

Eagle Farm to Luggage Point - QLD Treatment Plant Pipeline Stage 1

Sintakote® Pipe Shows True Grit



Objectives:

Brisbane City Council's sewer rising main from the catchment north of the Brisbane River (including the CBD) serves some 600,000 equivalent persons. The sewer operates under gravity from the CBD to Eagle Farm, where the Eagle Farm pump station lifts the sewage to the Luggage Point treatment plant. The Eagle Farm to Luggage Point rising main currently consists of three pipelines, one 1440mm OD steel line and two reinforced concrete (RC) pipes, one 1290mm diameter and another 1290/900mm combination. Brisbane City Council decided to replace the reinforced concrete pipes with a single SINTAKOTE cement lined steel pipe 1915mm in diameter. The first stage of the upgrade is replacing 3.6km of pipe from Eagle Farm to Serpentine Road.

Challenge

A major design criterion of the rising main is the grit load coming from the catchment. The grit travels along the invert of the rising main and can cause serious abrasion damage. The damage can be particularly severe at any discontinuity in the pipes such as coupling joints, bends and tees. The grit load had already caused significant damage to the existing pipelines which were suffering an increasing number of failures each year. Grit removal was investigated as an option but was not pursued due to the constraints of the Eagle Farm pump station site, and the impracticality of removing grit at source over the huge catchment. The solution was to increase the abrasion resistance of the rising main lining. In order to provide the most suitable lining for the operating conditions, Steel Mains Pipelines Research Centre in Melbourne carried out extensive testing on the abrasion resistance of several options. The testing was performed using the Darmstadt test on several cement/concrete mixes, with the result that Council specified the addition of aggregate to the cement mortar lining and boosted the lining thickness to 29 mm. The pipes were thus "concrete lined". All fittings were lined with high alumina cement and 'Alag' aggregate mixture, giving maximum abrasion resistance to the most severe wear areas. A special cement mixture was also formulated for the reinstatement of joints in the field.

With the challenge of designing a rising main to endure such operating conditions now overcome, the next challenge presented was the installation of the pipeline. The pipeline runs along the median strip of Kingsford Smith Drive, in the Eagle Farm industrial area, and then across reclaimed land and a swamp. Fondside Pty Ltd tackled 1,359 metres through the traffic of Kingsford Smith Drive, under the Pinkenba Railway Line and into an army stores compound. Brisbane City Council's own crews constructed 1,524m of pipeline from the army store compound through more factory yards and into the swamp, with the last section before Serpentine Road constructed on piles. A third section, 679m of the pipeline was laid on a concrete continuous raft over brackish, periodically flooded swamp. The water table varies, but is 1.5m below the surface at best. Digging the trench itself was quite a challenge with wall collapses being a constant hazard. After shoring of the trench, the bell holes for pipe welding required dewatering. At several locations along the pipeline, water saturated strata drained into the bell holes.

Solution

Like all major metropolitan pipelines, proximity to the existing rising main and numerous other services provided a number of challenges. Despite the size and complexity of the project, the pipeline forged ahead and was ready for operation on time in March 1996. Construction has been undertaken to best practice levels through attendance and accreditation of all parties to Steel Mains' SINTAKOTE Pipelines Installation Program. Steel Mains - Steel Pipeline System's SINTAKOTE steel pipeline system coupled with the best practice construction will ensure the security of Brisbane's main sewerage line for many years to come.

Eagle Farm to Luggage Point Treatment Plant Pipeline Stage 1

Client	Brisbane City Council
Pipeline	3,560m of 1915mm OD x 12mm WT Ball & Socket Joint SINTAKOTE MSCL Pipe
Construction	BCC Metropolitan Construction & Fondside Pty Ltd Contractors
Construction Period:	April 1995 - March 1996