Usage of shadow (local) geometry to find $W(23, 16)$

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A weighing matrix $W(n, k)$ is an $n \times n$ matrix with entries in $\{0, \pm 1\}$ which satisfies that $WW^T = kI_n$. Given a weighing matrix $W$, the matrix obtained from $W$ by taking absolute values componentwise (denoted $G$) is called a (quasi)geometry. The points and lines of the geometry correspond to columns and rows of the incidence matrix $G$. The part of the geometry that intersects a fixed line is called a local geometry $LG$. The properties of $W$ imply properties of $G$ and of $LG$. Those can be used as necessary conditions for the existence of $W$. In this case we were able to use the necessary conditions to form a construction, finding $LG$ and then finding $G$ and then finding $W$.

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