Memorandum

ARUP

To	Philip Ho, City of Oakland Alicia Parker, City of Oakland Mark Wald, City of Oakland	Date	January 20, 2012
Copies	John Cook, Circlepoint Tim Rood, CD+A	Reference number	208838/MVI
From	Michael V. Iswalt x 27748 (SF)	File reference	4-05
Subject	Central Estuary Implementation Guide - EIR Transportation Analysis Methodology		

This memorandum summarizes Arup's proposed methodology for completing the transportation impact analysis for the Central Estuary Implementation Guide (CEIG) Environmental Impact Report (EIR). The proposed land use changes included in the Implementation Guide represent the "Project" for purposes of the EIR traffic analysis. The CEIG is intended as a companion to the City's 1999 Estuary Policy Plan (EPP). The City considers the EPP to serve as part of the General Plan for pertinent areas. An Estuary Plan Implementation Guide is called for in Policy MF-2 of the Estuary Policy Plan. The CEIG will identify specific steps to be undertaken to implement the recommendations of the Estuary Policy Plan. These include detailed strategies and work programs to create and implement projects, site design and development standards, funding and institutional strategies, and other administrative steps necessary to carry out the Estuary Policy Plan.

Figure 1 summarizes the existing land use and the "reasonably foreseeable growth" allowable under the Draft CEIG from the Notice of Preparation (NOP) (City of Oakland, November 21, 2011). These totals will serve as the basis for the transportation impact analysis.

Figure 1: Estimated Foreseeable Growth

Central Estuary Planning Area	Residential (dwelling units)		Live/Work (dwelling units)		Industrial (square feet)		Commercial and Office (square feet)		Parks (acres)	
	Existing	*Reasonably Foreseeable*	*Existing*	*Reasonably Foreseeable*	*Existing*	*Reasonably Foreseeable*	*Existing*	*Reasonably Foreseeable*	*Existing*	*Reasonably Foreseeable*
West	29	0	39	11	2,322,764	0	174,207	83,713	8.9	2.1
Central-West	355	391	95	20	593,894	-177,240	25,336	0	0.4	0.4
Central-East	59	0	0	0	1,219,699	-139,461	200,100	268,071	0	0
East	0	0	0	0	680,544	691,558	5,366	360,238	7.3	8.2
Total, Existing	***443***	--	***134***	--	***4,816,899***	--	***405,009***	--	***17.2***	--
Total, Reasonably Foreseeable	--	***391***	--	***31***	--	***374,857***	--	***712,022***	--	***10.7***

Notes: The number of "Reasonably Foreseeable" units does not include the "Existing" units. The sum of the "Existing" and "Reasonably Foreseeable" units is the total amount of units that would be allowable per land - use category under the Implementation Guide.

Compared to the Estuary Policy Plan, the Implementation Guide has a more focused geographic scope, and is therefore more specific in nature. This Central Estuary Implementation Guide is only one component of the Implementation Guide called for in the Estuary Policy Plan and applies only to the Central Estuary Area. Attachment 1 presents the boundaries of the Implementation Guide Plan Area and the location of the intersections included in the larger study area required for the EIR traffic analysis. Table 1 presents the complete list of study intersections:

Table 1: Study Intersections

1. Embarcadero / 16th Ave	16. Fruitvale Ave / E 12th St
2. International Blvd (E 14th St) / 22nd Ave	17. Fruitvale Ave / San Leandro St / E 10th St
3. E 12th St / 22nd Ave / 23rd Ave	18. Fruitvale Ave / E 9th St
4. 23rd Ave / E 11th St	19. Fruitvale Ave / E 8th St
5. Dennison St / Kennedy St / SB 880 off-ramp	20. Fruitvale Ave / Alameda Ave
6. Kennedy St / SB 880 on-ramp	21. Tilden Way / Fernside Blvd / Blanding Ave
7. 29th Ave / International Blvd	22. 42nd Ave / International Blvd
8. 29th Ave / E 12th St	23. High St / International Blvd
9. E 8th St / Lisbon Ave / NB 880 on-ramp	24. High St / E 12th St
10. E 9th St / E 8th St / NB 880 off-ramp	25. High St / San Leandro St
11. 23rd Ave / Ford St	26. High St / Coliseum Wy
12. 29th Ave / Ford St	27. High St / SB 880 off-ramp/Oakport St
13. 29th Ave / 23rd Ave / Park St	28. High St / Fernside Blvd
14. Park St / Lincoln Ave / Tilden Way	29. Coliseum Wy / NB 880 off-ramp
15. Fruitvale Ave / International Blvd	30. Oakport St / SB 880 on-ramp

The City has identified pending and proposed transportation projects that should be considered part of the "Transportation Baseline Condition" for purposes of the traffic impact analysis (see Attachment 2). The City has grouped the transportation projects by the following categories:

- Approved, Funded and Will be Complete by June 2012; Include in Existing Conditions (as well as 2020/2035)

- Approved and Funded; Not Existing, but Include in 2020/2035 Future Baseline

- Neither Approved, nor Funded: Do NOT include in Existing, 2020 or 2035 (can discuss as Alternative and/or in separate section (see BRT))

Within the study area, three roadway projects are included in the first two categories and should be assumed "Approved and Funded by 2020/2035":

- **Interstate 880 (I-880) Operational and Safety Improvements at 29th Avenue and 23rd Avenue Overcrossings:** this project will remove and reconstruct the overcrossing structures at 23rd and 29th Avenues, reconfigure several on and off-ramps, and extend the northbound auxiliary lane along I-880. Local circulation will be improved by simplifying some intersections and providing interim improvements at the base of the 29th Avenue bridge where it intersects the Park Street Triangle. The main impact on the study area is that the two structures on 23rd Avenue that cross I-880 will be combined into one. This will consolidate the two existing northbound I-880 on-ramps from 23rd Avenue into one. The consolidated on-ramps will create a new signalized intersection on the structure with a left-

turn signal phase serving the northbound 23rd Avenue to northbound I-880 traffic. The project has a completion date of 2012/2013.

- **High Street Overhead Seismic Retrofit Project:** this project, which is currently under construction, will replace the overhead structures on I-880 from Fruitvale Avenue to south of High Street. The project will reconfigure the I-880 / State Route (SR) 77 / 42nd Avenue interchange into a diamond configuration with two new at-grade intersections with the I-880 ramps and 42nd Avenue. This project has an estimated completion date of 2012/2013.

- **42nd Avenue / High Street Access Improvements:** This project will build upon the High Street Overhead Project. The improvements include the extension of 42nd Avenue west from the new at-grade intersection at the southbound I-880 off-ramp to Jensen Street and widening High Street under I-880. This project, when combined with the new at-grade intersections on 42nd Avenue included as part of the Seismic Retrofit, will improve the overall east-west street connectivity across I-880. These changes will result in 42nd Avenue serving as a parallel route to High Street that connects to Alameda Avenue. The bridge work included in the Seismic Retrofit will allow High Street to be widened to eight lanes under I-880. This will allow for two full left-turn lanes in both directions and two through travel lanes. This project has an estimated completion date of 2015+.

The Alameda County Transportation Commission (ACTC)[1] has identified in its Countywide Transportation Plan a series of projects that they consider "fully funded". These projects include those identified in the Countywide Plan as "Committed" and "Tier 1". The Committed and Tier 1 projects are assumed in the ACTC Countywide Travel Demand Model ("Alameda Model") and are incorporated into the traffic forecasting process described in detail in the next section.

The majority of fully funded transportation projects are consistent between the City and the ACTC list. Within the study area, one additional project is considered Tier 1 by ACTC and included in a supplemental analysis for informational purposes only:

- **East Bay Bus Rapid Transit (BRT):** this project involves developing a BRT system along the Telegraph Avenue, Broadway, International and East 14th Street corridors. The BRT system will incorporate improvements intended to enhance bus reliability and reduce travel time. Within the vicinity of the study area, the BRT will travel along International Boulevard (E 14th Street). The current project description indicates that one travel lane in each direction will be converted to BRT-only operations along this segment of International Boulevard. The dedicated BRT lanes will reduce lane capacity at the study intersections along International Boulevard. The East Bay BRT project is not included in the impact analysis.

Before starting the EIR analysis, we will confirm the status of these projects with City staff. No additional transportation projects are proposed as part of the Implementation Guide Project.

[1] Formerly the Alameda County Congestion Management Agency (ACCMA)

Analysis Scenarios

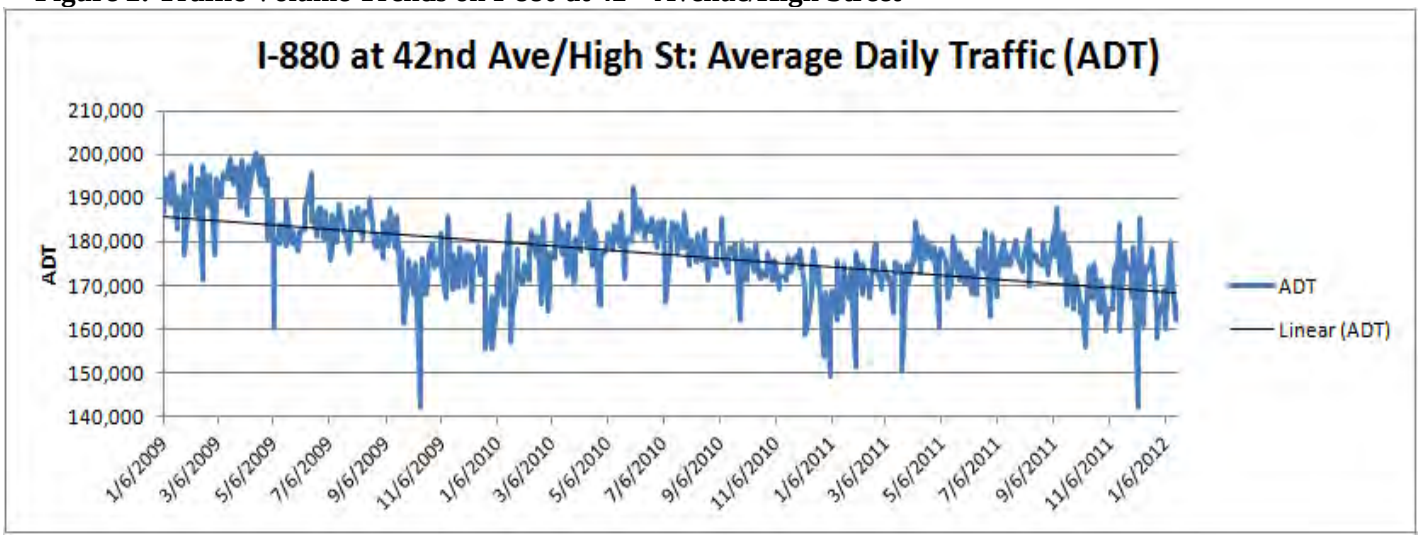
The EIR traffic analysis will include the following scenarios:

- Existing Conditions (2009)
- Existing Plus Project
- Interim Year (2020)
- Interim Year Plus Project
- Cumulative Year (2035)
- Cumulative Year Plus Project

The traffic counts were collected in March 2009, when the project originally began. While the counts were collected almost three years ago, traffic volumes in the study area have remained flat. Recent counts were collected at the new intersections on 42nd Avenue and the Interstate 880 (I-880) ramps by Dowling Associates for the 42nd Avenue & High Street Access Improvements Project. Comparing these counts to the 2009 counts at the adjacent intersections on High Street at Coliseum Way and Oakport Street indicates that the new counts are slightly higher at Oakport but lower at Coliseum Way. [**Note:** Dowling used the 2009 counts as the basis for their traffic analysis.]

Data from Caltrans' Freeway Performance Measurement System (PeMS) provides additional evidence that traffic volumes in the study area have not increased since 2009. Figure 2 provides a time-series diagram showing two-way average daily traffic (ADT) volumes on I-880 at 42nd Avenue and High Street from January 2009 to January 2012.

Figure 2: Traffic Volume Trends on I-880 at 42nd Avenue/High Street



Overall, volumes on I-880 continue to trend downward. This supports the assumption that the March 2009 traffic counts are conservative and appropriate for representing "existing conditions" for the purposes of the EIR.

Memorandum

Traffic Forecasting Methodology

The traffic forecasting methodology for the EIR would adopt the same overall process described in the memorandum *Central Estuary Implementation Guide, Traffic Forecasting Report* (Arup, August 2011). The only difference from this earlier document involves the revision to the land uses assumed as part of the CEIG Project. The steps used to develop the background traffic forecasts for 2035 remain the same.

The Alameda Model is maintained by ACTC and is updated every two years to reflect new land use forecasts developed by the Association of Bay Area Governments (ABAG) and transportation projects included in the Countywide Transportation Plan. The Alameda Model was updated in February 2009 with ABAG's Projections 2007 (P07) land use forecast for 2015 and 2035. This update occurred when the Central Estuary planning process began in 2008/2009 and reflected a more optimistic pre-recession economic outlook. In April 2011, the Alameda Model was updated again, to reflect Projections 2009 (P09) land uses. The P09 update took into account the deep economic contraction that occurred in 2008-2009 and thus provided a less sanguine view of growth going forward.

The consultant team compared household and employment forecasts from the P07 and P09 models to verify the differences in the forecasts. Figures 3 and 4 present the P07 and P09 forecasts and show the higher household and employment numbers in the future years.

The consultant team and City staff have decided to use the P07 based Alameda Model for the EIR and other studies related to the project for two reasons: i) the higher land use forecasts generate more conservative traffic volumes, and ii) it was the adopted model at the time the planning work on the project began.

The P07 Alameda Model consists of a year 2000 scenario that is calibrated against traffic and transit data. The Alameda Model forecasts for 2005, 2015 and 2035. In most cases, the 2005 land use is updated by local jurisdictions to reflect existing conditions. For the purposes of this analysis, the year 2005 scenario serves as the base year, while the 2035 scenario serves as the Cumulative scenario. The City's Draft CEQA Thresholds of Significance (June 30, 2011) require the analysis of a 2020 interim Cumulative scenario. The P07 Alameda Model contains a 2015 scenario. This requires an interpolation between the 2015 and 2035 model runs to generate 2020 traffic forecasts.

Memorandum

Figure 3: ABAG Household Forecast Comparison

Table 2-3. ABAG Projections of Alameda County Households

ABAG Projections 2007

SUBREGIONAL STUDY AREA	HOUSEHOLDS 2000	2005	2010	2015	2020	2025	2030	2035
ALAMEDA*	30,226	30,980	31,900	32,970	34,040	35,160	36,400	37,620
ALBANY*	7,011	7,130	7,310	7,490	7,630	7,790	7,950	8,110
BERKELEY*	44,955	45,530	46,320	47,050	47,960	48,960	49,980	50,980
DUBLIN**	9,335	13,440	16,600	19,070	21,310	23,770	26,250	28,720
EMERYVILLE*	3,975	4,830	5,510	6,100	6,700	7,320	7,940	8,350
FREMONT**	68,237	70,130	72,140	74,470	77,050	79,820	82,520	86,500
HAYWARD***	44,979	46,690	48,150	49,790	51,310	53,120	54,950	56,780
LIVERMORE**	26,315	28,550	31,160	33,360	35,750	38,090	40,470	42,820
NEWARK**	12,992	13,250	13,620	14,090	14,620	15,190	15,970	16,740
OAKLAND*	150,790	154,580	159,610	168,910	177,440	187,420	197,390	207,250
PIEDMONT*	3,804	3,810	3,820	3,830	3,840	3,850	3,860	3,870
PLEASANTON**	23,831	25,260	26,700	28,120	29,570	31,170	32,790	34,400
SAN LEANDRO*	30,642	31,250	31,750	32,300	33,020	33,890	34,780	35,660
UNION CITY**	18,647	19,660	20,730	21,740	22,870	24,330	25,810	27,280
ASHLAND***	7,223	7,360	7,560	7,750	7,950	8,180	8,410	8,640
CASTRO VALLEY***	21,606	22,170	22,520	22,890	23,410	24,070	24,740	25,400
CHERRYLAND-FAIRVIEW***	9,022	9,230	9,340	9,580	9,840	10,150	10,460	10,770
SAN LORENZO***	7,500	7,540	7,550	7,570	7,660	7,790	7,920	8,050
REMAINDER	2,276	2,400	2,590	2,700	2,820	2,950	3,100	3,240
ALAMEDA COUNTY	**523,366**	**543,790**	**564,880**	**589,780**	**614,790**	**643,030**	**671,700**	**700,090**

*CITY **CITY SPHERE OF INFLUENCE ***OTHER SUBREGIONAL AREA

ABAG Projections 2009

SUBREGIONAL STUDY AREA	HOUSEHOLDS 2000	2005	2010	2015	2020	2025	2030	2035
ALAMEDA*	30,226	30,980	31,770	32,740	33,410	34,080	34,750	35,620
ALBANY*	7,011	7,130	7,150	7,340	7,520	7,710	7,890	8,080
BERKELEY*	44,955	45,530	46,150	47,330	48,510	49,690	50,870	52,050
DUBLIN**	9,335	13,440	16,230	18,560	20,930	23,310	25,690	28,000
EMERYVILLE*	3,975	4,830	5,770	6,470	7,280	8,100	8,920	9,750
FREMONT**	68,237	70,130	71,120	73,660	76,790	79,730	82,870	86,000
HAYWARD***	44,979	46,690	47,490	49,460	51,580	53,810	56,130	58,500
LIVERMORE**	26,315	28,550	29,820	31,820	34,210	36,610	39,060	41,500
NEWARK**	12,992	13,250	13,300	13,900	14,490	15,090	15,680	16,280
OAKLAND*	150,790	154,580	157,840	167,940	178,730	189,630	200,530	212,000
PIEDMONT*	3,804	3,810	3,810	3,810	3,810	3,820	3,820	3,820
PLEASANTON**	23,831	25,260	25,850	27,070	28,290	29,510	30,760	32,000
SAN LEANDRO*	30,642	31,250	31,270	31,960	32,950	33,990	35,090	36,500
UNION CITY**	18,647	19,660	20,430	21,950	23,480	25,000	26,530	28,050
ASHLAND***	7,223	7,360	7,520	7,670	7,810	7,960	8,110	8,250
CASTRO VALLEY***	21,606	22,170	22,380	23,660	24,940	26,220	27,500	28,790
CHERRYLAND-FAIRVIEW***	9,022	9,230	9,310	9,670	10,040	10,400	10,760	11,130
SAN LORENZO***	7,500	7,540	7,560	7,590	7,620	7,650	7,670	7,700
REMAINDER	2,276	2,400	2,510	2,800	3,080	3,370	3,650	3,940
ALAMEDA COUNTY	**523,366**	**543,790**	**557,270**	**585,400**	**615,470**	**645,680**	**676,280**	**707,960**

*CITY **CITY SPHERE OF INFLUENCE ***OTHER SUBREGIONAL AREA

Alameda Countywide Transportation Model Update—DRAFT Model Documentation 7
Dowling Associates, Inc. April 15, 2011

Memorandum

Figure 4: ABAG Employment Forecast Comparison

Table 2-4. ABAG Projections of Alameda County Jobs

ABAG Projections 2007

SUBREGIONAL STUDY AREA	TOTAL JOBS 2000	2005	2010	2015	2020	2025	2030	2035
ALAMEDA*	27,380	27,400	29,870	34,330	38,230	43,120	46,520	50,550
ALBANY*	5,190	4,840	5,430	5,540	5,660	5,740	5,780	5,880
BERKELEY*	78,320	75,430	76,380	80,740	82,150	83,660	85,410	87,150
DUBLIN**	16,540	19,520	22,910	26,730	31,790	36,590	42,900	49,810
EMERYVILLE*	19,860	19,670	21,140	22,440	23,800	25,220	26,690	28,210
FREMONT**	104,830	93,950	97,530	103,200	114,130	125,720	137,240	148,840
HAYWARD***	77,660	72,950	75,880	81,370	87,160	93,260	99,630	106,260
LIVERMORE**	48,250	48,110	53,650	60,410	65,840	71,240	76,960	82,990
NEWARK**	21,420	20,590	21,930	23,000	23,720	24,290	24,900	25,750
OAKLAND*	199,470	202,570	218,350	231,250	243,100	258,390	273,600	285,600
PIEDMONT*	2,120	2,090	2,100	2,110	2,120	2,120	2,130	2,140
PLEASANTON**	59,480	58,110	64,260	70,260	73,180	76,020	78,720	81,270
SAN LEANDRO*	44,370	41,650	43,540	46,190	49,770	53,480	57,080	60,630
UNION CITY**	19,310	19,370	21,880	26,010	31,900	37,350	43,130	46,500
ASHLAND***	2,960	2,720	2,770	4,280	5,870	7,540	9,280	11,090
CASTRO VALLEY***	13,280	12,180	12,400	13,190	13,980	14,910	15,830	16,790
CHERRYLAND-FAIRVIEW***	2,630	2,470	2,510	2,610	2,710	2,820	2,780	2,890
SAN LORENZO***	3,530	3,240	3,410	3,460	3,510	3,540	3,550	3,580
REMAINDER	3,560	3,410	3,580	3,540	3,560	3,580	3,600	3,620
ALAMEDA COUNTY	**750,160**	**730,270**	**781,520**	**840,660**	**902,180**	**968,590**	**1,037,730**	**1,099,550**

*CITY **CITY SPHERE OF INFLUENCE ***OTHER SUBREGIONAL AREA

ABAG Projections 2009

SUBREGIONAL STUDY AREA	TOTAL JOBS 2000	2005	2010	2015	2020	2025	2030	2035
ALAMEDA*	27,380	27,400	26,970	29,650	32,850	36,160	39,470	42,730
ALBANY*	5,190	4,840	5,030	5,240	5,440	5,500	5,540	5,580
BERKELEY*	78,320	75,430	76,170	77,040	79,610	82,540	84,350	86,200
DUBLIN**	16,540	19,520	19,650	22,900	26,610	32,970	37,020	42,620
EMERYVILLE*	19,860	19,670	18,610	20,460	22,340	24,150	26,110	28,010
FREMONT**	104,830	93,950	94,440	96,410	101,050	112,920	127,800	140,440
HAYWARD***	77,660	72,950	72,400	73,670	79,750	86,060	92,740	99,100
LIVERMORE**	48,250	48,110	46,600	51,260	57,000	62,950	67,960	73,170
NEWARK**	21,420	20,590	20,350	21,490	22,810	23,570	24,180	24,830
OAKLAND*	199,470	202,570	188,590	209,340	229,720	246,780	264,390	281,900
PIEDMONT*	2,120	2,090	2,090	2,100	2,110	2,120	2,130	2,140
PLEASANTON**	59,480	58,110	56,700	62,320	67,790	71,320	75,450	79,130
SAN LEANDRO*	44,370	41,650	40,940	42,300	45,680	49,390	53,770	57,760
UNION CITY**	19,310	19,370	20,230	22,170	24,860	31,540	37,270	41,110
ASHLAND***	2,960	2,720	3,250	3,370	4,510	5,520	6,580	8,000
CASTRO VALLEY***	13,280	12,180	11,650	12,230	13,050	13,930	14,860	15,690
CHERRYLAND-FAIRVIEW***	2,630	2,470	2,500	2,580	2,900	3,260	3,500	3,750
SAN LORENZO***	3,530	3,240	3,260	3,300	3,430	3,490	3,590	3,680
REMAINDER	3,560	3,410	3,420	3,440	3,560	3,640	3,780	3,840
ALAMEDA COUNTY	**750,160**	**730,270**	**712,850**	**761,270**	**825,070**	**897,810**	**970,490**	**1,039,680**

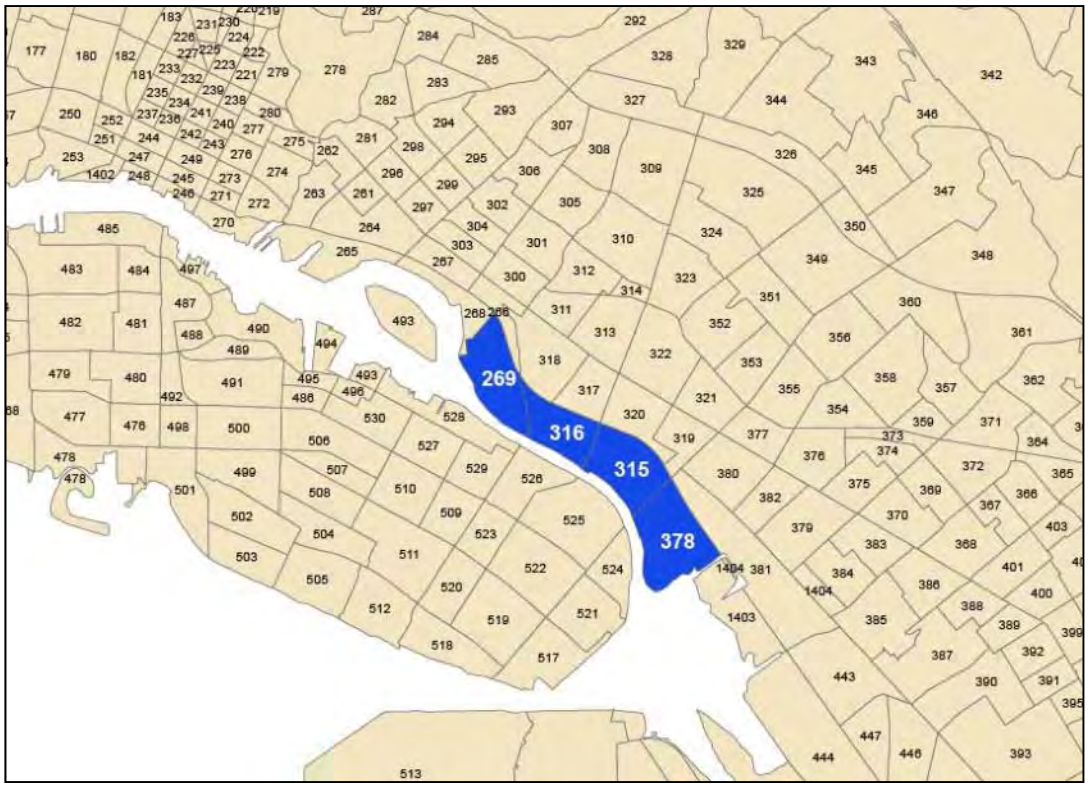
*CITY **CITY SPHERE OF INFLUENCE ***OTHER SUBREGIONAL AREA

Alameda Countywide Transportation Model Update—DRAFT Model Documentation 8
Dowling Associates, Inc. April 15, 2011

The following steps outline the methodology to develop the 2035 traffic forecasts:

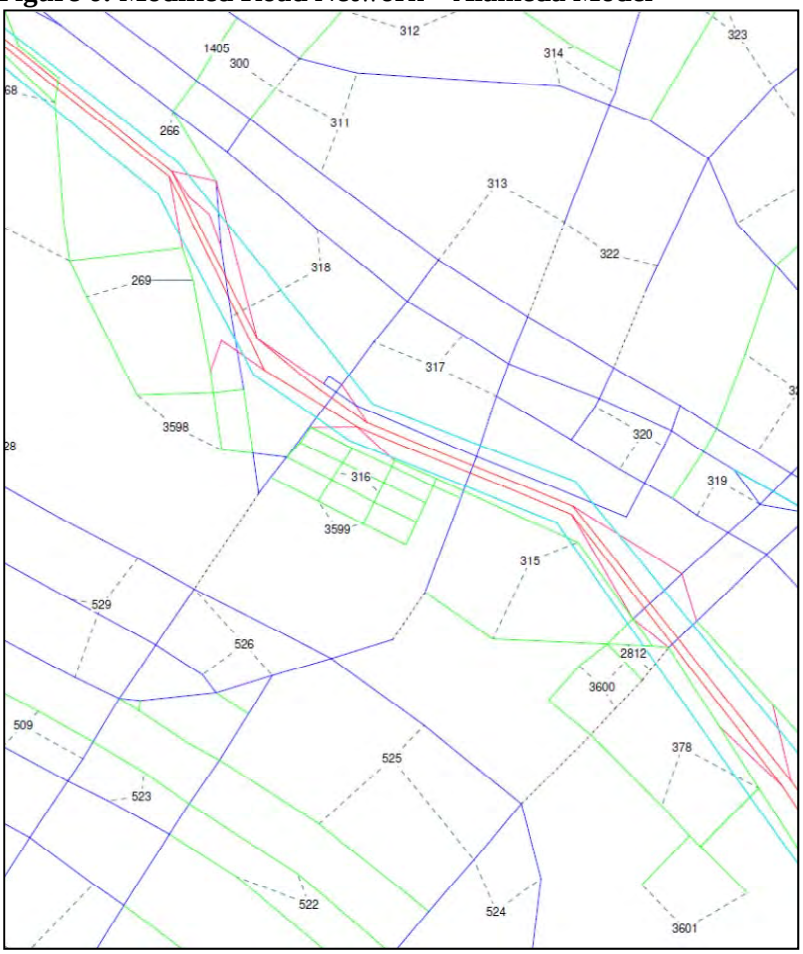
1. We reviewed the Alameda Model to check the location of traffic analysis zones (TAZs) within the study area, confirm land uses, and verify that all critical street segments are present and coded correctly (i.e., street classifications, number of lanes, free-flow travel speeds, etc.). TAZs 269, 315, 316, and 378 are located within the Plan Area and correspond very closely to the Plan sub-areas. Figure 5 shows the location of TAZs from the Alameda Model as received from ACTC staff.

   Figure 5: Central Estuary Traffic Analysis Zones



2. We modified the Alameda Model TAZ system and master network file to provide greater detail within the study area and to reflect roadway/intersection changes associated with the City's list of fully funded projects. Figure 6 shows the modified roadway network in the vicinity of the study area.

Figure 6: Modified Road Network – Alameda Model



3. We ran the base year 2005 model and conducted a "sub-area" validation at four screenlines surrounding the study area to check that the model is closely replicating the observed traffic counts entering and exiting the area. Only the study locations where traffic counts were collected are included as part of a screenline. Figure 7 shows the screenline locations and Tables 2 and 3 provide a comparison of the actual and modeled volumes across each screenline. Some internal intersections that have I-880 on and off ramps are included in the screenline as they serve as a proxy for I-880 traffic originating or destined to the model area.

Memorandum

Figure 7: Screenline Locations

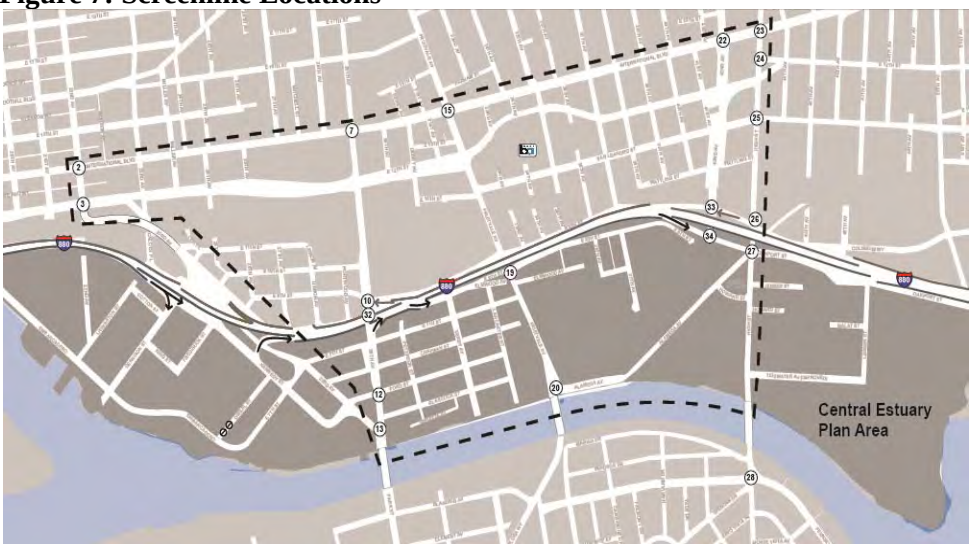


Table 2: AM Model Screenline Comparison

Screenline	Count	Modeled	Difference	% Difference
North – North of International Blvd	3,668	3,933	265	7%
West – I-880 North/West of 16th Ave	17,653	18,013	360	2%
South – Estuary/Alameda	6,698	8,428	1,730	25%
East – I-880 South/East of High Street	10,683	9,382	-1,301	-12%
Source: Arup, 2011				

Table 3: PM Model Screenline Comparison

Screenline	Count	Modeled	Difference	% Difference
North – North of International Blvd	3,900	4,499	599	18%
West – I-880 North/West of 16th Ave	18,656	19,642	806	4%
South – Estuary/Alameda	7,184	7,363	179	2%
East – I-880 South/East of High Street	12,450	11,518	-932	-7%
Source: Arup, 2011				

4. We adjusted the 2035 No Project land use within the Plan Area TAZs to match the base year 2005 land uses. Within the Plan Area TAZs, the residential growth assumed in the 2035 Alameda Model is considerable. The 2035 totals are much higher than today and are not possible under existing zoning. Table 4 compares the existing land uses to those assumed in the 2005 and 2035 Alameda Model scenarios.

Table 4: Model Land Use Comparison

		Residential			Employment		
Sub-Area	Year	Existing	Alameda Model		Existing[2]	Alameda Model	
		2009	2005	2035	2007	2005	2035
	Model TAZ	dwelling units	households		jobs	jobs	
West	269	90	70	815	2,726	1,389	1,413
Central-West	316	373	379	761	467	714	714
Central-East	315	54	58	58	1,031	1,151	1,321
East	378	4	3	3	572	1,774	1,181
Total		**521**	**510**	**1,637**	**4,796**	**5,027**	**5,264**

For residential, TAZs 269 and 316 assumed a much high number of dwelling units in 2035 than the 2005 base year or existing conditions. The employment totals are roughly consistent and do not differ much between the 2005 and 2035 Alameda Model scenarios.

The Alameda Model 2035 land uses were set to 2005 levels because of the significant growth in residential units. Also, the zoning changes associated with the Implementation Guide will only add 422 residential units and approximately 2,635 jobs to the Plan Area. This smaller residential change could result in fewer trips under the With Project scenario than a No Project scenario with the higher residential total.

5. We ran the 2035 No Project model and used the “difference” method to calculate the increment of growth between the 2005 base year and 2035 at the screenline level. The difference method adjusts for estimation error between the counts and the base year model volume. The difference method calculates the increment of growth between the 2005 and 2035 model runs and adds the “difference” to the existing traffic counts.

   Standard traffic forecasting practice applies the difference method at the link or the intersection approach/turning movement level. However, applying the difference method at this level within the study area proved problematic for two reasons:

   - While the Alameda Model 2005 base year scenario calibrates reasonably well at the screenline level, the model’s assignment of traffic at certain locations in the 2005 run differed considerably from traffic counts.

   - The forecasted traffic growth with the 2035 No Project scenario appears reasonable at the screenline level. However, the 2035 traffic assignment at certain locations appeared unreasonable.

   For these reasons, the difference method was applied at the screenline level to develop the traffic forecasts. The increment of traffic growth between the 2005 and 2035 model runs was calculated for each screenline. The traffic growth was distributed to locations across the screenline to better reflect the counts and known

travel patterns within the study area. The additional traffic was then assigned through the network of study intersections using the existing counts as a guide.

We estimated the vehicle trip generation for the incremental change in land use associated with the CEIG Project. Standard practice in developing traffic forecasts for a large project typically involves utilizing a travel demand model to estimate the project trip generation, distribution, and assignment. This was attempted for the proposed Central Estuary land uses. The proposed land use changes were incorporated into the 2035 Alameda Model and the model was run to develop With Project forecasts. However, the model vehicle trip generation estimates for several Plan Area TAZs appeared too low when compared to trip generation estimates developed with commonly used trip rates from the Institute of Transportation Engineer's (ITE) *Trip Generation, 8th Edition.* While we recognize that trip rates in the Bay Area and Oakland particularly are generally lower than ITE rates, which reflect higher non-auto mode share, a trip rate of twenty to forty percent lower than ITE would be considered acceptable. For the four Plan Area TAZs, the Alameda Model was predicting vehicle trip generation that was 60 to 80 percent less than estimates using ITE rates. The variance was even more significant for individual TAZs. The model's trip generation module, BAYCAST-90, was tested several times to try and identify the issue and account for it in the model run. However, we determined that the necessary adjustments to the model to boost the trip generation to more defensible levels would entail too many unreasonable changes.

For this reason, we will apply ITE rates to develop the trip generation estimate for the CEIG Project land uses. We propose the following reductions: i) a 20 percent reduction factor for internal/non-auto trips, ii) a 15 percent reduction for pass-by trip.

We are seeking a determination from the City on these trip generation assumptions.

6. The project trip distribution was estimated using a "select zone" run, with minor adjustments to reflect known travel patterns. The overall distribution is summarized below:

West

- 33% to/from the north on I-880
- 34% to/from the north on local streets (Downtown)
- 33% to/from the west across the Estuary (Alameda)

Central West

- 46% to/from the north on I-880
- 6% to/from the north on local streets (Downtown)
- 36% to/from the west across the Estuary (Alameda)
- 12% to/from the south on local streets (San Leadro/Fremont)

Central East

- 23% to/from the north on I-880
- 33% to/from the south on I-880
- 10% to/from the east on local streets (Coliseum and East Oakland)
- 33% to/from the west across the Estuary (Alameda)

East

- 23% to/from the north on I-880
- 33% to/from the south on I-880

- 10% to/from the east on local streets (Coliseum and East Oakland)
- 33% to/from the west across the Estuary (Alameda)

This distribution will be used as the basis for assigning the Project trips through the study area intersections for the impact analysis in the EIR.

7. Interim Year 2020 forecasts will be generated by running the 2015 model and performing a post-process similar to Steps 1-6. A straight line interpolation between the 2015 and 2035 model runs will be performed to develop the 2020 traffic forecasts.

Traffic Analysis Methodology

Traffic operations at the study intersections will be analyzed using methodologies contained in the *2000 Highway Capacity Manual (HCM)* (Transportation Research Board, 2000). The HCM provides analysis methods and equations that estimate the peak hour delay experienced by vehicles at signalized and unsignalized (i.e., stop-controlled) intersections. Inputs to the HCM intersection calculations include peak hour traffic volumes, intersection geometrics (number of lanes), traffic signal timing parameters, and other data such as pedestrian volumes and the percentage of trucks.

The HCM delay estimates are used to assign a qualitative level of service (LOS) rating, which describes overall intersection operating conditions. LOS ranges from LOS A, indicating free flow traffic conditions with little or no delay, to LOS F, representing over-saturated conditions where traffic flows exceed design capacity. LOS F conditions typically result in excessive queuing and delays.

At signalized intersections, LOS is based on the weighted average delay (measured in seconds per vehicle) for all movements. At intersections with stop control on the minor side street approaches, LOS is based on the delay for the worst movement at the side street controlled approach. For all-way stop-controlled intersections, LOS is based on the weighted average delay of all movements.

Table 5 presents the HCM LOS delay thresholds for signalized and unsignalized intersections.

Table 5: Intersection Level of Service Thresholds

Level of Service	Signalized Intersection Delay (sec/veh)[1]	Unsignalized Intersection Delay (sec/veh)[1]	General Description
A	0 – 10.0	0 – 10.0	Free flow conditions
B	10.1 – 20.0	10.1 – 15.0	Limited congestion and short delays
C	20.1 – 35.0	15.1 – 25.0	Some congestion with average delays
D	35.1 – 55.0	25.1 – 35.0	Significant congestion and delays
E	55.1 – 80.0	35.1 – 50.0	Severe congestion and delays develop as intersection demand nears capacity.
F	> 80.0	> 50.0	Intersection capacity is exceeded. Extreme delays and queues result.

Notes:
(1) HCM delay estimates and LOS thresholds are expressed as the average control delay (seconds per vehicle). Control delay includes the delay at the intersection that is attributable to the traffic control (initial deceleration delay, queue move-up time, stopped delay, and acceleration delay).
Source: *2000 Highway Capacity Manual* (Transportation Research Board), Chapter 16 – Signalized Intersections and Chapter 17, Unsignalized Intersections

The City of Oakland defines LOS D as the acceptable LOS for intersections outside of Downtown. Intersections that exceed LOS D (i.e., E or F) are considered deficient from a traffic operations standpoint.

Volume to capacity (v/c) ratios for each scenario will be reviewed for study area roadway segments identified in the ACTC Congestion Management Program (CMP) network.

EIR Impact Assessment

The City's *CEQA Thresholds of Significance Guidelines*[2] were used to determine traffic impacts at the study intersections. From the CEQA Guidelines, the following are criteria relevant to "Traffic Load and Capacity Thresholds":

The project would have a significant impact on the environment if it would:

1. At a study, signalized intersection which is located **outside the Downtown** area, the project would cause the level of service (LOS) to degrade to worse than LOS D (i.e., LOS E);
2. At a study, signalized intersection which is located **within the Downtown** area, the project would cause the LOS to degrade to worse than LOS E (i.e., LOS F);
3. At a study, signalized intersection **outside the Downtown** area where the level of service is LOS E, the project would cause the total intersection average vehicle delay to increase by four (4) or more seconds, or degrade to worse than LOS E (i.e., LOS F);

[**NOTE:** The Downtown area is defined in the Land Use and Transportation Element of the General Plan (page 67) as the area generally bounded by the West Grand Avenue to the north, Lake Merritt and Channel Park to the east, the Oakland Estuary to the south, and I-980/Brush Street to the west.]

[2] Adopted August 24, 2011.

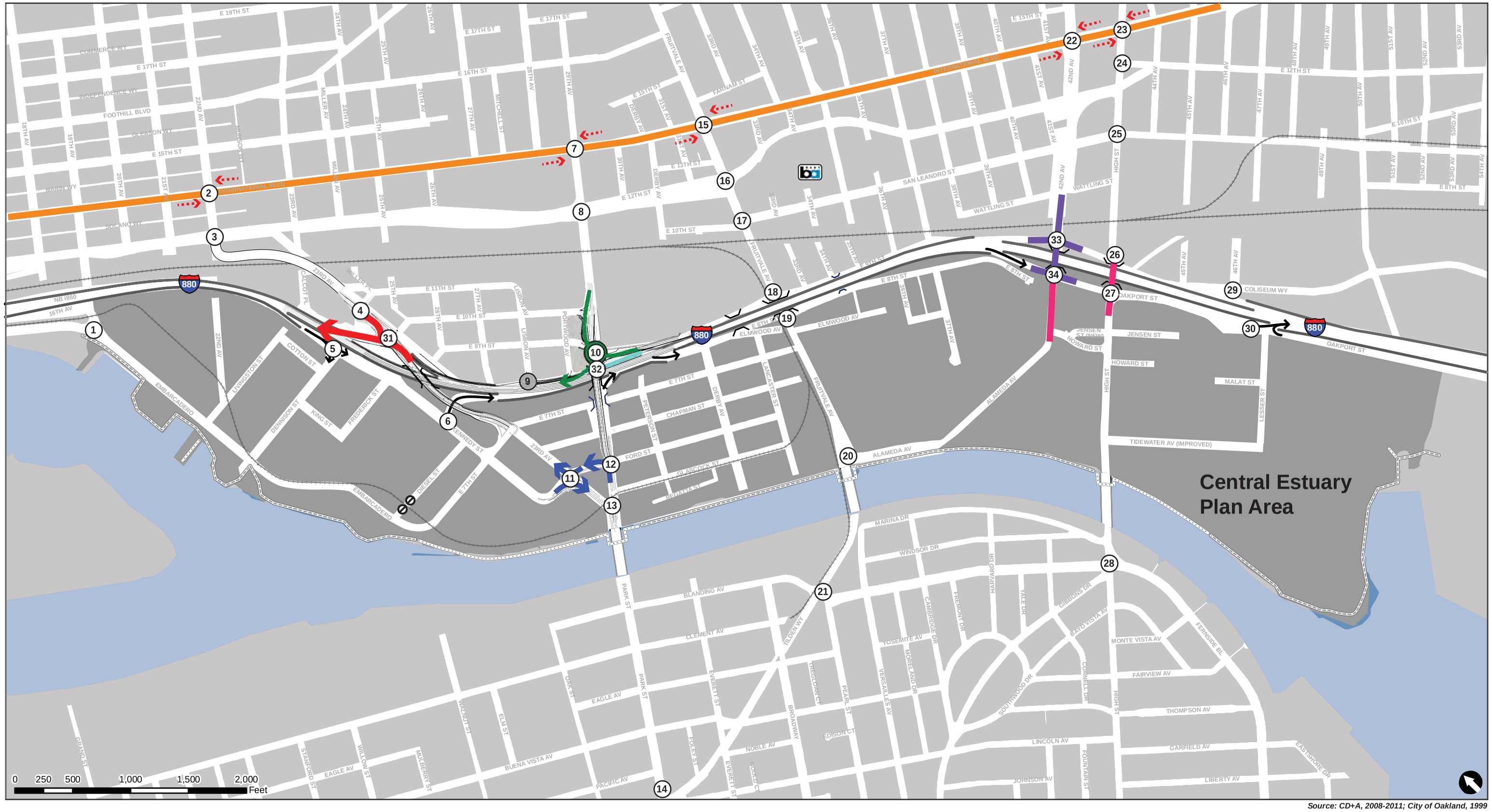
4. At a study, signalized intersection for **all areas** where the level of service is LOS E, the project would cause an increase in the average delay for any of the critical movements of six (6) seconds or more, or degrade to worse than LOS E (i.e., LOS F);
5. At a study, signalized intersection for all areas where the level of service is LOS F, the project would cause (a) the overall volume-to-capacity ("V/C") ratio to increase 0.01 or more or (b) the critical movement V/C ratio to increase 0.02 or more;
6. At a study, unsignalized intersection the project would add ten (10) or more vehicles and after project completion satisfy the Caltrans peak hour volume traffic signal warrant;
7. For a roadway segment of the Congestion Management Program (CMP) Network, the project would cause (a) the LOS to degrade from LOS E or better to LOS F or (b) the V/C ratio to increase 0.03 or more for a roadway segment that would operate at LOS F without the project [NOTE: This threshold only applies to land use development projects that generate a vehicle trip on a roadway segment of the CMP Network located in the project study area and to transportation projects that would reduce the vehicle capacity of a roadway segment of the CMP Network];

Appendix F, Transportation Impact Assessment Methodology in the CEQA Guidelines establishes the guidelines for conducting a traffic impact analysis.

Impacts to traffic safety, transit service, and pedestrian and bicycle facilities will be addressed qualitatively in the EIR.

Memorandum

ATTACHMENT 1



Source: CD+A, 2008-2011; City of Oakland, 1999

Study Locations and Transportation Projects

May 2011

I-880 Operational Improvements at 29th/23rd Overcrossings

- Changes to NB 880 on-ramp at 23rd Ave
- Proposed roundabout at E 8th

High Street Overhead Seismic Retrofit

- New at-grade intersections on 42nd Ave

42nd Avenue / High Street Access Improvements

- New at-grade intersections on 42nd Ave

East Bay Bus Rapid Transit (BRT) - Not Fully Funded

- International Boulevard Routing
- Study locations with a reduction in travel lanes

- Bay Trail (proposed)
- Bay Trail (existing)
- Gated or closed street
- I-880 On/Off Ramps
- Underpass - Existing
- Ped/Bike Underpass - Existing
- Ped/Bike Underpass - Future

CITY OF OAKLAND

CENTRAL ESTUARY Implementation Guidelines

COMMUNITY DESIGN + ARCHITECTURE
REGION • CITY • NEIGHBORHOOD • BUILDING

Memorandum

ATTACHMENT 2

Pending and Proposed Transportation Related Projects and EIR Analysis

Projects grouped by:

- **Approved, Funded and Will be Complete by June 2012; Include in Existing Conditions (as well as 2020/2035)**
- **Approved and Funded; Not Existing, but Include in 2020/2035 Future Baseline**
- **Neither Approved, nor Funded: Do NOT include in Existing, 2020 or 2035** (can discuss as Alternative and/or in separate section (see BRT))

Project Name & Description	EPP EIR Analysis
Approved, Funded and Will be Complete by June 2012; Include in Existing Conditions (as well as 2020/2035)	
1. Bike Master Plan Projects (in and around study area) City of Oakland Est. Completion: project complete Funded: funded and approved ▪ Class 3A on Fruitvale Av (north of E. 12th St)	Included in EIR for Bike Master Plan
2. Fruitvale Ave. improvements: sidewalk/planter on Fruitvale Ave. (RR track side between East 7th and Bridge) City of Oakland Est. Completion: May 2012 Funded: funded and approved	
3. Measure DD Projects City of Oakland Est. Completion: ongoing Funded: Funded and approved ▪ US Audio / NEU See Measure DD project spreadsheet for project details	Approved in Measure DD EIR certified in 2008
Approved and Funded; Not Existing, but Include in 2020/2035 Future Baseline	
4. I-880 Operational and Safety Improvements at the 29th and 23rd Ave Overcrossings ACCMA, Caltrans Est. Completion: 2012 Funding: Fully funded and approved (EIR Complete I. Starr to provide copy) Remove and reconstruct the overcrossing structures at 23rd and 29th Avenues, reconfigure several on/off ramps, and extend the NB aux lane. The project will improve access to and from NB I-880 by combining and closing ramps at both 23rd and 29th Avenues. Local circulation is improved by	**Land Use Chapter** **Impact A.6** (summary): Ramp improvements at 23rd Ave could displace established uses and require acquisition of right-of-way. Extent of impacts cannot be fully addressed at this time. Further study by Caltrans and City will be required prior to construction. **Transportation Chapter** Transportation Projects included in EPP (included under "Impacts" heading): 23rd Ave Interchange - Improvements at 23rd Ave. to include a full-movement interchange w/ a clear link to the Embarcadero Pkwy. page III B-7

Project Name & Description	EPP EIR Analysis
simplifying some intersections and providing interim improvements at the base of the 29th Avenue bridge where it intersects the Park Street Triangle.	**Impact B-1** (summary): Significant Cumulative Impacts – degradation to level of service along key arterial roadway segments: 23rd Ave and Interchange LOS E during AM and PM peak – the EPP recommends that the 23rd Ave bridge and interchange be reconstructed to create a full movement interchange. page III B.16
5. High Street Overhead Seismic Retrofit Project Caltrans Est. Completion: 2012/2013 Funding: Fully funded and approved (EIR Exempt) Replace the overhead structures on I-880 from Fruitvale Avenue to south of High Street and reconfigure the I-880 / SR 77 / 42nd Avenue interchange. The project will reconfigure the ramps at 42nd Avenue to create two at-grade intersections on 42nd Avenue that serve the NB 880 on-ramp and SB 880 off-ramp. The E 8th Street frontage road will terminate south of 37th Avenue to accommodate the retrofit.	**Land Use Chapter** **Impact A.6** (summary): Ramp improvements at 42nd Ave could displace established uses and require acquisition of right-of-way. Extent of impacts cannot be fully addressed at this time. Further study by Caltrans and City will be required prior to construction. **Transportation Chapter** Transportation Projects included in EPP (included under "Impacts" heading): Fruitvale/42nd Interchange - EPP proposes an urban diamond linked by frontage roads at 42nd Ave (that would provide connections to Fruitvale Ave) to improve access to I-880 and surrounding area. page III B-7
6. Bike Master Plan Projects (in and around study area) City of Oakland Est. Completion: ongoing Funded: funded and approved (Note: Only projects that reduce parking by 10% or that eliminate a travel lane requires specific Council approval) ▪ Class 1 bike path along the BART alignment southeast of Fruitvale Av ▪ Class 2 bike lanes on E. 12th St. (west of Fruitvale Av) ▪ Class 3A arterial bike route on E 12th St (east of Fruitvale Av) ▪ A Class 3B Bike Blvd on E. 7th St (currently a Class 3 bike route) ▪ Removal of bikeways at Oakport St.	Included in EIR for Bike Master Plan
7. 42nd Avenue/High Street Access Improvements City of Oakland Est. Completion: 2015+ Funding: Approved and funded (Negative Declaration) This project will follow on the heals of #3 and includes extending 42nd Avenue west from 880 to intersect Jensen Street and widening High Street under 880. This project, when combined with the 42nd Avenue interchange	See analysis for #2 High Street Overhead Seismic Retrofit Project.

Project Name & Description	EPP EIR Analysis
improvements included as part of #3, will improve the overall east-west street connectivity across I-880. These changes will result in 42nd Avenue serving as an parallel route to High Street that connects to Alameda Avenue. The bridge work in #3 will allow High Street to be widened to eight lanes under 880. This will allow for two full left-turn lanes in both directions and two through travel lanes.	
Neither Approved, nor Funded: Do NOT include in Existing, 2020 or 2035 (can discuss as Alternative and/or in separate section (see BRT))	
8. Fruitvale Ave. improvements for all modes from International Blvd. to I-880 to the Estuary Not approved or funded.	Transportation Chapter, in the "Proposed Roadway, Transit and Infr. Improvements" section states that "Class II bicycle lanes are proposed for … Fruitvale Ave., High St. …" page III B-5 Fruitvale Ave. Improvements – redesign to create attractive link b/w Fruitvale District and plan area. Incorporate parallel UP railroad to Alameda to serve as future transit corridor. page III B-7 (included under "Impacts" heading)
9. Extension of 37th Ave. to Alameda Ave. Not approved or funded. This project would improve circulation through the central east subarea and would not displace any existing facilities or activities.	Not included in EPP EIR analysis.
10. Reconfiguration of Alameda Ave. to conform to changes at 42nd Ave. & High St.) (Iris and Mohamed to check alignment for feasibility.) Not approved or funded.	Not included in EPP EIR analysis.
11. Waterfront Blvd Not approved or funded.	Embarcadero Parkway – continuous waterfront parkway along the Estuary would provide connection from Oak St. to 66th Ave. page III B-5 (included under "Impacts" heading)
12. Tidewater Ave. improvements- needed for Truck access to the industrial area, and car access to the new R&D area. Currently a private road. While ownership is a question to be resolved, we need to plan for a heavy duty road, with sidewalk and utility (lighting, sewer, storm drain) services. Not funded or approved.	Not included in EPP EIR analysis.
13. International Blvd Corridor portion of Bus Rapid Transit (BRT) AC Transit	Not included in EPP EIR analysis.

Project Name & Description	EPP EIR Analysis
Est. Completion: 2015 (best case) Not approved; not funded BRT would not directly serve the CEP area, but could travel along International Boulevard less than one-half mile from the CEP boundary. The enhanced frequency, speed, and quality of the BRT service could make transit a much more attractive mode to reach destinations in downtown Oakland and areas to the south. There is the potential that one travel lane along International Boulevard in each direction could be dedicated to BRT service. This would have a potentially negative affect on auto traffic circulation. This trade-off is being evaluated in the process of selecting a preferred alternative to study in the EIR.	
14. Measure DD Projects (Cont.) ▪ Cryer Site (phase II) ▪ Brooklyn Basin to Embarcadero Cove ▪ Livingston Pier ▪ Gallagher & Burk and Hanson Aggregate ▪ Trails around 3 bridges to Alameda See Measure DD project spreadsheet for project details Not approved; not funded	Approved in Measure DD EIR certified in 2008
15. High Street improvements for all modes from International Blvd. to I-880 to the Estuary (requires road rebuilding- road is not wide enough for access. May require some future ROW acquisition.) Not approved; not funded	Transportation Chapter, in the "Proposed Roadway, Transit and Infr. Improvements" section states that "Class II bicycle lanes are proposed for … Fruitvale Ave., High St. …" page III B-5 High Street Improvements – Bicycle and pedestrian improvements to High Street would improve access to the southern portion of study area. page III B-7 (included under "Impacts" heading)
16. Del Monte Rd. access, and other local pedestrian and bicycle access improvements b/w Fruitvale shopping areas and BART on the east side of I-880 and the Central Estuary areas	Not included in EPP EIR analysis.
17. Bike/Ped connection under or over I-880 at 50th Ave. between Fruitvale and 66th Ave. (not yet studied or approved)	Not included in EPP EIR analysis.

Additional Analysis from EPP EIR:

- The 29th Ave. Improvements were also included in EPP but is not associated with projects in the table above: – enhance 29th Ave as a local connecting street to encourage pedestrian and bicycle traffic. page III B-7

- Impact B-1: Significant Cumulative Impacts – degradation to level of service along key arterial roadway segments:
    - High St. and Park St. bridges are forecast to operate at LOS F, and the Fruitvale Bridge at LOS E during the AM and PM peak periods. Transportation improvements included in EPP would reduce congestion and improve roadway operations. page III B.16

- Impact B-2: increase in transit demand – accessibility improvements (improving access to areas north of I-880) could increase transit demand;

Other Notes:
Connections to the Fruitvale and Coliseum BART stations have not been discussed. Can we study improvements to transit access through the study area to the new High Street shopping area and to Coliseum BART?