

Traffic Analysis Methods and Assumptions: City of Vernonia Transportation System Plan Update

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DATE: December 17, 2010

This memorandum, a required deliverable of the project, refers the Project Management Team and Project Advisory Committee and others to the description of traffic analysis methods and assumptions contained in Technical Memorandums #2 (Existing Conditions and Needs) and #4 (Future Conditions and Needs). The descriptions will not be repeated here, nor attachment of the appendixes to these memorandums, as that would be unnecessarily redundant. The methods and assumptions for the project's traffic analysis were developed through a series of e-mails between the staff of CH2M HILL and ODOT, as listed above. These e-mails are attached to this memorandum to provide a record of the decision-making and approval process.

Addressed in TMs #2 and #4 are:

- Study Intersections and Analysis Time Period
- Seasonal and Growth Adjustments (detailed calculations are in the TM appendixes)
- Performance and Mobility Standards
- Traffic Analysis Software Tools

Weymouth, Larry/CVO

From: Johnson, Joshua/SEA
Sent: Friday, October 08, 2010 2:09 PM
To: Lingley, Terra/PDX
Cc: Weymouth, Larry/CVO; Stone, Celena/PDX; Houghton, Tegan/PDX
Subject: FW: City of Vernonia TSP - Existing Traffic Analysis Assumptions
Attachments: 30HV.xls

Follow Up Flag: Follow up
Flag Status: Completed

FYI

From: BAUMGARTNER Douglas G [mailto:Douglas.G.BAUMGARTNER@odot.state.or.us]
Sent: Friday, October 08, 2010 2:04 PM
To: Johnson, Joshua/SEA
Cc: BRUMLEY Seth A
Subject: RE: City of Vernonia TSP - Existing Traffic Analysis Assumptions

Good afternoon Josh,

Thanks for the in-depth inquiry. I had to recheck a few of my earlier calculations and assumptions based on newly available 2009 data and this further confirmed my original conclusions. In general we are not comfortable using counts from November through January. We were informed that the Vernonia Schools Relocation Project was on a tight schedule and so we agreed to let them use December counts that would be seasonally adjusted to May volumes to meet school conditions. However, using ATR 03-013 the adjustment would be less than 30% and in consideration that these are just for two neighborhood local connections the December counts should be fine to be adjusted and used in the update.

The 4:00 - 5:00 pm peak hour was common to the School Relocation and WOEC reports and so this should be an acceptable system peak hour.

The OR47 crash record for mile point 61 - 63 had 46 recorded crashes between 2000 and 2009 that were fairly uniform in distribution, included a number of fixed object hits, a few pedestrian and animal hits, and a number of parking maneuver hits. There were a good number of rear end hits but few turning and crossing hits. The scope of work for the TSP Update did not include a crash analysis and from the brief overview of the crash history on the highway I do not believe that a focused crash analysis would be of significant value to the update.

OR47 volumes on Rock Creek Bridge and near State Avenue are always higher than the recorded volumes to the east and west which average below 4500 ADT. ATR 03-013 represents an agricultural trend that I believe would be appropriate for the type of facility and route with the character of areas it serves, however, a commuter trend could be applied to intersections that are off of the highway. ATR 03-013 should be well suited to adjust the background seasonal adjustment in highway traffic.

The R-squared values from the Future Volumes Table are poor for this area and so I prepared a 10-year summary of ODOT Traffic Volume Table data to compare the growth and came up with an average of 1% yearly growth rate (1.01 annual factor). This was the same assumption used in the Schools Relocation report. I have attached the spreadsheet that I have used for your convenience. Please let me know if you have any other questions or need any other data for the TSP update.

Thanks,

Doug

Douglas Baumgartner, E.I.T.
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From: Joshua.Johnson@CH2M.com [mailto:Joshua.Johnson@CH2M.com]
Sent: Wednesday, October 06, 2010 4:35 PM
To: BAUMGARTNER Douglas G
Cc: Celena.Stone@CH2M.com; Larry.Weymouth@CH2M.com; Terra.Lingley@ch2m.com; Tegan.Houghton@CH2M.com
Subject: City of Vernonia TSP - Existing Traffic Analysis Assumptions

Hi Doug,

My name is Joshua Johnson and I work for CH2M HILL and will be helping out with the traffic analysis for the City of Vernonia Transportation System Plan Update. I've been getting myself up to speed on the project and digging into the analysis details of the project. I'm hoping you can help guide me through some traffic analysis assumptions and project details before we progress too far with the existing conditions analysis. I've tried to put my key questions in ***Bold Italics***.

Based on the information I've received, we're analyzing the following 10 intersections:

ID	Intersection	PM Peak Hour Count Interval	PM Date of Count
1	Bridge St/Missouri Avenue	3:00 PM - 6:00 PM	12/2/2009
2	Maple Street/Rose Avenue	3:00 PM - 5:00 PM	3/10/2010
3	Maple Street/Weed Avenue	3:00 PM - 5:00 PM	3/10/2010
4	Bridge Street/Rose Avenue	3:00 PM - 5:00 PM	3/10/2010
5	Bridge Street/Weed Avenue	3:00 PM - 5:00 PM	3/10/2010
6	Cougar Street/Rose Avenue	3:00 PM - 5:00 PM	3/10/2010
7	Bridge Street/State Avenue	4:00 PM - 6:00 PM	4/15/2008
8	Stoney Point/State Avenue	4:00 PM - 6:00 PM	4/15/2008
9	Bridge Street/Riverside Drive	4:00 PM - 6:00 PM	4/24/2008
10	Bridge Street/Texas Avenue	2:30 PM - 6:00 PM	12/2/2009

All of these study intersections were analyzed in some form or another over the past three years in various studies. After looking over the historic count data, two items stand out as potential issues:

1. Two of the counts were conducted in December 2009 for the Vernonia School Campus TIA. ***Are you comfortable using traffic counts from December to conduct the analysis, even though the APM indicates we should not use counts collected in November, December, and January?***
2. As noted above, the PM peak hour counts were collected between 2:30 PM and 6:00 PM, with varying count hours. Unfortunately, there is only one common hour between all the counts to determine the system peak hour, 4:00 PM – 5:00 PM. ***What are your thoughts in using this hour as the system peak? Do we need to collect more data so that we have a wider range to select our system peak hour?***

I've also started looking at seasonal adjustment factors for the study area. Based on my review of previous documentation and the data available, it appears that we should not use the On-site ATR method but the ATR characteristics table. My initial assessment was to use site 27-005 (commuter, rural, 2 lane, 7,000 ADT, regional

highway) as our representative site; however, after reading through the WOEC HQ Facility TIA (DEA, May, 2010), it appears ATR site 03-013 was already selected and approved for the Vernonia TSP update. ***Can you please confirm this is the ATR site we should be using?*** My thinking on the other site was solely based on traffic volumes, since AADT's were higher through the middle of town and near the schools (~7200 across the Rock Creek Bridge); however, the 03-013 site did show up in my initial site screening.

My final question pertains to normalizing the traffic counts up to 2010 volumes. ***Are you comfortable using the 2028 future volumes table to determine the growth from 2008/2009 counts to 2010 levels?*** My thought was to use the growth shown along OR 47 at MP 61.25 (0.02 mile north of Pebble Creek Road) since it's the only location with a R2 value greater than 0.75. The growth factor is approximately 1.022 per year.

If you have time, I'd like to schedule a quick call with you to go over these assumptions and discuss any additional assumptions I might be missing. I'm also putting together a methods and assumptions document that will outline more of the specifics of the existing count data and factors we'll use. Once I can get these few questions answered, I'll incorporate it into the document and send it to you (and other appropriate persons, Dorothy Upton?, Etc.) for comment. The information provided in this document will eventually be included in Technical Memo #2 and Technical Memo #3.

Thanks for your time!

Josh
Joshua Johnson, P.E.
Transportation Engineer
CH2M Hill
Bellevue - 425.233.3098
Downtown Seattle - 206.470.2210

Weymouth, Larry/CVO

From: Johnson, Joshua/SEA
Sent: Tuesday, November 09, 2010 1:57 PM
To: BAUMGARTNER Douglas G
Cc: Weymouth, Larry/CVO; Vanzerr, Mariah/PDX; Lingley, Terra/PDX
Subject: Vernonia TSP Future Year Traffic Analysis

Hi Doug,

Hope you had a good weekend! As promised, here's the operational assumptions we'd like to move forward for the Future Year 2031 Traffic analysis. There are a couple of items we'd like you to weigh in on. I'll bold those questions for you. If you have any additional comments or concerns, can you please let us know sooner than later?

Level 1 vs. Level 2 Analysis:

We previously chatted about doing a level 2 analysis (Cumulative Analysis) for the Vernonia TSP and upon further investigation, we were thinking a level 1 may be the more appropriate method. Looking through our original scope of work, it appears that we were originally scoped to do a level 1 trending forecasts. However, we started down the Level 2 path because we felt we had adequate data and it would provide a more detailed result. As we progressed, we discovered that our land use data is too aggregated for us to reasonably conduct a Level 2 Analysis, and we believe basically the same operational message would result with either method. **With that said, are you comfortable with us reverting back to a Level 1 Analysis?**

If yes, then we have a couple of options on a growth rate/growth factor.

Option #	Method	Annual Growth Rate (Geometric)	Exit 20
1	Vernonia Growth Rate - PSU Population Research Center - Medium Growth Forecast	0.58%	
2	County Growth Rate - PSU Population Research Center - Medium Growth Forecast	0.92%	
3	OR 47 Historical Growth (1999-2009)	0.61%	
4	OR 47 Future Volumes Table (APM method)	1.41%	

Based on the volume trends, I think we have a couple of approaches here. My first approach would be to use a uniform growth rate for the entire study area. Since both the Vernonia Population Growth forecast and the OR 47 historical growth (based on the spreadsheet you put together) show approximately the same growth, I would recommend moving forward with a geometric annual growth rate of 0.61%. A second option is if we want to capture the regional vs. local growth differences, I'd be inclined to use the higher growth rate for the state highway approaches (1.41%), and use the 0.58% growth for any local road approaches. I would then run NCHRP 255 to get the intersection turn volumes.

Thoughts on either approach or have an alternative method? I have attached my spreadsheet that calculates out each of these growth rates for your reference.

As for layering the site specific traffic from the previous studies (WOEC Facility, Nehalem View, Vernonia Schools), my thought was to grow the base traffic volumes, and then layer on these site specific trips onto the network. I've used this approach for TIA's in the past, and wanted to confirm if you're comfortable with this method.

Other future year operational assumptions are as follows:

Highway Mobility Standards – Based on ODOT Highway Design Manual (Table 10-1)

PHF – 0.85 for side street approaches, 0.90 for State Highway Minor Arterials, 0.95 for State Highway Major Arterials, or existing PHF if higher.

HV%, Peds, Channelization, Vehicle Queues – Same as existing.

Simulation Parameters – From TPAU APM.

Please let me know if you see any additional issues that would preclude us from moving forward. Thanks in advance for your response!

Cheers!

Josh

Joshua Johnson, P.E.

Transportation Engineer

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Weymouth, Larry/CVO

From: BRUMLEY Seth A [Seth.A.BRUMLEY@odot.state.or.us]
Sent: Tuesday, October 26, 2010 1:03 PM
To: Weymouth, Larry/CVO
Subject: RE: Vernonia TSP Schedule

Thanks for the update Larry,
I appreciate your effort to keep this project on schedule.

Seth

From: Larry.Weymouth@CH2M.com [<mailto:Larry.Weymouth@CH2M.com>]
Sent: Monday, October 25, 2010 4:37 PM
To: BRUMLEY Seth A; connellpc@comcast.net
Cc: Terra.Lingley@ch2m.com; Joshua.Johnson@CH2M.com; Bill@vernonia-or.gov; elliotscott@altaplanning.com; miket@altaplanning.com; Mariah.Vanzerr@CH2M.com; Erin.Diurba@critigen.com
Subject: Vernonia TSP Schedule

I wanted to let you two know that we are trying to keep to the attached schedule (unrevised) in terms of delivering the first bunch of tech memos prior to our next PMT-PAC meeting on November 17. However, we will have to make some adjustments for completion of drafts and the review dates, because we haven't been able to get all the land use and traffic data we needed when we needed it.

We expect to send you the draft TM#2 by Thursday this week. We expect to send you the draft TM#4 Future Conditions & Needs by Friday next week, November 5. We will use the e-mail correspondence between our traffic engineer (Josh) and ODOT's traffic engineer (Doug), and will describe the traffic analysis methodology in TM#2 and TM#4, as the record of agreement on the methodology. This is in lieu of trying to produce, review, and revise a standalone TM#3 during the next two weeks. TM#5, draft Safe Routes to New Schools, being prepared by Alta, will also be submitted by Friday next week.

Completion of TM#4 by November 5 will require us to receive from the City by Friday this week information regarding future commercial lands, as described in the second paragraph of Task 2.7:

In addition to the existing Land Use Inventories in Task 2.4, City Contract #10-001, the City will prepare an Alternative Land Use Scenario that reflects the City's desired zoning in order to provide for more commercial land outside the floodplain. This Alternative Land Use Scenario will be the basis for a future forecast that compares reasonable worst case traffic generated by the proposed zoning compared to the proposed zoning in order to satisfy the TPR.

If there are holes in any of the draft tech memos for lack of needed background documents, we will endeavor to add that information into the final tech memo, along with revisions based on your comments and input from the PAC. Because TM#1 is not tied specifically to later deliverables, the final TM#1 will be put on hold until we receive additional documents by the City. At this point, we are still waiting for the City to provide electronic files for the updated Comp Plan Map, CIP, Vision documents, and perhaps FEMA map (on the LC wall), which would help us finish TM#1.

Carole, please forward to us ASAP any information you can get that will help us meet the schedule for the tech memos, including GIS mapping, and what arrangements you're making for the next PAC meeting on Nov. 17.

Although Terra will be out of the office from Oct. 29 to Nov. 15, our staff will continue working on these deliverables. If you have any concerns about this schedule for deliverables, please let me know. Thanks. -- Larry

Larry Weymouth

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