Norwich Western Link

Drainage Strategy Report Appendix 3 : Rainfall data set application

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1 Rainfall data set application

1.1 Background

There has been an ongoing discussion between RUK, Ferrovial, NCC and the LLFA about which rainfall data set should be used for the hydraulic drainage modelling for Norwich Western Link. In the reference design carried out by WSP, FEH13 was used for return periods of 2, 5 and 100 years. WSP used the FEH website and the point descriptor method with the point selected appears to have been taken from the approximate middle of the scheme (x:611689, y:314391). An XML file was provided so RUK could replicate WSP simulations. It is assumed that WSP used the 2-year event to size their networks to ensure no surcharge and used the 5 year event to ensure no flooding or surcharge from the formation/sub formation where filter drains were used.

After discussions between RUK, Ferrovial and the LLFA it was determined that they would require analysis of a 1 year return period. As FEH13 is only suitable for return periods of 2 year or greater, an alternative data set would be required. Both FEH1999 and FSR rainfall methods have a 1 year return period dataset. In response to a TQ, the LLFA stated that FSR rainfall data should not be used as they would favour the use of the more recent FEH methods. They added that "While FEH99 is able to do the 1 in 1 year, the FEH13 has an additional 14 years of data. Therefore, a hydrology assessment should always be undertaken when preparing hydraulic modelling and a comparison of methods using the local site conditions should be undertaken to assess and select the appropriate hydrological approach by the developer." As a result of this RUK carried out a hydrological assessment on two catchments.

1.2 Hydrological Assessment

RUK carried out a hydrological assessment on catchments 4/5 and catchment 7. These catchments were selected due to the difference in size. In order to gain

FEH1999 rainfall data (Not supplied by WSP point descriptor data), catchment data was purchased from the FEH website that contained both FEH1999 and FEH2013. An appropriate catchment was selected near the middle of the scheme (x:610500, y:313350) which would give data based on average rainfall within the selected catchment. This file was downloaded as an XML. Both FEH1999 and 2013 (RUK and WSP data compared) were loaded into the MicroDrainage models with the results from both the storm network (Uses the modified rational method) and simulation (Uses Wallingford procedure) compared.

The results showed minimal difference between the FEH2013 data provided by WSP and the RUK collected data, with the RUK collected rainfall data giving marginally higher rainfall intensities and flows. The FEH1999 data gave higher peak intensities and flows than the corresponding 2013 data. Due to the preference of the LLFA to use more recent methodologies with more up to date and data, a decision was made to use FEH2013 (RUK gathered) for return periods 2 years or greater. As FEH2013 data is not available for 1 year return periods, FEH1999 (RUK gathered) would be used for this return period only. Using RUK gathered data ensures both FEH1999 and FEH2013 data has been gathered from the same catchment location, ensuring maximum accuracy and consistency.

Comparing FEH2013 2 year return period with FEH1999 1 year return period showed that the FEH2013 2 year return period data had higher peak intensities and flows than the 1 year return period FEH1999.