Here is the matrix for the first room (during first iteration, no input from other rooms):

$$
\begin{pmatrix}
-4.0 & 1.0 & 0.0 & 1.0 & 0.0 & 0.0 & 0.0 & 0.0 & 0.0 \\
1.0 & -4.0 & 1.0 & 0.0 & 1.0 & 0.0 & 0.0 & 0.0 & 0.0 \\
0.0 & 1.0 & -4.0 & 0.0 & 0.0 & 1.0 & 0.0 & 0.0 & 0.0 \\
1.0 & 0.0 & 0.0 & -4.0 & 1.0 & 0.0 & 1.0 & 0.0 & 0.0 \\
0.0 & 1.0 & 0.0 & 1.0 & -4.0 & 1.0 & 0.0 & 1.0 & 0.0 \\
0.0 & 0.0 & 1.0 & 0.0 & 1.0 & -4.0 & 0.0 & 0.0 & 1.0 \\
0.0 & 0.0 & 0.0 & 1.0 & 0.0 & 0.0 & -3.0 & 1.0 & 0.0 \\
0.0 & 0.0 & 0.0 & 0.0 & 1.0 & 0.0 & 1.0 & -3.0 & 1.0 \\
0.0 & 0.0 & 0.0 & 0.0 & 0.0 & 1.0 & 0.0 & 1.0 & -3.0
\end{pmatrix}
\begin{pmatrix}
e0 \\ e1 \\ e2 \\ e3 \\ e4 \\ e5 \\ e6 \\ e7 \\ e8
\end{pmatrix}
=
\begin{pmatrix}
-55 \\ -40 \\ -55 \\ -15 \\ 0 \\ -15 \\ -15 \\ 0 \\ -15
\end{pmatrix}
$$