Assignment Report

Summary

This report presents the results of an optimization study for a new high-rise residential development.

The aim was to determine the most profitable design for a residential tower, given Dutch housing policy requirements for social, middle, and free-sector apartments.
Three different tower heights were studied: 23, 40, and 56 floors. Real project data and an optimization model that calculates the best possible mix of apartments, sectors, and owners were used.

You can see the overview of the results in the table below.

Tower Height	Total Profit (€)	Key Owner Type	Main Sectors
23 floors	17.48 million	Investors	Social and Middle
40 floors	29.62 million	Investors	Middle
56 floors	39.19 million	Investors	Middle and Free

In summary:

- All options meet policy requirements and stay profitable.
- Profitability rises substantially with height.
- The 56-floor design delivers by far the highest profit while remaining compliant with all social housing rules.

Approach

A computer-based optimization tool was used to explore thousands of possible configurations. It automatically selected:

- how many floors should have each apartment layout,
- how to distribute social, middle, and free-sector apartments, and
- which ownership type (corporation, investor, private) should be assigned to each floor.

The model ensures that:

- all policy rules are met,
- every apartment is assigned to one sector and one owner,
- and the overall design is practical (no mixing of different owners on the same floor).

The results represent the best possible combination of apartments and owners for each tower height.

Results

The results of the optimization are presented in two tables for each number of floors. The first table shows the optimal design and owner selection required to achieve the maximum profit. The second table indicates how many apartments of each area and owner type should be allocated to each sector in order to obtain the optimal profit.

23 floors
Optimal profit(€): 17.48 million

Floors	**Design choice**	**Owner**
1 - 12	11 floors - aa 1 floor - ac	investor
13, 14	1 floor - cc 1 floor - cd	cc floor - investor cd floor - corporation
15 - 23	ee	private

sector	**area**	**owner**	**Number of apartments**
social	36	investor	46
social	42	investor	27
social	60	corporation	2
social	70	corporation	1
social	71	corporation	2
middle	42	investor	19
middle	48	investor	46
middle	60	investor	6
middle	71	investor	5
middle	96	corporation	2
free	71	investor	1
free	131	private	36

40 floors
Optimal profit(€): 39.19 million

Floors	Design choice	Owner
1 - 19	aa	investor
20, 21	bc	investor
22 - 24	cc	2 floors - investor 1 floor - corporation
25 - 40	ee	private

sector	area	owner	Number of apartments
social	36	investor	76
social	42	investor	50
social	60	corporation	4
social	71	corporation	4
middle	42	investor	30
middle	48	investor	76
middle	60	investor	10
middle	68	investor	2
middle	71	investor	12
free	60	investor	2
free	131	private	64

56 floors
Optimal profit(€): 19.19 million

Floors	Design choice	Owner
1 - 28	27 floors - aa 1 floor - ac	investor
29 - 33	4 floors - cc 1 floor - ce	3 cc floors - investor 1 cc floor - corporation ce floor - corporation
34 - 56	ee	private

sector	area	owner	Number of apartments
social	36	investor	110
social	42	investor	63
social	48	investor	1
social	60	corporation	6
social	71	corporation	6
middle	42	investor	47
middle	48	investor	109
middle	60	investor	14
middle	71	investor	14
middle	131	corporation	2
free	131	private	92

General results

- Investors own the majority of apartments
- Housing corporations focus on social and middle-income units
- Private buyers appear only in the free sector, mainly for large apartments

Recommendations

If structurally and legally feasible, the 56-floor design is the most attractive option.
It maximizes returns while meeting social housing targets and maintaining a strong investor base.