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COMMUNITY PLANNING ASSOCIATION
of Southwest Idaho

**HOV/Park-and-Ride Study
Findings and Recommendations**

Report Number 05-2012

Report of HOV/Park-and-Ride Study Findings and Recommendations

Purpose of the Study

In 2011, the Community Planning Association of Southwest Idaho (COMPASS) conducted a study to research how a high occupancy vehicle (HOV) transportation system, including park-and-ride facilities, would improve mobility in the Treasure Valley, identify criteria for evaluating HOV options and when HOVs would be appropriate additions to a transportation system, and identify “triggers” for implementing an HOV system, including park-and-ride facilities. The study researched criteria for evaluating HOV options and developed recommendations regarding further work on HOV/park-and-ride systems.

The main tasks were:

- Research other areas with recent implementation of HOV transportation corridors and systems to identify characteristics/parameters of successful, as well as failed, HOV systems (see the summary of nine of the systems in Tables 1 and 2, pages 10-20);
- Identify criteria for HOV transportation corridors and systems, support facilities, and programs;
- Describe possible HOV corridors and support facilities and programs in Ada and Canyon Counties; and
- Provide a summary of study results and recommendations for further work on HOV/park-and-ride facilities and programs.

The COMPASS study did not assess the feasibility of any particular corridor in the Treasure Valley.

Research Findings

Characteristics/parameters of successful, as well as failed, HOV systems vary greatly, depending on local conditions and goals for an HOV system. The common goals include a reduction in travel time and reduction in congestion. Common “trigger” characteristics in the researched HOV systems and plans center around:

- "Adequate" congestion
- Carpool/vanpool/transit volumes
- Major employment center(s)/destinations accessible via HOV system
- Travel time savings

The assessment of these and other "triggers" in the Treasure Valley requires adequate information about their current status and a forecast of their future trends. For example, the geography of the region (i.e., the Boise River and the foothills) includes barriers that are likely to concentrate development and constrict travel, and may create more congested corridors in the future.

While identification of major regional employment centers and other trip destinations is easy, the need for technical analysis, including feasibility and engineering analysis, to assess how an HOV system could access those employment centers/destinations is necessary.

In 2010, about 4% of lane miles in the Treasure Valley were highly congested at peak commute times - 6:30am to 8:30am and 4:00pm to 6:30pm. (Data collected on about 600 lane miles – 300 east or northbound, 300 west or southbound. See Figures 1 and 2 on pages 8 and 9.) However, road construction to widen sections of Interstate-84, the primary east-west corridor in the valley, has been ongoing since 2007. Therefore, waiting for the construction to be completed and the traffic patterns to stabilize before re-evaluating congestion and estimating future trends of the congestion is recommended.

The most recent I-84 vehicle occupancy (carpool) information is from a 2005 off-ramp vehicle occupancy survey. This information should be updated after the I-84 construction has been completed to reflect the "post-construction" travel patterns. Attachment 2 (page 7) is the proposed scope of work for a vehicle occupancy survey.

COMPASS conducted a vanpool survey in 2010 to gather information also about the use of park-and-ride lots (report available at <http://www.compassidaho.org/documents/prodserv/reports/VanpoolSurveySummary>).

[pdf](#)). There are efforts by ACHD and Valley Regional Transit to establish more park-and-ride lots to encourage carpooling and vanpooling. This is an important step toward increasing HOV volume that at some point in the future could occupy a dedicated lane.

According to current Idaho law Section 49-1412A

(<http://www.legislature.idaho.gov/idstat/Title49/T49CH14SECT49-1421A.htm>),

implementing an HOV facility in the Treasure Valley would be illegal. During the 2011 legislative session, House Bill 215 proposed to remove the provision that HOV lanes shall apply only in counties with a population less than 25,000, according to the most recent census, and where the county includes a resort city. House Bill 215 died in committee.

In February 2011, Idaho Transportation Department, District 3 released a report *Interstate 84/184 – High Occupancy Vehicle Lanes Stage 1: Feasibility Study*.¹ This preliminary stage 1 feasibility study was done to determine the potential feasibility of HOV facilities along the Interstate-84 corridors in Ada and Canyon Counties. The preliminary findings of the study indicate that by 2035 there would likely be enough congestion for an HOV lane on I-84. An HOV system appears to save overall travel time, and according to the report commuters between Canyon and Ada Counties would be likely to use an HOV lane requiring 2+ persons per vehicle. However, providing an HOV facility through the WYE Interchange or along I-184 appears to not be cost effective relative to travel time savings.

Recommendations

COMPASS staff met with the pertinent member agencies to review the research findings and recommendations for further work. The following summarizes the recommendations based on the research findings:

1. Expand the scope of further study and analysis into transportation demand management (TDM) more broadly. TDM can include: vanpool, carpool, bus routes, intelligent transportation system (ITS) projects, parking policies, land

¹ *Interstate 84/184 – High Occupancy Vehicle Lanes Stage 1: Feasibility Study*. Prepared for Idaho Transportation Department District 3, prepared by URS. February 2011.

use policies, HOV lanes, and high-occupancy toll (HOT) lanes. The analysis should include identifying trigger points for TDM measures (e.g., level of congestion, carpool use, vanpool use, transit investment in commuter routes and ridership).

2. Gain a better understanding of the federal requirements for planning of transportation improvements related to an ozone non-attainment designation.
3. Conduct a vehicle occupancy survey to update available information (see scope of work details in Attachment 2 below).
4. Update regional ITS architecture and incorporate into ongoing COMPASS activities.
5. Continue work on the following tasks to address needs identified by reviewing agencies and to lay ground work for more comprehensive travel demand management:
 - a. Develop recommendations for a regional park-and-ride system and incorporate site development criteria.
 - b. Document Congestion Management System (CMS) processes so they are institutionalized and consistent over time to allow for data comparisons.
 - c. Enhance the annual CMS report to include more detailed tracking and performance measures. The ultimate goal is to develop and maintain an operations and management strategies report to better fulfill federal requirements.
 - d. Update the 2005 Congestion Management System Plan²:
 - i. Review and update data collection process.
 - ii. Add data collection routes.
 - iii. Review and update evaluation process (what makes a route highly congested or not.)
 - iv. Document how CMS has been incorporated into TIP prioritization process (projects get points if on congested routes.)
 - v. Collect information about recent ITS projects (for example, signal timing before/after.)

² Treasure Valley Congestion Management System Plan. Report No. 6-2005. Community Planning Association of Southwest Idaho, March 2005.

- vi. Include continuous travel time data currently collected on I-84; outline how to incorporate the data in annual CMS report / monitoring process.
- vii. Outline a process to incorporate the transit system into CMS.
- e. Research IDAS software (allows for testing ITS and operational improvements.)

Summary

The HOV/Park-and-Ride study provides direction for further work and points out data needs and appropriate timing for data collection. The research findings also suggest that the initial scope of this study was too narrow; a more comprehensive look at travel demand management strategies will provide information about more options that may be better suited for the region to achieve future travel time savings and reduction in congestion.



April 2011

TO: Matt Stoll, Executive Director
FROM: Liisa Itkonen, Principal Planner
RE: Recommendations for COMPASS Projects for FY12 and Beyond

The following are projects recommended to be included in future COMPASS work programs.

- 1) Schedule vehicle occupancy survey for FY2012 (see scope of work details in Attachment 2 below)
 - a. Add to UPWP under Congestion Management Systems (842 CMS)
 - b. Request direct dollars for data collection
 - c. Add to data inventory (vanpool survey, 2010 Census, 2010 ridership survey, household travel survey collection).
- 2) Update regional ITS architecture and incorporate into annual COMPASS activities as part of task 842 CMS.
- 3) Develop a Transportation Demand Management task for FY2013 UPWP.
- 4) Depending on when EPA designates a new ozone standard, develop a work program to address pertinent requirements as needed.

Attachment 2.

Vehicle Occupancy Survey Scope of Work – Draft/Preliminary for FY2012

Task 0: Purpose and Need: Collect vehicle occupancy data at select I-84 on- and off-ramps during the morning and evening peak hours. Data are necessary to begin to understand I-84 travel market.

Responsibility: COMPASS staff

Direct dollars: \$0

Task 1: Identify Locations and collect Data

	Location	AM: 6AM to 8AM	PM: 4PM to 6:30PM
1	Exit 26/SH 44	EB On-ramp	WB Off-ramp
2	Exit 29/ Franklin Rd	EB On-ramp	WB Off-ramp
3	Karcher IC	EB On-ramp	WB Off-ramp
4	Franklin Blvd IC	EB On-ramp	WB Off-ramp
5	Garrity Blvd IC	EB On-ramp	WB Off-ramp
6	Ten Mile Rd IC	EB On-ramp	WB Off-ramp
7	Meridian Rd IC	EB Off-ramp	WB Off-ramp
8	Eagle Rd IC	EB Off-ramp	WB Off-ramp
9	Orchard St IC	EB Off-ramp	WB On-ramp
10	Vista Ave IC	EB Off-ramp	WB On-ramp
11	Broadway Ave IC	EB Off-ramp	WB On-ramp

Note: If it is necessary to collect data for both directions at both peak hours, , it will be necessary to double the number of persons for data collection and direct dollars.

Responsibility: COMPASS staff as project manager, hire temp agency staff or BSU students (up to 12 persons) to collect data

Direct dollars: \$2000

Task 2: Collect Traffic Counts

Road tubes (portable traffic counters) will need to be placed on each ramp on the day data are collected to allow for statistical evaluations and quality control. Each location will require 4 to 6 counters; therefore, this will likely take two private companies given the inventory. COMPASS may also request assistance from the Idaho Transportation Department and local highway districts.

Responsibility: COMPASS, with assistance from the Idaho Transportation Department, Ada County Highway District, City of Caldwell, City of Nampa, and consultants

Direct dollars: \$300 to \$500 per counter location (\$14,100 to \$23,500)

Task 3: Enter Vehicle Occupancy Data and Traffic Counts; Quality Check Data

Responsibility: COMPASS staff

Direct dollars: \$0

Task 4: Analyze Vehicle Occupancy Data

Responsibility: COMPASS staff

Direct dollars: \$0

Task 5: Document Process and Develop Final Report

Responsibility: COMPASS staff

Direct dollars: \$0

Estimated total direct dollars: \$16,100 to \$25,500

Estimated COMPASS workdays: 80 – includes staff time to assist in data collection

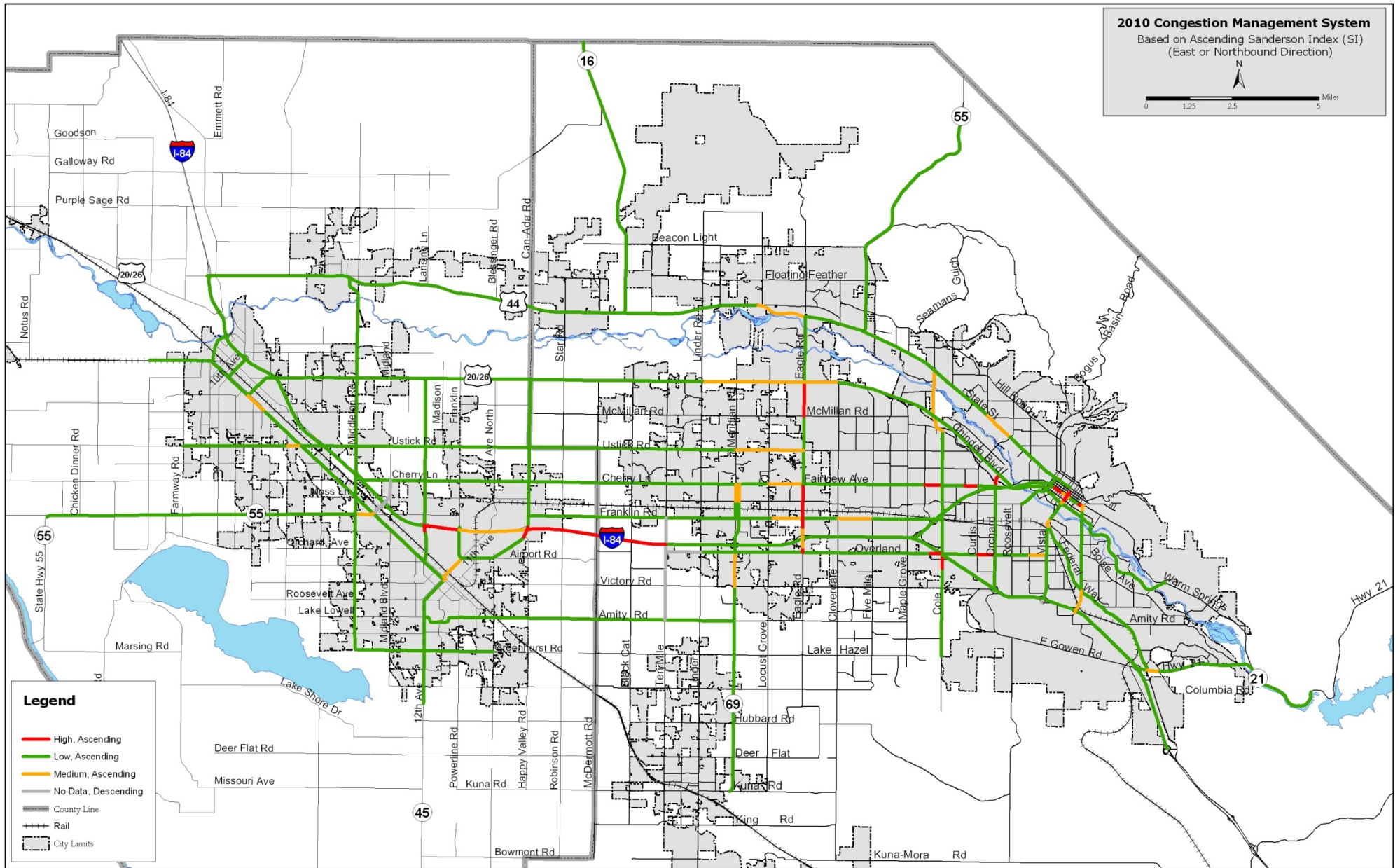


Figure 1. 2010 Congestion Management System, East and Northbound Direction.

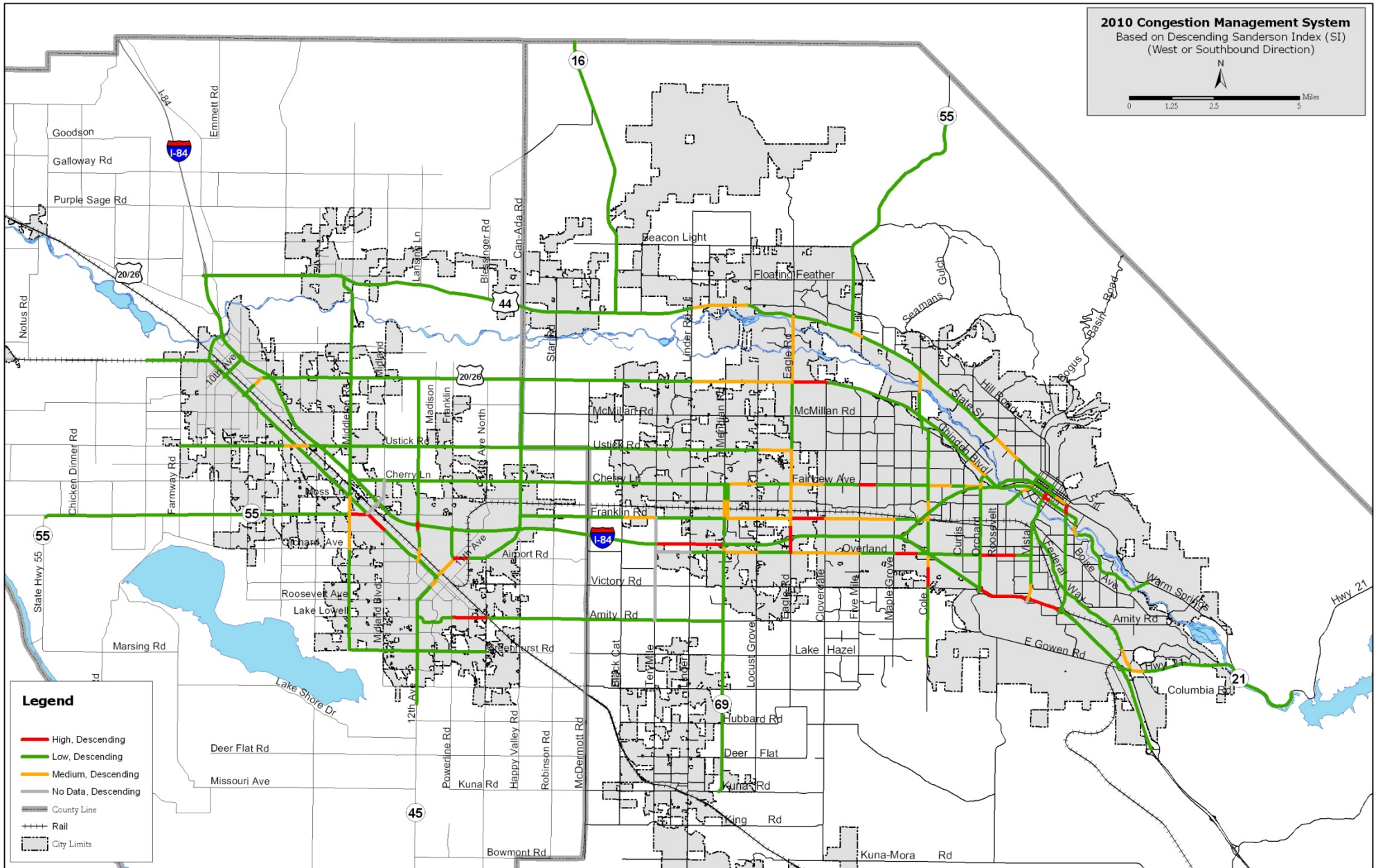


Figure 2. 2010 Congestion Management System, West and Southbound Direction.

Table 1. HOV Study Matrix Summary – Part 1: Nashville, Houston, Denver, Los Angeles

Parameters	Nashville	Houston	Denver	Los Angeles
Trip distance	<p>There are four HOV facilities</p> <ul style="list-style-type: none"> I-65 North - 4.8 miles I-65 South - 12.9 miles I-40 East - 10.2 miles I-24 South - 18.2 miles 	<p>There are 6 HOV facilities:</p> <ol style="list-style-type: none"> 1. Katy (I-10 W)--13 miles 2. North (I-45 N)--13.5 miles 3. Gulf (I-45 S)--12.1 miles 4. Northwest (US290)--13.5 miles 5. Southwest (US 59 S)--12.2 miles 6. Eastex (US 59 N)--14.8 miles 	<p>Average work trip is 10.7 miles and takes 25 minutes</p> <ul style="list-style-type: none"> US 36 HOV Length - 4.4 miles I-25 HOV Length - 6.6 miles Santa Fe Length - 6.6 miles 	<p>Los Angeles County:</p> <ul style="list-style-type: none"> Existing: 485 lane miles. Construction: 64 lane miles. Design: 55 lane miles. Planning: 89 lane miles
Congestion levels	<p>TTI Index (1) - 1.15</p> <p>Peak Travel Congestion - 41%</p> <p>Number of Rush Hours - 6</p> <p>Traffic Volume:</p> <ul style="list-style-type: none"> I-65 North - 137,000 (2009 for all) I-40 East - 98,000 I-24 South - 152,000 I-65 South - 148,000 	<p>Katy: LOS of "C" is target</p>	<p>TTI Index (1) - 1.31</p> <p>% of Peak Travel Congestion - 67%</p> <p>Number of Rush Hours - 7.4</p> <p>Info from Denver sources:</p> <ul style="list-style-type: none"> Afternoon rush hour period - 3 hours 79% of regional work trips are SOV 60% of CBD Denver work trips are SOV Santa Fe Volume s/o I-25 - 89,000 (2008) US 36 Volume e/o Federal - 116,000 (2008) I-25 Volume n/o I-70 - 211,000 (2007) 	

Parameters	Nashville	Houston	Denver	Los Angeles
Time of day use	I-65 North (7–9 a.m.) and South (4–6 p.m.) between Harding Place and Murfreesboro Road (Route 96) in Franklin I-24 North (7–9 a.m.) and South (4–6 p.m.) between the 440 Interchange and Murfreesboro Road (Route 96) in Murfreesboro I-40 East (7–9 a.m.) and West (4–6 p.m.) between Hermitage and Mt. Juliet	24/7 Katy (I-10 W) Southwest (US 59 S) Monday-Friday North (I-45 N): 5-11am, 2-8pm Gulf (I-45 S): 5-11am, 2-8pm Northwest (US290): 5-11am, 2-8pm Eastex (US 59 N): 5-11am, 2-8pm	I-25 NB M-F, noon to 3am I-25 SB M-F, 5am to 10am I-25 NB S-S, all day exc for special events US 36, HOV lanes 24/7 US 85 NB, M-F, 6am to 9am US 85 SB, M-F 4pm to 6:30 pm	Varies. Typically from 6:30am-7:30am. 3:15-5:30pm.
Person volume (HOV lane and GP lanes)	Unknown.	1. Katy (I-10 W)--28,585 2. North (I-45 N)--26,325 3. Gulf (I-45 S)--18,488 4. Northwest (US290)--20,566 5. Southwest (US 59 S)--23,396 6. Eastex (US 59 N)--5,841	DRCOG reports 1.38 persons per vehicle for all trips and 1.09 for work trips. The monthly vehicle trip reduction is 103,000 or 1.1 million vehicle miles. (Work trip benefits only. Assumed HOV rate of 2.0 ppv. Express users not counted toward reduction.)	Los Angeles County: 1,300 v/h. 3,300 v/peak hour. Twice the mixed-flow lane during peak hours. LA County: 331,000 vehicles/day. 780,000 people/day. 34% of freeway people using 20% of freeway space.
Travel demand and trip densities between origins and activity centers	Focus of HOV lanes is the Nashville CBD. 2000 Census commuting data show that the central city county (Nashville is in Davidson County) is the destination for up to 59% of the surrounding counties' work force.		Of Denver CBD workforce (1997 HH survey) 58% commute in from external communities. Focus of HOV system is on Denver CBD. Jobs in the City of Denver exceed the labor force by 100,000, making Denver a commuter magnet. Express Users mostly come from higher income hhs. 64% earn 75k or more. (38% of regional hhs fall into this income bracket.) Only 12% below \$40k. (42% of regional hhs)	

Parameters	Nashville	Houston	Denver	Los Angeles
Travel time savings	TDOT study (2) noted that data are not available to show travel time savings. It also noted that the HOV lanes may not offer significant travel time savings given that many HOVs eligible to use the lanes remained in the GP lanes.		No specific travel time savings known. CDOT monitors travel time on Express Lane to ensure that bus travel times not affected.	
Physical characteristics of roadway	All facilities are interstate highways with controlled access.	All facilities are interstate highways with controlled access. Typical features of the six Houston HOV lanes: <ul style="list-style-type: none"> • Single lane • Barrier separated • Dedicated, direct access ramps for transit • HOV lanes lead to downtown transit streets 	Santa Fe is managed, with left turns permitted at some locations US 36 and I-25 are controlled access	

Parameters	Nashville	Houston	Denver	Los Angeles
Design and treatments	HOV lanes are only separated from GP lanes by striping. No ramp treatments are provided to HOVs.	Five types of ramps: 1. One-way ramps operate as entrances in the morning and exits in the evening. 2. Two-way ramps operate as both entrance and exit, mornings and evenings. 3. Cross ramps allow access to/from both sides of the freeway 4. Slip ramps. 5. Wishbone ramps provide access to/from feeder roads on either side of the freeway in the direction of traffic flow. Design used for the HOV lanes was influenced by a number of factors. These factors include limited right-of-way in the freeway corridors, providing a safer operating environment through the use of barriers, and the directional splits in the corridors.	I-25 has physical barriers between the HOV/Express lanes Gates with cameras and transponder detectors provide access to separated lanes	Painted double-lines restrict crossing except for at designated areas. Many HOV lanes have separated exit ramps for ease of use.
Safety challenges	TDOT study (2) found no crash data specific to the HOV and recommended further analysis regarding HOV safety issues.		Weather issues in region, particularly ice/snow, can be a challenge Abandoned vehicles in the reversible HOV lanes have created an issue At least one head-on collision has occurred on the reversible I-25 lanes, although equipment was operating correctly	

Parameters	Nashville	Houston	Denver	Los Angeles
Incident response and management	Nothing found		Courtesy patrol on I-25. I-25 has an enforcement lane in one area for pullovers (15' wide) and a shoulder for breakdowns.	
Enforcement	Fine for illegal use of HOV lane is \$50 with no penalty points or progressive increase for repeat offenders. A 2008 study found violation rates running from 38-52%. In 2008 1873 citations were issued, up from 1028 in 2007; 2342 issued in 2002.		Fine for being neither an HOV or Express Transponder is \$70. For July 2009, 512 violations recorded--0.1% violation rate. (Total of HOV and Express users was 322,751, with 227,868 in HOV and 94,883 in Express.)	LA County: Average violation rate is 1.2%
Support facilities and programs	TDOT notes its policy is to evaluate the persons per hour of HOV in comparison with GP lanes. If the HOV lane PPH is as good or better than GP lanes, HOV performance is adequate. No indication as to whether or how such evaluations are being done.		Peak hour fee structure for Express Lane is tagged to be no less than the express bus fare for that route. The current peak hour fare (7:15 -8:15 am and 4:30-6:00pm is \$3.50 per vehicle. DRCOG attributes part of low SOV to CBD to parking costs and availability of alternates.	

Parameters	Nashville	Houston	Denver	Los Angeles
Park-and-ride location criteria	No criteria found. Lots are in close proximity to I-25, the longest stretch of HOV and I-40 East. No lots were shown adjacent to I-65 North or South. State Office of Passenger Transportation is responsible for development of park-and-ride lots.	No criteria found. The larger park-and-ride lots have direct access to the HOV lanes and transit stations with passenger amenities. 28 park-and-ride lots and four park-and-pool lots. There are spaces for between 900 and 2,500 automobiles at 19 of the lots. Parking spaces at lots range from over 3,000 to almost 7,500. The park-and-ride lots have transit stations with covered passenger waiting areas and other amenities. Transit centers without park-and-ride lots or with small lots are located at strategic transfer points. Direct access ramps connect major park-and-ride lots and transit stations to HOV lanes. Park-and-ride lots are 42-37% occupied.	RTD operates 70 park-and-ride lots in Denver metro area. Parking fees at some lots to vehicles registered outside RTD. Guidelines for maximum walk distances between parking spaces and station platforms of 1000-1500 feet. Criteria for design also based on area typology: urban center, community center, neighborhood center. Also, intersection frequency, transit service level, land use, ped/bike needs, and vehicle speeds. Consideration of run-off, landscaping to reduce heat islands, noise walls, future expansion and impact on surrounding area, displacements	On most HOV freeways.
Transit component	TDOT study noted that transit service levels not high enough to affect HOV operation policy.		Buses are a permitted use on any HOV/Express Lane.	
2+ occupancy	Yes	Typically. See below.	Yes	Typically. Can be 1+ off peak
3+ occupancy		US290 West M-F, 6:45-8am		I-10 only requires 3+.
Motorcycles	Yes	Yes	Yes	Yes
Hybrid/alternative fuels	Yes, since January 2009	No	Yes - decal from State reqd for specified alt fuels. Not clear if hybrids qualify. Survey results showed opposition to hybrids, but CDOT was ready to approve such usage	Yes. Hybrid or alt. fuel vehicle LA County: aver. 80 hybrids during AM and PM peak hour. Some HOVs carry over 300 hybrids during the AM peak hour.

Parameters	Nashville	Houston	Denver	Los Angeles
Toll paying	No	The Quick Ride value-pricing project operates on these two lanes, allowing participating 2+ carpools use of the lane for a \$2.00 per trip fee.	Yes - Transponder or License scan/billing	Yes. Reduced tolls for HOVs.
Emergency vehicles	Yes		Yes – only on I-25	
Concurrent flow	Yes	Yes	Yes - on US 36 and Santa Fe	Yes
Separated	No	Yes	I-25 and section of US 36	No
Contraflow	No	Yes. Katy Freeway increased from 86 AM peak HOV vehicles at opening date to 1,511 vehicles in 3 yrs.	I-25 is reversible lane system with permanent barriers	No
Opening date		<ol style="list-style-type: none"> 1. Katy (I-10 W): 1984 2. North (I-45 N): 1984 3. Gulf (I-45 S): 1988 4. Northwest (US290): 1988 5. Southwest (US 59 S): 1993 6. Eastex (US 59 N): 1999 		LA-10 (Alameda to Baldwin Ave) was first HOV in LA. Opening in 1973.

**Table 2. HOV Study Matrix Summary – Part 2:
Portland/Vancouver (OR/WA), Sacramento, Salt Lake City, Seattle, Vancouver (BC)**

Parameters	Portland/Vancouver	Sacramento	Salt Lake City	Seattle	Vancouver, BC
Trip distance	I-5 North 3.5 miles I-5 South 4 miles	US 50, Sunrise Blvd to El Dorado Blvd - 22.8 miles SR 99/51, Elk Grove Blvd to US 50 - 28.6 miles I-80, Roseville Rd to Antelope Rd- 17.2 miles Total = 66.8 miles	24.5 miles on I-15 (from 600 North to Utah County line south)	I-5 : approx 38 miles (Pierce to Snohomish County) I-405 : approx 25 miles (I-5 Junction near Tukwila to Snohomish co. border); SR520 : 7 mil. Redmond to Clyde Hill; I90 : 12 miles (Issaquah to Seattle)	Granville St - 8 blocks Georgia St - 1.1 route miles
Congestion levels		TTI Index (1) - 1.32 Peak Travel Congestion - 76% Number of Rush Hours - 7.8	TTI Index (1) - 1.19 Peak Travel Congestion - 54% Number of Rush Hours - 6.6	TTI Index (1) for 2007 = 1.29 Peak Travel Congestion = 66% Number of Rush Hours = 7.2	
Time of day use	6-8 AM, 3-6 PM	6-10 AM, 3-7 PM	24/7	I-5 - 24 Hours, I-405 = 5a to 7p Some parts of I-5 and I-90 have HOV lanes in Reversible Express lanes with variable hours	Granville St - M-F: 3-6 pm (SB only); Georgia St: Richards - Nicola: M-F: 3-7 pm; Nicola - Denman: 24 hours

Parameters	Portland/Vancouver	Sacramento	Salt Lake City	Seattle	Vancouver, BC
Person volume (HOV lane and GP lanes)	N - > 2300 persons/hour (1600 GP persons/hr in each adjacent lane); S ~ 1400 persons.hr (1100 GP persons/hr in each adjacent lane)		Average Vehicle Occupancy: GP - 1.05, HOV - 2.31. Person per Hour per Lane averages 900-1800 both AM and PM peak hours	I-5 South of Seattle CBD - AM 3-Hr Peak, NB - 11,943 Persons / Lane (PPL) for HOV, 6,248 PPL for GP (4 Lanes) - PM 4-Hr Peak, SB - 16,599 PPL for HOV, 8,012 PPL for GP-4. I-90 near Issaquah - AM 3-Hr WB, 3,400 PPL for HOV, 4,734 PPL for GP (3 lanes), 4-hr PM EB, 4,916 PPL for HOV, 6,922 PPL for GP-3. I-405 near Kirkland - AM 3-hr, SB 7,295 PPL, HOV, 5,863 PPL for GP - 3 lanes, PM 4-hr NB, 12,443 PPL HOV, 6,936 PPL GP-3.	No information
Travel demand and trip densities (origins and activity centers)	No information				No information
Travel time savings	I-5 N > 2 min/mile; I-5 S < 2 min/mile		1.82 min or 8.44% (HOV 19.75 vs GP 21.57 min)	Depends on corridor. Time savings range from 1 minute to almost 13 minutes (I-405 north of I-90, AM peak)	
Physical characteristics of roadway		single lane dedicated during peak hours	single lanes both directions	Single lanes in both directions Dedicated, direct access points at some locations	

Parameters	Portland/Vancouver	Sacramento	Salt Lake City	Seattle	Vancouver, BC
Design and treatments		painted separation - furthest outside lane	painted separation - furthest outside lane	Painted separation, located near median in most places, sometimes located in outside lanes. Direct Access ramps for certain locations.	Granville St: Curb lane on commuter arterial corridor; links airport/suburbs with CBD; separation by dash line; Georgia St: Curb lane on CBD arterial, feeds main commuter route, separation by standard dash line
Safety challenges	No information	No information	No information	No information	No information
Incident response/management	No information	No information	No information	No information	No information
Enforcement				Washington State Patrol, ticket is \$124. In 2008, issued 10,000 tickets for HOV violations. Citizens can report license plate numbers of violators. Average violation rate is 5%.	
Support facilities and programs	No information	No information	No information	No information	No information
Park-and-ride location criteria			Most TRAX stations (16 total) are free Park and Ride lots, excluding downtown station	Sound Transit operates about 80 Park N Ride Lots / Stations. Some lots are located next to Flyer Stops. WSDOT did a Park N Ride Lot planning study in 2001; used a model to estimate demand at the corridor level.	
Transit component	Transit ridership, peak hour: N ~600; S~ 400	E-tran, Caltrans BusPool	TRAX	Buses are permitted.	
2+ occupancy	Yes	Yes	Yes	Yes	No

Parameters	Portland/Vancouver	Sacramento	Salt Lake City	Seattle	Vancouver, BC
3+ occupancy	Yes			Only on SR 520, west of I-405	Yes
Motorcycles	Yes	Yes	Yes	Yes	Yes
Hybrid/alternative fuels		Yes	Yes	Same occupancy requirements as regular vehicles.	Not specified
Toll paying	No		Electronic toll system for solo users - deducts 25 cents to \$1	on SR 167 between Renton and Auburn	No
Emergency vehicles			Yes	Yes	
Concurrent flow		Yes	Yes		
Separated		No			
Contraflow		No			
Opening date	NB, PM 1998 (made permanent 2006-2007); SB, AM 2001 - SB converted to GP 2005	US 50: 2002 in stages I-80: 2003 and 2004 SR 99/51: 1990, 1998, 1999			Granville St: Mid 1990s; Georgia St: 1980s - Extended in segments Denman to Nicola 1980s, Nicola to Burrard 1990s, Burrard to Richards 2003