Optimizing Watershed Rents

Now that you have re-familiarized yourself with Microsoft Solver, you are going to use Solver to determine the optimal nightly rent for some of Watershed's properties – in other words, the rent that will maximize the annual revenue after transaction fees for that particular property.

Open Template Spreadsheet three, *Solver Rent Optimization,* and fill in the five additional columns you will need in order to use Solver. Put a "placeholder" value of $100 in each cell of the Solver "variable cell" column.

You will use Solver to change those values, one row at a time, so as to maximize the Solver "objective" of annual revenues before transaction fees – but first you must add two additional "constraints" on the Solver answer. Note that all of the data from the 244 comparable properties has percentile rents between 10% and 90%. This is not an accident – it is based on the assumption that a straight line model for the association between rent and occupancy rate fits the data between 10^{th} and 90^{th} fairly well, but that at the extremes of very high and low rent, a linear model would not be reliable.

It should be obvious that the line cannot be extended up and to the left indefinitely, because no property can have occupancy greater than 100%. And since we have used no occupancy data with rents of less than 10th percentile or greater than 90th percentile to build our model, we need similarly to constrain our answers to rent values between the 10th and 90th percentile.

It is easy to set constraints in Solver: Add constraints that the spreadsheet column called "Variable Cell Dollars Normalized to Percentile (using formula in Guide spreadsheet)" must not have values < 10% or > 90%. You will notice that some properties will therefore have a "maximum" at the 10% threshold.

You will put your Solver "objective" – the forecast annual revenues – in the column headed *SOLVER "Objective" Forecast ST Annual Revenues Before Transaction Costs* in the Solver Rent Optimization Template spreadsheet.

Note that, because, for later financial analysis, we will need only the portion of the cash actually received by Watershed, you should subtract the assumed third-party processing and regulatory fees now. These fees are assumed to total 30% - as listed in Row 1 of the column headed Forecast ST Revenues After Transaction Fees. Report your results after removing the 30% fee.