For a graph $G$ and edges $e = u_1v_1, e' = u_2v_2 \in E(G)$, the graph $G(e, e')$ is obtained from $G$ by replacing $e = u_1v_1$ by a path $u_1v_ev_1$ and by replacing $e' = u_2v_2$ by a path $u_2v_{e'}v_2$, where $v_e, v_{e'}$ are two new vertices not in $V(G)$. A graph $G$ is strongly spanning trailable if for any $e = u_1v_1, e' = u_2v_2 \in E(G)$, $G(e, e')$ has a spanning $(v_e, v_{e'})$-trail. Luo et al. [Discrete Mathematics 306 (2006) 87-98] proved that every 4-edge-connected graph is spanning trailable. In this paper, we show that, for a 3-edge-connected graph $G$ which is not the Wagner graph, if every pair of edges is joined by a longest path of length at most 8, then $G$ is strongly spanning trailable. (Received September 15, 2014)