

Understanding Bay Area UrbanSim 2.0

Plan Bay Area 2050 Webinar Series

Mike Reilly

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Welcome to Today's Webinar!

- Today's webinar will focus on **Bay Area UrbanSim 2.0**, the regional land use model used to simulate how public policies affect future regional growth patterns.
- In recent months, MTC/ABAG has presented on the **Bay Area Spatial Information System (BASIS)** as well as the **Plan Bay Area 2050 Final Blueprint Strategies** - both are key inputs to UrbanSim 2.0.
- And it's important to remember that UrbanSim 2.0 is **just one model** MTC/ABAG uses to conduct long-range planning - other key models include **Travel Model 1.5** (transportation) and **REMI** (economy).

Why is UrbanSim 2.0 Relevant?

- MTC/ABAG uses Bay Area UrbanSim 2.0 as a **key tool to create Plan Bay Area 2050**, the regional plan for transportation, housing, the economy, and the environment, in order to show how future strategies could affect the regional growth pattern.
- The Plan Bay Area 2050 growth pattern, on the county and sub-county levels, is submitted to the state to **meet the requirements of Senate Bill 375**, showing how we can make progress towards key regional goals.
- Furthermore, the Plan Bay Area 2050 growth pattern is being considered as a **potential input to the Cycle 6 Regional Housing Need Allocation (RHNA) methodology**, using a RHNA-specific export on the jurisdictional level.

Example: Forecasting Flow for Plan Bay Area 2050

Regional Growth
Forecast for
Households &
Jobs

Start with
Current Map of
Persons,
Buildings, and
Policies

Regional
Strategies Modify
Policies to
Achieve Goals

Summarize Land
Use Pattern and
Outcomes

Presentation Overview

1) Why forecast land use changes in the Bay Area?

2) How does Bay Area UrbanSim 2.0 work?

3) What are some example use cases for Bay Area UrbanSim 2.0?

4) Questions

Why Forecast Change Within the Region?

- **We want to be able to test the effects of regional policies.** How might a given public policy affect housing, economic development, environmental resilience, or transportation outcomes?
- **Analyzing the effects of such policies can provide information for local planning.** For example, what types of policies might need to be advanced to enable a Priority Development Area to be built out with new homes?
- **Ultimately, we need a detailed growth pattern of homes and workplaces as an input to other models.** For example, we conduct analyses with Travel Model 1.5 and land use is a critical input.

Broad Overview of Forecasting Change

1. Generate a **Regional Growth Forecast** through 2050 for total population, households, and jobs
2. Collect a lot of data on region's current state: households, jobs, buildings, and existing policies such as zoning (***BASIS Initiative***)
3. Use existing knowledge on development decisions to **predict future choices**
4. Incorporate **new strategies** to see how the growth patterns might be affected
5. Analyze outcomes to see if our strategies **achieve our goals**

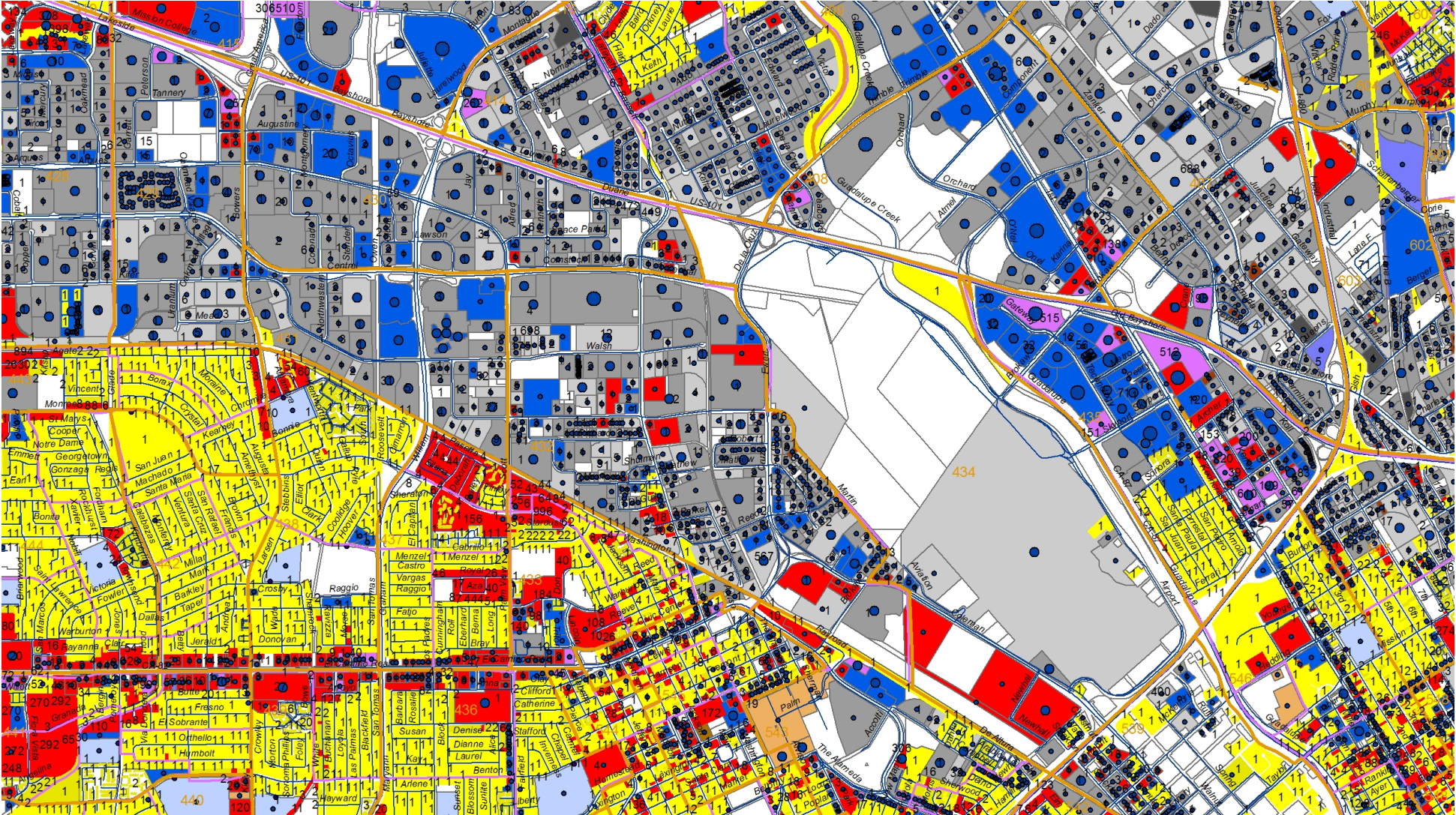
Bay Area UrbanSim 2.0 (BAUS2)

- Computer program that simulates people moving to new homes, firms picking new locations, and real estate developers building additional buildings to hold these households and firms
- Customized version of the most commonly-used model of this types
- Designed by UC Berkeley Planning Professor Paul Waddell
- Written in Python and takes a few hours to run on a computer
- Integrates large amounts of spatial data

BAUS2: The Database

- Every parcel of land within the region with information on its size, value, physical constraints, and zoning
- Every building with information on its type, size, age, materials, and value
- Every household by income quartile
- Every job by sector
- Additional existing policies such as fees, caps, etc.

Detailed Building Database



BAUS2: Demand for Buildings

- Through the forecast, both existing and new households are simulated to move and choose new homes
 - Use recent behavior on how different types of households choose where to live based on characteristics of the neighborhood and residential buildings
- Places where more households want to live than housing is available would be projected to see housing prices increase
- Similar process used for firms locating or relocating

BAUS2: Supply of Buildings

- As the region grows, BAUS simulates the construction of new buildings on both vacant and occupied land
- Uses a pro forma – the same tool most developers use to understand how a potential project’s costs relate to expected income over time
- This approach simulates key questions for developers such as:
 - How much does it cost to tear down any existing buildings and prepare the site?
 - How much to build a new building of a particular size and height?
 - How much income might this project generate once complete?

BAUS2: Forecast Process

- In five-year increments, BAUS simulates the Demand step and Supply step highlighted on previous slides
- Generates a future regional development pattern that integrates future growth with existing land use on the ground now

BAUS2: Strategies

- BAUS2 starts by assuming local policies such as zoning constrain what can be built in given locations
- However, we change some policies based upon approved regional strategies
- For Plan Bay Area 2050, 35 strategies guide future growth, including:
 - Allowable uses and densities in Growth Geographies
 - Inclusionary housing requirements
 - Subsidies for affordable housing in strategically-identified locations

*The San Francisco Bay Area
aspires to be:*



AFFORDABLE

All Bay Area residents and workers have sufficient housing options they can afford – households are economically secure.



CONNECTED

An expanded, well-functioning transportation system connects the Bay Area – fast, frequent and efficient intercity trips are complemented by a suite of local transportation options, connecting communities and creating a cohesive region.



DIVERSE

The Bay Area is an inclusive region where people from all backgrounds, abilities, and ages can remain in place – with access to the region's assets and resources.



HEALTHY

The region's natural resources, open space, clean water and clean air are conserved – the region actively reduces its environmental footprint and protects residents from environmental impacts.



VIBRANT

The Bay Area region is an innovation leader, creating quality job opportunities for all and ample fiscal resources for communities.

Final Guiding Principles

What geographies does PBA50 protect and prioritize?

Protect



Areas outside Urban Growth Boundaries
(including PCAs)



Unmitigated High Hazard Areas

Prioritize



PDAs



PPAs



TRAs:
Frequent Regional Rail



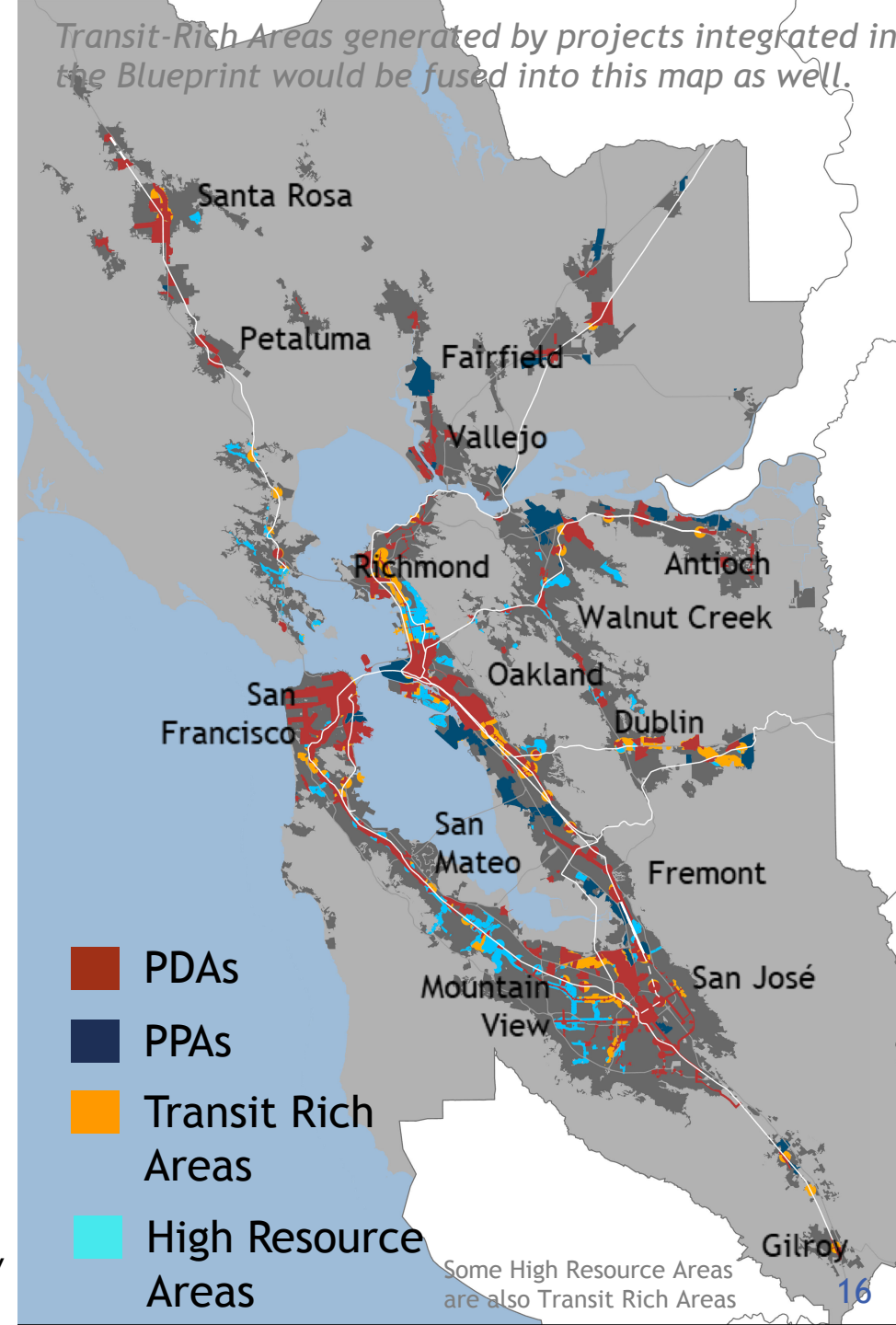
TRAs*
All Other



HRAs*

* Applies to all jurisdictions except those that have already nominated more than 50% of PDA-eligible areas

Transit-Rich Areas generated by projects integrated in the Blueprint would be fused into this map as well.



- PDAs
- PPAs
- Transit Rich Areas
- High Resource Areas

Some High Resource Areas are also Transit Rich Areas

BAUS2: Outputs

- BAUS produces new maps for each future forecast year
- Includes buildings, households, and jobs in various categories
- Summarize by various geographies to assess whether we are making progress towards the Guiding Principles
- Use as inputs for further analysis in Travel Model 1.5

Use Case #1: Effects of Housing on Transit Ridership

- The Bay Area's long-range plan have historically focused on increasing transit ridership to improve the return on transit investment and to reduce greenhouse gas emissions.
- Key strategies are integrated into BAUS2 that support this objective:
 - Allowing multi-family residential in locations near transit stations
 - Increasing the allowable residential density near transit stations

Use Case #1: Effects of Housing on Transit Ridership

- BAUS2 takes our policy modifications and reruns the real estate developer pro forma analyses
 - Calculate whether a developer can make a profit by building infill at that location
 - Dependent on what's there now, prices in that area, and the modified zoning levels (i.e., how much can be built?)
- BAUS2 calculates the total shift in housing toward these locations and then Travel Model 1.5 is used to calculate the change in travel behavior and GHG emissions

Use Case #2: Effects of Housing on Displacement Risk

- BAUS2 also forecasts the incomes of households that may occupy these new infill units
- Since the housing is new, it may tend to be occupied by wealthier households
- We can then mitigate the displacement of lower income households by modeling inclusionary zoning in BAUS2
 - Strategy requires the developer to build a specified amount of deed-restricted low-income units
 - May work or may make building infeasible

Conclusion

- Our process starts by gathering detailed information on what is on the ground today
- We gather information of local policies and these constrain growth in most of the region
- We modify existing policies with Strategies and Growth Geographies approved to shift regional outcomes towards adopted goals
- BAUS2 forecasts a future growth pattern that combines regional trends, current data, local policies, future regional strategies, and financial feasibility

Thanks for attending today's webinar!

- Mike Reilly (mreilly@bayareametro.gov)
- Dave Vautin (dvautin@bayareametro.gov)