The Real Estate Development Process

While real estate development models may look complex, the actual **concepts** are simpler than what you see for normal companies.

Real estate development modeling is different because it's more granular, happens in months rather than years, and because you start with nothing and generate revenue only when the building is complete.

If you're acquiring real estate that's already operational, it's more like modeling a normal company – see the hotel acquisition and renovation tutorial for more on that.

Step 1: Determine the Size, Parameters and Construction Timeline for the Property

Lot and Unit Assumptions - Bateman Apartments	
Lot Square Meters:	10,000 sq. m.
Minimum Square Meters Per Unit:	50 sq. m.
Apartment Units:	200
Average Apartment Unit Size:	50 sq. m.

You start with the Lot Size in square feet or square meters, and then base the number of units, rooms, or gross area of the building on that. In more complex models you look at the FAR (Floor Area Ratio) and local zoning requirements to determine the exact size.

Also in more complex models, you would distinguish between **Gross Area** and **Rentable Area**, especially for office and retail developments – the Rentable Area is always smaller due to walls, elevators, stairs, and so on.

Next, you estimate the average rent per square foot or square meter, or per unit if it's an apartment complex; for hotels you would look at the Average Daily Rate (ADR) per room instead.

You also determine the operating expenses and property taxes per unit or per square foot or square meter at this stage.

If your building has a parking structure attached, you estimate the spots required for that as well; that may be based on an assumed number of spots per unit or per rentable square foot / square meter.

Average Monthly Rent Per Square Meter:	$ 50.00
Average Monthly Parking Fees Per Spot:	$ 150.00
Average Monthly Rent Per Unit:	$ 2,500
Monthly Operating Expenses Per Unit:	$ 300.00
Monthly Property Taxes Per Unit:	150.00
Total OpEx and Taxes Per Unit:	**$ 450.00**
Required Parking Spots Per Unit:	1.5
Parking Spots:	300
Assumed Vacancy Rate at Stabilization:	5.0%

Finally, you should pick a stabilized Vacancy Rate to reflect the fact that you'll never fill the building 100% with tenants at any given time.

You speak with local real estate agents, other developers, and property owners in the area to determine the proper figures to use for all of the metrics above.

Pre-Construction # Months:	3
Construction Start Month:	4
Construction # Months:	6
Rental Period Start Month:	10

The **Construction Timeline** may be either simple or complex depending on your model – in this example

with only 1 year, we include only the Pre-Construction, Construction, and Post-Construction periods.

In a more complex model over many years, you would also include events such as the Tenant Move-In Dates (rather than assuming everyone moves in at once), the FF&E and TI purchase dates, and so on.

You may also assume a **Sale Date** here to indicate the exact month in which the building will be sold.

Step 2: Estimate the Revenue, Expenses, and NOI for the Property

Annual Property Income Statement:	
Gross Potential Annual Apartment Revenue:	$ 6,000,000
Gross Potential Annual Parking Revenue:	540,000
Less: Vacancy Allowance:	(327,000)
Annual Net Revenue:	**6,213,000**
Annual Operating Expenses:	720,000
Annual Property Taxes:	360,000
Total Property-Level Expenses:	**1,080,000**
Current Year Net Operating Income:	**$ 5,133,000**

This is the easy part: Rental Income is **rentable area * average rent per square foot or square meter**; you could also use units for apartments, or rooms, days, and the ADR for hotels.

Parking Revenue is based on the number of spots times the monthly fees times the months in a year.

You must also **subtract the Vacancy Allowance** to determine net revenue (except for hotels, where you normally look at the occupancy rate as part of the revenue buildup) – the entire building will never be fully occupied.

So if you were expecting to earn $100,000 in Rental Income but you also expect a 5% Vacancy Rate, you would net the $5,000 against the $100,000 to get $95,000 in net revenue.

Operating expenses and property taxes are based on the cost per unit, room, square foot, or square meter and the total area or units/rooms.

Then, Net Revenue – Operating Expenses – Property Taxes = Net Operating Income.

In more complex models, you also have to account for the fact that revenue scales up over time as tenants move in, and you have to decide on Gross Area vs. Rentable Area when calculating expenses.

Step 3: Estimate the Development Costs for the Project

The main expense categories are **Land Acquisition Costs**, **Hard Costs**, **Soft Costs**, **FF&E**, and **Tenant Improvements** (see the Real Estate Development Key Terms PDF for definitions).

Project Cost Assumptions - Bateman Apartments		
Project Costs:	**Per Unit:**	**Total:**
Hard Costs and FF&E:	$ 130,000	$26,000,000
Soft Costs:	50,000	10,000,000
Land Acquisition Costs:	70,000	14,000,000
Capitalized Interest:		684,809
Total Project Cost:		**$50,684,809**

You can go in-depth and project all of these on a fixed cost + variable cost (tied to square feet/meters) basis (see the office development course for an example of that).

Or you can stay at a high level and estimate lump sum amounts for everything (see estimates on the left).

You must also include "hidden costs" such as Capitalized Financing fees, the Operating Deficit, and the Origination Costs of Debt.

This part is tricky because **there's inherent circularity** – you can determine these expenses only once you've already built the rest of the model.

The convention in real estate is to assume that loan interest is capitalized when the building is still under construction; the Operating Deficit corresponds to the period when you start paying expenses but do not yet have sufficient net income to cover everything.

With all of these expenses, you need to speak with local real estate agents, developers, and property owners to get a sense of what your building might cost based on its size, location, and function – the numbers here are not necessarily representative of a real property.

Step 4: Create a Sources & Uses Schedule and Determine the Debt and Equity Levels

Once you know the Total Development Costs (TDC) you can assume a **Loan-to-Cost (LTC) Ratio**, an interest rate on the debt, and determine the required debt and equity:

Project Cost Assumptions - Bateman Apartments					
Project Costs:	**Per Unit:**	**Total:**		**Debt & Equity Assumptions:**	
Hard Costs and FF&E:	$ 130,000	$26,000,000		Loan to Cost (LTC) Ratio:	70.0%
Soft Costs:	50,000	10,000,000		Debt Interest Rate:	8.0%
Land Acquisition Costs:	70,000	14,000,000		Required Equity:	30.0%
Capitalized Interest:		684,809			
Total Project Cost:		**$50,684,809**		Loan Amount:	$ 35,479,366
				Equity Amount:	15,205,443

In a more complex model, you would include both **Developer Equity** and **Investor Equity**, and you might have multiple tranches of debt (such as **Senior Notes** and **Mezzanine**) with different interest rates.

The proper amounts for all of these and the Loan-to-Cost Ratio are based on comparable property developments – you would use whatever nearby, similar buildings have done recently.

You might need those additional equity levels and additional tranches of debt because investors are only willing to invest up to a certain amount – you, the developer, might only have $3 million to invest, in which case you would need to recruit 3rd party investors to cover the rest of the equity.

Step 5: Build an Income Statement Down to Net Operating Income or Net Income

Compressed Construction Timeline - Bateman Ap				
Calendar Month:	9/1/2012	10/1/2012	11/1/2012	12/1/2012
Month:	9	10	11	12
Phase (1 = Pre, 2 = Construction, 3 = Post):	2	3	3	3
Gross Potential Monthly Apartment Revenue:	$ -	$ 500,000	$ 500,000	$ 500,000
Gross Potential Monthly Parking Revenue:	-	45,000	45,000	45,000
Less: Vacancy Allowance:	-	(27,250)	(27,250)	(27,250)
Monthly Net Revenue:	-	**517,750**	**517,750**	**517,750**
Monthly Operating Expenses:	-	60,000	60,000	60,000
Monthly Property Taxes:	-	30,000	30,000	30,000
Monthly Expenses:	-	**90,000**	**90,000**	**90,000**
Net Operating Income:	$ -	$ 427,750	$ 427,750	$ 427,750

This part involves checking which **Development Phase** you're in and then linking in the appropriate numbers.

In this example, we assume a stabilized Vacancy Rate and 100% of monthly net revenue and monthly expenses as soon as construction finishes.

In more complex models (see the office development example on the site), we might add the following:

1. Scale up revenue over time as more tenants move in over many months;
2. Model in expenses before revenue, since it takes a while to attract tenants and sign leases;
3. Assume a higher Vacancy Rate until it declines to a stabilized level.

Ideally, you will also project **Interest Expense** to calculate **Net Income** rather than the NOI we've stopped at above – here, it doesn't matter much because the NOI is more than sufficient to cover cash interest.

But if it were not, we would need to draw on additional debt or equity.

Normally you don't look at **Depreciation** in real estate development models, but you may include it in real estate *acquisition* models if the property is already built; it doesn't make a difference because you would add it back when calculating cash flows anyway (and there are no corporate taxes, so no tax savings either).

Step 6: Distribute the Development Costs and Determine the Debt and Equity Required

In this model, we simply straight-line expenses over the Pre-Construction and Construction Phases:

Compressed Construction Timeline - Bateman Apartments									
Calendar Month:	1/1/2012	2/1/2012	3/1/2012	4/1/2012	5/1/2012	6/1/2012	7/1/2012	8/1/2012	9/1/2012
Month:	1	2	3	4	5	6	7	8	9
Phase (1 = Pre, 2 = Construction, 3 = Post):	1	1	1	2	2	2	2	2	2
Project Construction Costs:									
Hard Costs and FF&E:	-	-	-	4,333,333	4,333,333	4,333,333	4,333,333	4,333,333	4,333,333
Soft Costs:	-	-	-	1,666,667	1,666,667	1,666,667	1,666,667	1,666,667	1,666,667
Land Acquisition Costs:	4,666,667	4,666,667	4,666,667	-	-	-	-	-	-
Total Construction Costs:	**4,666,667**	**4,666,667**	**4,666,667**	**6,000,000**	**6,000,000**	**6,000,000**	**6,000,000**	**6,000,000**	**6,000,000**

In more complex models, you might create a normalized distribution schedule for Hard Costs and something more random for Soft Costs; others such as FF&E, TIs, and Land Acquisition Costs would be straight-lined.

You pay for the Land Acquisition Costs in the Pre-Construction phase; Hard Costs occur mostly in the Construction Phase; Soft Costs are distributed throughout all phases; and you pay for FF&E and TIs in the Post-Construction Phase, just before the tenants move in (simplified in the example above).

Unlike an LBO, where you pay for everything upfront, with real estate development the expenses occur gradually over time.

That's important because the debt and equity draws (see below) also occur over time, which affects the internal rate of return (IRR).

Step 7: Draw on Equity and Debt as Necessary

You assume that you draw on equity until you reach the maximum amount that you can draw on.

For example, if you have a maximum draw of $10 million and you need $5 million in the first month, you can use equity for that first $5 million. But if you need $10 million in the second month, you must use a combination of debt and equity since you only have $5 million of equity remaining to draw on.

Project Construction Costs:										
Hard Costs and FF&E:		-	-	-	4,333,333	4,333,333	4,333,333	4,333,333	4,333,333	4,333,333
Soft Costs:		-	-	-	1,666,667	1,666,667	1,666,667	1,666,667	1,666,667	1,666,667
Land Acquisition Costs:		4,666,667	4,666,667	4,666,667	-	-	-	-	-	-
Total Construction Costs:		**4,666,667**	**4,666,667**	**4,666,667**	**6,000,000**	**6,000,000**	**6,000,000**	**6,000,000**	**6,000,000**	**6,000,000**
Ending Debt Balance:	-	-	-	-	4,810,593	10,862,838	16,955,566	23,089,048	29,263,556	35,479,366
Capitalized Interest:	8.0%	-	-	-	16,035	52,245	92,728	133,482	174,509	215,810
Funds Required:		**4,666,667**	**4,666,667**	**4,666,667**	**6,016,035**	**6,052,245**	**6,092,728**	**6,133,482**	**6,174,509**	**6,215,810**
	Max Draw:									
Equity Draw:	15,205,443	4,666,667	4,666,667	4,666,667	1,205,443	-	-	-	-	-
Debt Draw:	35,479,366	-	-	-	4,810,593	6,052,245	6,092,728	6,133,482	6,174,509	6,215,810

The "Funds Required" above equals the Total Construction Costs + Capitalized Interest – Net Operating Income; in a more complex model you would use Net Income rather than NOI to capture the cash interest expense, and you'd take into account Loan Origination Costs and the Operating Deficit as well.

When you have multiple equity investors and multiple tranches of debt, you start with Developer Equity first, then draw on Investor Equity, then Mezzanine, and then Senior Notes (riskiest → least risky).

Then, based on the average debt balances (or the beginning debt balances to avoid circularity), you can calculate the Interest Expense each month and link that up to the income statement.

Step 8: Assume an Exit Cap Rate and Stabilized NOI, and Determine the Net Sale Proceeds

Just as with an LBO model, it's impossible to earn an acceptable IRR unless you **sell** the property in the future.

That's because the cash flows over the months or years that you own the property don't come close to what you earn when you sell it. In an LBO model, you assume an exit multiple, and in a real estate development model you assume an **Exit Cap Rate**:

Sale Assumptions & Output - Bateman Apartments				
Years to Stabilized NOI:		1.0	Annual Maintenance CapEx Per Unit:	$ 200.00
Annual Revenue Inflation:		3.0%	Stabilized NOI After Maintenance CapEx:	$ 5,245,790
Annual Expense Inflation:		3.0%	Yield on Cost:	10.3%
Property Sale Capitalization Rate:		7.0%	**Internal Rate of Return:**	188.8%
Gross Sale Value:		$74,939,857		
Less: Selling Costs:	4.0%	(2,997,594)		
Less: Pay Off Debt Principal:		(35,479,366)		
Net Sale Proceeds:		**$36,462,897**		

This Exit Cap Rate should be based on what similar properties in the area have sold for recently.

The "Stabilized NOI After Maintenance CapEx" line item here just means, "After we account for revenue and expense inflation a certain number of years into the future, and we subtract out the required Maintenance CapEx each year, what is our Net Operating Income at that future date?"

You don't **have** to take into account inflation and Maintenance CapEx, but it is common to see in real estate models. It's more important if you're looking at the property over 3-5 years rather than 1 year, because inflation is much more significant then.

You take into account inflation because both rent and expenses increase over time, and you take into account Maintenance CapEx because most buyers will subtract that from the NOI figures you quote.

To determine the Net Sale Proceeds, you must also subtract the Selling Costs (similar to paying for the financial advisors in an M&A deal) and the remaining Debt Principal that must be repaid.

Step 9: Calculate the Internal Rate of Return (IRR)

You could use either the IRR or XIRR function for this (XIRR is for when the cash flows occur on an irregular schedule).

You track the Equity Invested each month – with negative signs – and then link in the Net Sale Proceeds at the end of the period.

In more advanced models this gets complicated when you have features like **Developer Promotes** – i.e. the developer gets a higher percentage when the IRR reaches a certain level – but in the basic model here it's as simple as calculating the IRR in an LBO model:

Compressed Construction Timeline - Bateman Apartments												
Calendar Month:	1/1/2012	2/1/2012	3/1/2012	4/1/2012	5/1/2012	6/1/2012	7/1/2012	8/1/2012	9/1/2012	10/1/2012	11/1/2012	12/1/2012
Month:	1	2	3	4	5	6	7	8	9	10	11	12
Phase (1 = Pre, 2 = Construction, 3 = Post):	1	1	1	2	2	2	2	2	2	3	3	3
Equity Investor Returns:												
Equity Invested:	(4,666,667)	(4,666,667)	(4,666,667)	(1,205,443)	-	-	-	-	-	-	-	-
Net Sale Proceeds:	-	-	-	-	-	-	-	-	-	-	-	36,462,897
Net Cash Flow to Equity Investors:	**(4,666,667)**	**(4,666,667)**	**(4,666,667)**	**(1,205,443)**	-	-	-	-	-	-	-	**36,462,897**
Internal Rate of Return (IRR):	**=XIRR(F37:Q37,F4:Q4)**											

If you want to see how this can get more complex, take a look at the office development lessons on the site, in particular the one on Allocating Returns where we go through a full waterfall schedule.

That isn't a requirement, but you will sometimes see that type of schedule in real estate if the investors want to incentivize the developers to perform well.

One final note: the return here is exceptionally high because of the compressed timeline, and because our assumption for the Exit Cap Rate is quite aggressive (7.0% vs. the Yield on Cost figure of 10.3%).

In real life, investors aim for a 20-25% IRR, similar to what private equity firms target in a leveraged buyout.