I-680 Corridor System Management Plan
Smart Mobility Framework (SMF)
Place Type Analysis Methodology

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Introduction
System Metrics Group, Inc. (SMG) performed a place type assessment for the Contra Costa I-680 Corridor System Management Plan (CSMP). This analysis was done at the Traffic Analysis Zone (TAZ) level using the Smart Mobility Framework (SMF) Place Types. This document summarizes the findings of this analysis and describes the methodology used to label the place types.

These place type results should be reviewed by members of the I-680 CSMP Staff Working Group and Technical Advisory Committee (TAC) before being finalized. This will ensure that local expertise and knowledge of the communities is applied to the analysis.

Place Type Analysis Results Summary
Figure 1 is a map showing the results of the analysis for the I-680 corridor. Descriptions of the SMF Place Types are summarized in Figure 2. The table in Figure 2 also provides examples of areas related to the I-680 CSMP that were labeled as belonging to each SMF Place Type.

Based on the analysis, most of the I-680 CSMP corridor may be best described as the Suburban Community place type. Other predominant types include Special Use Areas such as the oil refineries near Martinez and the Concord Naval Weapons Station, and protected open space such as Mount Diablo State Park. Suburban Centers can be found in San Ramon in other areas.

Areas near the Walnut Creek and Concord BART rail transit stations were labeled as Urban Centers surrounded by a mix of Suburban Centers and Close-In Compact Communities all lying adjacent to I-680 and SR-242. Though the SMF Place Types have several sub-categories for the Close-In label, the SMG analysis did not attempt to distinguish between Close-In Centers, Close-In Corridors, or Close-In Neighborhoods. These were labeled with the more general Close-In Compact Communities designation.

Some Suburban Community Dedicated Use Areas along the corridor include Bishop Ranch in San Ramon, the California State University East Bay campus in Concord, and Waterworld Theme Park in Pleasant Hill.
Figure 1: SMF Place Types
### Figure 2: SMF Place Type Descriptions with Examples

<table>
<thead>
<tr>
<th>Place Type</th>
<th>Definition</th>
<th>I-880 Corridor Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban Centers</td>
<td>High density, mixed use places with high jobs-housing ratios overall, well-connected street networks, high levels of transit service &amp; pedestrian supportive environments. Transit-oriented development (TOD) fits into all of the urban place types.</td>
<td>None Identified</td>
</tr>
<tr>
<td>Urban Centers</td>
<td>Central cities &amp; large downtowns with full range of horizontally- &amp; vertically-mixed land uses &amp; with high capacity transit stations/corridors present or planned. Urban core hubs of transit systems with excellent transit coverage, service levels, &amp; intermodal passenger transfer opportunities including convenient airport access.</td>
<td>Downtown Concord</td>
</tr>
<tr>
<td>Urban Centers</td>
<td>Major activity centers with full range of horizontally- &amp; vertically-mixed land uses &amp; with high capacity transit stations/corridors present or planned.</td>
<td>Downtown Walnut Creek</td>
</tr>
<tr>
<td>Close-in Compact Communities</td>
<td>Located near Urban Core or Urban Centers, close-in compact communities comprised primarily of housing but with scattered mixed-use centers &amp; arterial corridors forming the skeleton of the transportation system. Housing is varied in density &amp; type. Transit is available to connect neighborhoods to multiple destinations, with an emphasis on serving commute trips. Residents may think of it as being in the suburban community place type only if they match the place type characterization relative to location efficiency factors.</td>
<td>Concord (near urban centers)</td>
</tr>
<tr>
<td>Close-in Compact Communities</td>
<td>Small &amp; medium sized downtowns, Transit Oriented Developments, institutions, lifestyle centers, &amp; other centers of activity</td>
<td>Pleasant Hill (near urban centers)</td>
</tr>
<tr>
<td>Close-in Compact Communities</td>
<td>Arterial streets with variety of fronting development types, with frequent transit service &amp; transfer opportunities</td>
<td>Walnut Creek (near urban centers)</td>
</tr>
<tr>
<td>Close in Corridors</td>
<td>Walkable neighborhoods with housing in close proximity to shops, services, &amp; public facilities, as well as good multi-modal connections to urban centers. Housing density varies from medium to high. Fine-grained circulation network of streets with high comfort for pedestrians &amp; bicyclists.</td>
<td>S. Main St Corridor (Walnut Creek)</td>
</tr>
<tr>
<td>Compact Communities</td>
<td>Historic cities &amp; towns as well as newer places characterized by strong presence of community design elements. While most compact communities outside of metropolitan regions, some on the periphery of metropolitan regions.</td>
<td>Downtown Danville</td>
</tr>
<tr>
<td>Compact Communities</td>
<td>Low integration of housing with jobs, retail, &amp; services, poorly connected street networks, low levels of transit service, large surface parking, &amp; inadequate walkability. Suburban communities defined by weak-to-moderate presence of location efficient community design factors. Vary with respect to regional accessibility; some suburban communities located w/in easy commute distance of urban centers. Places that share characteristics with suburban communities—such as high proportion of detached housing, categorized as suburban—may include tourist &amp; recreation destinations which can significantly affect land uses, character &amp; mobility needs.</td>
<td>Martinez</td>
</tr>
<tr>
<td>Suburban Communities</td>
<td>Mid-size &amp; small downtowns, lifestyle centers, or other activity centers embedded within suburban communities.</td>
<td></td>
</tr>
<tr>
<td>Suburban Communities</td>
<td>Arterial streets with variety of fronting development types, frequently characterized by inadequate walk &amp; bike environments, low land use efficiency &amp; poor aesthetics.</td>
<td></td>
</tr>
<tr>
<td>Suburban Communities</td>
<td>Large tracts of land used for commercial purposes such as business or industrial park or warehousing, or for recreational purposes such as golf courses.</td>
<td></td>
</tr>
<tr>
<td>Suburban Communities</td>
<td>Residential subdivisions &amp; complexes including housing, public facilities &amp; local-serving commercial uses, typically separated by arterial corridors.</td>
<td>Various</td>
</tr>
<tr>
<td>Rural and Agricultural Lands</td>
<td>Settlement pattern with widely-spaced towns separated by farms, vineyards, orchard, or grazing lands. The rural &amp; agricultural place type may include tourist &amp; recreation destinations which can significantly affect land uses, character &amp; mobility needs.</td>
<td>Viano Vineyards (Martinez)</td>
</tr>
<tr>
<td>Rural Towns</td>
<td>Rural towns provide mix of housing, services &amp; public institutions in compact form that serve surrounding rural areas. They vary in size from crossroads with single clusters of commercial uses to towns offering full range of retail &amp; service businesses. Towns may also be the focus of tourist &amp; recreational activity or gateways to recreation areas in protected lands.</td>
<td>None Identified</td>
</tr>
<tr>
<td>Rural Settlements and Agricultural Lands</td>
<td>Scattered dwelling units &amp; supporting commercial uses &amp; public facilities, no significant subdivisions &amp; limited non-agricultural industrial or commercial land use, &amp; lands in agricultural or grazing use.</td>
<td>None Identified</td>
</tr>
<tr>
<td>Protected Lands</td>
<td>Lands protected from development by virtue of ownership, long-term regulation, or resource constraints</td>
<td>Buchanan Regional Park</td>
</tr>
<tr>
<td>Protected Lands</td>
<td>Barren Regional Park Carquinez Strait Regional Shoreline Lafayette Reservoir Recreation Area Las Trampas Regional Wilderness Lime Ridge Little Hills Ranch Regional Recreational Area Mt. Diablo State Park</td>
<td>CEMEX Clayton Aggregates Concord Disposal Services Concord Naval Weapons Station Kaiser Canyon Landfill Miscellaneous Industrial/Oil Refineries Sewage/Water Treatment Plants U.S. Army Reserve Parks Reserve Forces Training Area</td>
</tr>
</tbody>
</table>
Analysis Methodology Overview

This section describes the methodology used by SMG to label the TAZes by SMF Place Type. Most of the SMF Place Types describe areas at jurisdictional levels below the city or town level. Three of the 18 place types (Suburban Communities, Compact Communities and Rural and Agricultural Lands) can be applicable to a town or city level, but the remaining (e.g., “corridor-level”) require a greater level of detail. This required the study team to perform an analysis smaller than the city or town level in order to capture the differentiation among the communities along the I-680 corridor. The study team attempted to label TAZes as given place types based on general criteria from the Smart Mobility Framework that include:

- Completeness in relation to land use and activities
- Connectivity of Transportation Networks
- Accessibility to a range of destinations throughout the area
- Local transit service
- Safe and convenient bicycling and walking.¹

The process for developing the place types was iterative as illustrated in Figure 3. The process began by using 2010 land use and socio-economic data at the TAZ level.²

The TAZ-level data is used to develop the CCTA countywide travel demand model and is linked to Geographic Information System (GIS) spatial coverages for visualization. Key data from this dataset included households and employment data including manufacturing and agricultural employment.

This data was supplemented by other data from Walk Score®, an internet-based site that rates street addresses based on the walkability to nearby utilitarian amenities (e.g., grocery, restaurants, entertainment)³. Transit schedules were also used to attempt to label place types.

Finally, TAZes were labeled based on a visual inspection of land use parcel and transit station and route GIS coverages provided by CCTA as well at maps showing Metropolitan Transportation Commission (MTC) Place Types. One of the most important tools used by the study team was Google Earth®, a geospatial satellite imagery viewing software that also has a “Street View” feature that allows one to view images at street level.

² Contra Costa Transportation Authority (2010). CCTA Countywide Model Master Land Use Data.
³ www.walkscore.com
Labeling TAZes with SMF Place types was an iterative process using all of the data sources and tools described above. There were also challenges in that there are no firm guidelines to apply quantitative measures to place types. For example, one of the key features of a highly compact place is residential density, but there are no thresholds to use for what constitutes a Close-in Compact Neighborhood versus a Suburban Neighborhood. The same holds true for other quantitative measures.

However, in combination with a visual validation, it may be possible to develop a “first cut” at identifying place types pending a thorough review by community representatives with extensive local experience and knowledge.

The following sections discuss in more detail each of the data sources and tools used for this analysis, including:

- CCTA Traffic Analysis Zone (TAZ) Data
- MTC Place Types
- CCTA Parcel Maps
- Google Earth®
- Walk Score®
- Transit Schedules.
CCTA Traffic Analysis Zone (TAZ) Data

The first step in the place type analysis was to obtain 2010 Land Use data by TAZ from the CCTA travel demand model. This extensive data includes several key variables that were used at least for the initial screening of TAZes including:

- Acres
- Households
- Total Employment
- Retail Employment
- Service Employment
- Other Employment
- Agricultural Employment
- Manufacturing Employment
- Wholesale Employment.

The TAZ household and acreage data were used to develop the Households per Acre statistic used to gauge residential housing density. Though it is preferable to use housing units per acre instead of households per acre as a measure of density, this data was not readily available for the analysis. The reason that housing units is a better measure is that it accounts for empty units that may be available. Because the foreclosure crisis hit some areas of Contra Costa County particularly hard, using households may not represent the true residential density of a particular TAZ. Figure 4 illustrates how household density data was used as part of the evaluation and combined visually with MTC Place Types (discussed below).
The CCTA data also has several employment statistics that were used to identify the mix of employment in a TAZ. For this analysis SMG grouped retail and service employment into a category called “Local Serving” commercial employment, which may be an indicator of commercial retail businesses that residents may be able to readily access. For example, a TAZ with high number of retail stores and services and high residential densities may be a TAZ that is a compact community if verified by visual inspection.

Manufacturing and Wholesale employment were added together into a single category because this type of employment may be indicative of a special use area. A TAZ with high total manufacturing and wholesale employment, high relative employment as a percentage of other types of employment, and with low residential densities is likely a TAZ that is a Special Use Area place type.

Agricultural employment was used to identify “Rural and Agricultural Lands” place types. If a TAZ has high total agricultural employment and as a percentage of other employment types in conjunction with residential densities, then that place type was flagged as rural and agricultural pending a visual inspection.
The CCTA data was sorted first by the Manufacturing+Wholesale employment category. TAZes with high absolute and relative levels of employment were reviewed in Google Earth®. If the analyst concluded that they appeared to be a Special Use Area they were labeled accordingly. Once the analyst was unable to determine the place type visually, this analysis was stopped and other methods were used to evaluate the TAZes. The same approach was used for Agricultural land uses.

Initially, the household density metric was analyzed in a similar manner to the employment data. Once sorted, the analyst would flag the highest density TAZes and flag them as being Close-In. This Close-In classification was further scrutinized by using the Walk Score®, “Local Serving” employment, and visually to qualitatively label the TAZ was Close-In or a “Center” (e.g., Urban or Suburban) or one of the Suburban Community classifications.

As one of the final review steps in the analysis, these socio-economic data items were used to identify TAZes that may have a place type label applied incorrectly during the process. The data were re-sorted by assigned place type and a review of the extreme values was performed. For example, if a TAZ was labeled as a Close-In place type, yet had a very low household density, that TAZ was reviewed visually a final time for classification.

**MTC Place Types**

SMG mapped the MTC Place Types to the CCTA TAZ coverage (Shown in Figure 4 above). The MTC Place Types were developed in coordination with local jurisdictions to help communities to identify Priority Development Areas (PDAs) where there exist opportunities for future infill development as shown in Figure 5.

The MTC Place Type classifications may be more prescriptive of what can be done to benefit a community rather than descriptive of an existing condition where the SMF Place Types are more descriptive in labeling of existing land uses within an area that may be candidates for transition to another place type.
Figure 5: MTC Contra Costa County Place Types

Source: Association of Bay Area Governments (ABAG) Jobs-Housing Connection Strategy. May 2012.

The MTC Place Types were used in this analysis to validate the SMF Place Type labeling. For example, downtown Danville is a Transit Town Center PDA with local commitment to increase housing and amenities in a pedestrian-friendly environment served by transit.\(^1\)

Since downtown Danville currently has housing densities, relatively high Walk Scores\(^{®}\) to existing amenities, and relatively accessible transit services it was labeled by the study team as a “Compact Community” SMF Place Type to be consistent with the community defined Transit Town Center Place Type.

SMG attempted to label TAZes with an MTC/SMF correspondence. However, the existing condition of the location did not correspond to the future-looking MTC Place Type. For example, TAZes adjacent to the North Concord/Martinez BART Station are designated as a Regional Center MTC Place Type. But when these were reviewed by the study team, these locations were deemed to be closer to the

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\(^1\) Eligibility to be classified as a PDA, a community has to be near existing or planned fixed transit or served by comparable bus service, and planned for more housing according to MTC guidelines.
Suburban Community or Special Use Area SMF Place Type even though much of that area has been designated by the community to transition to a Regional Center PDA. The SMG analysis indicated relatively low existing residential densities as well as few people-oriented land uses and amenities near the BART Station.

CCTA Parcel Maps
The parcel maps by CCTA proved extremely useful to identify Suburban Community Place Types. The parcel maps show each parcel of land along with street layouts for Contra Costa County as illustrated in Figure 6. Since much of the I-680 study corridor may be considered suburban residential in nature, the majority of TAZes were labeled Suburban Community by overlaying the TAZ GIS coverage on top of the parcel maps and manually selecting TAZes that “looked” suburban due to the street layout (e.g., having cul-de-sacs).

Follow-up analyses using other metrics were used to ultimately label TAZes, but this tool allowed the study team to quickly identify the majority of place types.

Figure 6: Contra Costa County Parcel Data

Source: CCTA Parcel GIS Coverages 2012.
CCTA Transit, Bicycle and Pedestrian GIS Coverages

These GIS coverages illustrated in Figure 7 were useful to visually identify TAZes with high concentrations of transit and non-motorized access. These coverages were used primarily to qualitatively review TAZes. For example, TAZes within a quarter mile of BART stations were flagged for identification as an Urban or Suburban Center, or Close-In place types unless other criteria suggested that another place type classification was more important.

Figure 7: Contra Costa County Transit and Bike Lanes

Source: CCTA Transit and Bicycle GIS Coverages 2012.
**Google Earth®**

Google Earth is a well-known virtual globe mapping software package used by Caltrans and other regional agencies for planning purposes.

Google Earth was the primary tool used to visually validate SMF Place Types in conjunction with CCTA Parcel Maps. All TAZes labeled *Special Use Area* were validated using Google Earth, and it was instrumental in reviewing all TAZes where questions existed about the Place Type label.

Uses of Google Earth include cases where a TAZ was labeled as *Close-In*, but had a low Walk Score® or was labeled as a *Suburban Community*, but had a high Walk Score. As mentioned earlier, T AZes with high manufacturing or agricultural employment were verified using Google Earth before labeling them as *Special Use Area*.

**Walk Score®**

Walk Score®¹ is a system to rate, from a score of 0 to 100, the walkability of a location based on an algorithm that evaluates the distance to utilitarian amenities in various categories. (Walk Score, 2011) The patent pending methodology calculates the most likely route and distance to one of nine amenity categories and penalizes locations that have long blocks or low intersection density. In addition it weights the categories according to their importance. The nine categories and the respective weightings are shown below:

- Grocery
- Coffee
- Banks
- Books
- Entertainment
- Parks
- Schools
- Restaurants
- Shopping.

SMG recognizes that Walk Score® may not be fully tested as a metric for pedestrian-oriented neighborhoods as it is not currently used by Caltrans, CCTA, or other regional entities for planning. Moreover, there may be very walkable neighborhoods that are not quantified as such by Walk Score. The study team, therefore, used it as one metric among many in evaluating place types.

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To analyze the TAZes, SMG took the centroid of each TAZ near the corridor or belonging to a city or town that touches the corridor and used the Walk Score® website to produce the associated score for the TAZ. The results of this analysis are shown in Exhibit x below. For very large TAZes, this may not accurately capture the walkability of that TAZ if, say, the TAZ is largely vacant, but with a walkable neighborhood on edge of the TAZ. The team used the Walk Score® recommended ranges for walkability as follows:

- 0-24 Very Car Dependent
- 25-49 Somewhat Car Dependent
- 50-69 Somewhat Walkable
- 70-89 Very Walkable
- 90-100 Extremely Walkable.

If a TAZ was near an Urban Center Place Type such as in Walnut Creek, had relatively high household densities, and a high Walk Score, it would be labeled as an In-Close Compact TAZ. If the same TAZ was instead not adjacent to an Urban Center, it would be labeled as a Suburban Center.
One result of using the Walk Score® methodology, was that the team labeled some TAZes in the Blackhawk-Camino Tassajara community as a Suburban Center based on the Walk Score® in addition to the residential densities and the access transit in that area. One of the objectives of the SMF is to be able to identify areas with potentially high “latent” location efficiency where land use, urban design patterns, and demographic characteristics could improve Smart Mobility outcomes if a fuller range of transportation facilities and services were present. (California Department of Transportation, 2010)

It is also important to note that Walk Score® was correlated with TAZ size. This is to be expected since TAZes are sized based on the demographics in an area. Cities or towns with higher population or employment densities have smaller TAZes.

**Transit Schedules**
In some cases, transit schedules were reviewed to assess the frequency of service. This was done if there was a question about whether to label a TAZ as a Suburban Community or a Close-In Community. A TAZ with a transit access with a high frequency of peak period service may be designated a Close-In Community if adjacent to other TAZes with a similar label or if it lay near an Urban Center.

**Works Cited**

Contra Costa Transportation Authority. (2012). 2010 CCTA Countywide Model Master Land Use Data. Pleasant Hill, California, USA.
