excavation to facilitate a repair. This is called opportunistic sampling. The samples will then be sent for analysis.

It is essential that a documented procedure, following strict procedures and methodologies, be introduced as soon as is practicable, to commence the build up of the stormwater network condition history.

The GIS is the ideal platform to hold the key data collected from site surveys / inspections against each individual pipe and thence enable the interrogation of such data to produce information on the condition of the network for further analysis within asset management planning.

Works during which opportunistic sampling can be undertaken include all the instances during which a pipe or sewer is exposed for repair or any other reason, such as:

- The repair of bursts / blockages / collapses
- The exposure of pipe by another utility
- Planned pipe sampling
- Manhole repairs / renewals

Once this data is transferred to the GIS, the necessary information can be extracted when an underground asset survey is being conducted. This information will aid in improving the confidence grades associated with the underground asset condition grading, which is primarily based on desktop surveys, as described in the following sections.

Initial Strategy

In order to commence asset management planning on the underground network a desktop condition grading methodology is required. This will provide initial condition grading of the pipelines with verification of the desktop findings being undertaken with the results of opportunistic sampling as well as strategically located pipe cut outs and condition assessment. This data will then be prepared for input into the GIS and extrapolated through the network with appropriate rules applied to maintain the quality assurance of the results.

To commence the exercise data will be required from the following sources:

- From the GIS the following data will be required: age, material, internal/external protection, location, ground surface type.
- Maintenance Records and interviews with maintenance personnel to ascertain areas with particular problems and areas of no problems.
- Contract Documents and other relevant sources for any specific information on ground conditions and the proximity of other utilities etc.
- Identification of strategic mains. These would be the first mains to be condition graded.

By analyzing the above information an assessment of pipe condition can be made.

Step one will be to examine the areas showing significantly high rates of pipe failure from the historical maintenance records. Through screening these records we will identify particular pipe lengths with high failure rates.

By examining the pipe materials, location, information available on ground conditions and proximity of systems an assessment of the pipe condition can be made, in the form