



SCAG's Base Year 2019 Transit Model Network Development

Modeling Task Force Meeting

7/27/2022

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Background

- SCAG performs a model validation for every planning cycle
- The base year for the current planning period (2024 RTP) is 2019
- The key model input is highway and transit networks for base year
 - TransCAD highway link/node layers: develop continuously
 - TransCAD transit route system: develop from scratch
- Base Year 2012: Metro's TripMaster, SCAG's transit LOS data collection
- Base Year 2016: GTFS converted from TripMaster
- Base Year 2019: Raw GTFS
 - Minimize the manual correction of routes and stops after importing
 - Maximize the use of existing transit LOS data (GTFS itself, NTD fares)

Overall Procedure

- Collect GTFS (General Transit Feed Specification) for public agencies who provide fixed-route transit services in the SCAG region
- Import GTFS to the TransCAD transit route systems
 - Wednesday services as a typical weekday
 - Include all different route patterns
 - inbound and outbound directions
 - different route paths for the same direction
 - different middle stop locations for the same route path
- Calculate transit route and stop attributes

70 Carriers & 3,155 Route Patterns

Carrier	Routes	%	Carrier	Routes	%	Carrier	Routes	%
LA Metro	1084	34.4%	Glendale Beeline	25	0.8%	Beach Cities Transit	6	0.2%
Orange County Transportation Authority	230	7.3%	Pasadena Transit	24	0.8%	Baldwin Park Transit	6	0.2%
Riverside Transit Agency	175	5.5%	City of Commerce Transit System	23	0.7%	Bellflower Bus	5	0.2%
Long Beach Transit	125	4.0%	Anaheim Resort Transportation	19	0.6%	Ojai Trolley	4	0.1%
Omnitrans	97	3.1%	Morongo Basin Transit Authority	18	0.6%	Moorpark Transit	4	0.1%
Foothill Transit	96	3.0%	Beaumont Transit	18	0.6%	La Puente Link Shuttle	4	0.1%
Santa Clarita Transit	91	2.9%	Big Bear Mountain Transit	17	0.5%	Downeylink Transit System	4	0.1%
Victor Valley Transit Authority	86	2.7%	Carson Circuit Transit System	15	0.5%	City of South Gate	4	0.1%
LADOT DASH	81	2.6%	Palo Verde Valley Transit Agency	14	0.4%	Burbank Bus	4	0.1%
Santa Monica Big Blue Bus	71	2.3%	Simi Valley Transit	13	0.4%	Alhambra Community Transit	4	0.1%
VCTC Intercity (formerly known as VISTA)	66	2.1%	Laguna Beach Transit	13	0.4%	LAX Shuttle and Airline Connections	3	0.1%
Torrance Transit	60	1.9%	Thousand Oaks Transit (TOT)	12	0.4%	City of Sierra Madre Gateway Coach	3	0.1%
SunLine Transit Agency	58	1.8%	Compton Renaissance	12	0.4%	Rosemead Explorer & Commuter Connection	2	0.1%
LADOT Commuter Express	58	1.8%	Lynwood Trolley (Lynwood Breeze)	11	0.3%	Lawndale Trolley	2	0.1%
Antelope Valley Transit Authority	57	1.8%	VALLEY EXPRESS TRANSIT SERVICES	9	0.3%	Huntington Park Combi	2	0.1%
Gold Coast Transit	46	1.5%	City of Monterey Park Spirit Bus	9	0.3%	Cudahy CART	2	0.1%
Metrolink	45	1.4%	Flyaway	8	0.3%	City of Inglewood I-Line Shuttle	2	0.1%
Montebello Bus Lines	44	1.4%	Corona Cruiser	8	0.3%	Cerritos On Wheels	2	0.1%
Palos Verdes Peninsula Transit Authority	43	1.4%	Go West Shuttle Service (West Covina)	7	0.2%	Bell Gardens Town Trolley	2	0.1%
Los Angeles County Shuttles (LA Go Bus)	36	1.1%	El Monte Transit (Trolleys)	7	0.2%	Kanan Shuttle	1	0.0%
Imperial Valley Transit	35	1.1%	City of Glendora	7	0.2%	City of El Segundo	1	0.0%
Culver City Bus	34	1.1%	Amtrak	7	0.2%	Calabasas Trolley	1	0.0%
Norwalk Transit System	32	1.0%	West Hollywood Transportation	6	0.2%			
Gardena Municipal Bus Lines	29	0.9%	Camarillo Area Transit	6	0.2%			
						<i>Total =</i>	3155	100.0%

70 Carriers & 628,264 Revenue Miles

Carrier	RevMiles	%	Carrier	RevMiles	%	Carrier	RevMiles	%
LA Metro	250,393	39.9%	Imperial Valley Transit	3,283	0.5%	Huntington Park Combi	631	0.1%
Orange County Transportation Authority	62,256	9.9%	Glendale Beeline	2,538	0.4%	Cerritos On Wheels	585	0.1%
Foothill Transit	40,457	6.4%	Pasadena Transit	2,517	0.4%	VALLEY EXPRESS TRANSIT SERVICES	550	0.1%
Riverside Transit Agency	32,725	5.2%	Carson Circuit Transit System	2,170	0.3%	Bellflower Bus	527	0.1%
Omnitrans	29,466	4.7%	Morongo Basin Transit Authority	1,750	0.3%	City of South Gate	521	0.1%
Long Beach Transit	22,903	3.6%	Beaumont Transit	1,748	0.3%	Downeylink Transit System	489	0.1%
LADOT DASH	18,965	3.0%	Palos Verdes Peninsula Transit Authority	1,401	0.2%	Moorpark Transit	417	0.1%
Santa Monica Big Blue Bus	15,689	2.5%	Big Bear Mountain Transit	1,390	0.2%	West Hollywood Transportation	411	0.1%
Antelope Valley Transit Authority	11,707	1.9%	Simi Valley Transit	1,343	0.2%	Rosemead Explorer & Commuter Connection	399	0.1%
Victor Valley Transit Authority	11,448	1.8%	City of Commerce Transit System	1,319	0.2%	Laguna Beach Transit	396	0.1%
SunLine Transit Agency	10,355	1.6%	Beach Cities Transit	1,233	0.2%	Ojai Trolley	368	0.1%
Santa Clarita Transit	10,151	1.6%	Burbank Bus	1,210	0.2%	La Puente Link Shuttle	361	0.1%
Metrolink	9,623	1.5%	LAX Shuttle and Airline Connections	1,204	0.2%	City of Glendora	321	0.1%
Montebello Bus Lines	7,654	1.2%	Anaheim Resort Transportation	1,145	0.2%	Bell Gardens Town Trolley	321	0.1%
LADOT Commuter Express	6,906	1.1%	Thousand Oaks Transit (TOT)	1,060	0.2%	Lawndale Trolley	252	0.0%
Torrance Transit	6,835	1.1%	Compton Renaissance	993	0.2%	Camarillo Area Transit	224	0.0%
Flyaway	6,736	1.1%	Palo Verde Valley Transit Agency	953	0.2%	Calabasas Trolley	192	0.0%
Gold Coast Transit	6,100	1.0%	Lynwood Trolley (Lynwood Breeze)	870	0.1%	Kanan Shuttle	166	0.0%
VCTC Intercity (formerly known as VISTA)	5,612	0.9%	City of Monterey Park Spirit Bus	787	0.1%	Cudahy CART	112	0.0%
Gardena Municipal Bus Lines	5,434	0.9%	Baldwin Park Transit	750	0.1%	City of Inglewood I-Line Shuttle	106	0.0%
Culver City Bus	5,230	0.8%	El Monte Transit (Trolleys)	717	0.1%	City of El Segundo	74	0.0%
Amtrak	4,879	0.8%	Go West Shuttle Service (West Covina)	665	0.1%	City of Sierra Madre Gateway Coach	35	0.0%
Norwalk Transit System	3,654	0.6%	Alhambra Community Transit	638	0.1%			
Los Angeles County Shuttles (LA Go Bus)	3,310	0.5%	Corona Cruiser	632	0.1%			
						<i>Total =</i>	628,264	100.0%

Overall Comparisons

	BY 2016	BY 2019
Carriers	78	70
Rail Route Patterns	84	79
Bus Route Patterns	2,758	3,076
Rail Physical Stations	156	158
Bus Route Stops	117,377	128,476

Notes:

- 4 carriers in BY 2016 were incorporated into a bigger agency: Barstow, Duarte, Irvine, South Whittier
- 2 carriers in BY 2016 discontinued: La Habra Express, Paramount Easy Rider
- 2019 GTFS is not available for 3 carriers: Arcadia, Bell, Maywood
- 1 carrier was added to BY 2019: Anaheim Resort Transportation

Revenue Miles Comparison by Transit Mode

Transit Mode	BY 2016	BY 2019	BY19/BY16
Commuter Rail	13,843	14,503	1.05
Local Rail	24,465	24,625	1.01
Bus Rapid Transit	6,195	5,328	0.86
Express Bus	72,487	69,016	0.95
Rapid Bus	49,046	47,408	0.97
Local Bus	449,031	467,385	1.04
Total	615,067	628,264	1.02

Notes:

- LA Metro Blue Line was temporarily closed for the southern portion from 01/2019 to 05/2019 and for the northern portion from 06/2019 to 10/2019. However, the entire Blue Line is coded in BY 2019.
- Some local and express bus routes out of the SCAG region are coded in BY 2019 to facilitate the import of GTFS: VCTC Intercity Express Bus to Santa Barbara, RTA Express Bus to Oceanside, AVTA Local Bus to Kern County

GTFS Data Sources

- GTFS: a text-based specification for a transit system
 - agency.txt, stops.txt, routes.txt, trips.txt, stop_times.txt, calendar.txt, shapes.txt
- Two different sources:
 - Raw GTFS from www.transitfeeds.com & agency's website
 - Pros: accurate stop locations
 - Cons: not available for many small agencies
 - GTFS converted from LA Metro's TripMaster
 - Pros: good coverage, less route patterns
 - Cons: stops consolidated at intersections, direction_id unavailable

GTFS Importing

- ***Route Systems > Import GTFS to Link Layer*** in TransCAD 9
- Base Year 2019 highway network as the underline link layer
- Select only Wednesday trips as a typical weekday
- Carefully set up the TransCAD .NET file
 - Define a proper network cost field
 - Link length with an HOV adjustment: useful for locating bus routes on HOV, not GP
 - Link travel times: useful for express bus routes with limited stops
 - Identify links that should not be used by buses and exclude them in the selection set
- Develop and maintain a SCAG planning highway network that is compatible with GTFS by adding missing street links

Transit Attributes

- Route attributes
 - route id, route name, route description, transit mode
 - trip frequency and average headway by time period
 - fare type, base cash fares, average fares
- Route stop attributes
 - route id, route information
 - route-stop coordinates, milepost, route-stop information, fare zone, rail times
 - corresponding highway node Id
- Physical stop attributes (not used in model)

Route Name Convention

Four components:

- Two-digit carrier code
- Line acronym
- Route direction
 - Forward or Reverse
- Route patterns

Route_ID	Route_Name	Carrier	Line	Direction	Pattern	Dist
57	MT-BLU-F-1	MT	BLU	F	1	5.77
58	MT-BLU-F-2	MT	BLU	F	2	3.92
59	MT-BLU-F-3	MT	BLU	F	3	15.27
60	MT-BLU-F-4	MT	BLU	F	4	18.36
61	MT-BLU-F-5	MT	BLU	F	5	21.32
62	MT-BLU-R-1	MT	BLU	R	1	3.84
63	MT-BLU-R-2	MT	BLU	R	2	11.75
64	MT-BLU-R-3	MT	BLU	R	3	15.27
65	MT-BLU-R-4	MT	BLU	R	4	21.25
66	MT-EXP-F-1	MT	EXP	F	1	12.64
67	MT-EXP-F-2	MT	EXP	F	2	15.24
68	MT-EXP-R-1	MT	EXP	R	1	12.64
69	MT-EXP-R-2	MT	EXP	R	2	15.24
78	MT-GLD-F-1	MT	GLD	F	1	5.77
79	MT-GLD-F-2	MT	GLD	F	2	30.71
80	MT-GLD-R-1	MT	GLD	R	1	5.77
81	MT-GLD-R-2	MT	GLD	R	2	25.48
82	MT-GLD-R-3	MT	GLD	R	3	24.15
83	MT-GLD-R-4	MT	GLD	R	4	30.71
74	MT-GRN-F-1	MT	GRN	F	1	7.97
75	MT-GRN-F-2	MT	GRN	F	2	18.46
76	MT-GRN-F-3	MT	GRN	F	3	19.56
77	MT-GRN-R-1	MT	GRN	R	1	19.56
72	MT-PUR-F-1	MT	PUR	F	1	4.99
73	MT-PUR-R-1	MT	PUR	R	1	4.99
70	MT-RED-F-1	MT	RED	F	1	14.66
71	MT-RED-R-1	MT	RED	R	1	14.66

Transit Modes

Mode1	Mode2	Description
1CR	10	Commuter Rail (Metrolink and Amtrak's Pacific Surfliner)
2LR	11	Local Rail
HSR	12	High-Speed Rail (future)
7BR	19	BRT (LA Metro Orange Line)
3EX	20	LA Metro Express Bus
	21	LADOT Commuter Express Bus
	22	Other Express Bus
6TB	23	Transitway Bus (Express Bus on I-110 and I-10 Expresslanes)
5LB	30	LA Metro Local Bus
	31	Muni Local Bus
	32	Other Local Bus
4RB	33	Rapid bus (e.g., LA Metro 770, Omnitrans sbX)

Average Headway Calculation (1)

- TransCAD creates a schedule table called GTFS_Routes_Weekday.bin
- Distinguish each trip by time period, using a midpoint time from the first stop time to the last stop time
- 5 time periods:
 - AM Peak: 6am to 9am
 - Midday: 9am to 3pm
 - PM Peak: 3pm to 7pm
 - Evening: 7pm to 9pm
 - Night: 9pm to 6am

Dataview16 - GTFS_Routes_Weekday

Route_ID	Trip	Sequence	Time	Access	Block	Min_Time	Stop_ID
1	1	0	345.00	1	1	345	64
1	1	1	366.00	1	1	345	35
1	1	2	372.00	1	1	345	30
1	1	3	379.00	1	1	345	55
1	1	4	403.00	1	1	345	54
1	1	5	410.00	1	1	345	38
1	1	6	419.00	1	1	345	39
1	1	7	435.00	1	1	345	65
1	2	0	1130.00	1	1	345	64
1	2	1	1151.00	1	1	345	35
1	2	2	1157.00	1	1	345	30
1	2	3	1164.00	1	1	345	55
1	2	4	1188.00	1	1	345	54
1	2	5	1195.00	1	1	345	38
1	2	6	1204.00	1	1	345	39
1	2	7	1225.00	1	1	345	65

Midpoint: 390 mins
→ AM Peak trip

Midpoint: 1177.5 mins
→ Evening trip

Average Headway Calculation (2)

- For each route pattern, calculate the number of trips (trip frequency) by time period
- Calculate average headway for each time period:
 - $AM_hdwy = 180 \text{ mins} / AM_freq$
 - $MD_hdwy = 360 \text{ mins} / MD_freq$
 - $PM_hdwy = 240 \text{ mins} / PM_freq$
 - $EV_hdwy = 120 \text{ mins} / EV_freq$
 - $NT_hdwy = 540 \text{ mins} / NT_freq$

Route_ID	Route_Name	Sign	AM_freq	MD_freq	PM_freq	EV_freq	NT_freq	Day_freq	AM_hdwy	MD_hdwy	PM_hdwy	EV_hdwy	NT_hdwy
1	ML-91-F-1	Riverside - Downtown	1	0	0	1	0	2	180.00	--	--	120.00	--
2	ML-91-F-2	Perris - South	0	0	4	0	0	4	--	--	60.00	--	--
3	ML-91-R-1	L.A. Union Station	0	0	1	0	0	1	--	--	240.00	--	--
4	ML-91-R-2	L.A. Union Station	3	0	0	0	1	4	60.00	--	--	--	540.00

3 Different Transit Fare Types

- Average initial boarding fares
 - Need to consider complex fare structures
 - NTD's average fare per trip by agency and mode
 - If not available, multiply base cash fares by a fare factor from the previous transit LOS data collection
- Average transfer fares
 - Defined at a mode-to-mode transfer table
 - e.g., the transfer fares from Metrolink to Urban Rail are free
- Average zonal fares
 - Commuter rail and some express bus services are based on zonal fares
 - The zone-to-zone fares are specified in a fare matrix
- All the fare types are converted to 2011\$ by a CPI adjustment factor

Stop Attributes – Rail Times

- Bus IVTT is computed based on congested travel times on highway links by auto
- Rail IVTT is hard-coded in the route-stop layer
 - stop_times.txt
 - scheduled travel times from this station to next station
 - PK/OP_RailTime

STOP_ID	Route_ID	Milepost	Route_Name	Stop_Name	Sequence	PK_RailTime	OP_RailTime
772	70	0.00	MT-RED-F-1	RED-North Hollywood	1	4.00	4.00
773	70	2.16	MT-RED-F-1	RED-Universal City/Studio City	2	4.00	4.00
774	70	5.41	MT-RED-F-1	RED-Hollywood/Highland	3	2.00	2.00
775	70	6.17	MT-RED-F-1	RED-Hollywood/Vine	4	2.00	2.00
776	70	7.15	MT-RED-F-1	RED-Hollywood/Western	5	2.00	2.00
777	70	8.29	MT-RED-F-1	RED-Vermont/Sunset	6	1.00	1.00
778	70	8.82	MT-RED-F-1	RED-Vermont/Santa Monica	7	2.00	2.00
779	70	9.75	MT-RED-F-1	RED-Vermont/Beverly	8	3.00	3.00
780	70	10.78	MT-RED-F-1	RED/PUR-Vermont	9	2.00	2.00
781	70	11.79	MT-RED-F-1	RED/PUR-Westlake/MacArthur Park	10	2.00	2.00
782	70	12.87	MT-RED-F-1	RED/PUR-7th St/Metro Center	11	1.00	1.00
783	70	13.40	MT-RED-F-1	RED/PUR-Pershing Square	12	1.00	1.00
784	70	13.88	MT-RED-F-1	RED/PUR-Civic Center/Grand Park	13	3.00	3.00
785	70	14.66	MT-RED-F-1	RED/PUR-Union Station	14	999.00	999.00
786	71	0.00	MT-RED-R-1	RED/PUR-Union Station	1	2.00	2.00
787	71	0.77	MT-RED-R-1	RED/PUR-Civic Center/Grand Park	2	1.00	1.00
788	71	1.26	MT-RED-R-1	RED/PUR-Pershing Square	3	2.00	2.00
789	71	1.79	MT-RED-R-1	RED/PUR-7th St/Metro Center	4	2.00	2.00
790	71	2.86	MT-RED-R-1	RED/PUR-Westlake/MacArthur Park	5	2.00	2.00
791	71	3.88	MT-RED-R-1	RED/PUR-Vermont	6	2.00	2.00
792	71	4.91	MT-RED-R-1	RED-Vermont/Beverly	7	2.00	2.00
793	71	5.83	MT-RED-R-1	RED-Vermont/Santa Monica	8	1.00	1.00
794	71	6.37	MT-RED-R-1	RED-Vermont/Sunset	9	2.00	2.00
795	71	7.50	MT-RED-R-1	RED-Hollywood/Western	10	3.00	3.00
796	71	8.48	MT-RED-R-1	RED-Hollywood/Vine	11	2.00	2.00
797	71	9.25	MT-RED-R-1	RED-Hollywood/Highland	12	4.00	4.00
798	71	12.50	MT-RED-R-1	RED-Universal City/Studio City	13	4.00	4.00
799	71	14.66	MT-RED-R-1	RED-North Hollywood	14	999.00	999.00

Stop Attributes – Fare Zones

- Define a fare zone for each stop of routes with a zonal fare system, based on a published fare schedule
- Match the fare zones with row and columns in the zonal fare matrix
- Fill in the matrix cells with average zonal fares (2011\$)

Dataview20 - 24r19by_stops

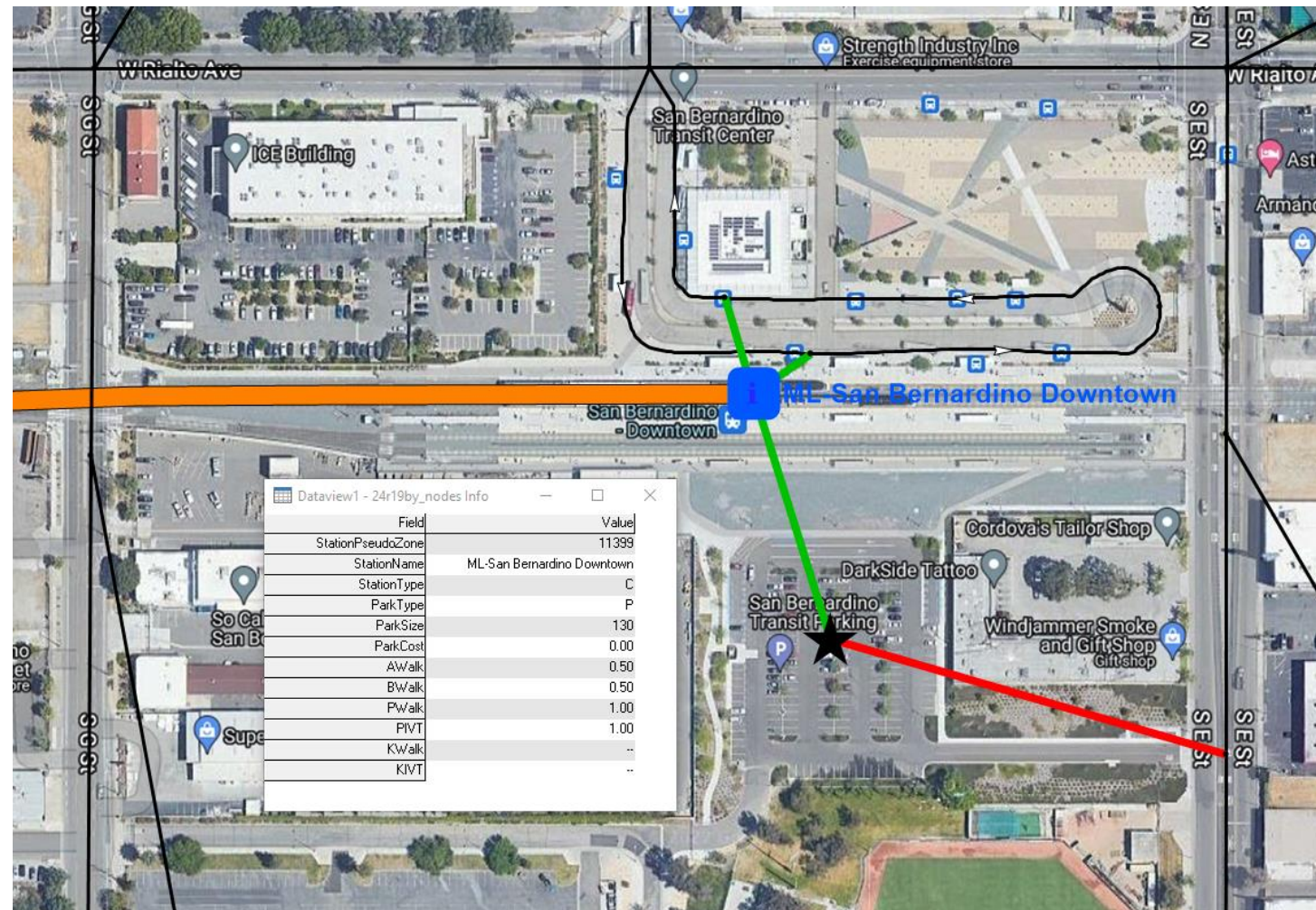
STOP_ID	Route_ID	Milepost	Route_Name	Stop_Name	Sequence	Fare_Type	Fare_Zone
18945	726	0.03	CX-409-R-3	Foothill Blvd & Glenoaks Blvd (Departing)	0	2	3
18946	726	1.32	CX-409-R-3	Foothill Blvd & Bledsoe St (Eastbound)	1	2	3
18947	726	1.87	CX-409-R-3	Foothill Blvd & Polk St (Eastbound)	2	2	3
18948	726	2.70	CX-409-R-3	Foothill Blvd & Hubbard St (Eastbound)	3	2	3
18949	726	3.53	CX-409-R-3	Foothill Blvd & Maclay St (Eastbound)	4	2	3
18950	726	4.58	CX-409-R-3	Foothill Blvd & Paxton St (Eastbound)	5	2	3
18951	726	5.69	CX-409-R-3	Foothill Blvd & Terra Bella St (Eastbound)	6	2	3
18952	726	6.57	CX-409-R-3	Foothill Blvd & 210 Hwy (Eastbound)	7	2	3
18953	726	10.34	CX-409-R-3	Sunland Blvd & Foothill Blvd (Eastbound)	8	2	2
18954	726	10.51	CX-409-R-3	Foothill Blvd & Sherman Grove Ave (Eastbound)	9	2	2
18955	726	10.73	CX-409-R-3	Foothill Blvd & Oro Vista Ave (Eastbound)	10	2	2
18956	726	11.23	CX-409-R-3	Foothill Blvd & Woodward Ave (Eastbound)	11	2	2
18957	726	11.79	CX-409-R-3	Foothill Blvd & Apperson St (Eastbound)	12	2	2
18958	726	12.27	CX-409-R-3	Foothill Blvd & Mountair Ave (Eastbound)	13	2	2
18959	726	12.76	CX-409-R-3	Foothill Blvd & Pinewood Ave (Eastbound)	14	2	2
18960	726	13.34	CX-409-R-3	Foothill Blvd & Tujunga Canyon Blvd (Eastbound)	15	2	2
18961	726	14.03	CX-409-R-3	Foothill Blvd & Lowell Ave (Eastbound)	16	2	2
18962	726	14.67	CX-409-R-3	Honolulu & Lowell Ave	17	2	2
18963	726	17.62	CX-409-R-3	Montrose Ave & Ocean View Blvd (Eastbound)	18	2	2
18964	726	17.88	CX-409-R-3	Montrose Ave & Florencita Dr (Southbound)	19	2	2
18965	726	18.23	CX-409-R-3	Verdugo Blvd & Valihi Way (Eastbound)	20	2	2
18966	726	22.36	CX-409-R-3	Harvey Dr & Holly Dr (Southbound)	21	2	1
18967	726	22.64	CX-409-R-3	Glendale Park & Ride (Eastbound)	22	2	1
18968	726	22.90	CX-409-R-3	Eagledale Ave & Colorado St (Southbound)	23	2	1
18969	726	30.98	CX-409-R-3	Broadway & Temple St.	24	2	1
18970	726	32.38	CX-409-R-3	Flower St & 7th St	25	2	1
18971	726	33.25	CX-409-R-3	Hill St & 12th St	26	2	1

Matrix21 - Zonal Fares for 2024 RTP (CX-409) - farematrix_2024rtp.mtx

	1	2	3	4	5
1	0.88	1.46	1.75	999.00	999.00
2	1.46	0.88	0.88	999.00	999.00
3	1.75	0.88	0.88	999.00	999.00
4	999.00	999.00	999.00	999.00	999.00
5	999.00	999.00	999.00	999.00	999.00
6	999.00	999.00	999.00	999.00	999.00
7	999.00	999.00	999.00	999.00	999.00

PNR Coding

Field	Description
<u>PseudoZone</u>	Pseudo zone number (11351-11,999)
<u>StationName</u>	Transit station description
<u>SGID</u>	Station group identification number [not used]
<u>UseFlag</u>	Flag indicating whether station is active [1] or inactive [0]
<u>SType</u>	Line-haul transit mode (B – bus, C – commuter rail, U – urban rail, R – BRT, T – transitway, H – high-speed rail)
<u>UType</u>	Urban rail line indicator (G – elevated, R – underground, B – at grade)
<u>TNode</u>	Rail, BRT or Transitway station node (TCNODE)
<u>HNode</u>	Highway node [not used]
<u>AWalk</u>	Walk access time from station entrance to station platform (min)
<u>BWalk</u>	Walk access time from bus stop to station platform (min)
<u>ParkType</u>	Parking behavior allowed (P-park, K-drop off only)
<u>ParkSize</u>	Parking capacity (veh)
<u>ParkCost</u>	Parking cost (dollars)
<u>PWalk</u>	Walk access time from parking lot to station platform (min)
<u>PIVT</u>	In-vehicle time from nearest highway node to parking space in lot (min)
<u>KWalk</u>	Walk access time from drop-off location to station platform (min)
<u>KIVT</u>	In-vehicle time from nearest highway node to curb for passenger drop-off (min)



- Parking cost link (mode=26, red line)
- Walk transfer link (mode=24, green line)
- PNR lot node (black star)
- Station node (blue square)

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THANK YOU!
