SUMMARY OF CONTENTS

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1.0 ENGINEERING REPORTS

1.1 GENERAL

This chapter is intended to provide guidance to Developers and Consultants in the preparation of engineering reports as part of the submission to support the development application.

Prior to any engineering assessment, it is recommended that the terms of reference be discussed with the Engineering Officer Development & Regulatory Services to establish a clear understanding of issues, methodologies, and report objectives. A suitably qualified Registered Professional Engineer in Queensland (RPEQ) must certify all engineering submissions.

Unless noted otherwise, Council submission must comprise:

- Three (3) sets of hardcopy reports and supporting plans.
- If required, a digital copy (floppy diskette or CD-ROM) of mathematical modelling input and output files.

1.2 GEOTECHNICAL ASSESSMENT

The report should cover stability and erodility issues including but not limited to:

- Visual aspects of the site.
- Conditions of the area.
- Soil characterisation.
- Probability of slip failure.
- Factor of safety.
- Impacts of development on surface water runoff.
- Measures to mitigate soil movement.
- Recommendations.

1.3 HYDROLOGIC AND HYDRAULIC ASSESSMENT

The submission must demonstrate reliability of the assessment approach and accuracy of the basic data. The report should cover issues including but not limited to:

- Source of topographic data.
- Assessment methodology.
- Hydrologic model setup (if applicable).
- Hydrologic model assumptions (eg loss parameters, fraction impervious values, catchment landuse patterns, flow routing method, etc).
- Hydraulic model setup (if applicable).
- Hydraulic model assumptions (eg Manning's roughness values, contraction and expansion coefficients, boundary conditions, etc). Council's minimum landscaping requirements of open channels dictates a minimum Manning's n of 0.08 although greater values may be directed by Council where deemed appropriate. A sensitivity

analysis should always be undertaken for a Manning's n of 0.15 to ensure the freeboard is not exceeded in a design.

- If required, provide details of encroachments and obstructions (eg ineffective areas, blocked obstruction, etc).
- If required, provide details on how head losses across structures (eg momentum, standard energy equations, etc) are derived. Modelled head loss values must be verified (eg manual calculations using methodologies outlined in AustRoads publication *A Guideline to the Hydraulic Design of Bridges, Culverts and Floodways*, verify Mike-11 outputs with HEC-RAS results, etc).
- Calibration and validation (if applicable).
- If required, hydrologic and hydraulic consistency (eg calibration of RAFTS hydrologic model outputs in conjunction with the MIKE-11 hydraulic model results) must be checked.
- Summary of findings.

Manual Calculations

Hand calculations must be legible and presented neatly in a logical and easy-to-follow format. Equations and/or information sources used in the analysis must be referenced, and if the reference is obscure, then photocopies of the relevant sections of the source material must be provided. The adopted analytical parameters must be substantiated with explanations.

Mathematical Models

To enable timely assessment by Council within the nominated response timeframe, the following industry standard modelling softwares must be used. (Note: Where donated assets are involved, the softwares listed below must be used to enable integration with Council database system).

- Runoff routing hydrologic models: RAFTS, WBNM, DRAINS (ILSAX)
- Steady state hydraulic model: HEC-RAS (developed by the US Army Corps of Engineers)
- Unsteady flow hydraulic model: MIKE-11 hydrodynamic model (developed by the Danish Hydraulic Institute)

Other mathematical modelling softwares may be accepted but this should be checked with Council prior to the commencement of any model simulations. As a minimum, the submission must be accompanied by:

- Basic parameters.
- Input data files.
- Output summary files.
- Relevant documentation relating to the program to enable deciphering and interpretation of the input and output files.
- Verification of models using industry standard techniques eg checking predicted peak discharge using the Rational Method, checking predicted peak flood level with HEC-RAS outputs, etc.