ETOD Methods

Data sources

Demographics: U.S. Census 2000, Summary File 1 and 3; American Community Survey 5-Year Estimates 2006-2010 and 2016-2020

Parcels: Cook County, 2020

Zoning: Chicago Zoning Map, 2016

Amenities: OpenStreetMap extract, 2021; ZipCar, Divvy, 2022

Transit: CTA, Metra, Pace, Northern Indiana Commuter Transportation District, 2022

Bike Lanes: Chicago Department of Transportation, 2022

Displacement Indicators: The Institute for Housing Studies at DePaul University, 2021

Default Building

The ETOD tool it designed such that once a parcel has been selected it is populated by the average multifamily building that is currently existing in the nearby area, this scenario is intended to be modified by the user to match more appropriately the intended development. This building is determined using the [1] (PUMS) data. These data, available at the Public Use Microdata Areas (PUMAs), are small enough to give a reasonable estimate of the local multifamily building. Figure 1 shows the PUMAs in Cook County, note they contain a few community areas in Chicago, and likewise a few suburban municipalities.

Figure 1: Map of Cook County Public Use
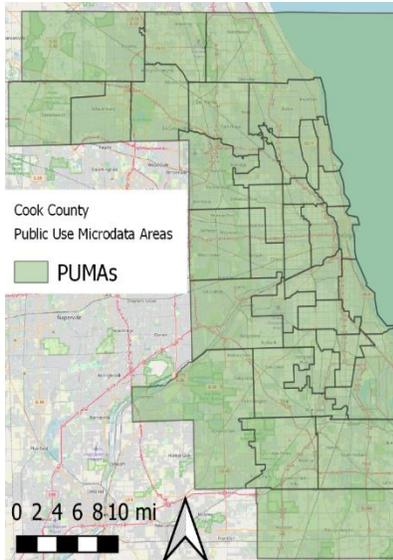
Once a parcel has been selected its PUMA is identified, and data about rental multi-family buildings are collected. These data include:

- Number of units in buildings with 5 or more units
- Unit mix of units by bedroom size, broken down in the following categories:
  - Studio Apartments
  - 1,2,3 Bedroom Apartments
  - 4 or more Bedrooms Apartments
- Average rent by unit bedroom size
- Average number of occupants by unit bedroom size

Using the parcel's Zip-Code, the HUD Fair Market Rent is obtained for each unit bedroom size. These rents are displayed for the user's reference but are not initially used.

Finally, the number of affordable housing units is determined. If the property is not in Chicago the affordable housing units are set to zero. For Chicago locations the

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[1] https://www.census.gov/programs-surveys/acs/microdata.html

affordable units are calculated using the Affordable Requirements Ordinance (ARO). The ARO defines areas in Chicago that must accommodate some affordable housing units. For the purposes of this tool the ARO is implemented so that 20% or each type of unit is made affordable at the HUD defined VLI, or 41-60% of the area median income.

The calculator assumes, for the default building, that the first floor of the building will be retail. Given the number of stories in the building and the floor to area ratio (FAR) the area of the first floor is estimated using the following equation:

$$A_r = \frac{A_p \times FAR}{S}$$

Where A_r is the area of the retail on the first floor, A_p is the area of the parcel, FAR is assumed to be 3 unless the parcel is within a City of Chicago TOD zone then it is assumed to by 3.5, S is the number of stories in the building, assumed to be 3 unless the parcel is within a City of Chicago TOD zone in which case it is assumed to be 5.

The default parking estimate is based on the number of units in the building. If this is in a Chicago TOD zone the parking is ½ of the number of units, if not, it is equal to the units. The non-residential parking places uses "None for first 4,000 square feet then 2.5 spaces per 1,000 square feet" used for most new commercial development in Chicago.

It is incumbent upon the user to change the input to better match the intended or established development.

Community benefits

Residents

The number of residents is calculated using the unit bedroom size and number, along with the average number of occupants by unit bedroom size. The following formula is used:

$$N = \sum_{i=0}^{4} n_i \times O_i$$

Where N is the total number of residents in the building, i is the bedroom size (0=studios, 1, 2, 3 as the number of bedrooms and 4 = 4 or more bedroom), n_i is the number of u units of type i, and O_i is the average number of occupants for unit types i.

In the **"what's the impact"** area the number of people in the affordable units is called out using the same formula as above. The average income of the households that will occupy the building is also calculated, by using the asking rent divided by 0.3 (assume 30% of income goes to rent) for the market rate units and for the affordable units the high end of the range for the type of affordable housing is assumed. The HUD affordability types are:

- ELI (BMR Below 40% AMI)
- VLI (BMR 41-60% AMI)
- LI (BMR 61-80%)
- MI (BMR 80-120% AMI)

Resident's Purchasing Power

Uses the total household income of the building minus the rent. In the **"what's the impact"** area these values are shown explicitly.

On-site Jobs

Uses a simple assumption of 350 square feet per employee and uses the defined non-residential area as input. The **"what's the impact"** calls out each type of non-residential use (retail, commercial and industrial) separately**.**

Annual Local Retail Spending

Is the sum of expected retail spending by the residents and workers in the building. The residential spending is estimated using the spending on food and other goods from the Bureau of Labor Statistics Consumer Expenditure Survey broken down by income. The employee spending is estimated using $141.06 per employee. The **"what's the impact"** breaks this out by residential spending and employee spending.

Tax revenue

Local tax revenue from real estate taxes and local sales taxes are added together and multiplied by ten to estimate the revenue over the next ten years in current dollars. Real estate taxes are calculated by using a generic location in Cook County and applying an estimated tax rate, and sales tax is estimated by calculating ten percent of the retail spending for residents and employees. The **"what's the impact"** states these sources explicitly.

Annual transit trips

Using CNT's model developed for the HTAIndex (see HTAIndex Methods) the average number of transit trips taken per household in this neighborhood (defined as the Census Block Group) is computed and assigned to the units in this building. The **"what's the impact"** uses the HTAIndex model to estimate the percent of commuters using transit for their journey to work and the total fares spent per household.

Residential Parking Used

CNT developed a model of residential parking use based on data collected in the middle of the night in multi-family rental building in Cook County (see Stalled Out); this model is used to estimate the parking usage in the dedicated residential parking spaces. There is no estimate of the non-residential parking utilization implemented in the ETOD tool yet. The **"what's the impact"** shows the estimates of cars parked in the residential spaces and the number of spaces used per unit.

Reduced GHG from Driving

Using CNT's driving model (see HTAIndex Methods) based on odometer readings from the Illinois Department of Natural Resources and the Department of Motor Vehicles, from the smog check program, the amount of driving per household is estimated. The **"what's the impact"** compares the estimated **miles driven at** this location to various other locations in Cook County illustrating the efficiency of this building's location.

Transit Benefits

The transit benefits are obtained from CNT's AllTransit tool (see AllTransit™) and reflect the current network of transit available in the building's neighborhood.