AC Transit East Bay Bus Rapid Transit

Fiscal Year 2012 Small Starts Submittal

The Case for the Project, Transportation System User Benefits, and Cost-Effectiveness

Prepared for
Federal Transit Administration

Prepared by
AC Transit

October 2010

Alameda-Contra Costa Transit District

Mary V. King, Interim General Manager

October 22, 2010

Mr. Dwayne Weeks, AICP
Office of Planning and Environment
Federal Transit Administration
1200 New Jersey Avenue, S.E.
Washington, DC 20590

Re: AC Transit East Bay Bus Rapid Transit Project - FY 2012 Small Starts Submittal

Dear Mr. Weeks:

As described in my previous letter of September 30, I am pleased to provide this additional information about the AC Transit East Bay Bus Rapid Transit (BRT) project, for inclusion in the Federal Transit Administration's (FTA) Annual Report on Funding Recommendations for Fiscal Year 2012. This additional information completes our updated New Starts submittal for FTA review.

The additional information for the project is provided as follows:

- The Case for the Project;
- Ridership and transportation system user benefits (TSUB) results;
- Summit files and maps;
- Cost-effectiveness; and
- Updated Small Starts Templates (Excel)

Again, we appreciate FTA's willingness to receive our information as it was refined for this year's submittal. Please do not hesitate to contact me if you have any questions about this or the previous information submitted for our project.

Sincerely,

Mary V. King
Interim General Manager

MVK/ts/clt

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1.0 Project Description

This section provides a general description of the AC Transit East Bay Bus Rapid Transit (BRT) project and identifies changes in the project scope since it was approved into Project Development in 2008. The section also sets forth the "Making the Case" narrative, including a summary of the purpose and need for the East Bay BRT project and a discussion of the benefits of this capital investment priority in Alameda County[1].

Section 1.0 is organized as follows:

- **Section 1.1 –** East Bay BRT Project Description;
- **Section 1.2 –** Baseline Alternative;
- **Section 1.3 –** Project Development Status; and
- **Section 1.4 –** The Case for the East Bay BRT.

1.1 East Bay BRT Project Description

The AC Transit East Bay Bus Rapid Transit Project would provide high-quality, fast, and frequent express bus service along an approximately 14.4-mile-long heavily urbanized corridor. The project extends from Downtown Berkeley and the University of California at Berkeley (UC Berkeley) at the northern end and through Downtown Oakland to San Leandro at the southern end. The project cost is estimated at $216.1 million (year-of-expenditure (YOE) dollars).

The current project, which has been refined through an extensive local process by each of the three municipalities – Berkeley, Oakland, and San Leandro – reflects a somewhat shorter alignment. The project will now terminate at the San Leandro BART Station, rather than Bay Fair. In addition, there will be no dedicated bus lane in Berkeley.

The proposed BRT alignment follows primarily Telegraph Avenue in the northern portion of the corridor and International Boulevard/East 14th Street in the southern portion (see Figure 1.1).

[1] Note that Section 1.4 is not included in this September 30 submittal, but will be provided to FTA no later than October 22.

Figure 1.1 East Bay Bus Rapid Transit Alignment

As shown, the alignment begins near the Downtown Berkeley Bay Area Rapid Transit (BART) Station, continues along the south side of the UC Berkeley campus to Telegraph Avenue, and then follows Telegraph Avenue to Broadway and Downtown Oakland. The alignment continues south of Downtown Oakland along International Boulevard/East 14th Street through Downtown San Leandro and terminates at the San Leandro BART Station.

The proposed BRT service would increase ridership on the already strong bus network; bus routes along the proposed BRT project alignment are projected to serve approximately 24,600 boardings a day in 2015.

The project includes the following features:

- **Dedicated Bus Lanes –** The BRT transitway consists of traffic lanes converted for exclusive transit use, for approximately 75 percent of the 14.4-mile corridor (see Figure 1.2 for BRT corridor lane configuration, including mixed traffic lanes). The dedicated lanes provide improved travel times and better schedule reliability. Median transitways 22 to 24 feet in width will serve two-directional travel while side-running transitways 11 to 12 feet in width serve single direction travel. Along most roadways, transit lanes would be established by converting mixed-flow traffic lanes to transit-only lanes.

- **Intelligent Transportation Systems Elements (ITS) –** Two main elements of ITS would be implemented as part of the East Bay BRT project: 1) transit signal priority treatments and signal coordination throughout the BRT project alignment; and 2) real-time bus arrival information displayed (and announced) at stations as well as available on the Internet.

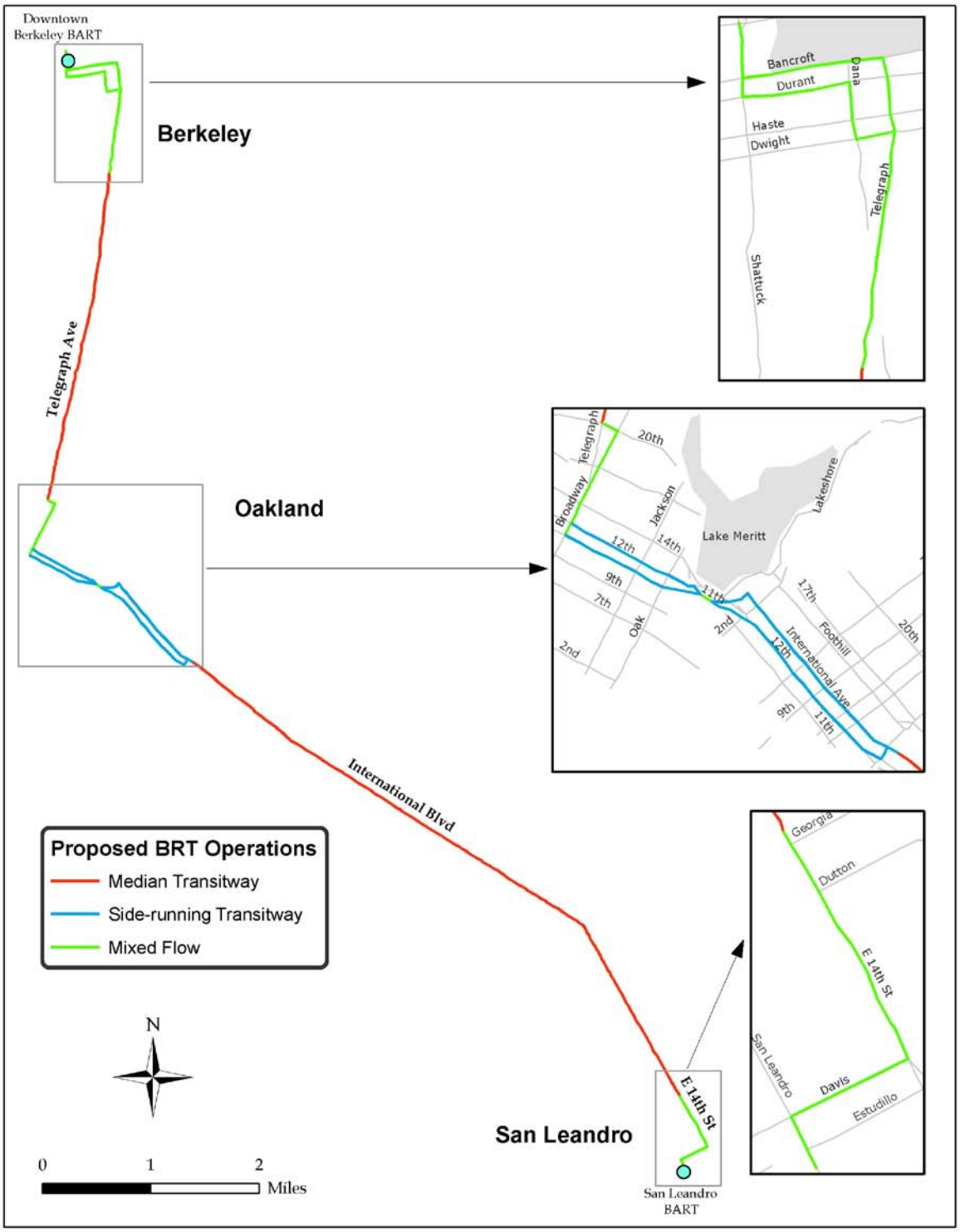
- **Bus Frequencies of Five-Minute Headways during Peak and Midday Periods –** All bus service along the project alignment would be operated along the BRT transitway as express service. The only routes that would use mixed-flow lanes would be those that operate along short segments of the alignment before continuing onto other streets.

- **Forty-Seven BRT Stations –** The BRT system would include 47 stations, spaced approximately every one-quarter to one-half mile. Stations would include: comfortable shelters, level boarding platforms, benches, security technologies, and fare machines, among other features.

- **Fare Collection –** The proposed East Bay BRT fare system would be barrier-free self-service, proof-of-payment fare collection.

- **BRT Vehicles –** AC Transit would deploy low-floor, low-emission, 60-foot articulated buses on East Bay BRT service. These could be similar to the articulated coaches currently assigned to Rapid Bus Route 1R. Because the BRT operates with a higher average speed than existing services, it makes more productive use of the bus fleet. As a result, AC Transit would be able to deploy the East Bay BRT service without procuring additional buses.

Figure 1.2 East Bay BRT, Configuration of Transitway



1.2 Baseline Alternative

The Baseline Alternative for the East Bay BRT project is the No-Build Alternative, which continues the current AC Transit services operating in the East Bay BRT corridor: local Route 1 and limited-stop Rapid Bus 1R. The No-Build Alternative also includes all currently planned and programmed projects in the study area, such as the MacArthur BART Station Transit Village, San Leandro BART Station Transit Village (Phase 1), Fruitvale Transit Village (Phase II), and expansion of express bus services in various transportation corridors throughout the San Francisco Bay Area. There have been no changes to the Baseline Alternative since the project was approved into Project Development.

Both Route 1 and Rapid Bus 1R operate for the most part on the same alignment proposed for the East Bay BRT – along Telegraph Avenue from Downtown Berkeley and UC Berkeley to Downtown Oakland; International Boulevard from Downtown Oakland to the Oakland/San Leandro border; and East 14th Street from the Oakland/San Leandro border to downtown San Leandro. Route 1 provides service to the San Leandro BART station, via Davis Street and San Leandro Boulevard. Both Routes 1 and 1R terminate at the Bay Fair BART. Route 1 is a local bus, with stops approximately every two blocks. It operates every 15 minutes during peak periods and every 20 minutes off peak.

Route 1R is a relatively new rapid bus service that incorporates low-floor buses, widened stop spacing to decrease running time, improvements to selected bus stops (benches, shelters, maps/signs, and bus arrival information), and transit signal priority (TSP). Route 1R Rapid Bus stops are spaced approximately one-half mile apart and located near major activity centers and transfer points. Service frequencies are every 12 minutes during most of the day. The combined service frequency of Route 1R and Route 1 is about every 6 to 7 minutes during peak periods. Route 1R service was initiated in June 2007.

1.3 Project Development Status

Planning for the East Bay BRT project dates back to the early 1990s, when AC Transit completed a systematic study of its busiest routes. That study, called the Alternative Modes Analysis, was completed in 1993 and identified priority corridors and candidate technologies for major transit investments that would serve ridership cost-effectively. The study identified the Berkeley/Oakland/San Leandro corridor as the single best corridor for further evaluation.

Over a three-year period from 1999 to 2002, the District conducted a major investment study (MIS) of the Berkeley/Oakland/San Leandro corridor to examine alternatives for improved transit service. That MIS identified BRT as the preferred modal option because it could provide many of the same benefits as light rail transit (LRT) and would attract a large number of new riders at a much lower cost with fewer traffic, parking, and

construction impacts than LRT. Based on this work, the AC Transit Board in 2001 confirmed selection of the BRT alignment as the preferred alternative, and also recommended that an early implementation of "Rapid Bus" be pursued with the understanding that the investments made during the early implementation would be preserved to the greatest extent possible for use in future BRT alternatives.

Following the MIS, AC Transit initiated the NEPA process and the preparation of the Draft Environmental Impact Statement/Draft Environmental Impact Report (DEIS/DEIR) in spring of 2004. The DEIS/DEIR was circulated for public comment in May 2007. Based on the findings of the DEIS/DEIR, the locally preferred alternative (LPA) was refined and presented in a September 2008 application to FTA requesting approval to enter Project Development. This request was approved by FTA in December 2008.

Work was initiated on technical studies related to the final EIS/EIR in July 2009, with a public release scheduled for spring 2011.

Concurrent with those technical studies, AC Transit worked with the cities of Berkeley, Oakland and San Leandro in the refinement of the LPA. Each city individually adopted an LPA, with San Leandro and Oakland voting to include dedicated bus lanes, and Berkeley voting for no dedicated lanes to be included within their city limits. Reflecting the decisions emerging from that local process, the AC Transit Board of Directors in June 2010 adopted the refined LPA described previously in Section 1.1. That refined LPA is the subject of the ongoing FEIS/FEIR, and this updated Small Start submittal.

Table 1.2 summarizes major milestones of the East Bay BRT planning and project development process, including actual/expected completion dates.

Table 1.2 East Bay BRT Major Milestones

Milestone	Actual/Expected Completion Date	Comments
Alternative Modes Analysis Study	May 12, 1993	Berkeley/Oakland/San Leandro corridor identified as the single best corridor for further evaluation.
Measure B (one-half percent sales tax) approved by voters	November 2000	Included funding for capital improvements along a Berkeley/Oakland corridor.
BRT adopted by AC Transit Board of Directors as Locally Preferred Alternative (LPA)	August 2, 2001	In addition, early implementation of "rapid bus" was adopted.
Major Investment Study	1999 through 2002	
Regional Measure 2 ($1 toll increase in seven state-owned region bridges) approved by voters	March 2004	The Regional Traffic Relief Plan included $65 million for capital investment on the East Bay BRT corridor, in addition to $3 million annually in operational subsidy for current "Rapid Bus" and future BRT service.
Approval of BRT options for evaluation in DEIS/DEIR	May 5, 2004	
Release of DEIS/DEIR for public comment	May 4, 2007	
Public Hearings for DEIS/DEIR	June 2007	Four public hearings conducted at different venues.
Close of DEIS/DEIR comment period	July 3, 2007	
City staff and community outreach to define details of the LPA for preparation of the Final EIS/EIR	July 2007 through May 2010	
FTA Small Starts preliminary submittal, FY 2010	July 2008	
FTA Small Starts (full submittal), FY 2010	September 2008	Request to enter project development.
FTA approval to enter project development	December 2008	
Local city approval of refined LPA	May 2010	For evaluation in final EIS/EIR.
AC Transit Board of Directors adoption of refined LPA	June 2010	For evaluation in final EIS/EIR.
FTA Small Starts (full submittal), FY 2012	September 2010	FY2012 Small Starts Submittal, based on revised and adopted LPA.
Project Development design	Fall 2013	Includes preliminary engineering, value engineering, and final design
Preparation of final EIS/EIR	July 2009 through March 2011	Administrative draft for review in December 2010
Record of Decision	June 2011	

1.4 The Case for the East Bay BRT Project

1.4.1 Project Identification

The East Bay BRT project would provide improved transit service, connecting the cities of Berkeley, Oakland, and San Leandro (see Figure 1.1). The project would operate in an exclusive lane for roughly 85 percent of its 14.4-mile length, and includes 47 stations and a proof-of-payment fare collection system. Other features of the project to enhance operations and ensure fast, reliable service include: level boarding, transit signal priority, signal coordination, and real-time bus arrival information. High-frequency service would be operated at five-minute headways during peak and midday periods.

1.4.2 Setting

The 14.4-mile East Bay BRT corridor extends from Downtown Berkeley and UC Berkeley at its northern end through Downtown Oakland, to San Leandro at the southern end.

AC Transit currently operates local and Rapid Bus service in the project corridor, projected to serve about 24,600 passengers daily in 2015 (see Section 1.2 for a description of services). Ten BART stations also are located within one mile of the East Bay BRT's alignment, providing access to four BART lines (Richmond-Fremont; Richmond-Daly City; Fremont-Daly City; and Dublin/Pleasanton-Daly City).

The primary roadways used by the proposed East Bay BRT are Telegraph Avenue between Downtown Berkeley and Downtown Oakland and International Boulevard/East 14th Street between Downtown Oakland and San Leandro BART. For the most part, these roadways are typical major urban arterials with two through traffic lanes in each direction and left-turn pockets at most major intersections. There are several parallel arterial roadways within the study area. These include Martin Luther King Junior Way, Adeline Street, Shattuck Avenue, College Avenue, and Broadway between Downtown Berkeley and Downtown Oakland; and Foothill Boulevard, Bancroft Avenue, San Leandro Street, and San Leandro Boulevard between Downtown Oakland and San Leandro BART.

As a target of investment, the corridor has characteristics that are highly conducive to expand transit use and particularly well-suited to BRT. It is home to more than 230,000 residents and contains some of the highest employment and residential densities in the East Bay. The corridor also experiences congestion and delay that limit the ability to improve travel time without BRT level investments.

The corridor contains many regional activity centers, reflected by the 173,300 jobs located in the corridor. The corridor is centered on Downtown Oakland. With 65,000 jobs, it is the largest employment center in the corridor. The northern end of the corridor is anchored by UC Berkeley, host to almost 36,000 students and over 13,000 employees. An additional 14,000 employees work in Downtown Berkeley. Population density in the corridor is high, with some 45 percent of the corridor population living in areas with

densities greater than 30 persons per acre, and nearly three quarters of the corridor population living in areas with densities greater than 20 persons per acre.[2] The southern end of the corridor is anchored by the San Leandro BART station, and served by three BART lines and five local bus routes.

The East Bay BRT corridor also is home to many people who are traditionally high transit users. Some 47 percent of the people in the corridor have incomes that are below the regional poverty level, and 26 percent do not own a car.[3] The corridor also has a high percentage of minority populations: almost 80 percent of corridor residents are minority. Other transit dependent populations include seniors and youth, accounting for approximately 10 percent and 23 percent of the population, respectively, living within one-half mile of the proposed BRT alignment.

The BRT corridor lies in the heavily populated, relatively flat part of the San Francisco East Bay. The San Francisco Bay is a few miles to the west of the corridor and the Oakland hills are a few miles to the east.

1.4.3 Current Conditions in the East Bay BRT Corridor

Although transit ridership is strong in this corridor, AC Transit's ability to expand regular bus service and improve speed and reliability is limited. Transit vehicles currently operate in congested mixed-flow conditions throughout much of the corridor. They are subject to several sources of delay, including general congestion, parallel parking vehicles, right-turning vehicles (often blocked by pedestrians), double parking, and wheelchair boardings. Existing Rapid Bus service travel time from end-to-end is about 85 minutes in the AM peak, 88 minutes in the PM peak period and about 83 minutes midday. Operating speeds range between 12 to 15 mph. Reliability on corridor bus service is also a challenge. About 70 percent of 1R trips operate more than 5 minutes late during the midday period. During peak periods, 42 percent of the AM peak trips are completed on-time, compared to 18 percent in the PM peak period.[4]

Major activity centers in the corridor (see Section 1.4.2) generate high trip volumes that strain the capacity of the existing roadway and transit networks. Downtown Oakland is a major employment destination in the corridor, and an area where over 20 percent of the attracted trips are made by transit. Telegraph Avenue, International Boulevard, East 14th Street, and other parallel routes are heavily used roadways, with congested conditions

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[2] For comparison, the citywide population density of San Francisco is 25 persons per acre, whereas population densities in Bay Area suburbs are below 10 persons per acre.

[3] Low-income populations are defined by the MTC as those falling under 200 percent of the Federal poverty level (Source: MTC's Transportation 2030 Equity Analysis Report, November 2004).

[4] AC Transit, *Line 1R Service and Reliability Study (Draft Report)*, January 2010. Note that 1R currently operates between downtown Berkeley and the BART BayFair station; the proposed East Bay BRT also begins in downtown Berkeley, but terminates at the BART San Leandro station.

typical of urban areas. Telegraph Avenue, International Boulevard, East 14th Street, and other parallel arterials all currently operate with volumes approaching capacity during the afternoon peak hour. Of the 88 intersections analyzed on these roadways for the DEIS/DEIR, 6 were found to operate with LOS E or F and 10 were found to operate with LOS D.

Existing bus services on the proposed BRT alignment serve over 24,600 daily transit trips. Of the total transit trips on the proposed BRT alignment, over 56 percent are nonwork trips, which is comparable to the share of nonwork transit trips served by AC Transit as a whole (i.e., almost 61 percent). Some of the most important transit markets served by the proposed BRT include trips from East Oakland (i.e., San Antonio, Fruitvale, Central East Oakland, and Elmhurst) to Downtown Oakland and Downtown/South Berkeley; trips between Downtown Oakland and Downtown/South Berkeley, trips from North Oakland to Downtown Oakland; and trips from the BRT corridor into San Francisco. Key information for these markets in the year 2015 is provided in the next section.

1.4.4 Future Conditions

Existing population, employment, and traffic conditions in the corridor already are conducive to transit use. Population and employment in the corridor are expected to grow and traffic conditions worsen, resulting in an even greater demand for transit improvements in the future.

- **Population, Employment, and Travel Demand are Increasing –** According to socioeconomic forecasts from the Association of Bay Area Governments (ABAG), over 92,000 new residents will move into the East Bay BRT corridor by 2035, an increase of approximately 40 percent from the 2000 population (close to 1 percent annual growth). This growth would increase the overall population density from 13,400 to 19,300 persons per square mile. Population growth will be highest in Downtown Oakland, where there is substantial new housing under construction or planned. Considerable population growth is forecast in the vicinity of the North Oakland. Significant growth also is expected in the southern portion of the BRT corridor through East Oakland, San Antonio and Fruitvale. Employment within the corridor is projected to increase by 30 percent over the same period. North and Central Oakland, and Fruitvale will experience particularly high net employment increases, accounting for almost 70 percent of the additional jobs in 2035. Most of the jobs are added in downtown Oakland (17,100 new jobs within one-half mile of BRT stations), North Oakland (almost 8,700 new jobs within one-half mile of BRT stations), and Fruitvale (over 6,400 new jobs within one-half mile of BRT stations). Several important markets served by the East Bay BRT are projected to have high future transit ridership (see Table 1.3). All of these markets experience high transit usage, with forecast transit market share greater than 20 percent. Travel demand results indicate that over 20 percent of the trips into downtown Oakland will use transit, with 33 percent of the person trips from transit-dependent communities in East Oakland into downtown Oakland using transit. Downtown/South Berkeley also attracts trips from East Oakland, with 22

percent of those trips occurring via transit. Over half of the trips from the BRT corridor into San Francisco are made by transit (via BART or AC Transit).

- **Growth in Automobile Traffic will Deteriorate Travel Conditions in the Corridor for All Users –** Travel projections suggest that without roadway or transit capacity improvements, corridor traffic will operate under increasingly congested conditions by 2035. AC Transit average bus speeds have declined by one percent per year over the last 20 years. This trend is expected to continue into the future, as traffic volumes and conditions continue to deteriorate. Traffic volumes on Telegraph Avenue, International Boulevard, and East 14th Street are expected to increase about 45 percent between 2009 and 2035 during the afternoon peak period. As a result, roadway performance will deteriorate and transit operating speed will drop. Of the 88 intersections analyzed in the DEIS/DEIR, the number forecast to operate at LOS E or F is expected to increase from 6 to 18, and the number at LOS D from 10 to 20.

- **High-Quality Transit Service is Needed to Support Transit-Oriented Development in the Corridor –** Building upon strong existing transit-supportive land use patterns, the cities within the East Bay corridor are carrying out extensive development and redevelopment efforts along Telegraph Avenue, International Boulevard, East 14th Street, and in the downtown portions of the corridor. Land use and zoning policies are in place that promote higher-density, transit-oriented development in the downtown areas and along transit corridors. At the northern end of the corridor, Downtown Berkeley and Telegraph Avenue in the vicinity of the UC Berkeley campus are expected to add substantial amounts of university research space, commercial development, and housing. Downtown Berkeley and the East 14th Street and downtown districts in San Leandro lie within planned Priority Development Areas (PDA), and virtually all remaining portions of the East Bay BRT corridor fall under a "Potential" PDA designation. A large part of the south corridor area is within Oakland's Enterprise and Empowerment Zone. A major focus of Oakland's updated *General Plan* policies is to invest in transit-oriented development at transit nodes and stations such as the Fruitvale Transit Village, in the Fruitvale BART Station area and a proposed BRT station. In San Leandro, the *General Plan* envisions reshaping the East 14th Street corridor from a three-mile commercial strip to a series of transit-oriented "districts" focused around the downtown, and other destinations served by the East Bay BRT. The San Leandro BART Station area is adjacent to downtown and is under development as a transit village with commercial and residential uses.

Table 1.3 Important East Bay BRT Transit Markets

Market	Transit Ridership (Baseline, 2015)	Transit Market Share (Baseline, 2015)
From East Oakland to Downtown Oakland	15,032	34%
From East Oakland to Downtown/South Berkeley	2,961	22%
Between Downtown Oakland and Downtown/South Berkeley	3,805	23%
From North Oakland to Downtown Oakland	4,626	24%
From Downtown Oakland to Downtown/South Berkeley	1,700	21%
From BRT corridor to San Francisco	33,203	52%

1.4.5 Purpose

The East Bay BRT project has been developed to meet the following purposes:

- **Improve Transit Service and Better Accommodate High Existing Bus Ridership –** The project would improve speed and reliability of service to current riders, including large numbers of minority, low-income, and transit-dependent residents, by offering higher frequency service, reduced travel time, access to more stops along the corridor, and greater schedule reliability. Almost 545,900 daily trips are projected within the corridor in 2015, of which 48,550 are anticipated on transit under Baseline conditions. Downtown Oakland is expected to attract 132,380 trips per day from places throughout the corridor, of which 25,240 would be on transit. Daily trips (122,700) are forecast from locations throughout the corridor to Downtown Berkeley and UC Berkeley, of which 10,750 would be on transit. The proposed BRT project would improve both the travel time and reliability for these trips by providing a transit alternative that avoids general congestion and removes disruptions caused by parallel parking vehicles, right-turning vehicles, and pervasive double parking.

- **Increase Transit Ridership by Providing a Viable and Competitive Transit Alternative to the Private Automobile –** The project would attract new riders and reduce single occupant automobile use by providing a rail-like experience by improving transit service and facilities along the corridor. The project would improve the two factors most important in attracting motorists to transit service: competitive transit travel times and a high degree of reliability.

- **Improve and Maintain Efficiency of Transit Service Delivery and Lower AC Transit's Operating Costs per Rider –** The project would improve fleet speeds and

service efficiencies by reducing delays from operating in mixed-flow traffic and the slow boarding and alighting of passengers.

- **Support Local and Regional Planning Goals to Organize Development along Transit Corridors and Around Transit Stations –** Providing BRT infrastructure of dedicated transit lanes and highly visible transit stations offers a sense of permanence that can help cities attract investment in transit-oriented development.

1.4.6 Merits of the Proposed East Bay BRT Project

The No-Build serves as the Baseline Alternative for this project because further improvements to transit service are not possible without a major capital investment. The implementation of the 1R Rapid Bus service initiated in the corridor in 2007 has reduced transit travel times by approximately 10 percent. However, attempting to meet demand by just adding more buses would not provide the benefits necessary to attract new riders. Further, it would be both inefficient and costly because buses would face the same operating constraints that delay them today. With 1 and 1R buses operating every six to seven minutes in each direction, the ability of the roadway to support reliable mixed-flow bus operations is strained. A recent capacity analysis found that frequencies only could be marginally increased without significantly worsening reliability and increasing bus bunching. Thus the Baseline Alternative will not adequately serve travel demand in the East Bay BRT corridor.

In contrast, the proposed East Bay BRT project would improve transit travel time and reliability, and increase the capacity of the roadway to handle more buses and of the system to handle more riders.

- **Service Improvements –** The proposed East Bay BRT project will result in additional capacity and travel time savings. Compared to the Baseline Alternative, peak period end-to-end transit travel time would improve from 74 minutes on Route 1R and 90 minutes on Route 1 to 65 minutes on BRT. Average bus speeds would improve from 11.5 mph on Route 1R and 9.5 minutes on Route 1 to 13.5 mph on BRT. Peak-period transit headway would be reduced from six to seven minutes to five minutes, resulting in an increase in bus seat miles of 33 percent. The BRT will increase the number of stops served along the alignment by 50 percent compared to the 1R Route.

- **Significant Ridership Increases –** Transit boardings in the corridor will increase by almost 17,130 per day in 2015 (opening year), of which 3,720 will be new riders to transit. The East Bay BRT would also serve and benefit sizable low-income and transit-dependent populations that currently live within one-half of the BRT corridor (see Section 1.4.2).

- **The Proposed BRT Project Would Attract New Riders and Create Benefits to Existing Riders –** Daily user benefits for the East Bay BRT by 2015 are estimated at 3,560 hours, as

a result of improved travel times, greater accessibility, and service frequency through the implementation of this project.[5] Forty-four percent of the transit user benefits accrue to trips within the East Bay BRT corridor cities of Berkeley, Oakland, and San Leandro. An additional 17 percent accrue to trips to San Francisco and 4.7 percent to the City of Alameda.

The largest share of benefits accrue to home-based shopping/other trips, which account for almost 28 percent (i.e., 990 hours) of the travel-time savings resulting from the BRT implementation. Downtown Oakland (541 new transit trips, 525 hours) and San Francisco County (34 new transit trips, 178 hours) show the largest benefits.

User benefits for home-based work trips are estimated at 812 hours of travel-time savings (i.e., 23 percent of total user benefit), and attracting about 1,640 new riders. The largest beneficiary is San Francisco County, with 129 new transit trips per day and 313 hours of travel-time savings in 2015. San Francisco County enjoys significant home-based work trip benefits because the BRT project improves transit service to BART stations. Downtown Oakland is forecast to gain 538 new home-based work transit trips and 291 hours of travel-time savings. Almost 710 of the new home-based work transit trips and 353 hours of savings are for trips coming from locations spread throughout the corridor.

The most important destination market for the East Bay BRT project is, not surprisingly, Downtown Oakland. Combining all trip purposes, the project will result in 1,004 hours of travel-time savings for this destination, and attract 1,294 new riders. Twenty-nine percent of the time savings are from home-based work trips and 52 percent from home-based shopping/other trips. Over three quarters of the benefits are for trips from other locations in the corridor (760 hours and almost 1,000 new riders). A particularly important origin for trips to Downtown Oakland is from the lower-income, low-vehicle ownership East Oakland neighborhoods of San Antonio, Fruitvale, Central East Oakland, and Elmhurst. For these trips, the BRT improves in-vehicle travel time by roughly 15 percent and transit travel time, including wait by roughly 20 to 25 percent. As a result, transit ridership in this market increases by 705 and 677 hours of travel time are saved.

Downtown Berkeley and UC Berkeley also are major beneficiaries (842 hours of travel time savings and 571 new transit trips). Most of the benefit is from home-based college trips, primarily attracted to UC Berkeley (555 hours of time savings). Trips from Downtown Oakland and the East Oakland neighborhoods of San Antonio, Fruitvale, Central East Oakland, and Elmhurst play a large role. For these trips, in-vehicle transit travel time is improved by 10 percent and transit travel time, including wait, by 15 percent. Transit ridership in this market increases by 214 per day and almost 540 hours of travel time are saved.

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[5] Per instructions from the FTA (via conference call, on August 14, 2008), the sum of transit and auto user benefits is reported in this document.

As mentioned earlier, trips destined to San Francisco receive significant benefits, because the BRT project improves transit service to BART stations. When accounting for all trip purposes, this market gains 192 transit riders per day and enjoys about 610 hours of user benefit. More than half of the user benefit is from home-based work trips and 29 percent from home-based shopping/other trips.

- **The East Bay BRT Would Help Support Transit-Oriented Development –** The East Bay BRT Project would construct infrastructure, including distinctive stations, supporting transit-oriented residential and commercial development of the corridor by providing a sense of permanence and nodes for new activity.

The capital cost of the project is estimated at $196.6 million in 2010 dollars ($216.1 million in year-of-expenditure (YOE) dollars). The added capital costs of the project are equivalent to $15.1 million per year over the life of the project, and operating costs will add $4.5 million per year. The projected time savings of almost 3,560 hours per day in 2015 translate into over 1.6 million hours per year. Overall, the project cost per hour of time savings is projected to be $12.26 per hour over the life of the project.

1.4.7 Uncertainties

Cost Uncertainties

Every effort has been made to anticipate and plan for variations in cost. Sources of uncertainty include cost-inflation assumptions, field conditions compared to basis for costing, and the implementation and construction schedule.

The cost estimate was developed in 2010 dollars; an average escalation factor of 2.5 percent was applied to convert the project cost to YOE dollars. The escalation rate is based on the Building Cost Index (BCI) forecast in the San Francisco Bay Area. Unit prices reflect longer-term construction price trends that are more likely to prevail when the project is advertized for construction, and were not reduced to the highly competitive prices seen in today's bidding climate.

Another source of uncertainty related to project cost is related to actual field conditions for several cost items, including:

- The costs associated with guideway construction were estimated at $5.9 million (2010 dollars), before contingencies. This cost estimate is based upon rehabilitation of the existing roadway pavement structural section. Should the pavement structural section be significantly different than assumed (i.e., extent or condition of underlying concrete, drainage deficiencies, location of utilities), more expensive construction techniques might be needed along some parts of the transitway.

- Utility work and relocations were assumed at $2.2 million (2010 dollars), before contingencies. As detailed design progresses, it may be determined that additional utility work is needed, thus increasing project costs.

- The cost estimates include $3.2 million (2010 dollars) to cover mitigation measures to address parking and traffic impacts, before contingencies. The overall project cost could increase if the scope or cost of mitigation commitments emerging from the Final EIS/EIR is larger than anticipated.

The project cost estimates include both allocated and unallocated contingencies to mitigate the impact of these and other cost items. At the current level of design, the cost estimates include an allocated contingency of over 56 percent, in addition to an unallocated contingency of 4 percent.

Also, the cost estimates were developed assuming a realistic schedule for project development and implementation. However, project delays will result in increased escalation of construction and professional service costs.

While there are several sources of cost uncertainty, this project has few design elements that are associated with a high degree of risk:

- The project is 100 percent at-grade, with no tunnels, bridges, or other aerial structures;
- Construction is mostly within the curb-to-curb limits of existing roadways with conversion of existing mixed-flow traffic lanes to dedicated busways;
- There is little below grade excavation; and
- There are minor right-of-way requirements and little right-of-way risk, again because the project is primarily constructed within existing roadways.

In conclusion, while the cost estimates for this project contains a number of elements of uncertainty, the risk is accounted for by conservative contingencies assumptions built into the preliminary cost estimates.

Ridership Uncertainties

The uncertainties surrounding the ridership forecast for the proposed East Bay BRT corridor are related to projected growth in the corridor, and potential underestimating of BRT ridership.

The primary uncertainty is whether the projected growth occurs in the corridor between 2009 and 2015. Model assumptions on growth were based on the regionally adopted ABAG Projections 2009 forecasts, which estimate average annual growth rates of 1.0 percent in population and 2.0 percent in employment in the corridor between 2009 and 2015. Growth rates below those forecast would impact ridership estimates.

A second uncertainty is the potential understating of BRT ridership. Due to shortcomings in the travel model's transit assignment procedures and a large amount of existing bus

service in the corridor, downward adjustments were made to the model's results for boardings on the BRT system,[6] resulting in a conservative estimate for BRT ridership. This uncertainty, however, does not apply to the model's mode choice procedures; thus the most important ridership measures (i.e., new transit trips and user benefits) are not significantly affected.

While there are uncertainties in the ridership estimates, we believe this project is subject to relatively less ridership risk because it is an improvement to an existing bus route in an older urbanized area with a significant existing transit system. In contrast to transit construction projects in areas with relatively little existing transit and an uncertain market for transit, there is an established market for transit in the BRT corridor.

To address the possible ridership and benefits uncertainties, we have made conservative assumptions in our forecasting methodology, including:

- In the application of the travel model, we took ridership credit for improvements in in-vehicle and out-of-vehicle travel time. Though we believe the proposed BRT project also would improve transit reliability, ease-of-use, and comfort and security, we did not take ridership credit for any of these, by assuming the same modal constant (i.e., local bus) for both the Build and Baseline Alternatives.

- The model also assumes that automobile operating costs increase between 2005 and 2015 on average at the same rate as general inflation, even though recent trends indicate automobile operating costs have generally escalated at a higher rate than inflation in the last ten years.

1.4.8 Summary

The East Bay BRT project will provide improved transit service in a heavily urbanized corridor that also is home to large concentrations of low-income and minority populations. The proposed project would improve end-to-end transit travel times between 8 to 9 minutes compared to the baseline (1R route) during peak and midday periods, serve 50 percent more stops along this route providing greater accessibility, attract about 3,720 daily new riders, and generate almost 3,560 hours of travel-time savings. Based on current user benefit and project cost estimates, the East Bay BRT is a highly cost-effective solution for this corridor. Uncertainties associated to cost and ridership for the project are relatively manageable.

---

[6] These adjustments were discussed with FTA and documented in the travel demand methodology report that is included in Section 3.0 of the September 2008 AC Transit East Bay Bus Rapid Transit Request to Enter Project Development Final Submittal.

PROJECT DESCRIPTION TEMPLATE

PROJECT NAME:	East Bay Bus Rapid Transit	
Participating Agencies		
Lead Agency	**Name**	Alameda Contra-Costa Transit District (AC Transit)
	Contact Person	Mary V. King
	Address	1600 Franklin Street, Oakland, CA 94612
	Telephone Number	510-891-4793
	Fax Number	
	Email	mking@actransit.org
Metropolitan Planning Organization	**Name**	Metropolitan Transportation Commission
	Contact Person	Kenneth Folan
	Address	Joseph P. Bort MetroCenter, 101 Eighth Street
	Telephone Number	510-817-5804
	Fax Number	510-817-5848
	Email	kfolan@mtc.ca.gov
Transit Agency	**Name**	Alameda Contra-Costa Transit District (AC Transit)
	Contact Person	Mary V. King
	Address	1600 Franklin Street, Oakland, CA 94612
	Telephone Number	
	Fax Number	510-891-4793
	Email	mking@actransit.org
State Department of Transportation	**Name**	California Department of Transportation (Caltrans)
	Contact Person	Jean Finney
	Address	111 Grand Ave, PO Box 23660, Oakland, CA 94623-0660
	Telephone Number	510-286-6196
	Fax Number	510-286-5559
	Email	jean_finney@dot.ca.gov
Other Relevant Agencies	**Name**	City of Berkeley
	Contact Person	Matt Nichols
	Address	1947 Center St, 3rd Flr, Berkeley, CA 94704
	Telephone Number	510-981-7068
	Fax Number	510-981-7060
	Email	mnichols@ci.berkeley.ca.us
Other Relevant Agencies	**Name**	City of Oakland
	Contact Person	Dan Lindheim
	Address	250 Frank Ogawa Plaza, Oakland, CA 94612-2033
	Telephone Number	510-238-6840
	Fax Number	510-238-4731
	Email	dlindheim@oaklandnet.com
Other Relevant Agencies	**Name**	City of San Leandro
	Contact Person	Keith Cooke
	Address	835 East 14th St, San Leandro, CA 94577
	Telephone Number	510-577-3439
	Fax Number	510-577-3294
	Email	kcooke@ci.san-leandro.ca.us
Other Relevant Agencies	**Name**	Alameda County Transportation Commission
	Contact Person	Arthur L. Dao
	Address	1333 Broadway, Suite 300, Oakland, CA, 94612
	Telephone Number	510-350-2329
	Fax Number	510-893-6489
	Email	adao@actia2022.com

PROJECT DESCRIPTION TEMPLATE (Page 2)		
Project Definition	**Length (miles)**	14.37
	Mode/Technology	BRT
	Number of Stations	47
	List each station separately, including the number of park and ride spaces at each and whether structured or surface parking	See attached spreadsheet with list of individual stations No park and ride facilities
	List each station with major transfer facilities to other modes	See attached spreadsheet with list of individual stations East Bay BRT provides connections to: BART, other AC Transit bus routes, UC Berkeley Bear Transit, Emery Go Round (shuttle).
	Number of vehicles/rolling stock	
Type of Alignment by Segment (Number of Miles)	**Above grade**	0
	Below grade	0
	At grade	14.37
	Exclusive	10.83
	Mixed Traffic	3.54
Status of Existing Right of Way	**Ownership – who owns the right of way?**	Cities of Berkeley, Oakland and San Leandro, Caltrans, and BART
	Current Use: active freight or passenger service?	No

PROJECT DESCRIPTION TEMPLATE (Page 3)

Project Planning Dates	**Base Year**	**Base Year/Opening Year**
		2015
Capital Cost Estimate	**2010 constant dollars**	$ 190
	Year of Expenditure	$ 216
Levels of Service	**Headways**	
	Weekday Peak	5 minutes
	Weekday Off-peak	5:00 AM-6:30 AM, 6 minutes 9:00 AM-2:30 PM, 5 minutes
	Weekday Evening	6 PM-Midnight: 10 minutes Midnight-5:00 AM: 60 minutes
	Weekend	Downtown Berkeley to Downtown Oakland: 5:00-6:30 AM, 15 minutes 6:30 AM-6:00 PM, 15 minutes 6:00 PM-Midnight, 15 minutes Midnight-5:00 AM, 60 minutes Downtown Oakland to San Leandro BART: 5:00-6:30 AM, 15 minutes 6:30 AM-6:00 PM, 7.5 minutes 6:00 PM-Midnight, 15 minutes Midnight-5:00 AM, 60 minutes
	Hours of Service	
	Weekday	5:00 AM to 4:59 AM
	Weekend	5:00 AM to 4:59 AM
Opening Year Travel Forecast		41,715
Fare Policy Assumptions Used in Travel Forecasts [footnote 1]		AC Transit - 1995 cash fare, $0.61 (1980 dollars) BART - 1995 cash fare (variable, station to station)
Project Planning and Development Schedule	***Project Schedule***	
	Insert anticipated or actual dates/durations	
	Planning Studies Initiated	1999
	Planning Studies Completed	2002
	LPA selected	Aug-01
	LPA included in the financially constrained long range plan	Feb-05
	Included in Financially Constrained TIP	n/a
	Initiation of DEIS	Jan-04
	Completion of DEIS	May-07
	Initiation of FEIS	Jul-09
	Completion of FEIS	Q2 - 2011
	Public Referenda (where applicable)	n/a
	Preliminary Engineering (duration – dates of beginning and	Q3-2010 through Q4-2011
	Final Design (duration)	Q4-2011 Through Q3-2013
	FFGA- submit request to award (duration)	Q4-2011
	Construction (duration)	Q4-2013 through Q3-2015 (2 years)
	Testing (duration)	Q3 through Q4 - 2015
	Revenue Operations	Q4 - 2015
Project Management		
Project Manager	**Name**	Tina Spencer
	Address	1600 Franklin Street, Oakland, CA 94612
	Phone	510-891-4754
	Fax	510-891-4874
	Email	tspencer@actransit.org
Agency CEO	**Name**	Mary V. King
	Address	1600 Franklin Street, Oakland, CA 94612
	Phone	510-891-4793
	Fax	
	Email	mking@actransit.org
Key Agency Staff: Overall New Starts Criteria	**Name**	Tina Spencer
	Address	1600 Franklin Street, Oakland, CA 94612
	Phone	510-891-4754
	Fax	510-891-4874
	Email	tspencer@actransit.org

[1] Please summarize fare policy assumptions used for all regional transit services modeled in the forecast year. Attach this summary to the Project Description Template.

PROJECT DESCRIPTION TEMPLATE (Page 4)

Project Management (continued)

Key Agency Staff: Ridership Forecasts	**Name**	Jim Cunradi
	Address	1600 Franklin Street, Oakland, CA 94612
	Phone	510-891-4841
	Fax	510-891-4874
	Email	jcunradi@actransit.org
Key Agency Staff: Cost Estimates	**Name**	Jim Cunradi
	Address	1600 Franklin Street, Oakland, CA 94612
	Phone	510-891-4841
	Fax	510-891-4874
	Email	jcunradi@actransit.org
Key Agency Staff: Environmental Documentation	**Name**	Jim Cunradi
	Address	1600 Franklin Street, Oakland, CA 94612
	Phone	510-891-4841
	Fax	510-891-4874
	Email	jcunradi@actransit.org
Key Agency Staff: Land Use Assessment	**Name**	Jim Cunradi
	Address	1600 Franklin Street, Oakland, CA 94612
	Phone	510-891-4841
	Fax	510-891-4874
	Email	jcunradi@actransit.org
Key Agency Staff: Financial Assessment	**Name**	Kate Miller
	Address	1600 Franklin Street, Oakland, CA 94612
	Phone	510-891-4859
	Fax	510-891-7139
	Email	kmiller@actransit.org
Key Agency Staff: Project Maps	**Name**	Jim Cunradi
	Address	1600 Franklin Street, Oakland, CA 94612
	Phone	510-891-4841
	Fax	510-891-4874
	Email	jcunradi@actransit.org
Contractors		
Current Prime Contractor	**Name**	Cambridge Systematics, Inc.
	Address	555 12th Street, Suite 1600, Oakland, CA 94607
	Phone	510-873-8700
	Fax	510-873-8701
	Email	atang@camsys.com
Prime Contractor: Project Manager	**Name**	Andrew Tang
	Address	555 12th Street, Suite 1600, Oakland, CA 94607
	Phone	510-873-8700
	Fax	510-873-8701
	Email	atang@camsys.com
Contractor Responsible for Travel Forecasts	**Name**	Damian Stefanakis, Dowling Associates, Inc.
	Address	180 Grand Avenue, Suite 250, Oakland, CA 94612
	Phone	510-839-1742
	Fax	510-839-0871
	Email	damian@dowlinginc.com
Contractor Responsible for Capital Cost Estimates	**Name**	Conrad Franchi, Parsons Transportation Group
	Address	50 Fremont Street, Suite 1500, San Francisco, CA 94105
	Phone	415-490-2400
	Fax	415-546-1602
	Email	conrad.franchi@parsons.com

3.0 Travel Demand Forecasts and Summit Results

This section provides a brief overview of the modeling development and coordination process with FTA for the model used to generate ridership forecasts and user benefits for the East Bay BRT project. Summit reports and maps, as well as the travel forecasts template, also are provided.

3.1 Modeling Methodology

The Alameda County Transportation Commission (Alameda CTC) Countywide Travel Demand Model was used for the purpose of supporting the AC Transit East Bay BRT Project Small Starts application. This model is the same used in the September 2008 Small Starts application, with the following modifications to improve the reliability of model results:

- Refinements to the travel model's traffic analysis zone (TAZ) structure to potentially eliminate the need for a spreadsheet post-processing of travel model transit assignment results, in response to FTA's recommendation following the FY 2010 Small Starts submittal. The new structure for the FEIS/R model contains 836 TAZs, compared to 791 TAZs for the 2008 Small Starts model. Post-processing of transit assignment results was still necessary, albeit at a finer TAZ structure. A description of the post-processing methodology is provided as part of the supporting documentation.
- Update of socioeconomic data developed by Association of Bay Area Governments (ABAG), reflecting 2009 actual conditions from California Economic Development Department base year employment and recent forecasts for 2015 and 2035, based on *Projections 2009*. Land use allocations from Projections 2007 (the latest set of land use allocations available) were applied to the Projections 2009 population and employment control totals, providing the latest set of socioeconomic data and land use allocations available.
- Validation of base year (2009) model with actual transit boardings (systemwide, and route- and segment-level within BRT corridor) and load factors.
- Fix on the highway travel times for network links outside of the corridor affected by lane closure associated with build alternative. One of the model refinements suggested by FTA, and adopted for the 2008 Small Starts submittal, involved using separate highway assignments for the Baseline and Build Alternatives in order to quantify the user benefits for auto travel associated with the project. While this

approach was successful in identifying the auto benefits, some of the district-to district results were illogical (both positive and negative), due to the lack of complete and consistent closure in the equilibrium assignment process. This effect was particularly noticeable for HBW trips, which are subject to assignment during the peak periods of congestion. The revised methodology adopted for estimating HBW user benefits for the 2010 Small Starts submittal estimated the highway travel times for the Baseline Alternative and kept those values fixed for all links outside of the corridor impacted by the project. Within the corridor (approximately one-mile on each side of the alignment) the highway trips were reassigned and paths and travel times recalculated for each alternative. The resulting analysis of benefits maintains the impacts of the project in the project corridor, but eliminates benefits and disbenefits for trips that aren't impacted by the project.

Supporting documentation that includes memoranda to FTA on travel forecasting approach and model validation is provided in the submittal CD, *02_Supporting Docs\01_Travel Forecast\01_SupportingDocs.*

3.2 Annualization Factor

There are no changes to the annualization factor used in the FY 2010 Small Starts submittal. An annualization factor of 300 has been used in the calculation of annual measures for this Small Starts submittal, based on an analysis of National Transit Database systemwide statistics reported by AC Transit over the last decade.

3.3 Summit Reports and Maps

Summit reports and maps are provided electronically on CD as part of this submittal; hardcopies of the Summit maps also are provided at the end of this section.

- Maps: *02_Supporting Docs\01_Travel Forecast\04_Maps;* and
- Summit Reports: *02_Supporting Docs\01_Travel Forecast\05_Summit.*

3.4 Travel Forecast Template

Ridership results for the East Bay BRT project are presented in the travel forecast template provided at the end of this section. An electronic version of the travel forecast template also has been provided in the submittal CD *(02_Supporting Docs\01_Travel Forecast\ 03_Template).*

The information provided in the Travel Forecast template conforms with the instructions provided in it, with a few exceptions that were discussed with FTA. These exceptions, which date back to the FY 2010 Small Starts submittal (September 2008), are:

- Line 4, Table 70: Table 41+42+44+45 is being reported rather than Table 70. The reason is two-fold. First, due to a travel model path building issue and the subsequent reclassifying of certain i-j interchanges by Summit from CW to NT,[1] only the user benefits for CW-CW, CW-MD, MD-CW, and MD-MD markets is being reported. The reported user benefit is reduced significantly because it excludes inaccurate user benefits calculated for NT-CW and CW-NT markets. Second, because the East Bay BRT produces auto user disbenefits, the sum of auto and transit benefits rather than just transit benefits is being reported.[2]

- Line 5, (Tables 44 + 47 + 48)/60: due to the same issue described above, line 5 is calculated as (Table 44)/60, eliminating NT-CW and NT-MD markets from the calculation. These two markets are not included in the user benefits reported in line 4.

- Home-based school and home-based university trip purposes: the data reported in lines 1 through 4 do not come from Summit.[3] Summit could not be used for home-based school and university trips because the travel model does not use a logit mode choice model for these purposes. Data for lines 1 through 3 were taken directly from the travel model. Data for line 4 were calculated by applying the change in in-vehicle and out-of-vehicle travel time between the Build and Baseline alternatives to the Baseline home-based school and university transit trip tables, with a weight applied to out-of-vehicle time.

- Lines 7, 23, and 25: the travel model does not provide results for transit dependents. It was agreed that this data will not be provided, since benefits accruing to transit dependents is not a criteria for Small Starts projects.[4]

- Line 22 and 24, daily project trips and project passenger miles: the data reported in this line does not come directly from the model outputs, but reflects the postmodeling

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[1] This issue was discussed with FTA; documentation on and procedures to address the issue are documented in a memorandum dated July 8, 2008. The document was provided in electronic format in the FY2010 Small Starts submittal CD (September 2008).

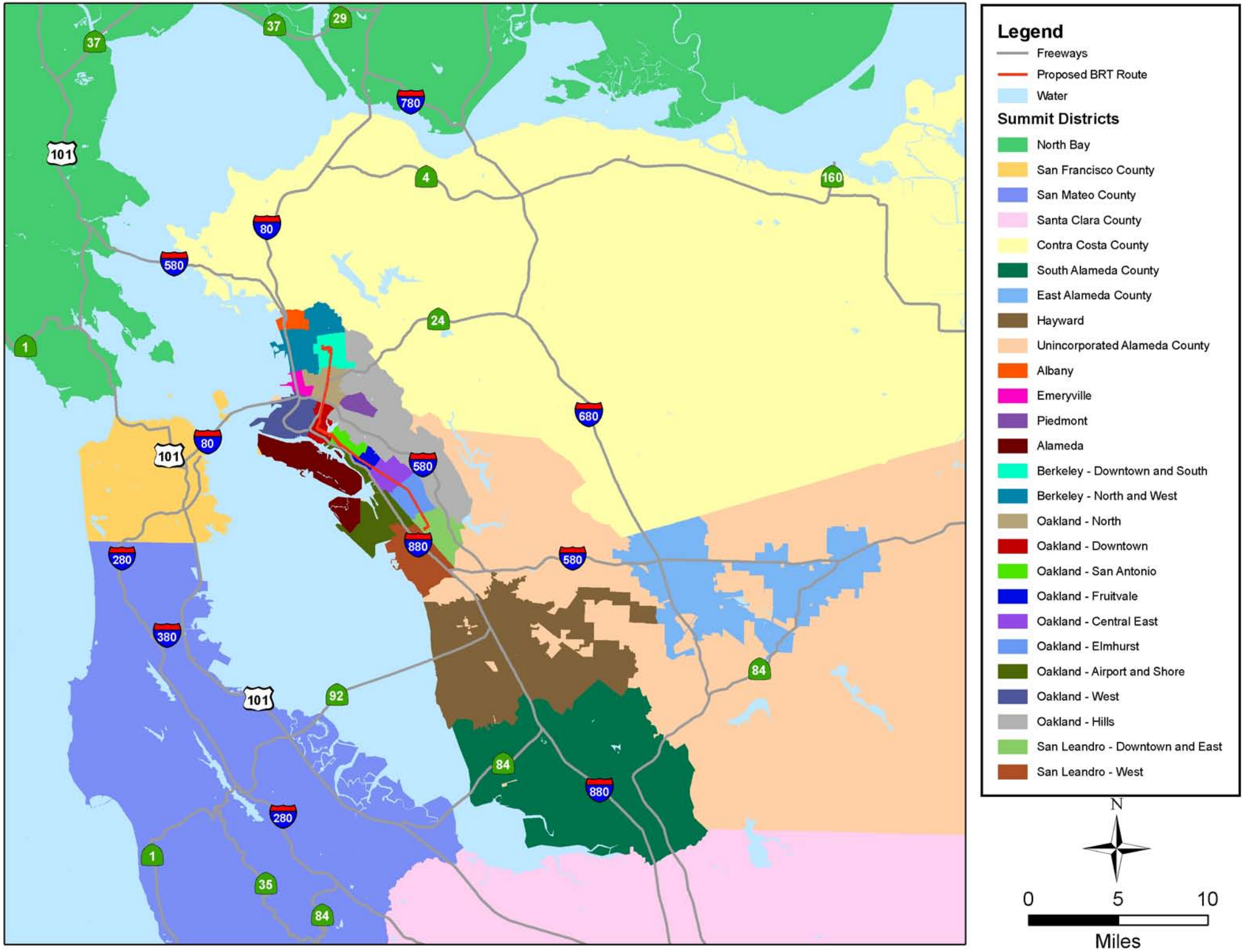
[2] This issue was discussed with FTA (August 14, 2008), and confirmed via e-mail (August 15, 2008).

[3] This issue was discussed with FTA; documentation on and procedures to address the issue are documented in a memorandum dated July 7, 2008. The document was provided in electronic format in the FY2010 Small Starts submittal CD (September 2008).

[4] E-mail from FTA (Stephanie McVey, July 2, 2008).

adjustments to project boardings.[5] These adjustments result in a lower reported value for daily project trips and project passenger miles.

[5] The boarding adjustment issue has been discussed with FTA, and supporting documentation on methodology was submitted to FTA via e-mail on July 5, 2008.


Legend
Freeways
Proposed BRT Route
Water
Summit Districts
North Bay
San Francisco County
San Mateo County
Santa Clara County
Contra Costa County
South Alameda County
East Alameda County
Hayward
Unincorporated Alameda County
Albany
Emeryville
Piedmont
Alameda
Berkeley - Downtown and South
Berkeley - North and West
Oakland - North
Oakland - Downtown
Oakland - San Antonio
Oakland - Fruitvale
Oakland - Central East
Oakland - Elmhurst
Oakland - Airport and Shore
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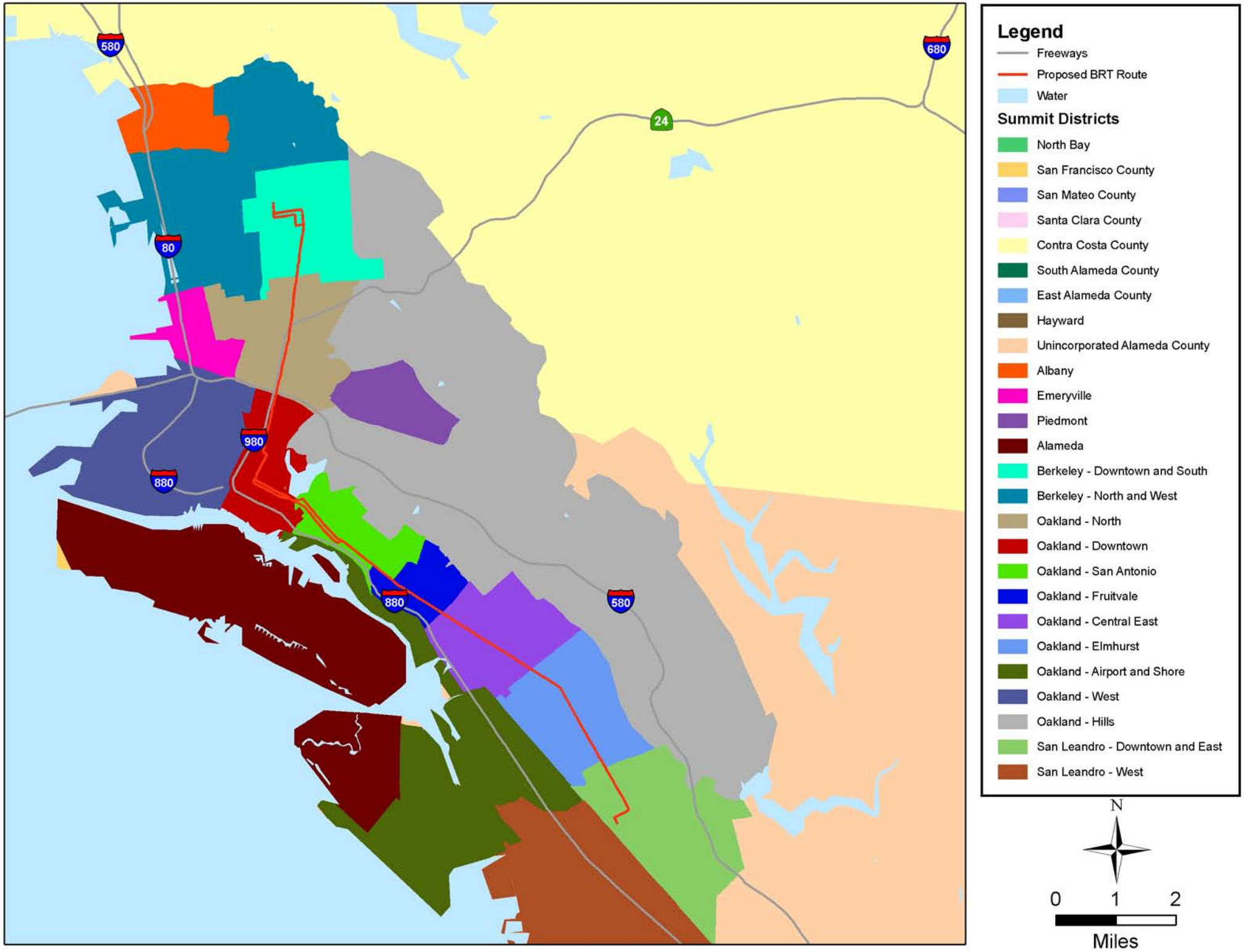
580
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24
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Legend
Freeways
Proposed BRT Route
Water
Summit Districts
North Bay
San Francisco County
San Mateo County
Santa Clara County
Contra Costa County
South Alameda County
East Alameda County
Hayward
Unincorporated Alameda County
Albany
Emeryville
Piedmont
Alameda
Berkeley - Downtown and South
Berkeley - North and West
Oakland - North
Oakland - Downtown
Oakland - San Antonio
Oakland - Fruitvale
Oakland - Central East
Oakland - Elmhurst
Oakland - Airport and Shore
Oakland - West
Oakland - Hills
San Leandro - Downtown and East
San Leandro - West
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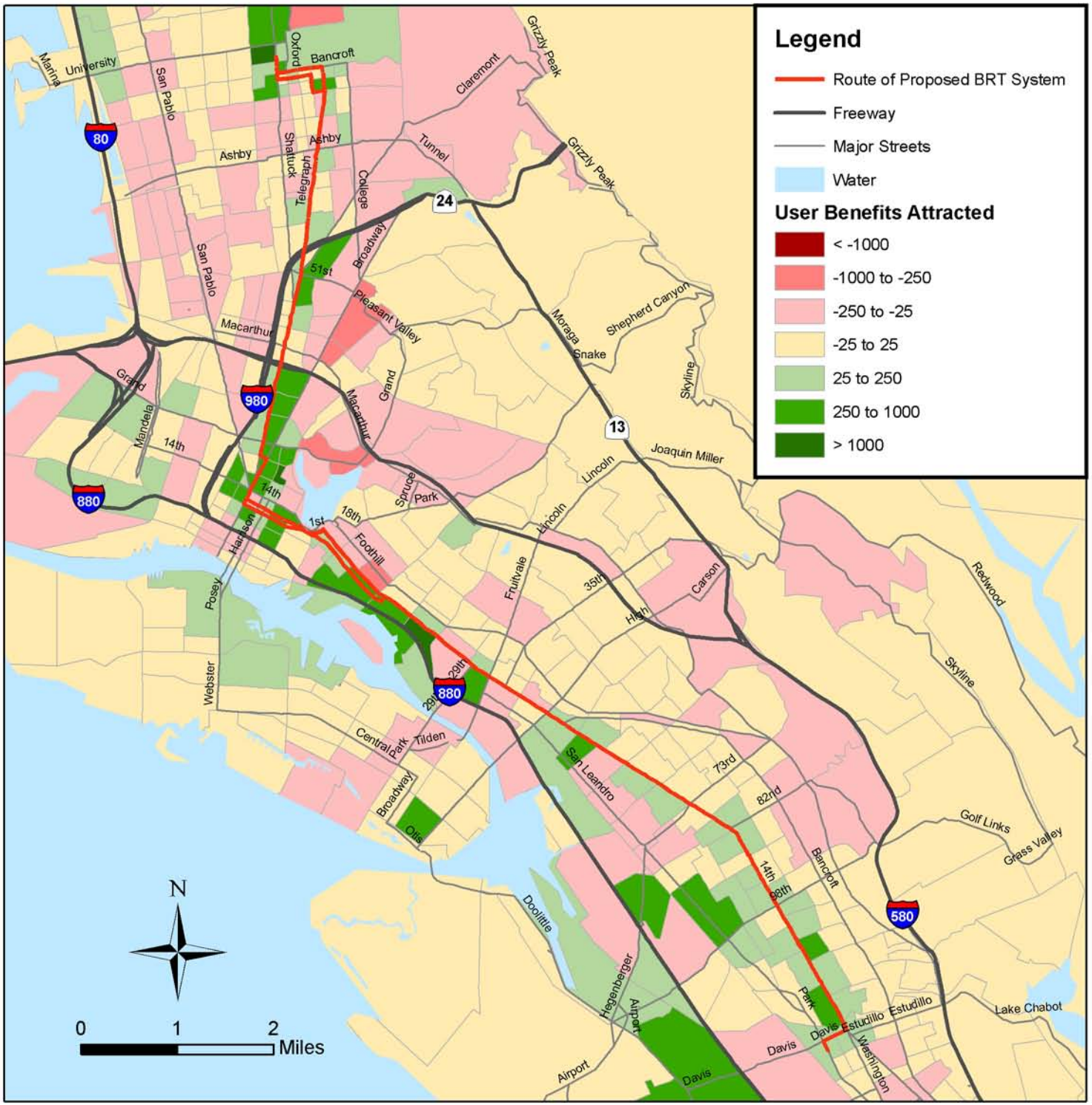
HB Work User Benefits Attracted



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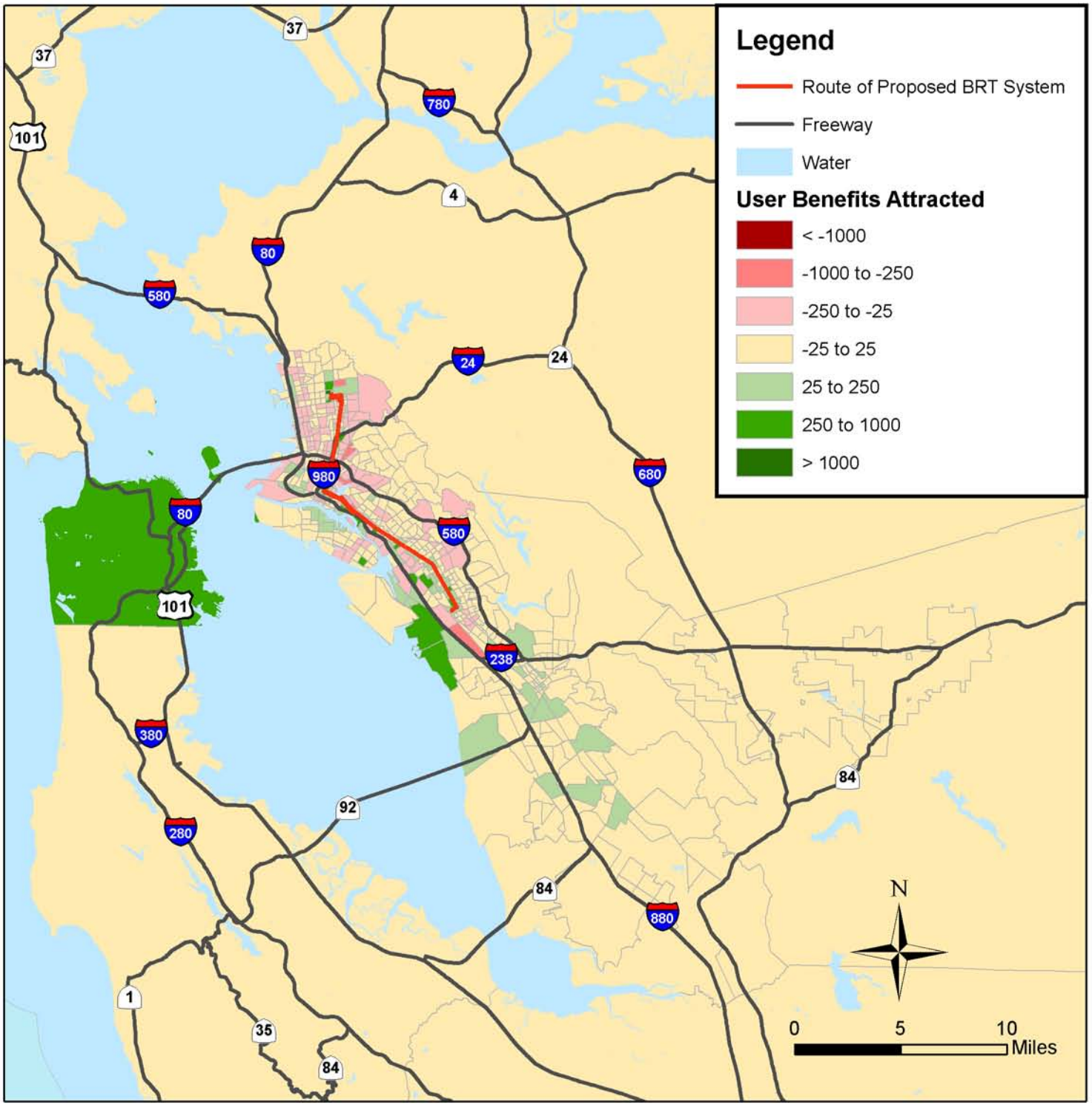

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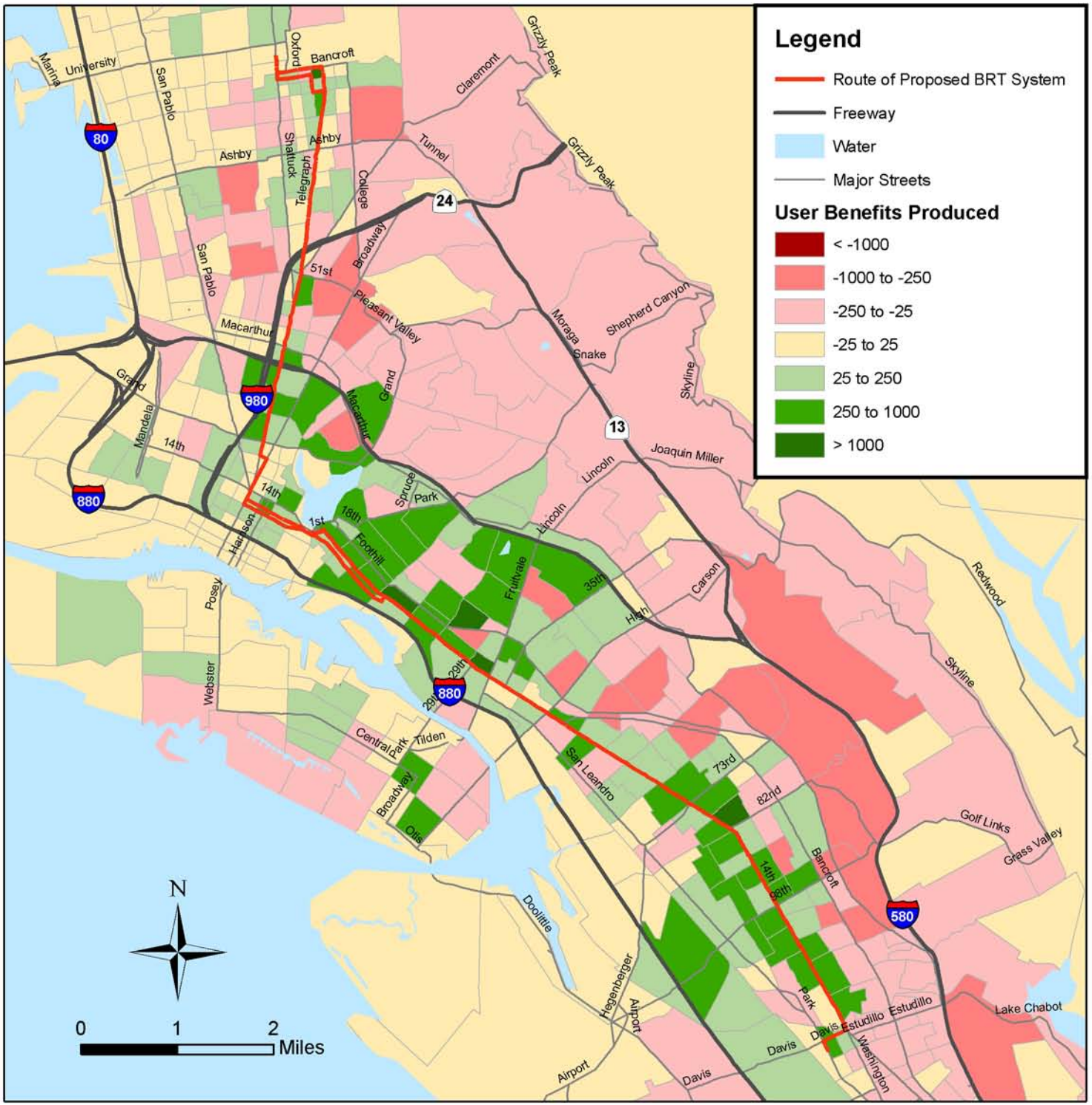
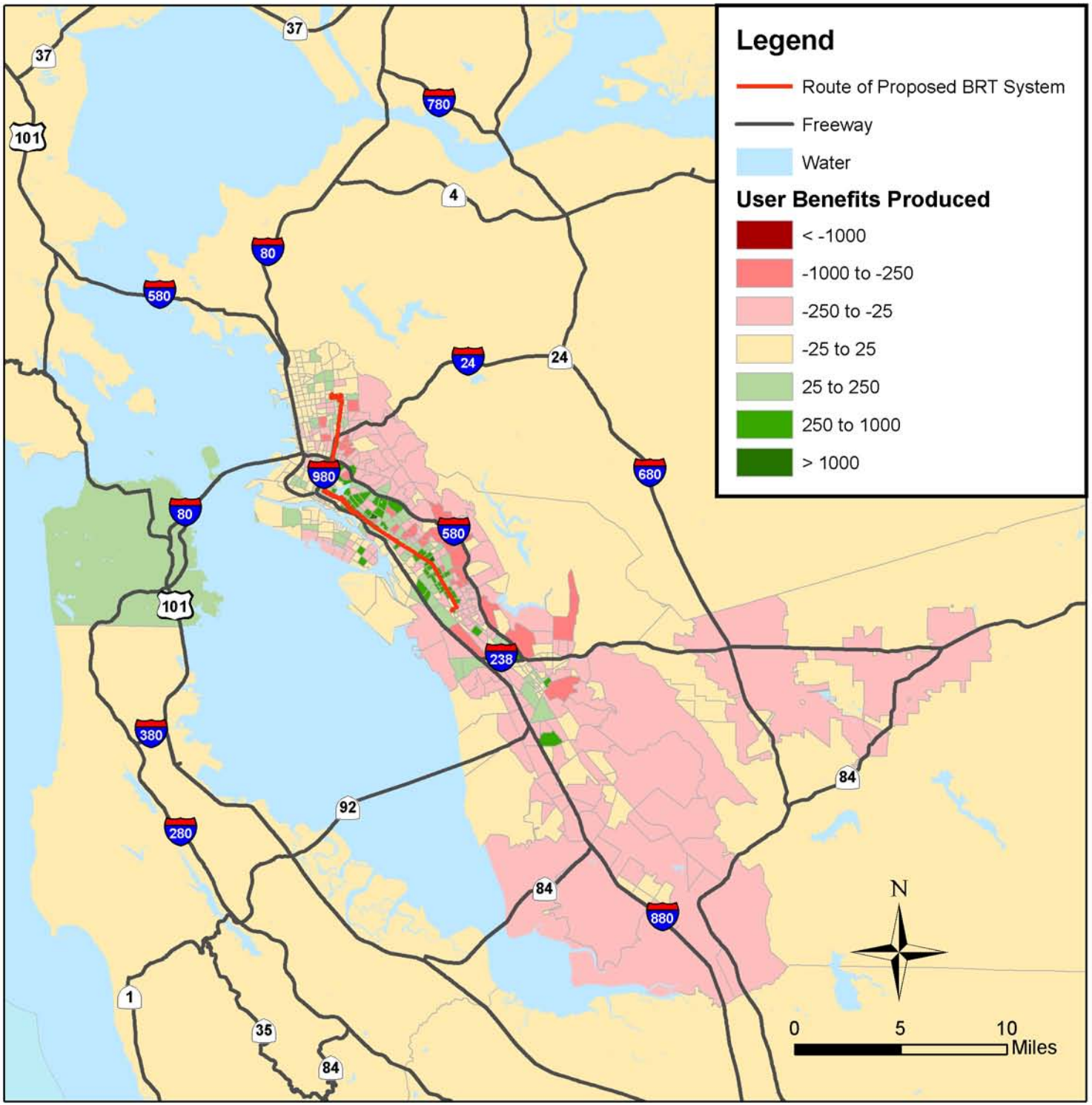
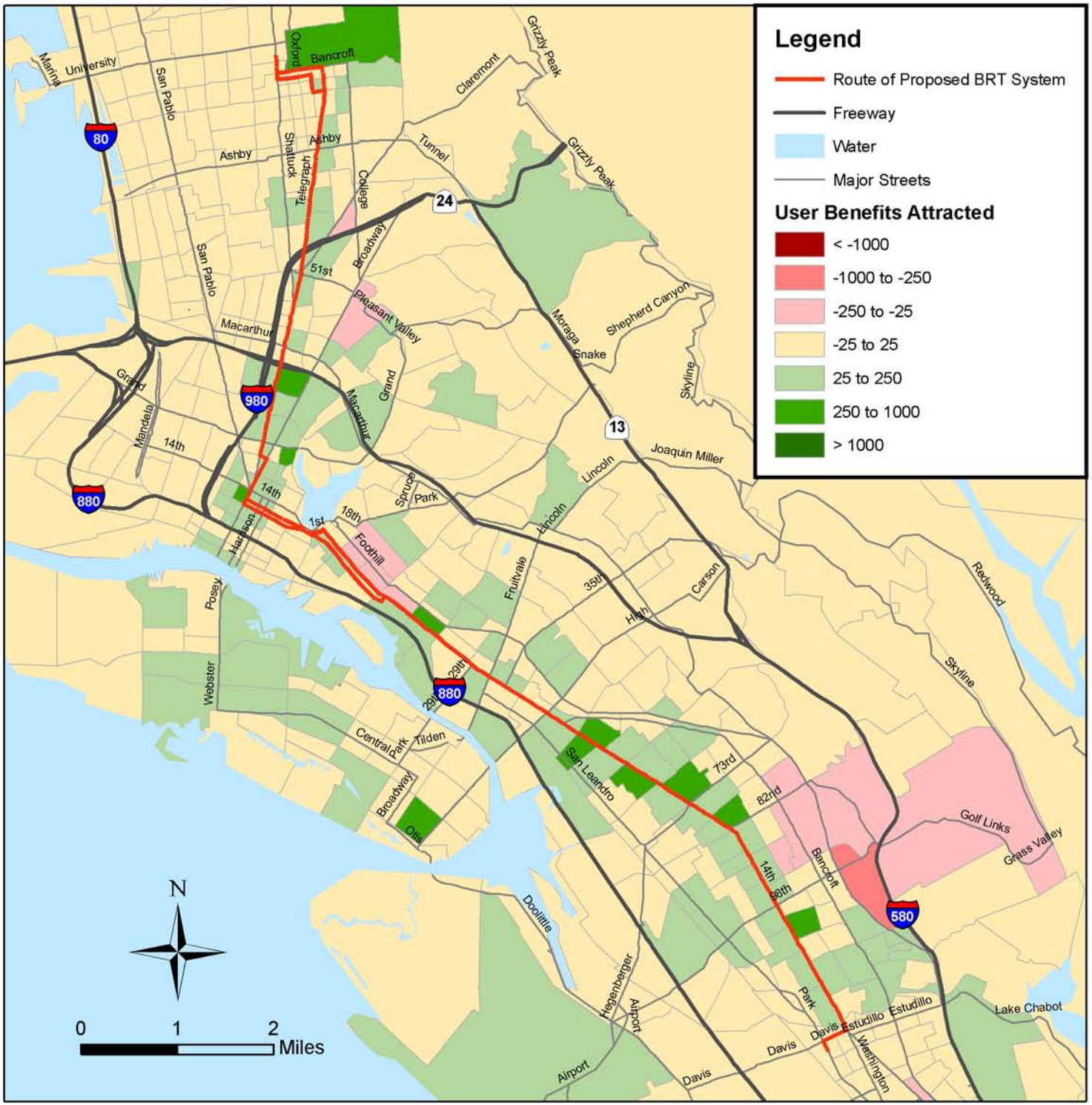


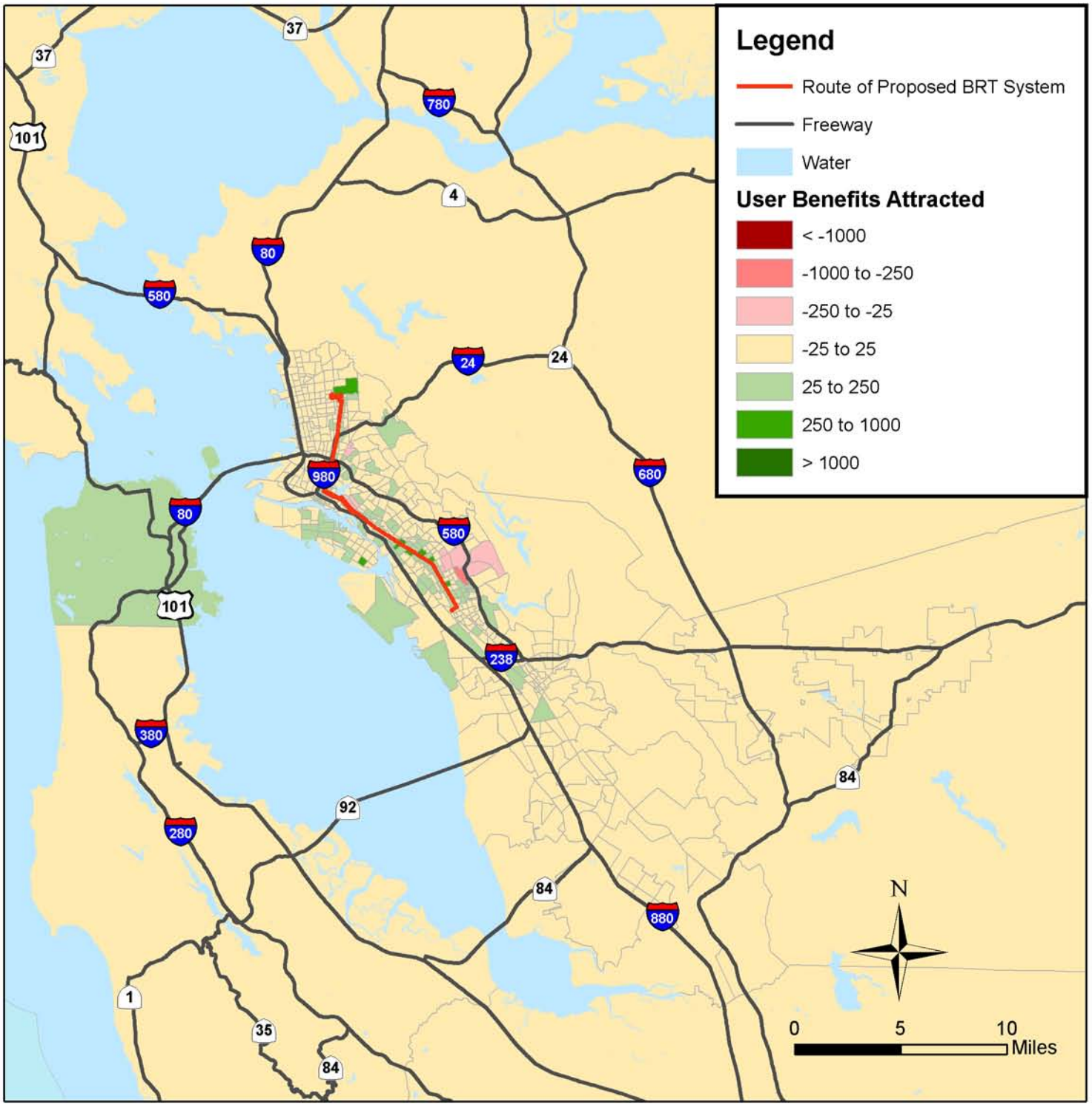
HB Work User Benefits Produced



HB Social Recreation User Benefits Attracted



HB Soc Rec User Benefits Attracted



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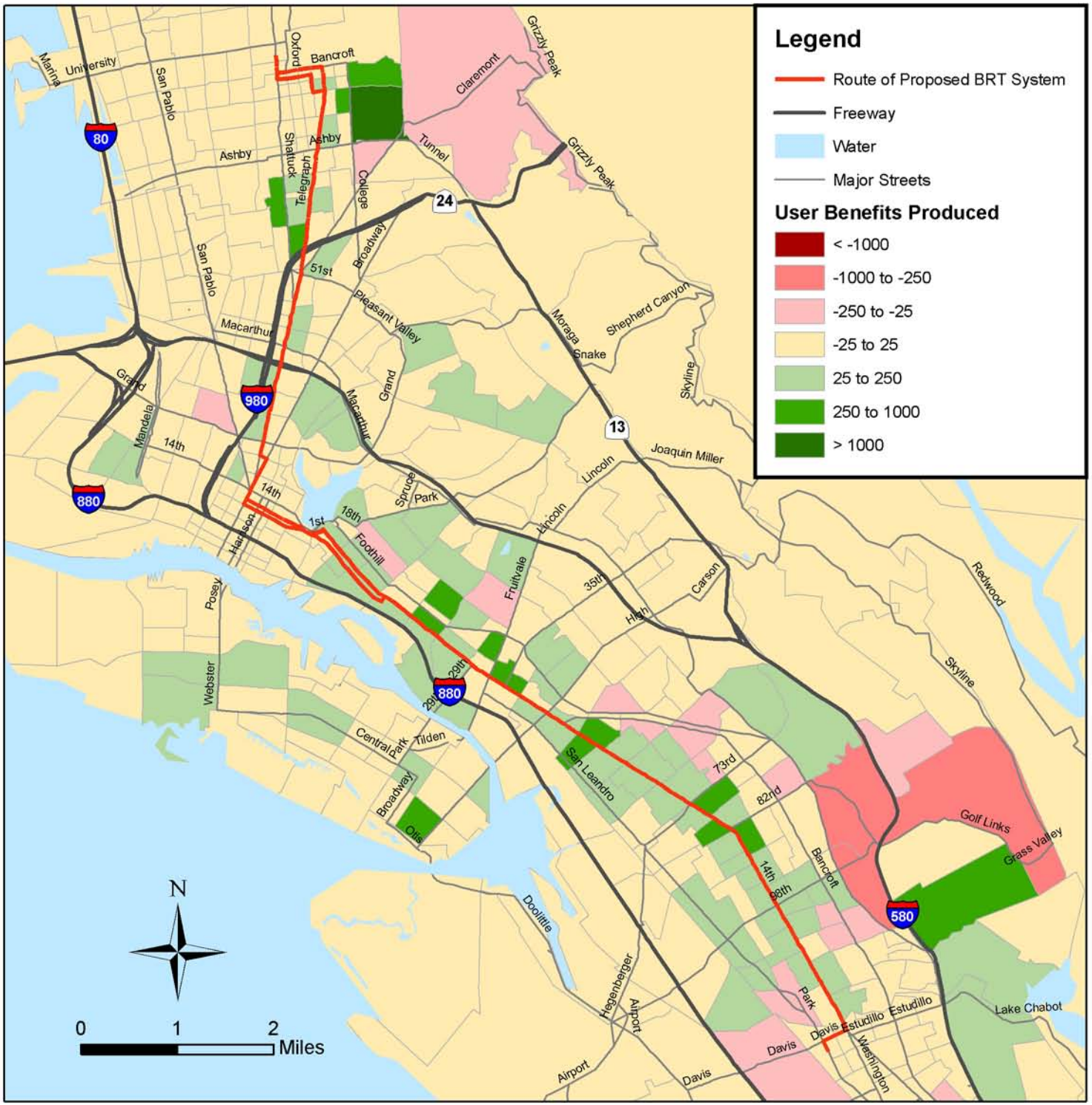
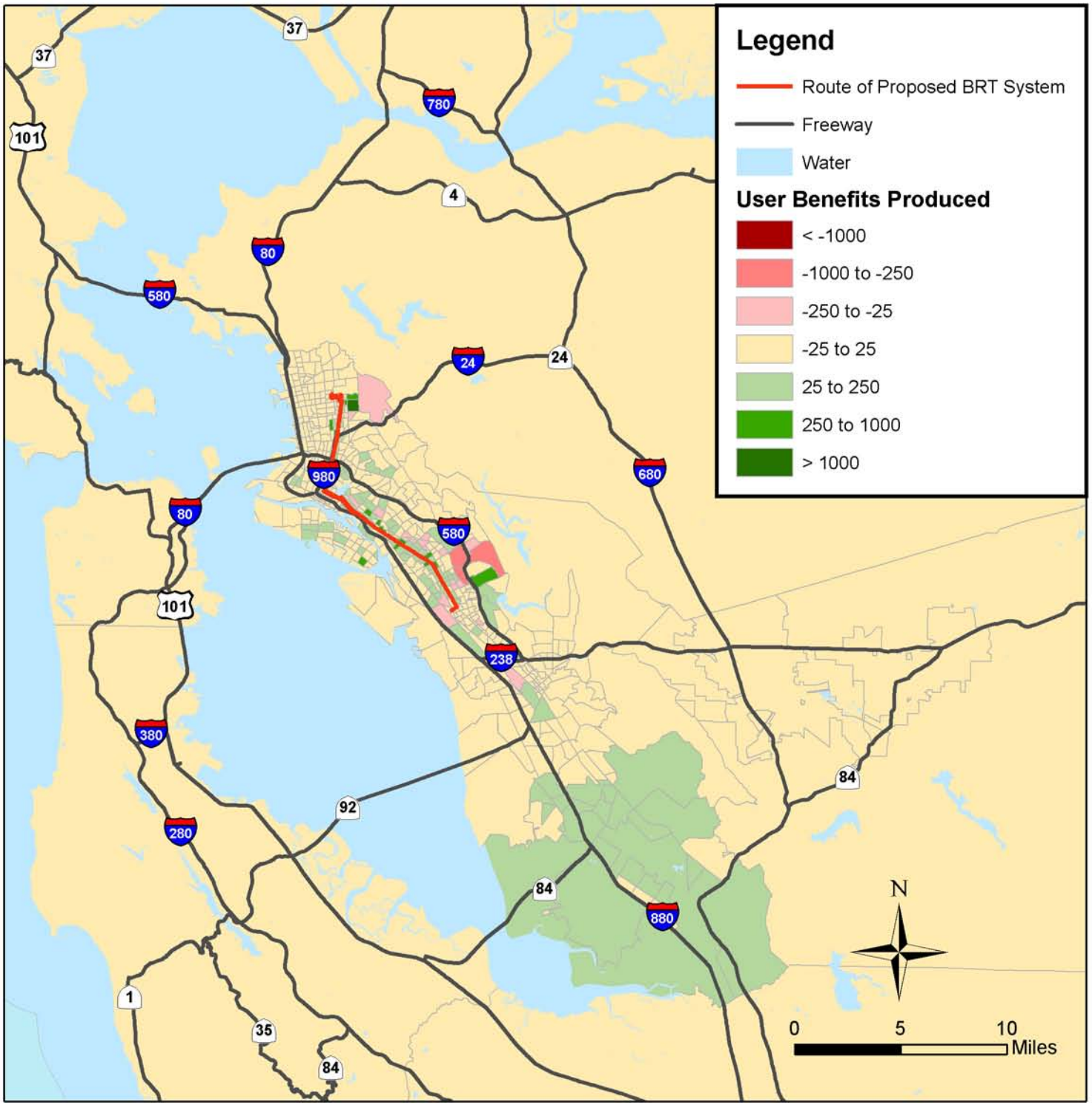
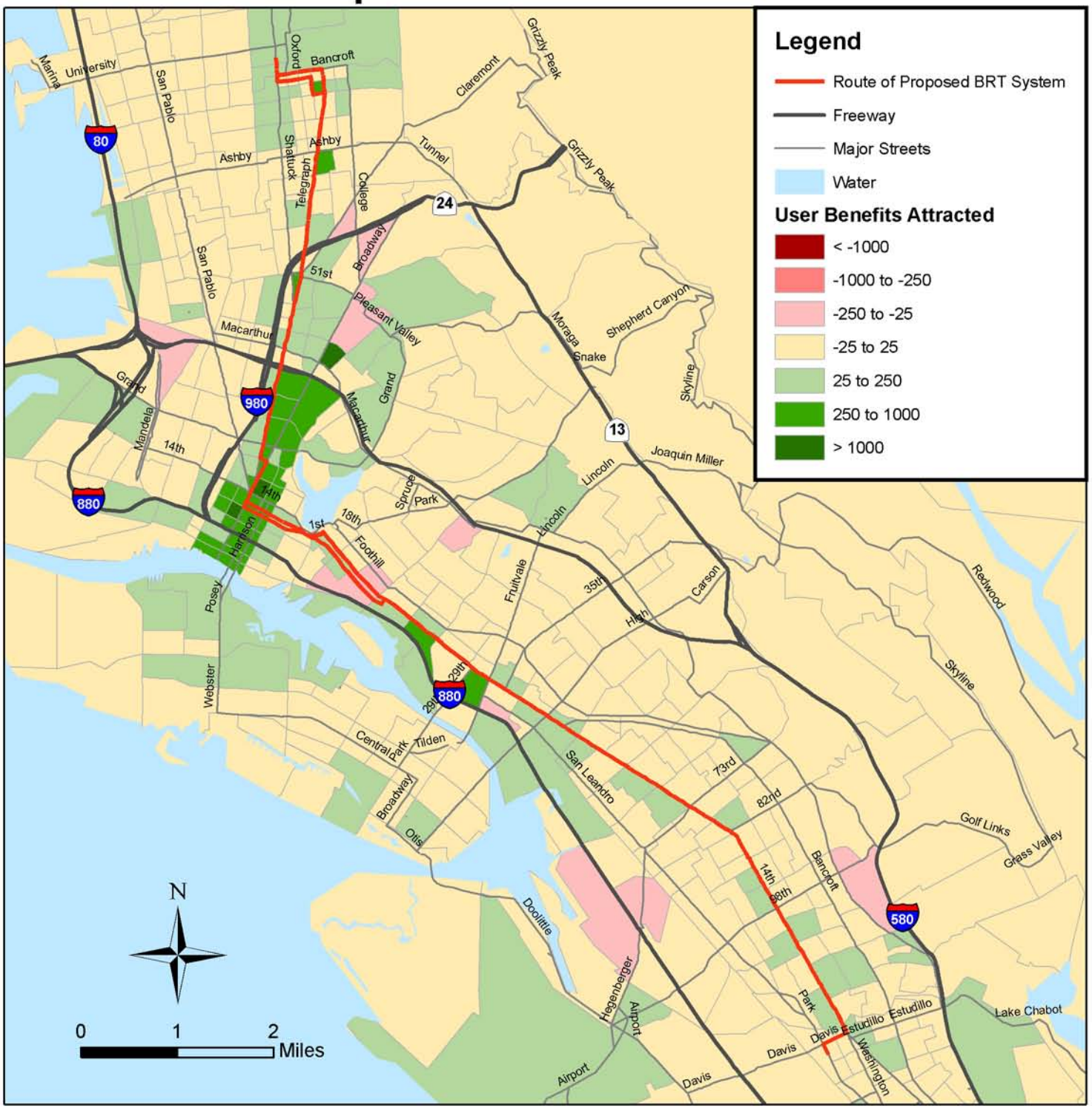


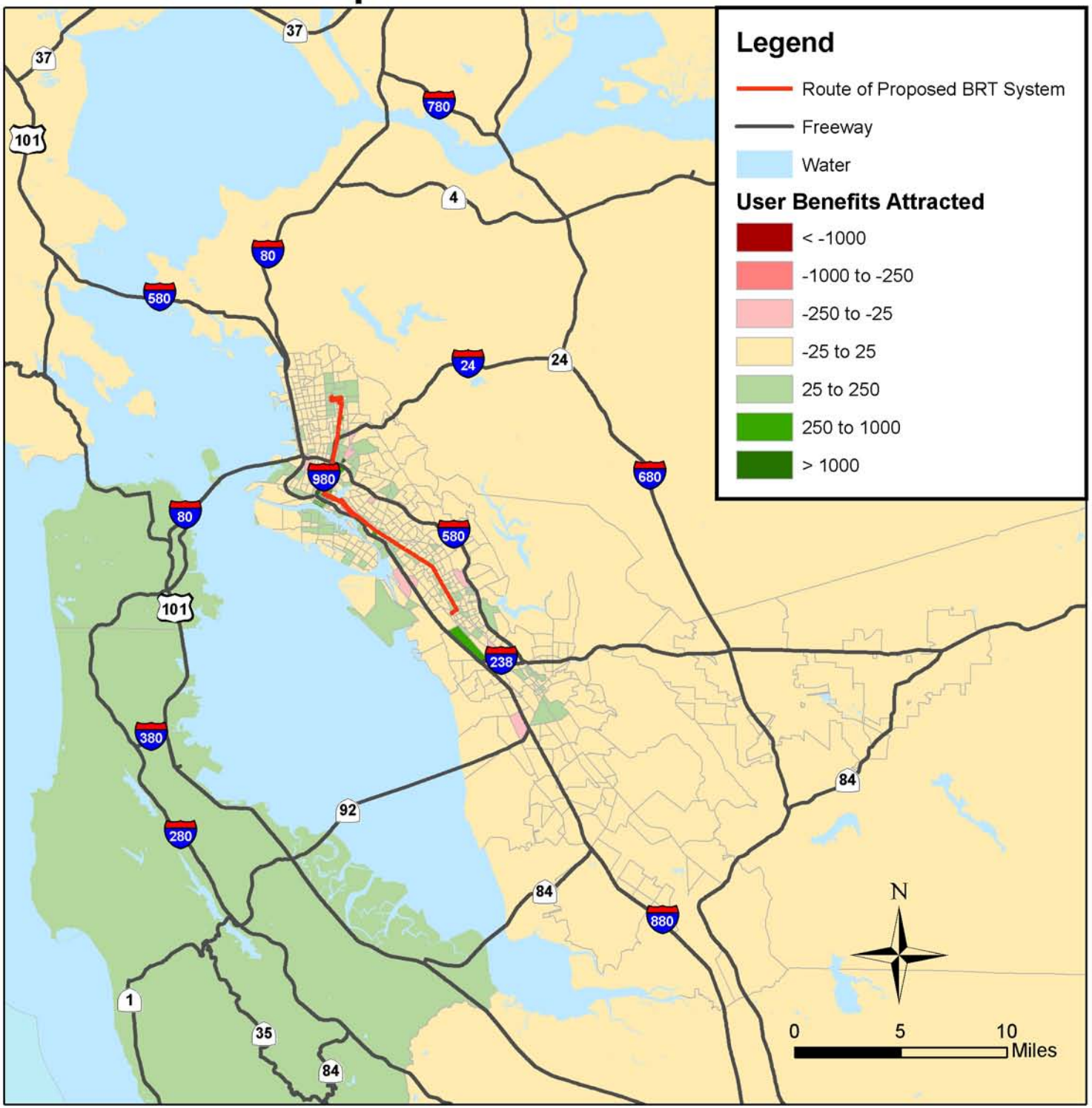
HB Social Recreation User Benefits Produced



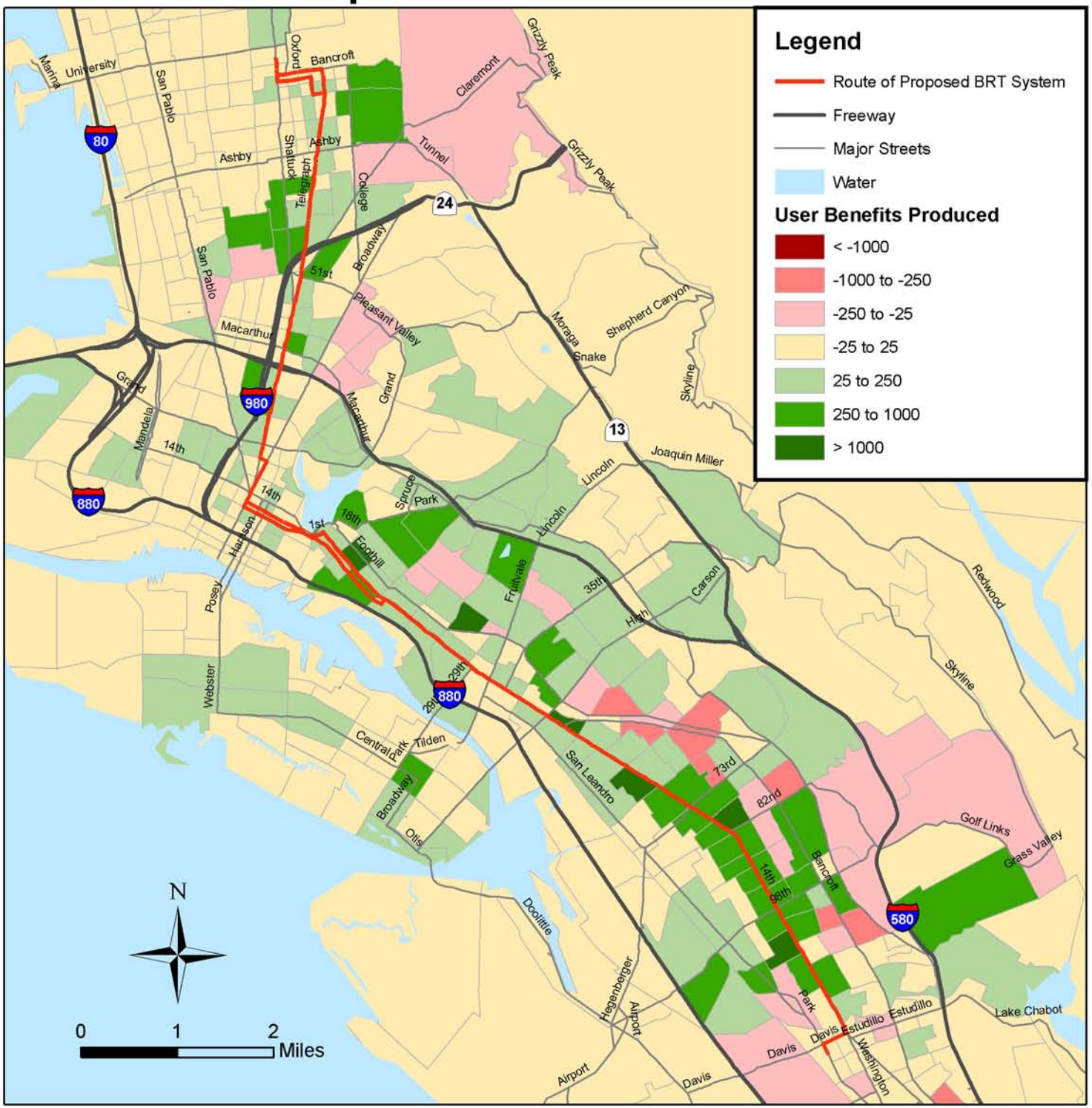
HB Shop User Benefits Attracted



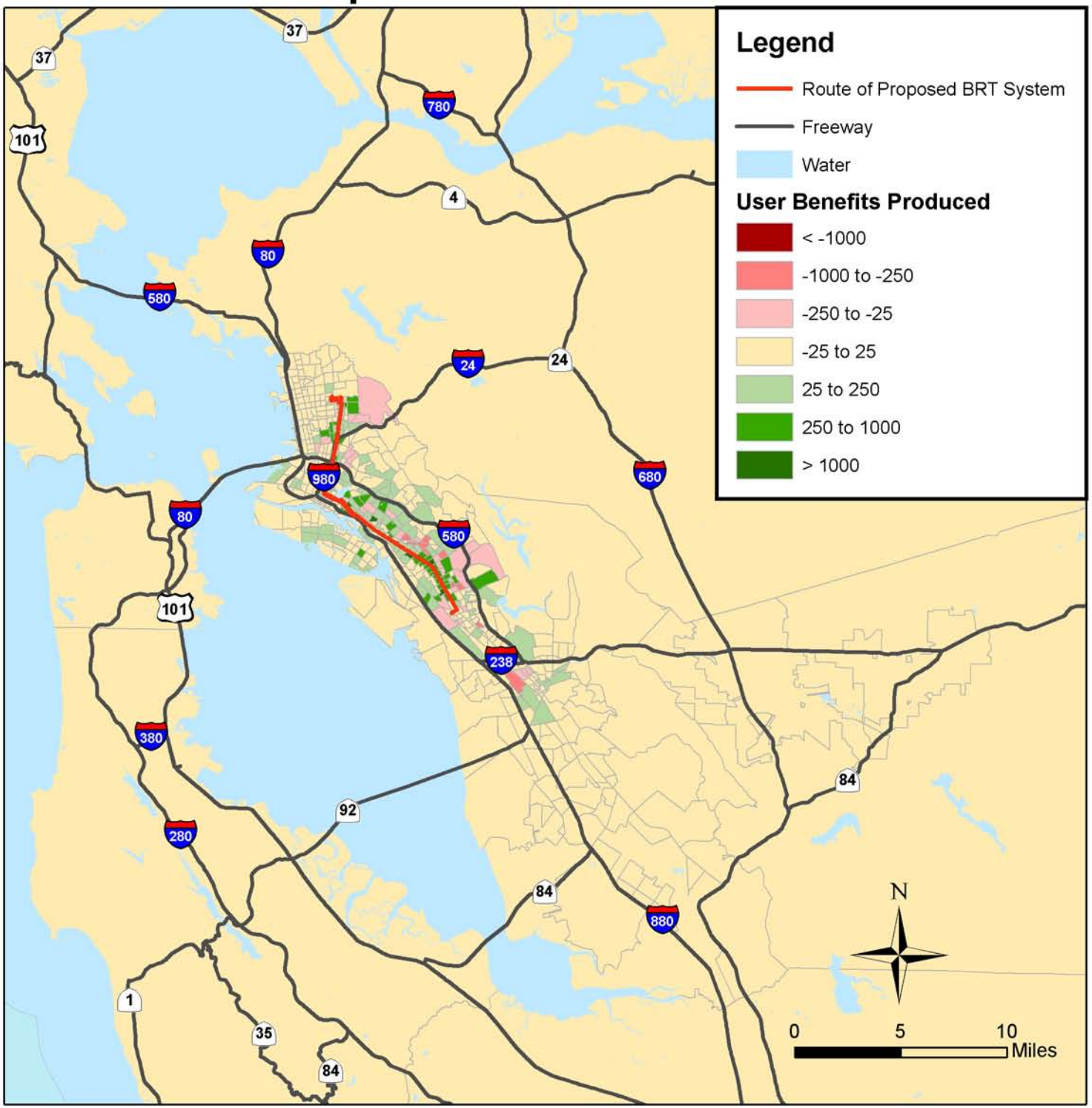
HB Shop User Benefits Attracted



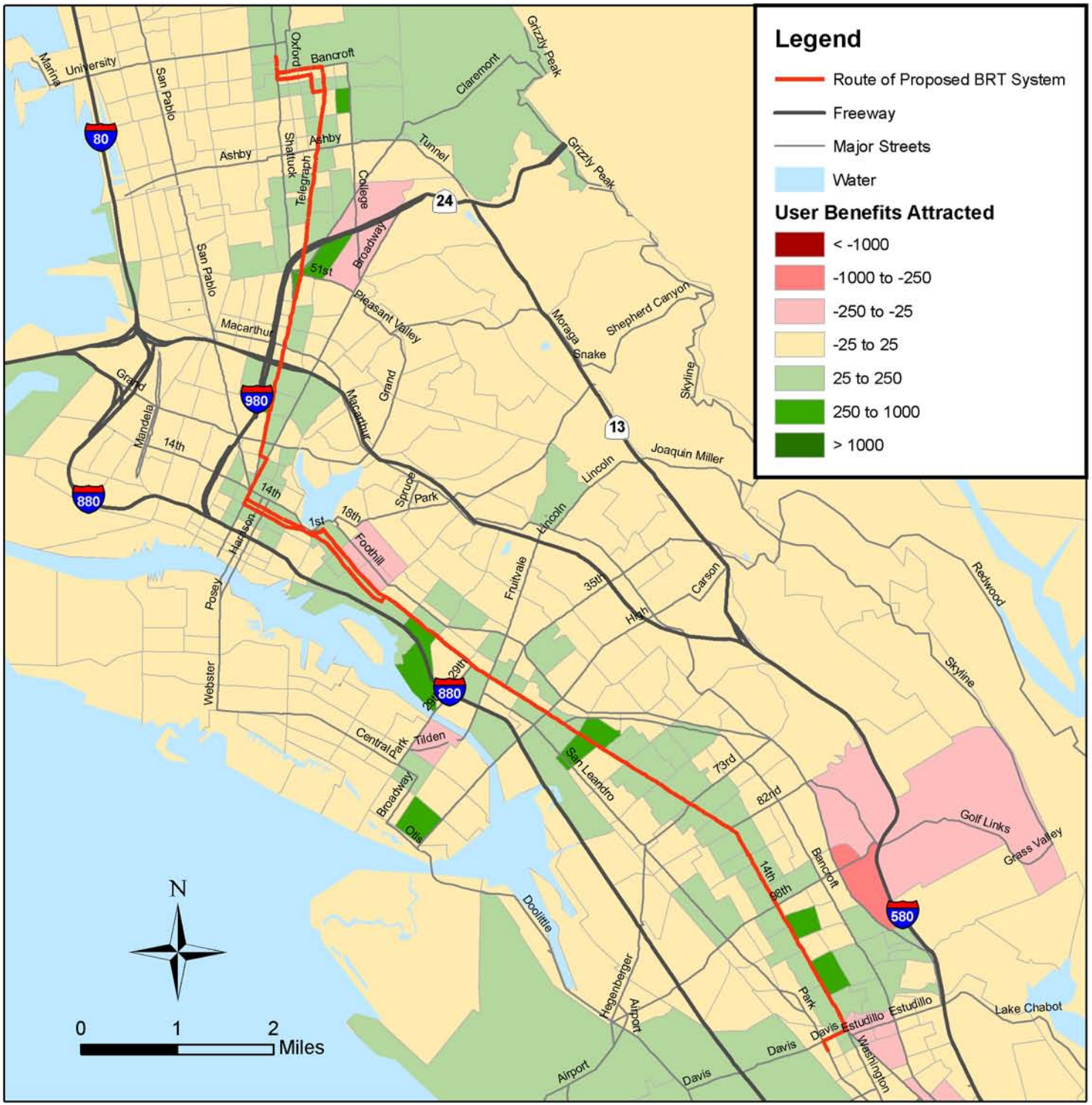
HB Shop User Benefits Produced



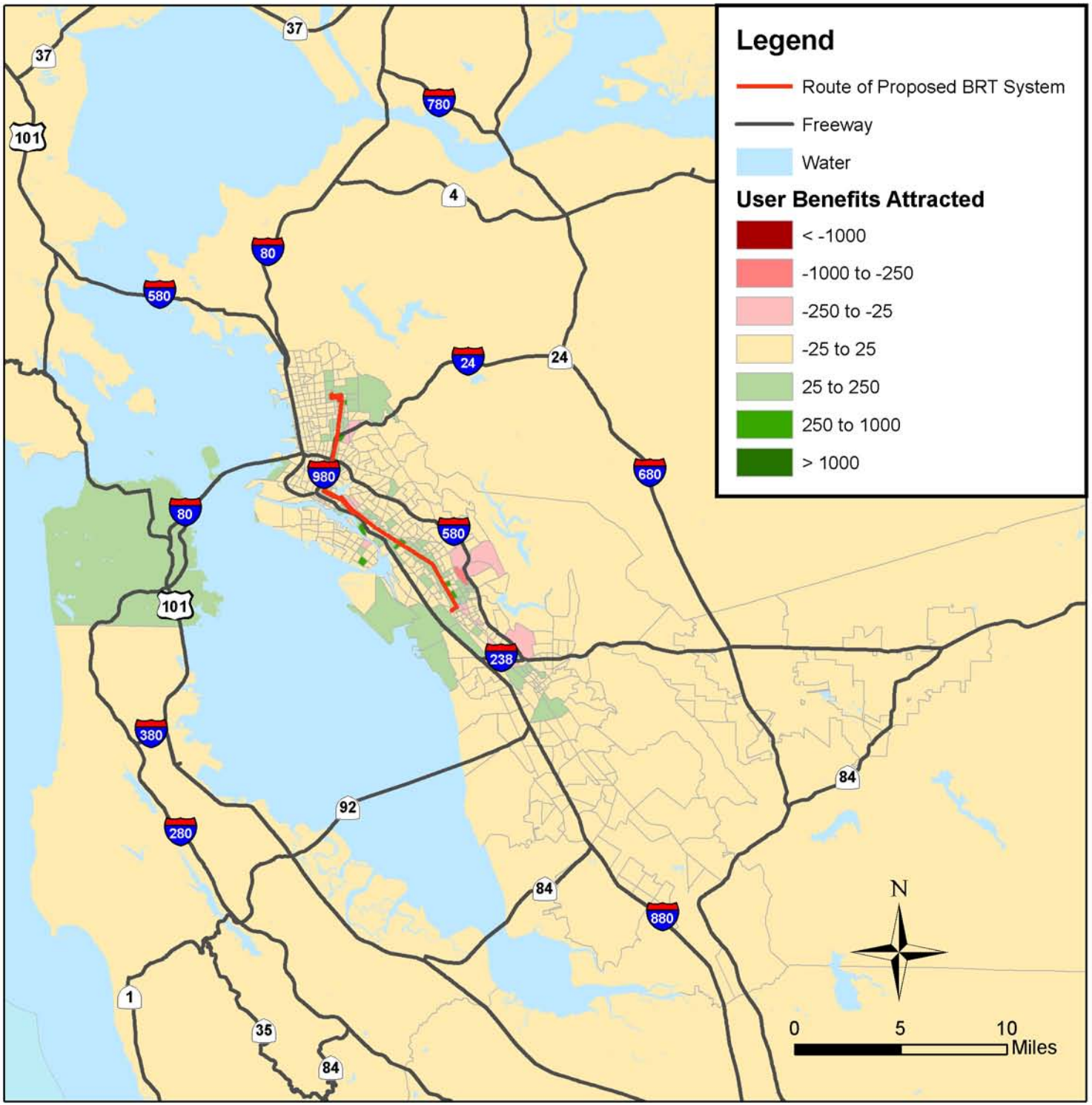
HB Shop User Benefits Produced



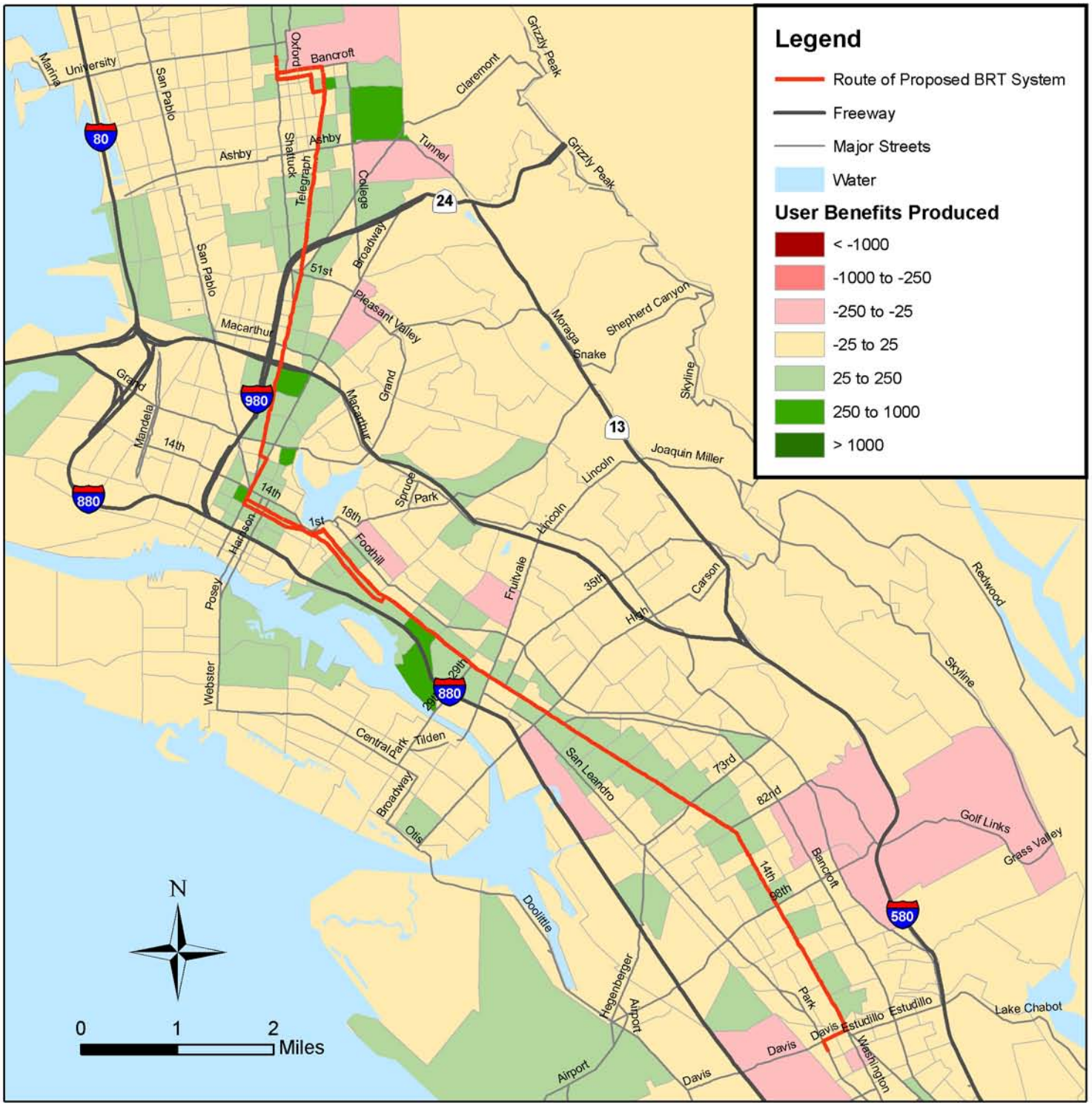
NHB User Benefits Attracted



NHB User Benefits Attracted



NHB User Benefits Produced



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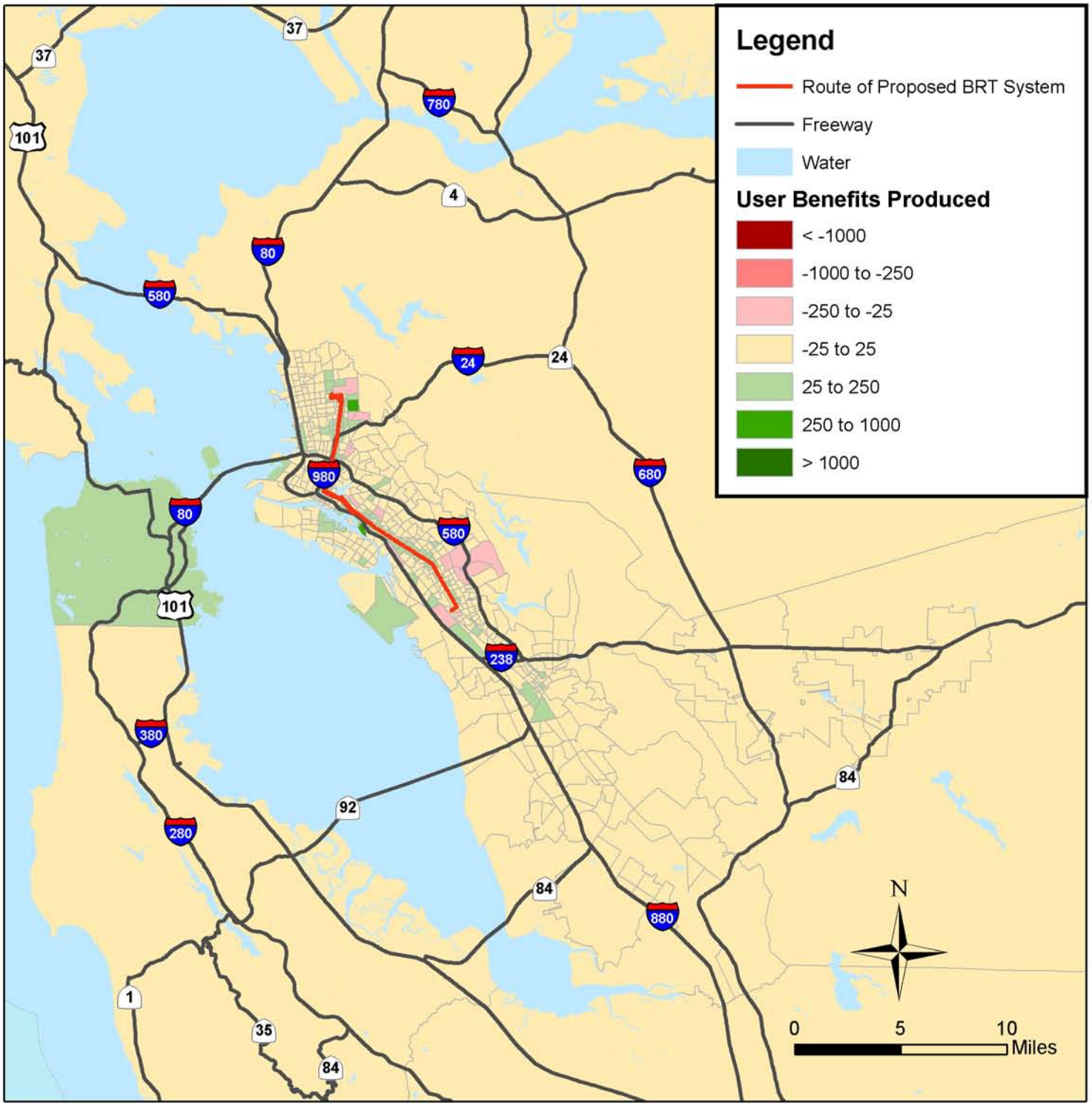
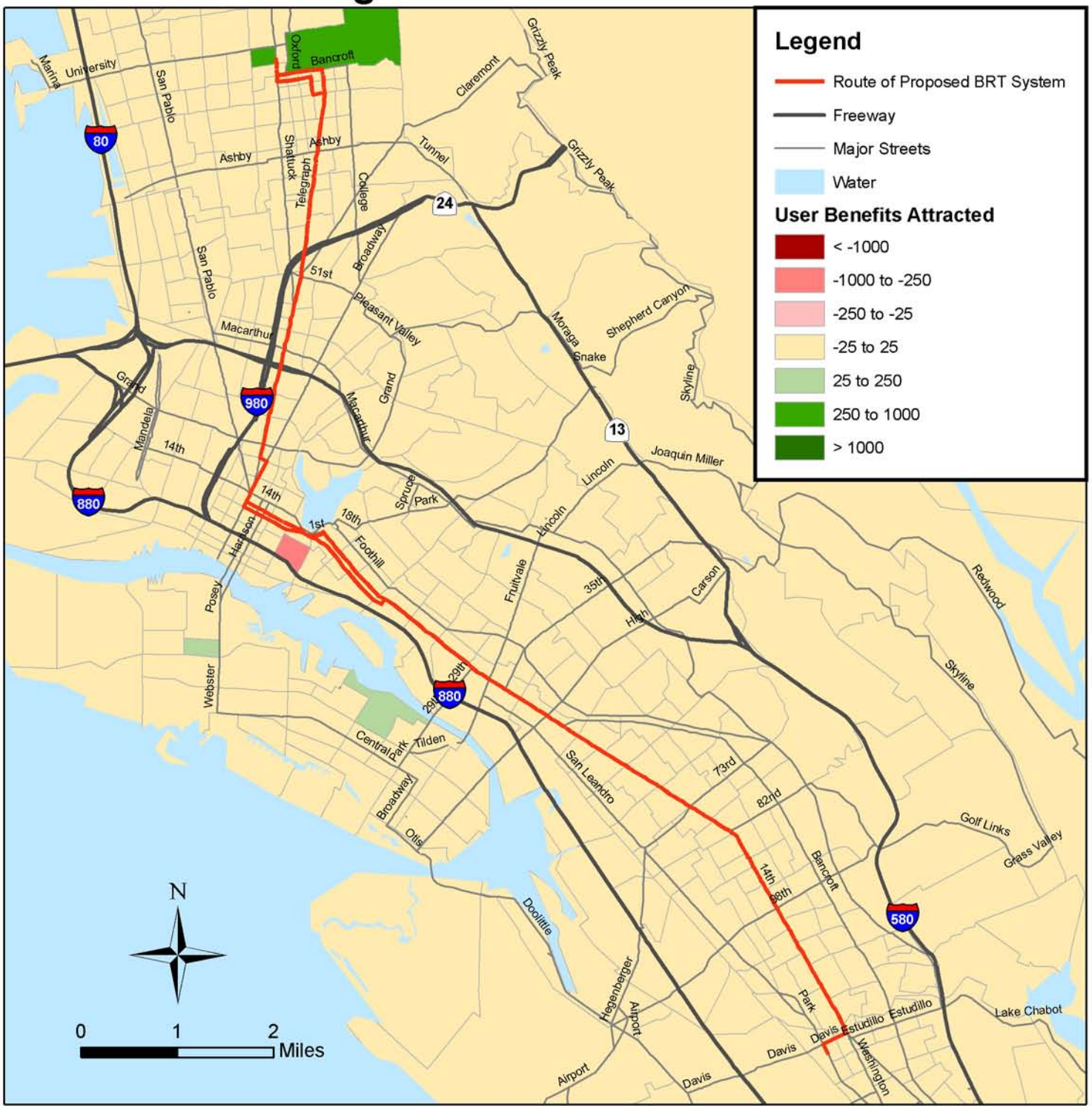
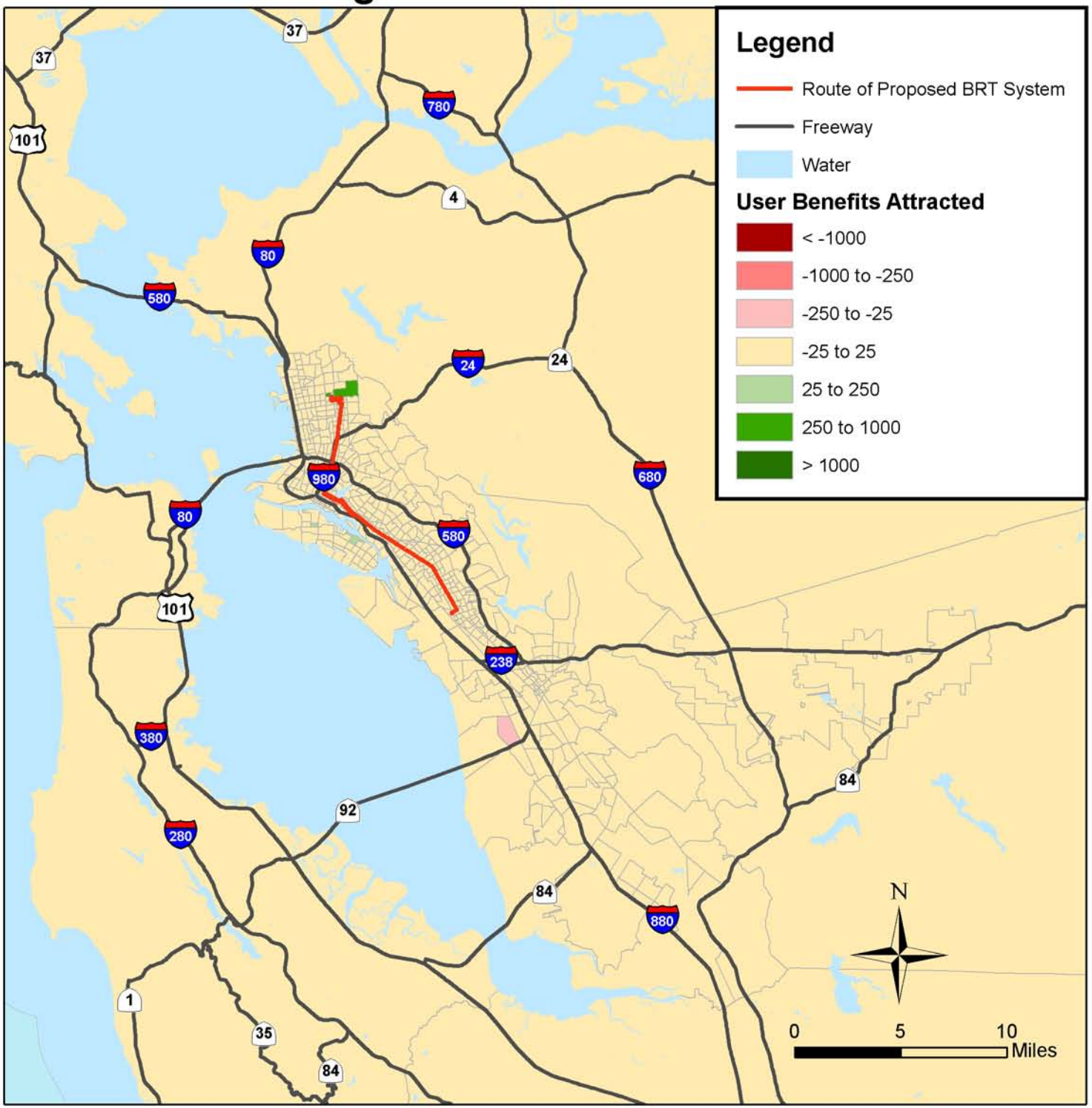


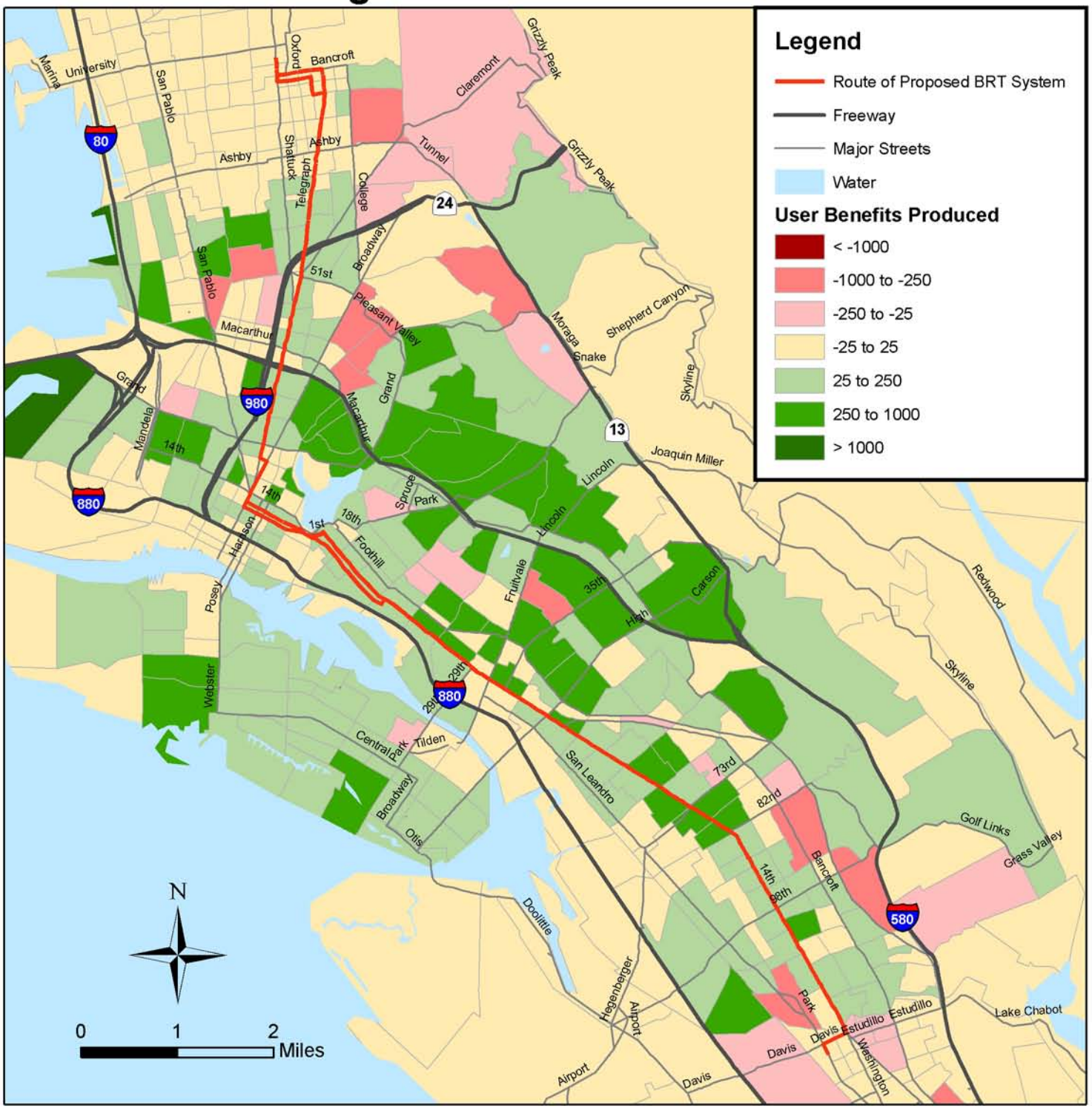
HB College User Benefits Attracted



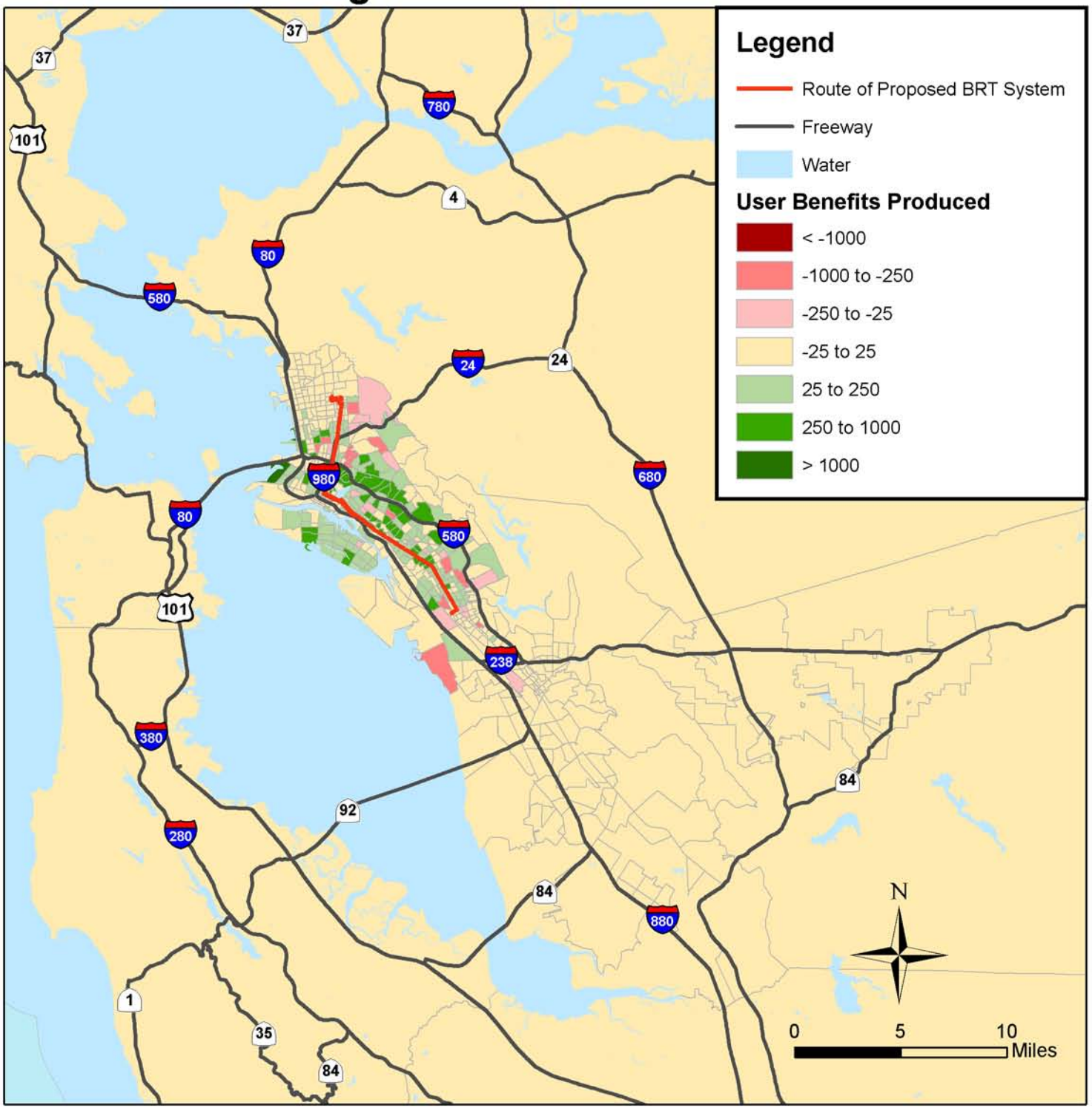
HB College User Benefits Attracted



HB College User Benefits Produced



HB College User Benefits Produced



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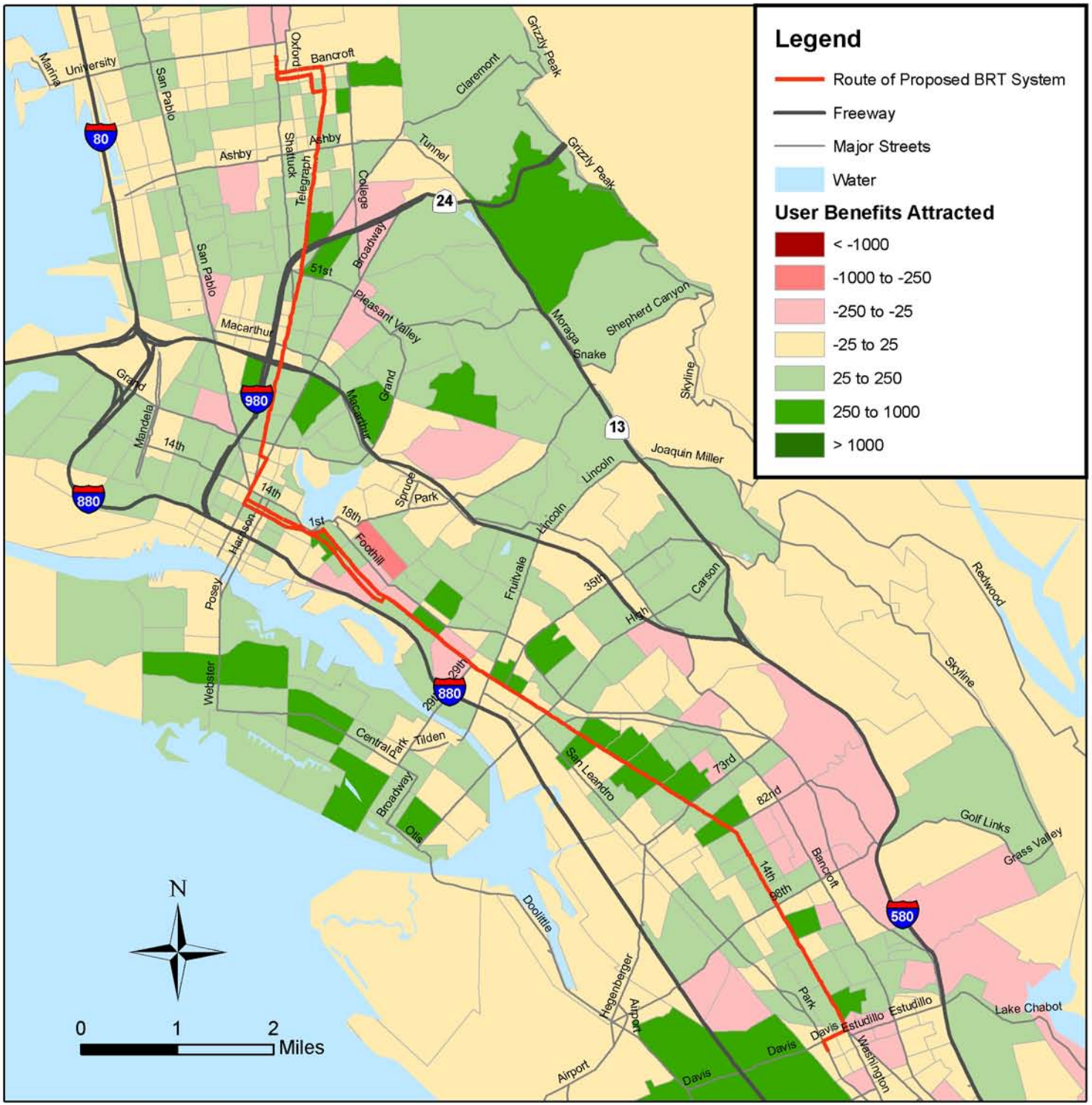
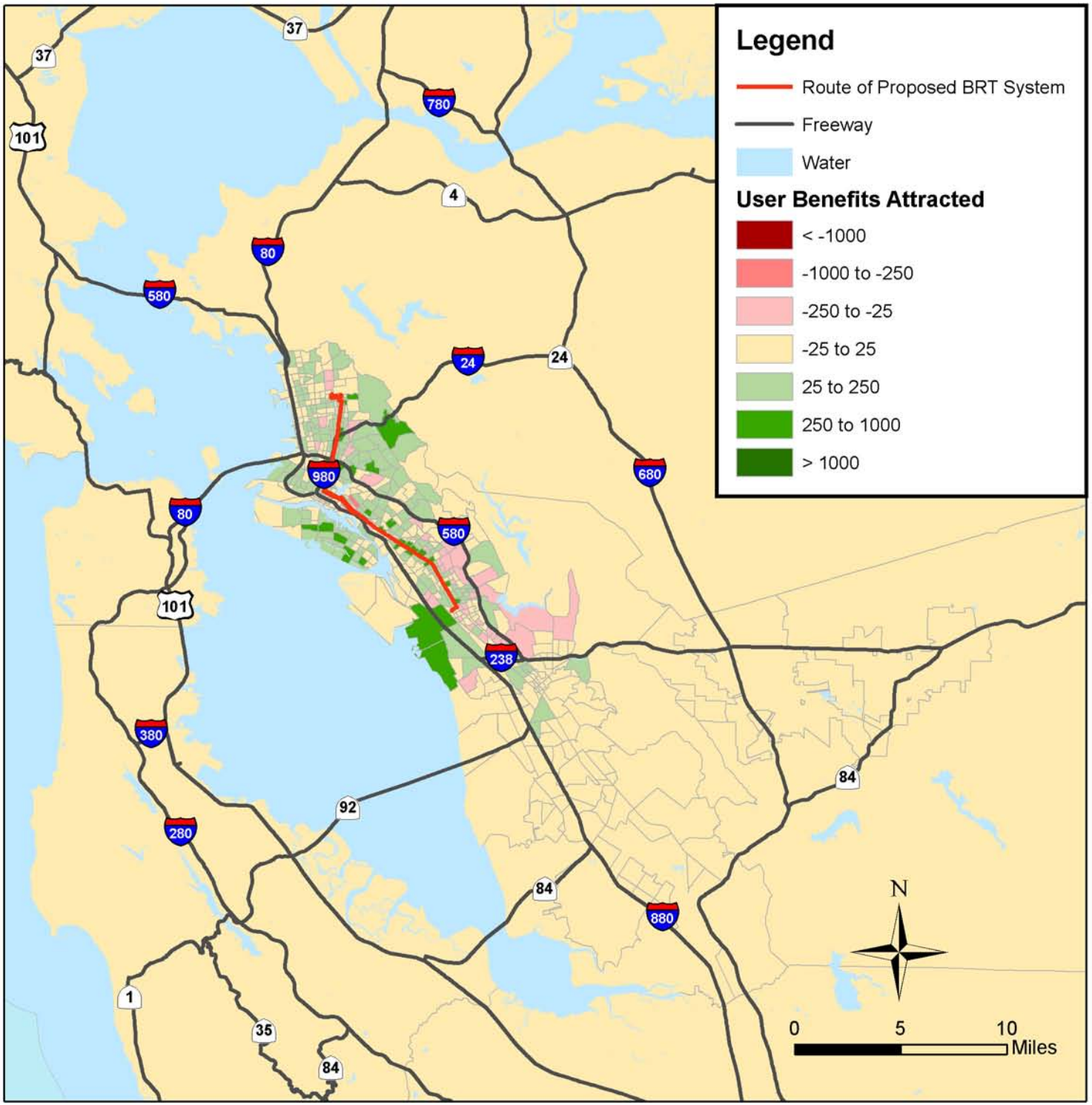


HB School User Benefits Attracted



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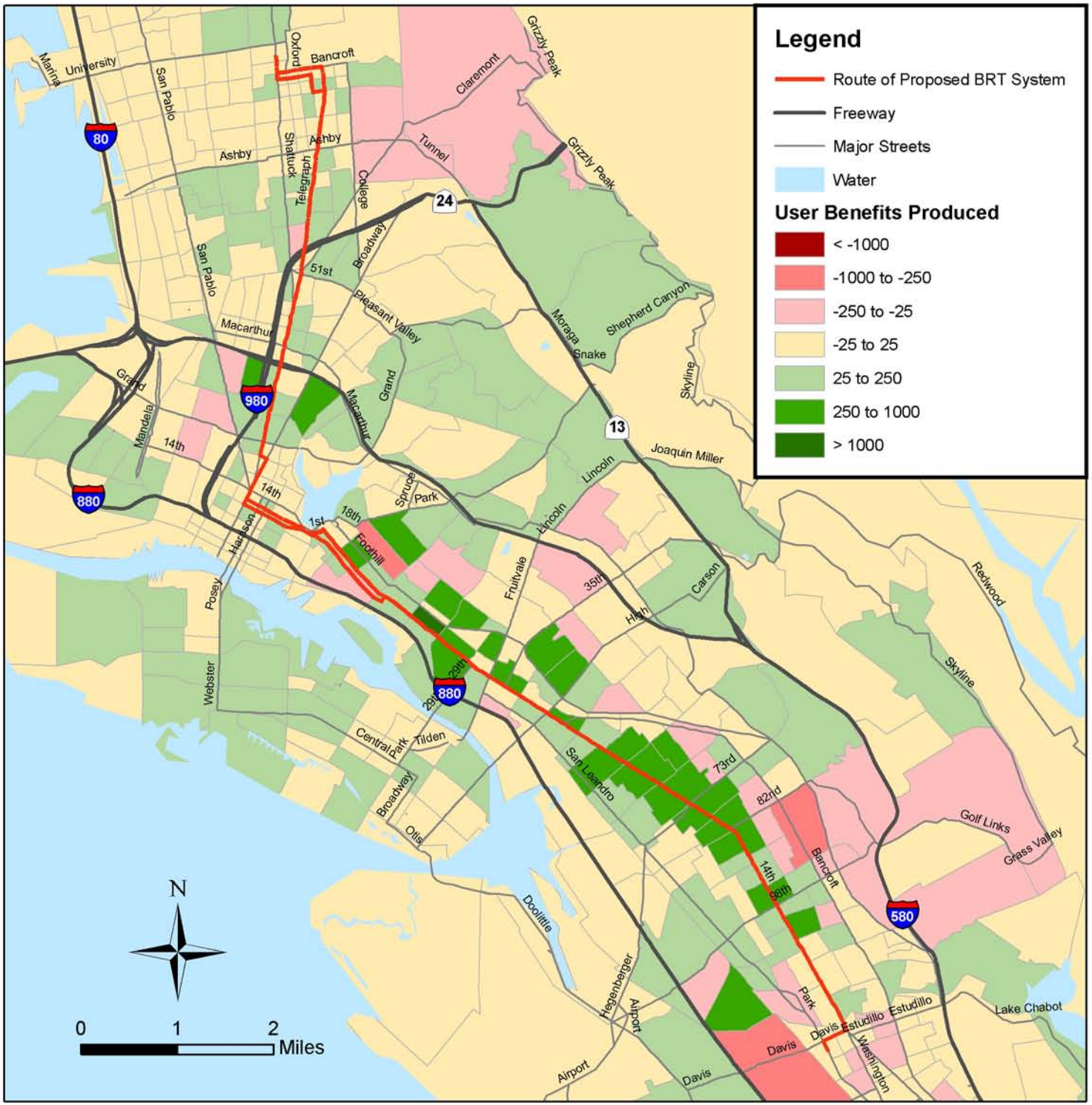
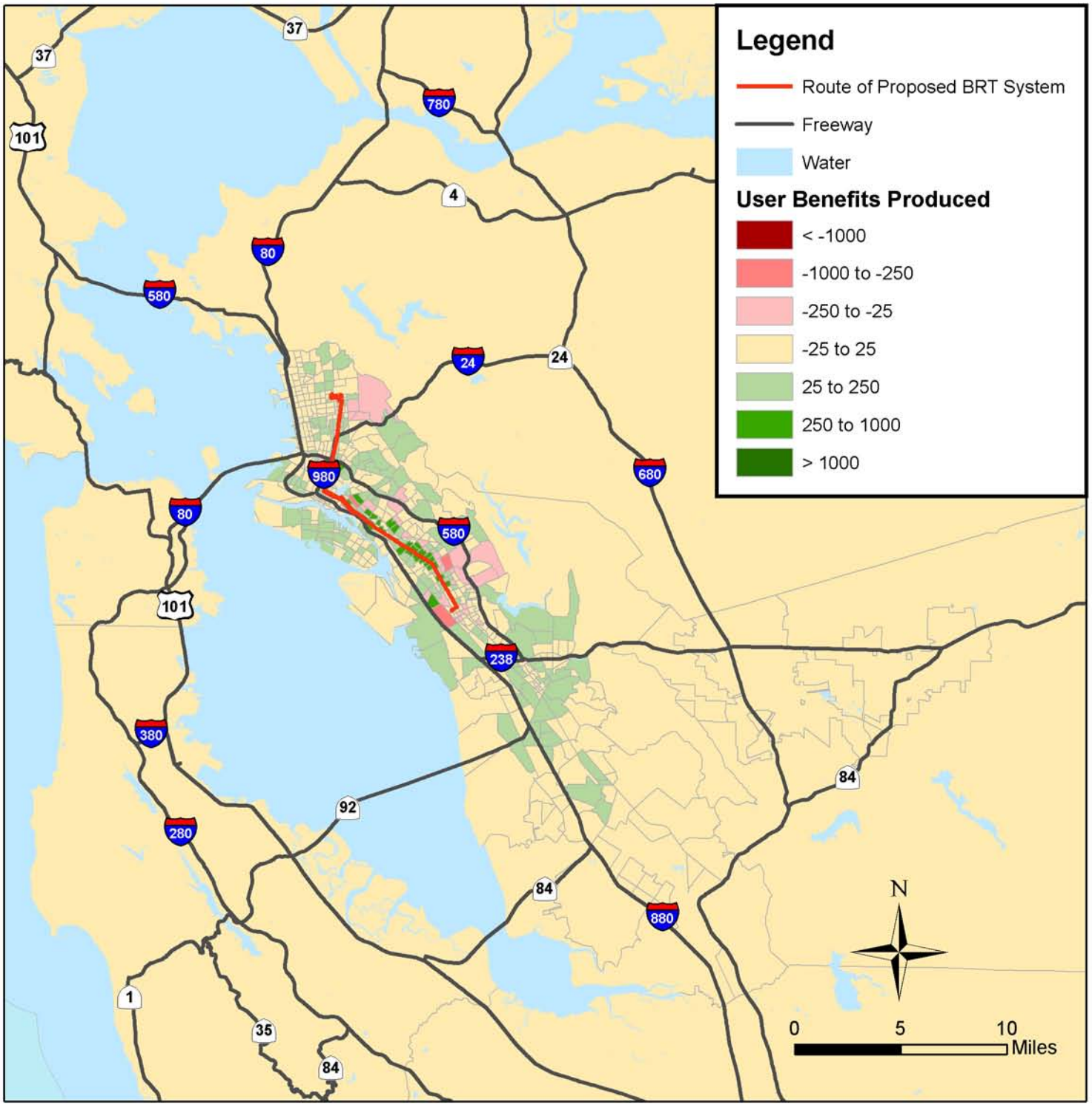
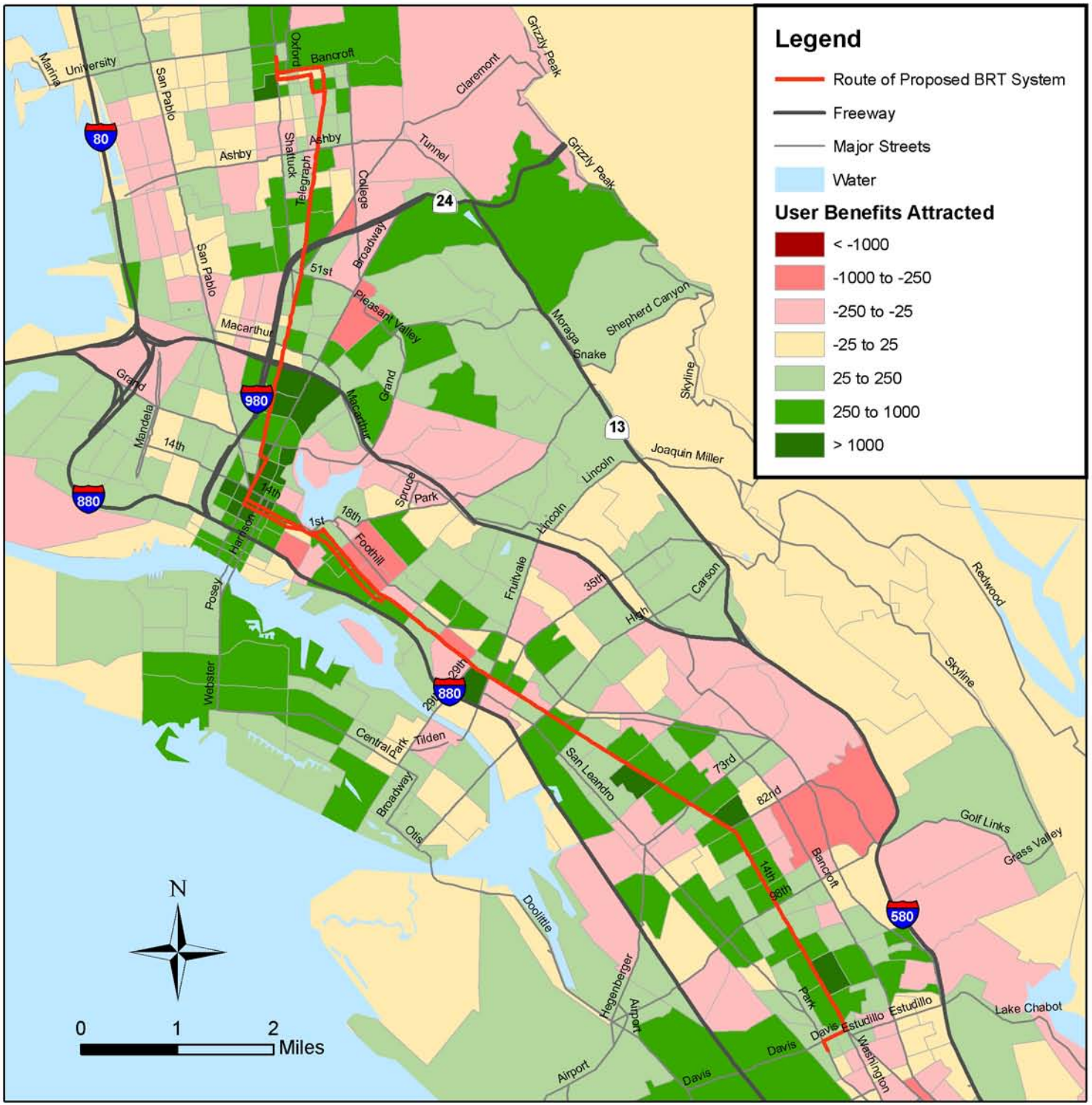


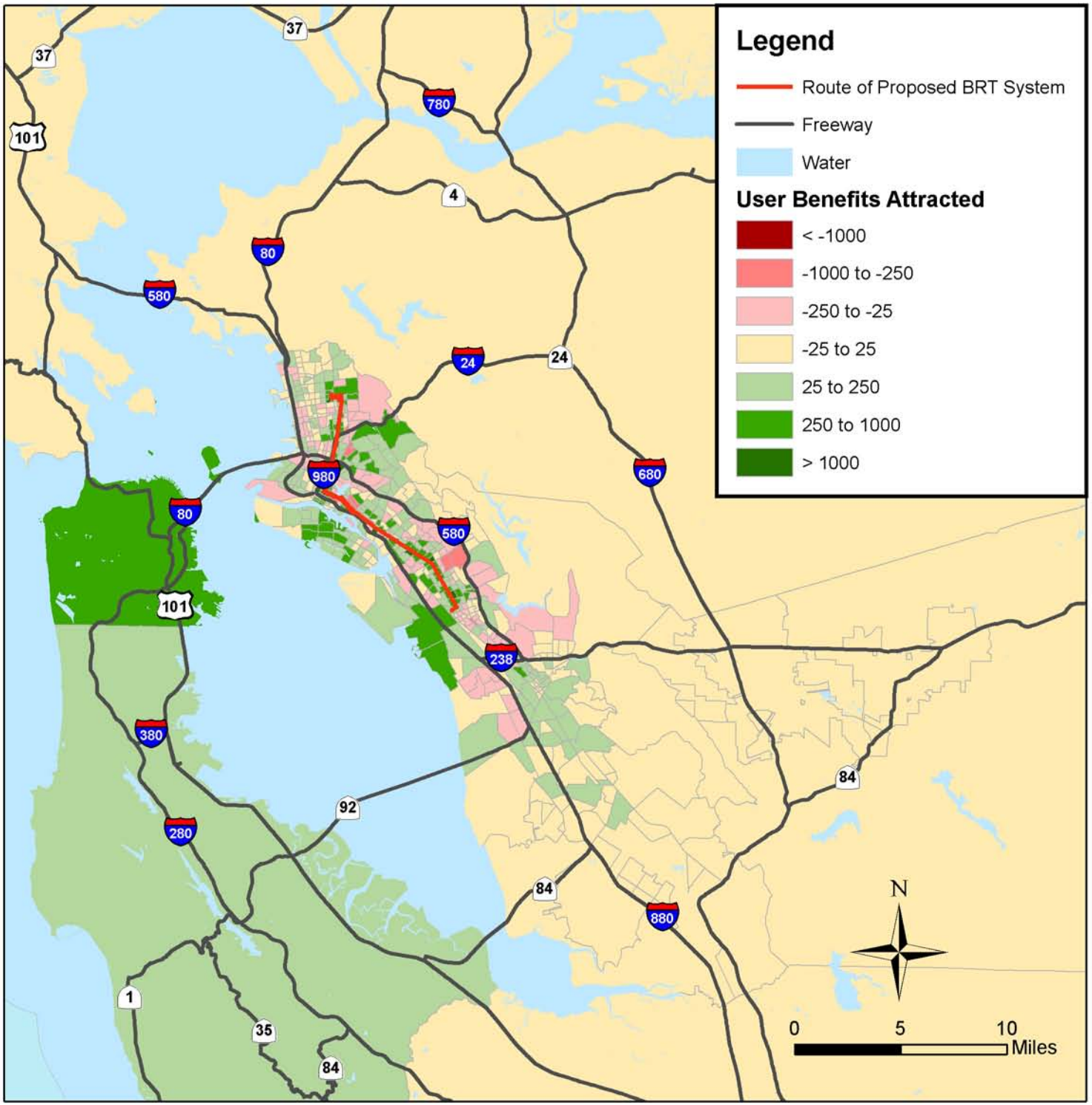
HB School User Benefits Produced



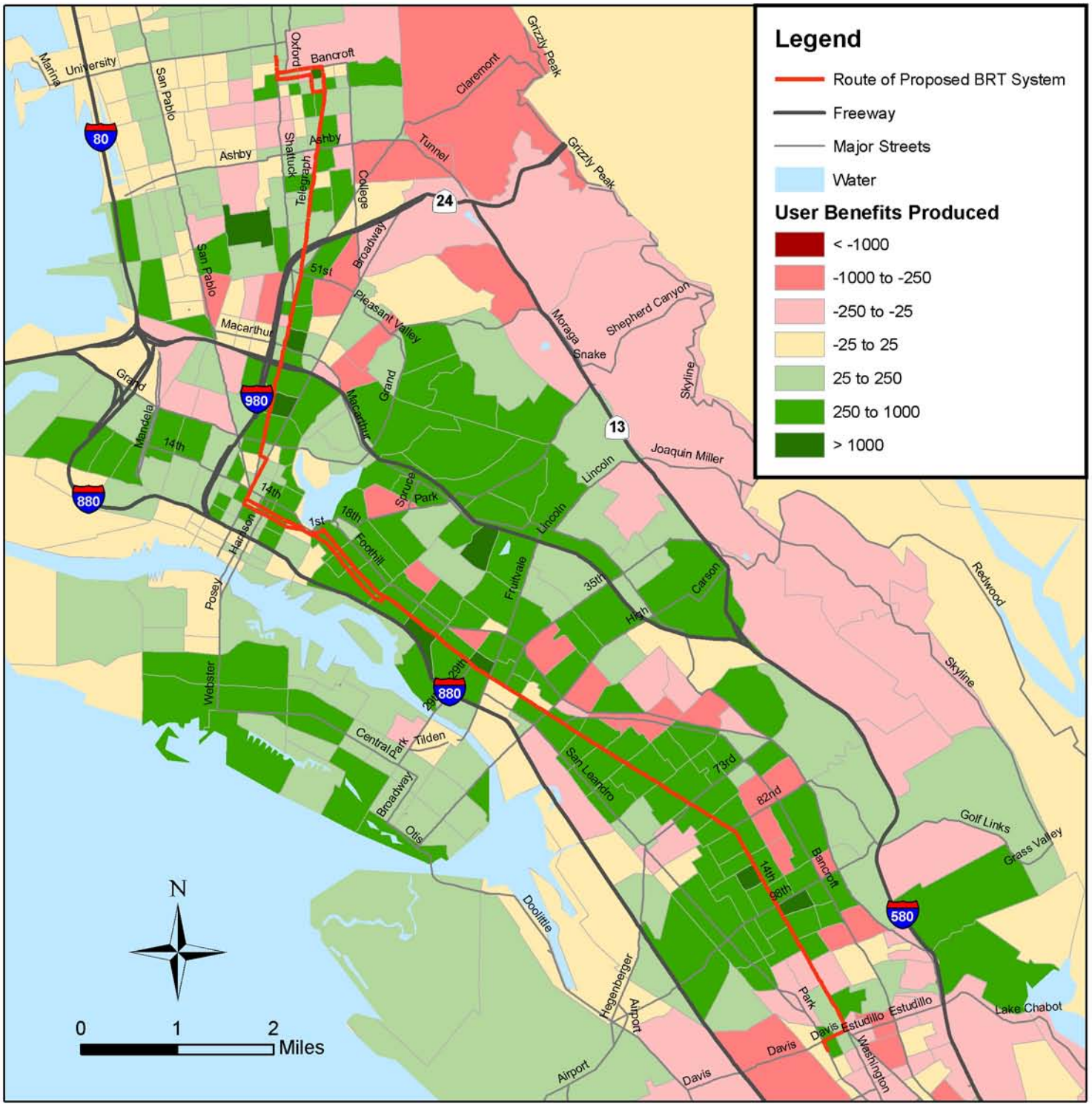
Total User Benefits Attracted



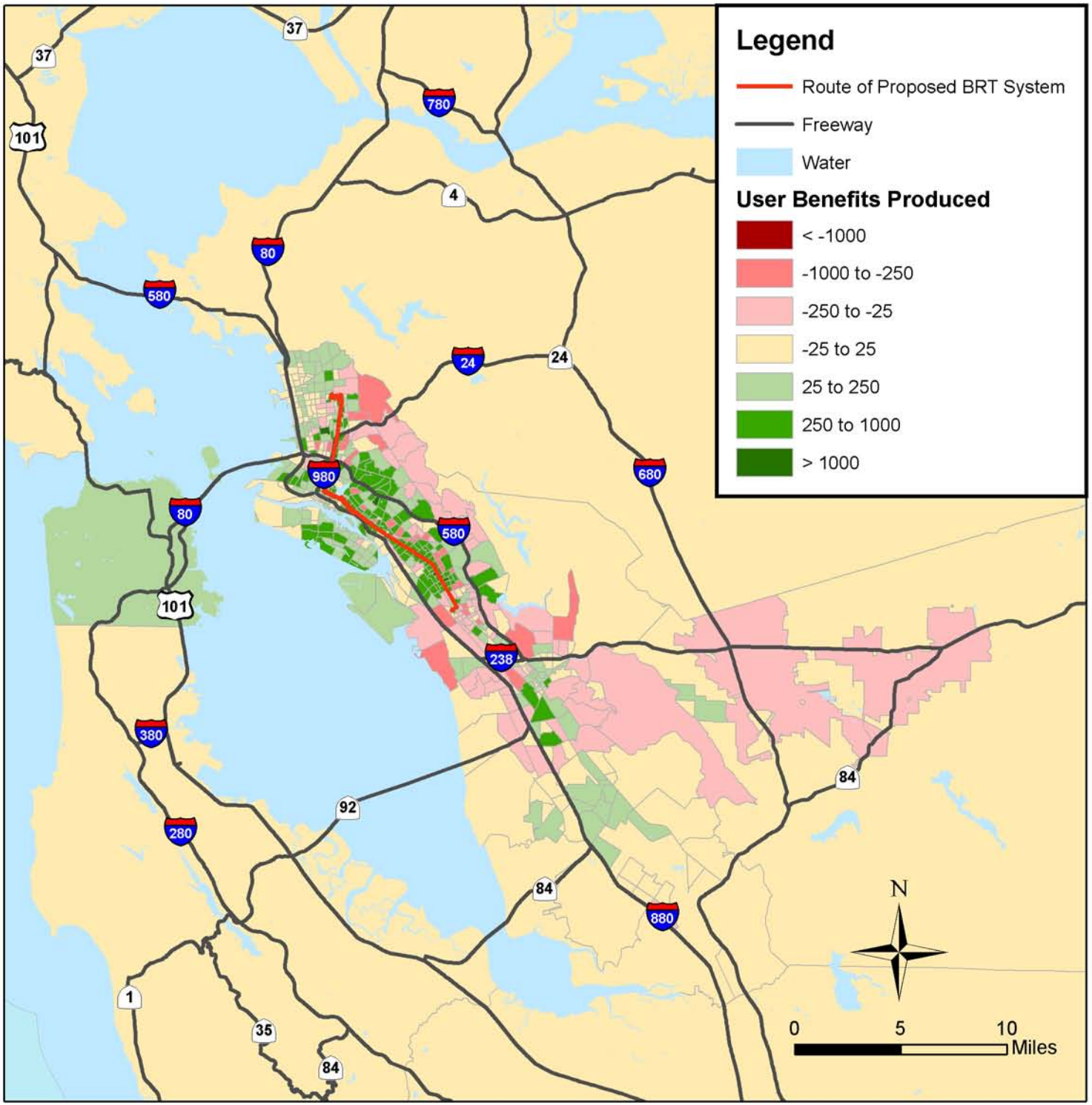
Total User Benefits Attracted



Total User Benefits Produced



Total User Benefits Produced



TRAVEL FORECASTS TEMPLATE (OPENING YEAR)

PROJECT NAME: East Bay Bus Rapid Transit

Line	Trip-Purpose-Specific Information	Source	HB Work	HB Social Rec	HB Shop Other	Non HB	HB School	HB College	Purpose 7	Purpose 8	DAILY TOTAL
1	Daily transit trips, Baseline Alternative	Summit: table 30	223,531	29,621	61,140	35,803	41,813	28,684			420,592
2	Daily transit trips, Build Alternative	Summit: table 40	225,174	29,798	62,075	36,302	42,249	28,716			424,314
3	Daily person trips, Build Alternative	Summit: table 20	1,632,782	896,449	1,461,518	1,485,892	585,774	68,132			6,130,547
4	Daily hours of user benefits (UB)	Summit: table 70 / 60	812	331	988	318	509	601			3,558
5	Positive UB hours from coverage changes	Summit: (tables 44+47+48) / 60									0
6	Change in hours of UBs due to capping	Summit: capping impact / 60	-30	0	-5	-2	0	0			-37
7	Daily hours of UBs for transit dependents	Summit: standard report									0
	Trip-Purpose-Specific Quality-Control Measures										
8	Daily new transit trips		1,643	177	935	499	436	32	0	0	3,722
9	Daily new transit trips -- distribution (%)		44%	5%	25%	13%	12%	1%	0%	0%	100%
10	Daily user benefits -- distribution (%)		23%	9%	28%	9%	14%	17%	0%	0%	100%
11	Daily transit trips, Baseline Alternative -- distribution (%)		53%	7%	15%	9%	10%	7%	0%	0%	100%
12	Percent change in user benefits due to capping		-4%	0%	-1%	-1%	0%	0%	0%	0%	-1%
13	Percent of user benefits accruing to transit dependents		0%	0%	0%	0%	0%	0%	0%	0%	0%

Line	Special-Markets Information	Source	Market 1	Market 2	Market 3	Market 4	Market 5	Market 6	Market 7	Market 8	ANNUAL TOTAL
14	Special-market project trips per event-day	Special-market forecasts									0
15	Special-market UB hours per event-day	Special-market forecasts									0
16	Special-market pass-miles per event-day	Special-market forecasts									0
17	Annualization factor (event-days / year)	Special-market forecasts									---
	Special-Markets Quality-Control Measures										
18	Annual new transit trips, special markets only -- distribution (%)		0%	0%	0%	0%	0%	0%	0%	0%	0%
19	Annual user benefits, special markets only -- distribution (%)		0%	0%	0%	0%	0%	0%	0%	0%	0%
20	Minutes of user benefits per project trip, special markets only		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Line	General Information	Source	Entry	General Information	Source	Entry
21	Annualization factor (days/year)	Current/similar guideway	300			
22	Daily project trips, no special mkts	Travel forecasts	41,715			
23	Daily project trips, transit dependents	Travel forecasts		Station-area employees (within 1/2 mile)	Linked from Land Use Template	153,468
24	Daily project pass-miles, no special mkts	Travel forecasts	140,953	Station-area residents (within 1/2 mile)	Linked from Land Use Template	192,129
25	Daily project pass-miles, trn dependents	Travel forecasts		Project length (miles)	Linked from Project Descrip Template	14.4

	General Quality Control Measures (Excluding Special Markets)	Value	General Quality Control Measures (Excluding Special Markets)	Value
26	Minutes of user benefits per daily project trip (before capping)	5.2	Daily project trips per station area employee	0.27
27	Minutes of user benefits per daily project trip (after capping)	5.1	Daily project trips per station area resident	0.22
28	Percent of user benefits that are coverage related	0%	Daily minutes of user benefits per station area employee	1.39
29	Percent of user benefits that are off-model	0%	Daily minutes of user benefits per station area resident	1.11
30	Percent of project trips that are new transit trips	9%		
31	Project average trip distance / project length	24%		

6.0 Cost Effectiveness

This section provides East Bay BRT's cost effectiveness results. Inputs for cost effectiveness calculation are obtained from the travel demand forecasts (see Section 3.0) and from the O&M cost model and SCC (see Sections 4.0 and 5.0).

6.1 Cost Effectiveness

Cost effectiveness for the East Bay BRT project was calculated and reported as the incremental cost per hour of transportation system user benefits. The result is reported in the Cost Effectiveness for Small Starts Template using data from the Travel Forecasts Template and input data on Baseline and Build capital and O&M costs.

The cost effectiveness for the East Bay BRT project is estimated at $12.26 per hour.

COST-EFFECTIVENESS FOR SMALL STARTS TEMPLATE

PROJECT NAME: East Bay Bus Rapid Transit

Cost Effectiveness

Line	Item	Alternative: New Starts Baseline	Alternative: New Starts Build	Difference	Value	Source/Calculation
21	Annualized capital cost (millions of constant 2010 dollars)	$ -	$ 15.1	$ 15.1	---	Source: SSC Worksheets
22	Total systemwide annual operating and maintenance cost (millions of constant 2010 dollars)	$ 20.6	$ 25.1	$ 4.5	---	Source: O&M cost models (attach documentation)
23	Total annualized cost in forecast year (millions of constant 2010 dollars)	$ 20.6	$ 40.2	$ 19.6	---	Sum of lines 21 and 22
24	Annual user benefits total (hours)	---	---	1,601,220	---	Line 6
25	Cost-Effectiveness: incremental annualized cost / annualized user benefits ($/hour)	---	---	---	$12.26	Line 23 divided by line 24
26	Total transit ridership	126,177,600	127,294,200	1,116,600		Linked from Travel Forecasts template
27	Cost Per New Transit Trip: incremental annualized cost / incremental annual transit trips ($/new trip)				$17.58	Line 23 divided by line 26