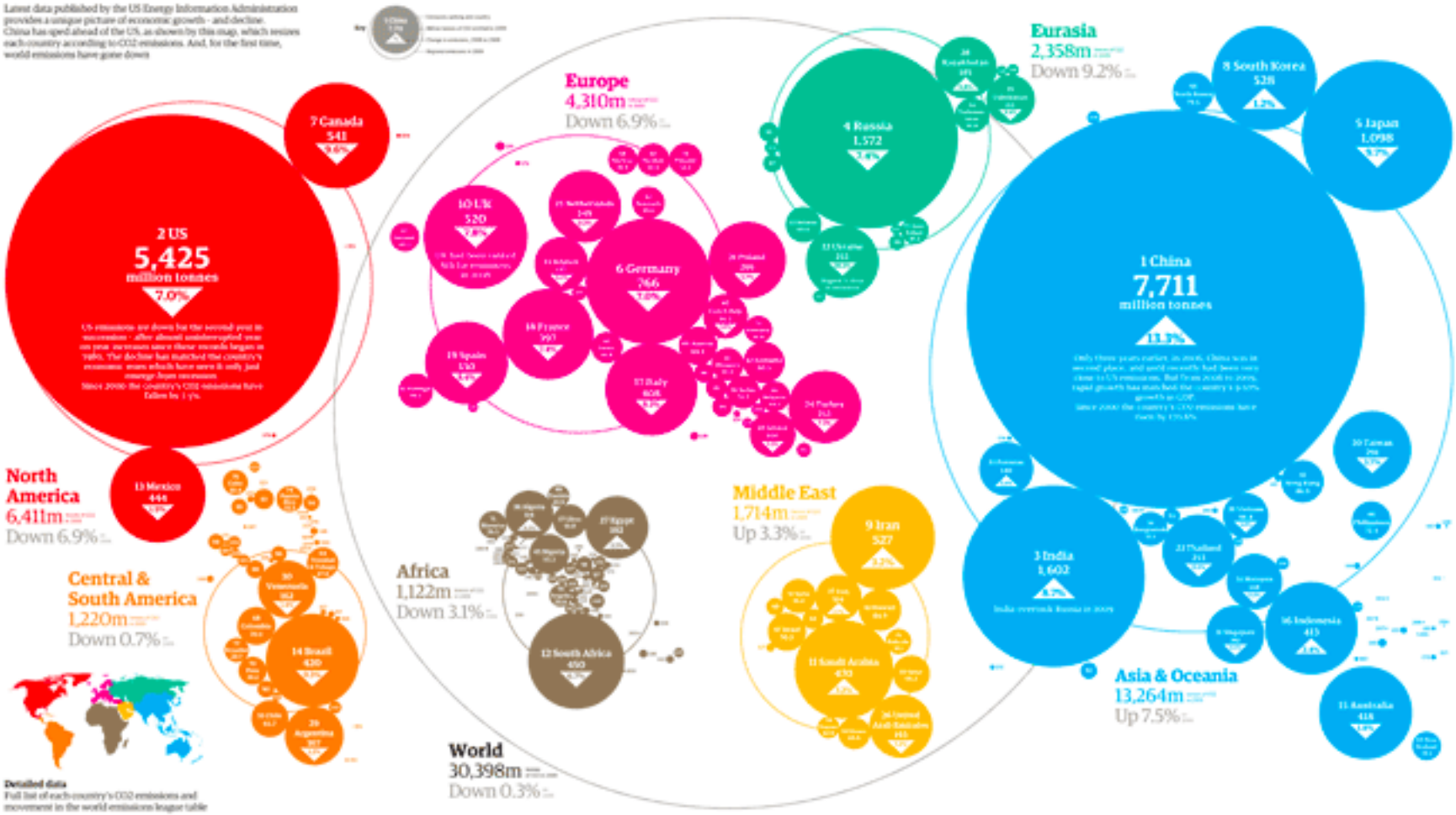

peter calthorpe
urbanism
in the age of
climate change

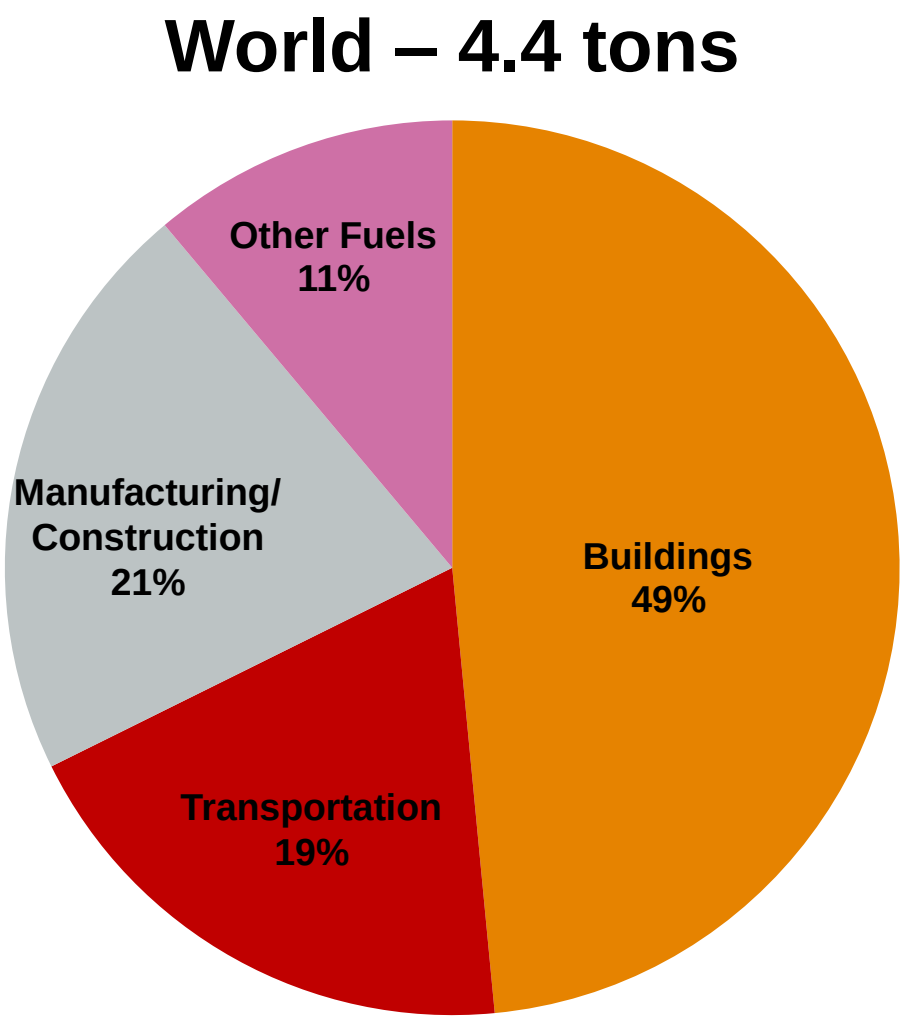
Global CO2 by Country



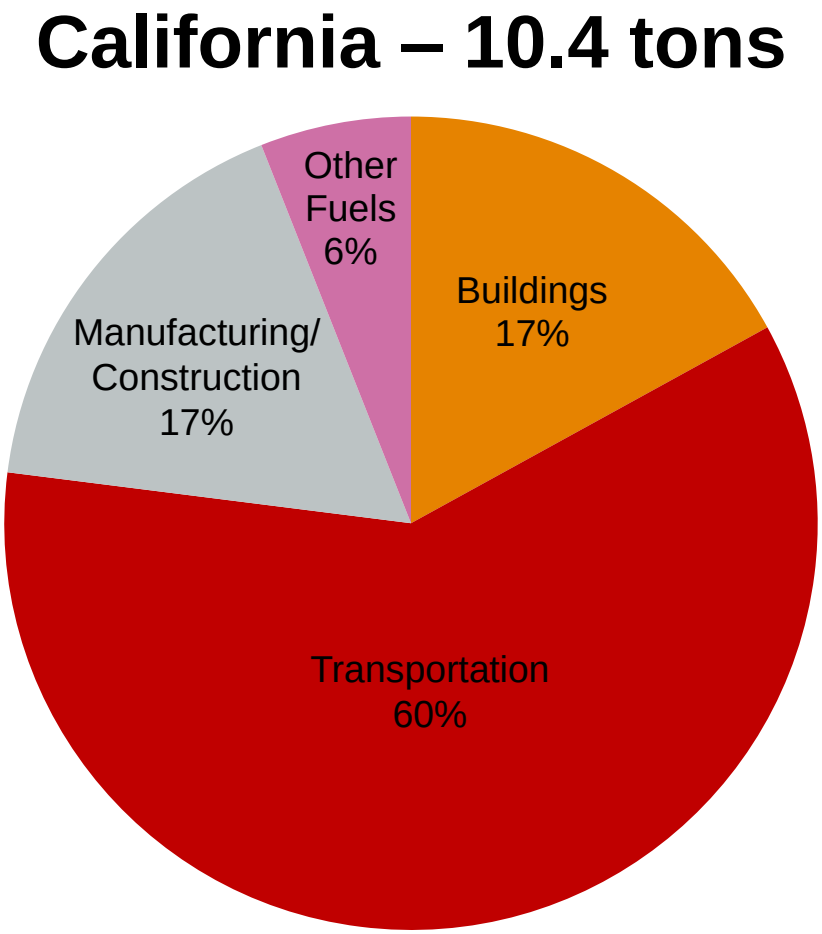
Global CO_2 Per Capita

The US emits 5x the world average of 4.5 metric tons per capita.

CO_2 Energy Emissions per Capita

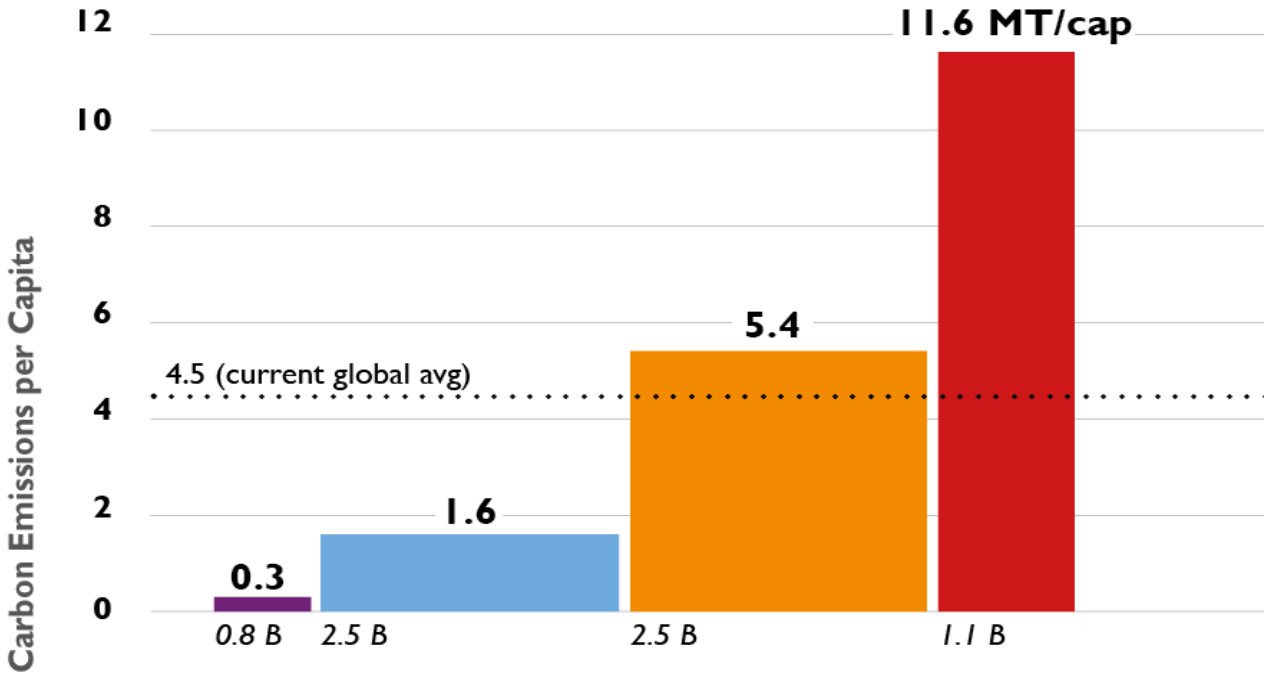


CO_2 Emissions per Capita



Global CO2 by Income 2010

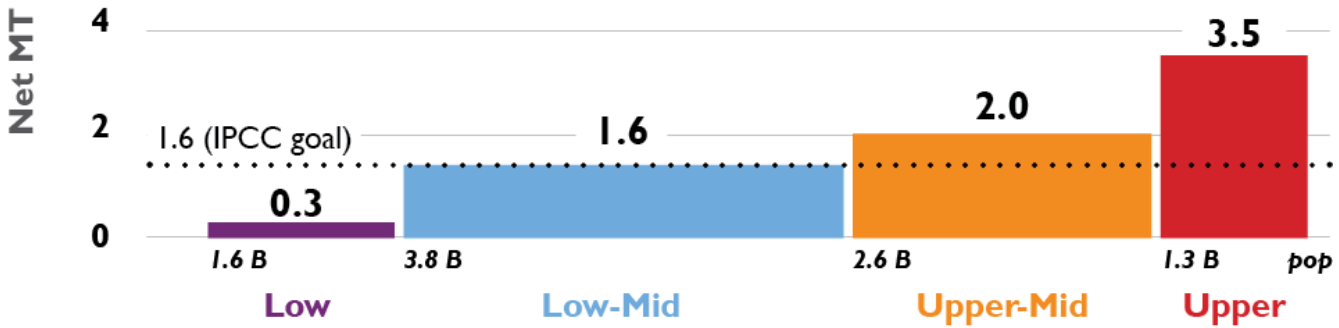
2010 Existing
31.9 BMT



Upper Income 86%

Global CO2 2050 Goal

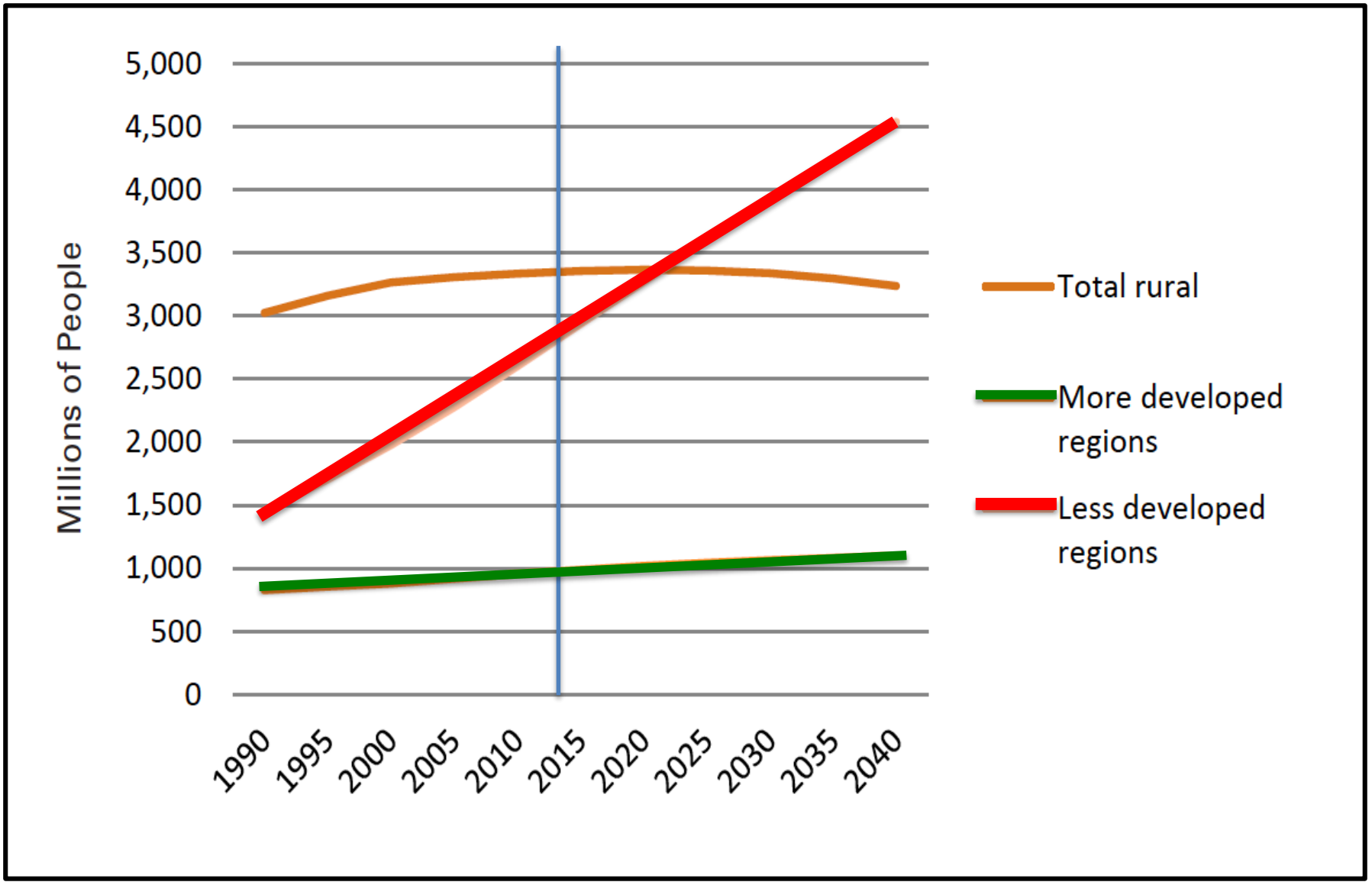
2050 IPCC
15.4 BMT



Upper Income 60%

Sweden- 4.8 France- 5.6 Norway- 7.9 California 2011- 10.4 California 2050-3.3

Rich Urban, Urban Poor, Rural




Climate Change
Health Care Costs
Failing Schools
Energy Security
Budget Shortfalls
Housing Costs
USA Challenges
Columbus, OH
Oil Dependency
Water Shortages
Political Gridlock
Energy Prices
Obesity
Failing Infrastructure
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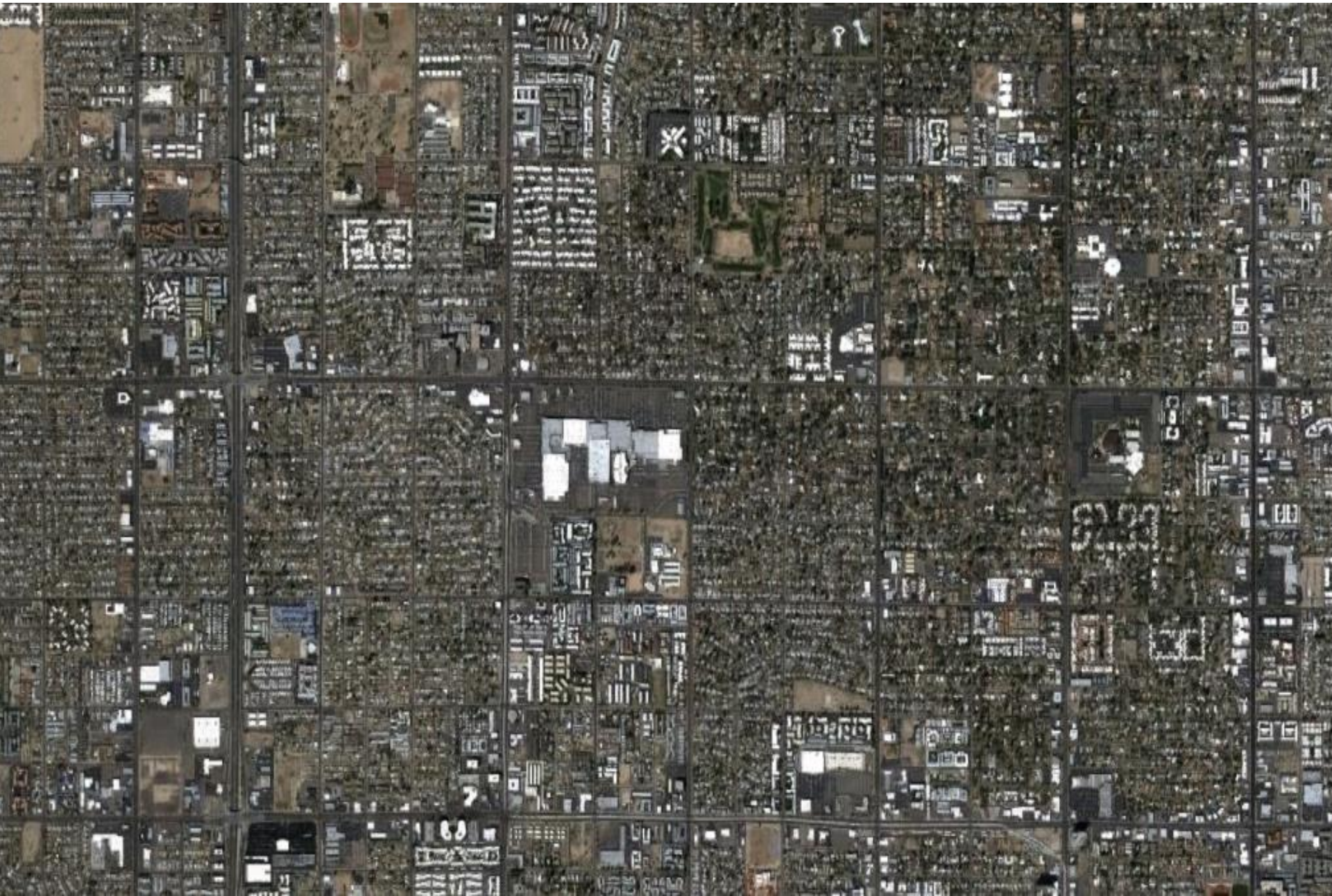
China – High Density Sprawl

Mexico – Low Income Sprawl


40
MAXIMA

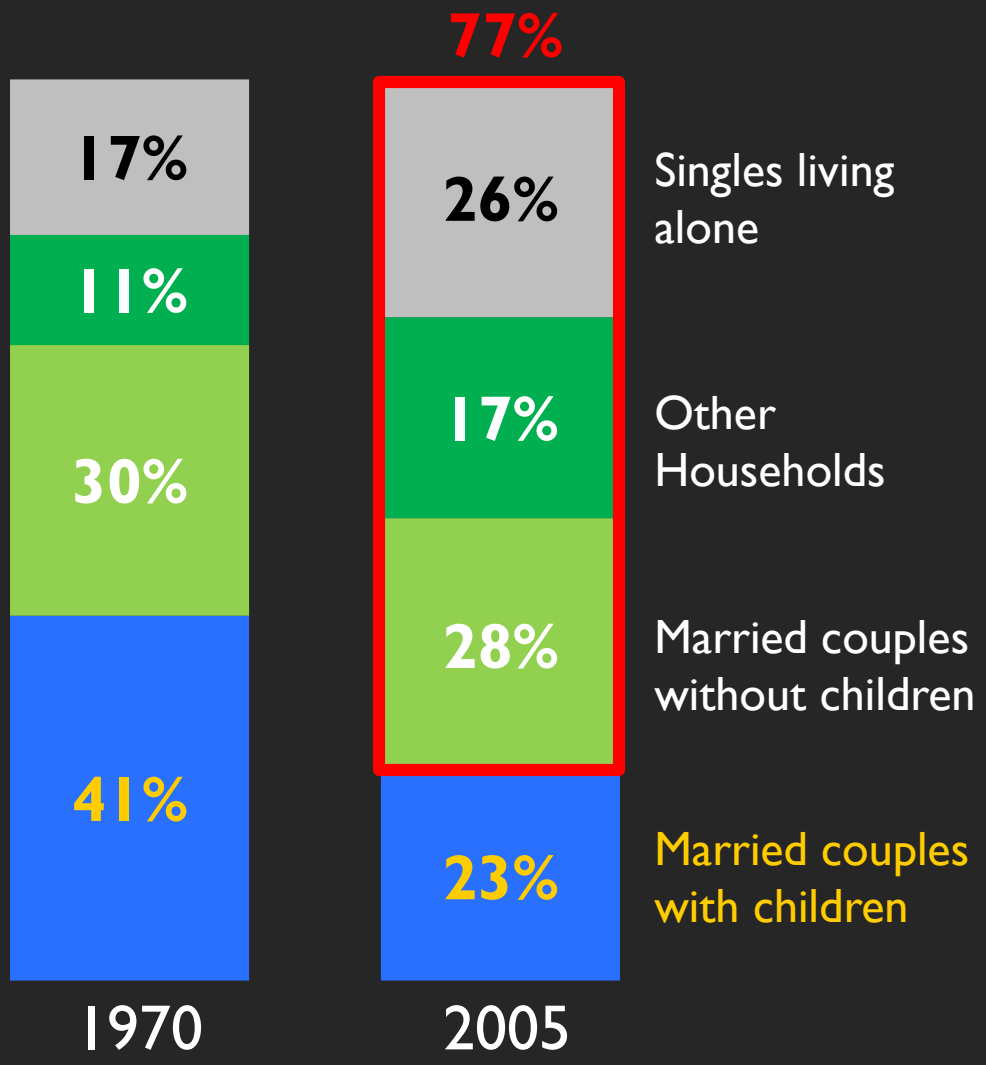

CIBER-ORTE
PC GAMES
Recargas
ROTOPLAS

USA – Middle Income Sprawl




41
Tamiami Trail
Flagler St

Who We Are (Really)

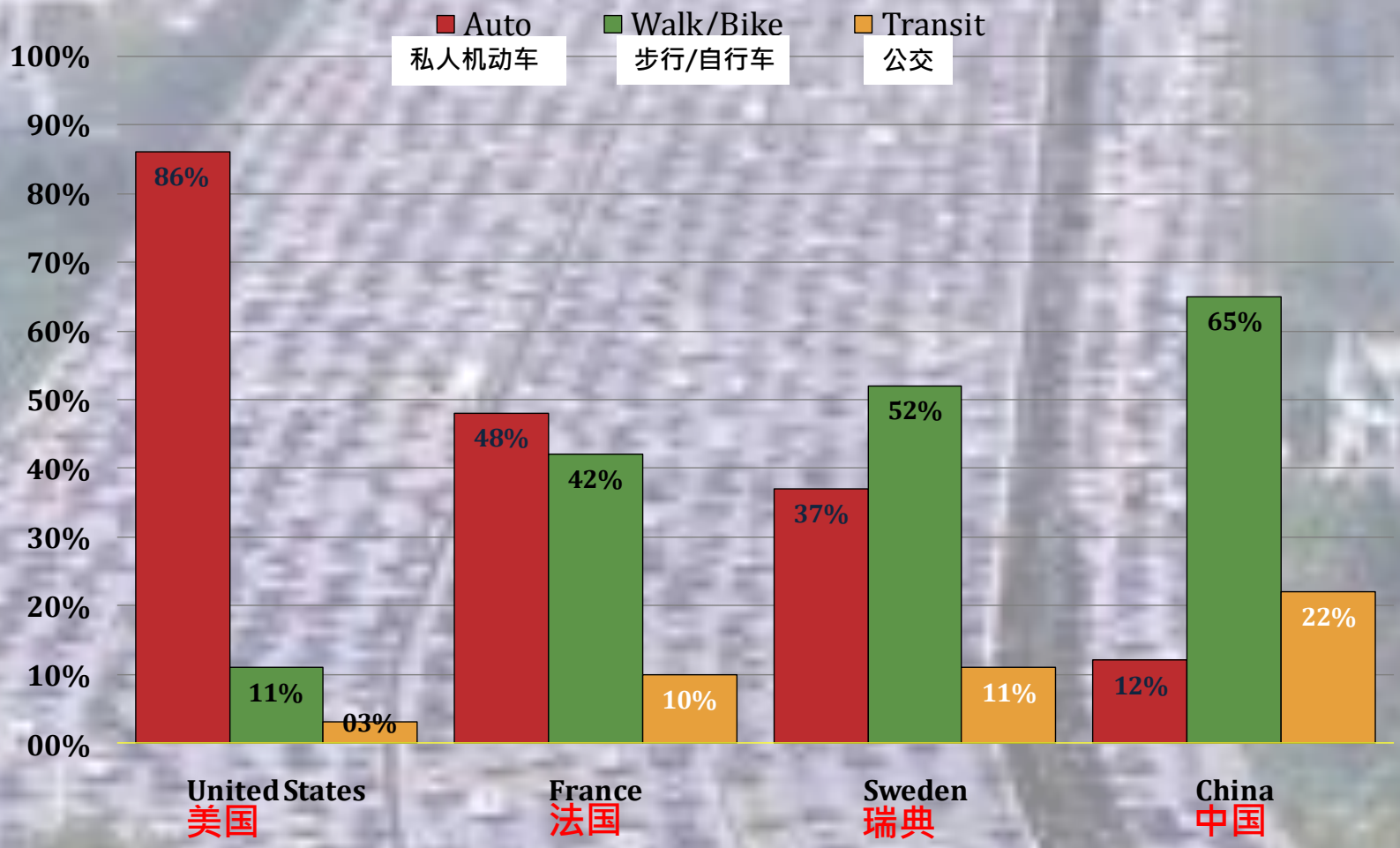



Shutterstock


Tamiami Trail
Flagler St

Transportation Mode By Country

各国出行模式分担率



Vision California

Trend

Blueprints

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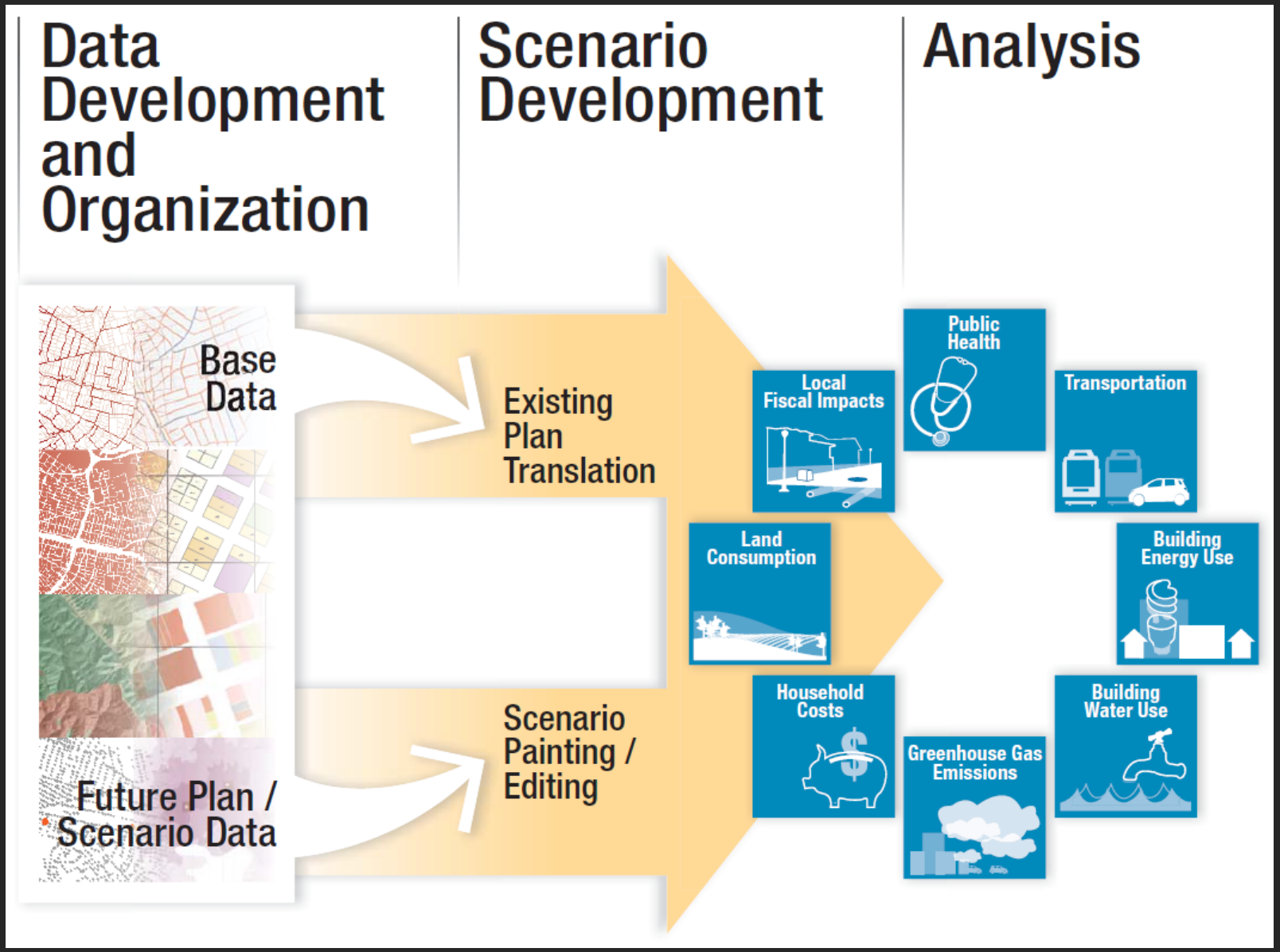
UrbanFootprint Scenario Ecosystem



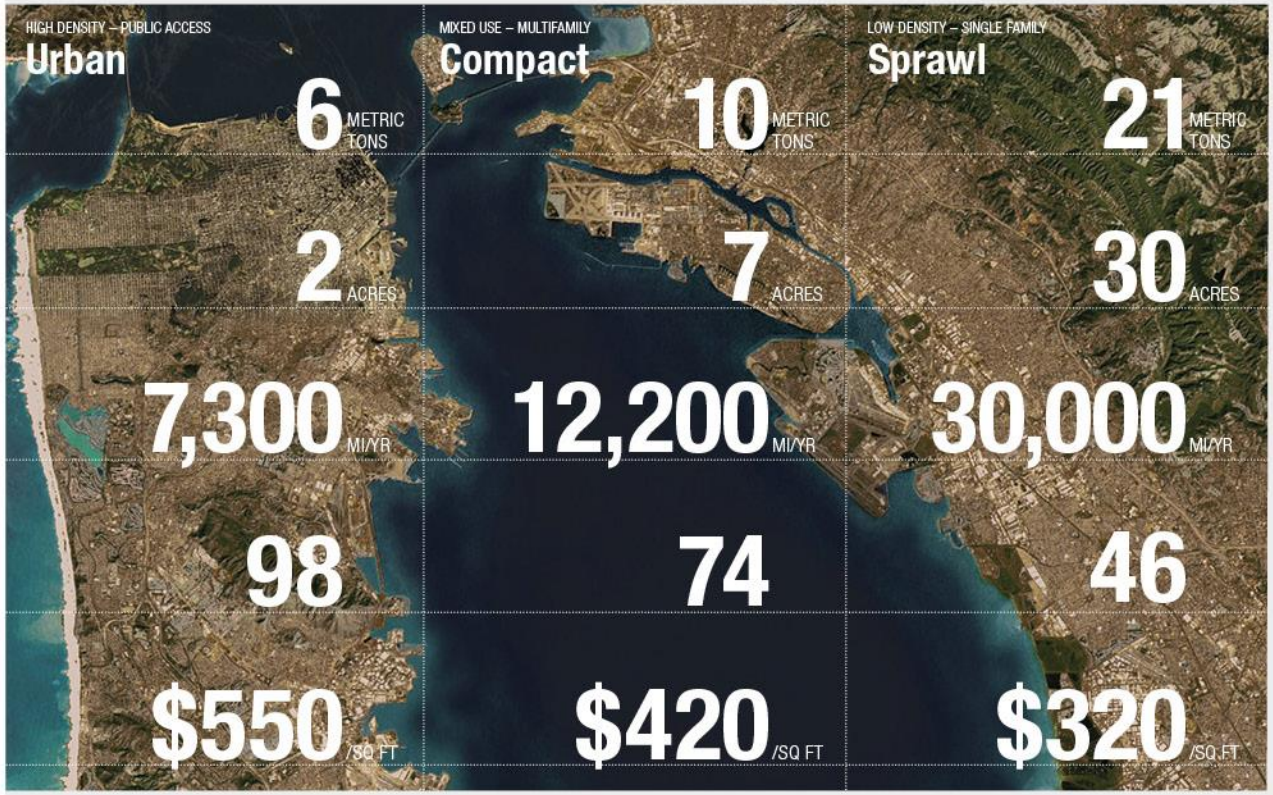
Three Urban Types: SF Bay Area

San Ramon - Sprawl

Rockridge - Compact

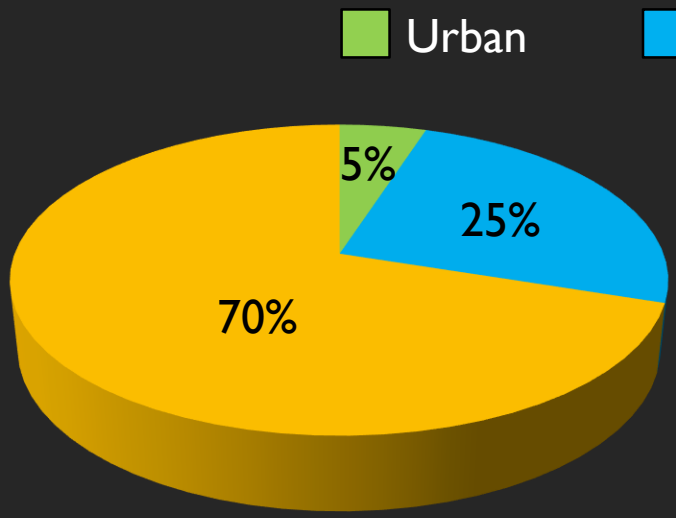
San Francisco - Urban

Comparing Neighborhoods

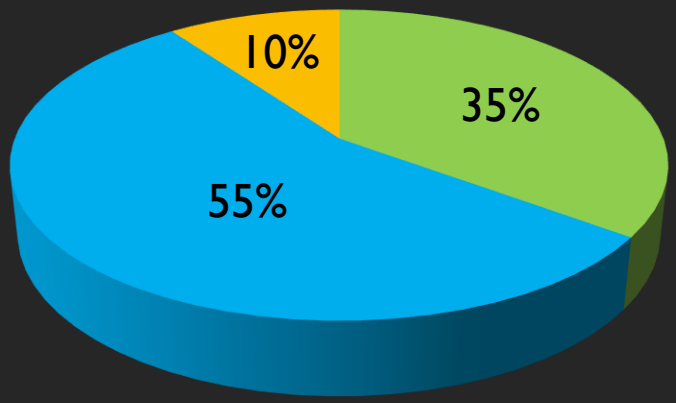


California Rapid Fire Scenarios

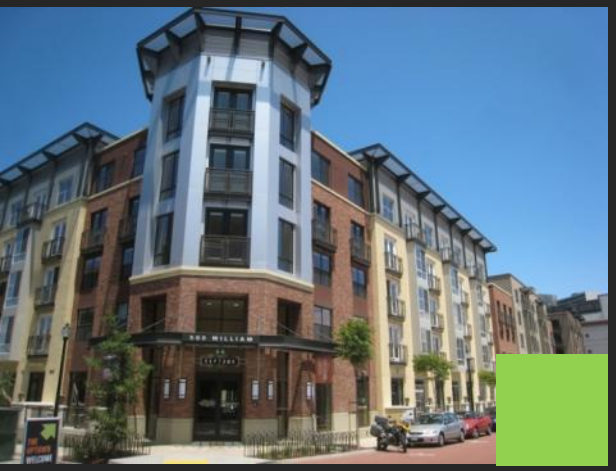
Land Use Mix for Growth Increment (2005-2050)



Business As Usual



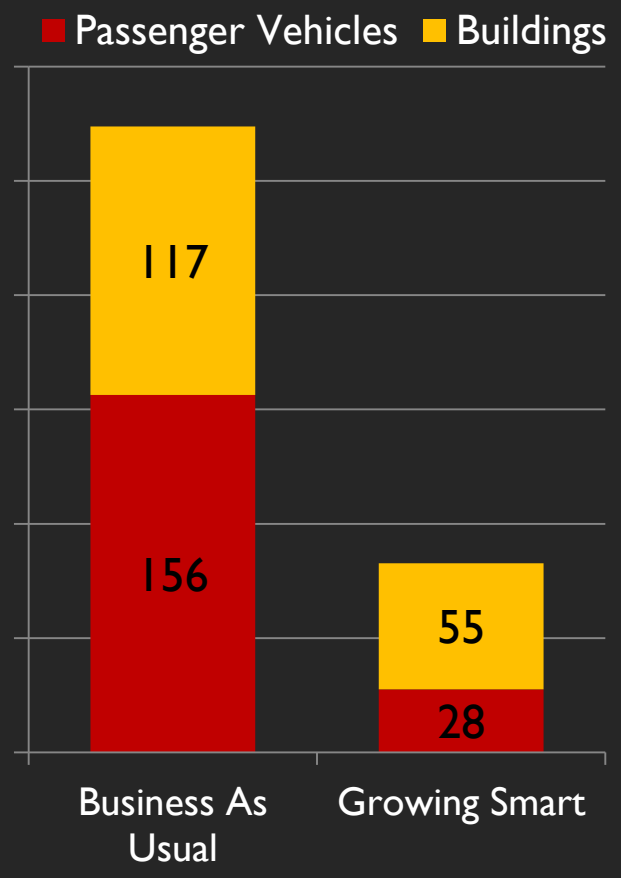
Growing Smart



Greenhouse Gas Emissions

Annual in 2050

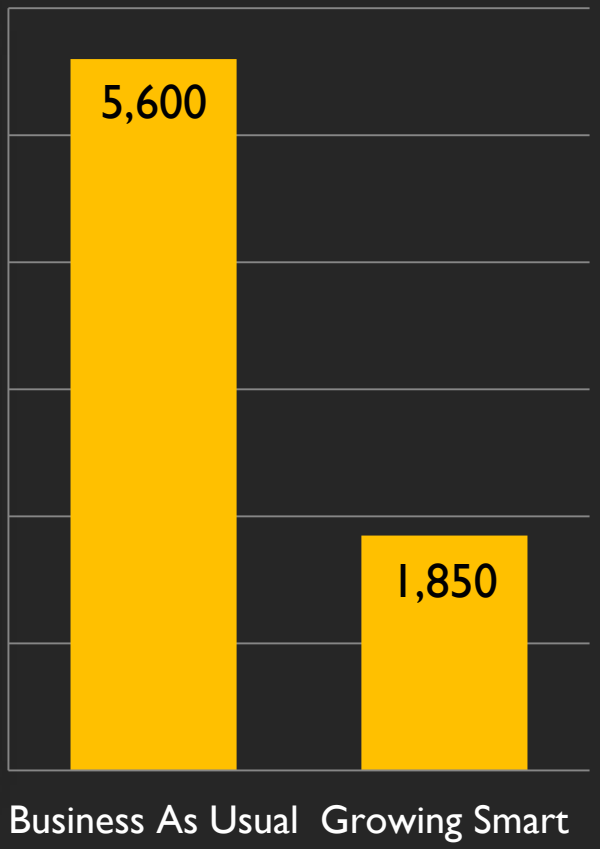
Equal to Emissions offset of a forest covering more than 1/2 of California.



Land Consumed

For New Growth to 2050 (mi²)

More land than Delaware and Rhode Island combined



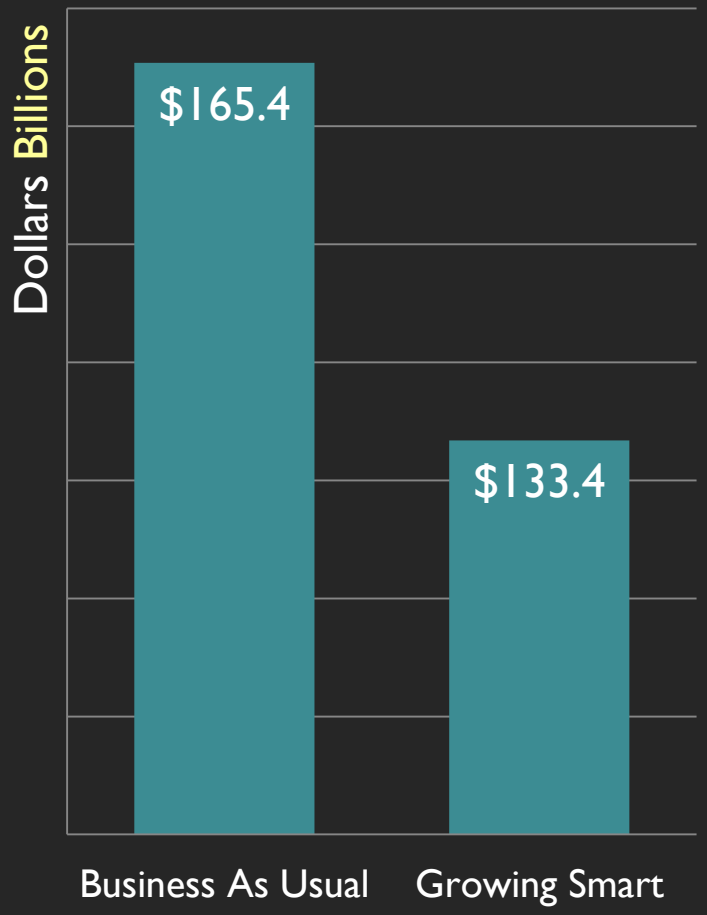
Infrastructure Cost for New Growth

Capital Costs for New Growth to 2050

$4,000 Saved per New Housing Unit : $710 Million/Year

Flickr: sl-engineer

*Includes local roads, waste water and sanitary sewer, water supply, and parks & recreation



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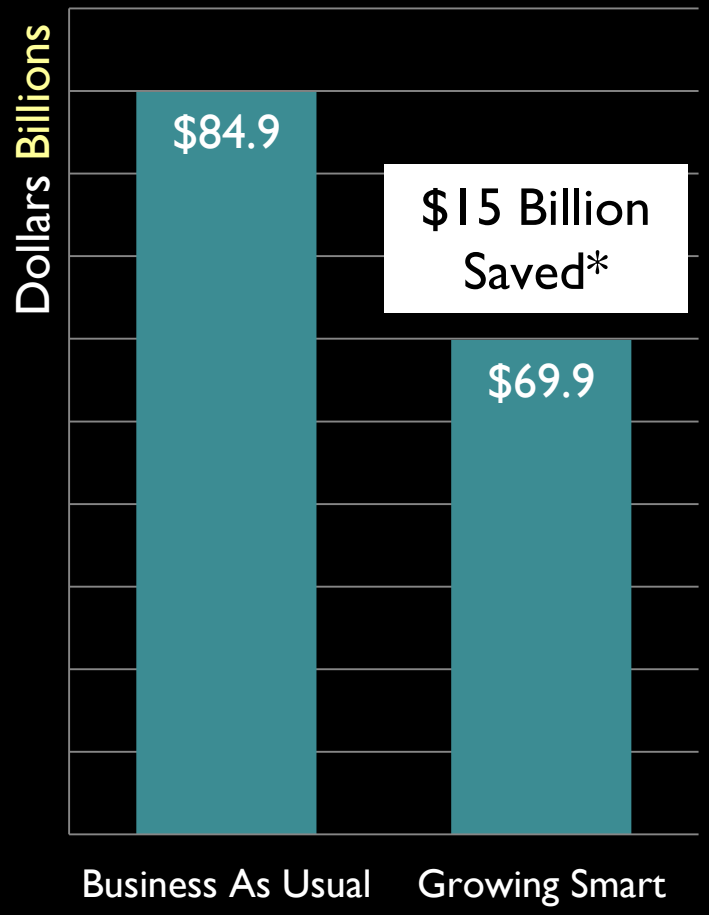
O&M Costs for New Growth

Engineering & Public Works Costs for New Growth to 2050

$15 Billion Saved : $334 Million Per Year

Flickr: watchlooksee



*Includes City General Fund engineering and public works functions

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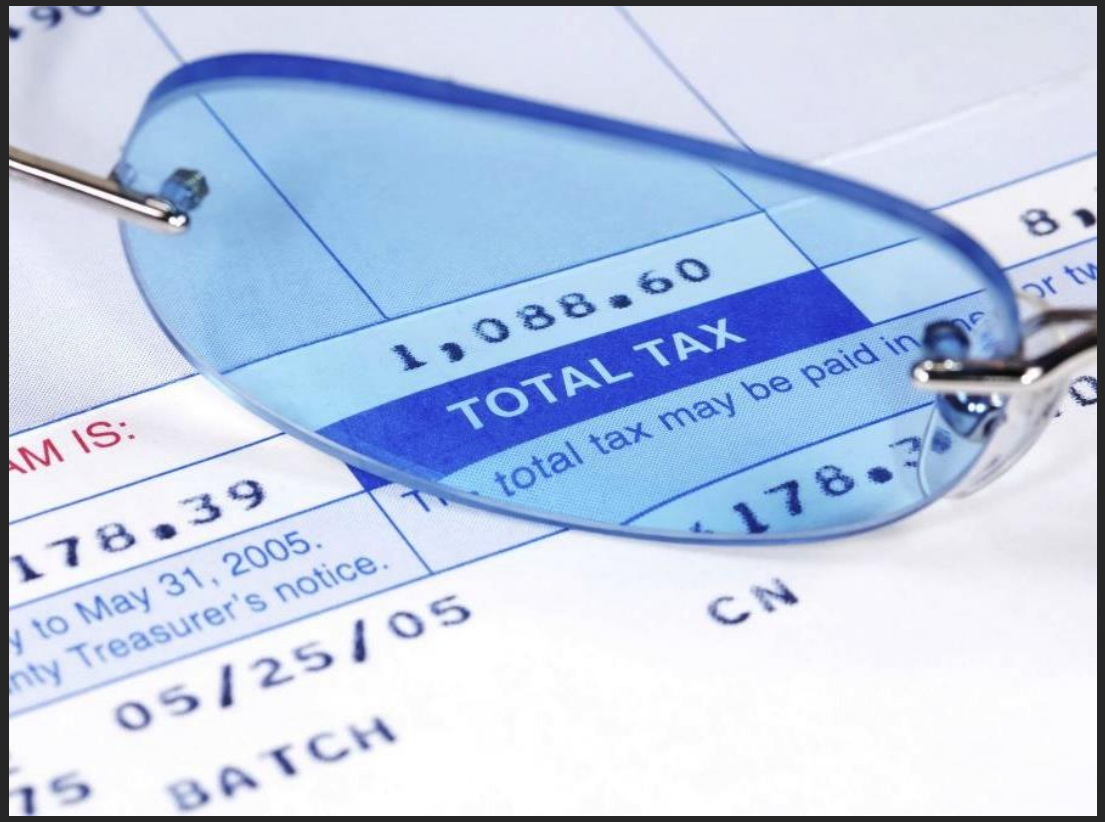
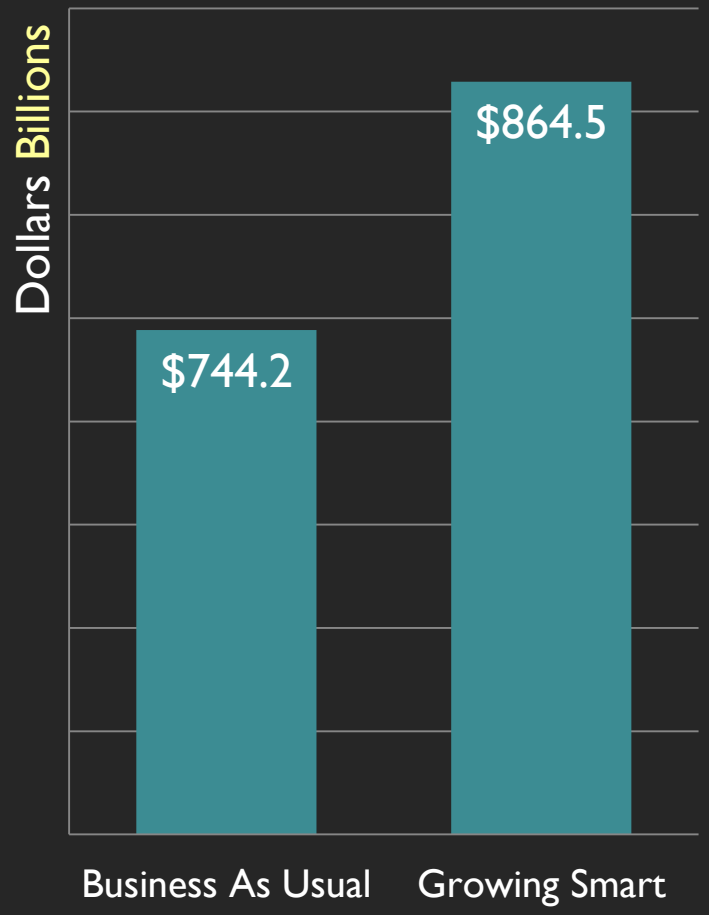
Revenues from New Growth

City Tax and Fee Revenue from New Growth to 2050

$2.7 Billion/Year in Additional Revenue to Cities



www.livinginplainfield.com



*Includes City revenues from Vehicle License Fees, Property Tax, and Sales Tax

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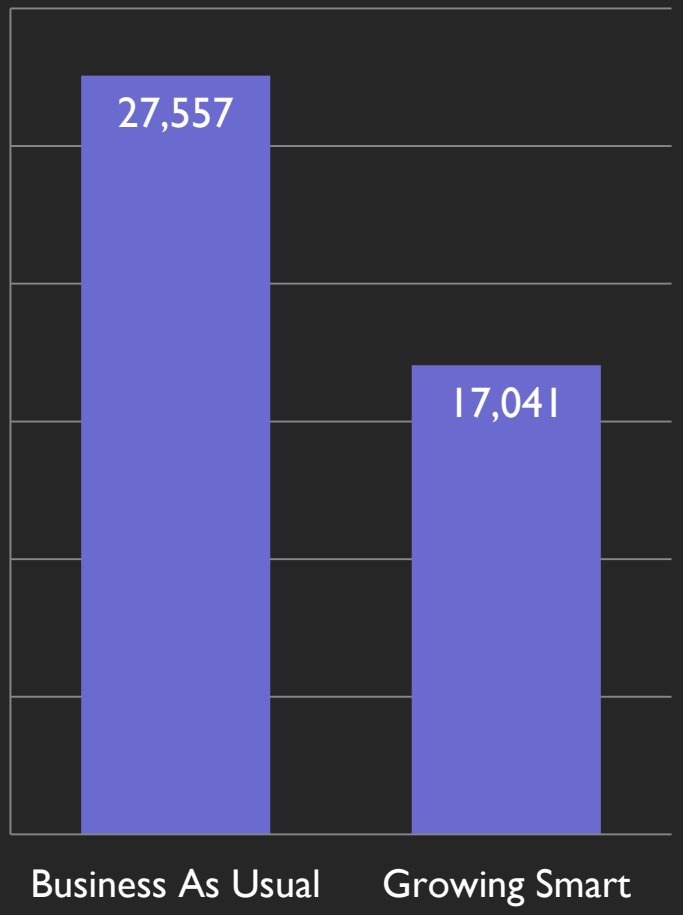
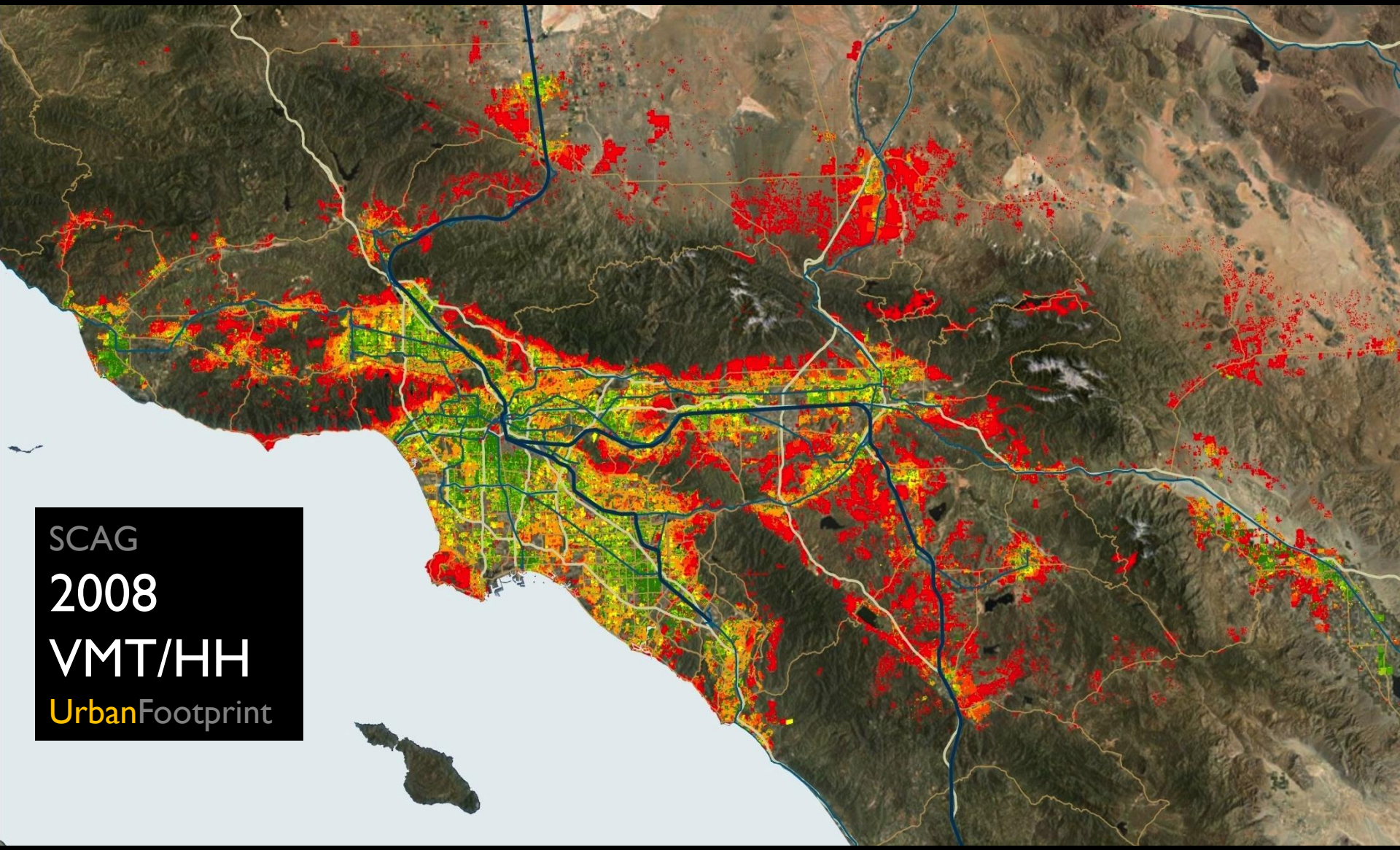
Vehicle Miles Traveled (VMT)

Miles Per Household in 2050

10,500 Fewer Miles Per Household

Flickr: trash-photography



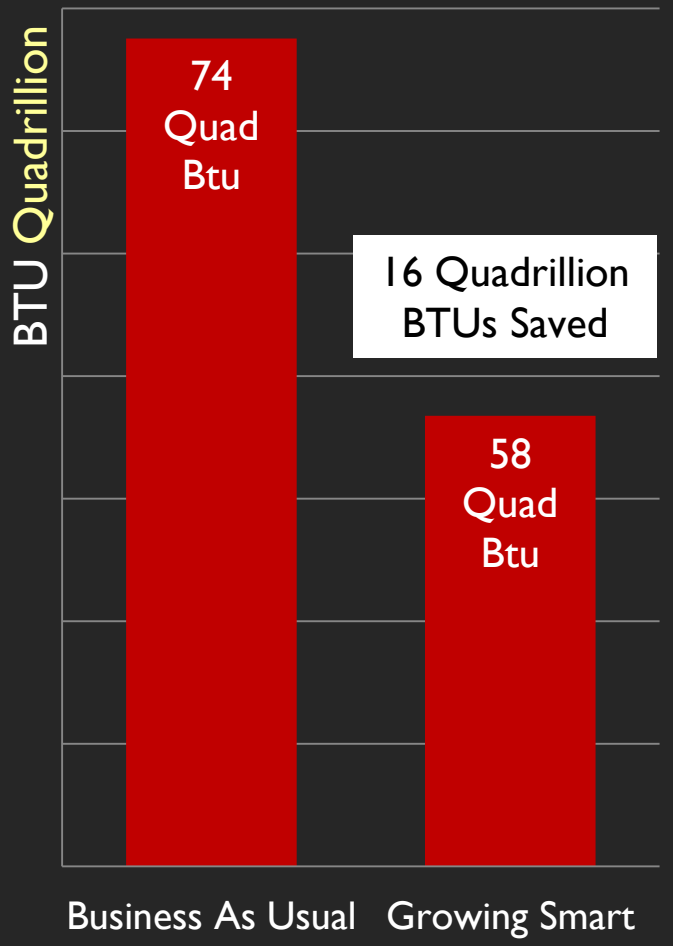

SCAG
2008
VMT/HH
UrbanFootprint

Building Energy

Cumulative to 2050

Would Power ALL Homes in California for 20 Years

Flickr: arbyreed



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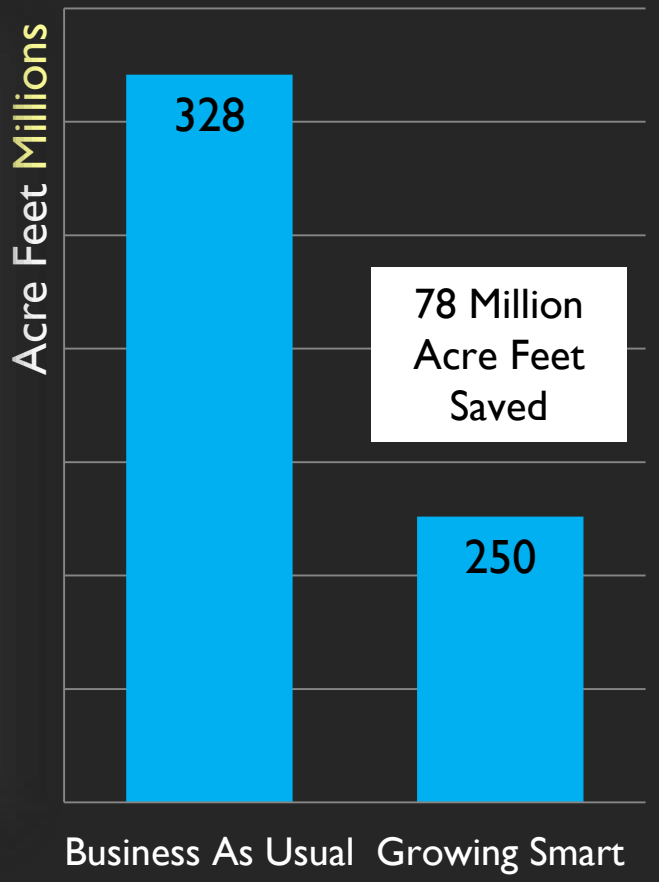
Residential Water Use

Cumulative to 2050

Water Savings Could Fill the San Francisco Bay 15 Times

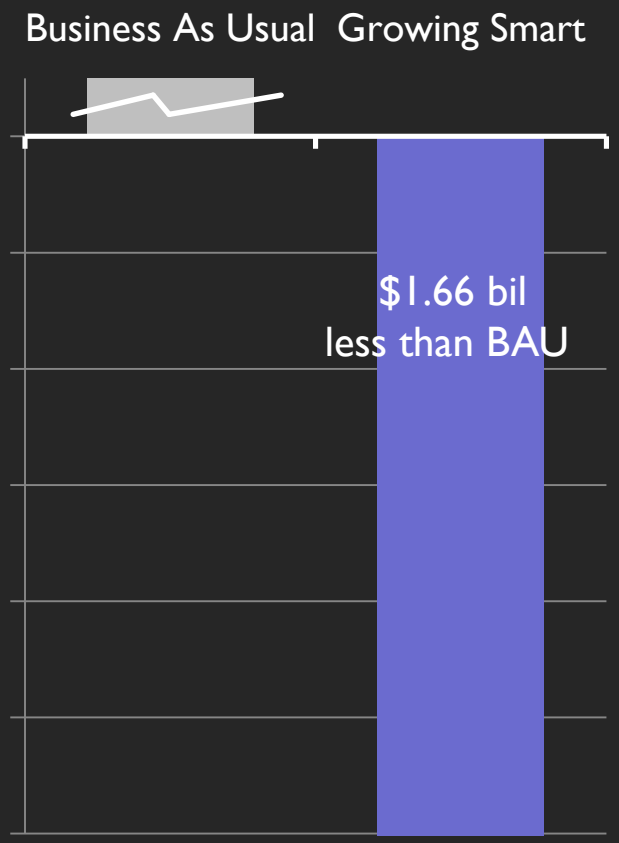


Respiratory Health Costs

Total Annual in 2035

Saves $1.66 billion annually by 2035

Flickr: Lance Page



Based on Analysis of Vision CA Results by TIAX, LLC

AMERICAN LUNG ASSOCIATION.
Fighting for Air

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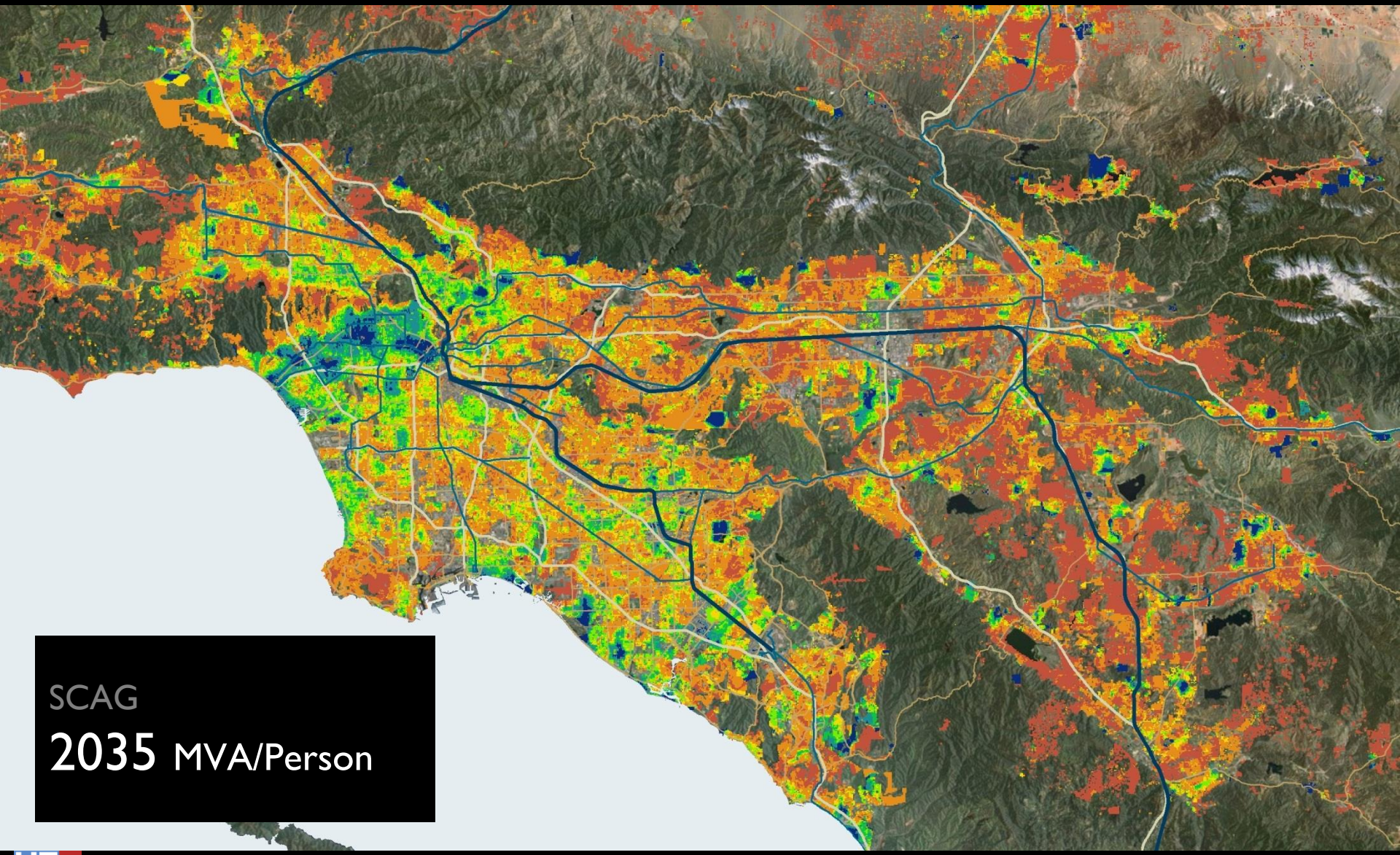
Activity-Related Health Indicators

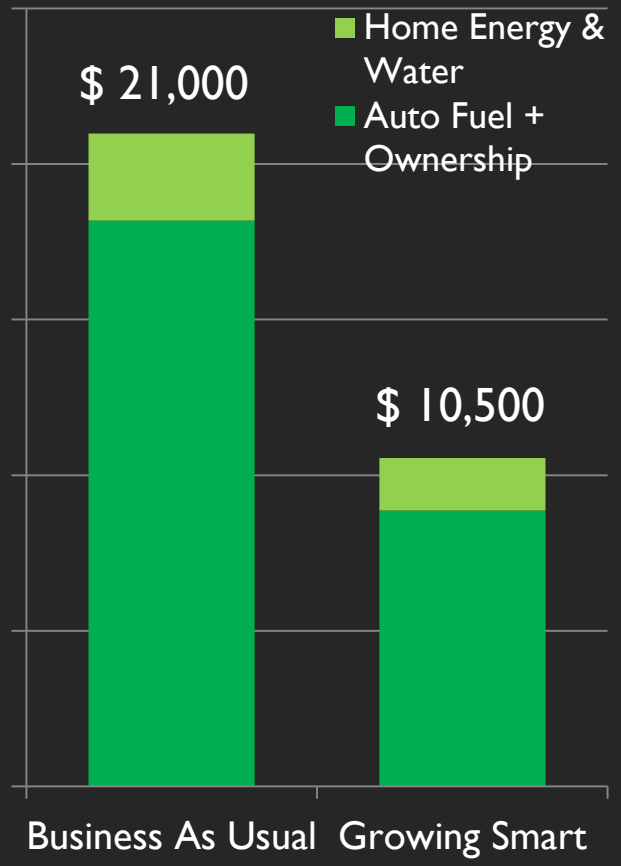


Annual Household Costs

Per Household Annual in 2050

$10,500 Savings Per Household in 2050

Flickr: Diablo_Solar



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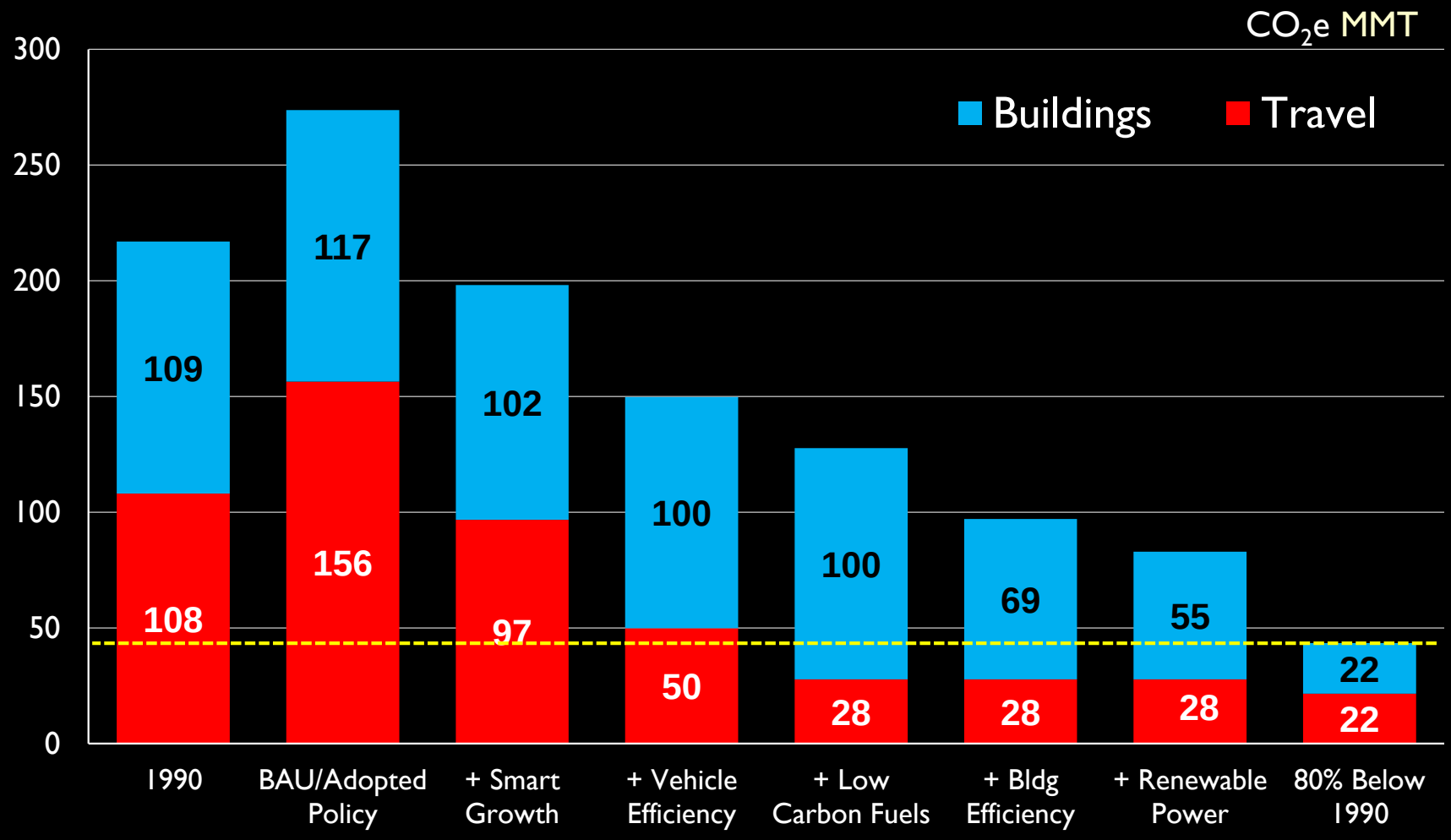
California 2050 GHG Emissions

Getting to 80% Below 1990



UF

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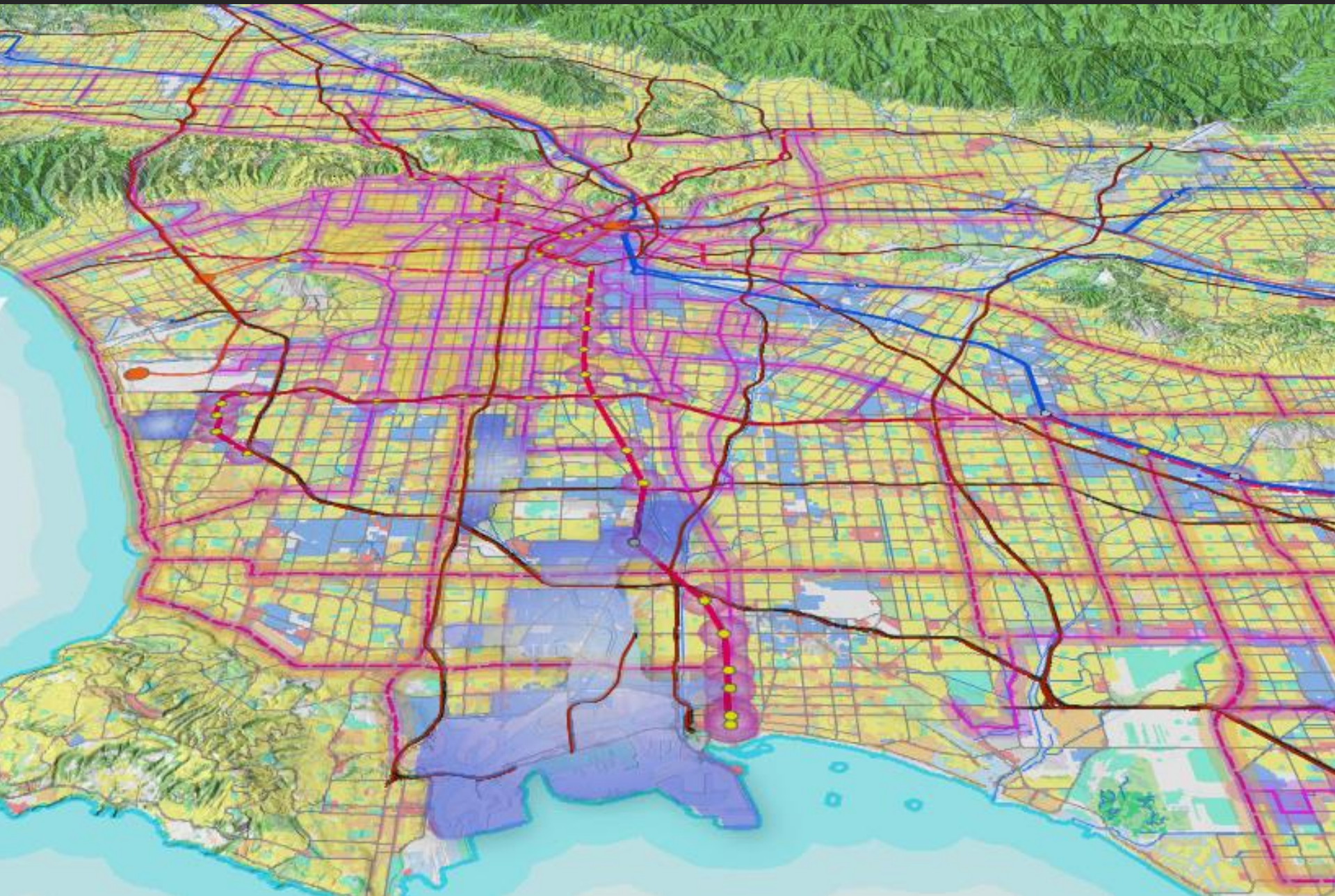
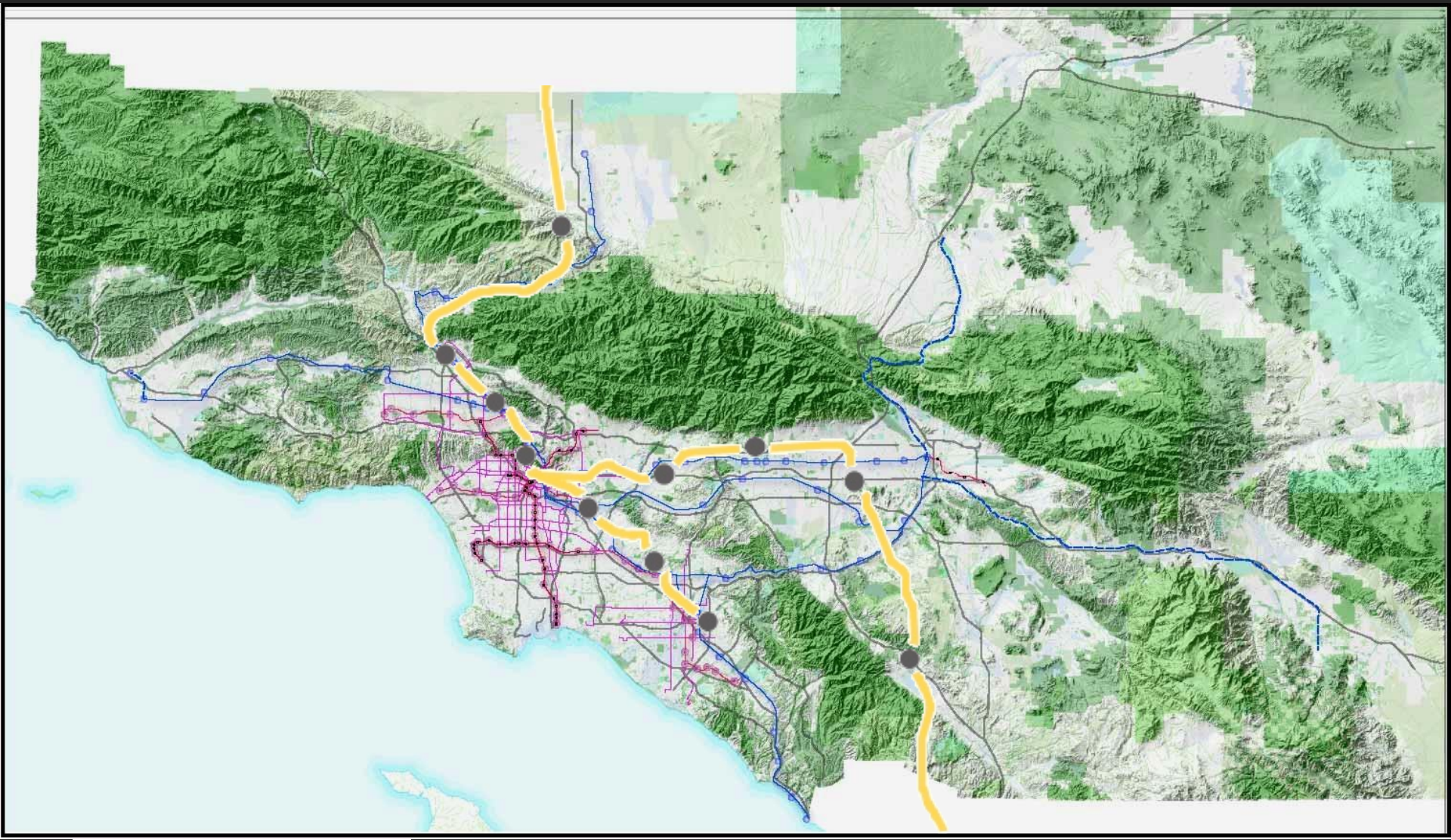
Los Angeles Regional Plan



Mobility

Transit Systems



Growth that Supports Transit

Urban Infill - Oakland Uptown

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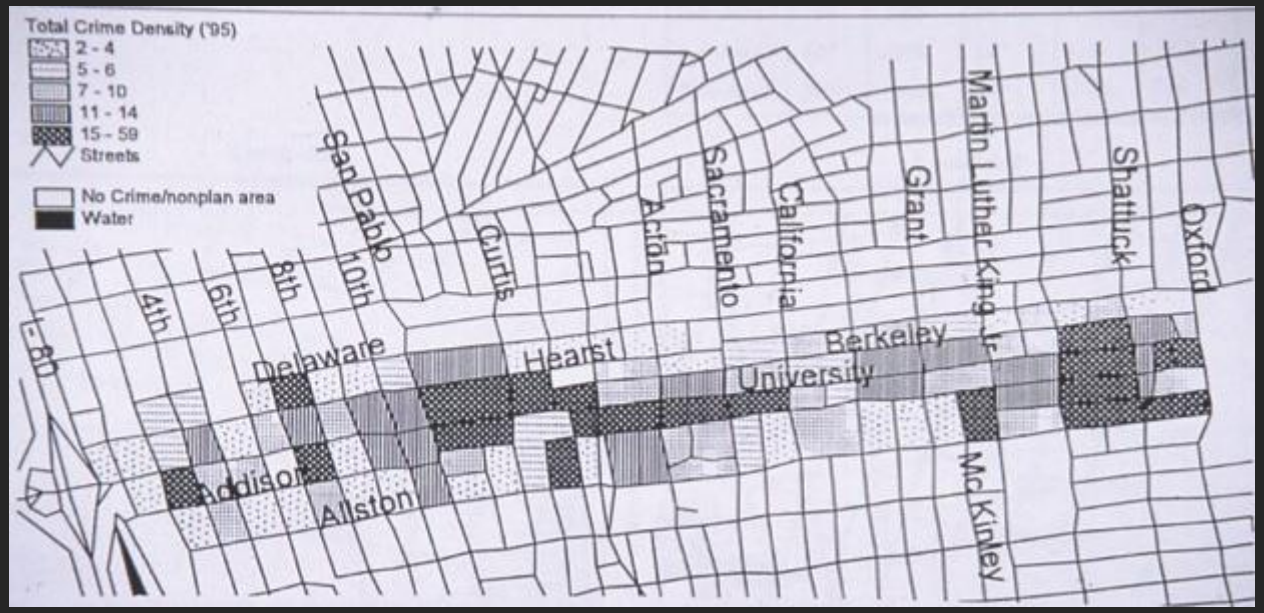
SHANGHAI KNIGHTS
Albright Parking
$2.00 $5.00
15 73
72 72


500 WILLIAM


U-HAUL
Our Low Decks
Make Your Move
EASIER!
500 WILLIA

University Avenue

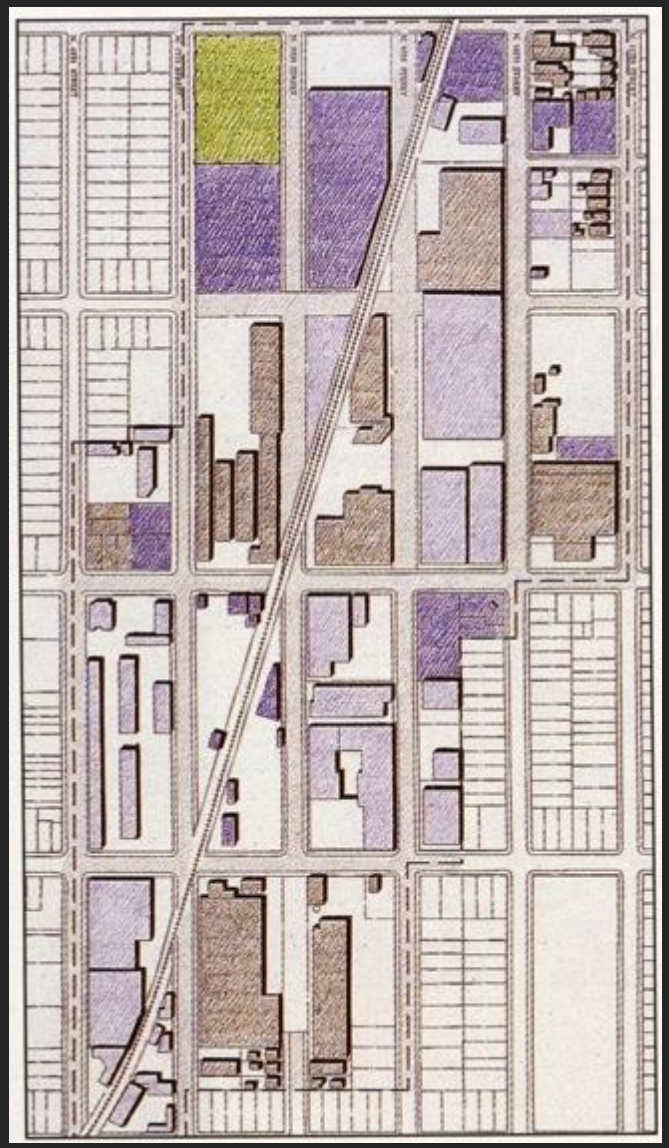


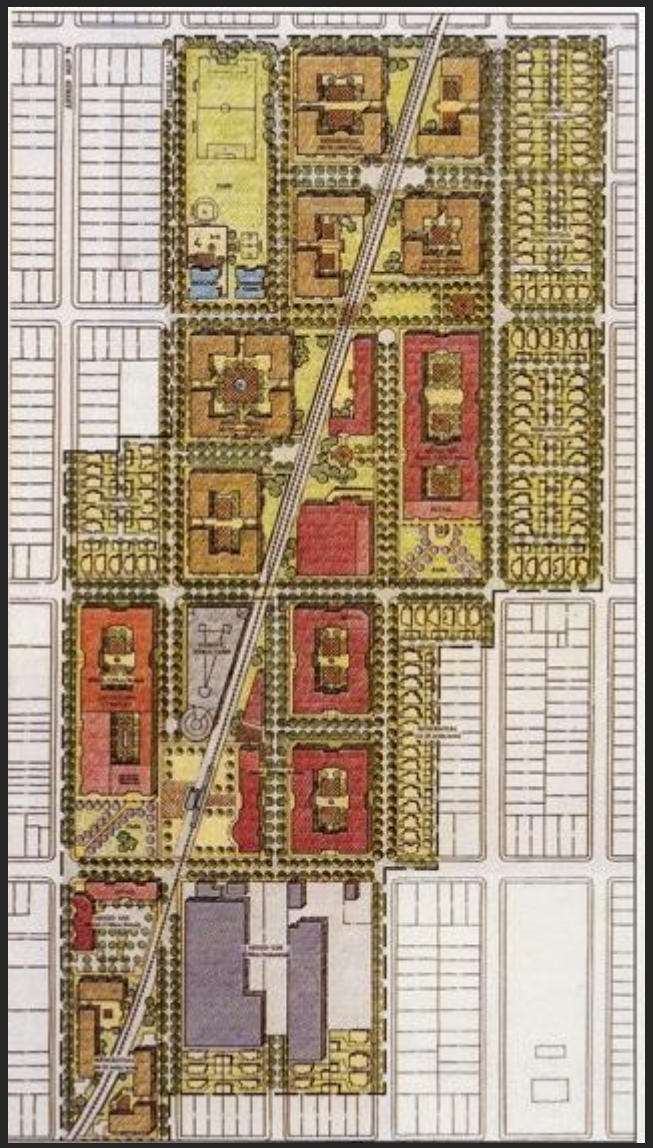

TUNELP
MASTERS
TUNE-UP
LUBE OIL CHANGE


1370

Jackson Taylor Neighborhood

San Jose, CA



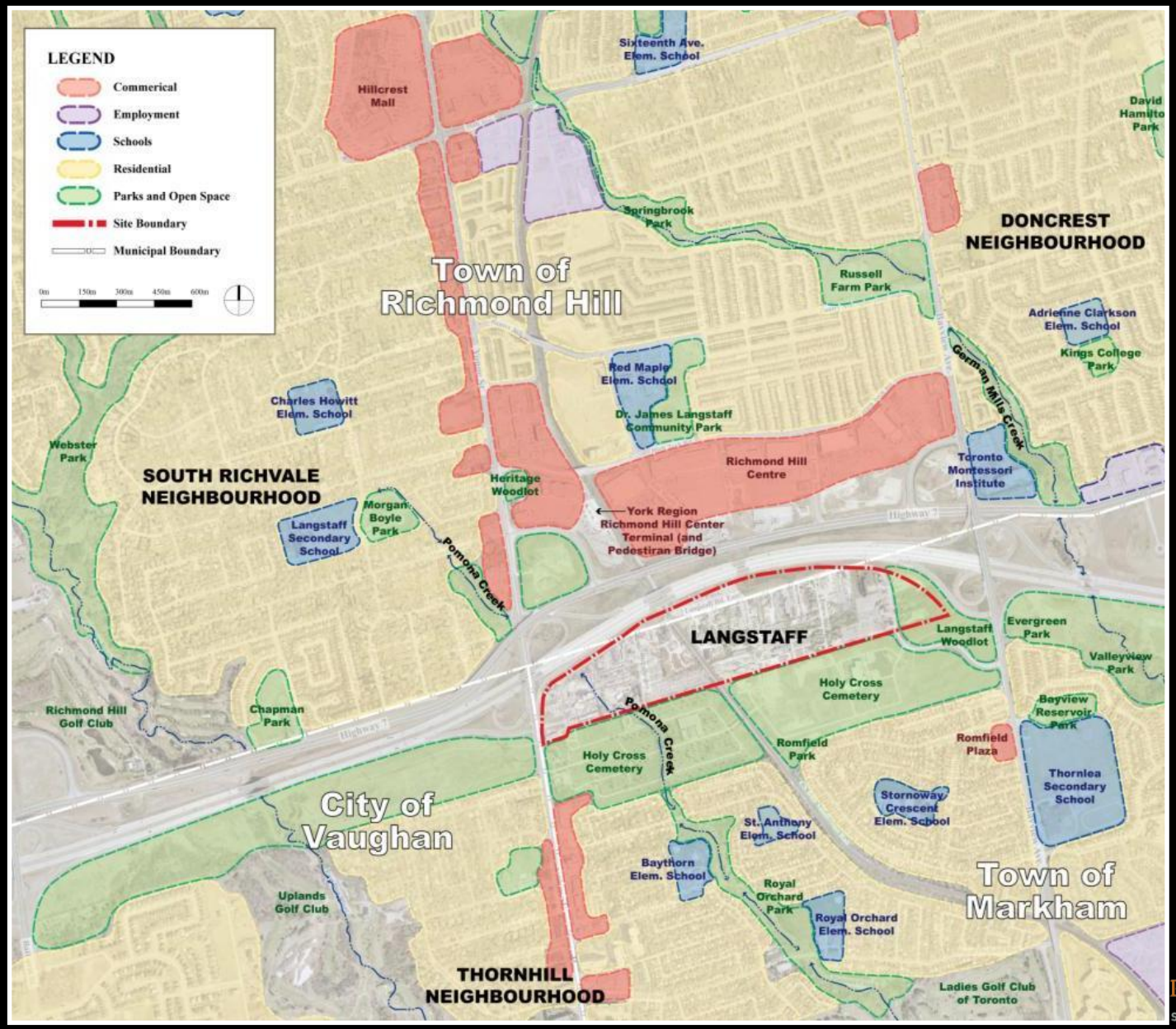



Seventh


RESTAURANT

Toronto: Places to Growth Plan

Existing Conditions: Land Use



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Preferred Concept Plan

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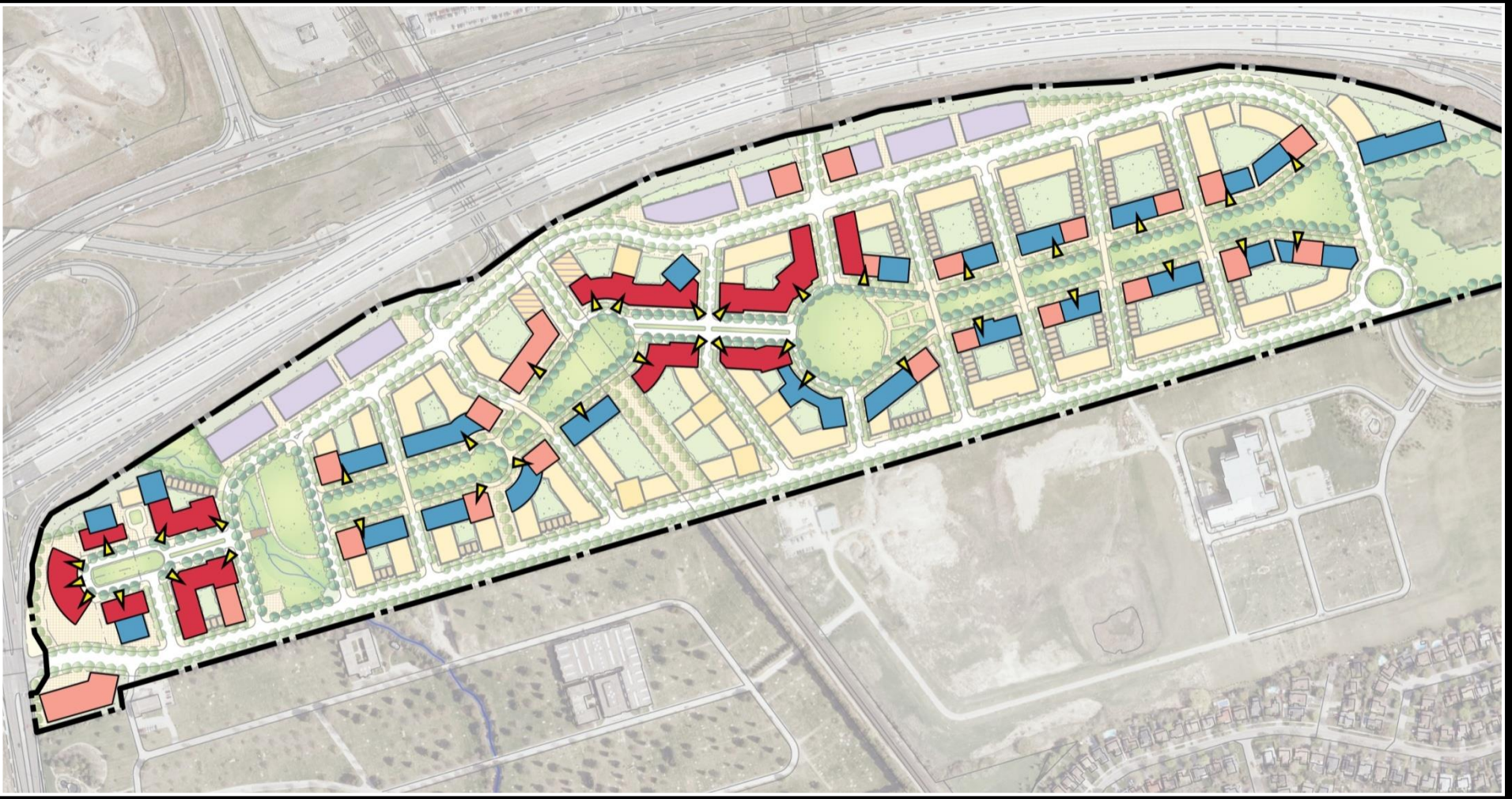
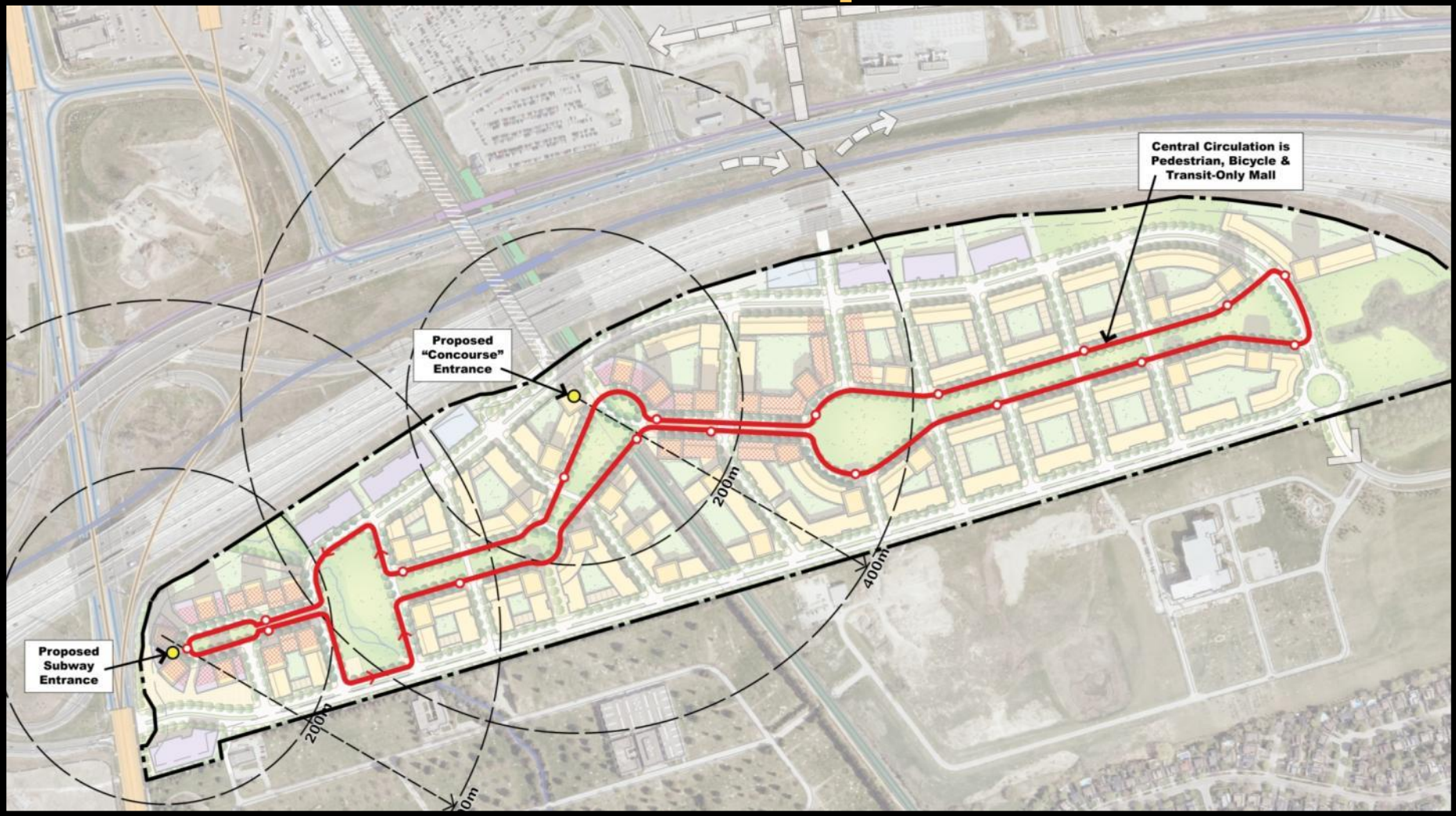
Livability & Urbanism:
A Vibrant Mixed-Use Public Realm

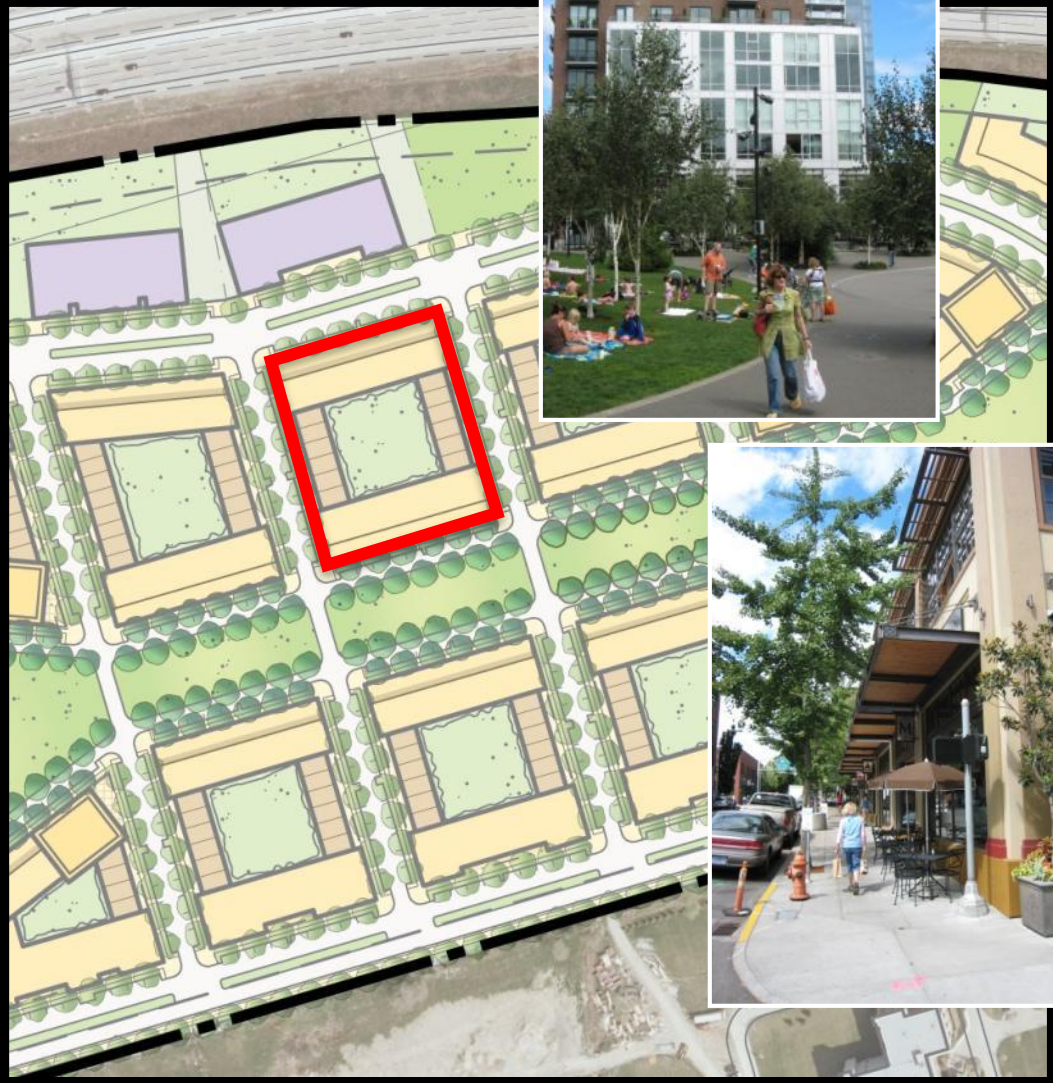


Transit & Transportation: "Transit Mall" Concept



Livability & Urbanism: Small Blocks

- Small, varied blocks create good pedestrian environment
- Size varies, but typical dimension is 70m by 85m (0.6 ha)
- Compare with Portland, OR: typical Portland block is 60m x 60m.

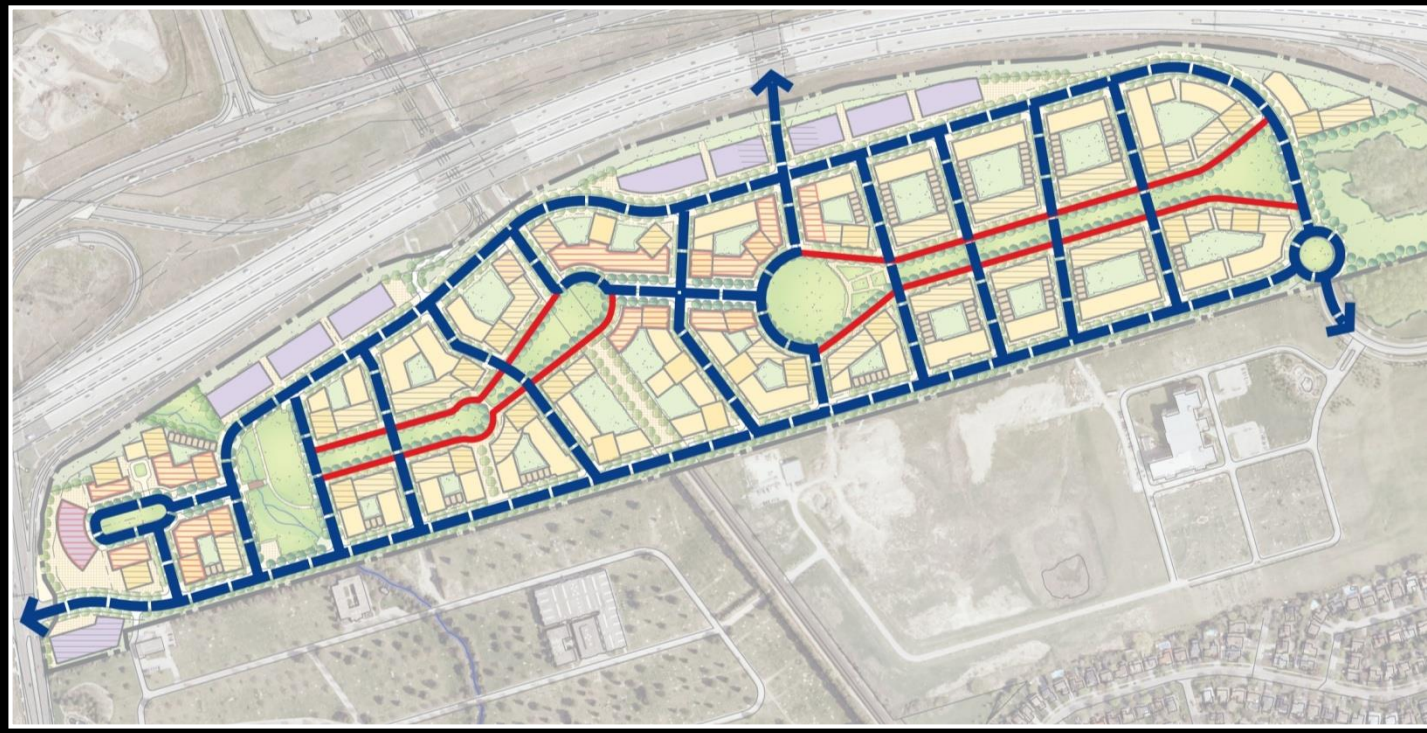


Livability & Urbanism:
Streets for People

- Corner sidewalk “bulbouts” favor pedestrians
- Plentiful street trees
- Varied building setbacks

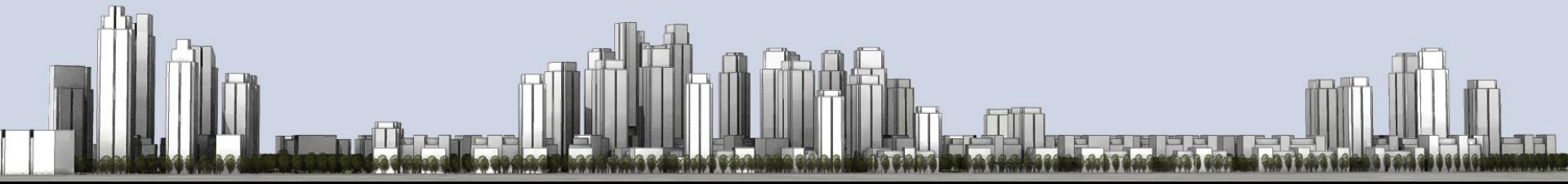
Livability & Urbanism: Interconnected Street Grid

- Network of streets is framework for good urbanism
- Some streets are ped only, others for people and cars
- More street connections makes walking easier



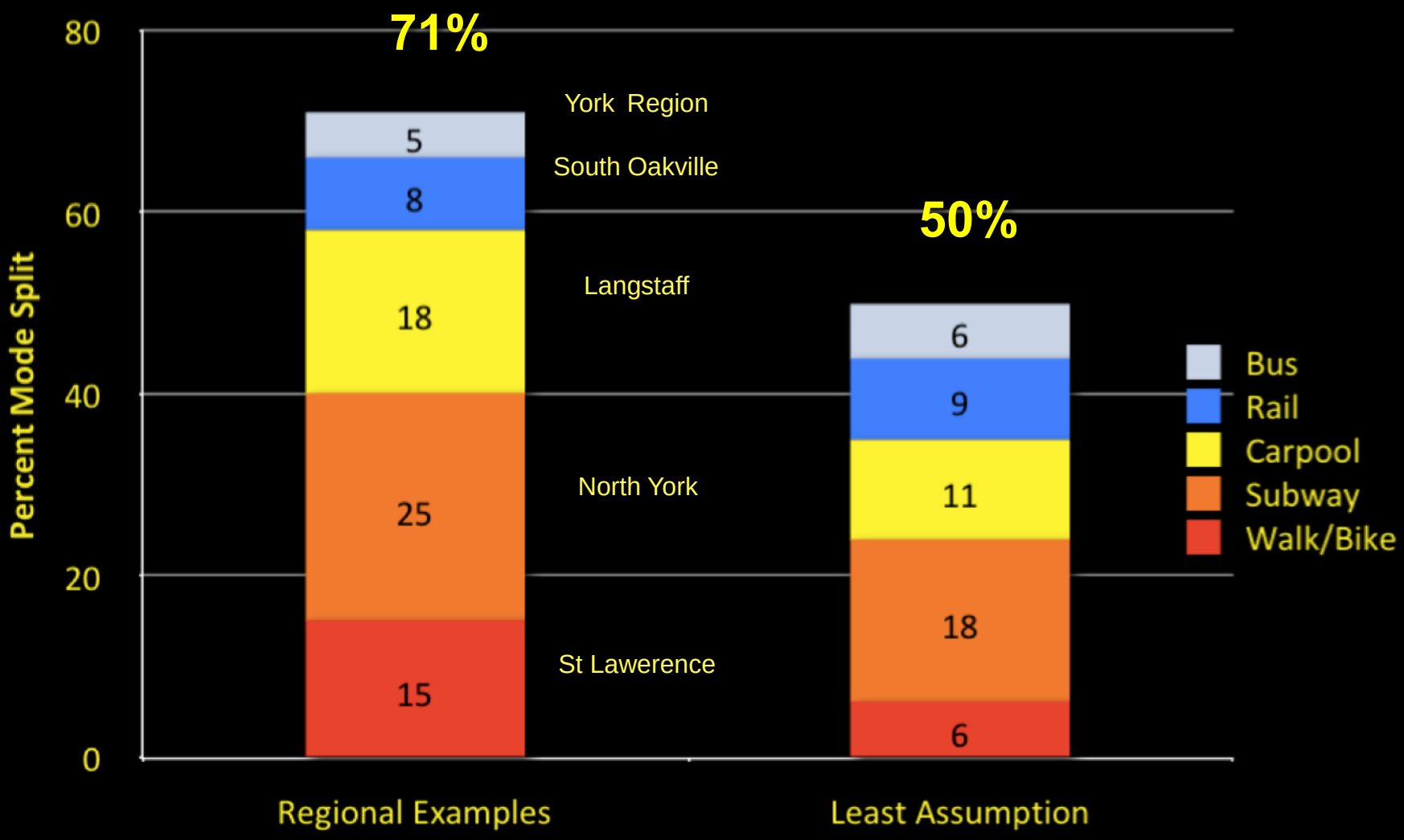
Design Guidelines: Tower Placement & Control

- Tower placement specified in certain locations
- Tower placement suggested in other locations
- Criteria: axial vistas & urban design statements
- Minimum distance between towers is 20 m




FAMILY
MEDICAL CENTRE
LAW OFFICE

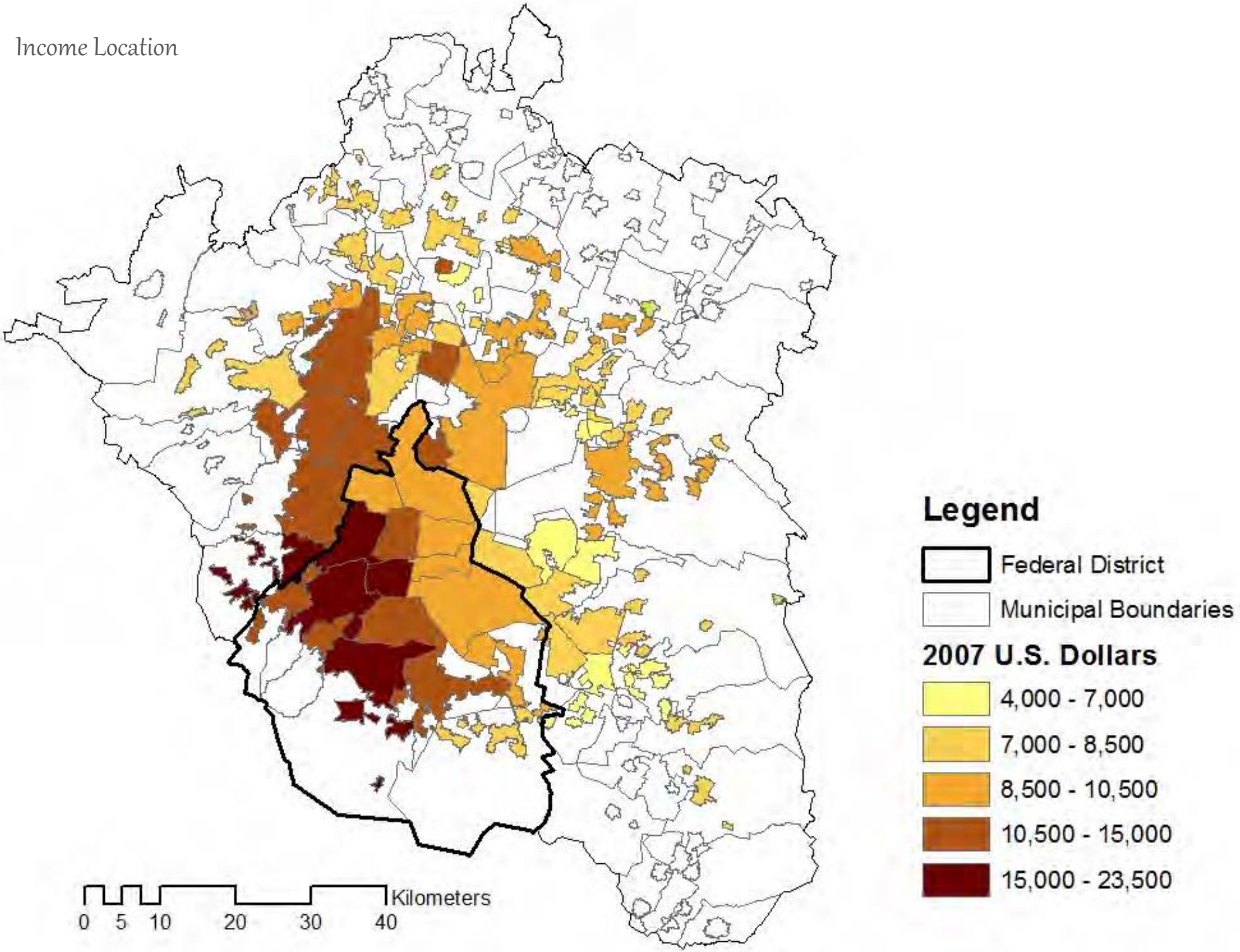
Non-Auto Mode Split



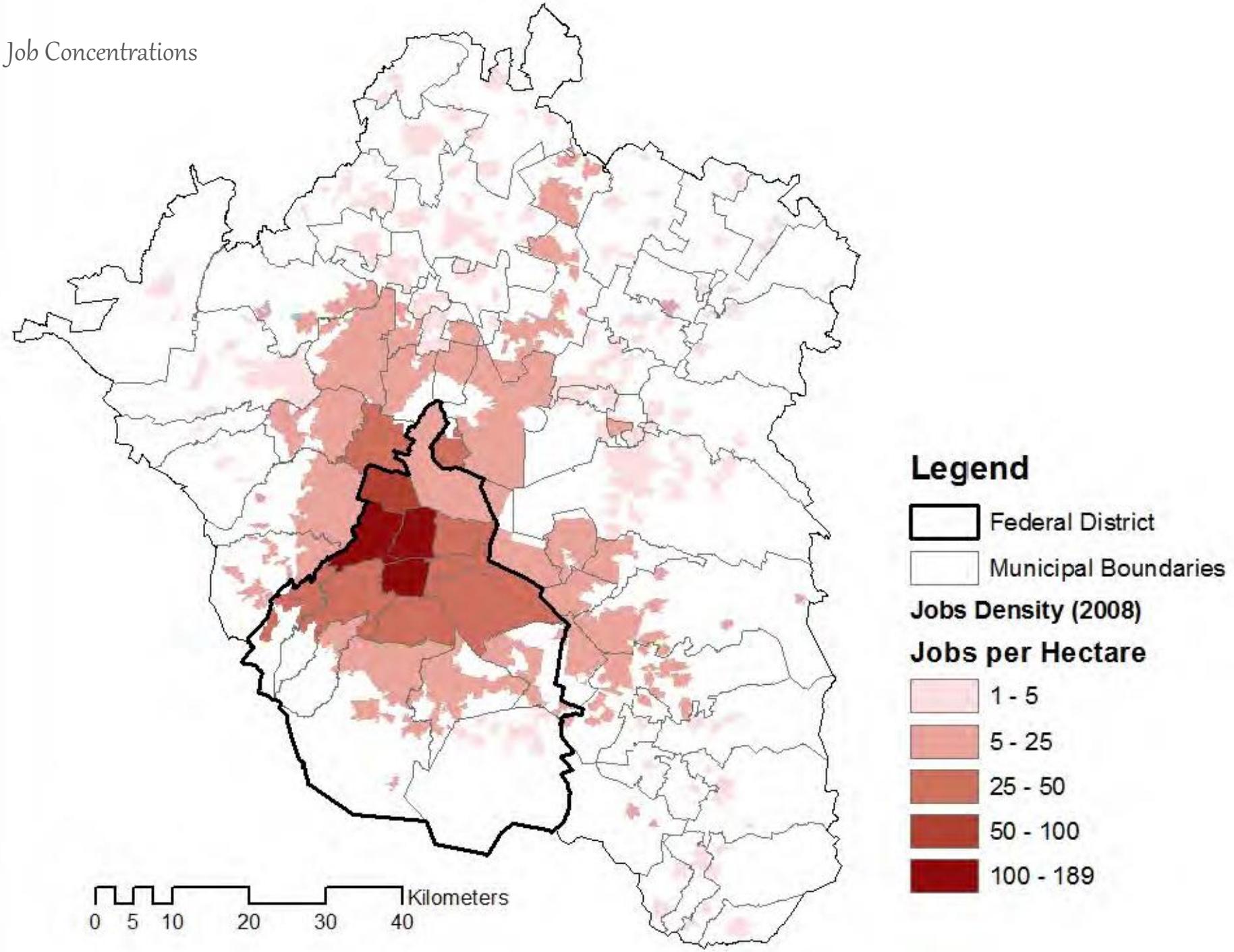

MARKET

Mexico – Low Income Sprawl

Income Location

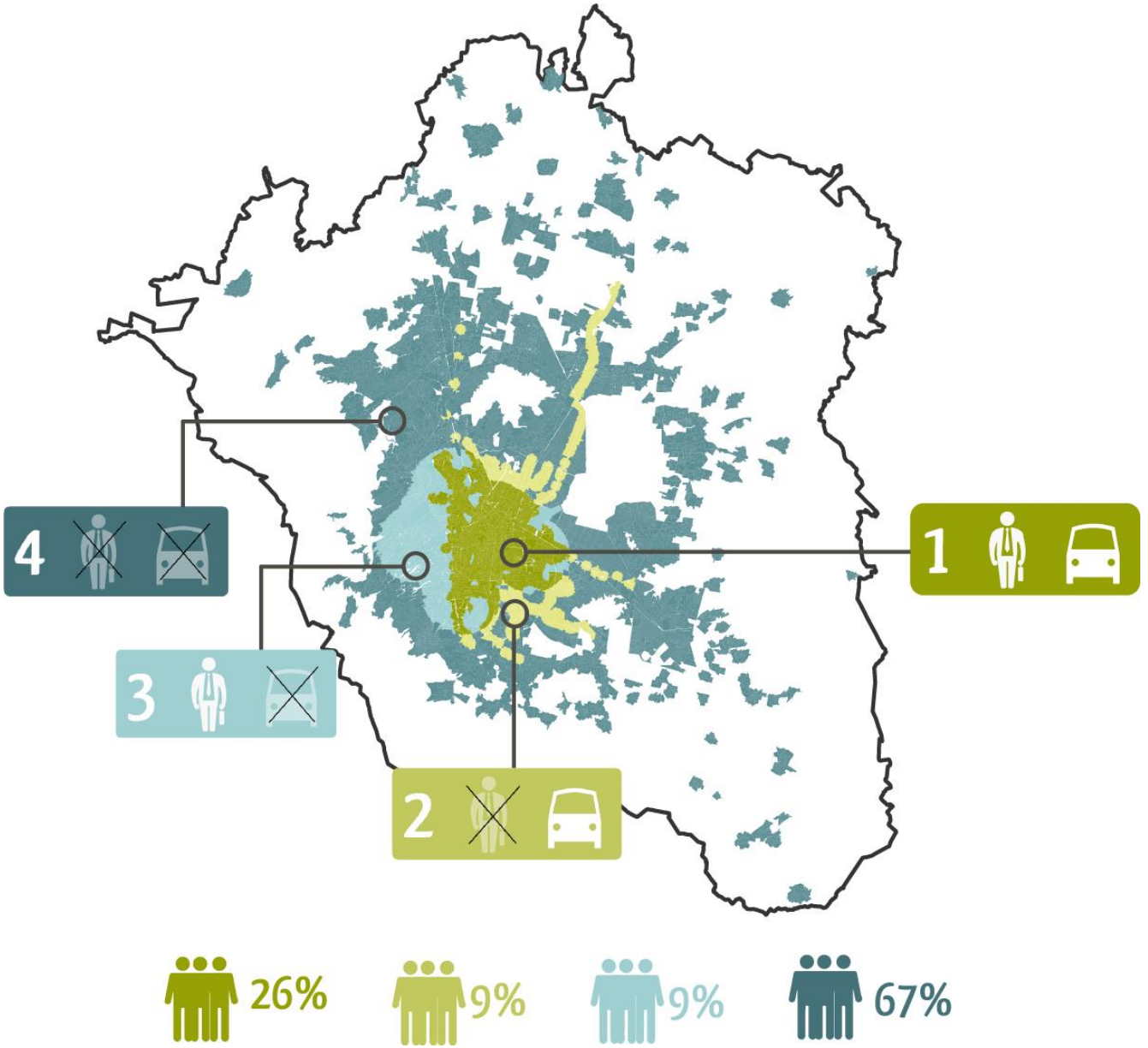


Job Concentrations



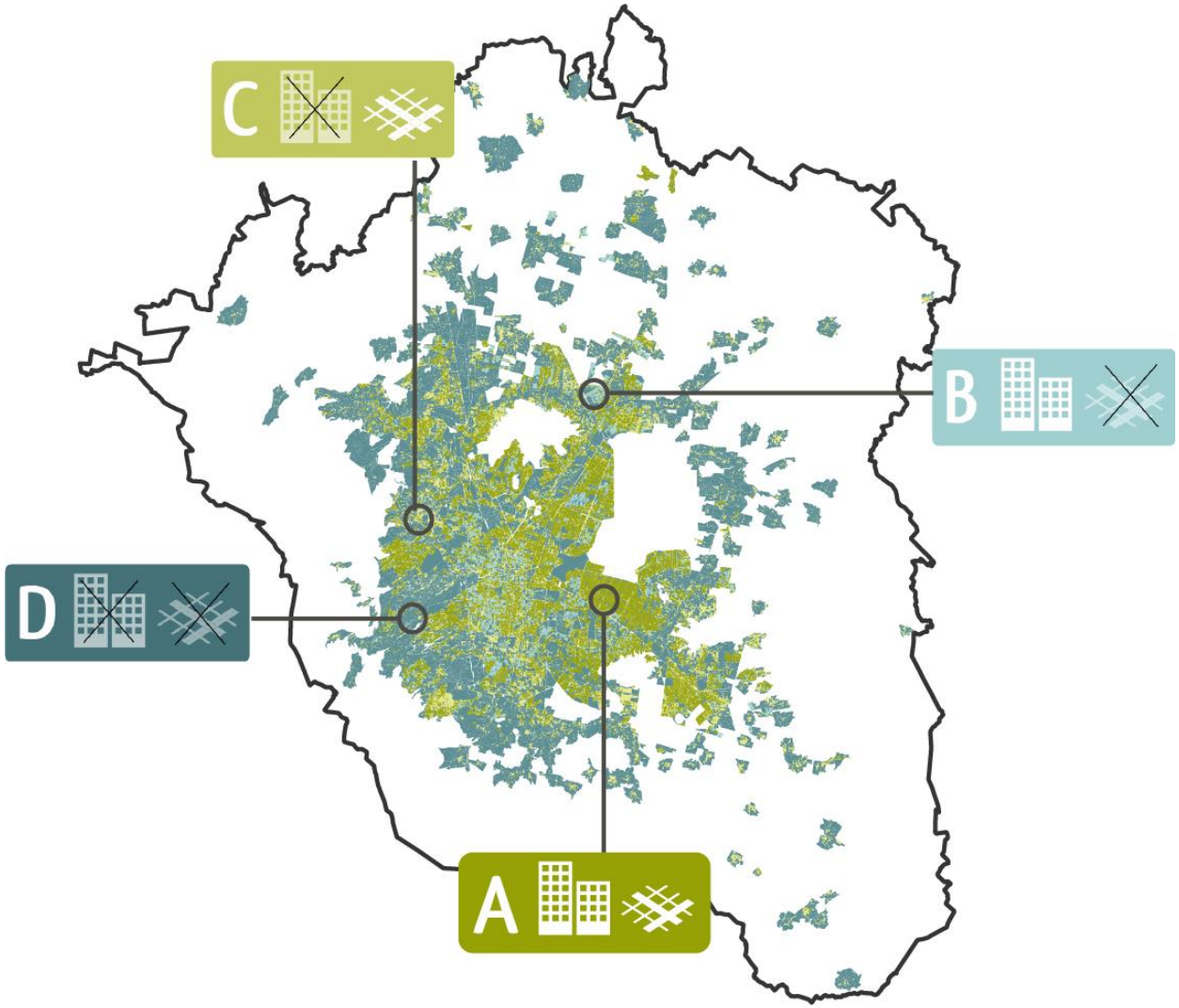
Modeling Framework

Regional location



Modeling Framework

Urban configuration



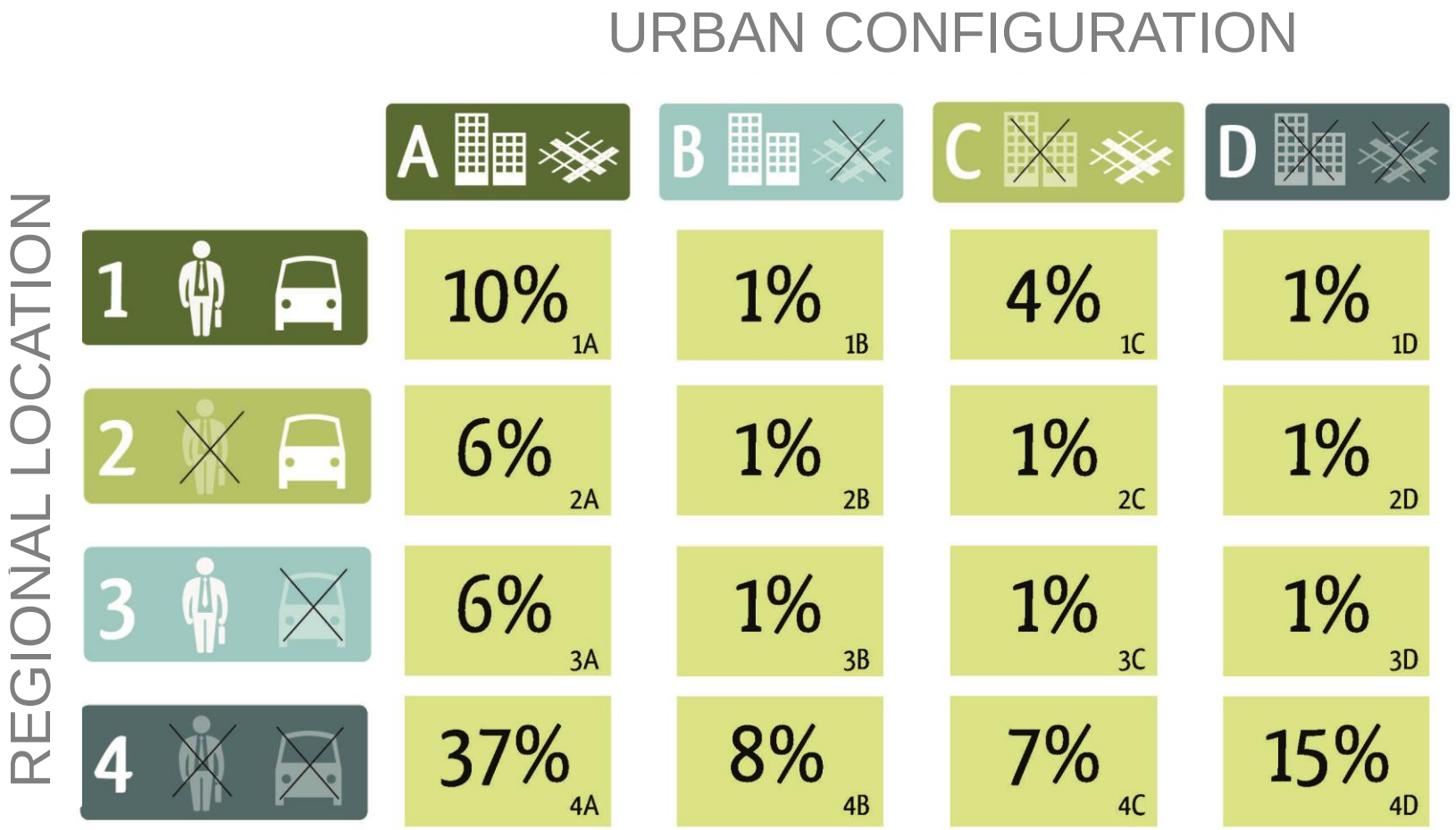
Scale

Density

58% 11% 12% 18%

Place type definition

16 Possible combinations



X 3 socioeconomic strata= 48 typologies

Metrics analysis

LAND CONSUMPTION

INFRASTRUCTURE COSTS

ENERGY CONSUMPTION

WATER CONSUMPTION

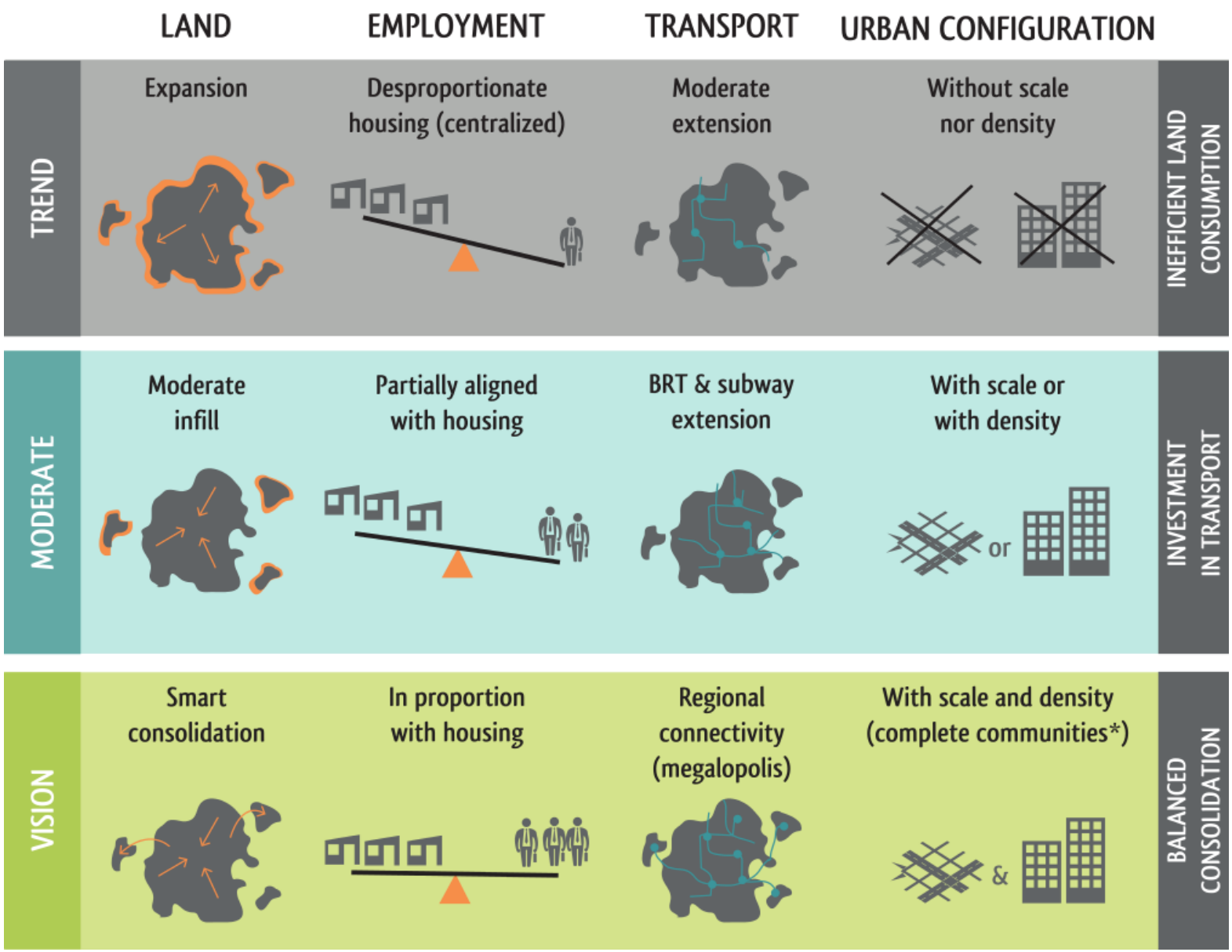
PUBLIC TRANSPORT

PRIVATE TRANSPORT

GHG EMISSIONS

COSTS PER HOUSEHOLD

Scenario definition



Metrics analysis

	LAND CONSUMPTION	INFRASTRUCTURE COSTS	ENERGY CONSUMPTION	WATER CONSUMPTION	TRAVELED KM (private)	TRAVEL TIME (public & private)	COSTS PER HOUSEHOLD (annualized)	GHG EMISSIONS (annualized)
TREND	640 km² (similar in size to Puebla)	$ 33,070 mill.	4,160 Quad. Btu	52,450 mill. m³	42,000 mill. vehicle km traveled	13,200 person hours traveled	$ 7,022 annual/household	26 mill. Ton CO_2
MODERATE	255 km² (similar in size to Toluca)	$ 11,338 mill. -$ 21,700 mill. 14 lines subway (line 12)	4,140 Quad. Btu -$ 867 mill.	52,200 mill. m³ -$ 116 mill.*	8% less vehicle km traveled -500,000 vehicles (2050)	15% less person hours traveled -½ hour PHT per day	$ 6,601 annual/household -$ 420 annual/household	24 mill. Ton CO_2 -6% emissions
VISION	140 km² (similar in size to Queretaro)	$ 6,983 mill. -$ 26,094 mill. 17 lines subway (line 12)	4,120 Quad. Btu -$ 1,799 mill.	45,900 mill. m³ -$ 123 mill.*	13% less vehicle km traveled -780,000 vehicles (2050)	23% less person hours traveled -1 hour PHT per day	$ 6,342 annual/household -$ 680 annual/household	23 mill. Ton CO_2 -9% emissions

China's Development Challenge

中国城市开发的挑战

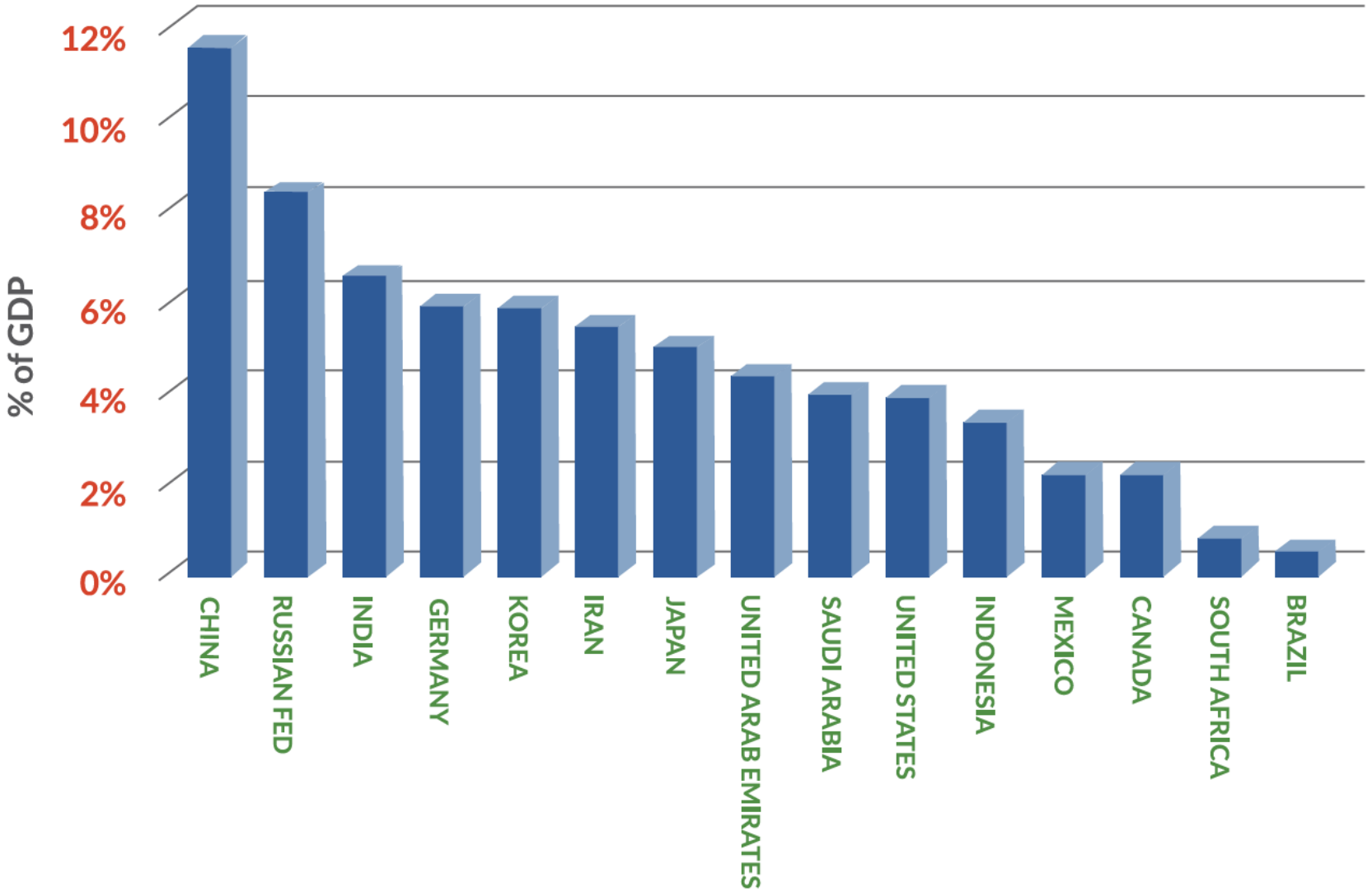

China World
China World Hotel

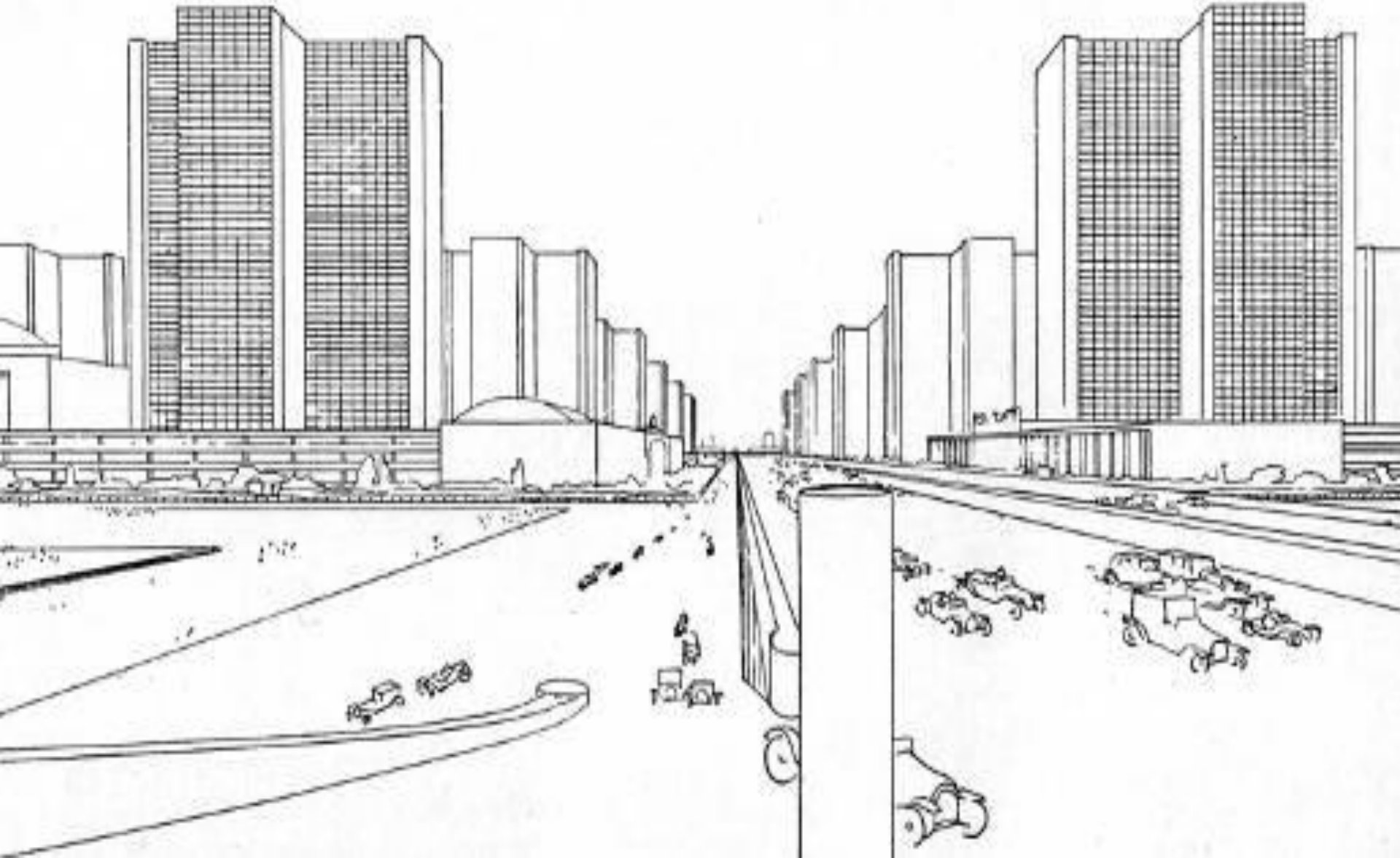
Congestion in big cities (Beijing, Shenzhen, Chongqing, Shanghai)
大城市的拥堵问题严重


乌鲁木齐在线
wlmqwb.com


珍惜生命,行人请走
人行横道或立交桥

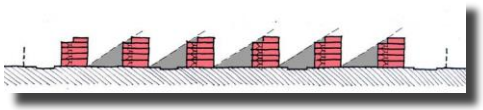
COST OF MORTALITY FROM OUTDOOR $PM_{2.5}$ EXPOSURE AS % OF GDP (MEDIAN ESTIMATES), 2010, 15 LARGEST CO_2 EMITTERS

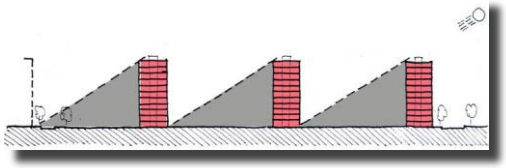


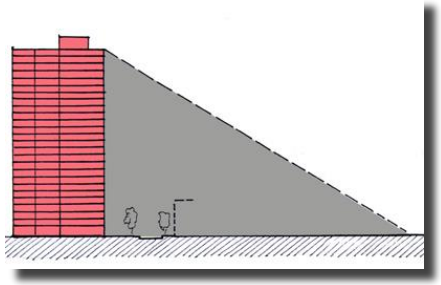


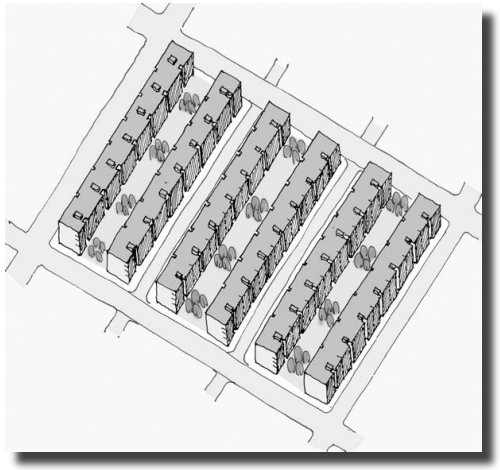

LETS
火热招商中

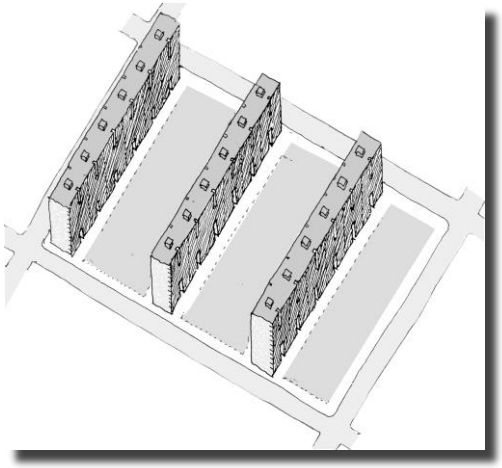

KF 金發凍肉平價市場
Kam Fat Food Market
特設旅行野火燒烤 凍肉海產零售批發
2394 5193 2390 5687
豐裕燒味
恒昌凍肉食品
HANG CHEONG FROZEN
95折
10元2個

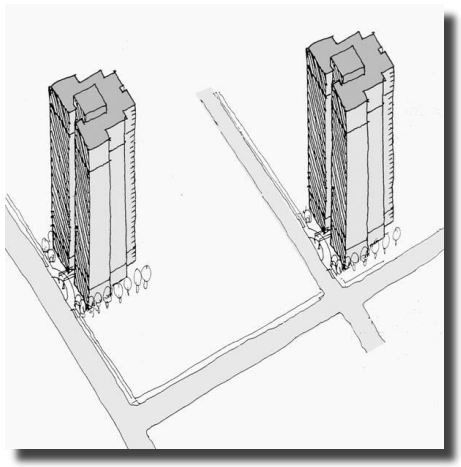


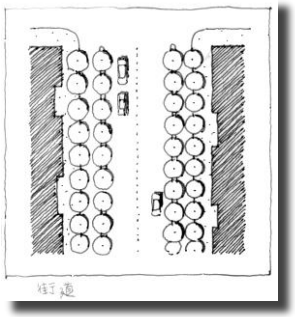


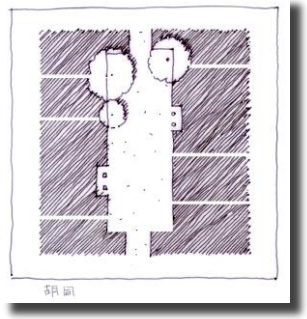


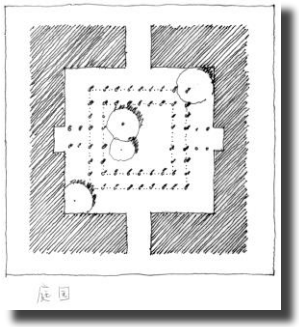


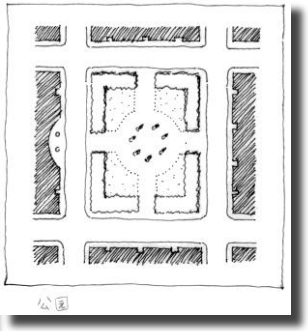












CALTHORPEASSOCIATES

URBAN DESIGNERS, PLANNERS, ARCHITECTS

《城市形态是否影响能耗》

Traditional
传统社区

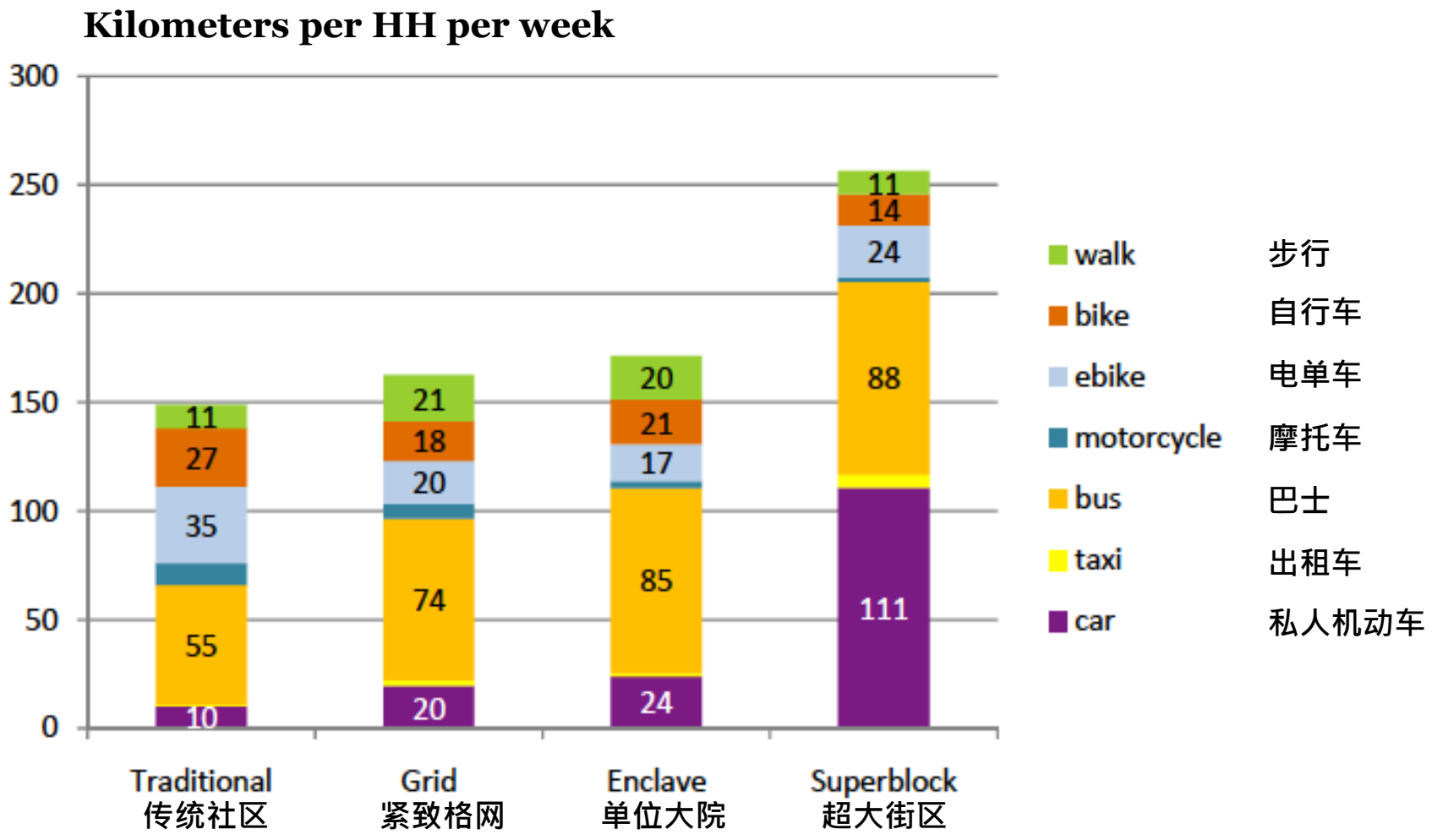
Grid
紧致格网

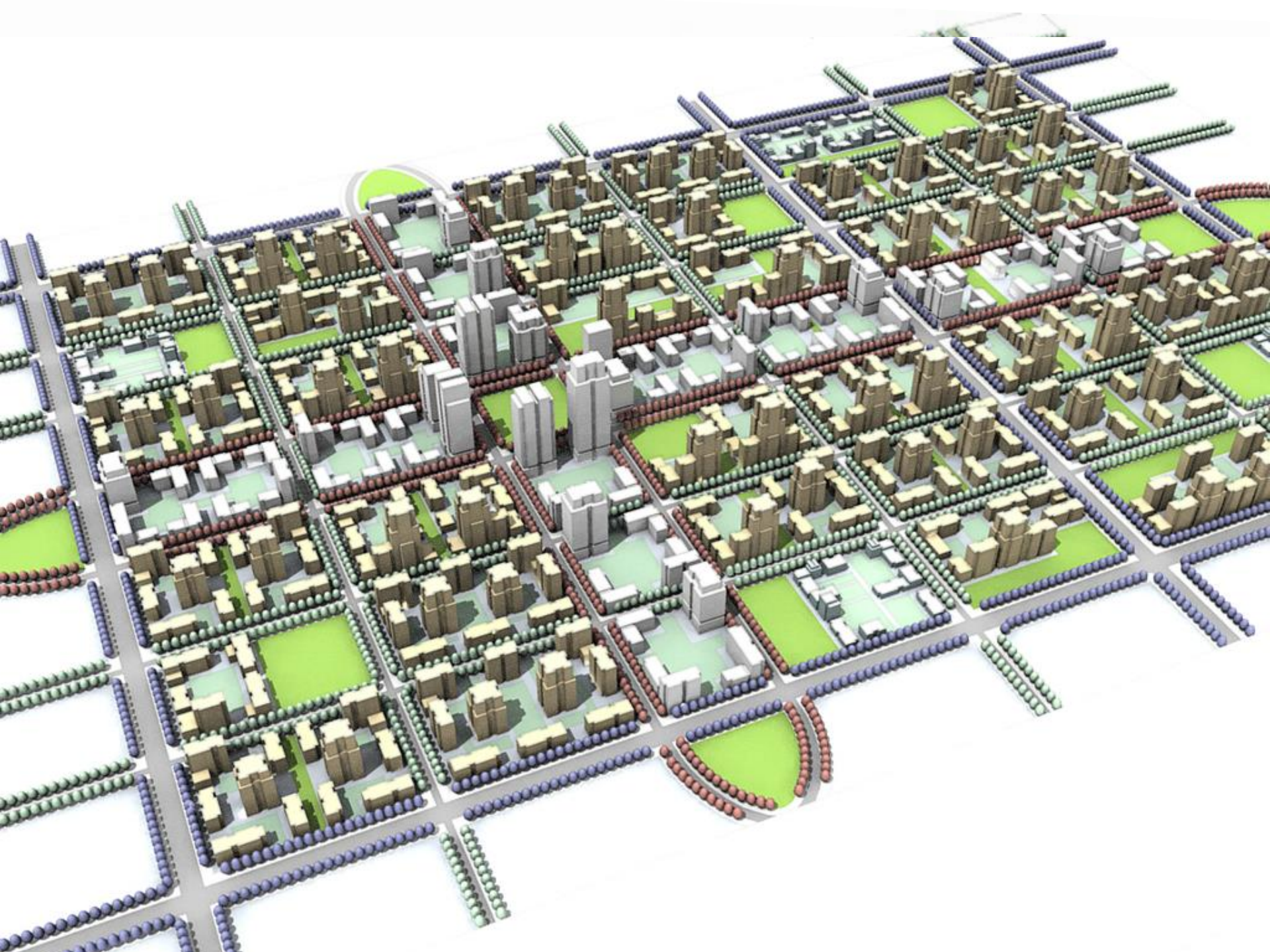
Enclave
单位大院

Superblock
超大街区

Travel Distance by Neighborhood Types

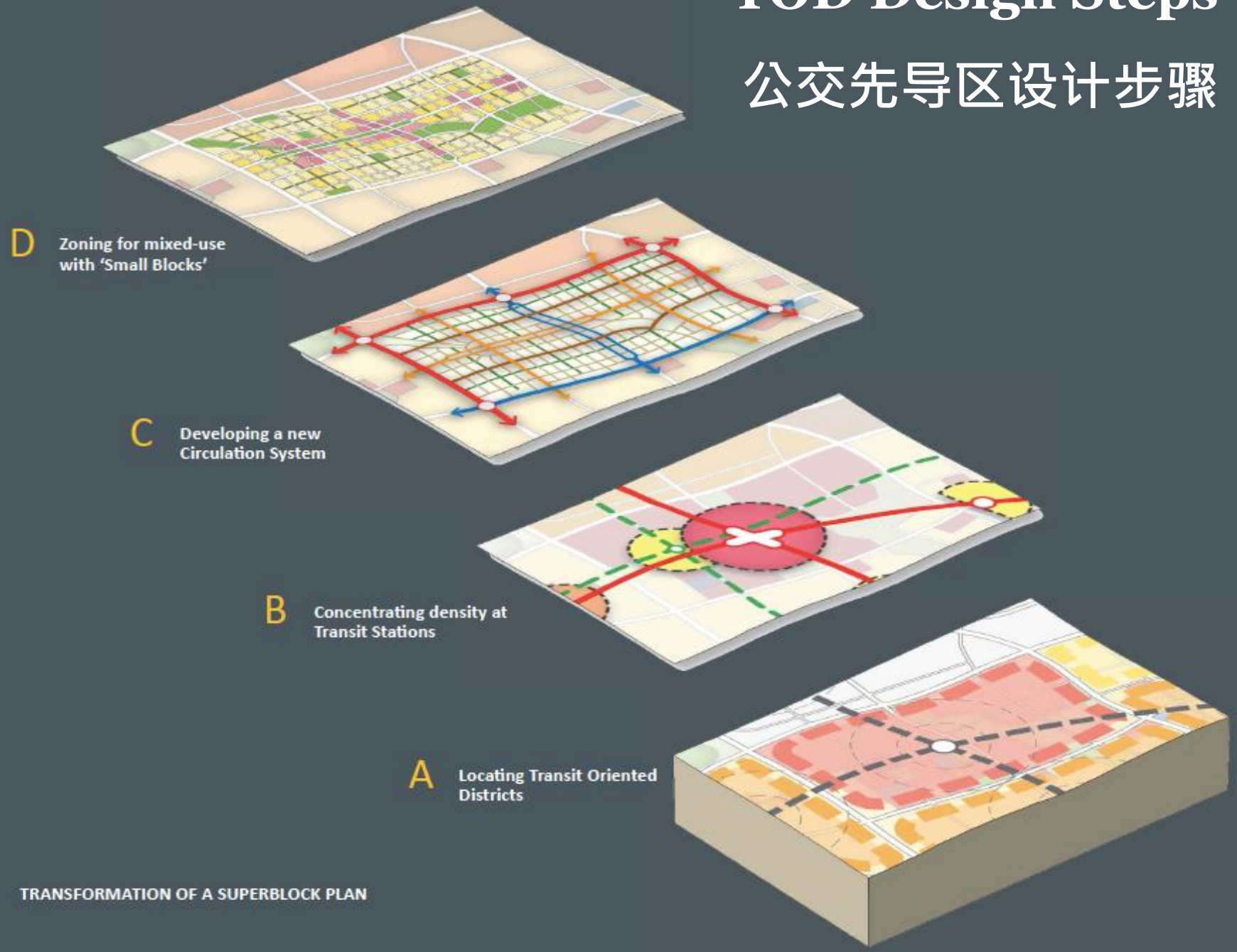
不同类型社区的出行距离



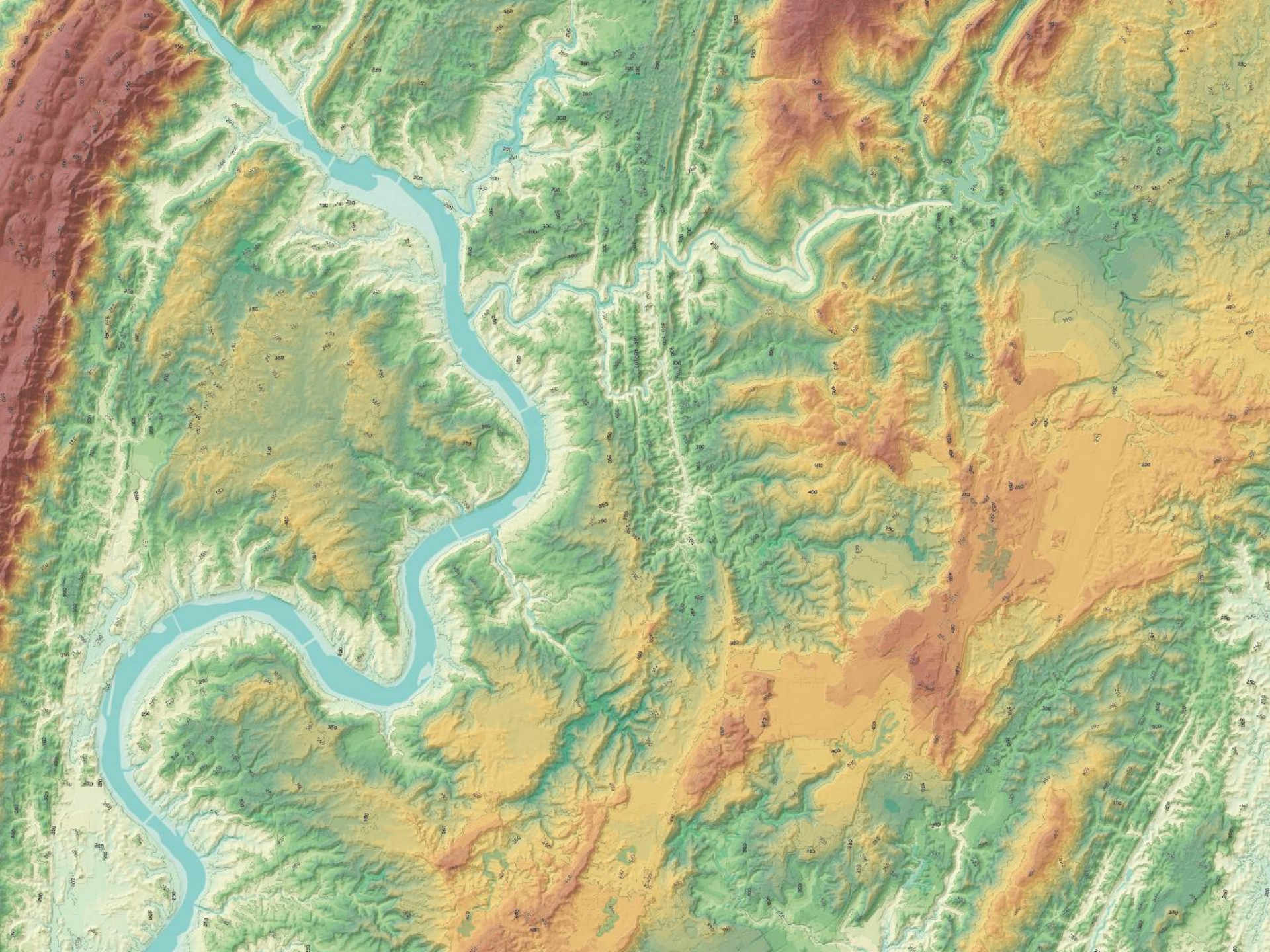


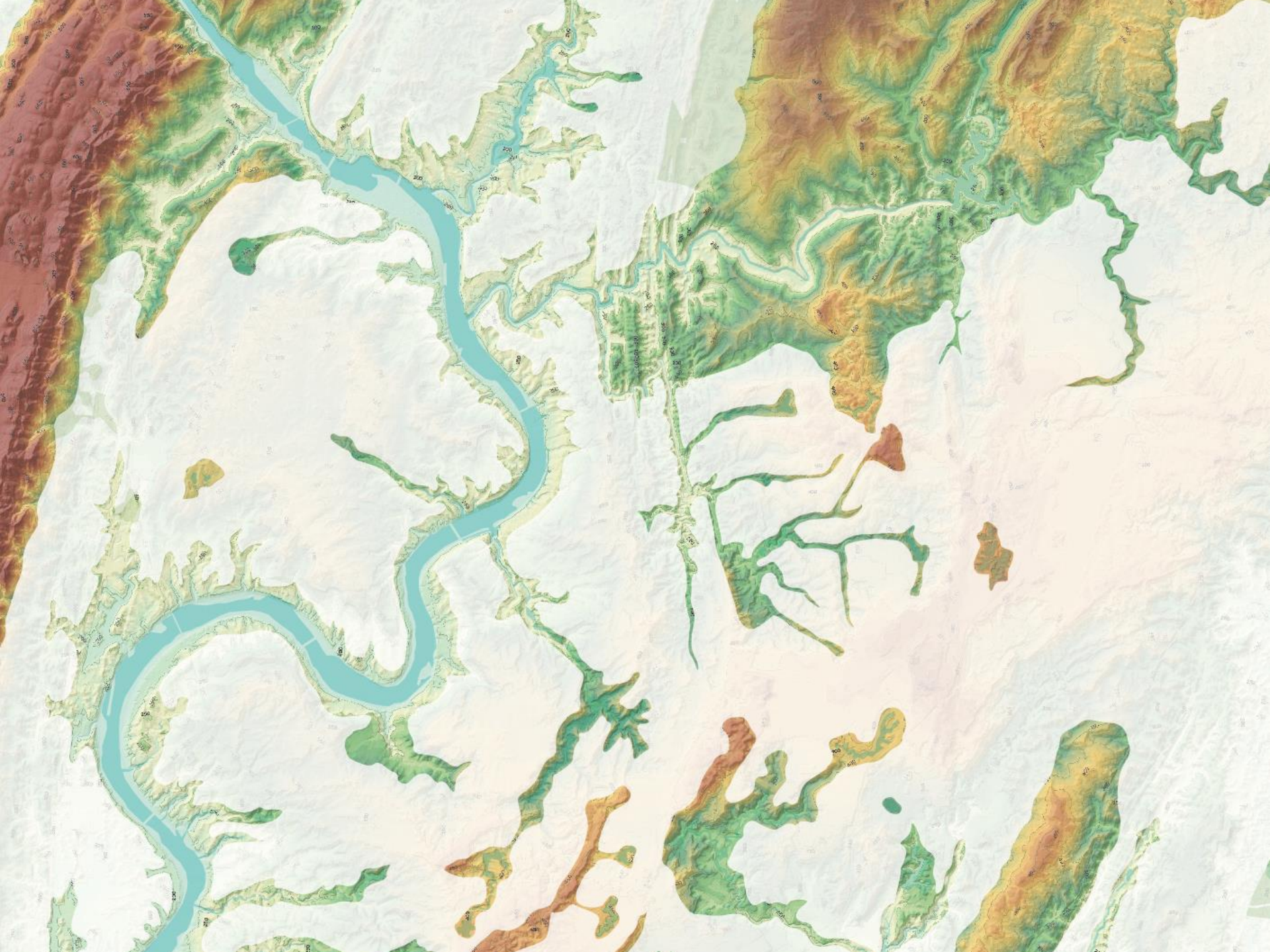
TOD Design Steps

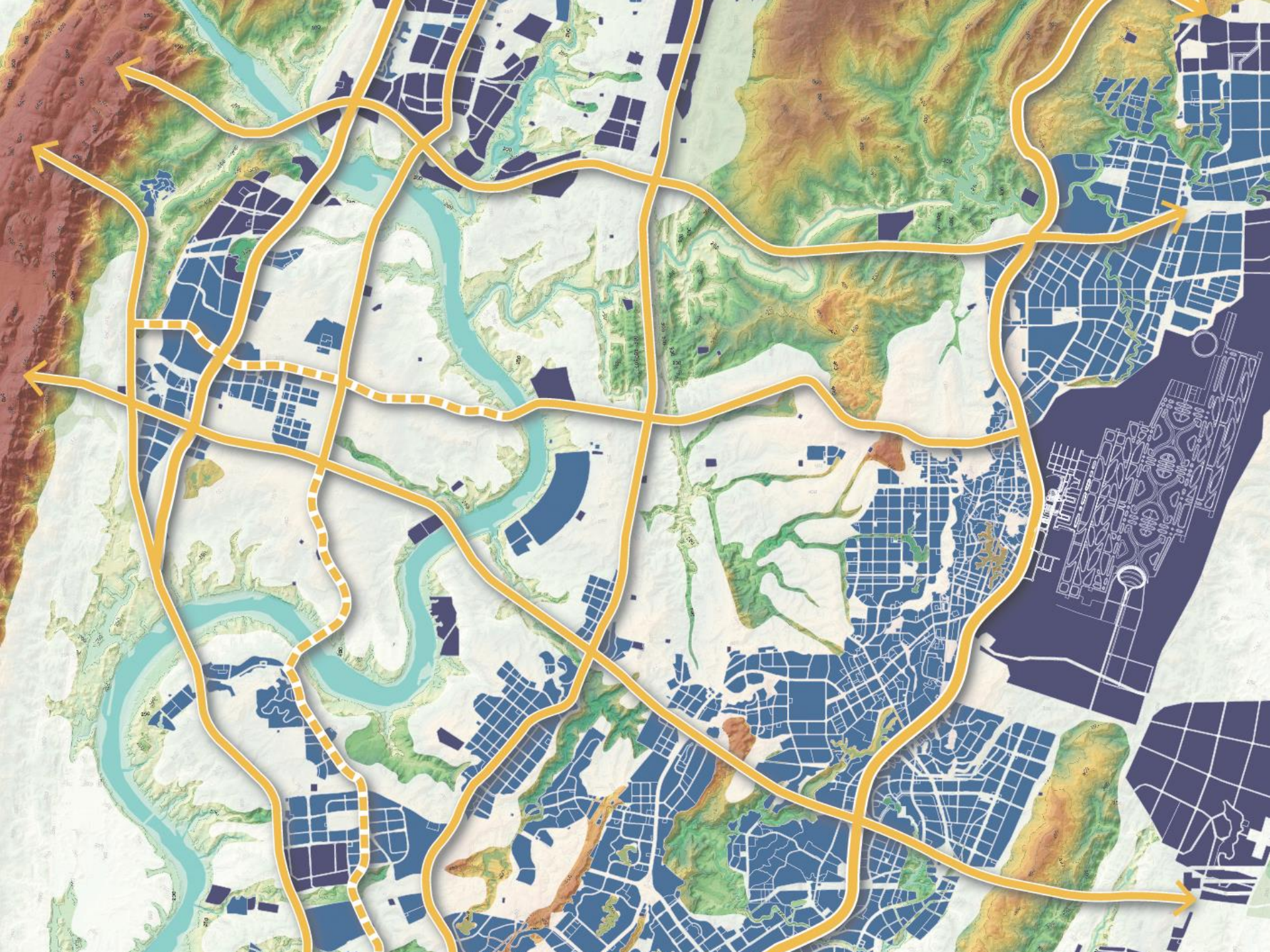
公交先导区设计步骤

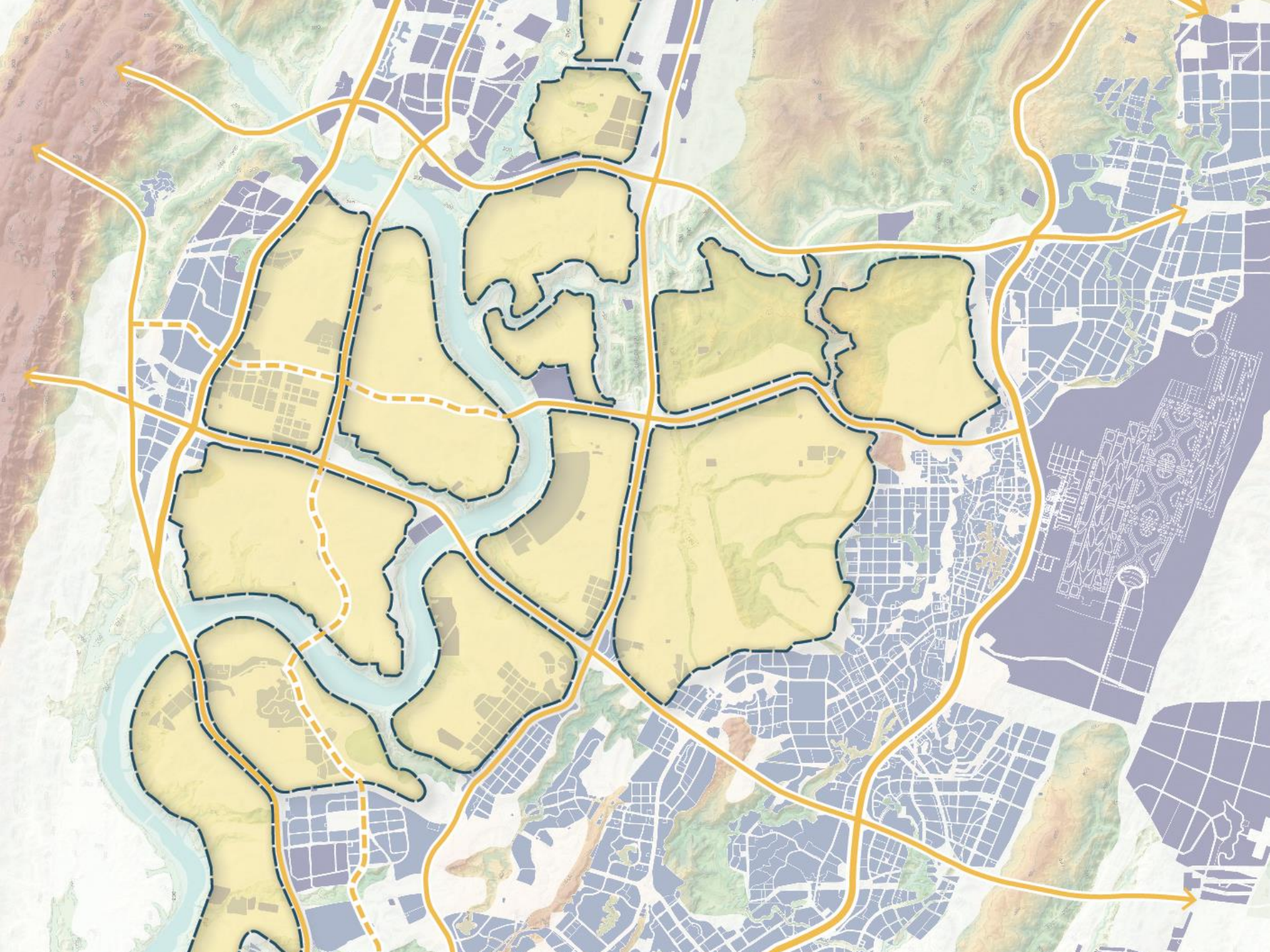


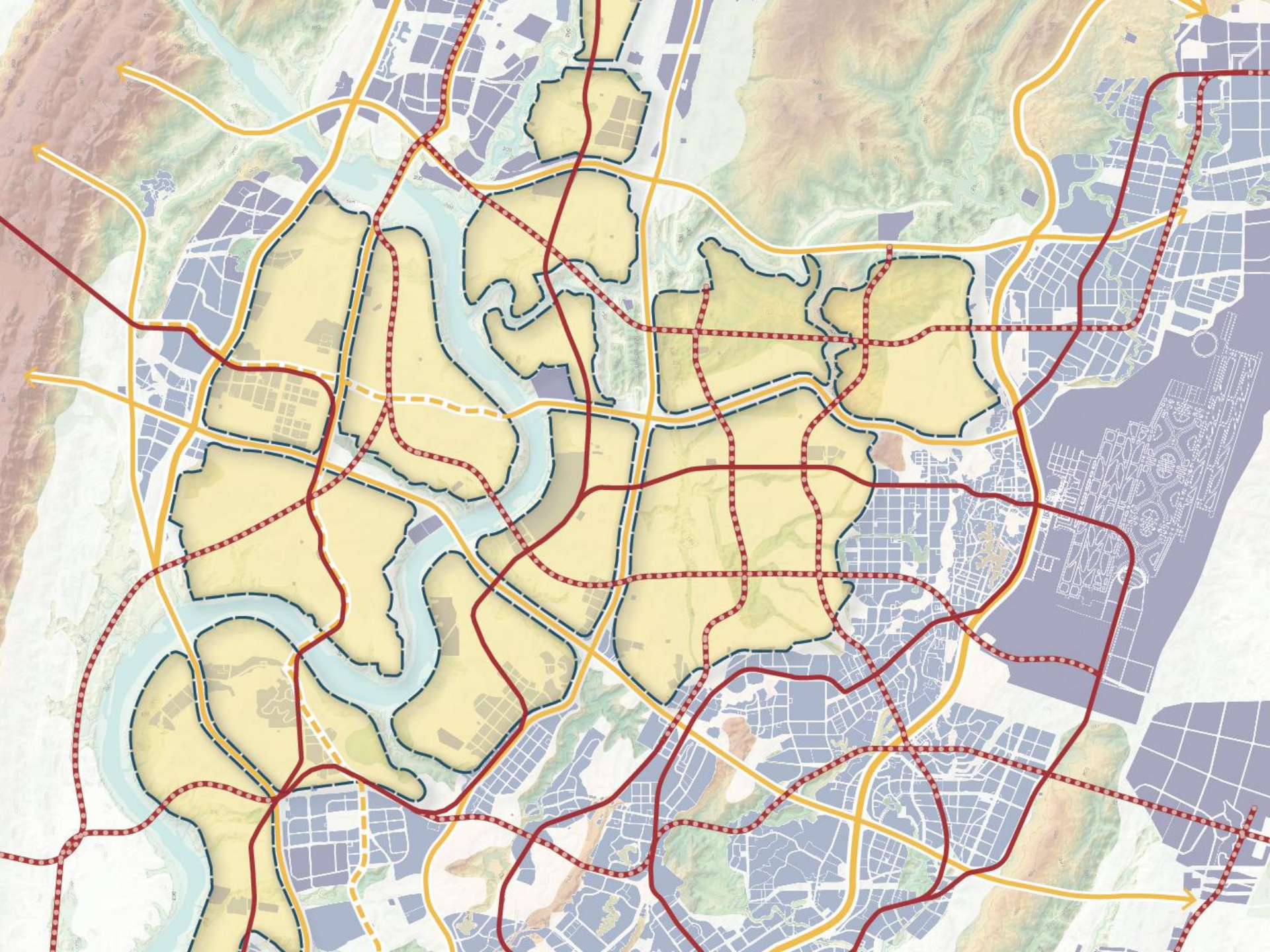

Study Area
研究区域
Chongqing
重庆建成区

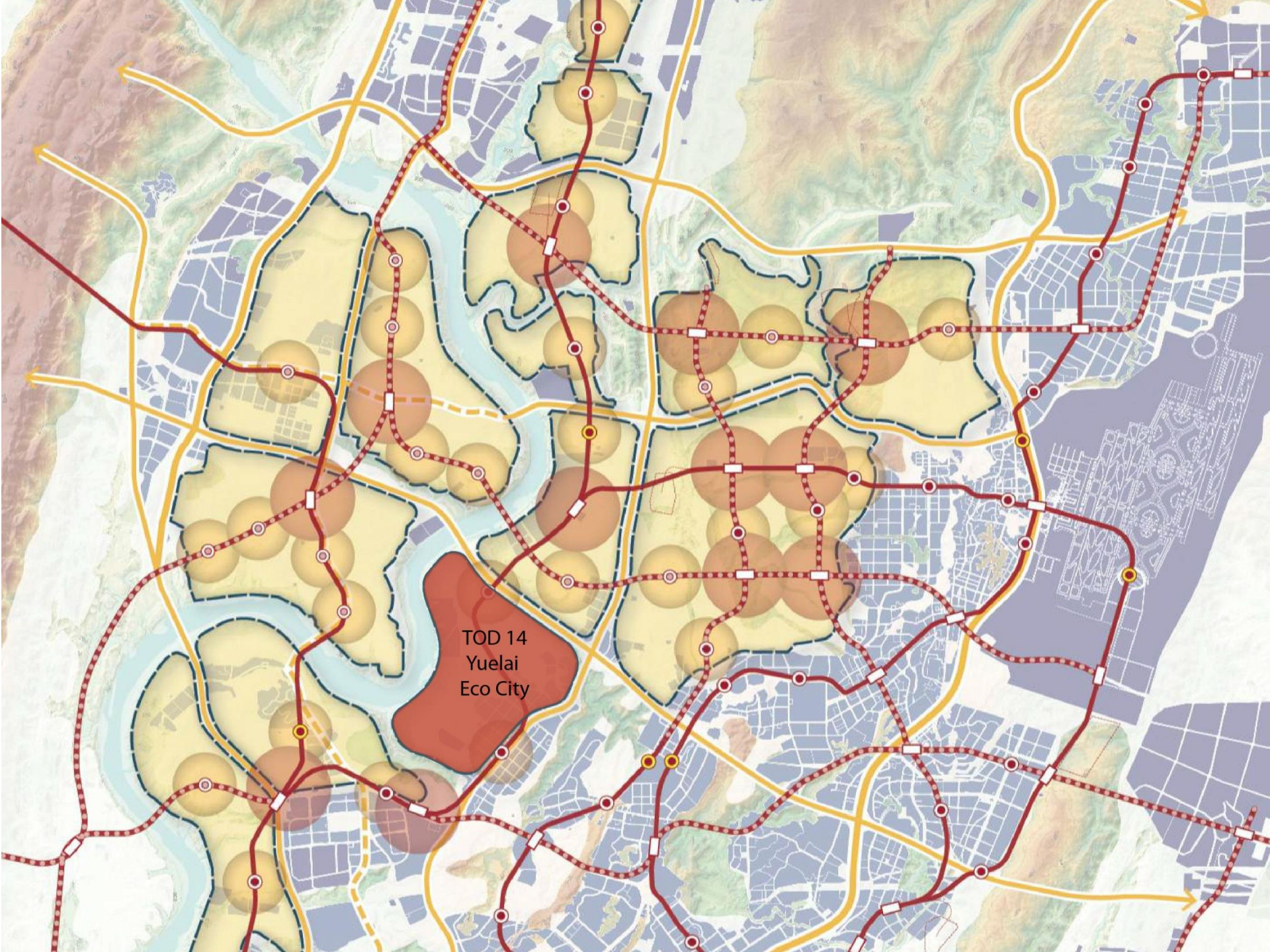











TOD 14
Yuelai
Eco City

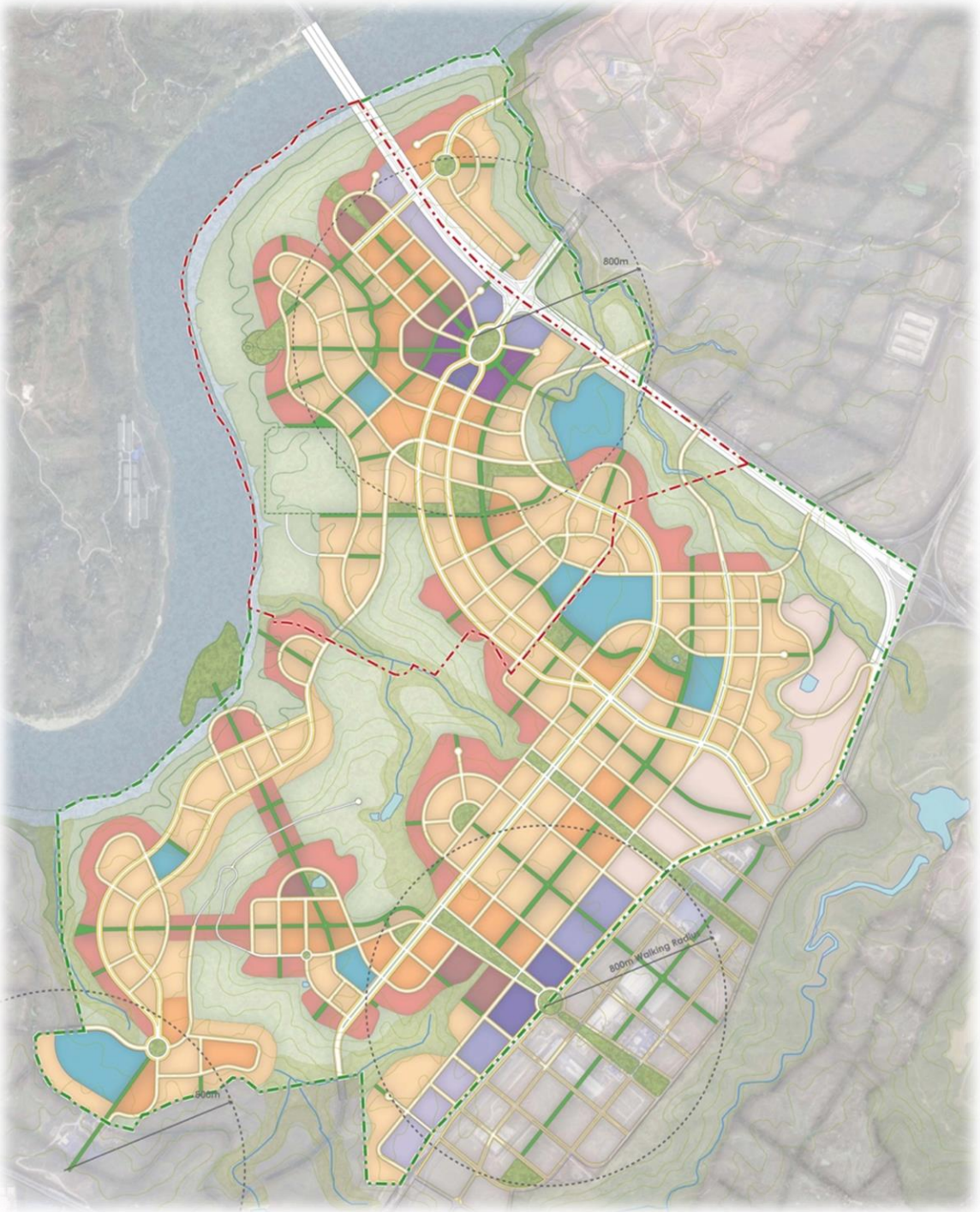
Current Plan

现有规划

Yuelai : Superblock
悦来生态城：超大街区

Proposed Plan

新版规划



Yuelai : Urban Network
悦来生态城：城市格网

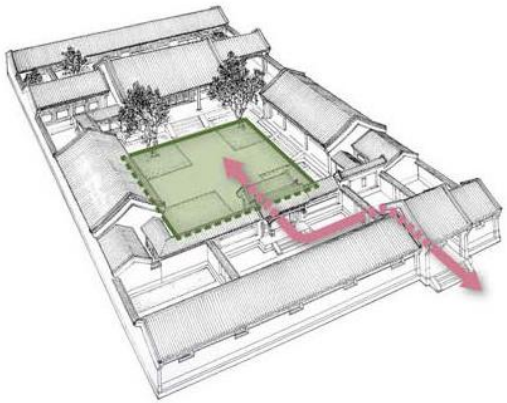
Yuelai Urban Network Comparison

悦来前后路网对比

Yuelai : Superblock
悦来生态城：超大街区

Yuelai : Urban Network
悦来生态城：城市格网

SMALL BLOCK NEIGHBORHOODS 小尺度街区



INTERIOR COURTYARD VIEW 街区内部庭院渲染

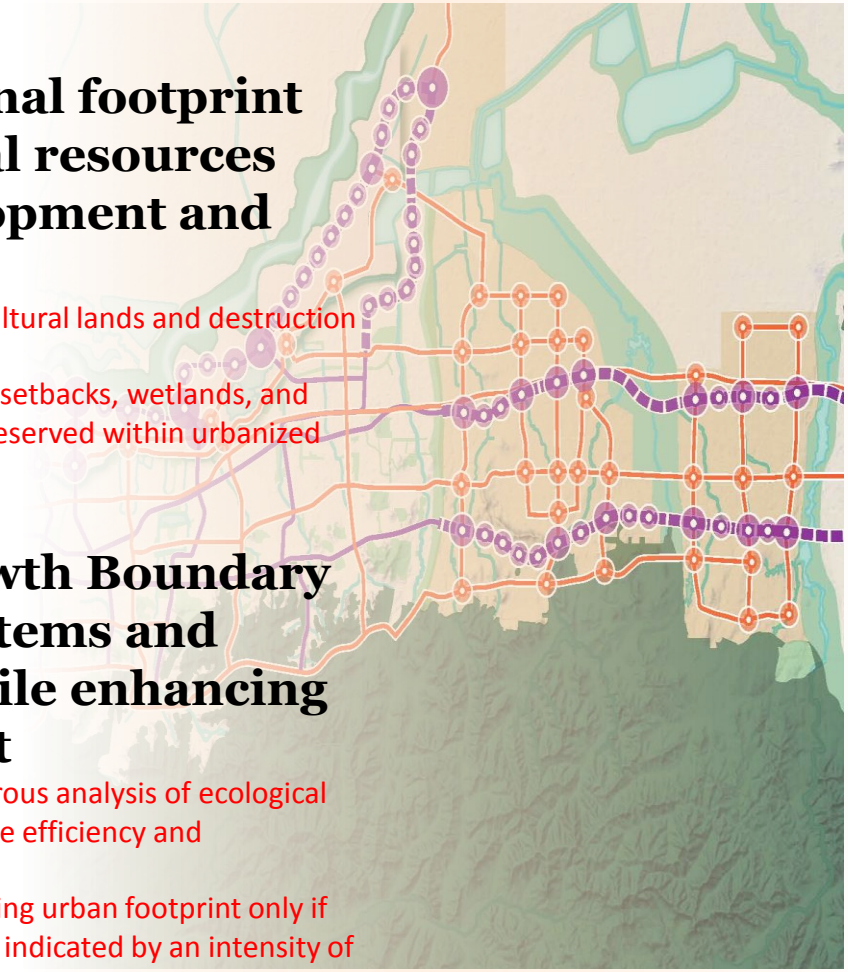
PRESERVE

Preserve natural ecologies, agrarian landscapes and cultural heritage sites

1

Seek a compact regional footprint that conserves natural resources and employs redevelopment and revitalization

- New development should avoid agricultural lands and destruction of natural resources.
- Steep slopes of 20% or more, riparian setbacks, wetlands, and other unique landscapes should be preserved within urbanized areas.



Create an Urban Growth Boundary that preserves ecosystems and agricultural lands while enhancing compact development

- The UGB should be based upon a rigorous analysis of ecological assets, environmental capacity, and the efficiency and productivities of various land uses.
- The UBG can expand beyond the existing urban footprint only if there are no suitable infill locations as indicated by an intensity of urban land use of at least 10,000 residents per square kilometer.

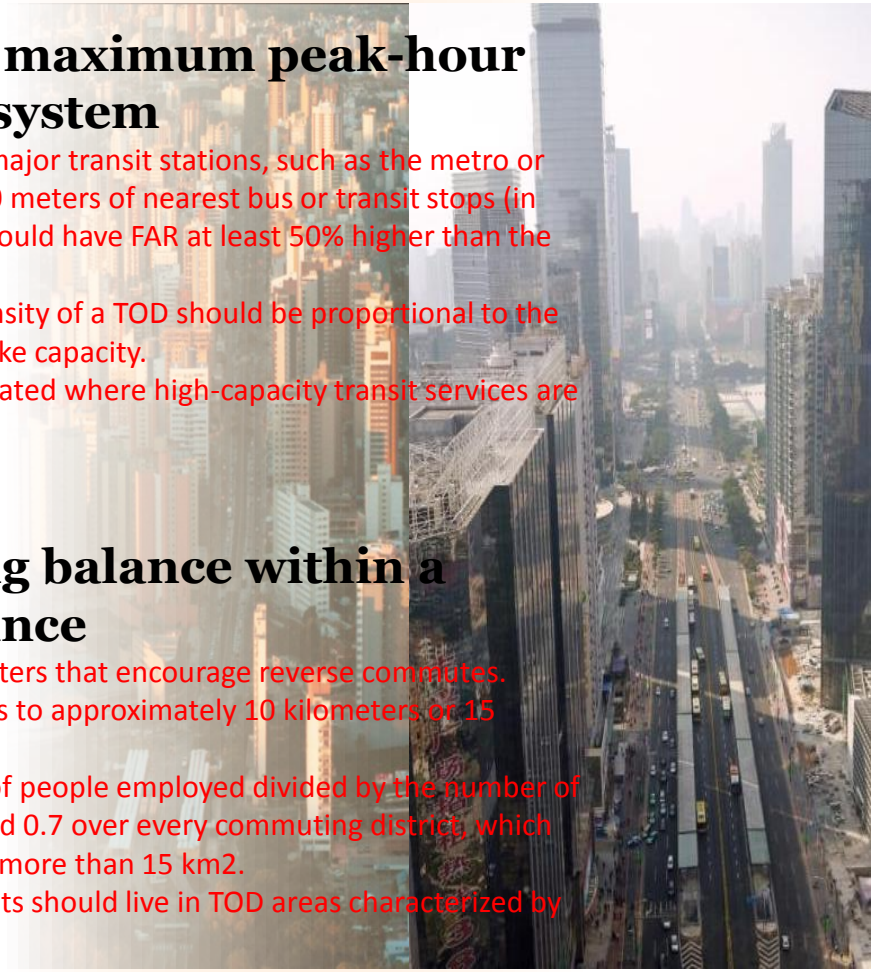
2

Focus

Match density and mix to transit capacity in TODs

Match density to the maximum peak-hour capacity of a transit system

- The area within 500-800 meters of major transit stations, such as the metro or bus rapid transit (BRT), or within 500 meters of nearest bus or transit stops (in case BR or Metro is not available) should have FAR at least 50% higher than the average of the district
- Both residential and commercial density of a TOD should be proportional to the area's peak-hour transit, walk and bike capacity.
- Major job centers should only be located where high-capacity transit services are available.



Create a jobs/housing balance within a short commute distance

- Create smaller decentralized job centers that encourage reverse commutes. Locate job centers to limit commutes to approximately 10 kilometers or 15 minutes on transit.
- The job-resident ratio (the number of people employed divided by the number of residents) should be between 0.5 and 0.7 over every commuting district, which should have a spatial area that is no more than 15 km2.
- For big cities, at least 70% of residents should live in TOD areas characterized by convenient mass transit service.

MIX

Create mixed-use neighborhoods and districts

3

Encourage an optimal of balance of housing and services in each residential district

- Housing options should accommodate a mix of income levels and age groups.
- Shops and local services should line the ground floor of most streets fronts within easy walking distance of housing and jobs.
- Residential units should be close to at least six kinds of amenities within 500-meter radius of building entrance (amenities include schools, post offices, banks, retails, clinics, activity centers, restaurants, etc.).

Provide a variety of accessible parks, civic clusters and open space

- Neighborhood parks should be located within 500 meters of housing; large regional parks within 1 kilometer.
- Publicly accessible and usable green space should comprise 20-40% of the construction areas (residential area should be at the higher end of this range).
- Clusters of schools and civic destinations should form neighborhood centers within 500 meters of residential buildings. This includes age-specific services, such as day care.

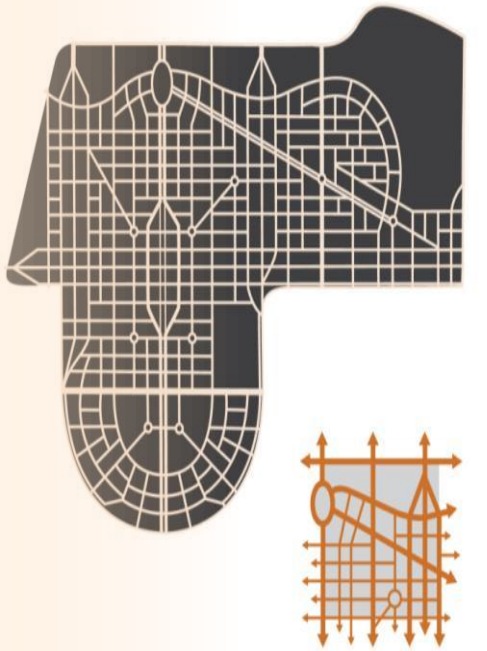
4

CONNECT

Increase density of road network and limit block size

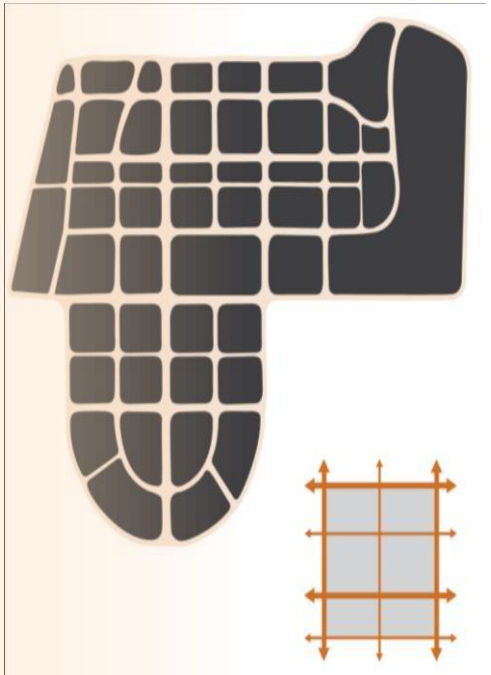
Create dense street networks that enhance walking, bicycling, and vehicle traffic flow

- Plan for a minimum of 50 intersections per square kilometer or at least 70% of blocks shall be 2ha or less
- Limit traffic speeds on local streets to 40 km/hour.
- Design local streets with traffic-calming features to help enforce speed limits.



Disperse high traffic volumes over narrow, parallel routes

- Create a grid of varied street types to provide multiple parallel routes for all types of traffic.
- Incorporate through-roads that connect adjacent neighborhoods at least every 300 meters.
- Replace major arterials wider than 45 meters with efficient one-way couplets (a pair of two narrower one-way thoroughfares).



5

WALK

Design walkable streets and human scale neighborhoods

Shorten street crossings and emphasize pedestrian safety and convenience

- Limit street widths to 45 meters for through traffic and 25 meters for local access.
- Create direct routes and permeable blocks by limiting average block length to 150 meters in new development and creating public paths through existing superblocks.
- Provide safe, well-defined and uninterrupted pedestrian zones at least 4 meters wide on each side of every major street.

Encourage ground-level activity and create places to relax along primary pedestrian routes

- To encourage sidewalk activity, visibility and safety, buildings with public uses and shops should front the sidewalk where feasible
- Residential developments should have multiple access points along sidewalks
- Limit the setback between buildings and the sidewalk

6

BIKE

Prioritize bicycle networks and auto-free streets

Design streets that emphasize bike safety and convenience

- Create dedicated and protected bike lanes, at least 3 meters wide in each direction, on all streets except low-speed local streets.
- Provide secure bike parking in buildings, on streets and at transit stations.

Create auto-free streets and greenways to encourage non-motorized travel

- Establish car-free corridors across the city grid, no more than 800 meters apart. These should accommodate biking paths of least 10 km in length per square kilometer

7

Ride

Develop high quality transit and affordable BRT

Ensure frequent and direct transit service

- Establish a grid of high-capacity, high-speed transit corridors approximately every 1000 meters with dedicated transit lanes.
- Provide an integrated multi-modal system and ensure seamless transfers to all available transit options. Minimize the number of transfers needed for most passengers.
- Create multiple high capacity transit connections to all new development areas.

Locate transit stations within walking distance of homes, jobs, and services

- All major housing and job centers should be within 500 meters of a local transit station and 1000 meters of regional transit service.
- For the city as a whole, at least 90% of developments should be within 800-meter radius of a public transit station.

8

SHIFT MODE

Increase mobility by regulating parking and road use

Limit parking in key employment districts to discourage driving during peak traffic periods

- Limit parking ratios in employment areas to 0.2 stalls per worker.
- Eliminate long-term street parking to ease congestion and reduce street width.
- Remove all parking-space minimums for residential buildings and establish city-wide parking-space maximums consistent with targets for private car use.

Adjust car fees by time of day and destination

- Institute a congestion-management system that limits auto use in key urban and employment districts at peak traffic hours.
- Charge tolls for use of overloaded roads and bridges and use the fees to support transit.
- Vary parking charges by time of day and location to insure high turnover.

GREEN BUILDING

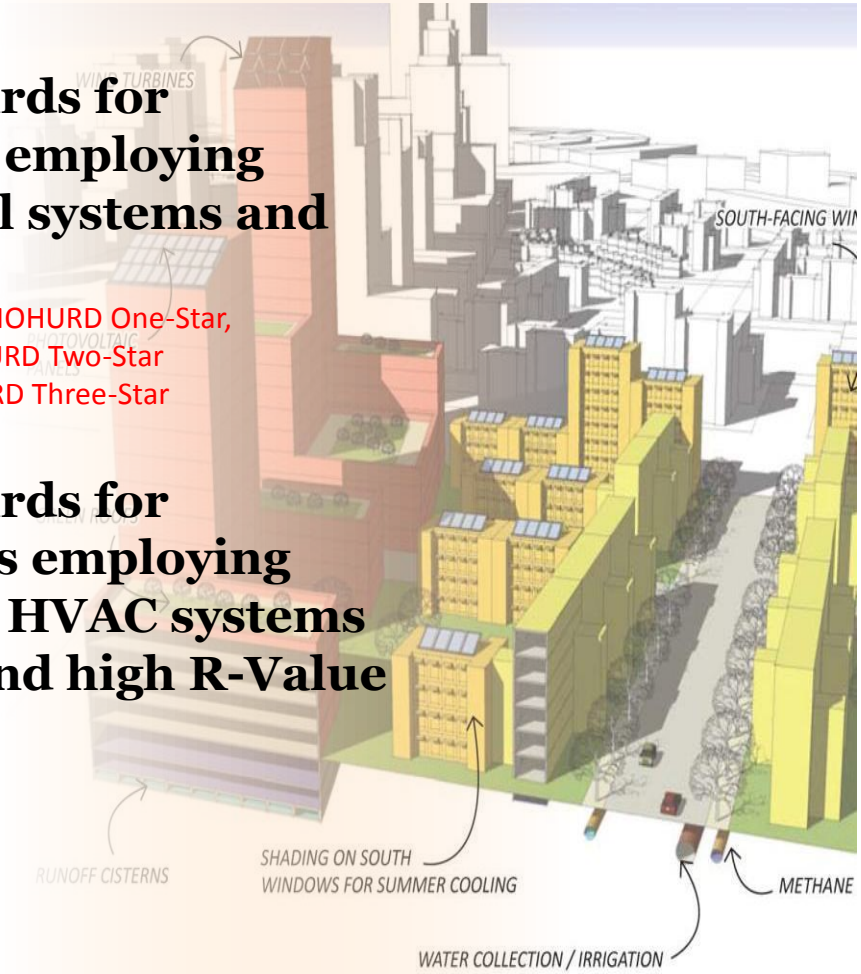
Employ best practice in building conservation

9

Create energy standards for residential buildings employing conservation, natural systems and renewables

- At least 70% of buildings should be MOHURD One-Star,
- 20-40% of buildings should be MOHURD Two-Star
- 5-15% of buildings should be MOHURD Three-Star

Create energy standards for commercial buildings employing efficient lighting and HVAC systems along with shading and high R-Value skins



10 SUSTAINABLE INFRASTRUCTURE

Community systems should be based on conservation, renewables and recycling

Deploy Renewable and District Energy energy systems for heat and electricity

- Every project should analyze the potential for district energy, such as combined heat and power (CHP), waste to energy, and waste heat re-use. There should be 5-15% local renewable energy generation for residential areas and 2-5% for commercial areas.

Use Waste management systems that recycle and reuse solid waste through on site separation and industrial capture

- All buildings should have waste classification facilities. All household waste must be sorted and collection of hazardous waste must be prioritized. At least 30-50% of waste should be composted and 35-50% recycled or re-used

Enhance Water efficiency through conservation appliances and recycling greywater

- All buildings must have 100% adoption of water saving appliances, and green spaces surrounding buildings must adopt low water-use plants. All water consumption should be metered and at least 20-30% of water supply must be recycled from either wastewater or rainwater.

CityMetric

China's urban policy unit just met for the first time in 38 years. Here's what it recommended

By Wade Shepard and CC Huang