envision tomorrow

a suite of urban and regional planning tools

PROTOTYPE BUILDER
USER GUIDE

VERSION 3.1 BETA

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INTRODUCTION

WHAT IS THE PROTOTYPE BUILDER?

The Prototype Builder is a versatile, easy-to-use spreadsheet tool that is used to test the physical and financial feasibility of proposed development and to better understand the effects of existing and/or proposed development regulations. The Prototype Builder considers a range of factors including parking requirements, height and use requirements, fees, rents, subsidies, and construction costs. The Prototype Builder then works to create a spectrum of feasible prototype buildings for a specific place.

HOW CAN THE PROTOTYPE BUILDER BE USED?

Planners and policy-makers use the Prototype Builder in a number of ways, ranging from a site-specific to neighborhood scale. It can be used as a stand-alone tool or in conjunction with the Envision Tomorrow Scenario Builder. As a stand-alone tool, the model can help to compare options for future infrastructure or ammenities investments in different areas of a city to increase housing affordability. The model can also evaluate the effects of specific regulations, like parking or height requirements, on the feasibililty of desired development. Or, by using a various mix of single-use and mixed-use building prototypes, it can be used to understand and evalute the implications of different styles of development. As part of an overall scenario planning process, the Prototype Builder's prototype buildings are combined with other elements of a city such as street types, civic uses and open spaces to form "development types" used by the scenario builder tool. After a scenario has been completed, the Prototype Builder displays the scenario's performance based on a range of selected benchmarks or indicators unique to each project.

PROTOTYPE BUILDER AT A GLANCE

1. Tests the physical and financial feasiblity of development based on a specific place.

2. Outputs a range of site-specific prototype buildings that can be used in the scenario planning process.

3. Provides scenario performance evaluation based on selected indicators.

4. Powerful as standalone tool or integrated with the scenario builder.

5. Tests the impact of existing and proposed regulations for financial feasibility.

6. Identifies regulatory roadblocks.

7. Allows experimentation with the sensitivity of key variables such as: height/FAR; parking/landscaping; land costs/rents/subsidies.


GETTING STARTED QUICKLY:

1. Save the Excel template under a new file name.
2. Gather the development parameters included in the data checklist below.
3. Fill in every input in the Prototype Builder.
4. Begin experimenting with a building!

INITIAL INPUTS

There are some simple pieces of information that are needed before you get started with the Prototype Builder. The following data checklist includes basic, place-specific development parameters.

√ **ZONING REGULATIONS**

Height limits

FAR limits

Landscaping and set-back requirements

Parking requirements

√ **DEVELOPMENT ASSUMPTIONS**

Construction costs/square foot

Property acquisition costs

Average rents
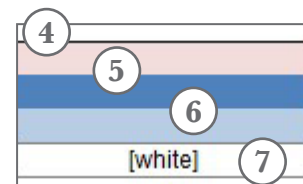
Average sales prices
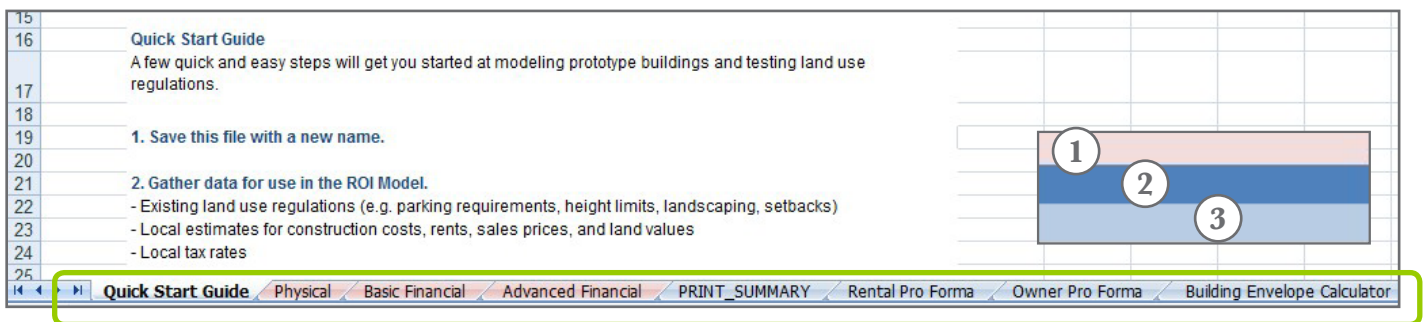
Prototype Builder tabs: The Prototype Builder tabs are colored coordinated to reference input, output, and reference.

1. *input tab*
2. *output tab*
3. *reference tab*

Cell color: The Prototype Builder cells are color-coordinated to reference input, header, subheader and output cells.

4. *input cell*
5. *header cell*
6. *subheader cell*
7. *output cell*

PHYSICAL TAB

PHYSICAL TAB OVERVIEW
The physical tab allows you to set the parameters that guide the building envelope of your prototype building.

Site Inputs			
Building name	①	H1 - Suburban Mixed Use Residential, Low	
Project City/State	②	Portland Metro	
Site area	③	10,000	square feet
		0.23	acres
Site gross-to-net ratio	④	100%	(enter percentage)
Landscaping or open space	⑤	15%	(enter percentage)
Building height (stories)	⑥	3	stories
Under-build	⑦	77%	(enter percentage)

1. **Building name:** The name entered here will be used on the printed summary sheet.

2. **Project city/state:** This is the name of the city or region where the prototype is being used. The name entered here will be used on the print summary sheet.

3. **Site area:** The size of the lot, in square feet, that you are testing. You can either input 43,560 to test the building on a per acre basis OR enter the actual lot size to test a specific site.

4. **Site gross-to-net ratio:** This is the ratio of the total area of land on a site (the gross square footage) to the total area minus any common areas (the net square footage). Use 100% if you are looking at a single parcel or small site.

5. **Landscaping or open space:** The percentage of landscaping or open space in the project. This input can also be used to account for required setbacks. This is an example of an input where you can test the existing or proposed regulations.

6. **Building height (stories):** The height, in stories, of the building.

7. **Under-build:** This input allows you to take building design into account. Assuming 100% underbuild means that the building volume is maxed out. By reducing the underbuild, you account for design features such as stepbacks or patios.

FAR & Density Checks ①			
Maximum FAR (if applicable)		FAR	
Percent of Allowed FAR Used			
Maximum residential density (if applicable)		units/acre	
Percent of Allowed Density Used			

1. **FAR and Density Checks:** FAR and Density Checks allow you to enter any regulatory limits and the "check" will show you if your prototype is within these limits. These inputs are optional.

Definition of FAR: The Floor Area Ratio (FAR) of the prototype building. This is calculated by dividing the total square footage of the building by the size of the lot (in square feet).

Elevation view:

100%
Underbuild

85%
Underbuild

15%

Plan view:

Parking

Open
Space

Building
Footprint

Unused
Space

Parking

Open
Space

Building
Footprint

HOW DO WE FACTOR IN BUILDING FORM?

When we reduce the total square footage of the building through design (e.g. upper floor step backs), the number of required parking spaces is also reduced. To capture the effects of the parking reduction, the model identifies the freed-up area as "unused or flexible space," which could become additional landscaping or even non-required parking. Taking building design into account can help to highlight different methods of creating financially feasible prototypes.

PHYSICAL TAB

Building Uses ①			
Residential		**Multifamily**	select single family, townhome, multifamily or none
		Renter ②	select owner, renter or none
Market-Rate		75%	
Affordable		0%	
Retail		25%	
Office		0%	
Industrial		0%	
Public		0%	
Total (Check)		100%	

Average residential unit size or gross square footage per employee by sector ③			
Market-Rate Residential (Unit Size)		950	net square feet/unit
Affordable Residential (Unit Size)		750	net square feet/unit
Retail		1,246	gross square feet/employee
Office		434	gross square feet/employee
Industrial		601	gross square feet/employee
Public		791	gross square feet/employee

1. **Building uses:** The percentage of the building square footage by use. The percentages must add to 100%. Buildings may be single-use or mixed-use. Public uses may include civic buildings, schools, etc. You will have the opportunity to define the assumptions for each of the uses in the Prototype Builder's parking and financial tabs.

2. **Owner or renter occupied:** If you choose to include residential uses in your building prototype, then you can select which type of building you want to model. If there is no residential, just select "none" in the blank.

3. **Average residential unit size or square footage per employee by sector:** The average unit size of the market-rate residential and/or affordable residential units in square feet. For non-residential uses, this is the average gross square footage per employee for retail, office, industrial, public, and other uses.

AVERAGE SQUARE FOOTAGE PER EMPLOYEE
BY EMPLOYMENT TYPE

Office: 416
Mall Retail: 838
Non-mall Retail: 1,021
Industrial/Warehouse: 1,865

Source: U.S. Department of Energy

Parking Requirements		
Parking Spaces Per Dwelling Unit or 1,000 sf of Commercial ①		
Market-Rate Residential	1.00	space(s)/dwelling unit
Affordable Residential	0.00	space(s)/dwelling unit
Retail	1.00	space(s)/1000 sf
Office	0.00	space(s)/1000 sf
Industrial	0.00	space(s)/1000 sf
Public	0.00	space(s)/1000 sf

1. **Parking spaces per dwelling unit or 1,000 square feet of non-residential use:** The number of parking spaces allocated to each use in the prototype building.

Parking Type		
Surface or Structured Parking ②	1.00	(number of levels)
Internal Parking (Tuck Under or Sandwich) ③	0.00	(number of levels)
Underground Parking ④	0.00	(maximum number of levels to test)
	0.60	levels will maximize site without surface or structured parking
	0.00	actual underground levels after factoring underbuild
Mechanical parking?	no	

2. **Surface or structured parking:** The number of levels of above ground parking. If there is only surface parking, it should equal 1. If there is structured parking, this should be more than 1.

3. **Internal parking (tuck under or sandwich/podium):** If you would like to include internal parking within the building envelope, such as tuck under or sandwich/podium parking, this input allows you to designate how many full or partial levels of the building would be internal parking. For example, if you wanted to test 1/2 of the ground floor as tuck-under, you would enter 0.5.

4. **Underground parking:** This input is the maximum number of levels that you could feasibly build on the site. Depending on your parking requirements, you may not need to build that many levels. The "check" to the right of the input shows how many levels of underground parking you would need in order to maximize development on the site. The output below shows how many actual levels are required based on your maximum levels assumption and your underbuild assumption.

Podium Parking   Tuck-Under Parking

Parking

Parking

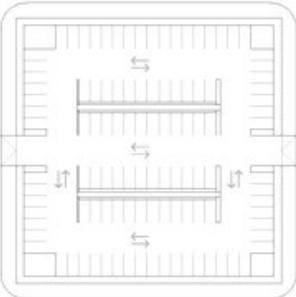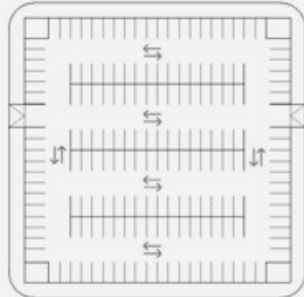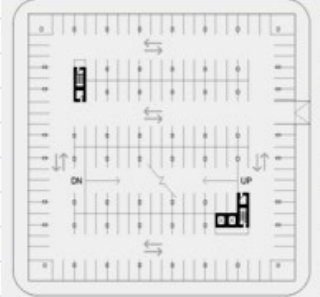### DESCRIPTION OF INTERNAL PARKING TYPES

Podium parking is located between two floors of commercial or residential space.

Tuck-under parking is located on the first floor of the building.

PHYSICAL TAB

Parking Layout				
	Mark choice with "X"	Square feet per space		
Suburban Perpendicular		400	sf	
Urban Perpendicular	X	255	sf	
Structured		260	sf	
Mechanical		125	sf	
Custom		325	sf	

Parking Layout Diagrams

Suburban Perpendicular	Urban Perpendicular	Structured

1. **Parking layout:** The area per parking space including entry, exit and circulation in square feet. Depending on the efficiency of your site, this can range from 250-400 square feet per parking space.

2. **Selection:** By placing an X in one of the five boxes, you are choosing which assumption to make for average parking space size (including circulation, etc.).

3. **Custom size:** If choosing a "custom" configuration, please enter an **average space size assumption in square feet.**

Site-Level Outputs			
Building footprint	4,986	square feet	
Landscaping or open space	1,500	square feet	
Parking area next to building	2,705	square feet	
Unused or flexible space	808	square feet	
Useable building total	11,519	square feet	

Land Use Outputs

Square Footage by Use ①	Gross Square Feet	Net Square Feet	Total Dwelling Units	Total Jobs	DU/acre	Jobs/acre
Market-Rate	8,639	7,343	7.7		34	
Affordable Residential	0	0	0		0	
Retail	2,880	2,448		2		10
Office	0	0		0		0
Industrial	0	0		0		0
Public	0	0		0		0
Internal Parking	0	0				
Total	11,519	9,791	7.7	2.3	33.7	10.1

1. **Square footage by use:** Note: The net square footage can be adjusted in the financial tab.

2. **Total dwelling units:** The number of housing units for the market-rate and affordable components of the building.

3. **Total jobs:** The estimated number of jobs by each non-residential use.

USING EXCEL'S GOAL SEEK TOOL

Goal Seek is a built-in Excel tool that allows you to see how one data item in a formula impacts another. You might look at these as "cause and effect" scenarios. Goal Seek can be found in Microsoft Office Excel's "Tools" menu or in the "What-if Analysis" menu, depending on the version of Microsoft Office you are using.
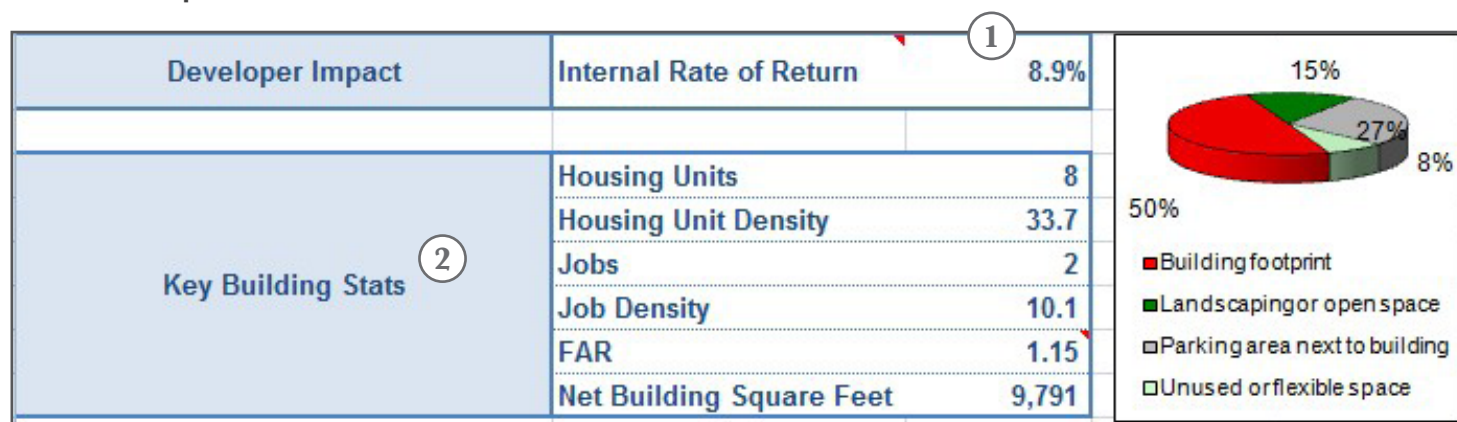
PHYSICAL TAB

Parking Outputs		
Parking Type	**255** Sq Ft per Space	
	Urban Perpendicular	
	①	
Required spaces per 1,000 sf of development	0.92	

Parking Spaces by Land Use	② Spaces Required	Parking Area ③
Market-Rate Residential	8	1,971 sf
Affordable Residential	0	0 sf
Retail	3	734 sf
Office	0	0 sf
Industrial	0	0 sf
Public	0	0 sf
Total	11	2,705 sf

Parking Spaces by Type ④	
Surface	11
Structured (above ground)	0
Underground	0
Internal (Tuck Under or Sandwich)	0
Total	11 spaces

1. **Required spaces per 1,000 sq ft of development or useable building:** The number of spaces required for every 1,000 square feet of development, averaged across all uses in the building.

2. **Spaces required by land use:** The total number of parking spaces required by building use.

3. **Parking area (sq ft):** The parking area (in square feet) for each use. The parking area is based on the average space size entered in "parking space size."

4. **Allocation of parking spaces by type:** This shows how the parking need is met, based on the previous assumptions.

PROTOTYPE SUMMARY DASHBOARD:
Renter-Occupied Residential or No Residential

Developer Impact	Internal Rate of Return	8.9%
	Housing Units	8
	Housing Unit Density	33.7
Key Building Stats ②	Jobs	2
	Job Density	10.1
	FAR	1.15
	Net Building Square Feet	9,791

Pie chart legend:
- 15%
- 27%
- 8%
- 50%
- Building footprint
- Landscaping or open space
- Parking area next to building
- Unused or flexible space

1. **Internal rate of return (rental):** The before tax leveraged internal rate of return (IRR) is the annual effective compounded rate of return which can be earned on the invested capital for a project with rental space (in other words, IRR is a way to measure the yield on an investment).

Target IRR for new development: **12-15%**

2. **Key building stats:** This information is automatically updated when you add or adjust the previous inputs.

RISK AND REQUIRED RETURNS

The returns required for a developer to pursue a project can vary widely, depending on how risky the project is perceived to be. This means that a mixed-use building where this type of development is common would probably require a lower return that the same building in an area which doesn't have a track record of mixed-use development.

PHYSICAL TAB

PROTOTYPE SUMMARY DASHBOARD:
For Sale Residential

Developer Impact	Project Profit %	6.3%
Key Building Stats	Housing Units	8
	Housing Unit Density	33.7
	Jobs	2
	Job Density	10.1
	FAR	1.15
	Net Building Square Feet	9,791

Pie chart legend:
- Building footprint — 50%
- Landscaping or open space — 15%
- Parking area next to building — 27%
- Unused or flexible space — 8%
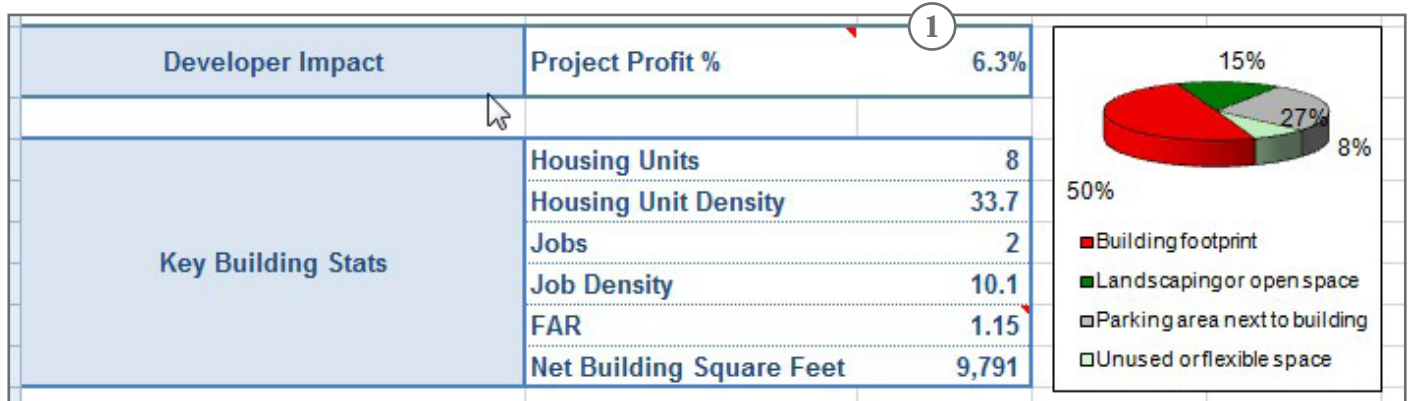
1. **Project profit % (owner):** The project profit as a percentage of total project costs.

Target profit for new development: **15%+**

BASIC FINANCIAL INPUTS

Construction Costs Per Square Foot (Core, Shell and Improvements)

Market-Rate Residential	$	120
Affordable Residential	$	95
Retail	$	120
Office	$	95
Industrial	$	95
Public	$	95
Greenbuilding Construction Premium (%)		0%
Acquisition Costs (Land and Improvements)	$	84,500	$8 /Square Foot
Subsidy		

1. **Construction costs per square foot (core, shell and improvements):** The construction costs per square foot including core, shell and tenant improvements. Does not include parking. (These costs are covered below under "parking costs.") Depending on use and level of finish, these costs could range from under $90 to $200+ per square foot.

2. **Acquisition costs:** The cost of acquiring the land and any improvements on the land (i.e. buildings). The total land cost is an input and the output to the right shows the cost per square foot. Recent sales of comparable buildings can help you estimate land value.

3. **Subsidy:** An input for any subsidy which may be put into a project. The output to the right shows the per square foot subsidy, if applicable.

BASIC
FINANCIAL TAB

Rents per Square Foot (Annual triple net, except monthly for rental.)					
Market-Rate Residential	① $	1.25	$ 1,188	Average Unit Rent	
Affordable Residential	$	-		of AMI:	$ 72,300
			$ -	Average Unit Rent	
Retail	② $	20			
Office	$	16			
Industrial	$	10			
Public	$	25			

1. **Residential:** The monthly rent per square foot for a residential unit. For example: a 2-bedroom, 1,000 sq ft apartment at $1.50/sq ft = $1,500/month.

2. **Non-residential:** The annual triple net rent per square foot for commercial or public uses. For example: a 1,000 sq ft commercial space at $19.50/sq ft = $1,625/month.

Sale Prices per Square Foot (Ownership Residential)		
Market-Rate Residential	③	$0 Avg Unit Sales Price
Affordable Residential		$0 Avg Unit Sales Price

3. **Residential:** For condominiums or for-sale residential properties, the sales price per square foot. For example: a 2-bedroom, 1,200 sq ft condo at $374/sq ft = $448,800.

Parking Costs Per Space		
Surface	$	3,000
Structured (above ground)	$	20,000
Underground	$	55,000
Internal (Tuck Under or Sandwich)	$	20,000
Mechanical	$	45,000

1. **Parking costs:** The average costs to construct a parking space by type. Surface parking is the least expensive option, though the trade-off is that more of the parcel is devoted to parking. On the other end of the spectrum, underground parking is the most expensive type of parking, but also allows to maximum development of a site.

FINANCIAL OUTPUTS

	Rental	For Sale
Building Construction (Hard Costs)	$ (1,143,564)	$ (1,143,564)
Parking Construction (Hard Costs)	$ (31,828)	$ (31,828)
Total Project Costs	$ (1,610,467)	$ (1,585,840)

2. **Building construction costs:** The hard construction costs for the building you are modeling.

3. **Parking construction costs:** The costs of parking construction for the project.

4. **Total costs:** The combined acquisition, hard and soft costs of the development.

BASIC
FINANCIAL TAB

PROTOTYPE SUMMARY DASHBOARD

Developer Impact	Internal Rate of Return	8.9%
Key Building Stats	Housing Units	8
	Housing Unit Density	33.7
	Jobs	2
	Job Density	10.1
	FAR	1.15
	Net Building Square Feet	9,791
Affordability	① Market-Rate Sales Price	$ -
	② Affordable Sales Price	$ -
	③ Market-Rate Rent	$ 1,188
	④ Affordable Rent	$ -

Pie chart:
- 15%
- 27%
- 8%
- 50%

Legend:
- Building footprint
- Landscaping or open space
- Parking area next to building
- Unused or flexible space

1. **Average market-rate unit sales price:** The selling price for an average market-rate for sale unit.

2. **Average affordable unit sales price:** The selling price for an average affordable for sale unit.

3. **Average market-rate unit rent:** The rental price for an average market-rate rental unit.

4. **Average affordable unit rent:** The rental price for an average affordable rental unit.

ADVANCED FINANCIAL TAB OVERVIEW

The advanced financial tab allows you to make additional, more-detailed assumptions about the financial characteristics of your development. These range from building efficiency to permit fees and demolition costs to loan terms.

ADVANCED FINANCIAL INPUTS

Building Efficiency — Reference

Gross to Net Square Footage (% Rentable)			Low	Average	High	Notes/Data Source
Market-Rate Residential		85%	75%	80%	85%	Enter 100% for single family, duplex or townhome buildings.
Affordable residential		85%	75%	80%	85%	Enter 100% for single family, duplex or townhome buildings.
Retail		85%	75%	80%	85%	
Office		85%	75%	80%	85%	
Industrial		85%	75%	80%	85%	
Public		85%	75%	80%	85%	

Annual Operating Expenses (% by type)			Low	Average	High	Notes/Data Source
Market-Rate Residential		30%	30%	35%	40%	
Affordable Residential		30%	30%	35%	40%	
Retail		30%	30%	35%	40%	
Office		30%	30%	35%	40%	
Industrial		20%	20%	25%	30%	
Public		35%	35%	40%	45%	

1. **Gross to net square footage:** The building efficiency reflecting the amount of space that is rentable/leasable (gross square footage minus common areas, hallways, etc.).

2. **Operating expenses:** Annual operating expenses (as a percentage of gross annual income) including utilities, property management, controllable costs and insurance.

Occupancy Rate (%)			Low	Average	High	Notes/Data Source
Market-Rate Residential		95%	90%	95%	100%	
Affordable Residential		95%	90%	95%	100%	
Retail		95%	90%	95%	100%	
Office		95%	90%	95%	100%	
Industrial		95%	90%	95%	100%	
Public		95%	90%	95%	100%	
General (for proforma cash flow)		95%	90%	95%	100%	

3. **Occupancy rates:** The percentage of the building which is occupied, on average, by use.

ADVANCED FINANCIAL TAB

Pre Development Costs		Low	Average	High	Notes/Data Source
Due diligence	$ -				Enter manually if applicable
Land carry (% of raw land cost)	5.0%	3%	5%	7%	Expert interviews
Land entitlement / legal fees (% raw land)	2.0%	2%	2%	2%	Expert interviews
Professional fees (% of hard costs)	5.0%	3%	5%	7%	Expert interviews

Development Costs		Low	Average	High	Notes/Data Source
Demolition Costs (total)	$ -				Enter manually if applicable
Site development costs (per sf)		$ -	$ 2.00	$ 5.00	
Additional infrastructure enhancement costs (total)	$ -				

Indirect Costs		Low	Average	High	Notes/Data Source
System development fees (per unit)	$ -				Enter manually if costs are required
Building permit fees (per unit)	$ 2,000				Enter manually if costs are required
Insurance during construction (% of total	1.0%	1%	1%	1%	Expert interviews
Taxes during construction (% raw land)	1.0%	1%	1%	1%	Expert interviews
Developer fee	4.0%	3%	4%	5%	Expert interviews
Contingency	10.0%	5%	10%	15%	Expert interviews
Marketing / Advertising Costs (per unit)	$ 1,500	$ 1,000	$ 1,500	$ 2,000	Expert interviews
Commission & closing costs	3.0%	3%	3%	3%	Expert interviews

1. **Pre-development costs:** Pre-development costs include due diligence, land carry costs, land entitlements and/or professional fees.

2. **Development costs:** Development costs reflect building costs in addition to the construction costs included above.

3. **Indirect and other costs:** Indirect fees and other costs include impact fees, insurance, permitting, taxes, developer fees, contingency, and marketing/advertising costs.

Construction Debt		Low	Average	High	Notes/Data Source
Loan term (yrs)	1.5	100%	150%	200%	Lender
Loan fees	1.5%	1%	2%	2%	http://www.constructionloancenter.com/rates_and_fees.htm
Average draw	50%	50%	50%	50%	Expert interviews
Interest rate	7.0%	6.0%	7.0%	8.0%	Lender

Permanent Financing Costs		Low	Average	High	Notes/Data Source
Equity (equity interest paid w/ profit sharing)	40%	25%	40%	50%	
Permanent debt	60%	75%	60%	50%	
Loan fees	2.0%	2.0%	2.0%	2.0%	
Interest rate	7.0%	6.0%	7.0%	8.0%	

Costs during Lease-Up		Low	Average	High	Notes/Data Source
Lease up period (months)	12	12	12	12	Expert interviews
Average occupancy	50%	65%	50%	35%	Expert interviews

Inflation Rates and Cash Flows		Low	Average	High	Notes/Data Source
Gross Rent (inflation rate)	4.0%	2.0%	4.0%	5.0%	http://www.bls.gov/CPI/
Operating Expenses (inflation rate)	4.0%	2.0%	4.0%	5.0%	http://www.bls.gov/CPI/
Project Cap Rate	8.0%	7.0%	8.0%	9.0%	

| Area Median Income | $ 72,300 | | | | Kansas City MSA, https://www.efanniemae.com/sf/refmaterials/hu |

1. **Construction Debt:** The assumptions for the construction loan including interest rate, loan period and average draw.

2. **Permanent financing costs:** Financing costs for the permanent debt. For example, a developer may borrow 60-75% of the project costs. However, this means that 25-40% equity represents a "gap" that needs to be filled in order to start a project.

3. **Costs during lease-up:** Costs during lease-up takes into account that all of the units will not be immediately leased or occupied.

4. **Inflation rates:** Inflation rates reflect the assumptions for annual increases in rents and operating expenses.

5. **Cap rates:** Capitalization rate (or "cap rate") is a measure of the ratio between the net operating income produced by an asset (usually real estate) and its capital cost (the original price paid to buy the asset) or alternatively its current market value: NOI (Net Operating Income)/Cap Rate = Capitalized Value. Talk with developers in the area to get a sense of average cap rates for each use.

PRINT SUMMARY TAB

You can customize the print summary to show just the inputs and outputs that are important to your project. The default print summary includes some basic details. This page is not password-protected, so you can change the names and link to elsewhere in the model as you would like. There is also a blank area which you can use to post a photo of the site or rendering of the potential prototype building.

PRINT SUMMARY SAMPLE
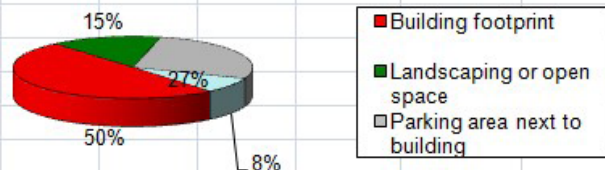

H1 - Suburban Mixed Use Residential, Low
Portland Metro

BUILDING FORM & USE

Lot area	10,000	sf
Lot area	0.23	acres
Height	3	stories
Floor-area ratio	1.15	FAR
Average unit size	950	sf
Residential density	34	/acre
Employment density	10	/acre

FINANCIAL PERFORMANCE

Average unit sale price	N/A	
Average cost/sf	N/A	/sf
Average unit rent	$ 1,187.50	/month
Average rent (sf/month)	$ 1.25	/sf
Retail rent (sf/year)	$20	/sf (triple net)
Office rent (sf/year)	N/A	/sf (triple net)
Estimated land value	$8	/sf
Estimated land value	$84,500	
Total project costs	**$1,610,467**	

Pie chart: 15%, 27%, 50%, 8%
- Building footprint
- Landscaping or open space
- Parking area next to building

PARKING & OPEN SPACE

Residential parking spaces per unit	1.00
Retail parking spaces per 1000sf	1.00
Office parking spaces per 1000sf	N/A
Total parking spaces	11
Landscaping and open space area	15%

CONSTRUCTION COSTS

Parking Construction

Surface	$3,000	/space
Structured (above ground)	$20,000	/space
Underground	$55,000	/space
Tuck-Under	$20,000	/space

Building Construction*

Residential	$120	/sf
Retail	$120	/sf
Office	$95	/sf

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CALCULATOR TABS

The other tabs in the model are the calculators that drive the model. All of the formulas and calculations behind the model are shown in the spreadsheet, so you can see exactly how it works. The calculation tabs include:

- Scenario spreadsheet
- Rental pro forma
- Owner pro forma
- Building envelope calculator

RENTAL PRO FORMA

DEVELOPMENT PROGRAM

Residential			
maximum # of residential units w/ existing zoning		36	Rounddown units
actual # of residential units approved w/ zoning density		36	
# market rate units		18	
# affordable units		18	
Total # of Units		36	
total residential square footage		32,651	Gross
Commercial			
Retail square footage (gross)		32,651	
Office square footage (gross)		0	
Industrial square footage (gross)		0	
Public square footage (gross)		0	
Other square footage (gross)		0	
Parking (6a)			
Residential (per unit average / total)	1.00	18	Net sf
Affordable residential (per unit average / total)	0.00	0	Roundup parking spaces
Retail	2.00	49	
Office	4.00	0	
Industrial	2.00	0	
Public	4.00	0	
Other	0.00	0	
Total Required parking spaces			
Total parking square footage			

BUILDING ENVELOPE

below grade parking		# s
above grade structured parking		
above grade uncovered surface parking		
Building envelope		
total building height		
total building square footage		
FAR		

Building Envelope Calculator

Land Uses
Streets
Landscaping
Land for Building and Parking
Total Lot Size

Maximum Building
Maximum Building Square Footage
Maximum Building Footprint

IF UNDERGROUND AND TUCK UNDER BUT NO SURFACE/STRUCTURE
Maximum Square Footage by Use
Market-Rate
Affordable

GLOSSARY

The glossary contains brief definitions of real estate and planning terms used in the Prototype Builder.

Capitalization rates: A capitalization rate is the ratio of year one expected net operating income (NOI) to total project value. (It is not the annual return.)

Year one NOI/value = Cap rate

The cap rate can be used to value a property, or to compare two properties.

Construction loan: A short-term interim loan for financing the cost of construction.

Developer profit: The difference between total costs and total revenue.

Gross square footage: The total area, measuring from the outside of the exterior walls and including all vertical features such as elevator shafts.

Internal rate of return (IRR): When an investment creates differing amounts of annual cash flow, a rate of return can be determined by calculating the Internal Rate of Return (IRR). Essentially an IRR is the rate needed to convert (or discount) the future uneven cash flow to equal your initial investment or down payment.

Example: Assume a cash flow of $100 in the second year. Also, assume that in order to generate that $100, you had to invest $500. In this example, you have an outflow of $500 the first year and an inflow of $600 in the second year ($100 earnings plus the $500 return of your initial investment). To convert or discount the $600 back to today's dollars to equal your initial investment of $500, a discount rate of 20% is required. Thus, your IRR is 20%.

Net operating income (NOI): Income after deducting for operating expenses but before deducting for income taxes and interest.

Net square footage: The gross square footage of a building (see above) minus common areas.

Operating expenses: These are costs, such as utilities and maintenance, required to run a building.

Parking ratio: The number of parking spaces required for each unit of residential development or per 1,000 sq ft of retail, office or industrial use.

Permanent loan: A long-term loan of not less than 10 years that is fully amortized and taken out after the construction of a building is finished.

Return on investment (ROI): A performance measure used to evaluate the efficiency of an investment or to compare the efficiency of a number of different investments. To calculate ROI, the net operating income (NOI) is divided by the total project costs; the result is expressed as a percentage.

INTERNET RESOURCES

General Real Estate Development
www.uli.org

Construction Costs
 www.rsmeans.com/calculator/index.asp
(paid subscription required)

Residential Rents and Sales Prices
www.zillow.com
www.zilpy.com
www.apartments.com

Commercial Rents and Sales Prices
www.loopnet.com