

# Origin-Destination Pattern Comparison by County and Sub-County Area Streetlight vs SCAG Model Output

May MTF Meeting

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Modeling & Forecasting  
5/25/2022

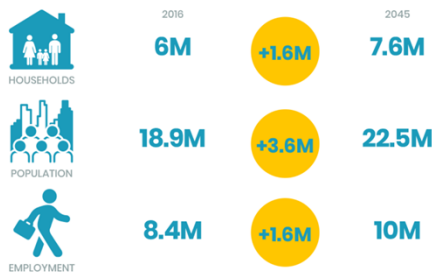


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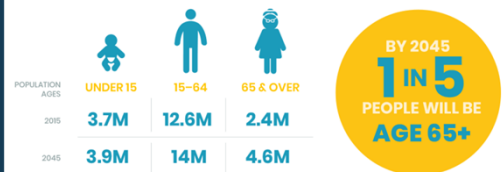
## Who are we planning for?



### Projected Regional Growth



### Changing Age Demographics in the Region



### HOW WE TRAVEL TODAY (2016)

	ALL TRIPS	TO/FROM: WORK	TO/FROM: SCHOOL	OTHER
SINGLE OCCUPANCY VEHICLE	36.0%	70.7%	12.8%	31.2%
HIGH OCCUPANCY VEHICLE	51.7%	23.5%	61.8%	58.2%
TRANSIT	3.2%	2.7%	9.0%	1.6%
BIKE	1.3%	0.7%	2.5%	1.1%
WALK	7.8%	2.4%	13.8%	7.8%

Source: SCAG Activity Based Model

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## Overview



- Sub-County Area Development
- Streetlight Variable and Analysis Description
- Origin-Destination Comparison
- Trip Length Distribution Comparison
- Correlation between Streetlight and SCAG Model Output

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## SCAG Sub-County Area Development



- SCAG Zonal Levels
  - 15 Sub Air Basin
  - 56 RSA (Regional Statistical Area)
  - 369 CSA (Community Statistical Area)
- Administrative Boundary within the SCAG Region
  - County
  - City / Unincorporated Area
  - 15 Sub Region
- Goal: to better detect O-D patterns, construct a zonal level that is
  - For SCAG travel demand modeling internal usage
  - Finer than and respect county boundary
  - Respect Tier2 TAZ boundary

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# SCAG Sub-Region Geography



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# SCAG Sub-Region Geography (Los Angeles County)



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## SCAG Sub-County Area Development



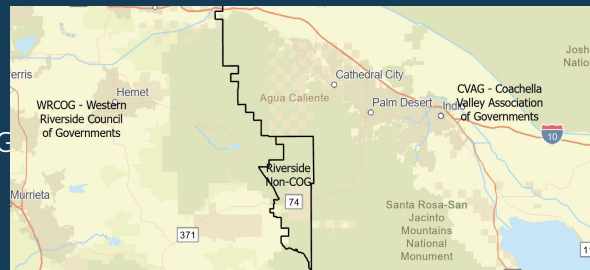
- Imperial County
  - A single sub-region county
  - Use the county boundary
  
- San Bernardino County
  - A single sub-region county
  - Use the county boundary
  
- Ventura County
  - A single sub-region county
  - Remove off-shore islands
  - Use the county boundary (mainland portion)

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## SCAG Sub-County Area Development (Riverside County)



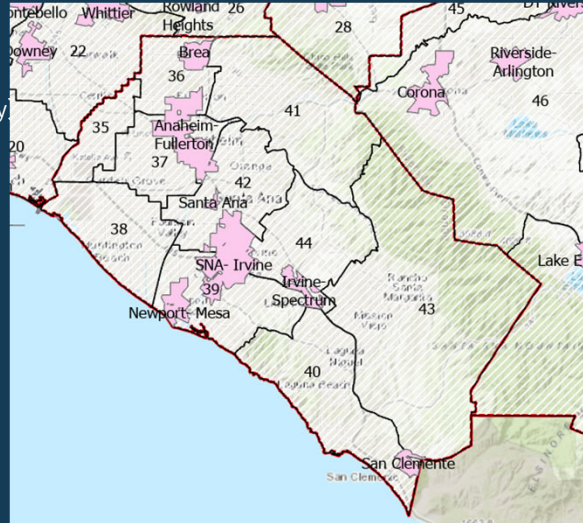
- Riverside County
  - Two sub-regions:
    - Coachella Valley Association of Governments (CVAG)
    - Western Riverside Council of Governments (WRCOG)
  - Three polygons in shapefile
    - Additional: Riverside Non-COG area  
Relatively stable SED across years
  - Merge Riverside Non-COG with WRCOG
  - Keep CVAG boundary as is



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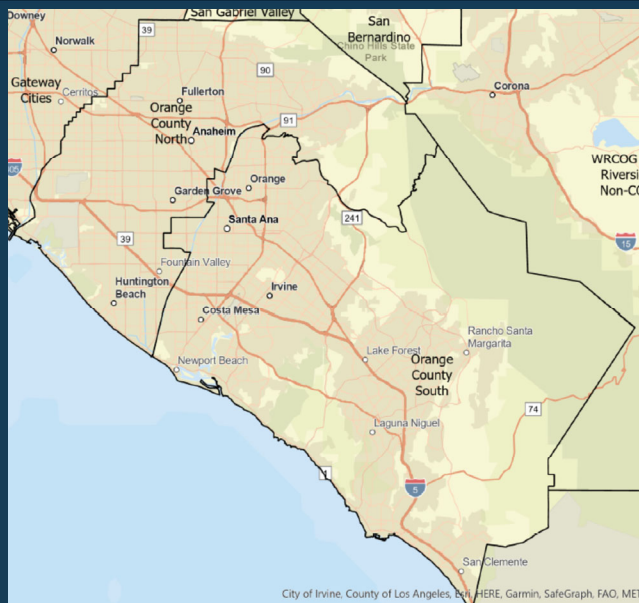
## SCAG Sub-County Area Development (Orange County)

- Orange County
  - A single sub region county
  - Job centers in 2016  
(def. by SCAG, significantly higher emp density)
    - Brea
    - Anaheim-Fullerton
    - Santa Ana
    - SNA-Irvine
    - Irvine-Spectrum
    - Newport-Mesa
    - San Clemente
  - Create two sub region areas
    - North  
Group by RSAs near Brea, Anaheim-Fullerton
    - South  
Group by the rest of RSAs in the county



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## SCAG Sub-County Area Development (Orange County)



- Orange County North
  - Anaheim
  - Brea
  - Buena Park
  - Fullerton
  - Garden Grove
  - Huntington Beach
  - Placentia
  - Westminster
  - Yorba Linda
- Orange County South
  - Costa Mesa
  - Irvine
  - Mission Viejo
  - Newport Beach
  - Santa Ana
  - San Clemente
  - San Juan Capistrano
  - Tustin

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## SCAG Sub-County Area Development (Los Angeles County)



- Los Angeles County
  - Nine sub-regions
    - San Gabriel Valley Council of Governments (SGVCOG)
    - Las Virgenes – Malibu Council of Governments
    - Westside Cities Council of Governments (WCCOG)
    - North Los Angeles County Transportation Coalition
    - San Fernando Valley Council of Governments (SFVCOG)
    - Arroyo Verdugo Communities Joint Powers Authority (AVCJPA)
    - Gateway Cities Council of Governments (GCCOG)
    - South Bay Cities Council of Governments (SBCCOG)
    - City of Los Angeles

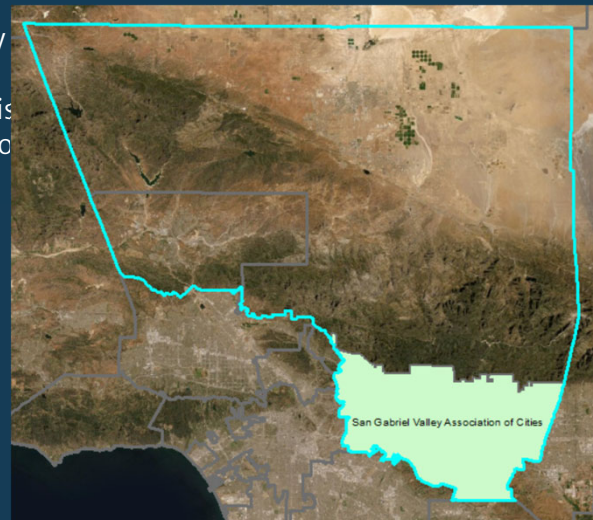
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## SCAG Sub-County Area Development (San Gabriel Valley)



- SGVCOG
  - Completely covered by North LA County
  - Keep SGVCOG sub-region boundary as is
  - Clip SGVCOG sub-region boundary out of North LA County sub-region
- San Gabriel Valley

Alhambra	Baldwin Park
City of Industry	Claremont
Covina	Diamond Bar
El Monte	Pasadena
Pomona	Rosemead
San Gabriel	West Covina

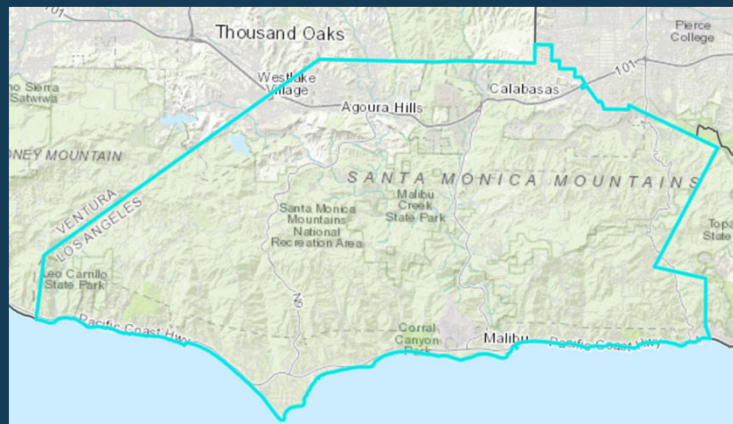


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## SCAG Sub-County Area Development (Las Virgenes)



- Las Virgenes – Malibu Council of Governments
  - Keep its sub-region boundary as is
- Las Virgenes
  - Calabasas
  - Malibu

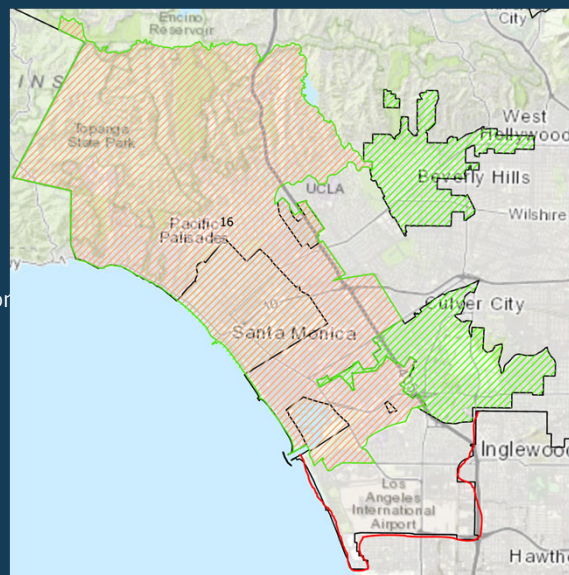


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## SCAG Sub-County Area Development (Westside Cities)



- WCCOG
  - A multi-polygon (enclave) sub-region
  - Create a spatially contiguous boundary
    - Merge WCCOG sub-region boundary (green hatched fill)
    - Merge RSA #16 (red hatched fill)
    - Merge TAZs near LAX Airport (red polygon) Part of City of Los Angeles sub-region
- Westside Cities
  - Beverly Hills
  - Culver City
  - Santa Monica
  - West Hollywood



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## SCAG Sub-County Area Development (North Los Angeles County)

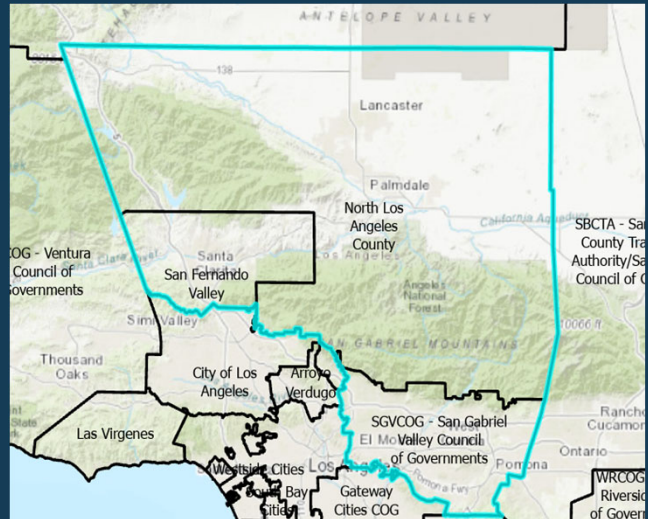


- North Los Angeles County Transportation Coalition

- Covers
  - SGVCOG (completely)
  - San Fernando Valley COG (partially)
- Include Santa Clarita w/ Palmdale & Lancaster
  - Clip out SGVCOG sub-region boundary
  - Clip out the overlapping SFVCOG sub-region

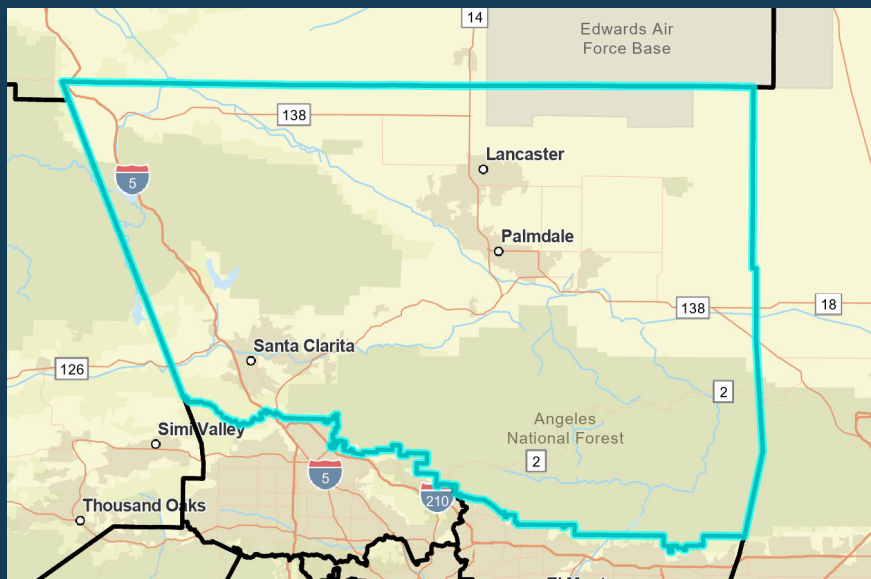
- North Los Angeles County

- Lancaster
- Palmdale
- Santa Clarita



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## SCAG Sub-County Area Development (North Los Angeles County)



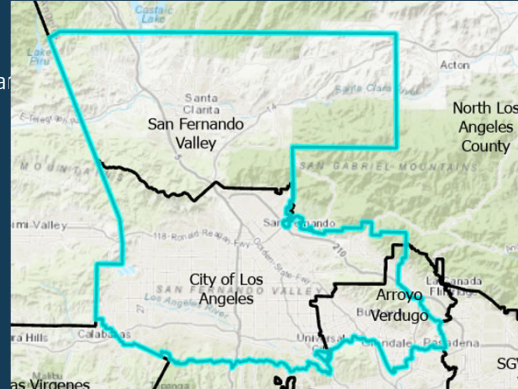
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## SCAG Sub-County Area Development (San Fernando Valley)

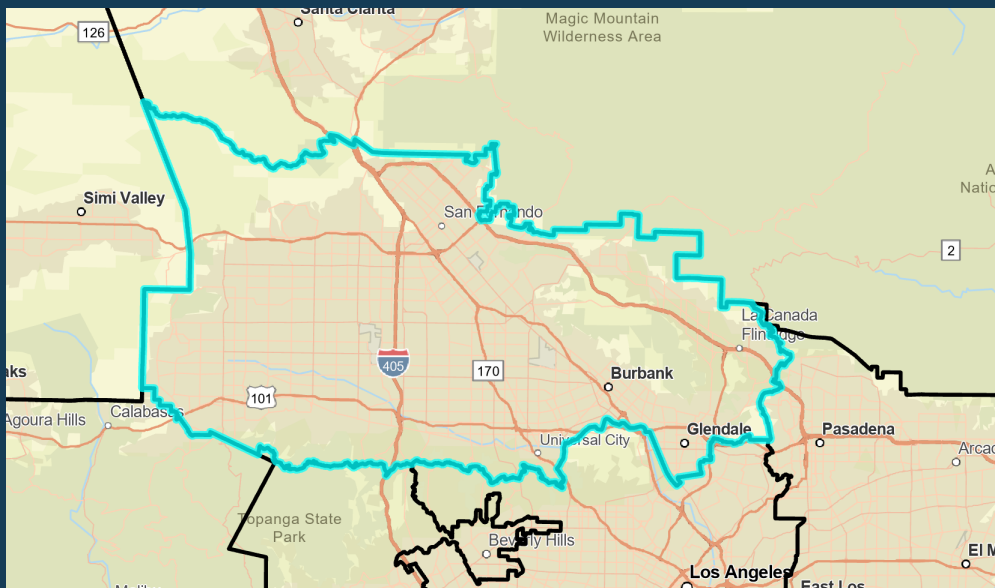


- San Fernando Valley Council of Governments (SFVCOG)
- Arroyo Verdugo Communities Joint Powers Authority (AVCJPA)
  - SFVCOG sub-region boundary covers
    - Part of City of Los Angeles sub-region boundary
    - Most of AVCJPA sub-region boundary
  - Merge AVCJPA
  - Keep the City of Los Angeles sub-region portion within
- San Fernando Valley
  - Burbank
  - Glendale
  - La Canada Flintridge
  - San Fernando



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## SCAG Sub-County Area Development (San Fernando Valley)



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## SCAG Sub-County Area Development (Gateway Cities)



- Gateway Cities Council of Governments (GCCOG)
  - Remove off-shore islands
  - Use the sub-region boundary (mainland portion)
  
- Gateway Cities
  - Artesia
  - Cerritos
  - Compton
  - Downey
  - Lakewood
  - Long Beach
  - Montebello
  - Norwalk
  - Whittier



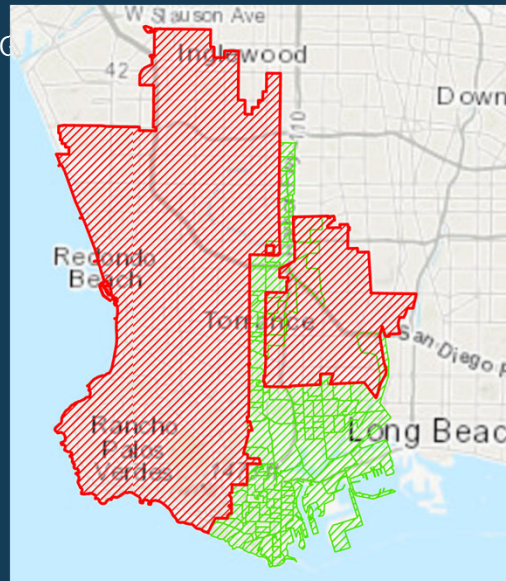
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## SCAG Sub-County Area Development (South Bay Cities)



- South Bay Cities Council of Governments (SBCCOG)
  - A multi-polygon (enclave) sub-region
  - Create a spatially contiguous boundary
    - Merge SBCCOG sub-region boundary (red hatched fill)
    - Merge TAZs in between and near two ports (green hatched fill)
  
- South Bay Cities
 

Carson	Gardena
Hawthorne	Hermosa Beach
Inglewood	Manhattan Beach
Rancho Palos Verdes	Redondo Beach
Torrance	

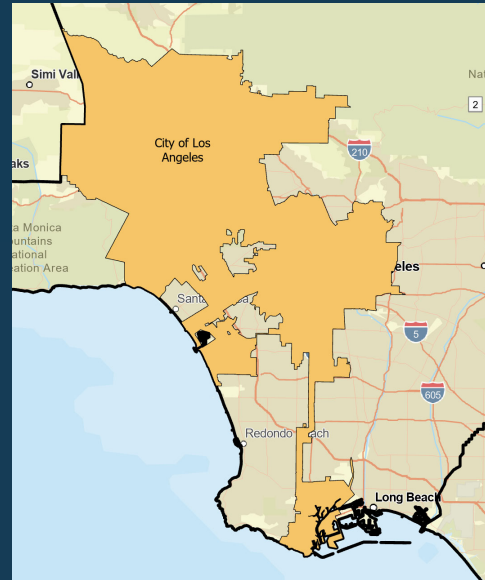


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## SCAG Sub-County Area Development (City of Los Angeles)

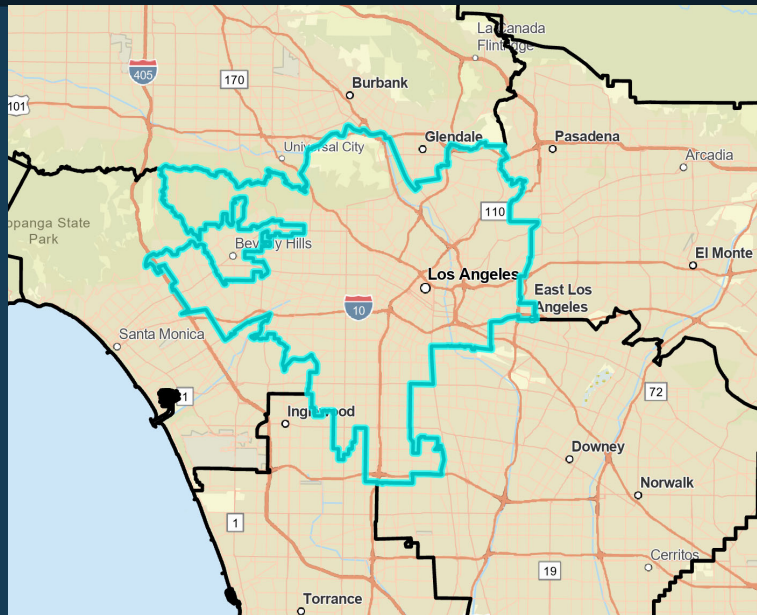


- City of Los Angeles sub-region
  - Overlaps with
    - SFVCOG
    - Las Virgenes – Malibu COG
    - WCCOG
    - GCCOG
    - SBCCOG
  - Keep the non-overlapping portion of City of Los Angeles sub-region boundary



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## SCAG Sub-County Area Development (City of Los Angeles)



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## SCAG Sub-County Area Development (Los Angeles County)



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## SCAG Sub-County Area: 2016 SED



Sub County Area	Residential Population %	Household %	Employment %
Imperial	100.0%	100.0%	100.0%
Westside Cities	5.3%	7.7%	10.3%
South Bay Cities	10.8%	11.1%	11.0%
City of Los Angeles	19.5%	20.8%	21.0%
Las Virgenes	0.8%	0.9%	1.5%
Gateway Cities	20.8%	18.1%	16.9%
San Fernando Valley	18.5%	18.9%	18.2%
San Gabriel Valley	17.7%	16.3%	16.5%
North Los Angeles County	6.6%	6.3%	4.6%
Orange County North	47.7%	46.2%	39.8%
Orange County South	52.3%	53.9%	60.2%
Western Riverside	79.9%	76.7%	74.5%
Coachella Valley	20.1%	23.3%	25.5%
San Bernardino	100.0%	100.0%	100.0%
Ventura	100.0%	100.0%	100.0%

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## Streetlight Variable and Analysis Description



- Focused on Weekday StreetLight Volume
  - Weekday from 1/1/2019 to 12/31/2019 (Tuesday to Thursday)
  - StreetLight Volume = an output type that represents an estimated number of vehicle trips that interact with zones of analysis
- Origin-Destination Analysis was used in this study
  - O-D analysis lets you analyze trips that start and stop your origin and destination zones
  - SCAG County and SCA Zones are used

### SCAG Model Output

- 2016BY LM Origin-Destination matrix was used

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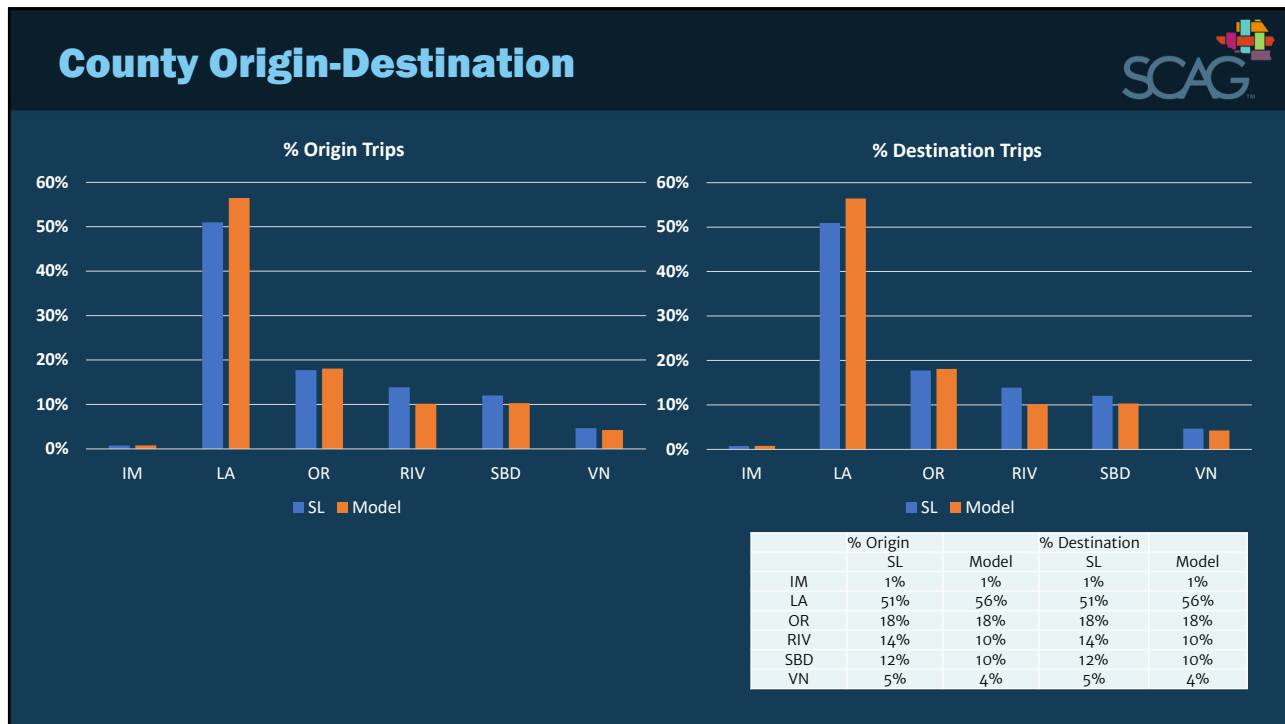
## County Origin-Destination



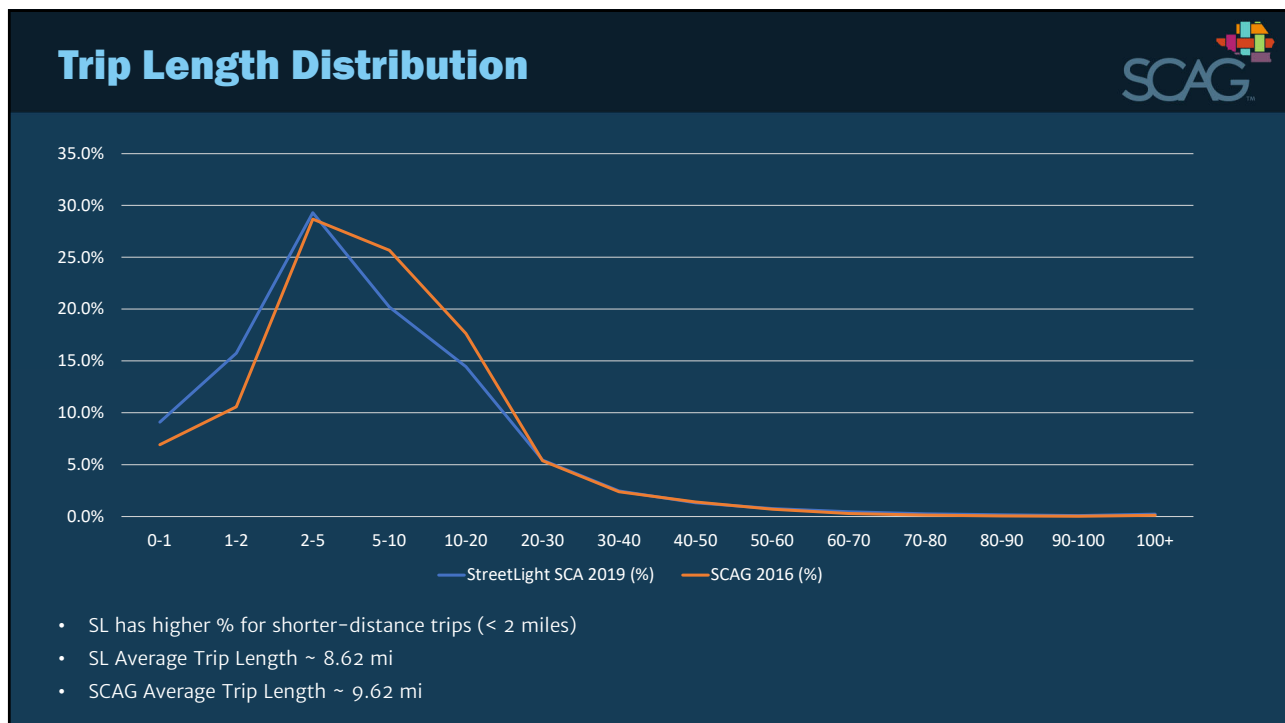
SCAG 2016		IMP	LA	OR	RIV	SB	VN		
County Name	County No.	25	37	59	65	71	111	Sum of Origin	% Origin
Imperial County	25	341,663	15	177	2,481	44	-	344,381	1%
Los Angeles County	37	25	23,417,477	762,299	129,597	377,140	217,046	24,903,585	56%
Orange County	59	171	764,470	6,979,434	135,648	93,248	2,718	7,975,691	18%
Riverside County	65	2,454	122,693	139,841	3,890,333	326,320	1,048	4,482,689	10%
San Bernardino County	71	47	381,045	92,425	323,365	3,750,142	1,962	4,548,986	10%
Ventura County	111	-	217,698	2,137	1,079	1,814	1,645,064	1,867,793	4%
Sum	Sum of Destination	344,361	24,903,398	7,976,314	4,482,505	4,548,708	1,867,839	44,123,125	100%
	% Destination	1%	56%	18%	10%	10%	4%	100%	
	Sum Intra-County	40,024,113							
	% Intra-County	0.91							

StreetLight 2019		IMP	LA	OR	RIV	SB	VN		
County Name	County No.	25	37	59	65	71	111	Sum of Origin	% Origin
Imperial County	25	452,340	366	163	4,279	493	16	457,657	1%
Los Angeles County	37	358	29,403,724	777,960	119,468	430,048	231,661	30,963,219	51%
Orange County	59	153	776,990	9,763,243	134,038	87,569	3,524	10,765,517	18%
Riverside County	65	4,309	118,748	132,684	7,714,108	453,001	1,592	8,424,442	14%
San Bernardino County	71	542	418,093	85,775	456,032	6,342,458	2,352	7,305,252	12%
Ventura County	111	21	227,871	3,349	1,643	2,578	2,598,894	2,834,356	5%
Sum	Sum of Destination	457,723	30,945,792	10,763,174	8,429,568	7,316,147	2,838,039	60,750,443	100%
	% Destination	1%	51%	18%	14%	12%	5%	100%	38%
	Sum Intra-County	56,274,767							
	% Intra-County	0.93							

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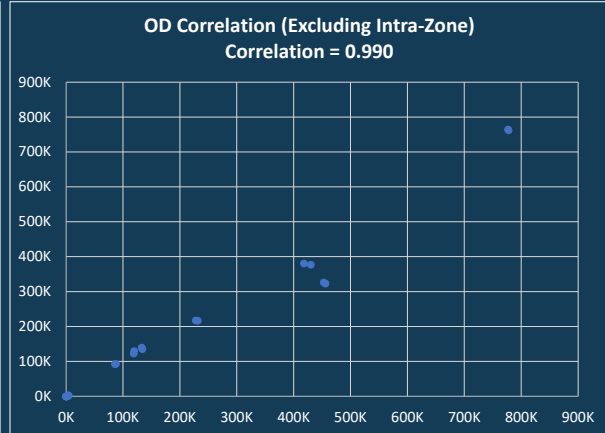
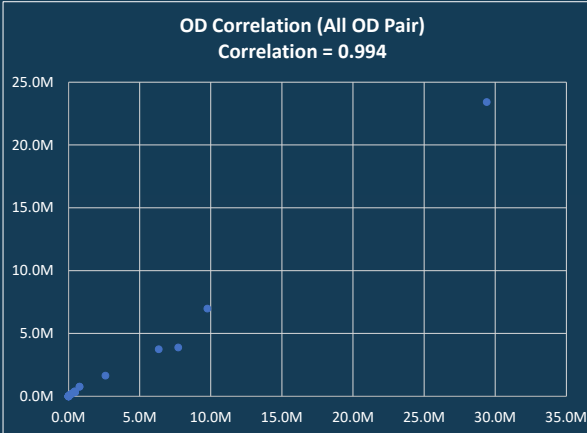


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# County Correlation



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# Sub-County Area Origin-Destination



SCAG 2016		Imperial	San Bernardino	Ventura	Westside Cities	South Bay Cities	City of Los Angeles	Las Virgenes	Gateway Cities	San Fernando Valley	San Gabriel Valley	North Los Angeles County	Orange County North	Orange County South	WRCOG and Riverside Non-COG	Coachella Valley	Sum of Origin	% Origin	
Sub-County Area	SCA_ID	25	71	111	371	372	373	374	375	376	377	378	591	592	651	652			
Imperial	25	341,995	44	-	-	1	3	-	16	-	9	-	4	4	79	2,402	344,557	1%	
San Bernardino	71	47	3,750,142	1,962	6,081	5,445	22,906	196	29,249	12,752	291,963	12,454	55,084	37,341	307,575	15,791	4,548,986	10%	
Ventura	111	-	1,814	1,645,064	13,128	5,135	18,347	51,676	4,463	105,911	5,088	13,951	1,291	846	452	627	1,867,793	4%	
Westside Cities	371	-	6,044	13,454	655,661	153,138	499,771	11,575	59,676	118,006	32,704	10,707	12,448	8,835	4,417	859	1,587,295	4%	
South Bay Cities	372	1	5,783	6,211	150,001	1,713,879	280,226	3,203	365,980	36,738	30,230	2,816	42,408	24,112	6,000	1,719	2,669,308	6%	
City of Los Angeles	373	3	24,666	21,920	489,857	279,139	2,774,110	11,172	491,117	440,796	295,675	19,273	35,965	19,730	10,039	3,147	4,916,608	11%	
Las Virgenes	374	-	192	48,893	12,574	2,713	10,181	94,759	2,213	63,433	1,957	1,399	358	166	33	78	238,950	1%	
Gateway Cities	375	19	30,938	5,709	63,356	361,762	490,912	2,890	3,045,709	56,721	311,841	4,530	371,343	83,418	27,312	3,261	4,859,719	11%	
San Fernando Valley	376	-	12,949	101,155	122,761	38,682	443,485	58,365	57,264	3,700,321	145,478	104,057	11,311	6,647	3,181	2,596	4,808,250	11%	
San Gabriel Valley	377	17	284,267	5,891	34,603	30,753	298,547	2,335	316,415	144,087	3,017,094	9,916	107,081	37,243	63,063	3,092	4,354,404	10%	
North Los Angeles County	378	-	12,301	13,813	10,646	2,659	16,040	1,875	4,061	107,517	10,193	1,287,922	821	401	460	341	1,469,049	3%	
Orange County North	591	8	55,195	1,623	13,700	44,834	34,738	472	371,898	11,412	107,504	860	2,262,837	665,240	64,131	2,930	3,637,383	8%	
Orange County South	592	5	38,053	1,095	8,991	24,689	17,262	190	83,488	6,269	37,712	437	667,319	3,384,035	65,619	2,969	4,338,132	10%	
WRCOG and Riverside Non-COG	651	76	308,591	552	4,281	5,667	8,741	40	25,964	3,051	63,735	497	66,888	67,858	3,039,140	14,779	3,609,858	8%	
Coachella Valley	652	2,378	17,729	496	480	1,109	2,052	57	2,283	1,783	2,687	268	2,599	18,666	817,749		872,831	2%	
<b>Sum</b>		<b>Sum of Destination</b>	344,548	4,548,708	1,867,839	1,586,119	2,669,603	4,917,321	238,807	4,859,795	4,808,797	4,353,870	1,469,086	3,637,755	4,338,371	3,610,167	872,338	44,123,125	100%
		<b>% Destination</b>	1%	10%	4%	4%	6%	11%	1%	11%	11%	10%	3%	8%	10%	8%	2%	100%	

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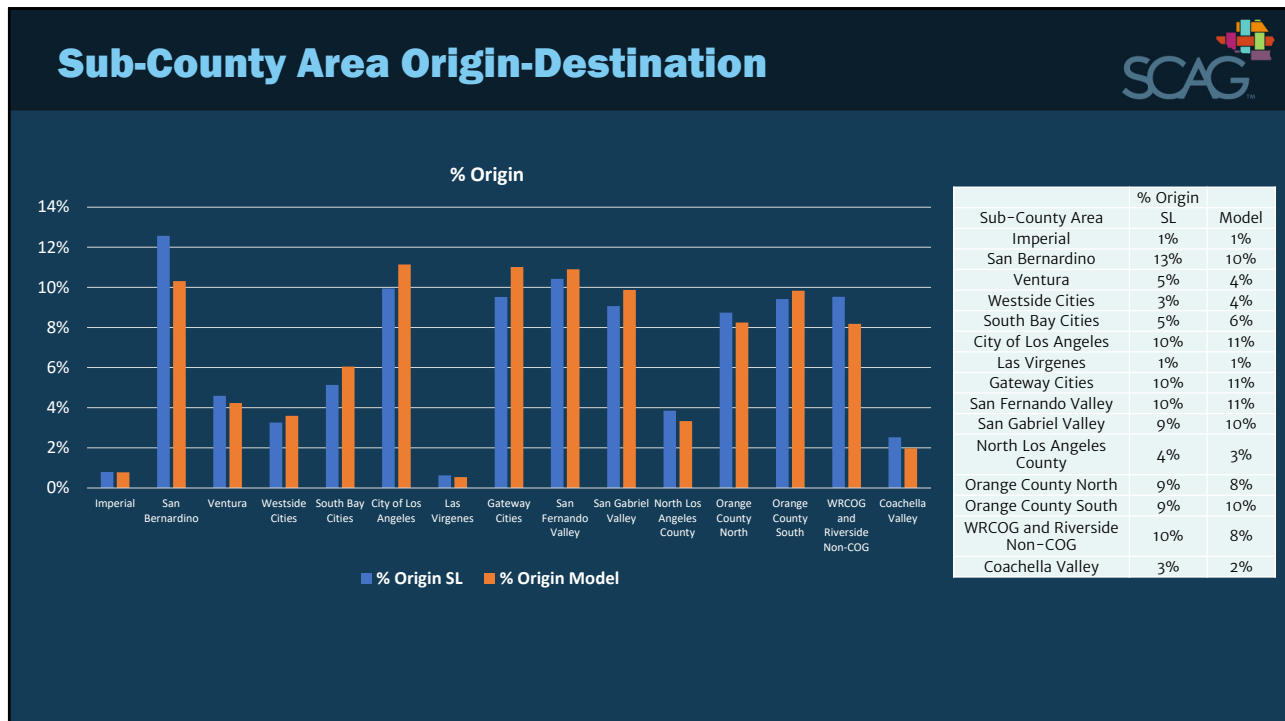
## Sub-County Area Origin-Destination



StreetLight 2019

Sub-County Area	SCA_ID	Imperial	San Bernardino	Ventura	Westside Cities	South Bay Cities	City of Los Angeles	Las Virgenes	Gateway Cities	San Fernando Valley	San Gabriel Valley	North Los Angeles County	Orange County North	Orange County South	WRCOG and Riverside Non-COG	Coachella Valley	Sum of Origin	% Origin
Imperial	25	452,339	494	15	8	50	51	1	99	45	67	40	81	79	473	3,548	457,390	1%
San Bernardino	71	543	6,345,391	2,276	6,736	10,252	29,347	382	38,080	13,080	305,506	9,588	53,310	31,925	389,955	18,818	7,255,189	13%
Ventura	111	20	2,495	2,419,021	9,896	2,724	14,204	82,087	3,113	92,714	4,539	14,704	1,868	1,328	1,106	323	2,650,142	5%
Westside Cities	371	5	6,378	9,987	1,015,009	139,722	478,366	15,207	43,645	109,772	24,981	9,679	15,067	10,727	3,951	556	1,883,052	3%
South Bay Cities	372	42	10,453	2,783	137,321	2,216,815	219,297	1,711	256,586	23,311	24,187	3,920	41,946	18,592	7,510	750	2,965,224	5%
City of Los Angeles	373	33	29,964	14,811	475,273	217,204	3,804,290	9,788	390,015	419,810	277,849	28,439	39,594	20,021	12,190	1,110	5,740,391	10%
Las Virgenes	374	2	404	81,947	14,422	1,625	9,218	172,380	1,094	75,608	1,466	2,105	469	493	203	67	361,503	1%
Gateway Cities	375	113	39,239	3,161	44,292	248,579	383,171	1,185	4,043,289	37,466	210,697	5,655	373,760	81,638	22,759	1,343	5,496,293	10%
San Fernando Valley	376	35	13,447	95,996	110,965	23,505	416,166	79,063	37,466	4,958,632	128,287	127,745	11,614	7,267	4,955	986	6,016,129	10%
San Gabriel Valley	377	89	314,854	4,472	24,887	23,455	269,004	1,528	208,656	128,291	4,083,063	10,439	85,928	32,346	42,917	1,957	5,231,886	9%
North Los Angeles County	378	34	9,727	14,596	9,214	3,609	26,768	2,170	5,334	123,755	10,182	2,012,000	2,433	1,519	2,083	408	2,223,832	4%
Orange County North	591	84	54,675	2,003	15,293	40,428	38,637	526	374,284	11,761	87,491	2,781	3,736,450	619,314	59,793	1,800	5,045,320	9%
Orange County South	592	68	32,389	1,363	11,259	18,214	19,495	520	80,725	7,299	32,349	1,697	627,502	4,547,850	54,102	1,833	5,436,665	9%
WRCOG and Riverside Non-COG	651	499	387,700	1,129	4,294	7,477	12,312	231	22,598	5,112	42,901	2,224	58,352	54,780	4,882,632	19,464	5,501,705	10%
Coachella Valley	652	3,548	17,924	254	531	536	1,050	70	1,019	818	1,539	398	1,599	1,565	18,957	1,406,727	1,456,535	3%
<b>Sum</b>		<b>457,454</b>	<b>7,265,534</b>	<b>2,653,814</b>	<b>1,879,400</b>	<b>2,954,195</b>	<b>5,721,376</b>	<b>366,849</b>	<b>5,506,003</b>	<b>6,007,420</b>	<b>5,235,104</b>	<b>2,231,414</b>	<b>5,049,973</b>	<b>5,429,444</b>	<b>5,503,586</b>	<b>1,459,690</b>	<b>57,721,256</b>	<b>31%</b>
<b>Sum of Destination</b>		<b>457,454</b>	<b>7,265,534</b>	<b>2,653,814</b>	<b>1,879,400</b>	<b>2,954,195</b>	<b>5,721,376</b>	<b>366,849</b>	<b>5,506,003</b>	<b>6,007,420</b>	<b>5,235,104</b>	<b>2,231,414</b>	<b>5,049,973</b>	<b>5,429,444</b>	<b>5,503,586</b>	<b>1,459,690</b>	<b>57,721,256</b>	<b>100%</b>
<b>% Destination</b>		<b>1%</b>	<b>13%</b>	<b>5%</b>	<b>3%</b>	<b>5%</b>	<b>10%</b>	<b>1%</b>	<b>10%</b>	<b>10%</b>	<b>9%</b>	<b>4%</b>	<b>9%</b>	<b>9%</b>	<b>10%</b>	<b>3%</b>	<b>100%</b>	<b>31%</b>

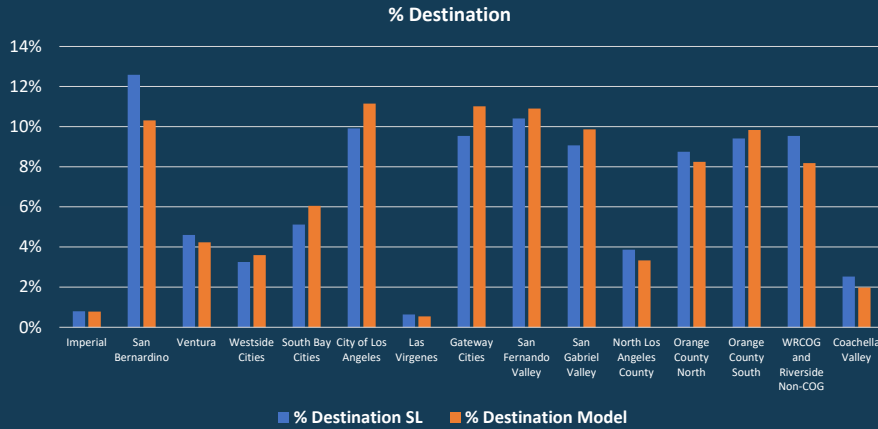
31



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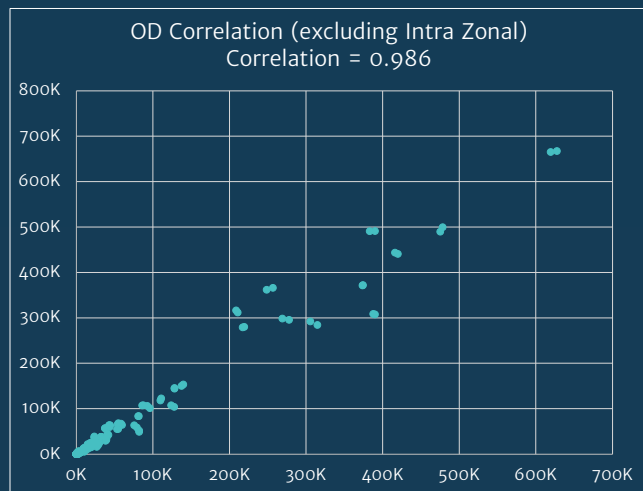
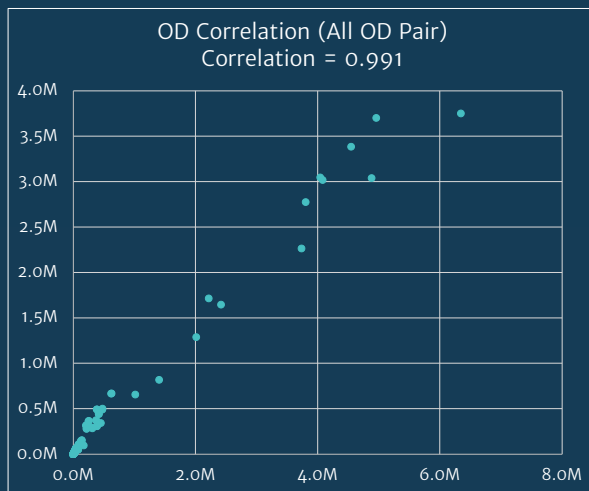
# Sub-County Area Origin-Destination



Sub-County Area	% Destination	
	SL	Model
Imperial	1%	1%
San Bernardino	13%	10%
Ventura	5%	4%
Westside Cities	3%	4%
South Bay Cities	5%	6%
City of Los Angeles	10%	11%
Las Virgenes	1%	1%
Gateway Cities	10%	11%
San Fernando Valley	10%	11%
San Gabriel Valley	9%	10%
North Los Angeles County	4%	3%
Orange County North	9%	8%
Orange County South	9%	10%
WRCOG and Riverside Non-COG	10%	8%
Coachella Valley	3%	2%

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# SCA Correlation



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**Thank you**

