

# Engineering a silo storage solution

A CASE STUDY

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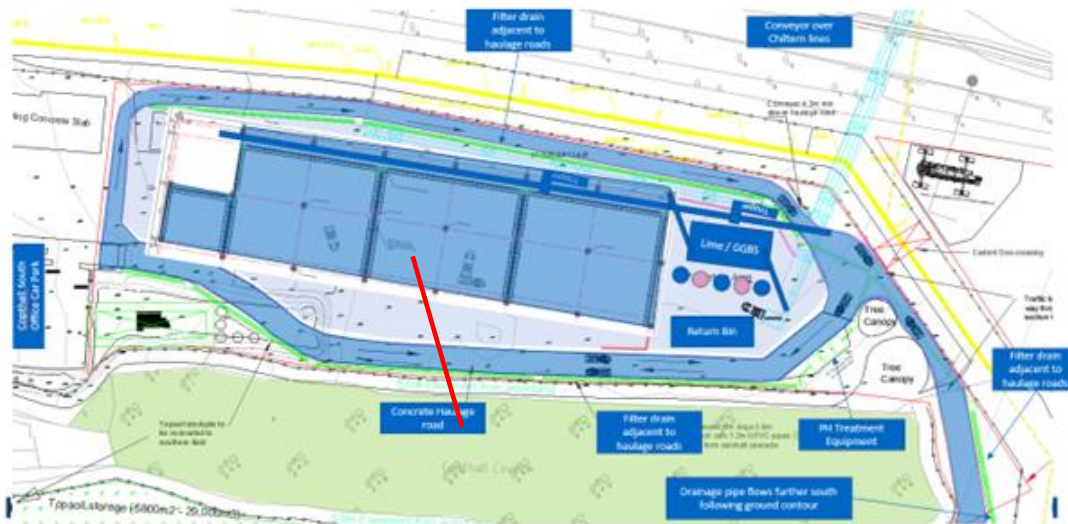
## LIME AND GGBS SILOS AND DOSING UNITS

### BACKGROUND

Skanska Costain STRABAG (SCSJV) has been contracted by High Speed 2 (HS2) to undertake the design and construction of sectors S1 & S2, which cover the length of the planned route from London Euston to Harvil Road (West Ruislip). In line with this scope of works, SCSJV are to construct the Northolt Tunnels running around 5 miles in length from West Ruislip to Green Park Way. These tunnels will be installed using 2No. Tunnel Boring Machines (TBMs). The arisings from the TBMs will be transported away from the face via a conveyor system. This conveyor will run along the north side of the existing Chiltern Lines up to the Cophthall Area.

## BACKGROUND CONT'D/...

At the TBM face a foaming agent will be added to produce a suitable consistency of material that can be transported along the conveyor. As a side effect this foaming agent will increase the moisture content of the arisings and in this condition the material will not be suitable to be placed and compacted. To ensure the TBM arisings are suitable to be placed in either location the moisture content of the material will need to be reduced. SCS are therefore going to construct the Southern Treatment Area that will be used to treat the TBM arisings and reroute the material to the required final location.



PROPOSED LAYOUT OF THE SOUTHERN TREATMENT AREA (STA)

# HARGREAVES SCOPE OF WORK

SCS ENGAGES HARGREAVES INDUSTRIAL SERVICES TO DESIGN, SUPPLY, INSTALL, COMMISSION, MAINTAIN AND REMOVE LIME / GGBS SILOS AND DOSING UNITS TO THE REQUIRED SPECIFICATION

The design of the required silos and dosing units has to take into account the following key requirements:

## SYSTEM REQUIREMENTS

- The conveyor system within the STA will be setup to allow flexibility for treatment of the TBM arisings.
- There are several options and possibilities depending on the final placement location and the condition of the TBM arisings.
- Hargreaves must work closely with Rowa (Conveyor supplier and designer) to ensure the equipment is compatible and set up to accommodate the required mix levels.
- Within the Southern Treatment Area (STA) there shall be 3No. pug mills, 3No. GGBS Silos, 3No. lime silos and 3No. TBM arising storage bins. All this equipment will be surrounded by a perimeter haulage road that will service the site.
- The dosing units are expected to provide up to 6% of lime and (when used on the copthall Tunnel) the same percentage of GGBS. Following bulk field testing these percentages are more likely to be between 3% and 4% but if the equipment can provide up to 6% then this will ensure the equipment is more than capable.
- The lime / GGBS will be delivered with articulated lorries
- The delivery lorries will use the one-way haulage road system to park up near the silos and use compressed air to transport the materials into the silos
- Access is required to carry out regular maintenance on the silo and dosing units.





# THE SOLUTION

Hargreaves will design, source, supply, and construct a system to include Lime Silos, GGBS Silos and dosing units and all associated pipework, to interface with the associated conveyor scheme (supplied by others), which will treat the TBM arisings prior to arrival in its final placement area.

Our design considered all of the requirements detailed above, the most challenging being the eventual layout of the silo locations, allowing for interface with other equipment and access for maintenance over the duration of the operational phase.

Please note: The photographs below show typical silo structures and are not indicative of the final design for this project.



*Typical Silo set up with refill in operation*