Ecocity Mapping for Urban Villages

Prepared by Ecocity Builders
For the Bay Area Air Quality Management District

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Much of the community outreach and interviews were conducted by our project partner Western Institute of Social Research (WISR). Their team includes John Bilorusky, Vera Labat, Monika Scott, Nzinga Pace, Judy Andreas, and Shyaam Shabaka.

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Last but not least, we'd like to offer our deep appreciation to the Bay Area Air Quality Management District, without whom this project would not have been possible.

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SECTION I

Reshaping Cities for a Healthier Future

Cities are approaching an era of new challenges, including meeting energy and transportation needs in a time of growing energy constraints, reshaping the built environment to fit a renewable energy future, relocalizing the economy through sustainable businesses and industries, and increasing food security through locally supportive agriculture.

Our main premise is that the sustainable human settlement of the future needs to become less a blanket of development accessed by cars and more a network of walkable "urban villages" linked by transit and connected to a strong downtown center, with room for urban agriculture, urban stream corridors and greenways.

The problem is fairly simple: cities are too thinly spread out. They require vast amounts of land and energy and pump climate-changing gases into the atmosphere because they are automobile dependent. The answer: reshape cities so that their vital centers – neighborhood centers, district centers and downtowns – become more diverse in their activities and more compact in their built form.

In this report, we present a strategy to enable this shifting of existing development towards increasingly healthy "urban villages" of different scales, from very small to large. In the process, cities will emerge that conserve land and energy, from their basic layout on up through their buildings – cities that also save money, time and health.

The biggest beneficiary, however, is the biosphere itself in the form of a more stable climate and a better chance of survival for humans and other living species. There are problems to be surmounted and benefits to be gained in the process. The main premise, though, is that cities can be reshaped to confront climate, ecological, economic and social justice problems all at once.

Ecocity Mapping for Urban Villages

In this report we demonstrate an innovative and strategic approach to mapping and planning for healthy human settlements and natural systems. The method combines science and technology with community education, outreach and input to describe, communicate, and achieve a shared vision for just and sustainable cities moving towards balance with natural systems.

By applying overlay analysis and adopting corresponding zoning, policies, ordinances and action plans, existing land and energy intensive infrastructure is reshaped to create compact centers where people live, work and play surrounded by green agricultural and recreational areas. These centers minimize travel, afford quick access to open space and sustainable agriculture and emphasize urban form within a natural context.

Initially developed in the mid-1980s on paper, Ecocity Builders now is using geographic information systems (GIS) and suitability modeling pioneered by Ian McHarg (1969) to organize and analyze information about communities in their natural contexts and identify and inventory vitality centers, or, as Ecocity Builders is phrasing this activity in our current pilot work, "urban villages". The resulting inventories can then be used as a visual road map to the future.

7 Steps to Ecocity Mapping

Step 1) Produce a local natural history map
Reveals historical creek channels, indigenous livelihoods, and cultural exchanges embodied in the neighborhood landscape. Important not only for recreational and learning opportunities, but also for avoiding potential natural disasters.

Step 2) Establish walkable vitality centers
Identifies access by proximity - within 1/4 mile walking distance - to jobs, shopping, healthcare, education, community gathering and other services.

Step 3) Zone outwards to nature corridors and agriculture
At each quarter-mile increment, the the urban village becomes less dense. Adjust zones according to relief and natural forms such as creeks.

Step 4) Identify key gateways and views
Streets ending perpendicular to a river and railroad right-of-ways are of particular value as gateways for goods and services and as potential locations of "keyhole plaza" offering a view into the urban village. Disused railroads can be used as a pedestrian or bicycle greenway.

Step 5) Render vertical cross sections
Visualize with neighborhood residents creative options for the third dimension that allow people to interact not just on the street level, but through open air skyways, and cafes.

Step 6) Provide a legend for the map of vitality centers

Step 7) Add scenario maps
Since there are often many solutions for building an ecocity, show as many scenarios as the community would like to see.

Village Bottoms Action Plan

Through an initial process of interviews and assessment, the neighborhood we found most interested in exploring the mapping and the "density shifting" approach was the Lower Bottoms neighborhood of West Oakland. The "bottoms" was once the marshy low-lying fringe on San Francisco Bay. The area was filled and elevated for buildings and streets in the early days of Oakland's development. Ecocity Builders colsely collaborated with the Village Bottoms Community Development Corporation, a California nonprofit, in exploring the project, looking at architectural preservation, agricultural revitalization and new development all at the same time.

The Village Bottoms Action Plan presented in this report was crafted through a collaborative community process and is based on the goals and objectives of the residents. The Plan is anchored by a vitality and needs assessment and inventory and, when implemented, would need to be supported by specific general plan policies and zoning, and economic (re)development strategies similar to those we are recommending in this report and coordinated with local and regional land use and transportation agencies.

The plan's focus is anchored on historic Pine Street between 7th Street and 12th Street, linking the emerging Central Station neighborhood development site and the already established West Oakland BART Transit-Oriented Development.

Greenhouse Gas Benefits of Urban Villages

Potentially applicable to any city, the Ecocity Mapping for Urban Villages approach to planning enables significant demand reduction for transportation fuel, thereby contributing to solving climate change. At the same time, people's lives will be made much more convenient. For people concerned with economical living, especially lower income individuals, seniors and families, the arrangement can mean freedom from supporting a car financially, saving an average person around $10,000 a year while doing more than almost any other approach for reducing greenhouse gasses. The greenhouse gas (GHG) benefits of Ecocity Mapping for Urban Villages can be realized at three scales: city, neighborhood and the planet. Good urban design and planning at all three scales is crucial.

City Scale

The city, mankind's basic economic engine of production and container of culture and social life, can be thought of as a whole-system, analogous to a living organism. It is the largest creation of our species and constitutes our single greatest impact on nature, resources and the biosphere. Ecocity Mapping for Urban Villages looks closely at principles that can rapidly move us in the direction of reversing the damage of climate change. The compact, mixed-use nature of "urban villages" or "vitality centers" of increasing density and functional diversity, paired with the removal of energy-intensive, low density development, means that transportation is minimized and shifted to low-energy or non-motorized transport. The goal is to get people out of their cars and into walkable neighborhoods, bikable cities and transit efficient/sufficient metropolitan regions. The compact diversity of functions is the guiding principle.

Life in a car-free urban village center in a multi-family dwelling is easily quantifiable relative to life in a single-family house with a car. The latter simply uses up much more energy.

The compact nature of Urban Village design, with apartments and condominiums, reduces the energy demand the sprawling model of detached single residencies, saving enormous amounts of energy for in-building temperature and climate control. Single detached residences are not only wasteful in their low-density arrangement dependent on private cars, paving, and enormous flows of cheap fuels, but also in heating and cooling. Energy used for heating and cooling a single detached home leaking from the surface of the house is lost to human purposes after just one use. In apartments and condominiums, shared walls mean shared heating and cooling at great efficiencies before the surface of the building loses its climate control energy to the air outside.

There are also ancillary effects, which can be quantified at projected points into the future and described by assumptions of speed with which the Ecocity Mapping and Urban Villages initiative is implemented. For example, if buildings farther from the urban village centers are removed by willing-seller transfer of development rights deals, while density and diversity of development is added in the centers, then farming, recreation and education can move closer to consumers. Food can be grown relatively close to neighborhood centers on formerly paved, lawn-covered or rooftop-displaced land. That means healthier, fresher food requiring less energy to ship.

With creeks and urban streams, ridge lines, shoreline and other natural features restored as buildings are removed farther from centers, recreational and educational trips to nature and become very short. Replacing an estimated fraction of such trips by car with local walks or bicycle rides to nearby landscapes and waterscapes save the energy that would be required for such trips by car – not to mention energy savings from less infrastructure and vehicles (asphalt, concrete, cars, gasoline and oil infrastructure) that have to be built to accomplish such trips.

Neighborhood Scale

Neighborhoods such as the Lower Bottoms in West Oakland where the Urban Villages project is proceeding, and larger neighborhood centers which might be thought of as city district centers, such as the Fruitvale Village area and Chinatown, already save energy directly and have specific climate benefits. The energy use required for living in these areas is less than in the lower-density areas of the city. The way to think about the sustainable development potential inside the neighborhood centers is to think of "fine grain" neighborhood design that shifts toward vital, active cultural and commercial clusters.

Like at the citywide scale, transportation energy conservation, building energy conservation and ancillary benefits can be realized at the neighborhoods scale. As vitality and diversity of functions increase, and at very close distances, a move towards more multi-family units would improve walkability, health, and overall quality of life free from cars. Energy savings from greater heating and cooling efficiency also occur in multi-family residential buildings at the neighborhood scale.

With the densification of neighborhood centers, land at the periphery of neighborhoods can be opened up for open space uses. These include food production, restoration of elements of the natural environment, recycling areas, and sports and passive recreation areas such as parks and bicycle and pedestrian paths.

In the case of areas of historic importance, as the Lower Bottoms is important in the Black cultural history of Oakland and the whole country, there are a considerable number of architectural gems that should be preserved. Many are single-family houses. One solution to "densify" such infrastructure is to raise some of the structures a story or two and allow for mixed uses, a desire expressed by many residents in the area. Enlarging interior volume in this manner supports energy conservation and ground-floor cultural and business activities that many residents want.

Global Scale

The largest climate impact of the Ecocity Mapping system and Urban Villages initiative would be at the world scale. There are already many good approaches that involve mapping and community development that increase density around transit hubs and make downtowns and major district centers of cities more vital and pedestrian-oriented. These approaches address increasing population in cities that come from international or regional in-migration and very slow natural increase (though some cities are actually shrinking at this time). The Association of Bay Area Governments (ABAG) and the Metropolitan Transportation Commission (MTC) support and help develop such plans and resources directing such changes, known often as Transit-Oriented Development (TOD).

But these TOD planning approaches do not yet deal with the entire big picture: that cities in the United States and many other parts of the world cover far more land for their populations than cities that were built before cars, such as those in many parts of Europe. We cannot ignore that the land use and built form we see today are a direct result to planning around the automobile. What if the goal were to discover the preferred sizes and shapes of ecologically healthy and car-free cities?

What is needed is the confrontation with the splayed out city itself and the necessity to remove thousands of acres of low-density, car-dependent development. One could say that in America there are thousands, even millions of acres of future natural and agricultural land yearning to breathe free. These millions of acres are buried under the suburbs, but are also buried under land inside major cities' borders.

There needs to be both sides of the transition represented in planning that leads to a new approach dealing effectively with climate change. More density in one place needs to be paired with the removal of low-density development somewhere else. Only then we will have the model for making 21st century cities genuinely sustainable – and energy-conserving enough to stop and perhaps even begin reversing global heating.

It is often said that if the United States moves to deal with climate change and China or India do not, then why bother and maybe face an unknown economic situation? Cities can have the same attitude, avoiding any serious confrontation with their land use demands on transportation. On the other hand, they can confront the problem with forward-thinking land development policies and take a leadership role within the United States, and a model to the world. How can small neighborhoods make a difference? Simply by showing the way we can go when we understand the bigger picture. The changes that are right for the time can be contagious – even as far away as India and China.

Overview of this Report

This report constitutes a scan of a whole city and then develops the idea of what would happen on the ground to one neighborhood. We hope to provide a complete ecocity map and clarify the idea enough to make it available to the public and decision makers, potentially in any and all cities.

In Section II, **Mapping Oakland's Centers of Vitality**, we demonstrate an application of the Ecocity Mapping for Urban Villages technique to the City of Oakland.

Section III, **Tools for Implementing Urban Villages**, we present recommendations for policy changes and innovations that encourage the development of Urban Villages, by attracting a diversity of land uses and shifting densities to augment vitality. A draft **Transfer of Development Ordinance** is enclosed as an Appendix.

Our extensive community outreach process, in partnership with Western Institute for Social Research (WISR) is documented in Section IV, **Community Outreach & Site Selection**.

Section V, **Village Bottoms Action Plan** outlines the vision for the revitalization of the Village Bottoms Cultural District crafted through a collaborative community process with the Village Bottoms Community Development Corporation.

Finally, in Section VI, **Greenhouse Gas Benefits of Urban Villages and Proposed Actions**, we provide quantitative details of greenhouse gas emission reductions of the Urban Villages approach in Oakland. We show the difference that strategic action in the Village Bottoms Cultural District can make in reducing greenhouse gas emissions.

BAAQMD Deliverables

Ecocity Mapping for Urban Villages technique applied to the City of Oakland & Village Bottoms neighborhood

Urban Villages zoning overlay map with recommendations for potential "Vitality Centers"

Community Outreach Process

Review of the Land Use and Transportation Element of the Oakland General Plan and the Zoning Ordinance

Policy Recommendations for Implementing Urban Villages:
- General Plan Amendments
- Form-Based Codes
- Draft Transfer of Development Rights Ordinance

Village Bottoms Action Plan: Analysis and recommendations for specific and detailed land use changes

Analysis of the potential greenhouse gas impacts of implementing the Action Plan

SECTION II

Mapping Oakland's Urban Villages

The land-use planning and urban design literature suggests models and key indicators of vitality that lower carbon emissions through the reduction of vehicle miles traveled. Many of these models are complex and require a great deal of data and expertise to analyze and implement. In partnership with the Bay Area Air Quality Management District and the Western Institute for Social Research, Ecocity Builders has developed a simple model that uses only ArcGIS 9.3 and a spreadsheet software. We apply this model to the City of Oakland in order to identify and inventory vitality centers that could serve as centers of future urban villages.

We calculated greenhouse gas emission reductions based on the reduction of non-work trips, specifically grocery store trips. The same procedure used in calculating greenhouse gas emission reductions may be used for other land-use and transportation changes, such as shorter commutes and multi-family versus single-family residential land-uses. Detailed analyses of greenhouse gas emission reductions for Oakland and for our proposed Action Plan are outlined in Section VI.

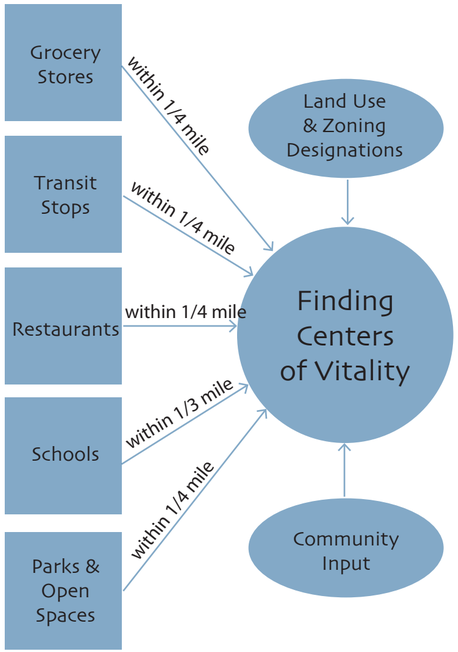
Ecocity Builders has been working with cities worldwide for over a decade on ways to find and build centers that minimize greenhouse gas emissions from transportation. The concept is simple: A vital center is a place where residents can meet almost all of their daily needs within walking distance. Using a simple raster-based model for analysis, we began by identifying concentrations of amenities.

The five categories of amenity we identified in the City of Oakland were:
1) Grocery stores, excluding convenience and liquor stores
2) Transit stops, such as bus stops and BART stations
3) Restaurants
4) Educational institutions
5) Parks and open spaces.

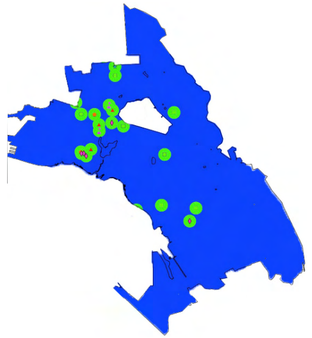
Using the raster model, we analyzed distances from residential parcels to areas with at least one of the above categories of amenity. This helps answer the question, **"How far will I have to travel from home to access what I need?"** We first did this independent of current land-use and zoning designations.

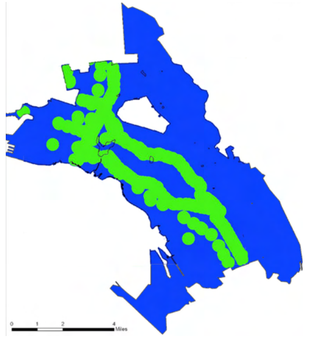
We then drew ring buffers around amenity centers according to transportation and land-use planning conventions, defining a quarter-mile walkability threshold for grocery stores, transit stops, and restaurants; a third-mile threshold for educational institutions, and a half-mile threshold for parks and open spaces. Raster cells within the specified threshold have a value of one point. Adding up the layers of areas within walkability thresholds of these amenities, we assessed the level of vitality according to the number of amenities found within an area. The higher the number of amenities (1-5), the higher the level of vitality. We identified areas of vitality to be residential areas with all five amenities within walking distance.

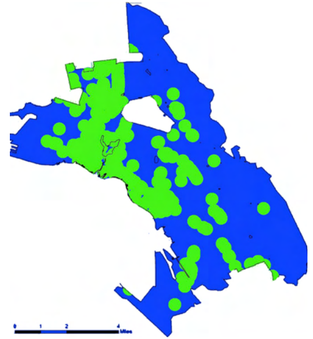
Next, we factored in land-use and zoning designations and looked for the commercial retail district that anchors the vital center. Specifically, we drew quarter-mile radii around the center points of the areas of vitality from the previous step. Then, we identified land uses within this quarter-mile radii, and extracted areas designated as "Community Commercial" and "Neighborhood Centers" in the City of Oakland General Plan.



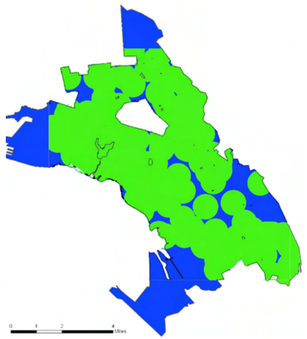
Buffering Walkability Thresholds Around Amenities to Assess Level of Vitality

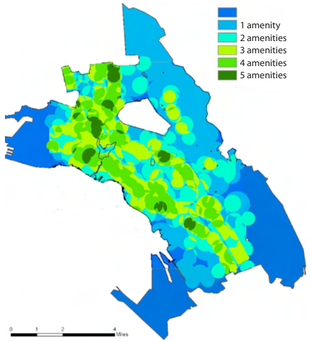

Within 1/4 mile of grocery stores


Within 1/4 mile of transit stops


Within 1/4 mile of restaurants


Within 1/3 mile of schools


Within 1/2 mile of parks



Level of vitality

We identified center points of areas designated as "Community Commercial" and "Neighborhood Centers," to ensure that it is located on a non-residential parcel.

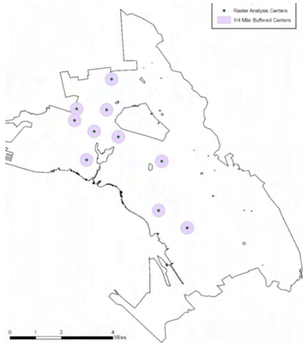
We then defined Urban Villages to be areas within walking distance (i.e. a quarter mile) from both these center points of areas designated as "Community Commercial" and "Neighborhood Centers" as well as from the areas themselves.

Identifying Potential Vitality Centers

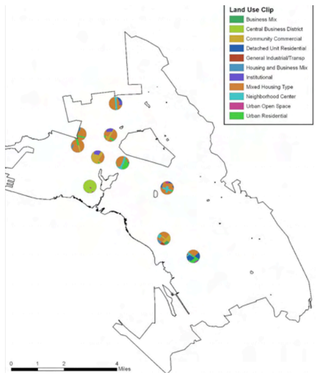
Areas zoned as "Community Commercial" and "Neighborhood Centers" are not necessarily successful vitality centers. Some may be missing certain amenities. To identify potential vitality centers to further develop the Urban Village approach at the neighborhood scale, we conducted a second set of analyses by identifying areas within walking distance of all areas designated as "Neighborhood Centers" and "Community Commercial" in the City of Oakland General Plan.

Our analyses revealed additional potential vitality centers, such as Golden Gate, West Oakland, Temescal, Montclair, Mills, Eastmont, and Elmhurst. However, these areas did not show up in our amenity-based analysis because they are lacking one or more of the five vital amenities we were looking for. For example, West Oakland lacks a grocery store that is not a convenience or liquor store, and Montclair is not served by a transit connection more frequently than every half hour.

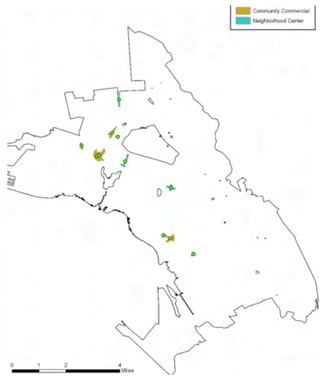
Finding centerpoints of areas of vitality



1/4-mile radius around centerpoints



Identifying land uses within 1/4-mile radius of centerpoints

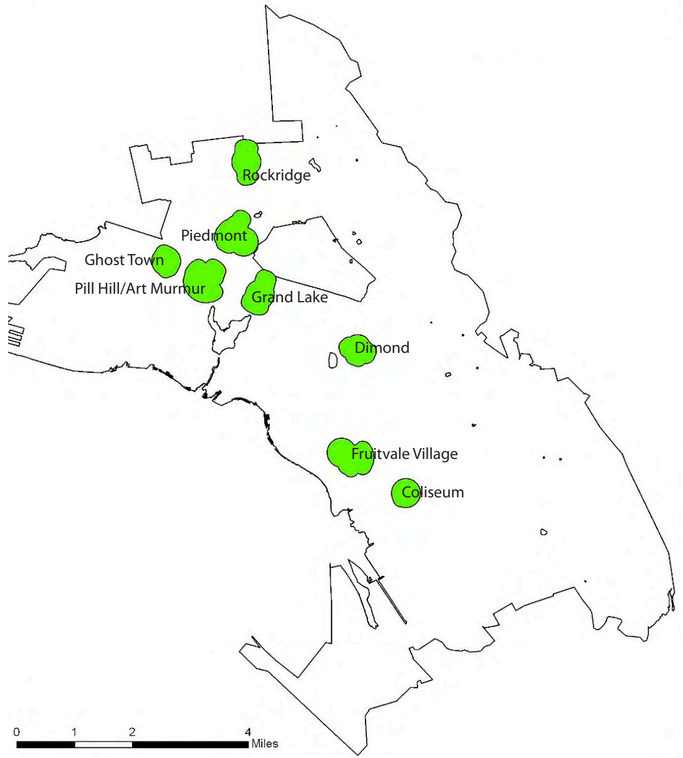


Extracting areas designated as "Community Commercial" and "Neighborhood Centers", with centerpoints shown

1/4 mile buffer around Community Commercial and Neighborhood Centers

1/4 mile radius around centerpoints of commercial retail district

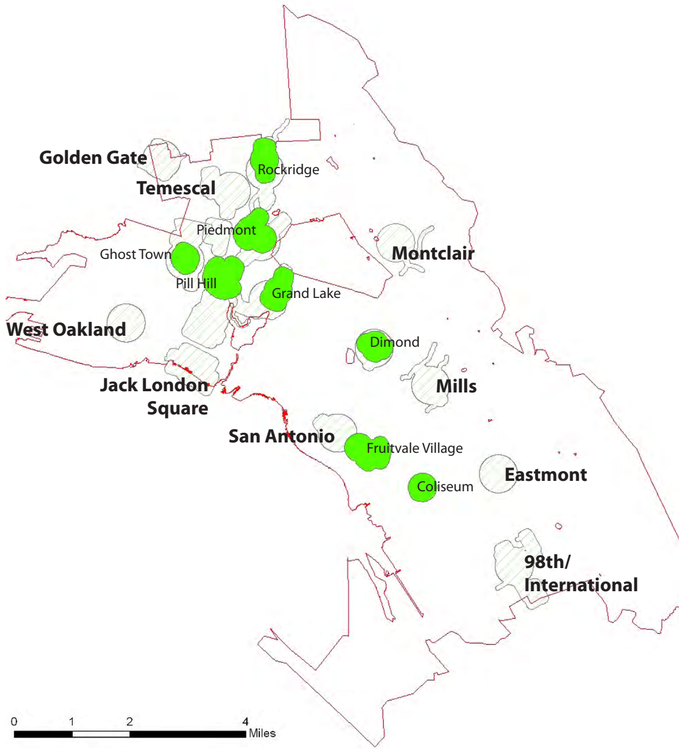
Oakland's Urban Villages



Through an environmental and social justice lens, and a community outreach process, we selected West Oakland as a pilot site that can demonstrate the Ecocity Mapping for Urban Villages approach to decision-makers and the general public. Historically a neighborhood marginalized by freeway construction, disproportionately burdened by air pollution impacts from its proximity to freeways and the Port of Oakland, West Oakland's low-income and predominantly African-American residents have further expressed its dire need for a quality grocery store in their neighborhood. Our approach thus seeks to promote investment in this area of potential vitality and strengthen an ageing and much neglected neighborhood in the face of a future of climate change uncertainties.

In the next section, we outline policy tools that encourage urban villages, based on a review of the current City of Oakland General Plan and Zoning and Transfer of Development Rights ordinances. We then describe the community involvement process that was essential as both a reality check and a way to customize the values, data and information used in the model.

Oakland's Urban Villages **and Potential Vitality Centers**



SECTION III

Tools for Implementing Urban Villages

To support the changes in land uses, urban form, and densities envisioned in the Urban Villages approach, Ecocity Builders recommends the following policy shifts and amendments based on an extensive review of current City of Oakland development practices and regulations:

1. Amend the 1998 Land Use and Transportation Element (LUTE) of the City of Oakland General Plan

2. Amend City of Oakland's Zoning Ordinance using Form-Based Codes to encourage diversity of land uses within Urban Villages

3. Create a financial mechanism for infrastructure and public improvements to support the Transportation Hierarchy and the Urban Village

4. Revise the Transfer of Development Rights Ordinance of the City of Oakland to shift densities towards Urban Villages/vitality centers and create additional open space and conservation areas

1. Amend the 1998 Land Use and Transportation Element (LUTE) of the City of Oakland General Plan

Urban planning and land development are primarily guided by the City of Oakland General Plan. The General Plan amendment, specifically to the Land Use and Transportation Element (LUTE), would contain overarching policies to bring the urban village concept to life for all of Oakland.

Recognizing that our daily movements are intricately linked to the urban form, we recommend that the LUTE be amended to improve coordination between land uses and transportation. Whereas, in previous decades, automobile dependence has been closely tied to sprawl, the Urban Villages concept should be supported by a policy emphasis on alternatives to private cars. LUTE policies should support a land use pattern that bring together a wide range of distinct yet compatible uses, so that daily live, work and shopping needs can be met within a small geographic area. The latter goal implies not only a high density but also a high diversity of uses that creates a sense of community and place, to which we refer as Urban Villages.

After amendments are adopted, a more rigorous investigation of each center identified would be completed in the form of an Area or Action Plan. The goal of the Area or Action Plan would be to see how the new General Plan policies would manifest in sub-areas of the city: Where are the consistencies and inconsistencies with the new goals and mandates? This research also identifies what steps should be taken to implement the General Plan policies, whether those be rezoning, changing parking requirements, or other on-the-ground changes. The Form-Based Codes amendments of the Zoning Ordinance would provide the implementing details.

2. Amend City of Oakland's Zoning Ordinance using Form-Based Codes to Regulate Urban Villages

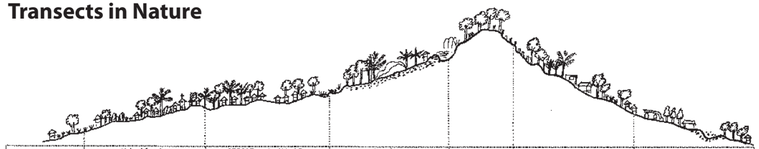
The Urban Village approach focuses to a greater extent on form rather than specific uses as per conventional zoning. We are therefore recommending that Oakland and other cities interested in the ecocity/urban villages approach consider applying an Urban Village form-based codes (FBC) as an overlay or substitute conventional zoning based on land uses.

The following draft FBC zoning overlay framework is based on the concept of the transects. As shown in this diagram, a transect in nature is a geographical cross-section of a region intended to reveal a sequence of environments. It helps study the many symbiotic elements that contribute to habitats where certain plants and animals thrive.

To guide the transition to a form to the built environment that is in closer balance with living systems and based on the principal of "access by proximity" and walkable distances, the Ecocity Transect is divided into five T-zones for application on zoning maps. These five zones vary by the ratio and level of intensity of their natural, built, and social components. They are coordinated to all scales of planning, from the region through the community scale down to the individual lot and building.

Further study and development would be require to build out a comprehensive Ecocity Transect, along with public input and consultation that would go hand-in-hand with the development of citywide Ecocity Mapping and Urban Village Action Plans. In this way, we believe, the FBC would more likely to achieve the desired results of healthy and sustainable development that is informed by the culture and design preferences of the residents themselves.

Transects in Nature



LANDUSE	Upland farming (mixed species of vegetables and rootcrops)		REFORESTATION AREA (Upland farming within reforestation site)		Upland farming (mixed species of vegetables and rootcrops)		Forest	REFORESTATION AREA (presence of kaingin & upland farming)		Upland farming with mixed species of vegetables and rootcrops	
SOIL COLOR	Reddish brown		Redish brown		Dark brown		Dark brown/black	Dark brown		Reddish brown	
FOREST TREES	Trees Cdamansin Coconut Coffee Acacia Mango Nangka Gmelina Gikan	Plants Corn Bagoio beans Kiskis Potola Squash Banana Coffee Sweet potato Bamboo cacao	Trees: Gmelina, Guava, Coconut, Star apple, Mahogany, Marang, Kamansi, Kalamansi, Hinagdang, Coffee, Binuga, Bunga, Pinetree, Nangka, Balite	Crops: Corn, Sweet potato, Taro, Chinese, bamboo, Banana, Hagonoy, Boha-bohe, Pota-pako, Cassava, Papaya, Santow, Wild strawberry, Lumot, Silhigan, hagimit	Trees: Nagol, Binanga, Balite, Alingatong, Tanguile, Tamiyan, Dantayan, Pulasarla, Bahe, Pinetree, Lawaan, Balite, Hinagdang, Bayarti, malakapas	Plants Banana Baging Sawete Corn Tomato Hagimit	Rattan	Trees Gmelina Mahogany Nangka Pinetree Guava Marang	Plants Corn Okra Banana Dankagan Wild strawberry	Trees Gmelina Coconut Mahogany Falcata Tugas Acacia	Plants Dalisai Upland rice Sweet potato Banana Corn Taro
ANIMALS	Chicken, Pig, Carabao, Dog, Cow, Birds		Chicken, Pig, Dog,Birds		Chicken Eben		Kulaksit (bats)			Pig, Chicken, Dog, Carabao, Cow, Birds	
OPPORTUNITIES	- Intercropping of vegetables and rootcrops i.e., corn, sweet potato, squash, taro - available water supply		- Vacant portions of reforestation area can be utilized for agro-forestry		- Tipan spring - good source of drinking water - Area is ideal for agro-forestry			- Vacant portions can be utilized for agro-forestry - Area can be used for agro-forestry - sedentary		- intercropping of vegetables and rootcrops - contouring using napier grass forage - initiated by DAR - LGU initiated mahogany plantation - seedlings were supplied by DENR	
PROBLEMS	Tipan water tub - easily tranpsired - covered with movable zinc sheet, good nesting ground for mosquitoes, leakage in piping, unsafe for consumption		Intensive swidden farming on both flanks		Tipan water source - not safe for drinking due to crude installation of water system, Netbag is used as strainer, plastic pipes are connected with nails (rusting), the pond where spring water trickled is stagnant			Possibility of land slide, erosion			

Source: http://www.iapad.org/transect_mapping.htm

What are Form-Based Codes?

Form-based codes offer a method of regulating development to achieve a specific urban form and create a predictable public realm primarily by controlling physical form, with a lesser focus on land use, through city or county regulations.

Form-based codes seek to influence or regulate:
- The relationship between building facades and the public realm
- The form and mass of buildings in relation to one another
- The scale and types of streets and blocks.

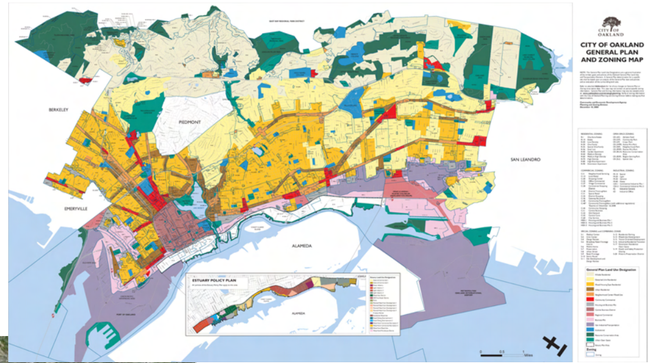
The regulations and standards in Form-based codes, presented in both diagrams and words, are keyed to a regulating plan that designates the appropriate form and scale (and therefore, character) of development rather than only distinctions in land use types. This is in contrast to conventional zoning's focus on the micromanagement and segregation of land uses, and the control of development intensity through abstract and uncoordinated parameters (e.g., FAR, dwellings per acre, setbacks, parking ratios, traffic LOS) to the neglect of an integrated built form. Not to be confused with design guidelines or general statements of policy, Form-based codes are regulatory, not advisory.

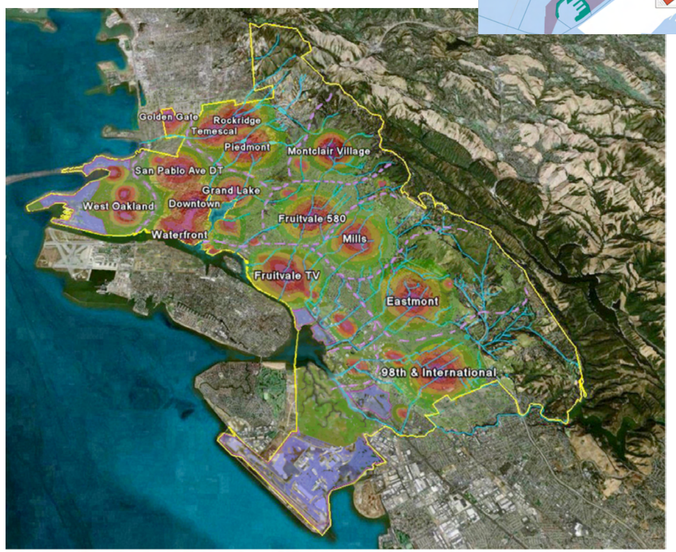
Ultimately, a Form-based code is a tool; the quality of development outcomes is dependent on the quality and objectives of the community plan that a code implements.

Ecocity Builders is suggesting that a form-based approach to zoning for Urban Villages would help define prescriptive land use and development guidelines to help achieve a timely transition from the existing car-based built environment to the Urban Villages model.

City of Oakland General Plan and Zoning Map

The General Plan reflects the long-range vision and policy framework to guide development for the next twenty years in the City of Oakland. The Oakland General Plan consists of a series of Elements. Completed and updated elements incude the Land Use and Transportation Element, the Open Spce, Conservation and Recreation Element (OSCAR), Historic Preservation Element, and the Estuary Policy Pan.





Proposed Transect-Based Zoning Overlay for the City of Oakland

The bands of color in indicate distances and general densities from vitality centers or urban villages. Higher densities are toward the center (pinks and reds) zones, while open space are prioritized farther from centers. The zones correspond to those in our recommendation for Form-Based Codes. This is an one iteration of our ecocity mapping approach; we have further refined this analysis using GIS raster-based analysis as described in Section II.

Urban Village Zone 1

Urban Village Zone 1 consists of the highest density and height with the greatest variety of uses and civic building of regional importance. "Vitality centers" are downtowns, major district or neighborhood centers becoming increasingly companct, pedestrian oriented and functionally diverse. This zone encourages creating car-free areas and bikeways that provide a diversity of activity near transit nodes.

Massing and facades (proposed)

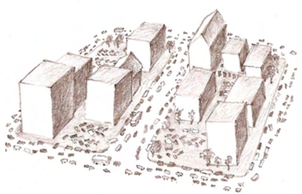
Medium to high-density mixed-use buildings including residential, business, entertainment, civic and cultural uses. Attached buildings forming continuous street walls; trees within the public right-of-way; highest pedestrian and transit activity. Building heights of 4-plus stories with more business and centralized cultural facilities than residences.

Street elements

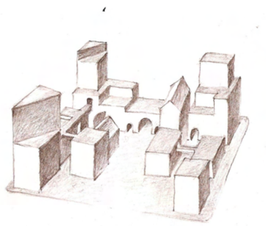
More compact development with greater mixed-uses eliminates dependence on automobiles while helping transit options such as light rail, bicycles and pedestrian walkways. Connectivity between buildings takes the form of bridges between buildings allowing more pedestrian accessibility. Plazas, open air markets and fountains are provided by public access to new open space.

Sustainability elements

Green roofs and ground level gardens, solar hot water and solar electric hardware control reduce storm water run-off and generate on-site local energy. A car-free zone contributes to lower vehicle miles traveled, reduced accidents and local pollution and reduced contribution to global heating.



Existing
Low architectural complexity
Low diversity of uses
Car-oriented urban core



Proposed
High architectual complexity
"Keyhole" public plaza
Pedestrian bridges
Mixed uses

Higher Architectural + Biological Complexity
Rooftop gardens

Urban Village Zone 2

Urban Village Zone 2 represents medium density and height variation from 3-7 stories with occasional taller towers encouraging retail, offices and multi-family uses.

Massing and facades (existing)

The massing in the drawing represents the random pattern in an area adjacent to a downtown in a city or town. Houses tend to be two or three stories. Land uses of multi-family housing and light commercial spaces are present.

Build out

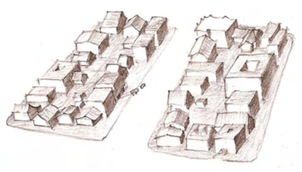
The next illustration, "Proposed," shows removal of a few small buildings and most of a street with several new larger buildings and considerable new open space with gardens and small gathering areas.

Street elements

The central street becomes partially a parking area and the rest is available for walking, biking and socializing, for urban orchard and gardens and occasional small events. Streets that are not removed experience less automobile traffic and, given the higher density and diversity of activity in the inner zones, more efficient transit.

Sustainability elements

Green roofs, ground level gardens and rooftop solar provide energy and views of the bioregion and city. Removing paving helps with groundwater recharge and prevents flooding. As in all zones, there are reductions in car-related accidents, local pollution and contribution to global heating.



Existing

Medium density residential form
Very small private lots

Proposed

Higher density housing
Increased open space
Pedestrian bridges
High architectual complexity

Urban Village Zone 3

Urban Village Zone 3 represents the second ring outside a vitality center. The center street shows the approximate mid-point beyond which, moving outward, density decreases. The illustration labeled "Existing" is a residential area mainly utilized by cars. The drawing labeled "Proposed" features more open space devoted to native plants and birds, food growing, recreation, recycling, sports activities and foot and bicycle paths.

Massing and Facades (proposed)

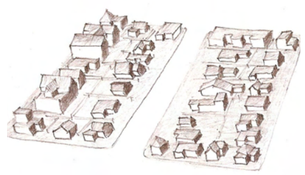
Zone 3 shows little change in overall density, but generally higher toward the center and lower toward the outer edge. Zone 3 will be residential, shifting toward slightly more mixed-use with occasional corner stores and home businesses.

Street elements

Small parking areas on the closed streets allow auto and bike parking. Neighborhood gardens, small gathering areas and mini-parks appear where a few houses have been removed in "willing seller deals."

Sustainability elements

Green roofs and solar hardware provide energy. Increased open space and ground level gardens reduce storm water run-off and help recharge groundwater. With higher density centers relatively nearby and with more variety of uses, Zone 3 residents are less dependent on and generate fewer vehicle miles traveled than in the city represented in this area in the drawing labeled "Existing."



Existing

Low density residential form
Small private lots

Proposed

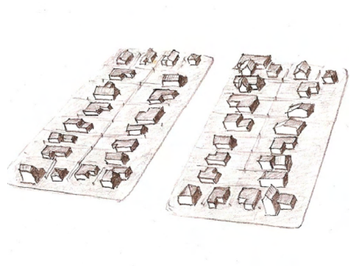
Moderate density at edges
Increased public space in center

Urban Village Zone 4

Urban Village Zone 4 represents the last ring outside a vitality center. In the drawing labeled "Existing" this zone consists almost exclusively of low-density residential development.

Build out

In the "Proposed" drawing, a considerable number of structures are removed and their materials recycled. This leaves room for agricultural and natural land to return. Setbacks can be relatively deep. In this expanding open acreage zone, sports and recreation would be closer to the inner three zones, bring the "countryside"closer to where people live.



Existing

Low density residential form
Large private lots

Sustainability elements

Farms provide locally grown produce, as shown in the "Proposed" drawing, while solar and wind installations provide on-site energy. Bioswales and retention ponds slow down and filter stormwater run-off. Creeks, ridgelines and other natural features can now be restored. With fewer people living in this area and thus less driving, a major contribution to ecological health is achieved.

Proposed

Clustering of houses
Increased open space for parks and agriculture

Urban Village Zone 5

Urban Village Zone 5 represents everything outside Zones 1 through 4. It is restricted to recreation, agricultural and open space uses. Woodlands and grasslands are encouraged to return. Agricultural, forestry and fishing uses are allowed.

Build out

Single family homes are acceptable while agriculture, telecommuting and small ecovillages are encouraged, with buildings of typical heights similar to European compact villages at 1 to 5 stories, or taller as appropriate. Large areas of forest and agriculture return, along with native plants and wildlife.

Existing

Very low density "suburban/exurban" form
Very large private lots

Sustainability elements

Farms provide locally grown produce, while solar and wind farms can provide energy. Minimal paving and rooftop areas allow maximum groundwater recharge and radically reduce run-off relative to today's low-density suburbs. Biodiversity returns to a city with a much smaller footprint. Reforestation will be crucial to sequester carbon from the atmosphere and slow down global warming.

Proposed

Clustering of houses
Regional parks
Agricultural parks

3. Create a financial mechanism for infrastructure and public improvements to support the Transportation Hierarchy and the Urban Village

A financial strategy is a key component of Urban Village development. The City should create clear plans, based on public input, that identify the infrastructure and other essential improvements to the Urban Villages concept and how the funds will be acquired.

Most infrastructure improvements should be considered on a city-wide basis and could include standards for street furniture for pedestrian friendly streets, bike racks, electric car charging stations, and innovations such as street lights that dim at dawn and dusk, in addition to standard functions. Bicycle and Pedestrian Master Plans provide a source for infrastructure improvements that must be reviewed during strategy development.

Since public funds are limited, a strategy that combines public and private investment should be part of the plan. City funding should be included in the five-year City's Capital Improvement Plan (CIP) budget so that as funding becomes available, urban village projects can be implemented.

A basic premise of private investment is to take advantage of land value premiums - the fact that the value of land may be increased by certain public projects or investment, and so it may make sense that those who benefit also share in the cost. At the same time public projects can attract private investment. Possible funding mechanisms include: Transit and Density Premiums; Development Disposition Agreements (DDA's) and Development Improvement Agreements; Redevelopment Agencies and Tax Increment Financing; and Infrastructure Impact Fees.

Transportation Hierarchy for Urban Villages

Ranking based on the amount of GHG emissions per person per trip

Least emissions	Rank	Mode of travel
	1	Walking
	2	Bicycling
	3	Electric bicycles, scooters and carts
	4	Electric rapid transit, such as BART or streetcars
	5	Diesel bus rapid transit
	6	Electric cars
	7	Plug-in hybrids a. electric drive train with onboard fueled generator b. gasoline drive train with electric assist motors
	8	Alternative fueled vehicles and hybrids
	9	Petroleum fueled cars
Most emissions	10	Airplanes

4. Revise the Transfer of Development Rights (TDR) Ordinance to establish additional Conservation and Open Space

Transfer of development rights (TDR) is a market-based technique that encourages the voluntary transfer of growth from places where a community would like to see less development, or sending areas, to places where a community would like to see more development, or receiving areas. The sending areas can be environmentally-sensitive properties, open space, agricultural land, wildlife habitat, historic landmarks or any other places that are important to a community. The receiving areas should be places that the general public has agreed are appropriate for extra development because they are close to jobs, shopping, schools, transportation and other urban services.

TDR is driven by the profit motive. Sending site owners permanently deed-restrict their properties because the TDR program makes it more profitable for them to sell their unused development rights than develop their land. Developers buy the development rights and use them to increase the density of receiving site projects; they do that because these larger projects are more profitable than the smaller projects allowed when development rights are not transferred. In addition to making property owners and developers happy, TDR solves a seemingly intractable dilemma for communities: it gives them a way to achieve critical land use goals using little or no public funding.

We recommend that:

- The Planning Department look comprehensively at areas that can be reverted back to open space, greenbelt, creeks and other natural amenities, as part of General Plan and/or Area Plan updates, and Redevelopment Plan.

- Urban Village Zones 1 and 2 are designated "receiving" sites and Urban Village Zones 3, 4 and 5 are designated "sending" sites, with additional "sending" sites throughout all Zones that are part of contiguous urban creek corridors or other special natural features and open space opportunity sites.

- City Council modify the existing Oakland TDR ordinance to make the tool more effective and supportive of the Urban Village concept.

- Use TDR in conjunction with or in place of eminent domain in Redevelopment areas.

Ecocity Builders crafted a preliminary draft TDR ordinance, enclosed in the Appendix. It is important to note that our recommendation is not simply to create high density throughout Oakland, but rather high density centers contrasting with surrounding areas that have open space. It is also important that high-density areas also incorporate natural features like creeks, greenbelts, or shorelines, as public amenities so that high density urban areas may be enriched by natural features. This is an important quality of life issue.

SECTION IV

Community Outreach & Site Selection

The Urban Villages model is based on the premise that in order to achieve long-term sustainability, a comprehensive and integrated approach is needed. If successful, the model will guide a transition of Oakland's built environment into a new regional vision of economically, environmentally and socially healthy "urban villages" of various sizes and characters, powered largely by clean, renewable energy and linked primarily through walking, public transit, greenways, trails and natural corridors. We are hoping that the model will be adapted to other Bay Area cities to meet goals of greenhouse gas emissions and carbon footprint reduction, climate protection, sustainable development, environmental quality, and increased economic stability.

Working with our project partner, Western Institute of Social Research (WISR) and the City of Oakland Neighborhood Crime Prevention Council (NCPC), we initially selected West Oakland to serve as the project Pilot Area. Criteria for selection included the "stressors" indices developed by Oakland's Human Services Department and used by the Oakland Police Department and others to identify "at-risk" neighborhoods. Early outreach focused on getting to know West Oakland, then refining the pilot project selection and learning about the pilot community we eventually connected with. Our selection process involved introducing ourselves and the project's scope, mission and goals, conducing interviews, small meetings and workshops, gathering information, listening to residents and community representatives and trying to better understand the complex social and political reality that is West Oakland.

We surveyed West Oakland using our Oakland GIS-based mapping system and on-the-ground observations of neighborhood assets (e.g. presence of parks and public transportation) and challenges (e.g. lack of parks and public transportation) in consultation with local leaders identified by community organizations serving as project partners. During this period we further refined the focus of our Pilot Area to concentrate on the Lower Bottoms of West Oakland, shifting away from the Hover/Foster area that we'd initially thought would emerge as the neighborhood focus area. This shift occurred as a natural unfolding of the project based on our outreach and expressions of interest and positive engagement.

We introduced the Urban Village approach and solicited feedback at a series of meetings with community residents and leaders and worked with our project partner WISR to do directed outreach to the community in the targeted Pilot Area. Along with WISR, we conducted interviews with a varied cross-section of neighborhood leaders and other well-informed residents. These interviews provided initial information about community needs and strengths, and informed the planning of neighborhood workshops by identifying likely participants and possible sites for holding the events. These meetings were used as a basis for conducting an assessment of community needs and strengths, and as a vehicle for assessing and mobilizing citizen interest in participating in the eventual action plan.

The outcome of our initial interviews and survey exercises was a summary Vitality and Needs Assessment Inventory, including an assessment of natural resources, transportation infrastructure and land uses, and concentrated social, cultural, and economic activity.

In September 2008, we got a fortuitous boost at the green building trade show and conference, West Coast Green 2008, where the Urban Villages project was showcased in a sustainable design charrette with several hundred in attendance, including some West Oakland community leaders and residents. Ecocity Builders co-organized and led the charrette, which generated a number of useful design ideas and recommendations and identified new project supporters and collaborators. The charrette also enjoyed a positive review in the San Francisco Chronicle, *West Coast Green tackles a sustainable future for West Oakland,* SF Chronicle, Oct. 7, 2008.

A project milestone was the establishment of a synergistic relationship with a neighborhood organization located in the Lower Bottoms (aka the Prescott neighborhood)—the Village Bottoms Community Development Corporation—who define their scope of outreach as roughly 7th Street to 24th Street and Peralta to Pine Street. We formed a positive and productive and strategic anchor partnership with the neighborhood, with additional supporting partnerships emerging with the West Oakland Environmental Indicators Project, Oakland Technology Exchange West, Urban Releaf, and others. We believe that the Lower Bottoms neighborhood constitutes a promising focus area in existing community leadership, vision, and in land use existing conditions and potential.

Community leaders in the Village Bottoms, we found, are already well-educated in issues regarding land-use, zoning, and sustainability. A primary need, however, is support for their comprehensive vision for the future and a roadmap and strategy that supports their sustainable economic, environmental and social development goals. Hence the Urban Villages Project, we found, is timely and relevant to this community who is looking for a way to define, organize and advance their vision of sustainable community, local job creation and greater social security and cultural identity.

Notes from Analysis and Interviews with Community Leaders in West Oakland

1. Police
Residents generally said that policing techniques in their community were often aggressive and adversarial. Many said that police only typically enter the neighborhoods with guns drawn to arrest suspects or question people in a confrontational tone. So, although there is policing happening, the approach used by police, they feel, does not make them feel safer.

2. Library
Residents said that library services could be improved. A common observation was that libraries were the only place where most residents can access the Internet, but that the short amount of time allowed online was insufficient to complete important tasks like job searches and online applications.

3. Shopping
Almost all residents indicated a severe lack of basic shopping opportunities in the community.

4. Grocery
Mapping and interviews show clearly that residents of West Oakland lack access to grocery stores and healthy food choices, although an abundance of fast food/convenience/liquor stores abound.

5. Employment
Mapping and interviews show that West Oakland lacks basic employment opportunities. Unemployment is high. Those with jobs, often

Inventory of Vitality Attributes for West Oakland Pilot Area

		Good	Fair	Poor	None
Public Services					
1	Courts/Police/Halls			**x**	
2	Libraries			x	
	Doctors			x	
	Community Health Facilities			x	
	Rec Centers			x	
	Educational Institutions			x	
	Senior Centers		x		
	Child Care		x		
	Hospitals			x	
	Shelters			x	
	Fire Station		x		
Retail Services					
	Entertainment			x	
3	Shopping			x	
4	Grocery			x	
	Banking			x	
	Food			x	
	Tourist Locations			x	
	Farmer's Markets			x	
Employment					
	Hospitals			x	
	Industry			x	
	Gov Buildings			x	
5	Other			x	
Transportation					
	Bike Routes		x		
	Bus Route	x			
	Pedestrian Routes		x		
	BART Station	x			
Housing					
	Public Housing		x		
	Single Family Housing		x		
	Multi-Family Housing		x		
	Assisted Housing		x		
Natural Amenities					
	Streams/ Creeks				x
6	City Parks		x		
	Community Gardens			x	
7	Historic Sites		x		
8	Clean air			x	
9	Soil			x	
	Water		x		
10	Sun	x			
11	Wind		x		
12	Trees and greenery/views to nature			x	

women with families, typically have to travel long distances to and from low wage service jobs. The long commutes put extra burden on families already at risk due to poverty and proximity to crime and drugs.

6. Parks
Residents reported that competition for use of parks and recreational fields by organized sports teams is excluding those who want to play informally. Children of families who can't afford to pay for organized sports programs are often shut out of their neighborhood park by teams from other areas in Oakland who have made advanced reservations for field use.

7. Historic Sites
West Oakland residents said that there is no lack of history and of historic sites in the neighborhood. The problem is that the buildings are becoming dilapidated and there are insufficient community resources to repair and maintain the historic homes.

8. Clean air
It is no secret that West Oakland has poor air quality. The residents and community leaders we talked to are upset and frustrated. They believe that the discussion about land uses can help sort out potential solutions and help the community prioritize for taking actions to improve the air quality in their community.

9. Soil
Almost all the land in the West Oakland Pilot Area is contaminated due to current or prior industrial use. Some areas are "toxic hot spots" and will require expensive environmental remediation if the soil is to be restored to safe levels. However there still remains a high potential for innovative community land use strategies such as greenhouse-based urban farming operations, and we are currently actively pursing this option with the Lower Bottoms neighbors.

10. Sun
The West Oakland Pilot Area enjoys mild weather, often with sun, and the potential for solar thermal, solar electric and passive solar heating through building orientation and other green building methods is generally good.

11. Wind
An initial wind analysis shows that although there is a fairly consistent breeze, the wind currents are not quite strong enough to support wind energy generation economically. Also worth noting is that the breezes also tend to blow dirty air from the freeways and Port of Oakland into the pilot neighborhood. A program of tree or bamboo planting could be one way to help filter the air and our project is looking into to the possibilities.

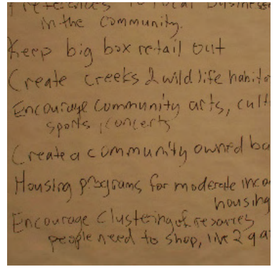
12. Trees/Greenery/Views to Nature
Mapping and on-the-ground observation shows that the West Oakland Pilot Area has comparatively poor tree covering, less greenery and fewer celebrated views to nature than other areas of Oakland.

Community Outreach
Urban Releaf

In the summer of 2008, Ecocity Builders as part of the project's outreach process approached Urban Releaf, an urban forestry nonprofit established to address the disproportionate absence of greenery in West Oakland. In partnership with Urban Releaf staff, Ecocity Builders implemented a neighborhood photography project to inventory on-the-ground conditions in West Oakland. Urban Releaf staff and volunteers captured existing needs and assets in the community.

The neighborhood photographers identified some of the greatest needs and concerns in West Oakland, including:
- A grocery store that isn't a corner/liquor store
- A bank
- Lack of trees, parks, and other greenery
- Access to jobs and job training
- Antagonistic police presence and youth crime
- Threat of displacement and gentrification

The photos on this page reflect their on-the-ground inventory, which the Urban Releaf team presented at a charrette convened by Ecocity Builders at West Coast Green 2008 in San Jose, CA.



Community Outreach
Village Bottoms Community Development Corporation

Our outreach engagement with the Village Bottoms Community Development Corporation proved to be fruitful. Community leaders comprised of artists, philosophers, and activists provide services to the community at-large in the form of affordable housing and first-time homebuyers assistance, business incubation, and cultural preservation in this historic neighborhood. We selected this community as a Urban Village pilot site because a strong community vision already exists for the holistic revitalization of the Village Bottoms Cultural District.

One of the core projects in the Village Bottoms Cultural District effort is the urban farm. Locally supportive agriculture, access to food by proximity, and reducing waste through composting and material reuse are all values and activities compatible with the Urban Villages idea and can potentially reduce greenhouse gas emissions. The community's vision is to build an aquaponics farm growing fish and then reusing water for irrigation of microgreens. Ecocity Builders and Village Bottoms leaders attended a training on aquaponics farming with Growing Power in Milwaukee, WI.

Mapping Community Resources

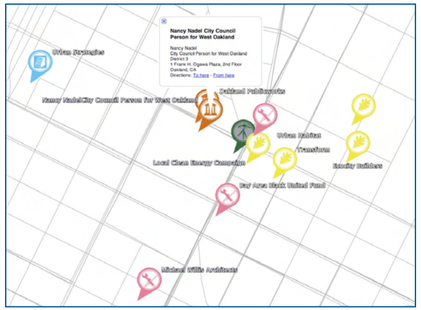
As part of the community outreach process, Ecocity Builders and WISR engaged in one-on-one conversations with community-based, nonprofit, and government organizations that were knowledgeable about the conditions in West Oakland. We contacted and built relationships with 43 organizations in Berkeley and Oakland working to address community and economic development, cultural, food security, and environmental issues in West Oakland.

We learned through our conversations that some of these organizations may be working on similar issues and their work could be strengthened through a network for resource sharing and collaboration. To highlight the wealth of community resources, and to visualize the extent of of our outreach, Ecocity Builders mapped the organizations and community leaders that we, along with our outreach partner, Western Institute for Social Research, engaged with.

The Community Asset Map is intended to be efficiently used and modified in Google Earth, but is also available to the community in paper form.

Community Asset Map

Zoom in of Community Assets, Downtown



Zoom in of Community Assets, West Oakland

Community Resources for West Oakland

Cultural
100 Black Men (Bay Area)
Bay Area Black United Fund
Black Dot Artists, Inc.
Gregory Chisholm, SJ, Jesuit School of Theology
Prescott Joseph Center
The Crucible

Community & Economic Development
B. O. S. S.
Bay Localize
Bruce Beasley
Cypress Mandela Training Center
Davillier-Sloan
East Bay Depot for Creative Reuse
Ella Baker Center for Human Rights
Holliday Development
Oakland Technology Exchange
Urban Habitat
Urban Strategies
Village Bottoms Neighborhood Assoc.
Western Institute for Social Research
YMCA of the East Bay

Food Systems and Security
Center Street Farm
City Slicker Farm
Mo' Betta Foods
OBUGS
People's Grocery
Ralph Bunche School Nursery
The Herb Farm
West Oakland Woods Farm

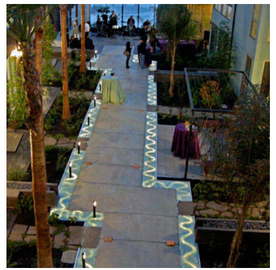
Environment/Energy/ Planning & Design
Community Energy Services
Ecocity Builders
Ecology Center
Local Clean Energy Campaign
Hood Design
Michael Willis Architects
Rising Sun Energy Center
StopWaste.org
TransForm
Urban Releaf
West Oakland Environmental Indicators Project

Government
Nancy Nadel, Councilwoman
Carletta L. Starks, Office of Councilwoman Nancy Nadel
City of Oakland Public Works
City of Oakland Community and Economic Development

Our next task was to help the neighborhood refine its vision for its short and long term sustainable development and start crafting the Village Bottoms Action Plan. Our overall strategy was to divide and think about the larger area as three main zones: the West Oakland BART station area and immediate neighborhoods; Pine Street and the Village Bottoms neighborhood; and the area around Central Station (16th and Wood Street).

Within the larger Pilot Area and in accordance with the broader vision of Oakland's emerging Urban Villages as prescribed by the previous mapping exercises, the West Oakland BART area emerges as the higher density center. Pine Street and the Village Bottoms neighborhood is strengthened and restored as a lower density mid-section and connector, with increased areas opening up for urban agriculture and local job incubation envisioned as part of a new Black Cultural District, as advocated by the Village Bottoms Neighborhood Association. The Central Station area starts to be defined as a medium density neighborhood center.

The next step for this project, working in partnership with the neighborhood, is to try and activate the Action Plan as quickly as possible by attracting resources and appropriate partners in its development. One of the residents' stated reasons for a fast pace in the pilot neighborhood is that they see a short window of time to propose their community vision for sustainable development against what they see as the tide of gentrification likely coming their way. They feel that the sooner they develop and propose a community initiated long-range land-use plan and plan for economic and cultural revival, the more likely they are to remain a viable and growing partner in the community.



Section IV

Village Bottoms Action Plan

Vision

- Activate Pine Street as a retail and cultural destination serving West Oakland
- Increase self-determination, self-reliance, and ecological resiliency within the community
- Prevent displacement through equitable partnerships, land ownership, and "bottom-up" planning.

While the ecocity vision inspires us to see the city of the future re-made "whole cloth", West Oakland presents itself today as a ragged and torn quilt; missing pieces, that don't fit, torn and worn by economic and social forces. The threads, however worn, are holding thousands of lives and stories together, woven through the fabric of the built environment down to the industrial parcels and the soil itself where new roots have been established by descendants of the African Diaspora.

As a local but clearly "outsider" nonprofit engaging with an established Black community in an historic Black neighborhood, our role was to listen, learn and support; to determine whether our services could be of use, or if indeed we even needed to be there at all. As we engaged with neighborhood leaders, we quickly saw that the people who live there are actively involved in what can be seen as an exercise in community quilting; repairing pieces, replacing some, and using what's on hand to re-make the fabric of West Oakland, specifically the Lower Bottoms, into something beautiful and sustainable (culturally, economically and ecologically).

At Ecocity Builders, this analogy to African-American quilting was instructive and inspiring. Using what's nearby, working within or modifying traditions and patterns, building a social network through shared labors (the quilting bee), and working urgently but with an intuitive eye for beauty and for the big picture.

The plan outlined in these pages attempts to show a community's emerging plan for a new urban fabric that includes a vibrant neighborhood and cultural district. The primary architect is undoubtably Marcel Diallo, a Pine Street resident, artist and community builder, who works alongside members of several engaged neighborhood organizations, namely the Village Bottoms Community Development Corporation and nonprofit Black Dot Artists, Inc.

All things reused, recycled and reclaimed are put into play in this concept of community building. Truly, the Village Bottoms neighborhood is engaged in perhaps the "greenest" urban experiment in the Bay Area today. The lot at 10th and Pine is the kickoff for the most recent phase of the emerging Village Bottoms plan, where the community has already built the first of a series of aquaponic (fish and greens) closed-system urban farms. Planter boxes, worm bins and compost bins are fed by the organic wastes from local cafes, coffee shops and breweries forming the building blocks of a new local enterprise. Wood for the aquaponics systems was milled in the neighborhood using trees harvested from Oakland's urban forest. The entire operation is modeled on a low cost, high yield method pioneered by MacArthur Genius Awardee Will Allen, operating out of Milwaukee Wisconsin. Allen, the son of a sharecropper, was a professional player in the NBA and spent several decades working in corporate America before returning to his roots and launching a revolution in urban farming. The Village Bottoms Farm is adapting some of Allen's concepts of intense vertical growing to their operation.

According to Diallo and associates, the goal is to not only grow and distribute affordable, healthy food, but to also grow self-determined, self-reliant people in the historic Village Bottoms Cultural District. They are already inspiring African-Americans to reengage with the land through urban gardening education, internships, jobs, compost service, and distribution of affordable food through a retail store and farmer's market on Pine Street.
Diallo sees the farm as part of a larger vision for the Village Bottoms Cultural District, an effort to maintain a serious Black cultural presence in West Oakland in the face of rapid gentrification. To date, the Village Bottoms has seen the establishment of The Black New World Social Aid & Pleasure Club, The Black Dot Cafe, Nganga Diallo's House of Common Sense aka The Juju Shop, Cornelia Bell's Black Bottoms Gallery and OT Jackson's Flophouse.

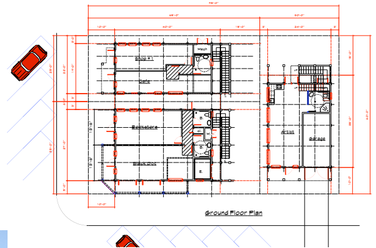
The Action Plan for future development features shipping container artist studios and retail opportunities along with elements drawing from the cultural mecca of New Orleans — plaza, parade route, museum, cafes and architectural features like street front balconies and porches. New Orleans was the point of entry into America for many enslaved African peoples whose descendants are now residents of the Lower Bottoms. During World War II, they came to Oakland and the East Bay to work in the ship yards and steel factories. Their stories are profound and poignant. Their life journeys will be celebrated through the offerings of this emerging cultural district, where the voices and struggles of the past will be preserved and woven into the present with an eye to a more equitable and sustainable future.

Neighborhood history

Pine Street Timeline

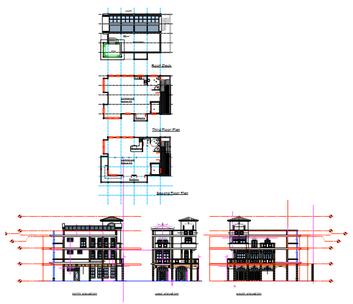
[design + planning + action]

Black New World
Performance Venue
Grand Opening



2006

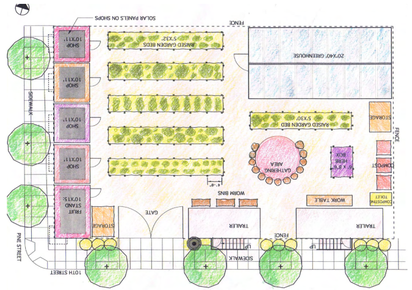
Pine Street @ 10th
[Mixed use development scheme]



2007

2008

Black Dot Cafe Opens
[w/ Pacific Cannery Lofts]



2009

Village Bottoms Farm
[Aquaponics = Tilapia Fish + Baby Greens]

Village Bottoms Action Plan
[Cultural District Armature]






Neighborhood opportunities

Vitality Clusters

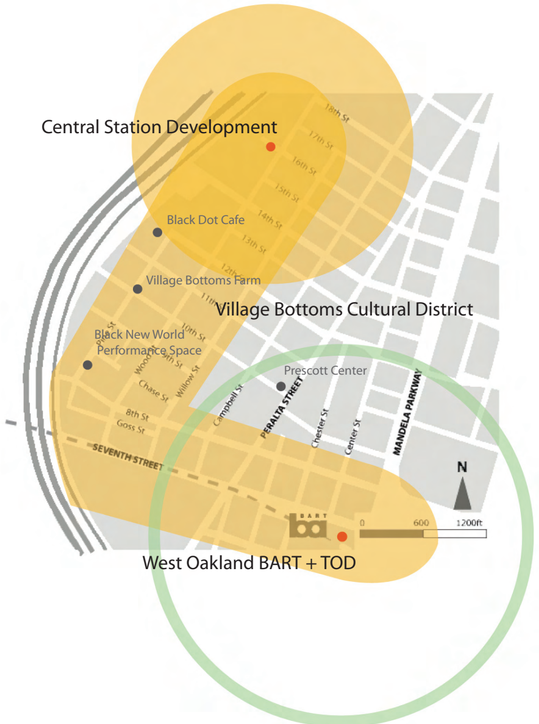
[Analysis + Adaptation of the West Oakland Urban Village]

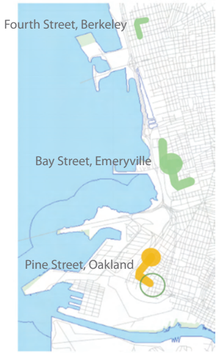
Extensive GIS analysis and mapping based on current zoning and land use determined that the West Oakland BART and TOD was the most suitable site for Urban Village Development. However, the emerging large scale development at Central Station, and the civic activities of the Village Bottoms Neighborhood Association revealed a more complex village structure.

Additional community outreach and qualitative analysis by Ecocity Builders also lent further weight to the idea of a multi-modal urban village with two dense transit centers connected by an axis of economic and cultural activity.

The map at right highlights these two transit hubs, as well as the emerging economic activity along the Pine Street corridor.

Ecocity Mapping provided the quantitative city-scale approach to locating urban villages.





The Village Bottoms District fits within a well established pattern of economic/retail development along the western edge of the East Bay. However, while the Bay Street and Fourth Street districts are typically visited by car, the Village Bottoms District will be also be easily accessible by train, foot, and bike. In addition, the district will also be woven into an existing and emerging neighborhood that desperately needs retail access.

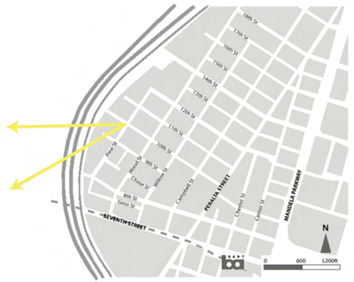
Village Bottoms Cultural District at Pine Street

[Site Constraints + Potential]

A great deal of grassroots neighborhood planning had already taken place at Village Bottoms prior to it being identified as a urban village site with high potential. Therefore, it was necessary for Ecocity builders to compile this existing site information, while also completing additional community outreach and physical inventories.

These maps are intended to consolidate much of the planning work that has taken place in the neighborhood since 2006, while also providing a spatial and formal foundation for the Village Bottoms Conceptual Plan.

Much of the site information was obtained from the Village Bottoms Neighborhood Association. Site inventories, design charrettes, and planning research were also conducted by Ecocity Builders.



Viewshed

Villages Bottoms Cultural District

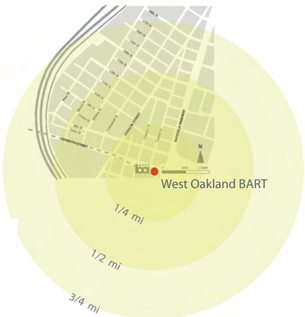
Vacant Lots

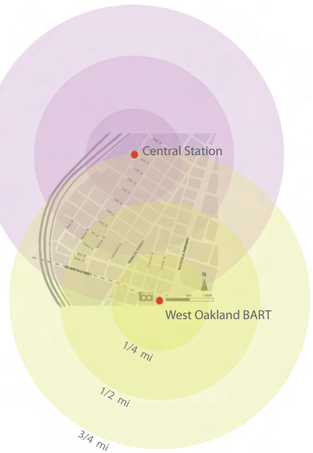
- Business Mix
- Community Commercial
- Housing & Business Mix
- Institutional
- Mixed Housing Type
- Neighborhood Center
- Urban Open Space
- Urban Residential

Land Use Designations

Bike Path
Pedestrian
Auto
Bus

Circulation Networks





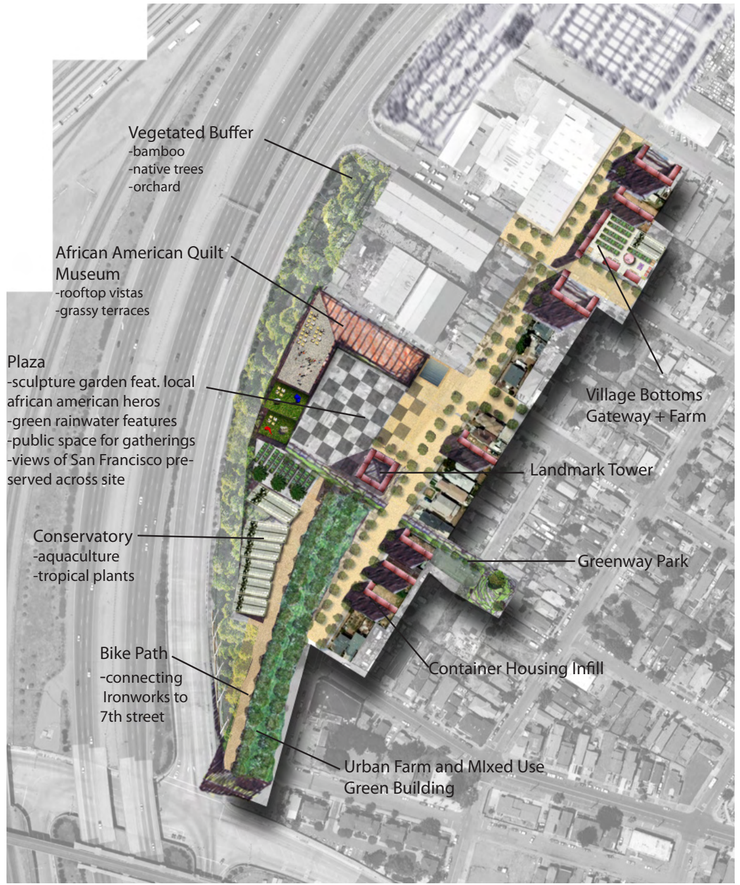
1 ring = 1/4 mile = 5-minute walk

Air Pollution

Village Bottoms Cultural District [in context]

After several years of analysis, planning, and small-scale development projects, Black Dot Artists, Inc. and Ecocity Builders have woven together a design framework for the *Village Bottoms Cultural District* plan. The purpose of the following plan is to highlight the balance between grassroots improvisational development, large scale building projects and the myriad of interests involved in the neighborhood. The resulting armature is intended to reveal the overall neighborhood structure, character and aesthetic, while maintaining flexibility.

The emphasis is on activating Pine Street as a destination for retail and cultural offerings and as a connector between West Oakland's traditional center near the BART station to the east and the nearby Central Station housing explosion now underway directly to the north.



Village Bottoms Cultural District [Conceptual Plan]

Urban Design

Paris meets Africa at the Ironworks site where the brownfield is transformed into a dynamic public space anchored by an African American Heritage Museum, featuring hundreds of quilts and cultural artifacts, as well as a tropical plant conservatory.

The plaza and green terraces house a sculpture garden featuring tributes to local black heroes, as well as local artwork. Towers made of shipping containers mark gateways to the neighborhood.

Brick street pavers mimic New Orleans, sidewalks are enlarged for cafe seating, and rainwater is brought to the surface.

Landscape

Urban agriculture produces food and reduces the neighborhood carbon footprint.

Rainwater from the plaza and the museum is channeled to a dynamic and artful water feature.

A vegetated buffer strip is used to filter pollution from the nearby freeway and port, while also functioning as a productive urban forest.

The Greenway park provides a more direct pedestrian route to BART, as well as space for an ecological and agricultural park.

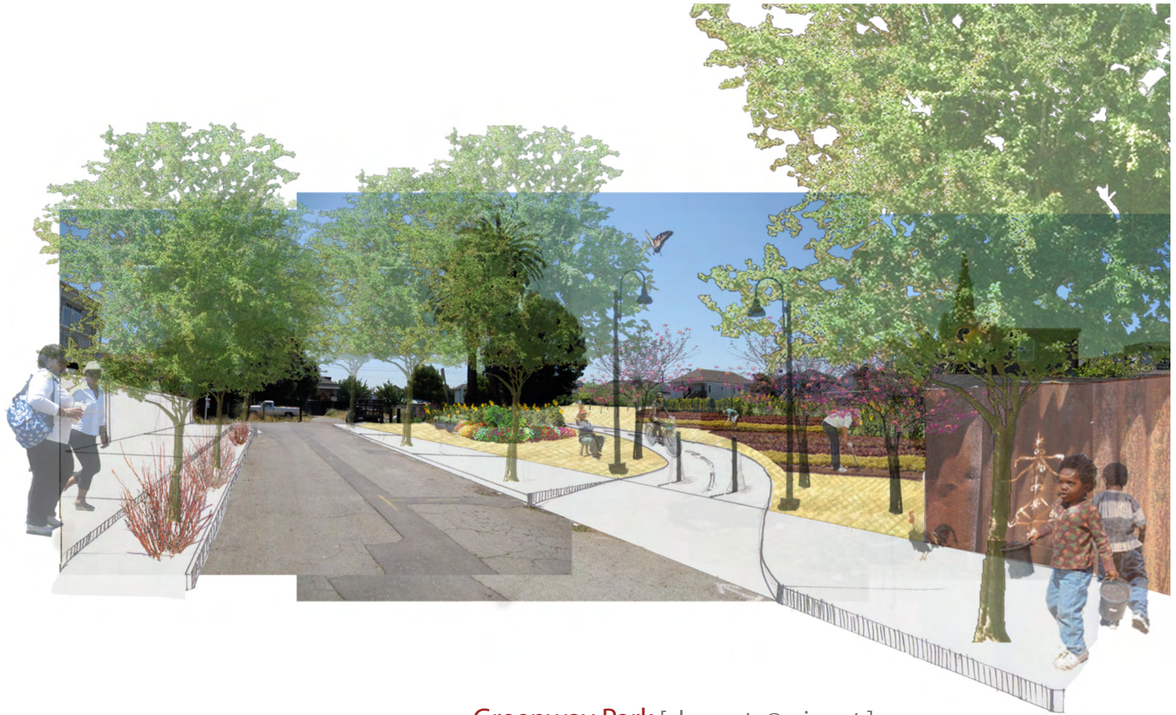
A bike path connects the former Ironworks to 7th street which in turn connects the waterfront to BART and downtown Oakland.

Pine Street @ Village Bottoms [activated]

This conceptual illustration highlights many of the key features of the Village Bottoms Action Plan. Higher density buildings with first floor retail that use local and inexpensive materials such as shipping containers. Street life that celebrates local resident's historical relationship to industry and to New Orleans.

Village Bottoms District Gateway [pine st. @ tenth]

The intersection of Pine street and 10th serves as a key gateway to the Village Bottoms Cultural District. This conceptual drawing emphasizes the importance of higher density along this street, first floor retail and produce market, flexible artisan/agricultural space, and enhanced pedestrian corridors. The building architecture combines the local aesthetic of shipping containers with second and third story streetfront porches indigenous to New Orleans.



Greenway Park [chase st. @ pine st.]

This conceptual image features a crucial component of urban village mapping: shifting densities. Vital areas are further densified while open space is consolidated for sustainable/ agricultural parks and greenways. In the Lower Bottoms, much of the open space takes the form of vacant lots. This particular cluster of undermaintained lots was identified as having the potential to hasten the walk to and from the West Oakland BART station.

SECTION VI

Greenhouse Gas Benefits

Looking ahead to implementation strategies for AB32 and SB375, the analysis in this section projects reasonable estimates of greenhouse gas (GHG) emissions from vehicle miles traveled by personal car and home energy consumption in Oakland's Urban Villages to 2020 under:

1) A business-as-usual scenario;
2) An Urban Village scenario with a 20% increase in density; or
3) A solar energy on rooftops scenario.

Oakland's Urban Villages neighborhoods have their origin in the historic trolley lines (Labeled A – H, Figure 1) and have been institutionalized in the zoning patterns as commercial and retail districts. Each village center already has a mix of uses to build upon (Miller 2005; OIO 2007; Schecter et al. 2006). Currently, they are home to about 117,000 of Oakland's 415,000 people (Wikipedia Contributors 2007). According to the 2000 Census, about 70% of the 52,000 households in these urban villages are multifamily units and 30% are single family units.

Oakland's Urban Villages can save Oakland 160,000 barrels of oil per year, or an equivalent to 67,200 tons CO_2, by 2020. A combined approach of 20% densification and solar rooftops installation would yield the above reductions in GHG emissions, while a 20% densification in Oakland's Urban Villages only will yield greater emission reductions than the solar rooftop approach alone.

Baseline Consumption/Business-As-Usual Scenario

In the current business-as-usual scenario, Oakland's Urban Villages consume a total of 1,159,600 bbl, or 487,032 tons of CO_2, per year. Taking the average areas of actual homes listed on City of Oakland property records, we took the average single-family home to be 1,600 square feet and the average multi-family unit to be 1,000 square feet (GISC 2007). We used these average figures into the Berkeley Institute of the Environment's Lifecycle Carbon Footprint Calculator (Jones 2005; Berkeley Institute of the Environment 2007), which considers oil consumption in a household to include space heating, electric costs and other energy costs, as well as costs for the construction, maintenance, water and sewerage. Based on assumptions from the Lifecycle Carbon Footprint Calculator, the average Oakland single-family household in 2000 consumed 25 barrels of oil per year (bbl/y), or 10.5 tons of CO2e per year, compared to only 16 bbl/y, or 6.7 CO2e per year in a typical multi-family unit (Table 1).

Oakland's Urban Villages are shaped by historic trolley lines
Figure 1

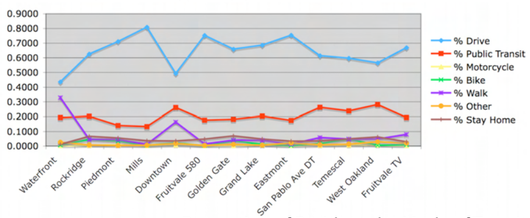
	# households	Area (sq. ft.)	Tons CO_2/HH	BBL
single-family home	36,400	1,600	10.5	25
multi-family unit	15,600	1,000	6.7	16

Assumptions of Energy Uses of the Average Home in BBL
Table 1
Source: BIE Lifecycle Carbon Footprint Calculator

The conversion from CO_2 emissions to presumed consumption of BBL equivalents could vary depending on assumptions of type of fuel (natural gas, gasoline, crude petroleum) because they all vary in amount of carbon and amount of useable energy. Farrell & Brandt (2006) estimate crude to emit 25 g carbon per mega joule. This would convert to .56 metric tons CO_2 per barrel. Bürer et al (2004) estimates a different rate savings bbl to CO_2 savings for each case study using regression ranging from .33 low to .52 high. The differences are based on differences in "upstream emissions" of assumed. Natural gas would emit .30 metric tons CO_2 per barrel equivalent (Aube 2001). Since Alameda County uses relatively clean electricity and natural gas (CARMA 2007), this memo assumes a middle range of .42 metric tons CO_2 per bbl for housing unit consumption.

GHG Reductions from Increasing Densities

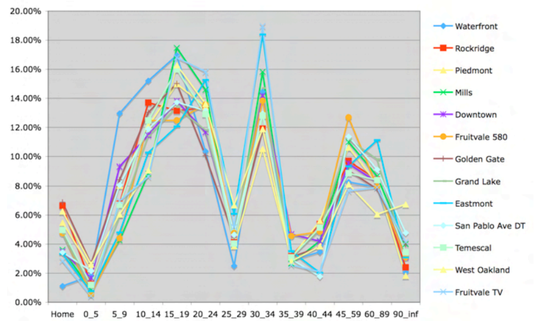
In these households, according the 2000 Census, 66% drive to work for an average of 30 minutes at 20 mpg each way (Figures 2 & 3). Driving to work consumes almost 990,000 bbl/y or emits 415,800 tons of CO_2 annually. By 2020, assuming the same mix of housing, population trends are reflected in housing starts, and car efficiency improves to an average of 35 mpg, this consumption will decrease to 650,000 bbl/y. Improved fuel efficiency alone would save 56,000 bbl/y or 23,520 tons CO_2.



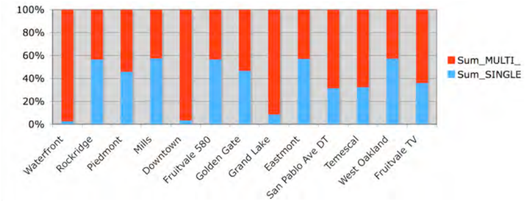
Proportion of Residents by Mode of Transit
Figure 2
Source: Census 2000

However, more can be done by increasing the proportion of multifamily housing. Burer et al (2004) studied the energy savings of greenfield developments in contrast to infill developments in the Bay Area and other metropolitan areas. They showed that higher density neighborhoods reduced vehicle miles traveled (VMT) per year and, in turn, oil consumption.

Using estimated reductions in VMT from Burer et al, we project that if the City of Oakland can increase the proportion multi-family units by 20% in urban villages with less than 90% multi-family units (Figure 4), it can reduce consumption to 594,777 bbl/y, or 249,806 tons of CO_2 per year (Table 2). This represents a reduction of about 40% from the 2000 baseline scenario, over and above GHG emission reductions from fuel efficiency improvements.



Distribution of Commuting Times in Minutes
Figure 3
Source: Census 2000



Proportion of Single-Family vs. Multi-Family Units
Figure 4
Source: Census 2000

GHG Reductions from Installing Rooftop Solar

Additionally, Oakland can promote the use of solar energy to substitute GHG-emitting sources as currently encouraged by a combination of state and Federal tax credits and rebates. Neighboring Berkeley has gone a step further to allow homeowners to amortize the purchase of a solar unit onto their property tax bill: The city pays for the installation and the owner and successors pay off the installation on their property tax bill.

Using energy saving assumptions from the BIE Lifecycle Carbon Footprint Calculator, if each home derived 50% of its heating needs from solar thermal to substitute natural gas, this would reduce citywide consumption to 840,000 bbl/y, or a 27.6% or 134,232 tons of CO_2 reduction over a business-as-usual scenario.

If every housing unit derived 80% of its electricity from solar PV, citywide oil consumption could be reduced to 740,000 bbl/y, representing a 36% or 176,232 tons of CO_2 in reductions.

NAME	Ave Minutes per day	Number Drivers in 2000	*BBL at 20 mpg*	Projected Number Drivers BAU 2020	*BAU BBL at 35 mpg*	New Drivers with 20% increase MF	*New Housing Mix BBL at 35 mpg*
Waterfront	27	816	*11757*	934	*7691*	1129	*9295*
Rockridge	28	7893	*116846*	9036	*76437*	9783	*82754*
Piedmont	27	3803	*55265*	4354	*36153*	3886	*32270*
Mills	31	7473	*124127*	8555	*81200*	7210	*68429*
Downtown	29	4707	*73016*	5389	*47765*	5775	*51187*
Fruitvale 580	31	5626	*91220*	6441	*59673*	5801	*53746*
Golden Gate	28	2529	*37537*	2895	*24556*	2802	*23768*
Grand Lake	31	12481	*204102*	14288	*133517*	11371	*106254*
Eastmont	32	3022	*51806*	3460	*33890*	3115	*30519*
San Pablo Ave DT	31	2947	*48953*	3374	*32023*	3163	*30025*
Temescal	29	7237	*110595*	8285	*72348*	8053	*70325*
West Oakland	30	823	*12900*	942	*8439*	1135	*10162*
Fruitvale TV	31	3716	*60085*	4254	*39306*	3783	*34955*
TOTAL	**30 (ave)**	**63073**	***994661***	**72206**	***650678***	**66003**	***594777***
Change from 2000				**9133**	***-343983***	**-2930**	***-399884***

Projected Change in Energy Use from Increasing Multi-Family Units by 20%
Table 2

The estimates were derived by first taking the difference in carbon emissions emitted by the average single-family home (1,600 square feet) and multi-family units (1,000 square feet) from a grid-powered house to a PV and thermal unit (Table 3). Next, the carbon savings of the solar PV and thermal units were used to calculate how much CO2 would be saved by reducing the electric and gas inputs. These CO2 savings were converted using the assumptions in Table 1. The savings are multiplied by the number of single-family and multi-family homes in each urban village (Table 4).

Ave. sq. ft.	Power Source	Emitted Metric Tons CO2/HH	Consumed BBL/HH	BBL Savings of MF Unit vs. SF Unit	BBL Savings Solar vs. Grid
1600	Grid	10.5	25		
1000	*Grid*	*6.7*	*16*	*9*	
1600	Solar PV	8.4	20		5
1000	*Solar PV*	*4.8*	*11*	*9*	*5*
1600	Solar Thermal	8.4	20		5
1000	*Solar Thermal*	*5.8*	*14*	*6*	*2*

CO_2 Emission Reductions by Installing Rooftop Solar by 2020
Table 3

	Baseline		Projected (Business-as-Usual)		Projected (PV)		Projected (Thermal)	
YEAR	*2000*	2000	*2020*	2020	*2020*	2020	*2020*	2020
Housing Type	*Single Family*	Multi-Family	*Single Family*	Multi-Family	*Single Family*	Multi-Family	*Single Family*	Multi-Family
Power	*Grid*	Grid	*Grid*	Grid	*Photo Voltaic*	Photo Voltaic	*Solar Thermal*	Solar Thermal
Waterfront	*693*	16340	*794*	18706	*635*	12861	*635*	16368
Rockridge	*74146*	36546	*84882*	41838	*67906*	28764	*67906*	36609
Piedmont	*25749*	19504	*29478*	22329	*23582*	15351	*23582*	19537
Mills	*66406*	31500	*76021*	36062	*60817*	24792	*60817*	31554
Downtown	*7159*	131802	*8196*	150887	*6557*	103735	*6557*	132026
Fruitvale 580	*46381*	22812	*53096*	26116	*42477*	17954	*42477*	22851
Golden Gate	*26166*	19142	*29954*	21914	*23964*	15066	*23964*	19174
Grand Lake	*21646*	148402	*24781*	169891	*19825*	116800	*19825*	148654
Eastmont	*32235*	15514	*36903*	17760	*29522*	12210	*29522*	15540
San Pablo Ave DT	*21839*	30583	*25001*	35011	*20001*	24070	*20001*	30635
Temescal	*48757*	65228	*55816*	74673	*44653*	51337	*44653*	65339
West Oakland	*11307*	5372	*12944*	6149	*10355*	4228	*10355*	5381
Fruitvale TV	*28272*	32162	*32366*	36819	*25893*	25313	*25893*	32217
TOTAL	***398383***	**479566**	***456069***	**549007**	***364855***	**377442**	***364855***	**480381**
Change from 2000			***57685***	**69440**	***-33529***	**-102124**	***-33529***	**814**

Projected Change in Energy Use from 2000 Baseline from Installing Rooftop Solar in Urban Villages (in bbl/y)
Table 4

This analysis shows how a combined approach of a 20% densification and rooftop solar installation would save 160,000 bbl/y, or 67,200 tons of CO2. While this analysis illustrates greater GHG emission reductions from densifying urban villages than from rooftop solar installation, it is likely that as energy costs rise, solar power will become more profitable. Current investments by homeowners and the public sector will probably pay for themselves over the lifetime of the equipment. Grid-delivered solar electrical energy would also present efficiencies of scale over household-scale solar installations. However, such detail is beyond the scope of this report.

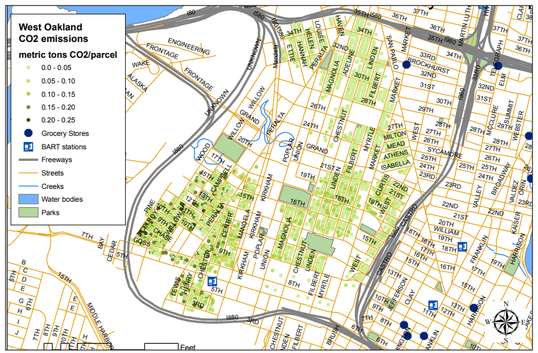
The cost of promoting density is more difficult to estimate, depending on the types of incentives offered. New construction is often subsidized with a combination of grants, tax incentives and demand-side vouchers for low-income families. Density bonuses could be offered to developers participating in a Transfer of Development Rights program as we proposed in Section III. Care would have to be made that rising property values driven by increased open space and attractive amenities would not drive out low-income families, or displace the unique cultural heritage of each Urban Village.

GHG Emission Reductions of Proposed Actions in West Oakland

Soul Food Co-operative

Ecocity Builders examined how introducing a grocery store into West Oakland would improve CO_2 emissions related to grocery store trips in the neighborhood. One of the proposed initiatives within the Village Bottoms Cultural District is the Soul Foods Co-operative. Located on Pine Street near the Pacific Cannery Lofts development, the grocery store would be within walking distance of many residential parcels in West Oakland.

Figure 5 depicts current day CO_2 emissions per residential parcel in West Oakland. Due to the presence of a grocery store north of West Oakland, northern parcels have far fewer emissions than

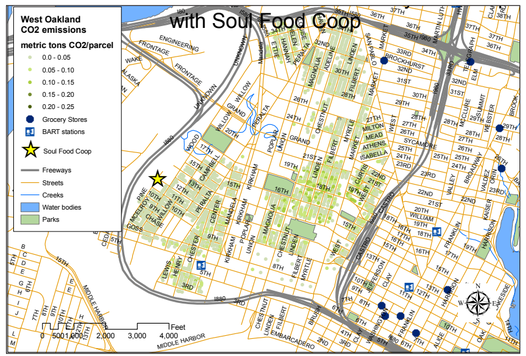


West Oakland CO_2 Emissions from Grocery Store Trips
Figure 5

	Metric Tons of CO2	Average metric tons of CO2 per household
Residential parcels in West Oakland	79.70	0.014
Residential parcels in West Oakland with Soul Food Coop	45.50	0.008
CO2 reduction	**34.20**	

West Oakland CO_2 Emissions with and without Soul Food Co-op
Table 5

southern parcels. With the addition of Soul Food Co-operative, many of the parcels in West Oakland would produce far fewer emissions (Figure 6), realizing a total potential reduction of 34% or 34.2 tons of CO_2 from fewer grocery store trips (Table 5).



West Oakland CO_2 Emissions with Soul-Food Co-operative
Figure 6

GHG Emission Reductions of Proposed Actions in West Oakland

Village Bottoms Farm

Urban farming can have a direct impact on air quality and greenhouse gas emissions. Lohry (1998) estimated that total US agriculture absorbed 1.7 billion metric tons of CO_2 per year from the atmosphere. Different plants and different yields absorp different levels of CO_2 (See Table 6).

Village Bottom Farm broke ground in spring of 2009 at 1000 Pine Street, Oakland, CA. The site is 3,200 square feet, of which approximately 2,795 will be used for raised bed agriculture. This will allow for five garden beds and also includes room for trees, shrubs and decorative plants. Other features include composting, herbs, microgreens, retail, artist space and aquaponics. One block south on Pine Street is the old Phoenix Iron Works site, controlled by the State of California. This space is over 240,000 square feet. Village Bottoms Farms plans to transition into this site, pending negotiations.

If we assume that the Village Bottom Farms will be mostly planting "other crops", which Lohry uses to include tubers, fruits and vegetables, then we can expect to offset 8.47 x 10-5 Metric Tons CO_2/year per square foot planted. The fish waste will fertilize the microgreens in the greenhouse and thus be carbon neutral.

For 2009, we can anticipate having offset about ½ metric ton CO_2, but after expanding to the Iron Works and other vacant parcels, we can anticipate offsetting about 21 metric tons CO_2 per year. Produce will be sold on site or at the Soul Food Co-operative which would incur additional carbon benefits from transporting produce over shorter distances (Table 7).

Activity	Quantity	Units Completed	Sq. Feet.	MT CO2e/Year Saved
Aquaponics	2			
Tree Planting	7		1008	
Shrub Planting	9	9	36	
Raised Garden Bed	6	1	900	
Greenhouse Plants	1		800	
Herb Box	1		51	
Total Garden			**2795**	**0.237**
Yard Compost	3	3	48	
Worm Bin Compost	3	3	7.5	
Total Compost			**55.5**	**1.27E-003**
Expansion to Iron Works			180,345.72	15.27
Expansion to Other Vacant Parcels			62031.25	5.25
Potential Total				**20.76**

GHG Reductions from Village Bottoms Farms
Table 6

Note: Carbon sink metrics adapted from Lohry (1998). Compost assumptions from US EPA (2002). Aquaponics assumed to be carbon neutral by design. Estimates of potential planting. Results not net of energy expenditure.

Tons per truck	22.5
Total yield for Ironworks site = 10 tons/acre/year	56.28
Truckloads displaced at 45,000 lb/truck	2.5
Roundtrips to and from Salinas	500.3
Gallons diesel saved	100.06
Metric tons GHG saved	1

GHG Reductions from Shedding Produce Delivery Distance
Table 7

Note: Assumes produce otherwise transported from Salinas, 100 miles from West Oakland, diesel truck fuel efficiency is 5 mpg.

GHG Emission Reductions
Village Wireless Network

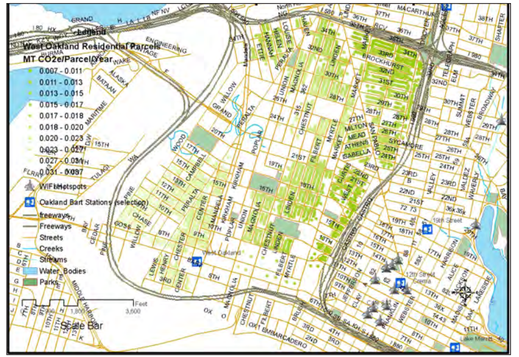
Ecocity Builders and the Oakland Technology Exchange (OTX) plan to collaborate to reduce carbon emissions upstream through reusing computers and sharing internet. OTX has been refurbishing and giving away 1,000 computers a year since 1998. Research has shown that computers in the home increase child achievement and entrepreneurship. However, only 50% of African-American homes have a computer and only 40% have access to the internet (Fairlie 2005, 2006). Since West Oakland is predominantly African-American, providing internet access can be a way to increase human capital and job opportunities right at home. By reusing computers, the air pollution associated with manufacturing and transporting a new one is avoided. By sharing wireless internet among neighbors, further GHG emissions for electricity production are avoided. By providing 250 additional computers per year targeted to families in West Oakland, this would avoid 152 metric tons CO2 in lifecycle emissions. By having 100 of those new families share internet this would save the other 150 from buying their internet which would save another 24 metric tons CO2 per year.

Another GHG benefits could be realized considering there are currently no official wireless hotspots in West Oakland (Figures 7 and 8; WiFi Alliance. 2009; Wi-Fi FreeSpot. 2009; Oakland CA WiFi Hotspots, 2009). If we assume that 60% in West Oakland do not have internet, that only 56.2% have a car and that those families take one vehicle trip per week to access internet, then those families generate about 22 metric tons CO2 per year. Providing new shared internet access could potentially save 1.1 metric tons CO2 per year through decreased vehicle trips (Table 8). Potential savings could be larger if access to a computer and internet encouraged home-based businesses in West Oakland.

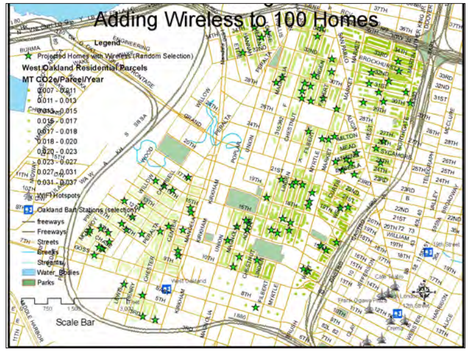
	# of households	CO2 Emissions from new equipment	CO2 Emissions from electricity	Change in CO2 Emissions from sharing internet
West Oakland Households (Census 2000)	4966			
With Computer (50% estimate)	2483	1501	288	
With Internet (40% estimate)	1986	26	381	-191
Without Internet (60% estimate)	2980			
Subtotal		*1527*	*669*	
New Reused Computers/year	250	-151	29	
New Reused Internet router/year	100	-1	48	-24
Total		-152	717	-215

GHG Savings from Computer Reuse and Shared Internet
Table 8

Note: These figures assume that the average household consumes 318 kWh/household/year for computer use (EIA, 2000); each kilowatt hours saved = 0.000365 metric tons of GHG emissions reduced (BAAQMD, 2007); used Linksys Wireless-G Broadband Router WRT54GL as model which consumes .5 amp or 525.6 kWh/year; The lifecycle GHG cost for a wireless device is 0.013 MT CO2e (EIOLCA, 2002); The lifecycle GHG cost for a computer and monitor is 0.605 MT CO2e (OTX 2009; FEC 2006).



West Oakland CO_2 Emissions from Car Trips to Wireless Hotspots
Figure 7



West Oakland CO_2 Emissions with Shared Wireless Network
Figure 8

GHG Emission Reductions
Increasing biking to BART stations

Currently, only 1% of West Oakland residents bike compared to 80% who drive to BART stations (Table 10). Figure 9 depicts CO2 emissions per residential parcel from driving to BART for commuting purposes. If biking to BART stations increased to 5%, a reduction of 1.7 tons of CO2 per year would result (Table 11).

Oakland has the potential for increasing bicycling as a means of transportation. Oakland's Bicycle Master Plan (BMP), adopted by the Oakland City Council on December 4, 2007 is a citywide, long-range policy document promoting bicycling as a viable means of transportation and recreation in Oakland. The Plan includes an existing conditions analysis, policies and action items, the Proposed Bikeway Network, design guidelines for bikeways and bicycle parking, and an implementation program. Ensuring safe bike routes, bike promotion, instituting bike infrastructure, and providing safe bike storage options at BART stations are all ways to encourage biking as a means of commuting.

If biking as the mode of transportation to BART stations were to increase by a small percentage, for example to 5%, Oakland would see a citywide reduction of 91 metric tons CO2 per year

Mode	West Oakland	System-wide
Walk	11%	23%
Bike	1%	2%
Transit	8%	21%
Auto	80%	54%

Mode of Getting to BART Stations From Home
Table 10

Source: BART 1998 Customer Profile Survey, AM & PM trips, BART Planning Division 2002

(Table 12). For this analysis, 5.5% of the residential parcels in Oakland were randomly selected to represent BART commuters, reflecting the proportion of Oakland residents who commute to work by BART (ABAG 2000). By applying these percentages, the amount of CO2 emissions generated from car trips to BART during commutes could be calculated (Figures 9 & 10).

	Current mode split	Metric tons of CO2	Modeled mode split (Bike to 5%)	Metric tons of CO2
Walk	11%	0	11%	0
Bike	1%	0	5%	0
Transit	8%	0	8%	0
Drive	80%	33.3	76%	31.6
CO2 reduction				1.7

West Oakland CO_2 Emissions Per Year, by Mode to BART Stations
Table 11

Note: Assumes roundtrips, 50 work weeks per year

	Current mode split	Metric tons of CO2	Modeled mode split (Bike to 5%)	Metric tons of CO2
Walk	23%	0	23%	0
Bike	2%	0	5%	0
Transit	21%	0	21%	0
Drive	54%	1629	47%	1538
CO2 reduction				91

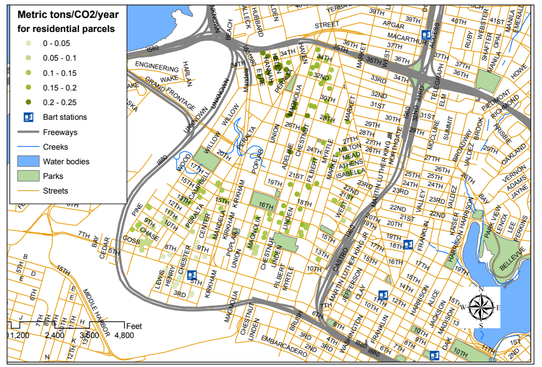
Oakland CO_2 Emissions Per Year, by Mode to BART Stations
Table 12

Note: Assumes roundtrips, 50 work weeks per year, 1 driver per residential parcel, 5.5% of Oakland residents taking BART

Increasing biking to Shoreline Parks

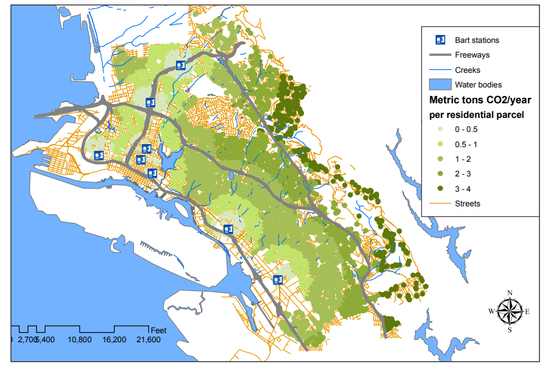
Oakland and Village Bottoms residents face barriers to access to the Shoreline Parks, namely Middle Harbor Shoreline Park and Portview Park. Currently, bicycles and pedestrians are not permitted past Pine Street on 7th street, and there is no safe access under I-880 along 7th to reach the Shoreline Parks. Thus, the primary way of reaching the parks is to drive. Figure 11 depicts CO2 emissions yearly from West Oakland residents from driving to one of the Shoreline Parks. For this analysis, we assumed one car per residential parcel driven to one of the Shoreline Parks monthly. West Oakland produces 63 metric tons of CO2 emissions yearly from these visits.

Figure 12 depicts proposed bike lanes by the City of Oakland which would link West Oakland and other parts of Oakland to the Shoreline Parks. Our analysis suggests that for every 5% of cars replaced by bikes or pedestrians for these trips, 3.2 metric tons of CO2 would be reduced yearly.



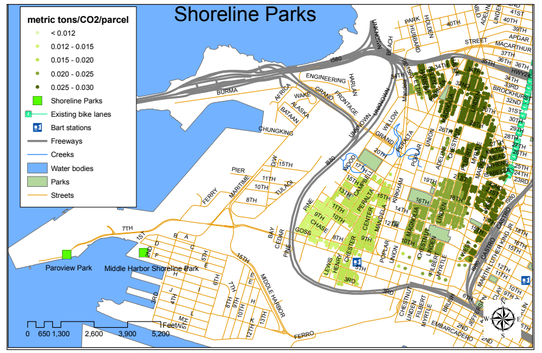
West Oakland CO_2 Emissions from Driving to BART Stations
Figure 9

Note: Assumes work commute roundtrips, 50 work weeks per year

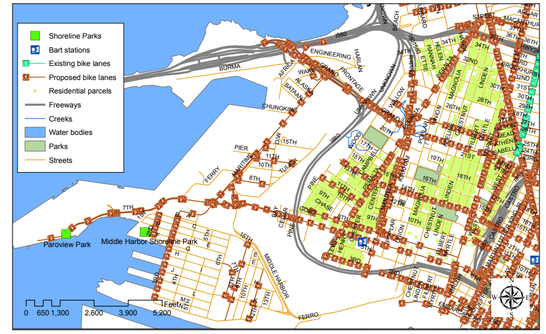


Oakland CO_2 Emissions from Driving to BART Stations
Figure 10

Note: Assumes work commute roundtrips, 50 work weeks per year



West Oakland CO_2 Emissions from Driving to Shoreline Park
Figure 11



West Oakland CO_2 Emissions from Biking to Shoreline Park
Figure 12

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Conclusion

Spending less time on the road is the most powerful way for California to reduce its carbon footprint. Today, with coalitions like the Joint Policy Council taking the lead, we are now poised to move more quickly in the direction of walkable, ecologically healthy communities where cars take a back seat to bicycling and public transit. The writing is on the wall: either we chart this new course or we risk losing a stable climate that will support the biodiversity needed to sustain us.

The single-largest source of greenhouse gases in California is emissions from passenger vehicles. In order to reduce those emissions, people will have to spend less time in their cars to get to work and to the grocery store; indeed, they will need to be able to get most of their needs met by walking. The mandate is clear: in order to reach California's greenhouse gas reductions goals set out in the Global Warming Solutions Act of 2006 (AB 32), we must rethink how we design our communities.

Senate Bill 375 will be the nation's first law to control greenhouse gas emissions by curbing sprawl. SB 375 provides emissions-reducing goals for which regions can plan and provides incentives for local governments and developers to follow new conscientiously-planned growth patterns. SB 375 enhances the Air Resources Board's (ARB) ability to reach AB 32 goals, and will be responsible for reshaping the face of California's communities into more sustainable, walkable communities, with alternative transportation options and increased quality of life.

California's population - now 38 million - is projected to grow to 46 million by 2030. If based on conventional car-based development, this growth will surely erode the progress of all other global warming reduction measures ARB is currently developing. California can, however, absorb this growth and meet AB 32 is by implementing the approach outlined in this report: ecocity mapping and urban village planning for communities that get Californians out of their cars.

Implementing this type of development will also mean a higher quality of life. The urban village approach to sustainable development provides incentives for creating attractive, walkable, equitable, sustainable communities and revitalizing existing ones.

As Governor Schwarzenegger stated in his October 2008 address announcing SB 375: Redesigning Communities to Reduce Greenhouse Gases: "For the state that epitomizes car culture to tackle the global warming problem of long commutes is a historic event. Over much of the past century, California was shaped largely by the automobile - our freeway system, our drive-thru restaurants, our bedroom communities. Starting now, our environmental goals and our focus on healthy lifestyles will give a facelift to California's car culture."

Instead of trying to improve an unhealthy automobile and oil-based infrastructure, Ecocity Mapping for Urban Villages calls for the city, town and village to be redesigned around the measure, needs and potential of the human being and based upon ecological principles. Specifically, it calls for urban diversity at close proximity instead of scattered uniformity. It calls for land uses, architecture and a steadily and rapidly growing infrastructure for pedestrians, bicyclists and transit, powered by renewable energy sources and balanced with preservation and restoration of natural and agricultural lands and waters. The approach is practical, comparatively low cost and accessible to local governments working under increasingly tighter budget constraints, to community organizations needing a smarter and more well positioned starting point for jump-starting dialogue and discussion about development, and to developers and investors looking for more certainty and clarity that their money and time is spent on projects that will end up creating results that add up to real emission reductions.

APPENDIX

Draft Transfer of Development Rights Ordinance

TRANSFER OF DEVELOPMENT RIGHTS
Oakland, California

ORDINANCE NO.

101. PURPOSE AND INTENT. It is the purpose and intent of this ordinance to establish a Transfer of Development Rights program whereby development rights can be transferred from one parcel to another for the following purposes:

(a) To reclaim and restore important urban resources such as watersheds, urban creeks and streets, wildlife habitat, greenways, community gardens and land potentially beneficial for urban agriculture and farming, for the benefit of current and future generations;

(b) To preserve existing open space resources and scenic vistas;

(c) To preserve shoreline lands for public access and recreation;

(d) To prevent urban sprawl and protect the character of the existing towns;

(e) To provide a mechanism whereby landowners who choose to participate in land preservation can share in the economic benefits created through development;

(f) To direct and redirect growth to areas most suitable for urban development based on such factors as the capacity of existing infrastructure and public facility systems, the cost-effectiveness of providing new infrastructure and public facility systems to the site, the site's proximity to employment centers, and favorable site conditions including topography and freedom of natural hazards and environmental constraints; and

(g) To implement the goals, objectives, and policies of the General Plan.

102. AUTHORITY. This ordinance is enacted pursuant to the authority granted by (City Council or similar)

103. DEFINITIONS. As used in this ordinance, the following words and terms shall have the meanings specified herein:

"Development Rights" mean the rights of the owner of a parcel of land, under land development regulations, to configure that parcel and the structures thereon to a particular density for residential uses or floor area ratio for nonresidential uses.

"Overlay District" means a district superimposed over one or more zoning districts or parts of districts that imposes additional requirements to those applicable for the underlying zone.

"Receiving Zone" means one or more districts in which the development rights of parcels in the Sending District may be used.

"Receiving Parcel" means a parcel of land in the Receiving District that is the subject of a transfer of development rights, where the owner of the parcel is receiving development rights, directly or by intermediate transfers, from a sending parcel, and on which increased density and/or intensity is allowed by reason of the transfer of development rights.

"Sending Zone" means one or more districts in which the development rights of parcels in the district may be designated for use in one or more Receiving Districts.

"Sending Parcel" means a parcel of land in the sending district that is the subject of a transfer of development rights, where the owner of the parcel is conveying development rights of the parcel, and on which those rights so conveyed are extinguished and may not be used by reason of the transfer of development rights.

"Transfer of Development Rights" means the procedure prescribed by this ordinance whereby the owner of a parcel in the sending district may convey development rights to the owner of a parcel in the receiving district or other person or entity, whereby the development rights so conveyed are extinguished on the sending parcel and may be exercised on the receiving parcel in addition to the development rights already existing regarding that parcel or may be held by the receiving person or entity.

"Transferee" means the person or legal entity, including a person or legal entity that owns property in a receiving district, who purchases the development rights.

"Transferor" means the landowner of a parcel in a sending district.

104. ESTABLISHMENT OF SENDING AND RECEIVING ZONES. Sending and Receiving Zones shall be designated through the General Plan update process. Sites identified as Sending and Receiving Districts shall be shown on the General Plan's Land Use Policy Maps and on the Zoning Maps.

Sending Zone shall include, but not be limited to, the following:

1) Identified developed areas with structures on top of or adjacent to certain watersheds, urban creeks and streams and their buffer zones, identified areas ideas of expansion of community gardens and urban farming;

2) Areas not yet developed that the City wants to preserve and protect as open space, habitat, ridgelines, shorelines, etc;

3) Areas that are excessively car energy- and land-dependent that would be better transitioned into other uses over time; and

4) Areas that are in certain dangerous zones like earthquake fault lines, flood zones or fire zones.

ECOCITY BUILDERS RECOMMENDS DESIGNATING URBAN VILLAGE ZONES 3, 4 AND 5 AS SENDING ZONES.

Receiving Zone shall include, but not be limited to, the following:

1) Planned Growth Area Receiving Zone; and

2) Planned Urban Villages, Urban Infill and Redevelopment Receiving Zone.

ECOCITY BUILDERS RECOMMENDS DESIGNATING URBAN VILLAGE ZONES 1 AND 2 AS RECEIVING ZONES.

Sending and Receiving Zones shall be permitted within any City zoning district, provided that the establishment of the zone shall further the goals, objectives, and policies of the General Plan. Upon the adoption of the General Plan, the Sending and Receiving Zones shall be established pursuant to the requirements contained herein.

105. SENDING ZONES. Sending zones consists of lands that are located within existing urban areas and or proposed planned growth areas.

a. Criteria for Designation. CRITERIA WOULD NEED TO BE DEVELOPED BY A CITY PROCESS.

106. PLANNED RECEIVING ZONES. The receiving zones consist of land designated in the General Plan and Zoning for future urban development, pursuant to the Plan's guiding principles, goals, objectives, and policies.

a. Criteria for Designation. The Planned Growth Area Receiving Zone shall consist of lands that meet the following criteria: CRITERIA DEVELOPED BY A CITY PROCESS

107. PLANNED URBAN INFILL AND REDEVELOPMENT RECEIVING ZONE. This receiving zone consists of select lands designated in the General Plan for future urban infill and redevelopment, pursuant to the Plan's guiding principles, goals, objectives, and policies.

a. Criteria for Designation. The Planned Urban Infill and Redevelopment Receiving Zone shall consist of lands that meet criteria number one (1) and either criteria number two (2) or three (3) as follows:

1) Infrastructure and public facility capacity is available, or can be made available to accommodate the increased density;

2) Designated for urban infill and redevelopment in the General Plan, or supporting plan documents including the Community Plans or Special Area Plans, such as an Urban Villages Action Plan; and

3) City zoned for housing business mix.

108. ELIGIBILITY. Landowners or representatives with the authority to transfer fee simple ownership of any parcel in the City of Oakland located within a designated Sending Zone (except as noted below) may apply for a Certificate of Development Right (CDR). Parcels not eligible are as follows:

a. any parcel from which all development rights have previously been sold or transferred;
b. any parcel on which a conservation easement or other permanent deed restriction has been previously granted;

c. any parcel fully developed based on its existing zoning; and
d. any publicly owned parcel.

109. CERTIFICATE of DEVELOPMENT RIGHTS. Development rights shall be created and transferred by means of Certificate of Development Rights (CDRs) in a form approved by the City. The CDR shall specify the amount of development rights to which the owner of the Certificate is entitled. CDRs shall be issued by the Department of Planning, "the Department", or Transfer of Development Rights Bank, "the Bank", according to the provisions of this section and may be sold to any person, corporation or other legal entity. Development rights shall be considered as interests in real property and may be transferred in portions or as a whole.

110. APPLICATION REQUIREMENTS FOR A CERTIFICATE of DEVELOPMENT RIGHTS. An eligible landowner or authorized representative must provide the following:

a. application form including name, address and telephone number of applicant and applicant's agent, if any;

b. documents which identify the owner of the subject parcel of land;

c. legal description of the subject property with metes and bounds survey prepared within 90 days of the date of application prepared by a licensed California surveyor;

d. site plan which illustrates existing or proposed lots, dwelling units, historic structures, easements or other encumbrances;

e. title report and 20-year report on liens and judgments;

f. copy of proposed deed restriction;

g. copy of recorded deed restriction; and

h. filing fee as established by the Department.

111. APPLICATION PROCEDURE. The following procedures shall be followed for Sending and Receiving Zone transactions:

a. Sending Zone. A Sending Zone landowner or authorized representative must apply to the Department, or Bank, to initiate the transfer process. The applicant shall complete an application form that includes the required documentation of the sending zone property. Within 95 days of the receipt of a compete application for a CDR, the Department, or Bank, shall certify the number of transferable development rights, assign serial numbers accordingly, and issue a CDR. Development Rights shall be calculated based on the formula contained herein for each Sending Zone.

b. Receiving Zone. A Receiving Zone landowner or authorized representative must redeem the CDRs with the Department, or Bank, prior to obtaining building permits. The applicant shall complete an application form that includes a description of the development, land ownership documentation, breakdown of proposed residential units and commercial and industrial square footage, and required CDRs. The Department, or Bank, shall process the application within 30 days. CDRs may be purchased and redeemed with the Department for each phase of a development.

112. RECORDING OF CERTIFICATES. The Department, or Bank, shall forward a copy of an approved CDR to the City Department of Finance, "the Finance Department" who shall keep an official register of such certificates, and such register shall be made

available for public inspection on the City's Website and at the Finance Department. CDRs once exercised for purposes of development shall be cancelled by the Director of Finance immediately thereafter, and a note to that effect shall be made in the register.

113. RECORDING OF DEED RESTRICTION. The owner of land in the Sending Zone, who has transferred said development rights, shall record with the bureau of conveyances a restrictive covenant running with the land permanently restricting the amount of development that may occur on the property. The Department, or Bank, shall forward a copy of the covenant to the Department of Public Works, who shall keep a record that the lot in the Sending Zone shall be restricted with regard to future development; and the Tax Assessor, who shall adjust the assessed value of the property in the Sending Zone based upon the decrease in the development potential of the land.

114. TRANSFERING DEVELOPMENT RIGHTS. Development Rights may be transferred between private parties or through the Bank.

a. Private Party Transactions. A landowner in a Receiving Zone or licensed real estate brokerage with the authority to transfer fee simple ownership of property within the City of Oakland may purchase some or all of the Development Rights of a lot in a Sending Zone as specified on the Certificate of Development Rights. Formal processing of the transaction shall occur at the Department, or Bank. Recordation of the transaction shall occur at the Finance Department.

b. Request for Certificate of Development Rights. A landowner in a Sending Zone may separate Development Rights from their property in exchange for CDRs. These CDRs may then be sold to Receiving Zone landowners, or a licensed real estate brokerage with the authority to transfer fee simple ownership of property within City of Oakland. Formal processing of the transaction shall occur at the Department, or Bank. Recordation of the transaction shall occur at the Finance Department.

c. Request for Density Transfer Charge. Receiving Zone landowners may pay cash-in-lieu to the Bank rather than purchasing CDRs from Sending Zone landowners or licensed brokerage firms. The cash-in-lieu fee paid by sending area landowners shall be based upon the appraised value of CDRs. If a current appraised value of CDRs cannot reasonably be obtained, then the base value of the CDR shall be (TO BE DETERMINED). This value shall be adjusted annually at the rate of increase of median home prices in City of Oakland.

d. Bank Transactions. The Bank may purchase CDRs from Sending Zone landowners and may sell CDRs directly to Receiving Zone land owners or licensed brokerage firms. Formal processing of the transaction shall occur at the Bank. Recordation of the transaction shall occur at the Finance Department.

115. CALCULATION METHOD FOR ACQUISITION OF DEVELOPMENT RIGHTS – SENDING AREAS.

FORMULAS WOULD NEED TO BE COMPUTED THROUGH A DETAILED INVESTIGATION AND BASED ON SENDING AND RECEIVING SITES IDENTIFIED BY THE CITY'S PROCESS AS WELL AS CALCULATING CURRENT MARKET RATES FOR HOUSING AND LAND

116. CALCULATION METHOD FOR ACQUISITION OF DEVELOPMENT RIGHTS – RECEIVING AREAS.

AGAIN, FORMULAS WOULD NEED TO BE COMPUTED THROUGH A DETAILED INVESTIGATION AND BASED ON THE SENDING AND RECEIVING SITES IDENTIFIED BY THE CITY'S PROCESS

117. APPEAL OF CALCULATION. Any landowner or authorized representative aggrieved by a final decision of the Department, or Bank, related to the certification of CDRs may appeal such final decision to the appropriate Board of Appeals (IDENTIFY) by filing, in writing, setting forth plainly and fully why the calculation is in error. Such appeal shall be filed no later than thirty (30) days after the date of the Department's final decision.

118. RECORDATION OF TRANSFER OF DEVELOPMENT RIGHTS TRANSACTIONS (RECEIVING AREAS).

119. TRANSFER OF DEVELOPMENT RIGHTS BANK. Subsequent to the adoption of this ordinance, City of Oakland may create a Transfer of Development Rights Bank ("the bank") to encourage the exchange of development rights in the private market. The bank will facilitate the exchange by purchasing and selling development rights. Also for the purposes of conserving land, the Bank may hold CDRs for any length of time to include in perpetuity.

120. ORGANIZATION OF THE BANK. The Bank shall be directed and managed by a Bank Board to consist of 5 members who shall be residents of City of Oakland, nominated by the Department and approved by the City Council. Specifically, one member shall have experience in the banking or financial industry, one member shall have environmental preservations and restoration experience in Oakland, one member shall be experienced in the legal industry, one member shall represent a conservation organization, and one member shall be a representative from the real estate development industry. The terms of office for the Bank Board members shall be four years and staggered. Three (3) members shall constitute a quorum. A majority vote shall be required for any action before the Bank Board. The Bank Board may adopt procedural and substantive rules to govern its powers, duties and functions. Staff support shall be provided by the Department or privately contracted.

Empowerments. The Bank Board shall be empowered to:

a. enter into agreements for professional services, e.g. consulting, appraising, accounting, subject to available funding;

b. apply for and accept grants or loans for the Bank Board's authorized purposes;

c. purchase, receive, sell or hold CDRs;

d. purchase properties in fee simple to preserve them through conservation easements and resell the restricted properties at fair market value; and

e. do all other things necessary to carry out the functions and operations of the Bank.

Authority and Compensation. The members of the Band Board shall receive no compensation from the Bank except reimbursement for expenses incurred for the performance of their duties as Board members.