

APPENDIX 7: MODELLING ASSUMPTIONS

RELATED STUDIES

- 1.1 Several recent studies were used as reference materials for this study or as a direct source for important modelling assumptions. Each study, along with how it was used in the Settlement Capacity Analysis, is listed in what follows.

Strategic Housing Market

- 1.2 The Strategic Housing Market Assessment, completed in 2015 by Opinion Research Services, was used to identify targets for new housing by type, and size based on projected future housing demand within the West Essex and East Hertfordshire Strategic Housing Market Area. These targets were used for comparison purposes and to gauge how closely the housing capacity within Epping Forest District matches projected demand in the SHMA.

Strategic Land Availability Assessment (2014)

- 1.3 In 2014, Nathaniel Lichfield & Partners prepared a draft update of the Strategic Land Availability Assessment (SLAA) for Epping Forest District Council. This document was used as the basis for the identification of the site pool used in this study. Available lands within settlement boundaries were identified, and later amended based on research conducted by Fregonese Associates.

Community Infrastructure Levey (CIL) and Local Plan Viability Study (2015)

- 1.4 In order to identify key real estate costs and achievable sales prices for residential construction, Fregonese Associates referenced the Affordable Housing, Community Infrastructure Levey (CIL) and Local Plan Viability Study. For the Settlement Capacity Analysis, this report was used to set assumptions related to potential CIL contributions, residential sales prices, and land prices.

North Weald Basset Masterplanning Study (2014)

- 1.5 One of the largest and most significant potential opportunities for housing development in Epping Forest District is the North Weald-Bassett Airfield and town/village centre master planning areas. Given the extensive planning process that occurred in the area in 2014, it was deemed necessary to incorporate the North Weald Bassett Masterplanning Study to guide assumptions for North Weald in areas within the existing green belt.

Epping Forest Open Space, Sport, and Recreation Assessment (2012)

- 1.6 Several of the development strategies identified through the Settlement Capacity Analysis dealt with the re-purposing of urban open space and recreation grounds. The Open Space, Sport, and Recreation Assessment was utilised to identify the quality and importance of various open space sites and helped sieve out potential housing sites during the process of identification of the site pool.

ENVISION TOMORROW MODEL

- 1.7 Envision Tomorrow (ET) is a suite of open-access software tools that allows users to build

scenarios that analyse how various growth patterns will affect a range of “quality of life” indicators from public health, public finance, and environmental sustainability. It enables users to: understand their current community using GIS and other data commonly available to local authorities; compare development scenarios; and understand their impacts. It can model development feasibility on a site-by-site basis, create and evaluate multiple land use scenarios, test and refine transportation plans, produce small-area concept plans, and model complex planning issues. ET was used to develop an accurate model of viable, feasible development that could occur in EFDC. The tool enabled the examination of many different ideas and plans.

Model Development and Calibration

1.8 Envision Tomorrow was calibrated for local conditions in Epping Forest District using widely available national datasets and substituting local information where available. Two geodatabases, one containing environmental constraints and one containing the scenario data were used. There are three primary components to model calibration:

- development of a scenario base layer;
- setting of market assumptions; and
- development of building and place types.

1.9 The first step was to assemble GIS data layers that could be used as the basis to test ideas. These were provided by EFDC and various open data sources, detailed in table 1 below. They were used to identify land that is feasible for development, to understand any constraints on its development, and to see the development in context to its surroundings. The end result was a series of GIS files containing information related to constrained lands, vacant and developed lands, land use, and ownership. Table 1 below includes the layers that were used to develop the base layer.

Scenario Base Layer

1.10 The first step was to assemble GIS data layers that could be used as the basis to test ideas. These were provided by EFDC and various open data sources, detailed in table 1 below. They were used to identify land that is feasible for development, to understand any constraints on its development, and to see the development in context to its surroundings. The end result was a series of GIS files containing information related to constrained lands, vacant and developed lands, land use, and ownership. Table 1 below includes the layers that were used to develop the base layer.

Table 1: Scenario Base Layer Data Sources

	Data	Source	Use
Constraints	Flood Zone 3B	EFDC	Used to constrain development in flood zones.
	Sites of Scientific Interest	EFDC	Use to exclude development.
	Special Conservation Areas	EFDC	Use to exclude development.
	Special Protection Areas	EFDC	Use to exclude development.
	Epping Forest Coverage	EFDC	Use to exclude development.
Analysis	High Streets	Created by FA.	Used to guide redevelopment.
	2014 Draft SLAA Update	EFDC	Used to identify potential development
	District Map	Ordnance Survey	Used to help identify infill opportunities.
	Land ownership in the District (INSIDE)	Land Registry	Used to identify parcels for development

Market Assumptions

1.11

The underlying logic behind the Envision Tomorrow model is a set of building prototypes which are built using a detailed viability analysis tool called the Envision Tomorrow Return on Investment (ROI) model. This spreadsheet-based tool requires users to provide information about building height, density, massing, rents, and construction costs. Given the development programme used, it can calculate the cost of construction and the rents needed for a scheme to be viable. This provides the information that can be used in a viability analysis of the final selected plan strategies. During the course of this study, the inputs to the ROI model were calibrated against local market conditions including recently completed project examples provided by EFDC.

Table 2 lists market assumptions and data sources.

Table 2: Local Market Assumptions

	Assumption	Value	Source
Construction Costs (Hard Costs*) / Sqm	Residential	£1,625	2015 CIL Report / EFDC
	Retail	£1,260	2015 CIL Report / EFDC
	Office	£1,486	2015 CIL Report / EFDC
Development and Other Costs	Average Land Cost / Hectare	£700,000	2015 CIL Report / EFDC
	Council Tax (Band H)	£3,168	EFDC
	CIL (£/Sqm)	£150	2015 CIL Report
Residential Market	Sales Price / Sqm	£5,500	EFDC
	Rental Rate / Sqm /Month	£12- £18	RightMove.uk / EFDC

* Hard costs area costs for materials and construction, as opposed to soft costs such as developer fees.

- 1.12 **Building and Place Types**
Using the above market assumptions, a portfolio of prototype buildings was created for use in the model. These buildings are combined into “development types” and are used in a scenario layer to “paint” on a map. In this way a scenario can be developed and modelled. It is important to note that any part of the scenario map can be examined in detail, and the results duplicated by hand, outside of the model. The following are the prototype buildings that were used for EFDC in the Envision Tomorrow model:

Table 3: Building Prototype Assumptions

Building Type	Plot Size (ha)	Bldg/Unit Size (sqm)	Site Coverage	Owner	Rent
4 Bed House	0.03	125	40%	X	
3 Bed House	0.02	95	42%	X	
2 Bed House	0.02	75	57%	X	
3 Bed Terraced House	0.05	95	32%		X
2 Bed Terraced House	0.1	60	46%		X
5 Storey Flat	0.55	88	89%		X
3 Storey Flat	0.15	97	68%		X
2 Storey Flat	0.1	59	61%		X

- 1.13 Using building types, development types were created and applied within the model. These development types were comprised of a mix of building types, scaled to a density that is similar to existing and potential future development patterns in Epping Forest District. In line with the SLAA, for lower density areas in more suburban locations, 30-50 dwellings per hectare average density was assumed while in built-up urban and town centre areas, 50 to 100 dwellings per hectare average density was used. The following table lists the development types used in the Settlement Capacity Analysis.

Table 4: Development Type Assumptions

Type	Housing Units / Gross Hectare	Jobs / Gross Hectare	Residential	Commercial
Town Centre / Mixed Use	87.3	10.5	95%	5%
Flats	59.3	31.7	80%	20%
Semi-Detached / Terraced Homes	48.7	11.3	90%	10%
Detached Residential	34.6	-	100%	0%
High Street Commercial	-	170	0%	100%
Business Park	-	128.9	0%	100%