Innovative Glass Recycling Facility

COUNCIL NAME
Shoalhaven City Council

WEB ADDRESS
shoalhaven.nsw.gov.au

SIZE
4567 square kilometers

POPULATION
104,371

Overview

Shoalhaven City Council was increasingly concerned that a significant amount of glass collected in the kerbside recycling system was being lost and saw an opportunity to focus on “legacy” glass and design a system to recover this material and return it to a circular economy. In January 2020 the Council commenced construction of an in-house designed glass processing plant at their recycling and waste facility located in West Nowra.

Background

Very few glass recyclers effectively recycle contaminated glass fines, or legacy glass, and the National Waste Report 2020 estimated that 41% was disposed to landfill. In 2019 the Council of Australian Governments (COAG) announced that bans would be established on the export of unprocessed glass, in a whole or broken state, both formed packaging and flat sheet glass and instead of losing this material to landfill, Council researched solutions to clean and recycle this material, providing a sustainable pathway to a circular economy.

The objectives of this project were to:

- Provide a crushing, screening and washing plant to produce a high-quality glass sand product.
- Avoid sending legacy glass fines to landfill.
- Provide capacity for additional input glass from the region.
- Address the minimal diversion of non-packaging/ non- container glass from landfill.
- Produce a high quality and readily accepted product for reuse within a selection of various end markets.

Implementation

Council staff and the machinery supplier worked together to obtain a dedicated purpose designed plant that achieved a robust and efficient process. The process needed flexibility to be able to manage the efficient processing of different feedstocks, dirty glass fines, clean glass bottles and jars and other glass such as plate glass and drinking glass.

Image 1: Legacy glass stockpile at the West Nowra MRF, showing the scale of the opportunity

Image 2: Kerb and gutter concrete incorporating Shoalhaven RCG glass

The original program aimed for commissioning to take place in August 2020. However, in January 2020, Shoalhaven was significantly impacted by devastating bushfires, floods and then COVID. This impacted the program significantly and the plant was finally commissioned in March 2021. The total capital cost of the facility was $2.36 million, with the intention for it to be cost neutral based on sales of glass sand and charges for disposal of dirty glass fines.

The high quality of product is in demand by customers for applications in road base materials, asphalt, concrete, pipe bedding, Portland cement replacement, drainage material and sand blasting grit and green ceramics. Shoalhaven recycled crushed glass (RCG) has been used in the construction of their new Materials Recycling Facility (MRF) access road including the asphalt surfacing along with other uses such as erosion control and kerb and gutter concrete.

Outcomes

In the first nine weeks of operation the Council produced and sold 1,800 tonnes of product to various users and collaborated with numerous stakeholders to explore further opportunities. These key stakeholders include Transport NSW (TfNSW), the Centre for International Economics, the NSW EPA and the University of NSW Centre for Sustainable Materials Research and Technology. Fulton Hogan, contracted to TfNSW to construct the Nowra Bridge Project, will be using the glass sand produced at West Nowra for all their Nowra bridge roadworks as well as local roads within the region.

Key Learnings

The dirty glass sand stockpile is very different to clean bottles and clean crushed cullet, so the process had to be adapted, this provided challenges. While there are some specifications for the use of glass in various construction activities, the mix is critical, this is especially the case in concrete mixes and in asphalt mixes.

Through production an opportunity was identified to recover an unexpected waste material - a “Super-fine” product - and there is a high level of interest for the product. Installing a modification to the plant to automate the Super-fine process has commenced. An opportunity for RCG use in green ceramics, together with textiles from the mattresses and lounges that are currently stockpiled, provides further circular economy opportunities.

Contact

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This project was the 2021 winner of the Transitioning to a Circular Economy Award at the LGNSW Excellence in the Environment Awards.