Pre-conference tour

The preconference tour will take in a visit to Butterley Reservoir, in the Marsden area, then continue on for lunch and a visit to the Standedge Tunnel.

Butterley Reservoir

Butterley Reservoir, completed in 1906, is situated at the foot of the Wessenden Valley and has three Yorkshire Water and two British Waterways reservoirs located upstream. The dam is a 34m zoned earth embankment with a puddle clay core and a crest length of 220m and it has a capacity of 1773Ml. The spillway and outlet structures are Grade II listed. Previous works have included a new ogee weir and grouting of old drawoff siphon, while a new spillway is required to safely pass the PMF.

Standedge Tunnel

Standedge Tunnel is the highest, longest and deepest canal tunnel in the UK, stretching for 5,029 metres (3.25 miles) through hard millstone grit. An engineering marvel worked on by Thomas Telford, the tunnel runs from Marsden in Yorkshire through to Diggle in Lancashire. There will be a 30-minute tunnel trip aboard a glass topped boat, while a guide explains all about the geology and history of the tunnel, as well as telling with tales of the folk who designed, built and later worked in the tunnel. Visitors will also have a chance to take a look around the visitors centre.
Tour A: Scammonden, Baitings and Boothwood

All these reservoirs are owned and operated by Yorkshire Water

**Baitings Reservoir** *(image from MMB)*

Baitings Reservoir forms the upper reservoir of a two-reservoir cascade for Yorkshire Water.

The mass concrete gravity dam structure, completed in 1956, is slightly curved in plan, giving a crest length of 470m and a maximum height of 51m.

The dam impounds the River Ryburn and retains a reservoir around 1km long, fed from a rough open moorland catchment, plus a small indirect catchment fed through the Manshead Tunnel.

**Boothwood Reservoir** *(image from Clifford Harrison)*

Boothwood Reservoir is the lowest in a group of four Yorkshire Water reservoirs.

The mass concrete gravity structure, completed in 1971, has a straight crest 350m long and maximum height of 48m.

The dam impounds the Booth Dean Clough and retains a reservoir around 1.5km long, fed by a small direct open moorland plus indirect inflows through scour and spills from the upper reservoirs.

**Scammonden Reservoir**

Scammonden Reservoir is a short distance downstream of Dean Head reservoir and was completed by 1970. It is formed by a rockfill embankment with upstream sloping clay core. It is up to 76m high and 625m long and the crest carries the M62 motorway across the Pennines.

The reservoir has a bellmouth overflow weir and extensive instrumentation was installed at the time of construction.
Tour B: Holme Valley Reservoirs (Riding Wood and Brownhill)
Both these reservoirs are owned and operated by Yorkshire Water

**Riding Wood Reservoir** *(image from MMB)*

Riding Wood Reservoir, completed in 1878, is the uppermost of the cascade on Ramsden Clough, with Ramsden Reservoir extending to the dam toe.

The dam comprises a zoned earthfill embankment with clay core and is 175m long.

In 1987 the side channel overflow capacity was increased and an ogee weir installed.

A new offline spillway was recently constructed.

**Brownhill Reservoir**

Brownhill Reservoir is the lowest reservoir on Ramsden Clough and impounds water against the downstream toe of Ramsden reservoir.

The earthfill embankment dam, completed in 1932, is zoned with a clay core. It has a 200m long crest and has a maximum height of 28m.

The original overflow weir was straight, with a side discharge which turned 90 degrees in a tumble bay, but supplementary works were added in 1948/49, comprising a 6 foot diameter culvert running off the back of the tumble bay.
Tour C: Agden and Dale Dike

Both these reservoirs are owned and operated by Yorkshire Water

**Agden Reservoir** *(image from Clifford Harrison)*

After the failure of Dale Dike dam in 1864 Hawksley and Son were appointed to take over the Agden dam. Design changes were made and the lowest draw off, already constructed, was sealed with concrete. The dam was completed in 1869.

The dam is a 27.5m high, 460 m long earthfill embankment with clay core. The downstream face has an 18m wide berm, 18m below the crest of the dam. Spillway and wave wall improvements were recently undertaken at this site.

**Dale Dike Reservoir** *(image from Clifford Harrison)*

The new Dale Dike dam was completed in 1875 and is 300m upstream of the original dam, which failed in 1864. It comprises an earthfill embankment with a puddle clay core and a 275m long crest. There is a 1.2m high masonry wave wall along the crest, while the downstream face has two 18m wide berms.

The overflow and waste water channels are constructed in dressed masonry. A cast iron bridge along axis of the dam acts as a hydraulic control during large flood events. The lower berm has recently been cleared of mature woodland, while mitre and berm drainage has also installed.
Tour D: Winscar, Langsett and Underbank

All these reservoirs are owned and operated by Yorkshire Water

**Winscar Reservoir** *(image from Arup)*

Winscar Reservoir, completed in 1975, is situated at the head of the River Don and supplies water to Dewsbury and Heckmondwike. It has a 53m high rockfill embankment dam with a 520m long crest and retains 8300Ml of water.

In recent years a geomembrane has been added to the asphaltic waterproof membrane on the upstream face.

**Langsett Reservoir** *(image from Arup)*

Langsett Reservoir, with a capacity of 6401 Ml, is situated at the head of the Little Don and supplies water to Sheffield. Its dam, completed in 1904, is a 32m high zoned earth embankment with a puddle clay core and a 340m long crest.

Recently new mitre, berm and toe drainage was installed and the spillway improved by lowering the tumblebay elevation by approximately 2.0m over the lower 25% of the weir length and with slots being cut beneath the arches of the bridge.

**Underbank Reservoir** *(image from Clifford Harrison)*

Underbank Reservoir, completed in 1907, is situated downstream of Langsett Reservoir and supplies compensation water to the Little Don. Historically this was used for cooling purposes at the major steel works in Stocksbridge. It has an 18m high zoned earth embankment with a puddle clay core and a 440m long crest, and has a capacity of 2955Ml.

In 1996 overflow works were completed which increased the spillway capacity in the upper part of the spillway channel. The works also included a reinforced grass protective embankment parallel to the spillway, reinforced grass on the toe of the embankment, raising of the core, works to make the wave wall continuous, and instrumentation, drainage and uplift protection measures.