Let $q > 1$ be an integer. Consider the problem of constructing a girth eight $(q + 1)$-regular bipartite graph containing the minimum possible number of vertices. For a given odd prime power $q$, there is only one known solution: the incidence graph of a generalized quadrangle. This graph contains a special induced subgraph denoted $\Gamma_3(q)$, which may be defined algebraically. Indeed, $\Gamma_3(q)$ is a bipartite graph with partite sets $P = \mathbb{F}_q^3 = L$. Vertices $(a_1, a_2, a_3) \in P$ and $[x_1, x_2, x_3] \in L$ are adjacent if and only if $a_2 + x_2 = a_1 x_1$ and $a_3 + x_3 = a_1 x_1^2$. We call $\Gamma_3(q)$ a monomial graph due to the monomials (namely $a_1 x_1$ and $a_1 x_1^2$) that determine its structure. In this talk, we will address the viability of using other algebraically defined graphs to construct additional generalized quadrangles over finite fields of odd order. In addition, we will discuss a related problem over the complex numbers.