



Dock Infill – Construction Method Statement

The below method statement provides a high-level approach to infilling of the Wet Basin Dock to facilitate construction of the new Wet Basin Hall for BAE Systems.

- Mobilisation
- Establish Site / Compound
- Complete appropriate pre-commencement surveys

Infilling Works

There are two potential sources of infill material, either crushed aggregate from land-based quarry or suitable marine dredged material.

The following outlines the infilling methodology based on each source. Infilling may be from a single source, or a combination of both.

Infilling Works based on Crushed Aggregate from Land Based Quarry.

- Infilling Works_(due to potential tidal constraints for marine navigation in the maintained channel it is anticipated that infilling works will be permitted 24 hours a day, 7 days a week)
- Install silt curtain and/or bubble curtain at entrance to Govan Basin (including a demountable section to allow passage of tug / barges into the basin area)
- Aggregate for infilling the basin will be loaded onto a barge / vessel at a separate facility
- Tug to tow barge to site with aggregate for infilling the basin.
- On arrival at the Govan Basin the demountable section of silt curtain will be opened to allow passage of the barge into the basin area and

reclosed once the barge has passed through and prior to discharge of infill material.

- A long reach excavator will be loaded onto the barge at the quayside and will initially place 4Nr. 0.5m thick layers of infill material totalling 2m deep over the soft layer of material in the basin working in a north to south direction. This material will be placed methodically in a 2m x 2m grid to stabilise the soft bed material. The long reach excavator will be fitted with a GPS machine control system for the accurate placement of the infill material
- In advance of the barge exiting the infill area of the basin a period of time will be accommodated to allow for a reduction in the level of suspended solids prior to the demountable section of the silt curtain being opened to allow the barge to exit and it will be reclosed once the barge has passed through.
- The above process will be repeated until the 2m thick stabilisation layer is complete.
- The bulk infilling works to the basin may continue to be infilled using barges and excavators or a self-discharging vessel.
- As the basin is infilled the available draft and under keel clearance for barges / vessels will reduce and infilling to a more localised location within the basin infill area will be necessary. This infilled material will be placed inside the silt curtain encapsulation area and placed to a level above MHWS, at periods of low tide this material will be dozed further south within the basin infill area until filling is complete
- Infilling of the wedge void behind the existing sheet pile wall forming the perimeter of the Govan Basin will be filled concurrent with the bulk infilling works (this may require local demolition of the existing cope beam and cutting down or extraction of sheet piles)
- Existing drainage discharging around the perimeter of the existing Govan basin will be collected by newly installed new carrier drain and



discharge will be via a number of new outfalls to be installed through the new piled wall

- Depending on final detailed design compaction of the infill material may be necessary above mid tide level. If this is necessary, it may be compacted in nominal layers using conventional rollers or using dynamic compaction such as Rolling Impact Compaction (RIC) / High Energy Impact Compaction (HEIC) / Vibro Compaction (VC)

Infilling Works based on suitable Marine Dredged Material (beneficial reuse marine dredged material)

- Infilling Works (due to potential tidal constraints for marine navigation in the maintained channel it is anticipated that infilling works will be permitted 24 hours a day, 7 days a week)
- Install silt curtain or bubble curtain at entrance to Govan Basin (including a demountable section to allow passage of tug / barges into the basin area)
- Subject to final methodology and material sources a berm of material may be placed towards the northern end of the dock infill area
- Aggregate for infilling the berm in the basin will be loaded onto a barge / vessel at a separate facility
- Tug to tow barge to site with aggregate for infilling the basin.
- On arrival at the Govan Basin the demountable section of silt curtain will be opened to allow passage of the barge into the basin area (bubble curtain will permit the vessel to sail through) and reclosed once the barge has passed through and prior to discharge of infill material.
- If a berm is required this material may be discharged from a split hopper barge by bottom dumping or a long reach excavator will be loaded onto the barge at the quayside and will place the material on the basin bed,

depending on the final height of the berm a temporary water discharge box weir may be installed for the infilling works

- The primary source of infill material may come from marine dredged aggregates using a Trailer Suction Hopper Dredger (TSHD) (recovery of this material is under a separate MS-LOT Licence)
- Again, depending on final methodology, a shallow layer of material may be placed over the existing basin bed material to cap it, this may be undertaken by a combination of rainbowing directly from the TSHD or discharged via a floating pipeline and spreader barge with a discharging nozzle circa 0.3m thick layers of infill material totalling up to 2m deep over the soft layer of material in the basin working in a north to south direction. This material will be placed methodically to stabilise the soft bed material. The spreader barge will be controlled by a mooring spread fastened to the existing bollards in the basin and fitted with a GPS machine control system for the accurate placement of the infill material
- The TSHD will subject to navigational constraints and harbour master approval either moor in the river channel or in an area within the basin that is not to be infilled.
- A temporary mooring spread will be installed along with the floating pipeline and the land side fixed pipeline
- Once the vessel is moored the floating pipeline will be connected to the TSHD and the dredged sand material discharged into the basin with excess pump water discharged through the silt curtain / bubble curtain or weir box
- As material builds up in front of the landside discharge pipeline the material will be dozed forward (north), and the pipeline extended as necessary to achieve the final levels
- Infilling of the wedge void behind the existing sheet pile wall forming the perimeter of the Govan Basin will be filled concurrent with the bulk



infilling works (this may require local demolition of the existing cope beam and cutting down or extraction of sheet piles)

- Existing drainage discharging around the perimeter of the existing Govan basin will be collected by newly installed new carrier drain and discharge will be via a number of new outfalls to be installed through the new piled wall
- Depending on final detailed design compaction of the infill material may be necessary above mid tide level. If this is necessary, it may be compacted in nominal layers using conventional rollers or using dynamic compaction such as Rolling Impact Compaction (RIC) / High Energy Impact Compaction (HEIC) / Vibro Compaction (VC)

Piling Works for New Quay Wall

To accommodate the construction of the new piled wall, the infill will temporarily extend beyond the plan footprint of the northern boundary of the proposed piled wall. It is proposed to construct the new piled wall from the newly placed infill material

- The piled wall is subject to detailed design but may consist of a combi tubular pile / infill sheet pile with tie rods connected back to a sheet piled anchor wall
- A temporary piling gate will be supported from a series of spud piles driven into the existing bed material using vibro or impact piling hammers and the piling gate positioned
- Once the pile gate has been successfully erected the first tubular pile will be pitched.
- The crane will then use a combination of a vibro and impact piling hammers to drive the pile to the final design level. The above procedure will be repeated until the first gate of tubular piles are

complete. The pile guide frame will then be removed and repositioned for the next gate of piles with the temporary spud piles extracted using the vibro piling hammer

- As the installation of the tubular piles progresses along the wall the crawler crane will pitch and drive the infill piles between the tubular piles using both Vibro and impact piling hammers.
- The tubular combi piles may require a rock socketed spigot pile at the toe drilled into the bed rock, this will be undertaken by rotary percussive piling rig with a down the hole hammer. Once the rock socket is drilled a steel spigot pile will be installed inside the combi tubular pile and into the rock socket and concreted into place.
- The anchor pile wall will be installed using a combination of vibro and impact piling techniques
- The tie rods will be installed from the front combi tubular piles to the sheet pile anchor wall
- Relieving platform piles between the front combi piled wall and the rear anchor wall will be installed using a combination of vibro and impact piling techniques
- The temporary over filled material to the north of the new piled wall will be excavated and recovered to land.
- The concrete capping beam will be constructed onto the combi tubular pile wall
- Following completion of the capping beam installation of quay furniture and fenders will commence
- Demobilisation