FREGONESE ASSOCIATES

M E M O R A N D U M

May 23, 2017

TO: City of Austin

FROM: Fregonese Associates, Inc.

RE: CodeNEXT Housing Capacity: Envision Tomorrow Analysis

INTRODUCTION

The purpose of this memorandum is to describe the methodology and assumptions used by Fregonese Associates, Inc. to conduct housing capacity estimates in “Phase 4” of the Comprehensive Land Development Code Revision for the City of Austin, or CodeNEXT. The most recent estimates are based on the draft zoning map that was released on May 8, 2017, however all previous and subsequent estimates use the same methodology that is described in this memorandum.

Envision Tomorrow

The capacity estimates described in this memorandum were completed using a combination of ESRI ArcGIS mapping software and the Envision Tomorrow Scenario Planning Tool.

Envision Tomorrow is an open-source suite of urban planning tools that has been in use and under steady development for over 10 years. It was originally developed by Fregonese Associates, Inc., but has a growing national community of users, including some practitioners in the Austin, TX region. ET allows users to analyze how their community's current growth pattern and future decisions will impact a range of measures from housing, employment, public health, fiscal resiliency and environmental sustainability.

THE SCENARIO BUILDING PROCESS

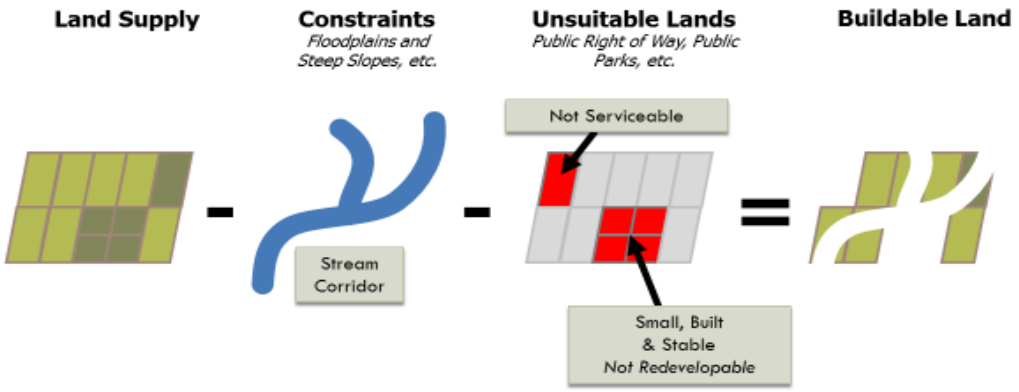
Envision Tomorrow is primarily a scenario planning tool, and in the CodeNEXT process, Envision Tomorrow was used to build and evaluate the capacity of the potential development patterns of Austin as proposed under the CodeNEXT draft code. The basic scenario building process is described below in Figure 1.

Figure 1. Envision Tomorrow Scenario Building Process

Data Gathering and Scenario Layer Setup

The first step in scenario building is the collection and setup of all relevant datasets for the area or region being evaluated. These include, but are not limited to, regional forecasts and needs, buildable lands inventory, existing & planned land use, development constraints, and infrastructure. These are then converted into a single "Scenario Layer" within ArcGIS. In this analysis, a 2015 Austin parcel dataset was used as the base geography, and a combination of Travis County assessor data and City of Austin planning resources were used to establish the total buildable land within the city. Below is a diagram of this process:

Figure 2: Creating the Scenario GIS Layer ("Buildable Lands" Layer)



A Linked System of Spreadsheets and GIS

Envision Tomorrow operates in a series of Microsoft Excel spreadsheets which are linked to ESRI ArcGIS File Geodatabases. These files make up the primary building blocks of an Envision Tomorrow scenario, and just like an actual city, are comprised of buildings and development types. Two sets of spreadsheets contain all of the assumptions used in the scenario evaluation:

1) Prototype Builder / Return on Investment (ROI) Models

The smallest unit of analysis when estimating housing capacity are buildings. Individual buildings are modeled in a spreadsheet called a Prototype Builder. This spreadsheet is a simplified, planning-level pro forma, not unlike one used by a developer to evaluate the financial feasibility of a development project. Each building used in a scenario has an individual Excel file, which includes both the physical attributes of buildings, such as height and landscaping, and also the financial attributes, such as rents and construction costs.

2) Scenario Builder Spreadsheet

A "library" of building prototypes (up to 100) and their associated attributes are then loaded into the Scenario Builder spreadsheet. Multiple buildings are combined into "Development Types", representing the distinct land use mix of an area. The individual building-level assumptions are combined into Development Type attributes, such as housing and job density, average building height, construction costs, etc. It is also from within the Scenario Builder spreadsheet that Development Types are calibrated with key district-level assumptions, such as street characteristics, percentage of parks & open space and redevelopment rates.

After Development Types are created, the Scenario Builder spreadsheet is synced with the Scenario Layer and all attributes are loaded into a File Geodatabase. The Development Types can then be applied, or "painted", onto specific areas of the city.

Capacity Mechanics – the Basics

Capacity is a function of three primary factors:

1) The amount of land area where zones are applied (acres mapped by zone)
2) The intensity of entitlement (the mix of building types assumed in each zone)
3) The rate at which lands in each zone are assumed to develop or redevelop within a given timeframe (the redevelopment and underbuild rates)

The amount of land area is represented by the draft zoning map. The intensity and mix of building types and development standards are derived from the draft zoning code document, which have been coded into Envision Tomorrow development types. The development rates are estimated by examining permit data for the last 6 years and understanding where and how intensive new developments have been over that time period.

Changing any one of these has an impact on assumed capacity. For instance, if a certain zone is mapped to a larger or smaller area, that will impact the assumed capacity.

Capacity Calculations

Current number of housing and jobs by type are quantified within the Scenario Layer so we know where housing and jobs are located today. The Development Types (or Zone Districts, in this exercise) used for mapping or "painting" represent future developments. Three key GIS attributes drive most of the calculations in Envision Tomorrow:

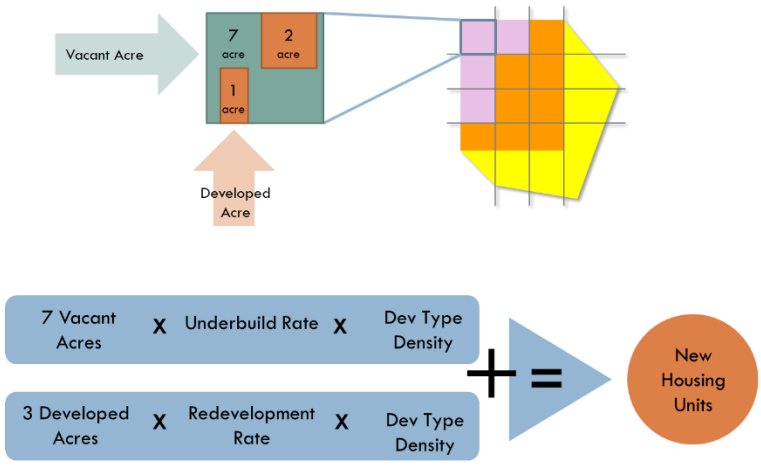
VAC_ACRE
Vacant acres available for development

DEVD_ACRE
Developed acres available for redevelopment

DEV_TYPE
Development Type Name

Vacant and developed acreage are determined by existing land use data, and assigned to each distinct parcel in the Scenario Layer. If a Development Type is then assigned to that parcel, the Development Type attributes, such as housing density, associated with that Development Type are used to calculate new production. For example:

Figure 3: New Housing Calculation Diagram



As shown in Figure 3, vacant acreage is reduced (or discounted) by the amount of assumed underbuild for each Development Type and then multiplied by the assumed housing density. Developed acres are discounted based on an assigned redevelopment rate. The redevelopment rate is a key governor

characterizing the market strength of an area, with a higher redevelopment rate representing higher overall development pressure. The assumed underbuild and redevelopment rates for each Development Type are listed further below.

CODENEXT HOUSING CAPACITY ASSUMPTIONS

The Intent

The capacity estimates produced for the CodeNEXT process are intended to provide an estimate of the potential new housing capacity that could be produced within 10 years of adoption of the new code. There is far more long term capacity represented in the draft map than the 10-year estimates produced, because limits have been applied on the amount of assumed development within the 10-year timeframe. These limits are called “underbuild” and “redevelopment” rates and are documented further below.

Limitations of Any Capacity Analysis

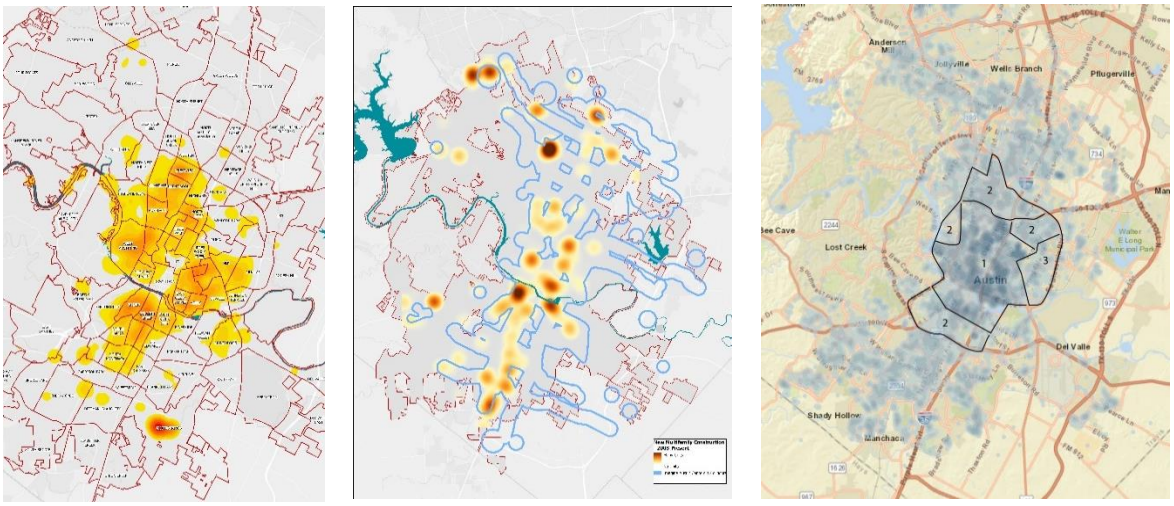
Far more actual capacity exists beyond 10 years, but this analysis was limited to estimating the 10 year capacity. Estimating housing capacity is inherently difficult because many outside factors influence the strength of the real estate market beyond zoning. Austin’s market has been strong in recent years, but changes in job growth, in-migration, access to credit, and many other factors will influence the rate of development that occurs in Austin moving forward. For the purposes of this capacity estimate, we have assumed Austin continues to experience the robust, projected growth.

Understand Housing Demand in Austin

Many factors influence what parts of a city have the highest levels of desirability and housing demand. In Austin, as with many cities, the downtown and core, walkable neighborhoods surrounding downtown have become desirable and housing prices (and associated property taxes) have been escalating quickly. The amount of housing that is available in these areas is less than what is desired by those looking for homes, and as a result, prices continue to climb. These areas have a mix of housing options (many built before current zoning), walkable retail, a connected street grid, and transit and bicycle facilities. These areas are within and near ImagineAustin Centers and Corridors.

Change is happening in these areas even under the current code, however. Often that change is a new single family home replacing an old single family home for a 1-for-1 replacement which does not expand the housing options in these neighborhoods. Increasing demand in areas with a limited supply of housing invariably leads to a rapid escalation of home costs as more affluent residents are able to pay more for housing in short supply.

Figure 4: Residential Demolition Permits (2010-2017); New Residential Unit Construction (2010-2017); Street Connectivity



The CodeNEXT Capacity Estimation Process

The capacity estimating mechanics and calculations described above were applied to the CodeNEXT draft code to arrive at the capacity estimates. A building prototype "library" was created consisting of more than 80 total prototypes representing buildings that could be realistically built under draft code standards. Financial assumptions, such as rents and construction costs, were assigned to individual prototypes to ground them in the market realities of Austin.

For this housing capacity analysis, the locally calibrated building types were then mixed to create Development Types representing all the zoning categories within the draft code. These Development Types were then assigned to the Scenario Layer parcels to match the draft zoning map. Based on the calculation shown in Figure 3 above, new housing units were calculated on a per parcel basis, the sum of which resulted in the estimated housing capacity for Austin.

Development Rates by Zone

Redevelopment Rates

The market strength and development pressure of an area differs significantly depending on a number of factors, such as proximity to downtown, quality of public infrastructure and services, local destinations and businesses, land prices, etc. As a general rule of thumb, the redevelopment rates assigned in the housing capacity scenario are meant to represent the current and projected market strength of the area where a Development Type (zone) is applied. Zones with higher redevelopment rates are generally within or along Imagine Austin Centers & Corridors, aligning with the City's strategies for growth, and the development patterns depicted in Figure 4. See Table 1 below for the redevelopment rate assumptions by zone.

Underbuild Rates

For zones that are applied in areas with significant acreage of vacant and developable lands, assumptions need to be made about the quantity of land that could be developed within 10 years. The underbuild rate is the percentage of land not assumed to be developed within the 10 year period. If, for example, an underbuild is set to 80%, it is assumed that only 20% of vacant or developable land will be developed within the next 10 years.

Table 1: Development Rates by Zone

Zone (Development Type)	Redevelopment Rate	Underbuild Rate	Housing Units / Gross Acre
T6U	50%		106
T6U-R	50%		106
T6UC	50%		285
DC	50%		121
CC120	50%		90
CC80	50%		32
CC60	50%		12
CC40	50%		12
T5U	40%		55
T5U-O	40%		55
T5MS	40%		46

T5MS-O	40%		48
T5N.SS	35%		21
T5N.SS-O	35%		21
T5U.SS	35%		55
T5U.SS-O	35%		55
T3MS	25%		15
T4N.IS	25%		12
T4N.IS-O	25%		12
T4N.SS	25%		17
T4N.SS-O	25%		17
T4MS	25%		21
T4MS-O	25%		20
GC-O	25%	45%	22
T4N	20%		20
T4N-O	20%		13
VHDR	20%		52
T3NE.WL	15%		4
T3NE	15%		5
T3N.DS	15%		6
T3N.DS-O	15%		6
T3N.IS	15%		8
T3N.IS-O	15%		8
T4N.DS	15%		12
T4N.DS-O	15%		12
HDR	15%		23
GC-L	15%		7
HC	15%	50%	19
LC-O	10%		16
MHDR	5%		18
NC-O	5%		9
SC-O	5%		16
MDR	3%		12
LMDR-SL	2%		7
LMDR	1%	50%	4
RR	0%	25%	1
VLDR	0%	15%	2
LDR	0%		4

Note: Only zones that permit residential uses are included