



Swellands and Black Moss Reservoirs Undertaker Requirements

Basis for a Permanent Access Track

Contents

Executive Summary	2
1. Introduction	3
2. Reservoir Background and Legal Requirements	3
3. Requirement for Reservoirs in the Public Interest	5
4. Consideration of Alternatives	6
5. Requirement for a Permanent Access Track	8
6. Access Track Design	9

Executive Summary

The Canal & River Trust ('the Trust') owns and operates 72 large raised reservoirs in England, which fall under the Reservoirs Act 1975. Two of these reservoirs are Swellands and Black Moss, operated on behalf of Yorkshire Water for public supply.

Swellands and Black Moss Reservoirs are sited within the Dark Peak, with no vehicular access. Pedestrian access is afforded via the Pennine Way and informal tracks over exposed moorland, over a distance of 2.5km from Brun Clough Reservoir. Following lessons learned from the Toddbrook Reservoir incident in 2019, access constraints mean that the inspection, maintenance and emergency procedures for the reservoirs are in need of improvement.

The Trust seeks consent to construct a permanent access track from the A62 to Black Moss and Swellands reservoirs to improve the inspection, maintenance and emergency procedures for the reservoirs.

Section 2 of this document explains the geographic and legal setting of the reservoirs, as well as the requirements for ongoing inspection and maintenance. Regular inspection and planned maintenance are required, as well as reactive maintenance identified through regular inspection.

The importance of continuing to operate the reservoirs in the public interest is explained in Section 3. The reservoirs are operated on behalf of Yorkshire Water under the Scammonden Agreement, with the water resource utilised for public supply. In return for providing the water for public use, the Trust receives a feed to the Huddersfield Narrow Canal at Marsden. The continued provision of adequate water resource for the Huddersfield Narrow Canal would be endangered through discontinuing the reservoirs, with the benefits of continued operation explained in Section 3 as follows:

- Industrial heritage (in particular the Standedge Tunnel);
- Amenity, recreational and wellbeing benefits for canal and towpath users;
- Economic benefits through boating business and visitor attractions;
- Increased property values.

The reasons behind the construction of a permanent access track being the only feasible solution in the public interest are explained in Sections 4 and 5. The following alternatives to a permanent access track have been considered and discounted:

- Reservoir discontinuance;
- Use of low ground pressure all-terrain vehicles;
- Temporary access track for major civil engineering works;
- Helicopter access.

The reservoirs are required in the public interest, therefore discontinuance is not possible. To allow adequate access to facilitate safe ongoing inspection and maintenance, as well as emergency access, the only feasible option is to install a permanent access track.

The Trust recognises the sensitivities of the proposal, and seeks to mitigate the impacts, and provide ecological compensation as a result of permanent loss of Blanket Bog. Section 6 of this report explains the mitigating measures which have been incorporated within the design as follows:

- Lowest impact route selected;
- Lightweight bog mat design solution over the most sensitive area surrounding Black Moss and Swellands Reservoirs;
- Free-draining stone track design so as not to affect the natural hydrology of the peat;
- Minimised stone depth to mitigate visual and ecological impacts;
- Minimised track width to accommodate vehicles during operation, with temporary measures to accommodate larger plant and vehicles during construction.

1. Introduction

The Trust owns and operates four reservoirs in the vicinity of Swellands Reservoir within the Dark Peak. The reservoirs are situated on exposed moorland over 200m above residential areas. There is currently no vehicular access to the reservoirs, and pedestrian access is via difficult terrain which can often become impassable due to poor weather and low visibility. Access is required to operate the reservoirs, for inspection, regular maintenance, large works in the interest of safety to the structures and for emergency access.

The Trust believes that there are reasons in the interest of public safety to construct a single access route to service these reservoirs with provision made to access individual structures from a suitable hub location in the region of Black Moss' western dam.

2. Reservoir Background and Legal Requirements

2.1 Reservoir Setting and Background

The reservoirs are in the Dark Peak area of the Peak District National Park, within an area designated as a Special Area of Conservation (SAC) and Special Protection Area (SPA) under European Law.

The reservoirs are regularly inspected and monitored to ensure there is a low risk that future failure could occur. Rapid access to the reservoirs is required to implement the well-developed and understood emergency draw down procedures. Providing reasonable permanent access to facilitate monitoring, maintenance, necessary remedial work and occasional improvement interventions will significantly improve the management and operation of the reservoirs.

2.1.1 Black Moss Reservoir

Black Moss is the highest of the Trust's reservoirs at over 400m AOD with a capacity of 58,190m³, built in 1806 and formed by two impounding dams.

2.1.2 Swellands Reservoir

Swellands Reservoir has a capacity of 246,300m³ impounded behind a 190m long dam wall about 9.6m high. The original dam at Swellands failed in 1810 when the construction was nearing completion, killing 6 people.

2.2 Background to the Reservoirs Act 1975

The Canal & River Trust is the 'Undertaker' (owner or main operator) for 72 regulated reservoirs, which are all within England.

Reservoirs are subject to stringent statutory control under the Reservoirs Act 1975, intended to assure the safety of the public below dams. The Reservoirs Act applies to all reservoirs classified as 'large raised reservoirs', i.e. those that hold a volume of water of 25,000m³, or more, cubic metres above natural ground level. The Flood and Water Management Act 2010 amendments to the Reservoirs Act introduced new arrangements for reservoir safety, based on risk rather than the size of the reservoir.

The Environment Agency is the enforcement authority for reservoirs in England. Reservoirs Act offences are primarily strict liability criminal offences. This means that for an offence to be committed, the mere fact that the non-compliance occurred is sufficient, rather than there being a need to prove wilful default and no reasonable excuse.

As the "Undertaker", the Trust is ultimately responsible for ensuring the structural integrity of the structures associated with the reservoir and where required by legislation, needs to ensure panel engineers are

employed to complete the necessary monitoring, supervision, inspections and design and supervision of new reservoirs or repair works to existing reservoirs.

Panel Engineers

Panel Engineers are qualified civil engineers appointed to one of the following four panels under the Act by the Secretary of State in consultation with the Institution of Civil Engineers.

Inspecting Engineers

An inspecting engineer is appointed to inspect a high risk reservoir, identify and make recommendations to be taken in the interests of safety, and in their role as a Qualified Civil Engineer (QCE) they are employed to supervise and certify the completion of measures recommended in the interests of safety in an inspection report.

Inspections are required at least every 10 years, or earlier if recommended in a previous inspection report, or when requested by a supervising engineer, or within 2 years of a final construction certificate being issued for the reservoir.

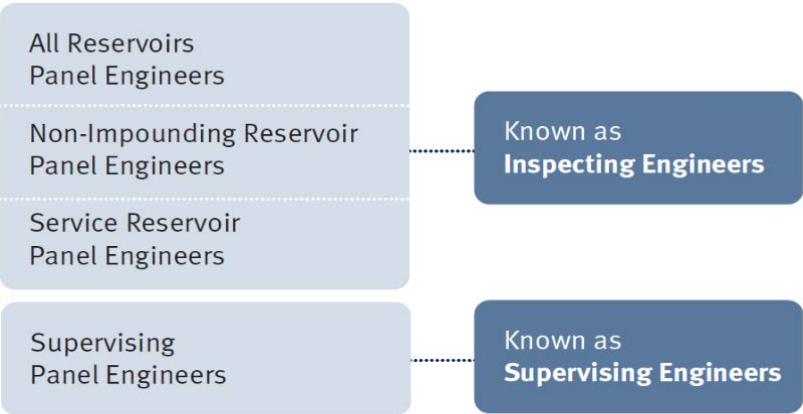
If an Inspecting Engineer recommends measures to be taken in the interests of safety, the Trust, as the Undertaker, is legally responsible for making sure these are carried out within the stated timescales.

Construction Engineers

A construction engineer is appointed to supervise the design and construction of a new reservoir or modification of a reservoir such that it increases or decreases its capacity.

Supervising Engineers

At all times when a high risk reservoir is not under the supervision of a construction engineer, a supervising engineer shall be employed to supervise the reservoir and keep the undertakers advised of its behaviour in any respect that might affect safety. The supervising engineer must supervise the reservoir in accordance with the Reservoirs Act. This includes giving notice to the Undertaker of things which might affect the safety of a reservoir, monitoring matters directed in any current inspection or safety report and monitoring the compliance of the Undertaker.



*Inspecting Engineers can also act
as supervising engineers*

3. Requirement for Reservoirs in the Public Interest

3.1 Public Supply – Scammonden Agreement

Swellands Reservoir, owned by the Trust, is one of the reservoirs that is operated under the Scammonden agreement, with the agreement relying on the combined Black Moss and Swellands catchment areas (Black Moss spills into Swellands and is therefore inherent in the agreement which requires continued overflow from Black Moss). The “Scammonden Agreement” is an arrangement between Canal & River Trust (the Trust) [then British Waterways Board] and Yorkshire Water Services (YWS) [then Borough of Huddersfield] which documents the exchange of water between both parties. The agreement was that British Waterways Board would use their reservoirs at March Haigh, Redbrook, Tunnel End and Swellands to support public water supply in exchange for a constant supply of water from the Borough of Huddersfield to the Huddersfield Narrow Canal at Marsden. This arrangement allows the effective sharing of water resources, to ensure statutory public water supply requirements and statutory navigation duties can be met, by the respective organisations.

The supply to the canal at Marsden from the Scammonden agreement equates to a total of 1273 million litres per year, with a maximum abstraction rate of 163.6 million litres in any consecutive period of 28 days and 9.1 million litres in any one day. The feed received is the principal source of supply to the canal summit, constituting 75% of the overall supply of resource.

Without Swellands reservoir, being available, i.e. if it were to be discontinued, then the Trust would be in breach of this agreement and this would adversely impact on Yorkshire Water’s public water supply duties. The associated impact of discontinuance of Swellands Reservoir by the Trust would risk the continued provision of water resource supply to the Huddersfield narrow canal at Marsden from Yorkshire Water. This would in turn threaten the Trust’s statutory duty to maintain its navigational duty on the Huddersfield narrow canal, as this is its main source of supply.

3.2 Public Interest – Canal Feed

As explained above, the deed at Marsden provided under the Scammonden Agreement is vital for water resource of the Huddersfield Narrow Canal. If Swellands and Black Moss were to be discontinued, not only would the public supply to Yorkshire Water be affected, in turn, the feed to the canal at Marsden would be compromised, putting the future of the Huddersfield Narrow Canal at risk.

The value of the waterways is now appreciated to be wider than its industrial past and operational functionality, providing as it does amenity, recreation, environmental, cultural and health and wellbeing benefits for the many people who use and live near the Trust’s inland waterways. Nationally, the Trust estimates that 650 million visits are made to its 3,000 kilometres of waterways each year.

The Huddersfield Narrow Canal is one such waterway and, to a large extent, depends on the water from Swellands Reservoir to maintain its navigational status and for it to remain an attractive destination for those who live alongside it. The Canal itself is 32 km long, stretching from Huddersfield in the north to Ashton-under-Lyne in the south. Along its length, the Trust estimates that nearly **127,393** people live within 1km and many more visitors come from further afield to experience the benefits offered by the Canal.

A key feature of the Huddersfield Narrow Canal is Standedge Tunnel. Over 200 years old, it is the longest canal tunnel in Britain, stretching over three miles deep beneath the Pennine hills. Having been closed in the mid-1940s, the tunnel was restored and reopened in 2001.

The Trust estimates usage at two key points along its length as follows:

- Nearly 25,000 visits are made to Standedge Tunnel each year. The estimated Gross Value Added from recreational visits to Standedge Tunnel is approximately £90,000 per annum;
- At least 30,000 visits to the Huddersfield Narrow Canal per annum.

Research commissioned by the Trust, using techniques delineated in HM Treasury's Green Book, estimates that each visit to a Trust waterway has a wellbeing value of approximately £6 per person, although this is likely to be a significant underestimate of the value of visiting specific heritage attractions such as Standedge Tunnel. Using this figure, the usage observed at Standedge and Huddersfield yield a wellbeing value of at least £330k per year. The wellbeing value of usage of the canal along its entire length is likely to be many times greater than this. For example, the canal is popular for recreational usage particularly walking and cycling with some large increases in usage recorded on much of the network during Lockdown. Canal towpaths are popular routes for commuting too.

The value of the Canal is not limited to the benefit experienced by users. Work carried out by the London School of Economics, which was commissioned by the Trust in 2018, demonstrated that properties within 100m of a Trust waterway command a property premium of 4-5% when compared with statistically similar properties elsewhere. Considering the approximately 15,000 properties within 100m of the Huddersfield Narrow, this yields an indicative amenity value of as much as £124.5m created by the existence of the Canal¹.

Similarly, the industrial heritage found along the canal has a latent value. A recent stated preference study carried out on behalf of the Trust explored the average amount people might be willing to pay to preserve the canal heritage (specifically to prevent stop degeneration and loss of buildings and other infrastructure). On a similar stretch of canal (Aire and Calder) this value was calculated to be between £6.50 and £7.50 per person per year. This could total £1,472,000 to £1,700,000². Once again, this figure is likely to be an underestimate of the true heritage value of the Huddersfield Narrow. The study did not consider the heritage value of notable heritage sites, such as Standedge Tunnel, and instead reflects the value of more day-to-day features such as locks, bridges and associated infrastructure.

It is essential water levels are maintained in the canal network to ensure navigation of commercial and leisure traffic. The Huddersfield Narrow Canal is prone to low water levels. Analysis of the Trust's boat sightings database estimates that 400 boating visits are made each year to the Huddersfield Narrow³. There are 17 mooring sites along the Huddersfield Narrow and four businesses who rely on navigation of the canal for their income. This boating activity results in tourism expenditure and jobs creation within the local economy that would almost certainly be lost if water levels were too low to permit navigation.

Despite its man-made origins, the Huddersfield Narrow is an invaluable environmental asset for those who live nearby and who visit it. The canal itself is designated a SSSI for much of its length. The Huddersfield Narrow provides easily accessible green and blue space for the 226,500 people who live nearby⁴, providing opportunities to spend time in and appreciate the natural environment.

The benefits of the Huddersfield Narrow aren't confined to easily observable benefits. Others include utilities buried in the towpath, flood mitigation and provision of water.

4. Consideration of Alternatives

4.1 Alternatives to a Permanent Access Track

The Trust has considered a number of alternatives for the future of Swellands and Black Moss Reservoirs, concluding that continuing to operate the reservoirs with a permanent access track is the only feasible option in the public interest.

4.1.1 Reservoir Discontinuance

Discontinuing the reservoirs has been considered, however as explained in Section 3, the reservoirs are required in the public interest. Discontinuance would have a direct effect on water supply to the Colne

valley area as the water from these reservoirs provides a water feed that forms an agreement between Yorkshire Water and the Trust (The Scammonden agreement).

4.1.2 Low Ground Pressure All-terrain Vehicles

The Trust has considered the use of alternative vehicles such as a Hagglund/Softtrack which is used elsewhere in the area for moorland maintenance. Regular use of any vehicle across the moor would form informal tracks, and all-terrain vehicles would not satisfy all access requirements nor provide emergency access for pumps and plant. A large variety of vehicles are needed for ongoing inspection and maintenance tasks: cars, vans and trailers and light goods vehicles for minor inspection and maintenance; moving materials such as masonry, cement, sealants, replacement valves, oils, tools, waste vegetation and debris for disposal; earth moving equipment; lifting equipment and welfare facilities. Irregular tracks for this type of equipment will cause impact which could not be reinstated, causing greater damage than a well-designed access.

4.1.3 Helicopter Access

The Trust considered use of helicopters for the upcoming major civil engineering works, emergency access and ongoing operation and maintenance. Due to helicopters being unable to fly in inclement weather, they would be unavailable when the current pedestrian route is impassable. The landing area required would need to be large and in the SAC/SPA. Helicopter access would therefore not be suitable for ongoing inspections.

Weather constraints mean that helicopters would be infeasible for lifting in materials, particularly concrete, which is required for the upcoming civil engineering works. Furthermore, commercial helicopters are unable to lift the size of plant required for civil engineering works at the reservoirs. Helicopter access is therefore unsuitable for ongoing maintenance.

Chinooks could be mobilised in an emergency situation, such as at Toddbrook Reservoir, however these were only mobilised to transport sandbags at Toddbrook, and the pumping equipment was brought in by road. Without a track to the reservoir dams, the time taken to implement procedures and transport pumps, generators, fuel, cables, hoses etc. in the event of emergency would undoubtedly be delayed.

4.1.4 Temporary Access Track

A temporary access track was installed in 2006/07 to facilitate major civil engineering works to Swellands Reservoir. Installing a temporary access track to complete major maintenance works intermittently does not allow plant and vehicle access in an emergency situation, and does not address the issues the Trust faces with regular inspection and maintenance which are required to ensure the safety of the reservoir.

4.2 Alternative Permanent Track Design Solutions

4.2.1 Alternative Routes

The proposed route is a revision of the route utilised for the temporary access track constructed in 2007/07. A thorough assessment of alternative routes was completed in 2006 and agreed with Peak District National Park Authority and Natural England. A map extract of the six access options from the 2006 the Penny Anderson Associates Appropriate Assessment is set out in Figure 1.

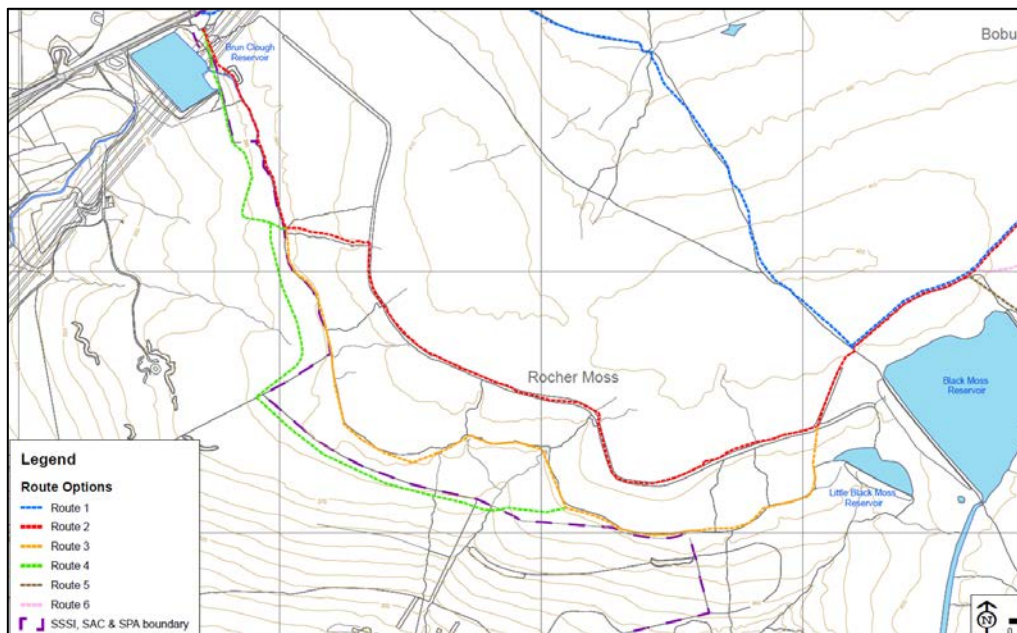


Figure 1 – Alternative Routes assessed in 2006

Route 2 shown in Figure 1 was agreed to be the route with the lowest impact. The same route is proposed for the permanent track, with the exception of the start of the route which will utilise an existing track to the west of Brun Clough Reservoir as opposed to route 2 was used in 2007. This alternative will mitigate visual and ecological impacts, and reduce the likelihood of unauthorised access.

5. Requirement for a Permanent Access Track

Given the requirement for the reservoirs in the public interest as described in Section 3 and the lack of suitable alternatives as described in Section 4, a permanent access track is required for the Trust to improve the management of the reservoirs and facilitate emergency access.

The Trust has learnt many lessons from the Toddbrook Reservoir (August 2019) incident. Consider how challenging a similar response would be without appropriate access. The access to Swellands and Black Moss reservoirs must be able to facilitate a similar response.

Following the Toddbrook incident where the partial collapse of the concrete slabs forming the auxiliary spillway chute led to the evacuation of over 1,500 local Whaley Bridge residents, the Environment Agency have published an advice note which provides recommended actions for reservoir undertakers and engineers. The recommendations include improvement to inspection, supervision, operation and maintenance activities. The Environment Agency is reviewing current legislation in line with the findings, and working with Defra to turn the recommendations into a full action plan for implementation.

To satisfy the legal requirements under the Reservoirs Act, the Trust must complete regular inspections and regular preventative maintenance. The current situation without vehicular access presents difficulties in achieving this, and puts the Trust's operatives and inspectors at risk. Furthermore, the lack of mobile phone connectivity and emergency vehicle access adds to the impracticality of requiring reservoir surveillance inspectors to access the reservoirs on foot, making use of the Pennine Way and informal footpaths across exposed moorland.

6. Access Track Design

6.1 Route

The permanent access track will begin at an existing access from the A62 to the West of Brun Clough Reservoir, passing below the reservoir on an established stone track to Point A. From Point A, in informal existing track will be formalised with stone to the existing gate a point B. This section of the track differs from the 2006/07 temporary route, to remove the need to cut back the bank of Brun Clough Car Park, reduce the amount of stone required and avoid an area of deep peat outside the SAC/SPA.

From Point B, most of the stone track will follow a disused feeder channel between Black Moss Reservoir and Brun Clough Reservoir, formalising the existing occasional light vehicle access arrangement. The stone track will terminate at point E shown in Figure 2.

Permanent access to Swellands Reservoir head wall will be achieved by a bog mat track from Point E. In 2007 the track used part of the Pennine Way as a temporary access route, however it is proposed to install the permanent bog mat track within the Trust's land ownership, away from the Pennine Way to avoid interface. Uneven ground will be regulated with stone to provide a level base for the bog mats, with a geotextile layer to separate the stone from the existing vegetation and peat.

From the intersection of the track with the Pennine Way at the eastern Black Moss dam, the bog mats will follow the previous route to the edge of Swellands Reservoir (Point F), with access into the reservoir for heavy construction plant and materials. A lighter duty track will 'dog-leg' to the north of Swellands on a previously un-used route over deep peat to provide ongoing inspection and maintenance access. Construction plant for the auxiliary spillway works will use this section of track between Points F and G on a once in and out basis. Temporary construction access to the main spillway and dam embankment is expected to be achieved by running on an access constructed within the reservoir bed, ramping in at the same point used previously (Point F).

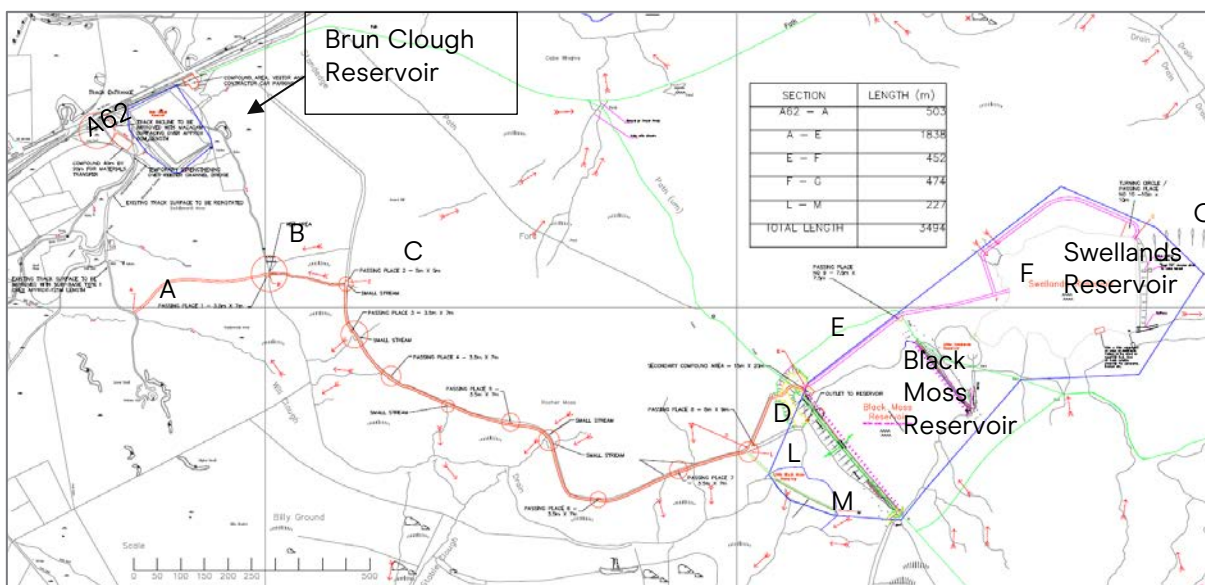


Figure 2 - General Arrangement of Proposed Track

6.2 Design Principles

The Trust's safety responsibilities are the priority although where possible this project will minimise the impact on the protected flora and fauna that occur in this area. Where damage to the protected areas cannot be fully mitigated, compensation will be provided in line with the Habitats Directive.

The design has been developed according to the following principles:

- Improve the operation, maintenance and emergency procedures for the reservoirs;
- Minimise impact on areas of deep peat, blanket mire, protected species & designated areas;
- Deliver an environmentally sensitive project in line with the Habitats Directive

The Trust has engaged Penny Anderson Associates to assess the impacts of the scheme and to advise on necessary mitigation measures throughout design development to ensure coherence of the protected site.

6.3 Specification

The route from the A62 to point E will be designed to be capable of transporting the vehicles required for the Trust to ensure the safety of Black Moss and Swellands Reservoirs, and will therefore be of gritstone construction. The stone depth will vary between 300mm and 540mm dependent on ground conditions.

Access within the SSSI/SAC/SPA should be considerate of the natural environment. The route within the leat between Point B and Point E is of low ecological value. However, beyond Point E is the most sensitive area due to the deeper peat and visibility from the Pennine Way, therefore from Point E the track will be constructed from a single layer of timber bog mats in the permanent state, with an additional layer of bog mats installed between Points E and F temporarily for the proposed reservoir safety construction works. A lesser grade of track has been specified beyond point E with the intention for large heavy deliveries being split at point E, before delivery to work area.

Future temporary upgrades of the sections beyond point E, will be designed in partnership with the Trust's contractors so that future short-term access is appropriate for the vehicles required to complete future construction tasks. An additional (second) layer of bog mats to facilitate construction is anticipated between Points E and F. Temporary access will also be needed to Little Black Moss Reservoir and Little Swellands Reservoir, shown edged green on the Location Plan drawing ARC_HML_ZZ_ZZ_Z_DR_CH_0037.

The track design basis and specification is fully detailed in Arcadis' 'Highways Technical Note'. Key parameters for the stone section between Points A and E are as follows:

- Granular materials ensure the track is free draining, without the need for positive drainage so as not to affect the hydrology of the peat. Culverts and pipes have been specified to areas where existing streams cross the proposed track;
- The width of the track is 4m which is the minimum width to allow all vehicles to utilise the track without detriment to the edges. The geometry of the track between Points A and E has been designed to accommodate 7.5T vehicles, based on the operational requirements. During construction, larger vehicles will use the track and road plates will be required to protect the surrounding ground from vehicle over-run. This ensures the track is no wider than it needs to be in the permanent state;
- The depth of the stone track is 300mm-540mm. Thickness has been reduced from the design thickness of up to 800mm by use of a geogrid within the construction and agreement of increased maintenance. This ensures; the least impact on the peat, lowest visual impact and reduced material usage
- 8 no. permanent passing places are specified along the route;

- Track construction generally to sit on top of the existing ground profile, with the exception of the start of the track at Point A, where cut will be required to provide a safe interface between the existing and proposed track;
- Locally quarried rock of similar PH to the site;
- The design life will be 25 years (with maintenance);
- The maximum load will be 28 tonnes on the permanent section A62 to point E;
- After construction the number of vehicle passes will be 2 inspection vehicles (4x4 vehicle) per week 3 tonne, monthly maintenance vehicle up to 7.5 tonnes;
- No materials will be taken off site;
- The existing gate at Point B will be utilised to prevent unauthorised vehicle access from the A62. A new gate will be installed to prevent unauthorised access between Points D and E.

The permanent design specification between Points E and G will be as follows:

- The maximum load on the removable bog mat track section will be 7.5 tonne in the permanent case, with increased specification during construction;
- After construction the number of vehicle passes will be 3 inspection vehicles (4x4 vehicle) per week 3 tonne, monthly maintenance vehicle up to 7.5 tonnes;
- No materials will be taken off site;
- Permanent turning circle at Point G and passing place at interface with Pennine Way.

¹ Average property price in Tameside = £167,793 (Source: [Rightmove](#)) 5% = £8,300 uplift x 15,000 properties = £124,500,000

² To estimate overall values for the maintenance/restoration of the heritage of each site, we aggregate average WTP values from the survey to the relevant population (ONS population estimate for Tameside (Ashton, Stalybridge) = 226,500 ([Nomis](#))).

³ This figure is based on average lock usage on the canal using lock gate sensor telemetry

⁴ ONS population estimate for Tameside local authority (including Ashton and Stalybridge)