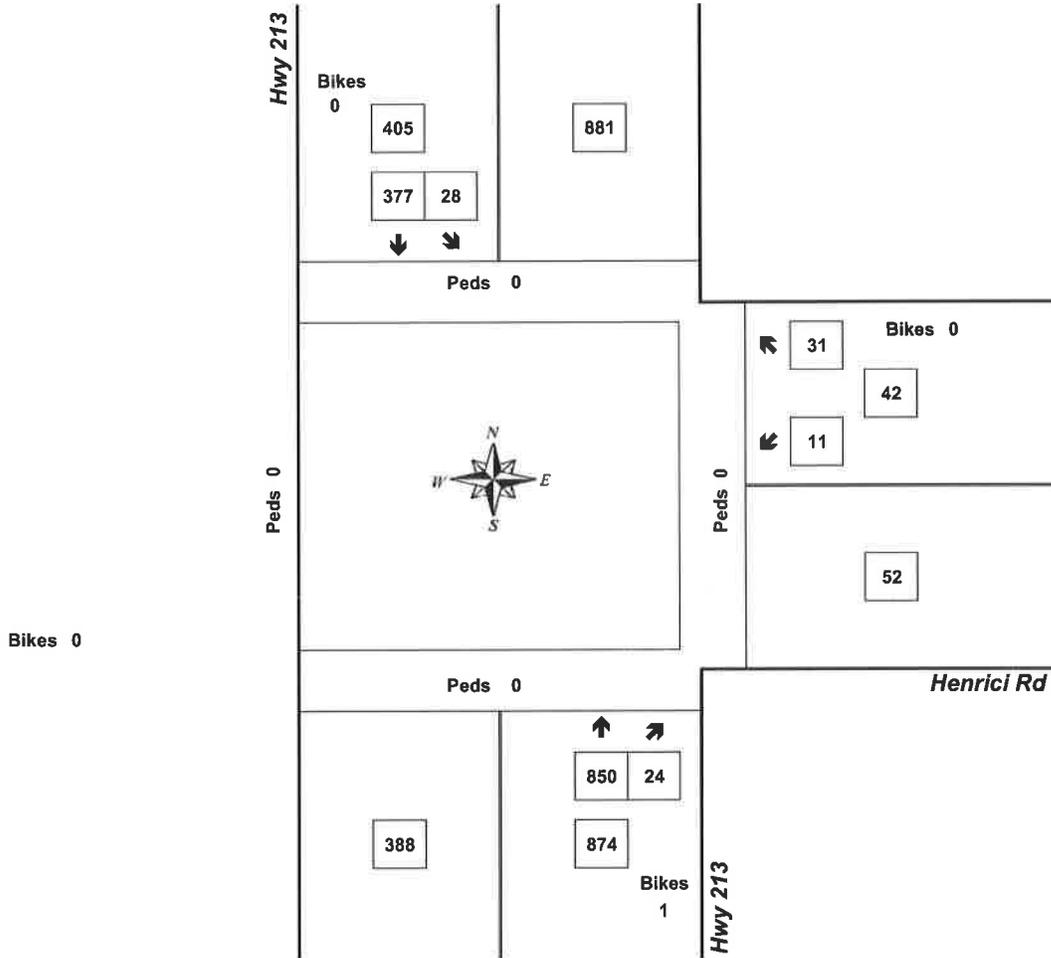
Peak Hour Summary



Clay Carney
(503) 833-2740

Hwy 213 & Henrici Rd

7:00 AM to 8:00 AM
Tuesday, August 27, 2013



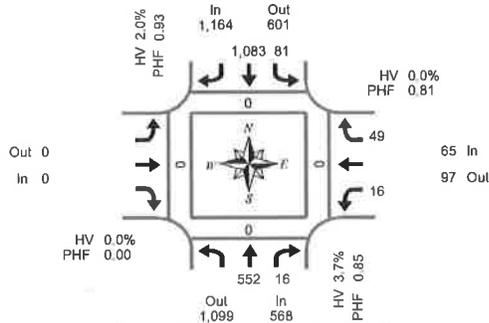
Approach	PHF	HV%	Volume
EB	0.00	0.0%	0
WB	0.66	4.8%	42
NB	0.92	7.1%	874
SB	0.85	8.9%	405
Intersection	0.97	7.6%	1,321

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

Total Vehicle Summary



Clay Carney
(503) 833-2740



Peak Hour Summary
4:30 PM to 5:30 PM

Hwy 213 & Henrici Rd

Tuesday, August 27, 2013
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 Henrici Rd			Westbound Henrici Rd			Interval Total	Pedestrians Crosswalk			
	T	R	Bikes	L	T	Bikes		Bikes	L	R	Bikes	North		South	East	West	
4:00 PM	72	0	0	8	70	0		0	0	4	0	0	0	0	0	0	
4:05 PM	47	0	0	5	98	0		0	0	4	0	0	0	0	0	0	
4:10 PM	42	1	0	4	94	0		0	3	3	0	0	0	0	0	0	
4:15 PM	51	0	0	7	52	0		0	1	2	0	0	0	0	0	0	
4:20 PM	51	2	0	3	70	0		0	1	5	0	0	0	0	0	0	
4:25 PM	44	0	0	7	90	0		0	0	7	0	0	0	0	0	0	
4:30 PM	59	1	1	5	100	0		0	0	4	0	0	0	0	0	0	
4:35 PM	43	1	0	7	87	0		0	1	4	0	0	0	0	0	0	
4:40 PM	62	1	0	5	82	0		0	0	8	0	0	0	0	0	0	
4:45 PM	44	5	0	5	100	0		0	1	3	0	0	0	0	0	0	
4:50 PM	38	0	0	5	100	0		0	0	6	0	0	0	0	0	0	
4:55 PM	42	1	0	9	94	0		0	3	7	0	0	0	0	0	0	
5:00 PM	50	3	0	10	88	0		0	0	1	0	0	0	0	0	0	
5:05 PM	43	1	0	9	82	0		0	3	3	0	0	0	0	0	0	
5:10 PM	34	1	0	9	74	2		0	0	4	0	0	0	0	0	0	
5:15 PM	41	0	0	6	94	0		0	3	3	0	0	0	0	0	0	
5:20 PM	46	2	0	5	83	0		0	2	3	0	0	0	0	0	0	
5:25 PM	50	0	0	6	99	0		0	3	3	0	0	0	0	0	0	
5:30 PM	44	4	0	7	63	0		0	2	3	0	0	0	0	0	0	
5:35 PM	46	1	0	7	92	0		0	1	3	0	0	0	0	0	0	
5:40 PM	37	3	0	7	87	1		0	2	5	0	0	0	0	0	0	
5:45 PM	40	2	0	8	77	0		0	2	3	0	0	0	0	0	0	
5:50 PM	48	2	0	6	89	0		0	2	7	0	0	0	0	0	0	
5:55 PM	45	2	0	4	85	0		0	1	3	0	0	0	0	0	0	
Total Survey	1,119	34	1	154	2,050	3		0	31	98	0	0	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 Henrici Rd			Westbound Henrici Rd			Interval Total	Pedestrians Crosswalk			
	T	R	Bikes	L	T	Bikes		Bikes	L	R	Bikes	North		South	East	West	
4:00 PM	161	2	0	17	262	0		0	3	11	0	0	0	0	0	0	
4:15 PM	146	2	0	17	212	0		0	2	14	0	0	0	0	0	0	
4:30 PM	164	3	1	17	269	0		0	1	16	0	0	0	0	0	0	
4:45 PM	124	6	0	19	294	0		0	4	16	0	0	0	0	0	0	
5:00 PM	127	5	0	28	244	2		0	3	8	0	0	0	0	0	0	
5:15 PM	137	2	0	17	276	0		0	8	9	0	0	0	0	0	0	
5:30 PM	127	8	0	21	242	1		0	5	11	0	0	0	0	0	0	
5:45 PM	133	6	0	18	251	0		0	5	13	0	0	0	0	0	0	
Total Survey	1,119	34	1	154	2,050	3		0	31	98	0	0	0	0	0	0	

Peak Hour Summary

4:30 PM to 5:30 PM

By Approach	Northbound Hwy 213				Southbound Hwy 213				Eastbound Henrici Rd				Westbound Henrici 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	568	1,099	1,667	1	1,164	601	1,765	2	0	0	0	0	65	97	162	0	0	0	0	0	
%HV		3.7%			2.0%				0.0%				0.0%				0	0	0	0	
PHF		0.85			0.93				0.00				0.81				0	0	0	0	

By Movement	Northbound Hwy 213			Southbound Hwy 213			Eastbound Henrici Rd			Westbound Henrici Rd			Total
	T	R	Total	L	T	Total		Total	L	R	Total		
Volume	552	16	568	81	1,083	1,164		0	16	49	65	1,797	
%HV	NA	3.3%	18.8%	3.7%	0.0%	2.1%	NA	2.0%	NA	NA	NA	2.4%	
PHF	0.84	0.57	0.85	0.72	0.92	0.93		0.00	0.50	0.72	0.81	0.96	

Rolling Hour Summary

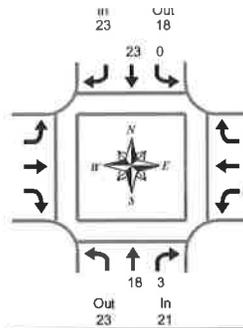
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 213			Southbound Hwy 213			Eastbound Henrici Rd			Westbound Henrici Rd			Interval Total	Pedestrians Crosswalk			
	T	R	Bikes	L	T	Bikes		Bikes	L	R	Bikes	North		South	East	West	
4:00 PM	595	13	1	70	1,037	0		0	10	57	0	0	1,782	0	0	0	0
4:15 PM	561	16	1	81	1,019	2		0	10	54	0	0	1,741	0	0	0	0
4:30 PM	552	16	1	81	1,083	2		0	16	49	0	0	1,797	0	0	0	0
4:45 PM	515	21	0	85	1,056	3		0	20	44	0	0	1,741	0	0	0	0
5:00 PM	524	21	0	84	1,013	3		0	21	41	0	0	1,704	0	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Out 0
In 0

Peak Hour Summary
4:30 PM to 5:30 PM

Hwy 213 & Henrici Rd

Tuesday, August 27, 2013
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 Henrici Rd			Westbound Henrici Rd			Interval Total
	T	R	Total	L	T	Total	Total	Total	L	R	Total		
4:00 PM	2	0	2	0	4	4	0	0	0	0	0	6	
4:05 PM	3	0	3	0	4	4	0	0	0	0	0	7	
4:10 PM	1	0	1	0	4	4	0	0	0	0	0	5	
4:15 PM	1	0	1	0	0	0	0	0	0	0	0	1	
4:20 PM	4	0	4	0	4	4	0	0	0	0	0	8	
4:25 PM	1	0	1	1	5	6	0	0	0	0	0	7	
4:30 PM	4	0	4	0	4	4	0	0	0	0	0	8	
4:35 PM	2	0	2	0	3	3	0	0	0	0	0	5	
4:40 PM	2	0	2	0	2	2	0	0	0	0	0	4	
4:45 PM	0	3	3	0	2	2	0	0	0	0	0	5	
4:50 PM	1	0	1	0	3	3	0	0	0	0	0	4	
4:55 PM	4	0	4	0	3	3	0	0	0	0	0	7	
5:00 PM	0	0	0	0	1	1	0	0	0	0	0	1	
5:05 PM	1	0	1	0	1	1	0	0	0	0	0	2	
5:10 PM	0	0	0	0	2	2	0	0	0	0	0	2	
5:15 PM	3	0	3	0	0	0	0	0	0	0	0	3	
5:20 PM	0	0	0	0	2	2	0	0	0	0	0	2	
5:25 PM	1	0	1	0	0	0	0	0	0	0	0	1	
5:30 PM	3	0	3	0	2	2	0	0	0	0	0	5	
5:35 PM	2	0	2	0	4	4	0	0	0	0	0	6	
5:40 PM	0	0	0	0	1	1	0	0	0	0	0	1	
5:45 PM	2	0	2	1	0	1	0	0	0	0	0	3	
5:50 PM	0	0	0	0	2	2	0	0	0	0	0	2	
5:55 PM	1	0	1	0	3	3	0	0	0	0	0	4	
Total Survey	38	3	41	2	56	58	0	0	0	0	0	99	

Heavy Vehicle 15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 213			Southbound Hwy 213			Eastbound Henrici Rd			Westbound Henrici Rd			Interval Total
	T	R	Total	L	T	Total	Total	Total	L	R	Total		
4:00 PM	6	0	6	0	12	12	0	0	0	0	0	18	
4:15 PM	6	0	6	1	9	10	0	0	0	0	0	16	
4:30 PM	8	0	8	0	9	9	0	0	0	0	0	17	
4:45 PM	5	3	8	0	8	8	0	0	0	0	0	16	
5:00 PM	1	0	1	0	4	4	0	0	0	0	0	5	
5:15 PM	4	0	4	0	2	2	0	0	0	0	0	6	
5:30 PM	5	0	5	0	7	7	0	0	0	0	0	12	
5:45 PM	3	0	3	1	5	6	0	0	0	0	0	9	
Total Survey	38	3	41	2	56	58	0	0	0	0	0	99	

Heavy Vehicle Peak Hour Summary 4:30 PM to 5:30 PM

By Approach	Northbound Hwy 213			Southbound Hwy 213			Eastbound Henrici Rd			Westbound Henrici Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	21	23	44	23	18	41	0	0	0	0	3	3	44
PHF	0.66			0.64			0.00			0.00			0.65

By Movement	Northbound Hwy 213			Southbound Hwy 213			Eastbound Henrici Rd			Westbound Henrici Rd			Total
	T	R	Total	L	T	Total	Total	Total	L	R	Total		
Volume	18	3	21	0	23	23	0	0	0	0	0	0	44
PHF	0.56	0.25	0.66	0.00	0.64	0.64	0.00	0.00	0.00	0.00	0.00	0.00	0.65

Heavy Vehicle Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 213			Southbound Hwy 213			Eastbound Henrici Rd			Westbound Henrici Rd			Interval Total
	T	R	Total	L	T	Total	Total	Total	L	R	Total		
4:00 PM	25	3	28	1	38	39	0	0	0	0	0	67	
4:15 PM	20	3	23	1	30	31	0	0	0	0	0	54	
4:30 PM	18	3	21	0	23	23	0	0	0	0	0	44	
4:45 PM	15	3	18	0	21	21	0	0	0	0	0	39	
5:00 PM	13	0	13	1	18	19	0	0	0	0	0	32	

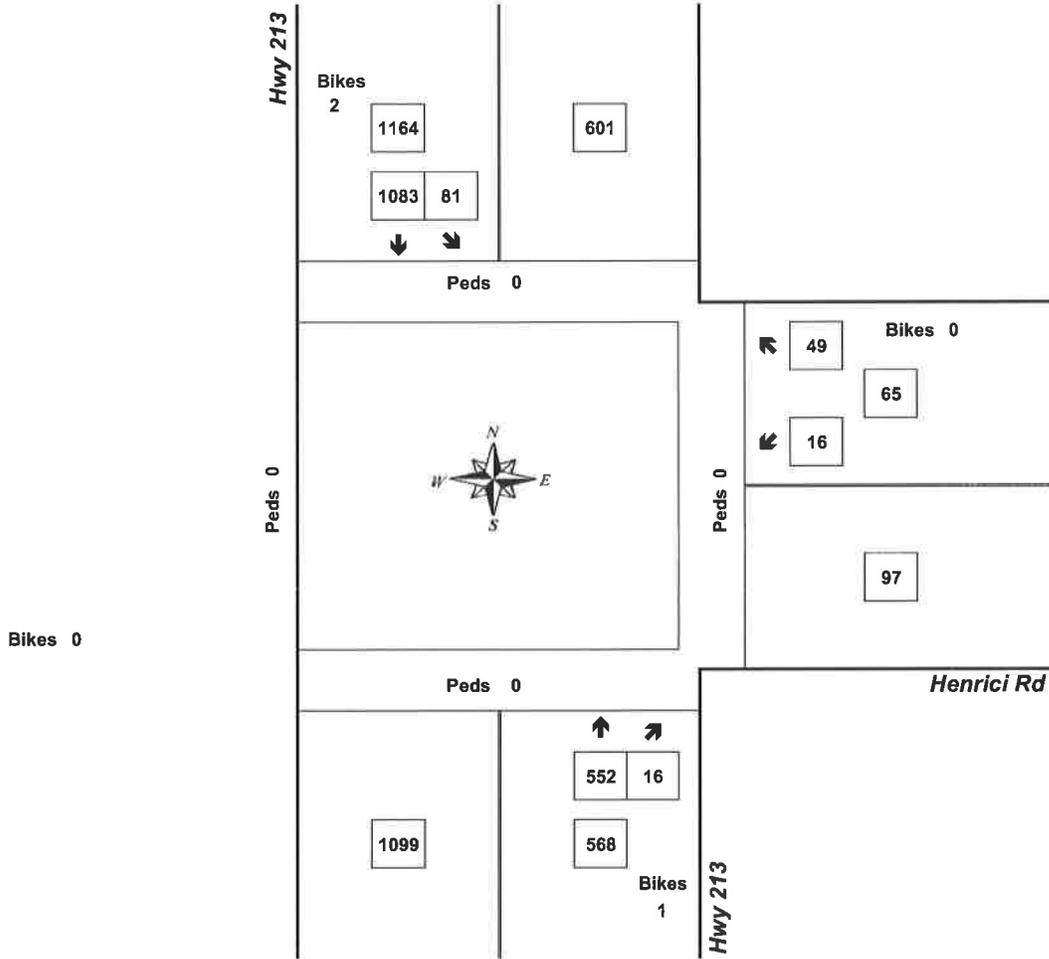
Peak Hour Summary



Clay Carney
(503) 833-2740

Hwy 213 & Henrici Rd

4:30 PM to 5:30 PM
Tuesday, August 27, 2013



Approach	PHF	HV%	Volume
EB	0.00	0.0%	0
WB	0.81	0.0%	65
NB	0.85	3.7%	568
SB	0.93	2.0%	1,164
Intersection	0.96	2.4%	1,797

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

All Traffic Data
15105 SE 17th St.
Vancouver, WA. 98683
503-833-2740

Site Code: 1
 HALS CONSTRUCTION

Start Time	27-Aug-13 Tue	Car Enter	HV Enter	Car Exit	HV Exit	Total
12:00 AM		0	0	0	0	0
12:15		0	0	0	0	0
12:30		0	0	0	0	0
12:45		0	0	0	0	0
01:00		0	0	0	0	0
01:15		0	0	0	0	0
01:30		0	0	0	0	0
01:45		0	0	0	0	0
02:00		0	0	0	0	0
02:15		0	0	0	0	0
02:30		0	0	0	0	0
02:45		0	0	0	0	0
03:00		0	0	0	0	0
03:15		0	0	0	0	0
03:30		0	0	0	0	0
03:45		0	0	0	0	0
04:00		0	0	0	0	0
04:15		0	0	0	0	0
04:30		0	0	0	0	0
04:45		0	0	0	0	0
05:00		0	0	0	0	0
05:15		1	0	0	0	1
05:30		0	0	0	0	0
05:45		1	0	0	0	1
06:00		1	0	1	0	2
06:15		5	1	0	0	6
06:30		4	0	0	0	4
06:45		4	0	0	0	4
07:00		7	0	0	0	7
07:15		5	0	0	0	5
07:30		0	0	4	8	12
07:45		1	0	1	1	3
08:00		0	0	0	0	0
08:15		1	0	1	0	2
08:30		0	0	0	1	1
08:45		1	0	1	1	3
09:00		0	0	2	0	2
09:15		0	0	0	0	0
09:30		0	1	0	0	1
09:45		0	0	0	0	0
10:00		0	1	1	0	2
10:15		0	0	0	1	1
10:30		0	0	1	0	1
10:45		2	0	1	0	3
11:00		0	0	2	0	2
11:15		0	0	0	0	0
11:30		1	1	0	0	2
11:45		2	3	1	1	7
Total		36	7	16	13	72
Percent		50.0%	9.7%	22.2%	18.1%	
Peak	-	06:15	11:00	07:30	07:00	06:45
Vol.	-	20	4	6	9	28
P.H.F.		0.714	0.333	0.375	0.281	0.583

All Traffic Data
15105 SE 17th St.
Vancouver, WA. 98683
503-833-2740

Site Code: 1
 HALS CONSTRUCTION

Start Time	27-Aug-13 Tue	Car Enter	HV Enter	Car Exit	HV Exit	Total
12:00 PM		0	2	0	1	3
12:15		0	0	0	0	0
12:30		1	0	5	0	6
12:45		0	0	4	0	4
01:00		0	0	3	0	3
01:15		1	0	1	0	2
01:30		1	0	0	0	1
01:45		0	0	0	0	0
02:00		1	0	0	0	1
02:15		0	3	0	0	3
02:30		0	0	0	0	0
02:45		0	0	1	1	2
03:00		1	0	2	0	3
03:15		1	0	1	0	2
03:30		0	0	0	0	0
03:45		0	0	1	0	1
04:00		0	0	1	0	1
04:15		0	1	3	0	4
04:30		0	0	0	0	0
04:45		0	2	1	0	3
05:00		2	0	2	0	4
05:15		0	0	2	0	2
05:30		4	1	1	0	6
05:45		1	0	0	0	1
06:00		0	0	2	0	2
06:15		0	0	1	0	1
06:30		0	0	0	0	0
06:45		0	0	0	0	0
07:00		0	0	0	0	0
07:15		0	0	1	0	1
07:30		0	0	0	0	0
07:45		0	0	0	0	0
08:00		0	0	0	0	0
08:15		0	0	0	0	0
08:30		1	0	0	0	1
08:45		1	0	1	0	2
09:00		0	0	0	0	0
09:15		0	1	0	0	1
09:30		0	0	1	0	1
09:45		0	0	0	0	0
10:00		0	0	0	0	0
10:15		0	0	0	0	0
10:30		0	0	0	0	0
10:45		0	0	0	0	0
11:00		0	0	0	0	0
11:15		0	0	0	0	0
11:30		0	0	0	0	0
11:45		0	0	0	0	0
Total		15	10	34	2	61
Percent		24.6%	16.4%	55.7%	3.3%	
Peak	-	17:00	13:30	12:30	12:00	12:30
Vol.	-	7	3	13	1	15
P.H.F.		0.438	0.250	0.650	0.250	0.625
Grand Total		51	17	50	15	133
Percent		38.3%	12.8%	37.6%	11.3%	

ADT Not Calculated

2e

TRIP GENERATION CALCULATIONS

Land Use: Automobile Care Center
Land Use Code: 942
Variable: 1000 Sq Feet Gross Leasable Area
Variable Quantity: 40

AM PEAK HOUR

Trip Rate: 2.25

	Enter	Exit	Total
Directional Distribution	66%	34%	
Trip Ends	59	31	90

PM PEAK HOUR

Trip Equation: $T = 2.41(X) + 11.79$

	Enter	Exit	Total
Directional Distribution	48%	52%	
Trip Ends	52	56	108

SATURDAY

Trip Rate: 23.72

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	474	474	948

SUNDAY

Trip Rate: 11.88

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	238	238	476

1e

TRIP GENERATION CALCULATIONS

Land Use: Animal Hospital/Veterinary Clinic
Land Use Code: 640
Variable: 1000 Sq Ft Gross Floor Area
Variable Value: 15

AM PEAK HOUR

Trip Rate: 4.08

	Enter	Exit	Total
Directional Distribution	72%	28%	
Trip Ends	44	17	61

PM PEAK HOUR

Trip Rate: 4.72

	Enter	Exit	Total
Directional Distribution	39%	61%	
Trip Ends	28	43	71

2e

TRIP GENERATION CALCULATIONS

Land Use: Shopping Center
Land Use Code: 820
Variable: 1,000 Sq Ft Gross Leasable Area
Variable Value: 5.0

AM PEAK HOUR

Trip Rate: 0.96

	Enter	Exit	Total
Directional Distribution	62%	38%	
Trip Ends	3	2	5

PM PEAK HOUR

Trip Rate: 3.71

	Enter	Exit	Total
Directional Distribution	48%	52%	
Trip Ends	9	10	19

WEEKDAY

Trip Rate: 42.7

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	107	107	214

SATURDAY

Trip Rate: 49.97

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	125	125	250

1e

TRIP GENERATION CALCULATIONS

Land Use: Industrial Park
Land Use Code: 130
Variable: Acres
Variable Quantity: 2.64

AM PEAK HOUR

Trip Rate: 8.20

	Enter	Exit	Total
Directional Distribution	83%	17%	
Trip Ends	18	4	22

PM PEAK HOUR

Trip Rate: 8.53

	Enter	Exit	Total
Directional Distribution	21%	79%	
Trip Ends	5	18	23

WEEKDAY

Trip Rate: 61.17

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	81	81	162

SATURDAY

Trip Rate: 34.23

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	45	45	90

2e

TRIP GENERATION CALCULATIONS

Land Use: Single-Family Detached Housing
Land Use Code: 210
Variable: Dwelling Units
Variable Value: 32

AM PEAK HOUR

Trip Rate: 0.75

	Enter	Exit	Total
Directional Distribution	25%	75%	
Trip Ends	6	18	24

PM PEAK HOUR

Trip Rate: 1.00

	Enter	Exit	Total
Directional Distribution	63%	37%	
Trip Ends	20	12	32

WEEKDAY

Trip Rate: 9.52

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	152	152	304

SATURDAY

Trip Rate: 9.91

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	159	159	318

Highway 160 ALL ROAD TYPES, MP 4.2 to 4.6 01/01/2008 to 12/31/2012, Both Add and Non-Add mileage

COLLISION TYPE	NON-PROPERTY			TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION RELATED	INTER-SECTION RELATED	OFF-ROAD
	FATAL CRASHES	FATAL CRASHES	DAMAGE ONLY											
YEAR: 2012														
REAR-END	0	0	1	1	0	0	0	1	0	1	0	0	0	0
TURNING MOVEMENTS	0	1	0	1	0	3	0	0	1	0	1	0	1	0
YEAR 2012 TOTAL	0	1	1	2	0	3	0	1	1	1	1	0	1	0
YEAR: 2010														
REAR-END	0	0	1	1	0	0	0	1	0	0	1	0	0	0
YEAR 2010 TOTAL	0	0	1	1	0	0	0	1	0	0	1	0	0	0
YEAR: 2009														
REAR-END	0	1	2	3	0	1	1	2	1	3	0	0	0	0
YEAR 2009 TOTAL	0	1	2	3	0	1	1	2	1	3	0	0	0	0
YEAR: 2008														
MISCELLANEOUS	0	0	1	1	0	0	0	1	0	1	0	0	0	0
REAR-END	0	2	1	3	0	7	0	3	0	3	0	0	1	0
SIDESWIPE - MEETING	0	0	1	1	0	0	0	1	0	0	1	0	0	0
YEAR 2008 TOTAL	0	2	3	5	0	7	0	5	0	4	1	0	1	0
FINAL TOTAL	0	4	7	11	0	11	1	9	2	8	3	0	2	0

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 requirements, 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
CONTINUOUS SYSTEM CRASH LISTING

Highway 160 ALL ROAD TYPES, MP 4.2 to 4.6 01/01/2008 to 12/31/2012, Both Add and Non-Add mileage

Total crash records: 11

STATE	NO. REF	DATE	TIME	MP	LANE	DIR	TYPE	SEVERITY	VEHICLE	DRIVER	INJURY	PROPERTY	ACT. EVENT	CRASH				
CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS				
04897	N N N	12/21/2010	8P	4.41	04	UN	STRGHT	(NONE)	N	CLR	S-STRGHT	01 NONE	0	STRGHT	S - N	0	07	
NONE	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS
00268	N N N	01/18/2008	4P	4.42	03	UN	STRGHT	(NONE)	N	CLR	O-STRGHT	01 NONE	0	STRGHT	S - N	0	05	
STATE	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS
00398	N N N	09/07/2008	10A	4.44	06	UN	STRGHT	(NONE)	N	CLR	S-1STOP	01 NONE	0	STRGHT	S - N	0	07	
NONE	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS
01770	N N N	05/15/2008	6P	4.50	03	UN	STRGHT	(NONE)	N	CLR	S-1STOP	01 NONE	0	STRGHT	S - N	0	07	
NONE	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS
00495	N N N	02/04/2009	8A	4.50	04	UN	STRGHT	(NONE)	N	CLR	S-1STOP	01 NONE	0	STRGHT	S - N	0	07	
STATE	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS	PORTLAND	CLACKAMAS

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Highway 160 ALL ROAD TYPES, MP 4.5 to 4.65 01/01/2008 to 12/31/2012, Both Add and Non-Add mileage

COLLISION TYPE	NON-PROPERTY			TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION RELATED	INTER-SECTION RELATED	OFF-ROAD
	FATAL CRASHES	DAMAGE ONLY	FATAL CRASHES											
YEAR: 2012														
REAR-END	0	1	0	1	0	0	0	0	1	1	0	1	0	0
YEAR 2012 TOTAL	0	1	0	1	0	0	0	0	1	1	0	1	0	0
YEAR: 2009														
REAR-END	0	2	0	3	0	1	1	1	2	3	0	0	0	0
YEAR 2009 TOTAL	0	2	0	3	0	1	1	1	2	3	0	0	0	0
YEAR: 2008														
MISCELLANEOUS	0	1	0	1	0	0	0	1	0	1	0	0	0	0
REAR-END	0	0	0	1	0	2	0	1	0	1	0	0	1	0
YEAR 2008 TOTAL	0	1	0	2	0	2	0	2	0	2	0	0	1	0
FINAL TOTAL	0	2	0	6	0	3	1	3	3	6	0	1	1	0

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 requirements, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

HWY	MP	Direction	HS	Description	2009	2010	2011	2031	RSQ
154	4.09	1		0.02 mile south of Alderman Road			4200	6100	0.8537
154	6.24	1		0.02 mile north of Bellevue-Ipewell Highway			4200	5800	0.8333
155	0.15	1		0.15 mile east of Pacific Highway West (OR99W)			1400	1700	0.7749
155	2.24	1		0.02 mile west of Whiteson Road			1400	1800	0.8184
155	2.28	1		0.02 mile east of Whiteson Road			1700	2200	0.8718
155	4.30	1		0.02 mile east of Airport Road			1200	1500	0.6148
155	6.56	1		0.10 mile south of Stringtown Road			2700	3800	0.9188
155	6.76	1		0.10 mile north of Stringtown Road			5100	7500	0.8882
155	7.42	1		0.02 mile southwest of Lafayette Highway (OR233)			2000	2600	0.8878
155	7.46	1		0.02 mile northeast of Lafayette Highway (OR233)			1100	1400	0.8479
155	8.30	1		0.02 mile east of Flower Lane			1500	2000	0.8546
155	8.68	1		0.02 mile west of 8th Street			2600	3100	0.6667
155	9.03	1		0.02 mile west of 5th Street			3200	3300	0.2604
155	9.17	1		0.02 mile west of Salem-Dayton Highway (OR221)			2800	2900	0.0348
157	0.55	1		0.06 mile north of Willamina-Salem Highway (OR22)	4000			6000	0.3535
157	1.56	1		South city limits of Willamina, 0.08 mile south of Hill Drive	4000			6100	0.2994
157	2.03	1		0.02 mile south of Polk Street	4300			4500	0.0310
157	2.24	1		0.04 mile south of W. Main Street	5700			8700	0.2687
157	2.31	1		0.02 mile west of "B" Street	6000			8800	0.1844
157	2.40	1		0.02 mile east of "C" Street	5600			7600	0.0512
157	2.54	1		0.02 mile east of "E" Street	5000			5900	0.0192
157	2.78	1		0.11 mile east of Oaken Hills Drive	4300			5700	0.1696
157	5.59	1		0.08 mile east of Rock Creek Road	4400			6100	0.2653
157	6.53	1		0.02 mile west of Western Street	5400			8100	0.3800
157	7.11	1		0.02 mile west of Bridge Street	6200			8900	0.2697
157	7.15	1		0.02 mile east of Bridge Street	5800			7900	0.5669
157	7.26	1		0.02 mile east of Hill Street	6000			8500	0.6195
157	8.10	1		0.50 mile west of Salmon River Highway (OR18)	4900			7800	0.7218
160	0.12	1		0.02 mile north of Washington Street		65000		94900	MODEL
160	0.16	1		0.02 mile south of Washington Street		47200		60000	MODEL
160	0.50	1		0.02 mile south of Redland Road		39700		48500	MODEL
160	3.00	1		0.02 mile south of Beavercreek Road		29100		32200	MODEL
160	3.69	1		0.10 mile south of Molalla Avenue (Entrance to Clackamas Community College)		25700		29400	MODEL
160	4.38	1		0.02 mile north of S. Henriki Road		18500		21600	MODEL
160	5.71	1		0.02 mile north of S. Leland Road		16900		18900	MODEL
160	7.14	1		0.02 mile south of S. Carus Road		13500		15600	MODEL
160	8.90	1		Mulino Automatic Traffic Recorder, Sta. 03-020, 0.94 mile south of S. Spangler Road		13000		14700	MODEL
160	11.03	1		0.05 mile south of S. Mulino Road at Mulino		14100		16100	MODEL
160	12.30	1		0.05 mile north of S. Union Mills Road		14100		17700	MODEL
160	13.76	1		0.02 mile north of S. Molalla Road		12100		14200	MODEL
160	13.80	1		0.02 mile south of S. Molalla Road		9100		13800	MODEL
160	15.69	1		0.02 mile north of S. Toliver Road		9700		14700	MODEL
160	16.08	1		0.02 mile north of Woodburn-Estacada Highway (OR211)		8800		13300	MODEL
160	16.12	1		0.02 mile south of Woodburn-Estacada Highway (OR211)		4100		6000	MODEL
160	20.30	1		0.02 mile south of S. Monte Cristo Road		4300		6200	MODEL
160	22.15	1		Marquam Automatic Traffic Recorder, Sta. 03-013, 2.05 miles northeast of Clackamas-Marion County Line		4000		6100	MODEL
160	24.20	1		Clackamas-Marion County Line		3800		5700	MODEL
160	26.45	1		0.02 mile north of Abiqua Road N.E.		3500		4900	0.5203
160	26.49	1		0.02 mile south of Abiqua Road N.E.		4000		5900	0.5815
160	27.30	1		0.02 mile south of S. Abiqua Road N.E.		5000		7700	0.7128
160	28.76	1		0.05 mile west of Meridian Road N.E. (Monitor Road)		5000		7400	0.4341
160	29.57	1		0.02 mile east of N. 2nd Street		7300		9900	0.8241
160	29.63	1		0.02 mile east of Hillsboro-Silverton Highway (OR214-Northbound)		6000		8800	0.7521
160	29.69	1		0.02 mile east of Hillsboro-Silverton Highway (OR214-Southbound)		3900		5000	0.6953
161	0.15	1		0.15 mile east of Pacific Highway East (OR99E) and Hillsboro-Silverton Highway (OR214)		11000		13400	MODEL
161	2.63	1		Marion-Clackamas County Line, 1.15 mile west of S. Meridian Road		6300		9400	MODEL
161	5.20	1		0.05 mile east of Barlow Road		5000		7000	MODEL
161	7.69	1		0.10 mile east of S. Canby-Marquam Road		5000		7200	MODEL
161	11.26	1		0.05 mile west of Cascade Highway South (OR213)		5500		8600	MODEL
161	11.36	1		0.05 mile east of Cascade Highway South (OR213)		8100		12700	MODEL
161	12.25	1		0.09 mile east of LeRoy Avenue		10300		16200	MODEL
161	13.27	1		0.02 mile west of Stowers Lane		7300		10000	MODEL
161	13.67	1		0.24 mile northeast of S. Mathias Road		5200		7100	MODEL
161	15.41	1		Molalla River (On Meadowbrook Bridge)		5100		6200	MODEL
161	16.34	1		0.03 mile north of Meadowbrook Road		5300		7300	MODEL
161	18.23	1		At Cedarvale, 0.19 mile east of S. Paveletz Road		4500		6600	MODEL
161	21.20	1		0.02 mile east of Wall Street at Colton		3400		4900	MODEL
161	21.69	1		0.02 mile northeast of Schieffer Road		2200		3200	MODEL
161	24.35	1		Colton Automatic Traffic Recorder, Sta. 03-014, 3.17 miles northeast of Wall Street		2300		3300	MODEL
161	26.43	1		0.02 mile north of S. Highland Road		2300		3300	MODEL
161	28.79	1		0.02 mile north of Hillock Burn Road		2800		4000	MODEL
161	30.73	1		0.02 mile north of Day Hill Road (south junction)		3100		4600	MODEL
161	32.55	1		0.02 mile north of Hayden Road		5600		8300	MODEL
161	33.20	1		0.02 mile east of Day Hill Road (North Jet.)		6300		9200	MODEL
161	33.40	1		South city limits of Estacada, 0.09 mile south of Clackamas Highway (OR224)		6300		9200	MODEL

HCM Unsignalized Intersection Capacity Analysis
 1: OR 213 & Henrici Road

7/21/2016

	↙	↘	↑	↗	↖	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↘	↑	↗	↖	↑
Volume (veh/h)	11	31	850	24	28	377
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	11	32	876	25	29	389
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	4					
Median type			None		None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1323	876			876	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1323	876			876	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	93	91			96	
cM capacity (veh/h)	163	344			742	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	43	876	25	29	389	
Volume Left	11	0	0	29	0	
Volume Right	32	0	25	0	0	
cSH	466	1700	1700	742	1700	
Volume to Capacity	0.09	0.52	0.01	0.04	0.23	
Queue Length 95th (ft)	8	0	0	3	0	
Control Delay (s)	19.7	0.0	0.0	10.1	0.0	
Lane LOS	C		B			
Approach Delay (s)	19.7	0.0	0.7			
Approach LOS	C					
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			54.7%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 2: OR 213 & Hals Construction

7/21/2016

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	4	10	871	4	9	379
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.75	0.75	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	13	917	4	9	399
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1337	919			921	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1337	919			921	
tC, single (s)	6.6	6.4			4.3	
tC, 2 stage (s)						
tF (s)	3.7	3.5			2.4	
p0 queue free %	97	96			99	
cM capacity (veh/h)	153	305			672	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	19	921	408			
Volume Left	5	0	9			
Volume Right	13	4	0			
cSH	237	1700	672			
Volume to Capacity	0.08	0.54	0.01			
Queue Length 95th (ft)	6	0	1			
Control Delay (s)	21.5	0.0	0.4			
Lane LOS	C		A			
Approach Delay (s)	21.5	0.0	0.4			
Approach LOS	C					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			56.1%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 1: OR 213 & Henrici Road

7/21/2016

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	16	49	552	16	81	1083
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	17	51	575	17	84	1128
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1872	575			575	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1872	575			575	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	77	90			92	
cM capacity (veh/h)	72	518			998	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	68	575	17	84	1128	
Volume Left	17	0	0	84	0	
Volume Right	51	0	17	0	0	
cSH	294	1700	1700	998	1700	
Volume to Capacity	0.23	0.34	0.01	0.08	0.66	
Queue Length 95th (ft)	22	0	0	7	0	
Control Delay (s)	26.6	0.0	0.0	8.9	0.0	
Lane LOS	D			A		
Approach Delay (s)	26.6	0.0		0.6		
Approach LOS	D					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			67.0%		ICU Level of Service	C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 2: OR 213 & Hals Construction

7/21/2016

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	1	4	597	1	3	1096
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.75	0.75	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	5	628	1	3	1154
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1789	629			629	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1789	629			629	
tC, single (s)	6.6	6.4			4.3	
tC, 2 stage (s)						
tF (s)	3.7	3.5			2.4	
p0 queue free %	98	99			100	
cM capacity (veh/h)	80	451			872	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	7	629	1157			
Volume Left	1	0	3			
Volume Right	5	1	0			
cSH	234	1700	872			
Volume to Capacity	0.03	0.37	0.00			
Queue Length 95th (ft)	2	0	0			
Control Delay (s)	20.8	0.0	0.1			
Lane LOS	C		A			
Approach Delay (s)	20.8	0.0	0.1			
Approach LOS	C					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			70.1%	ICU Level of Service	C	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 1: OR 213 & Henrici Road

7/21/2016

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	17	47	995	36	42	437
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	18	48	1026	37	43	451
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1563	1026			1026	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1563	1026			1026	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	84	83			93	
cM capacity (veh/h)	113	281			650	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	66	1026	37	43	451	
Volume Left	18	0	0	43	0	
Volume Right	48	0	37	0	0	
cSH	383	1700	1700	650	1700	
Volume to Capacity	0.17	0.60	0.02	0.07	0.27	
Queue Length 95th (ft)	15	0	0	5	0	
Control Delay (s)	26.3	0.0	0.0	10.9	0.0	
Lane LOS	D			B		
Approach Delay (s)	26.3	0.0		1.0		
Approach LOS	D					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			62.4%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 2: OR 213 & Hals Construction

7/21/2016

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	1	1030	0	1	453
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.75	0.75	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	1	1084	0	1	477
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1563	1084			1084	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1563	1084			1084	
tC, single (s)	6.6	6.4			4.3	
tC, 2 stage (s)						
tF (s)	3.7	3.5			2.4	
p0 queue free %	100	99			100	
cM capacity (veh/h)	111	243			580	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	1	1084	478			
Volume Left	0	0	1			
Volume Right	1	0	0			
cSH	243	1700	580			
Volume to Capacity	0.01	0.64	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	19.9	0.0	0.1			
Lane LOS	C		A			
Approach Delay (s)	19.9	0.0	0.1			
Approach LOS	C					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			64.2%		ICU Level of Service	C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 1: OR 213 & Henrici Road

7/21/2016

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑	↗	↘	↓
Volume (veh/h)	45	96	611	59	86	1169
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	48	102	650	63	91	1244
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2077	650			650	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2077	650			650	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	10	78			90	
cM capacity (veh/h)	53	469			936	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	150	650	63	91	1244	
Volume Left	48	0	0	91	0	
Volume Right	102	0	63	0	0	
cSH	167	1700	1700	936	1700	
Volume to Capacity	0.90	0.38	0.04	0.10	0.73	
Queue Length 95th (ft)	163	0	0	8	0	
Control Delay (s)	79.5	0.0	0.0	9.3	0.0	
Lane LOS	F			A		
Approach Delay (s)	79.5	0.0		0.6		
Approach LOS	F					
Intersection Summary						
Average Delay			5.8			
Intersection Capacity Utilization			71.5%	ICU Level of Service		C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 2: OR 213 & Hals Construction

7/21/2016



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	1	669	0	1	1213
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.75	0.75	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	1	704	0	1	1277
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1983	704			704	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1983	704			704	
tC, single (s)	6.6	6.4			4.3	
tC, 2 stage (s)						
tF (s)	3.7	3.5			2.4	
p0 queue free %	100	100			100	
cM capacity (veh/h)	60	408			816	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	1	704	1278
Volume Left	0	0	1
Volume Right	1	0	0
cSH	408	1700	816
Volume to Capacity	0.00	0.41	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	13.9	0.0	0.1
Lane LOS	B		A
Approach Delay (s)	13.9	0.0	0.1
Approach LOS	B		

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		74.6%	ICU Level of Service D
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
 1: OR 213 & Henrici Road

7/21/2016

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	17	47	1032	36	42	522
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	18	48	1064	37	43	538
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1689	1064			1064	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1689	1064			1064	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	81	82			93	
cM capacity (veh/h)	94	267			629	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	66	1064	37	43	538	
Volume Left	18	0	0	43	0	
Volume Right	48	0	37	0	0	
cSH	355	1700	1700	629	1700	
Volume to Capacity	0.19	0.63	0.02	0.07	0.32	
Queue Length 95th (ft)	17	0	0	6	0	
Control Delay (s)	29.5	0.0	0.0	11.1	0.0	
Lane LOS	D			B		
Approach Delay (s)	29.5	0.0		0.8		
Approach LOS	D					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			64.3%		ICU Level of Service	C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 2: OR 213 & Hals Construction

7/21/2016

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	16	39	1029	38	86	453
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.75	0.75	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	52	1083	40	91	477
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1761	1103			1123	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1761	1103			1123	
tC, single (s)	6.6	6.4			4.3	
tC, 2 stage (s)						
tF (s)	3.7	3.5			2.4	
p0 queue free %	70	78			84	
cM capacity (veh/h)	70	237			560	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	73	1123	567			
Volume Left	21	0	91			
Volume Right	52	40	0			
cSH	140	1700	560			
Volume to Capacity	0.52	0.66	0.16			
Queue Length 95th (ft)	63	0	14			
Control Delay (s)	56.1	0.0	4.4			
Lane LOS	F		A			
Approach Delay (s)	56.1	0.0	4.4			
Approach LOS	F					
Intersection Summary						
Average Delay			3.7			
Intersection Capacity Utilization			98.4%	ICU Level of Service	F	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 1: OR 213 & Henrici Road

7/21/2016

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	45	96	697	59	86	1232
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	47	101	734	62	91	1297
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2212	734			734	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2212	734			734	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	76			90	
cM capacity (veh/h)	43	420			871	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	148	734	62	91	1297	
Volume Left	47	0	0	91	0	
Volume Right	101	0	62	0	0	
cSH	131	1700	1700	871	1700	
Volume to Capacity	1.13	0.43	0.04	0.10	0.76	
Queue Length 95th (ft)	216	0	0	9	0	
Control Delay (s)	184.4	0.0	0.0	9.6	0.0	
Lane LOS	F			A		
Approach Delay (s)	184.4	0.0		0.6		
Approach LOS	F					
Intersection Summary						
Average Delay			12.1			
Intersection Capacity Utilization			74.8%		ICU Level of Service	D
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 2: OR 213 & Hals Construction

7/21/2016

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	39	88	668	28	66	1211
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.75	0.75	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	52	117	703	29	69	1275
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2132	718			733	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2132	718			733	
tC, single (s)	6.6	6.4			4.3	
tC, 2 stage (s)						
tF (s)	3.7	3.5			2.4	
p0 queue free %	0	71			91	
cM capacity (veh/h)	44	400			795	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	169	733	1344			
Volume Left	52	0	69			
Volume Right	117	29	0			
cSH	115	1700	795			
Volume to Capacity	1.47	0.43	0.09			
Queue Length 95th (ft)	302	0	7			
Control Delay (s)	322.1	0.0	3.8			
Lane LOS	F		A			
Approach Delay (s)	322.1	0.0	3.8			
Approach LOS	F					
Intersection Summary						
Average Delay			26.6			
Intersection Capacity Utilization			121.8%	ICU Level of Service	H	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 1: OR 213 & Henrici Road

7/21/2016

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑	↗	↘	↓
Volume (veh/h)	17	47	1032	36	42	522
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	18	48	1064	37	43	538
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type			TWLTL			None
Median storage (veh)			2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1689	1064			1064	
vC1, stage 1 conf vol	1064					
vC2, stage 2 conf vol	625					
vCu, unblocked vol	1689	1064			1064	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.3	
p0 queue free %	94	82			93	
cM capacity (veh/h)	279	267			629	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	66	1064	37	43	538	
Volume Left	18	0	0	43	0	
Volume Right	48	0	37	0	0	
cSH	364	1700	1700	629	1700	
Volume to Capacity	0.18	0.63	0.02	0.07	0.32	
Queue Length 95th (ft)	16	0	0	6	0	
Control Delay (s)	20.7	0.0	0.0	11.1	0.0	
Lane LOS	C			B		
Approach Delay (s)	20.7	0.0		0.8		
Approach LOS	C					
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			64.3%		ICU Level of Service	C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 2: OR 213 & Hals Construction

7/21/2016

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	16	39	1029	38	86	453
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.75	0.75	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	52	1083	40	91	477
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			None		
Median storage (veh)	2					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1761	1103			1123	
vC1, stage 1 conf vol	1103					
vC2, stage 2 conf vol	658					
vCu, unblocked vol	1761	1103			1123	
tC, single (s)	6.6	6.4			4.3	
tC, 2 stage (s)	5.6					
tF (s)	3.7	3.5			2.4	
p0 queue free %	91	78			84	
cM capacity (veh/h)	240	237			560	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	73	1123	567			
Volume Left	21	0	91			
Volume Right	52	40	0			
cSH	238	1700	560			
Volume to Capacity	0.31	0.66	0.16			
Queue Length 95th (ft)	32	0	14			
Control Delay (s)	26.8	0.0	4.4			
Lane LOS	D		A			
Approach Delay (s)	26.8	0.0	4.4			
Approach LOS	D					
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			98.4%	ICU Level of Service	F	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 1: OR 213 & Henrici Road

7/21/2016

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	45	96	697	59	86	1232
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.96
Hourly flow rate (vph)	47	101	734	62	91	1283
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type			TWLTL			None
Median storage (veh)			2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2198	734			734	
vC1, stage 1 conf vol	734					
vC2, stage 2 conf vol	1464					
vCu, unblocked vol	2198	734			734	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	73	76			90	
cM capacity (veh/h)	174	420			871	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	148	734	62	91	1283	
Volume Left	47	0	0	91	0	
Volume Right	101	0	62	0	0	
cSH	546	1700	1700	871	1700	
Volume to Capacity	0.27	0.43	0.04	0.10	0.75	
Queue Length 95th (ft)	27	0	0	9	0	
Control Delay (s)	21.7	0.0	0.0	9.6	0.0	
Lane LOS	C			A		
Approach Delay (s)	21.7	0.0		0.6		
Approach LOS	C					
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			74.8%		ICU Level of Service	D
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 2: OR 213 & Hals Construction

7/21/2016

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	39	88	668	28	66	1211
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.75	0.75	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	52	117	703	29	69	1275
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			None		
Median storage (veh)	2					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2132	718			733	
vC1, stage 1 conf vol	718					
vC2, stage 2 conf vol	1414					
vCu, unblocked vol	2132	718			733	
tC, single (s)	6.6	6.4			4.3	
tC, 2 stage (s)	5.6					
tF (s)	3.7	3.5			2.4	
p0 queue free %	70	71			91	
cM capacity (veh/h)	171	400			795	
Direction, Lane #						
	WB 1	NB 1	SB 1			
Volume Total	169	733	1344			
Volume Left	52	0	69			
Volume Right	117	29	0			
cSH	284	1700	795			
Volume to Capacity	0.60	0.43	0.09			
Queue Length 95th (ft)	89	0	7			
Control Delay (s)	34.9	0.0	3.8			
Lane LOS	D		A			
Approach Delay (s)	34.9	0.0	3.8			
Approach LOS	D					
Intersection Summary						
Average Delay			4.9			
Intersection Capacity Utilization			121.8%	ICU Level of Service	H	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 2: OR 213 & Hals Construction

7/21/2016

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	27	61	668	20	46	1211
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	28	64	703	21	48	1275
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2085	714			724	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2085	714			724	
tC, single (s)	6.6	6.4			4.3	
tC, 2 stage (s)						
tF (s)	3.7	3.5			2.4	
p0 queue free %	42	84			94	
cM capacity (veh/h)	49	403			801	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	93	724	1323			
Volume Left	28	0	48			
Volume Right	64	21	0			
cSH	124	1700	801			
Volume to Capacity	0.74	0.43	0.06			
Queue Length 95th (ft)	106	0	5			
Control Delay (s)	90.4	0.0	2.6			
Lane LOS	F		A			
Approach Delay (s)	90.4	0.0	2.6			
Approach LOS	F					
Intersection Summary						
Average Delay			5.5			
Intersection Capacity Utilization			112.9%	ICU Level of Service	H	
Analysis Period (min)			15			