Design Example: Building Three Basements

Arrival rate (AR%): 12%
Target interval: 30 seconds.

Number of occupant floors above the main entrance: 10 floors
Ground floor (main entrance floor) and three basements below it. B1, B2 and B3. These represent three car parks under the ground level, B3 being the lowest and B1 the one under the G floor directly.
The percentage arrival rates are split between the entrance floors as follow: G: B1: B2: B3 with ratios of 0.7:0.1:0.1:0.1
Equal floor heights for G and the occupant floors L1 to L10: 4.5 m per floor.
Floor heights for the three basements: 3.5 m each.

\[ \text{tpi}=\text{tpo}=1.2 \text{ s} \]
\[ \text{tdo}=2 \text{ s} \]
\[ \text{tdc}=3 \text{ s} \]
\[ \text{tsd}=0.5 \text{ s} \] (just add it to the door closing).

Population: 800 persons
Equal floor populations (i.e., 80 persons per floor).
v=1.6 m/s (you can force the speed to be 1.6 m/s in the software instead of letting the software decide the speed).
\[ a=1 \text{ m/s/s} \]
\[ j=1 \text{ m/s/s/s} \]

Try the above under the following conditions:
Case 1: pure incoming traffic conditions (i.e., 100% incoming traffic).
Case 2: balanced incoming and outgoing traffic conditions: (i.e., 50% incoming and 50% outgoing).
Case 3: mixed lunchtime traffic conditions as follows: 40% incoming traffic; 40% outgoing traffic; 20% interfloor traffic; 0% inter-entrance.

Each result might give a different number of required elevators. Comment on the results from the three cases. Which case is the most onerous?