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Characterisation of Network Objects in Natural and Anthropogenic Environments

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Abstract. Networks are structures that organise component objects, and they are extensive and recognisable across a range of environments. Estimating lengths of networks objects and their relationships to areas contiguous to them could assist provide owners with additional knowledge of their assets. There is currently some understanding of the way in which networks (such as waterways) relate and respond to their natural and anthropogenic environments. Despite this knowledge, there is no straight forward formula, method or model that can be applied to assess these relationships to a sufficient level of detail.

Whilst waterway networks and their structures are well understood from the work of Horton and Strahler, relatively little attention has been paid to how (or if) these properties and behaviours can inform the understanding of other, unrelated, networks. Analysis of existing natural and built network objects exhibited how relationships derived from waterway networks can be applied in new areas of interest. We create a predictive approach to associate dissimilar objects such as pipe networks to assess if using the model established for waterway networks and their relationships can be functional in other areas. Using diversity of inputs we create data to assist with the creation of a predictive model.

This work provides a clean theoretical connection between a formula applied to evaluate waterways and their environments, and other natural and anthropogenic network objects. It fills a key knowledge gap in the assessment and application of approaches used to measure natural and built networks.

[Conference Paper](#) (PDF, 895 KB)

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