This paper presents a decision support system, named the CLG-DSS model, which makes it possible for decision makers to assess various uncertainties in project appraisal in a systematic and explicit way. This model, a decision support system (DSS) developed within the Danish Centre for Logistics and Freight Transport (CLG), the CLG-DSS model, is based on cost-benefit analysis (CBA) embedded in a wider multi-criteria analysis (MCA) by some principles for composite modelling assessment (COSIMA). The CLG-DSS model is set up to make use of scenario analysis (SA) and Monte Carlo simulation (MCS). A particular concern in the model is the handling of varying information across the assessment criteria and the application of SA to inform the MCS parameter setting. After the presentation of the modelling principles some ex-post case calculations for the Øresund Fixed Link are illuminating different aspects of appraisal uncertainty and thereby, at the same time, demonstrate the features of the CLG-DSS model as a useful decision support tool. It is finally concluded that appraisal of large infrastructure projects can be effectively supported by dealing with uncertainty issues in accordance with the principles described.