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ACN 109 200 900

## AUSTRALIAN SECURITIES EXCHANGE ANNOUNCEMENT

27 May 2021

### COLORADO DEPARTMENT OF TRANSPORTATION

### CENTRAL 70 SHOTCRETE PROJECT UPDATE

#### HIGHLIGHTS

**EDENCRETE® SHOTCRETE MIX ON CENTRAL 70 PROJECT ENABLES REPLACEMENT OF 21% OF THE PORTLAND CEMENT WITH ADDITIONAL FLY ASH , DELIVERING:**

- Each cubic yard of the EdenCrete® shotcrete requires 152 lbs less Ordinary Portland Cement (cement) than in the previous shotcrete mix that is replaced with 34 lbs additional fly ash;
- The Central 70 Project, estimated to require in total between 6,000 -10,000 cubic yards of the new shotcrete mix when the project is complete, would result in:
  - a reduction in the total cement requirement for the shotcrete of between 912,000 lbs (413 metric tonnes) and 1,520,000lbs (689 tonnes); and
  - The estimated total additional fly ash required will be between 204,000lbs (93 tonnes) and 340,000lbs (154 tonnes) .
- Fly ash has a zero Greenhouse Gas Footprint and sells at 50% of the cost of cement in Colorado;
- Cement production generates an estimated 927kgs of CO<sub>2</sub> for every 1tonne of cement produced <sup>1</sup>;
- An estimated reduction in the total direct CO<sub>2</sub> footprint of between approximately 382 tonnes and 630 tonnes, resulting from only the reduction of the quantity of cement required in the estimated 6,000 -10,000 cubic yards (of shotcrete mix for the project;
- The total cost the new mix, including the cost of the EdenCrete® and the extra fly ash, is lower than the original shotcrete mix, due in large part to the reduction in the quantity of the cement required and the lower price of the additional replacement fly ash; and
- Strong shotcrete delivered - the EdenCrete® mix achieved 6,390psi, or 27% more than the minimum strength required by CDOT of 5,000psi, at 28 days.

1. [https://www.greenconcrete.info/downloads/11\\_ConcreteCO2.pdf](https://www.greenconcrete.info/downloads/11_ConcreteCO2.pdf)

## DETAILS

**Eden Innovations Ltd (“Eden”) (ASX: EDE)** is pleased to provide the following details on the use of EdenCrete® in the shotcrete concrete mix on the Colorado Department of Transportation (“CDOT”) Central 70 project (see **Eden’s ASX announcement (ASX:EDE) 15 November 2018**).

This project involves the reconstruction of 10 miles of the I-70 Interstate Highway through central Denver, including sinking it in part, and establishing of a park above it. Construction commenced in mid-2018 and is anticipated to run into the end of the first quarter of 2022.

The Central 70 Project was estimated, at commencement, to require in total somewhere between 6,000 -10,000 cubic yards of the new shotcrete mix used, which would result in:

- a reduction in the total amount of cement required for the shotcrete of between 912,000 lbs (413 metric tonnes) and 1,520,000lbs (689 tonnes);
- The estimated aggregate additional fly ash required will be between 204,000lbs (93 tonnes) and 340,000lbs (154 tonnes).

An additional small increase of 2% in the mass of aggregate is also added into the new mix.

Eden has not been informed what is the total quantity of shotcrete that has been applied to date on this project, but from the amount of work done (see Figures 1-5 for photos of work on some of the various stages), it is anticipated it may well require more than the 6,000 cubic yards originally estimated as the lower level.

Central 70 is the first major CDOT infrastructure project involving EdenCrete®. The shotcrete is being supplied by a Denver based ready-mix and shotcrete concrete supplier that has been using EdenCrete® products since 2015, using a shotcrete concrete mix developed jointly with Eden.

The dosage of EdenCrete® used in this project is 0.25 US gallons /cubic yard of concrete to produce sufficient compressive strength (6390psi at 28 days) to exceed CDOT’s project performance requirement of 5,000psi.

Fly ash, a waste product from coal fired power stations, has a zero Greenhouse Gas Footprint, and currently sells in the Colorado for approximately 50% of the cost of cement .

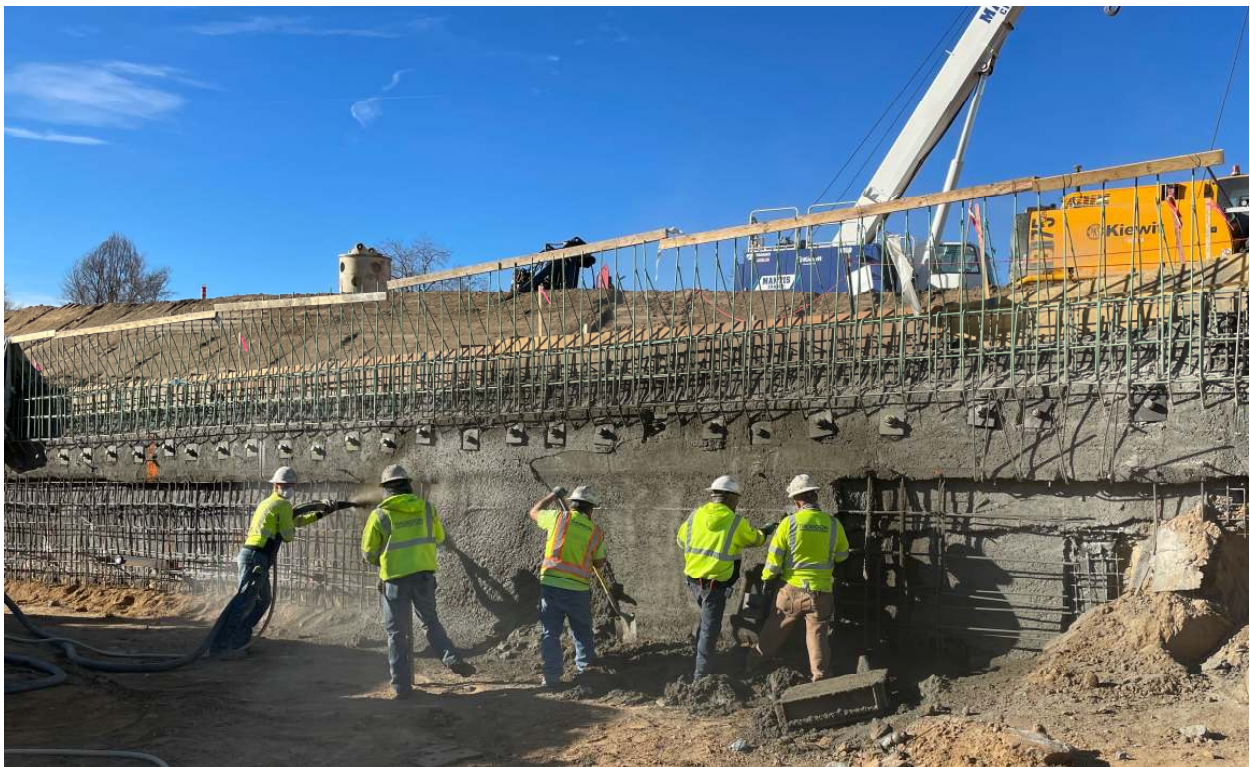
Importantly, producing one tonne of cement generates approximately 0.927 tonnes of CO<sup>1</sup>.

In this major CDOT project that is still ongoing, EdenCrete® is delivering the following:

- **Less Cement Required**- The addition of EdenCrete® facilitated the replacement of 152 lbs (69 kgs) of cement with 34 lbs (15 kg) of additional fly ash in each cubic yard of the concrete, compared with supplier’s previous standard shotcrete mix. The result was a lower percentage of cement and a higher percentage of cheaper fly ash was required.
- **Lower Greenhouse Gas Footprint**- An estimated reduction of between approximately 382 tonnes and 630 tonnes in the total CO<sub>2</sub> footprint directly due to the reduction of cement in the estimated 6,000 -10,000 cubic yards of shotcrete mix for the project;
- **Cheaper Shotcrete** – the net cost saving of more than \$3 /cubic yard of concrete (after including the costs of the EdenCrete® and additional fly ash and aggregate) is achieved with the reduced cost of replacing cement with fly ash; and
- **Strong shotcrete** – the EdenCrete® mix achieved a compressive strength of 6,390psi at 28 days, or 27% more the minimum strength required by CDOT of 5,000psi.



**Figure 1. Shotcrete being applied on Central 70 Project**



**Figure 2. Shotcrete being applied on Central 70 Project**



**Figure 3. Shotcrete being applied on Central 70 Project**



**Figure 4. Section where shotcrete is being applied on Central 70 Project**



**Figure 5. Shotcrete being applied on Central 70 Project**

1. [https://www.greenconcrete.info/downloads/11\\_ConcreteCO2.pdf](https://www.greenconcrete.info/downloads/11_ConcreteCO2.pdf)

## CONCLUSION

The significant benefits delivered by the EdenCrete®-enhanced shotcrete that is being installed on the Central 70 project, a major CDOT infrastructure project, are likely to open many new shotcrete markets for EdenCrete®, both in the USA and around the world, and not only for infrastructure projects, but also for almost all potential shotcrete applications.

As a result, Eden anticipates that these significant benefits, being:

- potentially significant cost savings from cheaper materials and less waste,
- potentially significant reductions in the direct Greenhouse Gas footprint, and
- potentially significant increases in performance of the shotcrete,

are expected to accelerate the existing expansion rate of the EdenCrete® market footprint in the US and overseas shotcrete markets over the coming months and years, for use in a wide range of shotcrete applications. These benefits are anticipated to also be relevant to a range of other applications, particularly where the delivery of concrete is by means of pumping, such as pumping concrete for high rise construction or for 3-D concrete printing of structures.

This market growth is likely to be further assisted if the recent commencement in the easing of COVID-19 restrictions, both in the US as well as in a growing number of other countries, gains momentum.

## **EdenCrete® Background**

*EdenCrete® products are Eden's 100% owned, proprietary carbon-strengthened concrete additives that enhance a wide range of performance characteristics of the concrete including compressive strength, flexural strength, tensile strength, abrasion resistance, reduced permeability, increased modulus of elasticity, reduced shrinkage and that collectively deliver stronger, tougher, more durable and longer lasting concrete.*

*EdenCrete® is generally used in concrete that incorporates a high percentage of Ordinary Portland Cement (OPC or Portland cement) whilst EdenCrete® Pz is mostly used in concrete that incorporates a high percentage of pozzolans as an alternative cementitious material (including fly-ash and blast furnace slag which are each waste by-products from coal fired power stations and metal smelting respectively, thereby each being treated, as a waste by-product, as having a zero Greenhouse Gas footprint from its production process).*

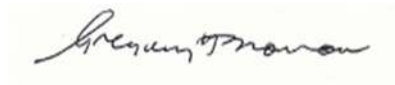
*As a result, EdenCrete® Pz in particular has repeatedly shown it is capable of enabling the proportion of the Portland cement in the concrete to be replaced by a percentage of pozzolans with far lower Greenhouse Gas footprints, resulting in a reduction in the Greenhouse Gas footprint generated in the production of the various cementitious components used in the manufacturing of the concrete.*

*In some cases, EdenCrete® has also shown that it can also assist in enabling a reasonable proportion of the Portland cement in the concrete to be replaced by pozzolans with far lower Greenhouse Gas footprints.*

*Both products have been repeatedly shown to be suitable for use in ready-mix concrete, pre-cast and pre-stressed concrete, shotcrete, pumped concrete and volumetric concrete.*

*One of the primary target markets for EdenCrete® products is improving the performance of concrete used in the construction and maintenance of concrete roads, bridges, ports, airports, and other infrastructure, particularly where it is subject to heavy wear, freeze/thaw weather conditions, heavy snow falls, and/or high levels of added salt or de-icing chemicals.*

*Since 2015, EdenCrete® products have been sold in the USA and more recently also in Australia and a growing number of other countries. They have successfully and repeatedly delivered a wide range of benefits when incorporated into concrete that is used in many different applications, including low-rise, medium-rise and high-rise building construction, roads and bridges, ports/marine/coastal applications, bus stations, carparks, water pipes, hardstand areas, waste transfer stations, warehouses, shotcrete applications, stadiums, and pre-stressed and pre-cast concrete products.*



**Gregory H. Solomon**

Executive Chairman

This announcement was authorised by the above signatory.

For any queries regarding this announcement please contact Aaron Gates on +618 9282 5889.