Southern Oregon Transportation Engineering, LLC
319 Eastwood Drive - Medford, Or. 97504 – Phone (541) 608-9923 – Email: Kwkp1@Q.com

March 13, 2017

Matt Samitore, Public Works Director
City of Central Point
140 South Third Street
Central Point, Oregon 97502

RE: Creekside Apartments 50-unit Development Traffic Analysis

Dear Matt,

Southern Oregon Transportation Engineering, LLC prepared a limited traffic analysis for the proposed Creekside Apartments development located west of Haskell Street between Ash Street and Cheney Loop in Central Point. Proposed development includes 50 apartments on Township 37S Range 2W Section 10AD tax lot 701.

Background

Access to the proposed Creekside Apartments development is provided from Cheney Loop and Ash Street, both of which intersect with Haskell Street. Haskell Street is the higher order street that provides connectivity to W. Pine Street to the north.

Cheney Loop and Ash Street are both two-lane local streets with curb and gutter. Haskell Street is a two-lane collector with curb and gutter in the vicinity of the site. Sidewalks and a park row will be added along the subject property frontage as part of development, connecting pedestrian facilities to the north and south on Haskell Street. The nearest higher order intersection with Haskell Street is its

intersection with W. Pine Street to the north. This intersection experiences its largest spike in traffic during the a.m. peak hour as a result of commuter traffic and school traffic from Mae Richardson Elementary occurring simultaneously Monday through Friday. As a result of this, the a.m. peak hour was used as the critical peak hour in the analysis.

Year 2017 No-Build Intersection Operations

Manual traffic counts were gathered in late February of 2017 at the study area intersection of Haskell Street and W. Pine Street. Counts were gathered during the a.m. peak period (7:00-9:00 a.m.) for three consecutive weekdays in an effort to capture a morning commute with heavy school traffic. Manual counts were also gathered on Pine Street at OR 99 (Front Street) during the a.m. peak period and at Haskell Street and W. Pine Street during an extended p.m. peak period (2:00-6:00 p.m.) to capture both school traffic and the commuter peak. All counts were seasonally adjusted to reflect peak conditions and then evaluated to determine how facilities currently operate. Results are summarized in Table 1.

Table 1 – Year 2017 No-Build Intersection Operations

Intersection	Jurisdiction	Performance Standard	Traffic Control	Year 2017 No-Build A.M. Peak	Year 2017 No-Build P.M. Peak
Haskell Street / W. Pine Street	City of Central Point	LOS D	Signal	C, 21.1 sec	A, 9.2 sec

LOS = Level of Service, sec = seconds
Note: Exceeded performance standards are shown in bold, italic

Results of the analysis show the intersection of Haskell Street and Pine Street operating at a level of service (LOS) "C" under existing year 2017 no-build conditions during a.m. peak hour, which is shown to be significantly worse than the LOS "A" operation during the p.m. peak hour. Both operations are within the City's LOS "D" performance standard, but this verifies that the a.m. peak hour is the critical peak hour of the day. Refer to the attachments for synchro output sheets.

Year 2017 No-Build Queuing and Blocking

Queuing is the stacking up of vehicles for a given lane movement, and it can have a significant effect on roadway safety and the overall operation of a transportation system. Long queue lengths in through lanes can block access to turn lanes, driveways, and minor street approaches, as well as spill back into upstream intersections. As a result of this, the estimation of queue lengths is an important aspect of the analysis process for determining how a transportation corridor operates.

Queue lengths are reported as the average, maximum, or 95th percentile queue length. The 95th percentile queue length is used for design purposes and is the queue length reported in this analysis. Five simulations were run and averaged in SimTraffic to determine 95th percentile queue lengths. Queue lengths were rounded up to the nearest 25 feet (single vehicle length) and reported in Table 2 for applicable movements during the a.m. and p.m. peak hours.

Table 2 – Year 2017 No-Build 95th Percentile Queue Lengths			
Intersection Movement	**Available Link Distance (Feet)**	**95th Percentile Queue Length AM (feet)**	**95th Percentile Queue Length PM (feet)**
Haskell Street / W. Pine Street			
Southbound Left	375	***750****	150
Southbound Through/Right	150	***175****	50
Northbound Left/Through/Right	525	100*	50
Eastbound Left	150	***175****	50
Eastbound Through/Right	425	***675****	175
Westbound Left	150	75	100
Westbound Through	375	200	250
Westbound Right	275	125	100

Note: Exceeded queue lengths are shown in bold, italic
* Queue lengths affected by downstream congestion at Pine Street / OR 99

Results of the queuing analysis show many exceeded queue lengths occurring under existing conditions during the a.m. peak hour as a result of downstream queuing on Pine Street at OR 99 (Front Street). In watching traffic in the field and verifying through model simulations, the eastbound traffic volume on Pine Street at OR 99 exceeds the single lane capacity provided, and the amount of green time for that movement cannot support the demand. This results in a queue length that backs up through the railroad crossing, Amy Street, and Haskell Street for approximately twenty minutes of the a.m. peak period. When this occurs, the southbound left, eastbound through, and northbound right turn movements at Haskell Street and W. Pine Street have no place to go when they have a green light. In order to properly show this, we evaluated the intersection of Haskell Street and W. Pine Street as an isolated intersection. The queuing results are shown in Table 3.

Table 3 – Year 2017 No-Build 95th Percentile Queue Lengths – Haskell / W. Pine Isolated			
Intersection Movement	**Available Link Distance (Feet)**	**95th Percentile Queue Length AM (feet)**	**Exceeded**
Haskell Street / W. Pine Street			
Southbound Left	375	250	No
Southbound Through/Right	150	50	No
Northbound Left/Through/Right	525	75	No
Eastbound Left	150	125	No
Eastbound Through/Right	425	250	No
Westbound Left	150	75	No
Westbound Through	375	150	No
Westbound Right	275	100	No

Note: Exceeded queue lengths are shown in bold, italic

What is shown in Table 3 is that the intersection of Haskell Street and W. Pine Street does not have exceeded queue lengths during the a.m. peak hour when it isn't impacted by downstream queue lengths. The green splits provided for traffic movements are sufficient to handle the spike in traffic that occurs when school traffic and commuter traffic mix. The southbound left turn and eastbound through queue lengths are still shown to be long, but this is expected during the peak period, and both continue to stay within their available link distances. This confirms that the problem on the system is occurring downstream at Pine Street and OR 99.

Traffic signal timing adjustments were explored at the intersection of Pine Street and OR 99, but were not shown to solve the capacity problem occurring during the a.m. peak hour. The solution is to

provide two eastbound through lanes on Pine Street between Haskell Street and S. 2nd Street. When two travel lanes are provided, the eastbound queue on Pine Street at OR 99 does not back up and impact the intersection of Haskell Street and W. Pine Street. Table 4 summarizes queue lengths with mitigation in place.

Table 4 – Year 2017 No-Build 95th Percentile Queue Lengths – Mitigated

Intersection Movement	Available Link Distance (Feet)	95th Percentile Queue Length AM (feet)	Exceeded
Haskell Street / W. Pine Street			
Southbound Left	375	275	No
Southbound Through/Right	150	75	No
Northbound Left/Through/Right	525	75	No
Eastbound Left	150	100	No
Eastbound Through/Right	425	250	No
Westbound Left	150	75	No
Westbound Through	375	150	No
Westbound Right	275	100	No

Note: Exceeded queue lengths are shown in bold, italic

As can be seen in Table 4, when two travel lanes are provided eastbound on Pine Street at OR 99, queue lengths at the Haskell Street and W. Pine Street are similar to those that were shown as an isolated intersection, which means that they aren't affected by downstream queuing. This mitigation was previously shown to be required in the year 2000 Central Point Transit Oriented Development Traffic Impact Study prepared by JRH Transportation. This study evaluated the need and benefit of a third railroad crossing at Twin Creeks to the north, which reduces traffic on Haskell Street and preserves future capacity at the intersection with W. Pine Street. Construction of this third railroad crossing is scheduled for completion by November of 2017, which will occur before the proposed 50-unit Creekside Apartments development builds out. For this reason, the year 2018 no-build and build analyses in this report assume re-routing of traffic from Haskell Street to OR 99 through the Twin Creeks railroad crossing, consistent with what was shown to occur in model runs provided for the JRH study.

Crash History

Crash data for the most recent 5-year period was provided from ODOT's Crash Analysis Unit. Results were provided for the period of January 1st, 2011 through December 31st, 2015.

Intersection safety is generally evaluated by determining the crash rate in terms of crashes per Million Entering Vehicles (MEV) at intersections or Million Vehicle Miles (MVM) for segments. The details of crash data are examined to identify any patterns that could be attributable to geometric or operational deficiencies. A crash rate higher than the ODOT published 90th percentile rate or trends of a specific type of crash may indicate the need for further investigation along a corridor.

Data at the study area intersection of Haskell Street and W. Pine Street showed ten collisions within a 5-year period. Tables 5 and 6 provide a summary of results. Crash data is provided in the attachments.

Table 5 - Study Area Intersection Crash Rates, 2011-2015

Intersection	2011	2012	2013	2014	2015	Total Crashes	AADT	Crash Rate	ODOT 90th %
Haskell Street / W. Pine Street	0	1	2	5	2	10	14,900	0.37	0.860

Table 6 - Crash History by Type, 2011-2015								
Intersection	**Collision Type**					**Severity**		
	Rear-End	**Turning/ Angle**	**Fixed Object**	**Other**	**Ped/ Bike**	**Non-Injury**	**Injury**	**Fatal**
Haskell Street / W. Pine Street	3	6	1	0	0	10	0	0

There were ten reported collisions at the study area intersection of Haskell Street and W. Pine Street within a five year period. Six of the ten collisions were turning collisions, which is common at intersections with permissive movements because drivers are required to yield and often do not. Three of the ten were rear-end collisions, all of which occurred during either the a.m. or p.m. peak periods likely as a result of congestion. None of the collisions resulted in injury. There were no pedestrian or bicyclist related collisions, nor were there any fatalities.

The number of collisions at Haskell Street and W. Pine Street show an average of two per year, which is not considered excessive especially considering the high traffic spikes that are shown to occur during peak periods, but more importantly, the severity of collisions is low which reduces the safety concern. The intersection crash rate is significantly less than the ODOT published 90th percentile crash rate, which is used as a measure to determine whether further investigation should be taken. Based on all of this, no further investigation is shown to be necessary.

Design Year 2018 No-Build Conditions

Design year 2018 no-build conditions represent development build year conditions for the study area without consideration of proposed development trips. This condition is evaluated to determine how a study area will be impacted by area background growth. An annual growth rate was developed for traffic movements from the ODOT Future Volumes Table. Two locations were evaluated and averaged, which included OR 99 at Beall Lane and OR 99 at Scenic Ave. The corresponding growth rate was 1.5% of growth per year through the future year 2035. Design year 2018 no-build traffic volumes were adjusted with one year of growth and then rounded up to the nearest five trips. A reduction in trips on Haskell Street was also made to account for the third railroad crossing at Twin Creeks. A spreadsheet with growth calculations and volume development is provided in the attachments.

Design Year 2018 No-Build Intersection Operations

The intersection of Haskell Street and W. Pine Street was evaluated under design year 2018 no-build conditions during the a.m. peak hour to evaluate impacts from background growth and re-routing of trips through the planned third railroad crossing at Twin Creeks. A mitigated scenario (additional eastbound lane on W. Pine Street) was also evaluated for comparison purposes. Results of both scenarios are summarized in Table 7.

Table 7 – Design Year 2018 No-Build Intersection Operations						
Intersection	**Jurisdiction**	**Performance Standard**	**Traffic Control**	**AM Peak No-Build**	**AM Peak Re-routed**	**AM Peak Mitigated**
Haskell Street / Pine Street	City of Central Point	LOS D	Signal	C, 20.3 sec	B, 17 sec	B, 16.9 sec

LOS = Level of Service, sec = seconds
Note: Exceeded performance standards are shown in bold, italic

Results of the analysis show the intersection of Haskell Street and W. Pine Street continues to operate acceptably under all design year 2018 no-build scenarios, but the intersection improves from a level of service (LOS) "C" to a LOS "B" with implementation of the third railroad crossing at Twin Creeks. Refer to the attachments for synchro output sheets.

Design Year 2018 No-Build Queuing and Blocking

Five simulations were run and averaged in SimTraffic to determine 95th percentile queue lengths at Haskell Street and W. Pine Street under design year 2018 no-build conditions. Queue lengths were rounded up to the nearest 25 feet (single vehicle length) and reported in Table 8 for applicable movements during the a.m. peak hour for the same three no-build scenarios (no-build, re-routed, and mitigated).

Table 8 – Design Year 2018 No-Build 95th Percentile Queue Lengths – AM Peak Hour

Intersection Movement	Available Link Distance (Feet)	95th Percentile Queue Length AM No-Build	95th Percentile Queue Length AM Re-routed	95th Percentile Queue Length AM Mitigated
Haskell Street / W. Pine Street				
Southbound Left	375	***850****	***425****	200
Southbound Through/Right	150	100	75	50
Northbound Left/Through/Right	525	75	75	75
Eastbound Left	150	***200****	***175****	125
Eastbound Through/Right	425	***1150****	***800****	250
Westbound Left	150	100	75	75
Westbound Through	375	225	175	150
Westbound Right	275	125	100	100

Note: Exceeded queue lengths are shown in bold, italic
* Queue lengths affected by downstream congestion at Pine Street / OR 99

As can be seen in Table 8, queue lengths are highest under year 2018 no-build conditions without consideration of the third railroad crossing at Twin Creeks and/or the additional eastbound travel lane on Pine Street. With consideration of the third railroad crossing at Twin Creeks, queue lengths reduced on Haskell Street and eastbound on W. Pine Street as a result of re-routed traffic volumes, but they continue to exceed the available link distances. With consideration of the third railroad crossing and an additional eastbound through lane on W. Pine Street east of Haskell Street, all queue lengths are shown to stay within their available link distances during the a.m. peak hour. Full queuing and blocking reports are provided in the attachments.

Trip Generation

Trip generation calculations for proposed development trips were prepared utilizing the Institute of Transportation Engineers (ITE) *Trip Generation* 9th edition. The ITE rate was used for land use code 220 – Apartment. All trips were considered new trips to the transportation system. A summary is provided in Table 9.

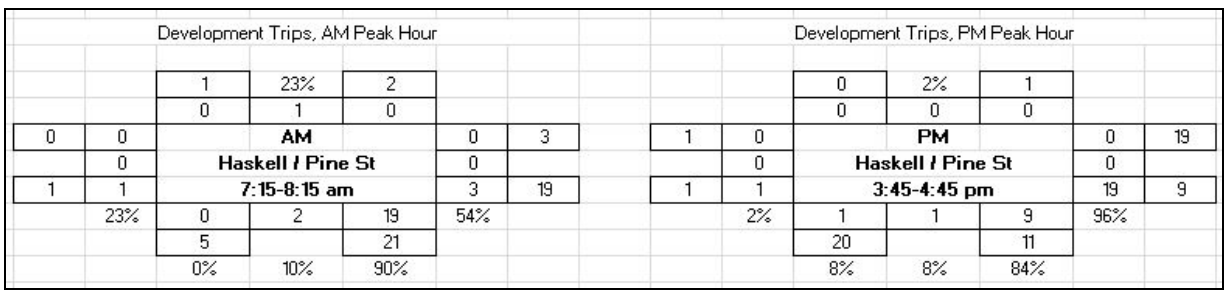
Table 9 – Development Trip Generations

Land Use	Unit	Size	AM Rate	AM Peak Hour			PM Rate	PM Peak Hour		
				Total	(In)	(Out)		Total	(In)	(Out)
220 - Apartment	DU	50	0.51	26	5	21	0.62	31	20	11
Net New Trips				**26**	**5**	**21**		**31**	**20**	**11**

DU = dwelling unit

Trip Distribution and Assignment

Development trips were assumed to distribute 100% to/from W. Pine Street through Haskell Street. At W. Pine Street, trips were distributed in accordance with existing traffic patterns. Splits were determined based on manual count data to/from the west, north, and east on W. Pine Street. Refer to the diagram below for percentage splits.



Under existing conditions, traffic from proposed development trips has no realistic outlet other than to/from W. Pine Street. This may change in the future if and when Haskell Street connects to Beall Lane to the south. With that connection, traffic patterns in the study area will change and redistribute to the closest connection to OR 99, but there is no planned timeline or assurance of this happening so all traffic was distributed to/from the north in this study.

Design Year 2018 Build Conditions

Design year 2018 build conditions represent design year 2018 no-build conditions with the addition of proposed development trips considered. Build conditions are compared to no-build conditions to determine what impacts and/or mitigation measures will result from proposed development.

Design Year 2018 Build Intersection Operations

The intersection of Haskell Street and W. Pine Street was evaluated under design year 2018 build conditions during the a.m. peak hour to determine what impacts, if any, would result from proposed development trips. Results are summarized in Table 10 for both re-routed and mitigated conditions.

Table 10 – Design Year 2018 Build Intersection Operations, A.M. Peak Hour

Intersection	Jurisdiction	Performance Standard	Traffic Control	Year 2018 Build–Re-routed	Year 2018 Build-Mitigated
Haskell Street / Pine Street	City of Central Point	LOS D	Signal	B, 17.7 sec	B, 17.6 sec

LOS = Level of Service, sec = seconds
Note: Exceeded performance standards are shown in bold, italic

Results of the analysis show the intersection of Haskell Street and W. Pine Street continues to operate acceptably (within performance standards) with no changes occurring as a result of proposed development trips from the Creekside Apartments. Refer to the attachments for synchro output sheets.

Design Year 2018 Build Queuing and Blocking

Five simulations were run and averaged in SimTraffic to determine 95th percentile queue lengths under design year 2018 build conditions. Queue lengths were rounded up to the nearest 25 feet (single vehicle length) and reported in Table 11 for traffic movements during both the a.m. and p.m. peak hours.

Table 11 – Design Year 2018 Build 95th Percentile Queue Lengths –A.M. Peak Hour

Intersection Movement	Available Link Distance (Feet)	95th Percentile Queue Length AM - Rerouted	95th Percentile Queue Length AM - Mitigated
Haskell Street / W. Pine Street			
Southbound Left	375	***475****	250
Southbound Through/Right	150	100	50
Northbound Left/Through/Right	525	100	75
Eastbound Left	150	***175****	100
Eastbound Through/Right	425	***700****	250
Westbound Left	150	100	75
Westbound Through	375	175	150
Westbound Right	275	100	100

Note: Exceeded queue lengths are shown in bold, italic
* Queue lengths affected by downstream congestion at Pine Street / OR 99

Results of the queuing analysis show queue lengths at the intersection of Haskell Street and W. Pine Street continue to operate much like they did under design year 2018 no-build re-routed and mitigated conditions during the a.m. peak hour. Slight increases occur in the southbound through movement as a result of development trips, but the change is insignificant. Refer to the attachments for a full queuing and blocking report.

Conclusions

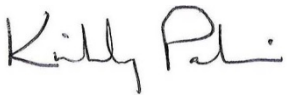
The findings of the traffic analysis conclude that the proposed 50-unit Creekside Apartments development can be approved without creating substantial impacts to the surrounding transportation system. Supporting factors include that Haskell Street has sufficient capacity to support proposed development, and the study area intersection of Haskell Street and W. Pine Street operates acceptably (within City performance standards) with and without proposed development. The only issue noted in the traffic analysis is an existing queuing problem on Pine Street at the study area intersection during the a.m. peak hour.

Queuing occurs on Pine Street at OR 99 (Front Street) in the eastbound direction during the a.m. peak hour because only one through lane is provided and this is not sufficient to handle the traffic demand. This eastbound queue length on Pine Street at OR 99 spills back past Haskell Street during the spike in traffic and impacts the signalized intersection of Haskell Street and W. Pine Street. The solution for this is to provide a second eastbound through lane on Pine Street, which was evaluated in this analysis and shown to mitigate congestion, but the logistics of this needs further investigation and should be pursued by the City to determine what options are available to provide such an improvement. Without the improvement, the study area intersection continues to operate at an acceptable level of service with and without the proposed development, but queuing will continue to be a problem during the a.m. peak hour.

The proposed development can participate in not making conditions worse by encouraging people to walk their kids to school when possible rather than driving them and contributing to the congestion problem. They can also be an advocate for connecting Haskell Street to Beall Lane to the south. Traffic volumes on Haskell Street are expected to reduce when the third railroad crossing at Twin Creeks is in place in November of 2017, but this is not expected, in itself, to mitigate the congestion problem on Pine Street so other efforts need to be encouraged as well to ensure that conditions do not continue to degrade as growth occurs in the area. These additional efforts are recommended while the City pursues the challenge of providing a second eastbound through lane on Pine Street.

Please feel free to contact me if you have any questions or need additional information regarding this letter.

Sincerely,

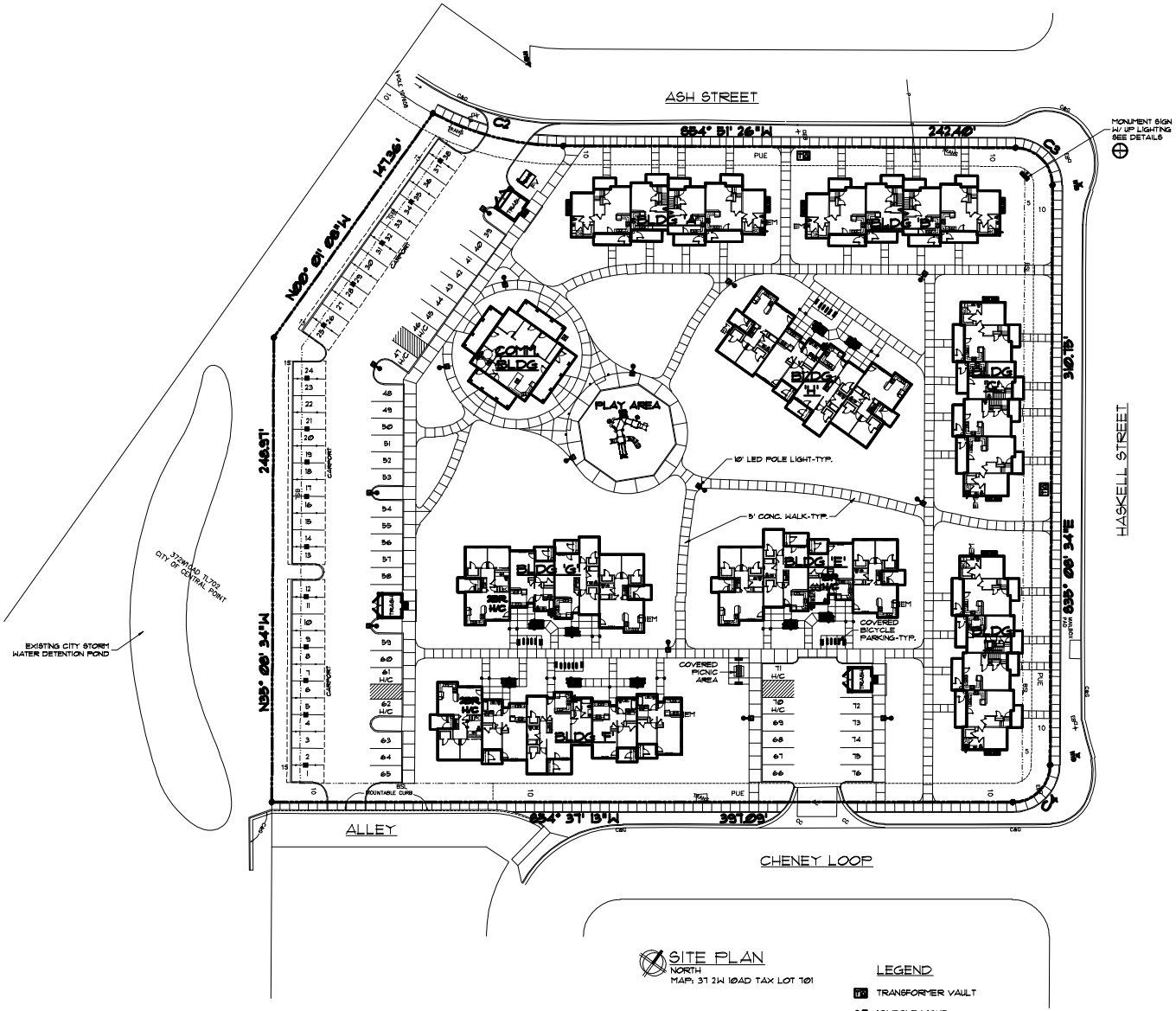


Kimberly Parducci PE, PTOE
Southern Oregon Transportation Engineering, LLC

Attachments: Site Plan
Count Data
Crash Data
Traffic Volume Development
Synchro Output/SimTraffic Output
Supporting Data

Cc: Client

ATTACHMENTS



SITE PLAN
NORTH
MAP: 37 2W 10AD TAX LOT 701

LEGEND

- TRANSFORMER VAULT
- 10' POLE LIGHT
- ELECTRICAL METER - (EM)
- FIRE SPRINKLER VAULT & FDC - (FV)

SITE TABULATIONS

ZONING: TOD-MMR, R3

AREA OF SITE:
143,147ft², 3.27 ACRES

DENSITY:
MINIMUM ALLOWED: 14 UNITS/ACRES x 3.29 = 46 UNITS
MAX. ALLOWED: 32 UNITS/ACRES x 3.29 = 105 UNITS
PROPOSED: 15 UNITS/ACRES x 3.29 = 50 UNITS

SITE COVERAGE:
BUILDING COVERAGE: 29,105ft² / 143,147ft² = 20%
PAVED PARKING/DRIVEWAYS: 24,740ft² / 143,147ft² = 17.5%
SIDEWALKS: 17,162ft² / 143,147ft² = 12%
LANDSCAPING: 71,001ft² / 143,147ft² = 49.5%
TOTAL 100%

PARKING:
1½ SPACES PER LIVING UNIT.
50 UNITS x 1.5 = 75 SPACES REQUIRED
76 PROVIDED (38 COVERED)

BICYCLE PARKING:
1 COVERED SPACE PER UNIT REQUIRED & PROVIDED.

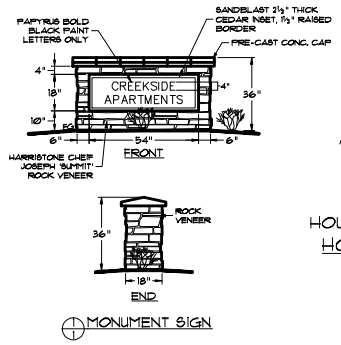
UNITS:		GROSS LIVING AREA
12 - 1BR. FLATS	@ 690ft²	= 8,280ft²
20 - 2BR. FLATS	@ 916ft²	= 18,320ft²
2 - 3BR. FLATS	@ 1,200ft²	= 2,400ft²
8 - 2BR. TWN	@ 957ft²	= 7,656ft²
8 - 3BR TWN	@ 1,246ft²	= 9,968ft²
50 UNITS		46,624ft²
COMMUNITY BLDG		1,296ft²
TOTAL BUILDING AREA		47,920ft²

ALL RESIDENTIAL BUILDINGS ARE TWO STORY WITH BUILDING HEIGHT OF 27 FT.
COMMUNITY BUILDING IS ONE STORY WITH BUILDING HEIGHT OF 19 FT.

BUILDING TYPES:
BLDG 'A', 'B', 'C', & 'D': 2 - 2BR. @ 957ft² = 1,914ft²
2 - 3BR. @ 1,246ft² = 2,492ft²
TOTAL LIVING AREA: 4,406ft²

BLDG 'E', 'G', & 'H': 6 - 2BR. @ 916ft² = 5,496ft²
2 - 1BR. @ 690ft² = 1,380ft²
TOTAL LIVING AREA: 6,876ft²

BLDG 'F': 6 - 1BR. @ 690ft² = 4,140ft²
2 - 2BR. @ 916ft² = 1,832ft²
2 - 3BR. @ 1,200ft² = 2,400ft²
TOTAL LIVING AREA: 8,372ft²



MONUMENT SIGN

CREEKSIDE APARTMENTS

ASH ST. & HASKELL ST.
CENTRAL POINT, OR

AN AFFORDABLE HOUSING DEVELOPMENT FOR HOUSING AUTHORITY OF JACKSON COUNTY
2251 TABLEROCK RD.
MEDFORD, OR

PROJECT NO: 16-129

DRH
© HORTON ARCHITECTURE, INC. 2016
169 W. MAIN ST., P.O. BOX 682
EAGLE POINT, OR. 97524
PHONE: 541-830-1014

The Drawings, Specifications, and other Documents prepared by the Architect for this project are to be used solely with respect to this project. The Architect shall retain ownership and all common law, statutory and other reserved rights to the Documents, including Copyright.

DATE:
24 OCTOBER 2016

Southern Oregon
Transportation Engineering, LLC
Medford, Or. 97504

North-South: S. Haskell Street
East-West: E. Pine Street
Weather: Overcast, 45 deg
Veh Type: All Vehicles

File Name : Pine-Haskell_Tues
Site Code : 00000001
Start Date : 2/21/2017
Page No : 1

Groups Printed- Unshifted

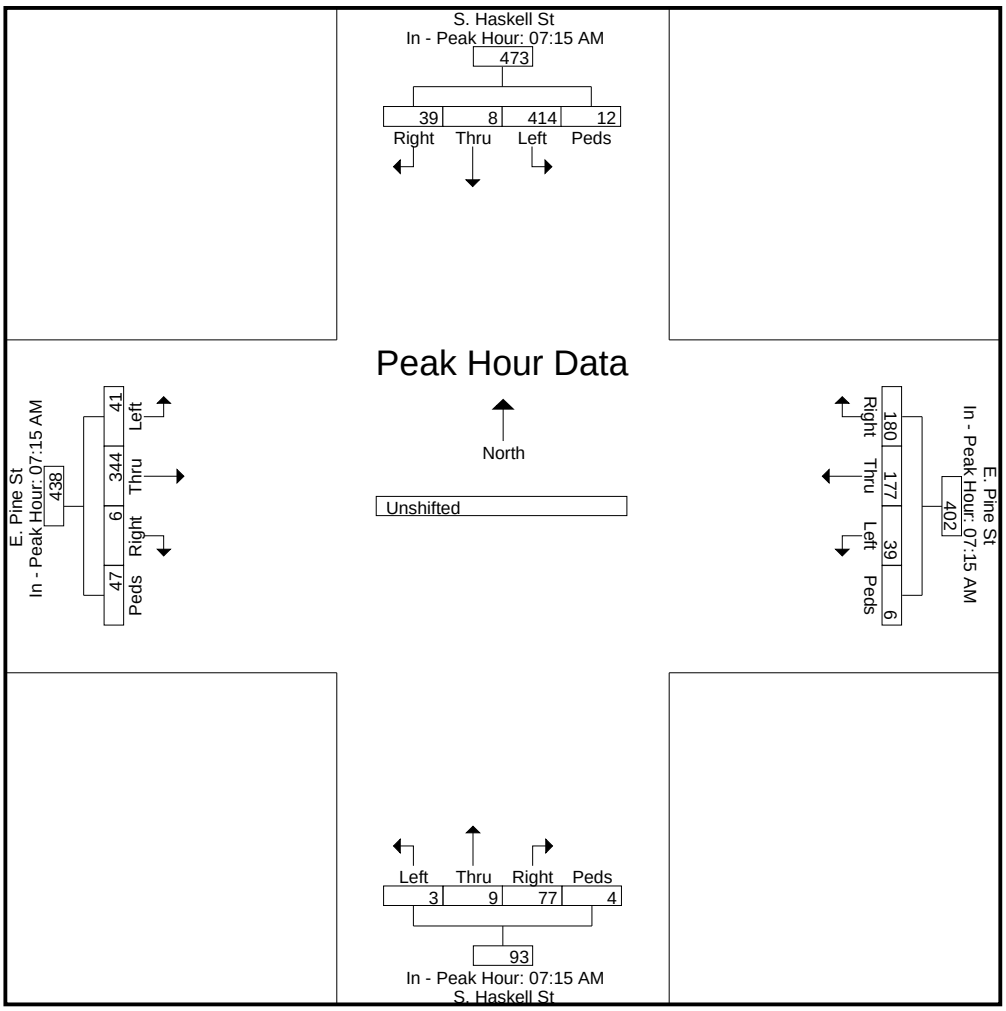
	S. Haskell St From North					E. Pine St From East					S. Haskell St From South					E. Pine St From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:45 AM	35	1	2	0	38	12	25	20	1	58	0	0	10	0	10	1	53	1	0	55	161
Total	35	1	2	0	38	12	25	20	1	58	0	0	10	0	10	1	53	1	0	55	161
07:00 AM	45	0	1	3	49	6	37	16	0	59	1	0	14	0	15	6	69	1	0	76	199
07:15 AM	83	1	7	0	91	4	37	52	1	94	2	1	8	0	11	12	82	0	1	95	291
07:30 AM	140	2	10	5	157	3	36	56	2	97	1	4	28	2	35	15	83	1	20	119	408
07:45 AM	120	2	13	5	140	19	66	42	3	130	0	3	20	0	23	12	89	2	23	126	419
Total	388	5	31	13	437	32	176	166	6	380	4	8	70	2	84	45	323	4	44	416	1317
08:00 AM	71	3	9	2	85	13	38	30	0	81	0	1	21	2	24	2	90	3	3	98	288
08:15 AM	69	0	1	2	72	9	35	30	0	74	3	2	7	1	13	2	59	1	1	63	222
08:30 AM	72	0	5	1	78	8	49	34	0	91	0	1	11	0	12	1	95	1	1	98	279
08:45 AM	47	2	3	0	52	20	44	27	2	93	3	2	12	1	18	1	52	1	3	57	220
Total	259	5	18	5	287	50	166	121	2	339	6	6	51	4	67	6	296	6	8	316	1009
Grand Total	682	11	51	18	762	94	367	307	9	777	10	14	131	6	161	52	672	11	52	787	2487
Apprch %	89.5	1.4	6.7	2.4		12.1	47.2	39.5	1.2		6.2	8.7	81.4	3.7		6.6	85.4	1.4	6.6		
Total %	27.4	0.4	2.1	0.7	30.6	3.8	14.8	12.3	0.4	31.2	0.4	0.6	5.3	0.2	6.5	2.1	27	0.4	2.1	31.6	

Southern Oregon
Transportation Engineering, LLC
Medford, Or. 97504

North-South: S. Haskell Street
East-West: E. Pine Street
Weather: Overcast, 45 deg
Veh Type: All Vehicles

File Name : Pine-Haskell_Tues
Site Code : 00000001
Start Date : 2/21/2017
Page No : 2

	S. Haskell St From North					E. Pine St From East					S. Haskell St From South					E. Pine St From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	07:15 AM					07:15 AM					07:15 AM					07:15 AM					
+0 mins.	83	1	7	0	91	4	37	52	1	94	**2**	1	8	0	11	12	82	0	1	95	
+15 mins.	**140**	2	10	**5**	**157**	3	36	**56**	2	97	1	**4**	**28**	**2**	**35**	**15**	83	1	20	119	
+30 mins.	120	2	**13**	5	140	**19**	**66**	42	**3**	**130**	0	3	20	0	23	12	89	2	**23**	**126**	
+45 mins.	71	**3**	9	2	85	13	38	30	0	81	0	1	21	2	24	2	**90**	**3**	3	98	
Total Volume	414	8	39	12	473	39	177	180	6	402	3	9	77	4	93	41	344	6	47	438	
% App. Total	87.5	1.7	8.2	2.5		9.7	44	44.8	1.5		3.2	9.7	82.8	4.3		9.4	78.5	1.4	10.7		
PHF	.739	.667	.750	.600	.753	.513	.670	.804	.500	.773	.375	.563	.688	.500	.664	.683	.956	.500	.511	.869	



Southern Oregon
Transportation Engineering, LLC
Medford, Or. 97504

North-South: S. Haskell Street
East-West: E. Pine Street
Weather: Overcast, 45 deg
Veh Type: All Vehicles

File Name : Pine-Haskell_Wednesday
Site Code : 00000002
Start Date : 2/22/2017
Page No : 1

Groups Printed- Unshifted

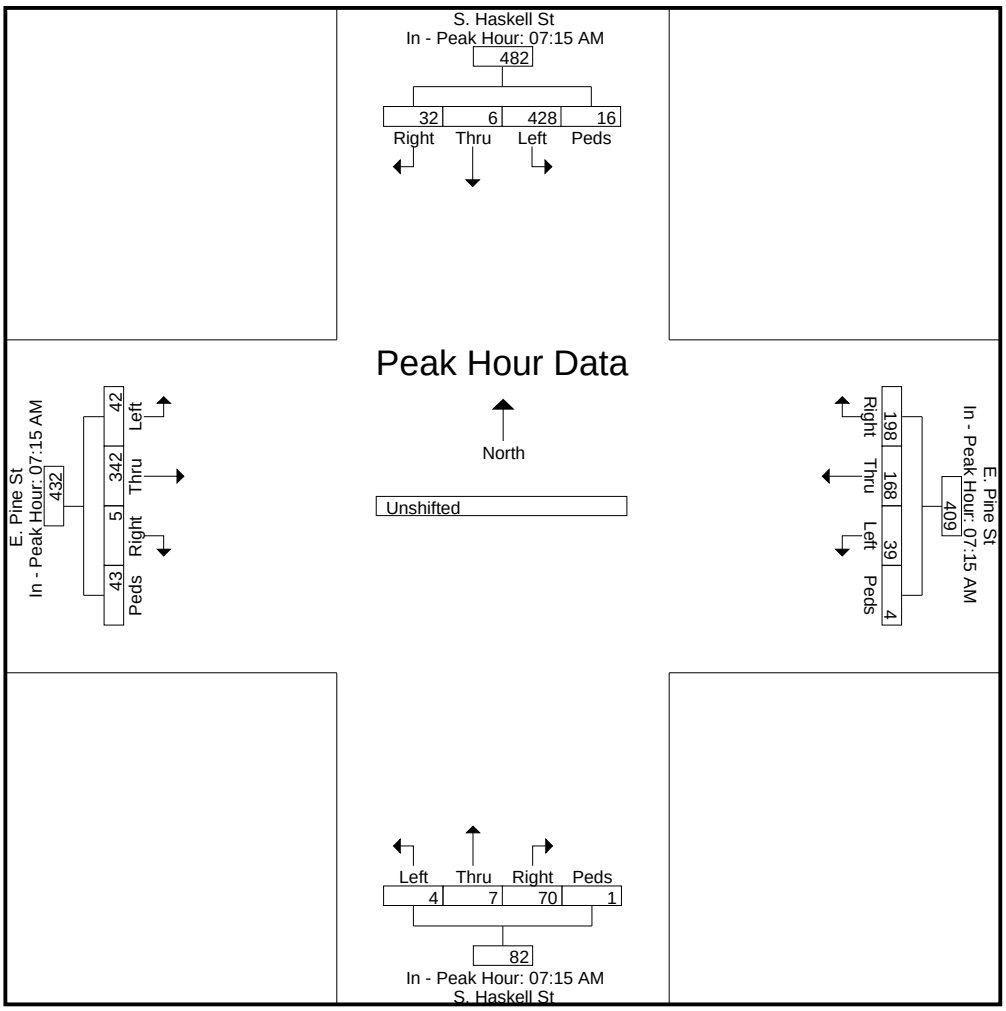
	S. Haskell St From North					E. Pine St From East					S. Haskell St From South					E. Pine St From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	43	0	2	1	46	9	35	19	0	63	0	0	14	0	14	3	49	1	0	53	176
07:15 AM	75	1	3	1	80	4	38	56	0	98	2	2	7	0	11	11	78	0	0	89	278
07:30 AM	145	1	12	5	163	9	21	52	1	83	1	2	36	0	39	18	88	2	24	132	417
07:45 AM	118	3	13	6	140	11	68	58	3	140	1	3	18	0	22	10	91	1	14	116	418
Total	381	5	30	13	429	33	162	185	4	384	4	7	75	0	86	42	306	4	38	390	1289
08:00 AM	90	1	4	4	99	15	41	32	0	88	0	0	9	1	10	3	85	2	5	95	292
08:15 AM	55	2	3	0	60	5	30	28	0	63	0	1	15	0	16	3	52	1	1	57	196
08:30 AM	66	0	5	1	72	8	33	22	0	63	1	1	11	1	14	0	61	0	4	65	214
08:45 AM	63	1	2	2	68	10	33	29	0	72	1	0	8	3	12	3	54	1	3	61	213
Total	274	4	14	7	299	38	137	111	0	286	2	2	43	5	52	9	252	4	13	278	915
Grand Total	655	9	44	20	728	71	299	296	4	670	6	9	118	5	138	51	558	8	51	668	2204
Apprch %	90	1.2	6	2.7		10.6	44.6	44.2	0.6		4.3	6.5	85.5	3.6		7.6	83.5	1.2	7.6		
Total %	29.7	0.4	2	0.9	33	3.2	13.6	13.4	0.2	30.4	0.3	0.4	5.4	0.2	6.3	2.3	25.3	0.4	2.3	30.3	

Southern Oregon
Transportation Engineering, LLC
Medford, Or. 97504

North-South: S. Haskell Street
East-West: E. Pine Street
Weather: Overcast, 45 deg
Veh Type: All Vehicles

File Name : Pine-Haskell_Wednesday
Site Code : 00000002
Start Date : 2/22/2017
Page No : 2

	S. Haskell St From North					E. Pine St From East					S. Haskell St From South					E. Pine St From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	07:15 AM					07:15 AM					07:15 AM					07:15 AM					
+0 mins.	75	1	3	1	80	4	38	56	0	98	**2**	2	7	0	11	11	78	0	0	89	
+15 mins.	**145**	1	12	5	**163**	9	21	52	1	83	1	2	**36**	0	**39**	**18**	88	**2**	**24**	**132**	
+30 mins.	118	**3**	**13**	**6**	140	11	**68**	**58**	**3**	**140**	1	**3**	18	0	22	10	**91**	1	14	116	
+45 mins.	90	1	4	4	99	**15**	41	32	0	88	0	0	9	**1**	10	3	85	2	5	95	
Total Volume	428	6	32	16	482	39	168	198	4	409	4	7	70	1	82	42	342	5	43	432	
% App. Total	88.8	1.2	6.6	3.3		9.5	41.1	48.4	1		4.9	8.5	85.4	1.2		9.7	79.2	1.2	10		
PHF	.738	.500	.615	.667	.739	.650	.618	.853	.333	.730	.500	.583	.486	.250	.526	.583	.940	.625	.448	.818	



Southern Oregon
Transportation Engineering, LLC
Medford, Or. 97504

North-South: S. Haskell St
East-West: E. Pine St
Weather: Overcast, 45 deg
Veh Type: All Vehicles

File Name : Pine-Haskell_Thursday
Site Code : 00000003
Start Date : 2/23/2017
Page No : 1

Groups Printed- Unshifted

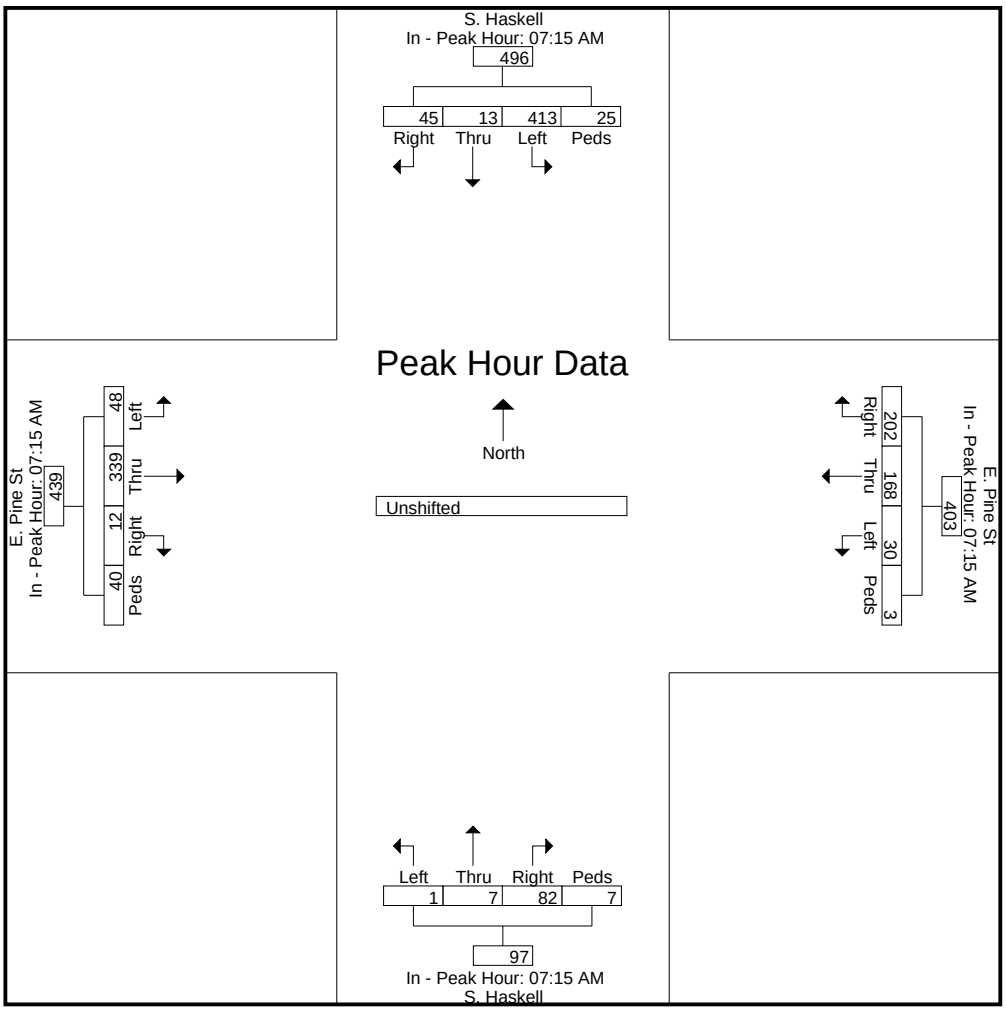
	S. Haskell From North					E. Pine St From East					S. Haskell From South					E. Pine St From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	35	2	2	1	40	15	30	19	1	65	1	0	13	0	14	3	58	0	1	62	181
07:15 AM	83	7	4	2	96	5	35	51	0	91	0	2	19	0	21	9	73	1	0	83	291
07:30 AM	136	3	16	7	162	2	42	62	0	106	0	3	23	0	26	17	90	4	15	126	420
07:45 AM	122	3	18	3	146	13	55	50	3	121	1	1	23	5	30	15	92	3	23	133	430
Total	376	15	40	13	444	35	162	182	4	383	2	6	78	5	91	44	313	8	39	404	1322
08:00 AM	72	0	7	13	92	10	36	39	0	85	0	1	17	2	20	7	84	4	2	97	294
08:15 AM	59	1	2	0	62	8	35	33	0	76	0	2	17	0	19	4	61	2	3	70	227
08:30 AM	70	0	1	2	73	5	38	36	0	79	0	0	12	0	12	1	105	1	1	108	272
08:45 AM	40	3	2	0	45	21	53	36	0	110	2	0	10	0	12	1	59	1	1	62	229
Total	241	4	12	15	272	44	162	144	0	350	2	3	56	2	63	13	309	8	7	337	1022
Grand Total	617	19	52	28	716	79	324	326	4	733	4	9	134	7	154	57	622	16	46	741	2344
Apprch %	86.2	2.7	7.3	3.9		10.8	44.2	44.5	0.5		2.6	5.8	87	4.5		7.7	83.9	2.2	6.2		
Total %	26.3	0.8	2.2	1.2	30.5	3.4	13.8	13.9	0.2	31.3	0.2	0.4	5.7	0.3	6.6	2.4	26.5	0.7	2	31.6	

Southern Oregon
Transportation Engineering, LLC
Medford, Or. 97504

North-South: S. Haskell St
East-West: E. Pine St
Weather: Overcast, 45 deg
Veh Type: All Vehicles

File Name : Pine-Haskell_Thursday
Site Code : 00000003
Start Date : 2/23/2017
Page No : 2

	S. Haskell From North					E. Pine St From East					S. Haskell From South					E. Pine St From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	07:15 AM					07:15 AM					07:15 AM					07:15 AM					
+0 mins.	83	**7**	4	2	96	5	35	51	0	91	0	2	19	0	21	9	73	1	0	83	
+15 mins.	**136**	3	16	7	**162**	2	42	**62**	0	106	0	**3**	**23**	0	26	**17**	90	**4**	15	126	
+30 mins.	122	3	**18**	3	146	**13**	**55**	50	**3**	**121**	**1**	1	23	**5**	**30**	15	**92**	3	**23**	**133**	
+45 mins.	72	0	7	**13**	92	10	36	39	0	85	0	1	17	2	20	7	84	4	2	97	
Total Volume	413	13	45	25	496	30	168	202	3	403	1	7	82	7	97	48	339	12	40	439	
% App. Total	83.3	2.6	9.1	5		7.4	41.7	50.1	0.7		1	7.2	84.5	7.2		10.9	77.2	2.7	9.1		
PHF	.759	.464	.625	.481	.765	.577	.764	.815	.250	.833	.250	.583	.891	.350	.808	.706	.921	.750	.435	.825	



Southern Oregon
Transportation Engineering, LLC
Medford, Or. 97504

North-South: S. Haskell Street
East-West: E. Pine Street
Weather: Overcast, 45 deg
Veh Type: All Vehicles

File Name : Haskell-Pine
Site Code : 00000005
Start Date : 2/23/2017
Page No : 1

Groups Printed- Unshifted

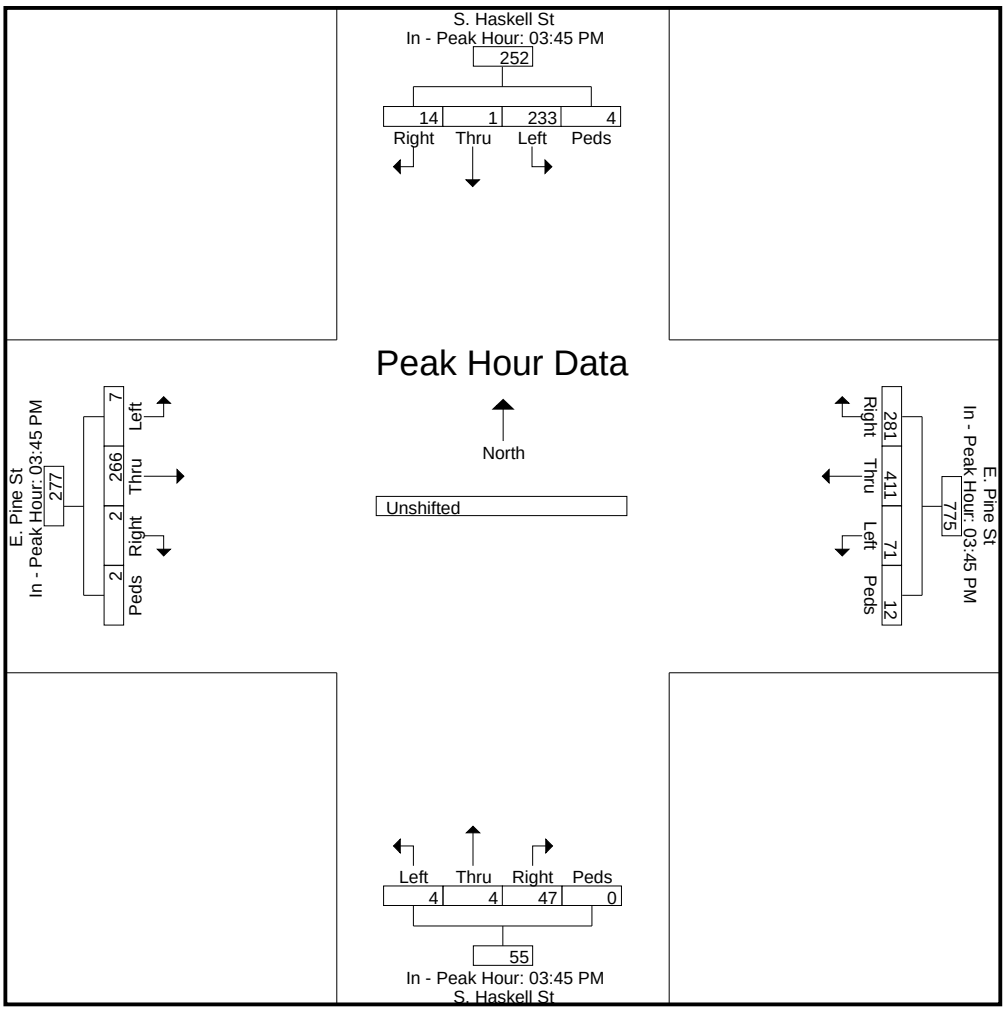
	S. Haskell St From North					E. Pine St From East					S. Haskell St From South					E. Pine St From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
02:00 PM	39	3	3	3	48	8	36	38	0	82	2	4	5	1	12	6	37	4	0	47	189
02:15 PM	91	1	14	26	132	9	61	70	1	141	2	1	8	3	14	6	54	1	2	63	350
02:30 PM	77	1	10	6	94	13	63	76	0	152	4	0	13	0	17	5	64	1	0	70	333
02:45 PM	60	0	3	0	63	19	62	58	0	139	4	3	11	2	20	2	51	0	4	57	279
Total	267	5	30	35	337	49	222	242	1	514	12	8	37	6	63	19	206	6	6	237	1151
03:00 PM	44	2	1	2	49	8	73	48	1	130	2	2	13	0	17	2	57	0	5	64	260
03:15 PM	59	0	7	2	68	11	61	59	3	134	2	1	15	0	18	6	67	2	0	75	295
03:30 PM	52	1	3	1	57	22	79	54	1	156	1	2	16	0	19	0	76	2	0	78	310
03:45 PM	66	0	6	0	72	25	105	72	1	203	0	2	15	0	17	2	66	1	2	71	363
Total	221	3	17	5	246	66	318	233	6	623	5	7	59	0	71	10	266	5	7	288	1228
04:00 PM	63	0	3	2	68	18	106	64	2	190	2	1	13	0	16	3	65	0	0	68	342
04:15 PM	55	1	4	2	62	14	102	72	4	192	0	0	9	0	9	1	69	0	0	70	333
04:30 PM	49	0	1	0	50	14	98	73	5	190	2	1	10	0	13	1	66	1	0	68	321
04:45 PM	42	0	1	0	43	9	107	71	0	187	1	1	7	0	9	4	47	2	1	54	293
Total	209	1	9	4	223	55	413	280	11	759	5	3	39	0	47	9	247	3	1	260	1289
05:00 PM	61	0	1	0	62	16	95	85	0	196	1	2	26	1	30	5	49	2	4	60	348
05:15 PM	51	1	3	0	55	19	120	73	3	215	0	1	15	2	18	1	65	0	0	66	354
05:30 PM	56	0	2	3	61	15	88	89	5	197	3	0	14	0	17	2	65	2	0	69	344
05:45 PM	43	0	2	0	45	9	99	58	1	167	2	0	10	4	16	3	49	1	0	53	281
Total	211	1	8	3	223	59	402	305	9	775	6	3	65	7	81	11	228	5	4	248	1327
Grand Total	908	10	64	47	1029	229	1355	1060	27	2671	28	21	200	13	262	49	947	19	18	1033	4995
Apprch %	88.2	1	6.2	4.6		8.6	50.7	39.7	1		10.7	8	76.3	5		4.7	91.7	1.8	1.7		
Total %	18.2	0.2	1.3	0.9	20.6	4.6	27.1	21.2	0.5	53.5	0.6	0.4	4	0.3	5.2	1	19	0.4	0.4	20.7	

Southern Oregon
Transportation Engineering, LLC
Medford, Or. 97504

North-South: S. Haskell Street
East-West: E. Pine Street
Weather: Overcast, 45 deg
Veh Type: All Vehicles

File Name : Haskell-Pine
Site Code : 00000005
Start Date : 2/23/2017
Page No : 2

	S. Haskell St From North					E. Pine St From East					S. Haskell St From South					E. Pine St From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	03:45 PM					03:45 PM					03:45 PM					03:45 PM					
+0 mins.	**66**	0	**6**	0	**72**	**25**	105	72	1	**203**	0	**2**	**15**	0	**17**	2	66	**1**	**2**	**71**
+15 mins.	63	0	3	**2**	68	18	**106**	64	2	190	**2**	1	13	0	16	**3**	65	0	0	68
+30 mins.	55	**1**	4	2	62	14	102	72	4	192	0	0	9	0	9	1	**69**	0	0	70
+45 mins.	49	0	1	0	50	14	98	**73**	**5**	190	2	1	10	0	13	1	66	1	0	68
Total Volume	233	1	14	4	252	71	411	281	12	775	4	4	47	0	55	7	266	2	2	277
% App. Total	92.5	0.4	5.6	1.6		9.2	53	36.3	1.5		7.3	7.3	85.5	0		2.5	96	0.7	0.7	
PHF	.883	.250	.583	.500	.875	.710	.969	.962	.600	.954	.500	.500	.783	.000	.809	.583	.964	.500	.250	.975



Southern Oregon
Transportation Engineering, LLC
Medford, Or. 97504

North-South: OR 99
East-West: E. Pine Street
Weather: Overcast, 45 deg
Veh Type: All Vehicles (Thurs)

File Name : E Pine_OR 99_AM
Site Code : 00000004
Start Date : 2/23/2017
Page No : 1

Groups Printed- Unshifted

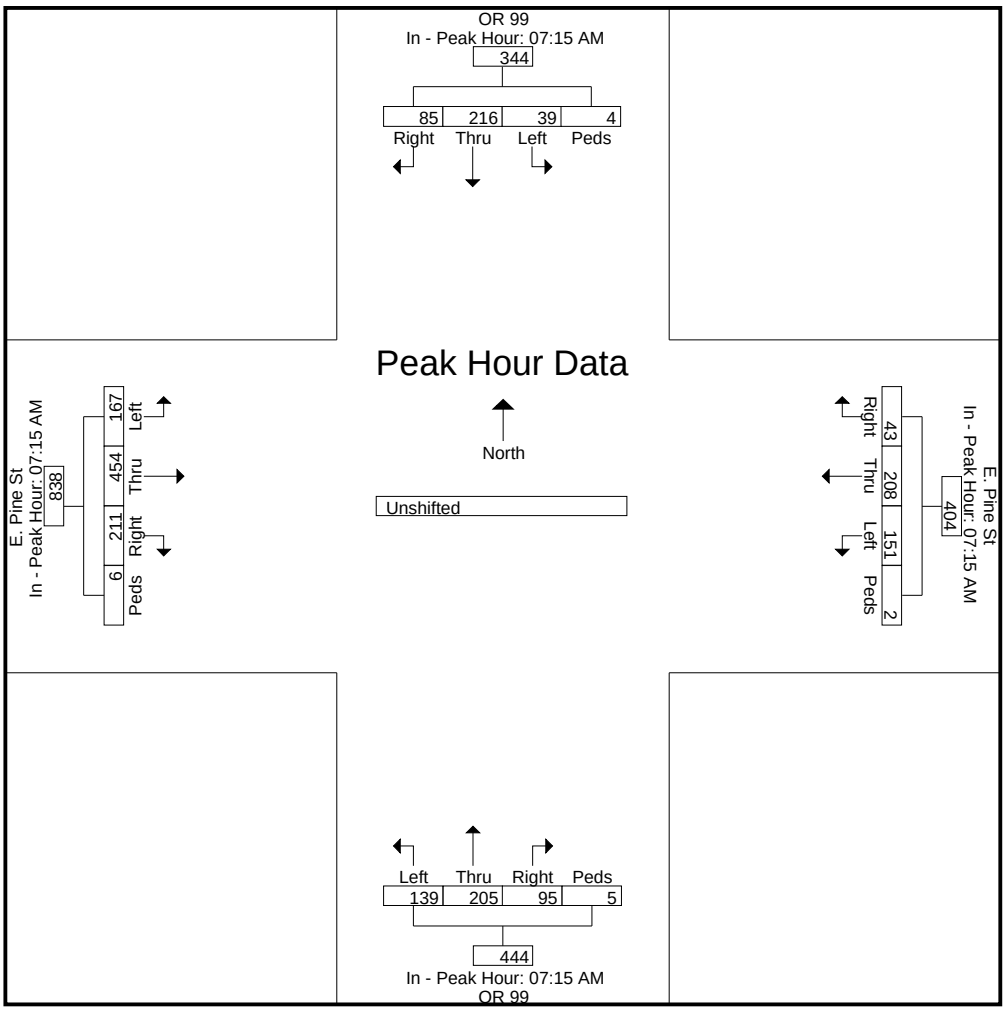
	OR 99 From North					E. Pine St From East					OR 99 From South					E. Pine St From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	3	28	16	0	47	21	37	4	0	62	19	30	19	0	68	17	72	27	1	117	294
07:15 AM	7	35	17	0	59	37	47	5	0	89	32	43	14	1	90	33	94	36	2	165	403
07:30 AM	11	58	28	0	97	35	44	9	0	88	38	49	23	0	110	42	140	62	1	245	540
07:45 AM	7	69	25	4	105	45	72	13	2	132	41	60	31	2	134	54	116	67	0	237	608
Total	28	190	86	4	308	138	200	31	2	371	130	182	87	3	402	146	422	192	4	764	1845
08:00 AM	14	54	15	0	83	34	45	16	0	95	28	53	27	2	110	38	104	46	3	191	479
08:15 AM	9	40	21	1	71	37	40	11	0	88	16	55	27	0	98	34	74	30	1	139	396
08:30 AM	13	57	19	0	89	41	49	7	0	97	13	73	30	0	116	72	82	45	0	199	501
08:45 AM	16	58	25	0	99	52	58	11	1	122	24	65	29	0	118	27	52	25	1	105	444
Total	52	209	80	1	342	164	192	45	1	402	81	246	113	2	442	171	312	146	5	634	1820
Grand Total	80	399	166	5	650	302	392	76	3	773	211	428	200	5	844	317	734	338	9	1398	3665
Apprch %	12.3	61.4	25.5	0.8		39.1	50.7	9.8	0.4		25	50.7	23.7	0.6		22.7	52.5	24.2	0.6		
Total %	2.2	10.9	4.5	0.1	17.7	8.2	10.7	2.1	0.1	21.1	5.8	11.7	5.5	0.1	23	8.6	20	9.2	0.2	38.1	

Southern Oregon
Transportation Engineering, LLC
Medford, Or. 97504

North-South: OR 99
East-West: E. Pine Street
Weather: Overcast, 45 deg
Veh Type: All Vehicles (Thurs)

File Name : E Pine_OR 99_AM
Site Code : 00000004
Start Date : 2/23/2017
Page No : 2

	OR 99 From North					E. Pine St From East					OR 99 From South					E. Pine St From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	07:15 AM					07:15 AM					07:15 AM					07:15 AM					
+0 mins.	7	35	17	0	59	37	47	5	0	89	32	43	14	1	90	33	94	36	2	165	
+15 mins.	11	58	**28**	0	97	35	44	9	0	88	38	49	23	0	110	42	**140**	62	1	**245**	
+30 mins.	7	**69**	25	**4**	**105**	**45**	**72**	13	**2**	**132**	**41**	**60**	**31**	**2**	**134**	**54**	116	**67**	0	237	
+45 mins.	**14**	54	15	0	83	34	45	**16**	0	95	28	53	27	2	110	38	104	46	**3**	191	
Total Volume	39	216	85	4	344	151	208	43	2	404	139	205	95	5	444	167	454	211	6	838	
% App. Total	11.3	62.8	24.7	1.2		37.4	51.5	10.6	0.5		31.3	46.2	21.4	1.1		19.9	54.2	25.2	0.7		
PHF	.696	.783	.759	.250	.819	.839	.722	.672	.250	.765	.848	.854	.766	.625	.828	.773	.811	.787	.500	.855	



OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING
HASKELL ST at PINE ST, City of Central Point, Jackson County, 01/01/2011 to 12/31/2015
Total Crash Records = 10
*******CRASH DE-CODER V5.0 PRC REPORT PRINTABLE EQUIVALENT*******

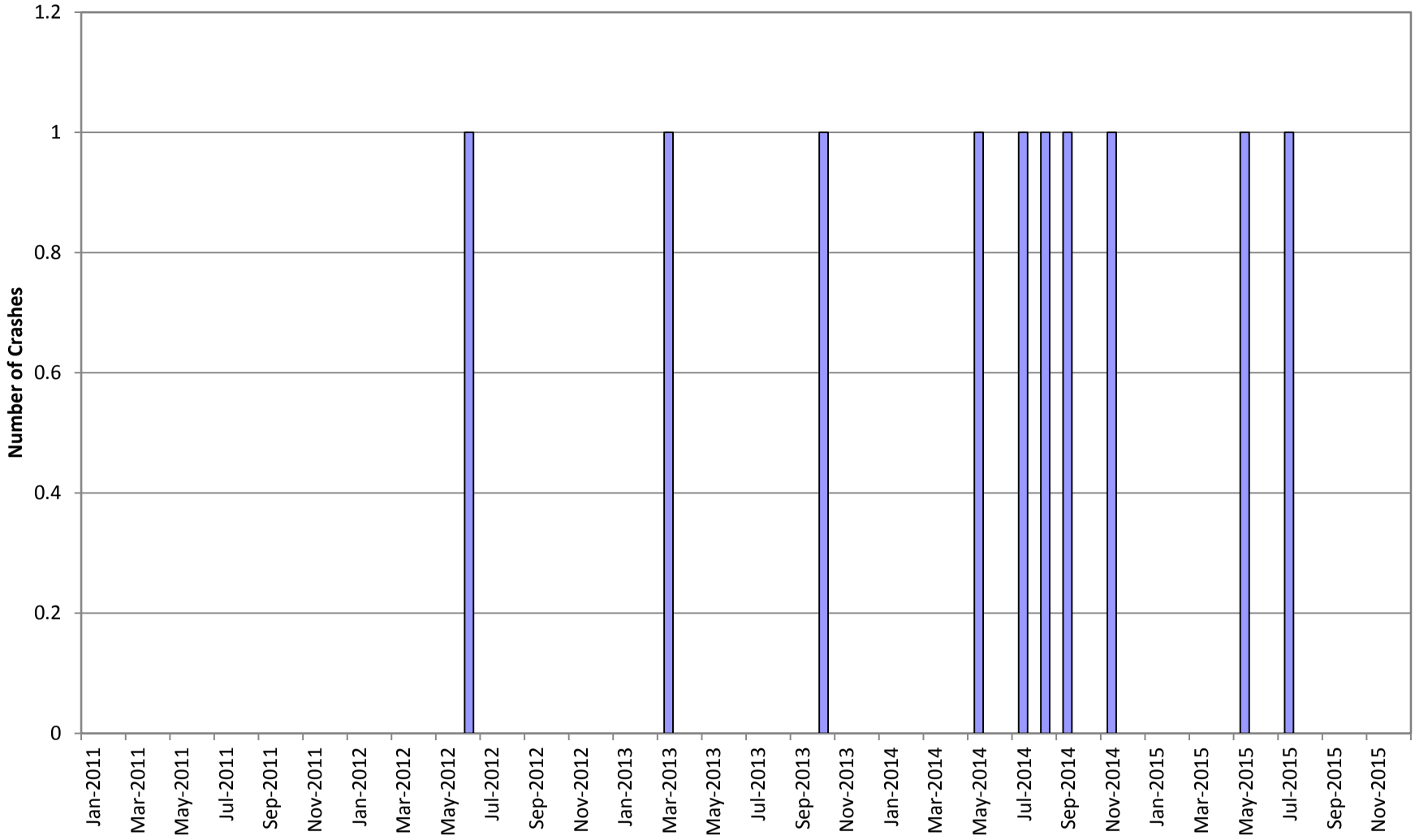
SER # ID # INVEST	SPEED	ALCOHOL	DRUG	SCH ZONE	WORK ZONE	DATE DAY TIME	COUNTY CITY URB AREA	RD # FUNCTIONAL CLASS COMPONENT MILEAGE TYPE MILEPOINT	CONN # FIRST STREET SECOND STREET	RD CHAR DIRECT LOCTN	INT-TYP (MEDIAN) LEGS (# LANES)	INT-REL TRAF-CONTL	OFF RD RNDBT DRVWY	WTHR SURF LIGHT	CRASH COLL SVRTY	VEHICLE #	SPCL USE TRLR QTY OWNER TYPE	MOVE FROM TO	PARTC #	PARTC TYPE	INJURY SEVERITY	AGE	SEX	LICNS RES	NON-MTRST LOCATION	ERROR	ACTION VEHICLE (PARTICIPANT)	EVENT CRASH	EVENT VEHICLE	EVENT PARTICIPANT	CAUSE CRASH	CAUSE VEHICLE	CAUSE PARTICIPANT
00434 1519429 NONE	N	N	N	N	N	03/05/2013 Tuesday 10A	Jackson Central Point MEDFORD UA	Non-ODOT Roadway 16-Urb Min Art Not on st. sys. Not on st. sys.	HASKELL ST PINE ST	INTER NE 05	CROSS () 0 ()	N UNKNOWN	N N N	CLR DRY DAY	S-1STOP REAR PDO	1	NONE 0 PRVTE PSNGR CAR	STRGHT SW-NE	1	DRVR	NONE	21	M	OR-Y OR<25		026-Faild Avoid Stop Veh	000-No Action (000-No Action)				07-Followed too Closely	00-No Code	07-Followed too Closely
																2	NONE 0 PRVTE PSNGR CAR	STOP SW-NE	1	DRVR	NONE	0	M	UNK UNK		000-No Error	011-Stop In Traf-No Lturn (000-No Action)					00-No Code	00-No Code
00760 1568386 NONE	N	N	N	N	N	05/02/2014 Friday 4P	Jackson Central Point MEDFORD UA	Non-ODOT Roadway 16-Urb Min Art Not on st. sys. Not on st. sys.	HASKELL ST PINE ST	INTER NE 06	CROSS () 0 ()	N TRF SIGNAL	N N N	CLR DRY DAY	S-1STOP REAR PDO	1	NONE 0 PRVTE PSNGR CAR	STRGHT NE-SW	1	DRVR	NONE	64	F	OR-Y OR<25		026-Faild Avoid Stop Veh	000-No Action (000-No Action)				29-Fail avoid veh. Ahead	00-No Code	29-Fail avoid veh. Ahead
																2	NONE 0 PRVTE PSNGR CAR	STOP NE-SW	1	DRVR	NONE	0	F	UNK UNK		000-No Error	011-Stop In Traf-No Lturn (000-No Action)					00-No Code	00-No Code
01052 1487012 NONE	N	N	N	N	N	06/18/2012 Monday 6P	Jackson Central Point MEDFORD UA	Non-ODOT Roadway 16-Urb Min Art Not on st. sys. Not on st. sys.	HASKELL ST PINE ST	INTER SW 05	CROSS () 0 ()	N TRF SIGNAL	N N N	CLR DRY DAY	S-OTHER TURN PDO	1	NONE 0 PRVTE PSNGR CAR	TURN-L NW-NE	1	DRVR	NONE	15	F	OR-Y OR<25		007-Turn Into Wrong Ln	000-No Action (000-No Action)				08-Improper Turn	00-No Code	08-Improper Turn
																2	NONE 0 PRVTE PSNGR CAR	TURN-L NW-NE	1	DRVR	NONE	17	M	OR-Y OR<25		000-No Error	000-No Action (000-No Action)					00-No Code	00-No Code
01663 1589075 CITY	N	N	N	Y	N	09/05/2014 Friday 12P	Jackson Central Point MEDFORD UA	Non-ODOT Roadway 16-Urb Min Art Not on st. sys. Not on st. sys.	HASKELL ST PINE ST	INTER SW 05	CROSS () 0 ()	N TRF SIGNAL	N N N	CLR DRY DAY	S-OTHER TURN PDO	1	NONE 1 PRVTE SEMI TOW	TURN-R NW-SW	1	DRVR	NONE	51	M	OTH-Y N-RES		003-Failed To Obey TCD 007-Turn Into Wrong Ln	000-No Action (000-No Action)				08-Improper Turn	00-No Code	08-Improper Turn
																2	NONE 0 PRVTE PSNGR CAR	TURN-R NW-SW	1	DRVR	NONE	36	F	OR-Y OR<25		000-No Error	000-No Action (000-No Action)					00-No Code	00-No Code
																			2	PSNG	NO<5	4	F			000-No Error	(000-No Action)						00-No Code
																			3	PSNG	NO<5	3	M			000-No Error	(000-No Action)						00-No Code

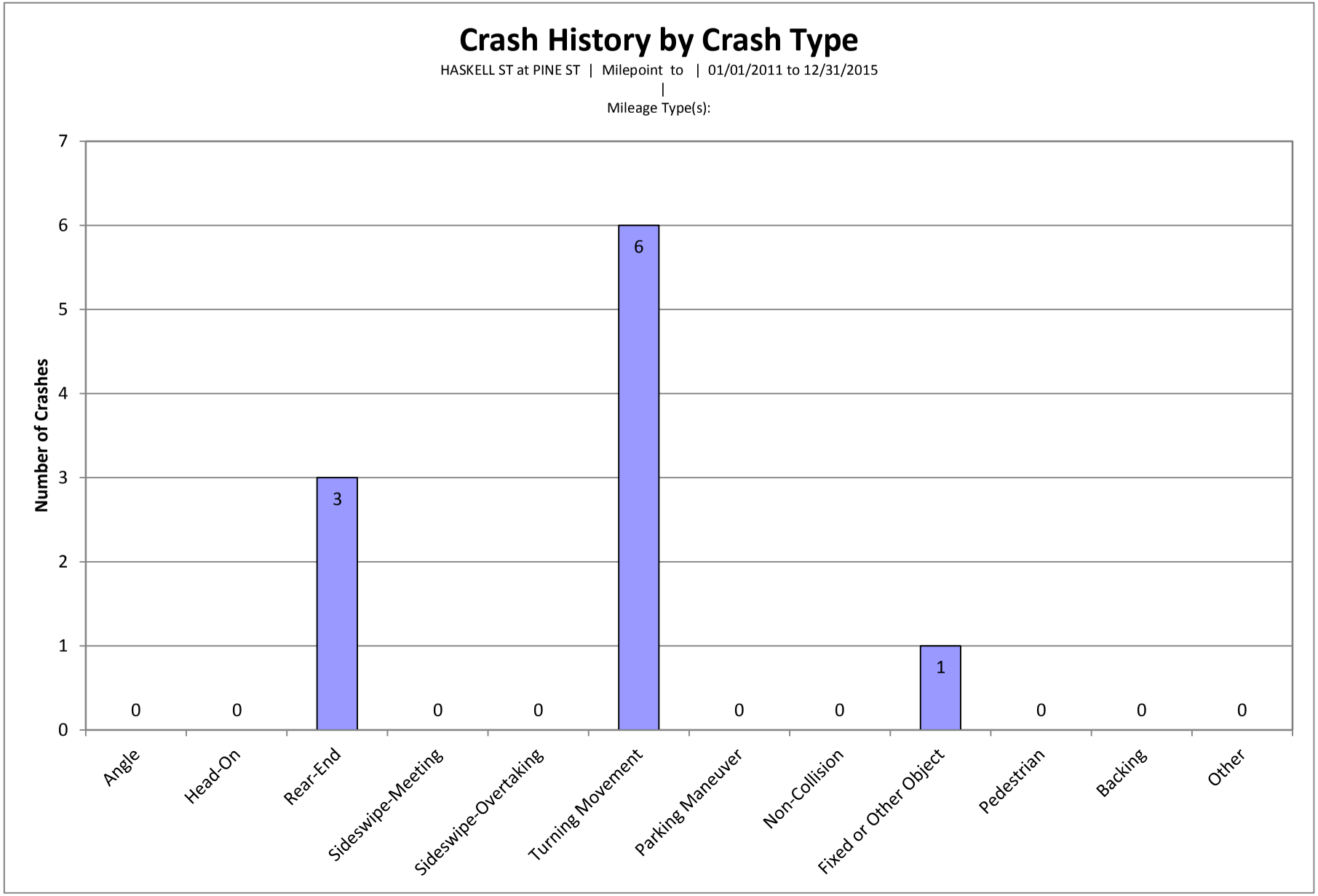
OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING
HASKELL ST at PINE ST, City of Central Point, Jackson County, 01/01/2011 to 12/31/2015
Total Crash Records = 10
*******CRASH DE-CODER V5.0 PRC REPORT PRINTABLE EQUIVALENT*******

SER # ID # INVEST	SPEED	ALCOHOL	DRUG	SCH ZONE	WORK ZONE	DATE DAY TIME	COUNTY CITY URB AREA	RD # FUNCTIONAL CLASS COMPONENT MILEAGE TYPE MILEPOINT	CONN # FIRST STREET SECOND STREET	RD CHAR DIRECT LOCTN	INT-TYP (MEDIAN) LEGS (# LANES)	INT-REL TRAF-CONTL	OFF RD RNDBT DRVWY	WTHR SURF LIGHT	CRASH COLL SVRTY	VEHICLE #	SPCL USE TRLR QTY OWNER TYPE	MOVE FROM TO	PARTC #	PARTC TYPE	INJURY SEVERITY	AGE	SEX	LICNS RES	NON-MTRST LOCATION	ERROR	ACTION VEHICLE (PARTICIPANT)	EVENT CRASH	EVENT VEHICLE	EVENT PARTICIPANT	CAUSE CRASH	CAUSE VEHICLE	CAUSE PARTICIPANT
00948 1653907 NO RPT	N	N	N	N	N	05/15/2015 Friday 2P	Jackson Central Point MEDFORD UA	Non-ODOT Roadway 16-Urb Min Art Not on st. sys. Not on st. sys.	HASKELL ST PINE ST	INTER SW 05	CROSS () 0 ()	N TRF SIGNAL	N N N	CLR DRY DAY	ANGL-OTH TURN PDO	1	NONE 0 PRVTE PSNGR CAR	TURN-L SE-SW	1	DRVR	NONE	31	F	OR-Y OR<25		042-FailSlowForSlowVeh	000-No Action (000-No Action)	092-Phantom Vehicle			29-Fail avoid veh. Ahead	00-No Code	29-Fail avoid veh. Ahead
																2	NONE 0 PRVTE PSNGR CAR	STRGHT NE-SW	1	DRVR	NONE	18	F	OR-Y OR<25		000-No Error	006-Slowed Down (000-No Action)		092-Phantom Vehicle			00-No Code	00-No Code
01419 1654540 CITY	N	N	N	N	N	07/11/2015 Saturday 3P	Jackson Central Point MEDFORD UA	Non-ODOT Roadway 16-Urb Min Art Not on st. sys. Not on st. sys.	HASKELL ST PINE ST	INTER SW 06	CROSS () 0 ()	N TRF SIGNAL	N N N	CLR DRY DAY	S-1STOP REAR PDO	1	NONE 0 PRVTE PSNGR CAR	STRGHT SW-NE	1	DRVR	NONE	57	F	OR-Y OR<25		043-Following Too Close 026-Faild Avoid Stop Veh	000-No Action (000-No Action)				07-Followed too Closely	00-No Code	07-Followed too Closely
																2	NONE 0 PRVTE PSNGR CAR	STOP SW-NE	1	DRVR	NONE	41	F	OR-Y OR<25		000-No Error	011-Stop In Traf-No Lturn (000-No Action)					00-No Code	00-No Code
01889 1544673 CITY	N	N	N	Y	N	10/11/2013 Friday 12P	Jackson Central Point MEDFORD UA	Non-ODOT Roadway 16-Urb Min Art Not on st. sys. Not on st. sys.	HASKELL ST PINE ST	INTER NW 05	CROSS () 0 ()	N TRF SIGNAL	Y N N	CLR DRY DAY	FIX OBJ FIX PDO	1	NONE 1 PRVTE SEMI TOW	TURN-R NE-NW	1	DRVR	NONE	66	M	OR-Y OR<25		002-Cut Corner 080-Fail To MaintainLane	000-No Action (000-No Action)	055-Pole-Traffic Signal	055-Pole-Traffic Signal		08-Improper Turn	00-No Code	08-Improper Turn
01191 1578701 CITY	N	N	N	Y	N	07/02/2014 Wednesday 7A	Jackson Central Point MEDFORD UA	Non-ODOT Roadway 16-Urb Min Art Not on st. sys. Not on st. sys.	HASKELL ST PINE ST	INTER CN 04	CROSS () 0 ()	N TRF SIGNAL	N N N	CLR DRY DAY	O-1 L-TURN TURN PDO	1	NONE 0 PRVTE PSNGR CAR	STRGHT SW-NE	1	DRVR	NONE	55	F	OR-Y OR<25		000-No Error	000-No Action (000-No Action)				08-Improper Turn	00-No Code	00-No Code
																2	NONE 0 PRVTE PSNGR CAR	TURN-L NE-SE	1	DRVR	NONE	78	F	OR-Y OR<25		004-LT In Front OfOncmg	000-No Action (000-No Action)					00-No Code	08-Improper Turn
01550 1583783 CITY	N	N	N	N	N	08/23/2014 Saturday 2P	Jackson Central Point MEDFORD UA	Non-ODOT Roadway 16-Urb Min Art Not on st. sys. Not on st. sys.	HASKELL ST PINE ST	INTER CN 04	CROSS () 0 ()	N TRF SIGNAL	N N N	CLR DRY DAY	O-1 L-TURN TURN PDO	1	NONE 0 PRVTE PSNGR CAR	STRGHT SW-NE	1	DRVR	NONE	47	M	OR-Y OR<25		000-No Error	000-No Action (000-No Action)				08-Improper Turn 02-Failed Yield ROW	00-No Code	00-No Code
																2	NONE 0 PRVTE PSNGR CAR	TURN-L NE-SE	1	DRVR	NONE	20	F	OR-Y OR<25		004-LT In Front OfOncmg 028-No ROW	000-No Action (000-No Action)					00-No Code	02-Failed Yield ROW 08-Improper Turn
02244 1597931 CITY	N	N	N	N	N	11/21/2014 Friday 8P	Jackson Central Point MEDFORD UA	Non-ODOT Roadway 16-Urb Min Art Not on st. sys. Not on st. sys.	HASKELL ST PINE ST	INTER CN 04	CROSS () 0 ()	N TRF SIGNAL	N N N	RAIN WET DARK	O-1 L-TURN TURN PDO	1	NONE 0 PRVTE PSNGR CAR	TURN-L NE-SE	1	DRVR	NONE	33	F	OR-Y OR<25		028-No ROW 004-LT In Front OfOncmg	000-No Action (000-No Action)				02-Failed Yield ROW	00-No Code	02-Failed Yield ROW
																2	NONE 0 PRVTE PSNGR CAR	STRGHT SW-NE	1	DRVR	NONE	24	M	OR-Y OR<25		000-No Error	000-No Action (000-No Action)					00-No Code	00-No Code

Crash History by Month & Year

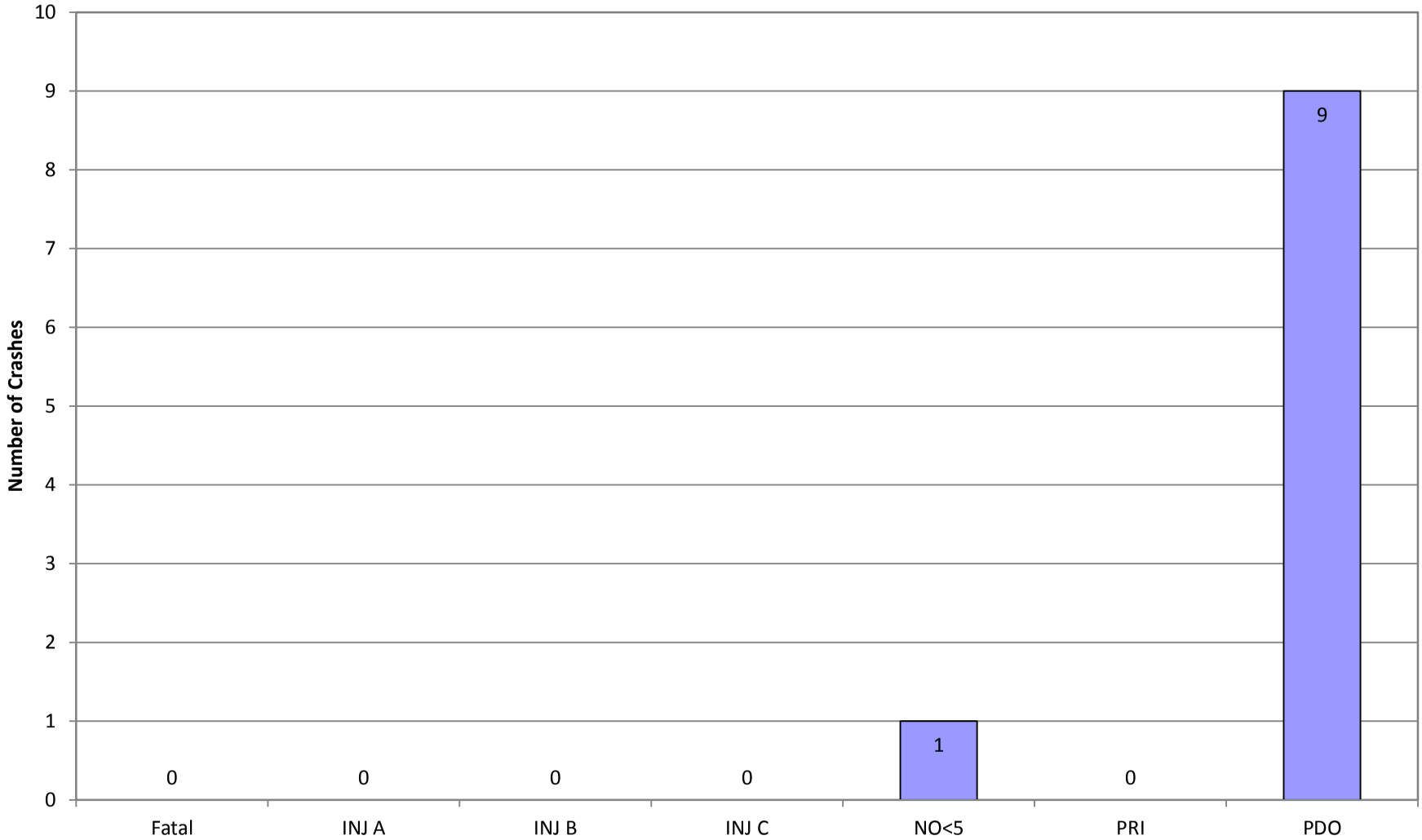
HASKELL ST at PINE ST | Milepoint to | 01/01/2011 to 12/31/2015
|
Mileage Type(s):




Crash History by Crash Type
HASKELL ST at PINE ST | Milepoint to | 01/01/2011 to 12/31/2015
|
Mileage Type(s):
Number of Crashes
0
1
2
3
4
5
6
7
0
0
3
0
0
6
0
0
1
0
0
0
Angle
Head-On
Rear-End
Sideswipe-Meeting
Sideswipe-Overtaking
Turning Movement
Parking Maneuver
Non-Collision
Fixed or Other Object
Pedestrian
Backing
Other

Crash History by Injury Severity

HASKELL ST at PINE ST | Milepoint to | 01/01/2011 to 12/31/2015
|
Mileage Type(s):



shown in the table should be flagged for further analysis.

Exhibit 4-1 Intersection Crash Rates per MEV by Land Type and Traffic Control

	Rural				Urban			
	3SG	3ST	4SG	4ST	3SG	3ST	4SG	4ST
No. of Intersections	7	115	20	60	55	77	106	60
Mean Crash Rate	0.226	0.196	0.324	0.434	0.275	0.131	0.477	0.198
Median Crash Rate	0.163	0.092	0.320	0.267	0.252	0.105	0.420	0.145
Standard Deviation	0.185	0.314	0.223	0.534	0.155	0.121	0.273	0.176
Coefficient of Variation	0.819	1.602	0.688	1.230	0.564	0.924	0.572	0.889
90th Percentile Rate	**0.464**	**0.475**	**0.579**	**1.080**	**0.509**	**0.293**	**0.860**	**0.408**

Source: Assessment Of Statewide Intersection Safety Performance, FHWA-OR-RD-18, Portland State University and Oregon State University, June 2011, Table 4.1, p. 47.

A spreadsheet calculator has been developed that implements the critical rate calculations for intersections. For additional information see pages 4-35 through 4-39 in HSM Volume 1. Example 4-2 illustrates the use of the Critical Rate method for urban area intersections.

Example 4-2 HSM Critical Rate for Intersections

As part of an urban street modernization project, a safety analysis needs to be done for Main Street. This street is a congested urban corridor with a mixture of unsignalized and signalized intersections with varying numbers of lanes.

The project engineer has created existing year average daily traffic (ADT) volumes from available intersection counts. The ADT counts were converted into AADT using appropriate seasonal factors which are shown as daily total entering volumes in the figure below. In addition, intersection crash data for the past five years are shown in the table below.

Data Needs:

Existing Year Annual Average Daily Entering Traffic Volumes

SEASONAL TREND TABLE (Updated: 9/30/16)																										
TREND	1-Jan	15-Jan	1-Feb	15-Feb	1-Mar	15-Mar	1-Apr	15-Apr	1-May	15-May	1-Jun	15-Jun	1-Jul	15-Jul	1-Aug	15-Aug	1-Sep	15-Sep	1-Oct	15-Oct	1-Nov	15-Nov	1-Dec	15-Dec	Seasonal Trend Peak Period Factor
INTERSTATE URBANIZED	1.0328	1.0423	1.0157	0.9891	0.9780	0.9670	0.9582	0.9493	0.9530	0.9567	0.9385	0.9202	0.9228	0.9275	0.9229	0.9182	0.9363	0.9544	0.9568	0.9592	0.9776	0.9959	1.0131	1.0303	0.9182
INTERSTATE NONURBANIZED	1.2437	1.3089	1.2543	1.1997	1.1341	1.0685	1.0594	1.0503	1.0243	0.9984	0.9494	0.9005	0.8748	0.8449	0.8450	0.8452	0.8928	0.9405	0.9815	1.0224	1.0445	1.0666	1.1193	1.1721	0.8449
COMMUTER	1.0475	1.0553	1.0272	0.9991	0.9913	0.9836	0.9655	0.9474	0.9442	0.9411	0.9497	0.9583	0.9410	0.9243	0.9206	0.9168	0.9289	0.9409	0.9431	0.9452	0.9734	1.0017	1.0249	1.0481	0.9168
COASTAL DESTINATION	1.2011	1.2105	1.1669	1.1234	1.0959	1.0684	1.0679	1.0673	1.0450	1.0227	0.9832	0.9438	0.8923	0.8293	0.8289	0.8284	0.8792	0.9300	0.9866	1.0432	1.1000	1.1567	1.1795	1.2023	0.8284
COASTAL DESTINATION ROUTE	1.4581	1.4945	1.4132	1.3319	1.2689	1.2060	1.1989	1.1918	1.1318	1.0718	1.0090	0.9462	0.8627	0.7570	0.7580	0.7589	0.8357	0.9125	1.0223	1.1321	1.2122	1.2922	1.3556	1.4189	0.7570
AGRICULTURE	1.2501	1.2671	1.2126	1.1581	1.1239	1.0896	1.0515	1.0134	0.9750	0.9367	0.9081	0.8794	0.8633	0.8439	0.8440	0.8441	0.8457	0.8473	0.8799	0.9125	0.9820	1.0515	1.1491	1.2467	0.8439
RECREATIONAL SUMMER	1.7175	1.7853	1.7144	1.6434	1.5416	1.4398	1.3847	1.3297	1.1730	1.0163	0.9355	0.8546	0.7960	0.7248	0.7363	0.7478	0.8050	0.8623	0.9661	1.0699	1.2299	1.3898	1.5122	1.6346	0.7248
RECREATIONAL SUMMER WINTER	1.1876	1.2510	1.2671	1.2831	1.3092	1.3353	1.4523	1.5692	1.5280	1.4868	1.2809	1.0750	0.9651	0.8183	0.8556	0.8930	1.0372	1.1814	1.4146	1.6262	1.6922	1.7365	1.4069	1.0773	0.8183
RECREATIONAL WINTER	0.9829	0.9405	0.9610	0.9814	1.0088	1.0363	1.2717	1.5070	1.8899	2.2729	1.9598	1.6468	1.4478	1.1378	1.1680	1.1981	1.3341	1.4702	1.7772	2.0843	2.4169	2.7495	1.8778	1.0060	0.9405
SUMMER	1.2064	1.2361	1.1933	1.1505	1.1163	1.0821	1.0551	1.0280	0.9946	0.9611	0.9252	0.8893	0.8654	0.8356	0.8394	0.8431	0.8787	0.9142	0.9489	0.9836	1.0386	1.0936	1.1381	1.1826	0.8356
SUMMER < 2500	1.2956	1.3295	1.2823	1.2352	1.1775	1.1198	1.0711	1.0223	0.9728	0.9232	0.8909	0.8586	0.8394	0.8161	0.8251	0.8341	0.8478	0.8616	0.9004	0.9392	1.0145	1.0898	1.1787	1.2675	0.8161

***Seasonal Trend Table factors are based on previous year ATR data. The table is updated yearly.**
***Grey shading indicates months were seasonal factor is greater than 30%**

	Commuter
Feb 23rd	0.9943
Peak	0.9168
Adjustme	1.085

HWY	MP	DIR	HS	DESCRIPTION	2013	2014	2015	2035	RSQ
062	40.95	1		0.02 mile east of Poodle Creek Road			4800	5600	0.2310
062	42.34	1		0.05 mile east of Knight Road			5800	6000	0.0000
062	43.86	1		Noti Automatic Traffic Recorder, Sta. 20-005, 3.06 miles west of Territorial Highway No. 200 (OR200)			6300	6400	0.1003
062	46.56	1		0.05 mile east of 8th Street			6800	7300	0.6673
062	47.02	1		0.10 mile east of Territorial Highway			10100	11500	0.0038
062	47.97	1		0.13 mile east of Huston Road			11500	13600	0.0913
062	49.73	1		0.02 mile west of Central Road			12300	14700	0.1338
062	49.77	1		0.02 mile east of Central Road			13800	15800	0.2023
062	52.20	1		0.10 mile east of Fisher Road			12500	15900	0.5030
062	52.48	1		0.10 mile east of Richmond Street			12700	15100	0.0395
063	0.50	1		0.16 mile south of the southbound Pacific Highway (I-5) ramps	5300			8100	MODEL
063	1.43	1		0.02 mile south of Scenic Avenue	7200			10100	MODEL
063	3.72	1		0.05 mile south of Beall Lane	14400			20100	MODEL
063	4.56	1		0.05 mile south of Sage Road	13000			17300	MODEL
063	4.84	1		0.02 mile southeast of Howard Avenue	13500			18100	MODEL
063	5.30	1		0.02 mile east of Elm Street	14500			19600	MODEL
063	8.18	1		0.05 mile south of Stewart Avenue	14700			20200	MODEL
063	9.74	1		0.05 mile north of South Stage Road	12000			15400	MODEL
063	9.81	1		0.02 mile south of South Stage Road	13300			17100	MODEL
063	11.13	1		0.02 mile north of Fern Valley Road	14800			18600	MODEL
063	11.27	1		0.02 mile south of Bolz Lane	13400			19300	MODEL
063	11.47	1		0.02 mile north of 4th Street	7200			8900	MODEL
063	11.51	1		0.02 mile south of 4th Street	6200			7600	MODEL

GROWTH DEVELOPMENT:

ODOT Future Volume Table

		2013	2035	Growth Rate / Year
OR 99	at Scenic	7200	10,100	1.015
OR 99	at Beall	14,400	20,100	1.015

TWIN CREEKS CROSSING IMPACT:

Re-routed Traffic from Twin Creeks Railroad Crossing

AM Peak Hour:	Approximately 15% SB increase on OR 99 or 50 trips reduction on Haskell Street at Pine (-50 SBL)
	Approximately 12% NB increase on OR 99 or 65 trip reduction on Pine at Haskell (-40 WBR, -25 WBT)
PM Peak Hour:	Approximately 12% SB increase on OR 99 or 45 trip reduction on Haskell Street at Pine (-45 SBL)
	Approximately 21% NB increase on OR 99 or 115 trip reduction on Pine at Haskell (-65 WBR, -50 WBT)

Raw 2017 Count data, AM/PM Peak Hour

		471		257					340		415			248		292					364		516		
		45	13	413					85	216	39			14	1	233					105	194	65		
	48	AM			202	400	432	167	AM			43	402	7	PM		281	763	760	101	PM			55	605
	339	Haskell / Pine St			168			454	OR 99 / Pine St			208		266	Haskell / Pine St		411			327	OR 99 / Pine St			430	
	12	7:15-8:15 am			30	834	832	211	7:15-8:15 am			151	588	2	3:45-4:45 pm		71	546	552	124	3:45-4:45 pm			120	557
		1	7	82					139	205	95				4	4	47				225	360	165		
		55		90					578		439				74		55				438		750		
						0.83							0.83					0.94							0.96

Seasonally Adj 2017 Count data, AM/PM Peak Hour

		515		280					345		430			271		320					395		560		
		50	15	450					85	220	40			15	1	255					115	210	70		
	50	AM			220	435	435	180	AM			45	405	10	PM		305	825	825	110	PM			60	655
	370	Haskell / Pine St			180			510	OR 99 / Pine St			210		290	Haskell / Pine St		445			355	OR 99 / Pine St			465	
	15	7:15-8:15 am			35	910	915	225	7:15-8:15 am			150	645	2	3:45-4:45 pm		75	595	600	135	3:45-4:45 pm			130	605
		1	10	90					140	205	95				5	5	50				245	390	180		
		65		101					595		440				78		60				475		815		

Trip Generation for 50-unit Creekside Apartments

Land Use	Unit	Size	Weekday Rate	Weekday Trips	AM Rate	AM Trips	In	Out	PM Rate	PM Trips	In	Out
220 - Apartment	DU	50	6.65	333	0.51	26	5	21	0.62	31	20	11
Total						**26**	**5**	**21**		**31**	**20**	**11**

Design Year 2018 No Build, AM/PM Peak Hour

		520		285					350		435			277		325					402		565		
		50	15	455					85	225	40			15	1	260					115	215	72		
	50	AM			225	445	445	180	AM			45	410	10	PM		310	835	835	110	PM			60	660
	375	Haskell / Pine St			185			515	OR 99 / Pine St			215		295	Haskell / Pine St		450			360	OR 99 / Pine			470	
	15	7:15-8:15 am			35	920	925	230	7:15-8:15 am			150	650	2	3:45-4:45 pm		75	605	610	140	3:45-4:45 pm			130	617
		1	10	90					145	210	95				5	5	50				250	395	185		
		65		101					605		450				78		60				485		830		

Design Year 2018 Re-routed Build, AM/PM Peak Hou

		470		245					350		500			277		325					402		565		
		50	15	405					85	225	40			15	1	260					115	215	72		
	50	AM			185	380	380	180	AM			90	410	10	PM		310	835	835	110	PM			60	660
	375	Haskell / Pine St			160			485	OR 99 / Pine St			170		295	Haskell / Pine St		450			360	OR 99 / Pine			470	
	15	7:15-8:15 am			35	870	875	210	7:15-8:15 am			150	620	2	3:45-4:45 pm		75	605	610	140	3:45-4:45 pm			130	617
		1	10	90					125	230	95				5	5	50				250	395	185		
		65		101					585		450				78		60				485		830		

Design Year 2018 Dev Trips, AM/PM Peak Hours

		1	23%	2					1		4			0	2%	1					3		2		
		0	1	0					1	0	0			0	0	0					3	0	0		
	0	AM			0	3	3	4	AM			0	1	0	PM		0	19	19	2	PM			0	11
	0	Haskell / Pine St			0			10	OR 99 / Pine St			1		0	Haskell / Pine St		0			5	OR 99 / Pine			11	
	1	7:15-8:15 am			3	19	19	5	7:15-8:15 am			0	10	1	3:45-4:45 pm		19	9	9	2	3:45-4:45 pm			0	5
	23%	0	2	19	54%				1	0	0			2%	1	1	9	96%			5	0	0		
		5		21					5		1				20		11				2		5		
		0%	10%	90%											8%	8%	84%								

Design Year 2018 Build, AM/PM Peak Hour

		471		247					351		504			277		326					405		567		
		50	16	405					86	225	40			15	1	260					118	215	72		
	50	AM			185	383	383	184	AM			90	411	10	PM		310	854	854	112	PM			60	671
	375	Haskell / Pine St			160			495	OR 99 / Pine St			171		295	Haskell / Pine St		450			365	OR 99 / Pine			481	
	16	7:15-8:15 am			38	889	894	215	7:15-8:15 am			150	630	3	3:45-4:45 pm		94	614	619	142	3:45-4:45 pm			130	622
		1	12	109					126	230	95				6	6	59				255	395	185		
		70		122					590		451				98		71				487		835		

HCM Signalized Intersection Capacity Analysis
54: E Pine St & Front

03/09/2017

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	140	205	95	40	220	85	180	510	225	150	210	45
Future Volume (vph)	140	205	95	40	220	85	180	510	225	150	210	45
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00	0.97	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	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1568	2810		1511	3107	1359	1628	1699	1420	1568	3008	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.54	1.00	1.00	0.16	1.00	
Satd. Flow (perm)	1568	2810		1511	3107	1359	930	1699	1420	262	3008	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	169	247	114	48	265	102	217	614	271	181	253	54
RTOR Reduction (vph)	0	42	0	0	0	86	0	0	66	0	11	0
Lane Group Flow (vph)	169	319	0	48	265	16	217	614	205	181	296	0
Confl. Peds. (#/hr)	4		5	5		4	2		6	6		2
Confl. Bikes (#/hr)			2			3			9			3
Heavy Vehicles (%)	6%	13%	8%	10%	7%	7%	2%	3%	2%	6%	8%	4%
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases						6	4		4	8		
Actuated Green, G (s)	14.1	21.9		7.0	14.8	14.8	53.2	41.2	41.2	53.4	41.3	
Effective Green, g (s)	14.1	22.9		7.0	15.8	15.8	53.2	41.2	41.2	53.4	41.3	
Actuated g/C Ratio	0.14	0.23		0.07	0.16	0.16	0.54	0.42	0.42	0.54	0.42	
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	2.5	4.7		2.5	4.7	4.7	2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	222	648		106	494	216	583	705	589	300	1252	
v/s Ratio Prot	c0.11	c0.11		0.03	0.09		0.05	c0.36		c0.07	0.10	
v/s Ratio Perm						0.01	0.15		0.14	0.25		
v/c Ratio	0.76	0.49		0.45	0.54	0.08	0.37	0.87	0.35	0.60	0.24	
Uniform Delay, d1	40.9	33.1		44.3	38.3	35.5	12.3	26.6	19.8	16.6	18.7	
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	13.7	1.1		2.2	1.9	0.3	0.3	11.3	0.3	2.9	0.1	
Delay (s)	54.6	34.2		46.5	40.2	35.8	12.6	37.9	20.1	19.4	18.8	
Level of Service	D	C		D	D	D	B	D	C	B	B	
Approach Delay (s)		40.7			39.8			28.5			19.0	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	31.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	99.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	450	15	50	1	10	90	50	370	15	35	180	220
Future Volume (vph)	450	15	50	1	10	90	50	370	15	35	180	220
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.96			0.97		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	0.99	1.00			1.00		1.00	1.00		0.97	1.00	1.00
Frt	1.00	0.88			0.88		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1615	1462			1470		1623	1685		1620	1549	1405
Flt Permitted	0.72	1.00			1.00		0.55	1.00		0.24	1.00	1.00
Satd. Flow (perm)	1225	1462			1469		944	1685		408	1549	1405
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	542	18	60	1	12	108	60	446	18	42	217	265
RTOR Reduction (vph)	0	27	0	0	48	0	0	1	0	0	0	174
Lane Group Flow (vph)	542	51	0	0	73	0	60	463	0	42	217	91
Confl. Peds. (#/hr)	7		25	25		7	3		40	40		3
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	2%	0%	2%	0%	0%	2%	2%	3%	0%	0%	13%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4			8			6			2		2
Actuated Green, G (s)	42.9	42.9			42.9		26.4	26.4		26.4	26.4	26.4
Effective Green, g (s)	42.9	42.9			42.9		26.4	26.4		26.4	26.4	26.4
Actuated g/C Ratio	0.55	0.55			0.55		0.34	0.34		0.34	0.34	0.34
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.5	2.5			2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	679	811			815		322	575		139	529	479
v/s Ratio Prot		0.04						c0.27			0.14	
v/s Ratio Perm	c0.44				0.05		0.06			0.10		0.06
v/c Ratio	0.80	0.06			0.09		0.19	0.80		0.30	0.41	0.19
Uniform Delay, d1	13.7	7.9			8.1		17.9	23.1		18.7	19.5	17.9
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.3	0.0			0.0		0.2	7.8		0.9	0.4	0.1
Delay (s)	20.1	8.0			8.1		18.1	30.9		19.6	19.9	18.1
Level of Service	C	A			A		B	C		B	B	B
Approach Delay (s)		18.5			8.1			29.5			18.9	
Approach LOS		B			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	77.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
54: E Pine St & Front

03/13/2017

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	245	390	180	70	210	115	110	355	135	130	465	60
Future Volume (vph)	245	390	180	70	210	115	110	355	135	130	465	60
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.97	1.00	1.00	0.98	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	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1630	3053		1630	3260	1410	1630	1716	1428	1630	3198	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.29	1.00	1.00	0.26	1.00	
Satd. Flow (perm)	1630	3053		1630	3260	1410	492	1716	1428	440	3198	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	255	406	188	73	219	120	115	370	141	135	484	62
RTOR Reduction (vph)	0	37	0	0	0	91	0	0	83	0	8	0
Lane Group Flow (vph)	255	557	0	73	219	29	115	370	58	135	539	0
Confl. Peds. (#/hr)	14		14	14		14	1		1	1		1
Confl. Bikes (#/hr)			2			3			9			3
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases						6	4		4	8		
Actuated Green, G (s)	14.9	26.1		7.8	19.0	19.0	31.5	21.8	21.8	30.9	21.5	
Effective Green, g (s)	14.9	27.1		7.8	20.0	20.0	31.5	21.8	21.8	30.9	21.5	
Actuated g/C Ratio	0.18	0.33		0.10	0.24	0.24	0.38	0.27	0.27	0.38	0.26	
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	2.5	4.7		2.5	4.7	4.7	2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	295	1007		154	794	343	323	455	379	301	837	
v/s Ratio Prot	c0.16	c0.18		0.04	0.07		0.04	c0.22		c0.05	0.17	
v/s Ratio Perm						0.02	0.09		0.04	0.12		
v/c Ratio	0.86	0.55		0.47	0.28	0.09	0.36	0.81	0.15	0.45	0.64	
Uniform Delay, d1	32.6	22.5		35.2	25.2	24.0	17.2	28.2	23.1	18.3	26.9	
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	22.0	1.0		1.7	0.4	0.2	0.5	10.4	0.1	0.8	1.5	
Delay (s)	54.6	23.6		36.9	25.5	24.2	17.7	38.6	23.2	19.1	28.4	
Level of Service	D	C		D	C	C	B	D	C	B	C	
Approach Delay (s)		32.9			27.2			31.3			26.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	82.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	255	1	15	5	5	50	10	290	2	75	445	305
Future Volume (vph)	255	1	15	5	5	50	10	290	2	75	445	305
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	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	0.97
Flpb, ped/bikes	1.00	1.00			1.00		0.99	1.00		1.00	1.00	1.00
Frt	1.00	0.86			0.89		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1614	1471			1494		1652	1681		1597	1699	1396
Flt Permitted	0.72	1.00			0.99		0.39	1.00		0.55	1.00	1.00
Satd. Flow (perm)	1216	1471			1481		683	1681		928	1699	1396
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	271	1	16	5	5	53	11	309	2	80	473	324
RTOR Reduction (vph)	0	11	0	0	35	0	0	0	0	0	0	173
Lane Group Flow (vph)	271	6	0	0	28	0	11	311	0	80	473	151
Confl. Peds. (#/hr)			4	4			12		2	2		12
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	3%	0%	0%	0%	0%	4%	0%	4%	0%	4%	3%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4			8			6			2		2
Actuated Green, G (s)	14.2	14.2			14.2		19.3	19.3		19.3	19.3	19.3
Effective Green, g (s)	14.2	14.2			14.2		19.3	19.3		19.3	19.3	19.3
Actuated g/C Ratio	0.34	0.34			0.34		0.47	0.47		0.47	0.47	0.47
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.5	2.5			2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	416	503			506		317	781		431	790	649
v/s Ratio Prot		0.00						0.18			c0.28	
v/s Ratio Perm	c0.22				0.02		0.02			0.09		0.11
v/c Ratio	0.65	0.01			0.06		0.03	0.40		0.19	0.60	0.23
Uniform Delay, d1	11.6	9.0			9.2		6.0	7.3		6.5	8.2	6.7
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.2	0.0			0.0		0.0	0.2		0.2	1.0	0.1
Delay (s)	14.8	9.0			9.2		6.1	7.5		6.7	9.3	6.8
Level of Service	B	A			A		A	A		A	A	A
Approach Delay (s)		14.5			9.2			7.5			8.1	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	41.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:10	7:10	7:10	7:10	7:10	7:10
End Time	8:15	8:15	8:15	8:15	8:15	8:15
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	3	3	3	3	3	3
# of Recorded Intervals	2	2	2	2	2	2
Vehs Entered	2925	2995	2923	3027	3007	2974
Vehs Exited	2947	3037	2941	3037	3023	2997
Starting Vehs	80	106	75	79	77	80
Ending Vehs	58	64	57	69	61	59
Travel Distance (mi)	1006	1012	996	1032	1029	1015
Travel Time (hr)	77.5	76.7	72.2	96.4	83.8	81.3
Total Delay (hr)	38.9	37.8	34.0	56.7	44.1	42.3
Total Stops	3851	3846	3656	4205	3966	3907
Fuel Used (gal)	45.1	45.5	44.0	50.5	47.6	46.5

Interval #0 Information Seeding

Start Time	7:10
End Time	7:15
Total Time (min)	5

Volumes adjusted by PHF, Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:15
End Time	7:30
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	831	832	767	813	808	810
Vehs Exited	814	794	764	766	755	780
Starting Vehs	80	106	75	79	77	80
Ending Vehs	97	144	78	126	130	112
Travel Distance (mi)	285	277	272	268	269	274
Travel Time (hr)	24.1	24.8	24.3	24.1	24.9	24.4
Total Delay (hr)	13.1	14.1	13.8	13.8	14.6	13.9
Total Stops	1126	1207	1145	1112	1168	1152
Fuel Used (gal)	13.2	13.4	13.0	12.9	13.0	13.1

Interval #2 Information Recording

Start Time	7:30
End Time	8:15
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2094	2163	2156	2214	2199	2167
Vehs Exited	2133	2243	2177	2271	2268	2219
Starting Vehs	97	144	78	126	130	112
Ending Vehs	58	64	57	69	61	59
Travel Distance (mi)	721	736	724	764	760	741
Travel Time (hr)	53.4	51.9	48.0	72.3	58.9	56.9
Total Delay (hr)	25.7	23.6	20.1	42.9	29.5	28.4
Total Stops	2725	2639	2511	3093	2798	2756
Fuel Used (gal)	31.9	32.1	31.0	37.7	34.6	33.5

Intersection: 48: E Pine St & 2nd

Movement	SE	NW	NE	NE	SW	SW
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	78	103	69	90	112	64
Average Queue (ft)	39	43	20	15	37	4
95th Queue (ft)	61	79	54	63	85	29
Link Distance (ft)	354	346		233	259	259
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			50			
Storage Blk Time (%)			0	1		
Queuing Penalty (veh)			1	2		

Intersection: 51: E Pine St & 1st

Movement	SE	NW	NE	SW	SW
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (ft)	60	103	166	93	126
Average Queue (ft)	28	44	28	22	15
95th Queue (ft)	56	81	108	67	74
Link Distance (ft)	313	295	221	233	233
Upstream Blk Time (%)			0		0
Queuing Penalty (veh)			0		0
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 54: E Pine St & Front

Movement	NB	NB	NB	SB	SB	SB	SB	NE	NE	NE	SW	SW
Directions Served	L	T	TR	L	T	T	R	L	T	R	L	T
Maximum Queue (ft)	224	298	231	117	189	157	104	203	317	125	194	233
Average Queue (ft)	114	98	80	38	99	55	38	84	289	102	89	145
95th Queue (ft)	216	233	175	87	167	128	76	153	323	168	162	256
Link Distance (ft)		316	316		327	327		222	222		221	221
Upstream Blk Time (%)		1	0					0	39		0	4
Queuing Penalty (veh)		2	0					1	178		0	8
Storage Bay Dist (ft)	200			200			150			100		
Storage Blk Time (%)	9	0			0	0	0		49	1		11
Queuing Penalty (veh)	10	0			0	0	0		112	7		18

Intersection: 54: E Pine St & Front

Movement	SW
Directions Served	TR
Maximum Queue (ft)	150
Average Queue (ft)	112
95th Queue (ft)	178
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	125
Storage Blk Time (%)	10
Queuing Penalty (veh)	11

Intersection: 57: E Pine St & Amy

Movement	NB	NE	NE	SW	SW
Directions Served	R	T	TR	T	TR
Maximum Queue (ft)	49	125	323	143	109
Average Queue (ft)	12	67	206	11	7
95th Queue (ft)	39	166	383	69	52
Link Distance (ft)	247		276	222	222
Upstream Blk Time (%)			8	0	0
Queuing Penalty (veh)			78	1	0
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	24		
Queuing Penalty (veh)		1	111		

Intersection: 60: E Pine St & Haskell St.

Movement	SE	SE	NW	NE	NE	SW	SW	SW
Directions Served	L	TR	LTR	L	TR	L	T	R
Maximum Queue (ft)	795	175	116	199	723	134	257	151
Average Queue (ft)	317	30	43	62	296	33	89	59
95th Queue (ft)	762	167	86	172	671	84	189	113
Link Distance (ft)	1332	1332	386		929		276	276
Upstream Blk Time (%)					2		1	
Queuing Penalty (veh)					0		1	
Storage Bay Dist (ft)				100		100		
Storage Blk Time (%)				1	40	0	10	
Queuing Penalty (veh)				4	21	0	4	

Intersection: 64: Front & Oak

Movement	NB	NB	SB	SB	SB	SW
Directions Served	T	TR	L	T	T	LR
Maximum Queue (ft)	39	28	51	36	56	78
Average Queue (ft)	3	1	18	2	2	39
95th Queue (ft)	27	10	49	17	24	62
Link Distance (ft)	491	491		316	316	194
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			50			
Storage Blk Time (%)			1	0		
Queuing Penalty (veh)			1	0		

Intersection: 66: Front & Manzanita

Movement	NB	NB	SB	SB	SB	SW
Directions Served	T	TR	L	T	T	LR
Maximum Queue (ft)	14	36	35	24	20	69
Average Queue (ft)	1	1	4	1	1	29
95th Queue (ft)	9	16	21	13	9	55
Link Distance (ft)	327	327		421	421	184
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			100			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 572

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:05	7:05	7:05	7:05	7:05	7:05
End Time	8:10	8:10	8:10	8:10	8:10	8:10
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	3	3	3	3	3	3
# of Recorded Intervals	2	2	2	2	2	2
Vehs Entered	1444	1510	1441	1483	1458	1467
Vehs Exited	1462	1523	1472	1499	1459	1483
Starting Vehs	51	44	52	45	36	45
Ending Vehs	33	31	21	29	35	29
Travel Distance (mi)	701	729	699	723	707	712
Travel Time (hr)	34.1	35.8	34.5	35.1	35.3	35.0
Total Delay (hr)	6.5	7.0	7.1	6.7	7.4	6.9
Total Stops	922	975	943	948	990	955
Fuel Used (gal)	24.3	25.0	24.3	24.8	24.8	24.6

Interval #0 Information Seeding

Start Time	7:05
End Time	7:10
Total Time (min)	5

Volumes adjusted by PHF, Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:10
End Time	7:25
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	421	414	444	443	463	437
Vehs Exited	434	415	449	441	449	439
Starting Vehs	51	44	52	45	36	45
Ending Vehs	38	43	47	47	50	45
Travel Distance (mi)	207	197	218	214	224	212
Travel Time (hr)	10.6	10.1	11.6	10.9	11.8	11.0
Total Delay (hr)	2.4	2.3	3.0	2.5	3.0	2.7
Total Stops	285	280	330	303	335	308
Fuel Used (gal)	7.3	6.9	7.8	7.4	8.0	7.5

Interval #2 Information Recording

Start Time	7:25
End Time	8:10
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	1023	1096	997	1040	995	1031
Vehs Exited	1028	1108	1023	1058	1010	1045
Starting Vehs	38	43	47	47	50	45
Ending Vehs	33	31	21	29	35	29
Travel Distance (mi)	494	531	482	509	483	500
Travel Time (hr)	23.5	25.7	22.9	24.2	23.4	24.0
Total Delay (hr)	4.1	4.6	4.0	4.2	4.4	4.3
Total Stops	637	695	613	645	655	648
Fuel Used (gal)	16.9	18.2	16.5	17.4	16.9	17.2

Intersection: 60: E Pine St & Haskell St.

Movement	SE	SE	NW	NE	NE	SW	SW	SW
Directions Served	L	TR	LTR	L	TR	L	T	R
Maximum Queue (ft)	307	55	98	177	344	112	229	99
Average Queue (ft)	152	17	35	46	142	32	76	51
95th Queue (ft)	254	43	75	127	265	79	163	84
Link Distance (ft)	1331	1331	386		929		1457	1457
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)				100		100		
Storage Blk Time (%)				0	15	0	4	
Queuing Penalty (veh)				1	8	1	1	

Network Summary

Network wide Queuing Penalty: 11

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:10	7:10	7:10	7:10	7:10	7:10
End Time	8:15	8:15	8:15	8:15	8:15	8:15
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	3	3	3	3	3	3
# of Recorded Intervals	2	2	2	2	2	2
Vehs Entered	2952	3008	2950	2980	3014	2980
Vehs Exited	2986	3018	2967	2988	3017	2994
Starting Vehs	87	67	82	64	68	70
Ending Vehs	53	57	65	56	65	57
Travel Distance (mi)	1008	1010	989	1014	1017	1008
Travel Time (hr)	64.8	63.6	60.6	64.7	63.2	63.4
Total Delay (hr)	25.9	24.7	22.5	25.6	24.1	24.6
Total Stops	3337	3322	3160	3327	3308	3293
Fuel Used (gal)	43.0	42.3	41.5	42.6	42.4	42.4

Interval #0 Information Seeding

Start Time	7:10
End Time	7:15
Total Time (min)	5

Volumes adjusted by PHF, Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:15
End Time	7:30
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	852	809	828	853	779	822
Vehs Exited	835	805	840	833	772	819
Starting Vehs	87	67	82	64	68	70
Ending Vehs	104	71	70	84	75	75
Travel Distance (mi)	297	280	288	301	267	287
Travel Time (hr)	20.4	18.2	19.0	20.6	17.6	19.2
Total Delay (hr)	9.0	7.5	7.9	9.0	7.3	8.1
Total Stops	1066	963	1005	1071	929	1008
Fuel Used (gal)	12.8	12.0	12.4	13.0	11.4	12.3

Interval #2 Information Recording

Start Time	7:30
End Time	8:15
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2100	2199	2122	2127	2235	2159
Vehs Exited	2151	2213	2127	2155	2245	2179
Starting Vehs	104	71	70	84	75	75
Ending Vehs	53	57	65	56	65	57
Travel Distance (mi)	712	729	701	713	750	721
Travel Time (hr)	44.4	45.4	41.5	44.0	45.6	44.2
Total Delay (hr)	17.0	17.2	14.6	16.6	16.8	16.4
Total Stops	2271	2359	2155	2256	2379	2283
Fuel Used (gal)	30.2	30.4	29.0	29.6	31.0	30.0

Intersection: 48: E Pine St & 2nd

Movement	SE	NW	NE	NE	SW	SW
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	86	95	80	85	110	38
Average Queue (ft)	37	43	28	11	29	6
95th Queue (ft)	66	74	70	48	75	30
Link Distance (ft)	354	346	234	234	259	259
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 51: E Pine St & 1st

Movement	SE	NW	NE	NE	SW	SW
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	54	92	75	80	101	132
Average Queue (ft)	25	41	13	7	19	13
95th Queue (ft)	55	72	51	41	64	75
Link Distance (ft)	319	288	222	222	234	234
Upstream Blk Time (%)						0
Queuing Penalty (veh)						0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 54: E Pine St & Front

Movement	NB	NB	NB	SB	SB	SB	SB	NE	NE	NE	SW	SW
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	T
Maximum Queue (ft)	220	271	206	108	185	136	69	200	273	296	191	226
Average Queue (ft)	102	73	64	37	83	37	35	87	162	208	82	140
95th Queue (ft)	188	169	131	88	143	98	65	171	255	299	150	246
Link Distance (ft)		318	318		328	328			223	223	222	222
Upstream Blk Time (%)		0							2	7	0	3
Queuing Penalty (veh)		0							7	33	0	6
Storage Bay Dist (ft)	200			200			150	100				
Storage Blk Time (%)	3				0	0		4	20			13
Queuing Penalty (veh)	3				0	0		11	37			20

Intersection: 54: E Pine St & Front

Movement	SW
Directions Served	TR
Maximum Queue (ft)	157
Average Queue (ft)	115
95th Queue (ft)	179
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	125
Storage Blk Time (%)	11
Queuing Penalty (veh)	12

Intersection: 57: E Pine St & Amy

Movement	NB	NE	NE	SW	SW
Directions Served	R	T	TR	T	TR
Maximum Queue (ft)	35	73	87	82	48
Average Queue (ft)	7	12	16	9	6
95th Queue (ft)	28	47	61	44	34
Link Distance (ft)	241	276	276	223	223
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 60: E Pine St & Haskell St.

Movement	SE	SE	NW	NE	NE	SW	SW	SW
Directions Served	L	TR	LTR	L	TR	L	T	R
Maximum Queue (ft)	321	112	91	195	284	69	181	158
Average Queue (ft)	156	20	35	36	136	27	80	59
95th Queue (ft)	277	68	68	100	246	63	155	112
Link Distance (ft)	1331	1331	373		929		276	276
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)				100		100		
Storage Blk Time (%)				0	13	0	4	
Queuing Penalty (veh)				0	7	0	2	

Intersection: 64: Front & Oak

Movement	NB	NB	SB	SB	SB	SW
Directions Served	T	TR	L	T	T	LR
Maximum Queue (ft)	13	38	53	14	30	82
Average Queue (ft)	1	1	18	1	1	39
95th Queue (ft)	8	14	48	9	14	64
Link Distance (ft)	491	491		318	318	194
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			50			
Storage Blk Time (%)			0	0		
Queuing Penalty (veh)			1	0		

Intersection: 66: Front & Manzanita

Movement	NB	NB	SB	SB	SB	SW
Directions Served	T	TR	L	T	T	LR
Maximum Queue (ft)	7	13	40	31	14	60
Average Queue (ft)	0	0	5	2	0	31
95th Queue (ft)	5	7	26	16	7	55
Link Distance (ft)	328	328		421	421	184
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			100			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 140

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	3:40	3:40	3:40	3:40	3:40	3:40
End Time	4:45	4:45	4:45	4:45	4:45	4:45
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	3	3	3	3	3	3
# of Recorded Intervals	2	2	2	2	2	2
Vehs Entered	3044	3026	3207	2969	2972	3042
Vehs Exited	3057	3042	3163	2975	2994	3047
Starting Vehs	61	66	51	68	90	65
Ending Vehs	48	50	95	62	68	60
Travel Distance (mi)	923	914	964	901	920	924
Travel Time (hr)	69.1	70.6	86.7	64.5	83.5	74.9
Total Delay (hr)	33.3	35.2	49.5	29.6	47.9	39.1
Total Stops	3979	3714	4496	3566	3943	3937
Fuel Used (gal)	42.7	43.0	48.1	40.9	46.2	44.2

Interval #0 Information Seeding

Start Time	3:40
End Time	3:45
Total Time (min)	5

Volumes adjusted by PHF, Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	3:45
End Time	4:00
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	858	787	882	837	838	841
Vehs Exited	839	797	833	834	832	828
Starting Vehs	61	66	51	68	90	65
Ending Vehs	80	56	100	71	96	77
Travel Distance (mi)	247	229	251	248	249	245
Travel Time (hr)	18.6	16.4	19.1	19.1	23.2	19.3
Total Delay (hr)	9.0	7.5	9.4	9.5	13.6	9.8
Total Stops	1081	883	1082	1028	1151	1043
Fuel Used (gal)	11.4	10.3	11.7	11.6	12.8	11.6

Interval #2 Information Recording

Start Time	4:00
End Time	4:45
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2186	2239	2325	2132	2134	2202
Vehs Exited	2218	2245	2330	2141	2162	2220
Starting Vehs	80	56	100	71	96	77
Ending Vehs	48	50	95	62	68	60
Travel Distance (mi)	676	685	713	653	671	679
Travel Time (hr)	50.6	54.2	67.6	45.4	60.2	55.6
Total Delay (hr)	24.3	27.7	40.1	20.1	34.3	29.3
Total Stops	2898	2831	3414	2538	2792	2896
Fuel Used (gal)	31.3	32.6	36.4	29.3	33.4	32.6

Intersection: 54: E Pine St & Front

Movement	NB	NB	NB	SB	SB	SB	SB	NE	NE	NE	SW	SW
Directions Served	L	T	TR	L	T	T	R	L	T	R	L	T
Maximum Queue (ft)	224	323	304	122	167	118	92	136	242	125	162	244
Average Queue (ft)	180	184	158	53	80	39	42	59	220	96	73	206
95th Queue (ft)	262	375	306	101	138	100	74	109	262	168	127	279
Link Distance (ft)		316	316		327	327		222	222		221	221
Upstream Blk Time (%)		17	0						26			15
Queuing Penalty (veh)		69	1						78			49
Storage Bay Dist (ft)	200			200			150			100		
Storage Blk Time (%)	32	0			0	0			54	1		28
Queuing Penalty (veh)	62	0			0	0			73	2		83

Intersection: 54: E Pine St & Front

Movement	SW
Directions Served	TR
Maximum Queue (ft)	152
Average Queue (ft)	135
95th Queue (ft)	180
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	125
Storage Blk Time (%)	15
Queuing Penalty (veh)	34

Intersection: 57: E Pine St & Amy

Movement	NB	NE	NE	SW	SW
Directions Served	R	T	TR	T	TR
Maximum Queue (ft)	38	124	290	121	76
Average Queue (ft)	6	36	149	19	8
95th Queue (ft)	27	125	324	79	41
Link Distance (ft)	247		276	222	222
Upstream Blk Time (%)			5		
Queuing Penalty (veh)			30		
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	19		
Queuing Penalty (veh)		0	58		

Intersection: 60: E Pine St & Haskell St.

Movement	SE	SE	NW	NE	NE	SW	SW	SW
Directions Served	L	TR	LTR	L	TR	L	T	R
Maximum Queue (ft)	170	71	72	53	224	122	290	115
Average Queue (ft)	84	7	28	10	92	47	133	62
95th Queue (ft)	146	39	61	39	174	109	251	105
Link Distance (ft)		467	386		455		276	276
Upstream Blk Time (%)							0	
Queuing Penalty (veh)							2	
Storage Bay Dist (ft)	150			100		100		
Storage Blk Time (%)	1				8	1	9	
Queuing Penalty (veh)	0				1	2	7	

Zone Summary

Zone wide Queuing Penalty: 551

HCM Signalized Intersection Capacity Analysis
60: E Pine St & Haskell St.

03/12/2017

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	455	15	50	1	10	90	50	375	15	35	185	225
Future Volume (vph)	455	15	50	1	10	90	50	375	15	35	185	225
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.96			0.97		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	0.99	1.00			1.00		1.00	1.00		0.97	1.00	1.00
Frt	1.00	0.89			0.88		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1615	1464			1471		1623	1685		1620	1549	1405
Flt Permitted	0.73	1.00			1.00		0.55	1.00		0.25	1.00	1.00
Satd. Flow (perm)	1233	1464			1470		946	1685		422	1549	1405
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	535	18	59	1	12	106	59	441	18	41	218	265
RTOR Reduction (vph)	0	26	0	0	47	0	0	1	0	0	0	175
Lane Group Flow (vph)	535	51	0	0	72	0	59	458	0	41	218	90
Confl. Peds. (#/hr)	7		25	25		7	3		40	40		3
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	2%	0%	2%	0%	0%	2%	2%	3%	0%	0%	13%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4			8			6			2		2
Actuated Green, G (s)	41.4	41.4			41.4		25.6	25.6		25.6	25.6	25.6
Effective Green, g (s)	41.4	41.4			41.4		25.6	25.6		25.6	25.6	25.6
Actuated g/C Ratio	0.55	0.55			0.55		0.34	0.34		0.34	0.34	0.34
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.5	2.5			2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	680	808			811		322	575		144	528	479
v/s Ratio Prot		0.03						c0.27			0.14	
v/s Ratio Perm	c0.43				0.05		0.06			0.10		0.06
v/c Ratio	0.79	0.06			0.09		0.18	0.80		0.28	0.41	0.19
Uniform Delay, d1	13.3	7.8			7.9		17.4	22.3		18.0	18.9	17.4
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.8	0.0			0.0		0.2	7.3		0.8	0.4	0.1
Delay (s)	19.1	7.8			7.9		17.6	29.6		18.8	19.3	17.5
Level of Service	B	A			A		B	C		B	B	B
Approach Delay (s)		17.7			7.9			28.3			18.4	
Approach LOS		B			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
60: E Pine St & Haskell St.

03/12/2017

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	405	15	50	1	10	90	50	375	15	35	160	185
Future Volume (vph)	405	15	50	1	10	90	50	375	15	35	160	185
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.96			0.97		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	0.99	1.00			1.00		1.00	1.00		0.98	1.00	1.00
Frt	1.00	0.89			0.88		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1617	1468			1472		1623	1686		1622	1549	1406
Flt Permitted	0.74	1.00			1.00		0.61	1.00		0.28	1.00	1.00
Satd. Flow (perm)	1252	1468			1472		1049	1686		476	1549	1406
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	476	18	59	1	12	106	59	441	18	41	188	218
RTOR Reduction (vph)	0	28	0	0	51	0	0	1	0	0	0	140
Lane Group Flow (vph)	476	49	0	0	68	0	59	458	0	41	188	78
Confl. Peds. (#/hr)	7		25	25		7	3		40	40		3
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	2%	0%	2%	0%	0%	2%	2%	3%	0%	0%	13%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4			8			6			2		2
Actuated Green, G (s)	34.5	34.5			34.5		23.9	23.9		23.9	23.9	23.9
Effective Green, g (s)	34.5	34.5			34.5		23.9	23.9		23.9	23.9	23.9
Actuated g/C Ratio	0.52	0.52			0.52		0.36	0.36		0.36	0.36	0.36
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.5	2.5			2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	650	762			764		377	606		171	557	506
v/s Ratio Prot		0.03						c0.27			0.12	
v/s Ratio Perm	c0.38				0.05		0.06			0.09		0.06
v/c Ratio	0.73	0.06			0.09		0.16	0.76		0.24	0.34	0.16
Uniform Delay, d1	12.4	7.9			8.0		14.4	18.7		14.9	15.5	14.4
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.0	0.0			0.0		0.1	5.1		0.5	0.3	0.1
Delay (s)	16.4	8.0			8.1		14.6	23.8		15.4	15.7	14.5
Level of Service	B	A			A		B	C		B	B	B
Approach Delay (s)		15.2			8.1			22.7			15.1	
Approach LOS		B			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	66.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
60: E Pine St & Haskell St.

03/12/2017

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	405	15	50	1	10	90	50	375	15	35	160	185
Future Volume (vph)	405	15	50	1	10	90	50	375	15	35	160	185
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.96			0.98		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		0.98	1.00	1.00
Frt	1.00	0.89			0.88		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1622	1468			1488		1624	1686		1622	1549	1406
Flt Permitted	0.74	1.00			1.00		0.61	1.00		0.28	1.00	1.00
Satd. Flow (perm)	1257	1468			1488		1049	1686		477	1549	1406
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	476	18	59	1	12	106	59	441	18	41	188	218
RTOR Reduction (vph)	0	28	0	0	51	0	0	1	0	0	0	140
Lane Group Flow (vph)	476	49	0	0	68	0	59	458	0	41	188	78
Confl. Peds. (#/hr)	7		25	25		7	3		40	40		3
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	2%	0%	2%	0%	0%	2%	2%	3%	0%	0%	13%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4			8			6			2		2
Actuated Green, G (s)	34.3	34.3			34.3		23.8	23.8		23.8	23.8	23.8
Effective Green, g (s)	34.3	34.3			34.3		23.8	23.8		23.8	23.8	23.8
Actuated g/C Ratio	0.52	0.52			0.52		0.36	0.36		0.36	0.36	0.36
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.5	2.5			2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	652	761			772		377	607		171	557	506
v/s Ratio Prot		0.03						c0.27			0.12	
v/s Ratio Perm	c0.38				0.05		0.06			0.09		0.06
v/c Ratio	0.73	0.06			0.09		0.16	0.75		0.24	0.34	0.16
Uniform Delay, d1	12.3	7.9			8.0		14.3	18.6		14.8	15.4	14.3
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.0	0.0			0.0		0.1	5.0		0.5	0.3	0.1
Delay (s)	16.3	7.9			8.1		14.5	23.6		15.3	15.7	14.4
Level of Service	B	A			A		B	C		B	B	B
Approach Delay (s)		15.1			8.1			22.6			15.0	
Approach LOS		B			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	66.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:10	7:10	7:10	7:10	7:10	7:10
End Time	8:15	8:15	8:15	8:15	8:15	8:15
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	3	3	3	3	3	3
# of Recorded Intervals	2	2	2	2	2	2
Vehs Entered	2964	3045	2951	2901	2984	2971
Vehs Exited	2958	3062	2979	2899	3004	2979
Starting Vehs	98	88	91	78	85	85
Ending Vehs	104	71	63	80	65	70
Travel Distance (mi)	1017	1043	1027	993	1039	1024
Travel Time (hr)	132.5	91.5	94.0	101.5	93.0	102.5
Total Delay (hr)	93.4	51.3	54.4	63.4	52.9	63.1
Total Stops	4620	4316	4183	4093	4225	4284
Fuel Used (gal)	58.0	49.6	49.8	50.7	49.6	51.5

Interval #0 Information Seeding

Start Time	7:10
End Time	7:15
Total Time (min)	5

Volumes adjusted by PHF, Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:15
End Time	7:30
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	767	808	797	753	814	789
Vehs Exited	724	772	785	697	773	751
Starting Vehs	98	88	91	78	85	85
Ending Vehs	141	124	103	134	126	124
Travel Distance (mi)	256	274	280	246	285	268
Travel Time (hr)	29.1	26.6	25.0	32.6	29.4	28.6
Total Delay (hr)	19.3	16.1	14.2	23.2	18.5	18.2
Total Stops	1255	1227	1165	1082	1239	1193
Fuel Used (gal)	13.7	13.6	13.5	14.3	14.4	13.9

Interval #2 Information Recording

Start Time	7:30
End Time	8:15
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2197	2237	2154	2148	2170	2178
Vehs Exited	2234	2290	2194	2202	2231	2231
Starting Vehs	141	124	103	134	126	124
Ending Vehs	104	71	63	80	65	70
Travel Distance (mi)	761	769	747	747	754	756
Travel Time (hr)	103.4	64.9	69.0	68.9	63.5	73.9
Total Delay (hr)	74.1	35.2	40.1	40.2	34.4	44.8
Total Stops	3365	3089	3018	3011	2986	3091
Fuel Used (gal)	44.4	36.0	36.3	36.4	35.2	37.6

Intersection: 48: E Pine St & 2nd

Movement	SE	NW	NE	NE	SW	SW
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	87	100	69	93	94	49
Average Queue (ft)	38	45	22	16	34	6
95th Queue (ft)	68	82	55	61	81	29
Link Distance (ft)	354	346		233	259	259
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			50			
Storage Blk Time (%)			0	1		
Queuing Penalty (veh)			1	2		

Intersection: 51: E Pine St & 1st

Movement	SE	NW	NE	SW	SW
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (ft)	63	110	131	99	133
Average Queue (ft)	24	45	23	24	17
95th Queue (ft)	55	87	84	73	73
Link Distance (ft)	313	295	221	233	233
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 54: E Pine St & Front

Movement	NB	NB	NB	SB	SB	SB	SB	NE	NE	NE	SW	SW
Directions Served	L	T	TR	L	T	T	R	L	T	R	L	T
Maximum Queue (ft)	218	241	196	111	202	160	83	222	319	125	206	239
Average Queue (ft)	115	79	79	43	105	57	32	90	289	105	91	147
95th Queue (ft)	208	175	157	91	172	135	66	169	330	170	167	260
Link Distance (ft)		316	316		327	327		222	222		221	221
Upstream Blk Time (%)		0						0	42		0	5
Queuing Penalty (veh)		1						1	198		1	10
Storage Bay Dist (ft)	200			200			150			100		
Storage Blk Time (%)	4	0			0	0			50	1		16
Queuing Penalty (veh)	4	0			0	0			114	8		25

Intersection: 54: E Pine St & Front

Movement	SW
Directions Served	TR
Maximum Queue (ft)	154
Average Queue (ft)	110
95th Queue (ft)	177
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	125
Storage Blk Time (%)	12
Queuing Penalty (veh)	14

Intersection: 57: E Pine St & Amy

Movement	NB	NE	NE	SW	SW
Directions Served	R	T	TR	T	TR
Maximum Queue (ft)	69	125	335	200	104
Average Queue (ft)	23	89	267	26	11
95th Queue (ft)	70	178	395	112	55
Link Distance (ft)	247		276	222	222
Upstream Blk Time (%)			14	0	
Queuing Penalty (veh)			128	0	
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	34		
Queuing Penalty (veh)		1	157		

Intersection: 60: E Pine St & Haskell St.

Movement	SE	SE	NW	NE	NE	SW	SW	SW
Directions Served	L	TR	LTR	L	TR	L	T	R
Maximum Queue (ft)	815	188	106	200	986	154	264	155
Average Queue (ft)	414	23	42	70	627	39	111	65
95th Queue (ft)	845	104	86	193	1150	100	227	121
Link Distance (ft)	1332	1332	386		929		276	276
Upstream Blk Time (%)					30		0	
Queuing Penalty (veh)					0		1	
Storage Bay Dist (ft)				100		100		
Storage Blk Time (%)				0	63	1	12	
Queuing Penalty (veh)				0	32	2	4	

Intersection: 64: Front & Oak

Movement	NB	NB	SB	SB	SB	SW
Directions Served	T	TR	L	T	T	LR
Maximum Queue (ft)	35	14	60	22	20	96
Average Queue (ft)	1	0	15	1	1	39
95th Queue (ft)	12	7	45	10	14	67
Link Distance (ft)	491	491		316	316	194
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			50			
Storage Blk Time (%)			0	0		
Queuing Penalty (veh)			1	0		

Intersection: 66: Front & Manzanita

Movement	NB	NB	SB	SB	SB	SW
Directions Served	T	TR	L	T	T	LR
Maximum Queue (ft)	19	26	39	21	6	60
Average Queue (ft)	1	1	3	1	0	28
95th Queue (ft)	11	14	19	12	4	54
Link Distance (ft)	327	327		421	421	184
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			100			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 703

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:10	7:10	7:10	7:10	7:10	7:10
End Time	8:15	8:15	8:15	8:15	8:15	8:15
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	3	3	3	3	3	3
# of Recorded Intervals	2	2	2	2	2	2
Vehs Entered	3044	2829	2886	2757	2905	2882
Vehs Exited	3035	2869	2916	2773	2937	2904
Starting Vehs	65	88	85	62	84	73
Ending Vehs	74	48	55	46	52	51
Travel Distance (mi)	1036	967	974	943	980	980
Travel Time (hr)	106.9	69.1	66.4	67.5	71.3	76.2
Total Delay (hr)	66.9	31.9	28.8	31.2	33.6	38.5
Total Stops	4295	3511	3483	3539	3661	3694
Fuel Used (gal)	52.9	42.3	42.1	41.4	43.3	44.4

Interval #0 Information Seeding

Start Time	7:10
End Time	7:15
Total Time (min)	5

Volumes adjusted by PHF, Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:15
End Time	7:30
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	844	770	797	749	791	790
Vehs Exited	771	767	801	726	777	769
Starting Vehs	65	88	85	62	84	73
Ending Vehs	138	91	81	85	98	98
Travel Distance (mi)	278	270	284	261	269	272
Travel Time (hr)	22.3	20.7	21.5	19.7	25.5	21.9
Total Delay (hr)	11.6	10.3	10.5	9.6	15.1	11.4
Total Stops	1115	1051	1135	1007	1185	1097
Fuel Used (gal)	12.6	12.0	12.8	11.7	13.3	12.5

Interval #2 Information Recording

Start Time	7:30
End Time	8:15
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2200	2059	2089	2008	2114	2095
Vehs Exited	2264	2102	2115	2047	2160	2137
Starting Vehs	138	91	81	85	98	98
Ending Vehs	74	48	55	46	52	51
Travel Distance (mi)	758	696	691	683	711	708
Travel Time (hr)	84.6	48.4	44.9	47.8	45.8	54.3
Total Delay (hr)	55.3	21.6	18.3	21.6	18.5	27.1
Total Stops	3180	2460	2348	2532	2476	2599
Fuel Used (gal)	40.3	30.4	29.4	29.7	30.1	32.0

Intersection: 48: E Pine St & 2nd

Movement	SE	NW	NE	NE	SW	SW
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	74	111	63	79	134	72
Average Queue (ft)	39	47	21	13	36	8
95th Queue (ft)	65	82	56	50	91	39
Link Distance (ft)	354	346		233	259	259
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			50			
Storage Blk Time (%)			1	0		
Queuing Penalty (veh)			2	1		

Intersection: 51: E Pine St & 1st

Movement	SE	NW	NE	SW	SW
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (ft)	69	96	178	124	112
Average Queue (ft)	25	43	27	28	13
95th Queue (ft)	56	75	107	83	59
Link Distance (ft)	313	295	221	233	233
Upstream Blk Time (%)			0		
Queuing Penalty (veh)			0		
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 54: E Pine St & Front

Movement	NB	NB	NB	SB	SB	SB	SB	NE	NE	NE	SW	SW
Directions Served	L	T	TR	L	T	T	R	L	T	R	L	T
Maximum Queue (ft)	210	218	226	129	202	165	84	182	324	125	156	234
Average Queue (ft)	96	85	76	41	101	53	35	85	285	103	83	138
95th Queue (ft)	185	193	173	95	179	133	67	153	331	168	146	257
Link Distance (ft)		316	316		327	327		222	222		221	221
Upstream Blk Time (%)		2	0					0	35			4
Queuing Penalty (veh)		4	0					0	154			8
Storage Bay Dist (ft)	200			200			150			100		
Storage Blk Time (%)	5	0			0	0			49	1		12
Queuing Penalty (veh)	6	0			0	0			103	4		21

Intersection: 54: E Pine St & Front

Movement	SW
Directions Served	TR
Maximum Queue (ft)	155
Average Queue (ft)	116
95th Queue (ft)	179
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	125
Storage Blk Time (%)	13
Queuing Penalty (veh)	12

Intersection: 57: E Pine St & Amy

Movement	NB	NE	NE	SW	SW
Directions Served	R	T	TR	T	TR
Maximum Queue (ft)	44	125	335	95	79
Average Queue (ft)	11	58	172	9	7
95th Queue (ft)	38	156	376	48	39
Link Distance (ft)	247		276	222	222
Upstream Blk Time (%)			7		
Queuing Penalty (veh)			62		
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	20		
Queuing Penalty (veh)		0	87		

Intersection: 60: E Pine St & Haskell St.

Movement	SE	SE	NW	NE	NE	SW	SW	SW
Directions Served	L	TR	LTR	L	TR	L	T	R
Maximum Queue (ft)	513	100	88	199	729	96	234	114
Average Queue (ft)	202	22	39	53	316	31	83	52
95th Queue (ft)	430	65	78	162	801	74	175	93
Link Distance (ft)	1332	1332	386		929		276	276
Upstream Blk Time (%)					9		0	
Queuing Penalty (veh)					0		0	
Storage Bay Dist (ft)				100		100		
Storage Blk Time (%)				0	33	0	5	
Queuing Penalty (veh)				2	17	1	2	

Intersection: 64: Front & Oak

Movement	NB	NB	SB	SB	SB	SW
Directions Served	T	TR	L	T	T	LR
Maximum Queue (ft)	56	18	64	45	25	137
Average Queue (ft)	4	1	20	2	1	43
95th Queue (ft)	30	9	52	21	11	90
Link Distance (ft)	491	491		316	316	194
Upstream Blk Time (%)						0
Queuing Penalty (veh)						0
Storage Bay Dist (ft)			50			
Storage Blk Time (%)			1	0		
Queuing Penalty (veh)			2	0		

Intersection: 66: Front & Manzanita

Movement	NB	NB	SB	SB	SW
Directions Served	T	TR	L	T	LR
Maximum Queue (ft)	27	25	35	34	51
Average Queue (ft)	1	1	4	2	27
95th Queue (ft)	12	13	22	14	52
Link Distance (ft)	327	327		421	184
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 490

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:10	7:10	7:10	7:10	7:10	7:10
End Time	8:15	8:15	8:15	8:15	8:15	8:15
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	3	3	3	3	3	3
# of Recorded Intervals	2	2	2	2	2	2
Vehs Entered	2873	2890	2923	2917	2967	2913
Vehs Exited	2901	2896	2923	2925	2969	2923
Starting Vehs	77	72	56	55	65	62
Ending Vehs	49	66	56	47	63	55
Travel Distance (mi)	970	972	964	974	996	975
Travel Time (hr)	59.0	58.7	58.4	61.3	61.5	59.8
Total Delay (hr)	21.8	21.1	21.3	23.7	23.1	22.2
Total Stops	2987	3065	3060	3155	3138	3081
Fuel Used (gal)	40.2	40.2	40.2	41.0	41.6	40.6

Interval #0 Information Seeding

Start Time	7:10
End Time	7:15
Total Time (min)	5

Volumes adjusted by PHF, Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:15
End Time	7:30
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	780	755	804	828	841	800
Vehs Exited	780	766	796	801	835	797
Starting Vehs	77	72	56	55	65	62
Ending Vehs	77	61	64	82	71	65
Travel Distance (mi)	272	259	275	283	290	276
Travel Time (hr)	17.9	16.5	17.4	19.5	19.6	18.2
Total Delay (hr)	7.5	6.5	6.8	8.6	8.5	7.6
Total Stops	908	880	953	1004	1000	949
Fuel Used (gal)	11.6	11.1	11.7	12.4	12.5	11.9

Interval #2 Information Recording

Start Time	7:30
End Time	8:15
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2093	2135	2119	2089	2126	2111
Vehs Exited	2121	2130	2127	2124	2134	2126
Starting Vehs	77	61	64	82	71	65
Ending Vehs	49	66	56	47	63	55
Travel Distance (mi)	698	713	689	691	707	700
Travel Time (hr)	41.1	42.2	41.1	41.8	41.9	41.6
Total Delay (hr)	14.3	14.6	14.5	15.1	14.6	14.6
Total Stops	2079	2185	2107	2151	2138	2131
Fuel Used (gal)	28.7	29.1	28.5	28.5	29.0	28.8

Intersection: 48: E Pine St & 2nd

Movement	SE	NW	NE	NE	SW	SW
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	95	88	86	84	91	69
Average Queue (ft)	38	42	23	8	27	6
95th Queue (ft)	71	69	61	42	69	34
Link Distance (ft)	354	346	234	234	259	259
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 51: E Pine St & 1st

Movement	SE	NW	NE	NE	SW	SW
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	63	83	70	60	113	119
Average Queue (ft)	26	38	12	4	20	11
95th Queue (ft)	57	69	46	30	71	67
Link Distance (ft)	319	288	222	222	234	234
Upstream Blk Time (%)					0	0
Queuing Penalty (veh)					0	0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 54: E Pine St & Front

Movement	NB	NB	NB	SB	SB	SB	SB	NE	NE	NE	SW	SW
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	T
Maximum Queue (ft)	175	167	152	131	168	129	84	199	280	286	198	231
Average Queue (ft)	81	70	64	38	80	38	33	87	145	198	78	122
95th Queue (ft)	148	134	123	91	145	98	65	168	240	295	147	239
Link Distance (ft)		318	318		328	328			223	223	222	222
Upstream Blk Time (%)									1	7	0	3
Queuing Penalty (veh)									6	29	0	7
Storage Bay Dist (ft)	200			200			150	100				
Storage Blk Time (%)	0	0			0	0		4	20			8
Queuing Penalty (veh)	0	0			0	0		10	37			15

Intersection: 54: E Pine St & Front

Movement	SW
Directions Served	TR
Maximum Queue (ft)	150
Average Queue (ft)	110
95th Queue (ft)	178
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	125
Storage Blk Time (%)	13
Queuing Penalty (veh)	12

Intersection: 57: E Pine St & Amy

Movement	NB	NE	NE	SW	SW
Directions Served	R	T	TR	T	TR
Maximum Queue (ft)	39	79	102	55	54
Average Queue (ft)	6	11	13	4	3
95th Queue (ft)	27	46	57	28	23
Link Distance (ft)	241	276	276	223	223
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 60: E Pine St & Haskell St.

Movement	SE	SE	NW	NE	NE	SW	SW	SW
Directions Served	L	TR	LTR	L	TR	L	T	R
Maximum Queue (ft)	227	54	82	171	302	100	169	124
Average Queue (ft)	127	17	32	39	128	30	65	49
95th Queue (ft)	200	44	65	114	236	72	137	99
Link Distance (ft)	1331	1331	373		929		276	276
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)				100		100		
Storage Blk Time (%)				0	11	0	3	
Queuing Penalty (veh)				1	6	0	1	

Intersection: 64: Front & Oak

Movement	NB	NB	SB	SB	SB	SW
Directions Served	T	TR	L	T	T	LR
Maximum Queue (ft)	19	14	50	25	21	87
Average Queue (ft)	1	0	17	1	1	38
95th Queue (ft)	8	7	46	17	9	67
Link Distance (ft)	491	491		318	318	194
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			50			
Storage Blk Time (%)			0	0		
Queuing Penalty (veh)			1	0		

Intersection: 66: Front & Manzanita

Movement	NB	NB	SB	SB	SB	SW
Directions Served	T	TR	L	T	T	LR
Maximum Queue (ft)	21	27	35	21	7	64
Average Queue (ft)	1	1	3	1	0	29
95th Queue (ft)	12	12	19	10	5	57
Link Distance (ft)	328	328		421	421	184
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			100			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 125

HCM Signalized Intersection Capacity Analysis
60: E Pine St & Haskell St.

03/12/2017

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	405	16	50	1	12	109	50	375	16	38	160	185
Future Volume (vph)	405	16	50	1	12	109	50	375	16	38	160	185
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.96			0.97		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	0.99	1.00			1.00		1.00	1.00		0.98	1.00	1.00
Frt	1.00	0.89			0.88		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1617	1471			1471		1623	1685		1622	1549	1406
Flt Permitted	0.71	1.00			1.00		0.61	1.00		0.27	1.00	1.00
Satd. Flow (perm)	1203	1471			1471		1043	1685		467	1549	1406
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	476	19	59	1	14	128	59	441	19	45	188	218
RTOR Reduction (vph)	0	28	0	0	61	0	0	1	0	0	0	140
Lane Group Flow (vph)	476	50	0	0	82	0	59	459	0	45	188	78
Confl. Peds. (#/hr)	7		25	25		7	3		40	40		3
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	2%	0%	2%	0%	0%	2%	2%	3%	0%	0%	13%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4			8			6			2		2
Actuated Green, G (s)	35.8	35.8			35.8		24.5	24.5		24.5	24.5	24.5
Effective Green, g (s)	35.8	35.8			35.8		24.5	24.5		24.5	24.5	24.5
Actuated g/C Ratio	0.52	0.52			0.52		0.36	0.36		0.36	0.36	0.36
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.5	2.5			2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	630	771			771		374	604		167	555	504
v/s Ratio Prot		0.03						c0.27			0.12	
v/s Ratio Perm	c0.40				0.06		0.06			0.10		0.06
v/c Ratio	0.76	0.06			0.11		0.16	0.76		0.27	0.34	0.16
Uniform Delay, d1	12.8	8.0			8.2		14.9	19.3		15.5	16.0	14.9
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.9	0.0			0.0		0.1	5.2		0.6	0.3	0.1
Delay (s)	17.7	8.0			8.2		15.0	24.5		16.2	16.3	15.0
Level of Service	B	A			A		B	C		B	B	B
Approach Delay (s)		16.3			8.2			23.4			15.6	
Approach LOS		B			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	68.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
60: E Pine St & Haskell St.

03/12/2017

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	405	16	50	1	12	109	50	375	16	38	160	185
Future Volume (vph)	405	16	50	1	12	109	50	375	16	38	160	185
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.96			0.98		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		0.98	1.00	1.00
Frt	1.00	0.89			0.88		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1622	1471			1487		1623	1685		1622	1549	1406
Flt Permitted	0.71	1.00			1.00		0.61	1.00		0.27	1.00	1.00
Satd. Flow (perm)	1207	1471			1486		1044	1685		468	1549	1406
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	476	19	59	1	14	128	59	441	19	45	188	218
RTOR Reduction (vph)	0	28	0	0	61	0	0	1	0	0	0	140
Lane Group Flow (vph)	476	50	0	0	82	0	59	459	0	45	188	78
Confl. Peds. (#/hr)	7		25	25		7	3		40	40		3
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	2%	0%	2%	0%	0%	2%	2%	3%	0%	0%	13%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4			8			6			2		2
Actuated Green, G (s)	35.6	35.6			35.6		24.4	24.4		24.4	24.4	24.4
Effective Green, g (s)	35.6	35.6			35.6		24.4	24.4		24.4	24.4	24.4
Actuated g/C Ratio	0.52	0.52			0.52		0.36	0.36		0.36	0.36	0.36
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.5	2.5			2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	631	770			777		374	604		167	555	504
v/s Ratio Prot		0.03						c0.27			0.12	
v/s Ratio Perm	c0.39				0.06		0.06			0.10		0.06
v/c Ratio	0.75	0.06			0.11		0.16	0.76		0.27	0.34	0.16
Uniform Delay, d1	12.8	8.0			8.2		14.8	19.2		15.5	15.9	14.8
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.9	0.0			0.0		0.1	5.2		0.6	0.3	0.1
Delay (s)	17.6	8.0			8.2		15.0	24.4		16.1	16.2	14.9
Level of Service	B	A			A		B	C		B	B	B
Approach Delay (s)		16.3			8.2			23.3			15.6	
Approach LOS		B			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	17.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	68.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:10	7:10	7:10	7:10	7:10	7:10
End Time	8:15	8:15	8:15	8:15	8:15	8:15
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	3	3	3	3	3	3
# of Recorded Intervals	2	2	2	2	2	2
Vehs Entered	2958	2951	2866	2933	2785	2897
Vehs Exited	2956	2973	2900	2954	2798	2917
Starting Vehs	65	78	106	85	75	79
Ending Vehs	67	56	72	64	62	63
Travel Distance (mi)	994	1009	971	996	948	984
Travel Time (hr)	74.5	78.6	78.3	82.8	61.5	75.1
Total Delay (hr)	36.2	39.5	40.9	44.3	25.1	37.2
Total Stops	3789	3899	3772	4081	3248	3759
Fuel Used (gal)	44.4	45.9	44.9	46.6	40.0	44.4

Interval #0 Information Seeding

Start Time	7:10
End Time	7:15
Total Time (min)	5

Volumes adjusted by PHF, Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:15
End Time	7:30
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	808	779	774	772	743	777
Vehs Exited	769	740	766	734	761	753
Starting Vehs	65	78	106	85	75	79
Ending Vehs	104	117	114	123	57	99
Travel Distance (mi)	272	268	263	261	268	266
Travel Time (hr)	23.4	26.1	27.1	25.7	18.3	24.1
Total Delay (hr)	13.0	15.7	17.0	15.7	8.1	13.9
Total Stops	1137	1189	1197	1221	992	1143
Fuel Used (gal)	12.9	13.4	13.6	13.2	11.5	12.9

Interval #2 Information Recording

Start Time	7:30
End Time	8:15
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2150	2172	2092	2161	2042	2122
Vehs Exited	2187	2233	2134	2220	2037	2164
Starting Vehs	104	117	114	123	57	99
Ending Vehs	67	56	72	64	62	63
Travel Distance (mi)	722	741	708	735	680	717
Travel Time (hr)	51.0	52.5	51.1	57.1	43.2	51.0
Total Delay (hr)	23.2	23.8	23.9	28.6	17.0	23.3
Total Stops	2652	2710	2575	2860	2256	2607
Fuel Used (gal)	31.6	32.5	31.2	33.4	28.5	31.4

Intersection: 48: E Pine St & 2nd

Movement	SE	NW	NE	NE	SW	SW
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	90	119	67	101	94	48
Average Queue (ft)	39	47	23	13	30	5
95th Queue (ft)	71	84	56	56	75	28
Link Distance (ft)	354	346		233	259	259
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			50			
Storage Blk Time (%)			1	1		
Queuing Penalty (veh)			1	2		

Intersection: 51: E Pine St & 1st

Movement	SE	NW	NE	SW	SW
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (ft)	59	123	177	119	137
Average Queue (ft)	25	43	29	30	17
95th Queue (ft)	54	88	114	89	79
Link Distance (ft)	313	295	221	233	233
Upstream Blk Time (%)			0		0
Queuing Penalty (veh)			0		0
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 54: E Pine St & Front

Movement	NB	NB	NB	SB	SB	SB	SB	NE	NE	NE	SW	SW
Directions Served	L	T	TR	L	T	T	R	L	T	R	L	T
Maximum Queue (ft)	185	189	176	109	194	162	80	174	322	125	185	232
Average Queue (ft)	92	79	71	39	96	49	34	84	281	99	87	140
95th Queue (ft)	172	147	138	87	166	126	68	151	339	167	150	258
Link Distance (ft)		316	316		327	327		222	222		221	221
Upstream Blk Time (%)									36		0	4
Queuing Penalty (veh)									165		0	9
Storage Bay Dist (ft)	200			200			150			100		
Storage Blk Time (%)	0	0			0	0			49	1		10
Queuing Penalty (veh)	1	0			0	0			105	6		18

Intersection: 54: E Pine St & Front

Movement	SW
Directions Served	TR
Maximum Queue (ft)	157
Average Queue (ft)	116
95th Queue (ft)	183
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	125
Storage Blk Time (%)	17
Queuing Penalty (veh)	14

Intersection: 57: E Pine St & Amy

Movement	NB	NE	NE	SW	SW
Directions Served	R	T	TR	T	TR
Maximum Queue (ft)	49	125	333	116	108
Average Queue (ft)	12	53	195	15	10
95th Queue (ft)	44	149	390	68	61
Link Distance (ft)	247		276	222	222
Upstream Blk Time (%)			8		
Queuing Penalty (veh)			76		
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	23		
Queuing Penalty (veh)		0	105		

Intersection: 60: E Pine St & Haskell St.

Movement	SE	SE	NW	NE	NE	SW	SW	SW
Directions Served	L	TR	LTR	L	TR	L	T	R
Maximum Queue (ft)	563	176	111	200	741	136	230	168
Average Queue (ft)	217	20	48	69	292	38	80	53
95th Queue (ft)	472	111	92	188	697	95	174	112
Link Distance (ft)	1332	1332	386		929		276	276
Upstream Blk Time (%)					2		0	
Queuing Penalty (veh)					0		0	
Storage Bay Dist (ft)				100		100		
Storage Blk Time (%)				0	36	0	6	
Queuing Penalty (veh)				1	19	0	3	

Intersection: 64: Front & Oak

Movement	NB	NB	SB	SB	SB	SW
Directions Served	T	TR	L	T	T	LR
Maximum Queue (ft)	34	26	54	20	21	100
Average Queue (ft)	1	1	20	1	1	40
95th Queue (ft)	14	10	50	10	10	74
Link Distance (ft)	491	491		316	316	194
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			50			
Storage Blk Time (%)			0	0		
Queuing Penalty (veh)			1	0		

Intersection: 66: Front & Manzanita

Movement	NB	NB	SB	SB	SB	SW
Directions Served	T	TR	L	T	T	LR
Maximum Queue (ft)	30	49	39	27	13	75
Average Queue (ft)	1	2	4	1	0	31
95th Queue (ft)	16	19	23	11	7	59
Link Distance (ft)	327	327		421	421	184
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			100			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 527

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:10	7:10	7:10	7:10	7:10	7:10
End Time	8:15	8:15	8:15	8:15	8:15	8:15
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	3	3	3	3	3	3
# of Recorded Intervals	2	2	2	2	2	2
Vehs Entered	2956	2874	2876	3039	3063	2961
Vehs Exited	2979	2899	2874	3047	3111	2982
Starting Vehs	80	70	60	76	89	71
Ending Vehs	57	45	62	68	41	51
Travel Distance (mi)	1000	970	956	1020	1033	996
Travel Time (hr)	61.7	61.0	57.7	63.9	64.7	61.8
Total Delay (hr)	23.1	23.6	21.1	24.7	24.8	23.4
Total Stops	3208	3174	3028	3297	3406	3221
Fuel Used (gal)	41.6	40.9	39.5	43.2	43.5	41.8

Interval #0 Information Seeding

Start Time	7:10
End Time	7:15
Total Time (min)	5

Volumes adjusted by PHF, Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:15
End Time	7:30
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	811	785	775	859	819	810
Vehs Exited	814	790	783	873	808	812
Starting Vehs	80	70	60	76	89	71
Ending Vehs	77	65	52	62	100	67
Travel Distance (mi)	284	273	270	297	286	282
Travel Time (hr)	19.0	17.9	16.8	20.5	18.9	18.6
Total Delay (hr)	8.2	7.5	6.4	9.1	7.9	7.8
Total Stops	1006	933	897	1068	980	978
Fuel Used (gal)	12.3	11.8	11.6	13.0	12.2	12.2

Interval #2 Information Recording

Start Time	7:30
End Time	8:15
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2145	2089	2101	2180	2244	2153
Vehs Exited	2165	2109	2091	2174	2303	2169
Starting Vehs	77	65	52	62	100	67
Ending Vehs	57	45	62	68	41	51
Travel Distance (mi)	717	698	686	724	748	714
Travel Time (hr)	42.6	43.1	40.9	43.4	45.8	43.2
Total Delay (hr)	14.9	16.2	14.7	15.6	16.9	15.6
Total Stops	2202	2241	2131	2229	2426	2243
Fuel Used (gal)	29.3	29.1	28.0	30.2	31.3	29.6

Intersection: 48: E Pine St & 2nd

Movement	SE	NW	NE	NE	SW	SW
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	65	75	90	87	94	61
Average Queue (ft)	36	39	28	9	30	5
95th Queue (ft)	55	64	71	45	74	31
Link Distance (ft)	354	346	234	234	259	259
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 51: E Pine St & 1st

Movement	SE	NW	NE	NE	SW	SW
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	50	87	78	83	85	97
Average Queue (ft)	25	40	12	6	20	11
95th Queue (ft)	53	71	51	35	61	51
Link Distance (ft)	319	288	222	222	234	234
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 54: E Pine St & Front

Movement	NB	NB	NB	SB	SB	SB	SB	NE	NE	NE	SW	SW
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	T
Maximum Queue (ft)	188	172	154	104	178	148	90	199	270	291	170	234
Average Queue (ft)	82	78	69	37	79	38	35	88	159	214	81	127
95th Queue (ft)	147	146	126	81	142	103	71	177	260	309	146	238
Link Distance (ft)		318	318		328	328			223	223	222	222
Upstream Blk Time (%)									2	10		3
Queuing Penalty (veh)									9	44		5
Storage Bay Dist (ft)	200			200			150	100				
Storage Blk Time (%)	0	0			0	0		3	21			8
Queuing Penalty (veh)	0	0			0	0		9	40			15

Intersection: 54: E Pine St & Front

Movement	SW
Directions Served	TR
Maximum Queue (ft)	152
Average Queue (ft)	117
95th Queue (ft)	177
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	125
Storage Blk Time (%)	14
Queuing Penalty (veh)	13

Intersection: 57: E Pine St & Amy

Movement	NB	NE	NE	SW	SW
Directions Served	R	T	TR	T	TR
Maximum Queue (ft)	35	88	111	41	43
Average Queue (ft)	5	11	20	3	3
95th Queue (ft)	24	52	77	22	19
Link Distance (ft)	241	276	276	223	223
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 60: E Pine St & Haskell St.

Movement	SE	SE	NW	NE	NE	SW	SW	SW
Directions Served	L	TR	LTR	L	TR	L	T	R
Maximum Queue (ft)	324	64	100	141	311	70	191	114
Average Queue (ft)	143	19	38	33	136	27	73	52
95th Queue (ft)	254	48	76	85	246	63	148	95
Link Distance (ft)	1331	1331	373		929		276	276
Upstream Blk Time (%)							0	
Queuing Penalty (veh)							0	
Storage Bay Dist (ft)				100		100		
Storage Blk Time (%)				0	12		3	
Queuing Penalty (veh)				1	6		1	

Intersection: 64: Front & Oak

Movement	NB	SB	SB	SB	SW
Directions Served	TR	L	T	T	LR
Maximum Queue (ft)	6	52	25	29	75
Average Queue (ft)	0	18	1	2	38
95th Queue (ft)	4	48	12	18	62
Link Distance (ft)	491		318	318	194
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		50			
Storage Blk Time (%)		0	0		
Queuing Penalty (veh)		1	0		

Intersection: 66: Front & Manzanita

Movement	NB	NB	SB	SB	SB	SW
Directions Served	T	TR	L	T	T	LR
Maximum Queue (ft)	19	35	35	27	21	64
Average Queue (ft)	1	2	4	1	1	30
95th Queue (ft)	11	19	22	11	10	53
Link Distance (ft)	328	328		421	421	184
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			100			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 143

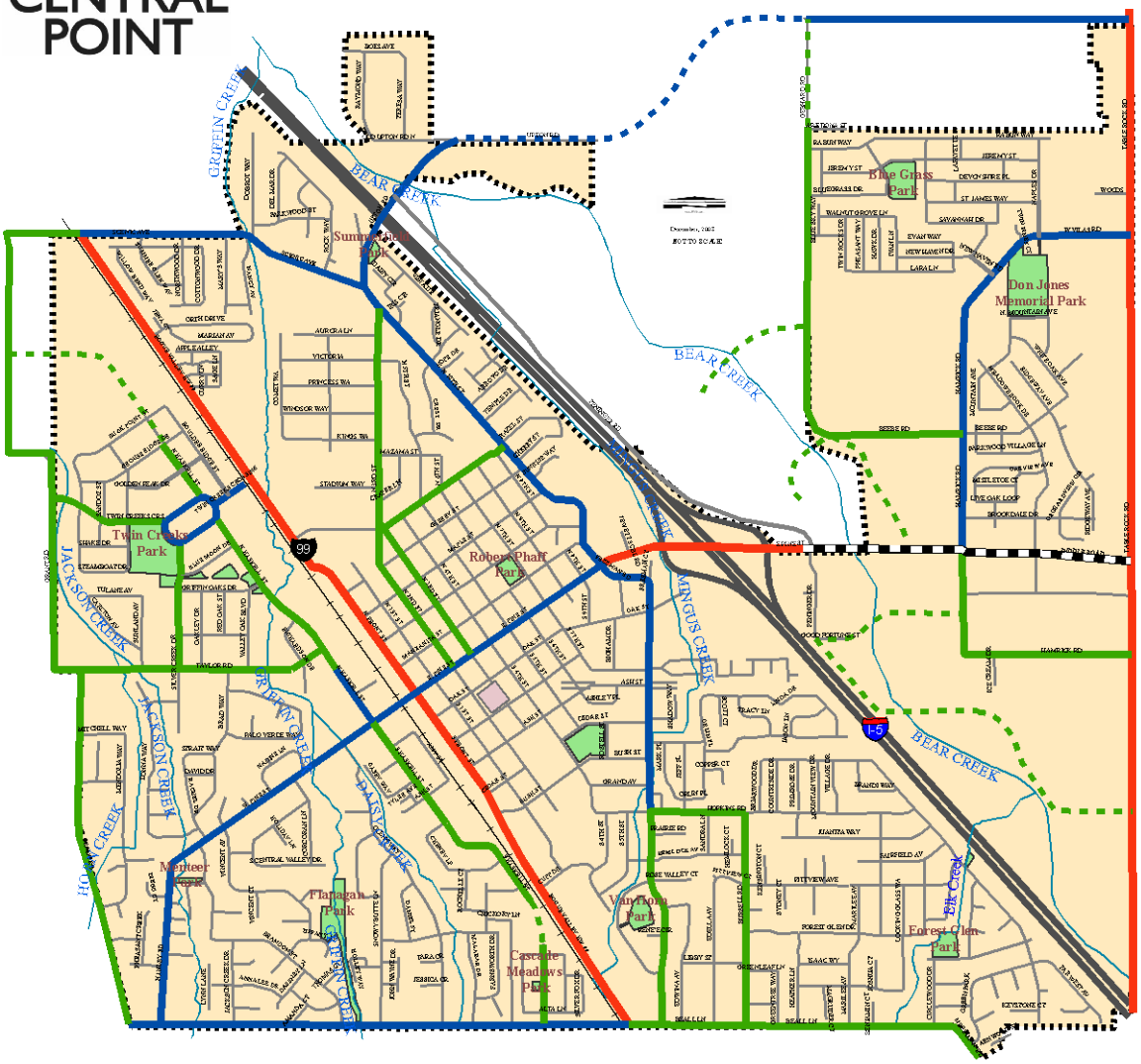
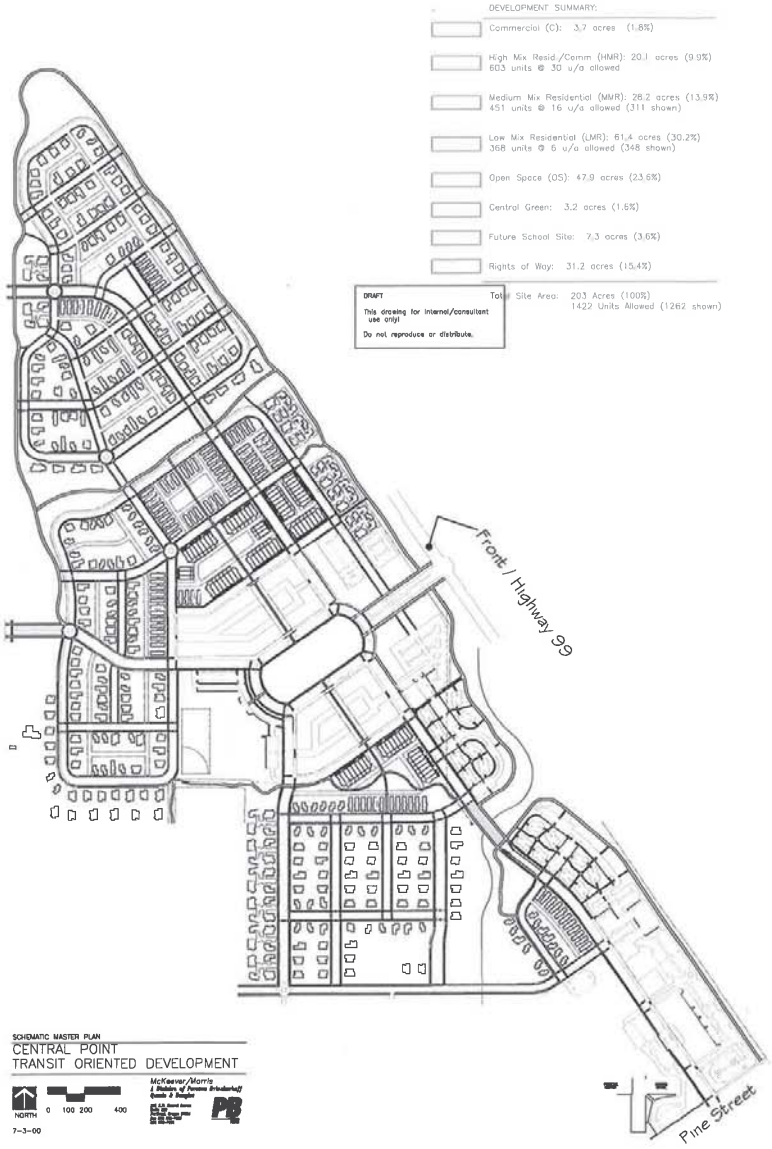
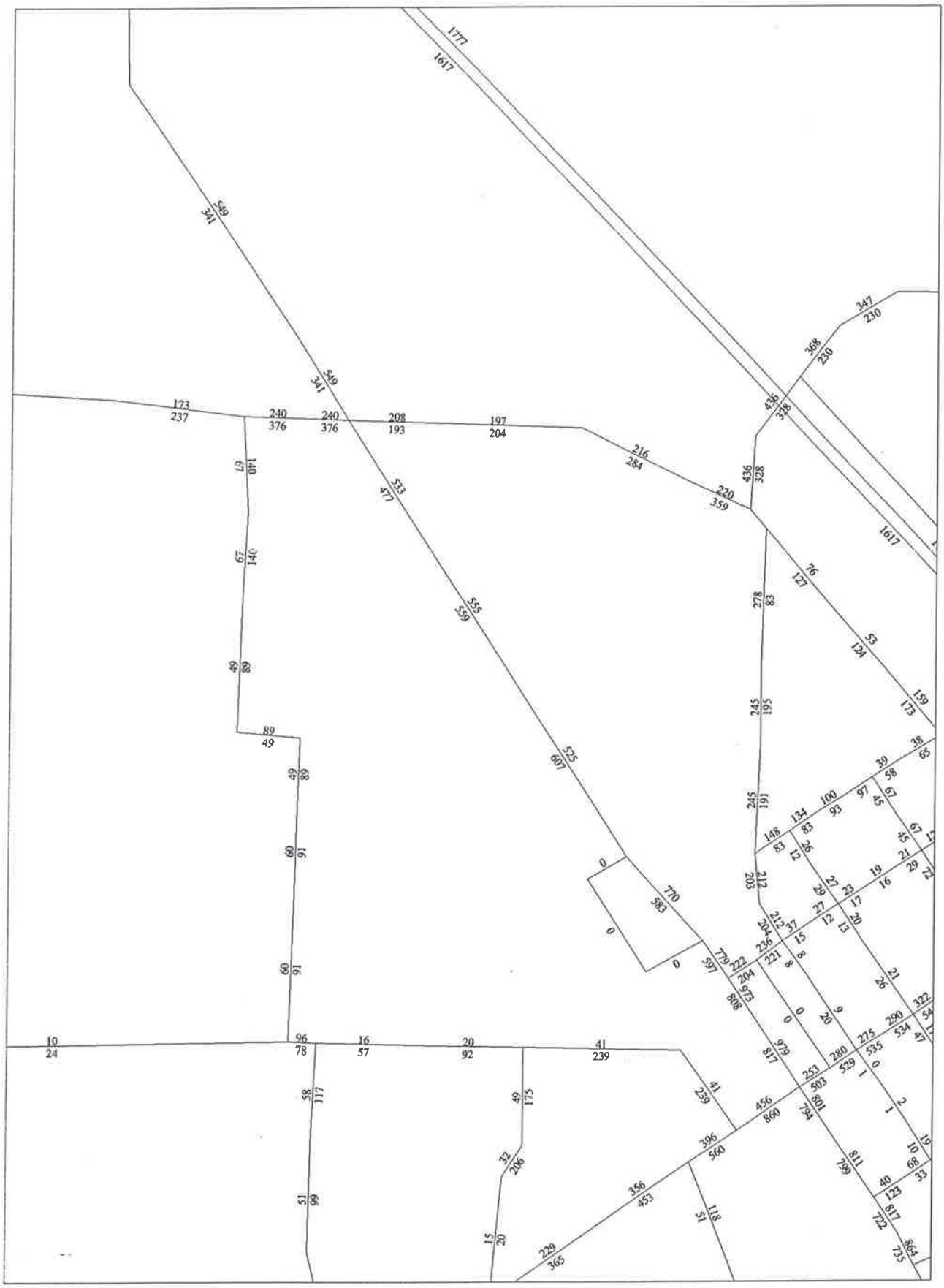


Figure 7.1
Functional Classification & Street Network Map
2008-2030

Figure 14

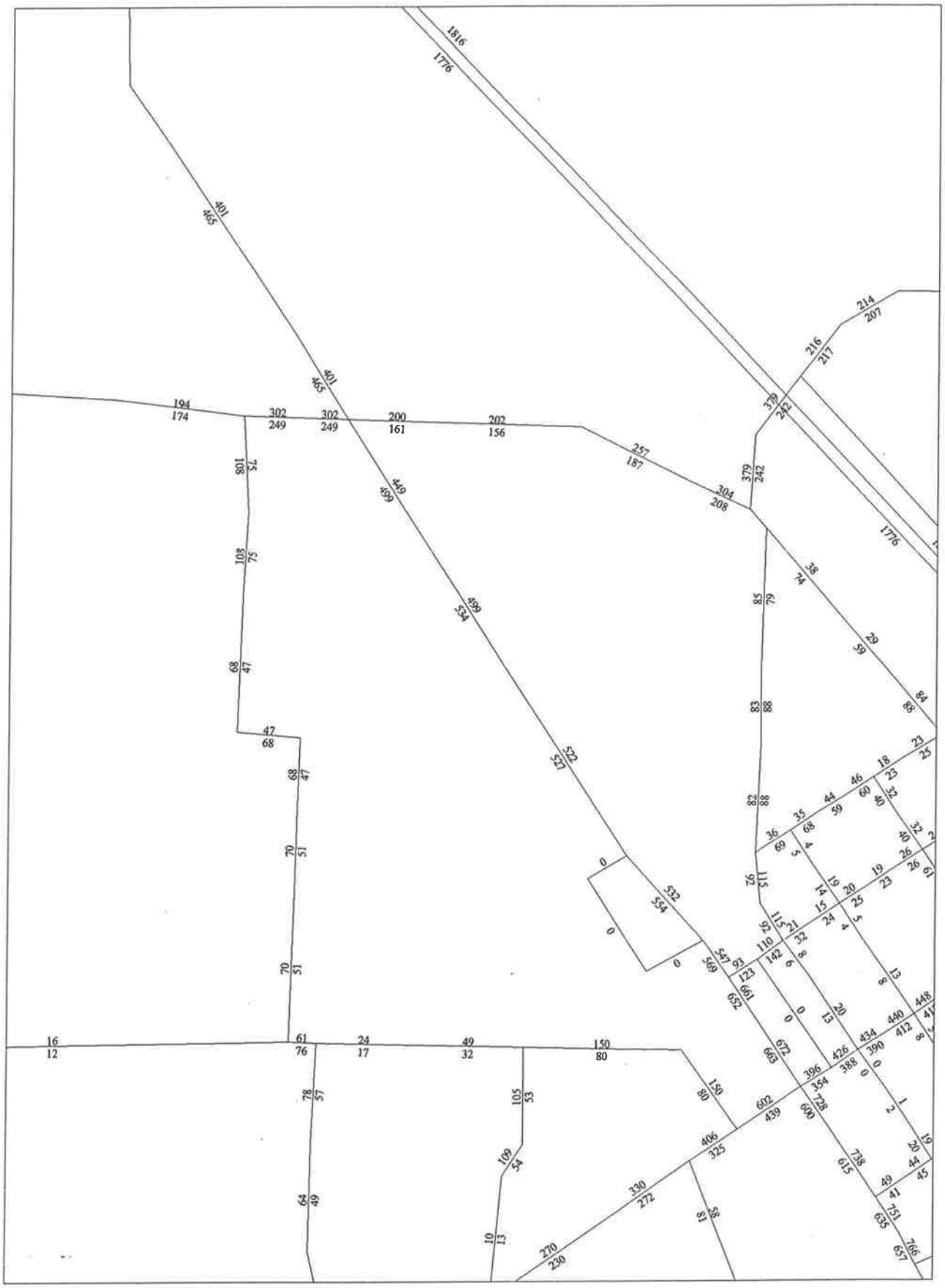
Central Point Transit Oriented Development





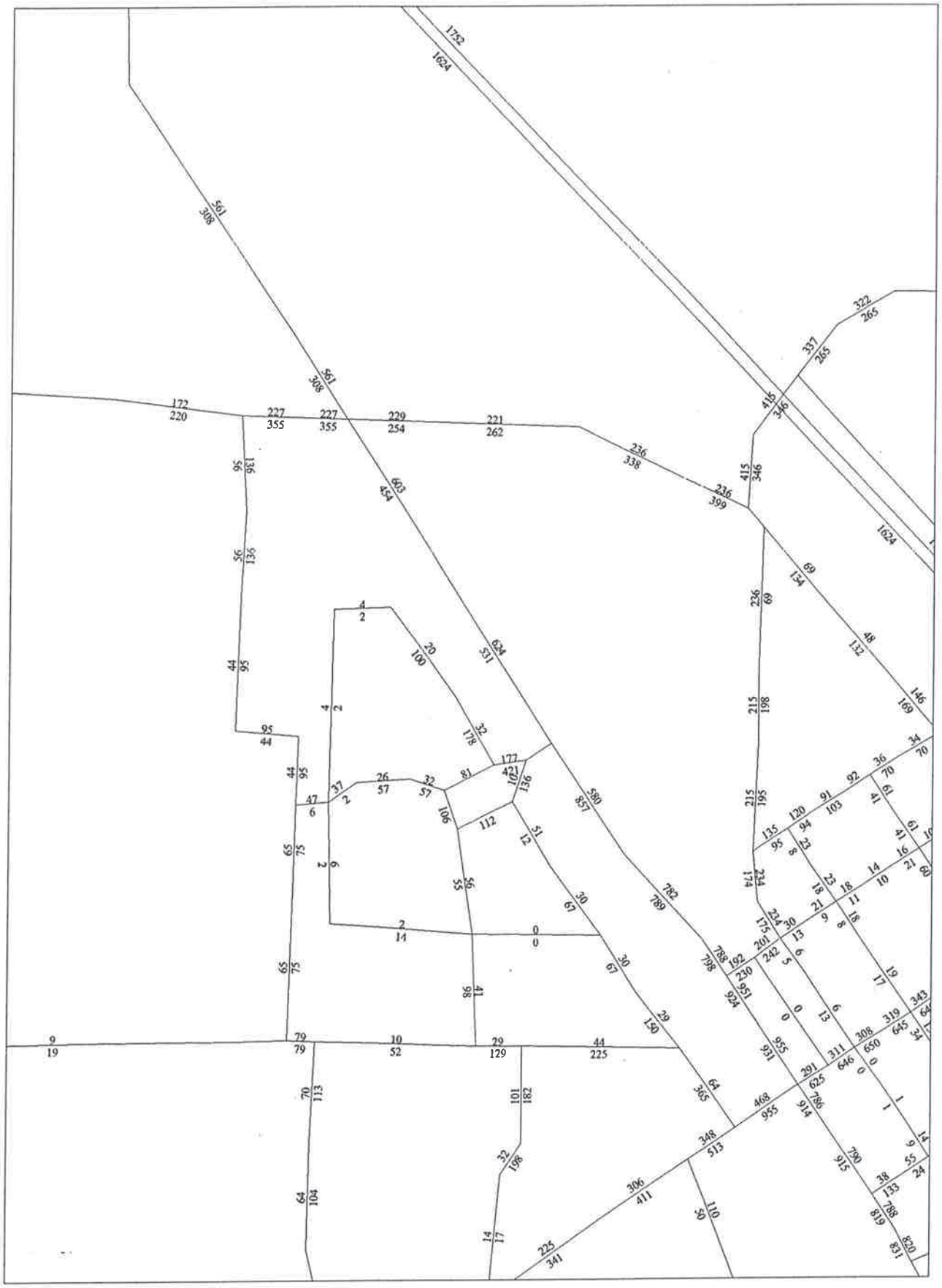
Scenario 150 (2020 Committed with Updated P&A)

2020 no-build AM



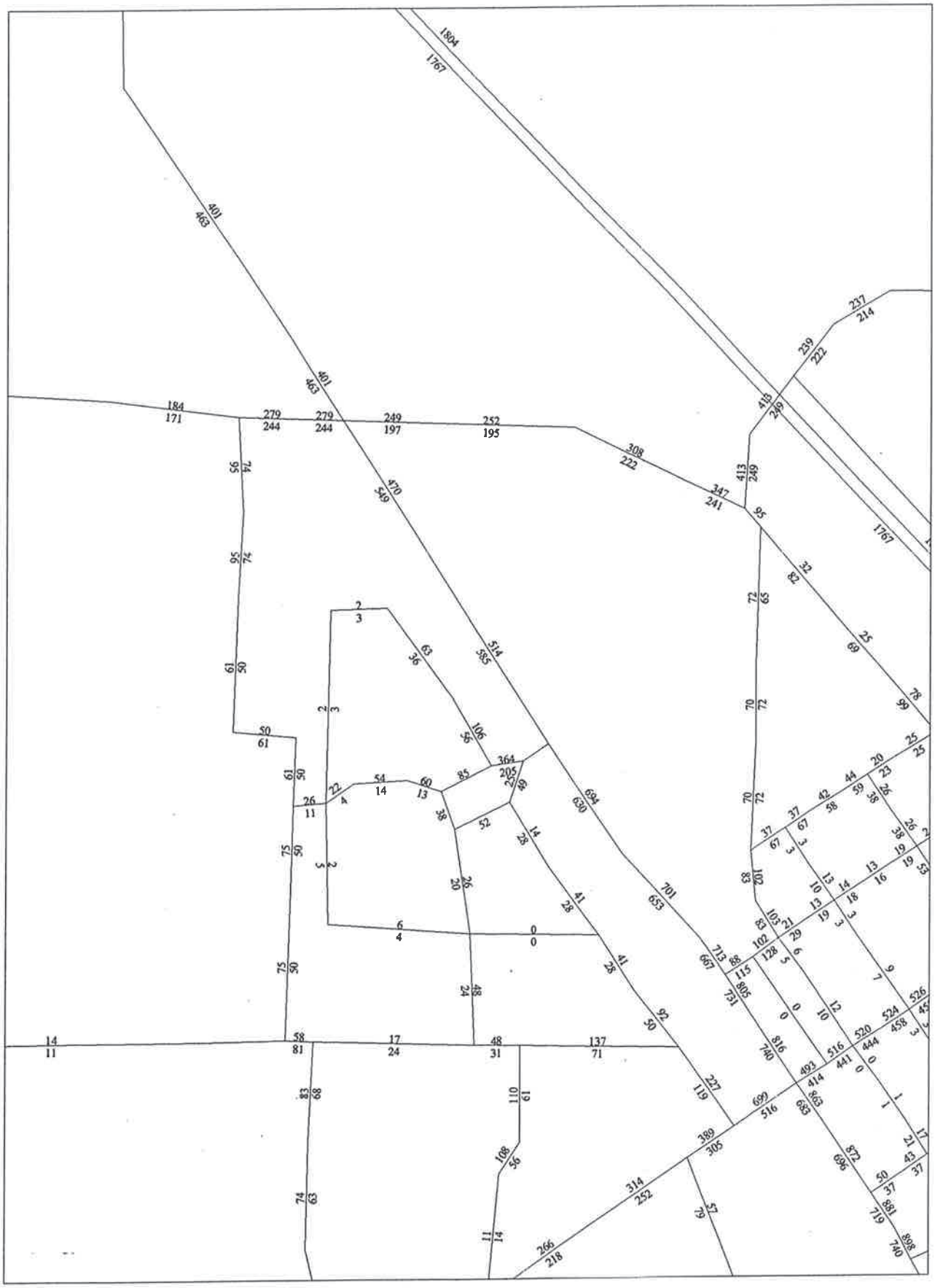
Scenario 150 (2020 Committed with Updated P&A)

2020 no-build PM



Scenario 550 (2020 Detailed Network)

2020 Build AM



Scenario 550 (2020 Detailed Network)

2020 Build PM