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CRITICAL ASSETS MONITORING

Wastewater treatment Plant "Bío Bío", Hualpén, Chile



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1 Introduction

This briefing note covers the waste water treatment plant 'Bío Bío' in Hualpén, Chile and provides image analysis of the facilities of the wastewater treatment plant. The wastewater treatment plant is very likely to be damaged due to the recent earthquake. The information is based on a Worldview-2 multispectral image, dated 27 January 2010 (before the earthquake), which has been combined with open source collateral information. The damage assessment information is based on a RapidEye acquisition taken on 27/02/2010 and some additional news and information collected via open source information. The information cut-off date of this briefing note is 04 March 2010.

2 Background Information

The wastewater treatment plant Bío Bío is the third largest plant in the county. It became operational in 2003 and processes direct discharges of sewage from Concepcion, Chigwell and half of Talcahuano (about 500 thousand inhabitants). The plant is a conventional activated sludge plant, with anaerobic sludge digestion on the site.

According to our information, the capacity in March 2007 was around 125000 m³/day of wastewater, removing 24 tons daily of organic matter and 4 tonnes of rubbish that was in the past dumped in the river. Apart from water treatment, it produces daily 50 tons of sludge. (source: <http://www.essbio.cl>)

The wastewater treatment plant is run by the Empresa de Servicios Sanitarios del Bio-Bío ESSBIO, controlled by the British firm Thames Water.

3 Description of facilities

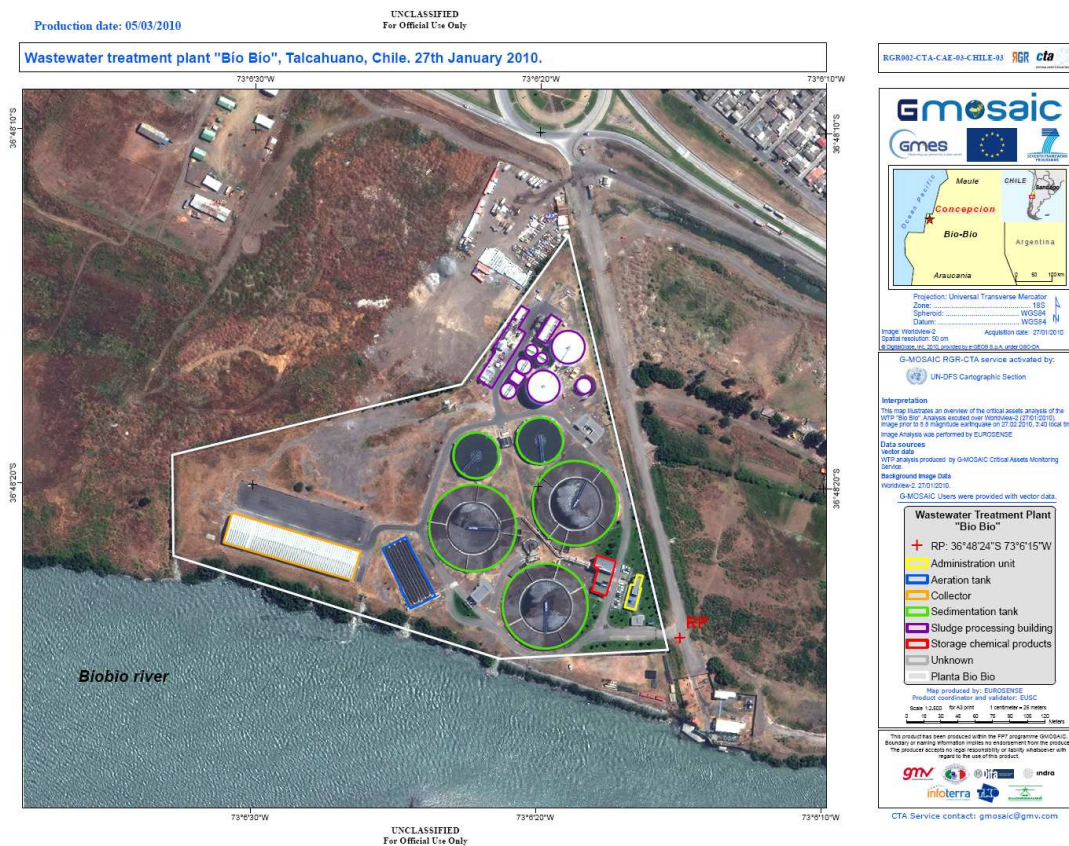


Figure 1: Pre-event analysis of waste water treatment plant 'Bío Bío' in Hualpén, Chile

Water treatment

Leaving homes, sewage is conveyed via the sewer network to the wastewater treatment plant. Once there, a system of thick and thin bars is used for the removal of solids (**collector**). Next, the water is lead to the primary **sedimentation tanks** where a primary treatment stage is done for stripping of grease by flotation. The water is then conveyed to **aeration tanks** where air in the presence of bacteria is degrading organic matter via a natural biological process. After this, the water is lead to the secondary **sedimentation tanks** for a second sedimentation phase. Next, the water is disinfected with chlorine gas (**storage chemical products**) and downloaded to the Bío Bío river.

Sludge processing

The primary sludge, the secondary sludge and the grease are thickened, mixed and pumped to the **anaerobic digesters**. During the anaerobic digestion, methane gas is produced. It is reused to maintain the temperature of the digesters at 35 degrees Celsius. The digested sludge is pressed trough band filters with the addition of cationic poly-electrolytes. Eventually, the sludge is transported and used for landfill and in forestry.

4 Damage Assessment

No information about the current functioning of the wastewater treatment plant was found via open source media.

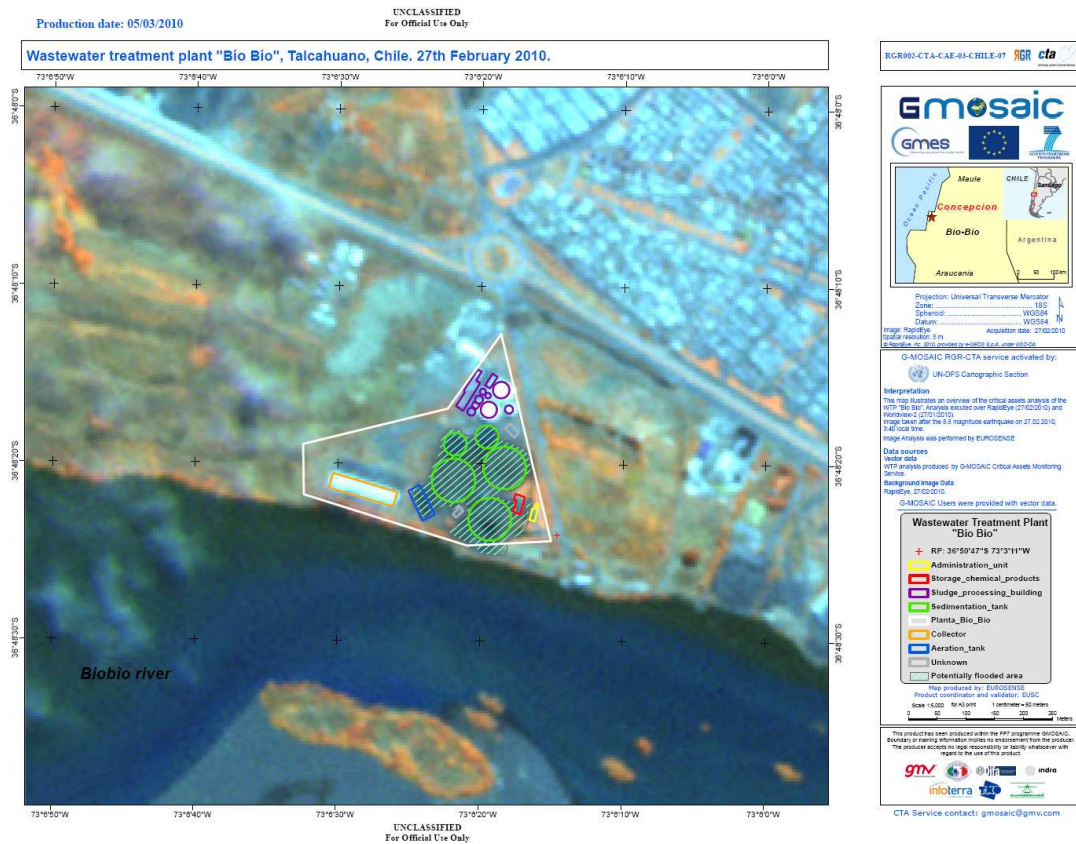


Figure 2: Post-event analysis of waste water treatment plant 'Bío Bío' in Hualpén, Chile

Based on a RapidEye acquisition taken on 27/02/2010 (after the earthquake), there is an indication that the contents of the sedimentation tanks is flooded in the area around. The potentially flooded area is highlighted on the figure shown above. However, due to the course resolution of the imagery and no validation information, it is not possible to confirm this information with clear evidence.

5 Conclusions

The wastewater treatment plant 'Bío Bío' is a conventional activated sludge plant, with anaerobic sludge digestion on the site. It processes direct discharges of sewage from Concepcion, Chigwell and half of Talcahuano (about 500 thousand inhabitants). The plant has a capacity of around 125000 m³/day of wastewater, removing 24 tons daily of organic matter and 4 tonnes of rubbish that was in the past dumped in the river. Apart from water treatment, it produces daily 50 tons of sludge.

It is not clear to which extent the plant is damaged. No open source information about the plant functioning was found on the worldwide web. Based on the interpretation of post-event satellite imagery, there is a chance that the content of the sedimentation tanks is flooded to the area around.

6 Disclaimer

Important to notice is that all activities (mapping and reporting) are executed in the best possible way (in the timeframe and with the available data), but could not be verified. In this context the authors cannot be held responsible for any errors.