CALIFORNIA TAX CREDIT ALLOCATION COMMITTEE

915 Capitol Mall, Suite 280
Sacramento, CA 95814
p (916) 654-6340
f (916) 654-6033
www.treasurer.ca.gov/ctcac

MEMBERS

FIONA MA, CPA, CHAIR
State Treasurer

MALIA M. COHEN
State Controller

JOE STEPHENSHAW
Director of Finance

GUSTAVO VELASQUEZ
Director of HCD

TONY SERTICH
Executive Director of CalHFA

EXECUTIVE DIRECTOR
MARINA WIANT

DATE: October 30, 2026

TO: Low-Income Housing Tax Credit Stakeholders

FROM: Marina Wiant, Executive Director

RE: Proposed Changes to the Market Study Guidelines

The California Tax Credit Allocation Committee (CTCAC) and the California Debt Limit Allocation Committee (CDLAC) are proposing changes to the Market Study Guidelines for calendar year 2027. This memorandum is accompanied by the draft 2027 Market Study Guidelines (Exhibit A) with the proposed changes in strikeout and underline format. The proposed changes are clarifying changes in nature or conforming changes to the proposed CTCAC regulation changes published on the CTCAC website on October 9, 2026. Staff will conduct a public hearing to explain the proposed changes, answer questions, and solicit comments specific to the changes being proposed. The notice for the public hearing will be sent out separately.

CTCAC is accepting written public comment to the proposed changes through Monday, November 23, 2026 at 5:00 p.m. Interested persons may submit public comment in writing via email to Carmen Doonan, Development Section Chief at carmen.doonan@treasurer.ca.gov and DC Navarrette, CDLAC Section Chief at dc.navarrette@treasurer.ca.gov, or by mail or hand delivery to CTCAC/CDLAC at 915 Capitol Mall, Suite 280, Sacramento, CA 95814. CTCAC and CDLAC encourage commenters to clear and concise with their public comments. Please explicitly indicate your agreement or disagreement with the changes to ensure staff accurately captures your position. Staff will only consider public comments relating to the changes being proposed.

California Tax Credit Allocation Committee &
California Debt Limit Allocation Committee

MARKET STUDY GUIDELINES - DRAFT

GENERAL – WHAT EACH APPLICANT MUST SUBMIT:

These market study guidelines apply to all applicants seeking tax-exempt bond authority from the California Debt Limit Allocation Committee and/or Housing Tax Credit from the California Tax Credit Allocation Committee under California's Low Income Housing Tax Credit program, irrespective of project size, location, and whether the applicant is seeking competitive 9% credit, or credit used in conjunction with tax-exempt financing. All market studies must be prepared or updated within 180 days of the filing deadline by an independent third party and must be at the expense of the developer. In such cases, applicants must provide a new market study.

An updated market study must include updates to the following sections as applicable: the executive summary, project description, delineation of market area, market area economy, population, household, income trends, rent comparables, and absorption rate. The demand estimate (capture rate and penetration rate) must be updated when new rent comparables affect demand at the proposed project. If the demand estimate remains unchanged, the update must indicate that this analysis was performed. The market study matrices must be updated if the proposed rents in the application change by any amount.

All market studies must include a letter, signed by the market analyst, certifying the following:

1) The date the report was prepared.
2) The date of the site inspection and that it is within two years of the application deadline.
3) The name and phone number of the analyst who prepared and certified the study.
4) A statement that there exists no identity of interest between the analyst and the entity for which the report is prepared, the applicant or its principals (general partners, members, etc.).
5) A statement that recommendations and conclusions are based solely on the professional opinion and best efforts of the analyst.
6) Include the number of years the analyst has had experience with multifamily rental housing.
7) Include the number of market studies the analyst has prepared in the project's PMA
8) Include the number of times, approximately, the analyst has done a physical inspection in the project's PMA.
9) A completed Market Study Index (attached separately).

The market study must address **all** of the items listed below and must demonstrate sufficient demand in the market area to support the proposed housing. Each study must provide up-to-date demographic information from a clearly identified source. Additionally, each study must also include an **analysis** of such data, identifying assumptions, estimates, and projections, used in the analysis. Recommendations should, of course, be based on market conditions, and not simply build a case in support of the developer's proposal.

The market study must address, in separate subsections, each housing type and specific population to be served by the development. For example, if a development is intended to be partially Special Needs and partially Large Family, separate subsections of the study must address the population/household trends, the demand estimate and absorption rate for each of these population types. Similarly, if a development is intended to be partially market-rate and partially affordable, different subsections should

address the population/household trends, household income distribution, demand and absorption rate, etc. for both the market-rate units and the affordable units.

Alternate Market Study Requirements for Acquisition/Rehabilitation Projects Meeting the Follow Criteria

Acquisition/Rehabilitation projects subject to an existing federal, state, or local public entity regulatory agreement or a federal, state, or local operating or rental assistance agreement may provide, as an alternative market study format, the following:

- A written statement certified by a third-party market analyst that the project meets the following requirements:

    1. The proposed tenant-paid rent and income targeting levels will not exceed 105% of the current rents. The proposed rent and income targeting levels for units subject to a continuing state or federal project-based rental assistance contract may increase more. Proposed rent and income targeting levels for resyndication projects must be consistent with CTCAC Regulation Section 10325(f)(11) or Section 10326(g)(8).

        ~~CDLAC ALTERNATIVE: as evidenced by copies of executed contracts, the project has been receiving federal, state, or local operating or rental assistance and will continue to receive such assistance for at least 5 additional years. If a contract demonstrating operating or rental assistance for an additional 5 years is not available, a letter signed by the contractor's senior official may be submitted that describes the efforts undertaken to effectuate an operating or rental assistance contract, the expected duration of the contract and the expected contract execution date.~~

    2. The project will have a vacancy rate of no more than five percent 5% (for special needs units and non-special needs SRO units without a significant project-based public rental subsidy, a vacancy rate of no more than ten percent 10%).

For tax-exempt bond authority projects, Sections I through V and Section VIII of these Market Study Guidelines will be used by CDLAC staff when evaluating the minimum requirement that restricted rents must be at least ten percent below market rents.

Hybrid Projects

A new construction hybrid 9% and 4% tax credit development may combine information for both component projects into one report and, if not, shall reflect the other component project as a development in the planning or construction stages.

I. EXECUTIVE SUMMARY AND CONCLUSIONS

Each market study must include a concise summary of the data, analysis and conclusions, including the following:

A. A concise description of the site and adjacent parcels, particularly neighborhood housing. The description must include the project's name, street address (if available), city, county, zip code and census tract number.

1. For acquisition and/or rehabilitation projects with one pre-existing USDA Rental Assistance contract or project-based Section 8 contract in effect for all the sites, there is no limit on the number or proximity of sites.

2. For acquisition and/or rehabilitation projects with any of the following: (A) existing federal or state rental assistance or operating subsidies, where there are multiple existing individual contracts for the different sites (B) an existing CTCAC Regulatory Agreement, or (C) an existing regulatory agreement with a federal, state, or local public entity, state that the number of sites is no more than five, and that all sites are either within the boundaries of the same city, within a 10-mile diameter circle in the same county, or within the same county if no location is within a city having a population of five-hundred thousand (500,000) or more.

3. For new construction projects and all other acquisition and/or rehabilitation projects, state that the number of sites are no more than five, and that all sites are within a ~~1~~one mile diameter circle within the same county. For projects with both new construction and rehabilitation, the ~~1~~one mile diameter requirement applies to all sites and is not limited to sites containing new construction.

4. For CDLAC projects, all sites must be financed through a single pooled bond transaction.

For projects with both new construction and rehabilitation, the site limit established above applies to all sites; rehabilitation site limits and new construction site limits are not additive.

B. A brief summary of the project including the type of construction (new or rehabilitation), number of buildings, number and type of units, proposed rents and population served.

C. A brief description of the market area, including a map delineating the market area.

D. A precise statement of the analyst's opinion of Market Feasibility including the prospect for long-term performance of the property given housing, demographic trends and economic factors. The statement must include an estimate of the demand for each unit type in the expected year of market entry.

E. A summary of market related strengths and/or weakness which may influence the subject development's marketability, including but not limited to, compatibility with surrounding uses, the appropriateness of the subject property's location, unit sizes and configuration, and number of units.

1. Address whether or not the service amenities, on-site amenities, off-site amenities and their distance from the project are appropriate and sufficient for the market and the intended tenants. Include, if any, additional amenities that are available to tenants at an additional cost.

2. Any site nuisances that have or may impact marketability of the project. Address whether the location's neighborhood characteristics and/or surrounding land uses attract or deter renters from moving to the site.

3. Address physical barriers (i.e., railroad tracks, freeway, rivers, mountains, etc.), if any, and the affect on project marketability.

4. Identify if there are single-family homes available for equal or less rent that could affect the marketability of these units.

F. A summary of the rent comparables, including their distance from the project, population served, number of units by bedroom size, rent by unit size, service and on-site amenities.

1. When making age or physical adjustments, the Market Analyst should physically walk the project, and speak to the management company to take into account the project maintenance, and/or the rehab/unit updating that has occurred on an on-going basis over the years, or if it was a project-wide rehabilitation. A detailed narrative of the visit and findings, and contact information of the management company and the person whom the Analyst walked the property with, and gathered project site information from should also be included.

G. A summary of the existing and planned affordable housing developments in the market area including names, type of affordable project, whether existing or planned, distance from the proposed development, population served, number of units by bedroom size, rent by unit size and the service and site amenities.

1. Include risks involved with competitive properties that may be ready to come online, be completed and/or available within six months before or after the subject property.

2. Address declining population in PMA due to unusual conditions, businesses closing, etc.

H. A precise statement of key conclusions reached by the analyst, supported by the data contained in the market study. These conclusions must include:

1. A summary of positive and negative attributes and issues that will affect the property's performance and lease-up, points that will mitigate or reduce any negative attributes, and any recommendations and/or suggested modifications to the proposed project.

2. An evaluation of the proposed development, given the target population and market conditions. This evaluation should include market justification for the proposed development, including the proposed rents by unit and population type, estimated absorption rate, and should further evaluate the proposed unit, development, and locational amenities given the market.

3. An objective review of past, present, and future demographic and economic trends in the defined market area and include an estimate of how the proposed development will be integrated into the market area based on existing rental comparables and anticipated pipeline additions to the rental base.

II. PROJECT DESCRIPTION

The market study must include a project description to show the analyst's understanding of the project at the point in time the market study is undertaken. The project description must include:

A. Sponsor's name and the Development's Location (**including color photos**). A detailed description of the location including closest streets, number of acres, and a map indicating site configuration and contiguous land use and zoning.

B. Scattered Site Project. A project in which the parcels of land are not contiguous except for the interposition of a road, street, stream or similar property.

1. For acquisition and/or rehabilitation projects with one pre-existing USDA Rental Assistance contract or project-based Section 8 contract in effect for all the sites, there shall be no limit on the number or proximity of sites.

2. For acquisition and/or rehabilitation projects with any of the following: (A) existing federal or state rental assistance or operating subsidies, where there are multiple existing individual contracts for the different sites (B) an existing CTCAC Regulatory Agreement, or (C) an existing regulatory agreement with a federal, state, or local public entity, the number of sites shall be limited to five, unless the Executive Director approves a higher number, and all sites shall be either within the boundaries of the same city, within a 10-mile diameter circle in the same county, or within the same county if no location is within a city having a population of five-hundred thousand (500,000) or more.

3. For new construction projects and all other acquisition and/or rehabilitation projects, the number of sites shall be limited to five, and all sites shall be within a ~~1~~one mile diameter circle within the same county. ~~-~~For projects with both new construction and rehabilitation, the ~~1~~one mile diameter requirement applies to all sites and is not limited to sites containing new construction.

4. For CDLAC projects, all sites must be financed through a single pooled bond transaction.

For projects with both new construction and rehabilitation, the site limit established above applies to all sites; rehabilitation site limits and new construction site limits are not additive.

C. Total proposed project units and total tax credit units by: number of bedrooms and baths, income limit as a percent of Area Median Income (AMI~~), unit size in square feet~~) with 60% being the highest for CDLAC and 80% being the highest for CTCAC with an average income federal set-aside, proposed rents, including income restrictions, proposed housing assistance and any special needs set-asides.

D. Address the tenant paid utility schedule and source of that schedule, as well as the utilities expected to be paid by tenants and energy sources for tenant paid hot water, heat and cooking.

E. Description of the project's Target Population and occupancy type (family, ~~elderly~~senior, special needs, etc.).

F. Whether the project will be a new construction, adaptive reuse, acquisition and/or rehabilitation.

G. Developer's projected dates for construction start and completion, and start of pre-leasing.

H. Description of: the number of buildings, design (walk-up, elevator, etc.), and number of stories, unit and common amenities, site amenities and parking.

1. For rehabilitation or demolition of occupied housing proposals, current occupancy levels, operating expenses and rents being charged, identification of any existing assisted housing program at the property such as Section 8, Section 202, Section 811, BMIR, Section 236, etc., and tenant incomes.

2. The status or date of architectural plans and name of the architect should be referenced.

3. A copy of the floor plans and elevations should be included as an appendix to the report.

III. DELINEATION OF MARKET AREA

Identify and define the geographic market area from which potential renters are expected to come. This section shall include the following:

A. Definitions of the Primary (PMA) and Secondary (SMA) Market Areas (including a map which clearly delineates the areas) and an explanation of the basis for the boundaries of the PMA and SMA.

1. Provide a written narrative detailing the rationale for the suggested PMA. This narrative should address any specific issues with the market area including the exclusion of nearby areas or justification for geographically large market areas.

~~a)~~a. The rationale should take into account demographic and socio-economic characteristics, target tenant population, political jurisdictional boundaries, natural boundaries, experience of nearby comparable developments, accessibility to mass transit or key transportation corridors and commute patterns, and market perceptions.

2. Identification of the PMA and SMA boundaries by census tracts or blocks, jurisdictions, street names, or other geography forming the boundaries.

3. Also define the larger geographic area in which the PMA is located (i.e. city, county, MSA, etc.). When inclusion of the SMA is unnecessary to demonstrate demand, identify the SMA and provide an explanation as to why it is unnecessary.

4. For rural projects, the defined PMA shall consider the relative draw of a town in comparison to its neighboring towns or cities. A rural PMA should not consist of large whole census tracts, except in rare circumstances, and should never include significantly larger more populous towns unless the analyst can provide evidence that the tenants will migrate to the subject location from the larger towns.

5. Avoid overlapping markets. A market area too large will overstate demand for a proposed development. A market area that is too small may either understate demand by understating the number of potential, income-qualified residents or overstate demand by excluding competitive existing or planned projects that are just outside the defined market area.

B. A scaled for distance map of the suggested market area that identifies the proposed development, the comparable rental developments, and location amenities, including but not limited to the closest transportation linkages, shopping, schools, medical services, public transportation, and other services such as libraries, community centers, banks, etc. In situations where it is not feasible to show all the amenity categories on a map, the categories, including their distance, may be addressed in the narrative.

C. Description of the site characteristics including its size, shape, general topography and vegetation and proximity to adverse conditions.

D. Photographs of the site and neighborhood.

E. Description and evaluation of the visibility and accessibility of the site.

F. Information or statistics on crime in the Primary Market Area relative to data for the overall area. Address any local perceptions of crime or problems in the Primary Market Area.

IV. MARKET AREA ECONOMY

For all proposals except ~~elderly~~senior, provide data and analysis on the employment and economy of the PMA to give an understanding of the overall economic health of the PMA. List sources for the data and methodology for the analysis.

A. Provide a description of employment by industry sector (numbers and percentages) for the PMA or smallest geographic area available that includes the PMA and compare the data to the larger geographic area, e.g. the city, county, labor market area, or MSA.

B. List major employers in the PMA, the type of business and the number employed and compare the data to the larger geographic area (i.e. MSA, County, Secondary Market Area, etc.). Outline any anticipated expansions, contractions in their workforces, as well as newly planned employers and their impact on employment in the PMA.

C. Show the historical unemployment rate for the last ten years (or other appropriate period) for the PMA and compare to the larger geographic area (i.e. MSA, County, Secondary Market Area, etc.). Provide total workforce figures and number and percentage unemployed.

D. Show employment growth over the same period or a more recent, shorter period (last five (5) years). Compare to the larger geographic area and to PMA household growth.

E. Comment on trends for employment in the PMA in relation to the subject.

F. If relevant, comment on the availability of affordable housing for employees of businesses and industries that draw from the PMA.

G. Provide a breakdown of typical or mean wages by occupation.

H. Relate the available employment to the project's target population.

I. When available, provide commuting patterns for workers such as how many workers in the PMA commute from surrounding areas outside the PMA.

V. POPULATION, HOUSEHOLD AND INCOME TRENDS

Provide the following demographic information for **both** the PMA and the SMA or minor civil division (city, village, township, etc.) in which the proposed project will be located. Projections must be prepared by one of the national proprietary data providers, for example, ESRI, Claritas, etc. U.S. Census data, unless current, is only acceptable as historical data. If the market analyst does not agree with the projections, an explanation of the reasons for the disagreement must be provided, along with substitute projections.

Population and households should be projected to the estimated time of market entry (generally two years from the year of application) and for five years from the year of application. For ~~elderly~~senior proposals, data should be based on households that are most likely to need one of three types of senior-restricted housing: ~~-~~independent living ages 65 years plus, congregate care and assisted living ages 75 plus. Indicate the source for all data, provide a methodology for estimates and provide an analysis of trends indicated by the data.

A. Population Trends:
   1. Total Population
   2. Population by age group
   3. Number of ~~elderly~~senior and non-~~elderly~~senior

B. Household Trends:
   1. Total number of households
   2. Household by tenure; that is, the number of owner and renter households by ~~elderly~~senior and non-~~elderly~~senior
   3. Average household size
   4. Renter households by number of persons in the household

C. Income Trends:
   1. Estimate of household incomes in $5,000 or $10,000 increments, by household size and by tenure. ~~Elderly~~Senior proposals should reflect the income distribution of ~~elderly~~senior households only
   2. Provide the reasonable assumptions upon which the income projections are based

VI. DEMAND ESTIMATE

In calculating demand, the analyst shall use the applicable incomes and rents in the development's tax credit application. The estimated demand must be based upon current households and projected household growth. Assume that market-rate households will spend up to 30% of their income for gross rent, and lower income households up to 40% for their gross rent. Demand should be calculated for each proposed rent level and each unit type (e.g., 1 one-bedroom/1 one bath at 50% AMI, etc.). Income qualified households should not be double counted.

- Number of potential income qualified households in the PMA must contain a sufficient number of households who meet the occupancy restrictions of a proposed project, i.e., if a homeless project, only include the homeless population in the number of income qualified households.

Demand calculations may be performed for both the PMA and the SMA. However, only the demand from the PMA will be considered in meeting the requirement of showing adequate demand, unless an estimate of the proportion of renters moving into the PMA from outside of the PMA can be provided based on surveys of initial move-in renters of similar housing type projects. An outline of any survey(s) used to derive this estimate must be included in the Appendix.

Section A-C below is an **example** of a demand analysis. Reliable local sources are preferable to regional sources. *CTCAC staff should be able to reconstruct your estimate of demand – step by step. The percentages used are for example only - market studies must use percentages based upon actual market data and/or other reliable sources.*

A. Demand from Existing Households for a given bedroom size and rent level:

1.	Number of existing households for current year.	40,000
2.	Number of renters.	40,000 x 30% = 12,000
3.	Number of appropriate sized households.	12,000 x 33% = 3,960
4.	Number of income-qualified renter households.	3,960 x 18% = 713
5.	Turnover rate. Turnover rates should be constructed using identified, reliable data sources, and should represent an estimate the percentage of renter households that move in a given year for that tenant type (senior, family, special needs, etc.) in that proposed PMA.	713 x 35% = 249
6.	Estimated annual demand from existing rental households.	249

B. Demand from New Households:

1.	Estimate the number of new, additional renter households by the time the project enters the market.	200
2.	Estimate the annual growth. This is the number of new households divided by the number of years between the current household number and the market entry number.	200 ÷ 2= 100
3.	Number of appropriately sized households.	100 x 25% = 25
4.	Number of income-qualified renter households.	25 x 18% = 5
5.	Estimated annual demand from new households.	5

Total annual demand from existing and new renter households: 249 + 5 = 254.

C. Demand from Commuters (Optional – for use when appropriate):

Certain PMAs may show insufficient demand from calculations based on residents, specifically those with a combination of one or more of the following: 1) high-income resident population, 2) high housing costs and 3) a low renter population base (statewide, 43% of all households are renter households).

There are seven counties where these factors are prevalent: Santa Clara, San Mateo, San Francisco, Marin, Contra Costa, Alameda and Santa Cruz. There is anecdotal evidence to support the assertion that low-income housing projects in these counties, and possibly other similar smaller communities throughout California, have a substantial need and demand for low-income housing projects. For family or non-targeted units in these kinds of PMAs, the analyst may choose to include a calculation of demand from households where one or more wage earners live outside the PMA but commute into it for employment purposes. Staff will be the final arbiter regarding the appropriateness of using this demand model for a PMA.

1.	Current Civilian Employment in the PMA. Typically, employment by industry, including average or median wage for that industry, in the PMA. Suggested Sources: EDD, BLS, Commercial Data Providers.	112,500 employees
1A.	Calculate Employment in PMA in Year of Market Entry (Optional). Base employment can be grown for a number of years without the necessity of changing other assumptions.	112,500 x 1.03 = 115,875 employees
2.	Income Qualifying Employees. Assume that employment wage distribution is approximately normally distributed around the mean or median within each industry.	115,875 x 25% = 28,969 employees
3.	Income Qualifying Households. Employment must be reduced to households. Use household or family data that shows number of employed persons in households or families in the county or statewide. Suggested sources: Counting California, EDD.	28,969 ÷ 1.64 = 17,664 households (÷ County # or ÷1.58 Default for State Average # of Workers per Family)
4.	Income Qualifying Commuter Households. Only commuters with commute distances in excess of eight (8) miles will be prompted to move closer to a job. –The percentage factor used will represent those employed within the PMA who commute more than eight (8) miles to work.– Commute time data can be used instead, with the percentage of workers commuting more than 20 minutes to work used instead. Suggested sources: Commercial Data Providers, Local Transportation Agencies, Local Government Associations.	17,664 -x 55% = 9,715 households

5.	Income Qualifying Commuter Renter Households. Only renters will move into low-income multi-family rental housing. Develop an appropriate renter proportion for the commuting population given the time and distance they commute. Suggested Sources: Employee surveys in the PMA, outlying Secondary Market Area (SMA) renter propensity.	9,715 x 40% = 3,886 households
6.	Size of Qualifying Households. Unless another mix of household sizes can be justified, assume the same mix as used to calculate demand from resident households.	3,886 x 33% = 1,282
7.	Annual Demand from Income Qualifying Commuter Renter Households. There is no relationship between commute distance/time and the likelihood of moving. Develop an appropriate turnover rate for the commuting population given the time and distance they commute. Suggested Sources: Outlying Secondary Market Area (SMA) turnover rate(s).	1,282 x 25% = 320 (25% Conservative Default Turnover Rate)

The market analysis may also include the results of tenant surveys of existing low-income housing projects to support the assertion of demand from commuter households.

D. Special Needs Projects:

For projects targeting special needs populations, in cases where target tenant population data is unavailable, demand may be shown through estimated annual referrals of federal, state, local or nonprofit social services agencies that serve the target population within the PMA. This evidence must include certified, written estimates from the appropriate service provider(s) of the annual referrals, and an estimate of the proportion of those referrals the agency believes will meet the project's income qualifications.

Analysts should not use a general occupancy or family occupancy model for special needs projects.

For projects with rental or operating subsidies on less than 100% of the units, analyst must demonstrate that the rent for tenants living in unsubsidized units will not exceed 30% of the tenants' incomes.

E. Senior Projects:

For projects targeting senior populations, demand estimates may be bolstered by evidence showing potential demand from sources not accounted for in subsections A and B of this section. Additional sources of demand for senior units may include the following:

1. Assuming a wider income band due to a higher proportion of income being used for rent. Analysts may assume up to 50% of income for gross rents to determine income bands for all unit sizes and all AMI income targets. Such wider bands may not overlap in order to avoid double-counting/over-counting senior households. Housing choice vouchers arguably further increase the potential income bands, however, voucher rental assistance should not

be assumed, and broader income banding based on rental assistance should only be used in cases where the project in question has a project-based rental assistance contract.

2. Age 55-64 households. This source of demand is only appropriate if the applicant (not just the Market Analyst) indicates that the project will specifically target senior households within these age ranges. The project in question must have appropriate amenities, and should be located specifically to attract younger senior households. CTCAC will require additional information from applicants who rely on demand from this source to show adequate demand for their project, including but not limited to, evidence of a marketing plan designed specifically to target senior households age 55-64.

3. Home owning seniors moving to rental projects. The additional demand for senior affordable rental units must be shown in a manner similar to that outlined in subsection A of this section:

		Number of existing households for current year.	40,000
		Number of senior homeowner households.	40,000 x 30% = 12,000
		Number of appropriate sized households.	12,000 x 33% = 3,960
		Number of income-qualified renter households.	3,960 x 18% = 713
		Conversion rate. (Using identified, reliable data sources, estimate the percentage of senior homeowner households that move into affordable rental units in a given year.)	713 x 5% = 36
		Estimated annual demand from existing senior homeowner households.	36

The critical factor in demonstrating this source of demand is a credible conversion rate. Evidence supporting the assumed conversion rate must include lease-up data from other senior projects in similar circumstances, i.e., data from rural affordable projects in California supporting the provided conversion for a rural affordable project, etc. Conversion rates based on aggregate data that does not distinguish between rural, suburban or urban projects, market-rate or affordable projects, or projects in step-up verses step-down markets, will not be accepted.

4. Relocation of seniors living outside the PMA by their adult children living within the PMA. This source of demand is extremely difficult to quantify, however, the Market Analyst may argue for a diminution in the units that must be filled by demand from within the PMA. Evidence supporting the assumed relocation rate must include lease-up data from other senior projects in similar circumstances, i.e., data from rural projects in California supporting the provided relocation rate for a rural project, etc. Relocation rates based on aggregate data that does not distinguish between rural, suburban or urban projects, market-rate or affordable projects, or projects in step-up verses step-down markets, will not be accepted. Using relocation rates as an alternative source of demand for affordable senior projects is most appropriate for projects in more affluent urban and suburban areas.

5. Migration of seniors from outside of the PMA to the project. Similar to the relocation of seniors by adult children living within the PMA, this source of demand is extremely difficult to quantify, however, the Market Analyst may argue for a diminution in the units that must be filled by demand from within the PMA. Evidence supporting the assumed migration rate must include lease-up data from other senior projects in similar circumstances, i.e., data from rural projects in California supporting the provided migration rate for a rural project, etc. Migration rates based on aggregate data that does not distinguish between rural, suburban or urban projects, market-rate or affordable projects, or projects in step-up verses step-down markets, will not be accepted. Using a migration rates as a source of demand for affordable senior projects is most appropriate for projects in step-up markets.

6. Pent-up demand from seniors living in extended families. Data on the number of seniors living in extended family households is available through the Census, and therefore may be available through many data providers. Analysts must provide sufficient evidence to support any turnover assumptions used to calculate expected demand from seniors living in extended families. This is arguably the most difficult source of additional demand to quantify, and likely only appropriate to certain PMAs.

F. Native American Projects

For projects on land to be owned by a Tribe, whether the land is owned in fee or in trust, and targeting tribal households (and up to 20% non-tribal households if required by the HOME Program), demand for tribally-restricted units may be shown through Tribal demographics (including employment, income, homeless population, family size and seniors).

G. Analysis.

For all but Special Needs Projects, the demand analysis must include:

1. A detailed analysis of the income levels of the potential tenants for the proposed units. The analysis must state and provide support for the minimum household income used for total housing expenses to set the lower limit of the targeted household income range.

2. A calculation of annual demand in the projected year of market entry for each unit size and rent level as outlined in A-C above.

3. A calculation of the annual demand, or reduction in units to be filled though PMA demand, as outlined in D-E above.

4. A calculation of the Capture Rate for each Income Limit in the subject property incorporating any other regulatory agency restrictions such as age, income, living in Substandard Conditions, renters versus home owners, household sizes, etc. For rehabilitation projects, the calculated Capture Rate may be based on the estimated number of units that will be normally vacant due to turnover plus the number of units that the existing tenants will be required to vacate for failing to income qualify for a unit, during the year the project is projected to be placed in service.

5. A calculation of the Penetration Rate. For rehabilitation projects, the calculated Penetration Rate may be based on the estimated number of units that will be normally vacant due to turnover plus the number of units that the existing tenants will be required to vacate for

failing to income qualify for a unit, during the year the project is projected to be placed in service.

6. A projection of, and explanation for, any future changes in the housing population within the PMA.

7. Identification of risks (i.e. competitive properties which may come on line at the same time as the subject property; declining population in the PMA, etc.), unusual conditions and mitigating circumstances.

8. Documentation and descriptions that show the methodology for calculations in the analysis section and relate the conclusions to the data.

VII. ABSORPTION RATE

The market study should define and justify the Absorption Rate for the subject property. The Absorption Period is considered to start as soon as the first units are released for occupancy. The analysis must provide an estimate of the time required to reach 95% occupancy. The Absorption Rate determination should consider, but is not limited to, such factors as the overall estimate of new household growth, the available supply of competitive units, observed trends in absorption of comparable units, and the availability of subsidies and rent specials. The month leasing is assumed to begin should accompany all absorption estimates.

- SRO and Special Needs must be 90% occupied within six months. If the property is over 150 units, must reach 90% occupancy within one year.
- Large Family projects must be 95% occupied within six months. If the property is over 150 units, must reach 95% occupancy within one year.
- All Senior projects must be 95% occupied within ~~1~~one year.

VIII. COMPETITIVE RENTAL MARKET

Provide information on other multifamily rental housing in the Primary Market Area (PMA) and any rental housing proposed to be developed in the PMA. This section of the market study should include:

A. Market-Rate Comparables:

1. Identify what market-rate developments are currently available to serve the target market in the PMA, and provide sufficient information on existing developments to allow a reviewer who is unfamiliar with the PMA to understand the current market conditions.

2. At least three (3) market-rate rental properties within one mile (or, in the case of projects where market-rate rental properties do not exist within one mile, within the PMA) of the subject property, should be included in the market analysis. For rural single-family homes, at least three (3) best comparables should be included in the market analysis (even if outside the PMA). Projects closest to the subject and projects in similar markets must be included in the analysis, and should be chosen over projects similar in age and amenities but more distant from the project in deriving an achievable market rent. ~~–~~Those more

distant projects similar in age and amenities may also be used in conjunction with projects in close proximity to the subject in deriving an achievable market rent.

3. The analysis should include information on all rental developments that can be considered currently available to serve the target population in the PMA as well as planned rental developments in the PMA that could also serve the target population and are expected to be placed in service during the two years following the year of the project's application to CTCAC or CDLAC, whichever is the later. The analysis should assess the impact of the proposed development on existing and planned market-rate rental housing.

4. A 10-year (or other appropriate period) history of building permits in the PMA, if available, by housing type and comments on building trends in relation to household trends.

5. For rural projects, analyze the availability and cost of purchasing a single-family home and/or mobile home in comparison to paying the subject property rent.

6. For rehabilitation projects, analyze the market-rate rents based on market-rate projects that have similar locations, designs and amenities as the current project. Do not assume a substantial increase in quality and achievable market rent post rehabilitation without specifically outlining how the project's quality will increase sufficient to warrant the increase in achievable market rent.

B. Existing and Planned Affordable Housing Comparables:

1. Provide a list of existing or planned affordable housing developments in the PMA. ~~-~~Where possible, provide the design type, target population, unit mix and income levels to be served.

2. Assess the impact of the proposed development on existing and planned affordable housing. The analysis should include a consideration of the age of existing affordable units, amenities offered as compared to those proposed at the subject development, and whether there is sufficient market demand (i.e., demand is greater than or equal to projected supply) for the existing affordable housing and the proposed affordable housing.

3. List vacancy rates for each existing tax credit project in the PMA, and if a property's vacancy rate is higher than 10%, provide an explanation and discuss how this may affect the subject property.

4. Provide detailed information on any of the existing tax credit projects observed deficiencies or recent improvements/maintenance, and include information on their waiting lists, if any.

C. Rent Comparability Matrix:

A separate rent comparability matrix must be completed for each unit type (SRO~~,~~ /Studio, One-Bedroom, etc.) in a project, for ~~both~~ market ~~-~~rate ~~and affordable housing~~ comparables (i.e., for a project with one-, two- and three-bedroom units, ~~six~~three rent comparability matrices must be completed). The ~~excel~~Excel version (.xls or .xlsx) of the matrices must be included electronically as well as within the study. Each rent comparability matrix must include three or more comparable projects, within one mile of the subject property, unless the market analyst certifies that fewer than three projects containing the unit type in question exist within the one mile. ~~-~~If using comps

outside one mile of the subject property, refer to section VIII, C(2)(d)(i) of these guidelines for further information.

1. The rent comparability matrix must demonstrate that the proposed tenant-paid rents for each tax credit and/or tax-exempt bond financed unit type in the proposed development will be at least 10% below the weighted average rent for the same unit types in the comparable market ~~rate rental properties and the unit value ratio ($/SF) will be at or below the weighted average unit values for the same unit types in the comparable~~ rate rental properties.

   ~~For tax-exempt bond financed projects~~Acquisition and/or rehabilitation projects meeting all three of the following conditions are exempt from this requirement:
   - Project is subject to an existing regulatory agreement ~~and~~
   - Project is not proposing tenant-paid rents and income targeting to exceed 105% of current ~~and~~(except that proposed rents and income targeting levels for units subject to a continuing state or federal project-based rental assistance contract may increase more and proposed rents and income targeting levels for resyndication projects shall be consistent with CTCAC regulatory requirements)
   - Project is operating with a vacancy rate of no more than 5% (10% for SRO and special needs housing~~), these projects are exempt from this requirement.)~~

   ~~Nine percent special needs rehabilitation projects in which at least 90% of the total units are SRO units are exempt from the value ratio requirement.~~

2. In areas lacking sufficient three- and four-bedroom market-rate rental comparables, the rent comparability matrix must show that in comparison to three- and four-bedroom single-family rentals, the tax credit rents and tax-exempt bond rents will be at least 20% below rents for these single-family homes~~, and the units value ratio ($/SF) will be at or below that of single family homes. ~~. Alternatively, the rent comparability matrix may utilize two-bedroom market-rate rental comparables for proposed three-bedroom units and three-bedroom market-rate rental comparables for proposed four-bedroom units~~~~; the square footage of the market rate units is increased to at least 900 square feet for a three bedroom unit and 1,100 for a four bedroom unit. The market rent "increase" is extrapolated using a $/SF based on the original rent and square footage~~.

3. A minimum of three projects used to demonstrate that the subject meets these requirements; must be within one mile of the subject property, unless the market analyst certifies that fewer than three projects containing the unit type in question exist within the one mile. If using comps outside one mile of the subject property, refer to section VIII, C(2)(d)(i) of these guidelines for further information.

4. All of the listed characteristics of the subject project and comparable projects must be addressed. Additional characteristics of a project may be considered but must be justified in the body of the analysis.

5. The rent comparability matrix file (in Excel format) is available on the CTCAC and CDLAC websites.

C(1). Instructions for Completing the Rent Comparability Matrix:

a) Prepare a separate matrix for each low-income unit type (SRO/studio, one-bedroom, etc.).

b) Note all of the various characteristics of the subject property. Consider only those amenities that are appropriate to ALL of the units of a particular type. ~~-~~For the purposes of meeting the 10% below market~~ -~~rate requirement, use the highest rent units for each of the project's unit types. ~~A square footage range will not be accepted. If the specific square footage of the highest rent unit type is unavailable, the highest rent and smallest square footage in the range for the unit type must be used in the matrix.~~

c) Comparable projects should be entered beginning with the closest to the most distant from the project. Note the appropriate characteristics for each of the comparables. If appropriate, assign a value to the differences in characteristics between the comparable and the subject project.
   (i) If the comparable is inferior to the subject on a particular characteristic, adjust the comparable upward. If the comparable is superior to the subject, adjust the comparable downward. The result should be a determination of what rent the comparable could obtain if it were more similar to the subject. Not all characteristics will affect rents. Make adjustments only for differences in characteristics that would affect the amount of rent tenants in the subject's market area are willing to pay;
   (ii) ~~create~~Create different entries for similar unit types with different rents or amenities in a comparable.

C(2). The analysis and text accompanying the rent comparables matrix must:

a) Include a list of ALL considered properties.
   (i) ~~address~~Address the following: name and address of the project, number of units, name and phone number of the person and/or management company contacted, ~~tenant type (i.e., Senior or Large Family),~~ and where the Analyst gathered the information from, i.e., site visit, website, or another source.

b) Include color photos of each property.

c) Include a map identifying the location of each property in relation to the subject

d) Identify those projects the analyst considers the best comparables, including a narrative as to why these comparables were chosen for the project. Please note: comps that exceed 10% above the Adjusted Rent/Base Rent, must be thoroughly justified and explained (refer to the last row of the Rent Comparability Matrix).

   (i) when the Market Study Analyst finds it necessary to use comps outside one mile, the analyst must explain why projects with similar unit type and bedroom count within one mile were not used/considered a comp. Additionally, the analyst must submit the following information when using comps outside one mile: Photos of the comp site, photos of the surrounding neighborhood in all four directions, and must provide a narrative comparing and contrasting the comp neighborhood with the subject's neighborhood.

   (ii) for Senior projects, ~~if~~ the Market Study Analyst ~~finds it necessary to~~may use ~~two (2) or more~~ comps outside one mile~~, the~~ as necessary. The analyst must provide

secondary rent comparability matrices using comparable family projects within one mile with similar unit types as a backup to the Senior comps outside one mile.

e) Explain in detail why each adjustment was made *and* how the dollar value of the adjustment was derived.

f) Explain and justify the inclusion of any additional characteristics in the matrix. These additional characteristics should consist of services and amenities. Characteristics that are primarily esthetic in nature should not be included.

g) Include a tenant profile as well as additional information related to households on a waiting list if the proposed development represents an additional phase of an existing housing development.

h) Provide the target population, type of design, number of units, unit configuration, rent concessions, rent structure and rent increase or decrease trends for the proceeding three years.

i) Provide an estimate of the Market Vacancy Rate for the PMA rental housing stock by population served (i.e. market-rate~~, Low Income Housing Tax Credit, and Project Based Rent Assistance)~~ and type of occupancy (i.e. family, seniors, special populations) and unit size.

j) Provide the estimated date of market entry and any other relevant market analysis information for developments in the planning or construction stages. If there are no developments in the planning stages or under construction, a statement to that effect must be provided.

k) For rural new construction projects, list any tax credit or other publicly-assisted project housing the same population and is currently under construction within the same market area.

l) Derive an achievable market rent for the subject property and quantify and discuss Market Advantage, or disadvantage, of the subject and impact on Marketability.

IX. APPENDICES

The Appendices of the analysis shall include:

1. A bibliographical list of the data sources used in the market study.

2. The demographic reports used for the study.

3. A utility allowance schedule.

4. A resume describing the Market Analyst's experience and background, which must be provided with each market study.

5. A copy of the floor plans and elevations.

APPENDIX A:- MARKET STUDY TERMINOLOGY

Terminology	Definition
Absorption Period	The period of time necessary for a newly constructed or renovated property to achieve the Stabilized Level of Occupancy. The Absorption Period begins when the first temporary or permanent certificate of occupancy is issued and ends when the last unit needed to reach the Stabilized Level of Occupancy has a signed lease. Assumes a typical pre-marketing period, prior to the issuance of the certificate of occupancy, of about three to six months. The month leasing is expected to begin should accompany all absorption estimates.
Absorption Rate	The average number of units rented each month during the Absorption Period.
Amenity	Tangible or intangible benefits offered to a tenant at no fee (with the exception of day care), typically on-site recreational facilities or planned programs, services and activities.
Annual Demand	The total estimated demand present in the market in any one year for the type of units proposed. Annual demand estimates factor in tenure, tenant age, income restrictions, family size and turnover.
Area Median Income or AMI	100% of the gross median Household income for a specific Metropolitan Statistical Area, county or non-metropolitan area established annually by HUD.
Assisted Living	These projects are typically referred to as “residential care” or “intermediate care” facilities and provide a continuum of living and personal care services.
Basic Rent	The minimum monthly rent that tenants who do not have rental assistance pay to lease units developed through the USDA-RD Section 515 Program, the HUD Section 236 Program and HUD Section 223(d)(3) Below Market Interest Rate Program. The Basic Rent is calculated on the rent required to operate the property, maintain debt service on a subsidized mortgage with a below-market interest rate, and provide a return on equity to the developer in accordance with the regulatory documents governing the property.
Capture Rate	The percentage of age, size, and income qualified renter Households in the Primary Market Area that the property must capture to achieve the Stabilized Level of Occupancy. The Capture Rate is calculated by dividing the total number of units at the property by the total number of age and income qualified renter Households in the primary market area. See Penetration Rate for rate for entire market area.
Comparable Property	A market-rate or Affordable Housing property that is representative of the rental housing choices of the subject’s Primary Market Area and that is similar in construction, size, amenities, or age.
Concession	Discount given to a prospective tenant to induce the tenant to sign a lease. Concessions typically are in the form of free rent for a specific period of time.
Congregate Care	Senior-restricted projects that are characterized by independent living units, coupled with a continuum of resident services. Resident services can include, but are not limited to, providing one or more meals per day, housekeeping assistance, linen service, 24-hour security and transportation service.
Contract Rent	The actual monthly rent payable by the tenant, including any rent subsidy paid on behalf of the tenant, to the owner, inclusive of all terms of the lease.

Demand	An estimate of the total number of market Households that have both the desire and the ability to obtain the product and/or services offered.
Effective Rents	Market Rents less concessions.
Family	A family consists of a householder (i.e., one who occupies or owns a house/head of a household) and one or more other persons living in the same household who are related to the householder by birth, marriage, or adoption. Not all households contain families since a household may comprise a group of unrelated persons or one person living alone. (Source: US Census)
Gross Rent	The monthly housing cost to a tenant which equals the Contract Rent provided for in the lease plus the estimated cost of all Tenant Paid Utilities.
Household	All the persons who occupy a housing unit as their usual place of residence. The occupants may be a single family, one person living alone, two or more families living together, or any other group of related or unrelated persons who share living arrangements. (Source: U.S. Census)
Household Trends	Changes in the number of Households for a particular area over a specific period of time, which is a function of new Household formation (e.g. at marriage or separation) and decreasing average Household size.
Income Band	The range of incomes of Households which can pay a specific rent but do not have more income than is allowed by the Income Limits of a particular housing program. The minimum income typically is based on a defined Acceptable Rent Burden percentage and the maximum typically is pre-defined by specific programmatic requirements or by general market parameters.
Independent Living	Senior-restricted projects characterized by independent living units and a lack of assisted living services. Such projects may have community rooms, club houses or other common area amenities but do not offer assisted living services. Tenants must contract for assisted living services with public or private agencies.
Infrastructure	Services and facilities including roads, highways, water, sewerage, emergency services, parks and recreation, etc. Infrastructure includes both public and private facilities.
Market Advantage	The difference, expressed as a percentage, between the estimated market rent for an apartment property without income restrictions and the lesser of (a) the owner's proposed rents or (b) the maximum rents permitted by the financing program for the same apartment property.
Market Area	A geographic area from which a Property is expected to draw the majority of its residents.
Market Area, Primary (PMA)	The most likely geographic area from which a Property would draw its support.
Market Area, Secondary (SMA)	The portion of a market area that supplies additional support to an apartment property beyond that provided by the primary market area.
Market Demand	The number of units required in a defined market area to accommodate Demand (i.e. Households that desire to improve the quality of their housing without significantly increasing their economic burden).

Market Feasibility Analysis	An analysis that determines whether a proposed development can attain its target rents, taking into account the development's characteristics (location, size, unit mix, design, and amenities), the depth of its target market, and the strength of its appeal in comparison to other existing and planned options available to potential consumers.
Marketability	The manner in which the subject fits into the market; the relative desirability of a property (for sale or lease) in comparison with similar or competing properties in the area.
Market Vacancy Rate	Average number of apartment units in any market area which are unoccupied divided by the total number of apartment units in the same market area, excluding units in properties which are in the lease-up stage.
Metropolitan Statistical Area (MSA)	A geographic entity defined by the federal Office of Management and Budget for use by federal statistical agencies, based on the concept of a core area with a large population nucleus, plus adjacent communities having a high degree of economic and social integration with that core. Qualification of an MSA requires the presence of a city with 50,000 or more inhabitants, or the presence of an Urbanized Area (UA) and a total population of at least 100,000. The county or counties containing the largest city and surrounding densely settled territory are central counties of the MSA. Additional outlying counties qualify to be included in the MSA by meeting certain other criteria of metropolitan character, such as a specified minimum population density or percentage of the population that is urban.
Move-up Demand	An estimate of how many consumers are able and willing to relocate to more expensive or desirable units, such as tenants who move up from Class C properties to Class B; and Class B tenants that move up to class A properties; and tenants that move from Class C and B properties to new superior Tax Credit properties. For purposes of demonstrating move-up demand both changes in Class Construction Type, and changes in Quality Classification of 5 or more, may be considered (Reference the California State Board of Equalization Assessor's Handbook Section 531, January 2003, pages 4-5 for definitions of Class and Quality Classifications).
Neighborhood	An area of a city or town with common demographic and economic features that distinguish it from adjoining areas.
Net Rent (also referred to as Contract Rent or Lease Rent)	Gross Rent less Tenant Paid Utilities.
Penetration Rate	The percentage of age and income qualified renter Households in the Primary Market Area that all existing and proposed properties, to be completed within six months of the subject, and which are competitively priced to the subject that must be captured to achieve the Stabilized Level of Occupancy. Funding agencies may require restrictions to the qualified Households used in the calculation including age, income, living in substandard housing, mover ship and other comparable factors. See Capture Rate for property specific rate.
Pent-up Demand	A market in which there is a scarcity of supply and vacancy rates are very low.
Population Trends	Changes in population levels for a particular area over a specific period of time—which is a function of the level of births, deaths, and net migration.

Project-Based Rent Assistance	Rental assistance from a federal, state or local program that is allocated to the property or a specific number of units in the property and is available to each income eligible tenant of the property or an assisted unit.
Rent Burden	Contract Rent plus Tenant Paid Utilities divided by the gross monthly Household income.
Rent Burdened Households	Households with Rent Burden above the level determined by the lender, investor, or public program to be an acceptable rent-to-income ratio.
Restricted Rent	The maximum allowable rent under the restrictions of a specific housing program or subsidy.
Saturation	The point at which there is no longer demand to support additional units.
Single-family Housing	A dwelling unit, either attached or detached, designed for use by one Household and with direct access to a street. It does not share heating facilities or other essential building facilities with any other dwelling.
Special Needs Population	Specific market niche which is typically not catered to in a conventional apartment property. This population should exhibit certain criteria which can be well-defined and are reasonably quantifiable, in order, for example, to assess the need and demand from this source.
Stabilized Level of Occupancy	The underwritten or actual number of occupied units that a property is expected to maintain after the initial rent-up period, expressed as a percentage of the total units. For CTCAC projects these percentages are equal to a physical occupancy rate that will generate 90% of aggregate restricted rents for SRO and Special Needs units and generate 95% of aggregate restricted rents for all other types of units.
Step-up or Strong Market	A market area characterized by natural and/or constructed amenities that is generally attractive to both renters and homeowners. Typically characterized by stronger home prices and higher rents relative to the county or secondary market area.
Step-Down or Weak Market	A market area characterized by a lack of natural and/or constructed amenities that is generally less attractive to both renters and homeowners. Typically characterized by weaker home prices and lower rents relative to the county or secondary market area.
Subsidy	Monthly income received by a tenant or by an owner on behalf of a tenant to pay the difference between the apartment's contract rent and the amount paid by the tenant toward rent.
Substandard Conditions	Housing conditions that are conventionally considered unacceptable which may be defined in terms of lacking plumbing facilities, one or more major systems not functioning properly, or overcrowded conditions.
Target Income Band	The estimated Income Band from which the subject property will likely draw tenants.
Target Population	Market niche a development will appeal to or cater to.
Tenant Paid Utilities	The cost of utilities necessary for the habitation of a dwelling unit which are paid by the tenant. Tenant Paid Utilities do not include costs for telephone or cable service.
Tenure	The distinction between owner-occupied and renter-occupied housing units.

Turnover	An estimate of the number of housing units in a market area as a percentage of total housing units in the market area that will likely change occupants in any one year. Only turnover in the primary market area rental market (i.e., number of rental housing units as a percentage of total rental housing units that will likely change occupants) shall be considered for purposes of constructing demand estimates.
Unmet Housing Need	New units required in the market area to accommodate Household growth, homeless Households, and Households in substandard housing.
Vacancy Period	The amount of time that an apartment remains vacant and available for rent.
Vacancy Rate-Economic	Maximum potential revenue less actual rent revenue divided by maximum potential rent revenue. The economic vacancy rate should be used exclusively for project rent proformas, and not for reporting the vacancy rate of rent comparables.
Vacancy Rate - Physical	The number of total habitable units that are vacant divided by the total number of units in the property. The physical vacancy rate shall be used when reporting rent comparable vacancy rates.
Zoning	Classification and regulation of land by local governments according to use categories (zones); often also includes density designations.