Where early signing and sealing occurs as a result of performance bonding, a plan of the finished surface levels must be submitted prior to the works going On Maintenance.

Where the overland flow easement is over an area inside the Flood Regulation Line, the design surface levels where works are constructed and/or existing surface levels where no works have been undertaken, must be shown on the real property survey plan. Prior to the works being accepted On Maintenance, As Constructed levels must be submitted to demonstrate the finished levels are within the accepted construction tolerances.

6.11.4 Variation to Easement Terms

There is no statutory procedure for the variation of a registered easement except by decision of Council. A variation or modification of the terms of the easement agreement can be achieved by surrendering the existing easement and by the granting of a new easement. All costs are the responsibility of the applicant.

6.11.5 Extinguishment of Easements

To have an easement extinguished, the owner of the property has to obtain the agreement of the grantee (ie the Council) to execute a surrender of the easement and have that surrender document registered by the Registrar of Titles. Council may also wish to recover previously paid compensation monies at the present market value. All costs are the responsibility of the applicant.

6.12 PUMPS AND STORAGE

6.12.1 Pumped Stormwater Drainage

A pumped drainage system will not be permitted on conventional title subdivisions. Council will only consider a pumped stormwater drainage system if:

1. Council is satisfied all other avenues have been exhausted.
2. Letters of refusal are received from all property owners through which the roofwater line could be taken by gravity to the street, including acknowledgement that significant overland flow will occur at times of power or mechanical failure.
3. It is part of a comprehensive stormwater recycling system.

Further, the applicant must satisfactorily address all the following requirements.

1. A suitably experienced Registered Professional Engineer in Queensland (RPEQ) must be engaged to prepare and certify the design. Further the RPEQ must inspect the works during construction to ensure that the design intent is achieved and certify same. Refer Section 6.1.
2. Demonstrate that the overspill can take the form of sheet flow to reflect pre-development conditions when the pump capacity is exceeded.
3. Demonstrate that in the event of malfunction, the consequences are not catastrophic. For example overflows should leave the site in a safe manner and not inundate habitable or non-habitable areas.
4. The pump well storage and pump capacities must be designed for the minimum 10 year ARI critical storm burst. The critical storm burst is the storm duration that dictates the maximum active storage size, and this storm duration is usually independent of the sub-catchment time of concentration. Typically pumping and storage characteristics during smaller storm events (eg 2, 5 and 10 year ARI) for a

range of duration (say up to 2 hours) would need to be investigated, to ensure that the pump operates within the manufacturer's recommendations.

5. In some instances the 10 year ARI design event maybe inadequate. For example, pumps may need to be sized for more extreme storm events when dewatering basement carparks or where overland sheet flows cannot be achieved.

6. Council prefers that the pumped systems be discharged directly to a gully, a manhole or a drainage line. Direct discharge to a kerb and channel is not permitted. Where the kerb and channel is the only lawful point of discharge, the outlet from the pump must feed to a storage manhole which then drains by gravity to the kerb and channel. Regardless of these disposal methods, a check of road capacity and existing drainage system is required to demonstrate that there are no adverse impacts.

7. Storage areas can be a combination of underground and aboveground areas, for example, shaped car park or landscaped area to hold water till pumping system restarts. However care needs to be exercised with aboveground storage area that public safety or amenity is not compromised.

8. The pump well design must consider the following factors.
   - Minimise deposition of solids.
   - Excessive foaming and air entrainment (usually caused by stormwater dropping from a high level inlet pipe) in the wet well to be avoided.
   - Structural design to resist uplift, soil and water pressures.
   - Suitable openings to enable pump removal, and for electrical and pipework access.
   - Sufficient space to be provided around the chamber for maintenance access and sufficient headroom for lifting tackle to be erected so as to raise the pumps if necessary.

9. The pump design must consider the following factors.
   - In addition to the operating duty pump, an equivalent standby pump (ie of equal size to duty pump) must be installed to safeguard against mechanical failure.
   - In order to assure reliability of the standby pump, the pumping system must be set up by automatic rotation to ensure that the hours run by both the duty and standby pumps are approximately similar.
   - The most likely stormwater pump station configuration is usually the submersible wet well centrifugal type pumps normally employed in the wastewater industry. These pumps are available off the shelf and come in an extensive range of sizes and configurations. They are also not self priming ie they require a positive head at their inlet in order to commence pumping without initial priming (removal of air from the pump casing).
   - Pump sizing calculations must incorporate the system resistance, pump duty point, frequency of pump motor starts, etc.

10. The property owner is responsible for all costs associated with installation, operation and maintenance; and is liable for damages as a result of system malfunction.

6.13 SEDIMENTATION BASINS AND GROSS POLLUTANT TRAPS

Refer Chapter 5, Part C - Water Quality Management Guidelines, of this document and the publication *Sediment Basin Design, Construction and Maintenance Guidelines* (Brisbane City Council, 2000).