Case Study #4: Optimal Decision at CalDev Company

CalDev Associates, Inc., a property development firm, purchased in 2010 a large old house near a town square in Concord. The old house was built in the late-1960s and the CalDev Associates restored it. For more than a decade, the company has leased the house to the nearby college for academic office space. The house is located on a wide lawn and has become a town landmark.

However, in 2021 the lease with the college was expiring, and CalDev Associates decided to build a hotel that would use all of the open space. The community was outraged and complained to the city council. One of the city's supervisors spoke with a representative from CalDev and hinted that if the company requested a permit, there was a fairly high chance that it would be rejected.

The top management at CalDev Associates had a series of meetings to review their alternatives. Eventually, they came up with three options: sell the property, request a permit to build a five-star hotel; or request a permit for an office building which would be, according to the city's supervisor, more appropriate for the city.

The management estimated that they could sell the property for $1.8 million. They also concluded that the hotel permit had a chance of 0.3 for being approved. If this happened and the city's economic growth would continue (according to the city council estimate, the chance is 0.6), the company would earn $4.4 million. In case of the declined economic activity (the chance is 0.4), CalDev would earn only $1.6 million. If the hotel permit is rejected (a chance is 0.7), the company could sell the property again for the same amount of money ($1.8 million), or lease it back to the college for $1.5 million, or request a new permit for the office building. If this permit is approved (the chance was estimated to be 0.8), CalDev could earn $3.3 million assuming the economic growth in the city, and $1.3 million in case of economic decline. If the permit for the office building is rejected (a chance is 0.2), CalDev could sell the property for $1.8 million or lease to the college for $1.5 million.

CalDev Associates could request the permit for the office building from the start with the same consequences (probabilities and earnings) as those described above. The office building permit may be approved with the subsequent possible economic growth or decline in the city or rejected with the subsequent selling or leasing of the property.

Each permit for building the hotel or for the office building would cost CalDev $150,000 for architectural design, drawings, submission fees, etc.

Questions.

1. Develop a decision tree for this problem to identify the best decision(s) to make. Use the PrecisionTree tool to develop the decision tree.
2. Present and explain the optimal decision tree for CalDev.
3. Present and explain the risk profile for CalDev decision making.
4. Present and explain one-way sensitivity analysis for: probability of approving the permit for the hotel (vary it from 0.1 to 0.95), amount of money from leasing to college (from $0.5 to $4 million),

and probability of approving the permit for the office building (from 0.1 to 0.95). Use the Strategy Region and Tornado Graph options to explain your results.

5. Present and explain two-way sensitivity analysis for: probability of approving the permit for the hotel (vary it from 0.1 to 0.95) and probability of approving the permit for the office building (from 0.1 to 0.95). Use the Strategy Region option to explain your results.

6. (Optional question). Develop your own one-way and two-way sensitivity analysis using parameters of the case. Use Strategy region for both one-way and two-way sensitivity analysis. Explain your results.