Effects of TOD Location on Affordable Housing Tenants: Travel Behavior, Access to Jobs and Services
Preliminary Survey Results

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Abstract

A combination of California laws direct land use planning towards both sustainable development (specifically as measured by green-house gas reduction) and an equitable distribution of housing resources (as required by the levels set for meeting regional housing needs). Tying these two goals together, competitive criteria for allocating State housing funds boost the ranking of projects in transit oriented developments. These policies are based on assumptions that TOD locating of affordable housing will reduce greenhouse gas production, reduce tenant travel costs, and improve tenant access to employment and resources.

With the recent construction of a range of affordable housing projects both within and distant from transit oriented developments in the San Francisco Bay Area, it is now possible to evaluate whether TOD sites provide advantages over other locations. Our research asks the questions:

- Do tenants of affordable housing sites at TOD locations travel less distance to work, school and services than tenants of affordable housing sites in other locations?
- Do tenants of affordable housing sites at TOD locations make greater use of public transit than tenants of affordable housing sites in other locations?
- Do tenants of affordable housing sites at TOD locations have greater access to services (medical, groceries, etc.) and to employment (larger pool of jobs to choose from, higher salaried jobs, faster to find a job) than tenants of affordable housing at other locations?
- Do tenants in TOD locations encounter other advantages or challenges compared to their counterparts at other locations?

This study develops a survey approach for studying tenants of affordable housing projects in the San Francisco Bay Area. The focus on low income families reduces the self-selection bias of surveying TOD tenants of market rate housing. Survey responses from 201 households in five different properties, two at TOD sites and three at non-TOD locations, address the research questions and also delve into the motivations behind tenant behavior that may explain the resulting travel patterns, employment consequences and use of services. The findings of the study help to inform "complete community" planning efforts by clarifying how residents of affordable housing projects interact with their immediate neighborhoods and the larger circulation network. In addition, the study offers a model for evaluating alternative locations for affordable housing investment.

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This paper gives preliminary survey results of a research project on travel behavior and access to services of tenants in five affordable housing properties in the San Francisco Bay Area. The paper provides a short history of the project, a detailed discussion of methodology, a description of the analytic approach, summary of key survey findings, and preliminary conclusions, next steps and policy implications. We will release additional material before the end of the year, expanding on the context (earlier research) and, based in part on feedback on this version, revising the statistical analysis.

Project History

The idea for this research project began in a series of conversations four years ago. Dan Sawislak, the executive director of Resources for Community Development (RCD), a nonprofit affordable housing development company with over 2000 units in the San Francisco Bay Area, was the lynch pin of these conversations. He and a donor began speculating on just how the housing was changing lives for the tenants. He and Cynthia Kroll (at the time staff research director at UC Berkeley's Fisher Center for Real Estate and later chief economist at the Association of Bay Area Governments) began talking about the possibility of surveying tenants on their travel patterns and other aspects of their experience in a transit-oriented-development (TOD) site.[1] Several years later the two gathered support for a small pilot project to survey tenants of several RCD projects, with funding from the San Francisco Foundation, the Ford Foundation, and the Association of Bay Area Governments Finance Authority.

Design of the project went through numerous iterations, some of which are described in the methodology section. Because of the small size of the funding ($75,000 total) and the challenges of obtaining detailed information from tenants while respecting privacy and confidentiality guaranteed by their landlord, the project was limited in size and scope. The survey focuses on affordable housing tenants only, in 5 RCD properties within four cities. Two of the properties are in TOD locations (downtown Berkeley and downtown Oakland), two smaller properties are in the city of Alameda, and one property is in Pittsburg.

Survey design began in Fall of 2013, before the project was funded. Jonathan Malagon, a graduate student in a survey class run by UC Berkeley professor Karen Chapple, designed and pretested a version of the survey. A second UC Berkeley graduate student, Carlo De La Cruz, one of the paper coauthors, joined the project in Winter of 2014, with the major survey design activity occurring in Spring of 2014, after the full funding was secured for the project. The surveys analyzed here were collected over the summer of 2014.

[1] Transit oriented development is broadly defined as a mixed-use, moderately dense area in close proximity to transit, generally within a half mile of a rail line or bus stop with service at least as frequent as every 15 minutes.

Research Context

A combination of California laws direct land use planning towards both sustainable development (specifically as measured by green-house gas reduction)[2] and an equitable distribution of housing resources (as required by the state's housing element law which establishes levels set for meeting regional housing needs).[3] Tying these two goals together, competitive criteria for allocating State housing funds boost the ranking of projects in transit oriented developments (California Tax Credit Committee 2004). These policies are based on assumptions that TOD locating of affordable housing will reduce greenhouse gas production, reduce tenant travel costs, and improve tenant access to employment and resources.

Earlier research has demonstrated how urban form affects vehicle miles traveled and greenhouse gas production. A metro area level analysis by Cervero and Murakami 2010 found that density of urban area tended to decrease VMT when taken alone, but that other confounding factors—complexity of road networks and congestion, could counteract the advantages of density in reducing VMT. There is lively debate in the literature around the intersection between sustainability and affordability, with Mulliner and Maleine arguing for a broad definition of affordability that includes some measures that parallel sustainability, such as transportation costs, and Talen and Kochinsky 2011 debating the framing of sustainability and it's compatibility with housing affordability with discussants Schwartz 2011 and Pendall and Parilla 2011. Mueller and Steiner 2011 emphasize the risks of displacement as sustainable development gravitates to older accessible urban centers, replacing more affordable units in areas that had lost value during waves of suburbanization.

Recent research supports some of the suggested advantages of TOD locations in reaching sustainability goals. A study of a Los Angeles neighborhood before and after the addition of a rail line found that average vehicle miles traveled (VMT) dropped by 10 miles per day for existing residents close to the new station (Boarnet et al 2013), compared to existing residents further away from the station. Yet the effects for new residents were much less clear—these residents tended to be younger, had higher incomes, and chose the site for other factors such as housing cost or access to shops and services as well as commute times. Proximity to the station did not appear to influence their VMT. A broad review of earlier research on attitudes (Lund 2006) was consistent with these results, finding housing cost, quality, and in some locations highway access were cited more often than transit access in choosing to live in a TOD. These two studies also provide evidence on the role of self-selection of location choice in determining how living in a TOD affects transit use. Lund found that respondents who listed transit accessibility as one of their reasons for choosing to live in a TOD raised the use of transit by 13 to 40 times compared to other households. Yet the Boarnet et al 2013 results for existing residents suggest that improvement of transit access can change patterns of transit use among existing residents.

Other research has focused on travel patterns related to employment, indicating that travel patterns are quite complex. For example, Cervero and Wu 1997 look at commute patterns overall, finding that commute times are shortest for workers in smaller centers more distant from the central city, and

[2] In 2006, the California Global Warming Solutions Act required the California Air Resources Board to set targets for reduced greenhouse gas emission levels by 2020. The 2008 Sustainable Communities and Climate Protection Act requires regional land use and transportation planning agencies to develop a sustainable community strategy to reduce greenhouse gas production. Full citation of these acts is provided in the references section of this article.
[3] See the California Department of Housing and Community Development description of the Regional Housing Need Assessment requirements, http://www.hcd.ca.gov/hpd/housing_element2/HN_PHN_regional.php.

longest for workers employed in the central city, yet central city employees are more likely to use public transit. Suburban center employees primarily drove, and workers commuting to the smallest centers were most likely to drive alone. Nevertheless, analyzing the same survey data used by Lund, Cervero 2007 found that VMT dropped by 40% for TOD residents after adjusting for changes in distance and mode.

Several studies have addressed the effects of TOD locations, or more broadly urban versus suburban locations on low income workers. Cervero, Rood and Appleyard 1999 analyzed commute patterns among job centers in the San Francisco Bay Area and found that high wage earners had a closer match between housing and job locations than did low wage earners, with professional workers having the highest match. Pendall et al 2014 found that car ownership made housing voucher recipients more likely to move to low poverty neighborhoods and to have better employment outcomes than households without automobiles. Transit access improved employment outcomes for those without automobiles (but the improvement was less than would come from automobile ownership). Shen 2001 found that job openings are greater in the city compared to suburban locations, but that transportation access is an overlooked factor in providing assistance to low income households. Spears, Houston and Boarnet, in a paper focusing primarily on the role of attitudes in determining mode choice, found that overall attitudes toward public transit and concern for safety helped shape the decision to use or avoid transit, but that lower income residents in general were more likely than higher income to use public transit.

California conducts a large survey of travel use, including travel diaries, every few years. Transform and the California Housing Partnership Corporation (CHPC) recently partnered with the Center for Neighborhood Technology to use the survey responses to examine how VMT varied among households at different income levels residing within, nearby, or distant from a transit-oriented development site (Transform and CHPC 2014). The analysis found that low income households living ¼ mile from transit drove almost 50 percent fewer miles than those in non-TOT locations, and that VMT of very low income households was less than half that of higher income households.

Finally, our research also benefitted from Mallett 2012, an earlier study by a UC Berkeley masters candidate in City and Regional Planning, sponsored by the Nonprofit Housing Corporation. The study reports a survey of tenants of sixteen properties in San Mateo and Santa Clara counties. Descriptive statistics from the responses suggested that density, level of transit service and parking spaces per unit could influence transit usage.

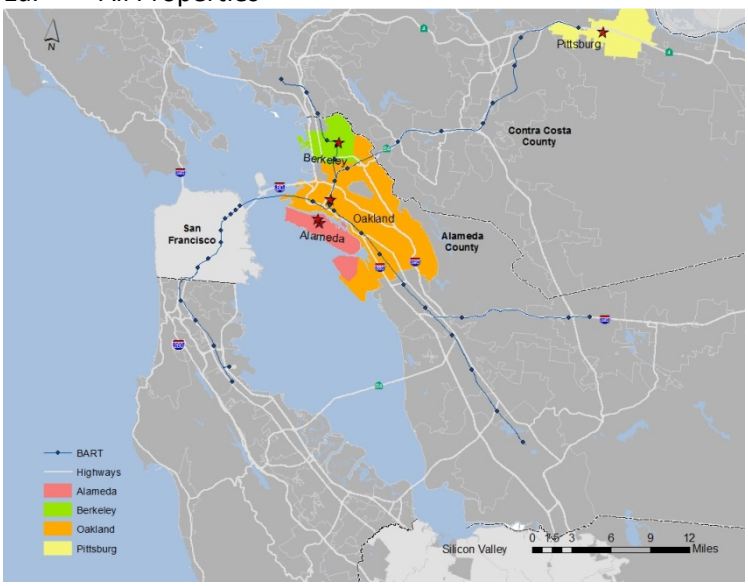
This study provides a more detailed picture of the travel patterns of low income households living in properties specifically designed for a low income population. The research delves more deeply than some of the earlier research into the kinds of destinations, frequency of travel to different types of destinations, and the reasons behind travel choices, as explained by the respondents.

Sample Selection and Property Characteristics

The survey was conducted across 5 properties in 4 cities. Alameda, Berkeley, Oakland are in Alameda County, located between 10 and 14 miles from downtown San Francisco. Pittsburg, in Contra Costa County, is over 40 miles from San Francisco, as shown in Figure 1.

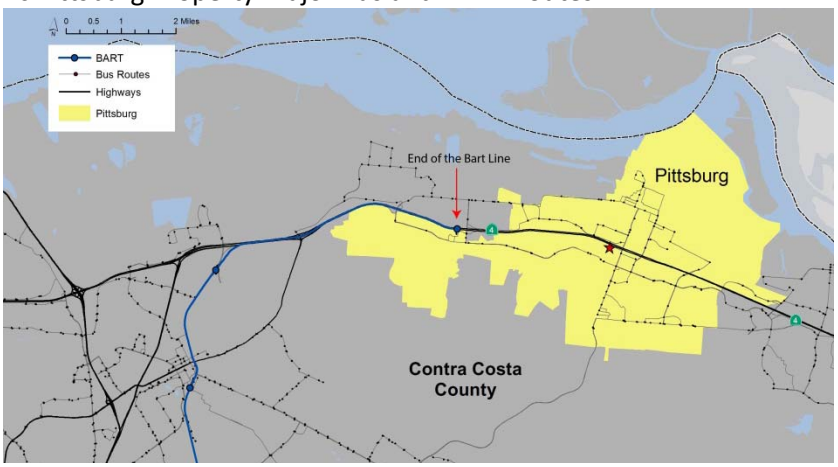
Figure 1 Property Locations

1a. All Properties



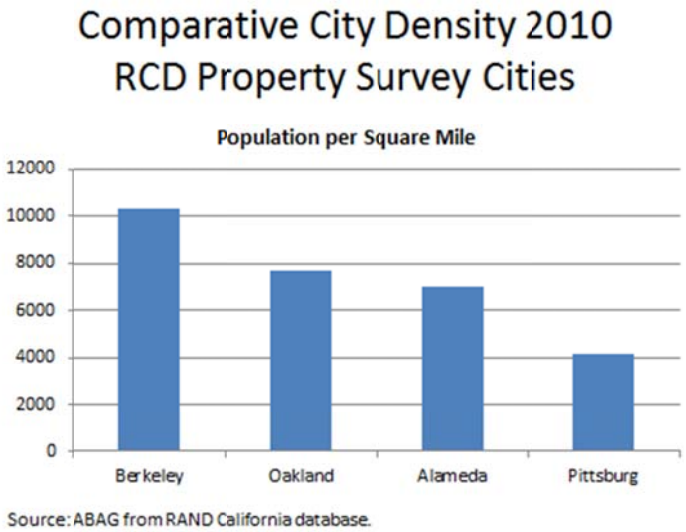
1b Berkeley, Oakland and Alameda Property Major Bus and BART Routes

1c Pittsburg Property Major Bus and BART Routes.



One of the Alameda properties opened in 2006, while the other four opened in 2009. The cities vary widely in terms of density, as shown in Figure 2. The Berkeley and Oakland properties are in downtown, within three blocks of the nearest BART station. The Alameda properties are connected to BART during the daytime through a free shuttle that connects the city of Alameda to the Lake Merritt BART station (approximately a 10 minute walk plus a 17 minute ride). Shuttle bus stops are 0.4-0.5 miles from the Alameda properties. The Pittsburg property is several miles from a BART station, a 25 minute trip via a combination of walking and bus, with bus service of 15 minute headways or less available only during commute hours.

Figure 2



Many services are fairly close to all sites. (See Table 1). Distance to grocery stores varies from 0.3 miles in Berkeley and Pittsburg to 0.9 miles in Oakland and approximately 0.8 to 1 mile at the Alameda site. (In fact, the Oakland and Alameda properties have closer grocery alternatives, with Alameda residents using the Target within a half mile of the property, and Oakland residents using Smart and Final, another discount variety store with groceries, also within a half mile).

Table 1: Comparative Locational Characteristics of RCD Survey Property Sites

Miles to	BA: Alameda	SA: Alameda	FO: Oakland	LP: Pittsburg	OB: Berkeley
San Francisco	13.2	13.2	11.7	40.9	13.8
Grocery Store	0.8	0.8	0.9	0.3	0.3
Library	1.1	1.4	0.9	0.5	0.1
Medical Care	3.3	3.3	0.6	0.8	1.5
Open Space	0.4	0.7	0.4	0.6	0.3
Primary School	0.2	0.5	1.0	0.3	0.5
High School	1.0	1.3	1.2	0.5	0.3
Community College	0.4	0.7	1.2	2.0	0.3
UC Berkeley	7.4	7.4	4.8	28.5	0.1
CSU East Bay	18.2	18.5	18.9	37.0	20.2

Source: Computed from google maps by ABAG survey project staff.

The Berkeley property has the closest library service, within 0.1 miles, and the Alameda sites the most distant at just over a mile. There are parks within a half mile of all of the sites except the Pittsburg site, where the distance is 0.6 miles. The Oakland site, although centralized in terms of transit is the furthest of the properties from primary and high schools, while the Berkeley and Alameda sites are most convenient to community colleges. Furthermore, the Berkeley property is right across the street from the UC Berkeley campus and has some UC students within its resident population.

Table 2 shows the number of units in each property, as allocated to each income category. The properties have a total of 339 units, of which 332 are reserved for low income tenants, with the remainder for property managers and maintenance staff. Some of the maintenance and managerial staff qualified for subsidized units, and were included in the survey population. A few units were not occupied at the time of the survey. The two smallest properties are in Alameda. Combined, the two Alameda properties, located approximately 3 blocks apart, have 91 properties, equivalent in size to the Berkeley property, which has 97 properties. The Oakland property has 80 units and the Pittsburg property 71 units. Thus, in total there were 177 units in TOD sites and 162 in more suburban sites.

Table 2: Property/City by Unit Income Category

	20%	30%	35%	40%	50%	55%	60%	Total	All units including manager /maintenance
Alameda1	-	-	18	-	15	-	18	51	52
	-	-	35.3%	-	29.4%	-	35.3%	100%	
Oakland	-	6	34	5	6	12	15	78	80
	-	7.7%	43.6%	6.4%	7.7%	15.4%	19.2%	100%	
Pittsburg	5	4	22	-	39	-	-	70	71
	7.1%	5.7%	31.4%	-	55.7%	-	-	100%	
Berkeley	14	19	-	-	33	-	29	95	97
	14.7%	20.0%	-	-	34.7%	-	30.5%	100%	
Alameda2	7	8	6	2	12	-	3	38	39
	18.4%	21.1%	15.8%	5.3%	31.6%	0	7.9%	100%	
Total	26	37	80	7	105	12	65	332	339
	7.8%	11.1%	24.1%	2.1%	31.6%	3.6%	19.6%	100%	

Source: Compiled by ABAG from property data provided by RCD. Pearson chi2(24) = 188.4883 Pr = 0.000

Survey Methodology

Preparation for the survey took place over several months, during which the research team developed questions, solicited feedback on the approach from RCD staff, set up an advisory group for further feedback on overall approach, the sample, and questionnaire design, and pretested a series of versions of the questionnaire. One member of the research team took on the role of survey manager. He developed a schedule for administering the survey in each city, with separate but overlapping time periods for each site as well as a survey protocol described below.

Questionnaire Design and Pretest

Survey design had to meet several goals—

1) to provide information on residents' travel patterns (including destination, mode choice and distance traveled)
2) to provide information on the ease of accessing services and job opportunities,
3) to identify residents' satisfaction with the location of their current housing relative their previous home; and
4) to provide enough background information on the household to help explain differences in responses

Furthermore, the survey design had to be sensitive to households with limited reading ability and language facility, including non-English-speaking households. Finally, we expected the time required to answer the survey to be a factor in response rates, so detail of information needed to be traded off with the time burden of answering the questions. The English version of the full survey is in Appendix A.

The first page of the survey explains the purpose, the gift card incentive, privacy guarantees, as well as the completely optional nature of the survey. The next page begins with asking for information on each member of the household (relation to the respondent, age, and whether the person is employed, a student, retired, or other, such as disabled). This portion of the survey is followed by a few simple questions on the location of their previous residence and vehicle ownership or use.

The next set of questions asks about travel modes and destinations. First, respondents are asked to check off from a set of choices how frequently household members travel by BART, bus, car, walking, bike, or other means. Then respondents are asked to list up to 6 destinations members of the household travel to regularly, giving the location, who is traveling there, mode(s), frequency, and noting variations in the routine (for example, do they use a different mode at night compared to daytime). A series of questions follow on whether destinations changed when they moved into their current housing, and whether these destinations are easier or harder to reach compared to where they lived before.

The questionnaire ends with short questions on employment change and ease of finding a job, a check list of advantages of their current housing location, background occupation and demographic information, and whether the household would be willing to participate in a more detailed interview. We found the survey would take most respondents 15 to 20 minutes to complete.

Questions regarding household income, lease agreements, and unit size were intentionally omitted from the survey. The survey team relied upon information collected by the property management company in order to analyze demographic information regarding each household to determine important social characteristics. Compiling background demographic and personal information on the units followed strict procedures that protected the anonymity of the residents and households.

The questions used in the final form of the survey were developed through a rigorous review and pretesting process. The first questionnaire was pretested with a population at a UC Berkeley married student housing complex. This pretest provided valuable feedback on the clarity or ambiguity of different questions as well as the effects of wording and visual layout on the ease and accuracy of response. This information was used to create a version 2 of the survey, which was sent to a group of advisors, including a professor of housing at UC Berkeley, a consultant on housing policy who was also on the Berkeley Planning Commission and on the board of RCD, research staff of a housing advocacy

organization, and a county housing official who had extensive experience surveying Contra Costa County affordable housing tenants. Their feedback was used to refine the survey instrument and the approach to survey administration.

After further revision, the research staff requested volunteers from ABAG to take the survey. This next testing step brought refinement of survey language and increased opportunities for open ended responses ("Don't you want to know *why* they make these choices?" our administrative aide asked us). The last pretesting exercise took place at an RCD property that was not included in the survey sample. The population taking the survey in this pretest were participants in a regular social services meeting, and were residents of special needs units on the property. This population received gift cards for participating in the survey. The respondents completed the survey and then spoke with us about the experience. This last pretest led to some small revisions in the survey instrument but was also very informative in terms of survey administration techniques. We concluded that a personal presence would be important to answer questions and to provide assistance to those with physical or learning disabilities. We also concluded that it would be important to have survey instrument in languages other than English. The survey was translated into Chinese and Spanish by summer interns at ABAG and checked by other native speakers.

Survey Administration

Survey administration depended on a mixture of tactics and methods designed to maximize the household response rate, while working within the limitations set forth by the property owner and manager and the limited budget and time-table to distribute and collect the survey. The outreach strategy used five main elements to incentivize participation and response, including i) letters, fliers and copies of the survey delivered to each individual household's door; ii) a $20 gift card for each household that completed and returned the survey; iii) on-site tabling to increase visibility and familiarity of the survey team to residents; iv) informational evening gatherings during the tabling week where survey response assistance was available and gift cards were distributed; v) entry of each household that completed the survey in a raffle drawing for an iPad mini. Four iPad minis were raffled, one in each city.

The general structure of the outreach strategy was similar for each site, but was tailored to the specific characteristics of the property. We tabled daily for five to six days at properties in Berkeley, Oakland, Pittsburg and one of the two properties in Alameda. Tables were set up in the lobby or central courtyard or near the mailboxes, with survey staff present for at least 3 hours/day. In the first two properties (Berkeley and Oakland), we varied time of day, but we found there was little interest in morning hours (7am to 10am) and few adults around midday (11am to 1pm), so tabling was concentrated from 4pm to 7pm in the last cities. The second Alameda property was not conducive to this type of tabling—the apartments are centered around the parking lot with mailboxes spread among several different nodes within a half-block long area. Instead, we posted flyers announcing tabling at their neighboring property. Even with repeated follow-up in the form of flyers and additional copies of the survey, this brought a response rate of only 15 to 20 percent. Ultimately, we tried tabling outside the property's office on three occasions—two afternoons and one Sunday morning to coincide with a neighborhood church service on the property, finally boosting the response rate at this property to almost 40 percent.

Beyond the information and assistance that was provided through tabling, word of mouth was effective in reaching additional households. Perhaps our strongest networking happened through the children living on the property. Early on in the outreach process it became clear that engagement with residents

and parents was highly dependent upon the dynamic and demeanor of the children in the family. We developed Children's Surveys to occupy children while the parent responded to the survey. (See Appendix B). The Children's Surveys were designed to relate to the main Tenant's Survey but also as a fun activity for children. These Children's Surveys were available at all five sites and were particularly helpful in the developments that had a large community of children who regularly played in the common space. The Children's Surveys not only allowed the parents to fill out the survey with minimal distractions, it also allowed the children to be informed messengers about the purpose of the survey, what we were asking, and why it was important for residents to fill out. By using the Children's Survey as an educational opportunity, we increased the response rate for households with children. Older children were also ambassadors of the survey, bringing their parents in on raffle day to fill out the survey and be eligible for the raffle.

Holding informational events also increased the response rate. This was most effective where there was already a core of residents who were active in the community. The RCD executive director attended two of the events and the evening provided not only additional responses but also an opportunity for feedback from the residents on a variety of aspects of living in the project, from barriers to car share use (credit card required) to temperature control issues in some of the units.

Analytic Approach

The analytic process includes: 1) coding of the property characteristics provided by RCD and the survey response; comparison of the characteristics of responding and nonresponding households, based on the unit characteristics provided by RCD; 2) descriptive statistics of the survey responses using Stata software to estimate Chi-Squared statistics testing differences among properties or by sample characteristics; 3) least squares and logistic regression to analyze responses where multiple factors may affect travel choices or access. This section of the paper covers notes on coding, response rate analysis, and hypotheses tested. The following section, Results, describes the findings on each hypothesis, drawing from descriptive and statistical techniques.

Notes on Coding

The questionnaire was coded into two companion spreadsheets. The first, the entry sheet, includes all responses in a form that could be used for analytic software. In the second comments sheet, actual responses are recorded, including the open ended responses for half of the 20 questions in the survey, where respondents are invited to elaborate on responses.

Actual responses were "translated" into responses that could be analyzed in several ways:

1. Yes/no answers were coded as 0 (no) and 1 (yes), to allow them to be used as indicator variables in the regression analyses. [4]
2. Address variables were coded as distance from the property where the household resided.[5]

[4] An indicator variable (also termed a dummy variable) is generally a variable indicating if a particular characteristic is present or absent (for example, is the person employed or not), with 1 indicating the characteristic is present and zero indicating the characteristic is absent).

[5] Distance was measured using Google Maps. Distance of 1 or more miles was measured as driving distance; less than 1 mile was measured as walking distance.

3. Multiple choice responses were created either as 0/1/blank (eg. did the household change its location for an activity after moving to the property), or as string variables with multiple responses (eg. was it easier, harder, or the same to travel to the household's activity compared to their previous residence, or not applicable).[6]
4. Some of the multiple choice string variable responses were converted to indicator variables for further analysis (eg. indicator variables were created for daily use of a mode of travel, for example, households that used BART at least a few times a week).

The questionnaire includes multi-part questions which complicate the analysis. In question 2, each respondent is asked to describe all members of the household (up to 8 descriptions of residents per household), including gender, age, whether the person is employed, a student, or retired, and any other important characteristic of the person, including whether he or she is disabled. For this portion of the analysis, we sum characteristics for each household into totals for adults 20 and over, children 19 and younger, number in the household who are working, number in the household who are students, number who are retired, and the number who are disabled. In addition, we identify single parent households (where only one parent of the children under 18 is present) and multigenerational households (including members of at least 3 generations). These are used as explanatory characteristics for some analyses. The latter two characteristics had to be identified by hand individually.

The second major area of multiple responses is in the destinations question. Respondents may list up to 6 destinations to which one or more people in the household travel regularly. The question is open ended, so that one respondent may put work as destinations 1 and 3 (one each for two household members, or indicating multiple jobs for a single adult), another may put work as destination 2, and some households may not list a work address at all. After creating a household response data set from the coded entry sheets, we created a second data set using each destination response as an observation (rather than the household). In the destinations data set, information on the household is included with each destination observation of the household.

Translating addresses into distances and identifying household nuances added to the time required for coding. In all, it took an average of approximately 15 to 20 minutes to code each survey. Because of the by-hand nature of the coding, project staff reviewed all coded responses for errors and inconsistencies before uploading the responses into the analytic software.

Confidentiality

It was necessary to identify units during the survey process to ensure proper follow-up. However, in coding and analyzing the data, to maintain the confidentiality of information, we developed a 3 part coding system starting with the property name and unit number and eventually translating to a random number assigned to each unit. Only the random numbers are included in the final coding material that is uploaded for analysis.

Response Rates

The response rate overall, before excluding vacant units, was 59.3 percent. Excluding vacant units, the response rate is 60.5 percent. The rate of response varied significantly by city, as shown in Table 3.[7] The

[6] A string variable has a text rather than a numerical response.

[7] Stata software calculated Pearson's Chi-Squared statistics to show the level of significance of differences in the distribution of responses.

TOD locations had higher response rates than the more suburban locations. However, close to 50 percent of households responded in even the more suburban locations. The response rate does not differ significantly by household income category (see Table 4). The lowest rate of response was among units with households in the income range of $24,000 to $40,000, neither the highest nor lowest range of incomes among property units.

Table 3: Response Rate by City			
City	0	1	Total
Alameda	46	45	91
	50.6%	49.5%	100%
Berkeley	35	62	97
	36.1%	63.9%	100%
Oakland	22	58	80
	27.5%	72.5%	100%
Pittsburg	35	36	71
	49.3%	50.7%	100%
Total	138	201	339
	40.7%	59.3%	100%
% Excluding Vacant	131	201	332
	39.5%	60.5%	100%
Pearson chi2(3) = 12.4630 Pr = 0.006			

Table 4: Response by Income Category			
Income category	0	1	Total
LT12K	30	52	82
	36.59	63.41	100
12to24K	34	55	89
	38.2	61.8	100
24to40K	43	41	84
	51.19	48.81	100
40to60K	18	25	43
	41.86	58.14	100
60Kplus	13	28	41
	31.71	68.29	100
Total	138	201	339
	40.71	59.29	100
Pearson chi2(4) = 6.0328 Pr = 0.197			

Response rates also varied significantly by ethnic group, when the entire pool of households is compared. White, Black or African American, and mixed ethnicity households were most likely to respond while Hispanic households were the least likely to complete the survey. These differential response rates may in part be related to where the households reside, as shown in Table 5. For example 57% of Hispanic households in TOD sites responded to the survey, compared to only 32% in the non-TOD sites. At this geographic level, the Hispanic response rate is much closer to the average overall response. However, a much higher proportion of Hispanic households lived in the suburban sites, compared to other ethnic groups.

Table 5: Ethnic Variations by City Property and by Response Rate					
	Ethnicity (Row 1, Percent of population in city property; Row 2 Response rate of ethnic group in city)				
City	Asian/Pacific Islander	Black or African American	Hispanic	Other or Mixed	White
Alameda	34.8% of HH 45.2% response	46.1% of HH 56.1% response	12.4% of HH 18.2% response	0% of HH --	6.7% of HH 66.7% response
Berkeley	2.7% of HH 50.0% response	56.8% of HH 71.4% response	6.8% of HH 40.0% response	14.9% of HH 72.7% response	18.9% of HH 71.4% response
Oakland	26.7% of HH 70.0% response	36.0% of HH 74.7% response	2.7% of HH 100% response	28.0% of HH 81.0% response	6.8% of HH 60.0% reponse
Pittsburg	10.0% of HH 42.9% response	55.7% of HH 53.9% response	28.6% of HH 45.0% response	1.4% of HH 0% response	4.3% of HH 66.7% response
Total	19.5% of HH 53.3% response	48.4% of HH 63.1% response	12.3% of HH 39.5% response	10.7% of HH 75.9% response	9.1% of HH 67.9% response
Statistics for ethnicity differences in response rate: Pearson chi2(4) = 12.5145 Pr = 0.014; when ethnic differences in response calculated by city, the differences were not significant.					

While response rate differences show some bias in the sample, the sample is large enough that we are able to explore the characteristics of different locations and household characteristics in the analysis.

Hypotheses Tested

We use the survey responses and statistical analysis to test 4 broad hypotheses:

H1. Affordable housing residents in TOD locations use automobiles less frequently to reach destinations than do residents in more suburban locations

H2. Affordable housing residents in TOD locations use public transit more frequently to reach destinations than do residents in more suburban locations

H3. Affordable housing residents in TOD locations travel shorter distances than do residents in more suburban locations

H4. Affordable housing residents have better access to employment opportunities and services in TOD locations

The detailed data collected also allows for more nuanced analysis within these hypotheses. We refine the results by looking at effects of household characteristics and trip type on mode choice and distance traveled. We also use open ended qualitative responses to further elucidate some of the findings from the survey.

Results

The survey responses overall were consistent with the first 3 hypotheses. There was not always a clear division between TOD versus suburban sites, but rather a continuum, from the most centralized and service rich site in Berkeley to the least centralized site in Pittsburg. Variations in the landscape of effects were more complex in exploring hypothesis 4, the access to services and employment opportunities.

Automobile Usage

Many of the households own motor vehicles, providing them with the opportunity to travel by car. With the exception of the Berkeley site, parking is provided without cost, with one space allocated per unit. Furthermore, there is ample street parking near the Alameda and Pittsburg properties. The Berkeley site, in contrast, is part of a larger "green" development, and was designed and is managed to discourage car use. Parking spots are not automatically allocated with apartments, and there is a charge for having a place in the garage. Over half of the Berkeley property households nevertheless own one or more motor vehicles, although the proportion is substantially less than in the other properties (see Table 6).

Table 6: Car Ownership and Frequency of Car Use, by Property Location

Property Location (City)	Percent Owning At Least One Vehicle	Percent Traveling by Car a Few Times per Week or More
Berkeley	54.8%	54.4%
Oakland	77.6%	75.4%
Alameda	77.8%	81.8%
Pittsburg	83.3%	94.3%
Statistical Significance	Pearson chi2(3) = 12.8813 Pr = 0.005	Pearson chi2(15) = 25.8654 Pr = 0.039

We use two sets of statistics from the survey to examine automobile use, including the reported frequency of car travel and the mode choice for destinations. The last column of Table 6 compares the proportion of households that frequently travel by car among the properties in the four cities (a few times a week or more). Frequent trips by vehicle are most common in Pittsburg, followed by Alameda, and least common in Berkeley, followed by Oakland.

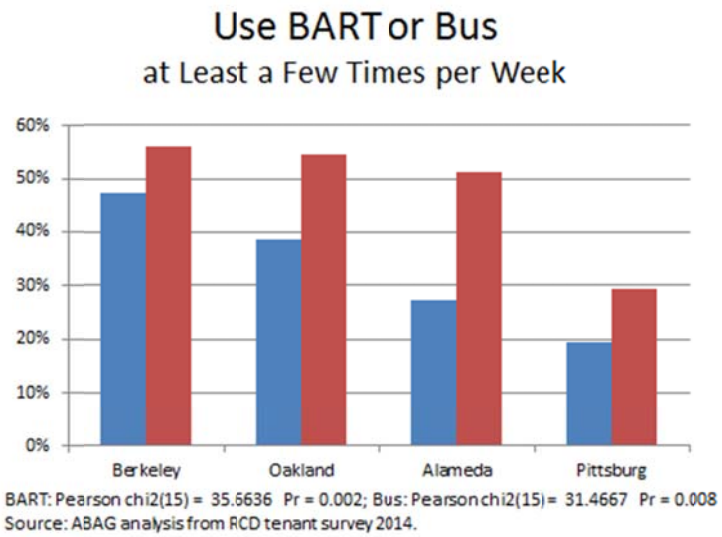
Logistic regression analysis identifies the factors that influence the choice to drive rather than using an alternative mode to reach a destination. Table 7 shows the results of a model that includes distance, the number of people in the household traveling to the destination, destination types, whether the household owns a car, the city where the household lives, and whether English is spoken at home (a measure of whether the family is a recent immigrant household or not). The results indicate that car use is higher when the distance traveled is longer, the number traveling is higher, for trips to the grocery store, and if the household owns a car. In this version of the regression, a household where English is spoken in the home is also more likely to use a car for the trip. Car use is lower for leisure trips and trips to school (which often are undertaken by the children without their parents). Car use is also lower in Berkeley, Oakland and Alameda compared to households living in Pittsburg.

Table 7: Logistic Regression Results, Dependent Variable: Travel by Car to Destination						
	Coef.	Std. Err.	z	P>|z|	95% Confidence Interval	
Destination distance	**0.052443**	**0.014808**	**3.54**	**0**	**0.02342**	**0.081467**
Number traveling	**0.168685**	**0.077361**	**2.18**	**0.029**	**0.017062**	**0.320309**
Destination type: Work	-0.11775	0.289018	-0.41	0.684	-0.68421	0.44872
Destination type: Groceries	**0.654053**	**0.292552**	**2.24**	**0.025**	**0.080662**	**1.227444**
Destination type: Leisure	**-0.75658**	**0.286084**	**-2.64**	**0.008**	**-1.3173**	**-0.19587**
Destination type: School	**-0.62237**	**0.272997**	**-2.28**	**0.023**	**-1.15743**	**-0.0873**
Destination type: Medical	-0.0473	0.314316	-0.15	0.88	-0.66335	0.568748
Own motor vehicle	**3.198451**	**0.275331**	**11.62**	**0**	**2.658813**	**3.73809**
Berkeley	**-1.55848**	**0.274038**	**-5.69**	**0**	**-2.09559**	**-1.02138**
Oakland	**-1.0685**	**0.27352**	**-3.91**	**0**	**-1.60459**	**-0.53241**
Alameda	**-0.82391**	**0.284275**	**-2.9**	**0.004**	**-1.38108**	**-0.26674**
English spoken at home	**0.547328**	**0.268749**	**2.04**	**0.042**	**0.02059**	**1.074067**
_cons	-2.28549	0.46478	-4.92	0	-3.19644	-1.37454
Sample size = 871; Pseudo R-Squared = 0.3012. **Bold: significant at the 5% level or better.**						

Use of Public Transit

There are significant differences by city in household use of both BART and bus, as shown in Figure 3. While differences exist for both modes of public transit, the level of use and variation among the households in different cities is not consistent between the two modes. The share of households using BART frequently (at least a few times a week) is highest in Berkeley and lowest in Pittsburg. Although the Berkeley and Oakland properties are equally close to BART stations, almost half of Berkeley households use BART frequently, compared to almost 40% of Oakland households. In contrast, the share using the bus at least a few times per week, while highest for the Berkeley and Oakland households (56% and 54% respectively), is almost as high for Alameda households (at 51%), and all 3 are much higher than for households in the more remote Pittsburg location. Nevertheless, even in that location, with much less frequent bus service, 29% of households reported using the bus at least a few times per week. The boost in bus usage in Alameda compared to Pittsburg may have several explanations. First, there is a free shuttle from a stop within a half mile of the properties (at the College of Alameda) to the nearest BART station. Second, more bus destinations and more frequent service are offered in Alameda, a much denser community than Pittsburg.

Figure 3



The logistic regression form offers further evidence on factors influencing a household to use BART or the bus. The model more strongly explains the choice to ride BART compared to the choice to ride the bus (a pseudo R-Squared of 0.2894 compared to 0.1032—see Table 8). BART is more likely to be a mode of choice for longer distances and for those traveling to work. BART is also more likely to be chosen by households living in Berkeley, Oakland and Alameda as compared to Pittsburg and is less likely to be chosen by households owning a car. Distance destination is also positively related to bus travel, although with a much smaller coefficient than for BART. Bus travel was also more likely for households traveling to medical appointments, and for those located in Berkeley, Oakland and Alameda. Households owning a car were less likely to ride the bus.

Table 8: Logistic Regression Results, Travel by Public Transit to Destination

	Dependent Variable: BART			Dependent Variable: Bus		
BART and BUS	Coef.	z	P>|z|	Coef.	z	P>|z|
Destination distance	**0.15005**	**8.59**	**0**	**0.030285**	**2.68**	**0.007**
Number traveling	0.028833	0.3	0.763	-0.05199	-0.62	0.537
Destination type: Work	**0.766465**	**2**	**0.045**	-0.04827	-0.15	0.877
Destination type: Groceries	*-0.91275*	*-1.68*	*0.092*	0.078691	0.28	0.783
Destination type: Leisure	-0.50889	-1.03	0.303	-0.33055	-1.02	0.309
Destination type: School	0.594796	1.41	0.159	*0.519048*	*1.8*	*0.072*
Destination type: Medical	0.425226	1.15	0.251	**0.67534**	**2.5**	**0.013**
Own motor vehicle	**-1.05822**	**-3.48**	**0**	**-1.16277**	**-5.83**	**0**
Berkeley	**4.50769**	**5.92**	**0**	**1.30517**	**4.17**	**0**
Oakland	**3.946196**	**5.14**	**0**	**1.020586**	**3.17**	**0.002**
Alameda	**2.407551**	**3.14**	**0.002**	**0.823834**	**2.49**	**0.013**
English spoken at home	0.368751	0.62	0.537	-0.41256	-1.4	0.162
_cons	**-6.57743**	**-6.49**	**0**	**-1.27592**	**-2.71**	**0.007**

Sample size = 871; Travel by BART pseudo R-Squared = 0.2894; by bus pseudo R-Squared = 0.1032; **bold: variables significant at the 5% level or better**; *italics: variables significant at the 10% level*

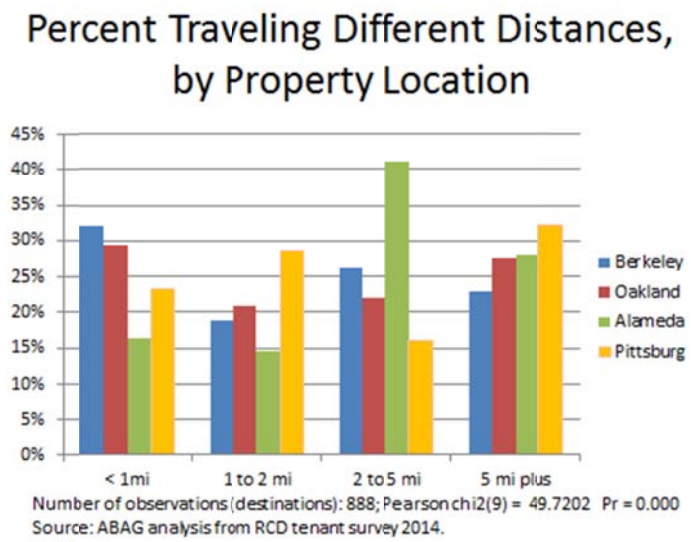
For both BART and bus use, we ran the same form of the regression on destinations of all households except those living in Pittsburg, and leaving the Alameda destination out of the regression to avoid an over-defined model. We then ran the model on just Berkeley and Oakland households (with the Oakland location as the excluded indicator variable). The purpose of these restricted regressions is to test differences among cities. In the two runs of the model for BART as the travel mode, the location variables remained significant, as shown in Table 9. Berkeley households were more likely to choose BART or bus as a travel mode compared to households in all other locations. Oakland households were the next most like to choose BART, followed by Alameda households. Results were not as strong for bus travel (not shown here)—households in the Berkeley location were significantly more likely than Oakland and Alameda households to use the bus in a model excluding Pittsburg households. In the model excluding both Pittsburg and Alameda households, however, the difference between Berkeley and Oakland households was no longer significant.

Table 9: Logistic regression results on BART use for limited locations						
	Berkeley, Oakland and Alameda only			Berkeley and Oakland only		
	Coef.	z	P>|z|	Coef.	z	P>|z|
Destination distance	**0.157**	**8.16**	**0**	**0.181**	**7.48**	**0**
Number traveling	0.024	0.24	0.807	0.018	0.18	0.86
Destination type: Work	0.540	1.33	0.182	*0.745*	*1.66*	*0.097*
Destination type: Groceries	*-0.961*	*-1.77*	*0.077*	-0.790	-1.4	0.163
Destination type: Leisure	-0.608	-1.21	0.225	-0.502	-0.94	0.346
Destination type: School	0.503	1.18	0.237	0.616	1.31	0.19
Destination type: Medical	0.384	1	0.317	0.425	1	0.316
Own motor vehicle	**-0.885**	**-2.83**	**0.005**	**-1.029**	**-3.03**	**0.002**
Berkeley	**2.148**	**4.67**	**0**	**0.605**	**2.01**	**0.044**
Oakland	**1.558**	**3.29**	**0.001**			
Alameda						
English spoken at home	0.739	1.08	0.282	1.166	1.11	0.267
_cons	**-4.612**	**-5.54**	**0**	**-3.630**	**-3.21**	**0.001**
Bold: Significant at 5% level; italic: Significant at 10%	Sample size = 703 Pseudo R-Squared = 0.2510			Sample size = 503 Pseudo R-Squared = 0.2408		

Distance Traveled

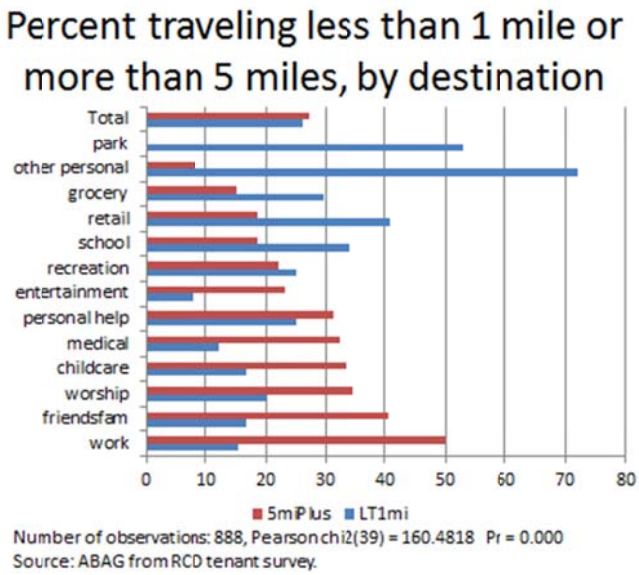
Distance traveled varied significantly by location, although not always in a predictable pattern by city. Residents in Berkeley and Oakland were most likely to be traveling to destinations less than a mile away, as shown in Figure 4, while Pittsburg residents were most likely to be traveling to destinations more than 5 miles away. However, many Pittsburg residents also traveled to destinations within one to two miles of the property, while Alameda properties had the largest share of residents traveling to destinations 2 to 5 miles away, and far fewer traveling under two miles compared to all other cities.

Figure 4



The variation in distance traveled by city of residents may be affected by the type of destination as well. Half of the work destinations reported were 5 or more miles away from the resident's property, while more than half of park and non-retail personal business trips were less than one mile away (see Figure 5).

Figure 5



As shown in Table 10, an ordinary least squares regression testing for the factors influencing distance traveled shows that taking both city location and type of destination into account, distances traveled from Berkeley, Oakland and Alameda were shorter than those traveled from Pittsburg. Grocery, leisure and school trips were significantly shorter than other trips (as were errands, if a less rigorous standard of 10% is used for significance). Even taking residence city and type of destination into account, those owning a motor vehicle were more likely to travel further distances.

Table 10: Factors Influencing Distance Traveled			
ddistance	Coef.	t	P>|t|
Berkeley	**-2.92781**	**-3.91**	**0.000**
Oakland	**-3.4273**	**-4.6**	**0.000**
Alameda	**-2.30182**	**-2.97**	**0.003**
destwork	1.112825	1.12	0.264
destgroc	**-4.13268**	**-4.31**	**0.000**
destleis	**-3.61399**	**-3.6**	**0.000**
destschool	**-3.50191**	**-3.53**	**0.000**
desterrand	*-2.31562*	*-1.91*	*0.056*
destfamfr	1.493514	1.09	0.275
destmed	-0.14477	-0.14	0.885
motorvehyn	**1.304326**	**2.13**	**0.034**
_cons	**8.096671**	**7.87**	**0.000**
Number of observations: 875			
Prob>F=0.0000; Adjusted R-sq = 0.0982			

Access to Employment and Services

There were a number of indications that apart from the expected benefits of affordable rent, residents felt they were better off after having moved to the RCD properties. The benefits were experienced by residents in both TOD and non-TOD properties.

Residents were asked whether they had gotten a new job or changed where they went for specific services since moving to the RCD properties. They were also asked whether access to jobs or services was easier, the same or harder than at their previous home.

Job opportunities. About one fourth of households with residents who worked regularly, had at least one person in the household who had obtained a new job since moving to the property, as shown in Table 11. Most respondents, whether they had changed jobs or not, felt the ease of finding a job was about the same from the RCD location as from their previous location. However, about 26 percent overall felt that it was easier to find a job in their current location than before they had moved (35 percent of those who had found a new job, 22 percent of those who had not changed jobs) compared to only 2 percent who felt it was harder to find a job from their RCD location.

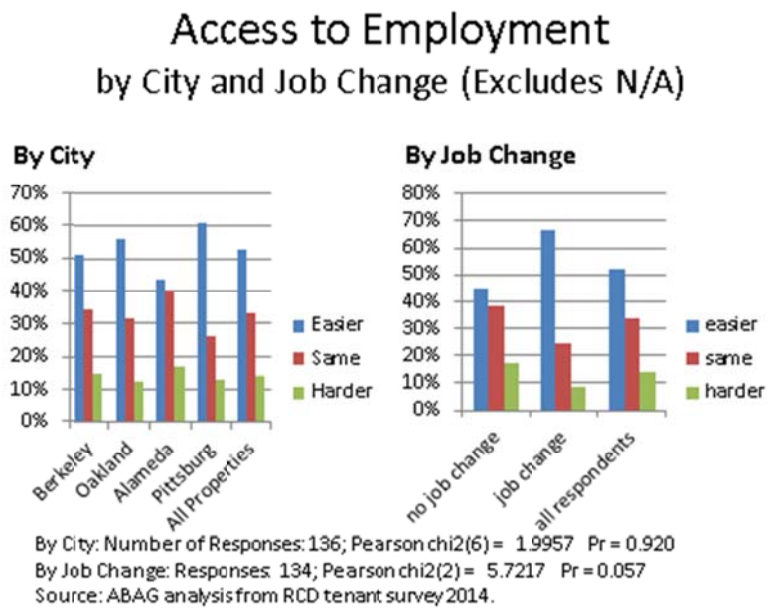
Table 11: Changed Jobs after Moving to RCD Property

	no	yes
Berkeley	79%	21%
Oakland	71%	29%
Alameda	73%	27%
Pittsburg	72%	28%
Total	74%	26%

Number of observations: 198
Pearson chi2(3) = 0.9587 Pr = 0.811

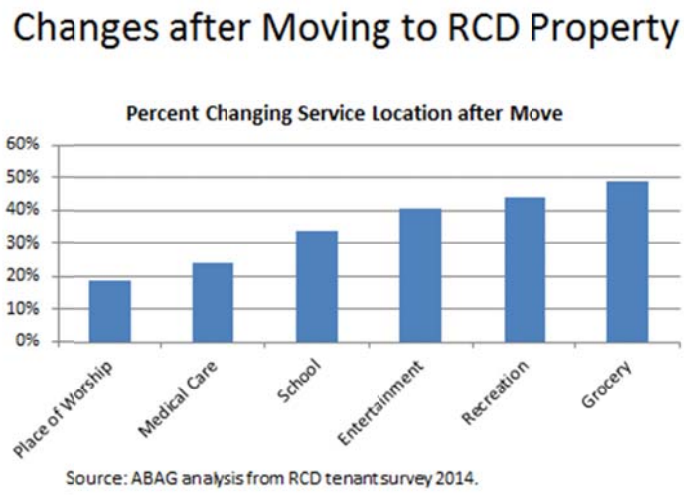
Ease of travel to work. Over 40% of residents who had *not* changed jobs and two thirds of those who had changed jobs felt their place of work was easier to reach in their new location compared to where they had lived before. These proportions were not significantly different for residents of TOD and non TOD locations. (See Figure 6).

Figure 6



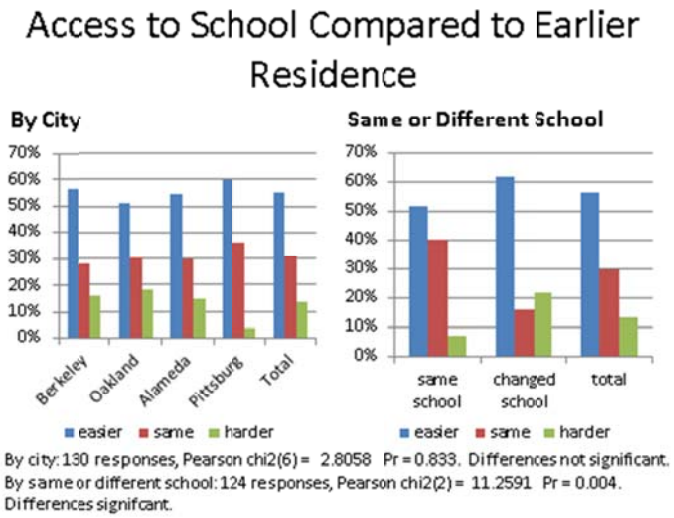
Changed Services Locations. The percent of households changing services location varied widely by type of service. Households were much more likely to change convenience services, such as the grocery store or park visited than their medical care provider or place of worship, as shown in Figure 7.

Figure 7



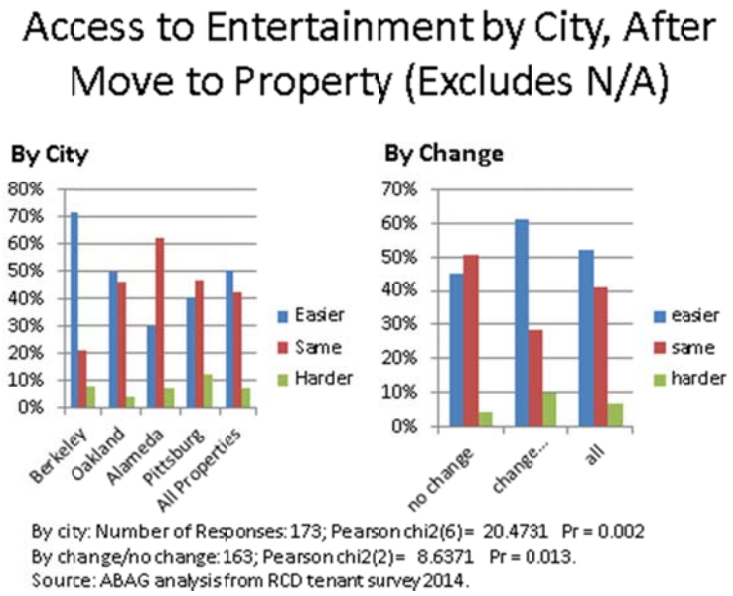
Schools. Over half of those residents with children or adults in school reported that schools were easier to reach in the RCD location than in their previous home. This was true whether or not anyone in the household had changed schools and in each of the cities, as shown in Figure 8. The only significantly different response was that more than 20 percent of those who had experienced school changes reported that access was harder, compared to fewer than 10 percent for those who had not experienced school changes. Some of the households that explained this difference mentioned that primary school aged children had moved onto secondary school, and secondary school children had moved onto college. Thus, the effect was one of a changing schooling circumstance rather than the location.

Figure 8



Shops, Entertainment and Recreation. Access to groceries and recreation opportunities was either as good or better for most residents, whether or not they had changed the location of shopping or recreation. In both cases a larger share of those who had changed where they shopped or recreation locations reported that it was easier to get there, compared to those who had not changed their recreation or shopping destinations. Differences between TOD and non-TOD sites were not significant for either of these types of destinations. In contrast, a far higher share of Berkeley residents reported easier access to entertainment, as did a far higher share of households who had chosen new entertainment sites after moving (see Figure 9).

Figure 9



Safety, Transit Availability, Quality of Schools. One of the last questions offered a list of possible advantages of living in the RCD property. This was a simple checklist—the respondent could answer or leave blank. Choices were:

- Neighborhood is safer
- Neighborhood has better access to transit services, car-share or carpooling options
- Neighborhood has better access to shops, services and restaurants
- Neighborhood has better access to recreational opportunities
- Neighborhood has better quality of local schools

Table 12 summarizes the responses. The Berkeley site stood out as having better access to transit and shops and services than any other location. The Oakland site was close to average in most advantages, except that it scored far lower than the other sites in school quality. Alameda scored highest for safety and school quality but below average for transit. The Pittsburg site scored close to average for all advantages except for transit access, and was never the lowest scoring site.

Table 12: Percent Responding Yes to Listed Advantage of Their Location

City	*Safety*	**Transit Convenience**	**Nearby Shops**	Close to Recreation	**School Quality**
Berkeley	*47%*	**84%**	**82%**	50%	**45%**
Oakland	*51%*	**66%**	**59%**	38%	**18%**
Alameda	*71%*	**24%**	**44%**	36%	**44%**
Pittsburg	*53%*	**28%**	**61%**	44%	**34%**
All Responses	*55%*	**54%**	**63%**	42%	**35%**
Number	*195*	**195**	**195**	195	**191**
Chi-Squared	*6.52*	**49.13**	**15.89**	2.72	**10.89**
Prob. Value	*0.089*	**0.000**	**0.001**	0.437	**0.012**

Bold: Significant at the 5% level; *Italics: Significant at the 10% level*

Overall, the responses to these comparative questions are best interpreted in conjunction with the comparisons among places described earlier in this paper, as elaborated by some of the open ended answers. All of the properties surveyed had been open since either 2006 (one of the Alameda properties) or 2009 (the other 4 properties), and over half of residents in Alameda, Berkeley and Oakland had moved into the property in 2009 or earlier. Thus the "changes" in access to services or in ease of finding a job could relate to many factors beyond the simple move. In addition to the example given above on changing school conditions, changes in economic conditions could affect ease of finding a job. Furthermore previous residence clearly was a consideration in how the move affected the household. One family that moved from a more distant part of the former naval base in Alameda to the RCD location, reported "I have more bus options now. When I lived at the Alameda Point Area, not all buses (such as Transbay) went down there, or come as often."

Observations and Open Ended Responses

The open ended responses further elaborated on some of the questions addressed in this research. These were particularly helpful in clarifying why car or public transit use or costs had changed. For example, one Alameda family explained reduced use of a car because "My employment changed so I have more commuting options." Households in Oakland and Berkeley commented on proximity to transit:

- "Our home is connected to all major bus lines and BART, no need to really drive." (Oakland)
- "We are so close to most of the bus lines, and parking is really hard," and "use of BART is a lot easier and closer, I try to use it as much as I can." (Berkeley)

At the same time, several mentioned rising gas cost or fares as a reason for higher costs—or for reduced use of the travel mode.

Walkability of the Berkeley and Oakland locations also came out in the comments. An Oakland household reported reduced public transit (and car) use because "I'm close to the places I go, so I don't have to use the bus or BART as much." A Berkeley household remarked "everything from bank, groceries stores, library, parks are within walking distance." Because of its location near shopping areas, the Pittsburg site also showed some of the advantages of more urban areas—"Since I moved here, everything I need is in walking distance that saves money and spares the air. So I try and do my part as much as possible." This sentiment was echoed similarly by several different Pittsburg households.

At the same time, some of the challenges of the Pittsburg site came out in other comments—"Public transportation is not as available or accessible as before. Therefore I drive more." One household mentioned the problem of having a single car and driver in a multigenerational household, in a location where a car was needed to get to appointments.

The open ended responses pointed to specific job opportunities the households had experienced, including internships in San Francisco and Walnut Creek, retail stores in Berkeley, Aquarium of the Bay in San Francisco, and a variety of Oakland Chinatown positions. Several households noted the numerous opportunities in Berkeley, but one also mentioned "I feel that the possibility of being hired is a lot more challenging here in Berkeley … Your chances of being hired for a middle class job(s) are a great deal more competitive."

Residents in each of the cities mentioned the resources at the facility or nearby that made it easier to find a job in the RCD location. One Alameda resident wrote, "All I had to do was go to the [property] computer lab, and the one-stop career center at the college." A Berkeley resident commented, "We have the computer lab and library accessible." From an Oakland resident, "If I became unemployed, the job center to look for jobs is within walking distance." And a Pittsburg resident noted, "The Internet [at the property's computer lab] is free for job search."

Pittsburg residents also appreciated the broader support the facility provides. As one Pittsburg resident said, "The big changes while living at [ ] are the opportunity that all parents have for our kids in the school program [a tutoring program provided free to children of residents]. The help and information that we have had when having difficulty paying rent [a service provided by the property managers]."

Conclusions

This study used a tenant survey at five affordable housing properties in San Francisco Bay Area East Bay cities to test four broad hypotheses related to travel patterns and access to employment and services of low income residents in subsidized units. The results of the tenant survey provide a clear picture of transit use and many other aspects of life in a variety of affordable housing locations in the San Francisco Bay Area's East Bay.

Residents in TOD locations were significantly less likely to use automobiles frequently to reach their destinations than were residents in the more suburban sites. (See Hypothesis 1). Overall, residents in Pittsburg, the most suburban site, were over 70% more likely than residents in Berkeley to use a car frequently, 25% more likely than residents in Oakland and 15% more likely than residents in Alameda. Furthermore, residents in TOD sites or more centralized nonTOD sites traveled shorter distances than residents in suburban locations (Hypothesis 3). After adjusting for type of destination and mode, living in Alameda rather than Pittsburg reduced average distances traveled by car by 22%; Berkeley compared to Pittsburg reduced car travel distance by 31%, while Oakland residents drove to destinations 42% shorter than Pittsburg residents.

Public transit use was greater in TOD sites compared to nonTOD sites (Hypothesis 2). Berkeley residents were most likely to use BART, while Berkeley, Oakland and Alameda residents used buses with similar frequency. Pittsburg residents were the least likely to use public transit, although even there, 29% of households used buses at least a few times a week.

TOD sites provided improved access to some services but not all services, while employment access did not appear to be benefitted by location (in contrast to Hypothesis 4). The Berkeley site was by far the most accessible to entertainment alternatives. However, the Oakland site was the least convenient in terms of distance to schools and also was the least likely to be noted as offering improved school quality. The three suburban properties (in Alameda and Pittsburg) were located close to shops, recreation and libraries, often offering improvements to residents over their previous residence, despite being less convenient to transit than the TOD sites. Overall, employment was seen as challenging to obtain, and the resources obtained from each of the RCD sites were seen as an advantage in the job search. Work trips tended to be longer than travel to many other destinations. A TOD site did not necessarily offer closer employment opportunities, but did provide an alternative means of travel to work (BART) once a position was obtained.

The survey results offer a number of insights for policy. On the one hand, a TOD site offers many advantages both for greenhouse gas reduction goals, for access to certain types of amenities, and for convenience of travel by public transit. A TOD location like Berkeley can give very low income populations access to a range of opportunities that they otherwise would be unable to enjoy because of the costs of travel.

At the same time, a well-placed suburban site can reach many of the goals of a TOD site, if it is located near shopping opportunities, schools, and other services such as libraries, medical clinics and social services. Other public programs, such as free shuttle service to BART, can further narrow the gap between TOD and suburban locations. Because each of the sites seemed to draw primarily from the surrounding area, a well-placed suburban site may be more likely to help residents in that portion of the region than units concentrated only in the most urban centralized locations, while still reaching some goals of trip reduction.

While this study was confined to a relatively small geographic area and a limited number of properties, we believe the results are relevant well beyond this single region and property owner. Further research could take several directions including:

- Conducting surveys in a broader number of communities, property types, and tenure.
- A study that pairs affordable housing communities with a range of income levels in market rates units.
- A study comparing residents in subsidized units with other low income residents including those receiving other types of housing assistance and those receiving no assistance.

The experience of designing and administering the survey, to be discussed in a companion piece, offers insights that can carry over to these other efforts.

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Appendix A
Transportation and Housing Survey for Residents

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Transportation and Housing Survey for Residents

Resources for Community Development (RCD)* is currently conducting a survey to find out how current residents access different services and amenities from their home, such as employment and job training, grocery stores, child care and other services. Your answers to this survey are extremely valuable and will help RCD better serve you and your neighbors and create better housing for all residents.

This survey will take approximately 15 to 20 minutes to complete. All households that complete the survey will each receive a $20 gift card (only one survey per household).

Households that complete a survey by JULY 31st will also be entered into a raffle to win an iPad mini.

Answering these questions is completely up to you. You may refuse to answer any of the questions, and you may stop the survey at any time, however only completed surveys will receive a gift card. We recommend doing this survey as a family/household or having one person fill out the survey who can answer the questions for the entire unit.

All names provided will be kept private and will be separated from any of the responses you provide. Any facts that might identify you will not appear when we present this study or publish its results.

In addition to the survey, RCD is conducting interviews with residents based on their answers. If you are willing to speak to RCD further about your responses, please provide your contact Information at the end of the survey. Households that are chosen to participate in the follow-up interview/conversation will receive an additional gift card.

Do you agree to take this voluntary survey?

- ○ Yes, I consent to take this survey.
- ○ No, I do not consent to take this survey.*

*If no, please return the blank survey in the envelope provided.

#
Survey for [property name] Residents
#

*RCD in partnership with the Association of Bay Area Governments (ABAG) will be conducting this survey on transportation and services for residents of affordable housing. The survey team will include a UC Berkeley Graduate Student and ABAG staff.

#

Please tell us about you and the other people in your unit#

#

1. Please confirm that you live at [property name] by checking: ○ Ye ○ No

Unit Number: _____

2. Who currently lives with you in the unit?

	Relationship to you (eg. mother, son, roommate)	Age	Gender	Employed (Y/N)	Student (Y/N)	Retired (Y/N)	Other: (eg. disability)
1	Self						
2							
3							
4							
5							
6							
7							
8							

3. When did you move into [property name]?

Year: _____

4. Where did you live before? Please let us know by identifying the nearest intersection, city and state that you lived in before.

Street Address or Cross Streets:	How long did you live there?
City: State (if not California):	○ Less than 1 year ○ 1 year or longer

5. Do you or the people you live with have access to a motor vehicle (car, truck, motorcycle)? **[Check all that apply]**

- ○ Yes. If yes,
  - How many motor vehicles does the household own? (Number:_____)
  - Where is (are) the vehicle(s) parked (check all that apply):
    - ○ At the apartment property ○ On the street ○ Other _____
- ○ No motor vehicle access
- ○ Car share membership
- ○ Other vehicle access (such as carpooling), please explain:

Please tell us about your usual travel choices

6. How often do you or the people you live with travel by? **[Check one for each method]**

	Almost Daily	Few times per week	Few times per month	Once per month	Rarely	Never
BART	○	○	○	○	○	○
Bus	○	○	○	○	○	○
Car	○	○	○	○	○	○
Walking	○	○	○	○	○	○
Bike	○	○	○	○	○	○
Carpool	○	○	○	○	○	○
Other:_____	○	○	○	○	○	○

7. What are the **main** travel destinations for you the people you live with during a typical week (Monday-Sunday)? **[List each destination only once and no more than 6 destinations in total]**

Type of Destination: (examples: Work; School; Daycare; Grocery Store; Library; Park; doctor; Church)	**Address , Cross Streets, or Neighborhood**: Please include city (example: Shattuck between Vine and Rose, Berkeley)* * Details will help us calculate distances traveled	**Who is going there?** (example: self and daughter)	**How do you/they usually get there?** (eg. bike; walk + bus; drive + BART + walk)	**Days/ Week or month** (eg. 5 days per week; once a month)	**Does the time of day change how you get to this destination?**
example: Hospital	*Grand and Broadway, Oakland*	*Self*	*BART + Walk*	*2 / week*	*At night I drive*
1.					
2.					
3.					
4.					
5.					
6.					

8. Since moving to [property name] do you and the people you live with: **[Check one]**
   - ○ Use public transportation **MORE** than we did before
   - ○ Use public transportation **ABOUT THE SAME** as we did before
   - ○ Use public transportation **LESS** than we did before

   If your use of public transportation has changed, **please explain why**:

9. Since moving to [property name] do you and the people you live with: **[Check one]**
   - ○ Use a private vehicle **MORE** than we did before
   - ○ Use a private vehicle **ABOUT THE SAME** as we did before
   - ○ Use a private vehicle **LESS** than we did before

   If your use of a car has changed, **please explain why**:

10. Do you or anyone you live with receive discounted transit passes or subsidized parking at home or work?
    - ○ Yes, *please provide a description of the type of pass or parking arrangement in the box below
    - ○ No
    - ○ Other, please explain:

11. **Overall transportation costs** (eg. the cost of driving, gas and public transit) for me and the people I live with have: **[Check one and explain in the box below]**
    - ○ **INCREASED** since moving to [property name]
    - ○ **STAYED THE SAME** since moving to [property name]
    - ○ **DECREASED** since moving to [property name]

    Please explain what has led to the changes (eg. higher gas prices, use bus instead of car, live closer to job):

Please tell us how your life has changed since moving to [property name]

12. Since moving to [property name] have you or any of the people you live with changed where you/they go for any of the following services?

Destination	No Change	Change	Does not apply (N/A)	Details or Comment
School (K-12 or college)				
Employment Services & Training				
Groceries				
Medical Care				
Library				
Child Care				
Parks, Recreation and Open Space				
Entertainment (Theater, Cafes)				
Place of Worship				
Other:_____				

13. How does the location of [property name] compare with your previous home when traveling to the following services?

	Easier to reach	Harder to reach	About the same	N/A
Work	○	○	○	○
School (K-12 or college)	○	○	○	○
Employment Services & Training	○	○	○	○
Groceries	○	○	○	○
Medical Care	○	○	○	○
Library	○	○	○	○
Child Care	○	○	○	○
Parks, Recreation and Open Space	○	○	○	○
Entertainment (Theater, Cafes)	○	○	○	○
Place of Worship	○	○	○	○
Other: _____	○	○	○	○

Comments (add any details on reasons for changes here):

14. Have you or any of the people you live with taken a **new** job since moving to [property name]?
- ○ Yes, *please provide the address or cross streets and city of previous job in the box below
- ○ No
- ○ Other, please explain:

15. Since moving to [property name] **finding a job** is now: **[Check one]**
- ○ **EASIER** than where I/we lived before
- ○ **NEITHER** easier nor harder to find a job than where I/we lived before
- ○ **HARDER** than where I/we lived before

Comments (add any details you choose here)

16. What are some advantages of moving to the [property name] neighborhood? **[Check all that apply]**
- ○ Neighborhood is safer
- ○ Neighborhood has better access to transit services, car-share or carpooling options
- ○ Neighborhood has better access to shops, services and restaurants
- ○ Neighborhood has better access to recreational opportunities
- ○ Neighborhood has better quality of local schools

Other or Comments:

The questions that follow give context to the results for all of the surveys. As in your earlier responses, all individual information will be kept confidential.

17. Please list the occupation of **each household member** that is currently employed. If an individual holds more than one job, please list each job on a separate line.

Person	**Part time / Full Time**	**Industry and Occupation** (eg. retail-sales person, construction - manager, etc.)	**Comments** (eg. self-employed, disability leave)
Self			

18. Which race or ethnicity best describes you? **[Check all that apply]**
- ○ Asian/Pacific Islander
- ○ Black/African-American
- ○ White/Caucasian
- ○ Latino/Hispanic
- ○ Native American/Alaskan Native
- ○ Other, please specify: _____
- ○ Prefer not to answer

19. What languages are spoken at home? **[Check all that apply]**
- ○ English
- ○ Spanish
- ○ Tagalog (Filipino)
- ○ Chinese, dialect:_____
- ○ Arabic
- ○ Other, please specify: _____

20. Please provide your name and contact information if you are willing to have an additional interview with us. Households selected for a follow up interview will receive an additional **$20** gift card.

Name: **Phone or email**:

This concludes the survey. Your answers will help RCD provide better services and housing for all residents.

Thank you for your time!

Appendix B
Children's Surveys

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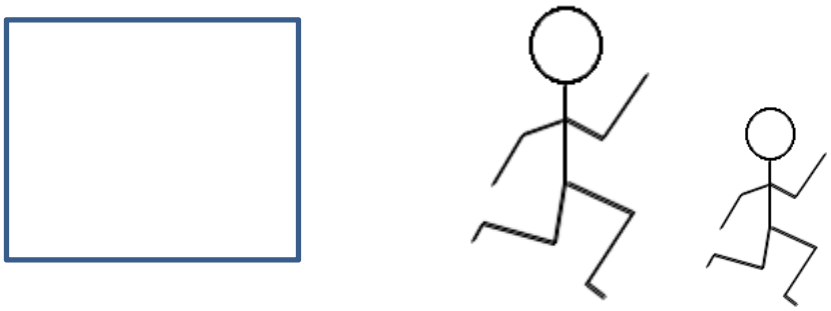
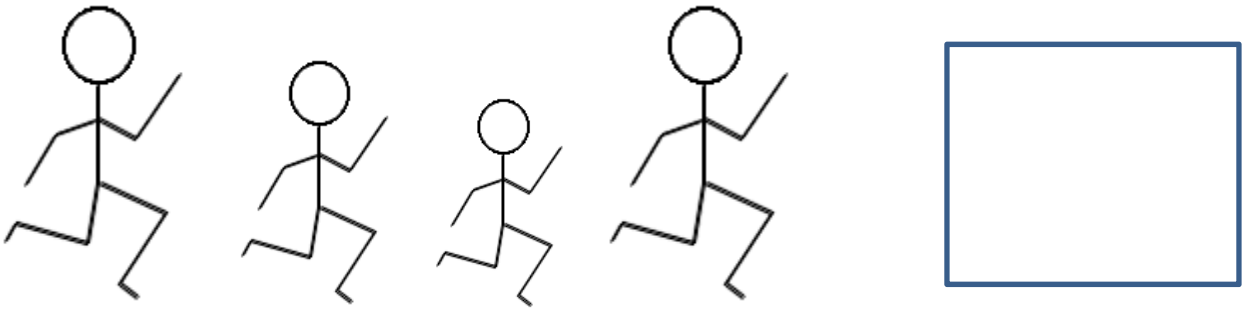
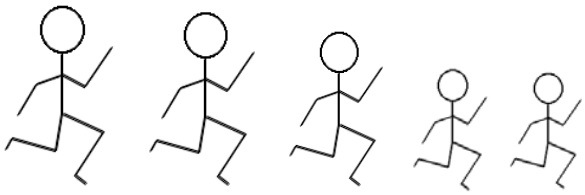
Survey Day 1: How many people in your family?







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Draw your family—

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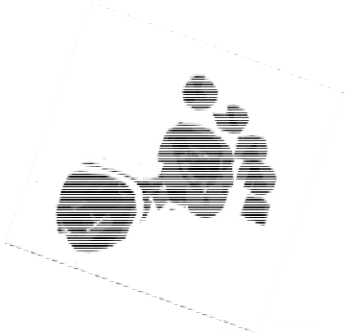
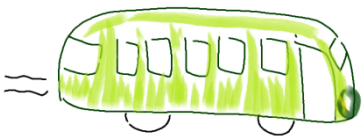
Survey Day 2—Draw where you go during the day.

How you get there—by car, by foot, by bus, by BART…?





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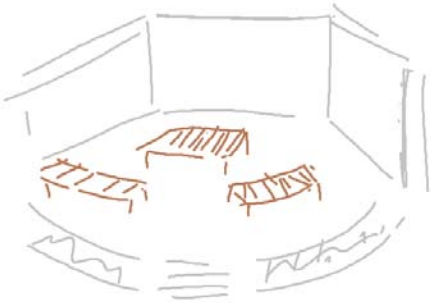
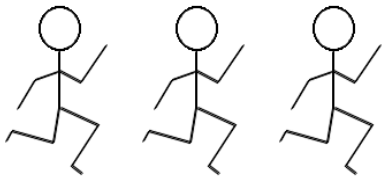
Survey Day 3: What's the Best Thing about Living Here?

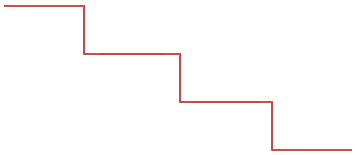
The Courtyard



My Friends



The Stairs



Animals

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Survey Day 4 WHAT PET DO YOU HAVE OR WANT?

	I HAVE THIS PET	I WANT THIS PET
DOG		
CAT		
BIRD		
FISH		
INSECT		
OTHER (DRAW OR WRITE)		

© C Kroll

DRAW YOUR IDEAL PET

©C Kroll

Survey Day 5: What foods do you eat at home?

Fruits

Vegetables

Meats

Grains

Sweets

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Draw your favorite meal

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