The use of industrial by-products in highway embankments is becoming popular due to their large-volume use in such systems. Steel slag is one of these by-products. Previous research shows that steel slag has mechanical properties comparable to those of traditional embankment fill material; however, the environmental impacts of using steel slag need to be carefully evaluated. In this study, a series of sequential water leach and column leach tests are performed in order to assess the trace metal leaching characteristics from pure or treated steel slag highway embankments into surface waters. In addition, a numerical model is used to determine the metal concentrations within the surface waters with respect to distance from the embankment. The results show that placing a clayey embankment soil around pure or treated steel slag significantly decreases the metal concentrations of the leachate. In addition, the numerical model results indicate that, after the slag leachate meets the surface waters, the concentrations decrease to levels significantly lower than the regulatory limits. (C) 2018 American Society of Civil Engineers.