Let $R$ be a commutative ring with nonzero identity and $I$ a proper ideal of $R$. The \textit{ideal-based zero-divisor graph} of $R$ with respect to the ideal $I$, denoted by $\Gamma_I(R)$, is the graph on vertices \{ $x \in R \setminus I \mid xy \in I$ for some $y \in R \setminus I$ \}, where distinct vertices $x$ and $y$ are adjacent if and only if $xy \in I$. In this work, we consider properties graph isomorphisms of ideal-based zero-divisor graphs. In particular, we seek to understand how isomorphisms of $\Gamma_I(R)$ relate to isomorphisms restricted to $\Gamma(R/I)$, where $\Gamma(R/I)$ is the zero-divisor graph of the factor ring $R/I$. (Received September 26, 2017)