W. 9. a.

Supplemental Memo Date: August 11, 2008
Third Reading Date: August 27, 2008

TO:	Board of County Commissioners
DEPARTMENT:	Public Works
PRESENTED BY:	Celia Barry, Public Works Transportation Planning
AGENDA ITEM TITLE:	**Ordinance No. PA 1248** / In The Matter Of Co-Adopting The 2007 Cottage Grove Transportation System Plan (TSP) For Application In The Urbanizable Area Outside Cottage Grove City Limits And Within The Cottage Grove Urban Growth Boundary (UGB), And Adopting Savings and Severability Clauses. (File No. PA 08-5142, Applicant: City of Cottage Grove)

I. ISSUE

Commissioner Sorenson requested explanation of statistical data used to analyze transportation needs within the Cottage Grove Urban Growth Boundary (UGB). Questions generally concerned the different outer boundaries of the 22 Transportation Area Zones (TAZs) used for traffic forecasting (**Attachment A**), compared to the Cottage Grove UGB.

Best practice standards for analyzing long term transportation needs have been established at the federal and state level. ODOT's Analysis Procedures Manual (APM) provides specific guidelines for analyzing transportation needs. TAZs are required as part of the analysis in order to most accurately estimate the number of average daily trips and traffic patterns. The purpose is to ensure potential transportation needs are adequately addressed. It is a misunderstanding to interpret the TAZ boundaries as anything more than a statistical tool to analyze traffic patterns within the UGB, and it is prudent for long range planning purposes to consider traffic generated on a daily basis from both inside and outside the UGB. More detailed explanation is provided below in the responses to Commissioner Sorenson's questions.

> *Request 1. What is the legal status of Transportation Analysis Zones (TAZs)? Who established them, what is the criteria used to establish them, and what is the legal effect of a TAZ. Are they federal, state, or other?*

A web search indicated that TAZs are used nationwide as a transportation analysis tool. Simplistically, they are based upon Census data about households, employment, and journey to work information. The Transportation Research Board and other entities appear to have participated in developing best practices for evaluating transportation needs, including establishing TAZs. ODOT staff with expertise in traffic modeling, the Transportation Planning Analysis Unit (TPAU), published guidelines based upon these nationally accepted best practices. The guidelines are contained in TPAU's Analysis Procedures Manual (APM).

ODOT funded Cottage Grove's TSP update and required the City and its consultant, DKS Associates to use APM methodology. See **Attachment B**, a March 2007 Memorandum from DKS Associates, first paragraph, referencing the "Level 2 Cumulative Analysis or similar forecasting methodology". Cumulative Analysis methodology is spelled out in **Attachment C**, the TPAU APM Chapter 4, Section 4.6.2.

Page 4-24 in Attachment C (page 4 of 15) provides the following direction in delineating TAZs: *Identify the study area. The study area should be defined such that all relevant facilities are included, since there may be other roadways that could directly influence the traffic patterns on the facilities being analyzed.*

Cottage Grove TAZs were originally delineated by LCOG when the TSP was first adopted in 1998 (Attachment A, page 2 shows the LCOG TAZs). For the 2008 update, DKS Associates consolidated LCOG's TAZs into the 22 that are shown in Attachment A, page 1. ODOT's TPAU staff participated in and approved the transportation needs analysis.

> *Request 2. Address the problem of looking at LCOG data for the population inside the UGB and the correlation with household data. Would it be better to use population than household data?*

It was asserted at the public hearing that it would be better to use population data rather than household data to evaluate traffic. This is untrue. Trip generation has been determined based upon a large volume of study data to be more accurately correlated to households than to population, as explained and documented in the August 4, 2008 email distributed previously to the Commissioners (**Attachment D**).

The City is required by state land use law to use the adopted population forecast number of 12,500 for analyzing traffic generated from inside the UGB. This number is converted to households based upon Census data, in order to calculate trips generated by people who live inside the UGB. The 2000 Census indicates there were 2.59 persons per owner occupied unit and 2.47 persons per renter occupied unit (Attachment E, page 4, last row of data). The DKS analysis assumed 2.55 persons per household (Attachment B, page 2, first paragraph). The TSP text on page 4-1 rounded this number up to 2.6 in describing the methodology; however, 2.55 was the actual number used for analysis purposes.

TPAU's APM, Chapter 4.6.2. (Attachment C) describes how to estimate future traffic generation for the 2005-2025 planning period. The number of estimated daily motor vehicle trips inside the Cottage Grove UGB must consider traffic generated by people who will live inside and outside the UGB during the 2005-2025 planning period, because people who live outside the UGB and work inside the UGB generate daily traffic trips.

> *Request 3. Address the difficulty in correlating population outside the ugb with population inside the ugb.*

The Cottage Grove TSP does not attempt to correlate population inside and outside the UGB. The question of population forecasting outside the UGB is not at issue for purposes of estimating traffic inside the UGB. The question that must be answered is the number of daily trips that will be generated inside the UGB, including from people who live outside the UGB and from places of work outside the UGB.

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The TPAU APM, Chapter 4.6.2. (Attachment C) provides guidelines that were used to analyze trips generated inside the UGB from outside the UGB. Trips are estimated based upon potential build-out of vacant lands: *The cumulative method uses information on existing and planned land uses in addition to historical trends to predict total future traffic volumes* (Attachment C, page 3 of 15, APM page 4-23, paragraph 2).

Trips, not population, are the basis for analyzing transportation needs. Daily trips between work and home are the primary variable used to evaluate the number of trips generated from sources outside the UGB. Other trip generators are also used, as required by the TPAU APM.

Attachment B, page 2 of 14, Table 1, indicates a total of 170 future additional households are anticipated outside the UGB, containing people who will be commuting on a daily basis into and out of the UGB area. Table 2 on the same page explains that a total of 85 future jobs are anticipated outside the UGB within TAZ areas, which will also generate trips inside the UGB. The Institute of Traffic Engineers (ITE) *Trip Generation* handbook is the basis for estimated trips per household and employment type (see Attachment B, page 5, Table 5).

> *Request 4. Address consistency of household and population data. Who established the 2.6 multiplier?*

The analysis requires the use of Census data. The 2000 Census indicates there were 2.59 persons per owner occupied unit and 2.47 persons per renter occupied unit (Attachment E, page 4, last row of data). The DKS analysis assumed 2.55 persons per household (Attachment B, page 2, first paragraph). The TSP text on page 4-1 rounded this number up to 2.6 in describing the methodology; however, 2.55 was the actual number used for analysis purposes inside the UGB.

In summary, Attachment B describes the methods used to estimate household and employment growth outside the UGB within the TAZs. The methods are based upon guidelines provided by the ODOT TPAU found in Attachment C. Although the methodology may be unfamiliar to many people, it is based upon accepted best practices.

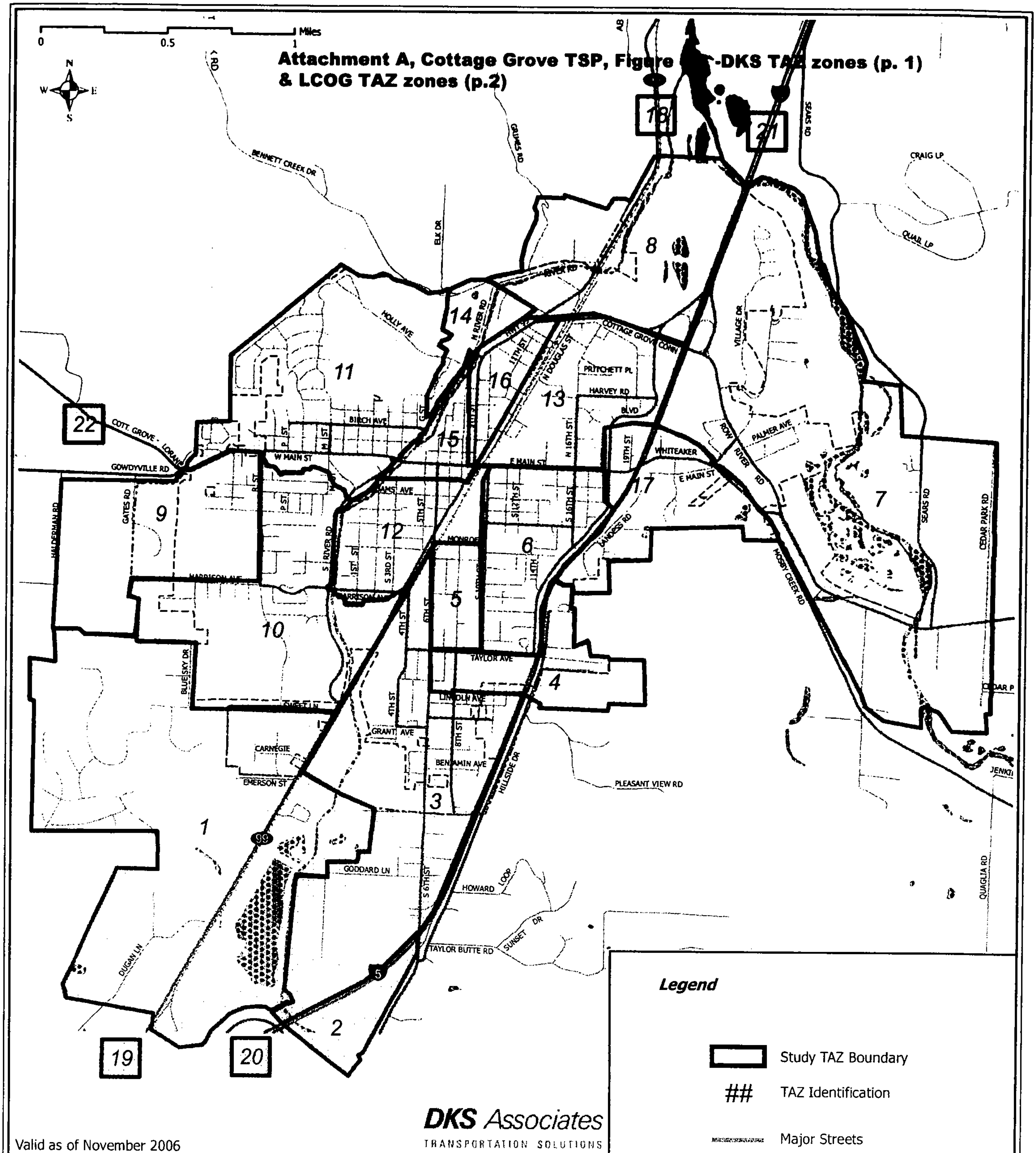
II. ATTACHMENTS

A. TSP Figure 4-3 showing TAZs in the Cottage Grove area (p. 1), and the original LCOG TAZ areas (p. 2)
B. March 2007 Memorandum from DKS Associates, and TSP Figures 4-1 and 4-2 Illustrating Household and Employment Growth projections in TAZ areas inside and outside UGBs
C. TPAU APM Chapter 4, Section 4.6.2.
D. August 4, 2008 email C. Barry to Stephanie Schulz
E. 1990 and 2000 Census Data

III. ABBREVIATIONS

TPAU	(ODOT) Transportation Planning Analysis Unit
APM	(ODOT TPAU) Analysis Procedures Manual
TAZ	Transportation Analysis Zone
ITE	Institute of Transportation Engineers

Attachment A, Cottage Grove TSP, Figure -DKS TAZ zones (p. 1) & LCOG TAZ zones (p.2)



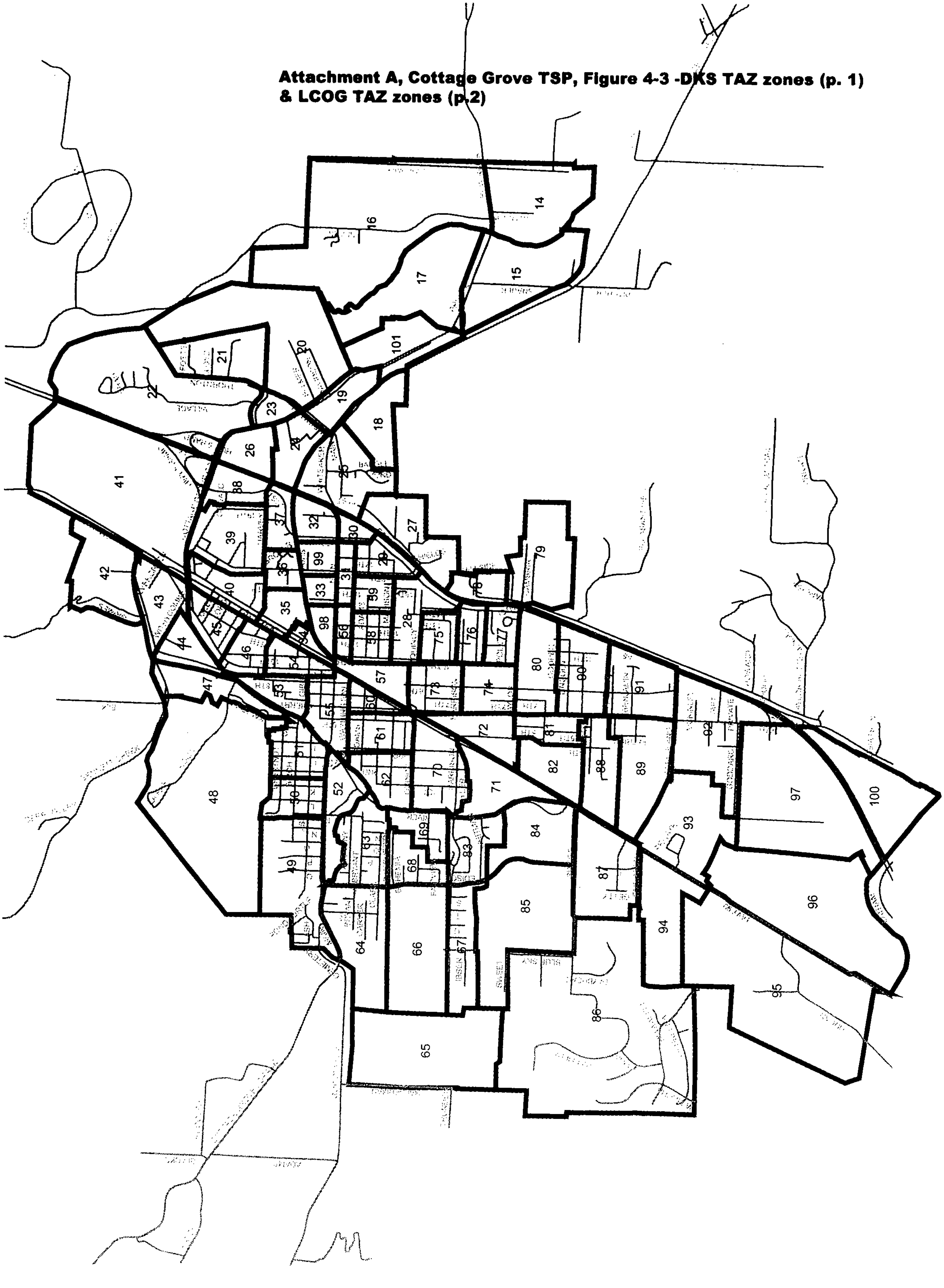
City of Cottage Grove Oregon

Transportation System Plan

FIGURE 4-3

Study TAZ System

Attachment A, Cottage Grove TSP, Figure 4-3 -DKS TAZ zones (p. 1) & LCOG TAZ zones (p.2)



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MEMORANDUM

DATE: March 2007

TO: Savannah Crawford, ODOT Region 2
Dorothy Upton, ODOT Transportation Planning Analysis Unit

FROM: Mat Dolata, DKS Associates

SUBJECT: **Cottage Grove 2025 Traffic Volume Forecasting Methodology**

P06097-000-000

The purpose of this memorandum is to summarize the methodology used to forecast the 2025 traffic volumes utilized for analysis in the Cottage Grove TSP Update. The project scope specifies that a "Level 2 Cumulative Analysis or similar forecasting methodology" be used for traffic volume forecasting. As such, the approach described replicates the methodology defined in TPAU's Analysis Procedure Manual (APM) wherever feasible. The Cumulative Analysis method described in the APM divides future growth into three distinct segments: External-External, Internal-Internal, and Internal-External/External-Internal. Trip growth is based on forecasted growth on external roadways and forecasted land use changes within the Cottage Grove TSP Update study area.

Land Use Changes

The following section summarizes the forecasted growth that will influence future travel within Cottage Grove. Land use projections were developed by Winterbrook Planning and summarized in the attached memorandum[1]. Projected land uses changes were developed for the study area and reflect information provided from several sources. The land use changes were identified for the Transportation Analysis Zone (TAZ) system developed by the Lane Council of Governments (LCOG). The forecasts were verified by City of Cottage Grove staff to include local expertise and knowledge of known developments.

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[1] *Cottage Grove TSP Future Land Use Forecast Methods and Assumptions* Memorandum, Winterbrook Planning, December 10, 2006.

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Household Growth

Lane County's 2025 coordinated population projection for Cottage Grove was used to estimate expected growth in households (assuming 2.55 persons per household) within the Cottage Grove UGB.

> In 2005, Lane County adopted a 2025 coordinated population projection for the Cottage Grove UGB of 12,500. The Base Year persons per household figures for each TAZ were used to convert population growth to dwelling units. The Lane County forecast does not allocate any future population growth to areas outside UGBs. However, the areas surrounding the Cottage Grove UGB are zoned for rural residential development on 5-acre and 10-acre lots. Therefore, additional rural residential development has been allocated to the rural TAZs totaling approximately 10 percent of the Cottage Grove population growth.

The growth of households outside of the UGB is allocated across an area of approximately 1,200 acres of space. Table 1 identifies how household growth is divided between areas within the UGB and areas outside of the UGB.

Table 1: Household Growth Summary

Location	HH-Base	HH-Growth	HH-Future
In UGB	3,459	1,433	4,892
Out of UGB	380	170	550
Total	3,839	1,603	5,442

Employment Growth

The 2001 Cottage Grove Buildable Lands Analysis was used as the basis of employment forecasts. Local knowledge of known and expected developments was used to supplement and adjust the land use forecasts where appropriate. The text below describes the development of projections within the UGB. No employment growth was projected outside of the UGB, but this has since been revised to allocate some employment outside of the UGB.

> The 2001 Cottage Grove Buildable Lands Analysis included a 2020 employment projection based on historical trends of 4,900 employees. This projection was adjusted upwards to account for economic development incentives, activities, and policies, for a final total of 5,400 employees in 2020. The 2020 projection was adjusted to the 2025 future year by using the population annual growth rate of 1.37 percent[2].

Table 2 identifies how employment growth is divided between areas within the UGB and areas outside of the UGB. *(In UGB Base of 3093 + total growth 2677 = 5770)*

Table 2: Employment Growth Summary

Location	Emp-Base	Emp-Growth	Emp-Future
In UGB	3,093	2,592	5,685
Out of UGB	332	85	417
Total	3,425	2,677	6,102

[2] The 1.37% annual growth rate is based on the Lane County Coordinated Population Projections for Cottage Grove.

This land use forecast included growth by various types of employment including retail, service, education, government and industrial.

> The future year employment was allocated to the employment sectors based on the base year allocation, except for the agricultural sector which was shifted to the industrial sector to reflect the urbanization of Cottage Grove.

Table 3 identifies the existing allocation of employment by sector (within the Cottage Grove UGB). The service and retail sectors make up almost 80% of employment.

Table 3: Existing Employment by Type

Sector	Base Year	%
AGRICULTURAL	71	2.3%
INDUSTRIAL	277	9.0%
RETAIL	733	23.7%
SERVICE	1,676	54.2%
EDUCATION	111	3.6%
GOVERNMENT	111	3.6%
OTHER	114	3.7%
TOTAL	**3,093**	100.0%

Study Area Growth Summary

Table 4 summarizes the land uses for the 2005 base and future 2025 scenarios within the Cottage Grove TSP Update study area (both inside and outside of the UGB).

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Table 4: Cottage Grove TSP Study Area Land Use Summary

Land Use	2005	2025	Increase	Percent Increase
Households	3,839	5,442	1,603	42%
Employees	3,425	6,102	2,677	78%

Growth Allocation

The land use projections identified were allocated between transportation analysis zones (TAZs), which represent the sources of vehicle trip generation. The TAZs in the Cottage Grove study area were originally developed by LCOG. A detailed summary of the uses for each Transportation Analysis Zone (TAZ) within the Cottage Grove study area is attached. An illustration of the LCOG TAZ system is also attached. Figures illustrating employment and household growth by TAZ are included in the Cottage Grove TSP update (Figure 5-1 and 5-2).

Internal Trip Growth

Internal trips within Cottage Grove were based on local trip generation – trips resulting from the employment and households projections identified in Table 4. Forecasted PM peak hour trip growth was calculated by applying the ITE Trip Generation rates to the land use growth forecasts for TAZs.

Trip Generation

The trip generation process translated land use quantities (number of households or employees) into vehicle trip ends (number of vehicles entering or leaving a TAZ) using established trip generation rates based on Institute of Transportation Engineers (ITE) research. Table 5 provides a listing of PM peak hour trip rates used in this analysis.

Table 5: ITE[3] PM Peak Hour Trip Rates

Growth Segment	Land Use Descrip-tion	ITE Code	Vehicle Trips Per Land Use Unit	Comments
Residential Households	Single Family Detached Housing	210	1.01	Avg. per dwelling unit, peak hour of adjacent street traffic. (pg. 271)
Industrial Employment	General Light Industrial	110	0.42	Avg. per employee, peak hour of adjacent street traffic (pg.92)
Retail Employment	Shopping Center	820	4.38	The PM Peak Hour trip rate per thousand square feet (ksf) rate was converted to a per employee rate by estimating employees per ksf. The per ksf rate (6.26 trips/ksf) is based upon the fitted curve equation provided by ITE (pg.1453) assuming a 100,000 square foot facility. The rate is converted by assuming one employee per ksf of retail space. A pass-by trip percentage of 30% was applied to yield a per employee rate of 4.36.
Service Employment	Specialty Retail	814	1.89	PM Peak Hour per thousand square feet (ksf) rate was converted to a per employee rate by estimating employees per ksf. The rate is based on average trip rate of 2.71 trips per ksf of leasable area (pg.1339). The rate is converted by assuming one employee per ksf of retail space. A pass-by trip percentage of 30% was applied to yield a per employee rate of 1.89
Education Employment	High School	530	1.55	Avg.per employee, peak hour of adjacent street traffic (pg.92)
Government Employment	Governm ent Office Building	730	0.30	Although a per employee rate exists in the ITE Trip Generation Manual for the government office code (730), the 1.91 trip per employee rate is based on only one study and was that of the generator's peak not adjacent street traffic peak (4-6 pm). Although the per thousand square foot (ksf) rate was only based on two studies, its rate is used (1.21 trips per ksf (pg.1201), and converted assumed 4 employees per ksf to get 0.3 trips per employee). The per employee study indicated a 74% entering rate for PM generator peak, which is counter to both expectations and the two studies based on KSF facilities (31% entering). Considering the government office building code is used as an approximation of all types of government employment, and the rate didn't intuitively seem correct, the methodology described above is employed instead of the per employee rate identified in the ITE Trip Generation Manual.
Other Employment	Office Park	750	0.39	Avg/ per employee, peak hour of generator (pg.1251)

[3] ITE Trip Generation, 7th Edition, Institute of Transportation Engineers.

Although the land use description will not match all actual developments, the trip generation rate identified is believed to be representative of the overall growth in Cottage Grove.

The shopping center ITE code was used to represent retail land uses. The service employment trip rate was calculated with the same methodology and also assumed a 30% pass-by rate and one employee per thousand square feet. The government trip rate (1.21 trips/ksf) was calculated using an estimate of four employees per thousand square feet, with no adjustment for pass-by trips.

Total trip growth was divided into outbound trips (productions) and inbound trip (attractions) based on the percentages identified in the ITE Trip Generation. Table 6 illustrates the estimated growth in vehicle trip ends (trip productions and attractions) generated within the Cottage Grove study area during the PM peak hour between 2005 and 2025. This forecast identifies the internal-internal as well as the internal-external and external-internal trip growth segments.

Table 6: PM Peak Hour Vehicle Trip Generation Growth Forecast

Growth Segment	Total Trip Growth	Attractions	Productions
Residential Households	1,619	1,020	599
Industrial Employment	126	26	100
Retail Employment	2,777	1,305	1,472
Service Employment	2,742	1,207	1,536
Education Employment	149	80	68
Government Employment	29	9	20
Other Employment	39	6	33
TOTAL	7,481	3,653	3,828

External Trip Growth

Growth of external trips (trips that have an origin and/or destination outside of Cottage Grove) was projected based on forecasted traffic growth on external roadways. Three roadways were identified as significant routes by which external trips (those with at least one end located outside of the study area) may travel:

- I-5
- Highway 99 (The Goshen Divide Highway)
- Cottage Grove–Lorane Road / Gowdyville Road

External nodes just outside of the study area were defined on these roadways. External growth volumes were forecasted at these points to identify External-External and External-Internal/Internal-External trip growth for the Cottage Grove study area.

Row River Road and Mosby Creek Road were also considered as candidates for analysis as external roadways. However, count data was not available on these roadways at points which would adequately characterize external traffic. Moreover, the growth in external volume on these roadways was believed to be minor and therefore not expected to significantly impact study intersection performance.

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Design Hour Volumes at External Nodes

Existing volumes were used in conjunction with growth percentages to calculate PM peak hour growth at external nodes. Where possible, study intersections located near external nodes were used to estimate existing volumes. Existing design hour volumes were calculated for study intersections during the existing conditions analysis. The methodology for these calculations was described in the *Revised Cottage Grove DHV Methodology* memorandum dated October 3rd, 2006. Growth rates are based upon ODOT future volume tables and are applied to existing design hour volumes.

For external nodes on Hwy 99, the study intersection at the Cottage Grove Connector was used to estimate volume at the north node, and the study intersection at River Road was used to estimate volume at the south node. For the external node at Cottage Grove-Lorane Road/Gowdyville Road, the intersection of Main Street and R Street was used to estimate volumes.

Since volumes for I-5 were not collected for this study, peak hour volumes on the highway were estimated using the Martins Creek Automatic Traffic Recorder (ATR #20-020) located 4 miles south of Cottage Grove at milepoint 169.2. ATR data for 2005 indicated that the 30 highest (design) hour volumes are 1,319 northbound and 1,352 southbound. These 2005 volumes were then multiplied by the average annual growth factor identified in the future volume table for ATR #20-020 (1.7% growth) to result in a 2006 peak hour estimate of 1,341 northbound vehicles and 1,375 southbound. This estimate was used as the volume on the southern node of I-5. Design hour volumes were added and subtracted at the highway interchanges in Cottage Grove to estimate volumes at the northern external node (1,846 northbound and 2,179 southbound).

Percentage of External-External Trips

I-5 and Hwy 99 are the only "through" roadways that have ends on both sides of the Cottage Grove study area. Therefore, Cottage Grove–Lorane Road, Row River Road, and Mosby Creek Road were assumed to have zero External-External trip growth and all growth was assigned to External-Internal (or Internal-External) trips.

External-External percentages were calculated by removing turns at each intersection through the corridor, as described in section 4.4.2 of the APM. The volumes were calculated by removing off turns (taken from ramp counts) from the ATR counts. Ramp counts where converted into design hour volumes at the ramps during existing conditions analysis. Starting with ATR counts (at the 30th highest hour for 2005, converted to 2006 values) at the south node, the appropriate ramp volumes are added or subtracted to yield the volumes at the north node. The directional counts at the south end are compared to the resulting directional counts at the north end to yield the external-external trip percentages, as described in the APM. I-5 was calculated to have 90% External-External trips both southbound and northbound at the south node, and 56% southbound and 65% northbound at the north node.

Highway 99 travels through the heart of downtown Cottage Grove and includes many Internal-Internal trips traveling within the city. Following the APM procedure of removing turns along Hwy 99 resulted in negative values, which indicated no External-External trips. While the

External-External trip percentage was thought to be small, a zero value was unrealistic. Therefore, a 5% External-External trip percentage is assumed at Hwy 99 external nodes.

Like Highway 99, the Cottage Grove-Lorane Highway / Gowdyville Road External-External volumes could not be computed due to the high turn volumes along the route. A 5% External-External percentage was also applied to the Cottage Grove-Lorane Highway / Gowdyville Road node. The external trips were split evenly between southbound (via Highway 99) and northbound (via the Cottage Grove Connector to I-5) external nodes.

No growth in External-External trips were assumed to occur that cross between I-5 and Highway 99. These roadways are parallel corridors and no data was available to estimate the degree of crossing between these roadways. Moreover, the impacts of growth of these volumes were not believed to significantly impact future study intersection operations.

Growth Rates

The forecasted growth on external roadways is based on the future volume table (ODOT's 2025 Future Volume Table[4]). The growth identified in the future volume tables is used to calculate an annual growth rate which is then applied to the 2006 DHV to result in a 2025 volume, as shown in Table 7.

Growth of external trips was projected based on forecasted traffic growth on I-5 and the Goshen Divide Highway. I-5 and Hwy 99 were the two ODOT facilities for which future volumes are available in the study area. The Future Volume Table identifies 2025 traffic volume forecasts at several points along the Goshen Divide Highway and I-5 based on historical growth trends.

The I-5 growth rate was calculated as 1.8% per year (total growth of 40% from 2006 to 2025) based on future volume table data for the three nearest locations to Cottage Grove (4 miles south of Cottage Grove, 0.1 mile south of the Cottage Grove Interchange, and 0.3 miles south of the Saginaw Interchange).

The Highway 99 future volume table indicated a average growth rate of 1.1 % per year (23% total growth from 2006 to 2025), based on the three locations listed within Cottage Grove with RSQ values above 0.5 (north city limits, 0.01 mile north of the Cottage Grove Connector, and 0.04 miles south of the Cottage Grove Connector). These values vary from 0.4% annual growth to 2.0% annual growth. As such, the middle value of 0.8% annual growth (taken just south of the the Cottage Grove Connector) was selected to result in a 16% total growth from 2006 to 2025. Since no projection data were available for growth rates along Cottage Grove-Lorane Road, the Highway 99 growth rate was applied at this external node as well.

External Trip Growth Summary

The projected growth on external roadways, at each external location, is illustrated in Table 7. The table shows the volume entering and exiting at each external point identified. Volumes that "enter" the external node originate in the study area (or other external zones) while volumes that

[4] *2024 Secondary Highway Future Volume Table*. Retrieved June 2006, from Oregon Dept. of Transportation Web site: http://www.oregon.gov/ODOT/TD/TP/TADR.shtml

"exit" the external node begin outside of the study area and travel to the study area via the external node.

Table 7: External PM Peak Hour Growth Forecast

Location	Direction	2006 Design Hour Volume	Growth Factor	2025 Design Hour Volume	Projected Growth
Hwy 99	Enter	178	1.16	207	29
North End	Exit	193	1.16	225	32
Hwy 99	Enter	281	1.16	327	46
South End	Exit	220	1.16	256	36
I-5	Enter	1,846	1.40	2591	745
North End	Exit	2,179	1.40	3058	879
I-5	Enter	1,375	1.40	1930	555
South End	Exit	1,341	1.40	1882	541
CG-Lorane	Enter	139	1.16	161	22
West End	Exit	201	1.16	233	32

External-Internal & Internal-External Trip Growth

As described above, an estimate was made of the probability of external trip growth being external-external (E-E,) as opposed to Internal-External (I-E) or External-Internal (I-E). Table 8 shows the expected trip growth for E-E and E-I/I-E trips using design hour volumes, growth rates, and E-E trip probability as inputs.

Table 8: External PM Peak Hour Growth Forecast by Trip Type

Location	Direction	Total Projected Growth	External-External Trip Probability	2025 External-External Trip Growth	2025 External-Internal / Internal-External Trip Growth
Hwy 99	Enter	29	0.05	2	27
North End	Exit	32	0.05	2	30
Hwy 99	Enter	46	0.05	2	44
South End	Exit	36	0.05	2	34
I-5	Enter	745	0.65	486	259
North End	Exit	879	0.57	499	380
I-5	Enter	555	0.90	499	56
South End	Exit	541	0.90	486	55
CG-Lorane	Enter	22	0.05	2	20
West End	Exit	32	0.05	2	30

Table 6 indicates that I-5 would experience 486 additional through trips northbound and 499 additional through trips southbound in 2025. The volumes are shown twice in the Table 8, once as they enter at a node and again at the exit node. Highway 99 would experience 2 additional northbound through trips and 2 additional southbound through trips. The west external node would experience 2 additional trips both outbound and inbound. These 2 trips are divided evenly between between the north end (I-5) and south end (Highway 99).

Trip Distribution

Trip distribution estimates how many trips travel from one zone in the model to any other zone. Distribution was based on the number of trip ends generated in each zone as either trips coming out from the zone (productions) or trips going into the zone (attractions). The percentage of each zone's total trips that are productions and attractions were defined based on ITE trip generation research. The productions and attractions for each zone were used to determine an attraction probability and production probability for each zone, relative to other zones in the transportation network.

In projecting long-range future traffic volumes, it was important to consider potential changes in regional travel patterns as well. Although the locations and amounts of traffic generation in Cottage Grove were essentially a function of future land use in the city, the distribution of trips was influenced by regional growth, particularly along I-5. For this reason, external trips were included in the analysis as well.

This section identifies how the identified growth of internal trips and external trips were combined to result in a trip table of future growth in Cottage Grove.

TAZ System

The expected growth identified for each LCOG TAZ was aggregated into 17 TAZs within the study area. Five external TAZs were added at the external nodes (access points to areas outside of the study area) at I-5 and Goshen Divide Highway north and south of Cottage Grove and Cottage Grove – Lorane Road west of Cottage Grove. The resulting 22 zones made up the TAZ system used for traffic forecasting in this study. The model zone boundaries for the 22 zone system are included as Figure 5-3 in the TSP Update. These TAZs represent land use and access to the transportation system in Cottage Grove.

Allocation of Internal Trip Generation

The forecasted growth in internal trips (productions and attractions) was aggregated to the 17 project TAZs within Cottage Grove. Table 9 shows the productions and attractions generated for each of the 17 internal study zones. The total in and out trips (7,466) matches the trip generation total identified in Table 6.

Table 9: Internal Trip Growth

Zone	IN trips	OUT trips
1	233.5	278.3
2	6.4	3.7
3	336.0	329.6
4	42.4	26.0
5	8.0	5.2
6	60.7	64.1
7	1110.7	1309.0
8	337.4	394.7
9	114.0	67.6
10	537.1	531.5
11	358.8	236.3
12	68.1	92.4
13	172.7	200.1
14	12.8	8.1
15	63.6	70.6
16	167.3	190.6
17	24.0	19.7
Total	**3653**	**3828**

Production and Attraction Probability

Table 10 shows the production and attraction probabilities for the 17 TAZs within Cottage Grove. The productions and attractions in each zone were used to calculate and attraction and production probability for each zone. These probabilities are based on the values in Table 7 (e.g. Zone 12 has 92.4 out trips. 92.4 trips / 3820 trips = 2% production probability.)

Table 10: TAZ Attraction and Production Probabilities

Zone	Attraction Probability	Production Probability
1	6%	7%
2	0%	0%
3	9%	9%
4	1%	1%
5	0%	0%
6	2%	2%
7	30%	34%
8	9%	10%
9	3%	2%
10	15%	14%
11	10%	6%
12	2%	2%
13	5%	5%
14	0%	0%
15	2%	2%
16	5%	5%
17	1%	1%
Total	100%	100%

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External-Internal & Internal-External Trip Distribution

The external-internal(E-I) and internal-external(I-E) trips identified in Table 8 were distributed across TAZs based on the percentages identified in Table 10. E-I trips were distributed based on attraction probabilities and I-E trips were distributed based on production probabilities.

Internal-Internal Trip Distribution

So as not to double-count the external-internal and internal-external trips, the growth in these trips was subtracted from the total internal trip growth. I-E trips were subtracted from productions and E-I trips were subtracted from attractions. The remaining trips represented internal-internal (I-I) trips.

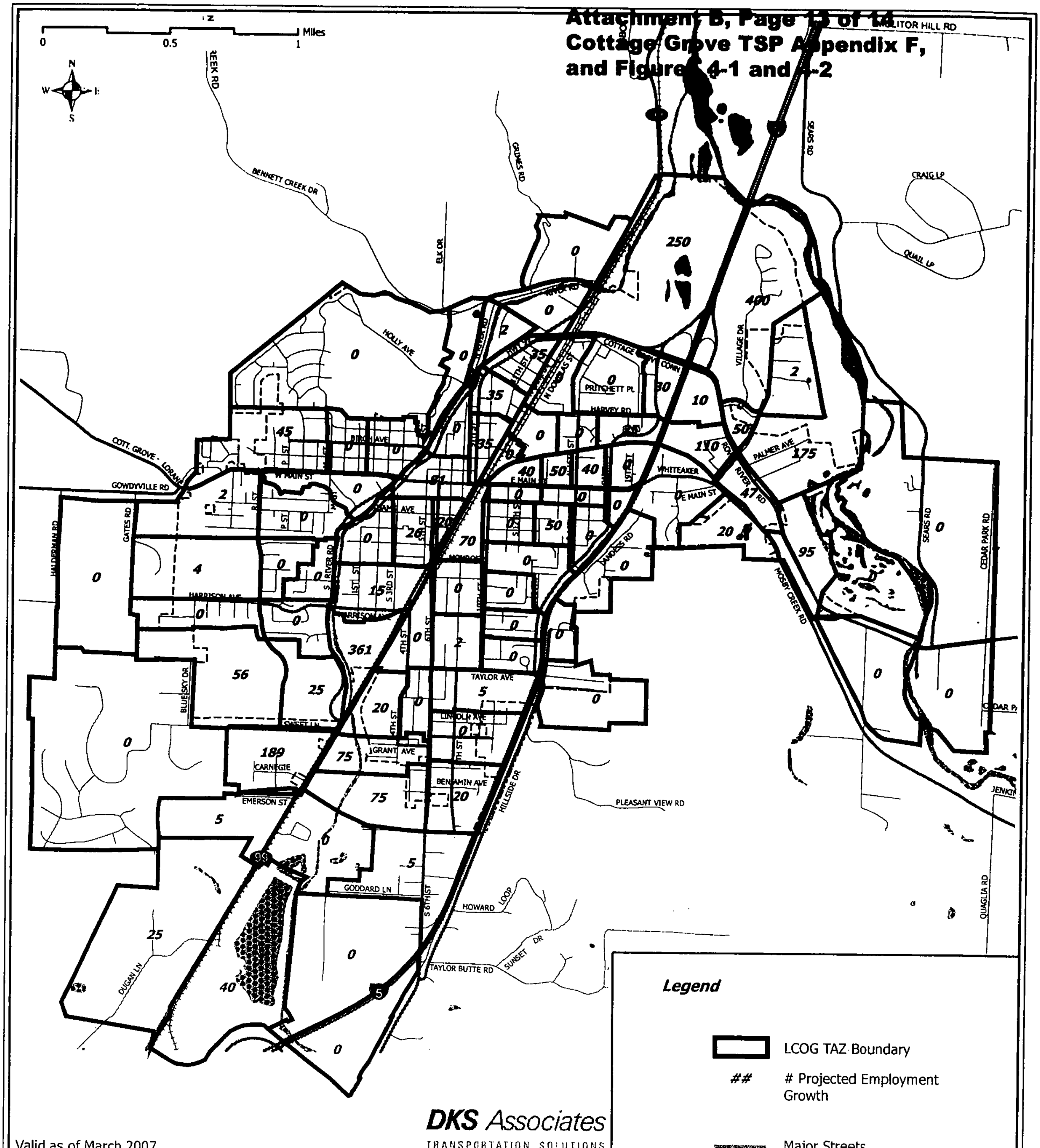
The production and attraction probabilities were used to distribute internal trips to and from the appropriate TAZs. This resulted in a productions trip table and an attractions trip table. To balance the trip productions and attractions and avoid double counting (since the trip generation process identifies trip ends, and every trip has two trip ends), the production and attraction trip tables were averaged to result in a final I-I trip table.

Final Trip Table

Internal trip productions and attractions were balanced to result in a trip table that specified the number of trips from each internal zone to each other internal zone in the network. The I-I trip table was combined with the I-E and I-E trip tables to address all identified internal growth. The E-E trips were added to complete the trip table including both internal and external growth. The resulting trip table was the travel growth that was added to the existing traffic in Cottage Grove for 2025 traffic volume projections.

Trip Assignment

In this process, the final trip table (representing trips traveling form one zone to another) was assigned to specific travel routes in the network, and resulting trip volumes were accumulated on links of the network until all trips are assigned. The Traffix software package was used to represent the transportation network and to assign the additional growth volume to the existing roadway and intersection volumes. The Traffix output file showing forecasted 2025 traffic volumes assigned to study intersection turning movements is attached.



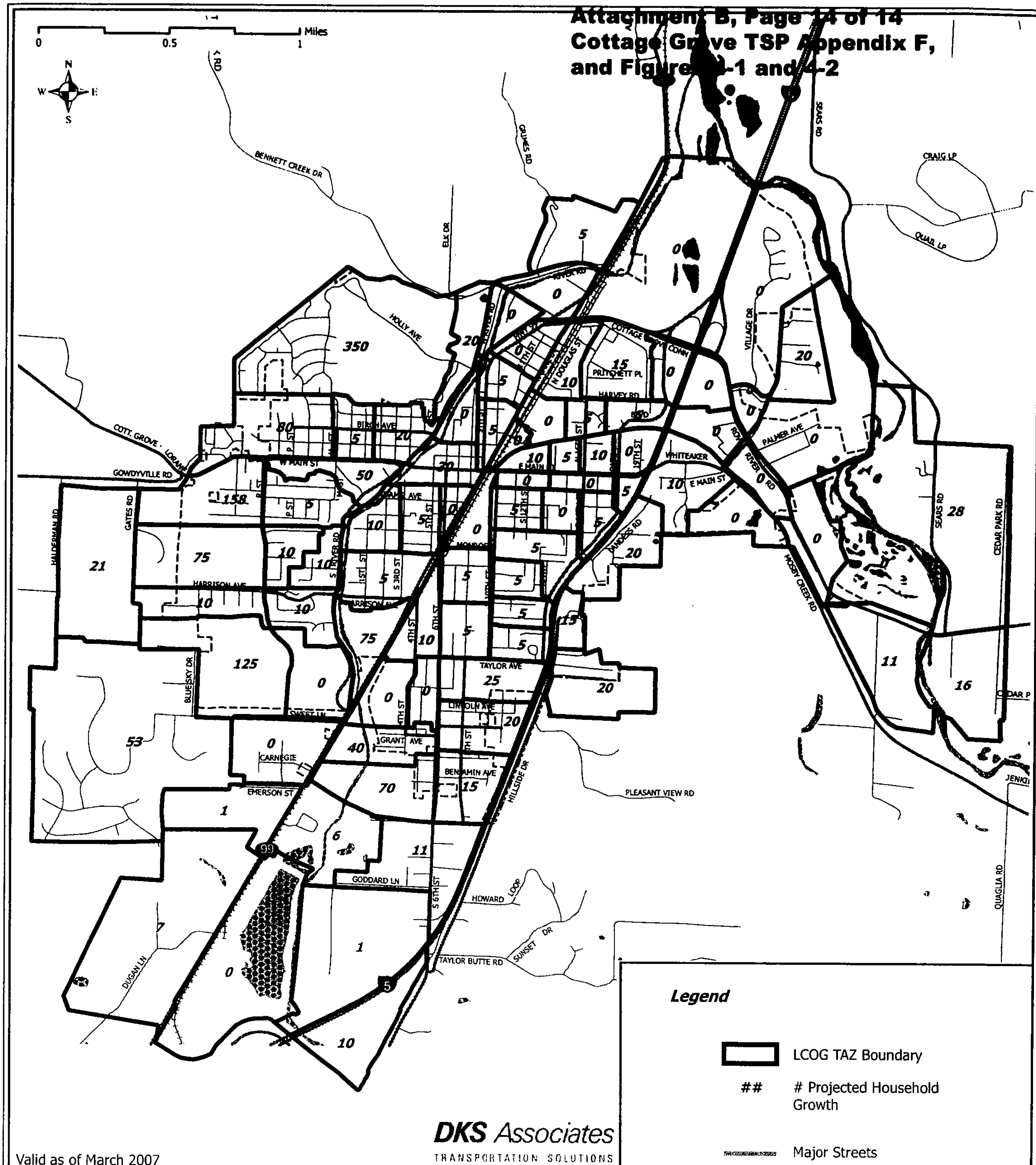
Valid as of March 2007

Transportation System Plan

FIGURE 4-1

Projected Employment Growth 2025

CITY OF COTTAGE GROVE OREGON



CITY OF COTTAGE GROVE OREGON

Transportation System Plan

FIGURE 4-2

Projected Household Growth 2025

Analysis Procedures Manual

April 2006

Oregon Department of Transportation
Transportation Development Division
Planning Section
Transportation Planning Analysis Unit
Salem, Oregon

ACKNOWLEDGEMENTS

The following individuals were contributors in the preparation of this manual.

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4.6.2 Cumulative Analysis

The cumulative analysis method is generally used to forecast volumes for small urban areas that are growing at a fairly uniform rate or for areas where only minor changes are expected to take place. This method is also used to project land use changes and effects on the transportation system. Due to increased traffic volumes practical use is limited to small urban areas or in sub-areas of larger regions because of the complexity in tracking changes associated with larger areas, such as an increase in parallel routes and/or the number of alternatives in the analysis.

The cumulative method uses information on existing and planned land uses in addition to historical trends to predict total future traffic volumes to predict total future traffic volumes. Total future volumes are estimated as the sum of the existing volumes plus future background traffic plus future development traffic (optional).

Total Traffic Volumes = Existing Volumes + Future Background Traffic
+ Future Development Traffic (optional)

Future development traffic only applies in case of a TIS. As described in Section 4-2, the existing 30 HV traffic is derived using counts and seasonal adjustments. The future background traffic includes additional traffic from the growth in through trips (may be estimated based on historical growth trends), traffic generated by approved and pending developments and build-out development of vacant land (as determined from current zoning and land use densities). In some cases, the vacant land growth rate may not reach build out by the forecast horizon year. If historical development rates indicate full development is not expected within the horizon year, then a lesser growth level should be assumed. Traffic generated by future development is estimated using the Institute of Transportation Engineers (ITE) *Trip Generation Manual* (if manual trip calculations are used) or a travel demand model for larger studies. In case of a TIS, the future development traffic is the specific development analyzed in the TIS. The analyst should be cautioned not to double count the impact of the subject property with the future build-out of vacant developable land covered in the background traffic portion. The generated traffic is then distributed throughout the study area according to O-D study data, if available, or local knowledge.

Example 4-6

Add Local Development Trips to DHV Forecast

This example continues the use of the DHV obtained in Example 4-4, which was projected to increase from 112 vph in 1997 to 190 vph in 2019 based on the historical growth trend. Assume that the land use in the area is currently exclusive forest use.

Increases in through trips are assumed in the 78 vph increase in the historical trend method. Future traffic growth will be related only to the increase in forest area use, i.e., no new development is reflected in the historical growth trend. In 2001, however, a new housing development was approved for construction, with completion by 2003. This is a 50-acre development with single-family homes on 2-acre lots resulting in 25 new homes.

From the ITE *Trip Generation Manual*, it is estimated that 25 single-family detached houses generate 25 peak hour trips total. Of the 25 trips in the afternoon peak hour, 16 are returning home. From O-D study data and existing traffic patterns, it is estimated that 15 of the 16 homeward trips are a part of the same turning movement containing the projected 190 vph from Example 4. The other 10 trips are a part of different turning movements, therefore:

2019 Future Volumes = 2019 DHV + 2019 Development Volumes
= 190 vph + 15 vph
= 205 vph

It is important to not double count traffic when using the cumulative method. If the turning movement described in this example accessed only a local street, the historical growth increase would not be applied since this is used only for through traffic on streets that extend beyond the study boundary. Thus, the only increase in turning volumes would be due to the new 25 single-family homes, and the turning volume would be 112 vph + 15 vph = 127 vph instead of 205 vph.

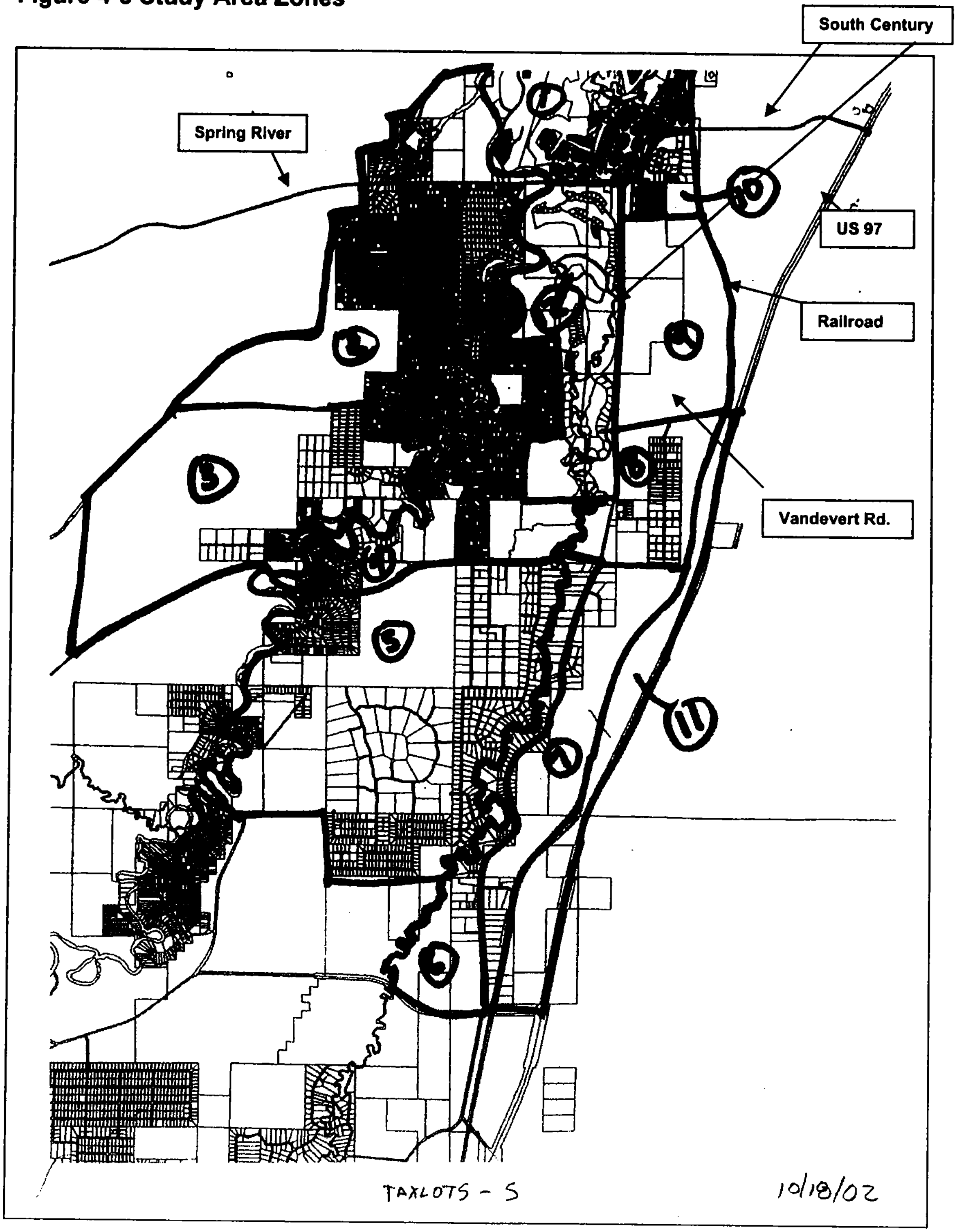
Example 4-7

The following procedure may be used for applying the cumulative method for projects. (Generally, this level of effort is too complex for a Transportation Impact Study.)

- Identify the study area. The study area should be defined such that all relevant facilities are included, since there may be other roadways that could directly influence the traffic patterns on the facilities being analyzed.

Divide the study area into zones as shown in Figure 4-3. In areas where development is not expected to occur uniformly, but vary widely between zones, it is recommended that select link and zone tree data be reviewed to identify potential changes in travel patterns and traffic growth along specific facilities.

Figure 4-3 Study Area Zones



Collect existing/proposed land-use information for each zone from GIS data. Determine the number of vacant lots and building rate for each zone. Based on the zone's building rate determine how many vacant lots will be developed by the design year. (See Table 4-9, column (4).)

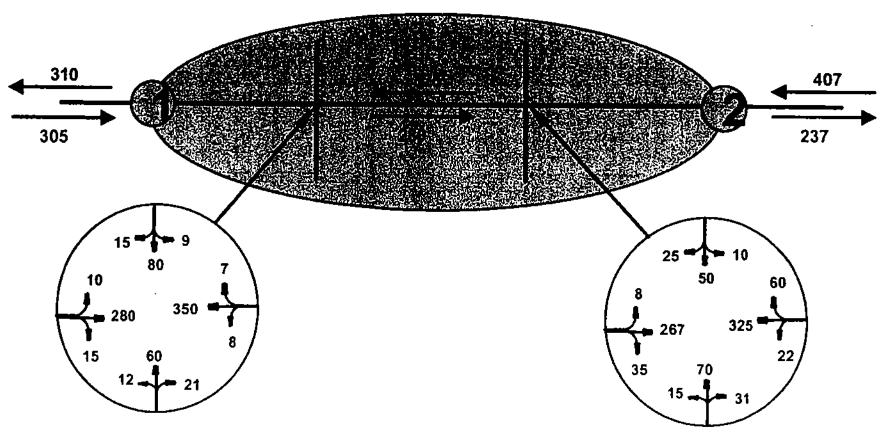
Determine each zone's trip productions (Exit) and trip attractions (Enter) using the land-use information for each zone and the ITE *Trip Generation Handbook* or TGEN Program (See Table 4-9, column (5).)

Table 4-10 Vacant Lots and Projected Trip Generation

(1) Zone	(2) Vacant Lots (2002)	(3) Building Rate	(4) 2027 Built Lots	(5) 2027 Total Trip Gen. (Enter/Exit)
1	537	80	537 (Buildout = 7 yrs.)	542 (349/193)
2	984	30	750 (Built by 2027)	758 (488/270)
3	167	17	167 (Buildout = 10 yrs.)	169 (109/60)
4	640	35	640 (Buildout = 19 yrs.)	646 (416/230)

Using the base year 30 HV, remove the percentage of external-external trips from the total external trips. If the origin-destination survey is available, use it. Otherwise, based on the 30 HVs, directionally hold a volume at one end (external station) and proceed to the other end (external station) by subtracting all turn volumes at each intersection downstream, as shown in Figure 4-4.

Figure 4-4 Determining Percent of External-External Trips At External Stations



Assume no other accesses between external-stations 1 and 2:
The eastbound external-external trip is 237 vehicles.
The westbound external-external trip is 310 vehicles.

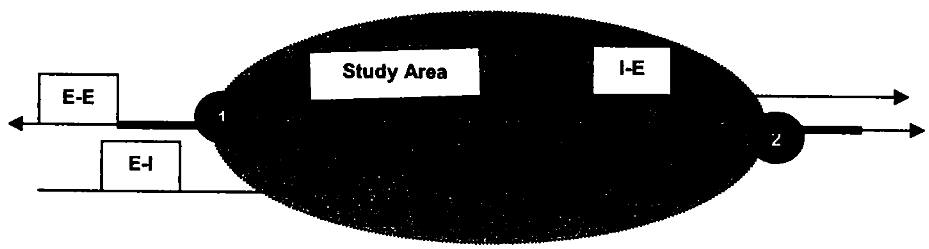
External trips are those trips that have at least one end located outside of the study area, as defined by the cordon line. The cordon line is an imaginary line that denotes the boundary of the study area. See Figure 4-5.

External-external (through) trips are trips with both ends (origin and destination) outside of the cordon line.

External-internal and internal-external trips are trips with one end outside of the cordon line.

The trips that do not cross the cordon line are internal-internal trips.

Figure 4-5 External-External, External-Internal and Internal-External Trips



Determine the percentage of external-external trips then calculate the increased external-internal and internal-external trips for the design year at the external stations as follows:

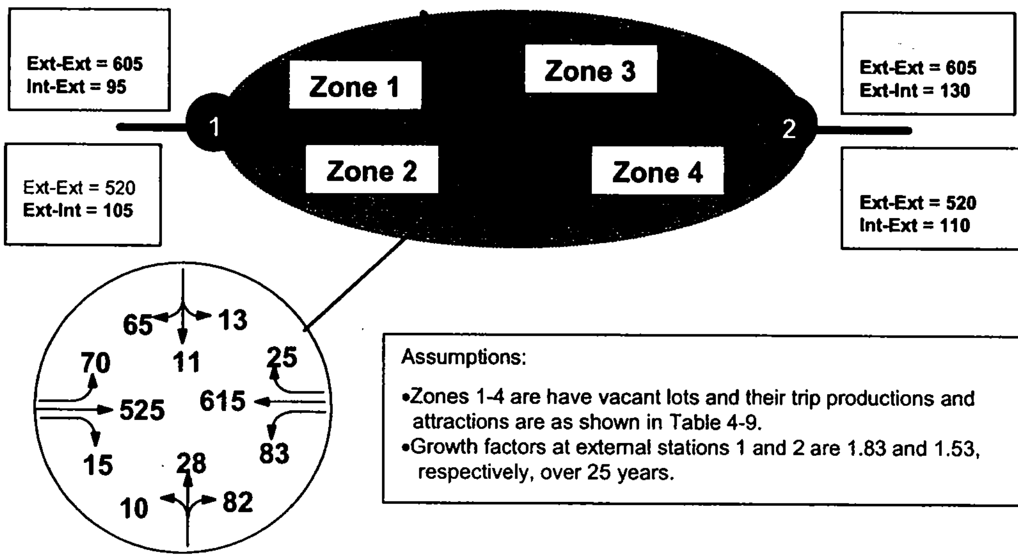
- Apply the growth factor to the base year 30 HVs to estimate the design year 30 HVs. See Table 4-10, column (4).
- Based on the percentage of external-external trips, calculate the base year external-external trips. See Table 4-10, column (3).
- Calculate the increase in external-external trips for the design year as the product of the percentage of external-external trips and the difference between the design year 30 HVs and the base year 30 HVs. See Table 4-10, column (6).
- Calculate the increase in external-internal and internal-external trips for the design year as the difference between the design year 30 HVs and the sum of the base year 30 HVs and the increase in external-external trips for the design year. See Table 4-10, column (7).

Example 4-8

External-Internal and Internal-External Trip Forecasts

Using the information in Figure 4-6, find the increase in external-internal and internal-external trips over 25 years.

Figure 4-6 Example Data for Future Internal-External, External-Internal Trip Estimation



Assumptions:

- Zones 1-4 are have vacant lots and their trip productions and attractions are as shown in Table 4-9.
- Growth factors at external stations 1 and 2 are 1.83 and 1.53, respectively, over 25 years.

Solution:

As given in Figure 4-6.

- Traffic volumes at the external-station 1 are 625 entering and 700 exiting.
- The probability of an external-external trip entering at the external-station 1 is 520/625 = 0.83 and the probability of an external-external trip exiting at Node 1 is 605/700 = 0.86.
- Traffic volumes at the external-station 2 are 735 entering and 630 exiting.
- The probability of an external-external trip entering at the external-station 2 is 605/735 = 0.82 and the probability of an external-external trip exiting at Node 2 is 520/630 = 0.82.
- The estimated increase in internal-external and external-internal trips over 25 years is shown in Table 4-10, column (7).

Table 4-11 25-Year Internal-External, External-Internal Trip Increase

Ext. Trip Table	Direction	(1) 2002 DHV	(2) Growth Factor	(3) 2002 E-E =(1)*(5)	(4) 2027 DHV =(1)*(2)	(5) E-E Trip Prob.	(6) 2027 E-E Trip Growth =(5)*((4)-(1))	(7) 2027 E-I, I-E Trip Growth = (4)-(1)-(6)
External-station 1	Enter (attr.)	625	1.83	519	1144	0.83	431	88
	Exit (prod.)	700	1.83	602	1281	0.86	500	81
External-station 2	Enter (attr.)	735	1.53	603	1125	0.82	320	70
	Exit (prod.)	630	1.53	517	964	0.82	274	64

After the external-external trip growth has been removed from the total external trip growth, the remaining trips are distributed to the internal zones according to the following procedure.

- Distribution of growth in external-internal trips:
  - Calculate the attraction probability of each zone's new trip attractions by dividing its new trip attractions by the study area's total new trip attractions.
  - Distribute the growth in external-internal trips for each external station by multiplying these trips by each zone's attraction probability.
- Distribution of growth in internal-external trips:
  - Calculate the production probability of each zone's new trip productions by dividing its new trip productions by the study area's total new trip productions.
  - Distribute the growth in internal-external trips for each external station by multiplying these trips by each zone's production probability.

Example 4-9

Distribute I-E and E-I trips to the identified zones.

Distribute the new external-internal and internal-external trips in Table 4-10 to the four zones shown in Figure 4-6. The new trip productions and attractions for these zones are shown in Table 4-11.

Solution:

The calculation of the attraction and production probabilities is shown in Table 4-11. For example, Zone 1's attraction probability is 349/1362 = 0.256 and its production probability is 193/753 = 0.256.

Table 4-12 Example External Trip Attractions and Productions Probabilities

Zone	1	2	3	4	Total
Total New Trips (From Table 4-9)	542	758	169	646	2115
Trip Attractions (From Table 4-9)	349	488	109	416	1362
Attraction Probability	0.256	0.358	0.080	0.305	1.0
Trip Productions (From Table 4-9)	193	270	60	230	753
Production Probability	0.256	0.359	0.080	0.305	1.0

The distribution of new external-internal trips is shown in Table 4-12. For example, Zone 1's new external-internal trips at external-station 1 are 88*0.256 = 23.

Table 4-13 Example External-Internal Trip Distribution

External-station	New E-I Trips (See Table 4-9)	Zone 1	Zone 2	Zone 3	Zone 4
1	88	23	32	7	27
2	70	18	25	6	21

The distribution of new internal-external trips is shown in Table 4-13. For example, Zone 1's new internal-external trips at external-station 1 are 81*0.256 = 21.

Table 4-14 Example Internal-External Trip Distribution

External-station	New I-E Trips (From Table 4-9)	Zone 1	Zone 2	Zone 3	Zone 4
1	81	21	29	6	25
2	64	16	23	5	20

After the new external-internal and internal-external trips have been distributed for each zone, the remaining new attractions and productions are internal-internal trips. For Example 4-8, the total internal-internal trips for Zone 1 are the difference between Zone 1's total new attraction/production trips and Zone 1's total new internal-external/external-internal trips (542 - 23 - 18 - 21 - 16 = 464).

To distribute the internal-internal trips for each zone, use the same distribution process as described in the new external-internal and internal-external trips distribution.

Example 4-10

Internal to Internal Trip Distribution

Find and distribute the internal-internal trips for each zone as shown in Figure 4-7.

Solution:

The internal-internal trips for each zone and the associated attraction and production probabilities are shown in Table 4-14.

Table 4-15 Example Internal Trip Attractions and Productions Probabilities

	Zone 1	Zone 2	Zone 3	Zone 4	Total
Total Internal-Internal Trips	464	649	145	553	1811
Internal Attractions	308	431	96	368	1203
Attraction Probability	0.256	0.358	0.080	0.306	1
Internal Productions	156	218	49	185	608
Production Probability	0.257	0.358	0.081	0.304	1

The distribution of new internal-internal attractions are shown in Table 4-15. For example, the attraction trips to Zone 1 from Zone 2 are 308*0.358 = 110.

Table 4-16 Example Internal Trip Attribution Distribution

Zone	I-I Attraction	Zone 1	Zone 2	Zone 3	Zone 4
1	308	79	110	25	94
2	431	110	154	34	132
3	96	25	34	8	29
4	368	94	132	30	112

The distribution of new internal-internal productions is shown in Table 4-16. For example, the production trips from Zone 1 from Zone 2 are 156*0.358 = 56.

Table 4-17 Example Internal Trip Production Distribution

Zone	I-I Attraction	Zone 1	Zone 2	Zone 3	Zone 4
1	156	40	56	13	47
2	218	56	78	18	66
3	49	13	18	4	15
4	185	48	66	15	56

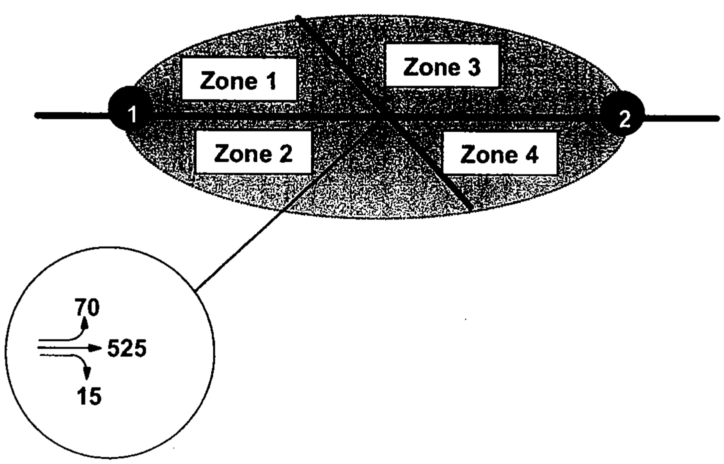
Following trip distribution, the next step in the procedure is traffic assignment, which involves assigning traffic to the road network. Trip assignment is the process used to estimate paths the trip will take, which ultimately results in traffic flow on the network. It assigns the trips to specific routes and establishes volumes on links, taking into consideration network characteristics to find the shortest path between origins and destinations. Identify the specific roadways that will be selected for each trip based on network link travel times. This step is a manual process that requires the use of engineering judgment.

Example 4-11

Referring to the example intersection in Figure 4-7, a possible set of assignment paths associated with the future eastbound through movement may be:

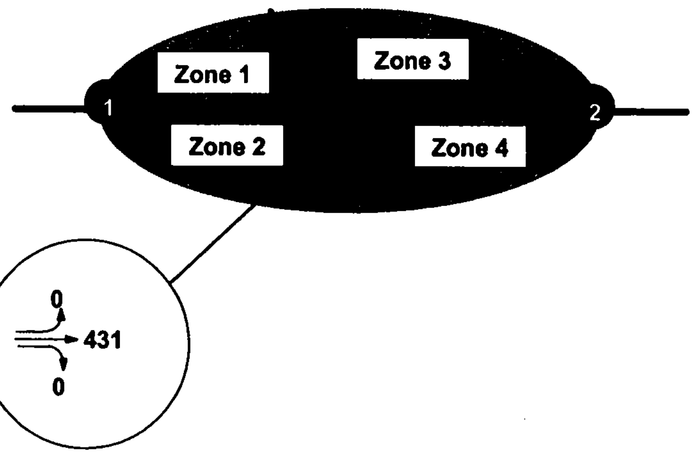
- Base-year 525 eastbound through trips.

Figure 4-7 Eastbound Assignment, Base Year



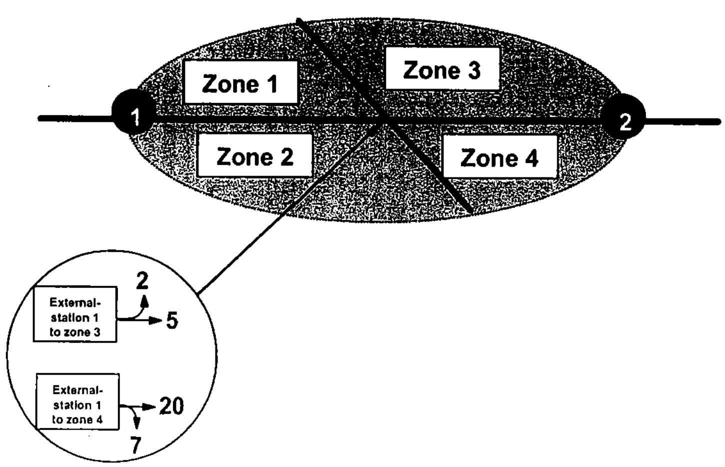
- 431 growth external-external trips. See Table 4-10, column (6).

Figure 4-8 Eastbound Assignment, External-External



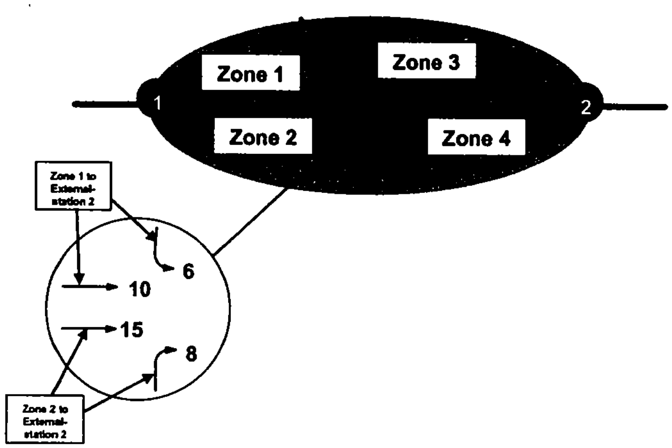
- From Table 4-12, the total external-internal trips from external-station 1 to Zone 3 is 7. These seven trips can access to Zone 3 by turning left at the intersection or through downstream access via the mainline. From Figure 4-9, two of the seven trips will travel to Zone 3 by turning left at the intersection and the remaining five trips will travel to Zone 3 through downstream access via the mainline. The same process is followed for trips from the external-station 1 to Zone 4. And the total external-internal trips from external-station1 to Zone 4 are 27. Same engineering judgment from Zone 3 applies to Zone 4 depending on the accessibility to Zone 4. Here, assuming 20 out of 27 will access to Zone 4 by downstream accesses.

Figure 4-9 Eastbound Assignment, External-Internal



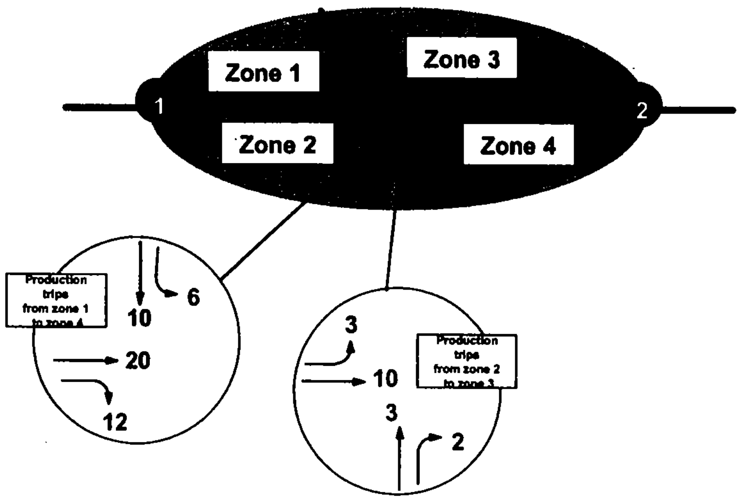
- From Table 4-13, the total internal-external trips from Zone 1 to external-station 2 are 16. The assignment of these trips depends on the accessibility from Zone 1 to the external station 2 is 16. From Figure 4-10, 10 of the 16 trips (depending on the accessibility from Zone 1 to the road network) will travel to external station 2 by using upstream access points. The remaining six trips will travel to external station 2 by turning left at the intersection.

Figure 4-10 Eastbound Assignment, Internal-External



- From Table 4-16, there are internal-internal production trips from Zone 1 to Zones 2, 3 and 4, and from Zone 2 to Zones 1, 3 and 4. Assuming internal-internal production trips from Zone 1 to Zones 2 and 3 and from Zone 2 to Zones 1 and 4 are not gone through the intersection, there are only internal-internal production trips between Zone 1 and 4 and Zones 2 and 3. The total internal-internal production trips from Zone 1 to Zone 4 is 48 trips and from Zone 2 to Zone 3 is 18 trips. Following the diagram will show the internal-internal trip assignment from Zone 1 to Zone 4 and from Zone 2 to Zone 3 based on its network accessibility assumption.

Figure 4-11 Eastbound Assignment, Internal-Internal



So the future eastbound through movement at the example intersection is a sum of 525, 431, 5, 20, 10, 15, 20 and 10 that equals 1036 vehicles.

4.6.3 Urban Transportation Demand Models

The output from urban transportation demand models may be used to estimate future traffic growth. A map of the transportation models used by ODOT is available on the Planning Section website on the Transportation Modeling References webpage. Transportation models use current and projected land use and transportation network data to estimate current and future travel demand. The data is obtained from many different sources, including census data, state employment data, O-D surveys, household travel surveys, traffic counts and field surveys.

Model output can be produced for either the daily period or specific time periods throughout the day, such as the AM and PM peak hours, AM and PM peak periods and mid-day period. Seasonal adjustments should not be applied to model output. Model output cannot be directly input into traffic analysis software, because it must first be adjusted (post processed) to reflect project specific actual (counted) current traffic volumes. However, the **relative difference** between the model output for two scenarios (e.g., current and future conditions) can be used directly such as for the screening of preliminary alternatives.

BARRY Celia

From: BARRY Celia

Sent: Monday, August 04, 2008 6:21 PM

To: SCHULZ Stephanie E

Cc: BERNARD Mark A; CLARK Andy; VORHES Stephen L; FERGUSON Amanda C (SMTP)

Subject: RE: Cottage Grove TSP Updates

Hi Stephanie,

I understand that at the first reading for the above, there was a question regarding the best indicator of trip generation.

The *Trip Generation Handbook* is produced by the Institute of Transportation Engineers, an international educational and scientific association of transportation and traffic engineers and other professionals responsible for meeting mobility (reduction of congestion) and safety needs. It is the standard used to determine the number of trips generated by various land uses. The handbook consists of 1,820 pages in three volumes covering 150 land uses and other guidelines. In addition to providing guidance on developing trip data, the handbook contains data based upon actual trip counts at identified time periods of day using a variety of independent variables such as dwelling units, commercial floor area, and employment. The handbook goes to painstaking lengths to demonstrate ethical, objective, accurate, and transparent data.

With regard to dwelling units, the Trip Generation Handbook collected 258 pages of data, doing hundreds of studies at various times and sites from the late 1960s to the 2000s throughout the United States and Canada, for the full span of unit types (single family, apartment, other). The Handbook states the following regarding data for projecting dwelling unit trips:

> The number of vehicles and residents have a high correlation with average weekday vehicle trip ends. The use of these variables is limited, however, because the number of vehicles and residents was often difficult to obtain or predict. The number of dwelling units is generally used as the independent variable of choice because it is usually readily available, easy to project and has a high correlation with average weekday vehicle trip ends.
>
> This land use included data from a wide variety of units with different sizes, price ranges, locations and ages. Consequently there was a wide variation in trips generated within this category. As expected, dwelling units that were larger in size, more expensive, or farther away from the central business district (CBD) had a higher rate of trip generation per unit . . . single family detached housing had the highest trip generation rate . . . (page 268).

I will defer to the City and its consultants to respond to specific questions about data they used. I can provide an opinion based upon what I have read that the trip generation information is not only based upon city and urban growth boundary traffic, but also traffic generated inside the ugb from residents expected to be developed on nearby residential lands outside the ugb. So, the population size that will be generating traffic as represented in the Plan is not the same as the population forecasted to be in the City's ugb. I'm sure the City can comment further in this regard.

I will plan to be at the hearing and if I can provide additional information, please let me know.

Celia Barry
LCPW Transportation Planning
541.682.6935

U.S. Census Bureau
American FactFinder

DP-1. **General Population and Housing Characteristics: 1990**
Data Set: 1990 Summary Tape File 1 (STF 1) - 100-Percent data
Geographic Area: **Cottage Grove city, Oregon**

NOTE: For information on confidentiality, nonsampling error, and definitions, see http://factfinder.census.gov/home/en/datanotes/expstf190.htm.

Subject	Number
Total population	**7,402**
SEX	
Male	3,512
Female	3,890
AGE	
Under 5 years	611
5 to 17 years	1,531
18 to 20 years	282
21 to 24 years	375
25 to 44 years	2,176
45 to 54 years	676
55 to 59 years	266
60 to 64 years	304
65 to 74 years	642
75 to 84 years	379
85 years and over	160
Under 18 years	2,142
65 years and over	1,181
HOUSEHOLDS BY TYPE	
Total households	**2,802**
Family households (families)	1,951
Married-couple families	1,521
Other family, male householder	105
Other family, female householder	325
Nonfamily households	851
Householder living alone	738
Householder 65 years and over	387
Persons living in households	7,296
Persons per household	2.60
GROUP QUARTERS	
Persons living in group quarters	106
Institutionalized persons	104
Other persons in group quarters	2
RACE AND HISPANIC ORIGIN	
White	7,163
Black	16
American Indian, Eskimo, or Aleut	103
Asian or Pacific Islander	78
Other race	42
Hispanic origin (of any race)	162
Total housing units	2,925
OCCUPANCY AND TENURE	
Occupied housing units	2,802
Owner occupied	1,613
Renter occupied	1,189
Vacant housing units	123

Subject	Number
For seasonal, recreational, or occasional use	7
Homeowner vacancy rate	1.6
Rental vacancy rate	2.4
Persons per owner-occupied unit	2.65
Persons per renter-occupied unit	2.54
Units with over 1 person per room	118
UNITS IN STRUCTURE	
1-unit detached	2,079
1-unit attached	124
2 to 4 units	244
5 to 9 units	89
10 or more units	221
Mobile home, trailer, or other	168
VALUE	
Specified owner-occupied housing units	**1,395**
Less than $50,000	651
$50,000 to $99,999	694
$100,000 to $149,999	37
$150,000 to $199,999	8
$200,000 to $299,999	4
$300,000 or more	1
Median (dollars)	51,600
CONTRACT RENT	
Specified renter-occupied housing units paying cash rent	**1,154**
Less than $250	385
$250 to $499	723
$500 to $749	45
$750 to $999	1
$1,000 or more	0
Median (dollars)	302
RACE AND HISPANIC ORIGIN OF HOUSEHOLDER	
Occupied housing units	2,802
White	2,741
Black	3
American Indian, Eskimo, or Aleut	23
Asian or Pacific Islander	17
Other race	18
Hispanic origin (of any race)	56

(X) Not applicable
Source: U.S. Bureau of the Census, 1990 Census of Population and Housing, Summary Tape File 1 (100% Data)
Matrices P1, P3, P5, P6, P8, P11, P15, P16, P23, H1, H2, H3, H5, H8, H10, H18A, H21, H23, H23B, H32, H32B, H41.

U.S. Census Bureau
American FactFinder

DP-1. **Profile of General Demographic Characteristics: 2000**
Data Set: Census 2000 Summary File 1 (SF 1) 100-Percent Data
Geographic Area: **Cottage Grove city, Oregon**

NOTE: For information on confidentiality protection, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf1u.htm.

Subject	Number	Percent
Total population	**8,445**	**100.0**
SEX AND AGE		
Male	4,049	47.9
Female	4,396	52.1
Under 5 years	593	7.0
5 to 9 years	652	7.7
10 to 14 years	682	8.1
15 to 19 years	607	7.2
20 to 24 years	492	5.8
25 to 34 years	1,015	12.0
35 to 44 years	1,217	14.4
45 to 54 years	1,145	13.6
55 to 59 years	374	4.4
60 to 64 years	314	3.7
65 to 74 years	643	7.6
75 to 84 years	536	6.3
85 years and over	175	2.1
Median age (years)	36.8	(X)
18 years and over	6,135	72.6
Male	2,845	33.7
Female	3,290	39.0
21 years and over	5,826	69.0
62 years and over	1,517	18.0
65 years and over	1,354	16.0
Male	524	6.2
Female	830	9.8
RACE		
One race	8,172	96.8
White	7,840	92.8
Black or African American	13	0.2
American Indian and Alaska Native	102	1.2
Asian	78	0.9
Asian Indian	7	0.1
Chinese	2	0.0
Filipino	18	0.2
Japanese	13	0.2
Korean	17	0.2
Vietnamese	2	0.0
Other Asian [1]	19	0.2
Native Hawaiian and Other Pacific Islander	8	0.1
Native Hawaiian	4	0.0
Guamanian or Chamorro	0	0.0
Samoan	1	0.0
Other Pacific Islander [2]	3	0.0
Some other race	131	1.6
Two or more races	273	3.2
Race alone or in combination with one or more other races [3]		
White	8,095	95.9
Black or African American	30	0.4
American Indian and Alaska Native	239	2.8
Asian	125	1.5

Subject	Number	Percent
Native Hawaiian and Other Pacific Islander	15	0.2
Some other race	231	2.7
HISPANIC OR LATINO AND RACE		
Total population	**8,445**	**100.0**
Hispanic or Latino (of any race)	417	4.9
Mexican	278	3.3
Puerto Rican	14	0.2
Cuban	1	0.0
Other Hispanic or Latino	124	1.5
Not Hispanic or Latino	8,028	95.1
White alone	7,639	90.5
RELATIONSHIP		
Total population	**8,445**	**100.0**
In households	8,293	98.2
Householder	3,264	38.7
Spouse	1,612	19.1
Child	2,520	29.8
Own child under 18 years	2,051	24.3
Other relatives	354	4.2
Under 18 years	156	1.8
Nonrelatives	543	6.4
Unmarried partner	220	2.6
In group quarters	152	1.8
Institutionalized population	98	1.2
Noninstitutionalized population	54	0.6
HOUSEHOLDS BY TYPE		
Total households	**3,264**	**100.0**
Family households (families)	2,183	66.9
With own children under 18 years	1,077	33.0
Married-couple family	1,612	49.4
With own children under 18 years	693	21.2
Female householder, no husband present	430	13.2
With own children under 18 years	296	9.1
Nonfamily households	1,081	33.1
Householder living alone	916	28.1
Householder 65 years and over	468	14.3
Households with individuals under 18 years	1,176	36.0
Households with individuals 65 years and over	946	29.0
Average household size	2.54	(X)
Average family size	3.05	(X)
HOUSING OCCUPANCY		
Total housing units	**3,430**	**100.0**
Occupied housing units	3,264	95.2
Vacant housing units	166	4.8
For seasonal, recreational, or occasional use	5	0.1
Homeowner vacancy rate (percent)	2.4	(X)
Rental vacancy rate (percent)	4.7	(X)
HOUSING TENURE		
Occupied housing units	**3,264**	**100.0**
Owner-occupied housing units	2,037	62.4
Renter-occupied housing units	1,227	37.6
Average household size of owner-occupied unit	2.59	(X)
Average household size of renter-occupied unit	2.47	(X)

(X) Not applicable
[1] Other Asian alone, or two or more Asian categories.
[2] Other Pacific Islander alone, or two or more Native Hawaiian and Other Pacific Islander categories.
[3] In combination with one or more other races listed. The six numbers may add to more than the total population and the six percentages may add to more than 100 percent because individuals may report more than one race.
Source: U.S. Census Bureau, Census 2000 Summary File 1, Matrices P1, P3, P4, P8, P9, P12, P13, P,17, P18, P19, P20, P23, P27, P28, P33, PCT5, PCT8, PCT11, PCT15, H1, H3, H4, H5, H11, and H12.